

Appendix B5

Technical Information Report

Prepared by AHBL, Inc.

April 2021

Technical Information Report

PREPARED FOR:

Issaquah School District No. 411
565 NW Holly Street
Issaquah, WA 98027

PROJECT:

Issaquah High School and
Elementary School
4227 228th Avenue SE,
Issaquah, WA 98029
2180412.10

PREPARED BY:

Charles Stout, PE
Project Engineer

REVIEWED BY:

Todd Sawin, PE, DBIA, LEED AP
Principal

DATE:

September 2020
Revised February 2021
Revised April 2021

I hereby state that this [Technical Information Report](#) for [Issaquah High School and Elementary School](#) has been prepared by me or under my supervision and meets the standard of care and expertise that is usual and customary in this community for professional engineers. I understand that [City of Issaquah](#) does not and will not assume liability for the sufficiency, suitability, or performance of drainage facilities prepared by me.

Technical Information Report

PREPARED FOR:

Issaquah School District No. 411
565 NW Holly Street
Issaquah, WA 98027

PROJECT:

Issaquah High School and
Elementary School
4227 228th Avenue SE,
Issaquah, WA 98029
2180412.10

PREPARED BY:

Charles Stout, PE
Project Engineer

REVIEWED BY:

Todd Sawin, PE, DBIA, LEED AP
Principal

DATE:

September 2020
Revised February 2021
Revised April 2021

Table of Contents

Section	Page
1.0 Project Overview	1
1.1 Proposed Project Description	1
2.0 Existing Conditions Summary and Site Analysis	2
2.1 Site Survey	2
2.2 Soils Report.....	2
3.0 Permanent Stormwater Control Plan	3
3.1 Existing Site Hydrology	3
3.1.1 Off-Site Drainage to the Property.....	3
3.1.2 Creeks, lakes, ponds, wetland, ravines, gullies, steep slopes, springs, and other environmentally sensitive areas on or down gradient of the property.	3
3.1.3 Is the project located in an aquifer recharge area or wellhead protection area, as defined by the King County Health Department, the Environmental Protection Agency, or the County?	3
3.1.4 Are there any specific requirements included in a basin plan for the area?	3
3.1.5 Are there drains, channels, and swales within the project site and immediately adjacent?	3
3.1.6 Points of exit for existing drainage from the property.	4
3.1.7 Are there any known historical drainage problems such as flooding, erosion, etc.?	5
3.2 Developed Site Hydrology	5
3.2.1 Summary of Minimum Requirements.....	5
MR 1 – Preparation of Stormwater Site Plans	6
MR 2 – Construction Stormwater Pollution Prevention.....	6
MR 3 – Source Control of Pollution.....	6
MR 4 – Preservation of Natural Drainage Systems and Outfalls.....	7
MR 5 – On-Site Stormwater Management.....	7
MR 6 – Runoff Treatment	8
MR 7 – Flow Control	9
MR 8 – Wetlands Protection	9
MR 9 – Operation and Maintenance	10
4.0 Construction Stormwater Pollution Prevention.....	10
5.0 Site Plans	10
5.1 Offsite Analysis	10
5.2 Creek Protection	14

5.3	Special Reports and Studies.....	14
5.4	Other Permits	15
5.5	Operations and Maintenance.....	15
5.6	Declaration of Covenant for Privately Maintained Flow Control and Treatment Facilities	15
5.7	Declaration of Covenant for Privately Maintained Onsite Stormwater Management BMPs	15
5.8	Bond Quantities.....	15
6.0	Facility Sizing	15
6.1	Runoff Treatment	16
6.2	Flow Control	16
6.3	Conveyance Sizing	16
7.0	Wetland Protections	16
8.0	Operation and Maintenance	17
9.0	Utilities	17
10.0	Conclusion.....	17

Appendices

Appendix A

Exhibits

A-1.....	Vicinity Map
A-2.....	Existing Conditions Map
A-3.....	Developed Conditions Map
A-4.....	FEMA Flood Map
A-5.....	Critical Aquifer Recharge Map
A-6.....	Downstream Drainage Path Map
A-7.....	Flow Chart for Determining Requirements of New Development
A-8.....	Project Screening for Stormwater Review
A-9.....	On-Site Stormwater BMPs

Appendix B

Stormwater Calculations

B-1.....	Developed Basin Map
B-2.....	Predeveloped Basin Map
B-3a.....	Southwest Subbasins – Historic Conditions
B-3b.....	Southwest Subbasins – Developed Conditions
B-4.....	WWHM Treatment Calculations
B-5.....	WWHM Flow Control Calculations
B-6.....	R-Tank Maintenance Row Sizing
B-7.....	BioPod DOE GULD
B-8.....	Storm and Sanitary Sewer Conveyance Analysis
B-9.....	Overflow Conveyance Analysis

Appendix C

Supplemental Reports

C-1.....	Subsurface Exploration, Geologic Hazard, and Preliminary Geotechnical Engineering Report
C-2.....	Landslide Hazard Assessment
C-3.....	Critical Area Study & Wetland Mitigation Plan

Appendix D

Operation and Maintenance Manual

1.0 Project Overview

The Issaquah High School and Elementary School project proposes to develop tax parcels 1624069001, 1624069029, and 1624069031. Tax parcel 1624069001 previously housed The City Church while the other two parcels are currently undeveloped with mostly forested cover. Project improvements include a new high school building, new elementary school building, parking areas, sports fields, tennis courts, playgrounds, retaining walls, hardscape surfaces, and supporting underground utilities. The project site is located in the northeast quadrant of Section 16, Township 24 North, Range 6 East, in the City of Issaquah, King County, Washington. The site is bounded by 228th Avenue Southeast to the east and residential properties to the north, west, and south. Refer to Appendix A-1 for the project Vicinity Map.

This report demonstrates that the onsite stormwater design for this project meets the requirements of the Washington State Department of Ecology (DOE) 2012 Stormwater Management Manual of Western Washington as Amended in December 2014 (*SMMWW*) and the City of Issaquah 2017 *Stormwater Design Manual Addendum (ISDMA)*. The stormwater reports and plans included as part of this SDP permit submittal include stormwater design information; a more detailed version of the proposed storm systems will be provided as part of the future construction permit submittal. It is understood that this future construction permit review could provide additional comments.

Frontage improvements to 228th Avenue Southeast are located within the City of Sammamish, Washington. The full scope of the frontage improvements required for the project are currently being coordinated with the City of Sammamish. As part of the frontage permitting process, a separate Technical Information Report will be prepared and provided to the City of Sammamish. The report will demonstrate that the proposed stormwater design for the proposed frontage improvements meets the requirements of the City of Sammamish, *Sammamish Addendum to the 2016 King County Surface Water Design Manual (SAKCSWDM)* Revised 9/25/2019. A preliminary version of this frontage TIR will have been provided to the City of Issaquah as a reference.

1.1 Proposed Project Description

The proposed project improvements for Issaquah High School and Elementary School include two new school buildings, parking areas, a large parking garage, sports fields, tennis courts, playgrounds, a water system, a sewer system, stormwater drainage facilities, flow control facilities, and stormwater quality facilities. The center of the project site will be relatively flat, similar to existing conditions, with retaining walls along the east side of the property to transition to existing grades near the 228th Ave SE right-of-way. Existing native vegetation, with dense tree coverage, will be maintained along the project boundary to provide a buffer between the proposed school development and surrounding residential properties. Larger tree protection areas are also provided on the existing eastern slope of the property, along the private Providence Heights Loop, and around the existing wetland located on the southern end of the project site.

The water utility will form multiple loops through the project site with two proposed connections off the existing 228th Avenue Southeast water main and two additional connections to the existing 224th Lane Southeast water main; forming loops around both the proposed high school and elementary school buildings. The proposed sanitary sewer utility will connect to an existing on-site sewer manhole and discharge to the existing sanitary sewer main northwest of the project site. The interior of the proposed parking garage will drain to a proposed grinder pump where a proposed force main will discharge this runoff to the proposed sewer main north of the new high school building. The parking area on the proposed parking garage roof will discharge into the parking garage's roof drainage system and enter the proposed stormwater conveyance system.

The storm drainage facilities will be split into two separate onsite basins, Northeast and Southwest, to follow the existing drainage patterns of the project site. Onsite drainage facilities will consist of ACF Environmental R-Tank detention systems to provide flow control along with OldCastle BioPod Biofilter Underground structures to provide water quality treatment. Existing discharge locations of the Northeast and Southwest basins will be maintained with the development. A third, offsite drainage basin is proposed within the 228th Avenue Southeast right-of-way. This Frontage basin will be the ultimate discharge location of the onsite Northeast basin and is located within the City of Sammamish, outside of the City of Issaquah, and therefore has been designed per City of Sammamish stormwater design standards.

2.0 Existing Conditions Summary and Site Analysis

The existing site is approximately 40.8 acres in size, with frontage along 228th Avenue Southeast. The site has two existing access driveways, both located off 228th Avenue Southeast. The project site once housed City Church but this building and foundations were recently demolished and various TESC measures still remain onsite from this building removal project. All disturbed area caused by this building removal were hydroseeded and there are no existing exposed soils onsite. One large TESC pond was created within this existing building footprint as part of the building removal; this large pond currently remains and collects runoff from the center of the project site. Existing access roads and parking areas remain onsite. The rest of the existing site consists of forested cover.

2.1 Site Survey

A survey of the project site has been prepared by AHBL, Inc. and is included as Appendix A-2 of this report. This survey was prepared by a registered land surveyor and shows the existing development, utility infrastructure on and adjacent to the site, hydrologic features and associated buffer boundaries, and topographic features; site survey meets the requirements outlined in Section I-3.1.1 of the *SMMWW*. According to FEMA Map Number 53033C0685 F, Panel 685 of 1725, the site is located outside the 100-year floodplain. Refer to Appendix A-4 for the FEMA Flood Map of this area. To our knowledge, there are no septic systems on site. There is an existing water tower located on-site and that is served by a well located north of the site. The well is not within the school district property or control. If an onsite well is encountered, it will be decommissioned per King County Health Department standards. To our knowledge, there are no existing underground fuel tanks on the site. If located during construction, the fuel tanks will be abandoned according to King County Health Department standards.

Refer to Section 5.2 for additional information on the existing geologic conditions. Refer to Section 3.1.3 for additional information on the adjacent aquifer recharge areas.

2.2 Soils Report

A Subsurface Exploration, Geologic Hazard, and Preliminary Geotechnical Engineering Report has been done by Associated Earth Sciences. This report is dated September 17th, 2019 and meets the requirements outlined in Section I-3.1.1 of the *SMMWW*. Refer to Section 5.2 of this report for additional information.

3.0 Permanent Stormwater Control Plan

3.1 Existing Site Hydrology

3.1.1 Off-Site Drainage to the Property

The project site is bordered by residential properties to the north, west, and south. These properties all discharge away from the project site through a combination of overland and piped conveyance systems; therefore, no off-site discharge enters the project site from the north, west, or south. The project site is bordered by 228th Ave SE to the east. The elevation of this existing roadway is significantly lower than most of the project site and the roadway has its own overland/culvert conveyance system; therefore, no off-site discharge enters the project site from the east. The project site is located on the top of a hill with all surrounding areas discharging away from the project site.

3.1.2 Creeks, lakes, ponds, wetland, ravines, gullies, steep slopes, springs, and other environmentally sensitive areas on or down gradient of the property.

A Critical Areas Study & Wetland Mitigation Plan was prepared for the project site by Wetland Resources, Inc. on July 10, 2020; refer to Appendix C-3. Two small Category IV wetlands (Wetland B and Wetland C) were observed on-site. Refer to Section 7.0 of this report for additional information.

The ultimate discharge location for all runoff generated on the project site and frontage improvements is Laughing Jacobs Creek which has existing pollutant concerns, based on the DOE Water Quality Atlas Map.

3.1.3 Is the project located in an aquifer recharge area or wellhead protection area, as defined by the King County Health Department, the Environmental Protection Agency, or the County?

The project site is located near several small Class 3 – High Aquifer Recharge Areas. These areas are located under the 228th Ave SE right-of-way on the east boundary of the project site and south/southwest of the project site under the 228th Ave SE right-of-way. Downstream flow paths and off-site hydrology will be maintained and therefore will not affect the aquifer recharge area.

The site is also home to a water tower. It is assumed that this water tower is charged by an off-site well. If a well is encountered on site it will be decommissioned per the King County Health Department standards.

3.1.4 Are there any specific requirements included in a basin plan for the area?

To our knowledge, there are no specific requirements other than the general requirements of the 2014 DOE *SMMWW*. Phosphorus and enhanced treatment are required because the ultimate discharge location of the project site is Laughing Jacobs Creek and the project site is a commercial development, per Table 1-2 of the *ISDMA*.

3.1.5 Are there drains, channels, and swales within the project site and immediately adjacent?

The 228th Ave SE right-of-way utilizes a combination of conveyance ditches and culverts to convey water. This conveyance system discharges to ditches outside of the right-of-way which ultimately discharge to Laughing Jacob's Creek and its smaller tributary

streams/creeks. The residential properties on the north, west, and south sides of the project site convey stormwater with a combination of overland and underground, piped conveyance systems; ultimately discharging to Laughing Jacob's Creek and its tributaries. These residential properties utilize detention ponds for stormwater detention prior to discharging to these creeks/streams.

3.1.6 Points of exit for existing drainage from the property.

The existing site drains into two separate onsite basins: Northeast and Southwest. Refer to Appendix B-2 for a map showing these two predeveloped basins.

The Northeast basin discharges east to 228th Ave SE and north along the roadway until it discharges east into a City of Sammamish drainage easement that runs east between two residential properties. This drainage easement discharges to an existing roadside drainage ditch on the west side of 229th Ave SE, enters a culvert that crosses to the east side of 229th Ave SE, and enters another City of Sammamish drainage easement that runs east between two residential properties. This drainage easement then turns forth and then east again, following the property lines that separate several adjacent residential properties until it reaches a culvert that crosses under 231st Ave SE. From here runoff flows through an underground, piped conveyance system until it discharges to the residential development's detention pond and overflows into Laughing Jacobs Creek, downstream of Laughing Jacobs Lake. This existing discharge location on the east side of 228th St SE will be maintained as part of the project.

The Southwest basin discharges offsite at ten different locations (subbasins A-J), all of which are tributary to Laughing Jacobs Creek at a point downstream of the ultimate discharge location of the above-mentioned Northeast basin. Refer to Appendix B-3a for a Southwest Subbasins – Historic Conditions map showing these existing Southwest basins and their historic discharge locations. Refer to Section 5.1 for historic surfacing of these subbasins.

- Existing subbasin A (0.61 ac) surrounds Wetland B, discussed in Section 7.0, and discharges runoff through an existing 12" culvert connected to the Providence Point storm system.
- Existing subbasin B (0.25 ac) is located southwest of Wetland B and discharges runoff overland across the western property line into the Providence Point storm system. Subbasin B is located outside of the proposed construction limits.
- Existing subbasin C (11.06 ac) covers the area previously covered by the former City Church building along with surrounding parking and vehicle access areas. Runoff from subbasin C discharges to an existing 15" culvert on the west side of the project site connected to SDMH #7000 within the Providence Point storm system.
- Existing subbasin D (4.05 ac) covers the historic northern parking area as well as a large amount of existing tree coverage. Runoff from subbasin D discharges overland across the western property line into the Providence Point storm system.
- Existing subbasin E (0.98 ac) is located near the northwest corner of the project site and is mostly existing tree coverage. Runoff discharges from subbasin E to existing culvert #7018 near the western property line which connects directly to the Providence Point storm system.

- Existing subbasin F (0.03 ac) is located near the northwest corner of the project site and is mostly existing tree coverage. Runoff from subbasin F discharges overland across the western property line into the Providence Point storm system. Subbasin F is located outside of the proposed construction limits.
- Existing subbasin G (1.48 ac) is located at the northwest corner of the project site and is mostly existing tree coverage. Runoff from subbasin G discharges overland across the western property line into the Providence Point storm system.
- Existing subbasin H (0.24 ac) is located at the northwest corner of the project site and is mostly existing tree coverage. Runoff from subbasin G discharges overland across the northwestern property line into the Providence Point storm system.
- Existing subbasin I (0.98 ac) is covers the eastern half of the historic northern parking area and a portion of the access road that runs along the northwestern property line. Runoff discharges from subbasin I to existing Providence Point catch basin on the northwestern property line and flows downstream through the Providence Point storm system.
- Existing subbasin J (2.88 ac) is on the southwest corner of the site and discharges runoff to the SE 43rd Way right-of-way where it enters the City of Issaquah stormwater conveyance system.

Subbasins A-I all discharge to Providence Point which is a private stormwater conveyance system. Proposed peak flows have been evaluated for all these discharge locations to confirm that there is no increase from historic to proposed flows to ensure the private conveyance system has enough capacity to convey proposed discharge rates. Refer to Section 5.1 for this offsite analysis.

3.1.7 Are there any known historical drainage problems such as flooding, erosion, etc.?

To the best of our knowledge, there are no known historical drainage problems within the site or any areas adjacent to the site. King County GIS there are areas within the project site marked as erosion hazards; these areas will be stabilized during construction. A Landslide Hazard Assessment prepared by Associated Earth Sciences Inc. is included as Appendix C-2, dated September 24, 2019.

3.2 Developed Site Hydrology

3.2.1 Summary of Minimum Requirements

Onsite improvements are subject to the 2014 *SMMWW* as well as the *ISDMA*. The project is classified as a new development because the existing impervious coverage is less than 35% of the total project area. The table provided below shows the total new hard surfaces, replaced hard surfaces, and converted pervious surfaces proposed as part of the project improvements. Under drained turf sections were modeled in WWHM as impervious surfaces but are considered pervious surfaces in the table shown below.

New Hard Surfaces (sf)	Replaced Hard Surfaces (sf)	Converted Native Vegetation (sf)
749,800	186,000	348,170

The new hard surface, replaced hard surface, and converted native vegetation areas in the table shown above do not add up to the total project area. This is due to perimeter buffer areas and tree protection areas onsite that will not be disturbed and are therefore not included in the project area values. Surfaces within the existing right-of-way were not included in this table.

Per Section 2.3 of the *ISDMA*, Minimum Requirements (MRs) 1 through 9 apply to all new and replaced hard surfaces and converted vegetation areas. The site is modeled as two Basin, the Northeast and Southwest, which have been divided based on the existing flow paths of the existing site. The north basin is made up of the Baseball fields, the entry drive aisle, and the high school parking lot. The south basin includes the high school building, elementary school building, bus loop, football field, playground, and the tennis courts and plaza areas. Each of the two larger basins has been broken into smaller subbasins and broken down by surface coverage. Refer to Appendix B-1 for a Proposed Basin Map. The table provided below shows the total new pollution generating hard surfaces, replaced pollution generating hard surfaces, effective impervious area, and converted vegetation area for the two proposed basins, Northeast and Southwest, and their subbasins.

Basin	Impervious Area (ac)	Pervious Area (ac)
Basin 1	7.15	2.40
Basin 2	1.55	1.60
Total Northeast	8.70	4.00
Basin 3	0.60	0.45
Basin 4	8.50	0.75
Basin 5	2.10	0.75
Basin 6	1.85	0.70
Basin 7	1.60	0.10
Total Southwest	14.44	2.75

The total basin areas in the table shown above do not add up to the total project area. This is due to perimeter buffer areas and tree protection areas onsite that will not be disturbed and are therefore not included in basin area values. Surfaces on the sloped areas on the east side of the site are also tributary to the right-of-way Frontage Basin and not any onsite basins.

MR 1 – Preparation of Stormwater Site Plans

This report and accompanying project plans represent the Stormwater Site Plan for this project and satisfy MR 1.

MR 2 – Construction Stormwater Pollution Prevention

A stand-alone Construction Stormwater Pollution Prevention Plan (CSWPPP) has been provided as part of this submittal package. Refer to Section 4.0 for additional information.

MR 3 – Source Control of Pollution

The proposed project is required to provide source control of pollution. The following are proposed measures to be implemented as part of the civil plans:

- All pollutants, including waste materials and demolition debris created on-site during construction, shall be handled and disposed of in a manner that does not cause contamination of surface water.
- Cover, containment, and protection from vandalism shall be provided for all chemicals, liquid products, petroleum products, and non-inert wastes present on the site (see Chapter 173-304 WAC for the definition of inert waste).
- Maintenance and repair of heavy equipment and vehicles that may result in discharge or spillage of pollutants to the ground or into surface water runoff must be conducted using spill prevention measures such as drip pans.
- All BMPs specified in the forthcoming CSWPPP must be maintained throughout the construction process. Please see the attached CSWPPP for more details about all BMPs that will be implemented on the project site.

MR 4 – Preservation of Natural Drainage Systems and Outfalls

The existing site is home to the former City Church building and two undeveloped parcels. The site has an existing high point located near the center of the site which splits the project site into two separate basins, northeast and southwest. The northeast basin discharges to the 228th Ave SE right-of-way conveyance system where it crosses under 228th Ave SE and makes its way to Laughing Jacob's Creek, just downstream of Laughing Jacobs Lake. The southwest basin currently discharges through the adjacent Providence Point housing development's drainage system and eventually makes its way to tributary streams to Laughing Jacobs Creek; a small portion of this basin discharges to 228th Ave SE where it flows west through the right-of-way conveyance system to one of the Laughing Jacobs Creek tributaries. Refer to Section 3.1.6 of this report for additional information on the existing downstream flow paths of the two existing basins.

The proposed design will maintain these two basins, northeast and southwest, while providing on-site flow control via several ACF Environmental R-Tank detention systems. Refer to Section 5.1 of this report for additional information on the proposed downstream flows path of the project site.

MR 5 – On-Site Stormwater Management

The project will meet the List #2: On-Site Stormwater Management BMPs for Projects Triggering Minimum Requirements #1 through #9 found in the *ISDMA*. Table 1-5 of the *ISDMA* was used to determine the applicable on-site stormwater BMPs.

For all proposed lawn and landscaped areas, the Post-Construction Soil Quality and Depth in accordance with BMP T5.13 of the *SMMWW* as well as IMC 18.12.140.

For the proposed roof area, full dispersion is not an option because the proposed site will have less than 65% native vegetation retained on-site. Bioretention is also not an option to manage the proposed roof area on-site based on information provided by Associated Earth Sciences Incorporated as part of the Subsurface Exploration, Geotechnical Hazard, and Preliminary Geotechnical Engineering Report, dated 17 September 2019, found in Appendix C; this report states "onsite infiltration is not recommended". Downspout dispersion systems are not an option due to the large roof areas proposed for the two schools and the limited amount of vegetation proposed on-site. Most areas with enough proposed/existing vegetation for dispersion will be located on very steep slopes or buffers between neighboring properties which will make dispersion infeasible and ineffective.

Perforated stub out connections are the final BMP for roof areas found on Table 1-5 of the *ISDMA*. Both the elementary school and the high school, and all other hard surfaces proposed on-site, discharge to large, underground detention systems for flow control (Detention 4 and Detention 5). These systems will be lined with washed rock and function similarly to perforated stub out connections by allowing small amounts of infiltration during the drier months; these systems also have no pollution generating surfaces tributary to them and therefore do not require treatment. Additionally, due to the poor infiltration capacity of the in-situ soils, there is a concern that any runoff discharged via perforated pipes near the buildings will more likely enter the foundation drains than the underlying soils. The proposed detention facilities meet the design intent of perforated stub out connections by allowing possible infiltration and will service much more hard surfaces than just the proposed roof areas. Therefore, we believe the intent of the on-site stormwater management BMP is being met. The elementary school and high school roof drainage systems will be connected to underground detention facilities which will be release runoff at a controlled rate.

For all other new and replaced hard surfaces found on-site, full dispersion is not an option for the same reasons as discussed above for the proposed roof area. Permeable pavement and bioretention are also not a viable option for stormwater management on the project site due to the geotechnical engineer's statement that "onsite infiltration is not recommended" as discussed above. Sheet flow dispersion systems are not an option due to the limited amount of vegetation proposed on-site. Proposed tree protection areas have existing slopes around 30 percent which makes dispersion infeasible and ineffective. All Stormwater Management BMPs listed under Other Hard Surfaces are infeasible for this project site, therefore no On-Site Stormwater Management BMPs are required for Other Hard Surfaces. All hard surfaces proposed as part of the on-site improvements shall discharge to underground detention facilities which will release runoff at a controlled rate.

MR 6 – Runoff Treatment

The *ISDMA* requires phosphorus treatment for all stormwater discharging to surface water. All runoff generated on-site ultimately discharges to Laughing Jacobs Creek and its tributary streams therefore Phosphorus Treatment is required. The *ISDMA* also required enhanced treatment for all commercial project sites that discharge through a conveyance system to fresh waters designated for aquatic life. This *ISDMA* enhanced treatment requirement only applies to proposed areas designated for commercial use such as parking and access roads, however both enhanced and phosphorus treatment is proposed on all developed subbasins therefore the runoff treatment proposed onsite goes above and beyond City of Issaquah runoff treatment requirements. Treatment will be provided downstream of stormwater detention for all on-site facilities therefore the full 2-year release rate from these detention facilities is used for water quality facility design. OldCastle BioPod Biofilter Underground treatment structures have DOE GULD approval for both phosphorus and enhanced water quality treatment; refer to Appendix B-7 for a copy of this GULD approval.

The proposed project site is not considered high-use because it does not meet the criteria outlined in Section 2.4.6.2 of the *ISDMA*. The proposed elementary school has a planned enrollment capacity of 744 students and 75 faculty and staff. Based on information provided in the Institute of Transportation Engineers Trip Generation User's Guide (TGUG), the elementary school will generate an average daily traffic count (ADT) count of 2,138 vehicles. The proposed high school has a planned enrollment capacity of 1,823 students and 150 faculty and staff. Based on information provided in the TGUG,

the high school will generate an ADT count of 6,079 vehicles. This makes a combined ADT count of 8,217 vehicles for the proposed school development.

- a. An area of a commercial or industrial site subject to an expected ADT count equal to or greater than 100 vehicles per 1,000 square feet of gross building area;

The proposed gross building area is approximately 274,233 square feet; this means that an ADT count of less than 27,424 does not trigger this high-use site requirement. The ADT count of 8,217 vehicles is much smaller than the 27,424 vehicle threshold.

- b. An area of a commercial or industrial site subject to petroleum storage and transfer in excess of 1,500 gallons per year, not including routinely delivered heating oil;

Petroleum storage and transfer in excess of 1,500 gallons per year is not proposed on the new school development.

- c. An area of a commercial or industrial site subject to parking, storage or maintenance of 25 or more vehicles that are over 10 tons gross weight (trucks, buses, trains, heavy equipment, etc.);

Parking, storage, or maintenance of 25 or more vehicles that are over 10 tons gross weight is not proposed. Though over 25 school busses will remain parked on-site throughout the school day from drop-off to pick-up, the project site will not be the location of overnight storage, maintenance, fueling, or washing of these school busses. Chapter V-2, Section V-2.1, Step 2 of the *SMMWW* notes “all-day parking areas are not intended to be defined as high-use sites and should not require an oil control facility.” This note is in reference to parking, storage, or maintenance of 25 or more vehicles that are over 10 tons gross weight. The intent of the DOE Oil Control Menu is to mitigate oil in stormwater from sites that generate high concentrations of oil due to high traffic turnover or the frequent transfer of oil and is not intended to apply to sites that are just providing all-day parking of vehicles.

- d. A road intersection with a measured ADT count of 25,000 vehicles or more on the main roadway and 15,000 vehicles or more on any intersecting roadway, excluding project proposing primarily pedestrian or bicycle use improvements.

With an ADT count of 8,217 vehicles on the proposed school development, the proposed onsite intersections will not generate an ADT of 15,000 vehicles.

MR 7 – Flow Control

Minimum Requirement #7 will be met using underground detention facilities and flow control structures. The North and South basins have been broken into several subbasins which have been modeled to detain and release stormwater at rates equal to or less than 50% of the 2-year to the 50-year peak flow.

MR 8 – Wetlands Protection

A Critical Area Study & Wetland Mitigation Plan was prepared for the project site by Wetland Resources, Inc. on July 10, 2020; refer to Appendix C-3. The ultimate discharge

location for all runoff generated on the project site and frontage improvements is Laughing Jacobs Creek which has existing pollutant concerns, based on the DOE Water Quality Atlas Map.

These critical areas are further discussed in Sections 3.1.2 and 7.0 of this report.

MR 9 – Operation and Maintenance

Maintenance standards have been prepared for all proposed drainage structures and is included as Appendix D of this report. Refer to Section 8.0 of this report for additional information.

4.0 Construction Stormwater Pollution Prevention

A stand-alone Construction Stormwater Pollution Prevention Plan (CSWPPP) has been prepared and included as part of this permit submittal. This CSWPPP explains and justifies the pollution prevention decisions made for the project site and contains concise information concerning existing site conditions, construction schedules, and pertinent items not contained on the Temporary Erosion and Sediment Control plans. The CSWPPP meets the requirements of Section I-3.1.6 of the *SMMWW*.

5.0 Site Plans

5.1 Offsite Analysis

The proposed project site maintains the two existing drainage basins, Northeast and Southwest. Refer to Appendix A-6 for a map showing the proposed downstream drainage path of these two basins from the project site to Laughing Jacobs Creek and finally Lake Sammamish. Refer to Appendix B-1 for a map showing the proposed onsite drainage basins; Basins 1 and 2 are part of the proposed Northeast Basin while Basins 3 through 7 are part of the proposed Southwest Basin. An eighth basin, the Frontage Basin, is located just downstream of Basin 1 within the 228th Ave SE right-of-way. This Frontage Basin is located offsite and within the City of Sammamish, outside of the City of Issaquah and therefore stormwater improvements within these frontage improvements have been designed to meet City of Sammamish standards.

All runoff generated in the Northeast basin, Basins 1 and 2, flows into a proposed stormwater conveyance system located within the 228th Ave SE right-of-way. Runoff then discharges to the same existing discharge location for the Northeast basin discussed in Section 3.1.6 of this report. Flow control is provided for the Northeast basin, as discussed in Section 6.2 of this report, to ensure that proposed flows do not exceed existing flows at this discharge location. WWHM Flow Control Calculations included in Appendix B-5 show that there is a net decrease in the runoff discharged from the Northeast basin from the 2-year flow to the 100-year flow. The pre-developed 100-yr discharge from the Northeast basin is 2.35 cfs while the developed discharge is only 1.26 cfs, significantly lower than the pre-developed flow rate. Therefore, the existing private residential conveyance system downstream of this discharge location is expected to have adequate capacity to convey the proposed stormwater discharges from the Northeast basin.

Runoff generated in the Southwest basin flows discharges runoff to either the private Providence Point conveyance system on the northwest and southwest sides of the property or east to the SE 43rd Way City of Issaquah conveyance system; refer to Section 3.1.6 of this report for a description of the historic, City Church site, subbasins.

To minimize the amount of proposed runoff discharging through the Providence Point conveyance system, Basins 4, 6, and 7 all discharge east to the SE 43rd Way City of Issaquah conveyance system along with the Southwest Basin bypass areas. This matches the existing discharge location of the eastern slope of the Southeast basin (Subbasin J) as discussed in Section 3.1.6 of this report. The table below compares historic, City Church site, discharge rates with proposed discharge rates to the SE 43rd Way City of Issaquah conveyance system.

Subbasin J	Historic Flow (cfs)	Developed Flow (cfs)
2-Year	0.3695	0.4573
5-year	0.5083	0.5917
10-year	0.6111	0.6867
25-year	0.7540	0.8137
50-year	0.8702	0.9136
100-year	0.9951	1.0181

The existing City of Issaquah conveyance system downstream of this discharge location is expected to have adequate capacity to convey the proposed stormwater discharges from Basins 4, 6, and 7 of the Southwest bypass basin. A 24" overflow pipe is proposed just upstream of the discharge location for Basins 4, 6, and 7 at SDCB 075; this pipe discharges into the existing roadside ditch along SE 43rd Way. The invert of this overflow pipe is at the crown of the inlet and outlet pipes and will only discharge runoff when a continuous stormwater event greater than the 100-year storm occurs. The proposed inlet and outlet pipes connected to SDCB 075 have adequate capacity to convey the design 100-year storm; refer to Section 6.3 of this report for additional information on the conveyance calculations performed on the proposed stormwater improvements.

As discussed in Section 3.1.6 of this report, there are nine historic discharge locations to Providence Point from the Southwest basin. The historic discharge location of Subbasin E will be the proposed discharge location of proposed Basin 3. The historic discharge location of Subbasin I will be the proposed discharge location of proposed Basin 5. Most of the historic subbasins will be reduced in size as part of the proposed improvements with developed portions of these basins discharging to onsite flow control facilities. Historic Subbasins B and F are both located completely outside of the proposed construction limits. The tables below compare historic, City Church site, discharge rates from these nine historic Providence Point subbasins to proposed discharge rates to these historic discharge locations.

Historic Subbasin A is reduced in size from 0.62-ac to 0.42-ac as part of the proposed improvements. New surfaces discharge to proposed Basins 4 and 5 for onsite flow control. No runoff from proposed improvements will discharge to the Subbasin A historic discharge location.

Subbasin A	Historic Flow (cfs)	Developed Flow (cfs)
2-Year	0.0446	0.0173
5-year	0.0653	0.0294
10-year	0.0814	0.0391
25-year	0.1047	0.0531
50-year	0.1243	0.0648
100-year	0.1459	0.0778

Historic Subbasin B not affected by the proposed improvements. No runoff from proposed improvements will discharge to the Subbasin B historic discharge location.

Subbasin B	Historic Flow (cfs)	Developed Flow (cfs)
2-Year	0.0124	0.0124

5-year	0.0193	0.0193
10-year	0.0247	0.0247
25-year	0.0324	0.0324
50-year	0.0389	0.0389
100-year	0.0461	0.0461

Historic Subbasin C is reduced in size from 11.06-ac to 0.57-ac as part of the proposed improvements. New surfaces discharge to proposed Basins 2, 4, 5, 6, and 7 for onsite flow control. No runoff from proposed improvements will discharge to the Subbasin C historic discharge location.

Subbasin C	Historic Flow (cfs)	Developed Flow (cfs)
2-Year	2.0583	0.0235
5-year	2.6528	0.0399
10-year	3.0716	0.0530
25-year	3.6304	0.0720
50-year	4.0689	0.0880
100-year	4.5272	0.1055

Historic Subbasin D is reduced in size from 4.05-ac to 0.61-ac as part of the proposed improvements. New surfaces discharge to proposed Basins 4, 5, and 7 for onsite flow control. No runoff from proposed improvements will discharge to the Subbasin D historic discharge location.

Subbasin D	Historic Flow (cfs)	Developed Flow (cfs)
2-Year	0.4103	0.0251
5-year	0.5627	0.0427
10-year	0.6754	0.0567
25-year	0.8317	0.0771
50-year	0.9587	0.0942
100-year	1.0950	0.1129

Historic Subbasin E is reduced in size from 0.98-ac to 0.26-ac as part of the proposed improvements. New surfaces discharge to proposed Basins 3, and 7 for onsite flow control. Runoff from proposed Basin 3 discharges to the historic Subbasin E discharge location and is included in the table below.

Subbasin E	Historic Flow (cfs)	Developed Flow (cfs)
2-Year	0.0488	0.0305
5-year	0.0759	0.0494
10-year	0.0969	0.0656
25-year	0.1273	0.0910
50-year	0.1527	0.1140
100-year	0.1806	0.1409

Basin 3 utilized Detention 3 for flow control prior to discharging through proposed conveyance pipes over the southwest property line into an existing stormwater culvert on the southwest side of the project site. This existing culvert discharges into the existing Providence Point conveyance system to Existing Detention 2, referenced in Section 3.1.6 of this report and shown in Appendix A-6.

Historic Subbasin F not affected by the proposed improvements. No runoff from proposed improvements will discharge to the Subbasin F historic discharge location.

Subbasin F	Historic Flow (cfs)	Developed Flow (cfs)
2-Year	0.0012	0.0012
5-year	0.0019	0.0019
10-year	0.0025	0.0025
25-year	0.0033	0.0033
50-year	0.0040	0.0040
100-year	0.0047	0.0047

Historic Subbasin G is reduced in size from 1.49-ac to 0.98-ac as part of the proposed improvements. New surfaces discharge to proposed Basin 3 for onsite flow control. No runoff from proposed improvements will discharge to the Subbasin G historic discharge location.

Subbasin G	Historic Flow (cfs)	Developed Flow (cfs)
2-Year	0.0842	0.0383
5-year	0.1261	0.0631
10-year	0.1585	0.0820
25-year	0.2051	0.1083
50-year	0.2441	0.1297
100-year	0.2871	0.1525

The size of historic Subbasin H is not affected by the proposed improvements. Existing impervious surfaces will be removed from this basin with no additional improvements proposed within the Subbasin H limits. No runoff from proposed improvements will discharge to the Subbasin H historic discharge location.

Subbasin H	Historic Flow (cfs)	Developed Flow (cfs)
2-Year	0.0131	0.0103
5-year	0.0208	0.0175
10-year	0.0270	0.0232
25-year	0.0360	0.0316
50-year	0.0437	0.0386
100-year	0.0522	0.0463

Historic Subbasin I is reduced in size from 2.39-ac to 0.68-ac as part of the proposed improvements. New surfaces discharge to proposed Basins 2, 4, and 5 for onsite flow control. Runoff from proposed Basin 5 discharges to the historic Subbasin E discharge location and is included in the table below.

Subbasin I	Historic Flow (cfs)	Developed Flow (cfs)
2-Year	0.3146	0.0781
5-year	0.4159	0.1175
10-year	0.4887	0.1495
25-year	0.5875	0.1974
50-year	0.6660	0.2390
100-year	0.7491	0.2862

Basin 5 utilizes Detention 5 for flow control prior to discharging through proposed conveyance pipes over the northwest property line into an existing Providence Point catch basin located on the northwest property line. This catch basin discharges stormwater through the Providence Point conveyance system to Existing Detention 1, referenced in Section 3.1.6 of this report and shown in Appendix A-6. This matches the existing discharge location of the northwest portion of the Southwest basin as discussed in Section 3.1.6 of this report.

5.2 Creek Protection

The ultimate discharge location of all runoff generated as part of the proposed project improvements is Laughing Jacob's Creek and its tributary streams. Both enhanced and phosphorous control water quality is provided for all new and replaced pollution generating surfaces. Proposed treatment facilities will protect Laughing Jacob's Creek from pollutants related to commercial and educational land uses. The flow control standard is also met for each of the two onsite basins, Northeast and Southwest, as well as the City of Sammamish Frontage Basin. Proposed flow control facilities discharge water from the proposed improvements to the site's existing discharge locations at controlled rates that do not exceed predeveloped, forested condition from 50% of the 2-year 24-hour storm to the full 50-year 24-hour stormwater event. These proposed flow control facilities will not allow for high developed flow rates to cause erosion or flooding issues within Laughing Jacob's Creek.

AHBL has performed several walks of the existing downstream flow paths, as discussed in Section 5.1, to ensure that there are no existing downstream conveyance or erosion concerns.

5.3 Special Reports and Studies

A Subsurface Exploration, Geologic Hazard, and Preliminary Geotechnical Engineering Report has been done by Associated Earth Sciences. This report is dated September 17th, 2019. Soils on site are sloping from 0 to 50 percent. The area topography is made up of a flat region near the center of the project area and slopes falling away at roughly 15 to 30 percent. Soils observed include Vashon Lodgement Till, Vashon Ice Contact Sediments, Olympia Non-Glacial Sediments, Possession Drift, Pre-Faser Till, Pre-Faser Silt, and Blakely harbor Formation. Per the report these soils have little to no hydraulic conductivity meaning infiltration is not feasible on site. For more information regarding soils the full report in Appendix C-1.

A Landslide Hazard Assessment was also prepared by Associated Earth Sciences. This report is dated September 24th, 2019. A relatively flat to generally sloping plateau is located in the central portion of the property and from this plateau, the topography generally slopes down toward the northeast, east, south, and southwest. As stated above, slopes on the flanks of the plateau are generally about 30 percent or less. There is one steeper area of 40-50 percent slope with a maximum height of approximately 30 feet is located near the southeast corner of the property; this area classifies as a Steep Slope Hazard Area under the Issaquah Municipal Code (IMC). This Steep Slope Hazard Area was created during the construction of 228th Ave SE and the south entrance road into the property therefore, alteration of these slopes is allowed under Section 18.1058D of the IMC. The Landslide Hazard Assessment states that damage to the proposed project by landsliding on the steep slope is low under both static and seismic conditions, with factors of safety exceeding the minimum acceptable value specified in the IMC. Most of this Steep Slope Hazard Area will be protected under developed conditions with existing trees to remain in place and no stormwater is proposed to discharge at the top of these slopes. Where improvements are proposed in this area, retaining walls are proposed to transition from proposed to existing grades with an ADA access sidewalk connecting the 228th Ave SE right-of-way to the new high school's bus loop.

A Critical Areas Study & Wetland Mitigation Plan was prepared for the project site by Wetland Resources, Inc. on July 10, 2020; refer to Appendix C-3. Two small Category IV wetlands (Wetland B and Wetland C) were observed on-site. Laughing Jacobs Creek is located east and south of the project site and is the ultimate discharge location of all runoff generated as part of the project improvements. Laughing Jacobs Creek is unclassified adjacent to the site and classified as a 2S stream by King County iMap approximately 1,300 feet from the project site; the creek is also classified as Type-F by Washington Department of Natural Resources from Laughing Jacobs Lake to its outfall at Lake Sammamish. Both wetlands are classified as Type IV with less than

2,500 of area; refer to Section 7.0 of this report for additional information on the existing wetlands and proposed project impacts on these wetlands.

5.4 Other Permits

This project will require other permitting such as NPDES, Building Permits, SEPA, and Site Development.

5.5 Operations and Maintenance

Maintenance standards have been prepared for all proposed drainage structures. It will be the responsibility of the owner to keep a copy of these standards onsite and to perform routine maintenance on all drainage facilities. These standards are provided in the Operation and Maintenance Manual in Appendix D of this report; refer to Section 8.0 for additional information.

5.6 Declaration of Covenant for Privately Maintained Flow Control and Treatment Facilities

A Declaration of Covenant for Maintenance and Inspection of Stormwater Facilities and BMPs shall be recorded against the property prior to final inspection and approval of drainage facilities. This declaration of covenant will be included with the final engineering submittal for the proposed improvements.

5.7 Declaration of Covenant for Privately Maintained Onsite Stormwater Management BMPs

A Declaration of Covenant for Maintenance and Inspection of Onsite Stormwater BMPs shall be recorded against the property prior to final inspection and approval. This declaration of covenant will be included with the final engineering submittal for the proposed improvements.

5.8 Bond Quantities

The proposed project improvements are not subject to bonding because Issaquah School District No. 411 is a public agency.

6.0 Facility Sizing

This Technical Information Report includes analysis of the proposed onsite water quality and flow control facilities. Appendix B-5, WWHM Flow Control Calculations, includes analysis of the proposed frontage flow control system. Frontage improvements to 228th Avenue Southeast are located within the City of Sammamish, Washington. A separate Technical Information Report shall be prepared and provided to the City of Sammamish to demonstrate that the proposed water quality and flow control facilities for the proposed frontage improvements meets the requirements of the City of Sammamish, *Sammamish Addendum to the 2016 King County Surface Water Design Manual (SAKCSWDM)* Revised 9/25/2019.

Proposed project improvements will provide greater than 5,000 square feet of new and replaced impervious surfaces. The project improvements also provide greater than 10,000 square feet of effective impervious surfaces and greater than $\frac{3}{4}$ acres of vegetation converted to lawn or landscape. There is no increase in the 100-year discharge compared to pre-project conditions as discussed above in Section 5.1 of this report.

6.1 Runoff Treatment

In order to meet Minimum Requirement 6 Stormwater Runoff treatment all pollution generating surfaces will be treated using OldCastle BioPod Biofilter Underground treatment structures. These structures have a DOE GULD for both enhanced and phosphorus treatment and will be placed downstream of the control structures proposed on-site and have been sized based on the water quality flow rate calculated using WWHM. See Appendix B-3 for Water Quality calculations. See Appendix B-7 for a copy of the BioPod Biofilter DOE GULD.

6.2 Flow Control

This project will be required to meet Minimum Requirement 7. To meet MR 7 stormwater runoff from the site will be detained on-site and released through flow control structures at a controlled rate. ACF Environmental R-Tank detention facilities and flow control structures have been sized to match developed discharge durations to pre-developed duration for the range of pre-developed discharge rates from 50% of the 2-year peak flow up to the full 50-year peak flow as required in Table 1-3 of the *ISDMA*. To size these facilities WWHM has been used. For WWHM flow control calculations showing that developed discharge durations match, or are less than, pre-developed durations for a range of pre-developed discharge rates from 50% of the 2-year peak flow up to the full 50-year peak flow see Appendix B-5. For the exact location of the detention facilities and flow control structures refer to the Developed Basin Map included in Appendix B-1.

6.3 Conveyance Sizing

The pipe and structure conveyance and capacity of the proposed improvements was analyzed to make sure adequate conveyance and capacity will be provided by the new stormwater system up to the 100-year storm. The analysis was done using Autodesk Storm and Sanitary Sewer Analysis. Additional overflow analysis was done to show that the proposed piped outfalls for the proposed detention systems have capacity to convey the 100-year inflow to these facilities; this assumes that the proposed systems fail or there are storm events higher than the required design storms. Refer to Appendix B-8 for a copy of the Storm and Sanitary Sewer Analysis for this project. Refer to Appendix B-9 for a copy of the overflow analysis performed.

7.0 Wetland Protections

A Critical Areas Study & Wetland Mitigation Plan was prepared for the project site by Wetland Resources, Inc. on July 10, 2020; refer to Appendix C-3. Two small Category IV wetlands (Wetland B and Wetland C) were observed on-site. Both existing onsite wetlands are classified as Type IV with less than 2,500 of area therefore the City of Issaquah does not require wetland buffers.

Wetland B is a small, 280-sf depression wetland on the southwest corner of parcel 1624069029. A 50-ft wetland buffer is provided around Wetland B as additional protection to the existing wetland. Proposed improvements will have no impact on Wetland B. The small size, lack of vegetation diversity and native food sources, as well as the lack of an existing undisturbed connection to other wetlands limits the level of wildlife functions provided by Wetland B.

Wetland C is a small, 1,806-sf slope wetland located along the existing Providence Heights Loop private access road; this wetland is a roadside ditch along an existing onsite access road off of the private Providence Height Loop. The small size, lack of vegetation diversity and native food sources, as well as the lack of an existing undisturbed connection to other wetlands limits the level of wildlife functions provided by Wetland C. Proposed improvements will impact the entirety of Wetland C; this impact is unavoidable and is the minimum impact necessary to construct the new school campus. These impacts to Wetland C will be permanent and cannot be restored. To

mitigate for this impact on Wetland C, over 10,800-sf area of significant trees will be retained on-site within the area surrounding Wetland B; this provides a 6:1 mitigation to impact ratio. Expanding Wetland B to mitigate for the impacts to Wetland C would require removal of significant trees surrounding Wetland B; this would reduce the overall number of significant trees on the site and reduce wildlife habitat quantity in the area around Wetland B.

8.0 Operation and Maintenance

A Preliminary Operation and Maintenance Manual, consistent with the provisions in Volume V of the 2014 *SMMWW*, is included as Appendix D of this report. This Preliminary Operation and Maintenance Manual was prepared for improvements that will be maintained by the City of Issaquah and the property owner only, not proposed Frontage Basin improvements. Frontage Basin improvements are located within the 228th Ave SE right-of-way, which is within the City of Sammamish, not the City of Issaquah, therefore these facilities will be maintained by the city of Sammamish. All proposed onsite stormwater facilities will be maintained by the property owner, not the City of Issaquah. Refer to the Operation and Maintenance Manual included as part of the Preliminary Frontage Technical Information Report for information on the facilities constructed as part of the proposed Frontage basin improvements that will be maintained by the City of Sammamish.

9.0 Utilities

The proposed project will include a new water loop connecting to the water main in 228th as well as the water main located in Providence point. This will be an 8" Ductile iron loop that will provide domestic water and fire protection throughout the project site. The project is also proposing to extend the 8" sewer main located towards the west parcel boundary. The sewer main will be extended to provide sewer coverage throughout the site. Dry utilities will be extended and provided as needed to support the proposed project.

10.0 Conclusion

The proposed improvements include a new high school and elementary school buildings, water main extension, sewer main extension, dry utilities, parking surfaces, playgrounds and play fields. If constructed per plans, the stormwater system will manage the anticipated runoff volumes based on the design criteria of the 2012 Department of Ecology *Stormwater Management Manual for Western Washington* as amended in December 2014 *Stormwater Management Manual for Western Washington* and the City of Issaquah 2017 *Stormwater Design Manual Addendum*. This report and associated plans have been prepared within the guidelines established by the City of Issaquah.

This analysis is based on data and records either supplied to or obtained by AHBL, Inc. These documents are referenced within the text of the analysis. The analysis has been prepared utilizing procedures and practices within the standard accepted practices of the industry. We conclude that this project, as proposed, will not create any new problems within the existing downstream drainage system. This project will not noticeably aggravate any existing downstream problems due to either water quality or quantity.

AHBL, Inc.

Charles Stout, PE
Project Engineer

CHS/

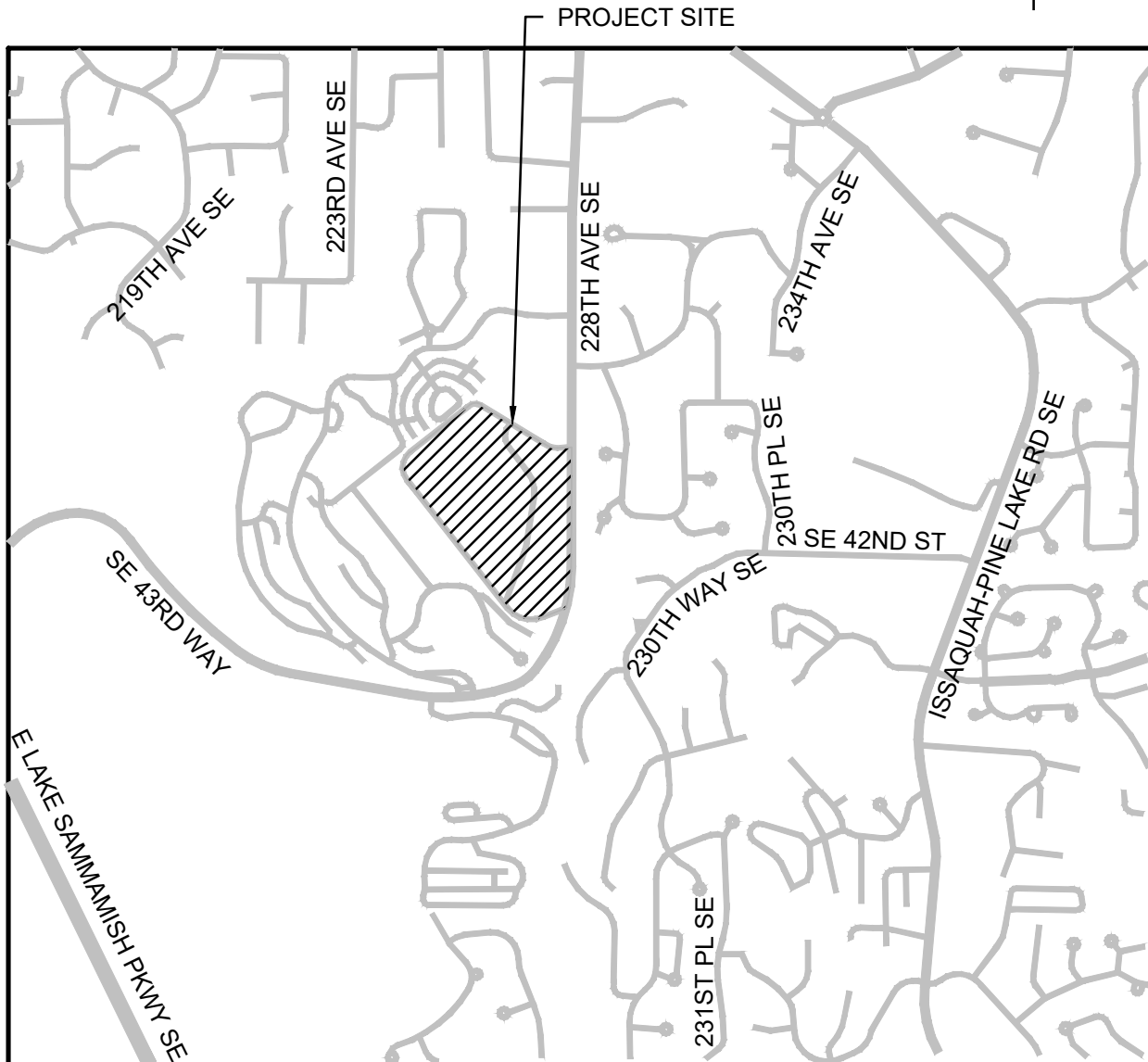
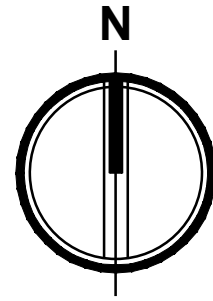
February 2021

Q:\2018\2180412\10_CIV\NON_CAD\REPORTS\Onsite TIR\20200831 Rpt (TIR) 2180412.10.docx

Appendix A

Exhibits

A-1.....	Vicinity Map
A-2.....	Existing Conditions Map
A-3.....	Developed Conditions Map
A-4.....	FEMA Flood Map
A-5.....	Critical Aquifer Recharge Map
A-6.....	Downstream Drainage Path Map
A-7.....	Flow Chart for Determining Requirements of New Development
A-8.....	Project Screening for Stormwater Review
A-9.....	On-Site Stormwater BMPs



VICINITY MAP

SCALE: 1" = 1/4 MILE (1320')



2215 North 30th Street,
Suite 300,
Tacoma, WA 98403
253.383.2422 TEL
253.383.2572 FAX

ISSAQUAH HIGH SCHOOL AND
ELEMENTARY SCHOOL
VICINITY MAP

JOB NO:
2180412.10
DATE: 6/12/2020

A-1

ISSAQUAH HIGH SCHOOL AND ELEMENTARY SCHOOL
A PORTION OF THE NE 1/4 OF SEC. 16, TWN. 24 N., RGE. 06 E. W.M.
CITY OF ISSAQUAH, KING COUNTY, WASHINGTON.



2215 North 30th Street, Suite 300 Tacoma, WA 98403
253.383.2422 TEL 253.383.2572 FAX www.ahbl.com WEB

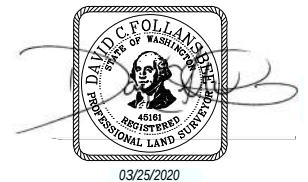
Project Title:
**ISSAQUAH HIGH
SCHOOL
AND ELEMENTARY
SCHOOL**

Client:
**ISSAQUAH
SCHOOL DISTRICT**
65 NW HOLLY STREET
ISSAQUAH, WA 98027
TOM MULLINS

Job No.
2180412.50

Issue Set & Date:

AUGUST 14, 2019



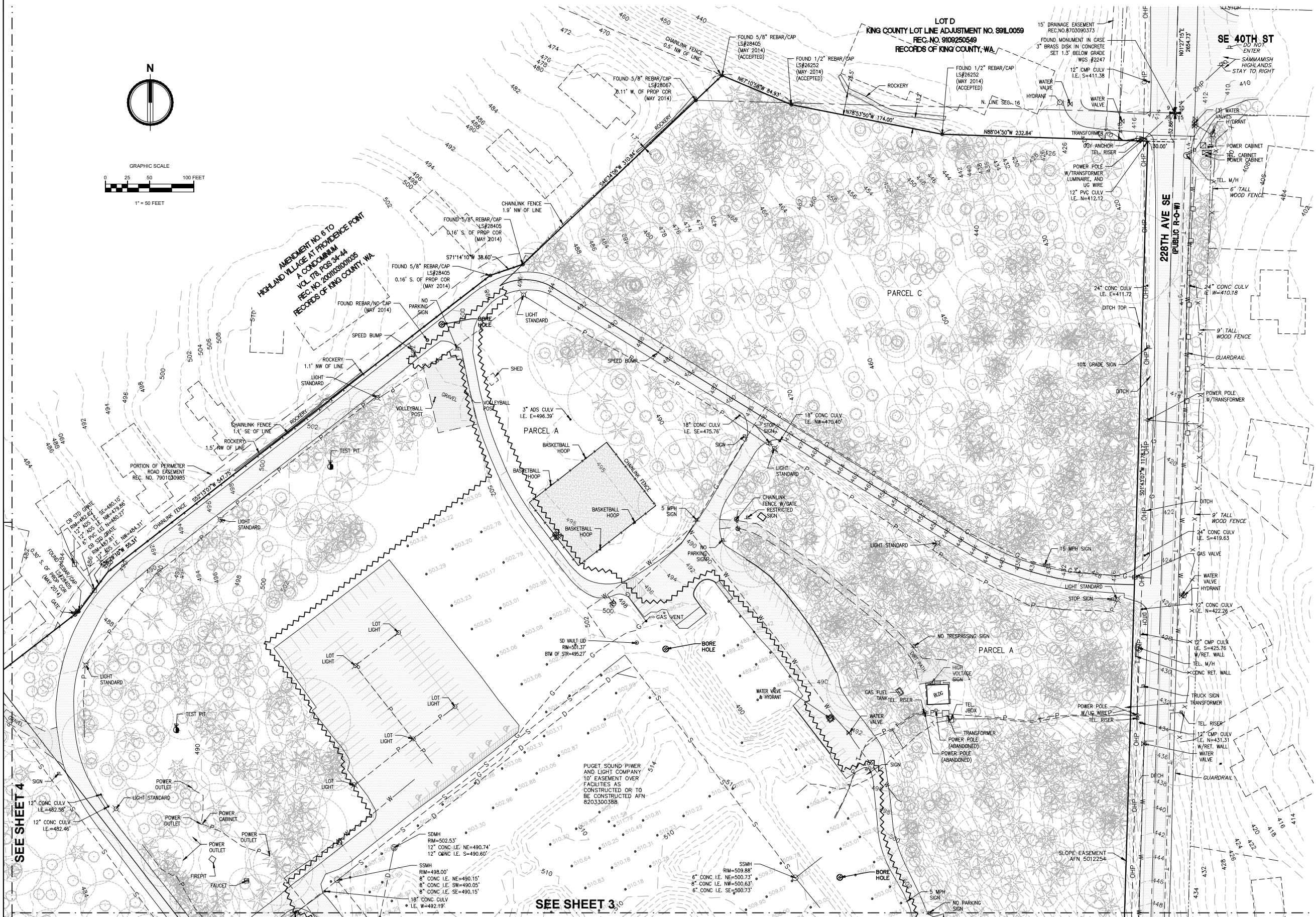
NOTICE
ALTERATION OF THIS DOCUMENT SHALL INVALIDATE THE
PROFESSIONAL SEAL AND SIGNATURE. PURSUANT TO
THIS DOCUMENT DOES NOT CONSTITUTE A GUARANTEE
OF THE ACCURACY OF THE INFORMATION HEREIN. IT IS THE
ONLY FOR THE PROJECT IDENTIFIED BY THE TITLE BLOCK
AND IS NOT TO BE USED FOR OTHER PROJECTS, OR
ADDITION TO THAT PROJECT OR FOR ANY OTHER PROJECT.

Revisions:

Sheet Title:
**TOPOGRAPHIC
SURVEY**

Designed by: Drawn by: Checked by:
TD DF

Sheet No.
A-2
2 of 4 Sheets



ISSAQUAH HIGH SCHOOL AND ELEMENTARY SCHOOL
A PORTION OF THE NE 1/4 OF SEC. 16, TWN. 24 N., RGE. 06 E. W.M.
CITY OF ISSAQUAH, KING COUNTY, WASHINGTON.



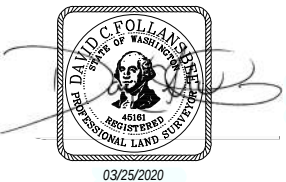
Project Title:
**ISSAQUAH HIGH
SCHOOL
AND ELEMENTARY
SCHOOL**

Client:
**ISSAQUAH
SCHOOL DISTRICT**
65 NW HOLLY STREET
ISSAQUAH, WA 98027
TOM MULLINS

Job No.
2180412.50

Issue Set & Date:

AUGUST 14, 2019



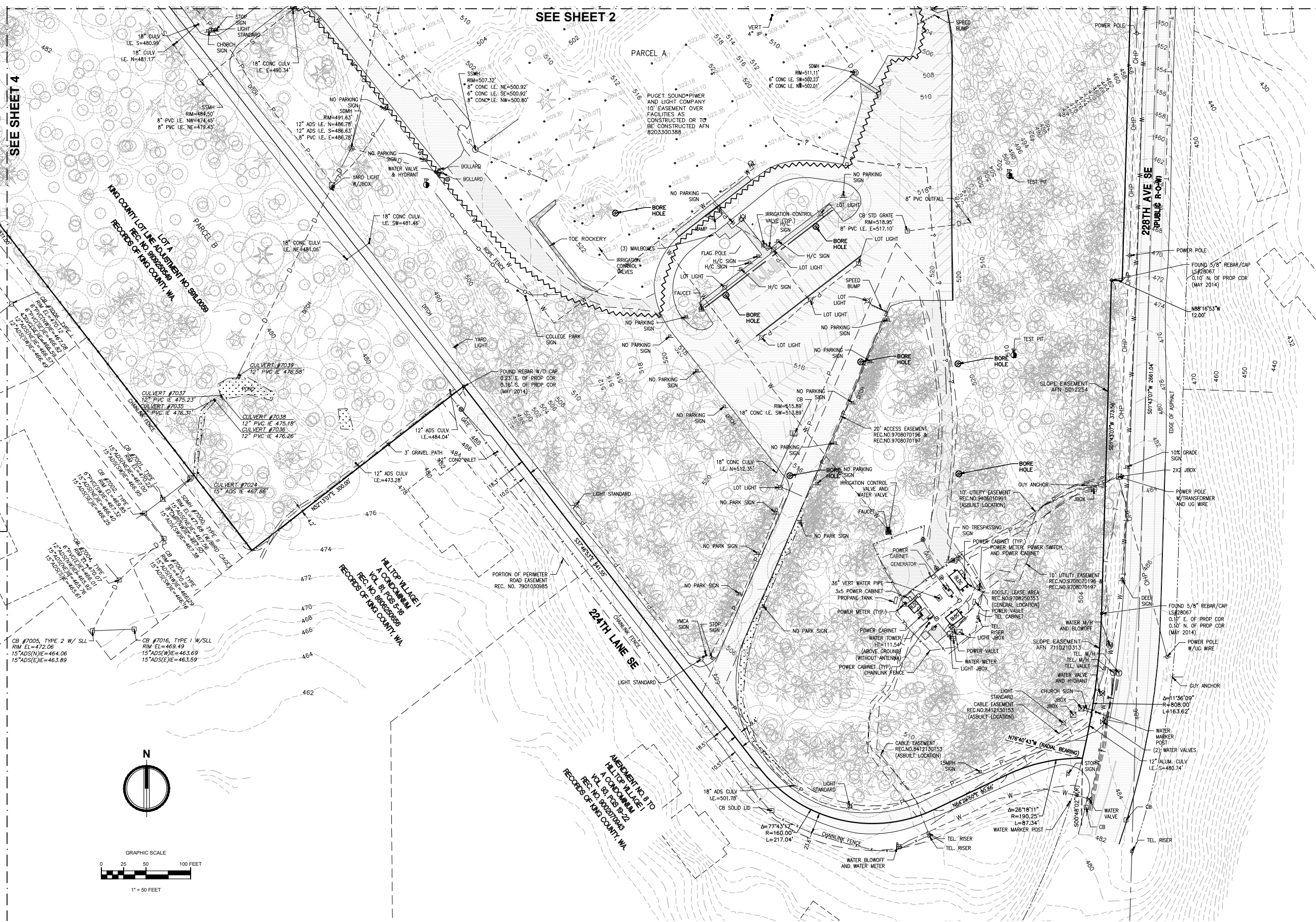
NOTICE
ALTERATION OF THIS DOCUMENT SHALL INVALIDATE THE
PROFESSIONAL SEAL AND SIGNATURE. PURSUANT TO
THIS DOCUMENT DOES NOT CONSTITUTE A GUARANTEE
OR WARRANTY. THIS DOCUMENT IS THE PROPERTY OF
DAVID C. POLLANS, P.L.S. AND IS NOT TO BE USED FOR ANY OTHER PROJECT.

Revisions:

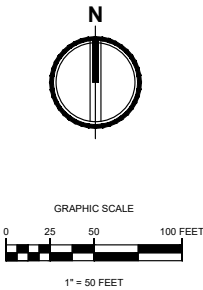
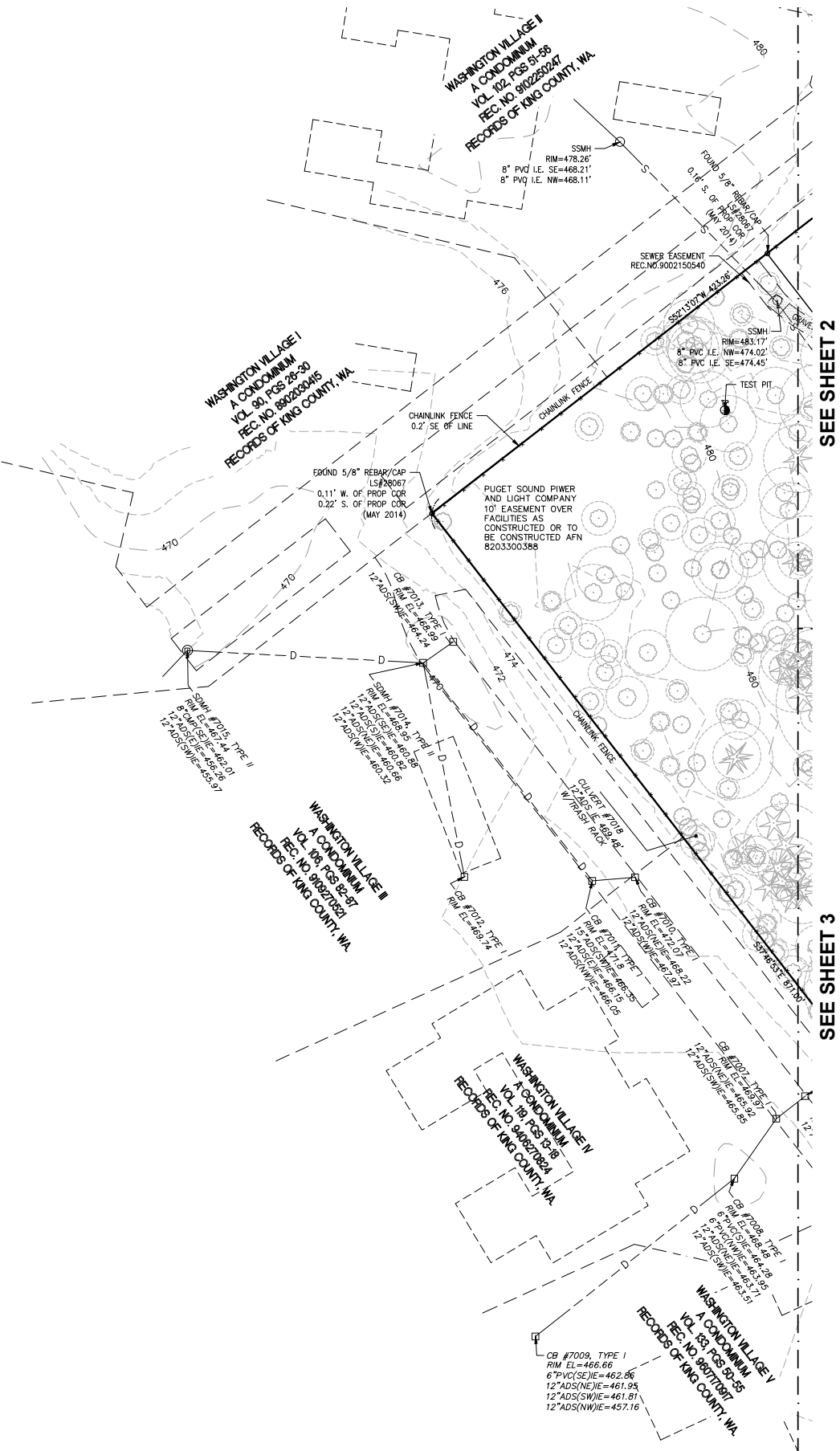
Sheet Title:
**TOPOGRAPHIC
SURVEY**

Designed by: Drawn by: Checked by:
TD DF

Sheet No.
A-2
3 of 4 Sheets



ISSAQUAH HIGH SCHOOL AND ELEMENTARY SCHOOL
A PORTION OF THE NE 1/4 OF SEC. 16, TWN. 24 N., RGE. 06 E. W.M.
CITY OF ISSAQUAH, KING COUNTY, WASHINGTON.



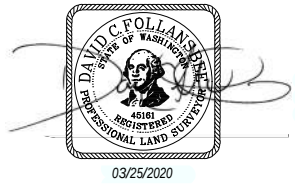
AHBL
TACOMA • SEATTLE • SPOKANE • TRI-CITIES
2215 North 30th Street, Suite 300 Tacoma, WA 98403
253.383.2422 TEL 253.383.2572 FAX www.ahbl.com WEB

Project Title:
**ISSAQUAH HIGH
SCHOOL
AND ELEMENTARY
SCHOOL**

Client:
**ISSAQUAH
SCHOOL DISTRICT**
65 NW HOLLY STREET
ISSAQUAH, WA 98027
TOM MULLINS

Job No.
2180412.50

Issue Set & Date:
AUGUST 14, 2019



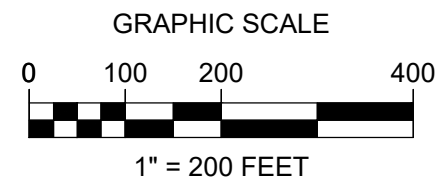
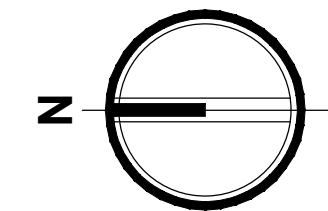
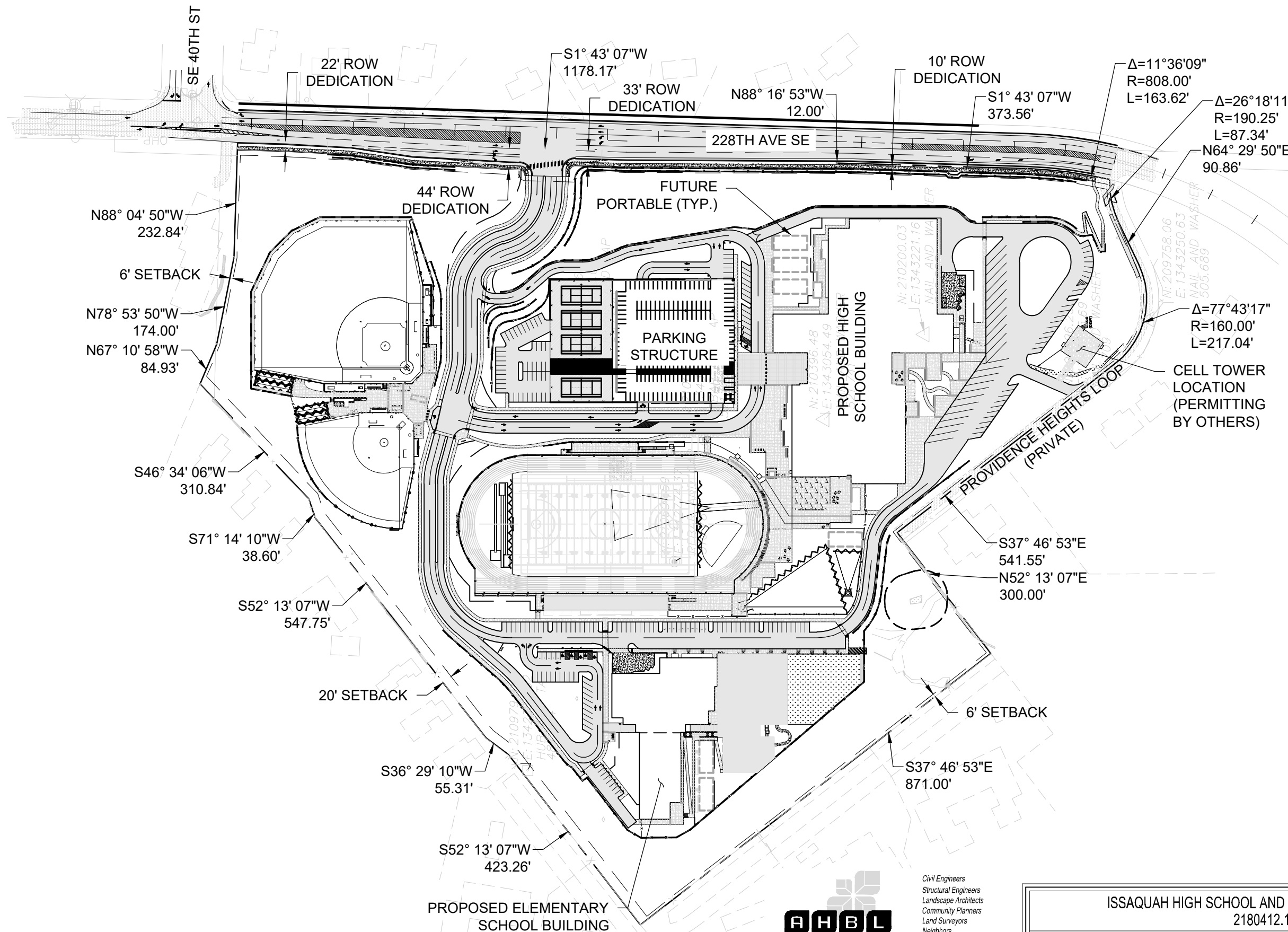
NOTICE
ALTERATION OF THIS DOCUMENT SHALL INVALIDATE THE
PROFESSIONAL SEAL AND SIGNATURE. PURSUANT TO
THIS DOCUMENT DOES NOT DEROGATE FROM RESERVED
OWNERSHIP RIGHTS IN IT. THIS DOCUMENT IS FOR USE
ONLY FOR THE PROJECT IDENTIFIED IN THE TITLE BLOCK
AND IS NOT TO BE USED FOR OTHER PURPOSES OR
ADDITION TO THAT PROJECT OR FOR ANY OTHER PROJECT.

Revisions:	

Sheet Title:
**TOPOGRAPHIC
SURVEY**

Designed by: Drawn by: Checked by:
TD DF

Sheet No.
A-2
4 of 4 Sheets



AHBL

TACOMA • SEATTLE

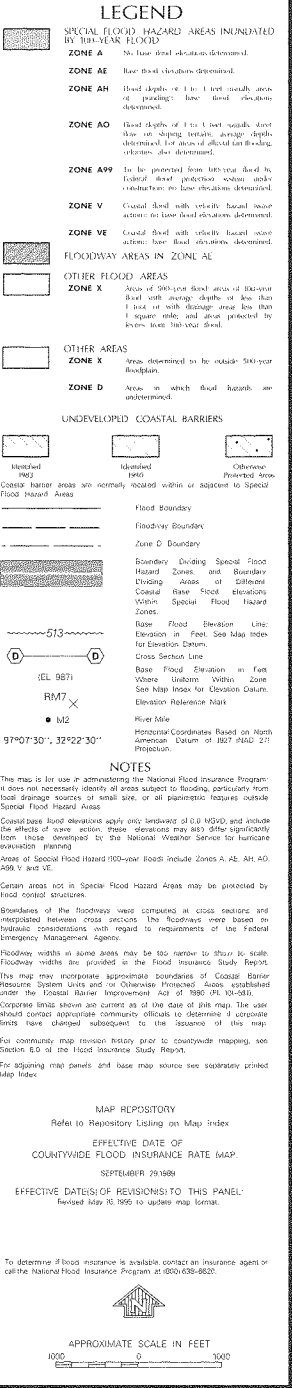
2215 North 30th Street, Suite 300, Tacoma, WA 98403 253.383.2422 TEL
316 Occidental Avenue South, Suite 320, Seattle, WA 98104 206.267.2425 TEL

Civil Engineers
Structural Engineers
Landscape Architects
Community Planners
Land Surveyors
Neighbors

ISSAQUAH HIGH SCHOOL AND ELEMENTARY SCHOOL
2180412.10

DEVELOPED CONDITIONS MAP
04/01/2021

A-3



CRITICAL AQUIFER RECHARGE AREA CLASSIFICATION MAP

LEGEND

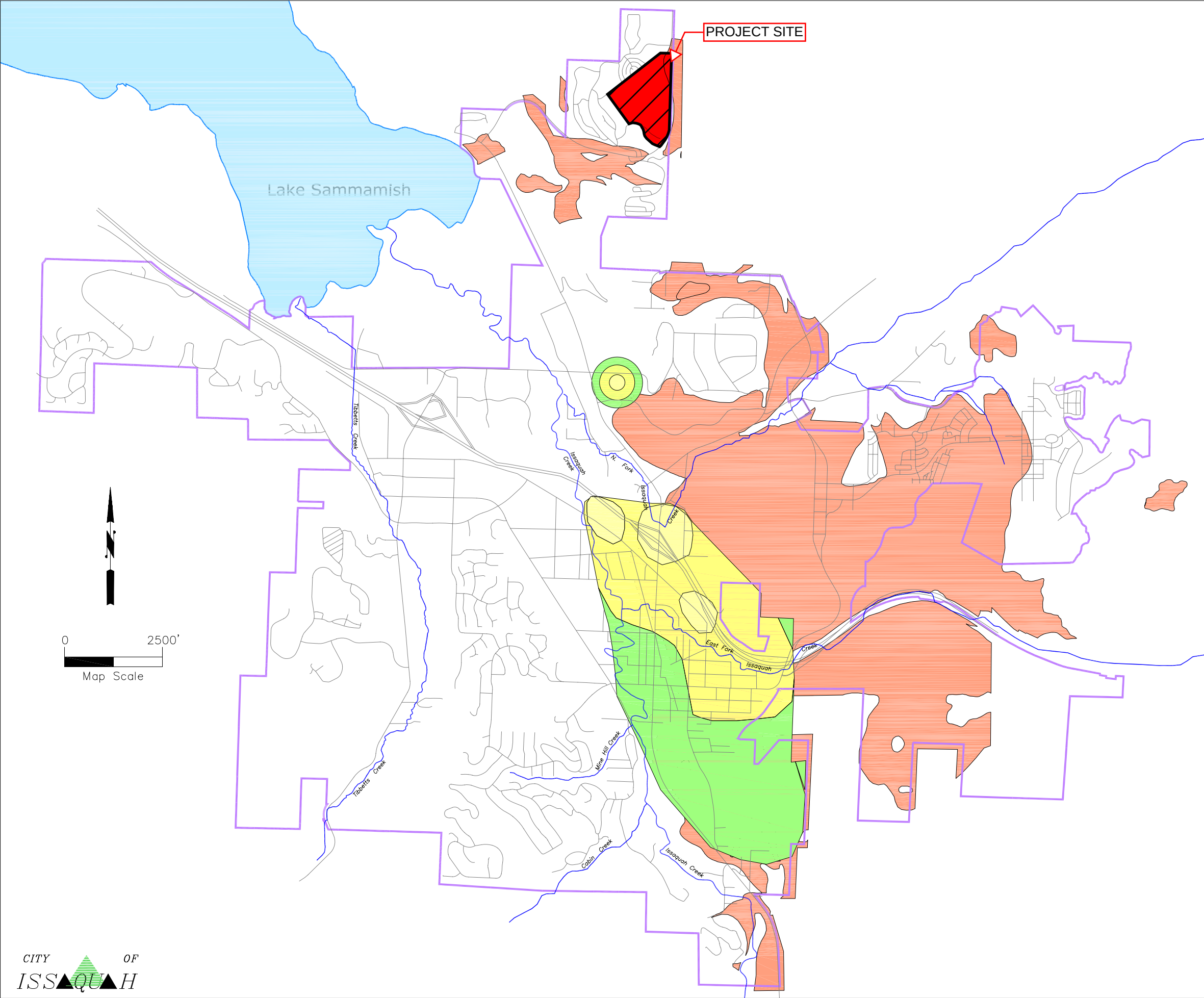
CARA CLASSES

-  Class 1 - 1 & 5 year Wellhead Capture Zone
-  Class 2 - 10 year Wellhead Capture Zone
-  Class 3 - High Aquifer Recharge Area

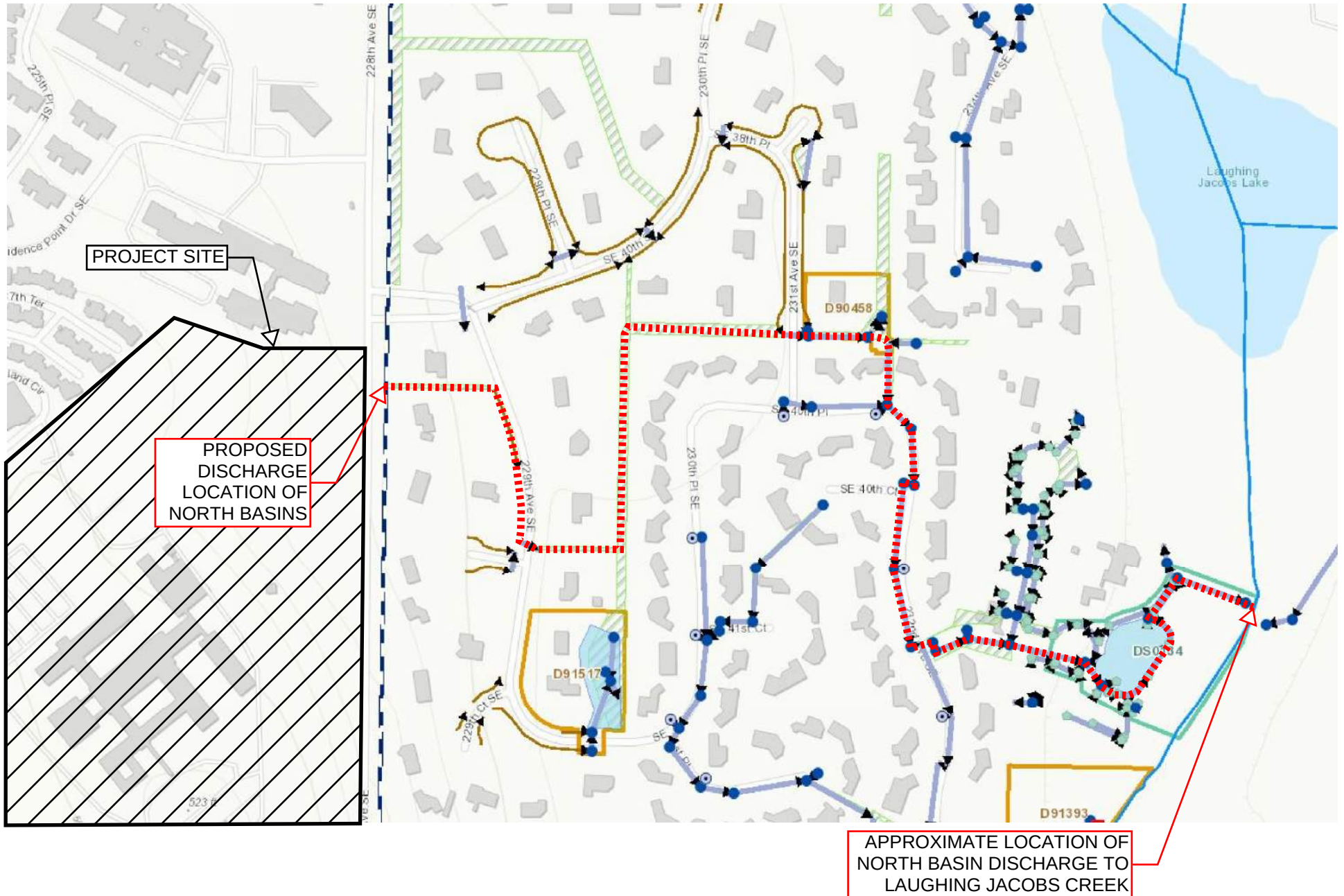
Notes:

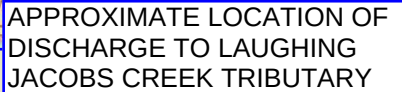
1) CARA Class 1 and Class 2 are based on wellhead capture zones that are documented in Lower Issaquah Valley Wellhead Protection Plan (Golder Associates, 1993) and Wellhead Protection Delineation for Overdale Well (Golder Associates, 1997).

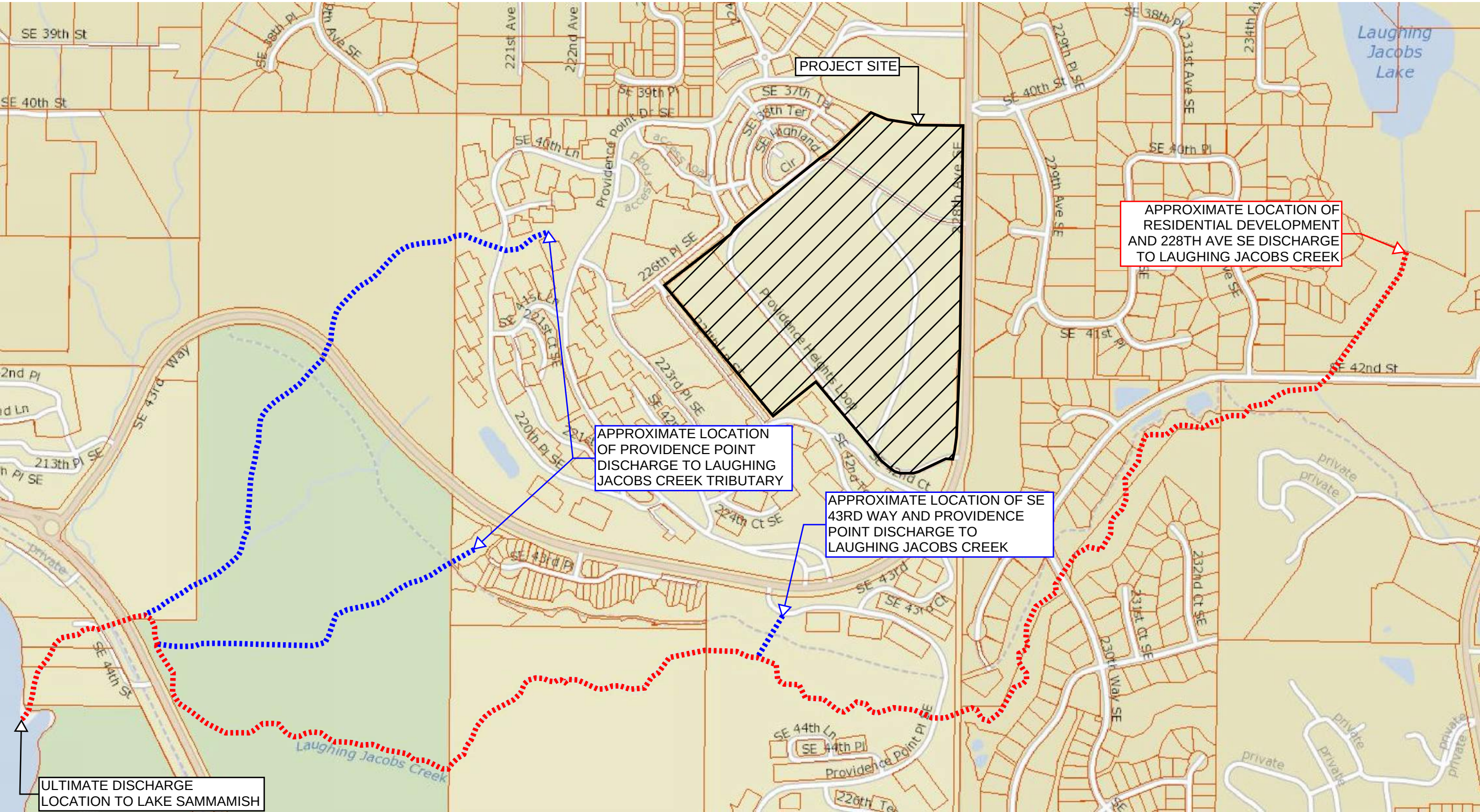
2) CARA Class 3– High Aquifer Recharge Area is based on surficial geology and soil units have high to moderate susceptibility to contamination. Sources for recharge area mapping include: Geologic Map of the Issaquah 7.5' Quadrangle (Booth and Minard, 1992) for all areas except Issaquah Highlands; Report on Geotechnical Services, Draft Environmental Impact Statement for Proposed Grand Ridge Development (Geoengineers, 1995) for Issaquah Highlands; and King County Soil Survey (U.S. Soil Conservation Service, 1973) for all areas.



Appendix A-6
Downstream Drainage Path Map







Subbasin Number: NA

1/9/2009

OFF-SITE ANALYSIS DRAINAGE SYSTEM TABLE

SURFACE WATER DESIGN MANUAL, CORE REQUIREMENT #2

Basin: Laughing Jacobs Creek

Subbasin Name:

Southwest Basin

Subbasin Number:

Basin 5

Symbol	Drainage Component Type, Name, and Size	Drainage Component Description	Slope	Distance from site discharge	Existing Problems	Potential Problems	Observations of field inspector, resource reviewer, or resident
see map	Type: sheet flow, swale, stream, channel, pipe, pond; Size: diameter, surface area	drainage basin, vegetation, cover, depth, type of sensitive area, volume	%	¼ ml = 1,320 ft.	constrictions, under capacity, ponding, overtopping, flooding, habitat or organism destruction, scouring, bank sloughing, sedimentation, incision, other erosion		tributary area, likelihood of problem, overflow pathways, potential impacts
1	PIPE FLOW	12" CMP PIPE	11.4%	37 FT	NONE	NONE	NONE
2	PIPE FLOW	12" CMP PIPE		24 FT	NONE	NONE	NONE
3	PIPE FLOW	12" CMP PIPE		52 FT	NONE	NONE	NONE
4	PIPE FLOW	12" CMP PIPE		160 FT	NONE	NONE	NONE
5	PIPE FLOW	18" CMP PIPE		90 FT	NONE	NONE	NONE
6	PIPE FLOW	18" CMP PIPE		123 FT	NONE	NONE	NONE
7	PIPE FLOW	12" CMP PIPE		69 FT	NONE	NONE	NONE
8	PIPE FLOW	12" CMP PIPE		146 FT	NONE	NONE	NONE
9	PIPE FLOW	12" CMP PIPE		42 FT	NONE	NONE	NONE
10	PIPE FLOW	21" CMP PIPE	3.82%	183 FT	NONE	NONE	NONE
3	CONVEYANCE DITCH	HEAVY VEGETATION		341 FT	NONE	NONE	NONE
4	EXISTING DETENTION 1	DETENTION POND	0%	53 FT	NONE	NONE	NONE
				1320 FT			

OFF-SITE ANALYSIS DRAINAGE SYSTEM TABLE

SURFACE WATER DESIGN MANUAL, CORE REQUIREMENT #2

Basin: Laughing Jacobs Creek

Subbasin Name:

Southwest Basin

Subbasin Number:

Basin 3

Symbol	Drainage Component Type, Name, and Size	Drainage Component Description	Slope	Distance from site discharge	Existing Problems	Potential Problems	Observations of field inspector, resource reviewer, or resident
see map	Type: sheet flow, swale, stream, channel, pipe, pond; Size: diameter, surface area	drainage basin, vegetation, cover, depth, type of sensitive area, volume	%	¼ mi = 1,320 ft.	constrictions, under capacity, ponding, overtopping, flooding, habitat or organism destruction, scouring, bank sloughing, sedimentation, incision, other erosion		tributary area, likelihood of problem, overflow pathways, potential impacts
1	PIPE FLOW	12" CMP CULVERT	2.4%	52 FT	NONE	NONE	NONE
2	PIPE FLOW	12" CMP PIPE	2.6%	195 FT	NONE	NONE	NONE
3	PIPE FLOW	12" CMP PIPE	2.4%	167 FT	NONE	NONE	NONE
4	PIPE FLOW	12" CMP PIPE	1.5%	22 FT	NONE	NONE	NONE
5	PIPE FLOW	12" CMP PIPE	3.0%	88 FT	NONE	NONE	NONE
6	PIPE FLOW	12" CMP PIPE	12.9%	85 FT	NONE	NONE	NONE
7	PIPE FLOW	12" CMP PIPE	5.0%	110 FT	NONE	NONE	NONE
8	PIPE FLOW	12" CMP PIPE	5.0%	31 FT	NONE	NONE	NONE
9	PIPE FLOW	12" CMP PIPE	5.0%	145 FT	NONE	NONE	NONE
10	PIPE FLOW	15" CMP PIPE	6.2%	160 FT	NONE	NONE	NONE
11	PIPE FLOW	18" CMP PIPE	1.0%	265 FT	NONE	NONE	NONE
				1320 FT			

OFF-SITE ANALYSIS DRAINAGE SYSTEM TABLE

SURFACE WATER DESIGN MANUAL, CORE REQUIREMENT #2

Basin: Laughing Jacobs Creek

Subbasin Name:

Southwest Basin

Subbasin Number: Basins 4, 6, 7

Symbol	Drainage Component Type, Name, and Size	Drainage Component Description	Slope	Distance from site discharge	Existing Problems	Potential Problems	Observations of field inspector, resource reviewer, or resident
see map	Type: sheet flow, swale, stream, channel, pipe, pond; Size: diameter, surface area	drainage basin, vegetation, cover, depth, type of sensitive area, volume	%	¼ ml = 1,320 ft.	constrictions, under capacity, ponding, overtopping, flooding, habitat or organism destruction, scouring, bank sloughing, sedimentation, incision, other erosion		tributary area, likelihood of problem, overflow pathways, potential impacts
1	PIPE FLOW	12" ALUM CULVERT		92 FT	NONE	NONE	NONE
2	PIPE FLOW	12" CMP PIPE		148 FT	NONE	NONE	NONE
3	PIPE FLOW	12" CMP PIPE		143 FT	NONE	NONE	NONE
4	PIPE FLOW	12" CMP PIPE	9.7%	144 FT	NONE	NONE	NONE
5	PIPE FLOW	12" PVC PIPE	10.3%	23 FT	NONE	NONE	NONE
6	PIPE FLOW	12" PVC PIPE	9.7%	125 FT	NONE	NONE	NONE
7	PIPE FLOW	12" PVC PIPE	9.1%	88 FT	NONE	NONE	NONE
8	PIPE FLOW	12" PVC PIPE	8.9%	70 FT	NONE	NONE	NONE
9	PIPE FLOW	12" PVC PIPE	8.7%	63 FT	NONE	NONE	NONE
10	PIPE FLOW	12" PVC PIPE	1.3%	52 FT	NONE	NONE	NONE
11	PIPE FLOW	36" CMP PIPE	14.8%	128 FT	NONE	NONE	NONE
12	PIPE FLOW	36" CMP PIPE		115 FT	NONE	NONE	NONE
13	PIPE FLOW	36" CMP PIPE		107 FT	NONE	NONE	NONE
14	CONVEYANCE DITCH	HEAVY VEGETATION		9 FT	NONE	NONE	NONE
				1320 FT			

2.3 APPLICABILITY OF THE MINIMUM REQUIREMENTS

2.3.1 Thresholds

Not all of the Minimum Requirements apply to every development or redevelopment project. The applicability varies depending on the project type and size. This section identifies thresholds that determine the applicability of the Minimum Requirements to projects. Use the flow charts in Figures 2.2, 2.3, and 2.4 to determine which of the Minimum Requirements apply. The Minimum Requirements themselves are presented in Section 3.

Use the thresholds in sections 2.3 and 2.4 at the time of application for a subdivision, plat, short plat, building permit, or other construction permit. The plat or short plat approval shall identify all stormwater BMPs that are required for each lot. For projects involving only land disturbing activities, (e.g., clearing or grading), the thresholds apply at the time of application for the permit allowing or authorizing that activity. Note the exemption in Section 2.1 for forest practices other than Class IV General.

Figure 2.2. Flow Chart for Determining Whether Site is Regulated

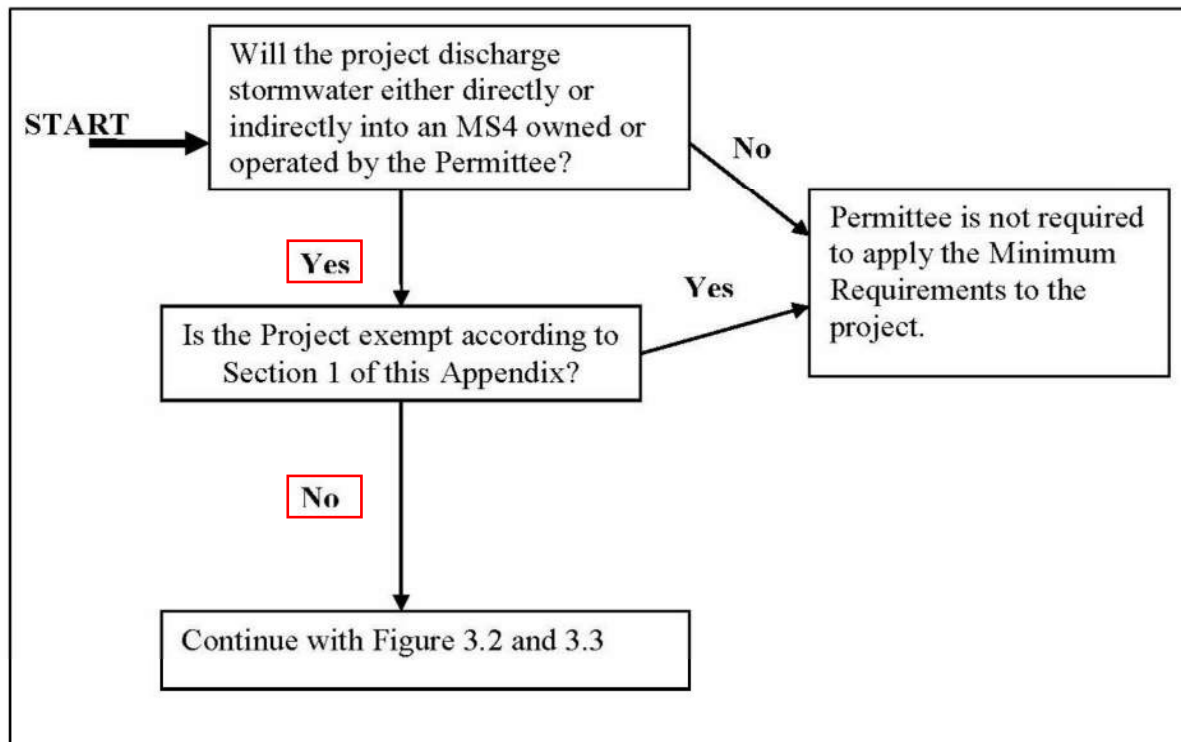


Figure 2.3. Flow Chart for Determining Requirements for New Development

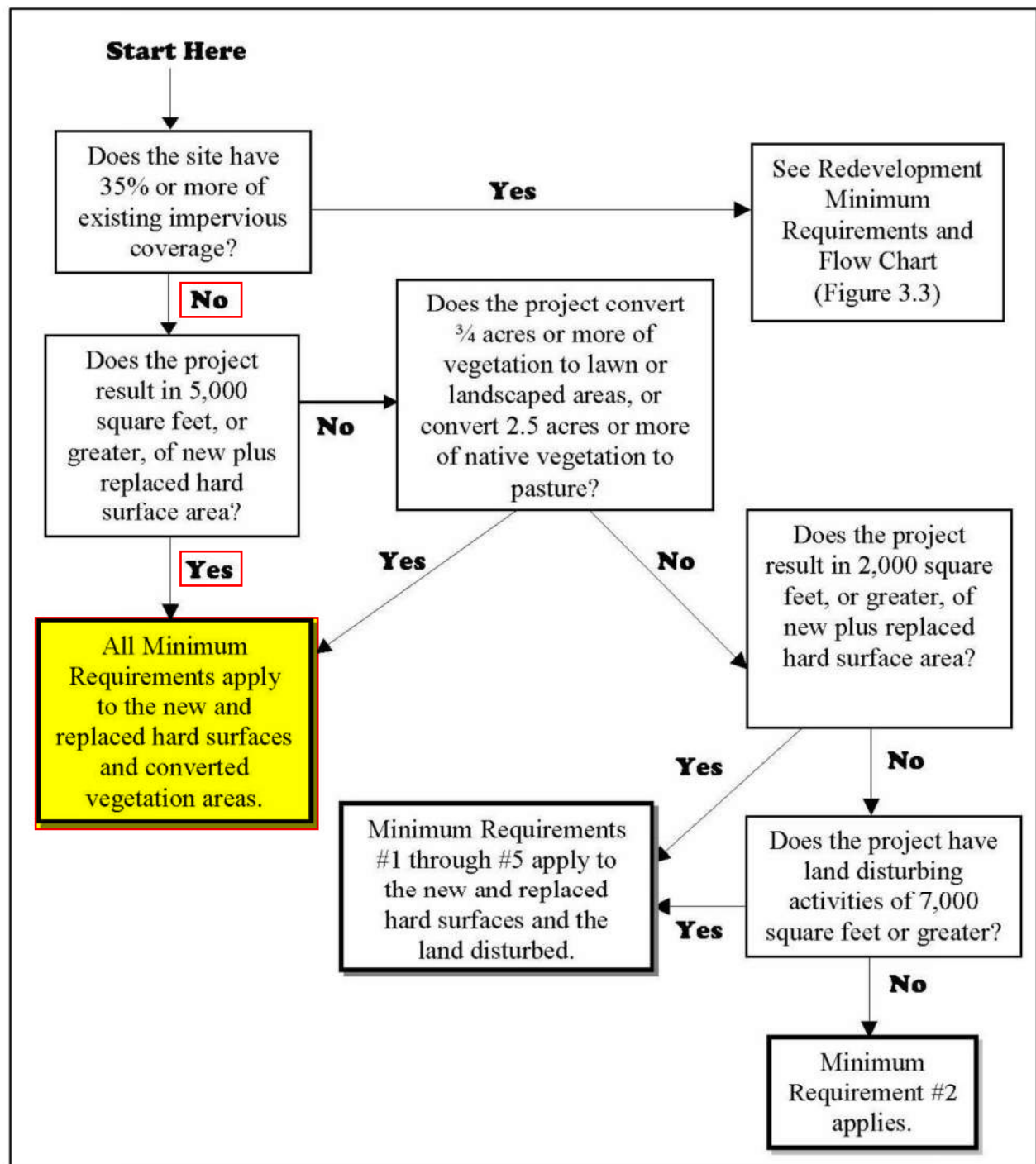


Table 1-1 PROJECT SCREENING FOR STORMWATER REVIEW

Project Type ^b	Screening Thresholds ^a		Minimum Requirements ^a			
	Hard Surfaces	Land Clearing	MR #1-5	MR #6-9	Stormwater Facility Target Surfaces ^d	Pre-Dev Cond.
1. TESC Only	<2000 SF new plus replaced hard surfaces	<7000 SF land disturbance	MR #2 – Construction Stormwater Pollution Prevention Plan			
2. New Development – All projects^c	2000-5000 SF new plus replaced hard surfaces	7000-32,670 SF land disturbance	✓		--	--
	>5000 SF new plus replaced hard surfaces	>32,670 SF land disturbance	✓	✓	<u>New and replaced hard surfaces</u>	Forested
3a. Redevelopment - Value of proposed improvements is <50% of value of existing site improvements^c	2000-5000 SF new plus replaced hard surfaces	7000-32,670 SF land disturbance	✓		--	--
	>5000 SF new plus replaced hard surfaces	>32,670 SF land disturbance	✓	✓	<u>New hard surfaces only</u>	Forested
3b. Redevelopment - Value of proposed improvements is >50% of value of existing site improvements^c	2000-5000 SF new plus replaced hard surfaces	7000-32,670 SF land disturbance	✓		--	--
	>5000 SF new plus replaced hard surfaces	>32,670 SF land disturbance	✓	✓	<u>New and replaced hard surfaces</u>	Forested
4a. Transportation redevelopment - New hard surfaces add <50% to existing hard surfaces	2000-5000 SF new plus replaced hard surfaces	7000-32,670 SF land disturbance	✓		--	--
	>5000 SF new plus replaced hard surfaces	>32,670 SF land disturbance	✓	✓	<u>New hard surfaces only</u>	Forested
4b. Transportation redevelopment - New hard surfaces add >50% to existing hard surfaces	2000-5000 SF new plus replaced hard surfaces	7000-32,670 SF land disturbance	✓		--	--
	>5000 SF new plus replaced hard surfaces	>32,670 SF land disturbance	✓	✓	<u>New and replaced hard surfaces</u>	Forested
5. Central Issaquah Alternative Flow Control Area (see Figure 2-5) – All projects	2000-5000 SF new plus replaced hard surfaces	7000-32,670 SF land disturbance	✓		--	--
	>5000 SF new plus replaced hard surfaces	>32,670 SF land disturbance	✓	✓	<u>New hard surfaces only</u>	Existing

^aSee Chapter 2 for requirements, following the flow charts in Figures 2-4 and 2-4 and referring to Minimum Requirements for specific criteria.

^bSee Chapter 2.1 for additional exemptions.

^cNew Development are sites with <35% existing impervious coverage; Redevelopment are sites with >35% existing impervious coverage.

^dStormwater Facility Target Surfaces: for flow control and water quality treatment. Onsite Stormwater BMPs required under MR #5.

TABLE 1-2 REQUIREMENTS FOR WATER QUALITY (MR #6)	
Thresholds	- Required for projects with new or replaced <i>pollution generating hard surface</i> > 5000 sf and for <i>pollution generating pervious surface</i> >3/4 ac. (see Target Surface definition under project type). - Oil control is required for high use sites
Standards	- Phosphorus treatment is required for projects discharging to streams. - Enhanced treatment for certain land uses and oil control for high use sites. - Pretreatment or Basic treatment is required prior to infiltration.
Surfaces	Pollution generating hard surfaces and pollution generating pervious surface (e.g., landscaping, turf fields, etc.)
Facility types	See Section 1.2.2.3 and Table 1-4. Treatment systems must be sized for the entire flow draining to the facility, not just additional areas added as part of a redevelopment project.

TABLE 1-3 REQUIREMENTS FLOW CONTROL (MR #7)	
Threshold	Evaluate projects with >5000 sf of new and/or replaced impervious surface to determine which of these criteria apply: - All sites with <i>Total effective impervious surface</i> >10,000 sf, or >3/4 acres of vegetation converted to lawn or landscape, or - Increase in the 100-year discharge compared to pre-project condition is 0.10 or 0.15 cfs (depending on WWHM model time step used). <i>Note: thresholds apply separately to each threshold discharge area</i>
Standard	Match developed discharge durations to pre-developed duration for the range of pre-developed discharge rates from 50% of the 2-year peak flow up to the full 50-year peak flow (i.e., "Level 2").
Target Surfaces	See Table 1-1 for summary, as further described in Chapter 2, to determine whether target surfaces include new or new plus replaced hard surfaces.
Pre-Developed Assumption	Depends on project type and location (see Fig. 2.3 and 2.4): - New Development (>35% existing impervious): Forested - Redevelopment (>35% existing impervious): Existing - Central Issaquah Area Alternative Flow Control Standard (new and redevelopment): Existing
Soils	Soil type shall be assumed to be existing site conditions, except as follows: <u>Saturated pre-development soils</u> can be assumed if applicants can demonstrate through a soil investigation that the site was historically (i.e., prior to European settlement) seasonally saturated.
Facility types	Flow control can be achieved through any combination of engineered facilities (e.g., stormwater pond or vault), infiltration to groundwater, and stormwater LID techniques.
Exemptions	Direct discharge to Lake Sammamish is exempt from flow control requirements, assuming the conveyance system is designed to accommodate the design peak discharge under full build-out condition for the local drainage area.

TABLE 1-5 REQUIREMENTS FOR ON-SITE STORMWATER BMPs (MR#5)				
Surface	How Evaluated	BMPs to be Evaluated for Feasibility		General Criteria ^a
		Projects that trigger MR#1-MR#5	Projects that Trigger MR#6-MR#9	
Lawn/ Landscaped Areas	Required in all projects.	1. Post-Construction Soil Quality and Depth (BMP T5.13; IMC 18.12.140)		De-compact and add topsoil meeting pH and organic criteria to depth of 8 inches.
Roofs	Use BMPs that are determined to be feasible, evaluated in order listed, until full BMP criteria is met.	2a. Full Dispersion (BMP T5.30), <u>or</u> Downspout Full Infiltration Systems (BMP T5.10A). LESS THAN 65% NATIVE VEGETATION INFILTRATION NOT POSSIBLE		Full dispersion requires large native growth area: 6.5 times area of roof draining to it. Downspout infiltration requires less area but is subject to soil conditions.
		2b. Rain Gardens (BMP T5.14A), <u>or</u> Bioretention.	Same as MR#1-MR#5 except Bioretention in place of rain gardens. INADEQUATE INFILTRATION RATES, > 0.3 IN/HR	Area of rain garden or bioretention to be 5% of roof area draining to it, at depth of 6-12 inches. Bioretention adds engineering criteria on design infiltration rate.
		2c. Downspout Dispersion Systems (BMP T5.10B) NOT ENOUGH VEGETATED AREA TO DISPERSE SCHOOL ROOFS		Used if dispersion area is moderate (25-50 ft length) using splash blocks or gravel-filled trenches
		2d. Perforated Stub-out Connections (BMP T5.10C)		Used if dispersion area is minimal (<25 ft length) using perforated pipe in 24" wide gravel trench
		3a. Full Dispersion (BMP T5.30) LESS THAN 65% NATIVE VEGETATION		Full Dispersion: see #2a above.
Other Hard Surfaces (e.g., parking lots, sidewalks)	Use BMPs that are determined to be feasible, evaluated in order listed, until full BMP criteria is met.	3b. Permeable pavement (BMP T5.15), <u>or</u> Rain Gardens (BMP T5.14A)	Same as MR#1-MR#5 except Bioretention in place of rain gardens. INADEQUATE INFILTRATION RATES	Permeable pavement: All surfaces, except high use, roads >400 ADT, and other infeasibility criteria. Rain gardens/bioretention: see #2b above.
		3c. Sheet Flow Dispersion (BMP T5.12), or Concentrated Flow Dispersion (BMP T5.11) NOT ENOUGH VEGETATED AREA TO DISPERSE SCHOOL ROOFS		Sheet flow: min 10 ft or larger vegetated buffer next to parking lot or road. Concentrated flow dispersion requires 50 ft flow path and is limited to 700 sf of hard surface.

^a This is a generalized summary only, and does not reflect the BMP infeasibility criteria or competing needs assessment that may apply to the project and site. See BMP sheets in Ecology Manual for complete criteria.

2.4.5.5 List #2: On-site Stormwater Management BMPs for Projects Triggering Minimum Requirements #1 through #9

For each surface, consider the BMPs in the order listed for that type of surface. Use the first BMP that is considered feasible. No other On-site Stormwater Management BMP is necessary for that surface. Feasibility shall be determined by evaluation against:

1. Design criteria, limitations, and infeasibility criteria identified for each BMP in the *SWMMWW*; and
2. Competing Needs Criteria listed in Chapter 5 of Volume V of the *SWMMWW*.

Lawn and landscaped areas:

1. Post-Construction Soil Quality and Depth in accordance with BMP T5.13 in Chapter 5 of Volume V of the *SWMMWW*

Roofs:

1. Full Dispersion in accordance with BMP T5.30 in Chapter 5 of Volume V of the *SWMMWW*, or Downspout Full Infiltration Systems in accordance with BMP T5.10A in Section 3.1.1 of Volume III of the *SWMMWW* **LESS THAT 65% NATIVE VEGETATION INFILTRATION NOT POSSIBLE**
2. Bioretention (See Chapter 7 of Volume V of the *SWMMWW*) facilities that have a minimum horizontally projected surface area below the overflow which is at least 5% of the of the total surface area draining to it **INADEQUATE INFILTRATION RATES, > 0.3 IN/HR**
3. Downspout Dispersion Systems in accordance with BMP T5.10B in Section 3.1.2 of Volume III of the *SWMMWW* **NOT ENOUGH VEGETATED AREA TO DISPERSE SCHOOL ROOFS**
4. Perforated Stub-out Connections in accordance with BMP T5.10C in Section 3.1.3 of Volume III of the *SWMMWW*.

Other Hard Surfaces:

3. Full Dispersion in accordance with BMP T5.30 in Chapter 5 of Volume V of the *SWMMWW* **LESS THAT 65% NATIVE VEGETATION**
4. Permeable pavement² in accordance with BMP T5.15 in Chapter 5 of Volume V of the *SWMMWW* **INADEQUATE INFILTRATION RATES**

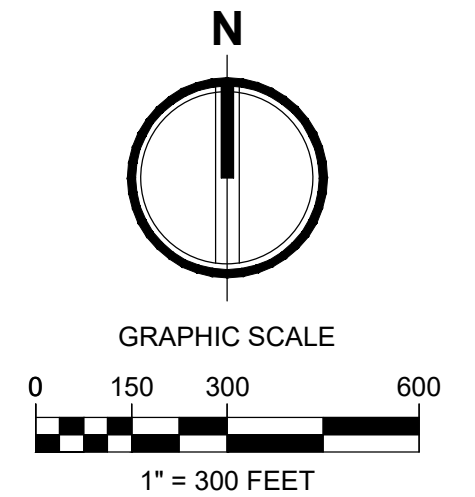
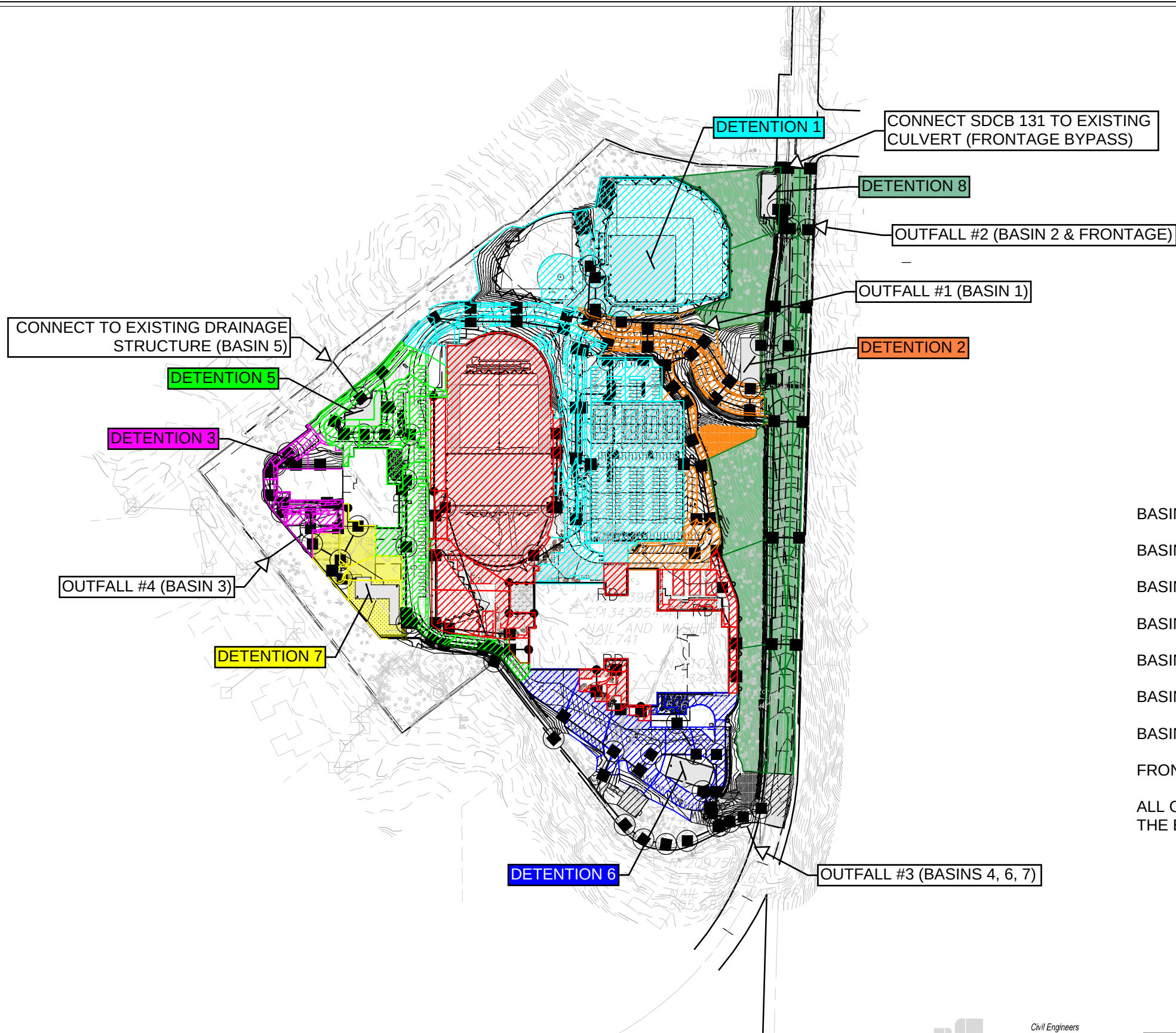
5. Bioretention (See Chapter 7, Volume V of the *SWMMWW*) facilities that have a minimum horizontally projected surface area below the overflow which is at least 5% of the total surface area draining to it. INADEQUATE INFILTRATION RATES, > 0.3 IN/HR
6. Sheet Flow Dispersion in accordance with BMP T5.12, or Concentrated Flow Dispersion in accordance with BMP T5.11 in Chapter 5 of Volume V of the *SWMMWW*

NOT ENOUGH VEGETATED AREA
TO DISPERSE SCHOOL ROOFS

Appendix B

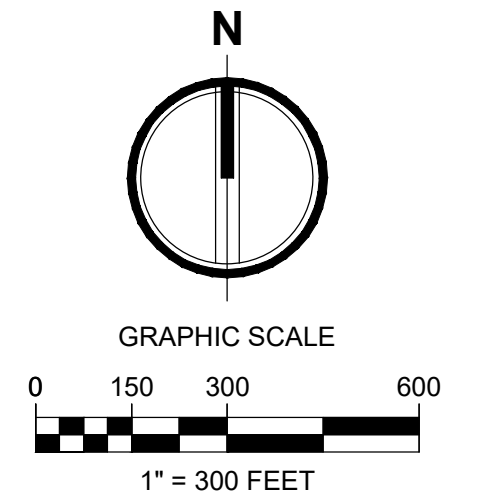
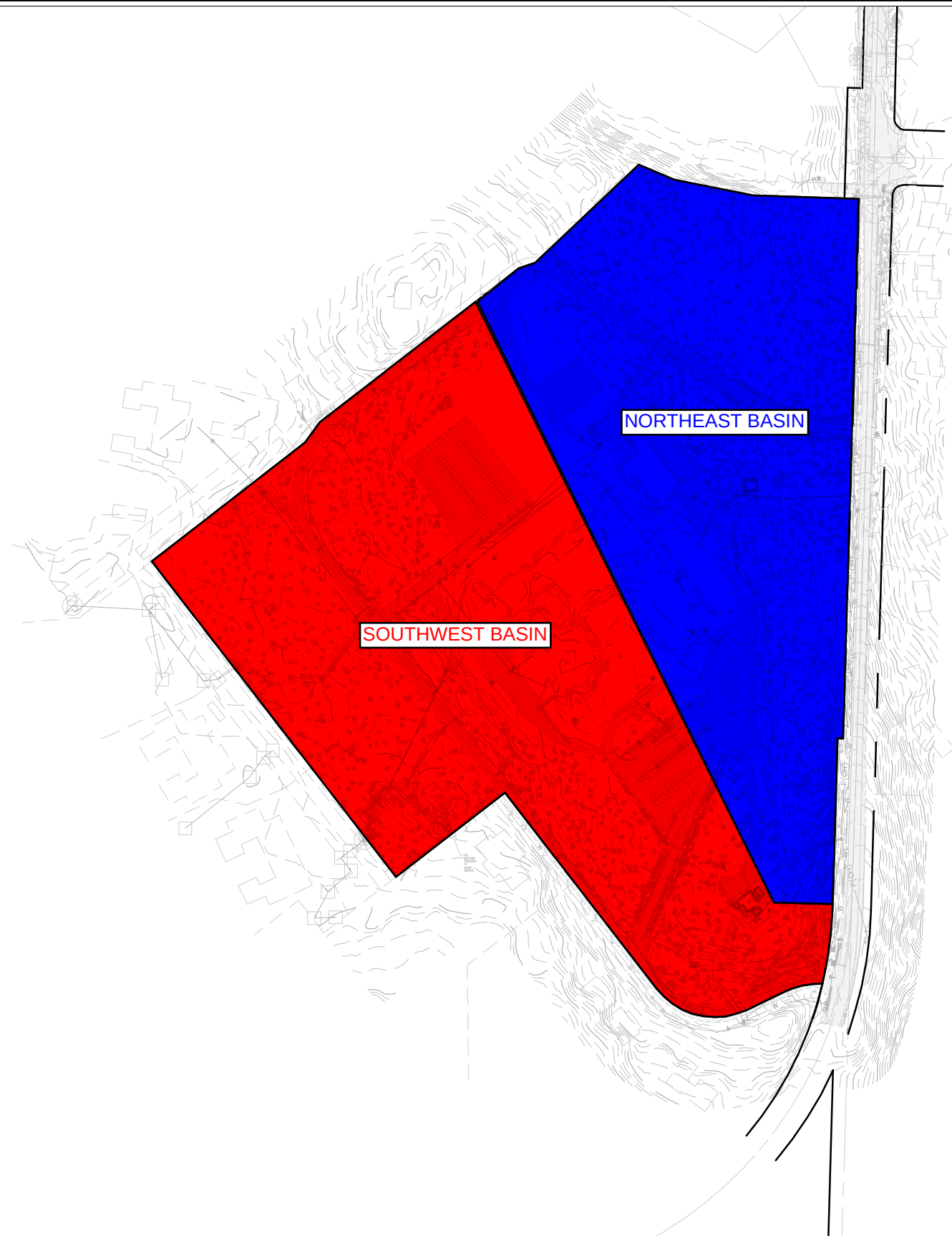
Stormwater Calculations

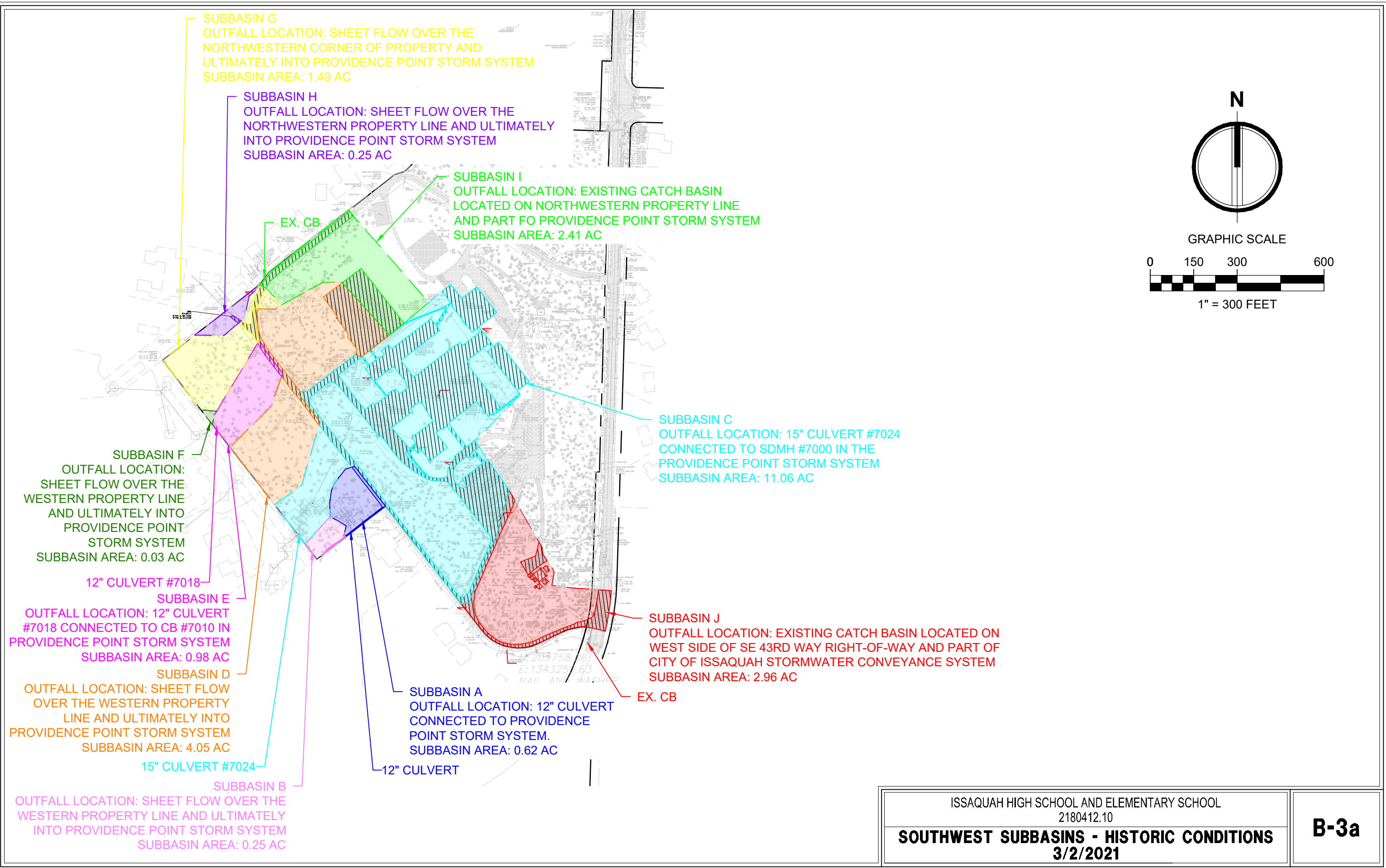
B-1.....	Developed Basin Map
B-2.....	Predeveloped Basin Map
B-3a.....	Southwest Subbasins – Historic Conditions
B-3b.....	Southwest Subbasins – Developed Conditions
B-4.....	WWHM Treatment Calculations
B-5.....	WWHM Flow Control Calculations
B-6.....	R-Tank Maintenance Row Sizing
B-7.....	BioPod DOE GULD
B-8.....	Storm and Sanitary Sewer Conveyance Analysis
B-9.....	Overflow Conveyance Analysis

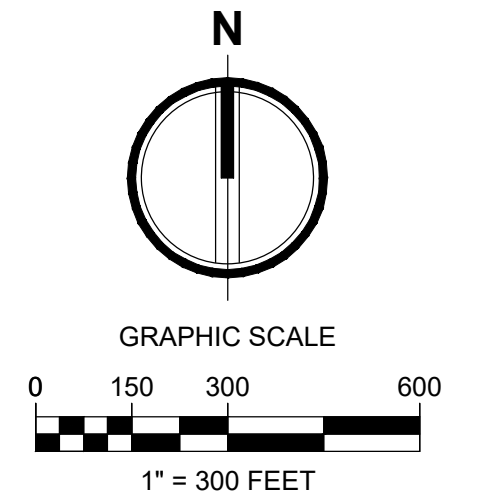
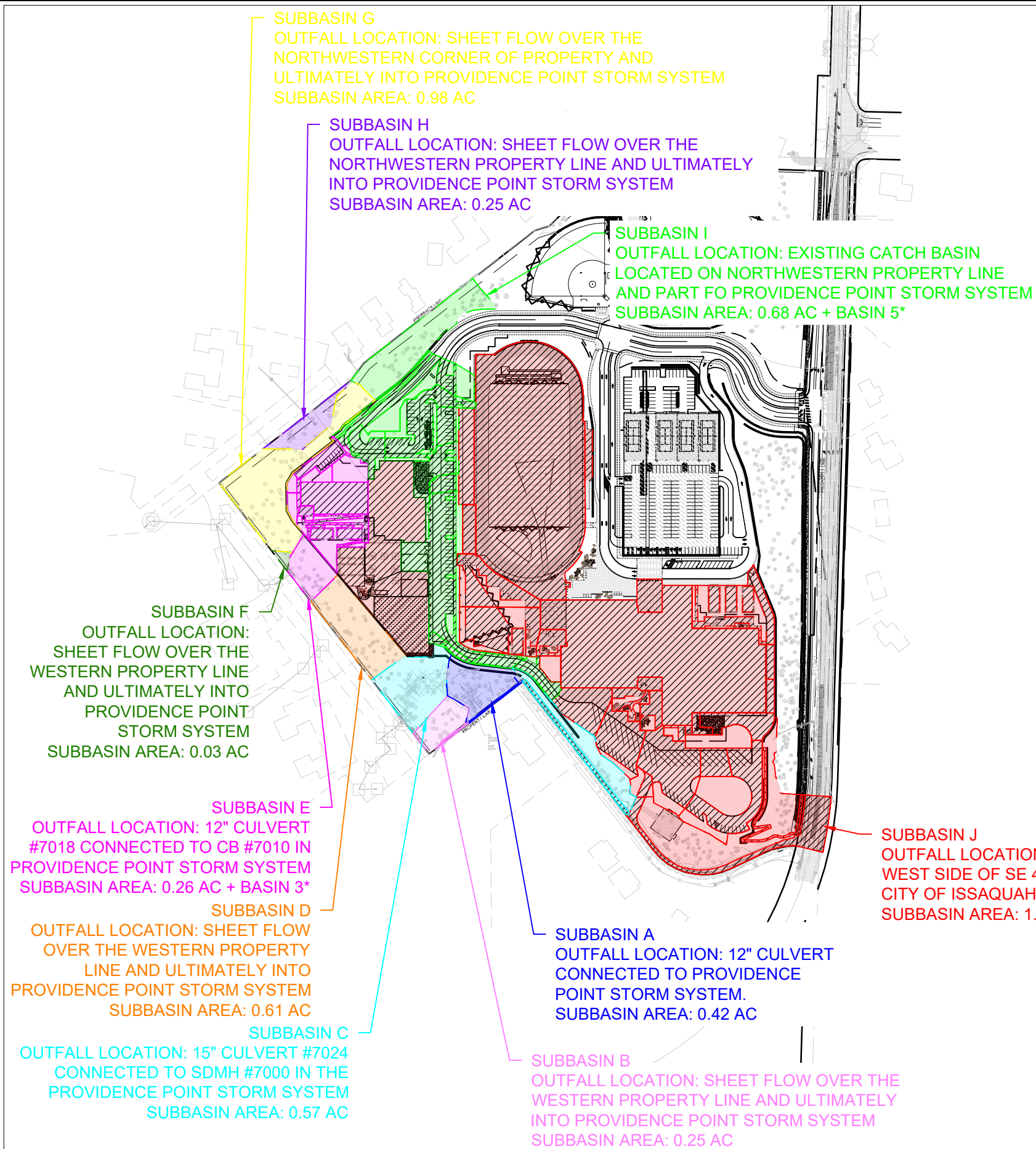


- BASIN 1
- BASIN 2
- BASIN 3
- BASIN 4
- BASIN 5
- BASIN 6
- BASIN 7
- FRONTAGE BASIN

ALL OTHER SURFACES HAVE BEEN INCLUDED IN THE BYPASS BASINS. REFER TO FIGURE B-2.







* DISCHARGE FROM THE PROPOSED SOUTHWEST BASIN DETENTION SYSTEMS FLOWS TO THE HISTORIC DISCHARGE LOCATIONS OF SUBBASIN E, I, AND J. THESE PROPOSED DISCHARGE RATES HAVE BEEN INCLUDED IN THE PEAK FLOW TABLES PROVIDED IN THE NARRATIVE OF THIS REPORT. THESE DEVELOPED ONSITE BASINS ARE SHOWN AS THE SAME COLOR AS THEIR DISCHARGE SUBBASINS.

ISSAQUAH HIGH SCHOOL AND ELEMENTARY SCHOOL
2180412.10

SOUTHWEST SUBBASINS - DEVELOPED CONDITIONS
3/2/2021

B-3b

Figure B-4

WWHM Treatment Calculations

Basin 1

Basin 1 Mitigated

Subbasin Name: Basin 1 ☐ Designate as Bypass for POC:

Flows To : Surface Interflow Groundwater
Detention 1 Detention 1

Area in Basin ☒ Show Only Selected

Available Pervious	Acres	Available Impervious	Acres
☒ C, Forest, Mod	0	☒ ROADS/MOD	7.15
☒ C, Forest, Steep	0		
☒ C, Pasture, Mod	2.4		

Pervious Total 2.4 Acres

Impervious Total 7.15 Acres

Basin Total 9.55 Acres

Per Figure B-5, ACF Environmental R-Tank Maintenance Row Sizing is based on the water quality flow rate discharging to the proposed R-Tank detention system. These treatment modules are proposed for maintenance purposes only, per manufacturer's recommendations, and no water quality credit is being taken for these R-Tank maintenance Rows.

$$\# \text{ of Treatment Modules} = \frac{\text{Design Flow Rate (cfs)}}{\text{Unit Flow Per Modules (cfs)}} = \frac{\text{Water Quality Flow Rate (cfs)}}{0.191 \text{ cfs}}$$

Water Quality	
On-Line BMP	Off-Line BMP
24 hour Volume (ac-ft) 1.0883	
Standard Flow Rate (cfs) 1.4958	Standard Flow Rate (cfs) 0.8392

$$\# \text{ of Treatment Modules} = \frac{1.4958 \text{ cfs}}{0.191 \text{ cfs}} = 7.83 \text{ Treatment Modules}$$

8 R-Tank treatment modules are proposed at the inlet of Detention 1.

Per Section 1-2.5.6 of the 2014 SMMWW, water quality facilities proposed downstream of detention facilities must utilize the full 2-year release rate from the detention facility as the design flow rate. Refer to Figure B-4 for WWHM Flow Control Calculations.

Flow Frequency		
Flow(cfs)	Predeveloped	Mitigated
2 Year =	0.3936	0.2170
5 Year =	0.6690	0.3445
10 Year =	0.8879	0.4544
25 Year =	1.2063	0.6280
50 Year =	1.4741	0.7861
100 Year =	1.7683	0.9725

OldCastle Underground BioPod Biofilters shall be used for water quality treatment. BioPods have DOE GULD approval for Basic, Enhanced, and Phosphorus treatment, refer to Figure B-6, with a treatment rate of 1.6 gpm per square foot of media surface and a minimum media thickness of 18".

$$0.2170 \text{ cfs} = 97.3967 \text{ gpm}$$

$$97.3967 \text{ gpm} / 1.6 \text{ gpm/sf} = 61 \text{ sf}$$

A BPU-612 provides 72 sf of media surface (6'x12') which is larger than 61 sf.

A 54" flow splitter, SDCB 040 is proposed upstream of the proposed BioPod treatment structure due to the high 100-year overflow rates shown in Appendix B-9. This flow splitter has been designed to discharge the 2-year release rate from the detention facility to the proposed BioPod treatment structure while bypassing higher flows around this BioPod treatment structure.

Per Figure 4.2.21 – Riser Inflow Curves of the SWMMWW:

$$Q_{\text{weir}} = 9.739 D H^{3/2}$$

$$Q_{\text{orifice}} = 3.782 D^2 H^{1/2}$$

Q in cfs, D and H in feet

$$Q_{wq} = 0.2170 \text{ cfs}$$

$$0.2170 \text{ cfs} = 3.782 \times \left(\frac{D}{12} \text{ ft} \right)^2 \times (2 \text{ ft})^{1/2}$$

$$D = 2.417 = 2.5" \text{ used}$$

A 2.5" orifice plate is proposed on the WQ outlet pipe with 2' of head within the flow splitter, option A per Figure 4.5.1 of the SWMMWW.

Figure B-4

WWHM Treatment Calculations

Basin 2

 Basin 2 Mitigated X

Subbasin Name: ☐ Designate as Bypass for POC:

Flows To : **Surface** **Interflow** **Groundwater**

Area in Basin ☒ Show Only Selected

Available Pervious	Acres	Available Impervious	Acres
☒ C, Forest, Mod	0	☒ ROADS/MOD	1.55
☒ C, Forest, Steep	.2		
☒ C, Pasture, Mod	1.4		

Pervious Total	1.6	Acres
Impervious Total	1.55	Acres
Basin Total	3.15	Acres

Per Figure B-5, ACF Environmental R-Tank Maintenance Row Sizing is based on the water quality flow rate discharging to the proposed R-Tank detention system. These treatment modules are proposed for maintenance purposes only, per manufacturer's recommendations, and no water quality credit is being taken for these R-Tank maintenance Rows.

$$\# \text{ of Treatment Modules} = \frac{\text{Design Flow Rate (cfs)}}{\text{Unit Flow Per Modules (cfs)}} = \frac{\text{Water Quality Flow Rate (cfs)}}{0.191 \text{ cfs}}$$

Water Quality	
On-Line BMP	Off-Line BMP
24 hour Volume (ac-ft) 0.2700	
Standard Flow Rate (cfs) 0.3212	Standard Flow Rate (cfs) 0.1782

$$\# \text{ of Treatment Modules} = \frac{0.3212 \text{ cfs}}{0.191 \text{ cfs}} = 1.682 \text{ Treatment Modules}$$

2 R-Tank treatment modules are proposed at the inlet of Detention 2.

Per Section 1-2.5.6 of the 2014 SMMWW, water quality facilities proposed downstream of detention facilities must utilize the full 2-year release rate from the detention facility as the design flow rate. Refer to Figure B-4 for WWHM Flow Control Calculations.

Flow Frequency		
Flow (cfs)	Predeveloped	Mitigated
2 Year =	0.1298	0.0795
5 Year =	0.2207	0.1194
10 Year =	0.2929	0.1522
25 Year =	0.3979	0.2022
50 Year =	0.4862	0.2463
100 Year =	0.5833	0.2969

OldCastle Underground BioPod Biofilters shall be used for water quality treatment. BioPods have DOE GULD approval for Basic, Enhanced, and Phosphorus treatment, refer to Figure B-6, with a treatment rate of 1.6 gpm per square foot of media surface and a minimum media thickness of 18".

$$0.0795 \text{ cfs} = 35.6822 \text{ gpm}$$

$$\frac{35.6822 \text{ gpm}}{1.6 \text{ gpm/sf}} = 22.3 \text{ sf}$$

A BPU-48-IB provides 24 sf of media surface (4'x6') which is larger than 22.3 sf.

Figure B-4

WWHM Treatment Calculations

Basin 3

Basin 3 Mitigated

Subbasin Name: Basin 3

☐ Designate as Bypass for POC:

Flows To :

Surface
 Detention 3

Interflow
 Detention 3

Groundwater

Area in Basin

☒ Show Only Selected

Available Pervious	Acres	Available Impervious	Acres
☒ C, Forest, Mod	0	☒ ROADS/FLAT	0
☒ C, Forest, Steep	0	☒ ROADS/STEEP	.6
☒ C, Pasture, Flat	0	☒ ROOF TOPS/FLAT	0
☒ C, Pasture, Steep	.45	☒ SIDEWALKS/FLAT	0

Pervious Total: 0.45 Acres
 Impervious Total: 0.6 Acres
 Basin Total: 1.05 Acres

Per Figure B-5, ACF Environmental R-Tank Maintenance Row Sizing is based on the water quality flow rate discharging to the proposed R-Tank detention system. These treatment modules are proposed for maintenance purposes only, per manufacturer's recommendations, and no water quality credit is being taken for these R-Tank maintenance Rows.

$$\# \text{ of Treatment Modules} = \frac{\text{Design Flow Rate (cfs)}}{\text{Unit Flow Per Modules (cfs)}} = \frac{\text{Water Quality Flow Rate (cfs)}}{0.191 \text{ cfs}}$$

Water Quality	
On-Line BMP	Off-Line BMP
24 hour Volume (ac-ft) 0.1060	
Standard Flow Rate (cfs) 0.1330	Standard Flow Rate (cfs) 0.0740

$$\# \text{ of Treatment Modules} = \frac{0.1330 \text{ cfs}}{0.191 \text{ cfs}} = 0.696 \text{ Treatment Modules}$$

1 R-Tank treatment modules are proposed at the inlet of Detention 3.

Per Section 1-2.5.6 of the 2014 SMMWW, water quality facilities proposed downstream of detention facilities must utilize the full 2-year release rate from the detention facility as the design flow rate. Refer to Figure B-4 for WWHM Flow Control Calculations.

Flow Frequency		
Flow(cfs)	Predeveloped	Mitigated
2 Year =	0.0433	0.0227
5 Year =	0.0736	0.0374
10 Year =	0.0976	0.0505
25 Year =	0.1326	0.0715
50 Year =	0.1621	0.0911
100 Year =	0.1944	0.1146

OldCastle Underground BioPod Biofilters shall be used for water quality treatment. BioPods have DOE GULD approval for Basic, Enhanced, and Phosphorus treatment, refer to Figure B-6, with a treatment rate of 1.6 gpm per square foot of media surface and a minimum media thickness of 18".

$$0.0227 \text{ cfs} = 10.1885 \text{ gpm}$$

$$10.1885 \text{ gpm} / 1.6 \text{ gpm/sf} = 6.4 \text{ sf}$$

A BPU-46-IB provides 16 sf of media surface (4'x4') which is larger than 6.4 sf.

Figure B-4

WWHM Treatment Calculations

Basin 4

Basin 4 Mitigated X

Subbasin Name: Basin 4 ☐ Designate as Bypass for POC:

Flows To : **Surface** Detention 4 **Interflow** Detention 4 **Groundwater**

Area in Basin ☒ Show Only Selected

Available Pervious	Acres	Available Impervious	Acres
☒ C, Forest, Mod	0	☒ ROADS/FLAT	0
☒ C, Forest, Steep	0	☒ ROADS/STEEP	0
☒ C, Pasture, Flat	.75	☒ ROOF TOPS/FLAT	3.1
☒ C, Pasture, Steep	0	☒ SIDEWALKS/FLAT	5.4

Pervious Total	0.75	Acres
Impervious Total	8.5	Acres
Basin Total	9.25	Acres

Per Figure B-5, ACF Environmental R-Tank Maintenance Row Sizing is based on the water quality flow rate discharging to the proposed R-Tank detention system. These treatment modules are proposed for maintenance purposes only, per manufacturer's recommendations, and no water quality credit is being taken for these R-Tank maintenance Rows.

$$\# \text{ of Treatment Modules} = \frac{\text{Design Flow Rate (cfs)}}{\text{Unit Flow Per Modules (cfs)}} = \frac{\text{Water Quality Flow Rate (cfs)}}{0.191 \text{ cfs}}$$

Water Quality	
On-Line BMP	Off-Line BMP
24 hour Volume (ac-ft) 1.2377	
Standard Flow Rate (cfs) 1.6150	Standard Flow Rate (cfs) 0.9125

$$\# \text{ of Treatment Modules} = \frac{1.6150 \text{ cfs}}{0.191 \text{ cfs}} = 8.455 \text{ Treatment Modules}$$

9 R-Tank treatment modules are proposed at the inlet of Detention 4.

Per Section 1-2.5.6 of the 2014 SMMWW, water quality facilities proposed downstream of detention facilities must utilize the full 2-year release rate from the detention facility as the design flow rate. Refer to Figure B-4 for WWHM Flow Control Calculations.

Water quality is provided for Basins 4, 6, and 7 in the same location, prior to the proposed discharge location near the southwest corner of the property into the existing 228th Ave SE conveyance system. Refer to Basin 7 for calculations used to size this treatment facility.

Figure B-4

WWHM Treatment Calculations

Basin 5

Basin 5 Mitigated X

Subbasin Name: Basin 5 ☐ Designate as Bypass for POC:

Flows To : **Surface** Detention 5 **Interflow** Detention 5 **Groundwater**

Area in Basin ☒ Show Only Selected

Available Pervious	Acres	Available Impervious	Acres
☒ C, Forest, Mod	0	☒ ROADS/FLAT	2.1
☒ C, Forest, Steep	0	☒ ROADS/STEEP	0
☒ C, Pasture, Flat	.75	☒ ROOF TOPS/FLAT	0
☒ C, Pasture, Steep	0	☒ SIDEWALKS/FLAT	0

Pervious Total	0.75	Acres
Impervious Total	2.1	Acres
Basin Total	2.85	Acres

Per Figure B-5, ACF Environmental R-Tank Maintenance Row Sizing is based on the water quality flow rate discharging to the proposed R-Tank detention system. These treatment modules are proposed for maintenance purposes only, per manufacturer's recommendations, and no water quality credit is being taken for these R-Tank maintenance Rows.

$$\# \text{ of Treatment Modules} = \frac{\text{Design Flow Rate (cfs)}}{\text{Unit Flow Per Modules (cfs)}} = \frac{\text{Water Quality Flow Rate (cfs)}}{0.191 \text{ cfs}}$$

Water Quality	
On-Line BMP	Off-Line BMP
24 hour Volume (ac-ft) 0.3210	
Standard Flow Rate (cfs) 0.3950	Standard Flow Rate (cfs) 0.2224

$$\# \text{ of Treatment Modules} = \frac{0.3950 \text{ cfs}}{0.191 \text{ cfs}} = 2.068 \text{ Treatment Modules}$$

3 R-Tank treatment modules are proposed at the inlet of Detention 5.

Per Section 1-2.5.6 of the 2014 SMMWW, water quality facilities proposed downstream of detention facilities must utilize the full 2-year release rate from the detention facility as the design flow rate. Refer to Figure B-4 for WWHM Flow Control Calculations.

Flow Frequency		
Flow(cfs)	Predeveloped	Mitigated
2 Year =	0.1175	0.0571
5 Year =	0.1996	0.0853
10 Year =	0.2650	0.1086
25 Year =	0.3600	0.1440
50 Year =	0.4399	0.1751
100 Year =	0.5277	0.2107

OldCastle Underground BioPod Biofilters shall be used for water quality treatment. BioPods have DOE GULD approval for Basic, Enhanced, and Phosphorus treatment, refer to Figure B-6, with a treatment rate of 1.6 gpm per square foot of media surface and a minimum media thickness of 18".

$$0.0571 \text{ cfs} = 25.6283 \text{ gpm}$$

$$25.6283 \text{ gpm} / 1.6 \text{ gpm/sf} = 16.02 \text{ sf}$$

A BPU-48-IB provides 24 sf of media surface (4'x6') which is larger than 16.02 sf.

WWHM Treatment Calculations


Basin 6 Mitigated
✕

Subbasin Name:

☐ Designate as Bypass for POC:

Surface
Flows To :

Interflow

Groundwater

Area in Basin

Available Pervious	Acres
☒ C, Forest, Mod	0
☒ C, Forest, Steep	0
☒ C, Pasture, Flat	.7
☒ C, Pasture, Steep	0

☒ Show Only Selected

Available Impervious	Acres
☒ ROADS/FLAT	1.85
☒ ROADS/STEEP	0
☒ ROOF TOPS/FLAT	0
☒ SIDEWALKS/FLAT	0

Pervious Total
Acres

Impervious Total
Acres

Basin Total
Acres

Per Figure B-5, ACF Environmental R-Tank Maintenance Row Sizing is based on the water quality flow rate discharging to the proposed R-Tank detention system. These treatment modules are proposed for maintenance purposes only, per manufacturer's recommendations, and no water quality credit is being taken for these R-Tank maintenance Rows.

$$\# \text{ of Treatment Modules} = \frac{\text{Design Flow Rate (cfs)}}{\text{Unit Flow Per Modules (cfs)}} = \frac{\text{Water Quality Flow Rate (cfs)}}{0.191 \text{ cfs}}$$

Water Quality	
On-Line BMP	Off-Line BMP
24 hour Volume (ac-ft) 0.2839	
Standard Flow Rate (cfs) 0.3480	Standard Flow Rate (cfs) 0.1957

$$\# \text{ of Treatment Modules} = \frac{0.3480 \text{ cfs}}{0.191 \text{ cfs}} = 1.822 \text{ Treatment Modules}$$

2 R-Tank treatment modules are proposed at the inlet of Detention 6.

Per Section 1-2.5.6 of the 2014 SMMWW, water quality facilities proposed downstream of detention facilities must utilize the full 2-year release rate from the detention facility as the design flow rate. Refer to Figure B-4 for WWHM Flow Control Calculations.

Water quality is provided for Basins 4, 6, and 7 in the same location, prior to the proposed discharge location near the southwest corner of the property into the existing 228th Ave SE conveyance system. Refer to Basin 7 for calculations used to size this treatment facility.

Figure B-4

WWHM Treatment Calculations

Basin 7

 Basin 7 Mitigated ✕

Subbasin Name: Basin 7 ☐ Designate as Bypass for POC:

Flows To : **Surface** Detention 7 **Interflow** Detention 7 **Groundwater**

Area in Basin ☒ Show Only Selected

Available Pervious	Acres	Available Impervious	Acres
☒ C, Forest, Mod	0	☒ ROADS/FLAT	0
☒ C, Forest, Steep	0	☒ ROADS/STEEP	0
☒ C, Pasture, Flat	.1	☒ ROOF TOPS/FLAT	.6
☒ C, Pasture, Steep	0	☒ SIDEWALKS/FLAT	1

Pervious Total	0.1	Acres
Impervious Total	1.6	Acres
Basin Total	1.7	Acres

Per Figure B-5, ACF Environmental R-Tank Maintenance Row Sizing is based on the water quality flow rate discharging to the proposed R-Tank detention system. These treatment modules are proposed for maintenance purposes only, per manufacturer's recommendations, and no water quality credit is being taken for these R-Tank maintenance Rows.

$$\# \text{ of Treatment Modules} = \frac{\text{Design Flow Rate (cfs)}}{\text{Unit Flow Per Modules (cfs)}} = \frac{\text{Water Quality Flow Rate (cfs)}}{0.191 \text{ cfs}}$$

Water Quality	
On-Line BMP	Off-Line BMP
24 hour Volume (ac-ft) 0.2300	
Standard Flow Rate (cfs) 0.3042	Standard Flow Rate (cfs) 0.1720

$$\# \text{ of Treatment Modules} = \frac{0.3042 \text{ cfs}}{0.191 \text{ cfs}} = 1.593 \text{ Treatment Modules}$$

2 R-Tank treatment modules are proposed at the inlet of Detention 7.

Per Section 1-2.5.6 of the 2014 SMMWW, water quality facilities proposed downstream of detention facilities must utilize the full 2-year release rate from the detention facility as the design flow rate. Refer to Figure B-4 for WWHM Flow Control Calculations.

Water quality is provided for Basins 4, 6, and 7 in the same location, prior to the proposed discharge location near the southwest corner of the property into the existing 228th Ave SE conveyance system.

Basin 4 water quality design flow:

Flow Frequency		
Flow(cfs)	Predeveloped	Mitigated
2 Year =	0.3812	0.3723
5 Year =	0.6480	0.4782
10 Year =	0.8600	0.5527
25 Year =	1.1685	0.6518
50 Year =	1.4278	0.7295
100 Year =	1.7127	0.8105

Basin 6 water quality design flow:

Flow Frequency			
Flow(cfs)		Predeveloped	Mitigated
2 Year	=	0.1051	0.0562
5 Year	=	0.1786	0.0842
10 Year	=	0.2371	0.1074
25 Year	=	0.3221	0.1426
50 Year	=	0.3936	0.1736
100 Year	=	0.4722	0.2092

Basin 7 water quality design flow:

Flow Frequency			
Flow(cfs)		Predeveloped	Mitigated
2 Year	=	0.0701	0.0361
5 Year	=	0.1191	0.0627
10 Year	=	0.1581	0.0873
25 Year	=	0.2147	0.1286
50 Year	=	0.2624	0.1682
100 Year	=	0.3148	0.2169

OldCastle Underground BioPod Biofilters shall be used for water quality treatment. BioPods have DOE GULD approval for Basic, Enhanced, and Phosphorus treatment, refer to Figure B-6, with a treatment rate of 1.6 gpm per square foot of media surface and a minimum media thickness of 18".

$$0.3723 \text{ cfs} + 0.0562 \text{ cfs} + 0.0361 \text{ cfs} = 0.4646 \text{ cfs} = 208.5276 \text{ gpm}$$

$$208.5276 \text{ gpm} / 1.6 \text{ gpm/sf} = 130 \text{ sf}$$

A BPU-824-IB provides 161 sf of media surface (2 x 8'x10'-1") which is larger than 130 sf.

Frontage improvements to 228th Avenue Southeast include a separate ACF Environmental R-Tank detention system and BioPod treatment vault for flow control and water quality treatment. These improvements are located within the City of Sammamish, Washington. A separate Technical Information Report shall be prepared and provided to the City of Sammamish to demonstrate that the proposed stormwater design for the proposed frontage improvements meets the requirements of the City of Sammamish, *Sammamish Addendum to the 2016 King County Surface Water Design Manual* (SAKCSWDM) Revised 9/25/2019. This separate frontage TIR will be provided as a reference to the City of Issaquah.

Predeveloped Northeast Basin

Northeast Basins Predeveloped [X]

Subbasin Name: Northeast Basins

Flows To : **Surface** **Interflow** **Groundwater**

Area in Basin ☒ Show Only Selected

Available Pervious		Acres	Available Impervious		Acres
☒	C, Forest, Mod	12.7	☒	ROADS/MOD	0
☒	C, Forest, Steep	0			
☒	C, Pasture, Mod	0			

Pervious Total	12.7	Acres
Impervious Total	0	Acres
Basin Total	12.7	Acres

The Northeast Basin is composed of two subbasins: Basin 1 and Basin 2. The Northeast Basin discharges runoff into the bypass portion of the frontage conveyance system and follows the existing drainage path, through the proposed discharge location of the north basin as shown in Appendix A-6.

Developed Northeast Basins:

Basin 1

Basin 1 Mitigated

Subbasin Name: Basin 1

☐ Designate as Bypass for POC:

Flows To :

Surface	Interflow	Groundwater
Detention 1	Detention 1	

Area in Basin

☒ Show Only Selected

Available Pervious	Acres	Available Impervious	Acres
☒ C, Forest, Mod	0	☒ ROADS/MOD	7.15
☒ C, Forest, Steep	0		
☒ C, Pasture, Mod	2.4		

Pervious Total	2.4	Acres
Impervious Total	7.15	Acres
Basin Total	9.55	Acres

Detention 1 Mitigated
✕

Facility Name

Outlet 1

Outlet 2

Outlet 3

Downstream Connection

Facility Type

☐ Precipitation Applied to Facility
 ☐ Evaporation Applied to Facility

Facility Dimensions

Trench Length (ft)
 Trench Bottom Width (ft)
 Effective Total Depth (ft)
 Top and bottom slope (H/V)
 Left Side Slope (H/V)
 Right Side Slope (H/V)

Outlet Structure Data

Riser Height (ft)
 Riser Diameter (in)
 Riser Type
 Notch Type

Material Layers for Trench/Bed

Layer 1 Thickness (ft)
 Layer 1 porosity (0-1)
 Layer 2 Thickness (ft)
 Layer 2 porosity (0-1)
 Layer 3 Thickness (ft)
 Layer 3 porosity (0-1)

Orifice

Number	Diameter (in)	Height (ft)
1	2	0.5
2	3.625	4.5
3	2.25	5.4

Infiltration

Trench Volume at Riser Head (ac-ft)

Show Trench

Initial Stage (ft)

These calculations show that 7.21' of live storage is provided on top of 6" of dead storage and with 6" of freeboard. The top 1' of gravel is used as the top 6" of live storage and the 6" freeboard. Dead storage is provided by the bottom 3" of the detention tanks as well as the 3" of gravel below the proposed tanks, totaling 6" of dead storage at the bottom of the detention system.

ACF Environmental HD R-Tanks shall be used for Detention 1. The manufacturer states that a porosity of 0.95 should be used for the R-Tank section; a porosity of 0.9 was used as a conservative design. A porosity of 0.4 was used for the top gravel layer.

Basin 2

Basin 2 Mitigated

Subbasin Name: Basin 2

☐ Designate as Bypass for POC:

Flows To :

Surface
 Detention 2

Interflow
 Detention 2

Groundwater

Area in Basin

☒ Show Only Selected

Available Pervious	Acres	Available Impervious	Acres
☒ C, Forest, Mod	0	☒ ROADS/MOD	1.55
☒ C, Forest, Steep	.2		
☒ C, Pasture, Mod	1.4		

Pervious Total	1.6	Acres
Impervious Total	1.55	Acres
Basin Total	3.15	Acres

Detention 2 Mitigated

Facility Name Detention 2

Outlet 1 0 **Outlet 2** 0 **Outlet 3** 0

Downstream Connection 0

Facility Type Gravel Trench/Bed

☐ Precipitation Applied to Facility

☐ Evaporation Applied to Facility

Quick Trench

Facility Dimension Diagram

Facility Dimensions

Trench Length (ft) 80
Trench Bottom Width (ft) 79
Effective Total Depth (ft) 8.21
Top and bottom slope (H/V) 0
Left Side Slope (H/V) 0
Right Side Slope (H/V) 0

Outlet Structure Data

Riser Height (ft) 7.71
Riser Diameter (in) 12
Riser Type Flat
Notch Type

Material Layers for Trench/Bed

Layer 1 Thickness (ft) 0.25
Layer 1 porosity (0-1) 0.4
Layer 2 Thickness (ft) 6.96
Layer 2 porosity (0-1) 0.9
Layer 3 Thickness (ft) 1
Layer 3 porosity (0-1) 0.4

Orifice **Diameter** **Height**
Number **(in)** **(ft)**

1 1 0.5
2 2 5
3 1.25 6

Infiltration NO

Trench Volume at Riser Head (ac-ft) .960

Show Trench Open Table

Initial Stage (ft) 0

These calculations show that 7.21' of live storage is provided on top of 6" of dead storage and with 6" of freeboard. The top 1' of gravel is used as the top 6" of live storage and the 6" freeboard. Dead storage is provided by the bottom 3" of the detention tanks as well as the 3" of gravel below the proposed tanks, totaling 6" of dead storage at the bottom of the detention system.

ACF Environmental HD R-Tanks shall be used for Detention 2. The manufacturer states that a porosity of 0.95 should be used for the R-Tank section; a porosity of 0.9 was used as a conservative design. A porosity of 0.4 was used for the top gravel layer.

**WWHM2012
PROJECT REPORT**

General Model Information

Project Name: Northeast Basin
Site Name:
Site Address:
City:
Report Date: 4/2/2021
Gage: Seatac
Data Start: 1948/10/01
Data End: 2009/09/30
Timestep: 15 Minute
Precip Scale: 1.167
Version Date: 2019/09/13
Version: 4.2.17

POC Thresholds

Low Flow Threshold for POC1:	50 Percent of the 2 Year
High Flow Threshold for POC1:	50 Year

Landuse Basin Data

Predeveloped Land Use

Northeast Basins

Bypass: No

GroundWater: No

Pervious Land Use acre
C, Forest, Mod 12.7

Pervious Total 12.7

Impervious Land Use acre

Impervious Total 0

Basin Total 12.7

Element Flows To:		
Surface	Interflow	Groundwater

*Mitigated Land Use***Basin 1**

Bypass:	No
---------	----

GroundWater:	No
--------------	----

Pervious Land Use	acre
C, Pasture, Mod	2.4

Pervious Total	2.4
----------------	-----

Impervious Land Use	acre
ROADS MOD	7.15

Impervious Total	7.15
------------------	------

Basin Total	9.55
-------------	------

Element Flows To:		
-------------------	--	--

Surface	Interflow	Groundwater
Detention 1	Detention 1	

Basin 2

Bypass: No

GroundWater: No

Pervious Land Use acre

C, Forest, Steep 0.2

C, Pasture, Mod 1.4

Pervious Total 1.6

Impervious Land Use acre

ROADS MOD 1.55

Impervious Total 1.55

Basin Total 3.15

Element Flows To:

Surface

Detention 2

Interflow

Detention 2

Groundwater

Routing Elements

Predeveloped Routing

Mitigated Routing**Detention 1**

Bottom Length: 180.00 ft.
 Bottom Width: 176.00 ft.
 Trench bottom slope 1: 0 To 1
 Trench Left side slope 0: 0 To 1
 Trench right side slope 2: 0 To 1
 Material thickness of first layer: 0.25
 Pour Space of material for first layer: 0.4
 Material thickness of second layer: 6.96
 Pour Space of material for second layer: 0.9
 Material thickness of third layer: 1.08
 Pour Space of material for third layer: 0.4
 Discharge Structure
 Riser Height: 7.79 ft.
 Riser Diameter: 18 in.
 Orifice 1 Diameter: 2 in. Elevation:0.5 ft.
 Orifice 2 Diameter: 3.625 in. Elevation:4.5 ft.
 Orifice 3 Diameter: 2.25 in. Elevation:5.4 ft.
 Element Flows To:
 Outlet 1 Outlet 2

Gravel Trench Bed Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.727	0.000	0.000	0.000
0.0921	0.727	0.026	0.000	0.000
0.1842	0.727	0.053	0.000	0.000
0.2763	0.727	0.113	0.000	0.000
0.3684	0.727	0.174	0.000	0.000
0.4606	0.727	0.234	0.000	0.000
0.5527	0.727	0.294	0.024	0.000
0.6448	0.727	0.355	0.041	0.000
0.7369	0.727	0.415	0.052	0.000
0.8290	0.727	0.475	0.062	0.000
0.9211	0.727	0.535	0.070	0.000
1.0132	0.727	0.596	0.077	0.000
1.1053	0.727	0.656	0.084	0.000
1.1974	0.727	0.716	0.090	0.000
1.2896	0.727	0.777	0.096	0.000
1.3817	0.727	0.837	0.101	0.000
1.4738	0.727	0.897	0.107	0.000
1.5659	0.727	0.958	0.112	0.000
1.6580	0.727	1.018	0.116	0.000
1.7501	0.727	1.078	0.121	0.000
1.8422	0.727	1.138	0.125	0.000
1.9343	0.727	1.199	0.130	0.000
2.0264	0.727	1.259	0.134	0.000
2.1186	0.727	1.319	0.138	0.000
2.2107	0.727	1.380	0.142	0.000
2.3028	0.727	1.440	0.145	0.000
2.3949	0.727	1.500	0.149	0.000
2.4870	0.727	1.560	0.153	0.000
2.5791	0.727	1.621	0.156	0.000
2.6712	0.727	1.681	0.159	0.000

2.7633	0.727	1.741	0.163	0.000
2.8554	0.727	1.802	0.166	0.000
2.9476	0.727	1.862	0.169	0.000
3.0397	0.727	1.922	0.173	0.000
3.1318	0.727	1.982	0.176	0.000
3.2239	0.727	2.043	0.179	0.000
3.3160	0.727	2.103	0.182	0.000
3.4081	0.727	2.163	0.185	0.000
3.5002	0.727	2.224	0.188	0.000
3.5923	0.727	2.284	0.190	0.000
3.6844	0.727	2.344	0.193	0.000
3.7766	0.727	2.404	0.196	0.000
3.8687	0.727	2.465	0.199	0.000
3.9608	0.727	2.525	0.201	0.000
4.0529	0.727	2.585	0.204	0.000
4.1450	0.727	2.646	0.207	0.000
4.2371	0.727	2.706	0.209	0.000
4.3292	0.727	2.766	0.212	0.000
4.4213	0.727	2.827	0.214	0.000
4.5134	0.727	2.887	0.258	0.000
4.6056	0.727	2.947	0.335	0.000
4.6977	0.727	3.007	0.380	0.000
4.7898	0.727	3.068	0.416	0.000
4.8819	0.727	3.128	0.447	0.000
4.9740	0.727	3.188	0.475	0.000
5.0661	0.727	3.249	0.500	0.000
5.1582	0.727	3.309	0.523	0.000
5.2503	0.727	3.369	0.545	0.000
5.3424	0.727	3.429	0.566	0.000
5.4346	0.727	3.490	0.611	0.000
5.5267	0.727	3.550	0.653	0.000
5.6188	0.727	3.610	0.687	0.000
5.7109	0.727	3.671	0.716	0.000
5.8030	0.727	3.731	0.744	0.000
5.8951	0.727	3.791	0.770	0.000
5.9872	0.727	3.851	0.794	0.000
6.0793	0.727	3.912	0.817	0.000
6.1714	0.727	3.972	0.840	0.000
6.2636	0.727	4.032	0.861	0.000
6.3557	0.727	4.093	0.882	0.000
6.4478	0.727	4.153	0.903	0.000
6.5399	0.727	4.213	0.922	0.000
6.6320	0.727	4.274	0.942	0.000
6.7241	0.727	4.334	0.960	0.000
6.8162	0.727	4.394	0.979	0.000
6.9083	0.727	4.454	0.996	0.000
7.0004	0.727	4.515	1.014	0.000
7.0926	0.727	4.575	1.031	0.000
7.1847	0.727	4.635	1.048	0.000
7.2768	0.727	4.662	1.065	0.000
7.3689	0.727	4.689	1.081	0.000
7.4610	0.727	4.716	1.097	0.000
7.5531	0.727	4.742	1.112	0.000
7.6452	0.727	4.769	1.128	0.000
7.7373	0.727	4.796	1.143	0.000
7.8294	0.727	4.823	1.283	0.000
7.9216	0.727	4.850	1.929	0.000
8.0137	0.727	4.876	2.840	0.000

8.1058	0.727	4.903	3.884	0.000
8.1979	0.727	4.930	4.934	0.000

Detention 2

Bottom Length: 80.00 ft.
 Bottom Width: 79.00 ft.
 Trench bottom slope 1: 0 To 1
 Trench Left side slope 0: 0 To 1
 Trench right side slope 2: 0 To 1
 Material thickness of first layer: 0.25
 Pour Space of material for first layer: 0.4
 Material thickness of second layer: 6.96
 Pour Space of material for second layer: 0.9
 Material thickness of third layer: 1
 Pour Space of material for third layer: 0.4
 Discharge Structure
 Riser Height: 7.71 ft.
 Riser Diameter: 12 in.
 Orifice 1 Diameter: 1 in. Elevation: 0.5 ft.
 Orifice 2 Diameter: 2 in. Elevation: 5 ft.
 Orifice 3 Diameter: 1.25 in. Elevation: 6 ft.
 Element Flows To:
 Outlet 1 Outlet 2

Gravel Trench Bed Hydraulic Table

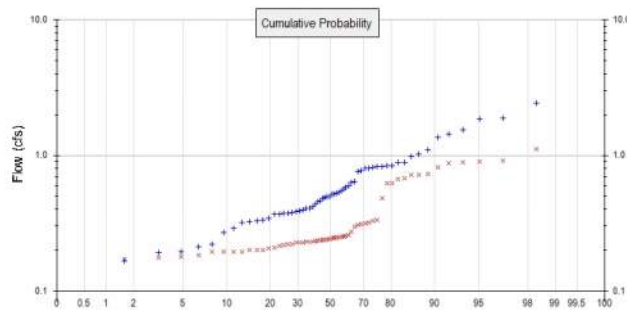
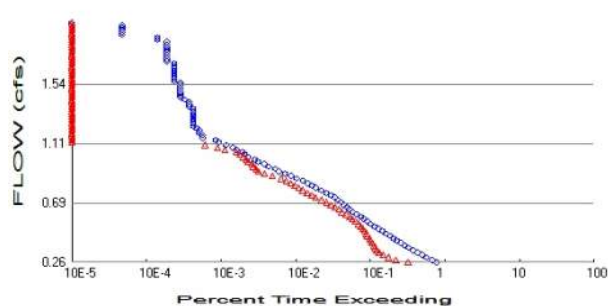
Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.145	0.000	0.000	0.000
0.0912	0.145	0.005	0.000	0.000
0.1824	0.145	0.010	0.000	0.000
0.2737	0.145	0.022	0.000	0.000
0.3649	0.145	0.034	0.000	0.000
0.4561	0.145	0.046	0.000	0.000
0.5473	0.145	0.058	0.005	0.000
0.6386	0.145	0.070	0.010	0.000
0.7298	0.145	0.082	0.013	0.000
0.8210	0.145	0.094	0.015	0.000
0.9122	0.145	0.105	0.017	0.000
1.0034	0.145	0.117	0.019	0.000
1.0947	0.145	0.129	0.020	0.000
1.1859	0.145	0.141	0.022	0.000
1.2771	0.145	0.153	0.023	0.000
1.3683	0.145	0.165	0.025	0.000
1.4596	0.145	0.177	0.026	0.000
1.5508	0.145	0.189	0.027	0.000
1.6420	0.145	0.201	0.029	0.000
1.7332	0.145	0.213	0.030	0.000
1.8244	0.145	0.225	0.031	0.000
1.9157	0.145	0.236	0.032	0.000
2.0069	0.145	0.248	0.033	0.000
2.0981	0.145	0.260	0.034	0.000
2.1893	0.145	0.272	0.035	0.000
2.2806	0.145	0.284	0.036	0.000
2.3718	0.145	0.296	0.037	0.000
2.4630	0.145	0.308	0.038	0.000
2.5542	0.145	0.320	0.038	0.000
2.6454	0.145	0.332	0.039	0.000
2.7367	0.145	0.344	0.040	0.000
2.8279	0.145	0.356	0.041	0.000

2.9191	0.145	0.367	0.042	0.000
3.0103	0.145	0.379	0.043	0.000
3.1016	0.145	0.391	0.043	0.000
3.1928	0.145	0.403	0.044	0.000
3.2840	0.145	0.415	0.045	0.000
3.3752	0.145	0.427	0.046	0.000
3.4664	0.145	0.439	0.046	0.000
3.5577	0.145	0.451	0.047	0.000
3.6489	0.145	0.463	0.048	0.000
3.7401	0.145	0.475	0.048	0.000
3.8313	0.145	0.487	0.049	0.000
3.9226	0.145	0.499	0.050	0.000
4.0138	0.145	0.510	0.050	0.000
4.1050	0.145	0.522	0.051	0.000
4.1962	0.145	0.534	0.052	0.000
4.2874	0.145	0.546	0.052	0.000
4.3787	0.145	0.558	0.053	0.000
4.4699	0.145	0.570	0.054	0.000
4.5611	0.145	0.582	0.054	0.000
4.6523	0.145	0.594	0.055	0.000
4.7436	0.145	0.606	0.055	0.000
4.8348	0.145	0.618	0.056	0.000
4.9260	0.145	0.630	0.057	0.000
5.0172	0.145	0.641	0.071	0.000
5.1084	0.145	0.653	0.094	0.000
5.1997	0.145	0.665	0.107	0.000
5.2909	0.145	0.677	0.117	0.000
5.3821	0.145	0.689	0.127	0.000
5.4733	0.145	0.701	0.135	0.000
5.5646	0.145	0.713	0.142	0.000
5.6558	0.145	0.725	0.149	0.000
5.7470	0.145	0.737	0.156	0.000
5.8382	0.145	0.749	0.162	0.000
5.9294	0.145	0.761	0.167	0.000
6.0207	0.145	0.772	0.179	0.000
6.1119	0.145	0.784	0.192	0.000
6.2031	0.145	0.796	0.203	0.000
6.2943	0.145	0.808	0.211	0.000
6.3856	0.145	0.820	0.219	0.000
6.4768	0.145	0.832	0.227	0.000
6.5680	0.145	0.844	0.234	0.000
6.6592	0.145	0.856	0.241	0.000
6.7504	0.145	0.868	0.248	0.000
6.8417	0.145	0.880	0.254	0.000
6.9329	0.145	0.892	0.260	0.000
7.0241	0.145	0.904	0.266	0.000
7.1153	0.145	0.915	0.272	0.000
7.2066	0.145	0.927	0.278	0.000
7.2978	0.145	0.933	0.283	0.000
7.3890	0.145	0.938	0.289	0.000
7.4802	0.145	0.943	0.294	0.000
7.5714	0.145	0.949	0.299	0.000
7.6627	0.145	0.954	0.304	0.000
7.7539	0.145	0.959	0.406	0.000
7.8451	0.145	0.964	0.833	0.000
7.9363	0.145	0.970	1.390	0.000
8.0276	0.145	0.975	1.927	0.000
8.1188	0.145	0.980	2.317	0.000

8.2100	0.145	0.986	2.536	0.000
--------	-------	-------	-------	-------

Analysis Results

POC 1



+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1

Total Pervious Area: 12.7
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1

Total Pervious Area: 4
Total Impervious Area: 8.7

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.523427
5 year	0.889626
10 year	1.180819
25 year	1.604252
50 year	1.960296
100 year	2.351515

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0.285568
5 year	0.461373
10 year	0.615076
25 year	0.860353
50 year	1.086185
100 year	1.354542

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1949	0.762	0.206
1950	0.816	0.274
1951	1.027	0.915
1952	0.341	0.185
1953	0.288	0.226
1954	0.417	0.232
1955	0.643	0.230
1956	0.593	0.333
1957	0.521	0.231
1958	0.480	0.246

1959	0.408	0.208
1960	0.820	0.718
1961	0.396	0.256
1962	0.268	0.180
1963	0.387	0.234
1964	0.534	0.242
1965	0.404	0.313
1966	0.321	0.220
1967	0.891	0.246
1968	0.492	0.227
1969	0.463	0.216
1970	0.372	0.230
1971	0.494	0.242
1972	0.805	0.682
1973	0.368	0.306
1974	0.486	0.243
1975	0.630	0.221
1976	0.458	0.236
1977	0.192	0.196
1978	0.372	0.250
1979	0.220	0.177
1980	1.429	0.722
1981	0.323	0.229
1982	0.835	0.483
1983	0.547	0.238
1984	0.334	0.195
1985	0.196	0.200
1986	0.831	0.299
1987	0.774	0.622
1988	0.328	0.201
1989	0.211	0.195
1990	2.418	0.716
1991	1.104	0.671
1992	0.434	0.251
1993	0.386	0.195
1994	0.166	0.171
1995	0.515	0.257
1996	1.362	0.893
1997	0.974	0.818
1998	0.378	0.199
1999	1.552	0.619
2000	0.369	0.246
2001	0.096	0.168
2002	0.520	0.311
2003	0.892	0.216
2004	0.838	0.884
2005	0.576	0.236
2006	0.566	0.318
2007	1.853	1.112
2008	1.882	0.873
2009	0.800	0.326

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	2.4177	1.1124
2	1.8821	0.9147
3	1.8529	0.8934

4	1.5523	0.8845
5	1.4293	0.8730
6	1.3621	0.8178
7	1.1042	0.7224
8	1.0270	0.7183
9	0.9744	0.7162
10	0.8916	0.6816
11	0.8909	0.6713
12	0.8379	0.6215
13	0.8352	0.6189
14	0.8312	0.4832
15	0.8200	0.3334
16	0.8160	0.3265
17	0.8048	0.3177
18	0.7996	0.3129
19	0.7744	0.3112
20	0.7624	0.3058
21	0.6433	0.2991
22	0.6299	0.2740
23	0.5932	0.2565
24	0.5760	0.2557
25	0.5663	0.2511
26	0.5466	0.2496
27	0.5343	0.2464
28	0.5212	0.2461
29	0.5197	0.2457
30	0.5151	0.2426
31	0.4940	0.2420
32	0.4923	0.2420
33	0.4861	0.2379
34	0.4804	0.2364
35	0.4628	0.2358
36	0.4578	0.2344
37	0.4344	0.2323
38	0.4170	0.2311
39	0.4081	0.2301
40	0.4045	0.2300
41	0.3956	0.2288
42	0.3872	0.2266
43	0.3860	0.2261
44	0.3779	0.2215
45	0.3724	0.2197
46	0.3718	0.2162
47	0.3686	0.2161
48	0.3678	0.2084
49	0.3414	0.2063
50	0.3342	0.2007
51	0.3276	0.1998
52	0.3233	0.1991
53	0.3210	0.1957
54	0.2880	0.1954
55	0.2684	0.1951
56	0.2196	0.1948
57	0.2115	0.1848
58	0.1957	0.1797
59	0.1922	0.1765
60	0.1658	0.1715
61	0.0961	0.1683

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.2617	16332	6840	41	Pass
0.2789	14217	4665	32	Pass
0.2960	12192	3773	30	Pass
0.3132	10528	3159	30	Pass
0.3303	9174	2785	30	Pass
0.3475	7993	2612	32	Pass
0.3647	6992	2485	35	Pass
0.3818	6164	2363	38	Pass
0.3990	5473	2271	41	Pass
0.4161	4864	2175	44	Pass
0.4333	4368	2089	47	Pass
0.4504	3927	1984	50	Pass
0.4676	3495	1897	54	Pass
0.4848	3101	1795	57	Pass
0.5019	2744	1697	61	Pass
0.5191	2417	1590	65	Pass
0.5362	2162	1481	68	Pass
0.5534	1938	1345	69	Pass
0.5705	1763	1232	69	Pass
0.5877	1605	1134	70	Pass
0.6049	1404	1022	72	Pass
0.6220	1246	895	71	Pass
0.6392	1121	816	72	Pass
0.6563	1036	720	69	Pass
0.6735	944	632	66	Pass
0.6906	876	555	63	Pass
0.7078	793	475	59	Pass
0.7250	717	394	54	Pass
0.7421	633	350	55	Pass
0.7593	548	306	55	Pass
0.7764	466	267	57	Pass
0.7936	393	235	59	Pass
0.8108	351	206	58	Pass
0.8279	311	184	59	Pass
0.8451	265	161	60	Pass
0.8622	218	136	62	Pass
0.8794	184	104	56	Pass
0.8965	153	81	52	Pass
0.9137	128	68	53	Pass
0.9309	114	63	55	Pass
0.9480	93	58	62	Pass
0.9652	80	55	68	Pass
0.9823	67	49	73	Pass
0.9995	60	46	76	Pass
1.0166	49	42	85	Pass
1.0338	44	38	86	Pass
1.0510	41	34	82	Pass
1.0681	34	24	70	Pass
1.0853	31	19	61	Pass
1.1024	25	13	52	Pass
1.1196	20	0	0	Pass
1.1367	18	0	0	Pass
1.1539	12	0	0	Pass

1.1711	12	0	0	Pass
1.1882	11	0	0	Pass
1.2054	11	0	0	Pass
1.2225	10	0	0	Pass
1.2397	9	0	0	Pass
1.2568	9	0	0	Pass
1.2740	9	0	0	Pass
1.2912	9	0	0	Pass
1.3083	9	0	0	Pass
1.3255	9	0	0	Pass
1.3426	9	0	0	Pass
1.3598	9	0	0	Pass
1.3769	8	0	0	Pass
1.3941	8	0	0	Pass
1.4113	8	0	0	Pass
1.4284	7	0	0	Pass
1.4456	6	0	0	Pass
1.4627	6	0	0	Pass
1.4799	6	0	0	Pass
1.4970	6	0	0	Pass
1.5142	6	0	0	Pass
1.5314	6	0	0	Pass
1.5485	6	0	0	Pass
1.5657	5	0	0	Pass
1.5828	5	0	0	Pass
1.6000	5	0	0	Pass
1.6171	5	0	0	Pass
1.6343	5	0	0	Pass
1.6515	5	0	0	Pass
1.6686	5	0	0	Pass
1.6858	5	0	0	Pass
1.7029	4	0	0	Pass
1.7201	4	0	0	Pass
1.7372	4	0	0	Pass
1.7544	4	0	0	Pass
1.7716	4	0	0	Pass
1.7887	4	0	0	Pass
1.8059	4	0	0	Pass
1.8230	4	0	0	Pass
1.8402	4	0	0	Pass
1.8574	3	0	0	Pass
1.8745	3	0	0	Pass
1.8917	1	0	0	Pass
1.9088	1	0	0	Pass
1.9260	1	0	0	Pass
1.9431	1	0	0	Pass
1.9603	1	0	0	Pass

Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume: 0 acre-feet
On-line facility target flow: 0 cfs.
Adjusted for 15 min: 0 cfs.
Off-line facility target flow: 0 cfs.
Adjusted for 15 min: 0 cfs.

LID Report

LID Technique	Used for Treatment ?	Total Volume Needs Treatment (ac-ft)	Volume Through Facility (ac-ft)	Infiltration Volume (ac-ft)	Cumulative Volume Infiltration Credit	Percent Volume Infiltrated	Water Quality	Percent Water Quality Treated	Comment
Detention 1 POC	☐	1406.42			☐	0.00			
Detention 2 POC	☐	376.33			☐	0.00			
Total Volume Infiltrated		1782.76	0.00	0.00		0.00	0.00	0%	No Treat Credit
Compliance with LID Standard 8% of 2-yr to 50% of 2-yr									Duration Analysis Result = Failed

POC 2

POC #2 was not reported because POC must exist in both scenarios and both scenarios must have been run.

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

No PERLND changes have been made.

IMPLND Changes

No IMPLND changes have been made.

Appendix

Predeveloped Schematic



Northeast
Basins
12.70ac

Mitigated Schematic

Predeveloped UCI File

RUN

GLOBAL

```

WWHM4 model simulation
START      1948 10 01      END      2009 09 30
RUN INTERP OUTPUT LEVEL    3      0
RESUME     0 RUN          1
UNIT SYSTEM      1
END GLOBAL

```

FILES

```

<File>  <Un#>  <-----File Name----->***
<-ID->                                     ***
WDM      26     Northeast Basin.wdm
MESSU    25     PreNortheast Basin.MES
          27     PreNortheast Basin.L61
          28     PreNortheast Basin.L62
          30     POCNortheast Basin1.dat

```

END FILES

OPN SEQUENCE

INGRP INDELT 00:15

```

PERLND    11
COPY      501
DISPLY     1

```

END INGRP

END OPN SEQUENCE

DISPLY

DISPLY-INF01

```

# - #<-----Title----->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
1      Northeast Basins          MAX          1    2    30    9

```

END DISPLY-INF01

END DISPLY

COPY

TIMESERIES

```

# - # NPT NMN ***
1      1    1
501    1    1

```

END TIMESERIES

END COPY

GENER

OPCODE

OPCD ***

END OPCODE

PARM

K ***

END PARM

END GENER

PERLND

GEN-INFO

```

<PLS ><-----Name----->NBLKS Unit-systems Printer ***
# - # User t-series Engl Metr ***

```

```

11      C, Forest, Mod          1    1    1    1    27    0

```

END GEN-INFO

*** Section PWATER***

ACTIVITY

```

<PLS > ***** Active Sections *****
# - # ATMP SNOW PWAT SED PST PWG PQAL MSTL PEST NITR PHOS TRAC ***
11      0    0    1    0    0    0    0    0    0    0    0    0

```

END ACTIVITY

PRINT-INFO

```

<PLS > ***** Print-flags ***** PIVL PYR
# - # ATMP SNOW PWAT SED PST PWG PQAL MSTL PEST NITR PHOS TRAC *****
11      0    0    4    0    0    0    0    0    0    0    0    0    1    9

```

END PRINT-INFO

```

PWAT-PARM1
<PLS > PWATER variable monthly parameter value flags ***
# - # CSNO RTOP UZFG VCS VUZ VNN VIFW VIRC VLE INFC HWT ***
11      0      0      0      0      0      0      0      0      0      0      0
END PWAT-PARM1

PWAT-PARM2
<PLS > PWATER input info: Part 2 ***
# - # ***FOREST LZSN INFILT LSUR SLSUR KVARY AGWRC
11      0      4.5      0.08      400      0.1      0.5      0.996
END PWAT-PARM2

PWAT-PARM3
<PLS > PWATER input info: Part 3 ***
# - # ***PETMAX PETMIN INFEXP INFILD DEEPFR BASETP AGWETP
11      0      0      2      2      0      0      0
END PWAT-PARM3

PWAT-PARM4
<PLS > PWATER input info: Part 4 ***
# - # CEPSC UZSN NSUR INTFW IRC LZETP ***
11      0.2      0.5      0.35      6      0.5      0.7
END PWAT-PARM4

PWAT-STATE1
<PLS > *** Initial conditions at start of simulation
ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
# - # *** CEPS SURS UZS IFWS LZS AGWS GWVS
11      0      0      0      0      2.5      1      0
END PWAT-STATE1

END PERLND

IMPLND
GEN-INFO
<PLS ><-----Name-----> Unit-systems Printer ***
# - # User t-series Engl Metr ***
in out
END GEN-INFO
*** Section IWATER***

ACTIVITY
<PLS > ***** Active Sections *****
# - # ATMP SNOW IWAT SLD IWG IQAL ***
END ACTIVITY

PRINT-INFO
<ILS > ***** Print-flags ***** PIVL PYR
# - # ATMP SNOW IWAT SLD IWG IQAL *****
END PRINT-INFO

IWAT-PARM1
<PLS > IWATER variable monthly parameter value flags ***
# - # CSNO RTOP VRS VNN RTLI ***
END IWAT-PARM1

IWAT-PARM2
<PLS > IWATER input info: Part 2 ***
# - # *** LSUR SLSUR NSUR RETSC
END IWAT-PARM2

IWAT-PARM3
<PLS > IWATER input info: Part 3 ***
# - # ***PETMAX PETMIN
END IWAT-PARM3

IWAT-STATE1
<PLS > *** Initial conditions at start of simulation
# - # *** RETS SURS
END IWAT-STATE1

```

END IMPLND

SCHEMATIC

<-Source->	<--Area-->	<-Target->	MBLK	***
<Name> #	<-factor->	<Name> #	Tbl#	***
Northeast Basins***				
PERLND 11	12.7	COPY 501	12	
PERLND 11	12.7	COPY 501	13	

*****Routing*****

END SCHEMATIC

NETWORK

<-Volume->	<-Grp>	<-Member->	<--Mult-->	Tran	<-Target vols>	<-Grp>	<-Member->	***
<Name> #		<Name> #	#	<-factor->strg	<Name> #		<Name> #	***
COPY 501	OUTPUT	MEAN	1 1	48.4	DISPLY 1	INPUT	TIMSER 1	

<-Volume->	<-Grp>	<-Member->	<--Mult-->	Tran	<-Target vols>	<-Grp>	<-Member->	***
<Name> #		<Name> #	#	<-factor->strg	<Name> #		<Name> #	***

END NETWORK

RCHRES

GEN-INFO

RCHRES	Name	Nexits	Unit Systems	Printer	***
# - #	<----->	<---->	User T-series	Engl Metr LKFG	***
			in out		***

END GEN-INFO

*** Section RCHRES***

ACTIVITY

<PLS >	*****	Active Sections	*****
# - #	HYFG	ADFG	CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***

END ACTIVITY

PRINT-INFO

<PLS >	*****	Print-flags	*****	PIVL	PYR	
# - #	HYDR	ADCA	CONS	HEAT SED	GQL OXRX NUTR PLNK PHCB PIVL	PYR *****

END PRINT-INFO

HYDR-PARM1

RCHRES	Flags for each HYDR Section	***
# - #	VC A1 A2 A3 ODFVFG for each	*** ODGTFG for each
	FG FG FG FG possible exit	*** possible exit
	* * * * *	* * * * *

END HYDR-PARM1

HYDR-PARM2

# - #	FTABNO	LEN	DELTH	STCOR	KS	DB50	***
<----->	<----->	<----->	<----->	<----->	<----->	<----->	***

END HYDR-PARM2

HYDR-INIT

RCHRES	Initial conditions for each HYDR section	***
# - #	*** VOL Initial value of COLIND Initial value of OUTDGT	
	*** ac-ft for each possible exit for each possible exit	
	<----->	<----->

END HYDR-INIT

END RCHRES

SPEC-ACTIONS

END SPEC-ACTIONS

FTABLES

END FTABLES

EXT SOURCES

<-Volume->	<Member>	SsysSgap	<--Mult-->	Tran	<-Target vols>	<-Grp>	<-Member->	***
<Name> #	<Name> #	tem strg	<-factor->strg	<Name> #	#		<Name> #	***
WDM 2	PREC	ENGL	1.167	PERLND	1 999	EXTNL	PREC	
WDM 2	PREC	ENGL	1.167	IMPLND	1 999	EXTNL	PREC	

WDM	1	EVAP	ENGL	0.76	PERLND	1	999	EXTNL	PETINP
WDM	1	EVAP	ENGL	0.76	IMPLND	1	999	EXTNL	PETINP

END EXT SOURCES

EXT TARGETS

<-Volume->	<-Grp>	<-Member->	<--Mult-->	Tran	<-Volume->	<Member>	Tsys	Tgap	Amd	***
<Name>	#	<Name>	#	#<-factor->	strg	<Name>	#	<Name>	tem	strg
COPY	501	OUTPUT	MEAN	1 1	48.4	WDM	501	FLOW	ENGL	REPL

END EXT TARGETS

MASS-LINK

<Volume>	<-Grp>	<-Member->	<--Mult-->	<Target>	<-Grp>	<-Member->	***
<Name>		<Name>	#	#<-factor->	<Name>		#
MASS-LINK		12					
PERLND	PWATER	SURO		0.083333	COPY	INPUT	MEAN
END MASS-LINK		12					

MASS-LINK		13					
PERLND	PWATER	IFW0		0.083333	COPY	INPUT	MEAN
END MASS-LINK		13					

END MASS-LINK

END RUN

Mitigated UCI File

RUN

GLOBAL

```

WWHM4 model simulation
START      1948 10 01      END      2009 09 30
RUN INTERP OUTPUT LEVEL    3      0
RESUME     0 RUN      1
UNIT SYSTEM      1
END GLOBAL

```

FILES

```

<File> <Un#> <-----File Name----->***
<-ID->                                     ***
WDM      26    Northeast Basin.wdm
MESSU    25    MitNortheast Basin.MES
          27    MitNortheast Basin.L61
          28    MitNortheast Basin.L62
          30    POCNortheast Basin1.dat

```

END FILES

OPN SEQUENCE

INGRP INDELT 00:15

```

PERLND    14
IMPLND     2
PERLND    12
RCHRES     1
RCHRES     2
COPY       1
COPY      501
DISPLY     1

```

END INGRP

END OPN SEQUENCE

DISPLY

DISPLY-INF01

```

# - #<-----Title----->***TRAN PIVL DIG1 FIL1 PYR DIG2 FIL2 YRND
1      Detention 1      MAX      1      2      30      9

```

END DISPLY-INF01

END DISPLY

COPY

TIMESERIES

```

# - # NPT NMN ***
1      1      1
501    1      1

```

END TIMESERIES

END COPY

GENER

OPCODE

```

#      # OPCD ***

```

END OPCODE

PARM

```

#      #      K ***

```

END PARM

END GENER

PERLND

GEN-INFO

```

<PLS ><-----Name----->NBLKS Unit-systems Printer ***
# - # User t-series Engl Metr ***
          in out
14      C, Pasture, Mod      1      1      1      1      27      0
12      C, Forest, Steep    1      1      1      1      27      0

```

END GEN-INFO

*** Section PWATER***

ACTIVITY

```

<PLS > ***** Active Sections *****
# - # ATMP SNOW PWAT SED PST PWG PQAL MSTL PEST NITR PHOS TRAC ***
14      0      0      1      0      0      0      0      0      0      0      0      0
12      0      0      1      0      0      0      0      0      0      0      0      0

```

END ACTIVITY

PRINT-INFO

```

<PLS > ***** Print-flags ***** PIVL  PYR
# - # ATMP SNOW PWAT SED PST PWG PQAL MSTL PEST NITR PHOS TRAC *****
14      0      0      4      0      0      0      0      0      0      0      0      0      0      1      9
12      0      0      4      0      0      0      0      0      0      0      0      0      0      1      9
END PRINT-INFO

```

PWAT-PARM1

```

<PLS > PWATER variable monthly parameter value flags ***
# - # CSNO RTOP UZFG VCS VUZ VNN VIFW VIRC VLE INFC HWT ***
14      0      0      0      0      0      0      0      0      0      0      0
12      0      0      0      0      0      0      0      0      0      0      0
END PWAT-PARM1

```

PWAT-PARM2

```

<PLS > PWATER input info: Part 2 ***
# - # ***FOREST LZSN INFILT LSUR SLSUR KVARV AGWRC
14      0      4.5      0.06      400      0.1      0.5      0.996
12      0      4.5      0.08      400      0.15      0.5      0.996
END PWAT-PARM2

```

PWAT-PARM3

```

<PLS > PWATER input info: Part 3 ***
# - # ***PETMAX PETMIN INFEXP INFILD DEEPFR BASETP AGWETP
14      0      0      2      2      0      0      0
12      0      0      2      2      0      0      0
END PWAT-PARM3

```

PWAT-PARM4

```

<PLS > PWATER input info: Part 4 ***
# - # CEPSC UZSN NSUR INTFW IRC LZETP ***
14      0.15      0.4      0.3      6      0.5      0.4
12      0.2      0.3      0.35      6      0.3      0.7
END PWAT-PARM4

```

PWAT-STATE1

```

<PLS > *** Initial conditions at start of simulation
ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
# - # *** CEPS SURS UZS IFWS LZS AGWS GWVS
14      0      0      0      0      2.5      1      0
12      0      0      0      0      2.5      1      0
END PWAT-STATE1

```

END PERLND

IMPLND

GEN-INFO

```

<PLS ><-----Name-----> Unit-systems Printer ***
# - # User t-series Engl Metr ***
# - # in out
2      ROADS/MOD      1      1      1      27      0
END GEN-INFO
*** Section IWATER***

```

ACTIVITY

```

<PLS > ***** Active Sections *****
# - # ATMP SNOW IWAT SLD IWG IQAL ***
2      0      0      1      0      0      0
END ACTIVITY

```

PRINT-INFO

```

<ILS > ***** Print-flags ***** PIVL  PYR
# - # ATMP SNOW IWAT SLD IWG IQAL *****
2      0      0      4      0      0      0      1      9
END PRINT-INFO

```

IWAT-PARM1

```

<PLS > IWATER variable monthly parameter value flags ***
# - # CSNO RTOP VRS VNN RTLI ***
2      0      0      0      0      0

```

END IWAT-PARM1

IWAT-PARM2

```

<PLS >      IWATER input info: Part 2      ***
# - # ***  LSUR      SLSUR      NSUR      RETSC
2          400        0.05        0.1        0.08

```

END IWAT-PARM2

IWAT-PARM3

```

<PLS >      IWATER input info: Part 3      ***
# - # ***  PETMAX    PETMIN
2          0          0

```

END IWAT-PARM3

IWAT-STATE1

```

<PLS > *** Initial conditions at start of simulation
# - # ***  RETS      SURS
2          0          0

```

END IWAT-STATE1

END IMPLND

SCHEMATIC

<-Source-> <Name> #	<-Area--> <-factor-->	<-Target-> <Name> #	MBLK Tbl#	*** ***
Basin 1***				
PERLND 14	2.4	RCHRES 1	2	
PERLND 14	2.4	RCHRES 1	3	
IMPLND 2	7.15	RCHRES 1	5	
Basin 2***				
PERLND 12	0.2	RCHRES 2	2	
PERLND 12	0.2	RCHRES 2	3	
PERLND 14	1.4	RCHRES 2	2	
PERLND 14	1.4	RCHRES 2	3	
IMPLND 2	1.55	RCHRES 2	5	

*****Routing*****

PERLND 14	2.4	COPY 1	12
IMPLND 2	7.15	COPY 1	15
PERLND 14	2.4	COPY 1	13
PERLND 12	0.2	COPY 1	12
PERLND 14	1.4	COPY 1	12
IMPLND 2	1.55	COPY 1	15
PERLND 12	0.2	COPY 1	13
PERLND 14	1.4	COPY 1	13
RCHRES 1	1	COPY 501	16
RCHRES 2	1	COPY 501	16

END SCHEMATIC

NETWORK

<-Volume->	<-Grp>	<-Member->	<-Mult-->	Tran	<-Target vols>	<-Grp>	<-Member->	***
<Name> #		<Name> #	#	<-factor-->strg	<Name> #		<Name> #	***
COPY 501	OUTPUT	MEAN	1 1	48.4	DISPLY 1	INPUT	TIMSER 1	

<-Volume->	<-Grp>	<-Member->	<-Mult-->	Tran	<-Target vols>	<-Grp>	<-Member->	***
<Name> #		<Name> #	#	<-factor-->strg	<Name> #		<Name> #	***

END NETWORK

RCHRES

GEN-INFO

RCHRES	Name	Nexits	Unit	Systems	Printer	***
# - #	<----->	<---->	User	T-series	Engl Metr LKFG	***
				in out		***
1	Detention 1	1	1	1 1	28 0 1	
2	Detention 2	1	1	1 1	28 0 1	

END GEN-INFO

*** Section RCHRES***

ACTIVITY

```

<PLS > ***** Active Sections *****
# - # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
1      1      0      0      0      0      0      0      0      0
2      1      0      0      0      0      0      0      0      0
END ACTIVITY

```

PRINT-INFO

```

<PLS > ***** Print-flags ***** PIVL  PYR
# - # HYDR ADCA CONS HEAT SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *****
1      4      0      0      0      0      0      0      0      0      1      9
2      4      0      0      0      0      0      0      0      0      1      9
END PRINT-INFO

```

HYDR-PARM1

```

RCHRES  Flags for each HYDR Section
# - # VC A1 A2 A3 ODFVFG for each *** ODGTFG for each  FUNCT for each
      FG FG FG FG possible exit *** possible exit
      * * * * * * * * * *
1      0 1 0 0      4 0 0 0 0      0 0 0 0 0      2 2 2 2 2
2      0 1 0 0      4 0 0 0 0      0 0 0 0 0      2 2 2 2 2
END HYDR-PARM1

```

HYDR-PARM2

```

# - # FTABNO      LEN      DELTH      STCOR      KS      DB50      ***
<-----><-----><-----><-----><-----><----->
1      1      0.03      0.0      0.0      0.5      0.0
2      2      0.02      0.0      0.0      0.5      0.0
END HYDR-PARM2

```

HYDR-INIT

```

RCHRES  Initial conditions for each HYDR section
# - # *** VOL      Initial value of COLIND      Initial value of OUTDGT
      *** ac-ft      for each possible exit      for each possible exit
<-----><----->      <-----><-----><-----><-----> *** <-----><-----><-----><----->
1      0      4.0 0.0 0.0 0.0 0.0      0.0 0.0 0.0 0.0 0.0
2      0      4.0 0.0 0.0 0.0 0.0      0.0 0.0 0.0 0.0 0.0
END HYDR-INIT

```

END RCHRES

SPEC-ACTIONS

END SPEC-ACTIONS

FTABLES

```
FTABLE      1
```

```

91      4
Depth      Area      Volume      Outflow1      Velocity      Travel Time***
(ft)      (acres)      (acre-ft)      (cfs)      (ft/sec)      (Minutes)***
0.000000  0.727273  0.000000  0.000000
0.092111  0.727273  0.026796  0.000000
0.184222  0.727273  0.053592  0.000000
0.276333  0.727273  0.113883  0.000000
0.368444  0.727273  0.174174  0.000000
0.460556  0.727273  0.234465  0.000000
0.552667  0.727273  0.294756  0.024911
0.644778  0.727273  0.355046  0.041302
0.736889  0.727273  0.415337  0.052831
0.829000  0.727273  0.475628  0.062261
0.921111  0.727273  0.535919  0.070440
1.013222  0.727273  0.596210  0.077763
1.105333  0.727273  0.656501  0.084453
1.197444  0.727273  0.716792  0.090651
1.289556  0.727273  0.777083  0.096452
1.381667  0.727273  0.837374  0.101923
1.473778  0.727273  0.897665  0.107115
1.565889  0.727273  0.957956  0.112066
1.658000  0.727273  1.018246  0.116808
1.750111  0.727273  1.078537  0.121365
1.842222  0.727273  1.138828  0.125757
1.934333  0.727273  1.199119  0.130000
2.026444  0.727273  1.259410  0.134109
2.118556  0.727273  1.319701  0.138096

```

2.210667	0.727273	1.379992	0.141972
2.302778	0.727273	1.440283	0.145744
2.394889	0.727273	1.500574	0.149421
2.487000	0.727273	1.560865	0.153009
2.579111	0.727273	1.621156	0.156516
2.671222	0.727273	1.681446	0.159945
2.763333	0.727273	1.741737	0.163303
2.855444	0.727273	1.802028	0.166592
2.947556	0.727273	1.862319	0.169818
3.039667	0.727273	1.922610	0.172984
3.131778	0.727273	1.982901	0.176093
3.223889	0.727273	2.043192	0.179149
3.316000	0.727273	2.103483	0.182152
3.408111	0.727273	2.163774	0.185108
3.500222	0.727273	2.224065	0.188016
3.592333	0.727273	2.284356	0.190881
3.684444	0.727273	2.344646	0.193703
3.776556	0.727273	2.404937	0.196484
3.868667	0.727273	2.465228	0.199227
3.960778	0.727273	2.525519	0.201932
4.052889	0.727273	2.585810	0.204602
4.145000	0.727273	2.646101	0.207237
4.237111	0.727273	2.706392	0.209839
4.329222	0.727273	2.766683	0.212410
4.421333	0.727273	2.826974	0.214949
4.513444	0.727273	2.887265	0.258806
4.605556	0.727273	2.947556	0.335795
4.697667	0.727273	3.007846	0.380935
4.789778	0.727273	3.068137	0.416779
4.881889	0.727273	3.128428	0.447587
4.974000	0.727273	3.188719	0.475104
5.066111	0.727273	3.249010	0.500252
5.158222	0.727273	3.309301	0.523585
5.250333	0.727273	3.369592	0.545470
5.342444	0.727273	3.429883	0.566164
5.434556	0.727273	3.490174	0.611392
5.526667	0.727273	3.550465	0.653577
5.618778	0.727273	3.610756	0.687021
5.710889	0.727273	3.671046	0.716782
5.803000	0.727273	3.731337	0.744226
5.895111	0.727273	3.791628	0.769984
5.987222	0.727273	3.851919	0.794418
6.079333	0.727273	3.912210	0.817764
6.171444	0.727273	3.972501	0.840188
6.263556	0.727273	4.032792	0.861812
6.355667	0.727273	4.093083	0.882731
6.447778	0.727273	4.153374	0.903023
6.539889	0.727273	4.213665	0.922747
6.632000	0.727273	4.273956	0.941957
6.724111	0.727273	4.334246	0.960694
6.816222	0.727273	4.394537	0.978998
6.908333	0.727273	4.454828	0.996898
7.000444	0.727273	4.515119	1.014425
7.092556	0.727273	4.575410	1.031602
7.184667	0.727273	4.635701	1.048452
7.276778	0.727273	4.662497	1.064995
7.368889	0.727273	4.689293	1.081247
7.461000	0.727273	4.716089	1.097225
7.553111	0.727273	4.742885	1.112944
7.645222	0.727273	4.769681	1.128416
7.737333	0.727273	4.796477	1.143654
7.829444	0.727273	4.823273	1.283321
7.921556	0.727273	4.850069	1.929670
8.013667	0.727273	4.876865	2.840416
8.105778	0.727273	4.903661	3.884091
8.197889	0.727273	4.930457	4.934768
8.290000	0.727273	4.997446	5.869815
END FTABLE	1		
FTABLE	2		
92	4		

Depth (ft)	Area (acres)	Volume (acre-ft)	Outflow1 (cfs)	Velocity (ft/sec)	Travel Time*** (Minutes)***
0.000000	0.145087	0.000000	0.000000		
0.091222	0.145087	0.005294	0.000000		
0.182444	0.145087	0.010588	0.000000		
0.273667	0.145087	0.022500	0.000000		
0.364889	0.145087	0.034411	0.000000		
0.456111	0.145087	0.046323	0.000000		
0.547333	0.145087	0.058235	0.005904		
0.638556	0.145087	0.070146	0.010101		
0.729778	0.145087	0.082058	0.013008		
0.821000	0.145087	0.093970	0.015375		
0.912222	0.145087	0.105881	0.017423		
1.003444	0.145087	0.117793	0.019255		
1.094667	0.145087	0.129705	0.020926		
1.185889	0.145087	0.141616	0.022474		
1.277111	0.145087	0.153528	0.023922		
1.368333	0.145087	0.165440	0.025287		
1.459556	0.145087	0.177351	0.026582		
1.550778	0.145087	0.189263	0.027817		
1.642000	0.145087	0.201175	0.029000		
1.733222	0.145087	0.213086	0.030136		
1.824444	0.145087	0.224998	0.031230		
1.915667	0.145087	0.236910	0.032288		
2.006889	0.145087	0.248821	0.033312		
2.098111	0.145087	0.260733	0.034305		
2.189333	0.145087	0.272645	0.035271		
2.280556	0.145087	0.284556	0.036211		
2.371778	0.145087	0.296468	0.037127		
2.463000	0.145087	0.308380	0.038021		
2.554222	0.145087	0.320291	0.038894		
2.645444	0.145087	0.332203	0.039748		
2.736667	0.145087	0.344115	0.040584		
2.827889	0.145087	0.356026	0.041404		
2.919111	0.145087	0.367938	0.042207		
3.010333	0.145087	0.379850	0.042996		
3.101556	0.145087	0.391761	0.043770		
3.192778	0.145087	0.403673	0.044531		
3.284000	0.145087	0.415585	0.045279		
3.375222	0.145087	0.427496	0.046014		
3.466444	0.145087	0.439408	0.046739		
3.557667	0.145087	0.451320	0.047452		
3.648889	0.145087	0.463231	0.048155		
3.740111	0.145087	0.475143	0.048847		
3.831333	0.145087	0.487055	0.049530		
3.922556	0.145087	0.498966	0.050203		
4.013778	0.145087	0.510878	0.050868		
4.105000	0.145087	0.522790	0.051524		
4.196222	0.145087	0.534701	0.052172		
4.287444	0.145087	0.546613	0.052812		
4.378667	0.145087	0.558525	0.053444		
4.469889	0.145087	0.570436	0.054069		
4.561111	0.145087	0.582348	0.054687		
4.652333	0.145087	0.594260	0.055297		
4.743556	0.145087	0.606171	0.055902		
4.834778	0.145087	0.618083	0.056499		
4.926000	0.145087	0.629995	0.057091		
5.017222	0.145087	0.641906	0.071921		
5.108444	0.145087	0.653818	0.094001		
5.199667	0.145087	0.665730	0.107332		
5.290889	0.145087	0.677641	0.117941		
5.382111	0.145087	0.689553	0.127059		
5.473333	0.145087	0.701465	0.135197		
5.564556	0.145087	0.713376	0.142629		
5.655778	0.145087	0.725288	0.149519		
5.747000	0.145087	0.737200	0.155977		
5.838222	0.145087	0.749111	0.162078		
5.929444	0.145087	0.761023	0.167880		
6.020667	0.145087	0.772935	0.179520		
6.111889	0.145087	0.784846	0.192928		

```

6.203111  0.145087  0.796758  0.202977
6.294333  0.145087  0.808670  0.211819
6.385556  0.145087  0.820581  0.219933
6.476778  0.145087  0.832493  0.227530
6.568000  0.145087  0.844404  0.234726
6.659222  0.145087  0.856316  0.241595
6.750444  0.145087  0.868228  0.248189
6.841667  0.145087  0.880139  0.254545
6.932889  0.145087  0.892051  0.260693
7.024111  0.145087  0.903963  0.266655
7.115333  0.145087  0.915874  0.272449
7.206556  0.145087  0.927786  0.278092
7.297778  0.145087  0.933080  0.283597
7.389000  0.145087  0.938374  0.288973
7.480222  0.145087  0.943668  0.294231
7.571444  0.145087  0.948962  0.299379
7.662667  0.145087  0.954256  0.304425
7.753889  0.145087  0.959551  0.406841
7.845111  0.145087  0.964845  0.833847
7.936333  0.145087  0.970139  1.390608
8.027556  0.145087  0.975433  1.927477
8.118778  0.145087  0.980727  2.317078
8.210000  0.145087  0.986021  2.536198
8.301222  0.145087  0.999256  2.759120

```

END FTABLE 2

END FTABLES

EXT SOURCES

```

<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member-> ***
<Name> # <Name> # tem strg<-factor->strg <Name> # # <Name> # # ***
WDM 2 PREC ENGL 1.167 PERLND 1 999 EXTNL PREC
WDM 2 PREC ENGL 1.167 IMPLND 1 999 EXTNL PREC
WDM 1 EVAP ENGL 0.76 PERLND 1 999 EXTNL PETINP
WDM 1 EVAP ENGL 0.76 IMPLND 1 999 EXTNL PETINP

```

END EXT SOURCES

EXT TARGETS

```

<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name> # <Name> # #<-factor->strg <Name> # <Name> tem strg strg***
RCHRES 1 HYDR RO 1 1 1 WDM 1024 FLOW ENGL REPL
RCHRES 1 HYDR STAGE 1 1 1 WDM 1025 STAG ENGL REPL
COPY 1 OUTPUT MEAN 1 1 48.4 WDM 701 FLOW ENGL REPL
COPY 501 OUTPUT MEAN 1 1 48.4 WDM 801 FLOW ENGL REPL
RCHRES 2 HYDR RO 1 1 1 WDM 1026 FLOW ENGL REPL
RCHRES 2 HYDR STAGE 1 1 1 WDM 1027 STAG ENGL REPL

```

END EXT TARGETS

MASS-LINK

```

<Volume> <-Grp> <-Member-><--Mult--> <Target> <-Grp> <-Member->***
<Name> <Name> # #<-factor-> <Name> <Name> # #***
MASS-LINK 2
PERLND PWATER SURO 0.083333 RCHRES INFLOW IVOL
END MASS-LINK 2

MASS-LINK 3
PERLND PWATER IFWO 0.083333 RCHRES INFLOW IVOL
END MASS-LINK 3

MASS-LINK 5
IMPLND IWATER SURO 0.083333 RCHRES INFLOW IVOL
END MASS-LINK 5

MASS-LINK 12
PERLND PWATER SURO 0.083333 COPY INPUT MEAN
END MASS-LINK 12

MASS-LINK 13
PERLND PWATER IFWO 0.083333 COPY INPUT MEAN
END MASS-LINK 13

```

MASS-LINK	15					
IMPLND	IWATER	SURO	0.083333	COPY	INPUT	MEAN
END MASS-LINK	15					

MASS-LINK	16					
RCHRES	ROFLOW			COPY	INPUT	MEAN
END MASS-LINK	16					

END MASS-LINK

END RUN

Predeveloped HSPF Message File

Mitigated HSPF Message File

Disclaimer

Legal Notice

This program and accompanying documentation are provided 'as-is' without warranty of any kind. The entire risk regarding the performance and results of this program is assumed by End User. Clear Creek Solutions Inc. and the governmental licensee or sublicensees disclaim all warranties, either expressed or implied, including but not limited to implied warranties of program and accompanying documentation. In no event shall Clear Creek Solutions Inc. be liable for any damages whatsoever (including without limitation to damages for loss of business profits, loss of business information, business interruption, and the like) arising out of the use of, or inability to use this program even if Clear Creek Solutions Inc. or their authorized representatives have been advised of the possibility of such damages. Software Copyright © by : Clear Creek Solutions, Inc. 2005-2021; All Rights Reserved.

Clear Creek Solutions, Inc.
6200 Capitol Blvd. Ste F
Olympia, WA. 98501
Toll Free 1(866)943-0304
Local (360)943-0304

www.clearcreeksolutions.com

Predeveloped Southwest Basin

Subbasin Name: Southwest Basins

Flows To :
Surface
Interflow
Groundwater

Area in Basin ☒ Show Only Selected

Available Pervious	Acres	Available Impervious	Acres
☒ C, Forest, Mod	18.7	☒ ROADS/FLAT	0
☒ C, Forest, Steep	0	☒ ROADS/STEEP	0
☒ C, Pasture, Flat	0	☒ ROOF TOPS/FLAT	0
☒ C, Pasture, Steep	0	☒ SIDEWALKS/FLAT	0

Pervious Total	18.7	Acres
Impervious Total	0	Acres
Basin Total	18.7	Acres

The South Basin is composed of five subbasins: Basin 3, Basin 4, Basin 5, Basin 6, and Basin 7. South Basin Bypass has also been included in this analysis to ensure the entire South Basin meets required flow controls standards.

Developed Southeast Basins:

Basin 3

Basin 3 Mitigated

Subbasin Name: Basin 3

☐ Designate as Bypass for POC:

Flows To :

Surface	Interflow	Groundwater
Detention 3	Detention 3	

Area in Basin

☒ Show Only Selected

Available Pervious		Available Impervious	
	Acres		Acres
☒ C, Forest, Mod	0	☒ ROADS/FLAT	0
☒ C, Forest, Steep	0	☒ ROADS/STEEP	.6
☒ C, Pasture, Flat	0	☒ ROOF TOPS/FLAT	0
☒ C, Pasture, Steep	.45	☒ SIDEWALKS/FLAT	0

Pervious Total	0.45	Acres
Impervious Total	0.6	Acres
Basin Total	1.05	Acres

Detention 3 Mitigated
✕

Facility Name

Outlet 1

Outlet 2

Outlet 3

Downstream Connection

Facility Type

☐ Precipitation Applied to Facility
 ☐ Evaporation Applied to Facility

Facility Dimensions

Trench Length (ft)	20
Trench Bottom Width (ft)	20
Effective Total Depth (ft)	7.18
Top and bottom slope (H/V)	0
Left Side Slope (H/V)	0
Right Side Slope (H/V)	0

Outlet Structure Data

Riser Height (ft)	6.68
Riser Diameter (in)	12
Riser Type	Flat
Notch Type	

Material Layers for Trench/Bed

Layer 1 Thickness (ft)	0.25
Layer 1 porosity (0-1)	0.4
Layer 2 Thickness (ft)	6.93
Layer 2 porosity (0-1)	0.9
Layer 3 Thickness (ft)	0
Layer 3 porosity (0-1)	0

Orifice

Number	Diameter (in)	Height (ft)
1	0.5	0.5
2	0	0
3	0	0

Infiltration

Trench Volume at Riser Head (ac-ft)

Show Trench

Initial Stage (ft)

These calculations show that 6.18' of live storage is provided on top of 6" of dead storage and with 6" of freeboard. The top 1' of gravel located above the proposed top of freeboard. 6" of freeboard storage is provided within the tank section. Dead storage is provided by the bottom 3" of the detention tanks as well as the 3" of gravel below the proposed tanks, totaling 6" of dead storage at the bottom of the detention system.

ACF Environmental HD R-Tanks shall be used for Detention 3. The manufacturer states that a porosity of 0.95 should be used for the R-Tank section; a porosity of 0.9 was used as a conservative design. A porosity of 0.4 was used for the top gravel layer.

Basin 4

Basin 4 Mitigated

Subbasin Name: Basin 4

☐ Designate as Bypass for POC:

Surface

Interflow

Groundwater

Flows To :

Detention 4

Detention 4

Area in Basin

☒ Show Only Selected

Available Pervious	Acres	Available Impervious	Acres
☒ C, Forest, Mod	0	☒ ROADS/FLAT	0
☒ C, Forest, Steep	0	☒ ROADS/STEEP	0
☒ C, Pasture, Flat	.75	☒ ROOF TOPS/FLAT	3.1
☒ C, Pasture, Steep	0	☒ SIDEWALKS/FLAT	5.4

Pervious Total	0.75	Acres
Impervious Total	8.5	Acres
Basin Total	9.25	Acres

Facility Name Detention 4

Outlet 1 0 **Outlet 2** 0 **Outlet 3** 0

Downstream Connection 0

Facility Type Gravel Trench/Bed

☐ Precipitation Applied to Facility

☐ Evaporation Applied to Facility

Quick Trench

Facility Dimension Diagram

Facility Dimensions

Trench Length (ft) 130
 Trench Bottom Width (ft) 302
 Effective Total Depth (ft) 8.29
 Top and bottom slope (H/V) 0
 Left Side Slope (H/V) 0
 Right Side Slope (H/V) 0

Outlet Structure Data

Riser Height (ft) 7.79
 Riser Diameter (in) 18
 Riser Type Flat
 Notch Type

Material Layers for Trench/Bed

Layer 1 Thickness (ft) 0.25
 Layer 1 porosity (0-1) 0.4
 Layer 2 Thickness (ft) 6.96
 Layer 2 porosity (0-1) 0.9
 Layer 3 Thickness (ft) 1.08
 Layer 3 porosity (0-1) 0.4

Orifice **Diameter** **Height**
Number **(in)** **(ft)**

1 2 0.5
 2 6.25 7.2
 3 0 0

Infiltration NO

Trench Volume at Riser Head (ac-ft) 5.977

Show Trench Open Table

Initial Stage (ft) 0

These calculations show that 7.29' of live storage is provided on top of 6" of dead storage and with 6" of freeboard. The top 13" of gravel is used as the top 7" of live storage and the 6". Dead storage is provided by the bottom 3" of the detention tanks as well as the 3" of gravel below the proposed tanks, totaling 6" of dead storage at the bottom of the detention system.

ACF Environmental HD R-Tanks shall be used for Detention 4. The manufacturer states that a porosity of 0.95 should be used for the R-Tank section; a porosity of 0.9 was used as a conservative design. A porosity of 0.4 was used for the top gravel layer.

Basin 5

Basin 5 Mitigated

Subbasin Name: Basin 5

☐ Designate as Bypass for POC:

Surface

Interflow

Groundwater

Flows To :

Detention 5

Detention 5

Area in Basin

☒ Show Only Selected

Available Pervious	Acres	Available Impervious	Acres
☒ C, Forest, Mod	0	☒ ROADS/FLAT	2.1
☒ C, Forest, Steep	0	☒ ROADS/STEEP	0
☒ C, Pasture, Flat	.75	☒ ROOF TOPS/FLAT	0
☒ C, Pasture, Steep	0	☒ SIDEWALKS/FLAT	0

Pervious Total	0.75	Acres
Impervious Total	2.1	Acres
Basin Total	2.85	Acres

Detention 5 Mitigated
✕

Facility Name

Outlet 1

Outlet 2

Outlet 3

Downstream Connection

Facility Type

☐ Precipitation Applied to Facility
 ☐ Evaporation Applied to Facility

Facility Dimensions

Trench Length (ft)	91
Trench Bottom Width (ft)	91
Effective Total Depth (ft)	8.21
Top and bottom slope (H/V)	0
Left Side Slope (H/V)	0
Right Side Slope (H/V)	0

Outlet Structure Data

Riser Height (ft)	7.71
Riser Diameter (in)	12
Riser Type	Flat
Notch Type	

Material Layers for Trench/Bed

Layer 1 Thickness (ft)	0.25
Layer 1 porosity (0-1)	0.4
Layer 2 Thickness (ft)	6.96
Layer 2 porosity (0-1)	0.9
Layer 3 Thickness (ft)	1
Layer 3 porosity (0-1)	0.4

Orifice

Number	Diameter (in)	Height (ft)
1	1	0.5
2	1.875	5.8
3	1.25	6.8

Infiltration

Trench Volume at Riser Head (ac-ft)

Show Trench

Initial Stage (ft)

These calculations show that 7.21' of live storage is provided on top of 6" of dead storage and with 6" of freeboard. The top 1' of gravel is used as the top 6" of live storage and the 6" freeboard. Dead storage is provided by the bottom 3" of the detention tanks as well as the 3" of gravel below the proposed tanks, totaling 6" of dead storage at the bottom of the detention system.

ACF Environmental HD R-Tanks shall be used for Detention 5. The manufacturer states that a porosity of 0.95 should be used for the R-Tank section; a porosity of 0.9 was used as a conservative design. A porosity of 0.4 was used for the top gravel layer.

Basin 6

Basin 6 Mitigated
 ✕

Subbasin Name: Basin 6
 ☐ Designate as Bypass for POC:

Flows To :
Surface: Detention 6
Interflow: Detention 6
Groundwater:

Area in Basin
☒ Show Only Selected

Available Pervious	Acres	Available Impervious	Acres
☒ C, Forest, Mod	0	☒ ROADS/FLAT	1.85
☒ C, Forest, Steep	0	☒ ROADS/STEEP	0
☒ C, Pasture, Flat	.7	☒ ROOF TOPS/FLAT	0
☒ C, Pasture, Steep	0	☒ SIDEWALKS/FLAT	0

Pervious Total	0.7	Acres
Impervious Total	1.85	Acres
Basin Total	2.55	Acres

Detention 6 Mitigated
✕

Facility Name

Outlet 1

Outlet 2

Outlet 3

Downstream Connection

Facility Type

☐ Precipitation Applied to Facility
 ☐ Evaporation Applied to Facility

Facility Dimensions

Trench Length (ft)	85
Trench Bottom Width (ft)	82
Effective Total Depth (ft)	8.21
Top and bottom slope (H/V)	0
Left Side Slope (H/V)	0
Right Side Slope (H/V)	0

Outlet Structure Data

Riser Height (ft)	7.71
Riser Diameter (in)	12
Riser Type	Flat
Notch Type	

Material Layers for Trench/Bed

Layer 1 Thickness (ft)	0.25
Layer 1 porosity (0-1)	0.4
Layer 2 Thickness (ft)	6.96
Layer 2 porosity (0-1)	0.9
Layer 3 Thickness (ft)	1
Layer 3 porosity (0-1)	0.4

Orifice

Number	Diameter (in)	Height (ft)
1	1	0.5
2	1.875	5.8
3	1.125	6.8

Infiltration

Trench Volume at Riser Head (ac-ft)

Show Trench

Initial Stage (ft)

These calculations show that 7.21' of live storage is provided on top of 6" of dead storage and with 6" of freeboard. The top 1' of gravel is used as the top 6" of live storage and the 6" freeboard. Dead storage is provided by the bottom 3" of the detention tanks as well as the 3" of gravel below the proposed tanks, totaling 6" of dead storage at the bottom of the detention system.

ACF Environmental HD R-Tanks shall be used for Detention 6. The manufacturer states that a porosity of 0.95 should be used for the R-Tank section; a porosity of 0.9 was used as a conservative design. A porosity of 0.4 was used for the top gravel layer.

Basin 7

Basin 7 Mitigated

Subbasin Name: Basin 7

☐ Designate as Bypass for POC:

Surface

Interflow

Groundwater

Flows To :

Detention 7

Detention 7

Area in Basin

☒ Show Only Selected

Available Pervious	Acres
☒ C, Forest, Mod	0
☒ C, Forest, Steep	0
☒ C, Pasture, Flat	.1
☒ C, Pasture, Steep	0

Available Impervious	Acres
☒ ROADS/FLAT	0
☒ ROADS/STEEP	0
☒ ROOF TOPS/FLAT	.6
☒ SIDEWALKS/FLAT	1

Pervious Total	0.1	Acres
Impervious Total	1.6	Acres
Basin Total	1.7	Acres

✕

Facility Name Detention 7

Outlet 1 0 **Outlet 2** 0 **Outlet 3** 0

Downstream Connection 0

Facility Type Gravel Trench/Bed

☐ Precipitation Applied to Facility

☐ Evaporation Applied to Facility

Quick Trench

Facility Dimension Diagram

Facility Dimensions

Trench Length (ft) 81
 Trench Bottom Width (ft) 81
 Effective Total Depth (ft) 7.31
 Top and bottom slope (H/V) 0
 Left Side Slope (H/V) 0
 Right Side Slope (H/V) 0

Outlet Structure Data

Riser Height (ft) 6.81
 Riser Diameter (in) 12
 Riser Type Flat
 Notch Type

Material Layers for Trench/Bed

Layer 1 Thickness (ft) 0.25
 Layer 1 porosity (0-1) 0.4
 Layer 2 Thickness (ft) 6.96
 Layer 2 porosity (0-1) 0.9
 Layer 3 Thickness (ft) 0.1
 Layer 3 porosity (0-1) 0.4

Orifice **Diameter** **Height**
Number **(in)** **(ft)**

1 0.75 0.5
 2 1.5 5.1
 3 1 6.1

Infiltration NO

Trench Volume at Riser Head (ac-ft) .907

Show Trench Open Table

Initial Stage (ft) 0

These calculations show that 6.31' of live storage is provided on top of 6" of dead storage and with 6" of freeboard. Freeboard is provided with the bottom 0.1' of the 12" top gravel section plus the top 0.4' of the tank section, totaling 6" of freeboard storage at the top of the live storage. Dead storage is provided by the bottom 3" of the detention tanks as well as the 3" of gravel below the proposed tanks, totaling 6" of dead storage at the bottom of the detention system.

ACF Environmental HD R-Tanks shall be used for Detention 7. The manufacturer states that a porosity of 0.95 should be used for the R-Tank section; a porosity of 0.9 was used as a conservative design. A porosity of 0.4 was used for the top gravel layer.

South Basin Bypass

South Bypass Mitigated
X

Subbasin Name:
☒ Designate as Bypass for POC:

Flows To :

Surface

Interflow

Groundwater

Area in Basin
☒ Show Only Selected

Available Pervious	Acres
☒ C, Forest, Mod	0
☒ C, Forest, Steep	.15
☒ C, Pasture, Flat	0
☒ C, Pasture, Steep	.75

Available Impervious	Acres
☒ ROADS/FLAT	.4
☒ ROADS/STEEP	0
☒ ROOF TOPS/FLAT	0
☒ SIDEWALKS/FLAT	0

Pervious Total	0.9	Acres
Impervious Total	0.4	Acres
Basin Total	1.3	Acres

No flow control is provided to the bypass portion of the Southwest basin. This area discharges directly to the Southwest basin point of compliance to ensure the entire Southwest basin meets the flow control standard.

**WWHM2012
PROJECT REPORT**

General Model Information

Project Name: Southwest Basin

Site Name:

Site Address:

City:

Report Date: 4/1/2021

Gage: Seatac

Data Start: 1948/10/01

Data End: 2009/09/30

Timestep: 15 Minute

Precip Scale: 1.167

Version Date: 2019/09/13

Version: 4.2.17

POC Thresholds

Low Flow Threshold for POC1:	50 Percent of the 2 Year
High Flow Threshold for POC1:	50 Year

Landuse Basin Data

Predeveloped Land Use

Southwest Basins

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Forest, Mod	18.7
Pervious Total	18.7
Impervious Land Use	acre
Impervious Total	0
Basin Total	18.7

Element Flows To:		
Surface	Interflow	Groundwater

*Mitigated Land Use***Basin 3**

Bypass:	No
---------	----

GroundWater:	No
--------------	----

Pervious Land Use	acre
C, Pasture, Steep	0.45

Pervious Total	0.45
----------------	------

Impervious Land Use	acre
ROADS STEEP	0.6

Impervious Total	0.6
------------------	-----

Basin Total	1.05
-------------	------

Element Flows To:		
-------------------	--	--

Surface	Interflow	Groundwater
Detention 3	Detention 3	

Basin 4

Bypass: No

GroundWater: No

Pervious Land Use	acre
C, Pasture, Flat	0.75

Pervious Total	0.75
----------------	------

Impervious Land Use	acre
ROOF TOPS FLAT	3.1
SIDEWALKS FLAT	5.4

Impervious Total	8.5
------------------	-----

Basin Total	9.25
-------------	------

Element Flows To:

Surface	Interflow	Groundwater
Detention 4	Detention 4	

Basin 5

Bypass: No

GroundWater: No

Pervious Land Use acre
C, Pasture, Flat 0.75

Pervious Total 0.75

Impervious Land Use acre
ROADS FLAT 2.1

Impervious Total 2.1

Basin Total 2.85

Element Flows To:

Surface	Interflow	Groundwater
Detention 5	Detention 5	

Basin 6

Bypass: No

GroundWater: No

Pervious Land Use acre
C, Pasture, Flat 0.7

Pervious Total 0.7

Impervious Land Use acre
ROADS FLAT 1.85

Impervious Total 1.85

Basin Total 2.55

Element Flows To:

Surface

Detention 6

Interflow

Detention 6

Groundwater

Basin 7

Bypass: No

GroundWater: No

Pervious Land Use acre
C, Pasture, Flat 0.1

Pervious Total 0.1

Impervious Land Use acre
ROOF TOPS FLAT 0.6
SIDEWALKS FLAT 1

Impervious Total 1.6

Basin Total 1.7

Element Flows To:

Surface	Interflow	Groundwater
Detention 7	Detention 7	

South Bypass

Bypass: Yes

GroundWater: No

Pervious Land Use acre

C, Forest, Steep 0.15

C, Pasture, Steep 0.75

Pervious Total 0.9

Impervious Land Use acre

ROADS FLAT 0.4

Impervious Total 0.4

Basin Total 1.3

Element Flows To:
Surface

Interflow

Groundwater

Routing Elements

Predeveloped Routing

Mitigated Routing**Detention 5**

Bottom Length: 91.00 ft.
 Bottom Width: 91.00 ft.
 Trench bottom slope 1: 0 To 1
 Trench Left side slope 0: 0 To 1
 Trench right side slope 2: 0 To 1
 Material thickness of first layer: 0.25
 Pour Space of material for first layer: 0.4
 Material thickness of second layer: 6.96
 Pour Space of material for second layer: 0.9
 Material thickness of third layer: 1
 Pour Space of material for third layer: 0.4
 Discharge Structure
 Riser Height: 7.71 ft.
 Riser Diameter: 12 in.
 Orifice 1 Diameter: 1 in. Elevation:0.5 ft.
 Orifice 2 Diameter: 1.875 in. Elevation:5.8 ft.
 Orifice 3 Diameter: 1.25 in. Elevation:6.8 ft.
 Element Flows To:
 Outlet 1 Outlet 2

Gravel Trench Bed Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.190	0.000	0.000	0.000
0.0912	0.190	0.006	0.000	0.000
0.1824	0.190	0.013	0.000	0.000
0.2737	0.190	0.029	0.000	0.000
0.3649	0.190	0.045	0.000	0.000
0.4561	0.190	0.060	0.000	0.000
0.5473	0.190	0.076	0.005	0.000
0.6386	0.190	0.091	0.010	0.000
0.7298	0.190	0.107	0.013	0.000
0.8210	0.190	0.123	0.015	0.000
0.9122	0.190	0.138	0.017	0.000
1.0034	0.190	0.154	0.019	0.000
1.0947	0.190	0.170	0.020	0.000
1.1859	0.190	0.185	0.022	0.000
1.2771	0.190	0.201	0.023	0.000
1.3683	0.190	0.216	0.025	0.000
1.4596	0.190	0.232	0.026	0.000
1.5508	0.190	0.248	0.027	0.000
1.6420	0.190	0.263	0.029	0.000
1.7332	0.190	0.279	0.030	0.000
1.8244	0.190	0.294	0.031	0.000
1.9157	0.190	0.310	0.032	0.000
2.0069	0.190	0.326	0.033	0.000
2.0981	0.190	0.341	0.034	0.000
2.1893	0.190	0.357	0.035	0.000
2.2806	0.190	0.372	0.036	0.000
2.3718	0.190	0.388	0.037	0.000
2.4630	0.190	0.404	0.038	0.000
2.5542	0.190	0.419	0.038	0.000
2.6454	0.190	0.435	0.039	0.000

2.7367	0.190	0.450	0.040	0.000
2.8279	0.190	0.466	0.041	0.000
2.9191	0.190	0.482	0.042	0.000
3.0103	0.190	0.497	0.043	0.000
3.1016	0.190	0.513	0.043	0.000
3.1928	0.190	0.528	0.044	0.000
3.2840	0.190	0.544	0.045	0.000
3.3752	0.190	0.560	0.046	0.000
3.4664	0.190	0.575	0.046	0.000
3.5577	0.190	0.591	0.047	0.000
3.6489	0.190	0.607	0.048	0.000
3.7401	0.190	0.622	0.048	0.000
3.8313	0.190	0.638	0.049	0.000
3.9226	0.190	0.653	0.050	0.000
4.0138	0.190	0.669	0.050	0.000
4.1050	0.190	0.685	0.051	0.000
4.1962	0.190	0.700	0.052	0.000
4.2874	0.190	0.716	0.052	0.000
4.3787	0.190	0.731	0.053	0.000
4.4699	0.190	0.747	0.054	0.000
4.5611	0.190	0.763	0.054	0.000
4.6523	0.190	0.778	0.055	0.000
4.7436	0.190	0.794	0.055	0.000
4.8348	0.190	0.809	0.056	0.000
4.9260	0.190	0.825	0.057	0.000
5.0172	0.190	0.841	0.057	0.000
5.1084	0.190	0.856	0.058	0.000
5.1997	0.190	0.872	0.058	0.000
5.2909	0.190	0.887	0.059	0.000
5.3821	0.190	0.903	0.060	0.000
5.4733	0.190	0.919	0.060	0.000
5.5646	0.190	0.934	0.061	0.000
5.6558	0.190	0.950	0.061	0.000
5.7470	0.190	0.965	0.062	0.000
5.8382	0.190	0.981	0.081	0.000
5.9294	0.190	0.997	0.097	0.000
6.0207	0.190	1.012	0.108	0.000
6.1119	0.190	1.028	0.117	0.000
6.2031	0.190	1.044	0.125	0.000
6.2943	0.190	1.059	0.132	0.000
6.3856	0.190	1.075	0.138	0.000
6.4768	0.190	1.090	0.144	0.000
6.5680	0.190	1.106	0.150	0.000
6.6592	0.190	1.122	0.155	0.000
6.7504	0.190	1.137	0.160	0.000
6.8417	0.190	1.153	0.174	0.000
6.9329	0.190	1.168	0.185	0.000
7.0241	0.190	1.184	0.194	0.000
7.1153	0.190	1.200	0.203	0.000
7.2066	0.190	1.215	0.210	0.000
7.2978	0.190	1.222	0.217	0.000
7.3890	0.190	1.229	0.224	0.000
7.4802	0.190	1.236	0.230	0.000
7.5714	0.190	1.243	0.236	0.000
7.6627	0.190	1.250	0.242	0.000
7.7539	0.190	1.257	0.345	0.000
7.8451	0.190	1.264	0.772	0.000
7.9363	0.190	1.271	1.330	0.000

8.0276	0.190	1.278	1.867	0.000
8.1188	0.190	1.285	2.257	0.000
8.2100	0.190	1.292	2.477	0.000

Detention 6

Bottom Length: 85.00 ft.
 Bottom Width: 82.00 ft.
 Trench bottom slope 1: 0 To 1
 Trench Left side slope 0: 0 To 1
 Trench right side slope 2: 0 To 1
 Material thickness of first layer: 0.25
 Pour Space of material for first layer: 0.4
 Material thickness of second layer: 6.96
 Pour Space of material for second layer: 0.9
 Material thickness of third layer: 1
 Pour Space of material for third layer: 0.4
 Discharge Structure
 Riser Height: 7.71 ft.
 Riser Diameter: 12 in.
 Orifice 1 Diameter: 1 in. Elevation: 0.5 ft.
 Orifice 2 Diameter: 1.875 in. Elevation: 5.8 ft.
 Orifice 3 Diameter: 1.125 in. Elevation: 6.8 ft.
 Element Flows To:
 Outlet 1 Outlet 2

Gravel Trench Bed Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.160	0.000	0.000	0.000
0.0912	0.160	0.005	0.000	0.000
0.1824	0.160	0.011	0.000	0.000
0.2737	0.160	0.024	0.000	0.000
0.3649	0.160	0.038	0.000	0.000
0.4561	0.160	0.051	0.000	0.000
0.5473	0.160	0.064	0.005	0.000
0.6386	0.160	0.077	0.010	0.000
0.7298	0.160	0.090	0.013	0.000
0.8210	0.160	0.103	0.015	0.000
0.9122	0.160	0.116	0.017	0.000
1.0034	0.160	0.129	0.019	0.000
1.0947	0.160	0.143	0.020	0.000
1.1859	0.160	0.156	0.022	0.000
1.2771	0.160	0.169	0.023	0.000
1.3683	0.160	0.182	0.025	0.000
1.4596	0.160	0.195	0.026	0.000
1.5508	0.160	0.208	0.027	0.000
1.6420	0.160	0.221	0.029	0.000
1.7332	0.160	0.235	0.030	0.000
1.8244	0.160	0.248	0.031	0.000
1.9157	0.160	0.261	0.032	0.000
2.0069	0.160	0.274	0.033	0.000
2.0981	0.160	0.287	0.034	0.000
2.1893	0.160	0.300	0.035	0.000
2.2806	0.160	0.313	0.036	0.000
2.3718	0.160	0.327	0.037	0.000
2.4630	0.160	0.340	0.038	0.000
2.5542	0.160	0.353	0.038	0.000
2.6454	0.160	0.366	0.039	0.000
2.7367	0.160	0.379	0.040	0.000
2.8279	0.160	0.392	0.041	0.000

2.9191	0.160	0.405	0.042	0.000
3.0103	0.160	0.418	0.043	0.000
3.1016	0.160	0.432	0.043	0.000
3.1928	0.160	0.445	0.044	0.000
3.2840	0.160	0.458	0.045	0.000
3.3752	0.160	0.471	0.046	0.000
3.4664	0.160	0.484	0.046	0.000
3.5577	0.160	0.497	0.047	0.000
3.6489	0.160	0.510	0.048	0.000
3.7401	0.160	0.524	0.048	0.000
3.8313	0.160	0.537	0.049	0.000
3.9226	0.160	0.550	0.050	0.000
4.0138	0.160	0.563	0.050	0.000
4.1050	0.160	0.576	0.051	0.000
4.1962	0.160	0.589	0.052	0.000
4.2874	0.160	0.602	0.052	0.000
4.3787	0.160	0.616	0.053	0.000
4.4699	0.160	0.629	0.054	0.000
4.5611	0.160	0.642	0.054	0.000
4.6523	0.160	0.655	0.055	0.000
4.7436	0.160	0.668	0.055	0.000
4.8348	0.160	0.681	0.056	0.000
4.9260	0.160	0.694	0.057	0.000
5.0172	0.160	0.707	0.057	0.000
5.1084	0.160	0.721	0.058	0.000
5.1997	0.160	0.734	0.058	0.000
5.2909	0.160	0.747	0.059	0.000
5.3821	0.160	0.760	0.060	0.000
5.4733	0.160	0.773	0.060	0.000
5.5646	0.160	0.786	0.061	0.000
5.6558	0.160	0.799	0.061	0.000
5.7470	0.160	0.813	0.062	0.000
5.8382	0.160	0.826	0.081	0.000
5.9294	0.160	0.839	0.097	0.000
6.0207	0.160	0.852	0.108	0.000
6.1119	0.160	0.865	0.117	0.000
6.2031	0.160	0.878	0.125	0.000
6.2943	0.160	0.891	0.132	0.000
6.3856	0.160	0.905	0.138	0.000
6.4768	0.160	0.918	0.144	0.000
6.5680	0.160	0.931	0.150	0.000
6.6592	0.160	0.944	0.155	0.000
6.7504	0.160	0.957	0.160	0.000
6.8417	0.160	0.970	0.172	0.000
6.9329	0.160	0.983	0.182	0.000
7.0241	0.160	0.996	0.191	0.000
7.1153	0.160	1.010	0.198	0.000
7.2066	0.160	1.023	0.205	0.000
7.2978	0.160	1.029	0.211	0.000
7.3890	0.160	1.034	0.217	0.000
7.4802	0.160	1.040	0.223	0.000
7.5714	0.160	1.046	0.229	0.000
7.6627	0.160	1.052	0.234	0.000
7.7539	0.160	1.058	0.337	0.000
7.8451	0.160	1.064	0.764	0.000
7.9363	0.160	1.069	1.321	0.000
8.0276	0.160	1.075	1.858	0.000
8.1188	0.160	1.081	2.248	0.000

8.2100	0.160	1.087	2.467	0.000
--------	-------	-------	-------	-------

Detention 7

Bottom Length: 81.00 ft.
 Bottom Width: 81.00 ft.
 Trench bottom slope 1: 0 To 1
 Trench Left side slope 0: 0 To 1
 Trench right side slope 2: 0 To 1
 Material thickness of first layer: 0.25
 Pour Space of material for first layer: 0.4
 Material thickness of second layer: 6.96
 Pour Space of material for second layer: 0.9
 Material thickness of third layer: 0.1
 Pour Space of material for third layer: 0.4
 Discharge Structure
 Riser Height: 6.81 ft.
 Riser Diameter: 12 in.
 Orifice 1 Diameter: 0.75 in. Elevation: 0.5 ft.
 Orifice 2 Diameter: 1.5 in. Elevation: 5.1 ft.
 Orifice 3 Diameter: 1 in. Elevation: 6.1 ft.
 Element Flows To:
 Outlet 1 Outlet 2

Gravel Trench Bed Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.150	0.000	0.000	0.000
0.0812	0.150	0.004	0.000	0.000
0.1624	0.150	0.009	0.000	0.000
0.2437	0.150	0.014	0.000	0.000
0.3249	0.150	0.025	0.000	0.000
0.4061	0.150	0.036	0.000	0.000
0.4873	0.150	0.047	0.000	0.000
0.5686	0.150	0.058	0.004	0.000
0.6498	0.150	0.069	0.005	0.000
0.7310	0.150	0.080	0.007	0.000
0.8122	0.150	0.091	0.008	0.000
0.8934	0.150	0.102	0.009	0.000
0.9747	0.150	0.113	0.010	0.000
1.0559	0.150	0.124	0.011	0.000
1.1371	0.150	0.135	0.012	0.000
1.2183	0.150	0.146	0.012	0.000
1.2996	0.150	0.157	0.013	0.000
1.3808	0.150	0.168	0.014	0.000
1.4620	0.150	0.179	0.015	0.000
1.5432	0.150	0.190	0.015	0.000
1.6244	0.150	0.201	0.016	0.000
1.7057	0.150	0.212	0.016	0.000
1.7869	0.150	0.223	0.017	0.000
1.8681	0.150	0.234	0.017	0.000
1.9493	0.150	0.245	0.018	0.000
2.0306	0.150	0.256	0.018	0.000
2.1118	0.150	0.267	0.019	0.000
2.1930	0.150	0.278	0.019	0.000
2.2742	0.150	0.289	0.020	0.000
2.3554	0.150	0.300	0.020	0.000
2.4367	0.150	0.312	0.021	0.000
2.5179	0.150	0.323	0.021	0.000

2.5991	0.150	0.334	0.022	0.000
2.6803	0.150	0.345	0.022	0.000
2.7616	0.150	0.356	0.023	0.000
2.8428	0.150	0.367	0.023	0.000
2.9240	0.150	0.378	0.023	0.000
3.0052	0.150	0.389	0.024	0.000
3.0864	0.150	0.400	0.024	0.000
3.1677	0.150	0.411	0.024	0.000
3.2489	0.150	0.422	0.025	0.000
3.3301	0.150	0.433	0.025	0.000
3.4113	0.150	0.444	0.026	0.000
3.4926	0.150	0.455	0.026	0.000
3.5738	0.150	0.466	0.026	0.000
3.6550	0.150	0.477	0.027	0.000
3.7362	0.150	0.488	0.027	0.000
3.8174	0.150	0.499	0.027	0.000
3.8987	0.150	0.510	0.028	0.000
3.9799	0.150	0.521	0.028	0.000
4.0611	0.150	0.532	0.028	0.000
4.1423	0.150	0.543	0.029	0.000
4.2236	0.150	0.554	0.029	0.000
4.3048	0.150	0.565	0.029	0.000
4.3860	0.150	0.576	0.030	0.000
4.4672	0.150	0.587	0.030	0.000
4.5484	0.150	0.598	0.030	0.000
4.6297	0.150	0.609	0.031	0.000
4.7109	0.150	0.620	0.031	0.000
4.7921	0.150	0.631	0.031	0.000
4.8733	0.150	0.642	0.031	0.000
4.9546	0.150	0.653	0.032	0.000
5.0358	0.150	0.664	0.032	0.000
5.1170	0.150	0.675	0.040	0.000
5.1982	0.150	0.686	0.052	0.000
5.2794	0.150	0.697	0.059	0.000
5.3607	0.150	0.708	0.064	0.000
5.4419	0.150	0.719	0.069	0.000
5.5231	0.150	0.730	0.073	0.000
5.6043	0.150	0.741	0.077	0.000
5.6856	0.150	0.752	0.081	0.000
5.7668	0.150	0.763	0.084	0.000
5.8480	0.150	0.774	0.088	0.000
5.9292	0.150	0.785	0.091	0.000
6.0104	0.150	0.796	0.094	0.000
6.0917	0.150	0.807	0.096	0.000
6.1729	0.150	0.818	0.106	0.000
6.2541	0.150	0.829	0.112	0.000
6.3353	0.150	0.840	0.117	0.000
6.4166	0.150	0.851	0.122	0.000
6.4978	0.150	0.862	0.126	0.000
6.5790	0.150	0.873	0.130	0.000
6.6602	0.150	0.884	0.134	0.000
6.7414	0.150	0.895	0.138	0.000
6.8227	0.150	0.906	0.156	0.000
6.9039	0.150	0.917	0.448	0.000
6.9851	0.150	0.928	0.902	0.000
7.0663	0.150	0.939	1.407	0.000
7.1476	0.150	0.950	1.858	0.000
7.2288	0.150	0.955	2.176	0.000

Detention 3

Bottom Length: 55.00 ft.
 Bottom Width: 50.00 ft.
 Trench bottom slope 1: 0 To 1
 Trench Left side slope 0: 0 To 1
 Trench right side slope 2: 0 To 1
 Material thickness of first layer: 0.25
 Pour Space of material for first layer: 0.4
 Material thickness of second layer: 6.93
 Pour Space of material for second layer: 0.9
 Material thickness of third layer: 0
 Pour Space of material for third layer: 0
 Discharge Structure
 Riser Height: 6.68 ft.
 Riser Diameter: 12 in.
 Orifice 1 Diameter: 0.625 in. Elevation: 0.5 ft.
 Orifice 2 Diameter: 1.25 in. Elevation: 4.98 ft.
 Orifice 3 Diameter: 0.75 in. Elevation: 6.01 ft.
 Element Flows To:
 Outlet 1 Outlet 2

Gravel Trench Bed Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.063	0.000	0.000	0.000
0.0798	0.063	0.002	0.000	0.000
0.1596	0.063	0.004	0.000	0.000
0.2393	0.063	0.006	0.000	0.000
0.3191	0.063	0.010	0.000	0.000
0.3989	0.063	0.015	0.000	0.000
0.4787	0.063	0.019	0.000	0.000
0.5584	0.063	0.024	0.002	0.000
0.6382	0.063	0.028	0.003	0.000
0.7180	0.063	0.033	0.004	0.000
0.7978	0.063	0.037	0.005	0.000
0.8776	0.063	0.042	0.006	0.000
0.9573	0.063	0.046	0.007	0.000
1.0371	0.063	0.051	0.007	0.000
1.1169	0.063	0.055	0.008	0.000
1.1967	0.063	0.060	0.008	0.000
1.2764	0.063	0.065	0.009	0.000
1.3562	0.063	0.069	0.009	0.000
1.4360	0.063	0.074	0.010	0.000
1.5158	0.063	0.078	0.010	0.000
1.5956	0.063	0.083	0.011	0.000
1.6753	0.063	0.087	0.011	0.000
1.7551	0.063	0.092	0.011	0.000
1.8349	0.063	0.096	0.012	0.000
1.9147	0.063	0.101	0.012	0.000
1.9944	0.063	0.105	0.013	0.000
2.0742	0.063	0.110	0.013	0.000
2.1540	0.063	0.114	0.013	0.000
2.2338	0.063	0.119	0.014	0.000
2.3136	0.063	0.123	0.014	0.000
2.3933	0.063	0.128	0.014	0.000
2.4731	0.063	0.133	0.014	0.000

2.5529	0.063	0.137	0.015	0.000
2.6327	0.063	0.142	0.015	0.000
2.7124	0.063	0.146	0.015	0.000
2.7922	0.063	0.151	0.016	0.000
2.8720	0.063	0.155	0.016	0.000
2.9518	0.063	0.160	0.016	0.000
3.0316	0.063	0.164	0.016	0.000
3.1113	0.063	0.169	0.017	0.000
3.1911	0.063	0.173	0.017	0.000
3.2709	0.063	0.178	0.017	0.000
3.3507	0.063	0.182	0.017	0.000
3.4304	0.063	0.187	0.018	0.000
3.5102	0.063	0.191	0.018	0.000
3.5900	0.063	0.196	0.018	0.000
3.6698	0.063	0.201	0.018	0.000
3.7496	0.063	0.205	0.019	0.000
3.8293	0.063	0.210	0.019	0.000
3.9091	0.063	0.214	0.019	0.000
3.9889	0.063	0.219	0.019	0.000
4.0687	0.063	0.223	0.020	0.000
4.1484	0.063	0.228	0.020	0.000
4.2282	0.063	0.232	0.020	0.000
4.3080	0.063	0.237	0.020	0.000
4.3878	0.063	0.241	0.020	0.000
4.4676	0.063	0.246	0.021	0.000
4.5473	0.063	0.250	0.021	0.000
4.6271	0.063	0.255	0.021	0.000
4.7069	0.063	0.259	0.021	0.000
4.7867	0.063	0.264	0.021	0.000
4.8664	0.063	0.268	0.022	0.000
4.9462	0.063	0.273	0.022	0.000
5.0260	0.063	0.278	0.031	0.000
5.1058	0.063	0.282	0.037	0.000
5.1856	0.063	0.287	0.042	0.000
5.2653	0.063	0.291	0.045	0.000
5.3451	0.063	0.296	0.049	0.000
5.4249	0.063	0.300	0.051	0.000
5.5047	0.063	0.305	0.054	0.000
5.5844	0.063	0.309	0.056	0.000
5.6642	0.063	0.314	0.059	0.000
5.7440	0.063	0.318	0.061	0.000
5.8238	0.063	0.323	0.063	0.000
5.9036	0.063	0.327	0.065	0.000
5.9833	0.063	0.332	0.067	0.000
6.0631	0.063	0.336	0.072	0.000
6.1429	0.063	0.341	0.076	0.000
6.2227	0.063	0.346	0.079	0.000
6.3024	0.063	0.350	0.082	0.000
6.3822	0.063	0.355	0.085	0.000
6.4620	0.063	0.359	0.087	0.000
6.5418	0.063	0.364	0.090	0.000
6.6216	0.063	0.368	0.092	0.000
6.7013	0.063	0.373	0.127	0.000
6.7811	0.063	0.377	0.435	0.000
6.8609	0.063	0.382	0.888	0.000
6.9407	0.063	0.386	1.383	0.000
7.0204	0.063	0.391	1.820	0.000
7.1002	0.063	0.395	2.128	0.000

Detention 4

Bottom Length: 130.00 ft.
 Bottom Width: 302.00 ft.
 Trench bottom slope 1: 0 To 1
 Trench Left side slope 0: 0 To 1
 Trench right side slope 2: 0 To 1
 Material thickness of first layer: 0.25
 Pour Space of material for first layer: 0.4
 Material thickness of second layer: 6.96
 Pour Space of material for second layer: 0.9
 Material thickness of third layer: 1.08
 Pour Space of material for third layer: 0.4
 Discharge Structure
 Riser Height: 7.79 ft.
 Riser Diameter: 18 in.
 Orifice 1 Diameter: 2 in. Elevation: 0.5 ft.
 Orifice 2 Diameter: 6.25 in. Elevation: 7.2 ft.
 Element Flows To:
 Outlet 1 Outlet 2

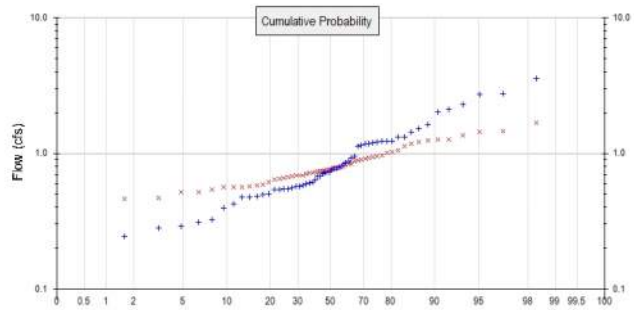
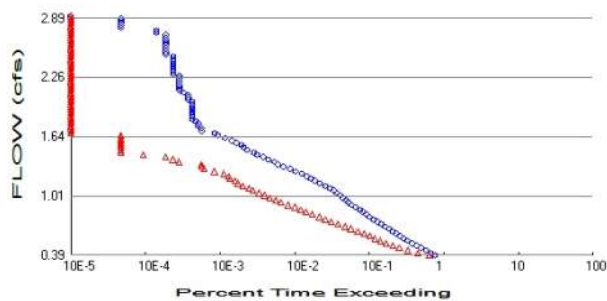
Gravel Trench Bed Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.901	0.000	0.000	0.000
0.0921	0.901	0.033	0.000	0.000
0.1842	0.901	0.066	0.000	0.000
0.2763	0.901	0.141	0.000	0.000
0.3684	0.901	0.215	0.000	0.000
0.4606	0.901	0.290	0.000	0.000
0.5527	0.901	0.365	0.024	0.000
0.6448	0.901	0.440	0.041	0.000
0.7369	0.901	0.514	0.052	0.000
0.8290	0.901	0.589	0.062	0.000
0.9211	0.901	0.664	0.070	0.000
1.0132	0.901	0.738	0.077	0.000
1.1053	0.901	0.813	0.084	0.000
1.1974	0.901	0.888	0.090	0.000
1.2896	0.901	0.963	0.096	0.000
1.3817	0.901	1.037	0.101	0.000
1.4738	0.901	1.112	0.107	0.000
1.5659	0.901	1.187	0.112	0.000
1.6580	0.901	1.261	0.116	0.000
1.7501	0.901	1.336	0.121	0.000
1.8422	0.901	1.411	0.125	0.000
1.9343	0.901	1.486	0.130	0.000
2.0264	0.901	1.560	0.134	0.000
2.1186	0.901	1.635	0.138	0.000
2.2107	0.901	1.710	0.142	0.000
2.3028	0.901	1.784	0.145	0.000
2.3949	0.901	1.859	0.149	0.000
2.4870	0.901	1.934	0.153	0.000
2.5791	0.901	2.009	0.156	0.000
2.6712	0.901	2.083	0.159	0.000
2.7633	0.901	2.158	0.163	0.000
2.8554	0.901	2.233	0.166	0.000
2.9476	0.901	2.307	0.169	0.000

3.0397	0.901	2.382	0.173	0.000
3.1318	0.901	2.457	0.176	0.000
3.2239	0.901	2.532	0.179	0.000
3.3160	0.901	2.606	0.182	0.000
3.4081	0.901	2.681	0.185	0.000
3.5002	0.901	2.756	0.188	0.000
3.5923	0.901	2.830	0.190	0.000
3.6844	0.901	2.905	0.193	0.000
3.7766	0.901	2.980	0.196	0.000
3.8687	0.901	3.055	0.199	0.000
3.9608	0.901	3.129	0.201	0.000
4.0529	0.901	3.204	0.204	0.000
4.1450	0.901	3.279	0.207	0.000
4.2371	0.901	3.353	0.209	0.000
4.3292	0.901	3.428	0.212	0.000
4.4213	0.901	3.503	0.214	0.000
4.5134	0.901	3.578	0.217	0.000
4.6056	0.901	3.652	0.219	0.000
4.6977	0.901	3.727	0.222	0.000
4.7898	0.901	3.802	0.224	0.000
4.8819	0.901	3.877	0.227	0.000
4.9740	0.901	3.951	0.229	0.000
5.0661	0.901	4.026	0.231	0.000
5.1582	0.901	4.101	0.234	0.000
5.2503	0.901	4.175	0.236	0.000
5.3424	0.901	4.250	0.238	0.000
5.4346	0.901	4.325	0.241	0.000
5.5267	0.901	4.400	0.243	0.000
5.6188	0.901	4.474	0.245	0.000
5.7109	0.901	4.549	0.247	0.000
5.8030	0.901	4.624	0.250	0.000
5.8951	0.901	4.698	0.252	0.000
5.9872	0.901	4.773	0.254	0.000
6.0793	0.901	4.848	0.256	0.000
6.1714	0.901	4.923	0.258	0.000
6.2636	0.901	4.997	0.260	0.000
6.3557	0.901	5.072	0.262	0.000
6.4478	0.901	5.147	0.264	0.000
6.5399	0.901	5.221	0.266	0.000
6.6320	0.901	5.296	0.268	0.000
6.7241	0.901	5.371	0.270	0.000
6.8162	0.901	5.446	0.272	0.000
6.9083	0.901	5.520	0.274	0.000
7.0004	0.901	5.595	0.276	0.000
7.0926	0.901	5.670	0.278	0.000
7.1847	0.901	5.744	0.280	0.000
7.2768	0.901	5.778	0.576	0.000
7.3689	0.901	5.811	0.720	0.000
7.4610	0.901	5.844	0.827	0.000
7.5531	0.901	5.877	0.918	0.000
7.6452	0.901	5.910	0.997	0.000
7.7373	0.901	5.944	1.069	0.000
7.8294	0.901	5.977	1.259	0.000
7.9216	0.901	6.010	1.952	0.000
8.0137	0.901	6.043	2.906	0.000
8.1058	0.901	6.076	3.989	0.000
8.1979	0.901	6.110	5.078	0.000

Analysis Results

POC 1



+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1

Total Pervious Area: 18.7
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1

Total Pervious Area: 3.65
Total Impervious Area: 15.05

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.770715
5 year	1.309921
10 year	1.738686
25 year	2.362166
50 year	2.88642
100 year	3.462467

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0.779199
5 year	1.016005
10 year	1.177466
25 year	1.38738
50 year	1.548304
100 year	1.713302

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1949	1.123	0.938
1950	1.201	0.931
1951	1.512	1.046
1952	0.503	0.575
1953	0.424	0.585
1954	0.614	0.541
1955	0.947	0.683
1956	0.873	0.740
1957	0.767	0.836
1958	0.707	0.613

1959	0.601	0.578
1960	1.207	0.972
1961	0.582	0.803
1962	0.395	0.434
1963	0.570	0.711
1964	0.787	0.688
1965	0.596	0.658
1966	0.473	0.636
1967	1.312	1.015
1968	0.725	0.760
1969	0.681	0.755
1970	0.547	0.737
1971	0.727	0.830
1972	1.185	0.889
1973	0.542	0.566
1974	0.716	0.793
1975	0.927	0.875
1976	0.674	0.731
1977	0.283	0.650
1978	0.548	0.721
1979	0.323	0.463
1980	2.104	1.253
1981	0.476	0.776
1982	1.230	1.213
1983	0.805	0.732
1984	0.492	0.561
1985	0.288	0.715
1986	1.224	0.842
1987	1.140	0.897
1988	0.482	0.566
1989	0.311	0.520
1990	3.560	1.672
1991	1.626	1.266
1992	0.640	0.672
1993	0.568	0.520
1994	0.244	0.469
1995	0.758	0.686
1996	2.006	1.175
1997	1.435	1.129
1998	0.556	0.777
1999	2.286	1.273
2000	0.543	0.665
2001	0.142	0.781
2002	0.765	1.029
2003	1.313	0.918
2004	1.234	1.354
2005	0.848	0.763
2006	0.834	0.746
2007	2.728	1.459
2008	2.771	1.440
2009	1.177	0.955

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	3.5599	1.6725
2	2.7713	1.4587
3	2.7283	1.4396

4	2.2857	1.3540
5	2.1045	1.2727
6	2.0056	1.2664
7	1.6258	1.2535
8	1.5122	1.2128
9	1.4347	1.1747
10	1.3128	1.1292
11	1.3118	1.0456
12	1.2337	1.0286
13	1.2298	1.0145
14	1.2239	0.9725
15	1.2074	0.9552
16	1.2015	0.9381
17	1.1850	0.9309
18	1.1774	0.9177
19	1.1402	0.8966
20	1.1226	0.8888
21	0.9472	0.8753
22	0.9274	0.8419
23	0.8734	0.8358
24	0.8482	0.8296
25	0.8339	0.8033
26	0.8049	0.7926
27	0.7867	0.7808
28	0.7674	0.7774
29	0.7652	0.7758
30	0.7585	0.7632
31	0.7274	0.7596
32	0.7249	0.7546
33	0.7157	0.7462
34	0.7074	0.7400
35	0.6815	0.7374
36	0.6741	0.7321
37	0.6396	0.7314
38	0.6141	0.7207
39	0.6009	0.7153
40	0.5956	0.7107
41	0.5825	0.6876
42	0.5702	0.6861
43	0.5684	0.6826
44	0.5564	0.6725
45	0.5483	0.6647
46	0.5475	0.6580
47	0.5427	0.6503
48	0.5416	0.6358
49	0.5027	0.6128
50	0.4922	0.5849
51	0.4824	0.5775
52	0.4760	0.5751
53	0.4727	0.5662
54	0.4240	0.5660
55	0.3952	0.5614
56	0.3234	0.5409
57	0.3114	0.5203
58	0.2882	0.5203
59	0.2829	0.4691
60	0.2441	0.4626
61	0.1415	0.4342

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.3854	16253	13584	83	Pass
0.4106	14166	9514	67	Pass
0.4359	12256	7024	57	Pass
0.4611	10517	5388	51	Pass
0.4864	9174	4415	48	Pass
0.5117	7991	3608	45	Pass
0.5369	6988	3033	43	Pass
0.5622	6147	2541	41	Pass
0.5875	5454	2158	39	Pass
0.6127	4872	1819	37	Pass
0.6380	4383	1493	34	Pass
0.6633	3921	1218	31	Pass
0.6885	3491	1008	28	Pass
0.7138	3097	814	26	Pass
0.7390	2731	659	24	Pass
0.7643	2419	548	22	Pass
0.7896	2165	458	21	Pass
0.8148	1940	368	18	Pass
0.8401	1760	301	17	Pass
0.8654	1599	258	16	Pass
0.8906	1397	217	15	Pass
0.9159	1250	173	13	Pass
0.9411	1119	139	12	Pass
0.9664	1036	119	11	Pass
0.9917	944	99	10	Pass
1.0169	876	84	9	Pass
1.0422	789	72	9	Pass
1.0675	716	59	8	Pass
1.0927	633	52	8	Pass
1.1180	549	43	7	Pass
1.1433	465	37	7	Pass
1.1685	392	34	8	Pass
1.1938	351	29	8	Pass
1.2190	309	28	9	Pass
1.2443	265	24	9	Pass
1.2696	219	18	8	Pass
1.2948	184	13	7	Pass
1.3201	152	12	7	Pass
1.3454	126	12	9	Pass
1.3706	114	6	5	Pass
1.3959	94	5	5	Pass
1.4212	80	4	5	Pass
1.4464	67	2	2	Pass
1.4717	60	1	1	Pass
1.4969	49	1	2	Pass
1.5222	44	1	2	Pass
1.5475	41	1	2	Pass
1.5727	35	1	2	Pass
1.5980	31	1	3	Pass
1.6233	25	1	4	Pass
1.6485	20	1	5	Pass
1.6738	18	0	0	Pass
1.6990	12	0	0	Pass

1.7243	12	0	0	Pass
1.7496	11	0	0	Pass
1.7748	11	0	0	Pass
1.8001	10	0	0	Pass
1.8254	9	0	0	Pass
1.8506	9	0	0	Pass
1.8759	9	0	0	Pass
1.9012	9	0	0	Pass
1.9264	9	0	0	Pass
1.9517	9	0	0	Pass
1.9769	9	0	0	Pass
2.0022	9	0	0	Pass
2.0275	8	0	0	Pass
2.0527	8	0	0	Pass
2.0780	8	0	0	Pass
2.1033	7	0	0	Pass
2.1285	6	0	0	Pass
2.1538	6	0	0	Pass
2.1790	6	0	0	Pass
2.2043	6	0	0	Pass
2.2296	6	0	0	Pass
2.2548	6	0	0	Pass
2.2801	6	0	0	Pass
2.3054	5	0	0	Pass
2.3306	5	0	0	Pass
2.3559	5	0	0	Pass
2.3812	5	0	0	Pass
2.4064	5	0	0	Pass
2.4317	5	0	0	Pass
2.4569	5	0	0	Pass
2.4822	5	0	0	Pass
2.5075	4	0	0	Pass
2.5327	4	0	0	Pass
2.5580	4	0	0	Pass
2.5833	4	0	0	Pass
2.6085	4	0	0	Pass
2.6338	4	0	0	Pass
2.6591	4	0	0	Pass
2.6843	4	0	0	Pass
2.7096	4	0	0	Pass
2.7348	3	0	0	Pass
2.7601	3	0	0	Pass
2.7854	1	0	0	Pass
2.8106	1	0	0	Pass
2.8359	1	0	0	Pass
2.8612	1	0	0	Pass
2.8864	1	0	0	Pass

Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume: 0 acre-feet
On-line facility target flow: 0 cfs.
Adjusted for 15 min: 0 cfs.
Off-line facility target flow: 0 cfs.
Adjusted for 15 min: 0 cfs.

LID Report

LID Technique	Used for Treatment ?	Total Volume Needs Treatment (ac-ft)	Volume Through Facility (ac-ft)	Infiltration Volume (ac-ft)	Cumulative Volume Infiltration Credit	Percent Volume Infiltrated	Water Quality	Percent Water Quality Treated	Comment
Detention 5 POC	☐	411.13			☐	0.00			
Detention 6 POC	☐	364.81			☐	0.00			
Detention 7 POC	☐	281.27			☐	0.00			
Detention 3 POC	☐	139.32			☐	0.00			
Detention 4 POC	☐	1508.93			☐	0.00			
Total Volume Infiltrated		2705.45	0.00	0.00		0.00	0.00	0%	No Treat. Credit
Compliance with LID Standard 8% of 2-yr to 50% of 2-yr									Duration Analysis Result = Failed

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

No PERLND changes have been made.

IMPLND Changes

No IMPLND changes have been made.

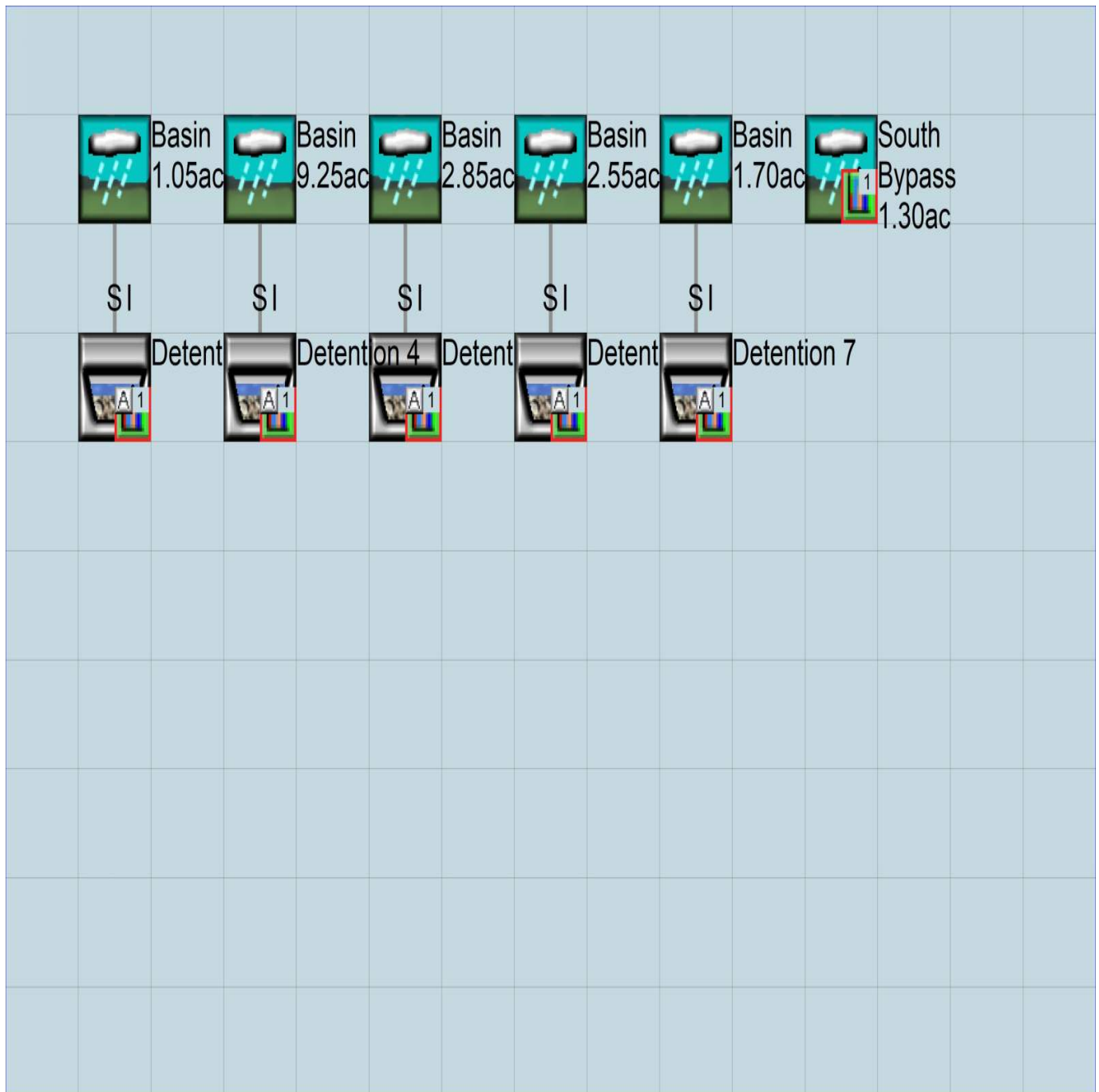
Appendix

Predeveloped Schematic



Southwest
Basins
18.70ac

Mitigated Schematic



Predeveloped UCI File

Mitigated UCI File

RUN

GLOBAL

```

WWHM4 model simulation
START      1948 10 01      END      2009 09 30
RUN INTERP OUTPUT LEVEL    3      0
RESUME     0 RUN      1      UNIT SYSTEM      1
END GLOBAL

```

FILES

```

<File>  <Un#>  <-----File Name----->***
<-ID->                                     ***
WDM      26      Southwest Basin.wdm
MESSU    25      MitSouthwest Basin.MES
          27      MitSouthwest Basin.L61
          28      MitSouthwest Basin.L62
          30      POCSouthwest Basin1.dat

```

END FILES

OPN SEQUENCE

INGRP INDELT 00:15

```

PERLND    15
IMPLND     3
PERLND    13
IMPLND     4
IMPLND     8
IMPLND     1
PERLND    12
RCHRES     1
RCHRES     2
RCHRES     3
RCHRES     4
RCHRES     5
COPY       1
COPY      501
COPY      601
DISPLY     1

```

END INGRP

END OPN SEQUENCE

DISPLY

DISPLY-INF01

```

# - #<-----Title----->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
1      Detention 5      MAX      1      2      30      9

```

END DISPLY-INF01

END DISPLY

COPY

TIMESERIES

```

# - # NPT NMN ***
1      1      1
501     1      1
601     1      1

```

END TIMESERIES

END COPY

GENER

OPCODE

OPCD ***

END OPCODE

PARM

K ***

END PARM

END GENER

PERLND

GEN-INFO

```

<PLS ><-----Name----->NBLKS Unit-systems Printer ***
# - # User t-series Engl Metr ***
          in out ***
15      C, Pasture, Steep      1      1      1      1      27      0
13      C, Pasture, Flat      1      1      1      1      27      0

```

12 C, Forest, Steep 1 1 1 1 27 0
 END GEN-INFO
 *** Section PWATER***

ACTIVITY

<PLS > ***** Active Sections *****
 # - # ATMP SNOW PWAT SED PST PWG PQAL MSTL PEST NITR PHOS TRAC ***
 15 0 0 1 0 0 0 0 0 0 0 0 0
 13 0 0 1 0 0 0 0 0 0 0 0 0
 12 0 0 1 0 0 0 0 0 0 0 0 0

END ACTIVITY

PRINT-INFO

<PLS > ***** Print-flags ***** PIVL PYR
 # - # ATMP SNOW PWAT SED PST PWG PQAL MSTL PEST NITR PHOS TRAC *****
 15 0 0 4 0 0 0 0 0 0 0 0 0 1 9
 13 0 0 4 0 0 0 0 0 0 0 0 0 1 9
 12 0 0 4 0 0 0 0 0 0 0 0 0 1 9

END PRINT-INFO

PWAT-PARM1

<PLS > PWATER variable monthly parameter value flags ***
 # - # CSNO RTOP UZFG VCS VUZ VNN VIFW VIRC VLE INFC HWT ***
 15 0 0 0 0 0 0 0 0 0 0 0
 13 0 0 0 0 0 0 0 0 0 0 0
 12 0 0 0 0 0 0 0 0 0 0 0

END PWAT-PARM1

PWAT-PARM2

<PLS > PWATER input info: Part 2 ***
 # - # ***FOREST LZSN INFILT LSUR SLSUR KVARV AGWRC
 15 0 4.5 0.06 400 0.15 0.5 0.996
 13 0 4.5 0.06 400 0.05 0.5 0.996
 12 0 4.5 0.08 400 0.15 0.5 0.996

END PWAT-PARM2

PWAT-PARM3

<PLS > PWATER input info: Part 3 ***
 # - # ***PETMAX PETMIN INFEXP INFILD DEEPFR BASETP AGWETP
 15 0 0 2 2 0 0 0
 13 0 0 2 2 0 0 0
 12 0 0 2 2 0 0 0

END PWAT-PARM3

PWAT-PARM4

<PLS > PWATER input info: Part 4 ***
 # - # CEPSC UZSN NSUR INTFW IRC LZETP ***
 15 0.15 0.25 0.3 6 0.3 0.4
 13 0.15 0.4 0.3 6 0.5 0.4
 12 0.2 0.3 0.35 6 0.3 0.7

END PWAT-PARM4

PWAT-STATE1

<PLS > *** Initial conditions at start of simulation
 ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
 # - # *** CEPS SURS UZS IFWS LZS AGWS GWVS
 15 0 0 0 0 2.5 1 0
 13 0 0 0 0 2.5 1 0
 12 0 0 0 0 2.5 1 0

END PWAT-STATE1

END PERLND

IMPLND

GEN-INFO

<PLS ><-----Name-----> Unit-systems Printer ***
 # - # User t-series Engl Metr ***
 in out
 3 ROADS/STEEP 1 1 1 27 0
 4 ROOF TOPS/FLAT 1 1 1 27 0
 8 SIDEWALKS/FLAT 1 1 1 27 0

```

1      ROADS/FLAT      1      1      1      27      0
END GEN-INFO
*** Section IWATER***

```

```

ACTIVITY
<PLS > ***** Active Sections *****
# - # ATMP SNOW IWAT SLD IWG IQAL ***
3      0      0      1      0      0      0
4      0      0      1      0      0      0
8      0      0      1      0      0      0
1      0      0      1      0      0      0
END ACTIVITY

```

```

PRINT-INFO
<ILS > ***** Print-flags ***** PIVL PYR
# - # ATMP SNOW IWAT SLD IWG IQAL *****
3      0      0      4      0      0      0      1      9
4      0      0      4      0      0      0      1      9
8      0      0      4      0      0      0      1      9
1      0      0      4      0      0      0      1      9
END PRINT-INFO

```

```

IWAT-PARM1
<PLS > IWATER variable monthly parameter value flags ***
# - # CSNO RTOP VRS VNN RTLI ***
3      0      0      0      0      0
4      0      0      0      0      0
8      0      0      0      0      0
1      0      0      0      0      0
END IWAT-PARM1

```

```

IWAT-PARM2
<PLS > IWATER input info: Part 2 ***
# - # *** LSUR SLSUR NSUR RETSC
3      400      0.1      0.1      0.05
4      400      0.01      0.1      0.1
8      400      0.01      0.1      0.1
1      400      0.01      0.1      0.1
END IWAT-PARM2

```

```

IWAT-PARM3
<PLS > IWATER input info: Part 3 ***
# - # *** PETMAX PETMIN
3      0      0
4      0      0
8      0      0
1      0      0
END IWAT-PARM3

```

```

IWAT-STATE1
<PLS > *** Initial conditions at start of simulation
# - # *** RETS SURS
3      0      0
4      0      0
8      0      0
1      0      0
END IWAT-STATE1

```

END IMPLND

```

SCHEMATIC
<-Source->      <-Area-->      <-Target->      MBLK      ***
<Name> #      <-factor->      <Name> #      Tbl#      ***
Basin 3***
PERLND 15      0.45      RCHRES 4      2
PERLND 15      0.45      RCHRES 4      3
IMPLND 3      0.6      RCHRES 4      5
Basin 4***
PERLND 13      0.75      RCHRES 5      2
PERLND 13      0.75      RCHRES 5      3

```


IMPLND	4	3.1	RCHRES	5	5
IMPLND	8	5.4	RCHRES	5	5
Basin	5***				
PERLND	13	0.75	RCHRES	1	2
PERLND	13	0.75	RCHRES	1	3
IMPLND	1	2.1	RCHRES	1	5
Basin	6***				
PERLND	13	0.7	RCHRES	2	2
PERLND	13	0.7	RCHRES	2	3
IMPLND	1	1.85	RCHRES	2	5
Basin	7***				
PERLND	13	0.1	RCHRES	3	2
PERLND	13	0.1	RCHRES	3	3
IMPLND	4	0.6	RCHRES	3	5
IMPLND	8	1	RCHRES	3	5
South Bypass***					
PERLND	12	0.15	COPY	501	12
PERLND	12	0.15	COPY	601	12
PERLND	12	0.15	COPY	501	13
PERLND	12	0.15	COPY	601	13
PERLND	15	0.75	COPY	501	12
PERLND	15	0.75	COPY	601	12
PERLND	15	0.75	COPY	501	13
PERLND	15	0.75	COPY	601	13
IMPLND	1	0.4	COPY	501	15
IMPLND	1	0.4	COPY	601	15

*****Routing*****

PERLND	15	0.45	COPY	1	12
IMPLND	3	0.6	COPY	1	15
PERLND	15	0.45	COPY	1	13
PERLND	13	0.75	COPY	1	12
IMPLND	4	3.1	COPY	1	15
IMPLND	8	5.4	COPY	1	15
PERLND	13	0.75	COPY	1	13
PERLND	13	0.75	COPY	1	12
IMPLND	1	2.1	COPY	1	15
PERLND	13	0.75	COPY	1	13
PERLND	13	0.7	COPY	1	12
IMPLND	1	1.85	COPY	1	15
PERLND	13	0.7	COPY	1	13
PERLND	13	0.1	COPY	1	12
IMPLND	4	0.6	COPY	1	15
IMPLND	8	1	COPY	1	15
PERLND	13	0.1	COPY	1	13
RCHRES	1	1	COPY	501	16
RCHRES	2	1	COPY	501	16
RCHRES	3	1	COPY	501	16
RCHRES	4	1	COPY	501	16
RCHRES	5	1	COPY	501	16

END SCHEMATIC

NETWORK

<-Volume->	<-Grp>	<-Member->	<-Mult-->	Tran	<-Target	vols>	<-Grp>	<-Member->	***
<Name>	#	<Name>	#	<-factor->	strg	<Name>	#	<Name>	#
COPY	501	OUTPUT	MEAN	1 1	48.4	DISPLY	1	INPUT	TIMSER 1

<-Volume->	<-Grp>	<-Member->	<-Mult-->	Tran	<-Target	vols>	<-Grp>	<-Member->	***
<Name>	#	<Name>	#	<-factor->	strg	<Name>	#	<Name>	#
END NETWORK									

RCHRES

GEN-INFO

RCHRES	Name	Nexits	Unit	Systems	Printer				
#	-	#	<----->	<---->	User	T-series	Engl	Metr	LKFG
					in	out			
1	Detention	5	1	1	1	1	28	0	1
2	Detention	6	1	1	1	1	28	0	1

```

3      Detention 7      1      1      1      1      28      0      1
4      Detention 3      1      1      1      1      28      0      1
5      Detention 4      1      1      1      1      28      0      1
END GEN-INFO
*** Section RCHRES***

```

```

ACTIVITY
<PLS > ***** Active Sections *****
# - # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
1      1      0      0      0      0      0      0      0      0      0      0
2      1      0      0      0      0      0      0      0      0      0      0
3      1      0      0      0      0      0      0      0      0      0      0
4      1      0      0      0      0      0      0      0      0      0      0
5      1      0      0      0      0      0      0      0      0      0      0
END ACTIVITY

```

```

PRINT-INFO
<PLS > ***** Print-flags ***** PIVL PYR *****
# - # HYDR ADCA CONS HEAT SED GQL OXRX NUTR PLNK PHCB PIVL PYR *****
1      4      0      0      0      0      0      0      0      0      0      1      9
2      4      0      0      0      0      0      0      0      0      0      1      9
3      4      0      0      0      0      0      0      0      0      0      1      9
4      4      0      0      0      0      0      0      0      0      0      1      9
5      4      0      0      0      0      0      0      0      0      0      1      9
END PRINT-INFO

```

```

HYDR-PARM1
RCHRES Flags for each HYDR Section *****
# - # VC A1 A2 A3 ODFVFG for each possible exit *** ODGTFG for each possible exit *** FUNCT for each possible exit ***
      FG FG FG FG
1      0 1 0 0      4 0 0 0 0      0 0 0 0 0      2 2 2 2 2
2      0 1 0 0      4 0 0 0 0      0 0 0 0 0      2 2 2 2 2
3      0 1 0 0      4 0 0 0 0      0 0 0 0 0      2 2 2 2 2
4      0 1 0 0      4 0 0 0 0      0 0 0 0 0      2 2 2 2 2
5      0 1 0 0      4 0 0 0 0      0 0 0 0 0      2 2 2 2 2
END HYDR-PARM1

```

```

HYDR-PARM2
# - # FTABNO LEN DELTH STCOR KS DB50 ***
<-----><-----><-----><-----><-----><-----><----->
1      1      0.02      0.0      0.0      0.5      0.0
2      2      0.02      0.0      0.0      0.5      0.0
3      3      0.02      0.0      0.0      0.5      0.0
4      4      0.01      0.0      0.0      0.5      0.0
5      5      0.02      0.0      0.0      0.5      0.0
END HYDR-PARM2

```

```

HYDR-INIT
RCHRES Initial conditions for each HYDR section *****
# - # *** VOL Initial value of COLIND Initial value of OUTDGT
      *** ac-ft for each possible exit for each possible exit
<-----><-----><-----><-----><-----><-----><-----><-----><-----><----->
1      0      4.0 0.0 0.0 0.0 0.0      0.0 0.0 0.0 0.0 0.0
2      0      4.0 0.0 0.0 0.0 0.0      0.0 0.0 0.0 0.0 0.0
3      0      4.0 0.0 0.0 0.0 0.0      0.0 0.0 0.0 0.0 0.0
4      0      4.0 0.0 0.0 0.0 0.0      0.0 0.0 0.0 0.0 0.0
5      0      4.0 0.0 0.0 0.0 0.0      0.0 0.0 0.0 0.0 0.0
END HYDR-INIT
END RCHRES

```

```

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES

```

```

FTABLE      1
92      4
Depth      Area      Volume      Outflow1      Velocity      Travel Time***
(ft)      (acres)      (acre-ft)      (cfs)      (ft/sec)      (Minutes)***
0.000000      0.190106      0.000000      0.000000
0.091222      0.190106      0.006937      0.000000
0.182444      0.190106      0.013873      0.000000

```

0.273667	0.190106	0.029481	0.000000
0.364889	0.190106	0.045089	0.000000
0.456111	0.190106	0.060696	0.000000
0.547333	0.190106	0.076304	0.005904
0.638556	0.190106	0.091912	0.010101
0.729778	0.190106	0.107520	0.013008
0.821000	0.190106	0.123127	0.015375
0.912222	0.190106	0.138735	0.017423
1.003444	0.190106	0.154343	0.019255
1.094667	0.190106	0.169950	0.020926
1.185889	0.190106	0.185558	0.022474
1.277111	0.190106	0.201166	0.023922
1.368333	0.190106	0.216773	0.025287
1.459556	0.190106	0.232381	0.026582
1.550778	0.190106	0.247989	0.027817
1.642000	0.190106	0.263596	0.029000
1.733222	0.190106	0.279204	0.030136
1.824444	0.190106	0.294812	0.031230
1.915667	0.190106	0.310419	0.032288
2.006889	0.190106	0.326027	0.033312
2.098111	0.190106	0.341635	0.034305
2.189333	0.190106	0.357242	0.035271
2.280556	0.190106	0.372850	0.036211
2.371778	0.190106	0.388458	0.037127
2.463000	0.190106	0.404065	0.038021
2.554222	0.190106	0.419673	0.038894
2.645444	0.190106	0.435281	0.039748
2.736667	0.190106	0.450888	0.040584
2.827889	0.190106	0.466496	0.041404
2.919111	0.190106	0.482104	0.042207
3.010333	0.190106	0.497711	0.042996
3.101556	0.190106	0.513319	0.043770
3.192778	0.190106	0.528927	0.044531
3.284000	0.190106	0.544534	0.045279
3.375222	0.190106	0.560142	0.046014
3.466444	0.190106	0.575750	0.046739
3.557667	0.190106	0.591357	0.047452
3.648889	0.190106	0.606965	0.048155
3.740111	0.190106	0.622573	0.048847
3.831333	0.190106	0.638180	0.049530
3.922556	0.190106	0.653788	0.050203
4.013778	0.190106	0.669396	0.050868
4.105000	0.190106	0.685003	0.051524
4.196222	0.190106	0.700611	0.052172
4.287444	0.190106	0.716219	0.052812
4.378667	0.190106	0.731826	0.053444
4.469889	0.190106	0.747434	0.054069
4.561111	0.190106	0.763042	0.054687
4.652333	0.190106	0.778649	0.055297
4.743556	0.190106	0.794257	0.055902
4.834778	0.190106	0.809865	0.056499
4.926000	0.190106	0.825472	0.057091
5.017222	0.190106	0.841080	0.057676
5.108444	0.190106	0.856688	0.058255
5.199667	0.190106	0.872295	0.058829
5.290889	0.190106	0.887903	0.059397
5.382111	0.190106	0.903511	0.059960
5.473333	0.190106	0.919118	0.060518
5.564556	0.190106	0.934726	0.061070
5.655778	0.190106	0.950334	0.061618
5.747000	0.190106	0.965941	0.062160
5.838222	0.190106	0.981549	0.062702
5.929444	0.190106	0.997157	0.063244
6.020667	0.190106	1.012764	0.108577
6.111889	0.190106	1.028372	0.117565
6.203111	0.190106	1.043980	0.125378
6.294333	0.190106	1.059587	0.132399
6.385556	0.190106	1.075195	0.138838
6.476778	0.190106	1.090803	0.144827
6.568000	0.190106	1.106410	0.150454

6.659222	0.190106	1.122018	0.155780
6.750444	0.190106	1.137626	0.160853
6.841667	0.190106	1.153233	0.174363
6.932889	0.190106	1.168841	0.185829
7.024111	0.190106	1.184449	0.194940
7.115333	0.190106	1.200056	0.203022
7.206556	0.190106	1.215664	0.210458
7.297778	0.190106	1.222601	0.217426
7.389000	0.190106	1.229538	0.224028
7.480222	0.190106	1.236474	0.230331
7.571444	0.190106	1.243411	0.236382
7.662667	0.190106	1.250348	0.242214
7.753889	0.190106	1.257285	0.345322
7.845111	0.190106	1.264221	0.772940
7.936333	0.190106	1.271158	1.330244
8.027556	0.190106	1.278095	1.867597
8.118778	0.190106	1.285031	2.257632
8.210000	0.190106	1.291968	2.477139
8.301222	0.190106	1.309310	2.700410

END FTABLE 1

FTABLE 2

92 4

Depth (ft)	Area (acres)	Volume (acre-ft)	Outflow1 (cfs)	Velocity (ft/sec)	Travel Time*** (Minutes)***
0.000000	0.160009	0.000000	0.000000		
0.091222	0.160009	0.005839	0.000000		
0.182444	0.160009	0.011677	0.000000		
0.273667	0.160009	0.024814	0.000000		
0.364889	0.160009	0.037951	0.000000		
0.456111	0.160009	0.051087	0.000000		
0.547333	0.160009	0.064224	0.005904		
0.638556	0.160009	0.077361	0.010101		
0.729778	0.160009	0.090498	0.013008		
0.821000	0.160009	0.103634	0.015375		
0.912222	0.160009	0.116771	0.017423		
1.003444	0.160009	0.129908	0.019255		
1.094667	0.160009	0.143045	0.020926		
1.185889	0.160009	0.156181	0.022474		
1.277111	0.160009	0.169318	0.023922		
1.368333	0.160009	0.182455	0.025287		
1.459556	0.160009	0.195592	0.026582		
1.550778	0.160009	0.208728	0.027817		
1.642000	0.160009	0.221865	0.029000		
1.733222	0.160009	0.235002	0.030136		
1.824444	0.160009	0.248139	0.031230		
1.915667	0.160009	0.261275	0.032288		
2.006889	0.160009	0.274412	0.033312		
2.098111	0.160009	0.287549	0.034305		
2.189333	0.160009	0.300686	0.035271		
2.280556	0.160009	0.313822	0.036211		
2.371778	0.160009	0.326959	0.037127		
2.463000	0.160009	0.340096	0.038021		
2.554222	0.160009	0.353233	0.038894		
2.645444	0.160009	0.366369	0.039748		
2.736667	0.160009	0.379506	0.040584		
2.827889	0.160009	0.392643	0.041404		
2.919111	0.160009	0.405780	0.042207		
3.010333	0.160009	0.418916	0.042996		
3.101556	0.160009	0.432053	0.043770		
3.192778	0.160009	0.445190	0.044531		
3.284000	0.160009	0.458327	0.045279		
3.375222	0.160009	0.471464	0.046014		
3.466444	0.160009	0.484600	0.046739		
3.557667	0.160009	0.497737	0.047452		
3.648889	0.160009	0.510874	0.048155		
3.740111	0.160009	0.524011	0.048847		
3.831333	0.160009	0.537147	0.049530		
3.922556	0.160009	0.550284	0.050203		
4.013778	0.160009	0.563421	0.050868		
4.105000	0.160009	0.576558	0.051524		

4.196222	0.160009	0.589694	0.052172
4.287444	0.160009	0.602831	0.052812
4.378667	0.160009	0.615968	0.053444
4.469889	0.160009	0.629105	0.054069
4.561111	0.160009	0.642241	0.054687
4.652333	0.160009	0.655378	0.055297
4.743556	0.160009	0.668515	0.055902
4.834778	0.160009	0.681652	0.056499
4.926000	0.160009	0.694788	0.057091
5.017222	0.160009	0.707925	0.057676
5.108444	0.160009	0.721062	0.058255
5.199667	0.160009	0.734199	0.058829
5.290889	0.160009	0.747335	0.059397
5.382111	0.160009	0.760472	0.059960
5.473333	0.160009	0.773609	0.060518
5.564556	0.160009	0.786746	0.061070
5.655778	0.160009	0.799882	0.061618
5.747000	0.160009	0.813019	0.062160
5.838222	0.160009	0.826156	0.081350
5.929444	0.160009	0.839293	0.097556
6.020667	0.160009	0.852429	0.108577
6.111889	0.160009	0.865566	0.117565
6.203111	0.160009	0.878703	0.125378
6.294333	0.160009	0.891840	0.132399
6.385556	0.160009	0.904976	0.138838
6.476778	0.160009	0.918113	0.144827
6.568000	0.160009	0.931250	0.150454
6.659222	0.160009	0.944387	0.155780
6.750444	0.160009	0.957523	0.160853
6.841667	0.160009	0.970660	0.172718
6.932889	0.160009	0.983797	0.182892
7.024111	0.160009	0.996934	0.191126
7.115333	0.160009	1.010070	0.198499
7.206556	0.160009	1.023207	0.205321
7.297778	0.160009	1.029046	0.211742
7.389000	0.160009	1.034884	0.217845
7.480222	0.160009	1.040723	0.223686
7.571444	0.160009	1.046561	0.229306
7.662667	0.160009	1.052400	0.234732
7.753889	0.160009	1.058239	0.337454
7.845111	0.160009	1.064077	0.764704
7.936333	0.160009	1.069916	1.321656
8.027556	0.160009	1.075754	1.858671
8.118778	0.160009	1.081593	2.248380
8.210000	0.160009	1.087431	2.467573
8.301222	0.160009	1.102028	2.690539

END FTABLE 2

FTABLE 3

91 4

Depth (ft)	Area (acres)	Volume (acre-ft)	Outflow1 (cfs)	Velocity (ft/sec)	Travel Time*** (Minutes)***
0.000000	0.150620	0.000000	0.000000		
0.081222	0.150620	0.004893	0.000000		
0.162444	0.150620	0.009787	0.000000		
0.243667	0.150620	0.014680	0.000000		
0.324889	0.150620	0.025691	0.000000		
0.406111	0.150620	0.036701	0.000000		
0.487333	0.150620	0.047711	0.000000		
0.568556	0.150620	0.058722	0.003997		
0.649778	0.150620	0.069732	0.005908		
0.731000	0.150620	0.080742	0.007336		
0.812222	0.150620	0.091753	0.008529		
0.893444	0.150620	0.102763	0.009575		
0.974667	0.150620	0.113773	0.010517		
1.055889	0.150620	0.124784	0.011381		
1.137111	0.150620	0.135794	0.012184		
1.218333	0.150620	0.146804	0.012937		
1.299556	0.150620	0.157814	0.013649		
1.380778	0.150620	0.168825	0.014326		
1.462000	0.150620	0.179835	0.014972		

1.543222	0.150620	0.190845	0.015591
1.624444	0.150620	0.201856	0.016186
1.705667	0.150620	0.212866	0.016761
1.786889	0.150620	0.223876	0.017316
1.868111	0.150620	0.234887	0.017854
1.949333	0.150620	0.245897	0.018377
2.030556	0.150620	0.256907	0.018885
2.111778	0.150620	0.267918	0.019379
2.193000	0.150620	0.278928	0.019861
2.274222	0.150620	0.289938	0.020332
2.355444	0.150620	0.300948	0.020792
2.436667	0.150620	0.311959	0.021243
2.517889	0.150620	0.322969	0.021684
2.599111	0.150620	0.333979	0.022116
2.680333	0.150620	0.344990	0.022539
2.761556	0.150620	0.356000	0.022955
2.842778	0.150620	0.367010	0.023364
2.924000	0.150620	0.378021	0.023766
3.005222	0.150620	0.389031	0.024160
3.086444	0.150620	0.400041	0.024549
3.167667	0.150620	0.411052	0.024931
3.248889	0.150620	0.422062	0.025308
3.330111	0.150620	0.433072	0.025679
3.411333	0.150620	0.444083	0.026045
3.492556	0.150620	0.455093	0.026406
3.573778	0.150620	0.466103	0.026762
3.655000	0.150620	0.477113	0.027113
3.736222	0.150620	0.488124	0.027460
3.817444	0.150620	0.499134	0.027802
3.898667	0.150620	0.510144	0.028141
3.979889	0.150620	0.521155	0.028475
4.061111	0.150620	0.532165	0.028805
4.142333	0.150620	0.543175	0.029132
4.223556	0.150620	0.554186	0.029455
4.304778	0.150620	0.565196	0.029775
4.386000	0.150620	0.576206	0.030091
4.467222	0.150620	0.587217	0.030404
4.548444	0.150620	0.598227	0.030713
4.629667	0.150620	0.609237	0.031020
4.710889	0.150620	0.620247	0.031323
4.792111	0.150620	0.631258	0.031624
4.873333	0.150620	0.642268	0.031922
4.954556	0.150620	0.653278	0.032217
5.035778	0.150620	0.664289	0.032509
5.117000	0.150620	0.675299	0.040760
5.198222	0.150620	0.686309	0.052222
5.279444	0.150620	0.697320	0.059236
5.360667	0.150620	0.708330	0.064827
5.441889	0.150620	0.719340	0.069635
5.523111	0.150620	0.730351	0.073927
5.604333	0.150620	0.741361	0.077848
5.685556	0.150620	0.752371	0.081482
5.766778	0.150620	0.763381	0.084889
5.848000	0.150620	0.774392	0.088107
5.929222	0.150620	0.785402	0.091167
6.010444	0.150620	0.796412	0.094092
6.091667	0.150620	0.807423	0.096898
6.172889	0.150620	0.818433	0.106927
6.254111	0.150620	0.829443	0.112863
6.335333	0.150620	0.840454	0.117901
6.416556	0.150620	0.851464	0.122456
6.497778	0.150620	0.862474	0.126685
6.579000	0.150620	0.873485	0.130672
6.660222	0.150620	0.884495	0.134464
6.741444	0.150620	0.895505	0.138096
6.822667	0.150620	0.906516	0.156721
6.903889	0.150620	0.917526	0.448666
6.985111	0.150620	0.928536	0.902705
7.066333	0.150620	0.939546	1.407448
7.147556	0.150620	0.950557	1.858442

7.228778 0.150620 0.955450 2.176871
 7.310000 0.150620 0.967684 2.387578
 END FTABLE 3
 FTABLE 4

92 4	Depth (ft)	Area (acres)	Volume (acre-ft)	Outflow1 (cfs)	Velocity (ft/sec)	Travel Time*** (Minutes)***
	0.000000	0.009183	0.000000	0.000000		
	0.076556	0.009183	0.000281	0.000000		
	0.153111	0.009183	0.000562	0.000000		
	0.229667	0.009183	0.000844	0.000000		
	0.306222	0.009183	0.001476	0.000000		
	0.382778	0.009183	0.002109	0.000000		
	0.459333	0.009183	0.002742	0.000000		
	0.535889	0.009183	0.003374	0.001285		
	0.612444	0.009183	0.004007	0.002275		
	0.689000	0.009183	0.004640	0.002949		
	0.765556	0.009183	0.005272	0.003496		
	0.842111	0.009183	0.005905	0.003968		
	0.918667	0.009183	0.006538	0.004390		
	0.995222	0.009183	0.007170	0.004774		
	1.071778	0.009183	0.007803	0.005130		
	1.148333	0.009183	0.008436	0.005463		
	1.224889	0.009183	0.009069	0.005776		
	1.301444	0.009183	0.009701	0.006073		
	1.378000	0.009183	0.010334	0.006357		
	1.454556	0.009183	0.010967	0.006628		
	1.531111	0.009183	0.011599	0.006889		
	1.607667	0.009183	0.012232	0.007140		
	1.684222	0.009183	0.012865	0.007383		
	1.760778	0.009183	0.013497	0.007618		
	1.837333	0.009183	0.014130	0.007845		
	1.913889	0.009183	0.014763	0.008067		
	1.990444	0.009183	0.015395	0.008282		
	2.067000	0.009183	0.016028	0.008492		
	2.143556	0.009183	0.016661	0.008697		
	2.220111	0.009183	0.017294	0.008898		
	2.296667	0.009183	0.017926	0.009094		
	2.373222	0.009183	0.018559	0.009285		
	2.449778	0.009183	0.019192	0.009473		
	2.526333	0.009183	0.019824	0.009657		
	2.602889	0.009183	0.020457	0.009838		
	2.679444	0.009183	0.021090	0.010015		
	2.756000	0.009183	0.021722	0.010190		
	2.832556	0.009183	0.022355	0.010361		
	2.909111	0.009183	0.022988	0.010530		
	2.985667	0.009183	0.023620	0.010696		
	3.062222	0.009183	0.024253	0.010859		
	3.138778	0.009183	0.024886	0.011020		
	3.215333	0.009183	0.025519	0.011179		
	3.291889	0.009183	0.026151	0.011336		
	3.368444	0.009183	0.026784	0.011490		
	3.445000	0.009183	0.027417	0.011642		
	3.521556	0.009183	0.028049	0.011793		
	3.598111	0.009183	0.028682	0.011941		
	3.674667	0.009183	0.029315	0.012088		
	3.751222	0.009183	0.029947	0.012233		
	3.827778	0.009183	0.030580	0.012376		
	3.904333	0.009183	0.031213	0.012517		
	3.980889	0.009183	0.031845	0.012657		
	4.057444	0.009183	0.032478	0.012796		
	4.134000	0.009183	0.033111	0.012933		
	4.210556	0.009183	0.033743	0.013068		
	4.287111	0.009183	0.034376	0.013202		
	4.363667	0.009183	0.035009	0.013335		
	4.440222	0.009183	0.035642	0.013467		
	4.516778	0.009183	0.036274	0.013597		
	4.593333	0.009183	0.036907	0.013726		
	4.669889	0.009183	0.037540	0.013854		
	4.746444	0.009183	0.038172	0.013980		

4.823000	0.009183	0.038805	0.014106
4.899556	0.009183	0.039438	0.014230
4.976111	0.009183	0.040070	0.014353
5.052667	0.009183	0.040703	0.014475
5.129222	0.009183	0.041336	0.014597
5.205778	0.009183	0.041968	0.014717
5.282333	0.009183	0.042601	0.014836
5.358889	0.009183	0.043234	0.014954
5.435444	0.009183	0.043867	0.015072
5.512000	0.009183	0.044499	0.015188
5.588556	0.009183	0.045132	0.015304
5.665111	0.009183	0.045765	0.015418
5.741667	0.009183	0.046397	0.015532
5.818222	0.009183	0.047030	0.015645
5.894778	0.009183	0.047663	0.015757
5.971333	0.009183	0.048295	0.015869
6.047889	0.009183	0.048928	0.015979
6.124444	0.009183	0.049561	0.016089
6.201000	0.009183	0.050193	0.016198
6.277556	0.009183	0.050826	0.016307
6.354111	0.009183	0.051459	0.016415
6.430667	0.009183	0.052092	0.103466
6.507222	0.009183	0.052724	0.438517
6.583778	0.009183	0.053357	0.885824
6.660333	0.009183	0.053990	1.356678
6.736889	0.009183	0.054622	1.764801
6.813444	0.009183	0.055255	2.049932
6.890000	0.009183	0.055888	2.220484
6.966556	0.009183	0.056591	2.408805

END FTABLE 4

FTABLE 5

91 4

Depth (ft)	Area (acres)	Volume (acre-ft)	Outflow1 (cfs)	Velocity (ft/sec)	Travel Time*** (Minutes)***
0.000000	0.901286	0.000000	0.000000		
0.092111	0.901286	0.033207	0.000000		
0.184222	0.901286	0.066415	0.000000		
0.276333	0.901286	0.141131	0.000000		
0.368444	0.901286	0.215848	0.000000		
0.460556	0.901286	0.290564	0.000000		
0.552667	0.901286	0.365281	0.024911		
0.644778	0.901286	0.439998	0.041302		
0.736889	0.901286	0.514714	0.052831		
0.829000	0.901286	0.589431	0.062261		
0.921111	0.901286	0.664147	0.070440		
1.013222	0.901286	0.738864	0.077763		
1.105333	0.901286	0.813580	0.084453		
1.197444	0.901286	0.888297	0.090651		
1.289556	0.901286	0.963014	0.096452		
1.381667	0.901286	1.037730	0.101923		
1.473778	0.901286	1.112447	0.107115		
1.565889	0.901286	1.187163	0.112066		
1.658000	0.901286	1.261880	0.116808		
1.750111	0.901286	1.336597	0.121365		
1.842222	0.901286	1.411313	0.125757		
1.934333	0.901286	1.486030	0.130000		
2.026444	0.901286	1.560746	0.134109		
2.118556	0.901286	1.635463	0.138096		
2.210667	0.901286	1.710179	0.141972		
2.302778	0.901286	1.784896	0.145744		
2.394889	0.901286	1.859613	0.149421		
2.487000	0.901286	1.934329	0.153009		
2.579111	0.901286	2.009046	0.156516		
2.671222	0.901286	2.083762	0.159945		
2.763333	0.901286	2.158479	0.163303		
2.855444	0.901286	2.233195	0.166592		
2.947556	0.901286	2.307912	0.169818		
3.039667	0.901286	2.382629	0.172984		
3.131778	0.901286	2.457345	0.176093		
3.223889	0.901286	2.532062	0.179149		


```

3.316000 0.901286 2.606778 0.182152
3.408111 0.901286 2.681495 0.185108
3.500222 0.901286 2.756211 0.188016
3.592333 0.901286 2.830928 0.190881
3.684444 0.901286 2.905645 0.193703
3.776556 0.901286 2.980361 0.196484
3.868667 0.901286 3.055078 0.199227
3.960778 0.901286 3.129794 0.201932
4.052889 0.901286 3.204511 0.204602
4.145000 0.901286 3.279227 0.207237
4.237111 0.901286 3.353944 0.209839
4.329222 0.901286 3.428661 0.212410
4.421333 0.901286 3.503377 0.214949
4.513444 0.901286 3.578094 0.217459
4.605556 0.901286 3.652810 0.219940
4.697667 0.901286 3.727527 0.222394
4.789778 0.901286 3.802243 0.224821
4.881889 0.901286 3.876960 0.227221
4.974000 0.901286 3.951677 0.229597
5.066111 0.901286 4.026393 0.231949
5.158222 0.901286 4.101110 0.234277
5.250333 0.901286 4.175826 0.236581
5.342444 0.901286 4.250543 0.238864
5.434556 0.901286 4.325259 0.241125
5.526667 0.901286 4.399976 0.243365
5.618778 0.901286 4.474693 0.245585
5.710889 0.901286 4.549409 0.247785
5.803000 0.901286 4.624126 0.249965
5.895111 0.901286 4.698842 0.252127
5.987222 0.901286 4.773559 0.254270
6.079333 0.901286 4.848276 0.256395
6.171444 0.901286 4.922992 0.258503
6.263556 0.901286 4.997709 0.260594
6.355667 0.901286 5.072425 0.262668
6.447778 0.901286 5.147142 0.264726
6.539889 0.901286 5.221858 0.266768
6.632000 0.901286 5.296575 0.268794
6.724111 0.901286 5.371292 0.270805
6.816222 0.901286 5.446008 0.272802
6.908333 0.901286 5.520725 0.274784
7.000444 0.901286 5.595441 0.276752
7.092556 0.901286 5.670158 0.278706
7.184667 0.901286 5.744874 0.280646
7.276778 0.901286 5.778082 0.282595
7.368889 0.901286 5.811289 0.284544
7.461000 0.901286 5.844497 0.286493
7.553111 0.901286 5.877704 0.288442
7.645222 0.901286 5.910911 0.290391
7.737333 0.901286 5.944119 0.292340
7.829444 0.901286 5.977326 0.294289
7.921556 0.901286 6.010533 0.296238
8.013667 0.901286 6.043741 0.298187
8.105778 0.901286 6.076948 0.300136
8.197889 0.901286 6.110155 0.302085
8.290000 0.901286 6.143362 0.304034
8.382111 0.901286 6.176570 0.305983
8.474222 0.901286 6.209777 0.307932
8.566333 0.901286 6.242985 0.309881
8.658444 0.901286 6.276192 0.311830
8.750556 0.901286 6.309400 0.313779
8.842667 0.901286 6.342607 0.315728
8.934778 0.901286 6.375815 0.317677
9.026889 0.901286 6.409022 0.319626
9.119000 0.901286 6.442230 0.321575
9.211111 0.901286 6.475437 0.323524
9.303222 0.901286 6.508645 0.325473
9.395333 0.901286 6.541852 0.327422
9.487444 0.901286 6.575060 0.329371
9.579556 0.901286 6.608267 0.331320
9.671667 0.901286 6.641475 0.333269
9.763778 0.901286 6.674682 0.335218
9.855889 0.901286 6.707890 0.337167
9.948000 0.901286 6.741097 0.339116
10.040111 0.901286 6.774305 0.341065
10.132222 0.901286 6.807512 0.343014
10.224333 0.901286 6.840720 0.344963
10.316444 0.901286 6.873927 0.346912
10.408556 0.901286 6.907135 0.348861
10.500667 0.901286 6.940342 0.350810
10.592778 0.901286 6.973550 0.352759
10.684889 0.901286 7.006757 0.354708
10.777000 0.901286 7.039965 0.356657
10.869111 0.901286 7.073172 0.358606
10.961222 0.901286 7.106380 0.360555
11.053333 0.901286 7.139587 0.362504
11.145444 0.901286 7.172795 0.364453
11.237556 0.901286 7.206002 0.366402
11.329667 0.901286 7.239210 0.368351
11.421778 0.901286 7.272417 0.370300
11.513889 0.901286 7.305625 0.372249
11.606000 0.901286 7.338832 0.374198
11.698111 0.901286 7.372040 0.376147
11.790222 0.901286 7.405247 0.378096
11.882333 0.901286 7.438455 0.380045
11.974444 0.901286 7.471662 0.381994
12.066556 0.901286 7.504870 0.383943
12.158667 0.901286 7.538077 0.385892
12.250778 0.901286 7.571285 0.387841
12.342889 0.901286 7.604492 0.389790
12.435000 0.901286 7.637700 0.391739
12.527111 0.901286 7.670907 0.393688
12.619222 0.901286 7.704115 0.395637
12.711333 0.901286 7.737322 0.397586
12.803444 0.901286 7.770530 0.399535
12.895556 0.901286 7.803737 0.401484
12.987667 0.901286 7.836945 0.403433
13.079778 0.901286 7.870152 0.405382
13.171889 0.901286 7.903360 0.407331
13.264000 0.901286 7.936567 0.409280
13.356111 0.901286 7.969775 0.411229
13.448222 0.901286 8.002982 0.413178
13.540333 0.901286 8.036190 0.415127
13.632444 0.901286 8.069397 0.417076
13.724556 0.901286 8.102605 0.419025
13.816667 0.901286 8.135812 0.420974
13.908778 0.901286 8.169020 0.422923
14.000889 0.901286 8.202227 0.424872
14.093000 0.901286 8.235435 0.426821
14.185111 0.901286 8.268642 0.428770
14.277222 0.901286 8.301850 0.430719
14.369333 0.901286 8.335057 0.432668
14.461444 0.901286 8.368265 0.434617
14.553556 0.901286 8.401472 0.436566
14.645667 0.901286 8.434680 0.438515
14.737778 0.901286 8.467887 0.440464
14.829889 0.901286 8.501095 0.442413
14.922000 0.901286 8.534302 0.444362
15.014111 0.901286 8.567510 0.446311
15.106222 0.901286 8.600717 0.448260
15.198333 0.901286 8.633925 0.450209
15.290444 0.901286 8.667132 0.452158
15.382556 0.901286 8.700340 0.454107
15.474667 0.901286 8.733547 0.456056
15.566778 0.901286 8.766755 0.458005
15.658889 0.901286 8.799962 0.459954
15.751000 0.901286 8.833170 0.461903
15.843111 0.901286 8.866377 0.463852
15.935222 0.901286 8.899585 0.465801
16.027333 0.901286 8.932792 0.467750
16.119444 0.901286 8.966000 0.469699
16.211556 0.901286 8.999207 0.471648
16.303667 0.901286 9.032415 0.473597
16.395778 0.901286 9.065622 0.475546
16.487889 0.901286 9.098830 0.477495
16.580000 0.901286 9.132037 0.479444
16.672111 0.901286 9.165245 0.481393
16.764222 0.901286 9.198452 0.483342
16.856333 0.901286 9.231660 0.485291
16.948444 0.901286 9.264867 0.487240
17.040556 0.901286 9.298075 0.489189
17.132667 0.901286 9.331282 0.491138
17.224778 0.901286 9.364490 0.493087
17.316889 0.901286 9.397697 0.495036
17.409000 0.901286 9.430905 0.496985
17.501111 0.901286 9.464112 0.498934
17.593222 0.901286 9.497320 0.500883
17.685333 0.901286 9.530527 0.502832
17.777444 0.901286 9.563735 0.504781
17.869556 0.901286 9.596942 0.506730
17.961667 0.901286 9.630150 0.508679
18.053778 0.901286 9.663357 0.510628
18.145889 0.901286 9.696565 0.512577
18.238000 0.901286 9.729772 0.514526
18.330111 0.901286 9.762980 0.516475
18.422222 0.901286 9.796187 0.518424
18.514333 0.901286 9.829395 0.520373
18.606444 0.901286 9.862602 0.522322
18.698556 0.901286 9.895810 0.524271
18.790667 0.901286 9.929017 0.526220
18.882778 0.901286 9.962225 0.528169
18.974889 0.901286 9.995432 0.530118
19.067000 0.901286 10.028640 0.532067
19.159111 0.901286 10.061847 0.534016
19.251222 0.901286 10.095055 0.535965
19.343333 0.901286 10.128262 0.537914
19.435444 0.901286 10.161470 0.539863
19.527556 0.901286 10.194677 0.541812
19.619667 0.901286 10.227885 0.543761
19.711778 0.901286 10.261092 0.545710
19.803889 0.901286 10.294300 0.547659
19.896000 0.901286 10.327507 0.549608
19.988111 0.901286 10.360715 0.551557
20.080222 0.901286 10.393922 0.553506
20.172333 0.901286 10.427130 0.555455
20.264444 0.901286 10.460337 0.557404
20.356556 0.901286 10.493545 0.559353
20.448667 0.901286 10.526752 0.561302
20.540778 0.901286 10.559960 0.563251
20.632889 0.901286 10.593167 0.565200
20.725000 0.901286 10.626375 0.567149
20.817111 0.901286 10.659582 0.569098
20.909222 0.901286 10.692790 0.571047
21.001333 0.901286 10.726000 0.572996
21.093444 0.901286 10.759207 0.574945
21.185556 0.901286 10.792415 0.576894
21.277667 0.901286 10.825622 0.578843
21.369778 0.901286 10.858830 0.580792
21.461889 0.901286 10.892037 0.582741
21.554000 0.901286 10.925245 0.584690
21.646111 0.901286 10.958452 0.586639
21.738222 0.901286 10.991660 0.588588
21.830333 0.901286 11.024867 0.590537
21.922444 0.901286 11.058075 0.592486
22.014556 0.901286 11.091282 0.594435
22.106667 0.901286 11.124490 0.596384
22.198778 0.901286 11.157697 0.598333
22.290889 0.901286 11.190905 0.600282
22.383000 0.901286 11.224112 0.602231
22.475111 0.901286 11.257320 0.604180
22.567222 0.901286 11.290527 0.606129
22.659333 0.901286 11.323735 0.608078
22.751444 0.901286 11.356942 0.610027
22.843556 0.901286 11.390150 0.611976
22.935667 0.901286 11.423357 0.613925
23.027778 0.901286 11.456565 0.615874
23.119889 0.901286 11.489772 0.617823
23.212000 0.901286 11.522980 0.619772
23.304111 0.901286 11.556187 0.621721
23.396222 0.901286 11.589395 0.623670
23.488333 0.901286 11.622602 0.625619
23.580444 0.901286 11.655810 0.627568
23.672556 0.901286 11.689017 0.629517
23.764667 0.901286 11.722225 0.631466
23.856778 0.901286 11.755432 0.633415
23.948889 0.901286 11.788640 0.635364
24.041000 0.901286 11.821847 0.637313
24.133111 0.901286 11.855055 0.639262
24.225222 0.901286 11.888262 0.641211
24.317333 0.901286 11.921470 0.643160
24.409444 0.901286 11.954677 0.645109
24.501556 0.901286 11.987885 0.647058
24.593667 0.901286 12.021092 0.649007
24.685778 0.901286 12.054300 0.650956
24.777889 0.901286 12.087507 0.652905
24.870000 0.901286 12.120715 0.654854
24.962111 0.901286 12.153922 0.656803
25.054222 0.901286 12.187130 0.658752
25.146333 0.901286 12.220337 0.660701
25.238444 0.901286 12.253545 0.662650
25.330556 0.901286 12.286752 0.664599
25.422667 0.901286 12.319960 0.666548
25.514778 0.901286 12.353167 0.668497
25.606889 0.901286 12.386375 0.670446
25.699000 0.901286 12.419582 0.672395
25.791111 0.901286 12.452790 0.674344
25.883222 0.901286 12.486000 0.676293
25.975333 0.901286 12.519207 0.678242
26.067444 0.901286 12.552415 0.680191
26.159556 0.901286 12.585622 0.682140
26.251667 0.901286 12.618830 0.684089
26.343778 0.901286 12.652037 0.686038
26.435889 0.901286 12.685245 0.687987
26.528000 0.901286 12.718452 0.689936
26.620111 0.901286 12.751660 0.691885
26.712222 0.901286 12.784867 0.693834
26.804333 0.901286 12.818075 0.695783
26.896444 0.901286 12.851282 0.697732
26.988556 0.901286 12.884490 0.699681
27.080667 0.901286 12.917697 0.701630
27.172778 0.901286 12.950905 0.703579
27.264889 0.901286 12.984112 0.705528
27.357000 0.901286 13.017320 0.707477
27.449111 0.901286 13.050527 0.709426
27.541222 0.901286 13.083735 0.711375
27.633333 0.901286 13.116942 0.713324
27.725444 0.901286 13.150150 0.715273
27.817556 0.901286 13.183357 0.717222
27.909667 0.901286 13.216565 0.719171
28.001778 0.901286 13.249772 0.721120
28.093889 0.901286 13.282980 0.723069
28.186000 0.901286 13.316187 0.725018
28.278111 0.901286 13.349395 0.726967
28.370222 0.901286 13.382602 0.728916
28.462333 0.901286 13.415810 0.730865
28.554444 0.901286 13.449017 0.732814
28.646556 0.901286 13.482225 0.734763
28.738667 0.901286 13.515432 0.736712
28.830778 0.901286 13.548640 0.738661
28.922889 0.901286 13.581847 0.740610
29.015000 0.901286 13.615055 0.742559
29.107111 0.901286 13.648262 0.744508
29.199222 0.901286 13.681470 0.746457
29.291333 0.901286 13.714677 0.748406
29.383444 0.901286 13.747885 0.750355
29.475556 0.901286 13.781092 0.752304
29.567667 0.901286 13.814300 0.754253
29.659778 0.901286 13.847507 0.756202
29.751889 0.901286 13.880715 0.758151
29.844000 0.901286 13.913922 0.760100
29.936111 0.901286 13.947130 0.762049
30.028222 0.901286 13.980337 0.763998
30.120333 0.901286 14.013545 0.765947
30.212444 0.901286 14.046752 0.767896
30.304556 0.901286 14.079960 0.769845
30.396667 0.901286 14.113167 0.771794
30.488778 0.901286 14.146375 0.773743
30.580889 0.901286 14.179582 0.775692
30.673000 0.901286 14.212790 0.777641
30.765111 0.901286 14.246000 0.779590
30.857222 0.901286 14.279207 0.781539
30.949333 0.901286 14.312415 0.783488
31.041444 0.901286 14.345622 0.785437
31.133556 0.901286 14.378830 0.787386
31.225667 0.901286 14.412037 0.789335
31.317778 0.901286 14.445245 0.791284
31.409889 0.901286 14.478452 0.793233
31.502000 0.901286 14.511660 0.795182
31.594111 0.901286 14.544867 0.797131
31.686222 0.901286 14.578075 0.799080
31.778333 0.901286 14.611282 0.801029
31.870444 0.901286 14.644490 0.802978
31.962556 0.901286 14.677697 0.804927
32.054667 0.901286 14.710905 0.806876
32.146778 0.901286 14.744112 0.808825
32.238889 0.901286 14.777320 0.810774
32.331000 0.901286 14.810527 0.812723
32.423111 0.901286 14.843735 0.814672
32.515222 0.901286 14.876942 0.816621
32.607333 0.901286 14.910150 0.818570
32.699444 0.901286 14.943357 0.820519
32.791556 0.901286 14.976565 0.822468
32.883667 0.901286 15.009772 0.824417
32.975778 0.901286 15.042980 0.826366
33.067889 0.901286 15.076187 0.828315
33.160000 0.901286 15.110395 0.830264
33.252111 0.901286 15.143602 0.832213
33.344222 0.901286 15.176810 0.834162
33.436333 0.901286 15.210017 0.836111
33.528444 0.901286 15.243225 0.838060
33.620556 0.901286 15.27643
```

<Name>	#	<Name>	#	#<-factor->	strg	<Name>	#	<Name>	tem	strg	strg***
COPY	1	OUTPUT	MEAN	1	1	48.4	WDM	701	FLOW	ENGL	REPL
COPY	501	OUTPUT	MEAN	1	1	48.4	WDM	801	FLOW	ENGL	REPL
COPY	601	OUTPUT	MEAN	1	1	48.4	WDM	901	FLOW	ENGL	REPL
RCHRES	1	HYDR	RO	1	1	1	WDM	1014	FLOW	ENGL	REPL
RCHRES	1	HYDR	STAGE	1	1	1	WDM	1015	STAG	ENGL	REPL
RCHRES	2	HYDR	RO	1	1	1	WDM	1016	FLOW	ENGL	REPL
RCHRES	2	HYDR	STAGE	1	1	1	WDM	1017	STAG	ENGL	REPL
RCHRES	3	HYDR	RO	1	1	1	WDM	1018	FLOW	ENGL	REPL
RCHRES	3	HYDR	STAGE	1	1	1	WDM	1019	STAG	ENGL	REPL
RCHRES	4	HYDR	RO	1	1	1	WDM	1022	FLOW	ENGL	REPL
RCHRES	4	HYDR	STAGE	1	1	1	WDM	1023	STAG	ENGL	REPL
RCHRES	5	HYDR	RO	1	1	1	WDM	1026	FLOW	ENGL	REPL
RCHRES	5	HYDR	STAGE	1	1	1	WDM	1027	STAG	ENGL	REPL

END EXT TARGETS

MASS-LINK

<Volume>	<-Grp>	<-Member->	<-Mult-->	<Target>	<-Grp>	<-Member->***
<Name>		<Name>	# #<-factor->	<Name>		<Name> # #***
MASS-LINK		2				
PERLND	PWATER	SURO	0.083333	RCHRES	INFLOW	IVOL
END MASS-LINK		2				
MASS-LINK		3				
PERLND	PWATER	IFW0	0.083333	RCHRES	INFLOW	IVOL
END MASS-LINK		3				
MASS-LINK		5				
IMPLND	IWATER	SURO	0.083333	RCHRES	INFLOW	IVOL
END MASS-LINK		5				
MASS-LINK		12				
PERLND	PWATER	SURO	0.083333	COPY	INPUT	MEAN
END MASS-LINK		12				
MASS-LINK		13				
PERLND	PWATER	IFW0	0.083333	COPY	INPUT	MEAN
END MASS-LINK		13				
MASS-LINK		15				
IMPLND	IWATER	SURO	0.083333	COPY	INPUT	MEAN
END MASS-LINK		15				
MASS-LINK		16				
RCHRES	ROFLOW			COPY	INPUT	MEAN
END MASS-LINK		16				

END MASS-LINK

END RUN

Predeveloped HSPF Message File

Mitigated HSPF Message File

Disclaimer

Legal Notice

This program and accompanying documentation are provided 'as-is' without warranty of any kind. The entire risk regarding the performance and results of this program is assumed by End User. Clear Creek Solutions Inc. and the governmental licensee or sublicensees disclaim all warranties, either expressed or implied, including but not limited to implied warranties of program and accompanying documentation. In no event shall Clear Creek Solutions Inc. be liable for any damages whatsoever (including without limitation to damages for loss of business profits, loss of business information, business interruption, and the like) arising out of the use of, or inability to use this program even if Clear Creek Solutions Inc. or their authorized representatives have been advised of the possibility of such damages. Software Copyright © by : Clear Creek Solutions, Inc. 2005-2021; All Rights Reserved.

Clear Creek Solutions, Inc.
6200 Capitol Blvd. Ste F
Olympia, WA. 98501
Toll Free 1(866)943-0304
Local (360)943-0304

www.clearcreeksolutions.com

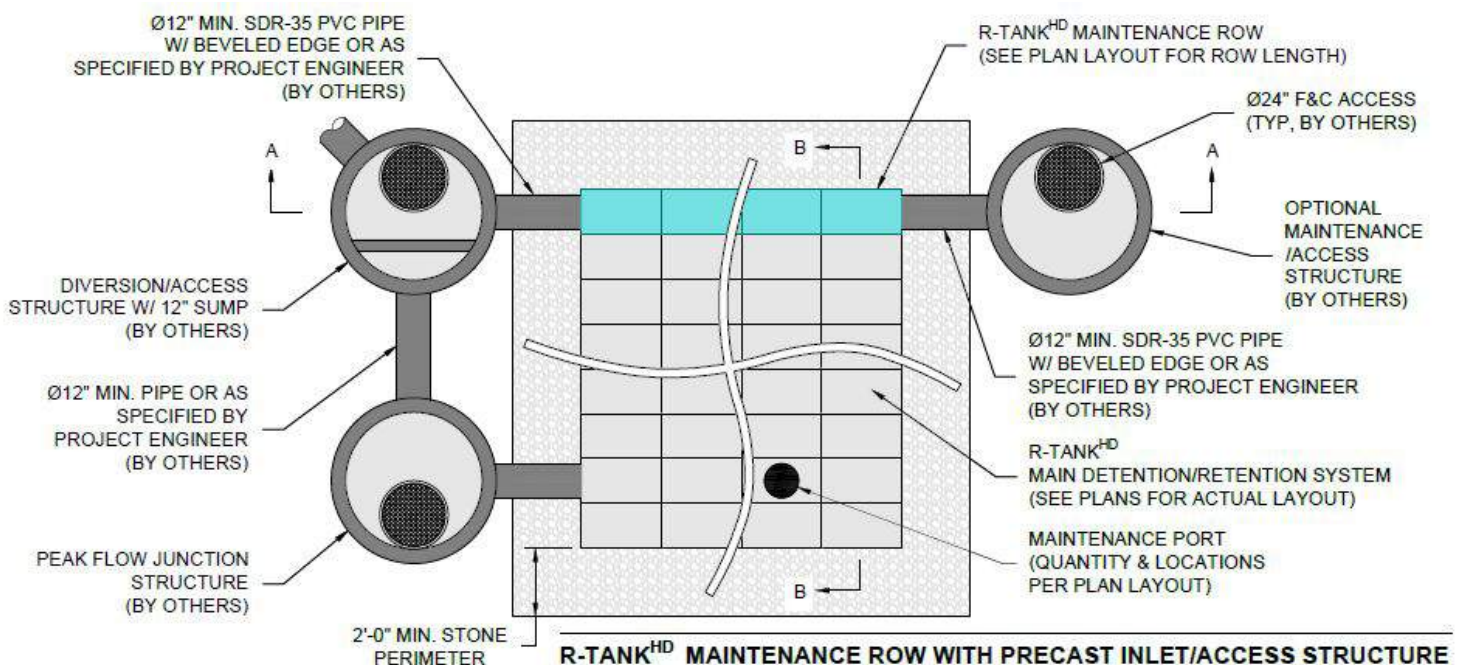
R-TANK[®] TREATMENT ROW SIZING

STORMWATER MANAGEMENT

The R-Tank Treatment Row is designed to capture the water quality flow or "first flush" as defined by a regulatory or permitting agency. The system consists of a series of modules utilizing open plates for maintenance access encapsulated by filter fabric and connected to a nearby manhole. The fabric-wrapped modules provide filtration and promote settling of pollutants.

Using ASTM C1746/C1746M-12 TRI Environmental completed full-scale testing in their South Carolina lab to determine the relationship between total suspended solids (TSS) removal and hydraulic load rate. This testing determined that the hydraulic loading rate needed to achieve 80% TSS removal is equal to 0.062 cfs/ft² or 0.191 cfs per module. Based on this information the sizing of the treatment row is as follows:

$$\# \text{ of Treatment Modules} = \frac{\text{Design Flow Rate (cfs)}}{\text{Unit Flow Per Modules (cfs)}}$$





October 2019

GENERAL USE LEVEL DESIGNATION FOR BASIC (TSS), DISSOLVED METALS (ENHANCED), AND PHOSPHORUS TREATMENT

For

**Oldcastle Infrastructure, Inc.'s
The BioPod™ Biofilter
(Formerly the TreePod Biofilter)**

Ecology's Decision:

Based on Oldcastle Infrastructure, Inc. application submissions for the The BioPod™ Biofilter (BioPod), Ecology hereby issues the following use level designation:

- 1. General Use Level Designation (GULD) for Basic, Enhanced, and Phosphorus Treatment:**
 - **Sized at a hydraulic loading rate of 1.6 gallons per minute (gpm) per square foot (sq ft) of media surface area.**
 - **Constructed with a minimum media thickness of 18-inches (1.5-feet).**
- 2. Ecology approves the BioPod at the hydraulic loading rate listed above, to achieve the maximum water quality design flow rate. The water quality design flow rates are calculated using the following procedures:**
 - **Western Washington:** For treatment installed upstream of detention or retention, the water quality design flow rate is the peak 15-minute flow rate as calculated using the latest version of the Western Washington Hydrology Model or other Ecology-approved continuous runoff model.
 - **Eastern Washington:** For treatment installed upstream of detention or retention, the water quality design flow rate is the peak 15-minute flow rate as calculated using one of the three methods described in Chapter 2.2.5 of the Stormwater Management Manual for Eastern Washington (SWMMEW) or local manual.
 - **Entire State:** For treatment installed downstream of detention, the water quality design flow rate is the full 2-year release rate of the detention facility.
- 3. The GULD has no expiration date, but may be amended or revoked by Ecology.**

Ecology's Conditions of Use:

The BioPod shall comply with these conditions:

- 1) Applicants shall design, assemble, install, operate, and maintain the BioPod installations in accordance with Oldcastle Infrastructure, Inc.'s applicable manuals and the Ecology Decision.**
- 2) The minimum size filter surface-area for use in Washington is determined by using the design water quality flow rate (as determined in Ecology Decision, Item 3, above) and the Infiltration Rate (as identified in Ecology Decision, Item 1, above). Calculate the required area by dividing the water quality design flow rate (cu-ft/sec) by the Infiltration Rate (converted to ft/sec) to obtain required surface area (sq ft) of the BioPod unit**
- 3) BioPod media shall conform to the specifications submitted to and approved by Ecology**
- 4) Maintenance: The required inspection/maintenance interval for stormwater treatment devices is often dependent on the efficiency of the device and the degree of pollutant loading from a particular drainage basin. Therefore, Ecology does not endorse or recommend a "one size fits all" maintenance cycle for a particular model/size of manufactured filter treatment device.**

- The BioPod is designed for a target maintenance interval of 1 year. Maintenance includes replacing the mulch, assessing plant health, removal of trash, and raking the top few inches of engineered media.**
- A BioPod system tested at the Lake Union Ship Canal Test Facility in Seattle, WA required maintenance after 1.5 months, or 6.3% of a water year. Monitoring personnel observed similar maintenance issues with other systems evaluated at the Test Facility. The runoff from the Test Facility may be unusual and maintenance requirements of systems installed at the Test Facility may not be indicative of maintenance requirements for all sites.**
- Test results provided to Ecology from a BioPod System evaluated in a lab following New Jersey Department of Environmental Protection Laboratory Protocol for Filtration MTDs have indicated the BioPod System is capable of longer maintenance intervals.**
- Owners/operators must inspect BioPod systems for a minimum of twelve months from the start of post-construction operation to determine site-specific inspection/maintenance schedules and requirements. Owners/operators must conduct inspections monthly during the wet season, and every other month during the dry season. (According to the SWMMWW, the wet season in western Washington is October 1 to April 30. According to the SWMMEW, the wet season in eastern Washington is October 1 to June 30.) After the first year of operation,**

owners/operators must conduct inspections based on the findings during the first year of inspections.

- **Conduct inspections by qualified personnel, follow manufacturer's guidelines, and use methods capable of determining either a decrease in treated effluent flow rate and/or a decrease in pollutant removal ability.**

- 5) Install the BioPod in such a manner that you bypass flows exceeding the maximum operating rate and you will not resuspend captured sediment.**
- 6) Discharges from the BioPod shall not cause or contribute to water quality standards violations in receiving waters.**

Approved Alternate Configurations

BioPod Internal Bypass

- 1) The BioPod Internal Bypass configuration may be combined with a Curb Inlet, Grated Inlet, and Piped-In Inlet. Water quality flows and peak flows are directed from the curb, overhead grate, or piped inlet to a contoured inlet rack. The inlet rack disperses water quality flows over the top surface of the biofiltration chamber. Excess flows are diverted over an curved bypass weir to the outlet area without passing through the treatment area. Both water quality flows and bypass flows are combined in the outlet area prior to being discharged out of the system.**
- 2) To select a BioPod Internal Bypass unit, the designer must determine the size of the standard unit using the sizing guidance described above. Systems that have an internal bypass, may use the off-line water quality design flow rate.**
- 3) The internal bypass configuration has a maximum flow rate of 900 gallons per minute. Sites where the anticipated flow rate at the treatment device is larger than 900 gpm must use an external bypass, or size the treatment device for the on-line water quality design flow rate.**

Applicant: Oldcastle Infrastructure, Inc.

Applicant's Address: 7100 Longe St, Suite 100
Stockton, CA 95206

Application Documents:

Technical Evaluation Report TreePod™ BioFilter System Performance Certification Project,
Prepared for Oldcastle, Inc., Prepared by Herrera Environmental Consultants, Inc. February 2018

Technical Memorandum: Response to Board of External Reviewers' Comments on the Technical Evaluation Report for the TreePod™ Biofilter System Performance Certification Project,
Oldcastle, Inc. and Herrera Environmental Consultants, Inc., February 2018

Technical Memorandum: Response to Board of External Reviewers' Comments on the Technical Evaluation Report for the TreePod™ Biofilter System Performance Certification Project, Oldcastle, Inc. and Herrera Environmental Consultants, Inc., January 2018

Application for Pilot Use Level Designation, TreePod™ Biofilter – Stormwater Treatment System, Oldcastle Stormwater Solutions, May 2016

Emerging Stormwater Treatment Technologies Application for Certification: The TreePod™ Biofilter, Oldcastle Stormwater Solutions, April 2016

Applicant's Use Level Request:

- General Use Level Designation as a Basic, Enhanced, and Phosphorus Treatment device in accordance with Ecology's *Stormwater Management Manual for Western Washington*

Applicant's Performance Claims:

Based on results from laboratory and field-testing, the applicant claims the BioPod™ Biofilter operating at a hydraulic loading rate of 153 inches per hour is able to remove:

- 80% of Total Suspended Solids (TSS) for influent concentrations greater than 100 mg/L and achieve a 20 mg/L effluent for influent concentrations less than 100 mg/L.
- 60% dissolved zinc for influent concentrations 0.02 to 0.3 mg/L.
- 30% dissolved copper for influent concentrations 0.005 to 0.02 mg/L.
- 50% or greater total phosphorus for influent concentrations 0.1 to 0.5 mg/L.

Ecology's Recommendations:

Ecology finds that:

- Oldcastle Infrastructure, Inc. has shown Ecology, through laboratory and field testing, that the BioPod™ Biofilter is capable of attaining Ecology's Basic, Total Phosphorus, and Enhanced treatment goals.

Findings of Fact:

Field Testing

1. Herrera Environmental Consultants, Inc. conducted monitoring of the BioPod™ Biofilter at the Lake Union Ship Canal Test Facility in Seattle Washington between November 2016 and April 2018. Herrera collected flow-weight composite samples during 14 separate storm events and peak flow grab samples during 3 separate storm events. The system was sized at an infiltration rate of 153 inches per hour or a hydraulic loading rate of 1.6 gpm/ft².
2. The D₅₀ of the influent PSD ranged from 3 to 292 microns, with an average D₅₀ of 28 microns.
3. Influent TSS concentrations ranged from 17 mg/L to 666 mg/L, with a mean concentration of 98 mg/L. For all samples (influent concentrations above and below 100 mg/L) the bootstrap

estimate of the lower 95 percent confidence limit (LCL 95) of the mean TSS reduction was 84% and the bootstrap estimate of the upper 95 percent confidence limit (UCL95) of the mean TSS effluent concentration was 8.2 mg/L.

4. Dissolved copper influent concentrations from the 17 events ranged from 9.0 µg/L to 21.1 µg/L. The 21.1 µg/L data point was reduced to 20.0 µg/L, the upper limit to the TAPE allowed influent concentration range, prior to calculating the pollutant removal. A bootstrap estimate of the LCL95 of the mean dissolved copper reduction was 35%.
5. Dissolved zinc influent concentrations from the 17 events ranged from 26.1 µg/L to 43.3 µg/L. A bootstrap estimate of the LCL95 of the mean dissolved zinc reduction was 71%.
6. Total phosphorus influent concentrations from the 17 events ranged from 0.064 mg/L to 1.56 mg/L. All influent data greater than 0.5 mg/L were reduced to 0.5 mg/L, the upper limit to the TAPE allowed influent concentration range, prior to calculating the pollutant removal. A bootstrap estimate of the LCL95 of the mean total phosphorus reduction was 64%.
7. The system experienced rapid sediment loading and needed to be maintained after 1.5 months. Monitoring personnel observed similar sediment loading issues with other systems evaluated at the Test Facility. The runoff from the Test Facility may not be indicative of maintenance requirements for all sites.

Laboratory Testing

1. Good Harbour Laboratories (GHL) conducted laboratory testing at their site in Mississauga, Ontario in October 2017 following the New Jersey Department of Environmental Protection Laboratory Protocol for Filtration MTDs. The testing evaluated a 4-foot by 6-foot standard biofiltration chamber and inlet contour rack with bypass weir. The test sediment used during the testing was custom blended by GHL using various commercially available silica sands, which had an average d_{50} of 69 µm. Based on the lab test results:
 - a. GHL evaluated removal efficiency over 15 events at a Maximum Treatment Flow Rate (MTFR) of 37.6 gpm, which corresponds to a MTFR to effective filtration treatment area ratio of 1.80 gpm/ft². The system, operating at 100% of the MTFR with an average influent concentration of 201.3 mg/L, had an average removal efficiency of 99 percent.
 - b. GHL evaluated sediment mass loading capacity over an additional 16 events using an influent SSC concentration of 400 mg/L. The first 11 runs were evaluated at 100% of the MTFR. The BioPod began to bypass, so the remaining 5 runs were evaluated at 90% of the MTFR. The total mass of the sediment captured was 245.0 lbs and the cumulative mass removal efficiency was 96.3%.
2. Herrera Environmental Consultants Inc. conducted laboratory testing in September 2014 at the Seattle University Engineering Laboratory. The testing evaluated the flushing characteristics, hydraulic conductivity, and pollutant removal ability of twelve different media blends. Based on this testing, Oldcastle Infrastructure, Inc. selected one media blend, Mix 8, for inclusion in their TAPE evaluation of the BioPod™ Biofilter.
 - a. Herrera evaluated Mix 8 in an 8-inch diameter by 36-inch tall polyvinyl chloride (PVC) column. The column contained 18-inches of Mix 8 on top of 6-inches of pea gravel. The BioPod will normally include a 3-inch mulch layer on top of the media layer; however, this was not included in the laboratory testing.
 - b. Mix 8 has a hydraulic conductivity of 218 inches per hour; however, evaluation of the pollutant removal ability of the media was based on an infiltration rate of 115 inches per

hour. The media was tested at 75%, 100%, and 125% of the infiltration rate. Based on the lab test results:

- The system was evaluated using natural stormwater. The dissolved copper and dissolved zinc concentrations in the natural stormwater were lower than the TAPE influent standards; therefore, the stormwater was spiked with 66.4 mL of 100 mg/L Cu solution and 113.6 mL of 1,000 mg/L Zn solution.
- The BioPod removed an average of 81% of TSS, with a mean influent concentration of 48.4 mg/L and a mean effluent concentration of 9.8 mg/L.
- The BioPod removed an average of 94% of dissolved copper, with a mean influent concentration of 10.6 µg/L and a mean effluent concentration of 0.6 µg/L.
- The BioPod removed an average of 97% of dissolved zinc, with a mean influent concentration of 117 µg/L and a mean effluent concentration of 4 µg/L.
- The BioPod removed an average of 97% of total phosphorus, with a mean influent concentration of 2.52 mg/L and a mean effluent concentration of 0.066 mg/L. When total phosphorus influent concentrations were capped at the TAPE upper limit of 0.5 mg/L, calculations showed an average removal of 87%.

Other BioPod Related Issues to be Addressed By the Company:

1. Conduct hydraulic testing to obtain information about maintenance requirements on a site with runoff that is more typical of the Pacific Northwest.

Technology Description:

Download at
<https://oldcastleprecast.com/stormwater/bioretention-biofiltration-applications/bioretention-biofiltration-solutions/>

Contact Information:

Applicant: Chris Demarest
Oldcastle Infrastructure, Inc.
(925) 667-7100
Chris.demarest@oldcastle.com

Applicant website: <https://oldcastleprecast.com/stormwater/>

Ecology web link: <https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Stormwater-permittee-guidance-resources/Emerging-stormwater-treatment-technologies>

Ecology:

Douglas C. Howie, P.E.
 Department of Ecology
 Water Quality Program
 (360) 407-6444
douglas.howie@ecy.wa.gov

Revision History

Date	Revision
March 2018	GULD granted for Basic Treatment
March 2018	Provisional GULD granted for Enhanced and Phosphorus Treatment
June 2016	PULD Granted
April 2018	GULD for Basic and Provisional GULD for Enhanced and Phosphorus granted, changed name to BioPod from TreePod
July 2018	GULD for Enhanced and Phosphorus granted
September 2018	Changed Address for Oldcastle
December 2018	Added minimum media thickness requirement
May 2019	Changed language on who must Install and maintain the device from Oldcastle to Applicants
August 2019	Added text on sizing using infiltration rate and water quality design flow rate
October 2019	Added text describing ability to use off-line design water quality flow rate for sizing due to internal bypass

Project Description

File Name 20210309_Issaquah Basin.SPF

Project Options

Flow Units CFS
 Elevation Type Elevation
 Hydrology Method Santa Barbara UH
 Time of Concentration (TOC) Method User-Defined
 Link Routing Method Hydrodynamic
 Enable Overflow Ponding at Nodes YES
 Skip Steady State Analysis Time Periods ... NO

Analysis Options

Start Analysis On Apr 09, 2020 00:00:00
 End Analysis On Apr 10, 2020 00:00:00
 Start Reporting On Apr 09, 2020 00:00:00
 Antecedent Dry Days 0 days
 Runoff (Dry Weather) Time Step 0 01:00:00 days hh:mm:ss
 Runoff (Wet Weather) Time Step 0 00:05:00 days hh:mm:ss
 Reporting Time Step 0 00:05:00 days hh:mm:ss
 Routing Time Step 30 seconds

Number of Elements

Qty
 Rain Gages 2
 Subbasins..... 118
 Nodes..... 219
 Junctions 204
 Outfalls 7
 Flow Diversions 0
 Inlets 0
 Storage Nodes 8
 Links..... 213
 Channels 0
 Pipes 205
 Pumps 0
 Orifices 0
 Weirs 0
 Outlets 8
 Pollutants 0
 Land Uses 0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1	100-YEAR	Time Series	100-YEAR	Intensity	inches					User Defined
2	25-YEAR	Time Series	25-YEAR	Intensity	inches	Washington	King	25	4.00	SCS Type IA 24-hr

Subbasin Summary

SN Subbasin ID	Area	Impervious Area	Impervious Area Curve Number	Pervious Area Curve Number	Total Rainfall	Total Runoff	Total Runoff Volume	Peak Runoff	Time of Concentration
	(ac)	(%)			(in)	(in)	(ac-in)	(cfs)	(days hh:mm:ss)
1 001	0.15	94.00	98.00	76.00	3.96	3.61	0.54	0.14	0 00:06:00
2 003	0.86	33.00	98.00	76.00	3.96	2.38	2.05	0.48	0 00:06:00
3 004	0.53	61.00	98.00	76.00	3.96	2.94	1.56	0.38	0 00:06:00
4 005	0.20	94.00	98.00	76.00	3.96	3.61	0.72	0.18	0 00:06:00
5 010	0.21	94.00	98.00	76.00	3.96	3.61	0.76	0.19	0 00:06:00
6 011	1.33	30.00	98.00	76.00	3.96	2.32	3.08	0.72	0 00:06:00
7 012	0.19	93.00	98.00	76.00	3.96	3.59	0.68	0.17	0 00:06:00
8 013	0.86	32.00	98.00	76.00	3.96	2.36	2.03	0.47	0 00:06:00
9 014	0.19	94.00	98.00	76.00	3.96	3.61	0.69	0.17	0 00:06:00
10 015	0.92	39.00	98.00	76.00	3.96	2.50	2.30	0.54	0 00:06:00
11 016	0.18	89.00	98.00	76.00	3.96	3.51	0.63	0.16	0 00:06:00
12 019	0.48	23.00	98.00	76.00	3.96	2.18	1.04	0.24	0 00:06:00
13 020	0.21	86.00	98.00	76.00	3.96	3.45	0.72	0.18	0 00:06:00
14 021	0.51	0.00	98.00	76.00	3.96	1.71	0.87	0.19	0 00:06:00
15 022	0.13	85.00	98.00	76.00	3.96	3.43	0.45	0.11	0 00:06:00
16 023	0.19	43.00	98.00	76.00	3.96	2.58	0.49	0.12	0 00:06:00
17 024	0.23	49.00	98.00	76.00	3.96	2.70	0.62	0.15	0 00:06:00
18 025	0.23	55.00	98.00	76.00	3.96	2.82	0.65	0.16	0 00:06:00
19 026	0.07	51.00	98.00	76.00	3.96	2.74	0.19	0.05	0 00:06:00
20 027	0.06	53.00	98.00	76.00	3.96	2.78	0.17	0.04	0 00:06:00
21 028	0.08	63.00	98.00	76.00	3.96	2.98	0.24	0.06	0 00:06:00
22 029	0.09	42.00	98.00	76.00	3.96	2.56	0.23	0.06	0 00:06:00
23 030	0.13	41.00	98.00	76.00	3.96	2.54	0.33	0.08	0 00:06:00
24 031	0.12	77.00	98.00	76.00	3.96	3.27	0.39	0.10	0 00:06:00
25 032	0.20	85.00	98.00	76.00	3.96	3.43	0.69	0.17	0 00:06:00
26 033	0.03	94.00	98.00	76.00	3.96	3.61	0.11	0.03	0 00:06:00
27 034	0.27	93.00	98.00	76.00	3.96	3.59	0.97	0.24	0 00:06:00
28 036	0.12	70.00	98.00	76.00	3.96	3.13	0.38	0.09	0 00:06:00
29 037	0.08	76.00	98.00	76.00	3.96	3.25	0.26	0.06	0 00:06:00
30 042	4.25	72.00	98.00	76.00	3.96	3.17	13.45	3.31	0 00:06:00
31 043	0.05	95.00	98.00	76.00	3.96	3.63	0.18	0.05	0 00:06:00
32 044	0.06	64.00	98.00	76.00	3.96	3.00	0.18	0.04	0 00:06:00
33 045	0.23	92.00	98.00	76.00	3.96	3.57	0.82	0.21	0 00:06:00
34 046	0.24	86.00	98.00	76.00	3.96	3.45	0.83	0.21	0 00:06:00
35 047	0.28	52.00	98.00	76.00	3.96	2.76	0.77	0.19	0 00:06:00
36 048	0.19	51.00	98.00	76.00	3.96	2.74	0.52	0.13	0 00:06:00
37 049	0.16	69.00	98.00	76.00	3.96	3.10	0.50	0.12	0 00:06:00
38 050	0.10	56.00	98.00	76.00	3.96	2.84	0.28	0.07	0 00:06:00
39 051	0.23	57.00	98.00	76.00	3.96	2.86	0.66	0.16	0 00:06:00
40 052	0.15	62.00	98.00	76.00	3.96	2.96	0.44	0.11	0 00:06:00
41 053	0.47	70.00	98.00	76.00	3.96	3.13	1.47	0.36	0 00:06:00
42 054	0.15	82.00	98.00	76.00	3.96	3.37	0.51	0.13	0 00:06:00
43 055	0.22	38.00	98.00	76.00	3.96	2.48	0.55	0.13	0 00:06:00
44 056	0.12	34.00	98.00	76.00	3.96	2.40	0.29	0.07	0 00:06:00
45 057	0.09	78.00	98.00	76.00	3.96	3.29	0.30	0.07	0 00:06:00
46 058	0.03	40.00	98.00	76.00	3.96	2.52	0.08	0.02	0 00:06:00
47 059	0.17	54.00	98.00	76.00	3.96	2.80	0.48	0.12	0 00:06:00
48 060	0.17	61.00	98.00	76.00	3.96	2.94	0.50	0.12	0 00:06:00
49 068	0.13	90.00	98.00	76.00	3.96	3.53	0.46	0.12	0 00:06:00
50 069	0.04	25.00	98.00	76.00	3.96	2.22	0.09	0.02	0 00:06:00
51 070	0.05	22.00	98.00	76.00	3.96	2.16	0.11	0.03	0 00:06:00
52 071	0.07	61.00	98.00	76.00	3.96	2.94	0.21	0.05	0 00:06:00
53 073	0.31	54.00	98.00	76.00	3.96	2.80	0.87	0.21	0 00:06:00
54 074	0.74	49.00	98.00	76.00	3.96	2.70	2.00	0.48	0 00:06:00
55 091	0.03	100.00	98.00	76.00	3.96	3.73	0.11	0.03	0 00:06:00
56 093	0.40	72.00	98.00	76.00	3.96	3.17	1.27	0.31	0 00:06:00
57 094	0.54	67.00	98.00	76.00	3.96	3.06	1.65	0.41	0 00:06:00
58 101	0.18	76.00	98.00	76.00	3.96	3.25	0.58	0.14	0 00:06:00
59 103	0.49	72.00	98.00	76.00	3.96	3.17	1.55	0.38	0 00:06:00
60 104	0.61	48.00	98.00	76.00	3.96	2.68	1.64	0.39	0 00:06:00
61 105	0.12	89.00	98.00	76.00	3.96	3.51	0.42	0.11	0 00:06:00
62 107	0.51	85.00	98.00	76.00	3.96	3.43	1.75	0.44	0 00:06:00
63 108	0.42	81.00	98.00	76.00	3.96	3.35	1.41	0.35	0 00:06:00
64 109	0.09	80.00	98.00	76.00	3.96	3.33	0.30	0.07	0 00:06:00
65 110	0.12	87.00	98.00	76.00	3.96	3.47	0.42	0.10	0 00:06:00
66 114	0.13	100.00	98.00	76.00	3.96	3.73	0.48	0.12	0 00:06:00
67 117	0.73	53.00	98.00	76.00	3.96	2.78	2.03	0.49	0 00:06:00
68 118	0.18	6.00	98.00	76.00	3.96	1.83	0.33	0.07	0 00:06:00
69 120	0.54	86.00	98.00	76.00	3.96	3.45	1.86	0.46	0 00:06:00
70 121	0.34	90.00	98.00	76.00	3.96	3.53	1.20	0.30	0 00:06:00
71 122	0.28	100.00	98.00	76.00	3.96	3.73	1.04	0.26	0 00:06:00
72 123	0.08	40.00	98.00	76.00	3.96	2.52	0.20	0.05	0 00:06:00
73 127	0.18	100.00	98.00	76.00	3.96	3.73	0.67	0.17	0 00:06:00
74 128	0.23	99.00	98.00	76.00	3.96	3.71	0.85	0.21	0 00:06:00
75 129	0.22	74.00	98.00	76.00	3.96	3.21	0.71	0.17	0 00:06:00
76 133	0.12	94.00	98.00	76.00	3.96	3.61	0.43	0.11	0 00:06:00
77 135	0.73	0.00	98.00	76.00	3.96	1.71	1.25	0.27	0 00:06:00
78 AD_01	0.02	33.00	98.00	76.00	3.96	2.38	0.05	0.01	0 00:06:00
79 AD_02	0.06	0.00	98.00	76.00	3.96	1.71	0.10	0.02	0 00:06:00
80 AD_03	0.13	4.00	98.00	76.00	3.96	1.79	0.23	0.05	0 00:06:00
81 AD_04	0.10	100.00	98.00	76.00	3.96	3.73	0.37	0.09	0 00:06:00
82 AD_05	0.11	83.00	98.00	76.00	3.96	0.00	0.00	0.09	0 00:00:00

Subbasin Summary

SN Subbasin ID	Area (ac)	Impervious Area (%)	Impervious Area Curve Number	Pervious Area Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
83 AD_06	0.07	0.00	98.00	76.00	3.96	1.71	0.12	0.03	0 00:06:00
84 AD_07	0.14	46.00	98.00	76.00	3.96	2.64	0.37	0.09	0 00:06:00
85 AD_08	0.05	100.00	98.00	76.00	3.96	3.73	0.19	0.05	0 00:06:00
86 AD_09	0.11	72.00	98.00	76.00	3.96	3.17	0.35	0.09	0 00:06:00
87 AD_10	0.05	49.00	98.00	76.00	3.96	2.70	0.14	0.03	0 00:06:00
88 BASIN_7_UNDERDRAIN	0.60	100.00	98.00	76.00	3.96	3.73	2.24	0.56	0 00:06:00
89 COVERED_PARKING	2.17	99.00	98.00	76.00	3.96	3.71	8.05	2.02	0 00:06:00
90 RDCO_02	0.12	100.00	98.00	76.00	3.96	3.73	0.45	0.11	0 00:06:00
91 RDCO_08	0.73	100.00	98.00	76.00	3.96	3.73	2.72	0.68	0 00:06:00
92 RDCO_10	0.17	100.00	98.00	76.00	3.96	3.73	0.63	0.16	0 00:06:00
93 RDCO_13	0.39	100.00	98.00	76.00	3.96	3.73	1.45	0.37	0 00:06:00
94 RDCO_15	0.43	100.00	98.00	76.00	3.96	3.73	1.60	0.40	0 00:06:00
95 RDCO_16	0.24	100.00	98.00	76.00	3.96	3.73	0.90	0.23	0 00:06:00
96 RDCO_18	0.13	100.00	98.00	76.00	3.96	3.73	0.48	0.12	0 00:06:00
97 RDCO_19	0.26	100.00	98.00	76.00	3.96	3.73	0.97	0.24	0 00:06:00
98 RDCO_21	0.13	100.00	98.00	76.00	3.96	3.73	0.48	0.12	0 00:06:00
99 RDCO_22	0.22	100.00	98.00	76.00	3.96	3.73	0.82	0.21	0 00:06:00
100 RDCO_25	0.30	100.00	98.00	76.00	3.96	3.73	1.12	0.28	0 00:06:00
101 RDCO_26	0.04	100.00	98.00	76.00	3.96	3.73	0.15	0.04	0 00:06:00
102 RDCO_31	0.15	100.00	98.00	76.00	3.96	3.73	0.56	0.14	0 00:06:00
103 RDCO_33	0.06	100.00	98.00	76.00	3.96	3.73	0.22	0.06	0 00:06:00
104 RDCO_34	0.18	100.00	98.00	76.00	3.96	3.73	0.67	0.17	0 00:06:00
105 RDCO_37	0.23	100.00	98.00	76.00	3.96	3.73	0.86	0.22	0 00:06:00
106 RDCO_41	0.07	100.00	98.00	76.00	3.96	3.73	0.26	0.07	0 00:06:00
107 RDCO_42	0.09	100.00	98.00	76.00	3.96	3.73	0.34	0.08	0 00:06:00
108 RDCO_44	0.17	100.00	98.00	76.00	3.96	3.73	0.63	0.16	0 00:06:00
109 RDCO_46	0.23	100.00	98.00	76.00	3.96	3.73	0.86	0.22	0 00:06:00
110 SDCB_035	0.57	58.00	98.00	76.00	3.96	2.88	1.64	0.40	0 00:06:00
111 SDCB_076	0.05	100.00	98.00	76.00	3.96	3.73	0.19	0.05	0 00:06:00
112 SDCB_077	0.05	100.00	98.00	76.00	3.96	3.73	0.19	0.05	0 00:06:00
113 SDCB_088	0.08	90.00	98.00	76.00	3.96	3.53	0.28	0.07	0 00:06:00
114 SPORT_UNDERDRAINS	3.73	100.00	98.00	76.00	3.96	3.73	13.91	3.50	0 00:06:00
115 Sub-124	0.21	89.00	98.00	76.00	3.96	3.51	0.74	0.18	0 00:06:00
116 Sub-142	0.03	100.00	98.00	76.00	3.96	3.73	0.11	0.03	0 00:06:00
117 TCD_#1	0.23	90.00	98.00	76.00	3.96	3.53	0.81	0.20	0 00:06:00
118 TCD_#2	0.20	100.00	98.00	76.00	3.96	3.73	0.75	0.19	0 00:06:00

Node Summary

SN	Element ID	Element Type	Invert Elevation	Ground/Rim (Max) Elevation	Initial Water Elevation	Surcharge Elevation	Ponded Area	Peak Inflow	Max HGL Elevation Attained	Max Surcharge Depth Attained	Min Freeboard Attained	Time of Peak Flooding Occurrence	Total Flooded Volume	Total Time Flooded
			(ft)	(ft)	(ft)	(ft)	(ft ²)	(cfs)	(ft)	(ft)	(ft)	(days hh:mm)	(ac-in)	(min)
1	AD 01	Junction	495.06	497.77	495.06	497.77	0.00	0.01	495.08	0.00	2.69	0 00:00	0.00	0.00
2	AD 02	Junction	487.37	491.86	487.37	491.86	0.00	0.07	487.43	0.00	4.43	0 00:00	0.00	0.00
3	AD 03	Junction	488.01	491.73	488.01	491.73	0.00	0.05	488.10	0.00	3.62	0 00:00	0.00	0.00
4	AD 04	Junction	501.01	503.72	501.01	503.72	0.00	0.30	502.21	0.00	1.50	0 00:00	0.00	0.00
5	AD 05	Junction	506.31	509.02	506.31	509.02	0.00	0.00	506.31	0.00	2.71	0 00:00	0.00	0.00
6	AD 06	Junction	506.20	508.91	506.20	508.91	0.00	0.03	506.24	0.00	2.67	0 00:00	0.00	0.00
7	AD 07	Junction	505.78	508.49	505.78	508.49	0.00	0.09	505.88	0.00	2.61	0 00:00	0.00	0.00
8	AD 08	Junction	506.92	509.63	506.92	509.63	0.00	0.05	506.97	0.00	2.66	0 00:00	0.00	0.00
9	AD 09	Junction	505.94	508.65	505.94	508.65	0.00	0.09	506.38	0.00	2.27	0 00:00	0.00	0.00
10	AD 10	Junction	506.90	509.61	506.90	509.61	0.00	0.03	506.95	0.00	2.66	0 00:00	0.00	0.00
11	AD 11	Junction	498.14	500.85	498.14	500.85	0.00	0.00	498.14	0.00	2.71	0 00:00	0.00	0.00
12	AD 12	Junction	500.98	503.84	500.98	503.84	0.00	0.00	500.98	0.00	2.87	0 00:00	0.00	0.00
13	AD 13	Junction	480.84	482.55	480.84	482.55	0.00	0.02	481.04	0.00	1.51	0 00:00	0.00	0.00
14	BPU-2	Junction	417.22	425.26	417.22	425.26	0.00	0.23	417.39	0.00	7.87	0 00:00	0.00	0.00
15	BPU-3	Junction	471.65	490.26	471.65	490.26	0.00	0.05	471.76	0.00	18.50	0 00:00	0.00	0.00
16	BPU-4	Junction	491.11	501.77	491.11	501.77	0.00	0.06	491.17	0.00	10.61	0 00:00	0.00	0.00
17	BPU-5	Junction	481.13	488.40	481.13	488.40	0.00	0.30	481.40	0.00	7.00	0 00:00	0.00	0.00
18	RDCO 01	Junction	500.60	509.93	500.60	509.93	0.00	3.10	502.22	0.00	7.71	0 00:00	0.00	0.00
19	RDCO 02	Junction	502.70	509.96	502.70	509.96	0.00	1.94	503.05	0.00	6.91	0 00:00	0.00	0.00
20	RDCO 03	Junction	502.88	509.98	502.88	509.98	0.00	1.83	503.50	0.00	6.48	0 00:00	0.00	0.00
21	RDCO 04	Junction	502.95	509.98	502.95	509.98	0.00	1.83	503.72	0.00	6.26	0 00:00	0.00	0.00
22	RDCO 05	Junction	503.24	509.92	503.24	509.92	0.00	1.83	503.95	0.00	5.97	0 00:00	0.00	0.00
23	RDCO 06	Junction	503.50	509.89	503.50	509.89	0.00	1.81	504.20	0.00	5.68	0 00:00	0.00	0.00
24	RDCO 07	Junction	504.39	509.94	504.39	509.94	0.00	1.81	504.96	0.00	4.99	0 00:00	0.00	0.00
25	RDCO 08	Junction	504.51	509.96	504.51	509.96	0.00	1.72	505.21	0.00	4.75	0 00:00	0.00	0.00
26	RDCO 09	Junction	504.97	509.98	504.97	509.98	0.00	1.01	505.63	0.00	4.35	0 00:00	0.00	0.00
27	RDCO 10	Junction	505.25	509.93	505.25	509.93	0.00	1.01	505.98	0.00	3.95	0 00:00	0.00	0.00
28	RDCO 11	Junction	505.85	509.84	505.85	509.84	0.00	0.87	506.38	0.00	3.46	0 00:00	0.00	0.00
29	RDCO 12	Junction	506.13	509.93	506.13	509.93	0.00	0.79	506.60	0.00	3.33	0 00:00	0.00	0.00
30	RDCO 13	Junction	506.35	509.91	506.35	509.91	0.00	0.76	506.86	0.00	3.05	0 00:00	0.00	0.00
31	RDCO 14	Junction	506.68	509.95	506.68	509.95	0.00	0.40	507.09	0.00	2.86	0 00:00	0.00	0.00
32	RDCO 15	Junction	507.40	509.92	507.40	509.92	0.00	0.40	507.74	0.00	2.18	0 00:00	0.00	0.00
33	RDCO 16	Junction	502.88	509.62	502.88	509.62	0.00	1.17	503.21	0.00	6.41	0 00:00	0.00	0.00
34	RDCO 17	Junction	503.04	509.95	503.04	509.95	0.00	0.95	503.47	0.00	6.48	0 00:00	0.00	0.00
35	RDCO 18	Junction	503.31	509.95	503.31	509.95	0.00	0.95	503.75	0.00	6.20	0 00:00	0.00	0.00
36	RDCO 19	Junction	503.65	509.27	503.65	509.27	0.00	0.84	504.04	0.00	5.22	0 00:00	0.00	0.00
37	RDCO 20	Junction	504.06	508.40	504.06	508.40	0.00	0.60	504.37	0.00	4.03	0 00:00	0.00	0.00
38	RDCO 21	Junction	504.60	509.96	504.60	509.96	0.00	0.60	504.91	0.00	5.05	0 00:00	0.00	0.00
39	RDCO 22	Junction	505.78	509.94	505.78	509.94	0.00	0.48	506.10	0.00	3.84	0 00:00	0.00	0.00
40	RDCO 23	Junction	506.01	509.91	506.01	509.91	0.00	0.28	506.26	0.00	3.65	0 00:00	0.00	0.00
41	RDCO 24	Junction	506.24	509.92	506.24	509.92	0.00	0.28	506.49	0.00	3.43	0 00:00	0.00	0.00
42	RDCO 25	Junction	507.40	509.92	507.40	509.92	0.00	0.28	507.62	0.00	2.29	0 00:00	0.00	0.00
43	RDCO 26	Junction	504.64	509.96	504.64	509.96	0.00	0.04	504.75	0.00	5.21	0 00:00	0.00	0.00
44	RDCO 27	Junction	498.14	503.90	498.14	503.90	0.00	0.36	498.40	0.00	5.50	0 00:00	0.00	0.00
45	RDCO 27A	Junction	497.78	503.90	497.78	503.90	0.00	0.57	498.03	0.00	5.87	0 00:00	0.00	0.00
46	RDCO 28	Junction	498.18	503.66	498.18	503.66	0.00	0.36	498.51	0.00	5.15	0 00:00	0.00	0.00
47	RDCO 29	Junction	498.63	502.86	498.63	502.86	0.00	0.36	498.88	0.00	3.97	0 00:00	0.00	0.00
48	RDCO 30	Junction	499.40	503.96	499.40	503.96	0.00	0.36	499.65	0.00	4.31	0 00:00	0.00	0.00
49	RDCO 31	Junction	499.51	503.97	499.51	503.97	0.00	0.36	499.82	0.00	4.15	0 00:00	0.00	0.00
50	RDCO 32	Junction	499.67	503.97	499.67	503.97	0.00	0.22	499.90	0.00	4.07	0 00:00	0.00	0.00
51	RDCO 33	Junction	500.77	503.93	500.77	503.93	0.00	0.22	500.97	0.00	2.96	0 00:00	0.00	0.00
52	RDCO 34	Junction	501.21	503.92	501.21	503.92	0.00	0.17	501.42	0.00	2.50	0 00:00	0.00	0.00
53	RDCO 35	Junction	500.83	503.98	500.83	503.98	0.00	0.21	500.92	0.00	3.06	0 00:00	0.00	0.00
54	RDCO 36	Junction	501.09	503.94	501.09	503.94	0.00	0.22	501.32	0.00	2.62	0 00:00	0.00	0.00
55	RDCO 37	Junction	501.46	503.95	501.46	503.95	0.00	0.22	501.66	0.00	2.29	0 00:00	0.00	0.00
56	RDCO 38	Junction	482.18	489.94	482.18	489.94	0.00	0.31	482.30	0.00	7.64	0 00:00	0.00	0.00
57	RDCO 39	Junction	485.50	489.92	485.50	489.92	0.00	0.15	485.61	0.00	4.32	0 00:00	0.00	0.00
58	RDCO 40	Junction	485.83	489.95	485.83	489.95	0.00	0.15	486.00	0.00	3.95	0 00:00	0.00	0.00
59	RDCO 41	Junction	486.04	489.93	486.04	489.93	0.00	0.15	486.22	0.00	3.71	0 00:00	0.00	0.00
60	RDCO 42	Junction	487.42	489.94	487.42	489.94	0.00	0.08	487.54	0.00	2.40	0 00:00	0.00	0.00
61	RDCO 43	Junction	487.38	489.94	487.38	489.94	0.00	0.16	487.51	0.00	2.43	0 00:00	0.00	0.00
62	RDCO 44	Junction	487.46	490.63	487.46	490.63	0.00	0.16	487.66	0.00	2.97	0 00:00	0.00	0.00
63	RDCO 45	Junction	502.19	505.80	502.19	505.80	0.00	0.21	502.43	0.00	3.37	0 00:00	0.00	0.00
64	RDCO 46	Junction	503.43	505.94	503.43	505.94	0.00	0.22	503.65	0.00	2.29	0 00:00	0.00	0.00
65	SDCB 001	Junction	406.15	415.54	408.15	415.54	0.00	1.42	408.61	0.00	6.94	0 00:00	0.00	0.00
66	SDCB 002	Junction	406.89	415.61	408.89	415.61	0.00	1.29	409.35	0.00	6.26	0 00:00	0.00	0.00
67	SDCB 003	Junction	406.97	415.28	408.97	415.28	0.00	1.22	409.49	0.00	5.79	0 00:00	0.00	0.00
68	SDCB 004	Junction	414.28	419.33	416.28	419.33	0.00	0.56	416.48	0.00	2.86	0 00:00	0.00	0.00
69	SDCB 005	Junction	414.68	419.74	416.68	419.74	0.00	0.18	416.86	0.00	2.88	0 00:00	0.00	0.00
70	SDCB 006	Junction	407.21	414.78	409.21	414.78	0.00	0.28	409.49	0.00	5.29	0 00:00	0.00	0.00
71	SDCB 007	Junction	405.31	416.01	409.31	416.01	0.00	0.28	409.52	0.00	6.49	0 00:00	0.00	0.00
72	SDCB 008	Junction	410.55	415.54	412.55	415.54	0.00	2.39	414.45	0.00	1.09	0 00:00	0.00	0.00
73	SDCB 009	Junction	410.59	415.62	412.59	415.62	0.00	2.40	414.45	0.00	1.17	0 00:00	0.00	0.00
74	SDCB 010	Junction	419.28	426.64	421.28	426.64	0.00	2.41	421.74	0.00	4.90	0 00:00	0.00	0.00
75	SDCB 011	Junction	428.28	433.23	430.28	433.23	0.00	2.22	430.58	0.00	2.65	0 00:00	0.00	0.00
76	SDCB 012	Junction	428.64	433.69	430.64	433.69	0.00	0.17	430.81	0.00	2.88	0 00:00	0.00	0.00
77	SDCB 013	Junction	450.12	455.60	452.12	455.60	0.00	1.34	452.37	0.00	3.24	0 00:00	0.00	0.00
78	SDCB 014	Junction	450.47	455.52	452.47	455.52	0.00	0.17	452.64	0.00	2.88	0 00:00	0.00	0.00
79	SDCB 015	Junction	470.99	476.05	472.99	476.05	0.00	0.70	473.16	0.00	2.89	0 00:00	0.00	0.00
80	SDCB 016	Junction	471.30	476.35	473.30	476.35	0.00	0.16	473.47	0.00	2.88	0 00:00	0.00	0.00
81	SDCB 017	Junction	414.58	423.39	416.58	423								

Node Summary

SN	Element ID	Element Type	Invert Elevation	Ground/Rim (Max) Elevation	Initial Water Elevation	Surcharge Elevation	Ponded Area	Peak Inflow	Max HGL Elevation Attained	Max Surcharge Depth Attained	Min Freeboard Attained	Time of Peak Flooding Occurrence	Total Flooded Volume	Total Time Flooded
			(ft)	(ft)	(ft)	(ft)	(ft²)	(cfs)	(ft)	(ft)	(ft)	(days hh:mm)	(ac-in)	(min)
82	SDCB 018	Junction	416.24	428.35	420.24	428.35	0.00	0.23	420.48	0.00	7.87	0 00:00	0.00	0.00
83	SDCB 019	Junction	422.57	427.90	424.57	427.90	0.00	2.56	425.84	0.00	2.06	0 00:00	0.00	0.00
84	SDCB 020	Junction	422.86	427.66	424.86	427.66	100.00	2.33	425.84	0.00	1.82	0 00:00	0.00	0.00
85	SDCB 021	Junction	423.80	428.27	425.80	428.27	100.00	0.19	425.92	0.00	2.34	0 00:00	0.00	0.00
86	SDCB 022	Junction	425.37	430.48	427.37	430.48	0.00	1.97	427.75	0.00	2.72	0 00:00	0.00	0.00
87	SDCB 023	Junction	425.66	430.72	427.66	430.72	0.00	1.86	428.37	0.00	2.35	0 00:00	0.00	0.00
88	SDCB 024	Junction	440.11	444.85	442.11	444.85	0.00	1.75	442.40	0.00	2.44	0 00:00	0.00	0.00
89	SDCB 025	Junction	440.64	445.37	442.64	445.37	0.00	1.45	443.54	0.00	1.83	0 00:00	0.00	0.00
90	SDCB 026	Junction	451.11	455.82	453.11	455.82	0.00	1.30	453.34	0.00	2.48	0 00:00	0.00	0.00
91	SDCB 027	Junction	456.94	461.65	458.94	461.65	0.00	1.25	459.22	0.00	2.43	0 00:00	0.00	0.00
92	SDCB 028	Junction	463.00	467.71	465.00	467.71	0.00	1.21	465.25	0.00	2.46	0 00:00	0.00	0.00
93	SDCB 029	Junction	474.56	479.27	476.56	479.27	0.00	1.15	476.80	0.00	2.47	0 00:00	0.00	0.00
94	SDCB 030	Junction	482.83	487.54	484.83	487.54	0.00	1.10	485.06	0.00	2.47	0 00:00	0.00	0.00
95	SDCB 031	Junction	487.54	492.25	489.54	492.25	0.00	0.10	489.61	0.00	2.64	0 00:00	0.00	0.00
96	SDCB 032	Junction	497.55	502.26	499.55	502.26	0.00	0.93	499.76	0.00	2.50	0 00:00	0.00	0.00
97	SDCB 033	Junction	500.07	504.78	502.07	504.78	0.00	0.03	502.11	0.00	2.67	0 00:00	0.00	0.00
98	SDCB 034	Junction	500.46	505.17	502.46	505.17	0.00	0.24	502.61	0.00	2.56	0 00:00	0.00	0.00
99	SDCB 035	Junction	499.95	504.66	501.95	504.66	100.00	0.49	502.17	0.00	2.49	0 00:00	0.00	0.00
100	SDCB 035A	Junction	503.77	508.53	505.77	508.53	0.00	0.09	505.87	0.00	2.67	0 00:00	0.00	0.00
101	SDCB 036	Junction	456.61	461.58	458.61	461.58	0.00	0.16	458.70	0.00	2.88	0 00:00	0.00	0.00
102	SDCB 037	Junction	456.85	461.58	458.85	461.58	0.00	0.06	458.97	0.00	2.61	0 00:00	0.00	0.00
103	SDCB 038	Junction	461.33	477.49	463.33	477.49	0.00	0.38	463.47	0.00	14.02	0 00:00	0.00	0.00
104	SDCB 039	Junction	463.10	478.99	465.10	478.99	0.00	0.38	465.21	0.00	13.78	0 00:00	0.00	0.00
105	SDCB 040	Junction	464.40	479.77	466.40	479.77	0.00	0.38	466.52	0.00	13.24	0 00:00	0.00	0.00
106	SDCB 041	Junction	464.93	481.73	466.93	481.73	0.00	0.38	467.16	0.00	14.57	0 00:00	0.00	0.00
107	SDCB 042	Junction	466.34	482.17	468.34	482.17	0.00	7.53	471.13	0.00	11.04	0 00:00	0.00	0.00
108	SDCB 043	Junction	467.05	480.00	469.05	480.00	0.00	4.28	471.13	0.00	8.87	0 00:00	0.00	0.00
109	SDCB 044	Junction	468.44	473.51	470.44	473.51	0.00	2.47	471.13	0.00	2.38	0 00:00	0.00	0.00
110	SDCB 045	Junction	469.38	481.47	471.38	481.47	0.00	2.43	471.94	0.00	9.53	0 00:00	0.00	0.00
111	SDCB 046	Junction	477.20	481.91	479.20	481.91	0.00	0.21	479.31	0.00	2.60	0 00:00	0.00	0.00
112	SDCB 047	Junction	475.42	480.44	477.42	480.44	0.00	1.12	477.68	0.00	2.75	0 00:00	0.00	0.00
113	SDCB 048	Junction	475.50	480.22	477.50	480.22	0.00	0.13	477.71	0.00	2.50	0 00:00	0.00	0.00
114	SDCB 049	Junction	480.87	485.88	482.87	485.88	0.00	0.81	483.14	0.00	2.74	0 00:00	0.00	0.00
115	SDCB 050	Junction	480.95	485.66	482.95	485.66	0.00	0.07	483.15	0.00	2.51	0 00:00	0.00	0.00
116	SDCB 051	Junction	486.91	492.07	488.91	492.07	0.00	0.63	489.12	0.00	2.95	0 00:00	0.00	0.00
117	SDCB 052	Junction	487.59	492.30	489.59	492.30	0.00	0.11	489.71	0.00	2.59	0 00:00	0.00	0.00
118	SDCB 053	Junction	497.82	502.53	499.82	502.53	0.00	0.36	499.96	0.00	2.56	0 00:00	0.00	0.00
119	SDCB 054	Junction	475.33	481.83	477.33	481.83	0.00	0.64	477.50	0.00	4.33	0 00:00	0.00	0.00
120	SDCB 055	Junction	476.05	482.04	478.05	482.04	0.00	0.52	478.32	0.00	3.71	0 00:00	0.00	0.00
121	SDCB 056	Junction	484.00	490.50	486.00	490.50	0.00	0.39	486.15	0.00	4.35	0 00:00	0.00	0.00
122	SDCB 057	Junction	485.57	490.28	487.57	490.28	0.00	0.07	487.67	0.00	2.61	0 00:00	0.00	0.00
123	SDCB 058	Junction	493.33	498.46	495.33	498.46	0.00	0.25	495.45	0.00	3.01	0 00:00	0.00	0.00
124	SDCB 059	Junction	493.51	498.22	495.51	498.22	0.00	0.12	495.73	0.00	2.49	0 00:00	0.00	0.00
125	SDCB 060	Junction	495.08	499.79	487.08	499.79	0.00	0.12	497.20	0.00	2.59	0 00:00	0.00	0.00
126	SDCB 061	Junction	468.37	498.87	470.37	498.87	0.00	0.05	470.47	0.00	28.40	0 00:00	0.00	0.00
127	SDCB 062	Junction	468.58	495.18	470.58	495.18	0.00	0.05	470.68	0.00	24.50	0 00:00	0.00	0.00
128	SDCB 063	Junction	468.96	494.35	470.96	494.35	0.00	0.05	471.05	0.00	23.29	0 00:00	0.00	0.00
129	SDCB 064	Junction	469.22	488.25	471.22	488.25	0.00	0.05	471.33	0.00	16.92	0 00:00	0.00	0.00
130	SDCB 065	Junction	469.63	489.77	471.63	489.77	0.00	0.05	471.73	0.00	18.04	0 00:00	0.00	0.00
131	SDCB 066	Junction	469.99	495.23	473.99	495.23	0.00	0.05	474.09	0.00	21.14	0 00:00	0.00	0.00
132	SDCB 067	Junction	477.83	494.68	479.83	494.68	0.00	0.80	480.06	0.00	14.61	0 00:00	0.00	0.00
133	SDCB 068	Junction	478.01	489.66	480.01	489.66	0.00	0.80	480.44	0.00	9.21	0 00:00	0.00	0.00
134	SDCB 069	Junction	478.46	489.32	480.46	489.32	0.00	0.31	480.77	0.00	8.55	0 00:00	0.00	0.00
135	SDCB 070	Junction	478.77	486.75	480.77	486.75	0.00	0.29	481.04	0.00	5.71	0 00:00	0.00	0.00
136	SDCB 071	Junction	484.97	490.27	486.97	490.27	0.00	0.27	487.07	0.00	3.20	0 00:00	0.00	0.00
137	SDCB 072	Junction	485.55	490.26	487.55	490.26	0.00	0.22	487.78	0.00	2.48	0 00:00	0.00	0.00
138	SDCB 073	Junction	485.76	490.47	487.76	490.47	0.00	0.22	487.98	0.00	2.48	0 00:00	0.00	0.00
139	SDCB 074	Junction	478.74	484.54	480.74	484.54	0.00	0.67	481.03	0.00	3.51	0 00:00	0.00	0.00
140	SDCB 075	Junction	479.00	485.62	481.00	485.62	0.00	0.30	481.24	0.00	4.38	0 00:00	0.00	0.00
141	SDCB 076	Junction	479.12	488.91	481.12	488.91	0.00	0.30	481.36	0.00	7.55	0 00:00	0.00	0.00
142	SDCB 077	Junction	479.87	490.77	481.87	490.77	0.00	0.30	481.89	0.00	8.88	0 00:00	0.00	0.00
143	SDCB 078	Junction	479.83	492.39	481.83	492.39	0.00	0.30	482.03	0.00	10.36	0 00:00	0.00	0.00
144	SDCB 079	Junction	480.44	500.94	482.44	500.94	0.00	0.24	482.61	0.00	18.34	0 00:00	0.00	0.00
145	SDCB 080	Junction	480.83	504.63	482.83	504.63	0.00	0.24	483.00	0.00	21.63	0 00:00	0.00	0.00
146	SDCB 081	Junction	481.24	504.68	483.24	504.68	0.00	0.24	483.42	0.00	21.27	0 00:00	0.00	0.00
147	SDCB 082	Junction	481.67	504.85	483.67	504.85	0.00	0.24	483.84	0.00	21.01	0 00:00	0.00	0.00
148	SDCB 083	Junction	483.69	496.97	485.69	496.97	0.00	0.24	485.85	0.00	11.12	0 00:00	0.00	0.00
149	SDCB 084	Junction	485.76	491.38	487.76	491.38	0.00	0.24	487.92	0.00	3.46	0 00:00	0.00	0.00
150	SDCB 084A	Junction	484.33	495.07	486.33	495.07	0.00	0.24	486.50	0.00	8.56	0 00:00	0.00	0.00
151	SDCB 085	Junction	489.01	507.17	491.01	507.17	0.00	0.24	491.09	0.00	16.08	0 00:00	0.00	0.00
152	SDCB 086	Junction	489.19	506.62	491.19	506.62	0.00	0.31	491.37	0.00	15.24	0 00:00	0.00	0.00
153	SDCB 087	Junction	494.54	507.06	498.54	507.06	0.00	0.21	498.66	0.00	8.40	0 00:00	0.00	0.00
154	SDCB 088	Junction	496.57	507.04	498.57	507.04	0.00	7.49	502.21	0.00	4.83	0 00:00	0.00	0.00
155	SDCB 089	Junction	500.77	505.62	502.77	505.62	0.00	0.06	502.81	0.00	2.80	0 00:00	0.00	0.00
156	SDCB 090	Junction	502.16	507.12	504.16	507.12	0.00	0.06	504.25	0.00	2.87	0 00:00	0.00	0.00
157	SDCB 091	Junction	502.41	507.12	504.41	507.12	0.00	0.03	504.49	0.00	2.63	0 00:00	0.00	0.00
158	SDCB 092	Junction	496.43	509.32	498.43	509.32	0.00	4.06	502.21	0.00	7.11	0 00:00	0.00	0.00
159	SDCB 093	Junction	499.02	507.16	501.02	507.16	0.00	1.01	502.21	0.00	4.94	0 00:00	0.00	0.00
160	SDCB 094	Junction	501.20	505.91	503.20	505.91	0.00	0.41	503.46	0.00	2.45	0 00:00	0.00	0.00
161	SDCB 095	Junction	501.57											

Node Summary

SN	Element ID	Element Type	Invert Elevation	Ground/Rim (Max) Elevation	Initial Water Elevation	Surcharge Elevation	Ponded Area	Peak Inflow	Max HGL Elevation Attained	Max Surcharge Depth Attained	Min Freeboard Attained	Time of Peak Flooding Occurrence	Total Flooded Volume	Total Time Flooded
			(ft)	(ft)	(ft)	(ft)	(ft²)	(cfs)	(ft)	(ft)	(ft)	(days hh:mm)	(ac-in)	(min)
163	SDCB 097	Junction	506.76	509.47	506.76	509.47	0.00	0.05	506.86	0.00	2.61	0 00:00	0.00	0.00
164	SDCB 098	Junction	489.33	502.02	493.33	502.02	0.00	0.06	493.43	0.00	8.59	0 00:00	0.00	0.00
165	SDCB 099	Junction	492.51	503.14	494.51	503.14	0.00	2.19	497.99	0.00	5.15	0 00:00	0.00	0.00
166	SDCB 100	Junction	497.28	502.86	499.28	502.86	0.00	0.14	499.37	0.00	3.50	0 00:00	0.00	0.00
167	SDCB 101	Junction	497.64	502.35	499.64	502.35	0.00	0.14	499.80	0.00	2.55	0 00:00	0.00	0.00
168	SDCB 102	Junction	493.05	502.87	495.05	502.87	0.00	2.07	497.99	0.00	4.88	0 00:00	0.00	0.00
169	SDCB 103	Junction	495.98	502.25	497.98	502.25	0.00	0.77	498.23	0.00	4.01	0 00:00	0.00	0.00
170	SDCB 104	Junction	496.44	501.15	498.44	501.15	0.00	0.39	498.76	0.00	2.39	0 00:00	0.00	0.00
171	SDCB 105	Junction	493.38	503.07	495.38	503.07	0.00	1.32	497.99	0.00	5.08	0 00:00	0.00	0.00
172	SDCB 106	Junction	493.98	502.46	495.98	502.46	0.00	1.22	497.99	0.00	4.47	0 00:00	0.00	0.00
173	SDCB 107	Junction	494.85	502.08	496.85	502.08	0.00	0.95	497.99	0.00	4.08	0 00:00	0.00	0.00
174	SDCB 108	Junction	496.80	501.56	498.80	501.56	0.00	0.52	499.11	0.00	2.45	0 00:00	0.00	0.00
175	SDCB 109	Junction	498.93	503.65	500.93	503.65	0.00	0.18	501.08	0.00	2.57	0 00:00	0.00	0.00
176	SDCB 110	Junction	501.34	506.06	503.34	506.06	0.00	0.10	503.44	0.00	2.62	0 00:00	0.00	0.00
177	SDCB 111	Junction	487.19	492.57	489.19	492.57	0.00	0.06	489.23	0.00	3.34	0 00:00	0.00	0.00
178	SDCB 112	Junction	491.75	504.69	493.75	504.69	0.00	0.06	493.79	0.00	10.90	0 00:00	0.00	0.00
179	SDCB 113	Junction	491.64	504.38	495.64	504.38	0.00	0.06	495.70	0.00	8.68	0 00:00	0.00	0.00
180	SDCB 114	Junction	497.80	507.07	499.80	507.07	0.00	1.96	500.58	0.00	6.50	0 00:00	0.00	0.00
181	SDCB 115	Junction	498.40	506.66	500.40	506.66	0.00	0.49	500.78	0.00	5.88	0 00:00	0.00	0.00
182	SDCB 116	Junction	498.88	504.70	500.88	504.70	0.00	0.49	501.25	0.00	3.45	0 00:00	0.00	0.00
183	SDCB 117	Junction	499.03	503.74	501.03	503.74	0.00	0.49	501.44	0.00	2.30	0 00:00	0.00	0.00
184	SDCB 118	Junction	498.64	509.36	500.64	509.36	0.00	0.30	500.89	0.00	8.47	0 00:00	0.00	0.00
185	SDCB 119	Junction	498.94	507.15	500.94	507.15	0.00	1.06	501.30	0.00	5.85	0 00:00	0.00	0.00
186	SDCB 120	Junction	499.20	505.68	501.20	505.68	0.00	1.06	501.69	0.00	3.98	0 00:00	0.00	0.00
187	SDCB 121	Junction	499.95	506.54	501.95	506.54	0.00	0.61	502.38	0.00	4.16	0 00:00	0.00	0.00
188	SDCB 122	Junction	502.76	507.47	504.76	507.47	0.00	0.26	504.94	0.00	2.53	0 00:00	0.00	0.00
189	SDCB 123	Junction	500.29	504.68	502.29	504.68	0.00	0.05	502.39	0.00	2.28	0 00:00	0.00	0.00
190	SDCB 124	Junction	488.67	502.91	490.67	502.91	0.00	0.50	491.37	0.00	11.54	0 00:00	0.00	0.00
191	SDCB 125	Junction	488.95	501.82	490.95	501.82	0.00	0.05	491.37	0.00	10.45	0 00:00	0.00	0.00
192	SDCB 126	Junction	487.05	501.31	491.05	501.31	0.00	0.03	491.37	0.00	9.93	0 00:00	0.00	0.00
193	SDCB 127	Junction	494.44	501.08	496.44	501.08	0.00	1.67	497.41	0.00	3.67	0 00:00	0.00	0.00
194	SDCB 128	Junction	494.68	501.56	496.68	501.56	0.00	0.95	497.41	0.00	4.15	0 00:00	0.00	0.00
195	SDCB 129	Junction	495.11	500.16	497.11	500.16	0.00	0.17	497.41	0.00	2.75	0 00:00	0.00	0.00
196	SDCB 130	Junction	410.12	414.04	412.12	414.04	0.00	0.56	412.57	0.00	1.46	0 00:00	0.00	0.00
197	SDCB 131	Junction	410.41	414.08	412.41	414.08	0.00	0.11	412.60	0.00	1.48	0 00:00	0.00	0.00
198	SDCB 132	Junction	410.15	413.92	412.15	413.92	0.00	0.45	412.60	0.00	1.32	0 00:00	0.00	0.00
199	SDCB 133	Junction	410.23	414.61	412.23	414.61	0.00	0.27	412.63	0.00	1.97	0 00:00	0.00	0.00
200	SDCB 134	Junction	477.65	483.22	479.65	483.22	2000.00	0.00	479.65	0.00	3.57	0 00:00	0.00	0.00
201	SDCO 02	Junction	409.41	419.94	409.41	419.94	0.00	2.39	414.44	0.00	5.50	0 00:00	0.00	0.00
202	SDCO 03	Junction	482.51	485.69	482.51	485.69	0.00	2.02	482.78	0.00	2.91	0 00:00	0.00	0.00
203	TDC #1	Junction	497.91	500.42	497.91	500.42	0.00	0.20	498.02	0.00	2.40	0 00:00	0.00	0.00
204	TDC #2	Junction	504.24	504.95	504.24	504.95	0.00	0.22	504.34	0.00	0.62	0 00:00	0.00	0.00
205	EX_CB_1	Outfall	484.31					0.06	485.31					
206	EX_CB_2	Outfall	478.41					0.67	479.41					
207	OUT_#4	Outfall	469.72					0.05	469.81					
208	Out-02	Outfall	411.38					0.55	411.69					
209	OUTFALL #2	Outfall	408.00					1.42	408.39					
210	OUTFALL_#1	Outfall	453.20					0.38	453.34					
211	OUTFALL_#3	Outfall	483.00					0.00	483.00					
212	DETENTION_1	Storage Node	466.43	474.64	466.93		0.00	7.53	471.12				0.00	0.00
213	DETENTION_2	Storage Node	419.74	427.95	420.24		0.00	2.56	425.83				0.00	0.00
214	DETENTION_3	Storage Node	473.49	481.45	473.99		0.00	0.80	478.86				0.00	0.00
215	DETENTION_4	Storage Node	498.04	506.33	498.54		0.00	7.49	502.21				0.00	0.00
216	DETENTION_5	Storage Node	492.83	501.04	493.33		0.00	2.19	497.99				0.00	0.00
217	DETENTION_6	Storage Node	495.14	503.35	495.64		0.00	1.95	500.33				0.00	0.00
218	DETENTION_7	Storage Node	492.35	500.64	492.85		0.00	1.67	497.41				0.00	0.00
219	DETENTION_8	Storage Node	408.81	415.54	409.31		0.00	2.39	414.44				0.00	0.00

Link Summary

SN Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Total Depth Ratio	Total Time Reported Surcharged Condition
				(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		(min)
1 Link-100	Pipe	SDCO 03	SDCB 045	101.58	482.51	471.38	10.9600	12.000	0.0120	2.02	12.78	0.16	6.52	0.42	0.42	0.00 Calculated
2 Link-101	Pipe	SDCB 046	SDCB 045	90.66	479.20	471.71	8.2600	8.000	0.0120	0.21	3.76	0.05	4.99	0.17	0.25	0.00 Calculated
3 Link-102	Pipe	SDCB 048	SDCB 047	16.00	477.50	477.42	0.5000	8.000	0.0120	0.12	0.93	0.13	1.16	0.23	0.35	0.00 Calculated
4 Link-103	Pipe	RDCO 16	RDCO 01	188.37	502.88	500.60	1.2100	12.000	0.0100	1.17	5.10	0.23	2.69	0.57	0.57	0.00 Calculated
5 Link-104	Pipe	SDCB 132	SDCB 130	5.91	412.15	410.12	34.3400	8.000	0.0150	0.45	6.14	0.07	1.45	0.56	0.84	0.00 Calculated
6 Link-105	Pipe	SDCB 063	SDCB 064	53.19	471.22	470.96	0.5000	12.000	0.0120	0.05	2.73	0.02	0.36	0.23	0.23	0.00 Calculated
7 Link-106	Pipe	SDCB 064	SDCB 065	80.88	471.63	471.22	0.5000	12.000	0.0120	0.05	2.73	0.02	0.25	0.30	0.30	0.00 Calculated
8 Link-107	Pipe	BPU-3	SDCB 065	5.00	471.65	471.63	0.5000	12.000	0.0120	0.05	2.73	0.02	1.12	0.10	0.10	0.00 Calculated
9 Link-108	Pipe	SDCB 068	SDCB 067	36.40	480.01	479.83	0.5000	12.000	0.0120	0.80	2.73	0.29	2.73	0.40	0.40	0.00 Calculated
10 Link-109	Pipe	SDCB 067	DETENTION_3	5.00	479.83	478.95	17.6400	12.000	0.0120	0.80	16.21	0.05	7.67	0.19	0.19	0.00 Calculated
11 Link-110	Pipe	RDCO 02	RDCO 01	80.23	502.70	500.60	2.6100	12.000	0.0100	1.94	7.48	0.26	4.48	0.59	0.59	0.00 Calculated
12 Link-111	Pipe	RDCO 30	RDCO 29	101.94	499.40	498.63	0.7500	8.000	0.0100	0.36	1.36	0.27	3.03	0.25	0.37	0.00 Calculated
13 Link-112	Pipe	AD 12	RDCO 30	6.31	500.98	499.40	25.0000	8.000	0.0120	0.00	6.55	0.00	0.00	0.12	0.19	0.00 Calculated
14 Link-114	Pipe	SDCB 077	BPU-5	5.00	481.68	481.63	0.9800	18.000	0.0120	0.30	11.27	0.03	2.29	0.19	0.13	0.00 Calculated
15 Link-115	Pipe	BPU-5	SDCB 076	5.00	481.13	481.12	0.2000	24.000	0.0120	0.30	10.96	0.03	1.28	0.26	0.13	0.00 Calculated
16 Link-116	Pipe	SDCB 076	SDCB 075	56.86	481.12	481.00	0.2100	24.000	0.0120	0.30	11.21	0.03	1.39	0.24	0.12	0.00 Calculated
17 Link-117	Pipe	SDCB 091	SDCB 090	50.46	504.41	504.16	0.5000	8.000	0.0120	0.03	0.93	0.03	1.04	0.09	0.13	0.00 Calculated
18 Link-118	Pipe	SDCB 090	SDCB 089	142.59	504.16	502.77	0.9700	8.000	0.0120	0.06	1.29	0.04	1.83	0.09	0.14	0.00 Calculated
19 Link-119	Pipe	SDCB 089	SDCB 088	12.23	502.77	499.40	27.5900	8.000	0.0120	0.06	6.88	0.01	3.70	0.35	0.53	0.00 Calculated
20 Link-120	Pipe	RDCO 46	RDCO 45	247.67	503.43	502.19	0.5000	6.000	0.0100	0.21	0.52	0.42	2.39	0.23	0.47	0.00 Calculated
21 Link-121	Pipe	RDCO 45	AD 04	62.70	502.19	501.87	0.5000	6.000	0.0100	0.21	0.52	0.41	2.08	0.26	0.52	0.00 Calculated
22 Link-122	Pipe	AD 05	SDCB 095	159.64	506.31	503.57	1.7100	8.000	0.0120	0.00	1.71	0.00	0.00	0.00	0.00	0.00 Calculated
23 Link-123	Pipe	SDCB 095	SDCB 094	38.11	503.57	503.20	0.9800	8.000	0.0120	0.00	1.30	0.00	0.00	0.13	0.19	0.00 Calculated
24 Link-124	Pipe	SDCB 102	SDCB 099	53.97	495.05	494.51	1.0000	12.000	0.0120	2.05	3.86	0.53	2.97	1.00	1.00	906.00 SURCHARGED
25 Link-125	Pipe	SDCB 104	SDCB 103	92.98	498.44	497.98	0.5000	8.000	0.0120	0.39	0.93	0.42	2.48	0.31	0.46	0.00 Calculated
26 Link-126	Pipe	AD 11	SDCB 127	33.69	498.14	496.77	4.0600	8.000	0.0120	0.00	2.64	0.00	0.00	0.32	0.48	0.00 Calculated
27 Link-127	Pipe	SDCB 129	SDCB 128	84.85	497.11	496.68	0.5000	12.000	0.0120	0.17	2.73	0.06	0.81	0.51	0.51	0.00 Calculated
28 Link-128	Pipe	SDCB 035A	SDCB 035	137.71	505.77	501.95	2.7800	8.000	0.0120	0.09	2.18	0.04	1.46	0.16	0.24	0.00 Calculated
29 Link-129	Pipe	AD 13	SDCB 070	14.44	480.84	480.77	0.5000	8.000	0.0120	0.02	0.92	0.03	0.26	0.23	0.35	0.00 Calculated
30 Link-13	Pipe	SDCB 108	SDCB 107	174.19	498.80	497.19	0.9300	8.000	0.0120	0.52	1.26	0.41	3.36	0.38	0.57	0.00 Calculated
31 Link-131	Pipe	SDCB 084A	SDCB 083	93.22	486.33	485.69	0.6900	18.000	0.0120	0.24	9.45	0.03	2.15	0.17	0.11	0.00 Calculated
32 Link-132	Pipe	SDCB 134	OUTFALL_#3	145.18	479.65	478.84	0.5600	18.000	0.0120	0.00	17.29	0.00	0.00	0.00	0.00	0.00 Calculated
33 Link-14	Pipe	SDCB 045	SDCB 044	46.89	471.38	470.44	2.0000	12.000	0.0120	2.43	5.46	0.44	5.10	0.58	0.58	0.00 Calculated
34 Link-16	Pipe	SDCB 032	SDCB 030	138.50	499.55	484.83	10.6300	8.000	0.0120	0.93	4.27	0.22	8.94	0.22	0.34	0.00 Calculated
35 Link-17	Pipe	SDCB 060	SDCB 058	96.20	497.08	495.33	1.8200	8.000	0.0120	0.12	1.77	0.07	2.83	0.12	0.18	0.00 Calculated
36 Link-18	Pipe	SDCB 002	SDCB 001	46.72	408.89	408.65	0.5000	18.000	0.0120	1.29	8.05	0.16	3.03	0.43	0.29	0.00 Calculated
37 Link-19	Pipe	SDCB 018	BPU-2	5.00	420.24	420.22	0.5000	12.000	0.0120	0.23	2.73	0.08	1.80	0.22	0.22	0.00 Calculated
38 Link-20	Pipe	BPU-2	SDCB 017	61.16	417.22	416.58	1.0400	12.000	0.0120	0.23	3.95	0.06	2.63	0.17	0.17	0.00 Calculated
39 Link-21	Pipe	SDCB 017	SDCB 002	306.34	416.58	409.39	2.3500	12.000	0.0120	0.23	5.91	0.04	3.60	0.13	0.13	0.00 Calculated
40 Link-25	Pipe	SDCB 004	SDCB 003	201.58	416.28	409.64	3.3000	12.000	0.0120	0.56	7.01	0.08	5.26	0.19	0.19	0.00 Calculated
41 Link-26	Pipe	SDCO 02	DETENTION_8	5.70	409.41	409.39	0.4900	18.000	0.0120	2.39	7.98	0.30	1.61	1.50	1.00	1005.00 SURCHARGED
42 Link-27	Pipe	SDCB 001	OUTFALL_#2	30.29	408.15	408.00	0.5000	24.000	0.0120	1.42	17.30	0.08	2.95	0.42	0.21	0.00 Calculated
43 Link-29	Pipe	SDCB 019	DETENTION_2	8.98	424.57	424.13	4.9200	12.000	0.0120	2.56	8.56	0.30	6.62	1.00	1.00	317.00 SURCHARGED
44 Link-30	Pipe	SDCB 130	Out-02	66.99	412.12	411.38	1.1000	12.000	0.0300	0.55	1.62	0.34	2.01	0.38	0.38	0.00 Calculated
45 Link-31	Pipe	SDCB 007	SDCB 006	19.00	409.31	409.21	0.5000	18.000	0.0120	0.28	8.05	0.03	1.93	0.24	0.16	0.00 Calculated
46 Link-32	Pipe	SDCB 006	SDCB 003	48.95	409.21	408.97	0.5000	18.000	0.0120	0.28	8.05	0.03	1.54	0.40	0.27	0.00 Calculated
47 Link-33	Pipe	SDCB 022	SDCB 020	94.95	427.37	424.86	2.6400	12.000	0.0120	1.97	6.28	0.31	3.86	0.62	0.62	0.00 Calculated
48 Link-34	Pipe	SDCB 023	SDCB 022	57.83	427.66	427.37	0.5000	12.000	0.0120	1.86	2.73	0.68	3.46	0.65	0.65	0.00 Calculated
49 Link-39	Pipe	SDCB 038	OUTFALL_#1	277.48	463.33	453.20	3.6500	18.000	0.0120	0.38	21.75	0.02	4.60	0.14	0.09	0.00 Calculated
50 Link-40	Pipe	SDCB 100	SDCB 099	58.78	499.28	494.84	7.5500	8.000	0.0120	0.14	3.60	0.04	3.43	0.38	0.57	0.00 Calculated
51 Link-42	Pipe	SDCB 103	SDCB 102	71.65	497.98	495.38	3.6300	8.000	0.0120	0.77	2.49	0.31	5.78	0.41	0.61	0.00 Calculated
52 Link-43	Pipe	SDCB 101	SDCB 100	36.42	499.64	499.28	1.0000	8.000	0.0120	0.14	1.31	0.11	2.35	0.15	0.23	0.00 Calculated
53 Link-45	Pipe	SDCB 099	DETENTION_5	7.00	494.51	494.44	1.0000	12.000	0.0120	2.19	3.86	0.57	2.92	1.00	1.00	957.00 SURCHARGED
54 Link-47	Pipe	SDCB 098	BPU-4	5.04	493.33	493.28	0.9900	12.000	0.0120	0.06	3.84	0.02	1.57	0.09	0.09	0.00 Calculated
55 Link-48	Pipe	BPU-4	EX_CB_1	109.69	491.11	484.31	6.2000	12.000	0.0120	0.06	9.61	0.01	0.14	0.53	0.53	0.00 Calculated
56 Link-51	Pipe	AD 01	SDCB 073	61.91	495.06	487.76	11.7900	8.000	0.0120	0.01	4.49	0.00	0.25	0.12	0.19	0.00 Calculated
57 Link-52	Pipe	SDCB 073	SDCB 072	29.56	487.76	487.56	0.7000	8.000	0.0120	0.22	1.10	0.20	2.10	0.23	0.34	0.00 Calculated
58 Link-57	Pipe	SDCB 113	SDCB 112	43.66	495.64	493.75	4.3200	12.000	0.0120	0.06	8.03	0.01	2.93	0.06	0.06	0.00 Calculated

Link Summary

SN Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/Design Flow Ratio	Peak Flow Velocity (ft/sec)	Peak Flow Depth (ft)	Peak Flow Total Depth Ratio	Total Time Reported Surcharged Condition (min)
59 Link-59	Pipe	SDCB 111	SDCB 078	42.84	489.19	482.33	16.0100	12.000	0.0120	0.06	15.44	0.00	4.61	0.04	0.04	0.00 Calculated
60 Link-60	Pipe	SDCB 078	SDCB 077	15.50	481.83	481.68	0.9800	18.000	0.0120	0.30	11.27	0.03	2.05	0.21	0.14	0.00 Calculated
61 Link-61	Pipe	SDCB 074	EX_CB_2	91.52	480.74	478.41	2.5500	12.000	0.0200	0.67	3.70	0.18	1.25	0.64	0.64	0.00 Calculated
62 Link-63	Pipe	SDCB 112	SDCB 111	18.25	493.75	489.19	25.0000	12.000	0.0120	0.06	19.30	0.00	4.98	0.04	0.04	0.00 Calculated
63 Link-64	Pipe	AD 02	SDCB 068	52.30	487.37	480.35	13.4300	8.000	0.0120	0.07	4.80	0.02	4.71	0.08	0.12	0.00 Calculated
64 Link-67	Pipe	SDCB 066	BPU-3	34.64	473.99	473.82	0.5000	12.000	0.0120	0.05	2.73	0.02	1.33	0.09	0.09	0.00 Calculated
65 Link-68	Pipe	SDCB 063	SDCB 062	74.62	470.96	470.58	0.5000	12.000	0.0120	0.05	2.73	0.02	1.29	0.10	0.10	0.00 Calculated
66 Link-69	Pipe	SDCB 062	SDCB 061	42.23	470.58	470.37	0.5000	12.000	0.0120	0.05	2.73	0.02	1.28	0.10	0.10	0.00 Calculated
67 Link-70	Pipe	SDCB 061	OUT_#4	130.71	470.37	469.72	0.5000	12.000	0.0120	0.05	2.73	0.02	1.36	0.09	0.09	0.00 Calculated
68 Link-73	Pipe	SDCB 087	SDCB 086	379.96	498.54	491.19	1.9300	18.000	0.0120	0.21	15.83	0.01	2.24	0.15	0.10	0.00 Calculated
69 Link-74	Pipe	SDCB 086	SDCB 085	26.16	491.19	491.01	0.6900	18.000	0.0120	0.24	9.47	0.03	2.05	0.18	0.12	0.00 Calculated
70 Link-75	Pipe	SDCB 085	SDCB 084	16.72	491.01	487.76	19.4400	18.000	0.0120	0.24	50.17	0.00	3.80	0.12	0.08	0.00 Calculated
71 Link-76	Pipe	SDCB 084	SDCB 084A	172.54	487.76	486.33	0.8300	18.000	0.0120	0.24	10.36	0.02	2.30	0.16	0.11	0.00 Calculated
72 Link-77	Pipe	SDCB 083	SDCB 082	292.32	485.69	483.67	0.6900	18.000	0.0120	0.24	9.45	0.03	2.19	0.17	0.11	0.00 Calculated
73 Link-78	Pipe	SDCB 082	SDCB 081	62.22	483.67	483.24	0.6900	18.000	0.0120	0.24	9.45	0.03	2.12	0.17	0.12	0.00 Calculated
74 Link-79	Pipe	SDCB 081	SDCB 080	60.08	483.24	482.83	0.6900	18.000	0.0120	0.24	9.46	0.03	2.12	0.17	0.12	0.00 Calculated
75 Link-80	Pipe	SDCB 080	SDCB 079	55.99	482.83	482.44	0.6900	18.000	0.0120	0.24	9.45	0.03	2.11	0.17	0.12	0.00 Calculated
76 Link-81	Pipe	SDCB 079	SDCB 078	88.50	482.44	481.83	0.6900	18.000	0.0120	0.24	9.46	0.03	1.96	0.18	0.12	0.00 Calculated
77 Link-82	Pipe	SDCB 117	SDCB 116	29.40	501.03	500.88	0.5000	8.000	0.0120	0.49	0.93	0.53	2.34	0.39	0.58	0.00 Calculated
78 Link-83	Pipe	SDCB 116	SDCB 115	97.58	500.88	500.39	0.5000	8.000	0.0120	0.49	0.93	0.53	2.42	0.37	0.56	0.00 Calculated
79 Link-84	Pipe	SDCB 115	SDCB 114	53.01	500.40	500.13	0.5000	8.000	0.0120	0.49	0.93	0.52	2.31	0.42	0.62	0.00 Calculated
80 Link-85	Pipe	SDCB 114	DETENTION_6	21.92	499.80	499.69	0.5000	12.000	0.0120	1.95	2.73	0.71	3.39	0.69	0.69	0.00 Calculated
81 Link-87	Pipe	SDCB 126	SDCB 125	20.59	491.05	490.95	0.5000	12.000	0.0120	0.03	2.73	0.01	0.14	0.38	0.38	0.00 Calculated
82 Link-88	Pipe	SDCB 125	SDCB 124	56.35	490.95	490.67	0.5000	12.000	0.0120	0.06	2.73	0.02	0.51	0.57	0.57	0.00 Calculated
83 Link-89	Pipe	SDCB 124	SDCB 086	216.18	490.67	489.58	0.5000	12.000	0.0120	0.50	2.73	0.18	0.93	0.85	0.85	0.00 Calculated
84 Link-92	Pipe	SDCB 044	SDCB 043	80.36	470.44	469.55	1.1000	12.000	0.0100	2.47	4.86	0.51	5.47	0.85	0.85	0.00 Calculated
85 Link-93	Pipe	SDCB 075	SDCB 074	52.16	481.00	480.74	0.5000	12.000	0.0120	0.30	2.73	0.11	2.16	0.23	0.23	0.00 Calculated
86 Link-94	Pipe	SDCB 075	SDCB 134	52.51	482.00	479.65	4.4800	24.000	0.0140	0.00	44.47	0.00	0.00	0.00	0.00	0.00 Calculated
87 Link-95	Pipe	SDCB 034	SDCB 032	100.53	502.46	499.55	2.9000	8.000	0.0120	0.24	2.23	0.11	3.18	0.18	0.27	0.00 Calculated
88 Link-96	Pipe	SDCB 033	SDCB 032	38.51	502.07	499.55	6.5500	8.000	0.0120	0.03	3.35	0.01	0.58	0.13	0.19	0.00 Calculated
89 Link-97	Pipe	SDCB 041	SDCB 040	99.36	466.93	466.40	0.5300	18.000	0.0120	0.38	8.29	0.05	2.31	0.22	0.15	0.00 Calculated
90 Link-98	Pipe	SDCB 040	SDCB 039	12.43	466.40	465.10	10.4900	18.000	0.0120	0.38	36.85	0.01	5.88	0.12	0.08	0.00 Calculated
91 Link-99	Pipe	SDCB 039	SDCB 038	17.39	465.10	463.33	10.1700	18.000	0.0120	0.38	36.29	0.01	5.31	0.13	0.08	0.00 Calculated
92 P - (111)	Pipe	SDCB 121	SDCB 120	83.71	501.95	501.53	0.5000	8.000	0.0120	0.60	0.93	0.65	2.77	0.40	0.60	0.00 Calculated
93 P - (115)	Pipe	SDCB 118	SDCB 114	94.85	500.64	500.13	0.5300	8.000	0.0120	0.30	0.96	0.31	1.97	0.35	0.53	0.00 Calculated
94 P - (119)	Pipe	RDCO 01	SDCB 092	71.57	500.60	499.74	1.2100	12.000	0.0120	3.08	4.24	0.72	4.93	1.00	1.00	547.00 SURCHARGED
95 P - (119) (2)	Pipe	SDCB 092	SDCB 088	134.37	499.24	498.57	0.5000	18.000	0.0120	4.05	8.05	0.50	2.29	1.50	1.00	925.00 SURCHARGED
96 P - (125)	Pipe	SDCB 106	SDCB 105	120.03	495.98	495.38	0.5000	12.000	0.0120	1.22	2.73	0.45	2.85	1.00	1.00	624.00 SURCHARGED
97 P - (125) (1)	Pipe	SDCB 107	SDCB 106	174.19	496.85	495.98	0.5000	12.000	0.0120	0.95	2.73	0.35	2.74	1.00	1.00	127.00 SURCHARGED
98 P - (129)	Pipe	SDCB 128	SDCB 127	49.06	496.68	496.44	0.5000	12.000	0.0120	0.95	2.73	0.35	2.89	0.85	0.85	0.00 Calculated
99 P - (129) (1)	Pipe	SDCB 127	DETENTION_7	36.48	496.44	494.61	5.0000	12.000	0.0120	1.67	8.63	0.19	7.42	0.99	0.99	0.00 Calculated
100 P - (130)	Pipe	TDC #1	SDCB 106	10.93	497.91	496.48	13.0100	6.000	0.0100	0.20	2.63	0.08	6.93	0.29	0.59	0.00 Calculated
101 P - (131)	Pipe	SDCB 015	SDCB 013	278.34	472.99	452.12	7.5000	12.000	0.0120	0.70	10.57	0.07	5.88	0.21	0.21	0.00 Calculated
102 P - (131) (1)	Pipe	SDCB 013	SDCB 011	304.53	452.12	430.28	7.1700	12.000	0.0120	1.34	10.34	0.13	7.67	0.27	0.27	0.00 Calculated
103 P - (132)	Pipe	SDCB 011	SDCB 010	110.47	430.28	421.28	8.1400	12.000	0.0120	2.22	11.01	0.20	8.09	0.38	0.38	0.00 Calculated
104 P - (132) (1)	Pipe	SDCB 009	SDCB 008	8.54	412.59	412.55	0.5000	12.000	0.0120	2.39	2.74	0.87	3.59	1.00	1.00	739.00 SURCHARGED
105 P - (132) (2)	Pipe	SDCB 010	SDCB 009	410.95	421.28	412.59	2.1100	12.000	0.0120	2.40	5.61	0.43	4.18	0.69	0.69	0.00 Calculated
106 P - (133)	Pipe	SDCB 005	SDCB 004	74.34	416.68	416.28	0.5400	12.000	0.0120	0.18	2.83	0.06	1.81	0.18	0.18	0.00 Calculated
107 P - (134)	Pipe	SDCB 072	SDCB 071	116.52	487.55	486.97	0.5000	8.000	0.0120	0.22	0.93	0.24	2.14	0.22	0.33	0.00 Calculated
108 P - (134) (1)	Pipe	SDCB 069	SDCB 068	22.78	480.46	480.35	0.5000	8.000	0.0120	0.31	0.93	0.34	2.21	0.28	0.42	0.00 Calculated
109 P - (134) (2)	Pipe	SDCB 070	SDCB 069	61.13	480.77	480.46	0.5000	8.000	0.0120	0.29	0.92	0.31	2.01	0.29	0.43	0.00 Calculated
110 P - (136)	Pipe	SDCB 024	SDCB 023	123.34	442.11	427.99	11.4500	8.000	0.0120	1.75	4.43	0.40	10.71	0.34	0.50	0.00 Calculated
111 P - (137)	Pipe	SDCB 036	SDCB 024	151.88	458.61	442.11	10.8700	8.000	0.0120	0.16	4.32	0.04	1.92	0.19	0.28	0.00 Calculated
112 P - (138)	Pipe	SDCB 049	SDCB 047	153.40	482.87	477.42	3.5500	8.000	0.0120	0.81	2.47	0.33	6.18	0.27	0.40	0.00 Calculated
113 P - (139) (1)	Pipe	SDCB 053	SDCB 051	158.86	499.82	488.91	6.8700	8.000	0.0120	0.36	3.43	0.10	4.73	0.18	0.27	0.00 Calculated
114 P - (140)	Pipe	SDCB 051	SDCB 049	132.82	488.91	482.87	4.5400	8.000	0.0120	0.63	2.79	0.22	5.41	0.24	0.37	0.00 Calculated
115 P - (141)	Pipe	AD 03	AD 02	63.37	488.01	487.37	1.0000	8.000	0.0120	0.05	1.31	0.04	2.23	0.08	0.12	0.00 Calculated
116 P - (144)	Pipe	SDCB 052	SDCB 051	45.90	489.59	488.91	1.5000	8.000	0.0120	0.11	1.60	0.07	1.59	0.17	0.25	0.00 Calculated

Link Summary

SN Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Reported Surcharged Condition
				(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		(min)
117 P - (145)	Pipe	SDCB 050	SDCB 049	16.00	482.95	482.87	0.5000	8.000	0.0120	0.07	0.93	0.07	0.62	0.24	0.36	0.00 Calculated
118 P - (148)	Pipe	SDCB 110	SDCB 109	102.22	503.34	500.93	2.3500	8.000	0.0120	0.10	2.01	0.05	2.30	0.12	0.19	0.00 Calculated
119 P - (149)	Pipe	SDCB 109	SDCB 108	127.35	500.93	498.80	1.6700	8.000	0.0120	0.18	1.69	0.10	1.68	0.23	0.34	0.00 Calculated
120 P - (151)	Pipe	RDCO 27A	SDCB 128	100.08	497.45	496.68	0.7600	12.000	0.0120	0.57	4.04	0.14	2.25	0.40	0.40	0.00 Calculated
121 P - (159)	Pipe	SDCB 003	SDCB 002	16.30	408.97	408.89	0.5000	18.000	0.0120	1.22	8.02	0.15	2.43	0.49	0.33	0.00 Calculated
122 P - (171)	Pipe	TDC #2	SDCB 118	24.02	504.24	500.64	15.0000	8.000	0.0120	0.22	5.07	0.04	3.07	0.17	0.26	0.00 Calculated
123 P - (182)	Pipe	SDCB 025	SDCB 024	47.27	442.64	442.11	1.1200	8.000	0.0120	1.45	1.38	1.05	4.30	0.62	0.92	0.00 > CAPACITY
124 P - (184)	Pipe	SDCB 037	SDCB 036	46.83	458.85	458.61	0.5000	8.000	0.0120	0.06	0.93	0.07	1.51	0.12	0.18	0.00 Calculated
125 P - (210)	Pipe	SDCB 096	SDCB 035A	110.88	506.33	505.77	0.5000	8.000	0.0120	0.09	0.93	0.10	1.69	0.14	0.21	0.00 Calculated
126 P - (211)	Pipe	SDCB 097	SDCB 096	85.92	506.76	506.33	0.5000	8.000	0.0120	0.05	0.93	0.05	1.04	0.12	0.19	0.00 Calculated
127 P - (218)	Pipe	SDCB 120	SDCB 119	51.10	501.20	500.94	0.5000	12.000	0.0120	1.06	2.73	0.39	2.97	0.46	0.46	0.00 Calculated
128 P - (219)	Pipe	SDCB 119	SDCB 114	117.57	500.94	499.80	0.9700	12.000	0.0120	1.06	3.81	0.28	2.29	0.57	0.57	0.00 Calculated
129 P - (221)	Pipe	SDCB 122	SDCB 121	161.19	504.76	501.95	1.7500	8.000	0.0120	0.26	1.73	0.15	1.70	0.30	0.45	0.00 Calculated
130 P - (225)	Pipe	SDCB 105	SDCB 102	67.33	495.38	495.05	0.5000	12.000	0.0120	1.31	2.73	0.48	2.63	1.00	1.00	831.00 SURCHARGED
131 P - (231)	Pipe	SDCB 088	DETENTION_4	5.00	498.57	498.54	0.5000	18.000	0.0120	7.49	8.05	0.93	4.24	1.50	1.00	970.00 SURCHARGED
132 P - (232)	Pipe	RDCO 25	RDCO 24	88.39	507.40	506.40	1.1300	6.000	0.0100	0.28	0.77	0.36	3.48	0.21	0.43	0.00 Calculated
133 P - (233)	Pipe	RDCO 24	RDCO 23	46.01	506.24	506.01	0.5000	8.000	0.0100	0.28	1.11	0.25	2.31	0.25	0.38	0.00 Calculated
134 P - (234)	Pipe	RDCO 23	RDCO 22	45.64	506.01	505.78	0.5000	8.000	0.0100	0.28	1.11	0.25	1.95	0.29	0.43	0.00 Calculated
135 P - (235)	Pipe	RDCO 22	RDCO 21	168.86	505.78	504.93	0.5000	8.000	0.0100	0.48	1.11	0.43	2.96	0.31	0.47	0.00 Calculated
136 P - (236)	Pipe	RDCO 21	RDCO 20	108.25	504.60	504.06	0.5000	12.000	0.0100	0.60	3.27	0.18	2.89	0.31	0.31	0.00 Calculated
137 P - (237)	Pipe	RDCO 20	RDCO 19	81.81	504.06	503.65	0.5000	12.000	0.0100	0.60	3.27	0.18	2.43	0.35	0.35	0.00 Calculated
138 P - (238)	Pipe	RDCO 19	RDCO 18	67.66	503.65	503.31	0.5000	12.000	0.0100	0.84	3.27	0.26	2.70	0.42	0.42	0.00 Calculated
139 P - (239)	Pipe	RDCO 18	RDCO 17	54.94	503.31	503.04	0.5000	12.000	0.0100	0.95	3.28	0.29	2.89	0.44	0.44	0.00 Calculated
140 P - (240)	Pipe	RDCO 17	RDCO 16	30.78	503.04	502.88	0.5000	12.000	0.0100	0.95	3.28	0.29	3.47	0.38	0.38	0.00 Calculated
141 P - (242)	Pipe	RDCO 15	RDCO 14	143.69	507.40	506.68	0.5000	6.000	0.0100	0.40	0.52	0.78	2.56	0.37	0.75	0.00 Calculated
142 P - (243)	Pipe	RDCO 14	RDCO 13	32.33	506.68	506.52	0.5000	6.000	0.0100	0.40	0.52	0.77	2.59	0.37	0.74	0.00 Calculated
143 P - (244)	Pipe	RDCO 13	RDCO 12	44.58	506.35	506.13	0.5000	8.000	0.0100	0.76	1.11	0.68	2.77	0.49	0.73	0.00 Calculated
144 P - (244) (1)	Pipe	RDCO 12	RDCO 11	37.23	506.13	505.85	0.7400	8.000	0.0100	0.79	1.35	0.59	2.99	0.50	0.75	0.00 Calculated
145 P - (245)	Pipe	RDCO 11	RDCO 10	121.72	505.85	505.25	0.5000	8.000	0.0100	0.86	1.11	0.77	2.69	0.60	0.89	0.00 Calculated
146 P - (246)	Pipe	RDCO 10	RDCO 09	54.85	505.25	504.97	0.5000	8.000	0.0100	1.01	1.11	0.91	2.90	0.66	0.99	0.00 Calculated
147 P - (247)	Pipe	RDCO 09	RDCO 08	25.66	504.97	504.84	0.5000	8.000	0.0100	1.01	1.11	0.91	3.19	0.57	0.85	0.00 Calculated
148 P - (248)	Pipe	RDCO 08	RDCO 07	24.07	504.51	504.39	0.5000	12.000	0.0100	1.72	3.27	0.53	3.30	0.63	0.63	0.00 Calculated
149 P - (248) (1)	Pipe	RDCO 07	RDCO 06	177.43	504.39	503.50	0.5000	12.000	0.0100	1.81	3.27	0.55	3.46	0.63	0.63	0.00 Calculated
150 P - (249)	Pipe	RDCO 06	RDCO 05	53.06	503.50	503.24	0.5000	12.000	0.0100	1.81	3.27	0.55	3.05	0.71	0.71	0.00 Calculated
151 P - (249) (1)	Pipe	RDCO 05	RDCO 04	58.27	503.24	502.95	0.5000	12.000	0.0100	1.83	3.27	0.56	2.92	0.74	0.74	0.00 Calculated
152 P - (250)	Pipe	RDCO 04	RDCO 03	13.79	502.95	502.88	0.5000	12.000	0.0100	1.83	3.28	0.56	3.12	0.70	0.70	0.00 Calculated
153 P - (251)	Pipe	RDCO 03	RDCO 02	36.29	502.88	502.70	0.5000	12.000	0.0100	1.83	3.27	0.56	4.78	0.49	0.49	0.00 Calculated
154 P - (253)	Pipe	RDCO 26	TDC #2	47.39	504.64	504.41	0.5000	6.000	0.0120	0.04	0.43	0.09	1.36	0.10	0.20	0.00 Calculated
155 P - (258)	Pipe	RDCO 34	RDCO 33	89.00	501.21	500.77	0.5000	6.000	0.0100	0.17	0.52	0.33	2.24	0.20	0.41	0.00 Calculated
156 P - (259)	Pipe	RDCO 33	RDCO 32	93.51	500.77	499.83	1.0000	6.000	0.0100	0.22	0.73	0.31	3.15	0.19	0.39	0.00 Calculated
157 P - (260)	Pipe	RDCO 32	RDCO 31	30.62	499.67	499.51	0.5000	8.000	0.0100	0.22	1.11	0.20	1.69	0.27	0.40	0.00 Calculated
158 P - (261)	Pipe	RDCO 31	RDCO 30	15.27	499.51	499.40	0.7500	8.000	0.0120	0.36	1.14	0.32	2.65	0.28	0.41	0.00 Calculated
159 P - (262)	Pipe	RDCO 37	RDCO 36	36.32	501.46	501.09	1.0000	6.000	0.0100	0.22	0.73	0.30	2.61	0.22	0.44	0.00 Calculated
160 P - (263)	Pipe	RDCO 36	RDCO 35	26.56	501.09	500.83	1.0000	6.000	0.0100	0.21	0.73	0.29	3.89	0.16	0.32	0.00 Calculated
161 P - (264)	Pipe	RDCO 35	RDCO 27A	11.54	500.83	497.95	24.9500	6.000	0.0100	0.21	3.64	0.06	8.99	0.09	0.18	0.00 Calculated
162 P - (265)	Pipe	RDCO 28	RDCO 27	5.29	498.18	498.14	0.7400	8.000	0.0100	0.36	1.35	0.27	2.42	0.30	0.44	0.00 Calculated
163 P - (266)	Pipe	RDCO 29	RDCO 28	60.54	498.63	498.18	0.7500	8.000	0.0100	0.36	1.36	0.27	2.47	0.29	0.44	0.00 Calculated
164 P - (267)	Pipe	RDCO 27	RDCO 27A	47.85	498.14	497.78	0.7500	8.000	0.0100	0.36	1.36	0.27	2.89	0.26	0.39	0.00 Calculated
165 P - (268)	Pipe	RDCO 42	RDCO 41	138.08	487.42	486.04	1.0000	6.000	0.0100	0.08	0.73	0.12	1.77	0.15	0.29	0.00 Calculated
166 P - (269)	Pipe	RDCO 41	RDCO 40	21.63	486.04	485.83	1.0000	6.000	0.0100	0.15	0.73	0.20	2.41	0.18	0.35	0.00 Calculated
167 P - (270)	Pipe	RDCO 40	RDCO 39	32.53	485.83	485.50	1.0000	6.000	0.0100	0.15	0.73	0.20	3.26	0.14	0.28	0.00 Calculated
168 P - (271)	Pipe	RDCO 39	RDCO 38	64.44	485.50	482.34	4.9000	6.000	0.0100	0.15	1.61	0.09	4.99	0.10	0.21	0.00 Calculated
169 P - (272)	Pipe	RDCO 38	SDCB 068	7.32	482.18	480.35	25.0100	8.000	0.0120	0.31	6.55	0.05	8.23	0.11	0.16	0.00 Calculated
170 P - (273)	Pipe	RDCO 44	RDCO 43	7.24	487.46	487.38	0.9900	6.000	0.0120	0.16	0.61	0.26	2.84	0.16	0.33	0.00 Calculated
171 P - (274)	Pipe	RDCO 43	RDCO 38	170.62	487.38	482.34	2.9500	6.000	0.0100	0.16	1.25	0.13	4.32	0.12	0.24	0.00 Calculated
172 P - (276)	Pipe	SDCB 123	SDCB 121	67.99	502.29	501.95	0.5000	8.000	0.0120	0.05	0.93	0.05	0.36	0.27	0.40	0.00 Calculated
173 P - (282)	Pipe	AD 04	SDCB 093	104.48	501.87	501.35	0.5000	8.000	0.0120	0.30	0.93	0.33	2.34	0.50	0.76	0.00 Calculated
174 P - (283)	Pipe	SDCB 093	SDCB 092	256.57	501.02	499.74	0.5000	12.000	0.0120	1.01	2.73	0.37	2.60	1.00	1.00	225.00 SURCHARGED

Link Summary

SN Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Reported Surcharged Condition (min)
				(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		
175 P - (291)	Pipe	AD 10	RDCO 12	12.39	506.90	506.13	6.2600	8.000	0.0120	0.03	3.28	0.01	0.26	0.26	0.39	0.00 Calculated
176 P - (292)	Pipe	AD 09	RDCO 11	17.89	505.94	505.85	0.5000	8.000	0.0120	0.08	0.92	0.09	0.37	0.48	0.72	0.00 Calculated
177 P - (293)	Pipe	AD 07	RDCO 07	54.87	505.78	504.72	1.9400	8.000	0.0120	0.09	1.82	0.05	2.22	0.17	0.25	0.00 Calculated
178 P - (295)	Pipe	AD 08	RDCO 08	26.63	506.92	504.84	7.8000	8.000	0.0120	0.05	3.66	0.01	2.62	0.21	0.31	0.00 Calculated
179 P - (296)	Pipe	AD 06	RDCO 05	48.54	505.91	503.57	4.8100	8.000	0.0120	0.03	3.05	0.01	2.07	0.21	0.32	0.00 Calculated
180 P - (298)	Pipe	SDCB 094	SDCB 093	177.08	503.20	501.35	1.0400	8.000	0.0120	0.40	1.34	0.30	3.28	0.38	0.57	0.00 Calculated
181 P - (299)	Pipe	SDCB 035	SDCB 032	85.86	501.95	499.55	2.8000	8.000	0.0120	0.49	2.19	0.22	4.87	0.22	0.33	0.00 Calculated
182 P - (319)	Pipe	SDCB 071	SDCB 070	37.78	486.97	480.77	16.4200	8.000	0.0120	0.27	5.30	0.05	3.35	0.19	0.28	0.00 Calculated
183 P - (320)	Pipe	SDCB 016	SDCB 015	63.83	473.30	472.99	0.4900	12.000	0.0120	0.16	2.71	0.06	1.74	0.17	0.17	0.00 Calculated
184 P - (321)	Pipe	SDCB 014	SDCB 013	68.75	452.47	452.12	0.5000	12.000	0.0120	0.17	2.73	0.06	1.46	0.21	0.21	0.00 Calculated
185 P - (322)	Pipe	SDCB 012	SDCB 011	73.83	430.64	430.28	0.5000	12.000	0.0120	0.17	2.73	0.06	1.20	0.24	0.24	0.00 Calculated
186 P - (324)	Pipe	SDCB 131	SDCB 130	56.92	412.41	412.12	0.5000	8.000	0.0150	0.11	0.74	0.14	0.66	0.32	0.48	0.00 Calculated
187 P - (326)	Pipe	SDCB 133	SDCB 132	15.09	412.23	412.15	0.5200	8.000	0.0150	0.27	0.75	0.36	1.18	0.43	0.64	0.00 Calculated
188 P - (34)	Pipe	SDCB 021	SDCB 020	14.58	425.80	425.19	4.2200	8.000	0.0120	0.19	2.69	0.07	3.20	0.35	0.52	0.00 Calculated
189 P - (34) (2)	Pipe	SDCB 020	SDCB 019	57.00	424.86	424.57	0.5000	12.000	0.0120	2.33	2.73	0.85	3.67	0.99	0.99	0.00 Calculated
190 P - (36)	Pipe	SDCB 047	SDCB 043	79.66	477.42	469.89	9.4600	8.000	0.0120	1.12	4.03	0.28	9.46	0.38	0.57	0.00 Calculated
191 P - (40)	Pipe	SDCB 043	SDCB 042	142.41	469.05	468.34	0.5000	18.000	0.0120	4.28	8.05	0.53	2.67	1.50	1.00	479.00 SURCHARGED
192 P - (48)	Pipe	SDCB 042	DETENTION_1	5.00	468.34	468.32	0.5000	18.000	0.0120	7.53	8.05	0.94	4.68	1.50	1.00	792.00 SURCHARGED
193 P - (58)	Pipe	SDCB 028	SDCB 027	52.28	465.00	458.94	11.5800	8.000	0.0120	1.21	4.46	0.27	9.38	0.26	0.40	0.00 Calculated
194 P - (58) (1)	Pipe	SDCB 027	SDCB 026	61.63	458.94	453.11	9.4700	8.000	0.0120	1.25	4.03	0.31	9.60	0.27	0.40	0.00 Calculated
195 P - (58) (1) (1)	Pipe	SDCB 026	SDCB 025	74.26	453.11	442.64	14.1000	8.000	0.0120	1.30	4.92	0.26	5.17	0.45	0.68	0.00 Calculated
196 P - (60)	Pipe	SDCB 031	SDCB 030	46.49	489.54	484.83	10.1400	8.000	0.0120	0.10	4.17	0.02	1.59	0.15	0.23	0.00 Calculated
197 P - (61)	Pipe	SDCB 030	SDCB 029	71.46	484.83	476.56	11.5600	8.000	0.0120	1.10	4.45	0.25	9.81	0.24	0.36	0.00 Calculated
198 P - (65)	Pipe	SDCB 029	SDCB 028	100.63	476.56	465.00	11.4900	8.000	0.0120	1.15	4.44	0.26	9.90	0.25	0.37	0.00 Calculated
199 P - (78)	Pipe	SDCB 058	SDCB 056	120.21	495.33	486.00	7.7700	8.000	0.0120	0.25	3.65	0.07	4.91	0.14	0.21	0.00 Calculated
200 P - (78) (2) (1)	Pipe	SDCB 056	SDCB 055	123.21	486.00	478.05	6.4500	8.000	0.0120	0.39	3.32	0.12	4.06	0.21	0.32	0.00 Calculated
201 P - (83)	Pipe	SDCB 054	SDCB 043	56.71	477.33	469.89	13.1300	8.000	0.0120	0.64	4.74	0.14	9.03	0.37	0.55	0.00 Calculated
202 P - (84)	Pipe	SDCB 058	SDCB 059	35.83	495.51	495.33	0.5000	8.000	0.0120	0.11	0.93	0.12	0.84	0.27	0.41	0.00 Calculated
203 P - (85)	Pipe	SDCB 055	SDCB 054	35.86	478.05	477.33	2.0000	8.000	0.0120	0.52	1.85	0.28	4.18	0.26	0.39	0.00 Calculated
204 P - (86)	Pipe	SDCB 056	SDCB 057	35.83	487.57	486.00	4.3800	8.000	0.0120	0.07	2.74	0.03	0.37	0.37	0.56	0.00 Calculated
205 SF_VAULT	Pipe	SDCB 008	SDCO 02	50.64	412.55	409.91	5.2100	12.000	0.0120	2.39	8.81	0.27	4.95	1.00	1.00	751.00 SURCHARGED
206 DETENTION_1_OUT	Outlet	DETENTION_1	SDCB 041		466.43	464.93				0.38						
207 DETENTION_2_OUT	Outlet	DETENTION_2	SDCB 018		419.74	416.24				0.23						
208 DETENTION_3_OUT	Outlet	DETENTION_3	SDCB 066		473.49	469.99				0.05						
209 DETENTION_4_OUT	Outlet	DETENTION_4	SDCB 087		498.04	494.54				0.21						
210 DETENTION_5_OUT	Outlet	DETENTION_5	SDCB 098		492.83	489.33				0.06						
211 DETENTION_6_OUT	Outlet	DETENTION_6	SDCB 113		495.14	491.64				0.06						
212 DETENTION_7_OUT	Outlet	DETENTION_7	SDCB 126		492.35	487.05				0.03						
213 DETENTION_8_OUT	Outlet	DETENTION_8	SDCB 007		408.81	405.31				0.28						

Subbasin Hydrology**Subbasin : 001****Input Data**

Area (ac) 0.15
Impervious Area (%) 94.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

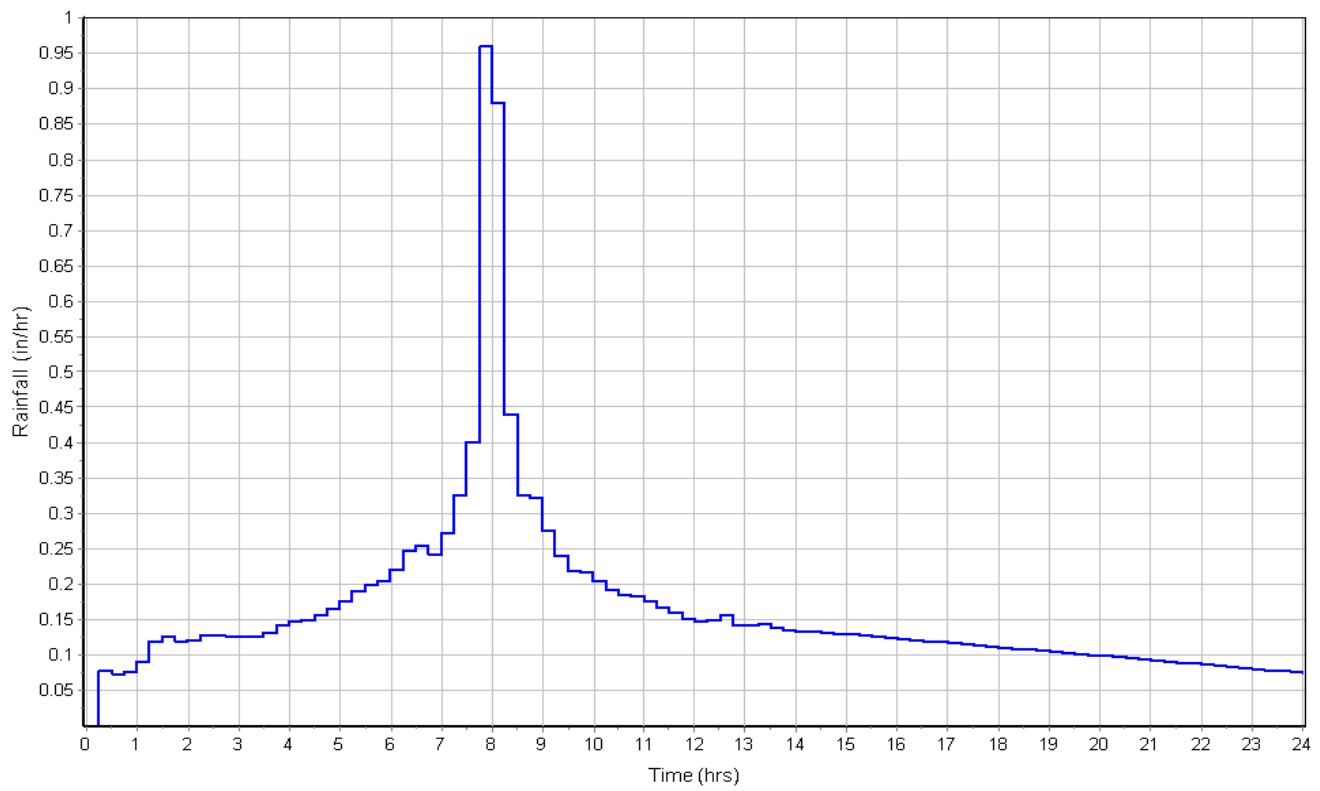
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.15		96.68

Subbasin Runoff Results

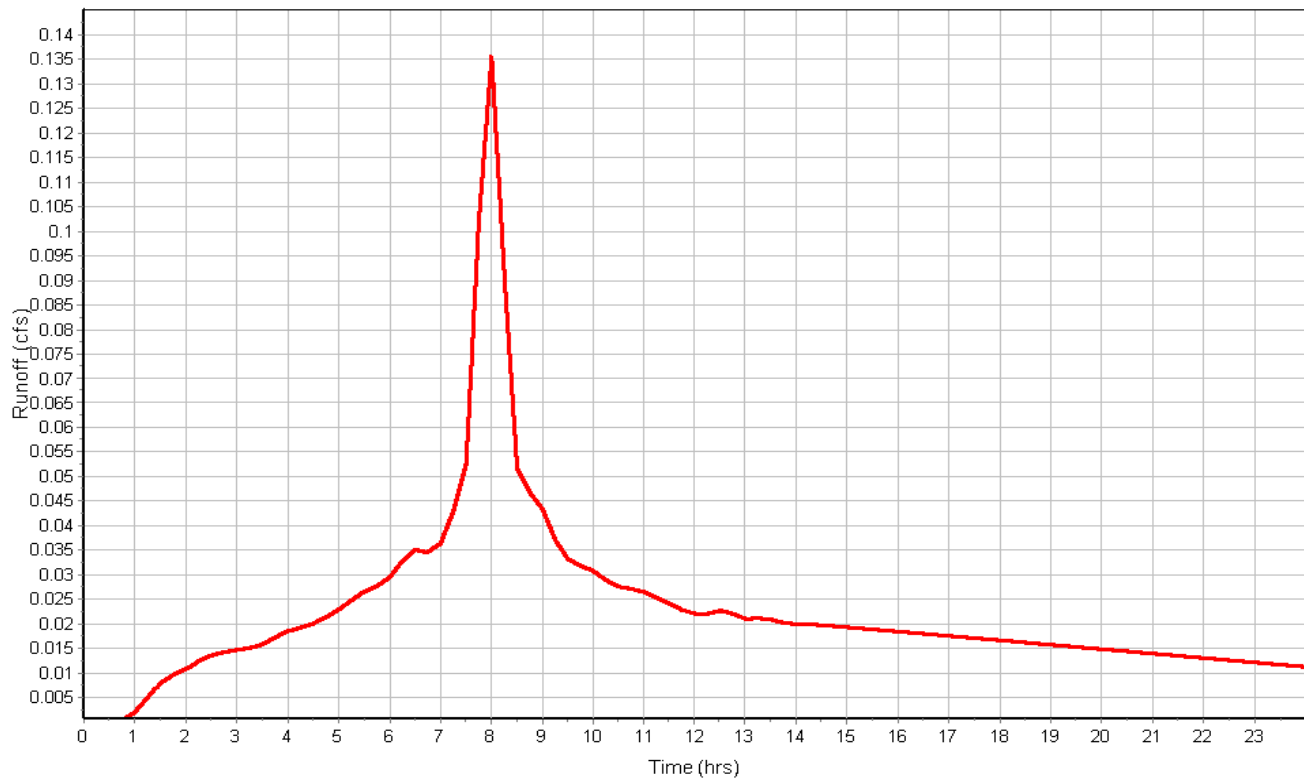
Total Rainfall (in) 3.96
Total Runoff (in) 3.61
Peak Runoff (cfs) 0.14
Weighted Curve Number 96.68
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 001

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 003**Input Data**

Area (ac) 0.86
Impervious Area (%) 33.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

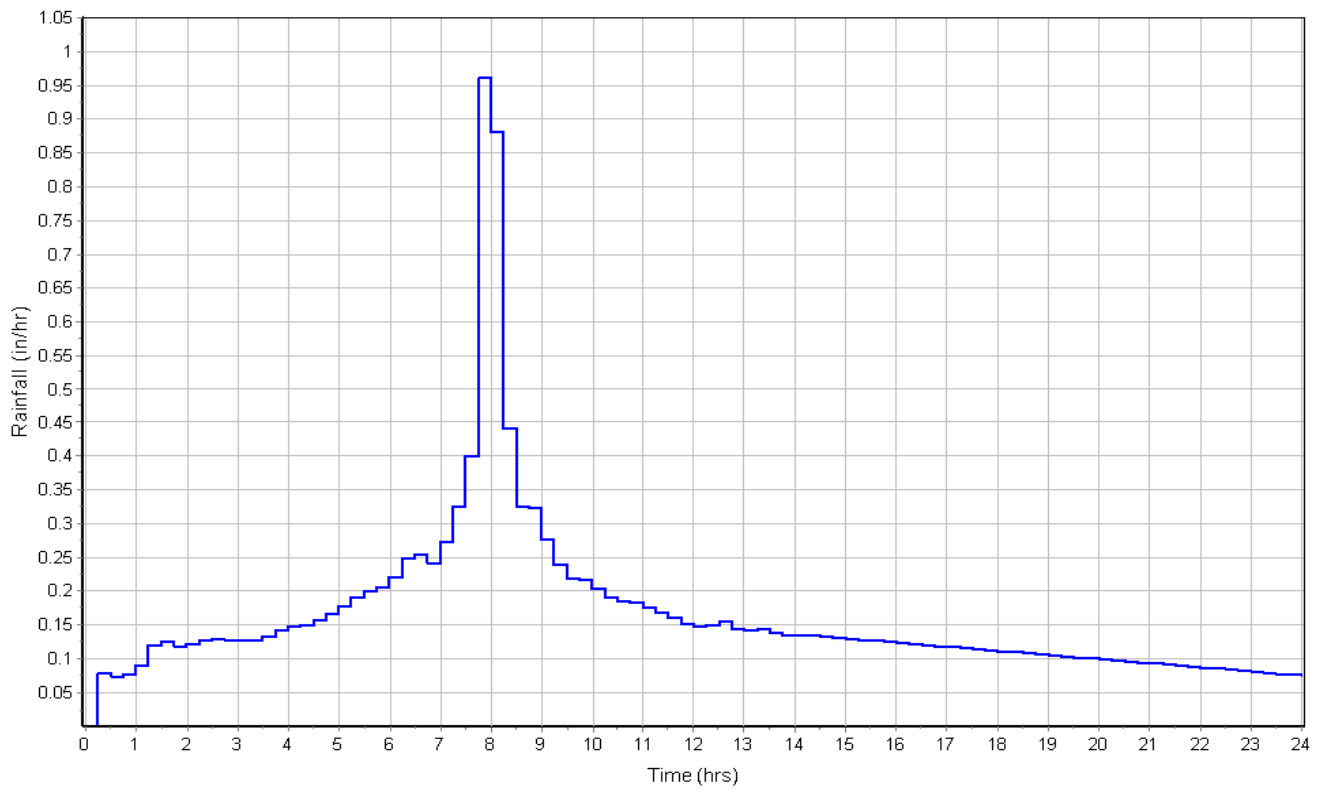
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.86		83.26

Subbasin Runoff Results

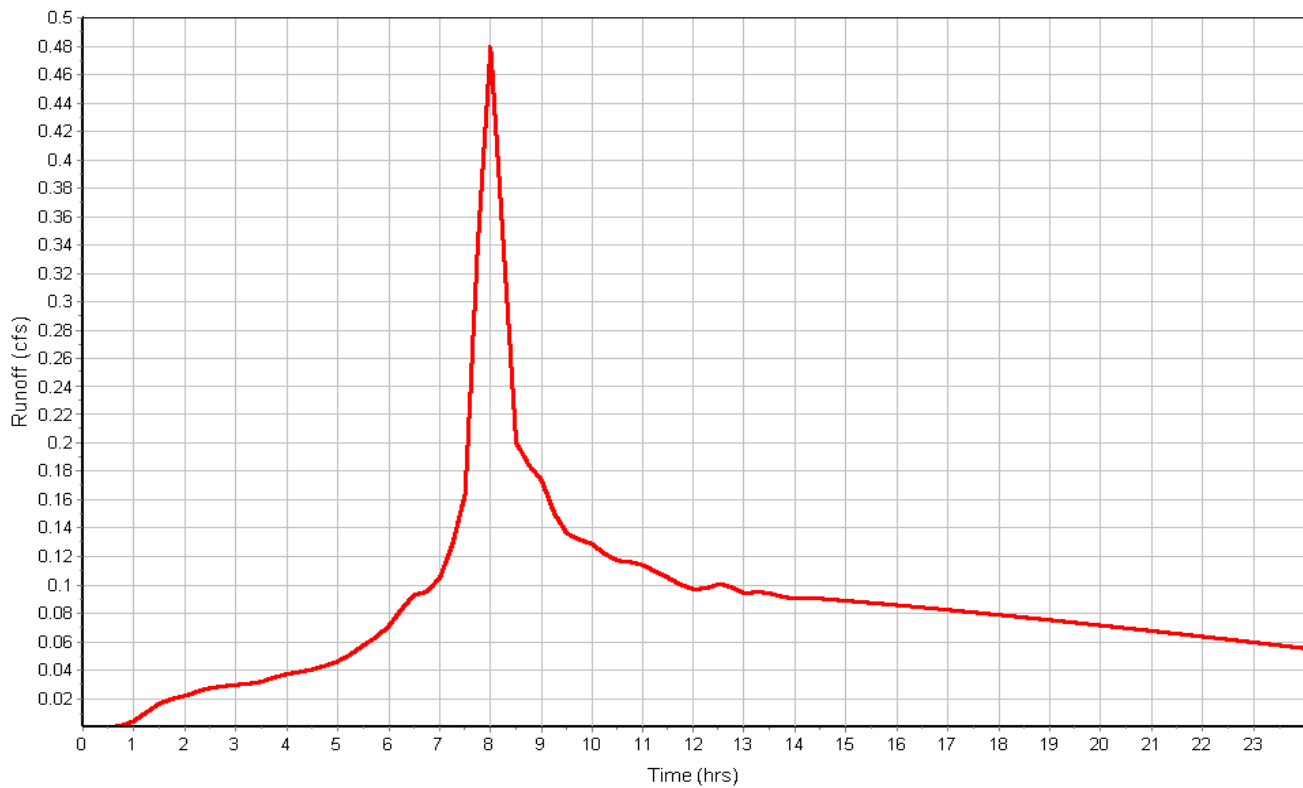
Total Rainfall (in) 3.96
Total Runoff (in) 2.38
Peak Runoff (cfs) 0.48
Weighted Curve Number 83.26
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 003

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 004**Input Data**

Area (ac) 0.53
Impervious Area (%) 61.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

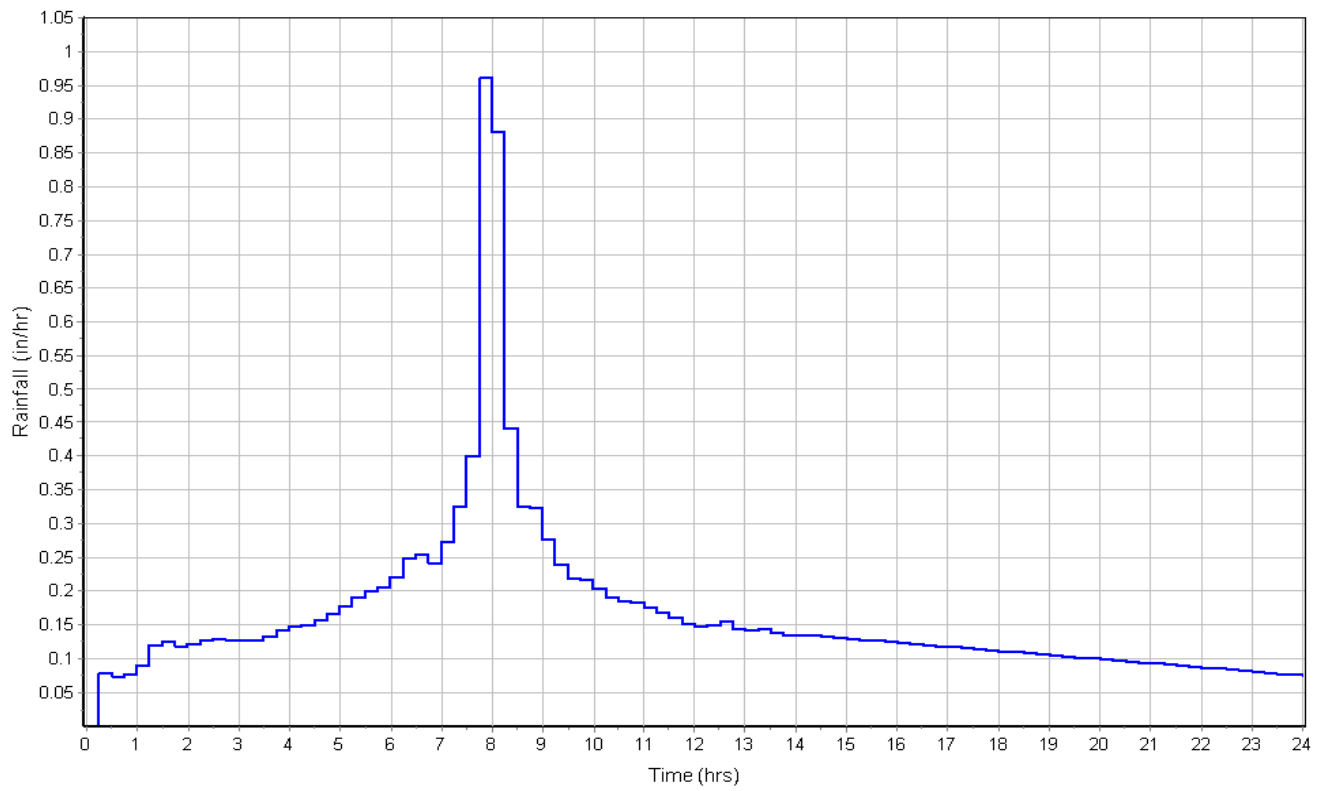
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.53		89.42

Subbasin Runoff Results

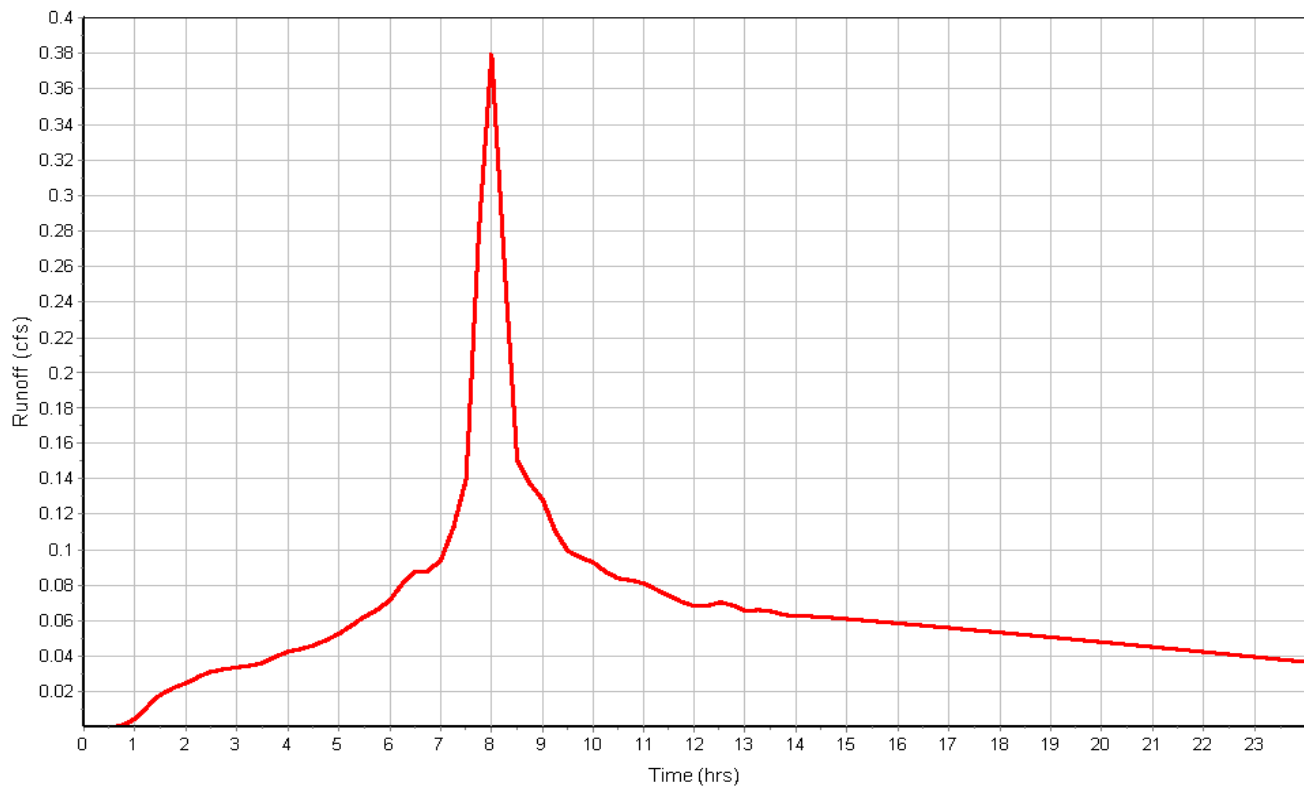
Total Rainfall (in) 3.96
Total Runoff (in) 2.94
Peak Runoff (cfs) 0.38
Weighted Curve Number 89.42
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 004

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 005**Input Data**

Area (ac) 0.20
Impervious Area (%) 94.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

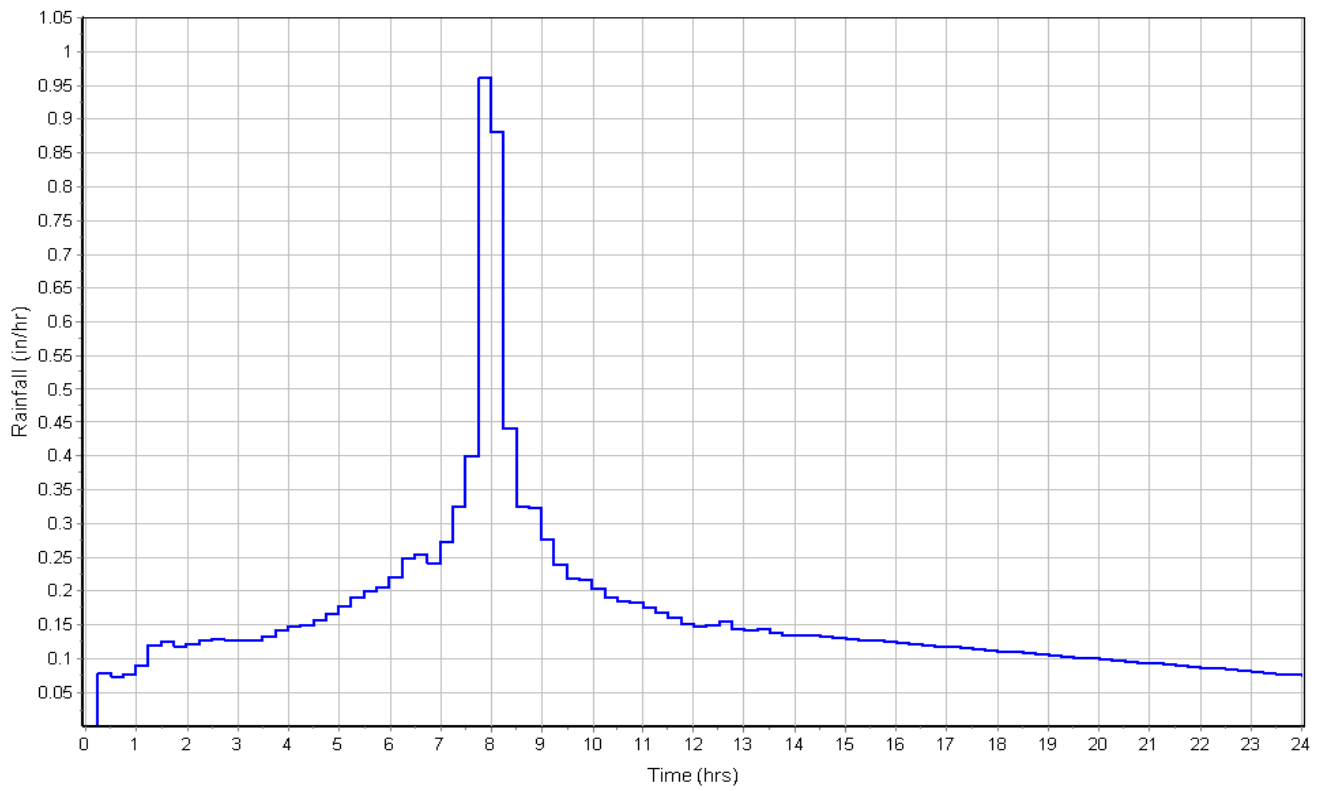
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.20		96.68

Subbasin Runoff Results

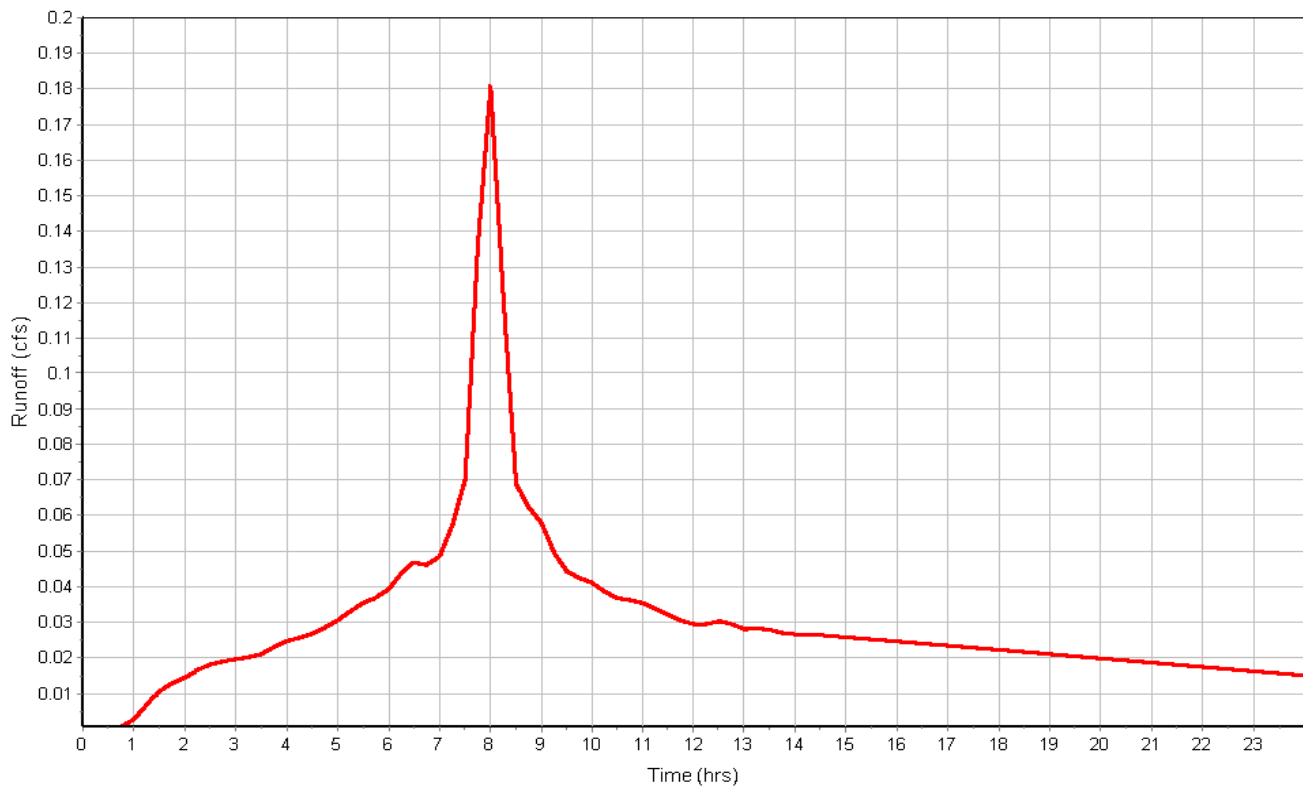
Total Rainfall (in) 3.96
Total Runoff (in) 3.61
Peak Runoff (cfs) 0.18
Weighted Curve Number 96.68
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 005

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 010**Input Data**

Area (ac) 0.21
 Impervious Area (%) 94.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

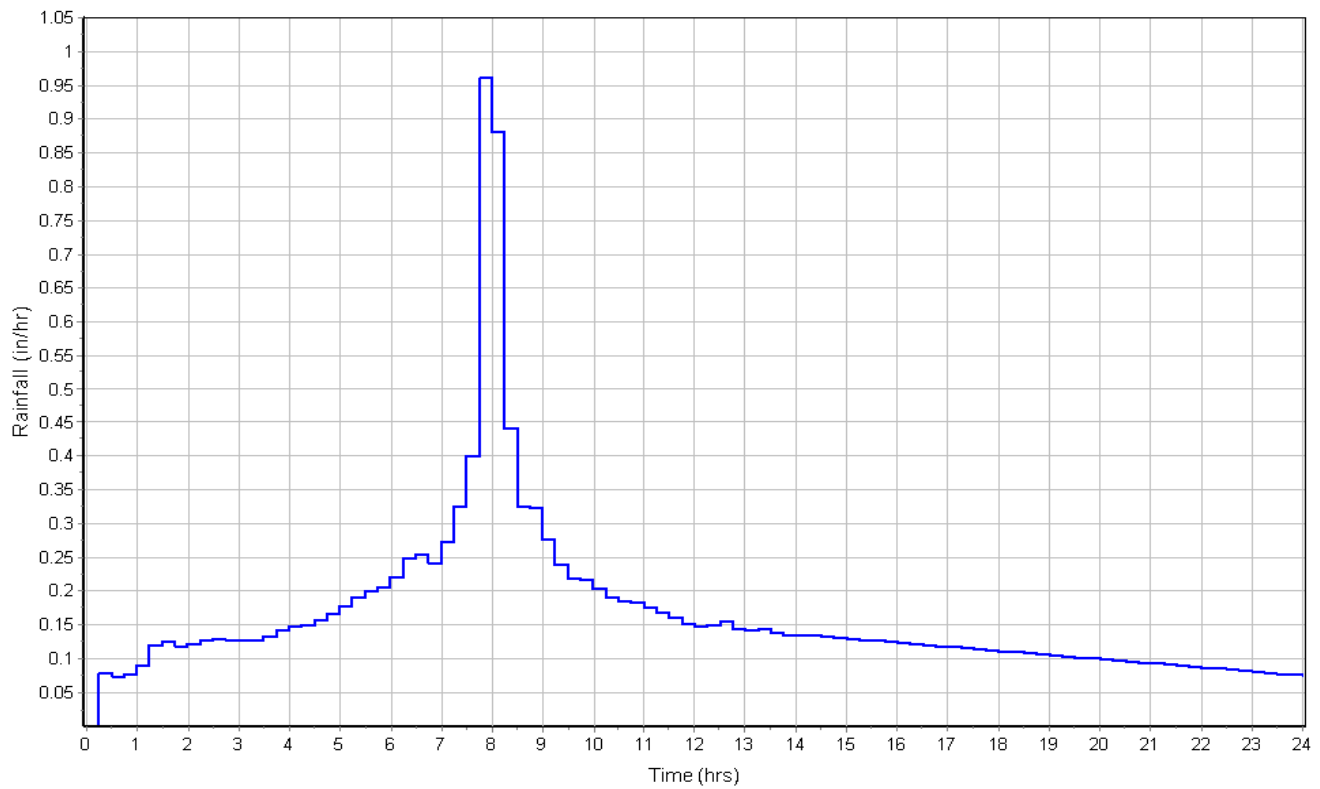
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.21		96.68

Subbasin Runoff Results

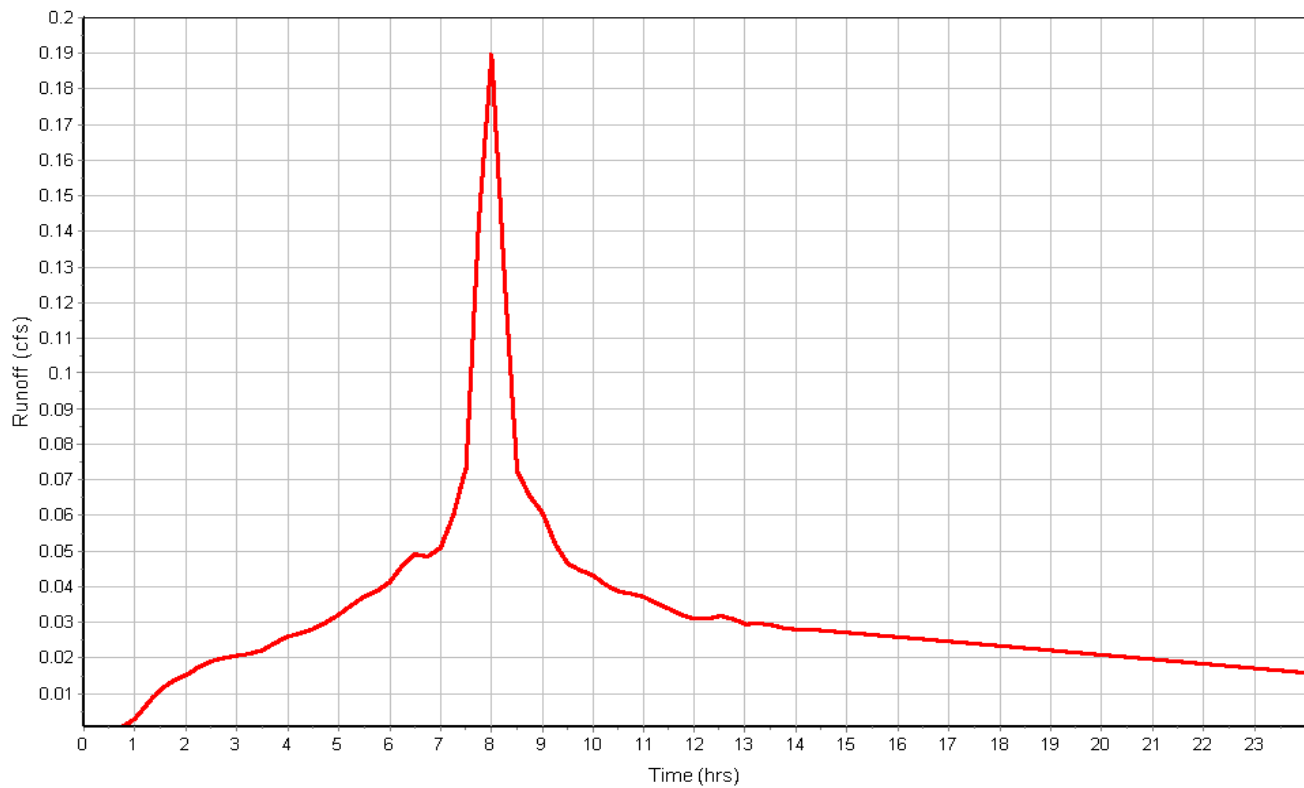
Total Rainfall (in) 3.96
 Total Runoff (in) 3.61
 Peak Runoff (cfs) 0.19
 Weighted Curve Number 96.68
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 010

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 011**Input Data**

Area (ac) 1.33
 Impervious Area (%) 30.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

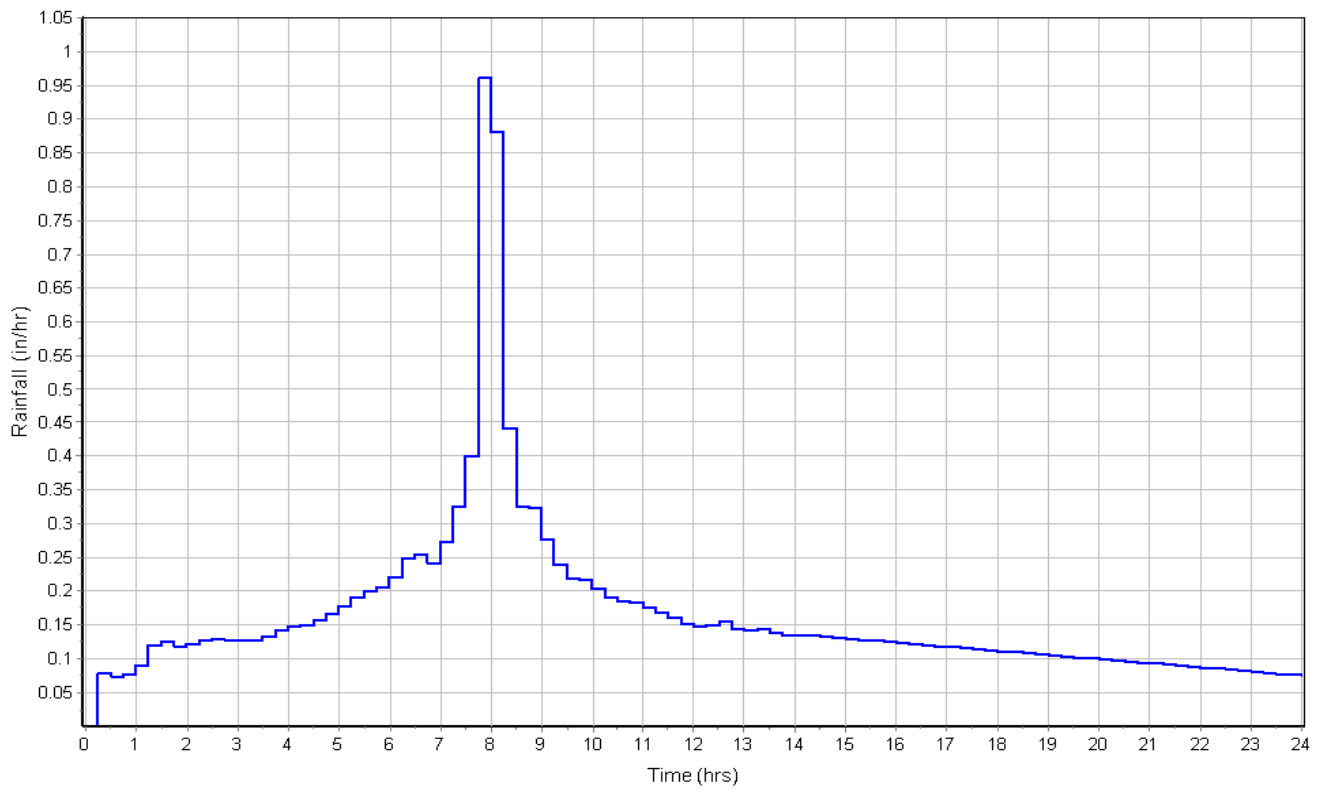
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	1.33		82.6

Subbasin Runoff Results

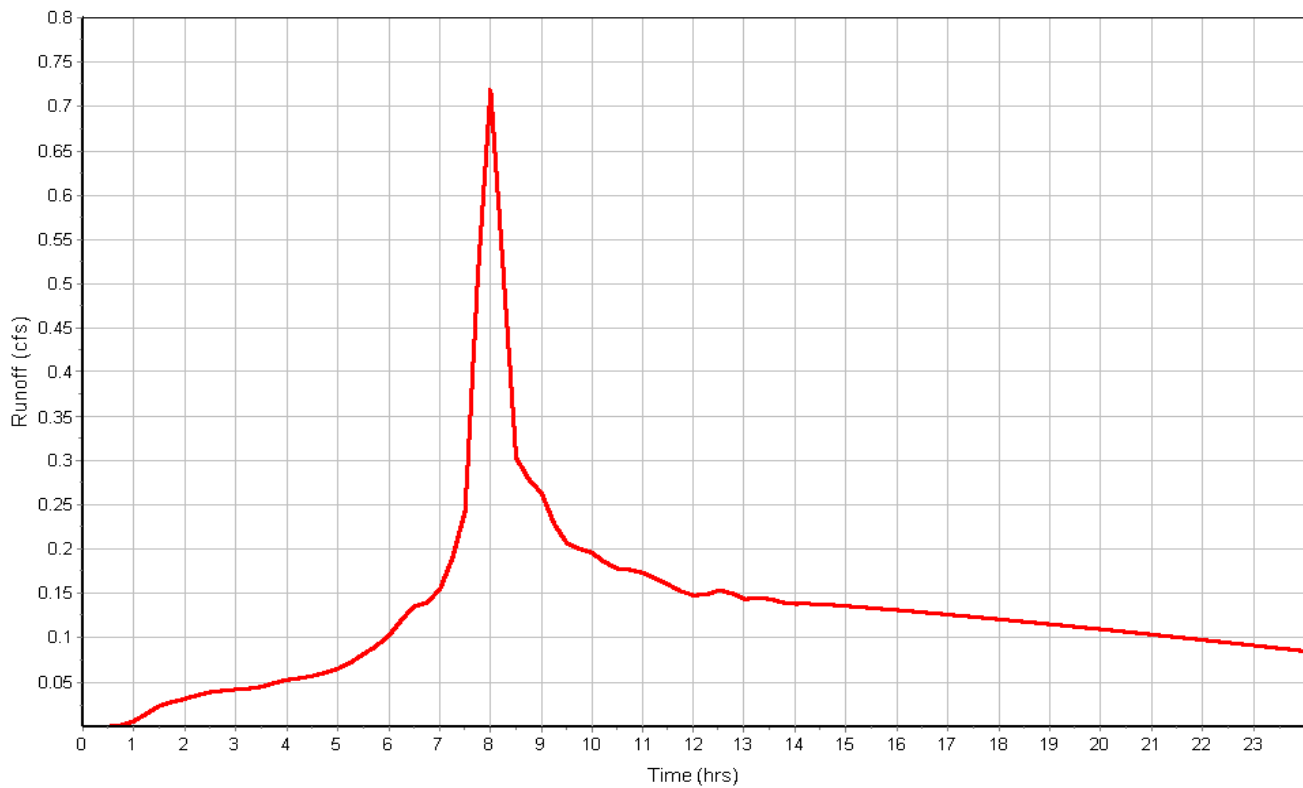
Total Rainfall (in) 3.96
 Total Runoff (in) 2.32
 Peak Runoff (cfs) 0.72
 Weighted Curve Number 82.60
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 011

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 012**Input Data**

Area (ac) 0.19
Impervious Area (%) 93.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

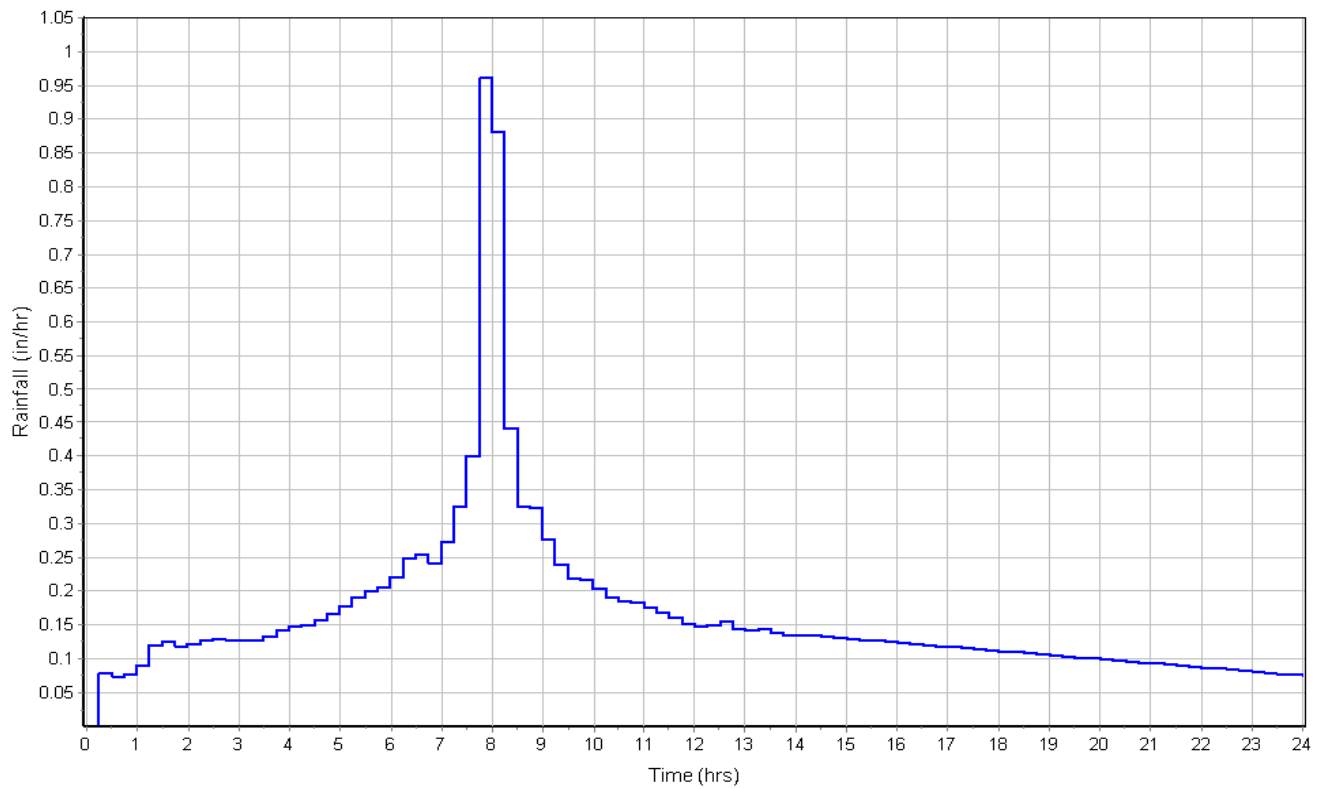
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.19		96.46

Subbasin Runoff Results

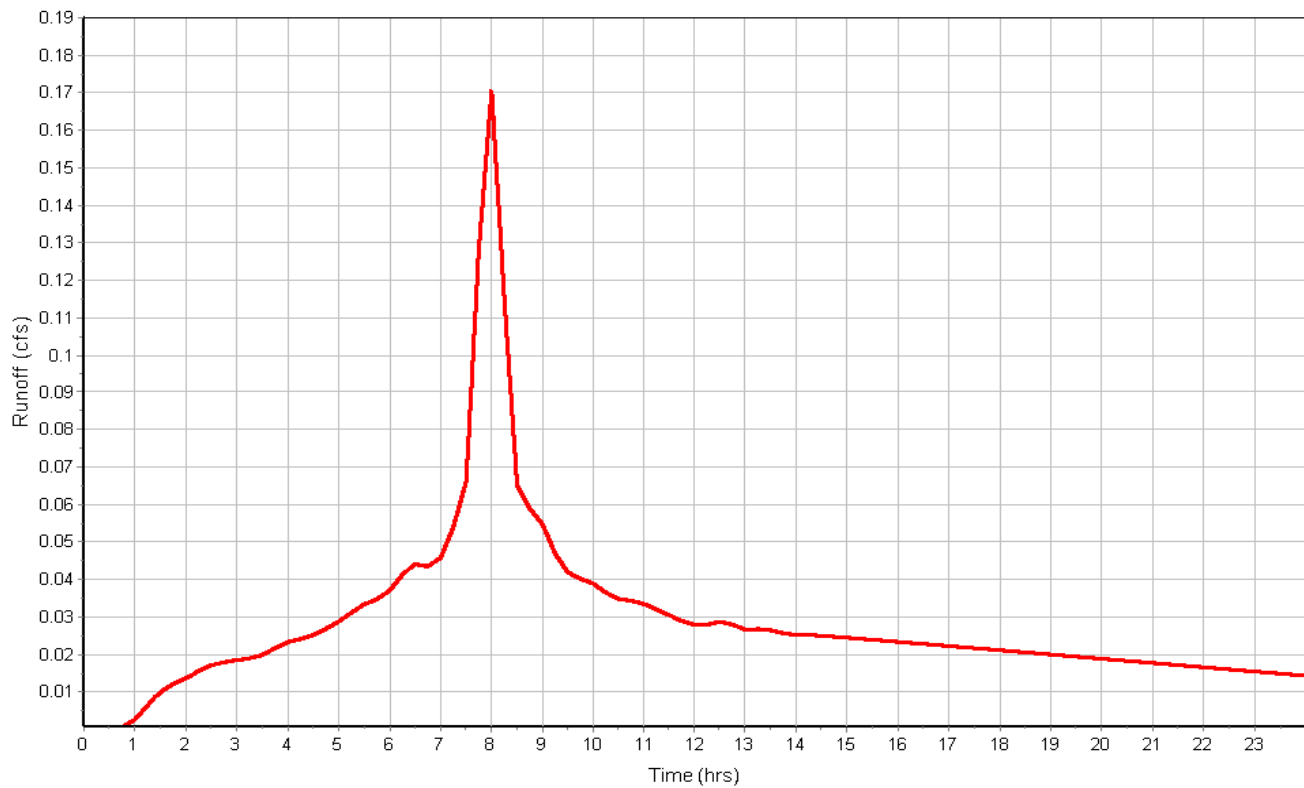
Total Rainfall (in) 3.96
Total Runoff (in) 3.59
Peak Runoff (cfs) 0.17
Weighted Curve Number 96.46
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 012

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 013**Input Data**

Area (ac) 0.86
 Impervious Area (%) 32.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

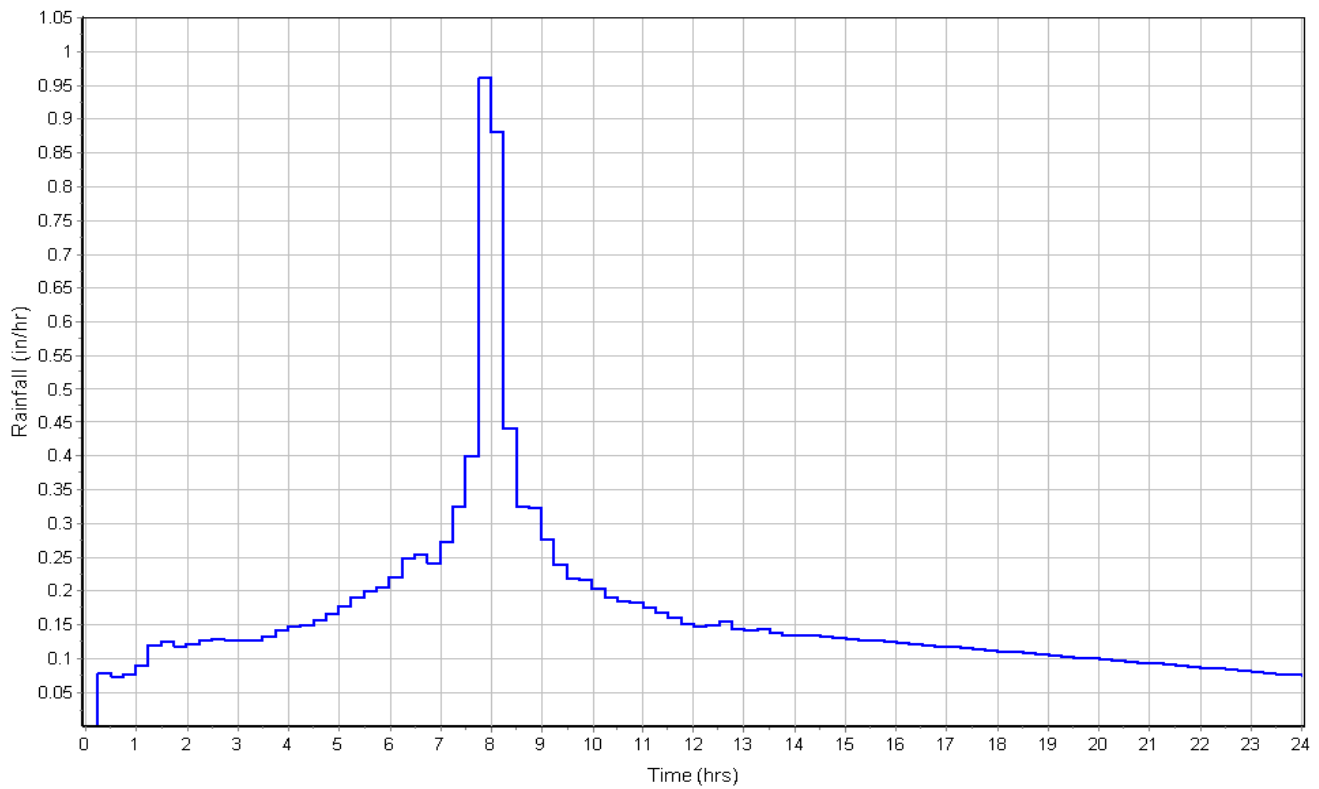
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.86		83.04

Subbasin Runoff Results

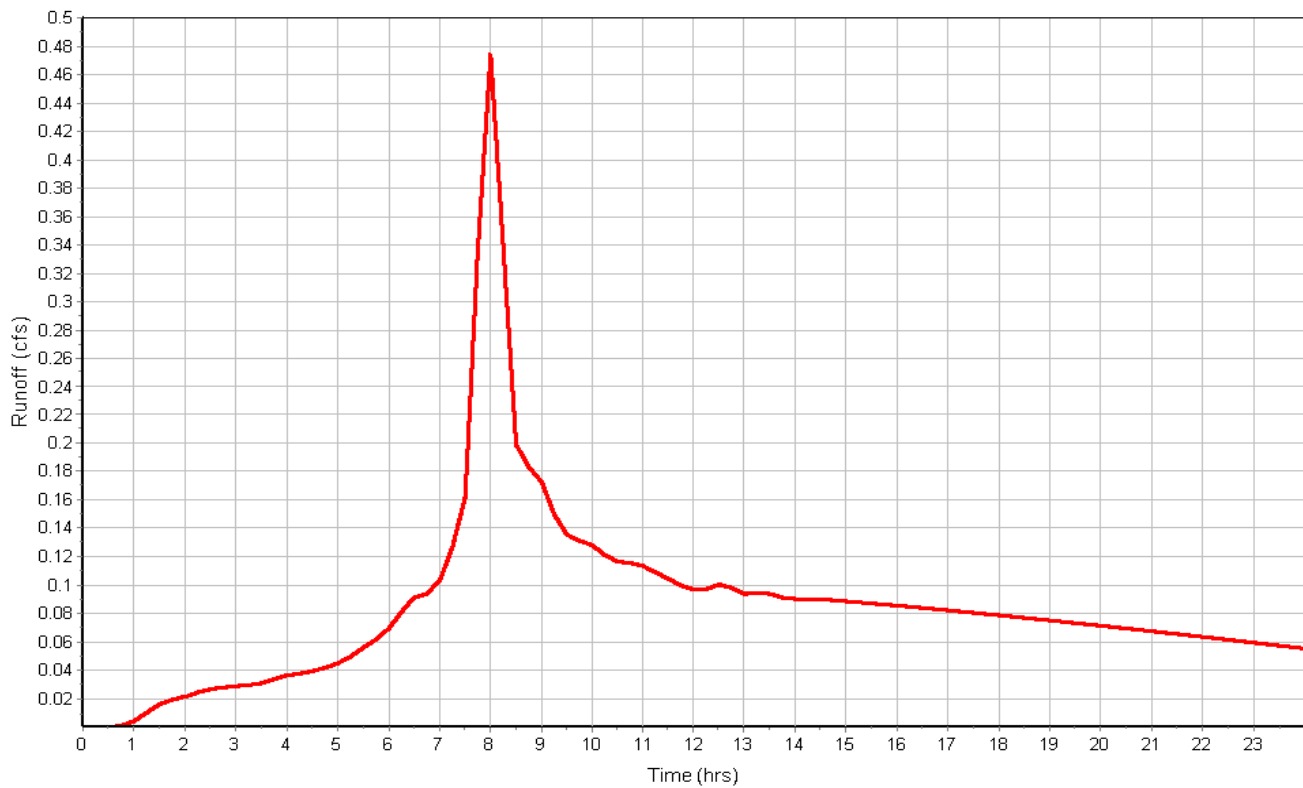
Total Rainfall (in) 3.96
 Total Runoff (in) 2.36
 Peak Runoff (cfs) 0.47
 Weighted Curve Number 83.04
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 013

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 014**Input Data**

Area (ac) 0.19
Impervious Area (%) 94.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

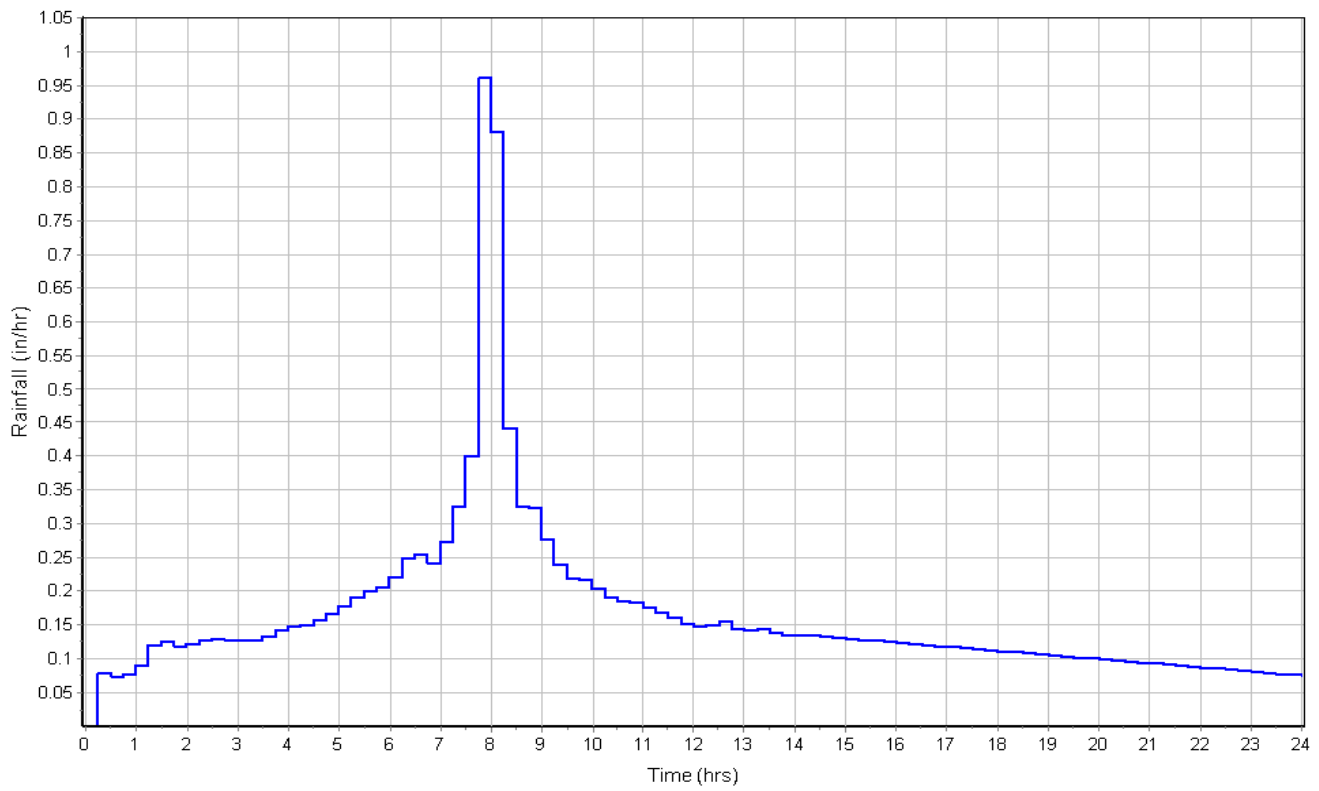
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.19		96.68

Subbasin Runoff Results

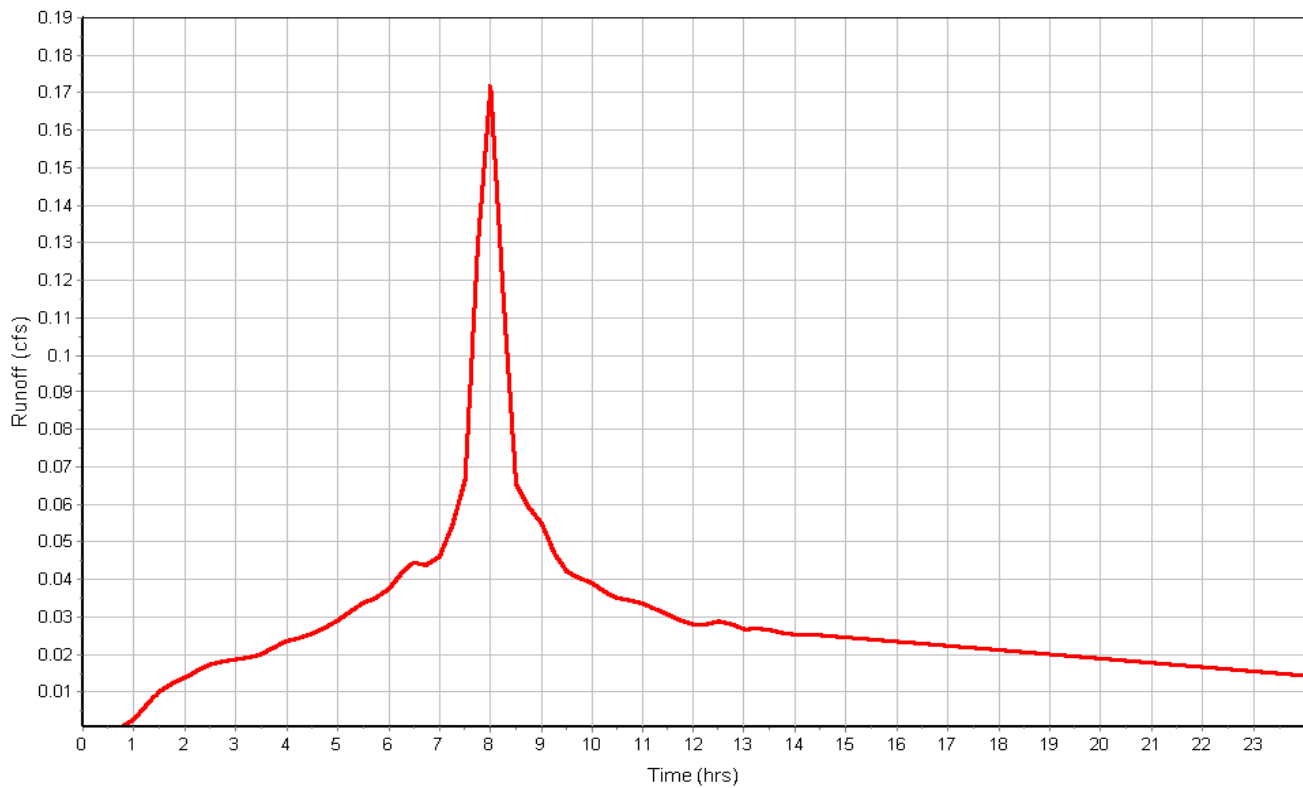
Total Rainfall (in) 3.96
Total Runoff (in) 3.61
Peak Runoff (cfs) 0.17
Weighted Curve Number 96.68
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 014

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 015**Input Data**

Area (ac) 0.92
Impervious Area (%) 39.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

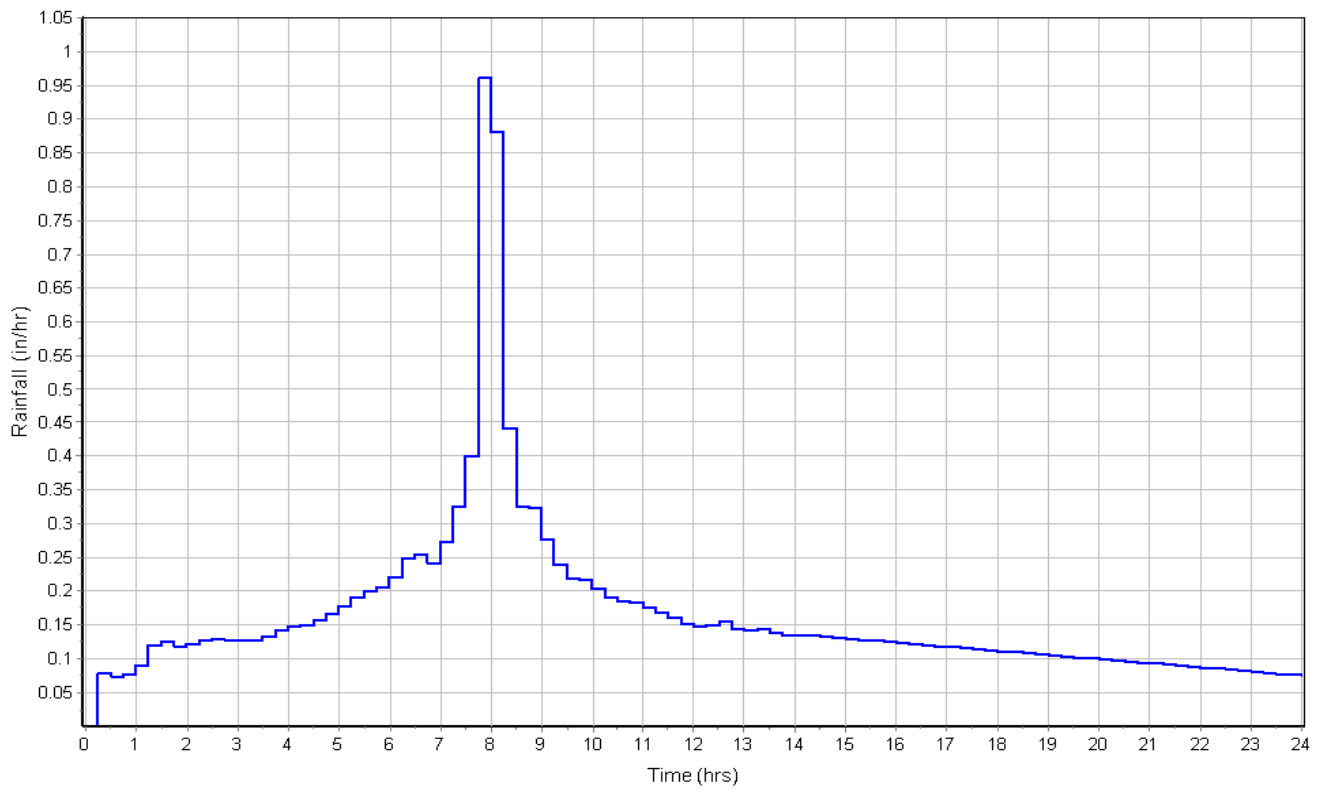
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.92		84.58

Subbasin Runoff Results

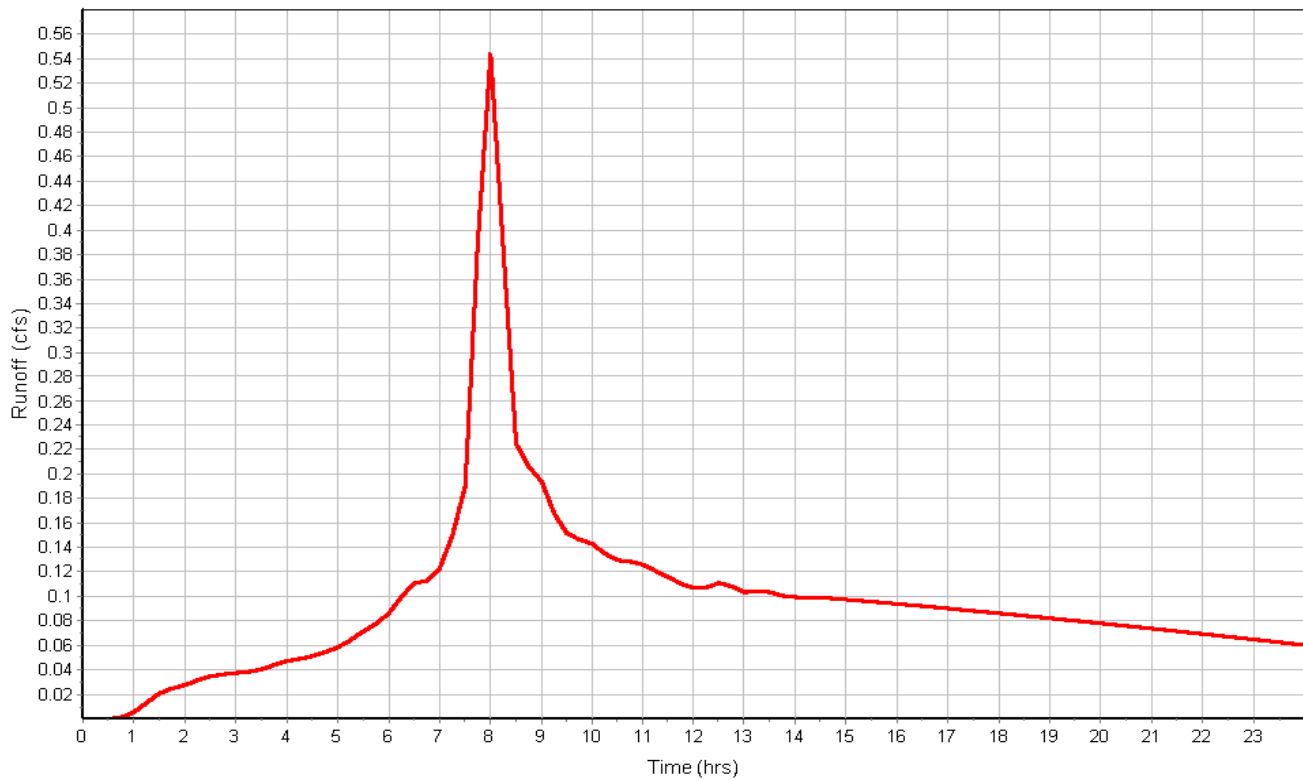
Total Rainfall (in) 3.96
Total Runoff (in) 2.50
Peak Runoff (cfs) 0.54
Weighted Curve Number 84.58
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 015

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 016**Input Data**

Area (ac) 0.18
Impervious Area (%) 89.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

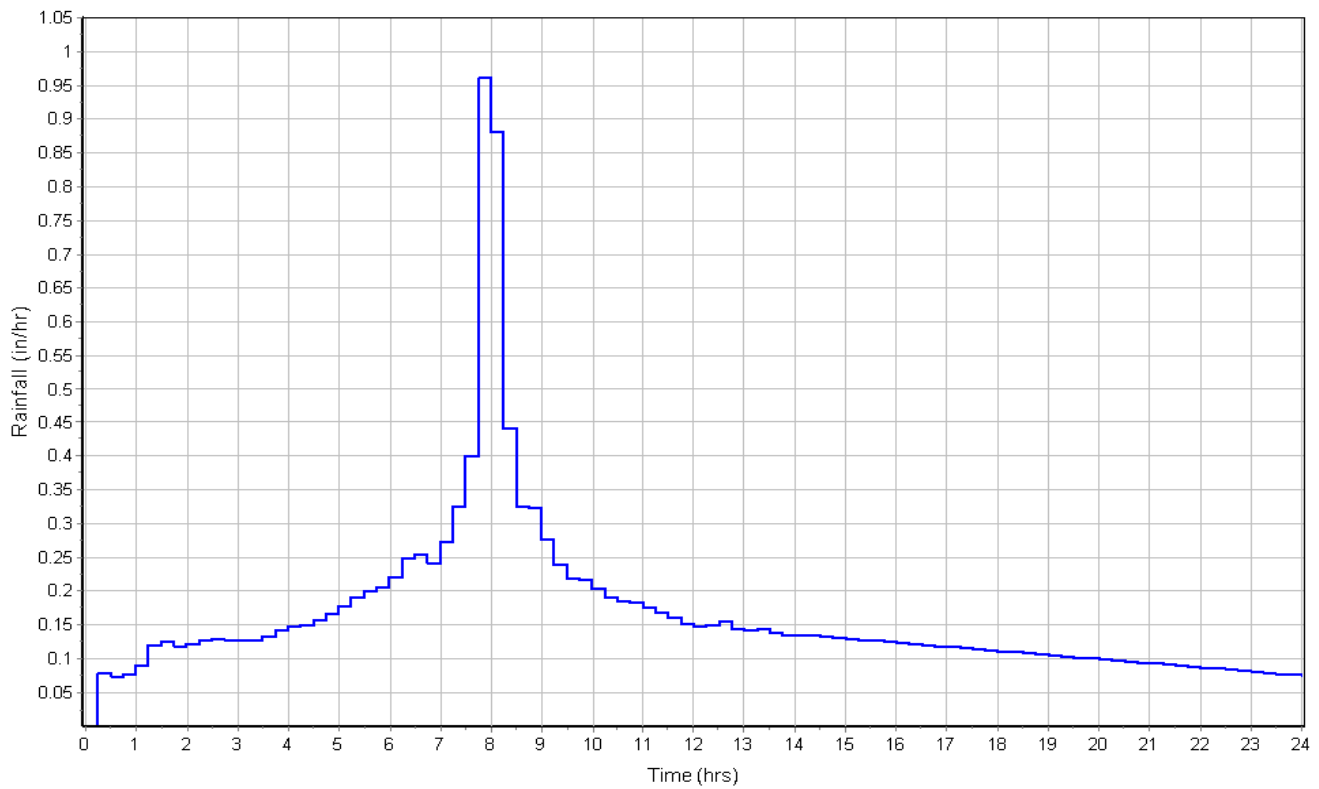
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.18		95.58

Subbasin Runoff Results

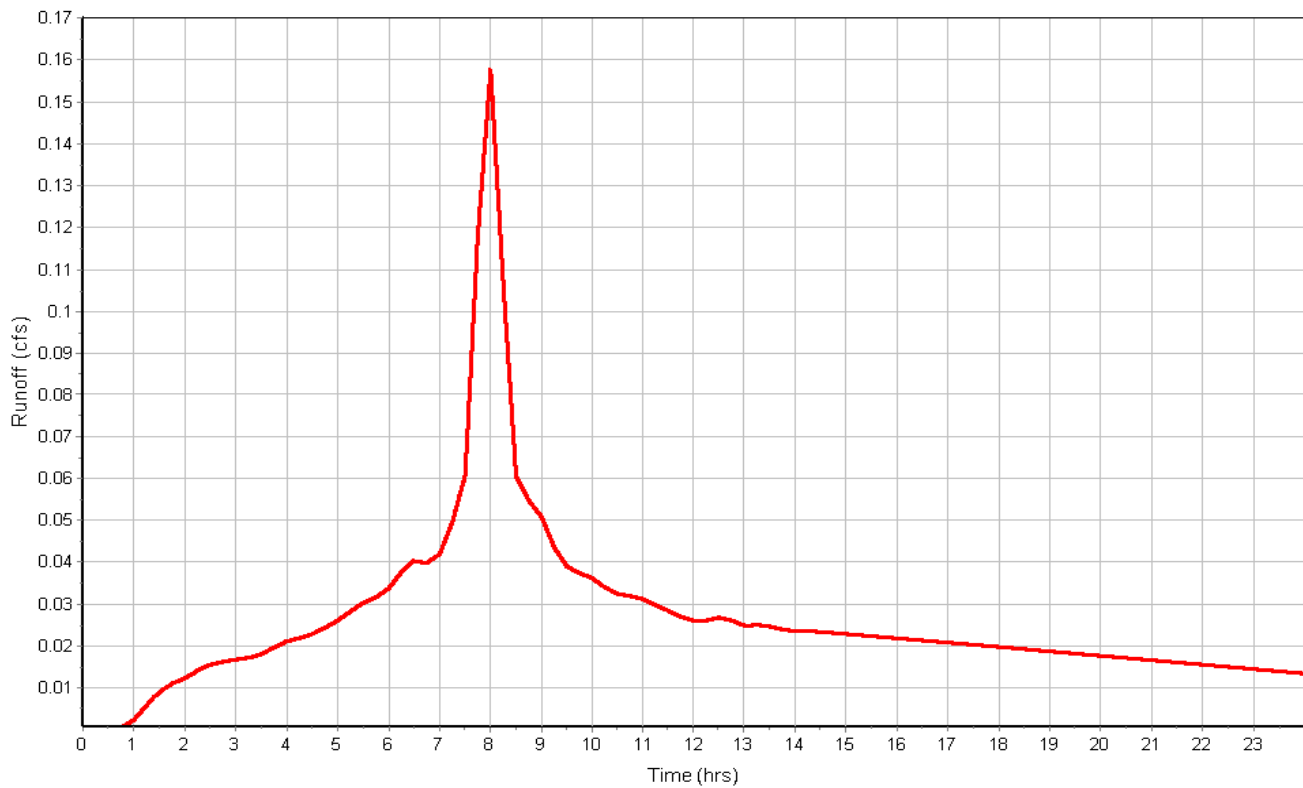
Total Rainfall (in) 3.96
Total Runoff (in) 3.51
Peak Runoff (cfs) 0.16
Weighted Curve Number 95.58
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 016

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 019**Input Data**

Area (ac) 0.48
 Impervious Area (%) 23.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

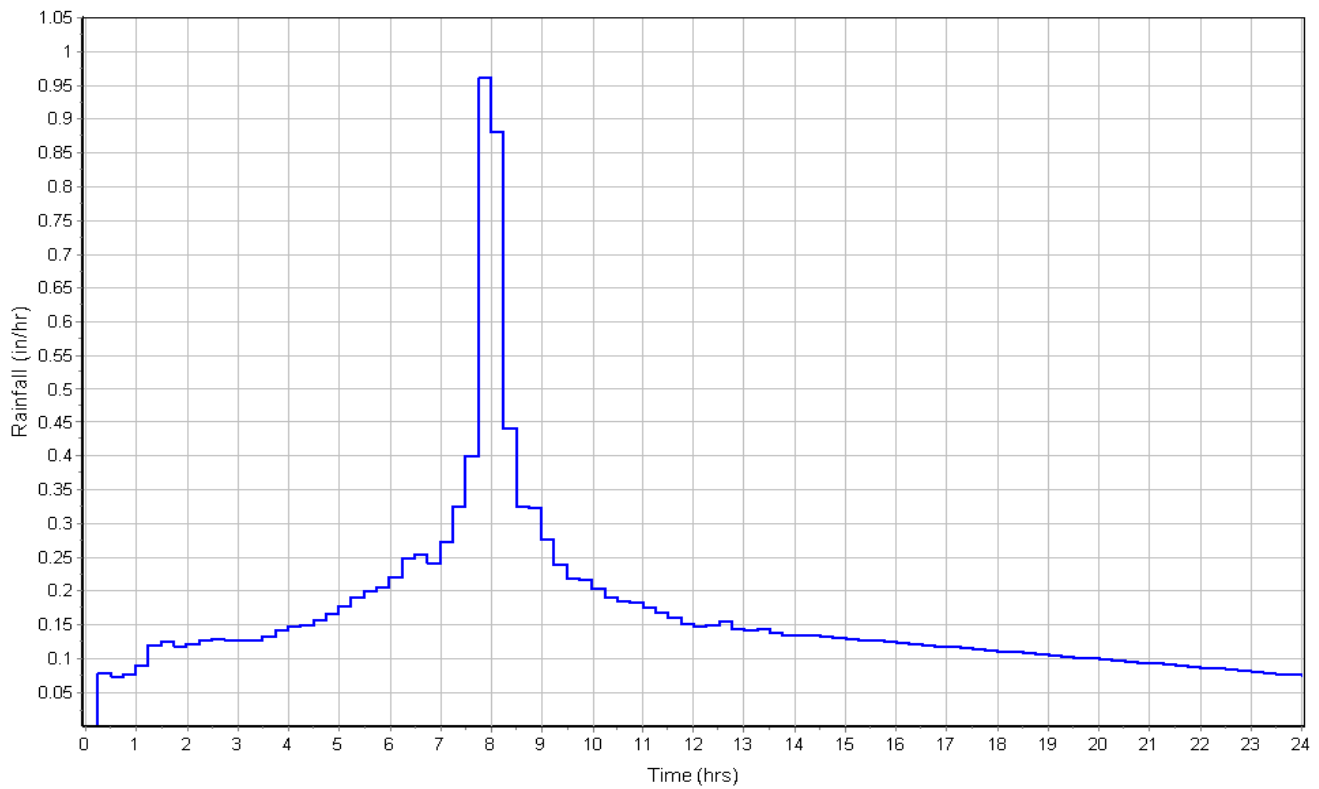
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.48		81.06

Subbasin Runoff Results

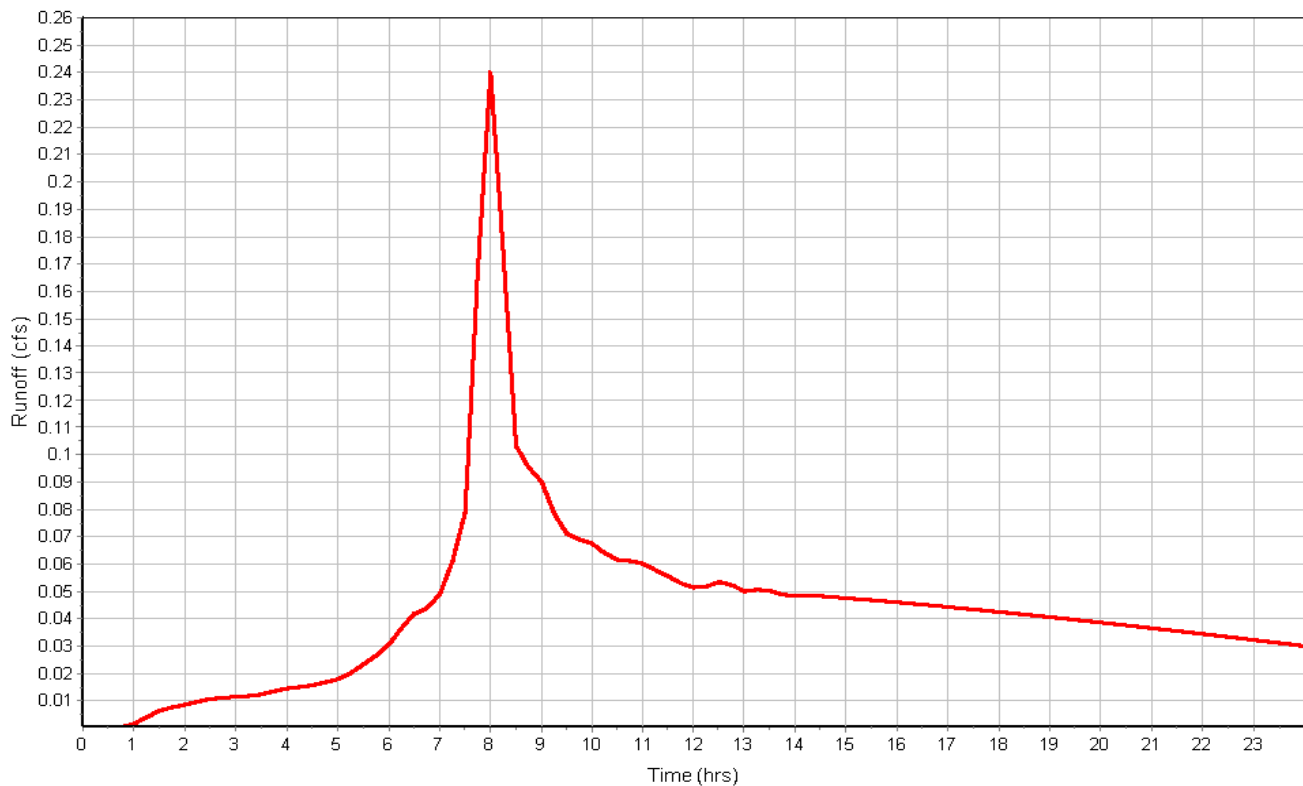
Total Rainfall (in) 3.96
 Total Runoff (in) 2.18
 Peak Runoff (cfs) 0.24
 Weighted Curve Number 81.06
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 019

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 020**Input Data**

Area (ac) 0.21
Impervious Area (%) 86.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

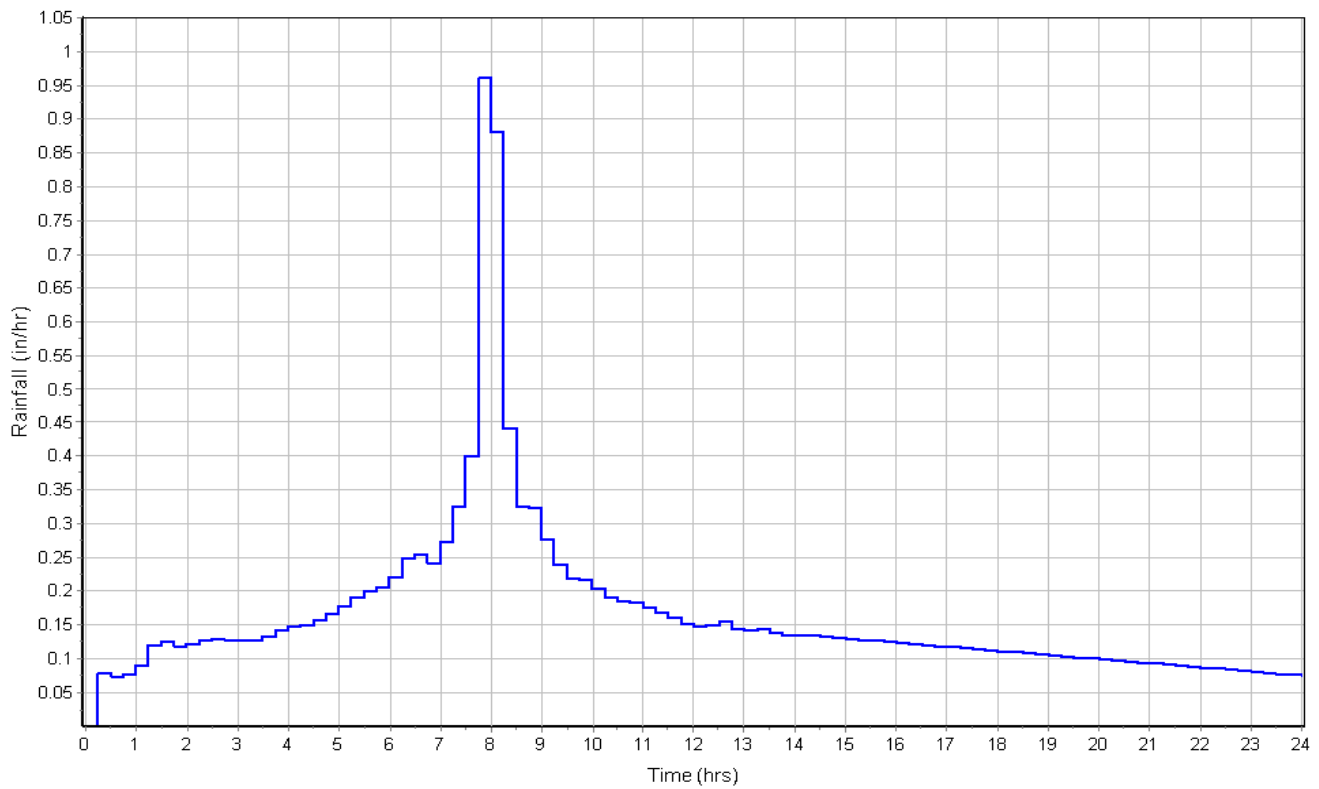
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.21		94.92

Subbasin Runoff Results

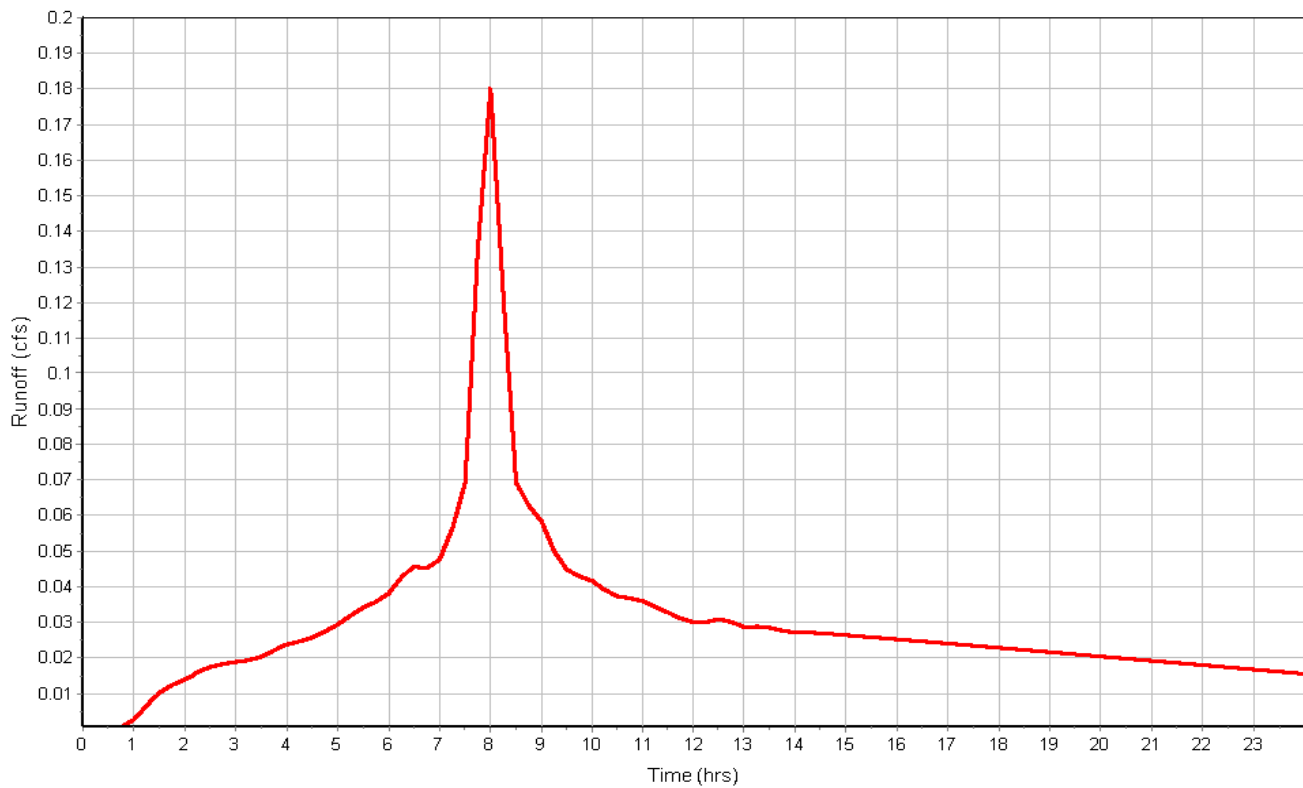
Total Rainfall (in) 3.96
Total Runoff (in) 3.45
Peak Runoff (cfs) 0.18
Weighted Curve Number 94.92
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 020

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 021**Input Data**

Area (ac) 0.51
 Impervious Area (%) 0.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

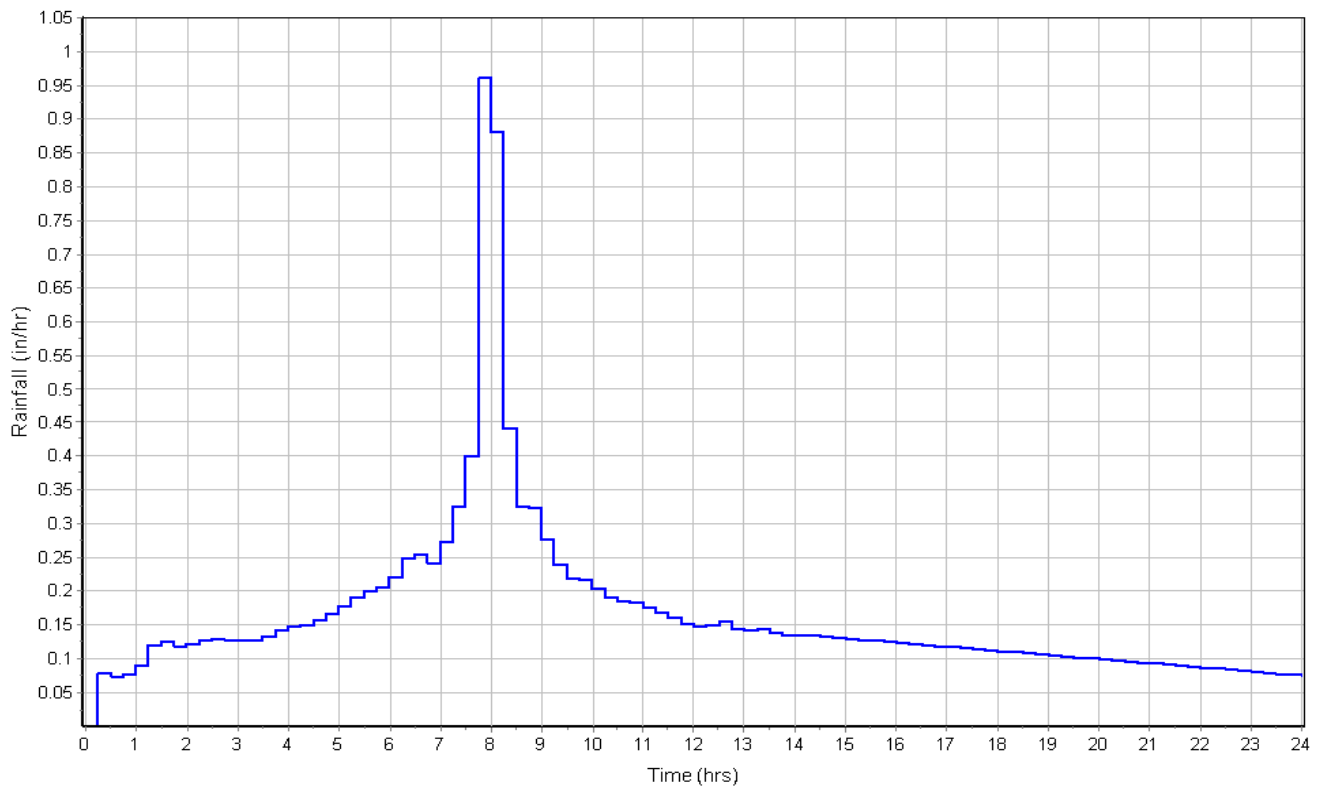
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.51		76

Subbasin Runoff Results

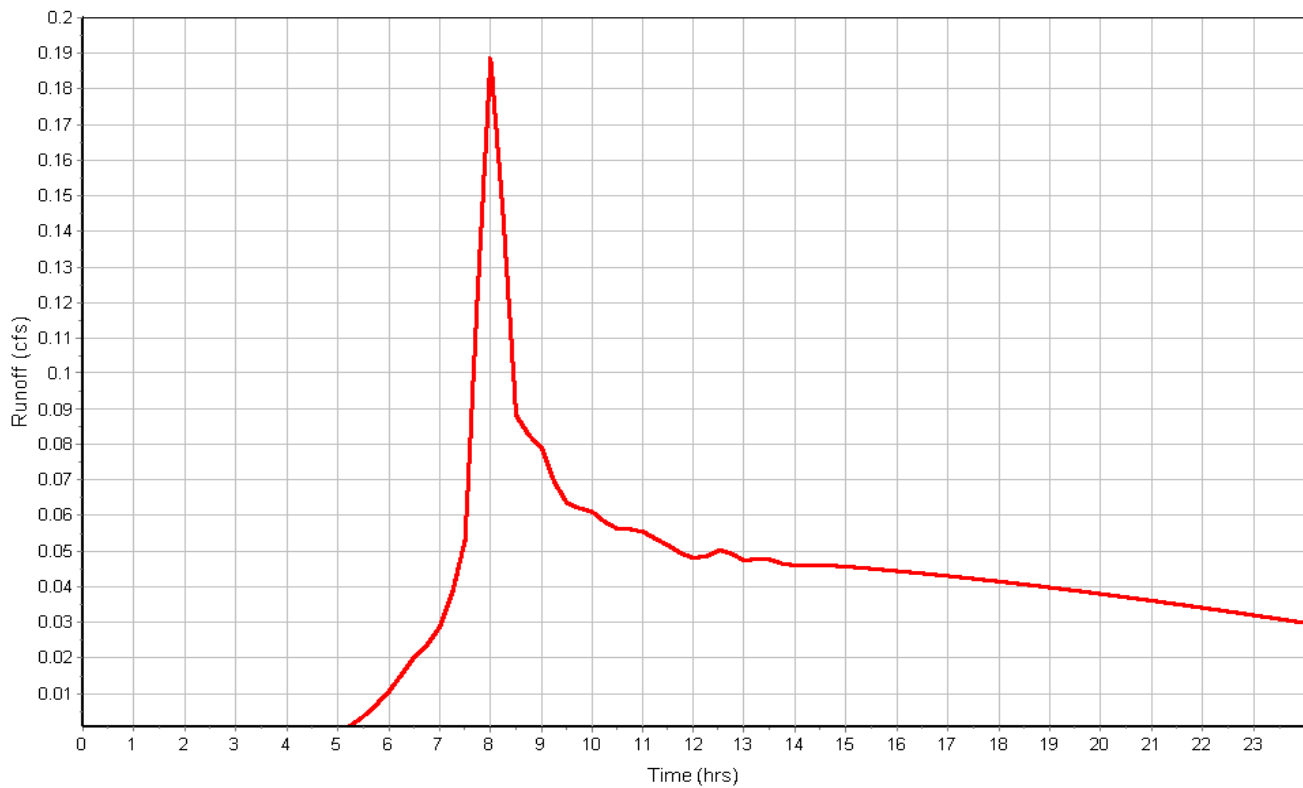
Total Rainfall (in) 3.96
 Total Runoff (in) 1.71
 Peak Runoff (cfs) 0.19
 Weighted Curve Number 76.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 021

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 022**Input Data**

Area (ac) 0.13
 Impervious Area (%) 85.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

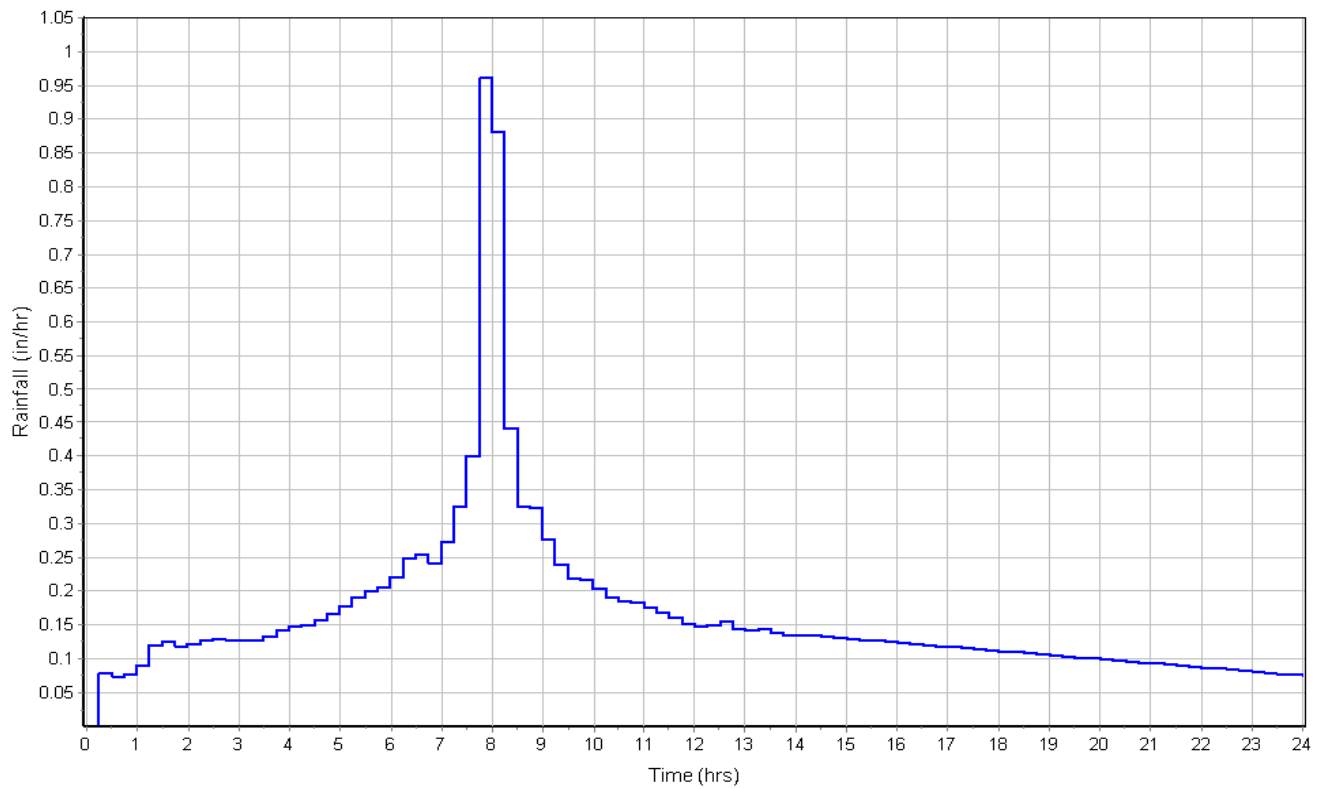
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.13		94.7

Subbasin Runoff Results

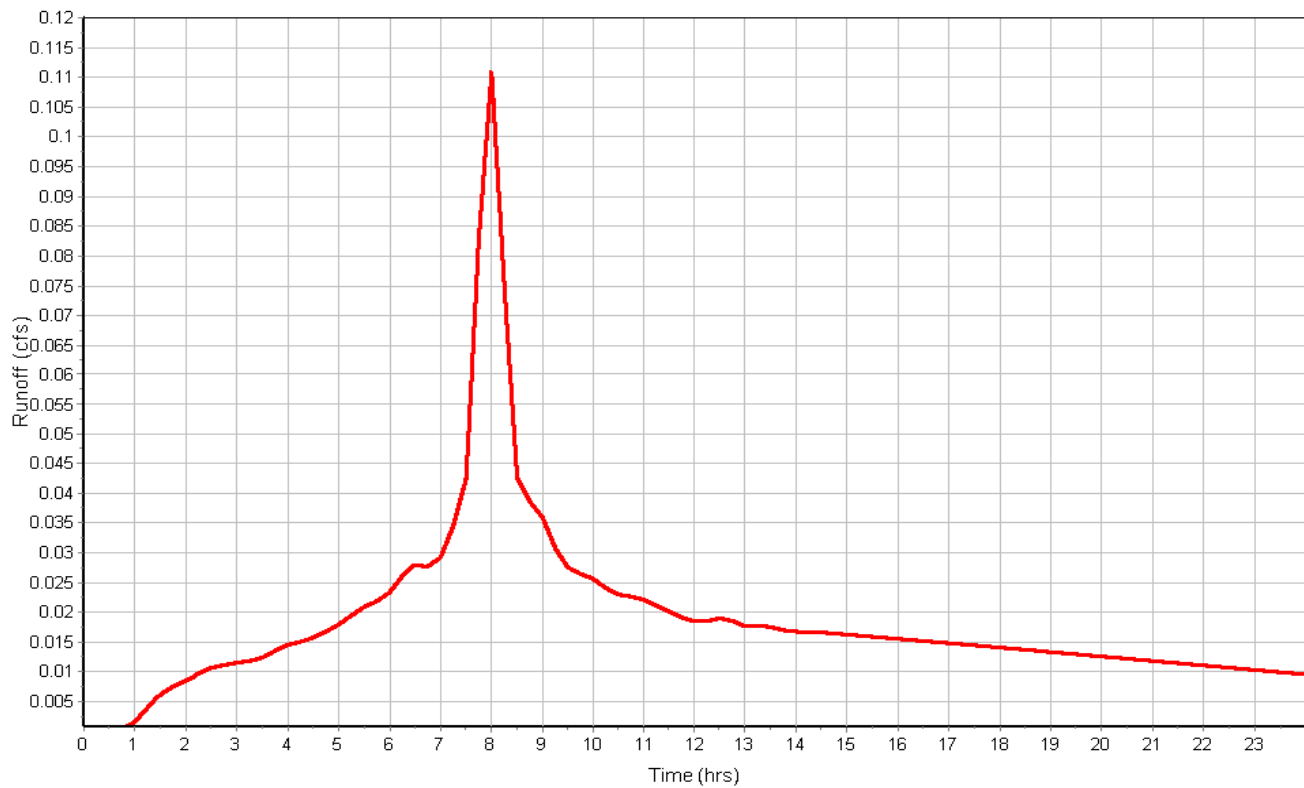
Total Rainfall (in) 3.96
 Total Runoff (in) 3.43
 Peak Runoff (cfs) 0.11
 Weighted Curve Number 94.70
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 022

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 023**Input Data**

Area (ac) 0.19
Impervious Area (%) 43.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

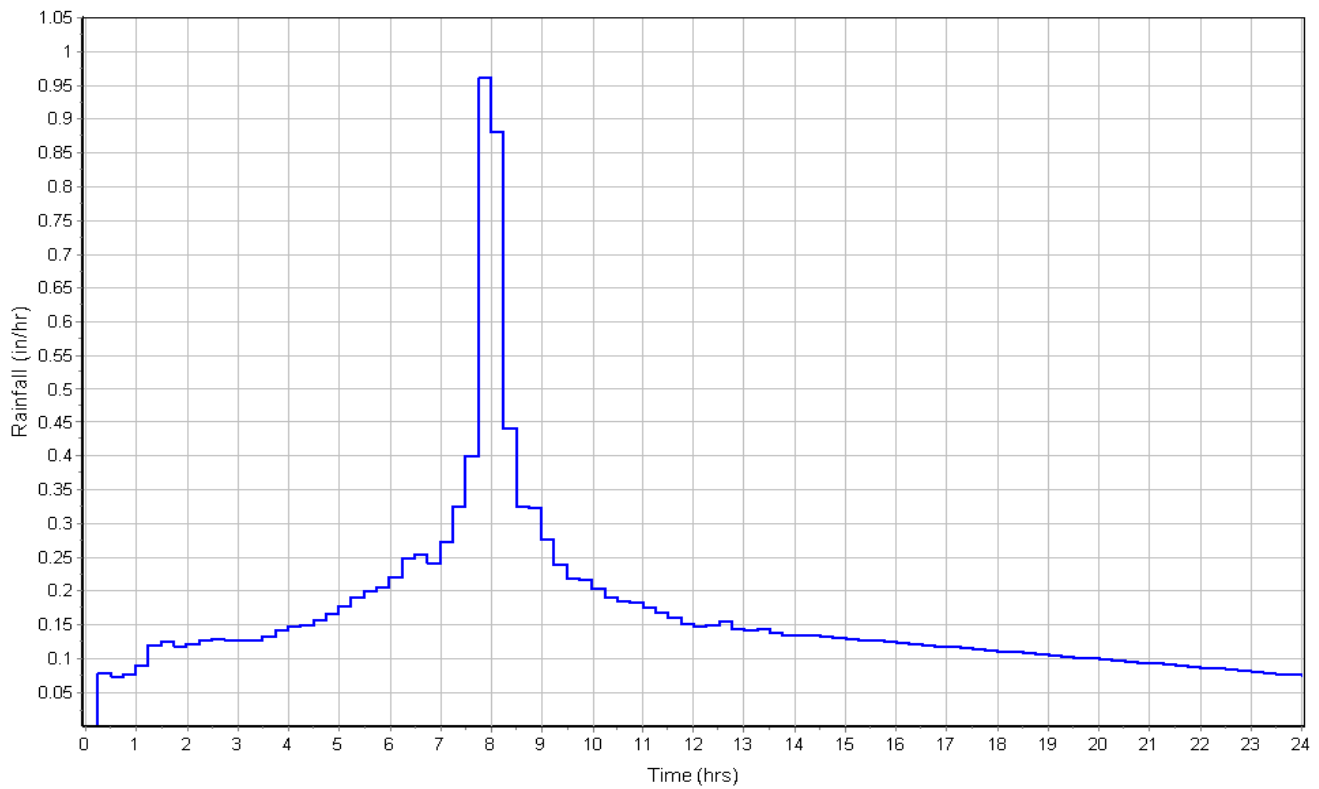
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.19		85.46

Subbasin Runoff Results

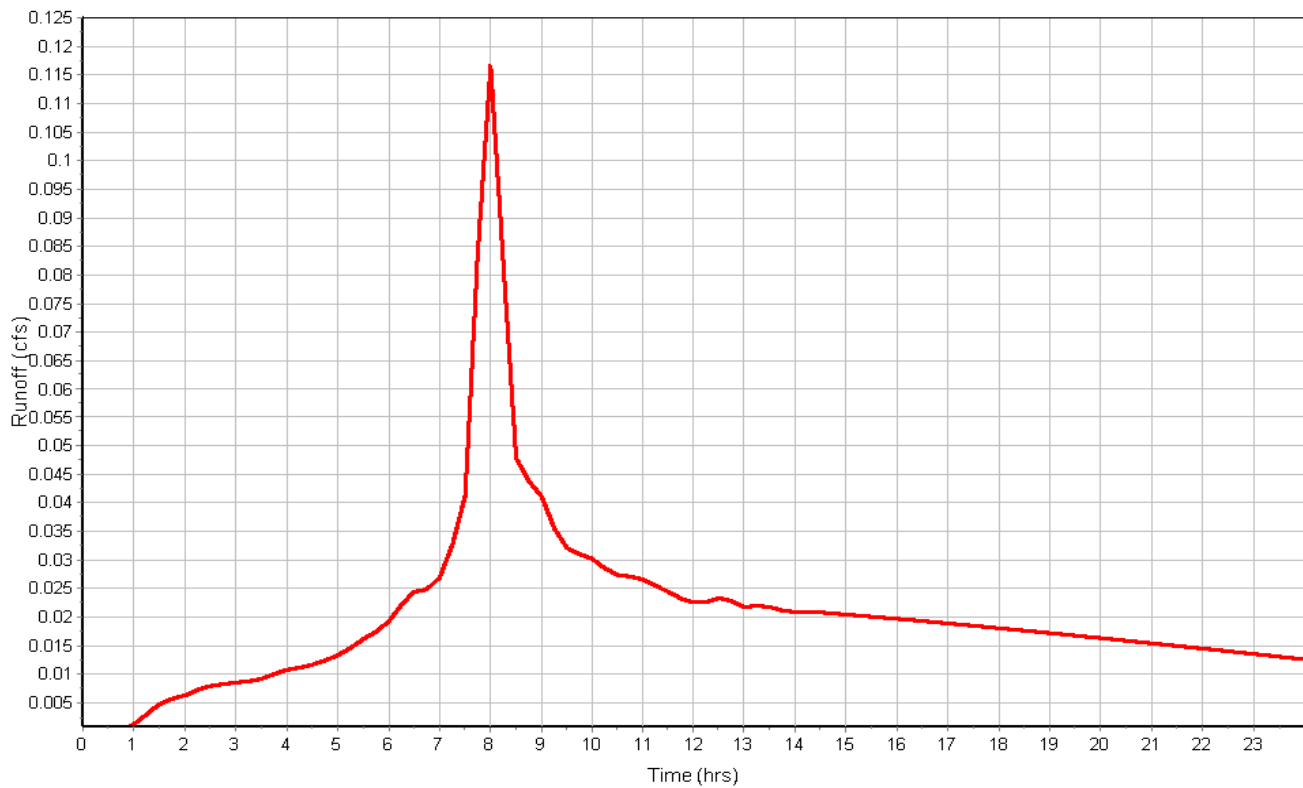
Total Rainfall (in) 3.96
Total Runoff (in) 2.58
Peak Runoff (cfs) 0.12
Weighted Curve Number 85.46
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 023

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 024**Input Data**

Area (ac) 0.23
Impervious Area (%) 49.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

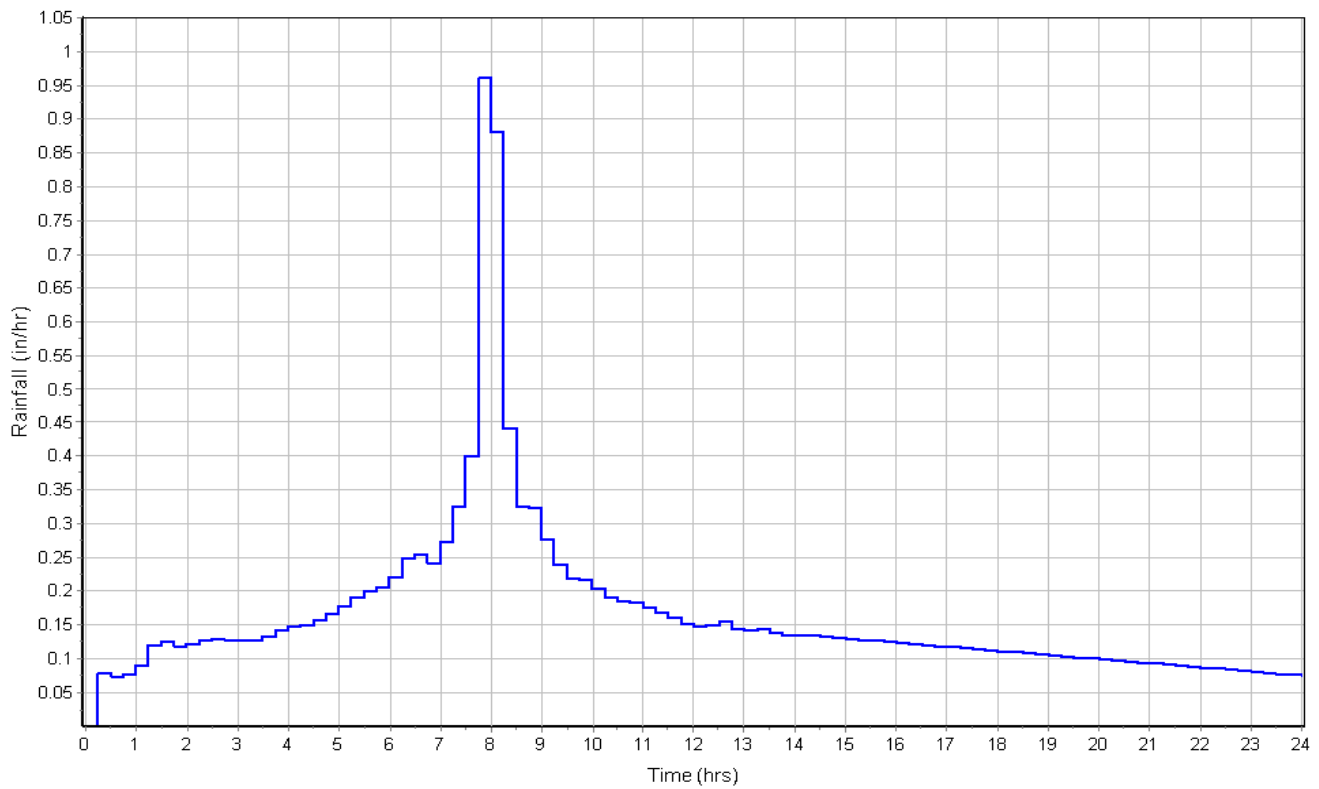
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.23		86.78

Subbasin Runoff Results

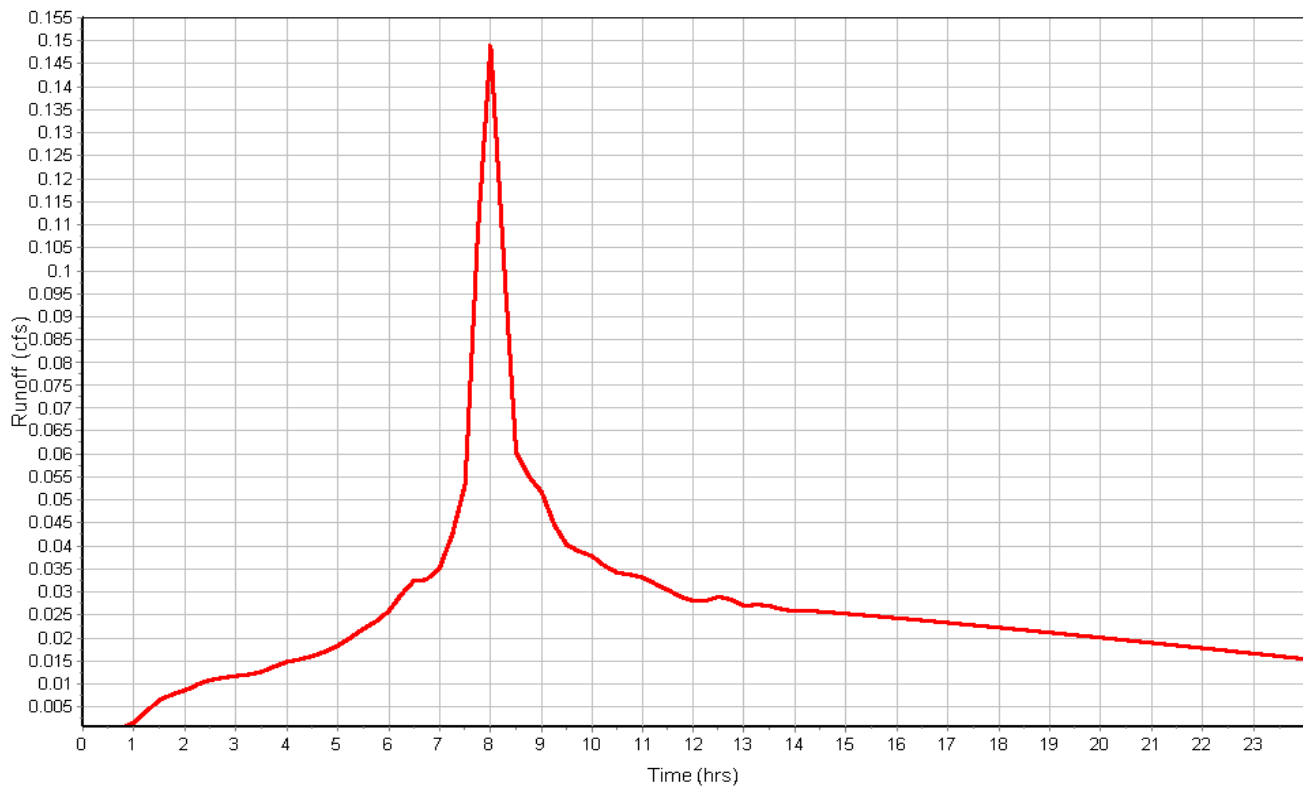
Total Rainfall (in) 3.96
Total Runoff (in) 2.70
Peak Runoff (cfs) 0.15
Weighted Curve Number 86.78
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 024

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 025**Input Data**

Area (ac) 0.23
 Impervious Area (%) 55.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

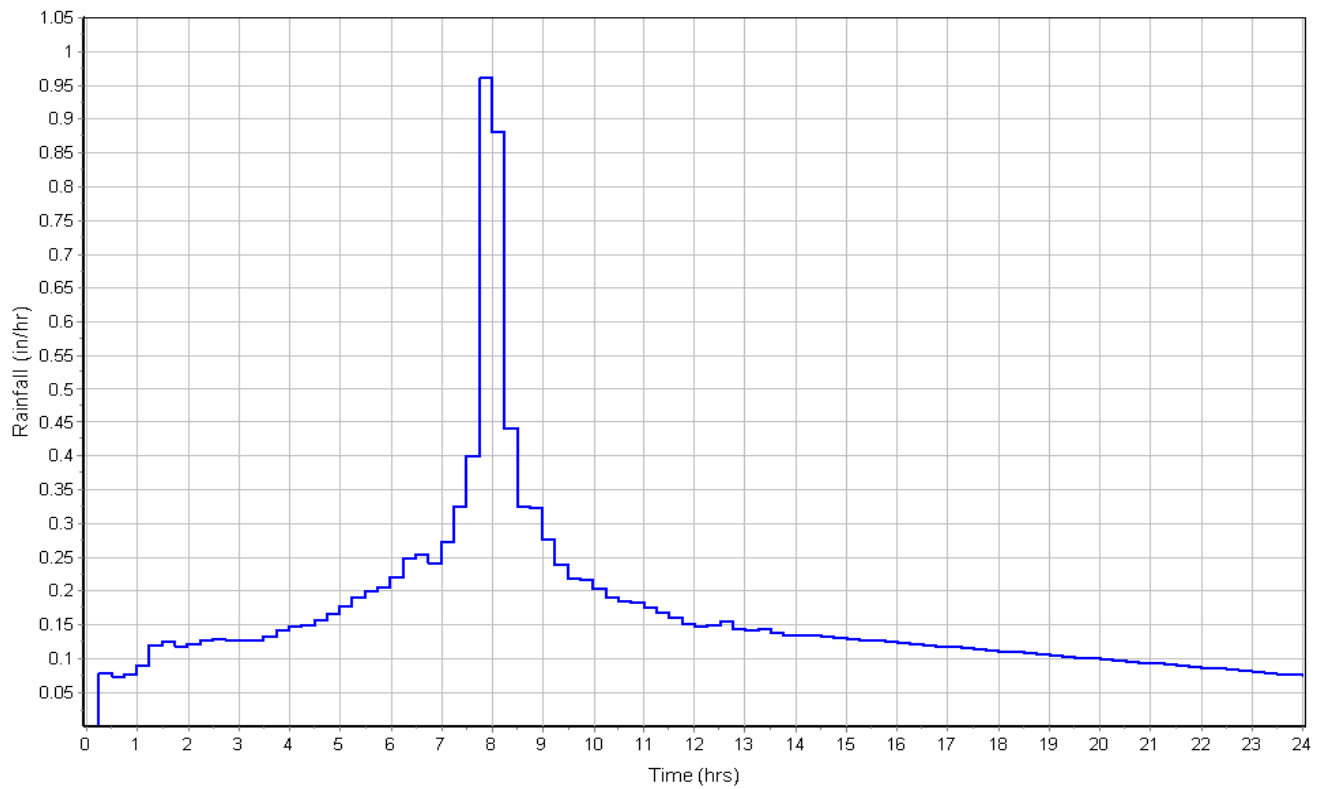
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.23		88.1

Subbasin Runoff Results

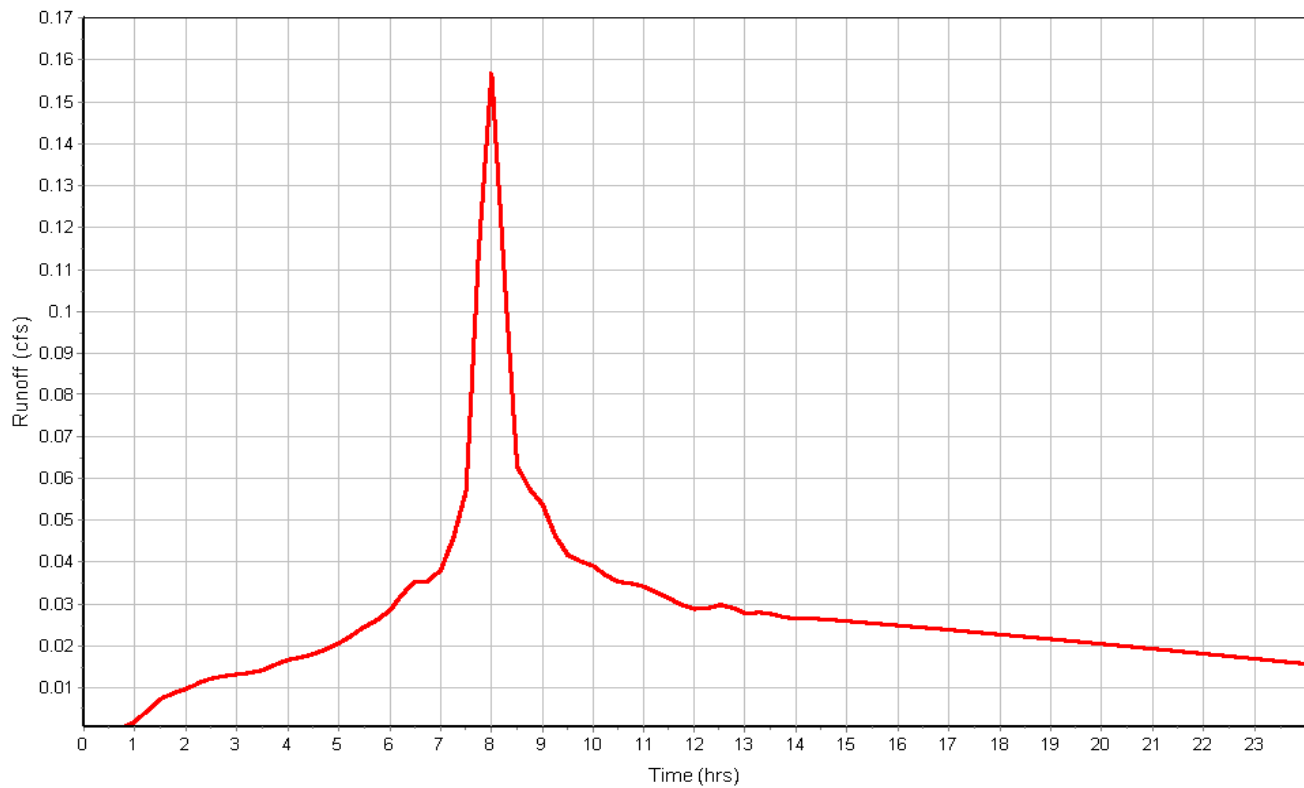
Total Rainfall (in) 3.96
 Total Runoff (in) 2.82
 Peak Runoff (cfs) 0.16
 Weighted Curve Number 88.10
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 025

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 026**Input Data**

Area (ac) 0.07
Impervious Area (%) 51.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

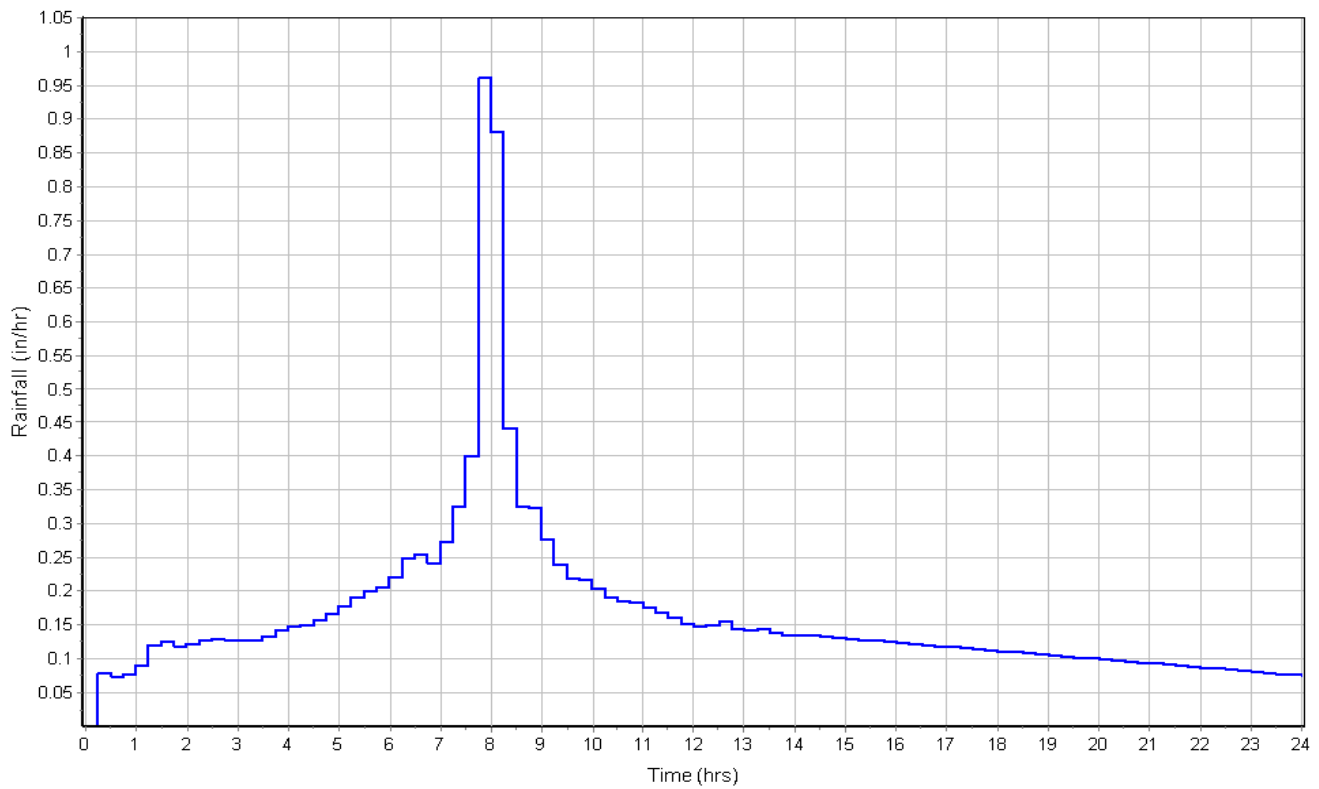
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.07		87.22

Subbasin Runoff Results

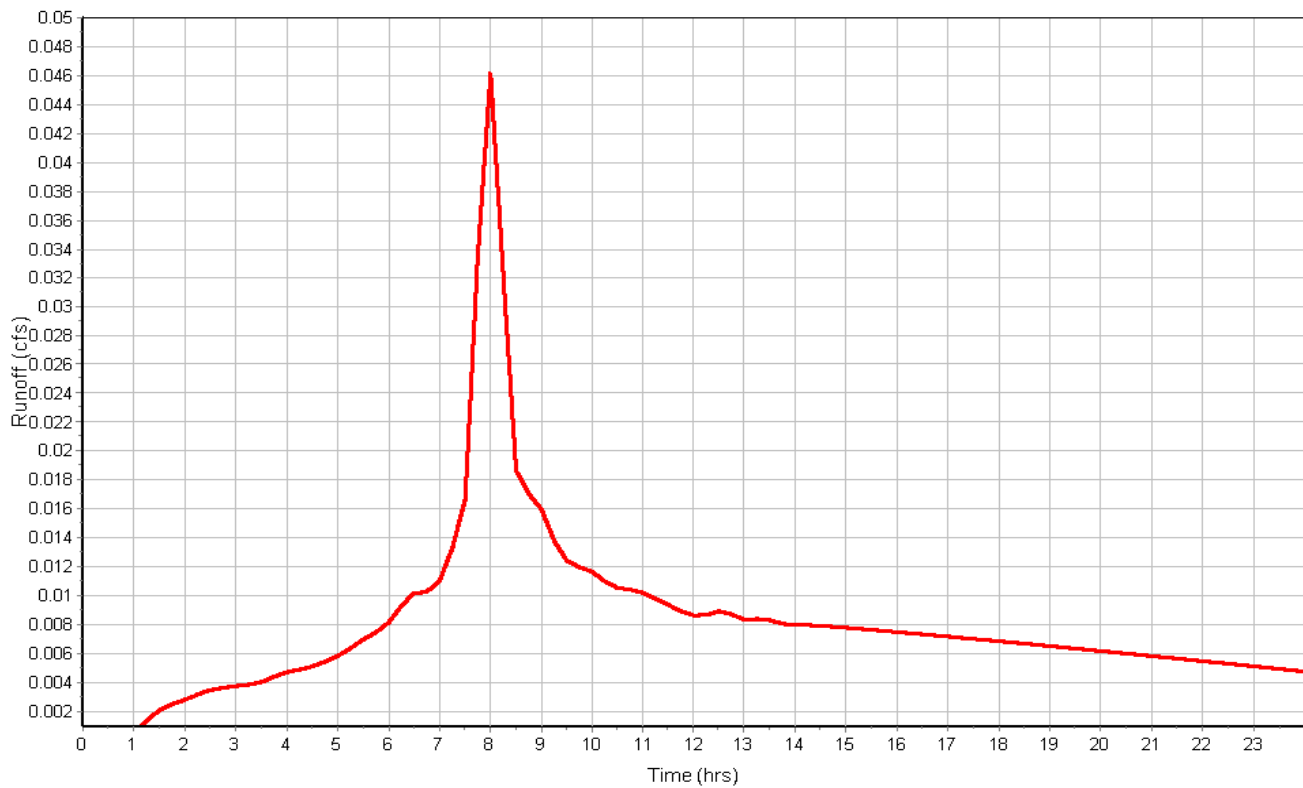
Total Rainfall (in) 3.96
Total Runoff (in) 2.74
Peak Runoff (cfs) 0.05
Weighted Curve Number 87.22
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 026

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 027**Input Data**

Area (ac) 0.06
Impervious Area (%) 53.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

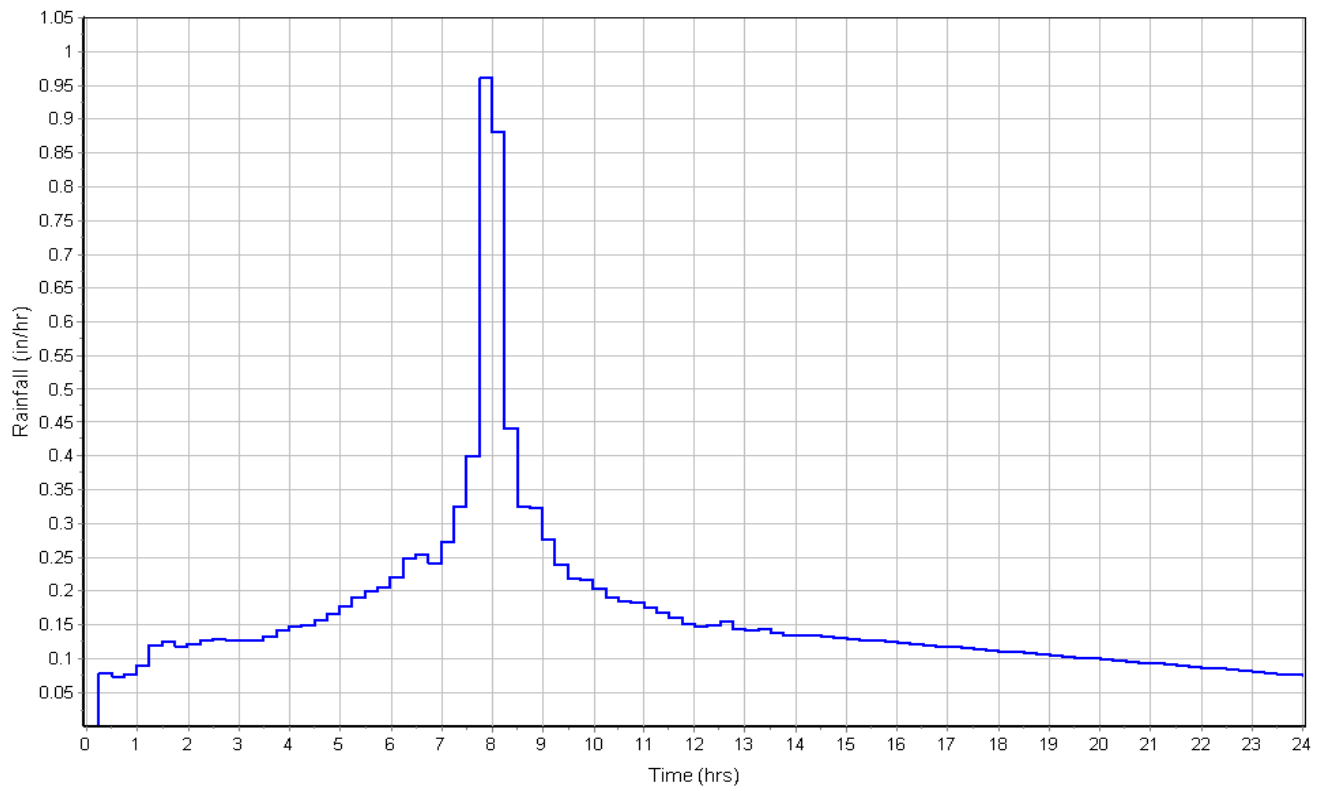
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.06		87.66

Subbasin Runoff Results

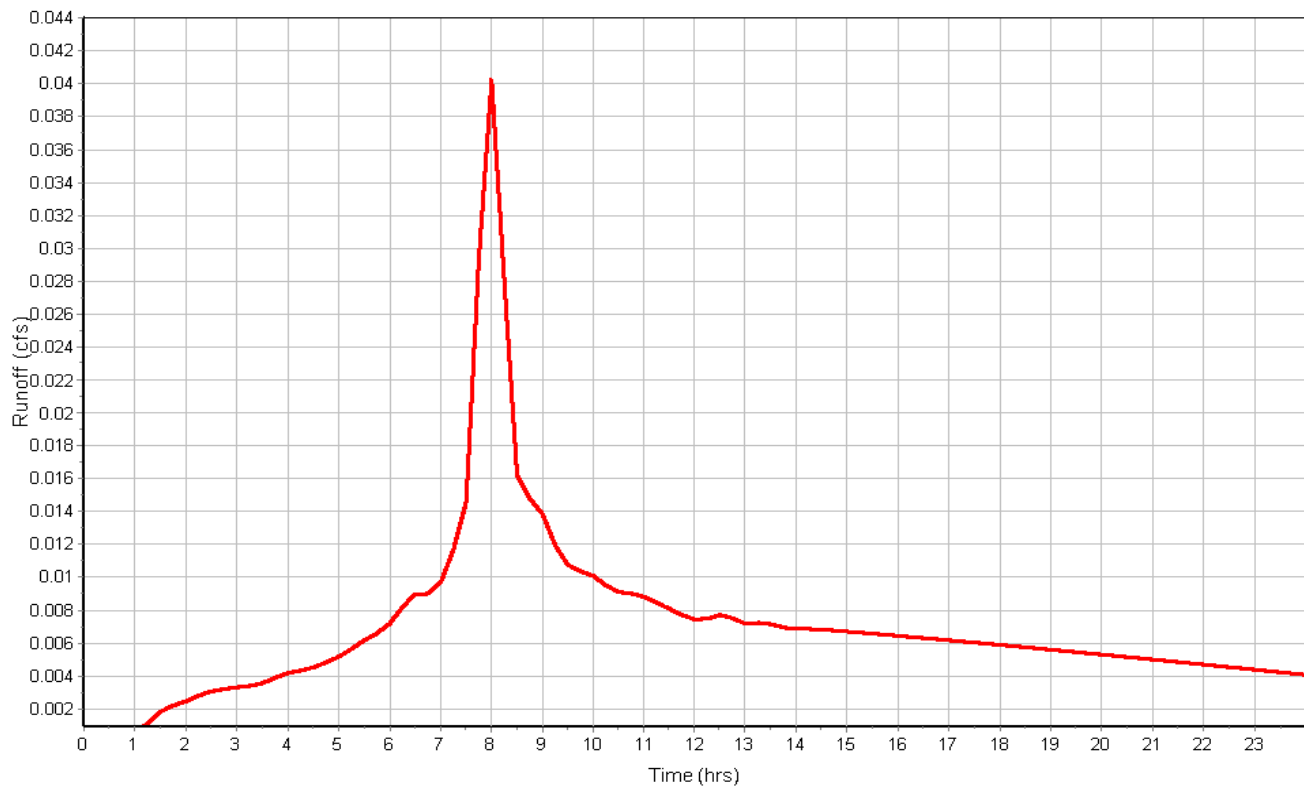
Total Rainfall (in) 3.96
Total Runoff (in) 2.78
Peak Runoff (cfs) 0.04
Weighted Curve Number 87.66
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 027

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 028**Input Data**

Area (ac) 0.08
Impervious Area (%) 63.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

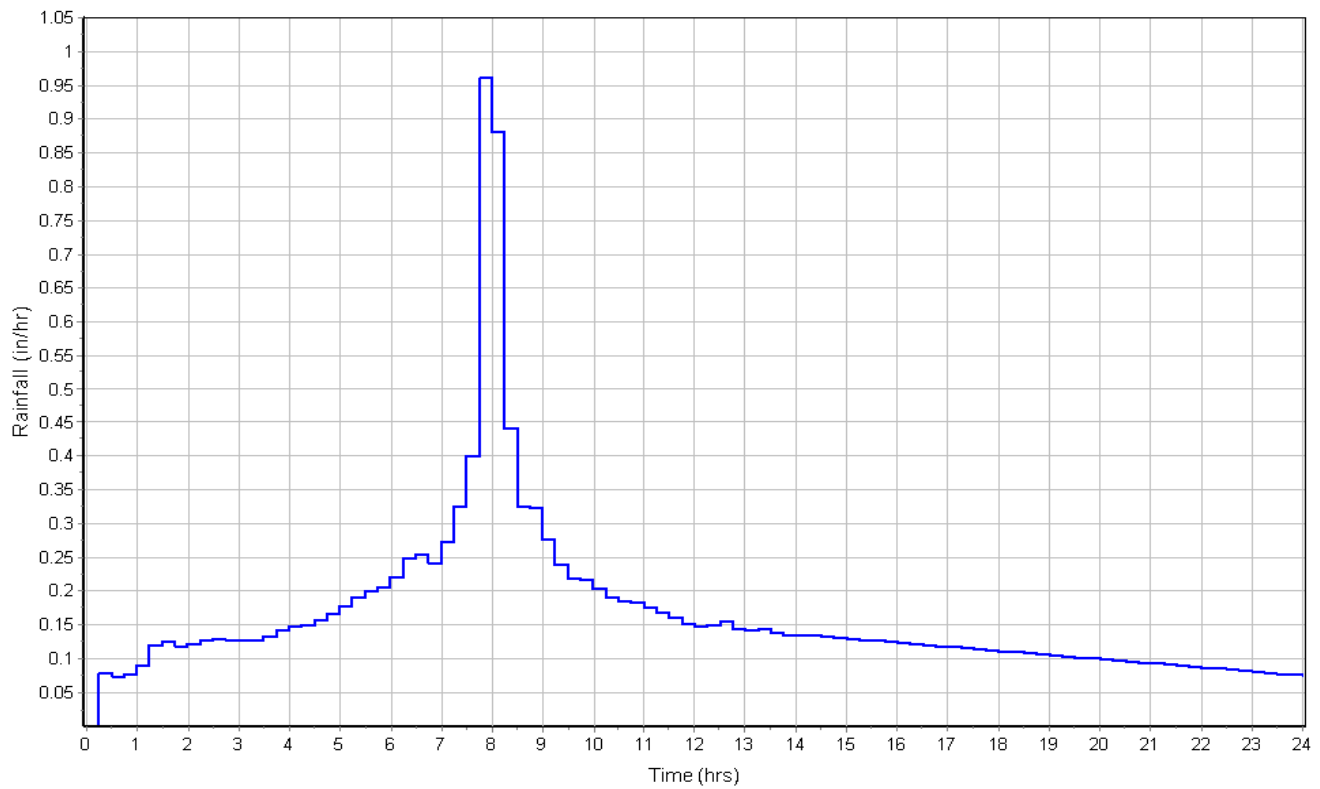
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.08		89.86

Subbasin Runoff Results

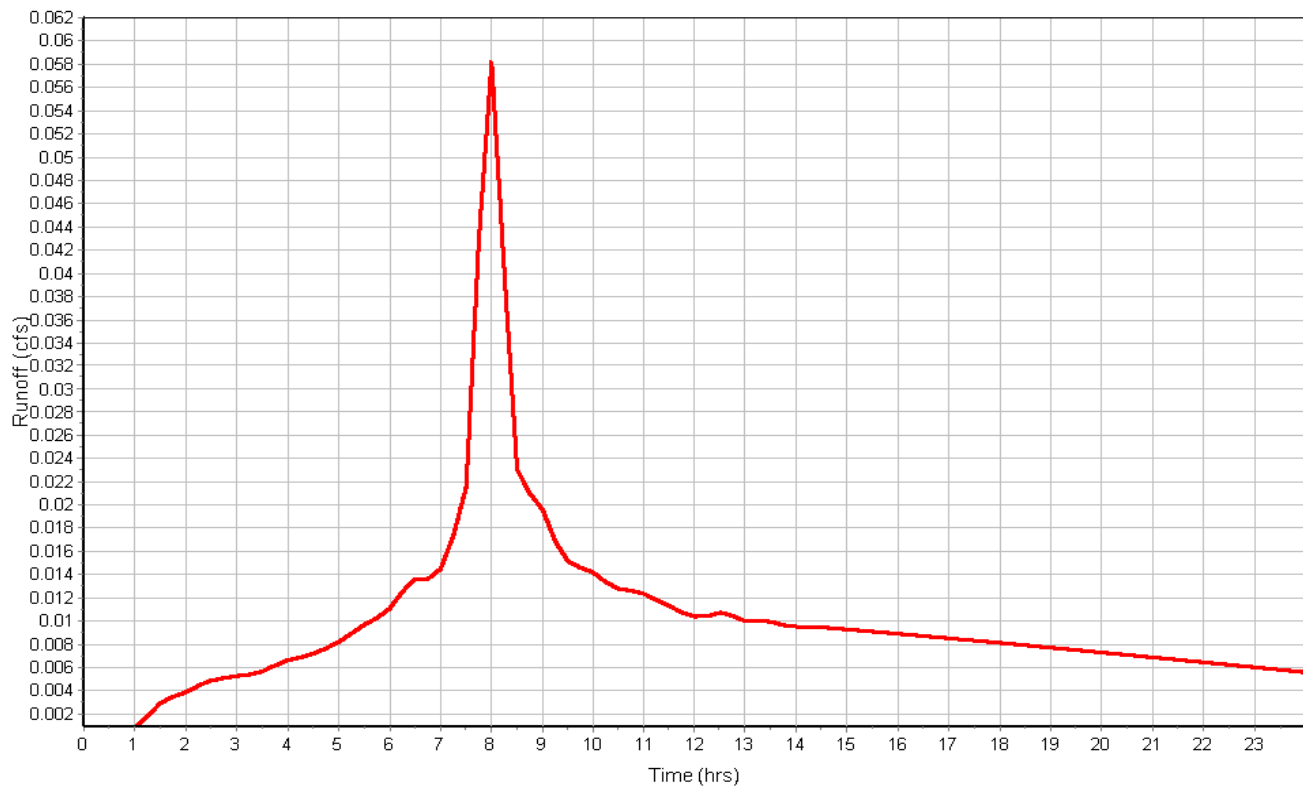
Total Rainfall (in) 3.96
Total Runoff (in) 2.98
Peak Runoff (cfs) 0.06
Weighted Curve Number 89.86
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 028

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 029**Input Data**

Area (ac) 0.09
 Impervious Area (%) 42.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

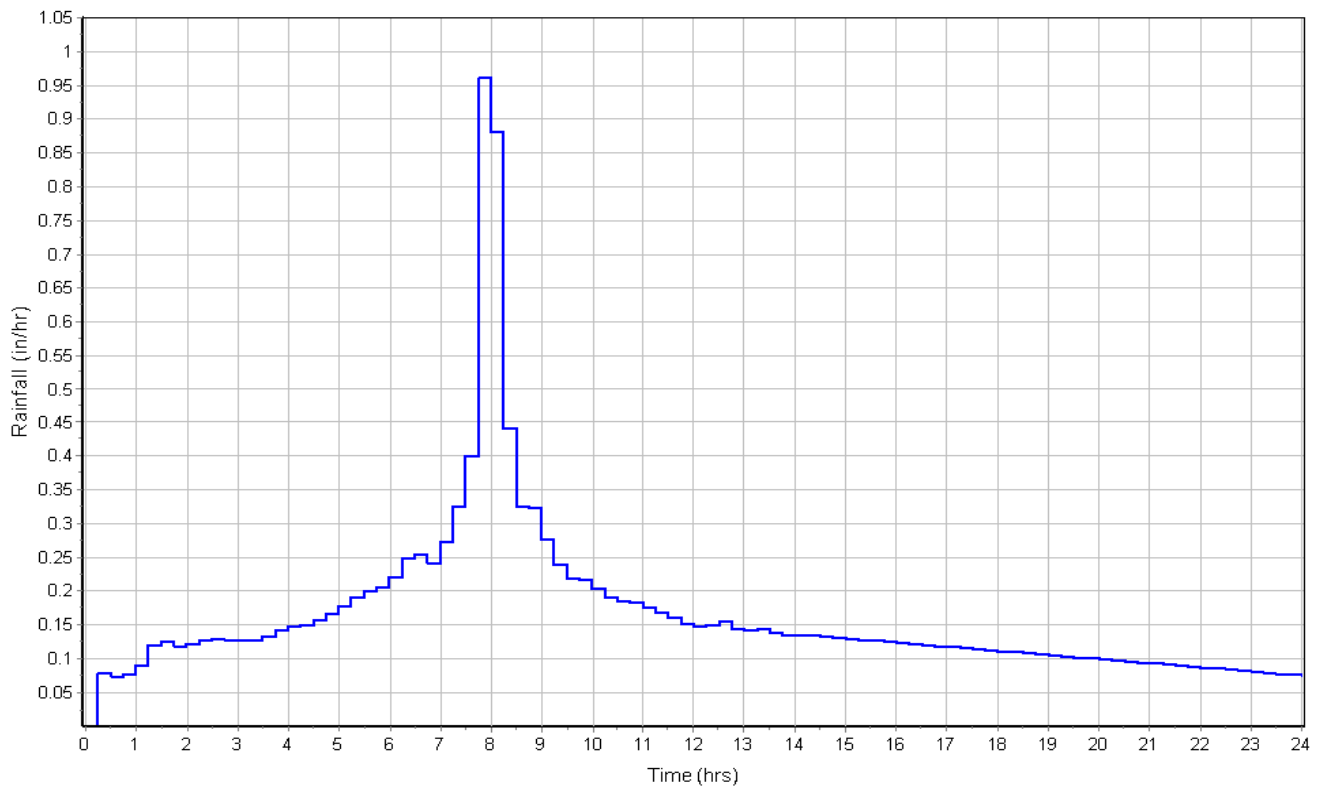
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.09		85.24

Subbasin Runoff Results

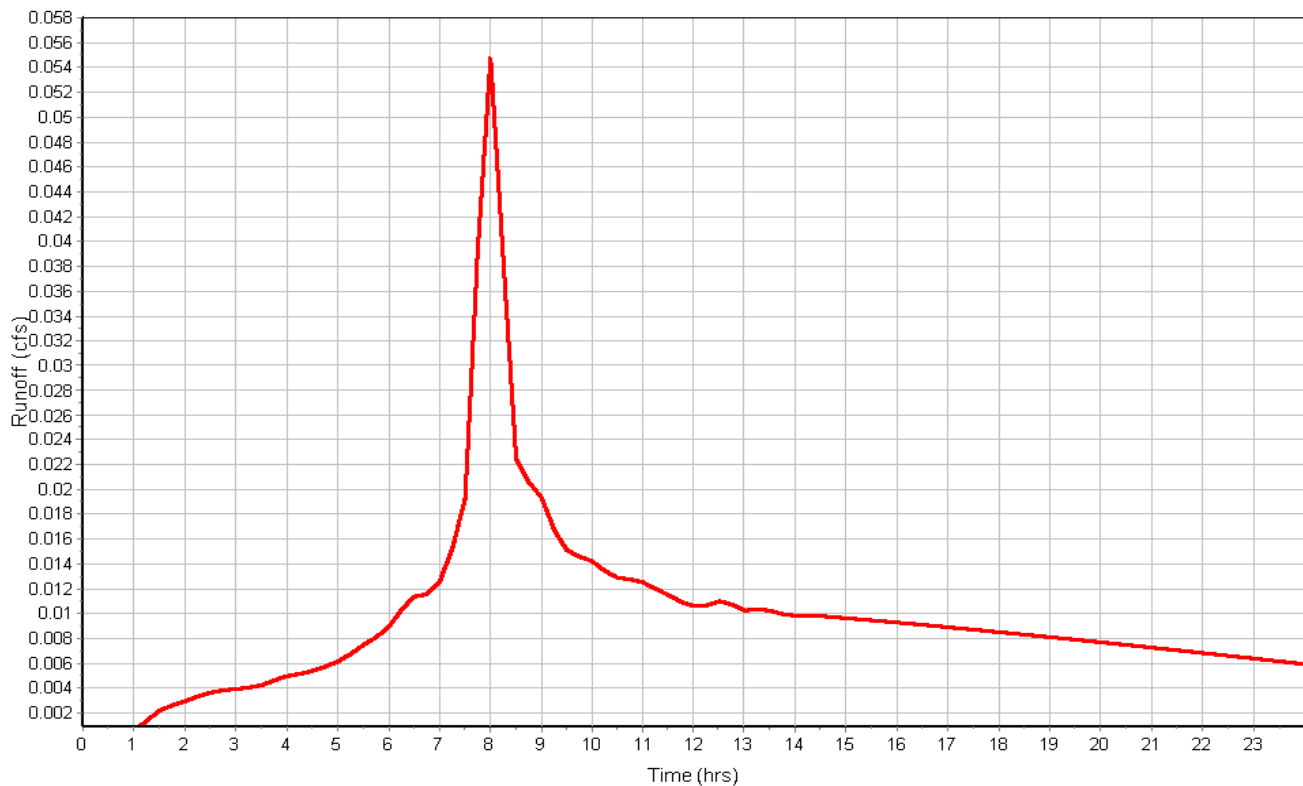
Total Rainfall (in) 3.96
 Total Runoff (in) 2.56
 Peak Runoff (cfs) 0.06
 Weighted Curve Number 85.24
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 029

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 030**Input Data**

Area (ac) 0.13
Impervious Area (%) 41.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

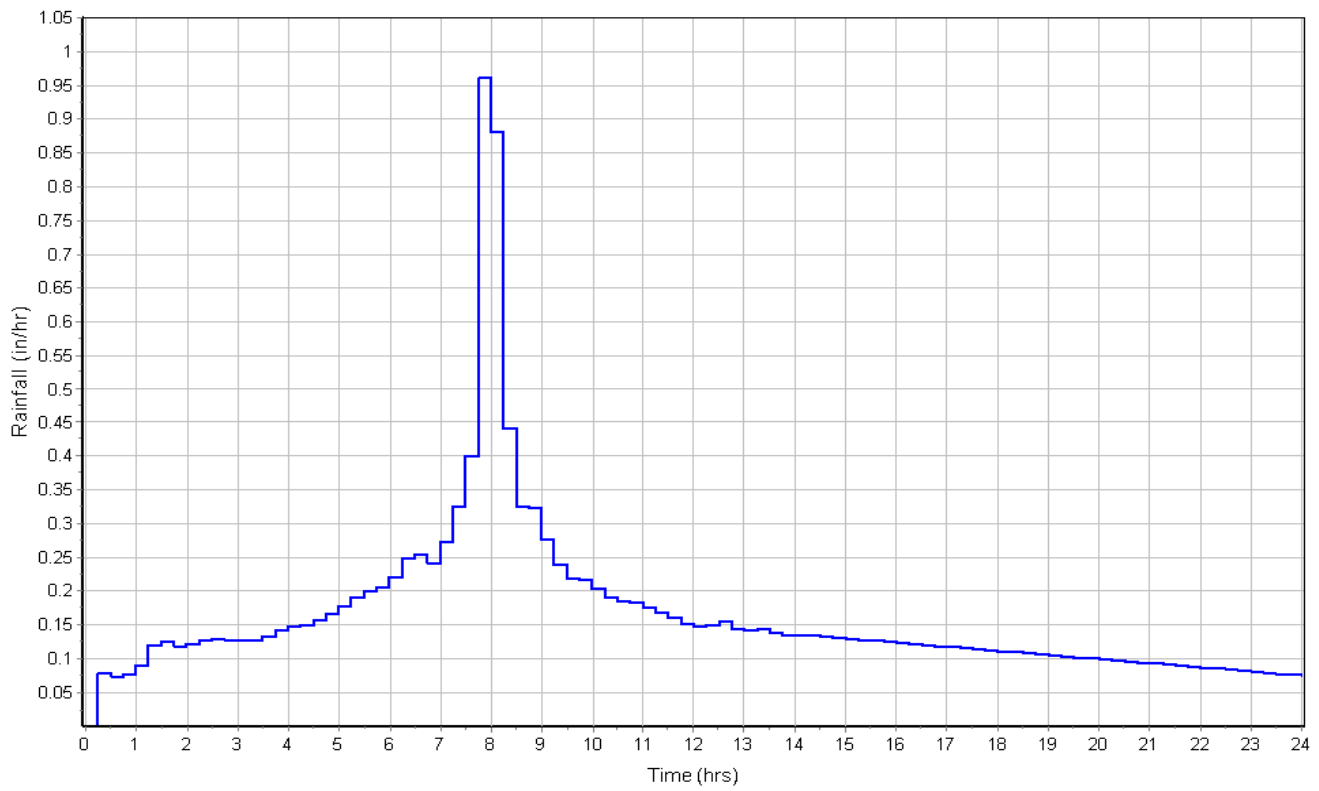
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.13		85.02

Subbasin Runoff Results

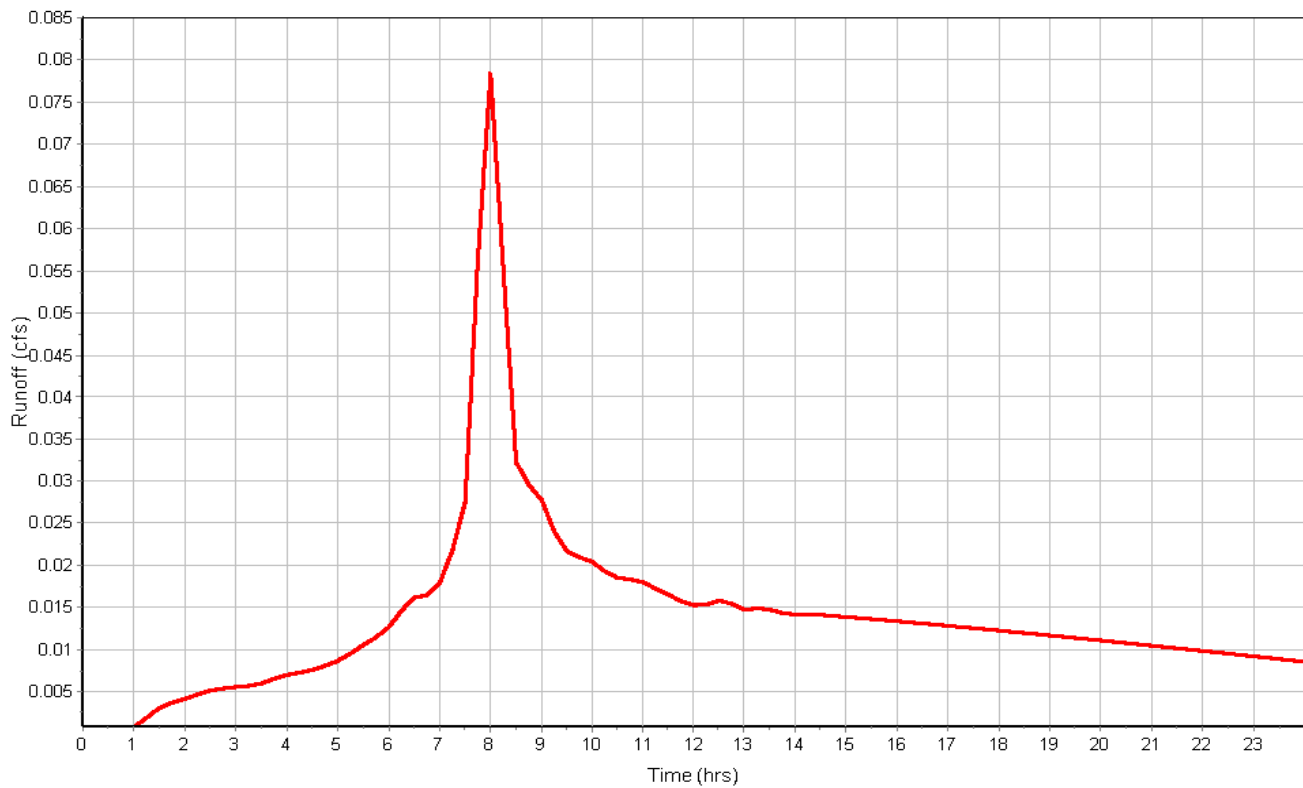
Total Rainfall (in) 3.96
Total Runoff (in) 2.54
Peak Runoff (cfs) 0.08
Weighted Curve Number 85.02
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 030

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 031**Input Data**

Area (ac) 0.12
 Impervious Area (%) 77.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

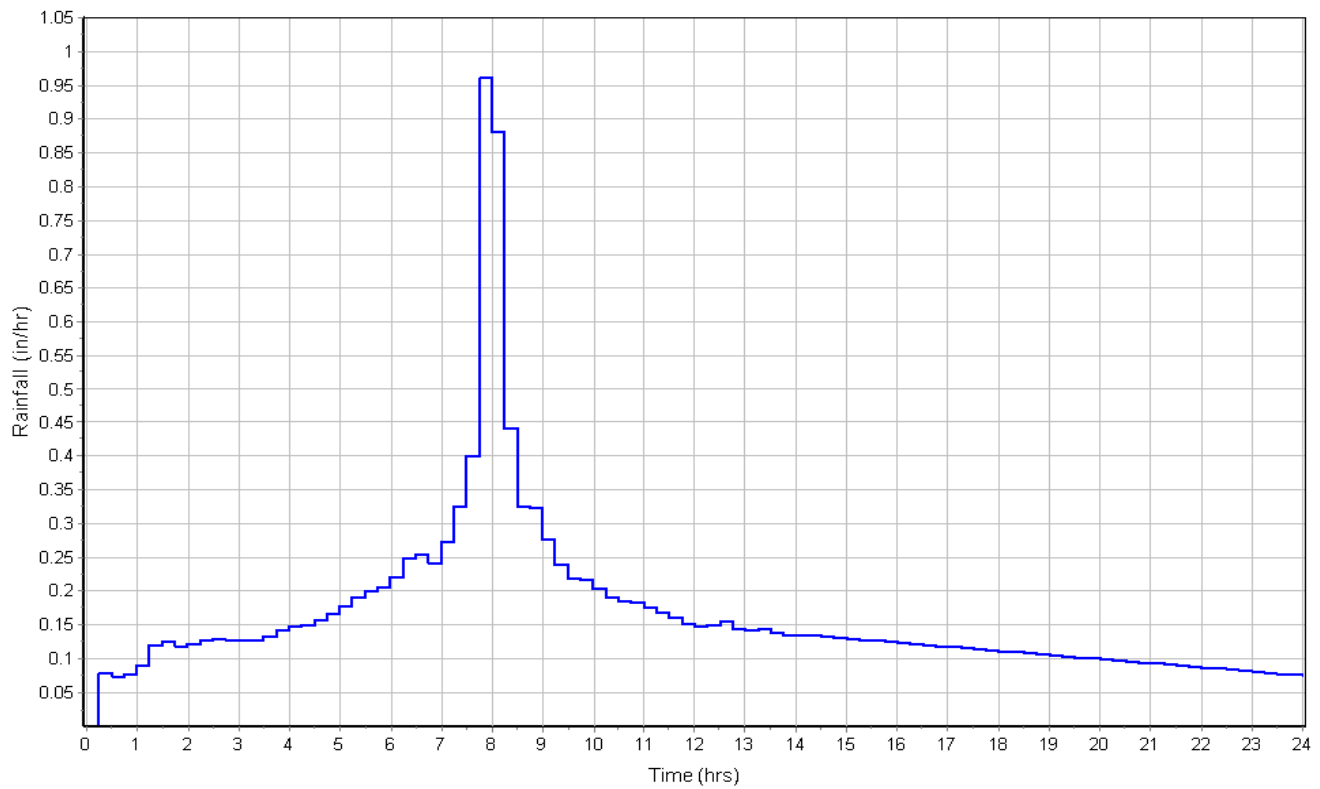
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.12		92.94

Subbasin Runoff Results

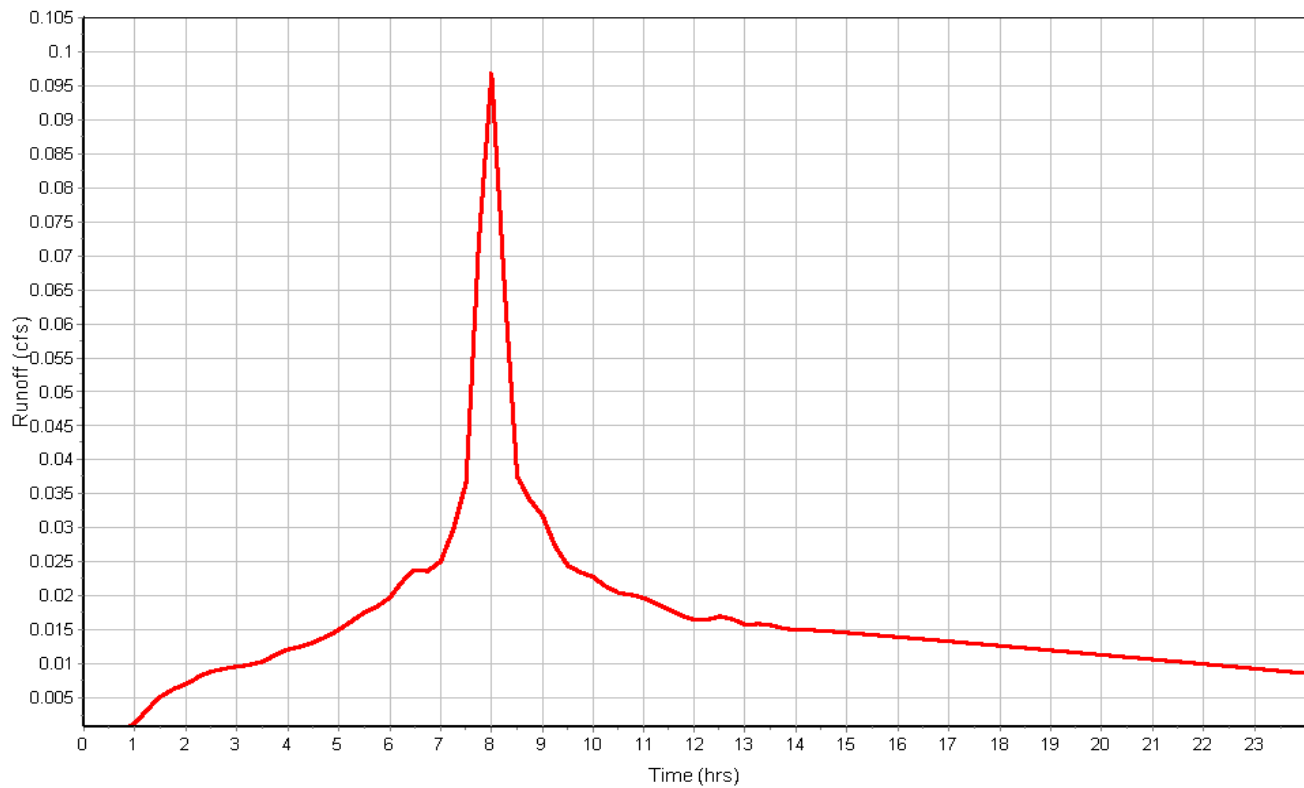
Total Rainfall (in) 3.96
 Total Runoff (in) 3.27
 Peak Runoff (cfs) 0.10
 Weighted Curve Number 92.94
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 031

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 032**Input Data**

Area (ac) 0.20
Impervious Area (%) 85.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

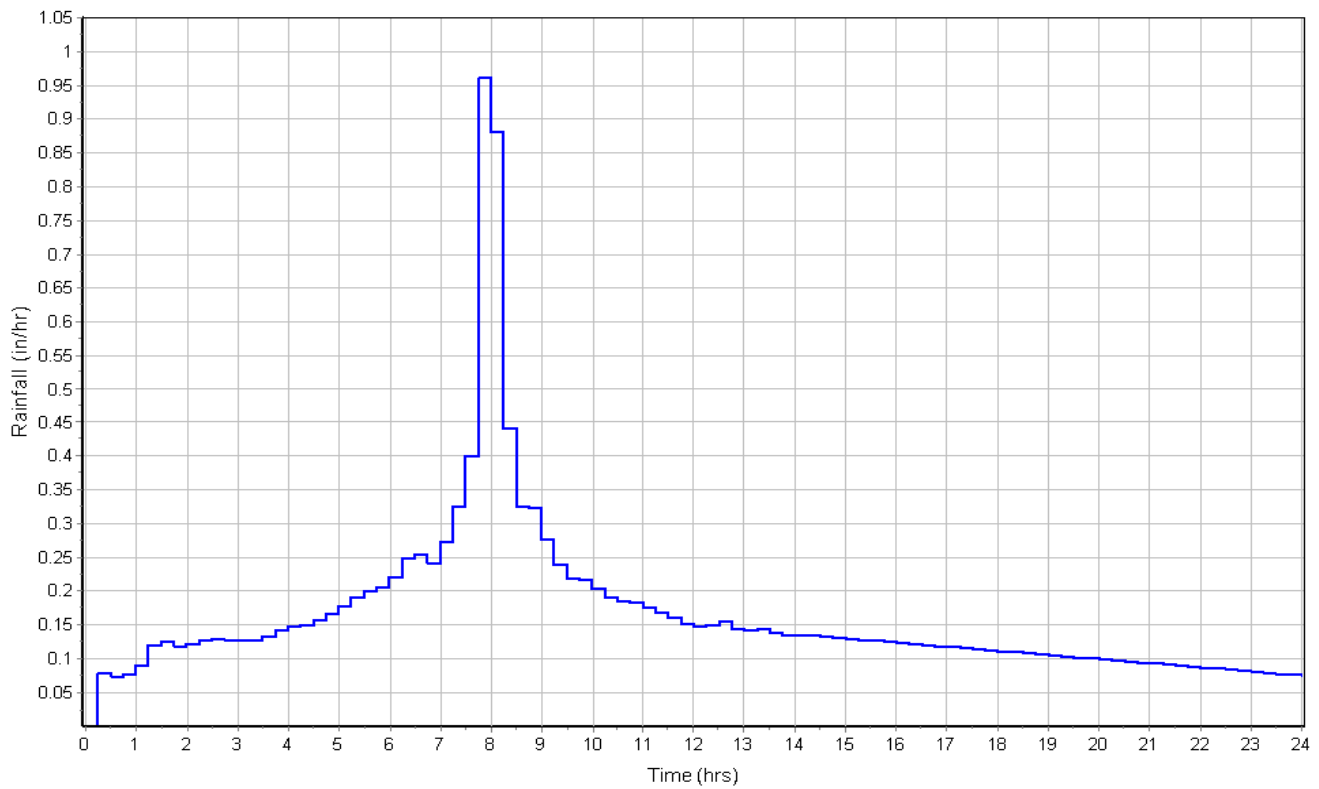
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.20		94.7

Subbasin Runoff Results

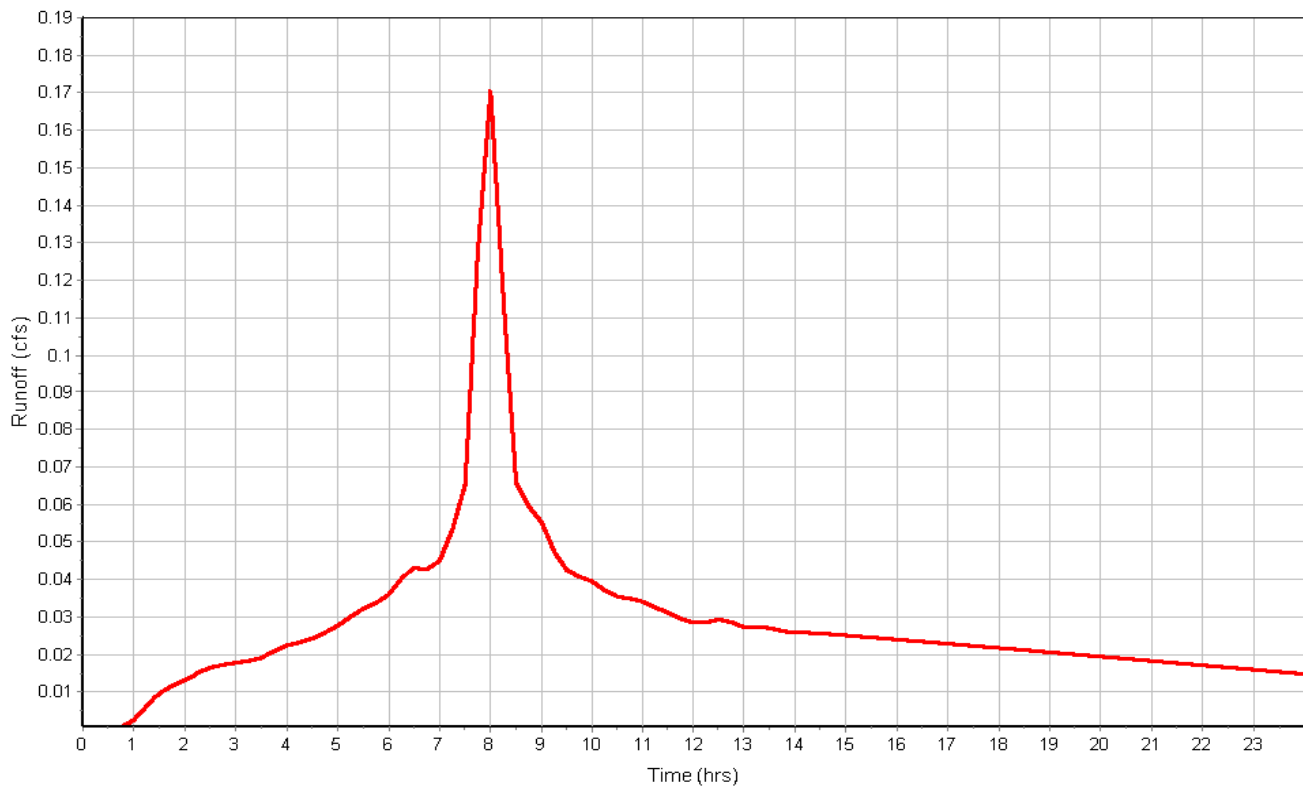
Total Rainfall (in) 3.96
Total Runoff (in) 3.43
Peak Runoff (cfs) 0.17
Weighted Curve Number 94.70
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 032

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 033**Input Data**

Area (ac) 0.03
Impervious Area (%) 94.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

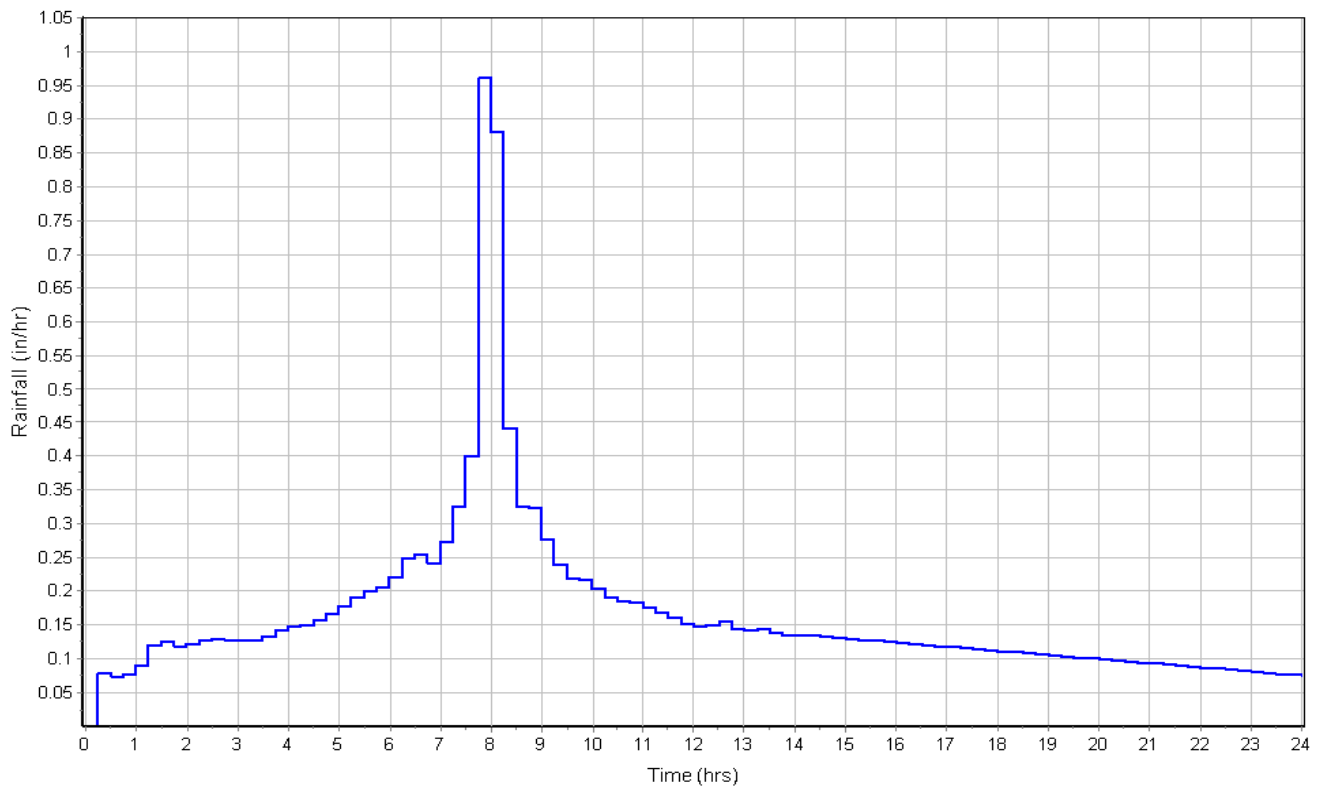
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.03		96.68

Subbasin Runoff Results

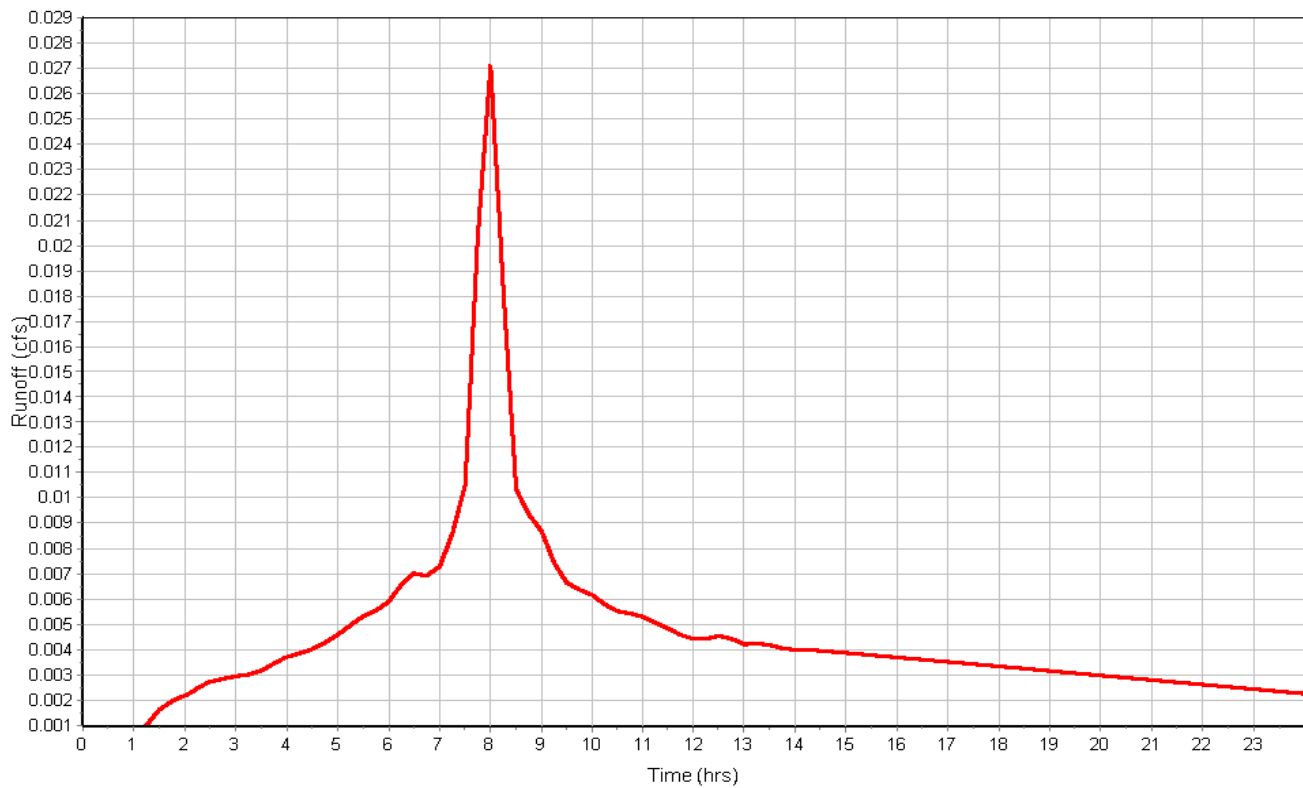
Total Rainfall (in) 3.96
Total Runoff (in) 3.61
Peak Runoff (cfs) 0.03
Weighted Curve Number 96.68
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 033

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 034**Input Data**

Area (ac) 0.27
 Impervious Area (%) 93.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

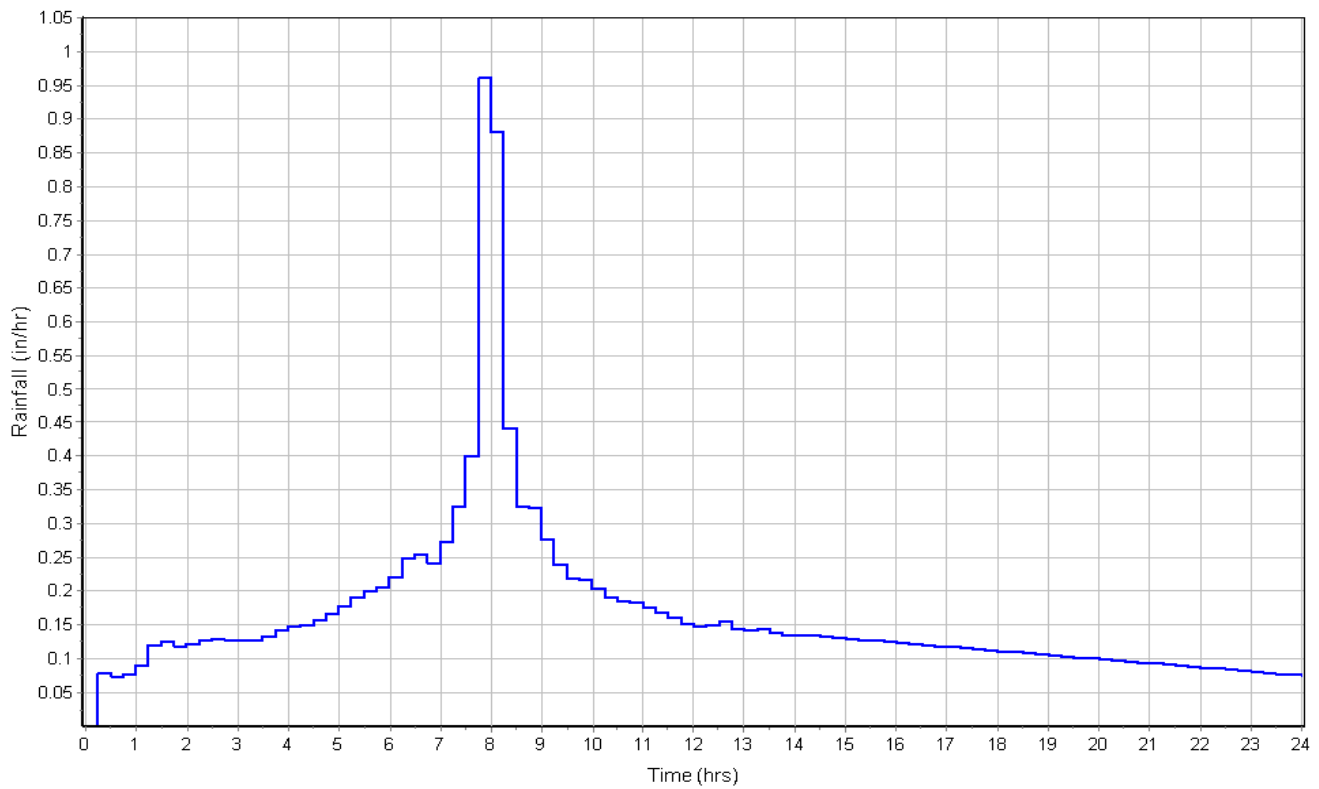
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.27		96.46

Subbasin Runoff Results

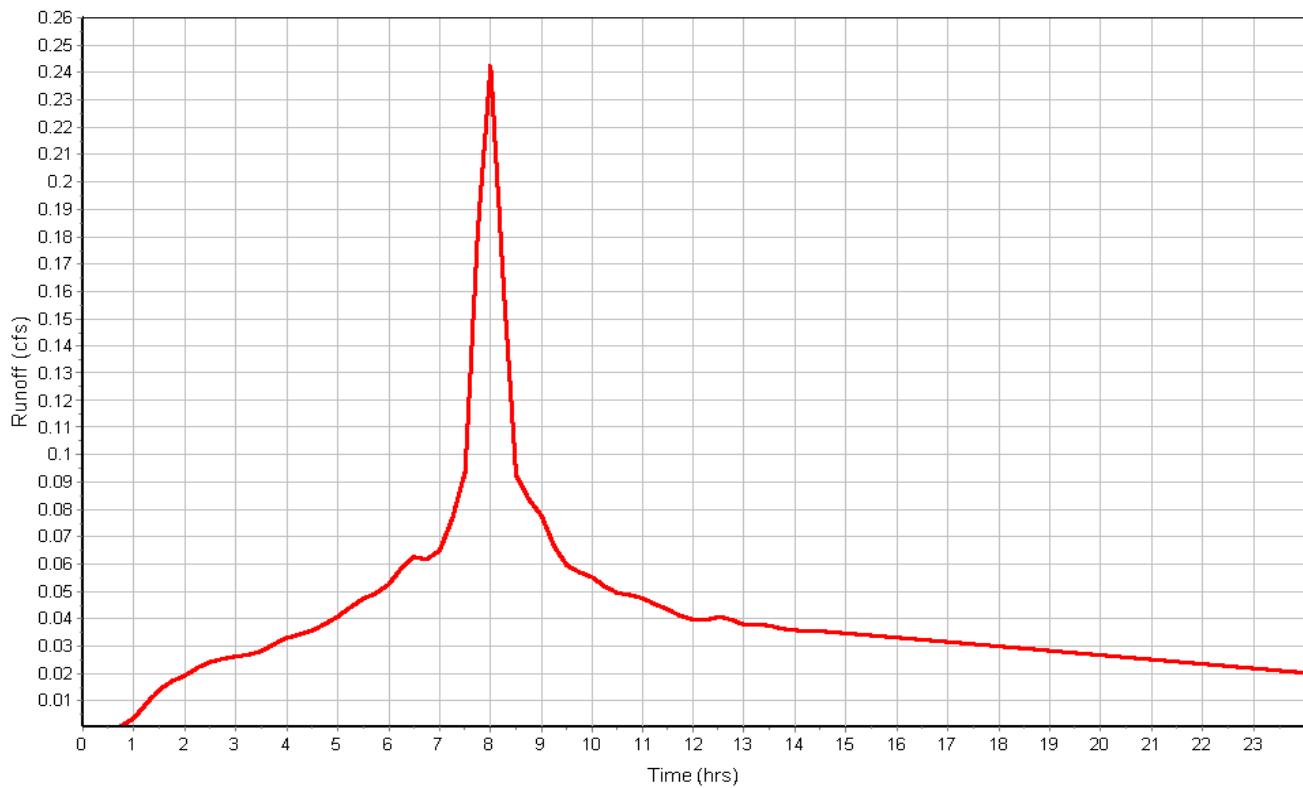
Total Rainfall (in) 3.96
 Total Runoff (in) 3.59
 Peak Runoff (cfs) 0.24
 Weighted Curve Number 96.46
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 034

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 036**Input Data**

Area (ac) 0.12
Impervious Area (%) 70.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

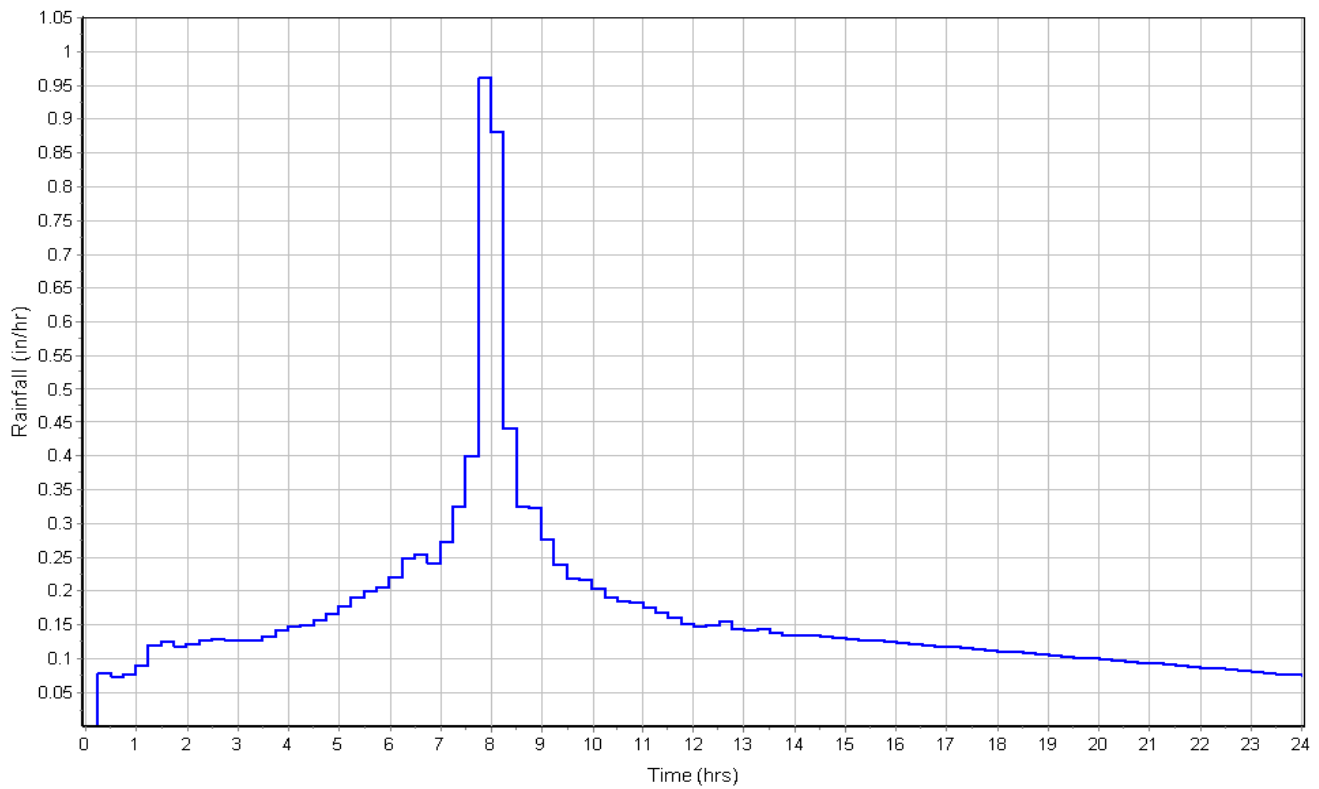
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.12		91.4

Subbasin Runoff Results

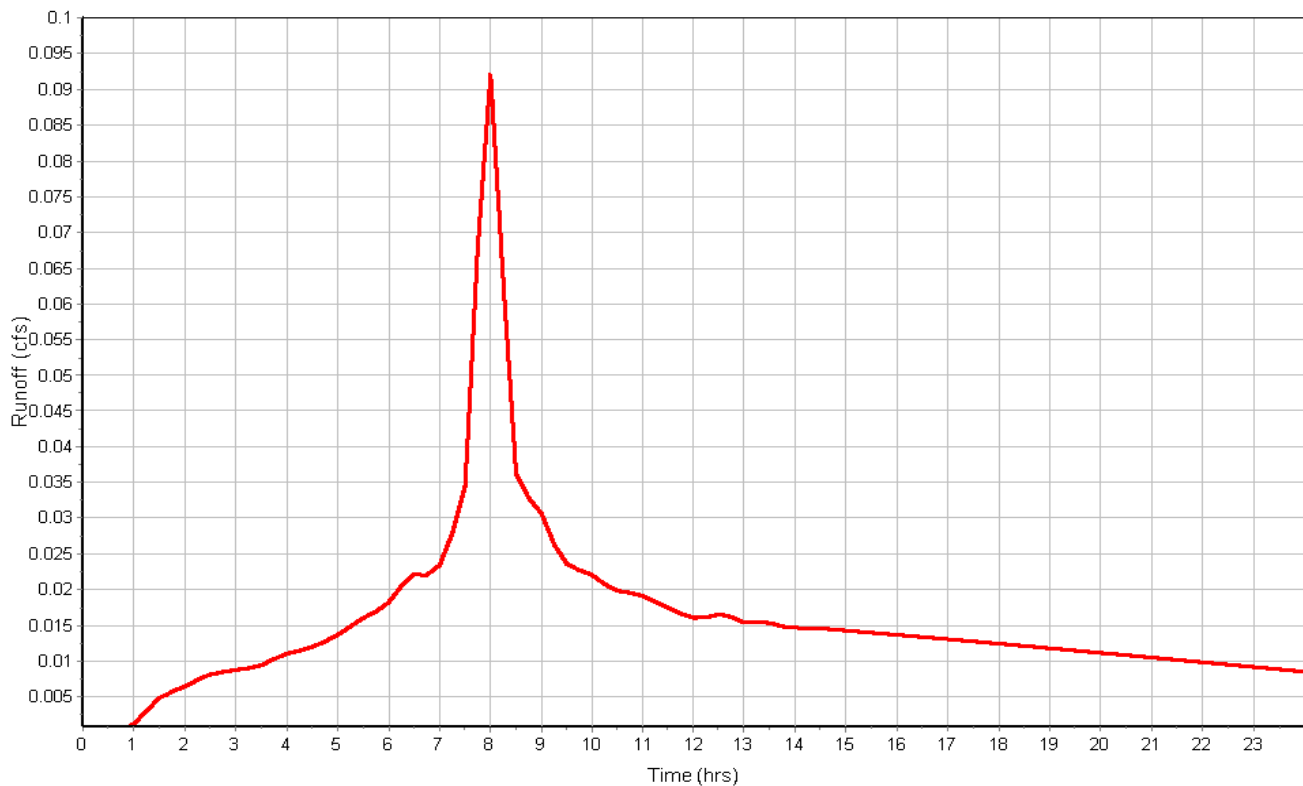
Total Rainfall (in) 3.96
Total Runoff (in) 3.13
Peak Runoff (cfs) 0.09
Weighted Curve Number 91.40
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 036

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 037**Input Data**

Area (ac) 0.08
Impervious Area (%) 76.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

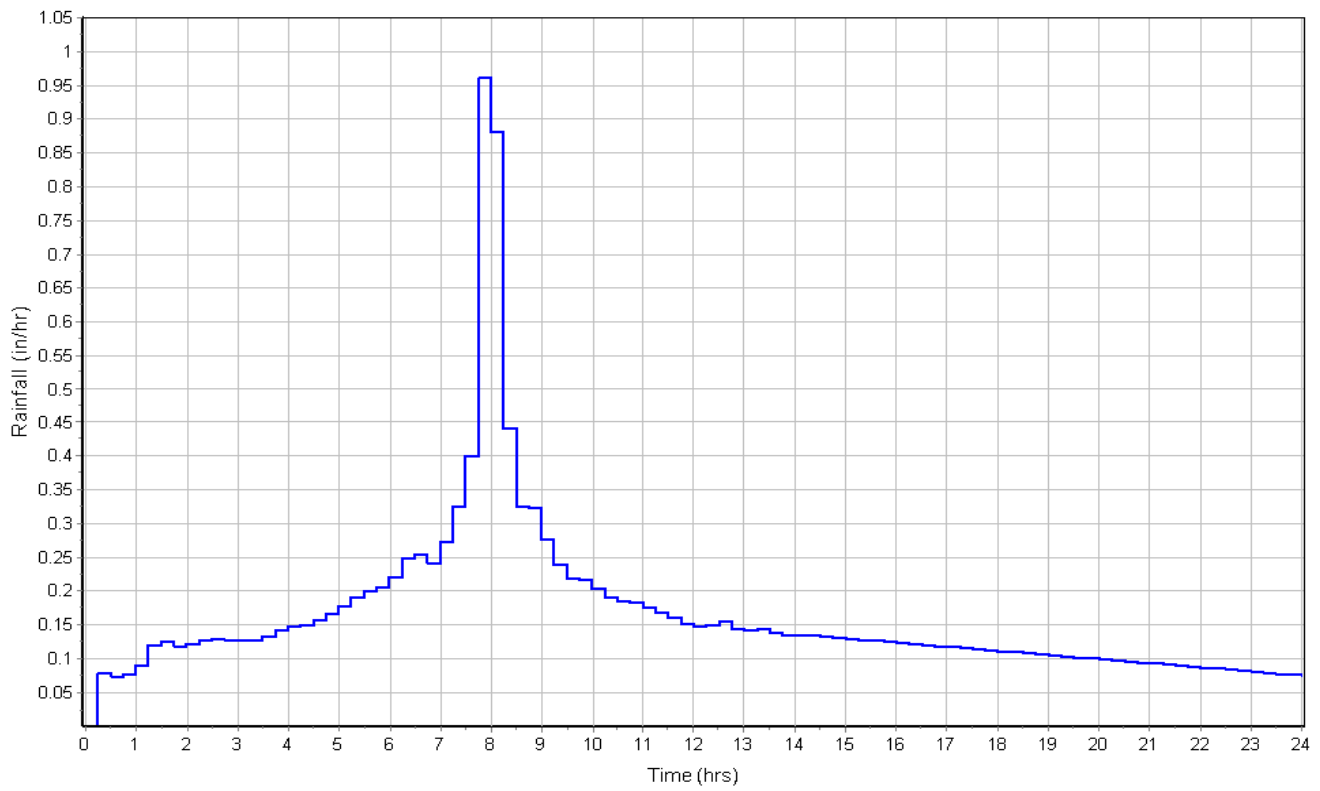
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.08		92.72

Subbasin Runoff Results

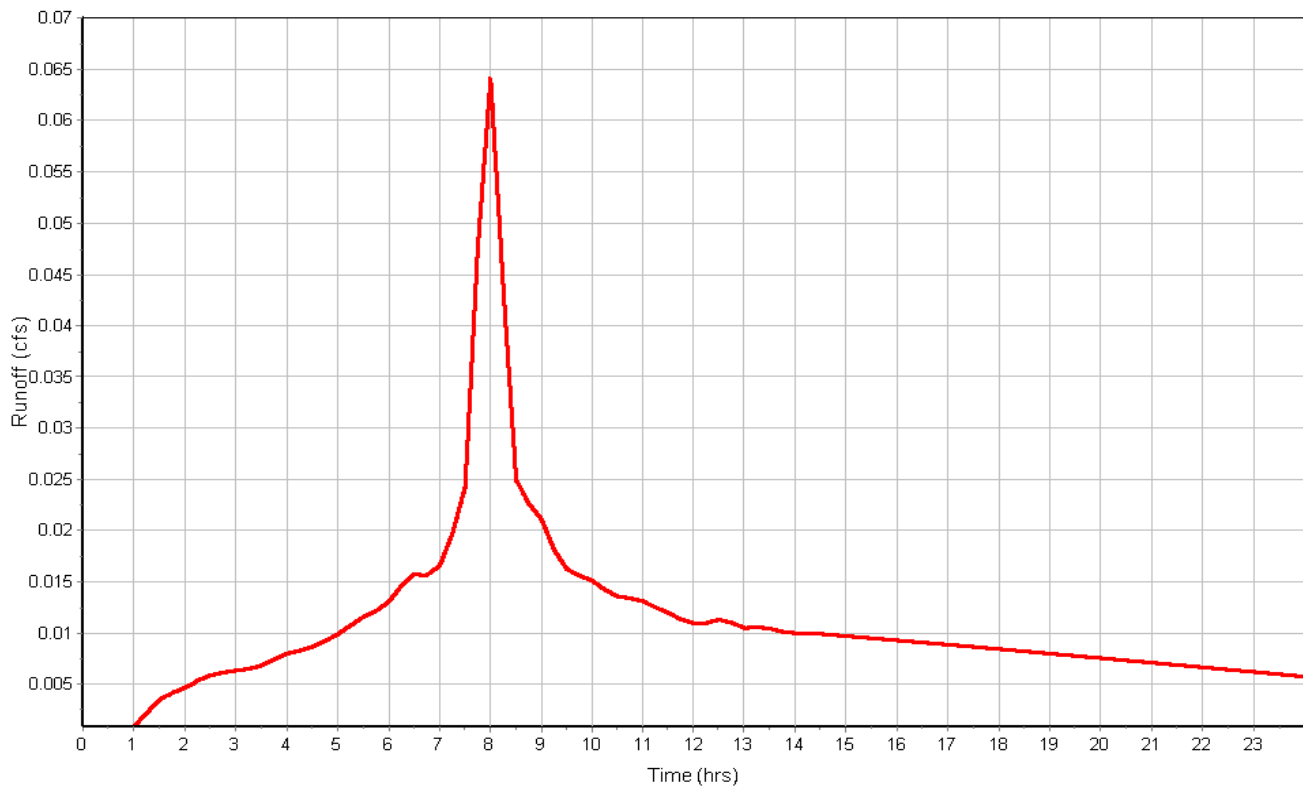
Total Rainfall (in) 3.96
Total Runoff (in) 3.25
Peak Runoff (cfs) 0.06
Weighted Curve Number 92.72
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 037

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 042**Input Data**

Area (ac) 4.25
Impervious Area (%) 72.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

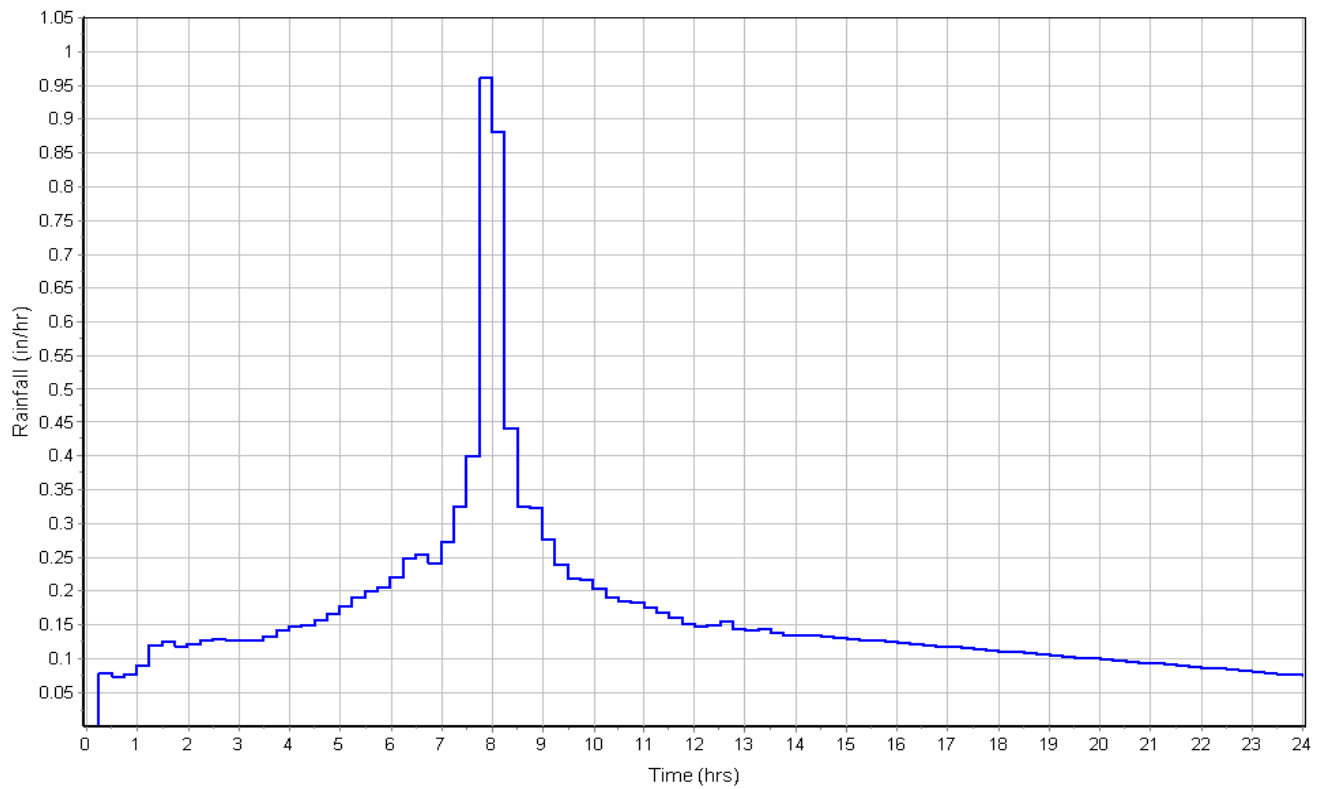
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	4.25		91.84

Subbasin Runoff Results

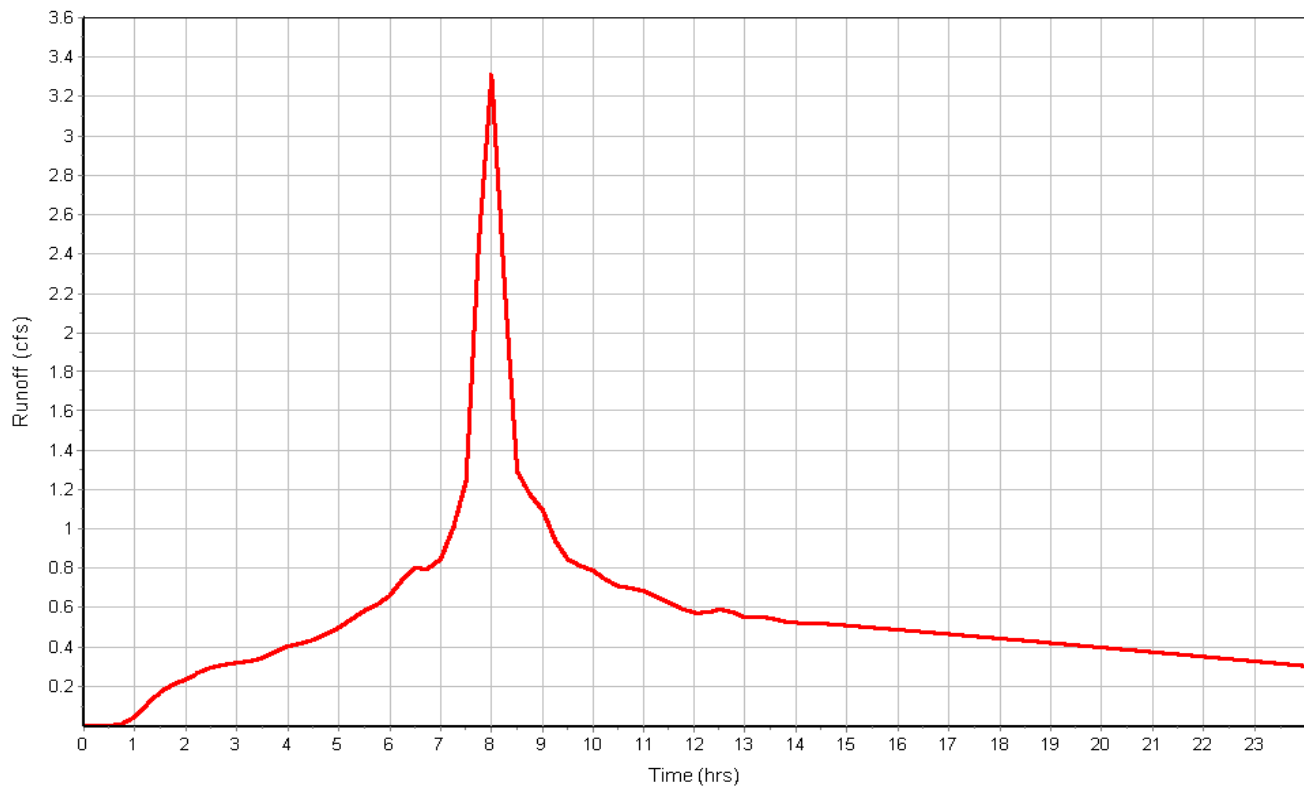
Total Rainfall (in) 3.96
Total Runoff (in) 3.17
Peak Runoff (cfs) 3.31
Weighted Curve Number 91.84
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 042

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 043**Input Data**

Area (ac) 0.05
Impervious Area (%) 95.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

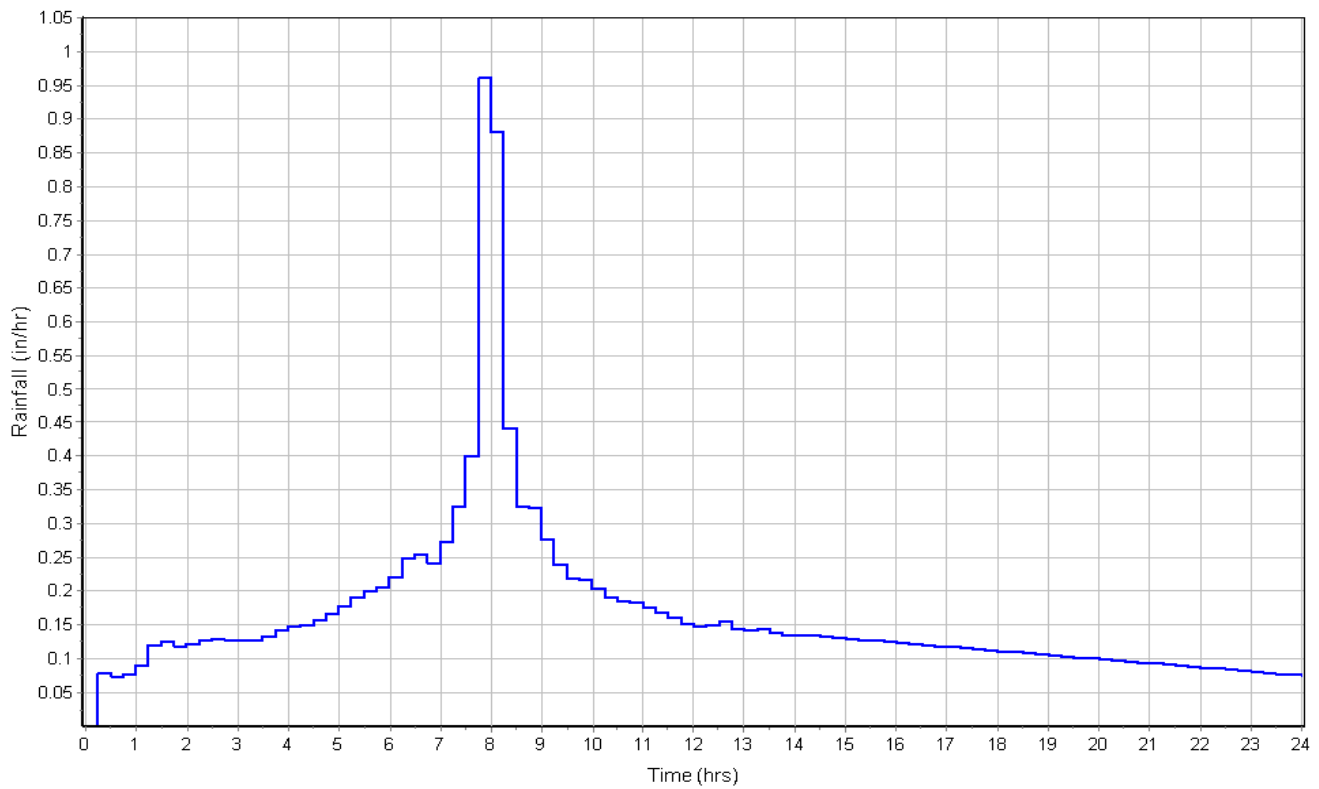
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.05		96.9

Subbasin Runoff Results

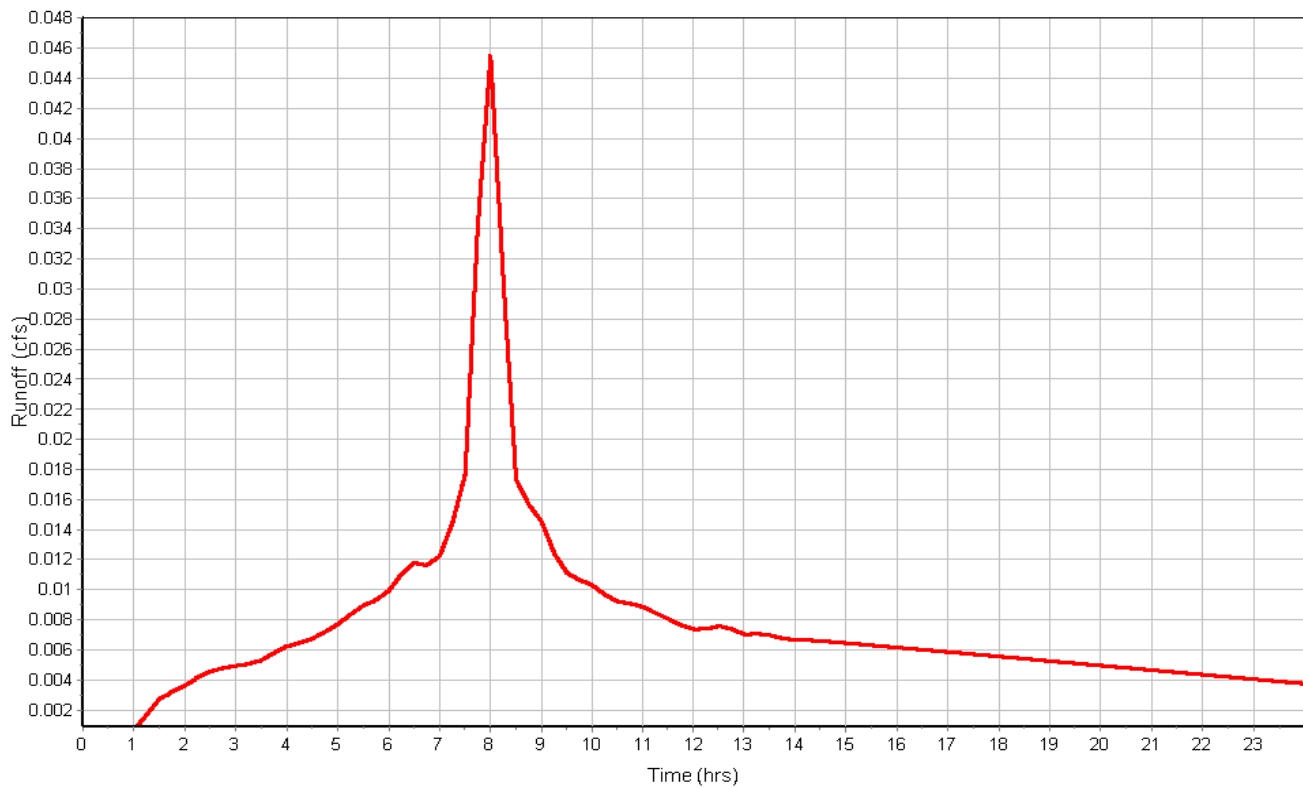
Total Rainfall (in) 3.96
Total Runoff (in) 3.63
Peak Runoff (cfs) 0.05
Weighted Curve Number 96.90
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 043

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 044**Input Data**

Area (ac) 0.06
 Impervious Area (%) 64.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

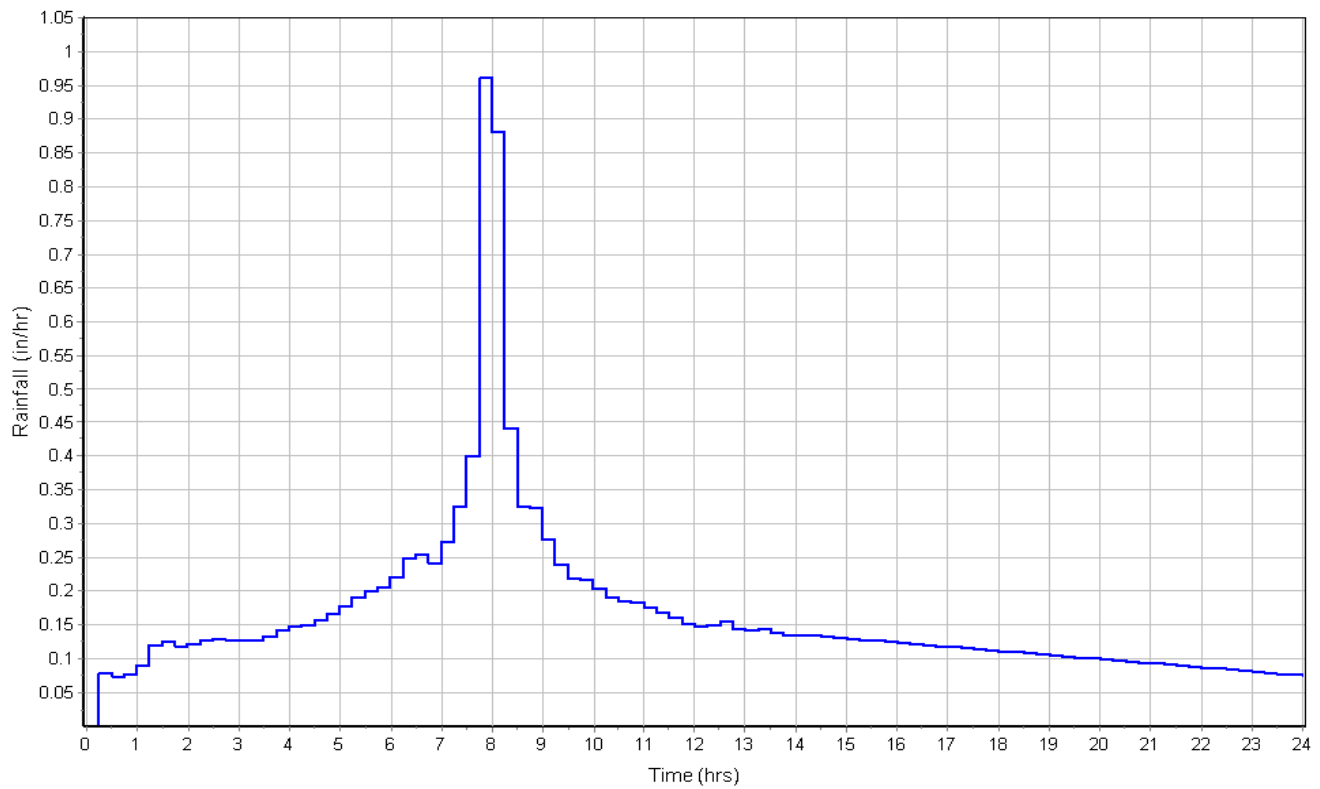
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.06		90.08

Subbasin Runoff Results

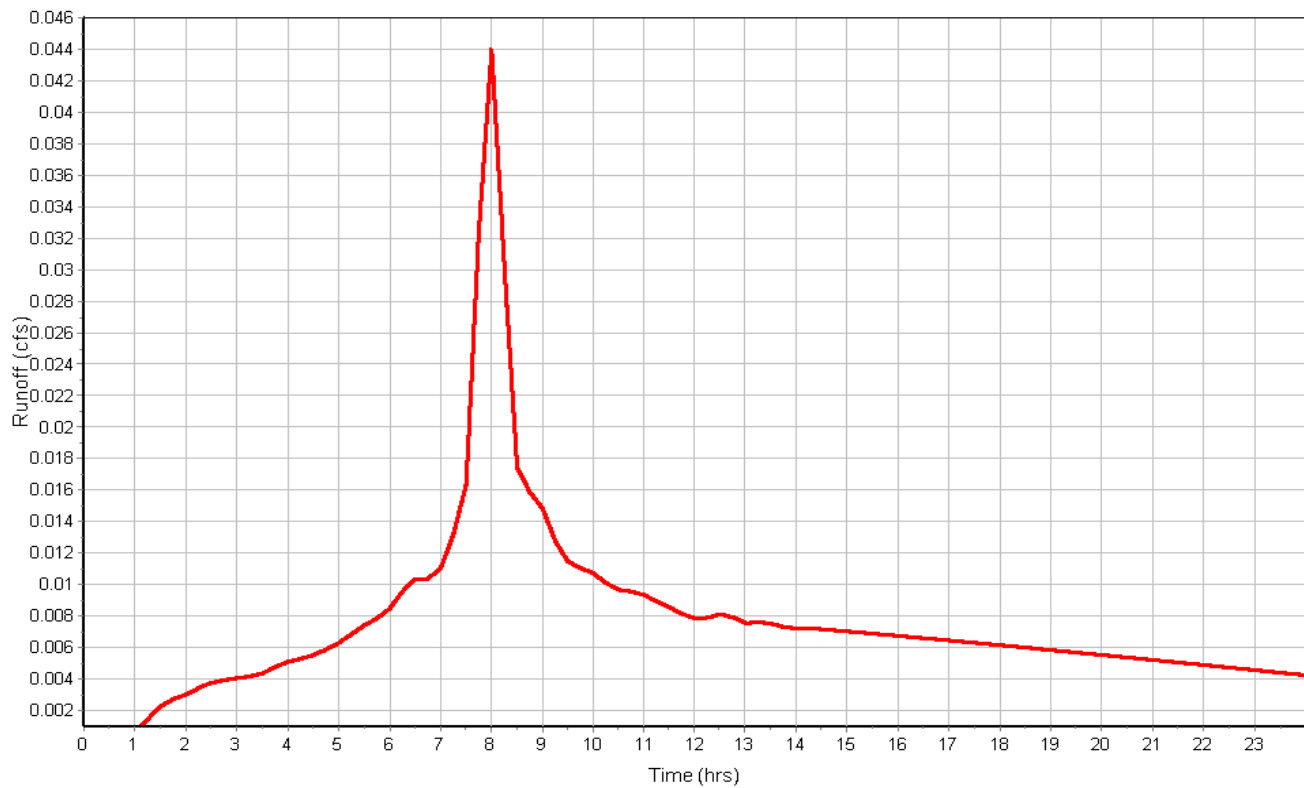
Total Rainfall (in) 3.96
 Total Runoff (in) 3.00
 Peak Runoff (cfs) 0.04
 Weighted Curve Number 90.08
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 044

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 045**Input Data**

Area (ac) 0.23
 Impervious Area (%) 92.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

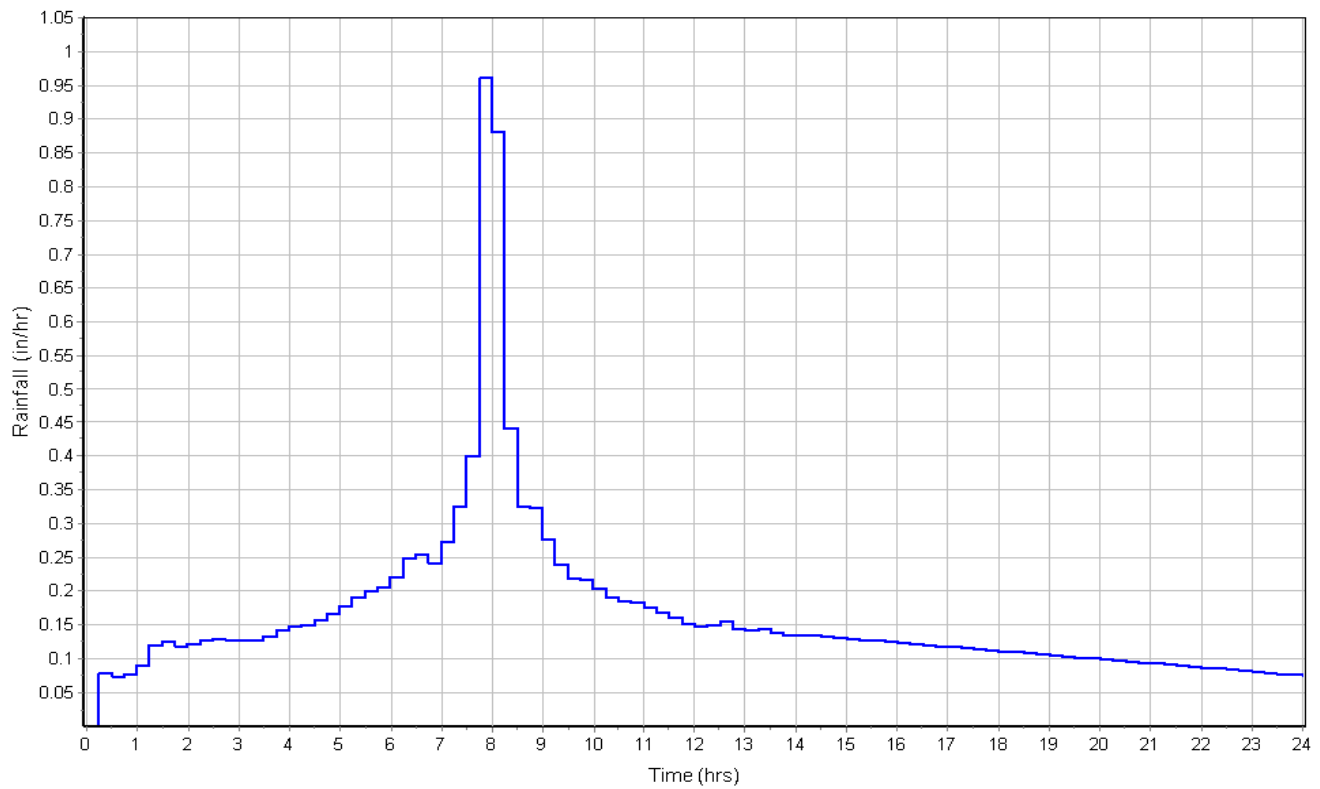
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.23		96.24

Subbasin Runoff Results

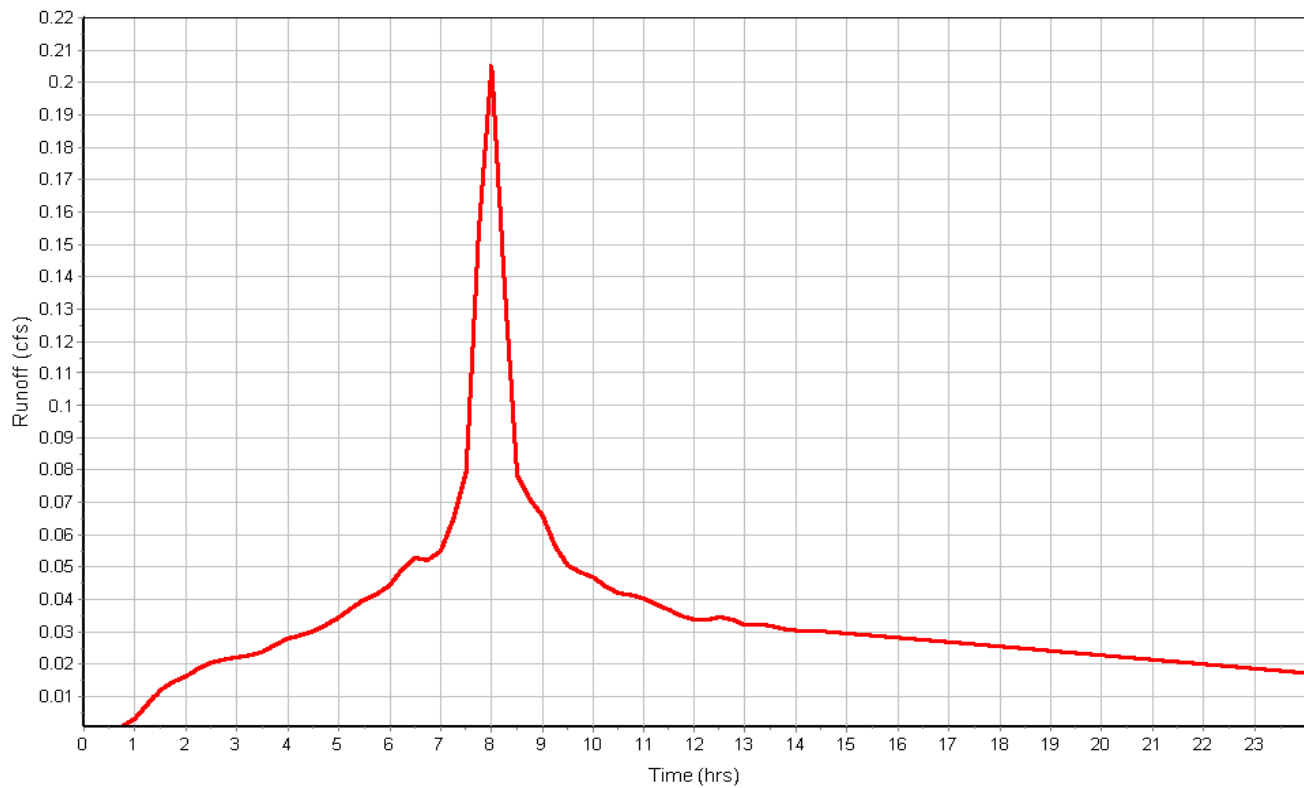
Total Rainfall (in) 3.96
 Total Runoff (in) 3.57
 Peak Runoff (cfs) 0.21
 Weighted Curve Number 96.24
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 045

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 046**Input Data**

Area (ac) 0.24
Impervious Area (%) 86.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

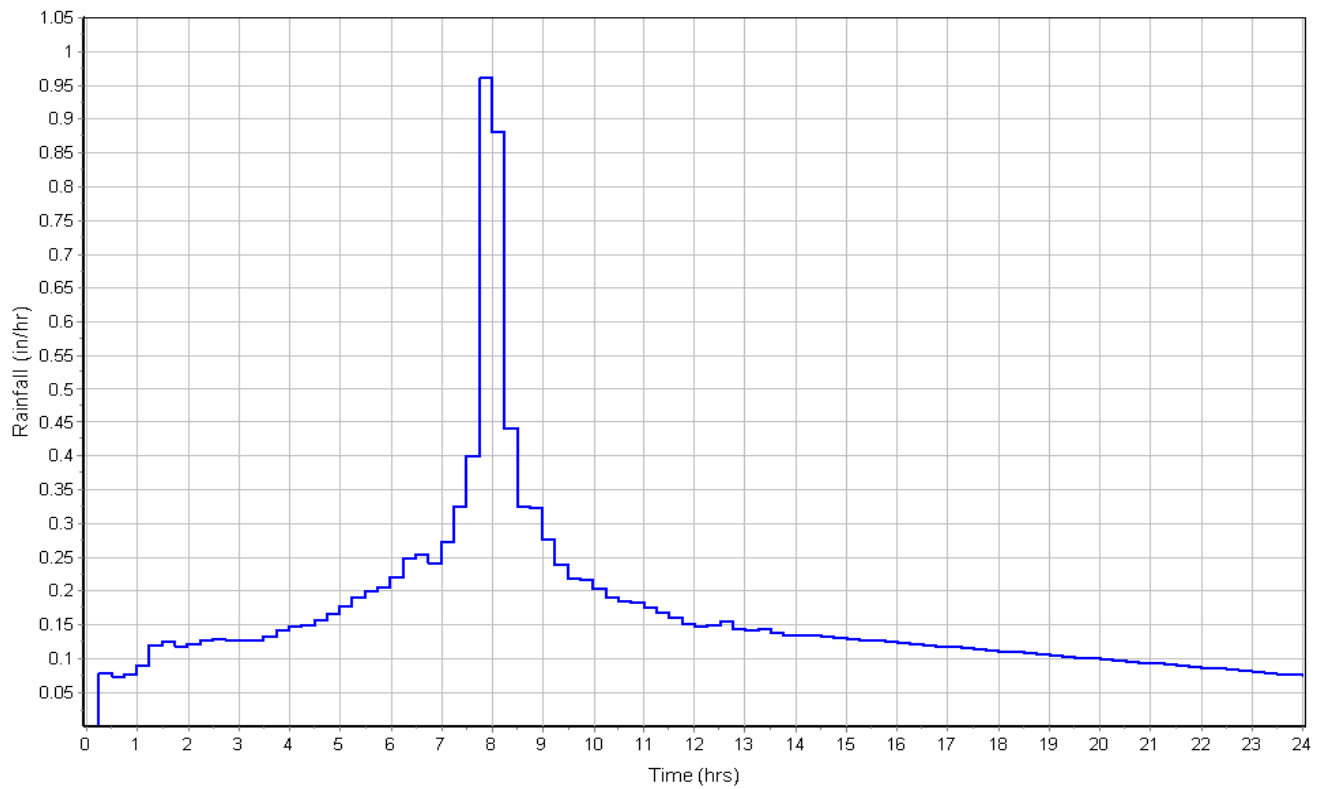
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.24		94.92

Subbasin Runoff Results

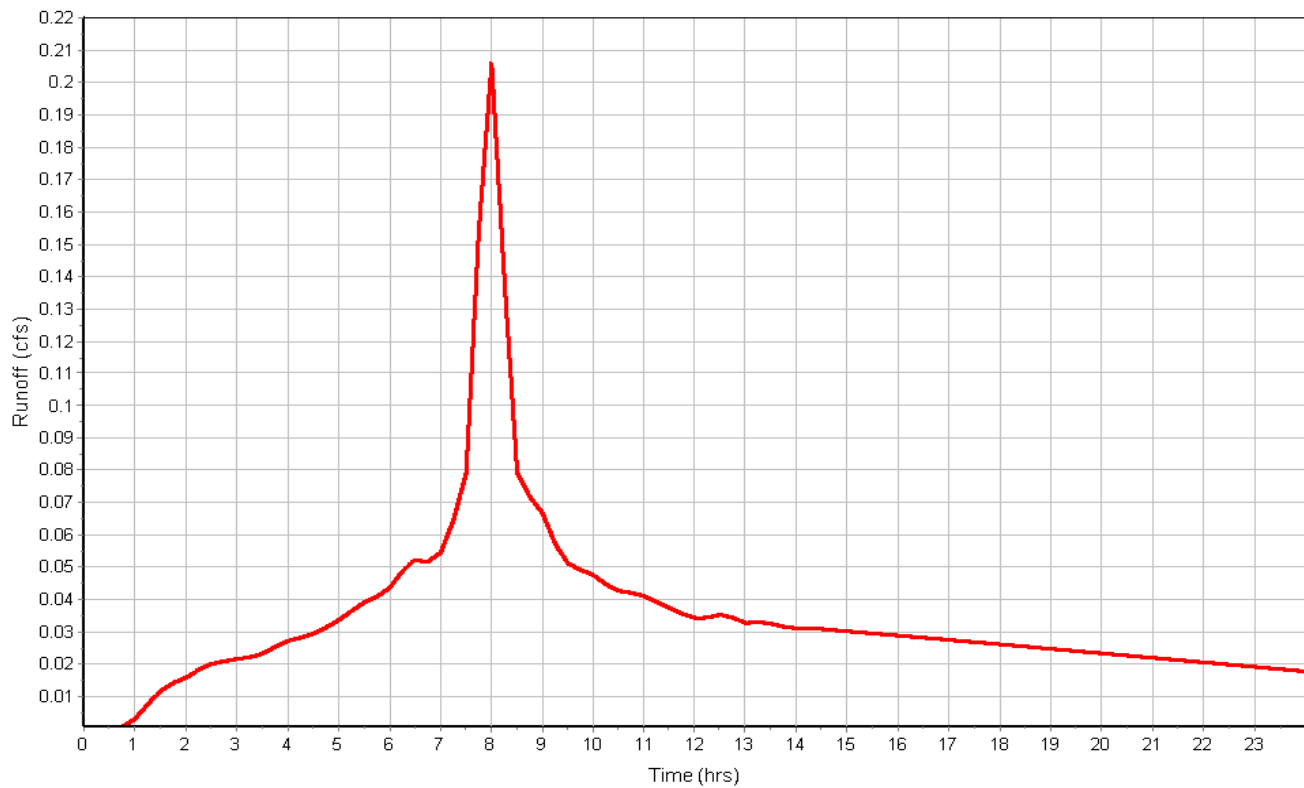
Total Rainfall (in) 3.96
Total Runoff (in) 3.45
Peak Runoff (cfs) 0.21
Weighted Curve Number 94.92
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 046

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 047**Input Data**

Area (ac) 0.28
Impervious Area (%) 52.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

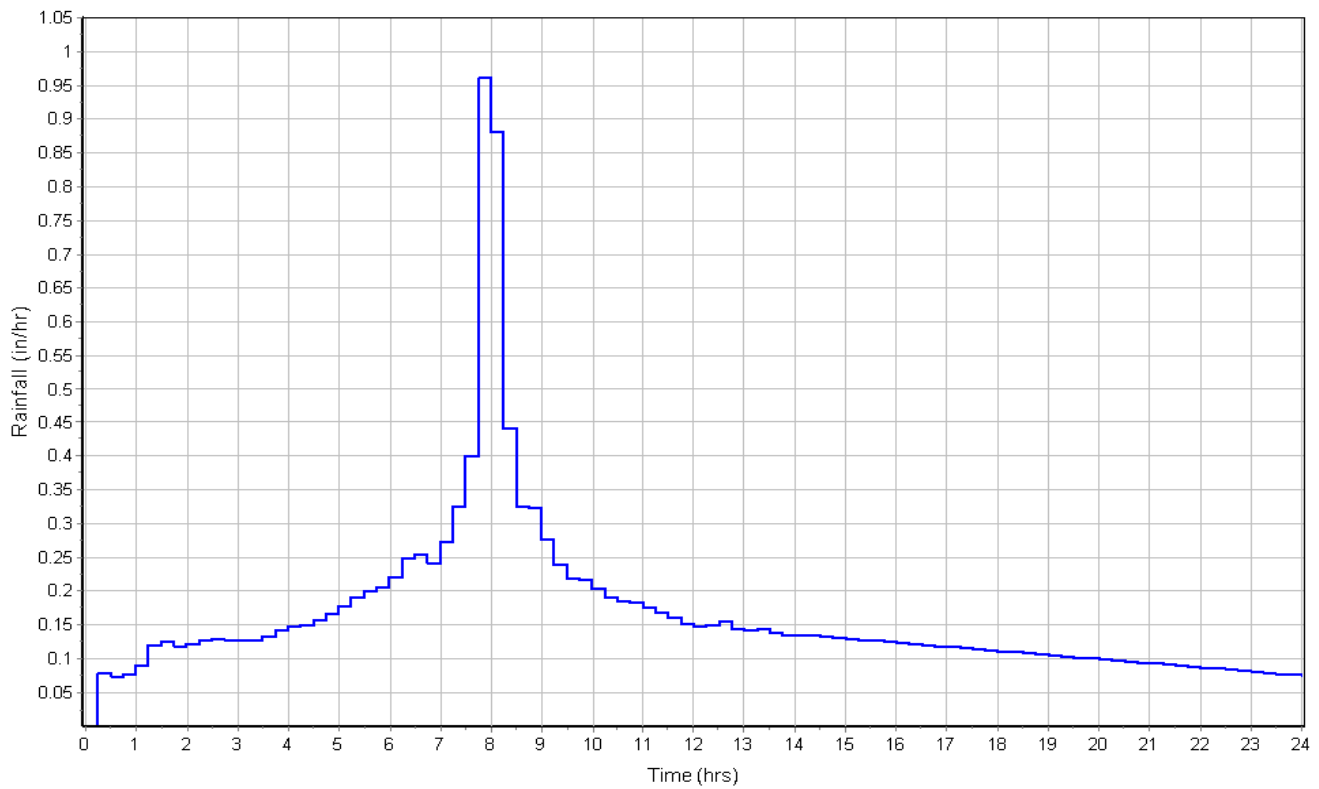
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.28		87.44

Subbasin Runoff Results

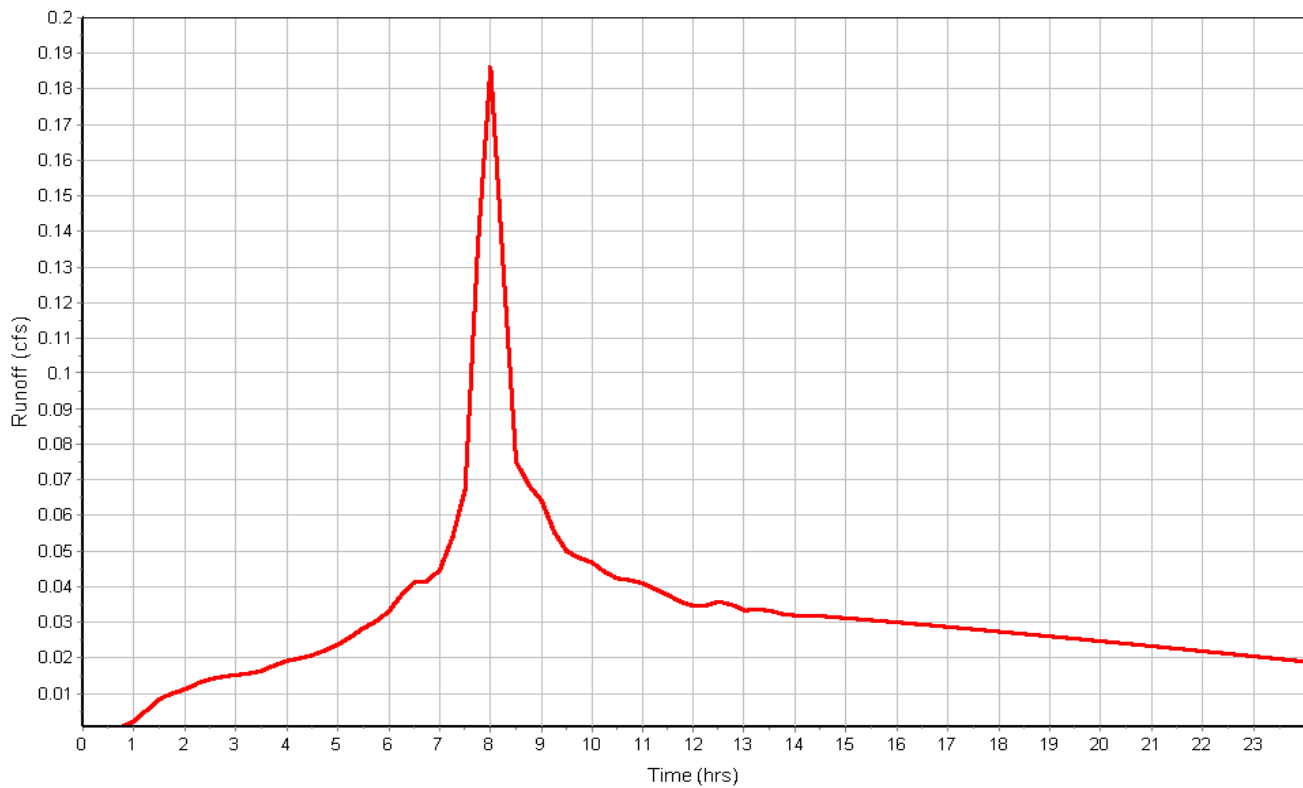
Total Rainfall (in) 3.96
Total Runoff (in) 2.76
Peak Runoff (cfs) 0.19
Weighted Curve Number 87.44
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 047

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 048**Input Data**

Area (ac) 0.19
Impervious Area (%) 51.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

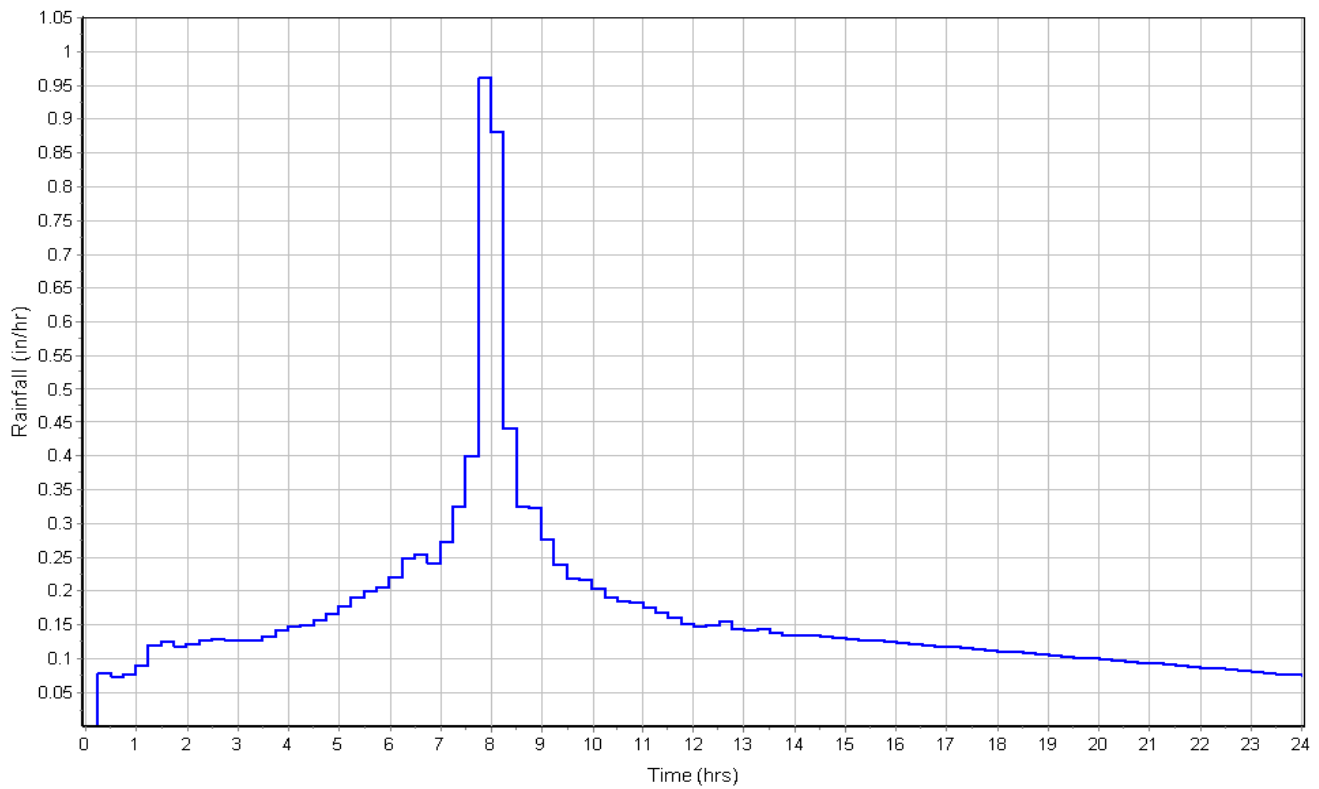
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.19		87.22

Subbasin Runoff Results

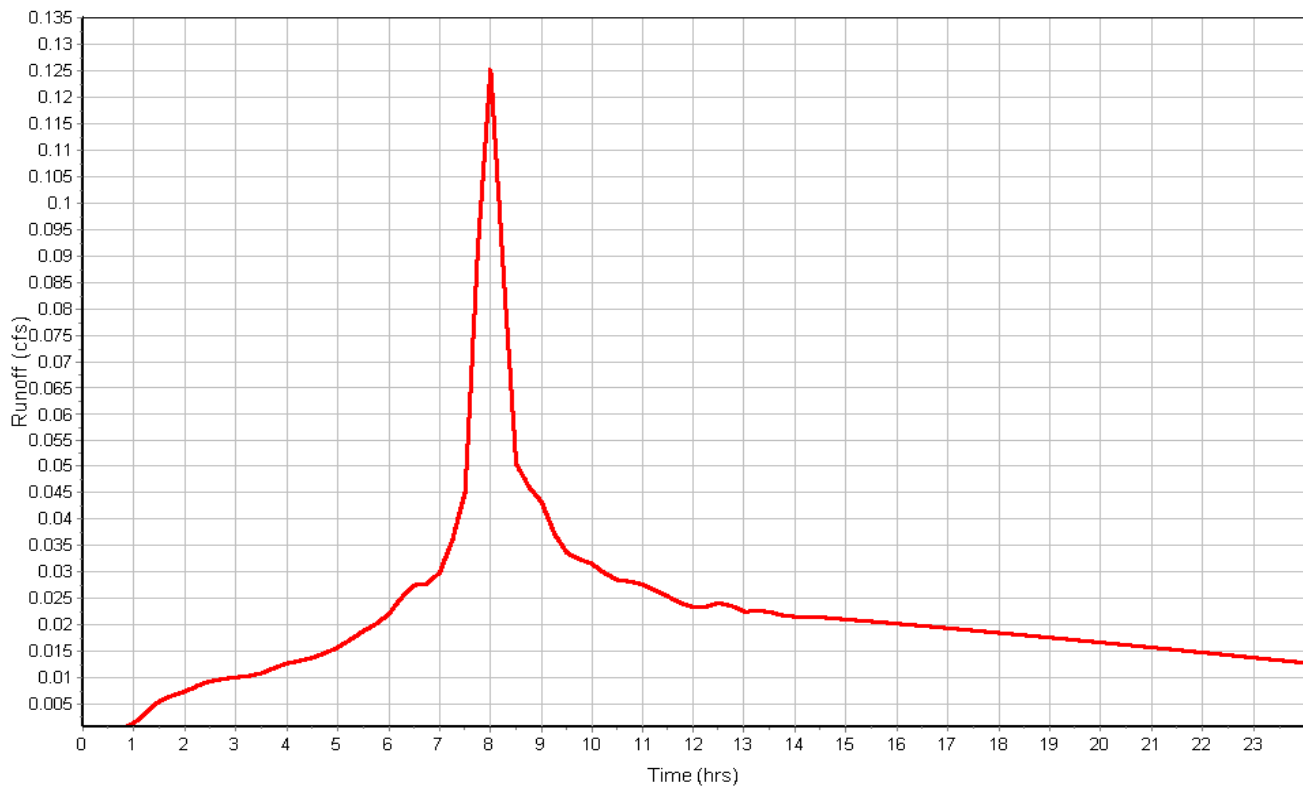
Total Rainfall (in) 3.96
Total Runoff (in) 2.74
Peak Runoff (cfs) 0.13
Weighted Curve Number 87.22
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 048

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 049**Input Data**

Area (ac) 0.16
Impervious Area (%) 69.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

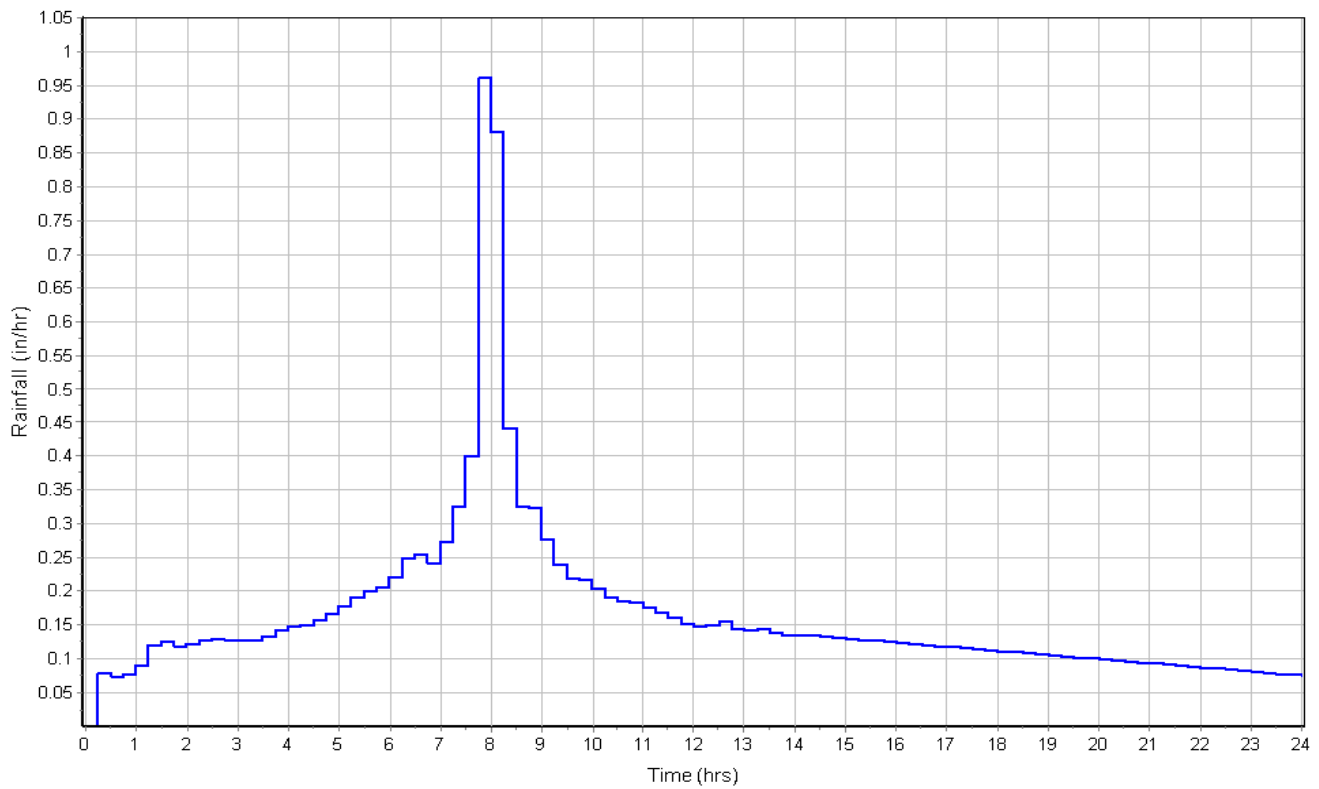
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.16		91.18

Subbasin Runoff Results

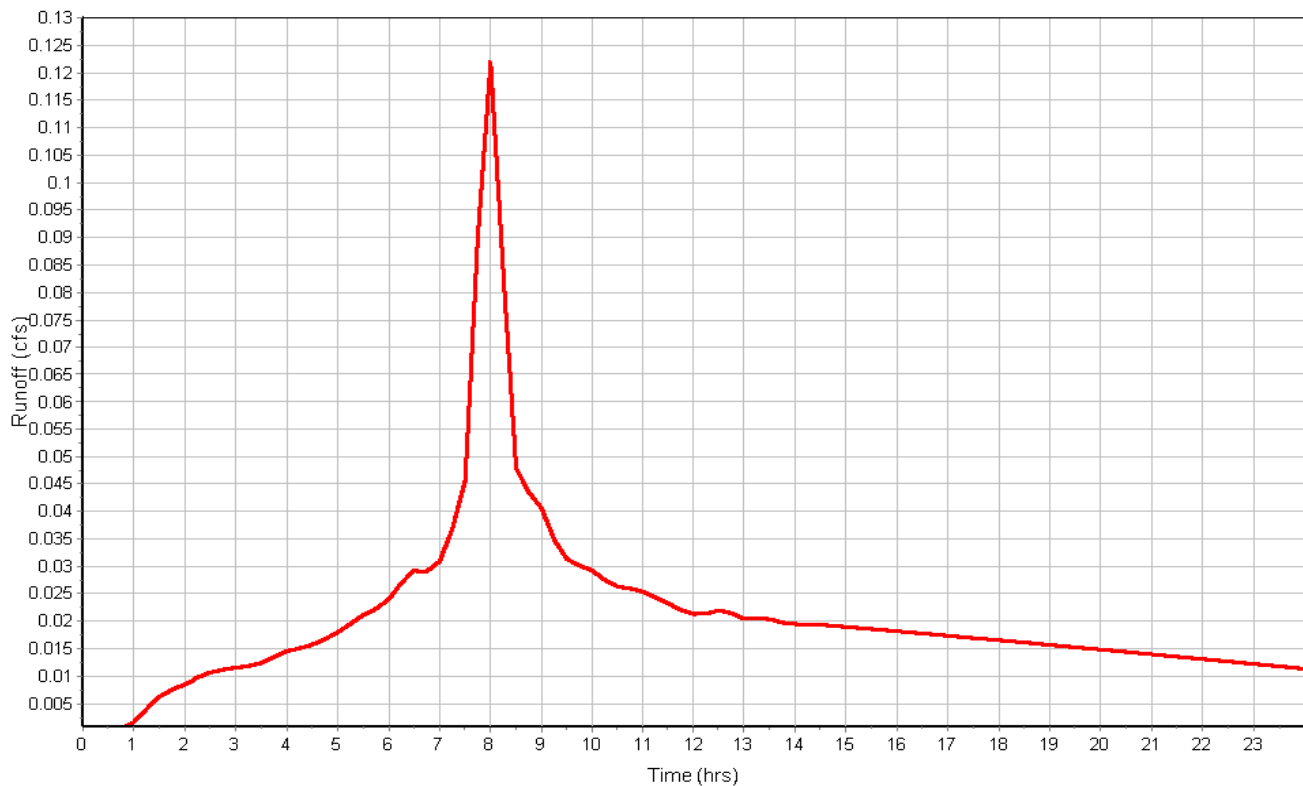
Total Rainfall (in) 3.96
Total Runoff (in) 3.10
Peak Runoff (cfs) 0.12
Weighted Curve Number 91.18
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 049

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 050**Input Data**

Area (ac) 0.10
Impervious Area (%) 56.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

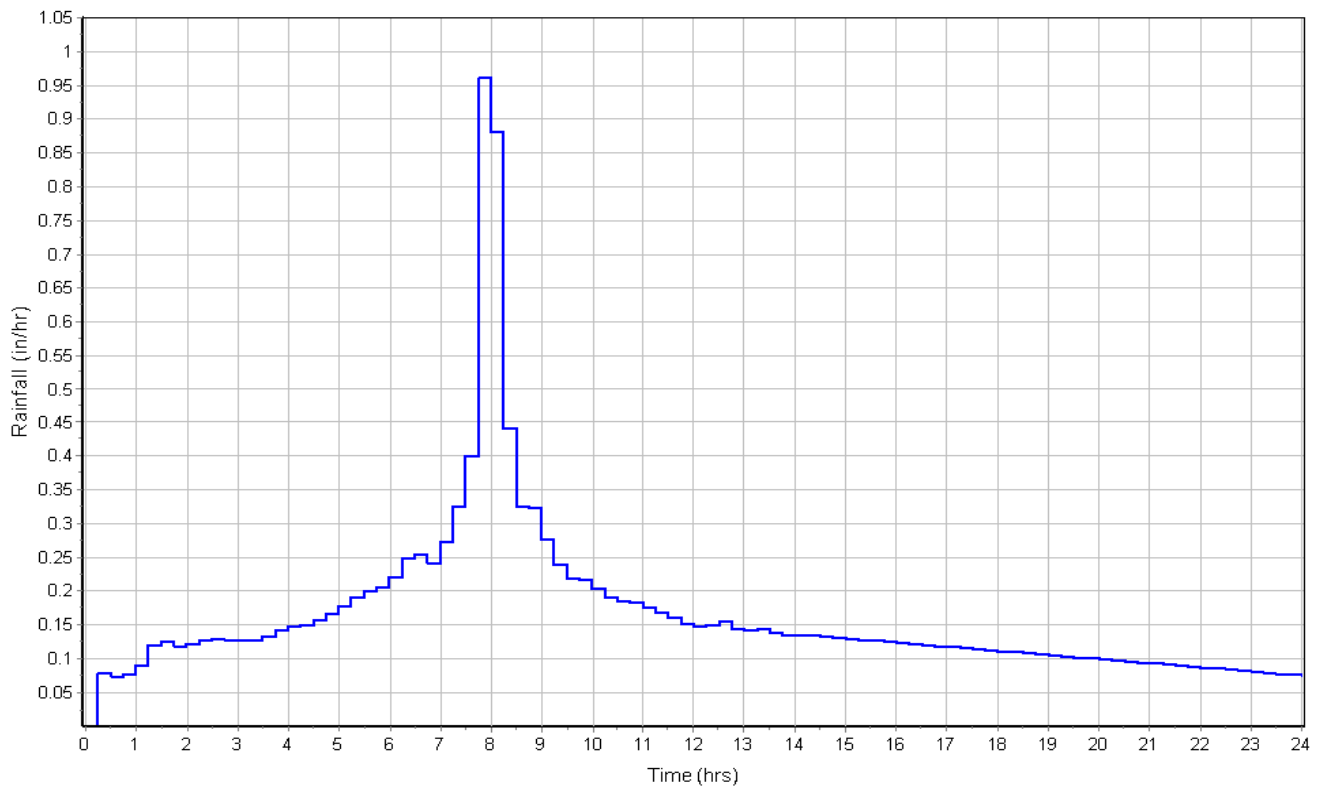
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.10		88.32

Subbasin Runoff Results

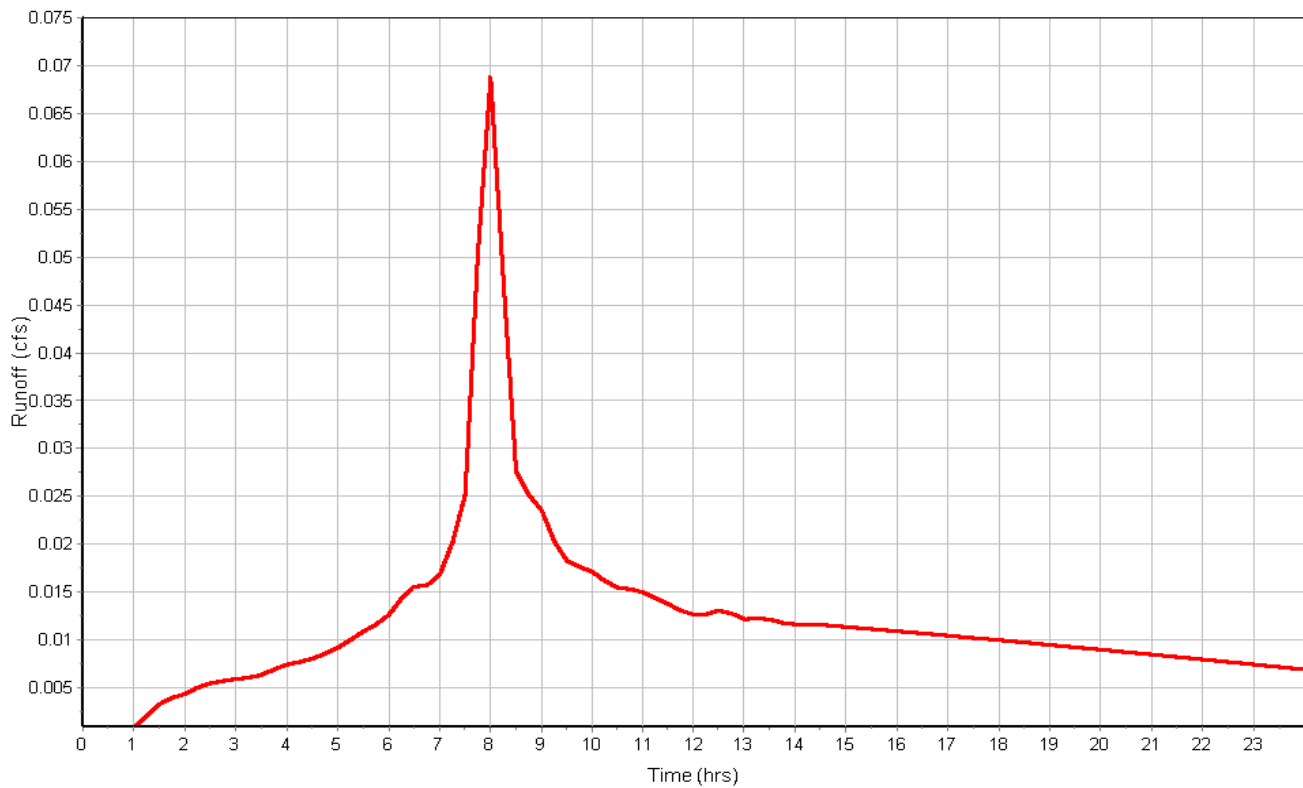
Total Rainfall (in) 3.96
Total Runoff (in) 2.84
Peak Runoff (cfs) 0.07
Weighted Curve Number 88.32
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 050

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 051**Input Data**

Area (ac) 0.23
Impervious Area (%) 57.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

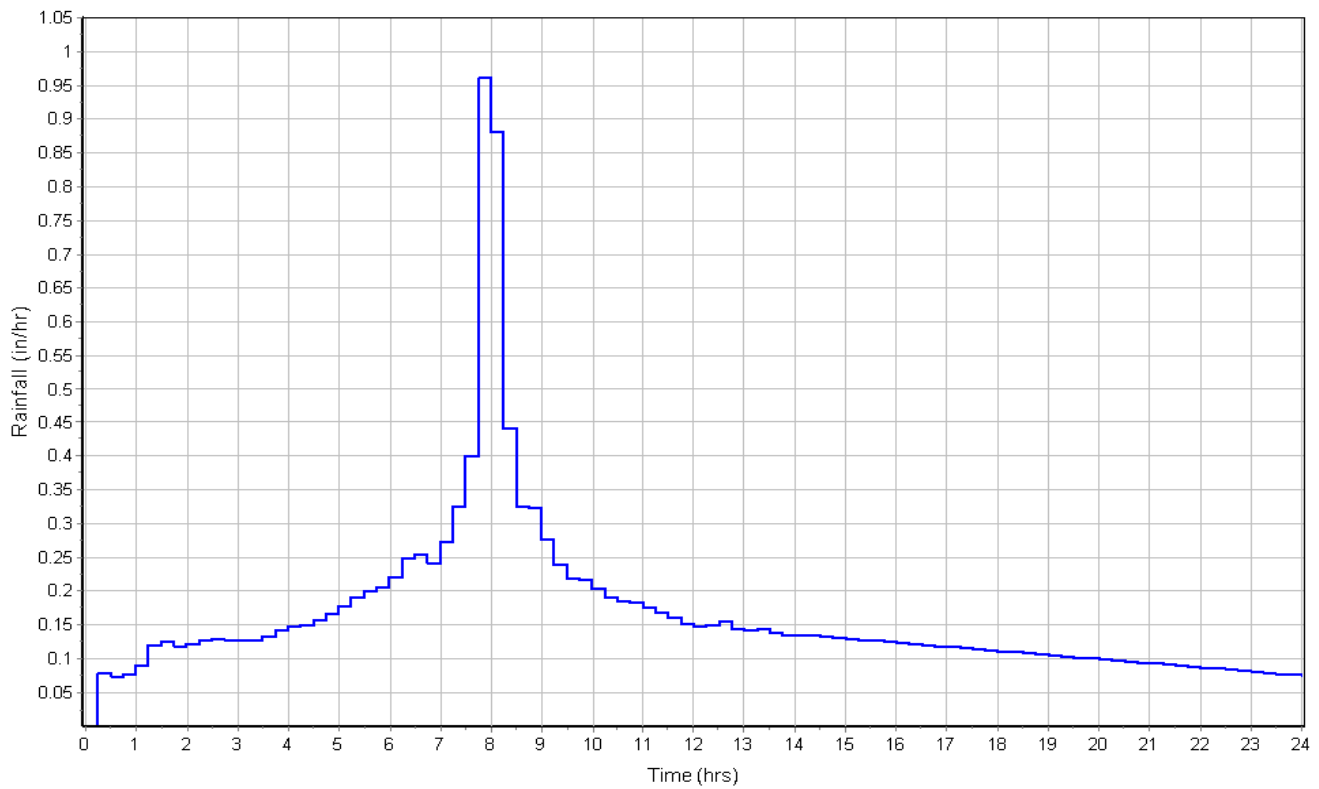
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.23		88.54

Subbasin Runoff Results

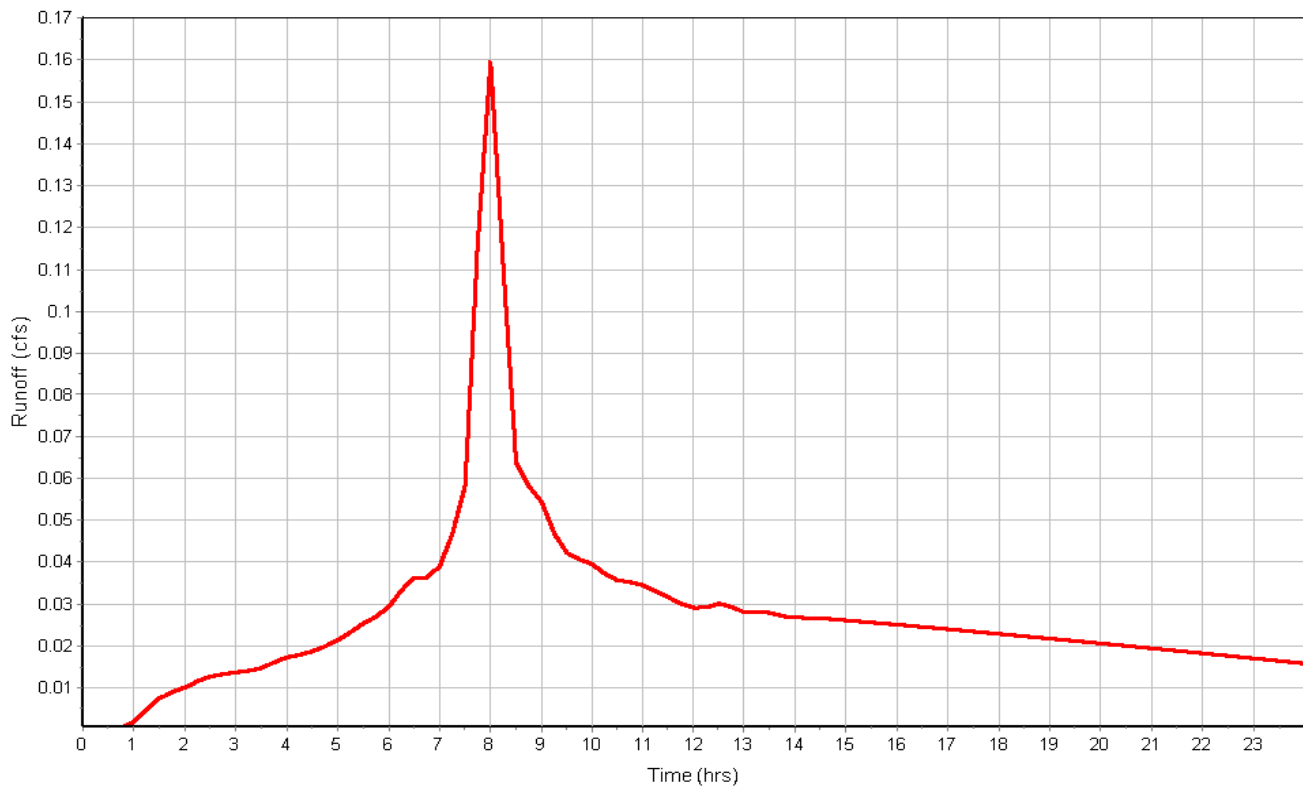
Total Rainfall (in) 3.96
Total Runoff (in) 2.86
Peak Runoff (cfs) 0.16
Weighted Curve Number 88.54
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 051

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 052**Input Data**

Area (ac) 0.15
Impervious Area (%) 62.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

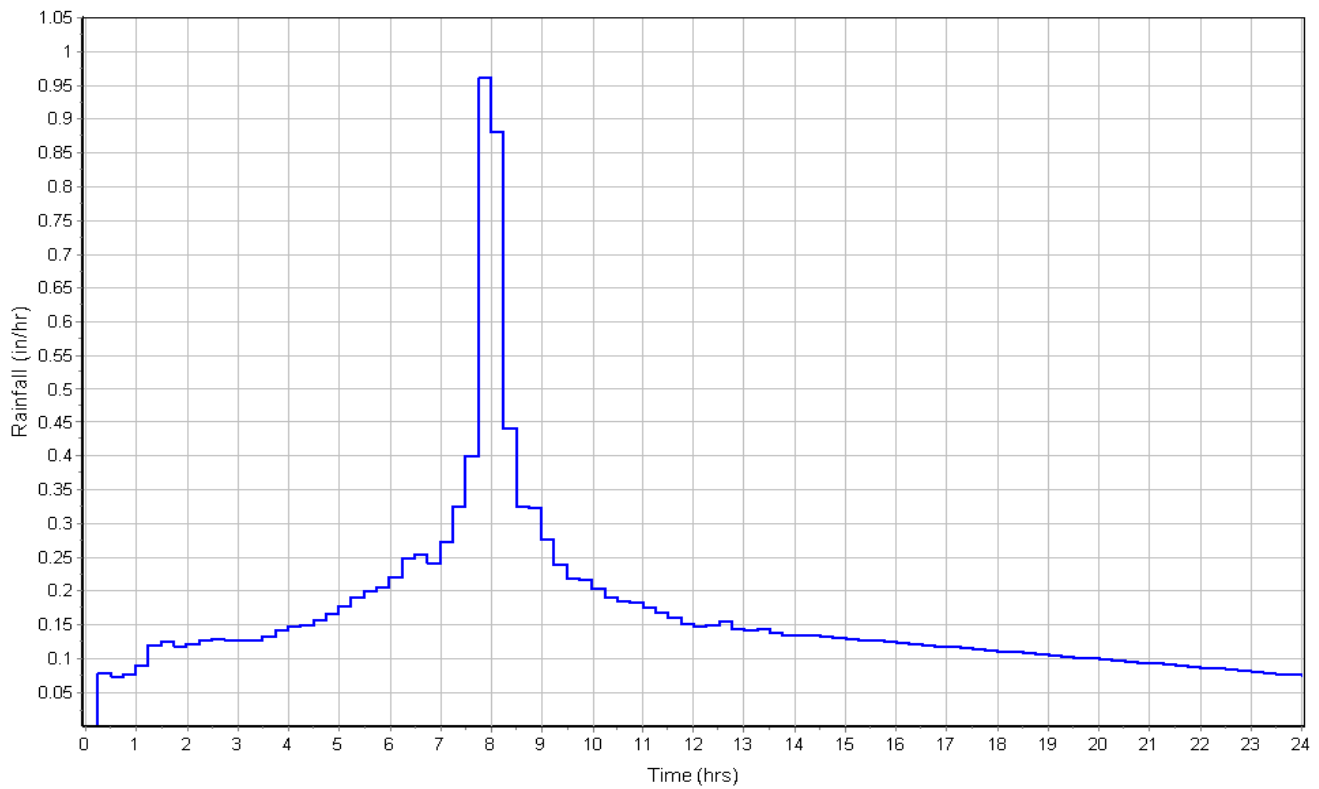
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.15		89.64

Subbasin Runoff Results

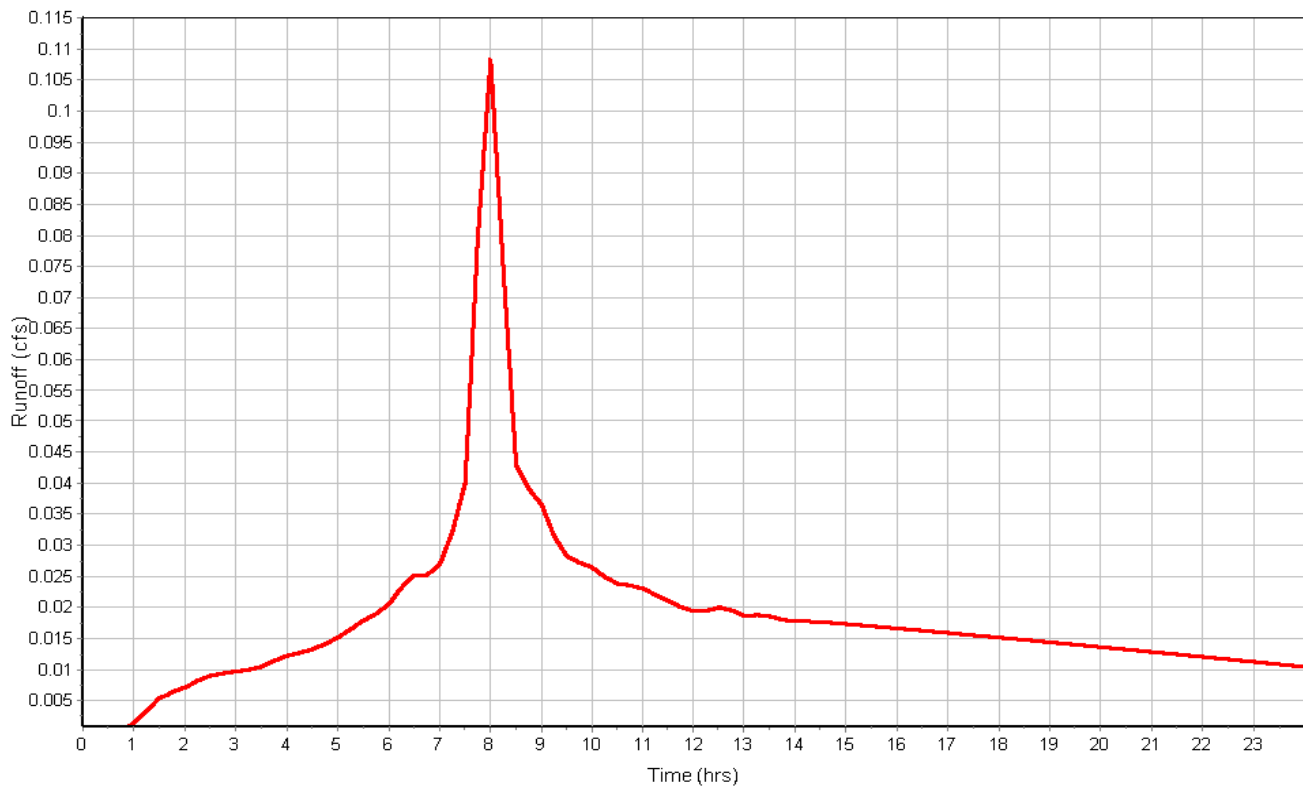
Total Rainfall (in) 3.96
Total Runoff (in) 2.96
Peak Runoff (cfs) 0.11
Weighted Curve Number 89.64
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 052

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 053**Input Data**

Area (ac) 0.47
Impervious Area (%) 70.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

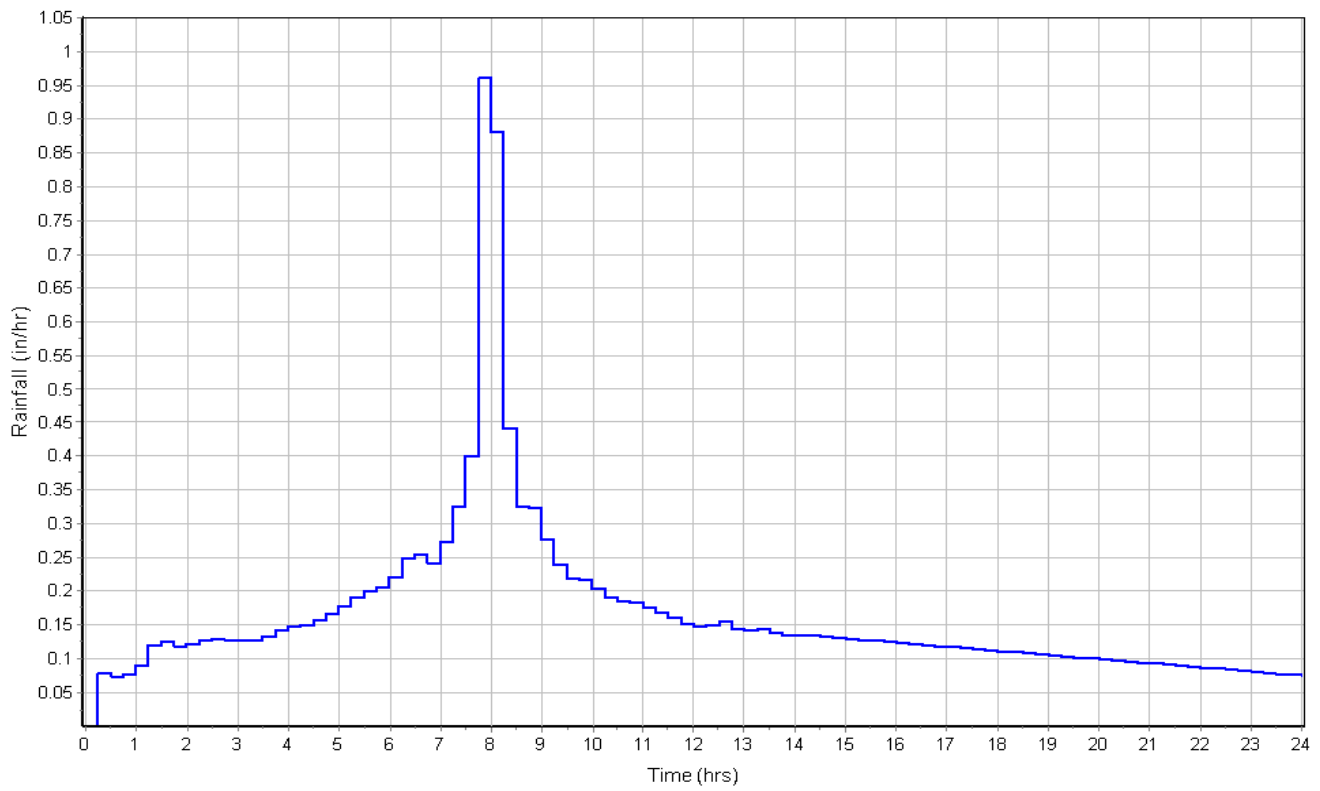
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.47		91.4

Subbasin Runoff Results

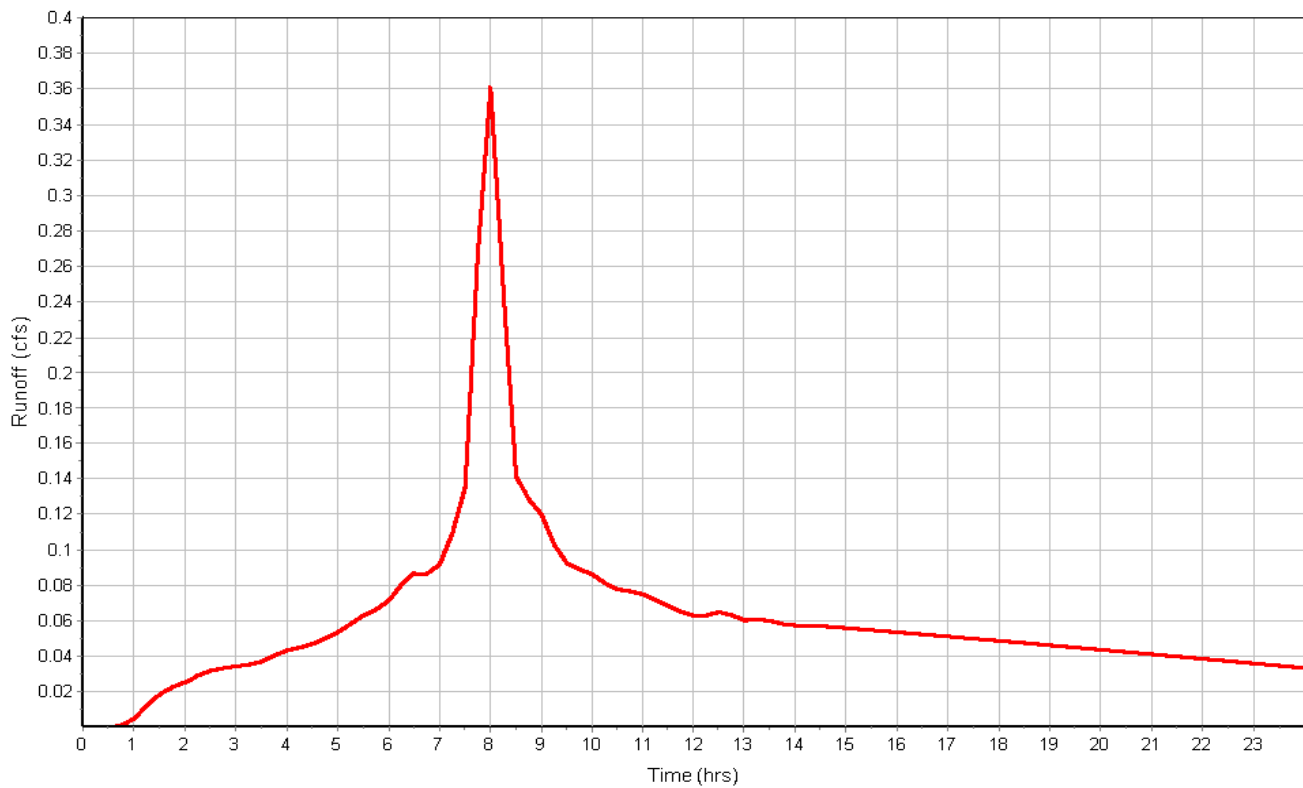
Total Rainfall (in) 3.96
Total Runoff (in) 3.13
Peak Runoff (cfs) 0.36
Weighted Curve Number 91.40
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 053

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 054**Input Data**

Area (ac) 0.15
 Impervious Area (%) 82.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

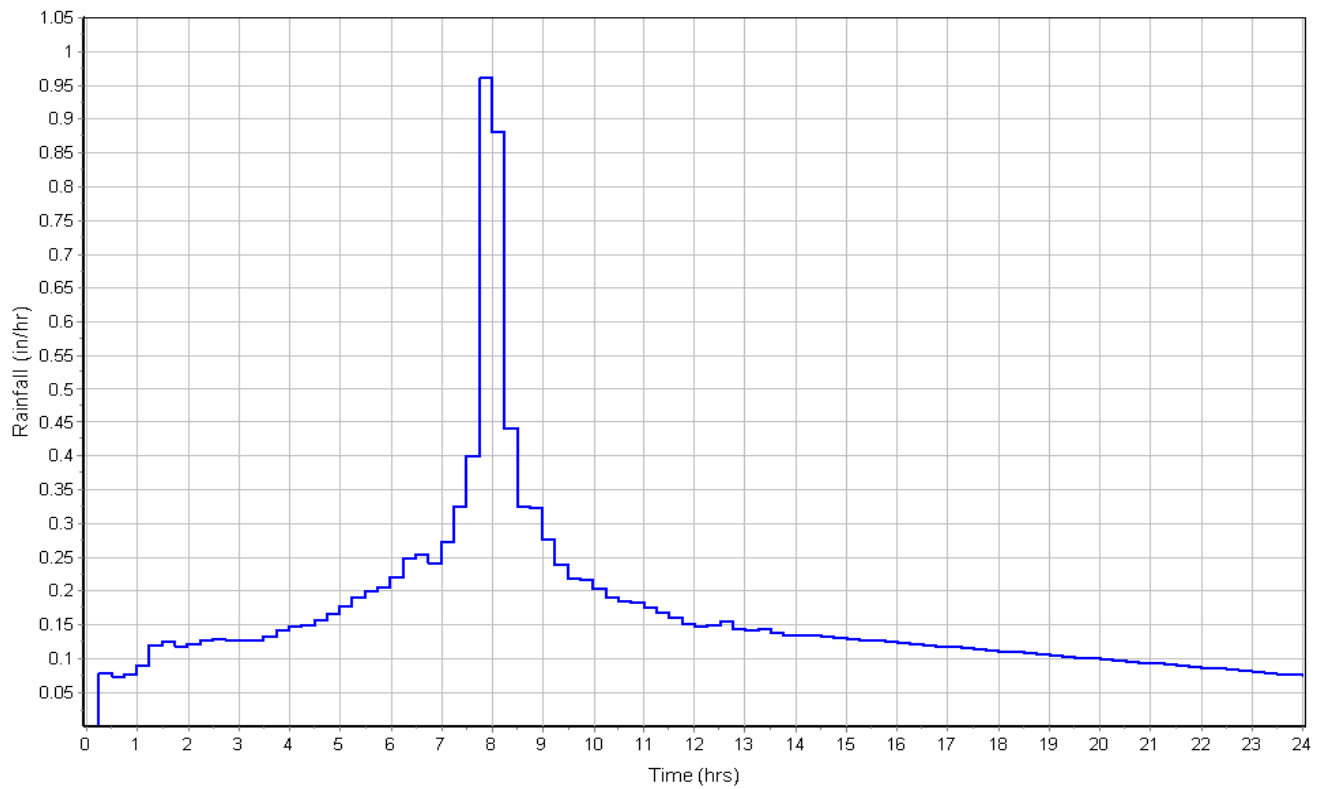
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.15		94.04

Subbasin Runoff Results

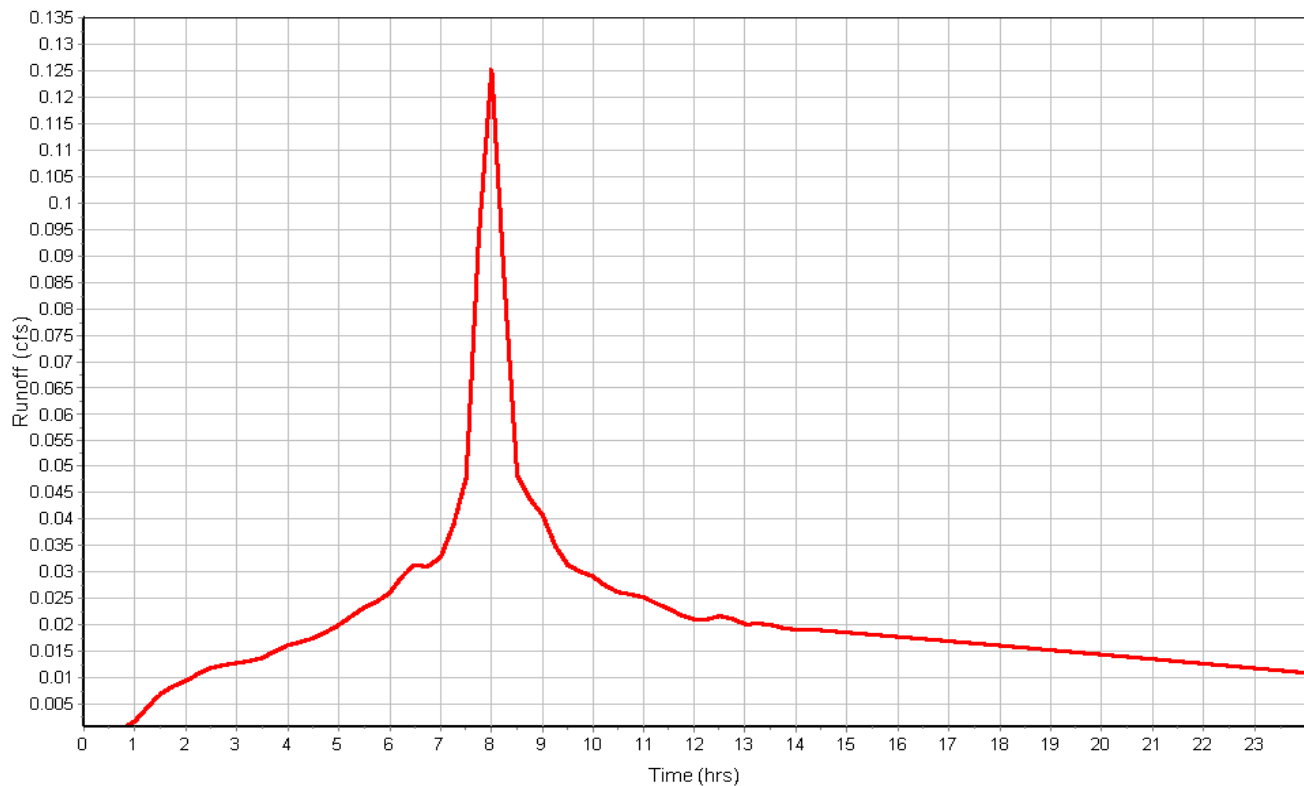
Total Rainfall (in) 3.96
 Total Runoff (in) 3.37
 Peak Runoff (cfs) 0.13
 Weighted Curve Number 94.04
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 054

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 055**Input Data**

Area (ac) 0.22
Impervious Area (%) 38.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

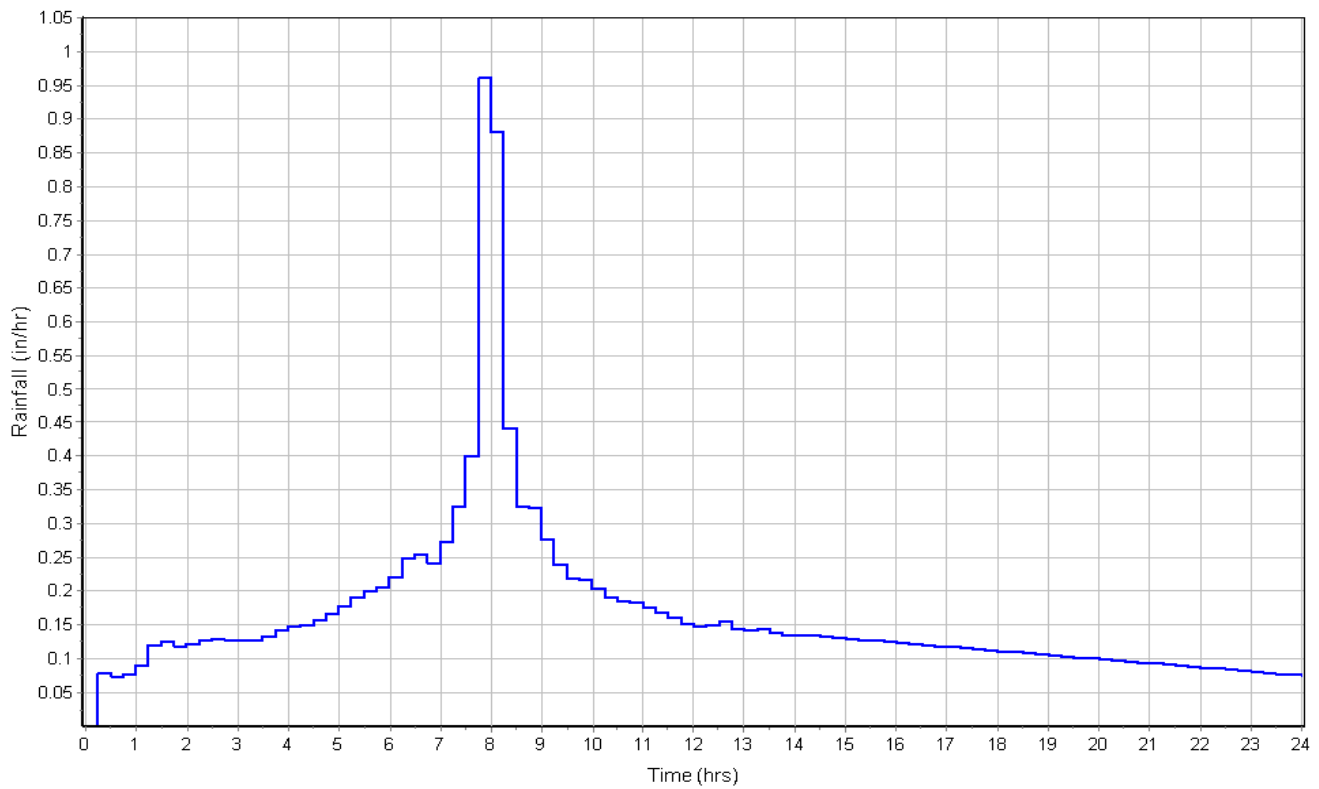
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.22		84.36

Subbasin Runoff Results

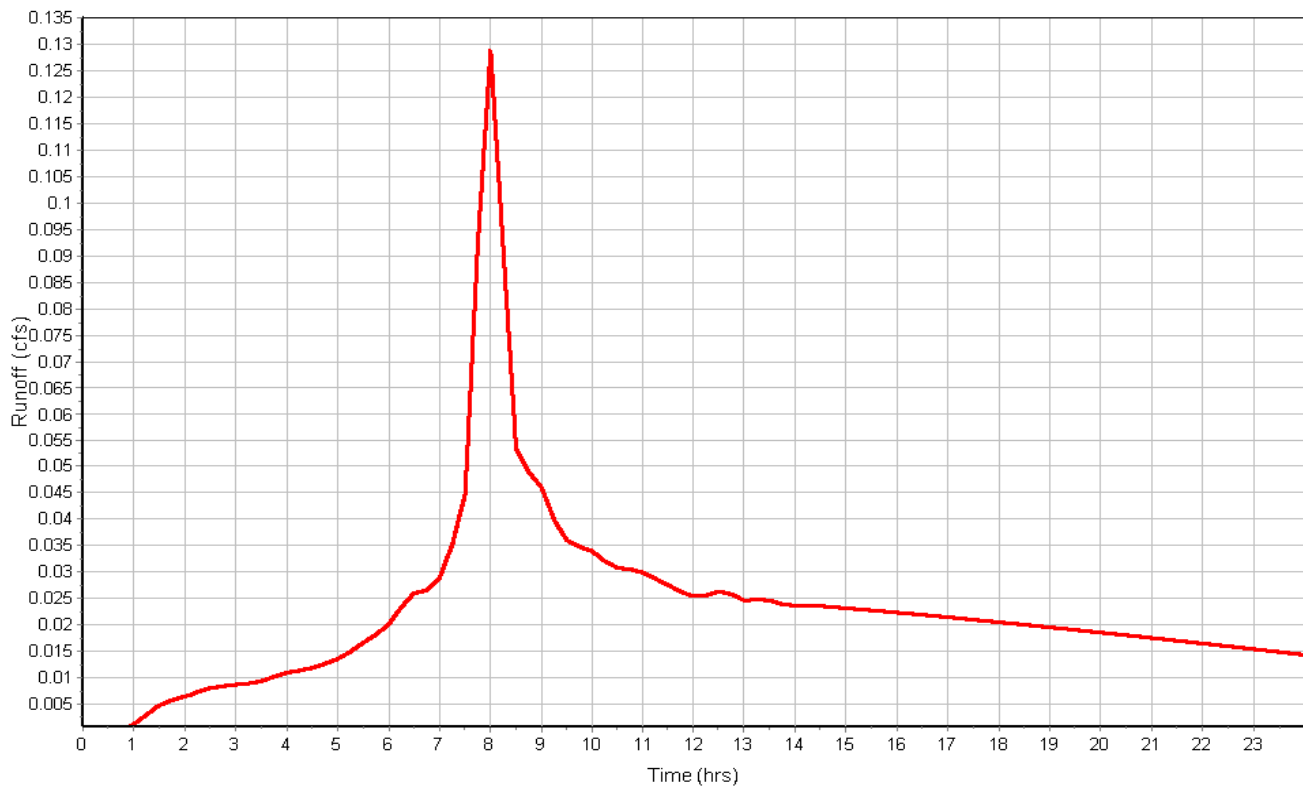
Total Rainfall (in) 3.96
Total Runoff (in) 2.48
Peak Runoff (cfs) 0.13
Weighted Curve Number 84.36
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 055

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 056**Input Data**

Area (ac) 0.12
Impervious Area (%) 34.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

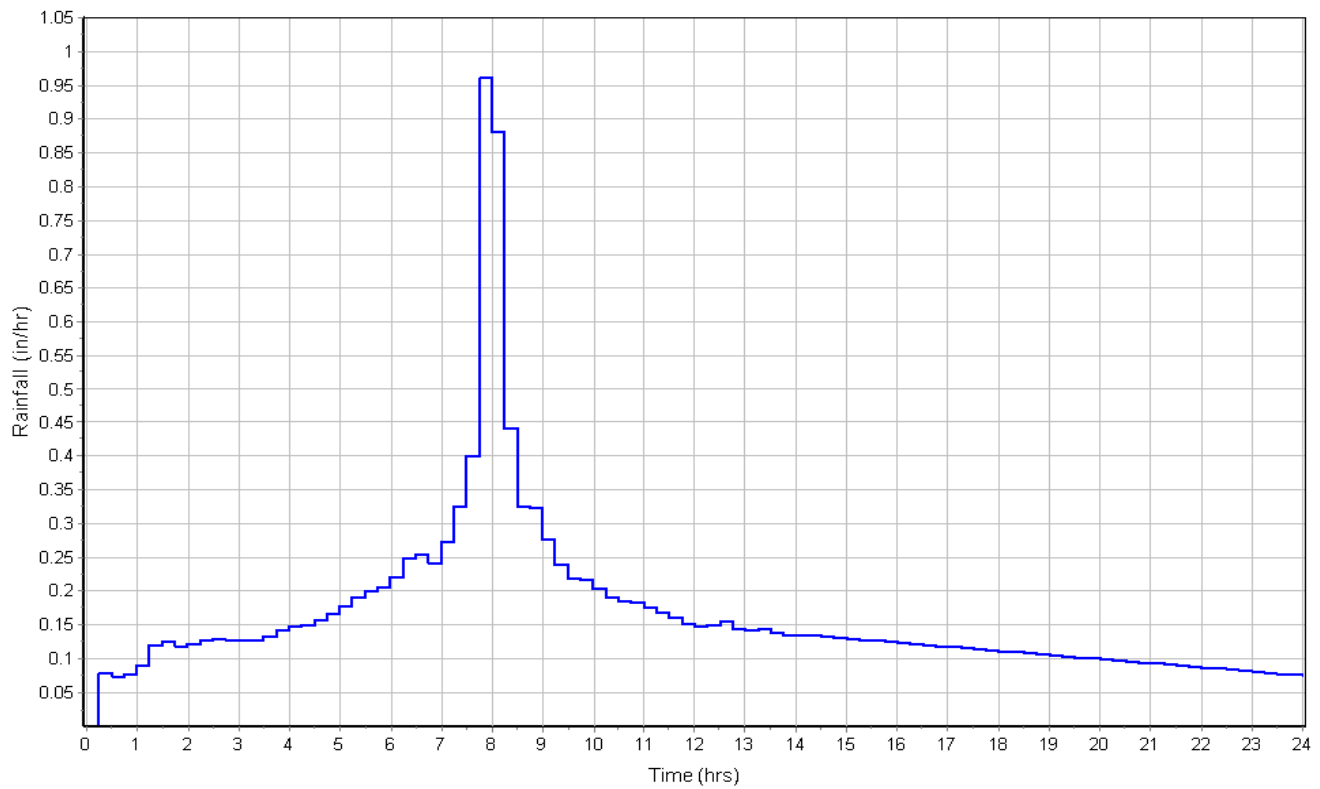
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.12		83.48

Subbasin Runoff Results

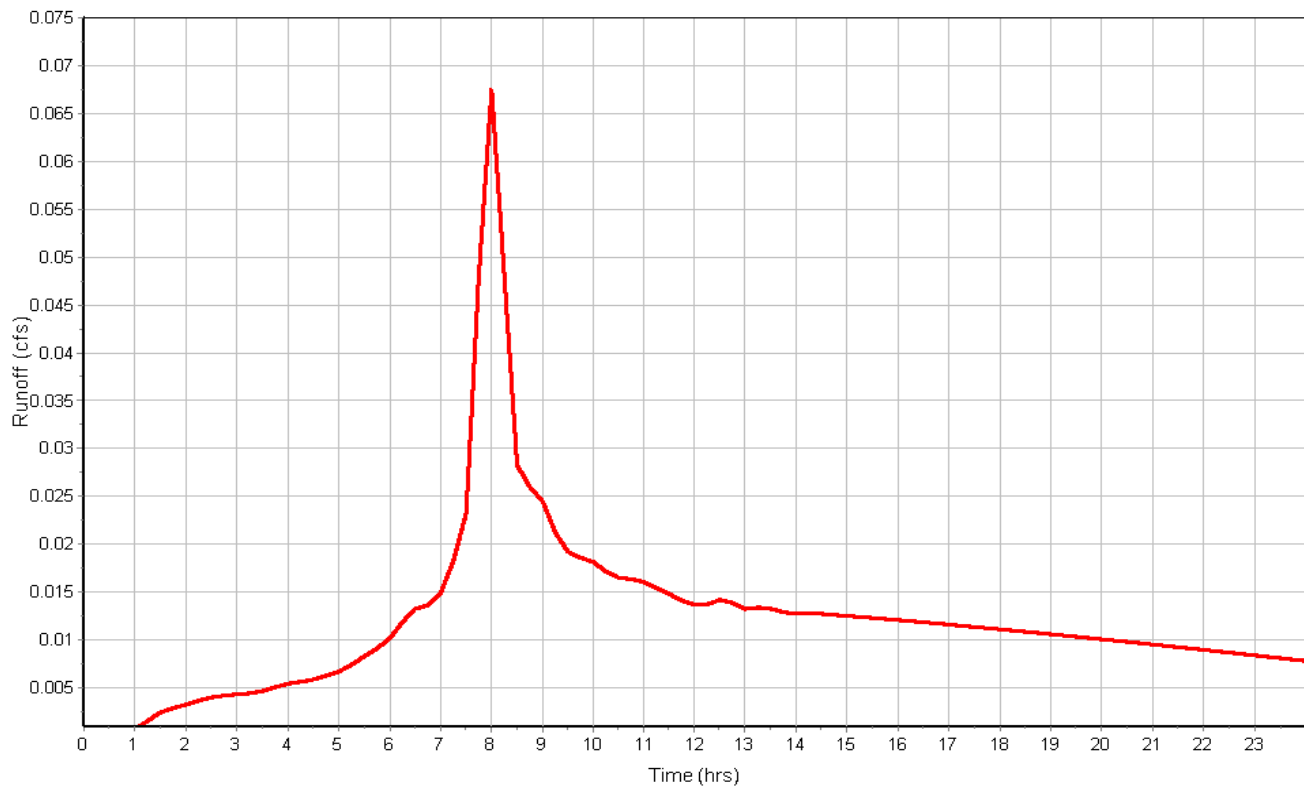
Total Rainfall (in) 3.96
Total Runoff (in) 2.40
Peak Runoff (cfs) 0.07
Weighted Curve Number 83.48
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 056

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 057**Input Data**

Area (ac) 0.09
 Impervious Area (%) 78.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

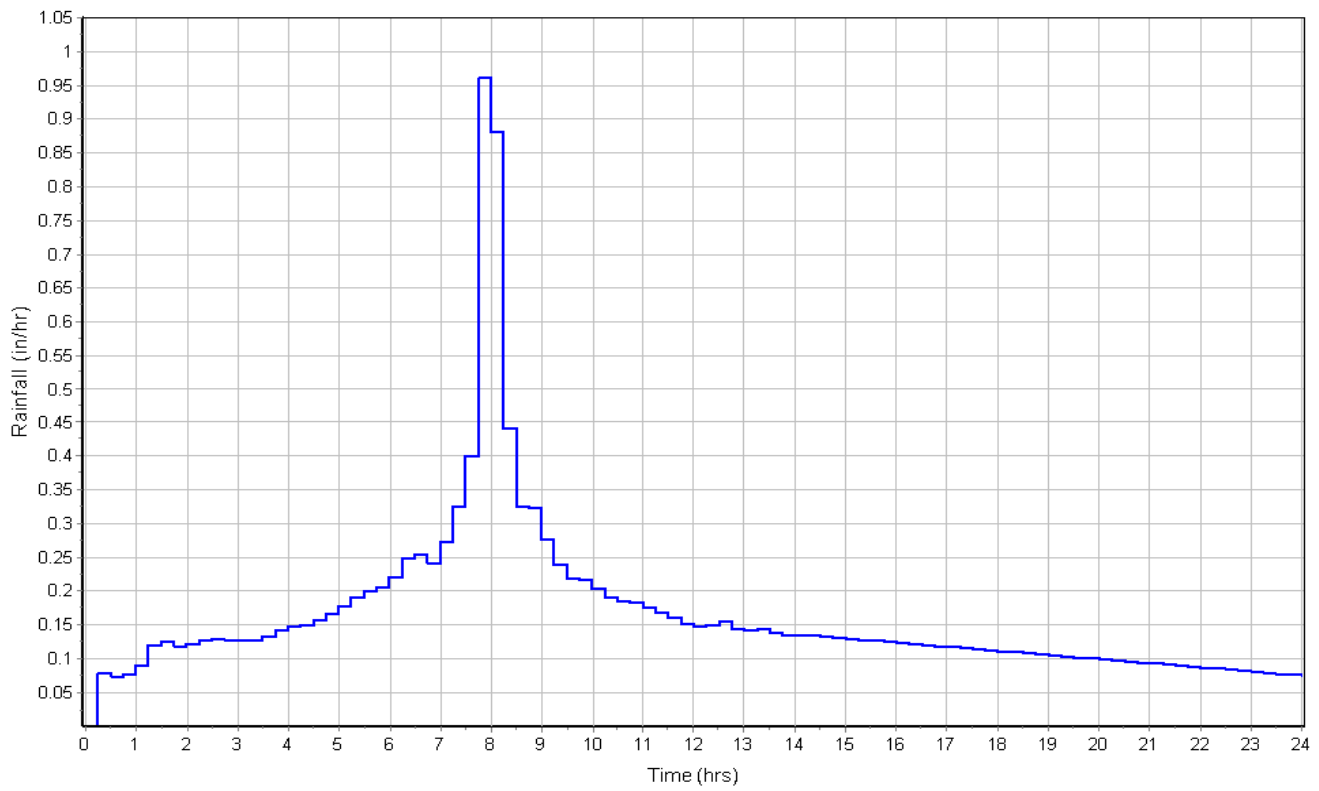
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.09		93.16

Subbasin Runoff Results

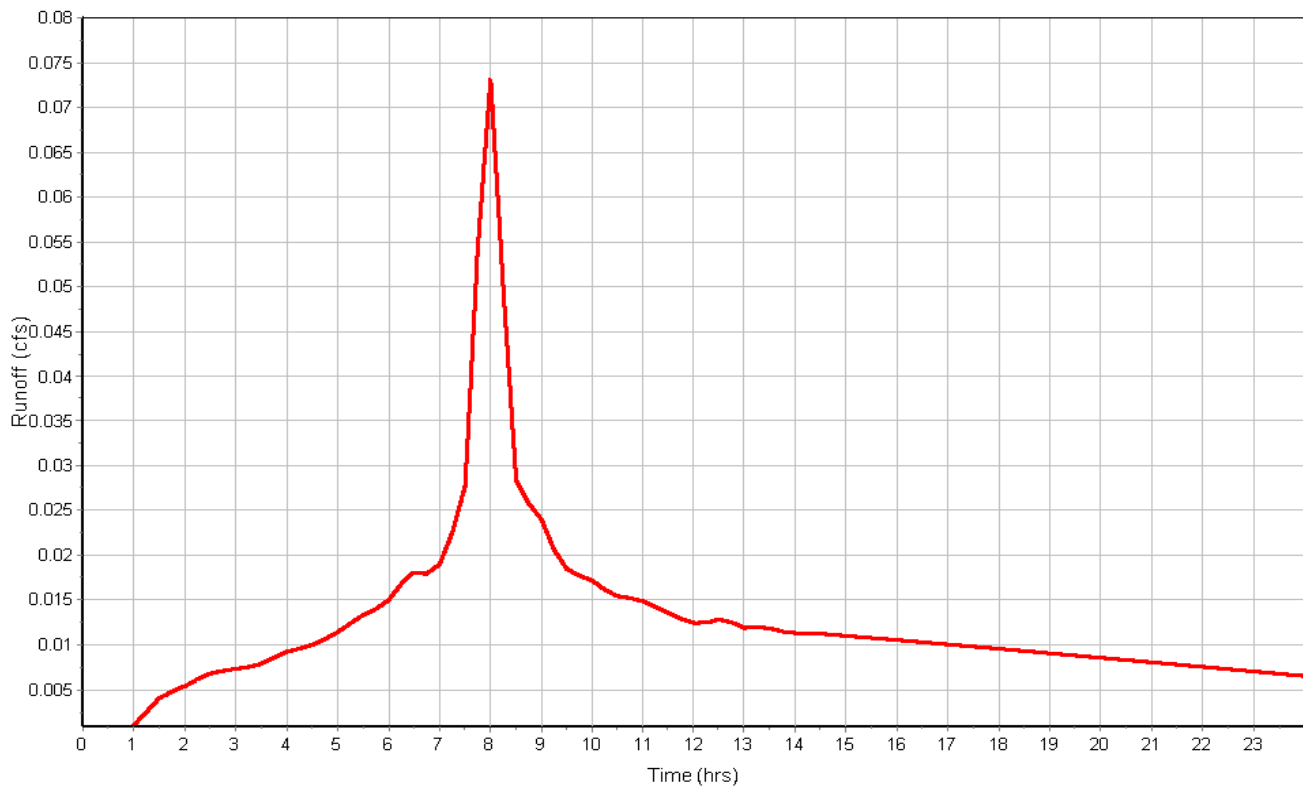
Total Rainfall (in) 3.96
 Total Runoff (in) 3.29
 Peak Runoff (cfs) 0.07
 Weighted Curve Number 93.16
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 057

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 058**Input Data**

Area (ac) 0.03
Impervious Area (%) 40.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

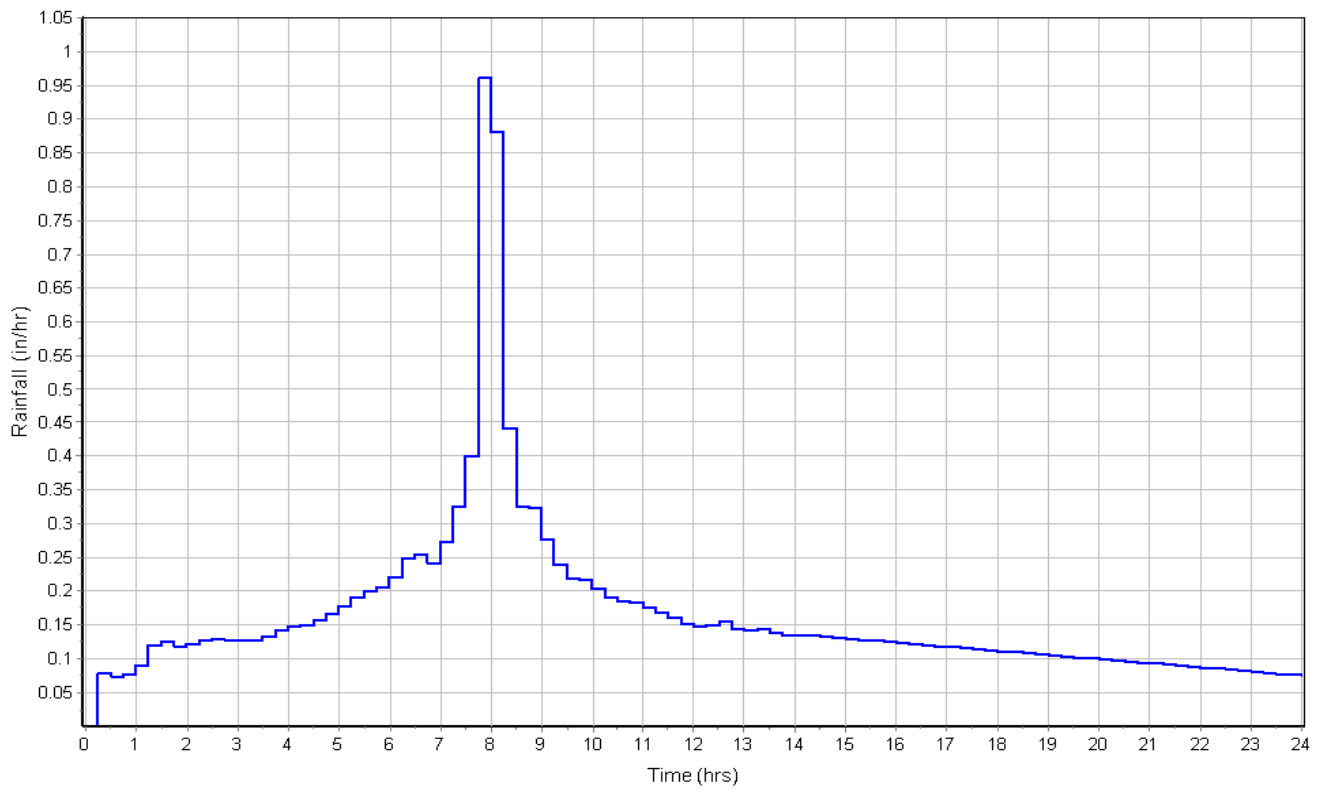
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.03		84.8

Subbasin Runoff Results

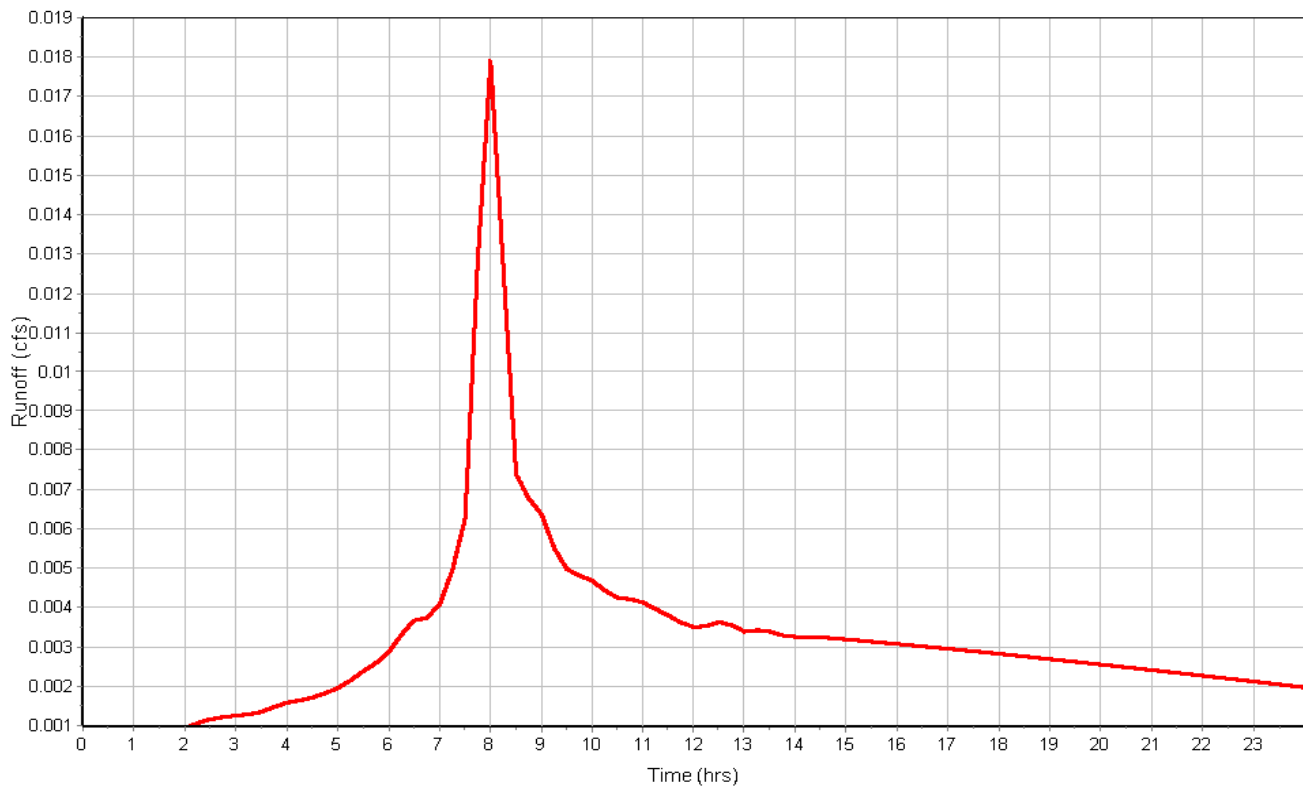
Total Rainfall (in) 3.96
Total Runoff (in) 2.52
Peak Runoff (cfs) 0.02
Weighted Curve Number 84.80
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 058

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 059**Input Data**

Area (ac) 0.17
 Impervious Area (%) 54.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

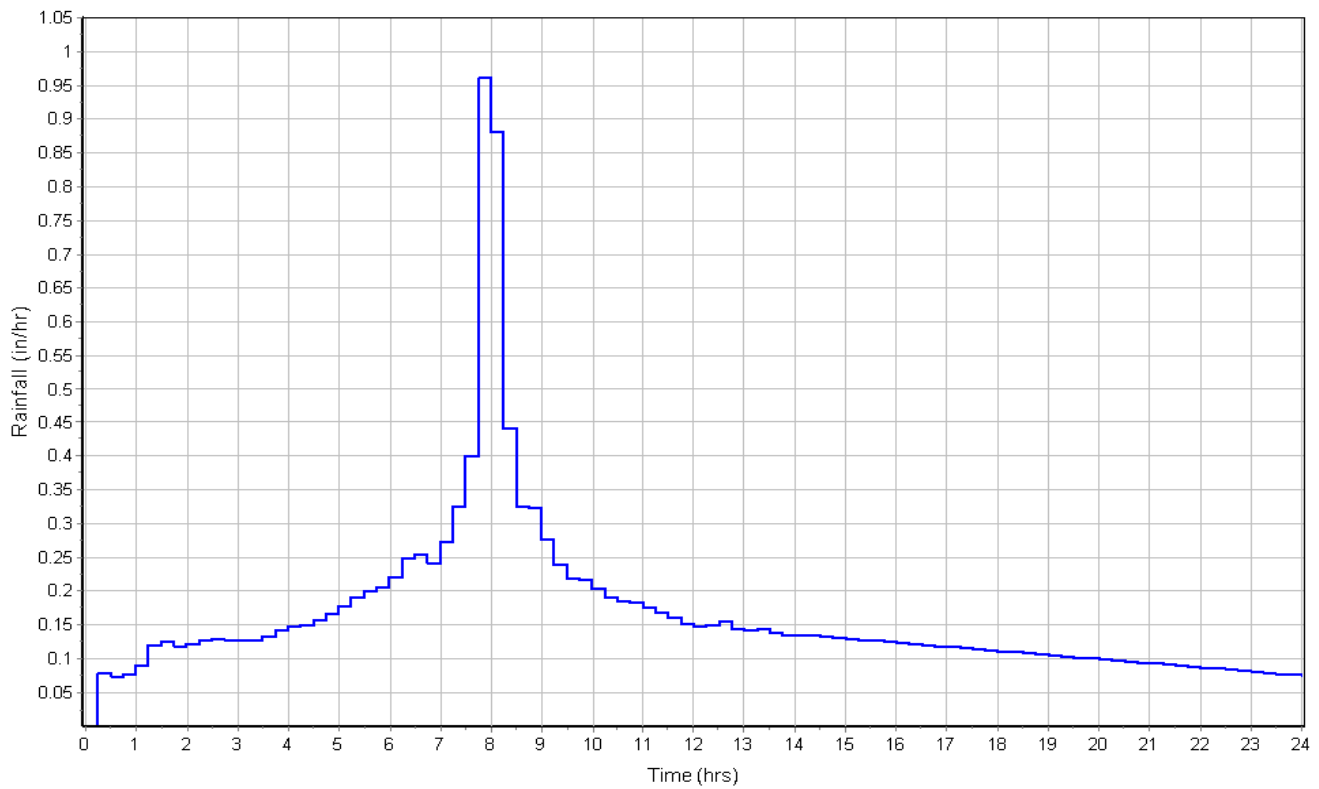
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.17		87.88

Subbasin Runoff Results

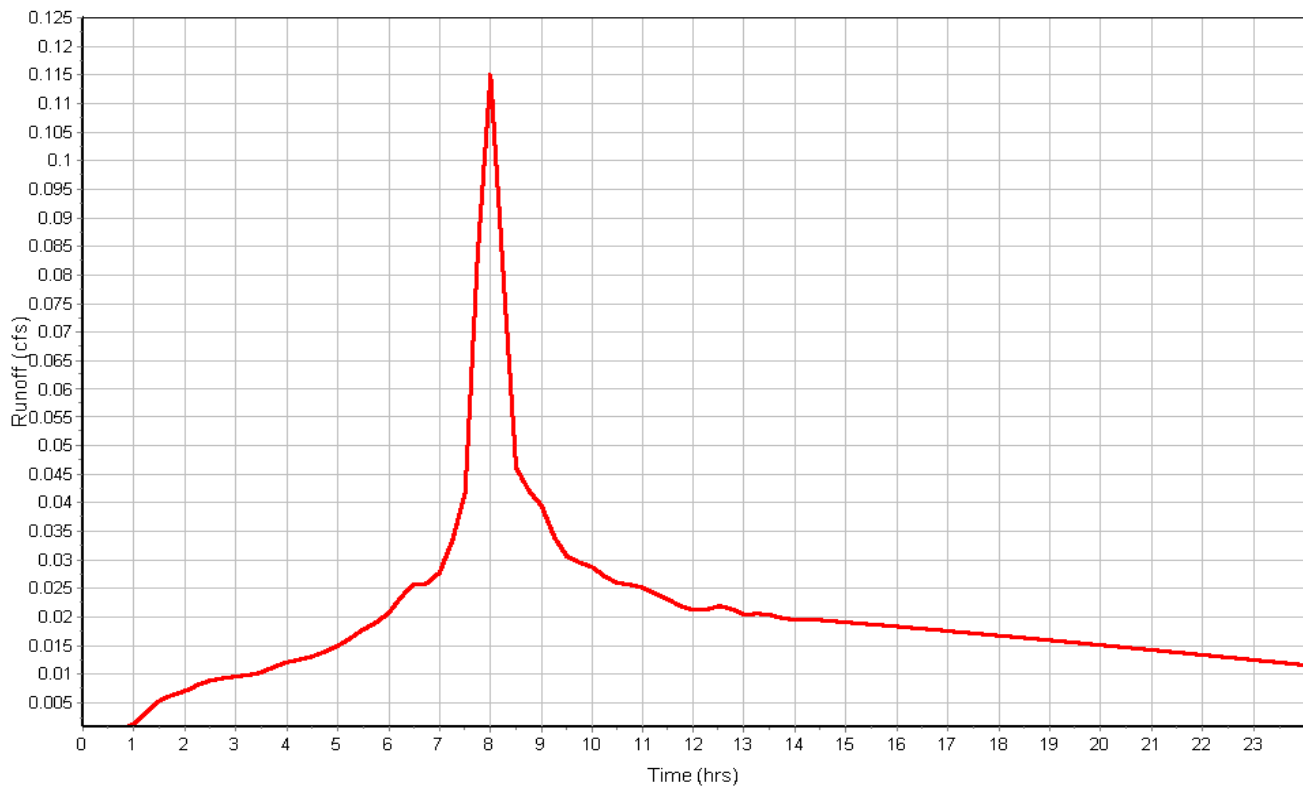
Total Rainfall (in) 3.96
 Total Runoff (in) 2.80
 Peak Runoff (cfs) 0.12
 Weighted Curve Number 87.88
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 059

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 060**Input Data**

Area (ac) 0.17
Impervious Area (%) 61.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

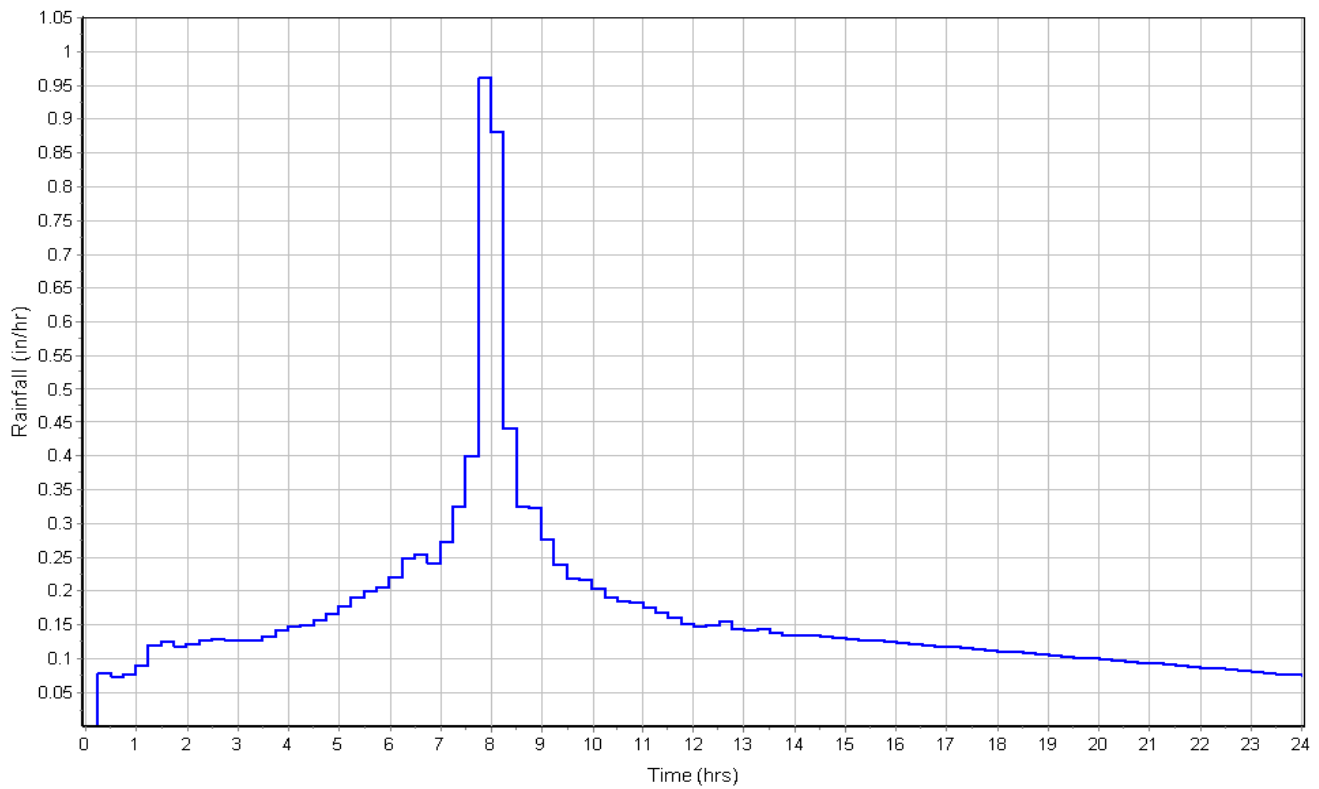
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.17		89.42

Subbasin Runoff Results

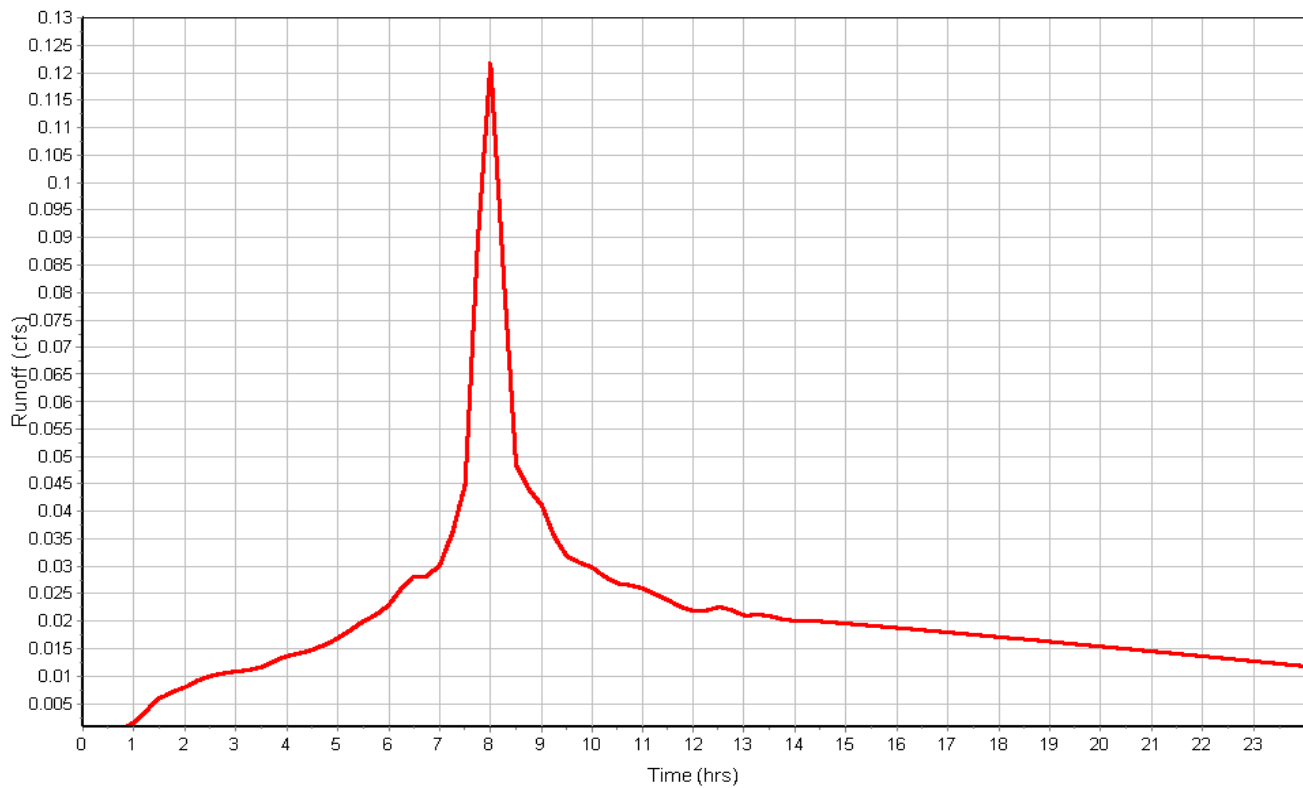
Total Rainfall (in) 3.96
Total Runoff (in) 2.94
Peak Runoff (cfs) 0.12
Weighted Curve Number 89.42
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 060

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 068**Input Data**

Area (ac) 0.13
 Impervious Area (%) 90.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

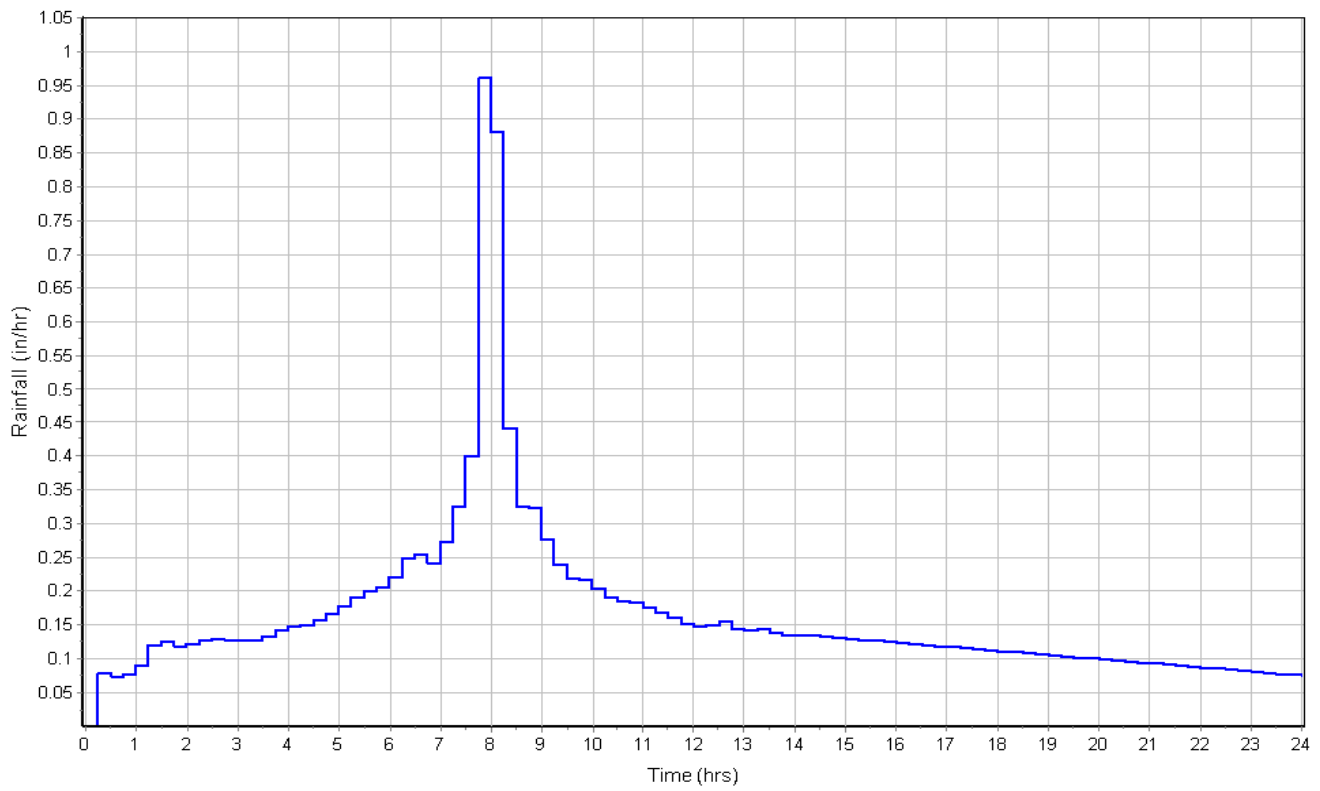
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.13		95.8

Subbasin Runoff Results

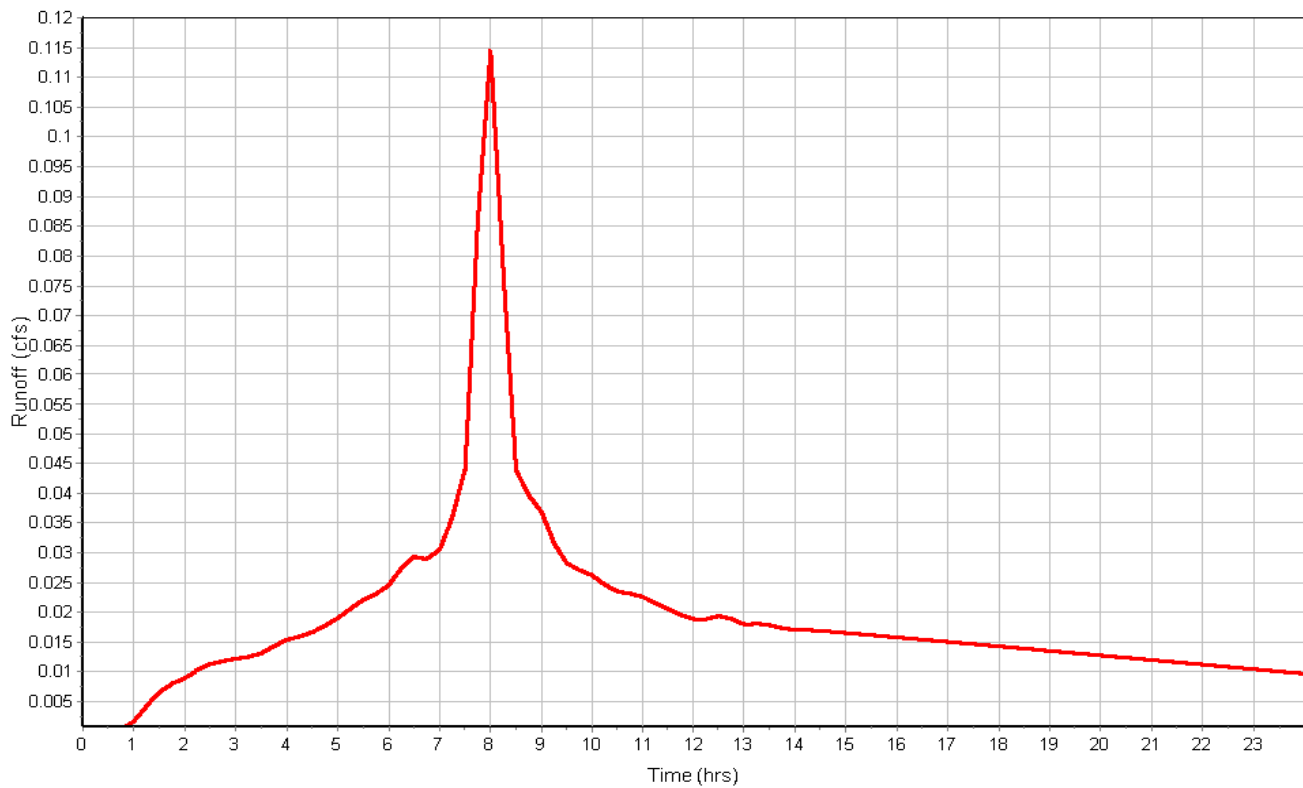
Total Rainfall (in) 3.96
 Total Runoff (in) 3.53
 Peak Runoff (cfs) 0.12
 Weighted Curve Number 95.80
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 068

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 069**Input Data**

Area (ac) 0.04
 Impervious Area (%) 25.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

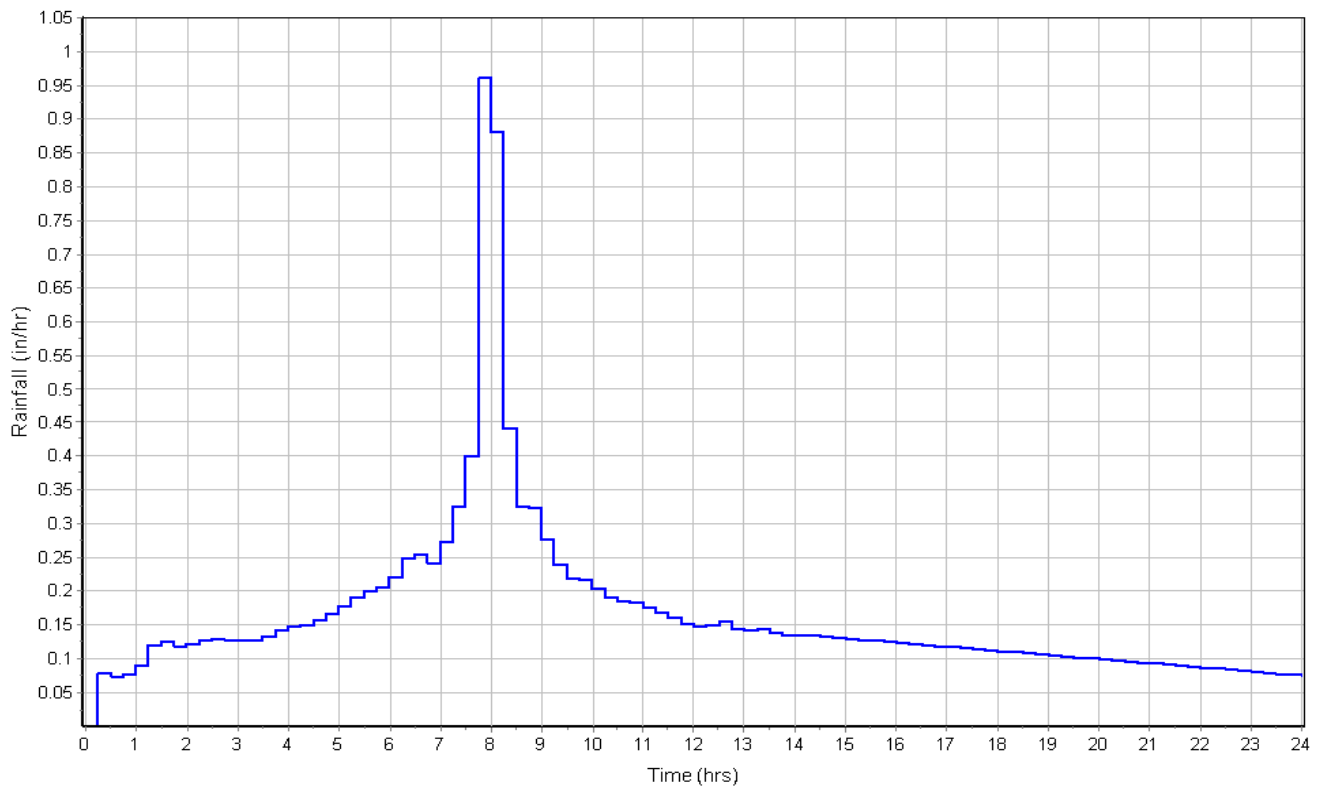
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.04		81.5

Subbasin Runoff Results

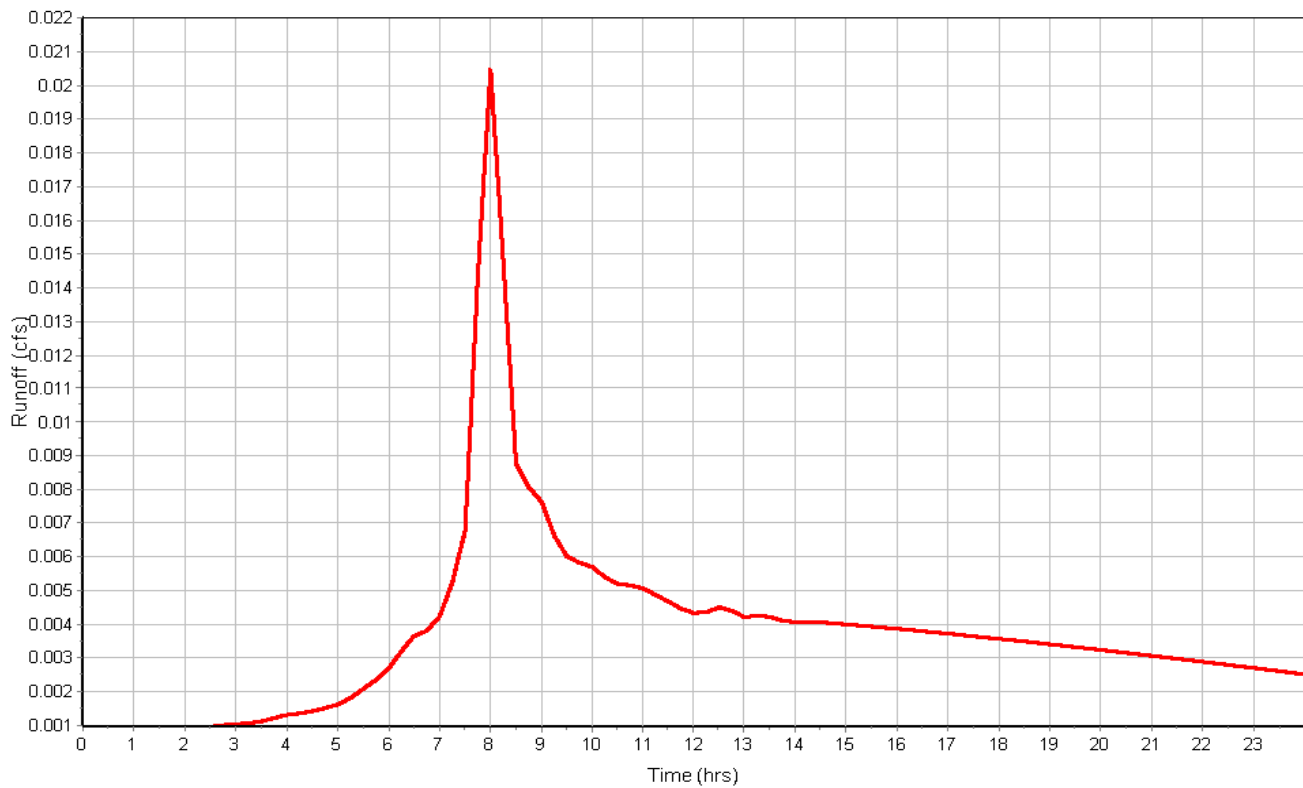
Total Rainfall (in) 3.96
 Total Runoff (in) 2.22
 Peak Runoff (cfs) 0.02
 Weighted Curve Number 81.50
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 069

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 070**Input Data**

Area (ac) 0.05
Impervious Area (%) 22.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

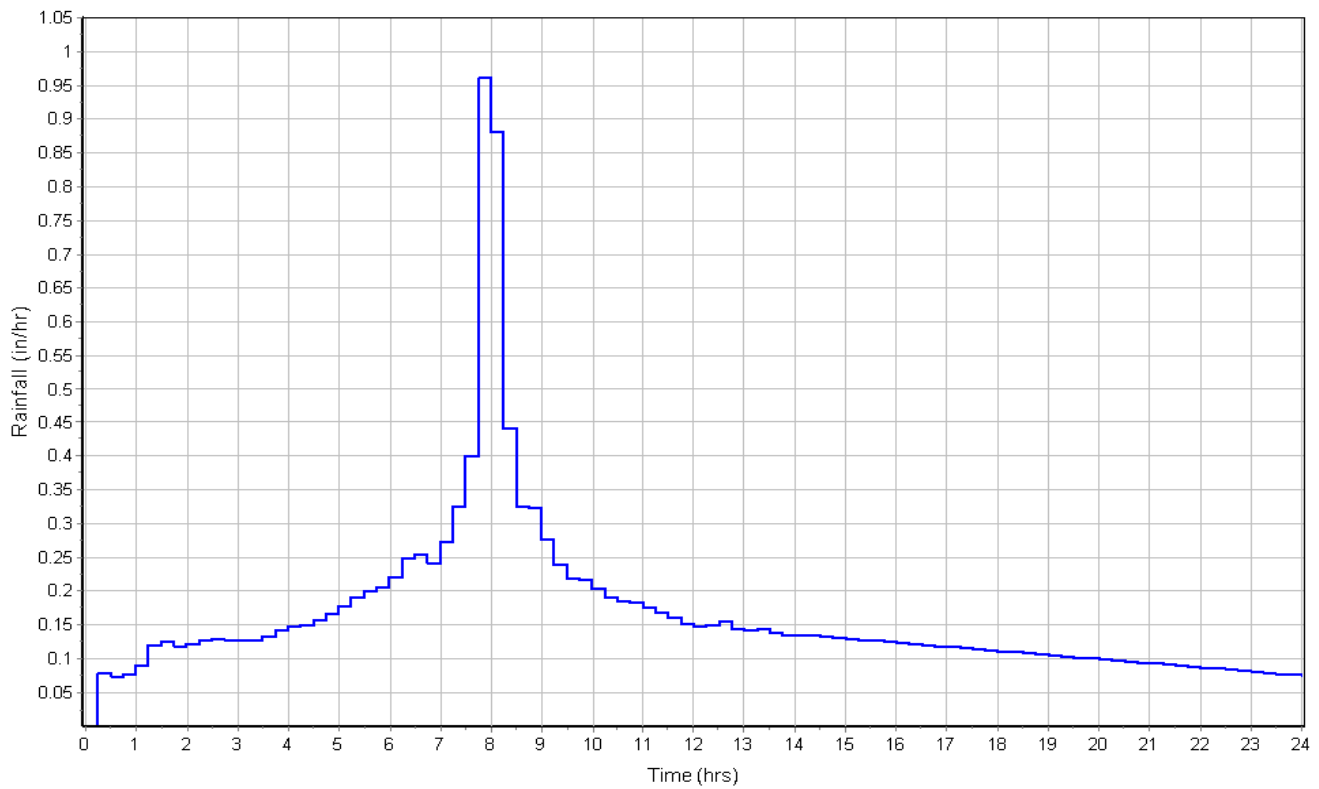
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.05		80.84

Subbasin Runoff Results

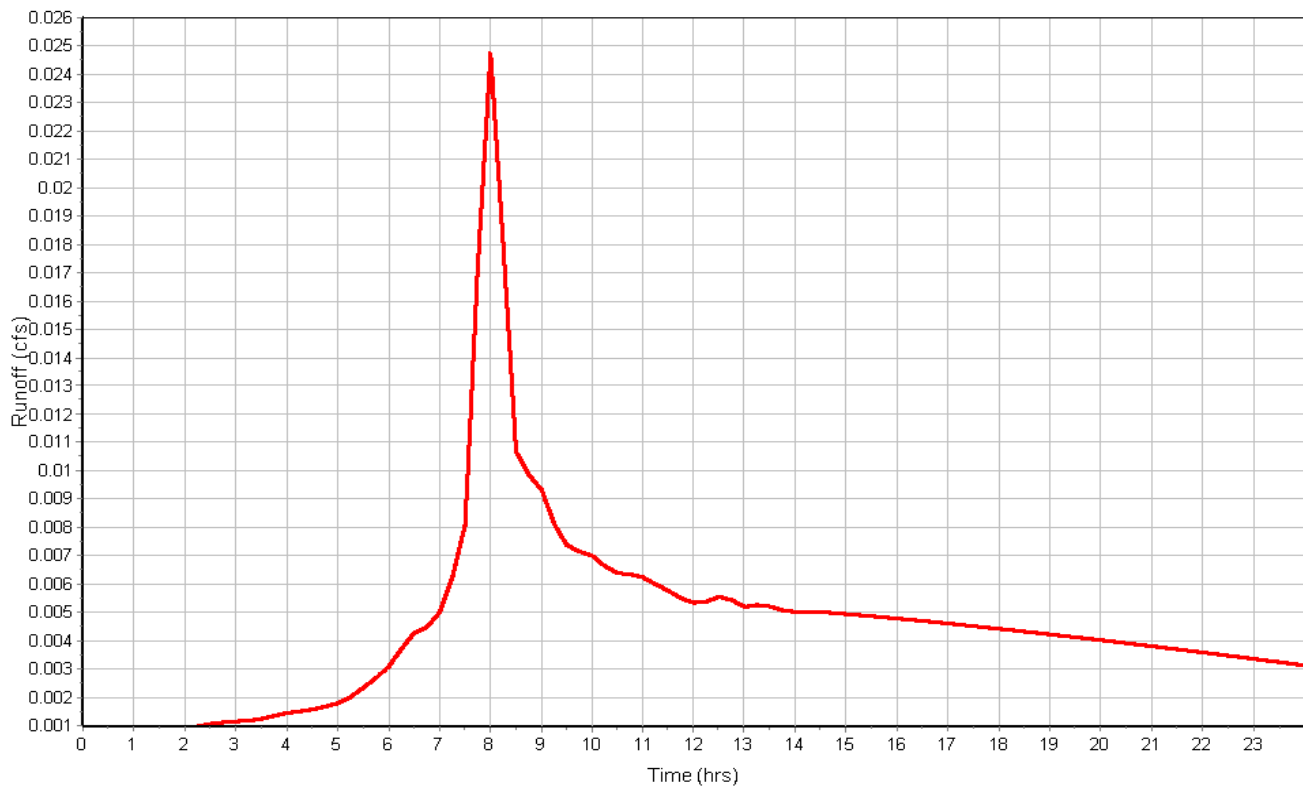
Total Rainfall (in) 3.96
Total Runoff (in) 2.16
Peak Runoff (cfs) 0.03
Weighted Curve Number 80.84
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 070

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 071**Input Data**

Area (ac) 0.07
Impervious Area (%) 61.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

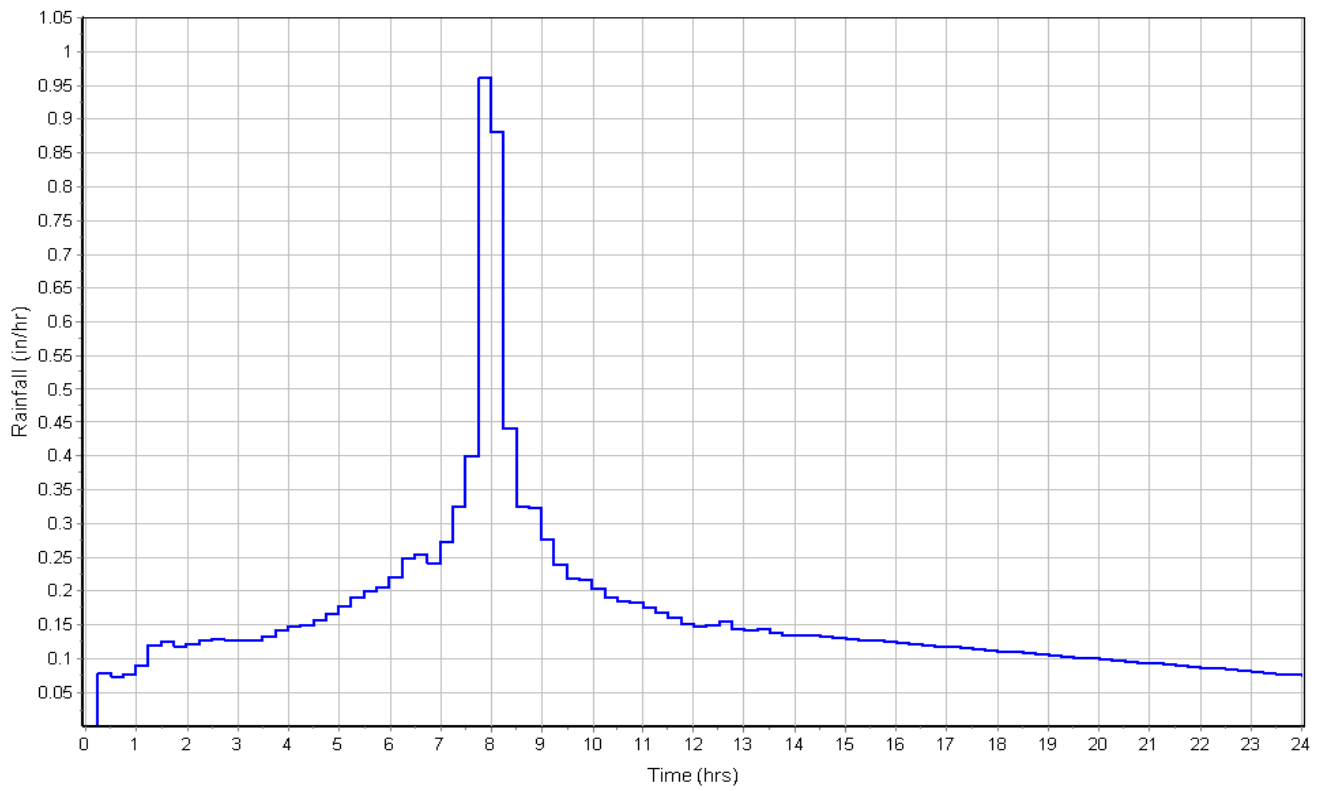
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.07		89.42

Subbasin Runoff Results

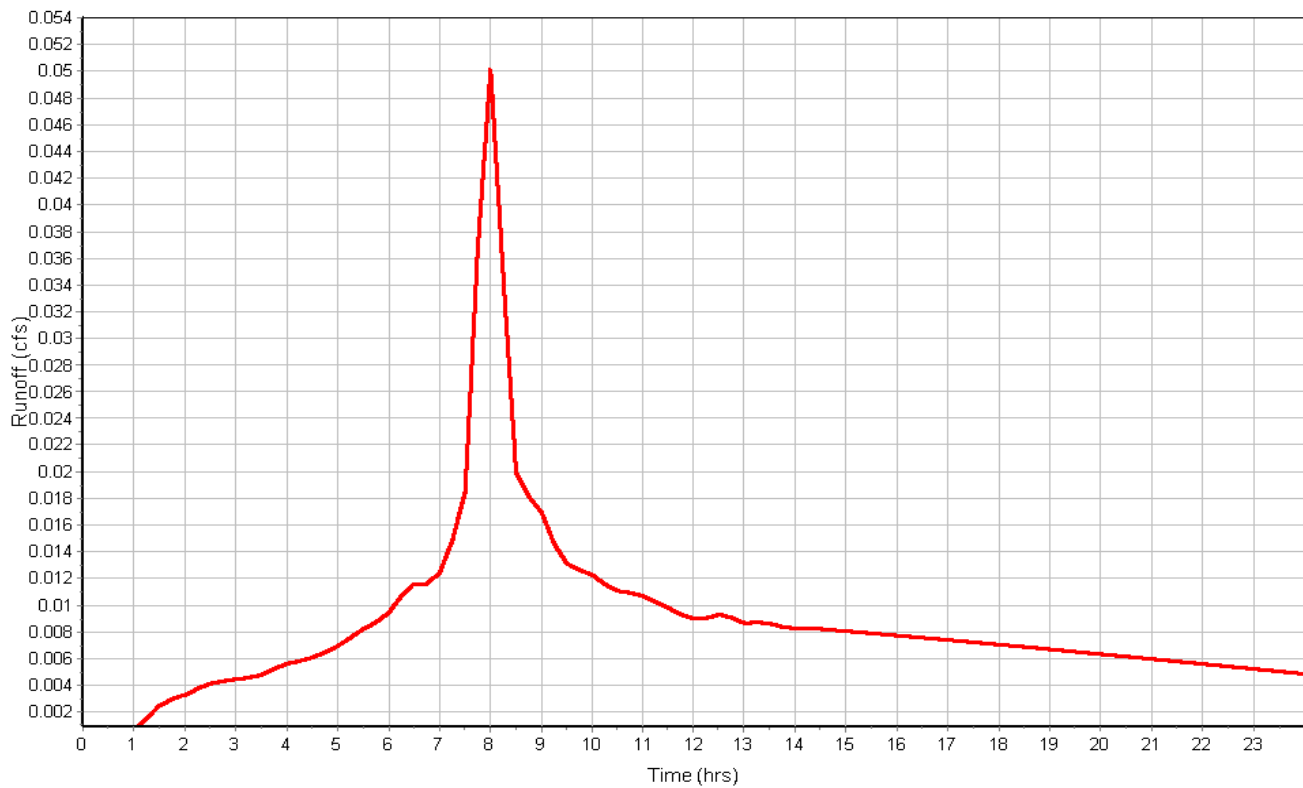
Total Rainfall (in) 3.96
Total Runoff (in) 2.94
Peak Runoff (cfs) 0.05
Weighted Curve Number 89.42
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 071

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 073**Input Data**

Area (ac) 0.31
 Impervious Area (%) 54.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

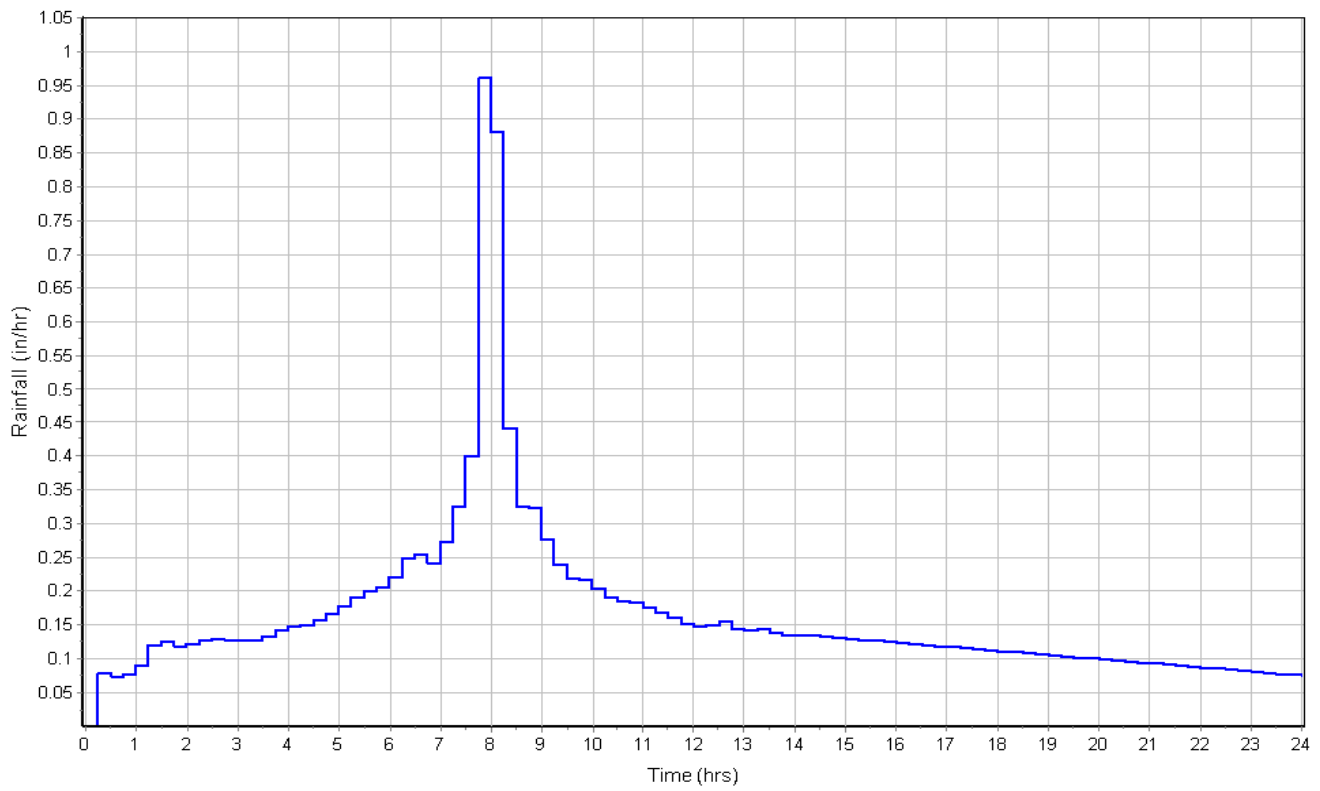
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.31		87.88

Subbasin Runoff Results

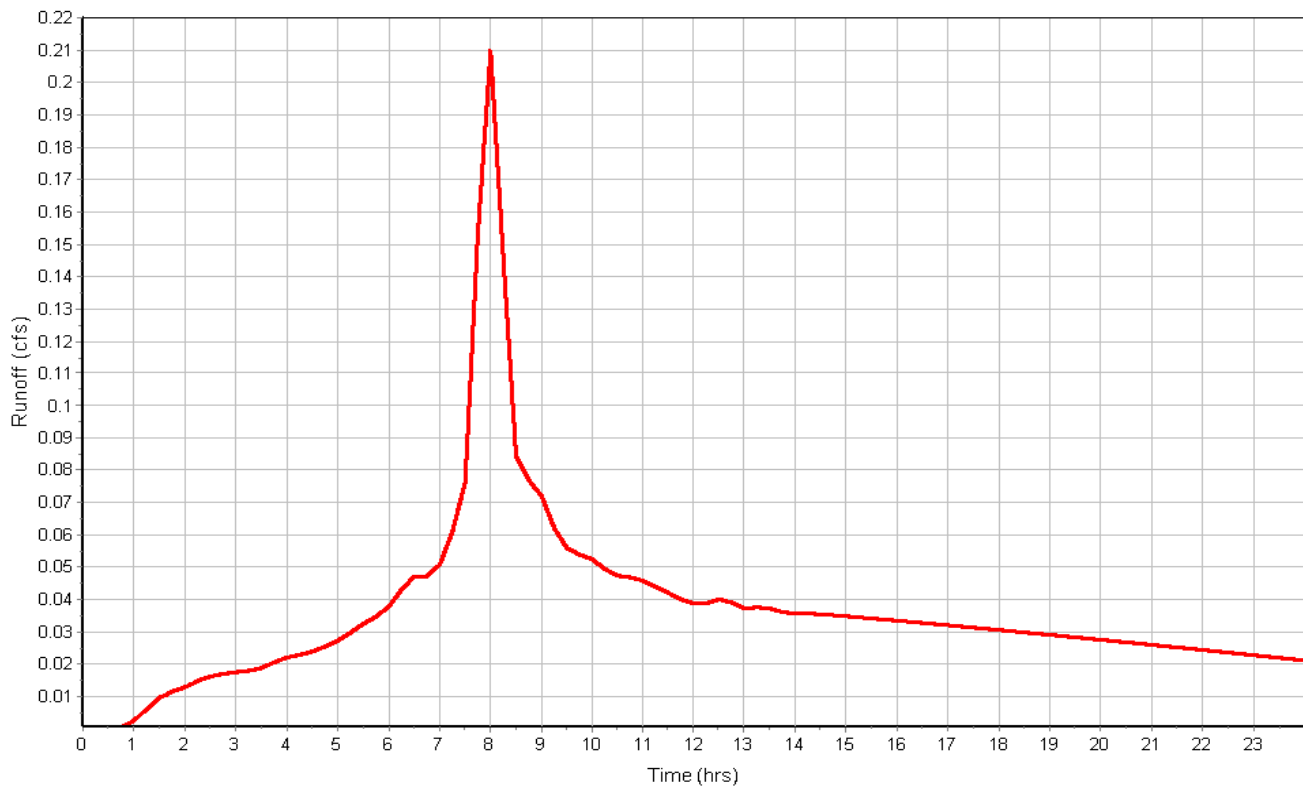
Total Rainfall (in) 3.96
 Total Runoff (in) 2.80
 Peak Runoff (cfs) 0.21
 Weighted Curve Number 87.88
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 073

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 074**Input Data**

Area (ac) 0.74
Impervious Area (%) 49.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

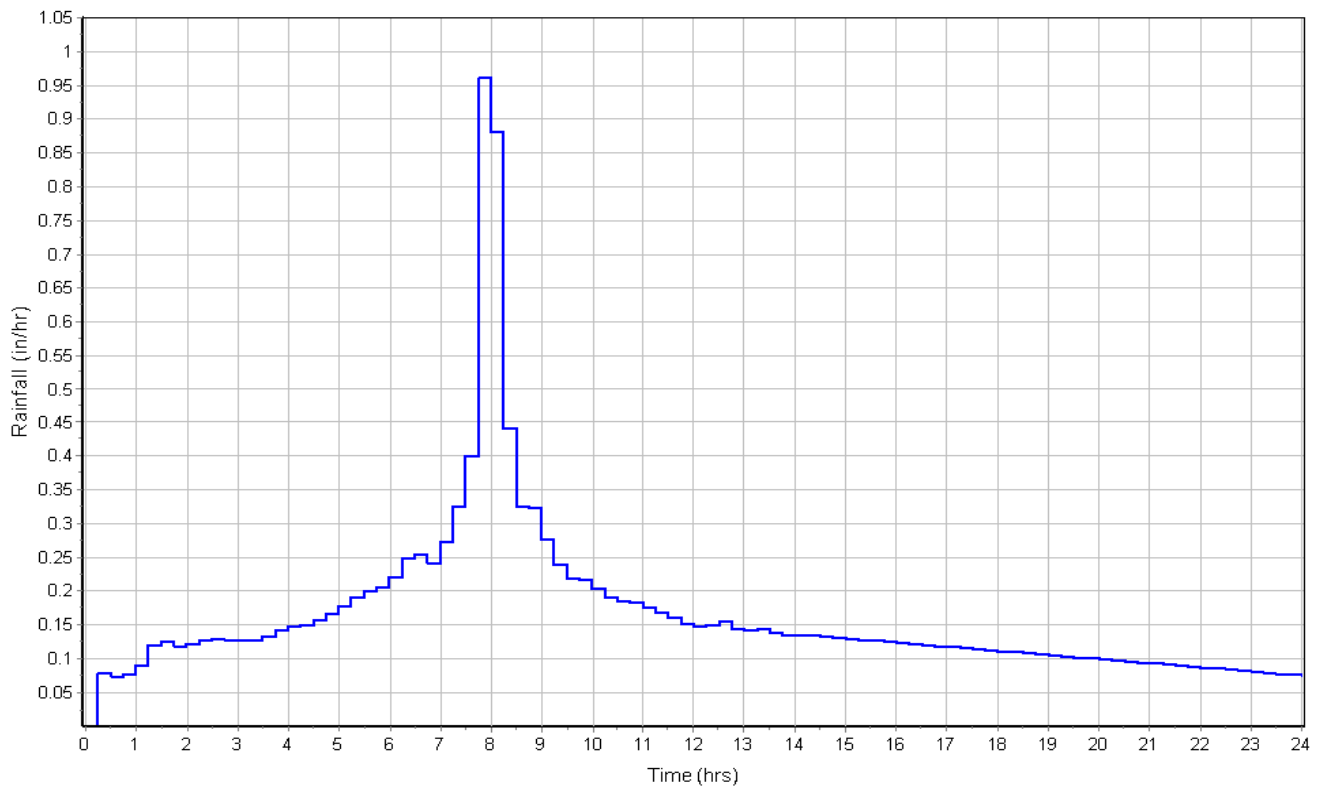
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.74		86.78

Subbasin Runoff Results

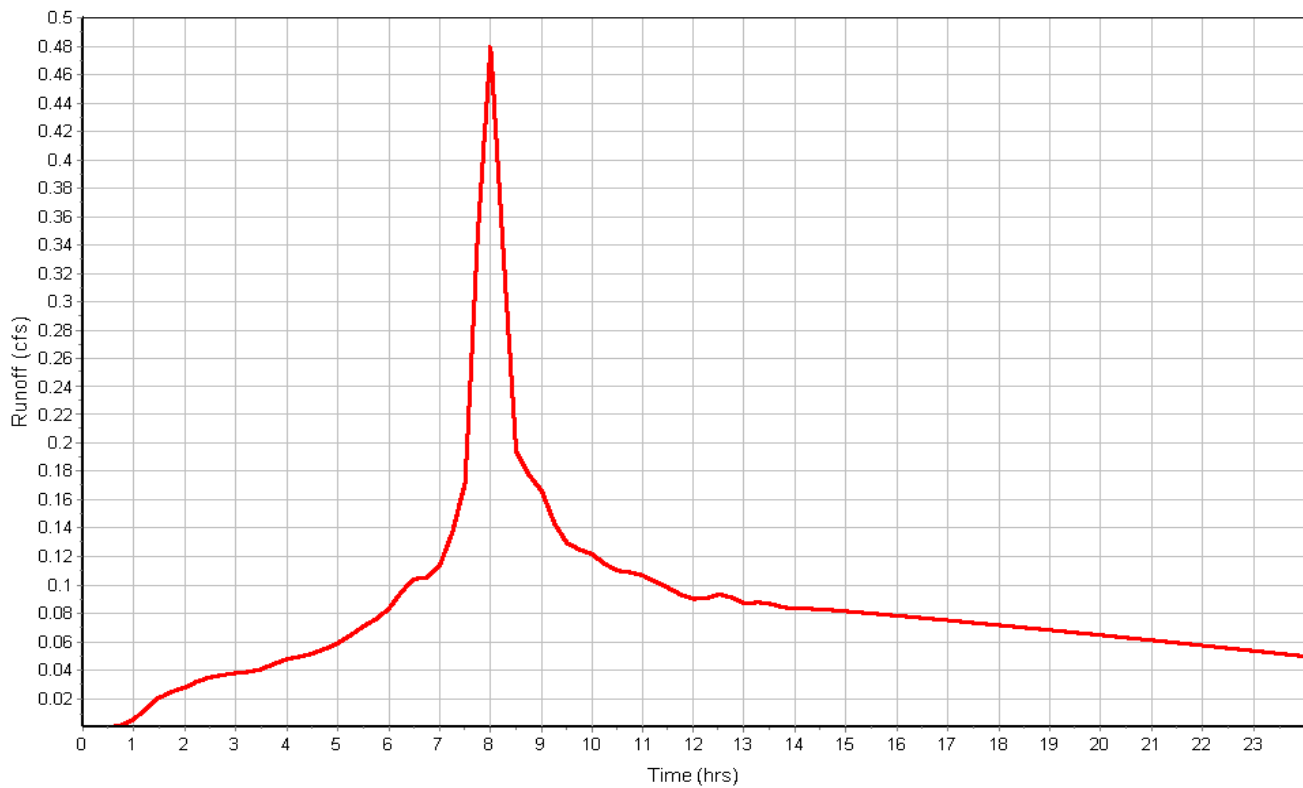
Total Rainfall (in) 3.96
Total Runoff (in) 2.70
Peak Runoff (cfs) 0.48
Weighted Curve Number 86.78
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 074

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 091**Input Data**

Area (ac) 0.03
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

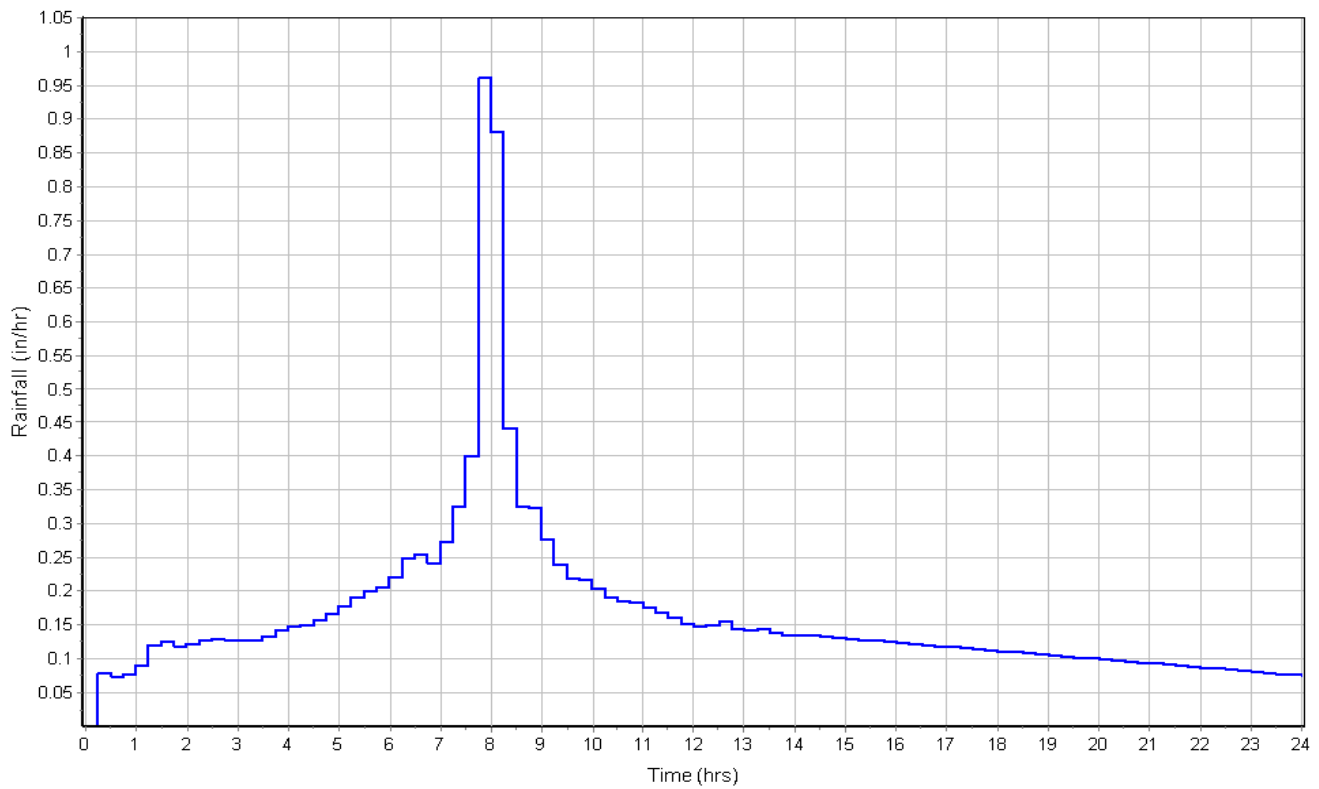
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.03		98

Subbasin Runoff Results

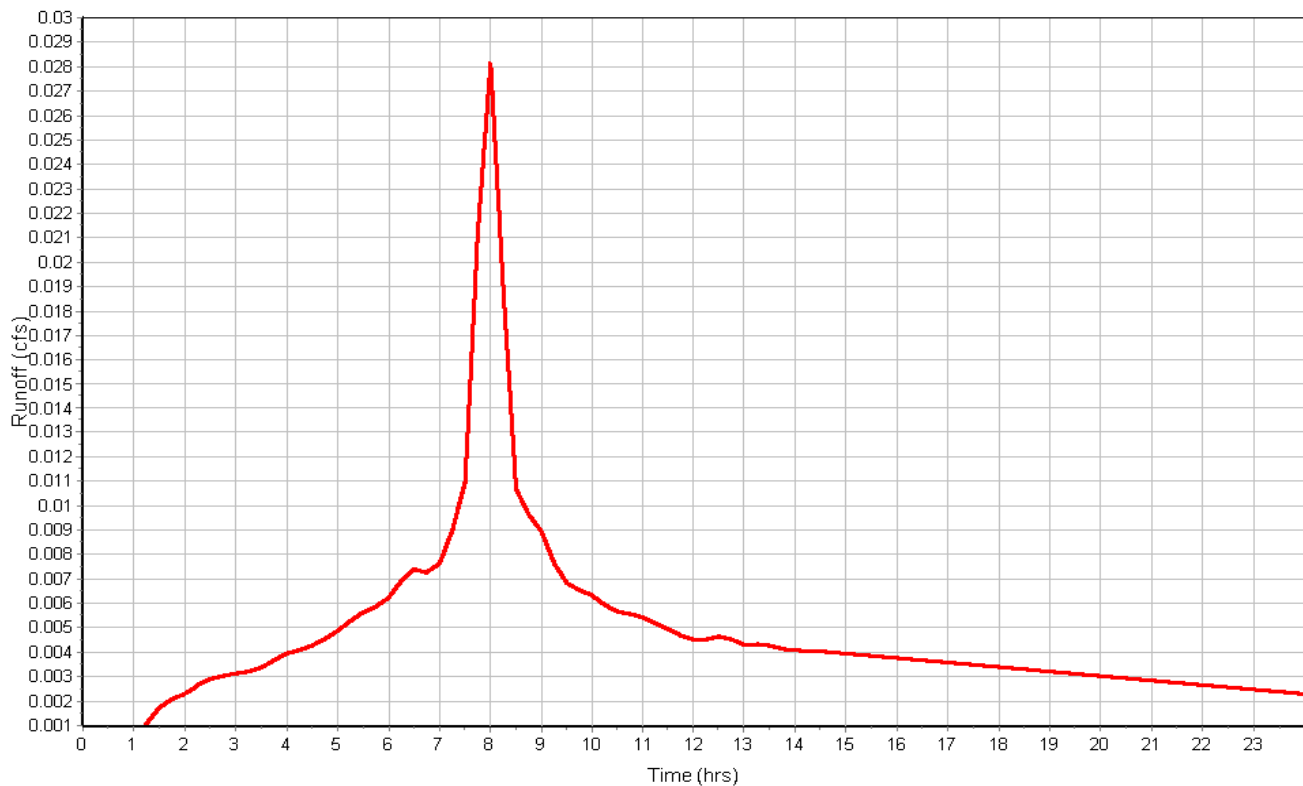
Total Rainfall (in) 3.96
 Total Runoff (in) 3.73
 Peak Runoff (cfs) 0.03
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 091

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 093**Input Data**

Area (ac) 0.40
Impervious Area (%) 72.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

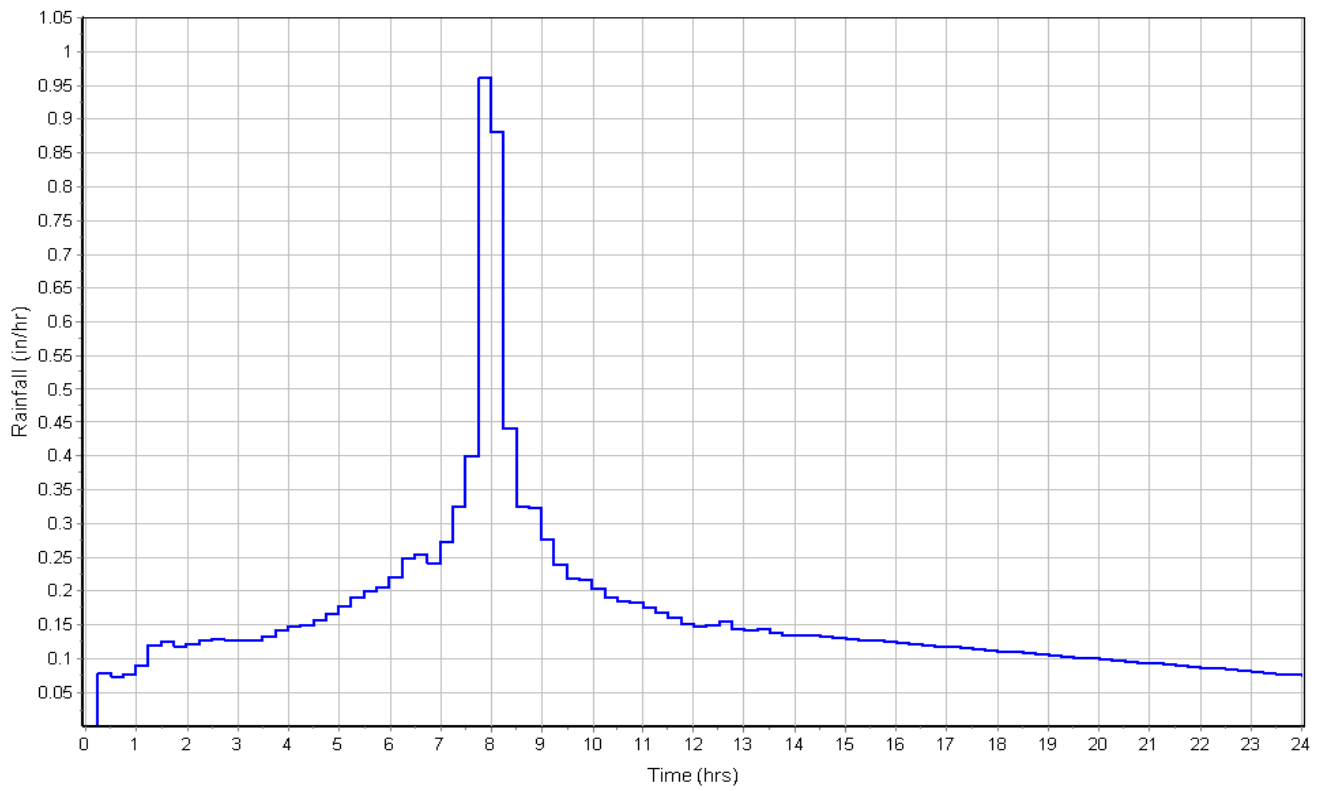
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.40		91.84

Subbasin Runoff Results

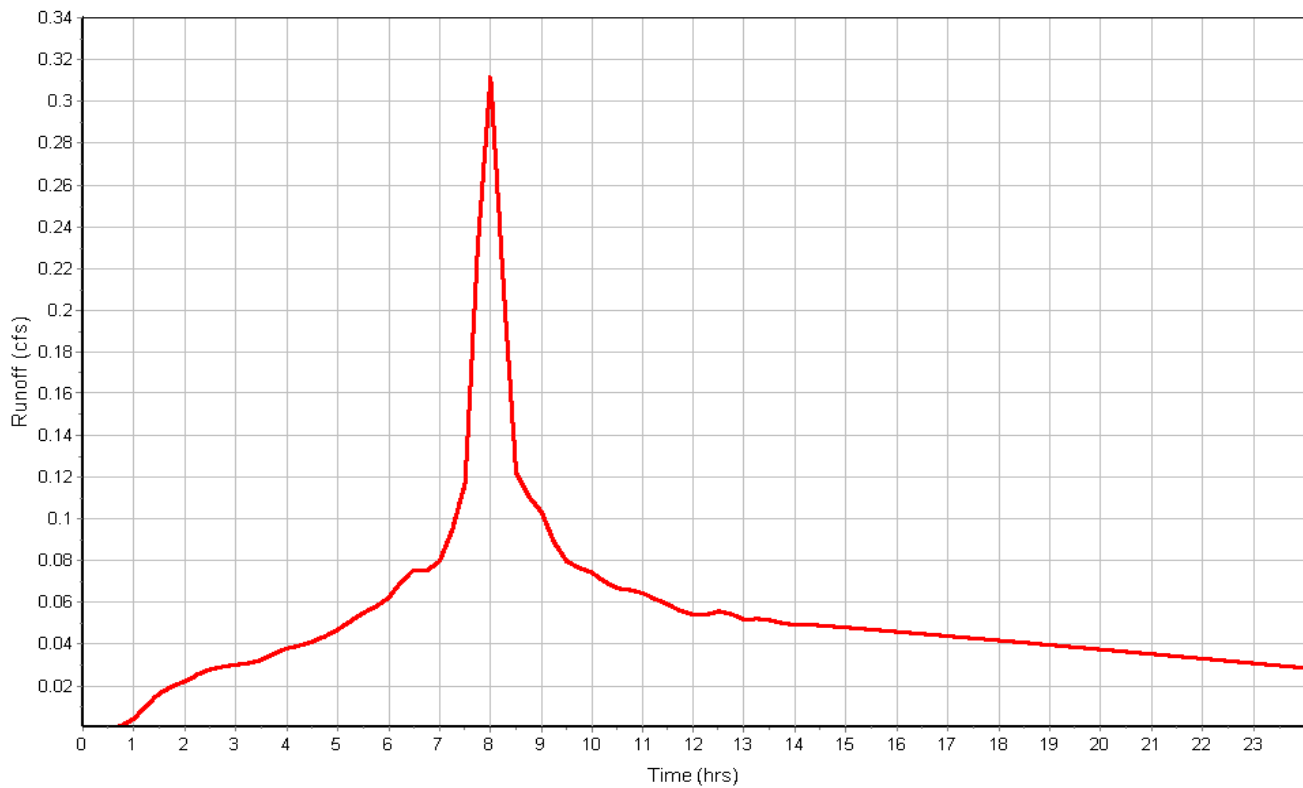
Total Rainfall (in) 3.96
Total Runoff (in) 3.17
Peak Runoff (cfs) 0.31
Weighted Curve Number 91.84
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 093

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 094**Input Data**

Area (ac) 0.54
Impervious Area (%) 67.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

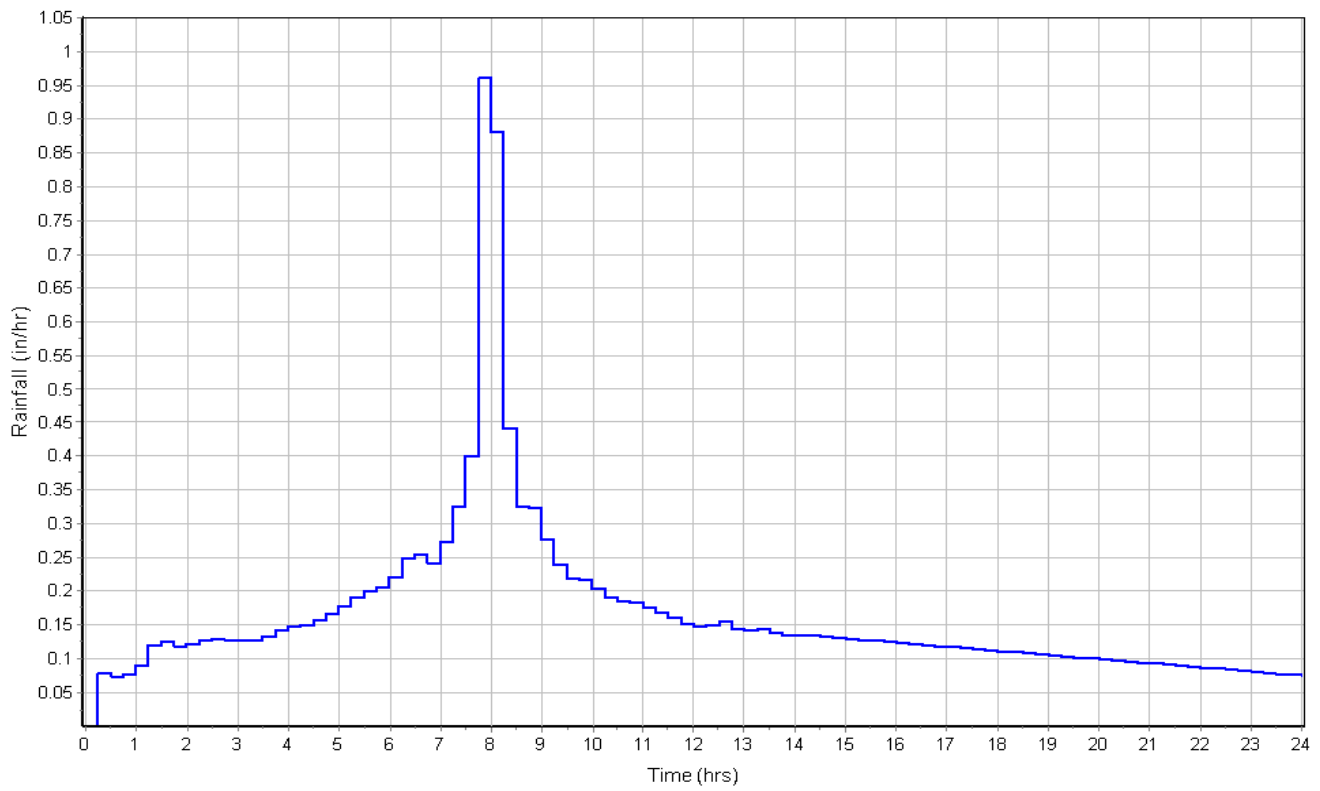
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.54		90.74

Subbasin Runoff Results

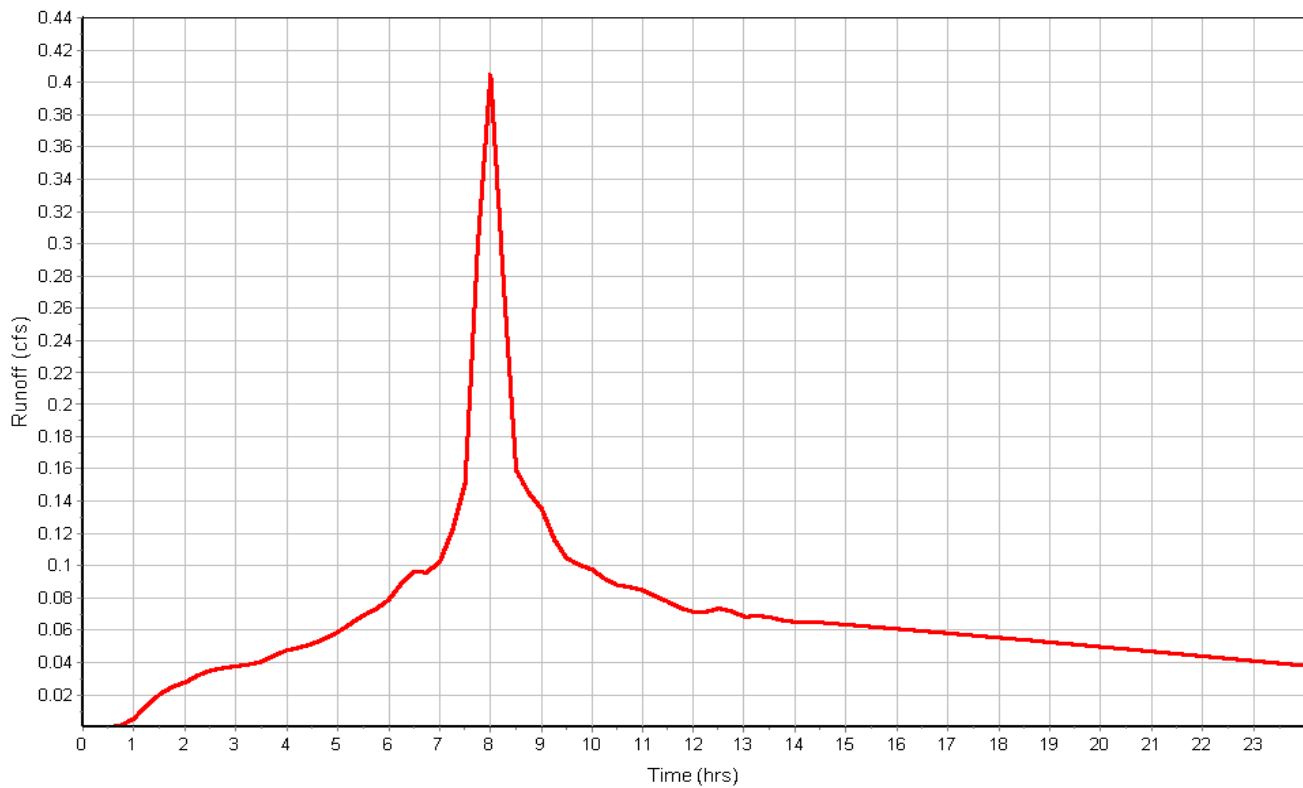
Total Rainfall (in) 3.96
Total Runoff (in) 3.06
Peak Runoff (cfs) 0.41
Weighted Curve Number 90.74
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 094

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 101**Input Data**

Area (ac) 0.18
 Impervious Area (%) 76.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

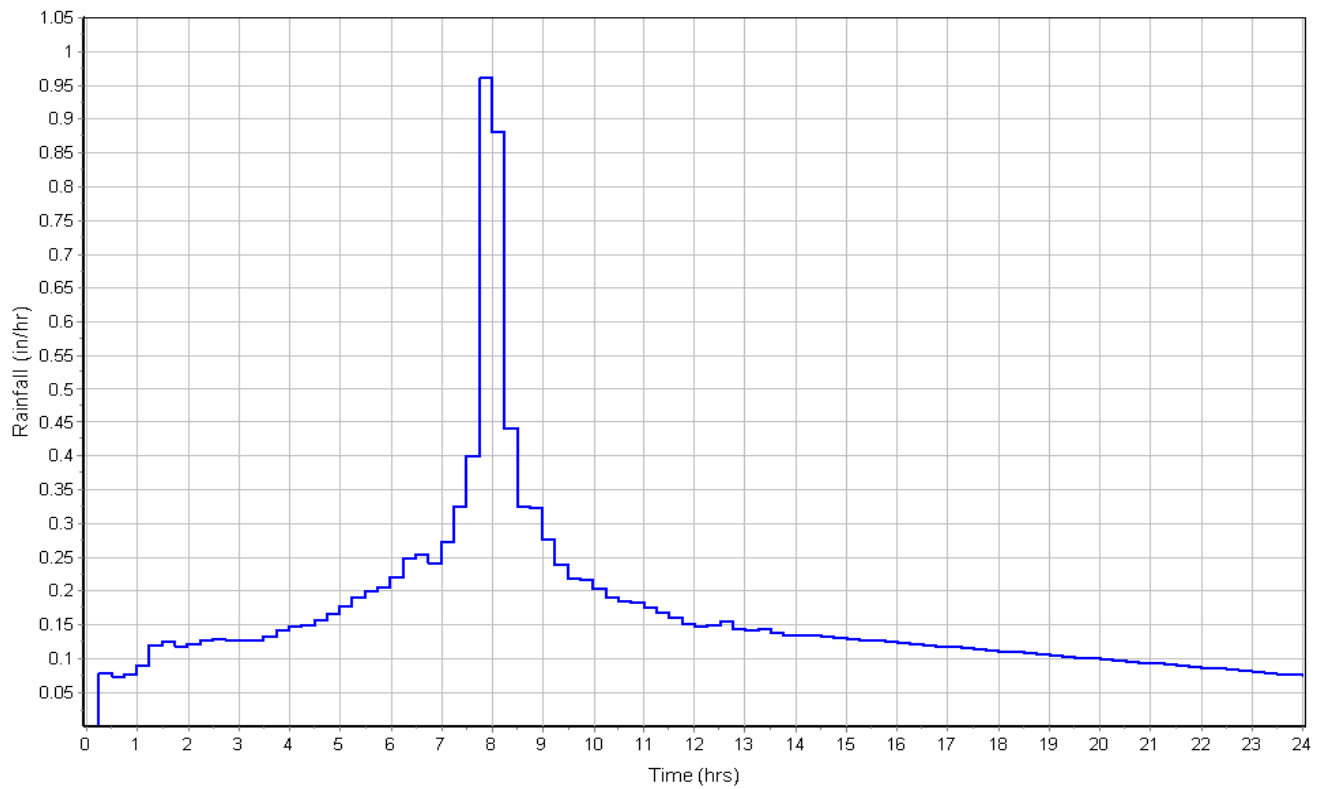
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.18		92.72

Subbasin Runoff Results

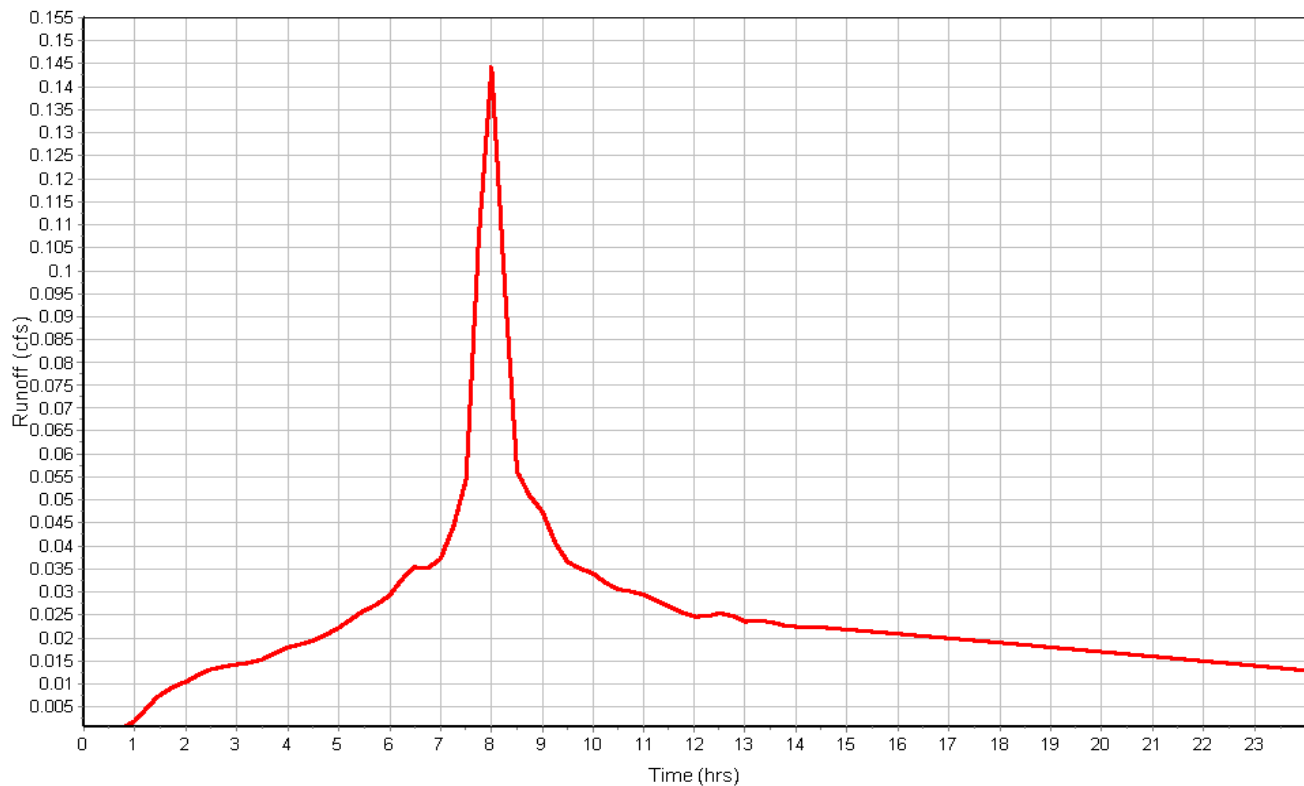
Total Rainfall (in) 3.96
 Total Runoff (in) 3.25
 Peak Runoff (cfs) 0.14
 Weighted Curve Number 92.72
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 101

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 103**Input Data**

Area (ac) 0.49
 Impervious Area (%) 72.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

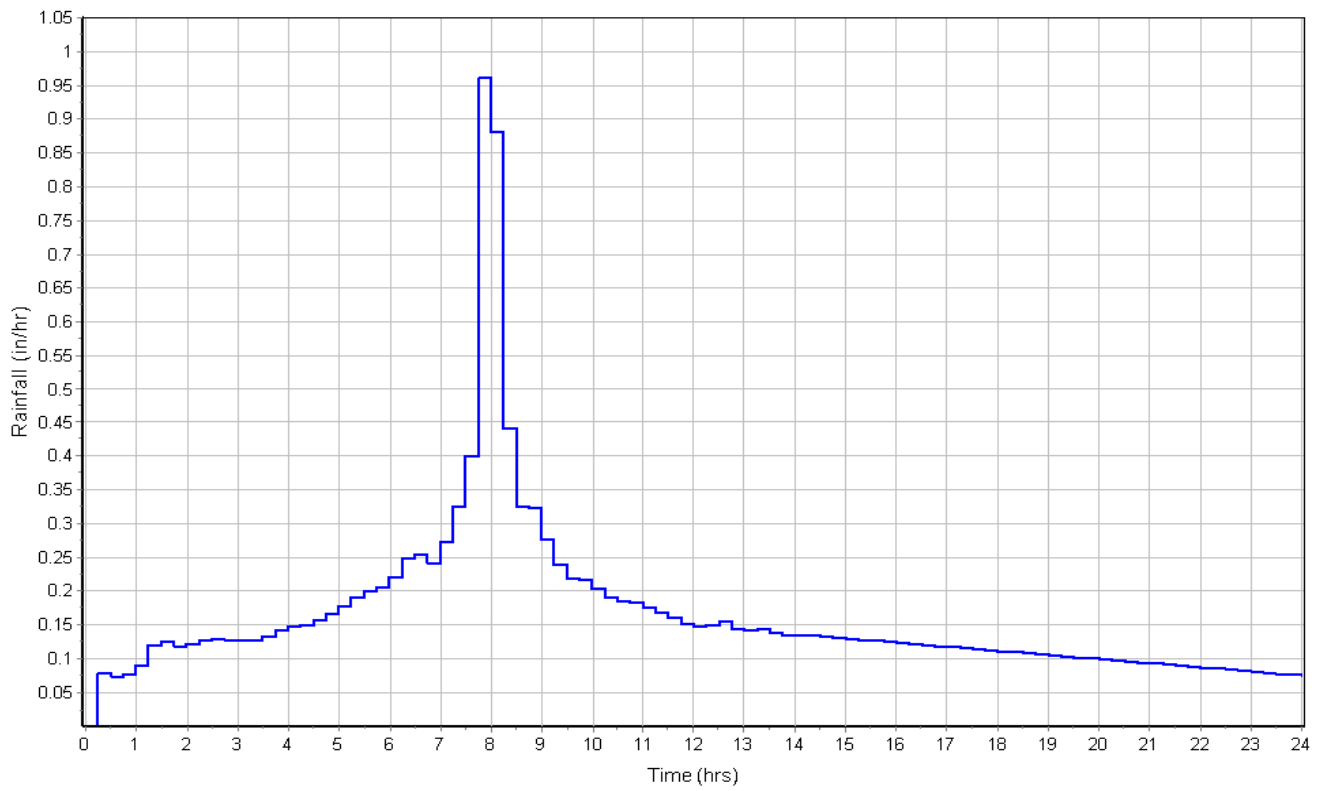
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.49		91.84

Subbasin Runoff Results

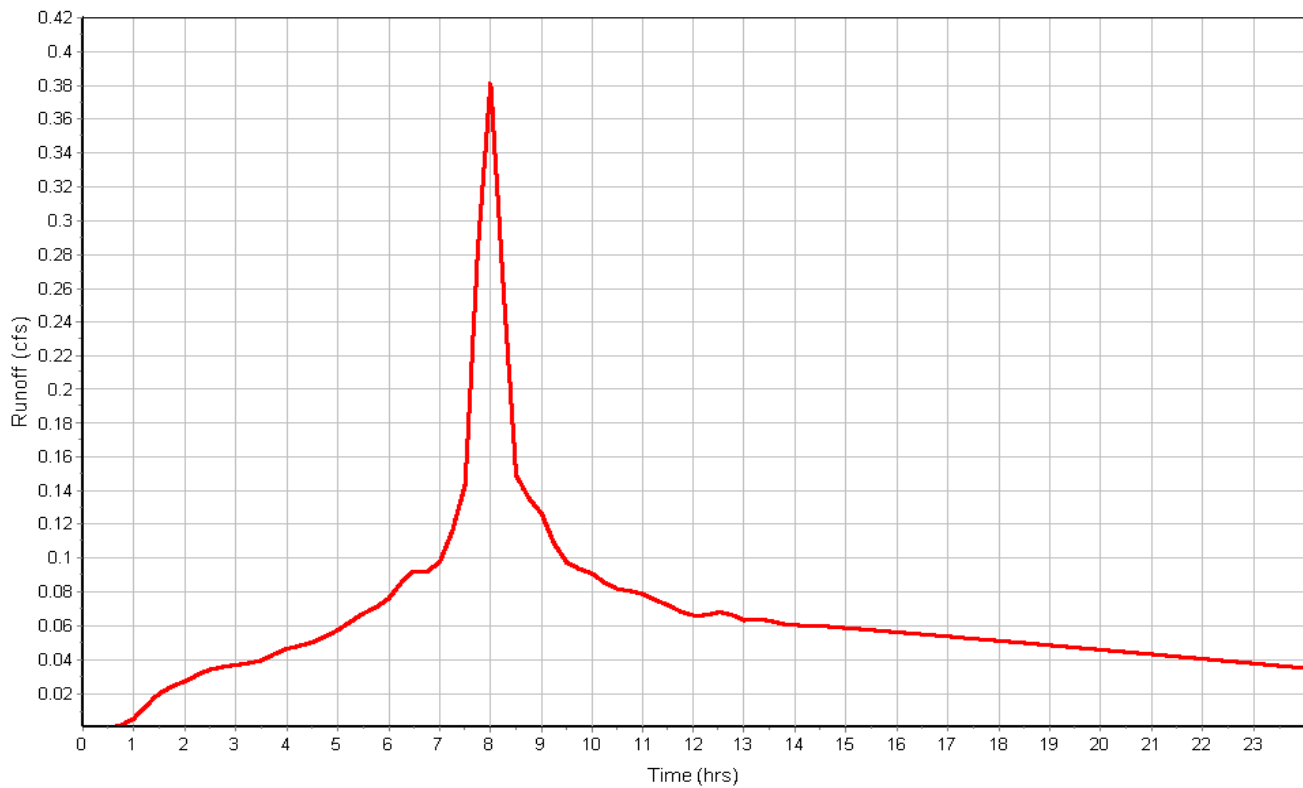
Total Rainfall (in) 3.96
 Total Runoff (in) 3.17
 Peak Runoff (cfs) 0.38
 Weighted Curve Number 91.84
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 103

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 104**Input Data**

Area (ac) 0.61
Impervious Area (%) 48.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

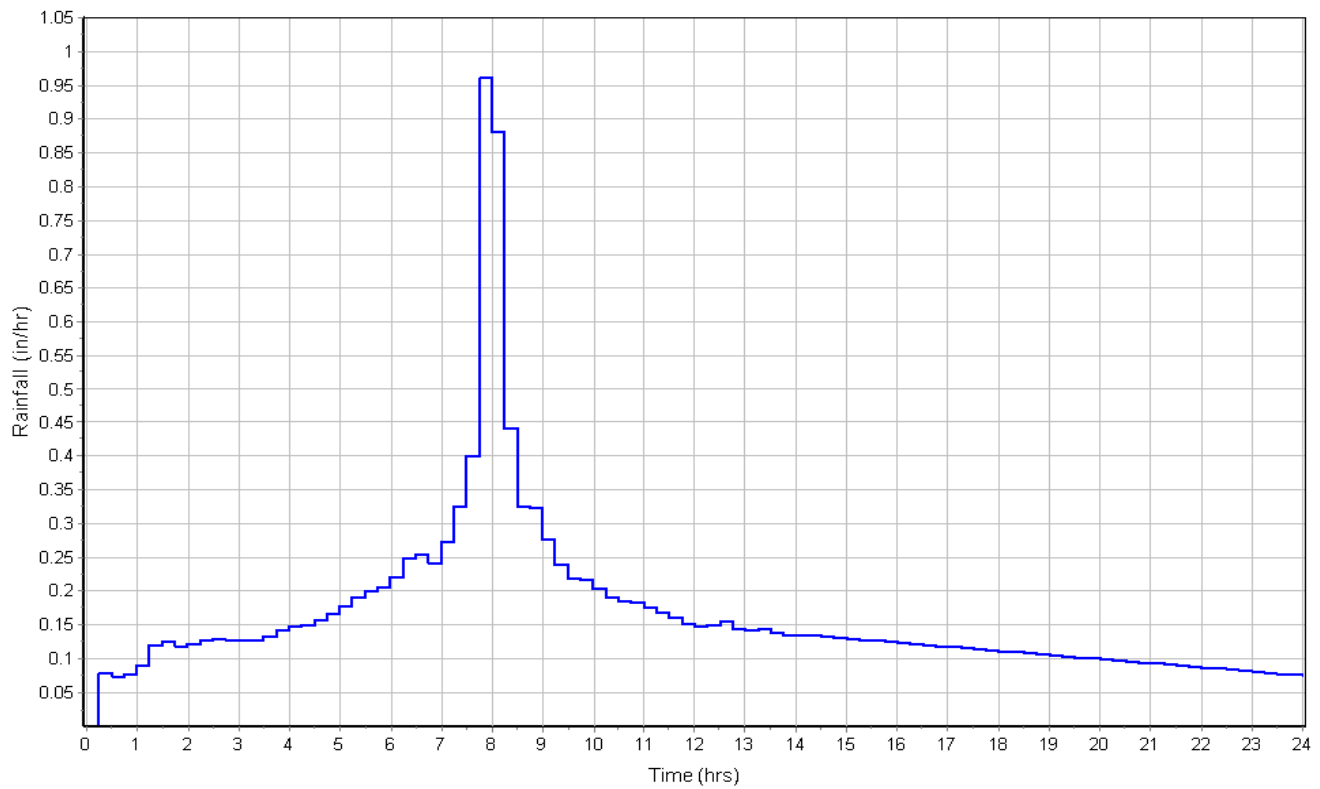
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.61		86.56

Subbasin Runoff Results

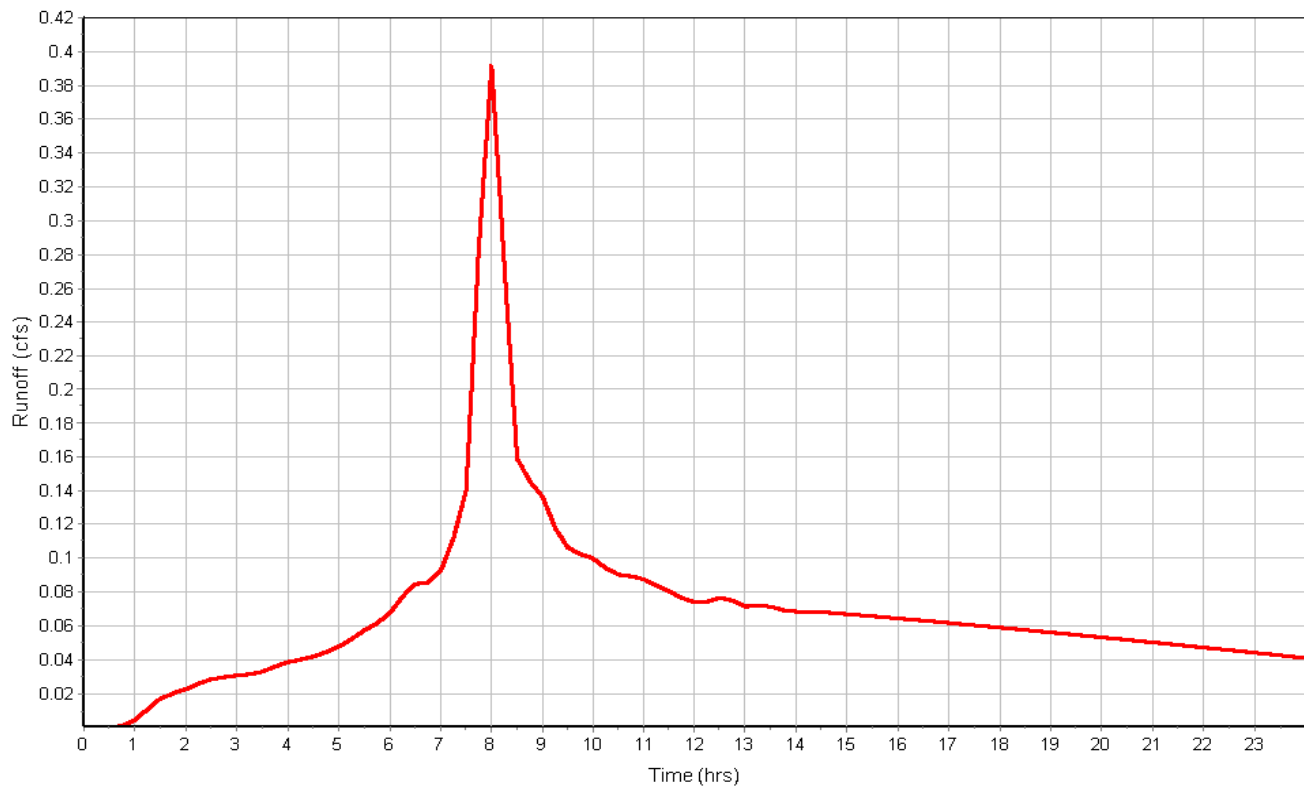
Total Rainfall (in) 3.96
Total Runoff (in) 2.68
Peak Runoff (cfs) 0.39
Weighted Curve Number 86.56
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 104

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 105**Input Data**

Area (ac) 0.12
 Impervious Area (%) 89.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

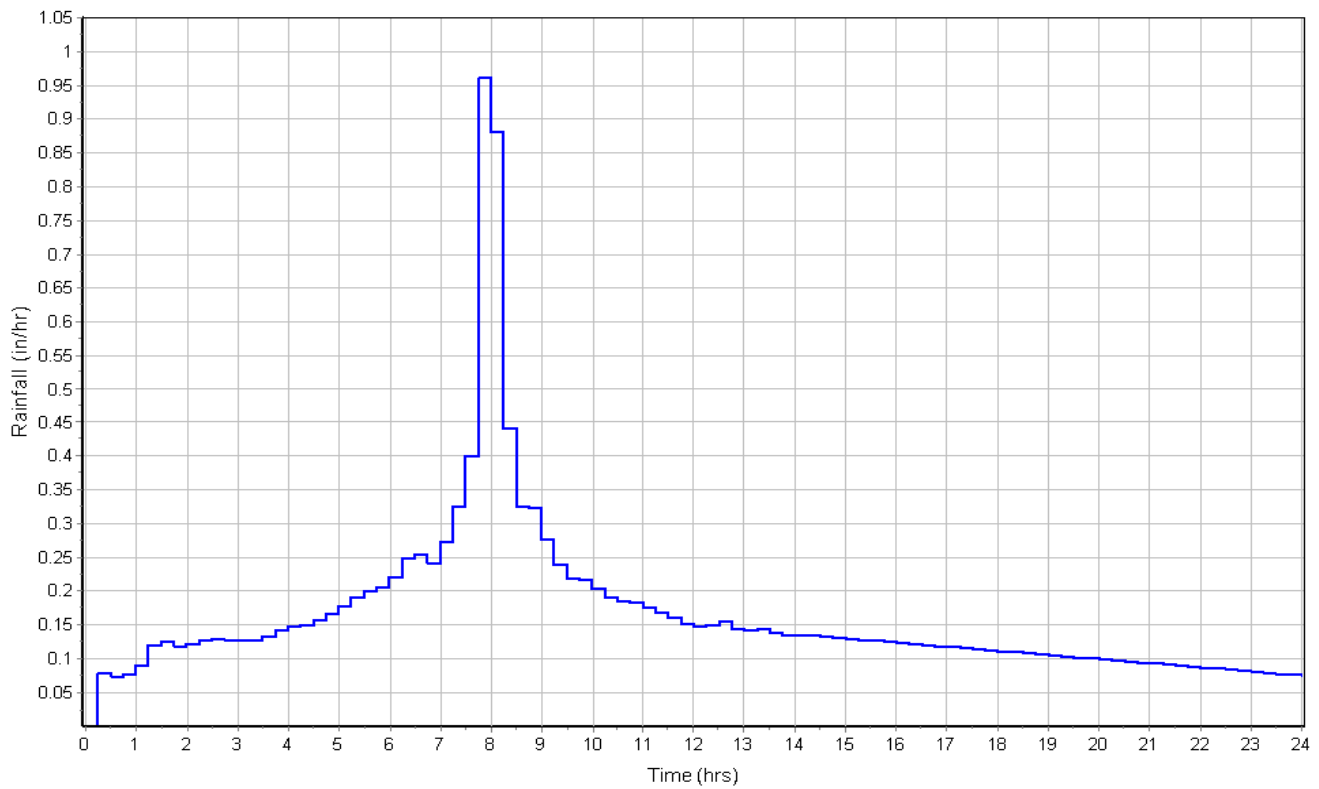
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.12		95.58

Subbasin Runoff Results

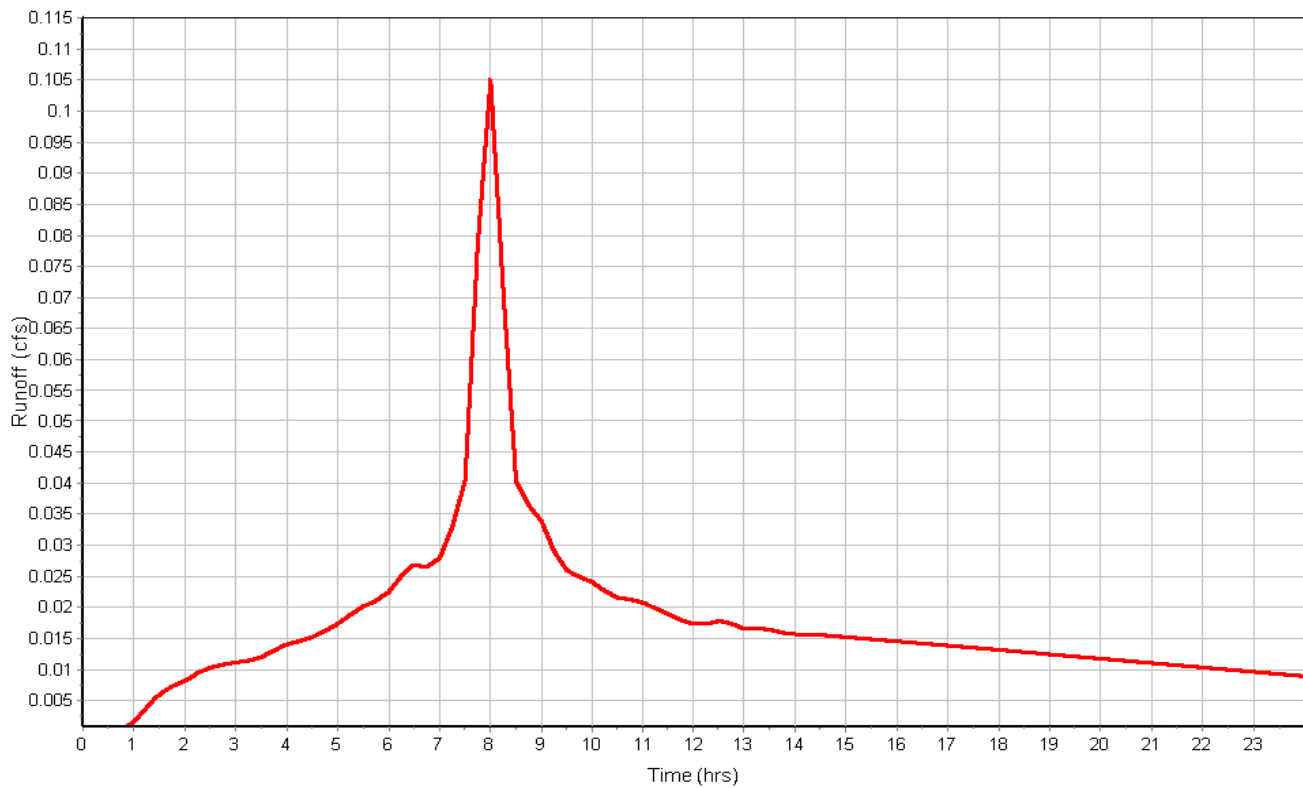
Total Rainfall (in) 3.96
 Total Runoff (in) 3.51
 Peak Runoff (cfs) 0.11
 Weighted Curve Number 95.58
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 105

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 107**Input Data**

Area (ac) 0.51
 Impervious Area (%) 85.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

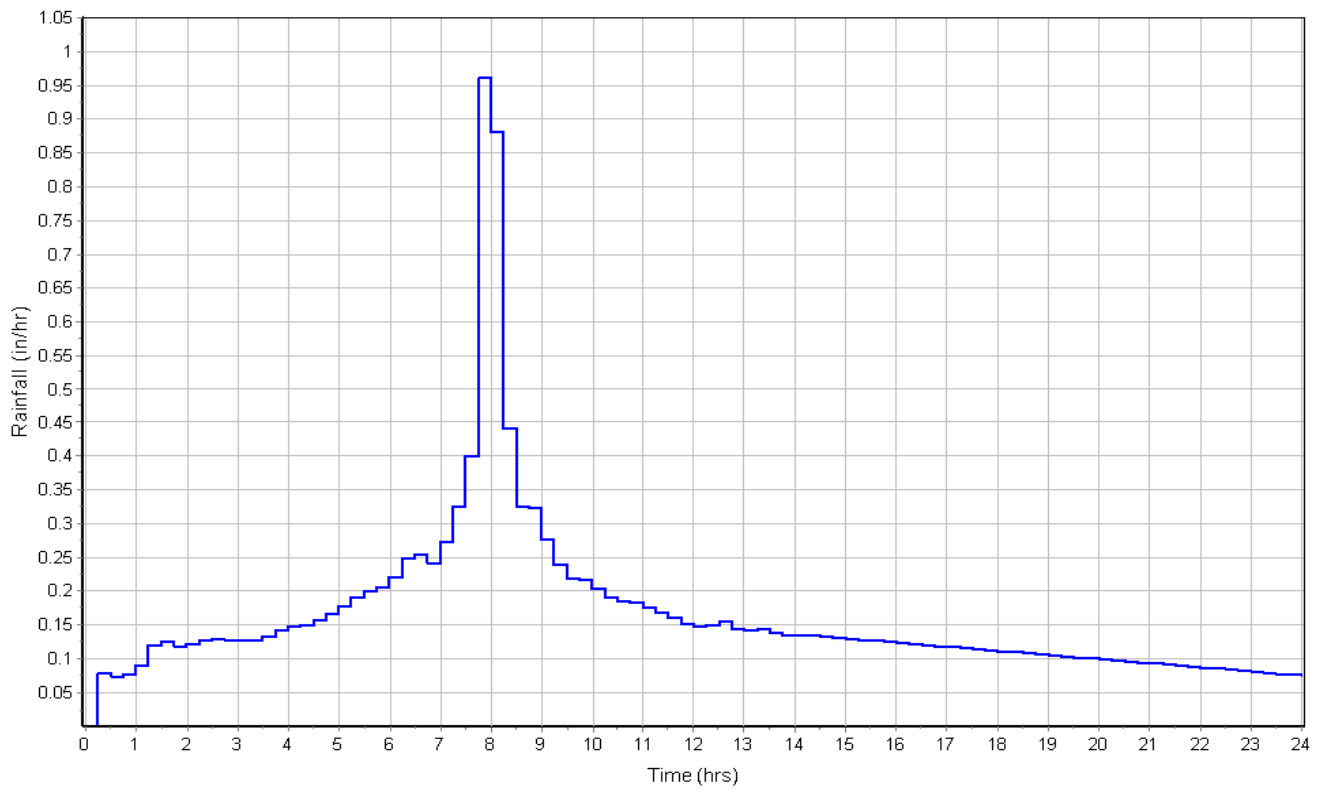
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.51		94.7

Subbasin Runoff Results

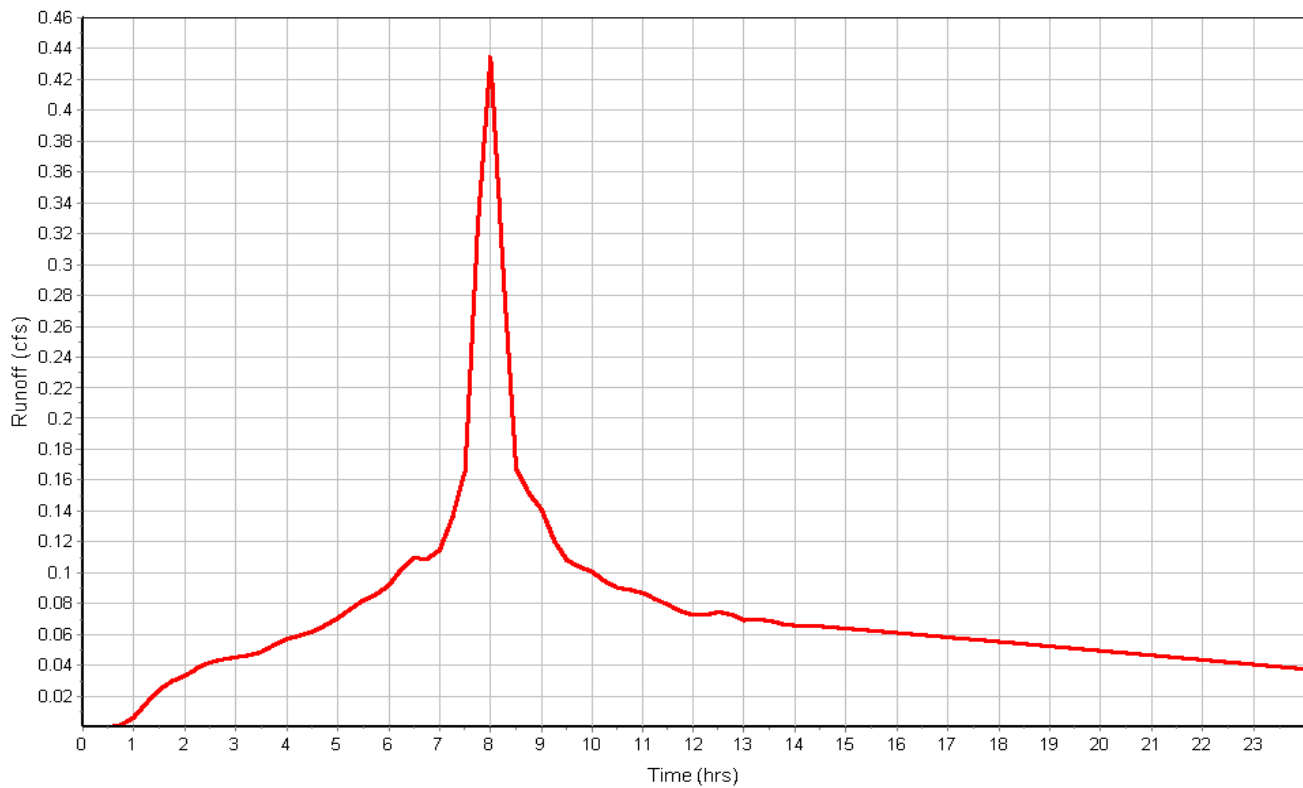
Total Rainfall (in) 3.96
 Total Runoff (in) 3.43
 Peak Runoff (cfs) 0.44
 Weighted Curve Number 94.70
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 107

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 108**Input Data**

Area (ac) 0.42
Impervious Area (%) 81.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

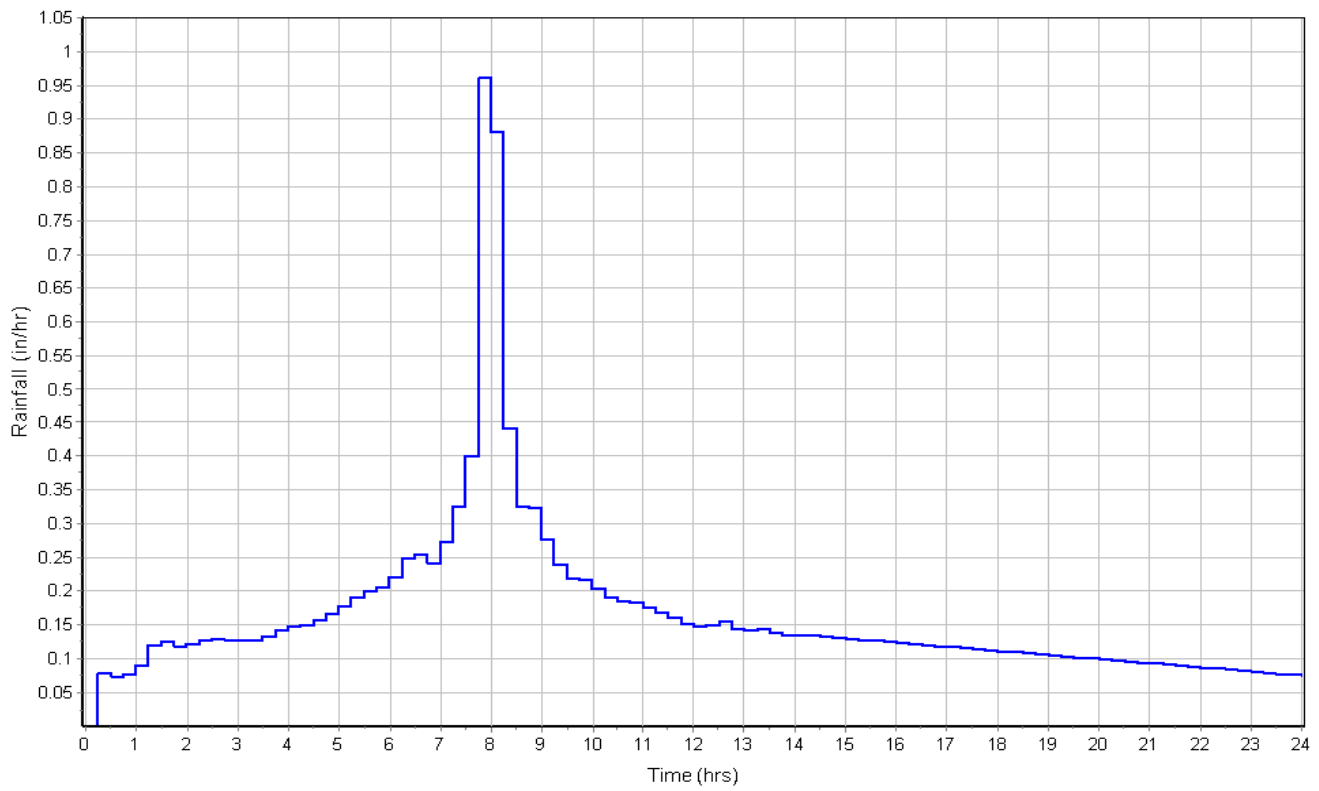
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.42		93.82

Subbasin Runoff Results

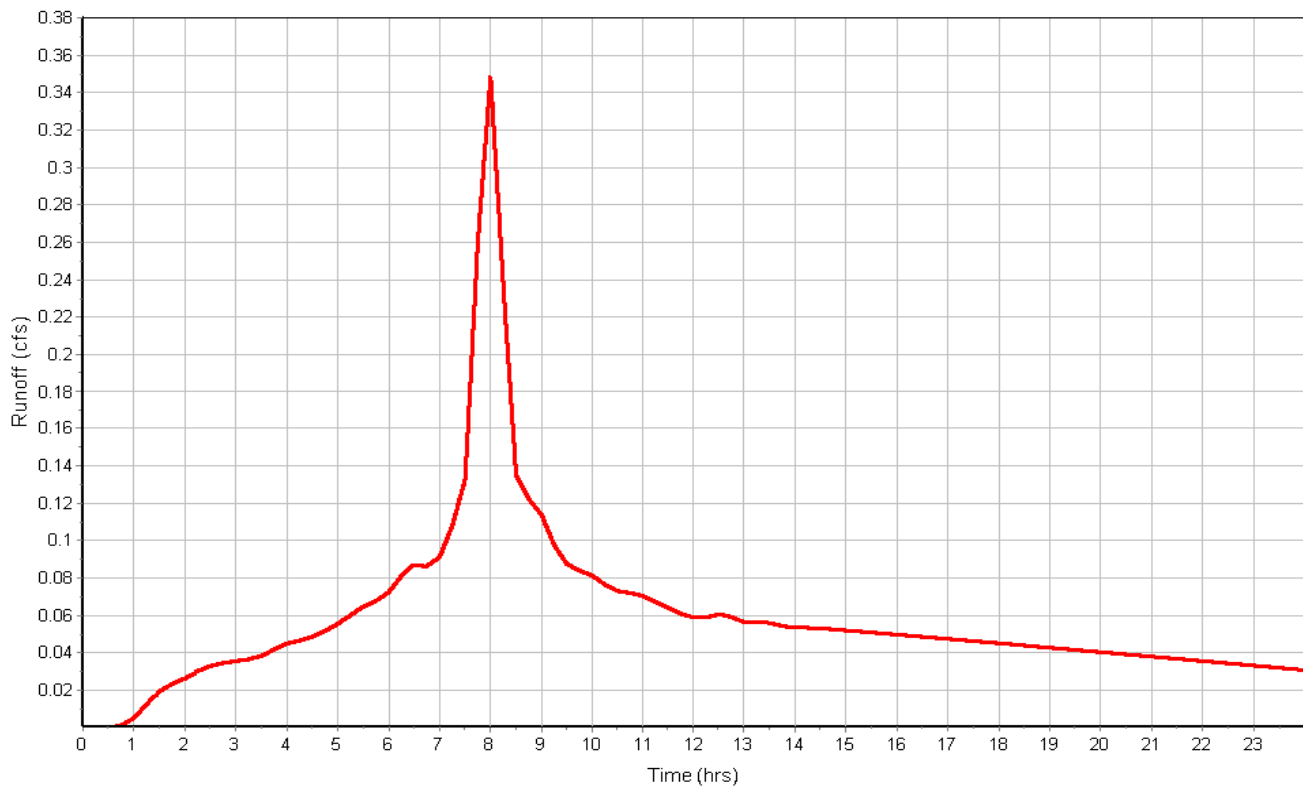
Total Rainfall (in) 3.96
Total Runoff (in) 3.35
Peak Runoff (cfs) 0.35
Weighted Curve Number 93.82
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 108

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 109**Input Data**

Area (ac) 0.09
Impervious Area (%) 80.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

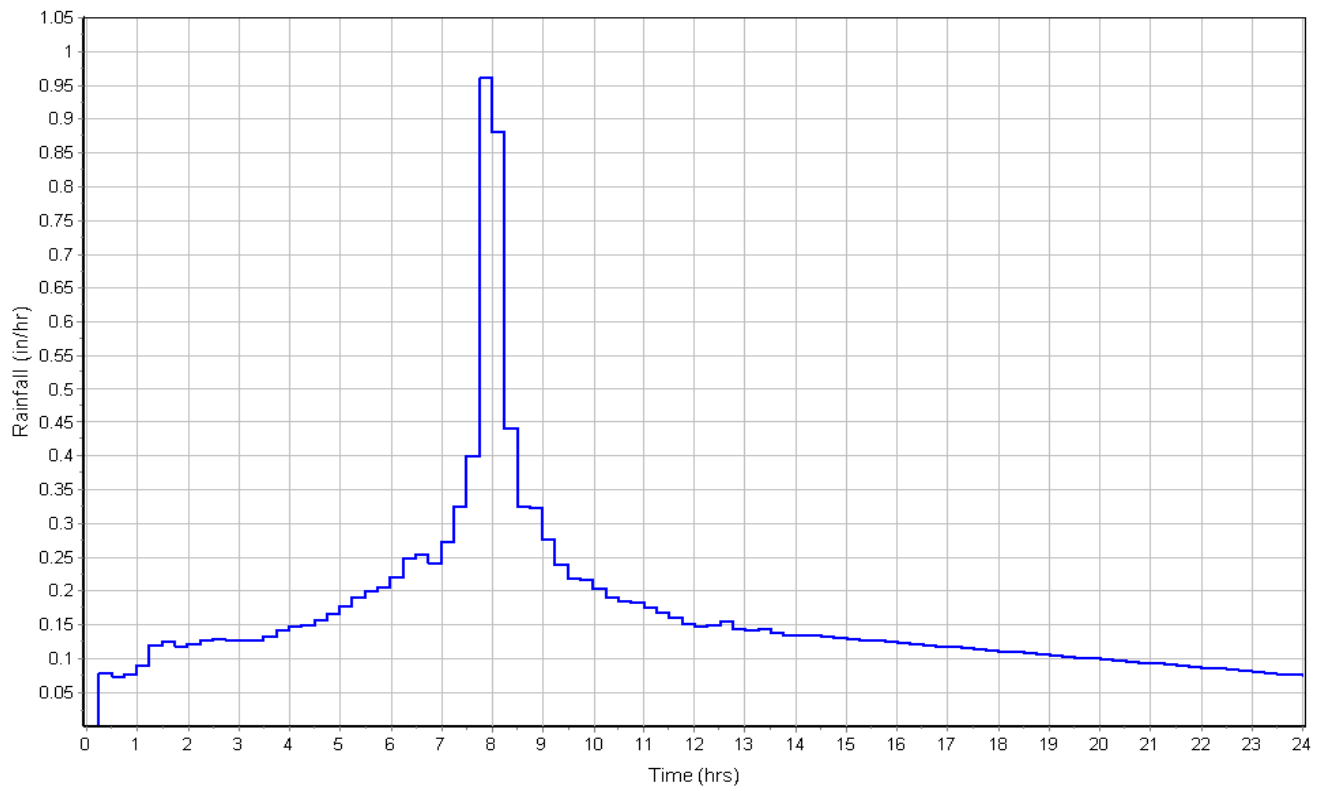
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.09		93.6

Subbasin Runoff Results

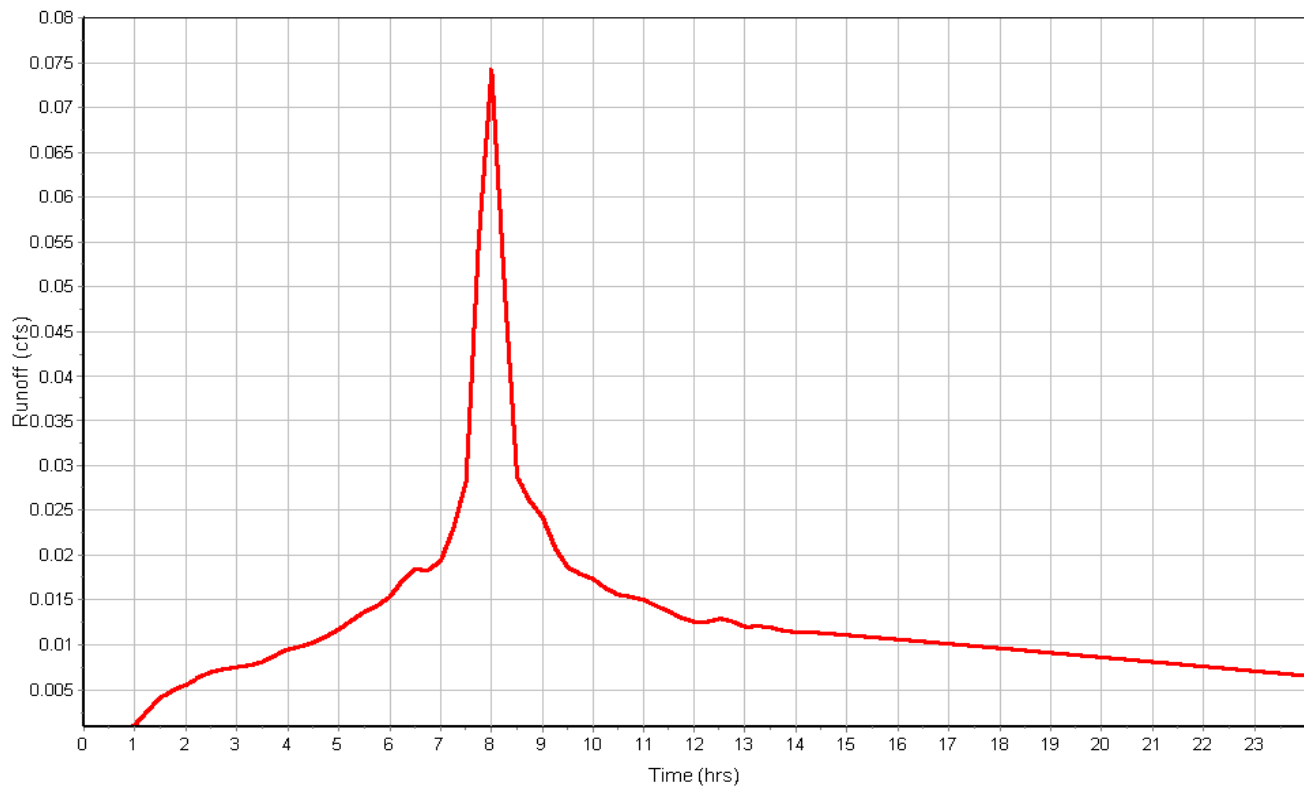
Total Rainfall (in) 3.96
Total Runoff (in) 3.33
Peak Runoff (cfs) 0.07
Weighted Curve Number 93.60
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 109

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 110**Input Data**

Area (ac) 0.12
 Impervious Area (%) 87.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

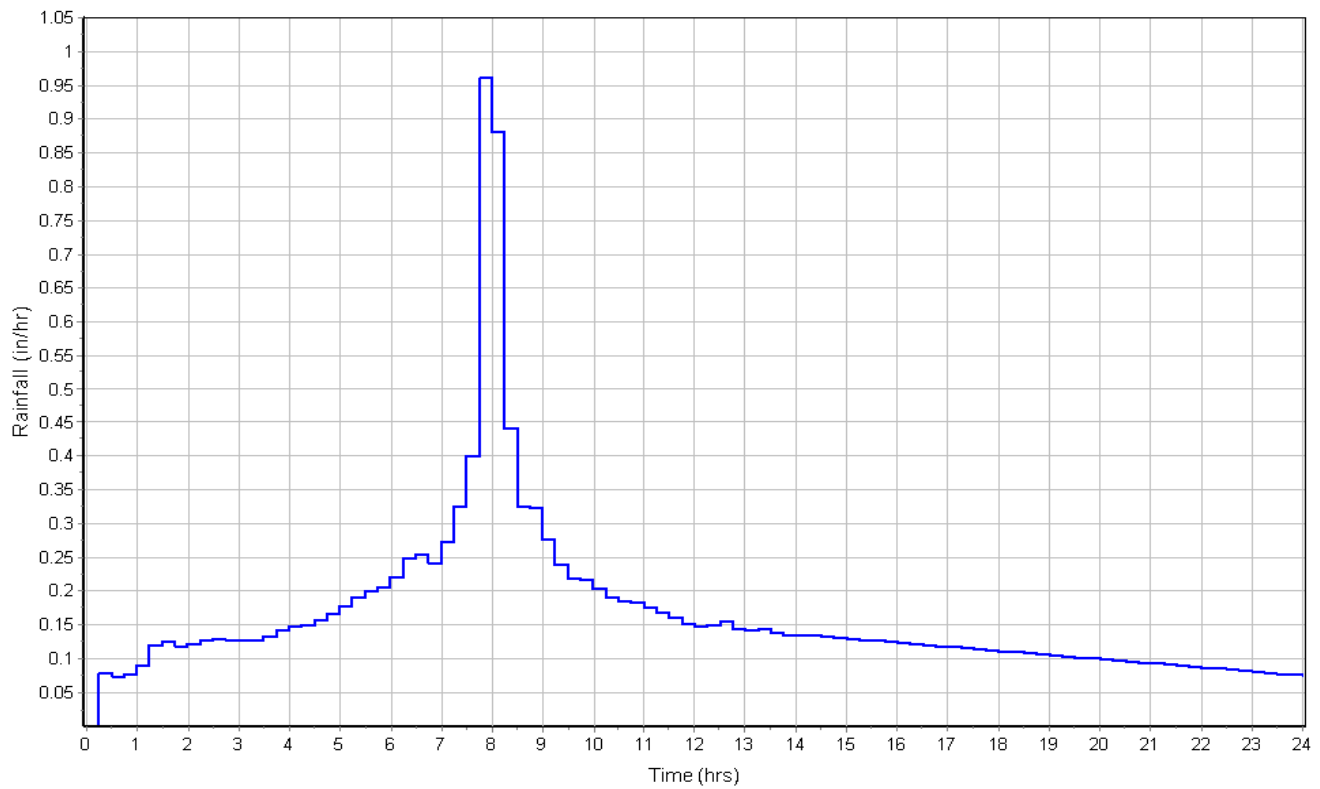
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.12		95.14

Subbasin Runoff Results

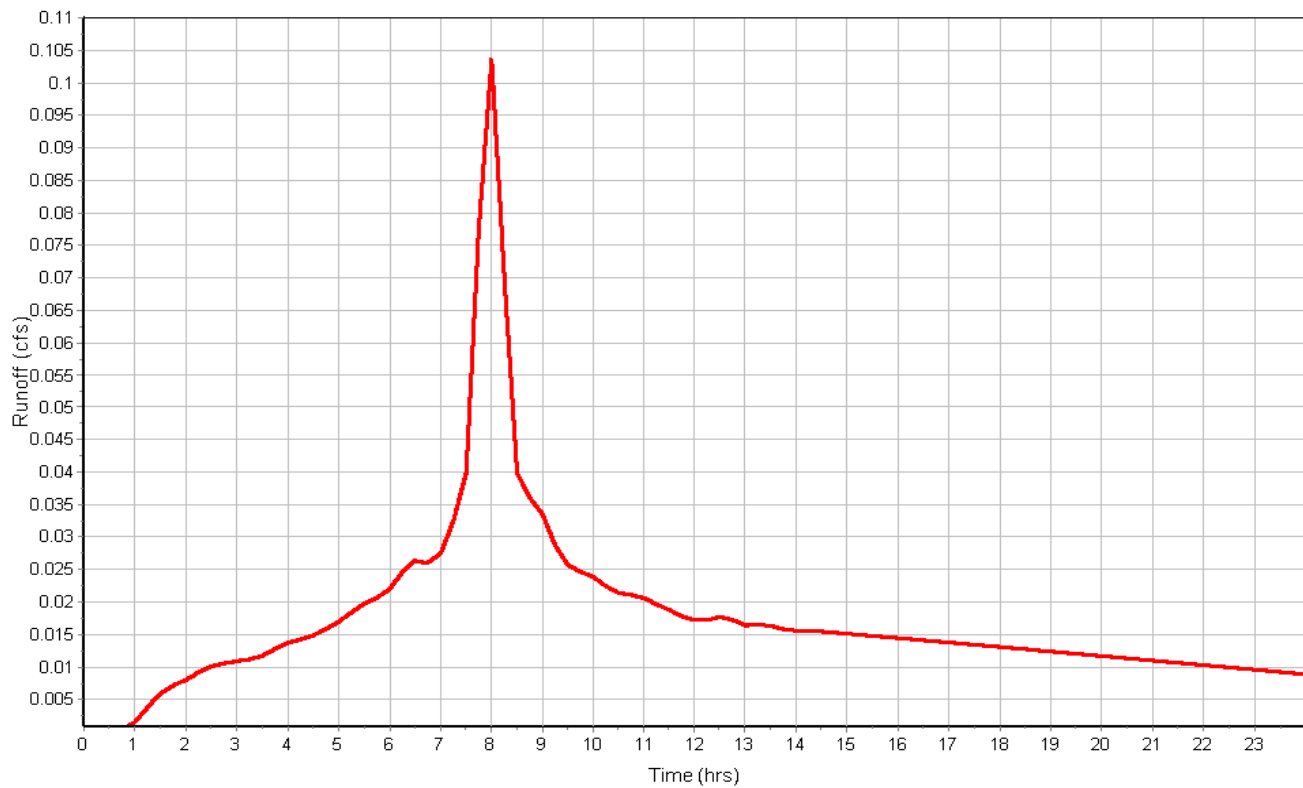
Total Rainfall (in) 3.96
 Total Runoff (in) 3.47
 Peak Runoff (cfs) 0.10
 Weighted Curve Number 95.14
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 110

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 114**Input Data**

Area (ac) 0.13
Impervious Area (%) 100.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

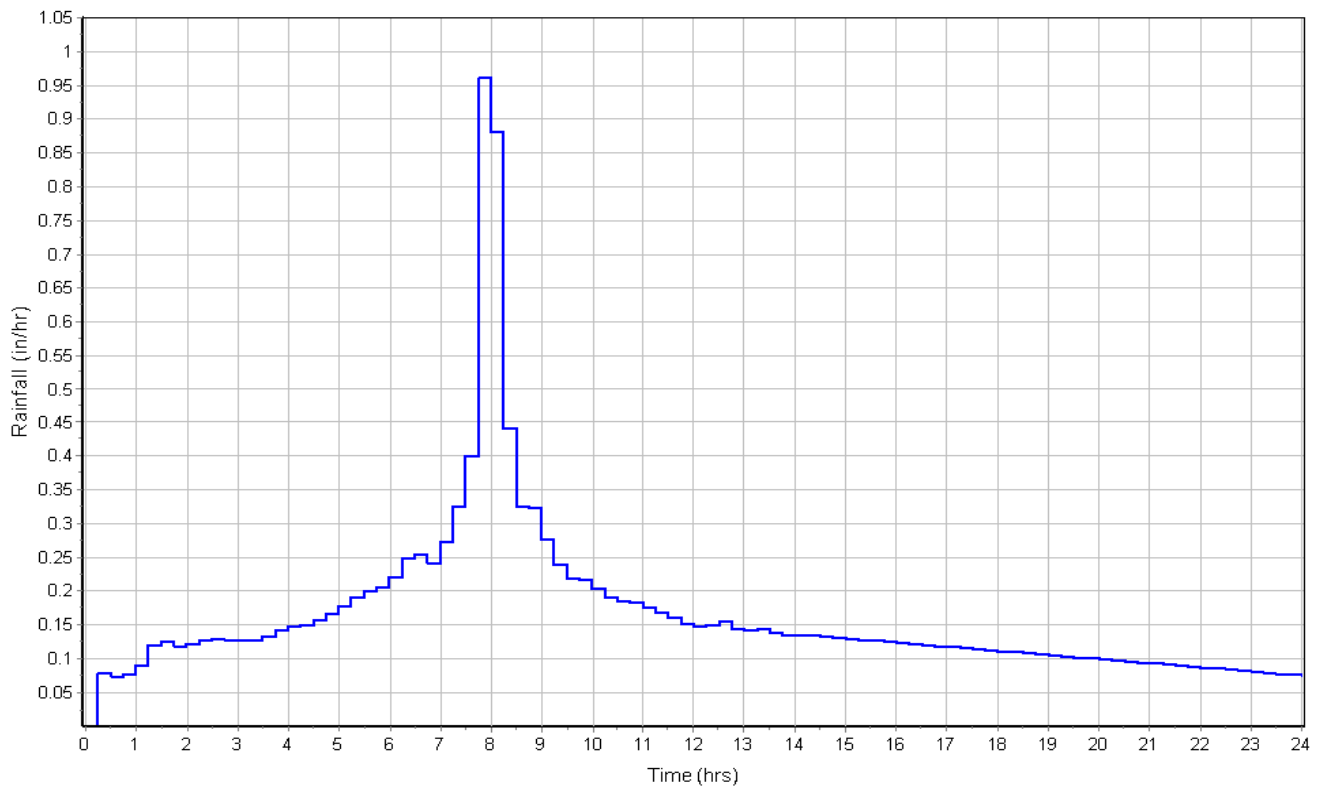
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.13		98

Subbasin Runoff Results

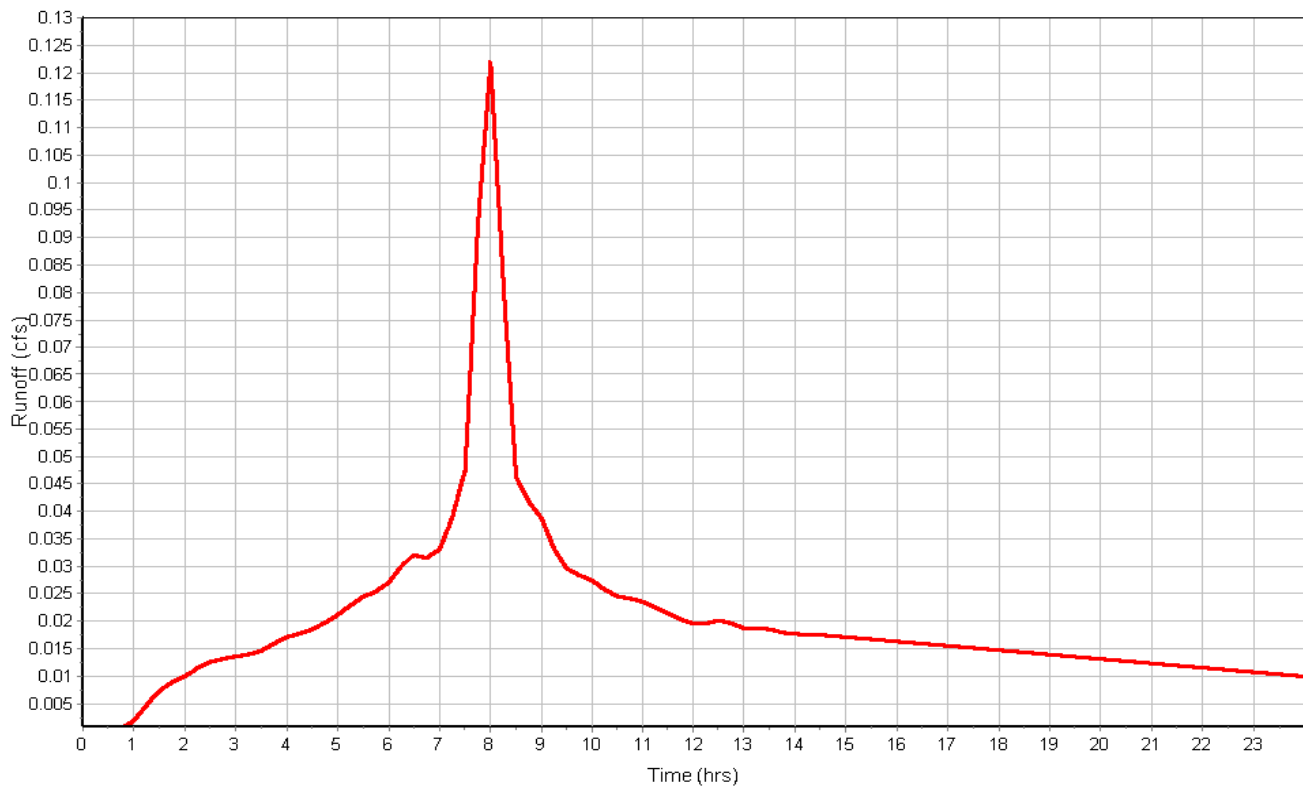
Total Rainfall (in) 3.96
Total Runoff (in) 3.73
Peak Runoff (cfs) 0.12
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 114

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 117**Input Data**

Area (ac) 0.73
Impervious Area (%) 53.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

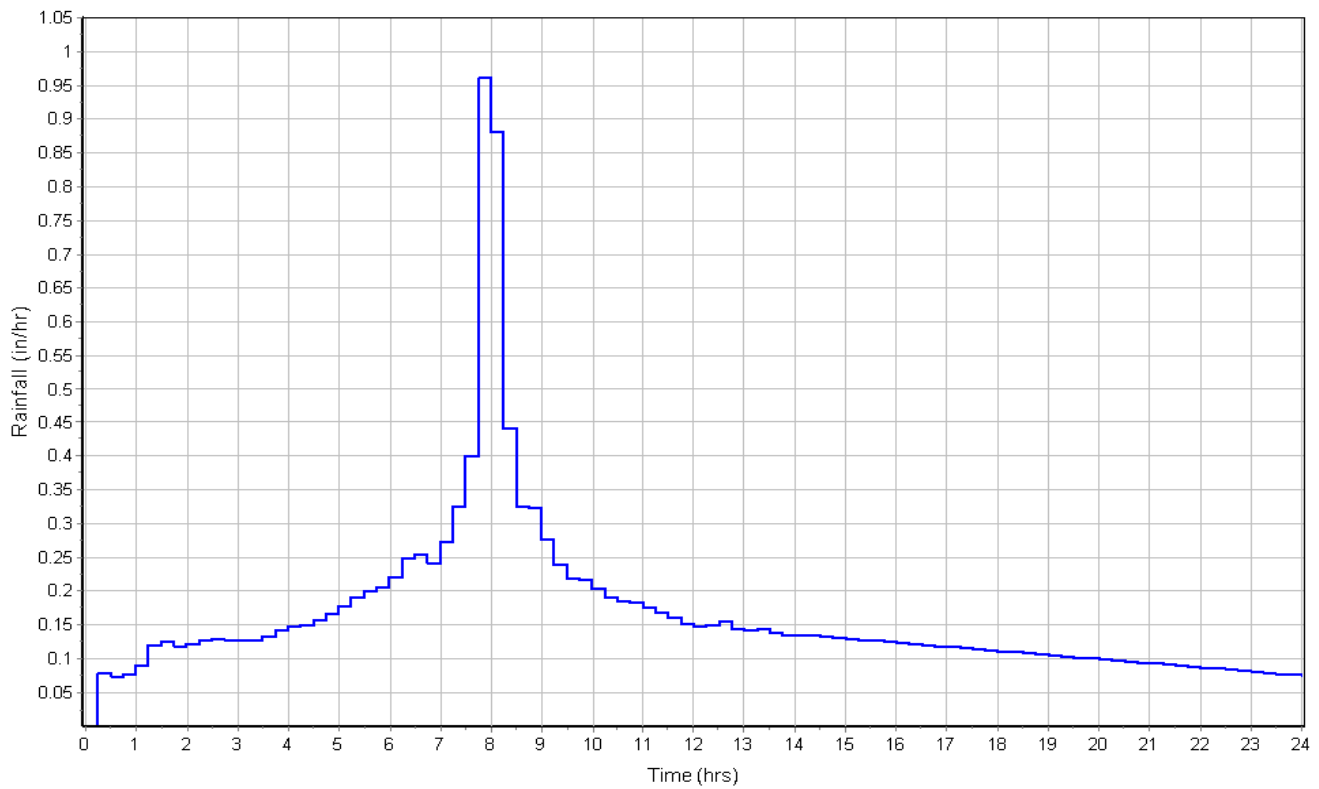
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.73		87.66

Subbasin Runoff Results

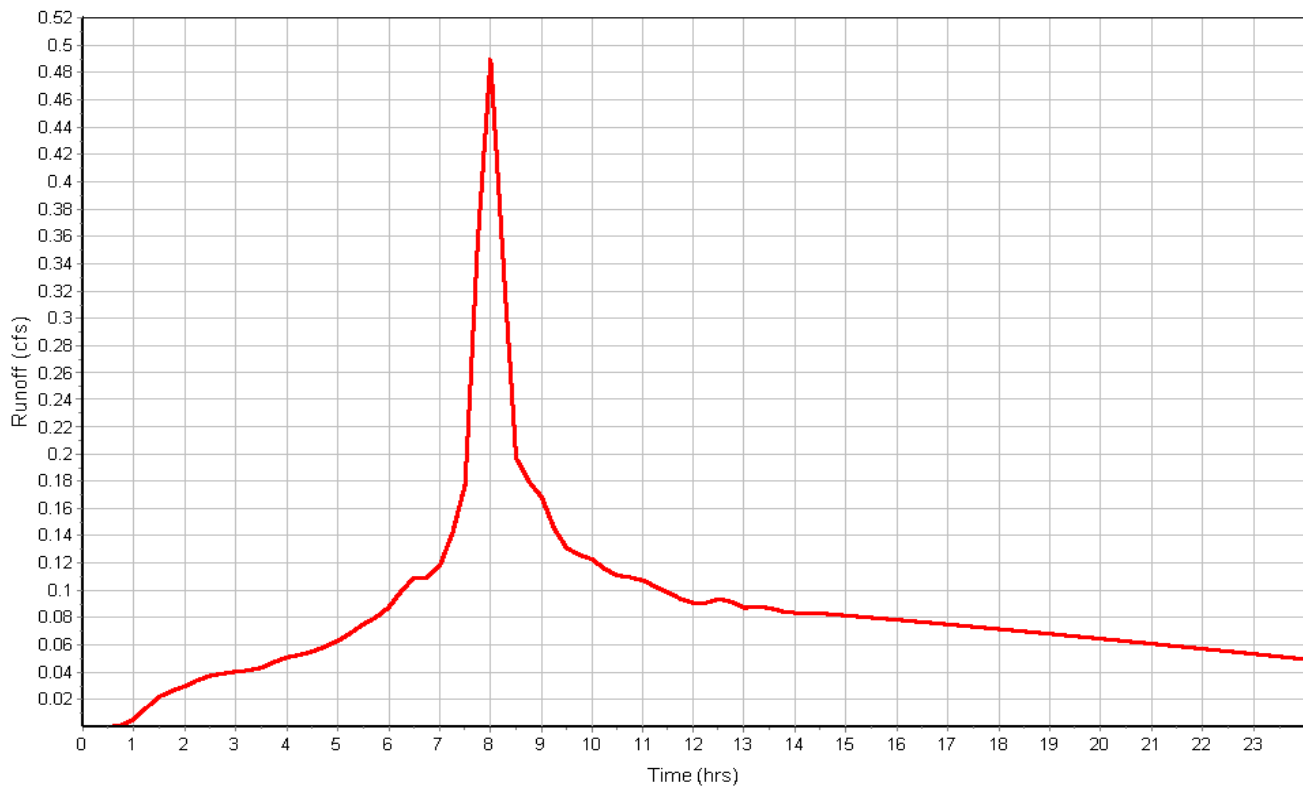
Total Rainfall (in) 3.96
Total Runoff (in) 2.78
Peak Runoff (cfs) 0.49
Weighted Curve Number 87.66
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 117

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 118**Input Data**

Area (ac) 0.18
 Impervious Area (%) 6.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

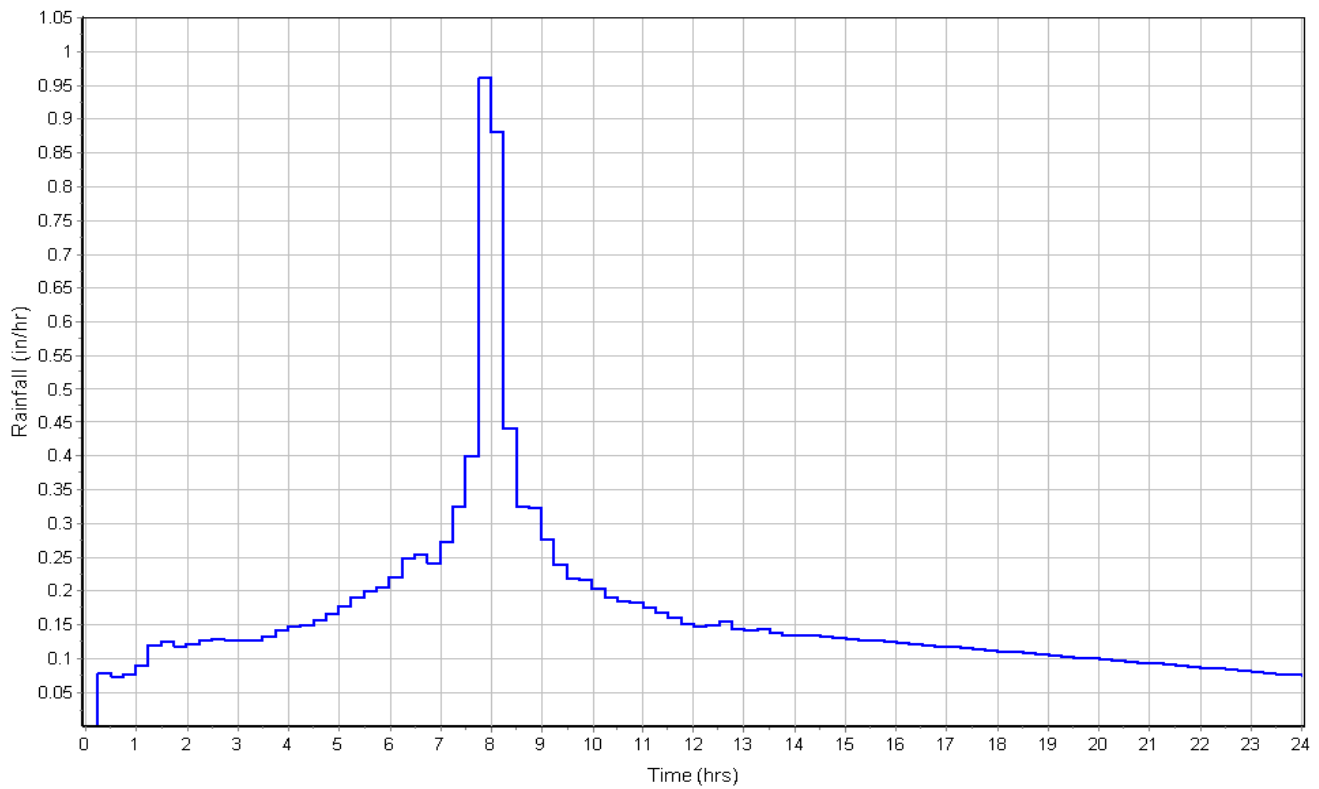
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.18		77.32

Subbasin Runoff Results

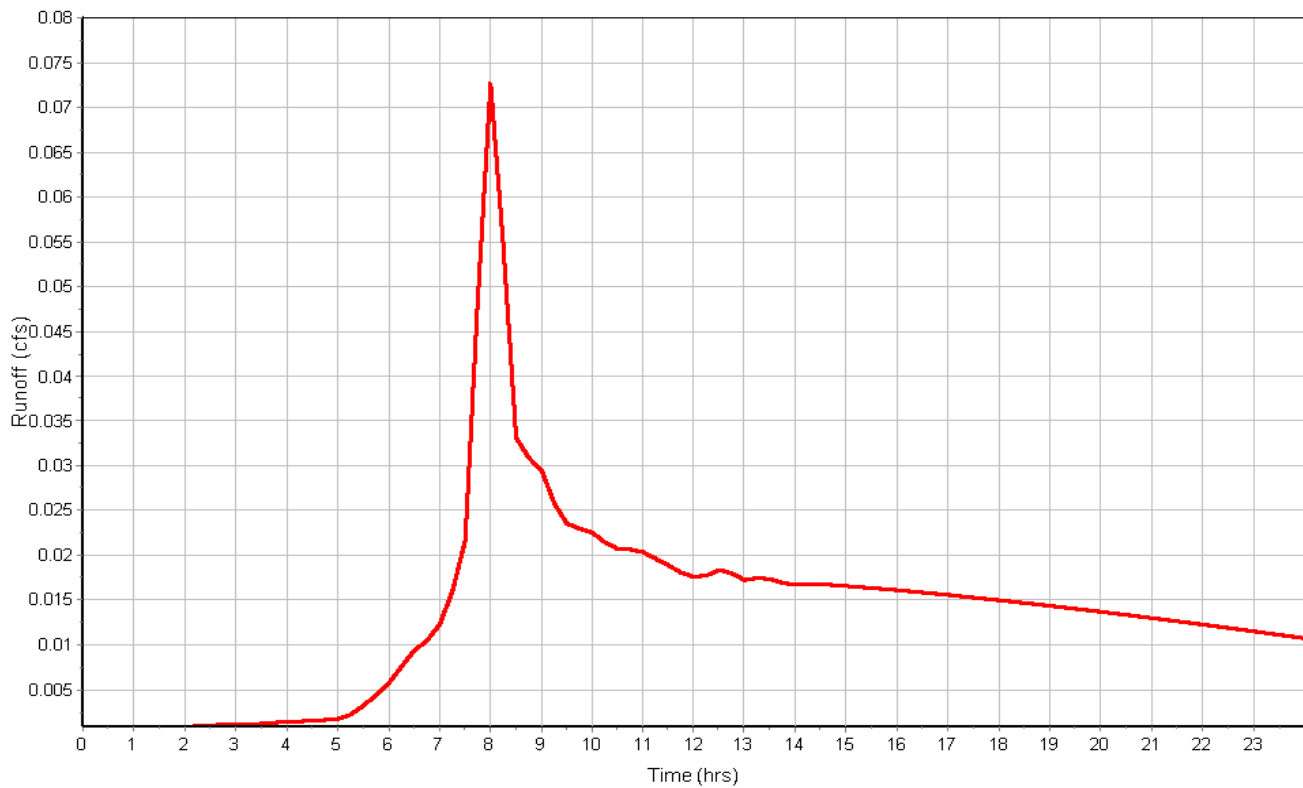
Total Rainfall (in) 3.96
 Total Runoff (in) 1.83
 Peak Runoff (cfs) 0.07
 Weighted Curve Number 77.32
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 118

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 120**Input Data**

Area (ac) 0.54
Impervious Area (%) 86.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

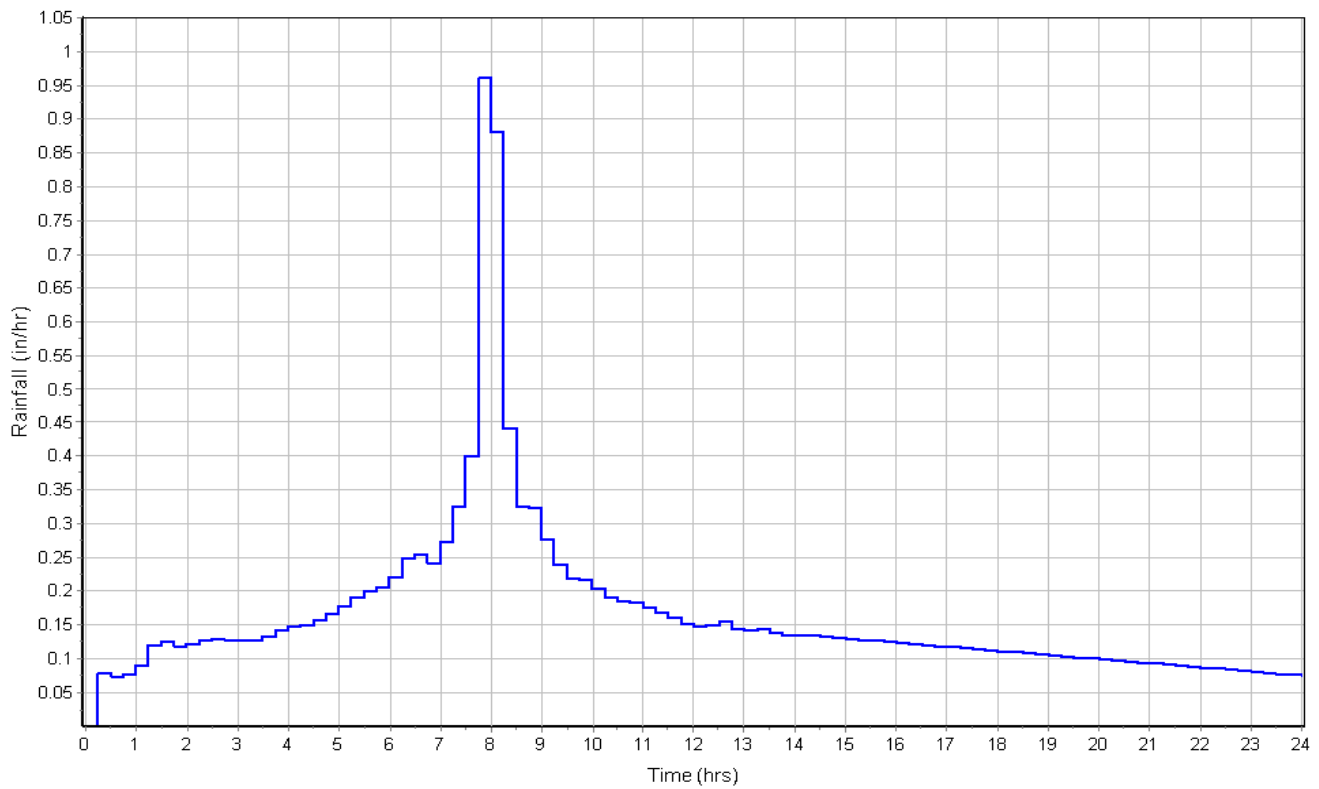
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.54		94.92

Subbasin Runoff Results

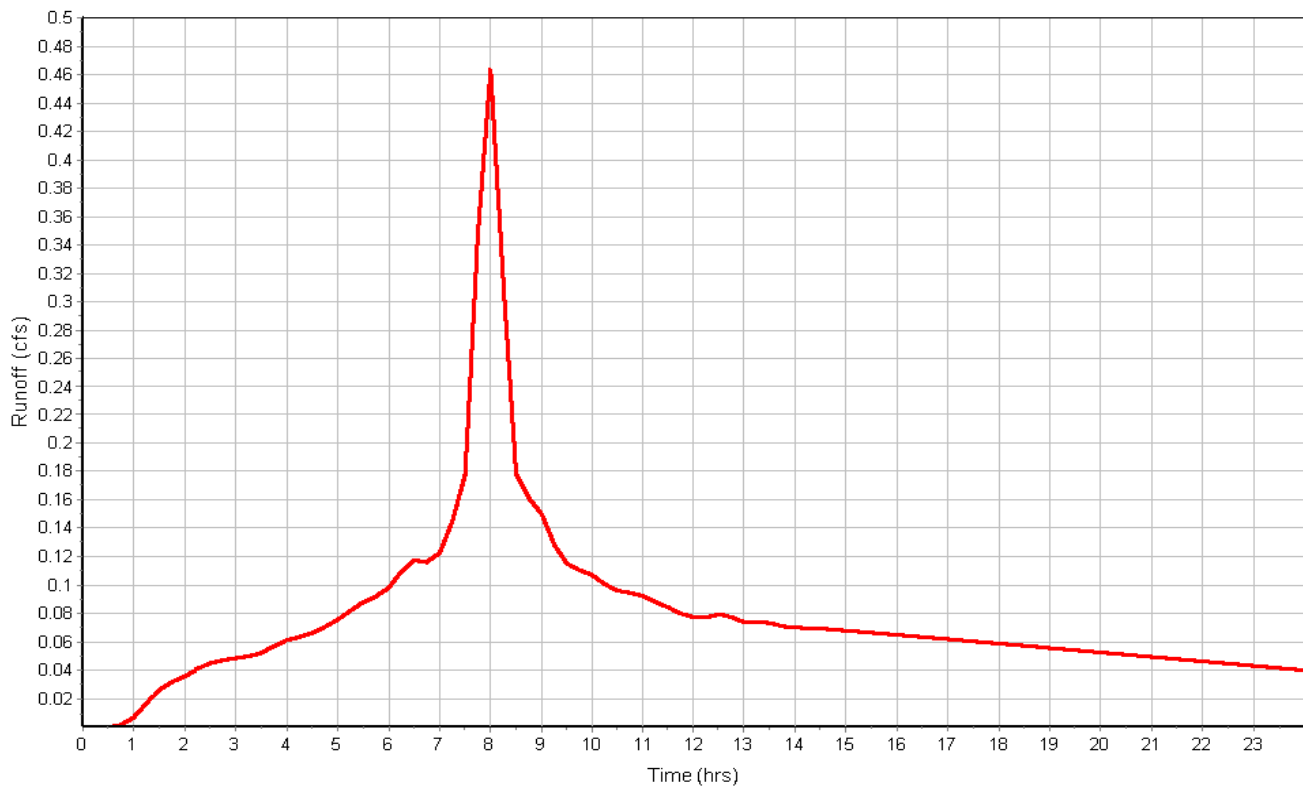
Total Rainfall (in) 3.96
Total Runoff (in) 3.45
Peak Runoff (cfs) 0.46
Weighted Curve Number 94.92
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 120

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 121**Input Data**

Area (ac) 0.34
 Impervious Area (%) 90.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

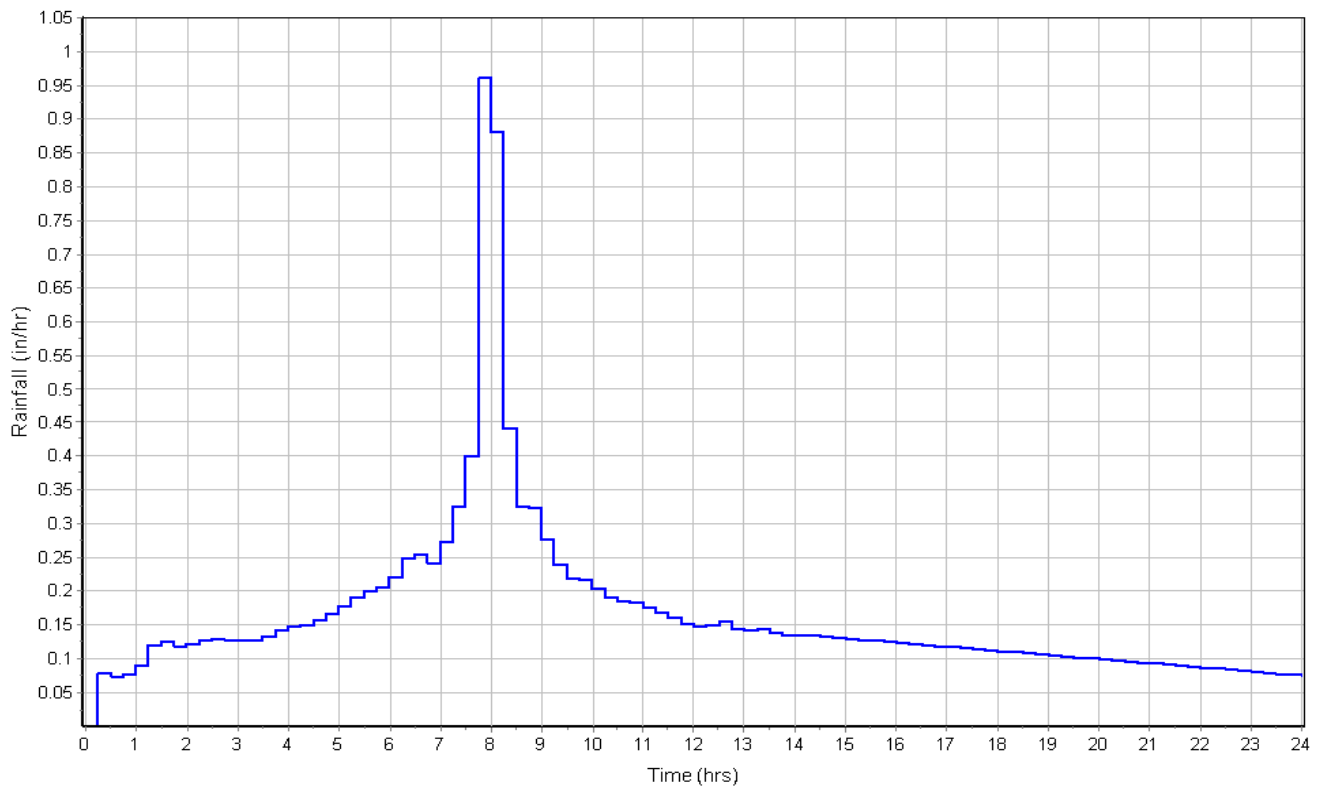
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.34		95.8

Subbasin Runoff Results

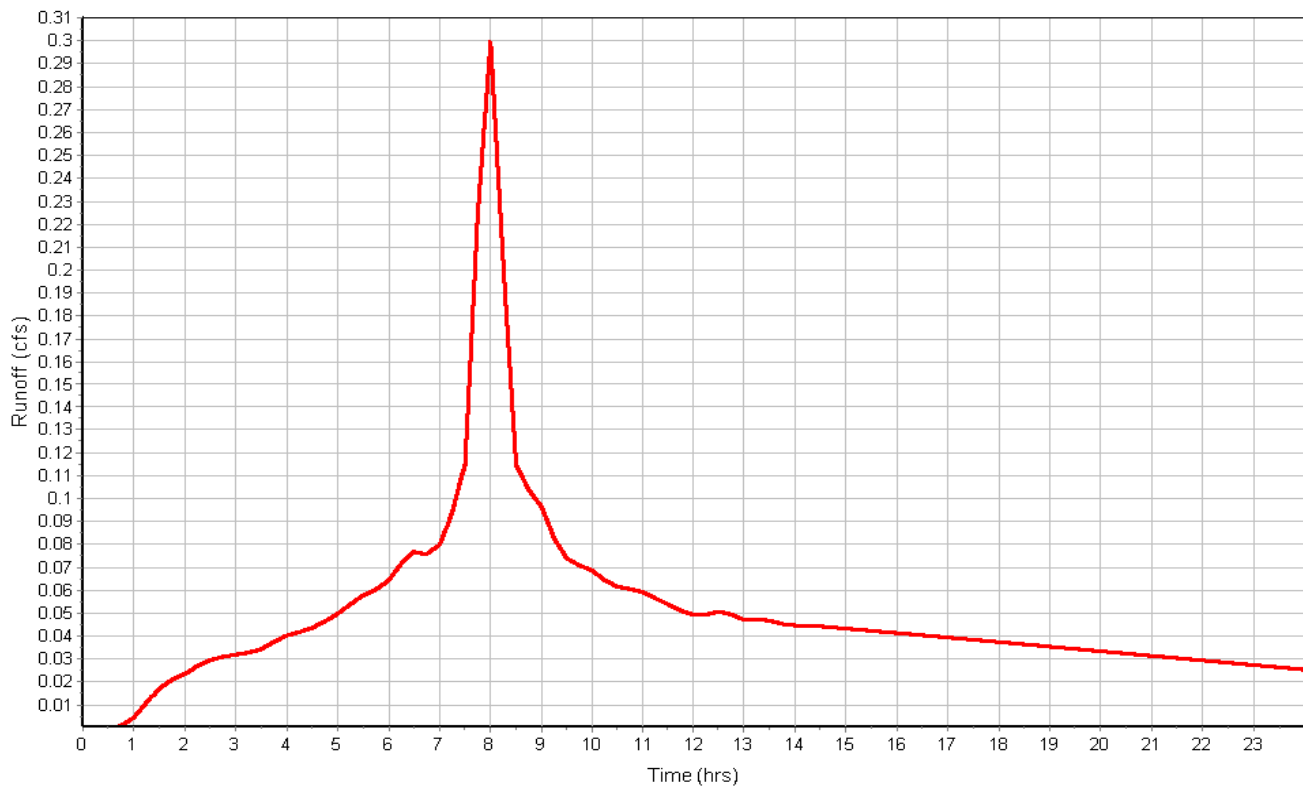
Total Rainfall (in) 3.96
 Total Runoff (in) 3.53
 Peak Runoff (cfs) 0.30
 Weighted Curve Number 95.80
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 121

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 122**Input Data**

Area (ac) 0.28
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

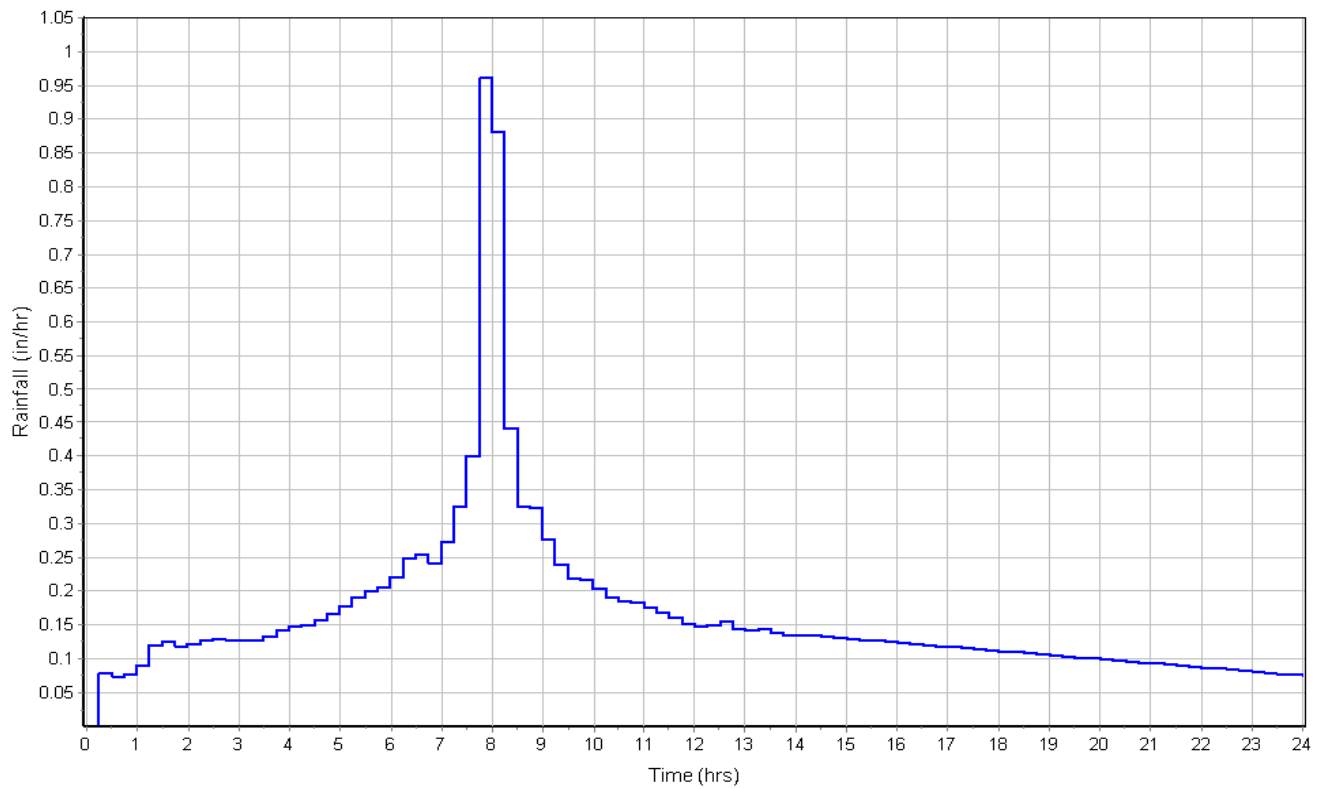
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.28		98

Subbasin Runoff Results

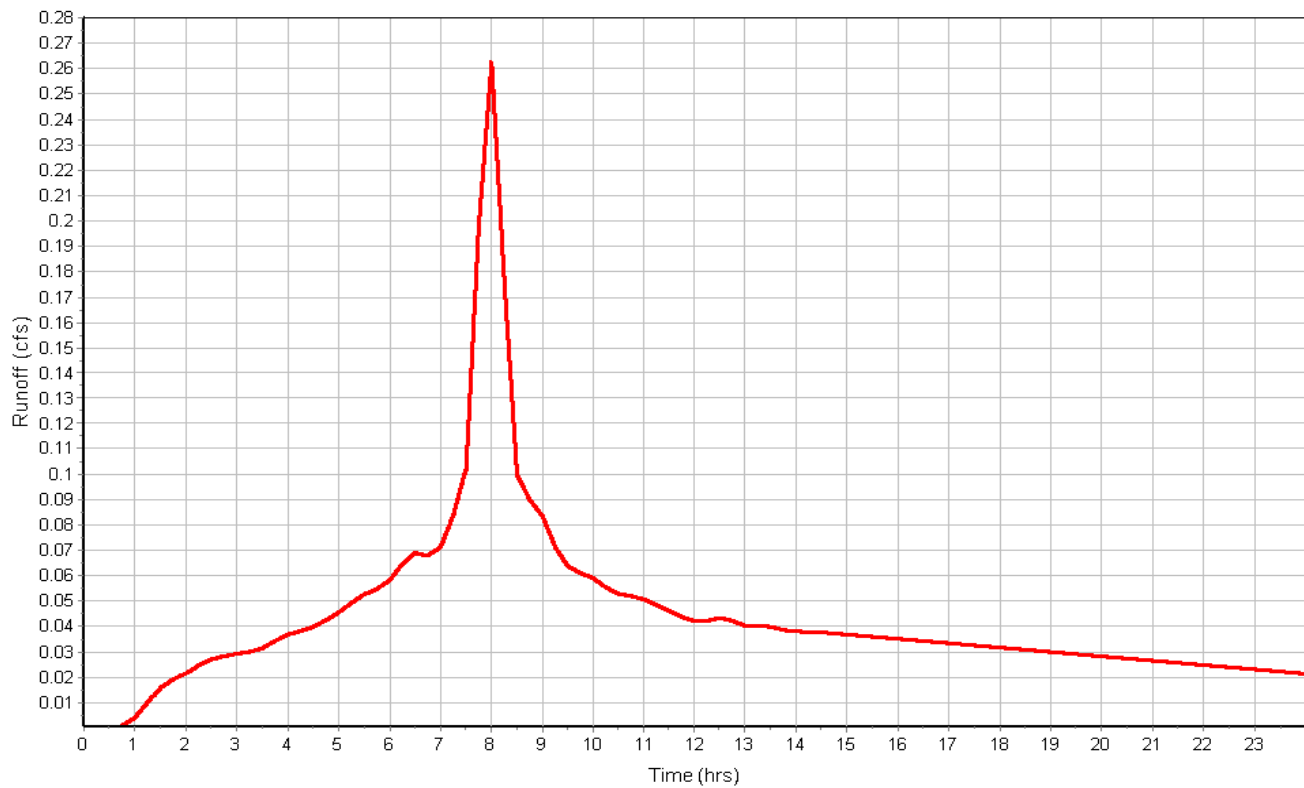
Total Rainfall (in) 3.96
 Total Runoff (in) 3.73
 Peak Runoff (cfs) 0.26
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 122

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 123**Input Data**

Area (ac) 0.08
Impervious Area (%) 40.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

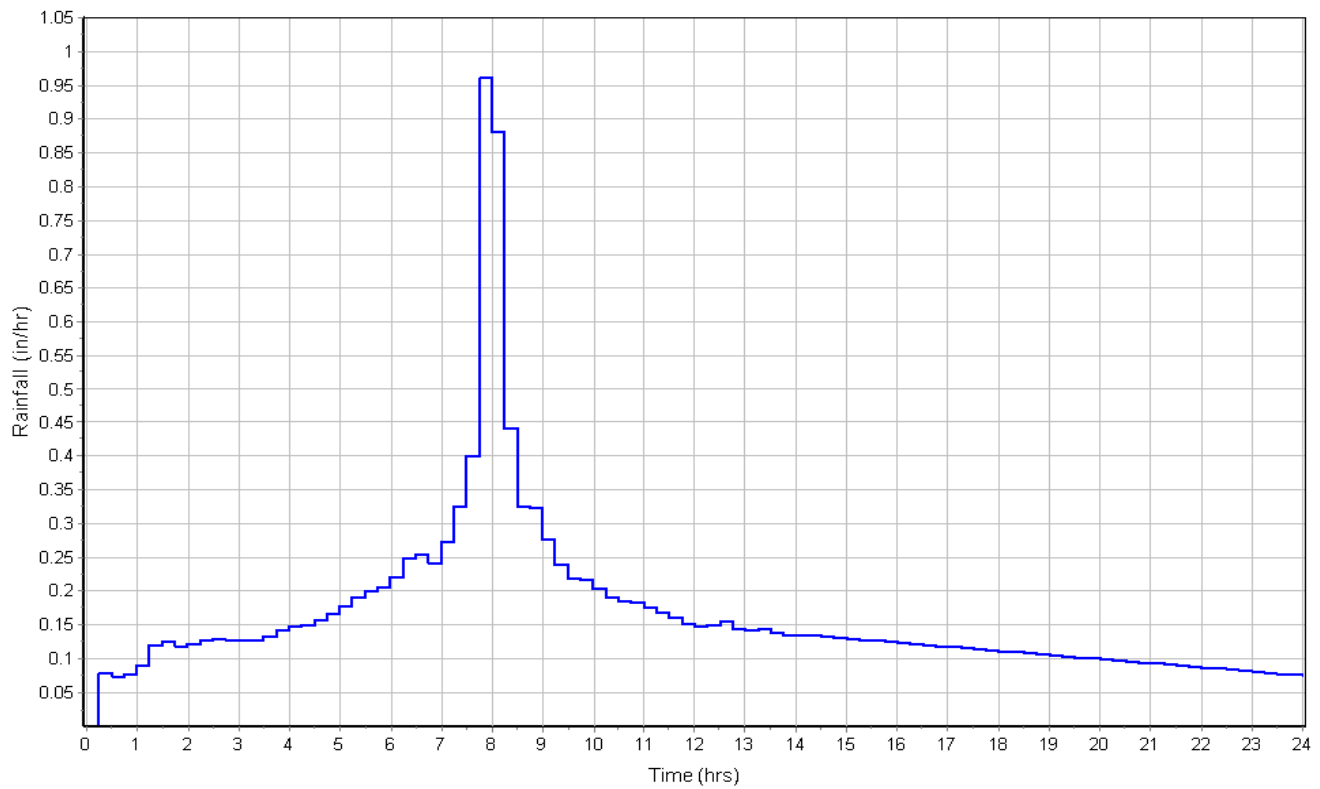
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.08		84.8

Subbasin Runoff Results

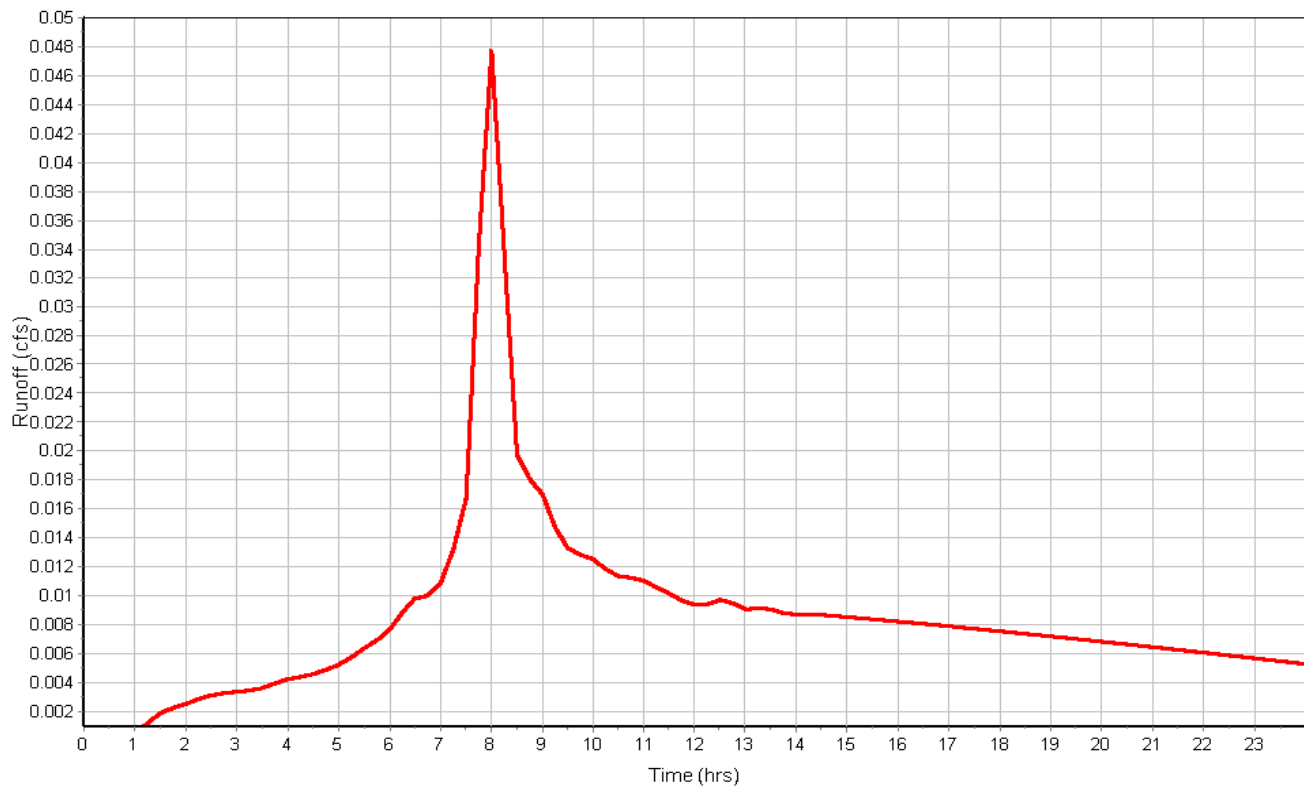
Total Rainfall (in) 3.96
Total Runoff (in) 2.52
Peak Runoff (cfs) 0.05
Weighted Curve Number 84.80
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 123

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 127**Input Data**

Area (ac) 0.18
Impervious Area (%) 100.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

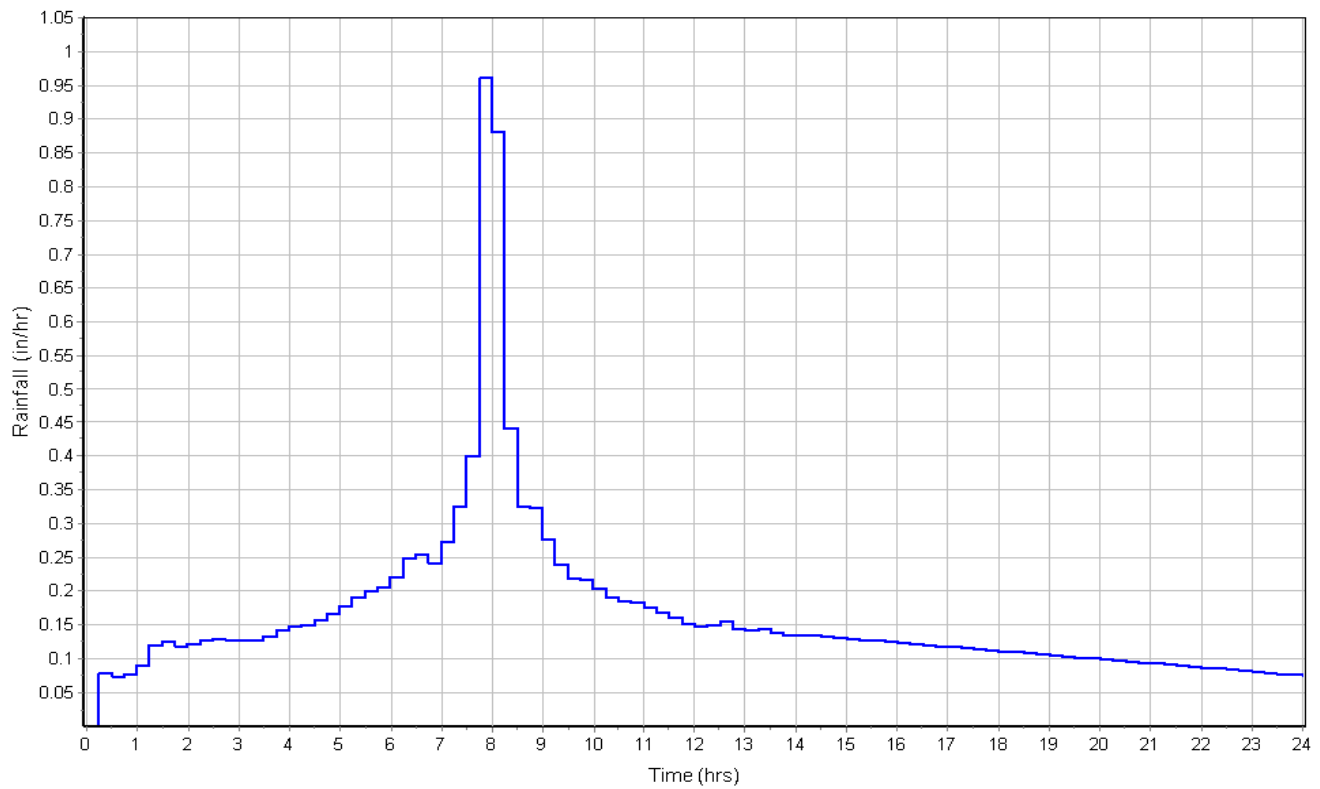
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.18		98

Subbasin Runoff Results

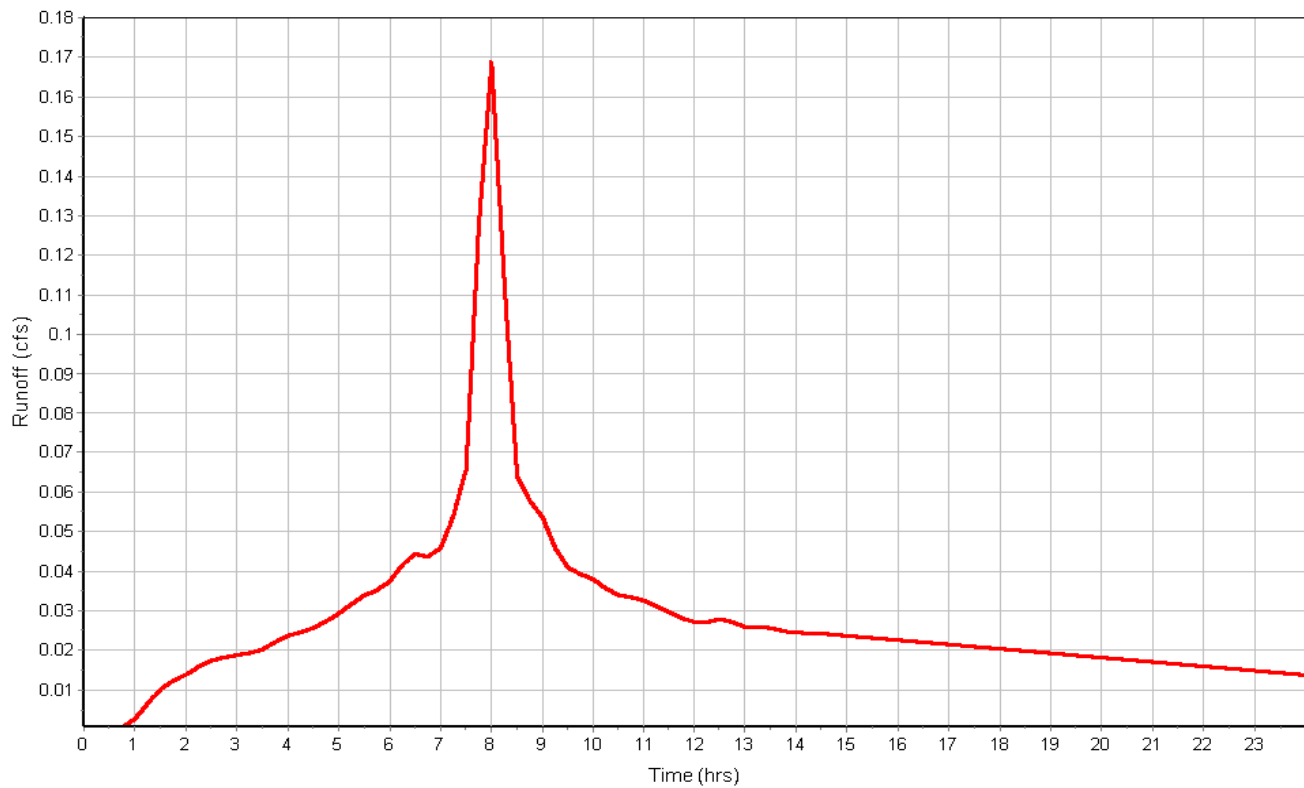
Total Rainfall (in) 3.96
Total Runoff (in) 3.73
Peak Runoff (cfs) 0.17
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 127

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 128**Input Data**

Area (ac) 0.23
Impervious Area (%) 99.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

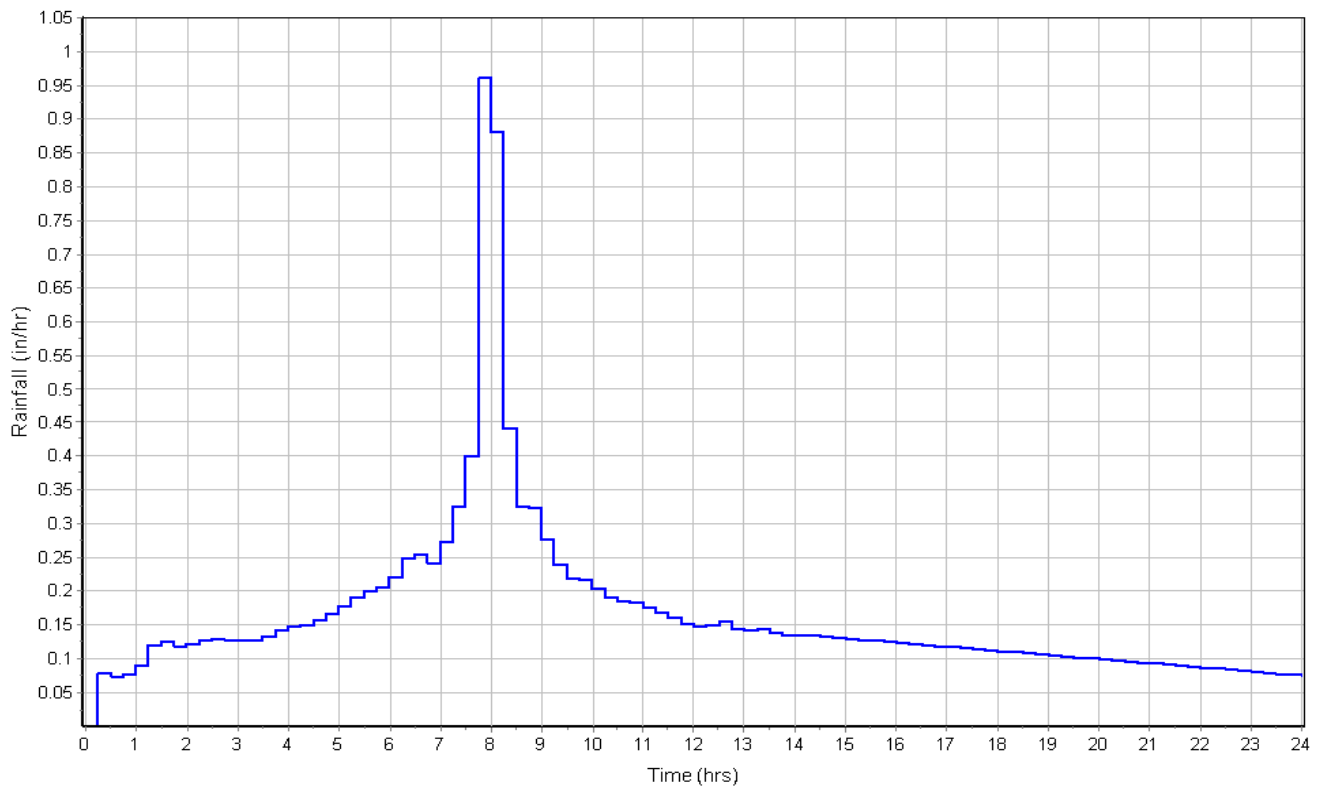
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.23		97.78

Subbasin Runoff Results

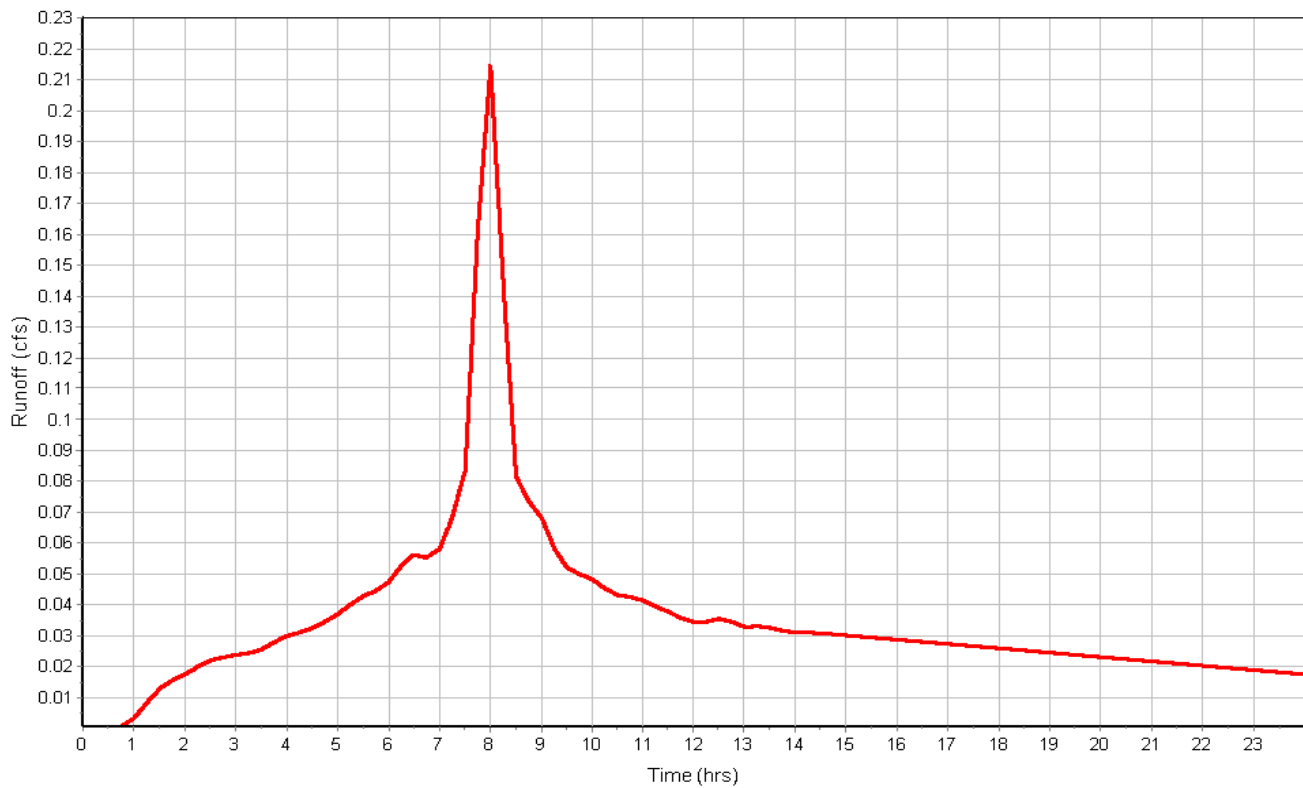
Total Rainfall (in) 3.96
Total Runoff (in) 3.71
Peak Runoff (cfs) 0.21
Weighted Curve Number 97.78
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 128

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 129**Input Data**

Area (ac) 0.22
 Impervious Area (%) 74.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

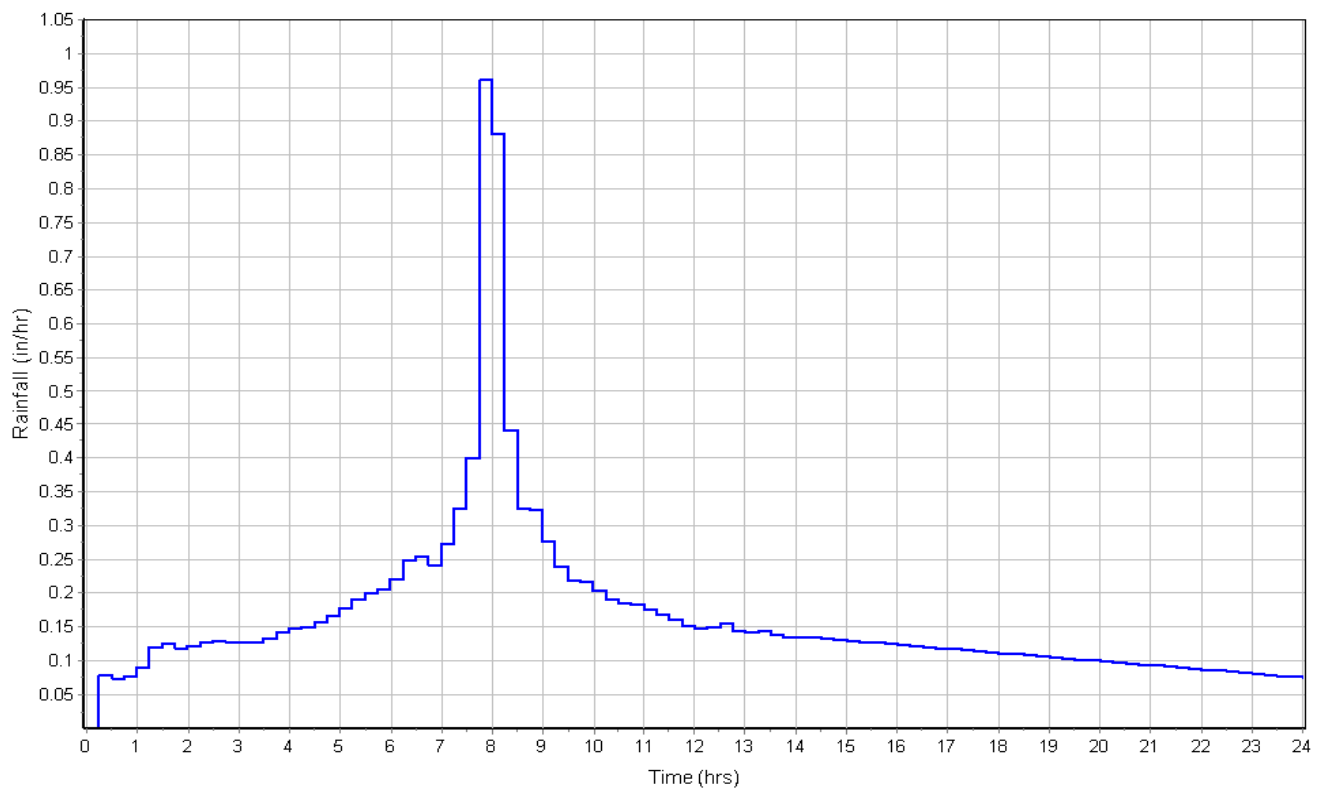
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.22		92.28

Subbasin Runoff Results

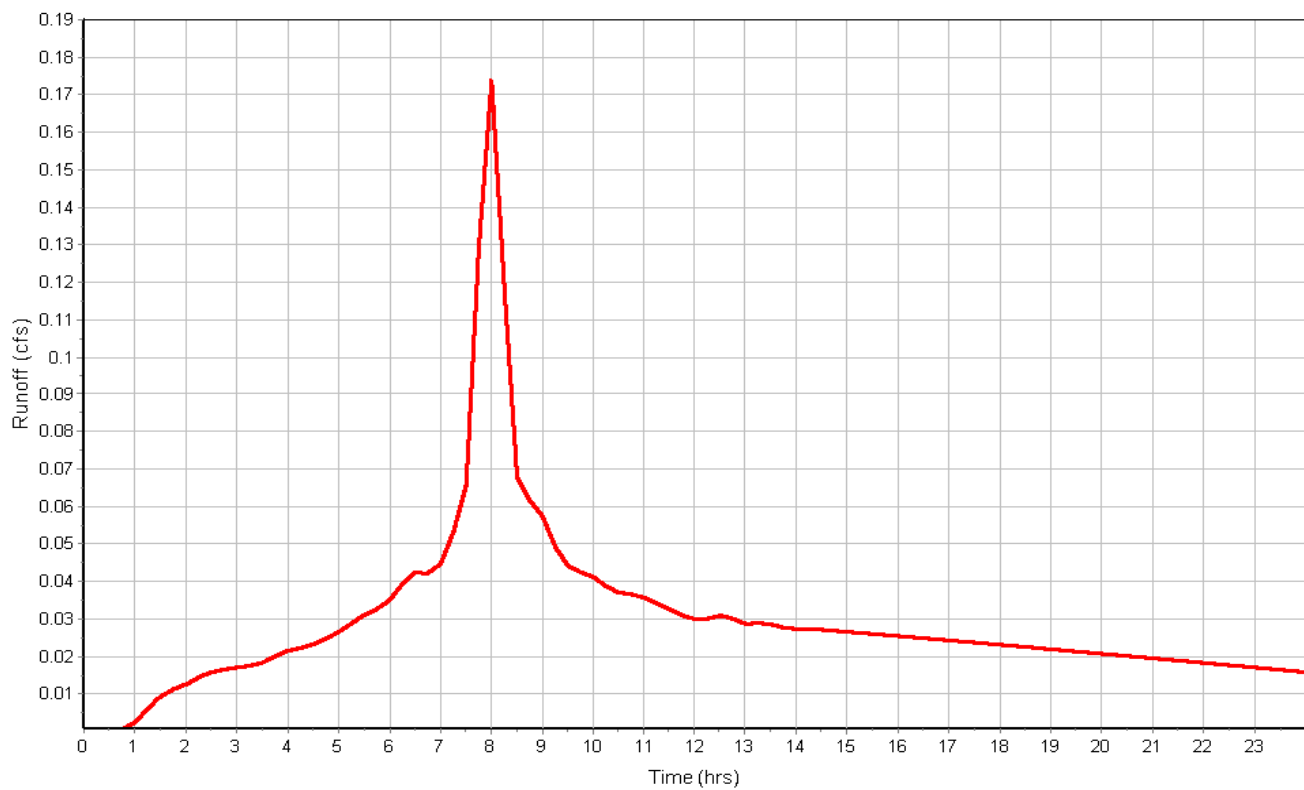
Total Rainfall (in) 3.96
 Total Runoff (in) 3.21
 Peak Runoff (cfs) 0.17
 Weighted Curve Number 92.28
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 129

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 133**Input Data**

Area (ac) 0.12
Impervious Area (%) 94.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

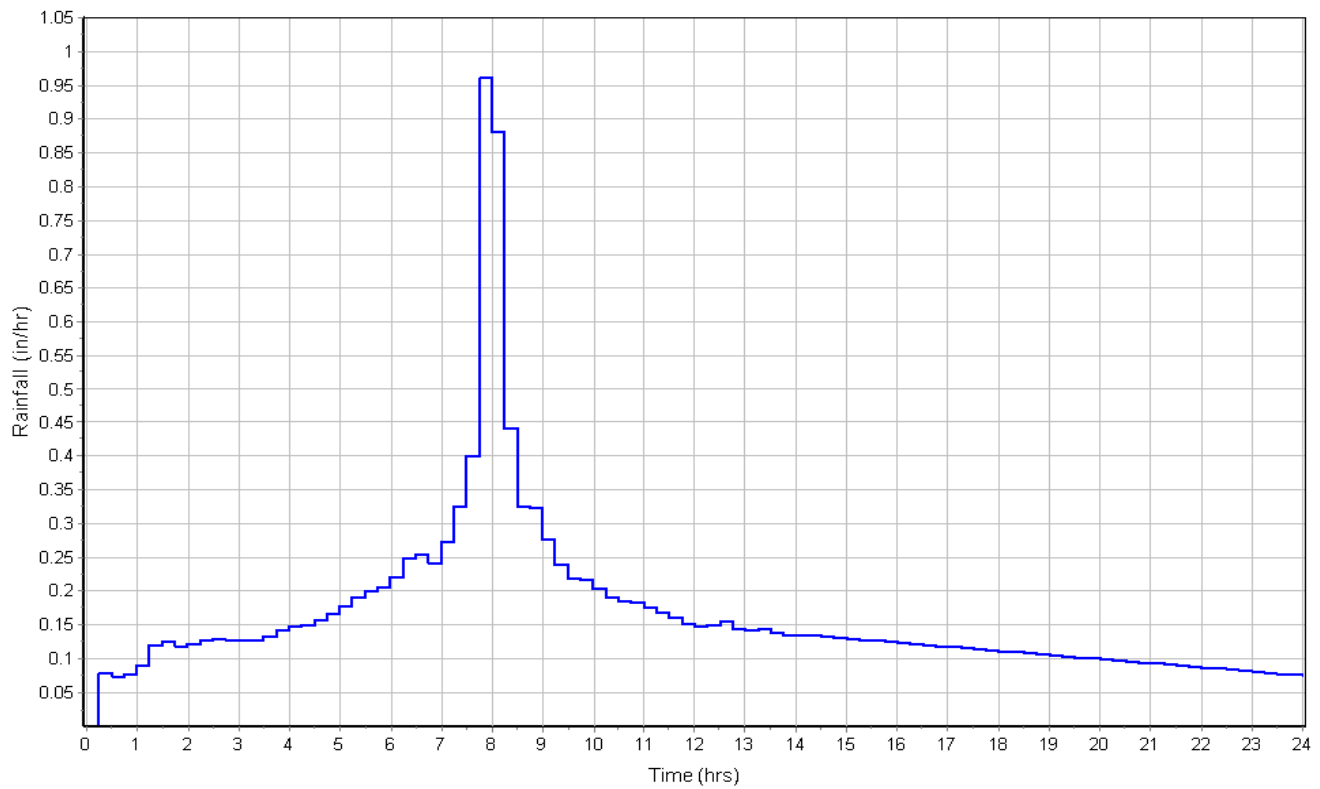
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.12		96.68

Subbasin Runoff Results

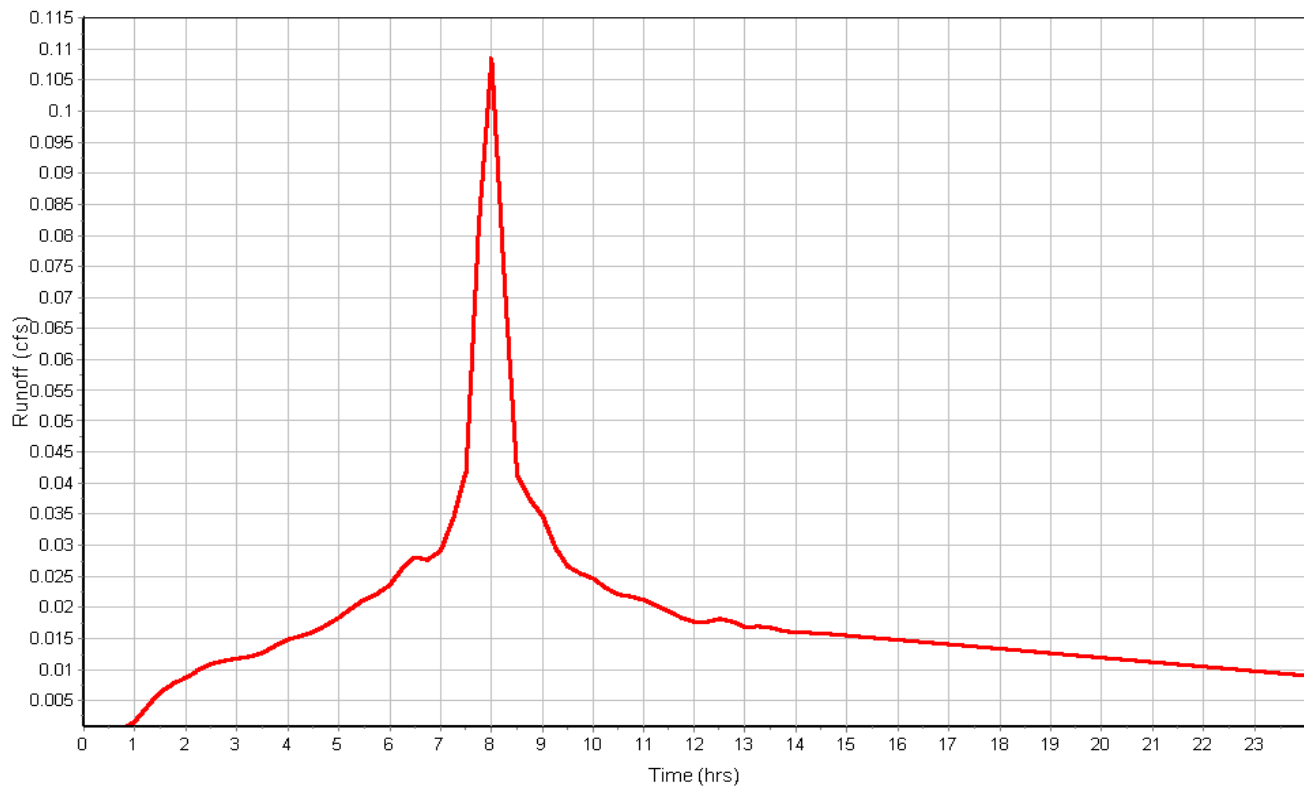
Total Rainfall (in) 3.96
Total Runoff (in) 3.61
Peak Runoff (cfs) 0.11
Weighted Curve Number 96.68
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 133

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 135**Input Data**

Area (ac) 0.73
 Impervious Area (%) 0.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

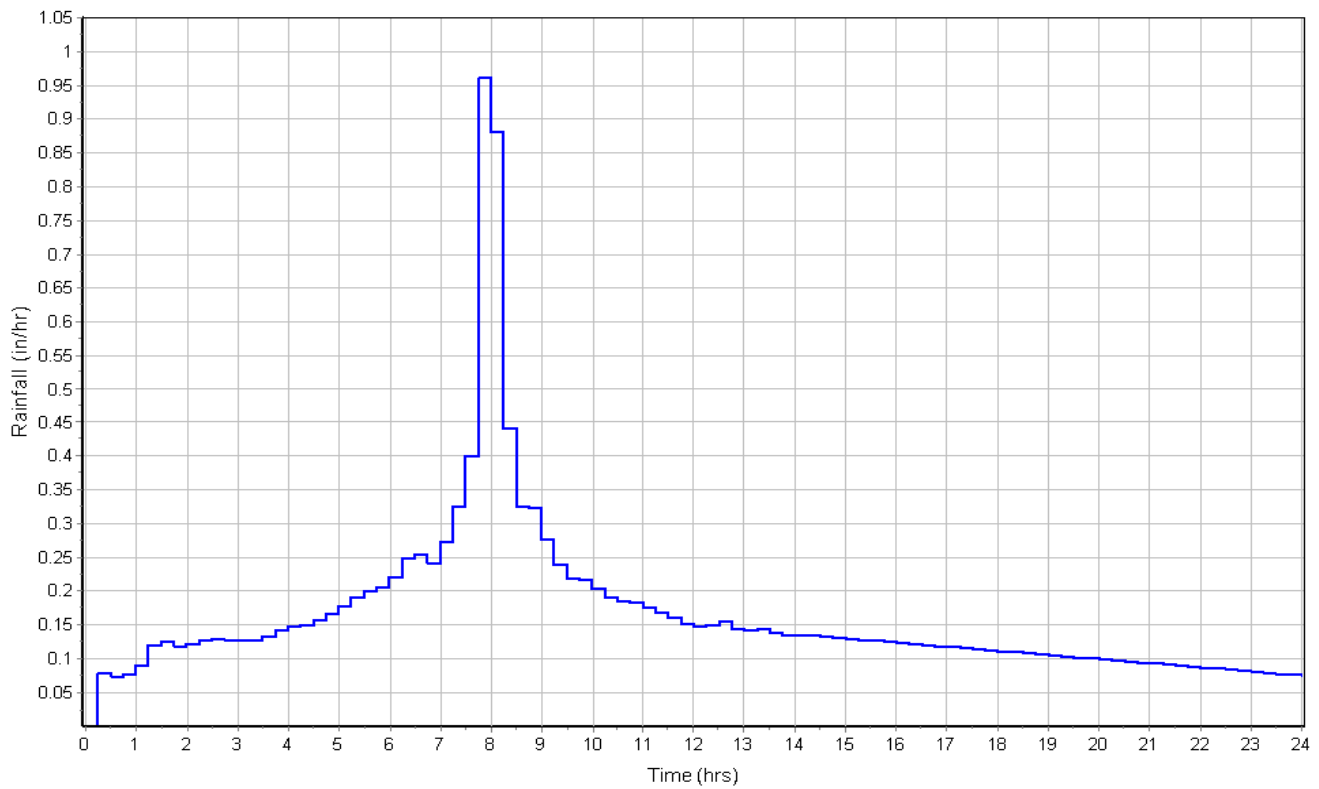
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.73		76

Subbasin Runoff Results

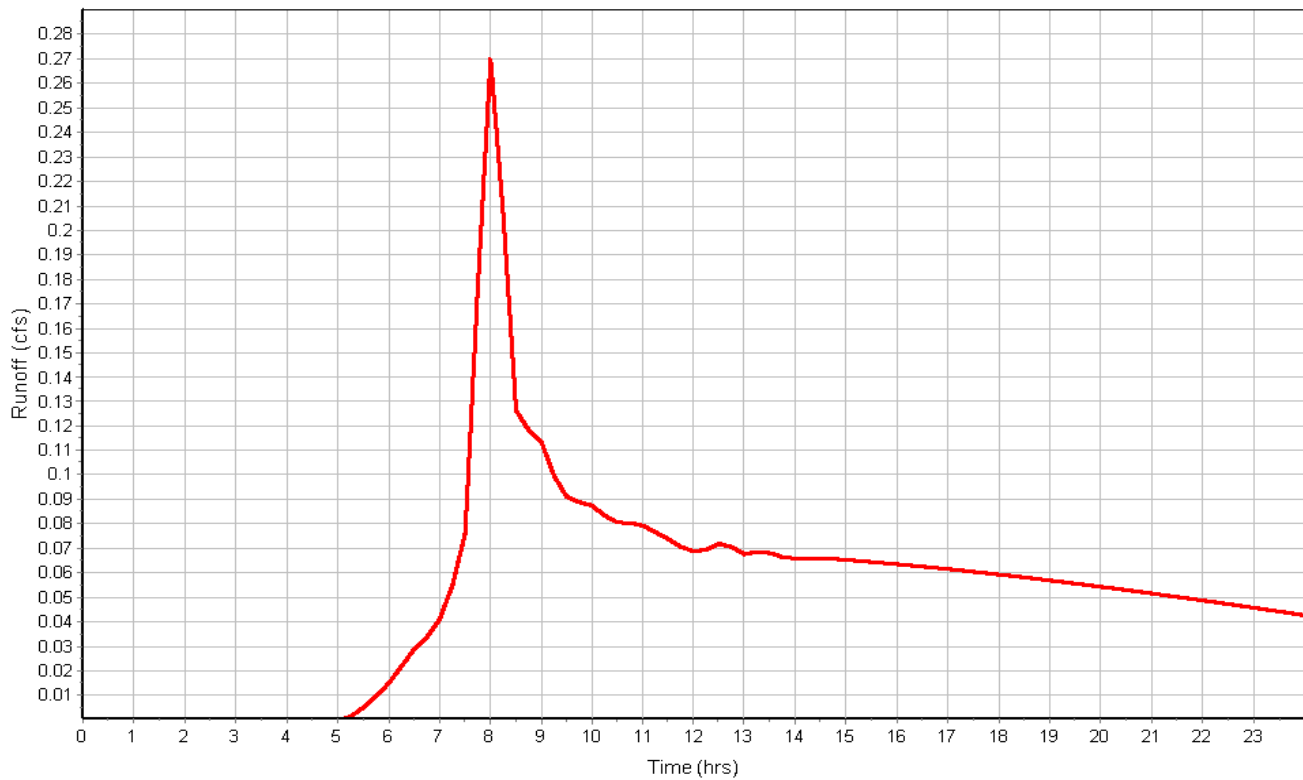
Total Rainfall (in) 3.96
 Total Runoff (in) 1.71
 Peak Runoff (cfs) 0.27
 Weighted Curve Number 76.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 135

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : AD_01**Input Data**

Area (ac) 0.02
Impervious Area (%) 33.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

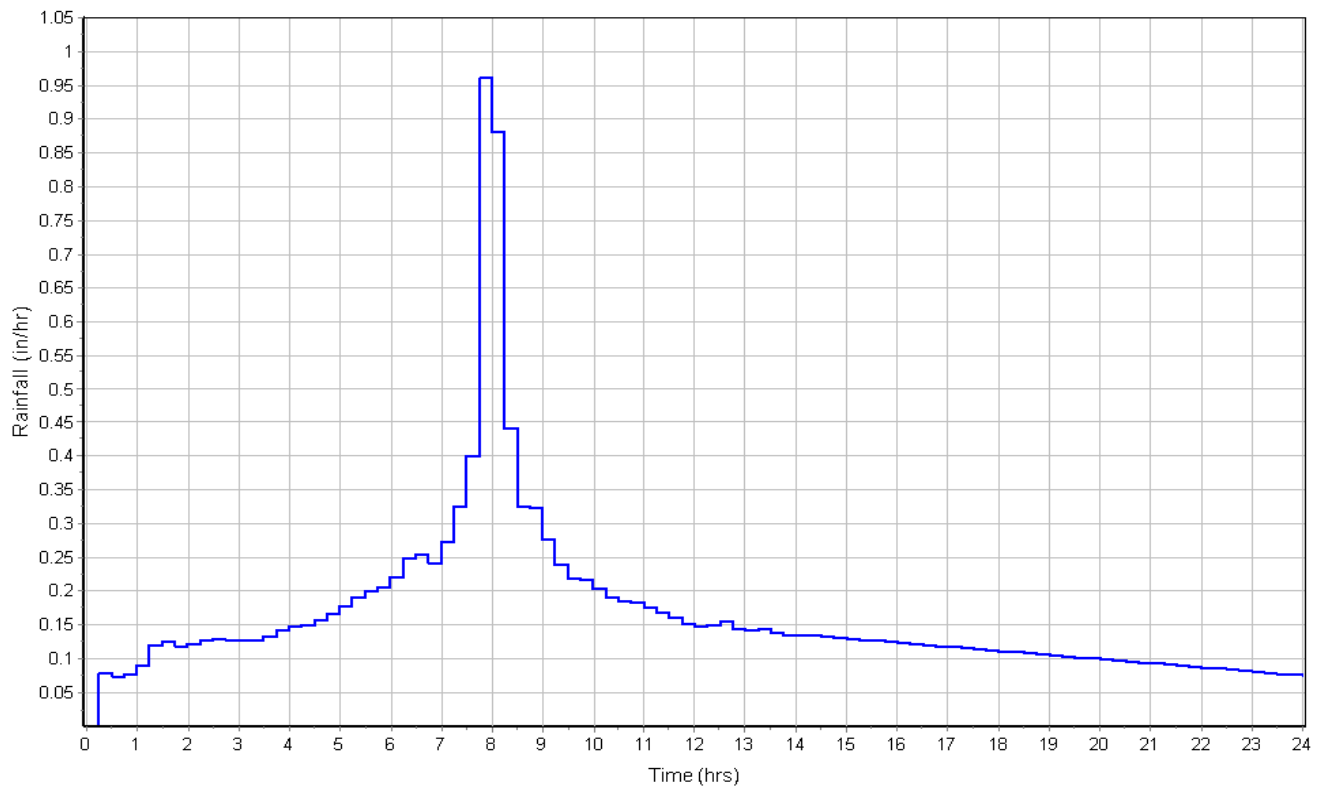
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.02		83.26

Subbasin Runoff Results

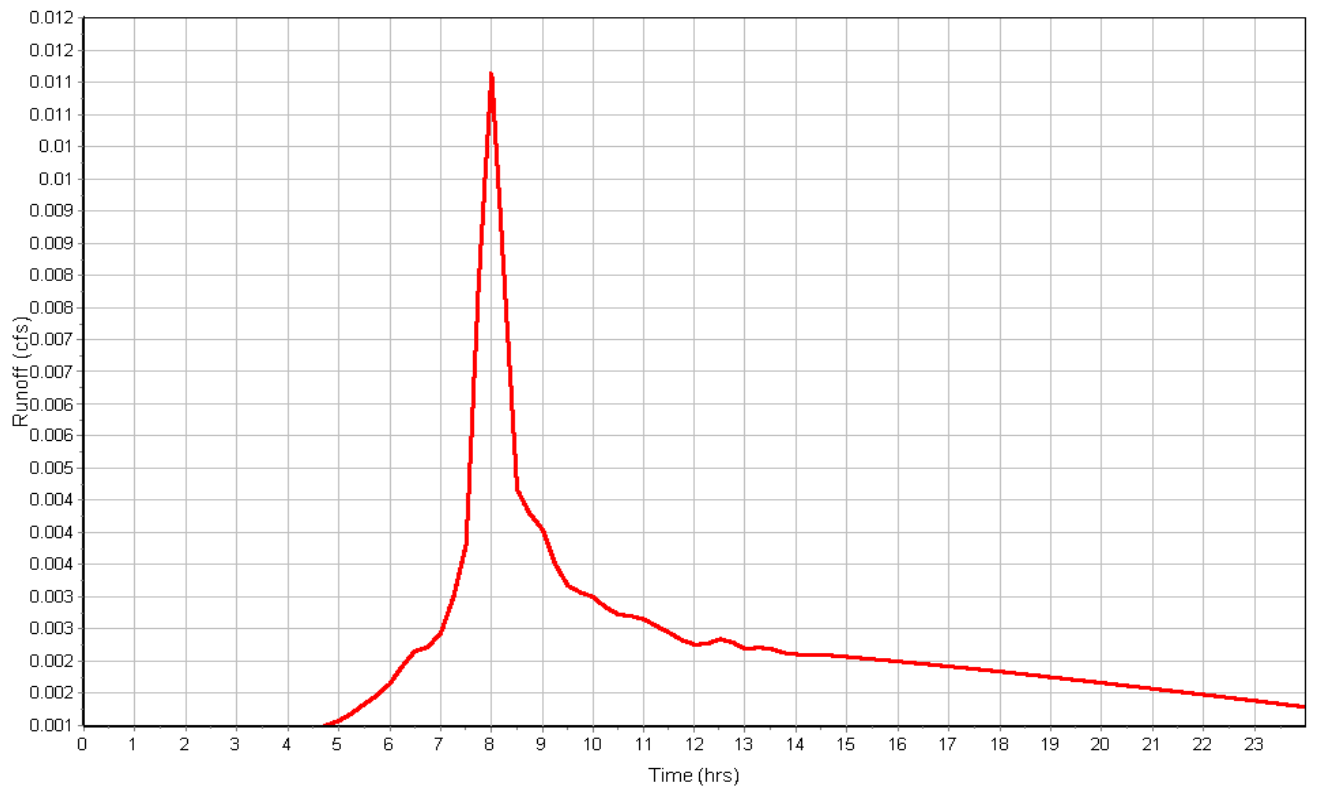
Total Rainfall (in) 3.96
Total Runoff (in) 2.38
Peak Runoff (cfs) 0.01
Weighted Curve Number 83.26
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : AD_01

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : AD_02**Input Data**

Area (ac) 0.06
 Impervious Area (%) 0.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

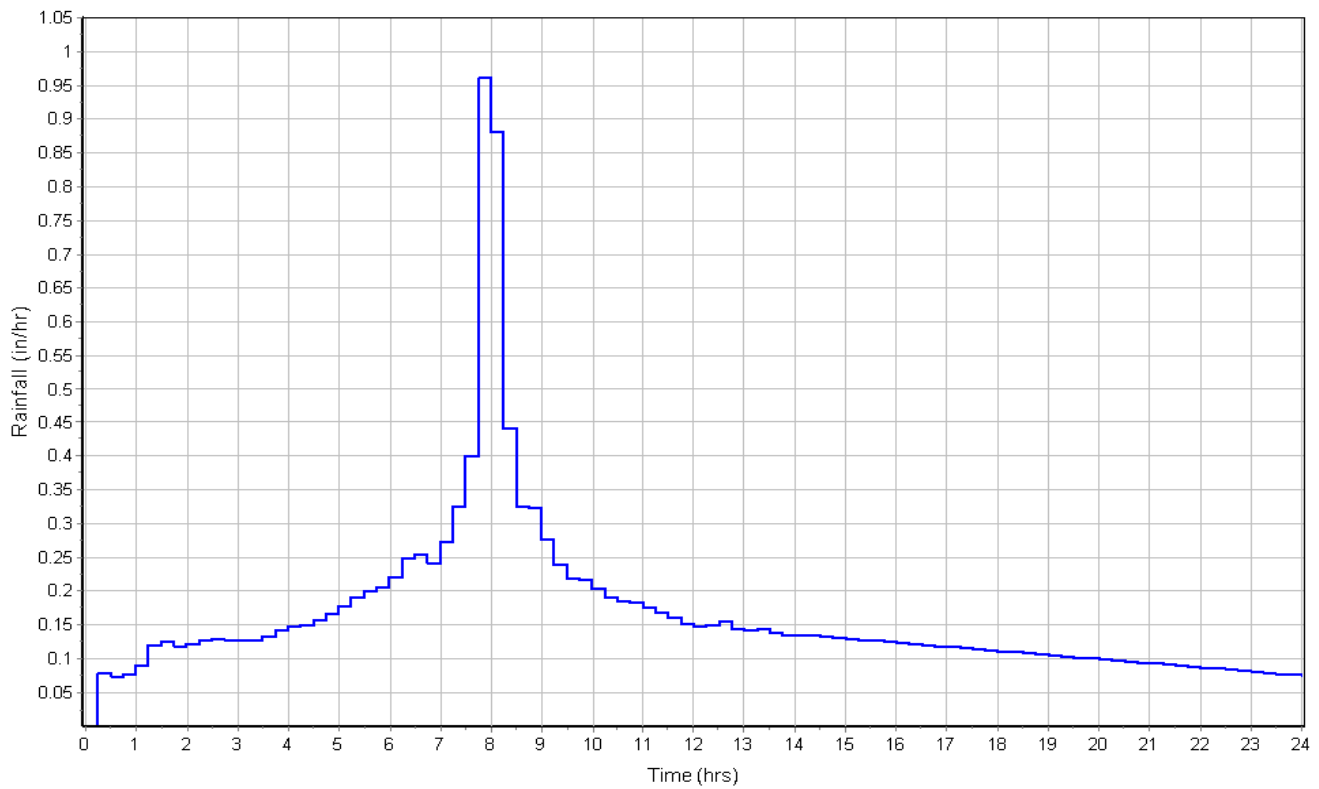
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.06		76

Subbasin Runoff Results

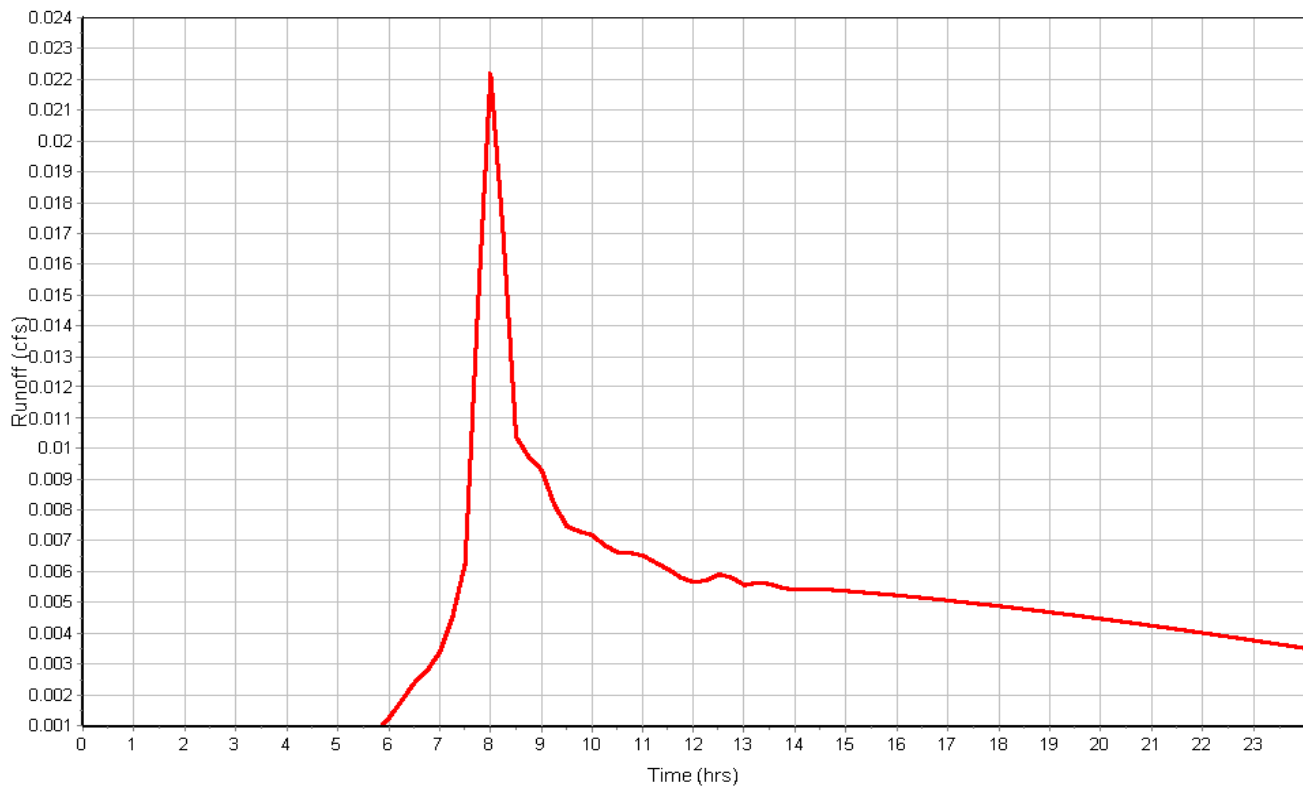
Total Rainfall (in) 3.96
 Total Runoff (in) 1.71
 Peak Runoff (cfs) 0.02
 Weighted Curve Number 76.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : AD_02

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : AD_03**Input Data**

Area (ac) 0.13
Impervious Area (%) 4.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

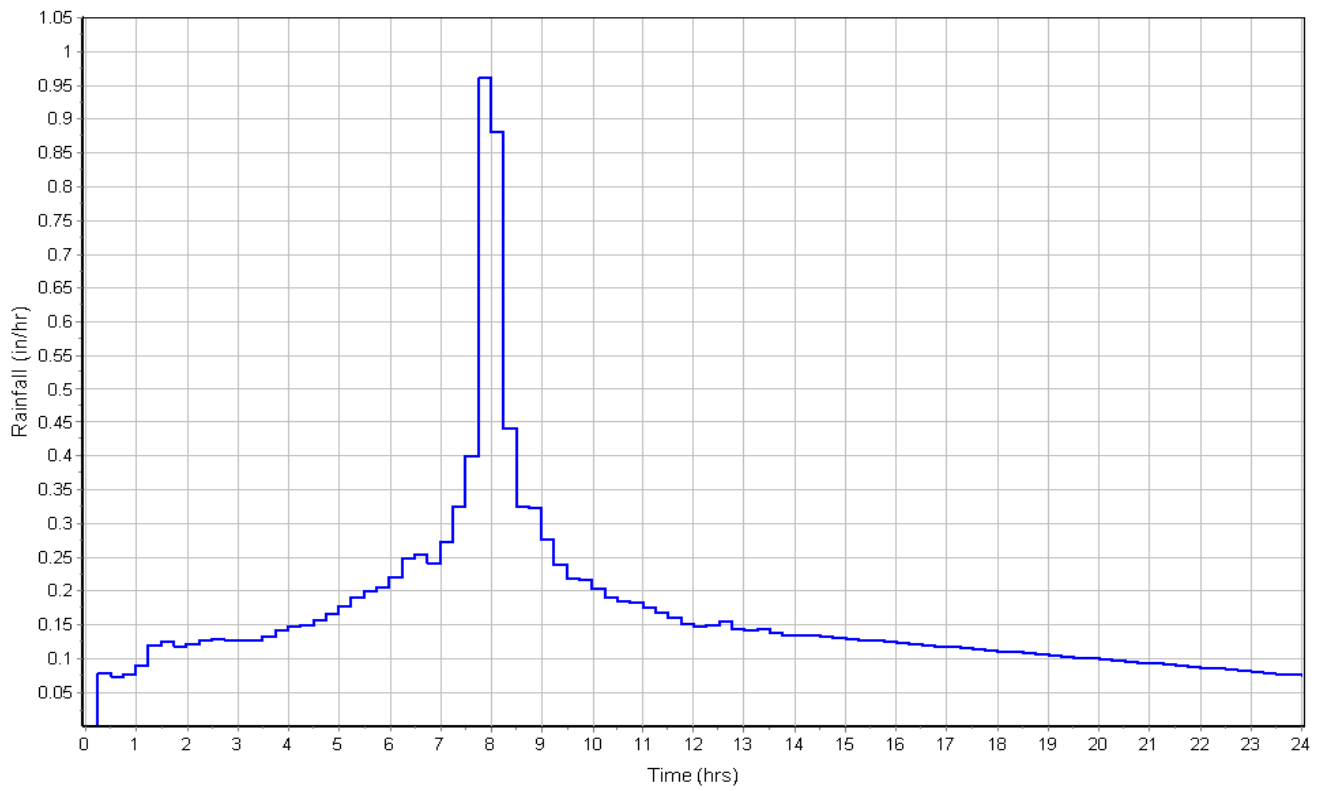
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.13		76.88

Subbasin Runoff Results

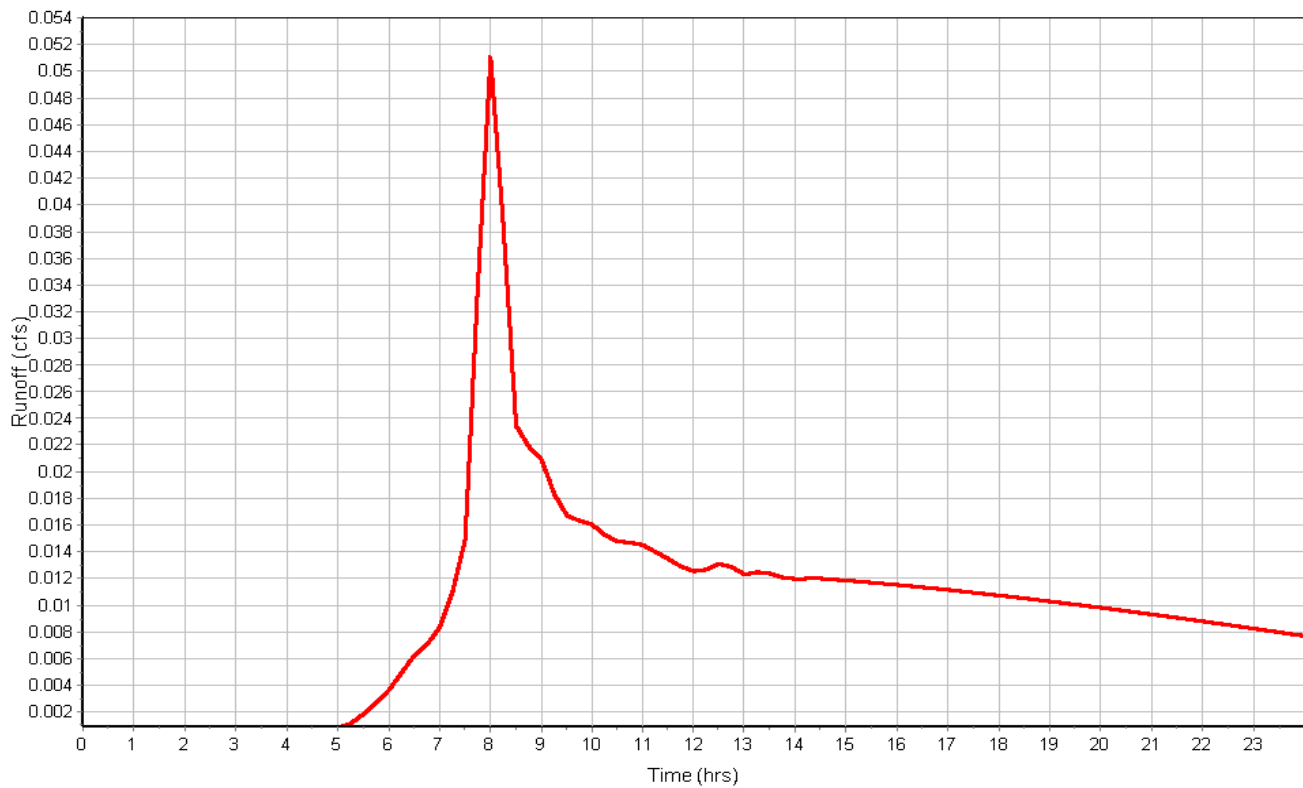
Total Rainfall (in) 3.96
Total Runoff (in) 1.79
Peak Runoff (cfs) 0.05
Weighted Curve Number 76.88
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : AD_03

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : AD_04**Input Data**

Area (ac) 0.10
Impervious Area (%) 100.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

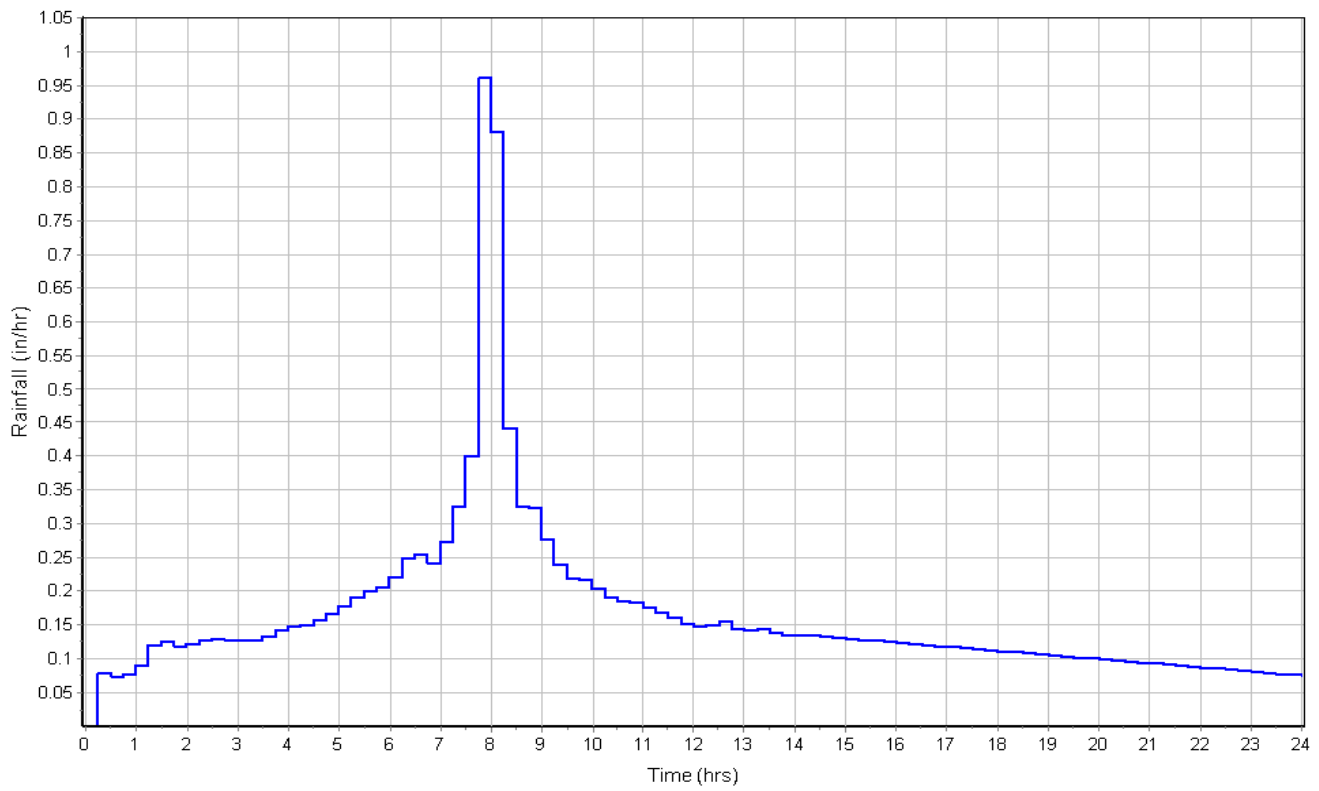
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.10		98

Subbasin Runoff Results

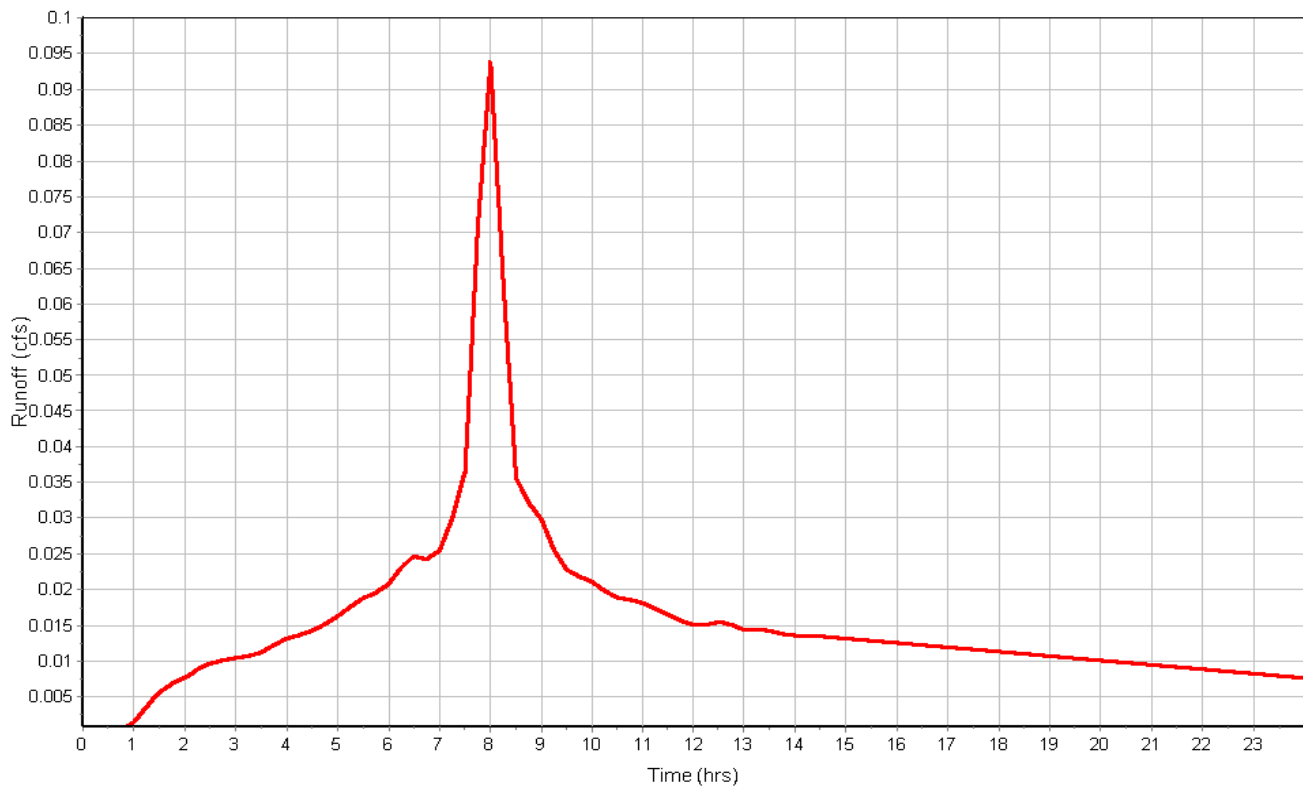
Total Rainfall (in) 3.96
Total Runoff (in) 3.73
Peak Runoff (cfs) 0.09
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : AD_04

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : AD_05**Input Data**

Area (ac) 0.11
Impervious Area (%) 83.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

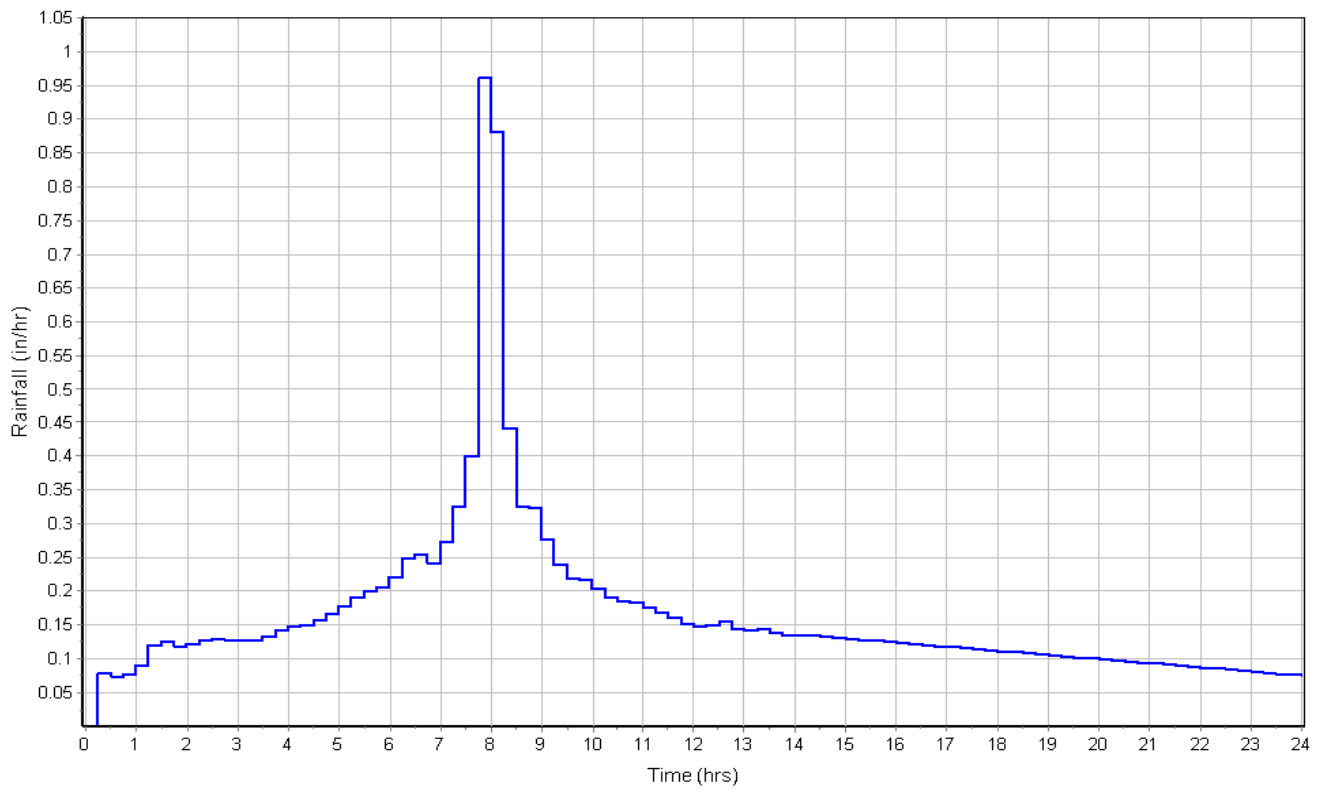
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.11		94.26

Subbasin Runoff Results

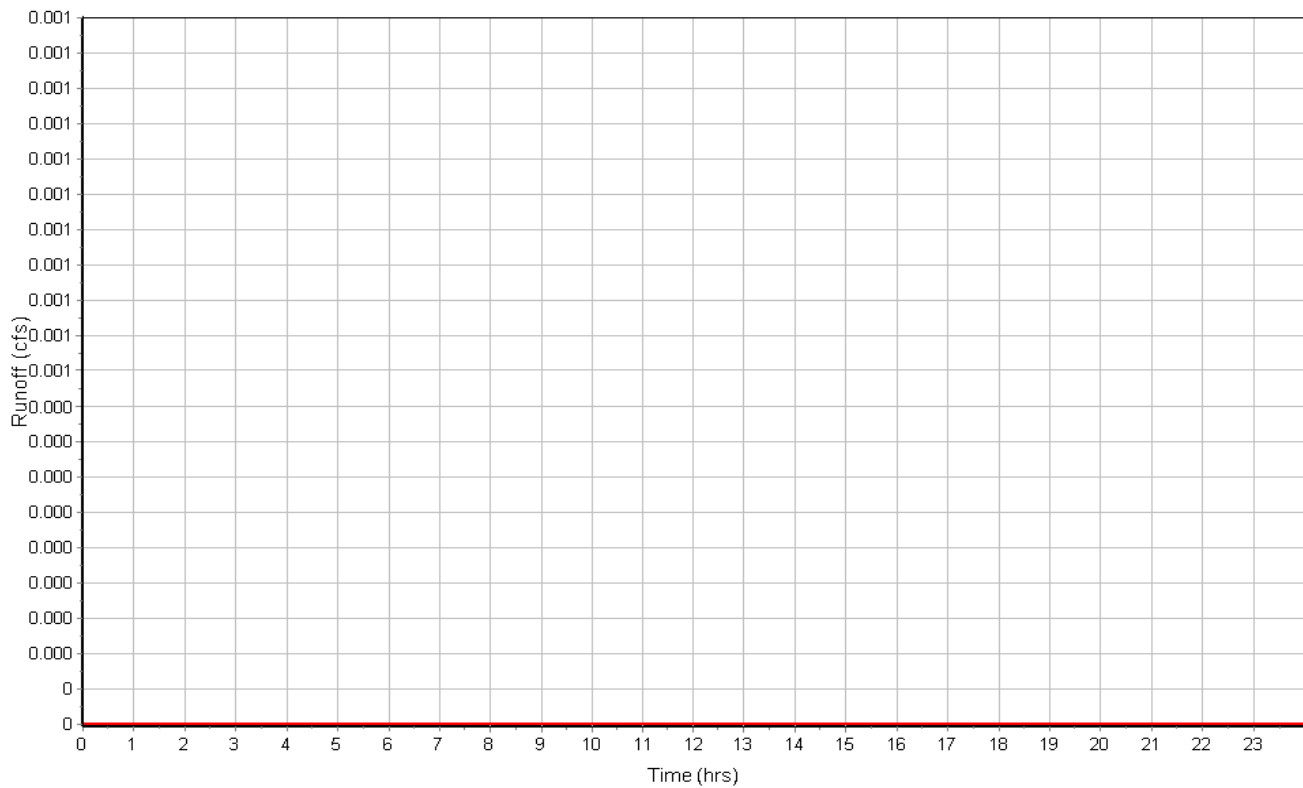
Total Rainfall (in) 3.96
Total Runoff (in) 0.00
Peak Runoff (cfs) 0.09
Weighted Curve Number 94.26
Time of Concentration (days hh:mm:ss) 0 00:00:00

Subbasin : AD_05

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : AD_06**Input Data**

Area (ac) 0.07
Impervious Area (%) 0.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

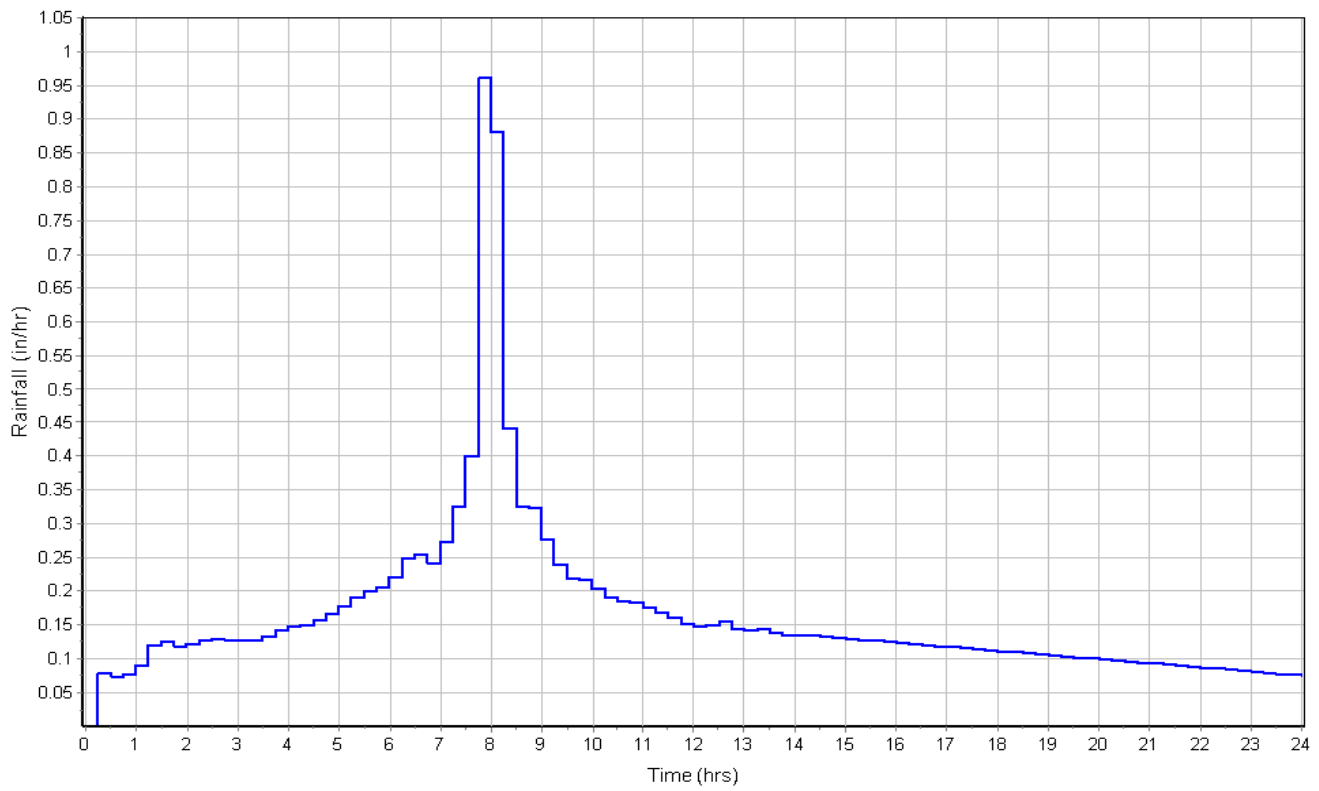
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.07		76

Subbasin Runoff Results

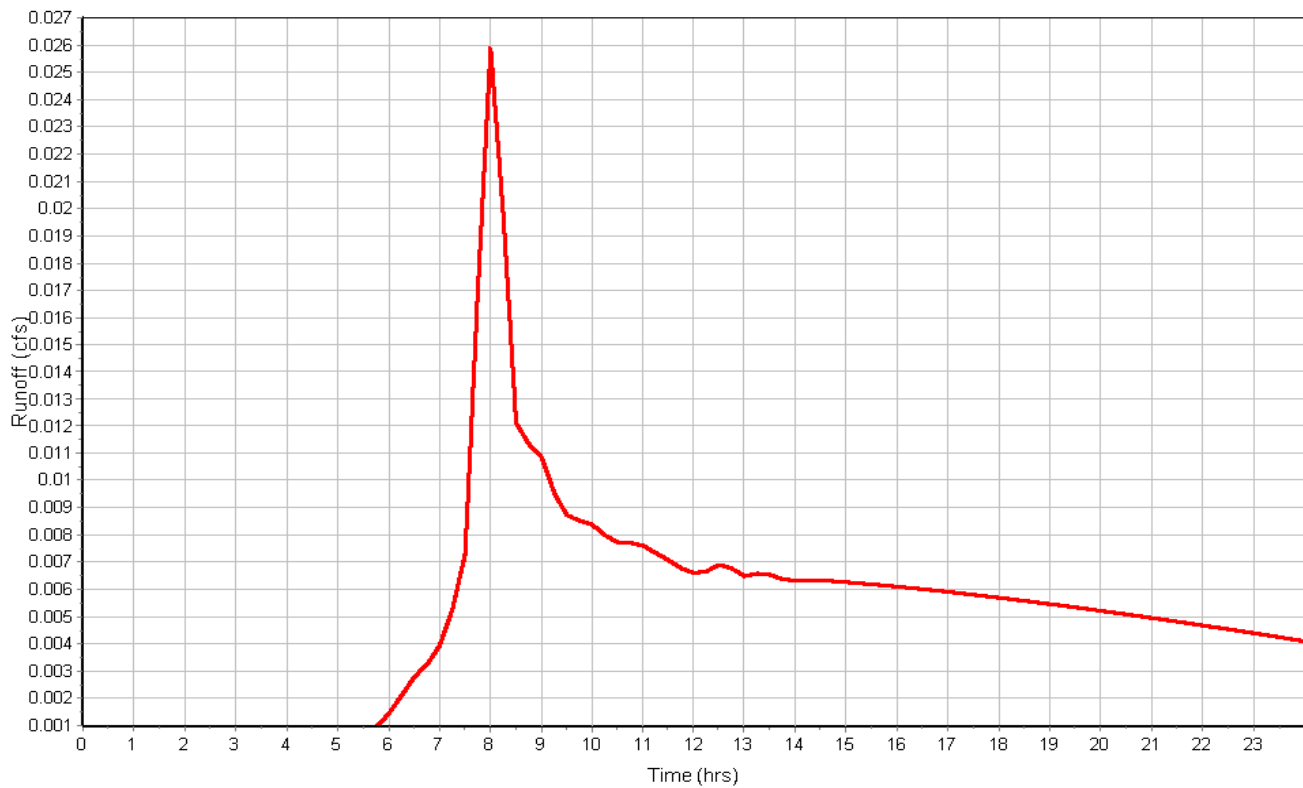
Total Rainfall (in) 3.96
Total Runoff (in) 1.71
Peak Runoff (cfs) 0.03
Weighted Curve Number 76.00
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : AD_06

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : AD_07**Input Data**

Area (ac) 0.14
Impervious Area (%) 46.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

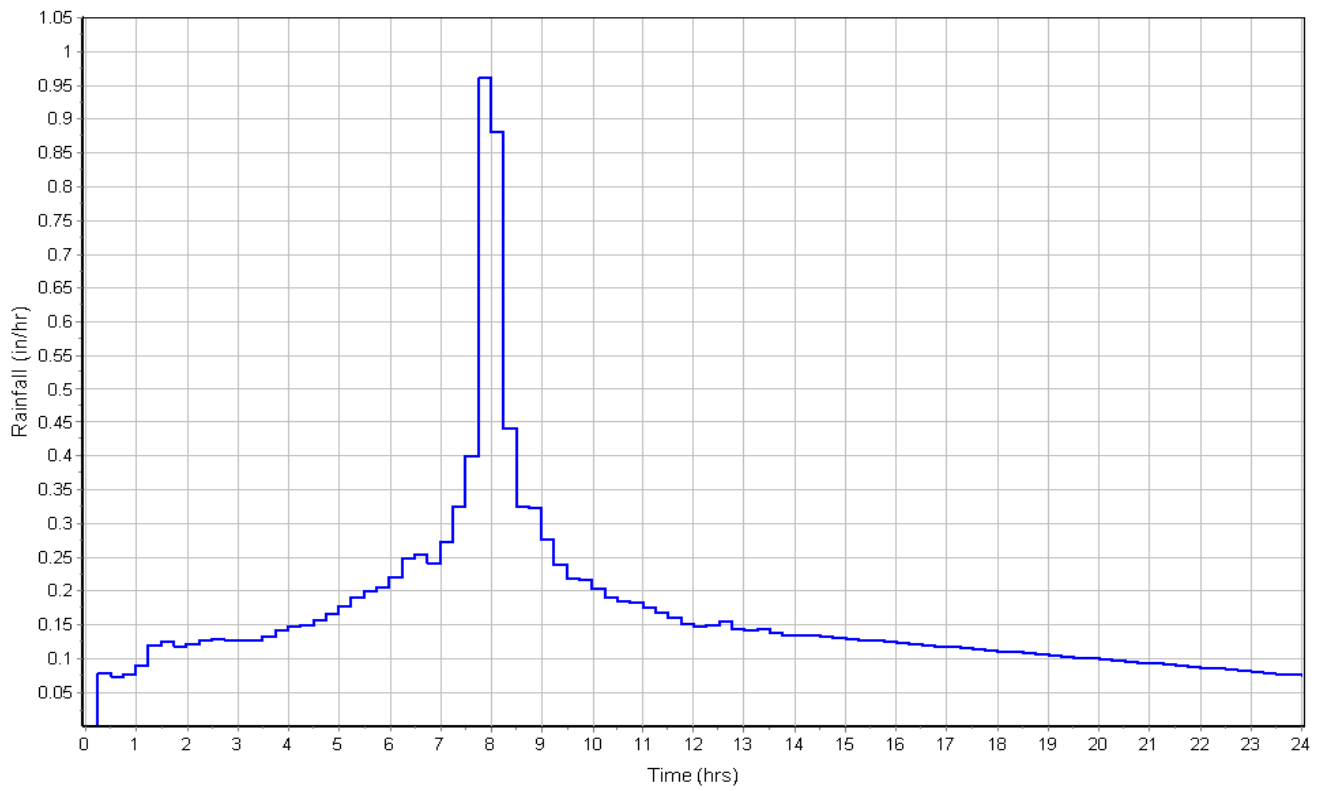
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.14		86.12

Subbasin Runoff Results

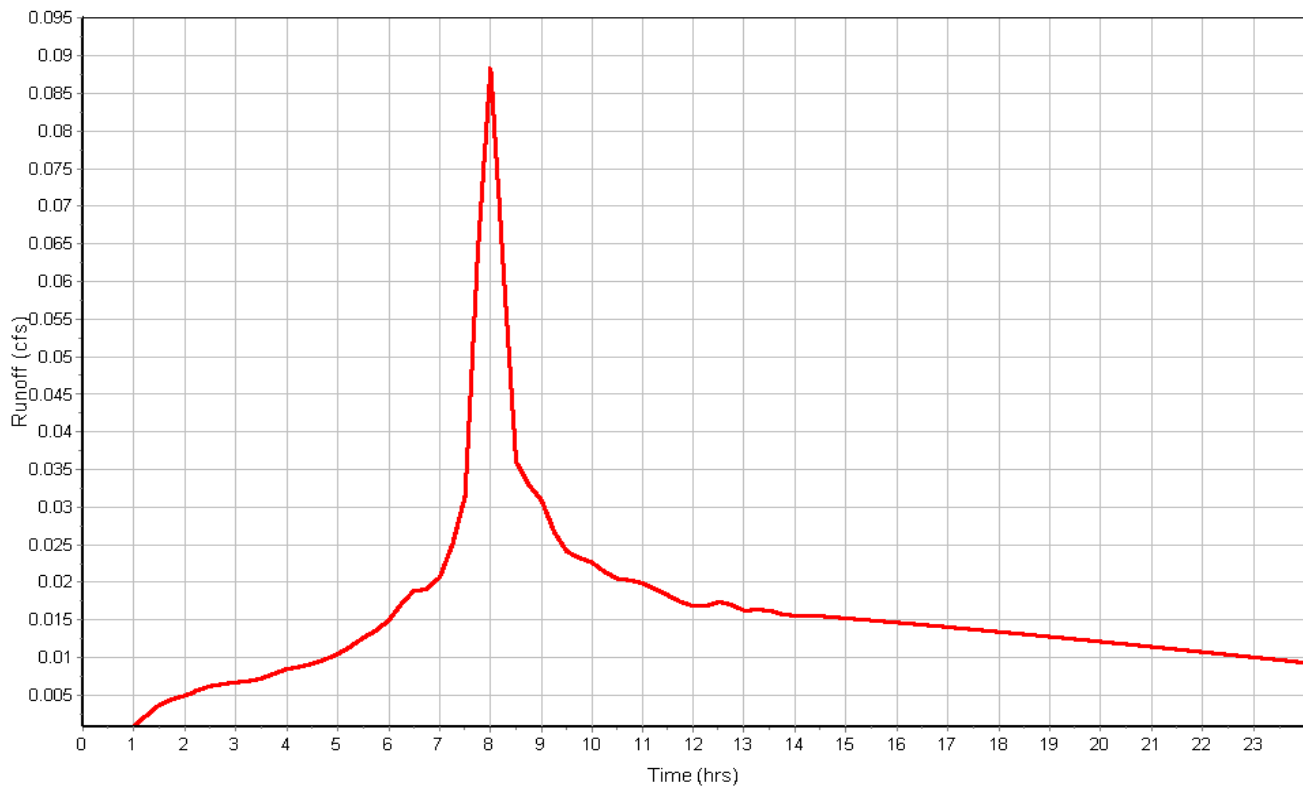
Total Rainfall (in) 3.96
Total Runoff (in) 2.64
Peak Runoff (cfs) 0.09
Weighted Curve Number 86.12
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : AD_07

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : AD_08**Input Data**

Area (ac) 0.05
Impervious Area (%) 100.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

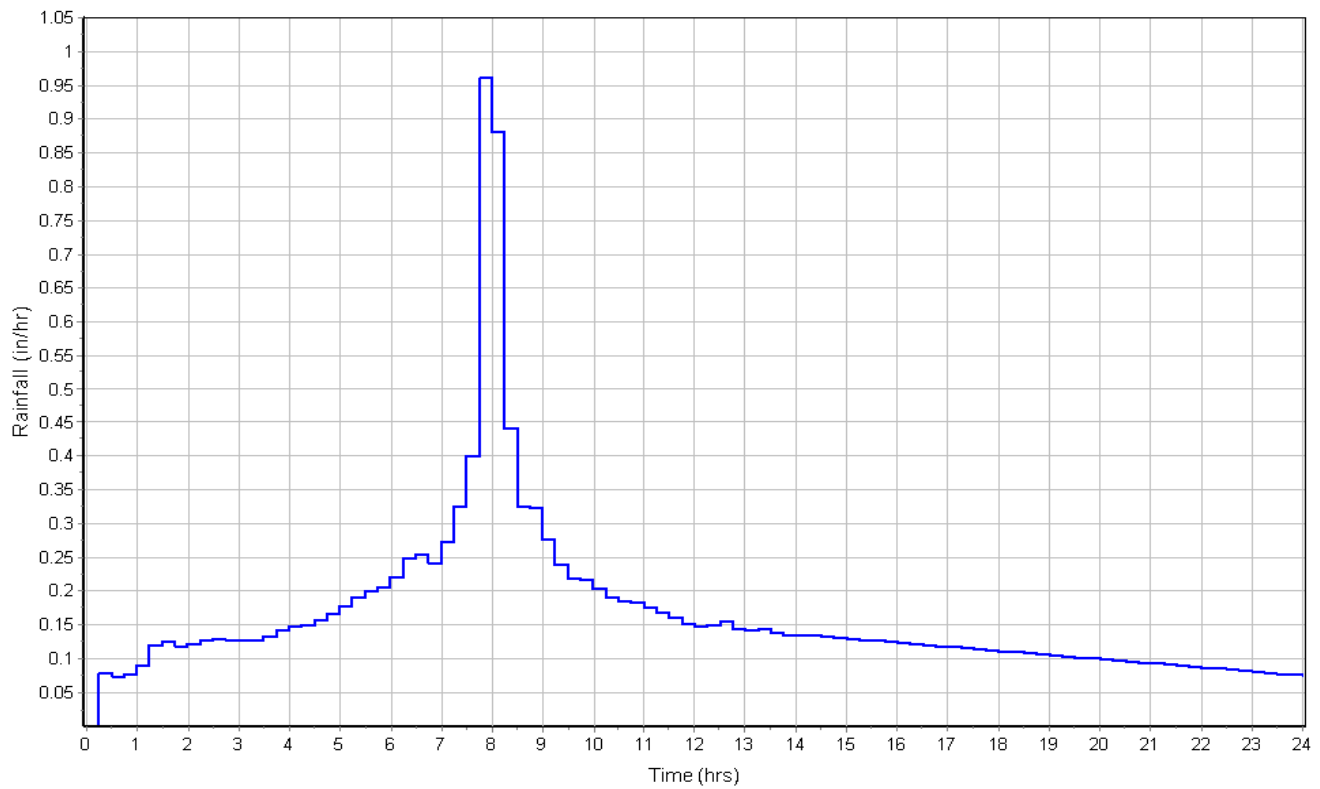
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.05		98

Subbasin Runoff Results

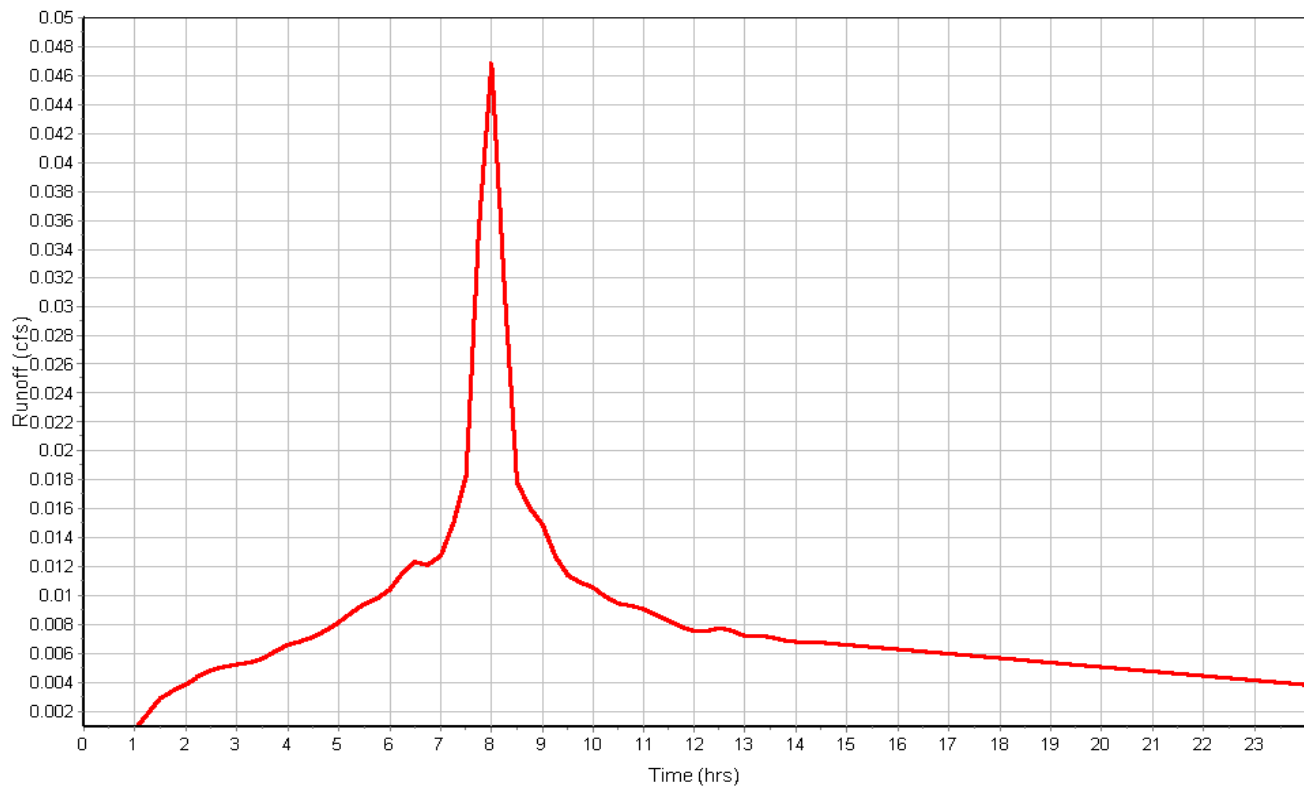
Total Rainfall (in) 3.96
Total Runoff (in) 3.73
Peak Runoff (cfs) 0.05
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : AD_08

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : AD_09**Input Data**

Area (ac) 0.11
Impervious Area (%) 72.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

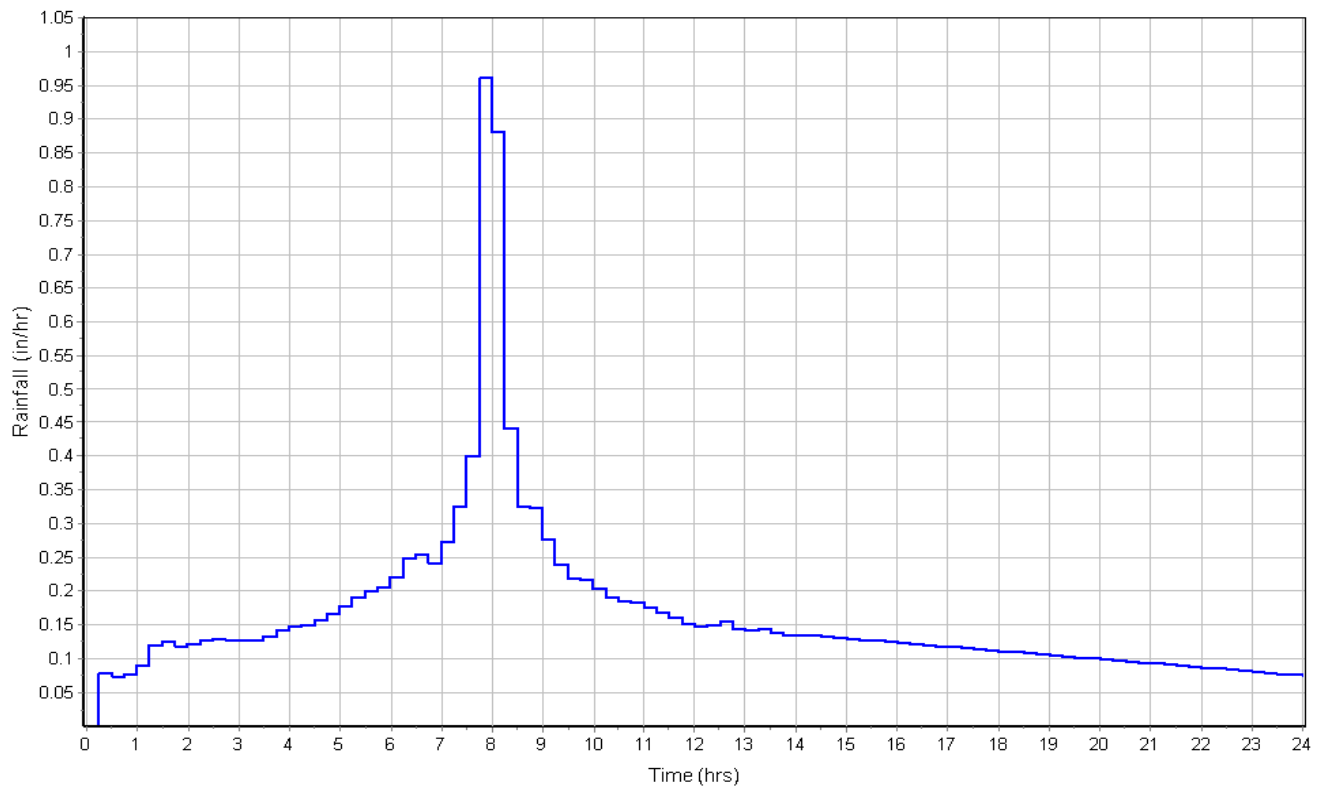
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.11		91.84

Subbasin Runoff Results

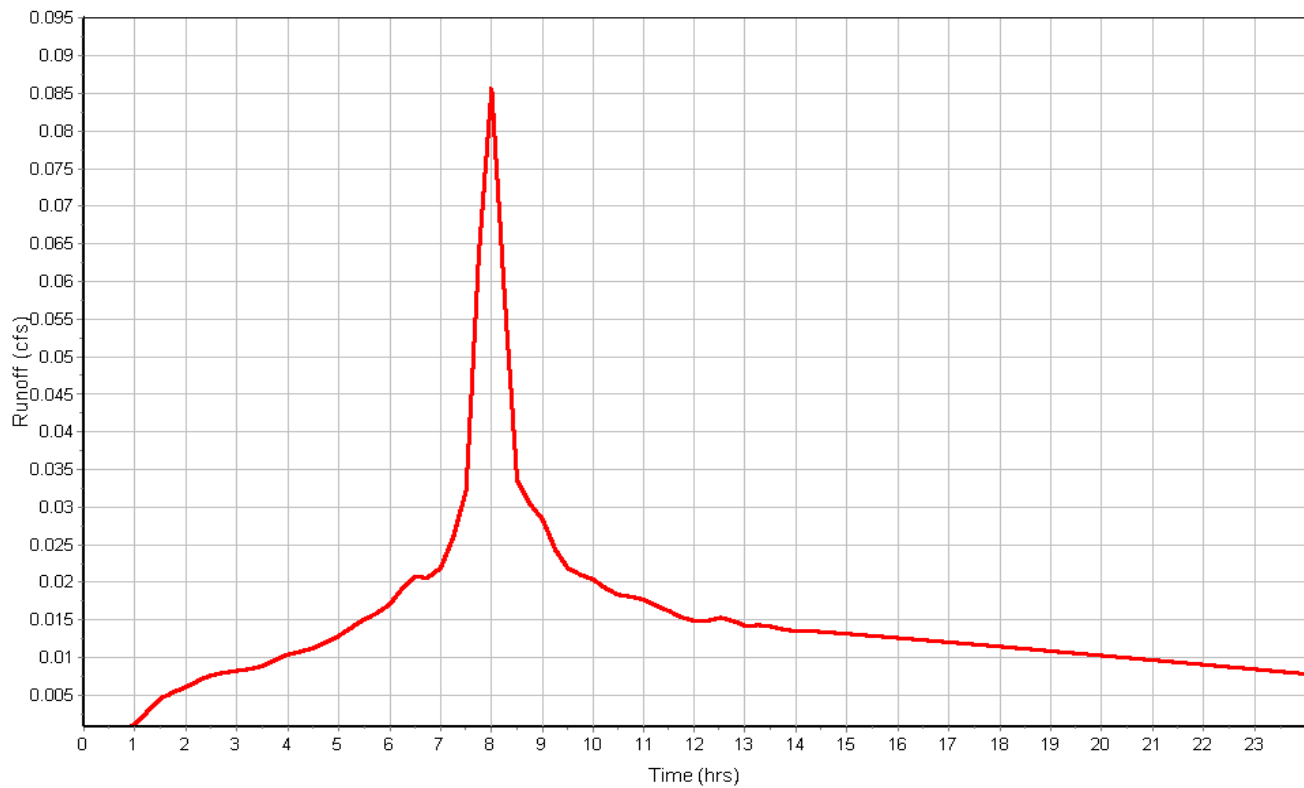
Total Rainfall (in) 3.96
Total Runoff (in) 3.17
Peak Runoff (cfs) 0.09
Weighted Curve Number 91.84
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : AD_09

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : AD_10**Input Data**

Area (ac) 0.05
Impervious Area (%) 49.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

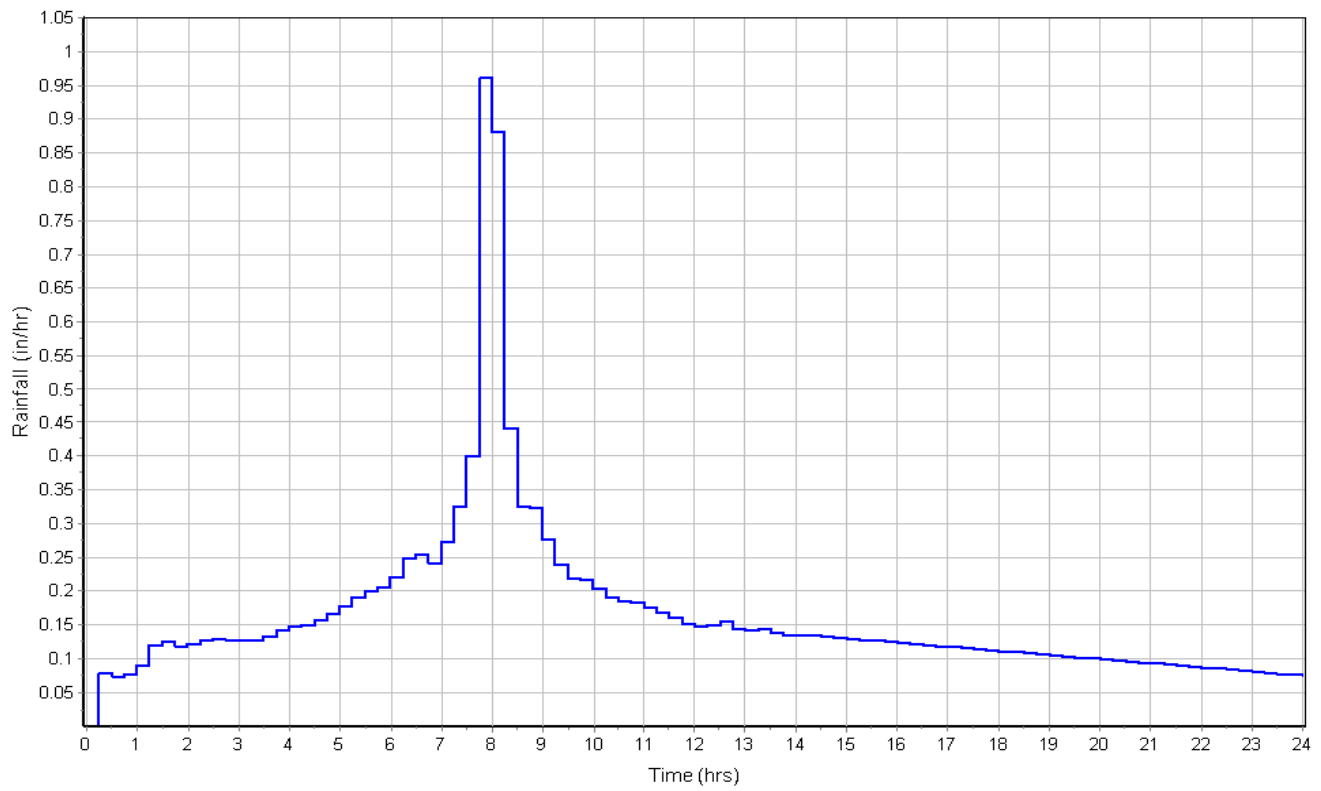
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.05		86.78

Subbasin Runoff Results

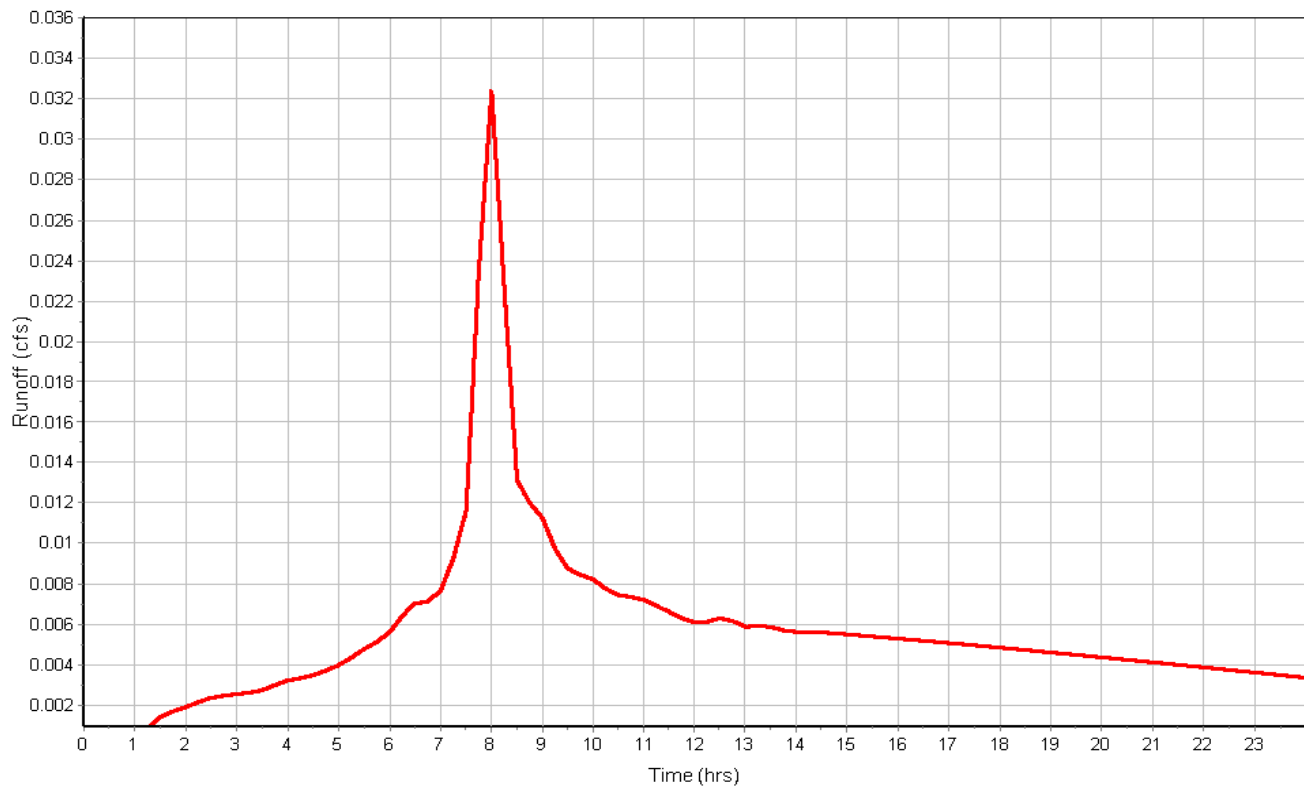
Total Rainfall (in) 3.96
Total Runoff (in) 2.70
Peak Runoff (cfs) 0.03
Weighted Curve Number 86.78
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : AD_10

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : BASIN_7_UNDERDRAIN**Input Data**

Area (ac) 0.60
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

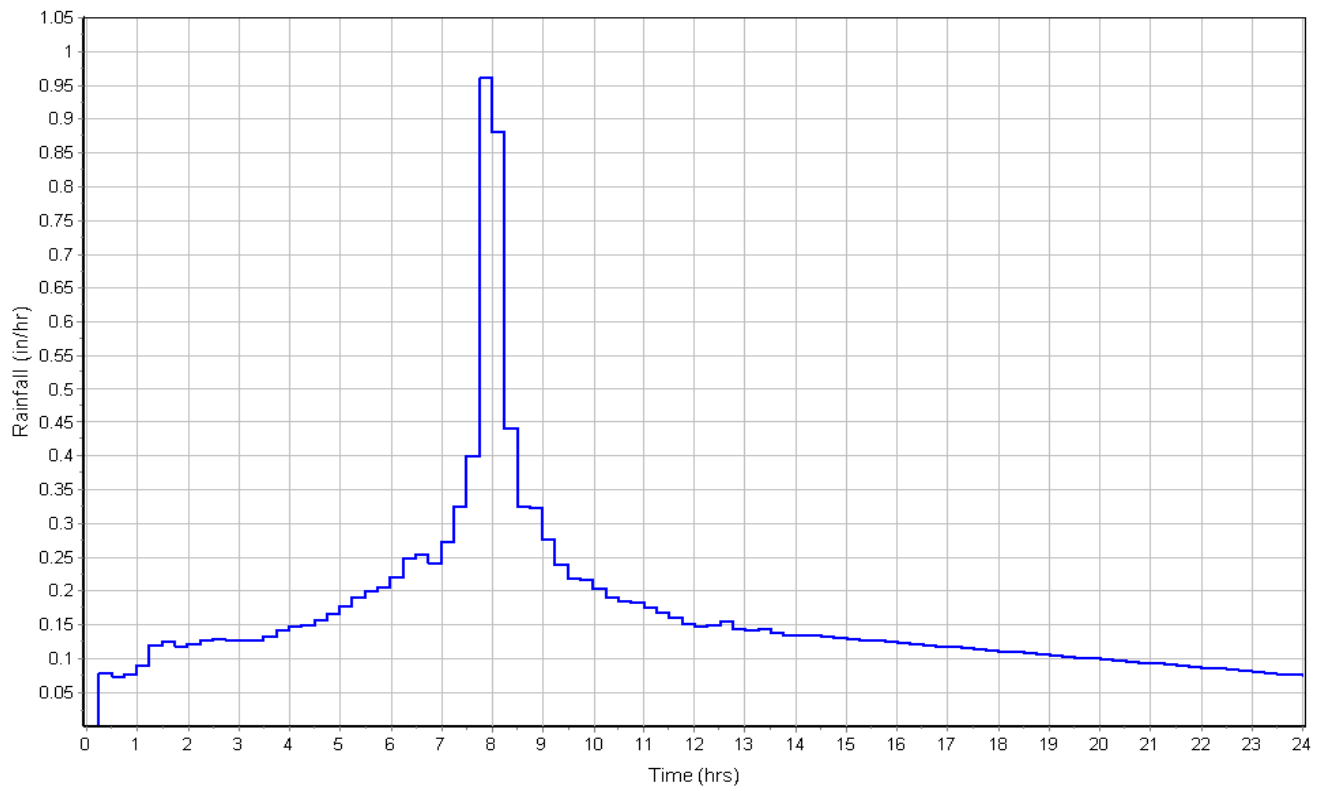
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.60		98

Subbasin Runoff Results

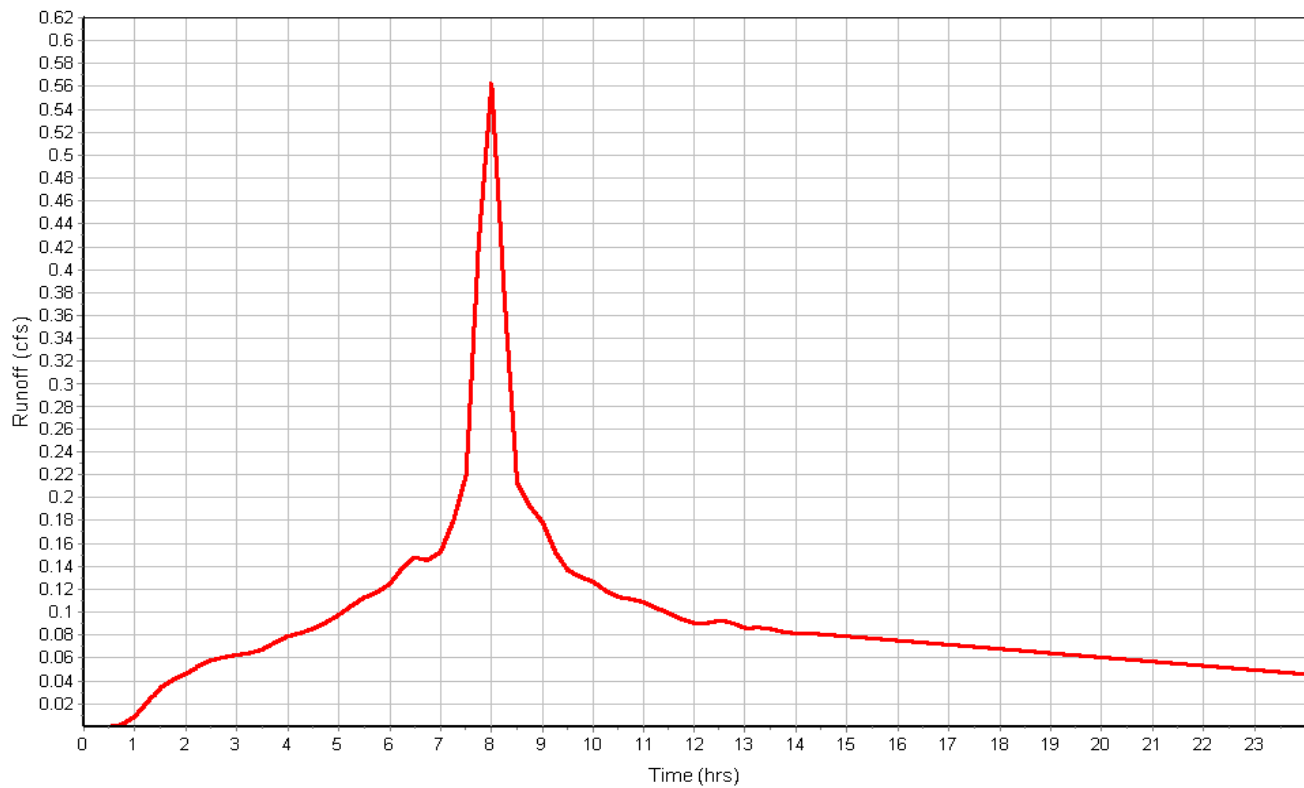
Total Rainfall (in) 3.96
 Total Runoff (in) 3.73
 Peak Runoff (cfs) 0.56
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : BASIN_7_UNDERDRAIN

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : COVERED_PARKING**Input Data**

Area (ac) 2.17
Impervious Area (%) 99.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

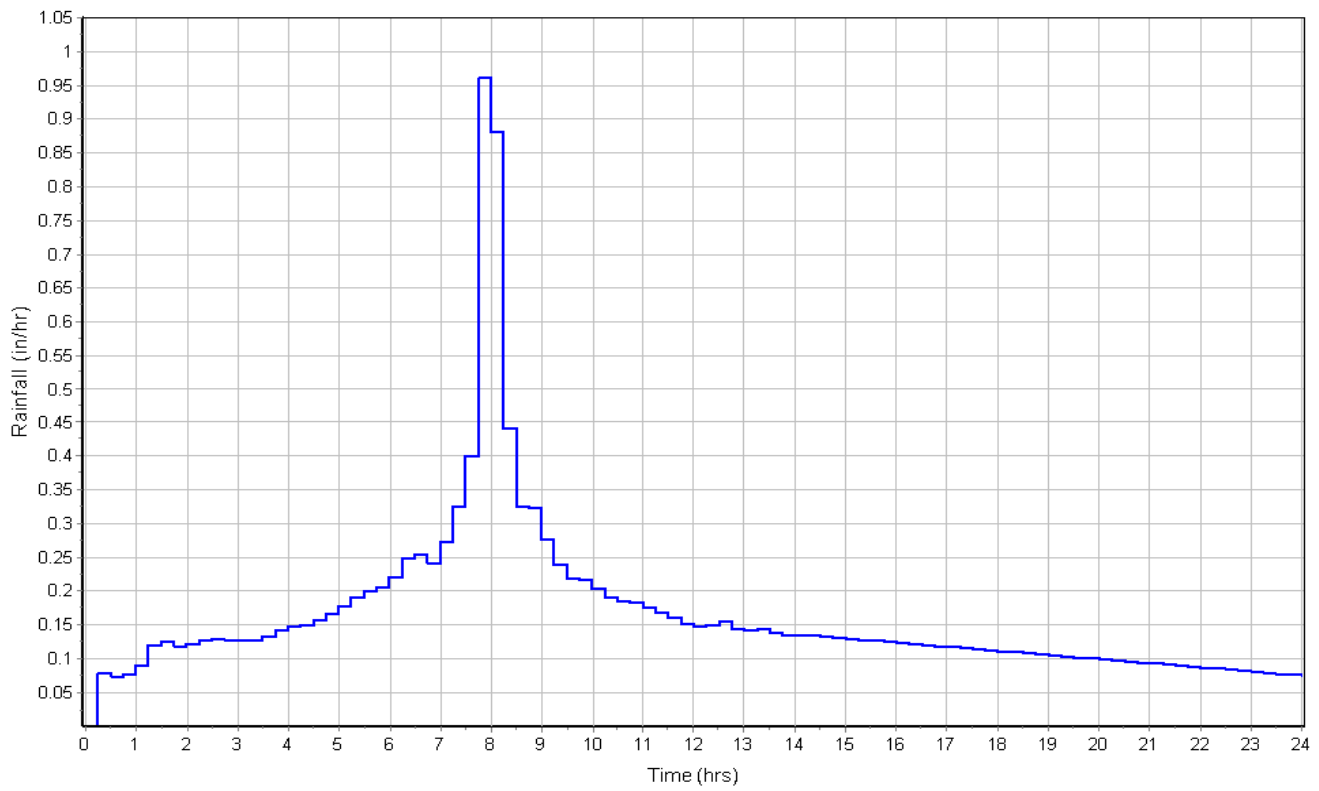
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	2.17		97.78

Subbasin Runoff Results

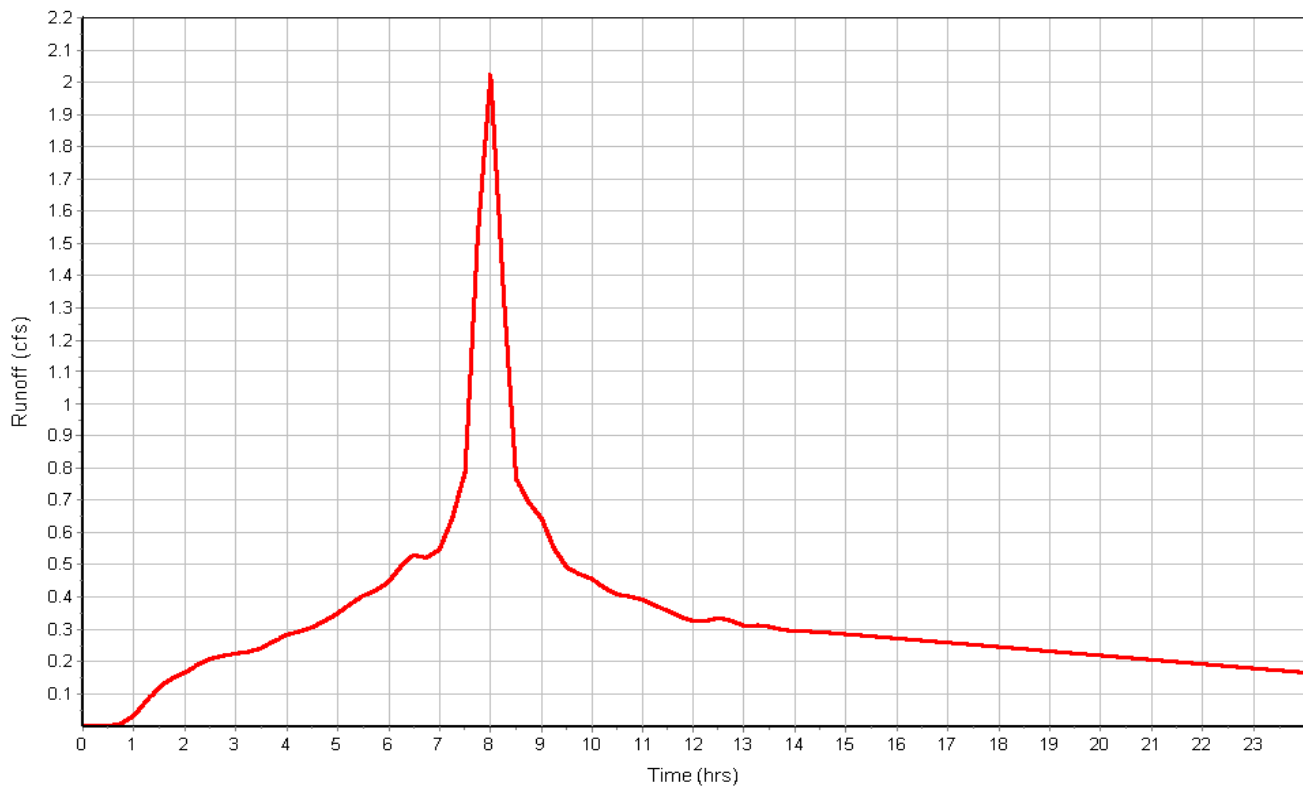
Total Rainfall (in) 3.96
Total Runoff (in) 3.71
Peak Runoff (cfs) 2.02
Weighted Curve Number 97.78
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : COVERED_PARKING

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RDCO_02**Input Data**

Area (ac) 0.12
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

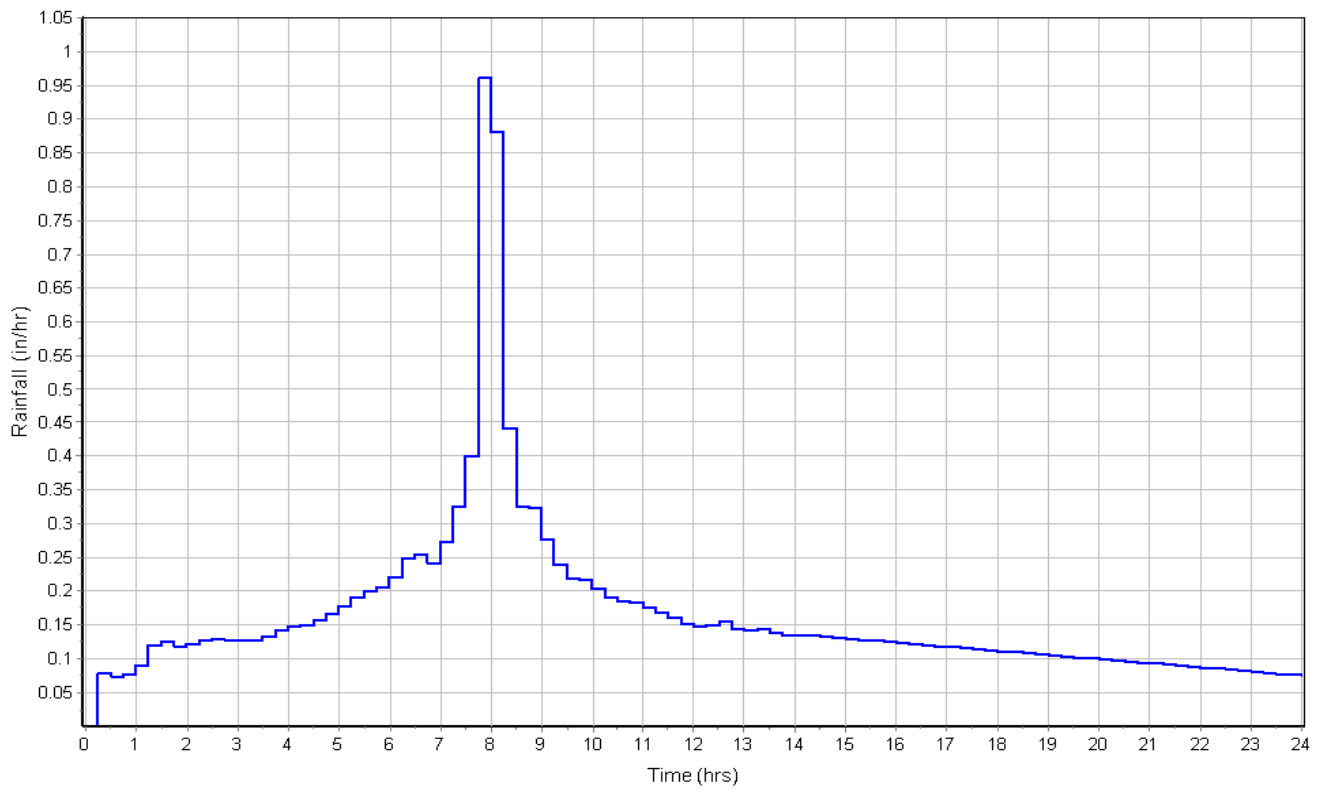
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.12		98

Subbasin Runoff Results

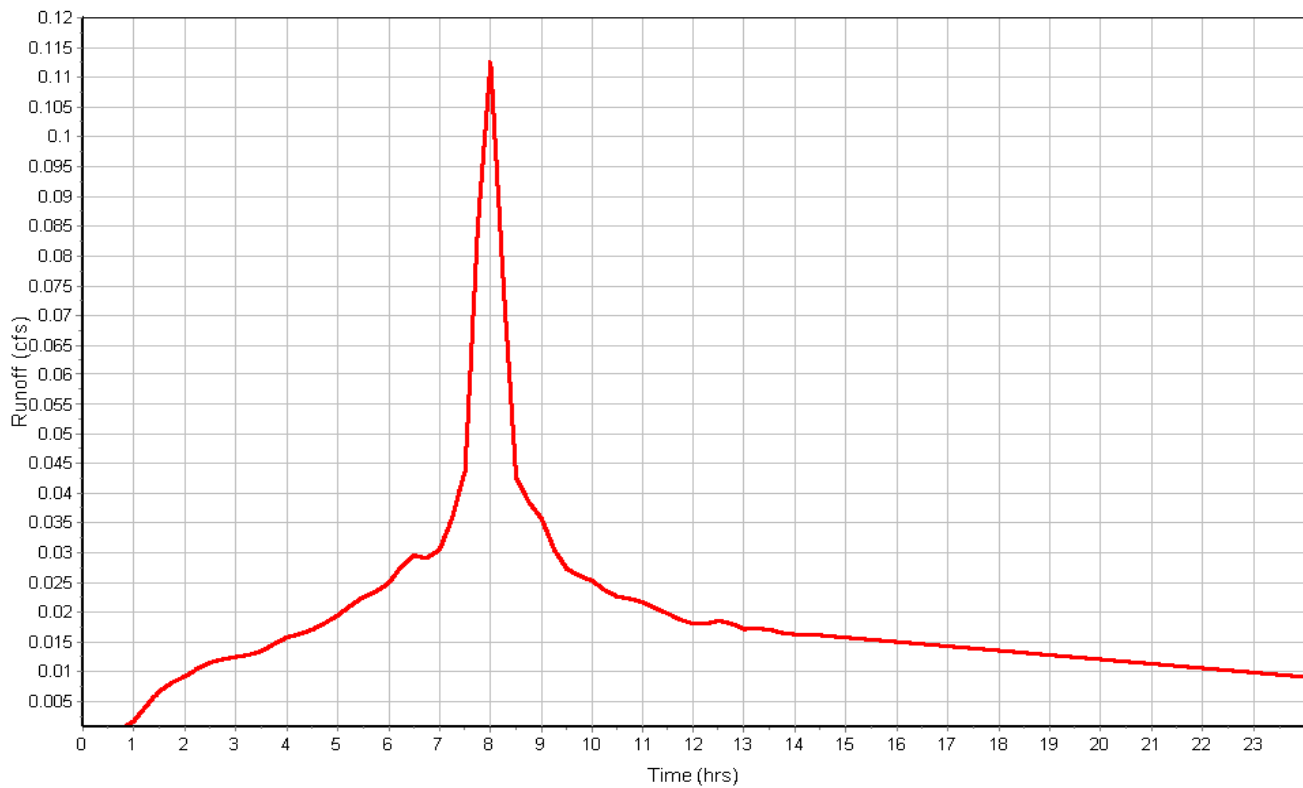
Total Rainfall (in) 3.96
 Total Runoff (in) 3.73
 Peak Runoff (cfs) 0.11
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : RDCO_02

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RDCO_08**Input Data**

Area (ac) 0.73
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

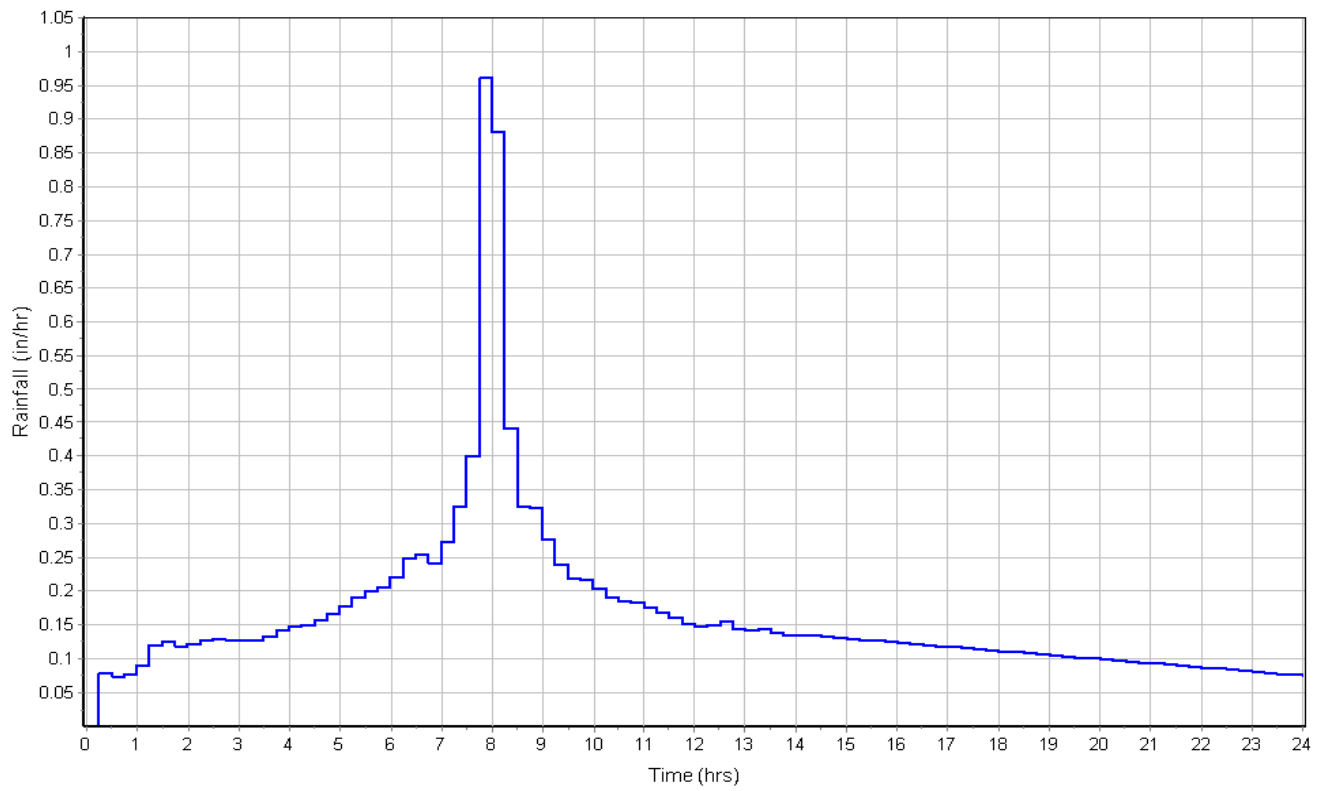
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.73		98

Subbasin Runoff Results

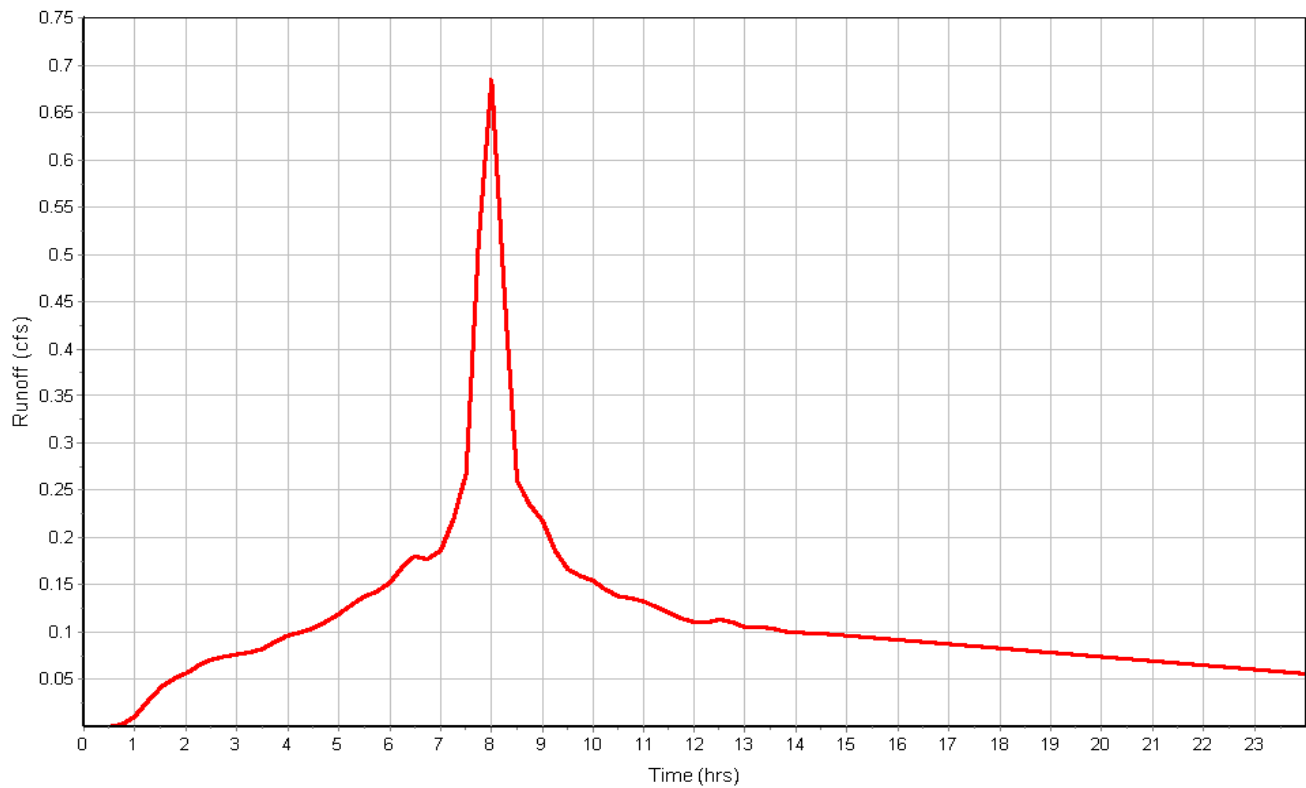
Total Rainfall (in) 3.96
 Total Runoff (in) 3.73
 Peak Runoff (cfs) 0.68
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : RDCO_08

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RDCO_10**Input Data**

Area (ac) 0.17
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

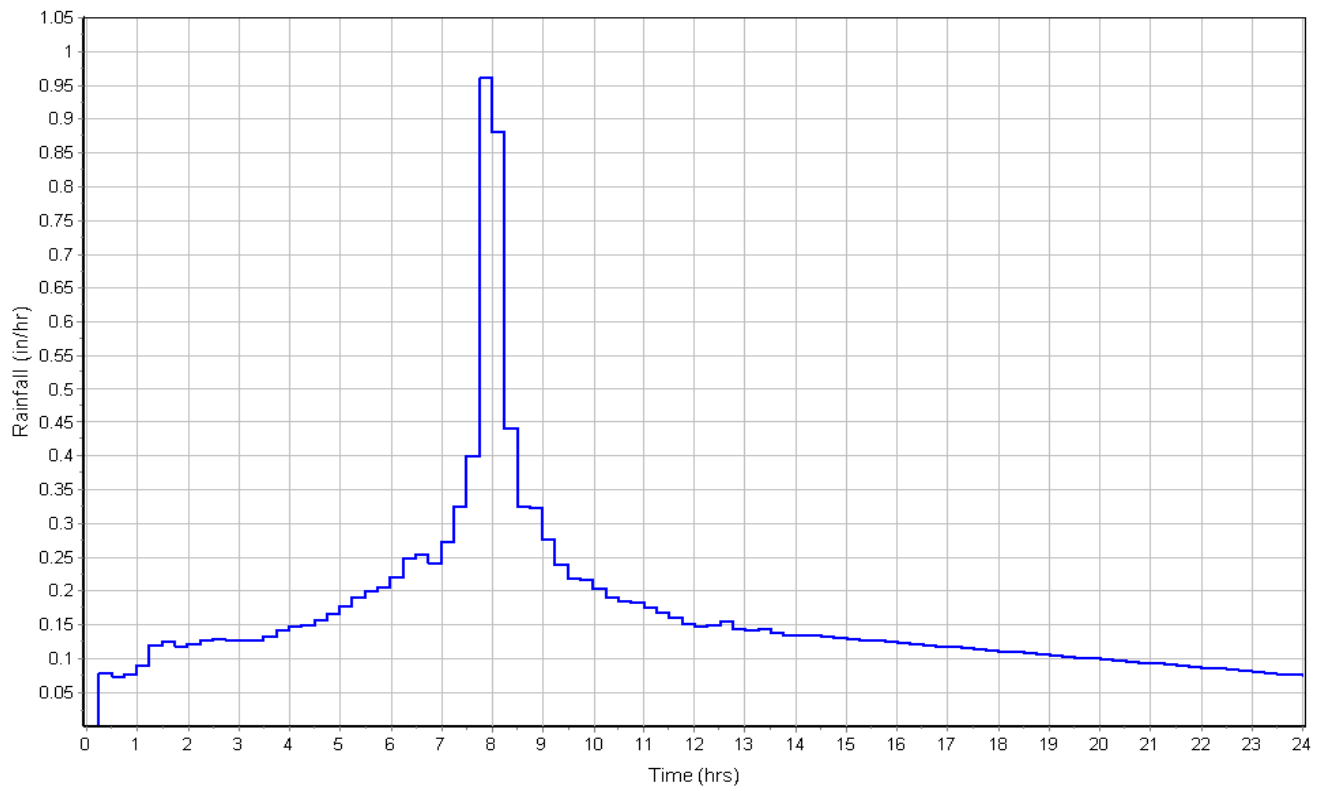
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.17		98

Subbasin Runoff Results

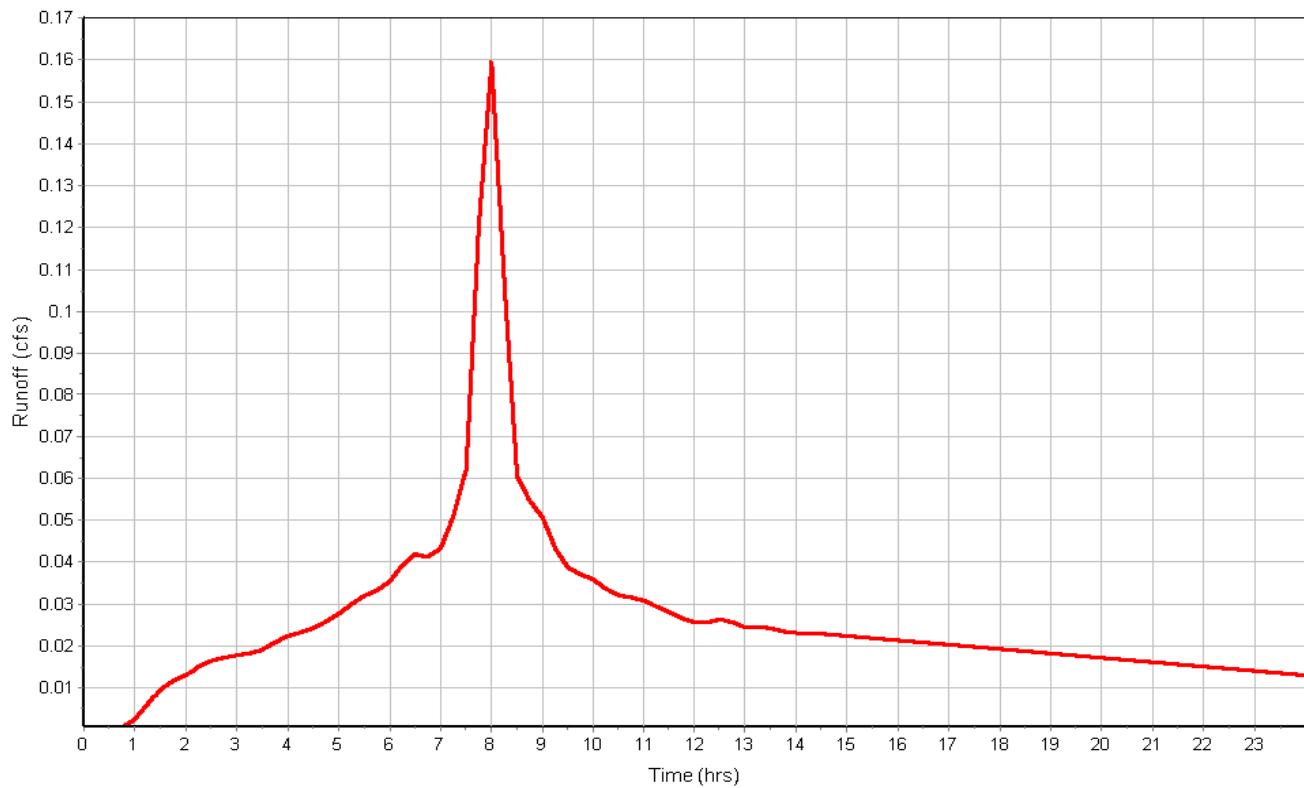
Total Rainfall (in) 3.96
 Total Runoff (in) 3.73
 Peak Runoff (cfs) 0.16
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : RDCO_10

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RDCO_13**Input Data**

Area (ac) 0.39
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

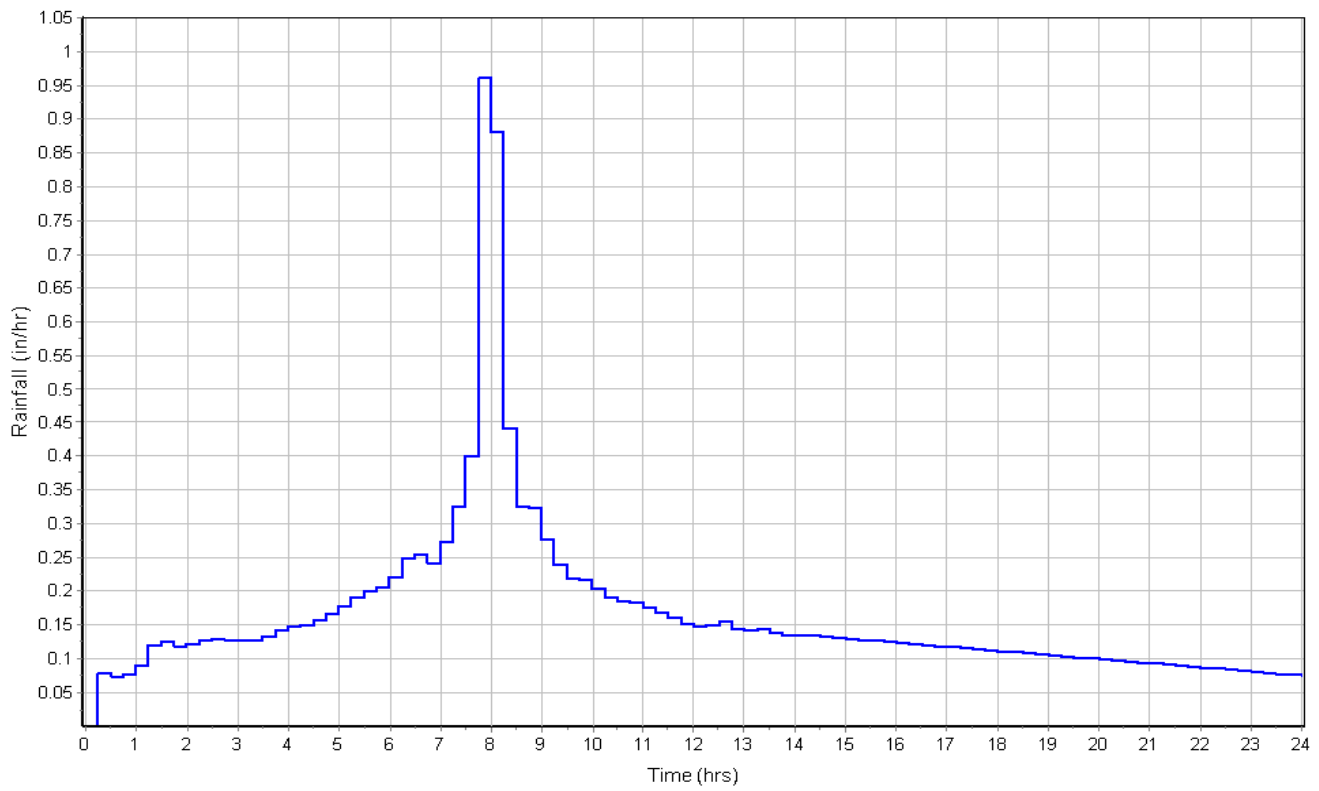
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.39		98

Subbasin Runoff Results

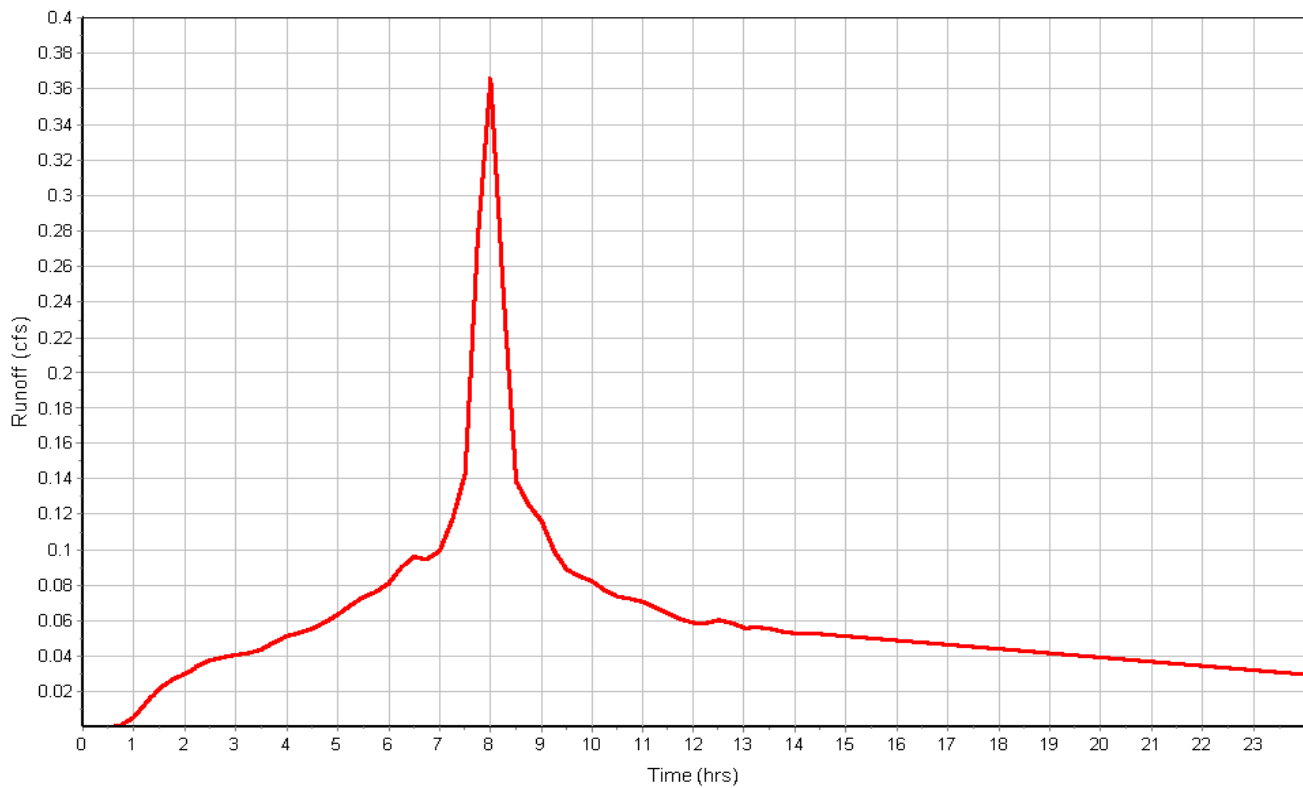
Total Rainfall (in) 3.96
 Total Runoff (in) 3.73
 Peak Runoff (cfs) 0.37
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : RDCO_13

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RDCO_15**Input Data**

Area (ac) 0.43
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

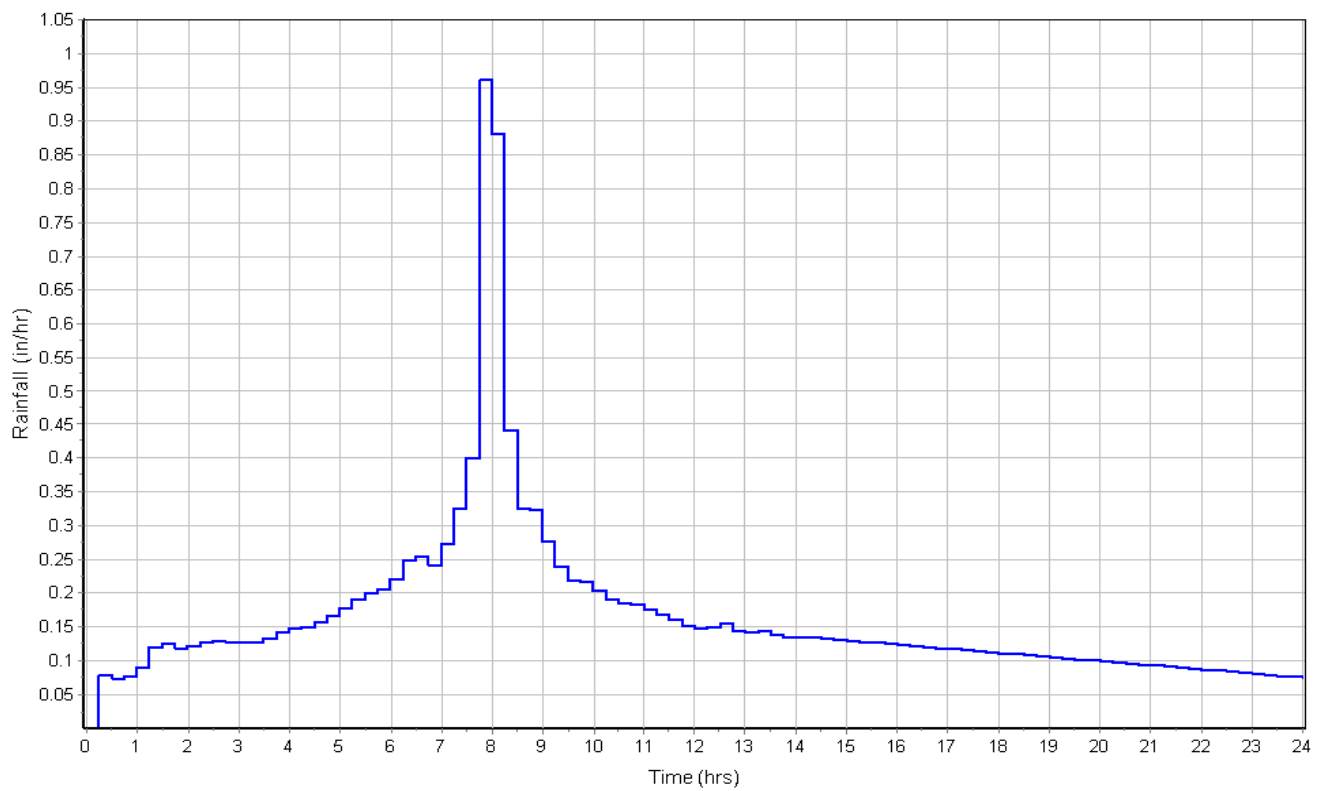
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.43		98

Subbasin Runoff Results

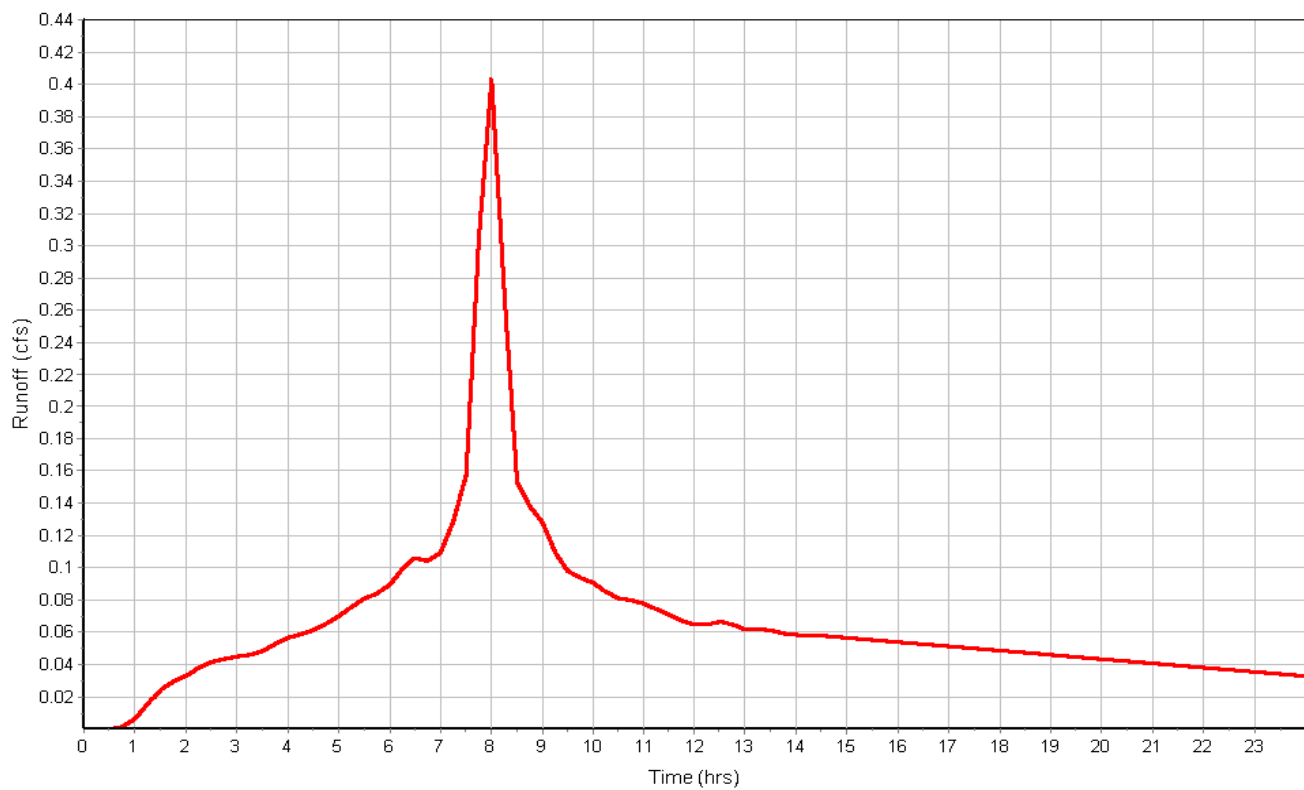
Total Rainfall (in) 3.96
 Total Runoff (in) 3.73
 Peak Runoff (cfs) 0.40
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : RDCO_15

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RDCO_16**Input Data**

Area (ac) 0.24
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

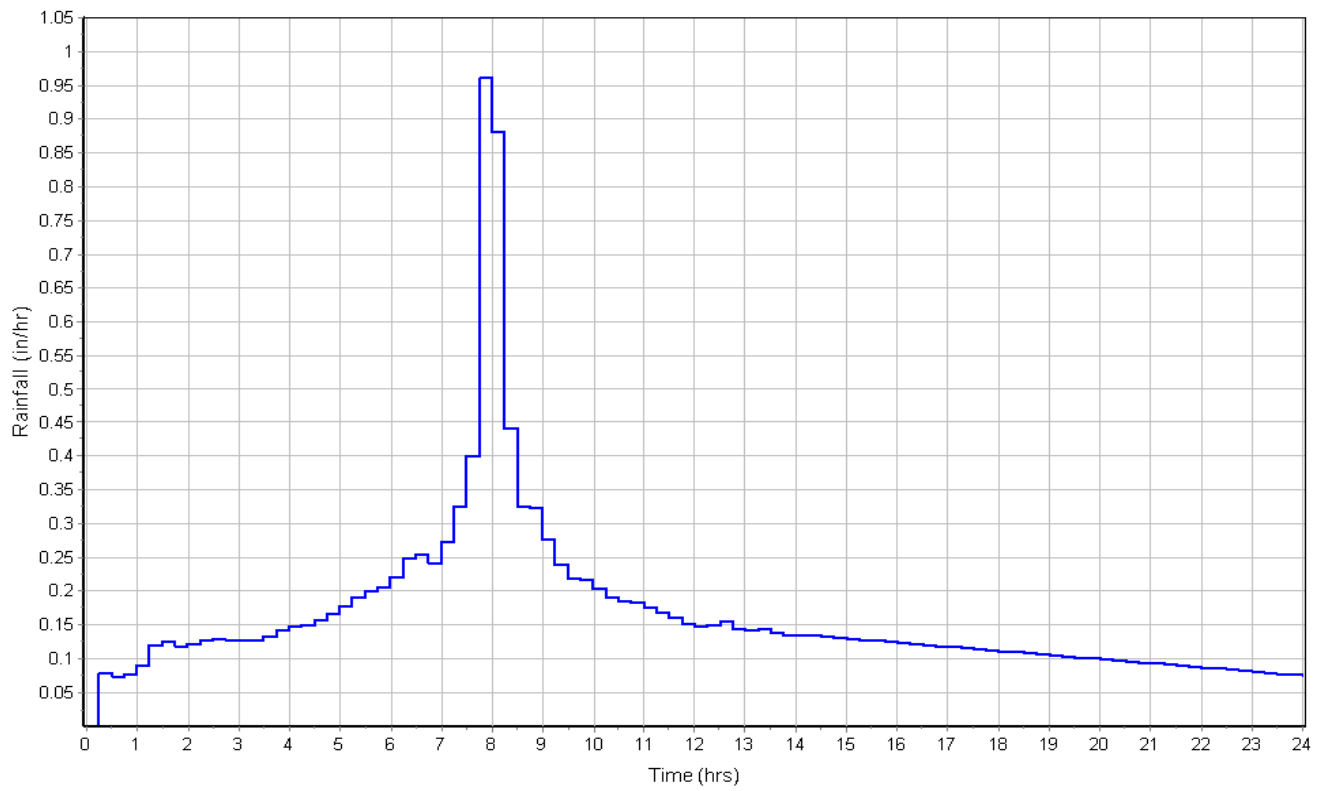
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.24		98

Subbasin Runoff Results

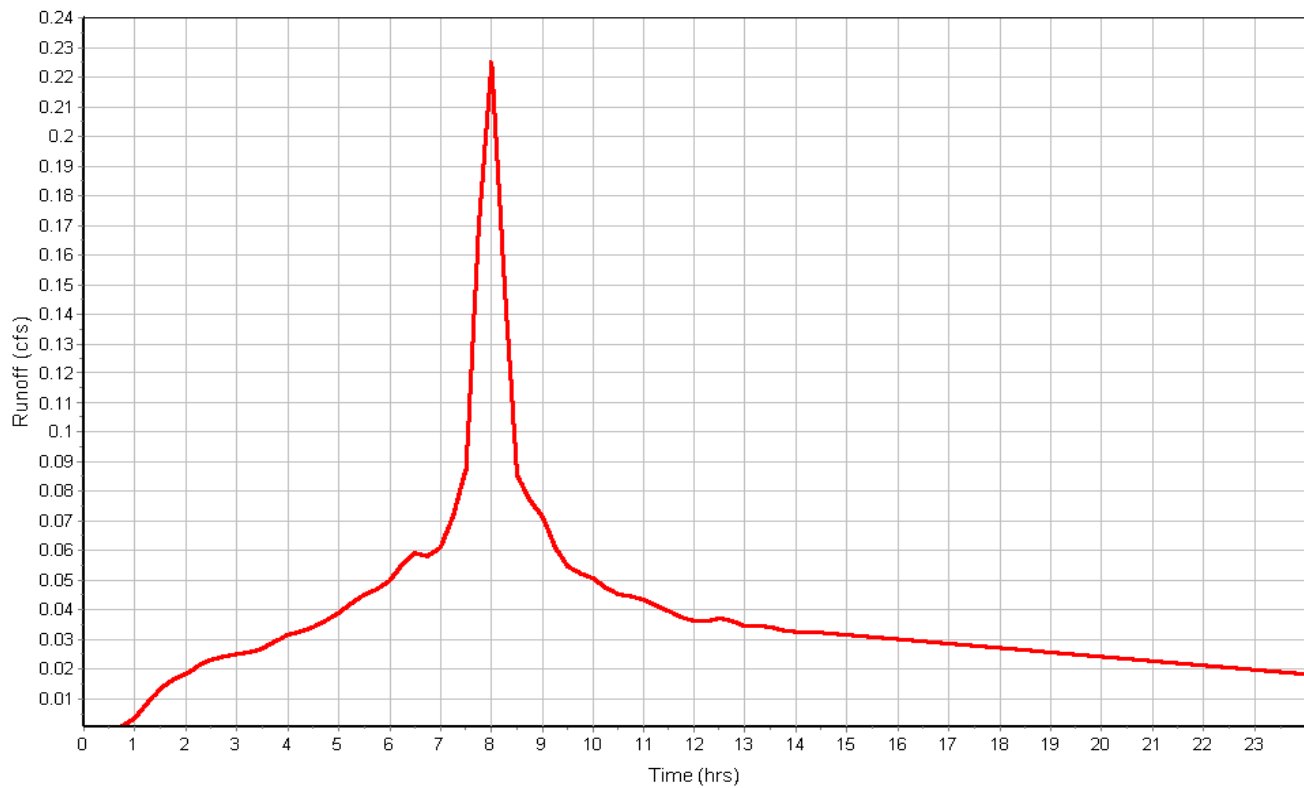
Total Rainfall (in) 3.96
 Total Runoff (in) 3.73
 Peak Runoff (cfs) 0.23
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : RDCO_16

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RDCO_18**Input Data**

Area (ac) 0.13
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

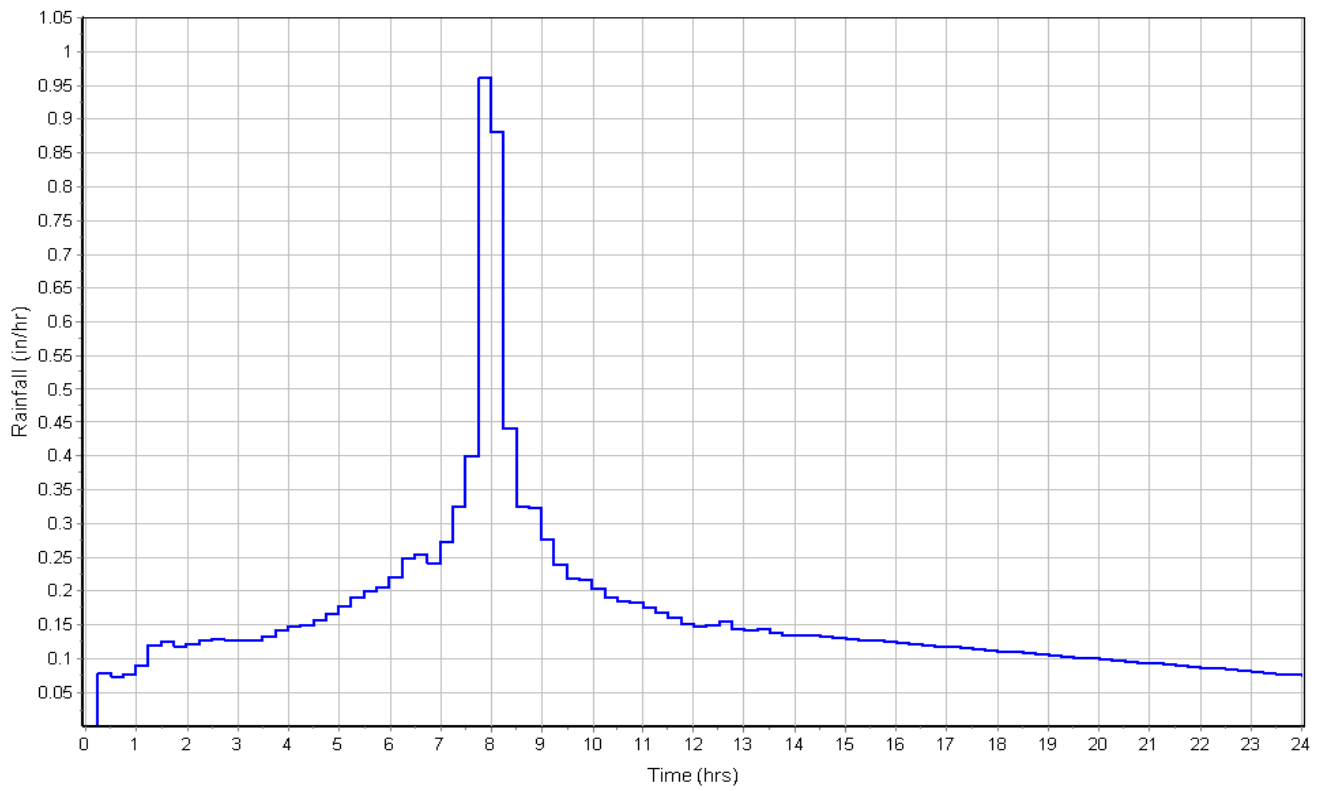
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.13		98

Subbasin Runoff Results

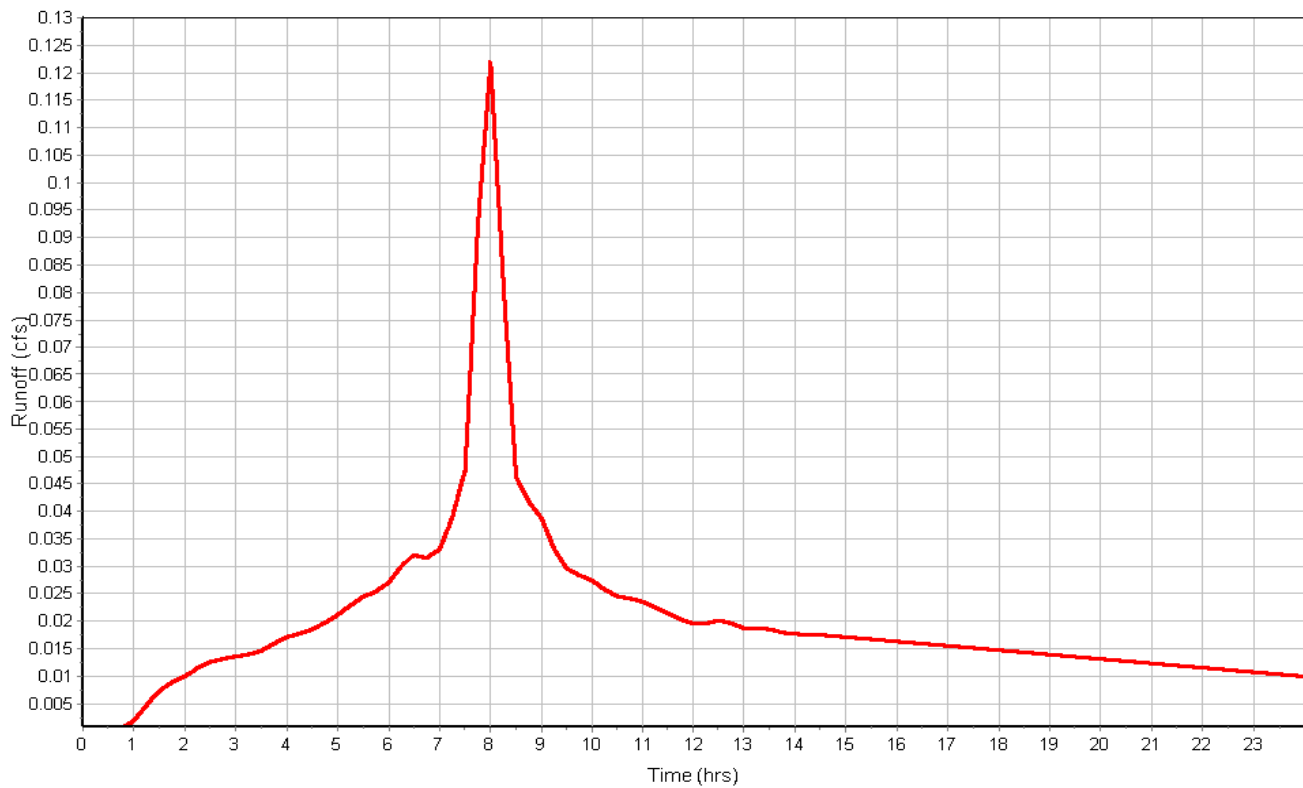
Total Rainfall (in) 3.96
 Total Runoff (in) 3.73
 Peak Runoff (cfs) 0.12
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : RDCO_18

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RDCO_19**Input Data**

Area (ac) 0.26
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

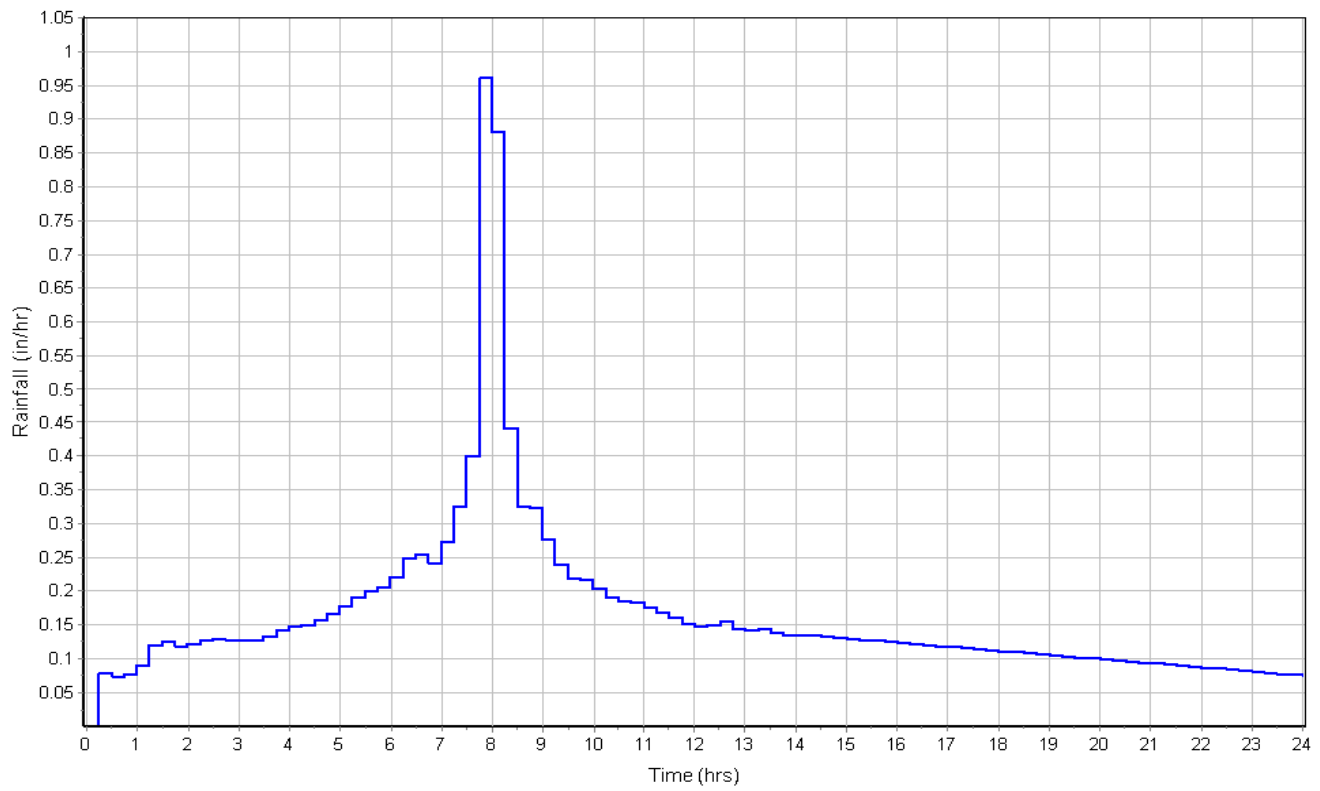
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.26		98

Subbasin Runoff Results

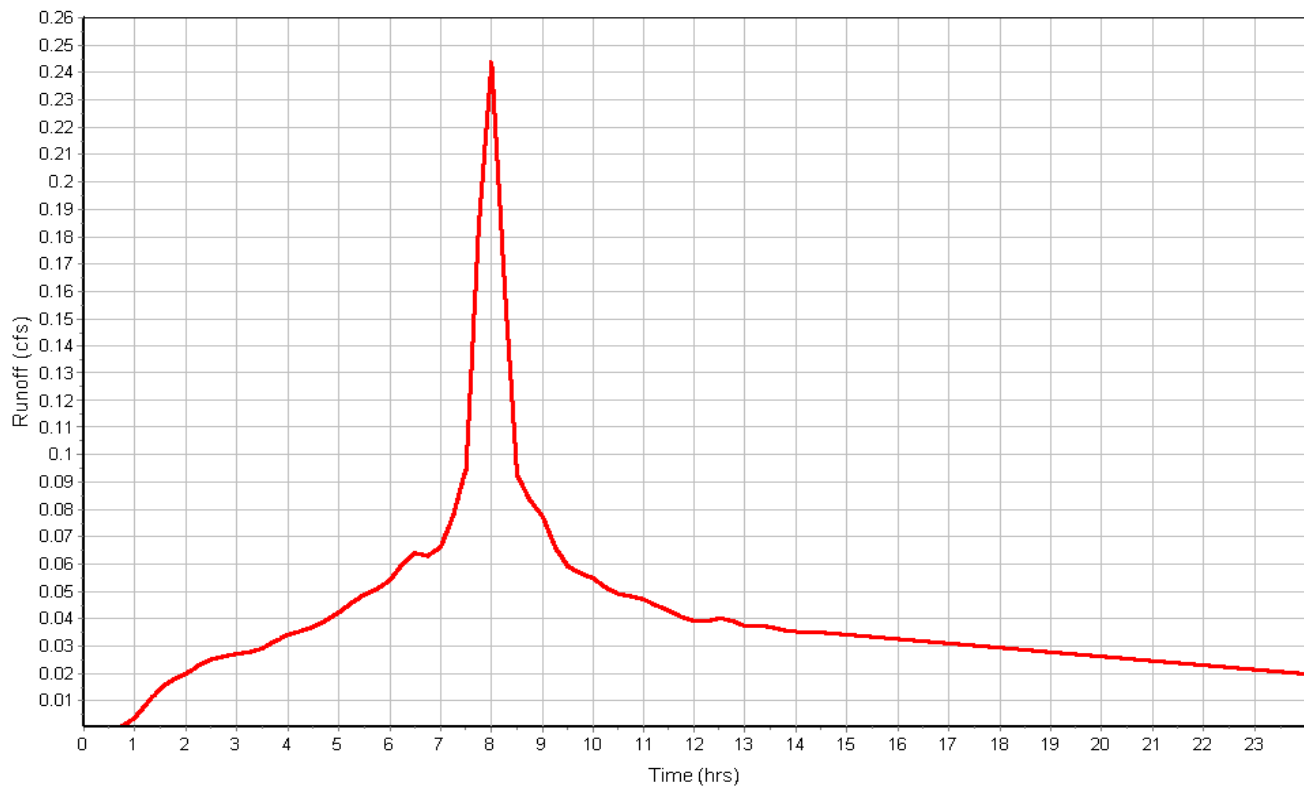
Total Rainfall (in) 3.96
 Total Runoff (in) 3.73
 Peak Runoff (cfs) 0.24
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : RDCO_19

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RDCO_21**Input Data**

Area (ac) 0.13
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

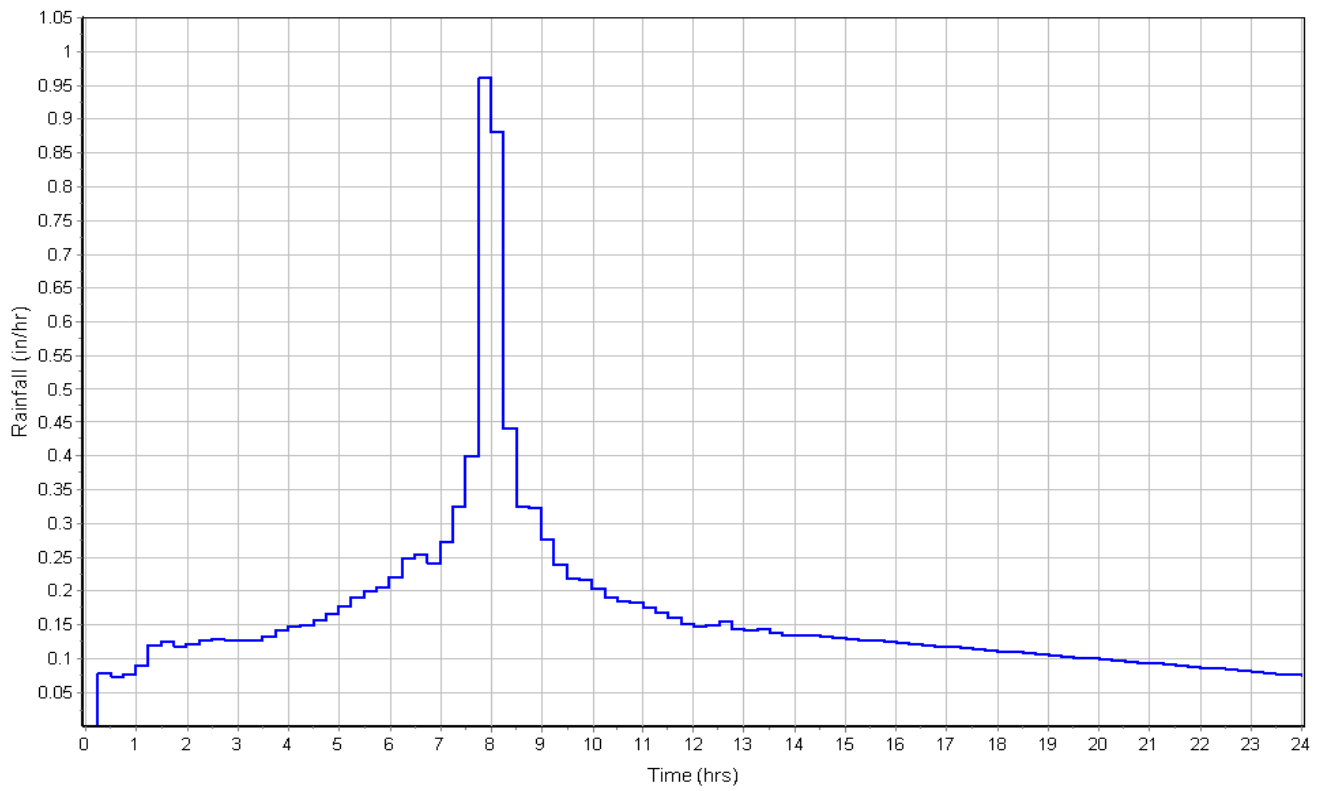
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.13		98

Subbasin Runoff Results

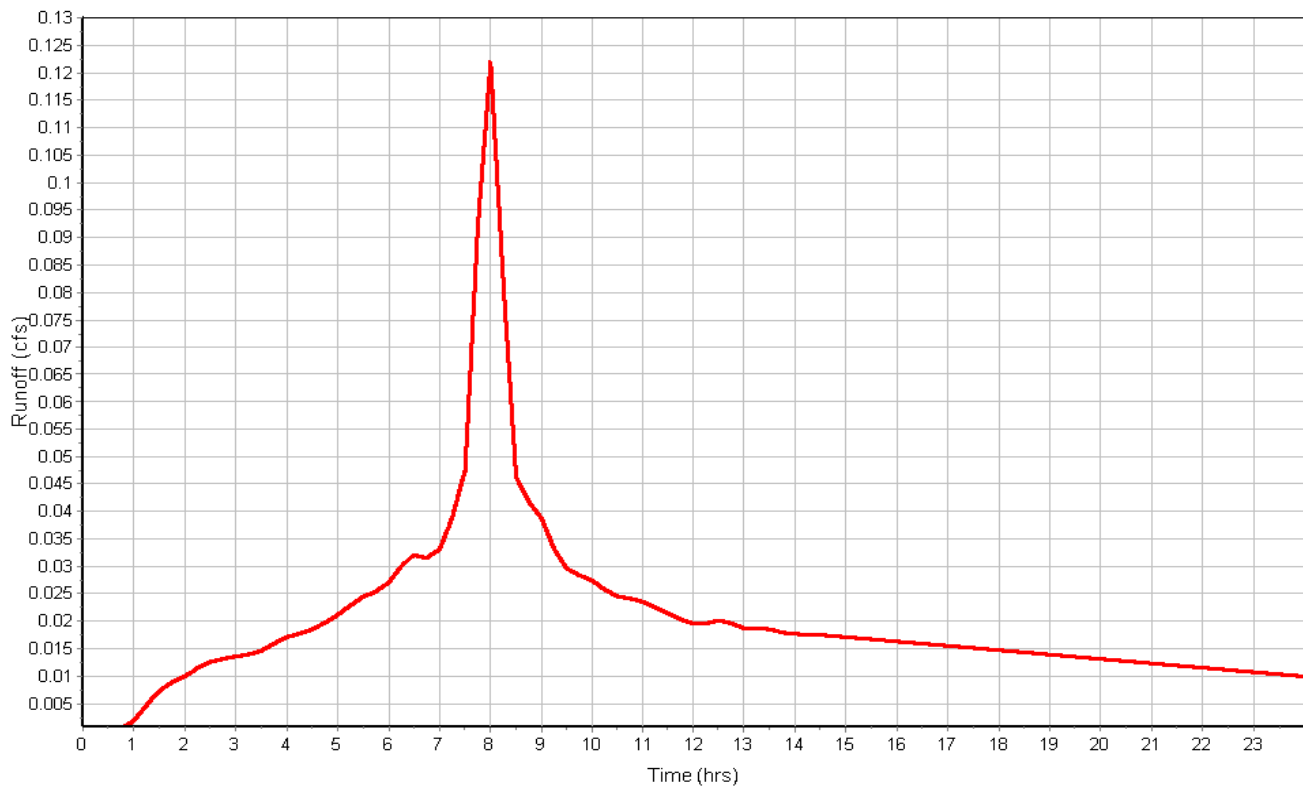
Total Rainfall (in) 3.96
 Total Runoff (in) 3.73
 Peak Runoff (cfs) 0.12
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : RDCO_21

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RDCO_22**Input Data**

Area (ac) 0.22
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

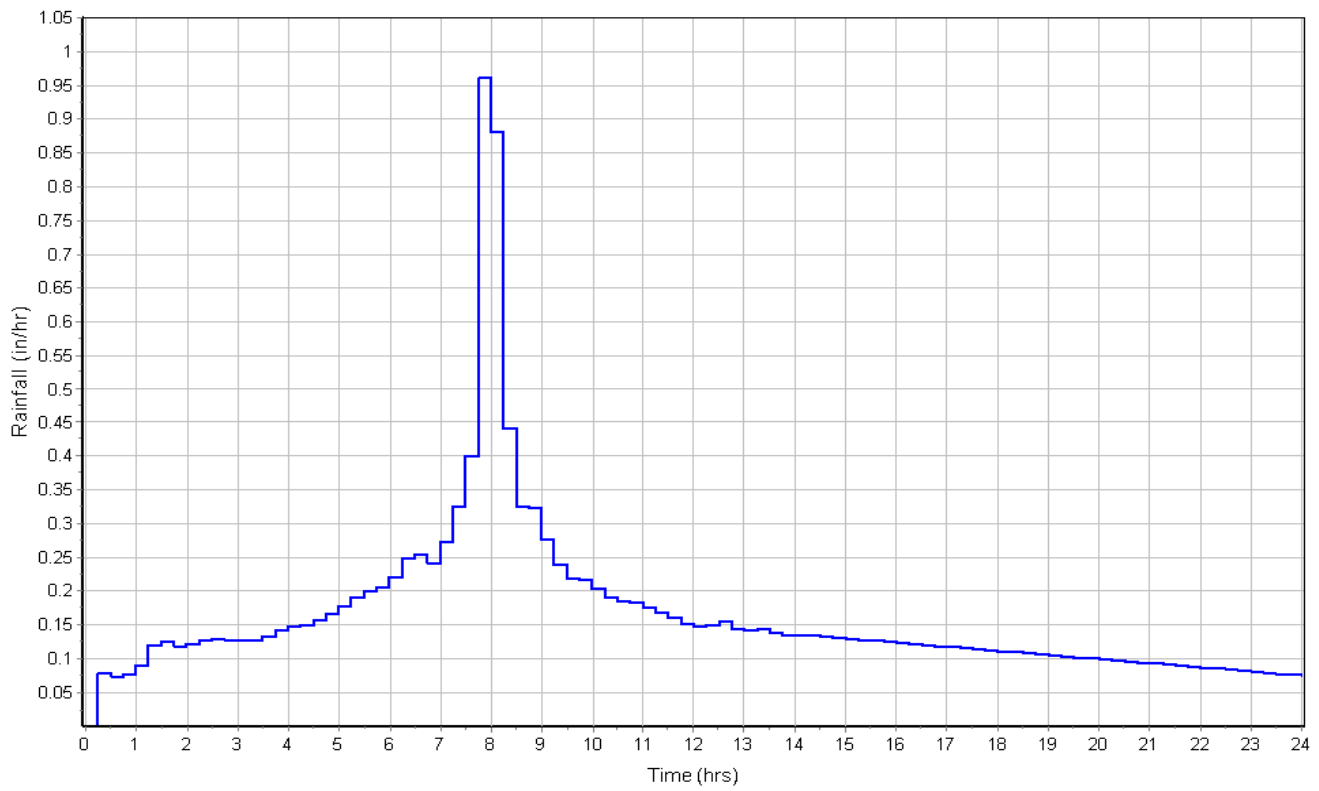
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.22		98

Subbasin Runoff Results

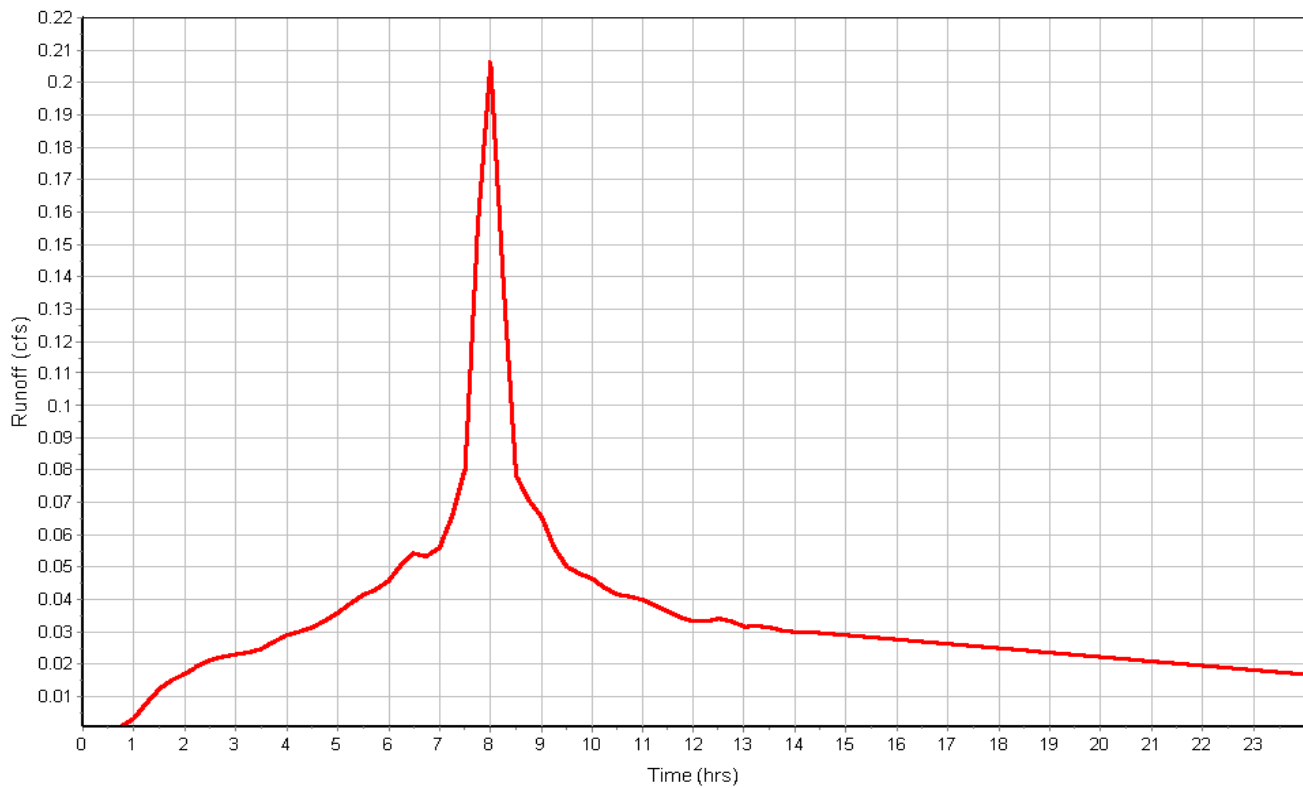
Total Rainfall (in) 3.96
 Total Runoff (in) 3.73
 Peak Runoff (cfs) 0.21
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : RDCO_22

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RDCO_25**Input Data**

Area (ac) 0.30
Impervious Area (%) 100.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

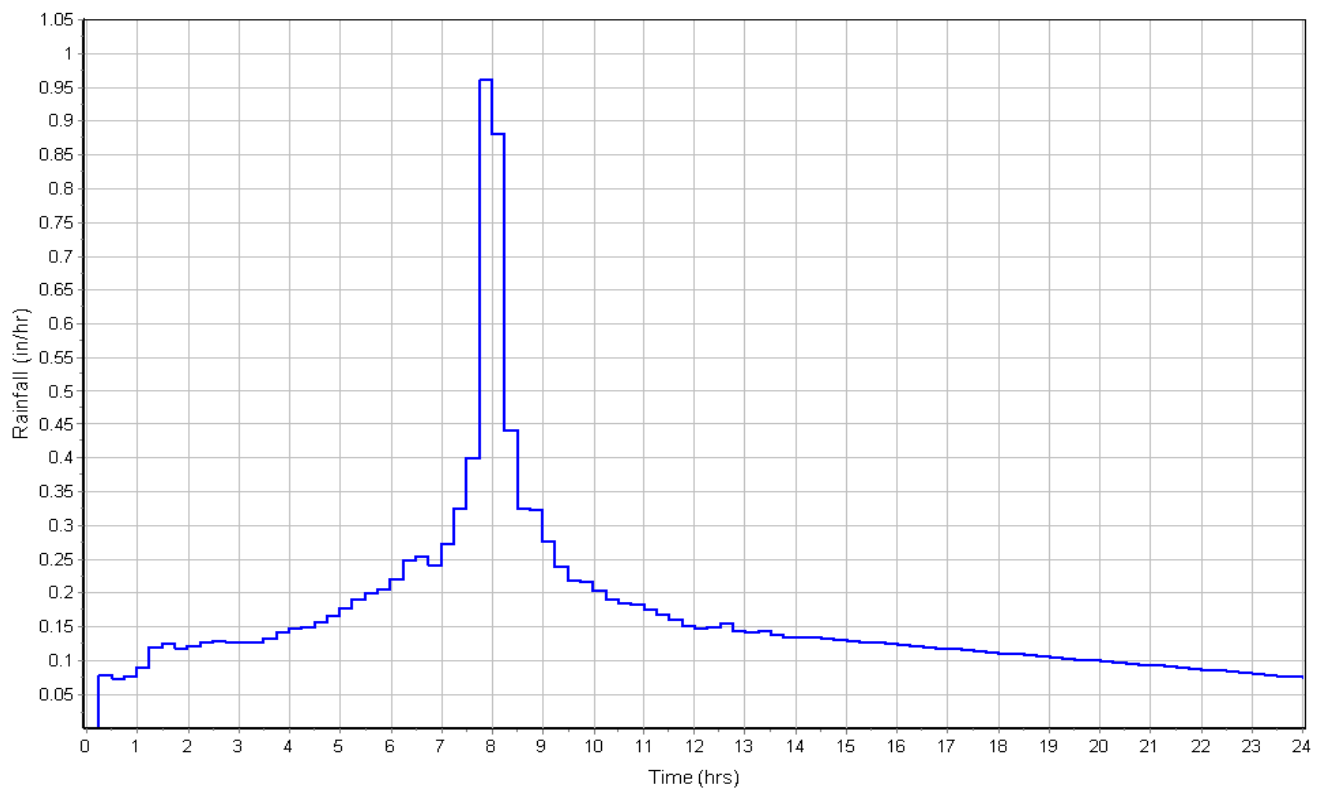
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.30		98

Subbasin Runoff Results

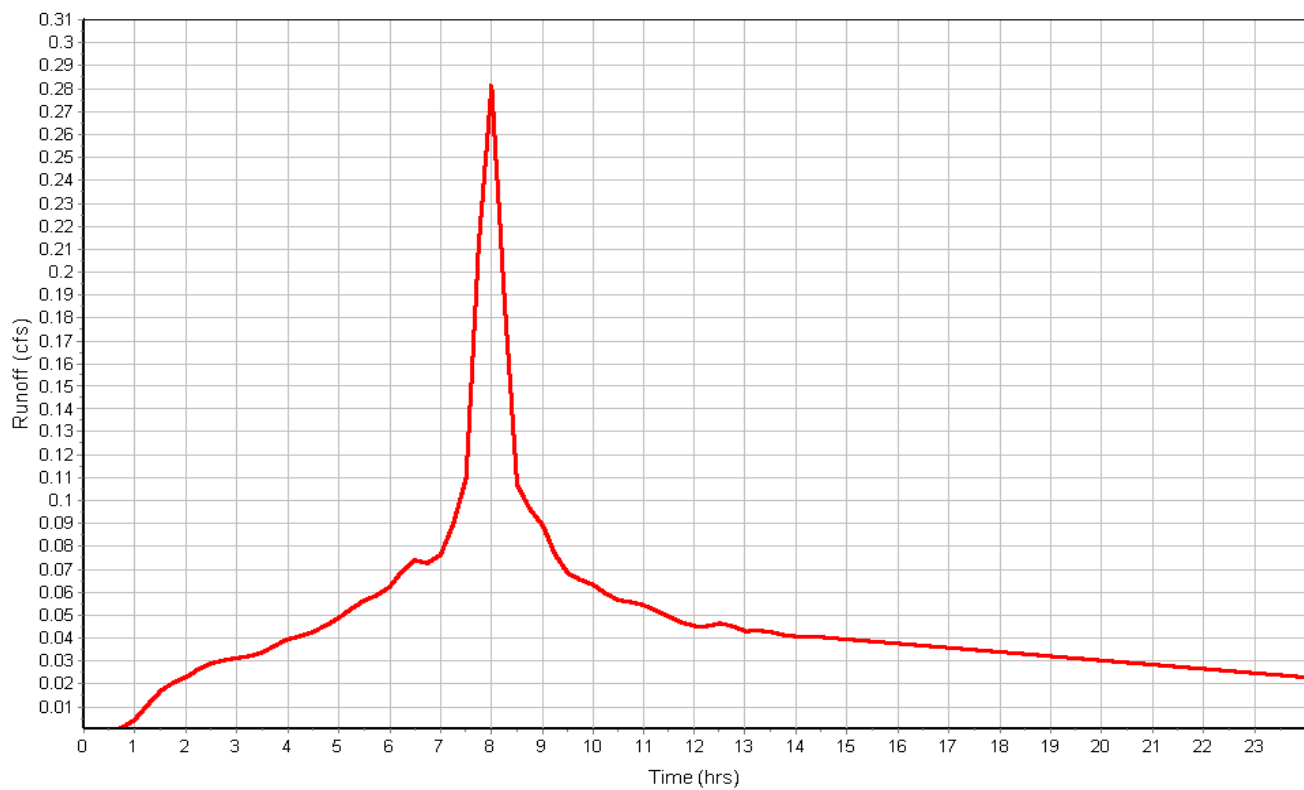
Total Rainfall (in) 3.96
Total Runoff (in) 3.73
Peak Runoff (cfs) 0.28
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : RDCO_25

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RDCO_26**Input Data**

Area (ac) 0.04
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

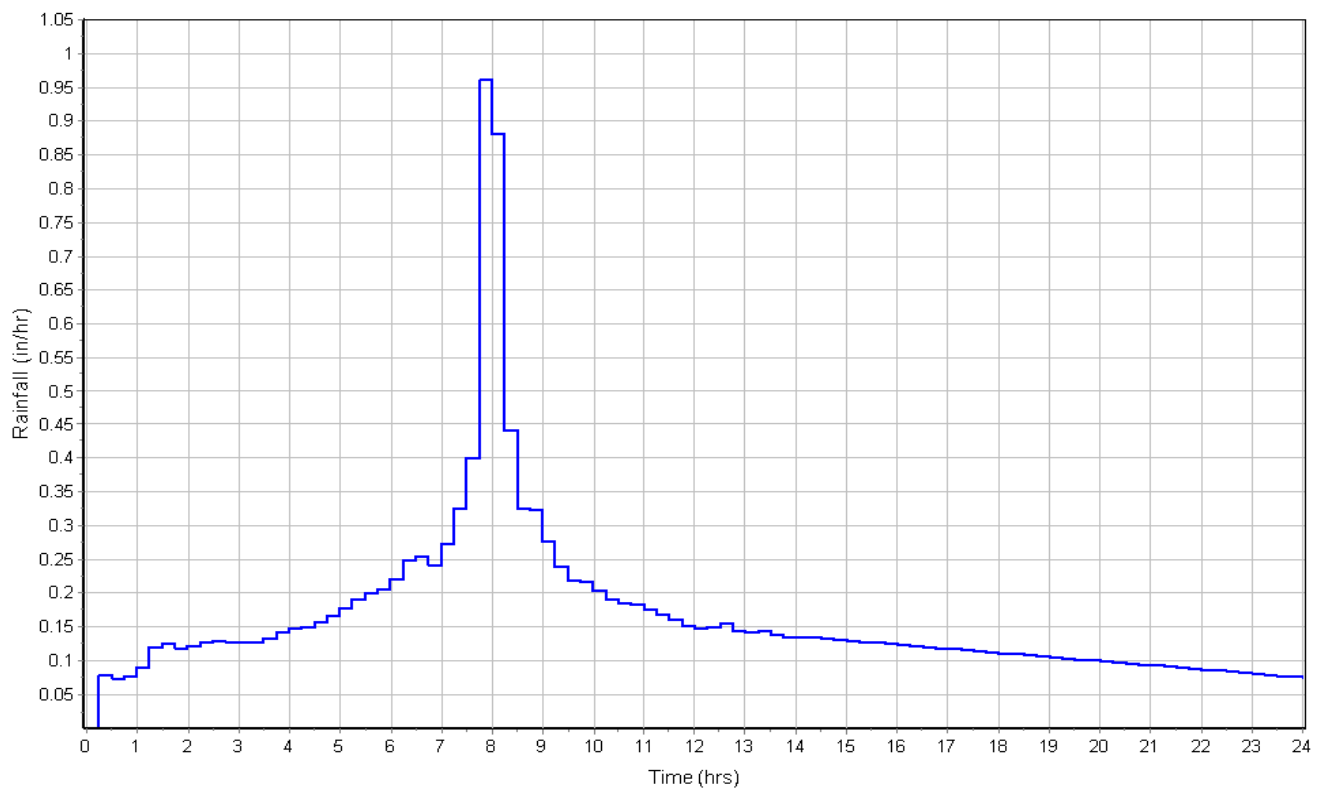
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.04		98

Subbasin Runoff Results

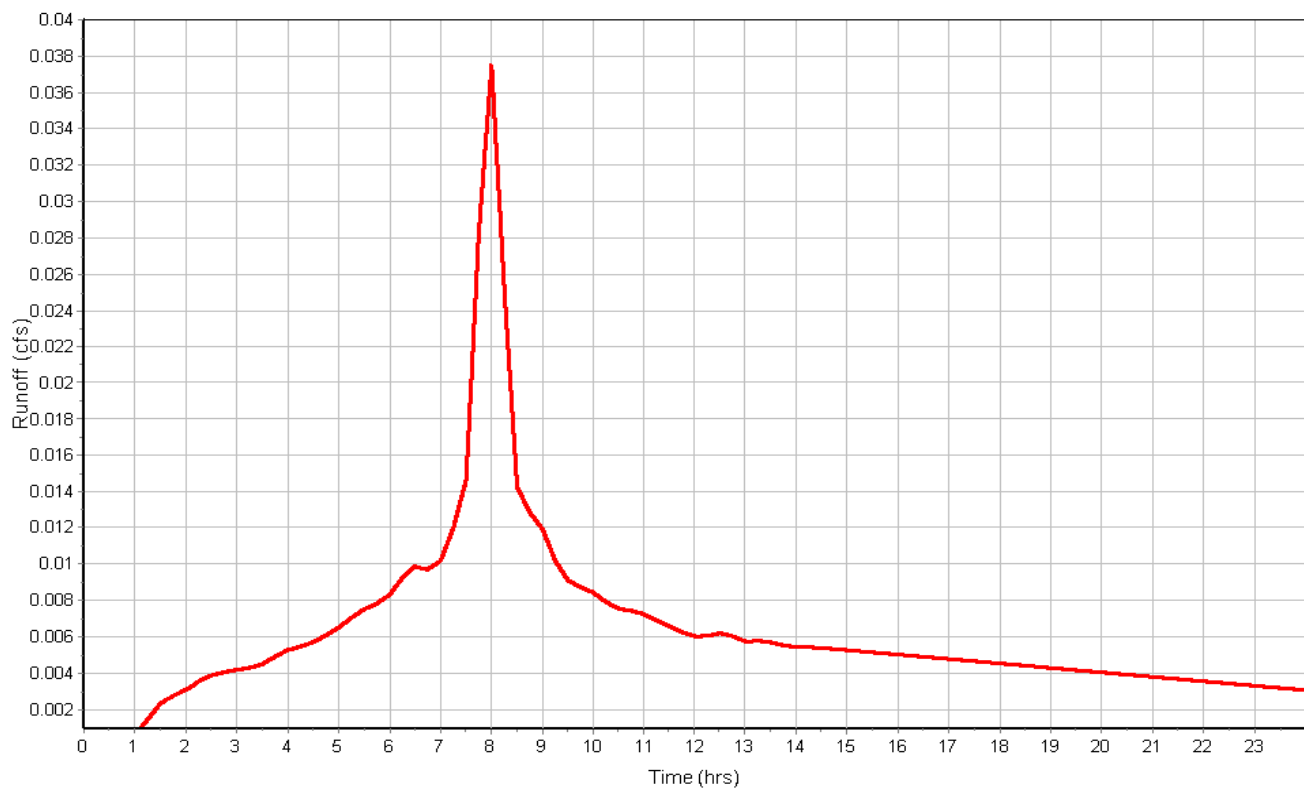
Total Rainfall (in) 3.96
 Total Runoff (in) 3.73
 Peak Runoff (cfs) 0.04
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : RDCO_26

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RDCO_31**Input Data**

Area (ac) 0.15
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

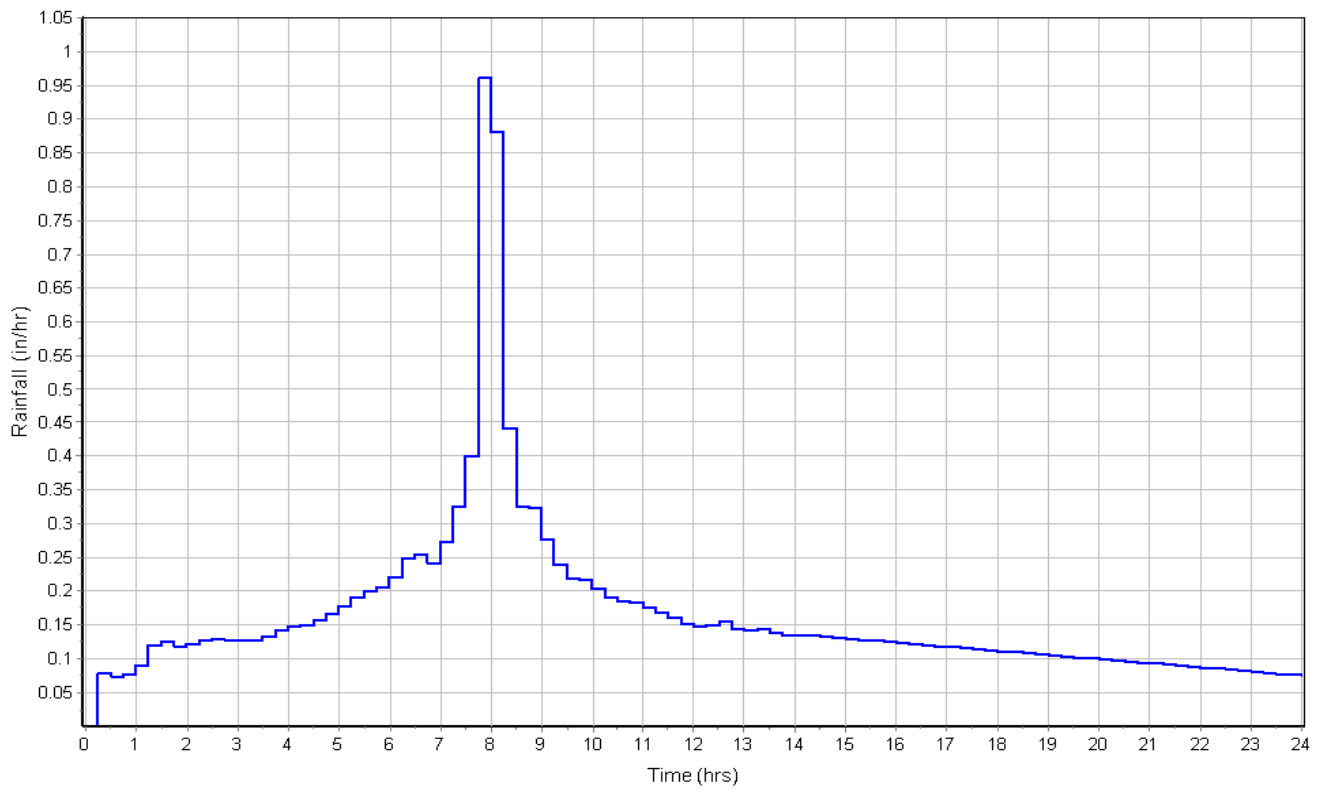
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.15		98

Subbasin Runoff Results

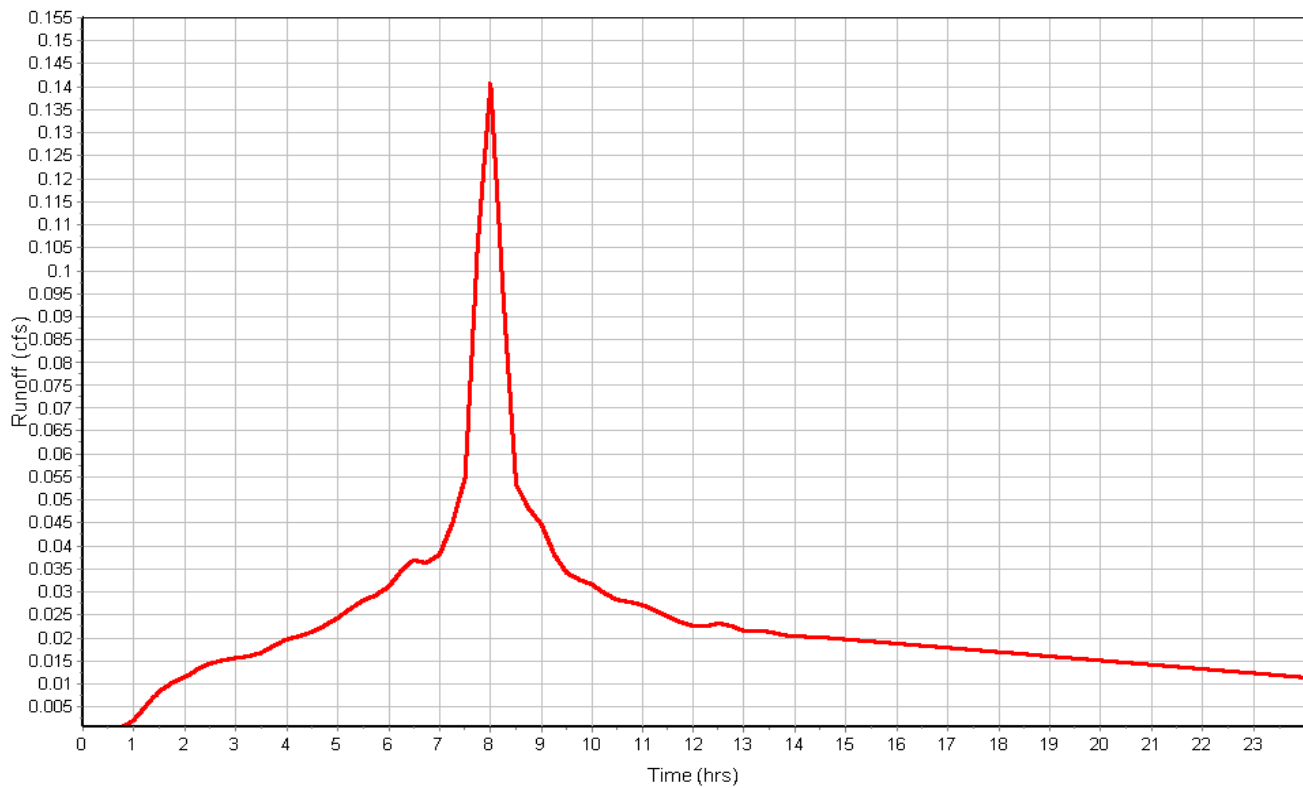
Total Rainfall (in) 3.96
 Total Runoff (in) 3.73
 Peak Runoff (cfs) 0.14
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : RDCO_31

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RDCO_33**Input Data**

Area (ac) 0.06
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

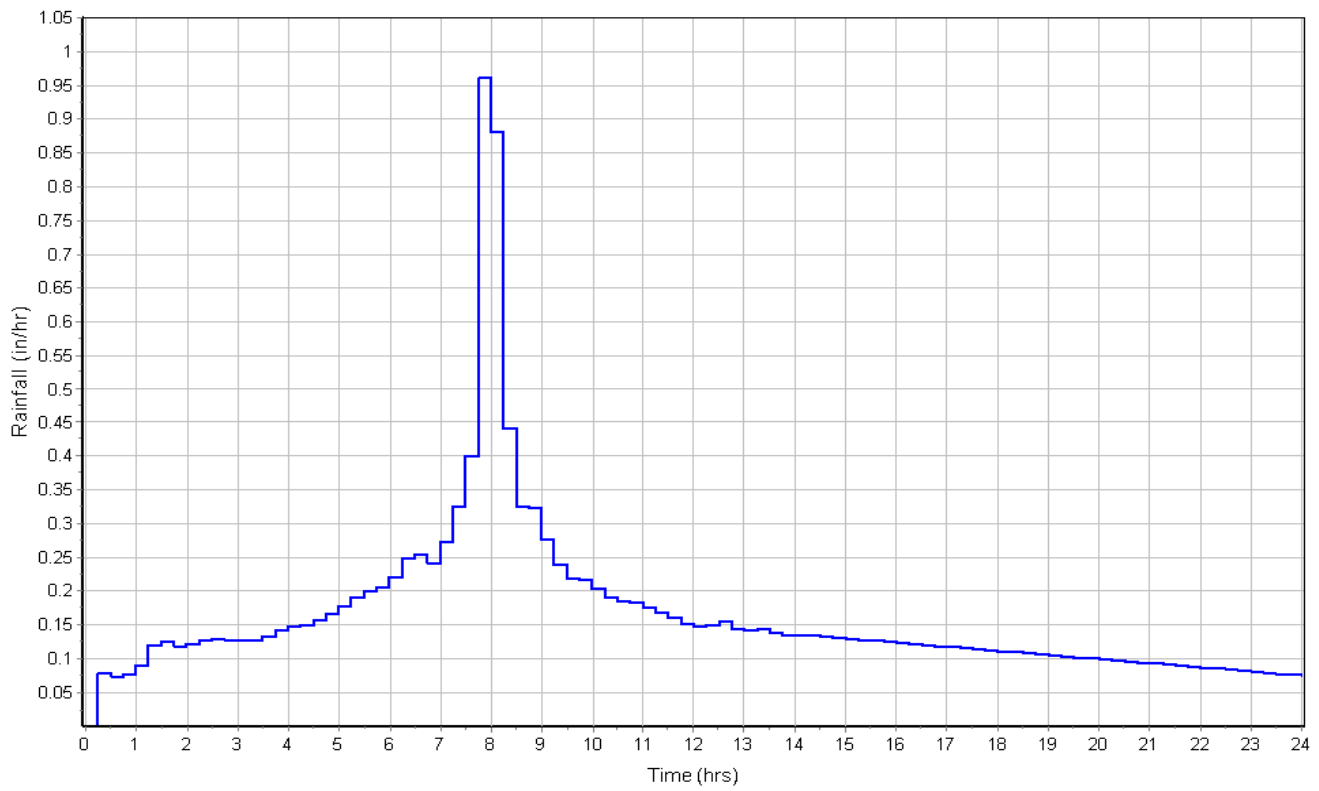
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.06		98

Subbasin Runoff Results

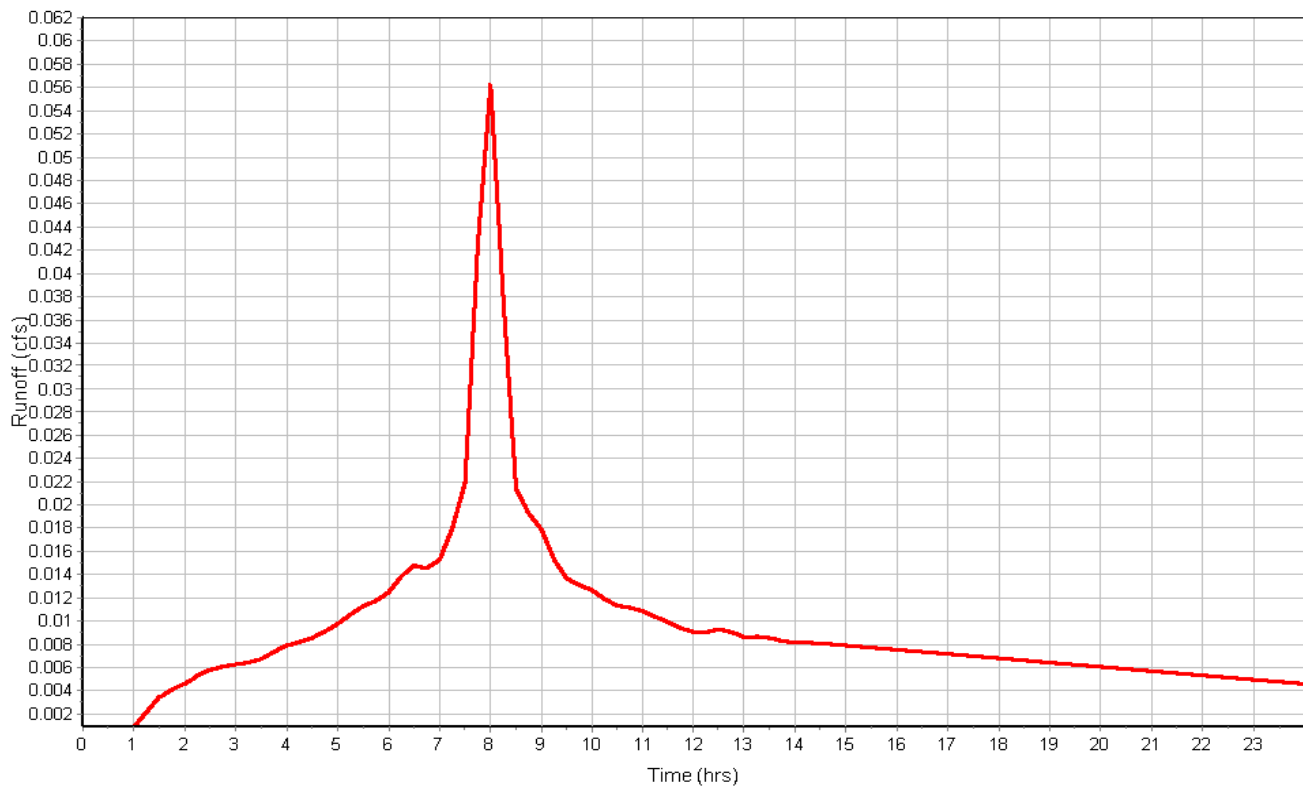
Total Rainfall (in) 3.96
 Total Runoff (in) 3.73
 Peak Runoff (cfs) 0.06
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : RDCO_33

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RDCO_34**Input Data**

Area (ac) 0.18
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

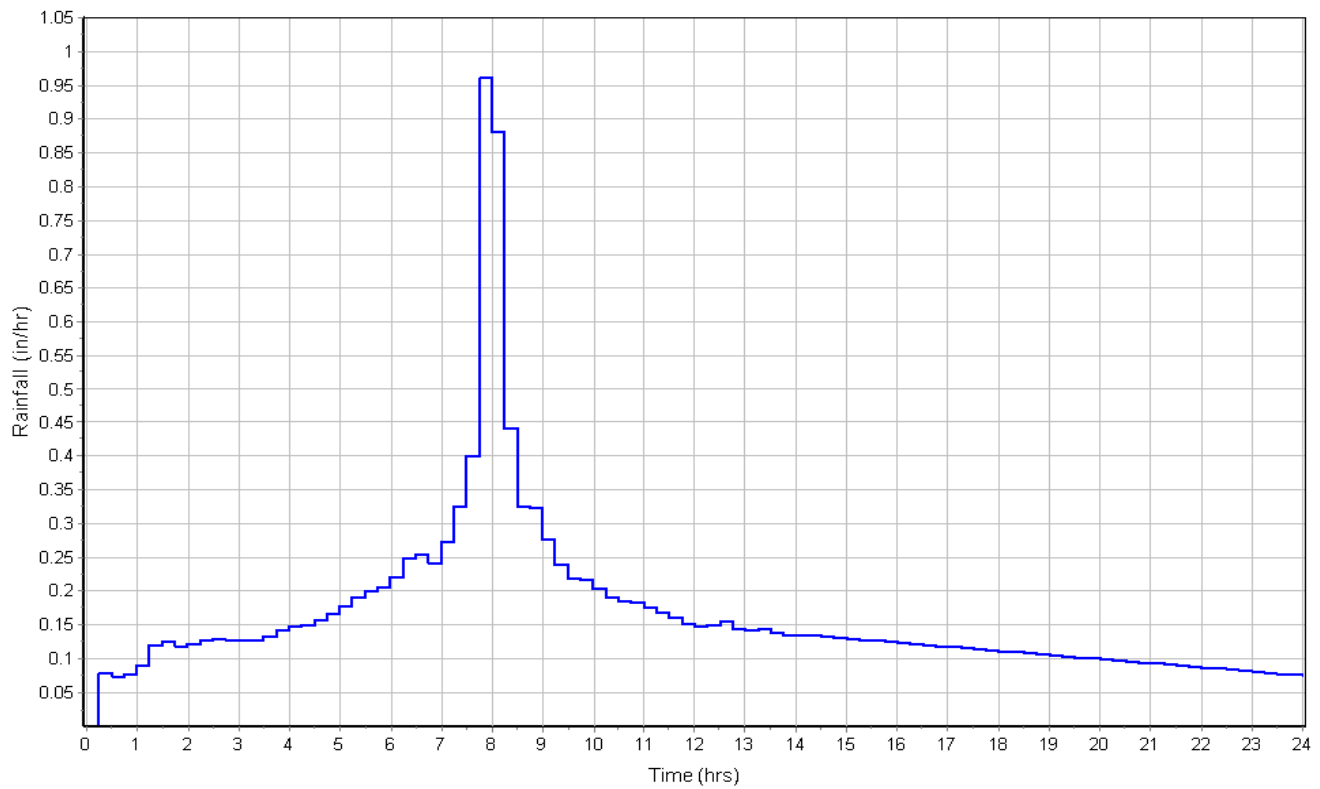
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.18		98

Subbasin Runoff Results

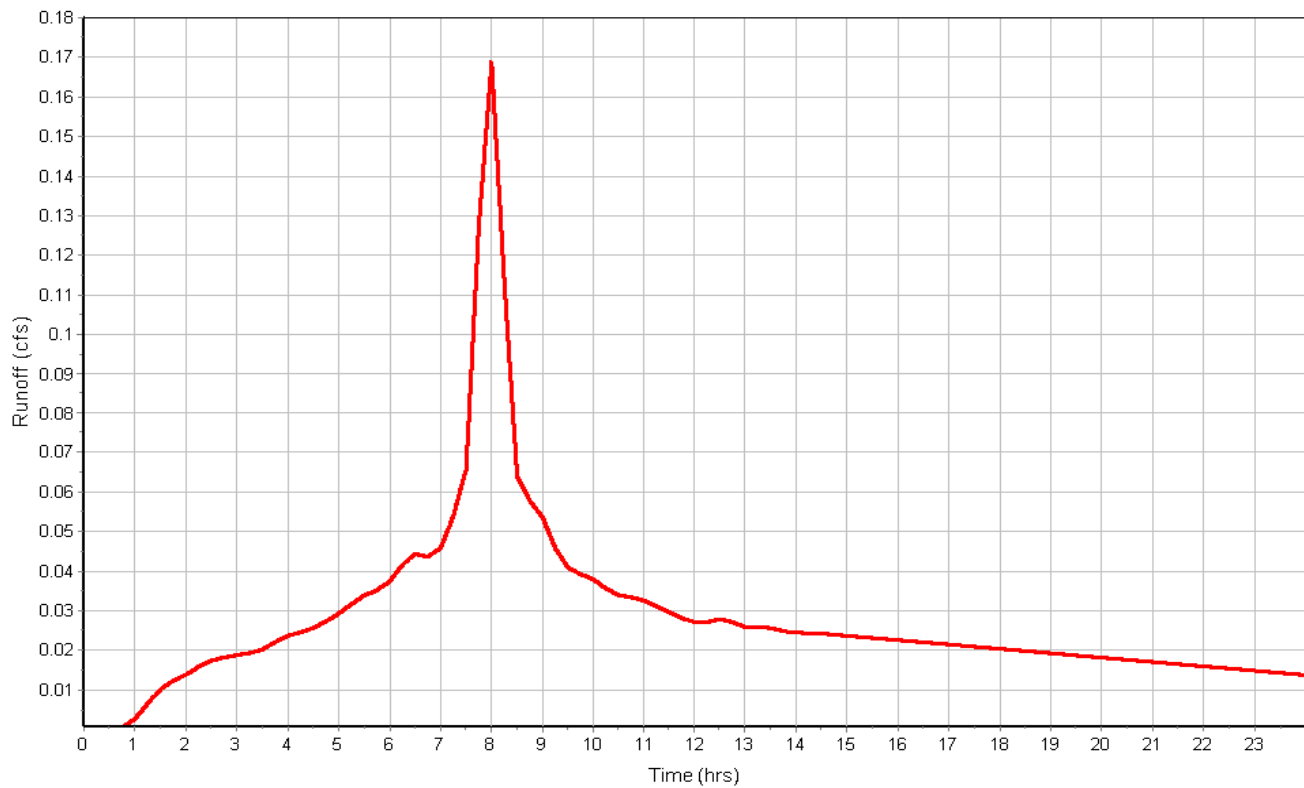
Total Rainfall (in) 3.96
 Total Runoff (in) 3.73
 Peak Runoff (cfs) 0.17
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : RDCO_34

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RDCO_37**Input Data**

Area (ac) 0.23
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

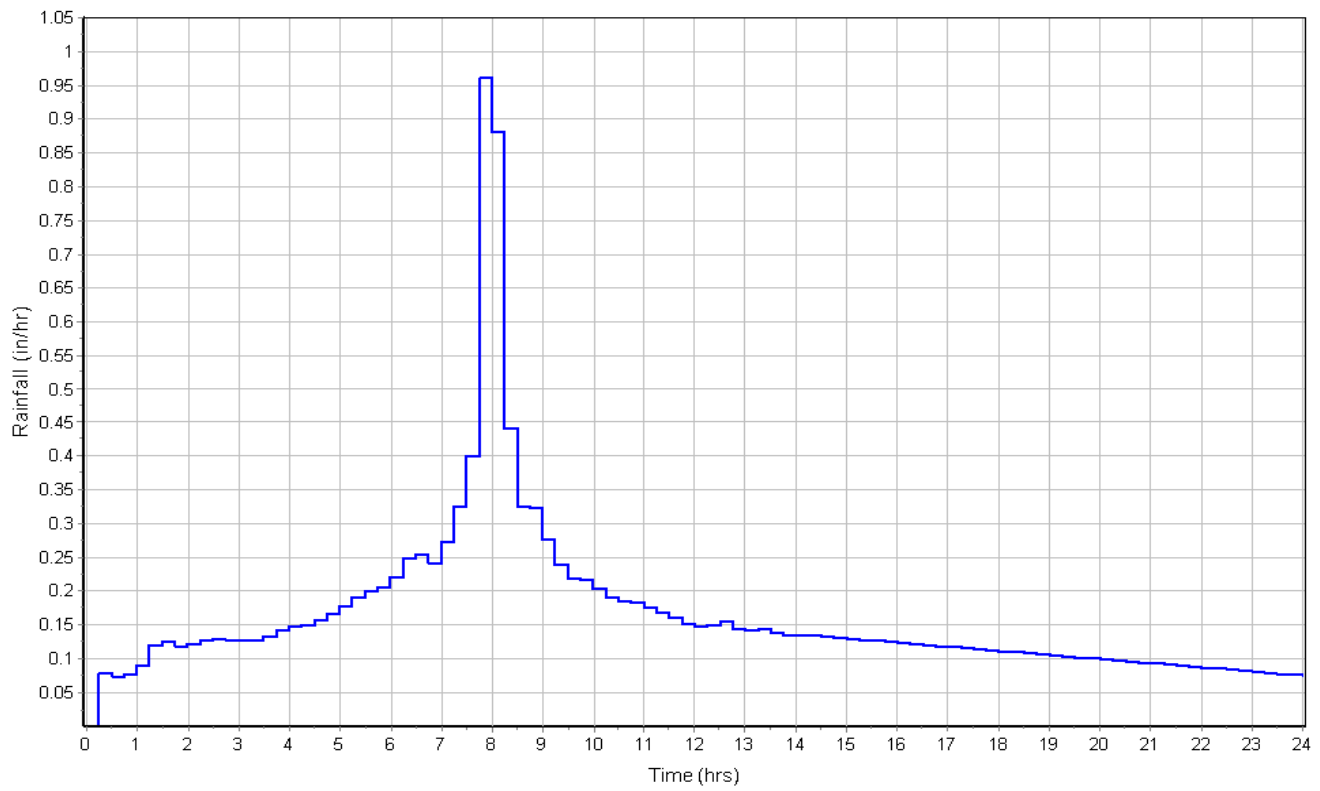
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.23		98

Subbasin Runoff Results

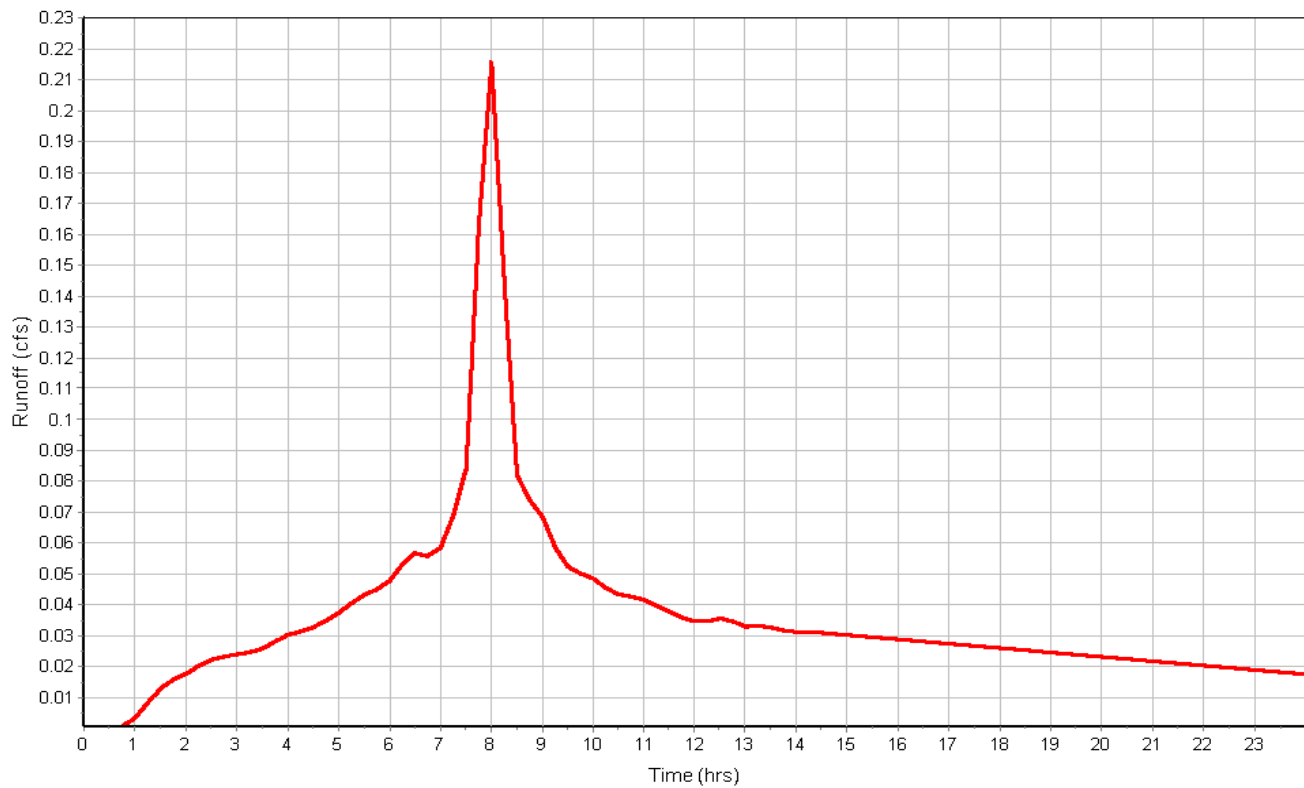
Total Rainfall (in) 3.96
 Total Runoff (in) 3.73
 Peak Runoff (cfs) 0.22
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : RDCO_37

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RDCO_41**Input Data**

Area (ac) 0.07
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

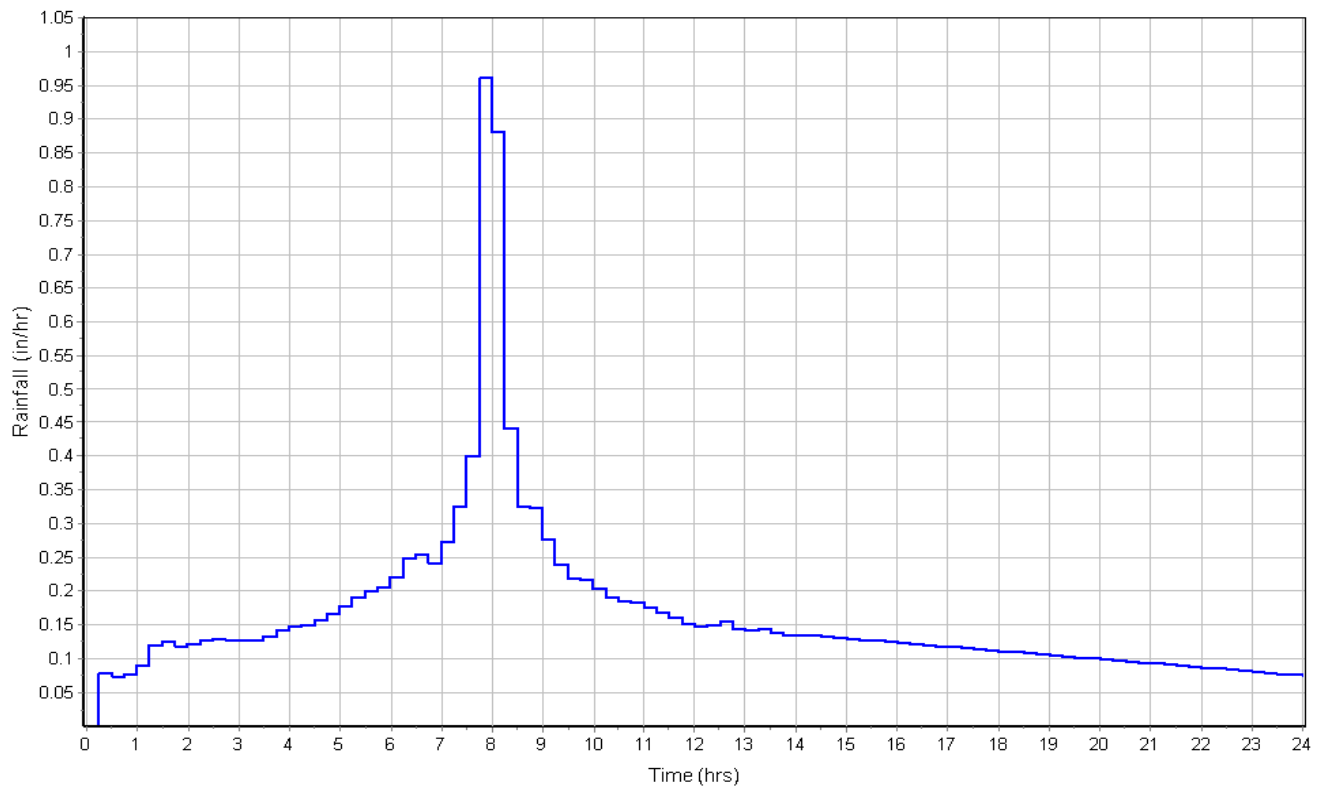
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.07		98

Subbasin Runoff Results

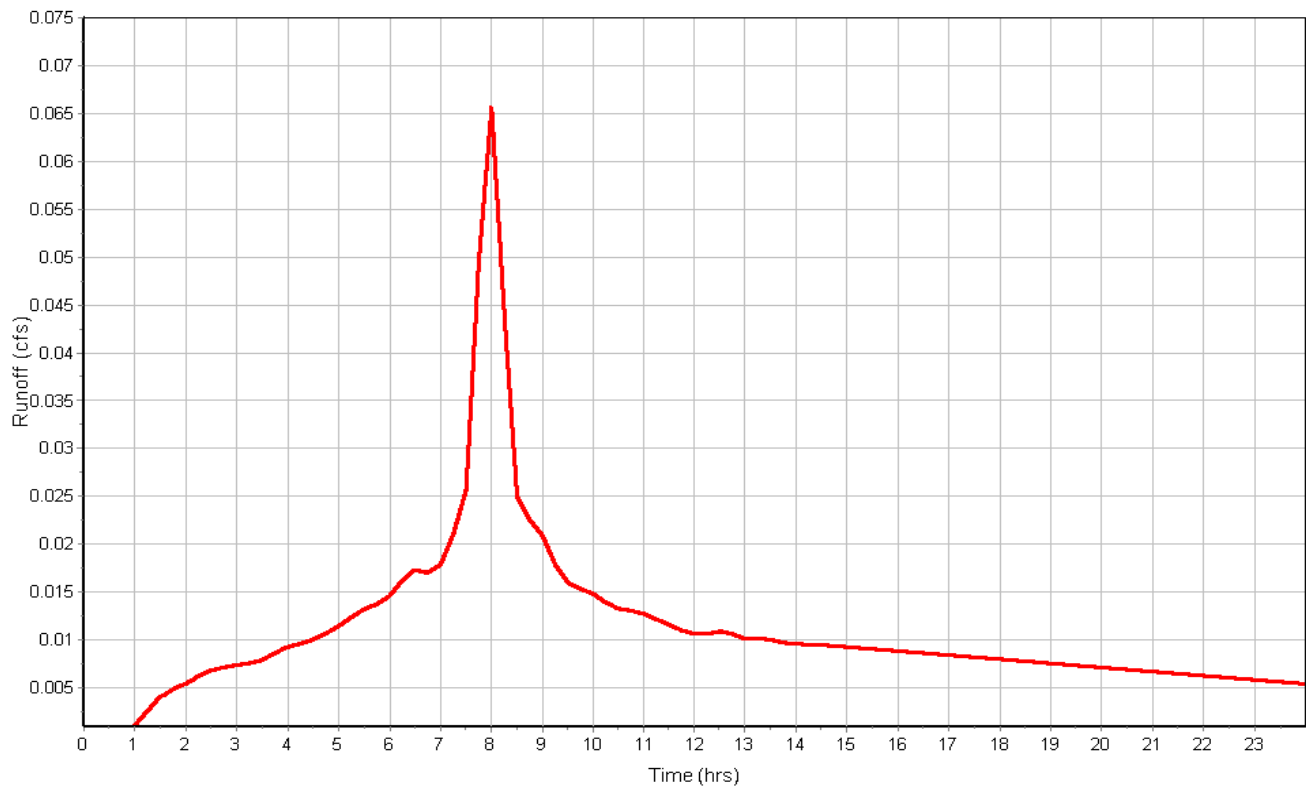
Total Rainfall (in) 3.96
 Total Runoff (in) 3.73
 Peak Runoff (cfs) 0.07
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : RDCO_41

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RDCO_42**Input Data**

Area (ac) 0.09
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

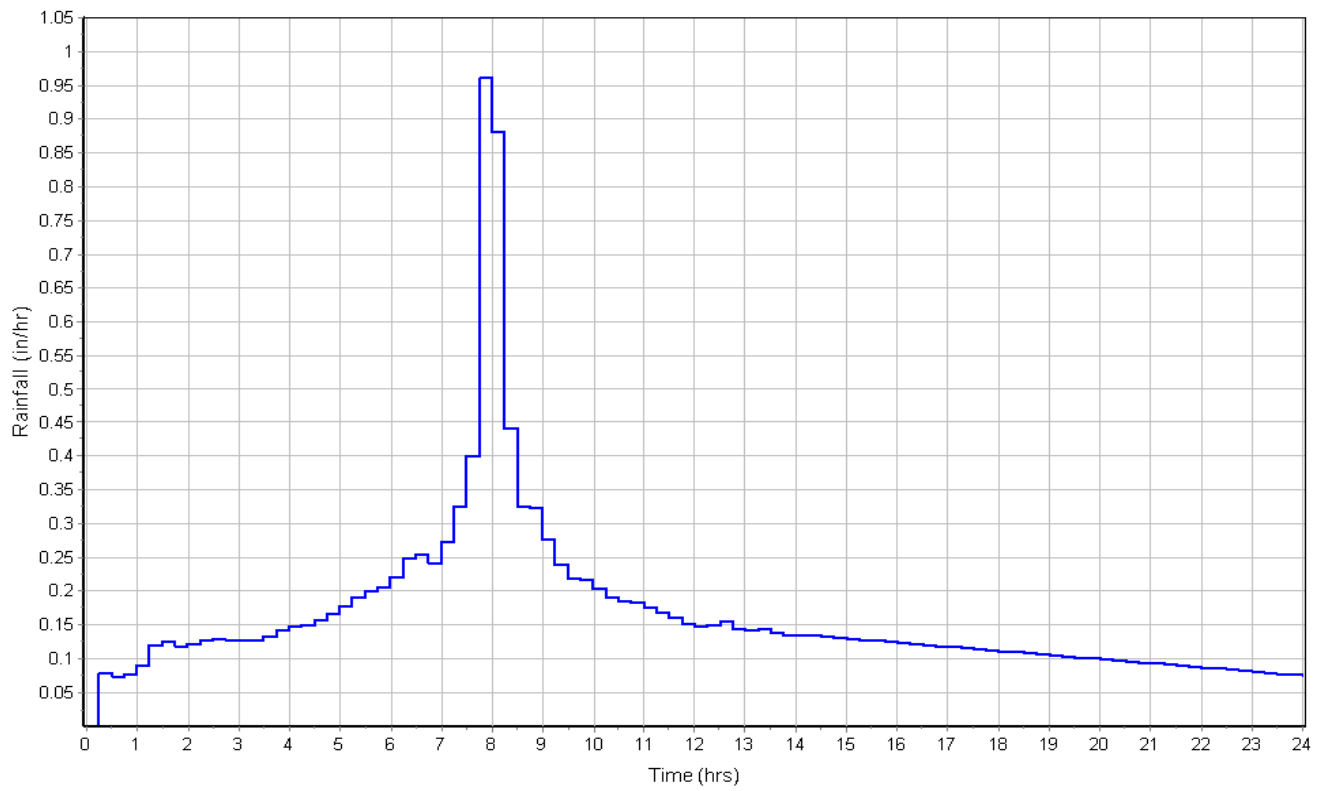
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.09		98

Subbasin Runoff Results

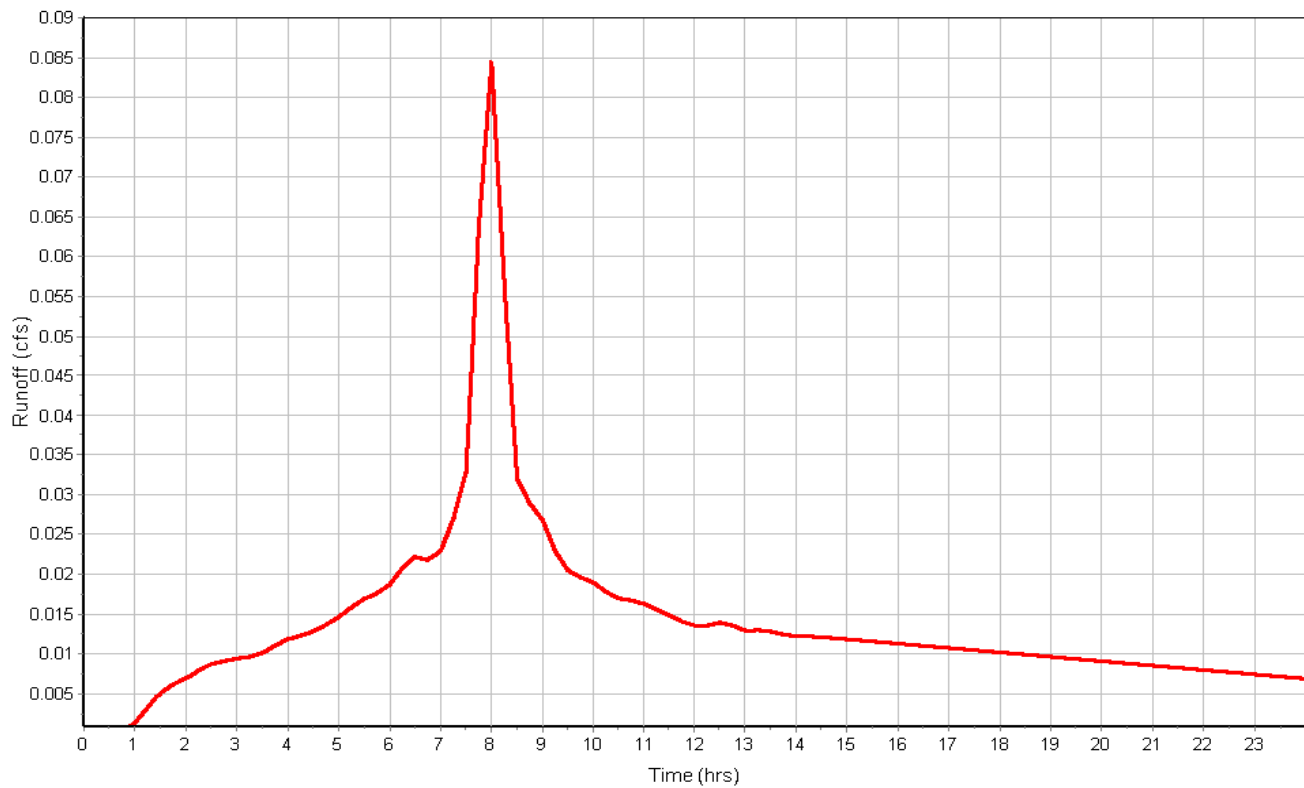
Total Rainfall (in) 3.96
 Total Runoff (in) 3.73
 Peak Runoff (cfs) 0.08
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : RDCO_42

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RDCO_44**Input Data**

Area (ac) 0.17
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

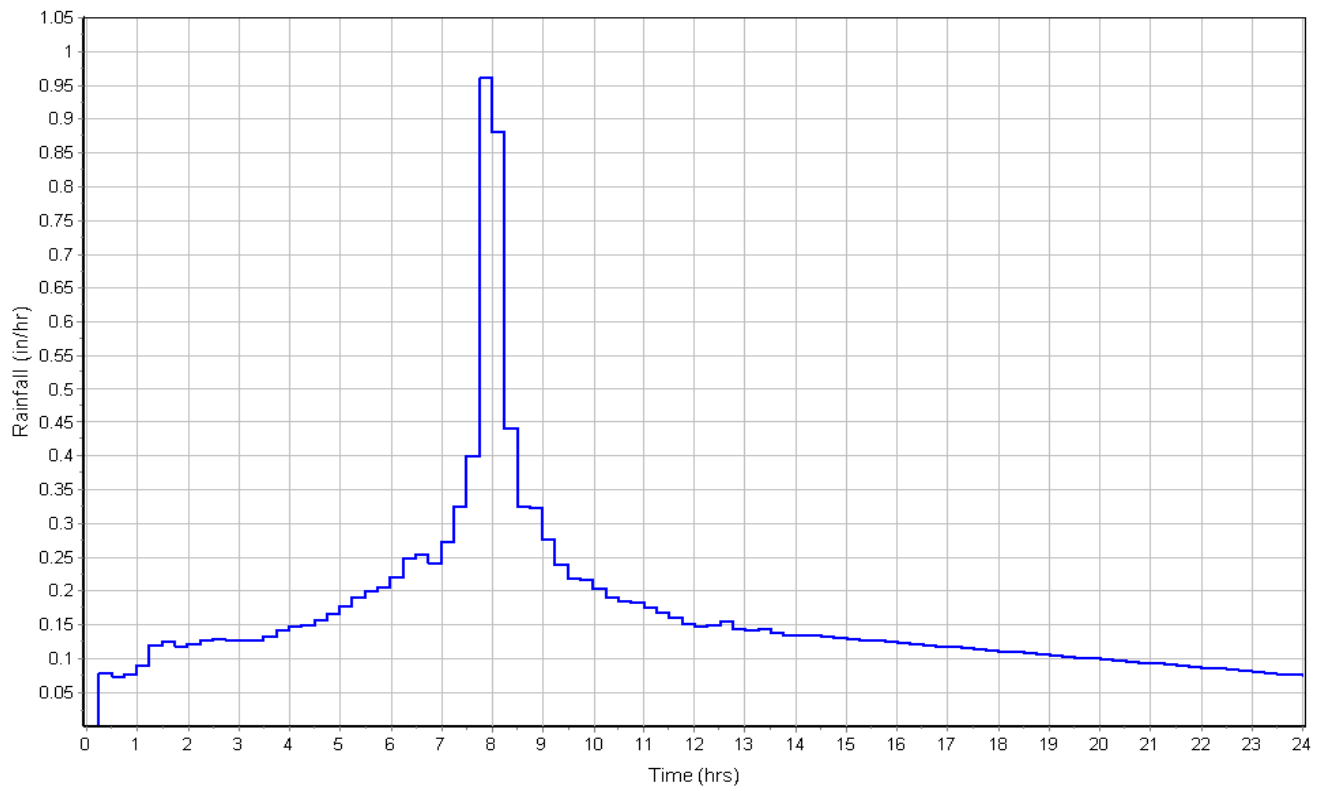
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.17		98

Subbasin Runoff Results

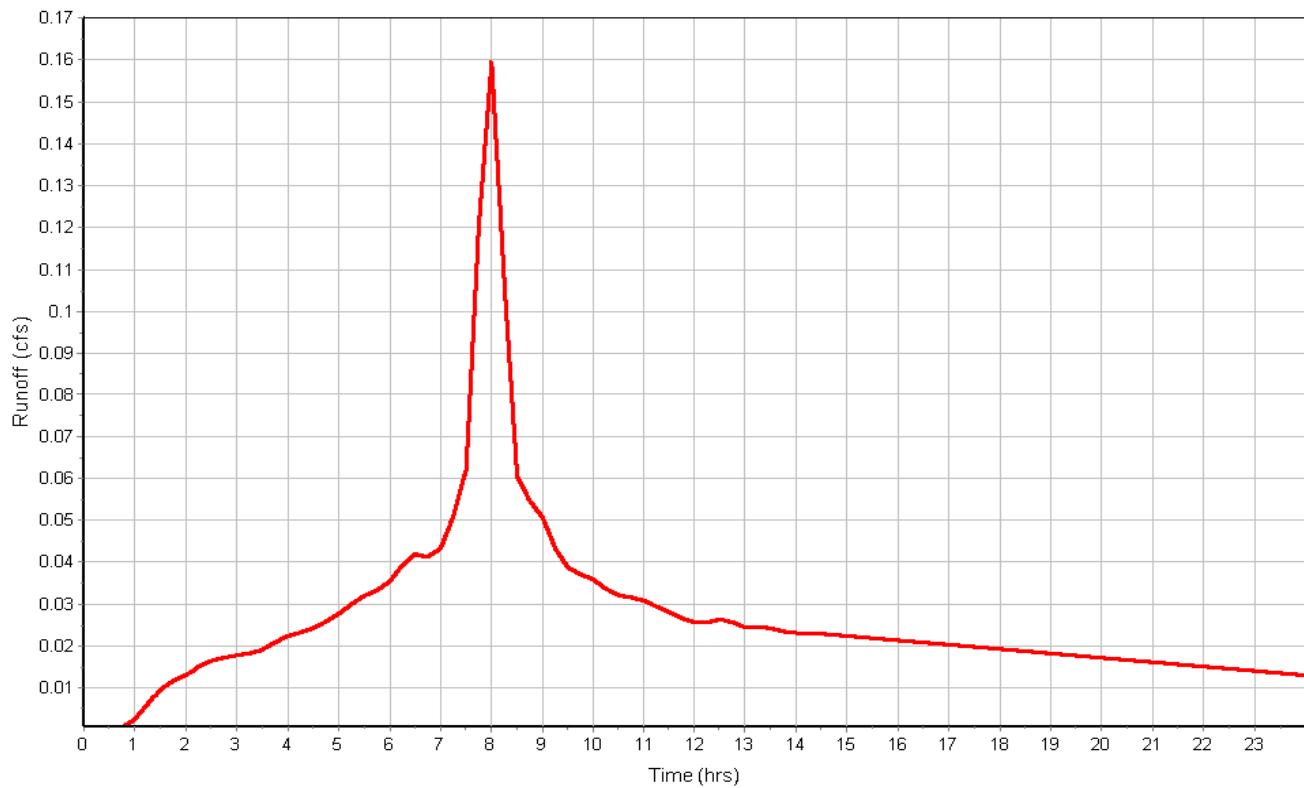
Total Rainfall (in) 3.96
 Total Runoff (in) 3.73
 Peak Runoff (cfs) 0.16
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : RDCO_44

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RDCO_46**Input Data**

Area (ac) 0.23
Impervious Area (%) 100.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

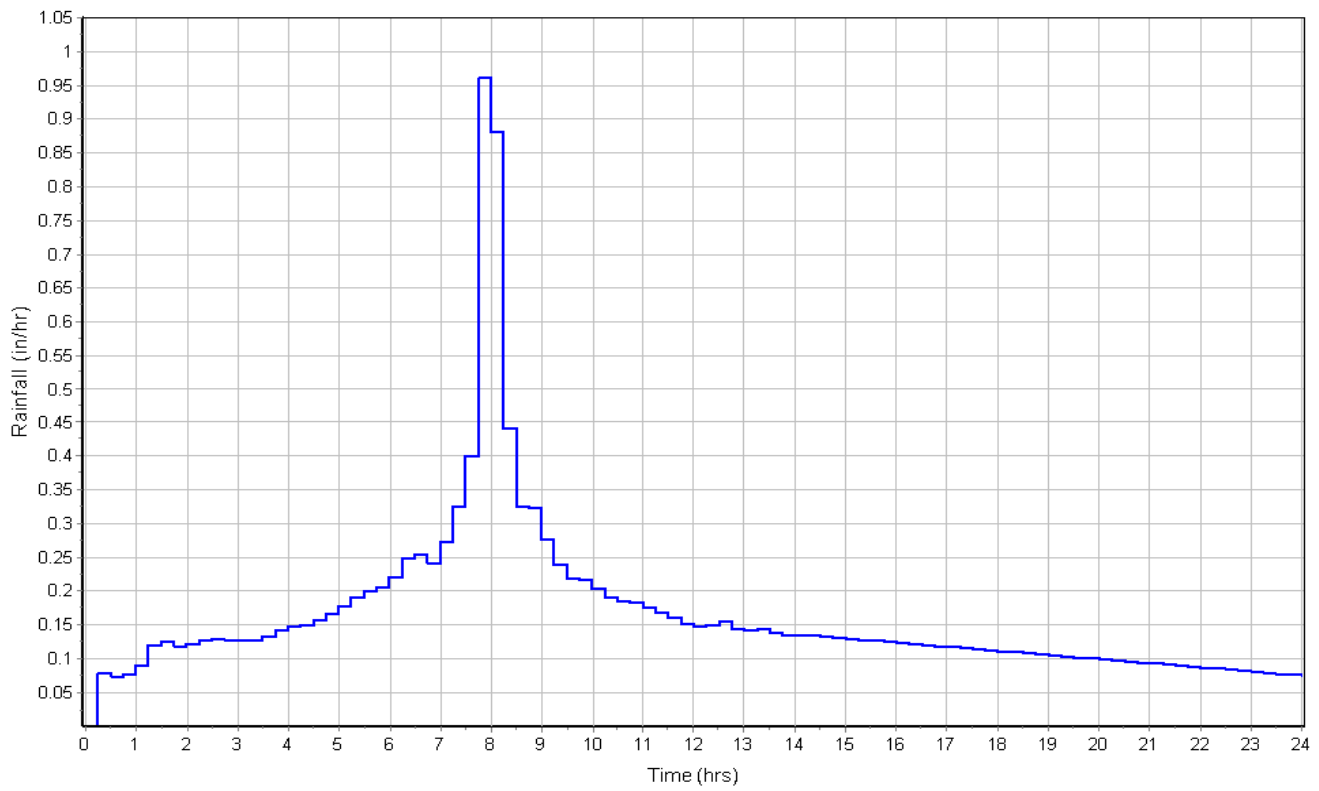
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.23		98

Subbasin Runoff Results

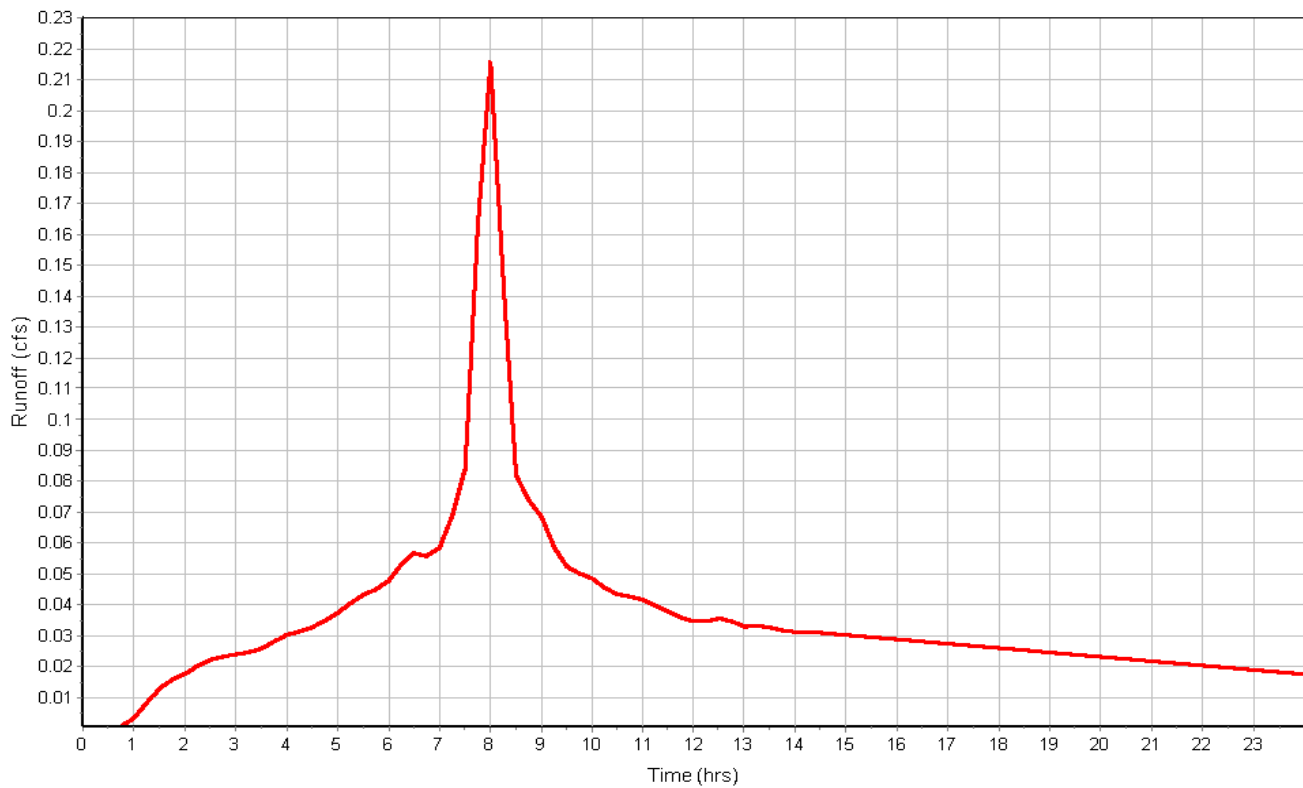
Total Rainfall (in) 3.96
Total Runoff (in) 3.73
Peak Runoff (cfs) 0.22
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : RDCO_46

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : SDCB_035**Input Data**

Area (ac) 0.57
Impervious Area (%) 58.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

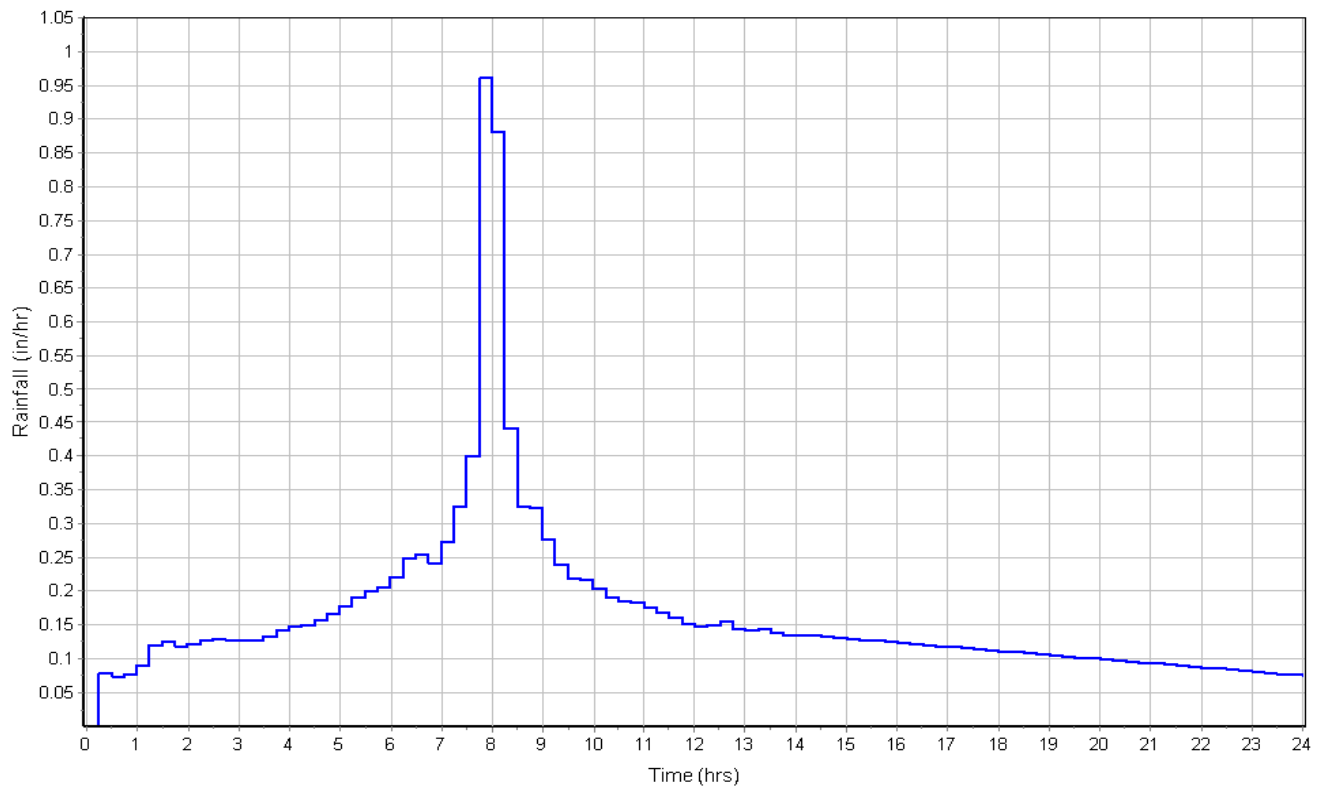
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.57		88.76

Subbasin Runoff Results

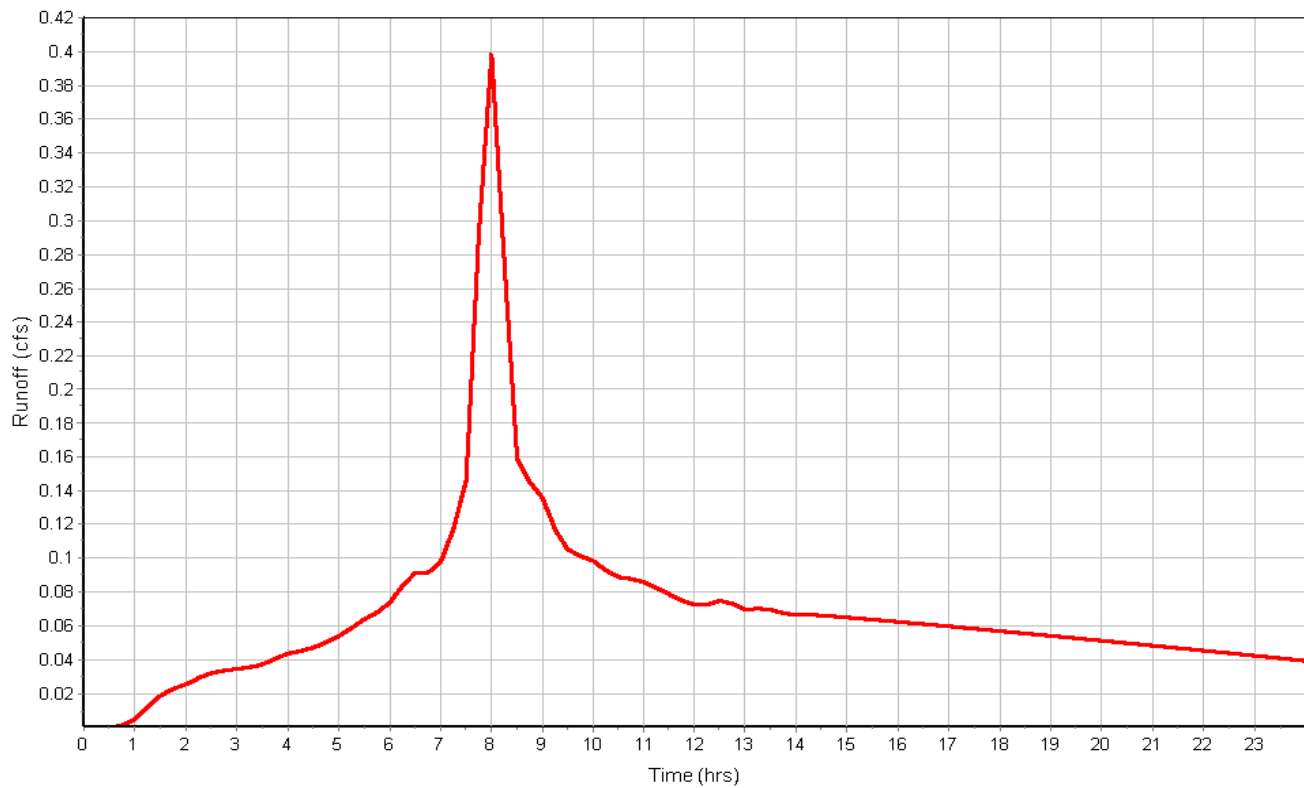
Total Rainfall (in) 3.96
Total Runoff (in) 2.88
Peak Runoff (cfs) 0.40
Weighted Curve Number 88.76
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : SDCB_035

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : SDCB_076**Input Data**

Area (ac) 0.05
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

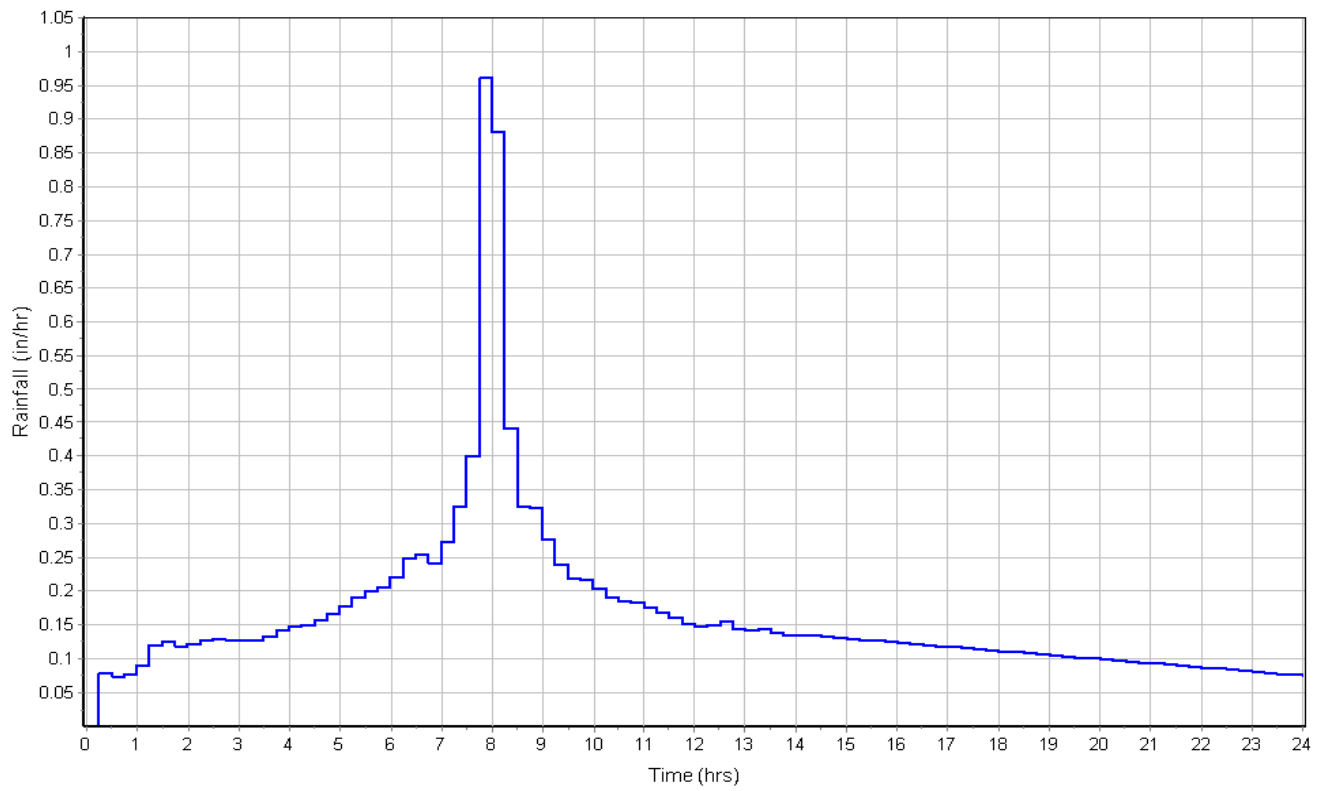
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.05		98

Subbasin Runoff Results

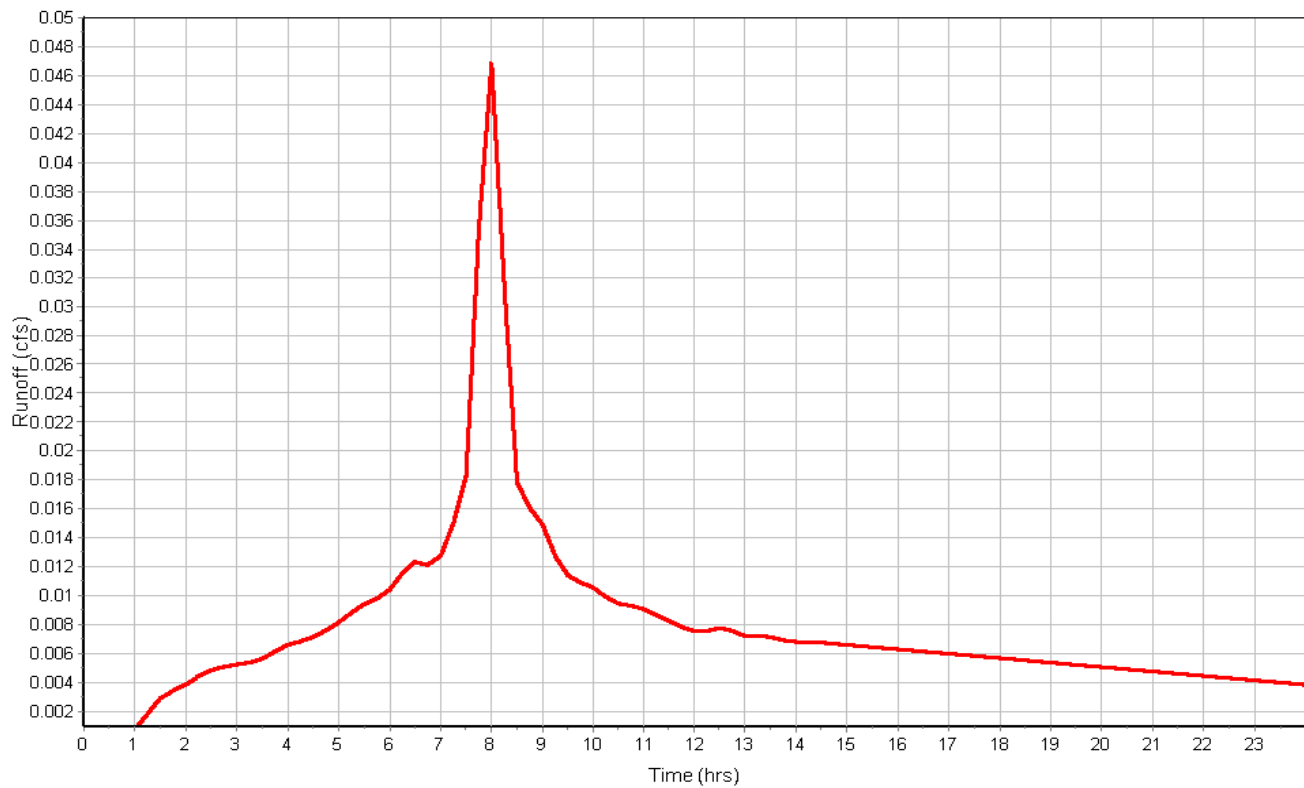
Total Rainfall (in) 3.96
 Total Runoff (in) 3.73
 Peak Runoff (cfs) 0.05
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : SDCB_076

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : SDCB_077**Input Data**

Area (ac) 0.05
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

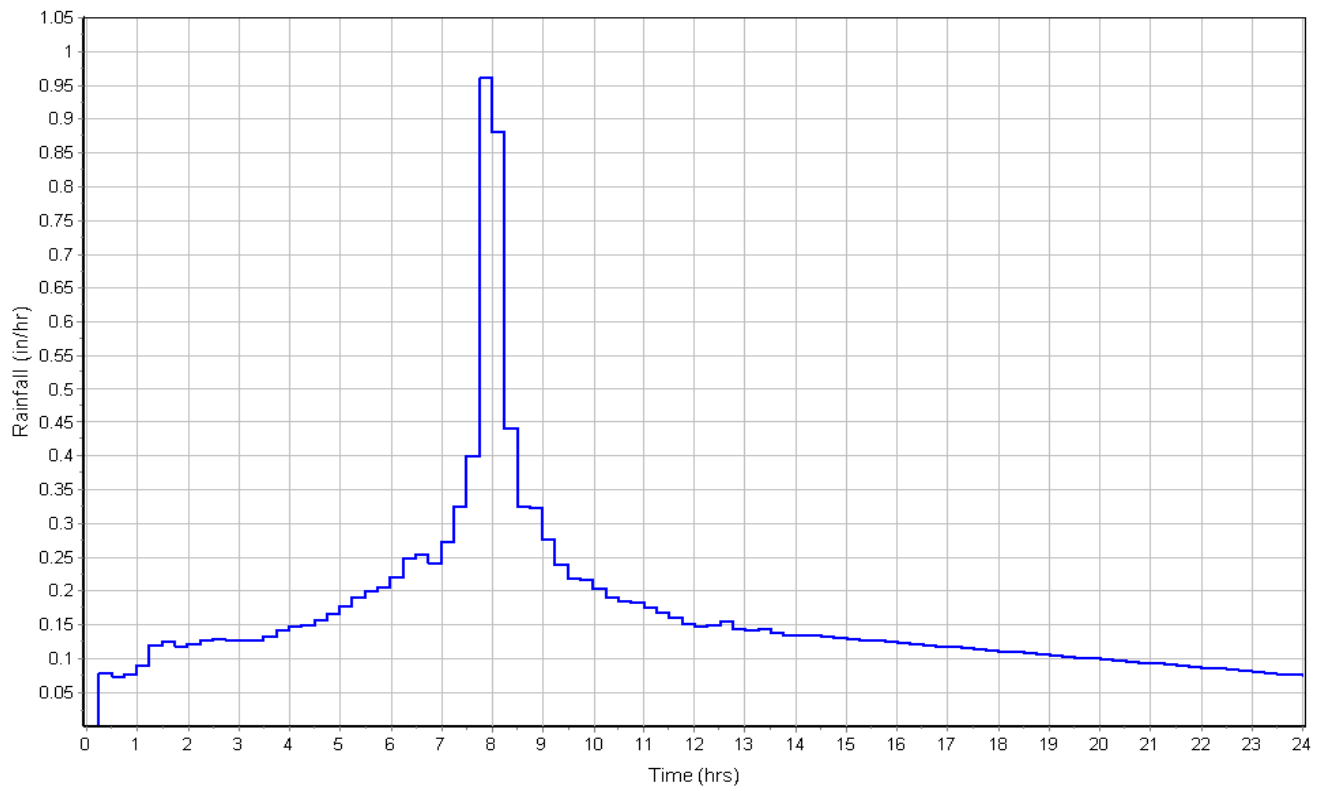
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.05		98

Subbasin Runoff Results

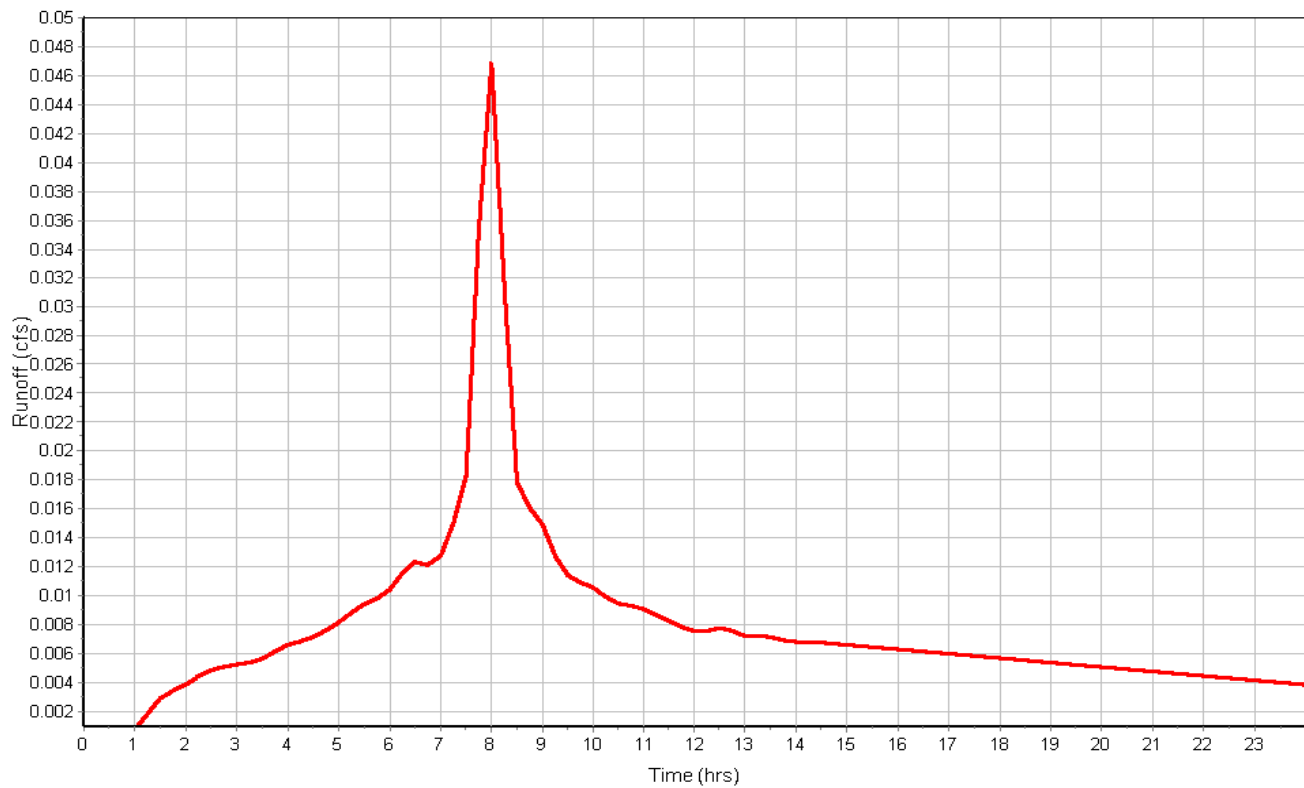
Total Rainfall (in) 3.96
 Total Runoff (in) 3.73
 Peak Runoff (cfs) 0.05
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : SDCB_077

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : SDCB_088**Input Data**

Area (ac) 0.08
 Impervious Area (%) 90.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

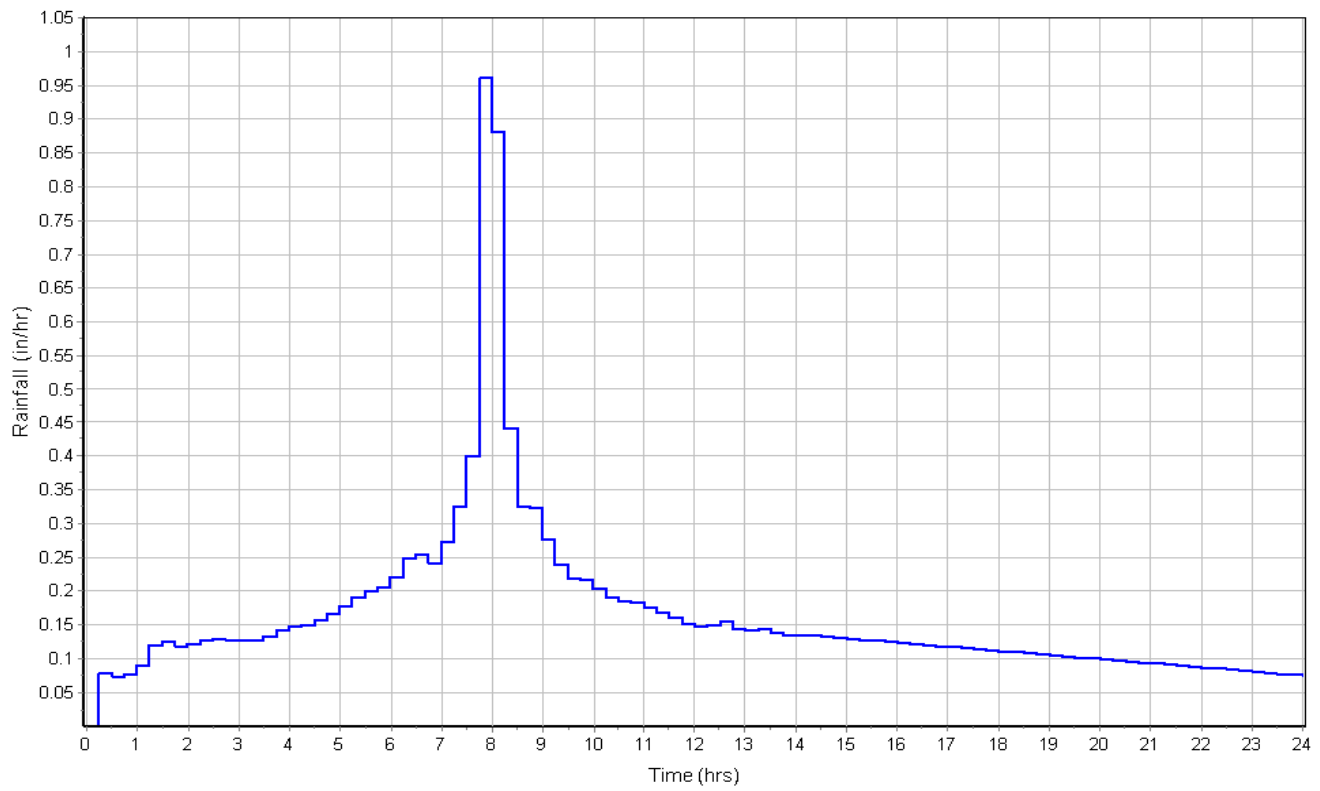
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.08		95.8

Subbasin Runoff Results

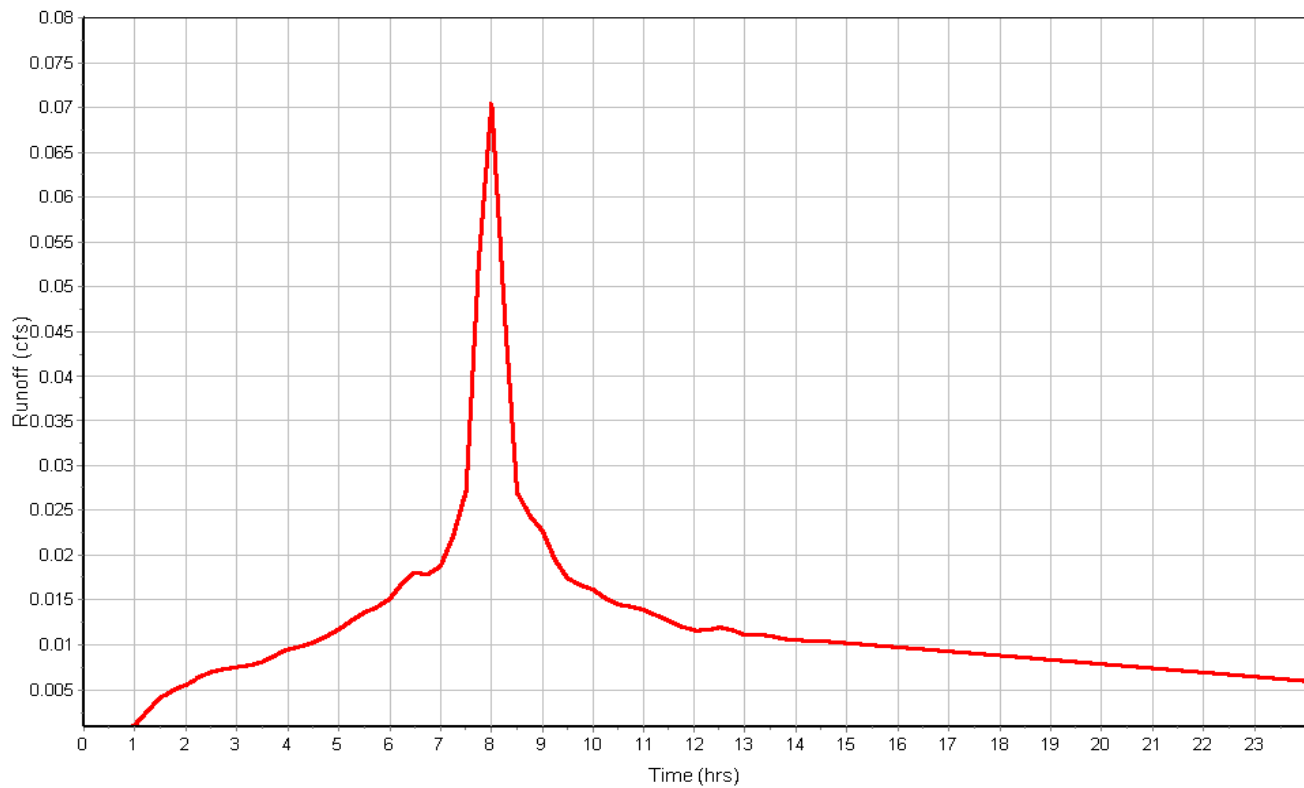
Total Rainfall (in) 3.96
 Total Runoff (in) 3.53
 Peak Runoff (cfs) 0.07
 Weighted Curve Number 95.80
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : SDCB_088

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : SPORT_UNDERDRAINS**Input Data**

Area (ac) 3.73
Impervious Area (%) 100.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

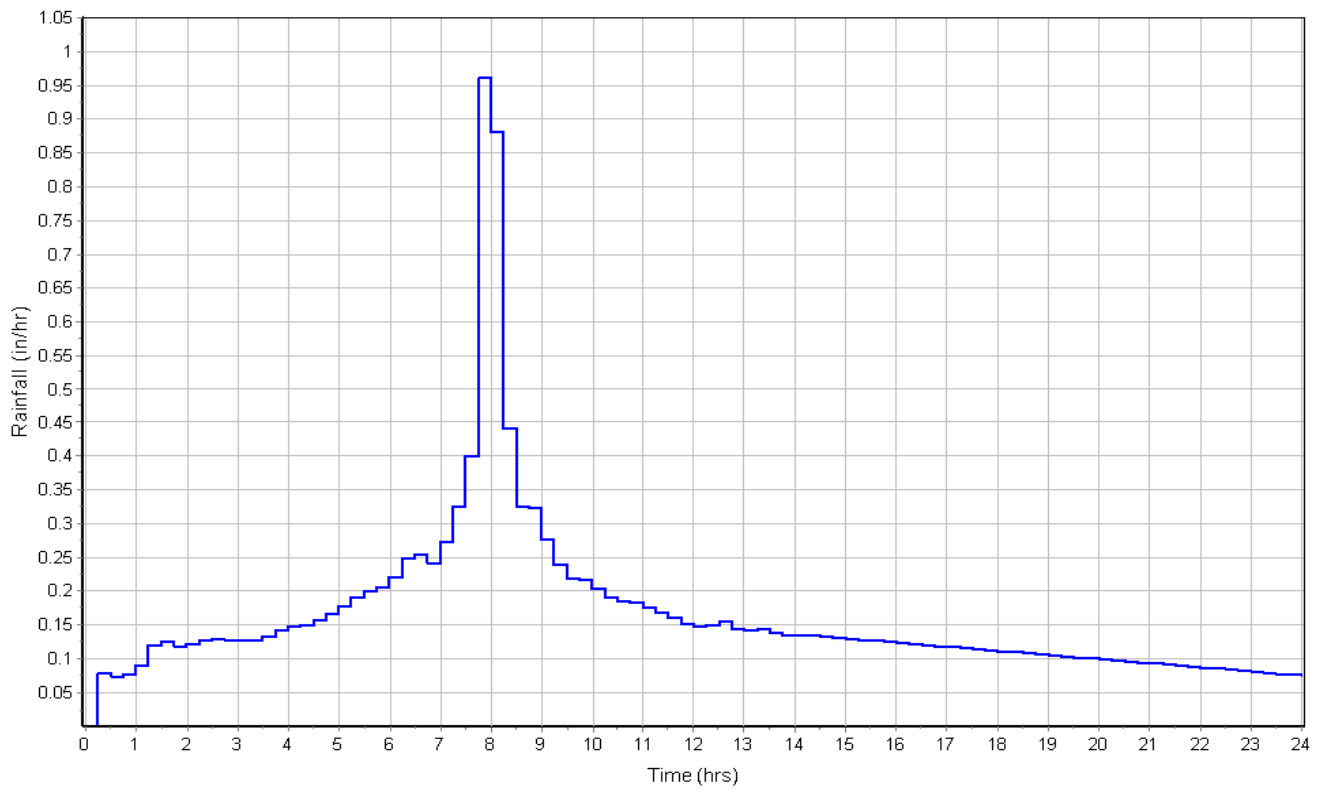
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	3.73		98

Subbasin Runoff Results

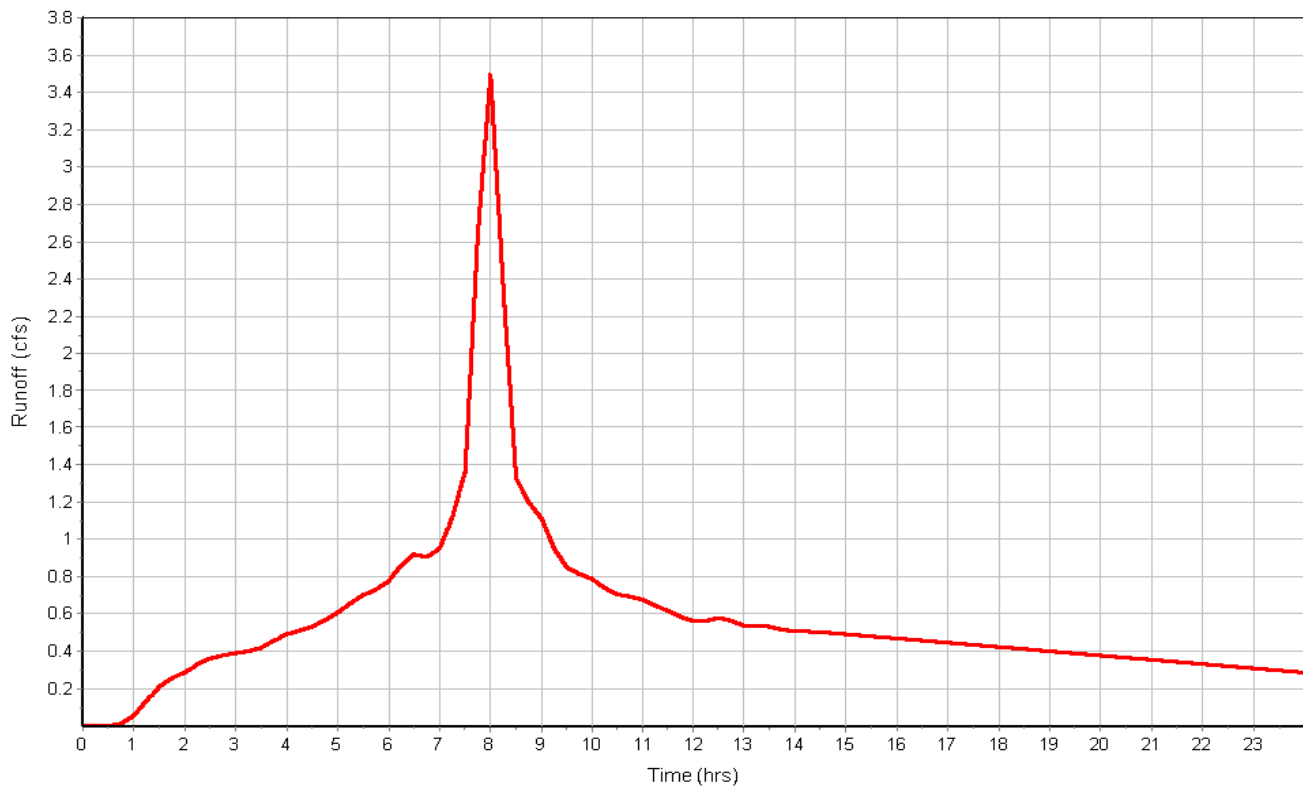
Total Rainfall (in) 3.96
Total Runoff (in) 3.73
Peak Runoff (cfs) 3.50
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : SPORT_UNDERDRAINS

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Sub-124**Input Data**

Area (ac) 0.21
Impervious Area (%) 89.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

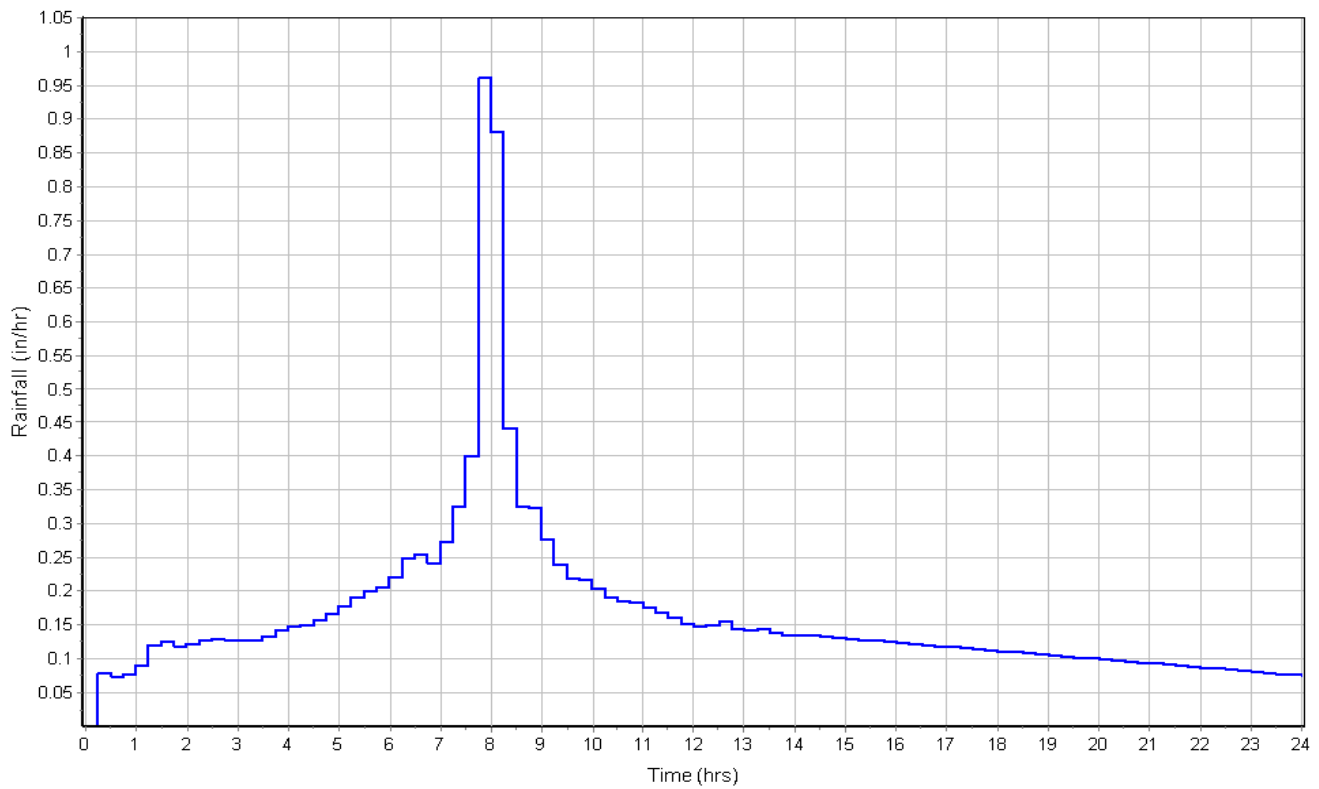
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.21		95.58

Subbasin Runoff Results

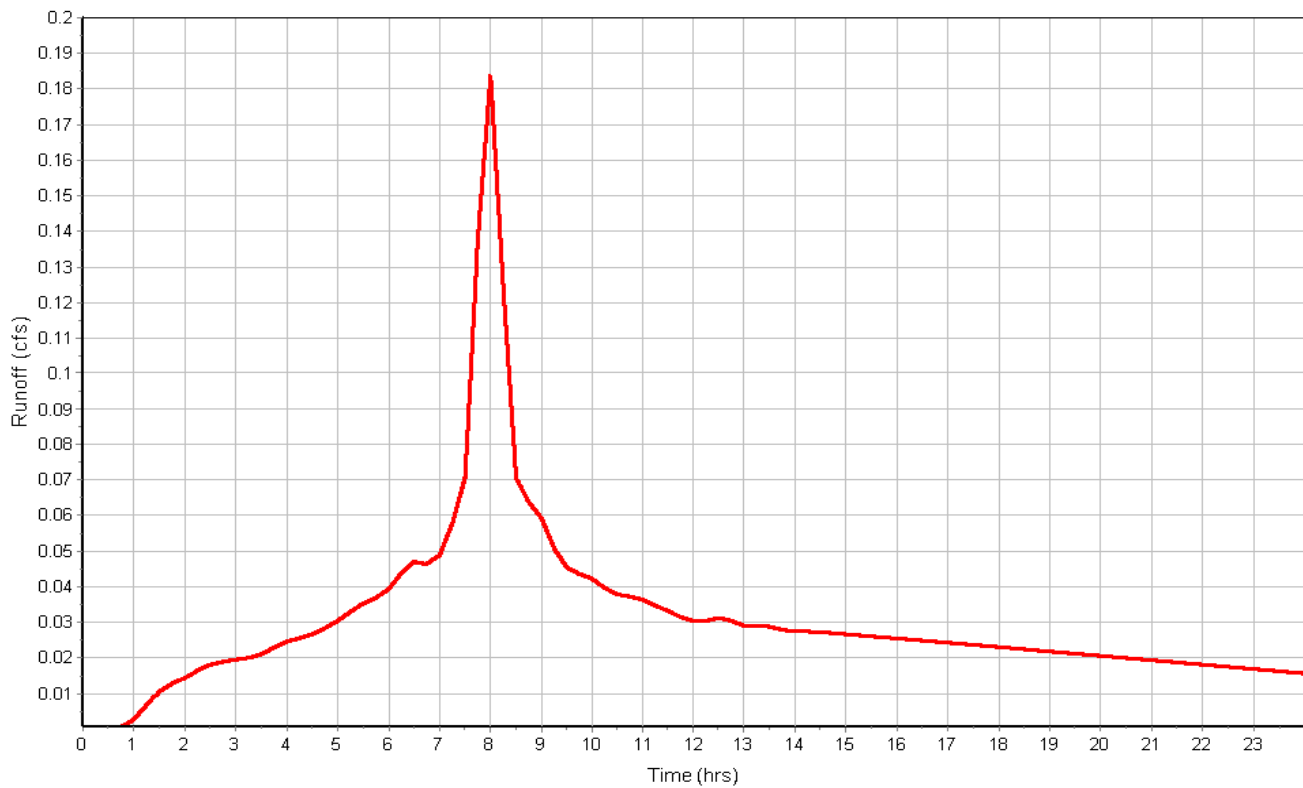
Total Rainfall (in) 3.96
Total Runoff (in) 3.51
Peak Runoff (cfs) 0.18
Weighted Curve Number 95.58
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : Sub-124

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Sub-142**Input Data**

Area (ac) 0.03
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

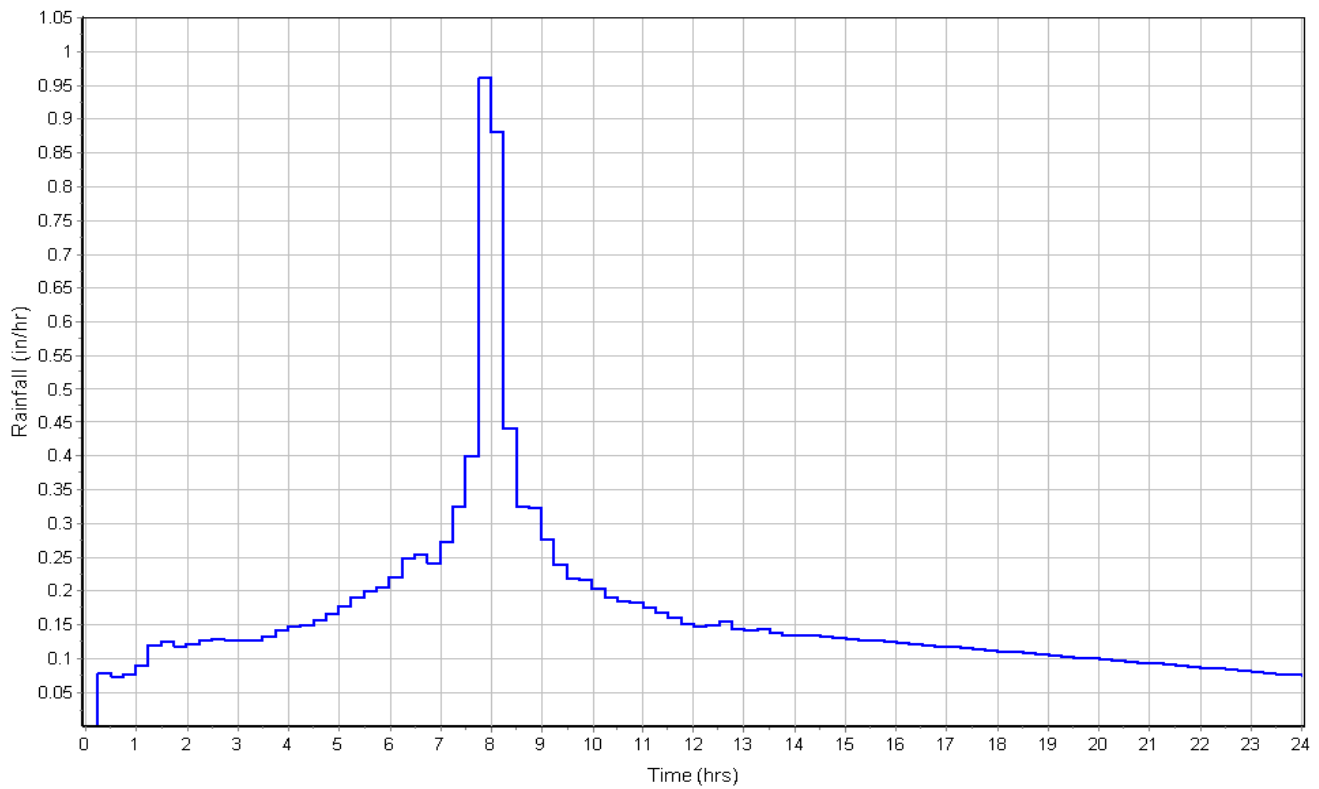
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.03		98

Subbasin Runoff Results

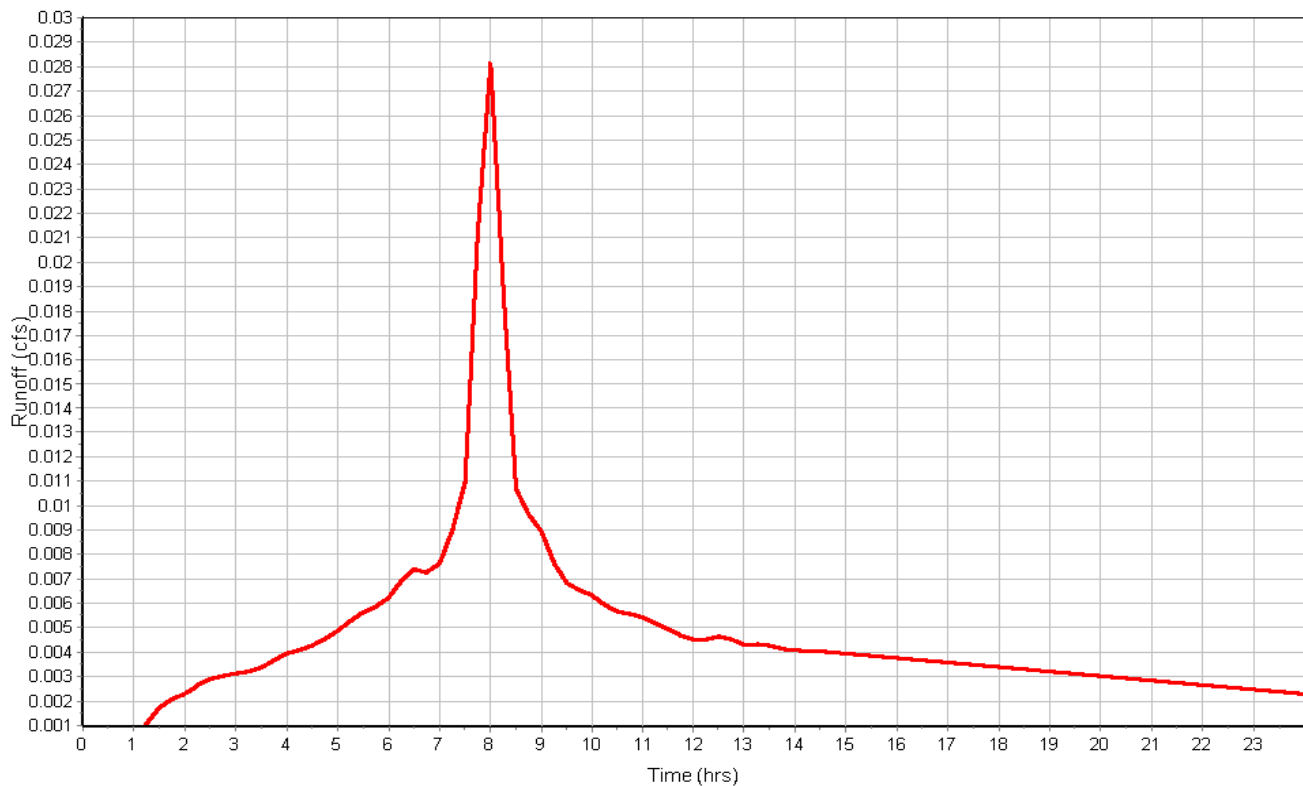
Total Rainfall (in) 3.96
 Total Runoff (in) 3.73
 Peak Runoff (cfs) 0.03
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : Sub-142

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : TCD_#1**Input Data**

Area (ac) 0.23
 Impervious Area (%) 90.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 25-YEAR

Composite Curve Number

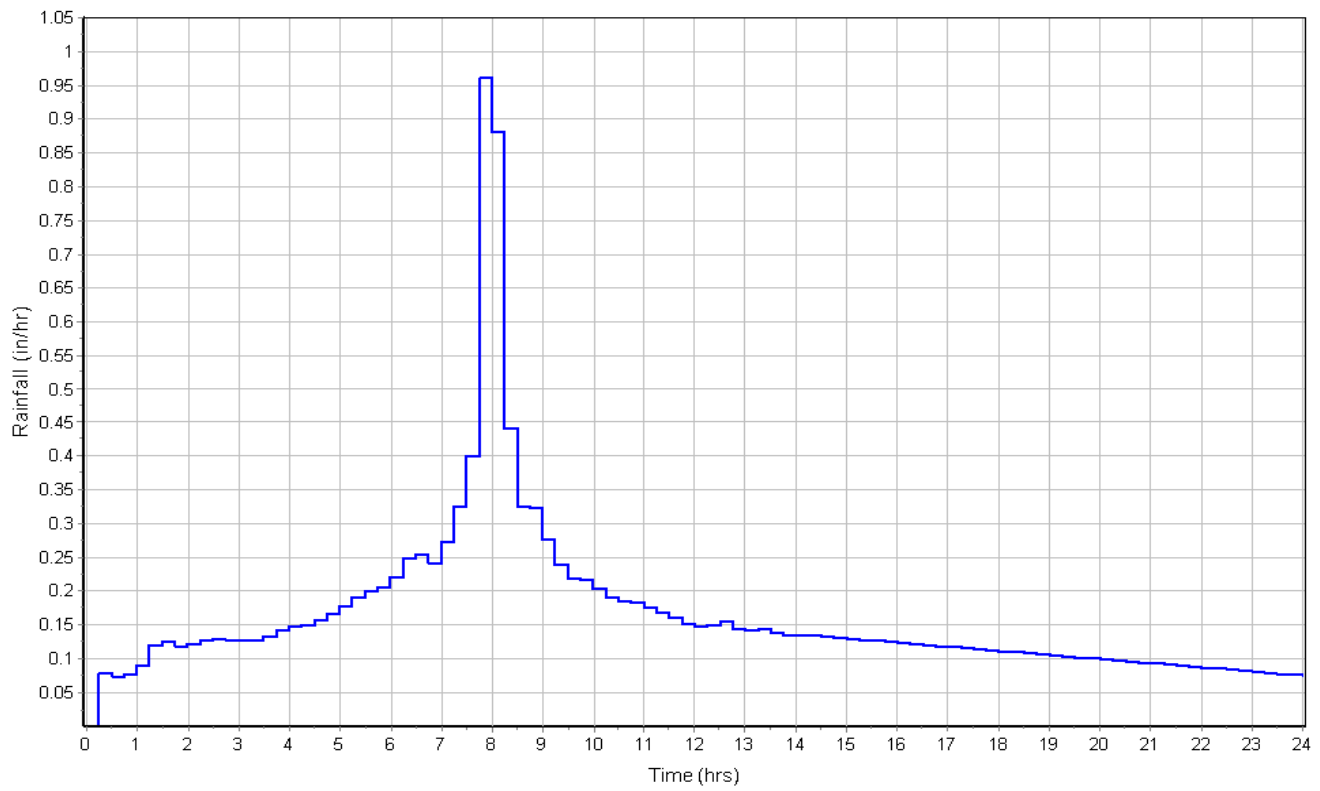
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.23		95.8

Subbasin Runoff Results

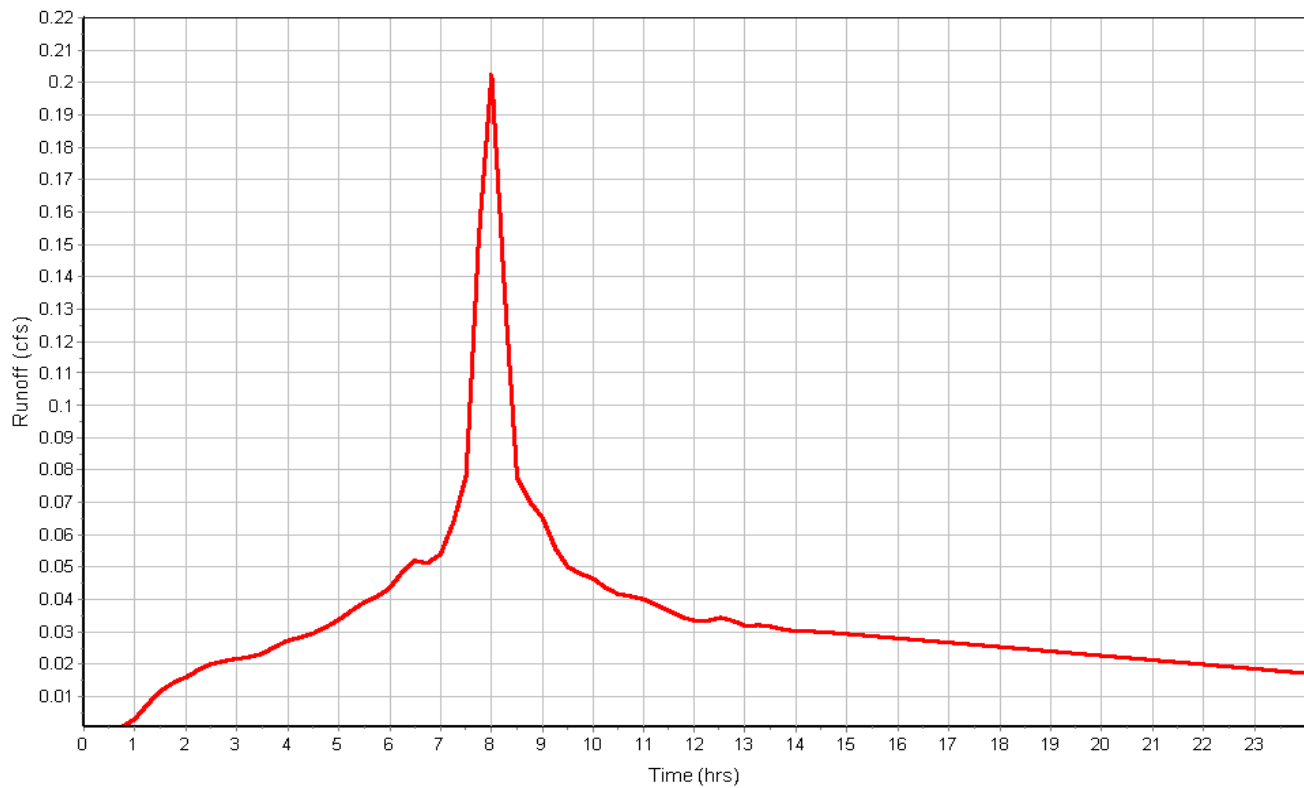
Total Rainfall (in) 3.96
 Total Runoff (in) 3.53
 Peak Runoff (cfs) 0.20
 Weighted Curve Number 95.80
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : TCD_#1

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : TCD_#2**Input Data**

Area (ac) 0.20
Impervious Area (%) 100.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 25-YEAR

Composite Curve Number

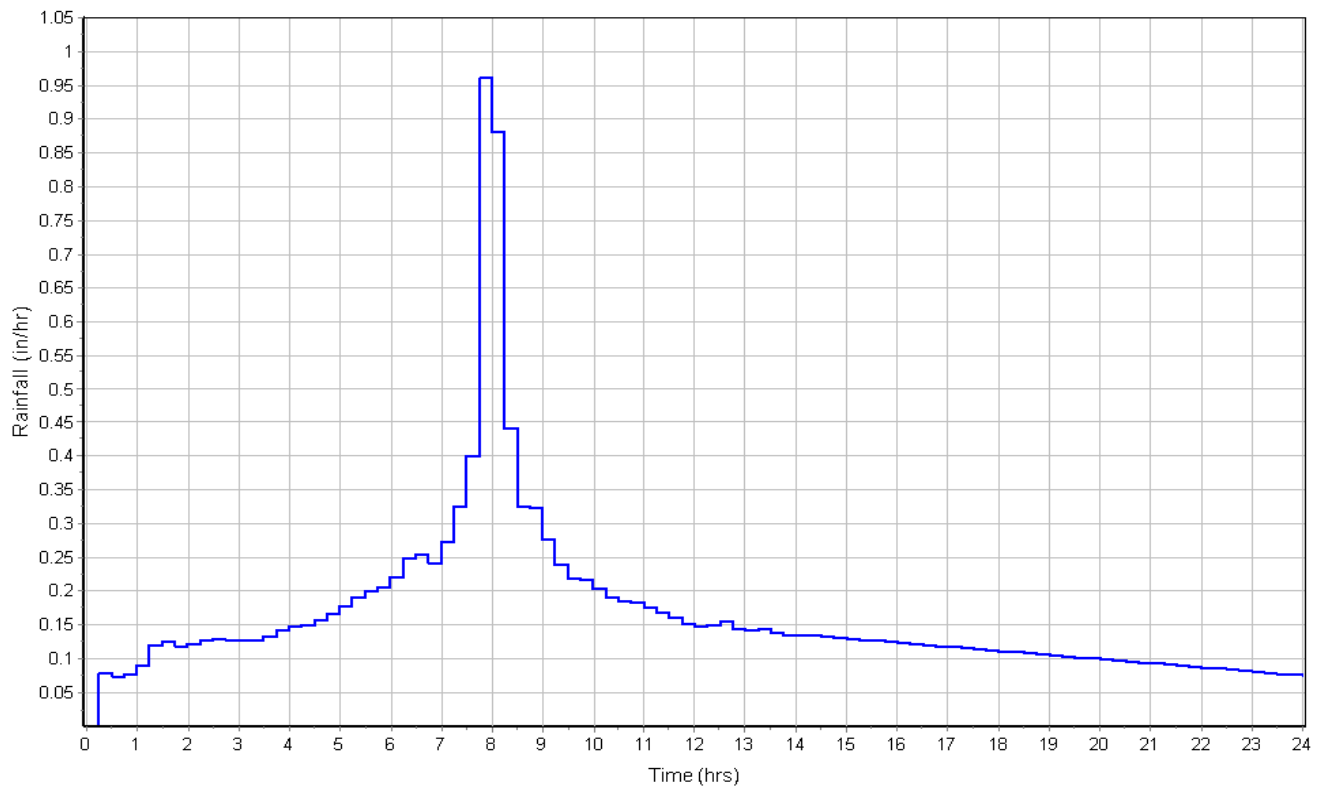
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.20		98

Subbasin Runoff Results

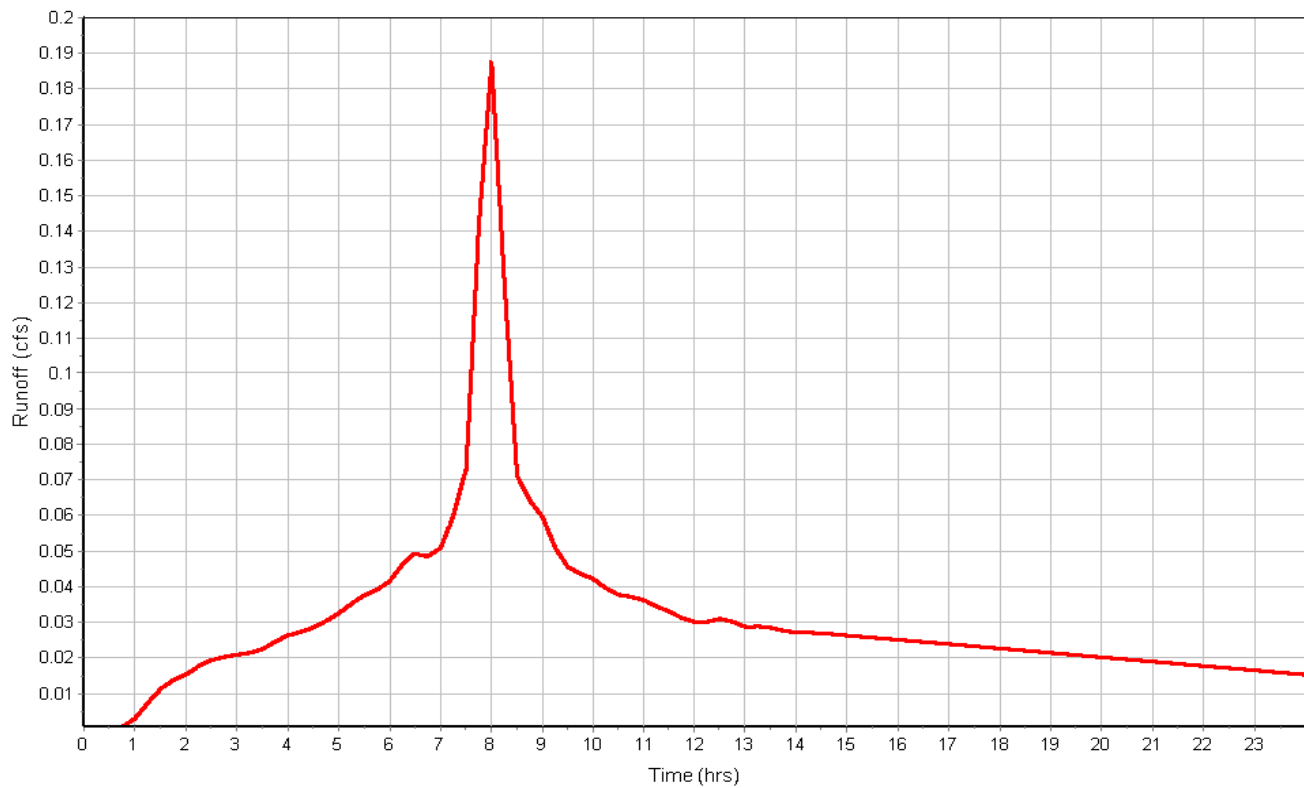
Total Rainfall (in) 3.96
Total Runoff (in) 3.73
Peak Runoff (cfs) 0.19
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : TCD_#2

Rainfall Intensity Graph



Runoff Hydrograph



Junction Input

SN Element ID	Invert Elevation	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft²)	Minimum Pipe Cover (in)
1 AD 01	495.06	497.77	2.71	495.06	0.00	497.77	0.00	0.00	24.52
2 AD 02	487.37	491.86	4.49	487.37	0.00	491.86	0.00	0.00	45.82
3 AD 03	488.01	491.73	3.72	488.01	0.00	491.73	0.00	0.00	36.68
4 AD 04	501.01	503.72	2.71	501.01	0.00	503.72	0.00	0.00	14.12
5 AD 05	506.31	509.02	2.71	506.31	0.00	509.02	0.00	0.00	24.53
6 AD 06	506.20	508.91	2.71	506.20	0.00	508.91	0.00	0.00	28.05
7 AD 07	505.78	508.49	2.71	505.78	0.00	508.49	0.00	0.00	24.52
8 AD 08	506.92	509.63	2.71	506.92	0.00	509.63	0.00	0.00	24.52
9 AD 09	505.94	508.65	2.71	505.94	0.00	508.65	0.00	0.00	24.52
10 AD 10	506.90	509.61	2.71	506.90	0.00	509.61	0.00	0.00	24.52
11 AD 11	498.14	500.85	2.71	498.14	0.00	500.85	0.00	0.00	24.53
12 AD 12	500.98	503.84	2.87	500.98	0.00	503.84	0.00	0.00	26.42
13 AD 13	480.84	482.55	1.71	480.84	0.00	482.55	0.00	0.00	12.53
14 BPU-2	417.22	425.26	8.05	417.22	0.00	425.26	0.00	0.00	48.54
15 BPU-3	471.65	490.26	18.61	471.65	0.00	490.26	0.00	0.00	185.30
16 BPU-4	491.11	501.77	10.66	491.11	0.00	501.77	0.00	0.00	89.93
17 BPU-5	481.13	488.40	7.27	481.13	0.00	488.40	0.00	0.00	63.24
18 RDCO 01	500.60	509.93	9.33	500.60	0.00	509.93	0.00	0.00	99.94
19 RDCO 02	502.70	509.96	7.27	502.70	0.00	509.96	0.00	0.00	75.19
20 RDCO 03	502.88	509.98	7.10	502.88	0.00	509.98	0.00	0.00	73.24
21 RDCO 04	502.95	509.98	7.03	502.95	0.00	509.98	0.00	0.00	72.41
22 RDCO 05	503.24	509.92	6.68	503.24	0.00	509.92	0.00	0.00	68.21
23 RDCO 06	503.50	509.89	6.39	503.50	0.00	509.89	0.00	0.00	64.62
24 RDCO 07	504.39	509.94	5.55	504.39	0.00	509.94	0.00	0.00	54.64
25 RDCO 08	504.51	509.96	5.45	504.51	0.00	509.96	0.00	0.00	53.37
26 RDCO 09	504.97	509.98	5.01	504.97	0.00	509.98	0.00	0.00	52.11
27 RDCO 10	505.25	509.93	4.69	505.25	0.00	509.93	0.00	0.00	48.27
28 RDCO 11	505.85	509.84	3.98	505.85	0.00	509.84	0.00	0.00	39.78
29 RDCO 12	506.13	509.93	3.80	506.13	0.00	509.93	0.00	0.00	37.60
30 RDCO 13	506.35	509.91	3.56	506.35	0.00	509.91	0.00	0.00	34.70
31 RDCO 14	506.68	509.95	3.27	506.68	0.00	509.95	0.00	0.00	33.19
32 RDCO 15	507.40	509.92	2.52	507.40	0.00	509.92	0.00	0.00	24.20
33 RDCO 16	502.88	509.62	6.74	502.88	0.00	509.62	0.00	0.00	68.89
34 RDCO 17	503.04	509.95	6.92	503.04	0.00	509.95	0.00	0.00	70.98
35 RDCO 18	503.31	509.95	6.64	503.31	0.00	509.95	0.00	0.00	67.70
36 RDCO 19	503.65	509.27	5.62	503.65	0.00	509.27	0.00	0.00	55.42
37 RDCO 20	504.06	508.40	4.34	504.06	0.00	508.40	0.00	0.00	40.04
38 RDCO 21	504.60	509.96	5.36	504.60	0.00	509.96	0.00	0.00	52.35
39 RDCO 22	505.78	509.94	4.16	505.78	0.00	509.94	0.00	0.00	41.97
40 RDCO 23	506.01	509.91	3.90	506.01	0.00	509.91	0.00	0.00	38.85
41 RDCO 24	506.24	509.92	3.68	506.24	0.00	509.92	0.00	0.00	36.17
42 RDCO 25	507.40	509.92	2.52	507.40	0.00	509.92	0.00	0.00	24.19
43 RDCO 26	504.64	509.96	5.31	504.64	0.00	509.96	0.00	0.00	57.76
44 RDCO 27	498.14	503.90	5.76	498.14	0.00	503.90	0.00	0.00	61.12
45 RDCO 27A	497.78	503.90	6.12	497.78	0.00	503.90	0.00	0.00	65.44
46 RDCO 28	498.18	503.66	5.48	498.18	0.00	503.66	0.00	0.00	57.72
47 RDCO 29	498.63	502.86	4.23	498.63	0.00	502.86	0.00	0.00	42.70
48 RDCO 30	499.40	503.96	4.56	499.40	0.00	503.96	0.00	0.00	46.71
49 RDCO 31	499.51	503.97	4.46	499.51	0.00	503.97	0.00	0.00	45.48
50 RDCO 32	499.67	503.97	4.31	499.67	0.00	503.97	0.00	0.00	43.68
51 RDCO 33	500.77	503.93	3.16	500.77	0.00	503.93	0.00	0.00	31.91
52 RDCO 34	501.21	503.92	2.70	501.21	0.00	503.92	0.00	0.00	26.45
53 RDCO 35	500.83	503.98	3.15	500.83	0.00	503.98	0.00	0.00	31.84
54 RDCO 36	501.09	503.94	2.85	501.09	0.00	503.94	0.00	0.00	28.20
55 RDCO 37	501.46	503.95	2.49	501.46	0.00	503.95	0.00	0.00	23.93
56 RDCO 38	482.18	489.94	7.76	482.18	0.00	489.94	0.00	0.00	85.14
57 RDCO 39	485.50	489.92	4.42	485.50	0.00	489.92	0.00	0.00	47.08
58 RDCO 40	485.83	489.95	4.13	485.83	0.00	489.95	0.00	0.00	43.55
59 RDCO 41	486.04	489.93	3.89	486.04	0.00	489.93	0.00	0.00	40.66
60 RDCO 42	487.42	489.94	2.52	487.42	0.00	489.94	0.00	0.00	24.22
61 RDCO 43	487.38	489.94	2.55	487.38	0.00	489.94	0.00	0.00	24.65
62 RDCO 44	487.46	490.63	3.17	487.46	0.00	490.63	0.00	0.00	32.08
63 RDCO 45	502.19	505.80	3.61	502.19	0.00	505.80	0.00	0.00	37.31
64 RDCO 46	503.43	505.94	2.52	503.43	0.00	505.94	0.00	0.00	24.20
65 SDCB 001	406.15	415.54	9.39	408.15	2.00	415.54	0.00	0.00	64.72
66 SDCB 002	406.89	415.61	8.73	408.89	2.00	415.61	0.00	0.00	62.70
67 SDCB 003	406.97	415.28	8.31	408.97	2.00	415.28	0.00	0.00	55.69
68 SDCB 004	414.28	419.33	5.05	416.28	2.00	419.33	0.00	0.00	24.60
69 SDCB 005	414.68	419.74	5.06	416.68	2.00	419.74	0.00	0.00	24.67
70 SDCB 006	407.21	414.78	7.57	409.21	2.00	414.78	0.00	0.00	48.84
71 SDCB 007	405.31	416.01	10.71	409.31	4.00	416.01	0.00	0.00	0.00
72 SDCB 008	410.55	415.54	4.99	412.55	2.00	415.54	0.00	0.00	23.83
73 SDCB 009	410.59	415.62	5.03	412.59	2.00	415.62	0.00	0.00	24.37
74 SDCB 010	419.28	426.64	7.36	421.28	2.00	426.64	0.00	0.00	52.31
75 SDCB 011	428.28	433.23	4.96	430.28	2.00	433.23	0.00	0.00	23.47
76 SDCB 012	428.64	433.69	5.05	430.64	2.00	433.69	0.00	0.00	24.60
77 SDCB 013	450.12	455.60	5.48	452.12	2.00	455.60	0.00	0.00	29.74
78 SDCB 014	450.47	455.52	5.05	452.47	2.00	455.52	0.00	0.00	24.60
79 SDCB 015	470.99	476.05	5.07	472.99	2.00	476.05	0.00	0.00	24.79
80 SDCB 016	471.30	476.35	5.05	473.30	2.00	476.35	0.00	0.00	24.60
81 SDCB 017	414.58	423.39	8.82	416.58	2.00	423.39	0.00	0.00	69.79
82 SDCB 018	416.24	428.35	12.11	420.24	4.00	428.35	0.00	0.00	0.00

Junction Input

SN Element ID	Invert Elevation	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft²)	Minimum Pipe Cover (in)
83 SDCB 019	422.57	427.90	5.33	424.57	2.00	427.90	0.00	0.00	27.94
84 SDCB 020	422.86	427.66	4.81	424.86	2.00	427.66	0.00	100.00	21.67
85 SDCB 021	423.80	428.27	4.46	425.80	2.00	428.27	0.00	100.00	21.53
86 SDCB 022	425.37	430.48	5.11	427.37	2.00	430.48	0.00	0.00	25.30
87 SDCB 023	425.66	430.72	5.06	427.66	2.00	430.72	0.00	0.00	24.74
88 SDCB 024	440.11	444.85	4.74	442.11	2.00	444.85	0.00	0.00	24.82
89 SDCB 025	440.64	445.37	4.73	442.64	2.00	445.37	0.00	0.00	24.81
90 SDCB 026	451.11	455.82	4.71	453.11	2.00	455.82	0.00	0.00	24.52
91 SDCB 027	456.94	461.65	4.71	458.94	2.00	461.65	0.00	0.00	24.52
92 SDCB 028	463.00	467.71	4.71	465.00	2.00	467.71	0.00	0.00	24.52
93 SDCB 029	474.56	479.27	4.71	476.56	2.00	479.27	0.00	0.00	24.52
94 SDCB 030	482.83	487.54	4.71	484.83	2.00	487.54	0.00	0.00	24.52
95 SDCB 031	487.54	492.25	4.71	489.54	2.00	492.25	0.00	0.00	24.52
96 SDCB 032	497.55	502.26	4.71	499.55	2.00	502.26	0.00	0.00	24.52
97 SDCB 033	500.07	504.78	4.71	502.07	2.00	504.78	0.00	0.00	24.52
98 SDCB 034	500.46	505.17	4.71	502.46	2.00	505.17	0.00	0.00	24.53
99 SDCB 035	499.95	504.66	4.71	501.95	2.00	504.66	0.00	100.00	24.52
100 SDCB 035A	503.77	508.53	4.76	505.77	2.00	508.53	0.00	0.00	25.12
101 SDCB 036	456.61	461.58	4.97	458.61	2.00	461.58	0.00	0.00	27.62
102 SDCB 037	456.85	461.58	4.73	458.85	2.00	461.58	0.00	0.00	24.81
103 SDCB 038	461.33	477.49	16.16	463.33	2.00	477.49	0.00	0.00	151.91
104 SDCB 039	463.10	478.99	15.89	465.10	2.00	478.99	0.00	0.00	148.72
105 SDCB 040	464.40	479.77	15.37	466.40	2.00	479.77	0.00	0.00	142.39
106 SDCB 041	464.93	481.73	16.80	466.93	2.00	481.73	0.00	0.00	0.00
107 SDCB 042	466.34	482.17	15.83	468.34	2.00	482.17	0.00	0.00	147.97
108 SDCB 043	467.05	480.00	12.95	469.05	2.00	480.00	0.00	0.00	113.36
109 SDCB 044	468.44	473.51	5.07	470.44	2.00	473.51	0.00	0.00	24.89
110 SDCB 045	469.38	481.47	12.09	471.38	2.00	481.47	0.00	0.00	109.13
111 SDCB 046	477.20	481.91	4.71	479.20	2.00	481.91	0.00	0.00	24.52
112 SDCB 047	475.42	480.44	5.01	477.42	2.00	480.44	0.00	0.00	28.13
113 SDCB 048	475.50	480.22	4.71	477.50	2.00	480.22	0.00	0.00	24.53
114 SDCB 049	480.87	485.88	5.01	482.87	2.00	485.88	0.00	0.00	28.12
115 SDCB 050	480.95	485.66	4.71	482.95	2.00	485.66	0.00	0.00	24.52
116 SDCB 051	486.91	492.07	5.16	488.91	2.00	492.07	0.00	0.00	29.96
117 SDCB 052	487.59	492.30	4.71	489.59	2.00	492.30	0.00	0.00	24.53
118 SDCB 053	497.82	502.53	4.71	499.82	2.00	502.53	0.00	0.00	24.52
119 SDCB 054	475.33	481.83	6.50	477.33	2.00	481.83	0.00	0.00	46.00
120 SDCB 055	476.05	482.04	5.99	478.05	2.00	482.04	0.00	0.00	39.84
121 SDCB 056	484.00	490.50	6.50	486.00	2.00	490.50	0.00	0.00	27.16
122 SDCB 057	485.57	490.28	4.71	487.57	2.00	490.28	0.00	0.00	43.37
123 SDCB 058	493.33	498.46	5.12	495.33	2.00	498.46	0.00	0.00	27.34
124 SDCB 059	493.51	498.22	4.71	495.51	2.00	498.22	0.00	0.00	26.67
125 SDCB 060	495.08	499.79	4.71	487.08	-8.00	499.79	0.00	0.00	24.53
126 SDCB 061	468.37	498.87	30.49	470.37	2.00	498.87	0.00	0.00	329.92
127 SDCB 062	468.58	495.18	26.60	470.58	2.00	495.18	0.00	0.00	283.14
128 SDCB 063	468.96	494.35	25.39	470.96	2.00	494.35	0.00	0.00	265.48
129 SDCB 064	469.22	488.25	19.03	471.22	2.00	488.25	0.00	0.00	187.46
130 SDCB 065	469.63	489.77	20.14	471.63	2.00	489.77	0.00	0.00	205.72
131 SDCB 066	469.99	495.23	25.24	473.99	4.00	495.23	0.00	0.00	0.00
132 SDCB 067	477.83	494.68	16.85	479.83	2.00	494.68	0.00	0.00	166.14
133 SDCB 068	478.01	489.66	11.64	480.01	2.00	489.66	0.00	0.00	103.72
134 SDCB 069	478.46	489.32	10.86	480.46	2.00	489.32	0.00	0.00	98.28
135 SDCB 070	478.77	486.75	7.98	480.77	2.00	486.75	0.00	0.00	63.78
136 SDCB 071	484.97	490.27	5.30	486.97	2.00	490.27	0.00	0.00	31.62
137 SDCB 072	485.55	490.26	4.71	487.55	2.00	490.26	0.00	0.00	24.52
138 SDCB 073	485.76	490.47	4.71	487.76	2.00	490.47	0.00	0.00	24.52
139 SDCB 074	478.74	484.54	5.80	480.74	2.00	484.54	0.00	0.00	33.61
140 SDCB 075	479.00	485.62	6.62	481.00	2.00	485.62	0.00	0.00	19.48
141 SDCB 076	479.12	488.91	9.79	481.12	2.00	488.91	0.00	0.00	69.49
142 SDCB 077	479.87	490.77	10.90	481.87	2.00	490.77	0.00	0.00	91.12
143 SDCB 078	479.83	492.39	12.56	481.83	2.00	492.39	0.00	0.00	108.74
144 SDCB 079	480.44	500.94	20.50	482.44	2.00	500.94	0.00	0.00	204.02
145 SDCB 080	480.83	504.63	23.80	482.83	2.00	504.63	0.00	0.00	243.59
146 SDCB 081	481.24	504.68	23.44	483.24	2.00	504.68	0.00	0.00	239.26
147 SDCB 082	481.67	504.85	23.18	483.67	2.00	504.85	0.00	0.00	236.18
148 SDCB 083	483.69	496.97	13.28	485.69	2.00	496.97	0.00	0.00	117.37
149 SDCB 084	485.76	491.38	5.62	487.76	2.00	491.38	0.00	0.00	25.40
150 SDCB 084A	484.33	495.07	10.73	486.33	2.00	495.07	0.00	0.00	86.81
151 SDCB 085	489.01	507.17	18.16	491.01	2.00	507.17	0.00	0.00	175.87
152 SDCB 086	489.19	506.62	17.43	491.19	2.00	506.62	0.00	0.00	167.11
153 SDCB 087	494.54	507.06	12.52	498.54	4.00	507.06	0.00	0.00	0.00
154 SDCB 088	496.57	507.04	10.47	498.57	2.00	507.04	0.00	0.00	83.69
155 SDCB 089	500.77	505.62	4.85	502.77	2.00	505.62	0.00	0.00	26.16
156 SDCB 090	502.16	507.12	4.96	504.16	2.00	507.12	0.00	0.00	27.54
157 SDCB 091	502.41	507.12	4.71	504.41	2.00	507.12	0.00	0.00	24.52
158 SDCB 092	496.43	509.32	12.89	498.43	2.00	509.32	0.00	0.00	103.01
159 SDCB 093	499.02	507.16	8.14	501.02	2.00	507.16	0.00	0.00	61.65
160 SDCB 094	501.20	505.91	4.71	503.20	2.00	505.91	0.00	0.00	24.52
161 SDCB 095	501.57	506.29	4.71	503.57	2.00	506.29	0.00	0.00	24.53
162 SDCB 096	506.33	509.47	3.14	506.33	0.00	509.47	0.00	0.00	29.68
163 SDCB 097	506.76	509.47	2.71	506.76	0.00	509.47	0.00	0.00	24.52
164 SDCB 098	489.33	502.02	12.69	493.33	4.00	502.02	0.00	0.00	0.00

Junction Input

SN Element ID	Invert Elevation	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft²)	Minimum Pipe Cover (in)
165 SDCB 099	492.51	503.14	10.64	494.51	2.00	503.14	0.00	0.00	91.62
166 SDCB 100	497.28	502.86	5.59	499.28	2.00	502.86	0.00	0.00	35.07
167 SDCB 101	497.64	502.35	4.71	499.64	2.00	502.35	0.00	0.00	24.52
168 SDCB 102	493.05	502.87	9.83	495.05	2.00	502.87	0.00	0.00	81.90
169 SDCB 103	495.98	502.25	6.27	497.98	2.00	502.25	0.00	0.00	43.25
170 SDCB 104	496.44	501.15	4.71	498.44	2.00	501.15	0.00	0.00	24.52
171 SDCB 105	493.38	503.07	9.68	495.38	2.00	503.07	0.00	0.00	80.20
172 SDCB 106	493.98	502.46	8.48	495.98	2.00	502.46	0.00	0.00	65.76
173 SDCB 107	494.85	502.08	7.22	496.85	2.00	502.08	0.00	0.00	50.66
174 SDCB 108	496.80	501.56	4.76	498.80	2.00	501.56	0.00	0.00	25.06
175 SDCB 109	498.93	503.65	4.72	500.93	2.00	503.65	0.00	0.00	24.64
176 SDCB 110	501.34	506.06	4.72	503.34	2.00	506.06	0.00	0.00	24.64
177 SDCB 111	487.19	492.57	5.38	489.19	2.00	492.57	0.00	0.00	28.56
178 SDCB 112	491.75	504.69	12.94	493.75	2.00	504.69	0.00	0.00	119.30
179 SDCB 113	491.64	504.38	12.74	495.64	4.00	504.38	0.00	0.00	0.00
180 SDCB 114	497.80	507.07	9.28	499.80	2.00	507.07	0.00	0.00	75.31
181 SDCB 115	498.40	506.66	8.26	500.40	2.00	506.66	0.00	0.00	67.12
182 SDCB 116	498.88	504.70	5.82	500.88	2.00	504.70	0.00	0.00	37.80
183 SDCB 117	499.03	503.74	4.71	501.03	2.00	503.74	0.00	0.00	24.52
184 SDCB 118	498.64	509.36	10.73	500.64	2.00	509.36	0.00	0.00	96.70
185 SDCB 119	498.94	507.15	8.21	500.94	2.00	507.15	0.00	0.00	62.47
186 SDCB 120	499.20	505.68	6.48	501.20	2.00	505.68	0.00	0.00	41.76
187 SDCB 121	499.95	506.54	6.59	501.95	2.00	506.54	0.00	0.00	47.07
188 SDCB 122	502.76	507.47	4.71	504.76	2.00	507.47	0.00	0.00	24.52
189 SDCB 123	500.29	504.68	4.39	502.29	2.00	504.68	0.00	0.00	20.62
190 SDCB 124	488.67	502.91	14.25	490.67	2.00	502.91	0.00	0.00	134.98
191 SDCB 125	488.95	501.82	12.88	490.95	2.00	501.82	0.00	0.00	118.50
192 SDCB 126	487.05	501.31	14.26	491.05	4.00	501.31	0.00	0.00	0.00
193 SDCB 127	494.44	501.08	6.64	496.44	2.00	501.08	0.00	0.00	43.67
194 SDCB 128	494.68	501.56	6.88	496.68	2.00	501.56	0.00	0.00	46.50
195 SDCB 129	495.11	500.16	5.05	497.11	2.00	500.16	0.00	0.00	24.60
196 SDCB 130	410.12	414.04	3.92	412.12	2.00	414.04	0.00	0.00	11.03
197 SDCB 131	410.41	414.08	3.67	412.41	2.00	414.08	0.00	0.00	12.03
198 SDCB 132	410.15	413.92	3.77	412.15	2.00	413.92	0.00	0.00	13.25
199 SDCB 133	410.23	414.61	4.38	412.23	2.00	414.61	0.00	0.00	20.54
200 SDCB 134	477.65	483.22	5.57	479.65	2.00	483.22	0.00	2000.00	0.00
201 SDCO 02	409.41	419.94	10.53	409.41	0.00	419.94	0.00	0.00	108.35
202 SDCO 03	482.51	485.69	3.18	482.51	0.00	485.69	0.00	0.00	26.18
203 TDC #1	497.91	500.42	2.52	497.91	0.00	500.42	0.00	0.00	24.20
204 TDC #2	504.24	504.95	0.71	504.24	0.00	504.95	0.00	0.00	0.53

Junction Results

SN Element ID	Peak Inflow	Peak Lateral Inflow	Max HGL Elevation Attained	Max HGL Depth Attained	Max Surge Depth Attained	Min Freeboard Attained	Average HGL Elevation Attained	Average HGL Depth Attained	Time of Max HGL Occurrence	Time of Peak Flooding Occurrence	Total Flooded Volume	Total Time Flooded
	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(days hh:mm)	(days hh:mm)	(ac-in)	(min)
1 AD 01	0.01	0.01	495.08	0.02	0.00	2.69	495.07	0.01	0 08:00	0 00:00	0.00	0.00
2 AD 02	0.07	0.02	487.43	0.06	0.00	4.43	487.40	0.03	0 08:00	0 00:00	0.00	0.00
3 AD 03	0.05	0.05	488.10	0.09	0.00	3.62	488.05	0.04	0 08:00	0 00:00	0.00	0.00
4 AD 04	0.30	0.09	502.21	1.20	0.00	1.50	502.01	1.00	1 00:00	0 00:00	0.00	0.00
5 AD 05	0.00	0.00	506.31	0.00	0.00	2.71	506.31	0.00	0 00:00	0 00:00	0.00	0.00
6 AD 06	0.03	0.03	506.24	0.04	0.00	2.67	506.22	0.02	0 08:00	0 00:00	0.00	0.00
7 AD 07	0.09	0.09	505.88	0.10	0.00	2.61	505.83	0.05	0 08:00	0 00:00	0.00	0.00
8 AD 08	0.05	0.05	506.97	0.05	0.00	2.66	506.94	0.02	0 08:00	0 00:00	0.00	0.00
9 AD 09	0.09	0.09	506.38	0.44	0.00	2.27	506.04	0.10	0 08:02	0 00:00	0.00	0.00
10 AD 10	0.03	0.03	506.95	0.05	0.00	2.66	506.93	0.03	0 08:00	0 00:00	0.00	0.00
11 AD 11	0.00	0.00	498.14	0.00	0.00	2.71	498.14	0.00	0 00:00	0 00:00	0.00	0.00
12 AD 12	0.00	0.00	500.98	0.00	0.00	2.87	500.98	0.00	0 00:00	0 00:00	0.00	0.00
13 AD 13	0.02	0.02	481.04	0.20	0.00	1.51	480.88	0.04	0 08:01	0 00:00	0.00	0.00
14 BPU-2	0.23	0.00	417.39	0.18	0.00	7.87	417.33	0.12	1 00:00	0 00:00	0.00	0.00
15 BPU-3	0.05	0.00	471.76	0.11	0.00	18.50	471.72	0.07	1 00:00	0 00:00	0.00	0.00
16 BPU-4	0.06	0.00	491.17	0.06	0.00	10.61	491.16	0.05	0 23:21	0 00:00	0.00	0.00
17 BPU-5	0.30	0.00	481.40	0.27	0.00	7.00	481.35	0.22	1 00:00	0 00:00	0.00	0.00
18 RDCO 01	3.10	0.00	502.22	1.62	0.00	7.71	501.32	0.72	1 00:00	0 00:00	0.00	0.00
19 RDCO 02	1.94	0.11	503.05	0.35	0.00	6.91	502.85	0.15	0 08:02	0 00:00	0.00	0.00
20 RDCO 03	1.83	0.00	503.50	0.62	0.00	6.48	503.13	0.25	0 08:02	0 00:00	0.00	0.00
21 RDCO 04	1.83	0.00	503.72	0.77	0.00	6.26	503.23	0.28	0 08:02	0 00:00	0.00	0.00
22 RDCO 05	1.83	0.00	503.95	0.71	0.00	5.97	503.48	0.24	0 08:02	0 00:00	0.00	0.00
23 RDCO 06	1.81	0.00	504.20	0.70	0.00	5.68	503.75	0.25	0 08:01	0 00:00	0.00	0.00
24 RDCO 07	1.81	0.00	504.96	0.57	0.00	4.99	504.61	0.22	0 08:00	0 00:00	0.00	0.00
25 RDCO 08	1.72	0.68	505.21	0.70	0.00	4.75	504.76	0.25	0 08:00	0 00:00	0.00	0.00
26 RDCO 09	1.01	0.00	505.63	0.66	0.00	4.35	505.19	0.22	0 08:02	0 00:00	0.00	0.00
27 RDCO 10	1.01	0.16	505.98	0.73	0.00	3.95	505.45	0.20	0 08:02	0 00:00	0.00	0.00
28 RDCO 11	0.87	0.00	506.38	0.53	0.00	3.46	506.03	0.18	0 08:02	0 00:00	0.00	0.00
29 RDCO 12	0.79	0.00	506.60	0.47	0.00	3.33	506.29	0.16	0 08:01	0 00:00	0.00	0.00
30 RDCO 13	0.76	0.37	506.86	0.51	0.00	3.05	506.53	0.18	0 08:00	0 00:00	0.00	0.00
31 RDCO 14	0.40	0.00	507.09	0.41	0.00	2.86	506.82	0.14	0 08:01	0 00:00	0.00	0.00
32 RDCO 15	0.40	0.40	507.74	0.34	0.00	2.18	507.53	0.13	0 08:00	0 00:00	0.00	0.00
33 RDCO 16	1.17	0.23	503.21	0.33	0.00	6.41	503.02	0.14	0 08:01	0 00:00	0.00	0.00
34 RDCO 17	0.95	0.00	503.47	0.43	0.00	6.48	503.21	0.17	0 08:01	0 00:00	0.00	0.00
35 RDCO 18	0.95	0.12	503.75	0.44	0.00	6.20	503.48	0.17	0 08:01	0 00:00	0.00	0.00
36 RDCO 19	0.84	0.24	504.04	0.39	0.00	5.22	503.81	0.16	0 08:01	0 00:00	0.00	0.00
37 RDCO 20	0.60	0.00	504.37	0.31	0.00	4.03	504.19	0.13	0 08:01	0 00:00	0.00	0.00
38 RDCO 21	0.60	0.12	504.91	0.31	0.00	5.05	504.73	0.13	0 08:01	0 00:00	0.00	0.00
39 RDCO 22	0.48	0.21	506.10	0.32	0.00	3.84	505.91	0.13	0 08:01	0 00:00	0.00	0.00
40 RDCO 23	0.28	0.00	506.26	0.25	0.00	3.65	506.10	0.09	0 08:01	0 00:00	0.00	0.00
41 RDCO 24	0.28	0.00	506.49	0.25	0.00	3.43	506.34	0.10	0 08:00	0 00:00	0.00	0.00
42 RDCO 25	0.28	0.28	507.62	0.22	0.00	2.29	507.49	0.09	0 08:00	0 00:00	0.00	0.00
43 RDCO 26	0.04	0.04	504.75	0.11	0.00	5.21	504.69	0.05	0 08:00	0 00:00	0.00	0.00
44 RDCO 27	0.36	0.00	498.40	0.26	0.00	5.50	498.24	0.10	0 08:02	0 00:00	0.00	0.00
45 RDCO 27A	0.57	0.00	498.03	0.25	0.00	5.87	497.89	0.11	0 08:01	0 00:00	0.00	0.00
46 RDCO 28	0.36	0.00	498.51	0.33	0.00	5.15	498.30	0.12	0 08:01	0 00:00	0.00	0.00
47 RDCO 29	0.36	0.00	498.88	0.25	0.00	3.97	498.74	0.11	0 08:01	0 00:00	0.00	0.00
48 RDCO 30	0.36	0.00	499.65	0.25	0.00	4.31	499.50	0.10	0 08:01	0 00:00	0.00	0.00
49 RDCO 31	0.36	0.14	499.82	0.31	0.00	4.15	499.63	0.12	0 08:00	0 00:00	0.00	0.00
50 RDCO 32	0.22	0.00	499.90	0.23	0.00	4.07	499.76	0.09	0 08:01	0 00:00	0.00	0.00
51 RDCO 33	0.22	0.06	500.97	0.20	0.00	2.96	500.85	0.08	0 08:00	0 00:00	0.00	0.00
52 RDCO 34	0.17	0.17	501.42	0.21	0.00	2.50	501.30	0.09	0 08:00	0 00:00	0.00	0.00
53 RDCO 35	0.21	0.00	500.92	0.09	0.00	3.06	500.87	0.04	0 08:00	0 00:00	0.00	0.00
54 RDCO 36	0.22	0.00	501.32	0.23	0.00	2.62	501.19	0.10	0 08:00	0 00:00	0.00	0.00
55 RDCO 37	0.22	0.22	501.66	0.20	0.00	2.29	501.54	0.08	0 08:00	0 00:00	0.00	0.00
56 RDCO 38	0.31	0.00	482.30	0.12	0.00	7.64	482.23	0.05	0 08:01	0 00:00	0.00	0.00
57 RDCO 39	0.15	0.00	485.61	0.11	0.00	4.32	485.55	0.05	0 08:01	0 00:00	0.00	0.00
58 RDCO 40	0.15	0.00	486.00	0.18	0.00	3.95	485.90	0.08	0 08:00	0 00:00	0.00	0.00
59 RDCO 41	0.15	0.07	486.22	0.18	0.00	3.71	486.11	0.07	0 08:00	0 00:00	0.00	0.00
60 RDCO 42	0.08	0.08	487.54	0.12	0.00	2.40	487.47	0.05	0 08:00	0 00:00	0.00	0.00
61 RDCO 43	0.16	0.00	487.51	0.13	0.00	2.43	487.44	0.06	0 08:00	0 00:00	0.00	0.00
62 RDCO 44	0.16	0.16	487.66	0.21	0.00	2.97	487.54	0.09	0 08:00	0 00:00	0.00	0.00
63 RDCO 45	0.21	0.00	502.43	0.24	0.00	3.37	502.28	0.09	0 08:01	0 00:00	0.00	0.00
64 RDCO 46	0.22	0.22	503.65	0.22	0.00	2.29	503.52	0.09	0 08:00	0 00:00	0.00	0.00
65 SDCB 001	1.42	0.14	408.61	2.46	0.00	6.94	408.42	2.27	0 08:01	0 00:00	0.00	0.00
66 SDCB 002	1.29	0.00	409.35	2.47	0.00	6.26	409.16	2.28	0 08:01	0 00:00	0.00	0.00
67 SDCB 003	1.22	0.48	409.49	2.52	0.00	5.79	409.25	2.28	0 08:01	0 00:00	0.00	0.00
68 SDCB 004	0.56	0.38	416.48	2.20	0.00	2.86	416.37	2.09	0 08:00	0 00:00	0.00	0.00
69 SDCB 005	0.18	0.18	416.86	2.18	0.00	2.88	416.76	2.08	0 08:00	0 00:00	0.00	0.00
70 SDCB 006	0.28	0.00	409.49	2.28	0.00	5.29	409.37	2.16	0 08:00	0 00:00	0.00	0.00
71 SDCB 007	0.28	0.00	409.52	4.21	0.00	6.49	409.49	4.18	0 23:04	0 00:00	0.00	0.00
72 SDCB 008	2.39	0.00	414.45	3.90	0.00	1.09	413.42	2.87	0 23:00	0 00:00	0.00	0.00
73 SDCB 009	2.40	0.00	414.45	3.86	0.00	1.17	413.53	2.94	0 22:59	0 00:00	0.00	0.00
74 SDCB 010	2.41	0.19	421.74	2.46	0.00	4.90	421.48	2.20	0 08:01	0 00:00	0.00	0.00
75 SDCB 011	2.22	0.72	430.58	2.31	0.00	2.65	430.41	2.14	0 08:00	0 00:00	0.00	0.00
76 SDCB 012	0.17	0.17	430.81	2.17	0.00	2.88	430.72	2.08	0 08:00	0 00:00	0.00	0.00
77 SDCB 013	1.34	0.47	452.37	2.25	0.00	3.24	452.23	2.11	0 08:00	0 00:00	0.00	0.00
78 SDCB 014	0.17	0.17	452.64	2.17	0.00	2.88	452.54	2.07	0 08:00	0 00:00	0.00	0.00
79 SDCB 015	0.70	0.54	473.16	2.17	0.00	2.89	473.07	2.08	0 08:00	0 00:00	0.00	0.00
80 SDCB 016	0.16	0.16	473.47	2.17	0.00	2.88	473.38	2.08	0 08:00	0 00:00	0.00	0.00
81 SDCB 017	0.23	0.00	416.71	2.13	0.00	6.68	416.66	2.08	1 00:00	0 00:00	0.00	0.00

Junction Results

SN Element ID	Peak Inflow	Peak Lateral Inflow	Max HGL Elevation Attained	Max HGL Depth Attained	Max Surge Depth Attained	Min Freeboard Attained	Average HGL Elevation Attained	Average HGL Depth Attained	Time of Max HGL Occurrence	Time of Peak Flooding Occurrence	Total Flooded Volume	Total Time Flooded
	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(days hh:mm)	(days hh:mm)	(ac-in)	(min)
82 SDCB 018	0.23	0.00	420.48	4.24	0.00	7.87	420.39	4.15	1 00:00	0 00:00	0.00	0.00
83 SDCB 019	2.56	0.24	425.84	3.27	0.00	2.06	425.07	2.50	1 00:00	0 00:00	0.00	0.00
84 SDCB 020	2.33	0.18	425.84	2.98	0.00	1.82	425.31	2.45	1 00:00	0 00:00	0.00	0.00
85 SDCB 021	0.19	0.19	425.92	2.12	0.00	2.34	425.85	2.05	0 08:00	0 00:00	0.00	0.00
86 SDCB 022	1.97	0.11	427.75	2.38	0.00	2.72	427.53	2.16	0 08:01	0 00:00	0.00	0.00
87 SDCB 023	1.86	0.12	428.37	2.71	0.00	2.35	427.92	2.26	0 08:01	0 00:00	0.00	0.00
88 SDCB 024	1.75	0.15	442.40	2.29	0.00	2.44	442.24	2.13	0 08:01	0 00:00	0.00	0.00
89 SDCB 025	1.45	0.16	443.54	2.90	0.00	1.83	442.86	2.22	0 08:01	0 00:00	0.00	0.00
90 SDCB 026	1.30	0.05	453.34	2.23	0.00	2.48	453.21	2.10	0 08:01	0 00:00	0.00	0.00
91 SDCB 027	1.25	0.04	459.22	2.28	0.00	2.43	459.06	2.12	0 08:00	0 00:00	0.00	0.00
92 SDCB 028	1.21	0.06	465.25	2.25	0.00	2.46	465.10	2.10	0 08:00	0 00:00	0.00	0.00
93 SDCB 029	1.15	0.05	476.80	2.24	0.00	2.47	476.66	2.10	0 08:00	0 00:00	0.00	0.00
94 SDCB 030	1.10	0.08	485.06	2.24	0.00	2.47	484.92	2.10	0 08:00	0 00:00	0.00	0.00
95 SDCB 031	0.10	0.10	489.61	2.07	0.00	2.64	489.57	2.03	0 08:00	0 00:00	0.00	0.00
96 SDCB 032	0.93	0.17	499.76	2.21	0.00	2.50	499.64	2.09	0 08:00	0 00:00	0.00	0.00
97 SDCB 033	0.03	0.03	502.11	2.04	0.00	2.67	502.09	2.02	0 08:00	0 00:00	0.00	0.00
98 SDCB 034	0.24	0.24	502.61	2.15	0.00	2.56	502.53	2.07	0 08:00	0 00:00	0.00	0.00
99 SDCB 035	0.49	0.40	502.17	2.22	0.00	2.49	502.04	2.09	0 08:00	0 00:00	0.00	0.00
100 SDCB 035A	0.09	0.00	505.87	2.10	0.00	2.67	505.81	2.04	0 08:01	0 00:00	0.00	0.00
101 SDCB 036	0.16	0.09	458.70	2.09	0.00	2.88	458.65	2.04	0 08:00	0 00:00	0.00	0.00
102 SDCB 037	0.06	0.06	458.97	2.12	0.00	2.61	458.90	2.05	0 08:00	0 00:00	0.00	0.00
103 SDCB 038	0.38	0.00	463.47	2.14	0.00	14.02	463.42	2.09	1 00:00	0 00:00	0.00	0.00
104 SDCB 039	0.38	0.00	465.21	2.11	0.00	13.78	465.17	2.07	1 00:00	0 00:00	0.00	0.00
105 SDCB 040	0.38	0.00	466.52	2.12	0.00	13.24	466.48	2.08	1 00:00	0 00:00	0.00	0.00
106 SDCB 041	0.38	0.00	467.16	2.23	0.00	14.57	467.08	2.15	1 00:00	0 00:00	0.00	0.00
107 SDCB 042	7.53	3.31	471.13	4.79	0.00	11.04	469.82	3.48	1 00:00	0 00:00	0.00	0.00
108 SDCB 043	4.28	0.05	471.13	4.08	0.00	8.87	470.00	2.95	1 00:00	0 00:00	0.00	0.00
109 SDCB 044	2.47	0.04	471.13	2.69	0.00	2.38	470.74	2.30	1 00:00	0 00:00	0.00	0.00
110 SDCB 045	2.43	0.21	471.94	2.56	0.00	9.53	471.58	2.20	0 08:00	0 00:00	0.00	0.00
111 SDCB 046	0.21	0.21	479.31	2.11	0.00	2.60	479.25	2.05	0 08:00	0 00:00	0.00	0.00
112 SDCB 047	1.12	0.19	477.68	2.26	0.00	2.75	477.53	2.11	0 08:00	0 00:00	0.00	0.00
113 SDCB 048	0.13	0.13	477.71	2.21	0.00	2.50	477.58	2.08	0 08:00	0 00:00	0.00	0.00
114 SDCB 049	0.81	0.12	483.14	2.27	0.00	2.74	482.99	2.12	0 08:00	0 00:00	0.00	0.00
115 SDCB 050	0.07	0.07	483.15	2.20	0.00	2.51	483.01	2.06	0 08:00	0 00:00	0.00	0.00
116 SDCB 051	0.63	0.16	489.12	2.21	0.00	2.95	489.00	2.09	0 08:00	0 00:00	0.00	0.00
117 SDCB 052	0.11	0.11	489.71	2.12	0.00	2.59	489.65	2.06	0 08:00	0 00:00	0.00	0.00
118 SDCB 053	0.36	0.36	499.96	2.14	0.00	2.56	499.88	2.06	0 08:00	0 00:00	0.00	0.00
119 SDCB 054	0.64	0.13	477.50	2.17	0.00	4.33	477.41	2.08	0 07:58	0 00:00	0.00	0.00
120 SDCB 055	0.52	0.13	478.32	2.27	0.00	3.71	478.16	2.11	0 08:00	0 00:00	0.00	0.00
121 SDCB 056	0.39	0.07	486.15	2.15	0.00	4.35	486.06	2.06	0 08:00	0 00:00	0.00	0.00
122 SDCB 057	0.07	0.07	487.67	2.10	0.00	2.61	487.60	2.03	0 07:57	0 00:00	0.00	0.00
123 SDCB 058	0.25	0.02	495.45	2.12	0.00	3.01	495.39	2.06	0 08:00	0 00:00	0.00	0.00
124 SDCB 059	0.12	0.12	495.73	2.22	0.00	2.49	495.59	2.08	0 08:00	0 00:00	0.00	0.00
125 SDCB 060	0.12	0.12	497.20	2.12	0.00	2.59	497.11	2.03	0 08:00	0 00:00	0.00	0.00
126 SDCB 061	0.05	0.00	470.47	2.10	0.00	28.40	470.43	2.06	1 00:00	0 00:00	0.00	0.00
127 SDCB 062	0.05	0.00	470.68	2.10	0.00	24.50	470.64	2.06	1 00:00	0 00:00	0.00	0.00
128 SDCB 063	0.05	0.00	471.05	2.09	0.00	23.29	471.01	2.05	1 00:00	0 00:00	0.00	0.00
129 SDCB 064	0.05	0.00	471.33	2.11	0.00	16.92	471.28	2.06	1 00:00	0 00:00	0.00	0.00
130 SDCB 065	0.05	0.00	471.73	2.10	0.00	18.04	471.68	2.05	1 00:00	0 00:00	0.00	0.00
131 SDCB 066	0.05	0.00	474.09	4.10	0.00	21.14	474.05	4.06	1 00:00	0 00:00	0.00	0.00
132 SDCB 067	0.80	0.00	480.06	2.23	0.00	14.61	479.92	2.09	0 08:01	0 00:00	0.00	0.00
133 SDCB 068	0.80	0.11	480.44	2.43	0.00	9.21	480.19	2.18	0 08:01	0 00:00	0.00	0.00
134 SDCB 069	0.31	0.02	480.77	2.31	0.00	8.55	480.58	2.12	0 08:01	0 00:00	0.00	0.00
135 SDCB 070	0.29	0.00	481.04	2.27	0.00	5.71	480.88	2.11	0 08:01	0 00:00	0.00	0.00
136 SDCB 071	0.27	0.05	487.07	2.10	0.00	3.20	487.01	2.04	0 08:01	0 00:00	0.00	0.00
137 SDCB 072	0.22	0.00	487.78	2.23	0.00	2.48	487.65	2.10	0 08:01	0 00:00	0.00	0.00
138 SDCB 073	0.22	0.21	487.98	2.22	0.00	2.48	487.85	2.09	0 08:00	0 00:00	0.00	0.00
139 SDCB 074	0.67	0.48	481.03	2.29	0.00	3.51	480.93	2.19	0 08:00	0 00:00	0.00	0.00
140 SDCB 075	0.30	0.00	481.24	2.24	0.00	4.38	481.19	2.19	1 00:00	0 00:00	0.00	0.00
141 SDCB 076	0.30	0.00	481.36	2.24	0.00	7.55	481.31	2.19	1 00:00	0 00:00	0.00	0.00
142 SDCB 077	0.30	0.00	481.89	2.02	0.00	8.88	481.85	1.98	1 00:00	0 00:00	0.00	0.00
143 SDCB 078	0.30	0.00	482.03	2.20	0.00	10.36	481.99	2.16	1 00:00	0 00:00	0.00	0.00
144 SDCB 079	0.24	0.00	482.61	2.17	0.00	18.34	482.58	2.14	1 00:00	0 00:00	0.00	0.00
145 SDCB 080	0.24	0.00	483.00	2.17	0.00	21.63	482.97	2.14	1 00:00	0 00:00	0.00	0.00
146 SDCB 081	0.24	0.00	483.42	2.18	0.00	21.27	483.38	2.14	1 00:00	0 00:00	0.00	0.00
147 SDCB 082	0.24	0.00	483.84	2.17	0.00	21.01	483.81	2.14	1 00:00	0 00:00	0.00	0.00
148 SDCB 083	0.24	0.00	485.85	2.16	0.00	11.12	485.82	2.13	1 00:00	0 00:00	0.00	0.00
149 SDCB 084	0.24	0.00	487.92	2.16	0.00	3.46	487.89	2.13	1 00:00	0 00:00	0.00	0.00
150 SDCB 084A	0.24	0.00	486.50	2.17	0.00	8.56	486.47	2.14	1 00:00	0 00:00	0.00	0.00
151 SDCB 085	0.24	0.00	491.09	2.08	0.00	16.08	491.07	2.06	1 00:00	0 00:00	0.00	0.00
152 SDCB 086	0.31	0.00	491.37	2.18	0.00	15.24	491.33	2.14	1 00:00	0 00:00	0.00	0.00
153 SDCB 087	0.21	0.00	498.66	4.12	0.00	8.40	498.64	4.10	1 00:00	0 00:00	0.00	0.00
154 SDCB 088	7.49	3.50	502.21	5.64	0.00	4.83	500.71	4.14	1 00:00	0 00:00	0.00	0.00
155 SDCB 089	0.06	0.00	502.81	2.04	0.00	2.80	502.79	2.02	0 08:01	0 00:00	0.00	0.00
156 SDCB 090	0.06	0.03	504.25	2.09	0.00	2.87	504.20	2.04	0 08:01	0 00:00	0.00	0.00
157 SDCB 091	0.03	0.03	504.49	2.08	0.00	2.63	504.45	2.04	0 08:00	0 00:00	0.00	0.00
158 SDCB 092	4.06	0.00	502.21	5.78	0.00	7.11	500.82	4.39	1 00:00	0 00:00	0.00	0.00
159 SDCB 093	1.01	0.31	502.21	3.19	0.00	4.94	501.47	2.45	1 00:00	0 00:00	0.00	0.00
160 SDCB 094	0.41	0.41	503.46	2.26	0.00	2.45	503.31	2.11	0 08:00	0 00:00	0.00	0.00
161 SDCB 095	0.00	0.00	503.57	2.00	0.00	2.71	503.57	2.00	0 00:00	0 00:00	0.00	0.00
162 SDCB 096	0.09	0.05	506.47	0.14	0.00	2.99	506.39	0.06	0 08:01	0 00:00	0.00	0.00

Junction Results

SN Element ID	Peak Inflow	Peak Lateral Inflow	Max HGL Elevation Attained	Max HGL Depth Attained	Max Surge Depth Attained	Min Freeboard Attained	Average HGL Elevation Attained	Average HGL Depth Attained	Time of Max HGL Occurrence	Time of Peak Flooding Occurrence	Total Flooded Volume	Total Time Flooded
	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(days hh:mm)	(days hh:mm)	(ac-in)	(min)
163 SDCB 097	0.05	0.05	506.86	0.10	0.00	2.61	506.80	0.04	0 08:00	0 00:00	0.00	0.00
164 SDCB 098	0.06	0.00	493.43	4.10	0.00	8.59	493.41	4.08	0 23:16	0 00:00	0.00	0.00
165 SDCB 099	2.19	0.00	497.99	5.48	0.00	5.15	496.22	3.71	1 00:00	0 00:00	0.00	0.00
166 SDCB 100	0.14	0.00	499.37	2.10	0.00	3.50	499.32	2.05	0 08:00	0 00:00	0.00	0.00
167 SDCB 101	0.14	0.14	499.80	2.16	0.00	2.55	499.71	2.07	0 08:00	0 00:00	0.00	0.00
168 SDCB 102	2.07	0.00	497.99	4.94	0.00	4.88	496.40	3.35	1 00:00	0 00:00	0.00	0.00
169 SDCB 103	0.77	0.38	498.23	2.25	0.00	4.01	498.09	2.11	0 07:59	0 00:00	0.00	0.00
170 SDCB 104	0.39	0.39	498.76	2.32	0.00	2.39	498.57	2.13	0 08:00	0 00:00	0.00	0.00
171 SDCB 105	1.32	0.11	497.99	4.61	0.00	5.08	496.53	3.15	1 00:00	0 00:00	0.00	0.00
172 SDCB 106	1.22	0.07	497.99	4.01	0.00	4.47	496.76	2.78	1 00:00	0 00:00	0.00	0.00
173 SDCB 107	0.95	0.43	497.99	3.14	0.00	4.08	497.23	2.38	1 00:00	0 00:00	0.00	0.00
174 SDCB 108	0.52	0.35	499.11	2.31	0.00	2.45	498.93	2.13	0 08:00	0 00:00	0.00	0.00
175 SDCB 109	0.18	0.07	501.08	2.15	0.00	2.57	501.00	2.07	0 08:00	0 00:00	0.00	0.00
176 SDCB 110	0.10	0.10	503.44	2.10	0.00	2.62	503.38	2.04	0 08:00	0 00:00	0.00	0.00
177 SDCB 111	0.06	0.00	489.23	2.04	0.00	3.34	489.23	2.04	0 22:45	0 00:00	0.00	0.00
178 SDCB 112	0.06	0.00	493.79	2.04	0.00	10.90	493.79	2.04	0 22:44	0 00:00	0.00	0.00
179 SDCB 113	0.06	0.00	495.70	4.06	0.00	8.68	495.69	4.05	0 22:44	0 00:00	0.00	0.00
180 SDCB 114	1.96	0.12	500.58	2.78	0.00	6.50	500.12	2.32	0 08:01	0 00:00	0.00	0.00
181 SDCB 115	0.49	0.00	500.78	2.39	0.00	5.88	500.54	2.15	0 08:01	0 00:00	0.00	0.00
182 SDCB 116	0.49	0.00	501.25	2.37	0.00	3.45	501.03	2.15	0 08:00	0 00:00	0.00	0.00
183 SDCB 117	0.49	0.49	501.44	2.41	0.00	2.30	501.18	2.15	0 08:00	0 00:00	0.00	0.00
184 SDCB 118	0.30	0.07	500.89	2.25	0.00	8.47	500.75	2.11	0 08:00	0 00:00	0.00	0.00
185 SDCB 119	1.06	0.00	501.30	2.36	0.00	5.85	501.10	2.16	0 08:00	0 00:00	0.00	0.00
186 SDCB 120	1.06	0.46	501.69	2.49	0.00	3.98	501.39	2.19	0 08:00	0 00:00	0.00	0.00
187 SDCB 121	0.61	0.30	502.38	2.43	0.00	4.16	502.11	2.16	0 08:01	0 00:00	0.00	0.00
188 SDCB 122	0.26	0.26	504.94	2.18	0.00	2.53	504.84	2.08	0 08:00	0 00:00	0.00	0.00
189 SDCB 123	0.05	0.05	502.39	2.10	0.00	2.28	502.34	2.05	0 08:00	0 00:00	0.00	0.00
190 SDCB 124	0.50	0.00	491.37	2.70	0.00	11.54	491.33	2.66	1 00:00	0 00:00	0.00	0.00
191 SDCB 125	0.05	0.00	491.37	2.42	0.00	10.45	491.33	2.38	1 00:00	0 00:00	0.00	0.00
192 SDCB 126	0.03	0.00	491.37	4.32	0.00	9.93	491.34	4.29	1 00:00	0 00:00	0.00	0.00
193 SDCB 127	1.67	0.73	497.41	2.97	0.00	3.67	496.74	2.30	1 00:00	0 00:00	0.00	0.00
194 SDCB 128	0.95	0.21	497.41	2.73	0.00	4.15	496.95	2.27	1 00:00	0 00:00	0.00	0.00
195 SDCB 129	0.17	0.17	497.41	2.30	0.00	2.75	497.20	2.09	1 00:00	0 00:00	0.00	0.00
196 SDCB 130	0.56	0.00	412.57	2.45	0.00	1.46	412.32	2.20	0 08:00	0 00:00	0.00	0.00
197 SDCB 131	0.11	0.11	412.60	2.19	0.00	1.48	412.48	2.07	0 08:00	0 00:00	0.00	0.00
198 SDCB 132	0.45	0.18	412.60	2.45	0.00	1.32	412.32	2.17	0 08:00	0 00:00	0.00	0.00
199 SDCB 133	0.27	0.27	412.63	2.40	0.00	1.97	412.35	2.12	0 08:00	0 00:00	0.00	0.00
200 SDCB 134	0.00	0.00	479.65	2.00	0.00	3.57	479.65	2.00	0 00:00	0 00:00	0.00	0.00
201 SDCO 02	2.39	0.00	414.44	5.03	0.00	5.50	412.49	3.08	0 23:03	0 00:00	0.00	0.00
202 SDCO 03	2.02	2.02	482.78	0.27	0.00	2.91	482.63	0.12	0 08:00	0 00:00	0.00	0.00
203 TDC #1	0.20	0.20	498.02	0.12	0.00	2.40	497.95	0.05	0 08:00	0 00:00	0.00	0.00
204 TDC #2	0.22	0.19	504.34	0.10	0.00	0.62	504.28	0.04	0 08:00	0 00:00	0.00	0.00

Pipe Input

SN	Element ID	Length	Inlet Invert Elevation	Inlet Invert Offset	Outlet Invert Elevation	Outlet Invert Offset	Total Drop	Average Slope	Pipe Shape	Pipe Diameter or Height	Pipe Width	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow	Flap Gate
		(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(%)		(in)	(in)					(cfs)	
1	Link-100	101.58	482.51	0.00	471.38	2.00	11.13	10.9600	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
2	Link-101	90.66	479.20	2.00	471.71	2.33	7.49	8.2600	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
3	Link-102	16.00	477.50	2.00	477.42	2.00	0.08	0.5000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
4	Link-103	188.37	502.88	0.00	500.60	0.00	2.28	1.2100	CIRCULAR	12.000	12.000	0.0100	0.5000	0.5000	0.0000	0.00	No
5	Link-104	5.91	412.15	2.00	410.12	0.00	2.03	34.3400	CIRCULAR	8.040	8.040	0.0150	0.5000	0.5000	0.0000	0.00	No
6	Link-105	53.19	471.22	2.27	470.96	1.73	0.27	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
7	Link-106	80.88	471.63	2.40	471.22	1.60	0.40	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
8	Link-107	5.00	471.65	0.00	471.63	2.00	0.03	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
9	Link-108	36.40	480.01	2.00	479.83	2.00	0.18	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
10	Link-109	5.00	479.83	2.00	478.95	5.46	0.88	17.6400	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
11	Link-110	80.23	502.70	0.00	500.60	0.00	2.09	2.6100	CIRCULAR	12.000	12.000	0.0100	0.5000	0.5000	0.0000	0.00	No
12	Link-111	101.94	499.40	0.00	498.63	0.00	0.76	0.7500	CIRCULAR	8.040	8.040	0.0100	0.5000	0.5000	0.0000	0.00	No
13	Link-112	6.31	500.98	0.00	499.40	0.00	1.58	25.0000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
14	Link-114	5.00	481.68	1.81	481.63	0.50	0.05	0.9800	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
15	Link-115	5.00	481.13	0.00	481.12	2.00	0.01	0.2000	CIRCULAR	24.000	24.000	0.0120	0.5000	0.5000	0.0000	0.00	No
16	Link-116	56.86	481.12	2.00	481.00	2.00	0.12	0.2100	CIRCULAR	24.000	24.000	0.0120	0.5000	0.5000	0.0000	0.00	No
17	Link-117	50.46	504.41	2.00	504.16	2.00	0.25	0.5000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
18	Link-118	142.59	504.16	2.00	502.77	2.00	1.39	0.9700	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
19	Link-119	12.23	502.77	2.00	499.40	2.83	3.37	27.5900	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
20	Link-120	247.67	503.43	0.00	502.19	0.00	1.24	0.5000	CIRCULAR	6.000	6.000	0.0100	0.5000	0.5000	0.0000	0.00	No
21	Link-121	62.70	502.19	0.00	501.87	0.87	0.31	0.5000	CIRCULAR	6.000	6.000	0.0100	0.5000	0.5000	0.0000	0.00	No
22	Link-122	159.64	506.31	0.00	503.57	2.00	2.74	1.7100	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
23	Link-123	38.11	503.57	2.00	503.20	2.00	0.37	0.9800	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
24	Link-124	53.97	495.05	2.00	494.51	2.00	0.54	1.0000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
25	Link-125	92.98	498.44	2.00	497.98	2.00	0.47	0.5000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
26	Link-126	33.69	498.14	0.00	496.77	2.33	1.37	4.0600	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
27	Link-127	84.85	497.11	2.00	496.68	2.00	0.42	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
28	Link-128	137.71	505.77	2.00	501.95	2.00	3.82	2.7800	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
29	Link-129	14.44	480.84	0.00	480.77	2.00	0.07	0.5000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
30	Link-13	174.19	498.80	2.00	497.19	2.33	1.62	0.9300	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
31	Link-131	93.22	486.33	2.00	485.69	2.00	0.64	0.6900	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
32	Link-132	145.18	479.65	2.00	478.84	-4.16	0.81	0.5600	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
33	Link-14	46.89	471.38	2.00	470.44	2.00	0.94	2.0000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
34	Link-16	138.50	499.55	2.00	484.83	2.00	14.72	10.6300	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
35	Link-17	96.20	497.08	2.00	495.33	2.00	1.75	1.8200	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
36	Link-18	46.72	408.89	2.00	408.65	2.50	0.23	0.5000	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
37	Link-19	5.00	420.24	4.00	420.22	3.00	0.03	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
38	Link-20	61.16	417.22	0.00	416.58	2.00	0.64	1.0400	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
39	Link-21	306.34	416.58	2.00	409.39	2.50	7.19	2.3500	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
40	Link-25	201.58	416.28	2.00	409.64	2.67	6.64	3.3000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
41	Link-26	5.70	409.41	0.00	409.39	0.58	0.03	0.4900	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
42	Link-27	30.29	408.15	2.00	408.00	0.00	0.15	0.5000	CIRCULAR	24.000	24.000	0.0120	0.5000	0.5000	0.0000	0.00	No
43	Link-29	8.98	424.57	2.00	424.13	4.39	0.44	4.9200	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
44	Link-30	66.99	412.12	2.00	411.38	0.00	0.74	1.1000	CIRCULAR	12.000	12.000	0.0300	0.5000	0.5000	0.0000	0.00	No
45	Link-31	19.00	409.31	4.00	409.21	2.00	0.09	0.5000	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
46	Link-32	48.95	409.21	2.00	408.97	2.00	0.25	0.5000	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
47	Link-33	94.95	427.37	2.00	424.86	2.00	2.51	2.6400	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
48	Link-34	57.83	427.66	2.00	427.37	2.00	0.29	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
49	Link-39	277.48	463.33	2.00	453.20	0.00	10.14	3.6500	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
50	Link-40	58.78	499.28	2.00	494.84	2.33	4.44	7.5500	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
51	Link-42	71.65	497.98	2.00	495.38	2.33	2.60	3.6300	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
52	Link-43	36.42	499.64	2.00	499.28	2.00	0.36	1.0000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
53	Link-45	7.00	494.51	2.00	494.44	1.61	0.07	1.0000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
54	Link-47	5.04	493.33	4.00	493.28	2.17	0.05	0.9900	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
55	Link-48	109.69	491.11	0.00	484.31	0.00	6.80	6.2000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
56	Link-51	61.91	495.06	0.00	487.76	2.00	7.30	11.7900	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
57	Link-52	29.56	487.76	2.00	487.55	2.00	0.21	0.7000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
58	Link-57	43.66	495.64	4.00	493.75	2.00	1.89	4.3200	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
59	Link-59	42.84	489.19	2.00	482.33	2.50	6.86	16.0100	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
60	Link-60	15.50	481.83	2.00	481.68	1.81	0.15	0.9800	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
61	Link-61	91.52	480.74	2.00	478.41	0.00	2.33	2.5500	CIRCULAR	12.000	12.000	0.0200	0.5000	0.5000	0.0000	0.00	No
62	Link-63	18.25	493.75	2.00	489.19	2.00	4.56	25.0000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
63	Link-64	52.30	487.37	0.00	480.35	2.33	7.03	13.4300	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
64	Link-67	34.64	473.99	4.00	473.82	2.17	0.17	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
65	Link-68	74.62	470.96	2.00	470.58	2.00	0.37	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
66	Link-69	42.23	470.58	2.00	470.37	2.00	0.21	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
67	Link-70	130.71	470.37	2.00	469.72	0.00	0.65	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
68	Link-73	379.96	498.54	4.00													

[illegible]

Pipe Input

SN Element ID	Length	Inlet Invert Elevation	Inlet Invert Offset	Outlet Invert Elevation	Outlet Invert Offset	Total Drop	Average Slope	Pipe Shape	Pipe Diameter or Height	Pipe Width	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow	Flap Gate
	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(%)		(in)	(in)					(cfs)	
83 Link-89	216.18	490.67	2.00	489.58	0.39	1.08	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
84 Link-92	80.36	470.44	2.00	469.55	2.50	0.88	1.1000	CIRCULAR	12.000	12.000	0.0100	0.5000	0.5000	0.0000	0.00	No
85 Link-93	52.16	481.00	2.00	480.74	2.00	0.26	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
86 Link-94	52.51	482.00	3.00	479.65	2.00	2.35	4.4800	CIRCULAR	24.000	24.000	0.0140	0.5000	0.5000	0.0000	0.00	No
87 Link-95	100.53	502.46	2.00	499.55	2.00	2.92	2.9000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
88 Link-96	38.51	502.07	2.00	499.55	2.00	2.52	6.5500	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
89 Link-97	99.36	466.93	2.00	466.40	2.00	0.53	0.5300	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
90 Link-98	12.43	466.40	2.00	465.10	2.00	1.30	10.4900	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
91 Link-99	17.39	465.10	2.00	463.33	2.00	1.77	10.1700	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
92 P - (111)	83.71	501.95	2.00	501.53	2.33	0.42	0.5000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
93 P - (115)	94.85	500.64	2.00	500.13	2.33	0.51	0.5300	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
94 P - (119)	71.57	500.60	0.00	499.74	3.31	0.86	1.2100	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
95 P - (119) (2)	134.37	499.24	2.81	498.57	2.00	0.67	0.5000	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
96 P - (125)	120.03	495.98	2.00	495.38	2.00	0.60	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
97 P - (125) (1)	174.19	496.85	2.00	495.98	2.00	0.87	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
98 P - (129)	49.06	496.68	2.00	496.44	2.00	0.25	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
99 P - (129) (1)	36.48	496.44	2.00	494.61	2.26	1.82	5.0000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
100 P - (130)	10.93	497.91	0.00	496.48	2.50	1.42	13.0100	CIRCULAR	6.000	6.000	0.0100	0.5000	0.5000	0.0000	0.00	No
101 P - (131)	278.34	472.99	2.00	452.12	2.00	20.86	7.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
102 P - (131) (1)	304.53	452.12	2.00	430.28	2.00	21.85	7.1700	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
103 P - (132)	110.47	430.28	2.00	421.28	2.00	8.99	8.1400	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
104 P - (132) (1)	8.54	412.59	2.00	412.55	2.00	0.04	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
105 P - (132) (2)	410.95	421.28	2.00	412.59	2.00	8.69	2.1100	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
106 P - (133)	74.34	416.68	2.00	416.28	2.00	0.40	0.5400	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
107 P - (134)	116.52	487.55	2.00	486.97	2.00	0.58	0.5000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
108 P - (134) (1)	22.78	480.46	2.00	480.35	2.33	0.11	0.5000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
109 P - (134) (2)	61.13	480.77	2.00	480.46	2.00	0.31	0.5000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
110 P - (136)	123.34	442.11	2.00	427.99	2.33	14.12	11.4500	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
111 P - (137)	151.88	458.61	2.00	442.11	2.00	16.50	10.8700	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
112 P - (138)	153.40	482.87	2.00	477.42	2.00	5.45	3.5500	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
113 P - (139) (1)	158.86	499.82	2.00	488.91	2.00	10.91	6.8700	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
114 P - (140)	132.82	488.91	2.00	482.87	2.00	6.04	4.5400	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
115 P - (141)	63.37	488.01	0.00	487.37	0.00	0.63	1.0000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
116 P - (144)	45.90	489.59	2.00	488.91	2.00	0.69	1.5000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
117 P - (145)	16.00	482.95	2.00	482.87	2.00	0.08	0.5000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
118 P - (148)	102.22	503.34	2.00	500.93	2.00	2.41	2.3500	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
119 P - (149)	127.35	500.93	2.00	498.80	2.00	2.13	1.6700	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
120 P - (151)	100.08	497.45	-0.33	496.68	2.00	0.76	0.7600	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
121 P - (159)	16.30	408.97	2.00	408.89	2.00	0.08	0.5000	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
122 P - (171)	24.02	504.24	0.00	500.64	2.00	3.60	15.0000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
123 P - (182)	47.27	442.64	2.00	442.11	2.00	0.53	1.1200	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
124 P - (184)	46.83	458.85	2.00	458.61	2.00	0.23	0.5000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
125 P - (210)	110.88	506.33	0.00	505.77	2.00	0.55	0.5000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
126 P - (211)	85.92	506.76	0.00	506.33	0.00	0.43	0.5000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
127 P - (218)	51.10	501.20	2.00	500.94	2.00	0.25	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
128 P - (219)	117.57	500.94	2.00	499.80	2.00	1.15	0.9700	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
129 P - (221)	161.19	504.76	2.00	501.95	2.00	2.81	1.7500	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
130 P - (225)	67.33	495.38	2.00	495.05	2.00	0.34	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
131 P - (231)	5.00	498.57	2.00	498.54	0.50	0.02	0.5000	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
132 P - (232)	88.39	507.40	0.00	506.40	0.17	1.00	1.1300	CIRCULAR	6.000	6.000	0.0100	0.5000	0.5000	0.0000	0.00	No
133 P - (233)	46.01	506.24	0.00	506.01	0.00	0.23	0.5000	CIRCULAR	8.040	8.040	0.0100	0.5000	0.5000	0.0000	0.00	No
134 P - (234)	45.64	506.01	0.00	505.78	0.00	0.23	0.5000	CIRCULAR	8.040	8.040	0.0100	0.5000	0.5000	0.0000	0.00	No
135 P - (235)	168.86	505.78	0.00	504.93	0.33	0.84	0.5000	CIRCULAR	8.040	8.040	0.0100	0.5000	0.5000	0.0000	0.00	No
136 P - (236)	108.25	504.60	0.00	504.06	0.00	0.54	0.5000	CIRCULAR	12.000	12.000	0.0100	0.5000	0.5000	0.0000	0.00	No
137 P - (237)	81.81	504.06	0.00	503.65	0.00	0.41	0.5000	CIRCULAR	12.000	12.000	0.0100	0.5000	0.5000	0.0000	0.00	No
138 P - (238)	67.66	503.65	0.00	503.31	0.00	0.34	0.5000	CIRCULAR	12.000	12.000	0.0100	0.5000	0.5000	0.0000	0.00	No
139 P - (239)	54.94	503.31	0.00	503.04	0.00	0.28	0.5000	CIRCULAR	12.000	12.000	0.0100	0.5000	0.5000	0.0000	0.00	No
140 P - (240)	30.78	503.04	0.00	502.88	0.00	0.15	0.5000	CIRCULAR	12.000	12.000	0.0100	0.5000	0.5000	0.0000	0.00	No
141 P - (242)	143.69	507.40	0.00	506.68	0.00	0.72	0.5000	CIRCULAR	6.000	6.000	0.0100	0.5000	0.5000	0.0000	0.00	No
142 P - (243)	32.33	506.68	0.00	506.52	0.17	0.16	0.5000	CIRCULAR	6.000	6.000	0.0100	0.5000	0.5000	0.0000	0.00	No
143 P - (244)	44.58	506.35	0.00	506.13	0.00	0.22	0.5000	CIRCULAR	8.040	8.040	0.0100	0.5000	0.5000	0.0000	0.00	No
144 P - (244) (1)	37.23	506.13	0.00	505.85	0.00	0.27	0.7400	CIRCULAR	8.040	8.040	0.0100	0.5000	0.5000	0.0000	0.00	No
145 P - (245)	121.72	505.85	0.00	505.25	0.00	0.61	0.5000	CIRCULAR	8.040	8.040	0.0100	0.5000	0.5000	0.0000	0.00	No
146 P - (246)	54.85	505.25	0.00	504.97	0.00	0.27	0.5000	CIRCULAR	8.040	8.040	0.0100	0.5000	0.5000	0.0000	0.00	No
147 P - (247)	25.66	504.97	0.00	504.84	0.33	0.13	0.5000	CIRCULAR	8.040	8.040	0.0100	0.5000	0.5000	0.0000	0.00	No
148 P - (248)	24.07	504.51	0.00	504.39	0.00	0.12	0.5000	CIRCULAR	12.000	12.000	0.0100	0.5000	0.5000	0.0000	0.00	No
149 P - (248) (1)	177.43	504.39	0.00	503.50	0.00	0.89	0.5000	CIRCULAR	12.000	12.000	0.0100	0.5000	0.5000	0.0000	0.00	No
150 P - (249)	53.06	503.50	0.00	503.24	0.00	0.26	0.5000	CIRCULAR	12.000	12.000	0.0100	0.5000	0.5000	0.0000	0.00	No
151 P - (249) (1)	58.27	503.24	0.													

[illegible]

Pipe Input

SN Element ID	Length	Inlet Invert Elevation	Inlet Invert Offset	Outlet Invert Elevation	Outlet Invert Offset	Total Drop	Average Pipe Slope	Pipe Shape	Pipe Diameter or Height	Pipe Width	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flap Flow Gate
	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(%)		(in)	(in)					(cfs)
165 P - (268)	138.08	487.42	0.00	486.04	0.00	1.38	1.0000	CIRCULAR	6.000	6.000	0.0100	0.5000	0.5000	0.0000	0.00 No
166 P - (269)	21.63	486.04	0.00	485.83	0.00	0.22	1.0000	CIRCULAR	6.000	6.000	0.0100	0.5000	0.5000	0.0000	0.00 No
167 P - (270)	32.53	485.83	0.00	485.50	0.00	0.32	1.0000	CIRCULAR	6.000	6.000	0.0100	0.5000	0.5000	0.0000	0.00 No
168 P - (271)	64.44	485.50	0.00	482.34	0.17	3.16	4.9000	CIRCULAR	6.000	6.000	0.0100	0.5000	0.5000	0.0000	0.00 No
169 P - (272)	7.32	482.18	0.00	480.35	2.33	1.83	25.0100	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
170 P - (273)	7.24	487.46	0.00	487.38	0.00	0.07	0.9900	CIRCULAR	6.000	6.000	0.0120	0.5000	0.5000	0.0000	0.00 No
171 P - (274)	170.62	487.38	0.00	482.34	0.17	5.04	2.9500	CIRCULAR	6.000	6.000	0.0100	0.5000	0.5000	0.0000	0.00 No
172 P - (276)	67.99	502.29	2.00	501.95	2.00	0.34	0.5000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
173 P - (282)	104.48	501.87	0.87	501.35	2.33	0.52	0.5000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
174 P - (283)	256.57	501.02	2.00	499.74	3.31	1.28	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00 No
175 P - (291)	12.39	506.90	0.00	506.13	0.00	0.78	6.2600	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
176 P - (292)	17.89	505.94	0.00	505.85	0.00	0.09	0.5000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
177 P - (293)	54.87	505.78	0.00	504.72	0.33	1.06	1.9400	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
178 P - (295)	26.63	506.92	0.00	504.84	0.33	2.08	7.8000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
179 P - (296)	48.54	505.91	-0.29	503.57	0.33	2.33	4.8100	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
180 P - (298)	177.08	503.20	2.00	501.35	2.33	1.85	1.0400	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
181 P - (299)	85.86	501.95	2.00	499.55	2.00	2.40	2.8000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
182 P - (319)	37.78	486.97	2.00	480.77	2.00	6.20	16.4200	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
183 P - (320)	63.83	473.30	2.00	472.99	2.00	0.31	0.4900	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00 No
184 P - (321)	68.75	452.47	2.00	452.12	2.00	0.34	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00 No
185 P - (322)	73.83	430.64	2.00	430.28	2.00	0.37	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00 No
186 P - (324)	56.92	412.41	2.00	412.12	2.00	0.29	0.5000	CIRCULAR	8.040	8.040	0.0150	0.5000	0.5000	0.0000	0.00 No
187 P - (326)	15.09	412.23	2.00	412.15	2.00	0.08	0.5200	CIRCULAR	8.040	8.040	0.0150	0.5000	0.5000	0.0000	0.00 No
188 P - (34)	14.58	425.80	2.00	425.19	2.33	0.61	4.2200	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
189 P - (34) (2)	57.00	424.86	2.00	424.57	2.00	0.28	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00 No
190 P - (36)	79.66	477.42	2.00	469.89	2.83	7.54	9.4600	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
191 P - (40)	142.41	469.05	2.00	468.34	2.00	0.71	0.5000	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00 No
192 P - (48)	5.00	468.34	2.00	468.32	1.89	0.03	0.5000	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00 No
193 P - (58)	52.28	465.00	2.00	458.94	2.00	6.05	11.5800	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
194 P - (58) (1)	61.63	458.94	2.00	453.11	2.00	5.84	9.4700	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
195 P - (58) (1) (1)	74.26	453.11	2.00	442.64	2.00	10.47	14.1000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
196 P - (60)	46.49	489.54	2.00	484.83	2.00	4.72	10.1400	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
197 P - (61)	71.46	484.83	2.00	476.56	2.00	8.26	11.5600	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
198 P - (65)	100.63	476.56	2.00	465.00	2.00	11.57	11.4900	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
199 P - (78)	120.21	495.33	2.00	486.00	2.00	9.34	7.7700	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
200 P - (78) (2) (1)	123.21	486.00	2.00	478.05	2.00	7.95	6.4500	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
201 P - (83)	56.71	477.33	2.00	469.89	2.83	7.45	13.1300	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
202 P - (84)	35.83	495.51	2.18	495.33	1.82	0.18	0.5000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
203 P - (85)	35.86	478.05	2.00	477.33	2.00	0.72	2.0000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
204 P - (86)	35.83	487.57	3.57	486.00	0.43	1.57	4.3800	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
205 SF_VAULT	50.64	412.55	2.00	409.91	0.50	2.64	5.2100	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00 No

[illegible]

Pipe Results

SN Element ID	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/Total Depth Ratio	Total Time Surcharged	Froude Number	Reported Condition
	(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)		
1 Link-100	2.02	0 08:00	12.78	0.16	6.52	0.26	0.42	0.42	0.00		Calculated
2 Link-101	0.21	0 08:00	3.76	0.05	4.99	0.30	0.17	0.25	0.00		Calculated
3 Link-102	0.12	0 08:00	0.93	0.13	1.16	0.23	0.23	0.35	0.00		Calculated
4 Link-103	1.17	0 08:01	5.10	0.23	2.69	1.17	0.57	0.57	0.00		Calculated
5 Link-104	0.45	0 08:00	6.14	0.07	1.45	0.07	0.56	0.84	0.00		Calculated
6 Link-105	0.05	1 00:00	2.73	0.02	0.36	2.46	0.23	0.23	0.00		Calculated
7 Link-106	0.05	1 00:00	2.73	0.02	0.25	5.39	0.30	0.30	0.00		Calculated
8 Link-107	0.05	1 00:00	2.73	0.02	1.12	0.07	0.10	0.10	0.00		Calculated
9 Link-108	0.80	0 08:01	2.73	0.29	2.73	0.22	0.40	0.40	0.00		Calculated
10 Link-109	0.80	0 08:01	16.21	0.05	7.67	0.01	0.19	0.19	0.00		Calculated
11 Link-110	1.94	0 08:02	7.48	0.26	4.48	0.30	0.59	0.59	0.00		Calculated
12 Link-111	0.36	0 08:01	1.36	0.27	3.03	0.56	0.25	0.37	0.00		Calculated
13 Link-112	0.00	0 00:00	6.55	0.00	0.00		0.12	0.19	0.00		Calculated
14 Link-114	0.30	1 00:00	11.27	0.03	2.29	0.04	0.19	0.13	0.00		Calculated
15 Link-115	0.30	1 00:00	10.96	0.03	1.28	0.07	0.26	0.13	0.00		Calculated
16 Link-116	0.30	1 00:00	11.21	0.03	1.39	0.68	0.24	0.12	0.00		Calculated
17 Link-117	0.03	0 08:00	0.93	0.03	1.04	0.81	0.09	0.13	0.00		Calculated
18 Link-118	0.06	0 08:01	1.29	0.04	1.83	1.30	0.09	0.14	0.00		Calculated
19 Link-119	0.06	0 08:01	6.88	0.01	3.70	0.06	0.35	0.53	0.00		Calculated
20 Link-120	0.21	0 08:00	0.52	0.42	2.39	1.73	0.23	0.47	0.00		Calculated
21 Link-121	0.21	0 08:01	0.52	0.41	2.08	0.50	0.26	0.52	0.00		Calculated
22 Link-122	0.00	0 00:00	1.71	0.00	0.00		0.00	0.00	0.00		Calculated
23 Link-123	0.00	0 00:00	1.30	0.00	0.00		0.13	0.19	0.00		Calculated
24 Link-124	2.05	0 08:01	3.86	0.53	2.97	0.30	1.00	1.00	906.00		SURCHARGED
25 Link-125	0.39	0 08:00	0.93	0.42	2.48	0.62	0.31	0.46	0.00		Calculated
26 Link-126	0.00	0 00:00	2.64	0.00	0.00		0.32	0.48	0.00		Calculated
27 Link-127	0.17	0 08:00	2.73	0.06	0.81	1.75	0.51	0.51	0.00		Calculated
28 Link-128	0.09	0 08:01	2.18	0.04	1.46	1.57	0.16	0.24	0.00		Calculated
29 Link-129	0.02	0 08:02	0.92	0.03	0.26	0.93	0.23	0.35	0.00		Calculated
30 Link-13	0.52	0 08:00	1.26	0.41	3.36	0.86	0.38	0.57	0.00		Calculated
31 Link-131	0.24	1 00:00	9.45	0.03	2.15	0.72	0.17	0.11	0.00		Calculated
32 Link-132	0.00	0 00:00	17.29	0.00	0.00		0.00	0.00	0.00		Calculated
33 Link-14	2.43	0 08:00	5.46	0.44	5.10	0.15	0.58	0.58	0.00		Calculated
34 Link-16	0.93	0 08:00	4.27	0.22	8.94	0.26	0.22	0.34	0.00		Calculated
35 Link-17	0.12	0 08:00	1.77	0.07	2.83	0.57	0.12	0.18	0.00		Calculated
36 Link-18	1.29	0 08:01	8.05	0.16	3.03	0.26	0.43	0.29	0.00		Calculated
37 Link-19	0.23	1 00:00	2.73	0.08	1.80	0.05	0.22	0.22	0.00		Calculated
38 Link-20	0.23	1 00:00	3.95	0.06	2.63	0.39	0.17	0.17	0.00		Calculated
39 Link-21	0.23	1 00:00	5.91	0.04	3.60	1.42	0.13	0.13	0.00		Calculated
40 Link-25	0.56	0 08:00	7.01	0.08	5.26	0.64	0.19	0.19	0.00		Calculated
41 Link-26	2.39	0 08:01	7.98	0.30	1.61	0.06	1.50	1.00	1005.00		SURCHARGED
42 Link-27	1.42	0 08:01	17.30	0.08	2.95	0.17	0.42	0.21	0.00		Calculated
43 Link-29	2.56	0 08:01	8.56	0.30	6.62	0.02	1.00	1.00	317.00		SURCHARGED
44 Link-30	0.55	0 08:00	1.62	0.34	2.01	0.56	0.38	0.38	0.00		Calculated
45 Link-31	0.28	0 23:04	8.05	0.03	1.93	0.16	0.24	0.16	0.00		Calculated
46 Link-32	0.28	0 23:04	8.05	0.03	1.54	0.53	0.40	0.27	0.00		Calculated
47 Link-33	1.97	0 08:01	6.28	0.31	3.86	0.41	0.62	0.62	0.00		Calculated
48 Link-34	1.86	0 08:01	2.73	0.68	3.46	0.28	0.65	0.65	0.00		Calculated
49 Link-39	0.38	1 00:00	21.75	0.02	4.60	1.01	0.14	0.09	0.00		Calculated
50 Link-40	0.14	0 08:00	3.60	0.04	3.43	0.29	0.38	0.57	0.00		Calculated
51 Link-42	0.77	0 08:00	2.49	0.31	5.78	0.21	0.41	0.61	0.00		Calculated
52 Link-43	0.14	0 08:00	1.31	0.11	2.35	0.26	0.15	0.23	0.00		Calculated
53 Link-45	2.19	0 08:01	3.86	0.57	2.92	0.04	1.00	1.00	957.00		SURCHARGED
54 Link-47	0.06	0 23:17	3.84	0.02	1.57	0.05	0.09	0.09	0.00		Calculated
55 Link-48	0.06	0 23:21	9.61	0.01	0.14	13.06	0.53	0.53	0.00		Calculated
56 Link-51	0.01	0 08:00	4.49	0.00	0.25	4.13	0.12	0.19	0.00		Calculated
57 Link-52	0.22	0 08:00	1.10	0.20	2.10	0.23	0.23	0.34	0.00		Calculated
58 Link-57	0.06	0 22:44	8.03	0.01	2.93	0.25	0.06	0.06	0.00		Calculated
59 Link-59	0.06	0 22:45	15.44	0.00	4.61	0.15	0.04	0.04	0.00		Calculated
60 Link-60	0.30	1 00:00	11.27	0.03	2.05	0.13	0.21	0.14	0.00		Calculated
61 Link-61	0.67	0 08:00	3.70	0.18	1.25	1.22	0.64	0.64	0.00		Calculated
62 Link-63	0.06	0 22:45	19.30	0.00	4.98	0.06	0.04	0.04	0.00		Calculated
63 Link-64	0.07	0 08:00	4.80	0.02	4.71	0.19	0.08	0.12	0.00		Calculated
64 Link-67	0.05	1 00:00	2.73	0.02	1.33	0.43	0.09	0.09	0.00		Calculated
65 Link-68	0.05	1 00:00	2.73	0.02	1.29	0.96	0.10	0.10	0.00		Calculated
66 Link-69	0.05	1 00:00	2.73	0.02	1.28	0.55	0.10	0.10	0.00		Calculated
67 Link-70	0.05	1 00:00	2.73	0.02	1.36	1.60	0.09	0.09	0.00		Calculated
68 Link-73	0.21	1 00:00	15.83	0.01	2.24	2.83	0.15	0.10	0.00		Calculated
69 Link-74	0.24	1 00:00	9.47	0.03	2.05	0.21	0.18	0.12	0.00		Calculated
70 Link-75	0.24	1 00:00	50.17	0.00	3.80	0.07	0.12	0.08	0.00		Calculated
71 Link-76	0.24	1 00:00	10.36	0.02	2.30	1.25	0.16	0.11	0.00		Calculated
72 Link-77	0.24	1 00:00	9.45	0.03	2.19	2.22	0.17	0.11	0.00		Calculated
73 Link-78	0.24	1 00:00	9.45	0.03	2.12	0.49	0.17	0.12	0.00		Calculated
74 Link-79	0.24	1 00:00	9.46	0.03	2.12	0.47	0.17	0.12	0.00		Calculated
75 Link-80	0.24	1 00:00	9.45	0.03	2.11	0.44	0.17	0.12	0.00		Calculated
76 Link-81	0.24	1 00:00	9.46	0.03	1.96	0.75	0.18	0.12	0.00		Calculated
77 Link-82	0.49	0 08:00	0.93	0.53	2.34	0.21	0.39	0.58	0.00		Calculated
78 Link-83	0.49	0 08:00	0.93	0.53	2.42	0.67	0.37	0.56	0.00		Calculated
79 Link-84	0.49	0 08:01	0.93	0.52	2.31	0.38	0.42	0.62	0.00		Calculated
80 Link-85	1.95	0 08:01	2.73	0.71	3.39	0.11	0.69	0.69	0.00		Calculated
81 Link-87	0.03	1 00:00	2.73	0.01	0.14	2.45	0.38	0.38	0.00		Calculated

Pipe Results

SN Element ID	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Froude Number	Reported Condition
	(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)		
82 Link-88	0.06	0 00:02	2.73	0.02	0.51	1.84	0.57	0.57	0.00		Calculated
83 Link-89	0.50	0 00:00	2.73	0.18	0.93	3.87	0.85	0.85	0.00		Calculated
84 Link-92	2.47	0 08:00	4.86	0.51	5.47	0.24	0.85	0.85	0.00		Calculated
85 Link-93	0.30	1 00:00	2.73	0.11	2.16	0.40	0.23	0.23	0.00		Calculated
86 Link-94	0.00	0 00:00	44.47	0.00	0.00		0.00	0.00	0.00		Calculated
87 Link-95	0.24	0 08:00	2.23	0.11	3.18	0.53	0.18	0.27	0.00		Calculated
88 Link-96	0.03	0 08:00	3.35	0.01	0.58	1.11	0.13	0.19	0.00		Calculated
89 Link-97	0.38	1 00:00	8.29	0.05	2.31	0.72	0.22	0.15	0.00		Calculated
90 Link-98	0.38	1 00:00	36.85	0.01	5.88	0.04	0.12	0.08	0.00		Calculated
91 Link-99	0.38	1 00:00	36.29	0.01	5.31	0.05	0.13	0.08	0.00		Calculated
92 P - (111)	0.60	0 08:01	0.93	0.65	2.77	0.50	0.40	0.60	0.00		Calculated
93 P - (115)	0.30	0 08:00	0.96	0.31	1.97	0.80	0.35	0.53	0.00		Calculated
94 P - (119)	3.08	0 08:03	4.24	0.72	4.93	0.24	1.00	1.00	547.00		SURCHARGED
95 P - (119) (2)	4.05	0 08:02	8.05	0.50	2.29	0.98	1.50	1.00	925.00		SURCHARGED
96 P - (125)	1.22	0 08:01	2.73	0.45	2.85	0.70	1.00	1.00	624.00		SURCHARGED
97 P - (125) (1)	0.95	0 08:00	2.73	0.35	2.74	1.06	1.00	1.00	127.00		SURCHARGED
98 P - (129)	0.95	0 08:01	2.73	0.35	2.89	0.28	0.85	0.85	0.00		Calculated
99 P - (129) (1)	1.67	0 08:00	8.63	0.19	7.42	0.08	0.99	0.99	0.00		Calculated
100 P - (130)	0.20	0 08:00	2.63	0.08	6.93	0.03	0.29	0.59	0.00		Calculated
101 P - (131)	0.70	0 08:00	10.57	0.07	5.88	0.79	0.21	0.21	0.00		Calculated
102 P - (131) (1)	1.34	0 08:00	10.34	0.13	7.67	0.66	0.27	0.27	0.00		Calculated
103 P - (132)	2.22	0 08:00	11.01	0.20	8.09	0.23	0.38	0.38	0.00		Calculated
104 P - (132) (1)	2.39	0 08:01	2.74	0.87	3.59	0.04	1.00	1.00	739.00		SURCHARGED
105 P - (132) (2)	2.40	0 08:01	5.61	0.43	4.18	1.64	0.69	0.69	0.00		Calculated
106 P - (133)	0.18	0 08:00	2.83	0.06	1.81	0.68	0.18	0.18	0.00		Calculated
107 P - (134)	0.22	0 08:01	0.93	0.24	2.14	0.91	0.22	0.33	0.00		Calculated
108 P - (134) (1)	0.31	0 08:01	0.93	0.34	2.21	0.17	0.28	0.42	0.00		Calculated
109 P - (134) (2)	0.29	0 08:01	0.92	0.31	2.01	0.51	0.29	0.43	0.00		Calculated
110 P - (136)	1.75	0 08:01	4.43	0.40	10.71	0.19	0.34	0.50	0.00		Calculated
111 P - (137)	0.16	0 08:00	4.32	0.04	1.92	1.32	0.19	0.28	0.00		Calculated
112 P - (138)	0.81	0 08:00	2.47	0.33	6.18	0.41	0.27	0.40	0.00		Calculated
113 P - (139) (1)	0.36	0 08:00	3.43	0.10	4.73	0.56	0.18	0.27	0.00		Calculated
114 P - (140)	0.63	0 08:00	2.79	0.22	5.41	0.41	0.24	0.37	0.00		Calculated
115 P - (141)	0.05	0 08:00	1.31	0.04	2.23	0.47	0.08	0.12	0.00		Calculated
116 P - (144)	0.11	0 08:00	1.60	0.07	1.59	0.48	0.17	0.25	0.00		Calculated
117 P - (145)	0.07	0 08:00	0.93	0.07	0.62	0.43	0.24	0.36	0.00		Calculated
118 P - (148)	0.10	0 08:00	2.01	0.05	2.30	0.74	0.12	0.19	0.00		Calculated
119 P - (149)	0.18	0 08:00	1.69	0.10	1.68	1.26	0.23	0.34	0.00		Calculated
120 P - (151)	0.57	0 08:01	4.04	0.14	2.25	0.74	0.40	0.40	0.00		Calculated
121 P - (159)	1.22	0 08:01	8.02	0.15	2.43	0.11	0.49	0.33	0.00		Calculated
122 P - (171)	0.22	0 08:00	5.07	0.04	3.07	0.13	0.17	0.26	0.00		Calculated
123 P - (182)	1.45	0 08:01	1.38	1.05	4.30	0.18	0.62	0.92	0.00		> CAPACITY
124 P - (184)	0.06	0 08:00	0.93	0.07	1.51	0.52	0.12	0.18	0.00		Calculated
125 P - (210)	0.09	0 08:01	0.93	0.10	1.69	1.09	0.14	0.21	0.00		Calculated
126 P - (211)	0.05	0 08:00	0.93	0.05	1.04	1.38	0.12	0.19	0.00		Calculated
127 P - (218)	1.06	0 08:00	2.73	0.39	2.97	0.29	0.46	0.46	0.00		Calculated
128 P - (219)	1.06	0 08:00	3.81	0.28	2.29	0.86	0.57	0.57	0.00		Calculated
129 P - (221)	0.26	0 08:00	1.73	0.15	1.70	1.58	0.30	0.45	0.00		Calculated
130 P - (225)	1.31	0 08:01	2.73	0.48	2.63	0.43	1.00	1.00	831.00		SURCHARGED
131 P - (231)	7.49	0 08:00	8.05	0.93	4.24	0.02	1.50	1.00	970.00		SURCHARGED
132 P - (232)	0.28	0 08:00	0.77	0.36	3.48	0.42	0.21	0.43	0.00		Calculated
133 P - (233)	0.28	0 08:00	1.11	0.25	2.31	0.33	0.25	0.38	0.00		Calculated
134 P - (234)	0.28	0 08:01	1.11	0.25	1.95	0.39	0.29	0.43	0.00		Calculated
135 P - (235)	0.48	0 08:01	1.11	0.43	2.96	0.95	0.31	0.47	0.00		Calculated
136 P - (236)	0.60	0 08:01	3.27	0.18	2.89	0.62	0.31	0.31	0.00		Calculated
137 P - (237)	0.60	0 08:01	3.27	0.18	2.43	0.56	0.35	0.35	0.00		Calculated
138 P - (238)	0.84	0 08:01	3.27	0.26	2.70	0.42	0.42	0.42	0.00		Calculated
139 P - (239)	0.95	0 08:01	3.28	0.29	2.89	0.32	0.44	0.44	0.00		Calculated
140 P - (240)	0.95	0 08:01	3.28	0.29	3.47	0.15	0.38	0.38	0.00		Calculated
141 P - (242)	0.40	0 08:00	0.52	0.78	2.56	0.94	0.37	0.75	0.00		Calculated
142 P - (243)	0.40	0 08:01	0.52	0.77	2.59	0.21	0.37	0.74	0.00		Calculated
143 P - (244)	0.76	0 08:00	1.11	0.68	2.77	0.27	0.49	0.73	0.00		Calculated
144 P - (244) (1)	0.79	0 08:01	1.35	0.59	2.99	0.21	0.50	0.75	0.00		Calculated
145 P - (245)	0.86	0 08:02	1.11	0.77	2.69	0.75	0.60	0.89	0.00		Calculated
146 P - (246)	1.01	0 08:02	1.11	0.91	2.90	0.32	0.66	0.99	0.00		Calculated
147 P - (247)	1.01	0 08:02	1.11	0.91	3.19	0.13	0.57	0.85	0.00		Calculated
148 P - (248)	1.72	0 08:00	3.27	0.53	3.30	0.12	0.63	0.63	0.00		Calculated
149 P - (248) (1)	1.81	0 08:01	3.27	0.55	3.46	0.85	0.63	0.63	0.00		Calculated
150 P - (249)	1.81	0 08:01	3.27	0.55	3.05	0.29	0.71	0.71	0.00		Calculated
151 P - (249) (1)	1.83	0 08:02	3.27	0.56	2.92	0.33	0.74	0.74	0.00		Calculated
152 P - (250)	1.83	0 08:02	3.28	0.56	3.12	0.07	0.70	0.70	0.00		Calculated
153 P - (251)	1.83	0 08:02	3.27	0.56	4.78	0.13	0.49	0.49	0.00		Calculated
154 P - (253)	0.04	0 08:00	0.43	0.09	1.36	0.58	0.10	0.20	0.00		Calculated
155 P - (258)	0.17	0 08:00	0.52	0.33	2.24	0.66	0.20	0.41	0.00		Calculated
156 P - (259)	0.22	0 08:00	0.73	0.31	3.15	0.49	0.19	0.39	0.00		Calculated
157 P - (260)	0.22	0 08:01	1.11	0.20	1.69	0.30	0.27	0.40	0.00		Calculated
158 P - (261)	0.36	0 08:00	1.14	0.32	2.65	0.10	0.28	0.41	0.00		Calculated
159 P - (262)	0.22	0 08:00	0.73	0.30	2.61	0.23	0.22	0.44	0.00		Calculated
160 P - (263)	0.21	0 08:00	0.73	0.29	3.89	0.11	0.16	0.32	0.00		Calculated
161 P - (264)	0.21	0 08:00	3.64	0.06	8.99	0.02	0.09	0.18	0.00		Calculated
162 P - (265)	0.36	0 08:01	1.35	0.27	2.42	0.04	0.30	0.44	0.00		Calculated

Pipe Results

SN Element ID	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Froude Number	Reported Condition
	(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)		
163 P - (266)	0.36	0 08:01	1.36	0.27	2.47	0.41	0.29	0.44	0.00		Calculated
164 P - (267)	0.36	0 08:02	1.36	0.27	2.89	0.28	0.26	0.39	0.00		Calculated
165 P - (268)	0.08	0 08:00	0.73	0.12	1.77	1.30	0.15	0.29	0.00		Calculated
166 P - (269)	0.15	0 08:00	0.73	0.20	2.41	0.15	0.18	0.35	0.00		Calculated
167 P - (270)	0.15	0 08:01	0.73	0.20	3.26	0.17	0.14	0.28	0.00		Calculated
168 P - (271)	0.15	0 08:01	1.61	0.09	4.99	0.22	0.10	0.21	0.00		Calculated
169 P - (272)	0.31	0 08:01	6.55	0.05	8.23	0.01	0.11	0.16	0.00		Calculated
170 P - (273)	0.16	0 08:00	0.61	0.26	2.84	0.04	0.16	0.33	0.00		Calculated
171 P - (274)	0.16	0 08:00	1.25	0.13	4.32	0.66	0.12	0.24	0.00		Calculated
172 P - (276)	0.05	0 08:00	0.93	0.05	0.36	3.15	0.27	0.40	0.00		Calculated
173 P - (282)	0.30	0 08:01	0.93	0.33	2.34	0.74	0.50	0.76	0.00		Calculated
174 P - (283)	1.01	0 08:01	2.73	0.37	2.60	1.64	1.00	1.00	225.00		SURCHARGED
175 P - (291)	0.03	0 08:00	3.28	0.01	0.26	0.79	0.26	0.39	0.00		Calculated
176 P - (292)	0.08	0 08:04	0.92	0.09	0.37	0.81	0.48	0.72	0.00		Calculated
177 P - (293)	0.09	0 08:00	1.82	0.05	2.22	0.41	0.17	0.25	0.00		Calculated
178 P - (295)	0.05	0 08:00	3.66	0.01	2.62	0.17	0.21	0.31	0.00		Calculated
179 P - (296)	0.03	0 08:00	3.05	0.01	2.07	0.39	0.21	0.32	0.00		Calculated
180 P - (298)	0.40	0 08:00	1.34	0.30	3.28	0.90	0.38	0.57	0.00		Calculated
181 P - (299)	0.49	0 08:00	2.19	0.22	4.87	0.29	0.22	0.33	0.00		Calculated
182 P - (319)	0.27	0 08:01	5.30	0.05	3.35	0.19	0.19	0.28	0.00		Calculated
183 P - (320)	0.16	0 08:00	2.71	0.06	1.74	0.61	0.17	0.17	0.00		Calculated
184 P - (321)	0.17	0 08:00	2.73	0.06	1.46	0.78	0.21	0.21	0.00		Calculated
185 P - (322)	0.17	0 08:00	2.73	0.06	1.20	1.03	0.24	0.24	0.00		Calculated
186 P - (324)	0.11	0 08:01	0.74	0.14	0.66	1.44	0.32	0.48	0.00		Calculated
187 P - (326)	0.27	0 08:00	0.75	0.36	1.18	0.21	0.43	0.64	0.00		Calculated
188 P - (34)	0.19	0 08:00	2.69	0.07	3.20	0.08	0.35	0.52	0.00		Calculated
189 P - (34) (2)	2.33	0 08:01	2.73	0.85	3.67	0.26	0.99	0.99	0.00		Calculated
190 P - (36)	1.12	0 08:00	4.03	0.28	9.46	0.14	0.38	0.57	0.00		Calculated
191 P - (40)	4.28	0 08:01	8.05	0.53	2.67	0.89	1.50	1.00	479.00		SURCHARGED
192 P - (48)	7.53	0 08:00	8.05	0.94	4.68	0.02	1.50	1.00	792.00		SURCHARGED
193 P - (58)	1.21	0 08:00	4.46	0.27	9.38	0.09	0.26	0.40	0.00		Calculated
194 P - (58) (1)	1.25	0 08:00	4.03	0.31	9.60	0.11	0.27	0.40	0.00		Calculated
195 P - (58) (1) (1)	1.30	0 08:01	4.92	0.26	5.17	0.24	0.45	0.68	0.00		Calculated
196 P - (60)	0.10	0 08:00	4.17	0.02	1.59	0.49	0.15	0.23	0.00		Calculated
197 P - (61)	1.10	0 08:00	4.45	0.25	9.81	0.12	0.24	0.36	0.00		Calculated
198 P - (65)	1.15	0 08:00	4.44	0.26	9.90	0.17	0.25	0.37	0.00		Calculated
199 P - (78)	0.25	0 08:00	3.65	0.07	4.91	0.41	0.14	0.21	0.00		Calculated
200 P - (78) (2) (1)	0.39	0 08:00	3.32	0.12	4.06	0.51	0.21	0.32	0.00		Calculated
201 P - (83)	0.64	0 08:00	4.74	0.14	9.03	0.10	0.37	0.55	0.00		Calculated
202 P - (84)	0.11	0 08:00	0.93	0.12	0.84	0.71	0.27	0.41	0.00		Calculated
203 P - (85)	0.52	0 08:00	1.85	0.28	4.18	0.14	0.26	0.39	0.00		Calculated
204 P - (86)	0.07	0 08:00	2.74	0.03	0.37	1.61	0.37	0.56	0.00		Calculated
205 SF_VAULT	2.39	0 08:01	8.81	0.27	4.95	0.17	1.00	1.00	751.00		SURCHARGED

Storage Nodes

Storage Node : DETENTION_1

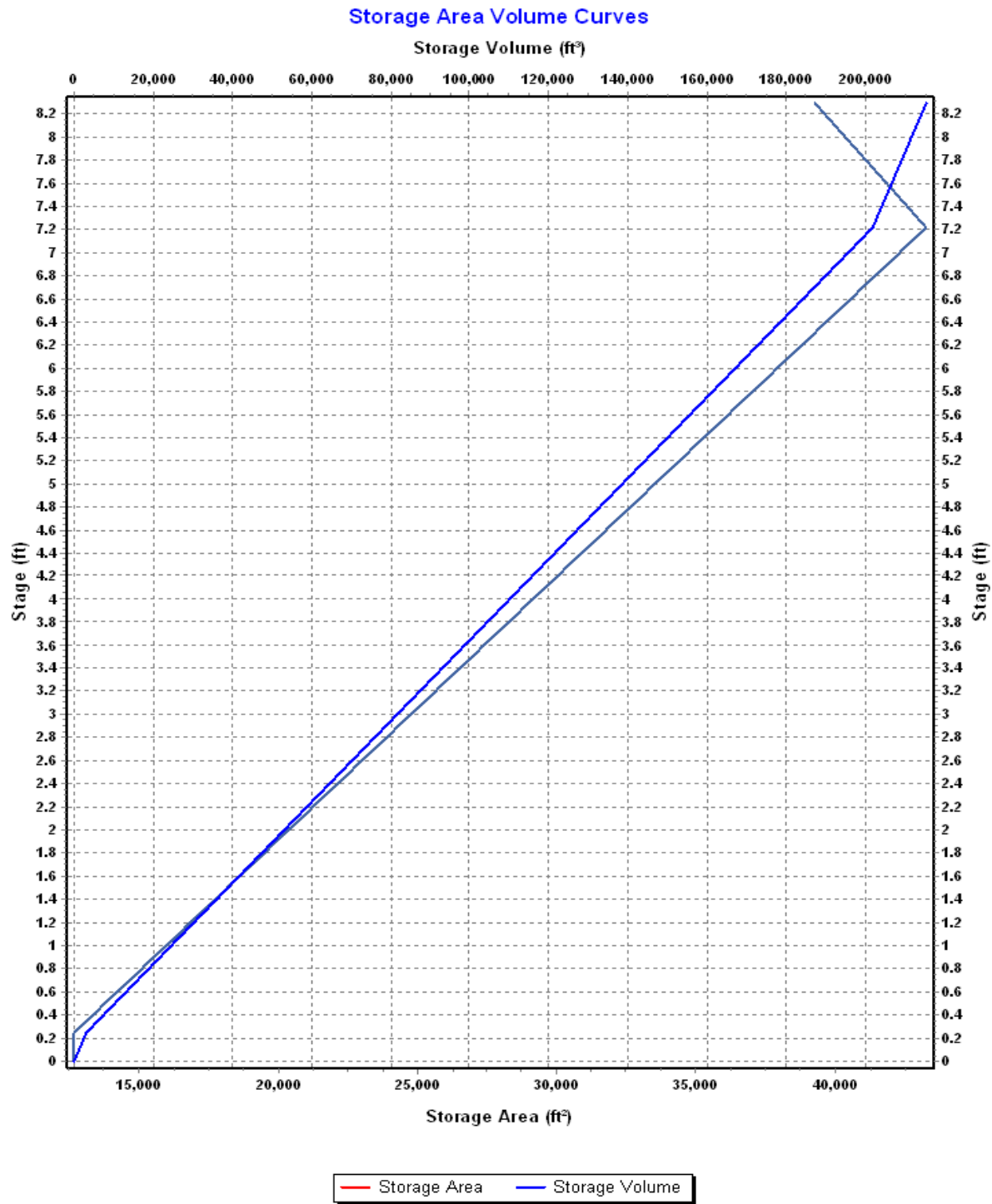
Input Data

Invert Elevation (ft)	466.43
Max (Rim) Elevation (ft)	474.64
Max (Rim) Offset (ft)	8.21
Initial Water Elevation (ft)	466.93
Initial Water Depth (ft)	0.50
Ponded Area (ft ²)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : DETENTION 1

Stage	Storage Area	Storage Volume
(ft)	(ft ²)	(ft ³)
0.000	12672	0
.25	12672.00	3168
7.21	43253.53	201611.52
8.29	39269.44	215297.28



Storage Node : DETENTION_1 (continued)**Output Summary Results**

Peak Inflow (cfs)	7.53
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	0.38
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	471.12
Max HGL Depth Attained (ft)	4.69
Average HGL Elevation Attained (ft)	469.34
Average HGL Depth Attained (ft)	2.91
Time of Max HGL Occurrence (days hh:mm)	1 00:00
Total Exfiltration Volume (1000-ft ³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Storage Node : DETENTION_2**Input Data**

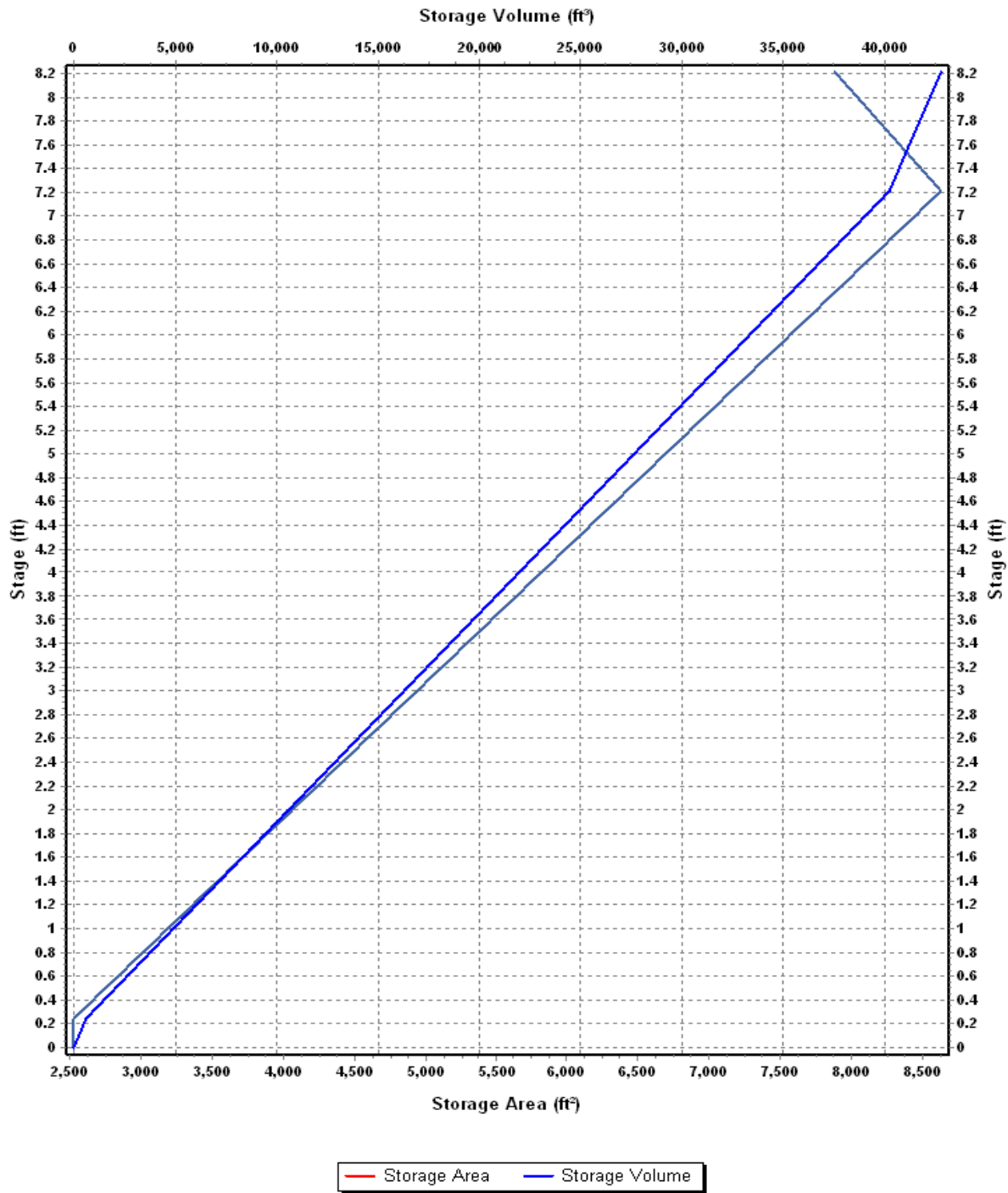
Invert Elevation (ft) 419.74
 Max (Rim) Elevation (ft) 427.95
 Max (Rim) Offset (ft) 8.21
 Initial Water Elevation (ft) 420.24
 Initial Water Depth (ft) 0.50
 Ponded Area (ft²) 0.00
 Evaporation Loss 0.00

Storage Area Volume Curves

Storage Curve : DETENTION 2

Stage (ft)	Storage Area (ft ²)	Storage Volume (ft ³)
0.000	2528	0
.25	2528.00	632
7.21	8628.86	40220.48
8.21	7885.76	42748.48

Storage Area Volume Curves



Storage Node : DETENTION_2 (continued)**Output Summary Results**

Peak Inflow (cfs)	2.56
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	0.46
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	425.83
Max HGL Depth Attained (ft)	6.09
Average HGL Elevation Attained (ft)	423.57
Average HGL Depth Attained (ft)	3.83
Time of Max HGL Occurrence (days hh:mm)	1 00:00
Total Exfiltration Volume (1000-ft ³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Storage Node : DETENTION_3**Input Data**

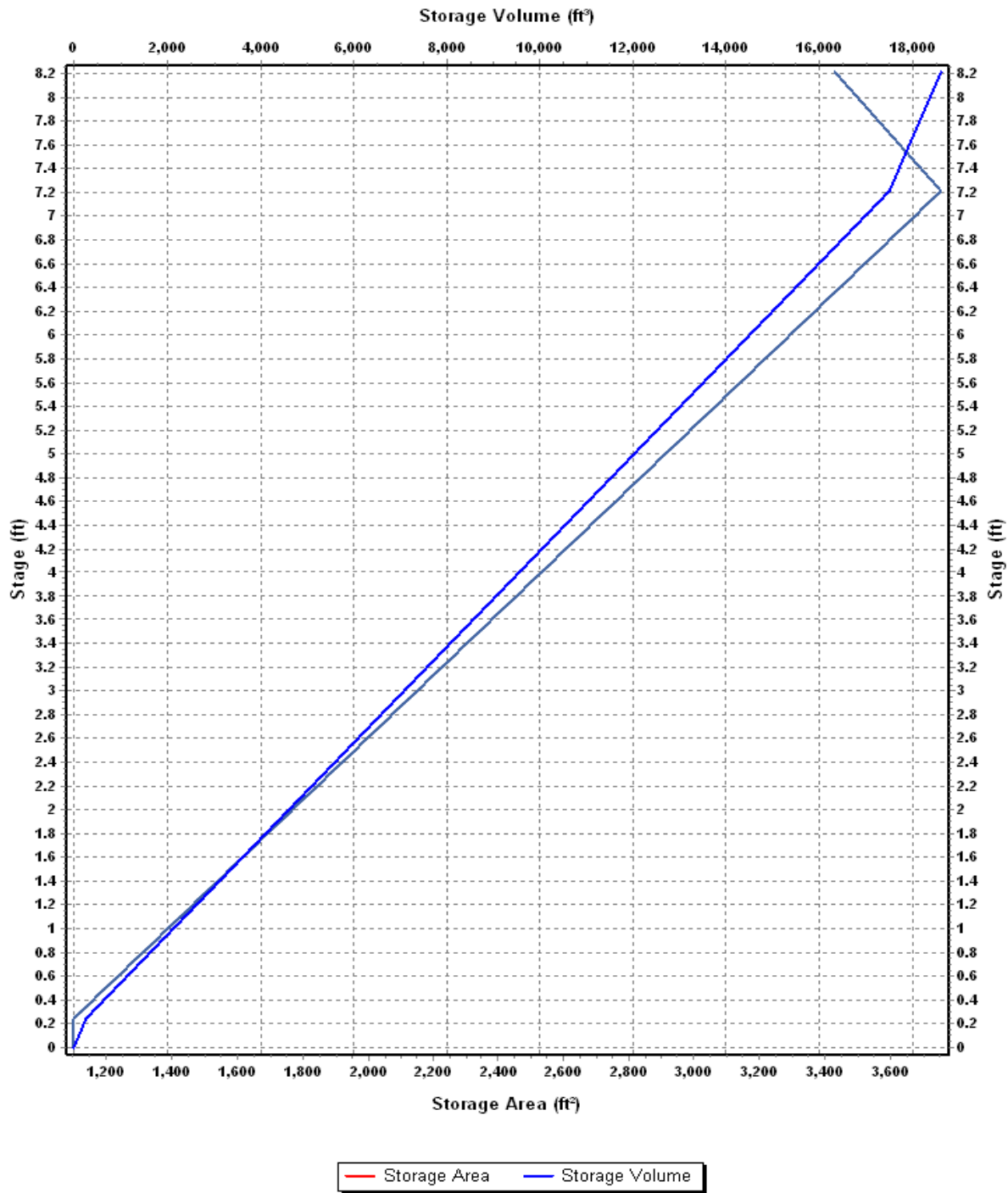
Invert Elevation (ft) 473.49
 Max (Rim) Elevation (ft) 481.45
 Max (Rim) Offset (ft) 7.96
 Initial Water Elevation (ft) 473.99
 Initial Water Depth (ft) 0.50
 Ponded Area (ft²) 0.00
 Evaporation Loss 0.00

Storage Area Volume Curves

Storage Curve : DETENTION 3

Stage (ft)	Storage Area (ft ²)	Storage Volume (ft ³)
0.000	1100	0
.25	1100.00	275
7.21	3754.65	17501
8.21	3431.30	18601

Storage Area Volume Curves



Storage Node : DETENTION_3 (continued)**Output Summary Results**

Peak Inflow (cfs)	0.80
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	0.05
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	478.86
Max HGL Depth Attained (ft)	5.37
Average HGL Elevation Attained (ft)	476.76
Average HGL Depth Attained (ft)	3.27
Time of Max HGL Occurrence (days hh:mm)	1 00:00
Total Exfiltration Volume (1000-ft ³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Storage Node : DETENTION_4**Input Data**

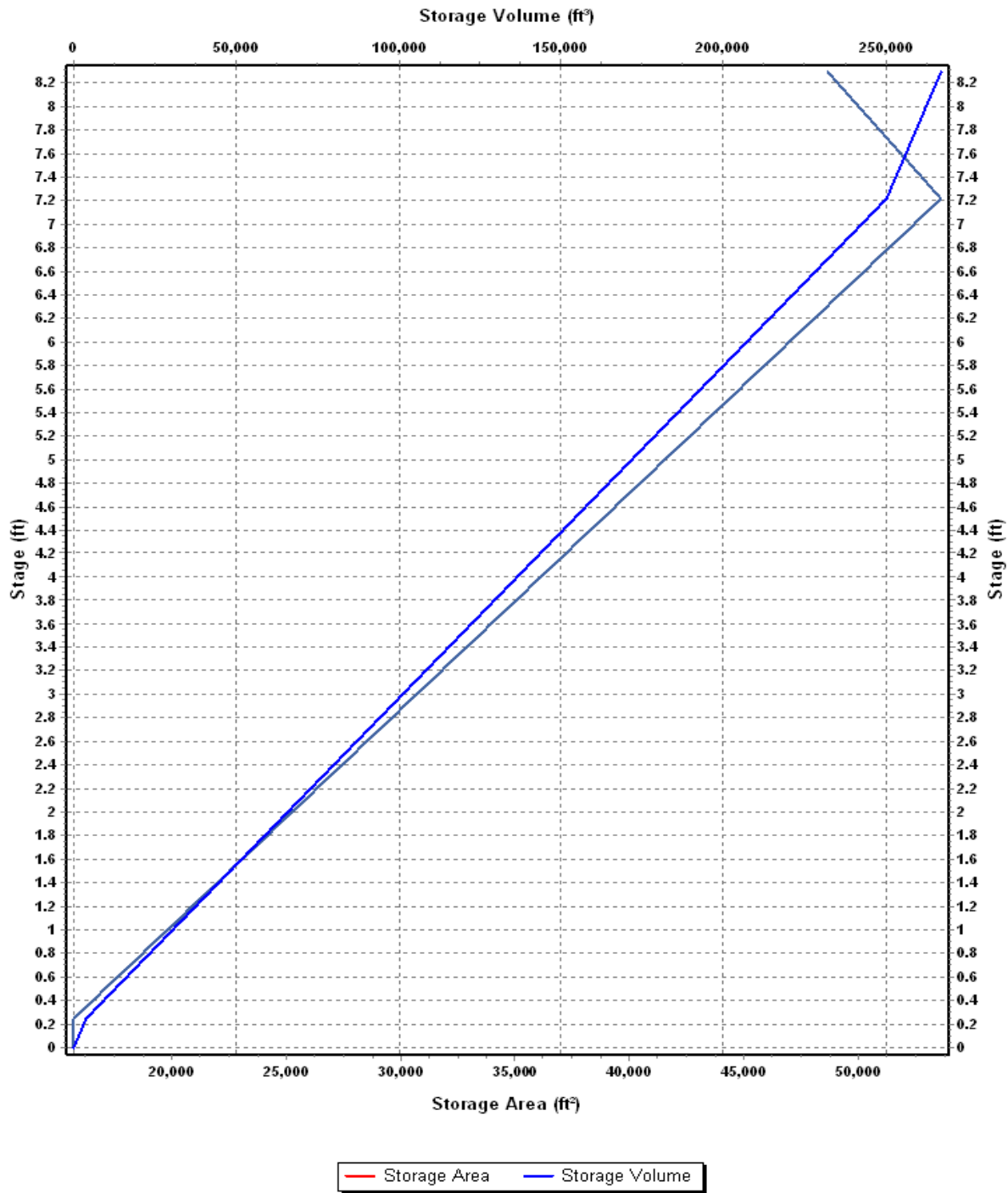
Invert Elevation (ft) 498.04
 Max (Rim) Elevation (ft) 506.33
 Max (Rim) Offset (ft) 8.29
 Initial Water Elevation (ft) 498.54
 Initial Water Depth (ft) 0.50
 Ponded Area (ft²) 0.00
 Evaporation Loss 0.00

Storage Area Volume Curves

Storage Curve : DETENTION 4

Stage (ft)	Storage Area (ft ²)	Storage Volume (ft ³)
0	15704	0
.25	15704.00	3926
7.21	53602.70	249850.64
8.29	48665.35	266810.96

Storage Area Volume Curves



Storage Node : DETENTION_4 (continued)**Output Summary Results**

Peak Inflow (cfs)	7.49
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	0.21
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	502.21
Max HGL Depth Attained (ft)	4.17
Average HGL Elevation Attained (ft)	500.65
Average HGL Depth Attained (ft)	2.61
Time of Max HGL Occurrence (days hh:mm)	1 00:00
Total Exfiltration Volume (1000-ft ³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Storage Node : DETENTION_5**Input Data**

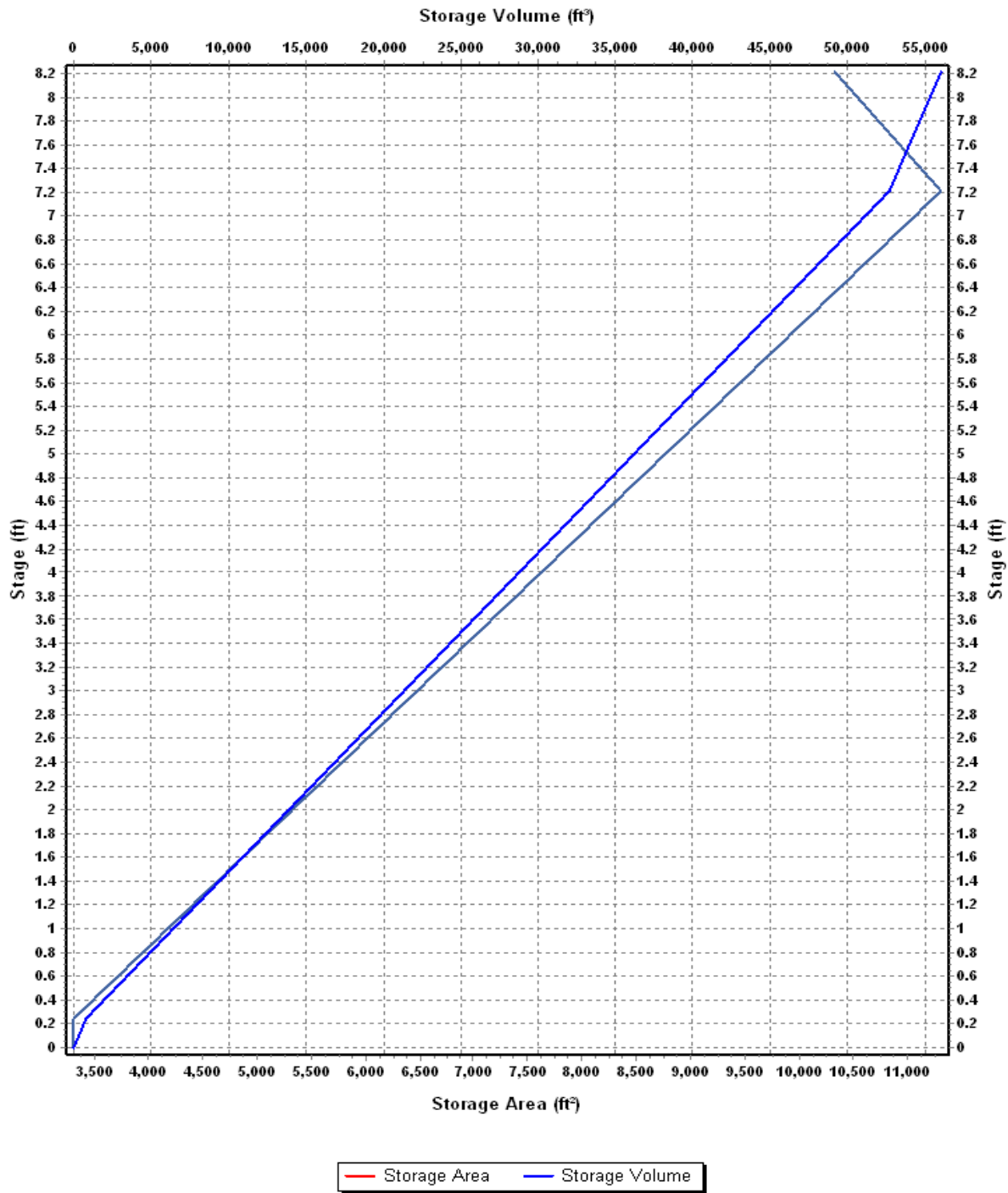
Invert Elevation (ft) 492.83
 Max (Rim) Elevation (ft) 501.04
 Max (Rim) Offset (ft) 8.21
 Initial Water Elevation (ft) 493.33
 Initial Water Depth (ft) 0.50
 Ponded Area (ft²) 0.00
 Evaporation Loss 0.00

Storage Area Volume Curves

Storage Curve : DETENTION 5

Stage (ft)	Storage Area (ft ²)	Storage Volume (ft ³)
0.000	3312.4	0
0.25	3312.40	828.1
7.21	11306.26	52700.284
8.21	10332.59	56012.684

Storage Area Volume Curves



Storage Node : DETENTION_5 (continued)**Output Summary Results**

Peak Inflow (cfs)	2.19
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	0.06
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	497.99
Max HGL Depth Attained (ft)	5.16
Average HGL Elevation Attained (ft)	495.98
Average HGL Depth Attained (ft)	3.15
Time of Max HGL Occurrence (days hh:mm)	1 00:00
Total Exfiltration Volume (1000-ft ³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Storage Node : DETENTION_6**Input Data**

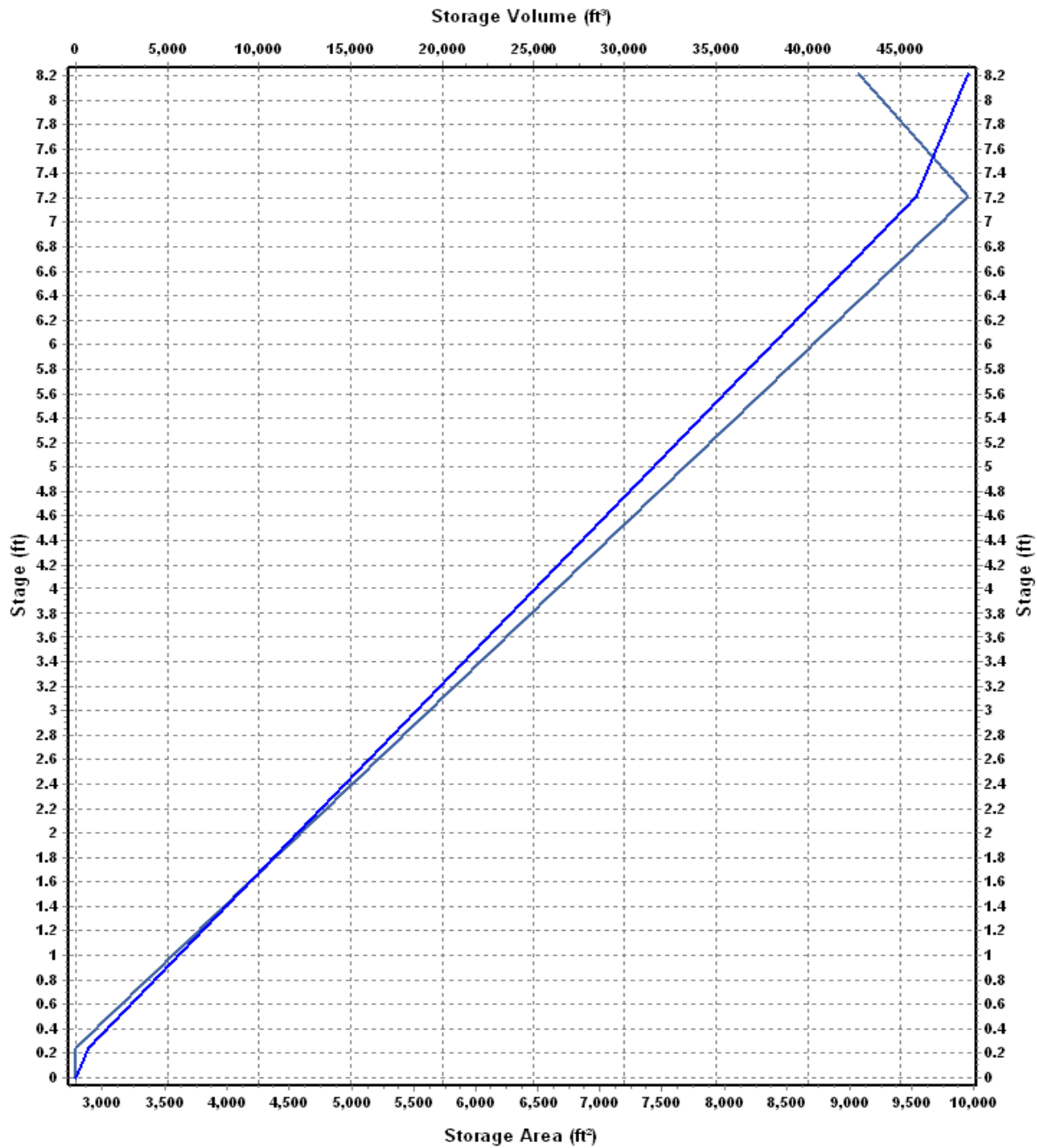
Invert Elevation (ft) 495.14
 Max (Rim) Elevation (ft) 503.35
 Max (Rim) Offset (ft) 8.21
 Initial Water Elevation (ft) 495.64
 Initial Water Depth (ft) 0.50
 Ponded Area (ft²) 0.00
 Evaporation Loss 0.00

Storage Area Volume Curves

Storage Curve : DETENTION 6

Stage (ft)	Storage Area (ft ²)	Storage Volume (ft ³)
0.000	2788	0
0.25	2788.00	697
7.21	9951.34	45925.33
8.21	9078.83	48713.33

Storage Area Volume Curves



— Storage Area — Storage Volume

Storage Node : DETENTION_6 (continued)**Output Summary Results**

Peak Inflow (cfs)	1.95
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	0.06
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	500.33
Max HGL Depth Attained (ft)	5.19
Average HGL Elevation Attained (ft)	498.32
Average HGL Depth Attained (ft)	3.18
Time of Max HGL Occurrence (days hh:mm)	1 00:00
Total Exfiltration Volume (1000-ft ³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Storage Node : DETENTION_7**Input Data**

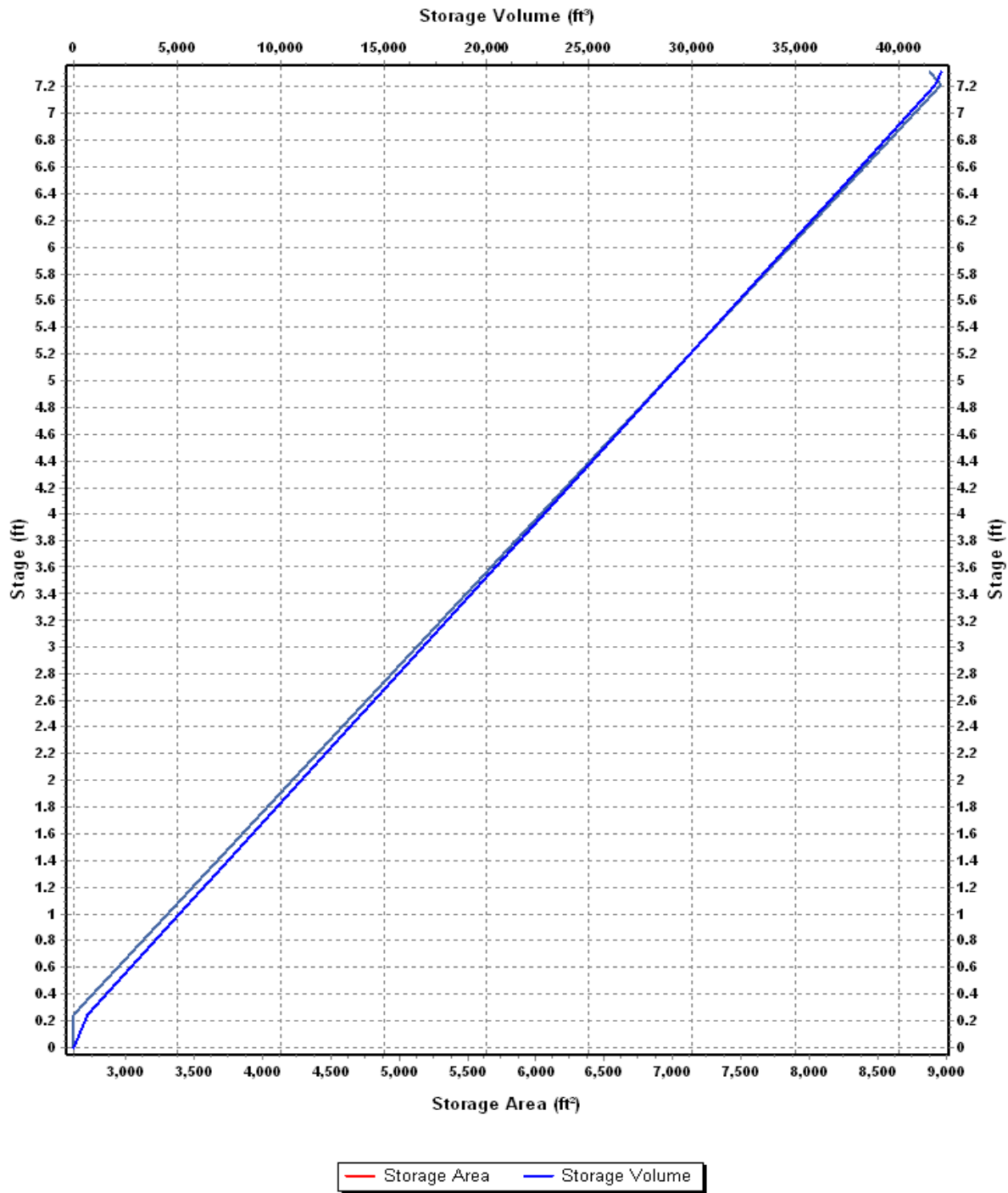
Invert Elevation (ft) 492.35
 Max (Rim) Elevation (ft) 500.64
 Max (Rim) Offset (ft) 8.29
 Initial Water Elevation (ft) 492.85
 Initial Water Depth (ft) 0.50
 Ponded Area (ft²) 0.00
 Evaporation Loss 0.00

Storage Area Volume Curves

Storage Curve : DETENTION 7

Stage (ft)	Storage Area (ft ²)	Storage Volume (ft ³)
0	2624.4	0
0.25	2624.40	656.1
7.21	8957.90	41754.204
7.31	8871.26	42016.644

Storage Area Volume Curves



Storage Node : DETENTION_7 (continued)**Output Summary Results**

Peak Inflow (cfs)	1.67
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	0.03
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	497.41
Max HGL Depth Attained (ft)	5.06
Average HGL Elevation Attained (ft)	495.50
Average HGL Depth Attained (ft)	3.15
Time of Max HGL Occurrence (days hh:mm)	1 00:00
Total Exfiltration Volume (1000-ft ³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Storage Node : DETENTION_8**Input Data**

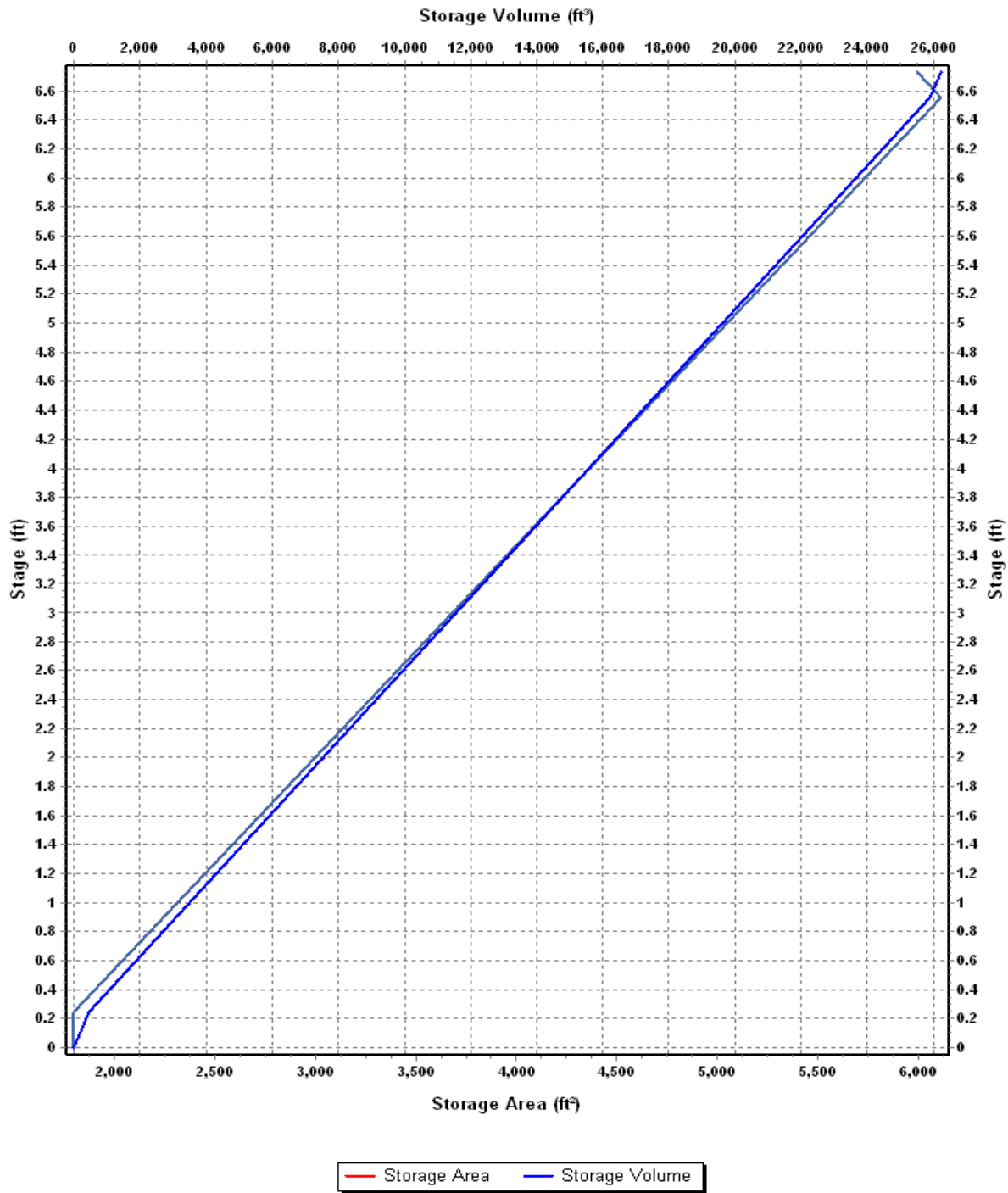
Invert Elevation (ft) 408.81
 Max (Rim) Elevation (ft) 415.54
 Max (Rim) Offset (ft) 6.73
 Initial Water Elevation (ft) 409.31
 Initial Water Depth (ft) 0.50
 Ponded Area (ft²) 0.00
 Evaporation Loss 0.00

Storage Area Volume Curves

Storage Curve : DETENTION 8

Stage (ft)	Storage Area (ft ²)	Storage Volume (ft ³)
0.000	1795.6	0
0.25	1795.60	448.9
6.55	6113.26	25901.53
6.73	5997.78	26224.738

Storage Area Volume Curves



Storage Node : DETENTION_8 (continued)**Output Summary Results**

Peak Inflow (cfs)	2.39
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	0.28
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	414.44
Max HGL Depth Attained (ft)	5.63
Average HGL Elevation Attained (ft)	412.48
Average HGL Depth Attained (ft)	3.67
Time of Max HGL Occurrence (days hh:mm)	0 23:03
Total Exfiltration Volume (1000-ft ³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Project Description

File Name 20210309_Issaquah Basin.SPF

Project Options

Flow Units CFS
 Elevation Type Elevation
 Hydrology Method Santa Barbara UH
 Time of Concentration (TOC) Method User-Defined
 Link Routing Method Hydrodynamic
 Enable Overflow Ponding at Nodes YES
 Skip Steady State Analysis Time Periods ... NO

Analysis Options

Start Analysis On Apr 09, 2020 00:00:00
 End Analysis On Apr 10, 2020 00:00:00
 Start Reporting On Apr 09, 2020 00:00:00
 Antecedent Dry Days 0 days
 Runoff (Dry Weather) Time Step 0 01:00:00 days hh:mm:ss
 Runoff (Wet Weather) Time Step 0 00:05:00 days hh:mm:ss
 Reporting Time Step 0 00:05:00 days hh:mm:ss
 Routing Time Step 30 seconds

Number of Elements

Qty
 Rain Gages 2
 Subbasins..... 118
 Nodes..... 219
 Junctions 204
 Outfalls 7
 Flow Diversions 0
 Inlets 0
 Storage Nodes 8
 Links..... 213
 Channels 0
 Pipes 205
 Pumps 0
 Orifices 0
 Weirs 0
 Outlets 8
 Pollutants 0
 Land Uses 0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1	100-YEAR	Time Series	100-YEAR	Intensity	inches					User Defined
2	25-YEAR	Time Series	25-YEAR	Intensity	inches	Washington	King	25	4.00	SCS Type IA 24-hr

Subbasin Summary

SN Subbasin ID	Area	Impervious Area	Impervious Area Curve Number	Pervious Area Curve Number	Total Rainfall	Total Runoff	Total Runoff Volume	Peak Runoff	Time of Concentration
	(ac)	(%)			(in)	(in)	(ac-in)	(cfs)	(days hh:mm:ss)
1 001	0.15	94.00	98.00	76.00	4.75	4.39	0.66	0.16	0 00:06:00
2 003	0.86	33.00	98.00	76.00	4.75	3.06	2.63	0.63	0 00:06:00
3 004	0.53	61.00	98.00	76.00	4.75	3.67	1.95	0.48	0 00:06:00
4 005	0.20	94.00	98.00	76.00	4.75	4.39	0.88	0.22	0 00:06:00
5 010	0.21	94.00	98.00	76.00	4.75	4.39	0.92	0.23	0 00:06:00
6 011	1.33	30.00	98.00	76.00	4.75	2.99	3.98	0.95	0 00:06:00
7 012	0.19	93.00	98.00	76.00	4.75	4.37	0.83	0.21	0 00:06:00
8 013	0.86	32.00	98.00	76.00	4.75	3.04	2.61	0.63	0 00:06:00
9 014	0.19	94.00	98.00	76.00	4.75	4.39	0.83	0.21	0 00:06:00
10 015	0.92	39.00	98.00	76.00	4.75	3.19	2.93	0.71	0 00:06:00
11 016	0.18	89.00	98.00	76.00	4.75	4.28	0.77	0.19	0 00:06:00
12 019	0.48	23.00	98.00	76.00	4.75	2.84	1.36	0.32	0 00:06:00
13 020	0.21	86.00	98.00	76.00	4.75	4.22	0.89	0.22	0 00:06:00
14 021	0.51	0.00	98.00	76.00	4.75	2.34	1.19	0.27	0 00:06:00
15 022	0.13	85.00	98.00	76.00	4.75	4.19	0.55	0.14	0 00:06:00
16 023	0.19	43.00	98.00	76.00	4.75	3.28	0.62	0.15	0 00:06:00
17 024	0.23	49.00	98.00	76.00	4.75	3.41	0.78	0.19	0 00:06:00
18 025	0.23	55.00	98.00	76.00	4.75	3.54	0.81	0.20	0 00:06:00
19 026	0.07	51.00	98.00	76.00	4.75	3.45	0.24	0.06	0 00:06:00
20 027	0.06	53.00	98.00	76.00	4.75	3.50	0.21	0.05	0 00:06:00
21 028	0.08	63.00	98.00	76.00	4.75	3.71	0.30	0.07	0 00:06:00
22 029	0.09	42.00	98.00	76.00	4.75	3.26	0.29	0.07	0 00:06:00
23 030	0.13	41.00	98.00	76.00	4.75	3.23	0.42	0.10	0 00:06:00
24 031	0.12	77.00	98.00	76.00	4.75	4.02	0.48	0.12	0 00:06:00
25 032	0.20	85.00	98.00	76.00	4.75	4.19	0.84	0.21	0 00:06:00
26 033	0.03	94.00	98.00	76.00	4.75	4.39	0.13	0.03	0 00:06:00
27 034	0.27	93.00	98.00	76.00	4.75	4.37	1.18	0.29	0 00:06:00
28 036	0.12	70.00	98.00	76.00	4.75	3.87	0.46	0.11	0 00:06:00
29 037	0.08	76.00	98.00	76.00	4.75	4.00	0.32	0.08	0 00:06:00
30 042	4.25	72.00	98.00	76.00	4.75	3.91	16.62	4.10	0 00:06:00
31 043	0.05	95.00	98.00	76.00	4.75	4.41	0.22	0.06	0 00:06:00
32 044	0.06	64.00	98.00	76.00	4.75	3.74	0.22	0.06	0 00:06:00
33 045	0.23	92.00	98.00	76.00	4.75	4.35	1.00	0.25	0 00:06:00
34 046	0.24	86.00	98.00	76.00	4.75	4.22	1.01	0.25	0 00:06:00
35 047	0.28	52.00	98.00	76.00	4.75	3.47	0.97	0.24	0 00:06:00
36 048	0.19	51.00	98.00	76.00	4.75	3.45	0.66	0.16	0 00:06:00
37 049	0.16	69.00	98.00	76.00	4.75	3.84	0.62	0.15	0 00:06:00
38 050	0.10	56.00	98.00	76.00	4.75	3.56	0.36	0.09	0 00:06:00
39 051	0.23	57.00	98.00	76.00	4.75	3.58	0.82	0.20	0 00:06:00
40 052	0.15	62.00	98.00	76.00	4.75	3.69	0.55	0.14	0 00:06:00
41 053	0.47	70.00	98.00	76.00	4.75	3.87	1.82	0.45	0 00:06:00
42 054	0.15	82.00	98.00	76.00	4.75	4.13	0.62	0.15	0 00:06:00
43 055	0.22	38.00	98.00	76.00	4.75	3.17	0.70	0.17	0 00:06:00
44 056	0.12	34.00	98.00	76.00	4.75	3.08	0.37	0.09	0 00:06:00
45 057	0.09	78.00	98.00	76.00	4.75	4.04	0.36	0.09	0 00:06:00
46 058	0.03	40.00	98.00	76.00	4.75	3.21	0.10	0.02	0 00:06:00
47 059	0.17	54.00	98.00	76.00	4.75	3.52	0.60	0.15	0 00:06:00
48 060	0.17	61.00	98.00	76.00	4.75	3.67	0.62	0.15	0 00:06:00
49 068	0.13	90.00	98.00	76.00	4.75	4.30	0.56	0.14	0 00:06:00
50 069	0.04	25.00	98.00	76.00	4.75	2.88	0.12	0.03	0 00:06:00
51 070	0.05	22.00	98.00	76.00	4.75	2.82	0.14	0.03	0 00:06:00
52 071	0.07	61.00	98.00	76.00	4.75	3.67	0.26	0.06	0 00:06:00
53 073	0.31	54.00	98.00	76.00	4.75	3.52	1.09	0.27	0 00:06:00
54 074	0.74	49.00	98.00	76.00	4.75	3.41	2.52	0.61	0 00:06:00
55 091	0.03	100.00	98.00	76.00	4.75	4.52	0.14	0.03	0 00:06:00
56 093	0.40	72.00	98.00	76.00	4.75	3.91	1.56	0.39	0 00:06:00
57 094	0.54	67.00	98.00	76.00	4.75	3.80	2.05	0.51	0 00:06:00
58 101	0.18	76.00	98.00	76.00	4.75	4.00	0.72	0.18	0 00:06:00
59 103	0.49	72.00	98.00	76.00	4.75	3.91	1.92	0.47	0 00:06:00
60 104	0.61	48.00	98.00	76.00	4.75	3.39	2.07	0.50	0 00:06:00
61 105	0.12	89.00	98.00	76.00	4.75	4.28	0.51	0.13	0 00:06:00
62 107	0.51	85.00	98.00	76.00	4.75	4.19	2.14	0.53	0 00:06:00
63 108	0.42	81.00	98.00	76.00	4.75	4.11	1.72	0.43	0 00:06:00
64 109	0.09	80.00	98.00	76.00	4.75	4.09	0.37	0.09	0 00:06:00
65 110	0.12	87.00	98.00	76.00	4.75	4.24	0.51	0.13	0 00:06:00
66 114	0.13	100.00	98.00	76.00	4.75	4.52	0.59	0.15	0 00:06:00
67 117	0.73	53.00	98.00	76.00	4.75	3.50	2.55	0.62	0 00:06:00
68 118	0.18	6.00	98.00	76.00	4.75	2.47	0.44	0.10	0 00:06:00
69 120	0.54	86.00	98.00	76.00	4.75	4.22	2.28	0.57	0 00:06:00
70 121	0.34	90.00	98.00	76.00	4.75	4.30	1.46	0.36	0 00:06:00
71 122	0.28	100.00	98.00	76.00	4.75	4.52	1.27	0.32	0 00:06:00
72 123	0.08	40.00	98.00	76.00	4.75	3.21	0.26	0.06	0 00:06:00
73 127	0.18	100.00	98.00	76.00	4.75	4.52	0.81	0.20	0 00:06:00
74 128	0.23	99.00	98.00	76.00	4.75	4.50	1.04	0.26	0 00:06:00
75 129	0.22	74.00	98.00	76.00	4.75	3.95	0.87	0.22	0 00:06:00
76 133	0.12	94.00	98.00	76.00	4.75	4.39	0.53	0.13	0 00:06:00
77 135	0.73	0.00	98.00	76.00	4.75	2.34	1.71	0.39	0 00:06:00
78 AD_01	0.02	33.00	98.00	76.00	4.75	3.06	0.06	0.02	0 00:06:00
79 AD_02	0.06	0.00	98.00	76.00	4.75	2.34	0.14	0.03	0 00:06:00
80 AD_03	0.13	4.00	98.00	76.00	4.75	2.43	0.32	0.07	0 00:06:00
81 AD_04	0.10	100.00	98.00	76.00	4.75	4.52	0.45	0.11	0 00:06:00
82 AD_05	0.11	83.00	98.00	76.00	4.75	0.00	0.00	0.11	0 00:00:00

Subbasin Summary

SN Subbasin ID	Area (ac)	Impervious Area (%)	Impervious Area Curve Number	Pervious Area Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
83 AD_06	0.07	0.00	98.00	76.00	4.75	2.34	0.16	0.04	0 00:06:00
84 AD_07	0.14	46.00	98.00	76.00	4.75	3.34	0.47	0.11	0 00:06:00
85 AD_08	0.05	100.00	98.00	76.00	4.75	4.52	0.23	0.06	0 00:06:00
86 AD_09	0.11	72.00	98.00	76.00	4.75	3.91	0.43	0.11	0 00:06:00
87 AD_10	0.05	49.00	98.00	76.00	4.75	3.41	0.17	0.04	0 00:06:00
88 BASIN_7_UNDERDRAIN	0.60	100.00	98.00	76.00	4.75	4.52	2.71	0.68	0 00:06:00
89 COVERED_PARKING	2.17	99.00	98.00	76.00	4.75	4.50	9.77	2.44	0 00:06:00
90 RDCO_02	0.12	100.00	98.00	76.00	4.75	4.52	0.54	0.14	0 00:06:00
91 RDCO_08	0.73	100.00	98.00	76.00	4.75	4.52	3.30	0.83	0 00:06:00
92 RDCO_10	0.17	100.00	98.00	76.00	4.75	4.52	0.77	0.19	0 00:06:00
93 RDCO_13	0.39	100.00	98.00	76.00	4.75	4.52	1.76	0.44	0 00:06:00
94 RDCO_15	0.43	100.00	98.00	76.00	4.75	4.52	1.94	0.49	0 00:06:00
95 RDCO_16	0.24	100.00	98.00	76.00	4.75	4.52	1.09	0.27	0 00:06:00
96 RDCO_18	0.13	100.00	98.00	76.00	4.75	4.52	0.59	0.15	0 00:06:00
97 RDCO_19	0.26	100.00	98.00	76.00	4.75	4.52	1.18	0.29	0 00:06:00
98 RDCO_21	0.13	100.00	98.00	76.00	4.75	4.52	0.59	0.15	0 00:06:00
99 RDCO_22	0.22	100.00	98.00	76.00	4.75	4.52	0.99	0.25	0 00:06:00
100 RDCO_25	0.30	100.00	98.00	76.00	4.75	4.52	1.36	0.34	0 00:06:00
101 RDCO_26	0.04	100.00	98.00	76.00	4.75	4.52	0.18	0.05	0 00:06:00
102 RDCO_31	0.15	100.00	98.00	76.00	4.75	4.52	0.68	0.17	0 00:06:00
103 RDCO_33	0.06	100.00	98.00	76.00	4.75	4.52	0.27	0.07	0 00:06:00
104 RDCO_34	0.18	100.00	98.00	76.00	4.75	4.52	0.81	0.20	0 00:06:00
105 RDCO_37	0.23	100.00	98.00	76.00	4.75	4.52	1.04	0.26	0 00:06:00
106 RDCO_41	0.07	100.00	98.00	76.00	4.75	4.52	0.32	0.08	0 00:06:00
107 RDCO_42	0.09	100.00	98.00	76.00	4.75	4.52	0.41	0.10	0 00:06:00
108 RDCO_44	0.17	100.00	98.00	76.00	4.75	4.52	0.77	0.19	0 00:06:00
109 RDCO_46	0.23	100.00	98.00	76.00	4.75	4.52	1.04	0.26	0 00:06:00
110 SDCB_035	0.57	58.00	98.00	76.00	4.75	3.60	2.05	0.50	0 00:06:00
111 SDCB_076	0.05	100.00	98.00	76.00	4.75	4.52	0.23	0.06	0 00:06:00
112 SDCB_077	0.05	100.00	98.00	76.00	4.75	4.52	0.23	0.06	0 00:06:00
113 SDCB_088	0.08	90.00	98.00	76.00	4.75	4.30	0.34	0.09	0 00:06:00
114 SPORT_UNDERDRAINS	3.73	100.00	98.00	76.00	4.75	4.52	16.86	4.22	0 00:06:00
115 Sub-124	0.21	89.00	98.00	76.00	4.75	4.28	0.90	0.22	0 00:06:00
116 Sub-142	0.03	100.00	98.00	76.00	4.75	4.52	0.14	0.03	0 00:06:00
117 TCD_#1	0.23	90.00	98.00	76.00	4.75	4.30	0.99	0.25	0 00:06:00
118 TCD_#2	0.20	100.00	98.00	76.00	4.75	4.52	0.90	0.23	0 00:06:00

Node Summary

SN	Element ID	Element Type	Invert Elevation	Ground/Rim (Max) Elevation	Initial Water Elevation	Surcharge Elevation	Ponded Area	Peak Inflow	Max HGL Elevation Attained	Max Surcharge Depth Attained	Min Freeboard Attained	Time of Peak Flooding Occurrence	Total Flooded Volume	Total Time Flooded
			(ft)	(ft)	(ft)	(ft)	(ft ²)	(cfs)	(ft)	(ft)	(ft)	(days hh:mm)	(ac-in)	(min)
1	AD 01	Junction	495.06	497.77	495.06	497.77	0.00	0.01	495.08	0.00	2.68	0 00:00	0.00	0.00
2	AD 02	Junction	487.37	491.86	487.37	491.86	0.00	0.10	487.44	0.00	4.42	0 00:00	0.00	0.00
3	AD 03	Junction	488.01	491.73	488.01	491.73	0.00	0.07	488.12	0.00	3.61	0 00:00	0.00	0.00
4	AD 04	Junction	501.01	503.72	501.01	503.72	0.00	0.37	502.82	0.00	0.90	0 00:00	0.00	0.00
5	AD 05	Junction	506.31	509.02	506.31	509.02	0.00	0.00	506.31	0.00	2.71	0 00:00	0.00	0.00
6	AD 06	Junction	506.20	508.91	506.20	508.91	0.00	0.04	506.25	0.00	2.66	0 00:00	0.00	0.00
7	AD 07	Junction	505.78	508.49	505.78	508.49	0.00	0.11	505.90	0.00	2.60	0 00:00	0.00	0.00
8	AD 08	Junction	506.92	509.63	506.92	509.63	0.00	0.06	506.98	0.00	2.65	0 00:00	0.00	0.00
9	AD 09	Junction	505.94	508.65	505.94	508.65	0.00	0.11	507.04	0.00	1.62	0 00:00	0.00	0.00
10	AD 10	Junction	506.90	509.61	506.90	509.61	0.00	0.07	507.29	0.00	2.32	0 00:00	0.00	0.00
11	AD 11	Junction	498.14	500.85	498.14	500.85	0.00	0.00	498.14	0.00	2.71	0 00:00	0.00	0.00
12	AD 12	Junction	500.98	503.84	500.98	503.84	0.00	0.00	500.98	0.00	2.87	0 00:00	0.00	0.00
13	AD 13	Junction	480.84	482.55	480.84	482.55	0.00	0.03	481.08	0.00	1.47	0 00:00	0.00	0.00
14	BPU-2	Junction	417.22	425.26	417.22	425.26	0.00	0.29	417.41	0.00	7.85	0 00:00	0.00	0.00
15	BPU-3	Junction	471.65	490.26	471.65	490.26	0.00	0.07	471.78	0.00	18.48	0 00:00	0.00	0.00
16	BPU-4	Junction	491.11	501.77	491.11	501.77	0.00	0.10	491.18	0.00	10.59	0 00:00	0.00	0.00
17	BPU-5	Junction	481.13	488.40	481.13	488.40	0.00	0.40	481.44	0.00	6.96	0 00:00	0.00	0.00
18	RDCO 01	Junction	500.60	509.93	500.60	509.93	0.00	3.78	502.82	0.00	7.11	0 00:00	0.00	0.00
19	RDCO 02	Junction	502.70	509.96	502.70	509.96	0.00	2.38	503.15	0.00	6.81	0 00:00	0.00	0.00
20	RDCO 03	Junction	502.88	509.98	502.88	509.98	0.00	2.25	503.59	0.00	6.39	0 00:00	0.00	0.00
21	RDCO 04	Junction	502.95	509.98	502.95	509.98	0.00	2.25	503.85	0.00	6.13	0 00:00	0.00	0.00
22	RDCO 05	Junction	503.24	509.92	503.24	509.92	0.00	2.26	504.11	0.00	5.81	0 00:00	0.00	0.00
23	RDCO 06	Junction	503.50	509.89	503.50	509.89	0.00	2.24	504.36	0.00	5.52	0 00:00	0.00	0.00
24	RDCO 07	Junction	504.39	509.94	504.39	509.94	0.00	2.24	505.04	0.00	4.90	0 00:00	0.00	0.00
25	RDCO 08	Junction	504.51	509.96	504.51	509.96	0.00	2.13	505.33	0.00	4.63	0 00:00	0.00	0.00
26	RDCO 09	Junction	504.97	509.98	504.97	509.98	0.00	1.25	505.79	0.00	4.19	0 00:00	0.00	0.00
27	RDCO 10	Junction	505.25	509.93	505.25	509.93	0.00	1.25	506.33	0.00	3.60	0 00:00	0.00	0.00
28	RDCO 11	Junction	505.85	509.84	505.85	509.84	0.00	1.06	507.03	0.00	2.80	0 00:00	0.00	0.00
29	RDCO 12	Junction	506.13	509.93	506.13	509.93	0.00	0.96	507.29	0.00	2.64	0 00:00	0.00	0.00
30	RDCO 13	Junction	506.35	509.91	506.35	509.91	0.00	0.93	507.68	0.00	2.23	0 00:00	0.00	0.00
31	RDCO 14	Junction	506.68	509.95	506.68	509.95	0.00	0.49	508.29	0.00	1.65	0 00:00	0.00	0.00
32	RDCO 15	Junction	507.40	509.92	507.40	509.92	0.00	0.49	509.92	0.00	0.00	0 07:58	0.00	0.00
33	RDCO 16	Junction	502.88	509.62	502.88	509.62	0.00	1.41	503.24	0.00	6.38	0 00:00	0.00	0.00
34	RDCO 17	Junction	503.04	509.95	503.04	509.95	0.00	1.15	503.52	0.00	6.43	0 00:00	0.00	0.00
35	RDCO 18	Junction	503.31	509.95	503.31	509.95	0.00	1.15	503.81	0.00	6.15	0 00:00	0.00	0.00
36	RDCO 19	Junction	503.65	509.27	503.65	509.27	0.00	1.01	504.09	0.00	5.17	0 00:00	0.00	0.00
37	RDCO 20	Junction	504.06	508.40	504.06	508.40	0.00	0.72	504.40	0.00	3.99	0 00:00	0.00	0.00
38	RDCO 21	Junction	504.60	509.96	504.60	509.96	0.00	0.72	504.95	0.00	5.02	0 00:00	0.00	0.00
39	RDCO 22	Junction	505.78	509.94	505.78	509.94	0.00	0.58	506.14	0.00	3.80	0 00:00	0.00	0.00
40	RDCO 23	Junction	506.01	509.91	506.01	509.91	0.00	0.34	506.29	0.00	3.62	0 00:00	0.00	0.00
41	RDCO 24	Junction	506.24	509.92	506.24	509.92	0.00	0.34	506.52	0.00	3.39	0 00:00	0.00	0.00
42	RDCO 25	Junction	507.40	509.92	507.40	509.92	0.00	0.34	507.65	0.00	2.27	0 00:00	0.00	0.00
43	RDCO 26	Junction	504.64	509.96	504.64	509.96	0.00	0.05	504.76	0.00	5.20	0 00:00	0.00	0.00
44	RDCO 27	Junction	498.14	503.90	498.14	503.90	0.00	0.44	498.43	0.00	5.47	0 00:00	0.00	0.00
45	RDCO 27A	Junction	497.78	503.90	497.78	503.90	0.00	0.69	498.06	0.00	5.84	0 00:00	0.00	0.00
46	RDCO 28	Junction	498.18	503.66	498.18	503.66	0.00	0.44	498.55	0.00	5.11	0 00:00	0.00	0.00
47	RDCO 29	Junction	498.63	502.86	498.63	502.86	0.00	0.44	498.91	0.00	3.94	0 00:00	0.00	0.00
48	RDCO 30	Junction	499.40	503.96	499.40	503.96	0.00	0.44	499.67	0.00	4.28	0 00:00	0.00	0.00
49	RDCO 31	Junction	499.51	503.97	499.51	503.97	0.00	0.44	499.85	0.00	4.12	0 00:00	0.00	0.00
50	RDCO 32	Junction	499.67	503.97	499.67	503.97	0.00	0.27	499.93	0.00	4.04	0 00:00	0.00	0.00
51	RDCO 33	Junction	500.77	503.93	500.77	503.93	0.00	0.27	500.99	0.00	2.94	0 00:00	0.00	0.00
52	RDCO 34	Junction	501.21	503.92	501.21	503.92	0.00	0.20	501.44	0.00	2.47	0 00:00	0.00	0.00
53	RDCO 35	Junction	500.83	503.98	500.83	503.98	0.00	0.26	500.93	0.00	3.05	0 00:00	0.00	0.00
54	RDCO 36	Junction	501.09	503.94	501.09	503.94	0.00	0.26	501.35	0.00	2.59	0 00:00	0.00	0.00
55	RDCO 37	Junction	501.46	503.95	501.46	503.95	0.00	0.26	501.69	0.00	2.26	0 00:00	0.00	0.00
56	RDCO 38	Junction	482.18	489.94	482.18	489.94	0.00	0.37	482.30	0.00	7.64	0 00:00	0.00	0.00
57	RDCO 39	Junction	485.50	489.92	485.50	489.92	0.00	0.18	485.62	0.00	4.31	0 00:00	0.00	0.00
58	RDCO 40	Junction	485.83	489.95	485.83	489.95	0.00	0.18	486.02	0.00	3.93	0 00:00	0.00	0.00
59	RDCO 41	Junction	486.04	489.93	486.04	489.93	0.00	0.18	486.24	0.00	3.69	0 00:00	0.00	0.00
60	RDCO 42	Junction	487.42	489.94	487.42	489.94	0.00	0.10	487.55	0.00	2.39	0 00:00	0.00	0.00
61	RDCO 43	Junction	487.38	489.94	487.38	489.94	0.00	0.19	487.52	0.00	2.42	0 00:00	0.00	0.00
62	RDCO 44	Junction	487.46	490.63	487.46	490.63	0.00	0.19	487.68	0.00	2.94	0 00:00	0.00	0.00
63	RDCO 45	Junction	502.19	505.80	502.19	505.80	0.00	0.26	502.82	0.00	2.98	0 00:00	0.00	0.00
64	RDCO 46	Junction	503.43	505.94	503.43	505.94	0.00	0.26	503.68	0.00	2.26	0 00:00	0.00	0.00
65	SDCB 001	Junction	406.15	415.54	408.15	415.54	0.00	1.76	408.66	0.00	6.88	0 00:00	0.00	0.00
66	SDCB 002	Junction	406.89	415.61	408.89	415.61	0.00	1.60	409.41	0.00	6.20	0 00:00	0.00	0.00
67	SDCB 003	Junction	406.97	415.28	408.97	415.28	0.00	1.53	409.56	0.00	5.72	0 00:00	0.00	0.00
68	SDCB 004	Junction	414.28	419.33	416.28	419.33	0.00	0.69	416.50	0.00	2.83	0 00:00	0.00	0.00
69	SDCB 005	Junction	414.68	419.74	416.68	419.74	0.00	0.22	416.88	0.00	2.86	0 00:00	0.00	0.00
70	SDCB 006	Junction	407.21	414.78	409.21	414.78	0.00	0.56	409.56	0.00	5.22	0 00:00	0.00	0.00
71	SDCB 007	Junction	405.31	416.01	409.31	416.01	0.00	0.56	409.62	0.00	6.39	0 00:00	0.00	0.00
72	SDCB 008	Junction	410.55	415.54	412.55	415.54	0.00	3.09	414.66	0.00	0.88	0 00:00	0.00	0.00
73	SDCB 009	Junction	410.59	415.62	412.59	415.62	0.00	3.09	414.67	0.00	0.96	0 00:00	0.00	0.00
74	SDCB 010	Junction	419.28	426.64	421.28	426.64	0.00	3.10	421.81	0.00	4.83	0 00:00	0.00	0.00
75	SDCB 011	Junction	428.28	433.23	430.28	433.23	0.00	2.87	430.62	0.00	2.61	0 00:00	0.00	0.00
76	SDCB 012	Junction	428.64	433.69	430.64	433.69	0.00	0.21	430.83	0.00	2.86	0 00:00	0.00	0.00
77	SDCB 013	Junction	450.12	455.60	452.12	455.60	0.00	1.73	452.40	0.00	3.20	0 00:00	0.00	0.00
78	SDCB 014	Junction	450.47	455.52	452.47	455.52	0.00	0.21	452.65	0.00	2.86	0 00:00	0.00	0.00
79	SDCB 015	Junction	470.99	476.05	472.99	476.05	0.00	0.90	473.18	0.00	2.87	0 00:00	0.00	0.00
80	SDCB 016	Junction	471.30	476.35	473.30	476.35	0.00	0.19	473.49	0.00	2.86	0 00:00	0.00	0.00
81	SDCB 017	Junction	414.58	423.39	416.58	42								

Node Summary

SN	Element ID	Element Type	Invert Elevation	Ground/Rim (Max) Elevation	Initial Water Elevation	Surcharge Elevation	Ponded Area	Peak Inflow	Max HGL Elevation Attained	Max Surcharge Depth Attained	Min Freeboard Attained	Time of Peak Flooding Occurrence	Total Flooded Volume	Total Time Flooded
			(ft)	(ft)	(ft)	(ft)	(ft²)	(cfs)	(ft)	(ft)	(ft)	(days hh:mm)	(ac-in)	(min)
82	SDCB 018	Junction	416.24	428.35	420.24	428.35	0.00	0.29	420.52	0.00	7.83	0 00:00	0.00	0.00
83	SDCB 019	Junction	422.57	427.90	424.57	427.90	0.00	3.26	426.59	0.00	1.30	0 00:00	0.00	0.00
84	SDCB 020	Junction	422.86	427.66	424.86	427.66	100.00	2.95	426.60	0.00	1.06	0 00:00	0.00	0.00
85	SDCB 021	Junction	423.80	428.27	425.80	428.27	100.00	0.27	426.60	0.00	1.66	0 00:00	0.00	0.00
86	SDCB 022	Junction	425.37	430.48	427.37	430.48	0.00	2.46	427.80	0.00	2.67	0 00:00	0.00	0.00
87	SDCB 023	Junction	425.66	430.72	427.66	430.72	0.00	2.33	428.51	0.00	2.21	0 00:00	0.00	0.00
88	SDCB 024	Junction	440.11	444.85	442.11	444.85	0.00	2.19	442.44	0.00	2.40	0 00:00	0.00	0.00
89	SDCB 025	Junction	440.64	445.37	442.64	445.37	0.00	1.81	444.02	0.00	1.35	0 00:00	0.00	0.00
90	SDCB 026	Junction	451.11	455.82	453.11	455.82	0.00	1.61	453.37	0.00	2.45	0 00:00	0.00	0.00
91	SDCB 027	Junction	456.94	461.65	458.94	461.65	0.00	1.55	459.26	0.00	2.39	0 00:00	0.00	0.00
92	SDCB 028	Junction	463.00	467.71	465.00	467.71	0.00	1.50	465.28	0.00	2.42	0 00:00	0.00	0.00
93	SDCB 029	Junction	474.56	479.27	476.56	479.27	0.00	1.43	476.83	0.00	2.44	0 00:00	0.00	0.00
94	SDCB 030	Junction	482.83	487.54	484.83	487.54	0.00	1.36	485.09	0.00	2.44	0 00:00	0.00	0.00
95	SDCB 031	Junction	487.54	492.25	489.54	492.25	0.00	0.12	489.62	0.00	2.63	0 00:00	0.00	0.00
96	SDCB 032	Junction	497.55	502.26	499.55	502.26	0.00	1.14	499.78	0.00	2.47	0 00:00	0.00	0.00
97	SDCB 033	Junction	500.07	504.78	502.07	504.78	0.00	0.03	502.12	0.00	2.66	0 00:00	0.00	0.00
98	SDCB 034	Junction	500.46	505.17	502.46	505.17	0.00	0.29	502.63	0.00	2.55	0 00:00	0.00	0.00
99	SDCB 035	Junction	499.95	504.66	501.95	504.66	100.00	0.61	502.20	0.00	2.46	0 00:00	0.00	0.00
100	SDCB 035A	Junction	503.77	508.53	505.77	508.53	0.00	0.11	505.88	0.00	2.66	0 00:00	0.00	0.00
101	SDCB 036	Junction	456.61	461.58	458.61	461.58	0.00	0.19	458.71	0.00	2.87	0 00:00	0.00	0.00
102	SDCB 037	Junction	456.85	461.58	458.85	461.58	0.00	0.08	458.98	0.00	2.60	0 00:00	0.00	0.00
103	SDCB 038	Junction	461.33	477.49	463.33	477.49	0.00	0.54	463.49	0.00	14.00	0 00:00	0.00	0.00
104	SDCB 039	Junction	463.10	478.99	465.10	478.99	0.00	0.54	465.24	0.00	13.76	0 00:00	0.00	0.00
105	SDCB 040	Junction	464.40	479.77	466.40	479.77	0.00	0.54	466.55	0.00	13.22	0 00:00	0.00	0.00
106	SDCB 041	Junction	464.93	481.73	466.93	481.73	0.00	0.54	467.20	0.00	14.52	0 00:00	0.00	0.00
107	SDCB 042	Junction	466.34	482.17	468.34	482.17	0.00	9.27	471.67	0.00	10.50	0 00:00	0.00	0.00
108	SDCB 043	Junction	467.05	480.00	469.05	480.00	0.00	5.27	471.68	0.00	8.32	0 00:00	0.00	0.00
109	SDCB 044	Junction	468.44	473.51	470.44	473.51	0.00	2.99	471.68	0.00	1.83	0 00:00	0.00	0.00
110	SDCB 045	Junction	469.38	481.47	471.38	481.47	0.00	2.94	472.03	0.00	9.44	0 00:00	0.00	0.00
111	SDCB 046	Junction	477.20	481.91	479.20	481.91	0.00	0.25	479.32	0.00	2.59	0 00:00	0.00	0.00
112	SDCB 047	Junction	475.42	480.44	477.42	480.44	0.00	1.41	477.70	0.00	2.74	0 00:00	0.00	0.00
113	SDCB 048	Junction	475.50	480.22	477.50	480.22	0.00	0.16	477.74	0.00	2.48	0 00:00	0.00	0.00
114	SDCB 049	Junction	480.87	485.88	482.87	485.88	0.00	1.02	483.18	0.00	2.70	0 00:00	0.00	0.00
115	SDCB 050	Junction	480.95	485.66	482.95	485.66	0.00	0.09	483.19	0.00	2.47	0 00:00	0.00	0.00
116	SDCB 051	Junction	486.91	492.07	488.91	492.07	0.00	0.78	489.15	0.00	2.92	0 00:00	0.00	0.00
117	SDCB 052	Junction	487.59	492.30	489.59	492.30	0.00	0.14	489.72	0.00	2.58	0 00:00	0.00	0.00
118	SDCB 053	Junction	497.82	502.53	499.82	502.53	0.00	0.45	499.98	0.00	2.55	0 00:00	0.00	0.00
119	SDCB 054	Junction	475.33	481.83	477.33	481.83	0.00	0.82	477.52	0.00	4.31	0 00:00	0.00	0.00
120	SDCB 055	Junction	476.05	482.04	478.05	482.04	0.00	0.66	478.37	0.00	3.67	0 00:00	0.00	0.00
121	SDCB 056	Junction	484.00	490.50	486.00	490.50	0.00	0.50	486.17	0.00	4.33	0 00:00	0.00	0.00
122	SDCB 057	Junction	485.57	490.28	487.57	490.28	0.00	0.09	487.69	0.00	2.59	0 00:00	0.00	0.00
123	SDCB 058	Junction	493.33	498.46	495.33	498.46	0.00	0.32	495.47	0.00	2.99	0 00:00	0.00	0.00
124	SDCB 059	Junction	493.51	498.22	495.51	498.22	0.00	0.15	495.76	0.00	2.46	0 00:00	0.00	0.00
125	SDCB 060	Junction	495.08	499.79	487.08	499.79	0.00	0.15	497.22	0.00	2.58	0 00:00	0.00	0.00
126	SDCB 061	Junction	468.37	498.87	470.37	498.87	0.00	0.07	470.48	0.00	28.38	0 00:00	0.00	0.00
127	SDCB 062	Junction	468.58	495.18	470.58	495.18	0.00	0.07	470.70	0.00	24.48	0 00:00	0.00	0.00
128	SDCB 063	Junction	468.96	494.35	470.96	494.35	0.00	0.07	471.07	0.00	23.28	0 00:00	0.00	0.00
129	SDCB 064	Junction	469.22	488.25	471.22	488.25	0.00	0.07	471.35	0.00	16.90	0 00:00	0.00	0.00
130	SDCB 065	Junction	469.63	489.77	471.63	489.77	0.00	0.07	471.75	0.00	18.02	0 00:00	0.00	0.00
131	SDCB 066	Junction	469.99	495.23	473.99	495.23	0.00	0.07	474.11	0.00	21.12	0 00:00	0.00	0.00
132	SDCB 067	Junction	477.83	494.68	479.83	494.68	0.00	1.01	480.10	0.00	14.58	0 00:00	0.00	0.00
133	SDCB 068	Junction	478.01	489.66	480.01	489.66	0.00	1.01	480.51	0.00	9.15	0 00:00	0.00	0.00
134	SDCB 069	Junction	478.46	489.32	480.46	489.32	0.00	0.40	480.82	0.00	8.50	0 00:00	0.00	0.00
135	SDCB 070	Junction	478.77	486.75	480.77	486.75	0.00	0.37	481.08	0.00	5.67	0 00:00	0.00	0.00
136	SDCB 071	Junction	484.97	490.27	486.97	490.27	0.00	0.34	487.08	0.00	3.19	0 00:00	0.00	0.00
137	SDCB 072	Junction	485.55	490.26	487.55	490.26	0.00	0.28	487.81	0.00	2.45	0 00:00	0.00	0.00
138	SDCB 073	Junction	485.76	490.47	487.76	490.47	0.00	0.28	488.02	0.00	2.45	0 00:00	0.00	0.00
139	SDCB 074	Junction	478.74	484.54	480.74	484.54	0.00	0.82	481.06	0.00	3.48	0 00:00	0.00	0.00
140	SDCB 075	Junction	479.00	485.62	481.00	485.62	0.00	0.40	481.28	0.00	4.34	0 00:00	0.00	0.00
141	SDCB 076	Junction	479.12	488.91	481.12	488.91	0.00	0.40	481.40	0.00	7.51	0 00:00	0.00	0.00
142	SDCB 077	Junction	479.87	490.77	481.87	490.77	0.00	0.40	481.93	0.00	8.85	0 00:00	0.00	0.00
143	SDCB 078	Junction	479.83	492.39	481.83	492.39	0.00	0.40	482.07	0.00	10.33	0 00:00	0.00	0.00
144	SDCB 079	Junction	480.44	500.94	482.44	500.94	0.00	0.30	482.63	0.00	18.32	0 00:00	0.00	0.00
145	SDCB 080	Junction	480.83	504.63	482.83	504.63	0.00	0.30	483.02	0.00	21.60	0 00:00	0.00	0.00
146	SDCB 081	Junction	481.24	504.68	483.24	504.68	0.00	0.30	483.44	0.00	21.24	0 00:00	0.00	0.00
147	SDCB 082	Junction	481.67	504.85	483.67	504.85	0.00	0.30	483.86	0.00	20.99	0 00:00	0.00	0.00
148	SDCB 083	Junction	483.69	496.97	485.69	496.97	0.00	0.30	485.87	0.00	11.10	0 00:00	0.00	0.00
149	SDCB 084	Junction	485.76	491.38	487.76	491.38	0.00	0.30	487.94	0.00	3.44	0 00:00	0.00	0.00
150	SDCB 084A	Junction	484.33	495.07	486.33	495.07	0.00	0.30	486.52	0.00	8.54	0 00:00	0.00	0.00
151	SDCB 085	Junction	489.01	507.17	491.01	507.17	0.00	0.30	491.09	0.00	16.07	0 00:00	0.00	0.00
152	SDCB 086	Junction	489.19	506.62	491.19	506.62	0.00	0.31	491.40	0.00	15.22	0 00:00	0.00	0.00
153	SDCB 087	Junction	494.54	507.06	498.54	507.06	0.00	0.22	498.66	0.00	8.40	0 00:00	0.00	0.00
154	SDCB 088	Junction	496.57	507.04	498.57	507.04	0.00	9.10	502.81	0.00	4.23	0 00:00	0.00	0.00
155	SDCB 089	Junction	500.77	505.62	502.77	505.62	0.00	0.07	502.82	0.00	2.80	0 00:00	0.00	0.00
156	SDCB 090	Junction	502.16	507.12	504.16	507.12	0.00	0.07	504.26	0.00	2.86	0 00:00	0.00	0.00
157	SDCB 091	Junction	502.41	507.12	504.41	507.12	0.00	0.03	504.50	0.00	2.62	0 00:00	0.00	0.00
158	SDCB 092	Junction	496.43	509.32	498.43	509.32	0.00	4.97	502.81	0.00	6.51	0 00:00	0.00	0.00
159	SDCB 093	Junction	499.02	507.16	501.02	507.16	0.00	1.25	502.82	0.00	4.34	0 00:00	0.00	0.00
160	SDCB 094	Junction	501.20	505.91	503.20	505.91	0.00	0.50	503.49	0.00	2.42	0 00:00	0.00	0.00
161	SDCB 095	Junction	501.57											

Node Summary

SN Element ID	Element Type	Invert Elevation	Ground/Rim (Max) Elevation	Initial Water Elevation	Surcharge Elevation	Ponded Area	Peak Inflow	Max HGL Elevation Attained	Max Surcharge Depth Attained	Min Freeboard Attained	Time of Peak Flooding Occurrence	Total Flooded Volume	Total Time Flooded
		(ft)	(ft)	(ft)	(ft)	(ft²)	(cfs)	(ft)	(ft)	(ft)	(days hh:mm)	(ac-in)	(min)
163 SDCB 097	Junction	506.76	509.47	506.76	509.47	0.00	0.06	506.87	0.00	2.60	0 00:00	0.00	0.00
164 SDCB 098	Junction	489.33	502.02	493.33	502.02	0.00	0.10	493.46	0.00	8.56	0 00:00	0.00	0.00
165 SDCB 099	Junction	492.51	503.14	494.51	503.14	0.00	2.64	498.75	0.00	4.39	0 00:00	0.00	0.00
166 SDCB 100	Junction	497.28	502.86	499.28	502.86	0.00	0.18	499.38	0.00	3.49	0 00:00	0.00	0.00
167 SDCB 101	Junction	497.64	502.35	499.64	502.35	0.00	0.18	499.82	0.00	2.53	0 00:00	0.00	0.00
168 SDCB 102	Junction	493.05	502.87	495.05	502.87	0.00	2.47	498.76	0.00	4.11	0 00:00	0.00	0.00
169 SDCB 103	Junction	495.98	502.25	497.98	502.25	0.00	0.97	498.76	0.00	3.49	0 00:00	0.00	0.00
170 SDCB 104	Junction	496.44	501.15	498.44	501.15	0.00	0.50	498.82	0.00	2.33	0 00:00	0.00	0.00
171 SDCB 105	Junction	493.38	503.07	495.38	503.07	0.00	1.53	498.76	0.00	4.31	0 00:00	0.00	0.00
172 SDCB 106	Junction	493.98	502.46	495.98	502.46	0.00	1.49	498.76	0.00	3.70	0 00:00	0.00	0.00
173 SDCB 107	Junction	494.85	502.08	496.85	502.08	0.00	1.16	498.76	0.00	3.31	0 00:00	0.00	0.00
174 SDCB 108	Junction	496.80	501.56	498.80	501.56	0.00	0.64	499.15	0.00	2.41	0 00:00	0.00	0.00
175 SDCB 109	Junction	498.93	503.65	500.93	503.65	0.00	0.22	501.09	0.00	2.56	0 00:00	0.00	0.00
176 SDCB 110	Junction	501.34	506.06	503.34	506.06	0.00	0.13	503.45	0.00	2.61	0 00:00	0.00	0.00
177 SDCB 111	Junction	487.19	492.57	489.19	492.57	0.00	0.10	489.25	0.00	3.32	0 00:00	0.00	0.00
178 SDCB 112	Junction	491.75	504.69	493.75	504.69	0.00	0.10	493.80	0.00	10.89	0 00:00	0.00	0.00
179 SDCB 113	Junction	491.64	504.38	495.64	504.38	0.00	0.10	495.72	0.00	8.66	0 00:00	0.00	0.00
180 SDCB 114	Junction	497.80	507.07	499.80	507.07	0.00	2.41	501.08	0.00	5.99	0 00:00	0.00	0.00
181 SDCB 115	Junction	498.40	506.66	500.40	506.66	0.00	0.62	501.08	0.00	5.57	0 00:00	0.00	0.00
182 SDCB 116	Junction	498.88	504.70	500.88	504.70	0.00	0.62	501.31	0.00	3.39	0 00:00	0.00	0.00
183 SDCB 117	Junction	499.03	503.74	501.03	503.74	0.00	0.62	501.51	0.00	2.23	0 00:00	0.00	0.00
184 SDCB 118	Junction	498.64	509.36	500.64	509.36	0.00	0.37	501.08	0.00	8.28	0 00:00	0.00	0.00
185 SDCB 119	Junction	498.94	507.15	500.94	507.15	0.00	1.29	501.34	0.00	5.81	0 00:00	0.00	0.00
186 SDCB 120	Junction	499.20	505.68	501.20	505.68	0.00	1.29	501.76	0.00	3.92	0 00:00	0.00	0.00
187 SDCB 121	Junction	499.95	506.54	501.95	506.54	0.00	0.74	502.45	0.00	4.09	0 00:00	0.00	0.00
188 SDCB 122	Junction	502.76	507.47	504.76	507.47	0.00	0.32	504.96	0.00	2.52	0 00:00	0.00	0.00
189 SDCB 123	Junction	500.29	504.68	502.29	504.68	0.00	0.06	502.45	0.00	2.22	0 00:00	0.00	0.00
190 SDCB 124	Junction	488.67	502.91	490.67	502.91	0.00	0.50	491.40	0.00	11.52	0 00:00	0.00	0.00
191 SDCB 125	Junction	488.95	501.82	490.95	501.82	0.00	0.08	491.40	0.00	10.43	0 00:00	0.00	0.00
192 SDCB 126	Junction	487.05	501.31	491.05	501.31	0.00	0.08	491.40	0.00	9.91	0 00:00	0.00	0.00
193 SDCB 127	Junction	494.44	501.08	496.44	501.08	0.00	2.02	497.99	0.00	3.09	0 00:00	0.00	0.00
194 SDCB 128	Junction	494.68	501.56	496.68	501.56	0.00	1.15	497.99	0.00	3.57	0 00:00	0.00	0.00
195 SDCB 129	Junction	495.11	500.16	497.11	500.16	0.00	0.21	497.99	0.00	2.17	0 00:00	0.00	0.00
196 SDCB 130	Junction	410.12	414.04	412.12	414.04	0.00	0.74	412.66	0.00	1.38	0 00:00	0.00	0.00
197 SDCB 131	Junction	410.41	414.08	412.41	414.08	0.00	0.13	412.67	0.00	1.40	0 00:00	0.00	0.00
198 SDCB 132	Junction	410.15	413.92	412.15	413.92	0.00	0.61	412.71	0.00	1.21	0 00:00	0.00	0.00
199 SDCB 133	Junction	410.23	414.61	412.23	414.61	0.00	0.39	412.76	0.00	1.85	0 00:00	0.00	0.00
200 SDCB 134	Junction	477.65	483.22	479.65	483.22	2000.00	0.00	479.65	0.00	3.57	0 00:00	0.00	0.00
201 SDCO 02	Junction	409.41	419.94	409.41	419.94	0.00	3.08	414.64	0.00	5.30	0 00:00	0.00	0.00
202 SDCO 03	Junction	482.51	485.69	482.51	485.69	0.00	2.44	482.81	0.00	2.89	0 00:00	0.00	0.00
203 TDC #1	Junction	497.91	500.42	497.91	500.42	0.00	0.25	498.76	0.00	1.66	0 00:00	0.00	0.00
204 TDC #2	Junction	504.24	504.95	504.24	504.95	0.00	0.27	504.34	0.00	0.61	0 00:00	0.00	0.00
205 EX_CB_1	Outfall	484.31					0.10	485.31					
206 EX_CB_2	Outfall	478.41					0.82	479.41					
207 OUT_#4	Outfall	469.72					0.07	469.82					
208 Out-02	Outfall	411.38					0.74	411.74					
209 OUTFALL #2	Outfall	408.00					1.76	408.43					
210 OUTFALL_#1	Outfall	453.20					0.54	453.37					
211 OUTFALL_#3	Outfall	483.00					0.00	483.00					
212 DETENTION_1	Storage Node	466.43	474.64	466.93		0.00	9.27	471.67				0.00	0.00
213 DETENTION_2	Storage Node	419.74	427.95	420.24		0.00	3.26	426.59				0.00	0.00
214 DETENTION_3	Storage Node	473.49	481.45	473.99		0.00	1.01	479.49				0.00	0.00
215 DETENTION_4	Storage Node	498.04	506.33	498.54		0.00	9.10	502.81				0.00	0.00
216 DETENTION_5	Storage Node	492.83	501.04	493.33		0.00	2.64	498.75				0.00	0.00
217 DETENTION_6	Storage Node	495.14	503.35	495.64		0.00	2.41	501.08				0.00	0.00
218 DETENTION_7	Storage Node	492.35	500.64	492.85		0.00	2.02	497.99				0.00	0.00
219 DETENTION_8	Storage Node	408.81	415.54	409.31		0.00	3.08	414.64				0.00	0.00

Link Summary

SN Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Reported Surcharged Condition
				(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		(min)
1 Link-100	Pipe	SDCO 03	SDCB 045	101.58	482.51	471.38	10.9600	12.000	0.0120	2.44	12.78	0.19	6.66	0.47	0.47	0.00 Calculated
2 Link-101	Pipe	SDCB 046	SDCB 045	90.66	479.20	471.71	8.2600	8.000	0.0120	0.25	3.76	0.07	5.01	0.22	0.33	0.00 Calculated
3 Link-102	Pipe	SDCB 048	SDCB 047	16.00	477.50	477.42	0.5000	8.000	0.0120	0.16	0.93	0.17	1.31	0.25	0.38	0.00 Calculated
4 Link-103	Pipe	RDCO 16	RDCO 01	188.37	502.88	500.60	1.2100	12.000	0.0100	1.41	5.10	0.28	2.74	0.68	0.68	0.00 Calculated
5 Link-104	Pipe	SDCB 132	SDCB 130	5.91	412.15	410.12	34.3400	8.000	0.0150	0.61	6.14	0.10	1.82	0.62	0.92	0.00 Calculated
6 Link-105	Pipe	SDCB 063	SDCB 064	53.19	471.22	470.96	0.5000	12.000	0.0120	0.07	2.73	0.02	0.44	0.25	0.25	0.00 Calculated
7 Link-106	Pipe	SDCB 064	SDCB 065	80.88	471.63	471.22	0.5000	12.000	0.0120	0.07	2.73	0.03	0.32	0.31	0.31	0.00 Calculated
8 Link-107	Pipe	BPU-3	SDCB 065	5.00	471.65	471.63	0.5000	12.000	0.0120	0.07	2.73	0.03	1.18	0.13	0.13	0.00 Calculated
9 Link-108	Pipe	SDCB 068	SDCB 067	36.40	480.01	479.83	0.5000	12.000	0.0120	1.01	2.73	0.37	2.88	0.46	0.46	0.00 Calculated
10 Link-109	Pipe	SDCB 067	DETENTION_3	5.00	479.83	478.95	17.6400	12.000	0.0120	1.01	16.21	0.06	7.91	0.30	0.30	0.00 Calculated
11 Link-110	Pipe	RDCO 02	RDCO 01	80.23	502.70	500.60	2.6100	12.000	0.0100	2.38	7.48	0.32	4.30	0.73	0.73	0.00 Calculated
12 Link-111	Pipe	RDCO 30	RDCO 29	101.94	499.40	498.63	0.7500	8.000	0.0100	0.44	1.36	0.32	3.16	0.28	0.42	0.00 Calculated
13 Link-112	Pipe	AD 12	RDCO 30	6.31	500.98	499.40	25.0000	8.000	0.0120	0.00	6.55	0.00	0.00	0.14	0.21	0.00 Calculated
14 Link-114	Pipe	SDCB 077	BPU-5	5.00	481.68	481.63	0.9800	18.000	0.0120	0.40	11.27	0.04	2.48	0.22	0.15	0.00 Calculated
15 Link-115	Pipe	BPU-5	SDCB 076	5.00	481.13	481.12	0.2000	24.000	0.0120	0.40	10.96	0.04	1.37	0.30	0.15	0.00 Calculated
16 Link-116	Pipe	SDCB 076	SDCB 075	56.86	481.12	481.00	0.2100	24.000	0.0120	0.40	11.21	0.04	1.49	0.28	0.14	0.00 Calculated
17 Link-117	Pipe	SDCB 091	SDCB 090	50.46	504.41	504.16	0.5000	8.000	0.0120	0.03	0.93	0.04	1.10	0.10	0.14	0.00 Calculated
18 Link-118	Pipe	SDCB 090	SDCB 089	142.59	504.16	502.77	0.9700	8.000	0.0120	0.07	1.29	0.05	1.93	0.10	0.16	0.00 Calculated
19 Link-119	Pipe	SDCB 089	SDCB 088	12.23	502.77	499.40	27.5900	8.000	0.0120	0.07	6.88	0.01	3.75	0.36	0.53	0.00 Calculated
20 Link-120	Pipe	RDCO 46	RDCO 45	247.67	503.43	502.19	0.5000	6.000	0.0100	0.26	0.52	0.50	2.48	0.29	0.58	0.00 Calculated
21 Link-121	Pipe	RDCO 45	AD 04	62.70	502.19	501.87	0.5000	6.000	0.0100	0.26	0.52	0.50	2.17	0.50	1.00	142.00 SURCHARGED
22 Link-122	Pipe	AD 05	SDCB 095	159.64	506.31	503.57	1.7100	8.000	0.0120	0.00	1.71	0.00	0.00	0.00	0.00	0.00 Calculated
23 Link-123	Pipe	SDCB 095	SDCB 094	38.11	503.57	503.20	0.9800	8.000	0.0120	0.00	1.30	0.00	0.00	0.15	0.22	0.00 Calculated
24 Link-124	Pipe	SDCB 102	SDCB 099	53.97	495.05	494.51	1.0000	12.000	0.0120	2.47	3.86	0.64	3.14	1.00	1.00	967.00 SURCHARGED
25 Link-125	Pipe	SDCB 104	SDCB 103	92.98	498.44	497.98	0.5000	8.000	0.0120	0.50	0.93	0.54	2.65	0.49	0.74	0.00 Calculated
26 Link-126	Pipe	AD 11	SDCB 127	33.69	498.14	496.77	4.0600	8.000	0.0120	0.00	2.64	0.00	0.00	0.33	0.50	0.00 Calculated
27 Link-127	Pipe	SDCB 129	SDCB 128	84.85	497.11	496.68	0.5000	12.000	0.0120	0.21	2.73	0.08	0.85	0.94	0.94	0.00 Calculated
28 Link-128	Pipe	SDCB 035A	SDCB 035	137.71	505.77	501.95	2.7800	8.000	0.0120	0.11	2.18	0.05	1.50	0.18	0.27	0.00 Calculated
29 Link-129	Pipe	AD 13	SDCB 070	14.44	480.84	480.77	0.5000	8.000	0.0120	0.03	0.92	0.04	0.27	0.28	0.42	0.00 Calculated
30 Link-13	Pipe	SDCB 108	SDCB 107	174.19	498.80	497.19	0.9300	8.000	0.0120	0.64	1.26	0.51	3.53	0.40	0.59	0.00 Calculated
31 Link-131	Pipe	SDCB 084A	SDCB 083	93.22	486.33	485.69	0.6900	18.000	0.0120	0.30	9.45	0.03	2.36	0.19	0.12	0.00 Calculated
32 Link-132	Pipe	SDCB 134	OUTFALL_#3	145.18	479.65	478.84	0.5600	18.000	0.0120	0.00	17.29	0.00	0.00	0.00	0.00	0.00 Calculated
33 Link-14	Pipe	SDCB 045	SDCB 044	46.89	471.38	470.44	2.0000	12.000	0.0120	2.93	5.46	0.54	5.20	0.68	0.68	0.00 Calculated
34 Link-16	Pipe	SDCB 032	SDCB 030	138.50	499.55	484.83	10.6300	8.000	0.0120	1.14	4.27	0.27	9.41	0.25	0.38	0.00 Calculated
35 Link-17	Pipe	SDCB 060	SDCB 058	96.20	497.08	495.33	1.8200	8.000	0.0120	0.15	1.77	0.09	3.03	0.13	0.20	0.00 Calculated
36 Link-18	Pipe	SDCB 002	SDCB 001	46.72	408.89	408.65	0.5000	18.000	0.0120	1.60	8.05	0.20	3.20	0.49	0.33	0.00 Calculated
37 Link-19	Pipe	SDCB 018	BPU-2	5.00	420.24	420.22	0.5000	12.000	0.0120	0.29	2.73	0.11	1.92	0.25	0.25	0.00 Calculated
38 Link-20	Pipe	BPU-2	SDCB 017	61.16	417.22	416.58	1.0400	12.000	0.0120	0.29	3.95	0.07	2.83	0.19	0.19	0.00 Calculated
39 Link-21	Pipe	SDCB 017	SDCB 002	306.34	416.58	409.39	2.3500	12.000	0.0120	0.29	5.91	0.05	3.89	0.15	0.15	0.00 Calculated
40 Link-25	Pipe	SDCB 004	SDCB 003	201.58	416.28	409.64	3.3000	12.000	0.0120	0.69	7.01	0.10	5.59	0.21	0.21	0.00 Calculated
41 Link-26	Pipe	SDCO 02	DETENTION_8	5.70	409.41	409.39	0.4900	18.000	0.0120	3.08	7.98	0.39	1.74	1.50	1.00	1050.00 SURCHARGED
42 Link-27	Pipe	SDCB 001	OUTFALL_#2	30.29	408.15	408.00	0.5000	24.000	0.0120	1.76	17.30	0.10	3.12	0.47	0.24	0.00 Calculated
43 Link-29	Pipe	SDCB 019	DETENTION_2	8.98	424.57	424.13	4.9200	12.000	0.0120	3.26	8.56	0.38	6.92	1.00	1.00	679.00 SURCHARGED
44 Link-30	Pipe	SDCB 130	Out-02	66.99	412.12	411.38	1.1000	12.000	0.0300	0.74	1.62	0.45	2.17	0.45	0.45	0.00 Calculated
45 Link-31	Pipe	SDCB 007	SDCB 006	19.00	409.31	409.21	0.5000	18.000	0.0120	0.56	8.05	0.07	2.21	0.31	0.21	0.00 Calculated
46 Link-32	Pipe	SDCB 006	SDCB 003	48.95	409.21	408.97	0.5000	18.000	0.0120	0.56	8.05	0.07	1.78	0.47	0.31	0.00 Calculated
47 Link-33	Pipe	SDCB 022	SDCB 020	94.95	427.37	424.86	2.6400	12.000	0.0120	2.46	6.28	0.39	4.08	0.72	0.72	0.00 Calculated
48 Link-34	Pipe	SDCB 023	SDCB 022	57.83	427.66	427.37	0.5000	12.000	0.0120	2.33	2.73	0.85	3.67	0.75	0.75	0.00 Calculated
49 Link-39	Pipe	SDCB 038	OUTFALL_#1	277.48	463.33	453.20	3.6500	18.000	0.0120	0.54	21.75	0.02	5.00	0.17	0.11	0.00 Calculated
50 Link-40	Pipe	SDCB 100	SDCB 099	58.78	499.28	494.84	7.5500	8.000	0.0120	0.18	3.60	0.05	3.46	0.38	0.58	0.00 Calculated
51 Link-42	Pipe	SDCB 103	SDCB 102	71.65	497.98	495.38	3.6300	8.000	0.0120	0.97	2.49	0.39	5.68	0.67	1.00	110.00 SURCHARGED
52 Link-43	Pipe	SDCB 101	SDCB 100	36.42	499.64	499.28	1.0000	8.000	0.0120	0.18	1.31	0.14	2.48	0.17	0.26	0.00 Calculated
53 Link-45	Pipe	SDCB 099	DETENTION_5	7.00	494.51	494.44	1.0000	12.000	0.0120	2.64	3.86	0.68	3.36	1.00	1.00	976.00 SURCHARGED
54 Link-47	Pipe	SDCB 098	BPU-4	5.04	493.33	493.28	0.9900	12.000	0.0120	0.10	3.84	0.02	1.73	0.12	0.12	0.00 Calculated
55 Link-48	Pipe	BPU-4	EX_CB_1	109.69	491.11	484.31	6.2000	12.000	0.0120	0.10	9.61	0.01	0.22	0.54	0.54	0.00 Calculated
56 Link-51	Pipe	AD 01	SDCB 073	61.91	495.06	487.76	11.7900	8.000	0.0120	0.01	4.49	0.00	0.26	0.14	0.22	0.00 Calculated
57 Link-52	Pipe	SDCB 073	SDCB 072	29.56	487.76	487.55	0.7000	8.000	0.0120	0.28	1.10	0.25	2.21	0.26	0.39	0.00 Calculated
58 Link-57	Pipe	SDCB 113	SDCB 112	43.66	495.64	493.75	4.3200	12.000	0.0120	0.10	8.03	0.01	3.41	0.08	0.08	0.00 Calculated

Link Summary

SN Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Reported Surcharged Condition
				(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		(min)
59 Link-59	Pipe	SDCB 111	SDCB 078	42.84	489.19	482.33	16.0100	12.000	0.0120	0.10	15.44	0.01	5.41	0.06	0.06	0.00 Calculated
60 Link-60	Pipe	SDCB 078	SDCB 077	15.50	481.83	481.68	0.9800	18.000	0.0120	0.40	11.27	0.04	2.17	0.24	0.16	0.00 Calculated
61 Link-61	Pipe	SDCB 074	EX_CB_2	91.52	480.74	478.41	2.5500	12.000	0.0200	0.82	3.70	0.22	1.49	0.66	0.66	0.00 Calculated
62 Link-63	Pipe	SDCB 112	SDCB 111	18.25	493.75	489.19	25.0000	12.000	0.0120	0.10	19.30	0.01	5.78	0.05	0.05	0.00 Calculated
63 Link-64	Pipe	AD 02	SDCB 068	52.30	487.37	480.35	13.4300	8.000	0.0120	0.10	4.80	0.02	4.94	0.11	0.17	0.00 Calculated
64 Link-67	Pipe	SDCB 066	BPU-3	34.64	473.99	473.82	0.5000	12.000	0.0120	0.07	2.73	0.03	1.45	0.11	0.11	0.00 Calculated
65 Link-68	Pipe	SDCB 063	SDCB 062	74.62	470.96	470.58	0.5000	12.000	0.0120	0.07	2.73	0.02	1.41	0.11	0.11	0.00 Calculated
66 Link-69	Pipe	SDCB 062	SDCB 061	42.23	470.58	470.37	0.5000	12.000	0.0120	0.07	2.73	0.02	1.40	0.11	0.11	0.00 Calculated
67 Link-70	Pipe	SDCB 061	OUT_#4	130.71	470.37	469.72	0.5000	12.000	0.0120	0.07	2.73	0.02	1.49	0.11	0.11	0.00 Calculated
68 Link-73	Pipe	SDCB 087	SDCB 086	379.96	498.54	491.19	1.9300	18.000	0.0120	0.22	15.83	0.01	2.24	0.16	0.11	0.00 Calculated
69 Link-74	Pipe	SDCB 086	SDCB 085	26.16	491.19	491.01	0.6900	18.000	0.0120	0.30	9.47	0.03	2.26	0.19	0.13	0.00 Calculated
70 Link-75	Pipe	SDCB 085	SDCB 084	16.72	491.01	487.76	19.4400	18.000	0.0120	0.30	50.17	0.01	4.04	0.13	0.09	0.00 Calculated
71 Link-76	Pipe	SDCB 084	SDCB 084A	172.54	487.76	486.33	0.8300	18.000	0.0120	0.30	10.36	0.03	2.44	0.18	0.12	0.00 Calculated
72 Link-77	Pipe	SDCB 083	SDCB 082	292.32	485.69	483.67	0.6900	18.000	0.0120	0.30	9.45	0.03	2.34	0.19	0.13	0.00 Calculated
73 Link-78	Pipe	SDCB 082	SDCB 081	62.22	483.67	483.24	0.6900	18.000	0.0120	0.30	9.45	0.03	2.26	0.19	0.13	0.00 Calculated
74 Link-79	Pipe	SDCB 081	SDCB 080	60.08	483.24	482.83	0.6900	18.000	0.0120	0.30	9.46	0.03	2.25	0.19	0.13	0.00 Calculated
75 Link-80	Pipe	SDCB 080	SDCB 079	55.99	482.83	482.44	0.6900	18.000	0.0120	0.30	9.45	0.03	2.33	0.19	0.13	0.00 Calculated
76 Link-81	Pipe	SDCB 079	SDCB 078	88.50	482.44	481.83	0.6900	18.000	0.0120	0.30	9.46	0.03	2.06	0.21	0.14	0.00 Calculated
77 Link-82	Pipe	SDCB 117	SDCB 116	29.40	501.03	500.88	0.5000	8.000	0.0120	0.62	0.93	0.67	2.45	0.45	0.68	0.00 Calculated
78 Link-83	Pipe	SDCB 116	SDCB 115	97.58	500.88	500.39	0.5000	8.000	0.0120	0.62	0.93	0.67	2.47	0.45	0.68	0.00 Calculated
79 Link-84	Pipe	SDCB 115	SDCB 114	53.01	500.40	500.13	0.5000	8.000	0.0120	0.61	0.93	0.66	2.34	0.67	1.00	23.00 SURCHARGED
80 Link-85	Pipe	SDCB 114	DETENTION_6	21.92	499.80	499.69	0.5000	12.000	0.0120	2.41	2.73	0.88	3.63	1.00	1.00	231.00 SURCHARGED
81 Link-87	Pipe	SDCB 126	SDCB 125	20.59	491.05	490.95	0.5000	12.000	0.0120	0.08	2.73	0.03	0.27	0.40	0.40	0.00 Calculated
82 Link-88	Pipe	SDCB 125	SDCB 124	56.35	490.95	490.67	0.5000	12.000	0.0120	0.08	2.73	0.03	0.51	0.59	0.59	0.00 Calculated
83 Link-89	Pipe	SDCB 124	SDCB 086	216.18	490.67	489.58	0.5000	12.000	0.0120	0.50	2.73	0.18	0.93	0.87	0.87	0.00 Calculated
84 Link-92	Pipe	SDCB 044	SDCB 043	80.36	470.44	469.55	1.1000	12.000	0.0100	2.99	4.86	0.62	5.46	1.00	1.00	298.00 SURCHARGED
85 Link-93	Pipe	SDCB 075	SDCB 074	52.16	481.00	480.74	0.5000	12.000	0.0120	0.40	2.73	0.15	2.34	0.27	0.27	0.00 Calculated
86 Link-94	Pipe	SDCB 075	SDCB 134	52.51	482.00	479.65	4.4800	24.000	0.0140	0.00	44.47	0.00	0.00	0.00	0.00	0.00 Calculated
87 Link-95	Pipe	SDCB 034	SDCB 032	100.53	502.46	499.55	2.9000	8.000	0.0120	0.29	2.23	0.13	3.33	0.20	0.30	0.00 Calculated
88 Link-96	Pipe	SDCB 033	SDCB 032	38.51	502.07	499.55	6.5500	8.000	0.0120	0.03	3.35	0.01	0.60	0.14	0.21	0.00 Calculated
89 Link-97	Pipe	SDCB 041	SDCB 040	99.36	466.93	466.40	0.5300	18.000	0.0120	0.54	8.29	0.07	2.54	0.27	0.18	0.00 Calculated
90 Link-98	Pipe	SDCB 040	SDCB 039	12.43	466.40	465.10	10.4900	18.000	0.0120	0.54	36.85	0.01	6.32	0.14	0.10	0.00 Calculated
91 Link-99	Pipe	SDCB 039	SDCB 038	17.39	465.10	463.33	10.1700	18.000	0.0120	0.54	36.29	0.01	5.86	0.15	0.10	0.00 Calculated
92 P - (111)	Pipe	SDCB 121	SDCB 120	83.71	501.95	501.53	0.5000	8.000	0.0120	0.73	0.93	0.79	2.90	0.45	0.68	0.00 Calculated
93 P - (115)	Pipe	SDCB 118	SDCB 114	94.85	500.64	500.13	0.5300	8.000	0.0120	0.37	0.96	0.39	1.98	0.55	0.83	0.00 Calculated
94 P - (119)	Pipe	RDCO 01	SDCB 092	71.57	500.60	499.74	1.2100	12.000	0.0120	3.78	4.24	0.89	4.81	1.00	1.00	820.00 SURCHARGED
95 P - (119) (2)	Pipe	SDCB 092	SDCB 088	134.37	499.24	498.57	0.5000	18.000	0.0120	4.97	8.05	0.62	2.81	1.50	1.00	973.00 SURCHARGED
96 P - (125)	Pipe	SDCB 106	SDCB 105	120.03	495.98	495.38	0.5000	12.000	0.0120	1.41	2.73	0.52	2.80	1.00	1.00	825.00 SURCHARGED
97 P - (125) (1)	Pipe	SDCB 107	SDCB 106	174.19	496.85	495.98	0.5000	12.000	0.0120	1.16	2.73	0.43	2.90	1.00	1.00	536.00 SURCHARGED
98 P - (129)	Pipe	SDCB 128	SDCB 127	49.06	496.68	496.44	0.5000	12.000	0.0120	1.15	2.73	0.42	3.02	1.00	1.00	293.00 SURCHARGED
99 P - (129) (1)	Pipe	SDCB 127	DETENTION_7	36.48	496.44	494.61	5.0000	12.000	0.0120	2.02	8.63	0.23	6.24	1.00	1.00	442.00 SURCHARGED
100 P - (130)	Pipe	TDC #1	SDCB 106	10.93	497.91	496.48	13.0100	6.000	0.0100	0.25	2.63	0.09	7.18	0.50	1.00	266.00 SURCHARGED
101 P - (131)	Pipe	SDCB 015	SDCB 013	278.34	472.99	452.12	7.5000	12.000	0.0120	0.90	10.57	0.08	6.31	0.24	0.24	0.00 Calculated
102 P - (131) (1)	Pipe	SDCB 013	SDCB 011	304.53	452.12	430.28	7.1700	12.000	0.0120	1.72	10.34	0.17	8.22	0.31	0.31	0.00 Calculated
103 P - (132)	Pipe	SDCB 011	SDCB 010	110.47	430.28	421.28	8.1400	12.000	0.0120	2.87	11.01	0.26	8.66	0.44	0.44	0.00 Calculated
104 P - (132) (1)	Pipe	SDCB 009	SDCB 008	8.54	412.59	412.55	0.5000	12.000	0.0120	3.09	2.74	1.13	4.24	1.00	1.00	914.00 SURCHARGED
105 P - (132) (2)	Pipe	SDCB 010	SDCB 009	410.95	421.28	412.59	2.1100	12.000	0.0120	3.09	5.61	0.55	4.80	0.76	0.76	0.00 Calculated
106 P - (133)	Pipe	SDCB 005	SDCB 004	74.34	416.68	416.28	0.5400	12.000	0.0120	0.22	2.83	0.08	1.89	0.20	0.20	0.00 Calculated
107 P - (134)	Pipe	SDCB 072	SDCB 071	116.52	487.55	486.97	0.5000	8.000	0.0120	0.28	0.93	0.30	2.29	0.25	0.38	0.00 Calculated
108 P - (134) (1)	Pipe	SDCB 069	SDCB 068	22.78	480.46	480.35	0.5000	8.000	0.0120	0.40	0.93	0.43	2.36	0.32	0.49	0.00 Calculated
109 P - (134) (2)	Pipe	SDCB 070	SDCB 069	61.13	480.77	480.46	0.5000	8.000	0.0120	0.37	0.92	0.40	2.11	0.34	0.50	0.00 Calculated
110 P - (136)	Pipe	SDCB 024	SDCB 023	123.34	442.11	427.99	11.4500	8.000	0.0120	2.19	4.43	0.49	10.71	0.43	0.64	0.00 Calculated
111 P - (137)	Pipe	SDCB 036	SDCB 024	151.88	458.61	442.11	10.8700	8.000	0.0120	0.19	4.32	0.04	2.00	0.21	0.32	0.00 Calculated
112 P - (138)	Pipe	SDCB 049	SDCB 047	153.40	482.87	477.42	3.5500	8.000	0.0120	1.02	2.47	0.41	6.54	0.30	0.46	0.00 Calculated
113 P - (139) (1)	Pipe	SDCB 053	SDCB 051	158.86	499.82	488.91	6.8700	8.000	0.0120	0.45	3.43	0.13	5.01	0.20	0.30	0.00 Calculated
114 P - (140)	Pipe	SDCB 051	SDCB 049	132.82	488.91	482.87	4.5400	8.000	0.0120	0.78	2.79	0.28	5.72	0.28	0.41	0.00 Calculated
115 P - (141)	Pipe	AD 03	AD 02	63.37	488.01	487.37	1.0000	8.000	0.0120	0.07	1.31	0.06	2.48	0.09	0.14	0.00 Calculated
116 P - (144)	Pipe	SDCB 052	SDCB 051	45.90	489.59	488.91	1.5000	8.000	0.0120	0.14	1.60	0.08	1.70	0.19	0.28	0.00 Calculated

Link Summary

SN Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Reported Surcharged Condition
				(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		(min)
117 P - (145)	Pipe	SDCB 050	SDCB 049	16.00	482.95	482.87	0.5000	8.000	0.0120	0.09	0.93	0.09	0.64	0.27	0.41	0.00 Calculated
118 P - (148)	Pipe	SDCB 110	SDCB 109	102.22	503.34	500.93	2.3500	8.000	0.0120	0.13	2.01	0.06	2.44	0.14	0.21	0.00 Calculated
119 P - (149)	Pipe	SDCB 109	SDCB 108	127.35	500.93	498.80	1.6700	8.000	0.0120	0.22	1.69	0.13	1.76	0.26	0.38	0.00 Calculated
120 P - (151)	Pipe	RDCO 27A	SDCB 128	100.08	497.45	496.68	0.7600	12.000	0.0120	0.69	4.04	0.17	2.33	0.60	0.60	0.00 Calculated
121 P - (159)	Pipe	SDCB 003	SDCB 002	16.30	408.97	408.89	0.5000	18.000	0.0120	1.53	8.02	0.19	2.55	0.56	0.37	0.00 Calculated
122 P - (171)	Pipe	TDC #2	SDCB 118	24.02	504.24	500.64	15.0000	8.000	0.0120	0.27	5.07	0.05	3.15	0.24	0.36	0.00 Calculated
123 P - (182)	Pipe	SDCB 025	SDCB 024	47.27	442.64	442.11	1.1200	8.000	0.0120	1.81	1.38	1.31	5.25	0.64	0.96	0.00 > CAPACITY
124 P - (184)	Pipe	SDCB 037	SDCB 036	46.83	458.85	458.61	0.5000	8.000	0.0120	0.08	0.93	0.08	1.60	0.13	0.20	0.00 Calculated
125 P - (210)	Pipe	SDCB 096	SDCB 035A	110.88	506.33	505.77	0.5000	8.000	0.0120	0.11	0.93	0.12	1.79	0.16	0.23	0.00 Calculated
126 P - (211)	Pipe	SDCB 097	SDCB 096	85.92	506.76	506.33	0.5000	8.000	0.0120	0.06	0.93	0.06	1.10	0.14	0.20	0.00 Calculated
127 P - (218)	Pipe	SDCB 120	SDCB 119	51.10	501.20	500.94	0.5000	12.000	0.0120	1.29	2.73	0.47	3.12	0.52	0.52	0.00 Calculated
128 P - (219)	Pipe	SDCB 119	SDCB 114	117.57	500.94	499.80	0.9700	12.000	0.0120	1.29	3.81	0.34	2.36	0.66	0.66	0.00 Calculated
129 P - (221)	Pipe	SDCB 122	SDCB 121	161.19	504.76	501.95	1.7500	8.000	0.0120	0.32	1.73	0.18	1.73	0.35	0.52	0.00 Calculated
130 P - (225)	Pipe	SDCB 105	SDCB 102	67.33	495.38	495.05	0.5000	12.000	0.0120	1.53	2.73	0.56	2.56	1.00	1.00	962.00 SURCHARGED
131 P - (231)	Pipe	SDCB 088	DETENTION_4	5.00	498.57	498.54	0.5000	18.000	0.0120	9.10	8.05	1.13	5.15	1.50	1.00	997.00 SURCHARGED
132 P - (232)	Pipe	RDCO 25	RDCO 24	88.39	507.40	506.40	1.1300	6.000	0.0100	0.34	0.77	0.44	3.64	0.24	0.48	0.00 Calculated
133 P - (233)	Pipe	RDCO 24	RDCO 23	46.01	506.24	506.01	0.5000	8.000	0.0100	0.34	1.11	0.30	2.37	0.28	0.43	0.00 Calculated
134 P - (234)	Pipe	RDCO 23	RDCO 22	45.64	506.01	505.78	0.5000	8.000	0.0100	0.34	1.11	0.30	2.01	0.32	0.48	0.00 Calculated
135 P - (235)	Pipe	RDCO 22	RDCO 21	168.86	505.78	504.93	0.5000	8.000	0.0100	0.58	1.11	0.52	3.10	0.35	0.53	0.00 Calculated
136 P - (236)	Pipe	RDCO 21	RDCO 20	108.25	504.60	504.06	0.5000	12.000	0.0100	0.72	3.27	0.22	3.01	0.34	0.34	0.00 Calculated
137 P - (237)	Pipe	RDCO 20	RDCO 19	81.81	504.06	503.65	0.5000	12.000	0.0100	0.72	3.27	0.22	2.51	0.39	0.39	0.00 Calculated
138 P - (238)	Pipe	RDCO 19	RDCO 18	67.66	503.65	503.31	0.5000	12.000	0.0100	1.01	3.27	0.31	2.79	0.47	0.47	0.00 Calculated
139 P - (239)	Pipe	RDCO 18	RDCO 17	54.94	503.31	503.04	0.5000	12.000	0.0100	1.15	3.28	0.35	3.01	0.49	0.49	0.00 Calculated
140 P - (240)	Pipe	RDCO 17	RDCO 16	30.78	503.04	502.88	0.5000	12.000	0.0100	1.15	3.28	0.35	3.64	0.42	0.42	0.00 Calculated
141 P - (242)	Pipe	RDCO 15	RDCO 14	143.69	507.40	506.68	0.5000	6.000	0.0100	0.49	0.52	0.94	2.57	0.50	1.00	8.00 SURCHARGED
142 P - (243)	Pipe	RDCO 14	RDCO 13	32.33	506.68	506.52	0.5000	6.000	0.0100	0.49	0.52	0.94	2.57	0.50	1.00	12.00 SURCHARGED
143 P - (244)	Pipe	RDCO 13	RDCO 12	44.58	506.35	506.13	0.5000	8.000	0.0100	0.93	1.11	0.83	2.77	0.67	1.00	12.00 SURCHARGED
144 P - (244) (1)	Pipe	RDCO 12	RDCO 11	37.23	506.13	505.85	0.7400	8.000	0.0100	0.96	1.35	0.71	2.99	0.67	1.00	14.00 SURCHARGED
145 P - (245)	Pipe	RDCO 11	RDCO 10	121.72	505.85	505.25	0.5000	8.000	0.0100	1.06	1.11	0.96	3.04	0.67	1.00	18.00 SURCHARGED
146 P - (246)	Pipe	RDCO 10	RDCO 09	54.85	505.25	504.97	0.5000	8.000	0.0100	1.25	1.11	1.13	3.58	0.67	1.00	22.00 SURCHARGED
147 P - (247)	Pipe	RDCO 09	RDCO 08	25.66	504.97	504.84	0.5000	8.000	0.0100	1.25	1.11	1.13	3.79	0.60	0.90	0.00 > CAPACITY
148 P - (248)	Pipe	RDCO 08	RDCO 07	24.07	504.51	504.39	0.5000	12.000	0.0100	2.12	3.27	0.65	3.43	0.74	0.74	0.00 Calculated
149 P - (248) (1)	Pipe	RDCO 07	RDCO 06	177.43	504.39	503.50	0.5000	12.000	0.0100	2.24	3.27	0.68	3.53	0.76	0.76	0.00 Calculated
150 P - (249)	Pipe	RDCO 06	RDCO 05	53.06	503.50	503.24	0.5000	12.000	0.0100	2.22	3.27	0.68	3.09	0.87	0.87	0.00 Calculated
151 P - (249) (1)	Pipe	RDCO 05	RDCO 04	58.27	503.24	502.95	0.5000	12.000	0.0100	2.25	3.27	0.69	3.06	0.89	0.89	0.00 Calculated
152 P - (250)	Pipe	RDCO 04	RDCO 03	13.79	502.95	502.88	0.5000	12.000	0.0100	2.25	3.28	0.69	3.31	0.81	0.81	0.00 Calculated
153 P - (251)	Pipe	RDCO 03	RDCO 02	36.29	502.88	502.70	0.5000	12.000	0.0100	2.25	3.27	0.69	4.97	0.58	0.58	0.00 Calculated
154 P - (253)	Pipe	RDCO 26	TDC #2	47.39	504.64	504.41	0.5000	6.000	0.0120	0.04	0.43	0.10	1.42	0.11	0.22	0.00 Calculated
155 P - (258)	Pipe	RDCO 34	RDCO 33	89.00	501.21	500.77	0.5000	6.000	0.0100	0.20	0.52	0.39	2.34	0.23	0.45	0.00 Calculated
156 P - (259)	Pipe	RDCO 33	RDCO 32	93.51	500.77	499.83	1.0000	6.000	0.0100	0.27	0.73	0.37	3.30	0.22	0.43	0.00 Calculated
157 P - (260)	Pipe	RDCO 32	RDCO 31	30.62	499.67	499.51	0.5000	8.000	0.0100	0.27	1.11	0.24	1.74	0.30	0.46	0.00 Calculated
158 P - (261)	Pipe	RDCO 31	RDCO 30	15.27	499.51	499.40	0.7500	8.000	0.0120	0.44	1.14	0.38	2.77	0.31	0.46	0.00 Calculated
159 P - (262)	Pipe	RDCO 37	RDCO 36	36.32	501.46	501.09	1.0000	6.000	0.0100	0.26	0.73	0.36	2.70	0.25	0.49	0.00 Calculated
160 P - (263)	Pipe	RDCO 36	RDCO 35	26.56	501.09	500.83	1.0000	6.000	0.0100	0.26	0.73	0.35	4.08	0.18	0.36	0.00 Calculated
161 P - (264)	Pipe	RDCO 35	RDCO 27A	11.54	500.83	497.95	24.9500	6.000	0.0100	0.26	3.64	0.07	9.00	0.11	0.21	0.00 Calculated
162 P - (265)	Pipe	RDCO 28	RDCO 27	5.29	498.18	498.14	0.7400	8.000	0.0100	0.44	1.35	0.32	2.50	0.33	0.50	0.00 Calculated
163 P - (266)	Pipe	RDCO 29	RDCO 28	60.54	498.63	498.18	0.7500	8.000	0.0100	0.44	1.36	0.32	2.56	0.33	0.49	0.00 Calculated
164 P - (267)	Pipe	RDCO 27	RDCO 27A	47.85	498.14	497.78	0.7500	8.000	0.0100	0.44	1.36	0.32	3.03	0.29	0.43	0.00 Calculated
165 P - (268)	Pipe	RDCO 42	RDCO 41	138.08	487.42	486.04	1.0000	6.000	0.0100	0.10	0.73	0.14	1.84	0.16	0.32	0.00 Calculated
166 P - (269)	Pipe	RDCO 41	RDCO 40	21.63	486.04	485.83	1.0000	6.000	0.0100	0.18	0.73	0.25	2.50	0.20	0.39	0.00 Calculated
167 P - (270)	Pipe	RDCO 40	RDCO 39	32.53	485.83	485.50	1.0000	6.000	0.0100	0.18	0.73	0.25	3.41	0.16	0.31	0.00 Calculated
168 P - (271)	Pipe	RDCO 39	RDCO 38	64.44	485.50	482.34	4.9000	6.000	0.0100	0.18	1.61	0.11	5.25	0.11	0.23	0.00 Calculated
169 P - (272)	Pipe	RDCO 38	SDCB 068	7.32	482.18	480.35	25.0100	8.000	0.0120	0.37	6.55	0.06	8.20	0.14	0.21	0.00 Calculated
170 P - (273)	Pipe	RDCO 44	RDCO 43	7.24	487.46	487.38	0.9900	6.000	0.0120	0.19	0.61	0.32	2.97	0.18	0.36	0.00 Calculated
171 P - (274)	Pipe	RDCO 43	RDCO 38	170.62	487.38	482.34	2.9500	6.000	0.0100	0.19	1.25	0.15	4.55	0.13	0.27	0.00 Calculated
172 P - (276)	Pipe	SDCB 123	SDCB 121	67.99	502.29	501.95	0.5000	8.000	0.0120	0.06	0.93	0.07	0.40	0.33	0.50	0.00 Calculated
173 P - (282)	Pipe	AD 04	SDCB 093	104.48	501.87	501.35	0.5000	8.000	0.0120	0.37	0.93	0.40	2.45	0.67	1.00	267.00 SURCHARGED
174 P - (283)	Pipe	SDCB 093	SDCB 092	256.57	501.02	499.74	0.5000	12.000	0.0120	1.19	2.73	0.44	2.31	1.00	1.00	593.00 SURCHARGED

Link Summary

SN Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Reported Surcharged Condition (min)
				(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		
175 P - (291)	Pipe	AD 10	RDCO 12	12.39	506.90	506.13	6.2600	8.000	0.0120	0.06	3.28	0.02	0.27	0.53	0.79	0.00 Calculated
176 P - (292)	Pipe	AD 09	RDCO 11	17.89	505.94	505.85	0.5000	8.000	0.0120	0.11	0.92	0.12	0.40	0.67	1.00	14.00 SURCHARGED
177 P - (293)	Pipe	AD 07	RDCO 07	54.87	505.78	504.72	1.9400	8.000	0.0120	0.11	1.82	0.06	2.28	0.22	0.33	0.00 Calculated
178 P - (295)	Pipe	AD 08	RDCO 08	26.63	506.92	504.84	7.8000	8.000	0.0120	0.06	3.66	0.02	2.62	0.27	0.41	0.00 Calculated
179 P - (296)	Pipe	AD 06	RDCO 05	48.54	505.91	503.57	4.8100	8.000	0.0120	0.04	3.05	0.01	2.19	0.29	0.44	0.00 Calculated
180 P - (298)	Pipe	SDCB 094	SDCB 093	177.08	503.20	501.35	1.0400	8.000	0.0120	0.50	1.34	0.37	3.47	0.39	0.58	0.00 Calculated
181 P - (299)	Pipe	SDCB 035	SDCB 032	85.86	501.95	499.55	2.8000	8.000	0.0120	0.61	2.19	0.28	5.16	0.25	0.37	0.00 Calculated
182 P - (319)	Pipe	SDCB 071	SDCB 070	37.78	486.97	480.77	16.4200	8.000	0.0120	0.34	5.30	0.06	3.50	0.21	0.32	0.00 Calculated
183 P - (320)	Pipe	SDCB 016	SDCB 015	63.83	473.30	472.99	0.4900	12.000	0.0120	0.19	2.71	0.07	1.81	0.19	0.19	0.00 Calculated
184 P - (321)	Pipe	SDCB 014	SDCB 013	68.75	452.47	452.12	0.5000	12.000	0.0120	0.21	2.73	0.08	1.51	0.23	0.23	0.00 Calculated
185 P - (322)	Pipe	SDCB 012	SDCB 011	73.83	430.64	430.28	0.5000	12.000	0.0120	0.21	2.73	0.08	1.22	0.27	0.27	0.00 Calculated
186 P - (324)	Pipe	SDCB 131	SDCB 130	56.92	412.41	412.12	0.5000	8.000	0.0150	0.13	0.74	0.17	0.63	0.40	0.60	0.00 Calculated
187 P - (326)	Pipe	SDCB 133	SDCB 132	15.09	412.23	412.15	0.5200	8.000	0.0150	0.39	0.75	0.52	1.28	0.55	0.82	0.00 Calculated
188 P - (34)	Pipe	SDCB 021	SDCB 020	14.58	425.80	425.19	4.2200	8.000	0.0120	0.27	2.69	0.10	3.32	0.67	1.00	222.00 SURCHARGED
189 P - (34) (2)	Pipe	SDCB 020	SDCB 019	57.00	424.86	424.57	0.5000	12.000	0.0120	2.95	2.73	1.08	4.07	1.00	1.00	584.00 SURCHARGED
190 P - (36)	Pipe	SDCB 047	SDCB 043	79.66	477.42	469.89	9.4600	8.000	0.0120	1.41	4.03	0.35	9.52	0.45	0.67	0.00 Calculated
191 P - (40)	Pipe	SDCB 043	SDCB 042	142.41	469.05	468.34	0.5000	18.000	0.0120	5.26	8.05	0.65	2.99	1.50	1.00	741.00 SURCHARGED
192 P - (48)	Pipe	SDCB 042	DETENTION_1	5.00	468.34	468.32	0.5000	18.000	0.0120	9.27	8.05	1.15	5.57	1.50	1.00	908.00 SURCHARGED
193 P - (58)	Pipe	SDCB 028	SDCB 027	52.28	465.00	458.94	11.5800	8.000	0.0120	1.50	4.46	0.34	9.81	0.30	0.45	0.00 Calculated
194 P - (58) (1)	Pipe	SDCB 027	SDCB 026	61.63	458.94	453.11	9.4700	8.000	0.0120	1.55	4.03	0.39	10.09	0.30	0.45	0.00 Calculated
195 P - (58) (1) (1)	Pipe	SDCB 026	SDCB 025	74.26	453.11	442.64	14.1000	8.000	0.0120	1.61	4.92	0.33	6.20	0.46	0.70	0.00 Calculated
196 P - (60)	Pipe	SDCB 031	SDCB 030	46.49	489.54	484.83	10.1400	8.000	0.0120	0.12	4.17	0.03	1.66	0.17	0.26	0.00 Calculated
197 P - (61)	Pipe	SDCB 030	SDCB 029	71.46	484.83	476.56	11.5600	8.000	0.0120	1.36	4.45	0.31	10.31	0.27	0.40	0.00 Calculated
198 P - (65)	Pipe	SDCB 029	SDCB 028	100.63	476.56	465.00	11.4900	8.000	0.0120	1.43	4.44	0.32	10.40	0.28	0.42	0.00 Calculated
199 P - (78)	Pipe	SDCB 058	SDCB 056	120.21	495.33	486.00	7.7700	8.000	0.0120	0.32	3.65	0.09	5.25	0.15	0.23	0.00 Calculated
200 P - (78) (2) (1)	Pipe	SDCB 056	SDCB 055	123.21	486.00	478.05	6.4500	8.000	0.0120	0.50	3.32	0.15	4.26	0.25	0.37	0.00 Calculated
201 P - (83)	Pipe	SDCB 054	SDCB 043	56.71	477.33	469.89	13.1300	8.000	0.0120	0.82	4.74	0.17	9.07	0.40	0.60	0.00 Calculated
202 P - (84)	Pipe	SDCB 058	SDCB 059	35.83	495.51	495.33	0.5000	8.000	0.0120	0.14	0.93	0.16	0.95	0.30	0.45	0.00 Calculated
203 P - (85)	Pipe	SDCB 055	SDCB 054	35.86	478.05	477.33	2.0000	8.000	0.0120	0.66	1.85	0.36	4.42	0.30	0.44	0.00 Calculated
204 P - (86)	Pipe	SDCB 056	SDCB 057	35.83	487.57	486.00	4.3800	8.000	0.0120	0.09	2.74	0.03	0.45	0.37	0.56	0.00 Calculated
205 SF_VAULT	Pipe	SDCB 008	SDCO 02	50.64	412.55	409.91	5.2100	12.000	0.0120	3.08	8.81	0.35	5.01	1.00	1.00	915.00 SURCHARGED
206 DETENTION_1_OUT	Outlet	DETENTION_1	SDCB 041		466.43	464.93				0.54						
207 DETENTION_2_OUT	Outlet	DETENTION_2	SDCB 018		419.74	416.24				0.29						
208 DETENTION_3_OUT	Outlet	DETENTION_3	SDCB 066		473.49	469.99				0.07						
209 DETENTION_4_OUT	Outlet	DETENTION_4	SDCB 087		498.04	494.54				0.22						
210 DETENTION_5_OUT	Outlet	DETENTION_5	SDCB 098		492.83	489.33				0.10						
211 DETENTION_6_OUT	Outlet	DETENTION_6	SDCB 113		495.14	491.64				0.10						
212 DETENTION_7_OUT	Outlet	DETENTION_7	SDCB 126		492.35	487.05				0.08						
213 DETENTION_8_OUT	Outlet	DETENTION_8	SDCB 007		408.81	405.31				0.56						

Subbasin Hydrology**Subbasin : 001****Input Data**

Area (ac) 0.15
Impervious Area (%) 94.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

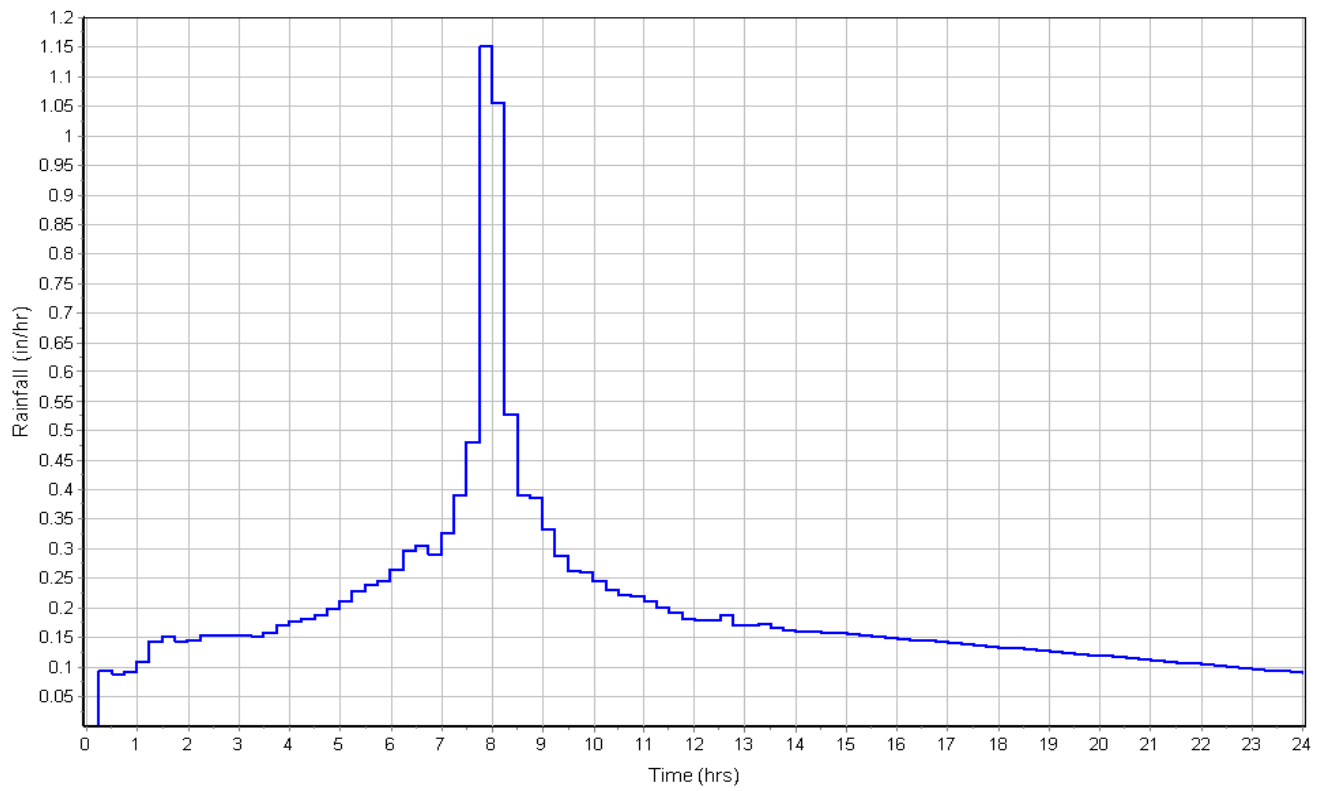
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.15		96.68

Subbasin Runoff Results

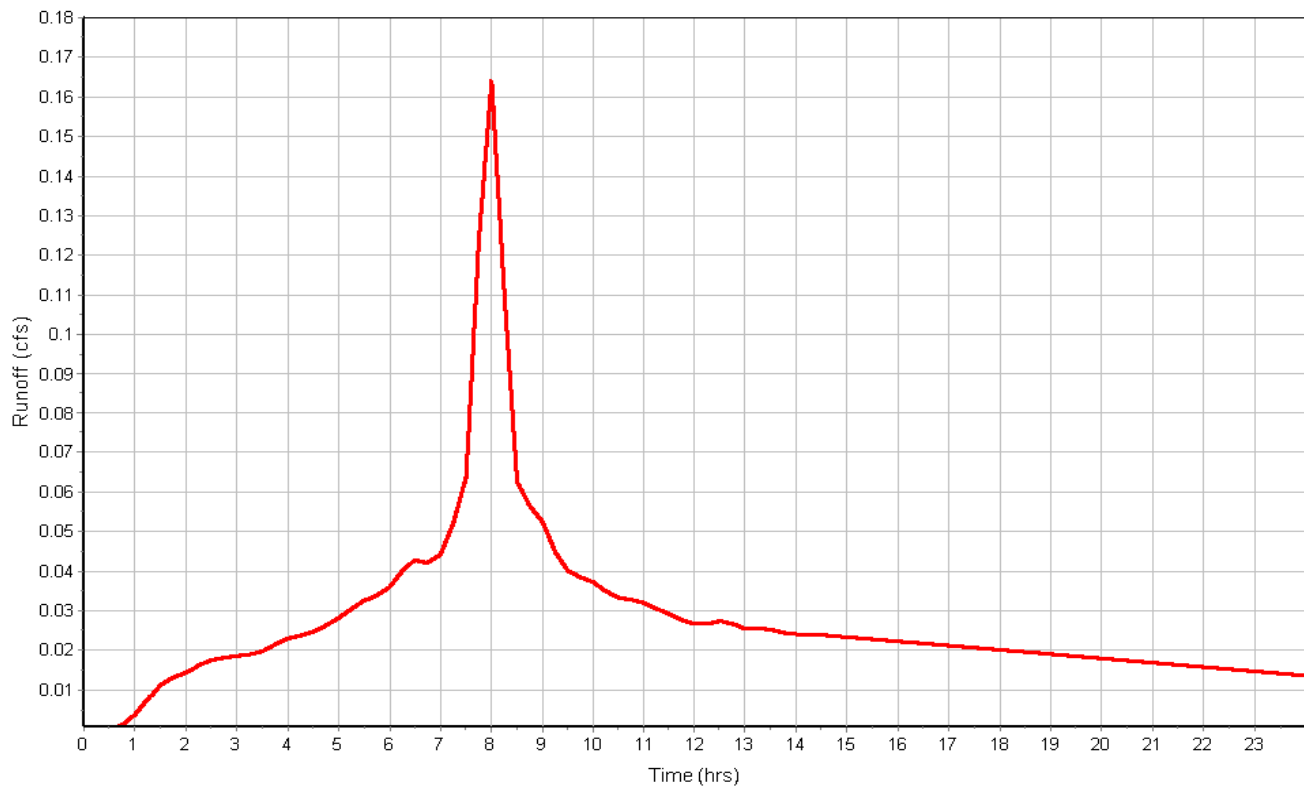
Total Rainfall (in) 4.75
Total Runoff (in) 4.39
Peak Runoff (cfs) 0.16
Weighted Curve Number 96.68
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 001

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 003**Input Data**

Area (ac) 0.86
Impervious Area (%) 33.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

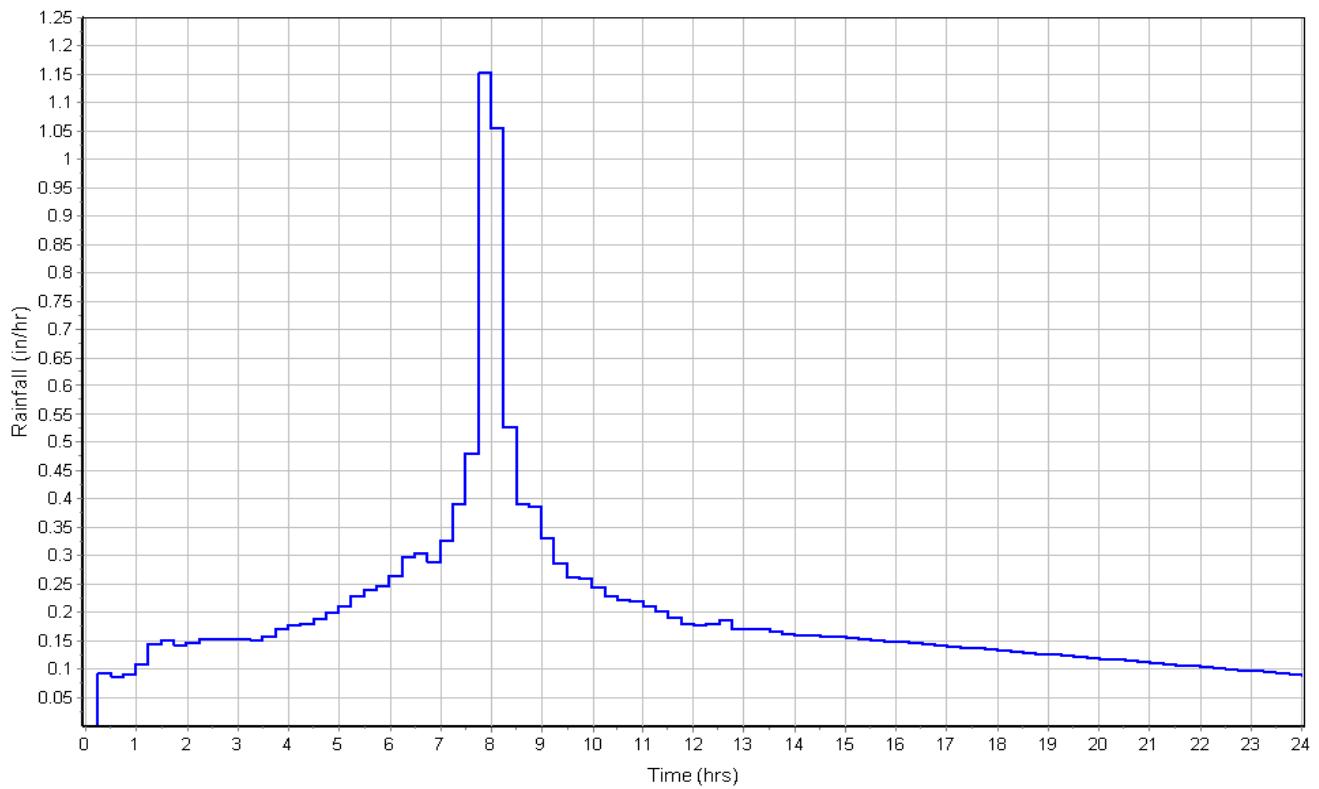
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.86		83.26

Subbasin Runoff Results

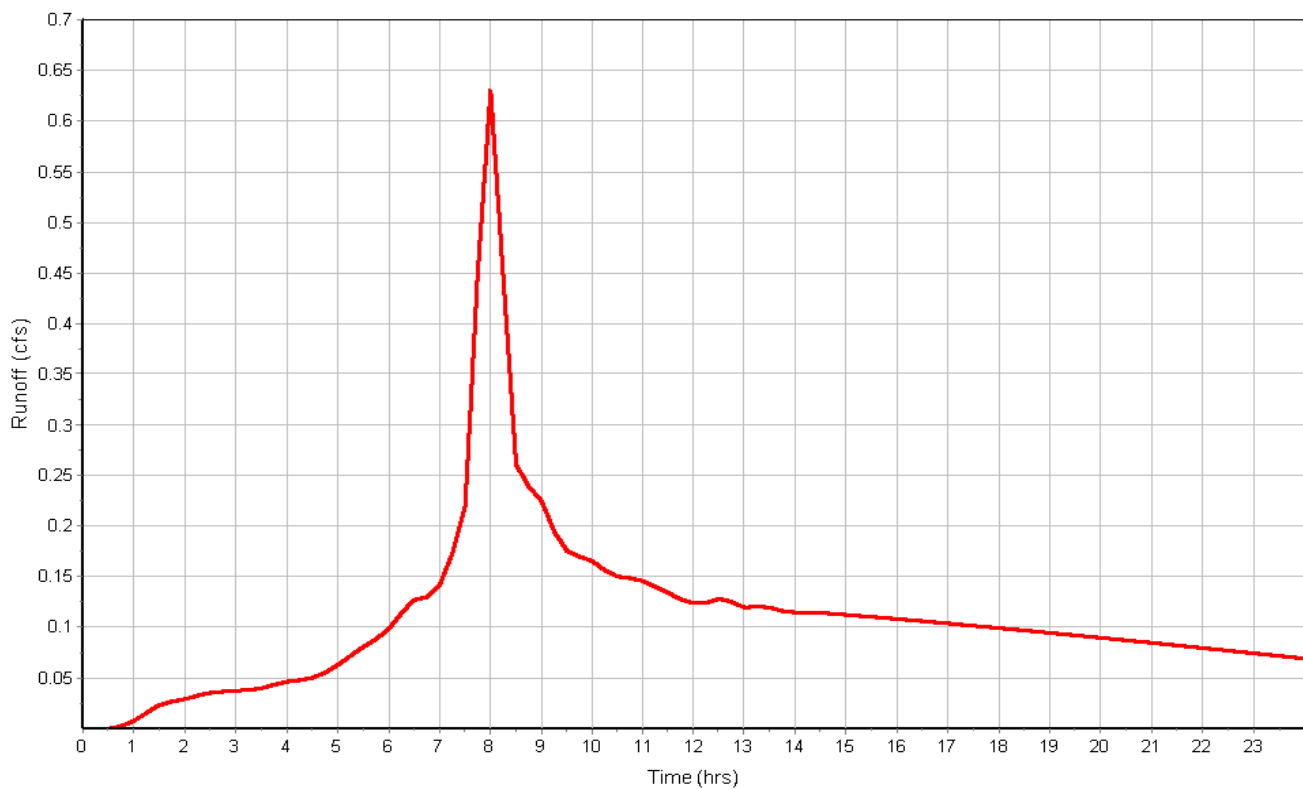
Total Rainfall (in) 4.75
Total Runoff (in) 3.06
Peak Runoff (cfs) 0.63
Weighted Curve Number 83.26
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 003

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 004**Input Data**

Area (ac) 0.53
Impervious Area (%) 61.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

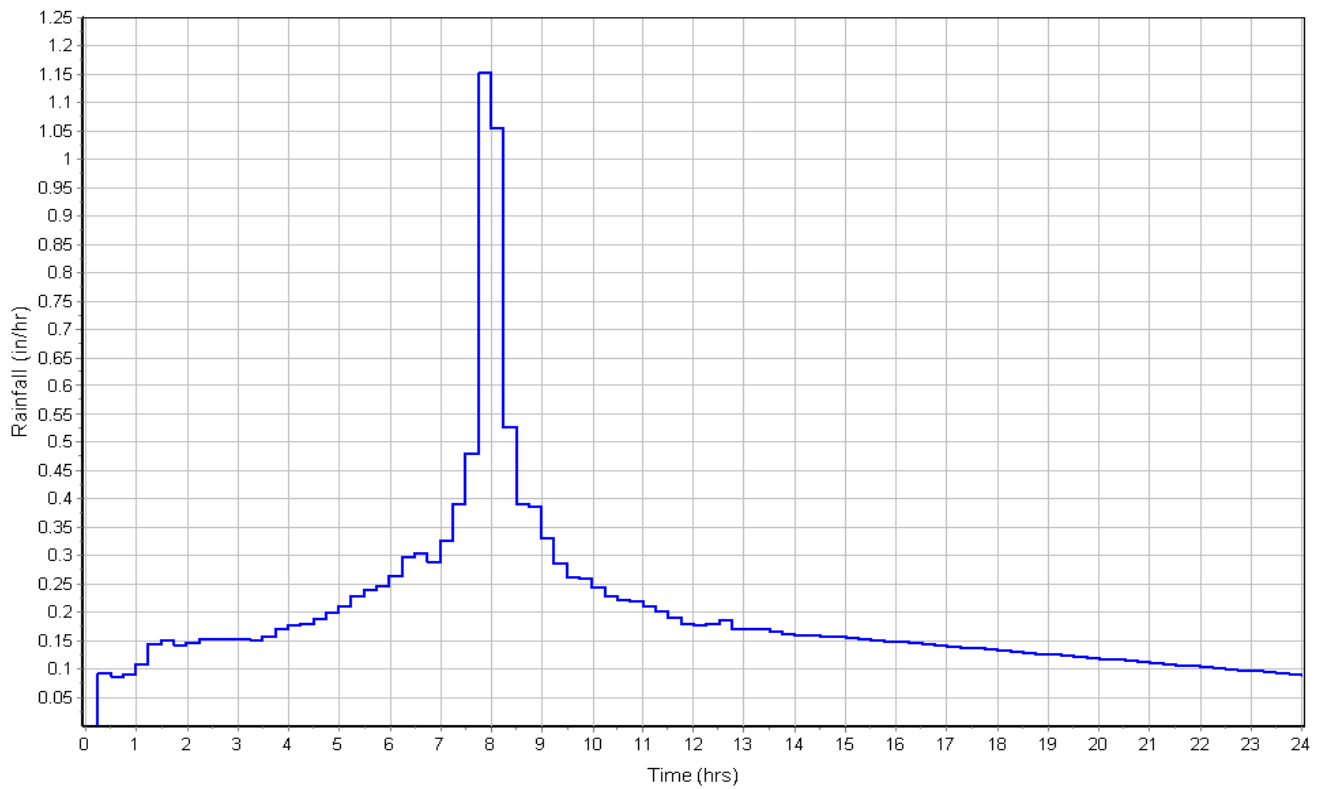
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.53		89.42

Subbasin Runoff Results

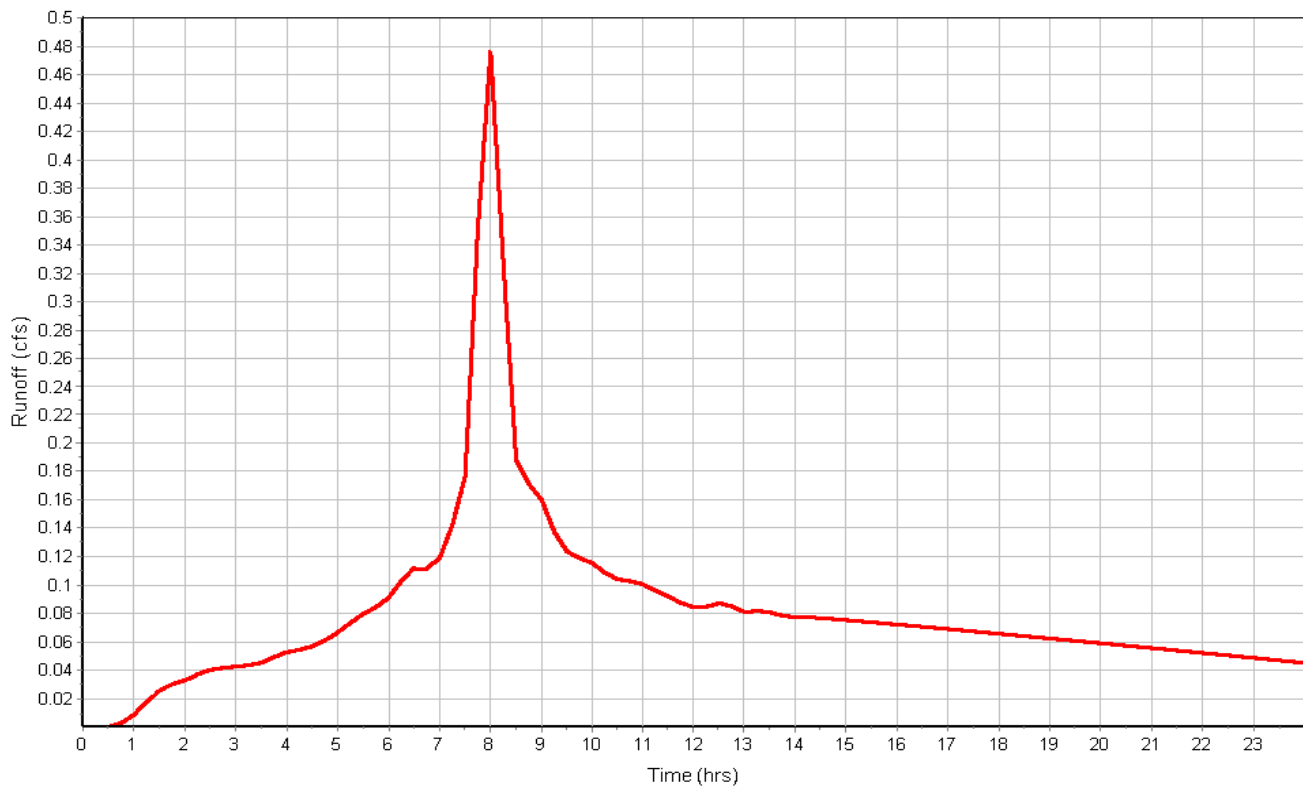
Total Rainfall (in) 4.75
Total Runoff (in) 3.67
Peak Runoff (cfs) 0.48
Weighted Curve Number 89.42
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 004

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 005**Input Data**

Area (ac) 0.20
Impervious Area (%) 94.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

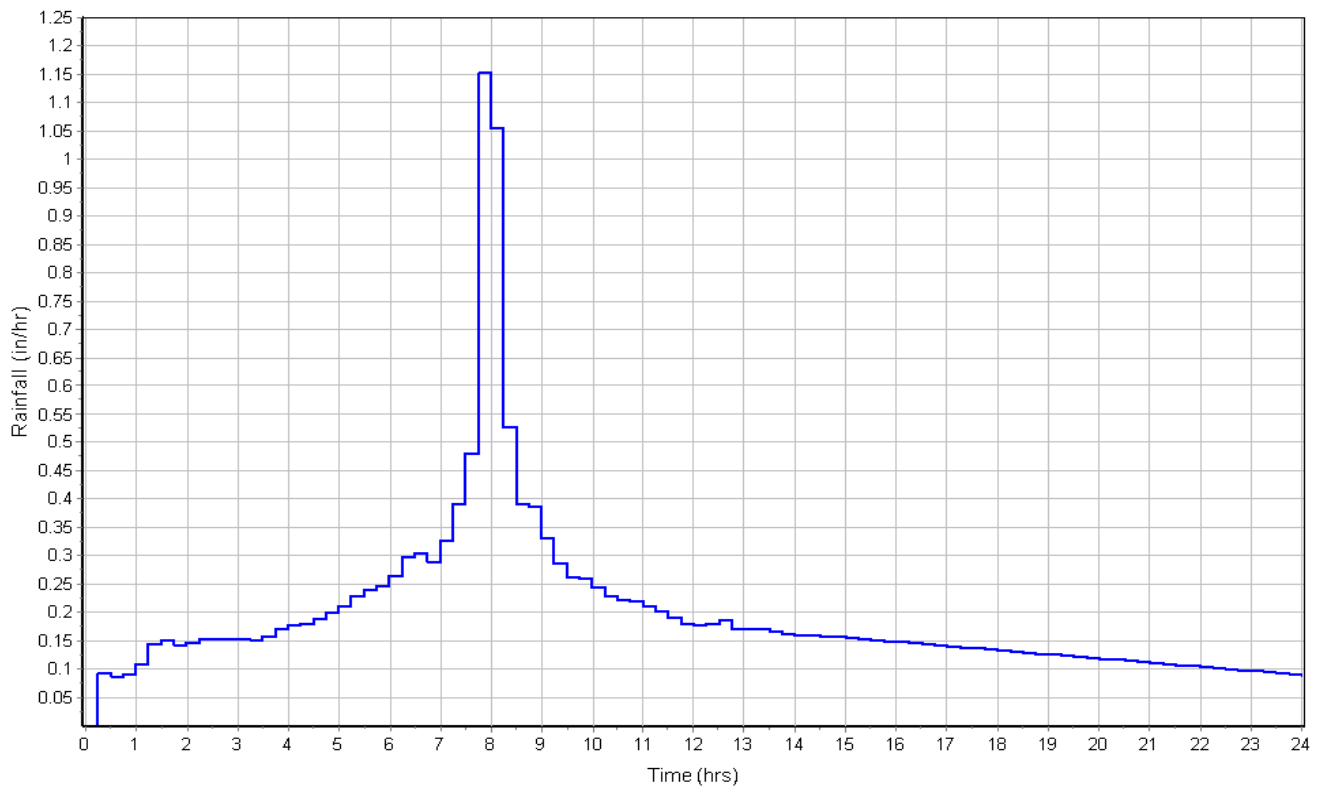
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.20		96.68

Subbasin Runoff Results

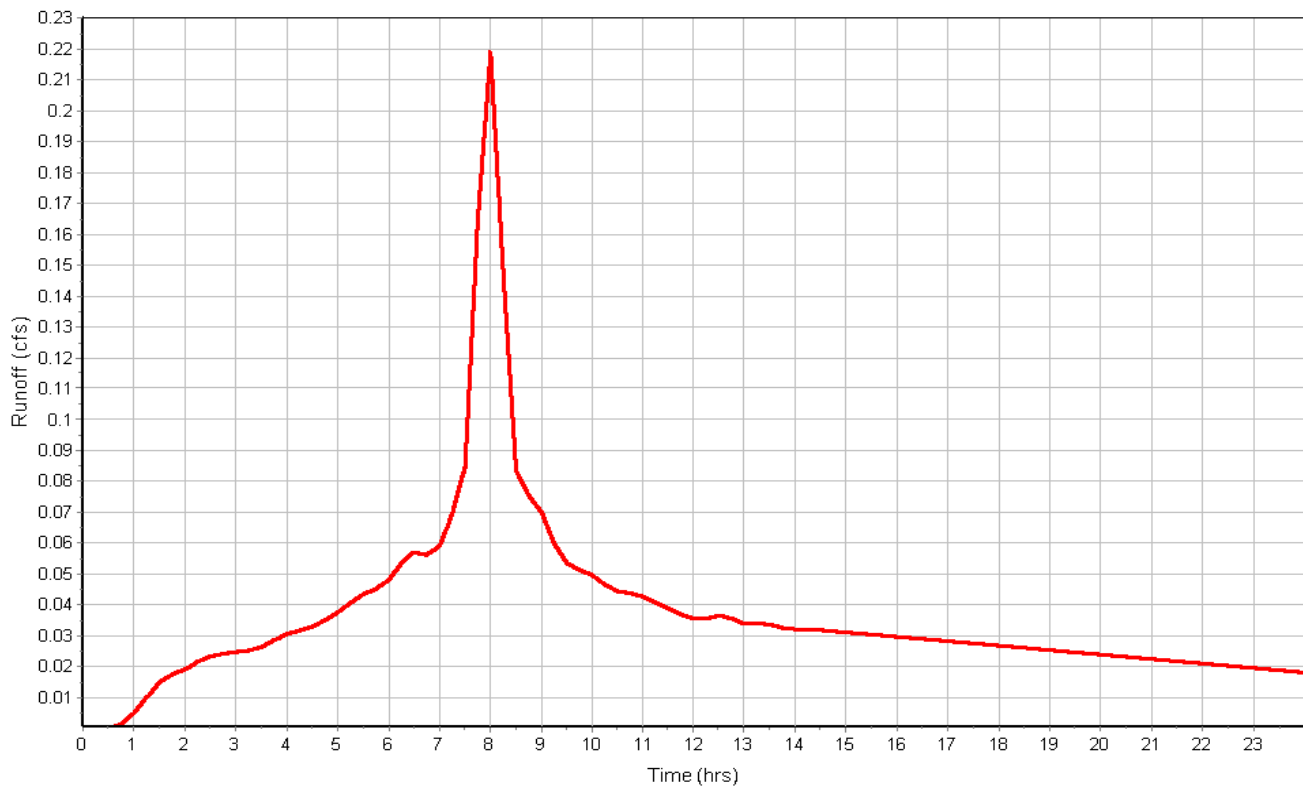
Total Rainfall (in) 4.75
Total Runoff (in) 4.39
Peak Runoff (cfs) 0.22
Weighted Curve Number 96.68
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 005

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 010**Input Data**

Area (ac) 0.21
 Impervious Area (%) 94.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

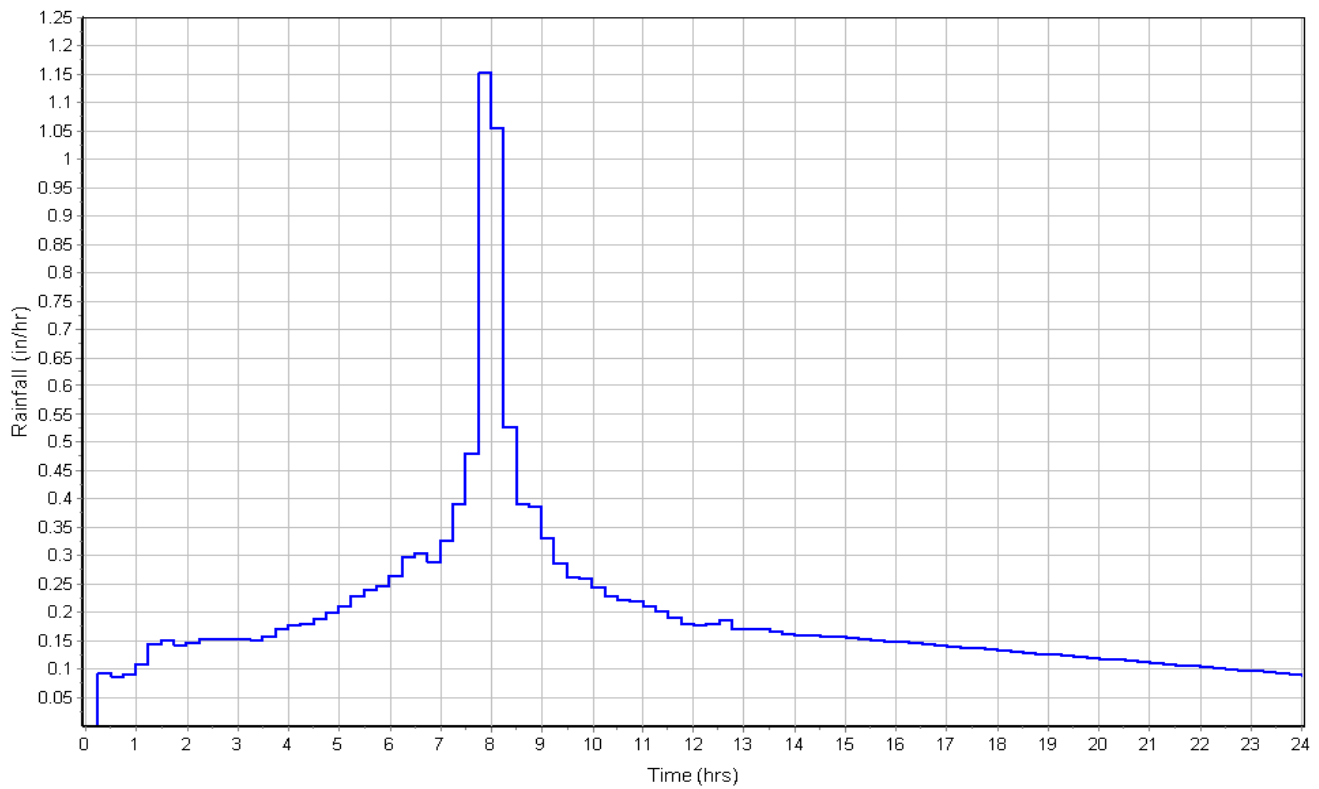
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.21		96.68

Subbasin Runoff Results

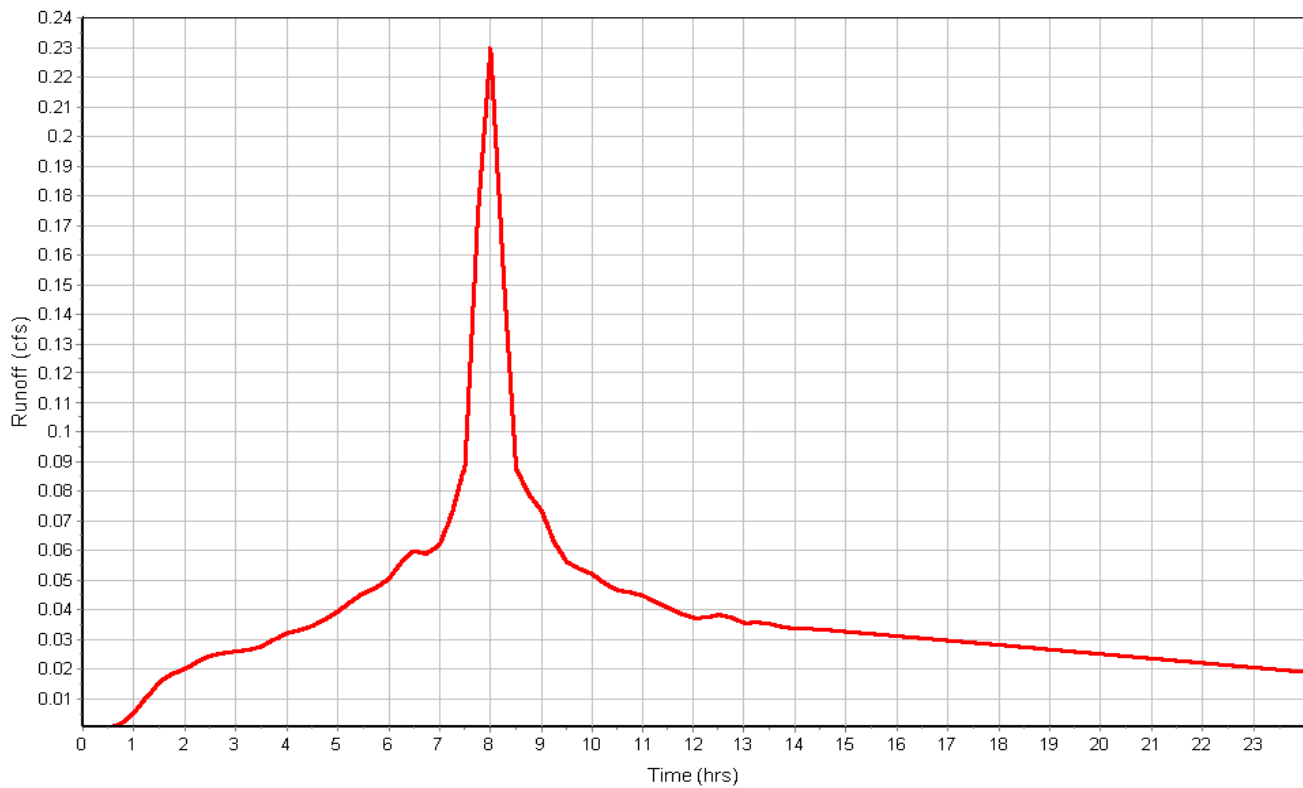
Total Rainfall (in) 4.75
 Total Runoff (in) 4.39
 Peak Runoff (cfs) 0.23
 Weighted Curve Number 96.68
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 010

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 011**Input Data**

Area (ac) 1.33
 Impervious Area (%) 30.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

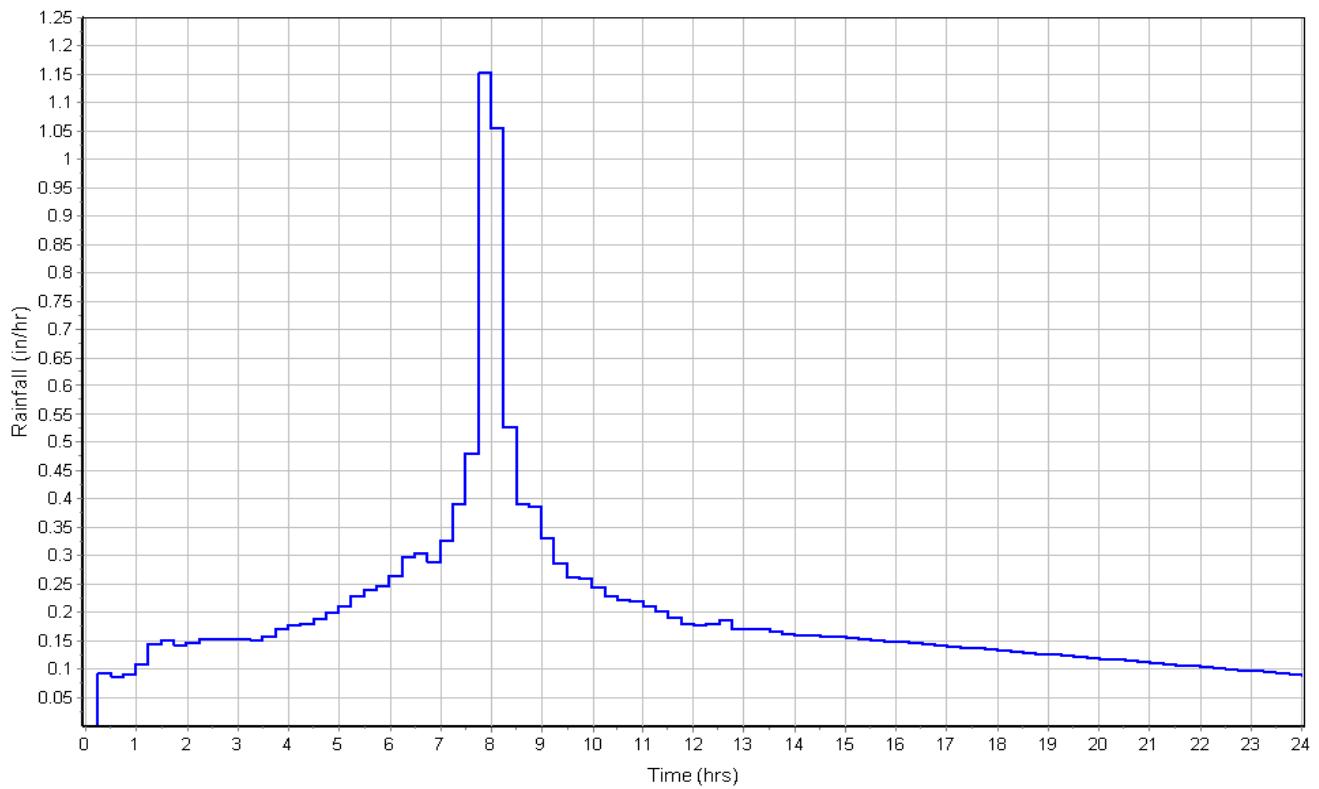
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	1.33		82.6

Subbasin Runoff Results

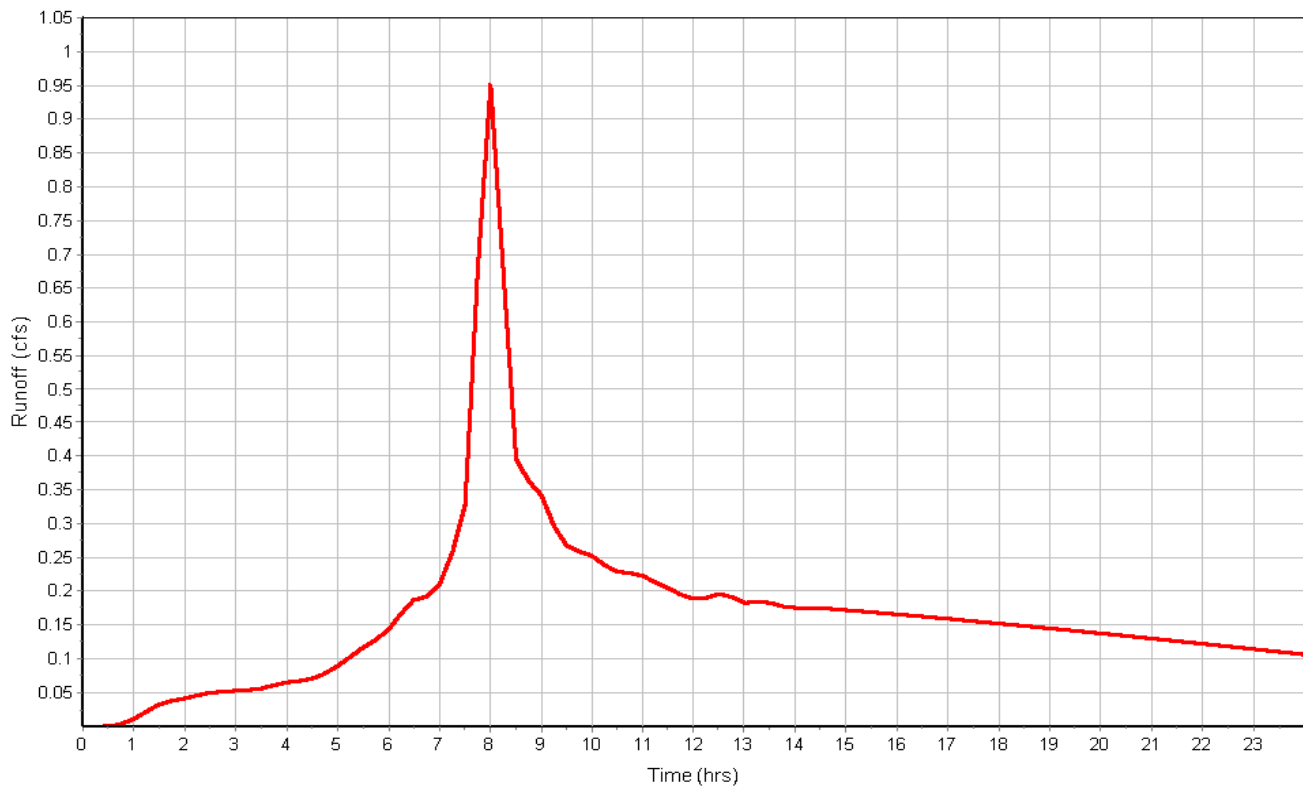
Total Rainfall (in) 4.75
 Total Runoff (in) 2.99
 Peak Runoff (cfs) 0.95
 Weighted Curve Number 82.60
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 011

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 012**Input Data**

Area (ac) 0.19
Impervious Area (%) 93.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

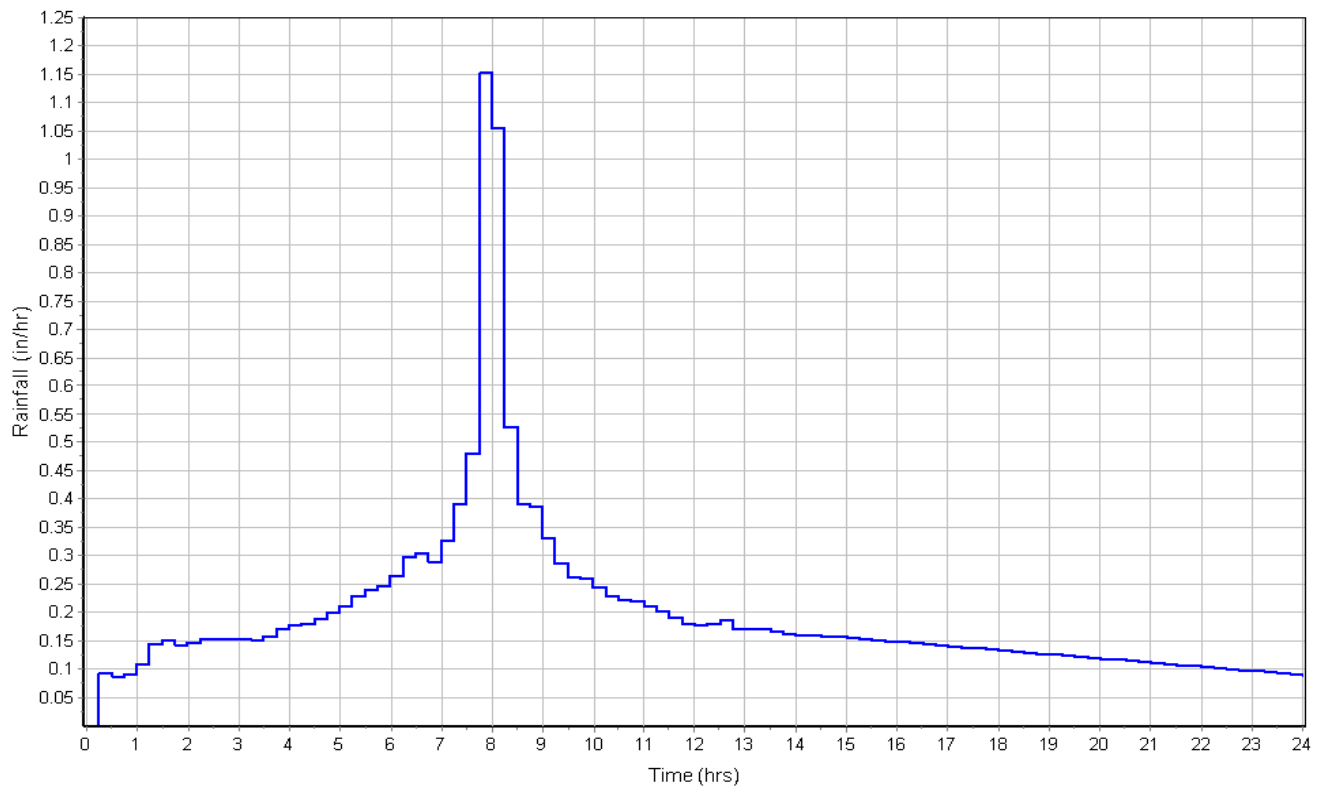
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.19		96.46

Subbasin Runoff Results

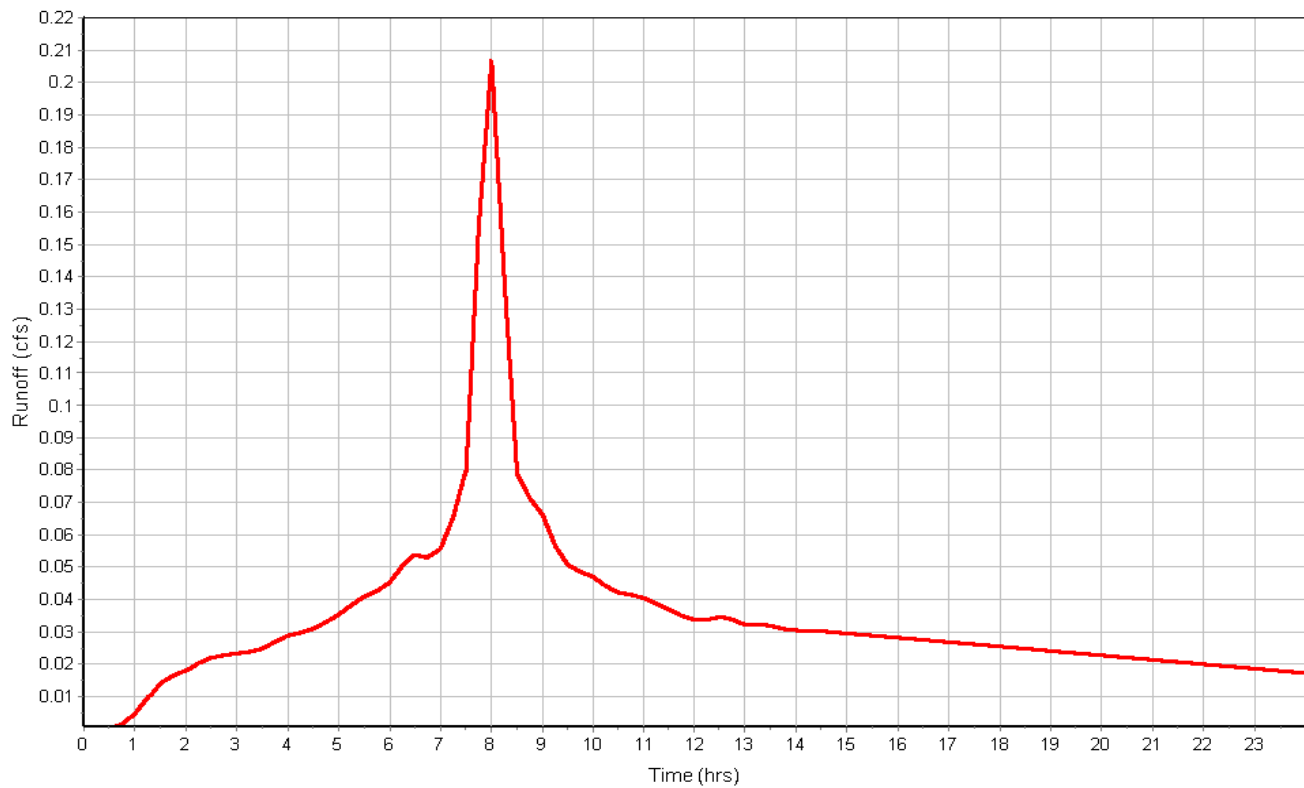
Total Rainfall (in) 4.75
Total Runoff (in) 4.37
Peak Runoff (cfs) 0.21
Weighted Curve Number 96.46
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 012

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 013**Input Data**

Area (ac) 0.86
 Impervious Area (%) 32.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

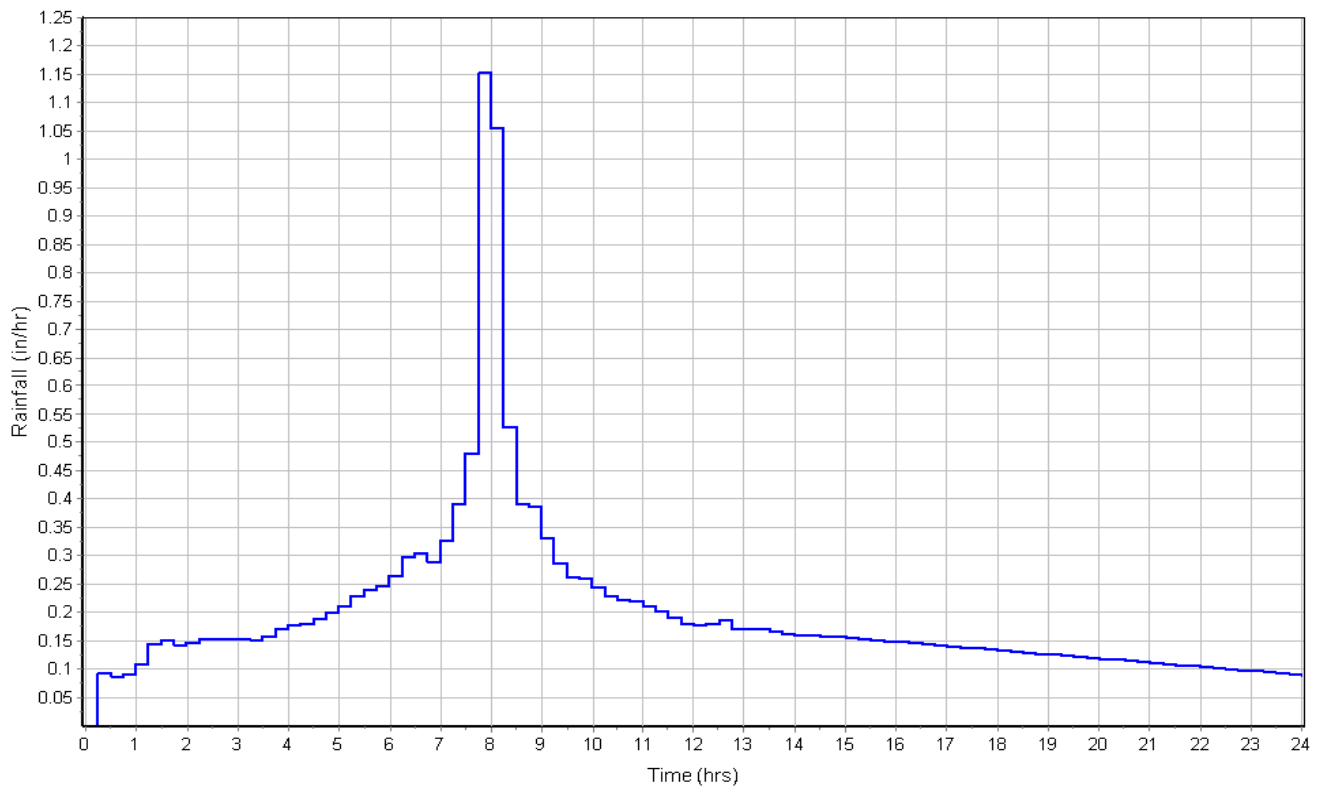
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.86		83.04

Subbasin Runoff Results

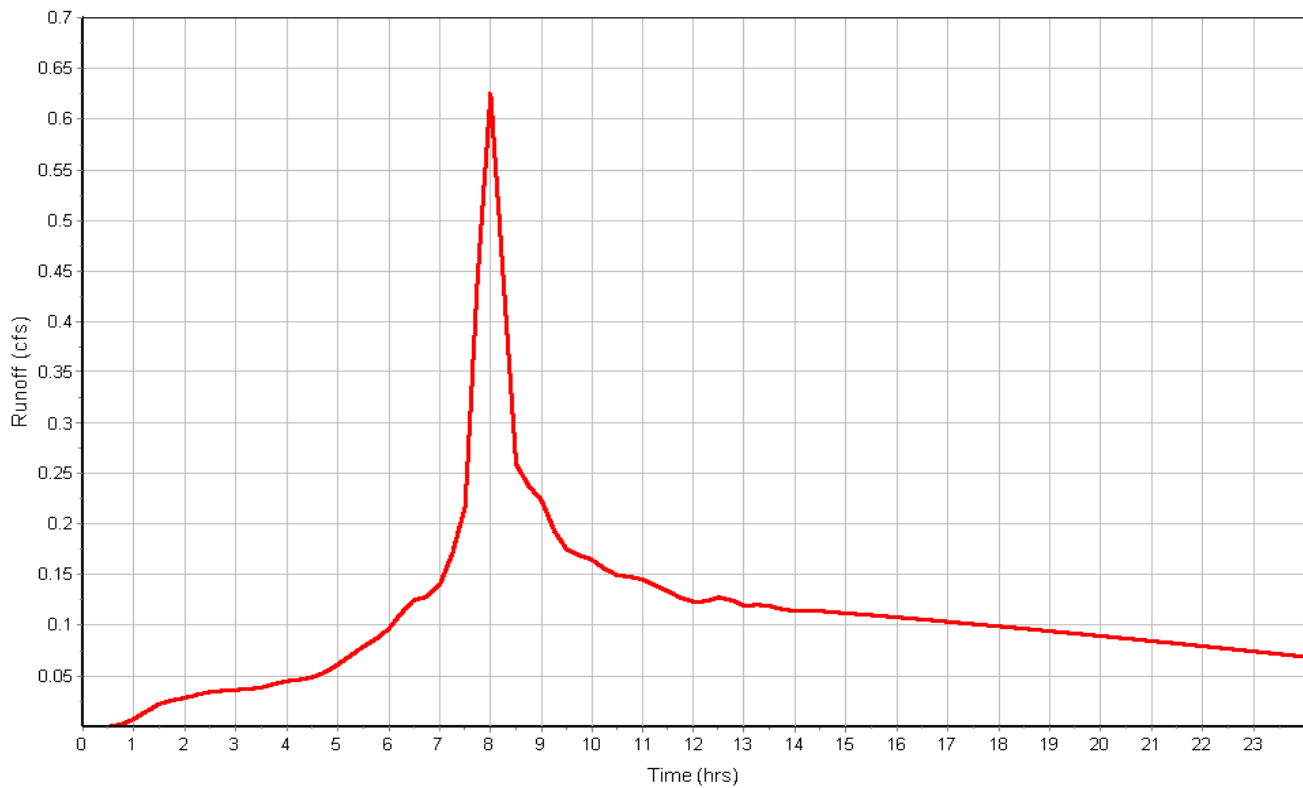
Total Rainfall (in) 4.75
 Total Runoff (in) 3.04
 Peak Runoff (cfs) 0.63
 Weighted Curve Number 83.04
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 013

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 014**Input Data**

Area (ac) 0.19
Impervious Area (%) 94.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

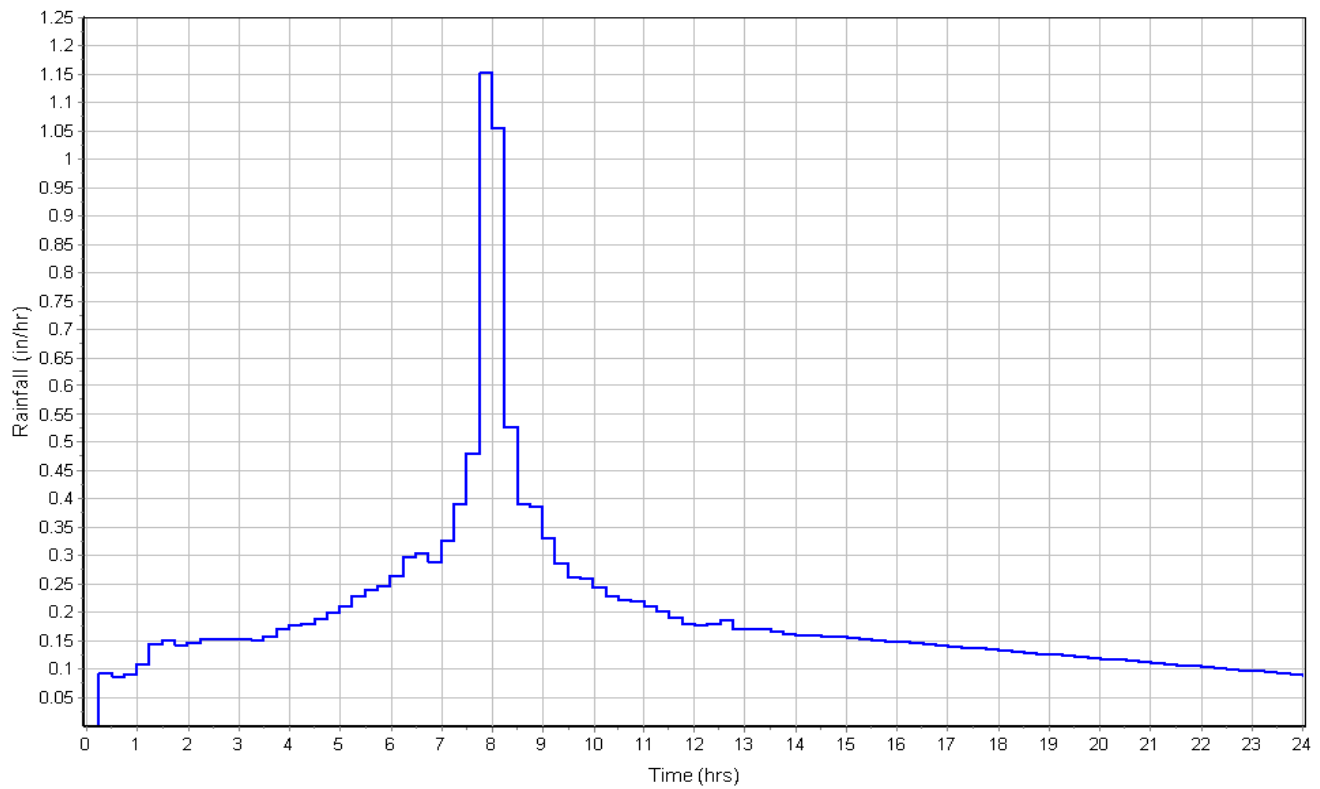
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.19		96.68

Subbasin Runoff Results

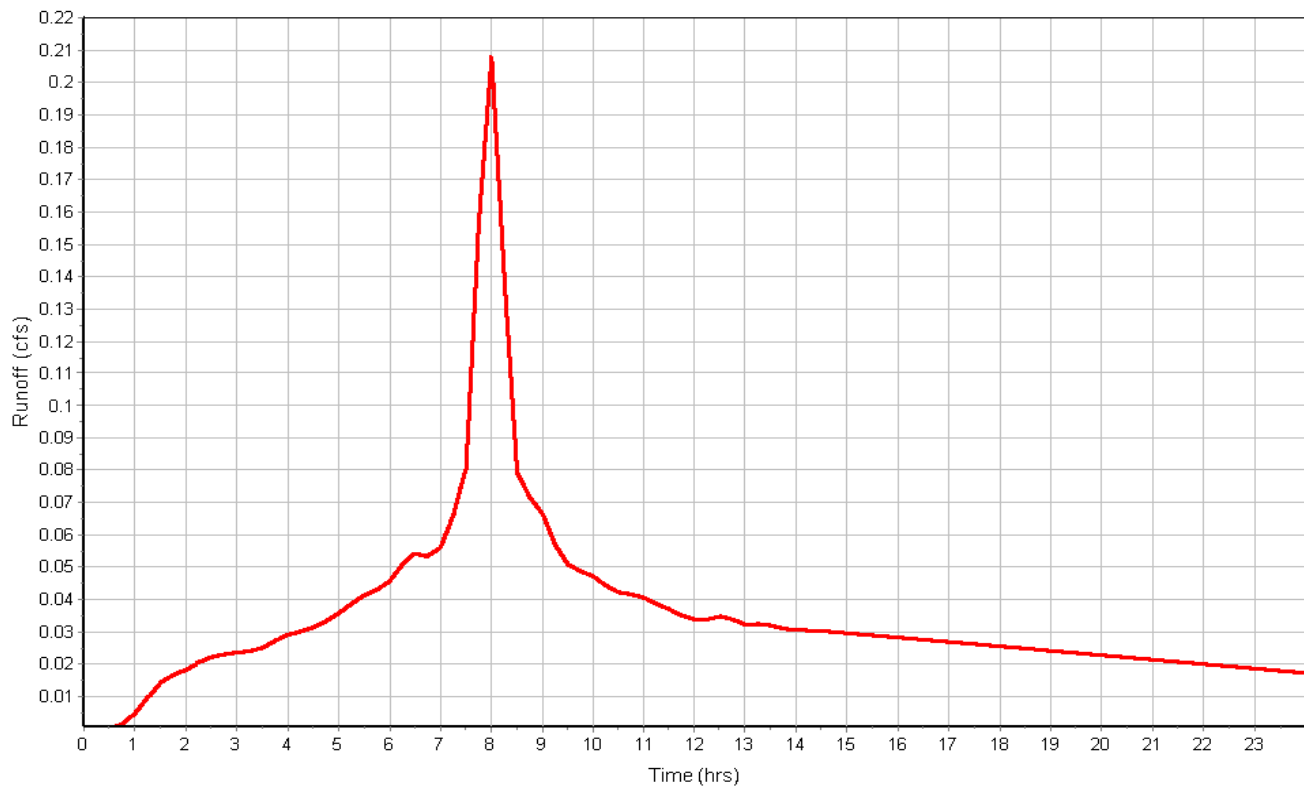
Total Rainfall (in) 4.75
Total Runoff (in) 4.39
Peak Runoff (cfs) 0.21
Weighted Curve Number 96.68
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 014

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 015**Input Data**

Area (ac) 0.92
Impervious Area (%) 39.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

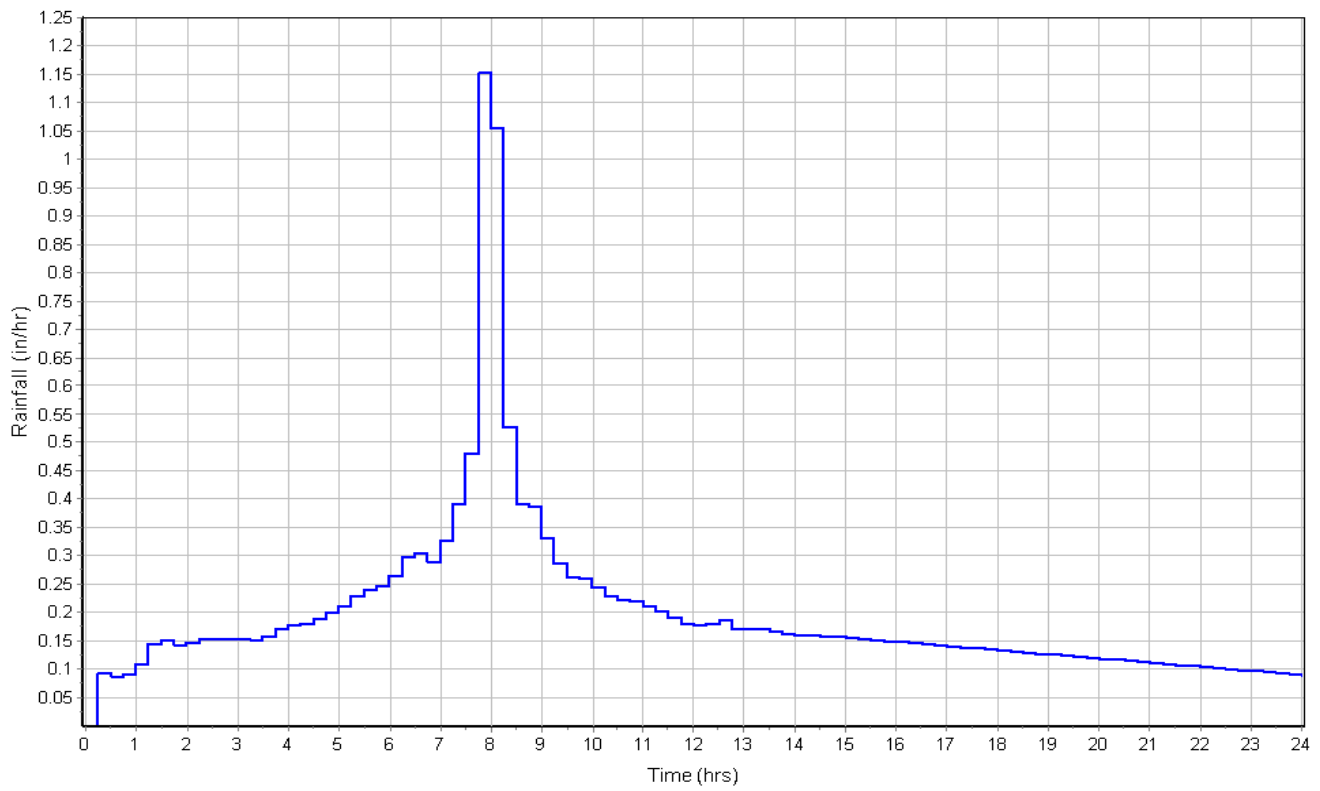
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.92		84.58

Subbasin Runoff Results

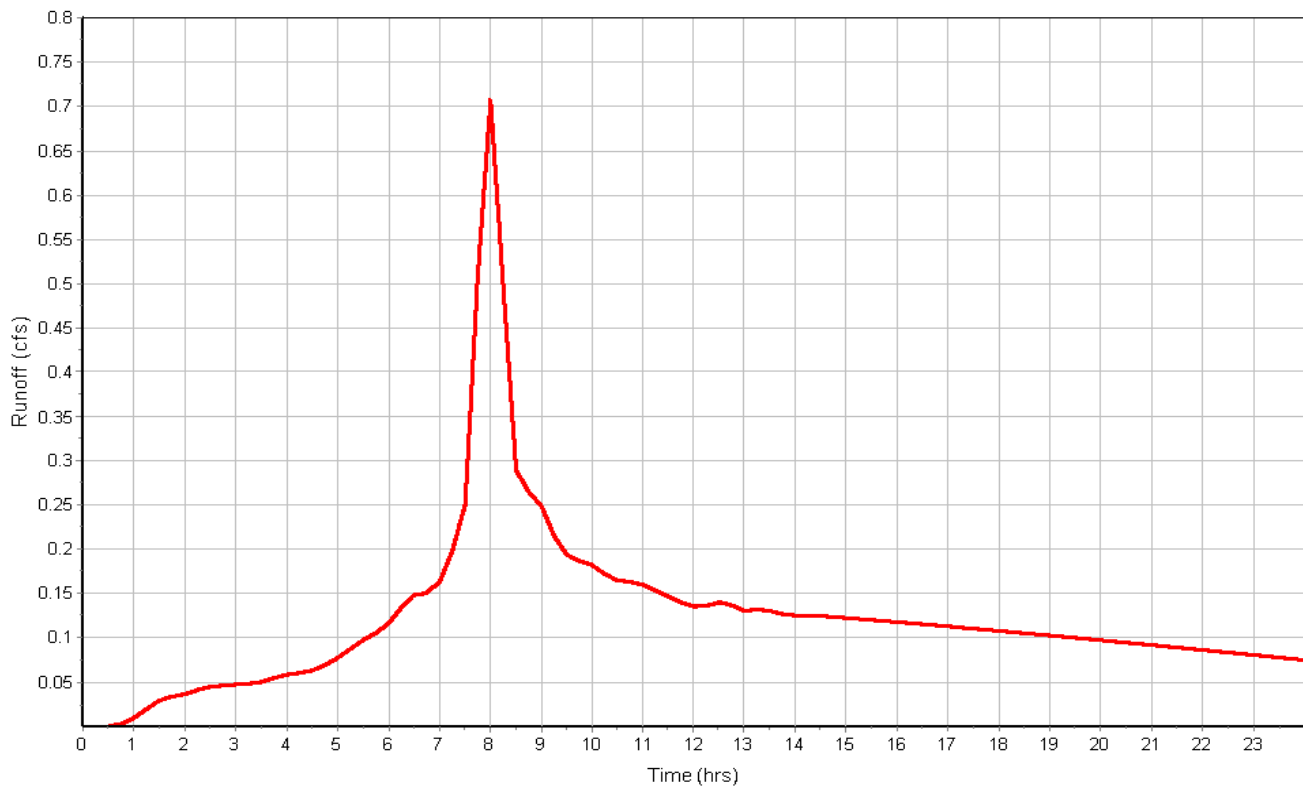
Total Rainfall (in) 4.75
Total Runoff (in) 3.19
Peak Runoff (cfs) 0.71
Weighted Curve Number 84.58
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 015

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 016**Input Data**

Area (ac) 0.18
 Impervious Area (%) 89.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

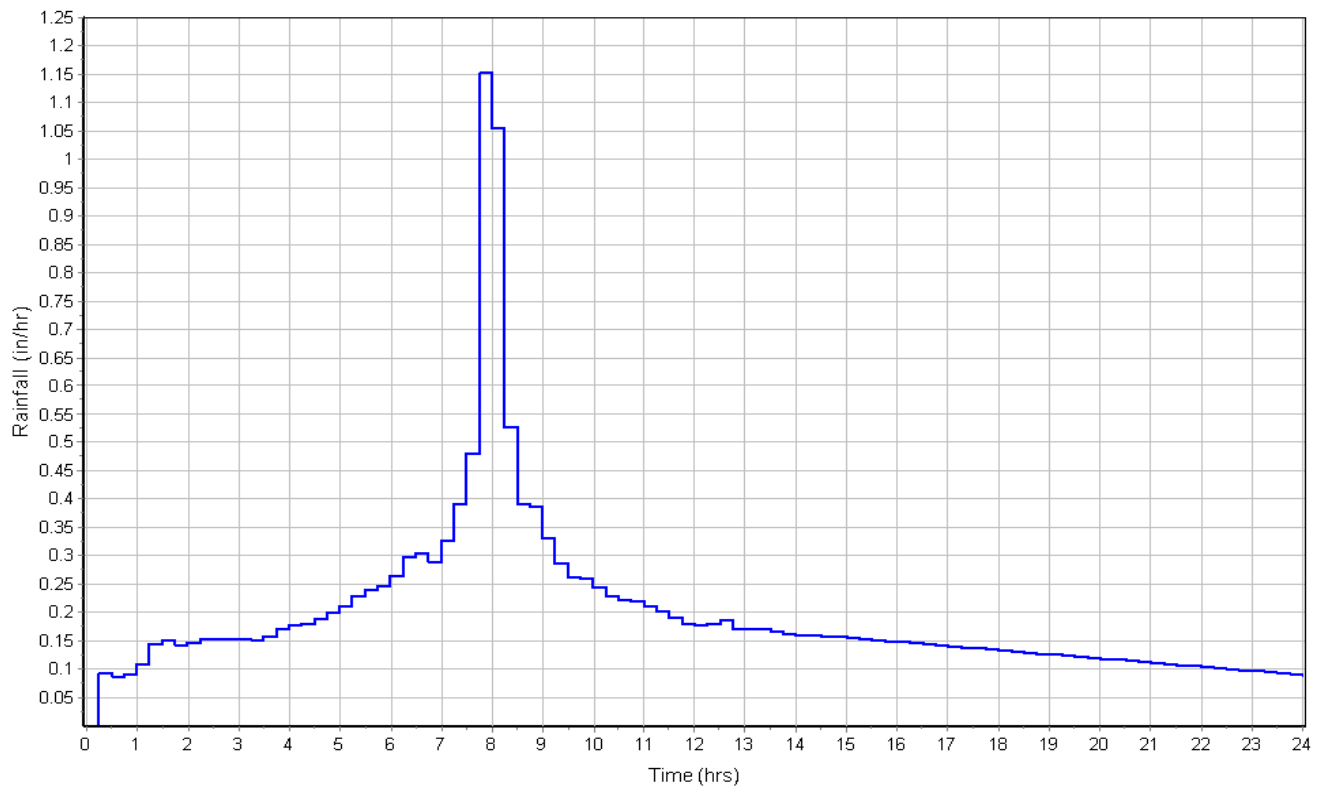
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.18		95.58

Subbasin Runoff Results

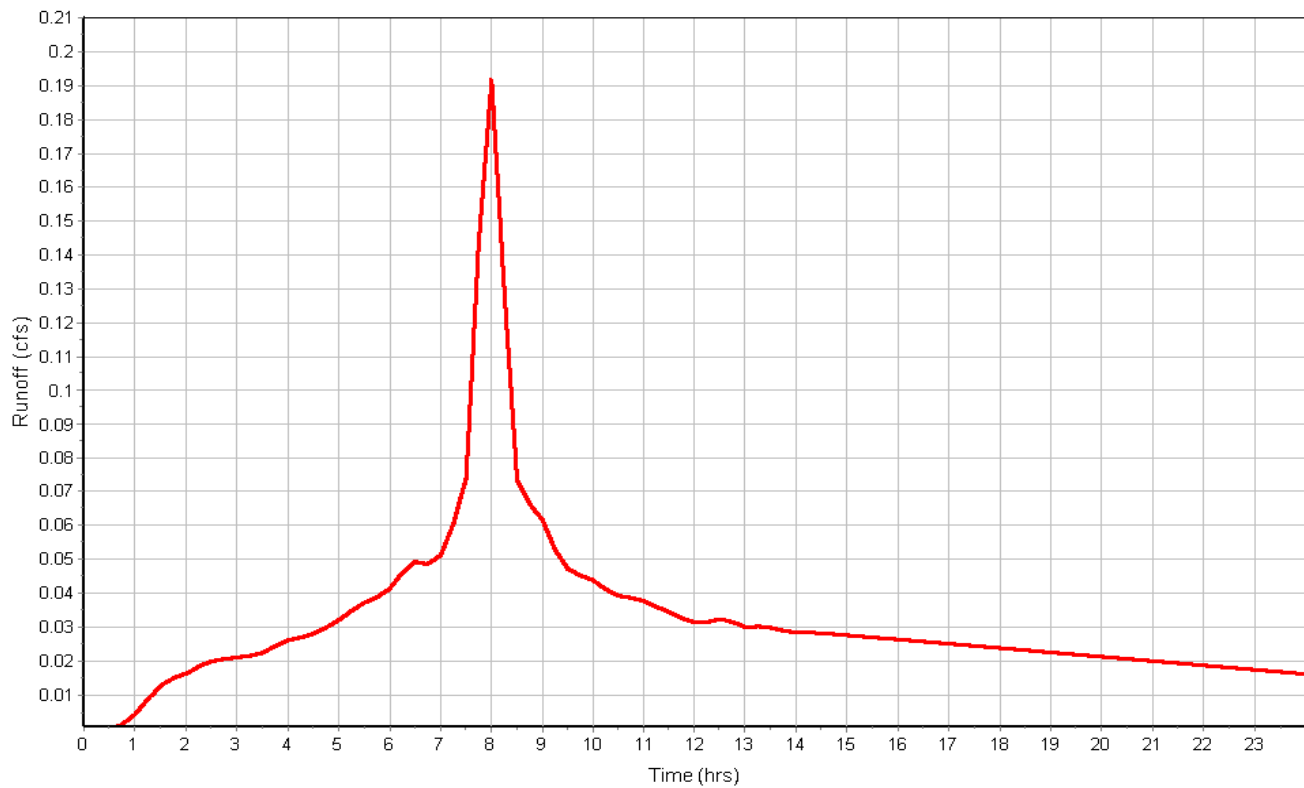
Total Rainfall (in) 4.75
 Total Runoff (in) 4.28
 Peak Runoff (cfs) 0.19
 Weighted Curve Number 95.58
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 016

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 019**Input Data**

Area (ac) 0.48
 Impervious Area (%) 23.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

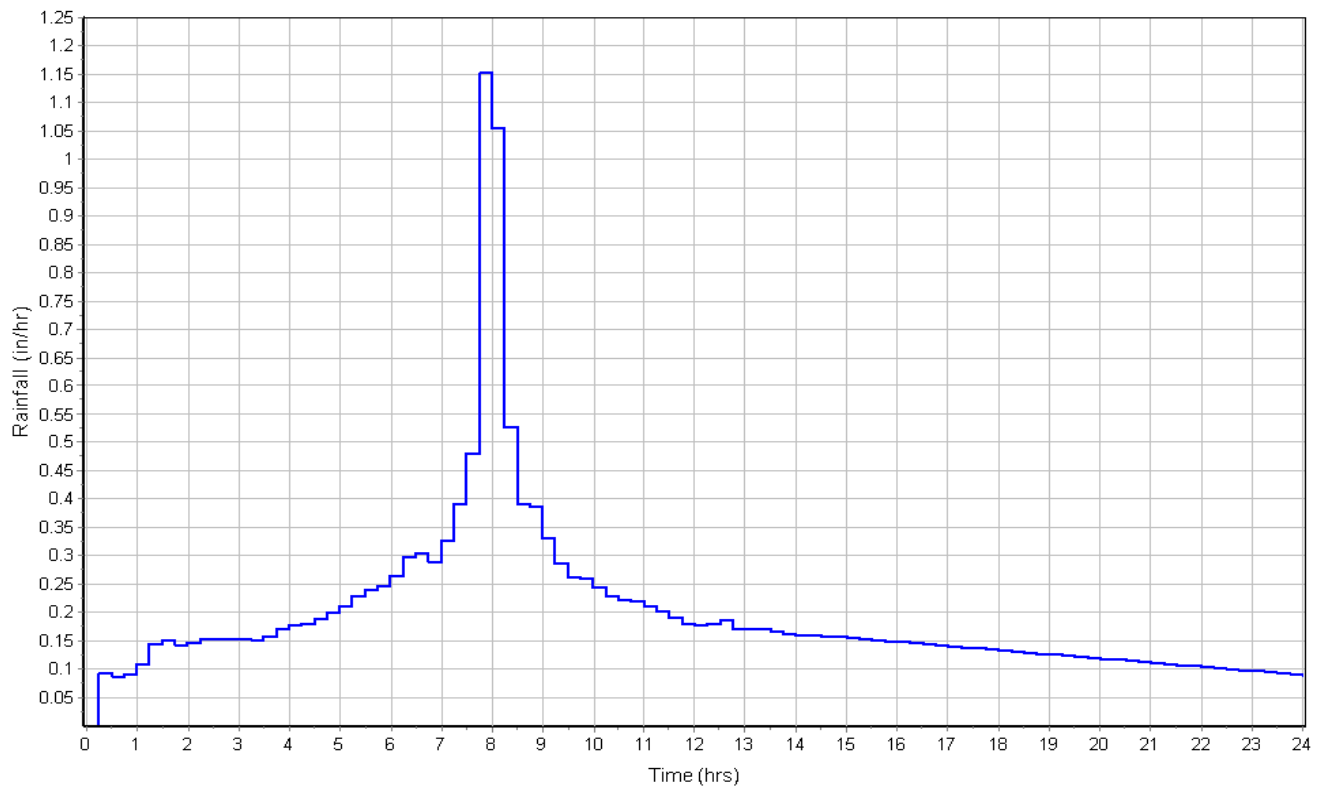
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.48		81.06

Subbasin Runoff Results

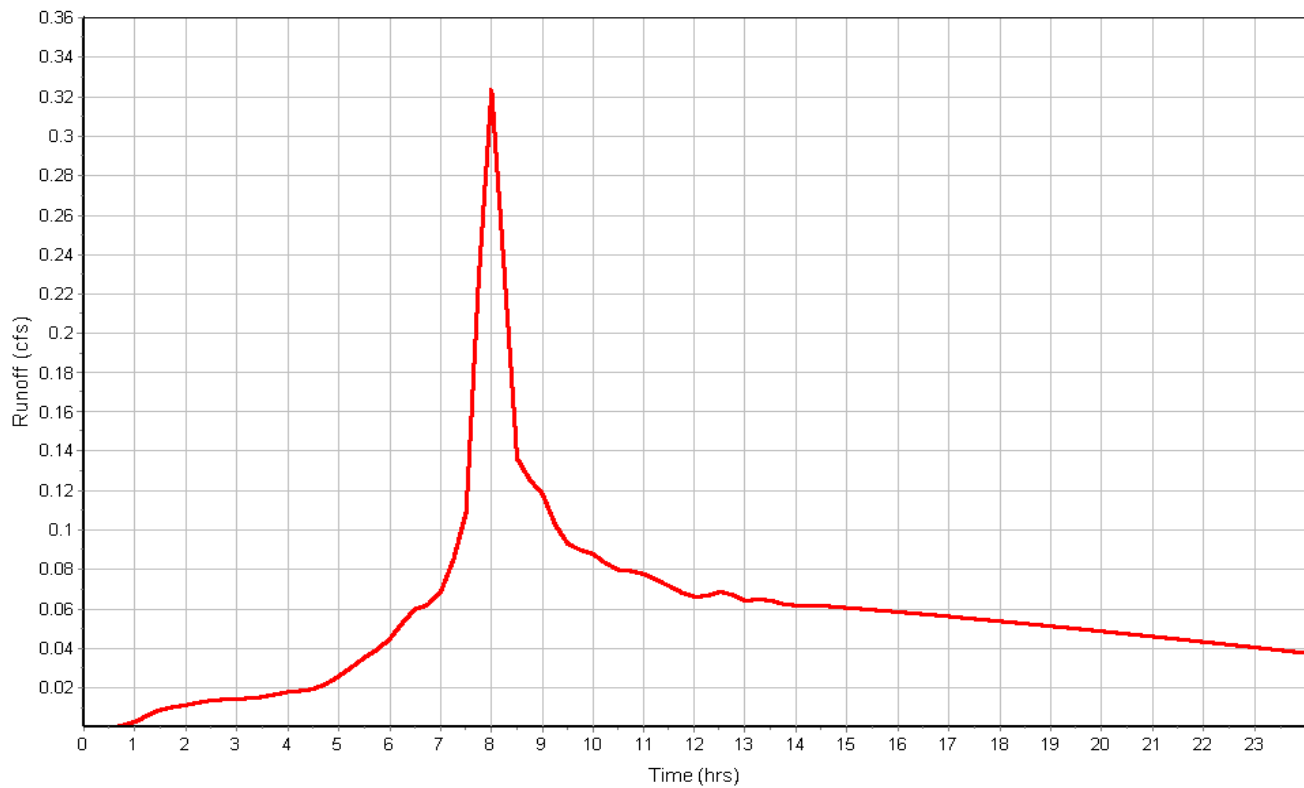
Total Rainfall (in) 4.75
 Total Runoff (in) 2.84
 Peak Runoff (cfs) 0.32
 Weighted Curve Number 81.06
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 019

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 020**Input Data**

Area (ac) 0.21
 Impervious Area (%) 86.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

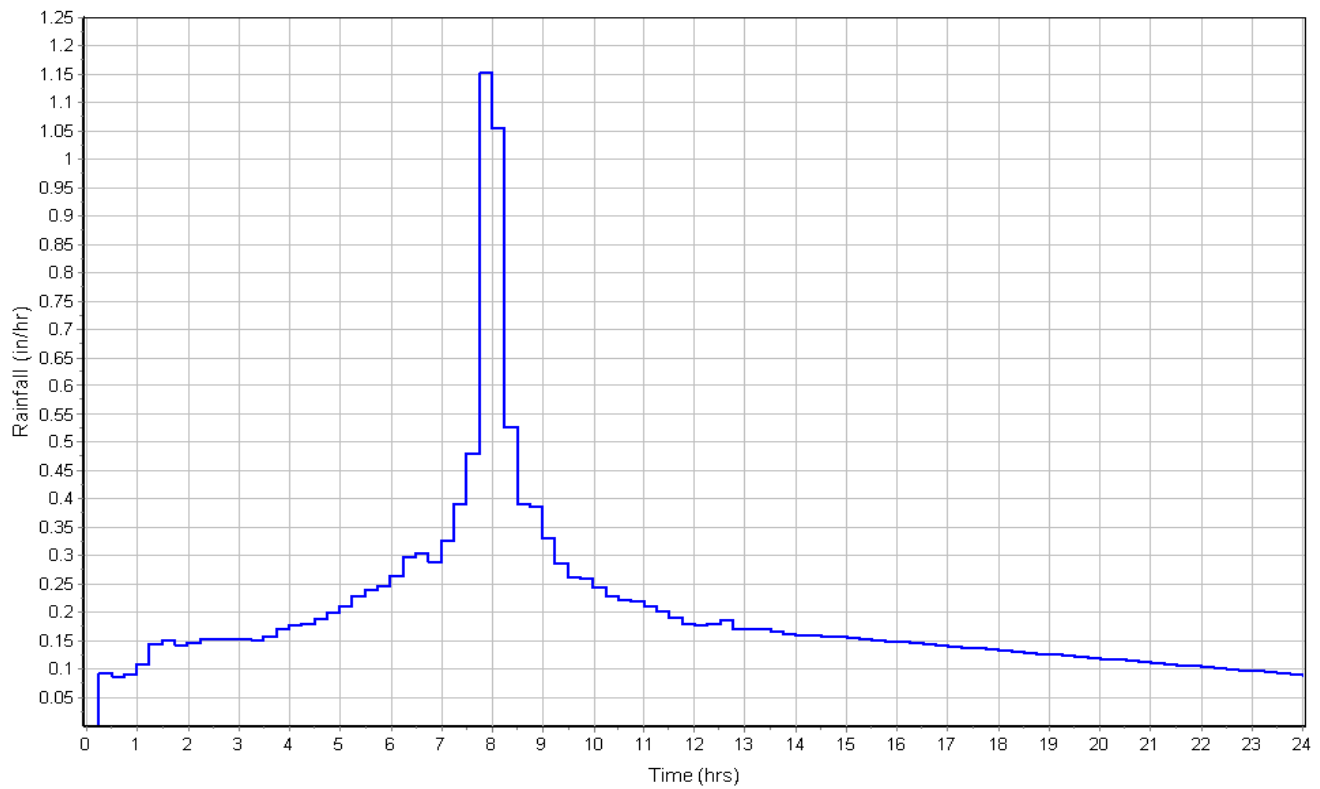
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.21		94.92

Subbasin Runoff Results

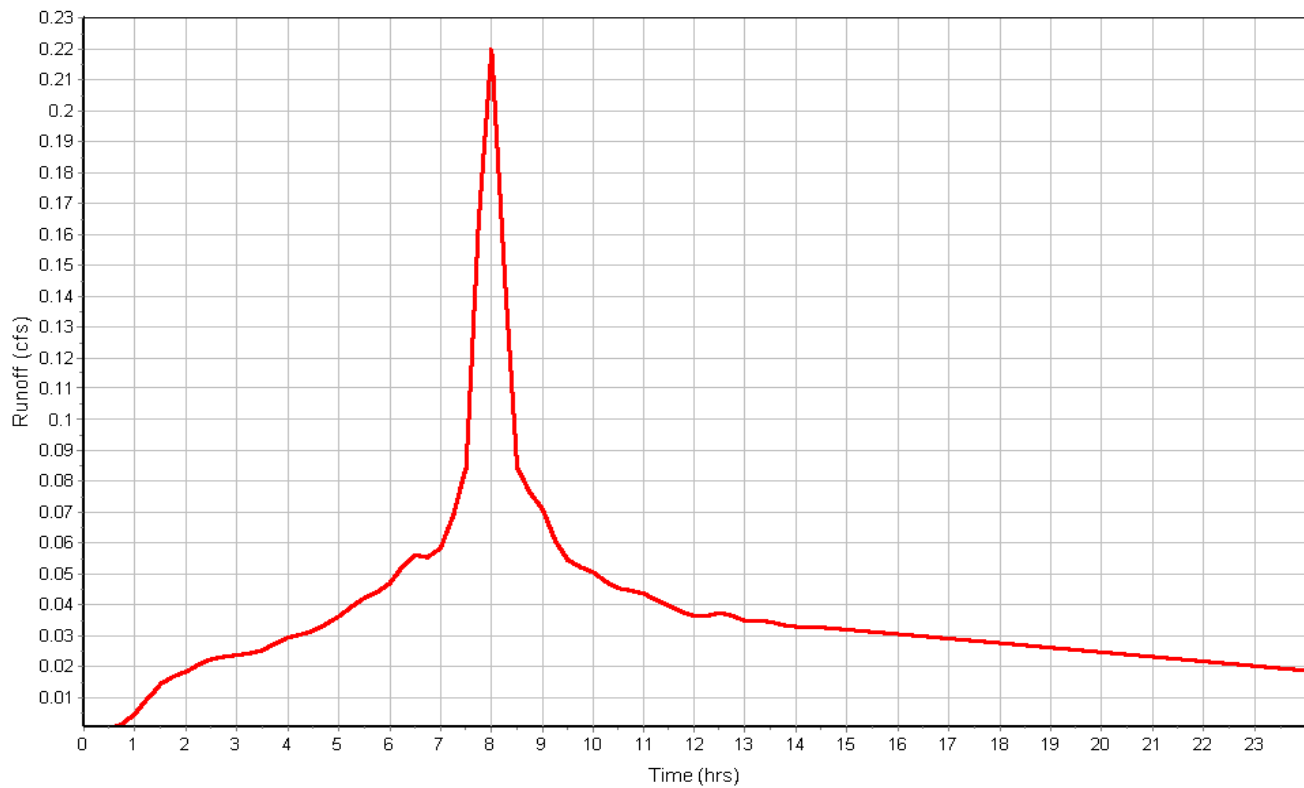
Total Rainfall (in) 4.75
 Total Runoff (in) 4.22
 Peak Runoff (cfs) 0.22
 Weighted Curve Number 94.92
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 020

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 021**Input Data**

Area (ac) 0.51
 Impervious Area (%) 0.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

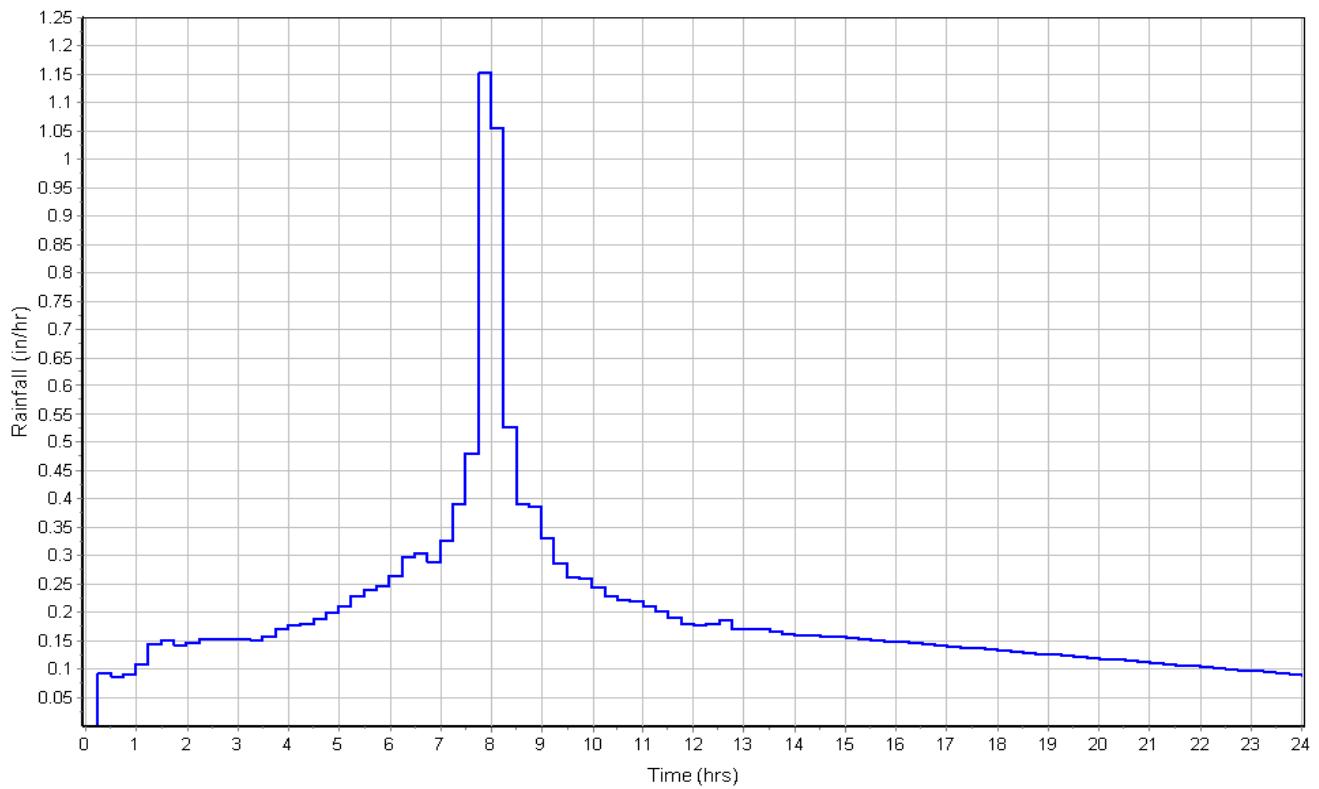
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.51		76

Subbasin Runoff Results

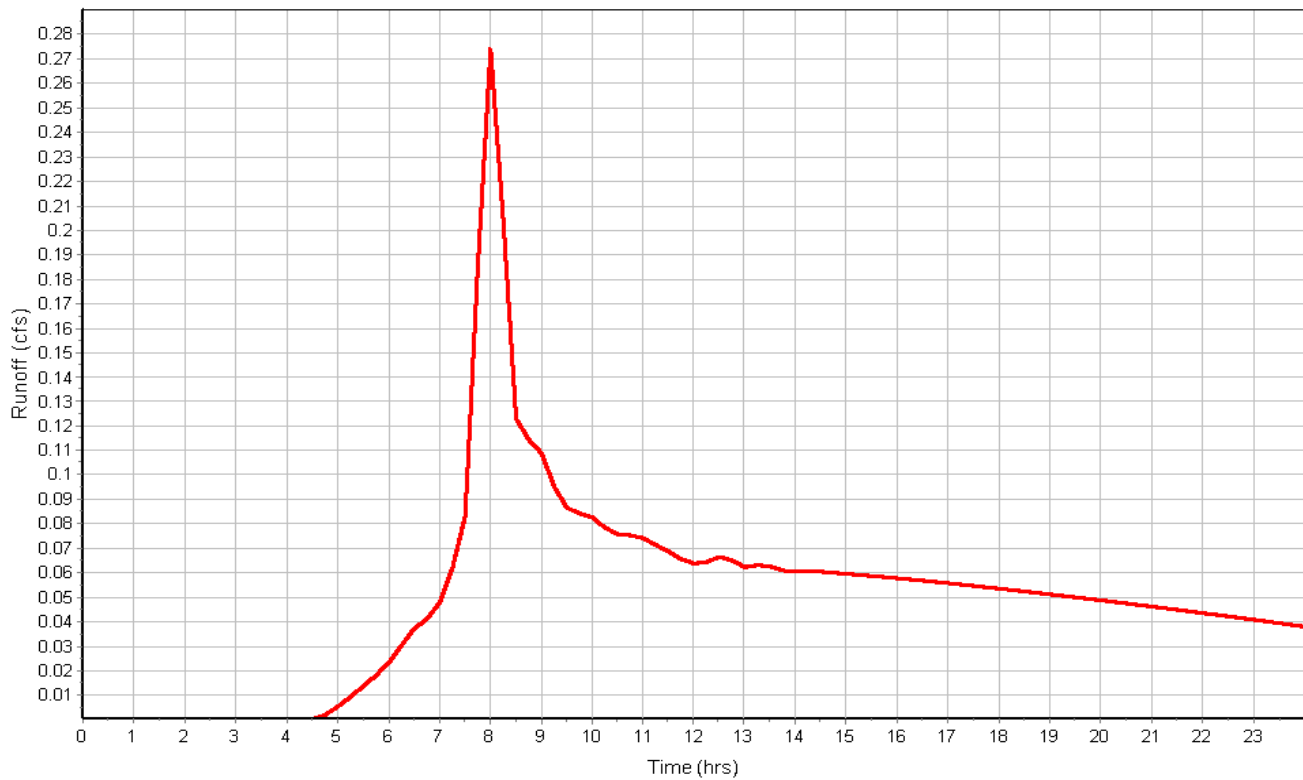
Total Rainfall (in) 4.75
 Total Runoff (in) 2.34
 Peak Runoff (cfs) 0.27
 Weighted Curve Number 76.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 021

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 022**Input Data**

Area (ac) 0.13
 Impervious Area (%) 85.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

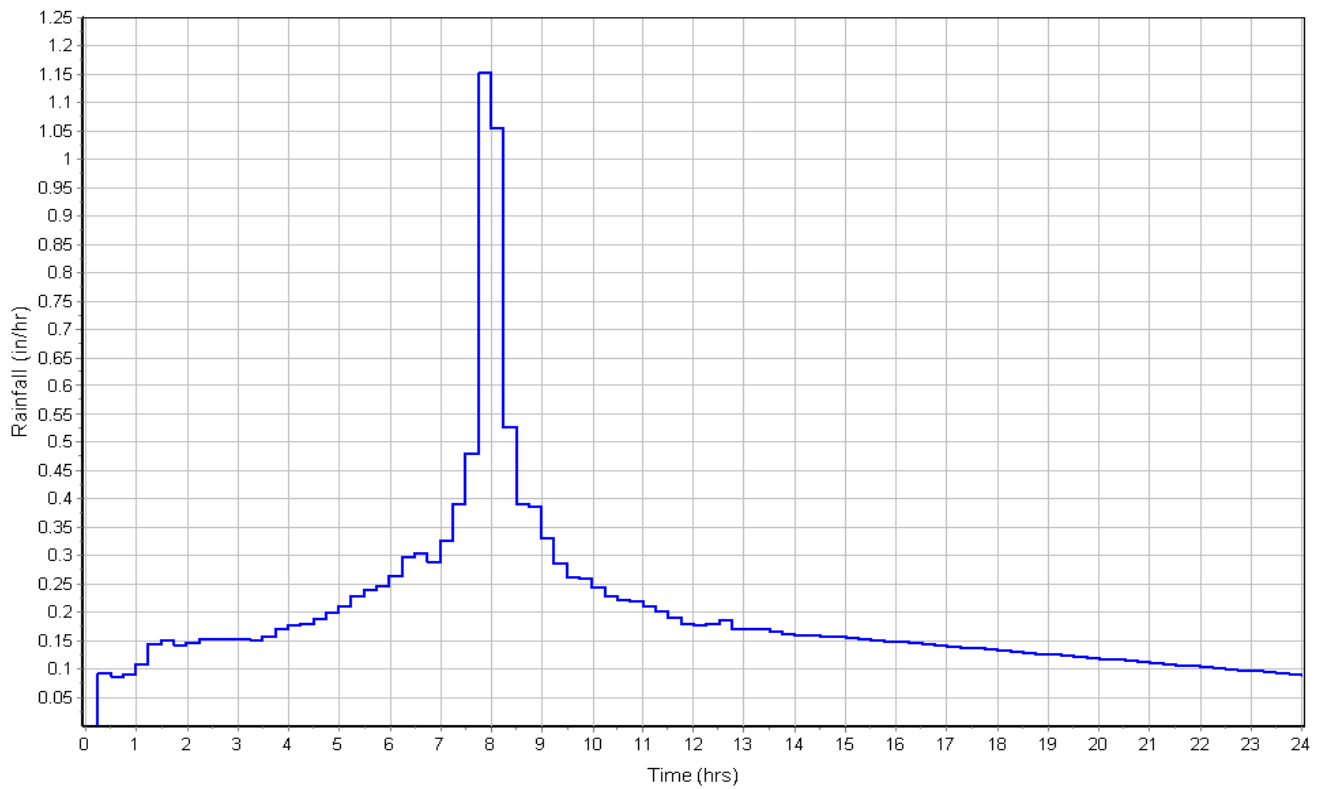
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.13		94.7

Subbasin Runoff Results

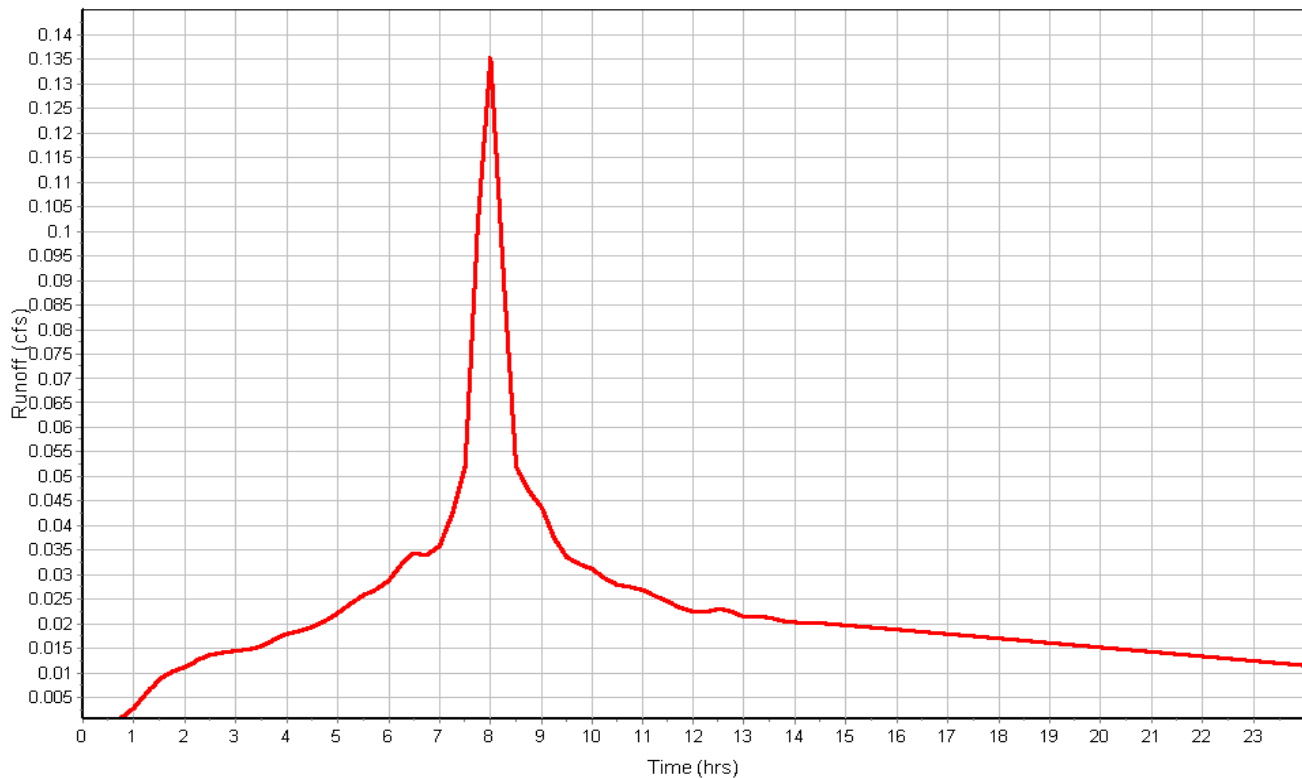
Total Rainfall (in) 4.75
 Total Runoff (in) 4.19
 Peak Runoff (cfs) 0.14
 Weighted Curve Number 94.70
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 022

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 023**Input Data**

Area (ac) 0.19
Impervious Area (%) 43.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

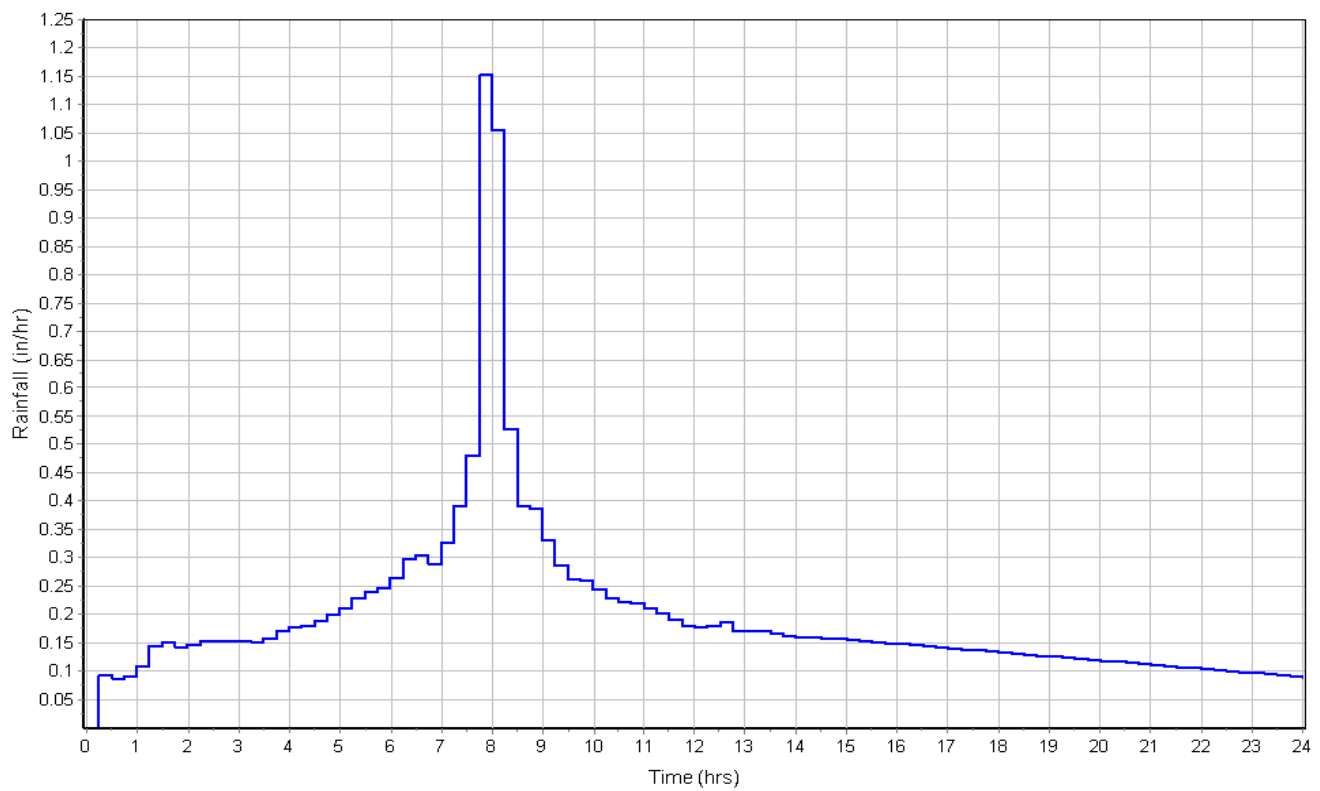
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.19		85.46

Subbasin Runoff Results

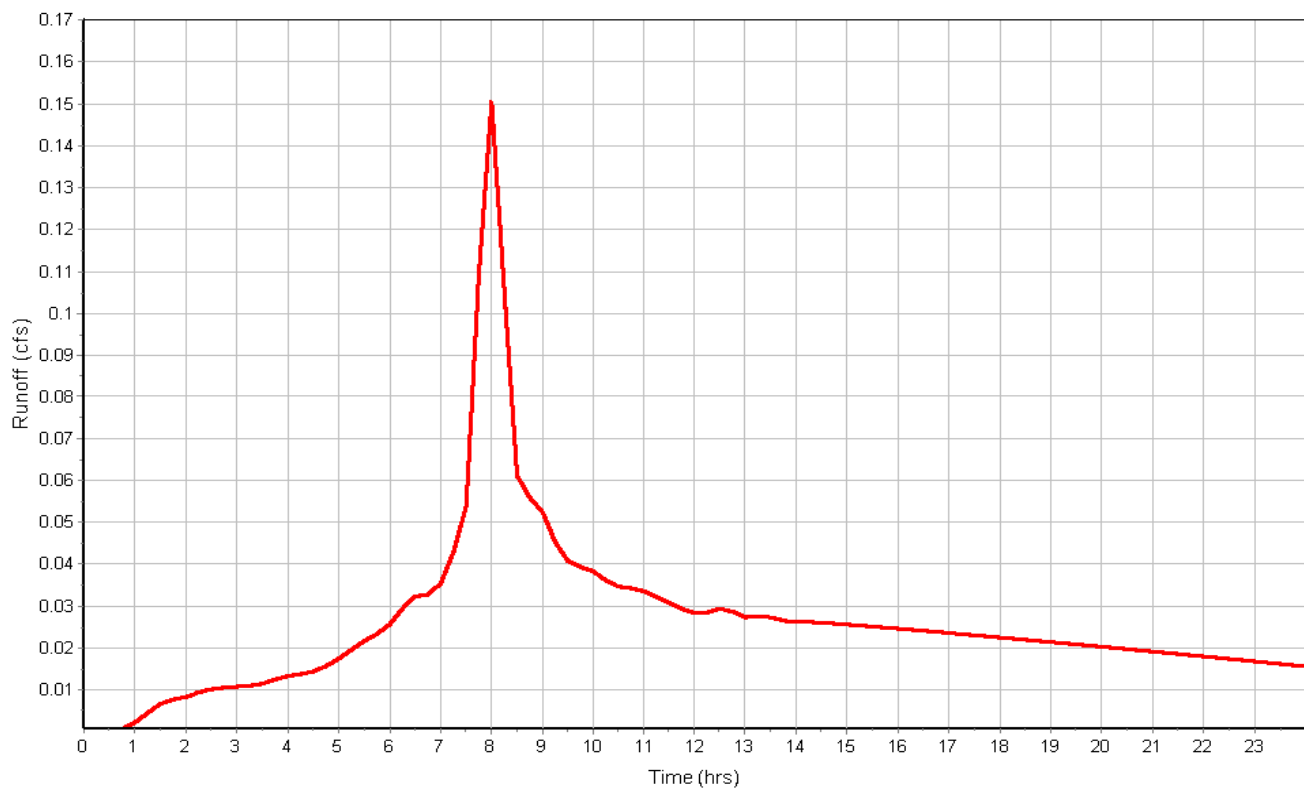
Total Rainfall (in) 4.75
Total Runoff (in) 3.28
Peak Runoff (cfs) 0.15
Weighted Curve Number 85.46
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 023

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 024**Input Data**

Area (ac) 0.23
 Impervious Area (%) 49.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

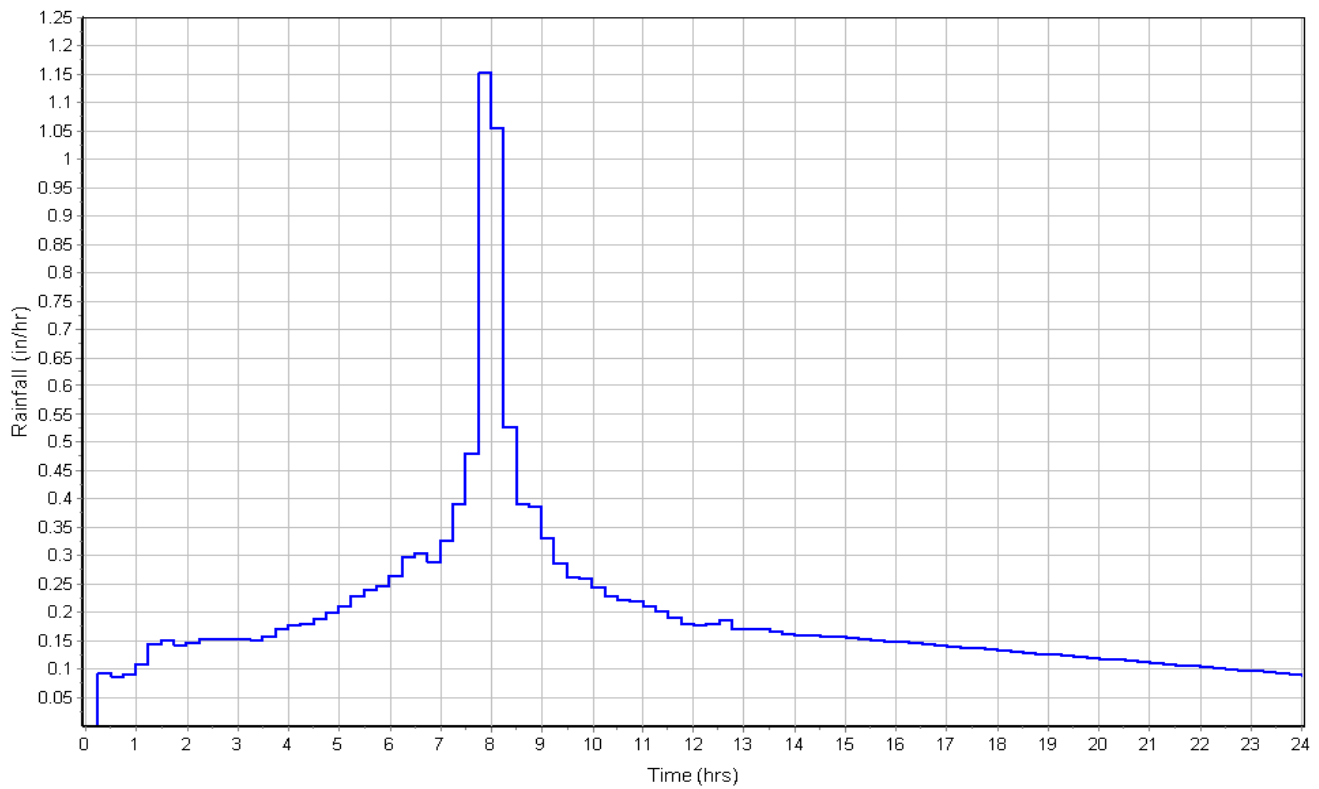
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.23		86.78

Subbasin Runoff Results

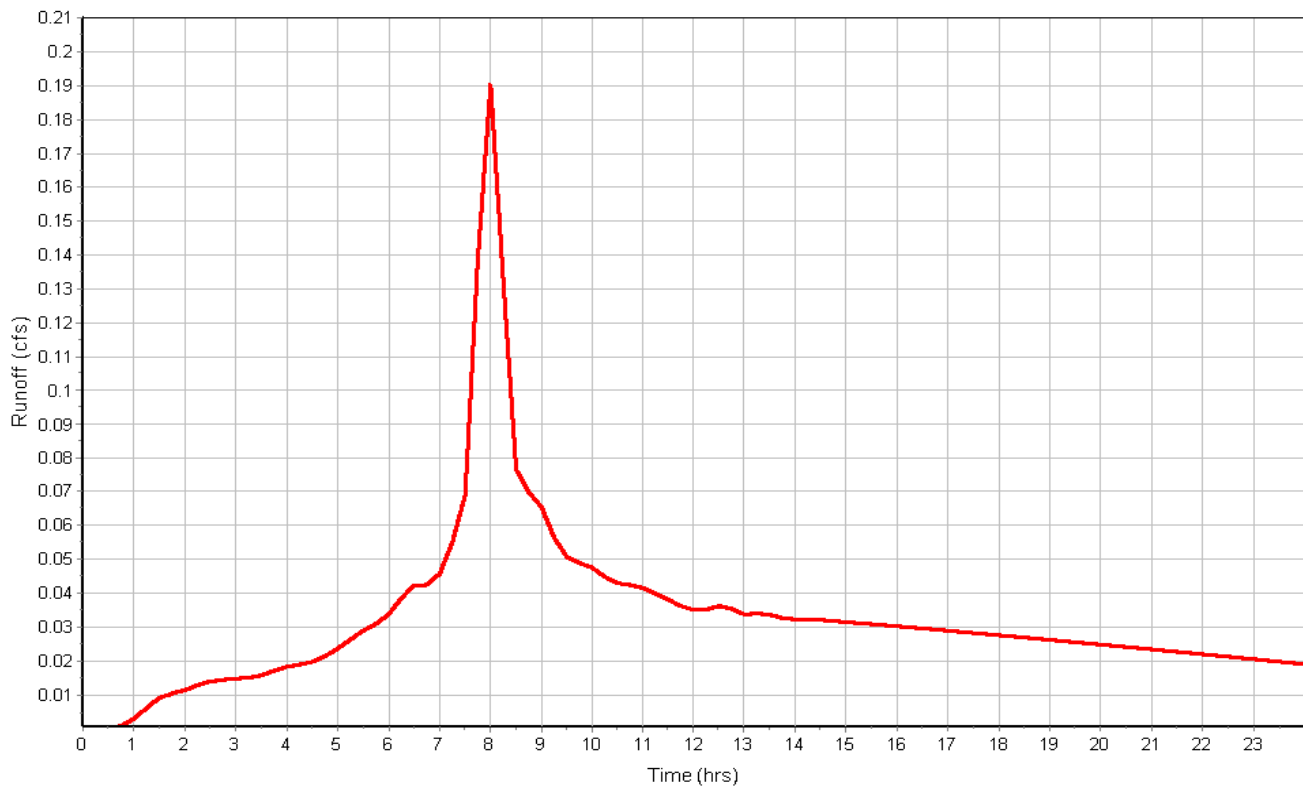
Total Rainfall (in) 4.75
 Total Runoff (in) 3.41
 Peak Runoff (cfs) 0.19
 Weighted Curve Number 86.78
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 024

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 025**Input Data**

Area (ac) 0.23
 Impervious Area (%) 55.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

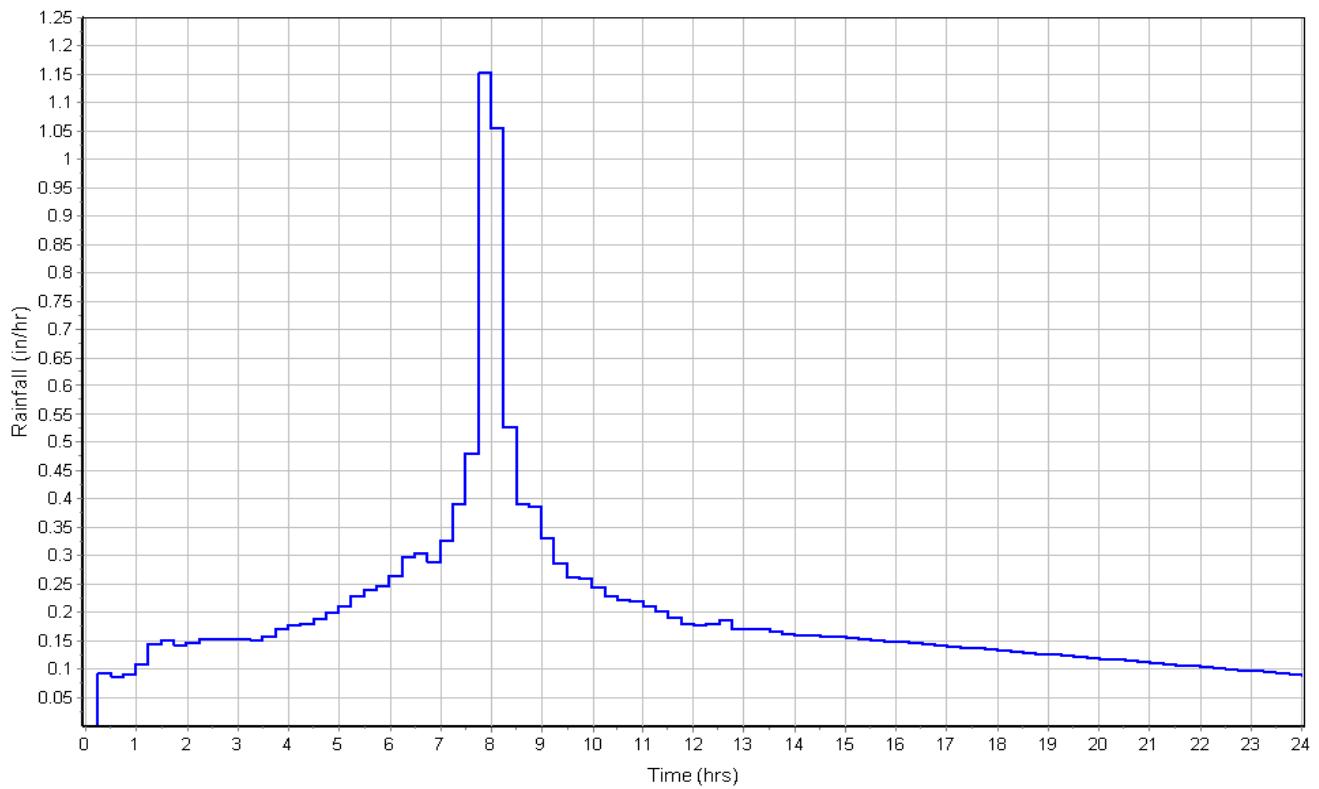
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.23		88.1

Subbasin Runoff Results

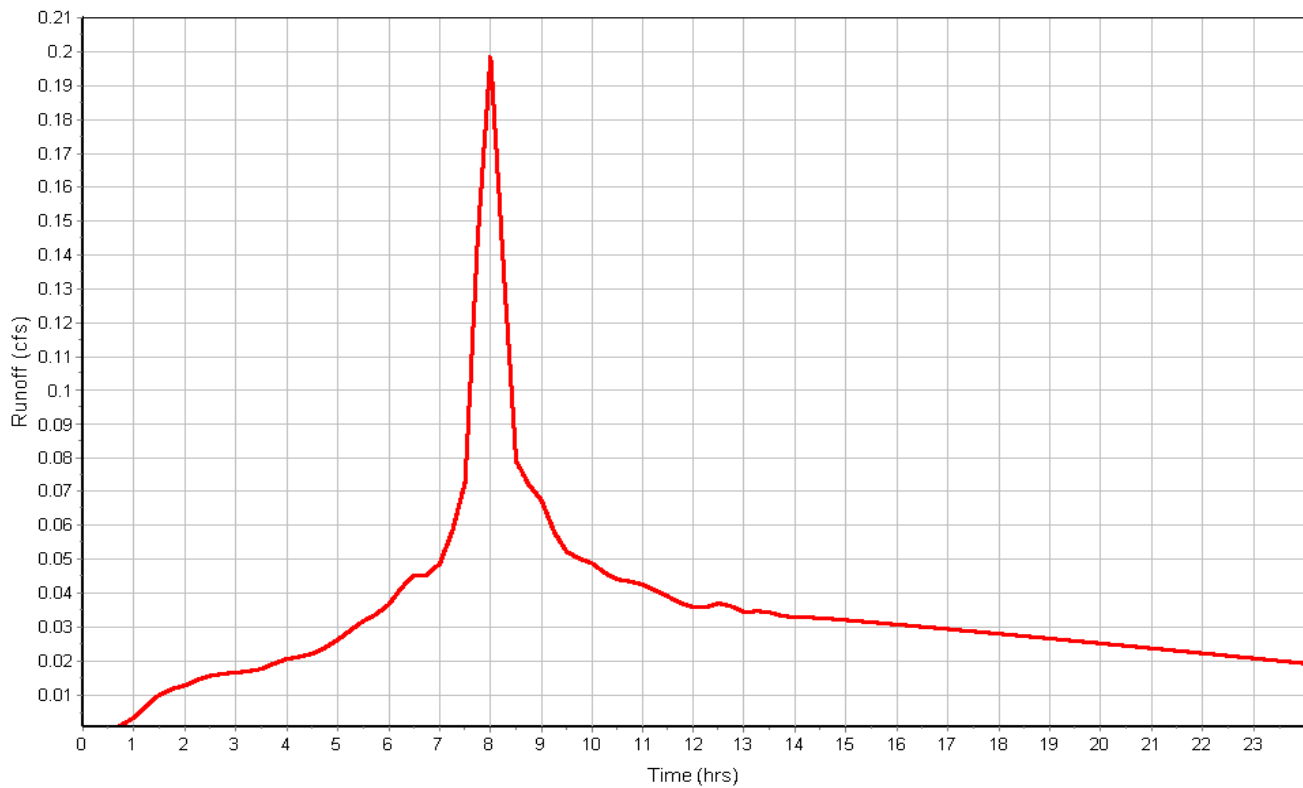
Total Rainfall (in) 4.75
 Total Runoff (in) 3.54
 Peak Runoff (cfs) 0.20
 Weighted Curve Number 88.10
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 025

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 026**Input Data**

Area (ac) 0.07
 Impervious Area (%) 51.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

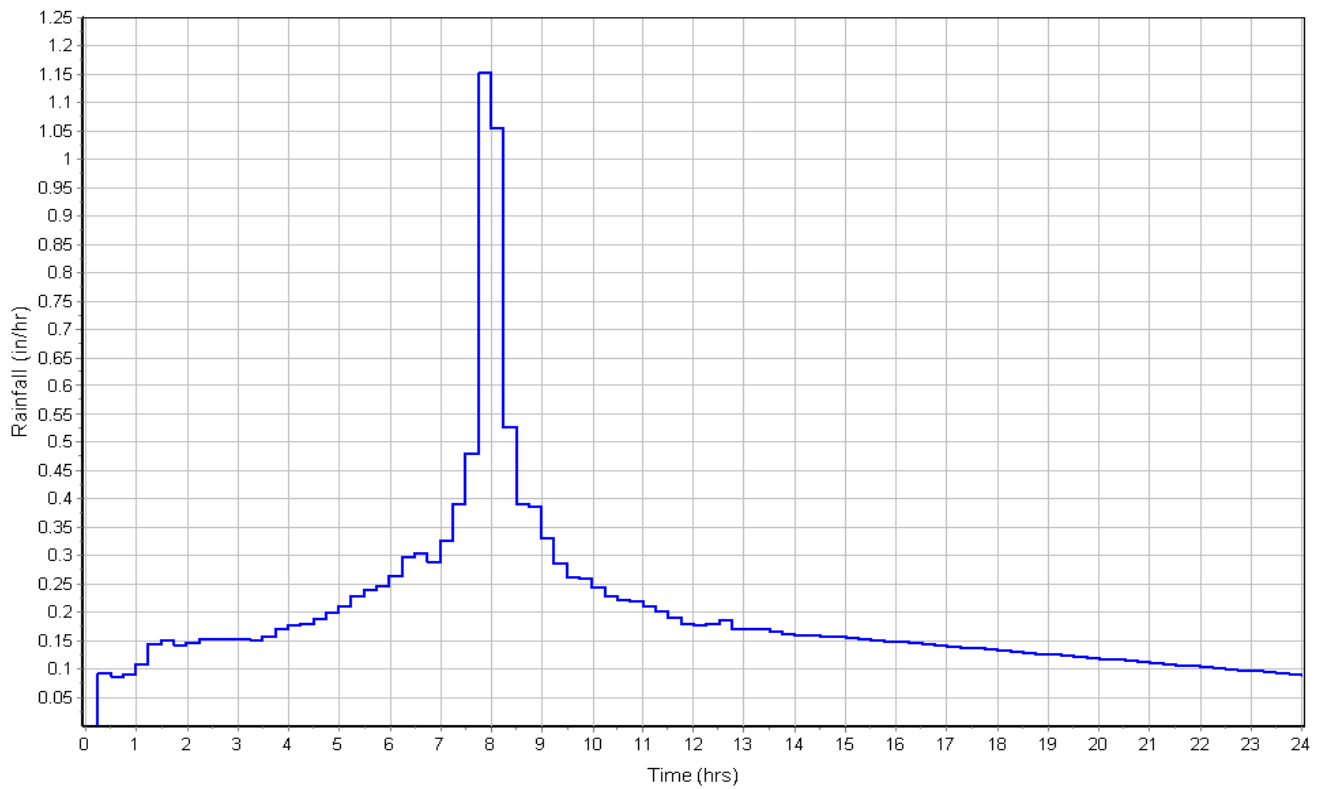
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.07		87.22

Subbasin Runoff Results

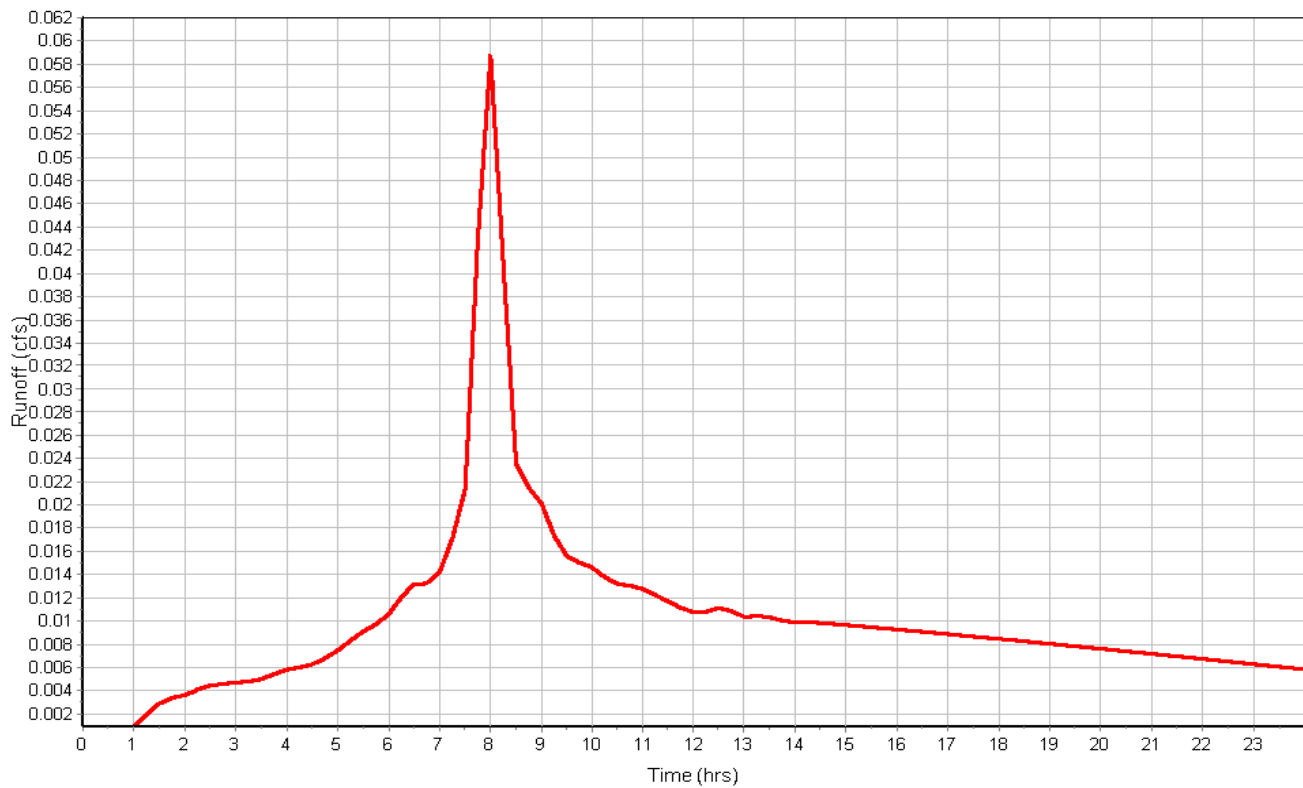
Total Rainfall (in) 4.75
 Total Runoff (in) 3.45
 Peak Runoff (cfs) 0.06
 Weighted Curve Number 87.22
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 026

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 027**Input Data**

Area (ac) 0.06
 Impervious Area (%) 53.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

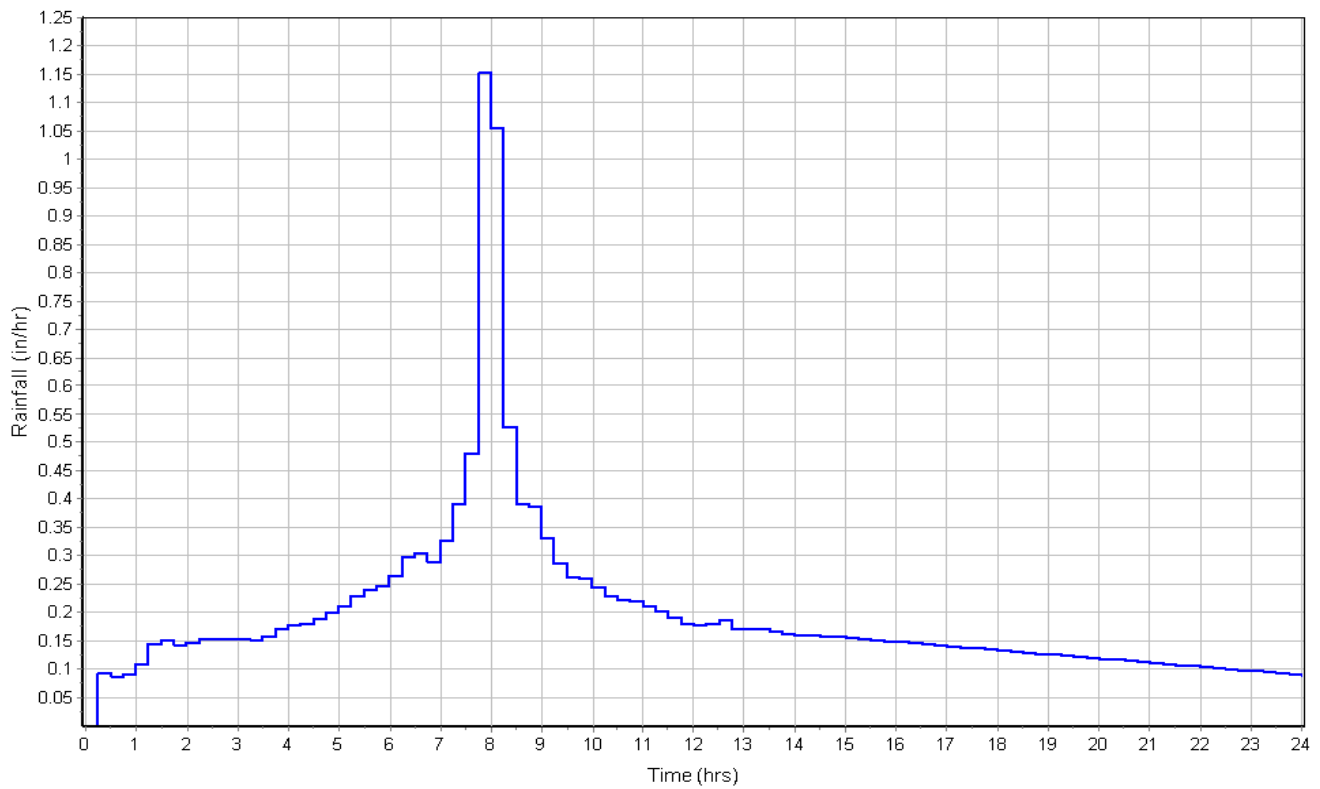
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.06		87.66

Subbasin Runoff Results

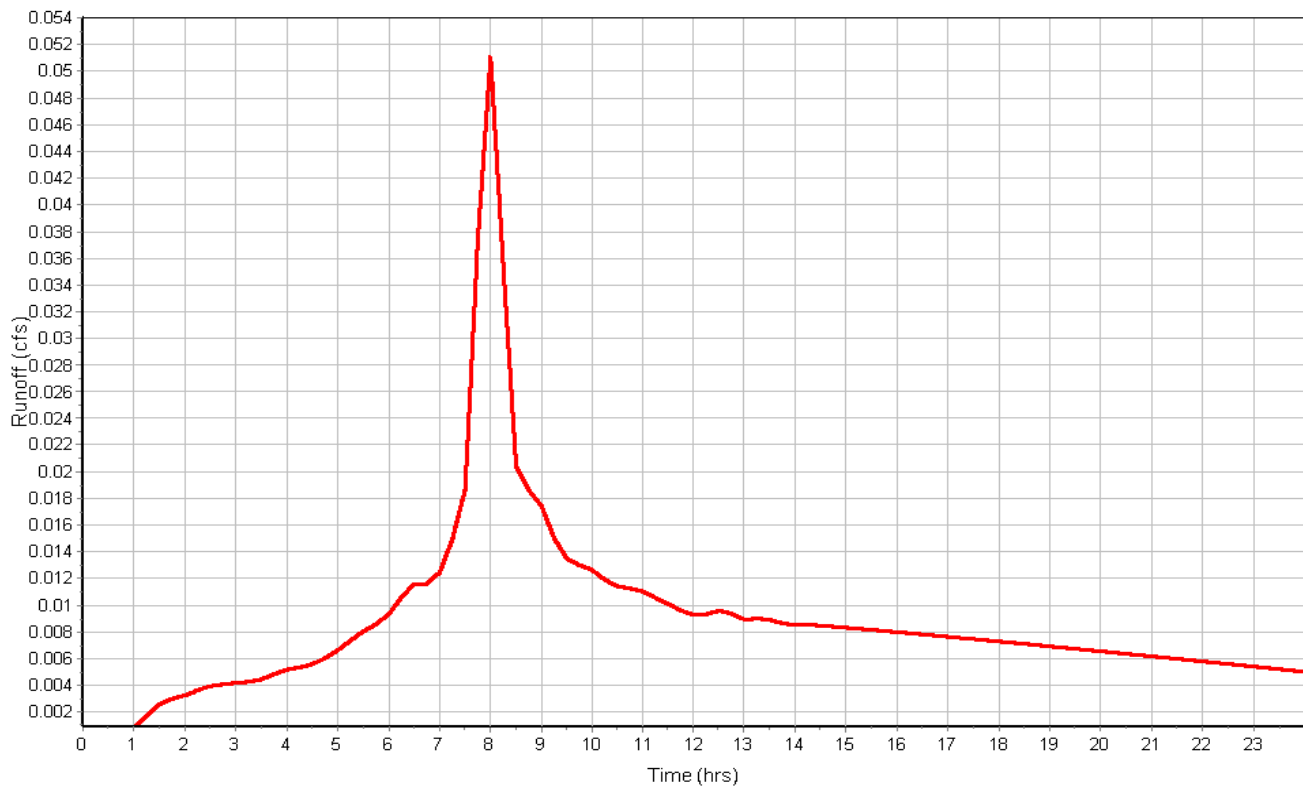
Total Rainfall (in) 4.75
 Total Runoff (in) 3.50
 Peak Runoff (cfs) 0.05
 Weighted Curve Number 87.66
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 027

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 028**Input Data**

Area (ac) 0.08
Impervious Area (%) 63.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

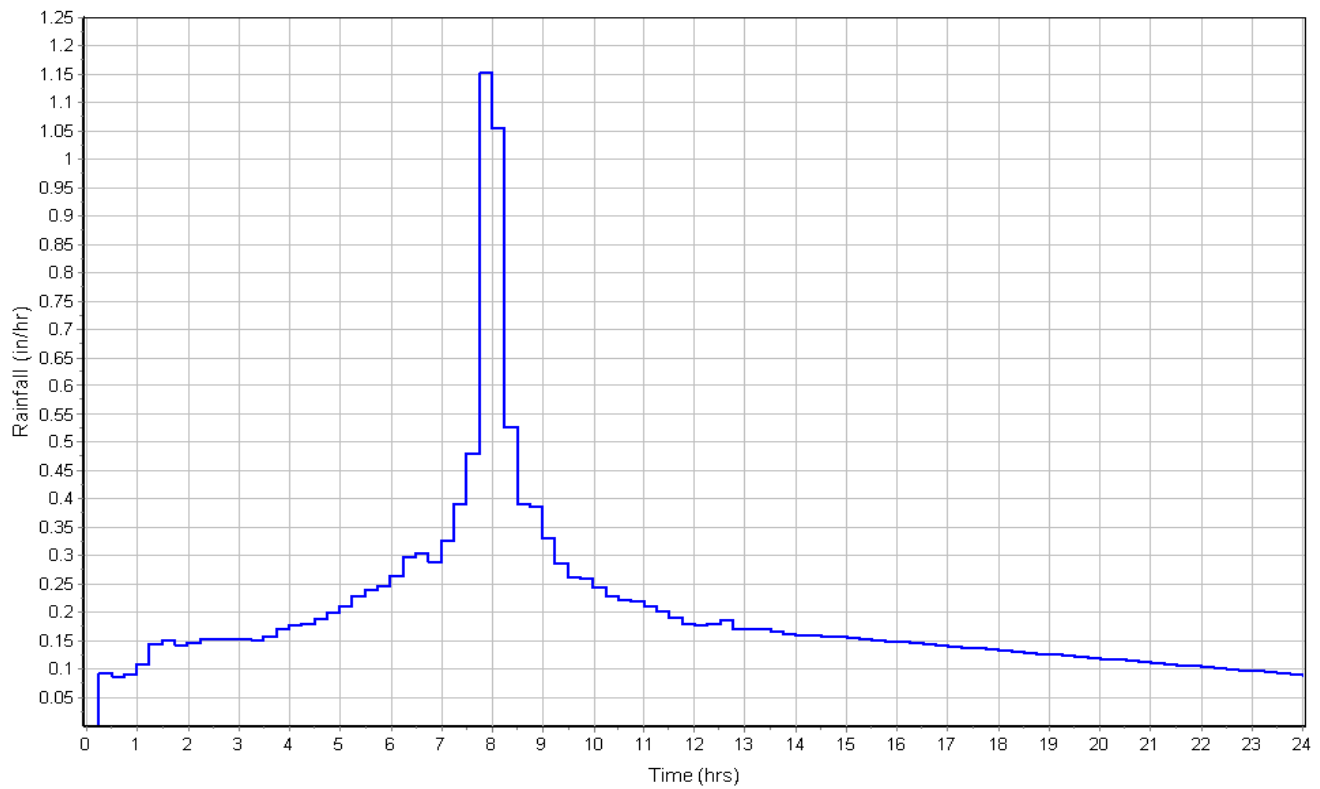
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.08		89.86

Subbasin Runoff Results

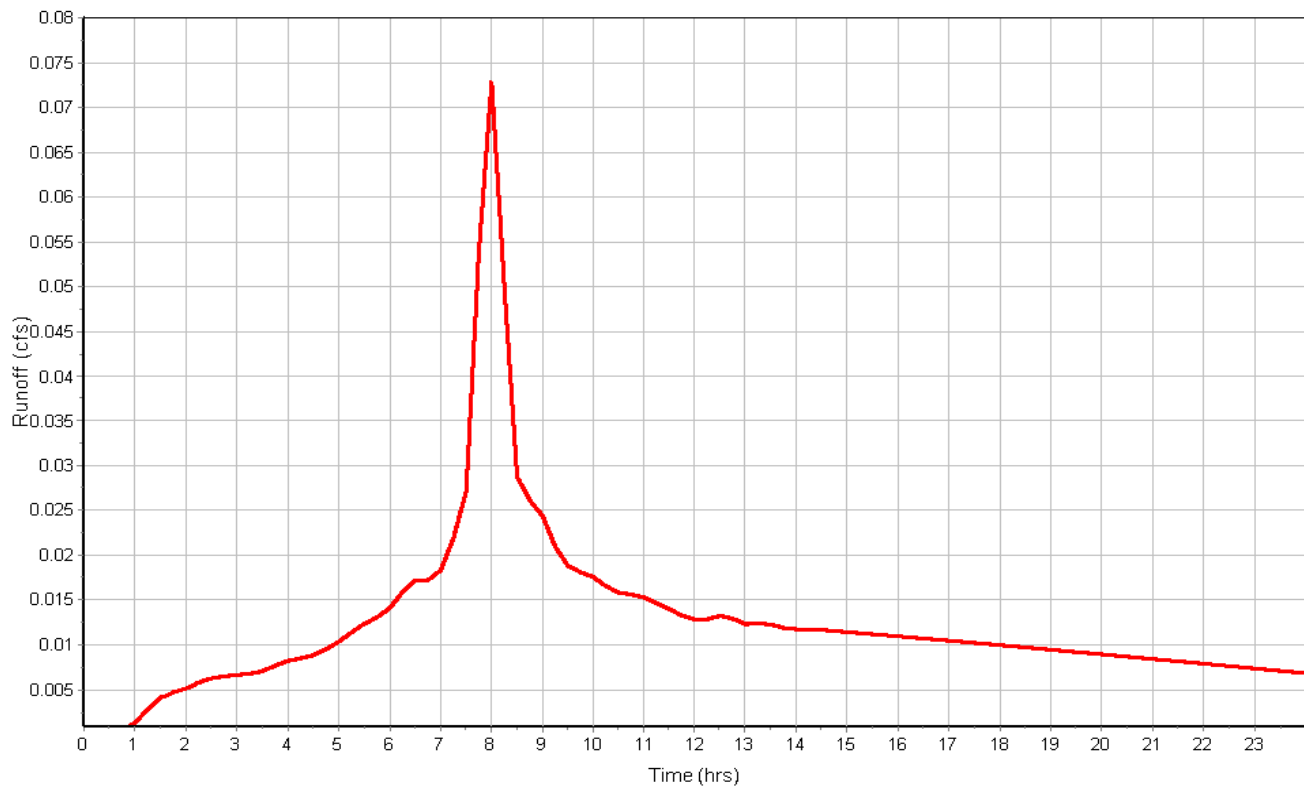
Total Rainfall (in) 4.75
Total Runoff (in) 3.71
Peak Runoff (cfs) 0.07
Weighted Curve Number 89.86
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 028

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 029**Input Data**

Area (ac) 0.09
Impervious Area (%) 42.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

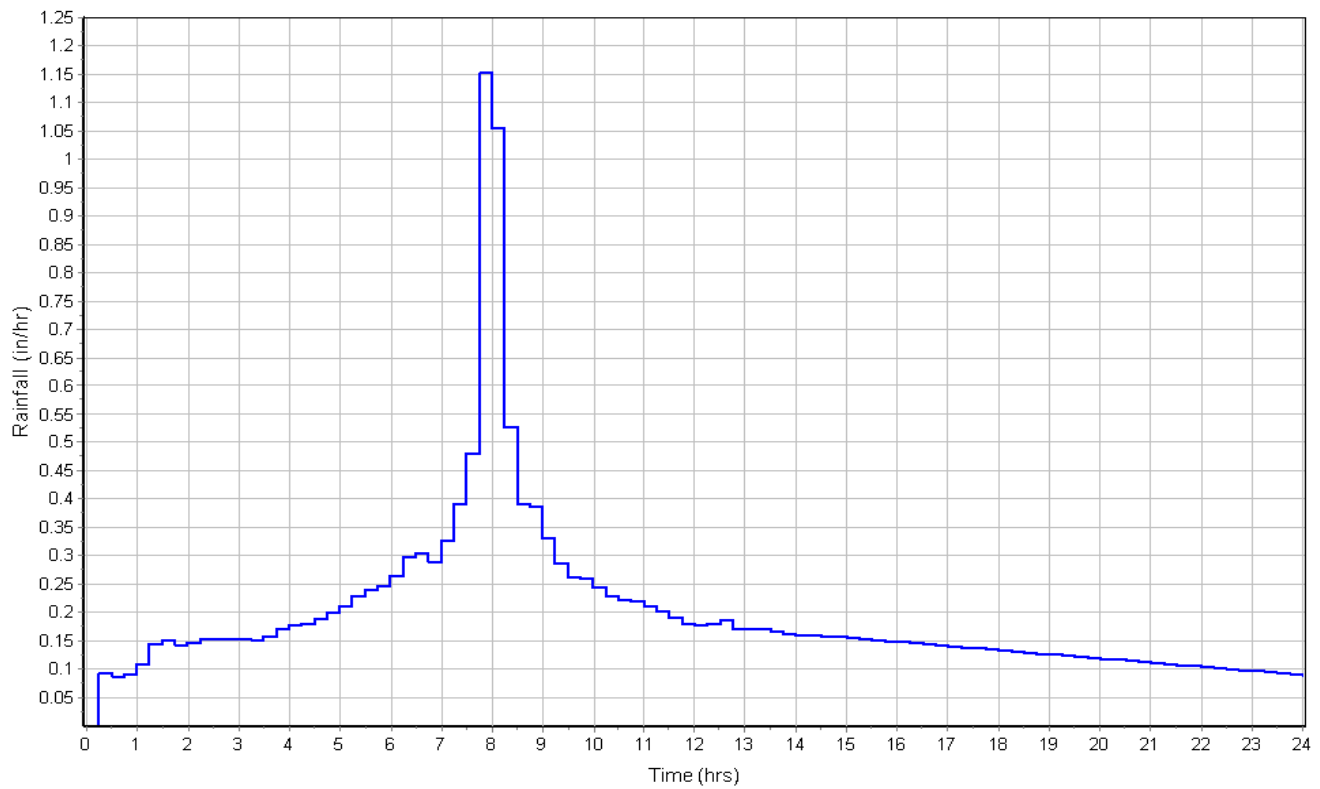
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.09		85.24

Subbasin Runoff Results

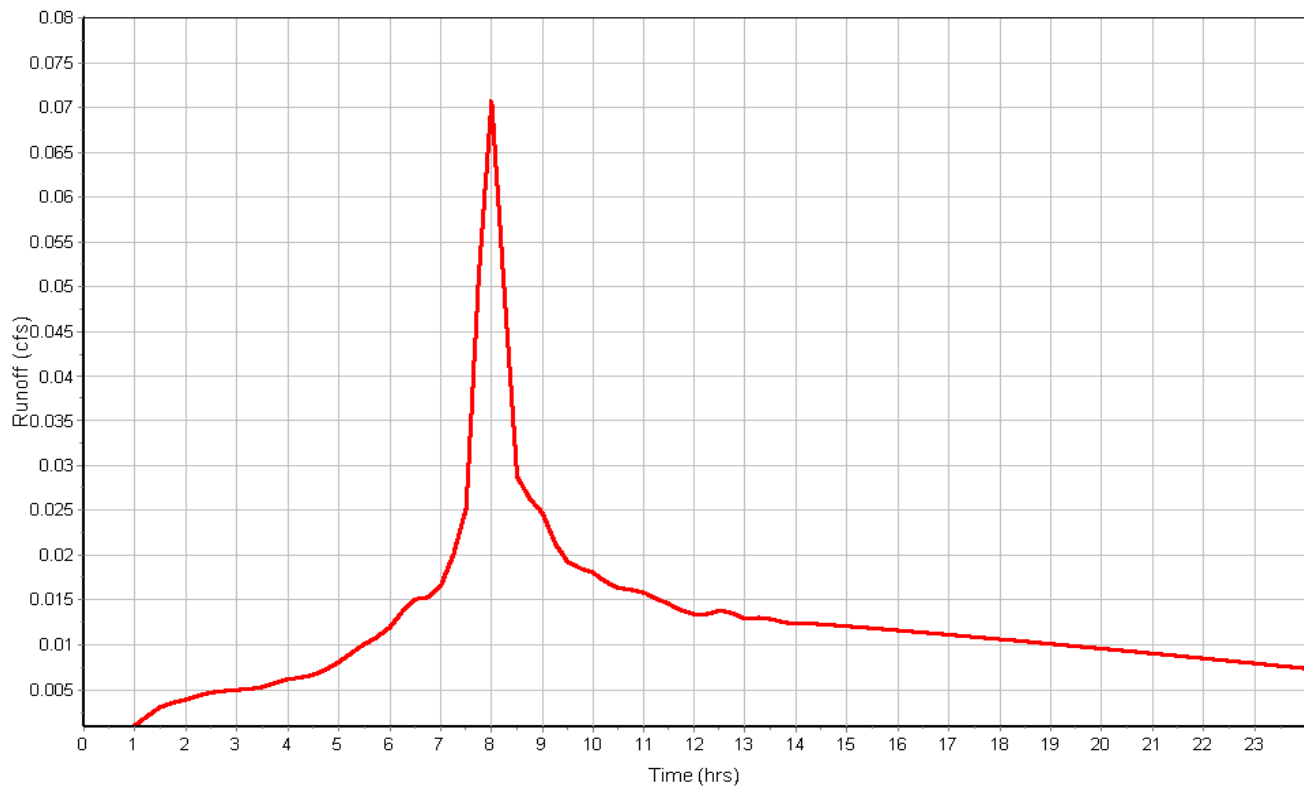
Total Rainfall (in) 4.75
Total Runoff (in) 3.26
Peak Runoff (cfs) 0.07
Weighted Curve Number 85.24
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 029

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 030**Input Data**

Area (ac) 0.13
Impervious Area (%) 41.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

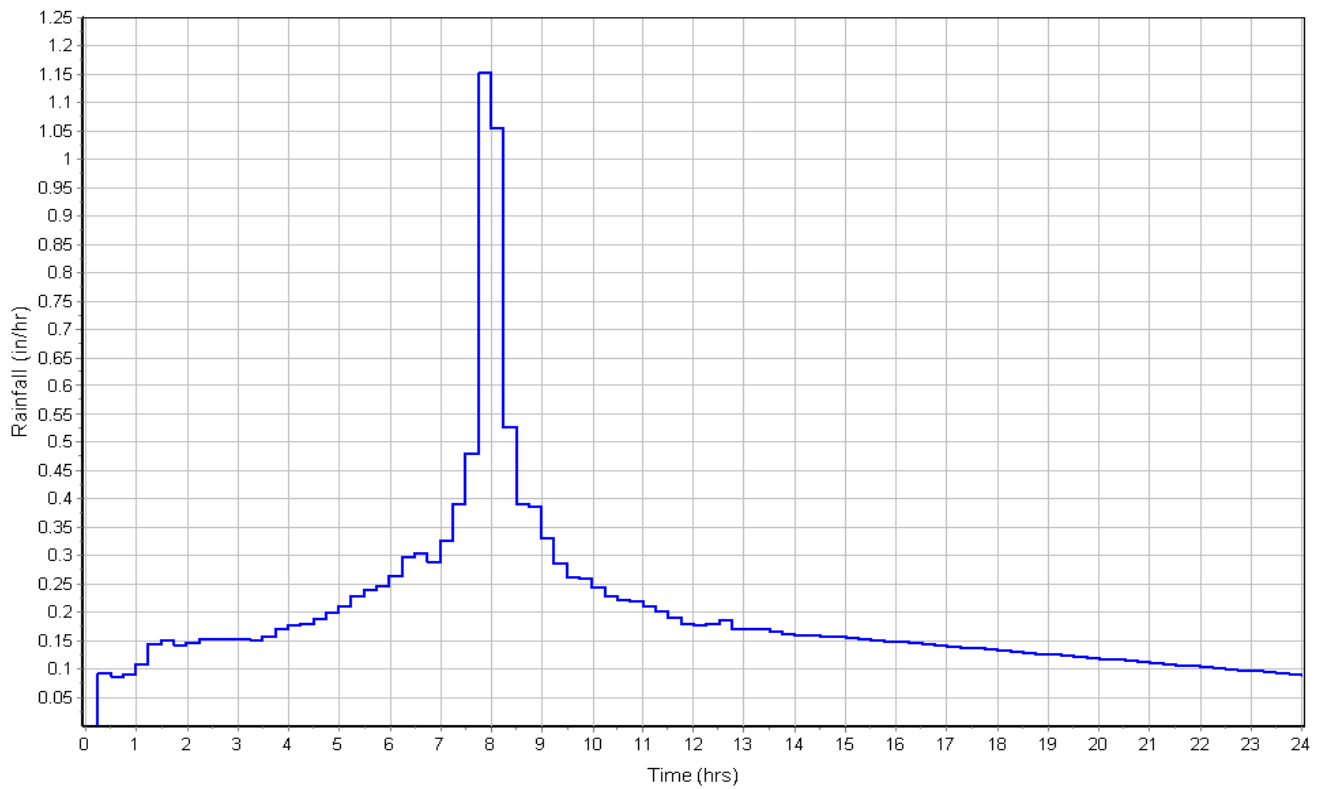
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.13		85.02

Subbasin Runoff Results

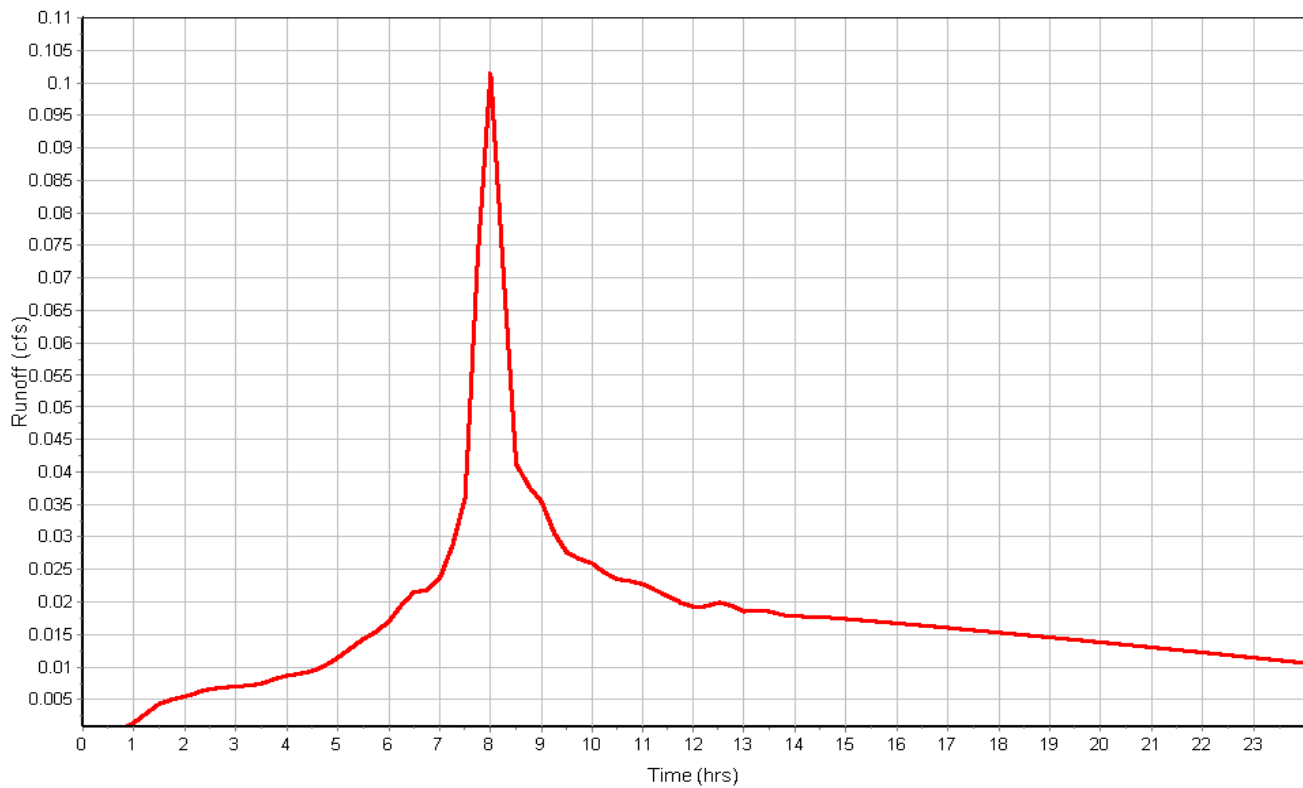
Total Rainfall (in) 4.75
Total Runoff (in) 3.23
Peak Runoff (cfs) 0.10
Weighted Curve Number 85.02
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 030

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 031**Input Data**

Area (ac) 0.12
Impervious Area (%) 77.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

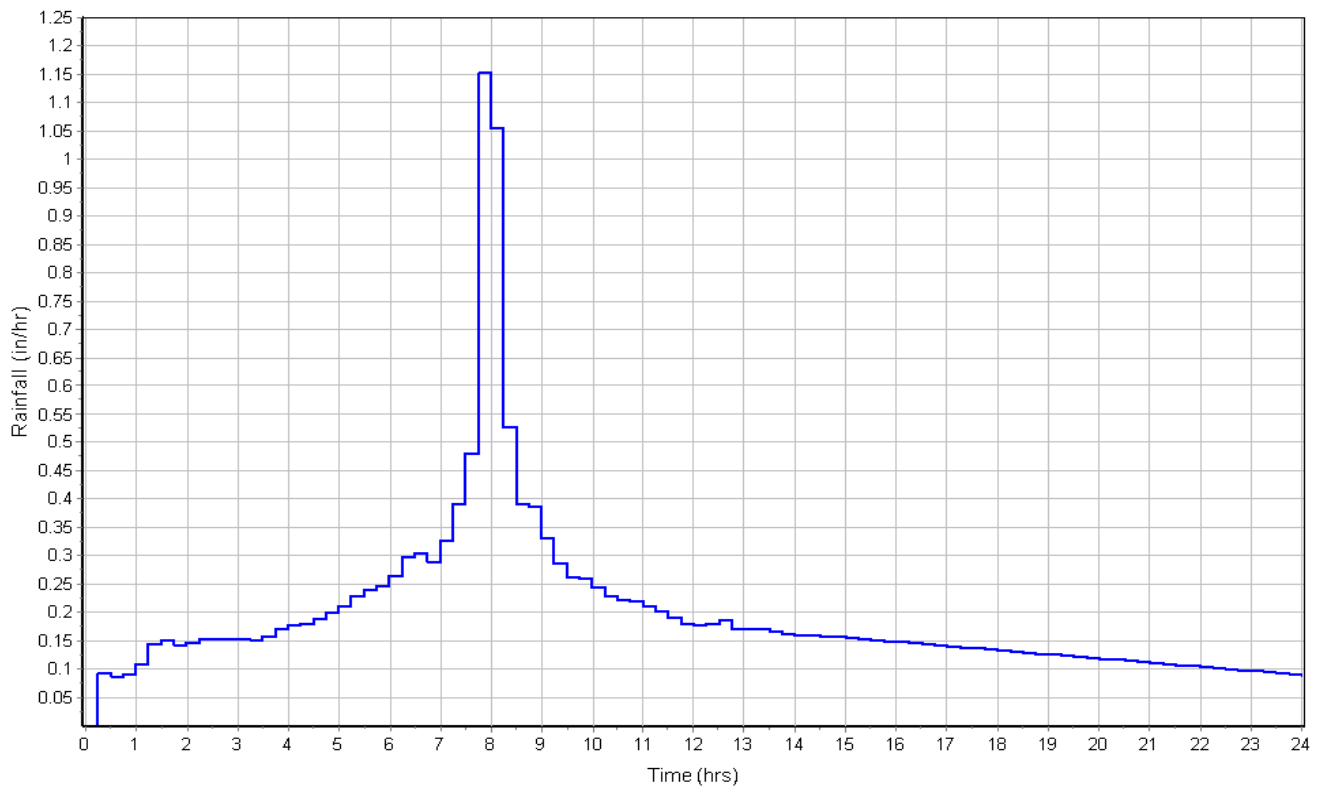
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.12		92.94

Subbasin Runoff Results

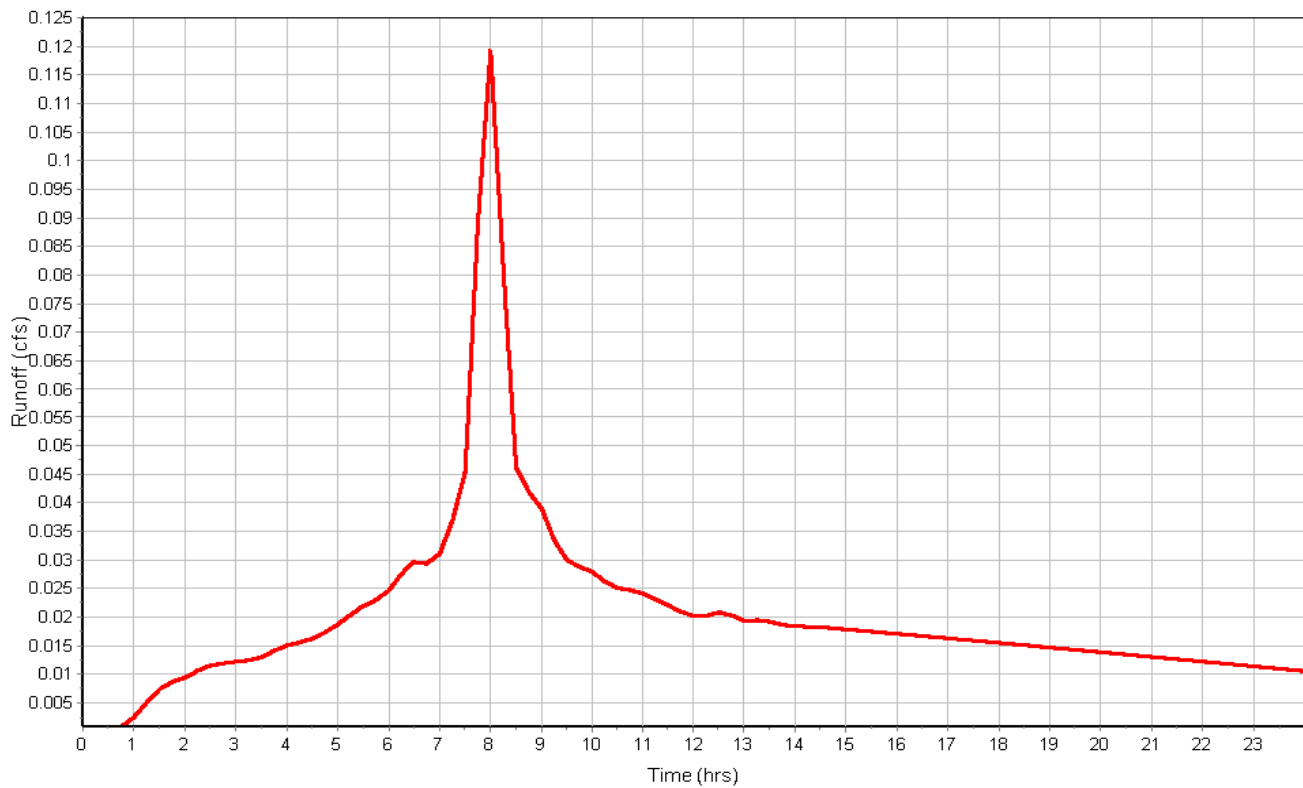
Total Rainfall (in) 4.75
Total Runoff (in) 4.02
Peak Runoff (cfs) 0.12
Weighted Curve Number 92.94
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 031

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 032**Input Data**

Area (ac) 0.20
Impervious Area (%) 85.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

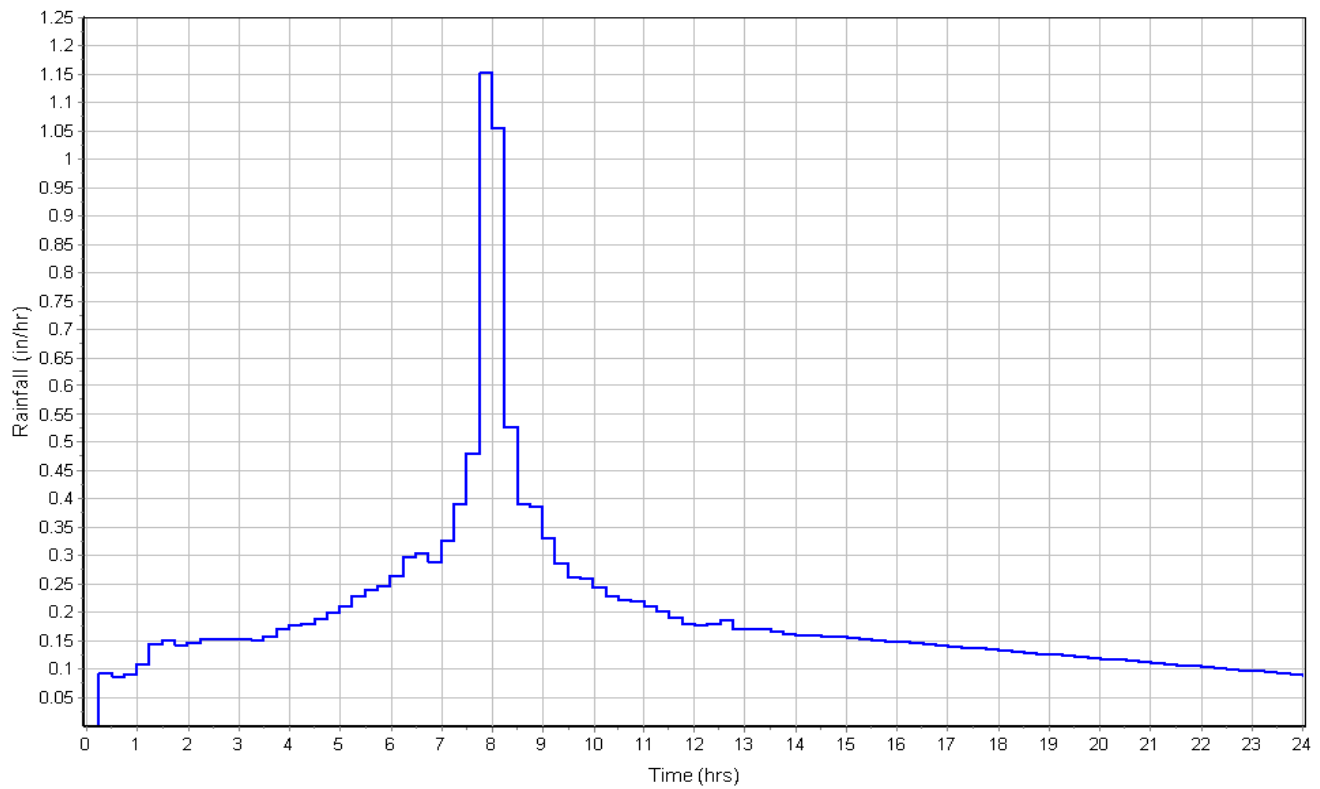
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.20		94.7

Subbasin Runoff Results

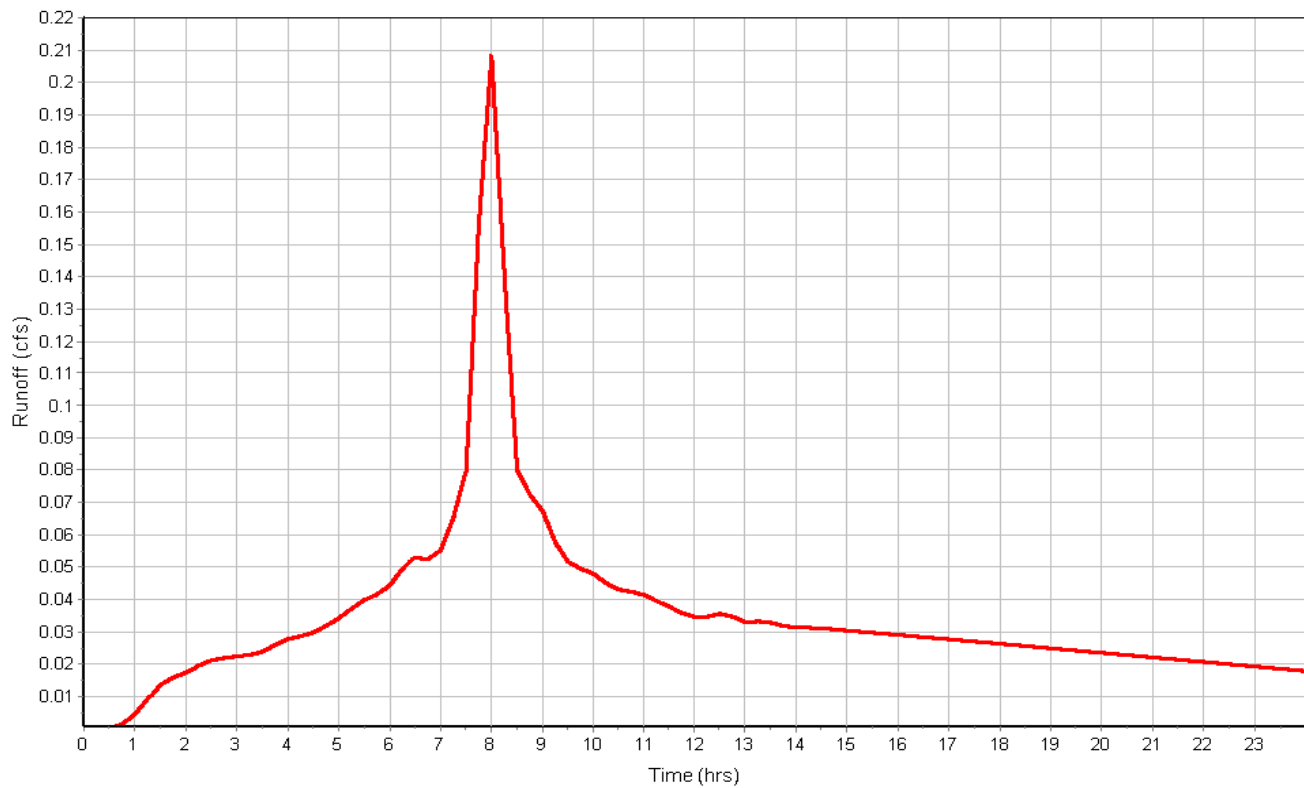
Total Rainfall (in) 4.75
Total Runoff (in) 4.19
Peak Runoff (cfs) 0.21
Weighted Curve Number 94.70
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 032

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 033**Input Data**

Area (ac) 0.03
 Impervious Area (%) 94.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

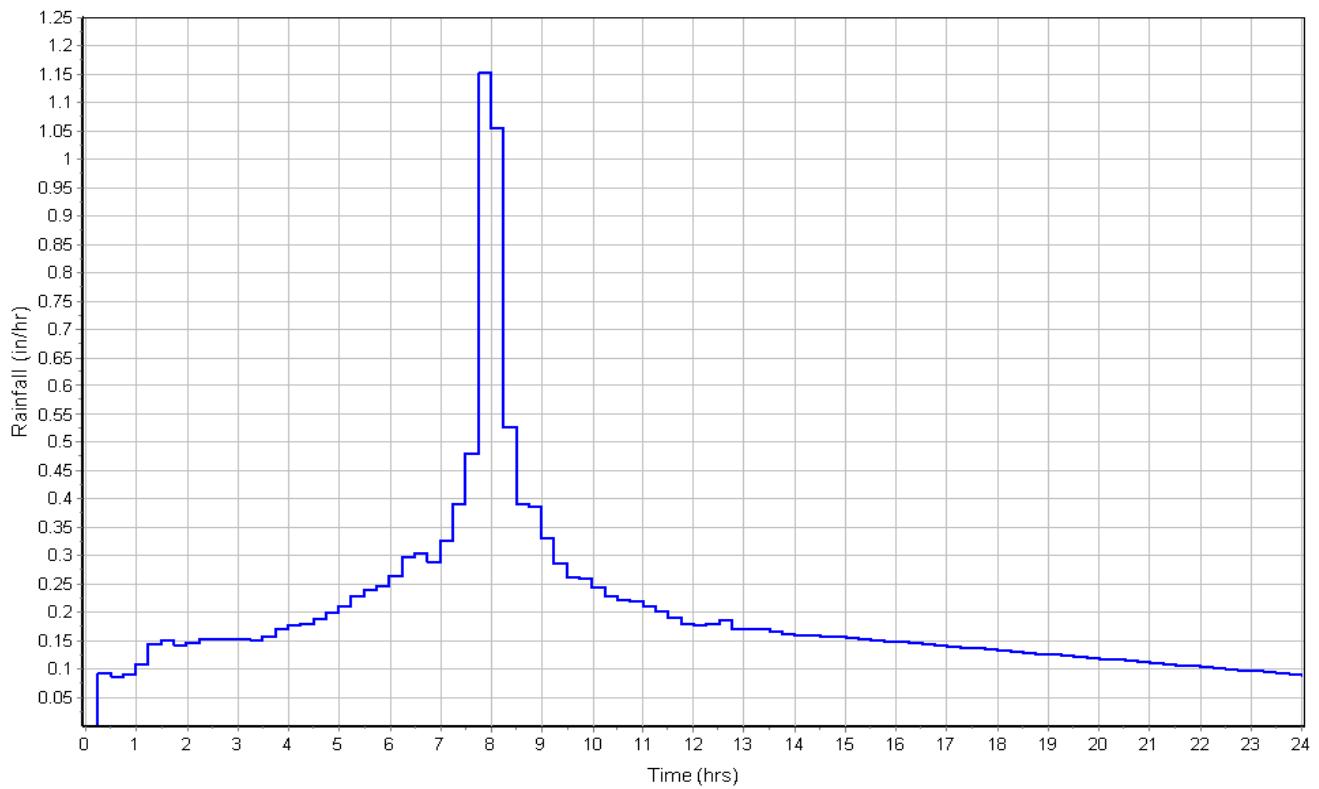
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.03		96.68

Subbasin Runoff Results

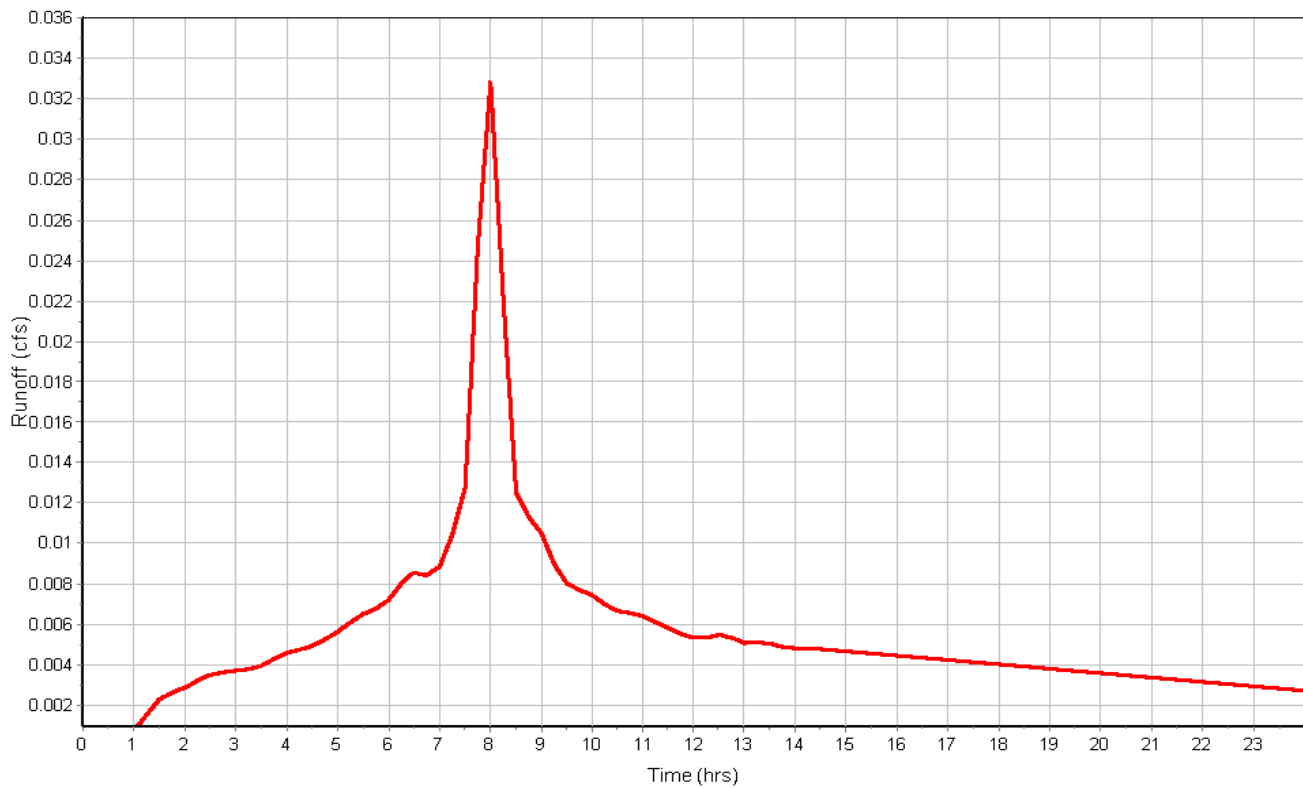
Total Rainfall (in) 4.75
 Total Runoff (in) 4.39
 Peak Runoff (cfs) 0.03
 Weighted Curve Number 96.68
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 033

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 034**Input Data**

Area (ac) 0.27
 Impervious Area (%) 93.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

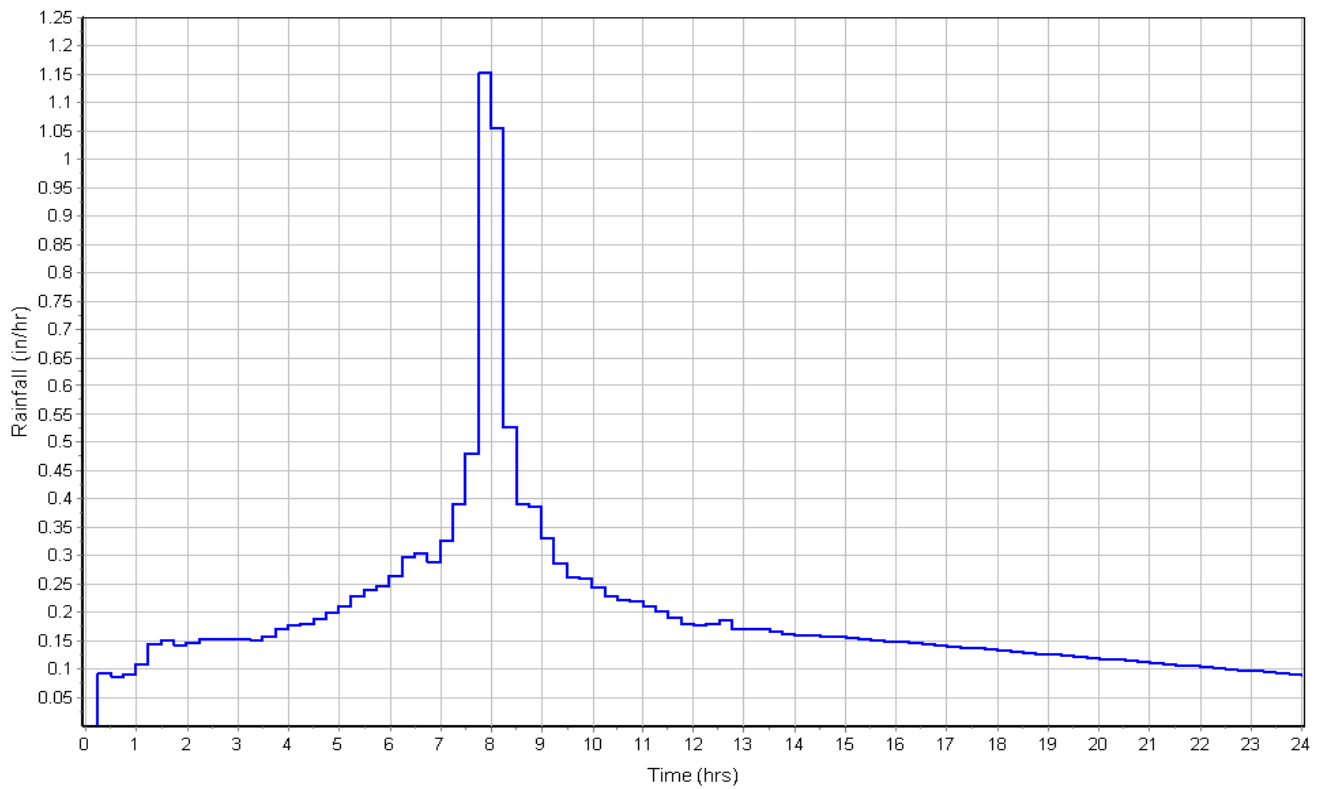
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.27		96.46

Subbasin Runoff Results

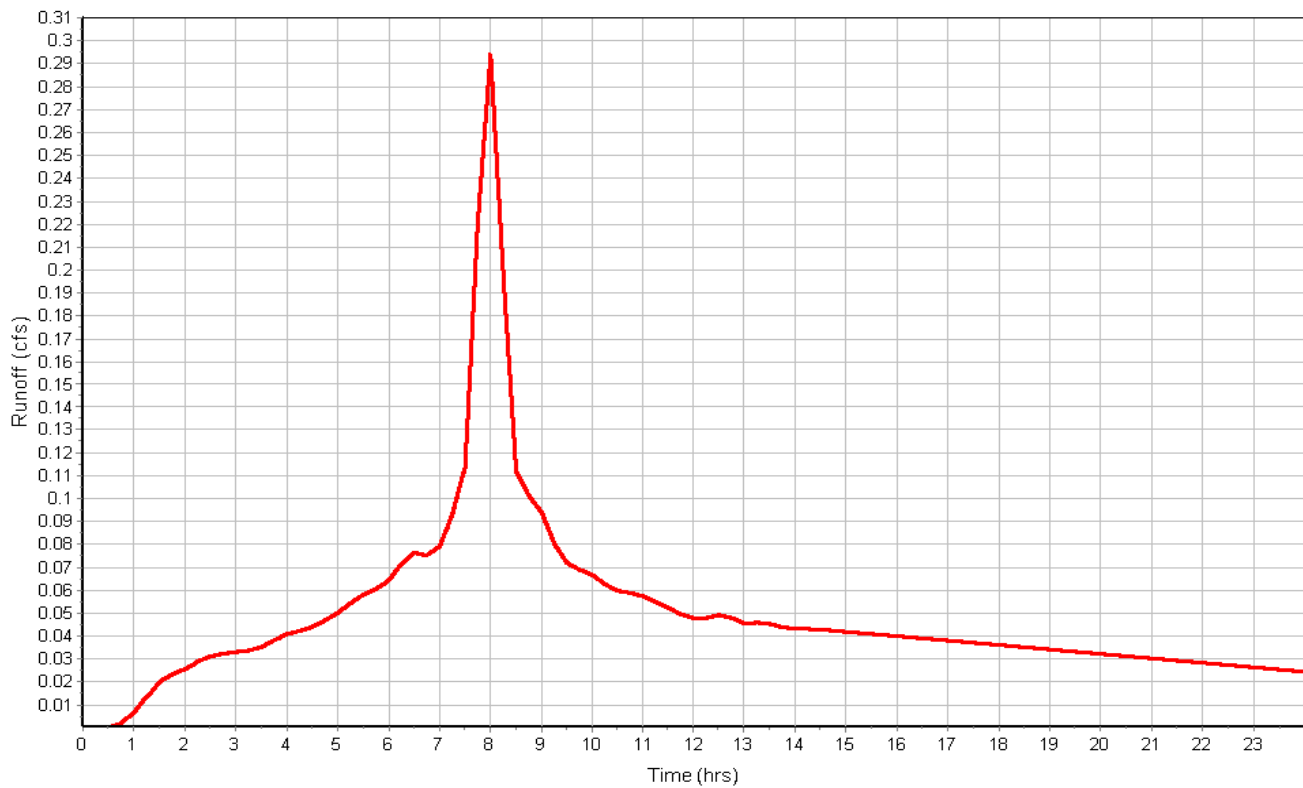
Total Rainfall (in) 4.75
 Total Runoff (in) 4.37
 Peak Runoff (cfs) 0.29
 Weighted Curve Number 96.46
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 034

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 036**Input Data**

Area (ac) 0.12
Impervious Area (%) 70.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

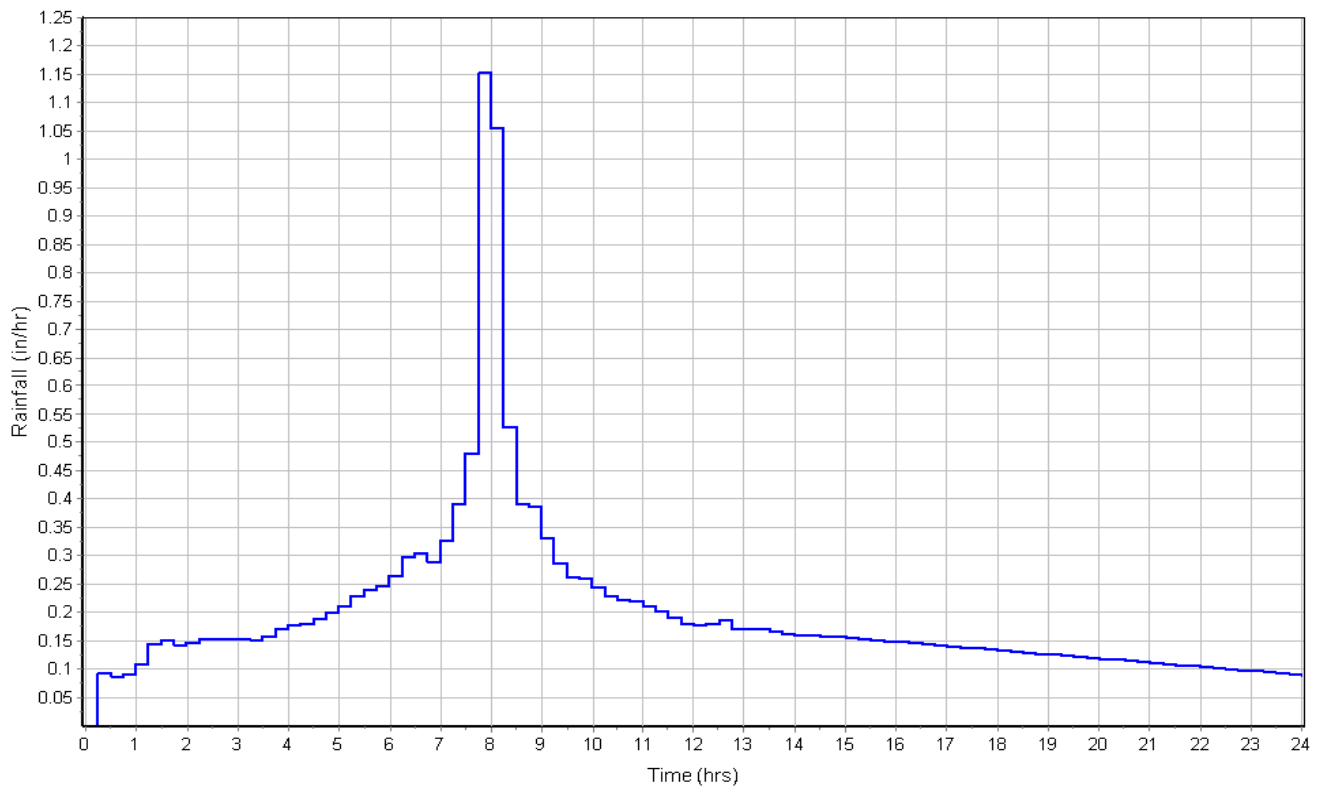
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.12		91.4

Subbasin Runoff Results

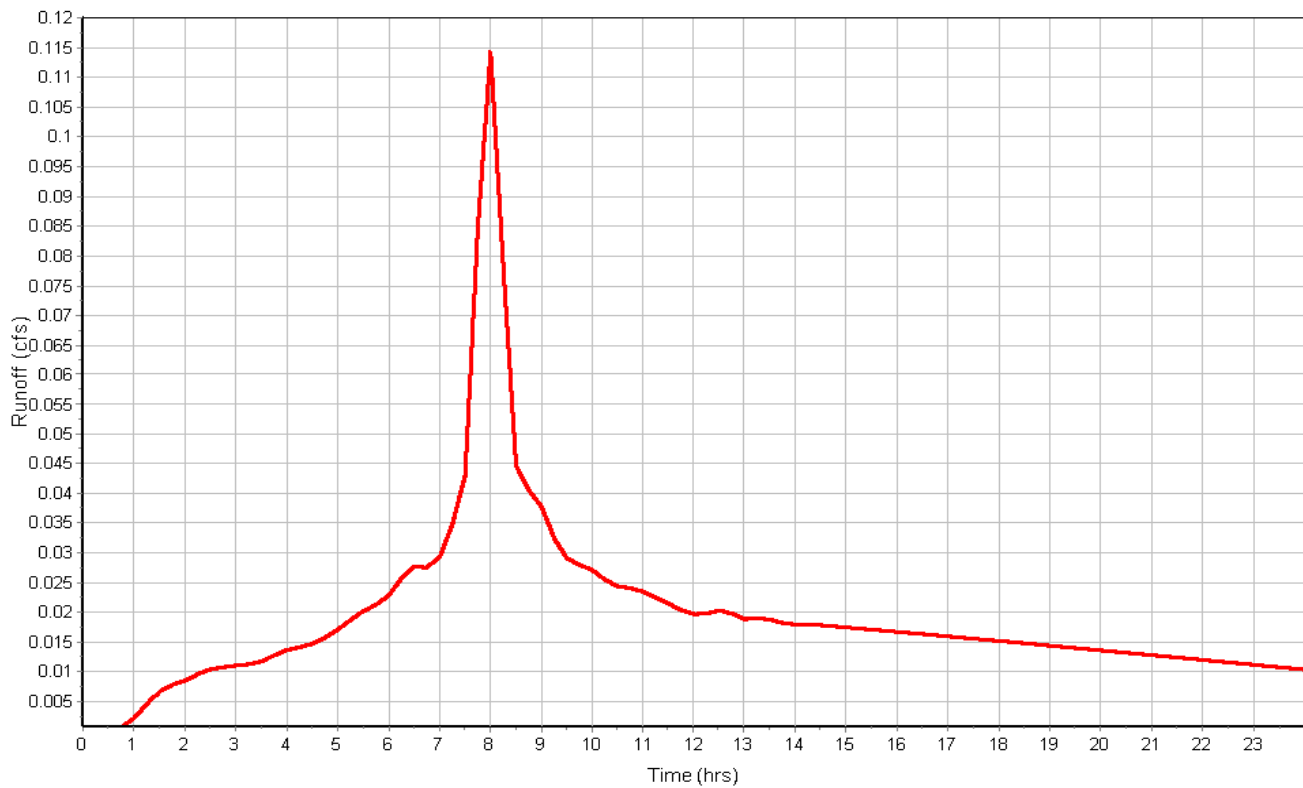
Total Rainfall (in) 4.75
Total Runoff (in) 3.87
Peak Runoff (cfs) 0.11
Weighted Curve Number 91.40
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 036

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 037**Input Data**

Area (ac) 0.08
Impervious Area (%) 76.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

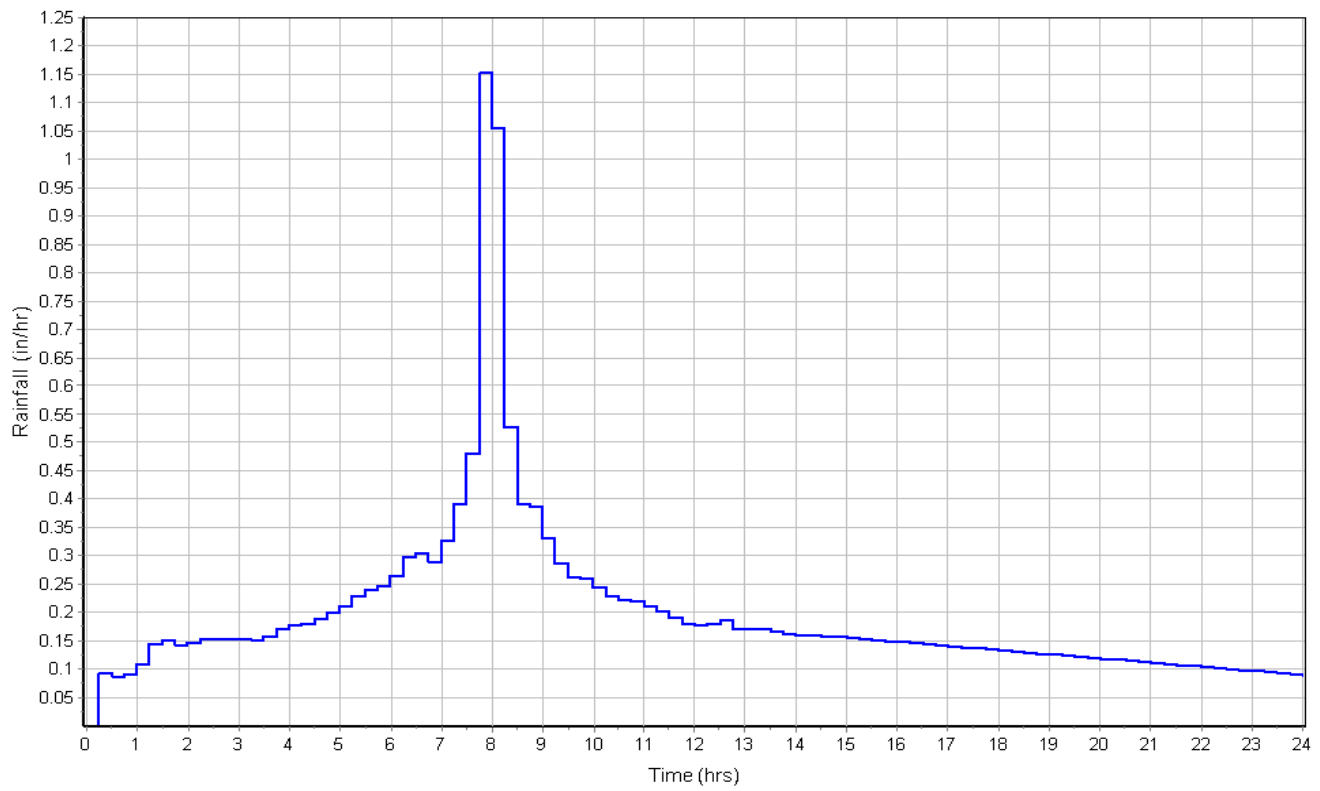
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.08		92.72

Subbasin Runoff Results

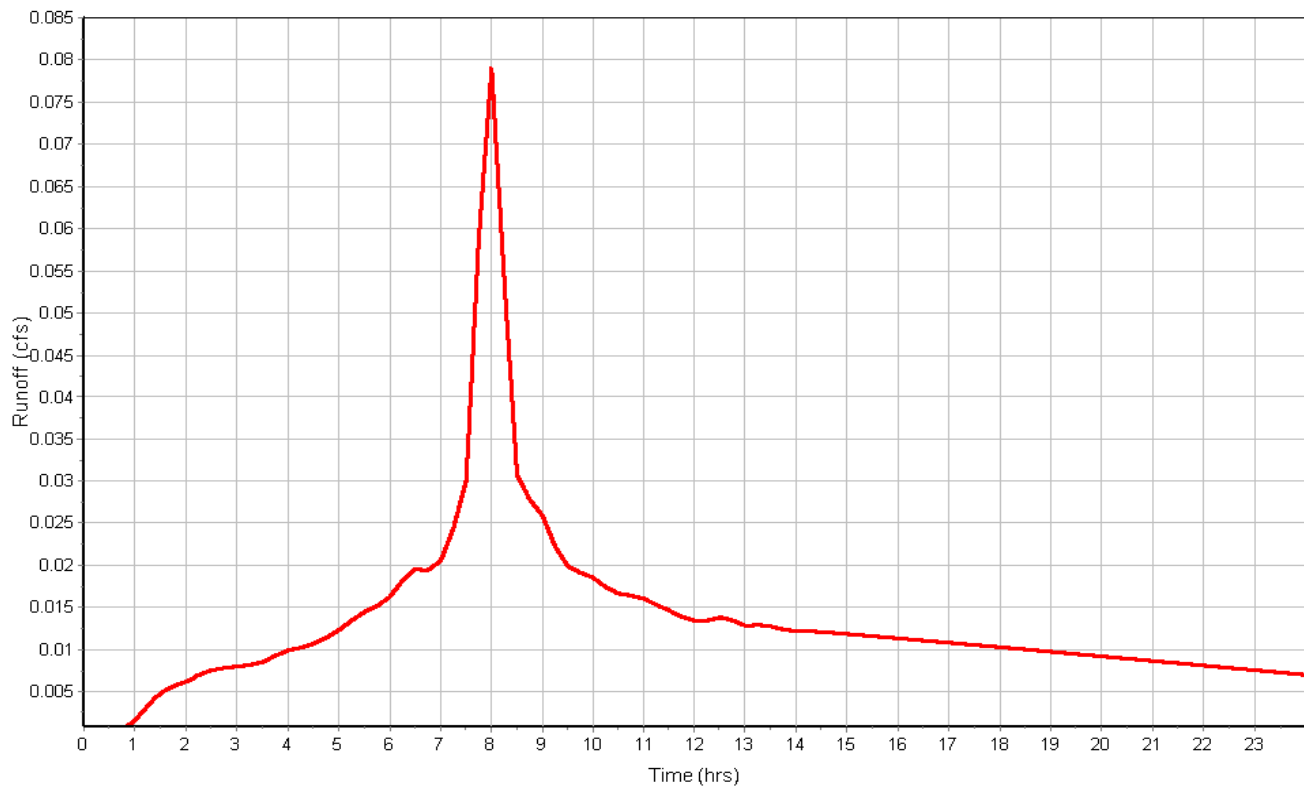
Total Rainfall (in) 4.75
Total Runoff (in) 4.00
Peak Runoff (cfs) 0.08
Weighted Curve Number 92.72
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 037

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 042**Input Data**

Area (ac) 4.25
Impervious Area (%) 72.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

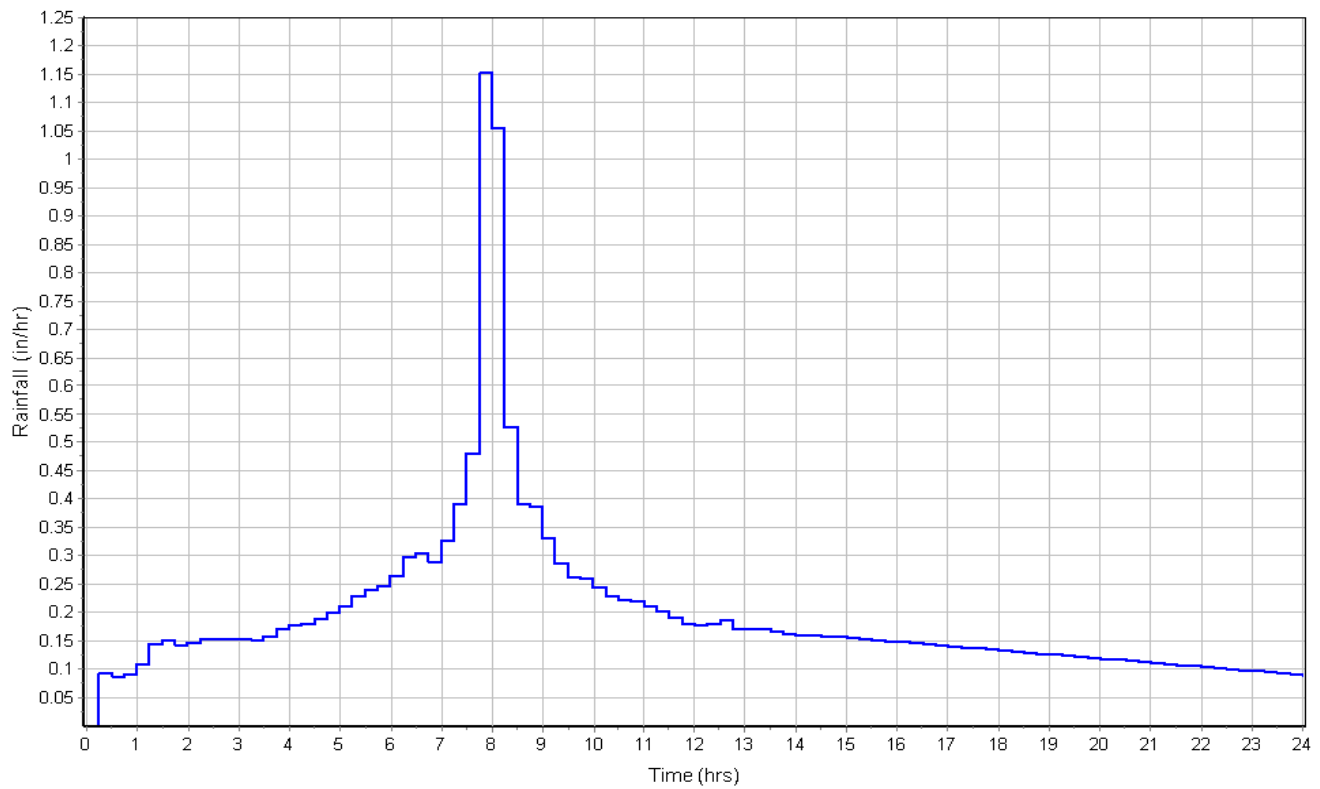
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	4.25		91.84

Subbasin Runoff Results

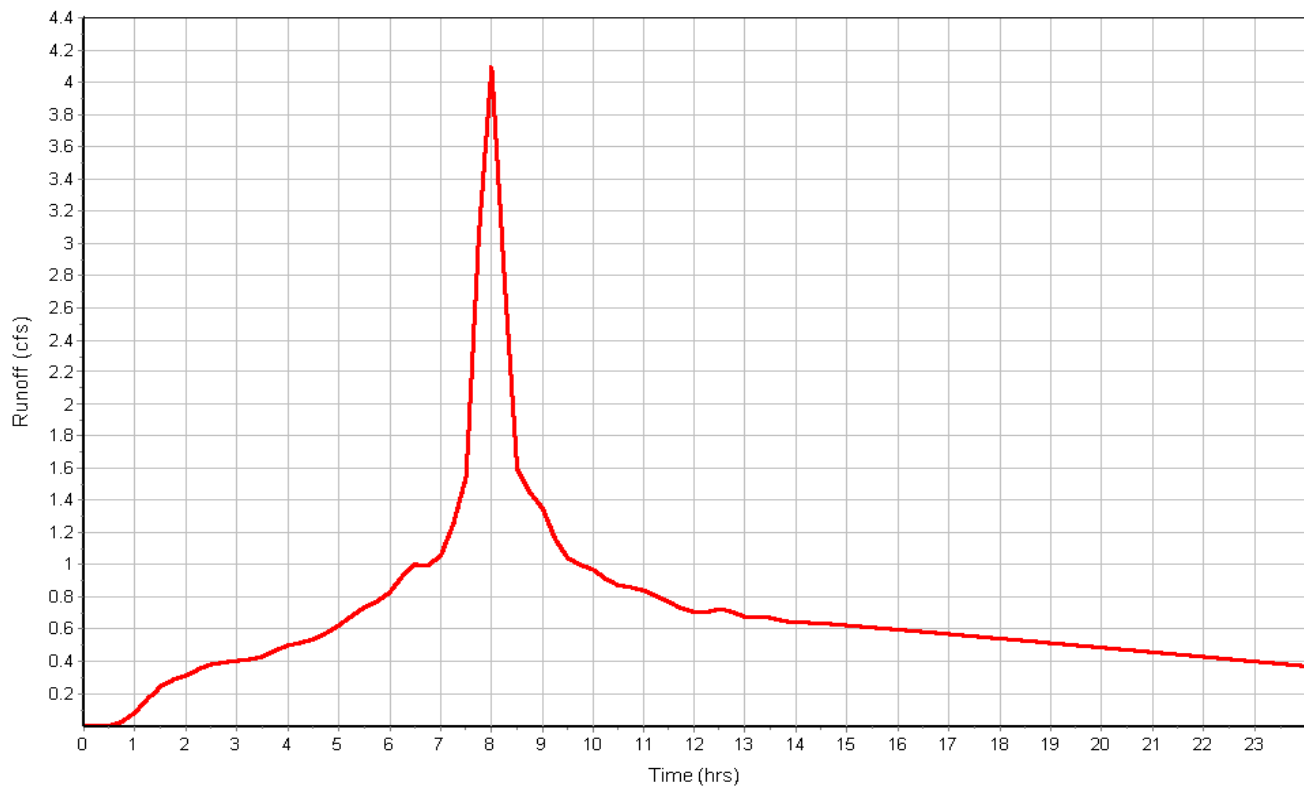
Total Rainfall (in) 4.75
Total Runoff (in) 3.91
Peak Runoff (cfs) 4.10
Weighted Curve Number 91.84
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 042

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 043**Input Data**

Area (ac) 0.05
 Impervious Area (%) 95.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

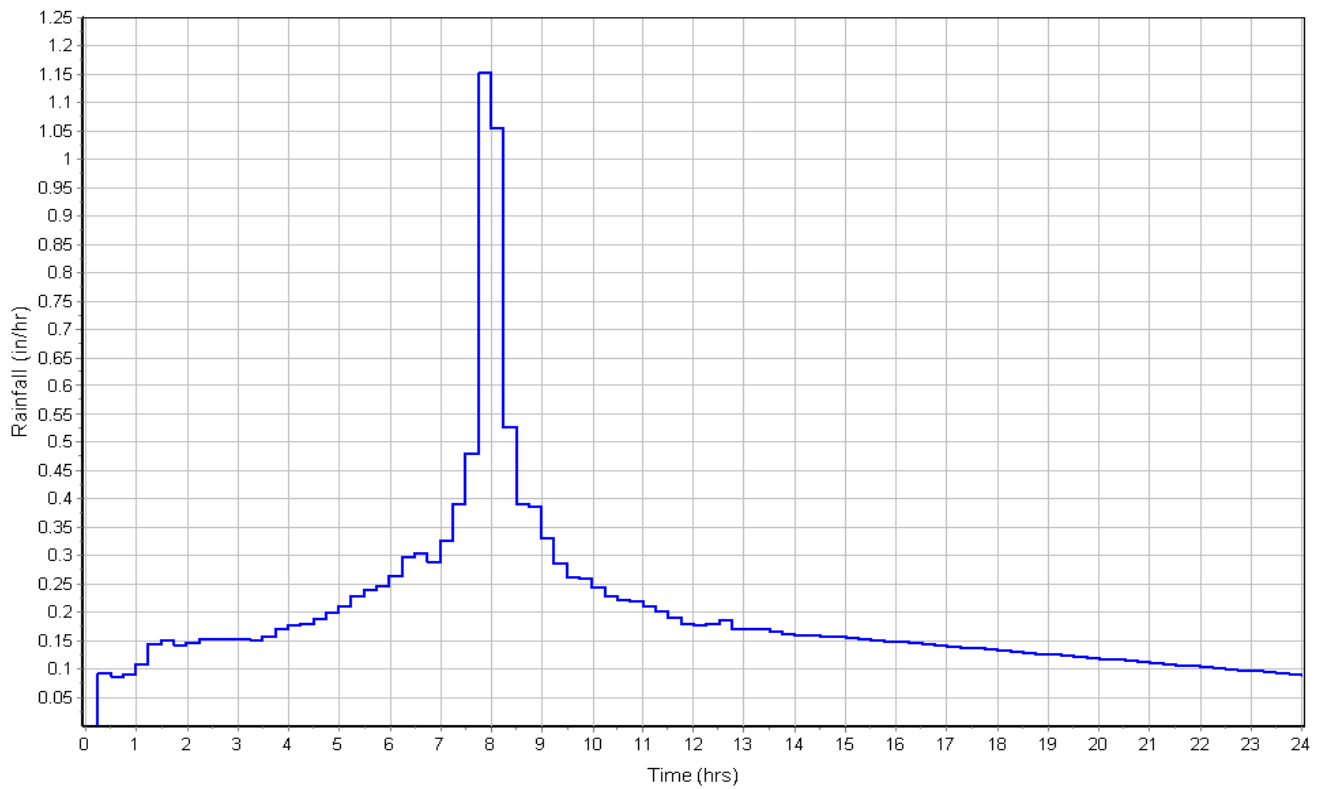
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.05		96.9

Subbasin Runoff Results

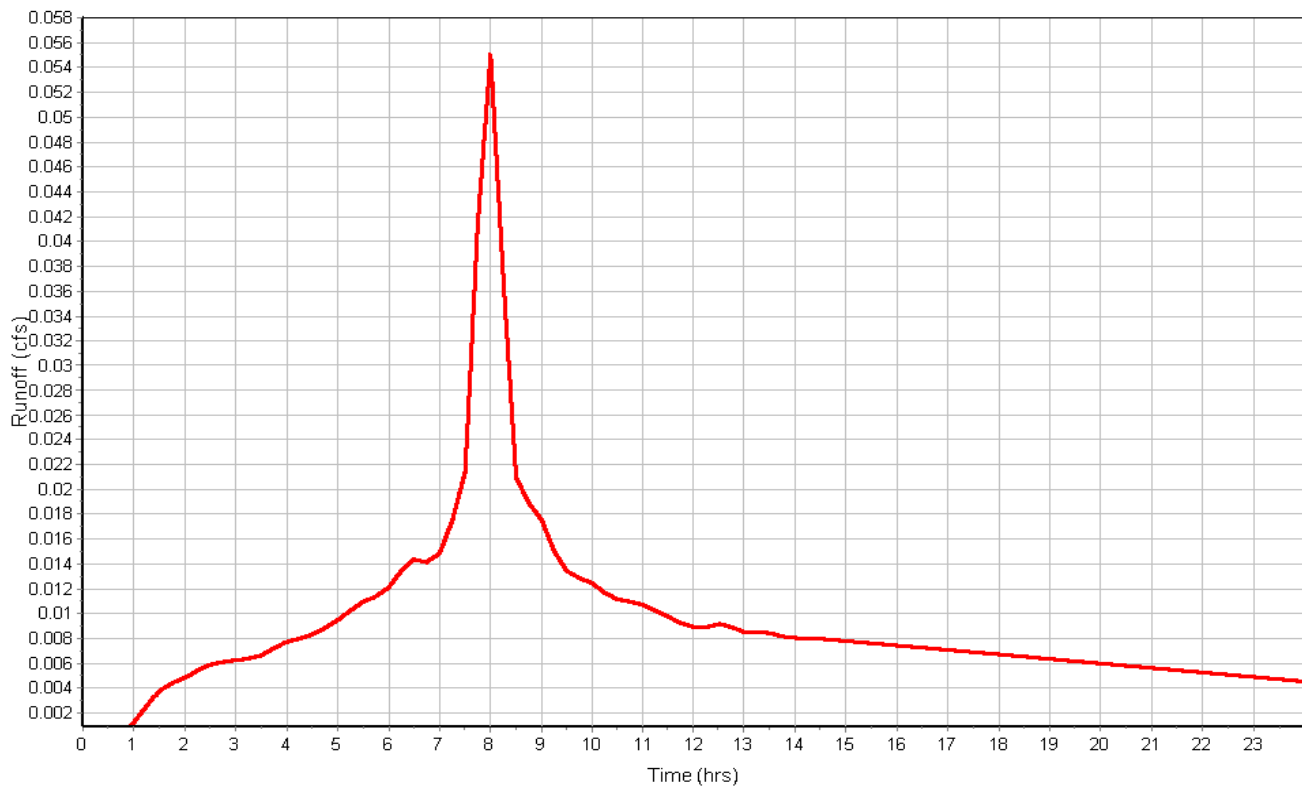
Total Rainfall (in) 4.75
 Total Runoff (in) 4.41
 Peak Runoff (cfs) 0.06
 Weighted Curve Number 96.90
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 043

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 044**Input Data**

Area (ac) 0.06
 Impervious Area (%) 64.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

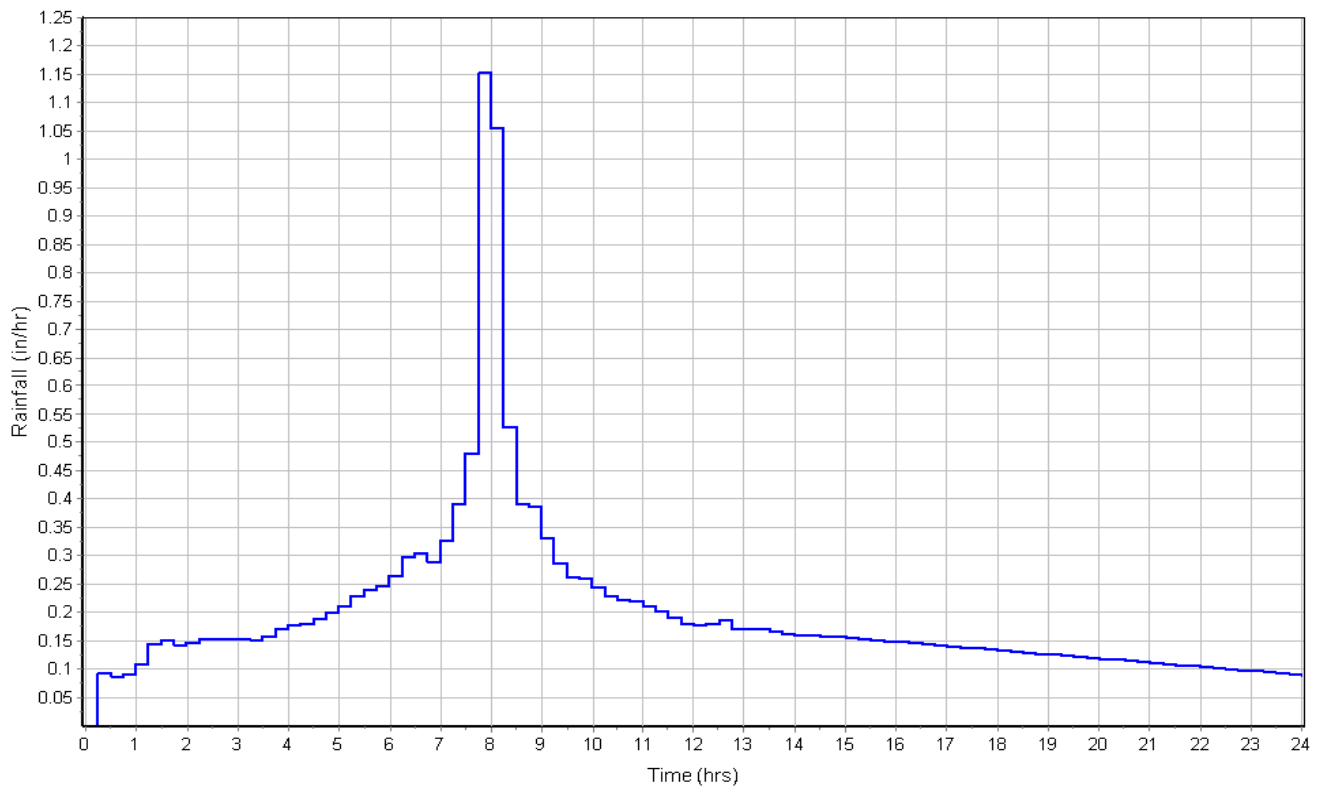
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.06		90.08

Subbasin Runoff Results

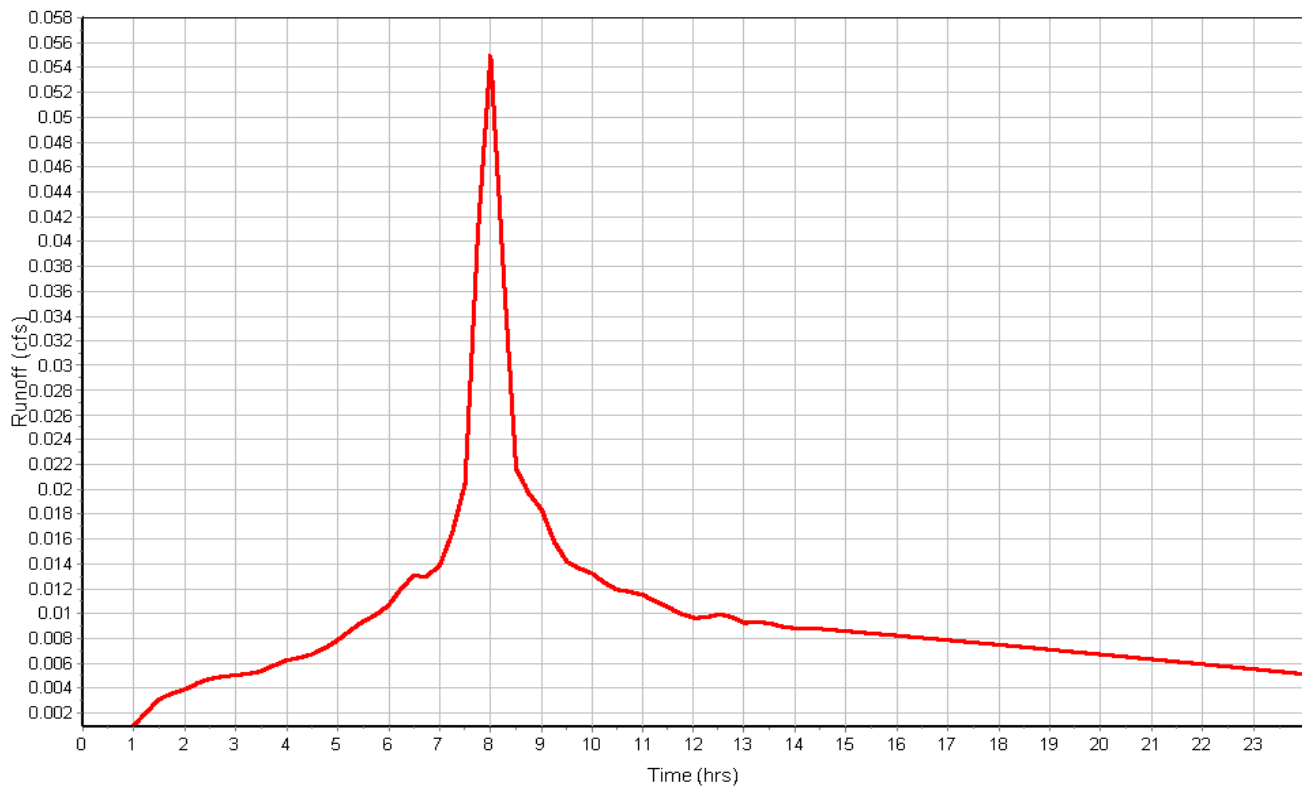
Total Rainfall (in) 4.75
 Total Runoff (in) 3.74
 Peak Runoff (cfs) 0.06
 Weighted Curve Number 90.08
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 044

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 045**Input Data**

Area (ac) 0.23
 Impervious Area (%) 92.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

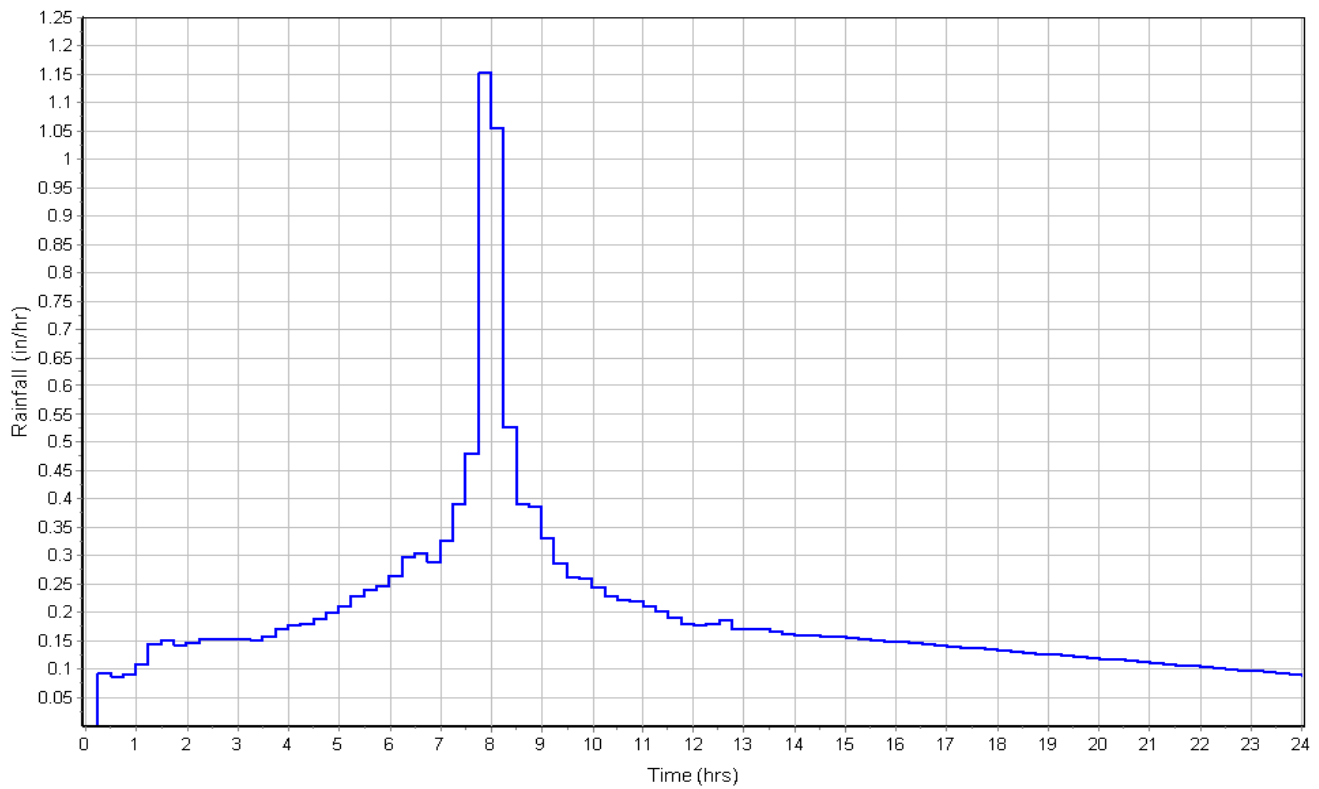
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.23		96.24

Subbasin Runoff Results

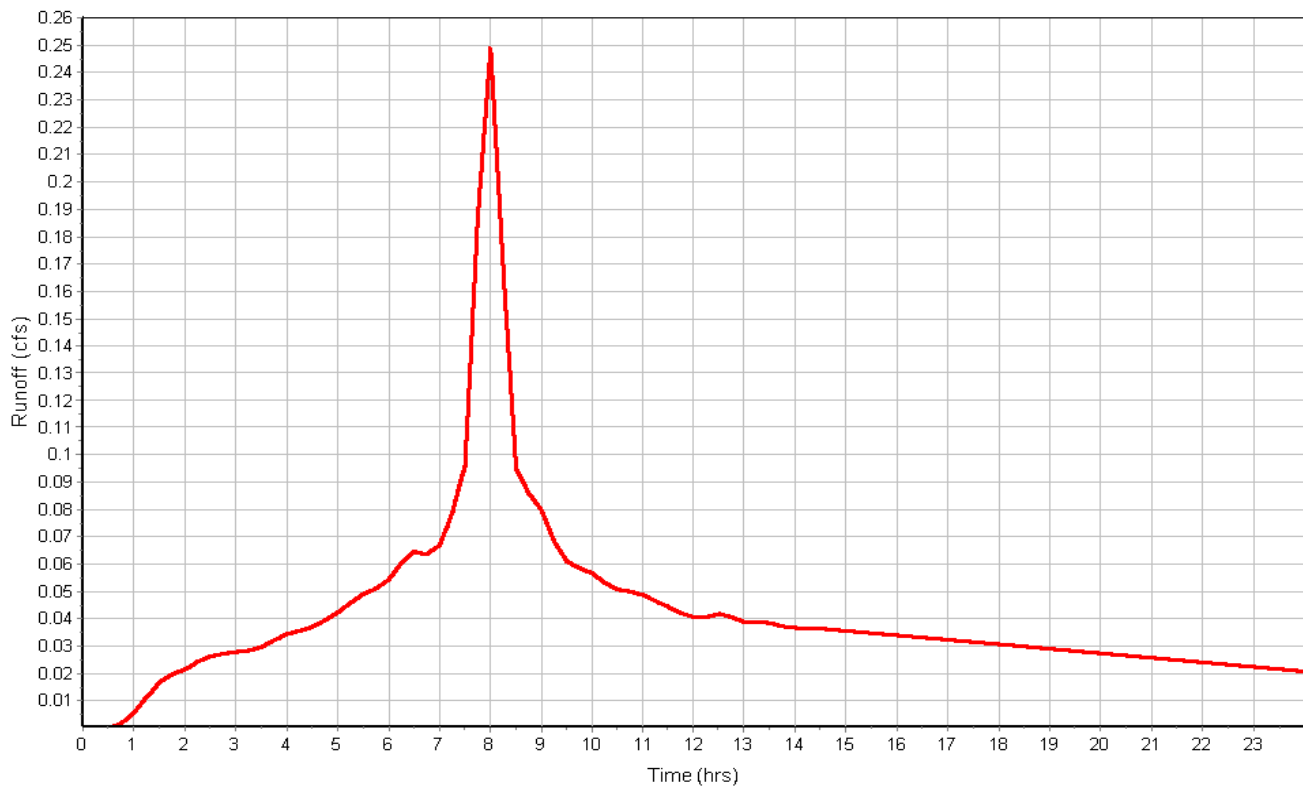
Total Rainfall (in) 4.75
 Total Runoff (in) 4.35
 Peak Runoff (cfs) 0.25
 Weighted Curve Number 96.24
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 045

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 046**Input Data**

Area (ac) 0.24
Impervious Area (%) 86.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

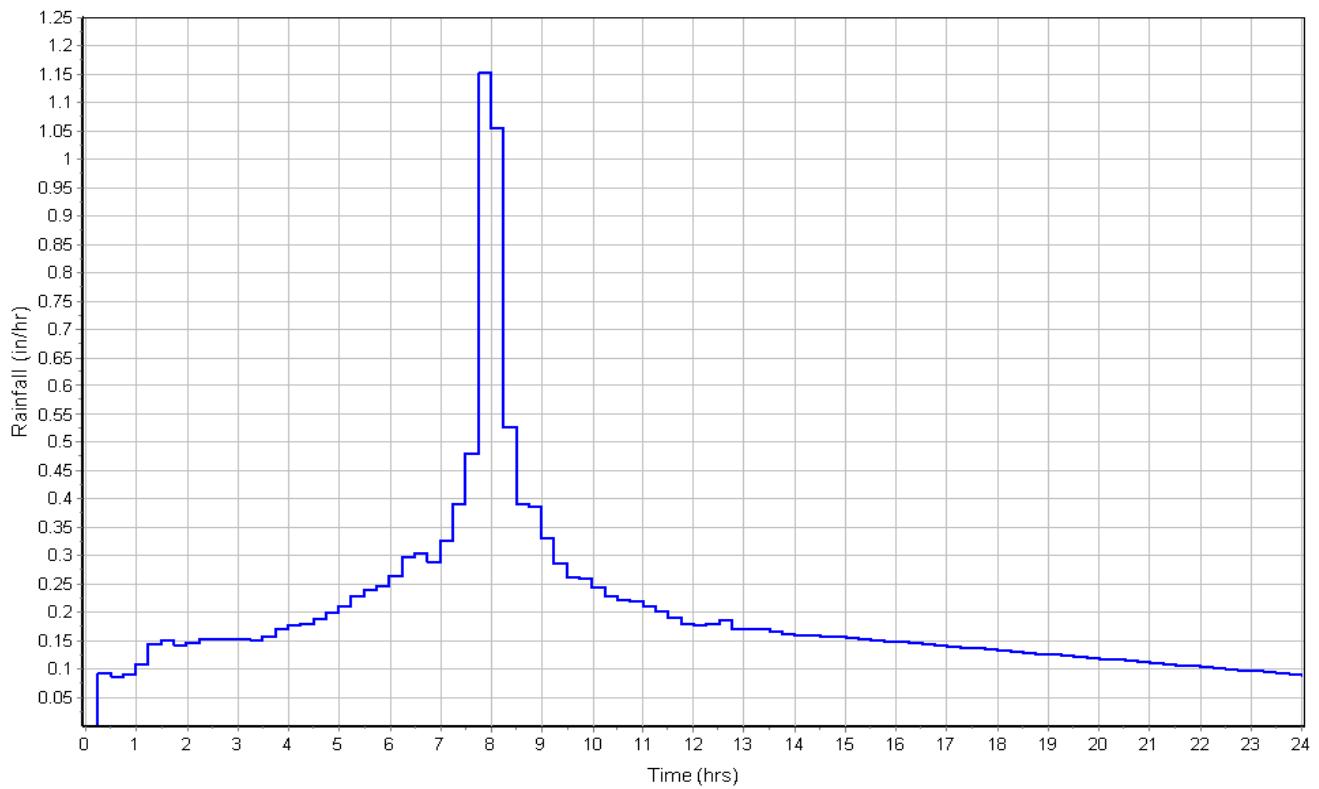
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.24		94.92

Subbasin Runoff Results

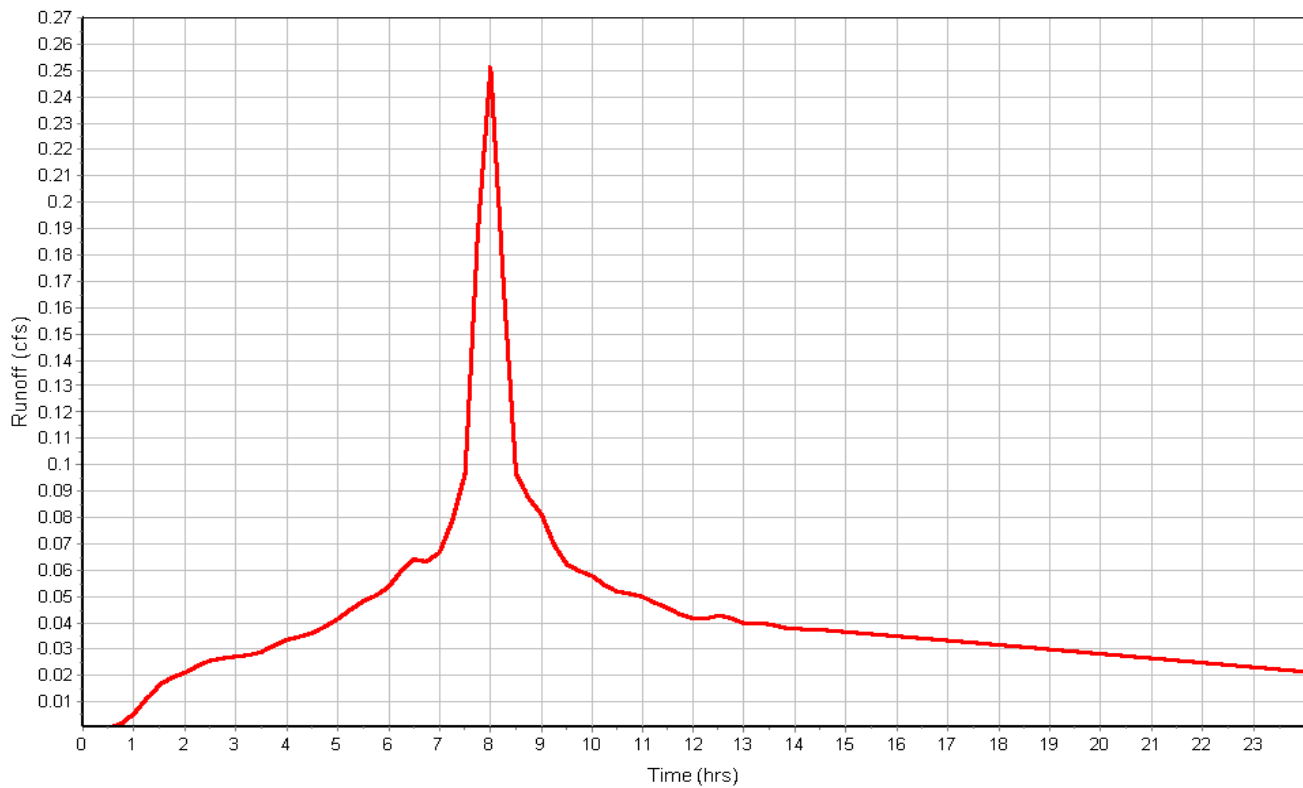
Total Rainfall (in) 4.75
Total Runoff (in) 4.22
Peak Runoff (cfs) 0.25
Weighted Curve Number 94.92
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 046

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 047**Input Data**

Area (ac) 0.28
 Impervious Area (%) 52.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

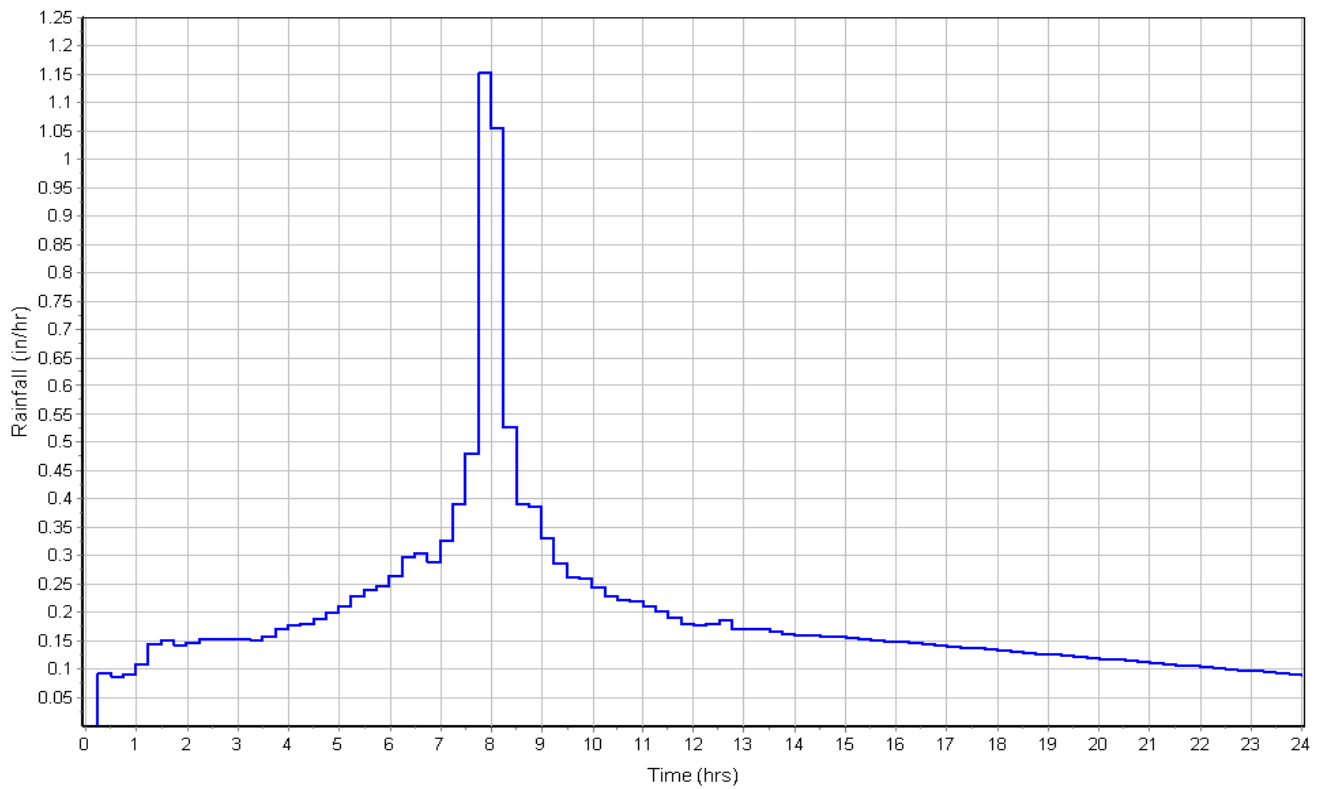
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.28		87.44

Subbasin Runoff Results

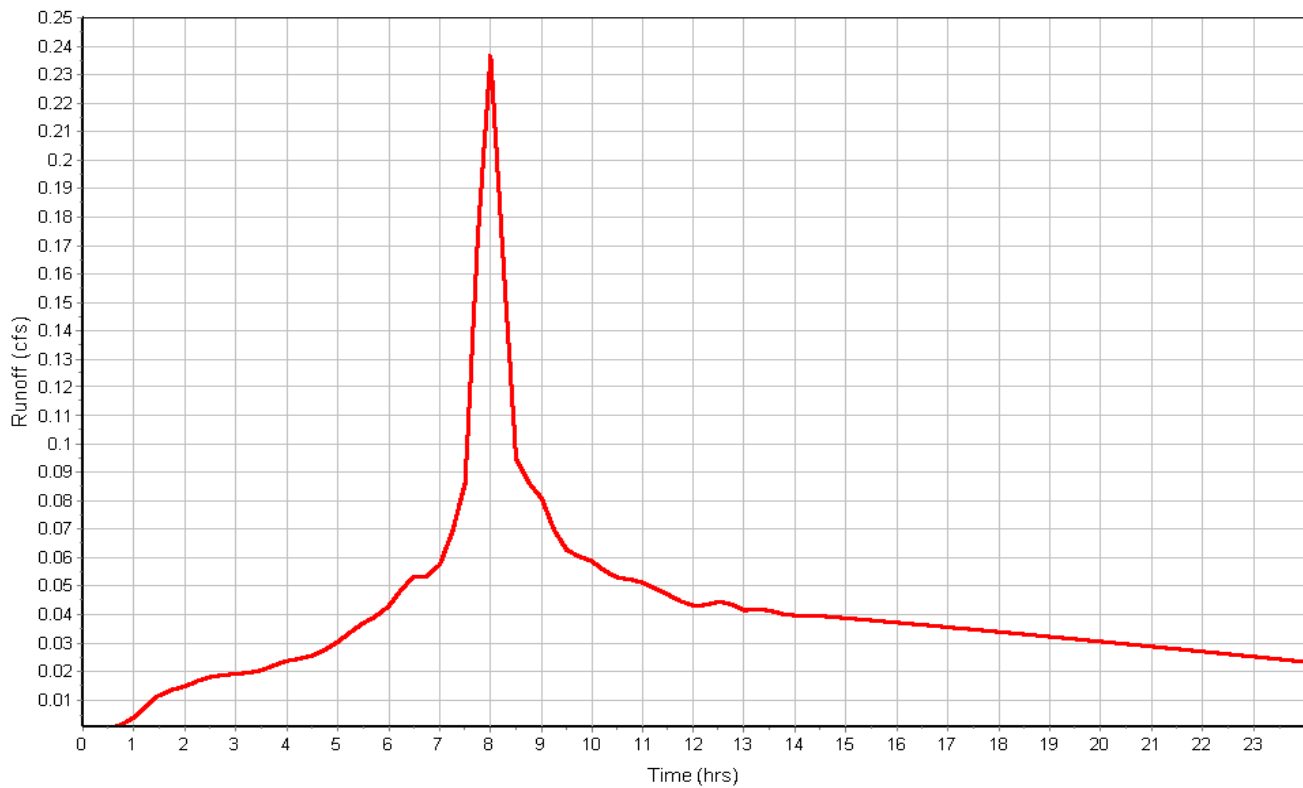
Total Rainfall (in) 4.75
 Total Runoff (in) 3.47
 Peak Runoff (cfs) 0.24
 Weighted Curve Number 87.44
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 047

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 048**Input Data**

Area (ac) 0.19
Impervious Area (%) 51.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

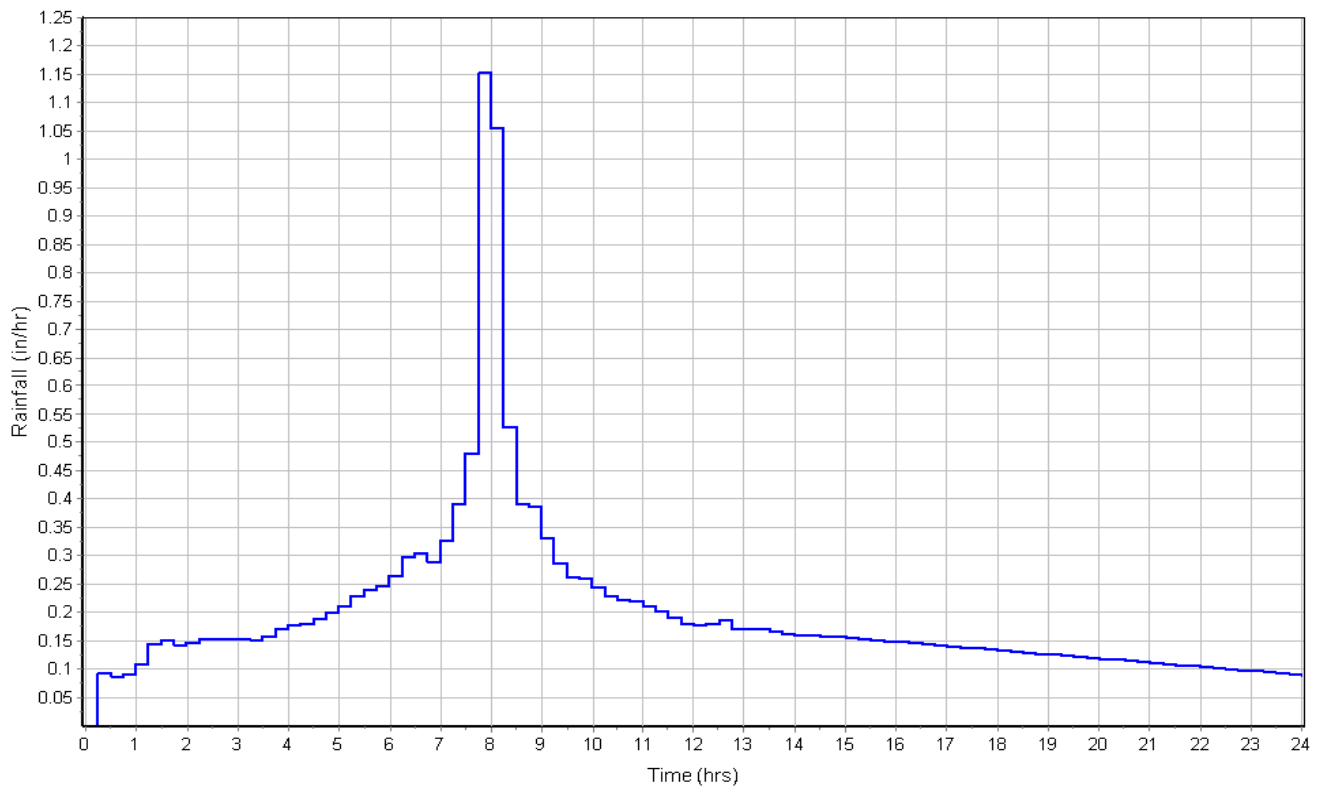
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.19		87.22

Subbasin Runoff Results

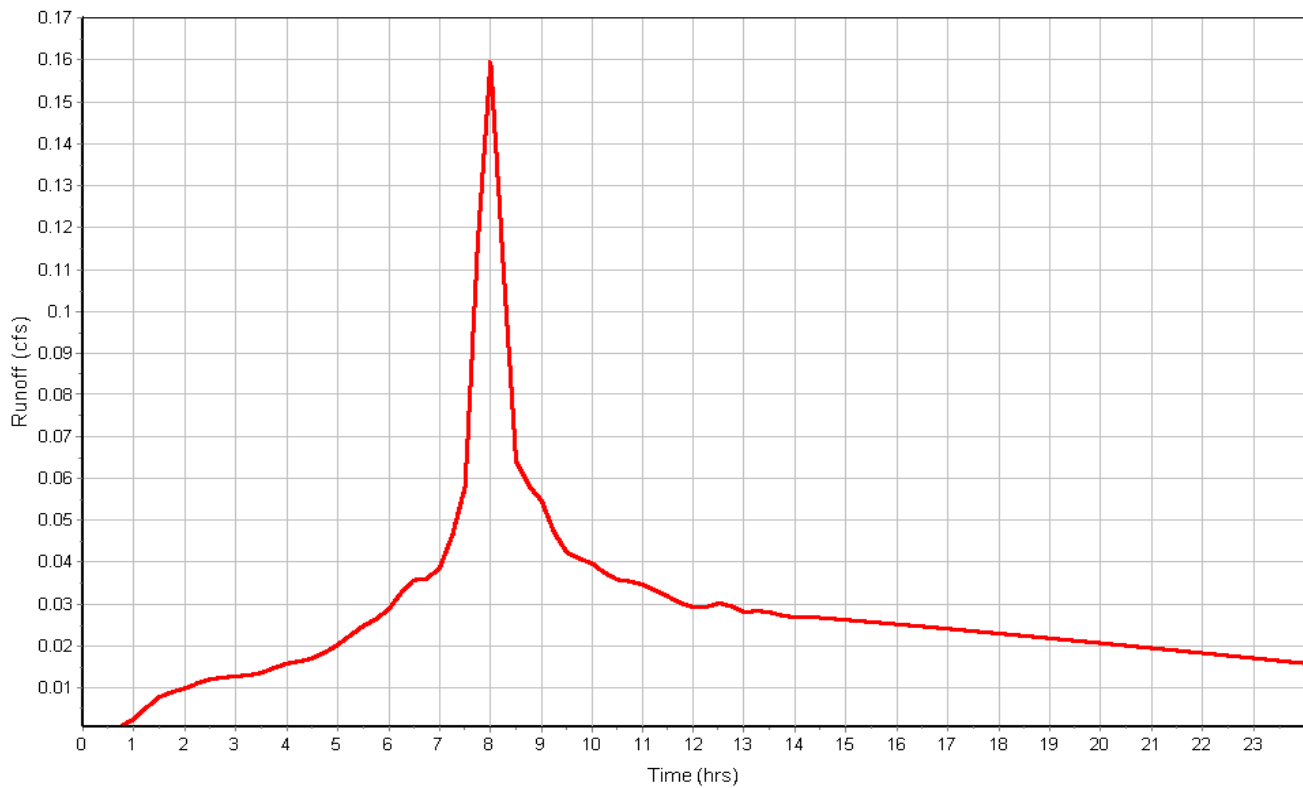
Total Rainfall (in) 4.75
Total Runoff (in) 3.45
Peak Runoff (cfs) 0.16
Weighted Curve Number 87.22
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 048

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 049**Input Data**

Area (ac) 0.16
 Impervious Area (%) 69.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

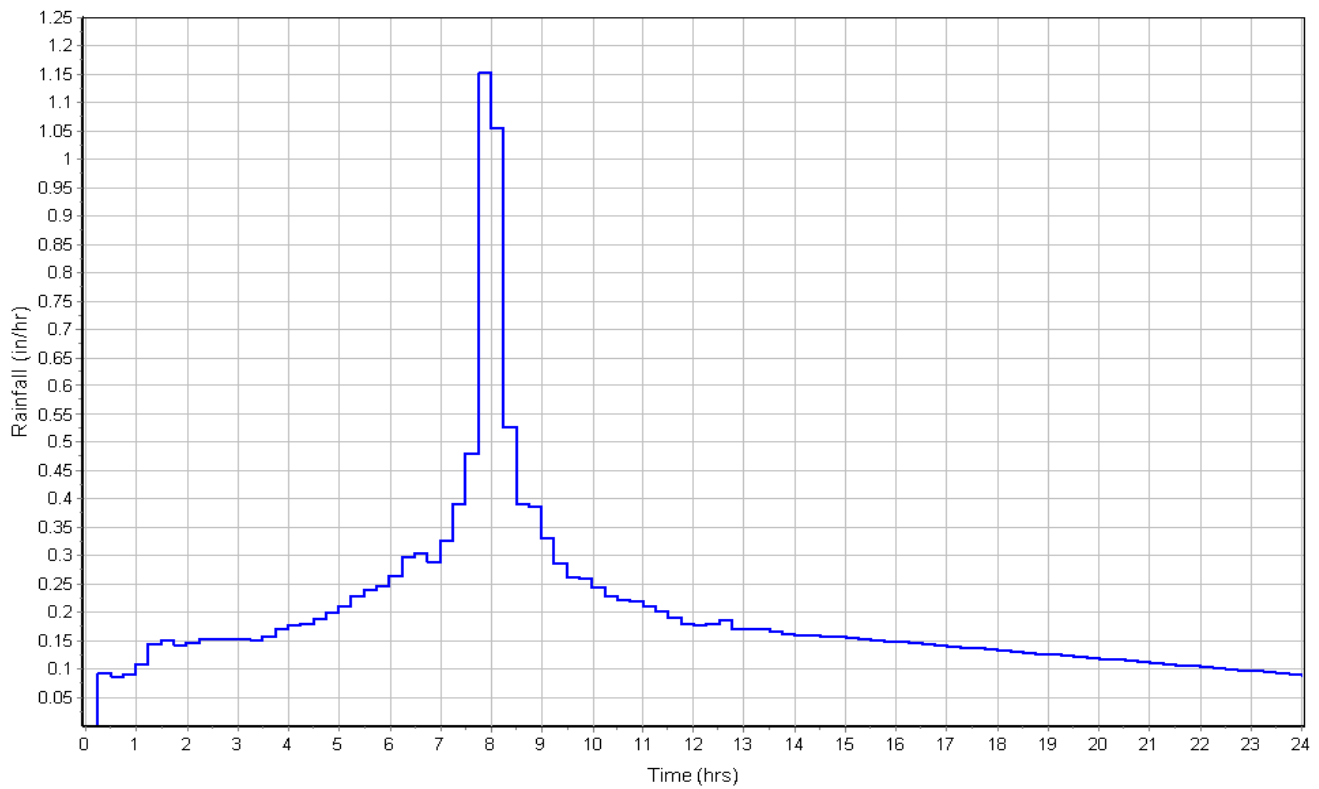
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.16		91.18

Subbasin Runoff Results

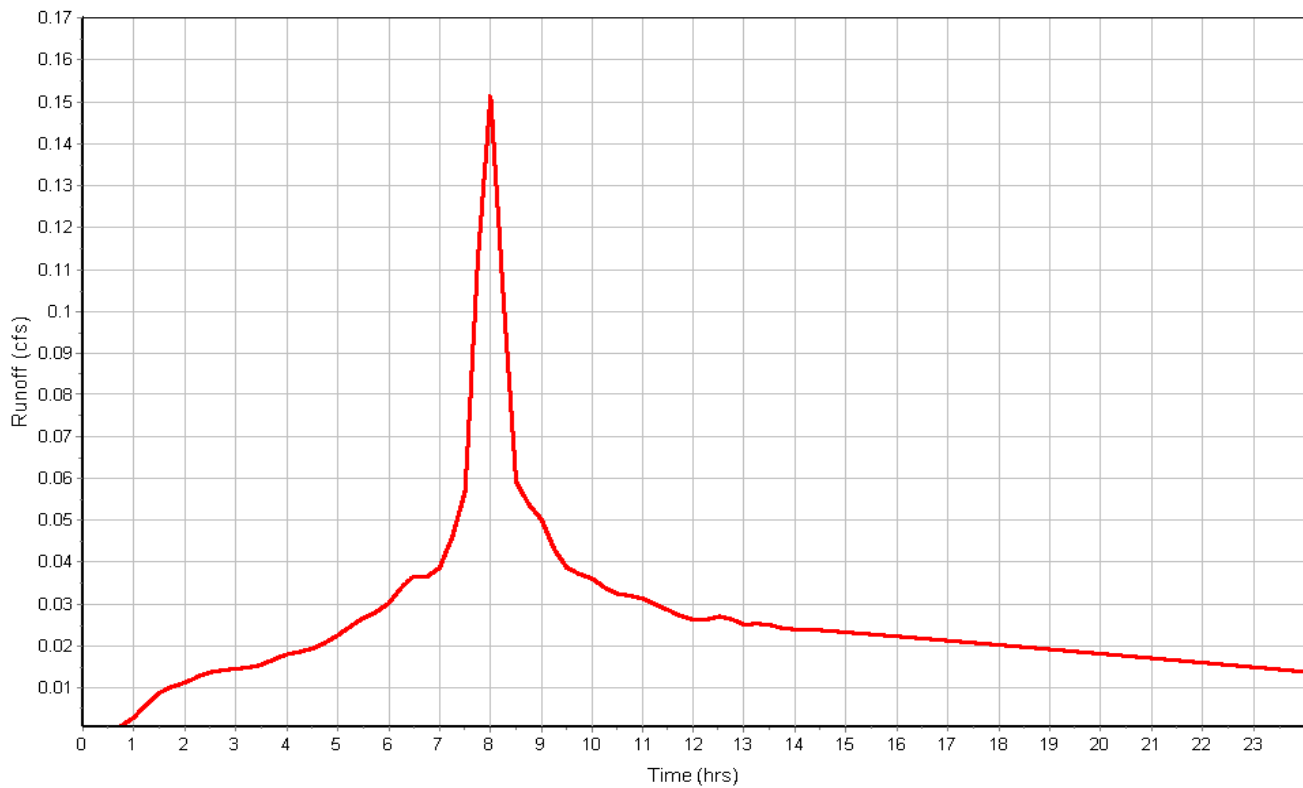
Total Rainfall (in) 4.75
 Total Runoff (in) 3.84
 Peak Runoff (cfs) 0.15
 Weighted Curve Number 91.18
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 049

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 050**Input Data**

Area (ac) 0.10
Impervious Area (%) 56.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

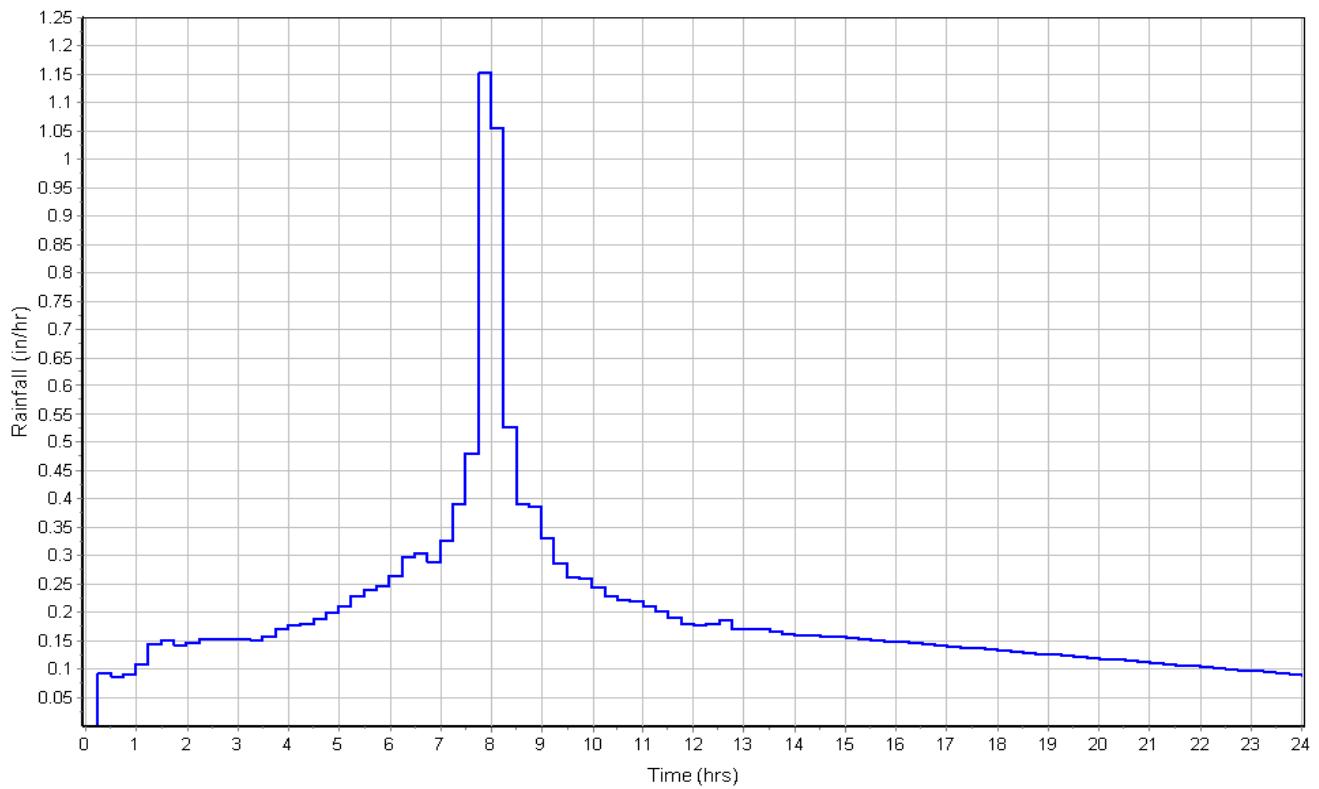
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.10		88.32

Subbasin Runoff Results

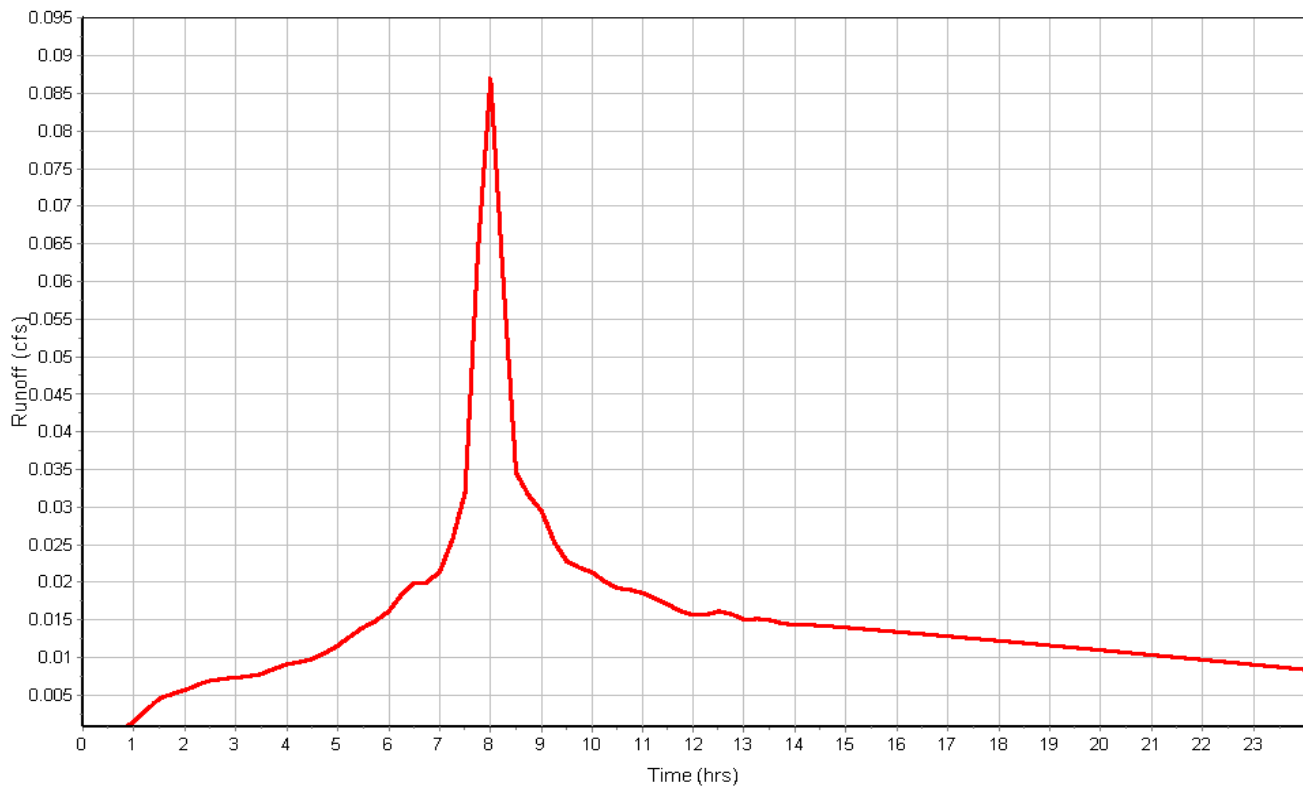
Total Rainfall (in) 4.75
Total Runoff (in) 3.56
Peak Runoff (cfs) 0.09
Weighted Curve Number 88.32
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 050

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 051**Input Data**

Area (ac) 0.23
 Impervious Area (%) 57.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

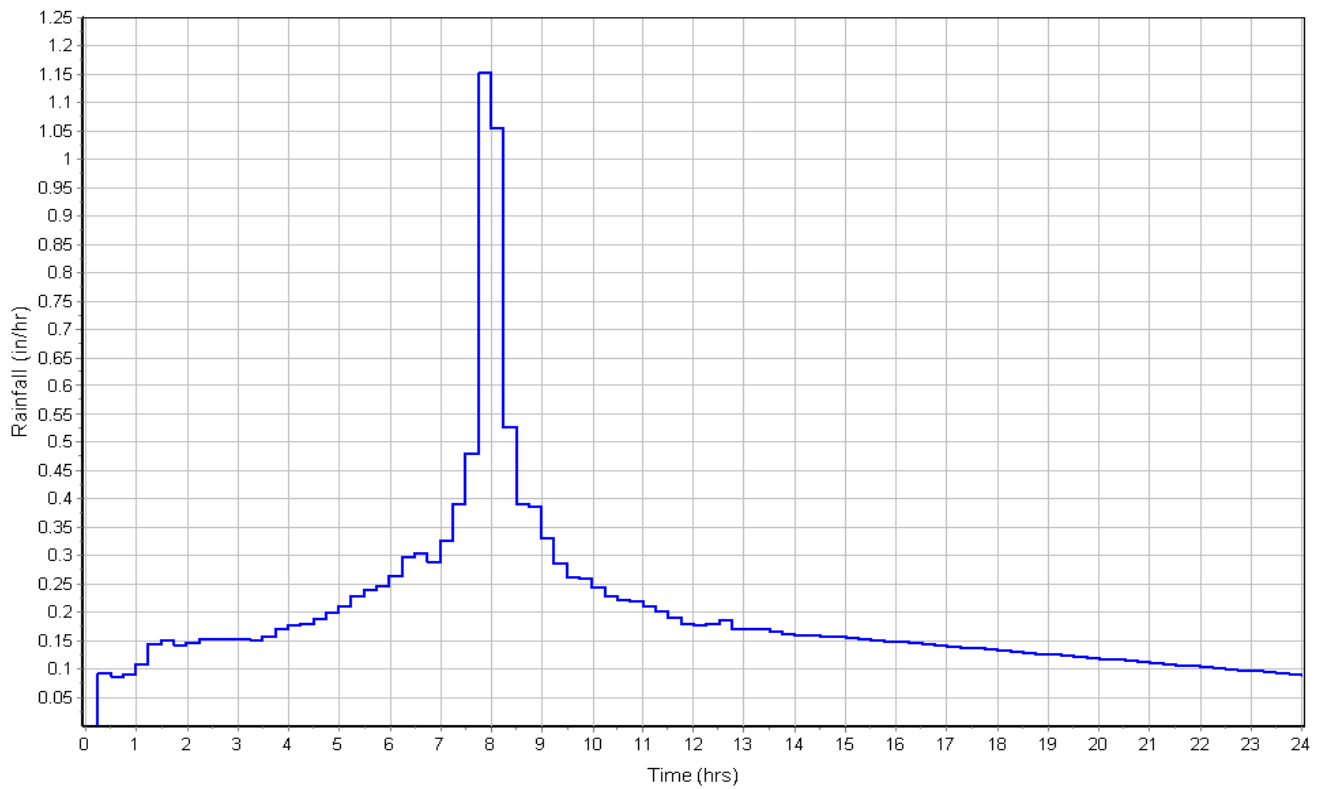
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.23		88.54

Subbasin Runoff Results

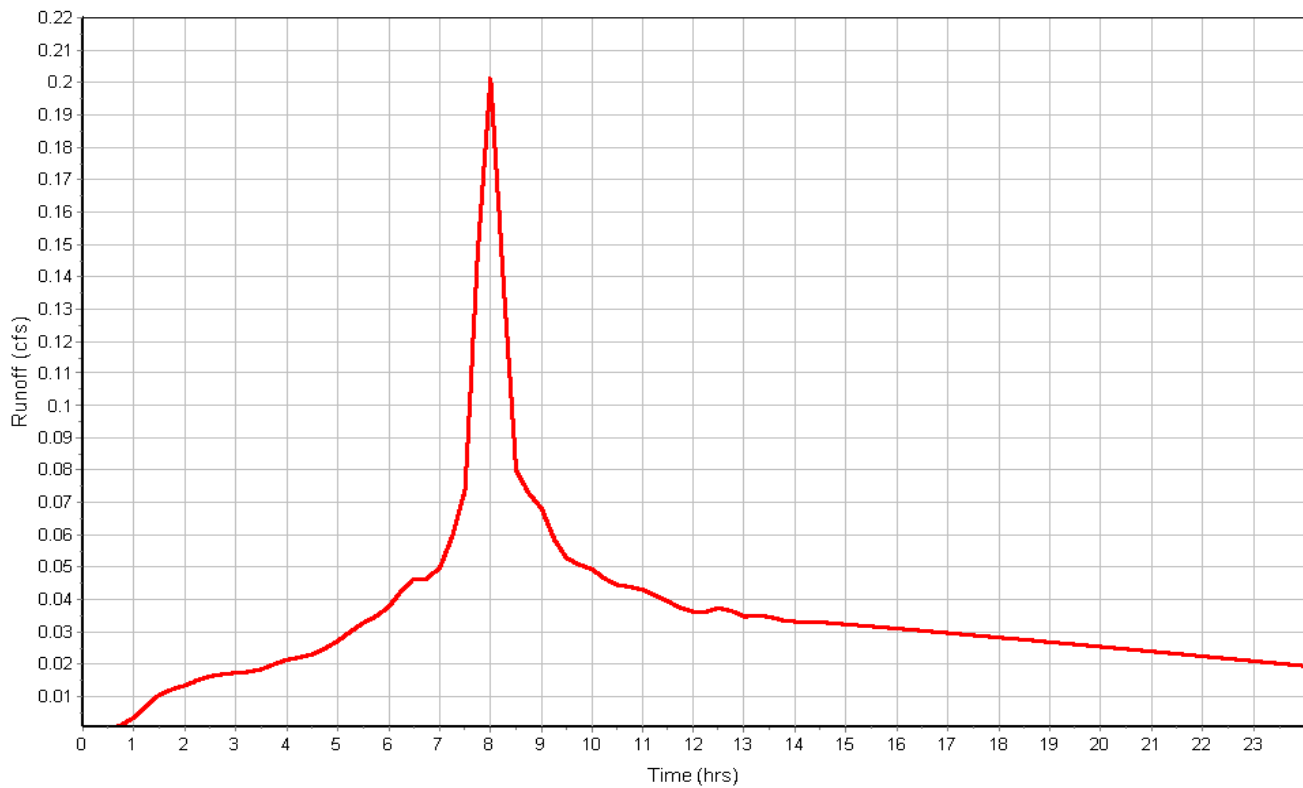
Total Rainfall (in) 4.75
 Total Runoff (in) 3.58
 Peak Runoff (cfs) 0.20
 Weighted Curve Number 88.54
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 051

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 052**Input Data**

Area (ac) 0.15
 Impervious Area (%) 62.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

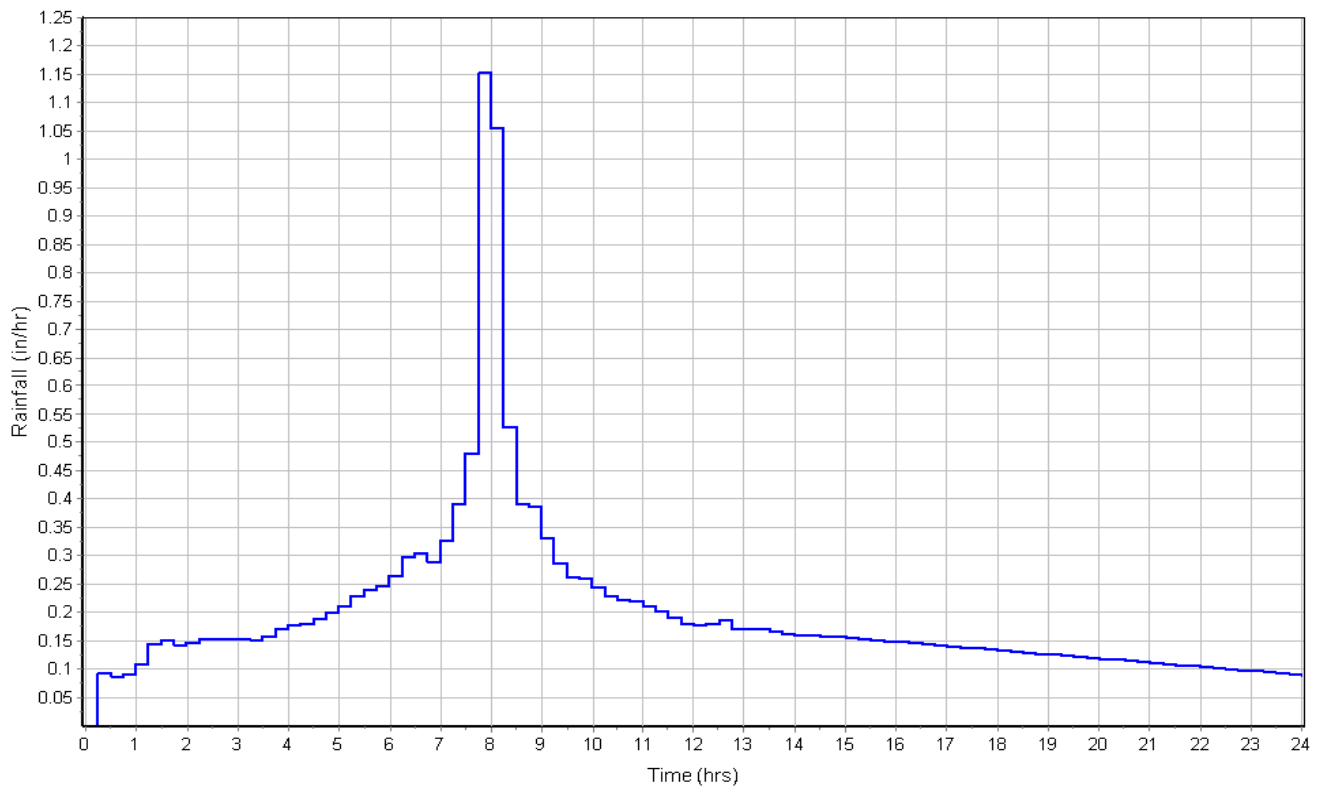
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.15		89.64

Subbasin Runoff Results

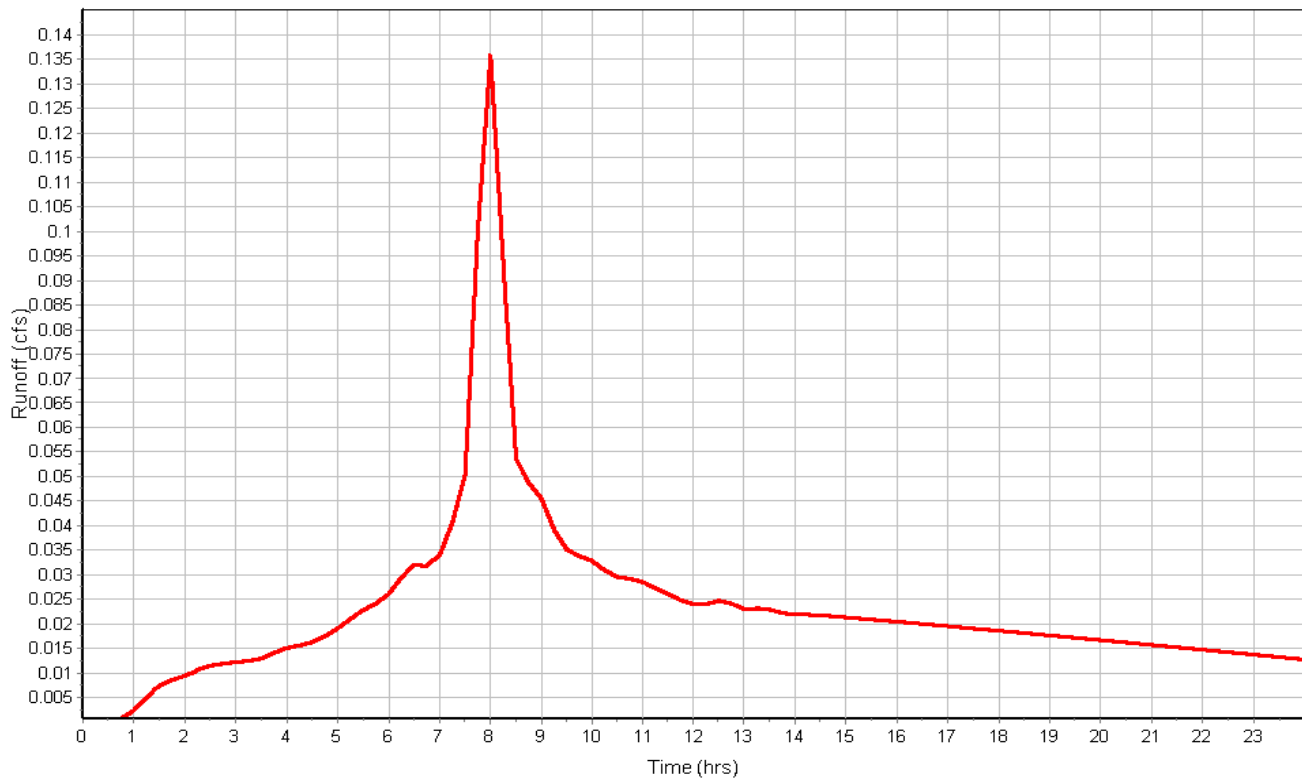
Total Rainfall (in) 4.75
 Total Runoff (in) 3.69
 Peak Runoff (cfs) 0.14
 Weighted Curve Number 89.64
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 052

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 053**Input Data**

Area (ac) 0.47
Impervious Area (%) 70.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

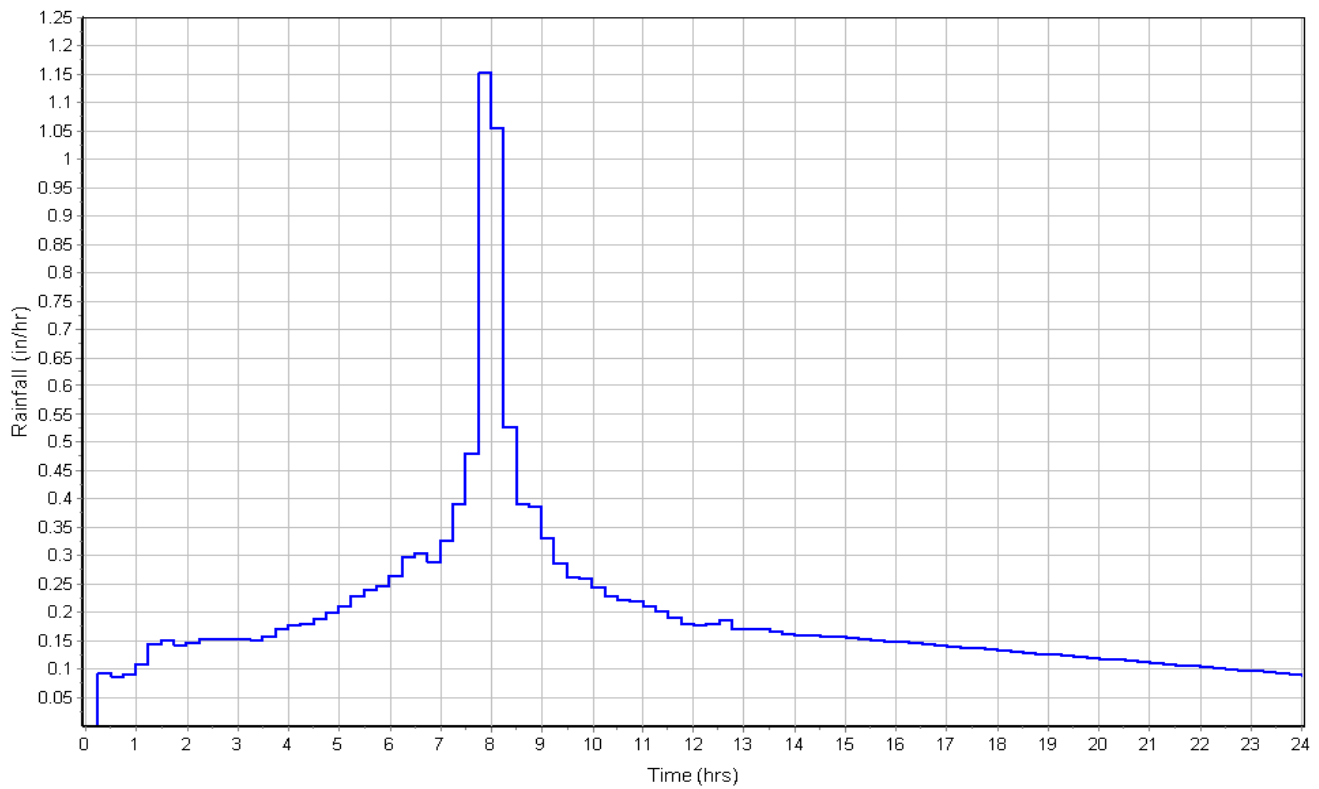
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.47		91.4

Subbasin Runoff Results

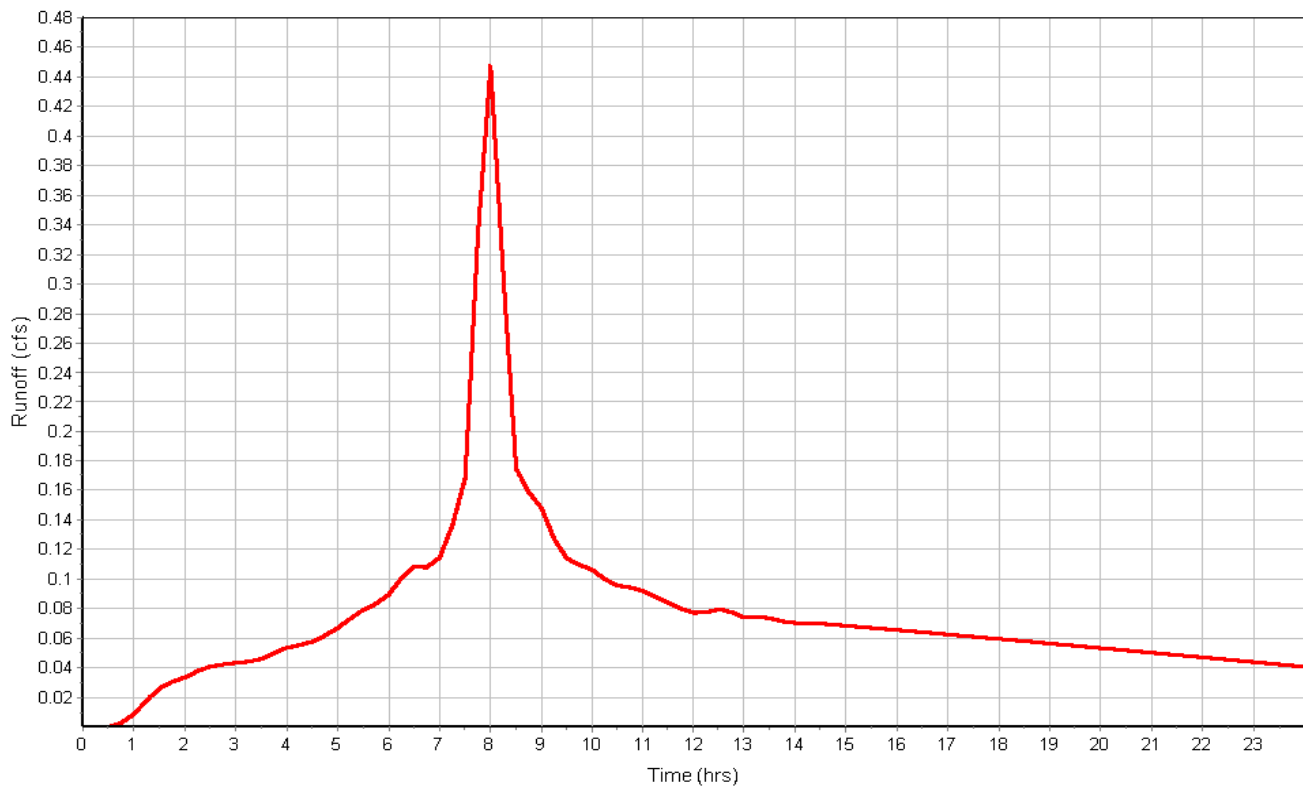
Total Rainfall (in) 4.75
Total Runoff (in) 3.87
Peak Runoff (cfs) 0.45
Weighted Curve Number 91.40
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 053

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 054**Input Data**

Area (ac) 0.15
Impervious Area (%) 82.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

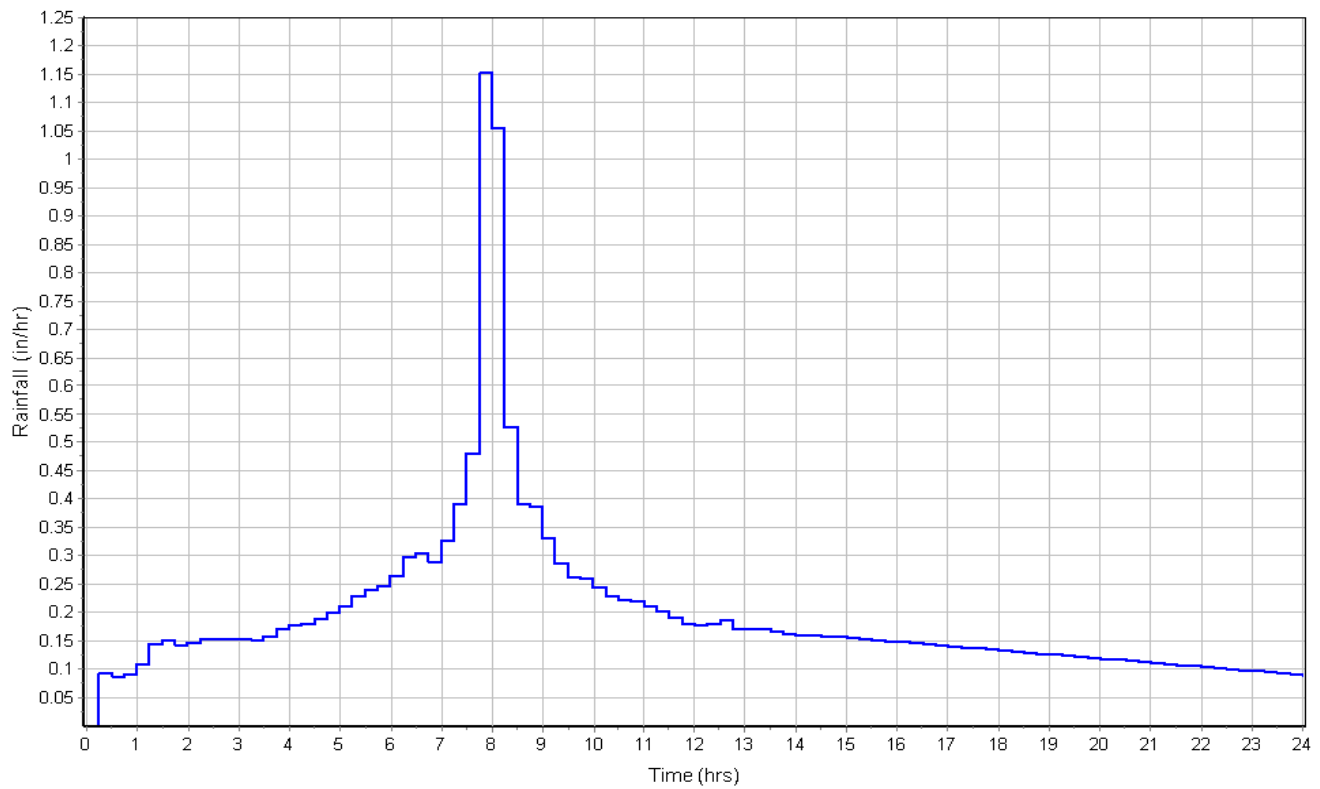
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.15		94.04

Subbasin Runoff Results

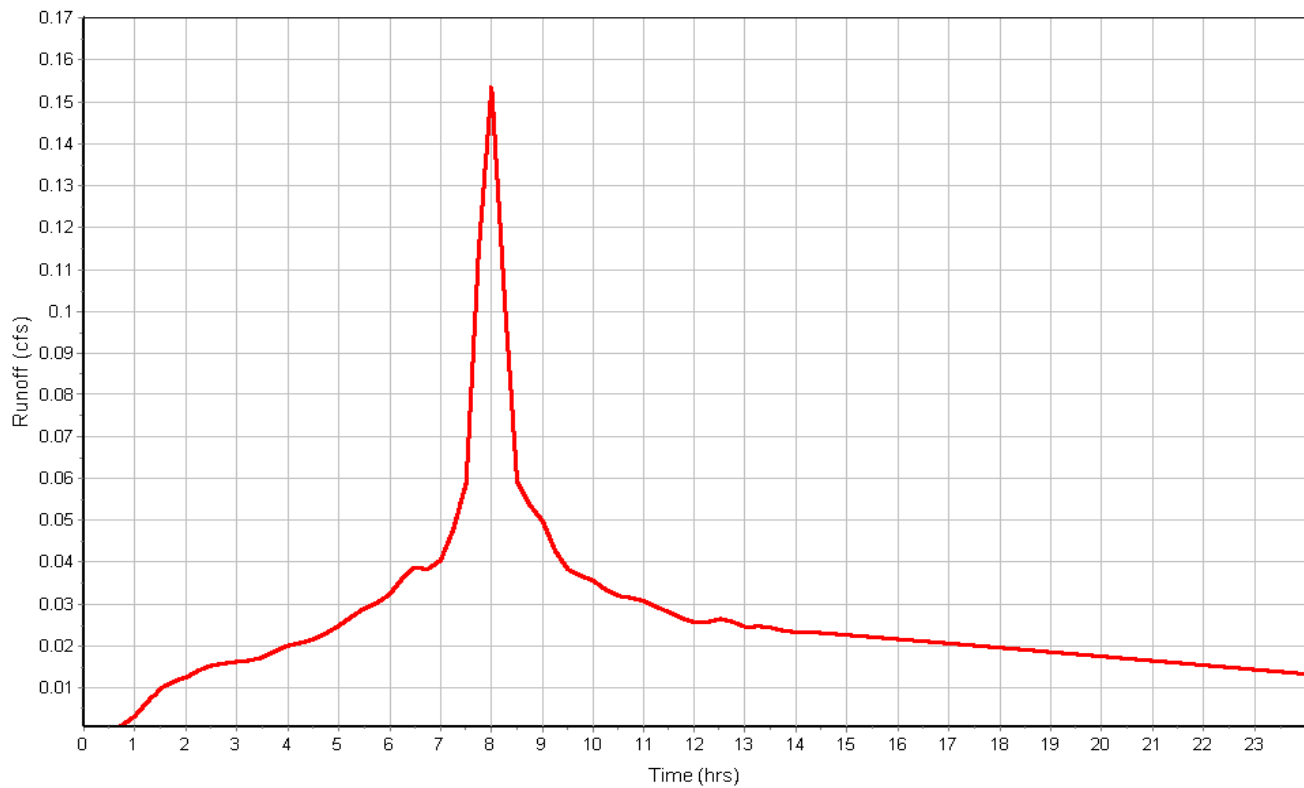
Total Rainfall (in) 4.75
Total Runoff (in) 4.13
Peak Runoff (cfs) 0.15
Weighted Curve Number 94.04
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 054

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 055**Input Data**

Area (ac) 0.22
Impervious Area (%) 38.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

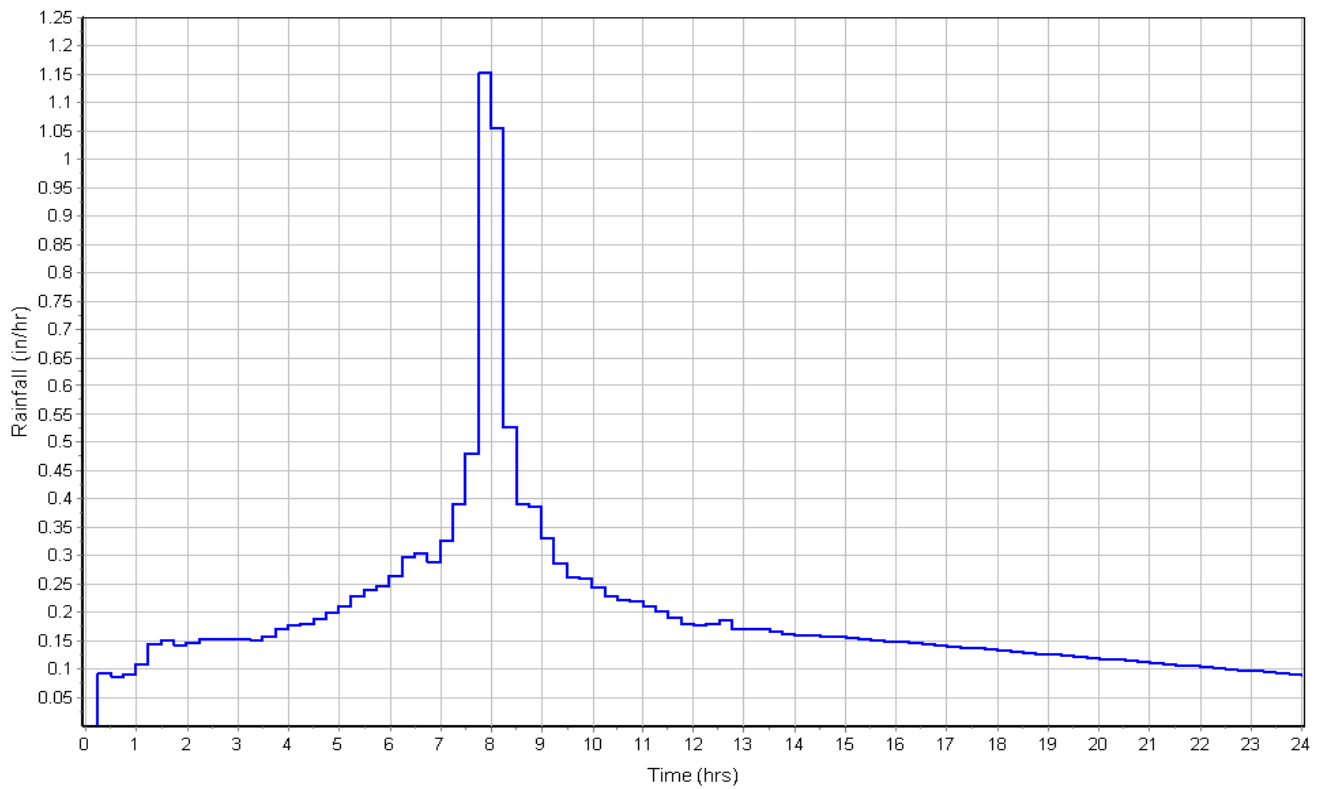
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.22		84.36

Subbasin Runoff Results

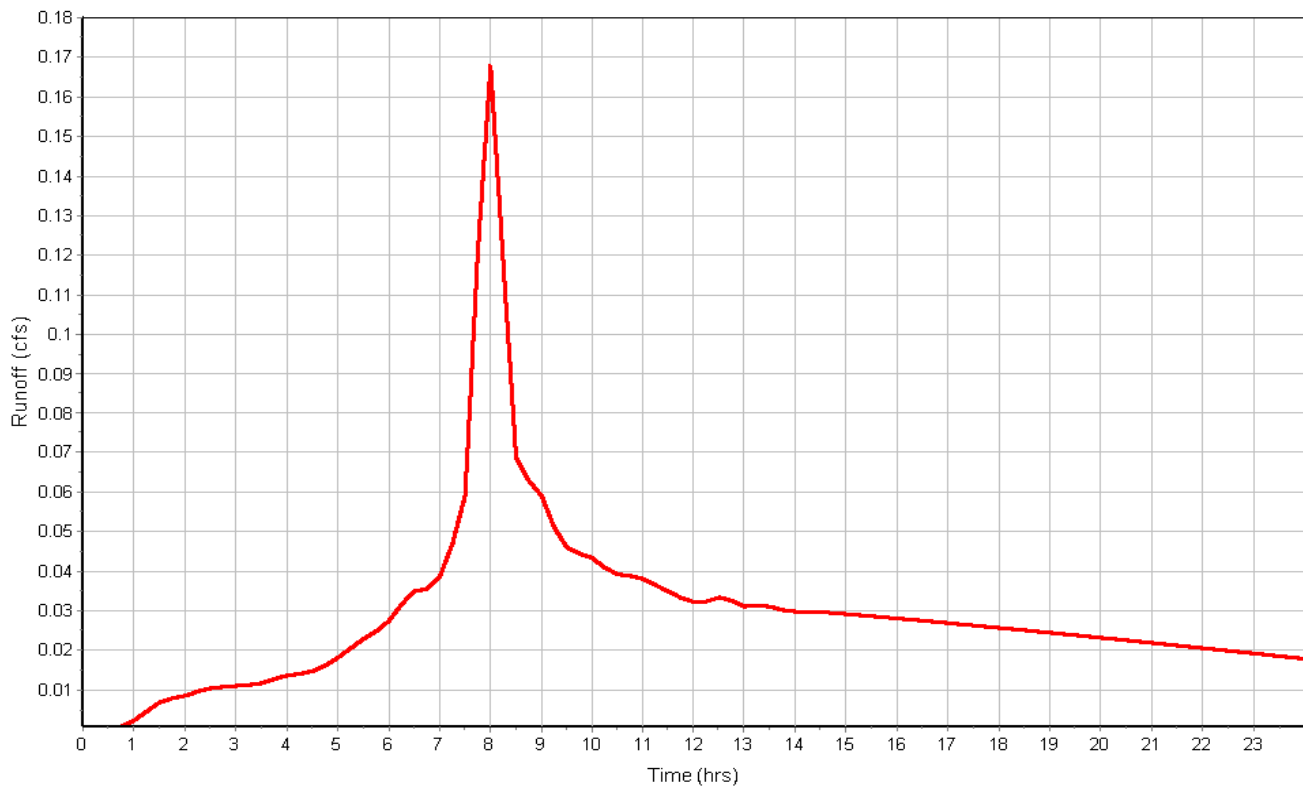
Total Rainfall (in) 4.75
Total Runoff (in) 3.17
Peak Runoff (cfs) 0.17
Weighted Curve Number 84.36
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 055

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 056**Input Data**

Area (ac) 0.12
 Impervious Area (%) 34.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

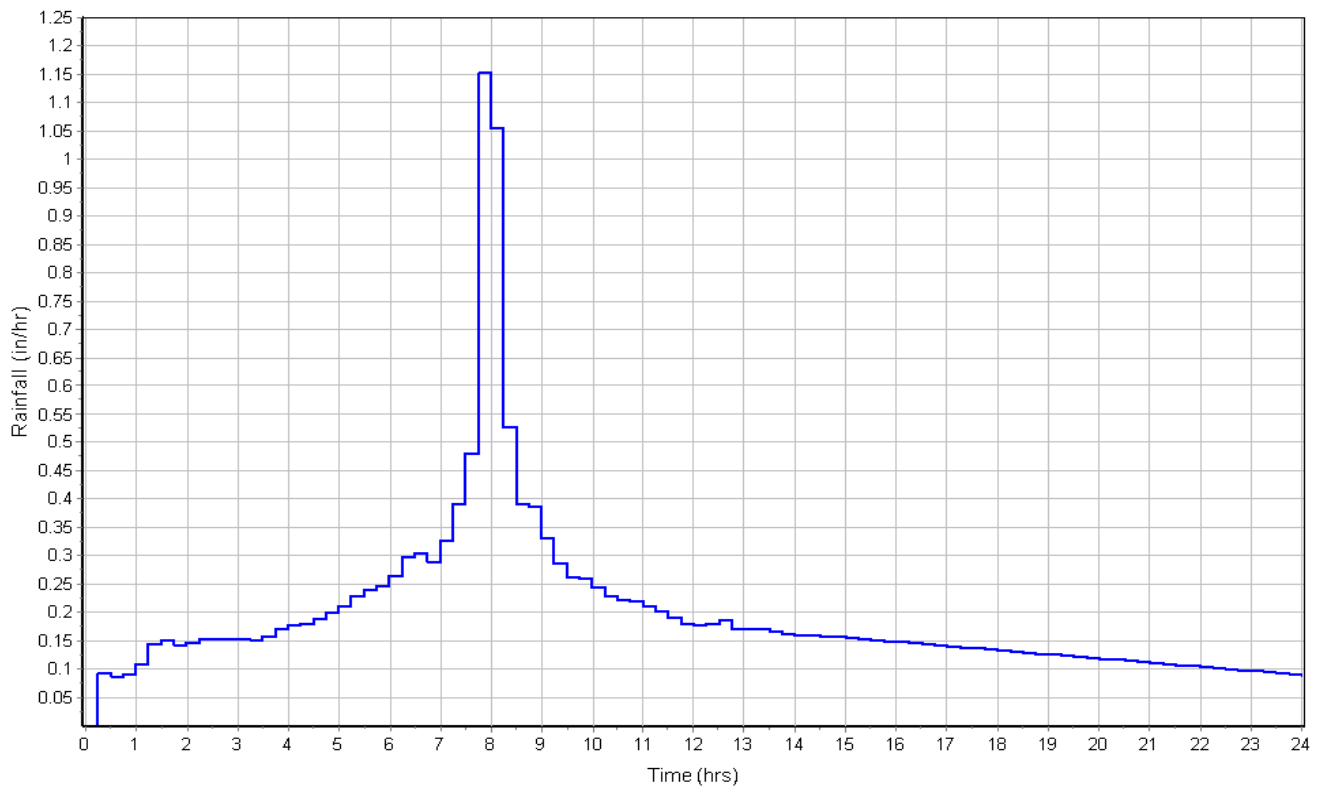
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.12		83.48

Subbasin Runoff Results

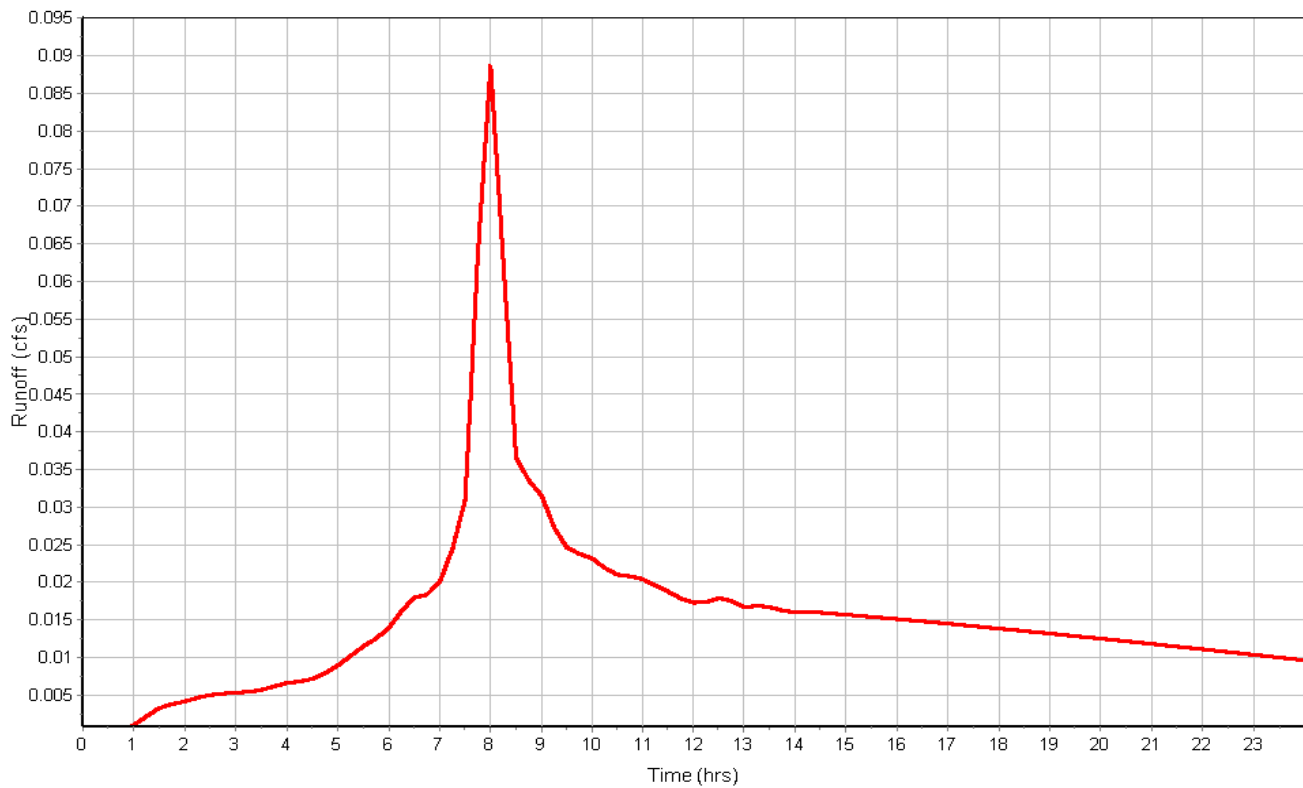
Total Rainfall (in) 4.75
 Total Runoff (in) 3.08
 Peak Runoff (cfs) 0.09
 Weighted Curve Number 83.48
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 056

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 057**Input Data**

Area (ac) 0.09
 Impervious Area (%) 78.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

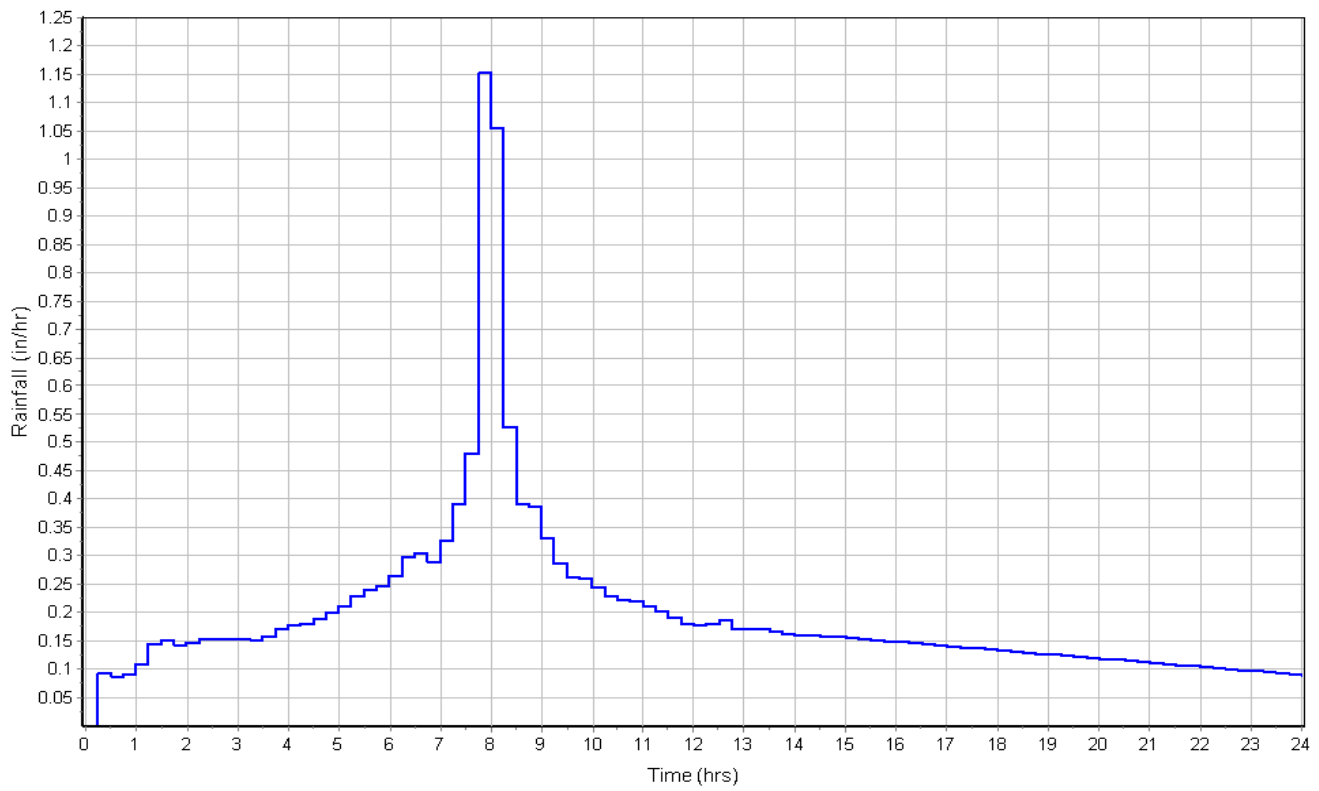
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.09		93.16

Subbasin Runoff Results

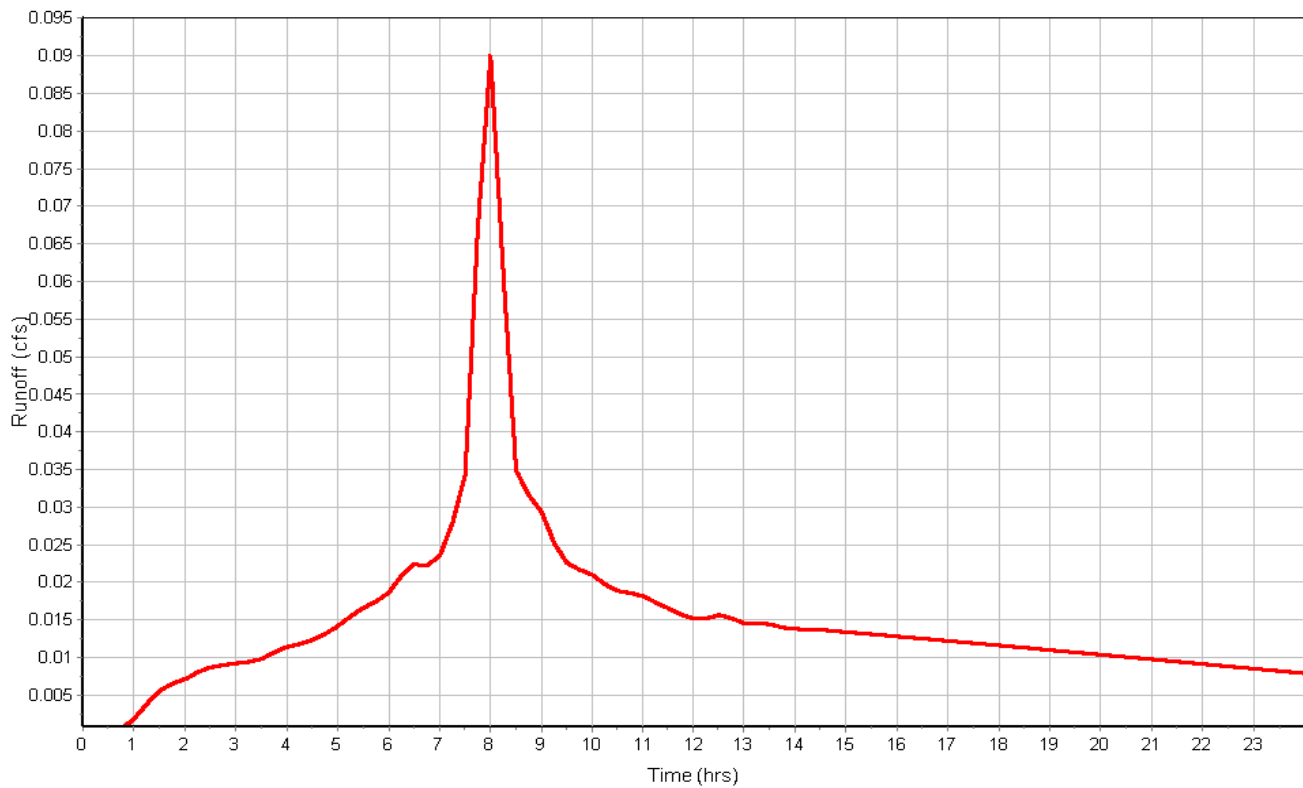
Total Rainfall (in) 4.75
 Total Runoff (in) 4.04
 Peak Runoff (cfs) 0.09
 Weighted Curve Number 93.16
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 057

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 058**Input Data**

Area (ac) 0.03
Impervious Area (%) 40.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

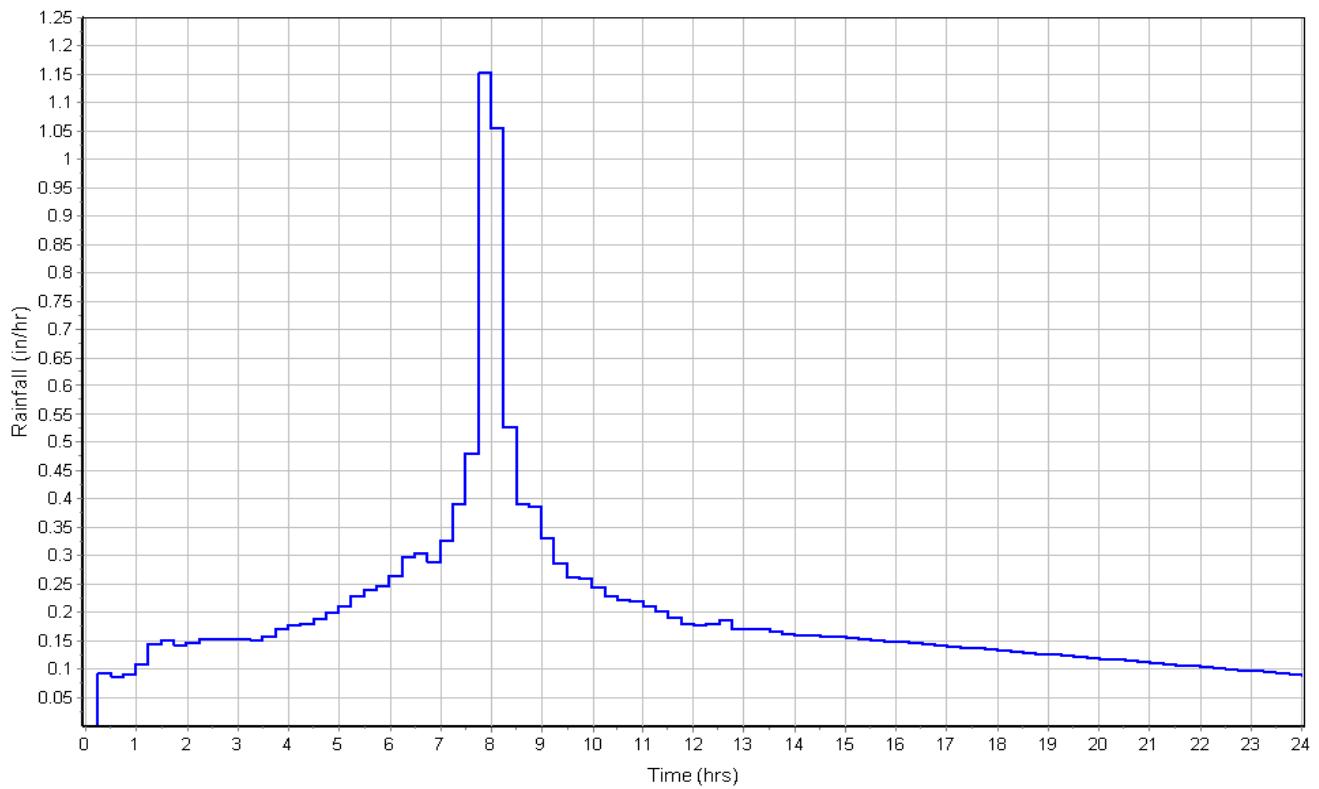
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.03		84.8

Subbasin Runoff Results

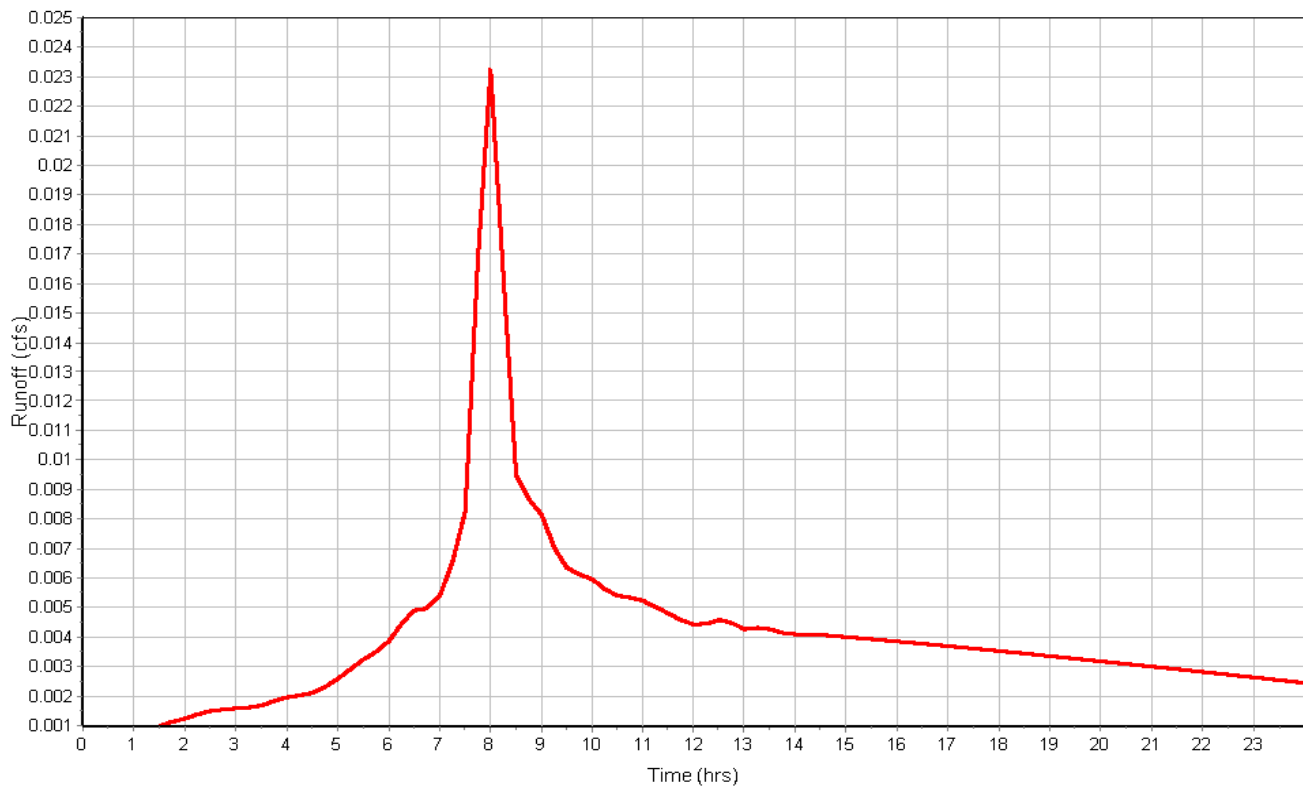
Total Rainfall (in) 4.75
Total Runoff (in) 3.21
Peak Runoff (cfs) 0.02
Weighted Curve Number 84.80
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 058

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 059**Input Data**

Area (ac) 0.17
Impervious Area (%) 54.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

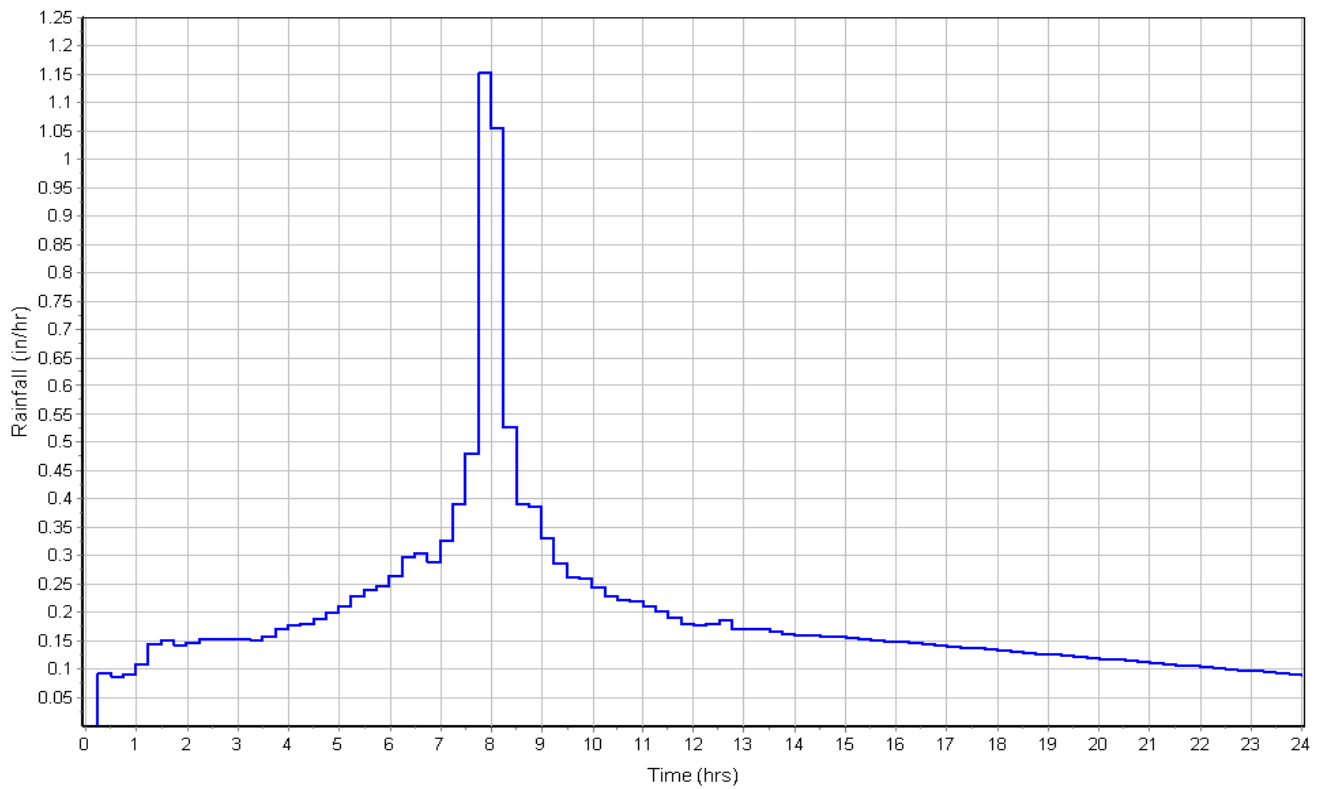
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.17		87.88

Subbasin Runoff Results

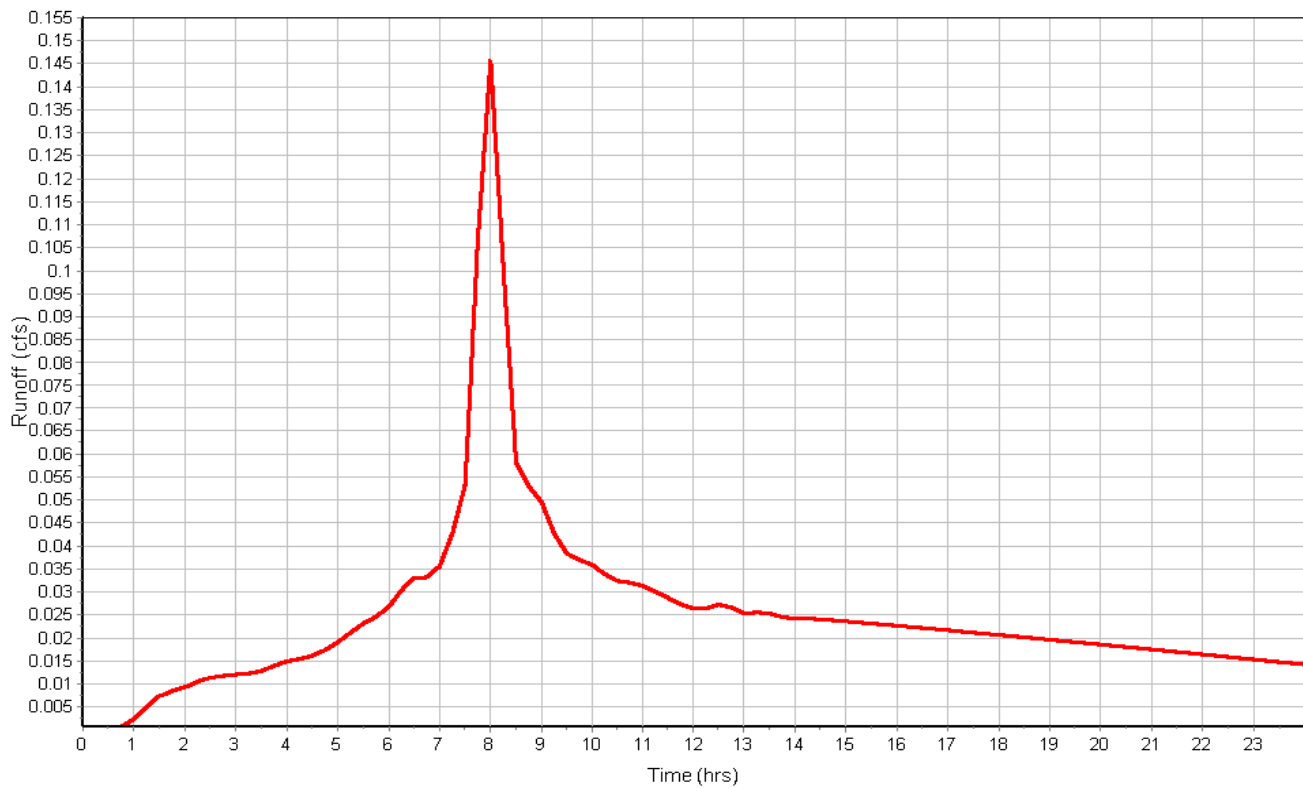
Total Rainfall (in) 4.75
Total Runoff (in) 3.52
Peak Runoff (cfs) 0.15
Weighted Curve Number 87.88
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 059

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 060**Input Data**

Area (ac) 0.17
Impervious Area (%) 61.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

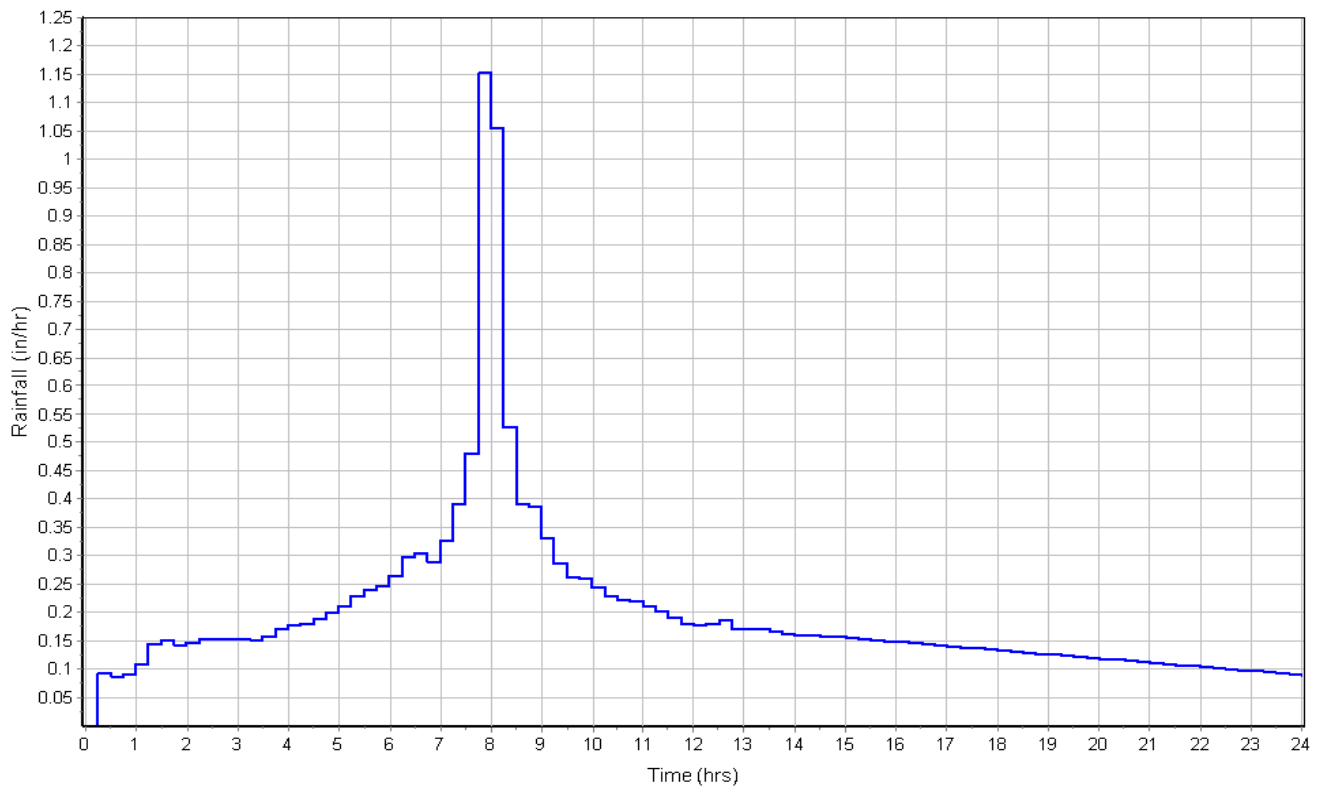
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.17		89.42

Subbasin Runoff Results

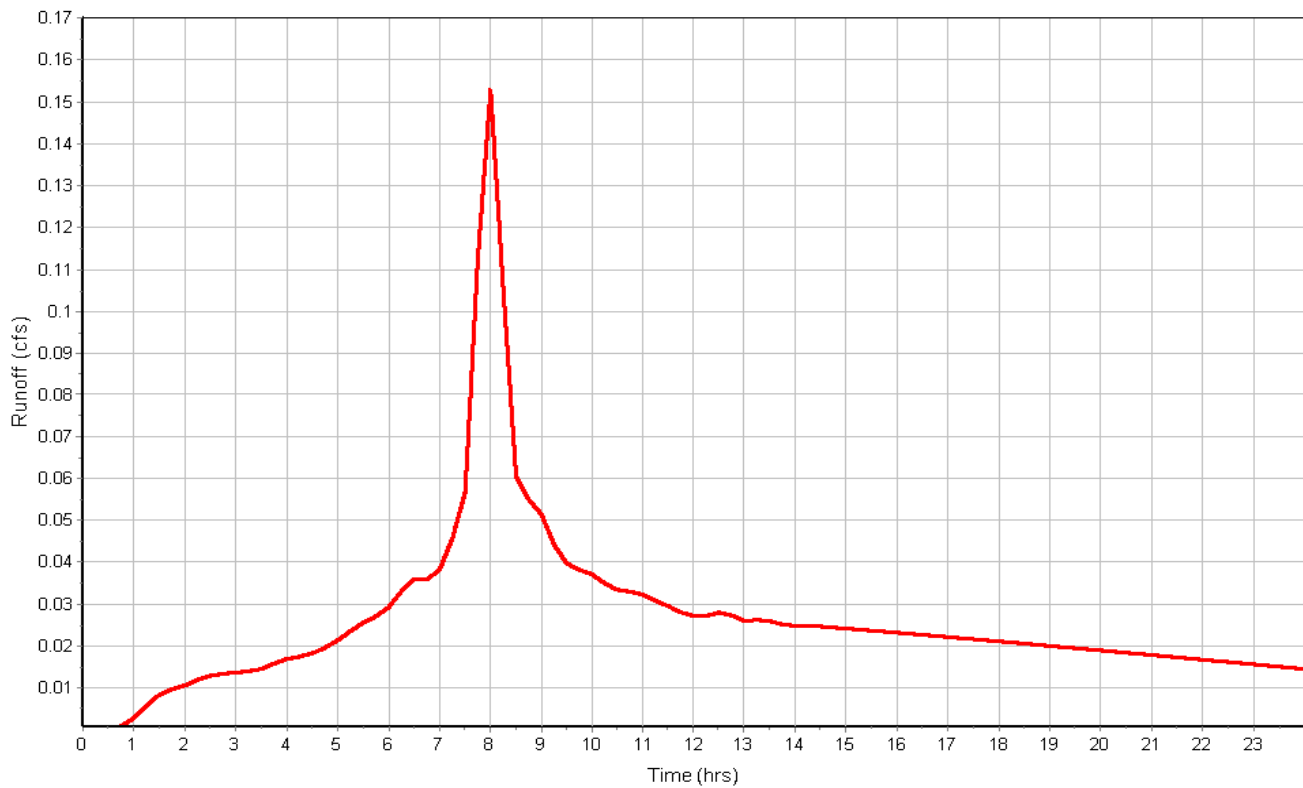
Total Rainfall (in) 4.75
Total Runoff (in) 3.67
Peak Runoff (cfs) 0.15
Weighted Curve Number 89.42
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 060

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 068**Input Data**

Area (ac) 0.13
Impervious Area (%) 90.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

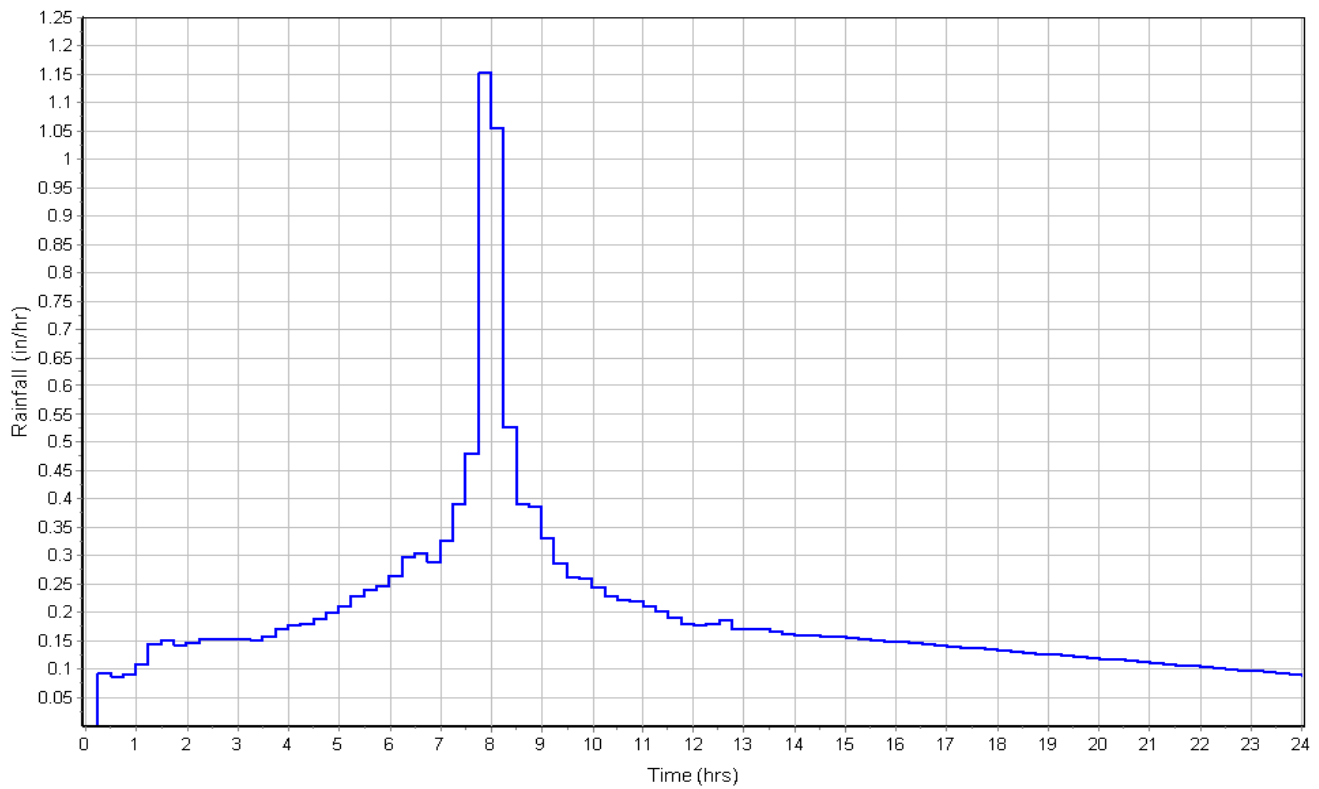
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.13		95.8

Subbasin Runoff Results

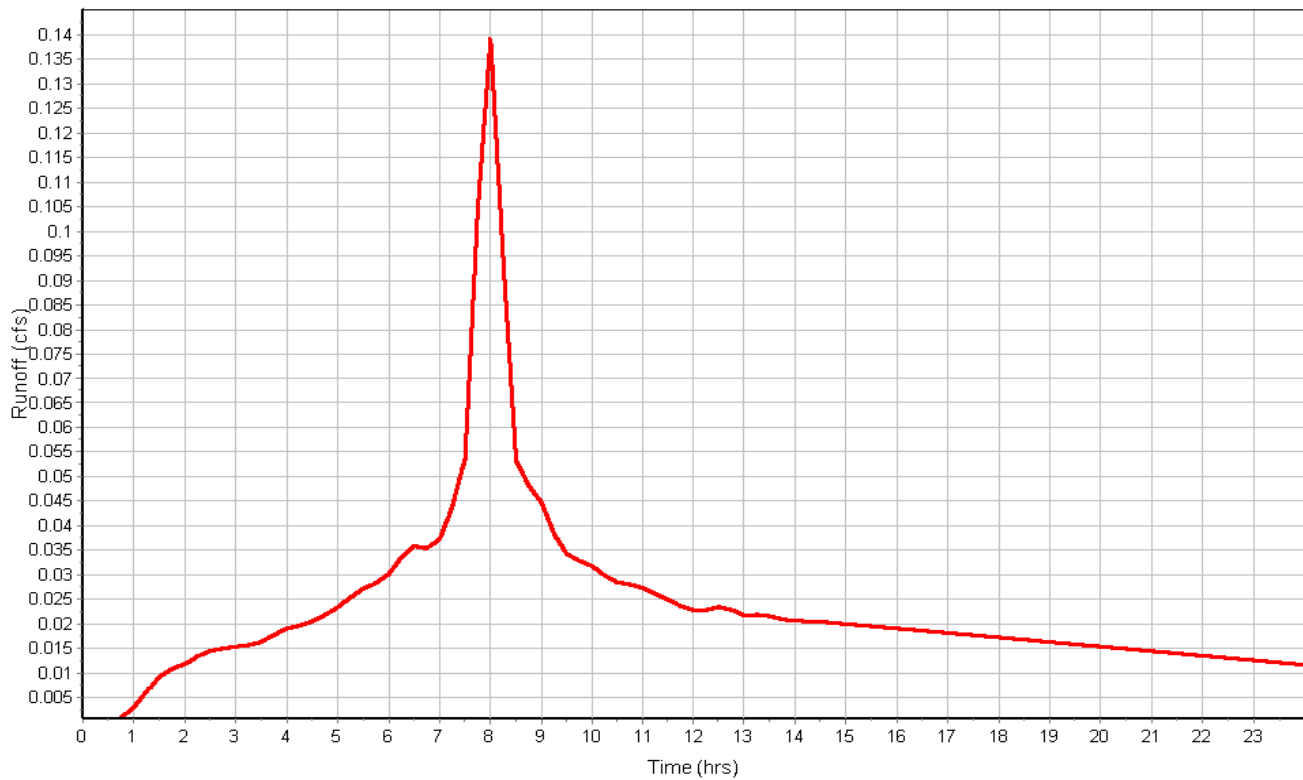
Total Rainfall (in) 4.75
Total Runoff (in) 4.30
Peak Runoff (cfs) 0.14
Weighted Curve Number 95.80
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 068

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 069**Input Data**

Area (ac) 0.04
 Impervious Area (%) 25.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

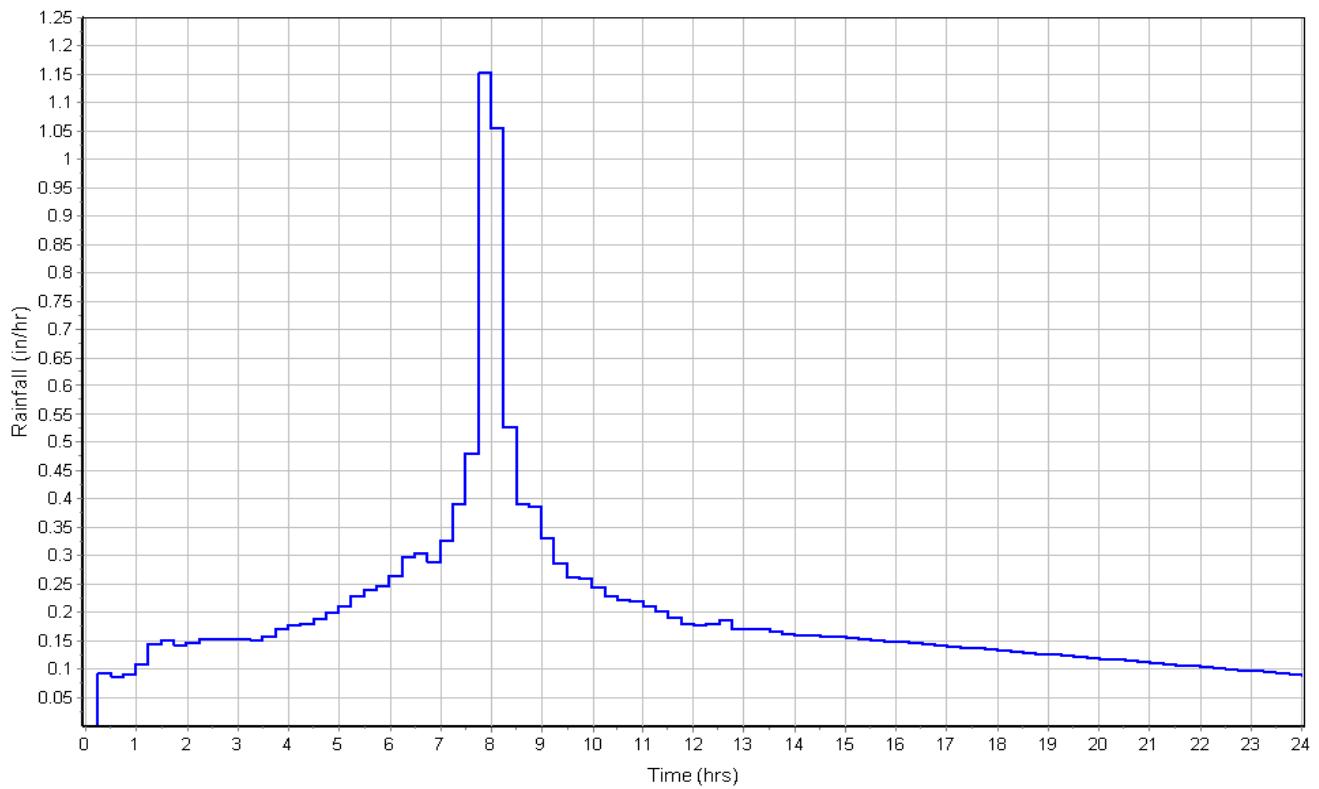
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.04		81.5

Subbasin Runoff Results

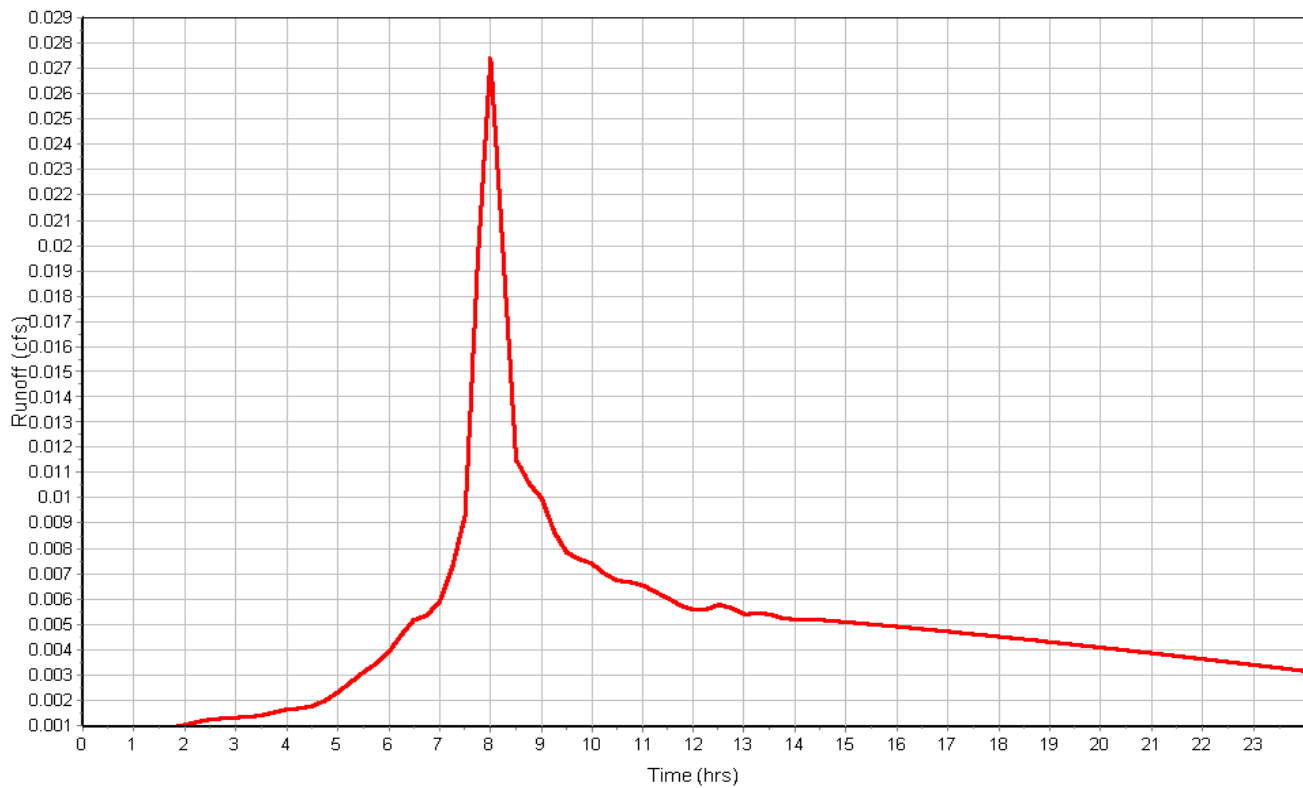
Total Rainfall (in) 4.75
 Total Runoff (in) 2.88
 Peak Runoff (cfs) 0.03
 Weighted Curve Number 81.50
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 069

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 070**Input Data**

Area (ac) 0.05
Impervious Area (%) 22.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

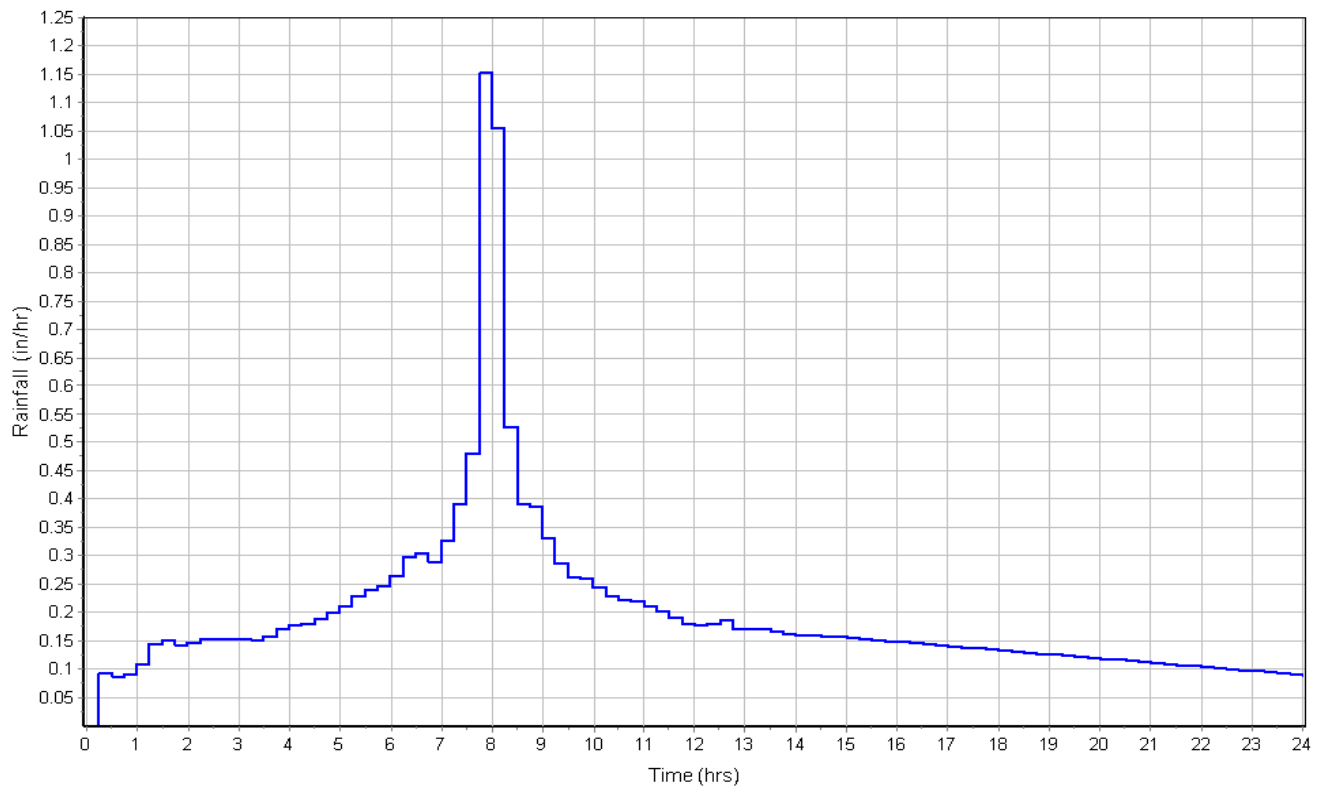
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.05		80.84

Subbasin Runoff Results

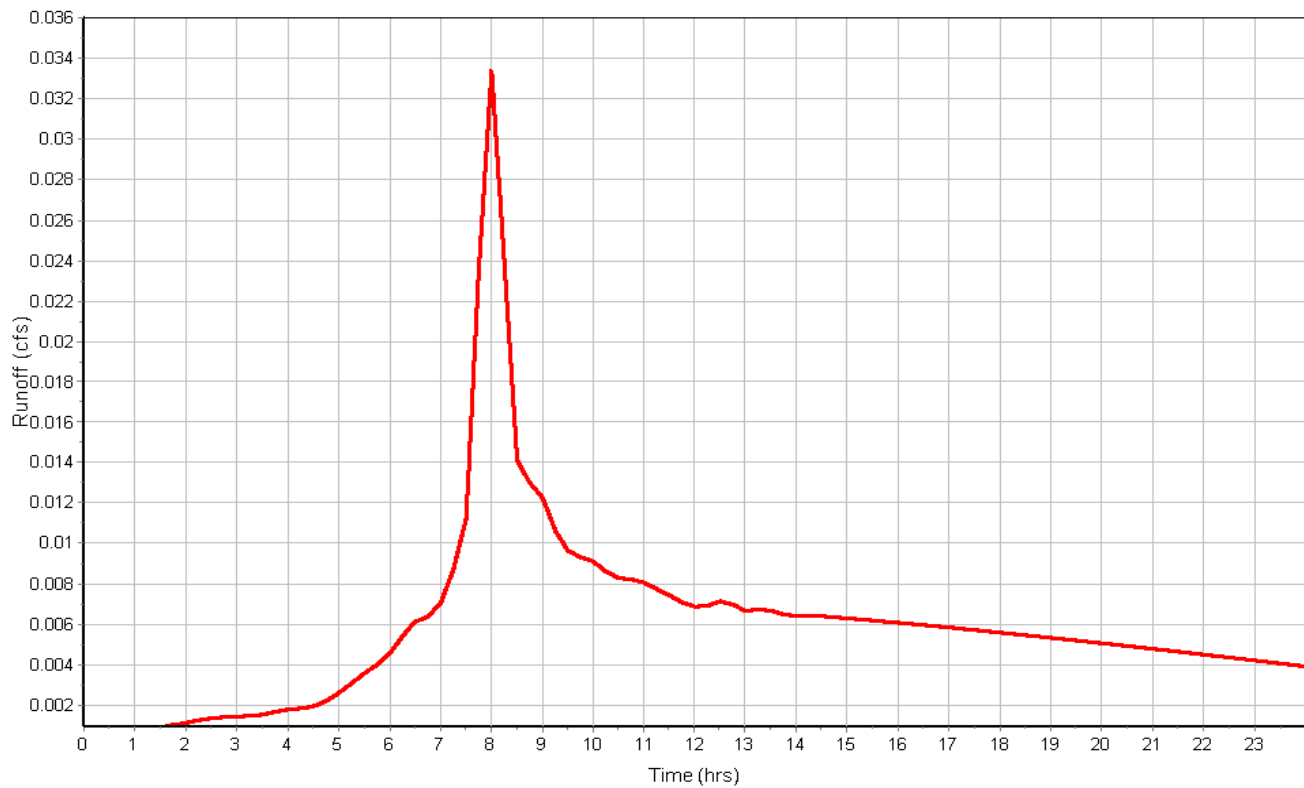
Total Rainfall (in) 4.75
Total Runoff (in) 2.82
Peak Runoff (cfs) 0.03
Weighted Curve Number 80.84
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 070

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 071**Input Data**

Area (ac) 0.07
 Impervious Area (%) 61.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

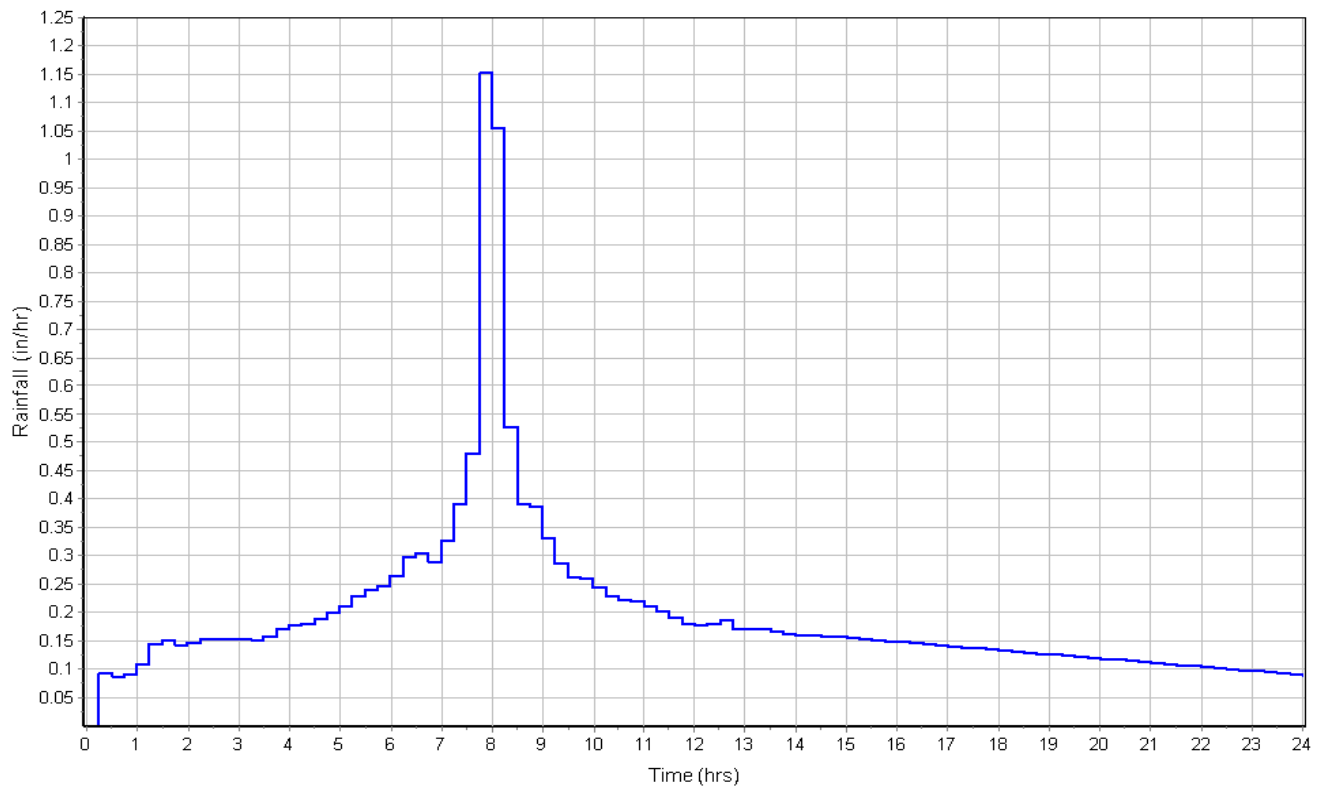
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.07		89.42

Subbasin Runoff Results

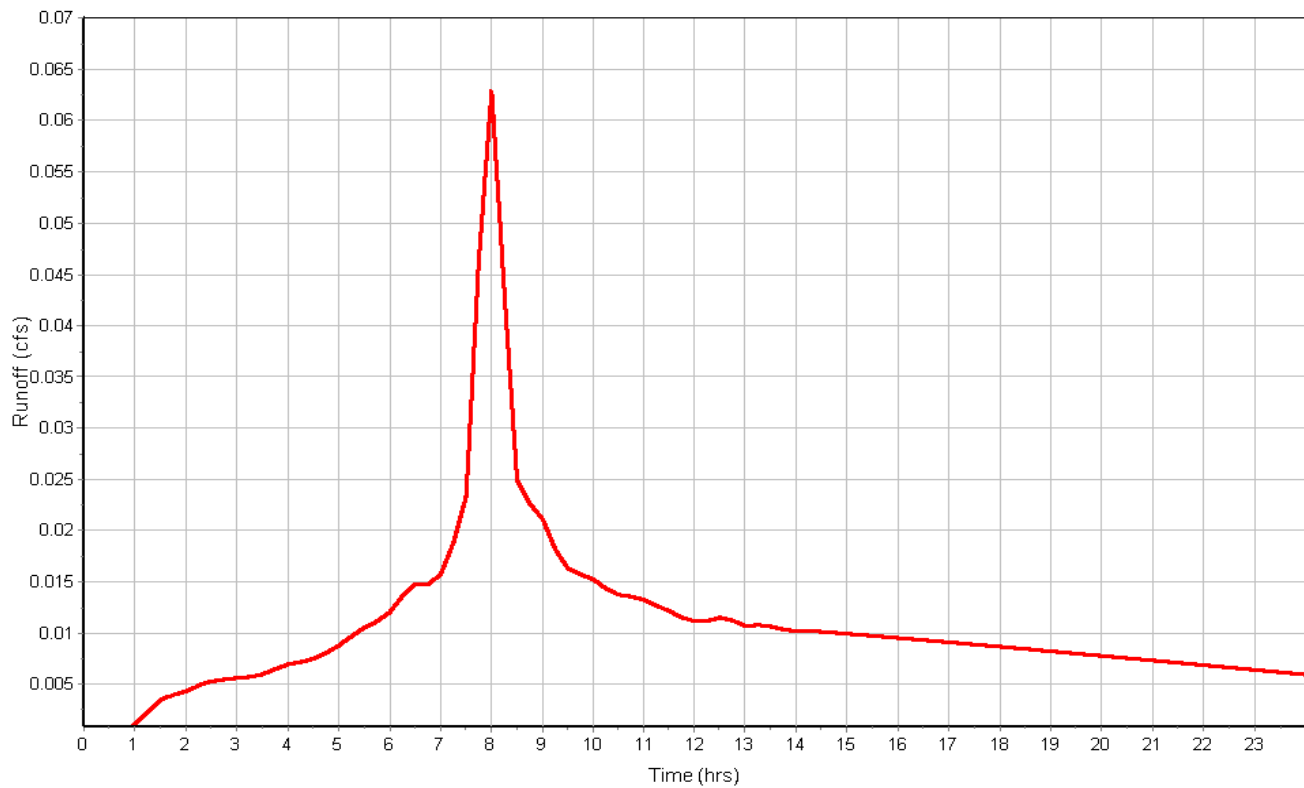
Total Rainfall (in) 4.75
 Total Runoff (in) 3.67
 Peak Runoff (cfs) 0.06
 Weighted Curve Number 89.42
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 071

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 073**Input Data**

Area (ac) 0.31
Impervious Area (%) 54.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

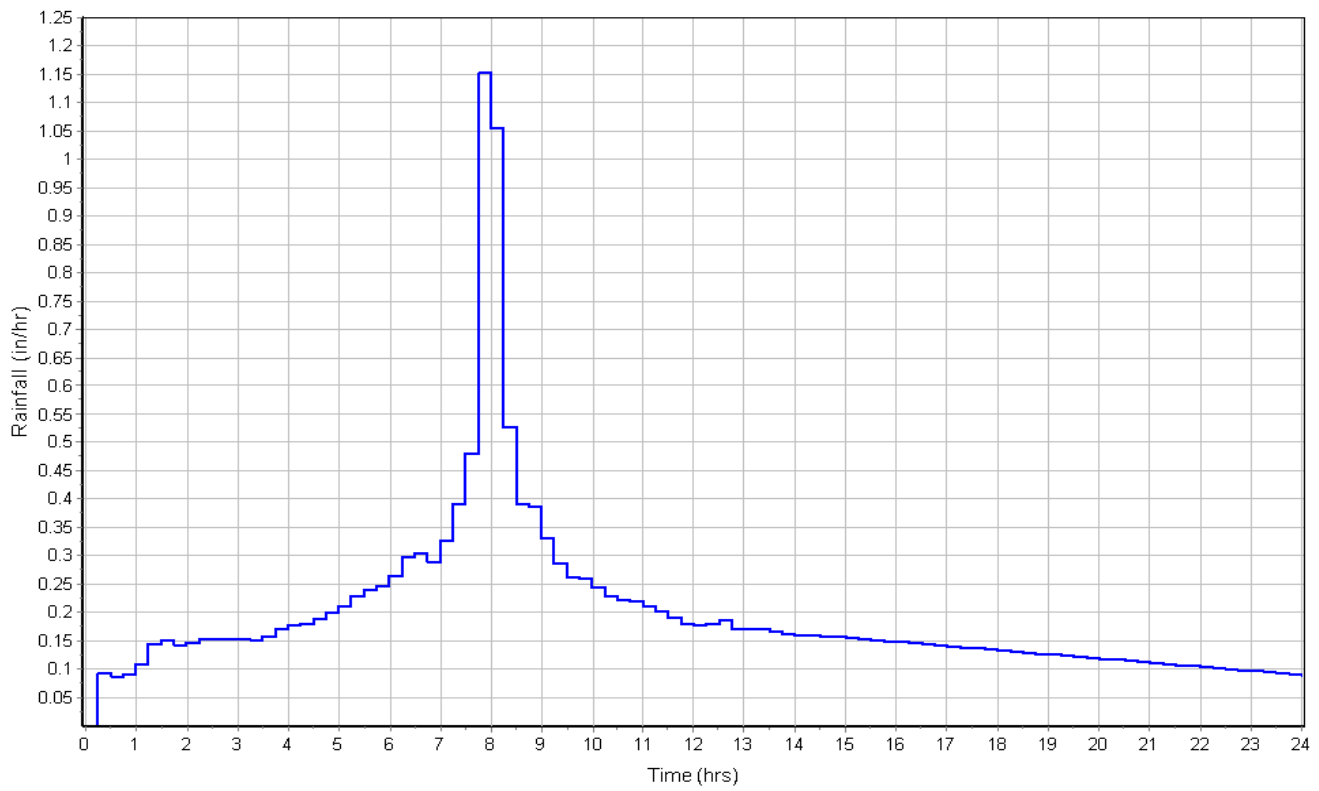
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.31		87.88

Subbasin Runoff Results

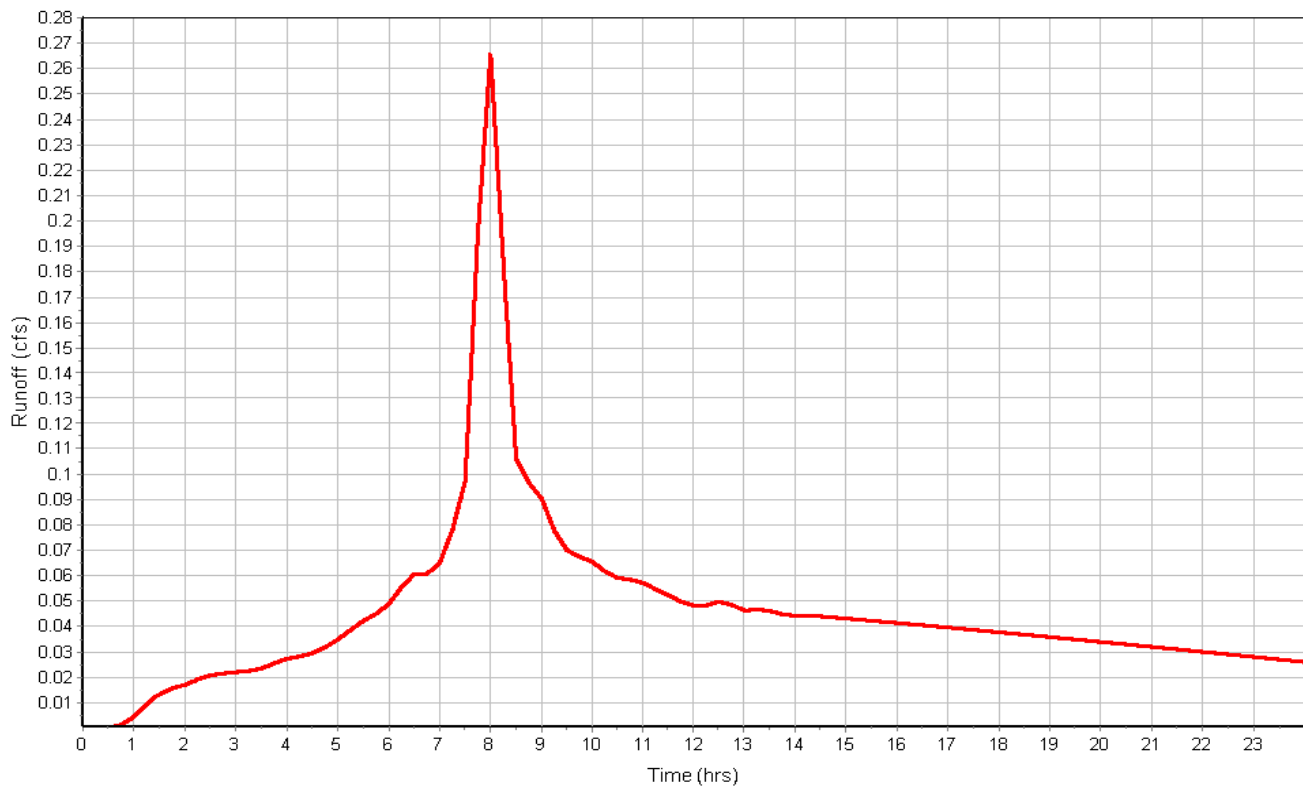
Total Rainfall (in) 4.75
Total Runoff (in) 3.52
Peak Runoff (cfs) 0.27
Weighted Curve Number 87.88
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 073

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 074**Input Data**

Area (ac) 0.74
 Impervious Area (%) 49.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

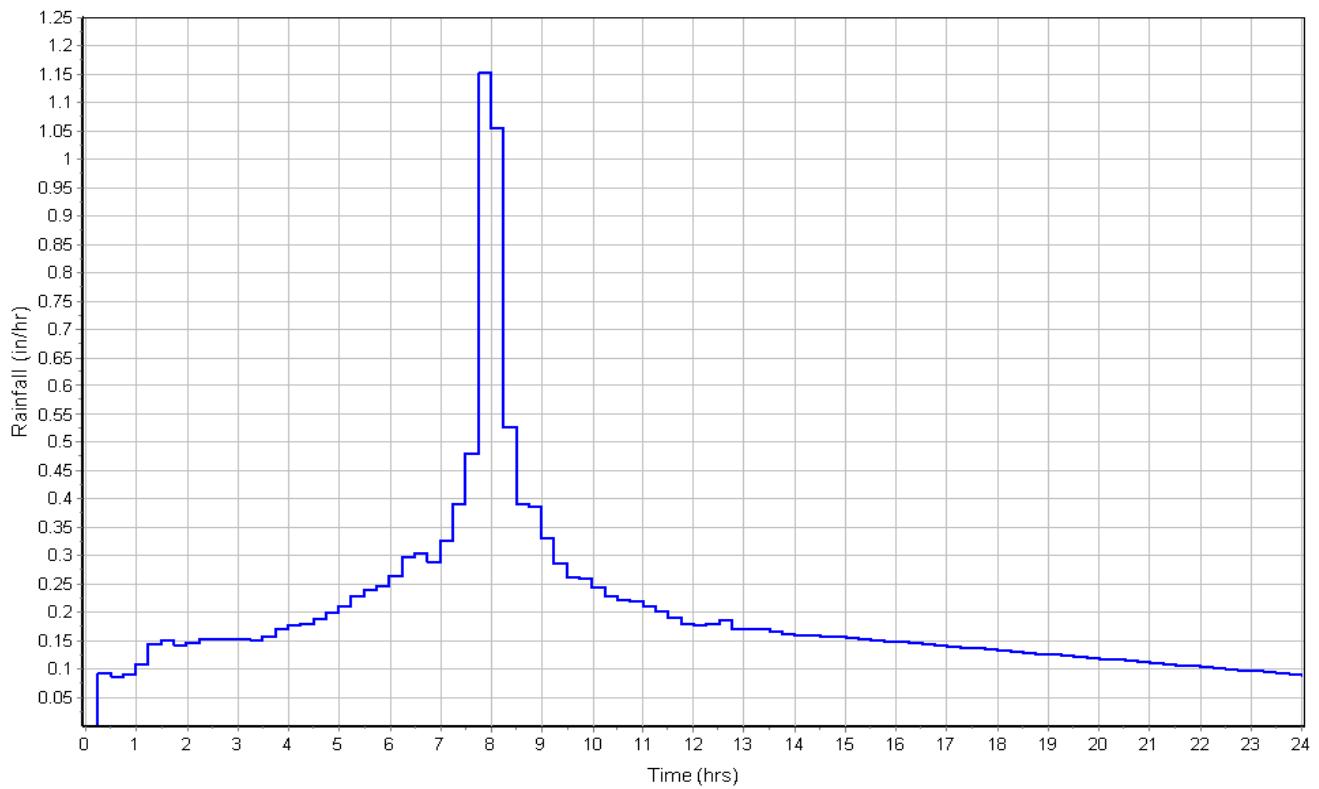
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.74		86.78

Subbasin Runoff Results

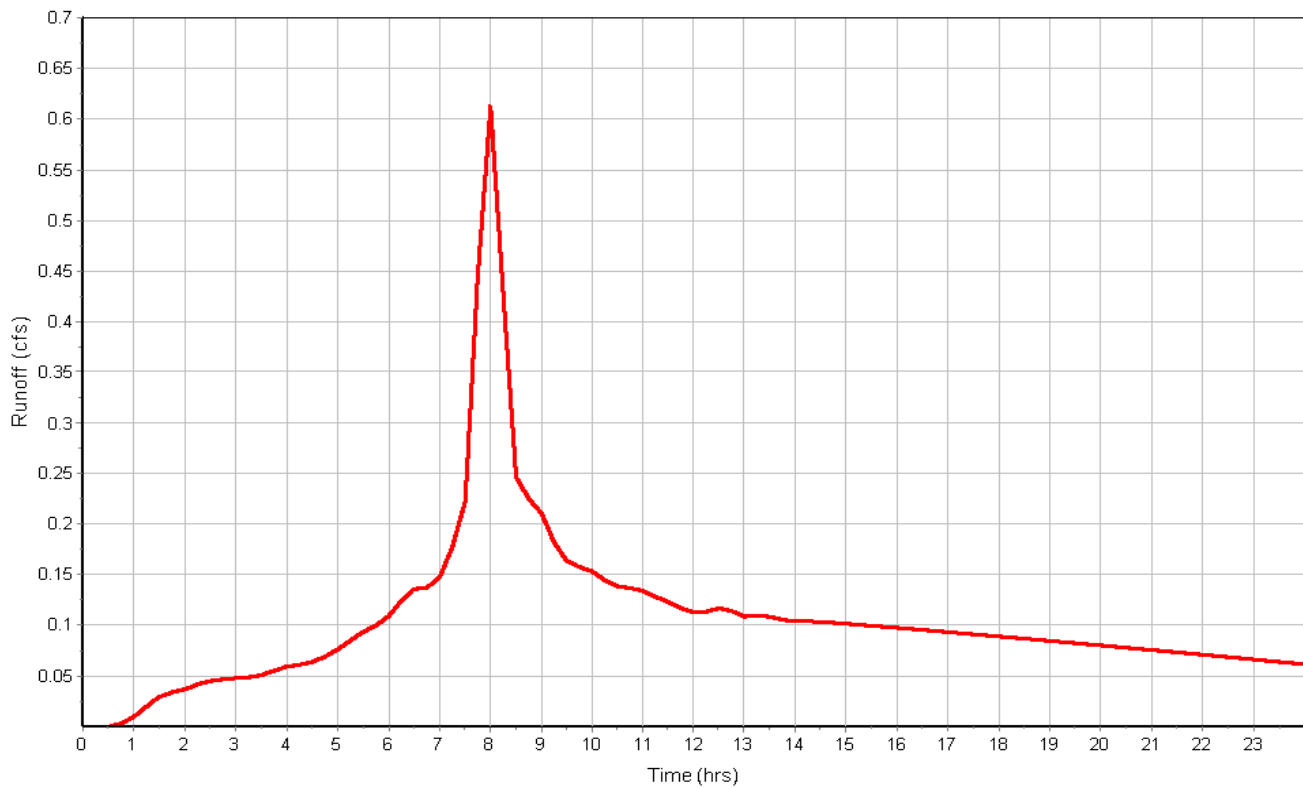
Total Rainfall (in) 4.75
 Total Runoff (in) 3.41
 Peak Runoff (cfs) 0.61
 Weighted Curve Number 86.78
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 074

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 091**Input Data**

Area (ac) 0.03
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

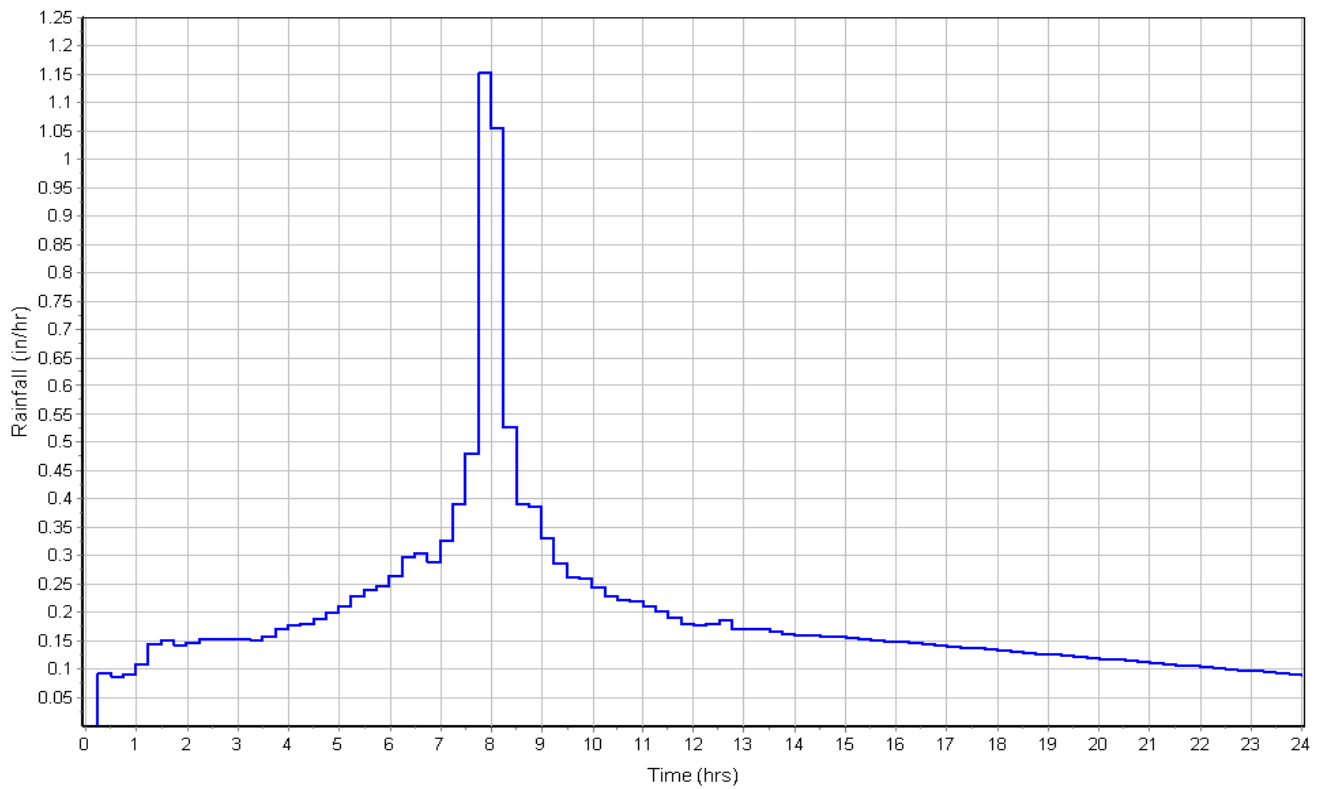
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.03		98

Subbasin Runoff Results

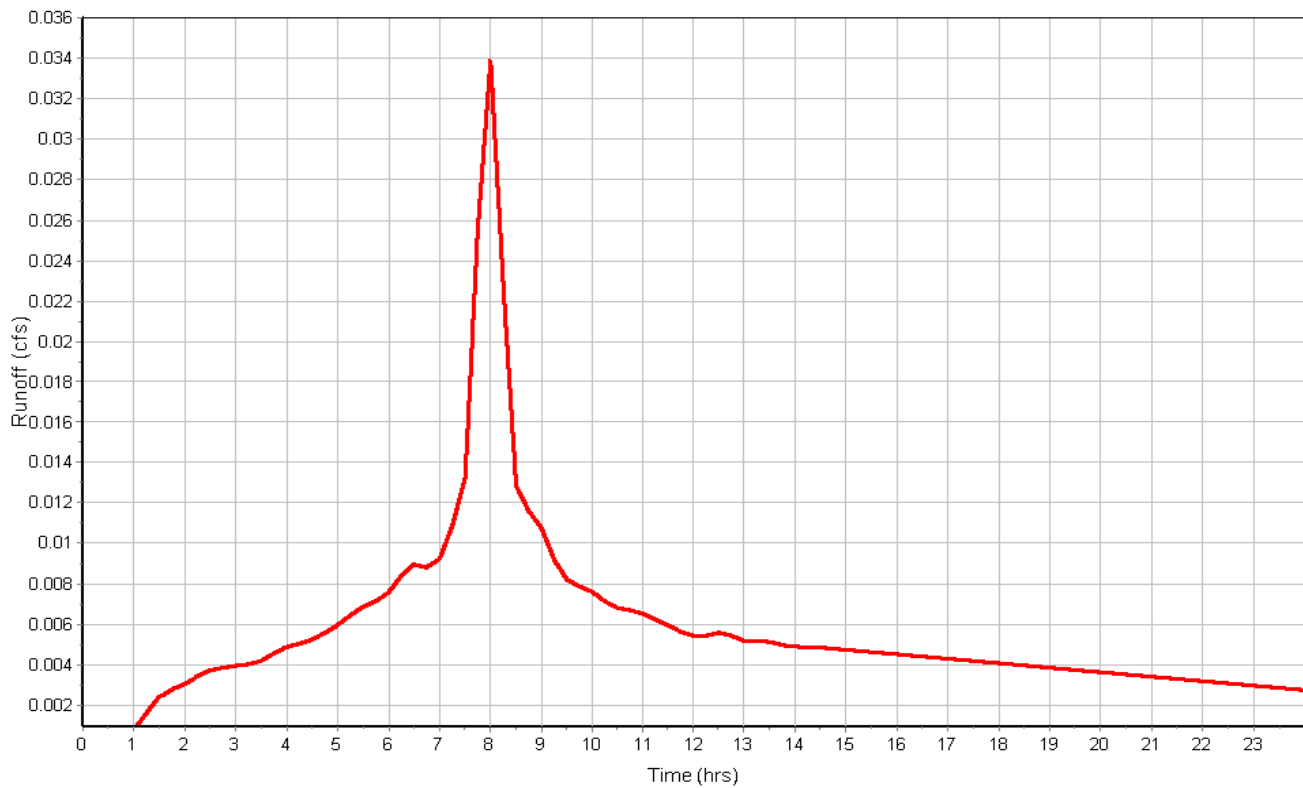
Total Rainfall (in) 4.75
 Total Runoff (in) 4.52
 Peak Runoff (cfs) 0.03
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 091

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 093**Input Data**

Area (ac) 0.40
Impervious Area (%) 72.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

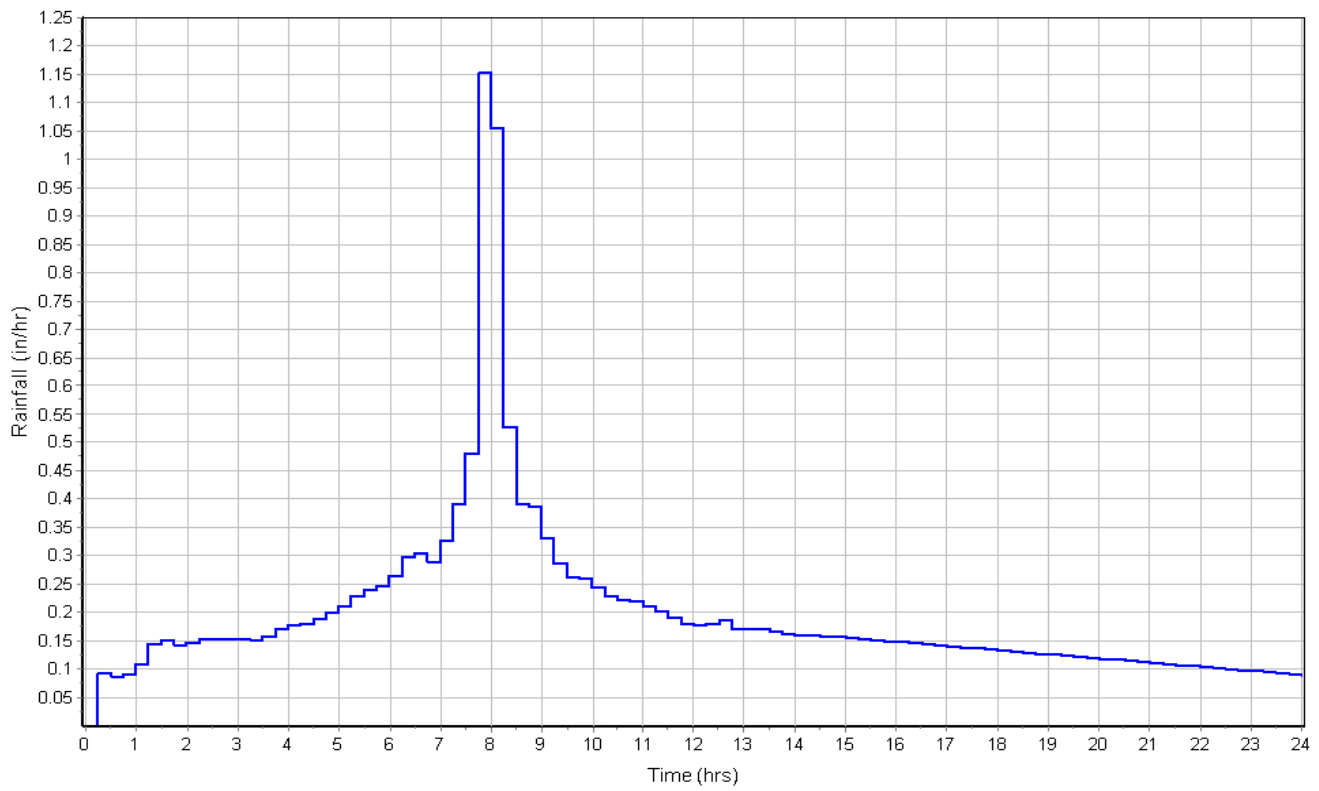
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.40		91.84

Subbasin Runoff Results

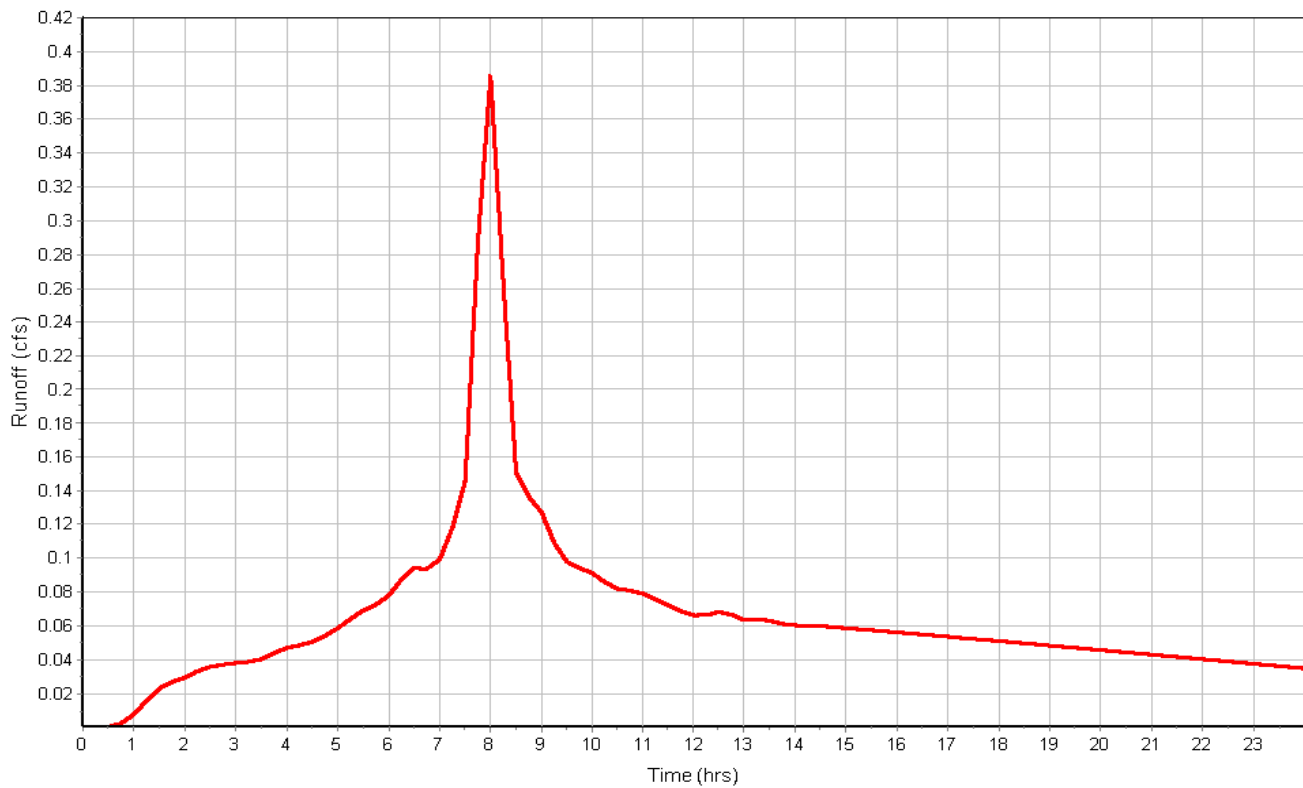
Total Rainfall (in) 4.75
Total Runoff (in) 3.91
Peak Runoff (cfs) 0.39
Weighted Curve Number 91.84
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 093

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 094**Input Data**

Area (ac) 0.54
 Impervious Area (%) 67.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

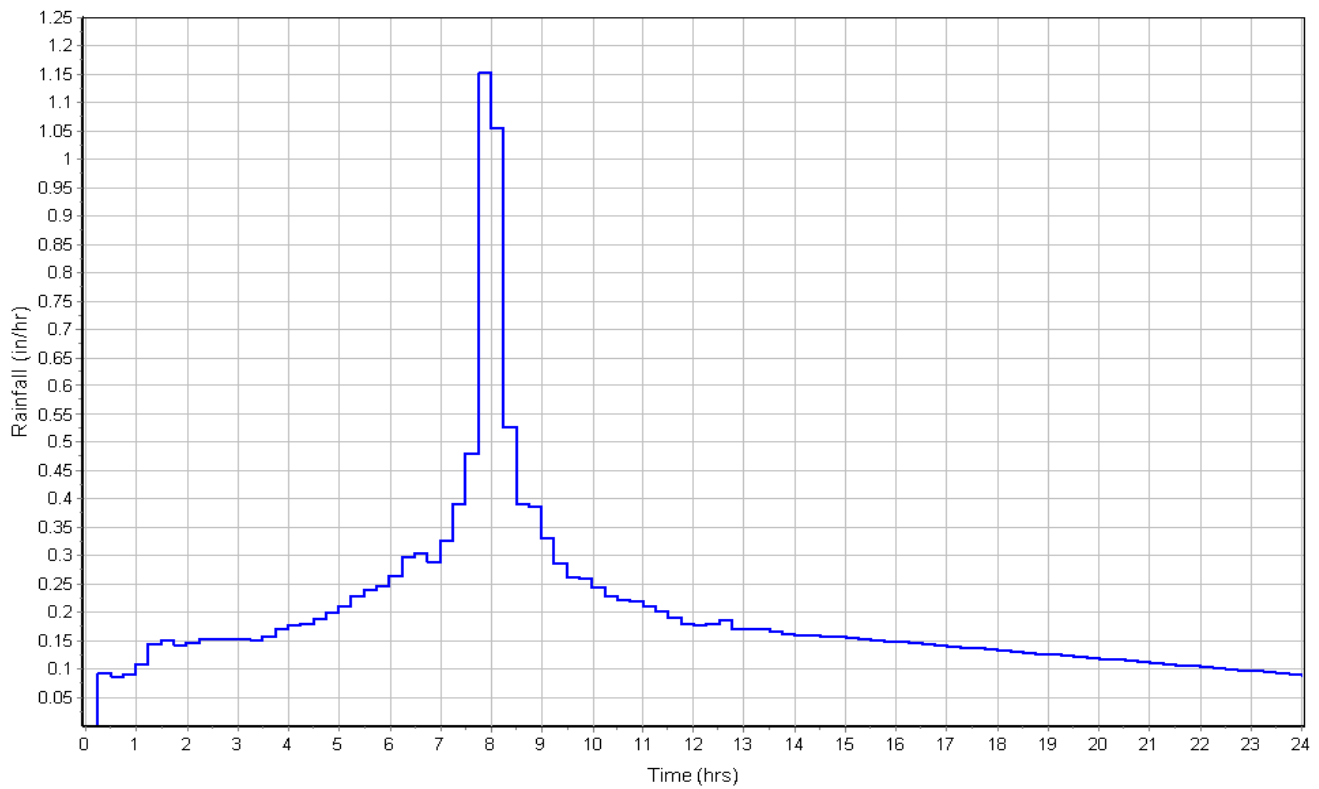
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.54		90.74

Subbasin Runoff Results

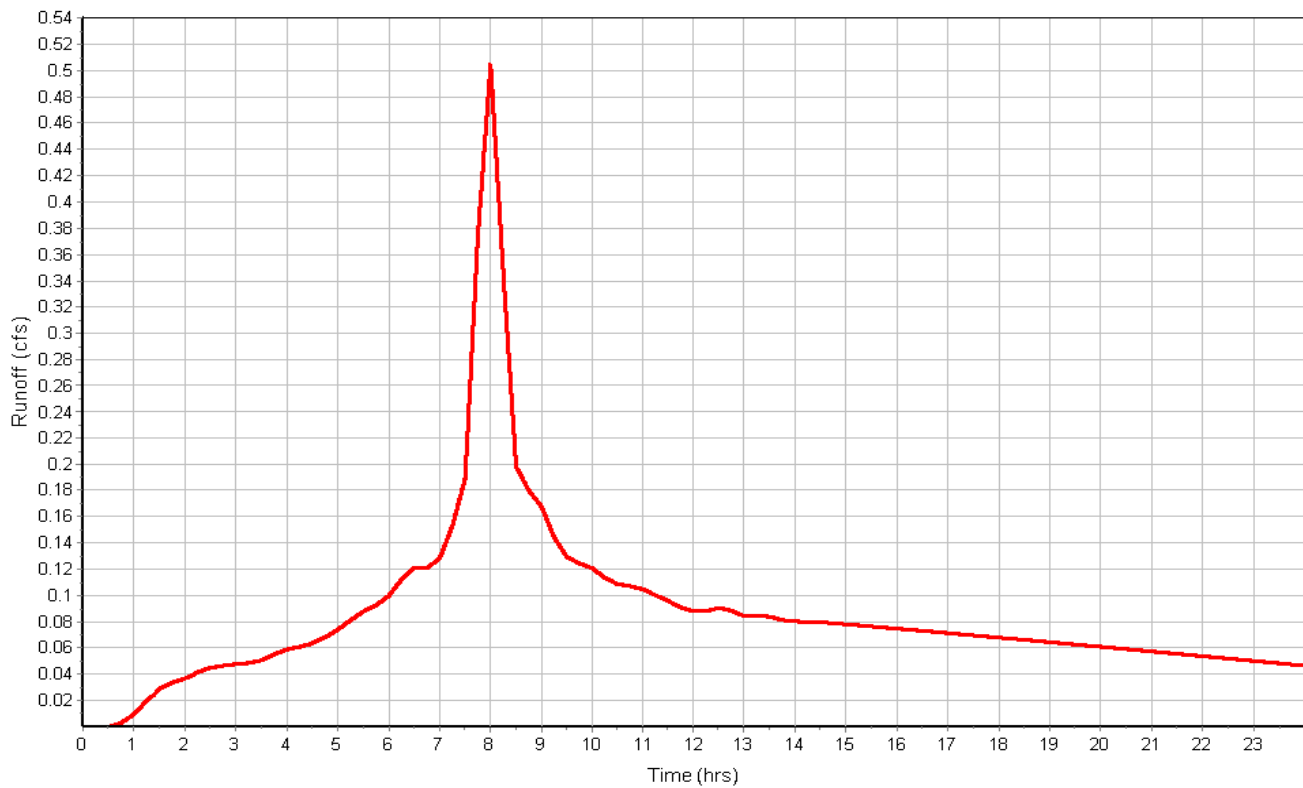
Total Rainfall (in) 4.75
 Total Runoff (in) 3.80
 Peak Runoff (cfs) 0.51
 Weighted Curve Number 90.74
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 094

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 101**Input Data**

Area (ac) 0.18
 Impervious Area (%) 76.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

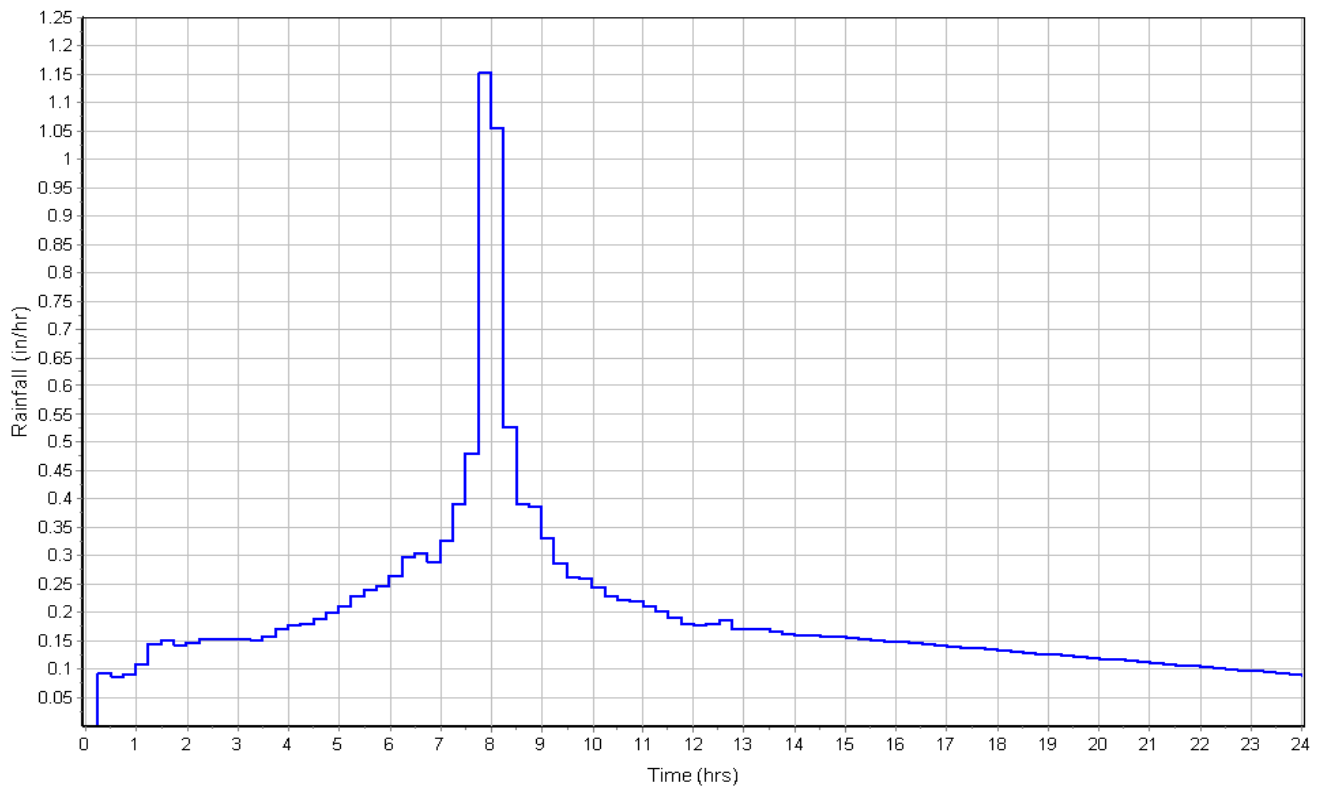
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.18		92.72

Subbasin Runoff Results

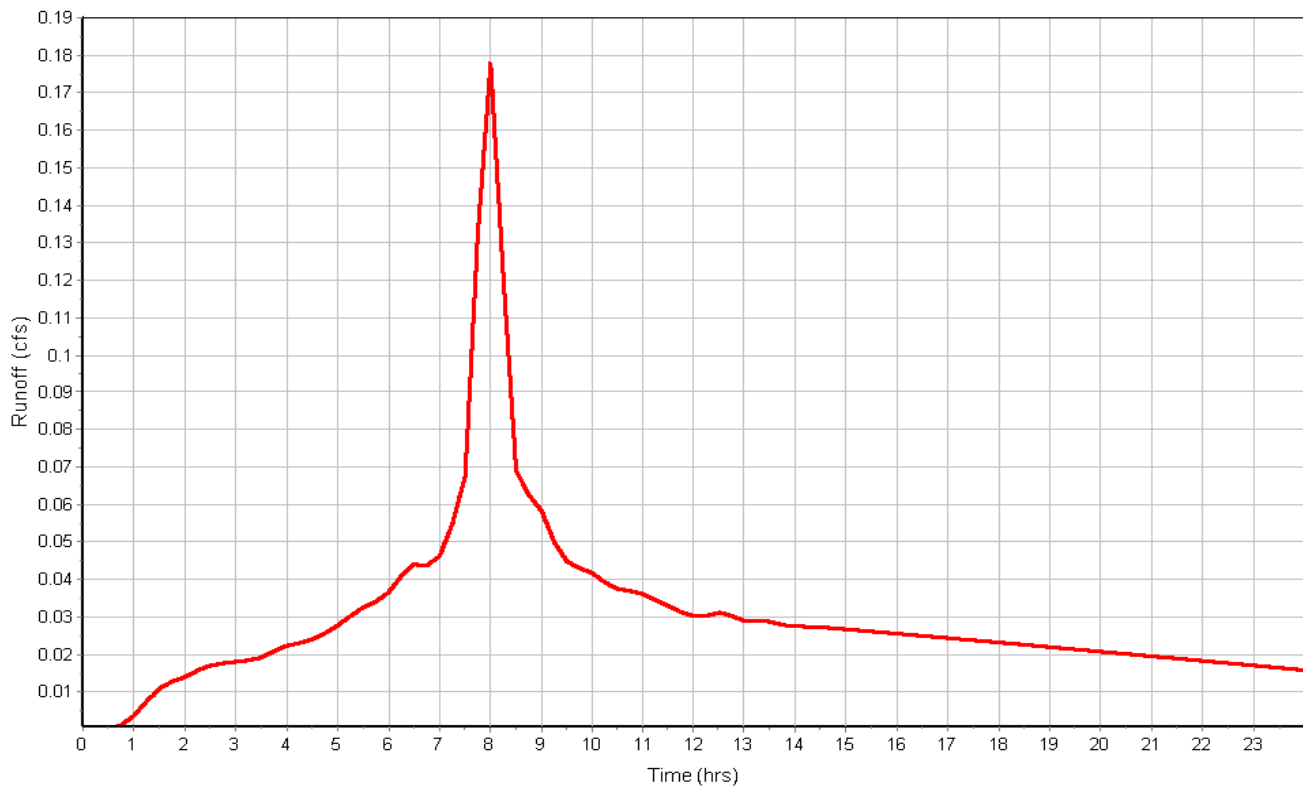
Total Rainfall (in) 4.75
 Total Runoff (in) 4.00
 Peak Runoff (cfs) 0.18
 Weighted Curve Number 92.72
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 101

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 103**Input Data**

Area (ac) 0.49
 Impervious Area (%) 72.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

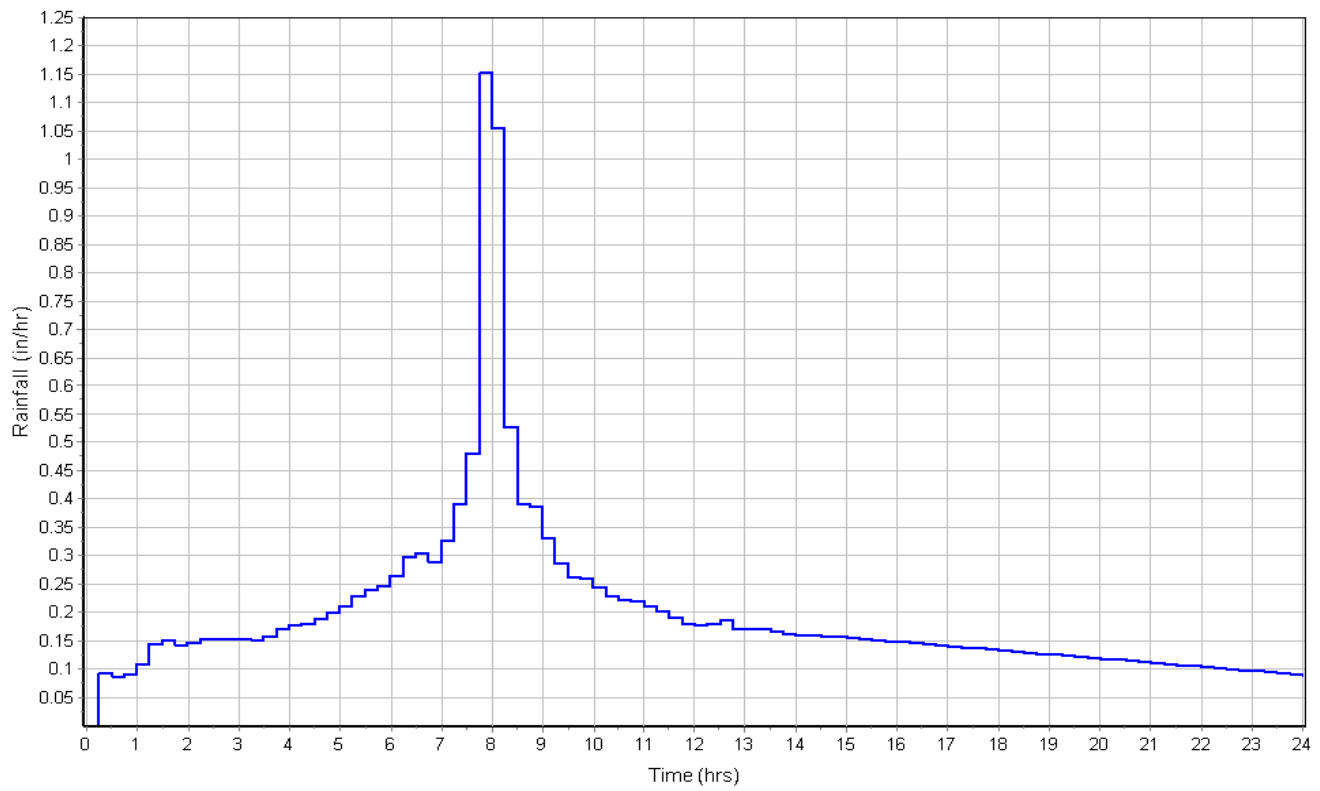
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.49		91.84

Subbasin Runoff Results

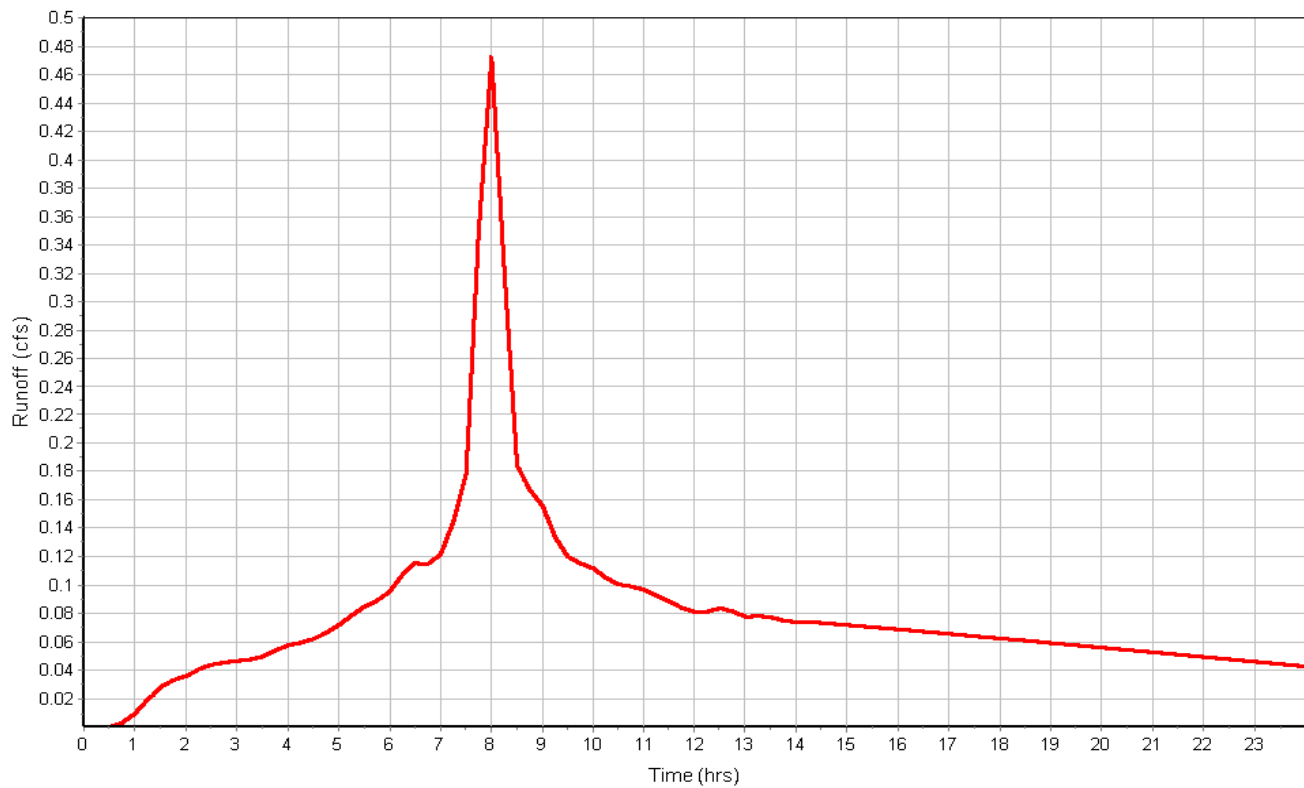
Total Rainfall (in) 4.75
 Total Runoff (in) 3.91
 Peak Runoff (cfs) 0.47
 Weighted Curve Number 91.84
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 103

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 104**Input Data**

Area (ac) 0.61
Impervious Area (%) 48.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

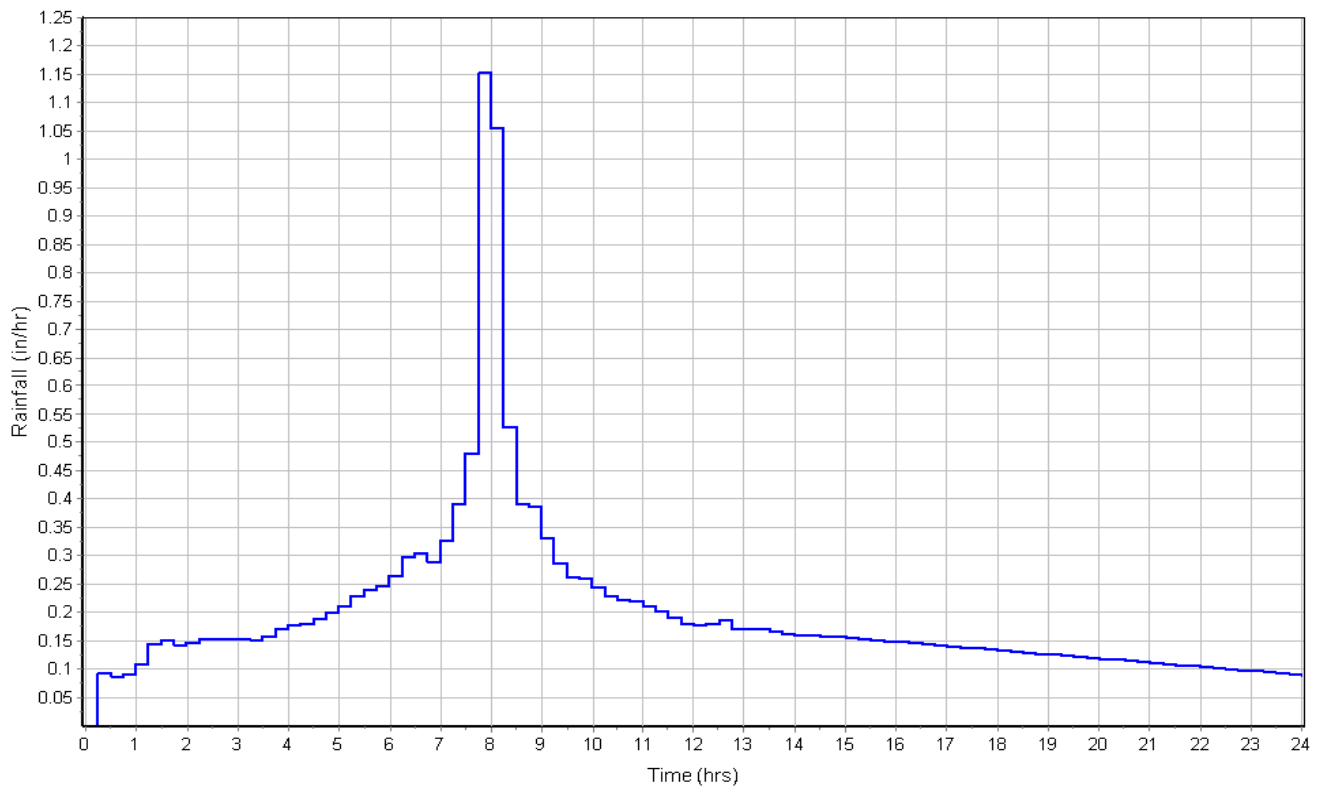
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.61		86.56

Subbasin Runoff Results

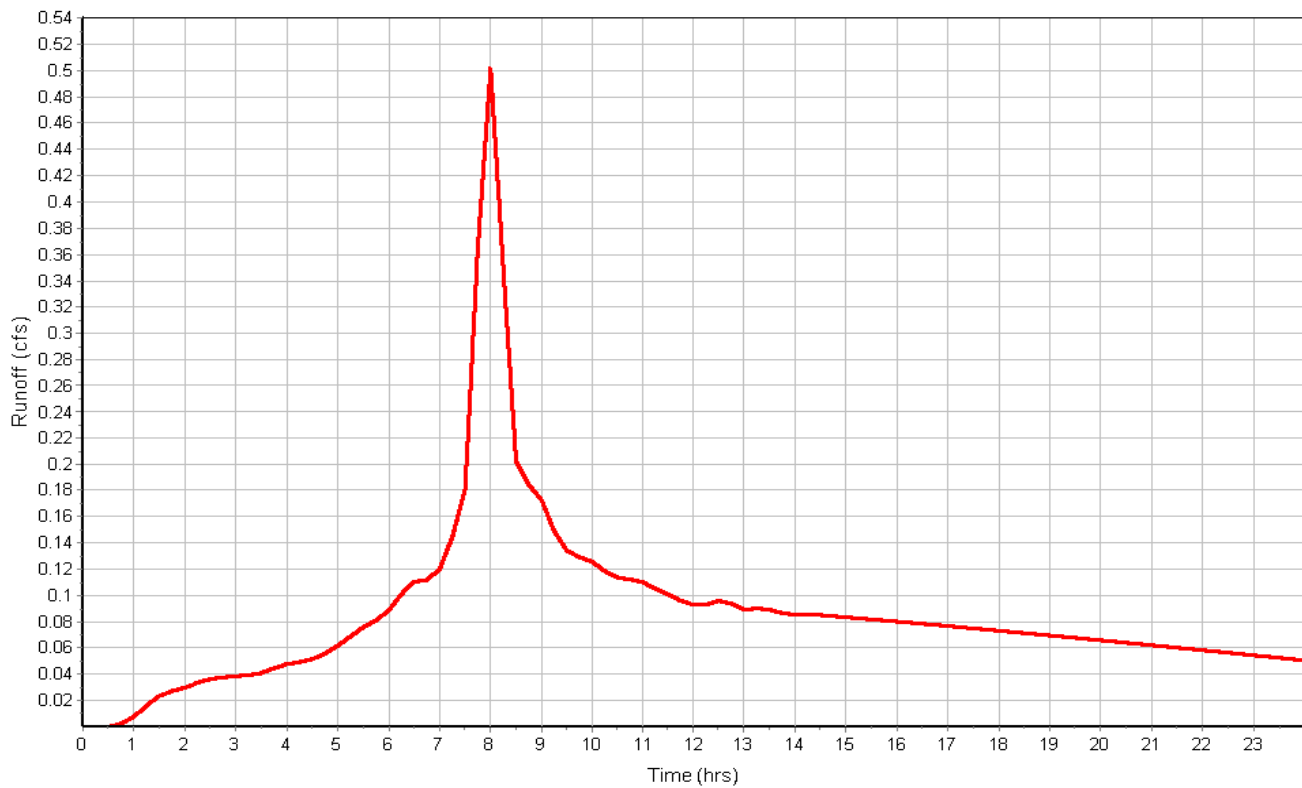
Total Rainfall (in) 4.75
Total Runoff (in) 3.39
Peak Runoff (cfs) 0.50
Weighted Curve Number 86.56
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 104

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 105**Input Data**

Area (ac) 0.12
Impervious Area (%) 89.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

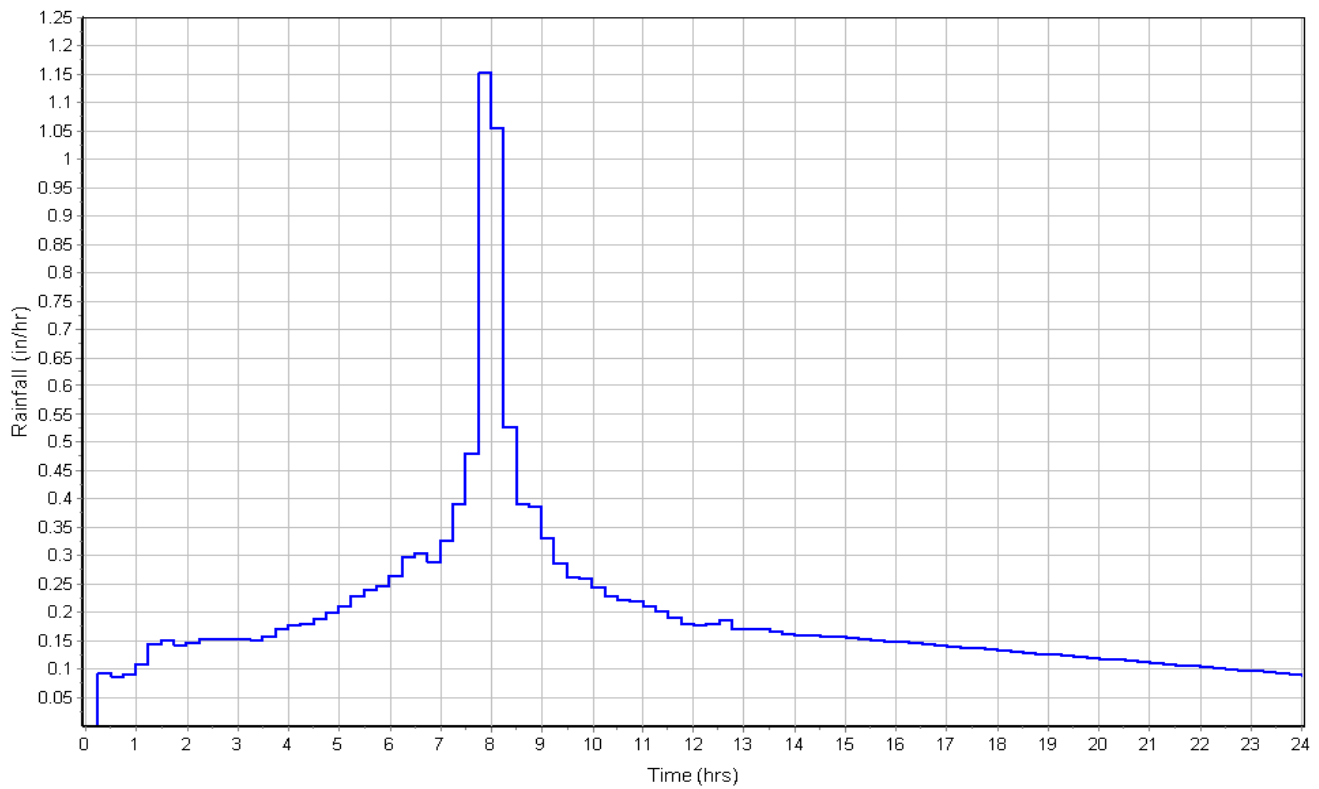
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.12		95.58

Subbasin Runoff Results

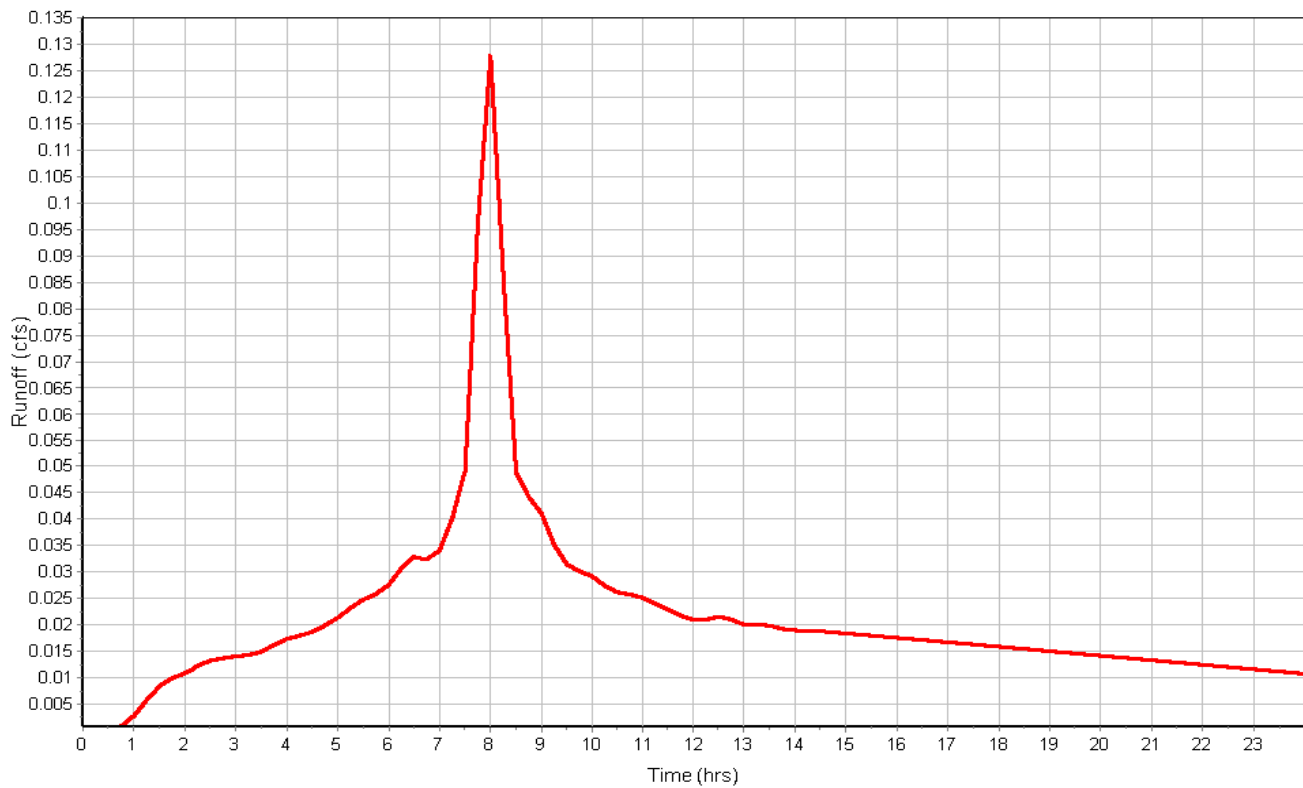
Total Rainfall (in) 4.75
Total Runoff (in) 4.28
Peak Runoff (cfs) 0.13
Weighted Curve Number 95.58
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 105

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 107**Input Data**

Area (ac) 0.51
 Impervious Area (%) 85.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

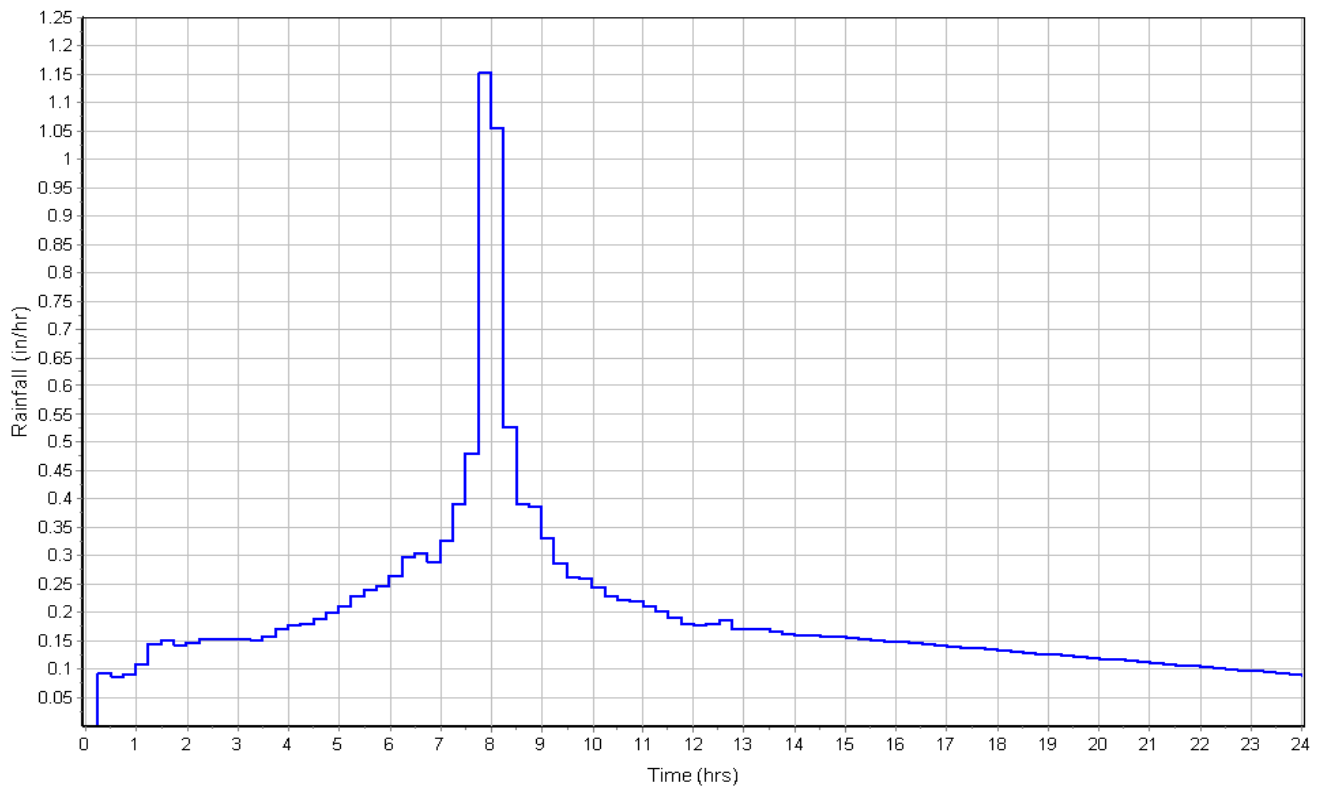
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.51		94.7

Subbasin Runoff Results

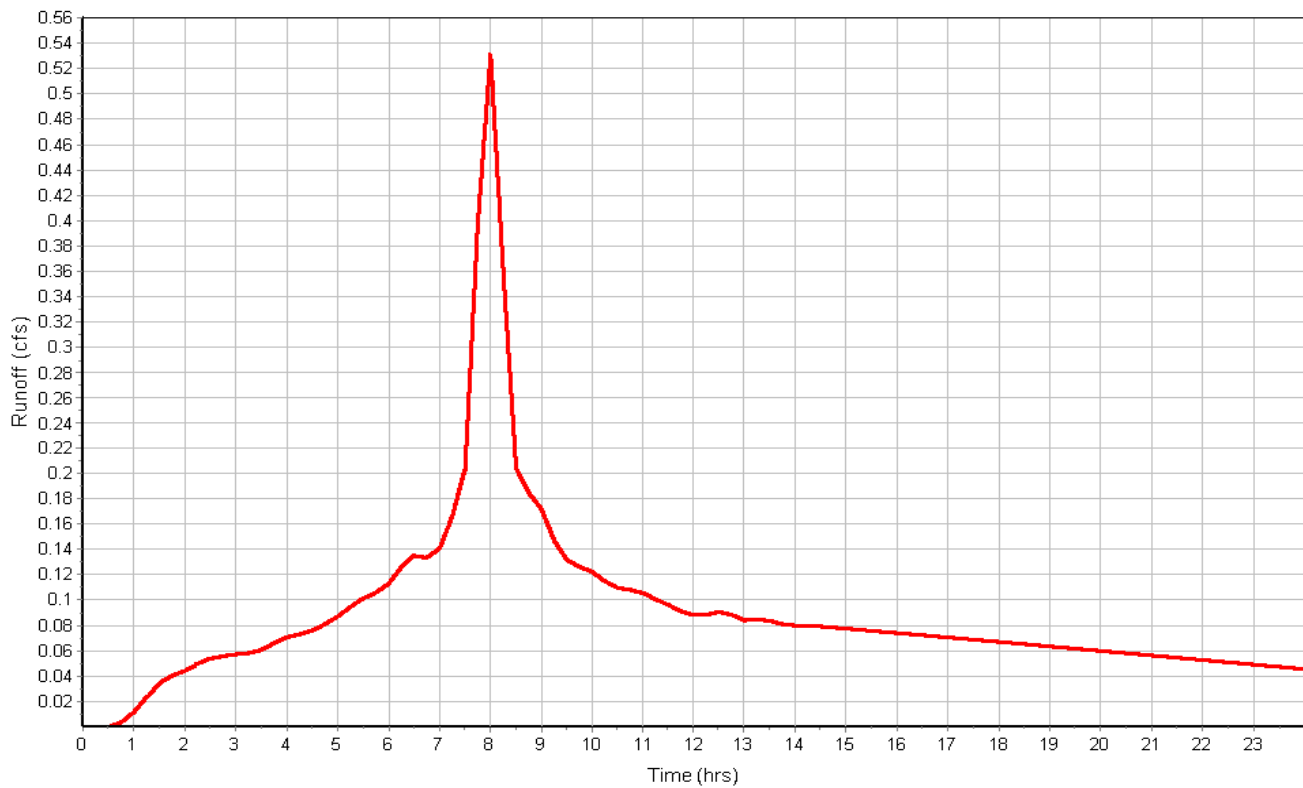
Total Rainfall (in) 4.75
 Total Runoff (in) 4.19
 Peak Runoff (cfs) 0.53
 Weighted Curve Number 94.70
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 107

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 108**Input Data**

Area (ac) 0.42
Impervious Area (%) 81.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

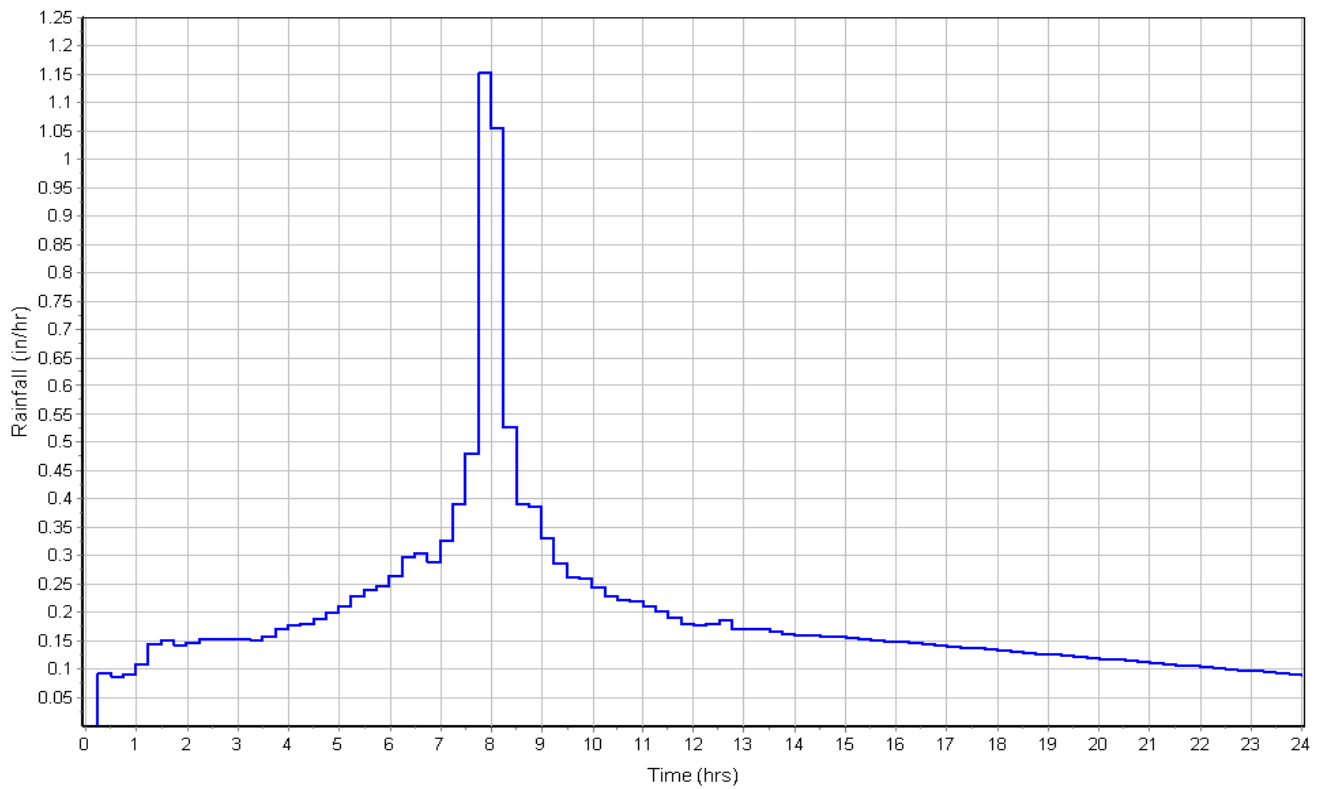
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.42		93.82

Subbasin Runoff Results

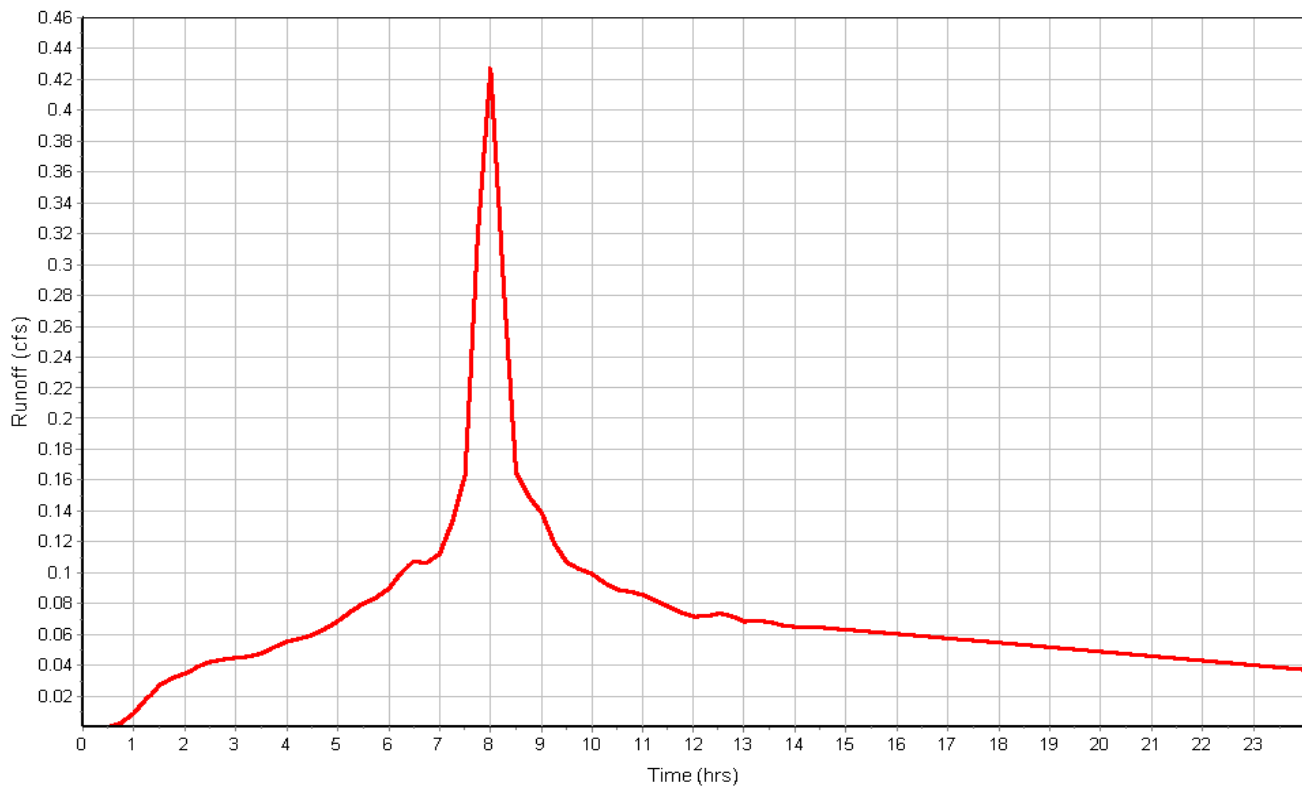
Total Rainfall (in) 4.75
Total Runoff (in) 4.11
Peak Runoff (cfs) 0.43
Weighted Curve Number 93.82
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 108

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 109**Input Data**

Area (ac) 0.09
 Impervious Area (%) 80.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

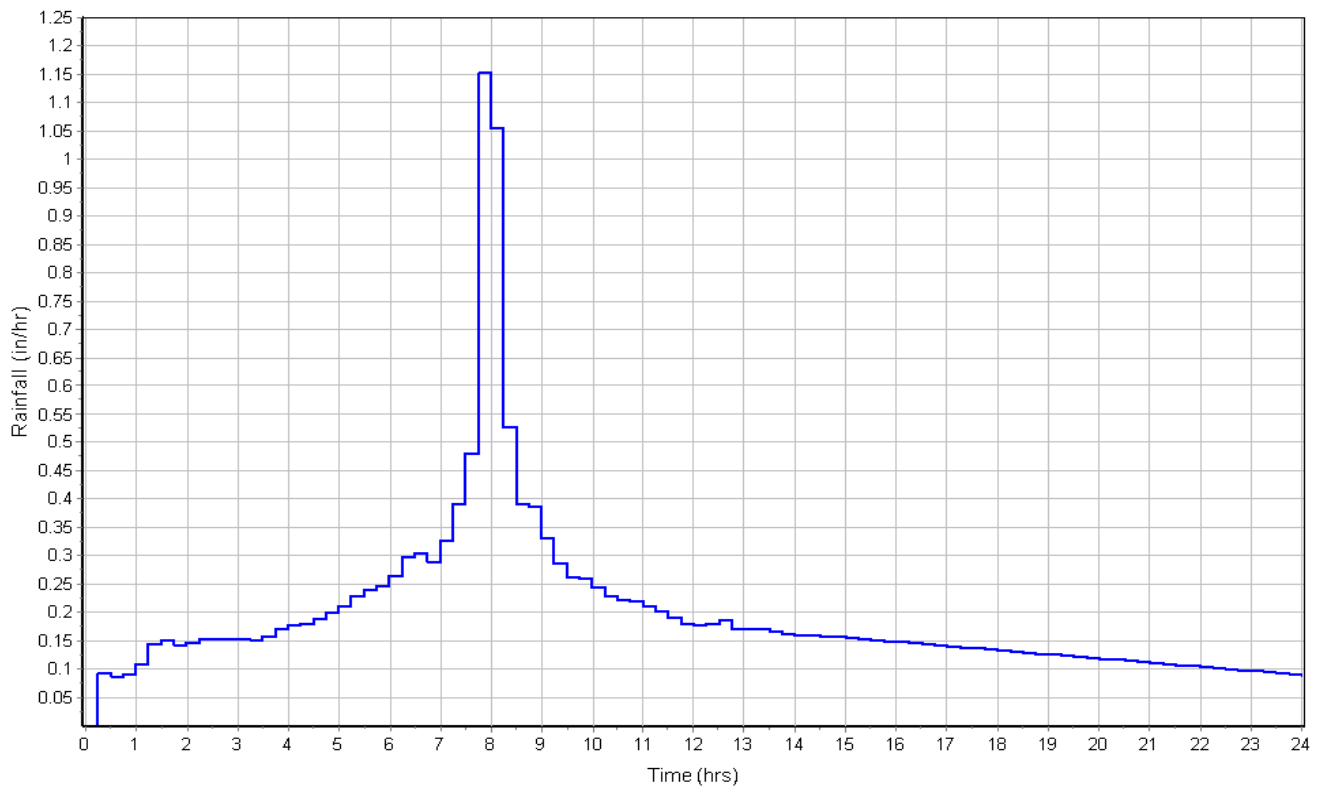
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.09		93.6

Subbasin Runoff Results

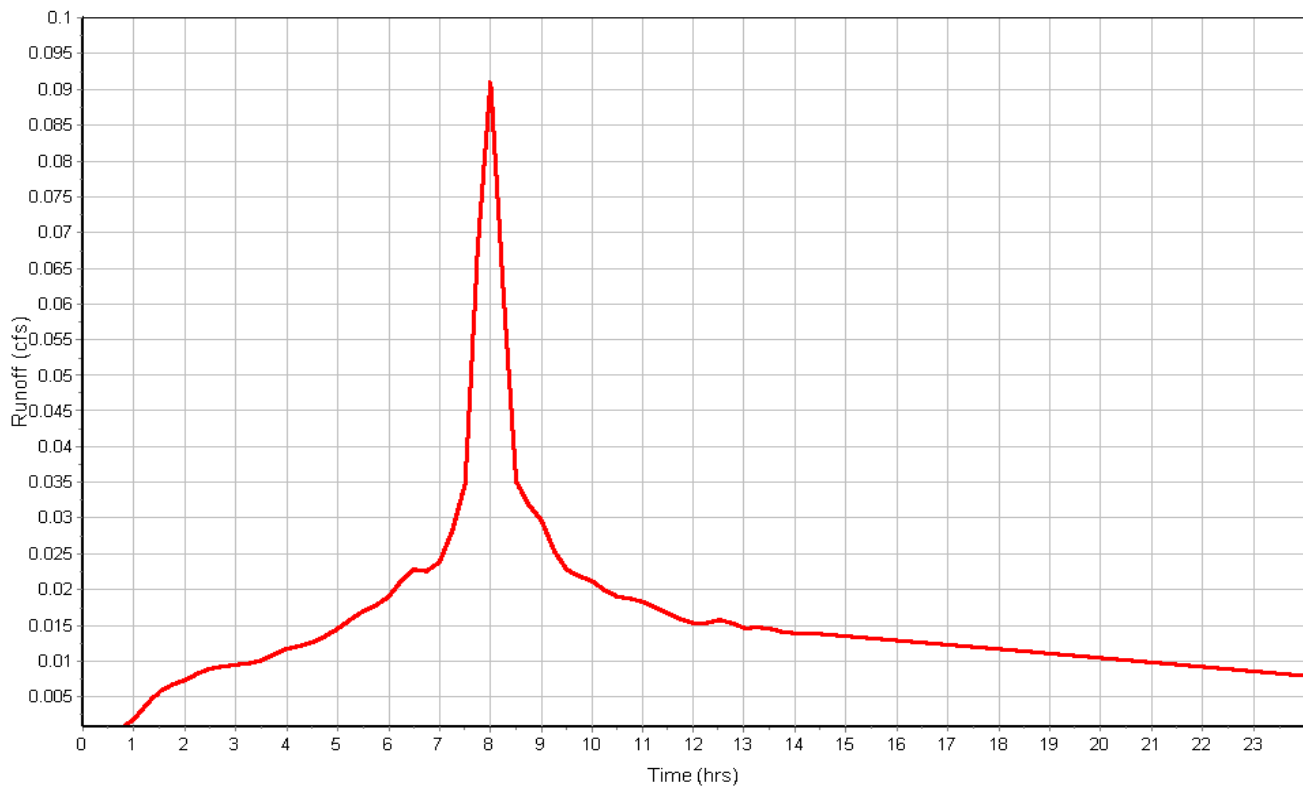
Total Rainfall (in) 4.75
 Total Runoff (in) 4.09
 Peak Runoff (cfs) 0.09
 Weighted Curve Number 93.60
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 109

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 110**Input Data**

Area (ac) 0.12
 Impervious Area (%) 87.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

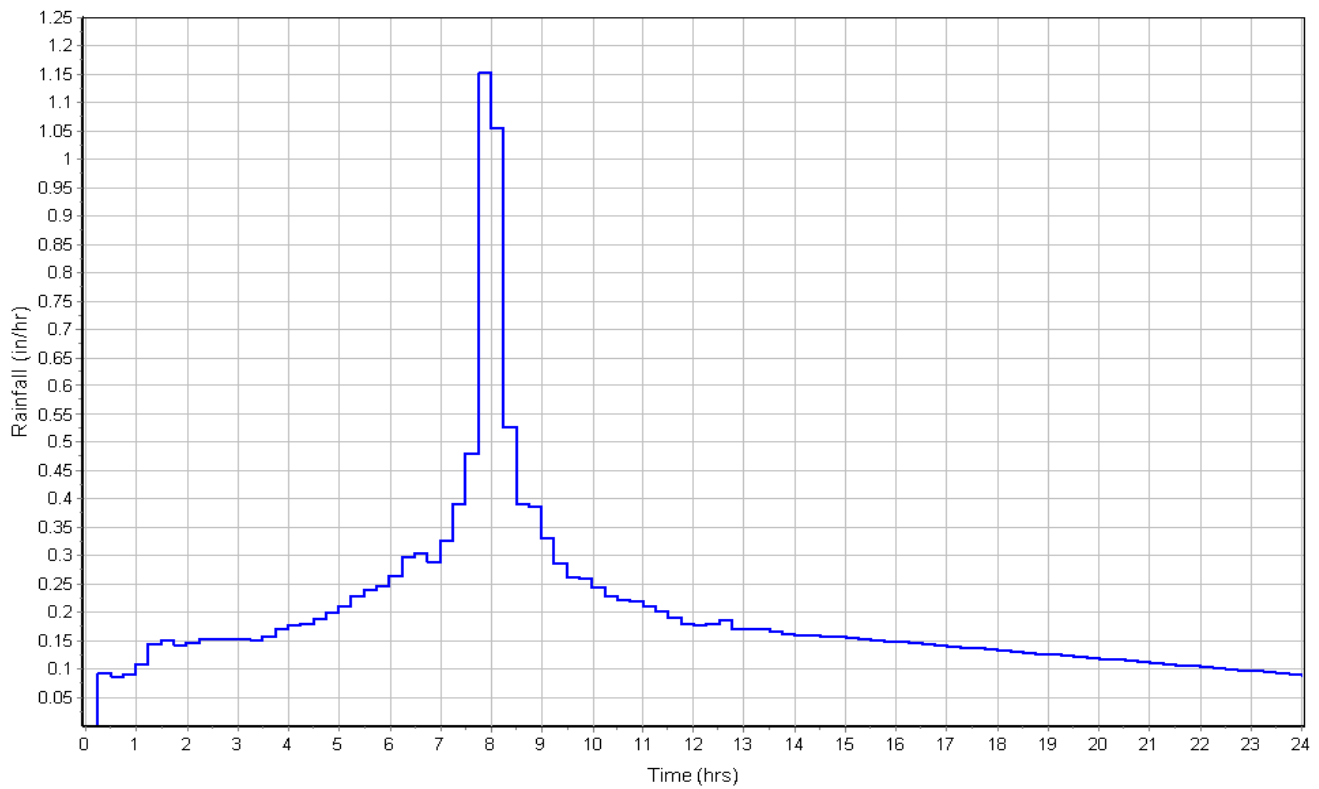
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.12		95.14

Subbasin Runoff Results

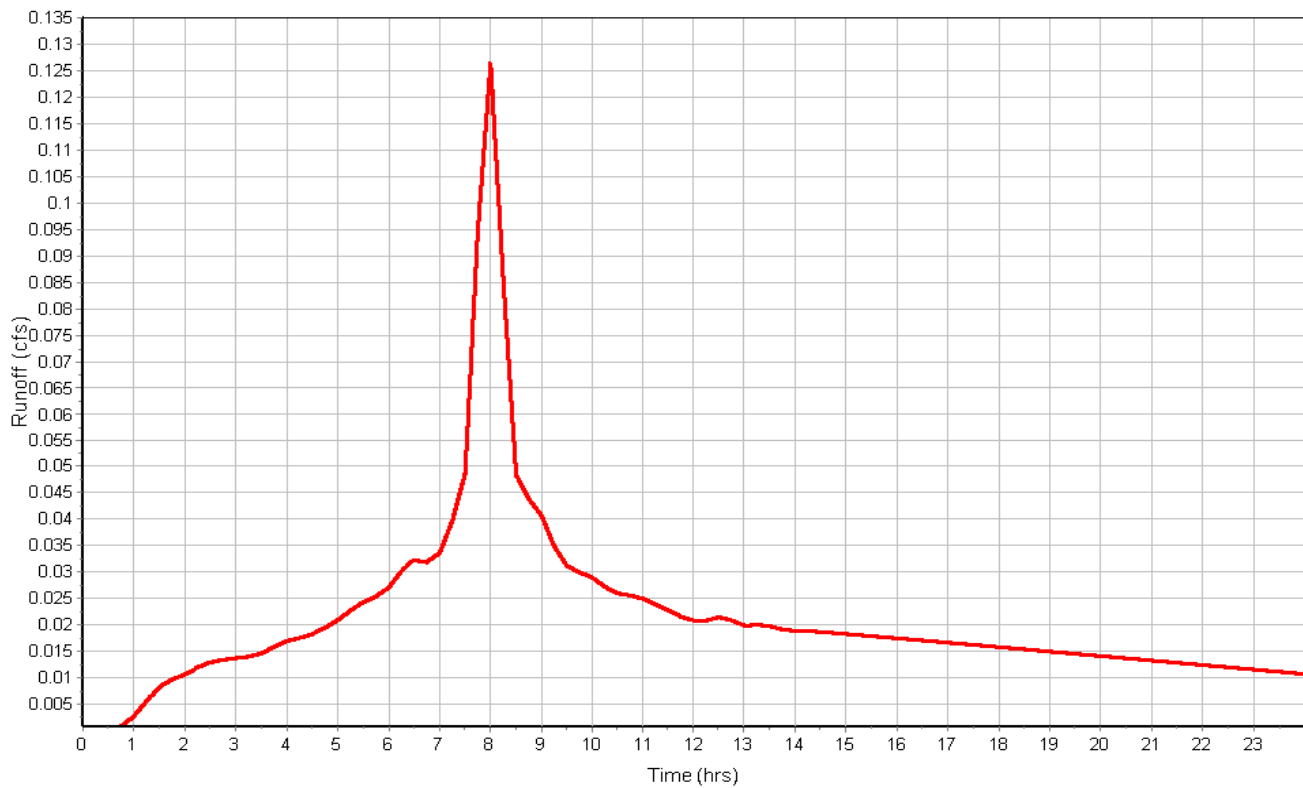
Total Rainfall (in) 4.75
 Total Runoff (in) 4.24
 Peak Runoff (cfs) 0.13
 Weighted Curve Number 95.14
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 110

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 114**Input Data**

Area (ac) 0.13
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

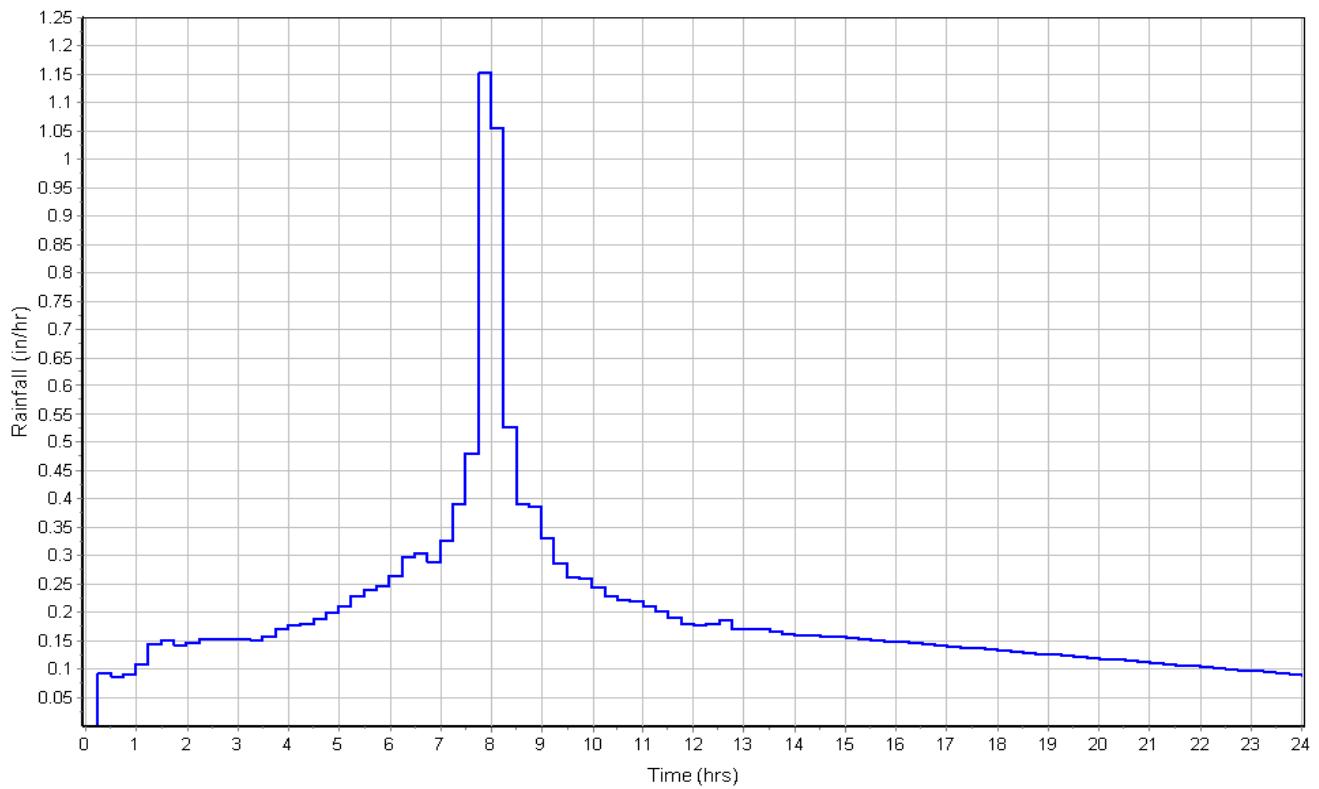
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.13		98

Subbasin Runoff Results

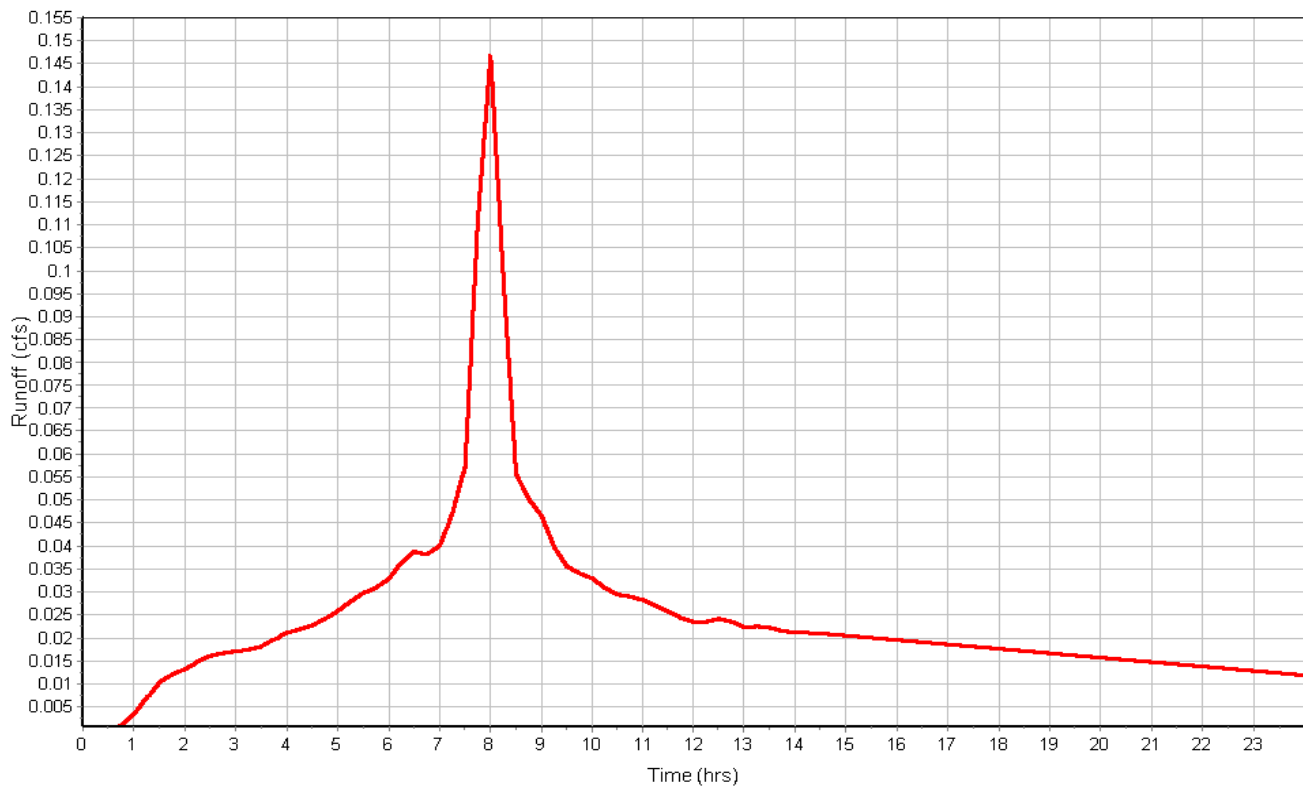
Total Rainfall (in) 4.75
 Total Runoff (in) 4.52
 Peak Runoff (cfs) 0.15
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 114

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 117**Input Data**

Area (ac) 0.73
 Impervious Area (%) 53.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

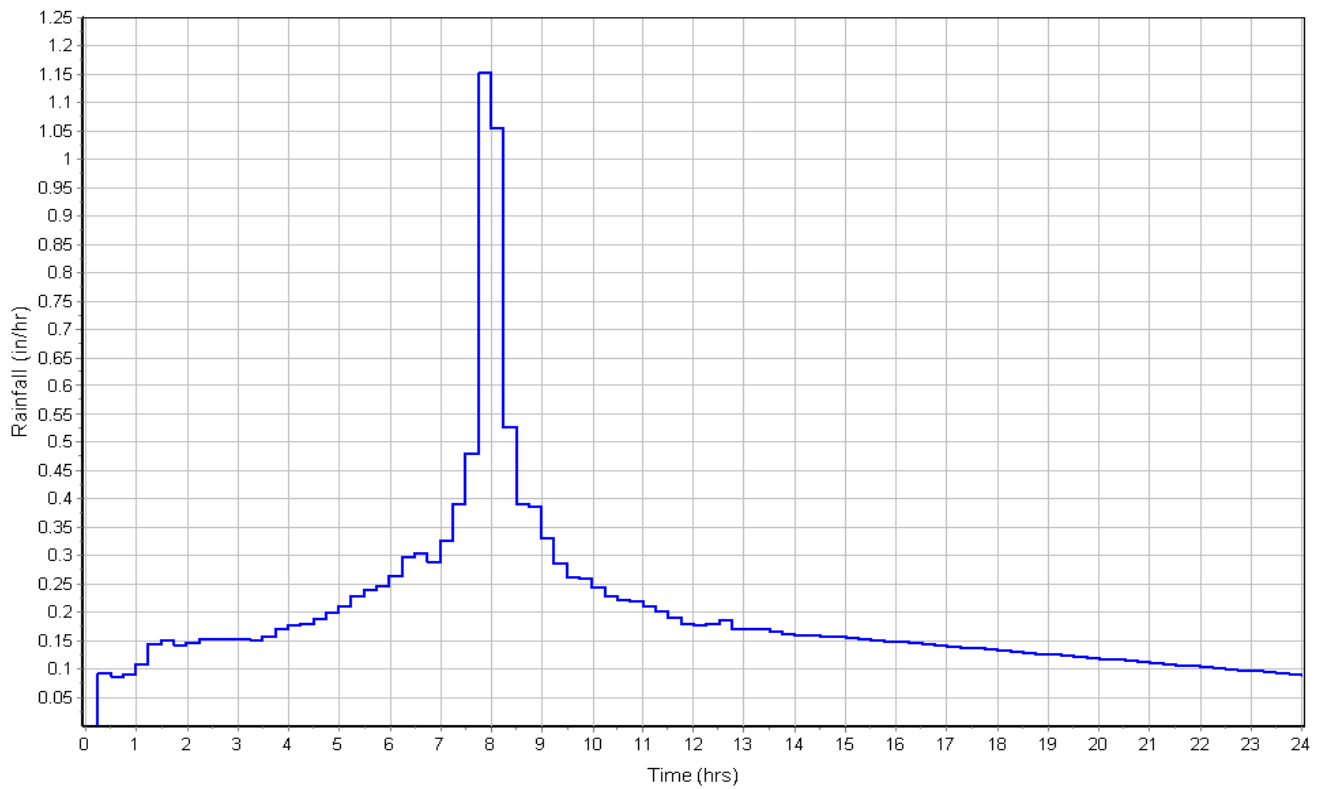
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.73		87.66

Subbasin Runoff Results

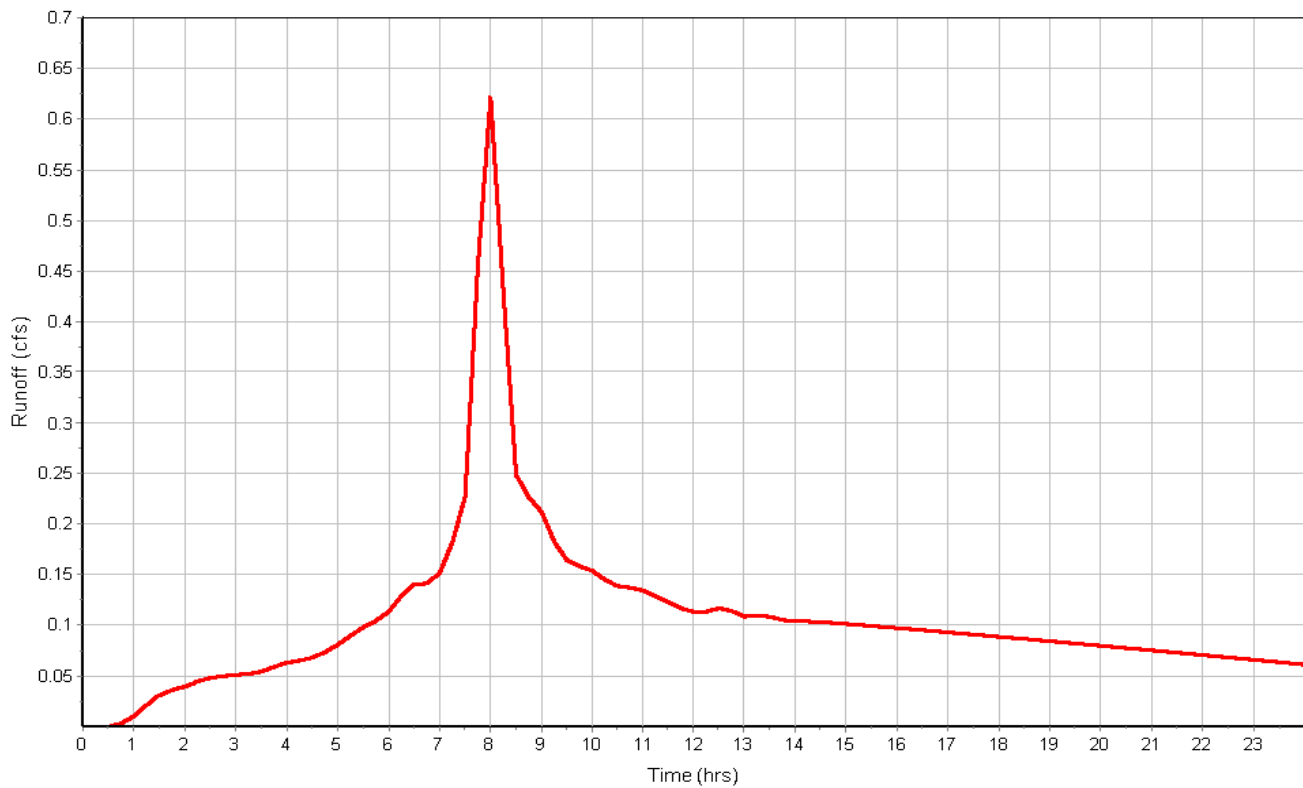
Total Rainfall (in) 4.75
 Total Runoff (in) 3.50
 Peak Runoff (cfs) 0.62
 Weighted Curve Number 87.66
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 117

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 118**Input Data**

Area (ac) 0.18
 Impervious Area (%) 6.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

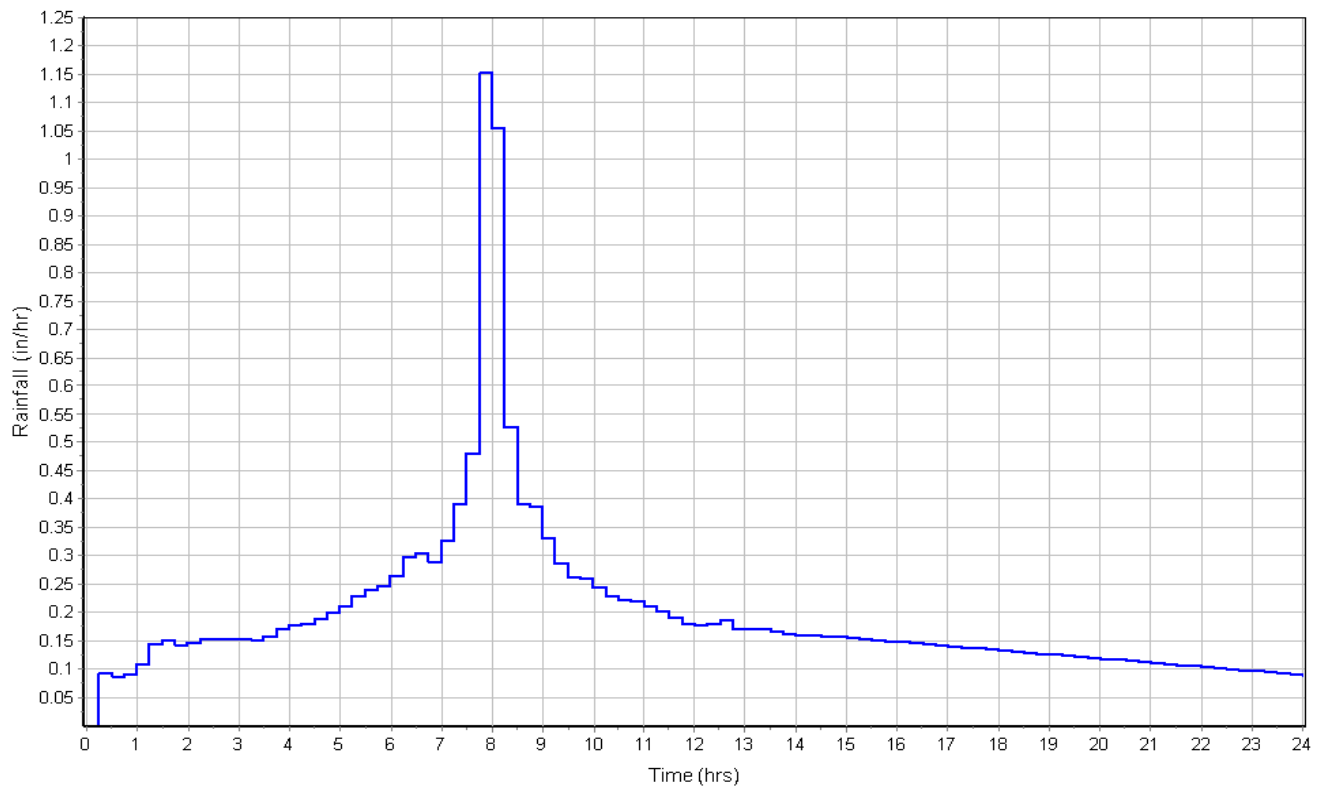
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.18		77.32

Subbasin Runoff Results

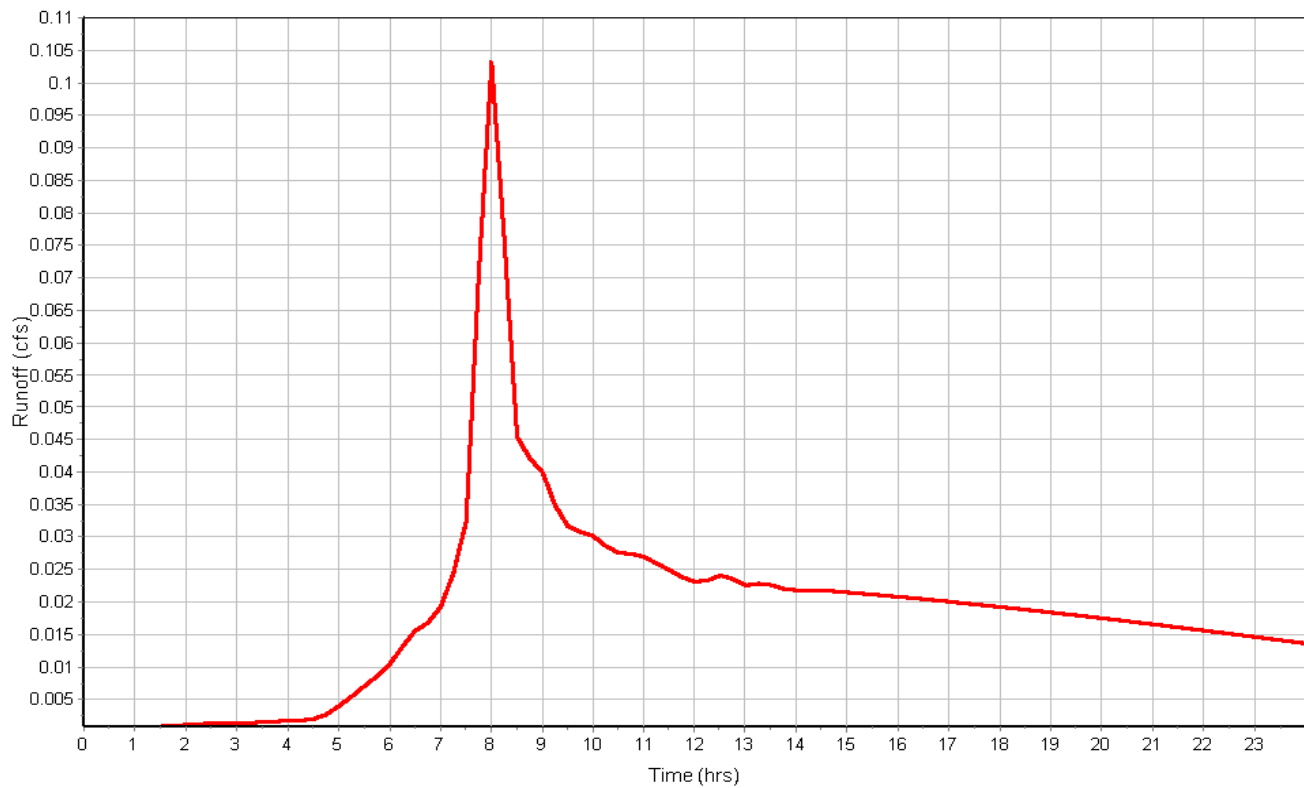
Total Rainfall (in) 4.75
 Total Runoff (in) 2.47
 Peak Runoff (cfs) 0.10
 Weighted Curve Number 77.32
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 118

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 120**Input Data**

Area (ac) 0.54
Impervious Area (%) 86.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

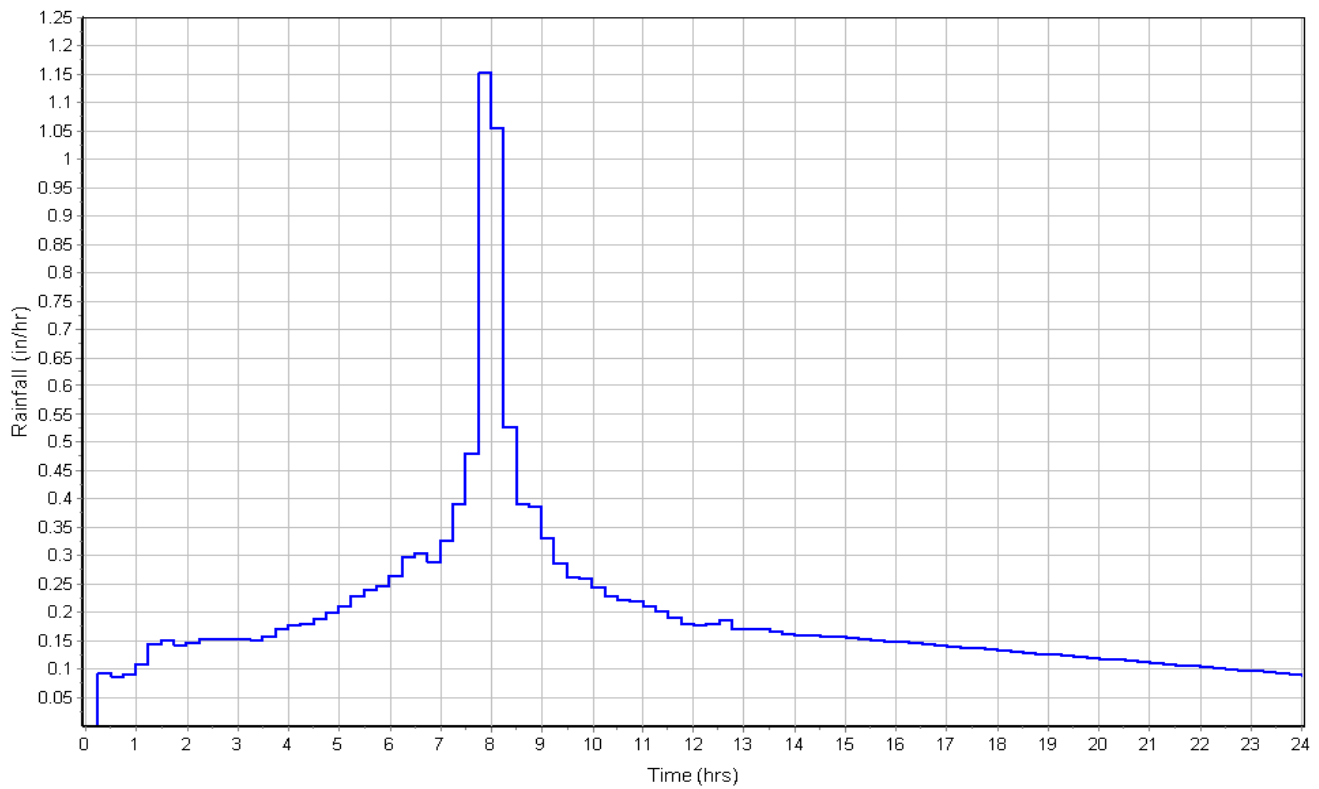
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.54		94.92

Subbasin Runoff Results

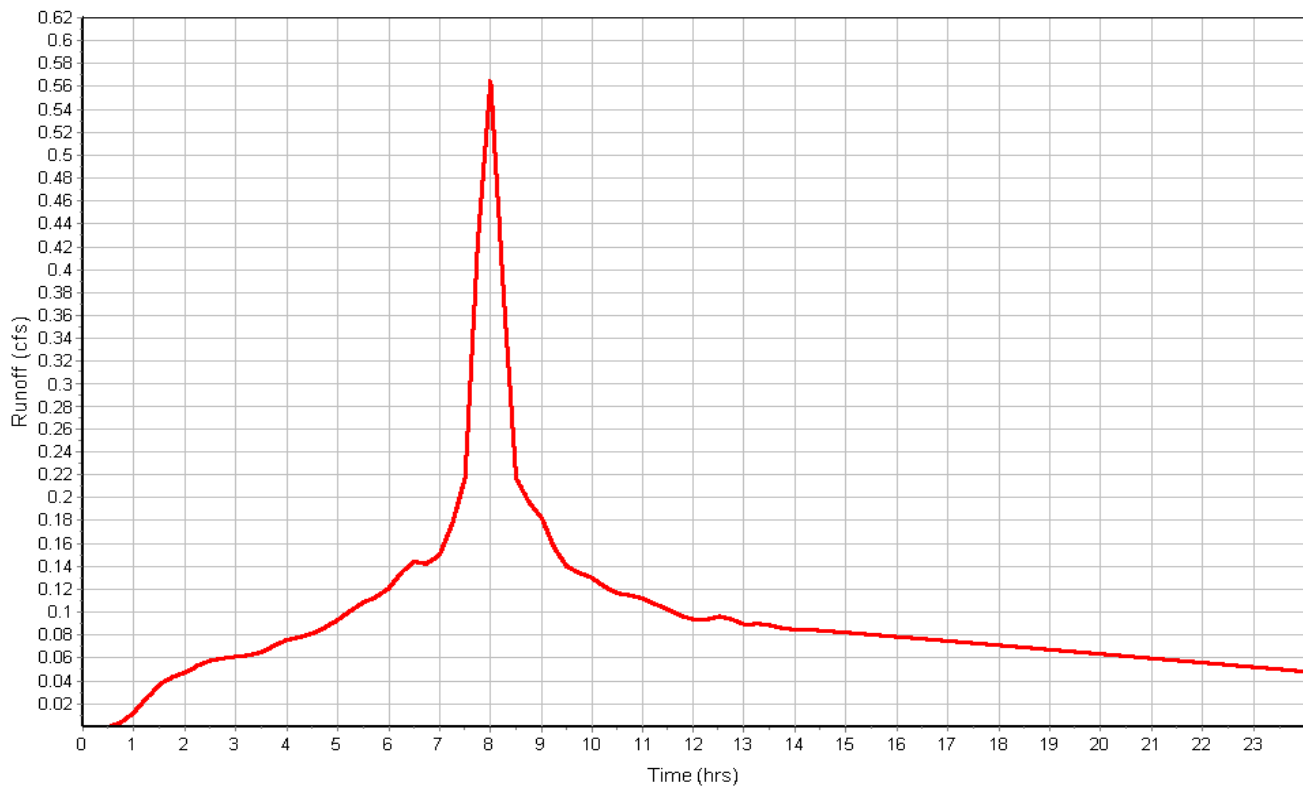
Total Rainfall (in) 4.75
Total Runoff (in) 4.22
Peak Runoff (cfs) 0.57
Weighted Curve Number 94.92
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 120

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 121**Input Data**

Area (ac) 0.34
 Impervious Area (%) 90.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

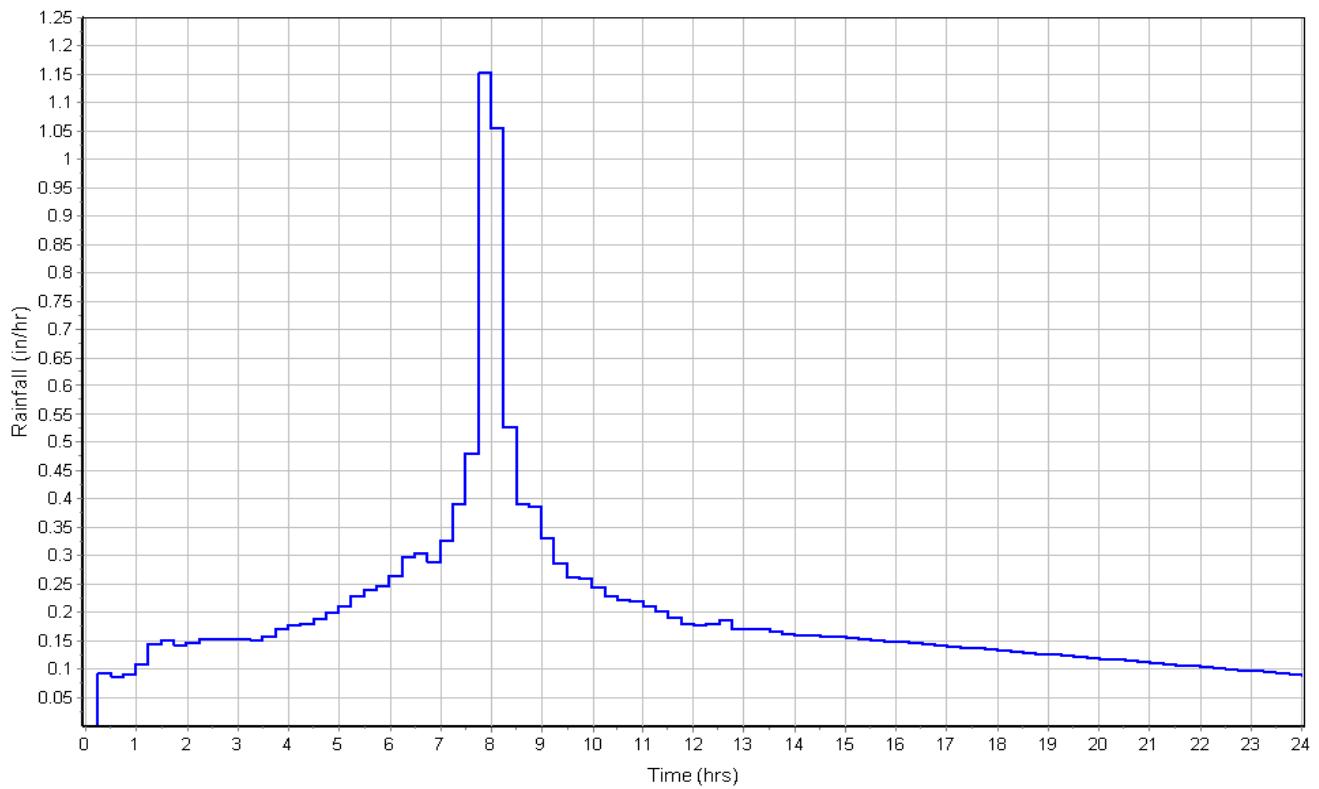
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.34		95.8

Subbasin Runoff Results

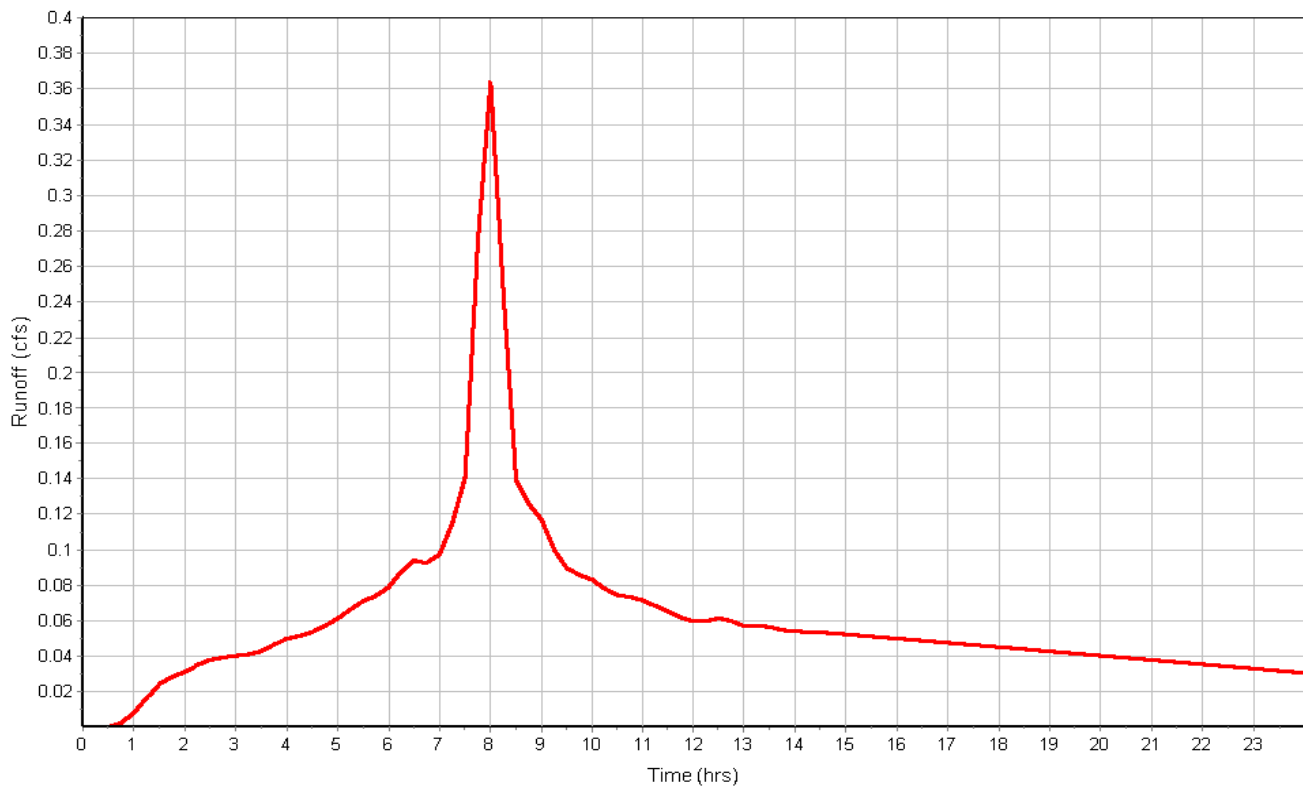
Total Rainfall (in) 4.75
 Total Runoff (in) 4.30
 Peak Runoff (cfs) 0.36
 Weighted Curve Number 95.80
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 121

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 122**Input Data**

Area (ac) 0.28
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

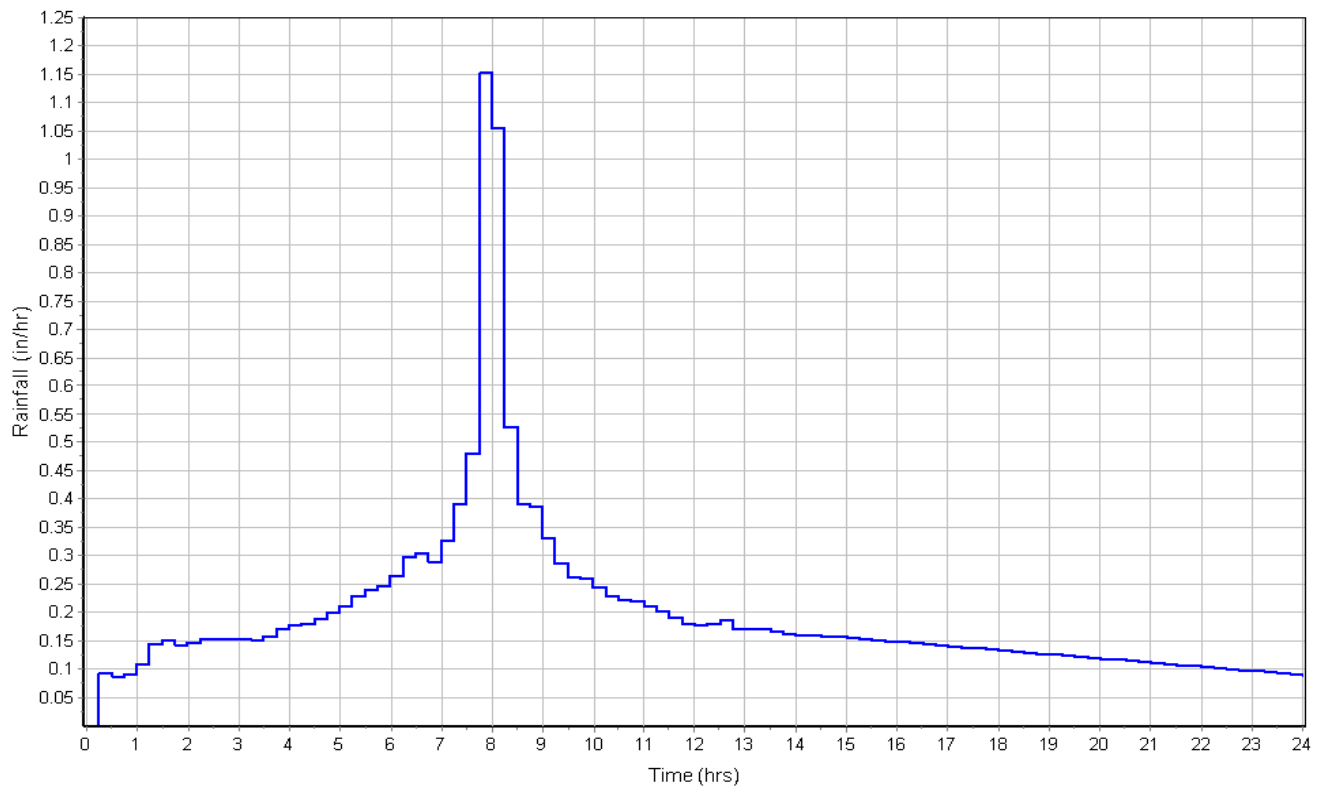
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.28		98

Subbasin Runoff Results

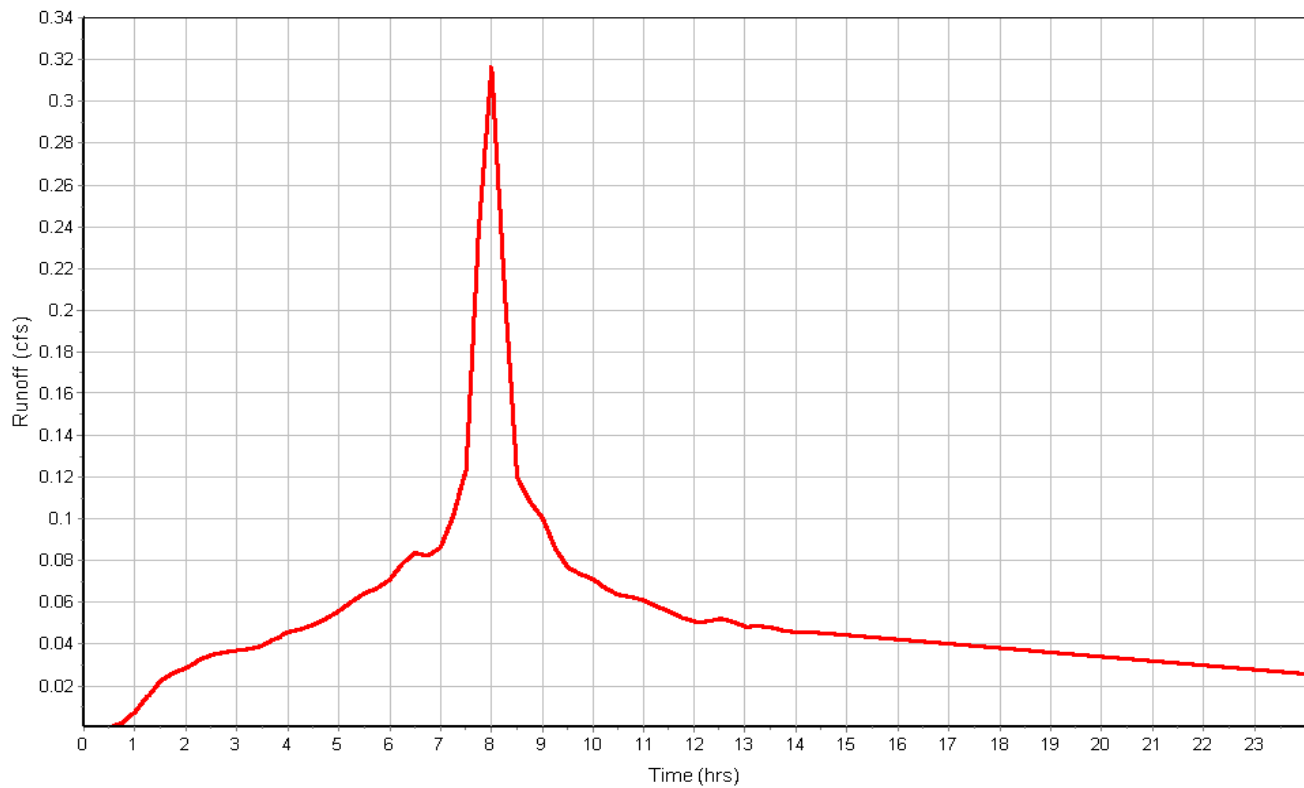
Total Rainfall (in) 4.75
 Total Runoff (in) 4.52
 Peak Runoff (cfs) 0.32
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 122

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 123**Input Data**

Area (ac) 0.08
Impervious Area (%) 40.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

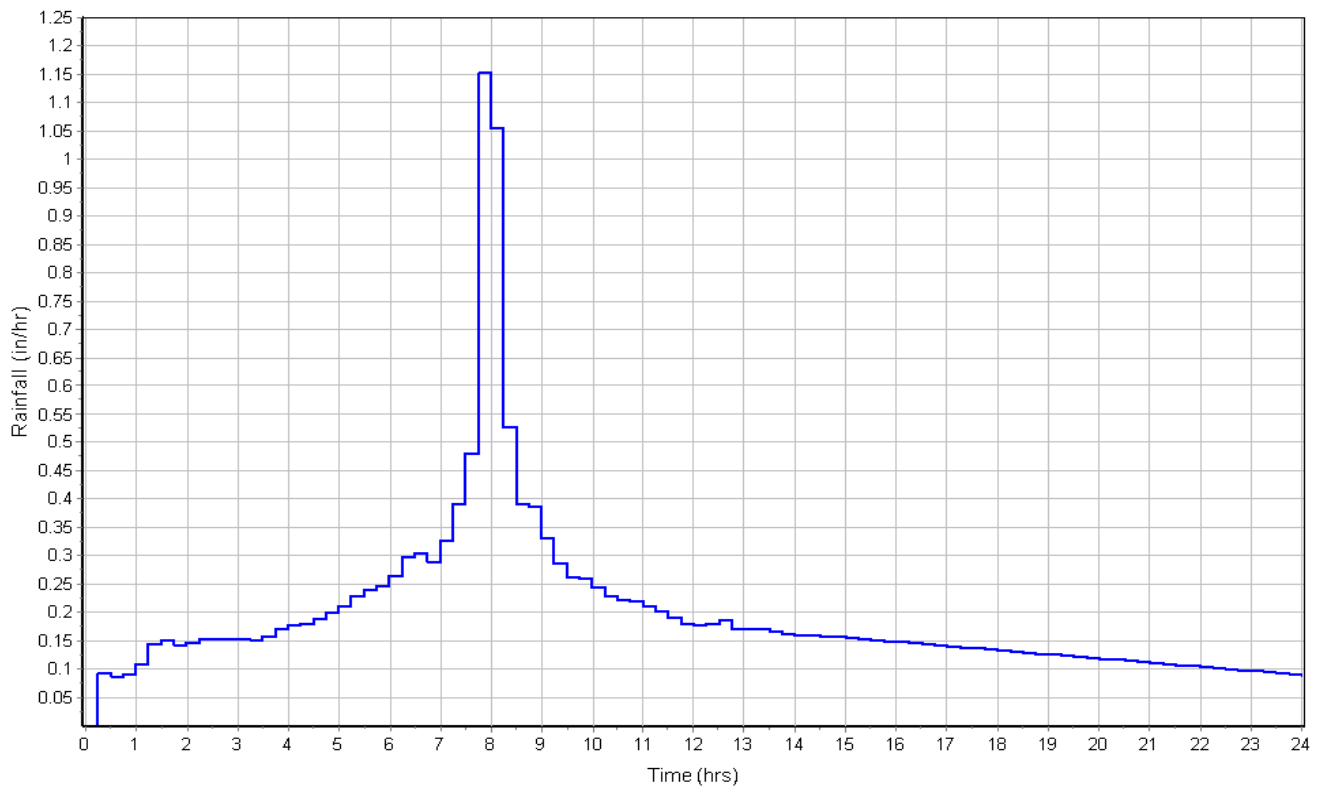
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.08		84.8

Subbasin Runoff Results

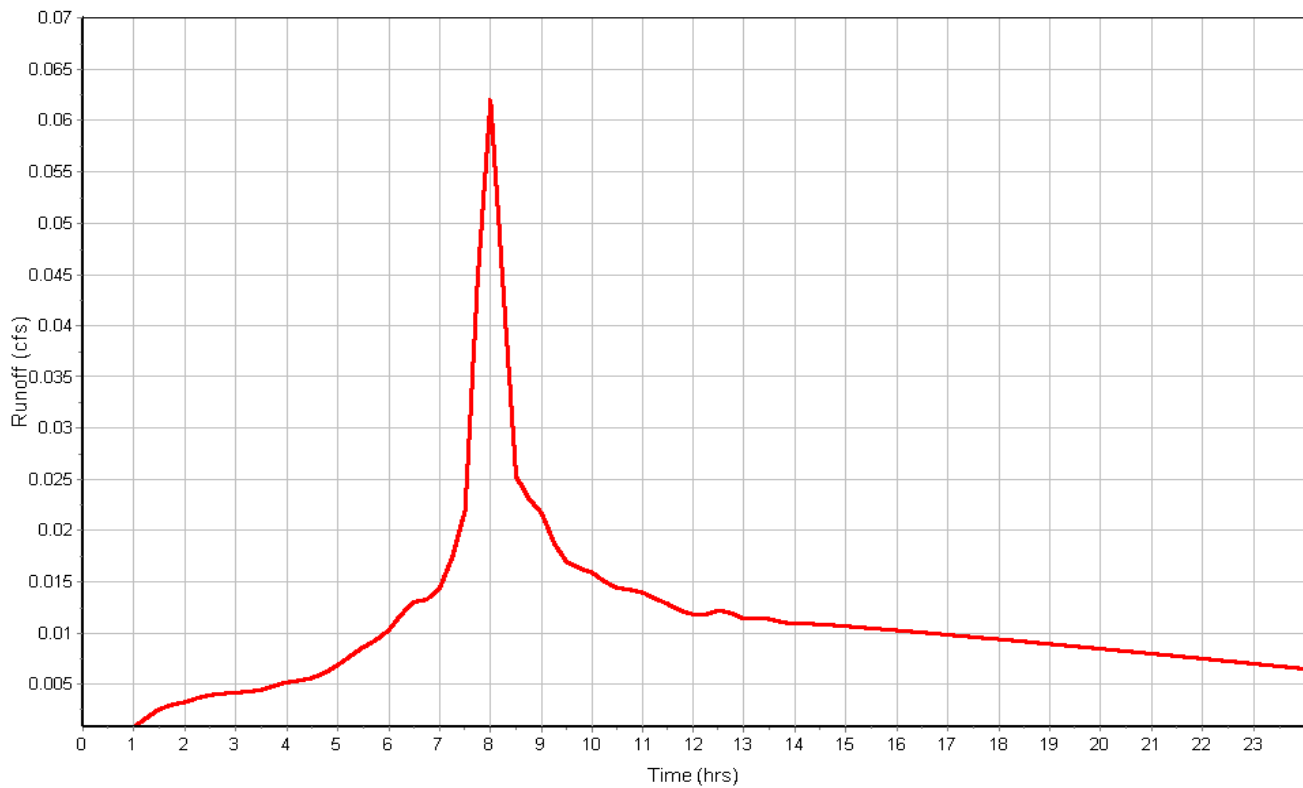
Total Rainfall (in) 4.75
Total Runoff (in) 3.21
Peak Runoff (cfs) 0.06
Weighted Curve Number 84.80
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 123

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 127**Input Data**

Area (ac) 0.18
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

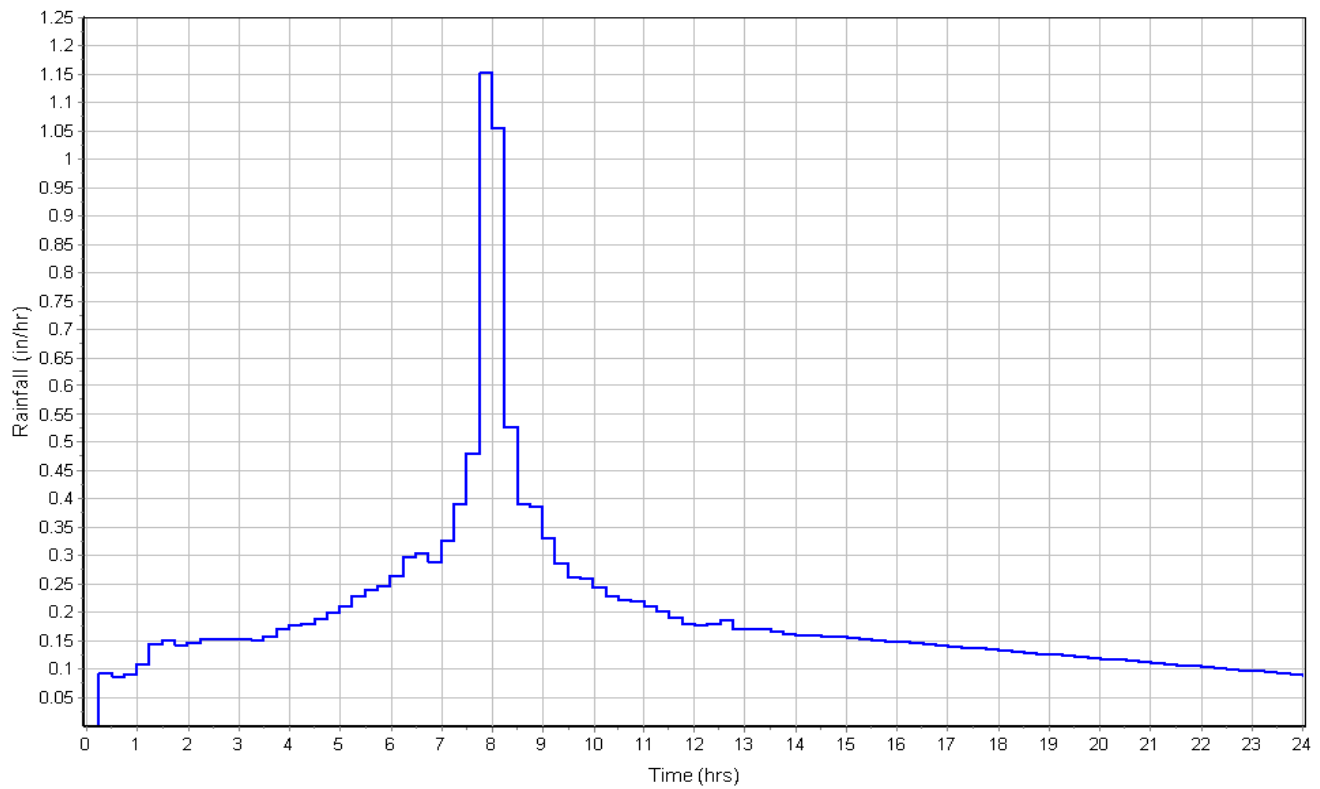
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.18		98

Subbasin Runoff Results

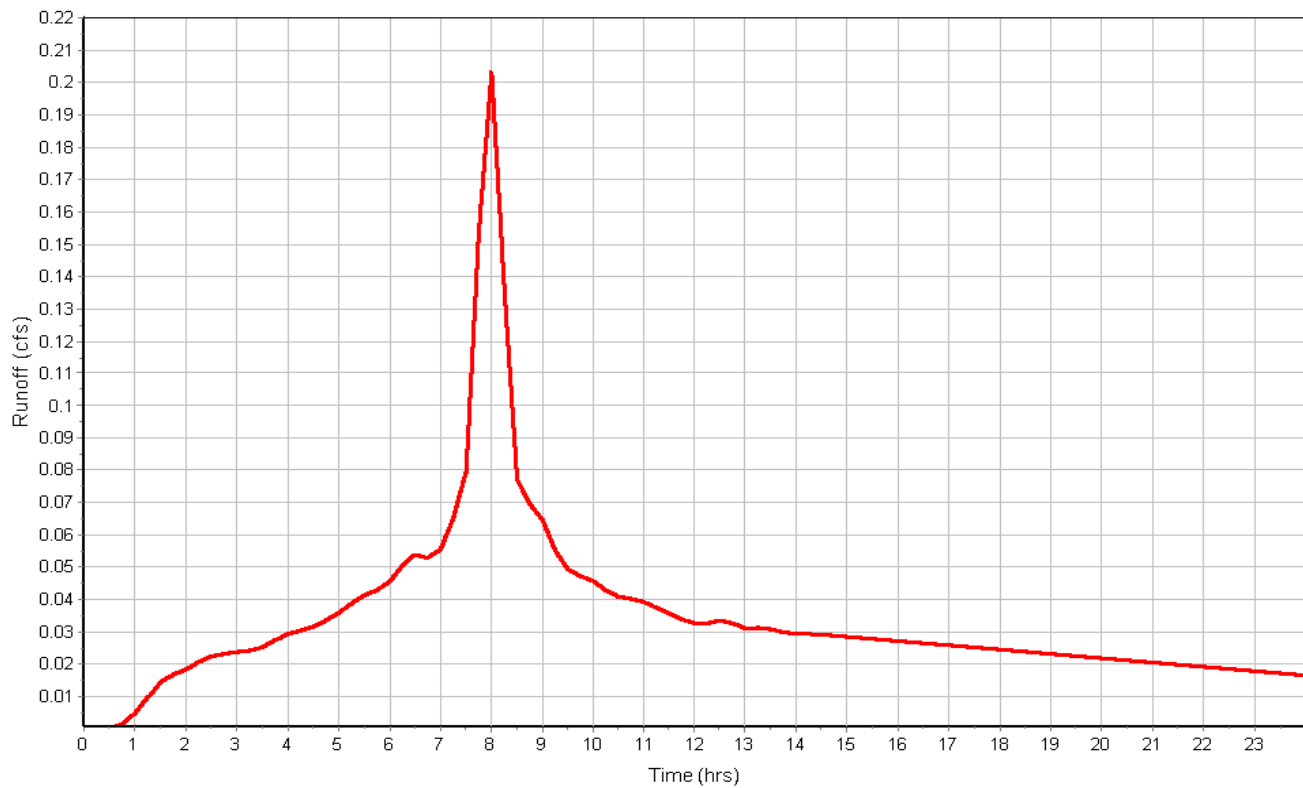
Total Rainfall (in) 4.75
 Total Runoff (in) 4.52
 Peak Runoff (cfs) 0.20
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 127

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 128**Input Data**

Area (ac) 0.23
 Impervious Area (%) 99.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

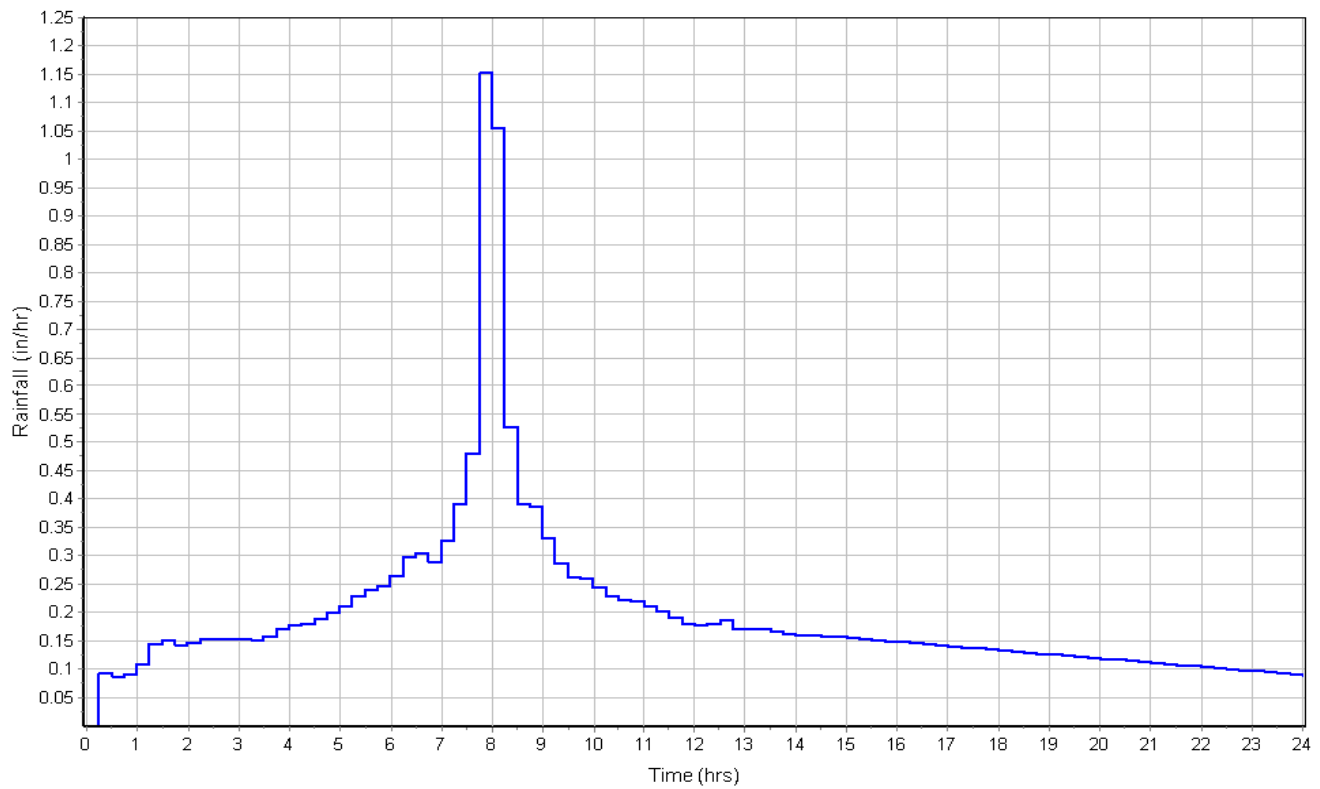
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.23		97.78

Subbasin Runoff Results

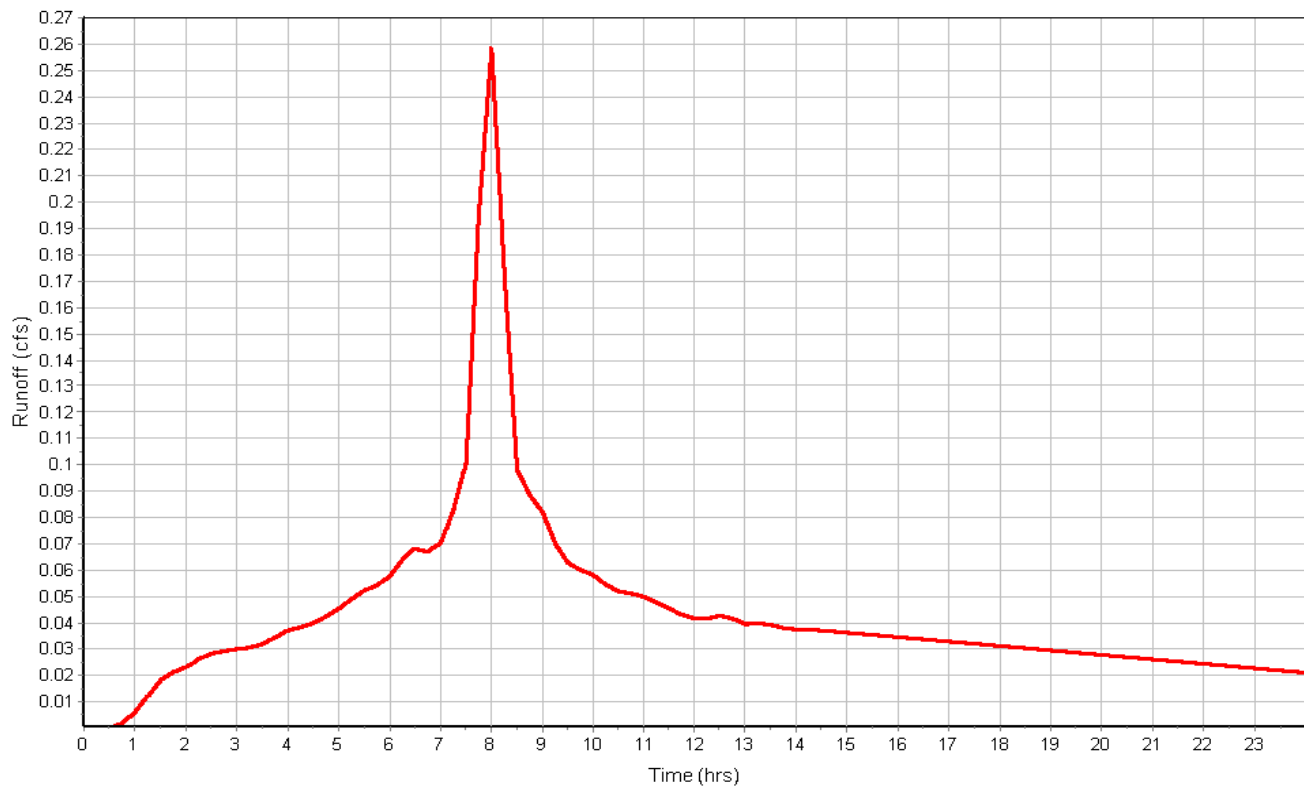
Total Rainfall (in) 4.75
 Total Runoff (in) 4.50
 Peak Runoff (cfs) 0.26
 Weighted Curve Number 97.78
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 128

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 129**Input Data**

Area (ac) 0.22
Impervious Area (%) 74.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

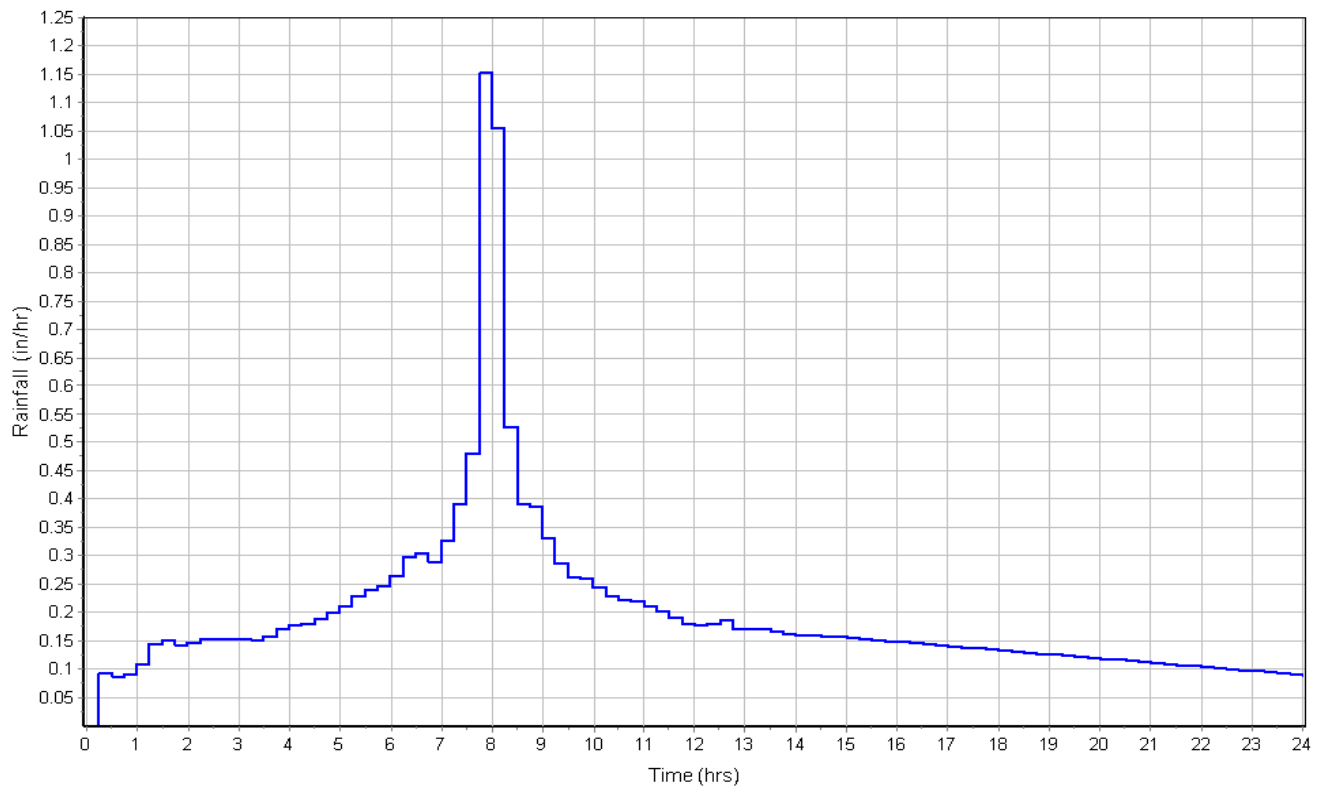
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.22		92.28

Subbasin Runoff Results

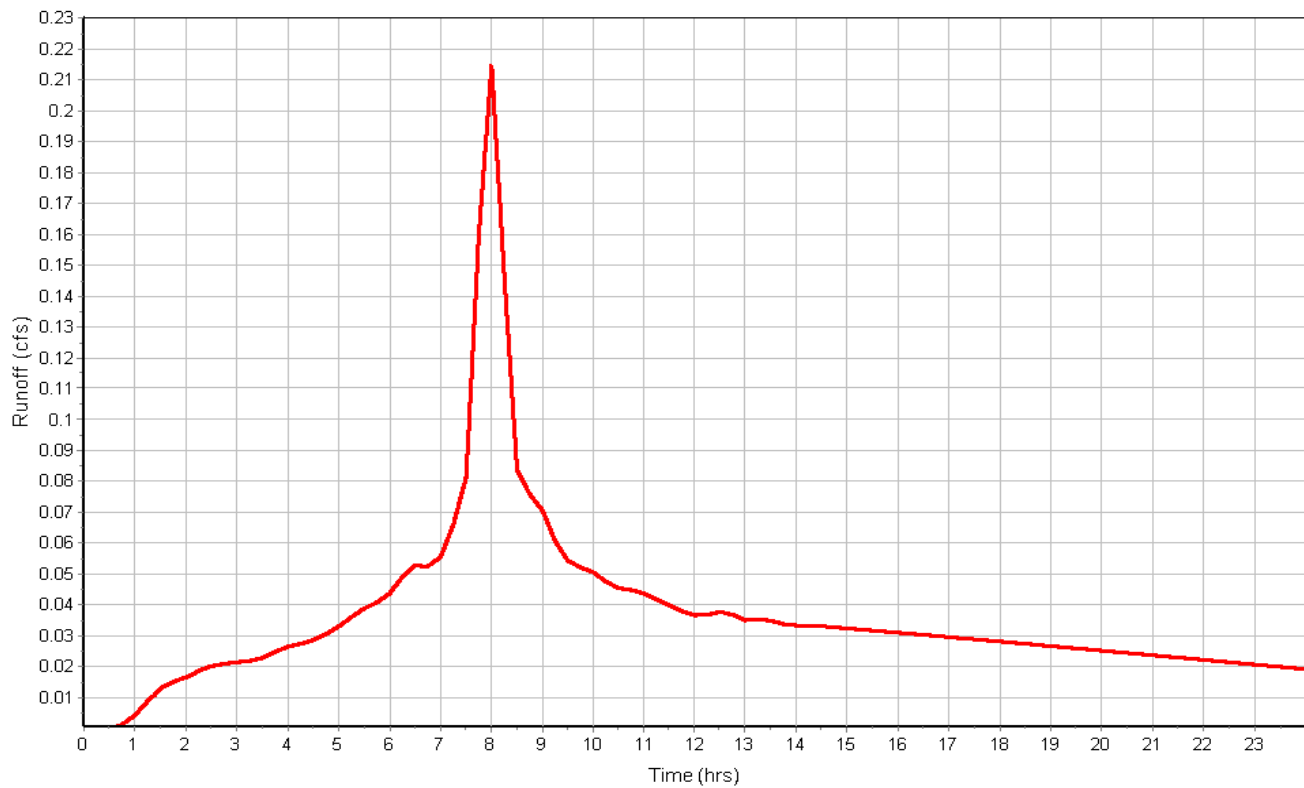
Total Rainfall (in) 4.75
Total Runoff (in) 3.95
Peak Runoff (cfs) 0.22
Weighted Curve Number 92.28
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 129

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 133**Input Data**

Area (ac) 0.12
 Impervious Area (%) 94.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

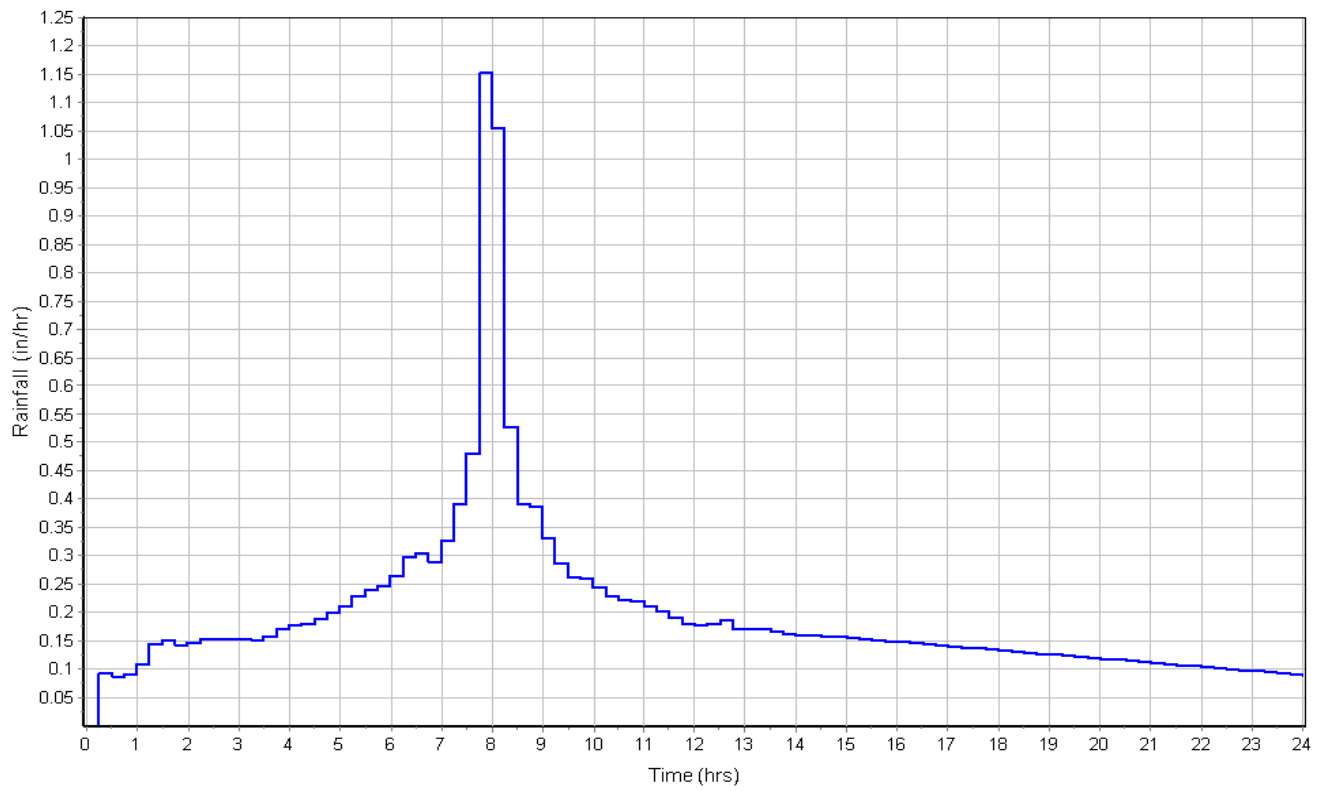
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.12		96.68

Subbasin Runoff Results

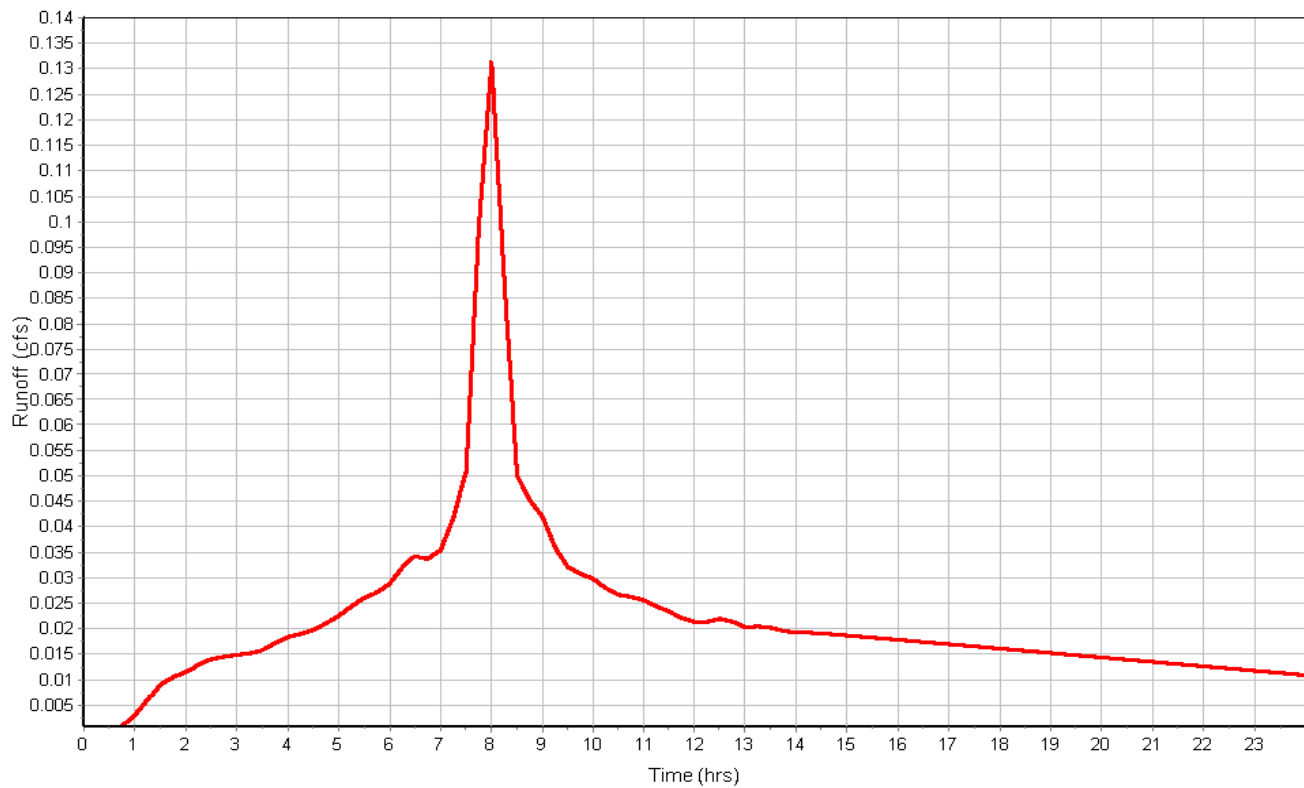
Total Rainfall (in) 4.75
 Total Runoff (in) 4.39
 Peak Runoff (cfs) 0.13
 Weighted Curve Number 96.68
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 133

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : 135**Input Data**

Area (ac) 0.73
Impervious Area (%) 0.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

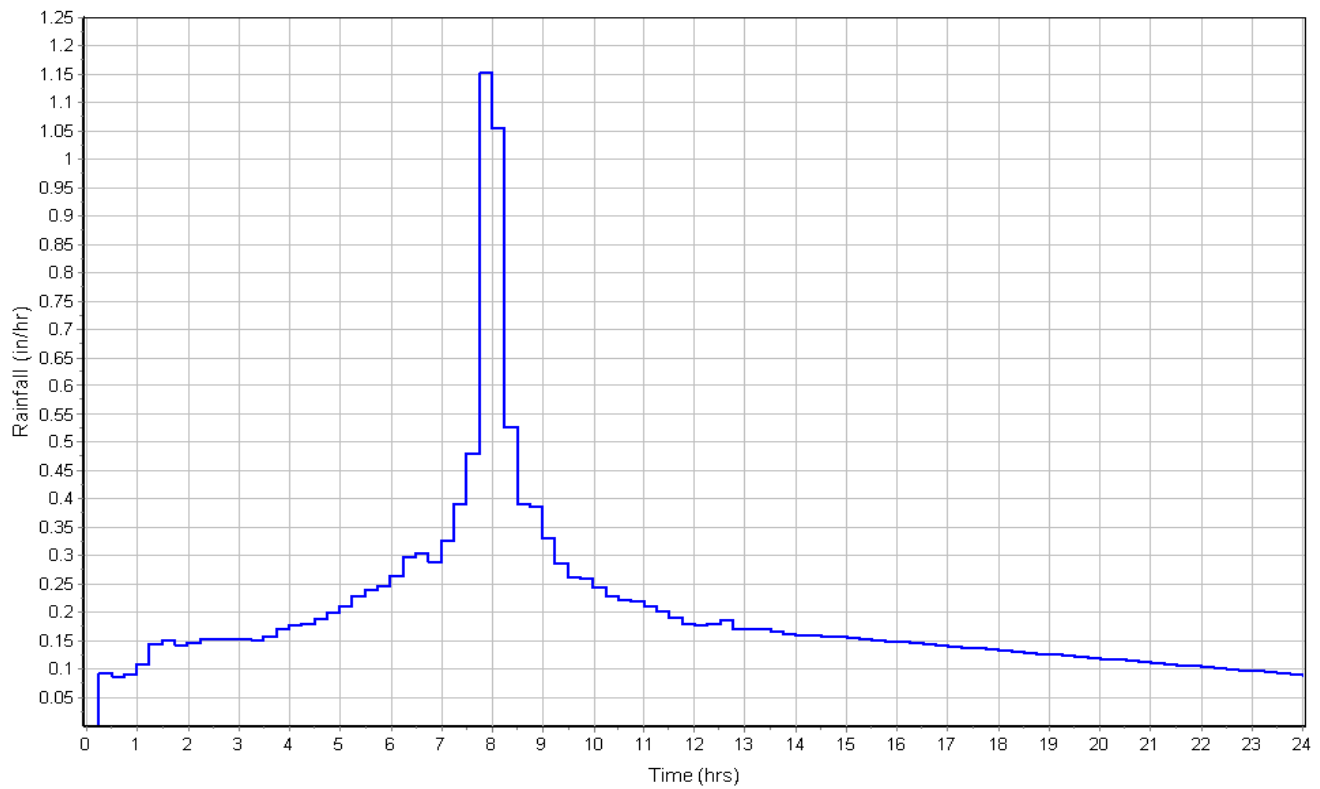
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.73		76

Subbasin Runoff Results

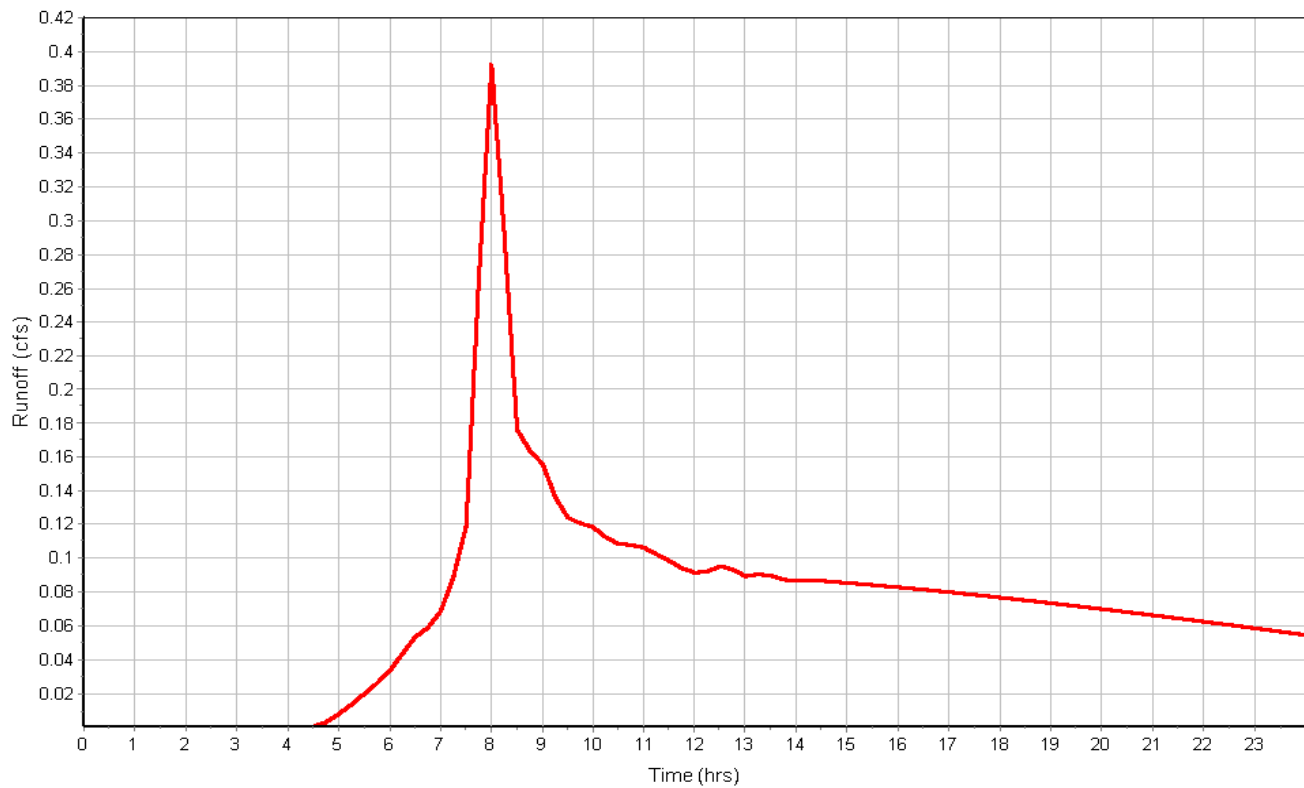
Total Rainfall (in) 4.75
Total Runoff (in) 2.34
Peak Runoff (cfs) 0.39
Weighted Curve Number 76.00
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : 135

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : AD_01**Input Data**

Area (ac) 0.02
Impervious Area (%) 33.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

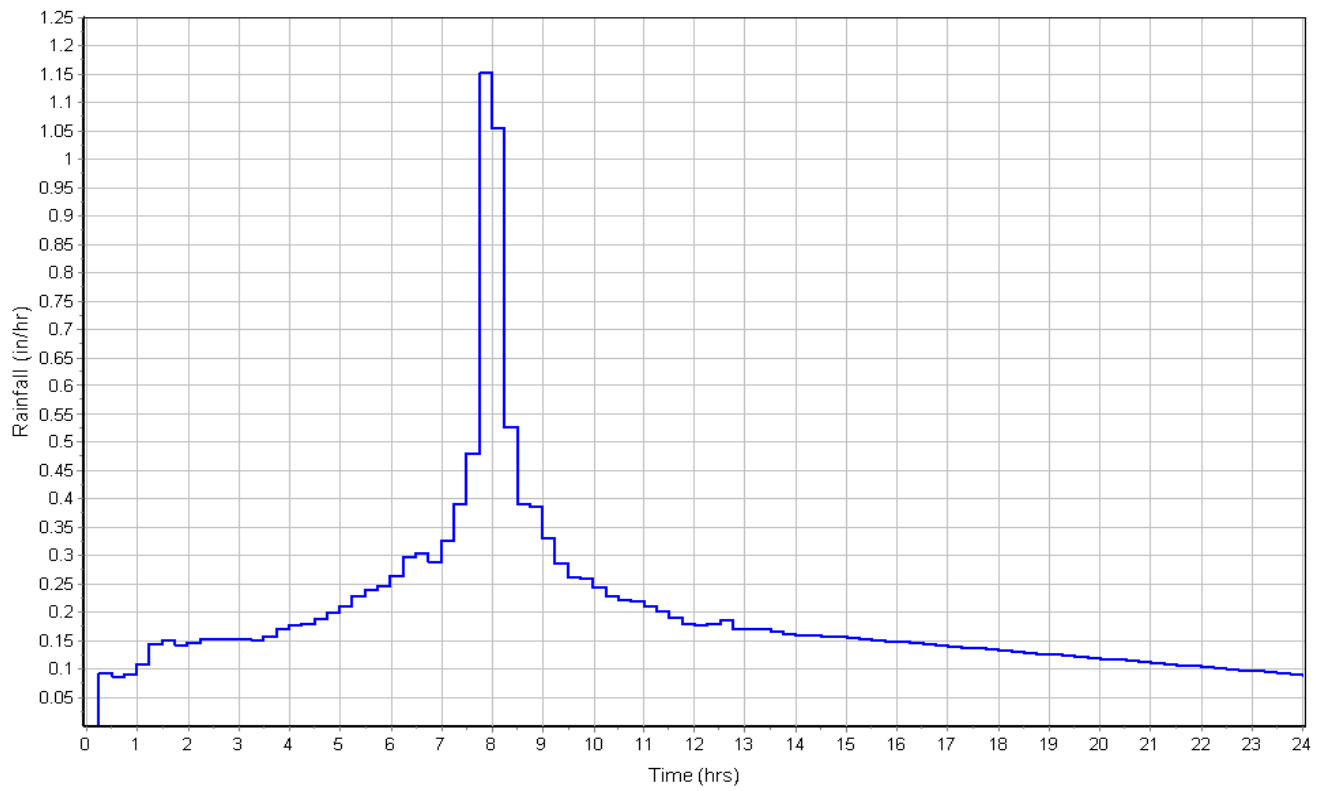
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.02		83.26

Subbasin Runoff Results

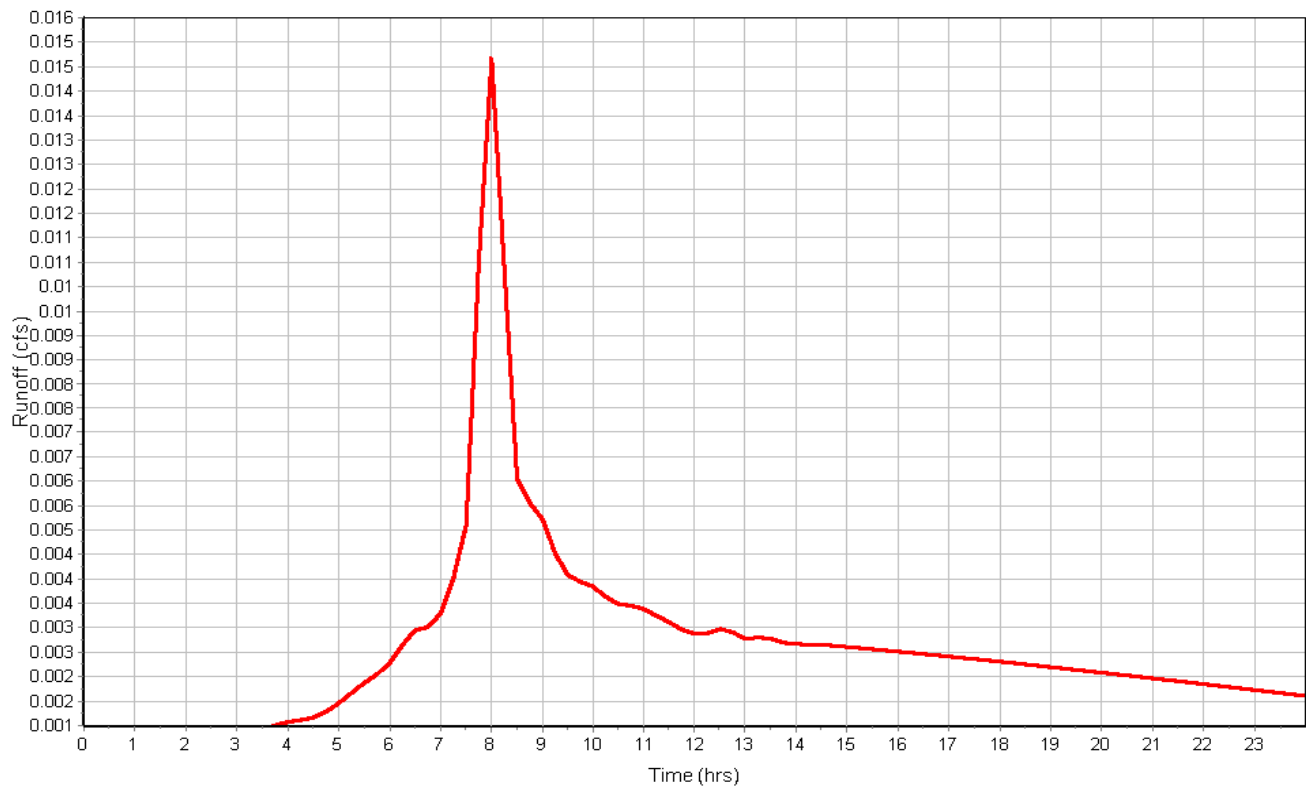
Total Rainfall (in) 4.75
Total Runoff (in) 3.06
Peak Runoff (cfs) 0.02
Weighted Curve Number 83.26
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : AD_01

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : AD_02**Input Data**

Area (ac) 0.06
Impervious Area (%) 0.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

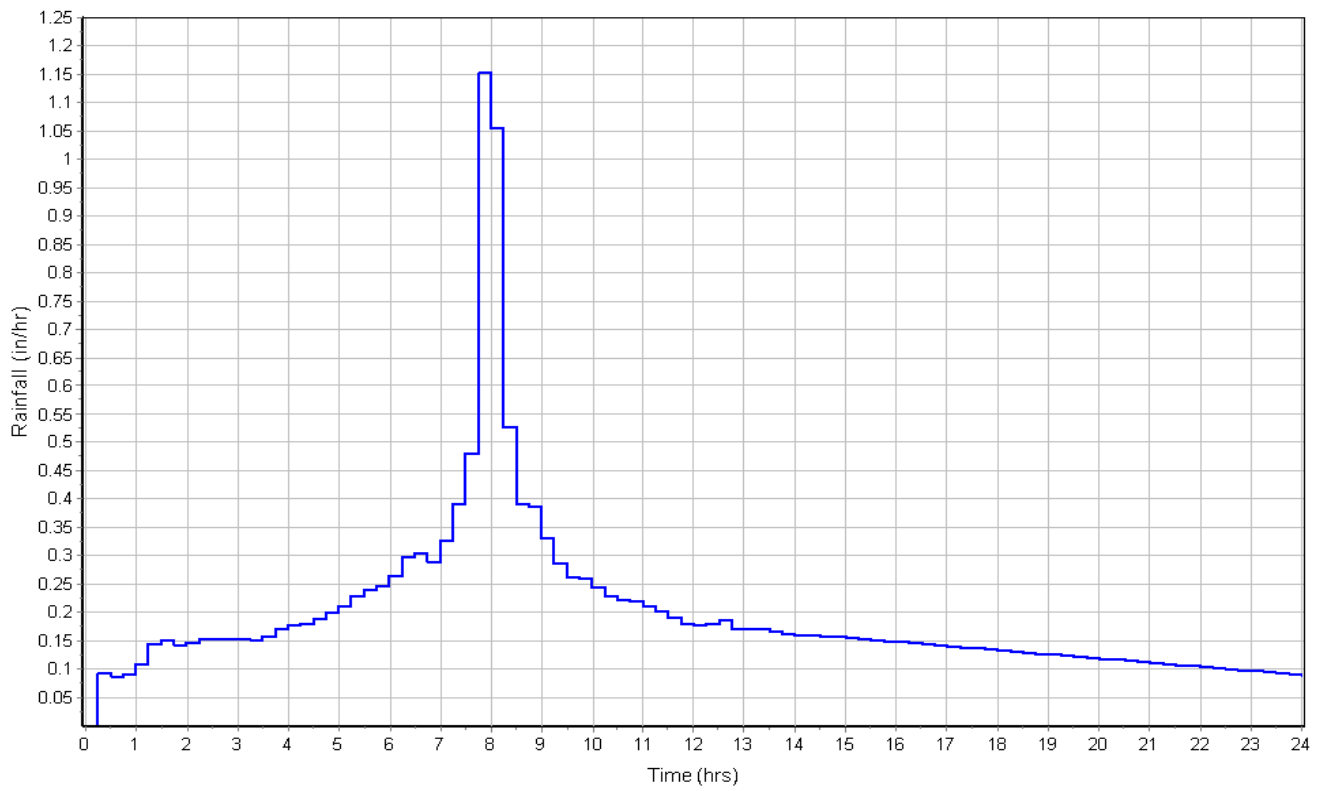
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.06		76

Subbasin Runoff Results

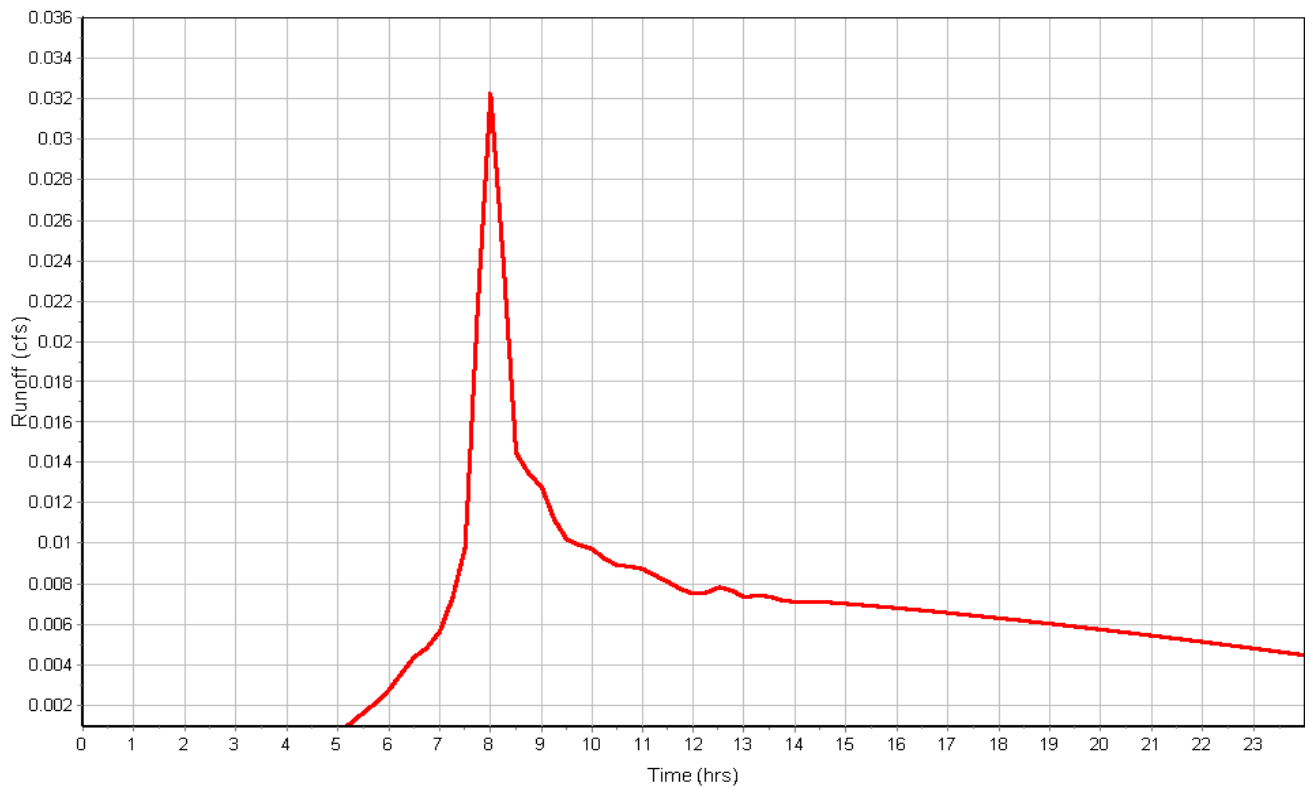
Total Rainfall (in) 4.75
Total Runoff (in) 2.34
Peak Runoff (cfs) 0.03
Weighted Curve Number 76.00
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : AD_02

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : AD_03**Input Data**

Area (ac) 0.13
Impervious Area (%) 4.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

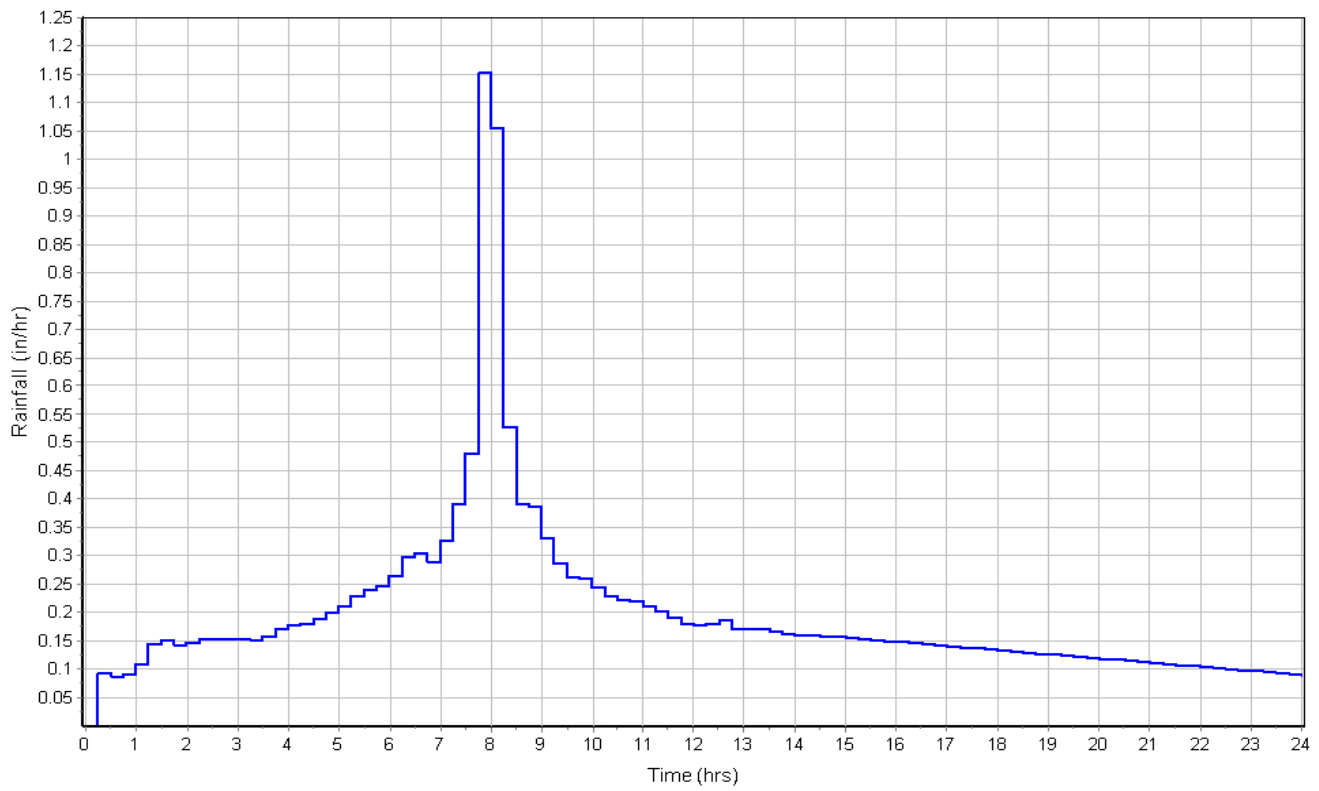
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.13		76.88

Subbasin Runoff Results

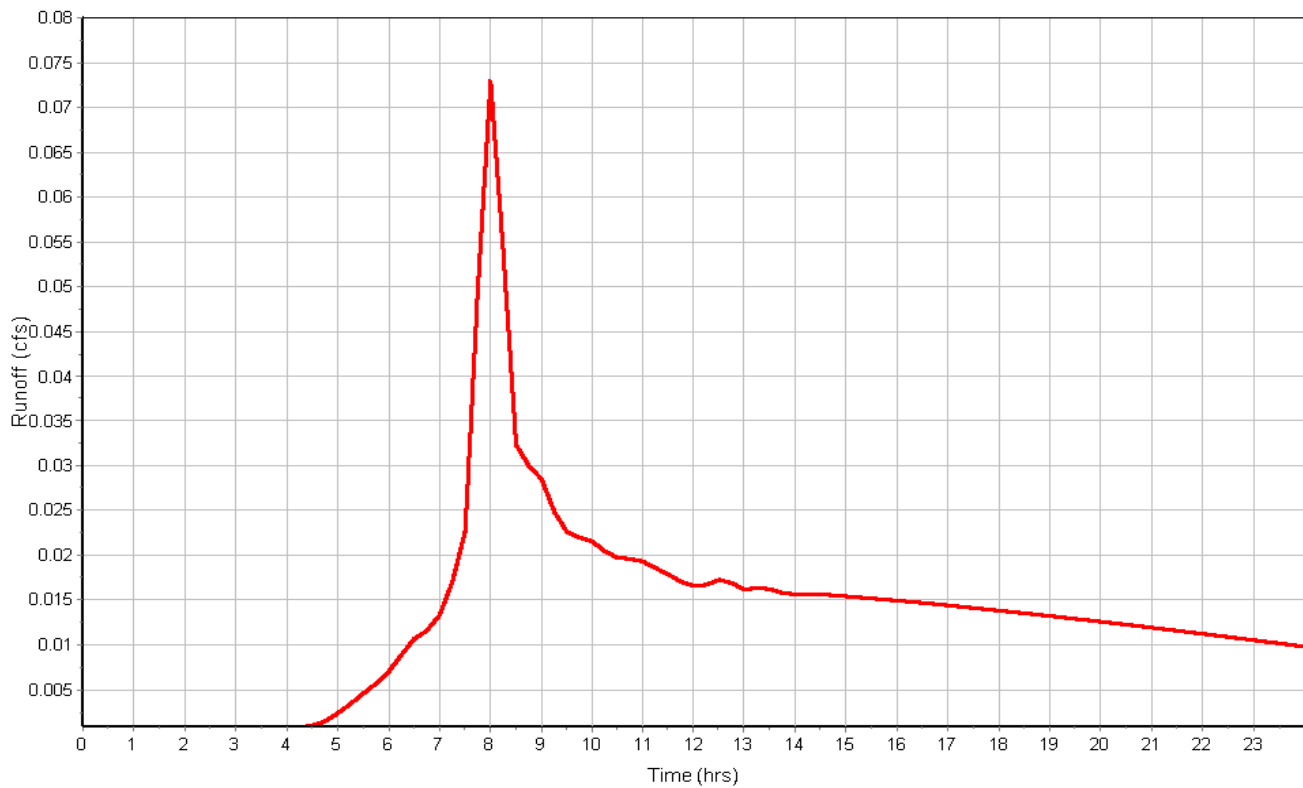
Total Rainfall (in) 4.75
Total Runoff (in) 2.43
Peak Runoff (cfs) 0.07
Weighted Curve Number 76.88
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : AD_03

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : AD_04**Input Data**

Area (ac) 0.10
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

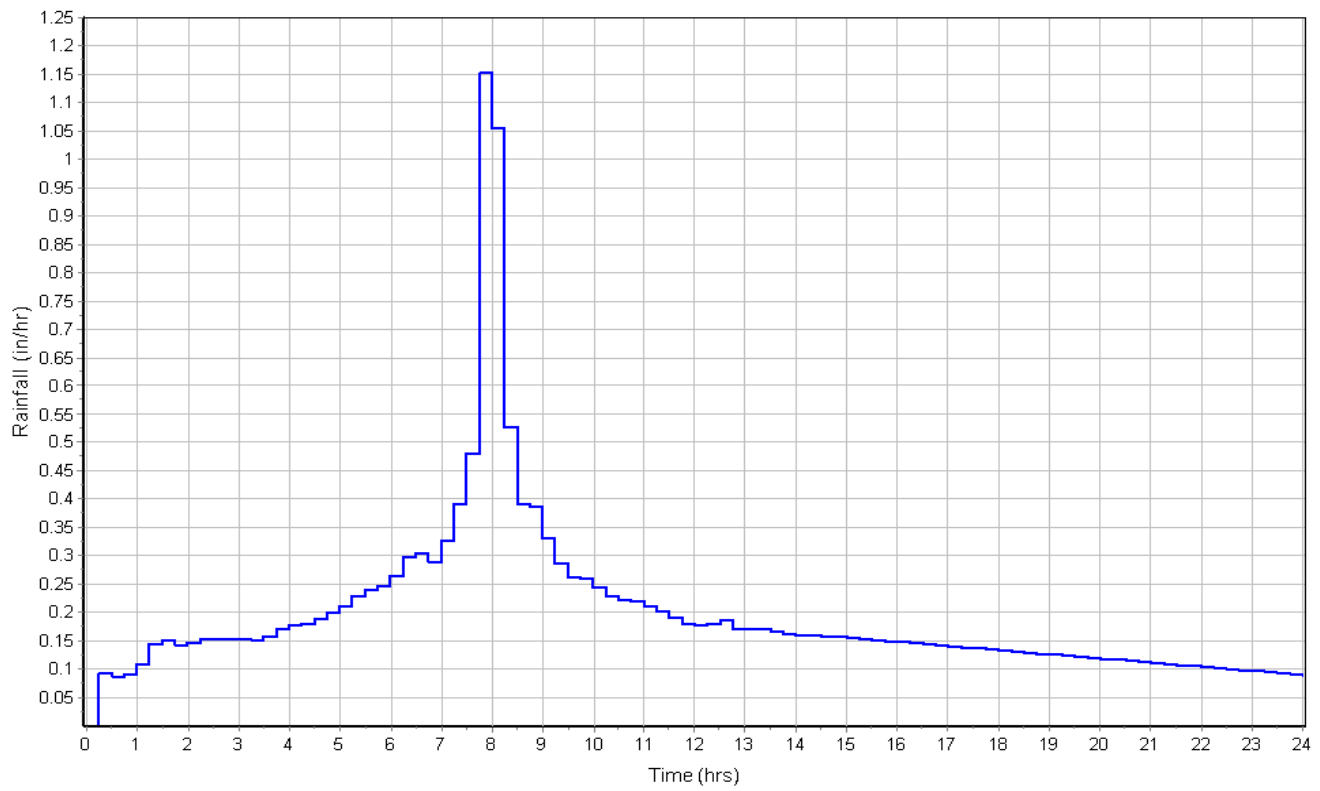
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.10		98

Subbasin Runoff Results

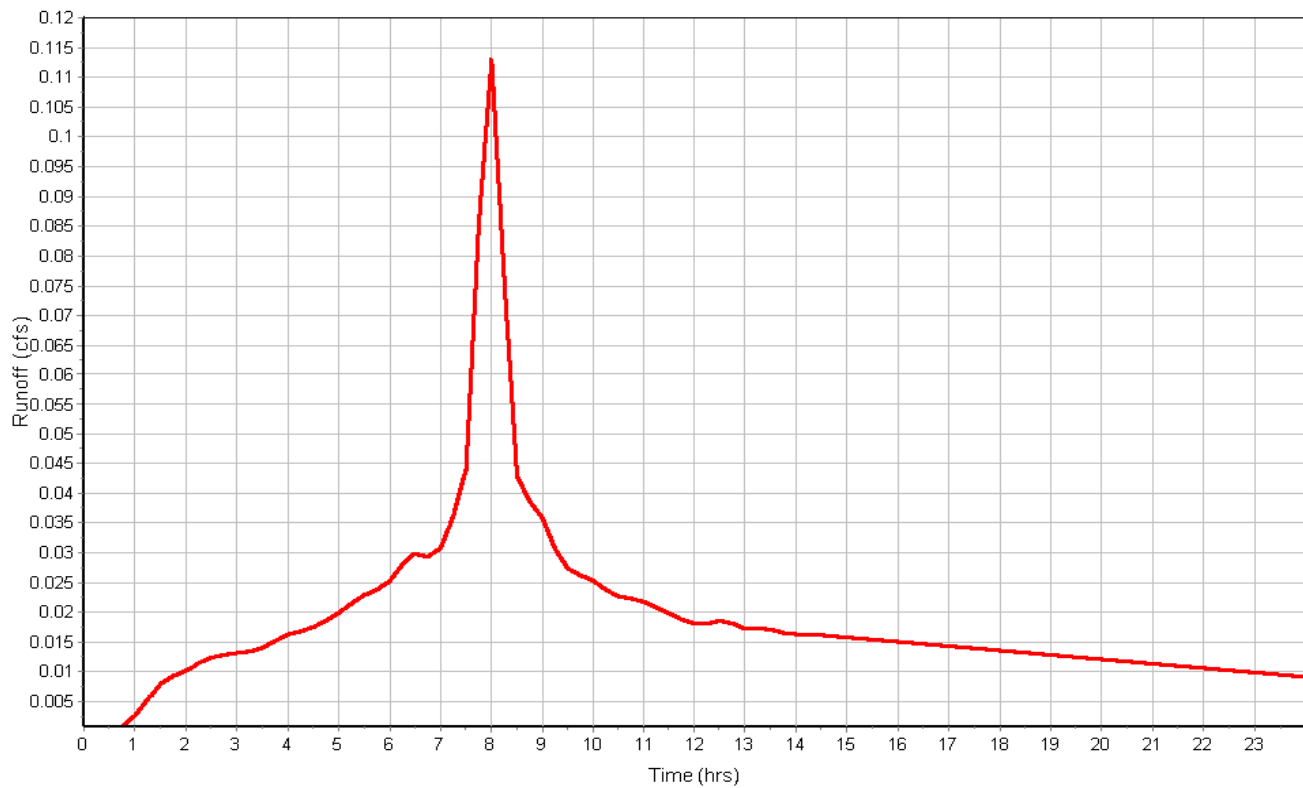
Total Rainfall (in) 4.75
 Total Runoff (in) 4.52
 Peak Runoff (cfs) 0.11
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : AD_04

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : AD_05**Input Data**

Area (ac) 0.11
 Impervious Area (%) 83.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

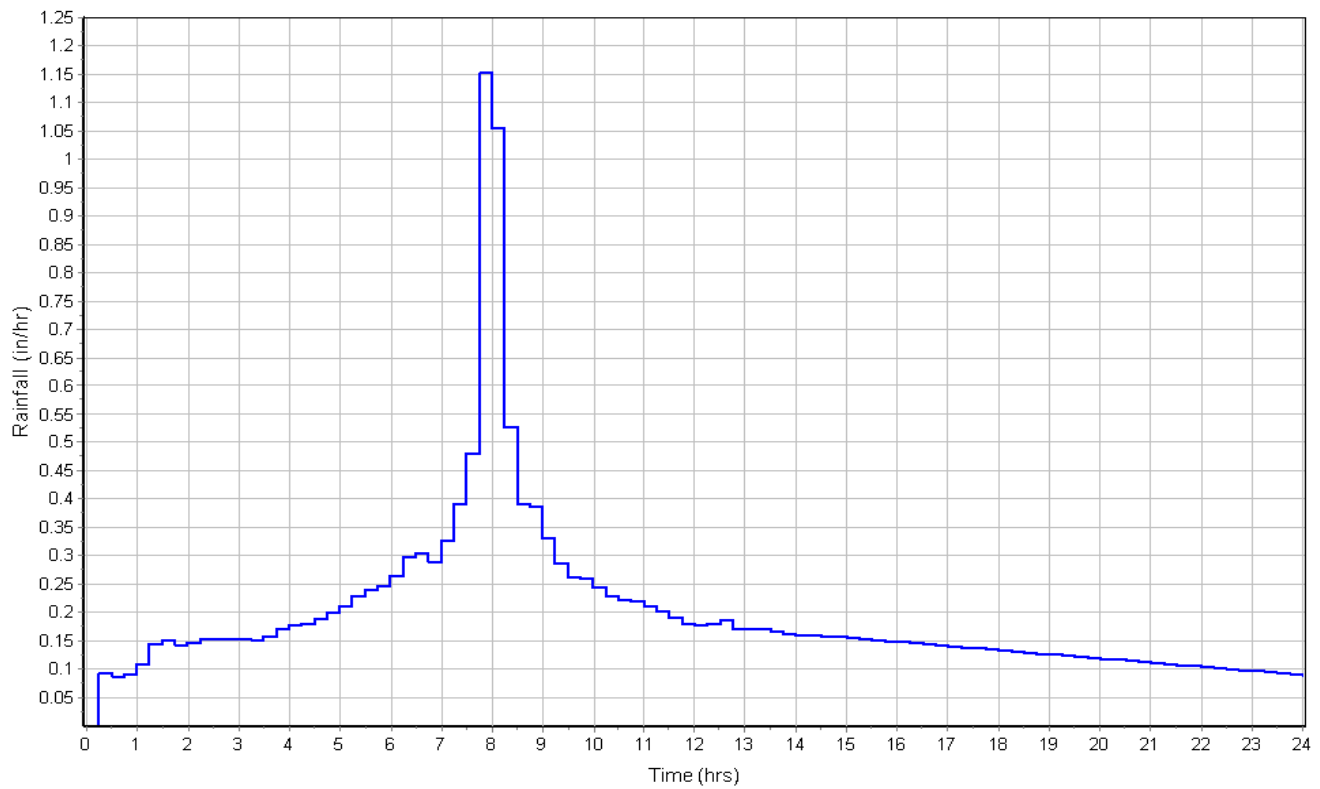
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.11		94.26

Subbasin Runoff Results

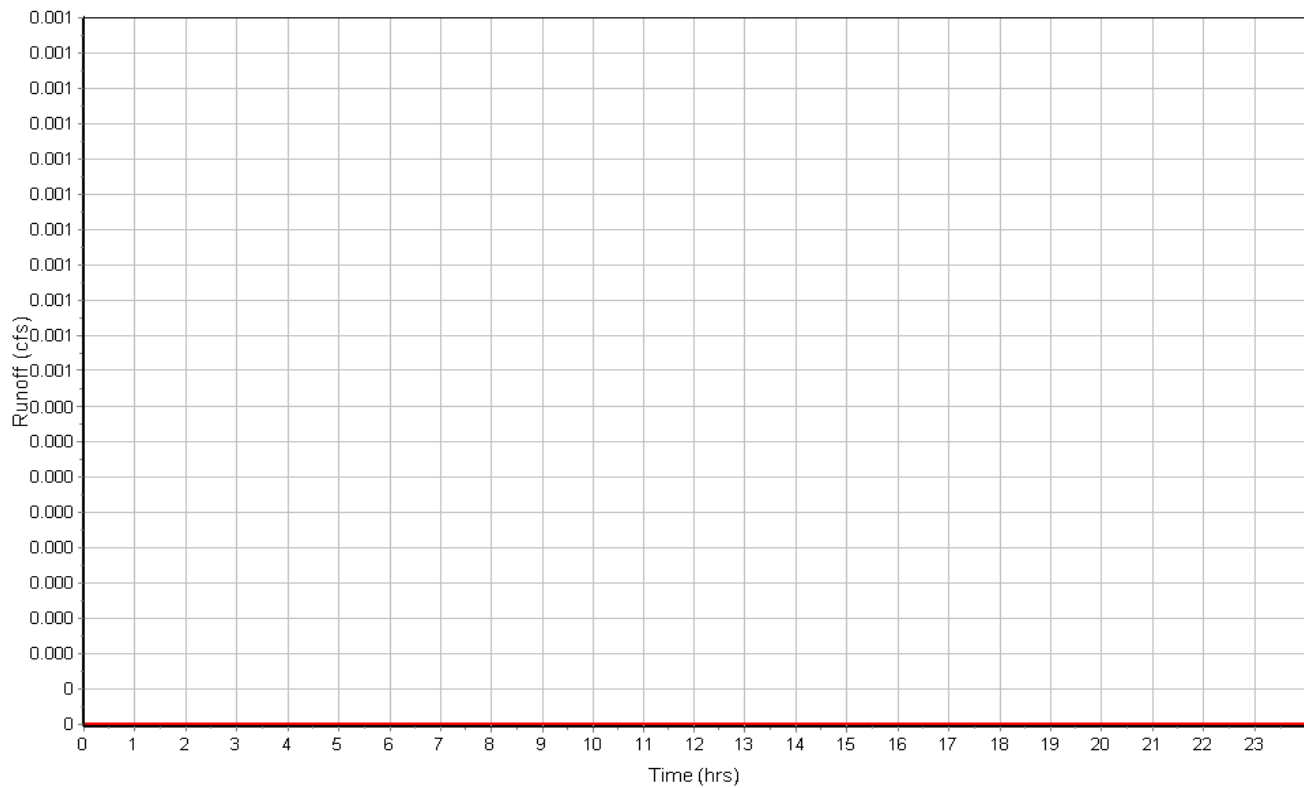
Total Rainfall (in) 4.75
 Total Runoff (in) 0.00
 Peak Runoff (cfs) 0.11
 Weighted Curve Number 94.26
 Time of Concentration (days hh:mm:ss) 0 00:00:00

Subbasin : AD_05

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : AD_06**Input Data**

Area (ac) 0.07
Impervious Area (%) 0.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

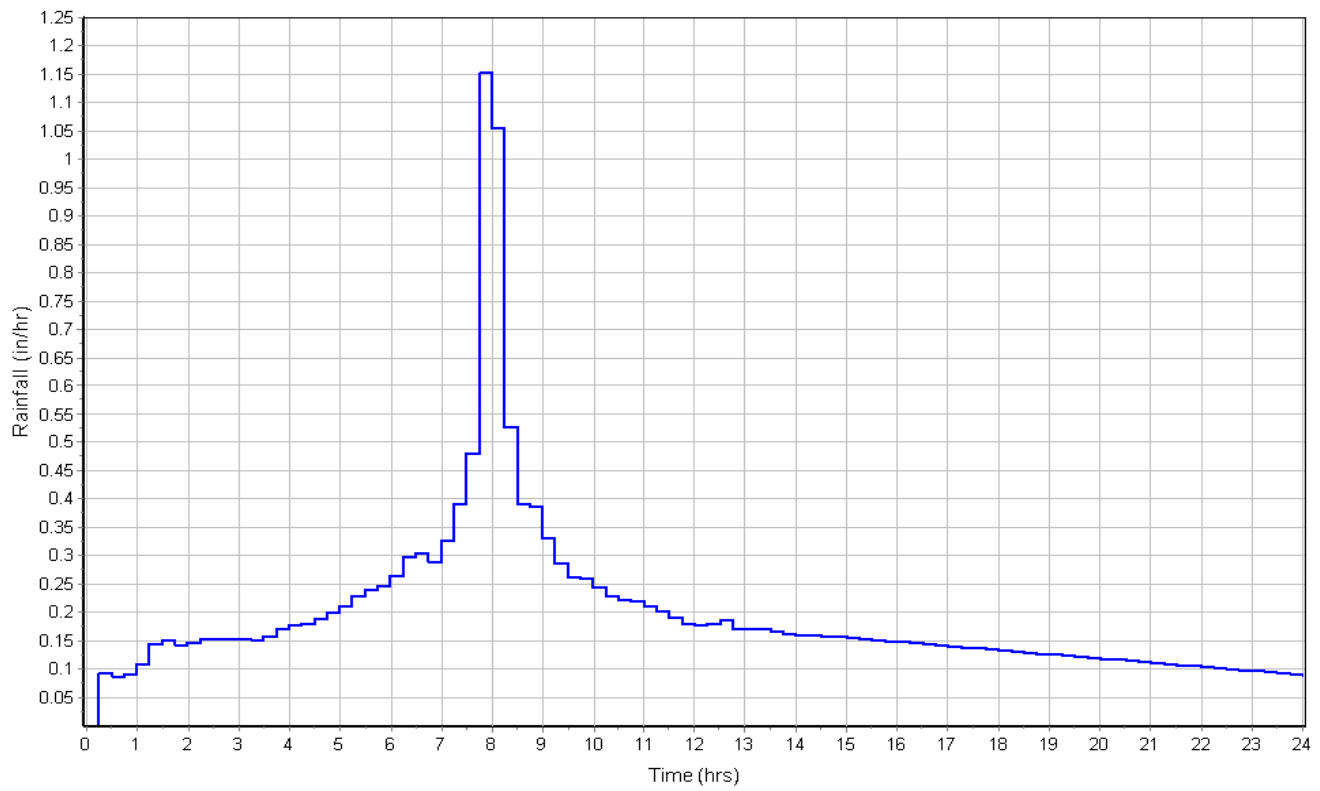
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.07		76

Subbasin Runoff Results

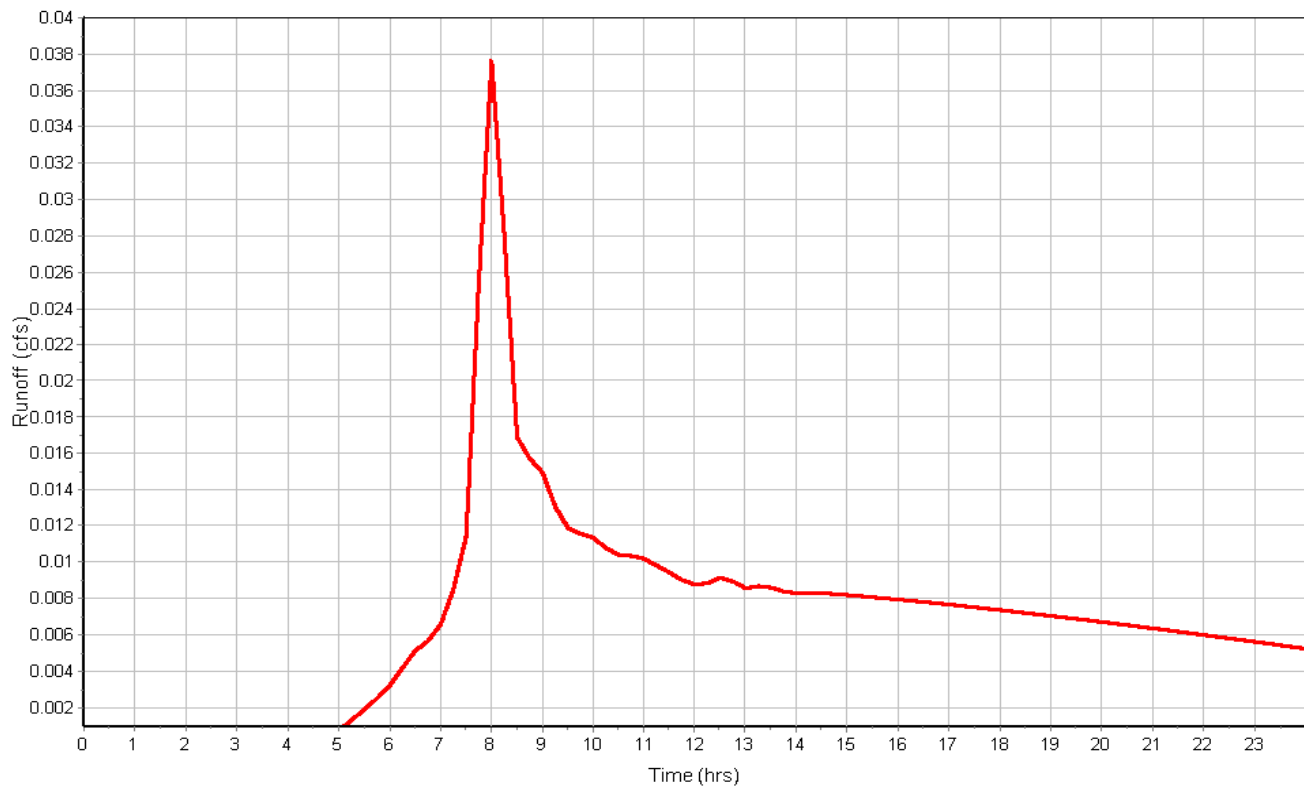
Total Rainfall (in) 4.75
Total Runoff (in) 2.34
Peak Runoff (cfs) 0.04
Weighted Curve Number 76.00
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : AD_06

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : AD_07**Input Data**

Area (ac) 0.14
Impervious Area (%) 46.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

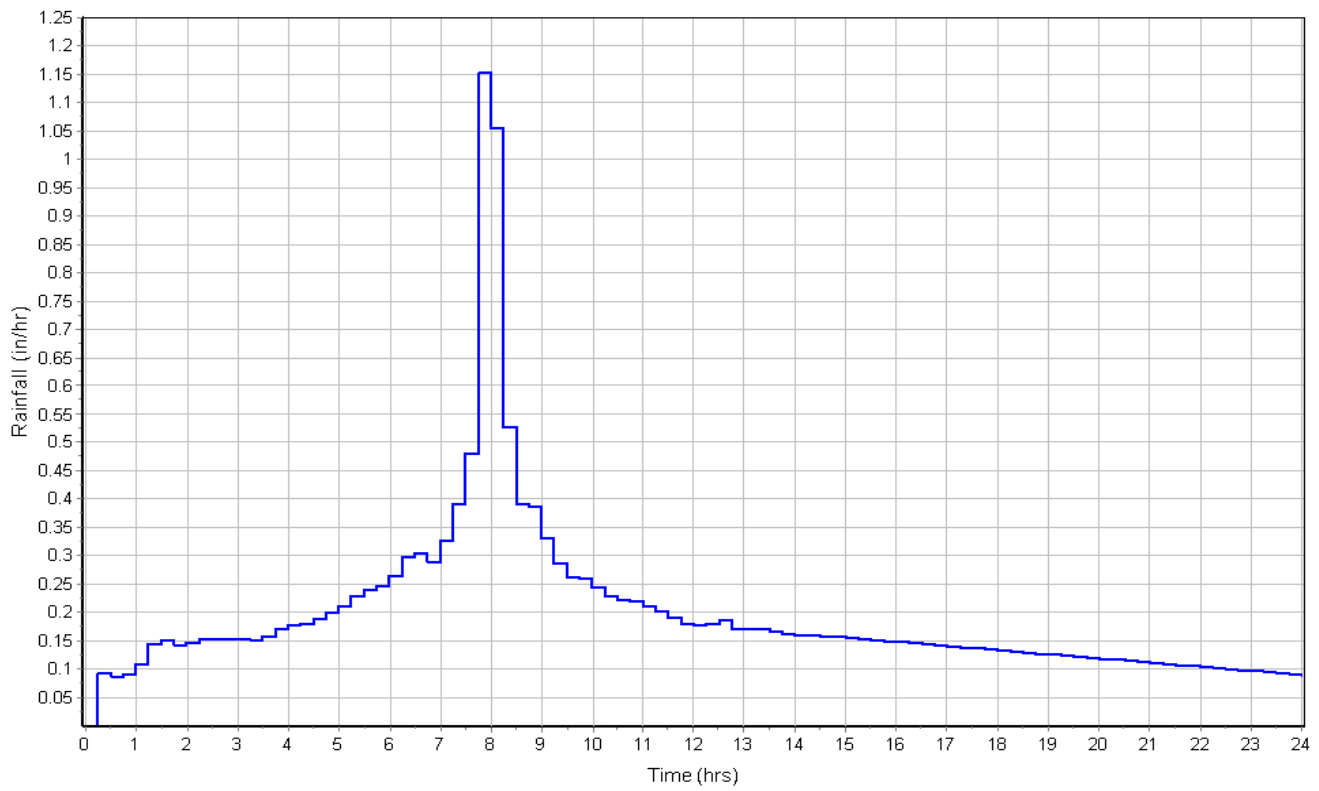
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.14		86.12

Subbasin Runoff Results

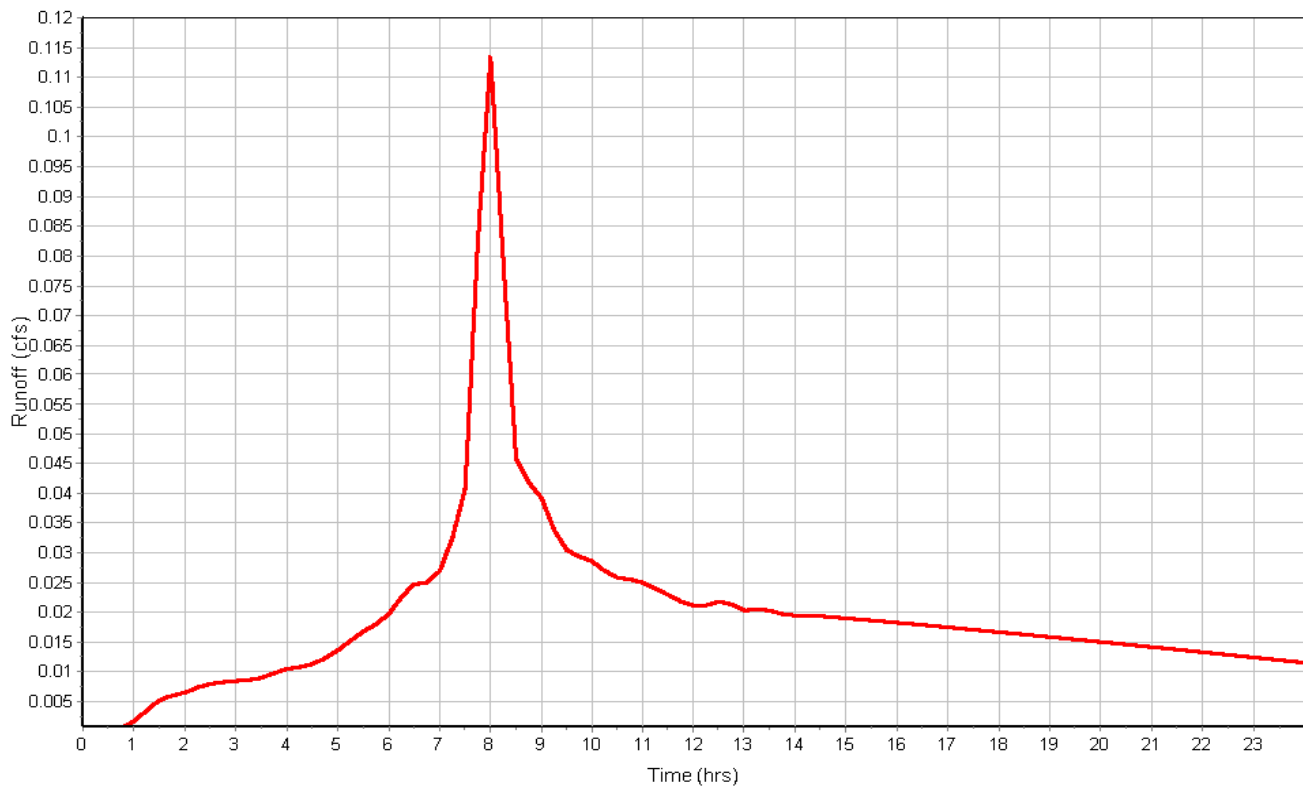
Total Rainfall (in) 4.75
Total Runoff (in) 3.34
Peak Runoff (cfs) 0.11
Weighted Curve Number 86.12
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : AD_07

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : AD_08**Input Data**

Area (ac) 0.05
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

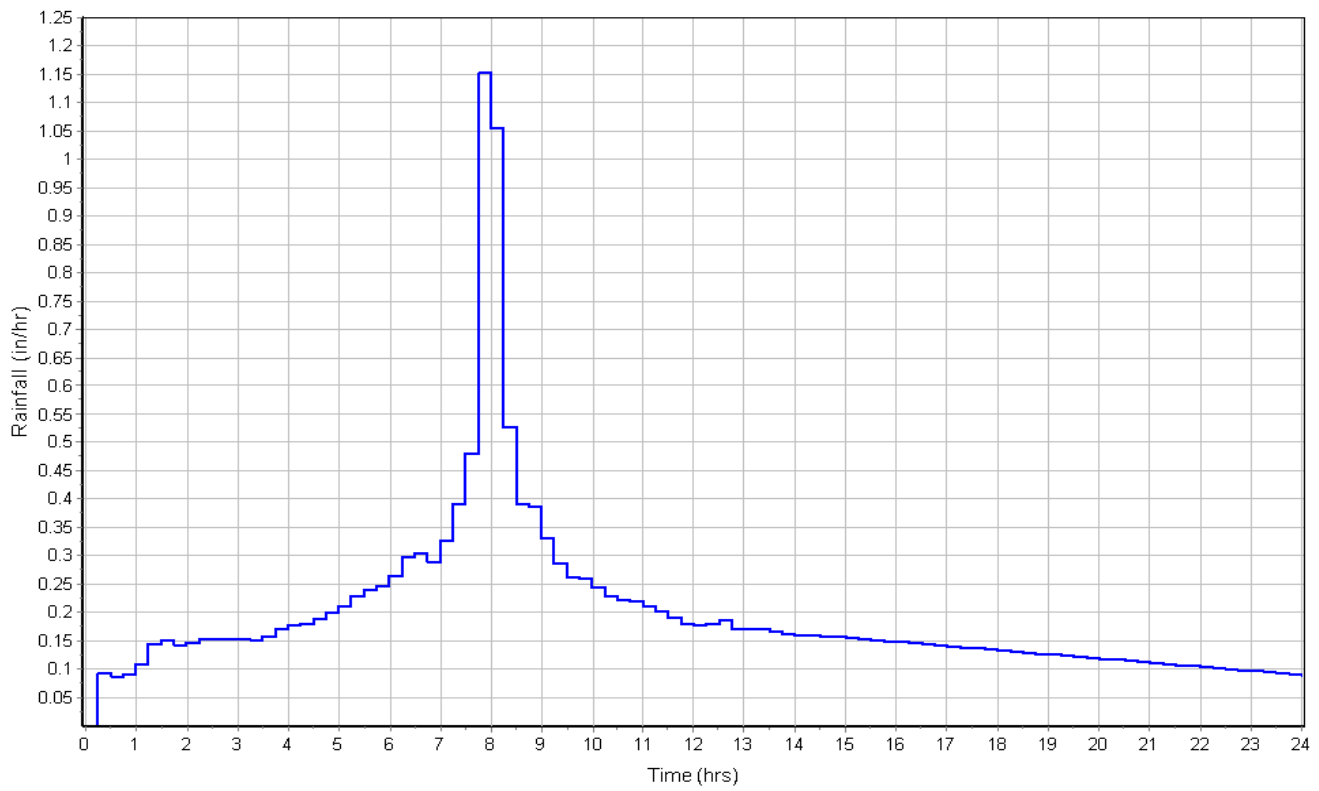
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.05		98

Subbasin Runoff Results

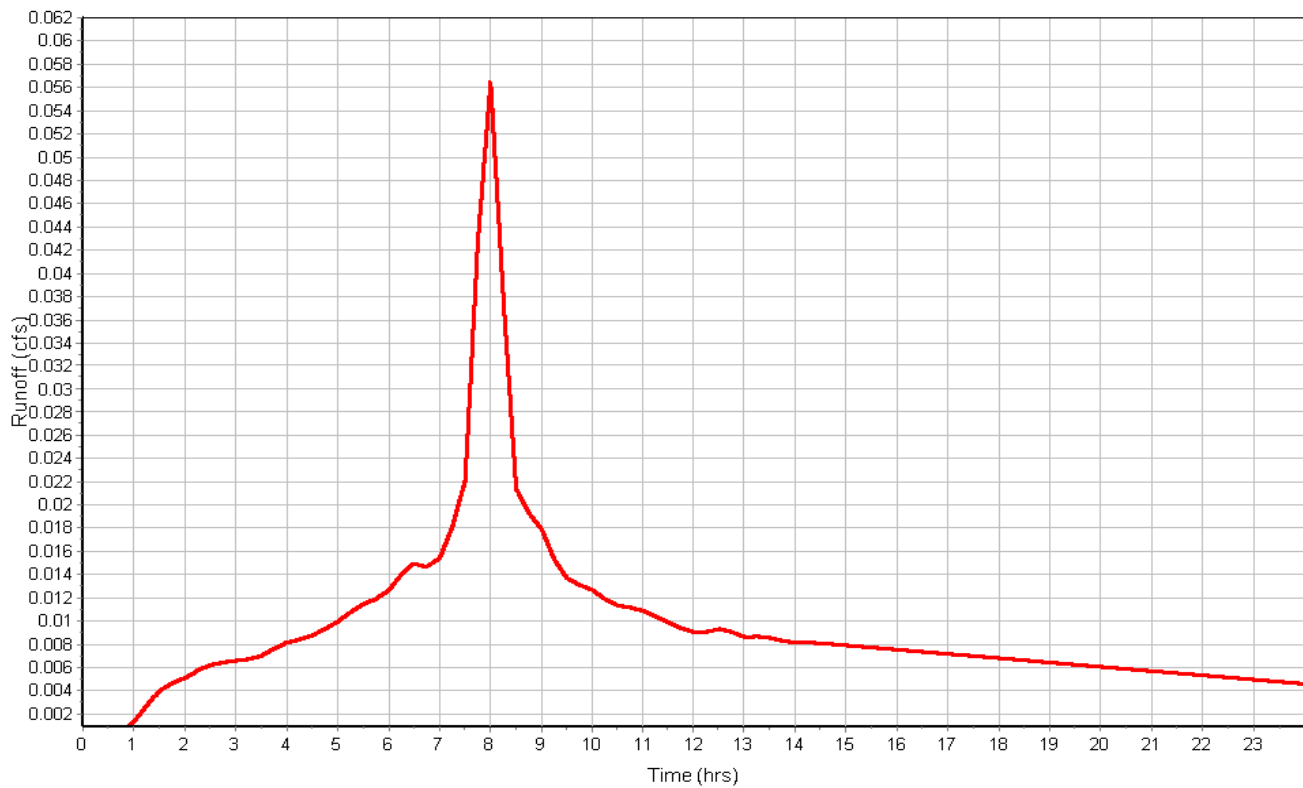
Total Rainfall (in) 4.75
 Total Runoff (in) 4.52
 Peak Runoff (cfs) 0.06
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : AD_08

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : AD_09**Input Data**

Area (ac) 0.11
Impervious Area (%) 72.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

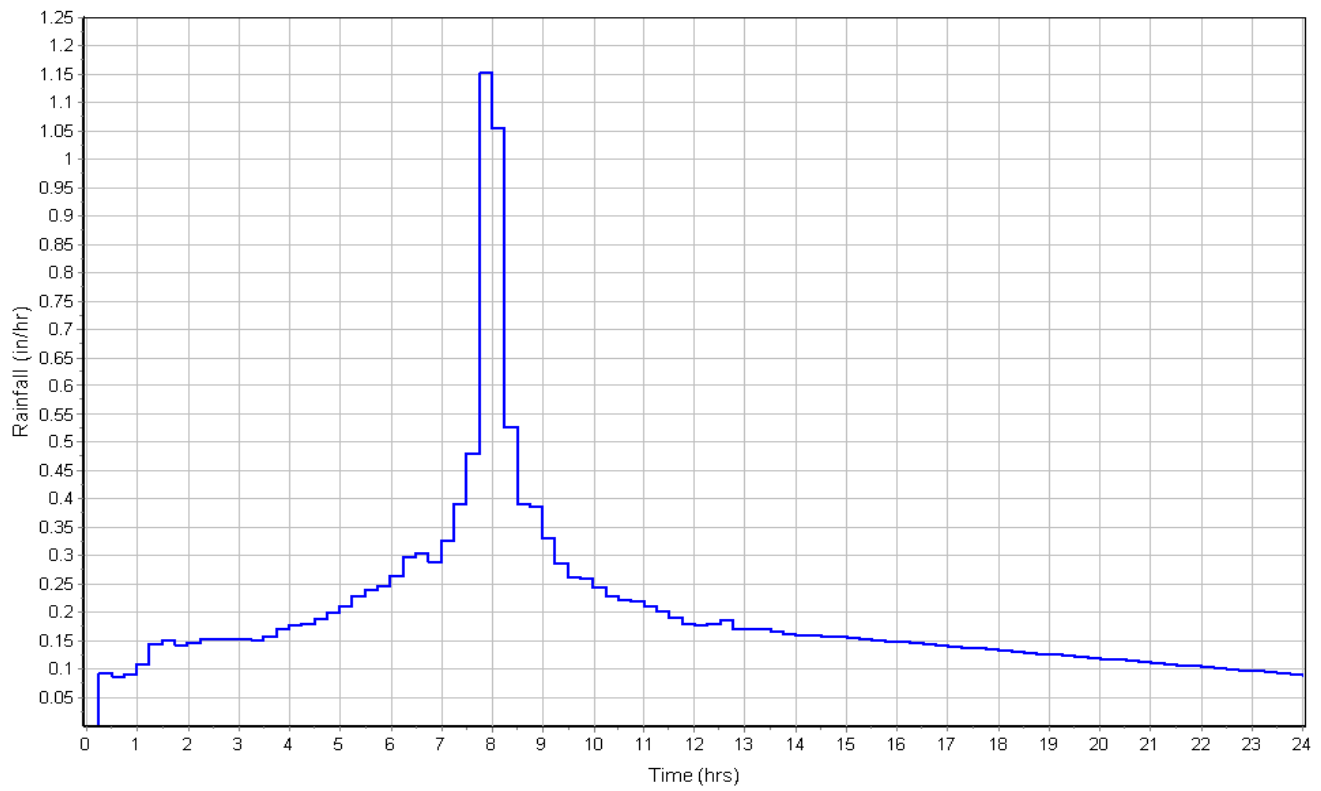
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.11		91.84

Subbasin Runoff Results

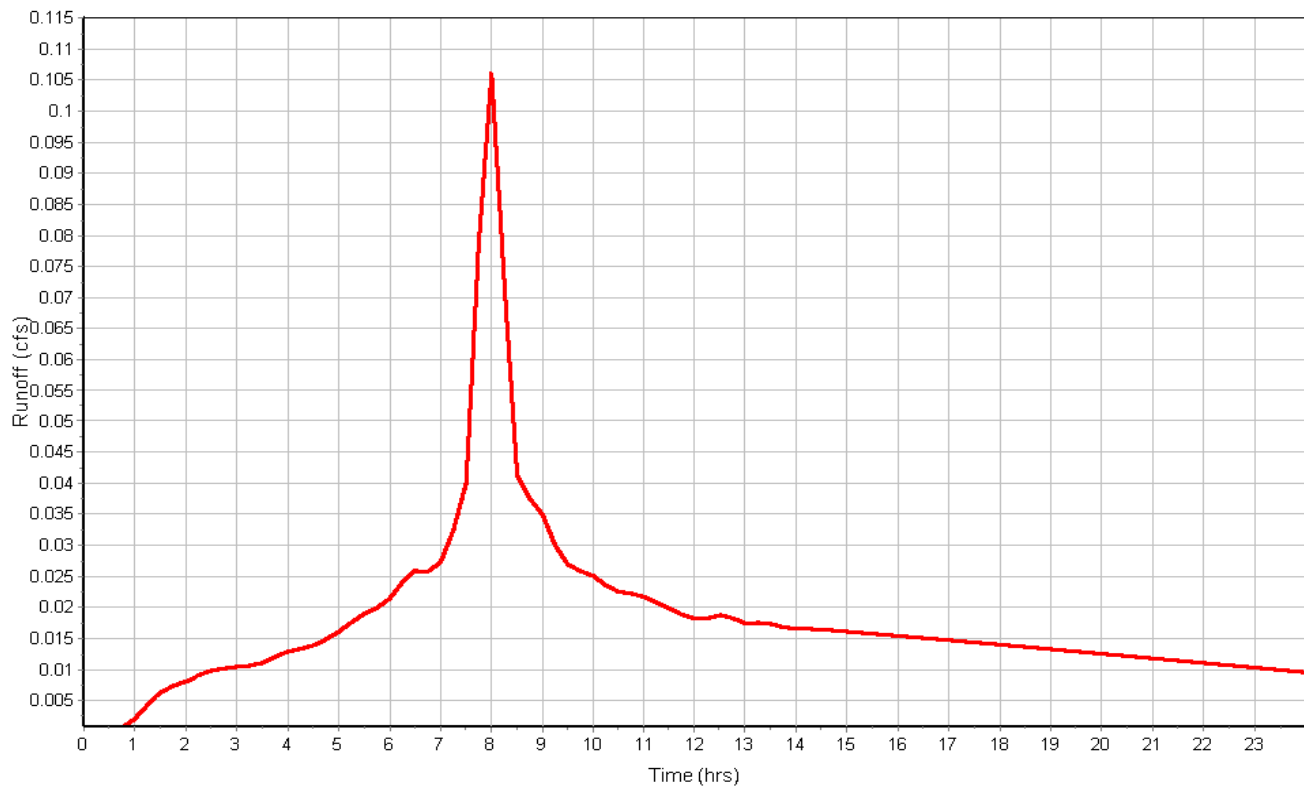
Total Rainfall (in) 4.75
Total Runoff (in) 3.91
Peak Runoff (cfs) 0.11
Weighted Curve Number 91.84
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : AD_09

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : AD_10**Input Data**

Area (ac) 0.05
Impervious Area (%) 49.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

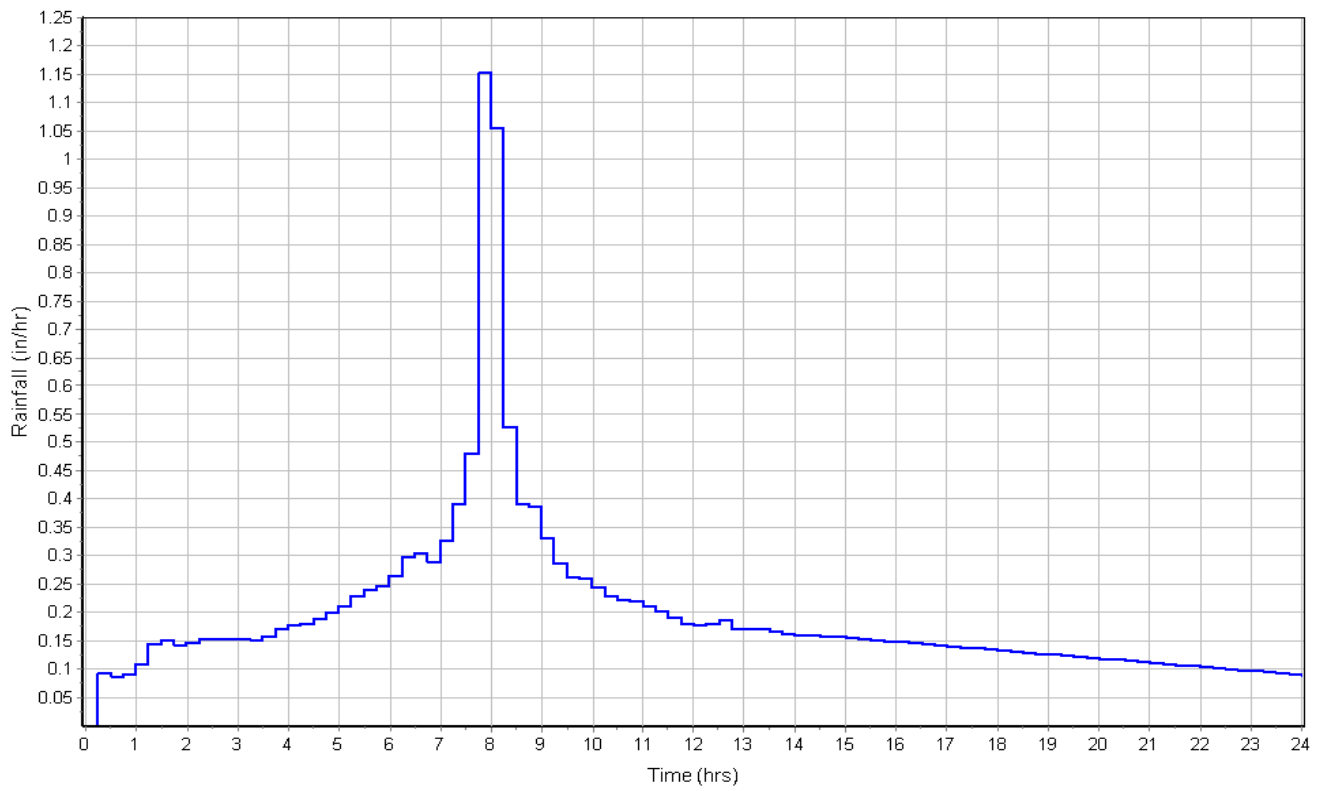
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.05		86.78

Subbasin Runoff Results

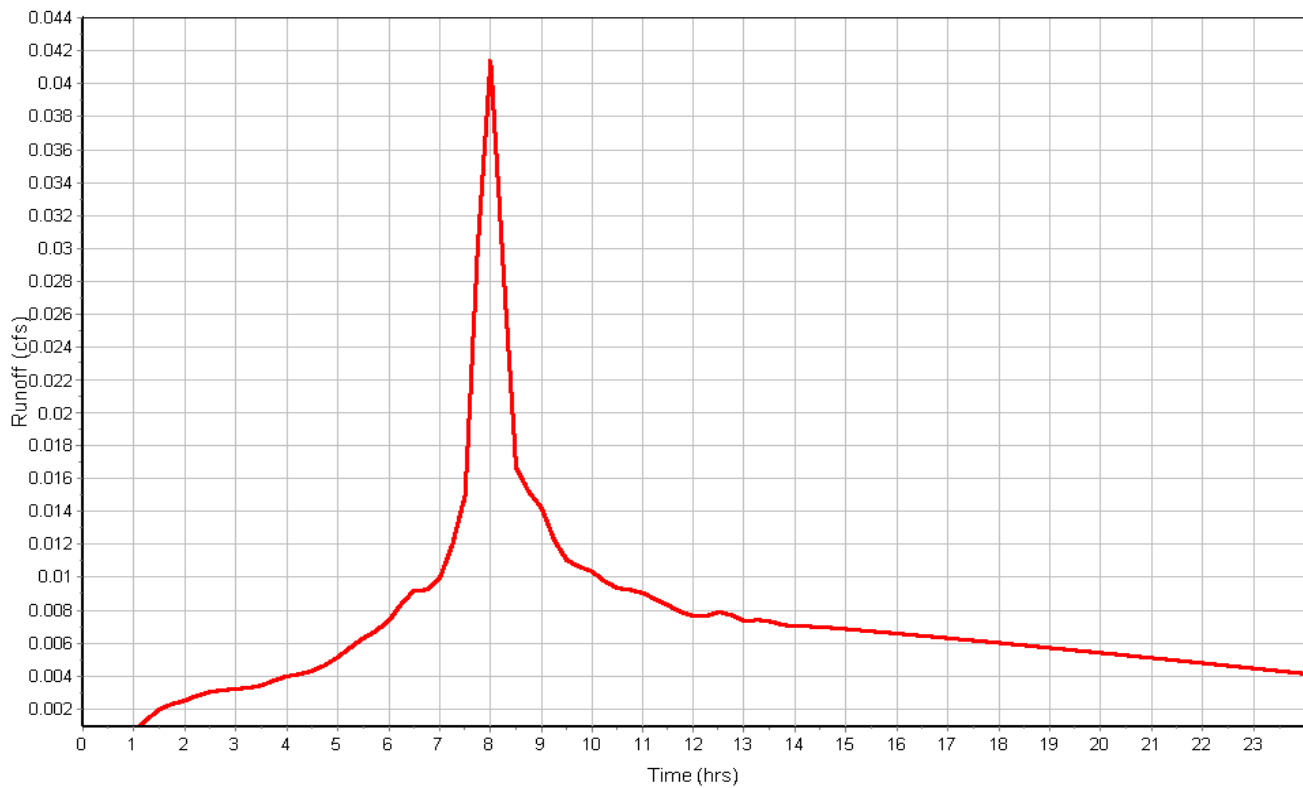
Total Rainfall (in) 4.75
Total Runoff (in) 3.41
Peak Runoff (cfs) 0.04
Weighted Curve Number 86.78
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : AD_10

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : BASIN_7_UNDERDRAIN**Input Data**

Area (ac) 0.60
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

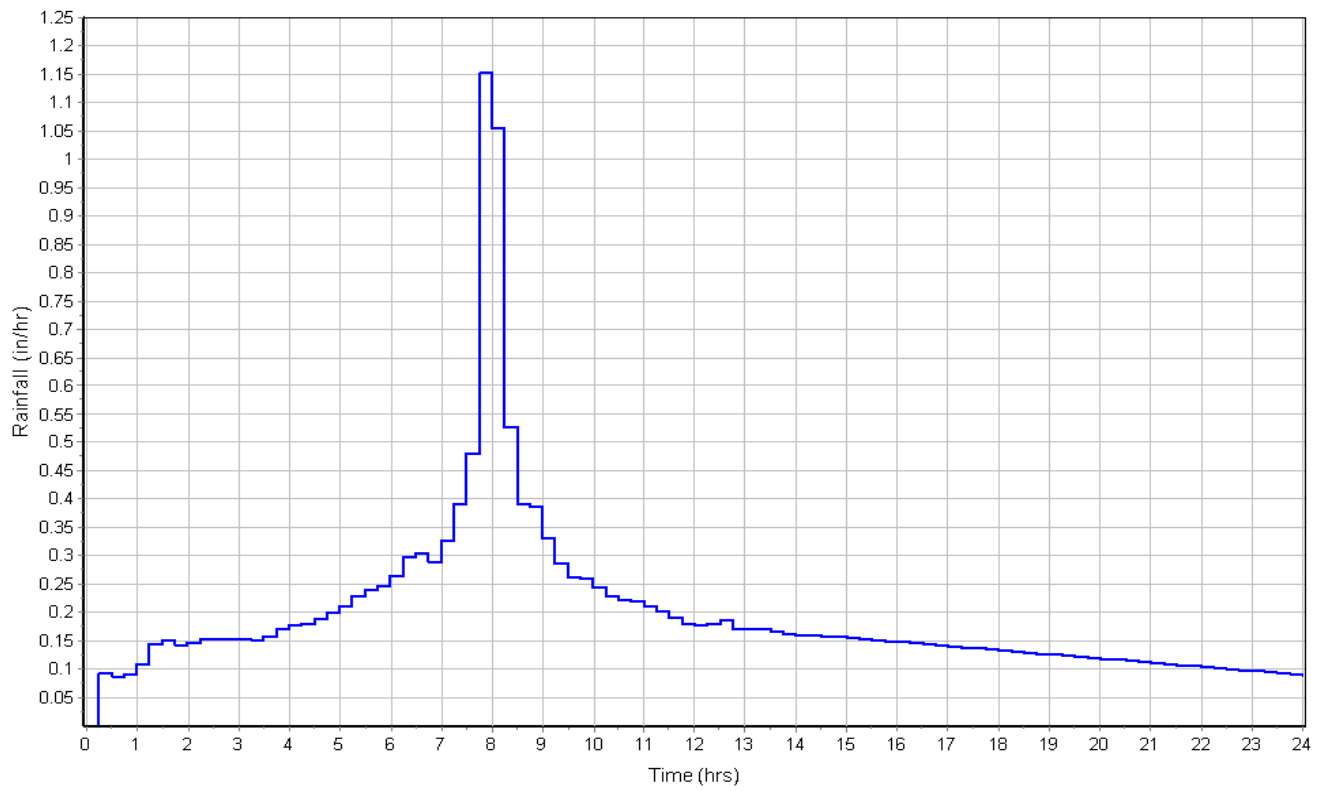
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.60		98

Subbasin Runoff Results

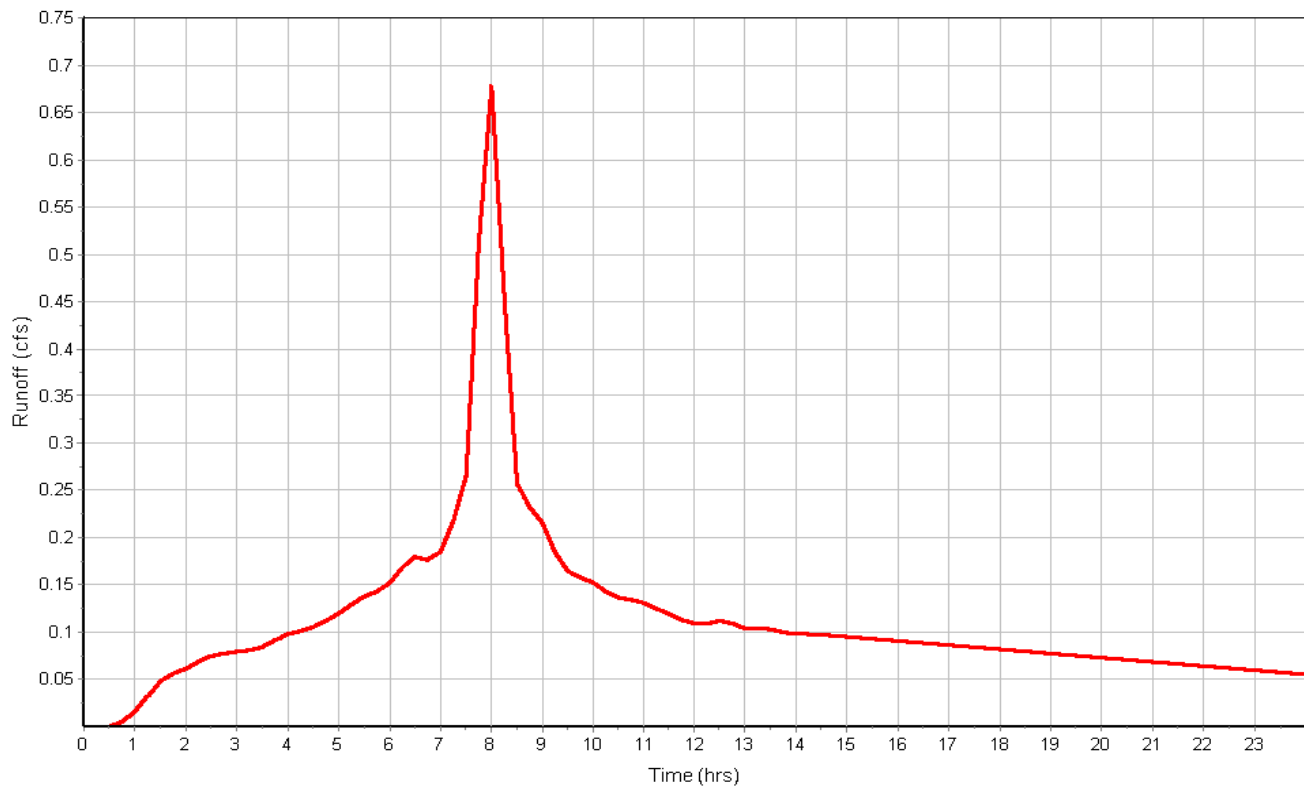
Total Rainfall (in) 4.75
 Total Runoff (in) 4.52
 Peak Runoff (cfs) 0.68
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : BASIN_7_UNDERDRAIN

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : COVERED_PARKING**Input Data**

Area (ac) 2.17
Impervious Area (%) 99.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

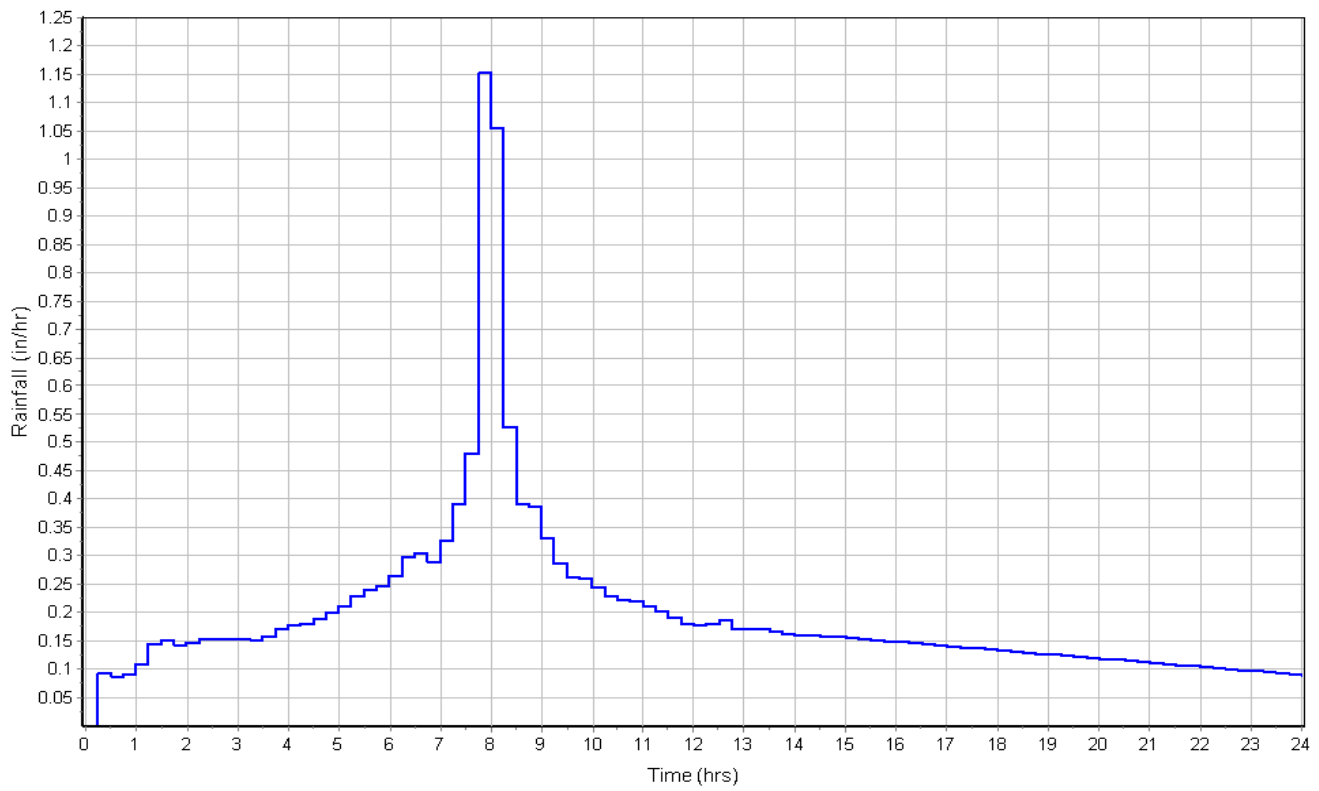
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	2.17		97.78

Subbasin Runoff Results

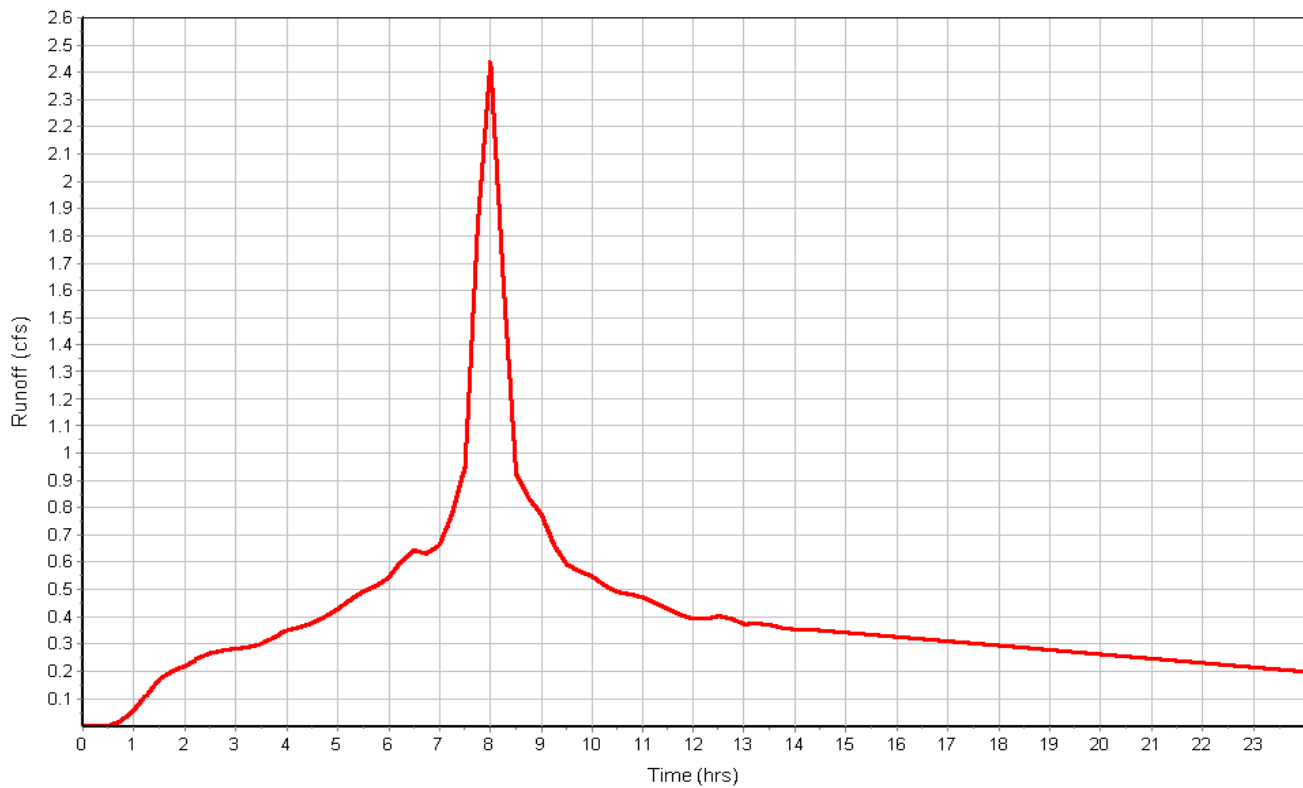
Total Rainfall (in) 4.75
Total Runoff (in) 4.50
Peak Runoff (cfs) 2.44
Weighted Curve Number 97.78
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : COVERED_PARKING

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RDCO_02**Input Data**

Area (ac) 0.12
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

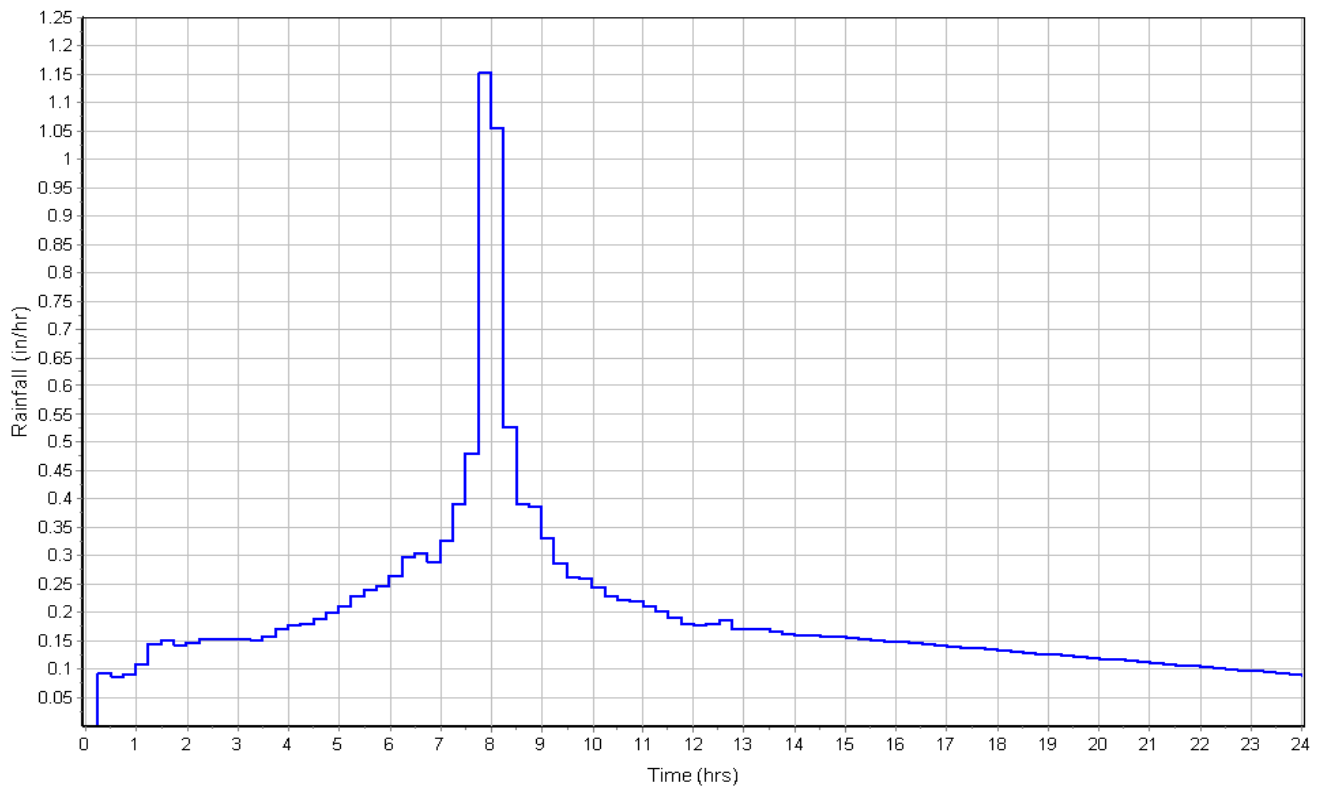
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.12		98

Subbasin Runoff Results

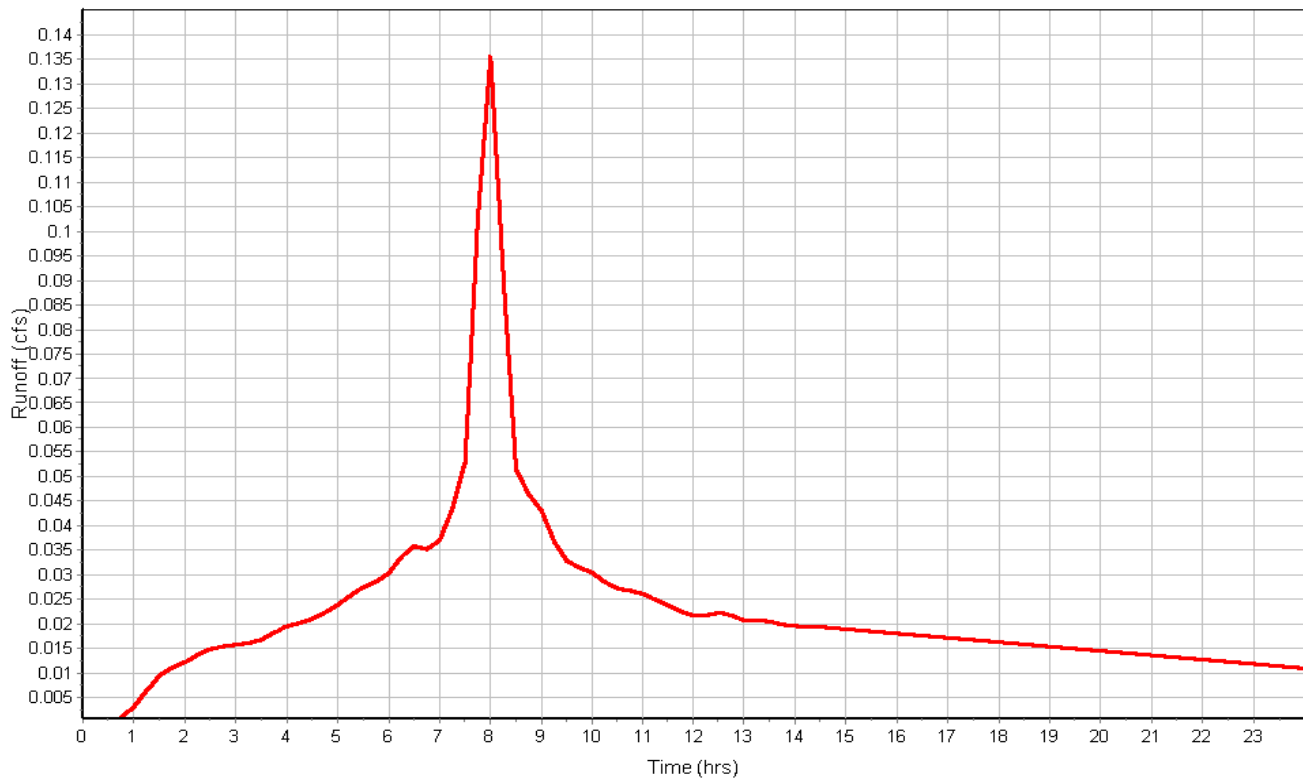
Total Rainfall (in) 4.75
 Total Runoff (in) 4.52
 Peak Runoff (cfs) 0.14
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : RDCO_02

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RDCO_08**Input Data**

Area (ac) 0.73
Impervious Area (%) 100.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

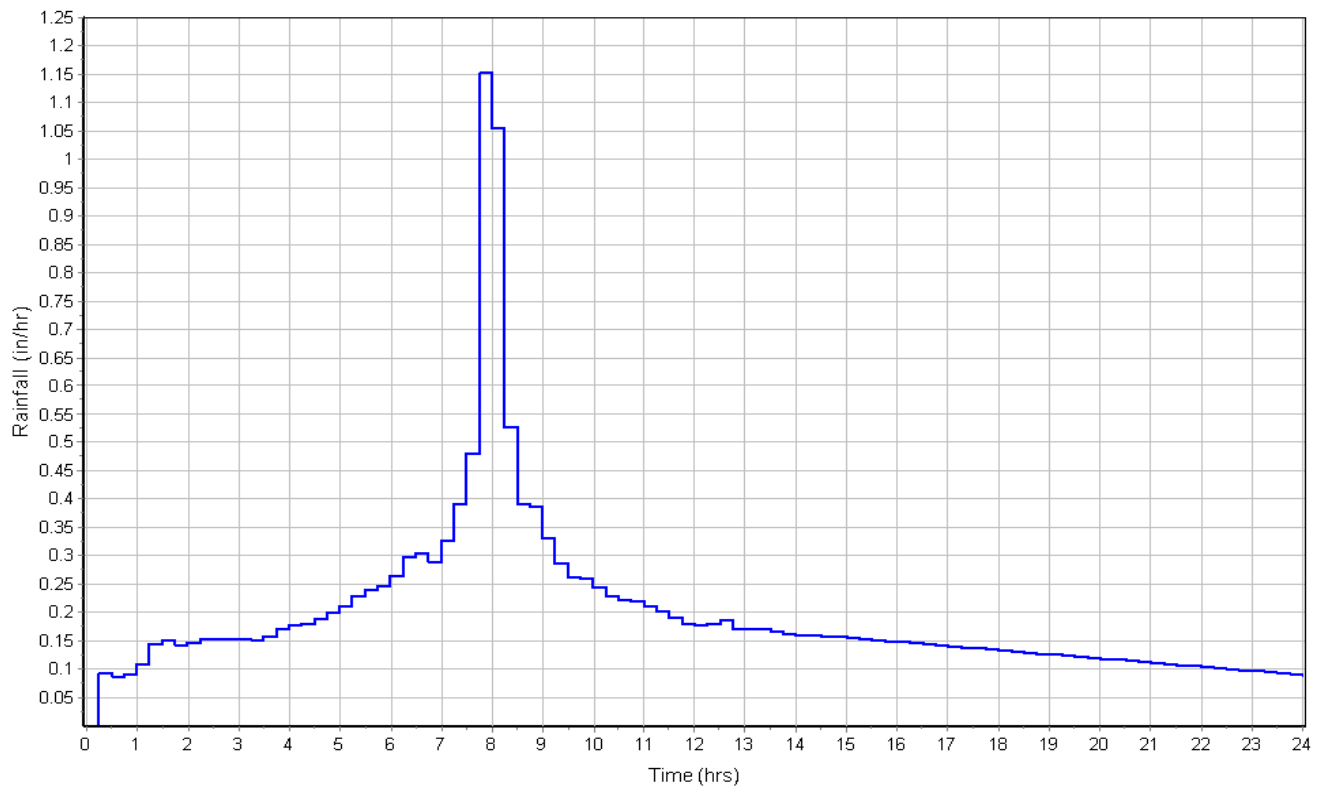
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.73		98

Subbasin Runoff Results

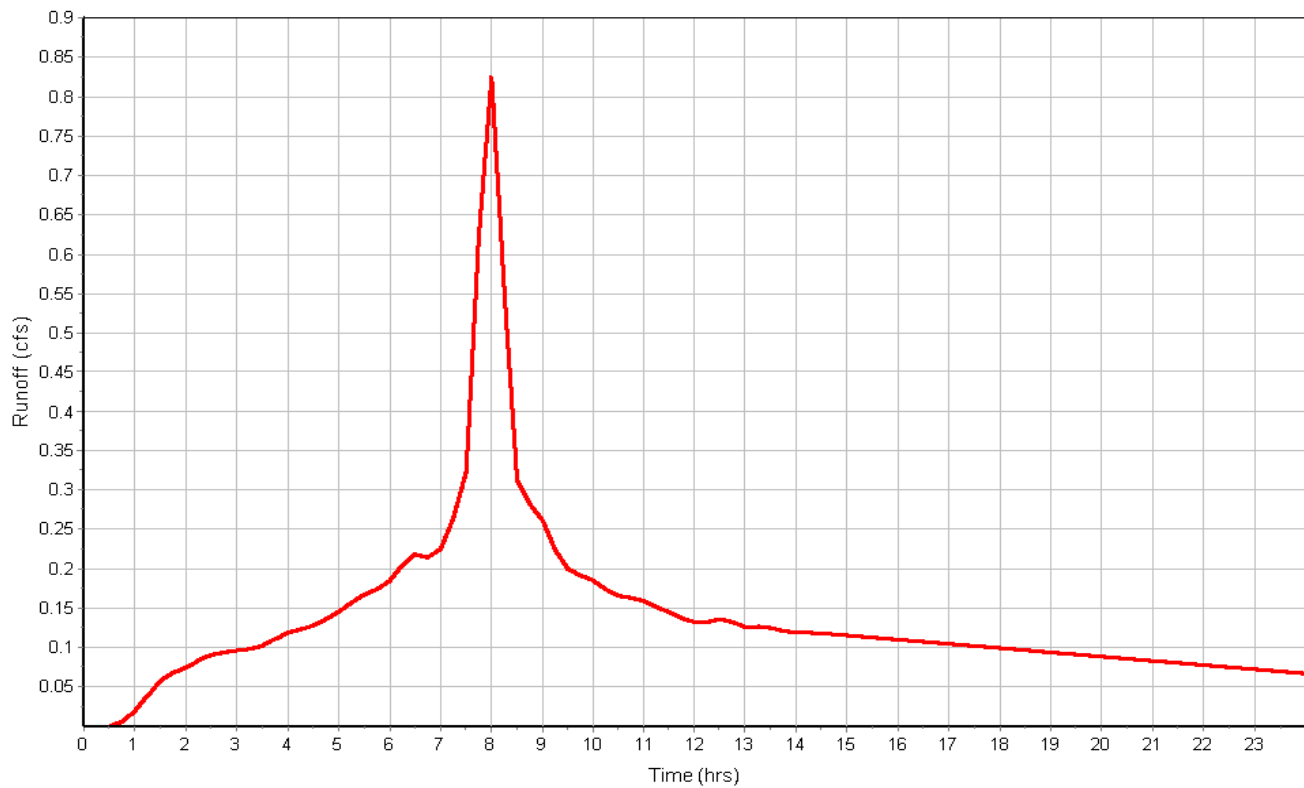
Total Rainfall (in) 4.75
Total Runoff (in) 4.52
Peak Runoff (cfs) 0.83
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : RDCO_08

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RDCO_10**Input Data**

Area (ac) 0.17
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

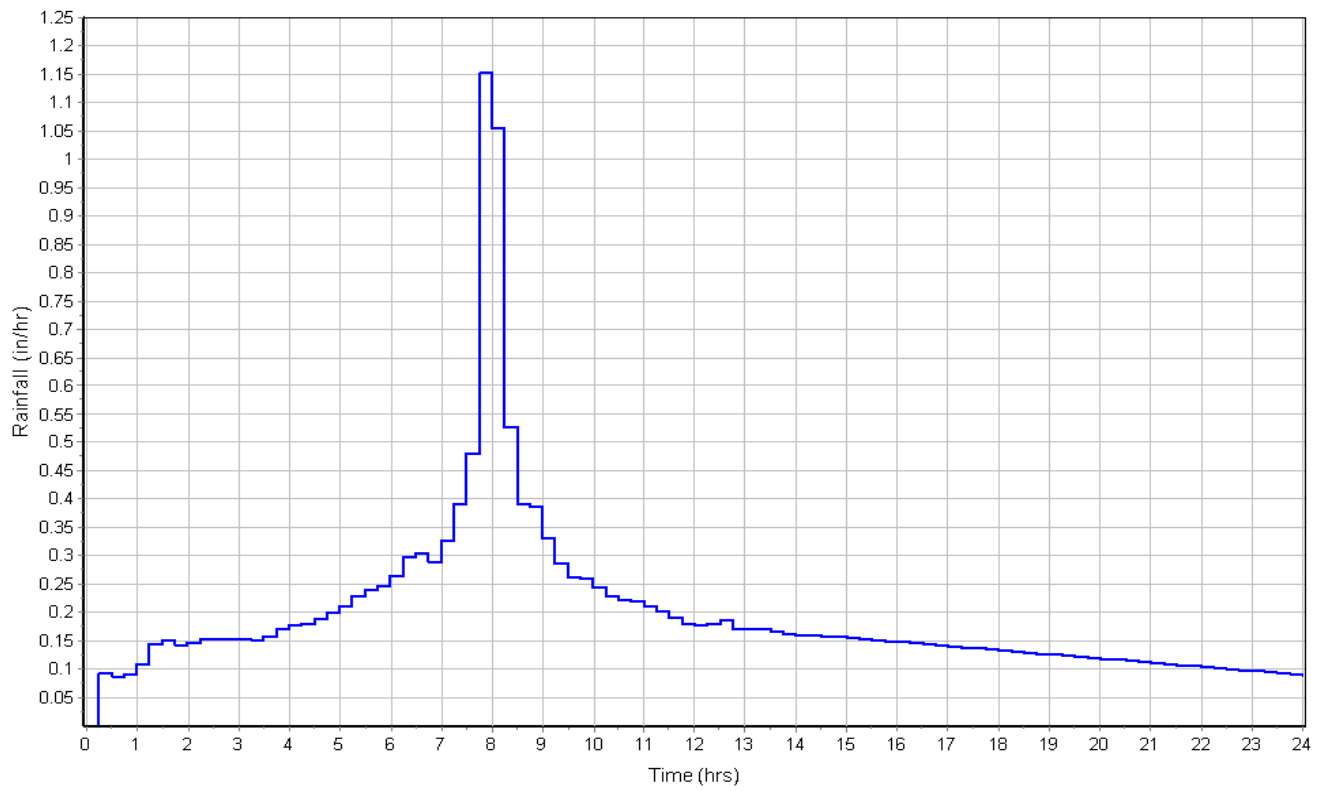
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.17		98

Subbasin Runoff Results

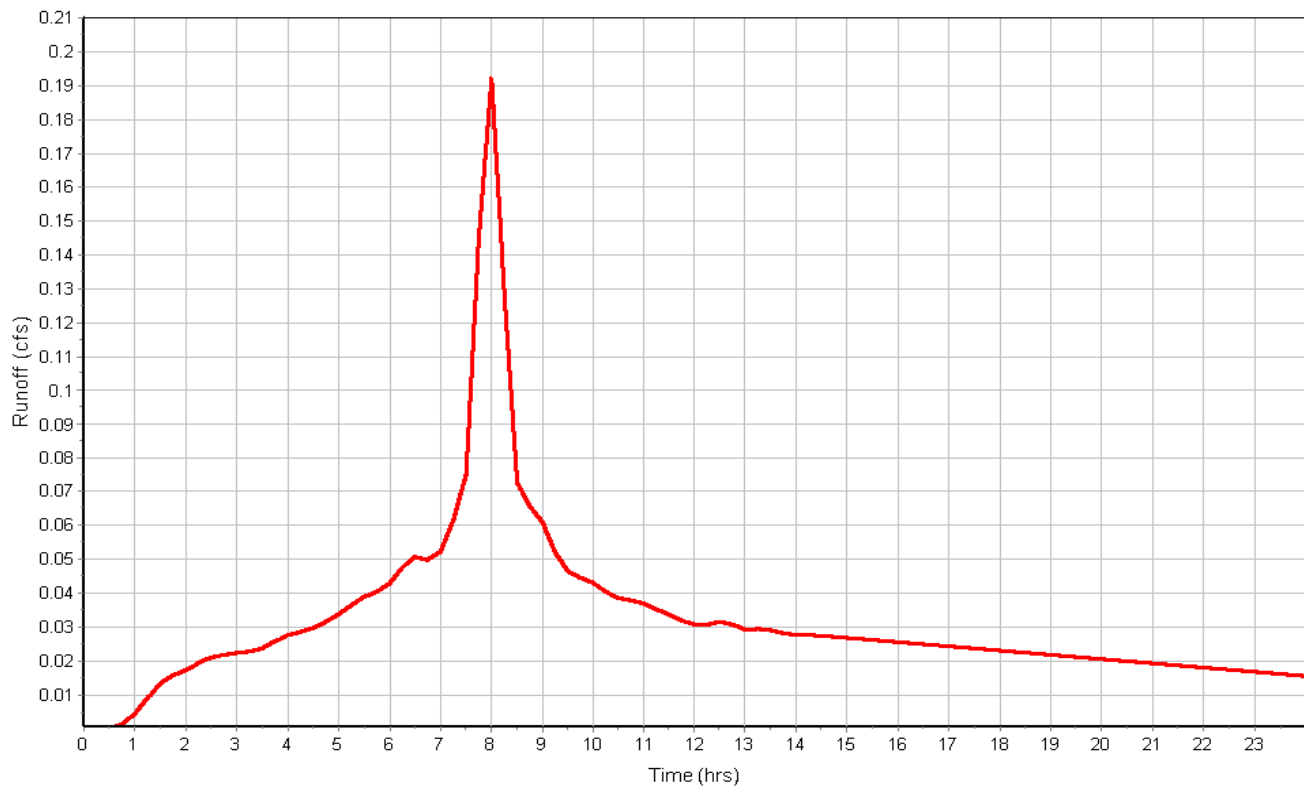
Total Rainfall (in) 4.75
 Total Runoff (in) 4.52
 Peak Runoff (cfs) 0.19
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : RDCO_10

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RDCO_13**Input Data**

Area (ac) 0.39
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

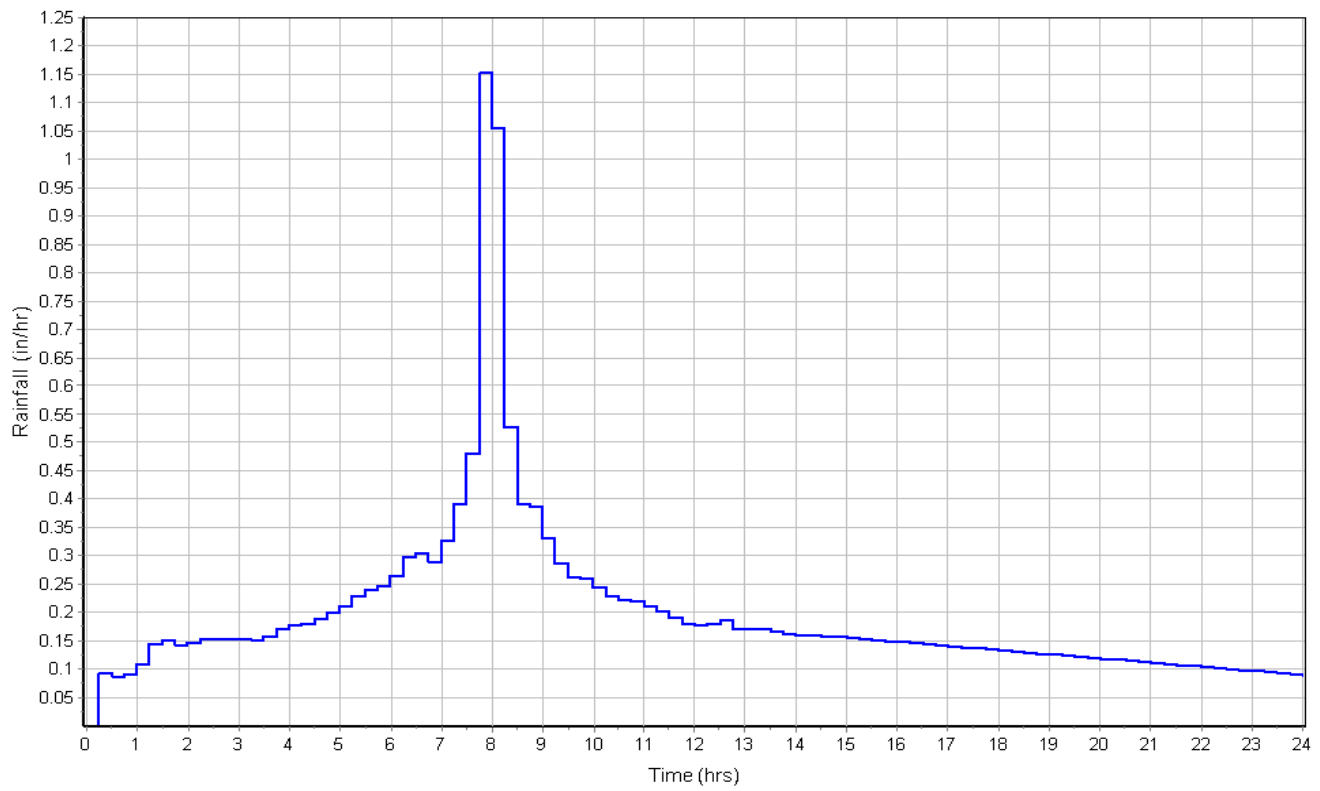
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.39		98

Subbasin Runoff Results

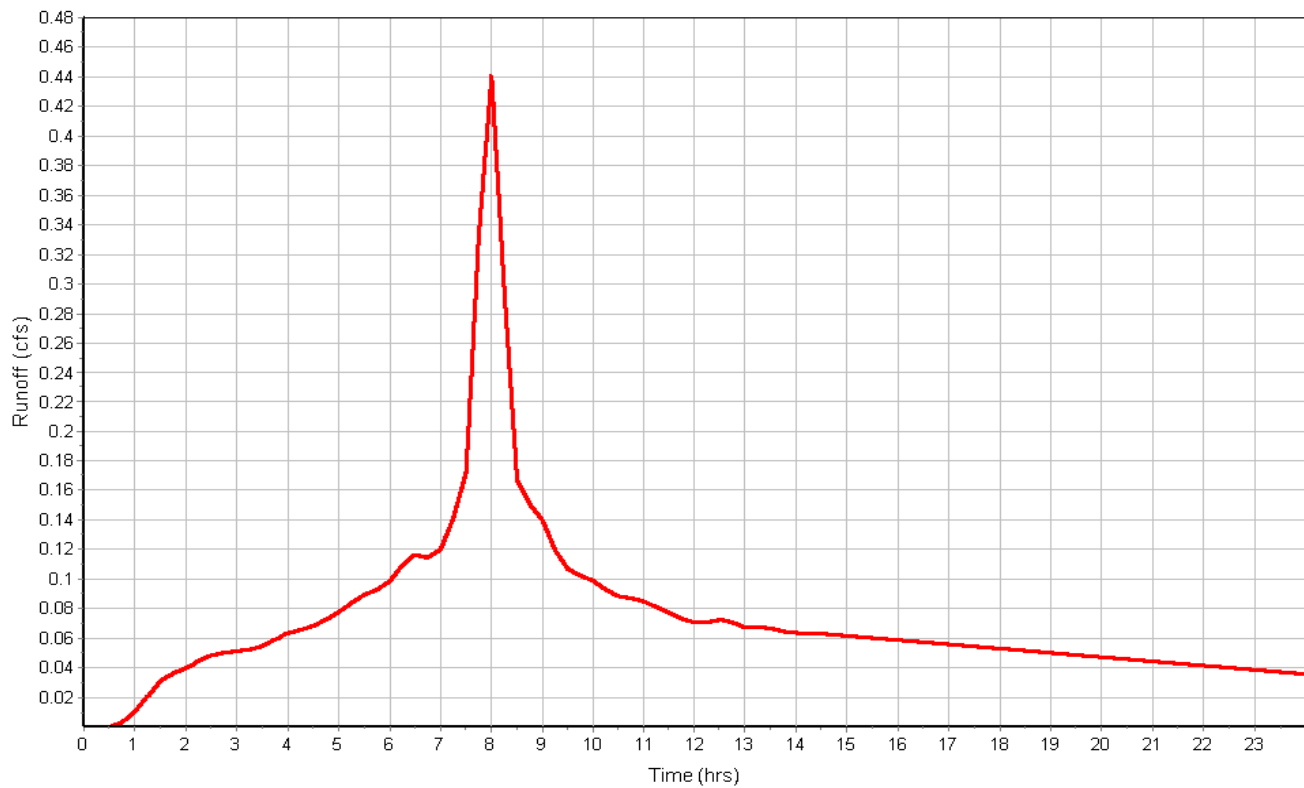
Total Rainfall (in) 4.75
 Total Runoff (in) 4.52
 Peak Runoff (cfs) 0.44
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : RDCO_13

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RDCO_15**Input Data**

Area (ac) 0.43
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

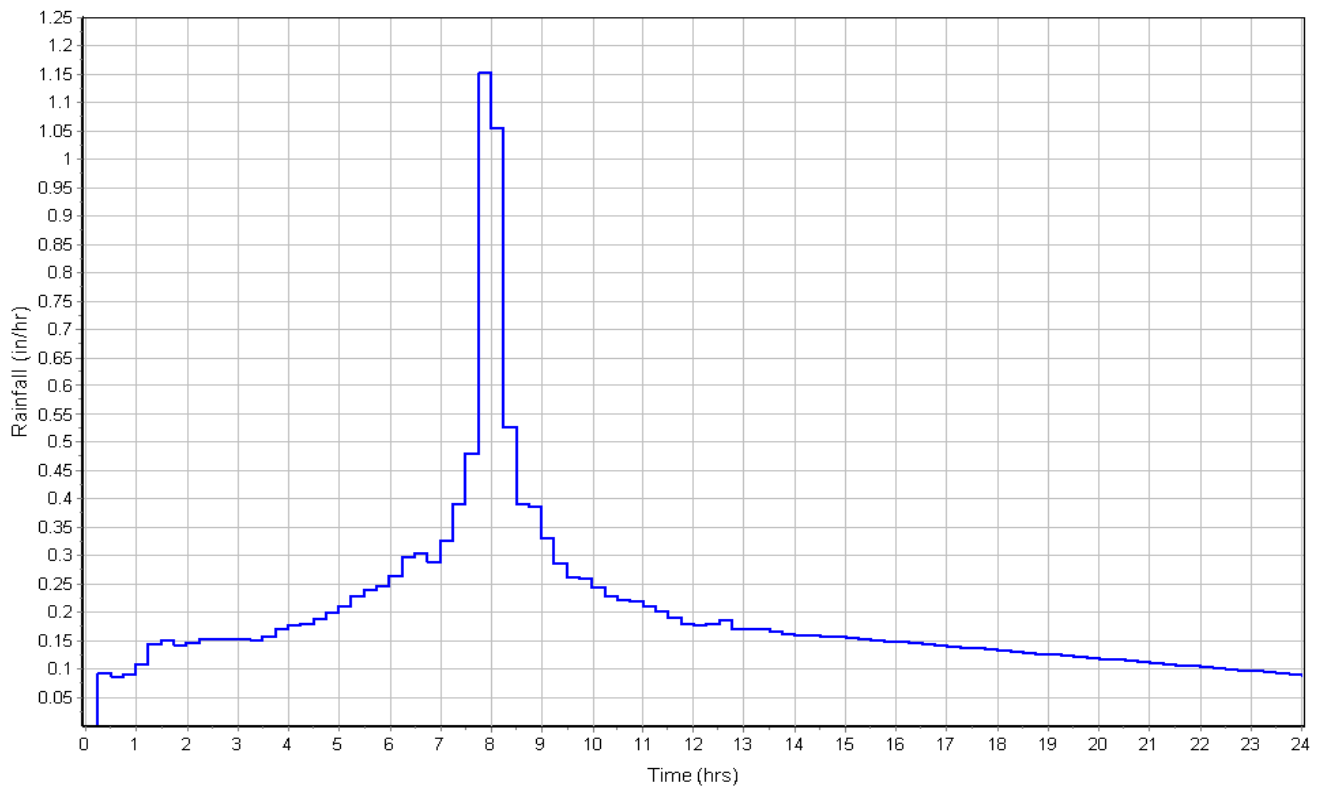
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.43		98

Subbasin Runoff Results

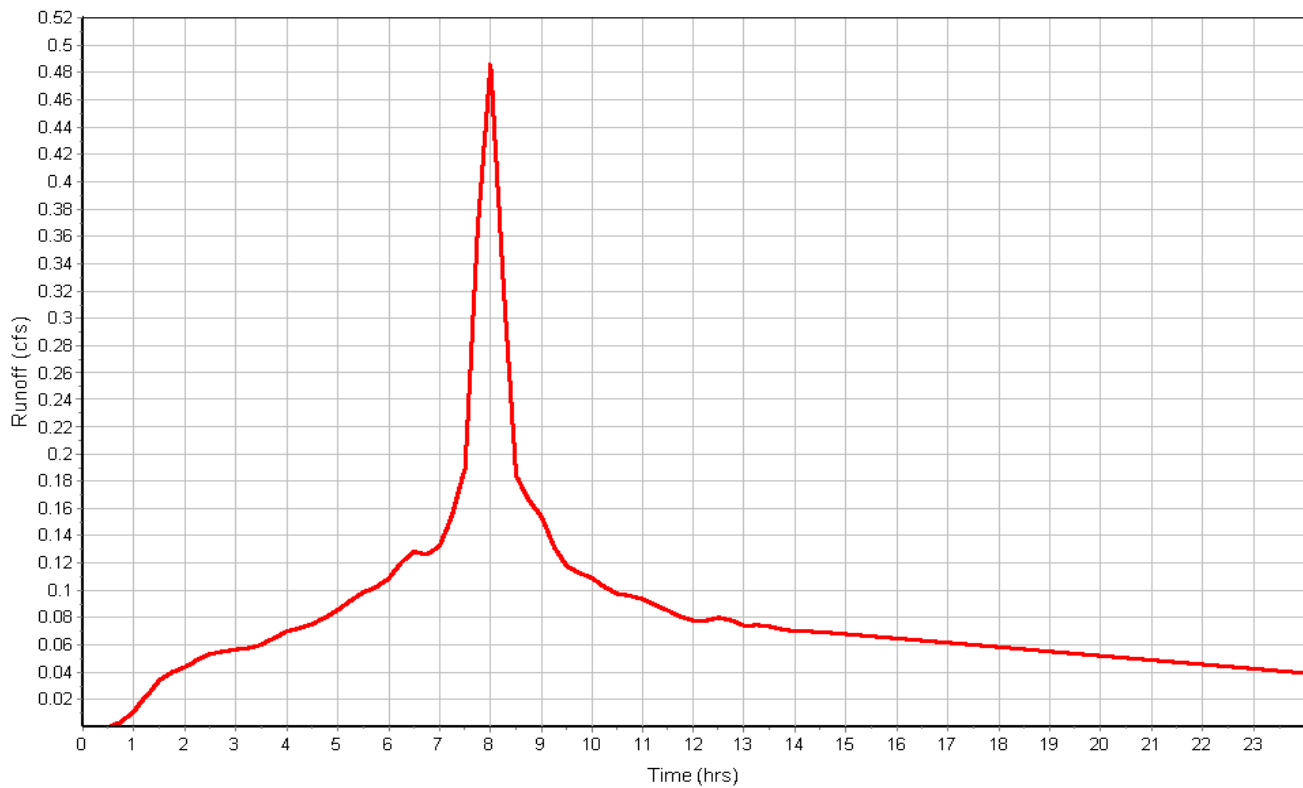
Total Rainfall (in) 4.75
 Total Runoff (in) 4.52
 Peak Runoff (cfs) 0.49
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : RDCO_15

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RDCO_16**Input Data**

Area (ac) 0.24
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

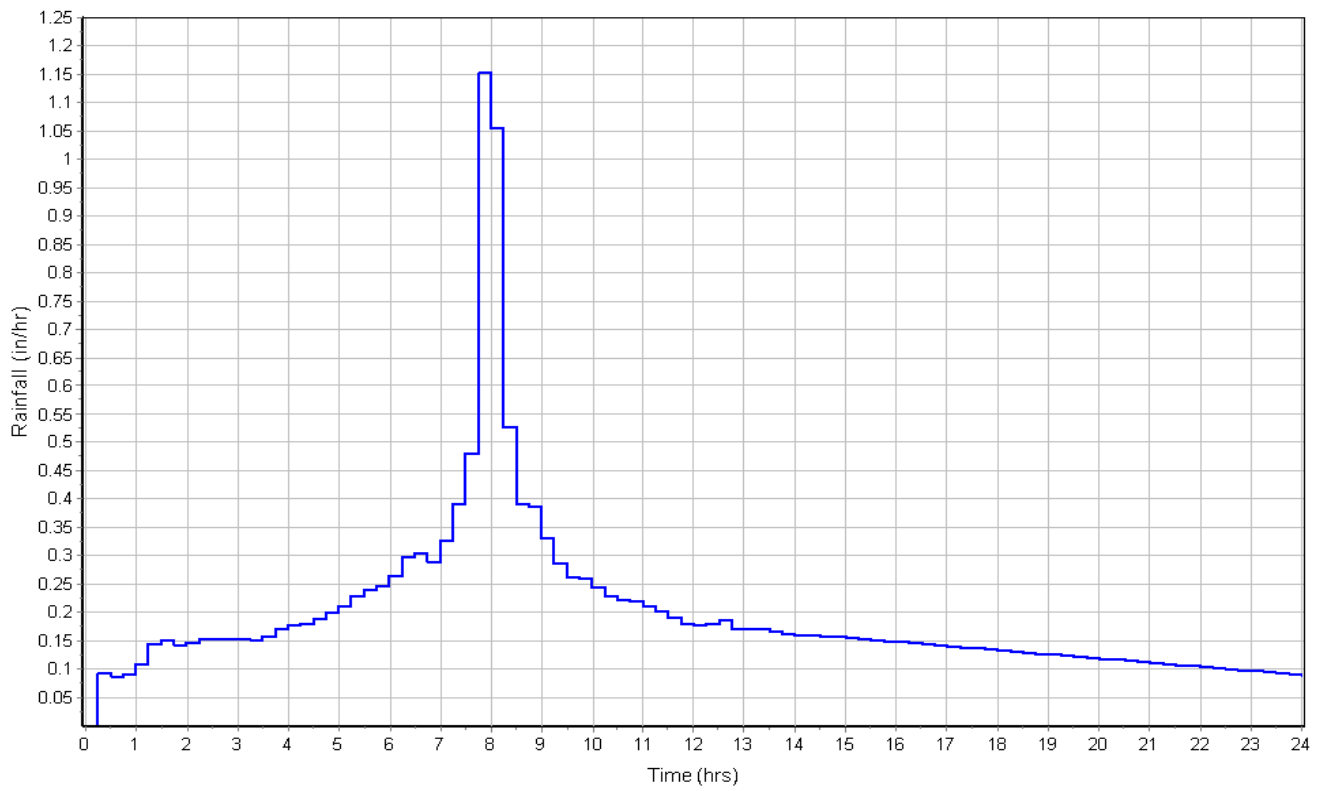
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.24		98

Subbasin Runoff Results

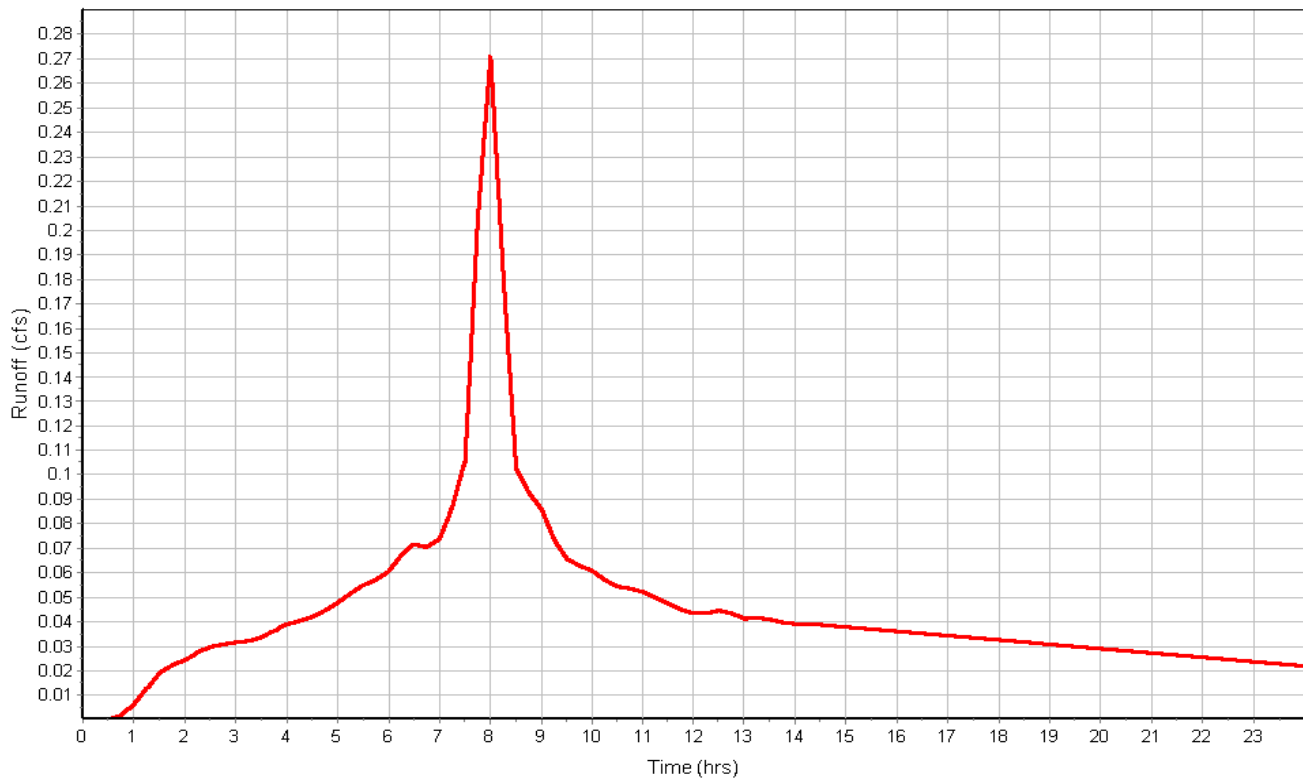
Total Rainfall (in) 4.75
 Total Runoff (in) 4.52
 Peak Runoff (cfs) 0.27
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : RDCO_16

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RDCO_18**Input Data**

Area (ac) 0.13
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

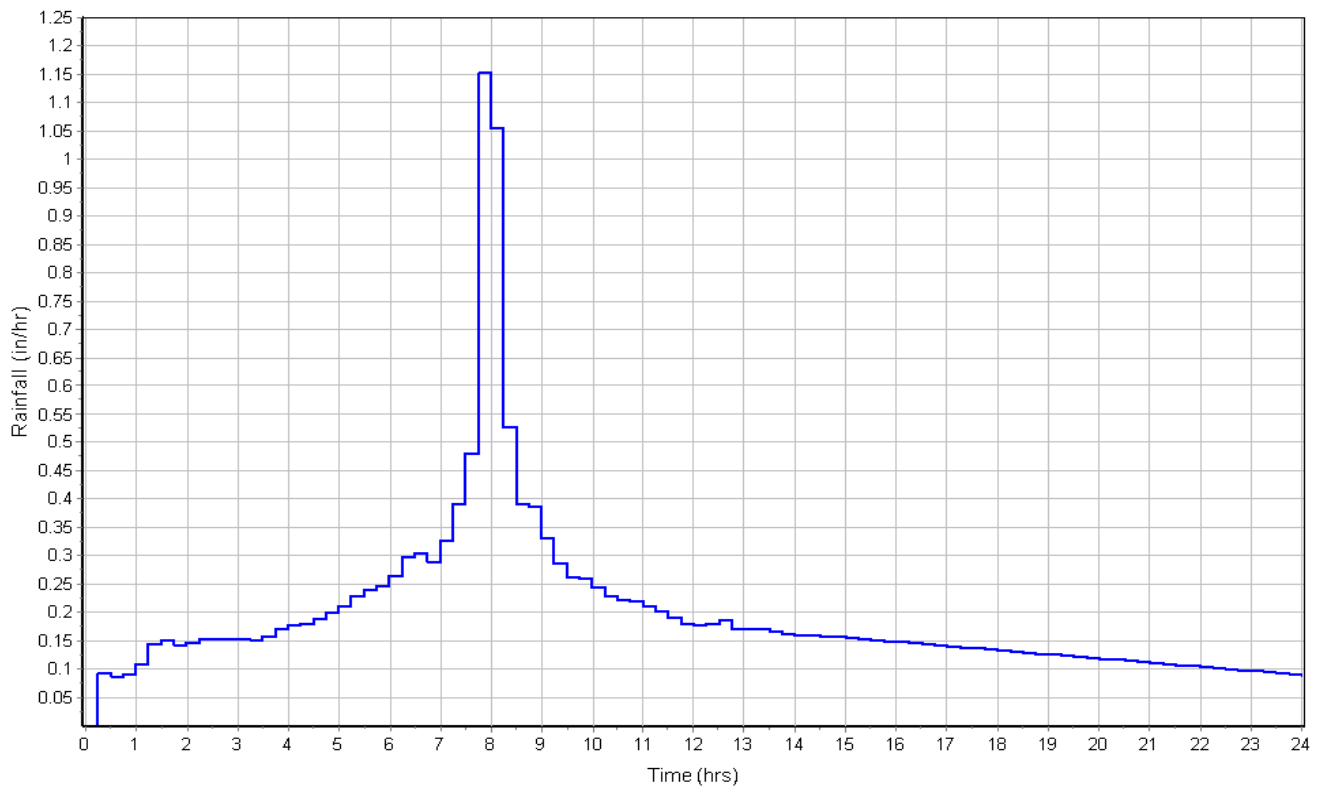
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.13		98

Subbasin Runoff Results

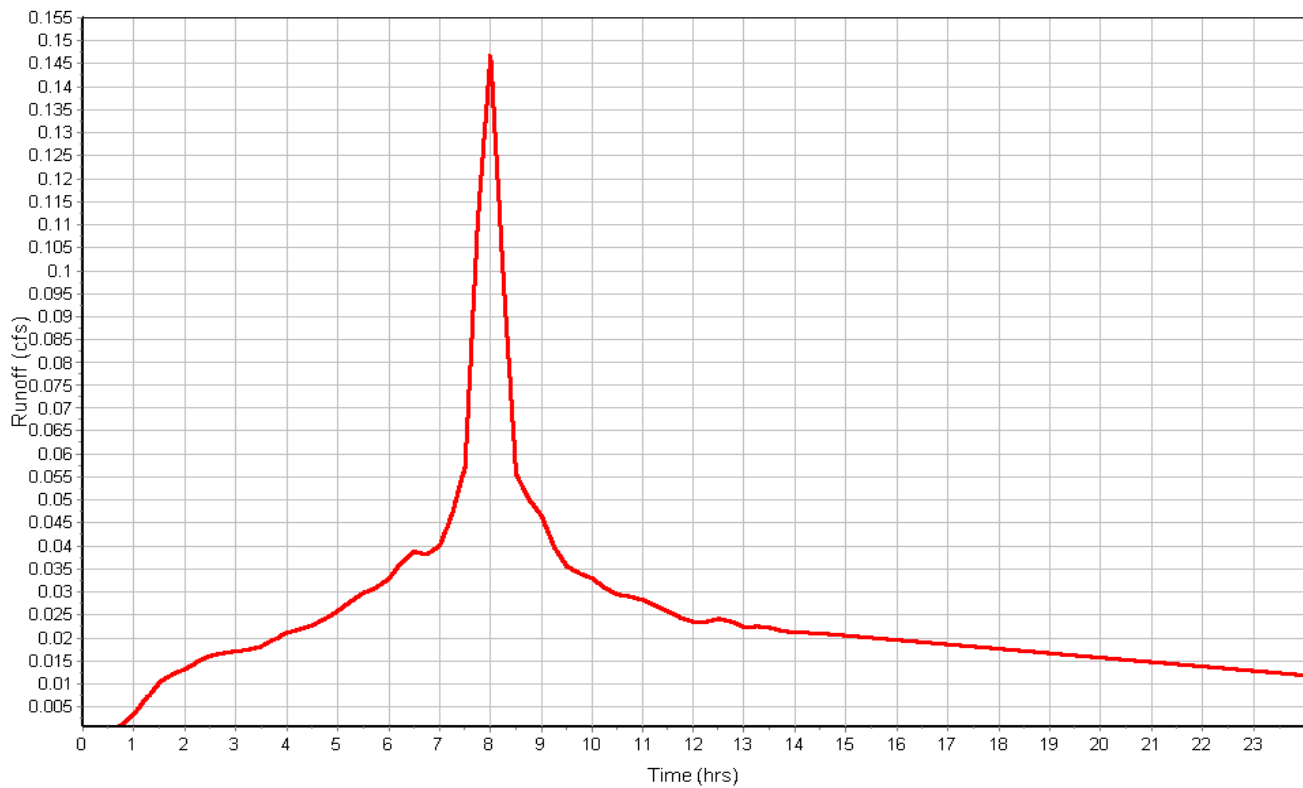
Total Rainfall (in) 4.75
 Total Runoff (in) 4.52
 Peak Runoff (cfs) 0.15
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : RDCO_18

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RDCO_19**Input Data**

Area (ac) 0.26
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

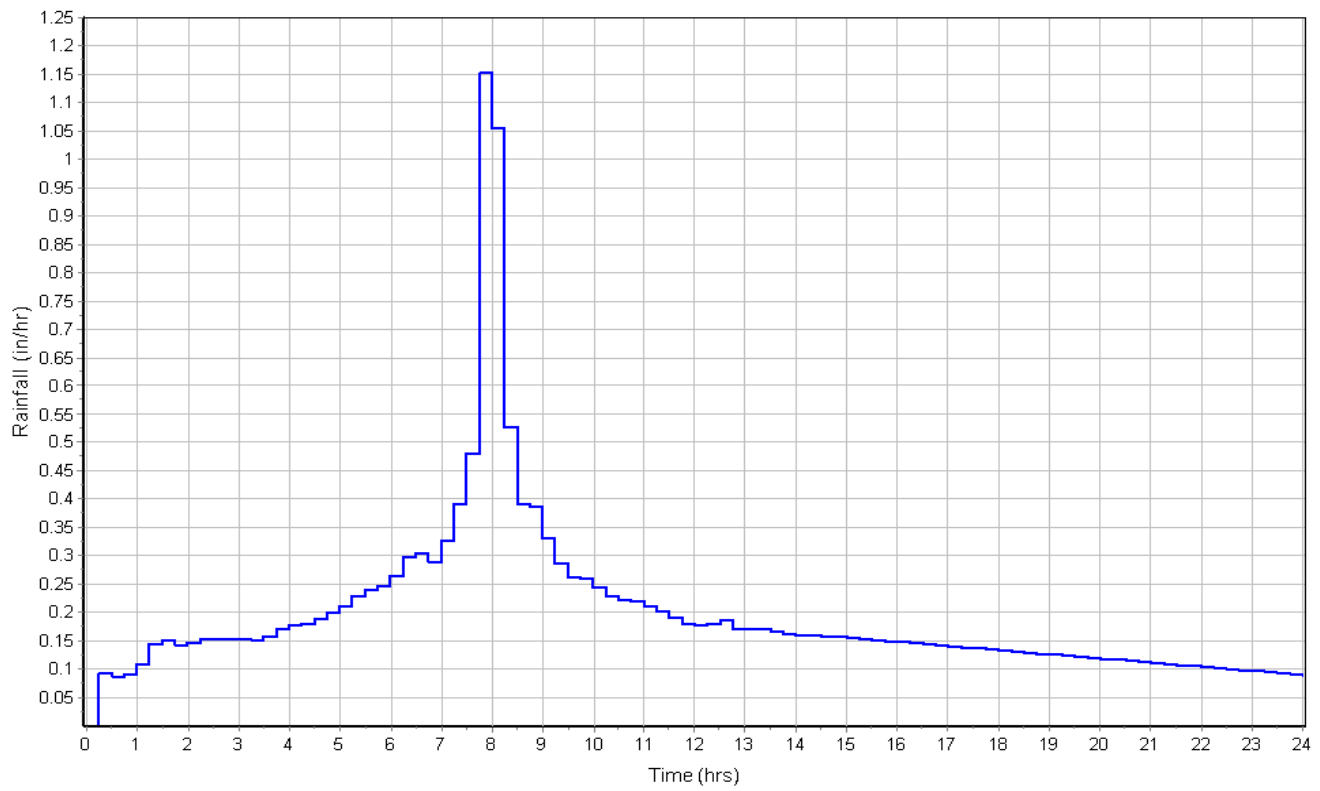
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.26		98

Subbasin Runoff Results

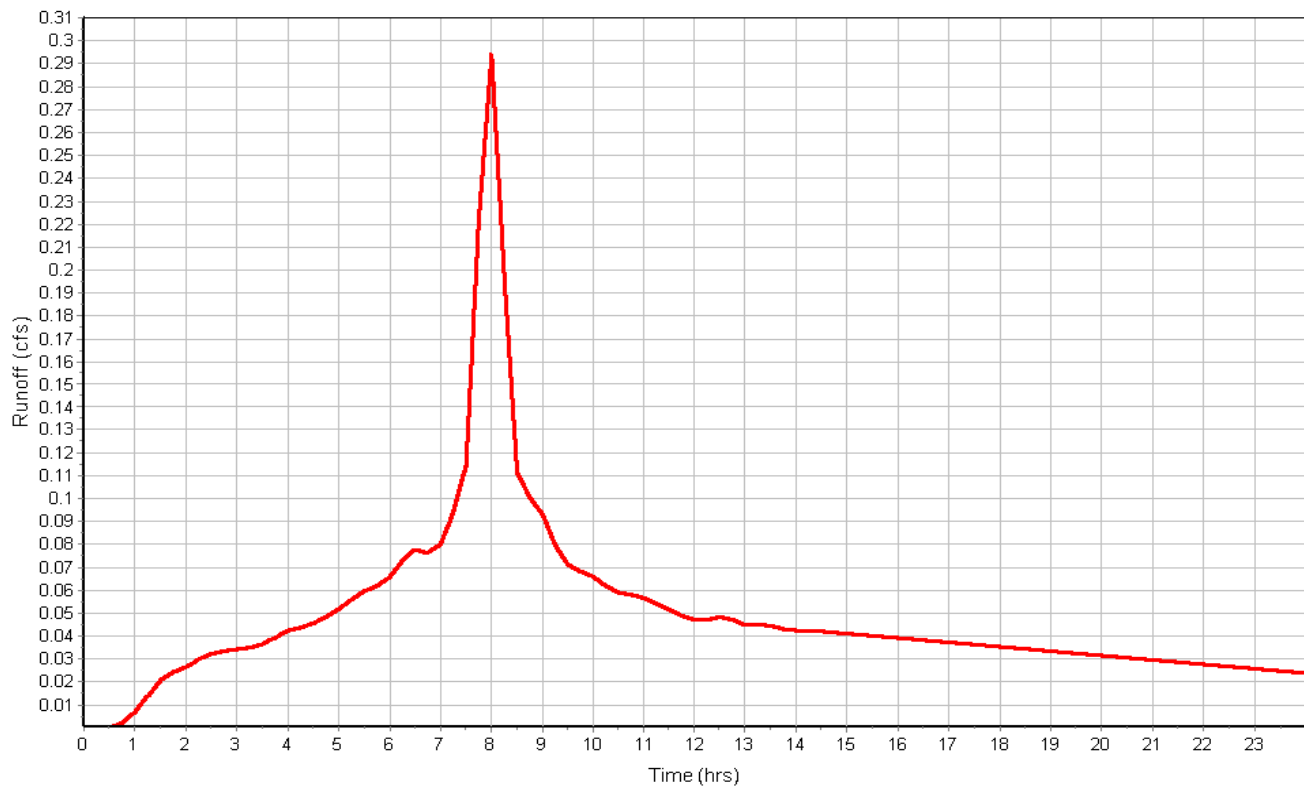
Total Rainfall (in) 4.75
 Total Runoff (in) 4.52
 Peak Runoff (cfs) 0.29
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : RDCO_19

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RDCO_21**Input Data**

Area (ac) 0.13
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

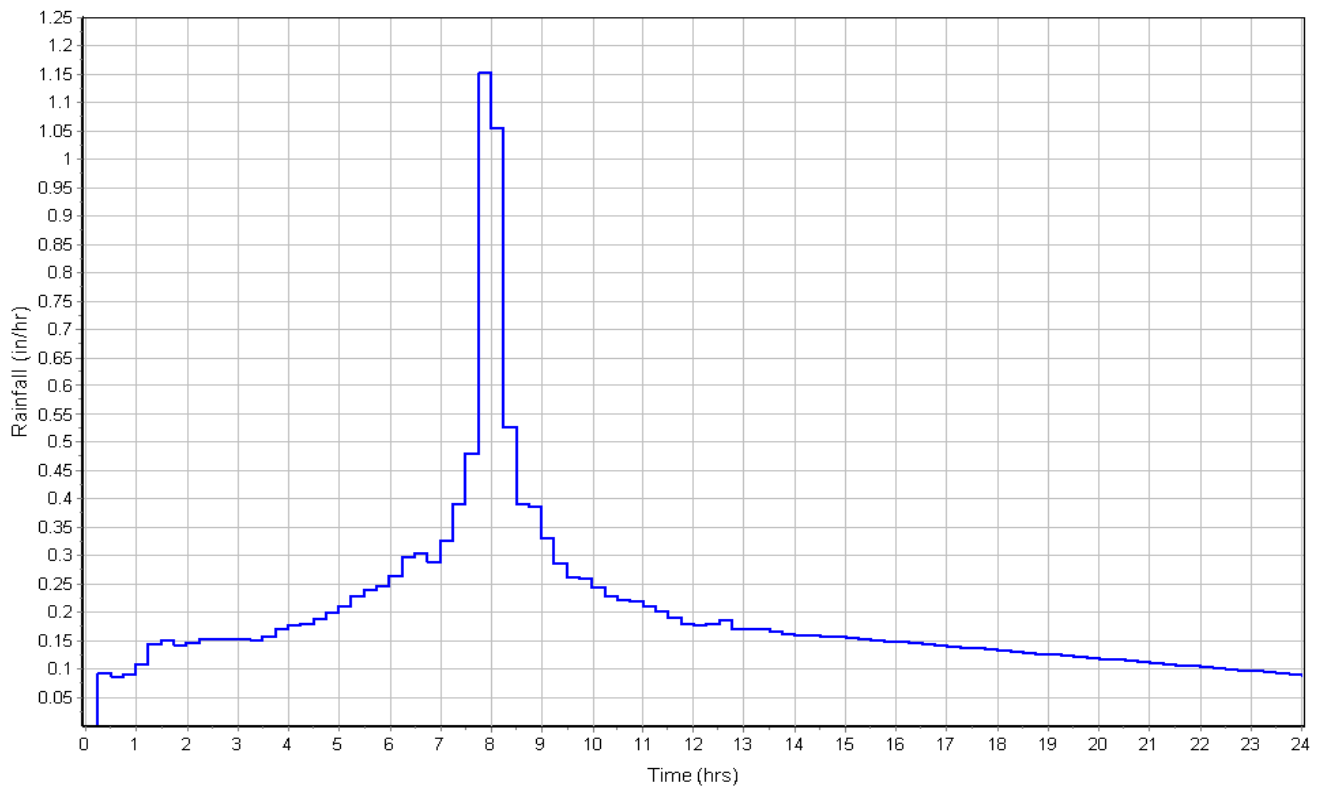
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.13		98

Subbasin Runoff Results

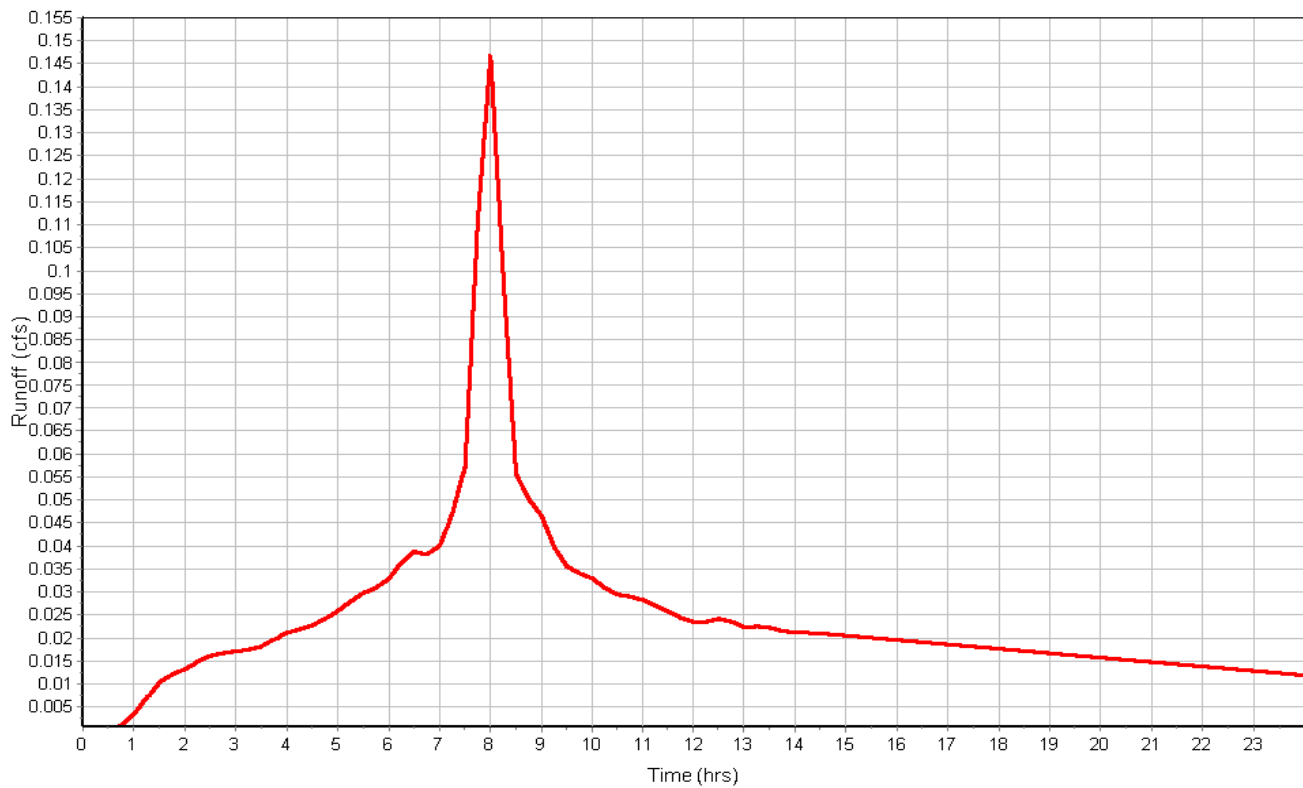
Total Rainfall (in) 4.75
 Total Runoff (in) 4.52
 Peak Runoff (cfs) 0.15
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : RDCO_21

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RDCO_22**Input Data**

Area (ac) 0.22
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

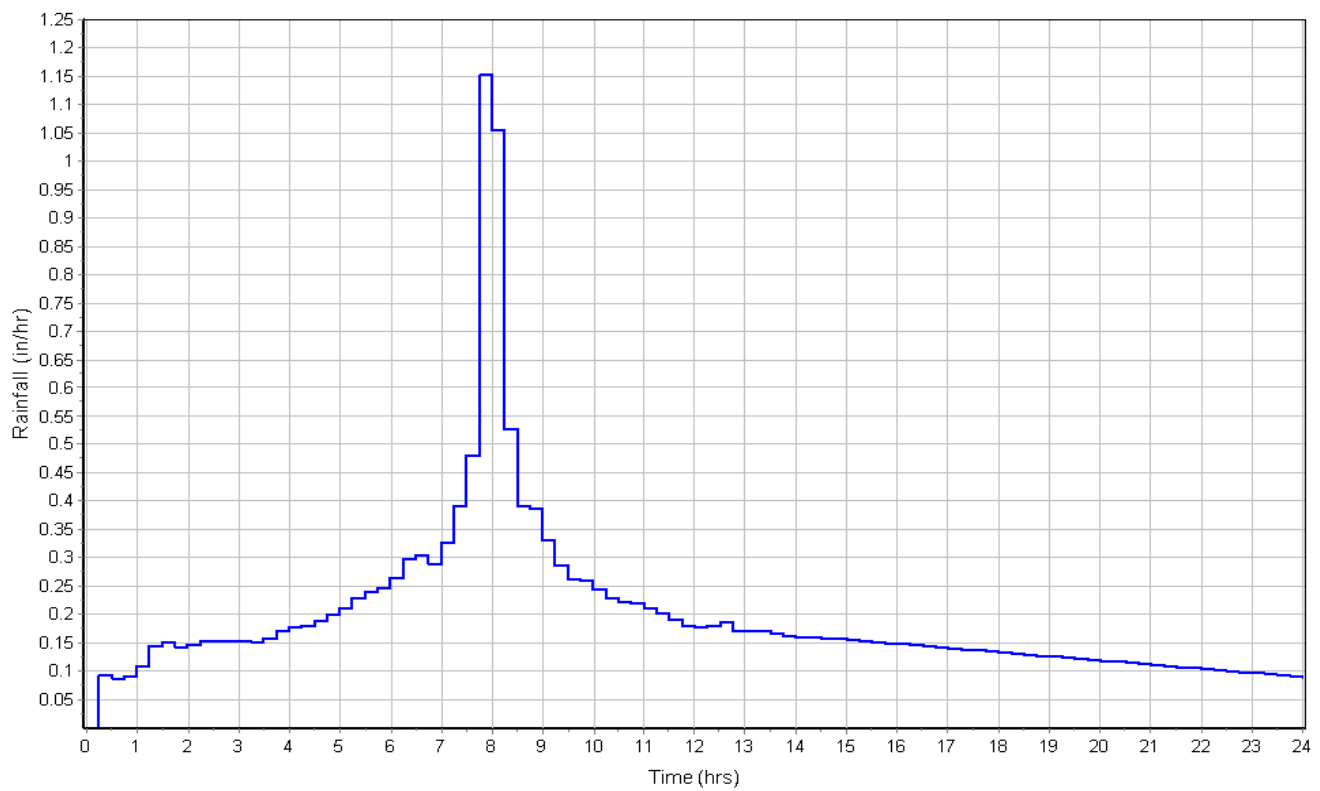
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.22		98

Subbasin Runoff Results

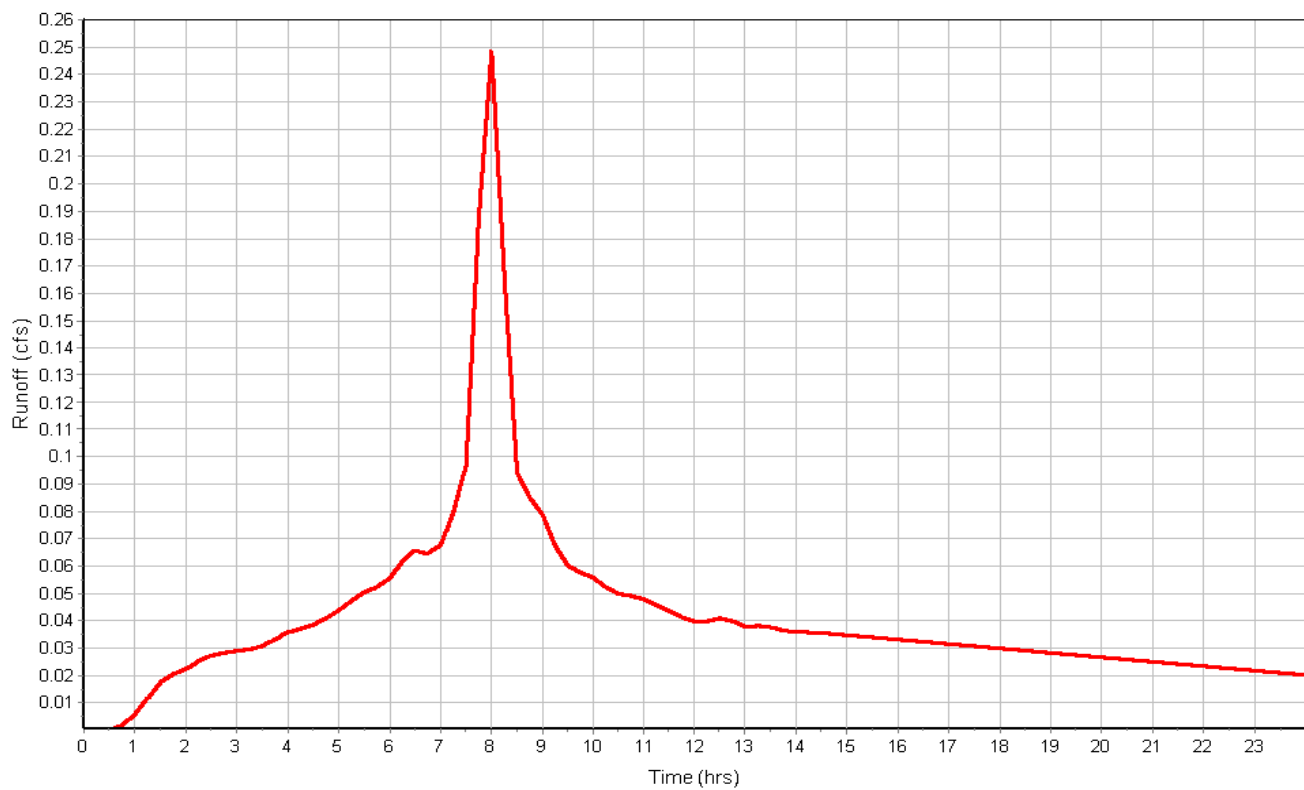
Total Rainfall (in) 4.75
 Total Runoff (in) 4.52
 Peak Runoff (cfs) 0.25
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : RDCO_22

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RDCO_25**Input Data**

Area (ac) 0.30
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

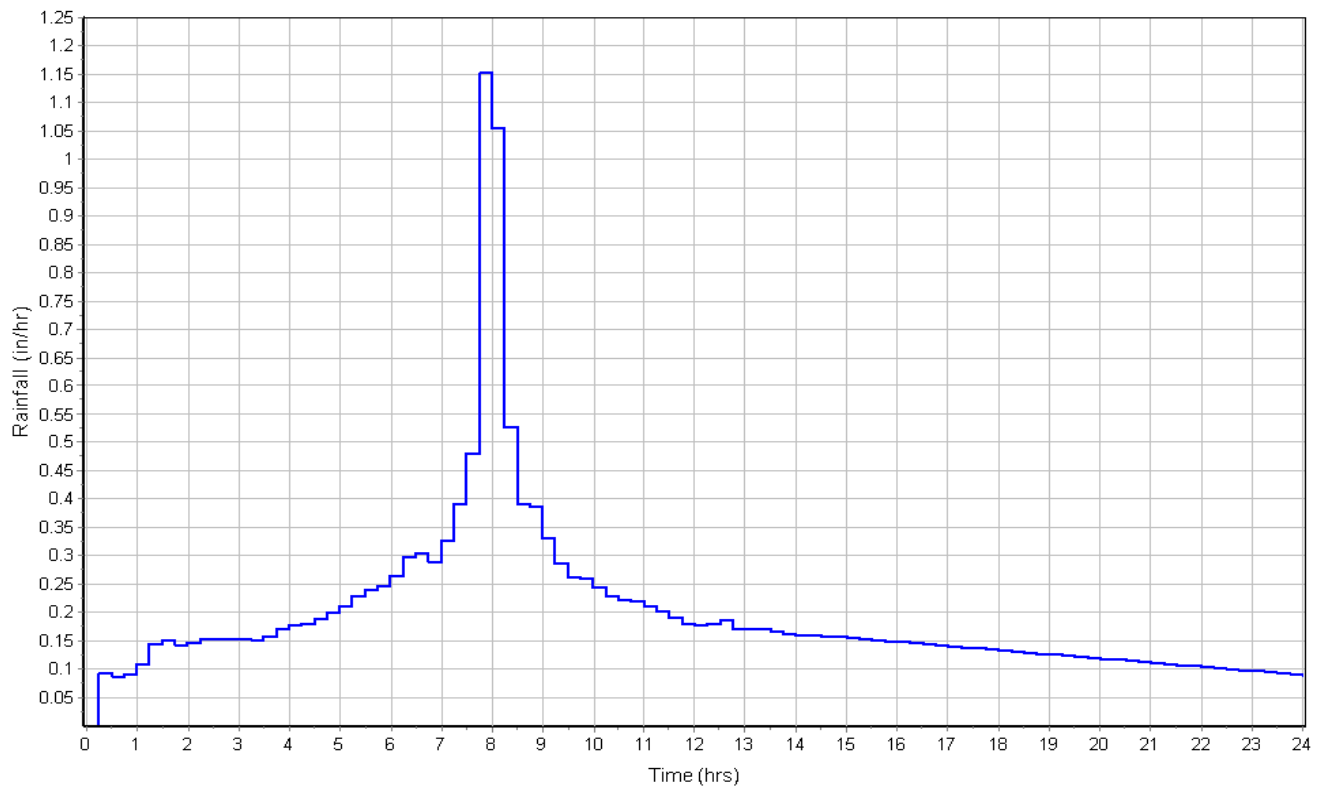
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.30		98

Subbasin Runoff Results

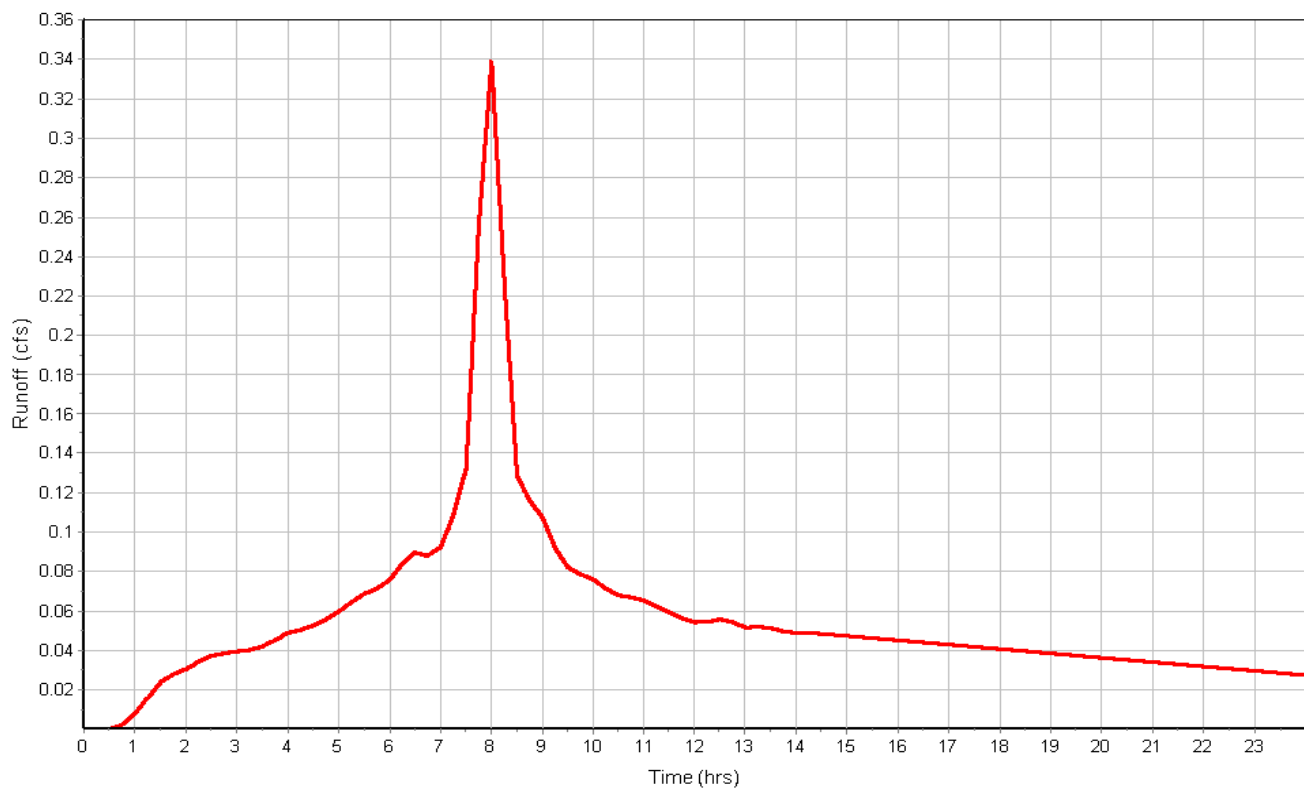
Total Rainfall (in) 4.75
 Total Runoff (in) 4.52
 Peak Runoff (cfs) 0.34
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : RDCO_25

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RDCO_26**Input Data**

Area (ac) 0.04
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

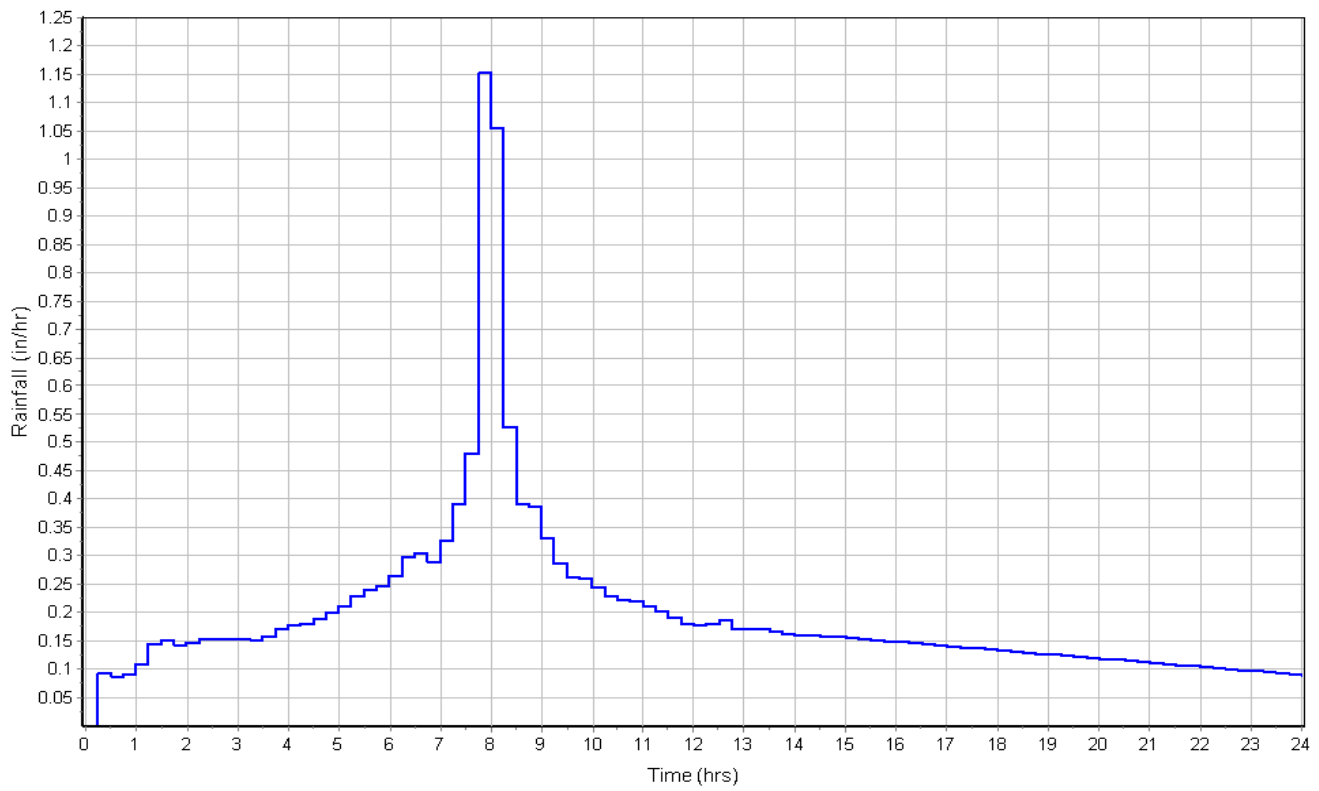
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.04		98

Subbasin Runoff Results

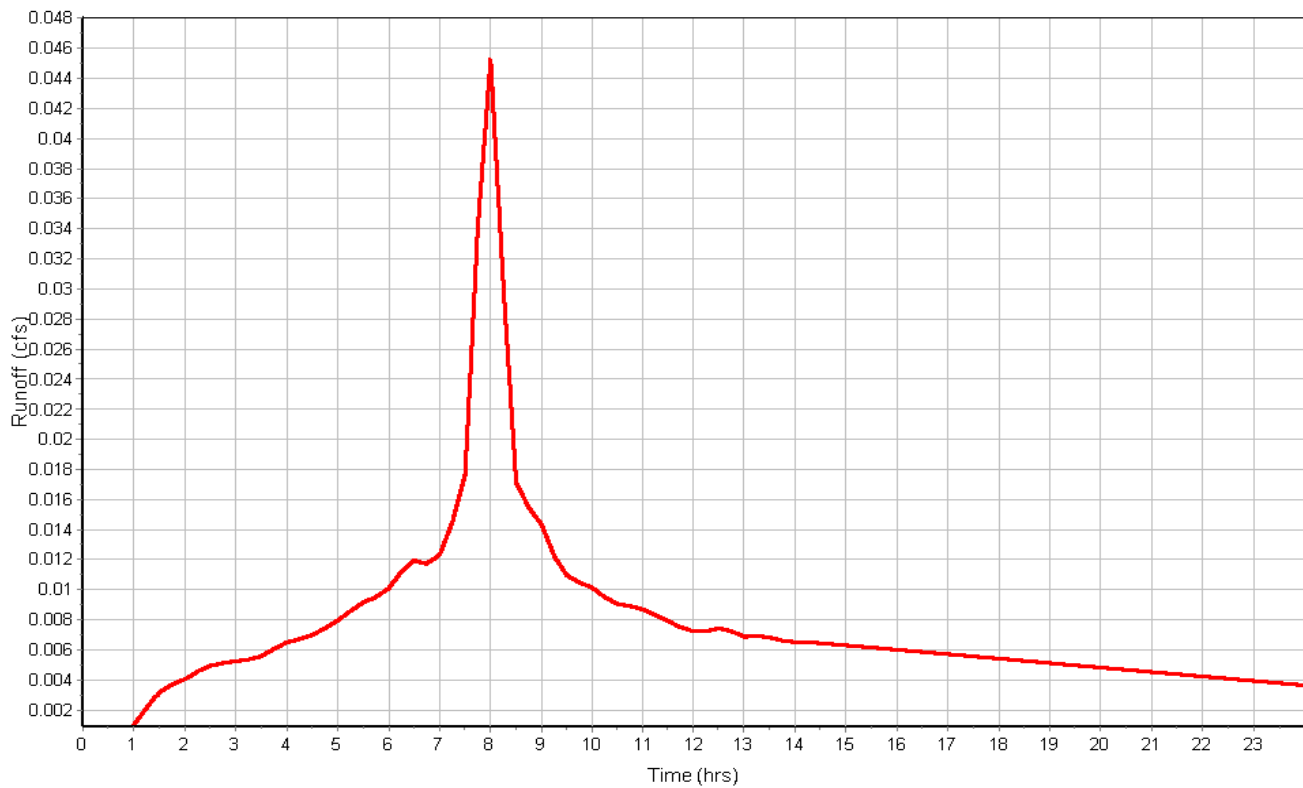
Total Rainfall (in) 4.75
 Total Runoff (in) 4.52
 Peak Runoff (cfs) 0.05
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : RDCO_26

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RDCO_31**Input Data**

Area (ac) 0.15
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

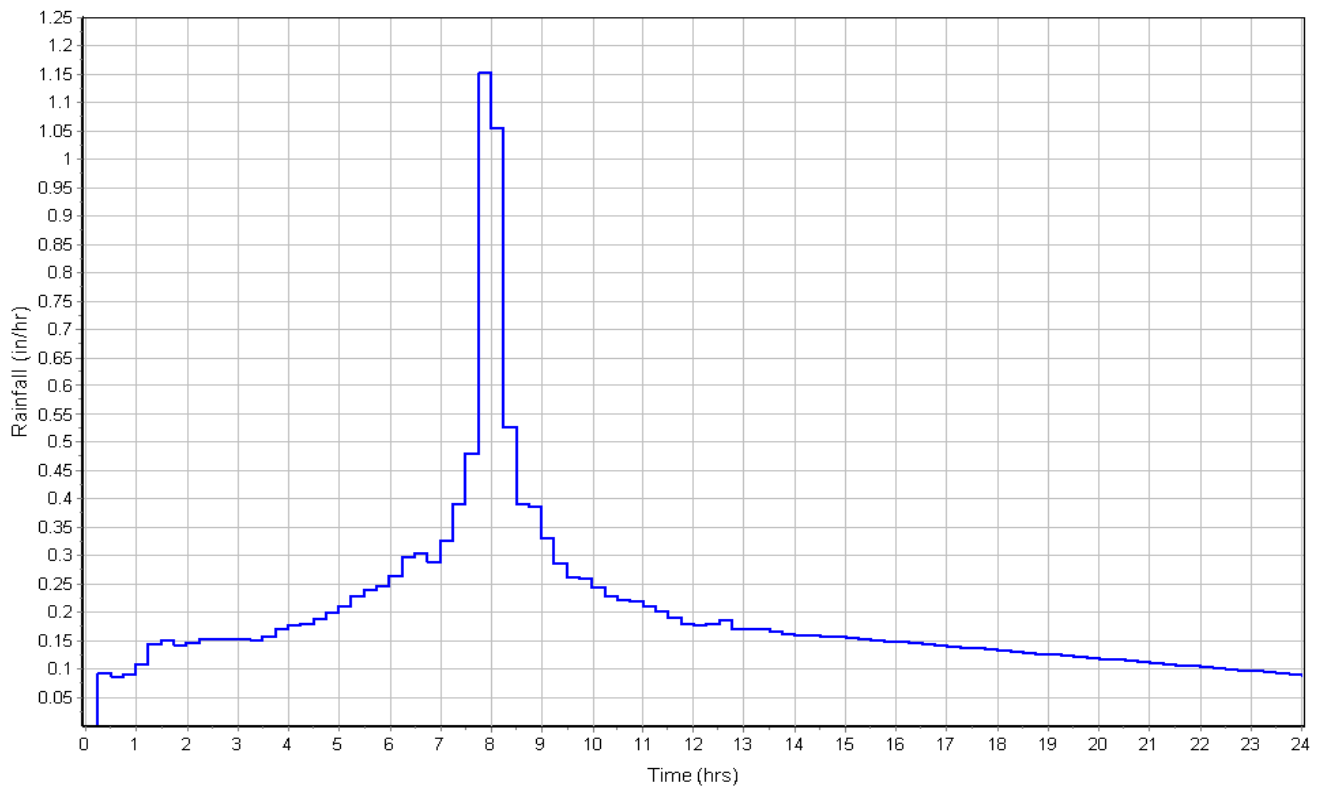
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.15		98

Subbasin Runoff Results

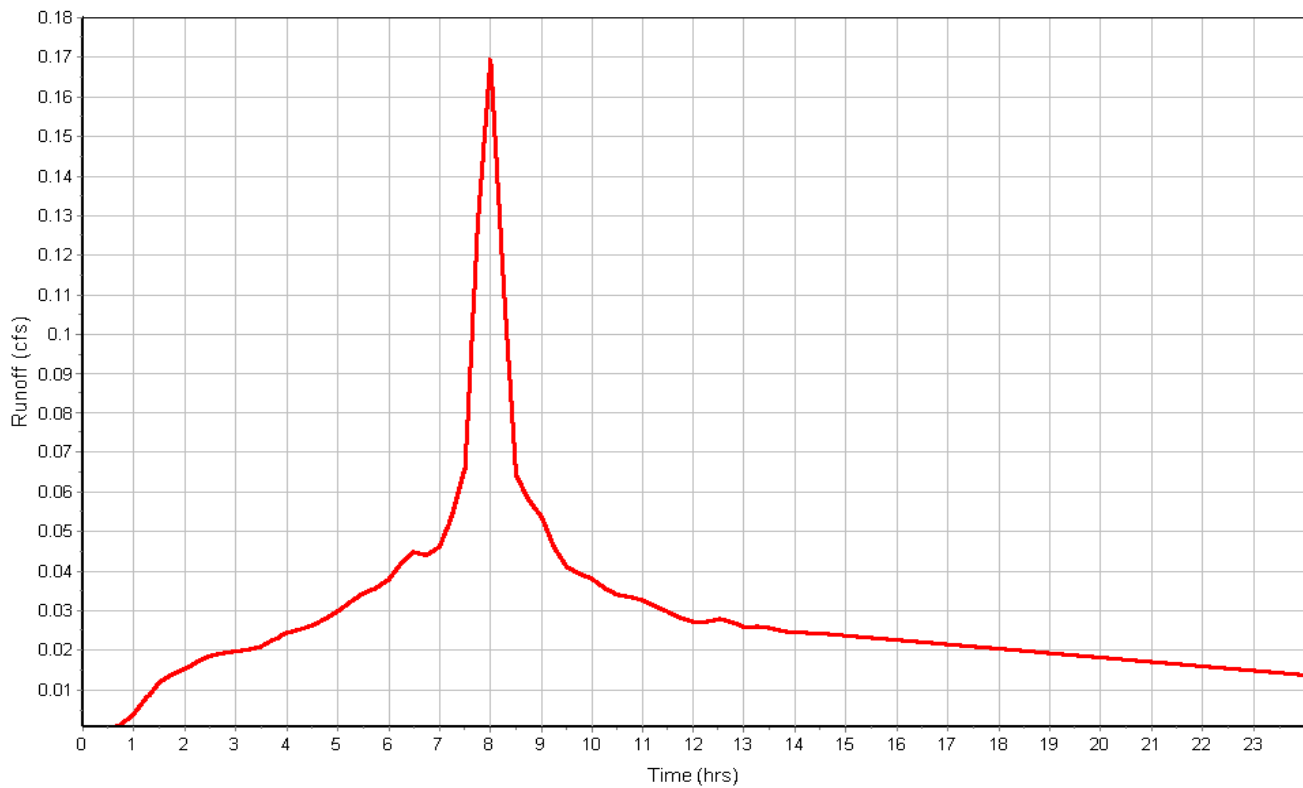
Total Rainfall (in) 4.75
 Total Runoff (in) 4.52
 Peak Runoff (cfs) 0.17
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : RDCO_31

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RDCO_33**Input Data**

Area (ac) 0.06
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

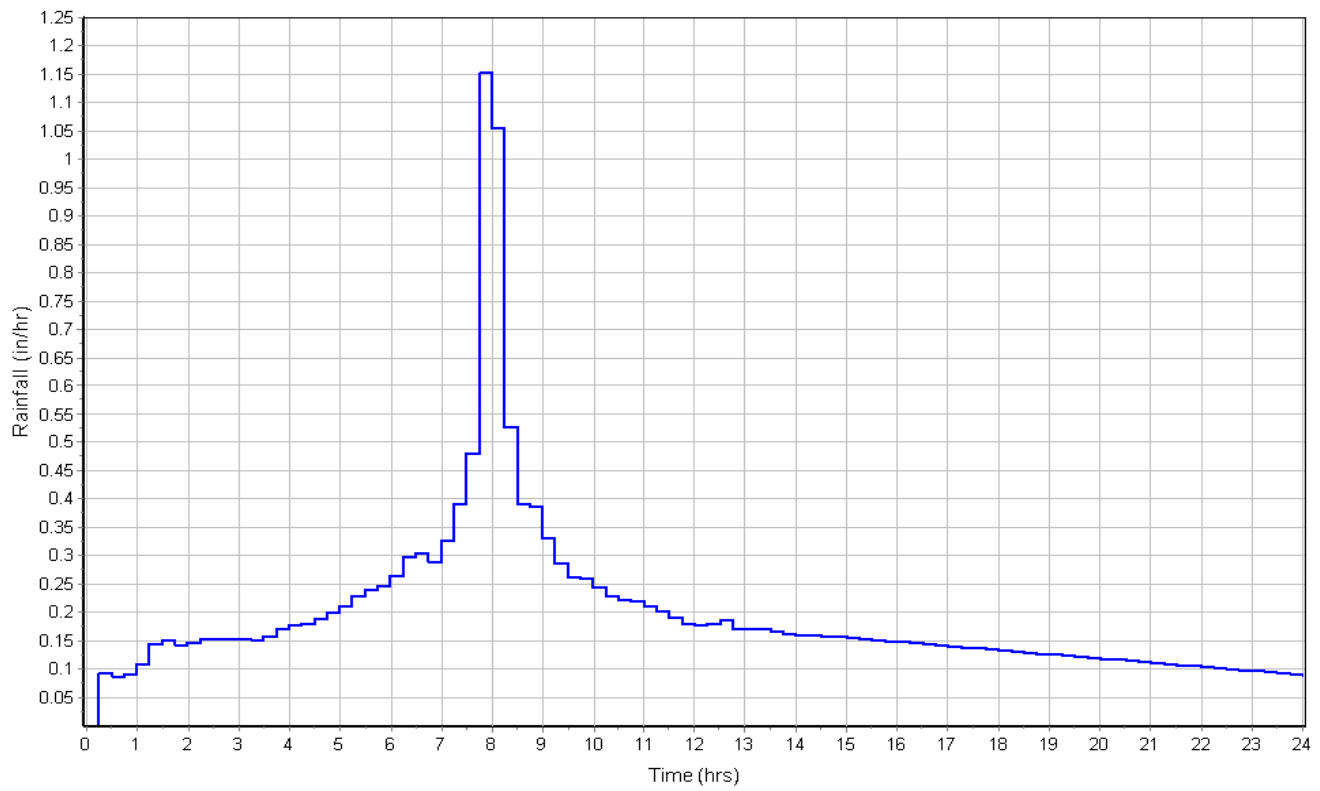
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.06		98

Subbasin Runoff Results

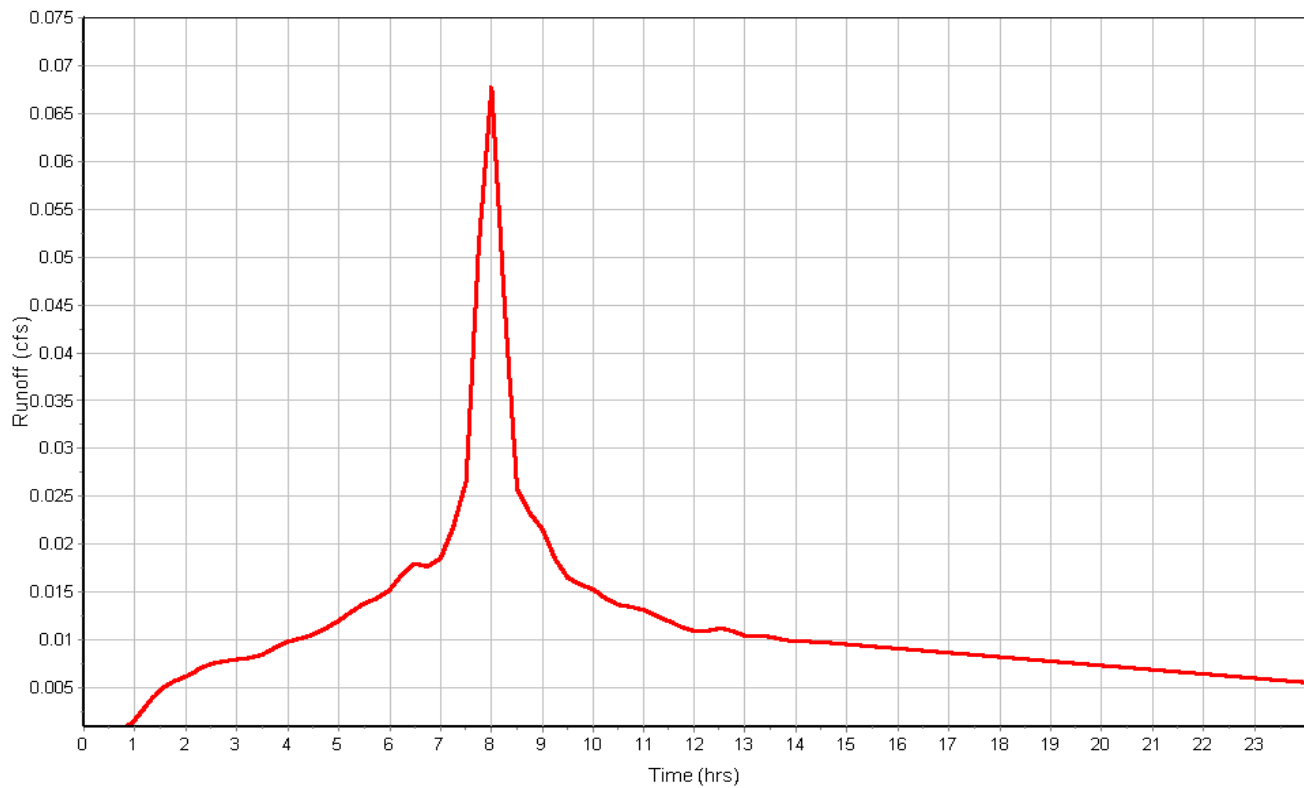
Total Rainfall (in) 4.75
 Total Runoff (in) 4.52
 Peak Runoff (cfs) 0.07
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : RDCO_33

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RDCO_34**Input Data**

Area (ac) 0.18
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

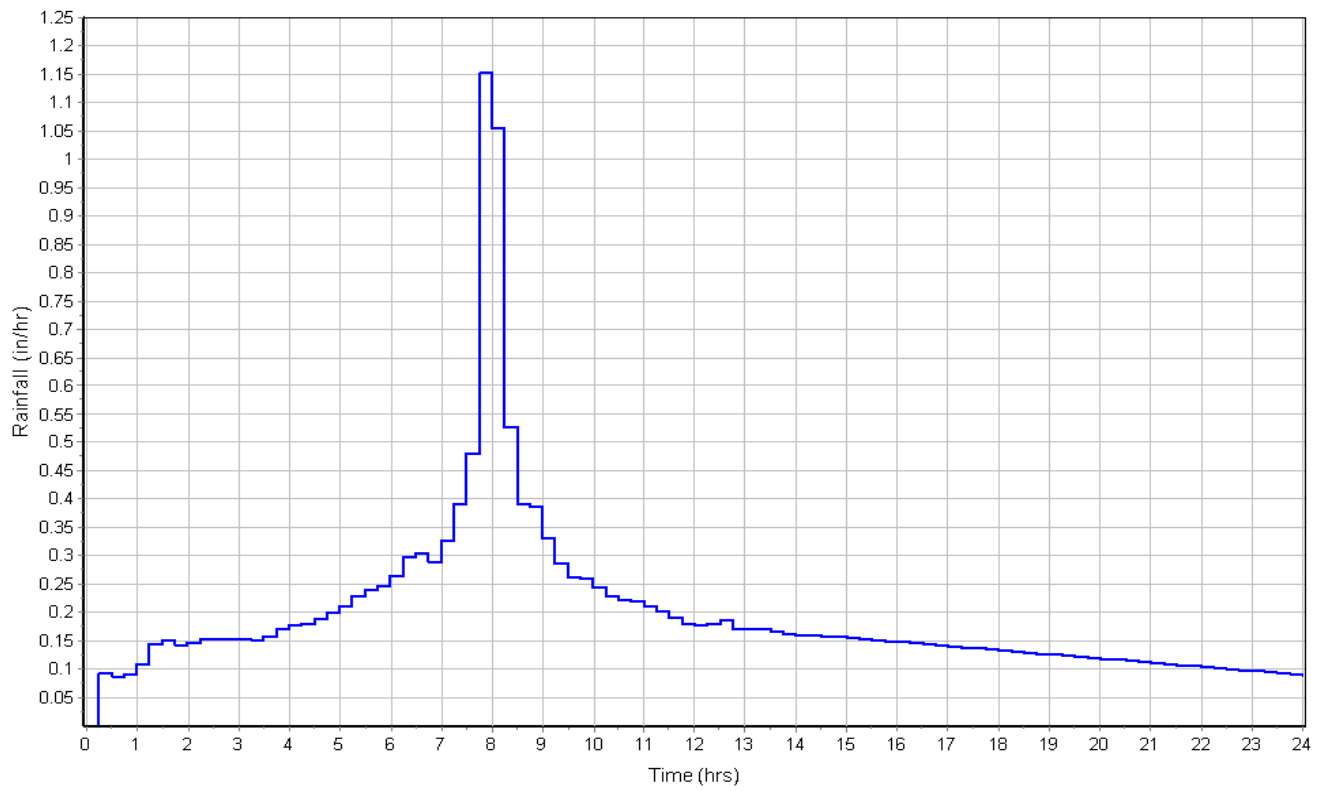
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.18		98

Subbasin Runoff Results

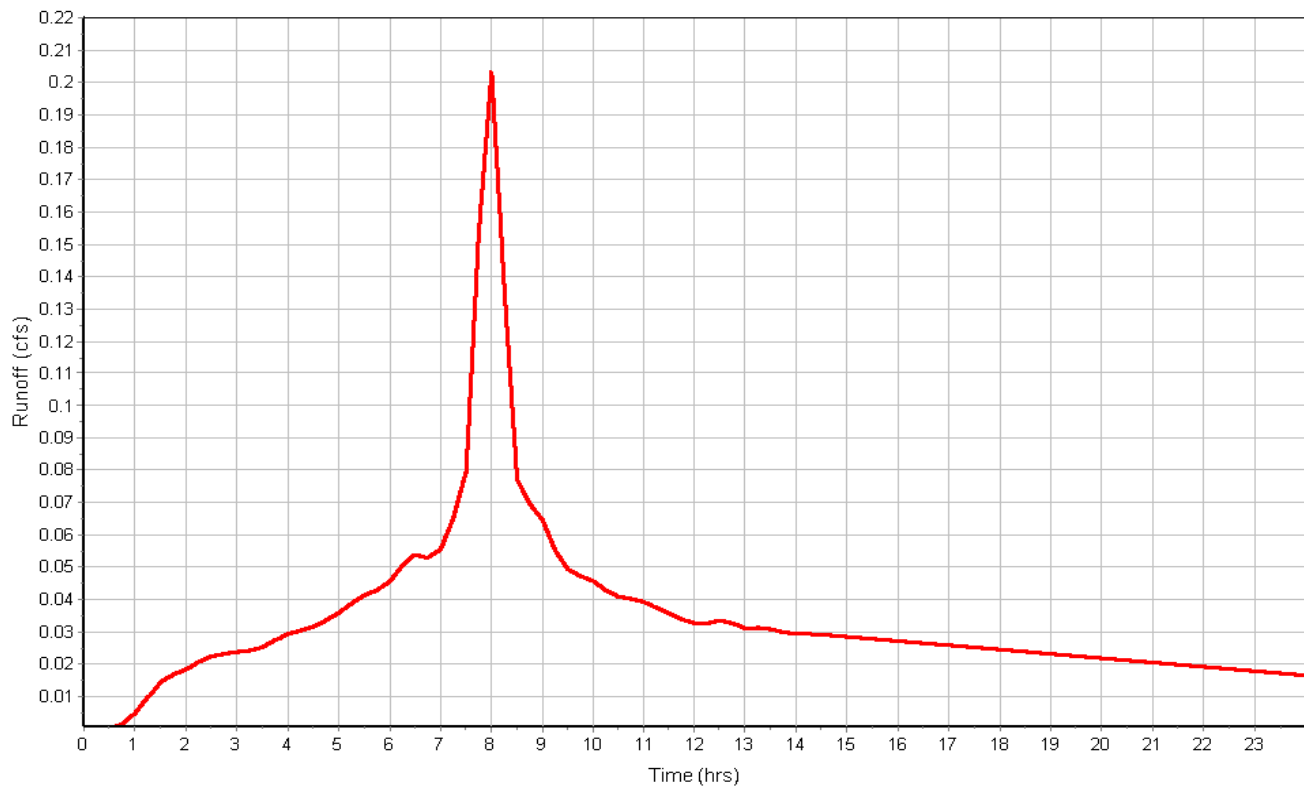
Total Rainfall (in) 4.75
 Total Runoff (in) 4.52
 Peak Runoff (cfs) 0.20
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : RDCO_34

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RDCO_37**Input Data**

Area (ac) 0.23
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

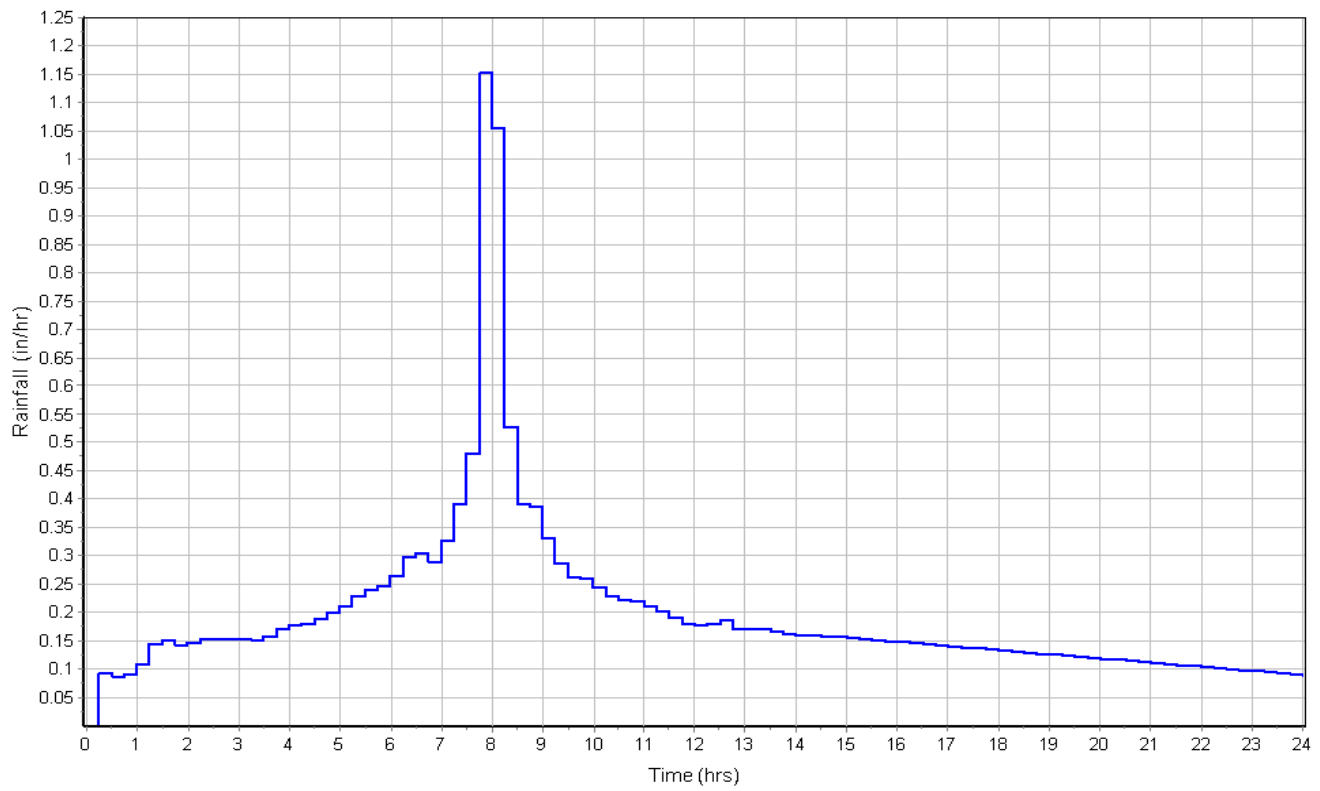
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.23		98

Subbasin Runoff Results

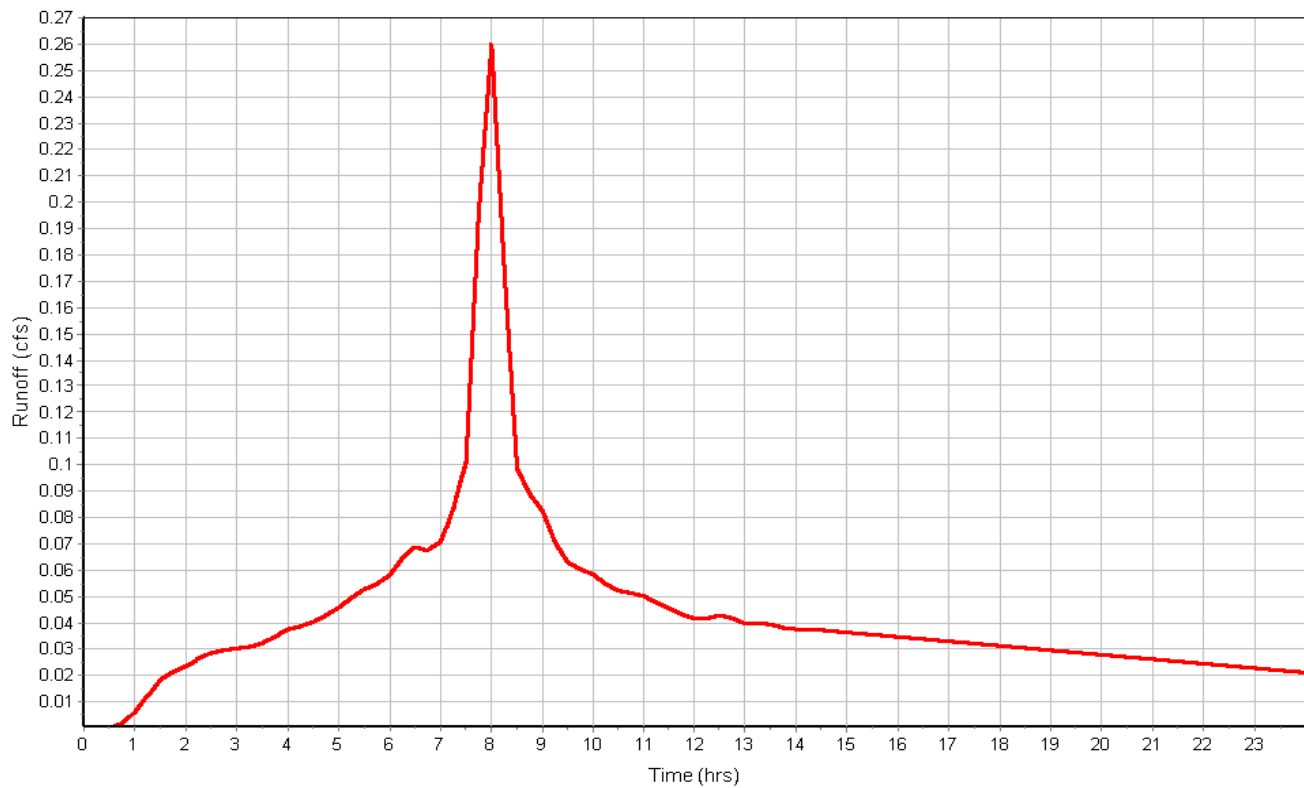
Total Rainfall (in) 4.75
 Total Runoff (in) 4.52
 Peak Runoff (cfs) 0.26
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : RDCO_37

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RDCO_41**Input Data**

Area (ac) 0.07
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

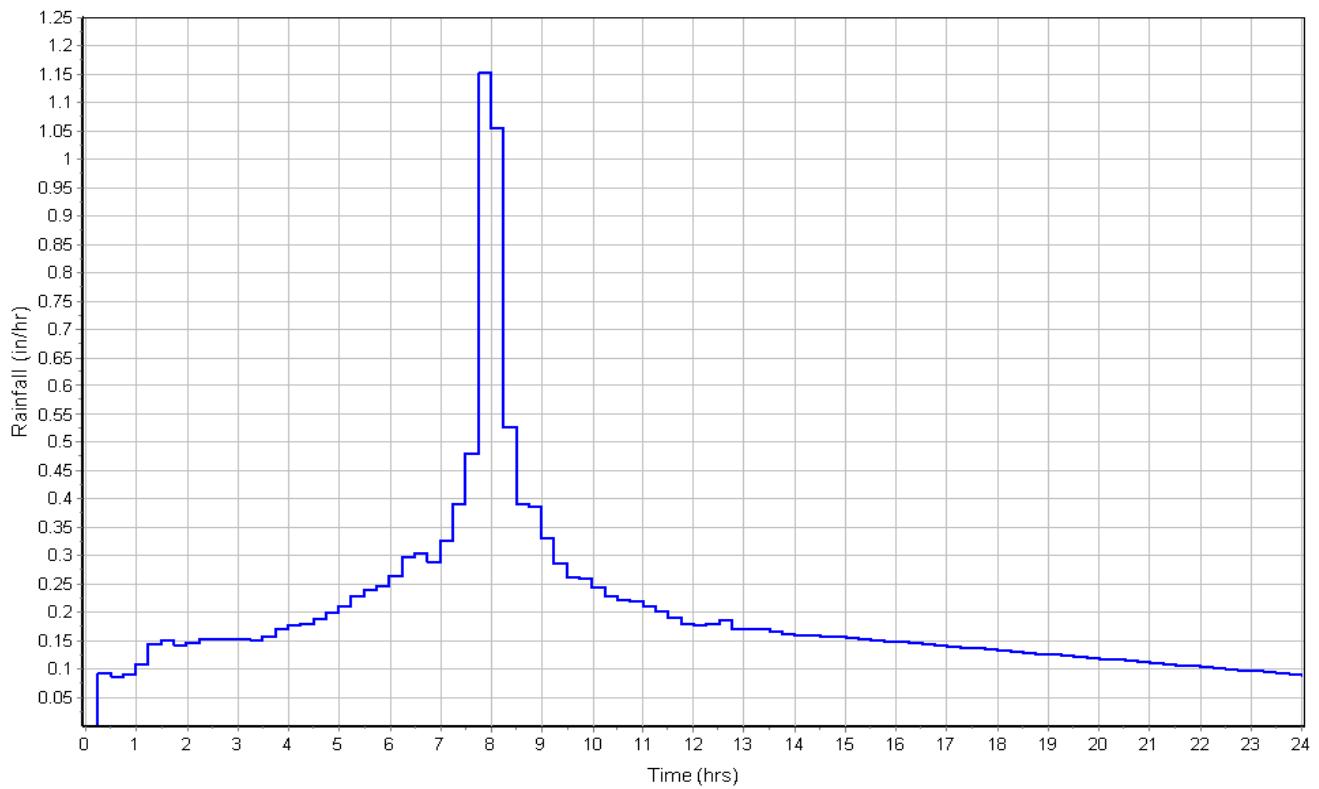
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.07		98

Subbasin Runoff Results

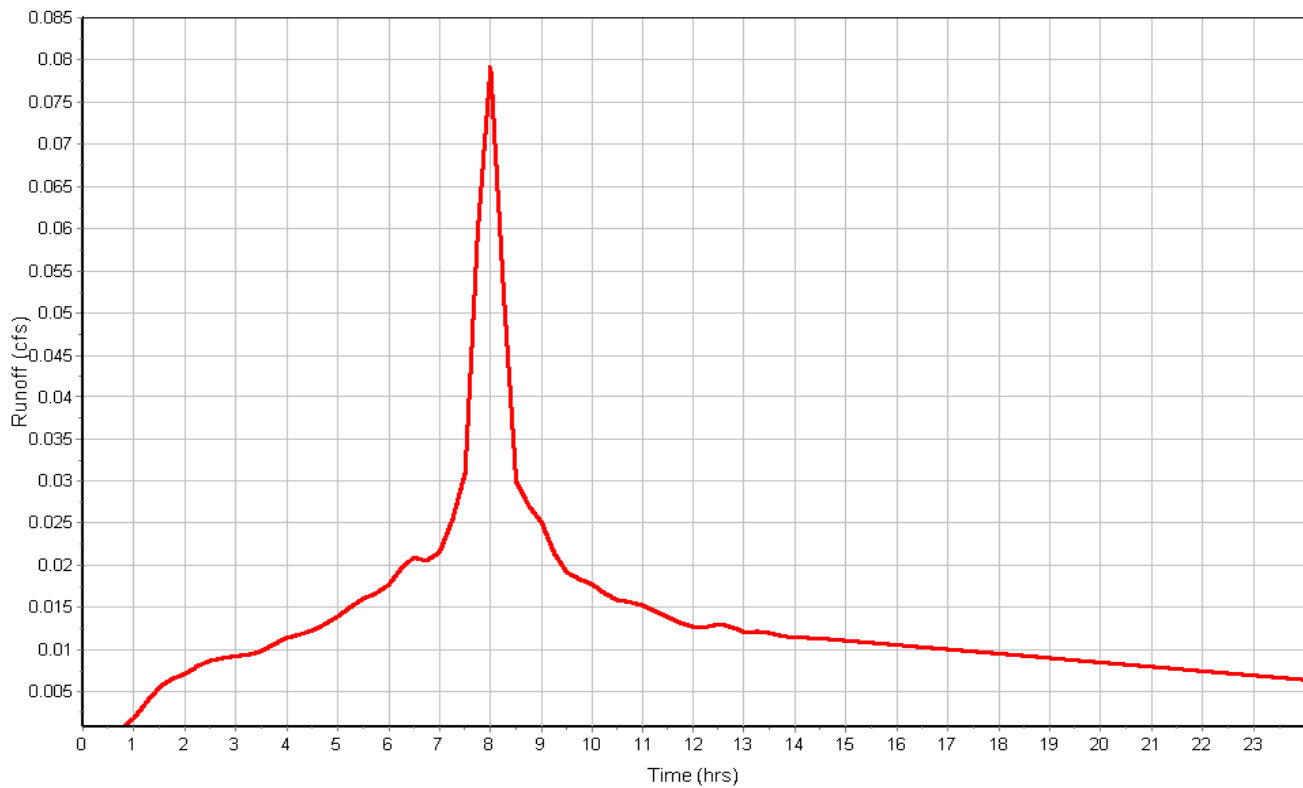
Total Rainfall (in) 4.75
 Total Runoff (in) 4.52
 Peak Runoff (cfs) 0.08
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : RDCO_41

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RDCO_42**Input Data**

Area (ac) 0.09
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

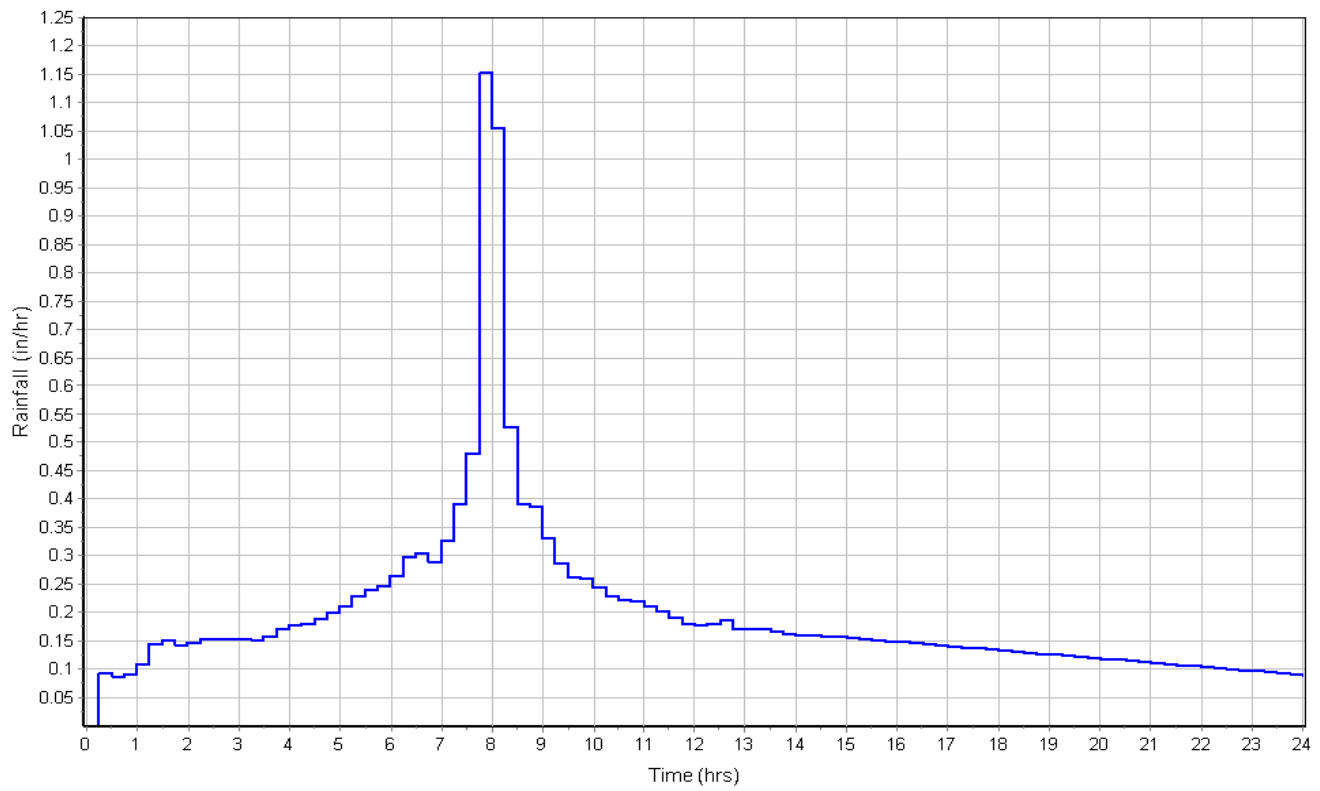
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.09		98

Subbasin Runoff Results

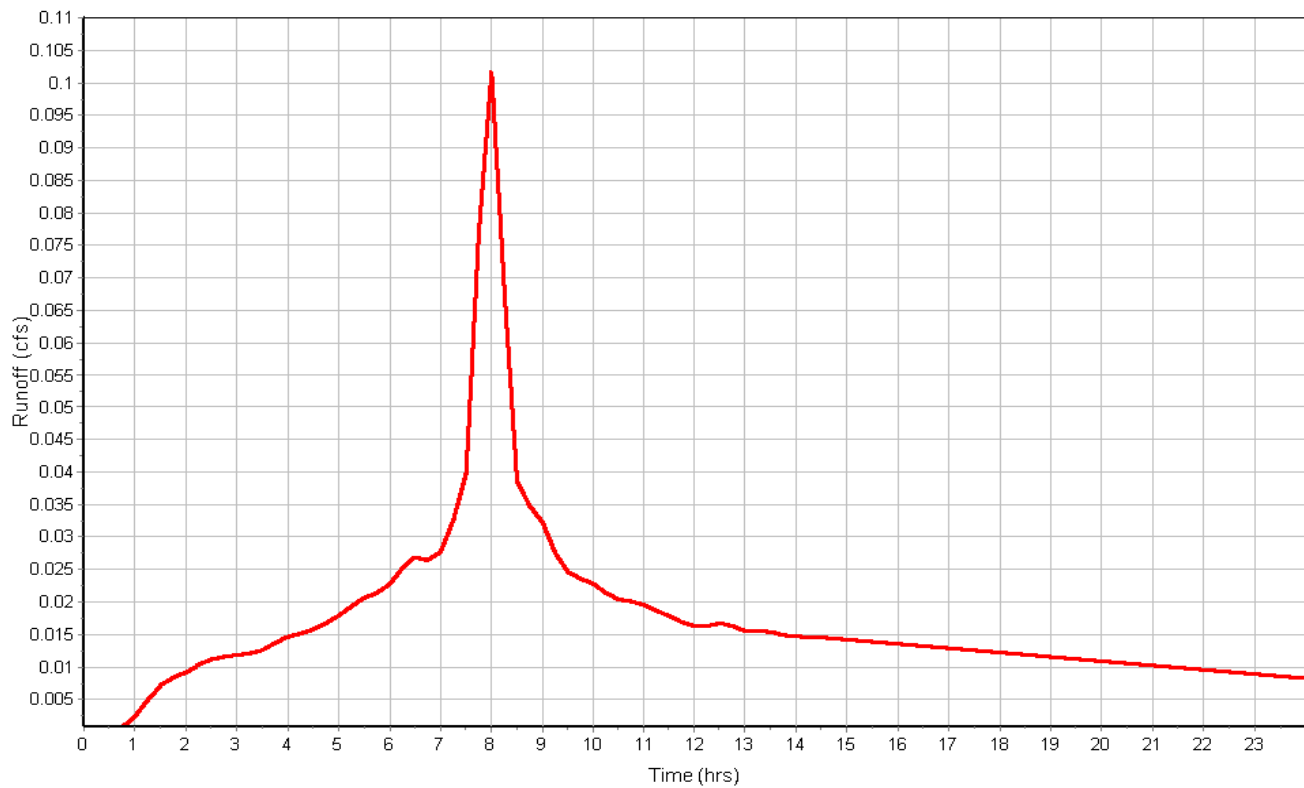
Total Rainfall (in) 4.75
 Total Runoff (in) 4.52
 Peak Runoff (cfs) 0.10
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : RDCO_42

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RDCO_44**Input Data**

Area (ac) 0.17
Impervious Area (%) 100.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

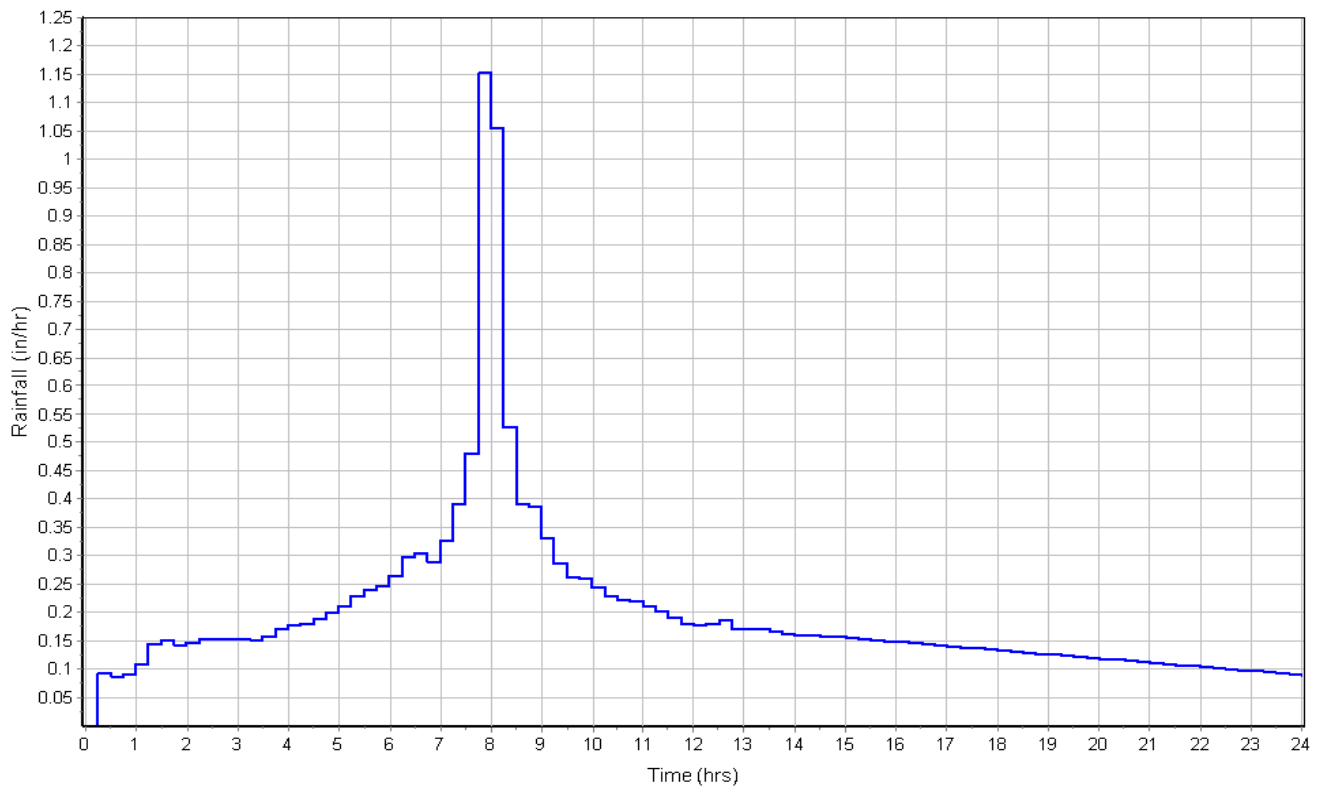
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.17		98

Subbasin Runoff Results

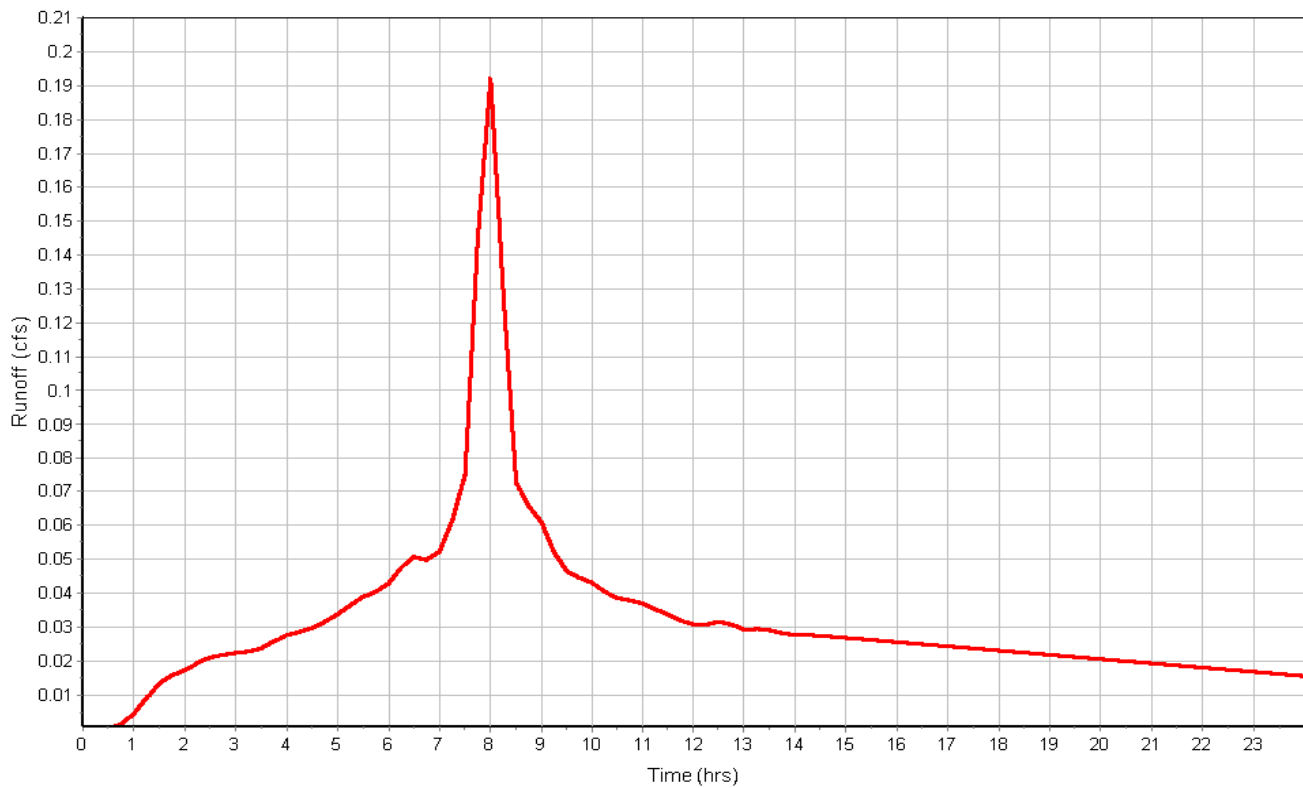
Total Rainfall (in) 4.75
Total Runoff (in) 4.52
Peak Runoff (cfs) 0.19
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : RDCO_44

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : RDCO_46**Input Data**

Area (ac) 0.23
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

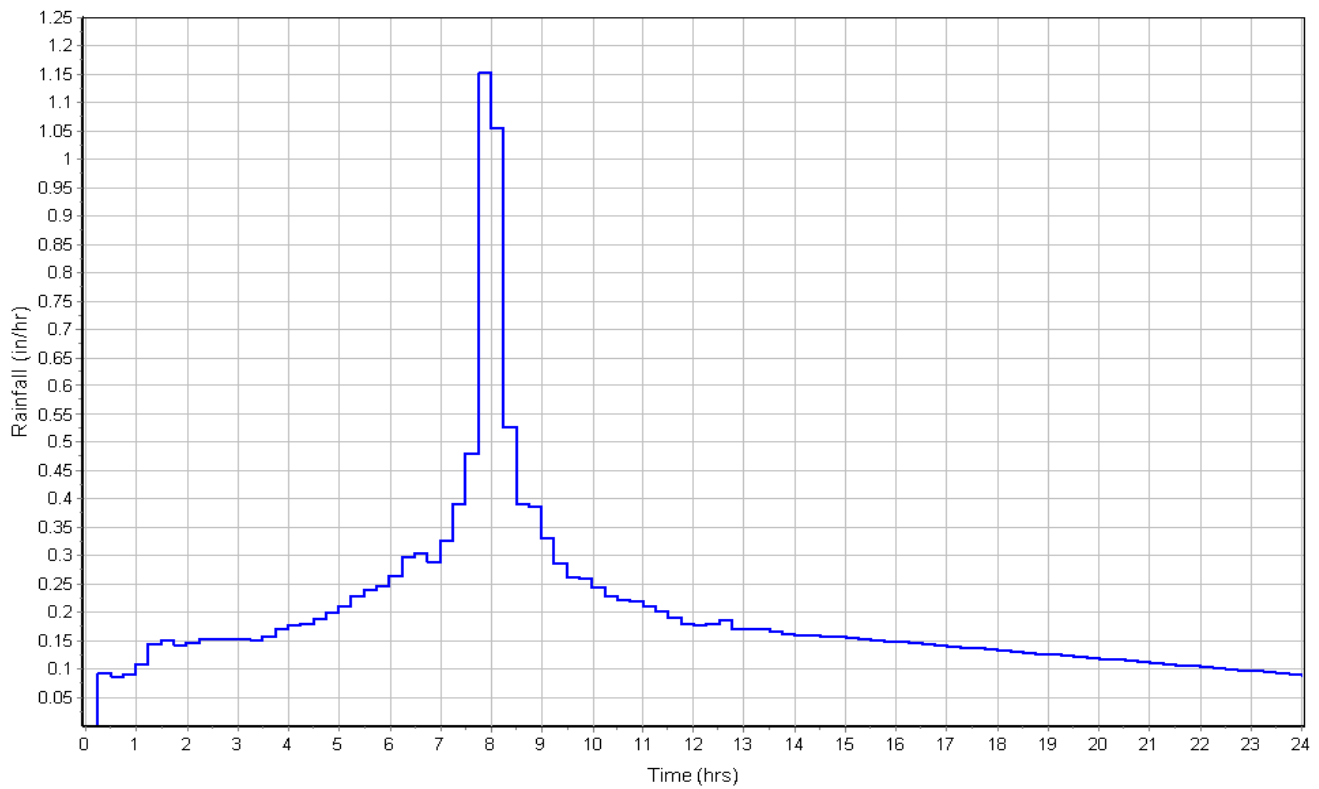
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.23		98

Subbasin Runoff Results

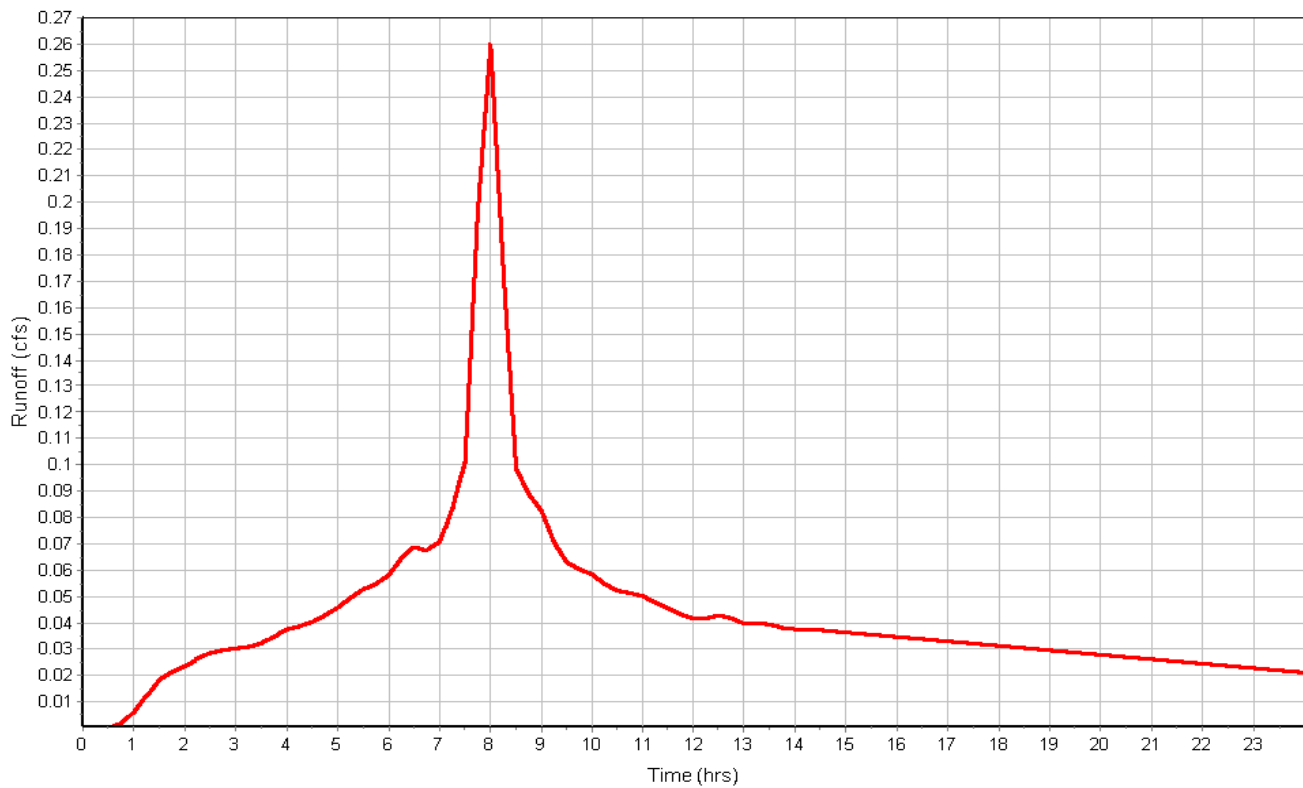
Total Rainfall (in) 4.75
 Total Runoff (in) 4.52
 Peak Runoff (cfs) 0.26
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : RDCO_46

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : SDCB_035**Input Data**

Area (ac) 0.57
Impervious Area (%) 58.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

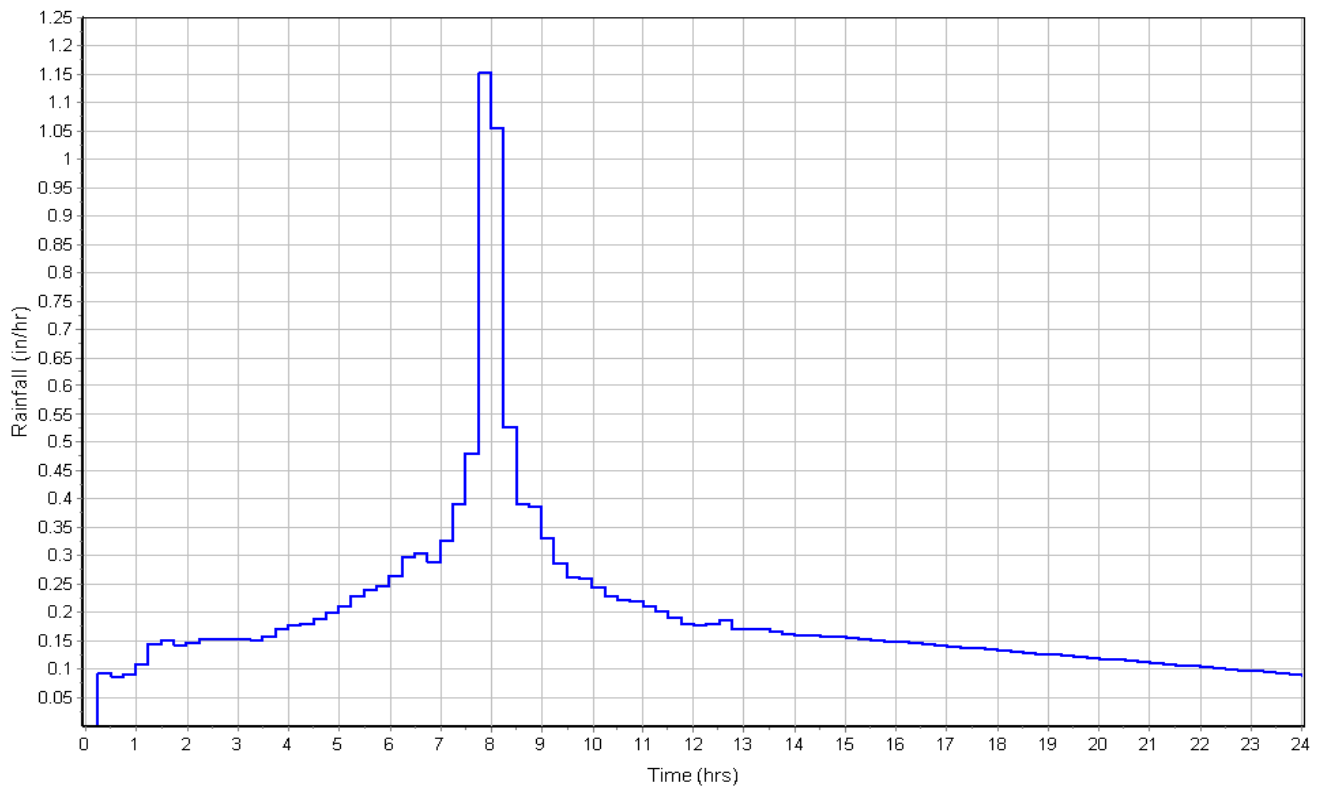
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.57		88.76

Subbasin Runoff Results

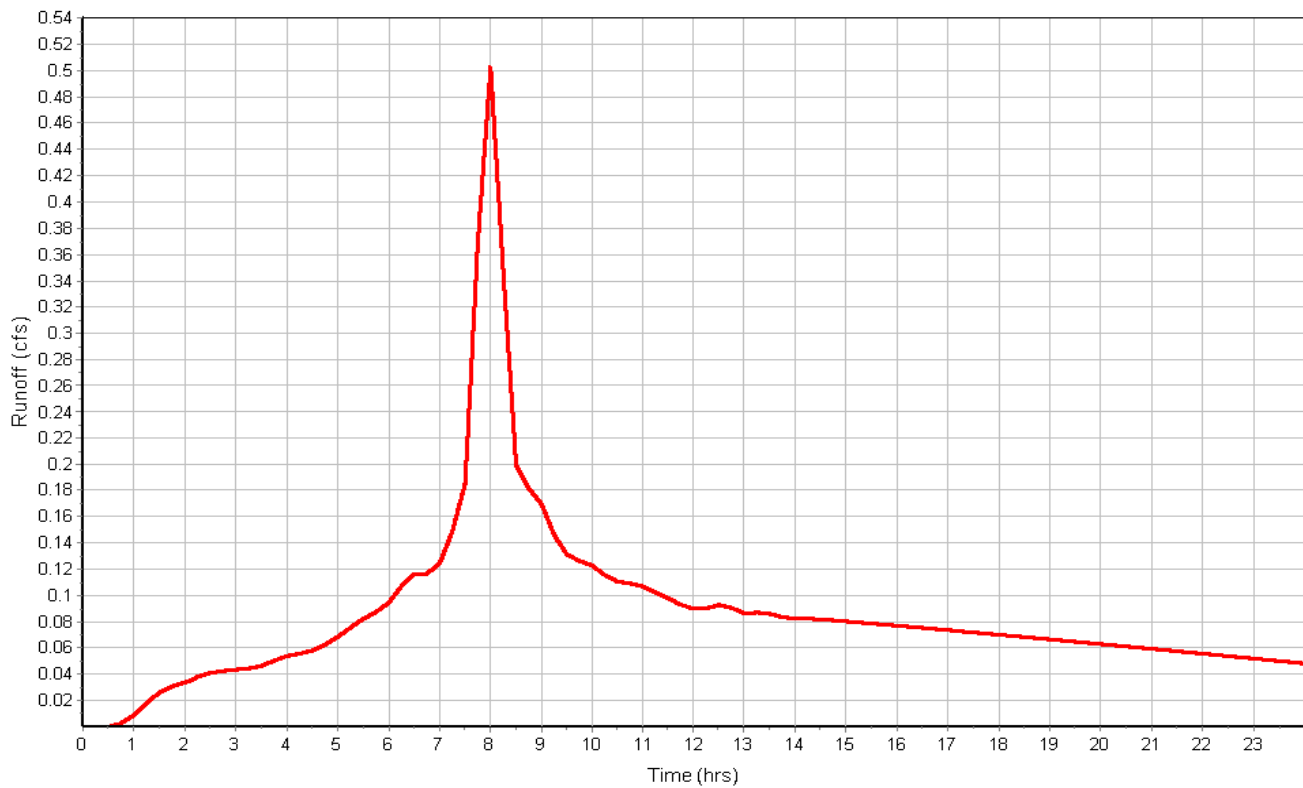
Total Rainfall (in) 4.75
Total Runoff (in) 3.60
Peak Runoff (cfs) 0.50
Weighted Curve Number 88.76
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : SDCB_035

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : SDCB_076**Input Data**

Area (ac) 0.05
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

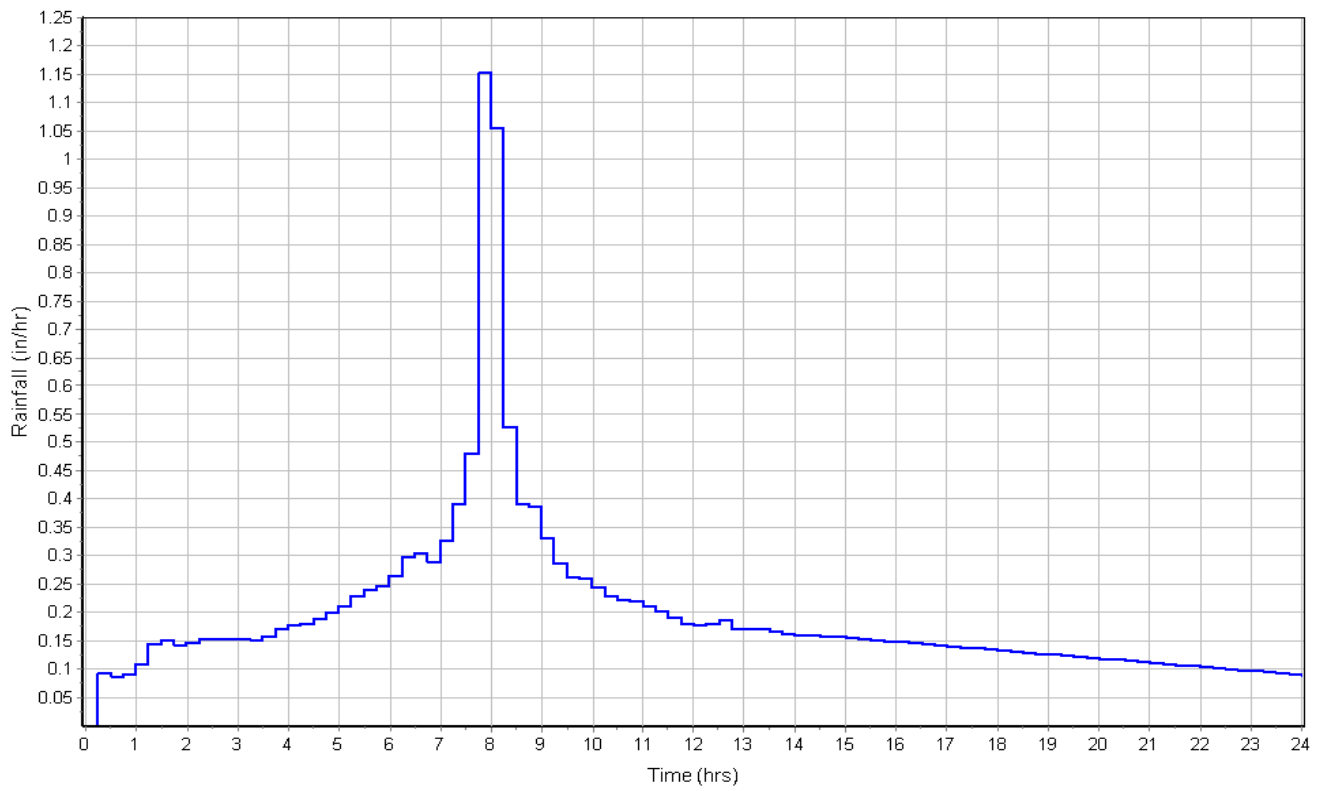
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.05		98

Subbasin Runoff Results

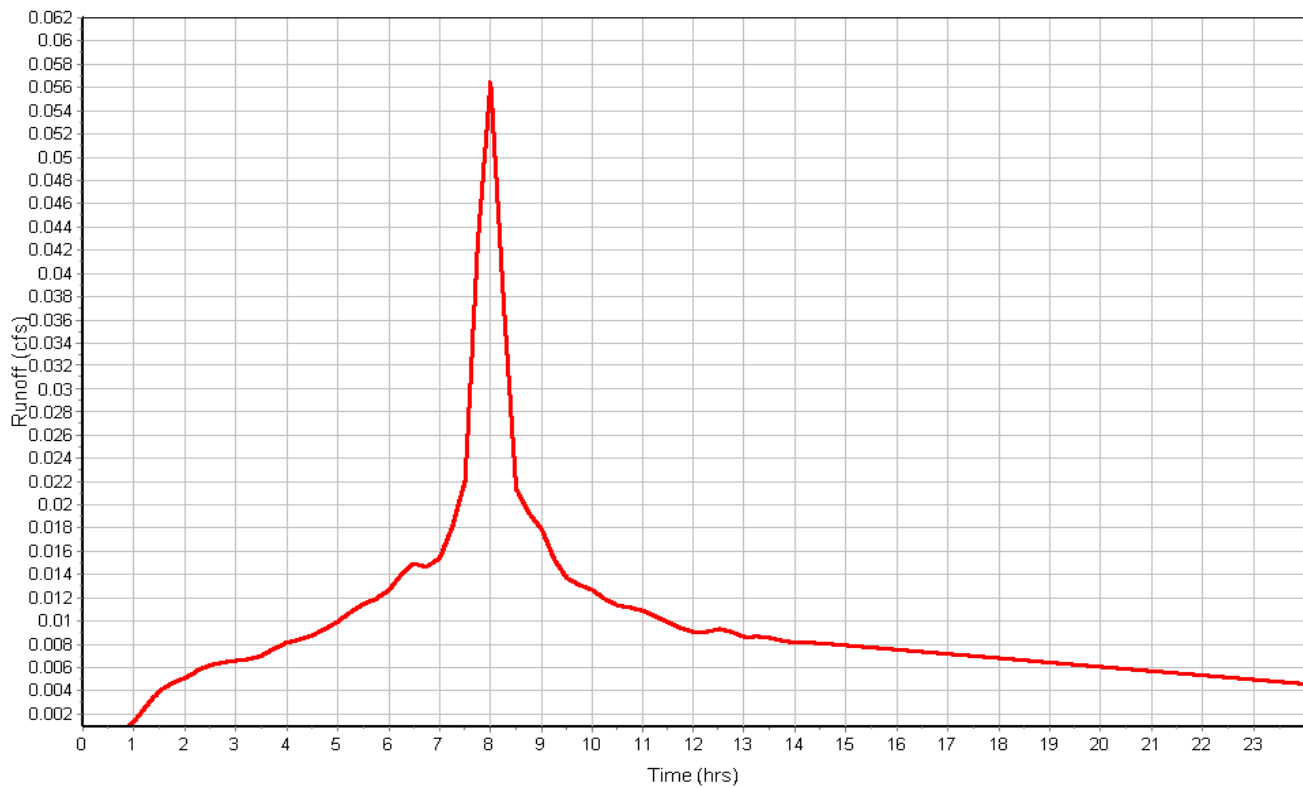
Total Rainfall (in) 4.75
 Total Runoff (in) 4.52
 Peak Runoff (cfs) 0.06
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : SDCB_076

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : SDCB_077**Input Data**

Area (ac) 0.05
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

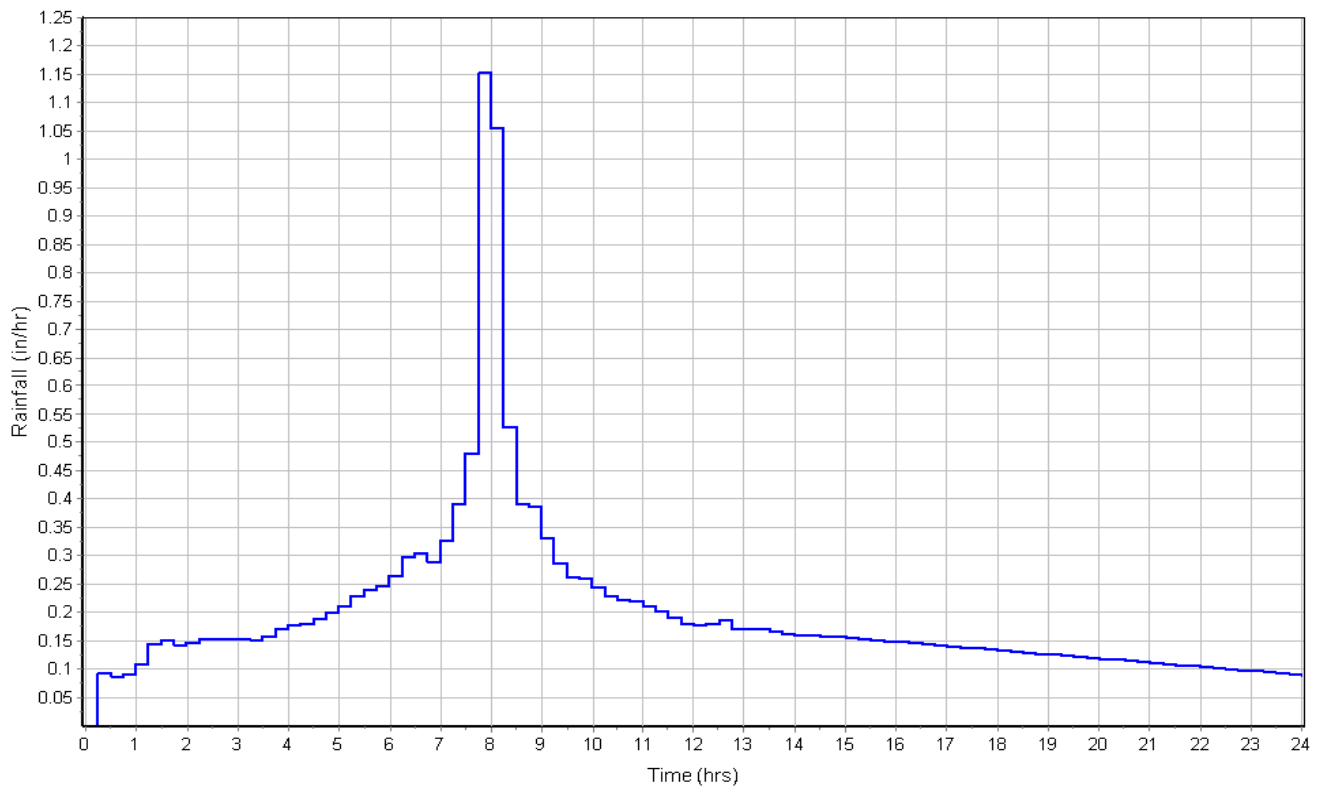
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.05		98

Subbasin Runoff Results

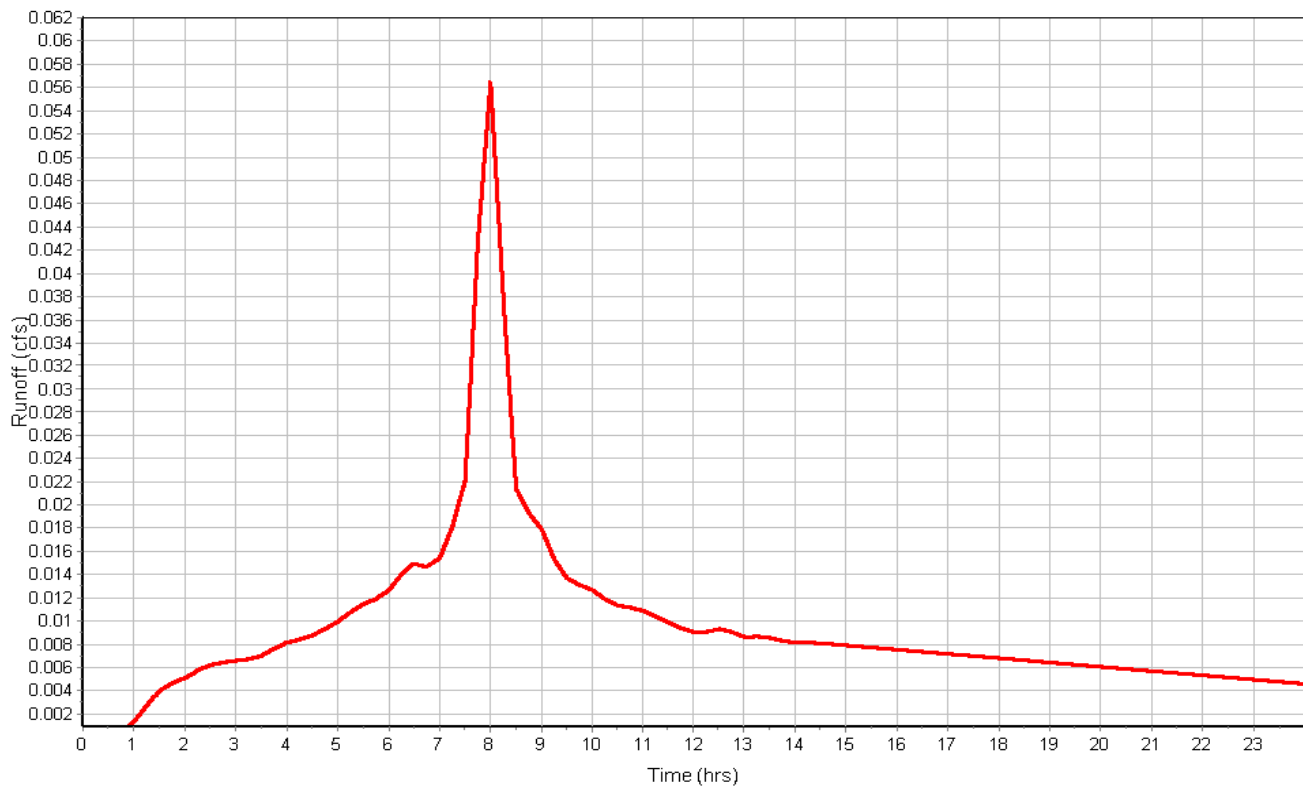
Total Rainfall (in) 4.75
 Total Runoff (in) 4.52
 Peak Runoff (cfs) 0.06
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : SDCB_077

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : SDCB_088**Input Data**

Area (ac) 0.08
 Impervious Area (%) 90.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

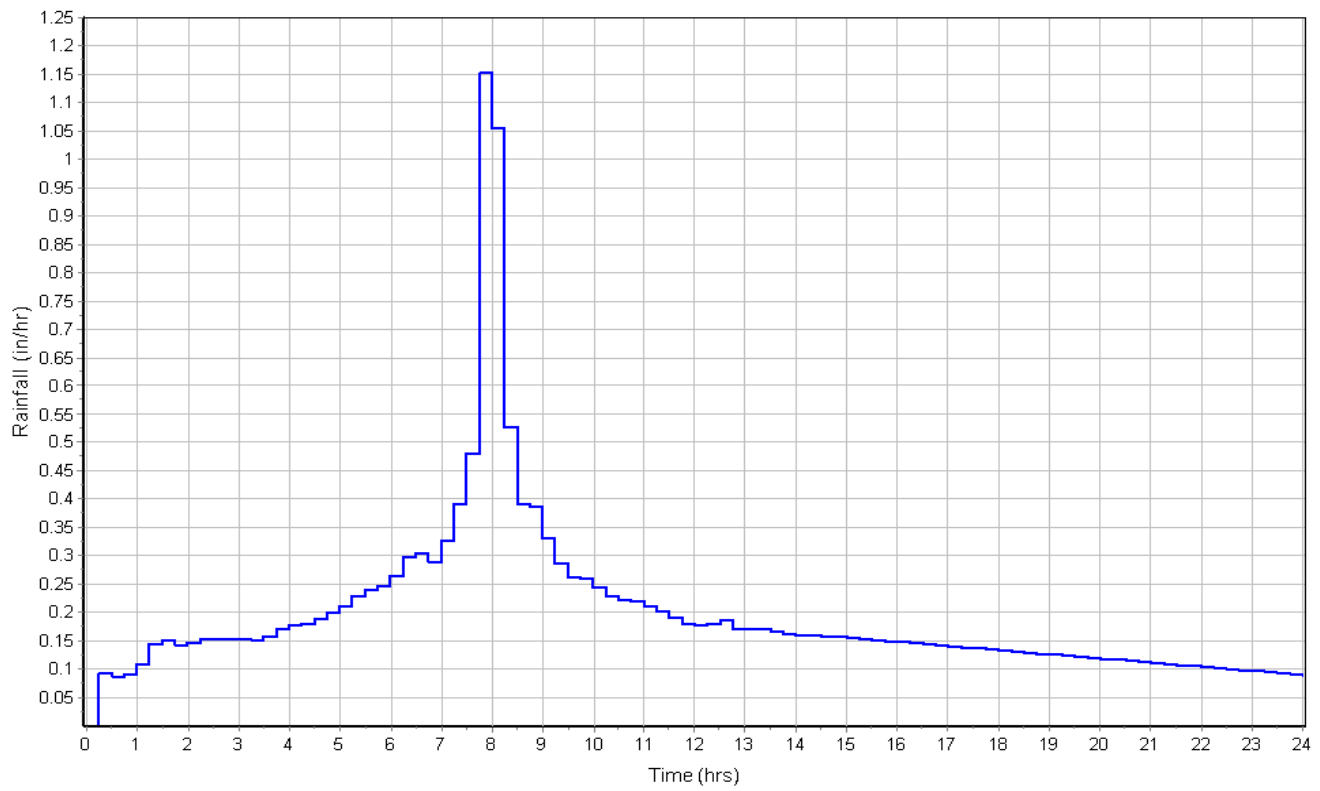
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.08		95.8

Subbasin Runoff Results

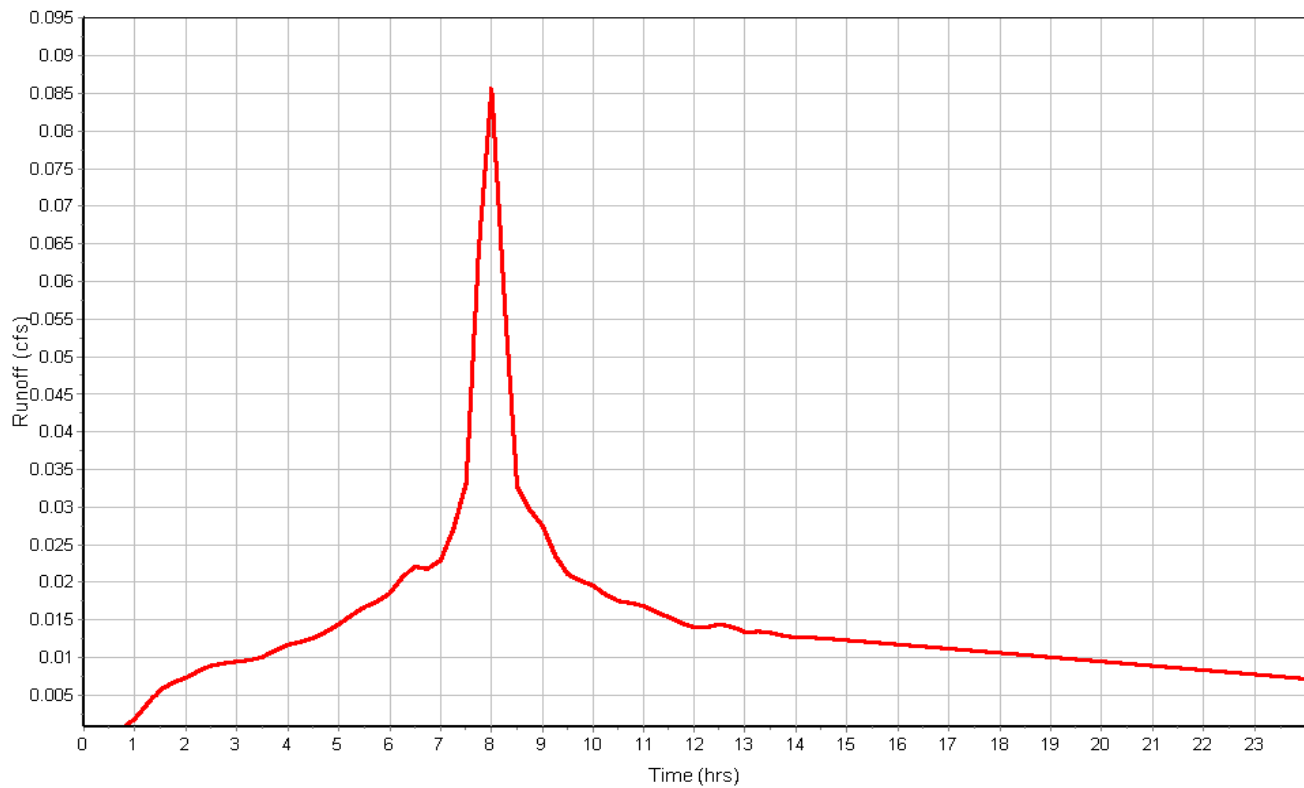
Total Rainfall (in) 4.75
 Total Runoff (in) 4.30
 Peak Runoff (cfs) 0.09
 Weighted Curve Number 95.80
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : SDCB_088

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : SPORT_UNDERDRAINS**Input Data**

Area (ac) 3.73
Impervious Area (%) 100.00
Impervious Area Curve Number 98.00
Pervious Area Curve Number 76.00
Rain Gage ID 100-YEAR

Composite Curve Number

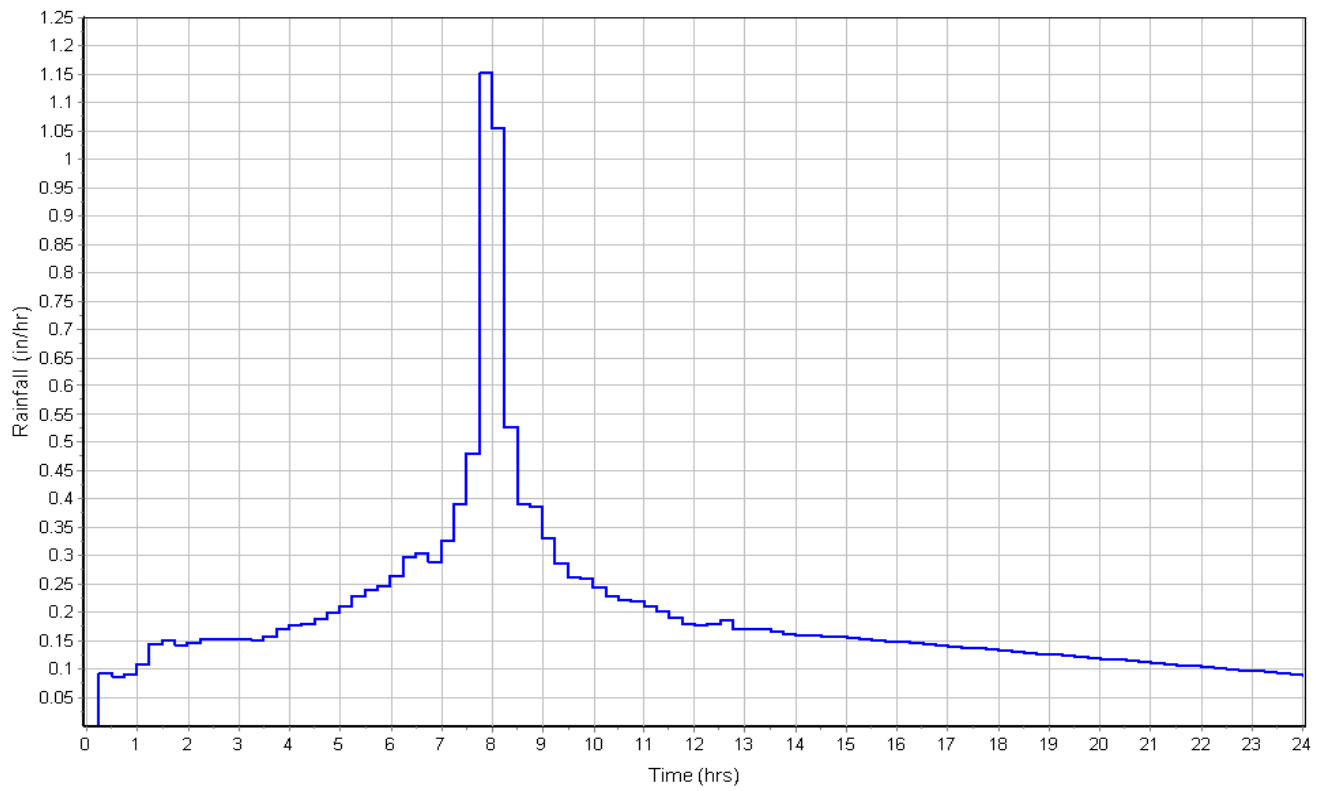
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	3.73		98

Subbasin Runoff Results

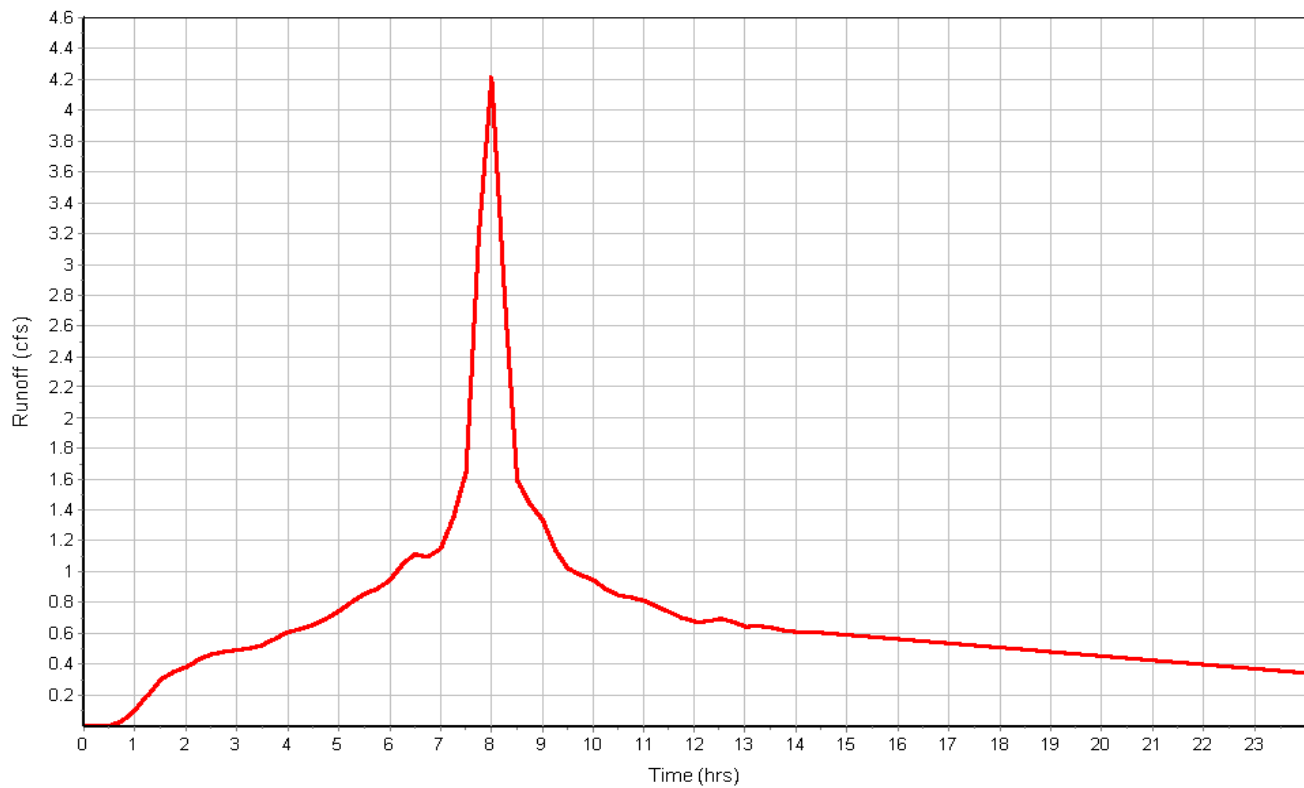
Total Rainfall (in) 4.75
Total Runoff (in) 4.52
Peak Runoff (cfs) 4.22
Weighted Curve Number 98.00
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : SPORT_UNDERDRAINS

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Sub-124**Input Data**

Area (ac) 0.21
 Impervious Area (%) 89.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

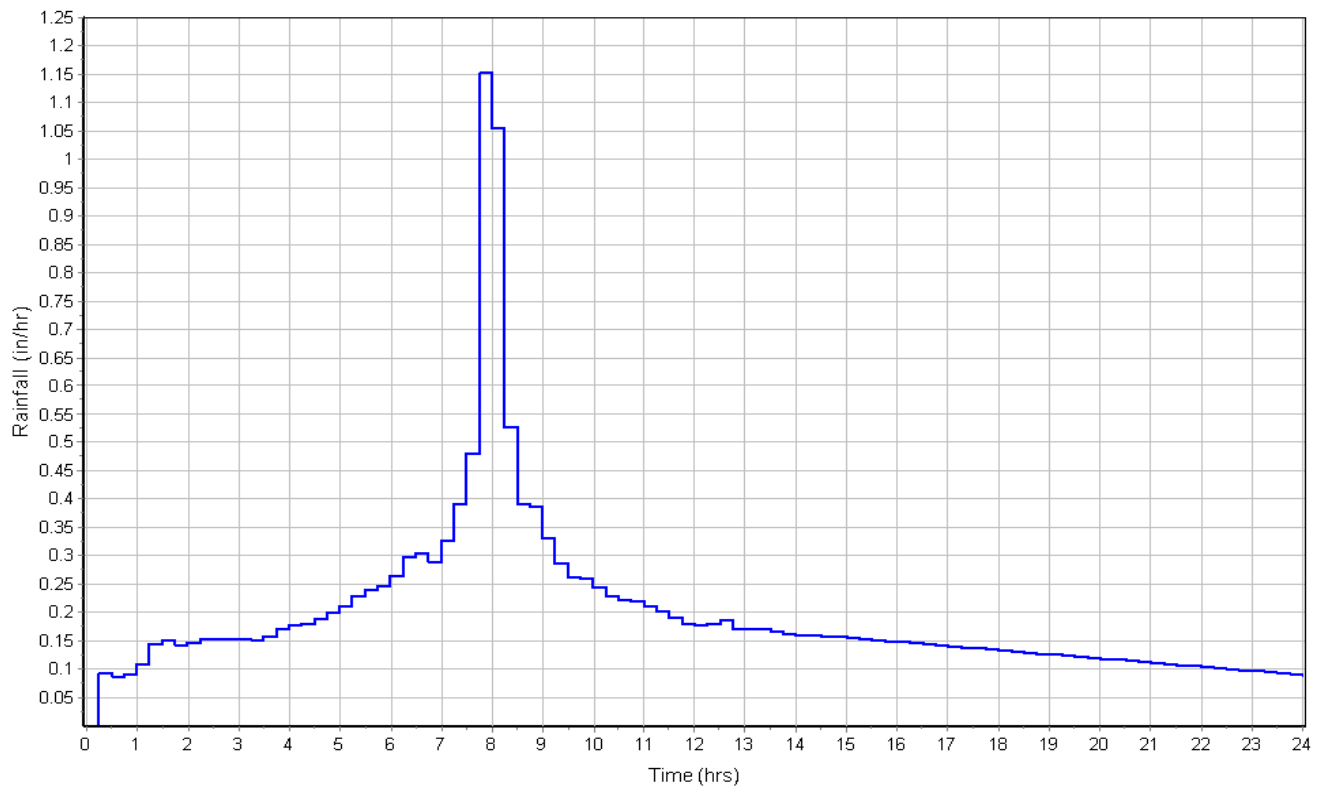
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.21		95.58

Subbasin Runoff Results

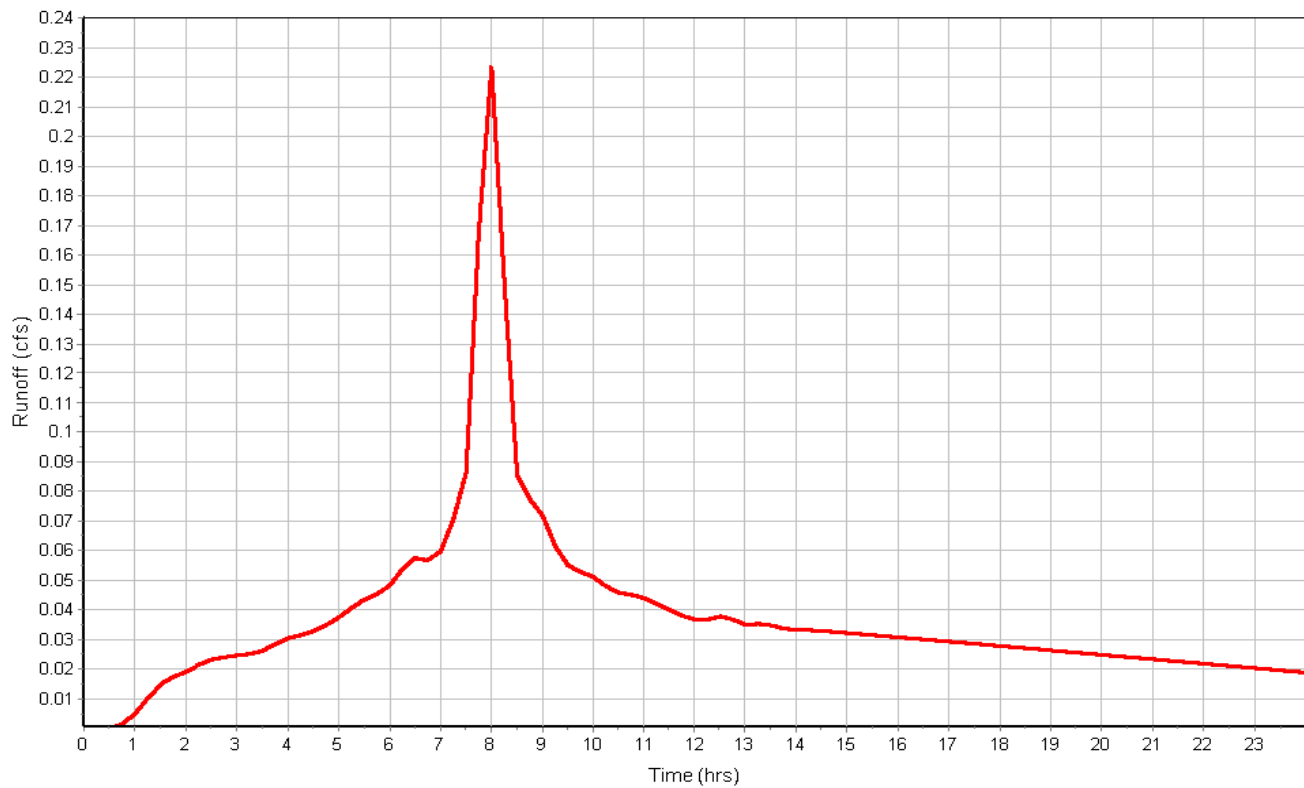
Total Rainfall (in) 4.75
 Total Runoff (in) 4.28
 Peak Runoff (cfs) 0.22
 Weighted Curve Number 95.58
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : Sub-124

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : Sub-142**Input Data**

Area (ac) 0.03
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

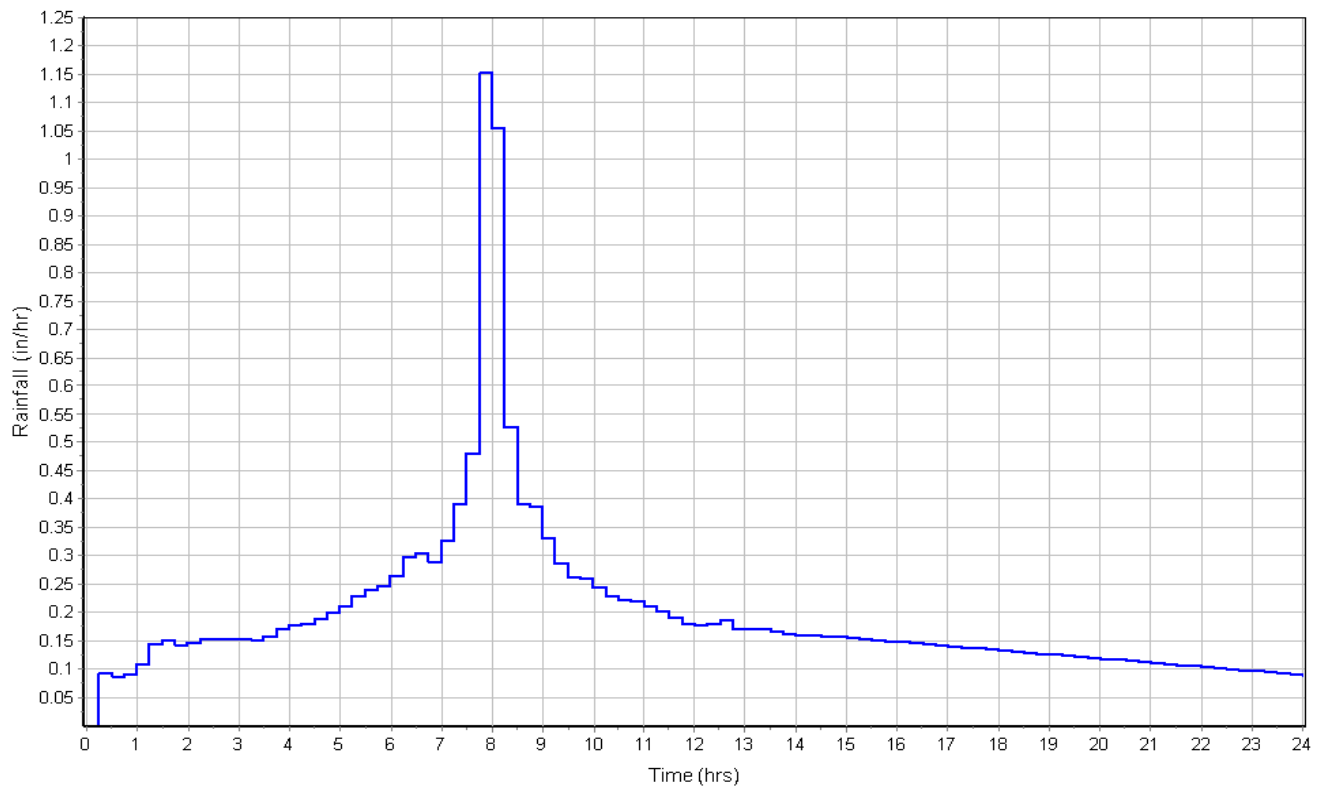
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.03		98

Subbasin Runoff Results

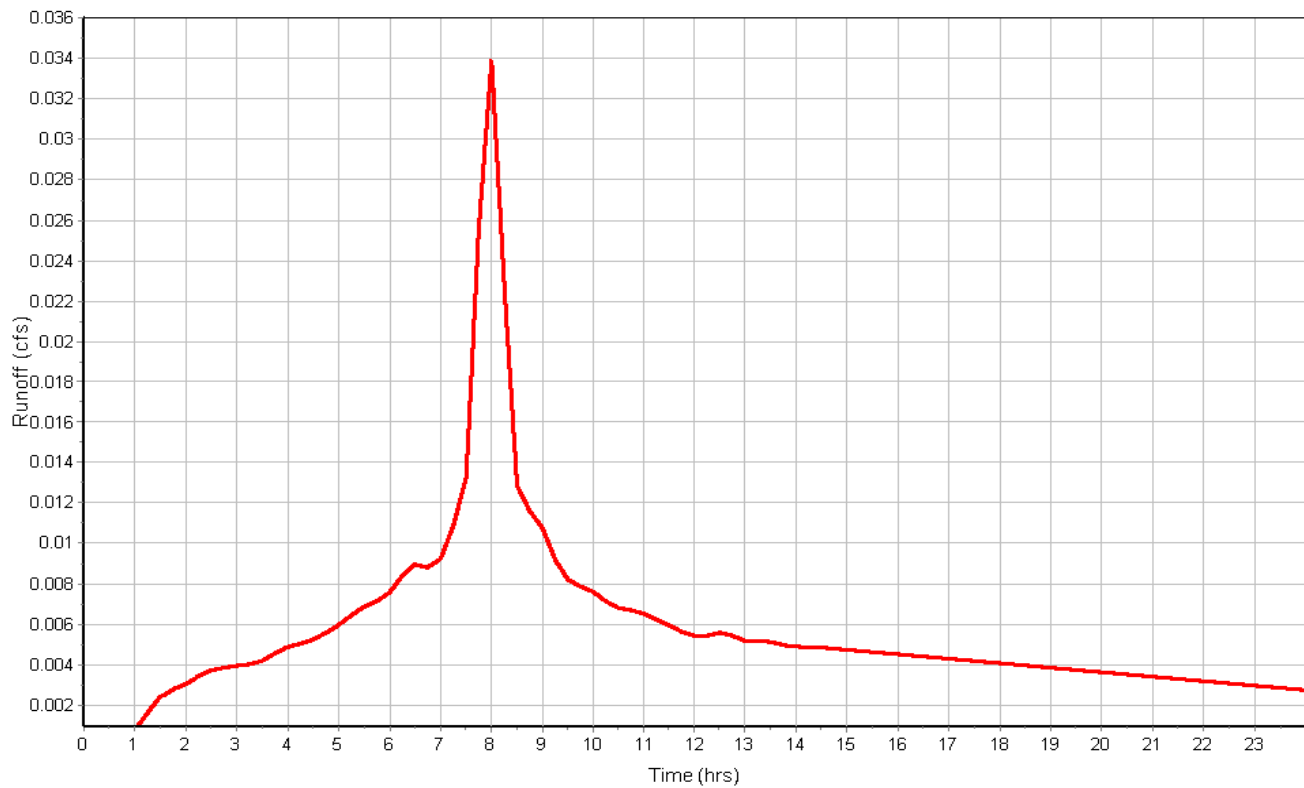
Total Rainfall (in) 4.75
 Total Runoff (in) 4.52
 Peak Runoff (cfs) 0.03
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : Sub-142

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : TCD_#1**Input Data**

Area (ac) 0.23
 Impervious Area (%) 90.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

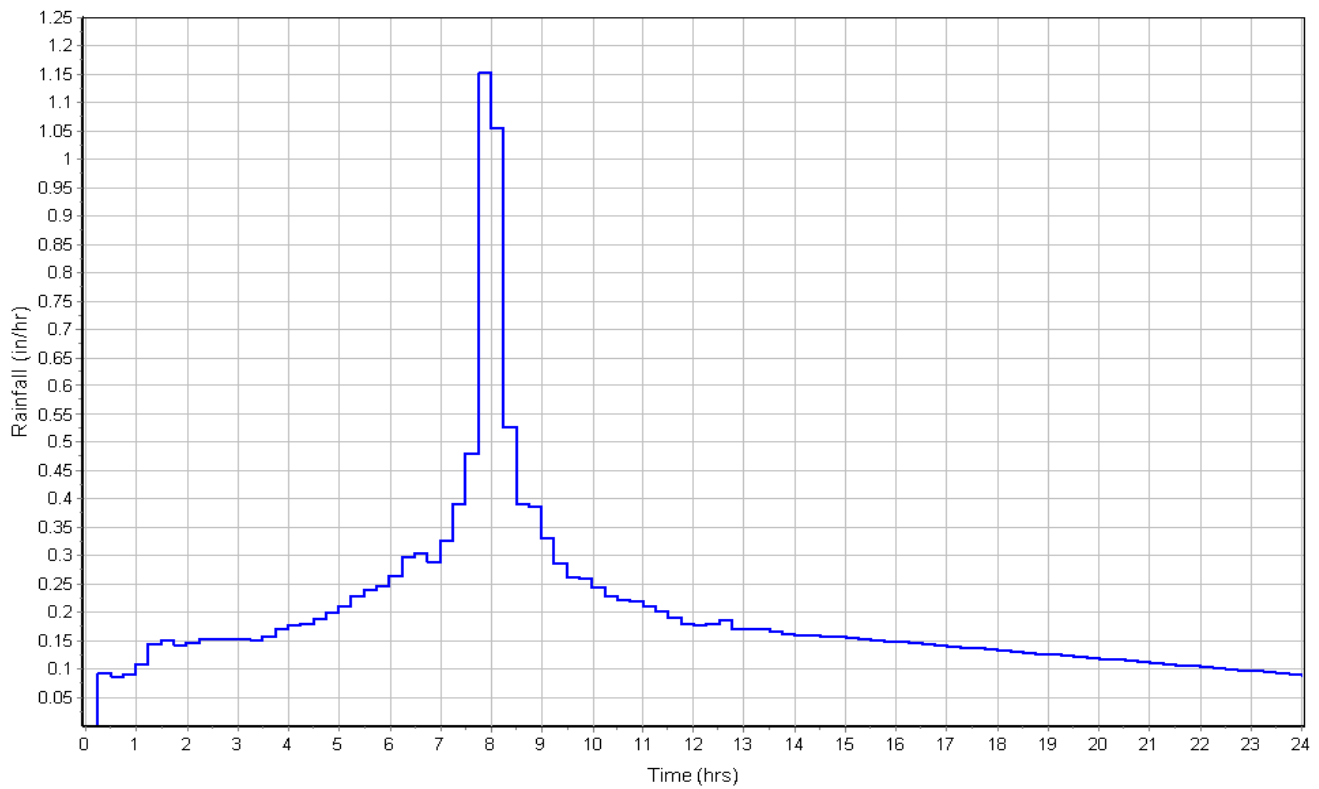
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.23		95.8

Subbasin Runoff Results

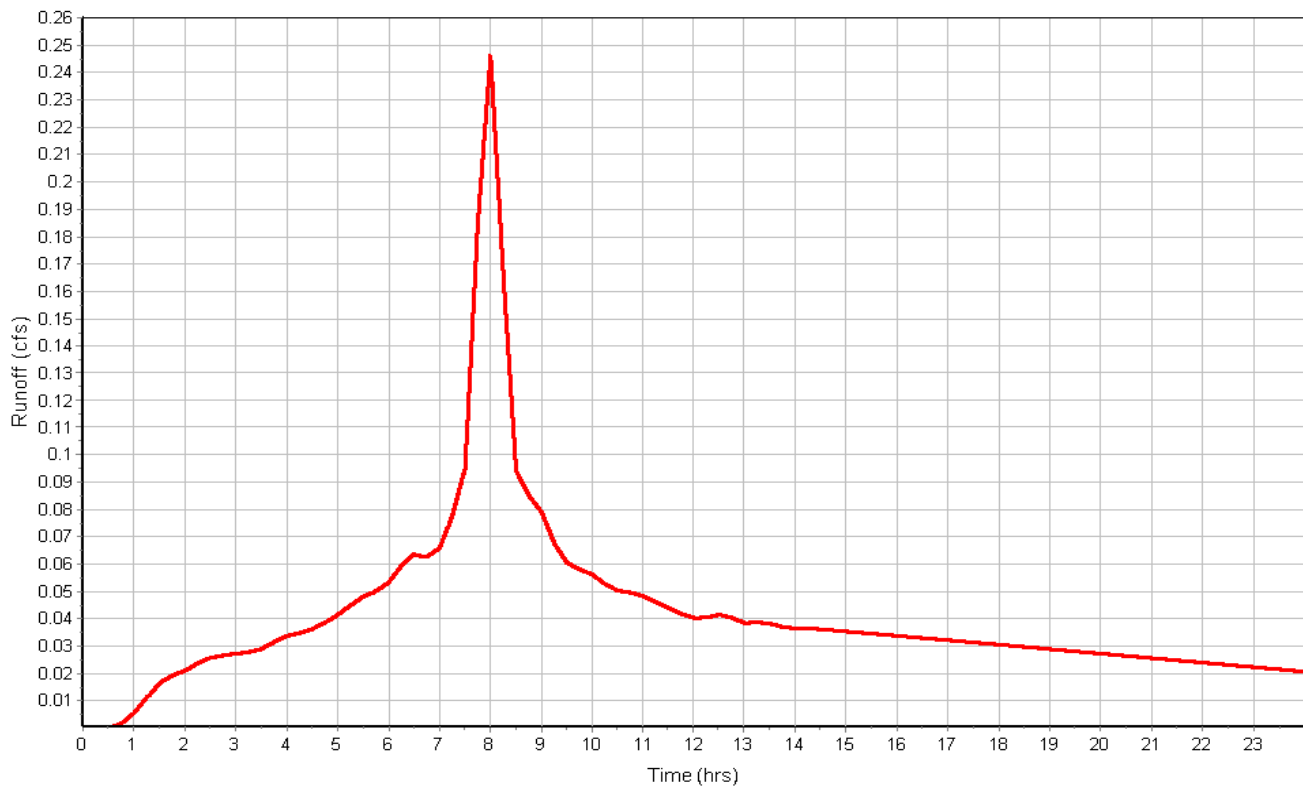
Total Rainfall (in) 4.75
 Total Runoff (in) 4.30
 Peak Runoff (cfs) 0.25
 Weighted Curve Number 95.80
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : TCD_#1

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : TCD_#2**Input Data**

Area (ac) 0.20
 Impervious Area (%) 100.00
 Impervious Area Curve Number 98.00
 Pervious Area Curve Number 76.00
 Rain Gage ID 100-YEAR

Composite Curve Number

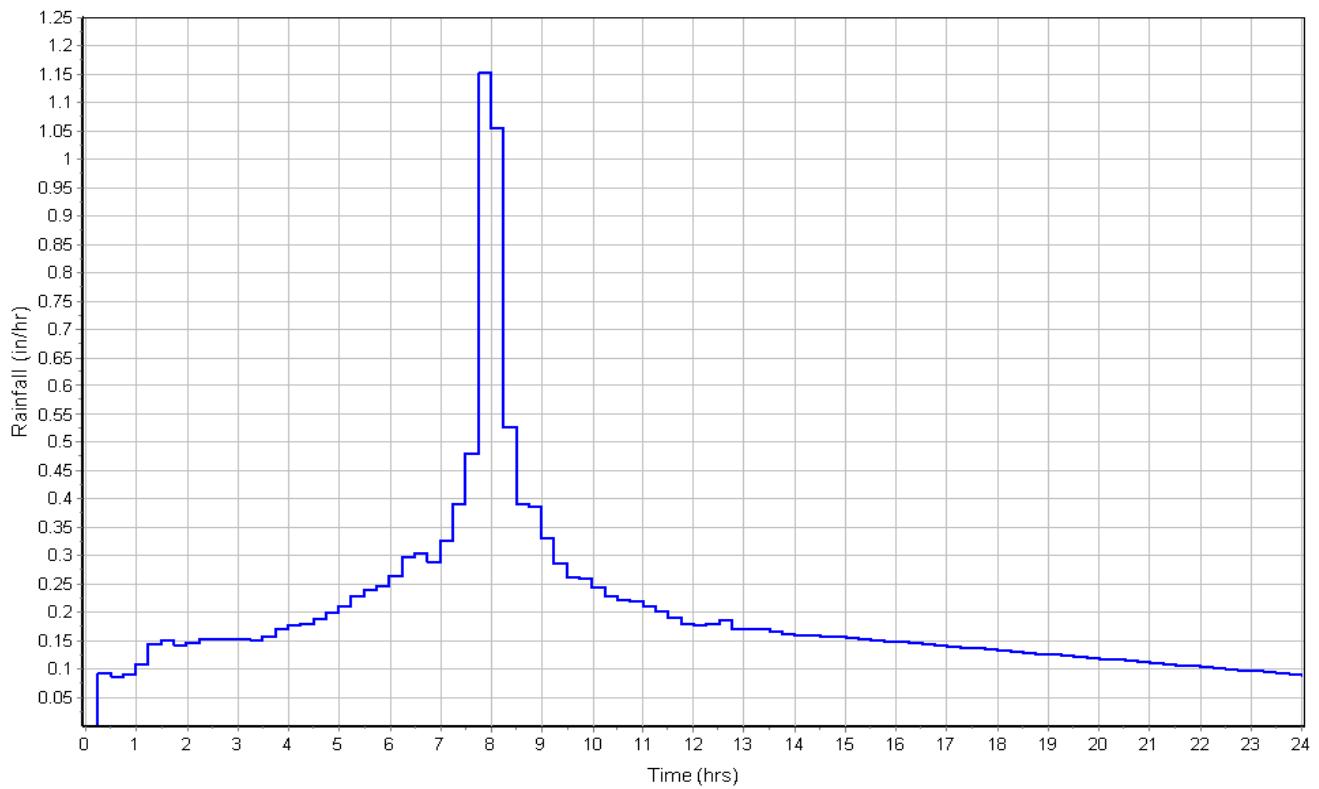
Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Composite Area & Weighted CN	0.20		98

Subbasin Runoff Results

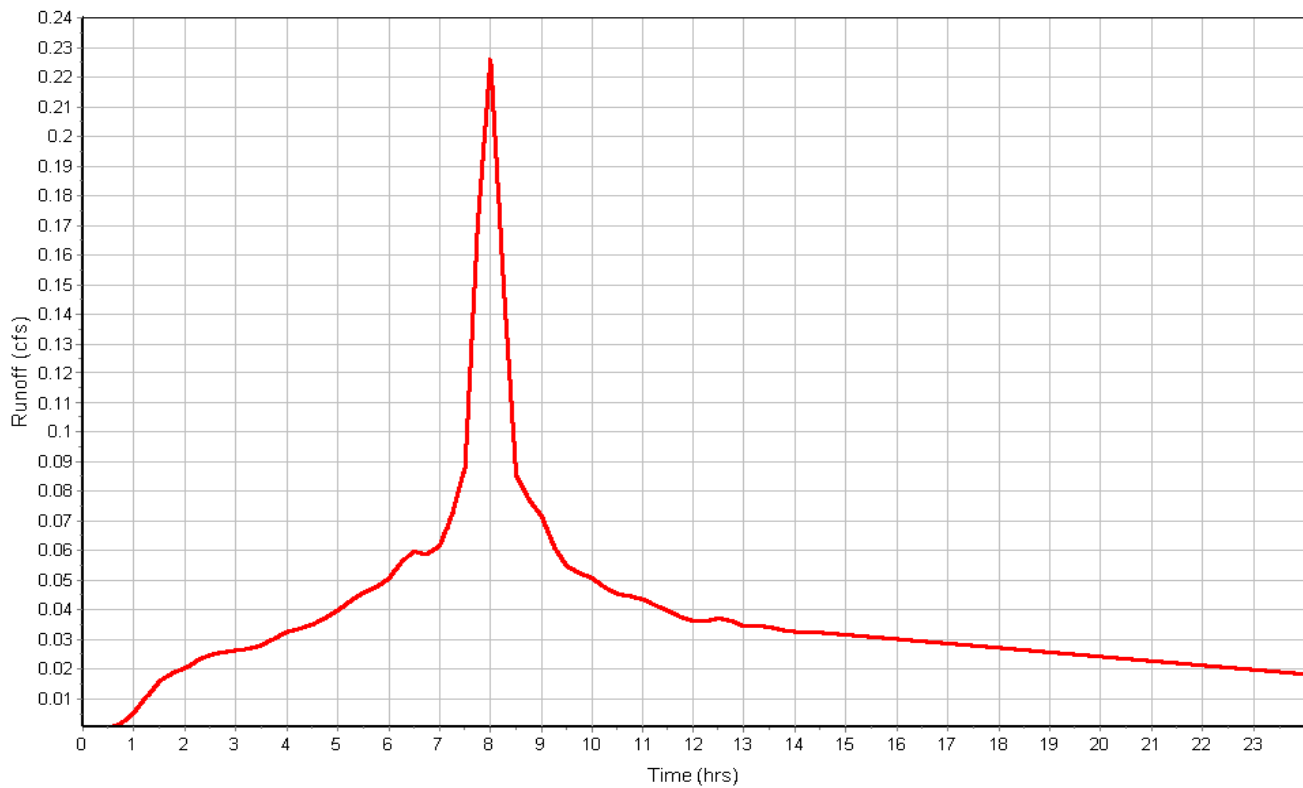
Total Rainfall (in) 4.75
 Total Runoff (in) 4.52
 Peak Runoff (cfs) 0.23
 Weighted Curve Number 98.00
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : TCD_#2

Rainfall Intensity Graph



Runoff Hydrograph



Junction Input

SN Element ID	Invert Elevation	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft²)	Minimum Pipe Cover (in)
1 AD 01	495.06	497.77	2.71	495.06	0.00	497.77	0.00	0.00	24.52
2 AD 02	487.37	491.86	4.49	487.37	0.00	491.86	0.00	0.00	45.82
3 AD 03	488.01	491.73	3.72	488.01	0.00	491.73	0.00	0.00	36.68
4 AD 04	501.01	503.72	2.71	501.01	0.00	503.72	0.00	0.00	14.12
5 AD 05	506.31	509.02	2.71	506.31	0.00	509.02	0.00	0.00	24.53
6 AD 06	506.20	508.91	2.71	506.20	0.00	508.91	0.00	0.00	28.05
7 AD 07	505.78	508.49	2.71	505.78	0.00	508.49	0.00	0.00	24.52
8 AD 08	506.92	509.63	2.71	506.92	0.00	509.63	0.00	0.00	24.52
9 AD 09	505.94	508.65	2.71	505.94	0.00	508.65	0.00	0.00	24.52
10 AD 10	506.90	509.61	2.71	506.90	0.00	509.61	0.00	0.00	24.52
11 AD 11	498.14	500.85	2.71	498.14	0.00	500.85	0.00	0.00	24.53
12 AD 12	500.98	503.84	2.87	500.98	0.00	503.84	0.00	0.00	26.42
13 AD 13	480.84	482.55	1.71	480.84	0.00	482.55	0.00	0.00	12.53
14 BPU-2	417.22	425.26	8.05	417.22	0.00	425.26	0.00	0.00	48.54
15 BPU-3	471.65	490.26	18.61	471.65	0.00	490.26	0.00	0.00	185.30
16 BPU-4	491.11	501.77	10.66	491.11	0.00	501.77	0.00	0.00	89.93
17 BPU-5	481.13	488.40	7.27	481.13	0.00	488.40	0.00	0.00	63.24
18 RDCO 01	500.60	509.93	9.33	500.60	0.00	509.93	0.00	0.00	99.94
19 RDCO 02	502.70	509.96	7.27	502.70	0.00	509.96	0.00	0.00	75.19
20 RDCO 03	502.88	509.98	7.10	502.88	0.00	509.98	0.00	0.00	73.24
21 RDCO 04	502.95	509.98	7.03	502.95	0.00	509.98	0.00	0.00	72.41
22 RDCO 05	503.24	509.92	6.68	503.24	0.00	509.92	0.00	0.00	68.21
23 RDCO 06	503.50	509.89	6.39	503.50	0.00	509.89	0.00	0.00	64.62
24 RDCO 07	504.39	509.94	5.55	504.39	0.00	509.94	0.00	0.00	54.64
25 RDCO 08	504.51	509.96	5.45	504.51	0.00	509.96	0.00	0.00	53.37
26 RDCO 09	504.97	509.98	5.01	504.97	0.00	509.98	0.00	0.00	52.11
27 RDCO 10	505.25	509.93	4.69	505.25	0.00	509.93	0.00	0.00	48.27
28 RDCO 11	505.85	509.84	3.98	505.85	0.00	509.84	0.00	0.00	39.78
29 RDCO 12	506.13	509.93	3.80	506.13	0.00	509.93	0.00	0.00	37.60
30 RDCO 13	506.35	509.91	3.56	506.35	0.00	509.91	0.00	0.00	34.70
31 RDCO 14	506.68	509.95	3.27	506.68	0.00	509.95	0.00	0.00	33.19
32 RDCO 15	507.40	509.92	2.52	507.40	0.00	509.92	0.00	0.00	24.20
33 RDCO 16	502.88	509.62	6.74	502.88	0.00	509.62	0.00	0.00	68.89
34 RDCO 17	503.04	509.95	6.92	503.04	0.00	509.95	0.00	0.00	70.98
35 RDCO 18	503.31	509.95	6.64	503.31	0.00	509.95	0.00	0.00	67.70
36 RDCO 19	503.65	509.27	5.62	503.65	0.00	509.27	0.00	0.00	55.42
37 RDCO 20	504.06	508.40	4.34	504.06	0.00	508.40	0.00	0.00	40.04
38 RDCO 21	504.60	509.96	5.36	504.60	0.00	509.96	0.00	0.00	52.35
39 RDCO 22	505.78	509.94	4.16	505.78	0.00	509.94	0.00	0.00	41.97
40 RDCO 23	506.01	509.91	3.90	506.01	0.00	509.91	0.00	0.00	38.85
41 RDCO 24	506.24	509.92	3.68	506.24	0.00	509.92	0.00	0.00	36.17
42 RDCO 25	507.40	509.92	2.52	507.40	0.00	509.92	0.00	0.00	24.19
43 RDCO 26	504.64	509.96	5.31	504.64	0.00	509.96	0.00	0.00	57.76
44 RDCO 27	498.14	503.90	5.76	498.14	0.00	503.90	0.00	0.00	61.12
45 RDCO 27A	497.78	503.90	6.12	497.78	0.00	503.90	0.00	0.00	65.44
46 RDCO 28	498.18	503.66	5.48	498.18	0.00	503.66	0.00	0.00	57.72
47 RDCO 29	498.63	502.86	4.23	498.63	0.00	502.86	0.00	0.00	42.70
48 RDCO 30	499.40	503.96	4.56	499.40	0.00	503.96	0.00	0.00	46.71
49 RDCO 31	499.51	503.97	4.46	499.51	0.00	503.97	0.00	0.00	45.48
50 RDCO 32	499.67	503.97	4.31	499.67	0.00	503.97	0.00	0.00	43.68
51 RDCO 33	500.77	503.93	3.16	500.77	0.00	503.93	0.00	0.00	31.91
52 RDCO 34	501.21	503.92	2.70	501.21	0.00	503.92	0.00	0.00	26.45
53 RDCO 35	500.83	503.98	3.15	500.83	0.00	503.98	0.00	0.00	31.84
54 RDCO 36	501.09	503.94	2.85	501.09	0.00	503.94	0.00	0.00	28.20
55 RDCO 37	501.46	503.95	2.49	501.46	0.00	503.95	0.00	0.00	23.93
56 RDCO 38	482.18	489.94	7.76	482.18	0.00	489.94	0.00	0.00	85.14
57 RDCO 39	485.50	489.92	4.42	485.50	0.00	489.92	0.00	0.00	47.08
58 RDCO 40	485.83	489.95	4.13	485.83	0.00	489.95	0.00	0.00	43.55
59 RDCO 41	486.04	489.93	3.89	486.04	0.00	489.93	0.00	0.00	40.66
60 RDCO 42	487.42	489.94	2.52	487.42	0.00	489.94	0.00	0.00	24.22
61 RDCO 43	487.38	489.94	2.55	487.38	0.00	489.94	0.00	0.00	24.65
62 RDCO 44	487.46	490.63	3.17	487.46	0.00	490.63	0.00	0.00	32.08
63 RDCO 45	502.19	505.80	3.61	502.19	0.00	505.80	0.00	0.00	37.31
64 RDCO 46	503.43	505.94	2.52	503.43	0.00	505.94	0.00	0.00	24.20
65 SDCB 001	406.15	415.54	9.39	408.15	2.00	415.54	0.00	0.00	64.72
66 SDCB 002	406.89	415.61	8.73	408.89	2.00	415.61	0.00	0.00	62.70
67 SDCB 003	406.97	415.28	8.31	408.97	2.00	415.28	0.00	0.00	55.69
68 SDCB 004	414.28	419.33	5.05	416.28	2.00	419.33	0.00	0.00	24.60
69 SDCB 005	414.68	419.74	5.06	416.68	2.00	419.74	0.00	0.00	24.67
70 SDCB 006	407.21	414.78	7.57	409.21	2.00	414.78	0.00	0.00	48.84
71 SDCB 007	405.31	416.01	10.71	409.31	4.00	416.01	0.00	0.00	0.00
72 SDCB 008	410.55	415.54	4.99	412.55	2.00	415.54	0.00	0.00	23.83
73 SDCB 009	410.59	415.62	5.03	412.59	2.00	415.62	0.00	0.00	24.37
74 SDCB 010	419.28	426.64	7.36	421.28	2.00	426.64	0.00	0.00	52.31
75 SDCB 011	428.28	433.23	4.96	430.28	2.00	433.23	0.00	0.00	23.47
76 SDCB 012	428.64	433.69	5.05	430.64	2.00	433.69	0.00	0.00	24.60
77 SDCB 013	450.12	455.60	5.48	452.12	2.00	455.60	0.00	0.00	29.74
78 SDCB 014	450.47	455.52	5.05	452.47	2.00	455.52	0.00	0.00	24.60
79 SDCB 015	470.99	476.05	5.07	472.99	2.00	476.05	0.00	0.00	24.79
80 SDCB 016	471.30	476.35	5.05	473.30	2.00	476.35	0.00	0.00	24.60
81 SDCB 017	414.58	423.39	8.82	416.58	2.00	423.39	0.00	0.00	69.79
82 SDCB 018	416.24	428.35	12.11	420.24	4.00	428.35	0.00	0.00	0.00

Junction Input

SN Element ID	Invert Elevation	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft²)	Minimum Pipe Cover (in)
83 SDCB 019	422.57	427.90	5.33	424.57	2.00	427.90	0.00	0.00	27.94
84 SDCB 020	422.86	427.66	4.81	424.86	2.00	427.66	0.00	100.00	21.67
85 SDCB 021	423.80	428.27	4.46	425.80	2.00	428.27	0.00	100.00	21.53
86 SDCB 022	425.37	430.48	5.11	427.37	2.00	430.48	0.00	0.00	25.30
87 SDCB 023	425.66	430.72	5.06	427.66	2.00	430.72	0.00	0.00	24.74
88 SDCB 024	440.11	444.85	4.74	442.11	2.00	444.85	0.00	0.00	24.82
89 SDCB 025	440.64	445.37	4.73	442.64	2.00	445.37	0.00	0.00	24.81
90 SDCB 026	451.11	455.82	4.71	453.11	2.00	455.82	0.00	0.00	24.52
91 SDCB 027	456.94	461.65	4.71	458.94	2.00	461.65	0.00	0.00	24.52
92 SDCB 028	463.00	467.71	4.71	465.00	2.00	467.71	0.00	0.00	24.52
93 SDCB 029	474.56	479.27	4.71	476.56	2.00	479.27	0.00	0.00	24.52
94 SDCB 030	482.83	487.54	4.71	484.83	2.00	487.54	0.00	0.00	24.52
95 SDCB 031	487.54	492.25	4.71	489.54	2.00	492.25	0.00	0.00	24.52
96 SDCB 032	497.55	502.26	4.71	499.55	2.00	502.26	0.00	0.00	24.52
97 SDCB 033	500.07	504.78	4.71	502.07	2.00	504.78	0.00	0.00	24.52
98 SDCB 034	500.46	505.17	4.71	502.46	2.00	505.17	0.00	0.00	24.53
99 SDCB 035	499.95	504.66	4.71	501.95	2.00	504.66	0.00	100.00	24.52
100 SDCB 035A	503.77	508.53	4.76	505.77	2.00	508.53	0.00	0.00	25.12
101 SDCB 036	456.61	461.58	4.97	458.61	2.00	461.58	0.00	0.00	27.62
102 SDCB 037	456.85	461.58	4.73	458.85	2.00	461.58	0.00	0.00	24.81
103 SDCB 038	461.33	477.49	16.16	463.33	2.00	477.49	0.00	0.00	151.91
104 SDCB 039	463.10	478.99	15.89	465.10	2.00	478.99	0.00	0.00	148.72
105 SDCB 040	464.40	479.77	15.37	466.40	2.00	479.77	0.00	0.00	142.39
106 SDCB 041	464.93	481.73	16.80	466.93	2.00	481.73	0.00	0.00	0.00
107 SDCB 042	466.34	482.17	15.83	468.34	2.00	482.17	0.00	0.00	147.97
108 SDCB 043	467.05	480.00	12.95	469.05	2.00	480.00	0.00	0.00	113.36
109 SDCB 044	468.44	473.51	5.07	470.44	2.00	473.51	0.00	0.00	24.89
110 SDCB 045	469.38	481.47	12.09	471.38	2.00	481.47	0.00	0.00	109.13
111 SDCB 046	477.20	481.91	4.71	479.20	2.00	481.91	0.00	0.00	24.52
112 SDCB 047	475.42	480.44	5.01	477.42	2.00	480.44	0.00	0.00	28.13
113 SDCB 048	475.50	480.22	4.71	477.50	2.00	480.22	0.00	0.00	24.53
114 SDCB 049	480.87	485.88	5.01	482.87	2.00	485.88	0.00	0.00	28.12
115 SDCB 050	480.95	485.66	4.71	482.95	2.00	485.66	0.00	0.00	24.52
116 SDCB 051	486.91	492.07	5.16	488.91	2.00	492.07	0.00	0.00	29.96
117 SDCB 052	487.59	492.30	4.71	489.59	2.00	492.30	0.00	0.00	24.53
118 SDCB 053	497.82	502.53	4.71	499.82	2.00	502.53	0.00	0.00	24.52
119 SDCB 054	475.33	481.83	6.50	477.33	2.00	481.83	0.00	0.00	46.00
120 SDCB 055	476.05	482.04	5.99	478.05	2.00	482.04	0.00	0.00	39.84
121 SDCB 056	484.00	490.50	6.50	486.00	2.00	490.50	0.00	0.00	27.16
122 SDCB 057	485.57	490.28	4.71	487.57	2.00	490.28	0.00	0.00	43.37
123 SDCB 058	493.33	498.46	5.12	495.33	2.00	498.46	0.00	0.00	27.34
124 SDCB 059	493.51	498.22	4.71	495.51	2.00	498.22	0.00	0.00	26.67
125 SDCB 060	495.08	499.79	4.71	487.08	-8.00	499.79	0.00	0.00	24.53
126 SDCB 061	468.37	498.87	30.49	470.37	2.00	498.87	0.00	0.00	329.92
127 SDCB 062	468.58	495.18	26.60	470.58	2.00	495.18	0.00	0.00	283.14
128 SDCB 063	468.96	494.35	25.39	470.96	2.00	494.35	0.00	0.00	265.48
129 SDCB 064	469.22	488.25	19.03	471.22	2.00	488.25	0.00	0.00	187.46
130 SDCB 065	469.63	489.77	20.14	471.63	2.00	489.77	0.00	0.00	205.72
131 SDCB 066	469.99	495.23	25.24	473.99	4.00	495.23	0.00	0.00	0.00
132 SDCB 067	477.83	494.68	16.85	479.83	2.00	494.68	0.00	0.00	166.14
133 SDCB 068	478.01	489.66	11.64	480.01	2.00	489.66	0.00	0.00	103.72
134 SDCB 069	478.46	489.32	10.86	480.46	2.00	489.32	0.00	0.00	98.28
135 SDCB 070	478.77	486.75	7.98	480.77	2.00	486.75	0.00	0.00	63.78
136 SDCB 071	484.97	490.27	5.30	486.97	2.00	490.27	0.00	0.00	31.62
137 SDCB 072	485.55	490.26	4.71	487.55	2.00	490.26	0.00	0.00	24.52
138 SDCB 073	485.76	490.47	4.71	487.76	2.00	490.47	0.00	0.00	24.52
139 SDCB 074	478.74	484.54	5.80	480.74	2.00	484.54	0.00	0.00	33.61
140 SDCB 075	479.00	485.62	6.62	481.00	2.00	485.62	0.00	0.00	19.48
141 SDCB 076	479.12	488.91	9.79	481.12	2.00	488.91	0.00	0.00	69.49
142 SDCB 077	479.87	490.77	10.90	481.87	2.00	490.77	0.00	0.00	91.12
143 SDCB 078	479.83	492.39	12.56	481.83	2.00	492.39	0.00	0.00	108.74
144 SDCB 079	480.44	500.94	20.50	482.44	2.00	500.94	0.00	0.00	204.02
145 SDCB 080	480.83	504.63	23.80	482.83	2.00	504.63	0.00	0.00	243.59
146 SDCB 081	481.24	504.68	23.44	483.24	2.00	504.68	0.00	0.00	239.26
147 SDCB 082	481.67	504.85	23.18	483.67	2.00	504.85	0.00	0.00	236.18
148 SDCB 083	483.69	496.97	13.28	485.69	2.00	496.97	0.00	0.00	117.37
149 SDCB 084	485.76	491.38	5.62	487.76	2.00	491.38	0.00	0.00	25.40
150 SDCB 084A	484.33	495.07	10.73	486.33	2.00	495.07	0.00	0.00	86.81
151 SDCB 085	489.01	507.17	18.16	491.01	2.00	507.17	0.00	0.00	175.87
152 SDCB 086	489.19	506.62	17.43	491.19	2.00	506.62	0.00	0.00	167.11
153 SDCB 087	494.54	507.06	12.52	498.54	4.00	507.06	0.00	0.00	0.00
154 SDCB 088	496.57	507.04	10.47	498.57	2.00	507.04	0.00	0.00	83.69
155 SDCB 089	500.77	505.62	4.85	502.77	2.00	505.62	0.00	0.00	26.16
156 SDCB 090	502.16	507.12	4.96	504.16	2.00	507.12	0.00	0.00	27.54
157 SDCB 091	502.41	507.12	4.71	504.41	2.00	507.12	0.00	0.00	24.52
158 SDCB 092	496.43	509.32	12.89	498.43	2.00	509.32	0.00	0.00	103.01
159 SDCB 093	499.02	507.16	8.14	501.02	2.00	507.16	0.00	0.00	61.65
160 SDCB 094	501.20	505.91	4.71	503.20	2.00	505.91	0.00	0.00	24.52
161 SDCB 095	501.57	506.29	4.71	503.57	2.00	506.29	0.00	0.00	24.53
162 SDCB 096	506.33	509.47	3.14	506.33	0.00	509.47	0.00	0.00	29.68
163 SDCB 097	506.76	509.47	2.71	506.76	0.00	509.47	0.00	0.00	24.52
164 SDCB 098	489.33	502.02	12.69	493.33	4.00	502.02	0.00	0.00	0.00

Junction Input

SN Element ID	Invert Elevation	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft²)	Minimum Pipe Cover (in)
165 SDCB 099	492.51	503.14	10.64	494.51	2.00	503.14	0.00	0.00	91.62
166 SDCB 100	497.28	502.86	5.59	499.28	2.00	502.86	0.00	0.00	35.07
167 SDCB 101	497.64	502.35	4.71	499.64	2.00	502.35	0.00	0.00	24.52
168 SDCB 102	493.05	502.87	9.83	495.05	2.00	502.87	0.00	0.00	81.90
169 SDCB 103	495.98	502.25	6.27	497.98	2.00	502.25	0.00	0.00	43.25
170 SDCB 104	496.44	501.15	4.71	498.44	2.00	501.15	0.00	0.00	24.52
171 SDCB 105	493.38	503.07	9.68	495.38	2.00	503.07	0.00	0.00	80.20
172 SDCB 106	493.98	502.46	8.48	495.98	2.00	502.46	0.00	0.00	65.76
173 SDCB 107	494.85	502.08	7.22	496.85	2.00	502.08	0.00	0.00	50.66
174 SDCB 108	496.80	501.56	4.76	498.80	2.00	501.56	0.00	0.00	25.06
175 SDCB 109	498.93	503.65	4.72	500.93	2.00	503.65	0.00	0.00	24.64
176 SDCB 110	501.34	506.06	4.72	503.34	2.00	506.06	0.00	0.00	24.64
177 SDCB 111	487.19	492.57	5.38	489.19	2.00	492.57	0.00	0.00	28.56
178 SDCB 112	491.75	504.69	12.94	493.75	2.00	504.69	0.00	0.00	119.30
179 SDCB 113	491.64	504.38	12.74	495.64	4.00	504.38	0.00	0.00	0.00
180 SDCB 114	497.80	507.07	9.28	499.80	2.00	507.07	0.00	0.00	75.31
181 SDCB 115	498.40	506.66	8.26	500.40	2.00	506.66	0.00	0.00	67.12
182 SDCB 116	498.88	504.70	5.82	500.88	2.00	504.70	0.00	0.00	37.80
183 SDCB 117	499.03	503.74	4.71	501.03	2.00	503.74	0.00	0.00	24.52
184 SDCB 118	498.64	509.36	10.73	500.64	2.00	509.36	0.00	0.00	96.70
185 SDCB 119	498.94	507.15	8.21	500.94	2.00	507.15	0.00	0.00	62.47
186 SDCB 120	499.20	505.68	6.48	501.20	2.00	505.68	0.00	0.00	41.76
187 SDCB 121	499.95	506.54	6.59	501.95	2.00	506.54	0.00	0.00	47.07
188 SDCB 122	502.76	507.47	4.71	504.76	2.00	507.47	0.00	0.00	24.52
189 SDCB 123	500.29	504.68	4.39	502.29	2.00	504.68	0.00	0.00	20.62
190 SDCB 124	488.67	502.91	14.25	490.67	2.00	502.91	0.00	0.00	134.98
191 SDCB 125	488.95	501.82	12.88	490.95	2.00	501.82	0.00	0.00	118.50
192 SDCB 126	487.05	501.31	14.26	491.05	4.00	501.31	0.00	0.00	0.00
193 SDCB 127	494.44	501.08	6.64	496.44	2.00	501.08	0.00	0.00	43.67
194 SDCB 128	494.68	501.56	6.88	496.68	2.00	501.56	0.00	0.00	46.50
195 SDCB 129	495.11	500.16	5.05	497.11	2.00	500.16	0.00	0.00	24.60
196 SDCB 130	410.12	414.04	3.92	412.12	2.00	414.04	0.00	0.00	11.03
197 SDCB 131	410.41	414.08	3.67	412.41	2.00	414.08	0.00	0.00	12.03
198 SDCB 132	410.15	413.92	3.77	412.15	2.00	413.92	0.00	0.00	13.25
199 SDCB 133	410.23	414.61	4.38	412.23	2.00	414.61	0.00	0.00	20.54
200 SDCB 134	477.65	483.22	5.57	479.65	2.00	483.22	0.00	2000.00	0.00
201 SDCO 02	409.41	419.94	10.53	409.41	0.00	419.94	0.00	0.00	108.35
202 SDCO 03	482.51	485.69	3.18	482.51	0.00	485.69	0.00	0.00	26.18
203 TDC #1	497.91	500.42	2.52	497.91	0.00	500.42	0.00	0.00	24.20
204 TDC #2	504.24	504.95	0.71	504.24	0.00	504.95	0.00	0.00	0.53

Junction Results

SN Element ID	Peak Inflow	Peak Lateral Inflow	Max HGL Elevation Attained	Max HGL Depth Attained	Max Surge Depth Attained	Min Freeboard Attained	Average HGL Elevation Attained	Average HGL Depth Attained	Time of Max HGL Occurrence	Time of Peak Flooding Occurrence	Total Flooded Volume	Total Time Flooded
	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(days hh:mm)	(days hh:mm)	(ac-in)	(min)
1 AD 01	0.01	0.01	495.08	0.02	0.00	2.68	495.07	0.01	0 08:00	0 00:00	0.00	0.00
2 AD 02	0.10	0.03	487.44	0.07	0.00	4.42	487.40	0.03	0 08:00	0 00:00	0.00	0.00
3 AD 03	0.07	0.07	488.12	0.11	0.00	3.61	488.05	0.04	0 08:00	0 00:00	0.00	0.00
4 AD 04	0.37	0.11	502.82	1.81	0.00	0.90	502.18	1.17	1 00:00	0 00:00	0.00	0.00
5 AD 05	0.00	0.00	506.31	0.00	0.00	2.71	506.31	0.00	0 00:00	0 00:00	0.00	0.00
6 AD 06	0.04	0.04	506.25	0.05	0.00	2.66	506.22	0.02	0 08:00	0 00:00	0.00	0.00
7 AD 07	0.11	0.11	505.90	0.12	0.00	2.60	505.83	0.05	0 08:00	0 00:00	0.00	0.00
8 AD 08	0.06	0.06	506.98	0.06	0.00	2.65	506.95	0.03	0 08:00	0 00:00	0.00	0.00
9 AD 09	0.11	0.11	507.04	1.10	0.00	1.62	506.06	0.12	0 08:00	0 00:00	0.00	0.00
10 AD 10	0.07	0.04	507.29	0.39	0.00	2.32	506.93	0.03	0 08:00	0 00:00	0.00	0.00
11 AD 11	0.00	0.00	498.14	0.00	0.00	2.71	498.14	0.00	0 00:00	0 00:00	0.00	0.00
12 AD 12	0.00	0.00	500.98	0.00	0.00	2.87	500.98	0.00	0 00:00	0 00:00	0.00	0.00
13 AD 13	0.03	0.03	481.08	0.24	0.00	1.47	480.89	0.05	0 08:01	0 00:00	0.00	0.00
14 BPU-2	0.29	0.00	417.41	0.20	0.00	7.85	417.35	0.14	1 00:00	0 00:00	0.00	0.00
15 BPU-3	0.07	0.00	471.78	0.13	0.00	18.48	471.73	0.08	1 00:00	0 00:00	0.00	0.00
16 BPU-4	0.10	0.00	491.18	0.07	0.00	10.59	491.16	0.05	1 00:00	0 00:00	0.00	0.00
17 BPU-5	0.40	0.00	481.44	0.31	0.00	6.96	481.36	0.23	1 00:00	0 00:00	0.00	0.00
18 RDCO 01	3.78	0.00	502.82	2.22	0.00	7.11	501.69	1.09	1 00:00	0 00:00	0.00	0.00
19 RDCO 02	2.38	0.14	503.15	0.45	0.00	6.81	502.86	0.16	0 08:02	0 00:00	0.00	0.00
20 RDCO 03	2.25	0.00	503.59	0.71	0.00	6.39	503.15	0.27	0 08:02	0 00:00	0.00	0.00
21 RDCO 04	2.25	0.00	503.85	0.90	0.00	6.13	503.26	0.31	0 08:02	0 00:00	0.00	0.00
22 RDCO 05	2.26	0.00	504.11	0.87	0.00	5.81	503.51	0.27	0 08:02	0 00:00	0.00	0.00
23 RDCO 06	2.24	0.00	504.36	0.86	0.00	5.52	503.77	0.27	0 08:02	0 00:00	0.00	0.00
24 RDCO 07	2.24	0.00	505.04	0.65	0.00	4.90	504.63	0.24	0 08:00	0 00:00	0.00	0.00
25 RDCO 08	2.13	0.82	505.33	0.82	0.00	4.63	504.79	0.28	0 08:00	0 00:00	0.00	0.00
26 RDCO 09	1.25	0.00	505.79	0.82	0.00	4.19	505.21	0.24	0 08:00	0 00:00	0.00	0.00
27 RDCO 10	1.25	0.19	506.33	1.08	0.00	3.60	505.48	0.23	0 08:00	0 00:00	0.00	0.00
28 RDCO 11	1.06	0.00	507.03	1.18	0.00	2.80	506.05	0.20	0 08:00	0 00:00	0.00	0.00
29 RDCO 12	0.96	0.00	507.29	1.16	0.00	2.64	506.31	0.18	0 08:00	0 00:00	0.00	0.00
30 RDCO 13	0.93	0.44	507.68	1.33	0.00	2.23	506.55	0.20	0 07:58	0 00:00	0.00	0.00
31 RDCO 14	0.49	0.00	508.29	1.61	0.00	1.65	506.84	0.16	0 07:58	0 00:00	0.00	0.00
32 RDCO 15	0.49	0.49	509.92	2.52	0.00	0.00	507.54	0.14	0 07:58	0 07:58	0.00	0.00
33 RDCO 16	1.41	0.27	503.24	0.36	0.00	6.38	503.04	0.16	0 08:01	0 00:00	0.00	0.00
34 RDCO 17	1.15	0.00	503.52	0.48	0.00	6.43	503.23	0.19	0 08:01	0 00:00	0.00	0.00
35 RDCO 18	1.15	0.15	503.81	0.50	0.00	6.15	503.50	0.19	0 08:01	0 00:00	0.00	0.00
36 RDCO 19	1.01	0.29	504.09	0.44	0.00	5.17	503.82	0.17	0 08:01	0 00:00	0.00	0.00
37 RDCO 20	0.72	0.00	504.40	0.34	0.00	3.99	504.20	0.14	0 08:01	0 00:00	0.00	0.00
38 RDCO 21	0.72	0.15	504.95	0.35	0.00	5.02	504.74	0.14	0 08:01	0 00:00	0.00	0.00
39 RDCO 22	0.58	0.25	506.14	0.36	0.00	3.80	505.92	0.14	0 08:01	0 00:00	0.00	0.00
40 RDCO 23	0.34	0.00	506.29	0.28	0.00	3.62	506.11	0.10	0 08:01	0 00:00	0.00	0.00
41 RDCO 24	0.34	0.00	506.52	0.28	0.00	3.39	506.35	0.11	0 08:00	0 00:00	0.00	0.00
42 RDCO 25	0.34	0.34	507.65	0.25	0.00	2.27	507.50	0.10	0 08:00	0 00:00	0.00	0.00
43 RDCO 26	0.05	0.05	504.76	0.12	0.00	5.20	504.69	0.05	0 08:00	0 00:00	0.00	0.00
44 RDCO 27	0.44	0.00	498.43	0.29	0.00	5.47	498.25	0.11	0 08:01	0 00:00	0.00	0.00
45 RDCO 27A	0.69	0.00	498.06	0.28	0.00	5.84	497.91	0.13	0 08:01	0 00:00	0.00	0.00
46 RDCO 28	0.44	0.00	498.55	0.37	0.00	5.11	498.31	0.13	0 08:01	0 00:00	0.00	0.00
47 RDCO 29	0.44	0.00	498.91	0.28	0.00	3.94	498.74	0.11	0 08:01	0 00:00	0.00	0.00
48 RDCO 30	0.44	0.00	499.67	0.27	0.00	4.28	499.51	0.11	0 08:01	0 00:00	0.00	0.00
49 RDCO 31	0.44	0.17	499.85	0.34	0.00	4.12	499.64	0.13	0 08:00	0 00:00	0.00	0.00
50 RDCO 32	0.27	0.00	499.93	0.26	0.00	4.04	499.76	0.09	0 08:01	0 00:00	0.00	0.00
51 RDCO 33	0.27	0.07	500.99	0.22	0.00	2.94	500.86	0.09	0 08:00	0 00:00	0.00	0.00
52 RDCO 34	0.20	0.20	501.44	0.23	0.00	2.47	501.30	0.09	0 08:00	0 00:00	0.00	0.00
53 RDCO 35	0.26	0.00	500.93	0.10	0.00	3.05	500.87	0.04	0 08:00	0 00:00	0.00	0.00
54 RDCO 36	0.26	0.00	501.35	0.26	0.00	2.59	501.19	0.10	0 08:00	0 00:00	0.00	0.00
55 RDCO 37	0.26	0.26	501.69	0.23	0.00	2.26	501.54	0.08	0 08:00	0 00:00	0.00	0.00
56 RDCO 38	0.37	0.00	482.30	0.12	0.00	7.64	482.23	0.05	0 08:00	0 00:00	0.00	0.00
57 RDCO 39	0.18	0.00	485.62	0.12	0.00	4.31	485.55	0.05	0 08:01	0 00:00	0.00	0.00
58 RDCO 40	0.18	0.00	486.02	0.20	0.00	3.93	485.90	0.08	0 08:00	0 00:00	0.00	0.00
59 RDCO 41	0.18	0.08	486.24	0.20	0.00	3.69	486.12	0.08	0 08:00	0 00:00	0.00	0.00
60 RDCO 42	0.10	0.10	487.55	0.13	0.00	2.39	487.48	0.06	0 08:00	0 00:00	0.00	0.00
61 RDCO 43	0.19	0.00	487.52	0.14	0.00	2.42	487.44	0.06	0 08:00	0 00:00	0.00	0.00
62 RDCO 44	0.19	0.19	487.68	0.23	0.00	2.94	487.55	0.10	0 08:00	0 00:00	0.00	0.00
63 RDCO 45	0.26	0.00	502.82	0.63	0.00	2.98	502.38	0.19	1 00:00	0 00:00	0.00	0.00
64 RDCO 46	0.26	0.26	503.68	0.25	0.00	2.26	503.53	0.10	0 08:00	0 00:00	0.00	0.00
65 SDCB 001	1.76	0.16	408.66	2.51	0.00	6.88	408.46	2.31	0 08:01	0 00:00	0.00	0.00
66 SDCB 002	1.60	0.00	409.41	2.53	0.00	6.20	409.21	2.33	0 08:01	0 00:00	0.00	0.00
67 SDCB 003	1.53	0.63	409.56	2.59	0.00	5.72	409.30	2.33	0 08:00	0 00:00	0.00	0.00
68 SDCB 004	0.69	0.48	416.50	2.22	0.00	2.83	416.37	2.09	0 08:00	0 00:00	0.00	0.00
69 SDCB 005	0.22	0.22	416.88	2.20	0.00	2.86	416.76	2.08	0 08:00	0 00:00	0.00	0.00
70 SDCB 006	0.56	0.00	409.56	2.35	0.00	5.22	409.41	2.20	0 08:00	0 00:00	0.00	0.00
71 SDCB 007	0.56	0.00	409.62	4.31	0.00	6.39	409.52	4.21	0 13:36	0 00:00	0.00	0.00
72 SDCB 008	3.09	0.00	414.66	4.11	0.00	0.88	413.77	3.22	0 13:30	0 00:00	0.00	0.00
73 SDCB 009	3.09	0.00	414.67	4.08	0.00	0.96	413.88	3.29	0 13:30	0 00:00	0.00	0.00
74 SDCB 010	3.10	0.23	421.81	2.53	0.00	4.83	421.50	2.22	0 08:00	0 00:00	0.00	0.00
75 SDCB 011	2.87	0.95	430.62	2.35	0.00	2.61	430.42	2.15	0 08:00	0 00:00	0.00	0.00
76 SDCB 012	0.21	0.21	430.83	2.19	0.00	2.86	430.72	2.08	0 08:00	0 00:00	0.00	0.00
77 SDCB 013	1.73	0.63	452.40	2.28	0.00	3.20	452.24	2.12	0 08:00	0 00:00	0.00	0.00
78 SDCB 014	0.21	0.21	452.65	2.18	0.00	2.86	452.55	2.08	0 08:00	0 00:00	0.00	0.00
79 SDCB 015	0.90	0.71	473.18	2.19	0.00	2.87	473.07	2.08	0 08:00	0 00:00	0.00	0.00
80 SDCB 016	0.19	0.19	473.49	2.19	0.00	2.86	473.38	2.08	0 08:00	0 00:00	0.00	0.00
81 SDCB 017	0.29	0.00	416.73	2.15	0.00	6.66	416.68	2.10	1 00:00	0 00:00	0.00	0.00

Junction Results

SN Element ID	Peak Inflow	Peak Lateral Inflow	Max HGL Elevation Attained	Max HGL Depth Attained	Max Surge Depth Attained	Min Freeboard Attained	Average HGL Elevation Attained	Average HGL Depth Attained	Time of Max HGL Occurrence	Time of Peak Flooding Occurrence	Total Flooded Volume	Total Time Flooded
	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(days hh:mm)	(days hh:mm)	(ac-in)	(min)
82 SDCB 018	0.29	0.00	420.52	4.28	0.00	7.83	420.42	4.18	1 00:00	0 00:00	0.00	0.00
83 SDCB 019	3.26	0.32	426.59	4.02	0.00	1.30	425.48	2.91	1 00:00	0 00:00	0.00	0.00
84 SDCB 020	2.95	0.22	426.60	3.74	0.00	1.06	425.68	2.82	1 00:00	0 00:00	0.00	0.00
85 SDCB 021	0.27	0.27	426.60	2.80	0.00	1.66	426.04	2.24	1 00:00	0 00:00	0.00	0.00
86 SDCB 022	2.46	0.14	427.80	2.43	0.00	2.67	427.55	2.18	0 08:01	0 00:00	0.00	0.00
87 SDCB 023	2.33	0.15	428.51	2.85	0.00	2.21	427.95	2.29	0 08:01	0 00:00	0.00	0.00
88 SDCB 024	2.19	0.19	442.44	2.33	0.00	2.40	442.25	2.14	0 08:00	0 00:00	0.00	0.00
89 SDCB 025	1.81	0.20	444.02	3.38	0.00	1.35	442.90	2.26	0 08:00	0 00:00	0.00	0.00
90 SDCB 026	1.61	0.06	453.37	2.26	0.00	2.45	453.22	2.11	0 08:00	0 00:00	0.00	0.00
91 SDCB 027	1.55	0.05	459.26	2.32	0.00	2.39	459.07	2.13	0 08:00	0 00:00	0.00	0.00
92 SDCB 028	1.50	0.07	465.28	2.28	0.00	2.42	465.11	2.11	0 08:00	0 00:00	0.00	0.00
93 SDCB 029	1.43	0.07	476.83	2.27	0.00	2.44	476.67	2.11	0 08:00	0 00:00	0.00	0.00
94 SDCB 030	1.36	0.10	485.09	2.27	0.00	2.44	484.93	2.11	0 08:00	0 00:00	0.00	0.00
95 SDCB 031	0.12	0.12	489.62	2.08	0.00	2.63	489.57	2.03	0 08:00	0 00:00	0.00	0.00
96 SDCB 032	1.14	0.21	499.78	2.23	0.00	2.47	499.65	2.10	0 08:00	0 00:00	0.00	0.00
97 SDCB 033	0.03	0.03	502.12	2.05	0.00	2.66	502.09	2.02	0 08:00	0 00:00	0.00	0.00
98 SDCB 034	0.29	0.29	502.63	2.17	0.00	2.55	502.53	2.07	0 08:00	0 00:00	0.00	0.00
99 SDCB 035	0.61	0.50	502.20	2.25	0.00	2.46	502.05	2.10	0 08:00	0 00:00	0.00	0.00
100 SDCB 035A	0.11	0.00	505.88	2.11	0.00	2.66	505.82	2.05	0 08:01	0 00:00	0.00	0.00
101 SDCB 036	0.19	0.11	458.71	2.10	0.00	2.87	458.65	2.04	0 08:00	0 00:00	0.00	0.00
102 SDCB 037	0.08	0.08	458.98	2.13	0.00	2.60	458.91	2.06	0 08:00	0 00:00	0.00	0.00
103 SDCB 038	0.54	0.00	463.49	2.16	0.00	14.00	463.44	2.11	1 00:00	0 00:00	0.00	0.00
104 SDCB 039	0.54	0.00	465.24	2.14	0.00	13.76	465.19	2.09	1 00:00	0 00:00	0.00	0.00
105 SDCB 040	0.54	0.00	466.55	2.15	0.00	13.22	466.50	2.10	1 00:00	0 00:00	0.00	0.00
106 SDCB 041	0.54	0.00	467.20	2.27	0.00	14.52	467.11	2.18	1 00:00	0 00:00	0.00	0.00
107 SDCB 042	9.27	4.10	471.67	5.33	0.00	10.50	470.21	3.87	1 00:00	0 00:00	0.00	0.00
108 SDCB 043	5.27	0.06	471.68	4.63	0.00	8.32	470.39	3.34	1 00:00	0 00:00	0.00	0.00
109 SDCB 044	2.99	0.06	471.68	3.24	0.00	1.83	470.98	2.54	1 00:00	0 00:00	0.00	0.00
110 SDCB 045	2.94	0.25	472.03	2.65	0.00	9.44	471.61	2.23	0 08:00	0 00:00	0.00	0.00
111 SDCB 046	0.25	0.25	479.32	2.12	0.00	2.59	479.25	2.05	0 08:00	0 00:00	0.00	0.00
112 SDCB 047	1.41	0.24	477.70	2.28	0.00	2.74	477.54	2.12	0 08:00	0 00:00	0.00	0.00
113 SDCB 048	0.16	0.16	477.74	2.24	0.00	2.48	477.59	2.09	0 08:00	0 00:00	0.00	0.00
114 SDCB 049	1.02	0.15	483.18	2.31	0.00	2.70	483.00	2.13	0 08:00	0 00:00	0.00	0.00
115 SDCB 050	0.09	0.09	483.19	2.24	0.00	2.47	483.02	2.07	0 08:00	0 00:00	0.00	0.00
116 SDCB 051	0.78	0.20	489.15	2.24	0.00	2.92	489.01	2.10	0 08:00	0 00:00	0.00	0.00
117 SDCB 052	0.14	0.14	489.72	2.13	0.00	2.58	489.65	2.06	0 08:00	0 00:00	0.00	0.00
118 SDCB 053	0.45	0.45	499.98	2.16	0.00	2.55	499.88	2.06	0 08:00	0 00:00	0.00	0.00
119 SDCB 054	0.82	0.15	477.52	2.19	0.00	4.31	477.41	2.08	0 08:00	0 00:00	0.00	0.00
120 SDCB 055	0.66	0.17	478.37	2.32	0.00	3.67	478.17	2.12	0 08:00	0 00:00	0.00	0.00
121 SDCB 056	0.50	0.09	486.17	2.17	0.00	4.33	486.07	2.07	0 08:00	0 00:00	0.00	0.00
122 SDCB 057	0.09	0.09	487.69	2.12	0.00	2.59	487.61	2.04	0 07:56	0 00:00	0.00	0.00
123 SDCB 058	0.32	0.02	495.47	2.14	0.00	2.99	495.39	2.06	0 08:00	0 00:00	0.00	0.00
124 SDCB 059	0.15	0.15	495.76	2.25	0.00	2.46	495.60	2.09	0 08:00	0 00:00	0.00	0.00
125 SDCB 060	0.15	0.15	497.22	2.14	0.00	2.58	497.11	2.03	0 08:00	0 00:00	0.00	0.00
126 SDCB 061	0.07	0.00	470.48	2.11	0.00	28.38	470.44	2.07	1 00:00	0 00:00	0.00	0.00
127 SDCB 062	0.07	0.00	470.70	2.12	0.00	24.48	470.65	2.07	1 00:00	0 00:00	0.00	0.00
128 SDCB 063	0.07	0.00	471.07	2.11	0.00	23.28	471.02	2.06	1 00:00	0 00:00	0.00	0.00
129 SDCB 064	0.07	0.00	471.35	2.13	0.00	16.90	471.29	2.07	1 00:00	0 00:00	0.00	0.00
130 SDCB 065	0.07	0.00	471.75	2.12	0.00	18.02	471.69	2.06	1 00:00	0 00:00	0.00	0.00
131 SDCB 066	0.07	0.00	474.11	4.12	0.00	21.12	474.06	4.07	1 00:00	0 00:00	0.00	0.00
132 SDCB 067	1.01	0.00	480.10	2.27	0.00	14.58	479.92	2.09	0 08:01	0 00:00	0.00	0.00
133 SDCB 068	1.01	0.14	480.51	2.50	0.00	9.15	480.20	2.19	0 08:01	0 00:00	0.00	0.00
134 SDCB 069	0.40	0.03	480.82	2.36	0.00	8.50	480.60	2.14	0 08:01	0 00:00	0.00	0.00
135 SDCB 070	0.37	0.00	481.08	2.31	0.00	5.67	480.89	2.12	0 08:01	0 00:00	0.00	0.00
136 SDCB 071	0.34	0.06	487.08	2.11	0.00	3.19	487.02	2.05	0 08:01	0 00:00	0.00	0.00
137 SDCB 072	0.28	0.00	487.81	2.26	0.00	2.45	487.66	2.11	0 08:01	0 00:00	0.00	0.00
138 SDCB 073	0.28	0.27	488.02	2.26	0.00	2.45	487.86	2.10	0 08:00	0 00:00	0.00	0.00
139 SDCB 074	0.82	0.61	481.06	2.32	0.00	3.48	480.94	2.20	0 08:00	0 00:00	0.00	0.00
140 SDCB 075	0.40	0.00	481.28	2.28	0.00	4.34	481.20	2.20	1 00:00	0 00:00	0.00	0.00
141 SDCB 076	0.40	0.00	481.40	2.28	0.00	7.51	481.33	2.21	1 00:00	0 00:00	0.00	0.00
142 SDCB 077	0.40	0.00	481.93	2.06	0.00	8.85	481.86	1.99	1 00:00	0 00:00	0.00	0.00
143 SDCB 078	0.40	0.00	482.07	2.24	0.00	10.33	482.00	2.17	1 00:00	0 00:00	0.00	0.00
144 SDCB 079	0.30	0.00	482.63	2.19	0.00	18.32	482.58	2.14	1 00:00	0 00:00	0.00	0.00
145 SDCB 080	0.30	0.00	483.02	2.19	0.00	21.60	482.98	2.15	1 00:00	0 00:00	0.00	0.00
146 SDCB 081	0.30	0.00	483.44	2.20	0.00	21.24	483.39	2.15	1 00:00	0 00:00	0.00	0.00
147 SDCB 082	0.30	0.00	483.86	2.19	0.00	20.99	483.82	2.15	1 00:00	0 00:00	0.00	0.00
148 SDCB 083	0.30	0.00	485.87	2.18	0.00	11.10	485.83	2.14	1 00:00	0 00:00	0.00	0.00
149 SDCB 084	0.30	0.00	487.94	2.18	0.00	3.44	487.90	2.14	1 00:00	0 00:00	0.00	0.00
150 SDCB 084A	0.30	0.00	486.52	2.19	0.00	8.54	486.48	2.15	1 00:00	0 00:00	0.00	0.00
151 SDCB 085	0.30	0.00	491.09	2.08	0.00	16.07	491.08	2.07	1 00:00	0 00:00	0.00	0.00
152 SDCB 086	0.31	0.00	491.40	2.21	0.00	15.22	491.34	2.15	1 00:00	0 00:00	0.00	0.00
153 SDCB 087	0.22	0.00	498.66	4.12	0.00	8.40	498.64	4.10	1 00:00	0 00:00	0.00	0.00
154 SDCB 088	9.10	4.21	502.81	6.24	0.00	4.23	501.08	4.51	1 00:00	0 00:00	0.00	0.00
155 SDCB 089	0.07	0.00	502.82	2.05	0.00	2.80	502.79	2.02	0 08:01	0 00:00	0.00	0.00
156 SDCB 090	0.07	0.03	504.26	2.10	0.00	2.86	504.20	2.04	0 08:01	0 00:00	0.00	0.00
157 SDCB 091	0.03	0.03	504.50	2.09	0.00	2.62	504.45	2.04	0 08:00	0 00:00	0.00	0.00
158 SDCB 092	4.97	0.00	502.81	6.38	0.00	6.51	501.19	4.76	1 00:00	0 00:00	0.00	0.00
159 SDCB 093	1.25	0.39	502.82	3.80	0.00	4.34	501.78	2.76	1 00:00	0 00:00	0.00	0.00
160 SDCB 094	0.50	0.50	503.49	2.29	0.00	2.42	503.32	2.12	0 08:00	0 00:00	0.00	0.00
161 SDCB 095	0.00	0.00	503.57	2.00	0.00	2.71	503.57	2.00	0 00:00	0 00:00	0.00	0.00
162 SDCB 096	0.11	0.06	506.49	0.16	0.00	2.98	506.40	0.07	0 08:01	0 00:00	0.00	0.00

Junction Results

SN Element ID	Peak Inflow	Peak Lateral Inflow	Max HGL Elevation Attained	Max HGL Depth Attained	Max Surge Depth Attained	Min Freeboard Attained	Average HGL Elevation Attained	Average HGL Depth Attained	Time of Max HGL Occurrence	Time of Peak Flooding Occurrence	Total Flooded Volume	Total Time Flooded
	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(days hh:mm)	(days hh:mm)	(ac-in)	(min)
163 SDCB 097	0.06	0.06	506.87	0.11	0.00	2.60	506.81	0.05	0 08:00	0 00:00	0.00	0.00
164 SDCB 098	0.10	0.00	493.46	4.13	0.00	8.56	493.42	4.09	1 00:00	0 00:00	0.00	0.00
165 SDCB 099	2.64	0.00	498.75	6.24	0.00	4.39	496.68	4.17	1 00:00	0 00:00	0.00	0.00
166 SDCB 100	0.18	0.00	499.38	2.11	0.00	3.49	499.32	2.05	0 08:00	0 00:00	0.00	0.00
167 SDCB 101	0.18	0.18	499.82	2.18	0.00	2.53	499.71	2.07	0 08:00	0 00:00	0.00	0.00
168 SDCB 102	2.47	0.00	498.76	5.71	0.00	4.11	496.85	3.80	1 00:00	0 00:00	0.00	0.00
169 SDCB 103	0.97	0.47	498.76	2.78	0.00	3.49	498.21	2.23	1 00:00	0 00:00	0.00	0.00
170 SDCB 104	0.50	0.50	498.82	2.38	0.00	2.33	498.60	2.16	0 08:00	0 00:00	0.00	0.00
171 SDCB 105	1.53	0.13	498.76	5.38	0.00	4.31	496.98	3.60	1 00:00	0 00:00	0.00	0.00
172 SDCB 106	1.49	0.09	498.76	4.78	0.00	3.70	497.21	3.23	1 00:00	0 00:00	0.00	0.00
173 SDCB 107	1.16	0.53	498.76	3.91	0.00	3.31	497.58	2.73	1 00:00	0 00:00	0.00	0.00
174 SDCB 108	0.64	0.43	499.15	2.35	0.00	2.41	498.94	2.14	0 08:00	0 00:00	0.00	0.00
175 SDCB 109	0.22	0.09	501.09	2.16	0.00	2.56	501.00	2.07	0 08:00	0 00:00	0.00	0.00
176 SDCB 110	0.13	0.13	503.45	2.11	0.00	2.61	503.39	2.05	0 08:00	0 00:00	0.00	0.00
177 SDCB 111	0.10	0.00	489.25	2.06	0.00	3.32	489.23	2.04	1 00:00	0 00:00	0.00	0.00
178 SDCB 112	0.10	0.00	493.80	2.05	0.00	10.89	493.79	2.04	1 00:00	0 00:00	0.00	0.00
179 SDCB 113	0.10	0.00	495.72	4.08	0.00	8.66	495.69	4.05	1 00:00	0 00:00	0.00	0.00
180 SDCB 114	2.41	0.15	501.08	3.28	0.00	5.99	500.34	2.54	1 00:00	0 00:00	0.00	0.00
181 SDCB 115	0.62	0.00	501.08	2.69	0.00	5.57	500.64	2.25	1 00:00	0 00:00	0.00	0.00
182 SDCB 116	0.62	0.00	501.31	2.43	0.00	3.39	501.04	2.16	0 08:00	0 00:00	0.00	0.00
183 SDCB 117	0.62	0.62	501.51	2.48	0.00	2.23	501.20	2.17	0 08:00	0 00:00	0.00	0.00
184 SDCB 118	0.37	0.10	501.08	2.44	0.00	8.28	500.79	2.15	1 00:00	0 00:00	0.00	0.00
185 SDCB 119	1.29	0.00	501.34	2.40	0.00	5.81	501.11	2.17	0 08:00	0 00:00	0.00	0.00
186 SDCB 120	1.29	0.57	501.76	2.56	0.00	3.92	501.41	2.21	0 08:00	0 00:00	0.00	0.00
187 SDCB 121	0.74	0.36	502.45	2.50	0.00	4.09	502.13	2.18	0 08:01	0 00:00	0.00	0.00
188 SDCB 122	0.32	0.32	504.96	2.20	0.00	2.52	504.85	2.09	0 08:00	0 00:00	0.00	0.00
189 SDCB 123	0.06	0.06	502.45	2.16	0.00	2.22	502.34	2.05	0 08:01	0 00:00	0.00	0.00
190 SDCB 124	0.50	0.00	491.40	2.73	0.00	11.52	491.34	2.67	1 00:00	0 00:00	0.00	0.00
191 SDCB 125	0.08	0.00	491.40	2.45	0.00	10.43	491.34	2.39	1 00:00	0 00:00	0.00	0.00
192 SDCB 126	0.08	0.00	491.40	4.35	0.00	9.91	491.34	4.29	1 00:00	0 00:00	0.00	0.00
193 SDCB 127	2.02	0.88	497.99	3.55	0.00	3.09	497.02	2.58	1 00:00	0 00:00	0.00	0.00
194 SDCB 128	1.15	0.26	497.99	3.31	0.00	3.57	497.19	2.51	1 00:00	0 00:00	0.00	0.00
195 SDCB 129	0.21	0.21	497.99	2.88	0.00	2.17	497.36	2.25	1 00:00	0 00:00	0.00	0.00
196 SDCB 130	0.74	0.00	412.66	2.54	0.00	1.38	412.34	2.22	0 08:00	0 00:00	0.00	0.00
197 SDCB 131	0.13	0.13	412.67	2.26	0.00	1.40	412.49	2.08	0 08:00	0 00:00	0.00	0.00
198 SDCB 132	0.61	0.22	412.71	2.56	0.00	1.21	412.34	2.19	0 08:00	0 00:00	0.00	0.00
199 SDCB 133	0.39	0.39	412.76	2.53	0.00	1.85	412.38	2.15	0 08:00	0 00:00	0.00	0.00
200 SDCB 134	0.00	0.00	479.65	2.00	0.00	3.57	479.65	2.00	0 00:00	0 00:00	0.00	0.00
201 SDCO 02	3.08	0.00	414.64	5.23	0.00	5.30	412.88	3.47	0 13:35	0 00:00	0.00	0.00
202 SDCO 03	2.44	2.44	482.81	0.30	0.00	2.89	482.64	0.13	0 08:00	0 00:00	0.00	0.00
203 TDC #1	0.25	0.25	498.76	0.86	0.00	1.66	498.10	0.20	1 00:00	0 00:00	0.00	0.00
204 TDC #2	0.27	0.23	504.34	0.10	0.00	0.61	504.29	0.05	0 08:00	0 00:00	0.00	0.00

Pipe Input

SN Element ID	Length	Inlet Invert Elevation	Inlet Invert Offset	Outlet Invert Elevation	Outlet Invert Offset	Total Drop	Average Slope	Pipe Shape	Pipe Diameter or Height	Pipe Width	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow	Flap Gate
	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(%)		(in)	(in)					(cfs)	
1 Link-100	101.58	482.51	0.00	471.38	2.00	11.13	10.9600	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
2 Link-101	90.66	479.20	2.00	471.71	2.33	7.49	8.2600	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
3 Link-102	16.00	477.50	2.00	477.42	2.00	0.08	0.5000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
4 Link-103	188.37	502.88	0.00	500.60	0.00	2.28	1.2100	CIRCULAR	12.000	12.000	0.0100	0.5000	0.5000	0.0000	0.00	No
5 Link-104	5.91	412.15	2.00	410.12	0.00	2.03	34.3400	CIRCULAR	8.040	8.040	0.0150	0.5000	0.5000	0.0000	0.00	No
6 Link-105	53.19	471.22	2.27	470.96	1.73	0.27	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
7 Link-106	80.88	471.63	2.40	471.22	1.60	0.40	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
8 Link-107	5.00	471.65	0.00	471.63	2.00	0.03	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
9 Link-108	36.40	480.01	2.00	479.83	2.00	0.18	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
10 Link-109	5.00	479.83	2.00	478.95	5.46	0.88	17.6400	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
11 Link-110	80.23	502.70	0.00	500.60	0.00	2.09	2.6100	CIRCULAR	12.000	12.000	0.0100	0.5000	0.5000	0.0000	0.00	No
12 Link-111	101.94	499.40	0.00	498.63	0.00	0.76	0.7500	CIRCULAR	8.040	8.040	0.0100	0.5000	0.5000	0.0000	0.00	No
13 Link-112	6.31	500.98	0.00	499.40	0.00	1.58	25.0000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
14 Link-114	5.00	481.68	1.81	481.63	0.50	0.05	0.9800	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
15 Link-115	5.00	481.13	0.00	481.12	2.00	0.01	0.2000	CIRCULAR	24.000	24.000	0.0120	0.5000	0.5000	0.0000	0.00	No
16 Link-116	56.86	481.12	2.00	481.00	2.00	0.12	0.2100	CIRCULAR	24.000	24.000	0.0120	0.5000	0.5000	0.0000	0.00	No
17 Link-117	50.46	504.41	2.00	504.16	2.00	0.25	0.5000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
18 Link-118	142.59	504.16	2.00	502.77	2.00	1.39	0.9700	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
19 Link-119	12.23	502.77	2.00	499.40	2.83	3.37	27.5900	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
20 Link-120	247.67	503.43	0.00	502.19	0.00	1.24	0.5000	CIRCULAR	6.000	6.000	0.0100	0.5000	0.5000	0.0000	0.00	No
21 Link-121	62.70	502.19	0.00	501.87	0.87	0.31	0.5000	CIRCULAR	6.000	6.000	0.0100	0.5000	0.5000	0.0000	0.00	No
22 Link-122	159.64	506.31	0.00	503.57	2.00	2.74	1.7100	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
23 Link-123	38.11	503.57	2.00	503.20	2.00	0.37	0.9800	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
24 Link-124	53.97	495.05	2.00	494.51	2.00	0.54	1.0000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
25 Link-125	92.98	498.44	2.00	497.98	2.00	0.47	0.5000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
26 Link-126	33.69	498.14	0.00	496.77	2.33	1.37	4.0600	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
27 Link-127	84.85	497.11	2.00	496.68	2.00	0.42	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
28 Link-128	137.71	505.77	2.00	501.95	2.00	3.82	2.7800	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
29 Link-129	14.44	480.84	0.00	480.77	2.00	0.07	0.5000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
30 Link-13	174.19	498.80	2.00	497.19	2.33	1.62	0.9300	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
31 Link-131	93.22	486.33	2.00	485.69	2.00	0.64	0.6900	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
32 Link-132	145.18	479.65	2.00	478.84	-4.16	0.81	0.5600	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
33 Link-14	46.89	471.38	2.00	470.44	2.00	0.94	2.0000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
34 Link-16	138.50	499.55	2.00	484.83	2.00	14.72	10.6300	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
35 Link-17	96.20	497.08	2.00	495.33	2.00	1.75	1.8200	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
36 Link-18	46.72	408.89	2.00	408.65	2.50	0.23	0.5000	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
37 Link-19	5.00	420.24	4.00	420.22	3.00	0.03	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
38 Link-20	61.16	417.22	0.00	416.58	2.00	0.64	1.0400	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
39 Link-21	306.34	416.58	2.00	409.39	2.50	7.19	2.3500	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
40 Link-25	201.58	416.28	2.00	409.64	2.67	6.64	3.3000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
41 Link-26	5.70	409.41	0.00	409.39	0.58	0.03	0.4900	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
42 Link-27	30.29	408.15	2.00	408.00	0.00	0.15	0.5000	CIRCULAR	24.000	24.000	0.0120	0.5000	0.5000	0.0000	0.00	No
43 Link-29	8.98	424.57	2.00	424.13	4.39	0.44	4.9200	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
44 Link-30	66.99	412.12	2.00	411.38	0.00	0.74	1.1000	CIRCULAR	12.000	12.000	0.0300	0.5000	0.5000	0.0000	0.00	No
45 Link-31	19.00	409.31	4.00	409.21	2.00	0.09	0.5000	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
46 Link-32	48.95	409.21	2.00	408.97	2.00	0.25	0.5000	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
47 Link-33	94.95	427.37	2.00	424.86	2.00	2.51	2.6400	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
48 Link-34	57.83	427.66	2.00	427.37	2.00	0.29	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
49 Link-39	277.48	463.33	2.00	453.20	0.00	10.14	3.6500	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
50 Link-40	58.78	499.28	2.00	494.84	2.33	4.44	7.5500	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
51 Link-42	71.65	497.98	2.00	495.38	2.33	2.60	3.6300	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
52 Link-43	36.42	499.64	2.00	499.28	2.00	0.36	1.0000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
53 Link-45	7.00	494.51	2.00	494.44	1.61	0.07	1.0000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
54 Link-47	5.04	493.33	4.00	493.28	2.17	0.05	0.9900	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
55 Link-48	109.69	491.11	0.00	484.31	0.00	6.80	6.2000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
56 Link-51	61.91	495.06	0.00	487.76	2.00	7.30	11.7900	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
57 Link-52	29.56	487.76	2.00	487.55	2.00	0.21	0.7000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
58 Link-57	43.66	495.64	4.00	493.75	2.00	1.89	4.3200	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
59 Link-59	42.84	489.19	2.00	482.33	2.50	6.86	16.0100	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
60 Link-60	15.50	481.83	2.00	481.68	1.81	0.15	0.9800	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
61 Link-61	91.52	480.74	2.00	478.41	0.00	2.33	2.5500	CIRCULAR	12.000	12.000	0.0200	0.5000	0.5000	0.0000	0.00	No
62 Link-63	18.25	493.75	2.00	489.19	2.00	4.56	25.0000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
63 Link-64	52.30	487.37	0.00	480.35	2.33	7.03	13.4300	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
64 Link-67	34.64	473.99	4.00	473.82	2.17	0.17	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
65 Link-68	74.62	470.96	2.00	470.58	2.00	0.37	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
66 Link-69	42.23	470.58	2.00	470.37	2.00	0.21	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
67 Link-70	130.71	470.37	2.00	469.72	0.00	0.65	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
68 Link-73	379.96	498.54	4.00	491.19	2.00	7.35	1.9300	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
69 Link-74	26.16	491.19	2.00	491.01	2.00	0.18	0.6900	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
70 Link-75	16.72	491.01	2.00	48												

[illegible]

Pipe Input

SN Element ID	Length	Inlet Invert Elevation	Inlet Invert Offset	Outlet Invert Elevation	Outlet Invert Offset	Total Drop	Average Slope	Pipe Shape	Pipe Diameter or Height	Pipe Width	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow	Flap Gate
	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(%)		(in)	(in)					(cfs)	
83 Link-89	216.18	490.67	2.00	489.58	0.39	1.08	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
84 Link-92	80.36	470.44	2.00	469.55	2.50	0.88	1.1000	CIRCULAR	12.000	12.000	0.0100	0.5000	0.5000	0.0000	0.00	No
85 Link-93	52.16	481.00	2.00	480.74	2.00	0.26	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
86 Link-94	52.51	482.00	3.00	479.65	2.00	2.35	4.4800	CIRCULAR	24.000	24.000	0.0140	0.5000	0.5000	0.0000	0.00	No
87 Link-95	100.53	502.46	2.00	499.55	2.00	2.92	2.9000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
88 Link-96	38.51	502.07	2.00	499.55	2.00	2.52	6.5500	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
89 Link-97	99.36	466.93	2.00	466.40	2.00	0.53	0.5300	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
90 Link-98	12.43	466.40	2.00	465.10	2.00	1.30	10.4900	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
91 Link-99	17.39	465.10	2.00	463.33	2.00	1.77	10.1700	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
92 P - (111)	83.71	501.95	2.00	501.53	2.33	0.42	0.5000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
93 P - (115)	94.85	500.64	2.00	500.13	2.33	0.51	0.5300	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
94 P - (119)	71.57	500.60	0.00	499.74	3.31	0.86	1.2100	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
95 P - (119) (2)	134.37	499.24	2.81	498.57	2.00	0.67	0.5000	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
96 P - (125)	120.03	495.98	2.00	495.38	2.00	0.60	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
97 P - (125) (1)	174.19	496.85	2.00	495.98	2.00	0.87	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
98 P - (129)	49.06	496.68	2.00	496.44	2.00	0.25	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
99 P - (129) (1)	36.48	496.44	2.00	494.61	2.26	1.82	5.0000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
100 P - (130)	10.93	497.91	0.00	496.48	2.50	1.42	13.0100	CIRCULAR	6.000	6.000	0.0100	0.5000	0.5000	0.0000	0.00	No
101 P - (131)	278.34	472.99	2.00	452.12	2.00	20.86	7.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
102 P - (131) (1)	304.53	452.12	2.00	430.28	2.00	21.85	7.1700	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
103 P - (132)	110.47	430.28	2.00	421.28	2.00	8.99	8.1400	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
104 P - (132) (1)	8.54	412.59	2.00	412.55	2.00	0.04	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
105 P - (132) (2)	410.95	421.28	2.00	412.59	2.00	8.69	2.1100	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
106 P - (133)	74.34	416.68	2.00	416.28	2.00	0.40	0.5400	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
107 P - (134)	116.52	487.55	2.00	486.97	2.00	0.58	0.5000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
108 P - (134) (1)	22.78	480.46	2.00	480.35	2.33	0.11	0.5000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
109 P - (134) (2)	61.13	480.77	2.00	480.46	2.00	0.31	0.5000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
110 P - (136)	123.34	442.11	2.00	427.99	2.33	14.12	11.4500	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
111 P - (137)	151.88	458.61	2.00	442.11	2.00	16.50	10.8700	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
112 P - (138)	153.40	482.87	2.00	477.42	2.00	5.45	3.5500	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
113 P - (139) (1)	158.86	499.82	2.00	488.91	2.00	10.91	6.8700	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
114 P - (140)	132.82	488.91	2.00	482.87	2.00	6.04	4.5400	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
115 P - (141)	63.37	488.01	0.00	487.37	0.00	0.63	1.0000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
116 P - (144)	45.90	489.59	2.00	488.91	2.00	0.69	1.5000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
117 P - (145)	16.00	482.95	2.00	482.87	2.00	0.08	0.5000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
118 P - (148)	102.22	503.34	2.00	500.93	2.00	2.41	2.3500	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
119 P - (149)	127.35	500.93	2.00	498.80	2.00	2.13	1.6700	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
120 P - (151)	100.08	497.45	-0.33	496.68	2.00	0.76	0.7600	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
121 P - (159)	16.30	408.97	2.00	408.89	2.00	0.08	0.5000	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
122 P - (171)	24.02	504.24	0.00	500.64	2.00	3.60	15.0000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
123 P - (182)	47.27	442.64	2.00	442.11	2.00	0.53	1.1200	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
124 P - (184)	46.83	458.85	2.00	458.61	2.00	0.23	0.5000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
125 P - (210)	110.88	506.33	0.00	505.77	2.00	0.55	0.5000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
126 P - (211)	85.92	506.76	0.00	506.33	0.00	0.43	0.5000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
127 P - (218)	51.10	501.20	2.00	500.94	2.00	0.25	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
128 P - (219)	117.57	500.94	2.00	499.80	2.00	1.15	0.9700	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
129 P - (221)	161.19	504.76	2.00	501.95	2.00	2.81	1.7500	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00	No
130 P - (225)	67.33	495.38	2.00	495.05	2.00	0.34	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No
131 P - (231)	5.00	498.57	2.00	498.54	0.50	0.02	0.5000	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00	No
132 P - (232)	88.39	507.40	0.00	506.40	0.17	1.00	1.1300	CIRCULAR	6.000	6.000	0.0100	0.5000	0.5000	0.0000	0.00	No
133 P - (233)	46.01	506.24	0.00	506.01	0.00	0.23	0.5000	CIRCULAR	8.040	8.040	0.0100	0.5000	0.5000	0.0000	0.00	No
134 P - (234)	45.64	506.01	0.00	505.78	0.00	0.23	0.5000	CIRCULAR	8.040	8.040	0.0100	0.5000	0.5000	0.0000	0.00	No
135 P - (235)	168.86	505.78	0.00	504.93	0.33	0.84	0.5000	CIRCULAR	8.040	8.040	0.0100	0.5000	0.5000	0.0000	0.00	No
136 P - (236)	108.25	504.60	0.00	504.06	0.00	0.54	0.5000	CIRCULAR	12.000	12.000	0.0100	0.5000	0.5000	0.0000	0.00	No
137 P - (237)	81.81	504.06	0.00	503.65	0.00	0.41	0.5000	CIRCULAR	12.000	12.000	0.0100	0.5000	0.5000	0.0000	0.00	No
138 P - (238)	67.66	503.65	0.00	503.31	0.00	0.34	0.5000	CIRCULAR	12.000	12.000	0.0100	0.5000	0.5000	0.0000	0.00	No
139 P - (239)	54.94	503.31	0.00	503.04	0.00	0.28	0.5000	CIRCULAR	12.000	12.000	0.0100	0.5000	0.5000	0.0000	0.00	No
140 P - (240)	30.78	503.04	0.00	502.88	0.00	0.15	0.5000	CIRCULAR	12.000	12.000	0.0100	0.5000	0.5000	0.0000	0.00	No
141 P - (242)	143.69	507.40	0.00	506.68	0.00	0.72	0.5000	CIRCULAR	6.000	6.000	0.0100	0.5000	0.5000	0.0000	0.00	No
142 P - (243)	32.33	506.68	0.00	506.52	0.17	0.16	0.5000	CIRCULAR	6.000	6.000	0.0100	0.5000	0.5000	0.0000	0.00	No
143 P - (244)	44.58	506.35	0.00	506.13	0.00	0.22	0.5000	CIRCULAR	8.040	8.040	0.0100	0.5000	0.5000	0.0000	0.00	No
144 P - (244) (1)	37.23	506.13	0.00	505.85	0.00	0.27	0.7400	CIRCULAR	8.040	8.040	0.0100	0.5000	0.5000	0.0000	0.00	No
145 P - (245)	121.72	505.85	0.00	505.25	0.00	0.61	0.5000	CIRCULAR	8.040	8.040	0.0100	0.5000	0.5000	0.0000	0.00	No
146 P - (246)	54.85	505.25	0.00	504.97	0.00	0.27	0.5000	CIRCULAR	8.040	8.040	0.0100	0.5000	0.5000	0.0000	0.00	No
147 P - (247)	25.66	504.97	0.00	504.84	0.33	0.13	0.5000	CIRCULAR	8.040	8.040	0.0100	0.5000	0.5000	0.0000	0.00	No
148 P - (248)	24.07	504.51	0.00	504.39	0.00	0.12	0.5000	CIRCULAR	12.000	12.000	0.0100	0.5000	0.5000	0.0000	0.00	No
149 P - (248) (1)	177.43	504.39	0.00	503.50	0.00	0.89	0.5000	CIRCULAR	12.000	12.000	0.0100	0.5000	0.5000	0.0000	0.00	No
150 P - (249)	53.06	503.50	0.00	503.24	0.00	0.26	0.5000	CIRCULAR	12.000	12.000	0.0100	0.5000	0.5000	0.0000	0.00	No
151 P - (249) (1)	58.27	503.24	0													

[illegible]

Pipe Input

SN Element ID	Length	Inlet Invert Elevation	Inlet Invert Offset	Outlet Invert Elevation	Outlet Invert Offset	Total Drop	Average Pipe Slope	Pipe Shape	Pipe Diameter or Height	Pipe Width	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flap Flow Gate
	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(%)		(in)	(in)					(cfs)
165 P - (268)	138.08	487.42	0.00	486.04	0.00	1.38	1.0000	CIRCULAR	6.000	6.000	0.0100	0.5000	0.5000	0.0000	0.00 No
166 P - (269)	21.63	486.04	0.00	485.83	0.00	0.22	1.0000	CIRCULAR	6.000	6.000	0.0100	0.5000	0.5000	0.0000	0.00 No
167 P - (270)	32.53	485.83	0.00	485.50	0.00	0.32	1.0000	CIRCULAR	6.000	6.000	0.0100	0.5000	0.5000	0.0000	0.00 No
168 P - (271)	64.44	485.50	0.00	482.34	0.17	3.16	4.9000	CIRCULAR	6.000	6.000	0.0100	0.5000	0.5000	0.0000	0.00 No
169 P - (272)	7.32	482.18	0.00	480.35	2.33	1.83	25.0100	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
170 P - (273)	7.24	487.46	0.00	487.38	0.00	0.07	0.9900	CIRCULAR	6.000	6.000	0.0120	0.5000	0.5000	0.0000	0.00 No
171 P - (274)	170.62	487.38	0.00	482.34	0.17	5.04	2.9500	CIRCULAR	6.000	6.000	0.0100	0.5000	0.5000	0.0000	0.00 No
172 P - (276)	67.99	502.29	2.00	501.95	2.00	0.34	0.5000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
173 P - (282)	104.48	501.87	0.87	501.35	2.33	0.52	0.5000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
174 P - (283)	256.57	501.02	2.00	499.74	3.31	1.28	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00 No
175 P - (291)	12.39	506.90	0.00	506.13	0.00	0.78	6.2600	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
176 P - (292)	17.89	505.94	0.00	505.85	0.00	0.09	0.5000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
177 P - (293)	54.87	505.78	0.00	504.72	0.33	1.06	1.9400	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
178 P - (295)	26.63	506.92	0.00	504.84	0.33	2.08	7.8000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
179 P - (296)	48.54	505.91	-0.29	503.57	0.33	2.33	4.8100	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
180 P - (298)	177.08	503.20	2.00	501.35	2.33	1.85	1.0400	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
181 P - (299)	85.86	501.95	2.00	499.55	2.00	2.40	2.8000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
182 P - (319)	37.78	486.97	2.00	480.77	2.00	6.20	16.4200	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
183 P - (320)	63.83	473.30	2.00	472.99	2.00	0.31	0.4900	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00 No
184 P - (321)	68.75	452.47	2.00	452.12	2.00	0.34	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00 No
185 P - (322)	73.83	430.64	2.00	430.28	2.00	0.37	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00 No
186 P - (324)	56.92	412.41	2.00	412.12	2.00	0.29	0.5000	CIRCULAR	8.040	8.040	0.0150	0.5000	0.5000	0.0000	0.00 No
187 P - (326)	15.09	412.23	2.00	412.15	2.00	0.08	0.5200	CIRCULAR	8.040	8.040	0.0150	0.5000	0.5000	0.0000	0.00 No
188 P - (34)	14.58	425.80	2.00	425.19	2.33	0.61	4.2200	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
189 P - (34) (2)	57.00	424.86	2.00	424.57	2.00	0.28	0.5000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00 No
190 P - (36)	79.66	477.42	2.00	469.89	2.83	7.54	9.4600	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
191 P - (40)	142.41	469.05	2.00	468.34	2.00	0.71	0.5000	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00 No
192 P - (48)	5.00	468.34	2.00	468.32	1.89	0.03	0.5000	CIRCULAR	18.000	18.000	0.0120	0.5000	0.5000	0.0000	0.00 No
193 P - (58)	52.28	465.00	2.00	458.94	2.00	6.05	11.5800	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
194 P - (58) (1)	61.63	458.94	2.00	453.11	2.00	5.84	9.4700	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
195 P - (58) (1) (1)	74.26	453.11	2.00	442.64	2.00	10.47	14.1000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
196 P - (60)	46.49	489.54	2.00	484.83	2.00	4.72	10.1400	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
197 P - (61)	71.46	484.83	2.00	476.56	2.00	8.26	11.5600	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
198 P - (65)	100.63	476.56	2.00	465.00	2.00	11.57	11.4900	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
199 P - (78)	120.21	495.33	2.00	486.00	2.00	9.34	7.7700	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
200 P - (78) (2) (1)	123.21	486.00	2.00	478.05	2.00	7.95	6.4500	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
201 P - (83)	56.71	477.33	2.00	469.89	2.83	7.45	13.1300	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
202 P - (84)	35.83	495.51	2.18	495.33	1.82	0.18	0.5000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
203 P - (85)	35.86	478.05	2.00	477.33	2.00	0.72	2.0000	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
204 P - (86)	35.83	487.57	3.57	486.00	0.43	1.57	4.3800	CIRCULAR	8.040	8.040	0.0120	0.5000	0.5000	0.0000	0.00 No
205 SF_VAULT	50.64	412.55	2.00	409.91	0.50	2.64	5.2100	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00 No

1

Pipe Results

SN Element ID	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/Total Depth Ratio	Total Time Surcharged	Froude Number	Reported Condition
	(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)		
1 Link-100	2.44	0 08:00	12.78	0.19	6.66	0.25	0.47	0.47	0.00		Calculated
2 Link-101	0.25	0 08:00	3.76	0.07	5.01	0.30	0.22	0.33	0.00		Calculated
3 Link-102	0.16	0 08:00	0.93	0.17	1.31	0.20	0.25	0.38	0.00		Calculated
4 Link-103	1.41	0 08:01	5.10	0.28	2.74	1.15	0.68	0.68	0.00		Calculated
5 Link-104	0.61	0 08:00	6.14	0.10	1.82	0.05	0.62	0.92	0.00		Calculated
6 Link-105	0.07	1 00:00	2.73	0.02	0.44	2.01	0.25	0.25	0.00		Calculated
7 Link-106	0.07	1 00:00	2.73	0.03	0.32	4.21	0.31	0.31	0.00		Calculated
8 Link-107	0.07	1 00:00	2.73	0.03	1.18	0.07	0.13	0.13	0.00		Calculated
9 Link-108	1.01	0 08:01	2.73	0.37	2.88	0.21	0.46	0.46	0.00		Calculated
10 Link-109	1.01	0 08:01	16.21	0.06	7.91	0.01	0.30	0.30	0.00		Calculated
11 Link-110	2.38	0 08:02	7.48	0.32	4.30	0.31	0.73	0.73	0.00		Calculated
12 Link-111	0.44	0 08:01	1.36	0.32	3.16	0.54	0.28	0.42	0.00		Calculated
13 Link-112	0.00	0 00:00	6.55	0.00	0.00		0.14	0.21	0.00		Calculated
14 Link-114	0.40	1 00:00	11.27	0.04	2.48	0.03	0.22	0.15	0.00		Calculated
15 Link-115	0.40	1 00:00	10.96	0.04	1.37	0.06	0.30	0.15	0.00		Calculated
16 Link-116	0.40	1 00:00	11.21	0.04	1.49	0.64	0.28	0.14	0.00		Calculated
17 Link-117	0.03	0 08:00	0.93	0.04	1.10	0.76	0.10	0.14	0.00		Calculated
18 Link-118	0.07	0 08:01	1.29	0.05	1.93	1.23	0.10	0.16	0.00		Calculated
19 Link-119	0.07	0 08:01	6.88	0.01	3.75	0.05	0.36	0.53	0.00		Calculated
20 Link-120	0.26	0 08:00	0.52	0.50	2.48	1.66	0.29	0.58	0.00		Calculated
21 Link-121	0.26	0 08:01	0.52	0.50	2.17	0.48	0.50	1.00	142.00		SURCHARGED
22 Link-122	0.00	0 00:00	1.71	0.00	0.00		0.00	0.00	0.00		Calculated
23 Link-123	0.00	0 00:00	1.30	0.00	0.00		0.15	0.22	0.00		Calculated
24 Link-124	2.47	0 08:01	3.86	0.64	3.14	0.29	1.00	1.00	967.00		SURCHARGED
25 Link-125	0.50	0 08:00	0.93	0.54	2.65	0.58	0.49	0.74	0.00		Calculated
26 Link-126	0.00	0 00:00	2.64	0.00	0.00		0.33	0.50	0.00		Calculated
27 Link-127	0.21	0 08:00	2.73	0.08	0.85	1.66	0.94	0.94	0.00		Calculated
28 Link-128	0.11	0 08:01	2.18	0.05	1.50	1.53	0.18	0.27	0.00		Calculated
29 Link-129	0.03	0 08:02	0.92	0.04	0.27	0.89	0.28	0.42	0.00		Calculated
30 Link-13	0.64	0 08:00	1.26	0.51	3.53	0.82	0.40	0.59	0.00		Calculated
31 Link-131	0.30	1 00:00	9.45	0.03	2.36	0.66	0.19	0.12	0.00		Calculated
32 Link-132	0.00	0 00:00	17.29	0.00	0.00		0.00	0.00	0.00		Calculated
33 Link-14	2.93	0 08:00	5.46	0.54	5.20	0.15	0.68	0.68	0.00		Calculated
34 Link-16	1.14	0 08:00	4.27	0.27	9.41	0.25	0.25	0.38	0.00		Calculated
35 Link-17	0.15	0 08:00	1.77	0.09	3.03	0.53	0.13	0.20	0.00		Calculated
36 Link-18	1.60	0 08:01	8.05	0.20	3.20	0.24	0.49	0.33	0.00		Calculated
37 Link-19	0.29	1 00:00	2.73	0.11	1.92	0.04	0.25	0.25	0.00		Calculated
38 Link-20	0.29	1 00:00	3.95	0.07	2.83	0.36	0.19	0.19	0.00		Calculated
39 Link-21	0.29	1 00:00	5.91	0.05	3.89	1.31	0.15	0.15	0.00		Calculated
40 Link-25	0.69	0 08:00	7.01	0.10	5.59	0.60	0.21	0.21	0.00		Calculated
41 Link-26	3.08	0 08:01	7.98	0.39	1.74	0.05	1.50	1.00	1050.00		SURCHARGED
42 Link-27	1.76	0 08:01	17.30	0.10	3.12	0.16	0.47	0.24	0.00		Calculated
43 Link-29	3.26	0 08:01	8.56	0.38	6.92	0.02	1.00	1.00	679.00		SURCHARGED
44 Link-30	0.74	0 08:00	1.62	0.45	2.17	0.51	0.45	0.45	0.00		Calculated
45 Link-31	0.56	0 13:35	8.05	0.07	2.21	0.14	0.31	0.21	0.00		Calculated
46 Link-32	0.56	0 13:36	8.05	0.07	1.78	0.46	0.47	0.31	0.00		Calculated
47 Link-33	2.46	0 08:01	6.28	0.39	4.08	0.39	0.72	0.72	0.00		Calculated
48 Link-34	2.33	0 08:01	2.73	0.85	3.67	0.26	0.75	0.75	0.00		Calculated
49 Link-39	0.54	1 00:00	21.75	0.02	5.00	0.92	0.17	0.11	0.00		Calculated
50 Link-40	0.18	0 08:00	3.60	0.05	3.46	0.28	0.38	0.58	0.00		Calculated
51 Link-42	0.97	0 08:00	2.49	0.39	5.68	0.21	0.67	1.00	110.00		SURCHARGED
52 Link-43	0.18	0 08:00	1.31	0.14	2.48	0.24	0.17	0.26	0.00		Calculated
53 Link-45	2.64	0 08:01	3.86	0.68	3.36	0.03	1.00	1.00	976.00		SURCHARGED
54 Link-47	0.10	1 00:00	3.84	0.02	1.73	0.05	0.12	0.12	0.00		Calculated
55 Link-48	0.10	1 00:00	9.61	0.01	0.22	8.31	0.54	0.54	0.00		Calculated
56 Link-51	0.01	0 08:00	4.49	0.00	0.26	3.97	0.14	0.22	0.00		Calculated
57 Link-52	0.28	0 08:00	1.10	0.25	2.21	0.22	0.26	0.39	0.00		Calculated
58 Link-57	0.10	1 00:00	8.03	0.01	3.41	0.21	0.08	0.08	0.00		Calculated
59 Link-59	0.10	1 00:00	15.44	0.01	5.41	0.13	0.06	0.06	0.00		Calculated
60 Link-60	0.40	1 00:00	11.27	0.04	2.17	0.12	0.24	0.16	0.00		Calculated
61 Link-61	0.82	0 08:00	3.70	0.22	1.49	1.02	0.66	0.66	0.00		Calculated
62 Link-63	0.10	1 00:00	19.30	0.01	5.78	0.05	0.05	0.05	0.00		Calculated
63 Link-64	0.10	0 08:00	4.80	0.02	4.94	0.18	0.11	0.17	0.00		Calculated
64 Link-67	0.07	1 00:00	2.73	0.03	1.45	0.40	0.11	0.11	0.00		Calculated
65 Link-68	0.07	1 00:00	2.73	0.02	1.41	0.88	0.11	0.11	0.00		Calculated
66 Link-69	0.07	1 00:00	2.73	0.02	1.40	0.50	0.11	0.11	0.00		Calculated
67 Link-70	0.07	1 00:00	2.73	0.02	1.49	1.46	0.11	0.11	0.00		Calculated
68 Link-73	0.22	1 00:00	15.83	0.01	2.24	2.83	0.16	0.11	0.00		Calculated
69 Link-74	0.30	1 00:00	9.47	0.03	2.26	0.19	0.19	0.13	0.00		Calculated
70 Link-75	0.30	1 00:00	50.17	0.01	4.04	0.07	0.13	0.09	0.00		Calculated
71 Link-76	0.30	1 00:00	10.36	0.03	2.44	1.18	0.18	0.12	0.00		Calculated
72 Link-77	0.30	1 00:00	9.45	0.03	2.34	2.08	0.19	0.13	0.00		Calculated
73 Link-78	0.30	1 00:00	9.45	0.03	2.26	0.46	0.19	0.13	0.00		Calculated
74 Link-79	0.30	1 00:00	9.46	0.03	2.25	0.45	0.19	0.13	0.00		Calculated
75 Link-80	0.30	1 00:00	9.45	0.03	2.33	0.40	0.19	0.13	0.00		Calculated
76 Link-81	0.30	1 00:00	9.46	0.03	2.06	0.72	0.21	0.14	0.00		Calculated
77 Link-82	0.62	0 08:00	0.93	0.67	2.45	0.20	0.45	0.68	0.00		Calculated
78 Link-83	0.62	0 08:00	0.93	0.67	2.47	0.66	0.45	0.68	0.00		Calculated
79 Link-84	0.61	0 08:01	0.93	0.66	2.34	0.38	0.67	1.00	23.00		SURCHARGED
80 Link-85	2.41	0 08:01	2.73	0.88	3.63	0.10	1.00	1.00	231.00		SURCHARGED
81 Link-87	0.08	1 00:00	2.73	0.03	0.27	1.27	0.40	0.40	0.00		Calculated

Pipe Results

SN Element ID	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Froude Number	Reported Condition
	(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)		
82 Link-88	0.08	1 00:00	2.73	0.03	0.51	1.84	0.59	0.59	0.00		Calculated
83 Link-89	0.50	0 00:00	2.73	0.18	0.93	3.87	0.87	0.87	0.00		Calculated
84 Link-92	2.99	0 08:00	4.86	0.62	5.46	0.25	1.00	1.00	298.00		SURCHARGED
85 Link-93	0.40	1 00:00	2.73	0.15	2.34	0.37	0.27	0.27	0.00		Calculated
86 Link-94	0.00	0 00:00	44.47	0.00	0.00		0.00	0.00	0.00		Calculated
87 Link-95	0.29	0 08:00	2.23	0.13	3.33	0.50	0.20	0.30	0.00		Calculated
88 Link-96	0.03	0 08:00	3.35	0.01	0.60	1.07	0.14	0.21	0.00		Calculated
89 Link-97	0.54	1 00:00	8.29	0.07	2.54	0.65	0.27	0.18	0.00		Calculated
90 Link-98	0.54	1 00:00	36.85	0.01	6.32	0.03	0.14	0.10	0.00		Calculated
91 Link-99	0.54	1 00:00	36.29	0.01	5.86	0.05	0.15	0.10	0.00		Calculated
92 P - (111)	0.73	0 08:01	0.93	0.79	2.90	0.48	0.45	0.68	0.00		Calculated
93 P - (115)	0.37	0 08:00	0.96	0.39	1.98	0.80	0.55	0.83	0.00		Calculated
94 P - (119)	3.78	0 08:02	4.24	0.89	4.81	0.25	1.00	1.00	820.00		SURCHARGED
95 P - (119) (2)	4.97	0 08:02	8.05	0.62	2.81	0.80	1.50	1.00	973.00		SURCHARGED
96 P - (125)	1.41	0 08:02	2.73	0.52	2.80	0.71	1.00	1.00	825.00		SURCHARGED
97 P - (125) (1)	1.16	0 08:00	2.73	0.43	2.90	1.00	1.00	1.00	536.00		SURCHARGED
98 P - (129)	1.15	0 08:01	2.73	0.42	3.02	0.27	1.00	1.00	293.00		SURCHARGED
99 P - (129) (1)	2.02	0 08:00	8.63	0.23	6.24	0.10	1.00	1.00	442.00		SURCHARGED
100 P - (130)	0.25	0 08:00	2.63	0.09	7.18	0.03	0.50	1.00	266.00		SURCHARGED
101 P - (131)	0.90	0 08:00	10.57	0.08	6.31	0.74	0.24	0.24	0.00		Calculated
102 P - (131) (1)	1.72	0 08:00	10.34	0.17	8.22	0.62	0.31	0.31	0.00		Calculated
103 P - (132)	2.87	0 08:00	11.01	0.26	8.66	0.21	0.44	0.44	0.00		Calculated
104 P - (132) (1)	3.09	0 08:01	2.74	1.13	4.24	0.03	1.00	1.00	914.00		SURCHARGED
105 P - (132) (2)	3.09	0 08:00	5.61	0.55	4.80	1.43	0.76	0.76	0.00		Calculated
106 P - (133)	0.22	0 08:00	2.83	0.08	1.89	0.66	0.20	0.20	0.00		Calculated
107 P - (134)	0.28	0 08:01	0.93	0.30	2.29	0.85	0.25	0.38	0.00		Calculated
108 P - (134) (1)	0.40	0 08:01	0.93	0.43	2.36	0.16	0.32	0.49	0.00		Calculated
109 P - (134) (2)	0.37	0 08:01	0.92	0.40	2.11	0.48	0.34	0.50	0.00		Calculated
110 P - (136)	2.19	0 08:00	4.43	0.49	10.71	0.19	0.43	0.64	0.00		Calculated
111 P - (137)	0.19	0 08:00	4.32	0.04	2.00	1.27	0.21	0.32	0.00		Calculated
112 P - (138)	1.02	0 08:00	2.47	0.41	6.54	0.39	0.30	0.46	0.00		Calculated
113 P - (139) (1)	0.45	0 08:00	3.43	0.13	5.01	0.53	0.20	0.30	0.00		Calculated
114 P - (140)	0.78	0 08:00	2.79	0.28	5.72	0.39	0.28	0.41	0.00		Calculated
115 P - (141)	0.07	0 08:00	1.31	0.06	2.48	0.43	0.09	0.14	0.00		Calculated
116 P - (144)	0.14	0 08:00	1.60	0.08	1.70	0.45	0.19	0.28	0.00		Calculated
117 P - (145)	0.09	0 08:00	0.93	0.09	0.64	0.42	0.27	0.41	0.00		Calculated
118 P - (148)	0.13	0 08:00	2.01	0.06	2.44	0.70	0.14	0.21	0.00		Calculated
119 P - (149)	0.22	0 08:00	1.69	0.13	1.76	1.21	0.26	0.38	0.00		Calculated
120 P - (151)	0.69	0 08:01	4.04	0.17	2.33	0.72	0.60	0.60	0.00		Calculated
121 P - (159)	1.53	0 08:00	8.02	0.19	2.55	0.11	0.56	0.37	0.00		Calculated
122 P - (171)	0.27	0 08:00	5.07	0.05	3.15	0.13	0.24	0.36	0.00		Calculated
123 P - (182)	1.81	0 08:00	1.38	1.31	5.25	0.15	0.64	0.96	0.00		> CAPACITY
124 P - (184)	0.08	0 08:00	0.93	0.08	1.60	0.49	0.13	0.20	0.00		Calculated
125 P - (210)	0.11	0 08:01	0.93	0.12	1.79	1.03	0.16	0.23	0.00		Calculated
126 P - (211)	0.06	0 08:00	0.93	0.06	1.10	1.30	0.14	0.20	0.00		Calculated
127 P - (218)	1.29	0 08:00	2.73	0.47	3.12	0.27	0.52	0.52	0.00		Calculated
128 P - (219)	1.29	0 08:00	3.81	0.34	2.36	0.83	0.66	0.66	0.00		Calculated
129 P - (221)	0.32	0 08:00	1.73	0.18	1.73	1.55	0.35	0.52	0.00		Calculated
130 P - (225)	1.53	0 08:02	2.73	0.56	2.56	0.44	1.00	1.00	962.00		SURCHARGED
131 P - (231)	9.10	0 08:00	8.05	1.13	5.15	0.02	1.50	1.00	997.00		SURCHARGED
132 P - (232)	0.34	0 08:00	0.77	0.44	3.64	0.40	0.24	0.48	0.00		Calculated
133 P - (233)	0.34	0 08:00	1.11	0.30	2.37	0.32	0.28	0.43	0.00		Calculated
134 P - (234)	0.34	0 08:01	1.11	0.30	2.01	0.38	0.32	0.48	0.00		Calculated
135 P - (235)	0.58	0 08:01	1.11	0.52	3.10	0.91	0.35	0.53	0.00		Calculated
136 P - (236)	0.72	0 08:01	3.27	0.22	3.01	0.60	0.34	0.34	0.00		Calculated
137 P - (237)	0.72	0 08:01	3.27	0.22	2.51	0.54	0.39	0.39	0.00		Calculated
138 P - (238)	1.01	0 08:01	3.27	0.31	2.79	0.40	0.47	0.47	0.00		Calculated
139 P - (239)	1.15	0 08:01	3.28	0.35	3.01	0.30	0.49	0.49	0.00		Calculated
140 P - (240)	1.15	0 08:01	3.28	0.35	3.64	0.14	0.42	0.42	0.00		Calculated
141 P - (242)	0.49	0 08:00	0.52	0.94	2.57	0.93	0.50	1.00	8.00		SURCHARGED
142 P - (243)	0.49	0 08:00	0.52	0.94	2.57	0.21	0.50	1.00	12.00		SURCHARGED
143 P - (244)	0.93	0 08:00	1.11	0.83	2.77	0.27	0.67	1.00	12.00		SURCHARGED
144 P - (244) (1)	0.96	0 08:00	1.35	0.71	2.99	0.21	0.67	1.00	14.00		SURCHARGED
145 P - (245)	1.06	0 08:00	1.11	0.96	3.04	0.67	0.67	1.00	18.00		SURCHARGED
146 P - (246)	1.25	0 08:00	1.11	1.13	3.58	0.26	0.67	1.00	22.00		SURCHARGED
147 P - (247)	1.25	0 08:00	1.11	1.13	3.79	0.11	0.60	0.90	0.00		> CAPACITY
148 P - (248)	2.12	0 08:00	3.27	0.65	3.43	0.12	0.74	0.74	0.00		Calculated
149 P - (248) (1)	2.24	0 08:01	3.27	0.68	3.53	0.84	0.76	0.76	0.00		Calculated
150 P - (249)	2.22	0 08:01	3.27	0.68	3.09	0.29	0.87	0.87	0.00		Calculated
151 P - (249) (1)	2.25	0 08:02	3.27	0.69	3.06	0.32	0.89	0.89	0.00		Calculated
152 P - (250)	2.25	0 08:02	3.28	0.69	3.31	0.07	0.81	0.81	0.00		Calculated
153 P - (251)	2.25	0 08:02	3.27	0.69	4.97	0.12	0.58	0.58	0.00		Calculated
154 P - (253)	0.04	0 08:00	0.43	0.10	1.42	0.56	0.11	0.22	0.00		Calculated
155 P - (258)	0.20	0 08:00	0.52	0.39	2.34	0.63	0.23	0.45	0.00		Calculated
156 P - (259)	0.27	0 08:00	0.73	0.37	3.30	0.47	0.22	0.43	0.00		Calculated
157 P - (260)	0.27	0 08:01	1.11	0.24	1.74	0.29	0.30	0.46	0.00		Calculated
158 P - (261)	0.44	0 08:00	1.14	0.38	2.77	0.09	0.31	0.46	0.00		Calculated
159 P - (262)	0.26	0 08:00	0.73	0.36	2.70	0.22	0.25	0.49	0.00		Calculated
160 P - (263)	0.26	0 08:00	0.73	0.35	4.08	0.11	0.18	0.36	0.00		Calculated
161 P - (264)	0.26	0 08:00	3.64	0.07	9.00	0.02	0.11	0.21	0.00		Calculated
162 P - (265)	0.44	0 08:01	1.35	0.32	2.50	0.04	0.33	0.50	0.00		Calculated

Pipe Results

SN Element ID	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Froude Number	Reported Condition
	(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)		
163 P - (266)	0.44	0 08:01	1.36	0.32	2.56	0.39	0.33	0.49	0.00		Calculated
164 P - (267)	0.44	0 08:02	1.36	0.32	3.03	0.26	0.29	0.43	0.00		Calculated
165 P - (268)	0.10	0 08:00	0.73	0.14	1.84	1.25	0.16	0.32	0.00		Calculated
166 P - (269)	0.18	0 08:00	0.73	0.25	2.50	0.14	0.20	0.39	0.00		Calculated
167 P - (270)	0.18	0 08:00	0.73	0.25	3.41	0.16	0.16	0.31	0.00		Calculated
168 P - (271)	0.18	0 08:01	1.61	0.11	5.25	0.20	0.11	0.23	0.00		Calculated
169 P - (272)	0.37	0 08:00	6.55	0.06	8.20	0.01	0.14	0.21	0.00		Calculated
170 P - (273)	0.19	0 08:00	0.61	0.32	2.97	0.04	0.18	0.36	0.00		Calculated
171 P - (274)	0.19	0 08:00	1.25	0.15	4.55	0.62	0.13	0.27	0.00		Calculated
172 P - (276)	0.06	0 08:01	0.93	0.07	0.40	2.83	0.33	0.50	0.00		Calculated
173 P - (282)	0.37	0 08:02	0.93	0.40	2.45	0.71	0.67	1.00	267.00		SURCHARGED
174 P - (283)	1.19	0 08:04	2.73	0.44	2.31	1.85	1.00	1.00	593.00		SURCHARGED
175 P - (291)	0.06	0 08:03	3.28	0.02	0.27	0.76	0.53	0.79	0.00		Calculated
176 P - (292)	0.11	0 07:58	0.92	0.12	0.40	0.75	0.67	1.00	14.00		SURCHARGED
177 P - (293)	0.11	0 08:00	1.82	0.06	2.28	0.40	0.22	0.33	0.00		Calculated
178 P - (295)	0.06	0 08:00	3.66	0.02	2.62	0.17	0.27	0.41	0.00		Calculated
179 P - (296)	0.04	0 08:00	3.05	0.01	2.19	0.37	0.29	0.44	0.00		Calculated
180 P - (298)	0.50	0 08:00	1.34	0.37	3.47	0.85	0.39	0.58	0.00		Calculated
181 P - (299)	0.61	0 08:00	2.19	0.28	5.16	0.28	0.25	0.37	0.00		Calculated
182 P - (319)	0.34	0 08:01	5.30	0.06	3.50	0.18	0.21	0.32	0.00		Calculated
183 P - (320)	0.19	0 08:00	2.71	0.07	1.81	0.59	0.19	0.19	0.00		Calculated
184 P - (321)	0.21	0 08:00	2.73	0.08	1.51	0.76	0.23	0.23	0.00		Calculated
185 P - (322)	0.21	0 08:00	2.73	0.08	1.22	1.01	0.27	0.27	0.00		Calculated
186 P - (324)	0.13	0 08:01	0.74	0.17	0.63	1.51	0.40	0.60	0.00		Calculated
187 P - (326)	0.39	0 08:00	0.75	0.52	1.28	0.20	0.55	0.82	0.00		Calculated
188 P - (34)	0.27	0 07:59	2.69	0.10	3.32	0.07	0.67	1.00	222.00		SURCHARGED
189 P - (34) (2)	2.95	0 08:01	2.73	1.08	4.07	0.23	1.00	1.00	584.00		SURCHARGED
190 P - (36)	1.41	0 08:00	4.03	0.35	9.52	0.14	0.45	0.67	0.00		Calculated
191 P - (40)	5.26	0 08:01	8.05	0.65	2.99	0.79	1.50	1.00	741.00		SURCHARGED
192 P - (48)	9.27	0 08:00	8.05	1.15	5.57	0.01	1.50	1.00	908.00		SURCHARGED
193 P - (58)	1.50	0 08:00	4.46	0.34	9.81	0.09	0.30	0.45	0.00		Calculated
194 P - (58) (1)	1.55	0 08:00	4.03	0.39	10.09	0.10	0.30	0.45	0.00		Calculated
195 P - (58) (1) (1)	1.61	0 08:00	4.92	0.33	6.20	0.20	0.46	0.70	0.00		Calculated
196 P - (60)	0.12	0 08:00	4.17	0.03	1.66	0.47	0.17	0.26	0.00		Calculated
197 P - (61)	1.36	0 08:00	4.45	0.31	10.31	0.12	0.27	0.40	0.00		Calculated
198 P - (65)	1.43	0 08:00	4.44	0.32	10.40	0.16	0.28	0.42	0.00		Calculated
199 P - (78)	0.32	0 08:00	3.65	0.09	5.25	0.38	0.15	0.23	0.00		Calculated
200 P - (78) (2) (1)	0.50	0 08:00	3.32	0.15	4.26	0.48	0.25	0.37	0.00		Calculated
201 P - (83)	0.82	0 08:00	4.74	0.17	9.07	0.10	0.40	0.60	0.00		Calculated
202 P - (84)	0.14	0 08:00	0.93	0.16	0.95	0.63	0.30	0.45	0.00		Calculated
203 P - (85)	0.66	0 08:00	1.85	0.36	4.42	0.14	0.30	0.44	0.00		Calculated
204 P - (86)	0.09	0 08:00	2.74	0.03	0.45	1.33	0.37	0.56	0.00		Calculated
205 SF_VAULT	3.08	0 08:01	8.81	0.35	5.01	0.17	1.00	1.00	915.00		SURCHARGED

Storage Nodes

Storage Node : DETENTION_1

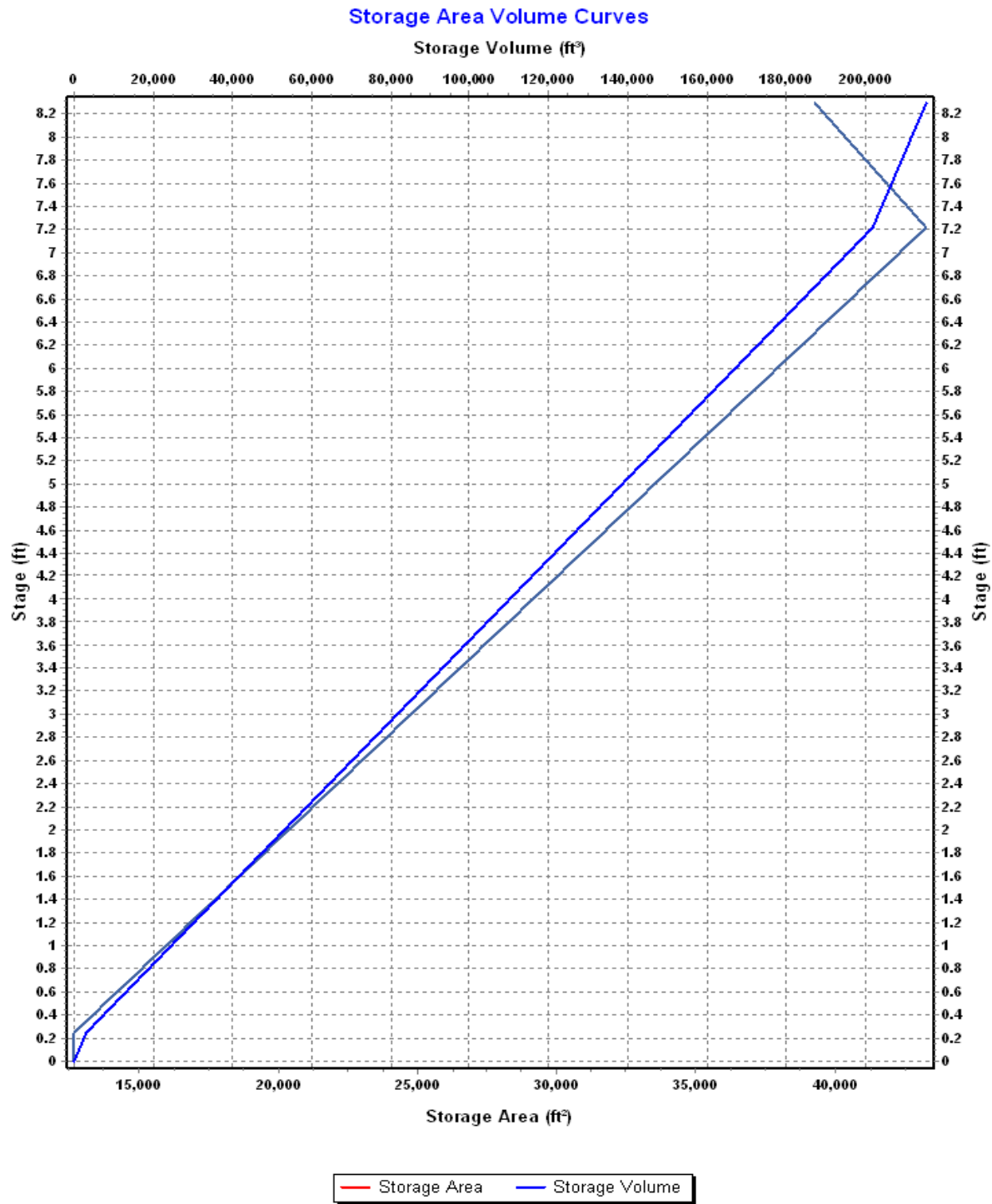
Input Data

Invert Elevation (ft)	466.43
Max (Rim) Elevation (ft)	474.64
Max (Rim) Offset (ft)	8.21
Initial Water Elevation (ft)	466.93
Initial Water Depth (ft)	0.50
Ponded Area (ft ²)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : DETENTION 1

Stage	Storage Area	Storage Volume
(ft)	(ft ²)	(ft ³)
0.000	12672	0
.25	12672.00	3168
7.21	43253.53	201611.52
8.29	39269.44	215297.28



Storage Node : DETENTION_1 (continued)**Output Summary Results**

Peak Inflow (cfs)	9.27
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	0.54
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	471.67
Max HGL Depth Attained (ft)	5.24
Average HGL Elevation Attained (ft)	469.74
Average HGL Depth Attained (ft)	3.31
Time of Max HGL Occurrence (days hh:mm)	1 00:00
Total Exfiltration Volume (1000-ft ³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Storage Node : DETENTION_2**Input Data**

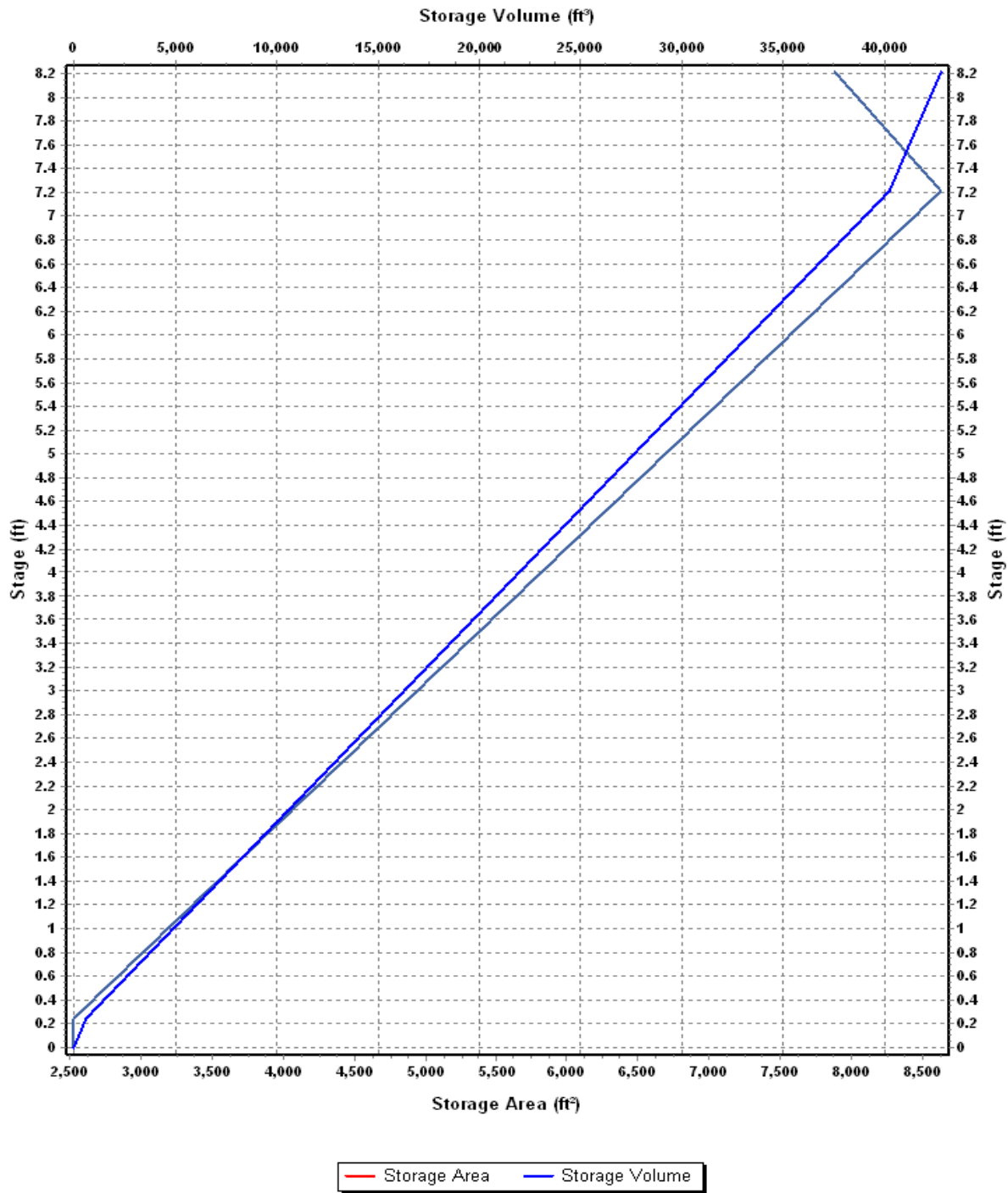
Invert Elevation (ft) 419.74
 Max (Rim) Elevation (ft) 427.95
 Max (Rim) Offset (ft) 8.21
 Initial Water Elevation (ft) 420.24
 Initial Water Depth (ft) 0.50
 Ponded Area (ft²) 0.00
 Evaporation Loss 0.00

Storage Area Volume Curves

Storage Curve : DETENTION 2

Stage (ft)	Storage Area (ft ²)	Storage Volume (ft ³)
0.000	2528	0
.25	2528.00	632
7.21	8628.86	40220.48
8.21	7885.76	42748.48

Storage Area Volume Curves



Storage Node : DETENTION_2 (continued)**Output Summary Results**

Peak Inflow (cfs)	3.26
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	0.29
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	426.59
Max HGL Depth Attained (ft)	6.85
Average HGL Elevation Attained (ft)	424.11
Average HGL Depth Attained (ft)	4.37
Time of Max HGL Occurrence (days hh:mm)	1 00:00
Total Exfiltration Volume (1000-ft ³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Storage Node : DETENTION_3**Input Data**

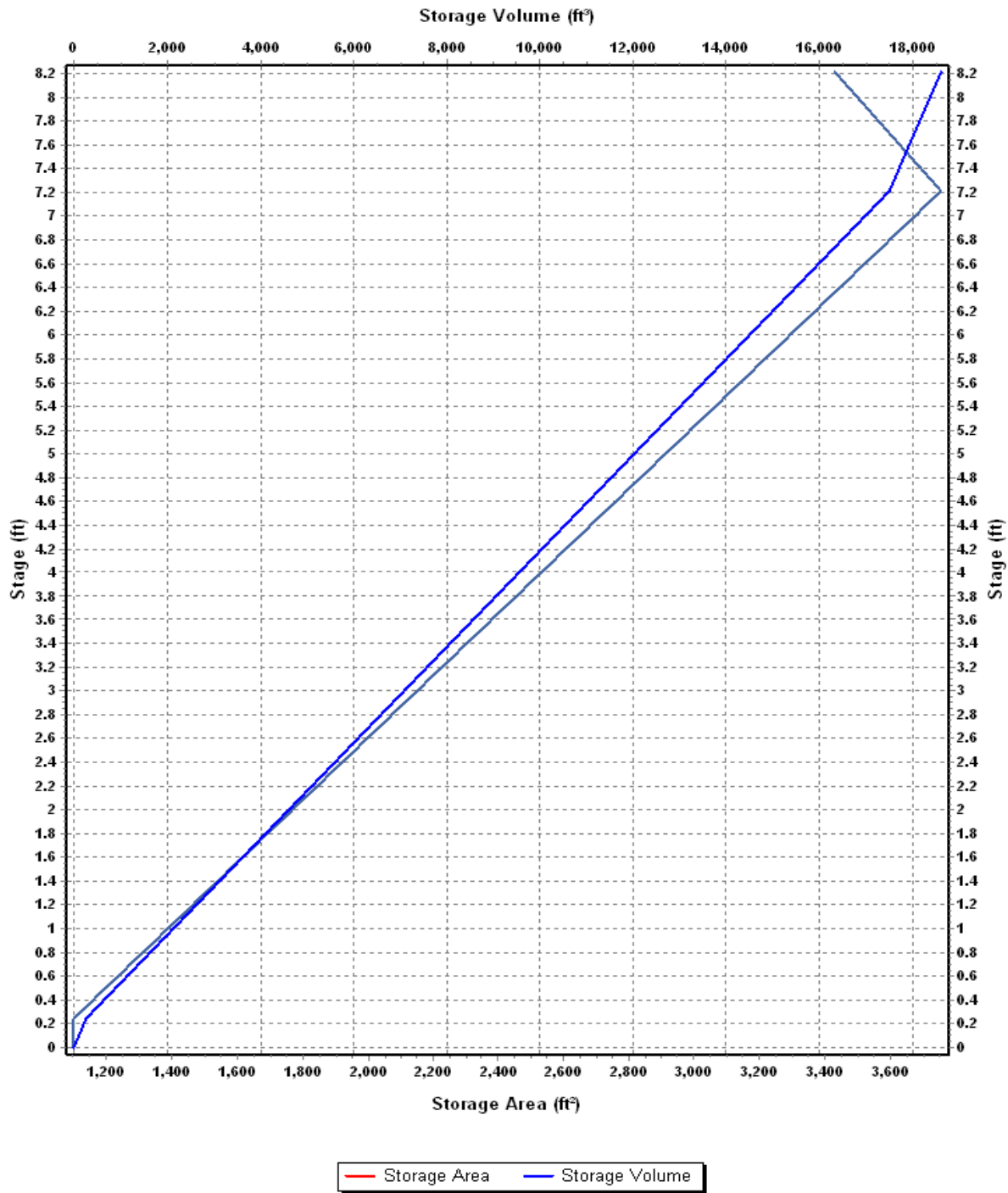
Invert Elevation (ft) 473.49
 Max (Rim) Elevation (ft) 481.45
 Max (Rim) Offset (ft) 7.96
 Initial Water Elevation (ft) 473.99
 Initial Water Depth (ft) 0.50
 Ponded Area (ft²) 0.00
 Evaporation Loss 0.00

Storage Area Volume Curves

Storage Curve : DETENTION 3

Stage (ft)	Storage Area (ft ²)	Storage Volume (ft ³)
0.000	1100	0
.25	1100.00	275
7.21	3754.65	17501
8.21	3431.30	18601

Storage Area Volume Curves



Storage Node : DETENTION_3 (continued)**Output Summary Results**

Peak Inflow (cfs)	1.01
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	0.07
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	479.49
Max HGL Depth Attained (ft)	6
Average HGL Elevation Attained (ft)	477.23
Average HGL Depth Attained (ft)	3.74
Time of Max HGL Occurrence (days hh:mm)	1 00:00
Total Exfiltration Volume (1000-ft ³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Storage Node : DETENTION_4**Input Data**

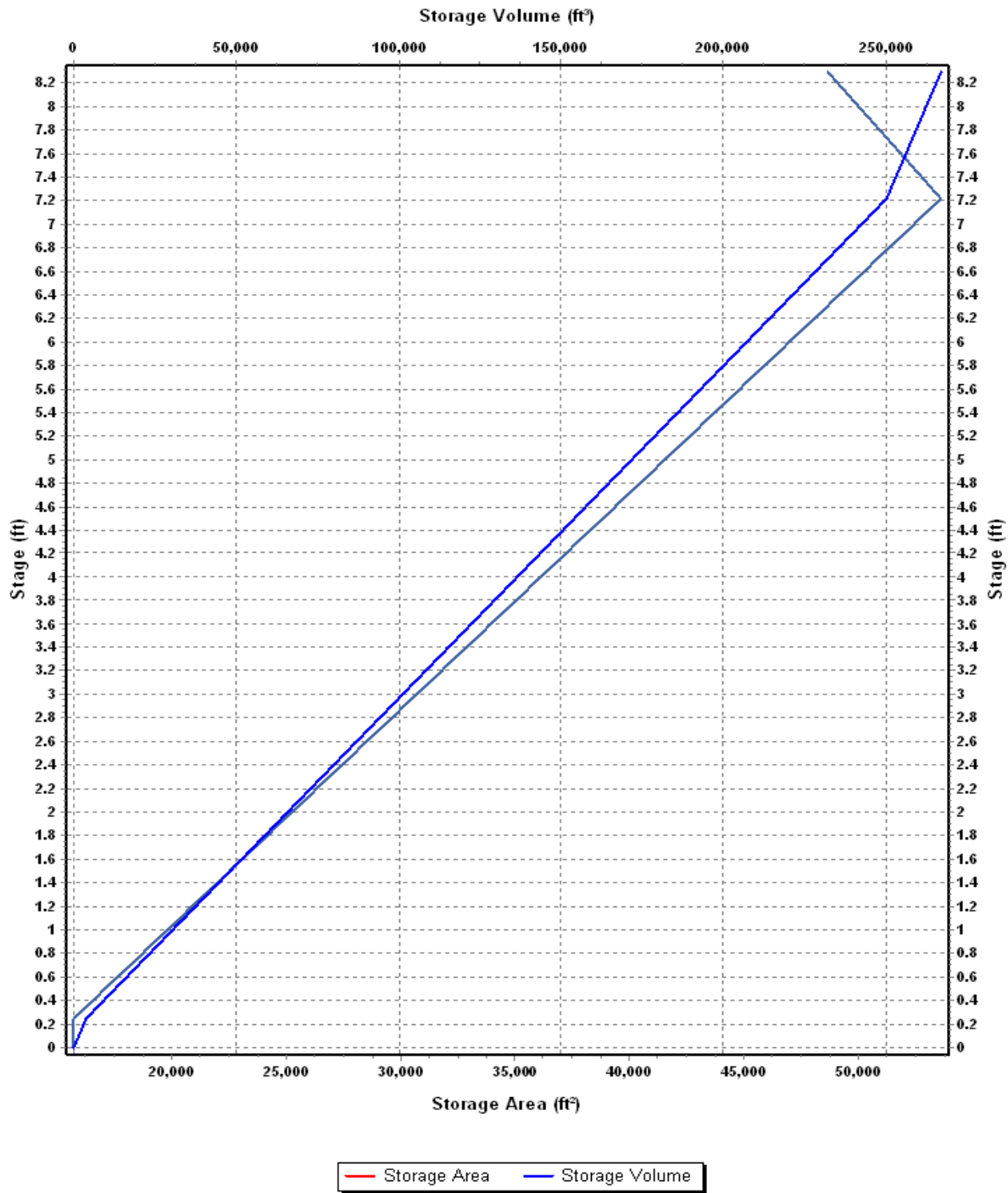
Invert Elevation (ft) 498.04
 Max (Rim) Elevation (ft) 506.33
 Max (Rim) Offset (ft) 8.29
 Initial Water Elevation (ft) 498.54
 Initial Water Depth (ft) 0.50
 Ponded Area (ft²) 0.00
 Evaporation Loss 0.00

Storage Area Volume Curves

Storage Curve : DETENTION 4

Stage (ft)	Storage Area (ft ²)	Storage Volume (ft ³)
0	15704	0
.25	15704.00	3926
7.21	53602.70	249850.64
8.29	48665.35	266810.96

Storage Area Volume Curves



Storage Node : DETENTION_4 (continued)**Output Summary Results**

Peak Inflow (cfs)	9.10
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	0.22
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	502.81
Max HGL Depth Attained (ft)	4.77
Average HGL Elevation Attained (ft)	501.01
Average HGL Depth Attained (ft)	2.97
Time of Max HGL Occurrence (days hh:mm)	1 00:00
Total Exfiltration Volume (1000-ft ³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Storage Node : DETENTION_5**Input Data**

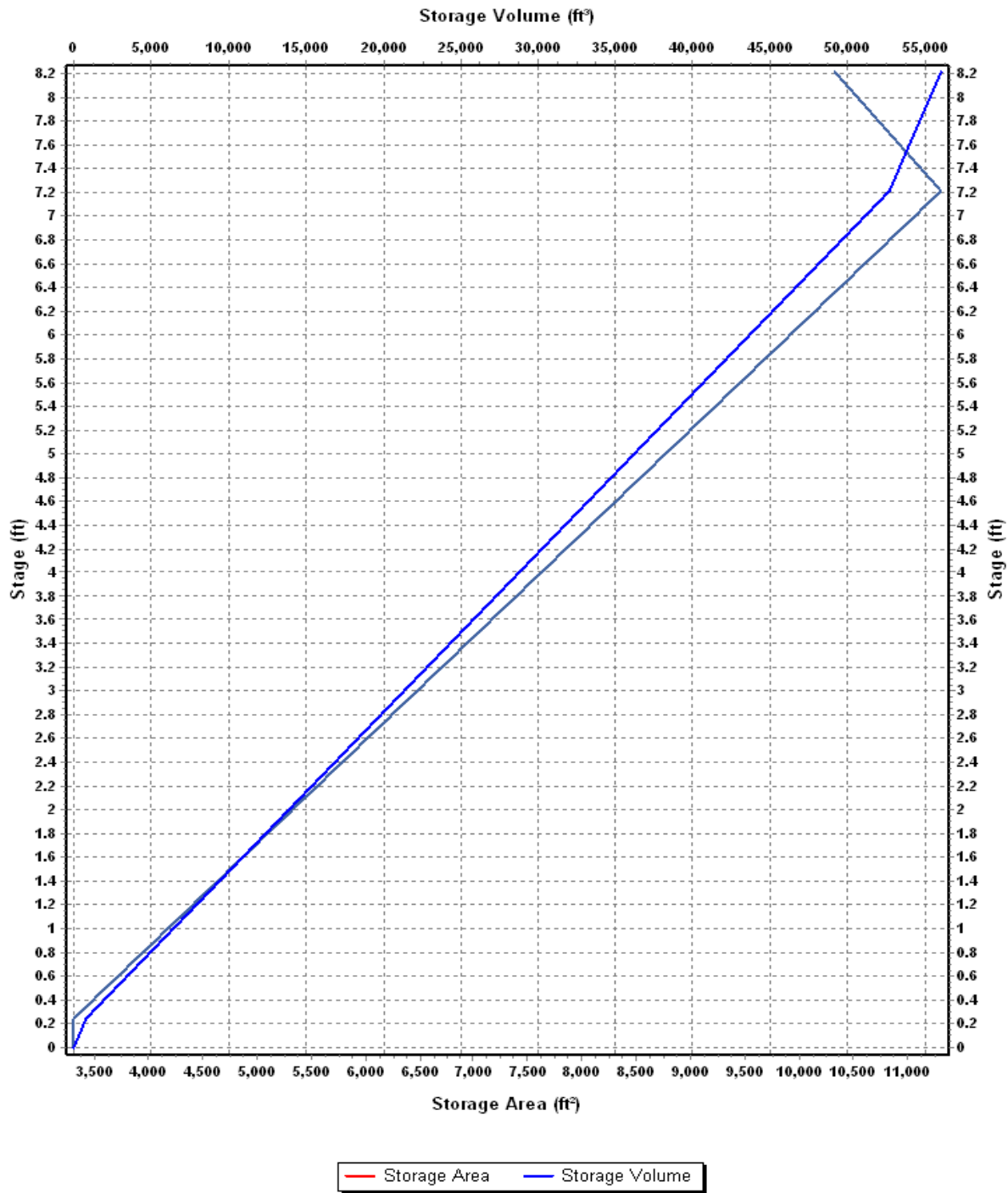
Invert Elevation (ft) 492.83
 Max (Rim) Elevation (ft) 501.04
 Max (Rim) Offset (ft) 8.21
 Initial Water Elevation (ft) 493.33
 Initial Water Depth (ft) 0.50
 Ponded Area (ft²) 0.00
 Evaporation Loss 0.00

Storage Area Volume Curves

Storage Curve : DETENTION 5

Stage (ft)	Storage Area (ft ²)	Storage Volume (ft ³)
0.000	3312.4	0
0.25	3312.40	828.1
7.21	11306.26	52700.284
8.21	10332.59	56012.684

Storage Area Volume Curves



Storage Node : DETENTION_5 (continued)**Output Summary Results**

Peak Inflow (cfs)	2.64
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	0.10
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	498.75
Max HGL Depth Attained (ft)	5.92
Average HGL Elevation Attained (ft)	496.44
Average HGL Depth Attained (ft)	3.61
Time of Max HGL Occurrence (days hh:mm)	1 00:00
Total Exfiltration Volume (1000-ft ³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Storage Node : DETENTION_6**Input Data**

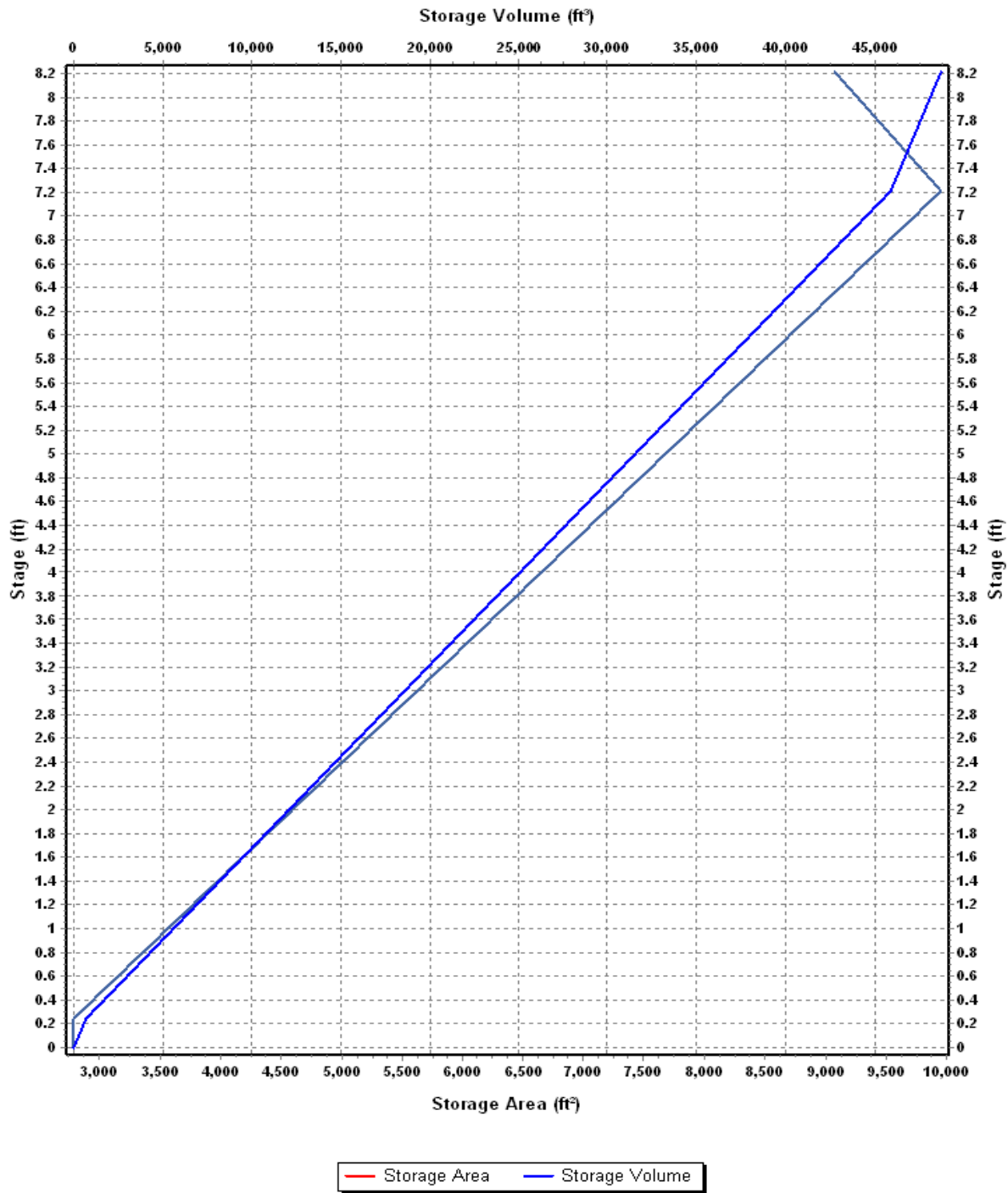
Invert Elevation (ft) 495.14
 Max (Rim) Elevation (ft) 503.35
 Max (Rim) Offset (ft) 8.21
 Initial Water Elevation (ft) 495.64
 Initial Water Depth (ft) 0.50
 Ponded Area (ft²) 0.00
 Evaporation Loss 0.00

Storage Area Volume Curves

Storage Curve : DETENTION 6

Stage (ft)	Storage Area (ft ²)	Storage Volume (ft ³)
0.000	2788	0
0.25	2788.00	697
7.21	9951.34	45925.33
8.21	9078.83	48713.33

Storage Area Volume Curves



Storage Node : DETENTION_6 (continued)**Output Summary Results**

Peak Inflow (cfs)	2.41
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	0.10
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	501.08
Max HGL Depth Attained (ft)	5.94
Average HGL Elevation Attained (ft)	498.79
Average HGL Depth Attained (ft)	3.65
Time of Max HGL Occurrence (days hh:mm)	1 00:00
Total Exfiltration Volume (1000-ft ³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Storage Node : DETENTION_7**Input Data**

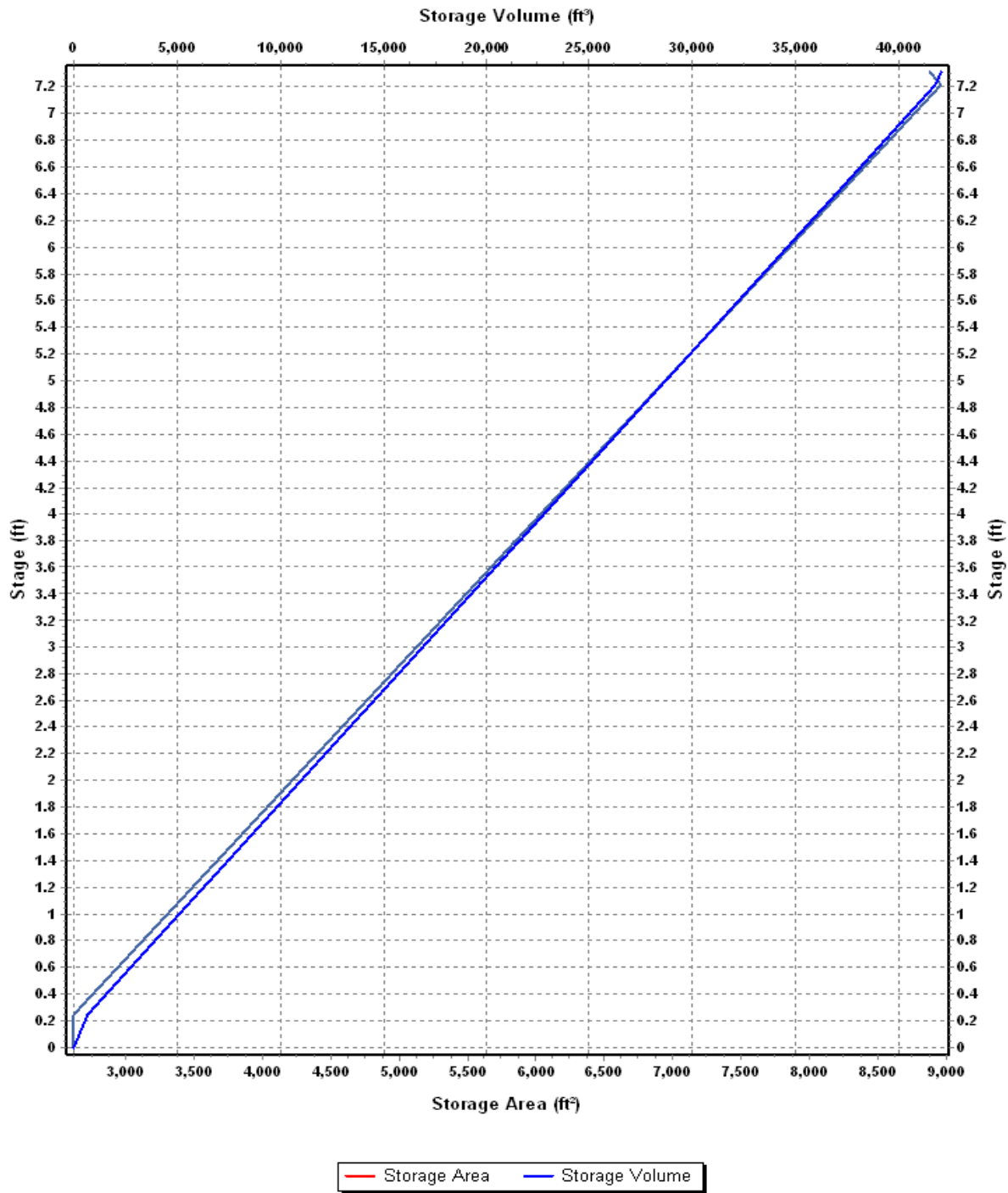
Invert Elevation (ft)	492.35
Max (Rim) Elevation (ft)	500.64
Max (Rim) Offset (ft)	8.29
Initial Water Elevation (ft)	492.85
Initial Water Depth (ft)	0.50
Ponded Area (ft ²)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : DETENTION 7

Stage (ft)	Storage Area (ft ²)	Storage Volume (ft ³)
0	2624.4	0
0.25	2624.40	656.1
7.21	8957.90	41754.204
7.31	8871.26	42016.644

Storage Area Volume Curves



Storage Node : DETENTION_7 (continued)**Output Summary Results**

Peak Inflow (cfs)	2.02
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	0.08
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	497.99
Max HGL Depth Attained (ft)	5.64
Average HGL Elevation Attained (ft)	495.91
Average HGL Depth Attained (ft)	3.56
Time of Max HGL Occurrence (days hh:mm)	1 00:00
Total Exfiltration Volume (1000-ft ³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Storage Node : DETENTION_8**Input Data**

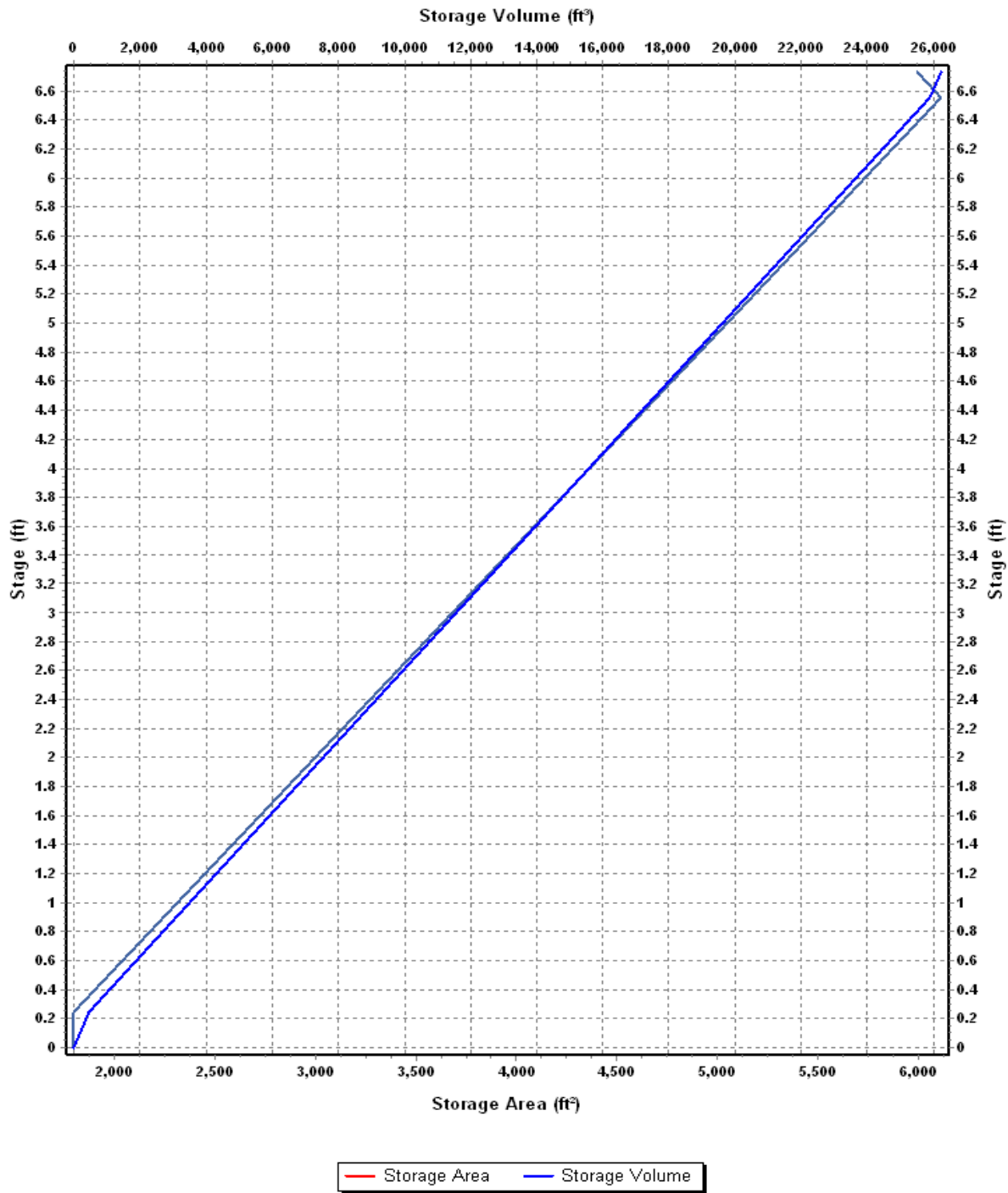
Invert Elevation (ft) 408.81
 Max (Rim) Elevation (ft) 415.54
 Max (Rim) Offset (ft) 6.73
 Initial Water Elevation (ft) 409.31
 Initial Water Depth (ft) 0.50
 Ponded Area (ft²) 0.00
 Evaporation Loss 0.00

Storage Area Volume Curves

Storage Curve : DETENTION 8

Stage (ft)	Storage Area (ft ²)	Storage Volume (ft ³)
0.000	1795.6	0
0.25	1795.60	448.9
6.55	6113.26	25901.53
6.73	5997.78	26224.738

Storage Area Volume Curves



Storage Node : DETENTION_8 (continued)**Output Summary Results**

Peak Inflow (cfs)	3.08
Peak Lateral Inflow (cfs)	0.00
Peak Outflow (cfs)	0.56
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	414.64
Max HGL Depth Attained (ft)	5.83
Average HGL Elevation Attained (ft)	412.86
Average HGL Depth Attained (ft)	4.05
Time of Max HGL Occurrence (days hh:mm)	0 13:35
Total Exfiltration Volume (1000-ft ³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

The purpose of this analysis is to determine that the overflow route for the proposed detention systems has enough capacity to convey the 100-year storm to the proposed downstream connections in the event that the proposed detention systems fail. This analysis uses the 100-year inflow, determined using WWHM, to the detention systems for conveyance analysis. Bentley FlowMaster was used to determine the full flow capacity of the overflow pipes.

Basin 1

Flow Frequency		
Flow(cfs)	Predeveloped	Mitigated
2 Year =	0.3936	3.8590
5 Year =	0.6690	4.9331
10 Year =	0.8879	5.6848
25 Year =	1.2063	6.6829
50 Year =	1.4741	7.4627
100 Year =	1.7683	8.2747

$Q_{100} = 8.2747$ cfs

The most constrictive pipe proposed downstream of Detention 1 is an 18" CPEP pipe at 0.53% slope.

Roughness Coefficient	0.012	...
Channel Slope:	0.0053	ft/ft
Normal Depth:	18.0	in
Diameter:	18.0	in
Discharge:	8.28	cfs

8.28 cfs > 8.2747 cfs

Adequate pipe capacity is provided downstream of Detention 1.

Basin 2

Flow Frequency		
Flow(cfs)	Predeveloped	Mitigated
2 Year =	0.1298	0.8817
5 Year =	0.2207	1.1395
10 Year =	0.2929	1.3214
25 Year =	0.3979	1.5646
50 Year =	0.4862	1.7557
100 Year =	0.5833	1.9557

$Q_{100} = 1.9557$ cfs

The most constrictive pipe proposed downstream of Detention 2 is a 12" CPEP pipe at 0.50% slope.

Roughness Coefficient	0.012	...
Channel Slope:	0.005	ft/ft
Normal Depth:	12.0	in
Diameter:	12.0	in
Discharge:	2.73	cfs

2.73 cfs > 1.9557 cfs

Adequate pipe capacity is provided downstream of Detention 2.

Basin 3

Flow Frequency		
Flow(cfs)	Predeveloped	Mitigated
2 Year =	0.0433	0.3594
5 Year =	0.0736	0.4643
10 Year =	0.0976	0.5384
25 Year =	0.1326	0.6373
50 Year =	0.1621	0.7151
100 Year =	0.1944	0.7965

Q₁₀₀ = 0.7965 cfs

The most constrictive pipe proposed downstream of Detention 3 is a 12" CPEP pipe at 0.50% slope.

Roughness Coefficient	0.012	...
Channel Slope:	0.005	ft/ft
Normal Depth:	12.0	in
Diameter:	12.0	in
Discharge:	2.73	cfs

2.73 cfs > 0.7965 cfs

Adequate pipe capacity is provided downstream of Detention 3.

Basin 4

Flow Frequency		
Flow(cfs)	Predeveloped	Mitigated
2 Year =	0.3812	3.9037
5 Year =	0.6480	4.9276
10 Year =	0.8600	5.6228
25 Year =	1.1685	6.5243
50 Year =	1.4278	7.2141
100 Year =	1.7127	7.9204

Q₁₀₀ = 7.9204 cfs

The most constrictive pipe proposed downstream of Detention 4 is an 18" CPEP pipe at 1.93% slope.

Roughness Coefficient	0.012	...
Channel Slope:	0.0193	ft/ft
Normal Depth:	18.0	in
Diameter:	18.0	in
Discharge:	15.81	cfs

15.81 cfs > 7.9204 cfs

Adequate pipe capacity is provided downstream of Detention 4.

Runoff from Detention 4 ultimately combines with runoff from Detention systems 6 and 7. Further analysis of this combined flow is provided below.

Basin 5

Flow Frequency			
Flow(cfs)	Predeveloped	Mitigated	
2 Year =	0.1175	0.9790	
5 Year =	0.1996	1.2438	
10 Year =	0.2650	1.4283	
25 Year =	0.3600	1.6723	
50 Year =	0.4399	1.8623	
100 Year =	0.5277	2.0596	

Q₁₀₀ = 2.0596 cfs

The most constrictive pipe proposed downstream of Detention 5 is a 12" CPEP pipe at 0.50% slope.

Roughness Coefficient	0.012	...
Channel Slope:	0.005	ft/ft
Normal Depth:	12.0	in
Diameter:	12.0	in
Discharge:	2.73	cfs

2.73 cfs > 2.0596 cfs

Adequate pipe capacity is provided downstream of Detention 5.

Basin 6

Flow Frequency			
Flow(cfs)	Predeveloped	Mitigated	
2 Year =	0.1051	0.8638	
5 Year =	0.1786	1.0978	
10 Year =	0.2371	1.2609	
25 Year =	0.3221	1.4766	
50 Year =	0.3936	1.6447	
100 Year =	0.4722	1.8192	

Q₁₀₀ = 1.8192 cfs

The most constrictive pipe proposed downstream of Detention 6 is a 12" CPEP pipe at 4.32% slope.

Roughness Coefficient	0.012	...
Channel Slope:	0.0432	ft/ft
Normal Depth:	12.0	in
Diameter:	12.0	in
Discharge:	8.02	cfs

8.02 cfs > 1.8192 cfs

Adequate pipe capacity is provided downstream of Detention 6.

Runoff from Detention 6 ultimately combines with runoff from Detention systems 4 and 7. Further analysis of this combined flow is provided below.

Basin 7

Flow Frequency			
Flow (cfs)	Predeveloped	Mitigated	
2 Year =	0.0701	0.7334	
5 Year =	0.1191	0.9254	
10 Year =	0.1581	1.0558	
25 Year =	0.2147	1.2248	
50 Year =	0.2624	1.3541	
100 Year =	0.3148	1.4864	

$Q_{100} = 1.4864 \text{ cfs}$

The most constrictive pipe proposed downstream of Detention 7 is a 12" CPEP pipe at 0.50% slope.

Roughness Coefficient	0.012	...
Channel Slope:	0.005	ft/ft
Normal Depth:	12.0	in
Diameter:	12.0	in
Discharge:	2.73	cfs

2.73 cfs > 1.4864 cfs

Adequate pipe capacity is provided downstream of Detention 7.

Runoff from Detention 7 ultimately combines with runoff from Detention systems 4 and 6. Further analysis of this combined flow is provided below.

Basins 4 and 7 Combined

$$Q_{100} = 7.9204 \text{ cfs} + 1.4864 \text{ cfs} = 9.4068 \text{ cfs}$$

The most constrictive pipe proposed downstream of where outflow from Detention systems 4 and 7 combine is an 18" CPEP pipe at 0.69% slope.

Roughness Coefficient	0.012	...
Channel Slope:	0.0069	ft/ft
Normal Depth:	18.0	in
Diameter:	18.0	in
Discharge:	9.45	cfs

9.45 cfs > 9.4068 cfs

Adequate pipe capacity is provided for the combined flow leaving Detention 4 and Detention 7.

Basins 4, 6, and 7 Combined

$$Q_{100} = 7.9204 \text{ cfs} + 1.8192 \text{ cfs} + 1.4864 \text{ cfs} = 11.2260 \text{ cfs}$$

The most constrictive pipe proposed downstream of where outflow from Detention systems 4, 6, and 7 combine is an 18" CPEP pipe at 0.98% slope.

Roughness Coefficient	0.012	...
Channel Slope:	0.0098	ft/ft
Normal Depth:	18.0	in
Diameter:	18.0	in
Discharge:	11.26	cfs

11.26 cfs > 11.2260 cfs

The most constrictive pipe proposed downstream of where outflow from Detention systems 4, 6, and 7 combine is an 24" CPEP pipe at 0.21% slope.

Roughness Coefficient	0.012	...
Channel Slope:	0.0021	ft/ft
Normal Depth:	24.0	in
Diameter:	24.0	in
Discharge:	11.23	cfs

11.22 cfs > 11.2260 cfs

Adequate pipe capacity is provided for the combined flow leaving Detention 4, Detention 6, and Detention 7.

Appendix C

Supplemental Reports

- C-1.....Subsurface Exploration, Geologic Hazard, and Preliminary Geotechnical
Engineering Report
- C-2.....Landslide Hazard Assessment
- C-3.....Critical Area Study & Wetland Mitigation Plan



a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d



*Subsurface Exploration, Geologic Hazard, and
Preliminary Geotechnical Engineering Report*

ISSAQUAH HIGH SCHOOL #4 AND ELEMENTARY SCHOOL #17

Issaquah, Washington

Prepared For:

ISSAQUAH SCHOOL DISTRICT

Project No. 180070E001

September 17, 2019



Associated Earth Sciences, Inc.
911 5th Avenue
Kirkland, WA 98033
P (425) 827 7701



September 17, 2019
Project No. 180070E001

Issaquah School District
5150 220th Avenue SE
Issaquah, Washington 98029

Attention: Mr. Tom Mullins

Subject: Subsurface Exploration, Geologic Hazard, and
Preliminary Geotechnical Engineering Report
Issaquah High School #4 and Elementary School #17
4221 228th Avenue SE
Issaquah, Washington

Dear Mr. Mullins:

We are pleased to present our preliminary geotechnical engineering report for the referenced project. This report summarizes the results of our subsurface exploration, geologic hazards, and geotechnical engineering studies, and offers preliminary recommendations for the design and development of the proposed project. Our recommendations are preliminary in that project plans and construction details were in preparation at the time this report was written. We should be allowed to review the recommendations presented in this report and modify them, if needed, once final project plans have been formulated.

We have enjoyed working with you on this study and are confident that the recommendations presented in this report will aid in the successful completion of your project. If you should have any questions or if we can be of additional help to you, please do not hesitate to call.

Sincerely,
ASSOCIATED EARTH SCIENCES, INC.
Kirkland, Washington

A handwritten signature in blue ink, appearing to read "AS", is positioned above a horizontal line.

Stephen A. Siebert, P.E.
Associate Geotechnical Engineer

SAS/ms - 180070E001-6 - Projects\20180070\KE\WP

Kirkland Office | 911 Fifth Avenue | Kirkland, WA 98033 P | 425.827.7701
Mount Vernon Office | 508 S. Second Street, Suite 101 | Mount Vernon, WA 98273 P | 425.827.7701
Tacoma Office | 1552 Commerce Street, Suite 102 | Tacoma, WA 98402 P | 253.722.2992
www.aesgeo.com

**SUBSURFACE EXPLORATION, GEOLOGIC HAZARD, AND
PRELIMINARY GEOTECHNICAL ENGINEERING REPORT**

**ISSAQUAH HIGH SCHOOL #4
AND ELEMENTARY SCHOOL #17**

Issaquah, Washington

Prepared for:

Issaquah School District
5150 220th Avenue SE
Issaquah, Washington 98029

Prepared by:

Associated Earth Sciences, Inc.
911 5th Avenue
Kirkland, Washington 98033
425-827-7701

September 17, 2019
Project No. 180070E001

I. PROJECT AND SITE CONDITIONS

1.0 INTRODUCTION

This report presents the results of our subsurface exploration, geologic hazard, and preliminary geotechnical engineering study for the new Issaquah High School #4 and Elementary School #17. Our recommendations are preliminary in that project plans and construction details were in preparation at the time this report was written. Our understanding of the project is based on review of preliminary civil plans prepared by AHBL. The site location is shown on the "Vicinity Map," Figure 1. An aerial photo of the site showing the approximate locations of the explorations completed for this study is included in Figure 2. The exploration locations and the locations of the proposed improvements as depicted on the most recent version of the civil plans, are shown on Figure 3. Copies of the exploration logs are included in Appendix A.

1.1 Purpose and Scope

The purpose of this study was to provide subsurface data to be utilized in the preliminary design and development of the referenced project. Our study included reviewing available geologic literature, advancing 31 exploration pits and 12 exploration borings, and performing geologic studies to assess the type, thickness, distribution, and physical properties of the subsurface sediments and groundwater. Geotechnical engineering studies were completed to formulate preliminary recommendations for site preparation, grading, types of suitable foundations and floors, allowable foundation soil bearing pressure, anticipated foundation and floor settlement, drainage considerations, pavement recommendations, construction of athletic fields, and infiltration feasibility. This report summarizes our fieldwork and offers preliminary recommendations based on our present understanding of the project. We recommend that we be allowed to review the recommendations presented in this report and revise them, if needed, when a project design has been finalized.

1.2 Authorization

Our study was accomplished in general accordance with our scope of work and cost proposal, dated November 2, 2018. This report has been prepared for the exclusive use of the Issaquah School District and their agents for specific application to this project. Within the limitations of scope, schedule, and budget, our services have been performed in accordance with generally accepted geotechnical engineering and engineering geology practices in effect in this area at the time our report was prepared. No other warranty, express or implied, is made.

2.0 PROJECT AND SITE DESCRIPTION

The subject site consists of three parcels totaling approximately 40-acres located at 4441, 4443, and 4461 228th Avenue SE in Issaquah, Washington (King County Parcel Nos. 1624069001, 1624069029, and 1624069031). Access to the site is gained via two paved driveways off 228th Avenue SE. The site is located adjacent to the Providence Point neighborhood, which borders the site to the north, south, and west. The site is bounded to the east by 228th Avenue SE, beyond which lies the Sammamish Highlands neighborhood.

As shown on Figure 2, the site generally consists of an elevated relatively flat to gently sloping plateau located in the central portion of the site. The topography generally slopes down from the central plateau toward the northeast, south, and southwest. Elevations on the site range from a low of approximately 415 feet near the northeastern corner of the site to a maximum of approximately 526 feet in the southern portion of the site. Slope inclinations on the site generally range from approximately 30 percent or less, but steepen to a maximum of approximately 50 percent in a relatively small area located near the southeast corner of the property. This steep slope appears to be a cut slope made for the construction of 228th Avenue SE and the south entrance road into the property.

The property was previously developed with a church, dormitories, and accessory buildings. These structures were in the process of being demolished during our initial phase of field exploration in December of 2018, but the demolition had been completed by the time of our second phase of exploration in June of 2019. Grading associated with the demolition has resulted in some localized areas of steep slopes in the areas of the former structures. Maximum slope inclinations in these areas were visually estimated to be up to approximately 2H:1V (Horizontal:Vertical). A water tank located in the southern portion of the site remains in place.

Based on review of civil plan sheets prepared by AHBL, dated May 20, 2019, we understand that preliminary development plans for the site consist of a new high school and elementary school. The high school building will be located in the southern portion of the site and the elementary school building in the western portion of the site. The high school will have a football field and track, baseball and softball fields, tennis courts above a parking structure, surface parking, and space for future portable classrooms. The elementary school will have play areas, surface parking, and space for future portable classrooms. The proposed facility layout is shown in Figure 3.

Maximum cuts for the project will be up to approximately 17 to 18 feet and will be located in the southern portion of the site in the area of the proposed high school building. A maximum fill depth of approximately 41 feet will be located in the northeastern portion of the site in the area of the proposed baseball field. We understand that conceptual plans include the use of

mechanically stabilized earth (MSE) walls to facilitate proposed grade changes in some areas. The conceptual grading plan shows maximum retaining wall heights of approximately 19 feet along the southwest site margin and in the northeastern portion of the site in the area of the baseball field.

The civil plans show six stormwater detention facilities planned across the site. The detention facilities consist of prefabricated Stormtank™ modules, or a similar underground detention system, that will be located below the elementary school building play area, below the high school football and baseball fields, below a traffic loop south of the high school building, and in an area in the northeastern portion of the site.

3.0 SUBSURFACE EXPLORATION

Our field study included advancing 31 exploration pits and 12 exploration borings at the site. This information was supplemented by 20 additional exploration pits completed at the site for previous geotechnical studies by Terra Associates, Inc. (Terra) in July 2015 and by Earth Solutions NW (ESNW) in May 2014. These exploration logs were included in a report titled "Geotechnical Report, Madison Pointe," prepared by Terra for Murray Franklyn Companies, Project No. T7252, dated March 18, 2016. A copy of this report was provided to us by the District. It should be noted that the log of ESNW exploration pit TP-2 was not included in the report. The approximate locations of the explorations are shown on Figures 2 and 3. The conclusions and recommendations presented in this report are based on the explorations completed for this study. The number, locations, and depths of our explorations were completed within site and budgetary constraints. Copies of the exploration logs are included in Appendix A.

Because of the nature of exploratory work below ground, extrapolation of subsurface conditions between field explorations is necessary. It should be noted that subsurface conditions between the explorations may differ from those inferred by the boring data due to the random nature of deposition and the alteration of topography by past grading and/or filling. The nature and extent of any variations between the field explorations may not become fully evident until construction. If variations are observed at that time, it may be necessary to re-evaluate specific recommendations in this report and make appropriate changes.

3.1 Exploration Pits

The exploration pits were excavated using a track-mounted excavator. The pits permitted direct, visual observation of subsurface conditions. Materials encountered in the exploration pits were studied and classified in the field by an engineering geologist from our firm. All of the exploration pits were backfilled immediately after examination and logging. Samples collected

from the exploration pits were classified in the field and representative portions placed in watertight containers. The samples were then transported to our laboratory for further visual classification and laboratory testing.

3.2 Exploration Borings

The exploration borings drilled for our study were completed using a track-mounted, hollow-stem auger drill rig. During the drilling process, samples were generally obtained at 2.5- to 5-foot-depth intervals. The exploration borings were continuously observed and logged by an engineering geologist from our firm. The exploration logs presented in Appendix A are based on the field logs, drilling action, and review of the samples collected.

Disturbed, but representative samples were obtained by using the Standard Penetration Test (SPT) procedure in accordance with *American Society for Testing and Materials* (ASTM) D-1586. This test and sampling method consists of driving a standard 2-inch, outside-diameter, split-barrel sampler a distance of 18 inches into the soil with a 140-pound hammer free-falling a distance of 30 inches. The number of blows for each 6-inch interval is recorded, and the number of blows required to drive the sampler the final 12 inches is known as the Standard Penetration Resistance ("N") or blow count. If a total of 50 is recorded within one 6-inch interval, the blow count is recorded as the number of blows for the corresponding number of inches of penetration. The resistance, or N-value, provides a measure of the relative density of granular soils or the relative consistency of cohesive soils; these values are plotted on the boring logs in Appendix A.

The samples obtained from the split-barrel sampler were classified in the field and representative portions placed in watertight containers. The samples were then transported to our laboratory for further visual classification.

4.0 SUBSURFACE CONDITIONS

Subsurface conditions at the project site were inferred from the field explorations accomplished for this study, visual reconnaissance of the site, and review of selected geologic literature. Detailed descriptions of the sediments encountered in each of the borings are provided on the exploration logs in Appendix A. The explorations generally encountered natural sediments consisting of granular, glacial sediments underlain by weathered sedimentary rock. Fine-grained glacial sediments and/or glacially consolidated non-glacial sediments were also encountered in some locations. In some areas of the site, the natural deposits were overlain by fill soils. The following section presents more detailed subsurface information organized from the shallowest (youngest) to the deepest (oldest) sediment types.

4.1 Stratigraphy

Fill

Fill soils (those not naturally deposited) were encountered in 11 of the explorations at the site. Where encountered, the existing fill generally consisted of loose to dense, gravelly, silty to very silty sand. Portions of the fill contained trace to abundant quantities of wood debris. In general, the areas where existing fill soils were encountered were located near the former buildings, pavement areas, and property margins. Where encountered in our explorations, the existing fill soils ranged in thickness from approximately 1 to 9 feet.

Excavated existing fill material is suitable for reuse in structural fill applications if such reuse is specifically allowed by project plans and specifications, if excessively organic and any other deleterious materials are removed, and the moisture content is suitable for compaction to the specified level. Because of its variable, and sometimes low relative density, the existing fill soil is not suitable for support of building foundations or other structures. The thicknesses of the existing fill soils encountered in the explorations are summarized in Table 1.

Table 1
Summary of Observed Fill Thicknesses

Exploration	Fill Thickness (feet)
EP-7	1
EP-8	8
EP-9	1
EP-11	6
EP-16	4
EP-18	2
EB-4	2.5
EB-8	4.5
EB-9	2.5
TP-6 (Terra, 2015)	1
TP-5 (ESNW, 2014)	9

Forest Duff/Topsoil

A surficial forest duff/topsoil horizon was encountered in most of our explorations located outside of areas of existing fill or asphalt pavement. Where encountered in our explorations, the thickness of the forest duff/topsoil horizon generally ranged from approximately 2 to 8 inches. Organic topsoil thicknesses shown on the Terra and ESNW exploration logs generally ranged from approximately 6 inches to 2 feet. Due to its high organic content, the forest duff/topsoil horizon is not suitable for foundation support or for use as structural fill.

Vashon Lodgement Till

With the exception of exploration pit EP-4, the natural sediments encountered in our exploration pits either directly below the ground surface, the surficial topsoil horizon, or the surficial fill layer generally consisted of loose to medium dense, non-stratified, silty to very silty, gravelly sand with scattered cobbles. These sediments typically became dense to very dense below depths ranging from approximately 6 inches to 6 feet. We interpret these sediments to be representative of Vashon lodgement till. The Vashon lodgement till was deposited directly from basal, debris-laden, glacial ice during the Vashon Stade of the Fraser Glaciation, approximately 12,500 to 15,000 years ago. The high relative density characteristic of the Vashon lodgement till is due to its consolidation by the massive weight of the glacial ice from which it was deposited. The reduced density observed in the upper portion of the till is interpreted to be due to weathering.

Lodgement till sediments were also encountered in the upper portions of exploration borings EB-1, EB-2, EB-5 through EB-9, EB-11, and EB-12, and appear to have been encountered in all of the ESNW and Terra exploration pits except Terra pit TP-6. The Terra and ESNW exploration logs do not consistently identify the geologic units encountered. However, in their report, Terra describes these sediments as consisting of lodgement till. At the locations of exploration borings EB-5, EB-8, EB-11, and EB-12, and in Terra pits TP-4, TP-5, and TP-8, the till extended to depths ranging from approximately 2 to 28 feet. Where encountered elsewhere in the explorations, the till extended beyond the maximum depths explored of approximately 4.5 to 15.5 feet. Exploration borings EB-1, EB-2, and EB-7 met with driller refusal in the till at depths of approximately 10 to 15.5 feet. In addition to cobbles, lodgement till typically contains scattered boulders and the difficult drilling conditions encountered at these locations are likely due to the presence of boulders and/or clusters of cobbles in the till.

Lodgement till typically possesses high-strength and low-compressibility attributes that are favorable for support of foundations, floor slabs, and paving with proper preparation. Lodgement till is silty and moisture-sensitive. In the presence of moisture contents above the optimum moisture content for compaction purposes, lodgement till can be easily disturbed by vehicles, earthwork equipment, and even foot traffic. Careful management of moisture-sensitive soils, as recommended in this report, will be needed to reduce the potential for disturbance of wet lodgement till soils and costs associated with repairing disturbed soils. Excavated lodgement till sediments are suitable for reuse in structural fill applications if specifically allowed by project specifications, and if moisture conditions are adjusted to allow compaction to a firm and unyielding condition at the time of construction. If the moisture content of these sediments is elevated at the time of construction, moisture conditioning of the till could be achieved by spreading out the soil proposed for use as structural fill and aerating it during favorable dry site and weather conditions.

Vashon Ice Contact Sediments

Sediments encountered below the weathered till horizon in boring EB-12, approximately 2 feet below the ground surface, generally consisted of stiff to very stiff, fine sandy silt with trace to some gravel. We interpret these sediments to be representative of material deposited by meltwater in close proximity to the glacial ice during Vashon time. At the location of boring EB-12, the ice contact sediments extended to a depth of approximately 14.5 feet. With proper preparation, the ice contact deposits are suitable for support of foundations, floor slabs, and paving. Because of the fine-grained, non-granular texture, these sediments are highly moisture-sensitive and subject to disturbance when wet. Suitable compaction of fine-grained deposits is only achievable over a narrow range of moisture contents. Moisture conditioning of these sediments is difficult due to their cohesive, non-granular texture. For these reasons, we do not recommend the use of these sediments as structural fill. Because the ice contact sediments were only encountered in boring EB-12, their distribution at the site appears to be very limited.

Olympia Non-Glacial Sediments

Sediments encountered at a depth of approximately 28 feet (below the Vashon lodgement till) in boring EB-11, generally consisted of very dense, tan-gray, fine to medium sand with moderate to high silt content. Below a depth of approximately 33.5 feet, the sediments of this geologic unit consisted of hard, tan silt with trace gravel. The silt was generally massive but contained scattered, thin, sandy lenses. Although we observed no clear, distinguishing features characteristic of a particular geologic unit, their color, gradation, and stratigraphic position below the lodgement till suggest that these sediments may be representative of material deposited during the Olympia non-glacial period. The Olympia non-glacial period occurred prior to the Fraser Glaciation, approximately 30,000 to 60,000 years ago. At the location of exploration boring EB-11, these sediments extended to a depth of approximately 48 feet. Because these sediments lie below the maximum anticipated excavation depth for the project, use of these sediments for foundation support or as structural fill is not expected.

Possession Drift

Sediments encountered below the Vashon lodgement till in boring EB-8 generally consisted of very stiff to hard, blue-gray silt. The silt was generally massive to laminated and contained scattered fine sand partings. These sediments effervesced in hydrochloric acid. We interpret these sediments to be representative of Possession Drift. The Possession Drift was deposited in a glaciomarine environment during the Possession Glaciation, approximately 60,000 to 80,000 years ago. At the location of boring EB-8, the Possession Drift extended beyond the maximum depth explored of approximately 26.5 feet. Because these sediments lie

below the maximum anticipated excavation depth in the area of boring EB-8, use of these sediments for foundation support or as structural fill is not expected.

Pre-Fraser Till

Sediments encountered below a depth of approximately 48 feet in boring EB-11 generally consisted of very dense, non-stratified, very silty, gravelly sand. Although these sediments appeared texturally similar to the Vashon lodgement till, their stratigraphic position below the suspected Olympia-aged non-glacial sediments indicate that they were deposited during a glacial period prior to the Fraser Glaciation. At the location of boring EB-11, the pre-Fraser till extended to a depth of approximately 68 feet. Because these sediments lie below the maximum anticipated excavation depth for the project, use of these sediments for foundation support or as structural fill is not expected.

Pre-Fraser Silt

Sediments encountered below the pre-Fraser till in boring EB-11 (below a depth of approximately 68 feet) generally consisted of hard silt with lenses and interbeds of very silty, fine sand. Based on their stratigraphic position below the pre-Fraser silt, deposition of these sediments also occurred prior to the Fraser Glaciation. These sediments were non-reactive in hydrochloric acid. At the location of boring EB-11, the pre-Fraser silt extended to a depth of approximately 80 feet. Because these sediments lie below the maximum anticipated excavation depth for the project, use of these sediments for foundation support or as structural fill is not expected.

Blakely Harbor Formation

Sediments encountered below the surficial topsoil horizon in exploration pit EP-4 consisted of loose, brown, very silty sand with some gravel and soft to medium stiff, yellowish-tan silt. These sediments became medium dense to dense below a depth of approximately 5.5 feet. The gravel-sized fraction of these sediments typically consisted of angular sedimentary rock. Similar sediments were encountered either directly below the surficial topsoil horizon, or below the lodgement till or pre-Fraser sediments in exploration borings EB-3 through EB-6, and EB-10 through EB-12. We interpret these sediments to be representative of the Blakely Harbor Formation. The Blakely Harbor Formation consists of a Miocene-aged sedimentary rock composed of sandstone, siltstone, conglomerate, tuff, and volcanoclastic sandstone. It is known to contain interbeds of coal, and in some locations, nearly coherent logs. Where encountered in our explorations, the bedrock was typically weathered and poorly lithified and exhibited physical characteristics more consistent with a non-lithified sediment than well indurated bedrock. However, the density/lithification of these sediments typically increased with depth. Sedimentary rock is also noted on the exploration logs for Terra pits TP-4 through

TP-6, and TP-8. At these locations the bedrock was encountered at depths ranging from approximately 2.5 to 9 feet.

In our opinion, the bedrock will typically be rippable with conventional excavation equipment to the penetration depths achievable by the hollow-stem auger drilling rig used for our exploration. Exploration borings EB-4 through EB-6, EB-10, and EB-12 met with refusal in the bedrock at depths ranging from approximately 12 to 20 feet. Refusal depths and elevations for these boring locations are summarized below in Table 2. It should be noted that the refusal elevations shown in Table 2 were estimated from the Light Detection and Ranging (LIDAR) based topography shown on Figure 2. The elevations shown in Table 2 should be considered accurate to the degree implied by the methods used to estimate them.

Exploration borings EB-4, EB-5, and EB-6 are located within the footprint of the proposed high school building. Although the estimated drilling refusal elevations all lie below the finished floor elevation of 510 feet, the density/lithification of the rock varies with both depth and location. We recommend that the contractor be prepared to use specialized rock-breaking equipment in the event that excavation in the bedrock cannot be achieved using conventional excavation equipment.

Table 2
Summary of Drilling Refusal Depths in the Blakely Harbor Formation Bedrock

Boring #	Depth to Drilling Refusal (Ft.)	Apx. Drilling Refusal Elevation (Ft.)
EB-4	20	494
EB-5	14	506
EB-6	12	508
EB-10	20	445
EB-12	18	487

With proper preparation, the Tertiary bedrock is suitable for support of foundations, floor slabs, and paving. Because of its elevated silt content, the weathered bedrock is moisture-sensitive and subject to disturbance when wet. The granular portions of the bedrock are suitable for reuse in structural fill applications if specifically allowed by project specifications, and if moisture conditions are adjusted to allow compaction to a firm and unyielding condition at the time of construction. Portions of the weathered bedrock composed predominantly of silt and clay are not recommended for use as structural fill.

4.2 Geologic Map Review

Review of the regional geologic map titled *Geologic Map of the Issaquah 7.5' Quadrangle, King County, Washington*, by Booth and Minard (1992) indicates that the area of the site is underlain by Vashon lodgement till with Tertiary sedimentary rock mapped in portions of the southern and eastern parts of the site. Our interpretation of the sediments encountered in our explorations is consistent with the regional geologic map.

4.3 Hydrology

Slow to moderately rapid groundwater seepage was observed in 11 of the Associated Earth Sciences, Inc. (AESI) exploration pits. Seepage was also noted on three of the ESNW pits. Specifically, groundwater seepage was encountered in AESI exploration pits EP-4, EP-6, EP-10, EP-11, EP-13 through EP-15, EP-18, EP-19, and EP-31, and in ESNW pits TP-1, TP-3, and TP-4. Generally, the seepage was limited to a thin perched zone in the lower portion of the weathered till horizon within 4 feet of the ground surface. Similarly, shallow, perched seepage was encountered on the surface of the bedrock in exploration pit EP-4. This perched seepage, known as "interflow" occurs when stormwater infiltrates through the relatively permeable, weathered soil horizon and becomes perched atop the underlying, dense, low permeability, unweathered till or bedrock. The exceptions were exploration pits EP-6 and EP-11. In exploration pit EP-6, a zone of thin, perched seepage was encountered in the unweathered till at a depth of approximately 7 feet and in exploration pit EP-11 a zone of thin, perched seepage was encountered at a depth of approximately 2 feet in fill. The occurrence or level of seepage below the site likely varies in response to changes in season, precipitation, and other factors.

II. GEOLOGIC HAZARDS AND MITIGATIONS

The following discussion of potential geologic hazards is based on the geologic conditions as observed and discussed herein.

5.0 LANDSLIDE HAZARDS AND RECOMMENDED MITIGATION

Slope inclinations on the site generally range from approximately 30 percent or less, but steepen to approximately 40 to 50 percent over a maximum height of approximately 30 feet in a relatively small area located near the southeast corner of the property. Based on the morphology of the topography in this area, we interpret the steep slope to be a cut slope made for the construction of 228th Avenue SE and the south entrance road into the property.

Section 18.10.390 of the *Issaquah Municipal Code* (IMC) defines Steep Slope Hazard Areas as any ground that rises at an inclination of 40 percent or more within a vertical elevation change of at least 10 feet. Section 18.10.580 of the IMC states that a buffer shall be established at a horizontal distance of 50 feet from the top, toe, and sides of Steep Slope Hazard Areas with an additional 15-foot building setback established from the edge of the buffer. The buffer may be reduced to a minimum of 10 feet upon acceptance by the City of a geotechnical study supporting the buffer reduction. Alteration of steep slopes are generally prohibited under the code with limited alterations allowed for trails, utilities, and surface water conveyance. The City may grant an exemption from the prohibition of steep slope alteration under the following conditions:

1. Where the height of a steep slope is 20 feet or less. In this case, an alteration may be granted upon review and acceptance by the City of a soils report prepared by a geologist or licensed geotechnical engineer demonstrating that no adverse impact will result from the exemption.
2. Where the slope has been created from previous legal grading activities. In this case, any remaining steep slope shall be subject to the protection mechanisms for steep slopes specified in the code.

Steep slope protection mechanisms specified in Section 18.10.580 of the IMC include a factor of safety of at least 1.5.

Review of the May 20, 2019 grading plans prepared by AHBL civil engineers indicates that the project will entail some grading of the steep slopes. A copy of the grading plan prepared for this area is shown in Figure 4. As previously stated, we interpret the steep slopes to consist of

cut slopes associated with grading for construction of 228th Avenue SE and the entrance road into the property off of 228th Avenue SE. Consequently, alteration of these slopes is allowed under Section 18.10580D of the IMC, subject to the protection mechanisms specified in the code.

5.1 Slope Reconnaissance

We completed a reconnaissance of the steep slopes at the site at the time of our field exploration. During our reconnaissance of these areas we did not observe any geomorphologic indications of historic landslide activity, such as tension cracks, landslide scarps, or hummocky topography. No emergent seepage or unusually deformed tree trunks indicative of historical or ongoing slope movement were observed.

5.2 LIDAR Mapping

LIDAR based imagery is a remote sensing technology that can be used to generate a detailed expression of ground surface topography even in densely vegetated areas. For this reason, LIDAR based topographic imagery can be helpful in distinguishing surface features (such as old landslide features) that may otherwise not be easily recognizable. A LIDAR based shaded relief map of the subject site is included as Figure 5. We did not observe any indications of historic landslide activity during our review of the LIDAR shaded relief map.

5.3 Slope Stability Analysis

An analysis of the global stability of the slope in the southeast corner of the site was conducted using the computer program SLOPE/W, version 7.23 by GeoSlope International. The program used the Morgenstern-Price method for evaluating a rotational failure. Input parameters for the analysis included slope geometry, geology, and soil strength parameters. The slope geometry used for our analysis was based on the topography depicted on the civil grading plan along section lines A-A' and B-B' (Figure 4). These sections extend through the steepest and highest portions of the slope. The following cases were analyzed for each of these two sections:

- Existing topographic conditions, static case.
- Existing topographic conditions, seismic case.
- Post-construction (post-grading) conditions, static case.
- Post-construction conditions, seismic case.

Subsurface exploration in this area indicates that the slope is underlain by bedrock with Vashon lodgement till overlying the bedrock in most areas. Because the shear strength of the bedrock is estimated to be equivalent to or stronger than the lodgement till, we conservatively

assumed that the native sediments underlying the slope consist entirely of lodgement till. Soil strength parameters used for our analysis were assumed based on typical published values for lodgement till and our prior experience. The soil strength parameters used for our analysis are shown on the SLOPE/W profiles included in Appendix B. For evaluation of slope stability under seismic conditions, a horizontal ground acceleration of 0.26g was used for our analysis. This value is equivalent to $\frac{1}{2}$ of the peak horizontal ground acceleration based on a seismic event with a 2 percent probability of exceedance in 50 years in accordance with the 2015 *International Building Code* (IBC).

The stability of a slope can be expressed in terms of its factor of safety. The factor of safety of a slope is the ratio between the forces that resist sliding to the forces that drive sliding. For example, a factor of safety of 1.0 would indicate a slope where the driving forces and the resisting forces are exactly equal. Increasing factor of safety values greater than 1.0 indicate increased stability. Factors of safety below 1.0 indicate conditions where the driving forces exceed the resisting forces and landsliding is imminent.

Under static conditions, the minimum calculated factors of safety all exceeded the minimum value of 1.5 specified in the IMC. The IMC does not specify a minimum factor of safety for seismic conditions, but as a typical standard of practice, a factor of safety of 1.1 is generally considered to be a minimum acceptable value. The minimum factors of safety calculated for seismic conditions all exceeded a factor of safety of 1.5. The minimum calculated factors of safety are summarized below in Table 3. Copies of the results of the slope stability analysis are included in Appendix B.

Table 3
Summary of Minimum Calculated Factors of Safety

Section Line	Case	Minimum Factor of Safety
A-A'	Existing Static	2.43
A-A'	Existing Seismic	1.52
A-A'	Post-Construction Static	3.69
A-A'	Post-Construction Seismic	2.13
B-B'	Existing Static	2.64
B-B'	Existing Seismic	1.62
B-B'	Post-Construction Static	2.65
B-B'	Post-Construction Seismic	1.61

5.4 Landslide Hazard Mitigation

Based on our observations and analyses, it is our opinion that the risk of damage to the proposed project by landsliding on the steep slope is low under both static and seismic conditions, with minimum calculated factors of safety exceeding the minimum acceptable

value specified in the IMC. This opinion assumes that construction practices for the project will be completed in accordance with the recommendations presented in this report. We recommend that stormwater discharge on or adjacent to the top of the steep slope be avoided as it could increase the potential for accelerated erosion and negatively impact the stability of the slope.

As previously discussed, some areas of steep slope were generated during grading associated with the demolition of the former buildings. Post-demolition topography is not included on the project grading plans and therefore these steep slopes are not shown. However, the current grading plans indicate that grading proposed for the project will eliminate any steep slopes resulting from the demolition activities. At the time this report was prepared, development plans for the project were conceptual. We recommend that AESI review the final plans to verify that they comply with our recommendations.

6.0 SEISMIC HAZARDS AND RECOMMENDED MITIGATION

Earthquakes occur in the Puget Sound Lowland with great regularity. The vast majority of these events are small and are usually not felt by people. However, large earthquakes do occur as evidenced by the most recent 6.8-magnitude event on February 28, 2001, near Olympia Washington, the 1965 6.5-magnitude event, and the 1949 7.2-magnitude event. The 1949 earthquake appears to have been the largest in this area during recorded history. Evaluation of return rates indicates that an earthquake of the magnitude between 5.5 and 6.0 is likely within a given 20-year period.

Generally, there are four types of potential geologic hazards associated with large seismic events: 1) surficial ground rupture, 2) seismically induced landslides, 3) liquefaction, and 4) ground motion. The potential for each of these hazards to adversely impact the proposed project is discussed below.

6.1 Surficial Ground Rupture

The subject site is located near both the South Whidbey Island Fault Zone (SWIFZ), and the Seattle Fault Zone.

A 2005 study by the U.S. Geological Survey (USGS) (Sherrod et al., 2005, *Holocene Fault Scarps and Shallow Magnetic Anomalies Along the Southern Whidbey Island Fault Zone Near Woodinville, Washington*, Open-File Report 2005-1136, March 2005) reported that “strong” evidence of prehistoric earthquake activity has been observed along two fault strands thought to be part of the southeastward extension of the SWIFZ. The study suggests as many as nine earthquake events along the SWIFZ may have occurred within the last 16,400 years. The

recognition of this fault splay is relatively new, and data pertaining to it are limited with the studies still ongoing. The recurrence interval of movement along this fault system is still unknown, although it is hypothesized to be in excess of 1,000 years.

Studies of the Seattle Fault Zone by the USGS (e.g., Johnson et al., 1994, *Origin and Evolution of the Seattle Fault and Seattle Basin, Washington*, Geology, v. 22, pp. 71-74; and Johnson et al., 1999, *Active Tectonics of the Seattle Fault and Central Puget Sound Washington - Implications for Earthquake Hazards*, Geological Society of America Bulletin, July 1999, v. 111, n. 7, pp. 1042-1053) have provided evidence of surficial ground rupture along a northern splay of the Seattle Fault. According to the USGS studies, the latest movement of this fault was about 1,100 years ago when about 20 feet of surficial displacement took place. This displacement can presently be seen in the form of raised, wave-cut beach terraces along Alki Point in West Seattle and Restoration Point at the south end of Bainbridge Island. The recurrence interval of movement along this fault system is still unknown, although it is hypothesized to be in excess of several thousand years.

Due to the suspected long recurrence intervals for both fault zones, the potential for surficial ground rupture is considered to be low during the expected life of the proposed structure.

6.2 Seismically Induced Landslides

It is our opinion that the potential risk of damage to the proposed structures by seismically induced landsliding is low. Landslide hazards were previously discussed in greater detail in the "Landslide Hazards and Recommended Mitigation" section of this report.

6.3 Liquefaction

Liquefaction is a process through which unconsolidated soil loses strength as a result of vibrations, such as those which occur during a seismic event. During normal conditions, the weight of the soil is supported by both grain-to-grain contacts and by the fluid pressure within the pore spaces of the soil below the water table. Extreme vibratory shaking can disrupt the grain-to-grain contact, increase the pore pressure, and result in a temporary decrease in soil shear strength. The soil is said to be liquefied when nearly all of the weight of the soil is supported by pore pressure alone. Liquefaction can result in deformation of the sediment and settlement of overlying structures. Areas most susceptible to liquefaction include those areas underlain by non-cohesive silt and sand with low relative densities, accompanied by a shallow water table.

In our opinion, the potential risk of damage to the proposed structures by liquefaction is low due to the high relative density of the underlying sediments and bedrock, and the lack of adverse groundwater conditions. The site does not classify as a Seismic Hazard Area under the IMC.

6.4 Ground Motion/Seismic Site Class (2015 International Building Code)

Structural design of the building should follow 2015 IBC standards. We recommend that the project be designed in accordance with Site Class "C" as defined in IBC Table 20.3-1 of *American Society of Civil Engineers (ASCE) 7 – Minimum Design Loads for Buildings and Other Structures*.

7.0 EROSION HAZARDS AND MITIGATION

The site soils contain significant quantities of silt and fine sand and are considered to be sensitive to erosion and disturbance when wet. Review of the Natural Resource Conservation Service (NRCS) Web Soil Survey indicates that soil in the area of the subject site is mapped as "Alderwood gravelly sandy loam, 8 to 15 percent slopes (AgC), Alderwood gravelly sandy loam, 15 to 30 percent slopes (AgD)," and "Beausite gravelly sandy loam, 15 to 30 percent slopes." The Alderwood soils are derived from lodgement till and the Beausite soils are derived from till and sandstone. The mapped soil types are generally consistent with the soil conditions observed in our explorations. Portions of the site which exhibit slope inclinations in excess of 15 percent classify as Erosion Hazard Areas under the IMC. Section 18.10.520 of the IMC restricts clearing activities in Erosion Hazard Areas to between April 1st and November 1st and specifies general best management practices and other requirements for work in these areas.

Project plans should include implementation of temporary erosion controls in accordance with local standards of practice. Control methods should include use of perimeter silt fences, and straw mulch in exposed areas. Removal of existing vegetation should be limited to those areas that are required to construct the project, and new landscaping and vegetation with equivalent erosion mitigation potential should be established as soon as possible after grading is complete. During construction, surface water should be collected as close as possible to the source to minimize silt entrainment that could require treatment or detention prior to discharge. Timely implementation of permanent drainage control measures should also be a part of the project plans and will help reduce erosion and generation of silty surface water onsite.

III. PRELIMINARY DESIGN RECOMMENDATIONS

8.0 INTRODUCTION

Our exploration indicates that, from a geotechnical engineering standpoint, the proposed project is feasible provided the recommendations contained herein are properly followed. Conventional spread footing foundations may be used for building support. The depth to suitable foundation bearing soils encountered in the explorations located in the proposed building areas generally ranged from approximately 1 to 5 feet.

9.0 SITE PREPARATION

Site preparation of building and paving areas should include removal of all sod, trees, brush, debris, pavement, and any other deleterious materials. All existing fill beneath planned foundation areas should be removed. Any remaining foundation elements, buried utilities, or other structures should be removed from below planned foundation areas. Buried utilities should be abandoned in place or removed from below planned new paving. Any depressions below planned final grades caused by demolition activities should be backfilled with structural fill, as discussed under the "Structural Fill" section of this report.

Existing topsoil should be stripped from all structural areas. The actual observed in-place depth of forest duff and topsoil at the locations of the explorations ranged from approximately 6 inches to 2 feet. After stripping, remaining roots and stumps should be removed from structural areas. All soils disturbed by stripping and grubbing operations should be recompacted as described below for structural fill.

Once excavation to subgrade elevation is complete, the resulting surface should be recompacted to a firm and unyielding condition. Subgrades below pavement areas should be proof-rolled with a loaded dump truck or other suitable equipment. Any soft, loose, yielding areas or areas exposing excessively organic material should be excavated to expose suitable bearing soils. The subgrade should then be compacted to a firm and unyielding condition. Structural fill can then be placed to achieve desired grades, if needed.

9.1 Temporary Cut Slopes

In our opinion, stable construction slopes should be the responsibility of the contractor and should be assessed during construction. For estimating purposes, however, temporary, unsupported cut slopes can be planned at maximum inclinations of 1.5H:1V in unsaturated existing fill or loose to medium dense, weathered glacial sediments or weathered

bedrock-derived soils. Temporary slopes of up to 1H:1V can be planned in the unsaturated, dense to very dense, unweathered glacial sediments or weathered bedrock.

The recommended temporary cut slope angles apply where groundwater seepage is not present at the faces of the slopes. If seepage is present where temporary excavation slopes are exposed, flatter slope angles may be recommended. Alternatively, temporary dewatering in the form of pumped sumps or other measures may be recommended. As is typical with earthwork operations, some sloughing and raveling may occur, and cut slopes may have to be adjusted in the field. In addition, WISHA/OSHA regulations should be followed at all times.

9.2 Site Disturbance

The on-site soils contain high percentages of fine-grained material, which makes them moisture-sensitive and subject to disturbance when wet. The contractor must use care during site preparation and excavation operations so that the underlying soils are not softened. If disturbance occurs, the softened soils should be removed and the area brought to grade with structural fill.

9.3 Winter Construction

The existing fill material, natural glacial sediments, and weathered bedrock generally contain high percentages of silt and are considered highly moisture-sensitive. Some of these materials may require drying during favorable dry weather conditions to allow their reuse in structural fill applications. Care should be taken to seal all earthwork areas during mass grading at the end of each workday by grading all surfaces to drain and sealing them with a smooth-drum roller. Stockpiled soils that will be reused in structural fill applications should be covered whenever precipitation is anticipated.

If winter construction is expected, crushed rock fill could be used to provide construction staging areas where exposed soil is present. The stripped subgrade should be observed by the geotechnical engineer, and should then be covered with a geotextile fabric, such as Mirafi 500X or equivalent. Once the fabric is placed, we recommend using a crushed rock fill layer at least 10 inches thick in areas where construction equipment will be used.

10.0 STRUCTURAL FILL

All references to structural fill in this report refer to subgrade preparation, fill type, placement, and compaction of materials, as discussed in this section. If a percentage of compaction is specified under another section of this report, the value given in that section should be used.

For backfill of buried utilities in the right-of-way, the backfill should be placed and compacted in accordance with the City of Issaquah codes and standards.

After stripping, planned excavation, and any required overexcavation has been performed to the satisfaction of the geotechnical engineer/engineering geologist, the surface of the exposed ground should be recompacted to a firm and unyielding condition. If the subgrade contains too much moisture, adequate recompaction may be difficult or impossible to achieve, and should probably not be attempted. In lieu of recompaction, the area to receive fill should be blanketed with washed rock or quarry spalls to act as a capillary break between the new fill and the wet subgrade. Where the exposed ground remains soft and further overexcavation is impractical, placement of an engineering stabilization fabric may be necessary to prevent contamination of the free-draining layer by silt migration from below.

After recompaction of the exposed ground is approved, or a free-draining rock course is laid, structural fill may be placed to attain desired grades. Structural fill is defined as non-organic soil, acceptable to the geotechnical engineer, placed in maximum 8-inch loose lifts, with each lift being compacted to 95 percent of ASTM D-1557. The top of the compacted fill should extend horizontally outward a minimum distance of 3 feet beyond the locations of the perimeter footings or roadway edges before sloping down at a maximum angle of 2H:1V. Extending the fill beyond the footing edge provides subgrade conditions consistent with anticipated footing pressure distribution.

The contractor should note that any proposed fill soils should be evaluated by AESI prior to their use in fills. This would require that we have a sample of the material at least 72 hours in advance to perform a Proctor test and determine its field compaction standard.

Soils in which the amount of fine-grained material (smaller than the No. 200 sieve) is greater than approximately 5 percent (measured on the minus No. 4 sieve size) should be considered moisture-sensitive. The sediments encountered in our explorations contain substantially more than 5 percent fine-grained material. The use of moisture-sensitive soil in structural fills should be limited to favorable dry weather and dry subgrade conditions. Construction equipment traversing the site when the soils are wet can cause considerable disturbance.

If fill is placed during wet weather or if proper compaction cannot be attained, a select, import material consisting of a clean, free-draining gravel and/or sand should be used. Free-draining fill consists of non-organic soil, with the amount of fine-grained material limited to 5 percent by weight when measured on the minus No. 4 sieve fraction, and at least 25 percent retained on the No. 4 sieve.

Excavated existing fill is suitable for reuse in structural fill applications if such reuse is specifically allowed by project plans and specifications, if it is free of excessive organic debris

and other deleterious materials, and the moisture content is at or adjusted to a level suitable to achieve the specified level of compaction. Portions of the sediments encountered in our explorations exhibited moisture contents above the optimum for achieving suitable compaction. These sediments are described as “very moist” on the exploration logs in Appendix A. Soil moisture conditions should be expected to vary with location, depth, weather conditions, season, and other factors. If the moisture content of the excavated on-site soils proposed for reuse in structural fill applications is high at the time of construction, they could be moisture-conditioned by drying during favorable dry weather conditions. Alternatives to drying site soils include treating the soil with Portland cement or using imported granular soils with moisture contents suitable for achieving the specified compaction.

10.1 Controlled Low-Strength Material

Controlled low-strength material, also known as controlled density fill or “CDF,” is normally specified in terms of its compressive strength, which typically ranges from approximately 50 to 200 pounds per square inch (psi). CDF having a strength of 50 psi (7,200 pounds per square foot [psf]), provides adequate support for most structural applications and can be readily excavated with hand shovels and other non-mechanized tools. A strength of 100 psi (14,400 psf) provides additional support for special applications, but greatly increases the difficulty of hand excavation. In general, CDF with a strength greater than about 100 psi requires power equipment to excavate and therefore should not be used in areas where future hand excavation may be needed. CDF may be used in lieu of structural fill for this project. However, in those areas where CDF will be used below footings with an allowable bearing pressure exceeding 3,000 psf, we recommend that the CDF have a minimum compressive strength of 200 psi.

11.0 FOUNDATIONS

Conventional continuous footings and column pads may be used for building support when founded either directly on the undisturbed, medium dense to very dense natural sediments, or on structural fill placed over these materials. We recommend that an allowable foundation soil bearing pressure of 3,000 psf be used for design purposes, including both dead and live loads. An allowable bearing pressure of 6,000 psf may be used where foundations bear directly on the dense to very dense, unweathered glacial sediments or bedrock. In most areas of the site, dense to very dense sediments/bedrock were encountered in our explorations at depths of approximately 1 to 5 feet. However, dense natural sediments were encountered at depths of up to approximately 10 to 15 feet in a few locations. An increase in the allowable bearing pressure of one-third may be used for short-term wind or seismic loading. If structural fill is placed below footing areas, the structural fill should extend horizontally beyond the footing edges. For a footing supported on a structural fill bearing pad, this distance should be equal to

or greater than the thickness of the fill pad. This requirement does not apply to footings supported on a large mass fill such as behind a tall retaining wall.

All footings must penetrate to the prescribed bearing stratum and no footing should be founded in or above loose, organic, or existing fill soils. It should be noted that the area bounded by lines extending downward at 1H:1V from any footing must not intersect another footing or filled area. In addition, a 1.5H:1V line extending down from any footing must not daylight because sloughing or raveling may eventually undermine the footing. Thus, footings should not be placed near the edge of steps or cuts in the bearing soils.

We recommend using a modulus of subgrade reaction equal to 40 pounds per cubic inch (pci) for footings designed for an allowable bearing pressure of 3,000 psf and a modulus of subgrade reaction equal to 80 pci for footings designed for an allowable bearing pressure of 6,000 psf. Anticipated settlement of footings founded on suitable bearing soils should be less than 1 inch with differential settlement one-half of the anticipated total settlement. Most of this movement should occur during initial dead load applications. However, disturbed soil not removed from footing excavations prior to concrete placement could result in increased settlements. All footing areas should be observed by AESI prior to placing concrete to verify that the design bearing capacity of the soils has been attained and that construction conforms to the recommendations contained in this report. Such observation may be required by the City of Issaquah. Perimeter foundation drain systems should be provided as discussed under the "Drainage Considerations" section of this report.

The contractor must use care during site preparation and excavation operations so that the underlying soils are not softened. If disturbance occurs, the softened soils should be removed and foundations extended down to competent natural soil. Once the base of the excavation is reached, consideration should be given to "armoring" the exposed subgrade with a thin layer of imported aggregate to provide a working surface during foundation construction. We recommend a 6-inch layer of crushed rock for this purpose.

11.1 Drainage Considerations

All building and retaining wall foundations should be provided with foundation drains. Drains should consist of rigid, perforated, polyvinyl chloride (PVC) pipe surrounded by washed gravel. The drains should be constructed with sufficient gradient to allow gravity discharge away from the proposed building. Roof and surface runoff should not discharge into the footing drain system, but should be handled by a separate, rigid, tightline drain. In planning, exterior grades adjacent to walls should be sloped downward away from the proposed structures to achieve surface drainage.

12.0 FLOOR SUPPORT

Slab-on-grade floors may be constructed either directly on the medium dense to dense, natural sediments, or on structural fill placed over these materials. Areas of the slab subgrade that are disturbed (loosened) during construction should be recompact to an unyielding condition prior to placing the capillary break, as described below. Slab-on-grade floors should be constructed atop a capillary break consisting of a minimum thickness of 4 inches of washed pea gravel or washed, crushed rock. The washed pea gravel or crushed rock should be overlain by a 10-mil (minimum thickness) plastic vapor retarder.

13.0 FOUNDATION WALLS

The following preliminary recommendations may be applied to backfilled concrete retaining walls up to 8 feet tall. We should be allowed to offer situation-specific input for taller walls. All backfill behind foundation walls or around foundation units should be placed as per our recommendations for structural fill and as described in this section of the report. Horizontally backfilled walls, which are free to yield laterally at least 0.1 percent of their height, may be designed to resist lateral earth pressure represented by an equivalent fluid equal to 35 pounds per cubic foot (pcf). Fully restrained, horizontally backfilled, rigid walls that cannot yield should be designed for an equivalent fluid of 50 pcf. Walls with sloping backfill up to a maximum gradient of 2H:1V should be designed using an equivalent fluid of 55 pcf for yielding conditions or 75 pcf for fully restrained conditions. If parking areas are adjacent to walls, a surcharge equivalent to 2 feet of soil should be added to the wall height in determining lateral design forces.

As required by the 2015 IBC, retaining wall design should include a seismic surcharge pressure in addition to the equivalent fluid pressures presented above. Considering the site soils and the recommended wall backfill materials, we recommend a seismic surcharge pressure of 9H and 11H psf, where H is the wall height in feet for the “active” and “at-rest” loading conditions, respectively. The seismic surcharge should be modeled as a rectangular distribution with the resultant applied at the midpoint of the walls.

The lateral pressures presented above are based on the conditions of a uniform backfill consisting of excavated on-site soils, or imported structural fill compacted to 90 to 95 percent of ASTM D-1557. A higher degree of compaction is not recommended, as this will increase the pressure acting on the walls. A lower compaction may result in settlement of the slab-on-grade or other structures supported above the walls. Thus, the compaction level is critical and must be tested by our firm during placement. Surcharges from adjacent footings or heavy construction equipment must be added to the above values. Perimeter footing drains should

be provided for all retaining walls, as discussed under the “Drainage Considerations” section of this report.

It is imperative that proper drainage be provided so that hydrostatic pressures do not develop against the walls. This would involve installation of a minimum 1-foot-wide blanket drain to within 1 foot of finish grade for the full wall height using imported, washed gravel against the walls.

13.1 Passive Resistance and Friction Factors

Lateral loads can be resisted by friction between the foundation and the natural soils or supporting structural fill soils, and by passive earth pressure acting on the buried portions of the foundations. The foundations must be backfilled with structural fill and compacted to at least 95 percent of the maximum dry density to achieve the passive resistance provided below. We recommend the following allowable design parameters:

- Passive equivalent fluid = 300 pcf
- Coefficient of friction = 0.35

14.0 PAVEMENT RECOMMENDATIONS

14.1 Flexible Pavement

The project will include construction of new asphalt-paved surfaces in the form of parking lots, access drives, and bus loops. Pavement recommendations for these areas are provided below. The project will also include widening and other improvements in 228th Avenue SE. Pavement design for the 228th Avenue SE improvements is being assessed and pavement recommendations for this area will be provided in a separate report.

After the area to be paved is stripped, any organic soils are removed, and the soils are recompacted, the area should be proof-rolled with a loaded dump truck under the observation of AESI. Any soft, wet, organic, or yielding areas should be mitigated as recommended during construction. If warranted, engineering stabilization fabric, such as Mirafi 500X (or equivalent), should be placed over the subgrade with the edges overlapped in accordance with the manufacturer’s recommendations. Following subgrade preparation, clean, free-draining structural fill should be placed over the fabric and compacted to 95 percent of ASTM D-1557. Where fabric is exposed, spreading should be performed such that the dozer remains on the fill material and is not allowed to operate directly on the uncovered fabric. When 12 inches of fill has been placed, the fill should be proof-rolled with a loaded dump truck to pretension the

fabric and identify soft spots in the fill. Upon completing the proof-rolling operation, additional structural fill should be placed and compacted to attain desired grades.

For driveways and paving serving passenger cars, we recommend a paving section consisting of 3 inches of Class ½-inch Hot Mix Asphalt (HMA) underlain by 4 inches of crushed surfacing base course (CSBC). Alternatively, asphalt treated base (ATB) or Class ¾-inch HMA could be used for construction access followed by repair of any construction damage and final surfacing. If this alternative is used, we recommend a minimum of 2 inches of CSBC to serve as a working surface and a minimum of 3 inches of ATB. Final surfacing should consist of 2 inches of Class ½-inch HMA after any construction damage has been repaired.

Paving for heavy traffic areas such as bus lanes, fire lanes, and access for garbage and food service trucks should consist of 4 inches of Class ½-inch HMA above 6 inches of crushed rock base. If an ATB section is desired, we recommend a 2-inch-thick working surface of crushed rock, topped by 4 inches of ATB and 3 inches of Class ½-inch HMA.

14.2 Rigid Pavement

Project plans include the use of rigid concrete pavement at loading docks, in the fire lane east of the high school, and in the student drop-off area in front of the high school. Upon completion of the subgrade preparation as described above for flexible pavement, we recommend the following rigid pavement sections:

- Student Drop-Off Area
 - 6 inches - Portland Cement Concrete (PCC)
 - 4 inches - Compacted, 1¼-inch minus crushed surfacing base course
- Loading Dock and Fire Lane Areas
 - 7 inches - Portland Cement Concrete (PCC)
 - 4 inches - Compacted, 1¼-inch minus crushed surfacing base course

The base course material should be compacted to 95 percent of maximum dry density as defined by ASTM D-1557.

All concrete should have a minimum of six sacks of cement per cubic yard, a minimum 28-day compressive strength of 4,000 psi, and a minimum 28-day flexural strength of 650 psi. We further recommend that all concrete contain 5 percent entrained air for freeze-thaw protection, and be placed at a maximum 2½-inch slump. The wear surface should be textured with a coarse metal broom or rake finish to provide skid resistance.

To allow for an orderly arrangement of the cracking that concrete naturally undergoes during curing, we recommend placement of contraction joints. The depth of the joints should be sawed into the hardened concrete, formed by plastic strips, or tooled into the concrete during placement. Contraction joints should be placed at a maximum of 15-foot intervals. If rigid pavement is to be used for covering broad expanses, contraction joints should be placed on a 15-foot grid pattern.

Expansion joints should be installed at 60-foot intervals along the fire lane. These joints will also function as contraction joints. The expansion joints should be $\frac{3}{4}$ inch wide. All expansion joints should be filled with suitable filler material.

Load transfer dowels should be installed perpendicular to all pavement expansion joints. These dowels should be $\frac{3}{4}$ -inch-diameter (No. 6), smooth bars, 18 inches in length, thus allowing 9 inches of penetration on each side of the joint. Load transfer dowels should be spaced 12 inches on-center and be set 3 inches below the concrete surface. Suitable wire mesh reinforcement, properly placed (and properly maintained during construction) in the upper one-third of the slab, should also be provided for all concrete pavements.

15.0 ATHLETIC FIELD DESIGN AND CONSTRUCTION

We understand that the new athletic field for the high school will have a synthetic turf surface and lighting.

AESI has participated in construction of numerous synthetic turf athletic fields in western Washington. In our opinion, synthetic turf projects are very specialized, and should be designed by a specialty field designer with demonstrated experience designing and construction managing synthetic turf athletic fields in Western Washington. The recommendations presented below include geotechnical recommendations directed to the field designer. We are available on request to assist the field designer as plans are formulated.

15.1 Athletic Field Site Preparation

We recommend that the surface of the subgrade soils exposed during grading be compacted with a smooth-drum, vibratory roller to at least 90 percent of the modified Proctor maximum dry density, as determined by the ASTM D-1557 test procedure, and to a firm and unyielding surface. When stripping and excavation are completed, we anticipate that exposed soils will consist of existing fill or lodgement till. If areas of existing fill with excessive organic material or demolition waste are exposed after rough grading, it may be appropriate to overexcavate these materials and replace them with suitable fill. We recommend that project bid documents include some overexcavation and replacement of subgrade soils in the base bid, and equitable

unit costs for volumes more or less than the base bid. A base bid volume of overexcavation and replacement of 200 cubic yards might be appropriate based on subsurface exploration data. We recommend that volumes of overexcavation and replacement be defined in terms of bank cubic yards, with unit costs volumes based on before and after survey data. The District should be aware that the 200-cubic-yard figure is an estimate, and is used to establish an equitable base bid and unit cost structure that is flexible and able to address field conditions that will not be fully known until the time of construction. We recommend that the District carry a budget contingency for additional overexcavation and replacement beyond what is included in the base bid.

Following stripping, any organic material removal, replacement, and recompaction, all athletic field and track subgrades should be proof-rolled using a loaded dump truck or other suitable equipment under the observation of the geotechnical engineer. If soft or yielding areas are observed during proof-rolling, additional preparation might be required. Depending upon field conditions at the time of construction, additional preparation could include overexcavation and replacement of yielding soils with structural fill, use of a geotextile fabric, soil cement admixture stabilization, or some combinations of these methods. The amount of overexcavation will depend on the time of year construction occurs, the amount of precipitation during this time, and the amount of care the contractor takes in protecting the exposed subgrade.

The on-site soils contain a significant amount of fine-grained material, which makes them moderately moisture-sensitive and subject to disturbance when wet. The contractor must use care during site preparation and excavation operations so that the underlying soils are not softened. If disturbance occurs, the softened soils should be removed and the area brought to grade with structural fill. It should be noted that the moisture content of the site soils was visually estimated to typically be near or above the optimum moisture content for compaction purposes at the time of our study. It will likely be necessary to aerate site soils during favorable dry weather to reach suitable moisture contents prior to compaction.

15.2 Athletic Field Cut and Fill Slopes

In our opinion, stable construction slopes should be the responsibility of the contractor and should be determined during construction. For estimating purposes, however, we anticipate that temporary, unsupported cut slopes in the existing fill can be made at a maximum slope of 1.5H:1V or flatter. Temporary slopes in unsaturated lodgement till may be planned at 1H:1V. As is typical with earthwork operations, some sloughing and raveling may occur, and cut slopes may have to be adjusted in the field. If groundwater seepage is encountered in cut slopes, or if surface water is not routed away from temporary cut slope faces, flatter slopes will be required. In addition, WISHA/OSHA regulations should be followed at all times. Permanent cut and structural fill slopes that are not intended to be exposed to surface water should be

designed at inclinations of 2H:1V or flatter. All permanent cut or fill slopes should be compacted to at least 95 percent of the modified Proctor maximum dry density, as determined by ASTM D-1557, and the slopes should be protected from erosion by sheet plastic until vegetation cover can be established during favorable weather.

15.3 Athletic Field Structural Fill

Fill Placement

After athletic field stripping, excavation, and any required overexcavation have been performed to the satisfaction of the geotechnical engineer/engineering geologist, the upper 12 inches of exposed ground should be recompacted to 90 percent of the modified Proctor maximum density using ASTM D-1557 as the standard. If the subgrade contains too much moisture, adequate recompaction may be difficult or impossible to obtain and should probably not be attempted. In lieu of recompaction, the area to receive fill should be blanketed with washed rock or quarry spalls to act as a capillary break between the new fill and the wet subgrade. Where the exposed ground remains soft and further overexcavation is impractical, placement of an engineering stabilization fabric may be necessary to prevent contamination of the free-draining layer by silt migration from below.

After recompaction of the exposed ground is tested and approved, or a free-draining rock course is laid, structural fill may be placed to attain desired grades. Structural fill is defined as non-organic soil, acceptable to the geotechnical engineer, placed in maximum 8-inch loose lifts, with each lift being compacted to 90 percent of the modified Proctor maximum density using ASTM D-1557 as the standard. In the case of utility trench filling, the backfill may also need to be placed and compacted in accordance with current local codes and standards. The top of the compacted fill should extend horizontally outward a minimum distance of 3 feet beyond the locations of athletic field and pavement edges before sloping down at a maximum angle of 2H:1V.

The contractor should note that any proposed fill soils must be evaluated by AESI prior to their use in fills. This would require that we have a sample of the material 72 hours in advance of filling activities to perform a Proctor test and determine its field compaction standard. Soils in which the amount of fine-grained material (smaller than the No. 200 sieve) is greater than approximately 5 percent (measured on the minus No. 4 sieve size) should be considered moisture-sensitive. Use of moisture-sensitive soil in structural fills should be limited to favorable dry weather conditions. The on-site existing fill and native sediments contain significant amounts of silt and are considered highly moisture-sensitive. We anticipate that most of the existing soils will be wetter than optimum moisture content for compaction purposes and will require drying during favorable dry site and weather conditions prior to reuse in structural fill applications. The reuse of on-site soils in structural fill applications is

contingent on moisture-conditioning to a moisture content that allows compaction to a firm and unyielding condition at the specified level, and is only permitted if specifically allowed by project plans and specifications.

Construction equipment traversing the site when the soils are wet can cause considerable disturbance. If fill is placed during wet weather or if proper compaction cannot be obtained, a select import material consisting of a clean, free-draining gravel and/or sand should be used. Free-draining fill consists of non-organic soil with the amount of fine-grained material limited to 5 percent by weight when measured on the minus No. 4 sieve fraction with at least 25 percent retained on the No. 4 sieve.

15.4 Subsurface Drains (Underdrains)

We recommend that a subsurface drainage system be provided below the new field. The new underdrain system should consist of perforated pipes placed approximately 15 to 20 feet apart. The pipes should have an invert of at least 12 inches below final grade and be enveloped in washed pea gravel which freely communicates with the field surfacing. We defer to the field designer for specific underdrain requirements and are available to provide geotechnical recommendations related to underdrain design on request.

Subsurface Drain Trenching

Based on current grading plans, field elevation will be approximately elevation 509 feet. To achieve the planned field elevation fills ranging from 3 to 8 feet or cuts of about 2 feet will be required. Construction of the subsurface drains will require trenching into the new fill or lodgement till. The new fill soils within the proposed athletic field area will be medium dense to dense while the lodgement till will be medium dense to very dense. The lodgement till could contain gravel, cobbles and boulders. Therefore, the contractor should be prepared to excavate dense soils and to encounter gravel, cobbles, and occasional boulders during trenching.

15.5 Subfield Drainage Aggregate

We anticipate that two layers of drainage aggregate will be placed and compacted over the prepared field subgrade and below the turf. The drainage aggregate is a very specialized manufactured product that provides a compactable, stable working surface while maintaining a high minimum infiltration rate. Ideally, the aggregate should be sourced from a supplier who has demonstrated experience providing synthetic field drainage aggregate on previous projects. The drainage aggregate should be tested for gradation and approved by the field designer prior to delivery onsite. Daily sampling and gradation testing during placement is recommended. The material should be kept moist during transport, placement, and

compaction to reduce the potential for fines segregation. Once placed and compacted, the material should be field tested for density and permeability. If field permeability test results are below the minimum project requirements, the material may need to be loosened and recompacted or removed and replaced with materials that meet the minimum permeability requirements.

15.6 Athletic Field Light Pole Foundations

We understand that light pole foundations for this project will consist of concrete piers cast neat against the sidewalls of drilled holes without the use of forms.

Compressive Capacities

For this project, we anticipate that lateral capacities will be the most critical design factor for the light pole foundations, and will likely exert the most control over the depth of embedment. We recommend that the end-bearing portion of the axial compressive capacity be assumed to be 500 psf for light poles embedded at least 5 feet below the ground surface into new structural fill, existing fill or lodgement till. Vertical capacity can also be achieved through friction along the shafts of the poles, as described below.

Frictional Resistance

For frictional resistance along the shaft of the drilled piers used for light pole foundations, acting both in compression and in uplift, an allowable skin friction value of 250 psf for the existing fill, new structural fill or lodgement till is recommended. We recommend that frictional resistance be neglected in the uppermost 2 feet below the ground surface. The allowable skin friction value includes a safety factor of at least 2.0.

Lateral Capacities

Passive Pressure Method

Lateral loads on the proposed light pole foundations, caused by seismic or transient loading conditions, may be resisted by passive soil pressure against the side of the foundation. An allowable passive earth pressure of 200 pcf, expressed as an equivalent fluid unit weight, may be used for that portion of the foundation embedded within existing fill. The above values only apply to foundation elements cast "neat" against undisturbed soil. For new structural fill placed around the pier shaft or lodgement till, a passive earth pressure value of 250 pcf is recommended. All fill must be placed as structural fill and compacted to at least 95 percent of ASTM D-1557. Passive values presented may be represented by a triangular pressure

distribution acting over two pier diameters beginning at the surface and held at a constant depth greater than 8 feet. The triangular pressure distribution is truncated above 2 feet.

Light Pole Foundation Construction Considerations

In our opinion, the light pole foundation excavations may need to be cased during drilling within fill soils to facilitate construction and limit caving. The contractor should include temporary casing for the light pole foundation holes in their base bid, in our opinion. The contractor should have the ability to excavate and remove obstacles encountered during light pole foundation drilling, or light pole locations should be shifted to avoid obstacles that are encountered.

16.0 INFILTRATION FEASIBILITY

Because of their high percentage of fine-grained material and high relative density, the lodgement till and Blakely Harbor Formation bedrock are not recommended receptor soils for stormwater infiltration. Exploration boring EB-11, located in the central portion of the site, was drilled to a maximum depth of approximately 86 feet to assess the feasibility of deep infiltration. With the exception of a thin sand stratum encountered in this boring at a depth of approximately 30 feet, the sediments encountered in boring EB-11 consisted of dense, silty deposits. Because of their high relative density/consistency and elevated silt content, these sediments exhibit a low permeability and are not considered suitable receptor soils for stormwater infiltration. The sand stratum encountered at a depth of approximately 30 feet in boring EB-11 was estimated to be about 4 feet thick. In addition, this stratum was not encountered in any of the other explorations advanced at the site. Because of its limited thickness and lateral extent, it is our opinion that this sand stratum is not a suitable receptor soil for stormwater infiltration. Due to the lack of suitable infiltration receptor soils at the site, on-site stormwater infiltration is not recommended for this project. Exploration boring EB-11 was terminated in the Blakely Harbor Formation bedrock.

17.0 PROJECT DESIGN AND CONSTRUCTION MONITORING

Because project plans were not available at the time of our study, this report is considered to be preliminary. We recommend that we be allowed to review project plans when they are completed and to revise the recommendations presented in this report, if appropriate.

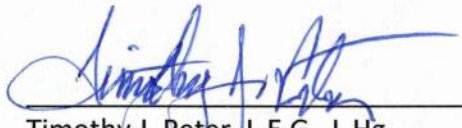
*Issaquah High School #4 and Elementary School #17
Issaquah, Washington*

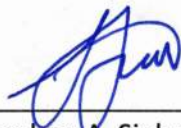
*Subsurface Exploration, Geologic Hazard, and
Preliminary Geotechnical Engineering Report
Preliminary Design Recommendations*

We are also available to provide geotechnical engineering and monitoring services during construction. The integrity of the foundation system depends on proper site preparation and construction procedures. In addition, engineering decisions may have to be made in the field in the event that variations in subsurface conditions become apparent.

We have enjoyed working with you on this study and are confident these recommendations will aid in the successful completion of your project. If you should have any questions or require further assistance please do not hesitate to call.

Sincerely,
ASSOCIATED EARTH SCIENCES, INC.
Kirkland, Washington


Timothy J. Peter, L.E.G., L.Hg.
Senior Engineering Geologist


Stephen A. Siebert, P.E.
Associate Geotechnical Engineer



Kurt D. Merriman, P.E.
Senior Principal Engineer

Attachments: Figure 1: Vicinity Map
Figure 2: 2017 Aerial, LIDAR Based Contours
Figure 3: Site and Exploration Plan
Figure 4: Steep Slope Areas
Figure 5: LIDAR Shaded Relief Map
Appendix A: Exploration Logs
Appendix B: SLOPE/W Profiles

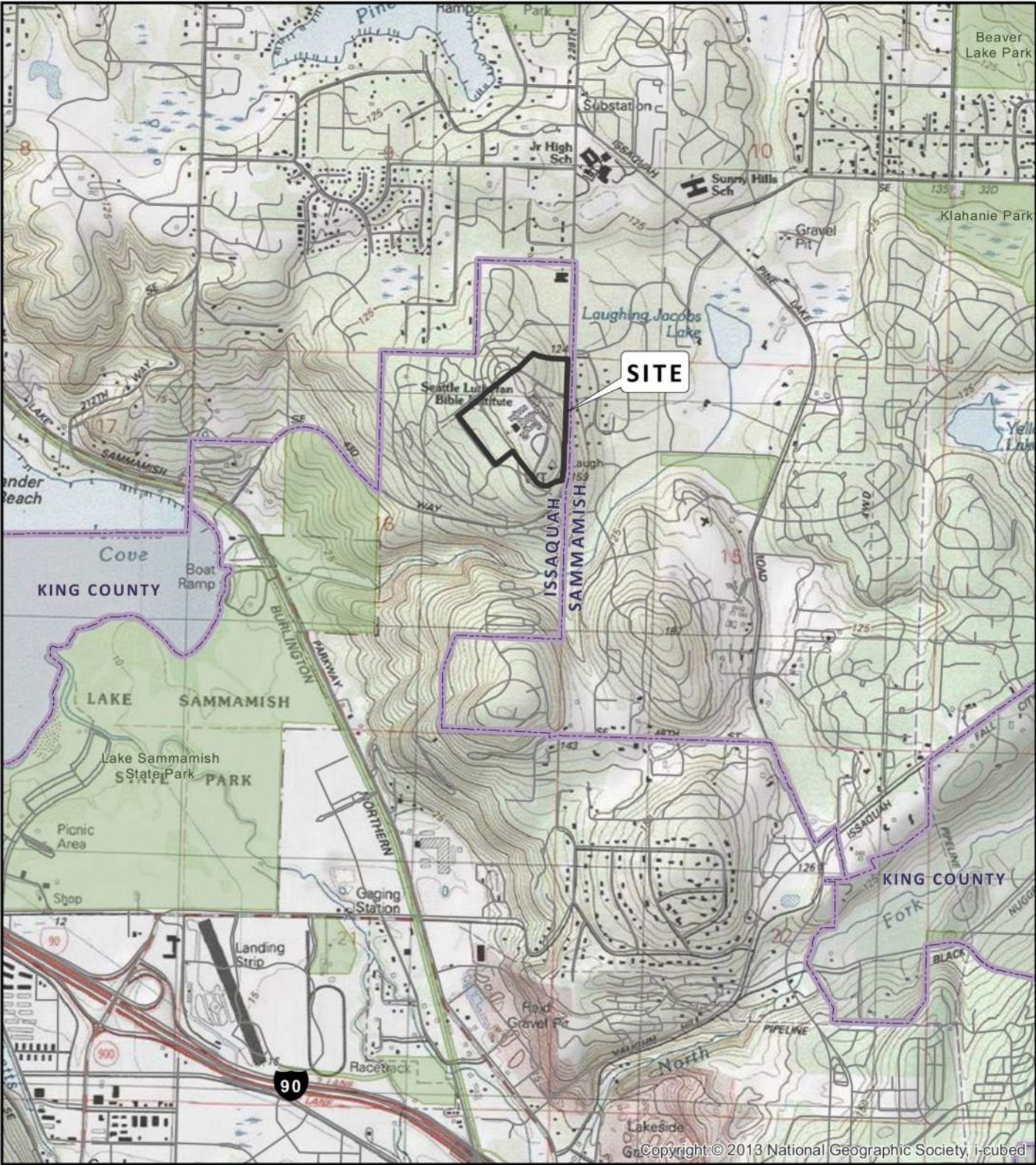
September 17, 2019

TJP/ms - 180070E001-6 - Projects\20180070\KE\WP

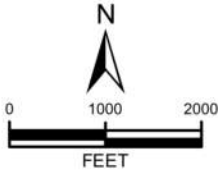
ASSOCIATED EARTH SCIENCES, INC.

Page 31

Document Path: G:\GIS_Projects\laay2018\180070 Issaquah HS\mxd\180070E001 F1 VM_IssaquahHS.mxd
C-1 - Page 35 of 118



DATA SOURCES / REFERENCES:
USGS: 7.5' SERIES TOPOGRAPHIC MAPS, ESRI/I-CUBED/NGS 2013
KING CO: STREETS, CITY LIMITS 1/18, PARCELS 8/18
LOCATIONS AND DISTANCES SHOWN ARE APPROXIMATE



NOTE: BLACK AND WHITE
REPRODUCTION OF THIS COLOR
ORIGINAL MAY REDUCE ITS
EFFECTIVENESS AND LEAD TO
INCORRECT INTERPRETATION

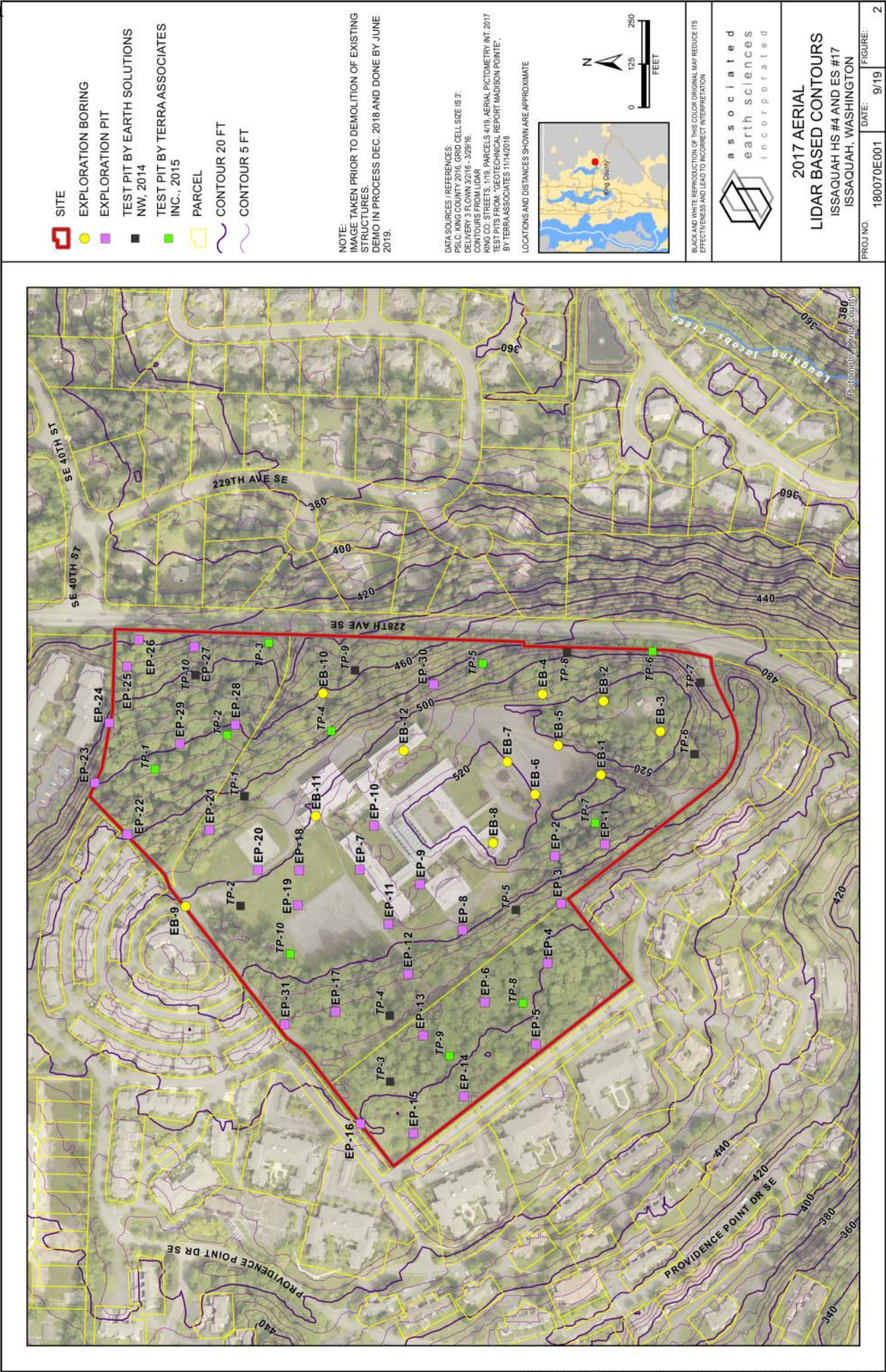


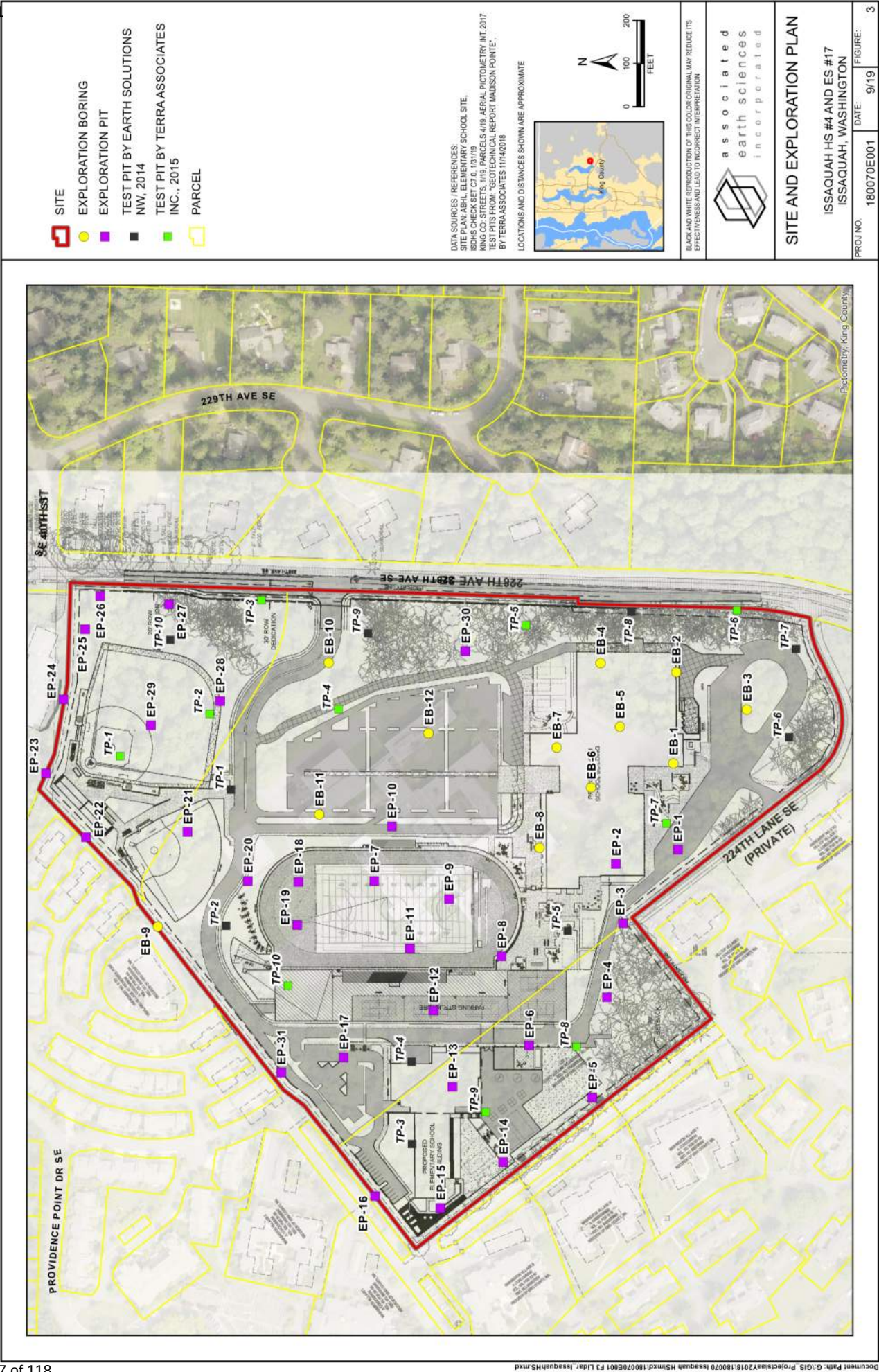
associated
earth sciences
incorporated

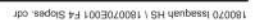
VICINITY MAP

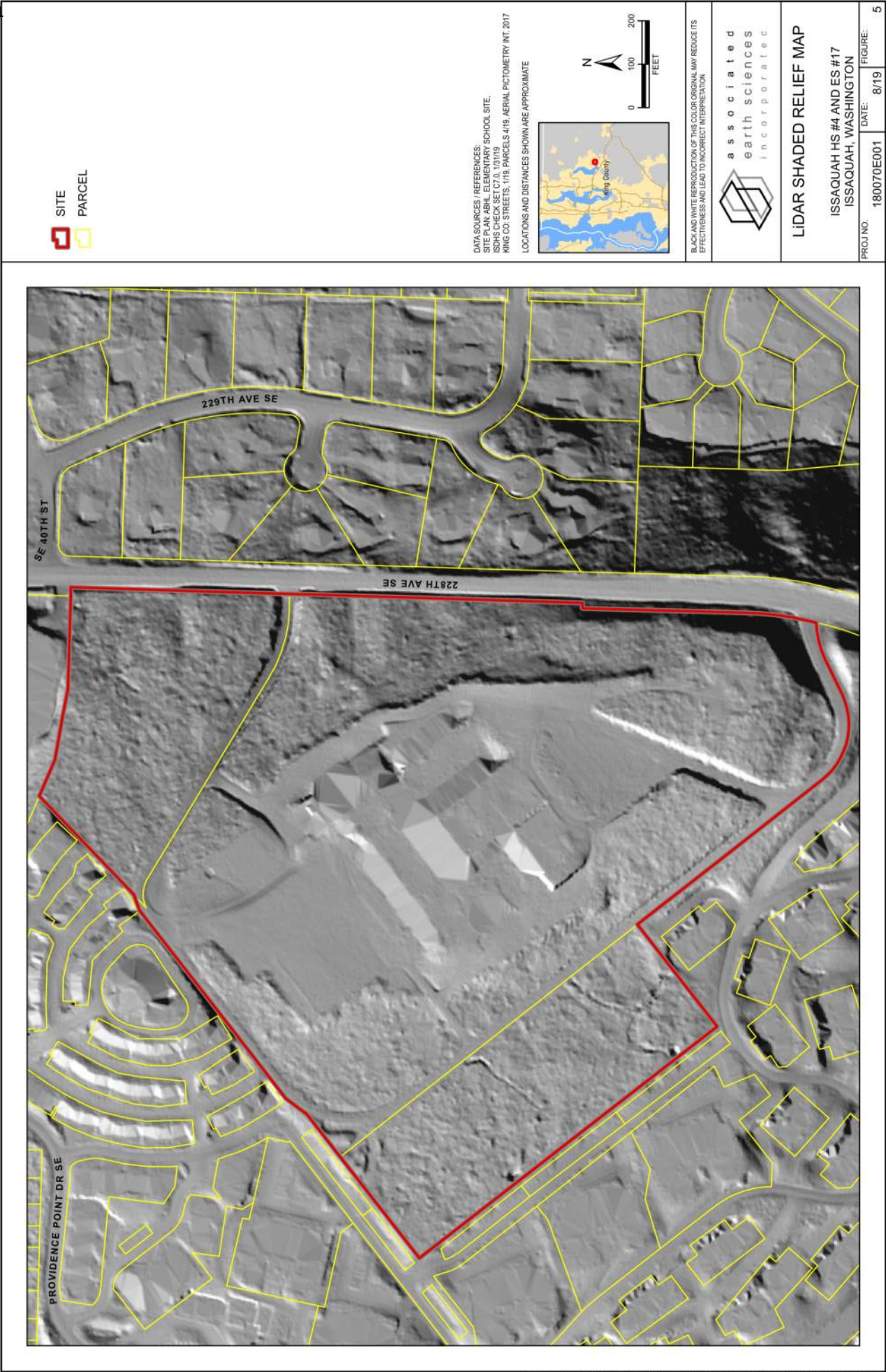
ISSAQUAH HS #4 AND ES #17
ISSAQUAH, WASHINGTON

PROJ NO.	DATE:	FIGURE:
180070E001	9/19	1









APPENDIX A

Exploration Logs

Coarse-Grained Soils - More than 50% ⁽¹⁾ Retained on No. 200 Sieve				Terms Describing Relative Density and Consistency							
Gravels - More than 50% ⁽¹⁾ of Coarse Fraction Retained on No. 4 Sieve		≤ 5% Fines ⁽⁵⁾	GW	Well-graded gravel and gravel with sand, little to no fines	Density	SPT ⁽²⁾ blows/foot		Test Symbols			
GP	Poorly-graded gravel and gravel with sand, little to no fines	≥ 12% Fines ⁽⁵⁾	GM			Silty gravel and silty gravel with sand	Coarse-Grained Soils		Very Loose	0 to 4	G = Grain Size M = Moisture Content A = Atterberg Limits C = Chemical DD = Dry Density K = Permeability
									Loose	4 to 10	
									Medium Dense	10 to 30	
									Dense	30 to 50	
Very Dense	>50										
Sands - 50% ⁽¹⁾ or More of Coarse Fraction Passes No. 4 Sieve		≤ 5% Fines ⁽⁵⁾	SP	Well-graded sand and sand with gravel, little to no fines	Consistency	SPT ⁽²⁾ blows/foot					
SW	Poorly-graded sand and sand with gravel, little to no fines	≥ 12% Fines ⁽⁵⁾	SM			Silty sand and silty sand with gravel	Fine-Grained Soils	Very Soft	0 to 2		
								Soft	2 to 4		
								Medium Stiff	4 to 8		
								Stiff	8 to 15		
Very Stiff	15 to 30										
Hard	>30										
Component Definitions											
Descriptive Term		Size Range and Sieve Number									
Boulders		Larger than 12"									
Cobbles		3" to 12"									
Gravel		3" to No. 4 (4.75 mm)									
Coarse Gravel		3" to 3/4"									
Fine Gravel		3/4" to No. 4 (4.75 mm)									
Sand		No. 4 (4.75 mm) to No. 200 (0.075 mm)									
Coarse Sand		No. 4 (4.75 mm) to No. 10 (2.00 mm)									
Medium Sand		No. 10 (2.00 mm) to No. 40 (0.425 mm)									
Fine Sand		No. 40 (0.425 mm) to No. 200 (0.075 mm)									
Silt and Clay		Smaller than No. 200 (0.075 mm)									
(3) Estimated Percentage				Moisture Content							
Component		Percentage by Weight		Dry - Absence of moisture, dusty, dry to the touch							
Trace		<5		Slightly Moist - Perceptible moisture							
Some		5 to <12		Moist - Damp but no visible water							
Modifier (silty, sandy, gravelly)		12 to <30		Very Moist - Water visible but not free draining							
Very modifier (silty, sandy, gravelly)		30 to <50		Wet - Visible free water, usually from below water table							
Symbols											
Sampler Type		Blows/6" or portion of 6"		Cement grout surface seal							
2.0" OD Split-Spoon Sampler (SPT)		3.0" OD Split-Spoon Sampler		Bentonite seal							
Bulk sample		3.25" OD Split-Spoon Ring Sampler		Filter pack with blank casing section							
Grab Sample		3.0" OD Thin-Wall Tube Sampler (including Shelby tube)		Screened casing or Hydrotip with filter pack							
		Portion not recovered		End cap							
(1) Percentage by dry weight				(4) Depth of groundwater							
(2) (SPT) Standard Penetration Test (ASTM D-1586)				▼ ATD = At time of drilling							
(3) In General Accordance with Standard Practice for Description and Identification of Soils (ASTM D-2488)				▽ Static water level (date)							
				(5) Combined USCS symbols used for fines between 5% and 12%							

Classifications of soils in this report are based on visual field and/or laboratory observations, which include density/consistency, moisture condition, grain size, and plasticity estimates and should not be construed to imply field or laboratory testing unless presented herein. Visual-manual and/or laboratory classification methods of ASTM D-2487 and D-2488 were used as an identification guide for the Unified Soil Classification System.



associated
earth sciences
incorporated

EXPLORATION LOG KEY

FIGURE A1



associated
earth sciences
incorporated

Exploration Boring

Project Number
180070E001

Exploration Number
EB-1

Sheet
1 of 1

Project Name Issaquah HS #4 and ES #17

Location Issaquah, WA

Driller/Equipment Advance Drilling Technology / Track Rig

Hammer Weight/Drop 140# / 30 inches

Ground Surface Elevation (ft) 520

Datum NAVD 88

Date Start/Finish 6/25/19, 6/25/19

Hole Diameter (in) 7

Depth (ft)	S T	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6" Blows/ft	Blows/Foot				Other Tests
								10	20	30	40	
				Asphalt - 3.5 inches								
				Vashon Lodgement Till								
		S-1		Moist, grayish tan, gravelly, very silty, SAND; nonstratified (SM).		16 21 12				▲33		
		S-2		Becomes mottled; some gravel.		7 14 19				▲33		
5		S-3		Contains a lens of gray silt at 5 to 6 feet. Becomes very moist and gravelly below 6 feet.		6 12 23				▲35		
				Refusal on a rock at 7.5 feet. Moved over 2.5 feet and resumed drilling.								
10		S-4		Becomes gray.		19 22 18				▲40		
15		S-5		Bottom of exploration boring at 15.5 feet due to refusal. No groundwater encountered.		50/4"				▲50/4"		
20												
25												

Sampler Type (ST):



2" OD Split Spoon Sampler (SPT)



No Recovery

M - Moisture



3" OD Split Spoon Sampler (D & M)



Ring Sample



Water Level ()



Grab Sample



Shelby Tube Sample



Water Level at time of drilling (ATD)

Logged by: TJP

Approved by: CJK



associated
earth sciences
incorporated

Exploration Boring

Project Number
180070E001

Exploration Number
EB-2

Sheet
1 of 1

Project Name Issaquah HS #4 and ES #17

Location Issaquah, WA

Driller/Equipment Advance Drilling Technology / Track Rig

Hammer Weight/Drop 140# / 30 inches

Ground Surface Elevation (ft) 524

Datum NAVD 88

Date Start/Finish 6/25/19, 6/25/19

Hole Diameter (in) 7

Depth (ft)	S T	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot				Other Tests
								10	20	30	40	
		S-1		Forest Duff - 4 inches Vashon Lodgement Till Moist, reddish brown, gravelly, very silty, SAND (SM).		6			▲20			
		S-2		Becomes tan.		6				▲28		
5		S-3		Blowcounts are likely overstated, pounding on a rock. Difficult drilling.		50/4"						▲50/4"
10		S-4		Becomes mottled and very gravelly. Bottom of exploration boring at 11 feet due to refusal. No groundwater encountered. Moved over 3 feet and attempted to re-drill. Met refusal at 7.5 feet.		20 50/5"						▲50/5"
15												
20												
25												

Sampler Type (ST):



2" OD Split Spoon Sampler (SPT)



No Recovery

M - Moisture



3" OD Split Spoon Sampler (D & M)



Ring Sample



Water Level ()



Grab Sample



Shelby Tube Sample



Water Level at time of drilling (ATD)

Logged by: TJP

Approved by: CJK



associated
earth sciences
incorporated

Exploration Boring

Project Number
180070E001

Exploration Number
EB-3

Sheet
1 of 1

Project Name Issaquah HS #4 and ES #17

Location Issaquah, WA

Driller/Equipment Advance Drilling Technology / Track Rig

Hammer Weight/Drop 140# / 30 inches

Ground Surface Elevation (ft) 525

Datum NAVD 88

Date Start/Finish 6/25/19, 6/25/19

Hole Diameter (in) 7

Depth (ft)	S T	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot				Other Tests
								10	20	30	40	
		S-1		Forest Duff / Topsoil - 6 inches Blakely Harbor Formation Moist, mottled light brown, very silty, SAND, trace to some gravel (SM).		2 5 5		▲10				
5		S-2				8 8 11			▲19			
		S-3				6 9 13			▲22			
10		S-4		Becomes very moist.		7 11 19				▲30		
15		S-5		Trace fine gravel.		6 9 30					▲39	
20		S-6		Becomes tan gray with heavy orange brown mottling. Contains coal fragments.		12 13 22				▲35		
25		S-7		Becomes gravelly.		28 50/5"						▲50/5"
				Bottom of exploration boring at 26 feet No groundwater encountered.								

Sampler Type (ST):



2" OD Split Spoon Sampler (SPT)



No Recovery

M - Moisture



3" OD Split Spoon Sampler (D & M)



Ring Sample



Water Level ()



Grab Sample



Shelby Tube Sample



Water Level at time of drilling (ATD)

Logged by: TJP

Approved by: CJK



associated
earth sciences
incorporated

Exploration Boring

Project Number
180070E001

Exploration Number
EB-4

Sheet
1 of 1

Project Name Issaquah HS #4 and ES #17

Location Issaquah, WA

Driller/Equipment Advance Drilling Technology / Track Rig

Hammer Weight/Drop 140# / 30 inches

Ground Surface Elevation (ft) 514

Datum NAVD 88

Date Start/Finish 6/25/19, 6/25/19

Hole Diameter (in) 7

Depth (ft)	S T	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot				Other Tests
								10	20	30	40	
5		S-1		Fill Very moist, reddish brown, very silty, gravelly, SAND; nonstratified (SM).		5 4 5	▲9					
		S-2		Blakely Harbor Formation Very moist, reddish brown, gravelly, very silty, fine SAND; gravel fraction consists of angular sandstone fragments (SM).		2 2 3	▲5					
		S-3		Becomes tan and silty.		4 5 13	▲18					
10		S-4		Contains angular gray gravel; poor recovery.		21 50 50/6"						▲50/6"
15		S-5				38 50/3"						▲50/3"
20		S-6		Becomes gray and more lithified. Bottom of exploration boring at 20 feet due to refusal. No groundwater encountered.		50/5"						▲50/5"
25												

Sampler Type (ST):



2" OD Split Spoon Sampler (SPT)



No Recovery

M - Moisture



3" OD Split Spoon Sampler (D & M)



Ring Sample



Water Level ()



Grab Sample



Shelby Tube Sample



Water Level at time of drilling (ATD)

Logged by: TJP

Approved by: CJK



associated
earth sciences
incorporated

Exploration Boring

Project Number
180070E001

Exploration Number
EB-5

Sheet
1 of 1

Project Name Issaquah HS #4 and ES #17

Location Issaquah, WA

Driller/Equipment Advance Drilling Technology / Track Rig

Hammer Weight/Drop 140# / 30 inches

Ground Surface Elevation (ft) 520

Datum NAVD 88

Date Start/Finish 6/25/19, 6/25/19

Hole Diameter (in) 7

Depth (ft)	S T	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot				Other Tests
								10	20	30	40	
5		S-1		Asphalt - 1.5 inches thick Vashon Lodgement Till Moist, brown, very gravelly, very silty, SAND; rounded gravel (SM).		18 19 50/6"						▲ 50/6"
		S-2		Blakely Harbor Formation Moist, gray, silty, SAND; contains angular rock fragments (SM).		22 38 50/6"						▲ 50/6"
		S-3		Orange brown mottling.		28 33 50/3"						▲ 50/3"
		S-4		Becomes more heavily mottled.		18 50/4"						▲ 50/4"
		S-5				50/4"						▲ 50/4"
10												
15				Bottom of exploration boring at 14 feet due to refusal. No groundwater encountered.								
20												
25												

Sampler Type (ST):



2" OD Split Spoon Sampler (SPT)



No Recovery

M - Moisture



3" OD Split Spoon Sampler (D & M)



Ring Sample



Water Level ()



Grab Sample



Shelby Tube Sample



Water Level at time of drilling (ATD)

Logged by: TJP

Approved by: CJK



associated
earth sciences
incorporated

Exploration Boring

Project Number
180070E001

Exploration Number
EB-6

Sheet
1 of 1

Project Name Issaquah HS #4 and ES #17

Location Issaquah, WA

Driller/Equipment Advance Drilling Technology / Track Rig

Hammer Weight/Drop 140# / 30 inches

Ground Surface Elevation (ft) 520

Datum NAVD 88

Date Start/Finish 6/26/19, 6/26/19

Hole Diameter (in) 7

Depth (ft)	S T	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot				Other Tests
								10	20	30	40	
				Asphalt - 2 inches								
				Vashon Lodgement Till								
		S-1		Moist, grayish tan, gravelly, very silty, SAND; nonstratified (SM).		8				▲25		
						10						
						15						
		S-2		Some gravel.		12						▲48
						21						
						27						
5		S-3		Trace gravel; contains scattered thin lenses (<1/8 inches thick) of fine sand.		18				▲29		
						11						
						18						
						18						
				Blakely Harbor Formation								
10		S-4		Gravelly drilling at 9 feet.		50/6"						▲50/6"
				Moist, yellowish tan to gray, silty, SAND; contains angular rock fragments (SM).								
		S-5				46						▲50/3"
						50/3"						
				Bottom of exploration boring at 12.25 feet due to refusal. No groundwater encountered.								
15												
20												
25												

Sampler Type (ST):



2" OD Split Spoon Sampler (SPT)



No Recovery

M - Moisture



3" OD Split Spoon Sampler (D & M)



Ring Sample



Water Level ()



Grab Sample



Shelby Tube Sample



Water Level at time of drilling (ATD)

Logged by: TJP

Approved by: CJK



associated
earth sciences
incorporated

Exploration Boring

Project Number
180070E001

Exploration Number
EB-7

Sheet
1 of 1

Project Name Issaquah HS #4 and ES #17

Location Issaquah, WA

Driller/Equipment Advance Drilling Technology / Track Rig

Hammer Weight/Drop 140# / 30 inches

Ground Surface Elevation (ft) 520

Datum NAVD 88

Date Start/Finish 6/26/19, 6/26/19

Hole Diameter (in) 7

Depth (ft)	S T	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot				Other Tests
								10	20	30	40	
				Asphalt - 2.5 inches Vashon Lodgement Till								
		S-1		Moist, grayish tan, gravelly, very silty, SAND; nonstratified (SM).		8 6 10			▲16			
		S-2				10 18 50/5"						▲50/5"
5		S-3		Poor recovery, driving a rock. Very difficult drilling.		25 50/5"						▲50/5"
		S-4		Becomes yellowish tan, very gravelly.		14 46 50/5"						▲50/5"
10		S-5		No recovery. Bottom of exploration boring at 10 feet due to refusal. No groundwater encountered.		50/1"						▲50/1"
15												
20												
25												

Sampler Type (ST):



2" OD Split Spoon Sampler (SPT)



No Recovery

M - Moisture



3" OD Split Spoon Sampler (D & M)



Ring Sample



Water Level ()



Grab Sample



Shelby Tube Sample



Water Level at time of drilling (ATD)

Logged by: TJP

Approved by: CJK



associated
earth sciences
incorporated

Exploration Boring

Project Number
180070E001

Exploration Number
EB-8

Sheet
1 of 1

Project Name Issaquah HS #4 and ES #17

Location Issaquah, WA

Driller/Equipment Advance Drilling Technology / Track Rig

Hammer Weight/Drop 140# / 30 inches

Ground Surface Elevation (ft) 520

Datum NAVD 88

Date Start/Finish 6/26/19, 6/26/19

Hole Diameter (in) 7

Depth (ft)	S T	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6" Blows/ft	Blows/Foot				Other Tests
								10	20	30	40	
5		S-1		Fill Moist, tan, gravelly, very silty, SAND (SM).		1 2 2	▲4					
		S-2		Trace tile debris.		3 3 4	▲7					
		S-3		Vashon Lodgement Till Moist, grayish tan, gravelly, very silty, SAND; nonstratified (SM).		5 10 14		▲24				
10		S-4		Becomes very moist. Drilling action becomes smoother at 12 feet. Drilling action becomes gravelly.		14 25 36						▲61
		S-5				18 36 36						▲72
		S-6		Becomes mottled with increased moisture.		16 15 20				▲35		
25		S-7		Possession Drift Very moist, blue gray, SILT; contains fine sand partings; massive; effervesces in hydrochloric acid (ML). Becomes laminated.		9 12 16				▲28		
				Bottom of exploration boring at 26.5 feet No groundwater encountered.								

Sampler Type (ST):



2" OD Split Spoon Sampler (SPT)



No Recovery

M - Moisture



3" OD Split Spoon Sampler (D & M)



Ring Sample



Water Level ()



Grab Sample



Shelby Tube Sample



Water Level at time of drilling (ATD)

Logged by: TJP

Approved by: CJK



associated
earth sciences
incorporated

Exploration Boring

Project Number
180070E001

Exploration Number
EB-9

Sheet
1 of 1

Project Name Issaquah HS #4 and ES #17

Location Issaquah, WA

Driller/Equipment Advance Drilling Technology / Track Rig

Hammer Weight/Drop 140# / 30 inches

Ground Surface Elevation (ft) 500

Datum NAVD 88

Date Start/Finish 6/26/19, 6/26/19

Hole Diameter (in) 7

Depth (ft)	S T	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot				Other Tests
								10	20	30	40	
				Asphalt - 1.5 inches								
				Fill								
		S-1		Moist, grayish tan and brown (mixed), gravelly, very silty, SAND; contains scattered organic debris (SM).		12 16 11				▲27		
				Vashon Lodgement Till								
		S-2		Very moist, tan gray, very silty, gravelly, SAND; nonstratified (SM).		6 9 12			▲21			
5												
		S-3		Becomes tan to grayish tan.		8 16 24					▲40	
10												
		S-4		Becomes moist.		16 24 30						▲54
15												
		S-5		Becomes very moist.		48 50/1"						▲50/1"
20												
		S-6				33 50/5"						▲50/5"
25												
		S-7		Poor recovery.		50/4"						▲50/4"
				Bottom of exploration boring at 25.5 feet No groundwater encountered.								

Sampler Type (ST):



2" OD Split Spoon Sampler (SPT)



No Recovery

M - Moisture



3" OD Split Spoon Sampler (D & M)



Ring Sample



Water Level ()



Grab Sample



Shelby Tube Sample



Water Level at time of drilling (ATD)

Logged by: TJP

Approved by: CJK



associated
earth sciences
incorporated

Exploration Boring

Project Number
180070E001

Exploration Number
EB-10

Sheet
1 of 1

Project Name Issaquah HS #4 and ES #17

Location Issaquah, WA

Driller/Equipment Advance Drilling Technology / Track Rig

Hammer Weight/Drop 140# / 30 inches

Ground Surface Elevation (ft) 465

Datum NAVD 88

Date Start/Finish 6/26/19, 6/26/19

Hole Diameter (in) 7

Depth (ft)	S T	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot				Other Tests
								10	20	30	40	
5		S-1		Blakely Harbor Formation Very moist, brown to tan, very silty, gravelly, SAND (SM).			5 5 8	▲13				
		S-2		Becomes moist, grayish tan, silty with angular gravel sized sedimentary rock fragments.			9 15 18		▲33			
		S-3		Becomes tan to yellowish tan.			11 15 22			▲37		
		S-4		Becomes mottled and fine grained (siltstone); angular rock fragments still present.			50/5"					▲50/5"
		S-5					13 29 50/5"					▲50/5"
20		S-6		Poor recovery. Bottom of exploration boring at 20 feet due to refusal. No groundwater encountered.			50/2"					▲50/2"
25												

Sampler Type (ST):



2" OD Split Spoon Sampler (SPT)



No Recovery

M - Moisture



3" OD Split Spoon Sampler (D & M)



Ring Sample



Water Level ()



Grab Sample



Shelby Tube Sample



Water Level at time of drilling (ATD)

Logged by: TJP

Approved by: CJK



associated
earth sciences
incorporated

Exploration Boring

Project Number
180070E001

Exploration Number
EB-11

Sheet
1 of 3

Project Name Issaquah HS #4 and ES #17

Location Issaquah, WA

Driller/Equipment Advance Drilling Technology / Track Rig

Hammer Weight/Drop 140# / 30 inches

Ground Surface Elevation (ft) 500

Datum NAVD 88

Date Start/Finish 6/27/19, 6/27/19

Hole Diameter (in) 7

Depth (ft)	S T	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot				Other Tests
								10	20	30	40	
				Vashon Lodgement Till								
		S-1		Very moist, grayish tan, very silty, gravelly, SAND; nonstratified (SM).		6 9 9			▲18			
		S-2		Becomes moist.		29 50/6"						▲50/6"
5		S-3		Met with refusal at 4 feet; moved over 4 feet and resumed drilling.		4 37 50/5"						▲50/5"
10		S-4		Becomes very moist.		50/3"						▲50/3"
15		S-5		Becomes very moist.		14 50/4"						▲50/4"
20		S-6				50/6"						▲50/6"
25		S-7		Becomes very moist, slightly less gravelly, and slightly more silty.		13 21 30						▲51
				Driller adding water (~1 to 2 gallons).								
				Olympia Nonglacial Sediments ?								
				Drilling action becomes smooth below ~28 feet.								

Sampler Type (ST):



2" OD Split Spoon Sampler (SPT)



No Recovery

M - Moisture



3" OD Split Spoon Sampler (D & M)



Ring Sample



Water Level ()



Grab Sample



Shelby Tube Sample



Water Level at time of drilling (ATD)

Logged by: TJP

Approved by: CJK



associated
earth sciences
incorporated

Exploration Boring

Project Number
180070E001

Exploration Number
EB-11

Sheet
2 of 3

Project Name Issaquah HS #4 and ES #17

Location Issaquah, WA

Driller/Equipment Advance Drilling Technology / Track Rig

Hammer Weight/Drop 140# / 30 inches

Ground Surface Elevation (ft) 500

Datum NAVD 88

Date Start/Finish 6/27/19, 6/27/19

Hole Diameter (in) 7

Depth (ft)	S T	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot				Other Tests
								10	20	30	40	
		S-8		Moist, tan gray, fine to medium SAND, some silt (SP-SM).		18 30 41						▲ 71
		S-9		Sand becomes tan, silty, and fine grained.		27 39 50/6"						▲ 50/6"
35		S-10		Moist, tan, SILT; nonplastic; massive; driller adding water (ML).		11 37 50/5"						▲ 50/5"
		S-11		Trace gravel.		27 50/6"						▲ 50/6"
40		S-12		Contains a lens (~3 inches thick) of lightly mottled, fine sandy, silt at ~40.5 feet.		20 39 50						▲ 50/6"
45		S-13				12 20 33						▲ 53
				Pre-Fraser Till								
				Gravelly drilling action at 48 feet.								
50		S-14		Moist, grayish tan, very silty, gravelly, SAND; nonstratified (SM).		20 32 48						▲ 80
55		S-15		Slight increase in moisture content. Becomes very moist and gray.		12 33 50/5"						▲ 50/5"

Sampler Type (ST):



2" OD Split Spoon Sampler (SPT)



No Recovery

M - Moisture



3" OD Split Spoon Sampler (D & M)



Ring Sample



Water Level ()



Grab Sample



Shelby Tube Sample



Water Level at time of drilling (ATD)

Logged by: TJP

Approved by: CJK



associated
earth sciences
incorporated

Exploration Boring

Project Number
180070E001

Exploration Number
EB-11

Sheet
3 of 3

Project Name Issaquah HS #4 and ES #17

Location Issaquah, WA

Driller/Equipment Advance Drilling Technology / Track Rig

Hammer Weight/Drop 140# / 30 inches

Ground Surface Elevation (ft) 500

Datum NAVD 88

Date Start/Finish 6/27/19, 6/27/19

Hole Diameter (in) 7

Depth (ft)	S T	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6" Blows/6"	Blows/Foot				Other Tests
								10	20	30	40	
65		S-16		Driller adding water.		13 33 50/6"						▲ 50/6"
		S-17				16 22 27						▲ 49
70		S-18		Pre-Fraser Silt Drilling action becomes smooth below 68 feet. Moist, mottled tan, SILT; nonplastic; contains thin sand lens (~1 inch thick) at 71 feet; non-reactive in hydrochloric acid (ML).		17 27 40						▲ 67
75		S-19		Moist, grayish tan, very silty, fine SAND; frequent thin lenses (~2 inches thick) of silt (SM).		16 27 46						▲ 73
80		S-20		Blakely Harbor Formation Gravelly drilling action at 80 feet. Moist, gray, very silty, gravelly, SAND; nonstratified (SM).		50/6"						▲ 50/6"
85		S-21		Becomes greenish gray, very gravelly, and contains pink rock fragments. Bottom of exploration boring at 85.75 feet No groundwater encountered.		40 50/3"						▲ 50/3"

Sampler Type (ST):



2" OD Split Spoon Sampler (SPT)



No Recovery

M - Moisture



3" OD Split Spoon Sampler (D & M)



Ring Sample



Water Level ()



Grab Sample



Shelby Tube Sample



Water Level at time of drilling (ATD)

Logged by: TJP

Approved by: CJK



associated
earth sciences
incorporated

Exploration Boring

Project Number
180070E001

Exploration Number
EB-12

Sheet
1 of 1

Project Name Issaquah HS #4 and ES #17

Location Issaquah, WA

Driller/Equipment Advance Drilling Technology / Track Rig

Hammer Weight/Drop 140# / 30 inches

Ground Surface Elevation (ft) 505

Datum NAVD 88

Date Start/Finish 6/28/19, 6/28/19

Hole Diameter (in) 7

Depth (ft)	S T	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot				Other Tests
								10	20	30	40	
5		S-1		Vashon Lodgement Till Very moist, mottled tan, very silty, gravelly, SAND; nonstratified (SM).			5 9 9		▲18			
		S-2		Vashon Ice Contact Very moist, mottled tan, fine sandy, SILT, some gravel; nonplastic (ML).			4 5 6		▲11			
		S-3		Trace to some gravel.			4 6 10		▲16			
10		S-4		No gravel. Becomes blue gray below 11 feet.			5 10 15		▲25			
		S-5		Blakely Harbor Formation Gravelly drilling action below 14.5 feet. Moist, purplish gray, silty, fine SAND, trace organics (SM).			15 41 50/4"					▲50/4"
15		S-6		Becomes purplish greenish gray and fine to medium grained with some pebble gravel.			50/5"					▲50/5"
				Bottom of exploration boring at 18 feet due to refusal. No groundwater encountered.								
20												
25												

Sampler Type (ST):



2" OD Split Spoon Sampler (SPT)



No Recovery

M - Moisture



3" OD Split Spoon Sampler (D & M)



Ring Sample



Water Level ()



Grab Sample



Shelby Tube Sample



Water Level at time of drilling (ATD)

Logged by: TJP

Approved by: CJK

LOG OF EXPLORATION PIT NO. EP-1

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.	
	DESCRIPTION	Elev: 505 ft
	Topsoil - 6 inches	
	Weathered Vashon Lodgement Till	
1	Loose, very moist, brown, very silty, gravelly, SAND; abundant roots (SM).	
2	Becomes medium dense and tan below 2 feet.	
3		
	Vashon Lodgement Till	
4	Hard, very moist, grayish tan, fine sandy, SILT; oxidized fracture surfaces; nonstratified (ML).	
5		
6	Trace to some gravel below 6 feet.	
7		
8		
9	Bottom of exploration pit at depth 8.5 feet No seepage. No caving.	
10		
11		
12		

Issaquah HS #4 and ES #17
Issaquah, WA



associated
earth sciences
incorporated

Logged by: TJP

Approved by: CJK

Project No. 180070E001

12/12/18

LOG OF EXPLORATION PIT NO. EP-2

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.	
	DESCRIPTION	<u>Elev: 510 ft</u>
	Topsoil - 6 inches	
	Weathered Vashon Lodgement Till	
1	Loose, wet, reddish brown, very silty, gravelly, SAND (SM).	
2	Abundant roots to 2.5 feet.	
3	Becomes medium dense, very moist, and grayish tan below 2.5 feet.	
	Vashon Lodgement Till	
4	Very dense, moist, grayish tan, very silty, gravelly, SAND; nonstratified (SM).	
5		
6		
7		
8		
9	Bottom of exploration pit at depth 8 feet No seepage. No caving.	
10		
11		
12		

Issaquah HS #4 and ES #17 Issaquah, WA



a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Logged by: TJP

Approved by: CJK

Project No. 180070E001

12/12/18

LOG OF EXPLORATION PIT NO. EP-3

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.
	DESCRIPTION
	<u>Elev: 485 ft</u>
	Topsoil - 8 inches
1	Weathered Vashon Lodgement Till Loose, very moist, brown to reddish brown, very silty, gravelly, SAND (SM).
2	
3	Abundant roots 0 to 2.5 feet. Becomes medium dense, increased moisture, and grayish tan with mottling below 2.5 feet.
	Vashon Lodgement Till
4	Dense, very moist, grayish tan, very silty, gravelly, SAND; scattered cobbles; mottled above 5 feet (sandy till); nonstratified (SM).
5	
6	
7	
8	
9	Bottom of exploration pit at depth 8 feet No seepage. No caving.
10	
11	
12	

Issaquah HS #4 and ES #17 Issaquah, WA

Logged by: TJP

Approved by: CJK



a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Project No. 180070E001

12/13/19

LOG OF EXPLORATION PIT NO. EP-4

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.
	DESCRIPTION
	<u>Elev: 480 ft</u>
	Topsoil - 10 inches
1	Blakely Harbor Formation Loose, very moist, brown, very silty, SAND, some gravel; abundant roots (SM).
2	
3	Soft to medium stiff, very moist to wet, yellowish tan, SILT (ML).
4	
5	
6	Medium dense to dense, very moist, yellowish tan, very silty, fine SAND (SM) and hard, fine sandy, SILT (ML); stratified (sandstone/siltstone).
7	
8	
9	
10	Bottom of exploration pit at depth 9 feet Moderately rapid seepage 2 to 4 feet. Moderate sloughing 2 to 4 feet.
11	
12	

Issaquah HS #4 and ES #17 Issaquah, WA

Logged by: TJP

Approved by: CJK



a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Project No. 180070E001

12/12/18

LOG OF EXPLORATION PIT NO. EP-5

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.	
	DESCRIPTION Elev: 476 ft	
	Topsoil - 6 inches	
	Weathered Vashon Lodgement Till	
1	Loose to medium dense, very moist, brown, very silty, gravelly, SAND; scattered cobbles; abundant roots (SM).	
2	Blakely Harbor Formation	
3	Medium dense to dense, very moist, yellowish tan, very silty, SAND (SM).	
4		
5		
6	Becomes very dense below 6 feet.	
7	Bottom of exploration pit at depth 7 feet No seepage. No caving.	
8		
9		
10		
11		
12		

Issaquah HS #4 and ES #17
Issaquah, WA



associated
earth sciences
incorporated

Logged by: TJP

Approved by: CJK

Project No. 180070E001

12/13/18

LOG OF EXPLORATION PIT NO. EP-6

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.	
	DESCRIPTION Elev: 482 ft	
	Topsoil - 6 inches	
	Weathered Vashon Lodgement Till	
1	Loose, very moist, reddish brown, very silty, gravelly, SAND (SM). Abundant roots 0 to 2 feet.	
2	Becomes medium dense and tan below 2 feet.	
3	Vashon Lodgement Till	
4	Dense, very moist, mottled grayish tan, very silty, gravelly, SAND; scattered cobbles and boulders; nonstratified (SM).	
5		
6		
7	Wet at 7 feet.	
8		
9	Bottom of exploration pit at depth 9 feet Slow discontinuous seepage at 7 feet. No caving.	
10		
11		
12		

Issaquah HS #4 and ES #17
Issaquah, WA



associated
earth sciences
incorporated

Logged by: TJP

Approved by: CJK

Project No. 180070E001

12/13/18

LOG OF EXPLORATION PIT NO. EP-7

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.	
	DESCRIPTION Fill Loose, very moist, brown, very silty, gravelly, SAND (SM).	<u>Elev: 505 ft</u>
1	Vashon Lodgement Till	
2	Very dense, moist, tan gray, very silty, gravelly, SAND; nonstratified (SM). Very difficult digging.	
3		
4		
5	Bottom of exploration pit at depth 5 feet No seepage. No caving.	
6		
7		
8		
9		
10		
11		
12		

Issaquah HS #4 and ES #17 Issaquah, WA

Logged by: TJP

Approved by: CJK



a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Project No. 180070E001

12/10/18

LOG OF EXPLORATION PIT NO. EP-8

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.	
	DESCRIPTION	Elev: 500 ft
	Fill	
1	Loose, moist, brown, very silty, gravelly, SAND (SM).	
2		
3	Abundant roots 0 to 4 feet	
4	Becomes tan below 4 feet.	
5		
6		
7		
8	Weathered Vashon Lodgement Till	
	Medium dense, moist, reddish brown, very silty, gravelly, SAND (SM).	
9		
10	Clay pipe encountered at 10 feet in north end of excavation.	
	Vashon Lodgement Till	
11	Very dense, moist, grayish tan, very silty, SAND, some gravel; nonstratified (SM).	
	Bottom of exploration pit at depth 11 feet	
	No seepage. No caving.	
12		

Issaquah HS #4 and ES #17
Issaquah, WA



a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Logged by: TJP

Approved by: CJK

Project No. 180070E001

12/12/18

LOG OF EXPLORATION PIT NO. EP-9

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.
	DESCRIPTION Elev: 510 ft
1	Fill Loose, very moist, brown, very silty, SAND, some gravel; contains pockets of clean sand (SM).
2	Vashon Lodgement Till Very dense, moist, grayish tan, very silty, gravelly, SAND; scattered cobbles and boulders; nonstratified (SM).
3	
4	
5	
6	
7	
8	Bottom of exploration pit at depth 7 feet No seepage. No caving.
9	
10	
11	
12	

Issaquah HS #4 and ES #17
Issaquah, WA



associated
earth sciences
incorporated

Logged by: TJP

Approved by: CJK

Project No. 180070E001

12/12/18

LOG OF EXPLORATION PIT NO. EP-10

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.	
	DESCRIPTION <u>Elev: 512 ft</u>	
	Weathered Vashon Lodgement Till	
	Loose, very moist, brown, very silty, gravelly, SAND; abundant roots; wet at base (SM).	
1	Vashon Lodgement Till	
	Very dense, very moist, grayish tan, very silty, gravelly, SAND; scattered boulders and cobbles; nonstratified (SM).	
2		
	Becomes moist below ~2.5 feet.	
3		
4		
5		
6	Bottom of exploration pit at depth 6 feet Refusal due to boulder. Slow seepage at 1 foot. No caving.	
7		
8		
9		
10		
11		
12		

Issaquah HS #4 and ES #17 Issaquah, WA

Logged by: TJP

Approved by: CJK



a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Project No. 180070E001

12/12/18

LOG OF EXPLORATION PIT NO. EP-11

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.
	DESCRIPTION Elev: 512 ft
	Fill
1	Loose, very moist to wet, brown, very silty, gravelly, SAND; contains trace wood debris (SM).
2	Clay pipe and wires encountered at ~2 and 3 feet.
3	
4	
5	
6	Vashon Lodgement Till
7	Very dense, very moist, grayish tan, very silty, gravelly, SAND; nonstratified (SM).
8	Bottom of exploration pit at depth 7 feet Slow seepage at ~2 feet. Moderately severe caving at ~2 feet.
9	
10	
11	
12	

Issaquah HS #4 and ES #17
Issaquah, WA



associated
earth sciences
incorporated

Logged by: TJP

Approved by: CJK

Project No. 180070E001

12/12/18

LOG OF EXPLORATION PIT NO. EP-12

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.
	DESCRIPTION Elev: 492 ft
	Topsoil - 6 inches
	Weathered Vashon Lodgement Till
1	Dense, moist to very moist, reddish brown, very silty, gravelly, SAND; abundant roots (SM).
2	
3	
4	Vashon Lodgement Till
	Very dense, very moist, grayish tan, very silty, gravelly, SAND; nonstratified (SM).
5	
6	Bottom of exploration pit at depth 5 feet No seepage. No caving. Broke water line during excavation; repaired.
7	
8	
9	
10	
11	
12	

Issaquah HS #4 and ES #17
Issaquah, WA



associated
earth sciences
incorporated

Logged by: TJP

Approved by: CJK

Project No. 180070E001

12/12/18

LOG OF EXPLORATION PIT NO. EP-13

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.
	DESCRIPTION <u>Elev: 485 ft</u>
	Topsoil - 6 inches
	Weathered Vashon Lodgement Till
1	Loose, very moist, reddish brown, very silty, gravelly, SAND (SM).
2	
3	Abundant roots 0 to 2.5 feet. Becomes medium dense and grayish tan below 2.5 feet. Wet at base.
	Vashon Lodgement Till
4	Very dense, moist, grayish tan, very silty, gravelly, SAND; scattered cobbles; nonstratified (SM).
5	
6	
7	
8	
9	Bottom of exploration pit at depth 8 feet Slow seepage at 3 feet. No caving.
10	
11	
12	

Issaquah HS #4 and ES #17 Issaquah, WA

Logged by: TJP

Approved by: CJK



a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Project No. 180070E001

12/13/18

LOG OF EXPLORATION PIT NO. EP-14

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.	
	DESCRIPTION <u>Elev: 476 ft</u>	
	Topsoil - 6 inches	
	Weathered Vashon Lodgement Till	
1	Loose, very moist, reddish brown, very silty, gravelly, SAND (SM).	
2		
	Wet at 2.5 feet. Abundant roots 0 to 2.5 feet.	
3	Becomes medium dense, very moist, and tan below 3 feet.	
	Vashon Lodgement Till	
4	Dense, very moist, tan, very silty, gravelly, SAND; scattered cobbles; nonstratified (SM).	
	Lightly mottled 3.5 to 4.5 feet. Becomes very dense below 4.5 feet.	
5		
6		
7		
	Bottom of exploration pit at depth 7 feet Slow seepage at 2.5 feet. No caving.	
8		
9		
10		
11		
12		

Issaquah HS #4 and ES #17 Issaquah, WA

Logged by: TJP

Approved by: CJK



a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Project No. 180070E001

12/13/18

LOG OF EXPLORATION PIT NO. EP-15

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.	
	DESCRIPTION <u>Elev: 477 ft</u>	
	Topsoil - 8 inches	
1	Weathered Vashon Lodgement Till Loose, very moist, reddish brown, gravelly, very silty, SAND; scattered cobbles (SM).	
2		
3	Wet at 2.5 feet. Abundant roots 0 to 2.5 feet. Becomes medium dense and tan below 2.5 feet.	
4	Vashon Lodgement Till Dense, very moist, grayish tan, very silty, gravelly, SAND; scattered cobbles; nonstratified (SM). Mottled 3.5 to 5 feet.	
5		
6	Becomes very dense below ~6 feet.	
7		
8	Bottom of exploration pit at depth 8 feet Moderately rapid seepage at 2.5 feet. No caving.	
9		
10		
11		
12		

Issaquah HS #4 and ES #17 Issaquah, WA

Logged by: TJP

Approved by: CJK



a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Project No. 180070E001

12/13/18

LOG OF EXPLORATION PIT NO. EP-16

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.
	DESCRIPTION Elev: 480 ft
	Forest Duff
	Fill
1	Very dense, moist, grayish brown, very silty, gravelly, SAND; scattered cobbles (SM).
2	Medium dense to dense, moist, grayish brown, very gravelly, fine to medium SAND, trace silt; scattered cobbles (SP).
3	Abundant wood debris below ~2.5 feet. Pockets of silty, sand below 3 feet.
4	Vashon Lodgement Till
5	Dense, very moist, gray, very silty, gravelly, SAND; scattered cobbles; nonstratified (SM).
6	Becomes tan gray below 6 feet.
7	
8	
9	Bottom of exploration pit at depth 8 feet No seepage. No caving.
10	
11	
12	

Issaquah HS #4 and ES #17
Issaquah, WA

Logged by: TJP

Approved by: CJK



associated
earth sciences
incorporated

Project No. 180070E001

12/13/18

LOG OF EXPLORATION PIT NO. EP-17

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.
	DESCRIPTION Elev: 489 ft
	Topsoil - 6 inches
1	Weathered Vashon Lodgement Till Loose, very moist, reddish brown, very silty, gravelly, SAND (SM).
2	Abundant roots 0 to 3 feet.
3	Becomes medium dense and tan below 3 feet.
4	
5	Vashon Lodgement Till
6	Dense, very moist, grayish tan, very silty, gravelly, SAND; scattered cobbles; nonstratified (SM).
7	Becomes very dense below 7 feet.
8	Bottom of exploration pit at depth 8 feet No seepage. No caving.
9	
10	
11	
12	

Issaquah HS #4 and ES #17
Issaquah, WA



associated
earth sciences
incorporated

Logged by: TJP

Approved by: CJK

Project No. 180070E001

12/13/18

LOG OF EXPLORATION PIT NO. EP-18

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.	
	DESCRIPTION	Elev: 501 ft
	Topsoil - 6 inches	
	Fill	
1	Medium dense, moist to very moist, grayish tan, fine to medium SAND, some silt; scattered wood debris; wet at 2 feet (SP-SM).	
2	Vashon Lodgement Till	
3	Very dense, very moist, grayish tan, very silty, gravelly, SAND; nonstratified (SM).	
4		
5	Bottom of exploration pit at depth 4.5 feet Refusal due to a large boulder. Slow seepage at 2 feet. No caving.	
6		
7		
8		
9		
10		
11		
12		

Issaquah HS #4 and ES #17
Issaquah, WA



associated
earth sciences
incorporated

Logged by: TJP

Approved by: CJK

Project No. 180070E001

12/12/18

LOG OF EXPLORATION PIT NO. EP-19

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.	
	DESCRIPTION Elev: 502 ft	
	Sod / Topsoil - 6 inches	
	Weathered Vashon Lodgement Till	
1	Medium dense, very moist, brown, gravelly, silty, SAND; wet at 1.5 feet (SM).	
	Vashon Lodgement Till	
2	Very dense, wet, grayish tan, very silty, gravelly, SAND; scattered cobbles; nonstratified (SM).	
3		
4		
5		
6		
7		
8	Bottom of exploration pit at depth 7 feet Slow seepage at 1.5 feet. No caving.	
9		
10		
11		
12		

Issaquah HS #4 and ES #17
Issaquah, WA



associated
earth sciences
incorporated

Logged by: TJP

Approved by: CJK

Project No. 180070E001

12/12/18

LOG OF EXPLORATION PIT NO. EP-20

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.
	DESCRIPTION Elev: 499 ft
	Sod / Topsoil - 6 inches
	Vashon Lodgement Till
1	Very dense, very moist, grayish tan, very silty, gravelly, SAND; scattered cobbles; nonstratified (SM). Becomes moist below ~1 foot.
2	
3	
4	Becomes tan gray below ~4 feet.
5	
6	Very difficult digging.
7	Bottom of exploration pit at depth 6 feet No seepage. No caving.
8	
9	
10	
11	
12	

Issaquah HS #4 and ES #17
Issaquah, WA



associated
earth sciences
incorporated

Logged by: TJP

Approved by: CJK

Project No. 180070E001

12/12/18

LOG OF EXPLORATION PIT NO. EP-21

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.	
	DESCRIPTION <u>Elev: 490 ft</u>	
	Topsoil - 6 inches	
	Weathered Vashon Lodgement Till	
1	Loose, moist, reddish brown to brown, very silty, gravelly, SAND (SM).	
2	Abundant roots 0 to 2 feet. Becomes medium dense, very moist, and tan below 2 feet.	
3	Wet at 3.5 feet.	
	Vashon Lodgement Till	
4	Very dense, moist, grayish tan, very silty, gravelly, SAND; nonstratified (SM). Mottled 3.5 to 4.5 feet.	
5		
6		
7		
8		
9		
10	Bottom of exploration pit at depth 9.5 feet Slow seepage at 3.5 feet. No caving.	
11		
12		

Issaquah HS #4 and ES #17 Issaquah, WA

Logged by: TJP

Approved by: CJK



a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Project No. 180070E001

12/10/18

LOG OF EXPLORATION PIT NO. EP-22

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.
	DESCRIPTION <u>Elev: 478 ft</u>
	Topsoil - 8 inches
1	Weathered Vashon Lodgement Till Loose, moist, reddish brown, very silty, gravelly, SAND (SM). Abundant roots 0 to 2 feet.
2	Becomes medium dense, very moist, and tan below 2 feet.
3	
4	Vashon Lodgement Till
5	Dense, moist, tan, very silty, gravelly, SAND; nonstratified (SM). Mottled 4 to 5 feet. Very dense and grayish tan below 5 feet.
6	
7	
8	
9	Bottom of exploration pit at depth 8.5 feet No seepage. No caving.
10	
11	
12	

Issaquah HS #4 and ES #17 Issaquah, WA

Logged by: TJP

Approved by: CJK



a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Project No. 180070E001

12/10/18

LOG OF EXPLORATION PIT NO. EP-23

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.	
	DESCRIPTION	<u>Elev: 460 ft</u>
	Topsoil - 6 inches	
	Weathered Vashon Lodgement Till	
1	Loose, moist, reddish brown, very silty, gravelly, SAND (SM).	
2	Becomes medium dense and tan below 2 feet. Abundant roots 0 to 2 feet.	
3	Vashon Lodgement Till	
4	Very dense, moist, grayish tan, very silty, gravelly, SAND; nonstratified (SM).	
5		
6		
7		
8		
9	Bottom of exploration pit at depth 8 feet No seepage. No caving.	
10		
11		
12		

Issaquah HS #4 and ES #17 Issaquah, WA

Logged by: TJP

Approved by: CJK



a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Project No. 180070E001

12/10/18

LOG OF EXPLORATION PIT NO. EP-24

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.	
	DESCRIPTION	<u>Elev: 445 ft</u>
	Topsoil - 6 inches	
	Weathered Vashon Lodgement Till	
1	Loose, moist, reddish brown, very silty, gravelly, SAND (SM).	
2		
3	Becomes medium dense and tan below 2.5 feet.	
	Vashon Lodgement Till	
4	Very dense, moist, grayish tan, very silty, gravelly, SAND; scattered cobbles and boulders; nonstratified (SM). Mottled 3.5 to 4.5 feet.	
5		
6		
7		
8		
9		
10	Bottom of exploration pit at depth 9 feet No seepage. No caving.	
11		
12		

Issaquah HS #4 and ES #17 Issaquah, WA



a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Logged by: TJP

Approved by: CJK

Project No. 180070E001

12/10/18

LOG OF EXPLORATION PIT NO. EP-25

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.
	DESCRIPTION <u>Elev: 425 ft</u>
	Topsoil - 6 inches
	Weathered Vashon Lodgement Till
1	Loose, moist, reddish brown, very silty, gravelly, SAND (SM).
2	
3	Abundant roots 0 to 3 feet. Becomes medium dense and tan below 3 feet.
4	
	Vashon Lodgement Till
5	Very dense, moist, grayish tan, very silty, gravelly, SAND; scattered boulders and cobbles; nonstratified (SM). Mottled 4.5 to 6 feet.
6	
7	
8	
9	
10	
	Bottom of exploration pit at depth 10 feet No seepage. No caving.
11	
12	

Issaquah HS #4 and ES #17 Issaquah, WA

Logged by: TJP

Approved by: CJK



a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Project No. 180070E001

12/10/18

LOG OF EXPLORATION PIT NO. EP-26

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.	
	DESCRIPTION <u>Elev: 420 ft</u>	
	Topsoil - 6 inches	
	Weathered Vashon Lodgement Till	
1	Loose, moist, reddish brown, very silty, SAND, some gravel (SM).	
2	Abundant roots 0 to 2 feet. Becomes medium dense, very moist, and tan below 2 feet.	
3	Vashon Lodgement Till	
	Very dense, moist, grayish tan, very silty, gravelly, SAND; scattered cobbles; nonstratified (SM).	
4	Mottled 3 to 4 feet.	
5		
6		
7		
8		
	Bottom of exploration pit at depth 8 feet No seepage. No caving.	
9		
10		
11		
12		

Issaquah HS #4 and ES #17 Issaquah, WA

Logged by: TJP

Approved by: CJK



a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Project No. 180070E001

12/10/18

LOG OF EXPLORATION PIT NO. EP-27

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.
	DESCRIPTION Elev: 425 ft
	Topsoil - 6 inches
1	Weathered Vashon Lodgement Till Loose, moist, reddish brown, very silty, gravelly, SAND; scattered cobbles (SM). Medium dense, very moist, and tan below 1.5 feet. Abundant roots 0 to 1.5 feet.
2	
3	Vashon Lodgement Till Very dense, moist, grayish tan, very silty, gravelly, SAND; nonstratified (SM).
4	
5	
6	
7	
8	
9	Bottom of exploration pit at depth 8 feet No seepage. No caving.
10	
11	
12	

Issaquah HS #4 and ES #17
Issaquah, WA



associated
earth sciences
incorporated

Logged by: TJP

Approved by: CJK

Project No. 180070E001

12/10/18

LOG OF EXPLORATION PIT NO. EP-28

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.
	DESCRIPTION <u>Elev: 460 ft</u>
	Topsoil - 6 inches
	Weathered Vashon Lodgement Till
1	Loose, moist, reddish brown, very silty, gravelly, SAND (SM).
2	
3	Abundant roots 0 to 2.5 feet. Becomes medium dense, very moist, and tan below 2.5 feet.
4	Vashon Lodgement Till
5	Very dense, moist, tan, very silty, gravelly, SAND; scattered cobbles (SM).
6	
7	
8	
9	Bottom of exploration pit at depth 8 feet No seepage. No caving.
10	
11	
12	

Issaquah HS #4 and ES #17 Issaquah, WA



a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Logged by: TJP

Approved by: CJK

Project No. 180070E001

12/10/18

LOG OF EXPLORATION PIT NO. EP-29

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.
	DESCRIPTION Elev: 460 ft
	Topsoil - 6 inches
1	Weathered Vashon Lodgement Till Loose to medium dense, moist, reddish brown, very silty, gravelly, SAND; abundant roots (SM).
2	
3	
4	Vashon Lodgement Till Mottled 3.5 to 4.5 feet. Dense to very dense, moist, grayish tan, very silty, gravelly, SAND; scattered cobbles; nonstratified (SM).
5	
6	Grades to tan gray below ~6 feet.
7	
8	
9	
10	Bottom of exploration pit at depth 9 feet No seepage. No caving.
11	
12	

Issaquah HS #4 and ES #17
Issaquah, WA



associated
earth sciences
incorporated

Logged by: TJP

Approved by: CJK

Project No. 180070E001

12/10/18

LOG OF EXPLORATION PIT NO. EP-30

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.	
	DESCRIPTION Elev: 485 ft	
	Topsoil - 8 inches	
1	Weathered Vashon Lodgement Till Loose, moist, brown, very silty, gravelly, SAND (SM). Abundant roots 0 to 1.5 feet.	
2		
3	Becomes medium dense, very moist, and tan below 2.5 feet.	
4		
5		
6	Vashon Lodgement Till	
7	Dense, moist, light yellowish tan, very silty, gravelly, SAND; scattered cobbles; nonstratified (SM).	
8		
9	Bottom of exploration pit at depth 8 feet No seepage. No caving. Note: The color and density of the Till at this location suggests that it contains a significant percentage of reworked material from the underlying bedrock.	
10		
11		
12		

Issaquah HS #4 and ES #17
Issaquah, WA

Logged by: TJP

Approved by: CJK



associated
earth sciences
incorporated

Project No. 180070E001

12/13/18

LOG OF EXPLORATION PIT NO. EP-31

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.
	DESCRIPTION <u>Elev: 490 ft</u>
	Topsoil - 8 inches
1	Weathered Vashon Lodgement Till Loose to medium dense, very moist, reddish brown, very silty, gravelly, SAND (SM).
2	
3	Abundant roots 0 to 3 feet. Wet at 3 feet. Becomes medium dense and grayish tan below 3 feet.
4	Vashon Lodgement Till Dense, very moist, grayish tan, very silty, gravelly, SAND; scattered cobbles; nonstratified (SM). Mottled 3.5 to 4.5 feet. Becomes very dense below 4.5 feet.
5	
6	
7	
8	
9	Bottom of exploration pit at depth 8 feet Slow seepage at 3 feet. Minor sloughing at 3 feet.
10	
11	
12	

Issaquah HS #4 and ES #17 Issaquah, WA

Logged by: TJP

Approved by: CJK



a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Project No. 180070E001

12/13/18



Earth Solutions NW
1805 - 136th Place N.E., Suite 201
Bellevue, Washington 98005
Telephone: 425-449-4704
Fax: 425-449-4711

TEST PIT NUMBER TP-1

PAGE 1 OF 1

CLIENT Plateau Campus, LLC

PROJECT NAME Plateau Campus Property

PROJECT NUMBER 3333

PROJECT LOCATION Issaquah, Washington

DATE STARTED 5/5/14

COMPLETED 5/5/14

GROUND ELEVATION _____

TEST PIT SIZE _____

EXCAVATION CONTRACTOR NW Excavating

GROUND WATER LEVELS:

EXCAVATION METHOD _____

AT TIME OF EXCAVATION _____

LOGGED BY SHA

CHECKED BY SSR

AT END OF EXCAVATION _____

NOTES Depth of Topsoil & Sod 10": bare soil

AFTER EXCAVATION _____

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0					TOPSOIL
			TPSL		
		MC = 16.90% Fines = 24.00%			
			SM		
5		MC = 12.50%			
					Test pit terminated at 7.0 feet below existing grade. Groundwater seepage encountered at 4.0 feet during excavation. Bottom of test pit at 7.0 feet.

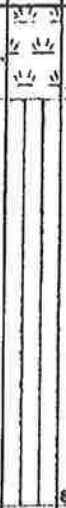
GENERAL BH / TP / WELL 3333.GPJ GINT US GDT 6/6/14

		Earth Solutions NW 1805 - 136th Place N.E., Suite 201 Bellevue, Washington 98005 Telephone: 425-449-4704 Fax: 425-449-4711		TEST PIT NUMBER TP-3 PAGE 1 OF 1	
CLIENT <u>Plateau Campus, LLC</u>			PROJECT NAME <u>Plateau Campus Property</u>		
PROJECT NUMBER <u>3333</u>			PROJECT LOCATION <u>Issaquah, Washington</u>		
DATE STARTED <u>5/5/14</u>		COMPLETED <u>5/5/14</u>		GROUND ELEVATION _____ TEST PIT SIZE _____	
EXCAVATION CONTRACTOR <u>NW Excavating</u>			GROUND WATER LEVELS:		
EXCAVATION METHOD _____			AT TIME OF EXCAVATION _____		
LOGGED BY <u>SHA</u> CHECKED BY <u>SSR</u>			AT END OF EXCAVATION _____		
NOTES <u>Depth of Topsoil & Sod 12": lvy</u>			AFTER EXCAVATION _____		

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0					TOPSOIL
			TPSL	1.0	Brown silty SAND with gravel, loose to medium dense, moist (Weathered Till)
		MC = 15.70% Fines = 29.10%			-heavy perched seepage
		MC = 8.00%	SM		-becomes very dense and unweathered
5				5.0	Test pit terminated at 5.0 feet below existing grade. Groundwater seepage encountered at 1.5 feet during excavation. Bottom of test pit at 5.0 feet.

GENERAL BH / TP / WELL 3333.GPJ GINT US GDT 6/5/14

		Earth Solutions NW 1805 - 138th Place N.E., Suite 201 Bellevue, Washington 98005 Telephone: 425-449-4704 Fax: 425-449-4711		TEST PIT NUMBER TP-4 PAGE 1 OF 1	
		CLIENT <u>Plateau Campus, LLC</u>		PROJECT NAME <u>Plateau Campus Property</u>	
PROJECT NUMBER <u>3333</u>		PROJECT LOCATION <u>Issaquah, Washington</u>			
DATE STARTED <u>5/5/14</u>		COMPLETED <u>5/5/14</u>		GROUND ELEVATION _____ TEST PIT SIZE _____	
EXCAVATION CONTRACTOR <u>NW Excavating</u>		EXCAVATION METHOD _____		GROUND WATER LEVELS:	
LOGGED BY <u>SHA</u>		CHECKED BY <u>SSR</u>		AT TIME OF EXCAVATION _____	
NOTES <u>Depth of Topsoil & Sod 18" Ivy</u>				AT END OF EXCAVATION _____	
				AFTER EXCAVATION _____	

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0					TOPSOIL
		MC = 11.80%	TPSL		
		MC = 12.00%			Brown silty SAND with gravel, loose and medium dense, moist (Weathered Till)
5		MC = 12.10%	SM		-becomes very dense and unweathered
					Test pit terminated at 8.0 feet below existing grade. Groundwater seepage encountered at 3.5 feet during excavation.
					Bottom of test pit at 8.0 feet.

GENERAL BH / TP / WELL 3333.GPJ GINT US.GDT 8/5/14

		Earth Solutions NW 1805 - 136th Place N.E., Suite 201 Bellevue, Washington 98005 Telephone: 425-449-4704 Fax: 425-449-4711		TEST PIT NUMBER TP-5 PAGE 1 OF 1	
CLIENT <u>Plateau Campus, LLC</u>			PROJECT NAME <u>Plateau Campus Property</u>		
PROJECT NUMBER <u>3333</u>			PROJECT LOCATION <u>Issaquah, Washington</u>		
DATE STARTED <u>5/5/14</u>		COMPLETED <u>5/5/14</u>		GROUND ELEVATION _____ TEST PIT SIZE _____	
EXCAVATION CONTRACTOR <u>NW Excavating</u>			GROUND WATER LEVELS:		
EXCAVATION METHOD _____			AT TIME OF EXCAVATION _____		
LOGGED BY <u>SHA</u> CHECKED BY <u>SSR</u>			AT END OF EXCAVATION _____		
NOTES <u>Depth of Topsoil & Sod 6": bare soil</u>			AFTER EXCAVATION _____		

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0					
			TPSL	0.5	TOPSOIL Brown silty SAND with gravel, medium dense, moist (Fill)
5		MC = 14.30%		SM	-becomes medium dense to dense
10		MC = 16.80%			-native, unweathered till contact
				10.0	Test pit terminated at 10.0 feet below existing grade. No groundwater encountered during excavation. Bottom of test pit at 10.0 feet.

GENERAL BH/TP / WELL 3333.GPJ GINT US.GDT 5/5/14



Earth Solutions NW
1805 - 136th Place N.E., Suite 201
Bellevue, Washington 98005
Telephone: 425-449-4704
Fax: 425-449-4711

TEST PIT NUMBER TP-6

PAGE 1 OF 1

CLIENT Plateau Campus, LLCPROJECT NAME Plateau Campus PropertyPROJECT NUMBER 3393PROJECT LOCATION Issaquah, WashingtonDATE STARTED 5/5/14 COMPLETED 5/5/14

GROUND ELEVATION _____ TEST PIT SIZE _____

EXCAVATION CONTRACTOR NW Excavating

GROUND WATER LEVELS:

EXCAVATION METHOD _____

AT TIME OF EXCAVATION —LOGGED BY SHA CHECKED BY SSRAT END OF EXCAVATION —NOTES Depth of Topsoil & Sod 6" fernsAFTER EXCAVATION —

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0				
		TPSL	1/2"	0.5 TOPSOIL
				Brown silty SAND with gravel, medium dense, moist (Weathered Till)
		SM		-becomes very dense and unweathered
				4.0
				Test pit terminated at 4.0 feet below existing grade. No groundwater encountered during excavation. Bottom of test pit at 4.0 feet.

GENERAL BH / TP / WELL 3025.GPJ GINT US.GOT 8/5/14

		Earth Solutions NW 1805 - 136th Place N.E., Suite 201 Bellevue, Washington 98005 Telephone: 425-449-4704 Fax: 425-449-4711		TEST PIT NUMBER TP-7 PAGE 1 OF 1	
		CLIENT <u>Plateau Campus, LLC</u>		PROJECT NAME <u>Plateau Campus Property</u>	
PROJECT NUMBER <u>3333</u>		PROJECT LOCATION <u>Issaquah, Washington</u>			
DATE STARTED <u>5/5/14</u>		COMPLETED <u>5/5/14</u>		GROUND ELEVATION _____ TEST PIT SIZE _____	
EXCAVATION CONTRACTOR <u>NW Excavating</u>		GROUND WATER LEVELS:			
EXCAVATION METHOD _____		AT TIME OF EXCAVATION <u>—</u>			
LOGGED BY <u>SHA</u>		AT END OF EXCAVATION <u>—</u>			
CHECKED BY <u>SSR</u>		AFTER EXCAVATION <u>—</u>			
NOTES <u>Depth of Topsoil & Sod 12": ferns</u>					

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0					TOPSOIL
		MC = 15.80%	TPSL		1.0
					Brown silty SAND with gravel, medium dense, moist (Weathered Till)
		MC = 10.40% Fines = 11.30%	SM		4.0
					-cobbles -becomes very dense and unweathered -cobbles down to terminus of test pit
5					Brown poorly graded GRAVEL with silt and sand, dense, moist
		MC = 21.80%	GP-GM		13.0
10					Test pit terminated at 13.0 feet below existing grade. No groundwater encountered during excavation.
					Bottom of test pit at 13.0 feet.

GENERAL BH / TP / WELL 3333 GP / GINT US GDT 6/2/14

		Earth Solutions NW 1805 - 136th Place N.E., Suite 201 Bellevue, Washington 98005 Telephone: 425-449-4704 Fax: 425-449-4711		TEST PIT NUMBER TP-9 PAGE 1 OF 1	
CLIENT <u>Plateau Campus, LLC</u>		PROJECT NAME <u>Plateau Campus Property</u>			
PROJECT NUMBER <u>3333</u>		PROJECT LOCATION <u>Issaquah, Washington</u>			
DATE STARTED <u>5/5/14</u>		COMPLETED <u>5/5/14</u>		GROUND ELEVATION _____ TEST PIT SIZE _____	
EXCAVATION CONTRACTOR <u>NW Excavating</u>		GROUND WATER LEVELS: _____			
EXCAVATION METHOD _____		AT TIME OF EXCAVATION _____			
LOGGED BY <u>SHA</u>		CHECKED BY <u>SSR</u>		AT END OF EXCAVATION _____	
NOTES <u>Depth of Topsoil & Sod 12": duff</u>		AFTER EXCAVATION _____			

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0					TOPSOIL
		MC = 23.20%	TPSL	1.0	Brown silty SAND with gravel, loose to medium dense, moist (Weathered Till)
			SM	3.0	-fractured -cobbles, mottled texture Brown poorly graded GRAVEL with silt and sand, dense, moist
5		MC = 17.20%	GP-GM	8.0	Test pit terminated at 9.0 feet below existing grade. No groundwater encountered during excavation. Bottom of test pit at 9.0 feet.

GENERAL BH / TP / WELL 3333.GPJ GINT US.GDT 8/5/14

		Earth Solutions NW 1805 - 138th Place N.E., Suite 201 Bellevue, Washington 98005 Telephone: 425-449-4704 Fax: 425-449-4711		TEST PIT NUMBER TP-8 PAGE 1 OF 1	
		CLIENT <u>Plateau Campus, LLC</u>		PROJECT NAME <u>Plateau Campus Property</u>	
PROJECT NUMBER <u>3333</u>		PROJECT LOCATION <u>Issaquah, Washington</u>			
DATE STARTED <u>5/5/14</u>		COMPLETED <u>5/5/14</u>		GROUND ELEVATION _____ TEST PIT SIZE _____	
EXCAVATION CONTRACTOR <u>NW Excavating</u>		GROUND WATER LEVELS:			
EXCAVATION METHOD _____		AT TIME OF EXCAVATION _____			
LOGGED BY <u>SHA</u>		AT END OF EXCAVATION _____			
CHECKED BY <u>SSR</u>		AFTER EXCAVATION _____			
NOTES <u>Depth of Topsoil & Sod 10": forest duff</u>					

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0					TOPSOIL
			TPSL	1.0	Brown silty SAND with gravel, loose to medium dense, moist (Weathered Till)
			SM		-becomes very dense and unweathered -cobbles
5					
		MC = 19.70%			
				8.0	Test pit terminated at 8.0 feet below existing grade. No groundwater encountered during excavation. Bottom of test pit at 8.0 feet.

GENERAL BH / TP / WELL: 3333.GPJ GINT US.GDT 5/5/14



Earth Solutions NW
1805 - 136th Place N.E., Suite 201
Bellevue, Washington 98005
Telephone: 425-449-4704
Fax: 425-449-4711

TEST PIT NUMBER TP-10

PAGE 1 OF 1

CLIENT Plateau Campus, LLC

PROJECT NAME Plateau Campus Property

PROJECT NUMBER 3333

PROJECT LOCATION Issaquah, Washington

DATE STARTED 5/5/14

COMPLETED 5/5/14

GROUND ELEVATION _____

TEST PIT SIZE _____

EXCAVATION CONTRACTOR NW Excavating

GROUND WATER LEVELS:

EXCAVATION METHOD _____

AT TIME OF EXCAVATION —

LOGGED BY SHA

CHECKED BY SSR

AT END OF EXCAVATION —

NOTES Depth of Topsoil & Sod 10": blackberry bushes

AFTER EXCAVATION —

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0				
		TPSL		TOPSOIL
			1.0	Brown silty SAND with gravel, medium dense, moist
		SM		
			3.0	-cobbles and weathered fractured bedrock
		GP-GM		Brown poorly graded GRAVEL with silt and sand, dense, moist
5			5.0	Test pit terminated at 5.0 feet below existing grade. No groundwater encountered during excavation. Bottom of test pit at 5.0 feet.

GENERAL BH / TP / WELL 3333.GPJ GINT US GDT 5/5/14

LOG OF TEST PIT NO. TP-1

FIGURE A-2

PROJECT NAME: Madison Pointe PROJ. NO: T-7252 LOGGED BY: CSD
 LOCATION: Issaquah, Washington SURFACE CONDS: Heavy Understory APPROX. ELEV: 466 Feet
 DATE LOGGED: July 8, 2015 DEPTH TO GROUNDWATER: N/A DEPTH TO CAVING: N/A

DEPTH (FT.)	SAMPLE NO.	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)	REMARKS
1		Brown silty SAND, fine grained, dry, heavy organic inclusions. (SM) (Topsoil)	Loose	7.1		
2	1					
3		Brown silty SAND with gravel, fine to medium grained, dry, roots. (SM)	Medium Dense	9.5		
4						
5						
6	2					
7		Gray silty SAND with gravel to SAND with silt and gravel, fine to medium grained, dry to moist, cemented. (SM/SP-SM)	Very Dense			
8						
9						
10						
11		Test pit terminated at approximately 10 feet. No groundwater seepage observed.				
12						
13						
14						
15						

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



**Terra
Associates, Inc.**
 Consultants in Geotechnical Engineering
 Geology and
 Environmental Earth Sciences

LOG OF TEST PIT NO. TP-2

FIGURE A-3

PROJECT NAME: Madison Pointe PROJ. NO: T-7252 LOGGED BY: CSD
 LOCATION: Issaquah, Washington SURFACE CONDS: Heavy Understory APPROX. ELEV: 464 Feet
 DATE LOGGED: July 8, 2015 DEPTH TO GROUNDWATER: N/A DEPTH TO CAVING: N/A

DEPTH (FT.)	SAMPLE NO.	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)	REMARKS
1		Brown silty SAND, fine grained, dry, heavy organic inclusions. (SM) (Topsoil)	Loose			
2	1	Brown silty SAND with gravel, fine to medium grained, dry, roots. (SM)	Medium Dense	9.2		
3						
4	2	Gray silty SAND with gravel, fine to medium grained, dry, cemented. (SM)	Dense	6.5		
5						
6						
7	3	Gray silty SAND with gravel to SAND with silt and gravel, fine to medium grained, moist, cemented. (SM/SP-SM)	Very Dense	8.1		
8						
9						
10						
11		Test pit terminated at approximately 10 feet. No groundwater seepage observed.				
12						
13						
14						
15						

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



**Terra
Associates, Inc.**
 Consultants in Geotechnical Engineering
 Geology and
 Environmental Earth Sciences

LOG OF TEST PIT NO. TP-3

FIGURE A-4

PROJECT NAME: Madison Pointe PROJ. NO: T-7252 LOGGED BY: CSD
 LOCATION: Issaquah, Washington SURFACE CONDS: Moderate Understory APPROX. ELEV: 438 Feet
 DATE LOGGED: July 8, 2015 DEPTH TO GROUNDWATER: N/A DEPTH TO CAVING: 0 to 3 Feet

DEPTH (FT.)	SAMPLE NO.	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)	REMARKS
1	1	(6 inches ORGANICS) Brown silty SAND with gravel to SAND with silt and gravel, fine to medium grained, dry, roots. (SM/SP-SM)	Medium Dense	5.7		
2						
3						
4						
5	2			4.9		
6		Gray silty SAND with gravel to SAND with silt and gravel, fine to medium grained, dry to moist, cemented, occasional cobble. (SM/SP-SM)	Very Dense			
7						
8						
9						
10		Test pit terminated at approximately 9 feet. No groundwater seepage observed. Minor caving observed in the upper 3 feet.				
11						
12						
13						
14						
15						

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



**Terra
Associates, Inc.**
 Consultants in Geotechnical Engineering
 Geology and
 Environmental Earth Sciences

LOG OF TEST PIT NO. TP-4

FIGURE A-5

PROJECT NAME: Madison Pointe PROJ. NO: T-7252 LOGGED BY: CSD
 LOCATION: Issaquah, Washington SURFACE CONDS: Minimal Understory APPROX. ELEV: 480 Feet
 DATE LOGGED: July 8, 2015 DEPTH TO GROUNDWATER: N/A DEPTH TO CAVING: N/A

DEPTH (FT.)	SAMPLE NO.	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)	REMARKS
1		Brown silty SAND, fine grained, dry, heavy organic inclusions. (SM) (Topsoil)	Loose			
2	1	Gray silty SAND with gravel, fine to medium grained, dry, some roots. (SM)	Dense	9.7		
3						
4						
5	2			23.7		
6						
7		Gray SILTSTONE, moist.	Very Dense			
8						
9	3			25.1		
10		Test pit terminated at approximately 10 feet. No groundwater seepage observed.				
11						
12						
13						
14						
15						

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



**Terra
Associates, Inc.**
 Consultants in Geotechnical Engineering
 Geology and
 Environmental Earth Sciences

LOG OF TEST PIT NO. TP-5

FIGURE A-6

PROJECT NAME: Madison Pointe PROJ. NO: T-7252 LOGGED BY: CSD
 LOCATION: Issaquah, Washington SURFACE CONDS: Moderate Understory APPROX. ELEV: 490 Feet
 DATE LOGGED: July 8, 2015 DEPTH TO GROUNDWATER: N/A DEPTH TO CAVING: N/A

DEPTH (FT.)	SAMPLE NO.	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)	REMARKS
1		Brown silty SAND, fine grained, dry, heavy organic inclusions. (SM) (Topsoil)	Loose			
2	1	Brown silty SAND with gravel, fine to medium grained, dry, large roots. (SM)	Medium Dense	9.0		
3						
4						
5						
6	2	Gray-brown silty SAND mixed with pieces of weathered SANDSTONE, fine to medium grained, dry, cobbles. (SM)	Very Dense	11.6		
7						
8						
9		*Sandstone pieces increase with depth, by 9 feet became difficult to excavate with 125 machine				
10		Test pit terminated at approximately 9 feet. No groundwater seepage observed.				
11						
12						
13						
14						
15						

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



Terra Associates, Inc.
 Consultants in Geotechnical Engineering
 Geology and
 Environmental Earth Sciences

LOG OF TEST PIT NO. TP-6

FIGURE A-7

PROJECT NAME: Madison Pointe PROJ. NO: T-7252 LOGGED BY: CSD
 LOCATION: Issaquah, Washington SURFACE CONDS: Brush/Weeds APPROX. ELEV: 520 Feet
 DATE LOGGED: July 8, 2015 DEPTH TO GROUNDWATER: N/A DEPTH TO CAVING: N/A

DEPTH (FT.)	SAMPLE NO.	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)	REMARKS
1	1	(less than 1" ORGANICS) FILL: gray sandy silt, fine grained, dry, roots, minor construction debris, large piece of concrete.	Medium Dense	11.0		
2		Black silty SAND, fine to medium grained, dry, roots, heavy organic inclusions. (SM) (Topsoil)	Medium Dense			
3						
4	2		Dense	56.0		
5						
6		Red-brown SILTSTONE, very weathered, some cobbles, occasional boulders.				
7						
8						
9		@-9' material becomes less weathered, larger pieces	Very Dense			
10	3			46.6		
11		Test pit terminated at approximately 10 feet. No groundwater seepage observed.				
12						
13						
14						
15						

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



**Terra
Associates, Inc.**
 Consultants in Geotechnical Engineering
 Geology and
 Environmental Earth Sciences

LOG OF TEST PIT NO. TP-7

FIGURE A-8

PROJECT NAME: Madison Pointe PROJ. NO: T-7252 LOGGED BY: CSD
 LOCATION: Issaquah, Washington SURFACE CONDS: Heavy Understory APPROX. ELEV: 516 Feet
 DATE LOGGED: July 8, 2015 DEPTH TO GROUNDWATER: N/A DEPTH TO CAVING: N/A

DEPTH (FT.)	SAMPLE NO.	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)	REMARKS
1		Brown silty SAND, fine grained, dry, heavy organic inclusions. (SM) (Topsoil)	Loose			
2	1	Brown silty SAND with gravel, fine to medium grained, dry, roots. (SM)	Medium Dense	8.0		
3						
4						
5	2	Gray silty SAND with gravel to SAND with silt and gravel, fine to medium grained, dry, cemented. (SM/SP-SM)	Dense	5.9		
6						
7						
8		Test pit terminated at approximately 7 feet. No groundwater seepage observed.				
9						
10						
11						
12						
13						
14						
15						

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



**Terra
Associates, Inc.**
 Consultants in Geotechnical Engineering
 Geology and
 Environmental Earth Sciences

LOG OF TEST PIT NO. TP-8

FIGURE A-9

PROJECT NAME: Madison Pointe PROJ. NO: T-7252 LOGGED BY: CSD
 LOCATION: Issaquah, Washington SURFACE CONDS: Moderate Understory APPROX. ELEV: 482 Feet
 DATE LOGGED: July 8, 2015 DEPTH TO GROUNDWATER: N/A DEPTH TO CAVING: N/A

DEPTH (FT.)	SAMPLE NO.	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)	REMARKS
1		Brown silty SAND, fine grained, dry, heavy organic inclusions. (SM) (Topsoil)	Loose			
2	1			5.3		
3		Brown SAND with silt and gravel, fine to medium grained, dry, roots. (SP-SM)	Medium Dense			
4						
5			Dense			
6						
7	2	Gray silty SAND with gravel, fine to medium grained, dry to moist, cemented, some cobbles/boulders. (SM/SP-SM)	Very Dense	12.7		
8						
9						
10	3	Red-brown SANDSTONE, moist, weathered, difficult to excavate.	Very Dense	10.7		
11		Test pit terminated at approximately 10 feet. No groundwater seepage observed.				
12						
13						
14						
15						

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



Terra Associates, Inc.
 Consultants in Geotechnical Engineering
 Geology and
 Environmental Earth Sciences

LOG OF TEST PIT NO. TP-9

FIGURE A-10

PROJECT NAME: Madison Pointe PROJ. NO: T-7252 LOGGED BY: CSD
 LOCATION: Issaquah, Washington SURFACE CONDS: Moderate Understory APPROX. ELEV: 482 Feet
 DATE LOGGED: July 8, 2015 DEPTH TO GROUNDWATER: N/A DEPTH TO CAVING: N/A

DEPTH (FT.)	SAMPLE NO.	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)	REMARKS
1		Brown silty SAND, fine grained, dry, heavy organic inclusions. (SM) (Topsoil)	Loose			
2	1	Brown silty SAND with gravel, fine to medium grained, dry, roots. (SM)	Medium Dense	7.2		
3						
4						
5						
6	2	Gray silty SAND with gravel to SAND with silt and gravel, fine to medium grained, dry to moist, some cementation, occasional cobble/boulder. (SM/SP-SM)		8.0		
7			Very Dense			
8		*Soil becomes less cemented with depth.				
9	3	*At 9 feet soil becomes wet.		11.6		
10						
11						
12		Test pit terminated at approximately 11 feet. No groundwater seepage observed.				
13						
14						
15						

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



Terra Associates, Inc.
 Consultants in Geotechnical Engineering
 Geology and
 Environmental Earth Sciences

LOG OF TEST PIT NO. TP-10

FIGURE A-11

PROJECT NAME: Madison Pointe PROJ. NO: T-7252 LOGGED BY: CSD
 LOCATION: Issaquah, Washington SURFACE CONDS: Moderate Understory APPROX. ELEV: 503 Feet
 DATE LOGGED: July 8, 2015 DEPTH TO GROUNDWATER: N/A DEPTH TO CAVING: N/A

DEPTH (FT.)	SAMPLE NO.	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)	REMARKS
1		Brown silty SAND, fine grained, dry, heavy organic inclusions. (SM) (Topsoil)	Loose			
2	1	Brown silty SAND with gravel, fine to medium grained, dry, roots. (SM)	Medium Dense	5.9		
3			Dense			
4			Very Dense			
5	2			9.6		
6						
7		Gray silty SAND with gravel, fine to medium grained, dry to moist, cemented, occasional cobble. (SM)				
8						
9						
10						
11						
12		Test pit terminated at approximately 11 feet. No groundwater seepage observed.				
13						
14						
15						

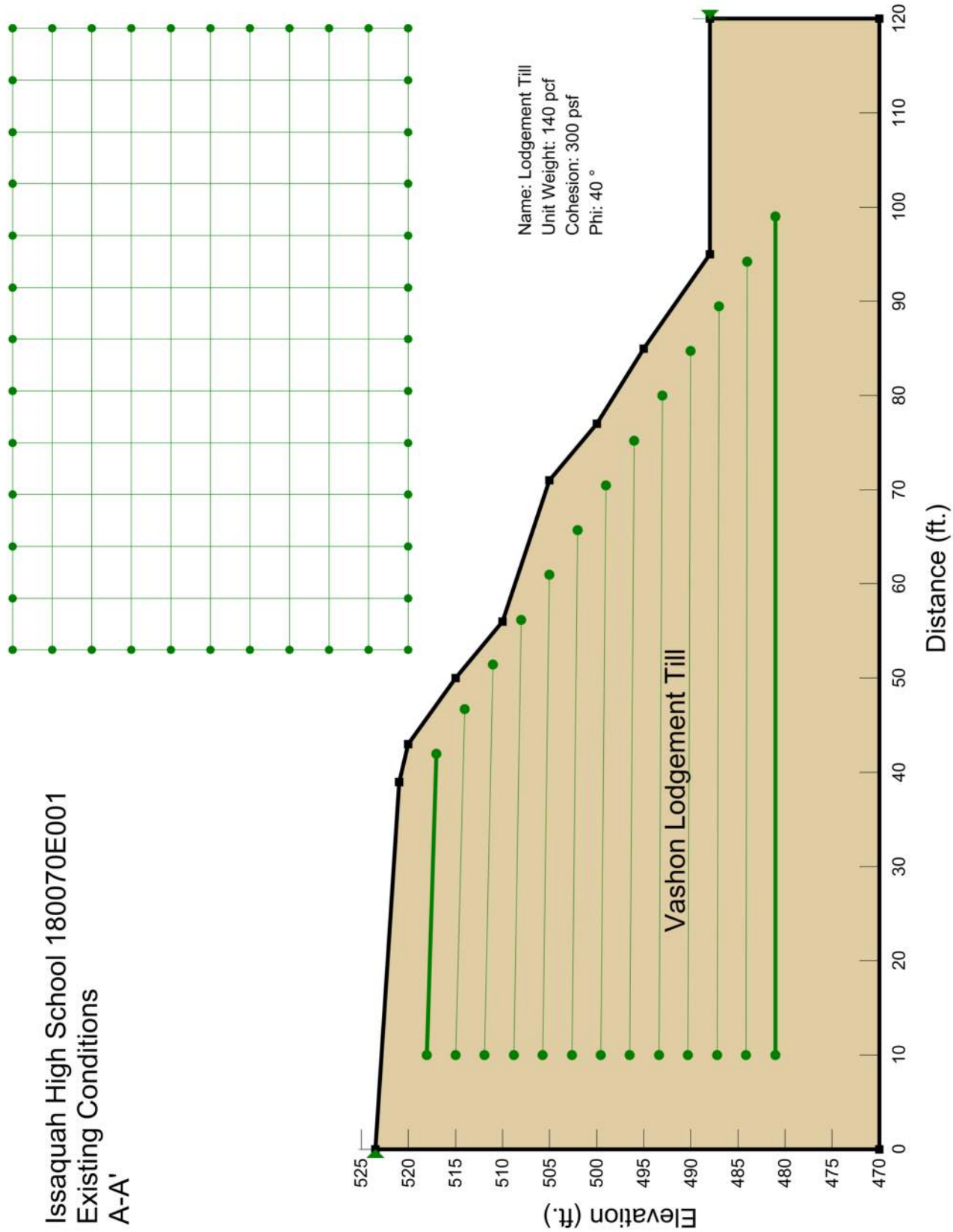
NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

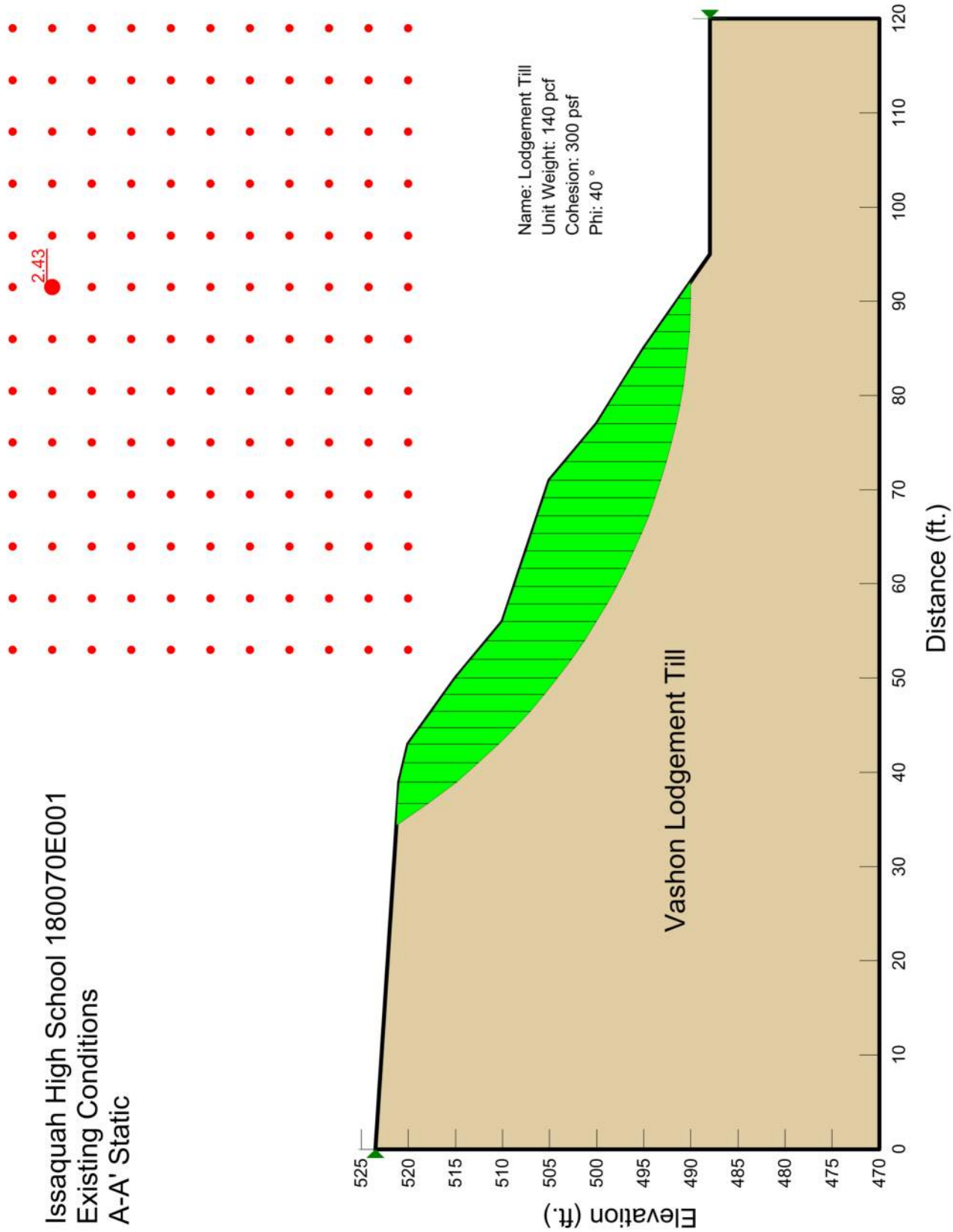


**Terra
Associates, Inc.**
 Consultants in Geotechnical Engineering
 Geology and
 Environmental Earth Sciences

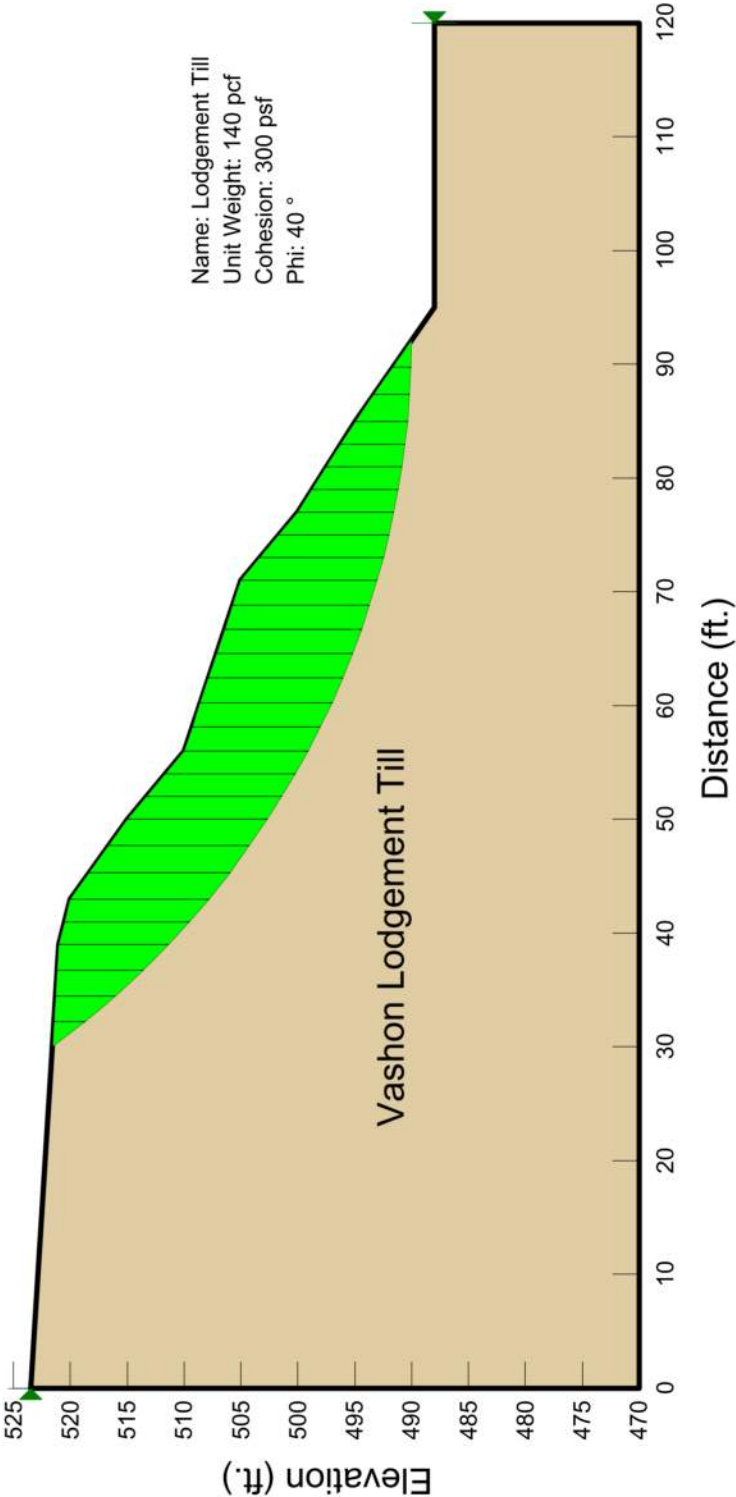
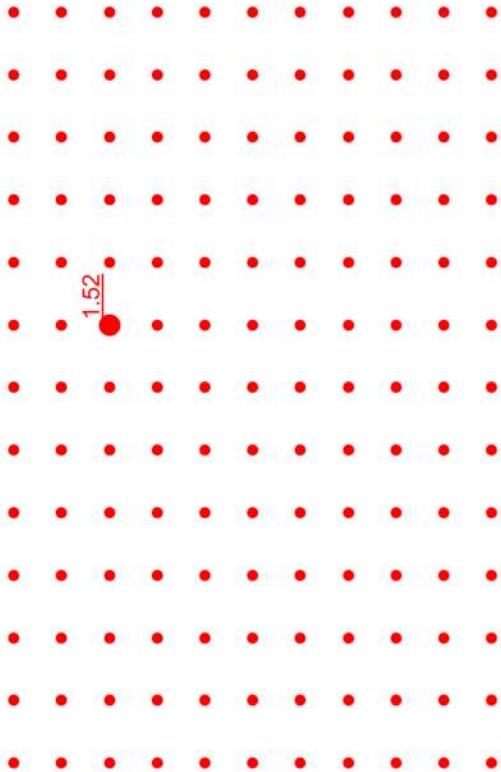
APPENDIX B

SLOPE/W Profiles

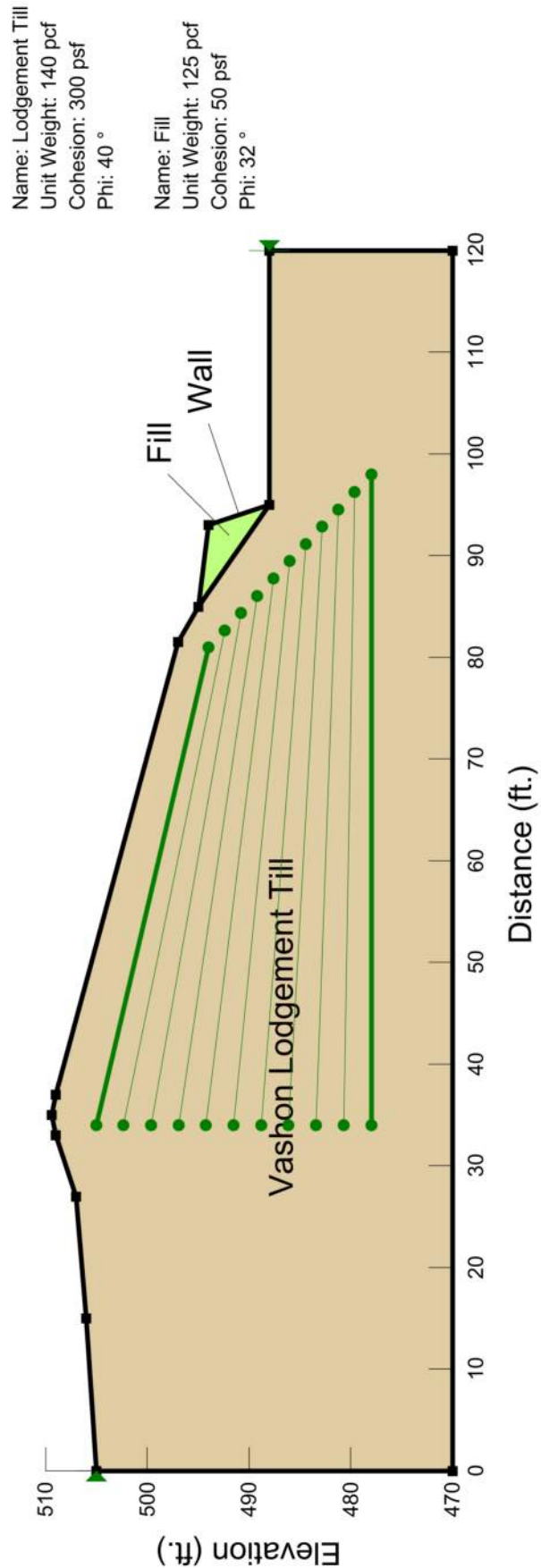
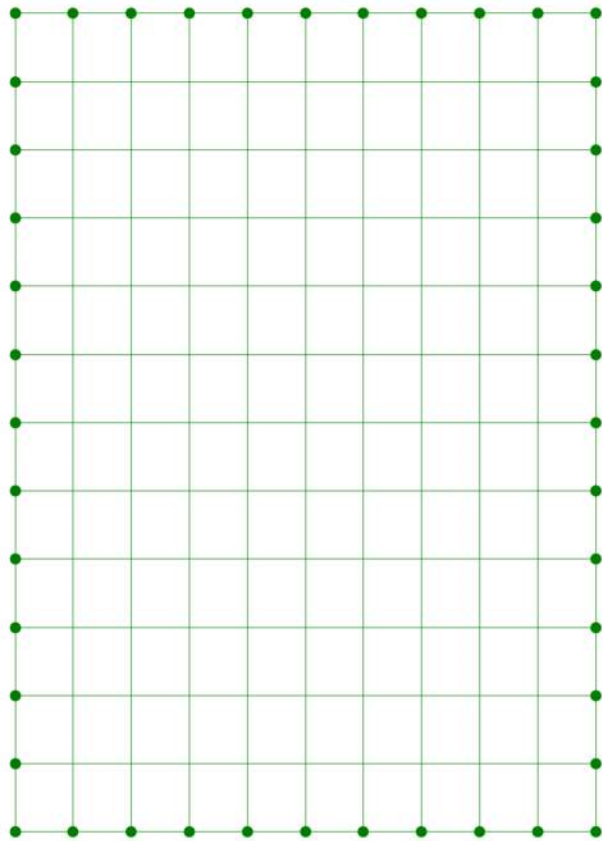




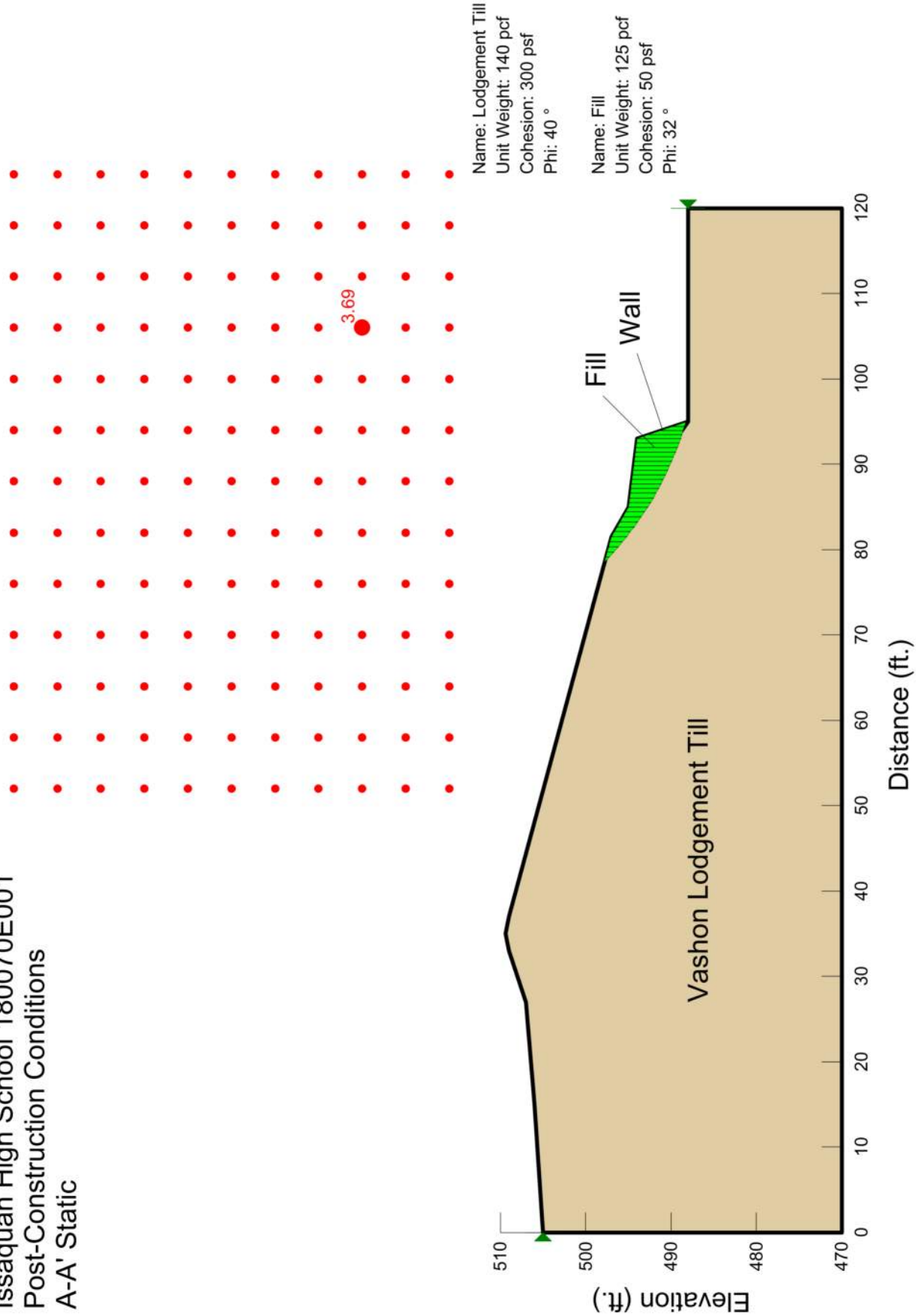
Issaquah High School 180070E001
Existing Conditions
A-A' Seismic - 0.26g

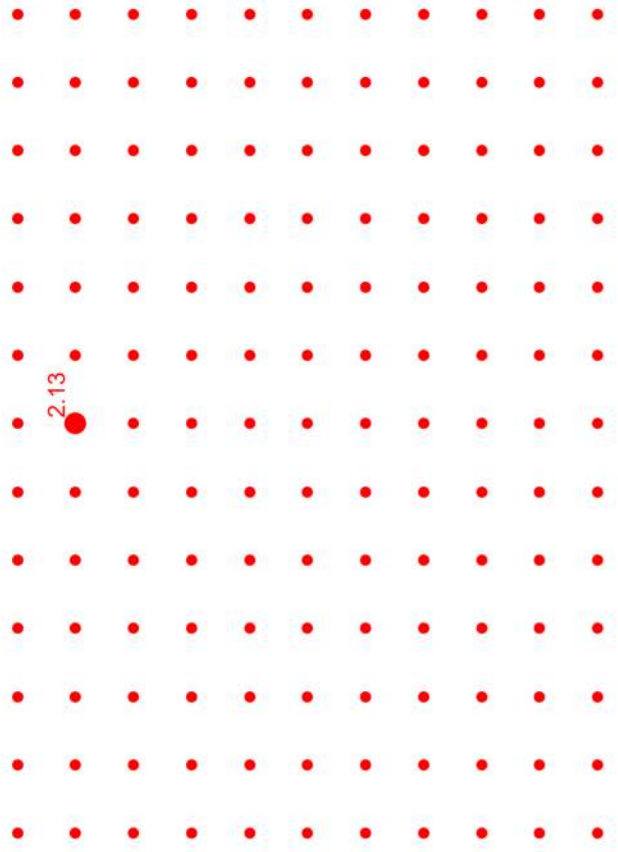


Issaquah High School 180070E001
Post-Construction Conditions
A-A'



Issaquah High School 180070E001
Post-Construction Conditions
A-A' Static

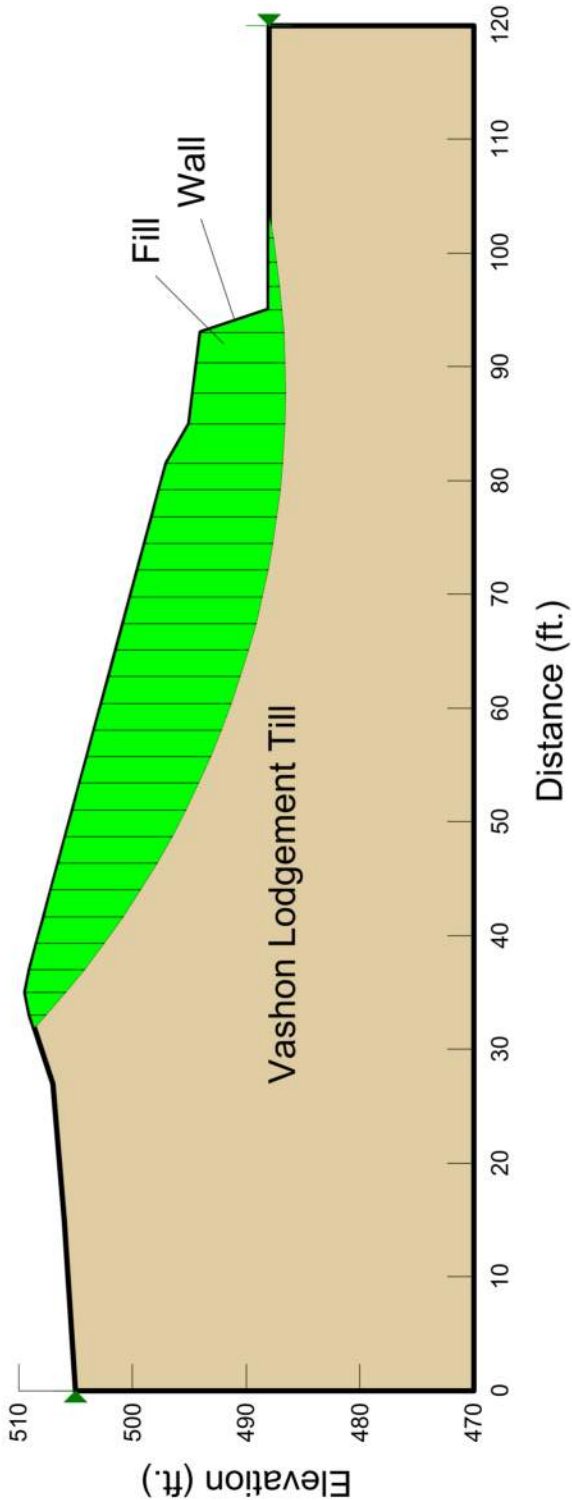




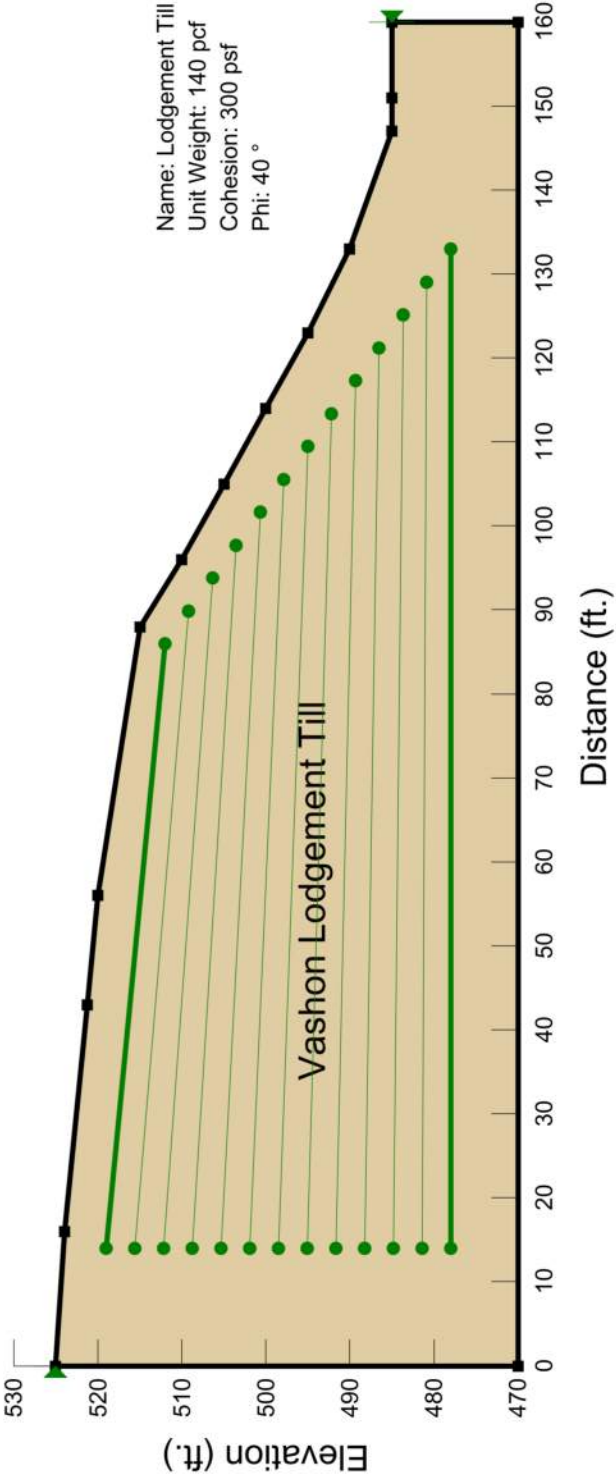
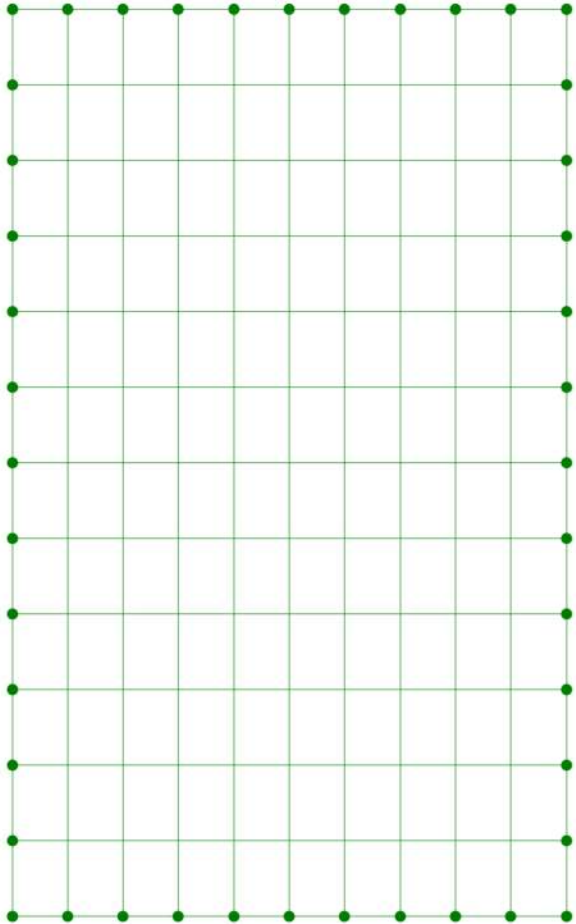
Issaquah High School 180070E001
Post-Construction Conditions
A-A' Seismic - 0.26g

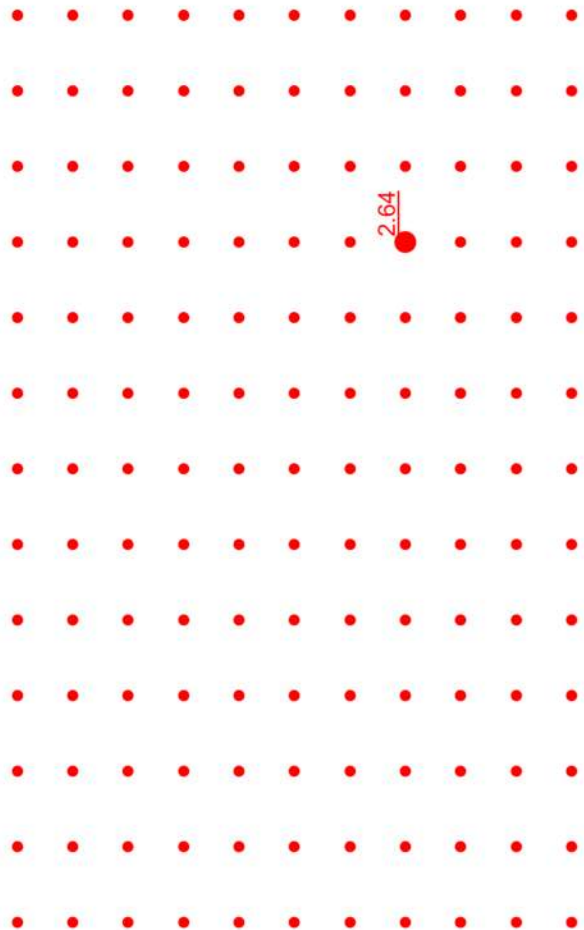
Name: Lodgement Till
Unit Weight: 140 pcf
Cohesion: 300 psf
Phi: 40 °

Name: Fill
Unit Weight: 125 pcf
Cohesion: 50 psf
Phi: 32 °

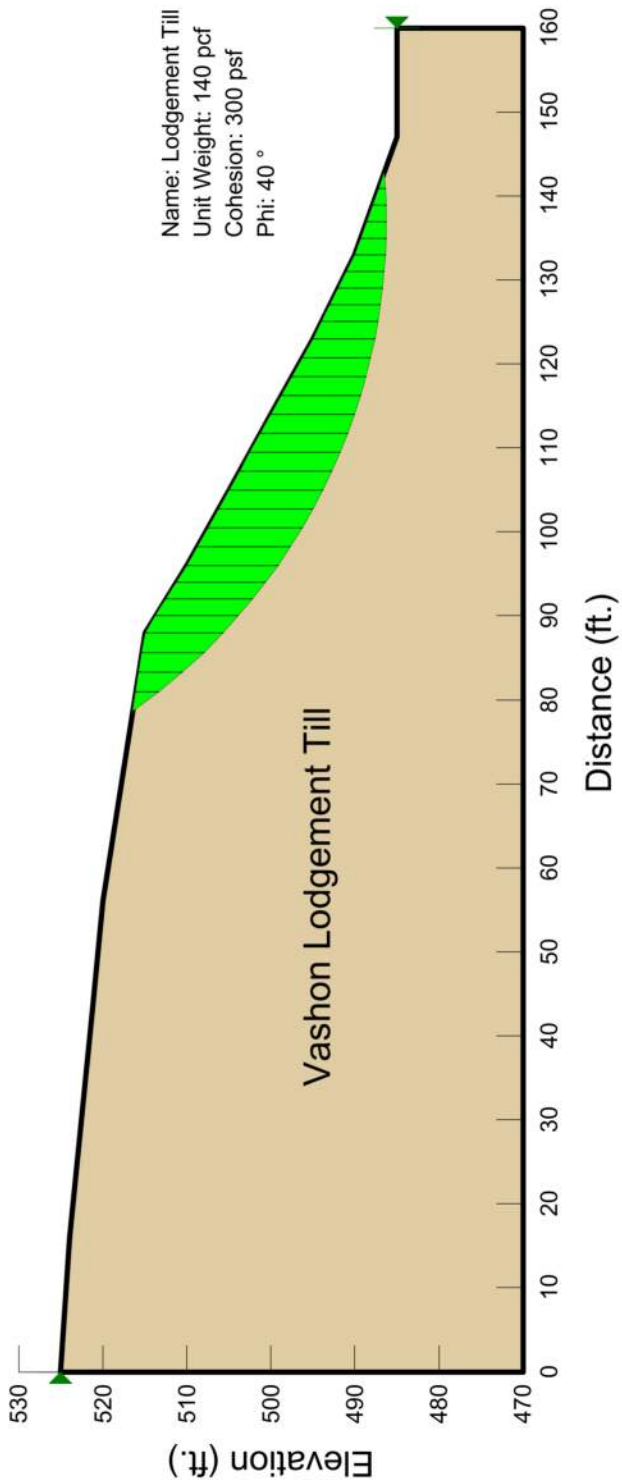


Issaquah High School 180070E001
Existing Conditions
B-B'

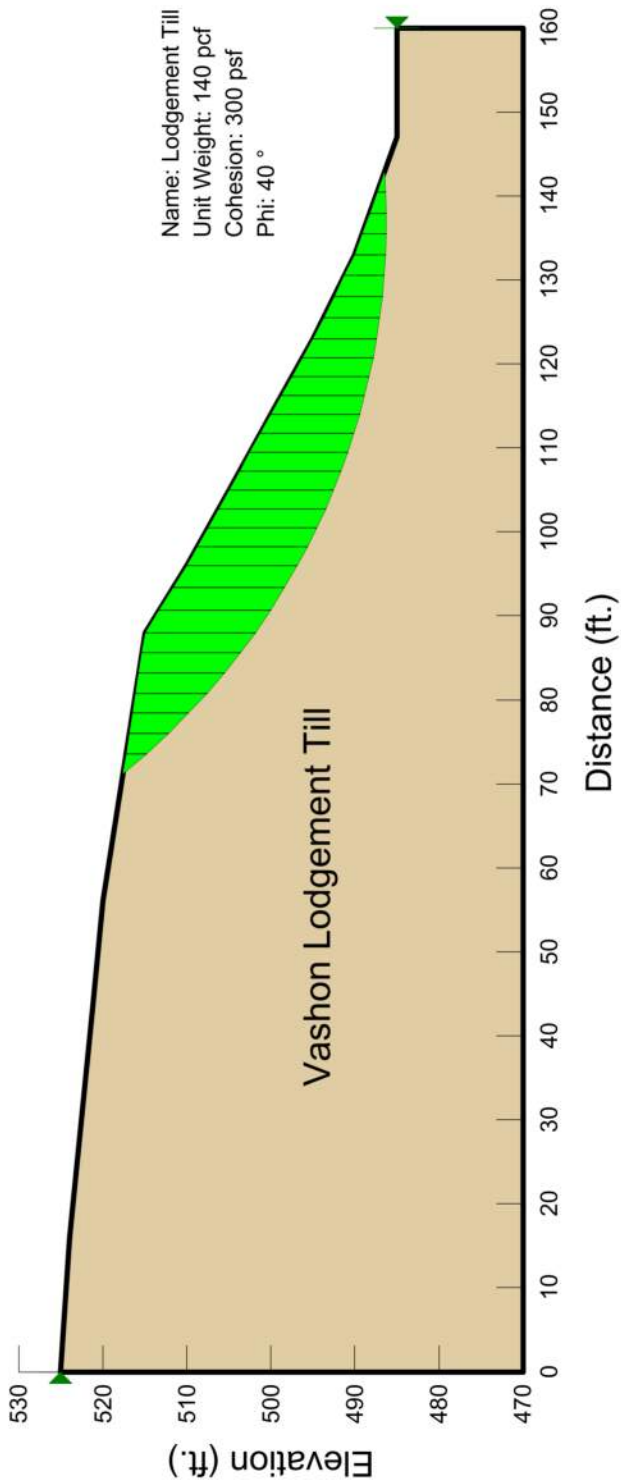
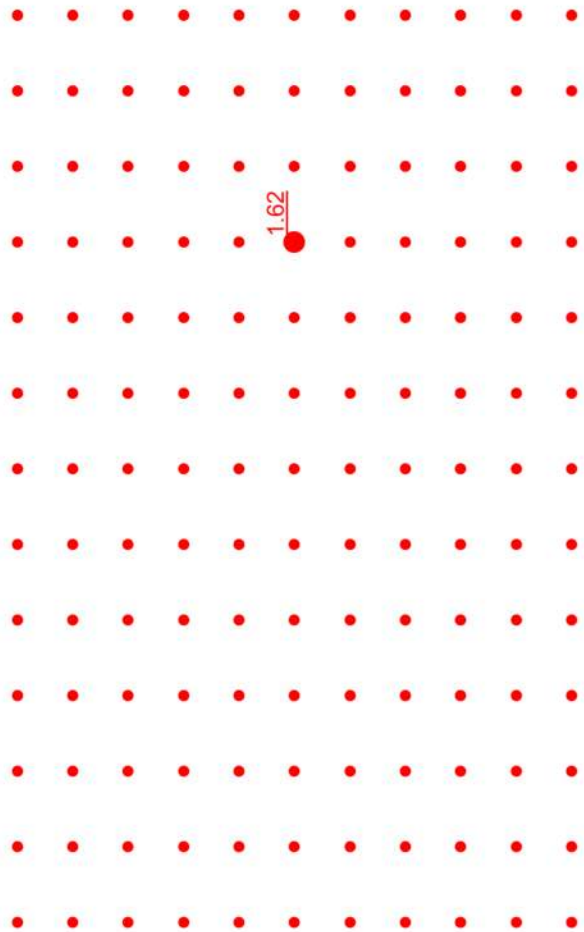




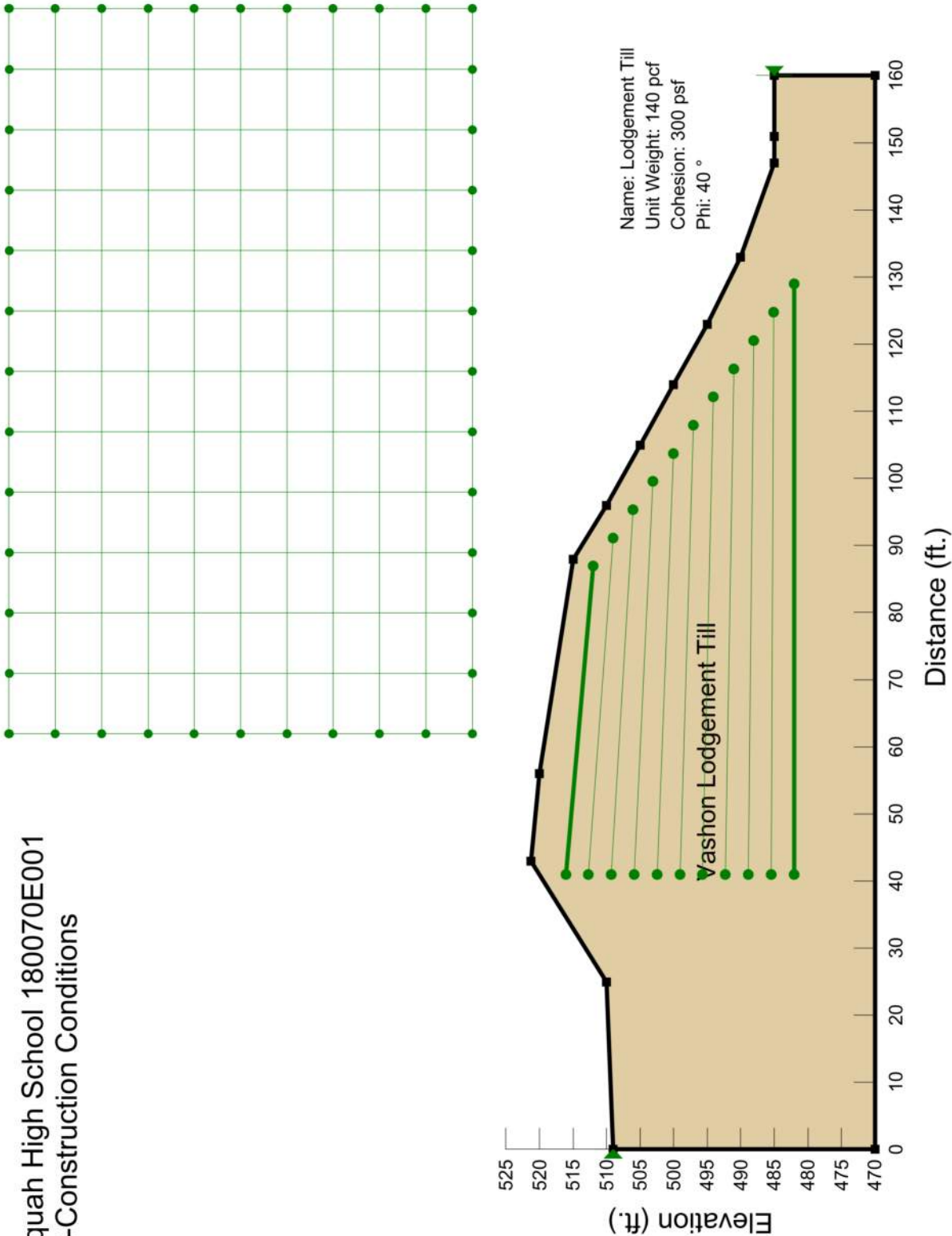
Issaquah High School 180070E001
Existing Conditions
B-B' Static



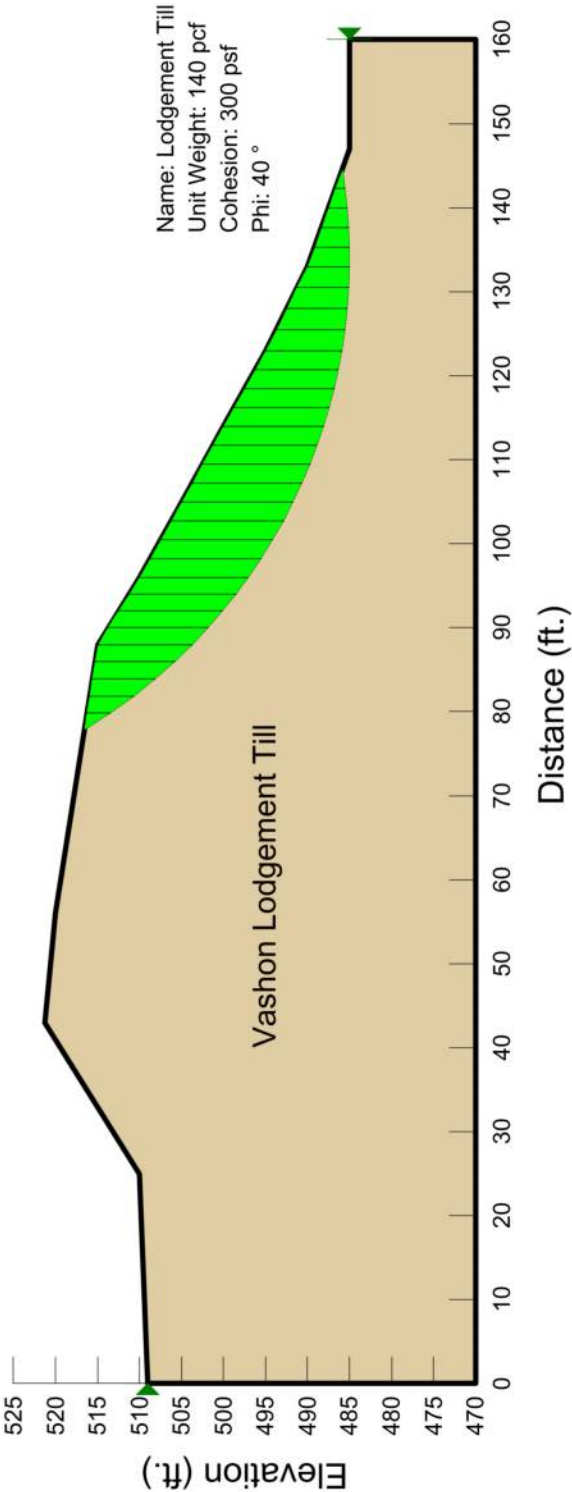
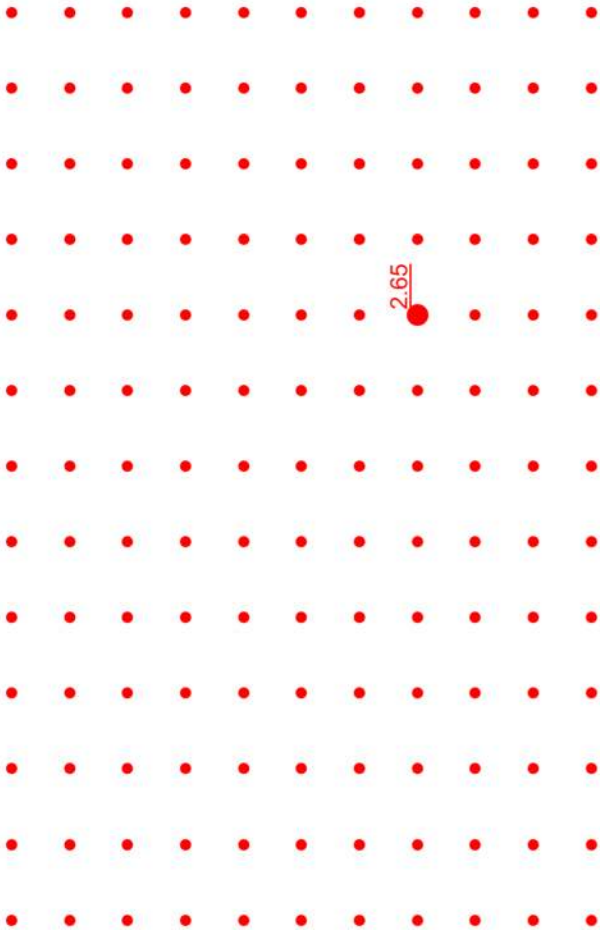
Issaquah High School 180070E001
Existing Conditions
B-B' Seismic - 0.26g



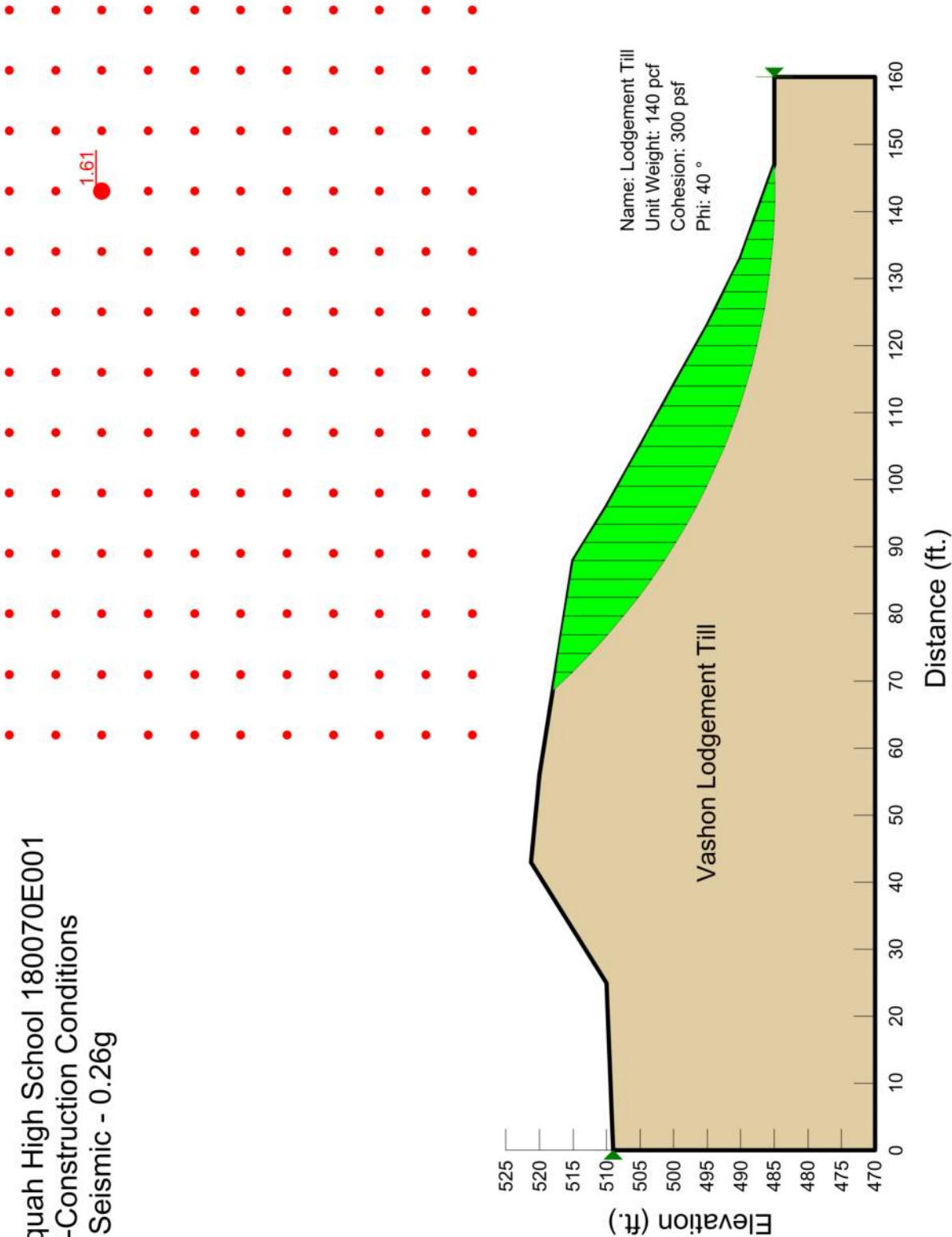
Issaquah High School 180070E001
Post-Construction Conditions
B-B'



Issaquah High School 180070E001
Post-Construction Conditions
B-B' Static



Issaquah High School 180070E001
Post-Construction Conditions
B-B' Seismic - 0.26g





September 24, 2019
Project No. 180070E001

Issaquah School District
5150 220th Avenue SE
Issaquah, Washington 98029

Attention: Mr. Tom Mullins

Subject: Landslide Hazard Assessment
Issaquah High School #4 and Elementary School #17
4221 228th Avenue SE
Issaquah, Washington

Dear Mr. Mullins:

We are pleased to present the findings of the landslide hazard assessment completed for the subject project. This report has been prepared for the exclusive use of the Issaquah School District, and their authorized agents, for specific application to this project. No other warranty, express or implied, is made.

SITE AND PROJECT DESCRIPTION

The subject site is comprised of three parcels totaling approximately 40 acres located at 4441, 4443, and 4461 228th Avenue SE in Issaquah, Washington (King County Parcel Nos. 1624069001, 1624069029, and 1624069031). The location of the site is shown on the "Vicinity Map," Figure 1.

As shown on Figure 2, a relatively flat to gently sloping plateau is located in the central portion of the property. From this plateau, the topography generally slopes down toward the northeast, east, south, and southwest. Elevations on the property range from a low of approximately 415 feet near the northeastern corner of the site to a maximum of approximately 526 feet in the southern portion of the site. Slope inclinations on the flanks of the plateau are generally about 30 percent or less, but steepen to approximately 40 to 50 percent over a maximum height of approximately 30 feet near the southeast corner of the property. This area classifies as a Steep Slope Hazard Area under the *Issaquah Municipal Code* (IMC). The central portion of the property was previously developed with a church, dormitories, and accessory buildings. These structures were demolished in early 2019. Grading associated with the demolition has resulted in some localized areas of steep slopes in the areas of the former structures. Maximum slope inclinations in these areas were visually estimated to be up to approximately 2H:1V (Horizontal:Vertical).

The central plateau area, including the area of the demolished buildings, generally consists of bare or sparsely vegetated ground with some scattered trees and areas of asphalt pavement. The remainder of the site generally consists of mixed coniferous/deciduous forest with some access roads. A water tank is located in a forested area near the south end of the plateau. The locations of the former buildings and other prominent site features are shown on the 2017 aerial photo included as Figure 2. The topographic contours included on Figure 2 are based on Light Detection and Ranging (LIDAR) data and are representative of conditions prior to building demolition.

Based on review of civil plan sheets prepared by AHBL, dated May 20, 2019, we understand that preliminary development plans for the site consist of a new high school and elementary school. The high school and elementary school buildings will be located in the southern and western portions of the site, respectively. The high school will have a football field and track, baseball and softball fields, tennis courts above a parking structure, surface parking, and space for future portable classrooms. The elementary school will have play areas, surface parking, and space for future portable classrooms. The proposed facility layout is shown in Figure 3.

Maximum cuts for the project will be up to approximately 17 to 18 feet and will be located in the southern portion of the site in the area of the proposed high school building. A maximum fill depth of approximately 41 feet will be located in the northeastern portion of the site in the area of the proposed baseball field. We understand that conceptual plans include the use of mechanically stabilized earth (MSE) walls to facilitate proposed grade changes in some areas.

SUBSURFACE EXPLORATION

Our field study included advancing 31 exploration pits and 12 exploration borings at the site. This information was supplemented by 20 additional exploration pits completed at the site for previous geotechnical studies by Terra Associates, Inc. (Terra) in July 2015 and by Earth Solutions NW (ESNW) in May 2014. These exploration logs were included in a report titled "Geotechnical Report, Madison Pointe," prepared by Terra for Murray Franklyn Companies, Project No. T7252, dated March 18, 2016. A copy of the Terra report was provided to us by the District. It should be noted that the log of ESNW exploration pit TP-2 was not included in the Terra report. The approximate locations of the explorations are shown on Figures 2 and 3. The conclusions and recommendations presented in our report are based on the explorations completed for this study. The number, locations, and depths of our explorations were completed within site and budgetary constraints. Copies of the exploration logs are included in Appendix A.

Because of the nature of exploratory work below ground, extrapolation of subsurface conditions between field explorations is necessary. It should be noted that subsurface conditions between the explorations may differ from those inferred by the boring data due to the random nature of deposition and the alteration of topography by past grading and/or filling. The nature and extent of any variations between the field explorations may not become fully evident until construction. If

variations are observed at that time, it may be necessary to re-evaluate specific recommendations in this report and make appropriate changes.

Exploration Pits

The exploration pits were excavated using a track-mounted excavator. The pits permitted direct, visual observation of subsurface conditions. Materials encountered in the exploration pits were studied and classified in the field by an engineering geologist from our firm. All of the exploration pits were backfilled immediately after examination and logging. Samples collected from the exploration pits were classified in the field and representative portions placed in watertight containers. The samples were then transported to our laboratory for further visual classification and laboratory testing.

Exploration Borings

The exploration borings drilled for our study were completed using a track-mounted, hollow-stem auger drill rig. During the drilling process, samples were generally obtained at 2.5- to 5-foot-depth intervals. The exploration borings were continuously observed and logged by an engineering geologist from our firm. The exploration logs presented in Appendix A are based on the field logs, drilling action, and review of the samples collected.

Disturbed, but representative samples were obtained by using the Standard Penetration Test (SPT) procedure in accordance with *American Society for Testing and Materials* (ASTM) D-1586. This test and sampling method consists of driving a standard 2-inch, outside-diameter, split-barrel sampler a distance of 18 inches into the soil with a 140-pound hammer free-falling a distance of 30 inches. The number of blows for each 6-inch interval is recorded, and the number of blows required to drive the sampler the final 12 inches is known as the Standard Penetration Resistance ("N") or blow count. If a total of 50 is recorded within one 6-inch interval, the blow count is recorded as the number of blows for the corresponding number of inches of penetration. The resistance, or N-value, provides a measure of the relative density of granular soils or the relative consistency of cohesive soils; these values are plotted on the boring logs in Appendix A.

The samples obtained from the split-barrel sampler were classified in the field and representative portions placed in watertight containers. The samples were then transported to our laboratory for further visual classification.

Stratigraphy

Detailed descriptions of the sediments encountered in each of the borings are provided on the exploration logs in Appendix A. The explorations generally encountered natural sediments consisting of granular, glacial sediments underlain by weathered sedimentary rock. Fine-grained glacial sediments and/or glacially consolidated non-glacial sediments were also encountered in some locations. In some areas of the site, the natural deposits were overlain by fill soils. The

following section presents more detailed subsurface information organized from the shallowest (youngest) to the deepest (oldest) sediment types.

Fill

Fill soils (those not naturally deposited) were encountered in 11 of the explorations at the site. Where encountered, the existing fill generally consisted of loose to dense, gravelly, silty to very silty sand. Portions of the fill contained trace to abundant quantities of wood debris. In general, the areas where existing fill soils were encountered were located near the former buildings, pavement areas, and property margins. Where encountered in our explorations, the existing fill soils ranged in thickness from approximately 1 to 9 feet. The thicknesses of the existing fill soils encountered in the explorations are summarized in Table 1.

Table 1
Summary of Observed Fill Thicknesses

Exploration	Fill Thickness (feet)
EP-7	1
EP-8	8
EP-9	1
EP-11	6
EP-16	4
EP-18	2
EB-4	2.5
EB-8	4.5
EB-9	2.5
TP-6 (Terra, 2015)	1
TP-5 (ESNW, 2014)	9

Forest Duff/Topsoil

A surficial forest duff/topsoil horizon was encountered in most of our explorations located outside of areas of existing fill or asphalt pavement. Where encountered in our explorations, the thickness of the forest duff/topsoil horizon generally ranged from approximately 2 to 8 inches. Organic topsoil thicknesses shown on the Terra and ESNW exploration logs generally ranged from approximately 6 inches to 2 feet.

Vashon Lodgement Till

With the exception of exploration pit EP-4, the natural sediments encountered in our exploration pits either directly below the ground surface, the surficial topsoil horizon, or the surficial fill layer generally consisted of loose to medium dense, non-stratified, silty to very silty, gravelly sand with

scattered cobbles. These sediments typically became dense to very dense below depths ranging from approximately 6 inches to 6 feet. We interpret these sediments to be representative of Vashon lodgement till. The Vashon lodgement till was deposited directly from basal, debris-laden, glacial ice during the Vashon Stade of the Fraser Glaciation, approximately 12,500 to 15,000 years ago. The high relative density characteristic of the Vashon lodgement till is due to its consolidation by the massive weight of the glacial ice from which it was deposited. The reduced density observed in the upper portion of the till is interpreted to be due to weathering.

Lodgement till sediments were also encountered in the upper portions of exploration borings EB-1, EB-2, EB-5 through EB-9, EB-11, and EB-12, and appear to have been encountered in all of the ESNW and Terra exploration pits except Terra pit TP-6. The Terra and ESNW exploration logs do not consistently identify the geologic units encountered. However, in their report, Terra describes these sediments as consisting of lodgement till. At the locations of exploration borings EB-5, EB-8, EB-11, and EB-12, and in Terra pits TP-4, TP-5, and TP-8, the till extended to depths ranging from approximately 2 to 28 feet. Where encountered elsewhere in the explorations, the till extended beyond the maximum depths explored of approximately 4.5 to 15.5 feet. Exploration borings EB-1, EB-2, and EB-7 met with driller refusal in the till at depths of approximately 10 to 15.5 feet. In addition to cobbles, lodgement till typically contains scattered boulders and the difficult drilling conditions encountered at these locations are likely due to the presence of boulders and/or clusters of cobbles in the till.

Vashon Ice Contact Sediments

Sediments encountered below the weathered till horizon in boring EB-12, approximately 2 feet below the ground surface, generally consisted of stiff to very stiff, fine sandy silt with trace to some gravel. We interpret these sediments to be representative of material deposited by meltwater in close proximity to the glacial ice during Vashon time. At the location of boring EB-12, the ice contact sediments extended to a depth of approximately 14.5 feet.

Olympia Non-Glacial Sediments

Sediments encountered at a depth of approximately 28 feet (below the Vashon lodgement till) in boring EB-11 generally consisted of very dense, tan-gray, fine to medium sand with moderate to high silt content. Below a depth of approximately 33.5 feet, the sediments of this geologic unit consisted of hard, tan silt with trace gravel. The silt was generally massive but contained scattered, thin, sandy lenses. Although we observed no clear, distinguishing features characteristic of a particular geologic unit, their color, gradation, and stratigraphic position below the lodgement till suggest that these sediments may be representative of material deposited during the Olympia non-glacial period. The Olympia non-glacial period occurred prior to the Fraser Glaciation, approximately 30,000 to 60,000 years ago. At the location of exploration boring EB-11, these sediments extended to a depth of approximately 48 feet.

Possession Drift

Sediments encountered below the Vashon lodgement till in boring EB-8 generally consisted of very stiff to hard, blue-gray silt. The silt was generally massive to laminated and contained scattered fine sand partings. These sediments effervesced in hydrochloric acid. We interpret these sediments to be representative of Possession Drift. The Possession Drift was deposited in a glaciomarine environment during the Possession Glaciation, approximately 60,000 to 80,000 years ago. At the location of boring EB-8, the Possession Drift extended beyond the maximum depth explored of approximately 26.5 feet.

Pre-Fraser Till

Sediments encountered below a depth of approximately 48 feet in boring EB-11 generally consisted of very dense, non-stratified, very silty, gravelly sand. Although these sediments appeared texturally similar to the Vashon lodgement till, their stratigraphic position below the suspected Olympia-aged non-glacial sediments indicate that they were deposited during a glacial period prior to the Fraser Glaciation. At the location of boring EB-11, the pre-Fraser till extended to a depth of approximately 68 feet.

Pre-Fraser Silt

Sediments encountered below the pre-Fraser till in boring EB-11 (below a depth of approximately 68 feet) generally consisted of hard silt with lenses and interbeds of very silty, fine sand. Based on their stratigraphic position below the pre-Fraser silt, deposition of these sediments also occurred prior to the Fraser Glaciation. These sediments were non-reactive in hydrochloric acid. At the location of boring EB-11, the pre-Fraser silt extended to a depth of approximately 80 feet.

Blakely Harbor Formation

Sediments encountered below the surficial topsoil horizon in exploration pit EP-4 consisted of loose, brown, very silty sand with some gravel and soft to medium stiff, yellowish-tan silt. These sediments became medium dense to dense below a depth of approximately 5.5 feet. The gravel-sized fraction of these sediments typically consisted of angular sedimentary rock. Similar sediments were encountered either directly below the surficial topsoil horizon, or below the lodgement till or pre-Fraser sediments in exploration borings EB-3 through EB-6, and EB-10 through EB-12. We interpret these sediments to be representative of the Blakely Harbor Formation. The Blakely Harbor Formation consists of a Miocene-aged sedimentary rock composed of sandstone, siltstone, conglomerate, tuff, and volcaniclastic sandstone. It is known to contain interbeds of coal, and in some locations, nearly coherent logs. Where encountered in our explorations, the bedrock was typically weathered and poorly lithified and exhibited physical characteristics more consistent with a non-lithified sediment than well indurated bedrock. However, the density/lithification of these sediments typically increased with depth. Sedimentary

rock is also noted on the exploration logs for Terra pits TP-4 through TP-6, and TP-8. At these locations, the bedrock was encountered at depths ranging from approximately 2.5 to 9 feet.

Exploration borings EB-4 through EB-6, EB-10, and EB-12 met with refusal in the bedrock at depths ranging from approximately 12 to 20 feet. Refusal depths and elevations for these boring locations are summarized below in Table 2. It should be noted that the refusal elevations shown in Table 2 were estimated from the LIDAR based topography shown on Figure 2. The elevations shown in Table 2 should be considered accurate to the degree implied by the methods used to estimate them.

Table 2
Summary of Drilling Refusal Depths in the Blakely Harbor Formation Bedrock

Boring Number	Depth to Drilling Refusal (feet)	Apx. Drilling Refusal Elevation (feet)
EB-4	20	494
EB-5	14	506
EB-6	12	508
EB-10	20	445
EB-12	18	487

Geologic Map Review

Review of the regional geologic map titled *Geologic Map of the Issaquah 7.5' Quadrangle, King County, Washington*, by Booth and Minard (1992) indicates that the area of the site is underlain by Vashon lodgement till with Tertiary sedimentary rock mapped in portions of the southern and eastern parts of the site. Our interpretation of the sediments encountered in our explorations is consistent with the regional geologic map.

Hydrology

Slow to moderately rapid groundwater seepage was observed in 11 of the Associated Earth Sciences, Inc. (AESI) exploration pits. Seepage was also noted on three of the ESNW pits. Specifically, groundwater seepage was encountered in AESI exploration pits EP-4, EP-6, EP-10, EP-11, EP-13 through EP-15, EP-18, EP-19, EP-21, and EP-31, and in ESNW pits TP-1, TP-3, and TP-4. Generally, the seepage was limited to a thin, perched zone in the lower portion of the weathered till horizon within 4 feet of the ground surface. Similarly, shallow, perched seepage was encountered on the surface of the bedrock in exploration pit EP-4. This perched seepage, known as "interflow" occurs when stormwater infiltrates through the relatively permeable, weathered soil horizon and becomes perched atop the underlying, dense, low permeability, unweathered till or bedrock. Accumulation of interflow is typically a seasonal phenomenon. The exploration data indicates that the interflow is not laterally continuous across the site, but rather is limited to

relatively small isolated areas. Deeper perched seepage was encountered in exploration pit EP-6. At this location, the seepage was limited to a thin, perched zone in the unweathered till at a depth of approximately 7 feet. The occurrence or level of seepage below the site likely varies in response to changes in season, precipitation, and other factors.

LANDSLIDE HAZARDS AND RECOMMENDED MITIGATION

Slope inclinations on the site are generally about 30 percent or less, but steepen to approximately 40 to 50 percent over a maximum height of approximately 30 feet in a relatively small area located near the southeast corner of the property. Based on the morphology of the topography in this area, we interpret the steep slope to be a cut slope made for the construction of 228th Avenue SE and the south entrance road into the property.

Section 18.10.390 of the IMC defines Steep Slope Hazard Areas as any ground that rises at an inclination of 40 percent or more within a vertical elevation change of at least 10 feet. Section 18.10.580 of the IMC states that a buffer shall be established at a horizontal distance of 50 feet from the top, toe, and sides of Steep Slope Hazard Areas with an additional 15-foot building setback established from the edge of the buffer. The buffer may be reduced to a minimum of 10 feet upon acceptance by the City of a geotechnical study supporting the buffer reduction. Alteration of steep slopes are generally prohibited under the code with limited alterations allowed for trails, utilities, and surface water conveyance. The City may grant an exemption from the prohibition of steep slope alteration under the following conditions:

1. Where the height of a steep slope is 20 feet or less. In this case, an alteration may be granted upon review and acceptance by the City of a soils report prepared by a geologist or licensed geotechnical engineer demonstrating that no adverse impact will result from the exemption.
2. Where the slope has been created from previous legal grading activities. In this case, any remaining steep slope shall be subject to the protection mechanisms for steep slopes specified in the code.

Steep slope protection mechanisms specified in Section 18.10.580 of the IMC include a factor of safety of at least 1.5.

Review of the May 20, 2019 grading plans prepared by AHBL civil engineers indicates that the project will entail some grading of the steep slopes. A copy of the grading plan prepared for this area is shown in Figure 4. As previously stated, we interpret the steep slopes to consist of cut slopes associated with grading for construction of 228th Avenue SE and the entrance road into the property off of 228th Avenue SE. Consequently, alteration of these slopes is allowed under Section 18.10580D of the IMC, subject to the protection mechanisms specified in the code.

Slope Reconnaissance

We completed a reconnaissance of the steep slopes at the site at the time of our field exploration. During our reconnaissance of these areas, we did not observe any geomorphologic indications of historic landslide activity, such as tension cracks, landslide scarps, or hummocky topography. No emergent seepage or unusually deformed tree trunks indicative of historical or ongoing slope movement were observed.

LIDAR Mapping

LIDAR based imagery is a remote sensing technology that can be used to generate a detailed expression of ground surface topography even in densely vegetated areas. For this reason, LIDAR based topographic imagery can be helpful in distinguishing surface features (such as old landslide features) that may otherwise not be easily recognizable. A LIDAR based shaded relief map of the subject site is included as Figure 5. We did not observe any indications of historic landslide activity during our review of the LIDAR shaded relief map.

Slope Stability Analysis

An analysis of the global stability of the slope in the southeast corner of the site was conducted using the computer program SLOPE/W, version 7.23 by GeoSlope International. The program used the Morgenstern-Price method for evaluating a rotational failure. Input parameters for the analysis included slope geometry, geology, and soil strength parameters. The slope geometry used for our analysis was based on the topography depicted on the civil grading plan along section lines A-A' and B-B' (Figure 4). These sections extend through the steepest and highest portions of the slope. The following cases were analyzed for each of these two sections:

- Existing topographic conditions, static case.
- Existing topographic conditions, seismic case.
- Post-construction (post-grading) conditions, static case.
- Post-construction conditions, seismic case.

Subsurface exploration in this area indicates that the slope is underlain by bedrock with Vashon lodgement till overlying the bedrock in most areas. Because the shear strength of the bedrock is estimated to be equivalent to or stronger than the lodgement till, we conservatively assumed that the native sediments underlying the slope consist entirely of lodgement till. Soil strength parameters used for our analysis were assumed based on typical published values for lodgement till and our prior experience. The soil strength parameters used for our analysis are shown on the SLOPE/W profiles included in Appendix B. For evaluation of slope stability under seismic conditions, a horizontal ground acceleration of 0.26g was used for our analysis. This value is equivalent to ½ of the peak horizontal ground acceleration based on a seismic event with

a 2 percent probability of exceedance in 50 years in accordance with the 2015 *International Building Code* (IBC).

The stability of a slope can be expressed in terms of its factor of safety. The factor of safety of a slope is the ratio between the forces that resist sliding to the forces that drive sliding. For example, a factor of safety of 1.0 would indicate a slope where the driving forces and the resisting forces are exactly equal. Increasing factor of safety values greater than 1.0 indicate increased stability. Factors of safety below 1.0 indicate conditions where the driving forces exceed the resisting forces and landsliding is imminent.

Under static conditions, the minimum calculated factors of safety all exceeded the minimum value of 1.5 specified in the IMC. The IMC does not specify a minimum factor of safety for seismic conditions, but as a typical standard of practice, a factor of safety of 1.1 is generally considered to be a minimum acceptable value. The minimum factors of safety calculated for seismic conditions all exceeded a factor of safety of 1.5. The minimum calculated factors of safety are summarized below in Table 3. Copies of the results of the slope stability analysis are included in Appendix B.

Table 3
Summary of Minimum Calculated Factors of Safety

Section Line	Case	Minimum Factor of Safety
A-A'	Existing Static	2.43
A-A'	Existing Seismic	1.52
A-A'	Post-Construction Static	3.69
A-A'	Post-Construction Seismic	2.13
B-B'	Existing Static	2.64
B-B'	Existing Seismic	1.62
B-B'	Post-Construction Static	2.65
B-B'	Post-Construction Seismic	1.61

Landslide Hazard Mitigation

Based on our observations and analyses, it is our opinion that the risk of damage to the proposed project by landsliding on the steep slope is low under both static and seismic conditions, with minimum calculated factors of safety exceeding the minimum acceptable value specified in the IMC. This opinion assumes that construction practices for the project will be completed in accordance with the recommendations presented in this report. We recommend that stormwater discharge on or adjacent to the top of the steep slope be avoided as it could increase the potential for accelerated erosion and negatively impact the stability of the slope.

As previously discussed, some areas of steep slope were generated during grading associated with the demolition of the former buildings. Post-demolition topography is not included on the project grading plans and, therefore, these steep slopes are not shown. However, the current grading plans indicate that grading proposed for the project will eliminate any steep slopes resulting from the demolition activities. At the time this report was prepared, development plans for the project were conceptual. We recommend that AESI review the final plans to verify that they comply with our recommendations.

We appreciate this opportunity to be of continued service to you with your project. Should you have any questions, please contact us at your convenience.

Sincerely,
ASSOCIATED EARTH SCIENCES, INC.
Kirkland, Washington

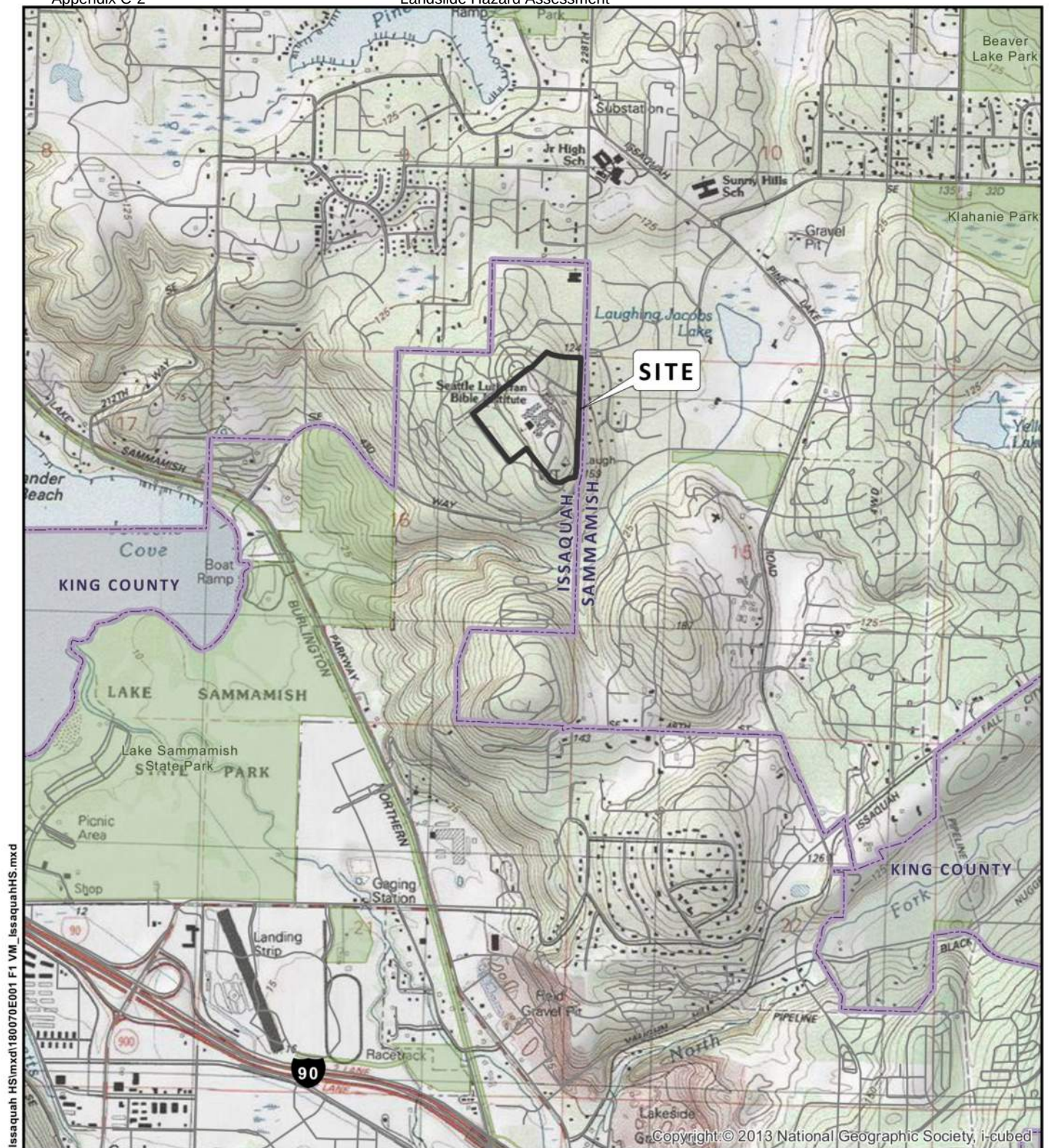

Timothy J. Peter, L.E.G., L.Hg.
Senior Geologist


Stephen A. Siebert, P.E.
Associate Geotechnical Engineer



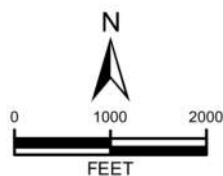
Kurt D. Merriman, P.E.
Senior Principal Engineer

Attachments: Figure 1: Vicinity Map
Figure 2: 2017 Aerial, LIDAR Based Contours
Figure 3: Site and Exploration Plan
Figure 4: Steep Slope Areas
Figure 5: LIDAR Shaded Relief Map
Appendix A: Exploration Logs
Appendix B: SLOPE/W Profiles



DATA SOURCES / REFERENCES:
 USGS: 7.5' SERIES TOPOGRAPHIC MAPS, ESRI/I-CUBED/NGS 2013
 KING CO: STREETS, CITY LIMITS 1/18, PARCELS 8/18

LOCATIONS AND DISTANCES SHOWN ARE APPROXIMATE
 C-2 - Page 12 of 95



NOTE: BLACK AND WHITE
 REPRODUCTION OF THIS COLOR
 ORIGINAL MAY REDUCE ITS
 EFFECTIVENESS AND LEAD TO
 INCORRECT INTERPRETATION



associated
 earth sciences
 incorporated

VICINITY MAP

ISSAQUAH HS #4 AND ES #17
 ISSAQUAH, WASHINGTON

PROJ NO.

180070E001

DATE:

9/19

FIGURE:

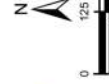
1

- SITE**
- EXPLORATION BORING
 - EXPLORATION PIT
 - TEST PIT BY EARTH SOLUTIONS
 - NW, 2014
 - TEST PIT BY TERRA ASSOCIATES
 - INC., 2015
 - PARCEL
 - CONTOUR 20 FT
 - CONTOUR 5 FT

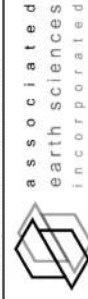
NOTE:
IMAGE TAKEN PRIOR TO DEMOLITION OF EXISTING
STRUCTURES.
DEMO IN PROCESS DEC. 2018 AND DONE BY JUNE
2019.

DATA SOURCES / REFERENCES
PCLC KING COUNTY 2016 GRID CELL SIZE IS 3'.
DELIVERY 3 FLOWN 3/2016 - 3/2016.
KING COUNTY 2016 GRID CELL SIZE IS 3'.
KING CO. STREETS 1/19. PARCELS 4/19. AERIAL PICTOMETRY INT. 2016.
TEST PITS FROM "GEOTECHNICAL REPORT (AUSON POINT)".
BY TERRA ASSOCIATES 11/14/2018

LOCATIONS AND DISTANCES SHOWN ARE APPROXIMATE



BLACK AND WHITE REPRODUCTION OF THIS COLOR ORIGINAL MAY REDUCE ITS
EFFECTIVENESS AND LEAD TO INCORRECT INTERPRETATION



**2017 AERIAL
LIDAR BASED CONTOURS**
ISSAQUAH HS #4 AND ES #17
ISSAQUAH, WASHINGTON

PROJ. NO. 180070E001 DATE: 9/19 FIGURE: 2



- SITE**
- EXPLORATION BORING
 - EXPLORATION PIT
 - TEST PIT BY EARTH SOLUTIONS
 - NW, 2014
 - TEST PIT BY TERRA ASSOCIATES
 - INC., 2015
 - PARCEL

DATA SOURCES/ REFERENCES
 SITE PLAN APRIL ELEMENTARY SCHOOL SITE,
 KING COUNTY, 2014, BY TERRA ASSOCIATES 11/14/2018
 TEST PITS FROM "GEOTECHNICAL REPORT MAISON POINTE",
 BY TERRA ASSOCIATES 11/14/2018

LOCATIONS AND DISTANCES SHOWN ARE APPROXIMATE



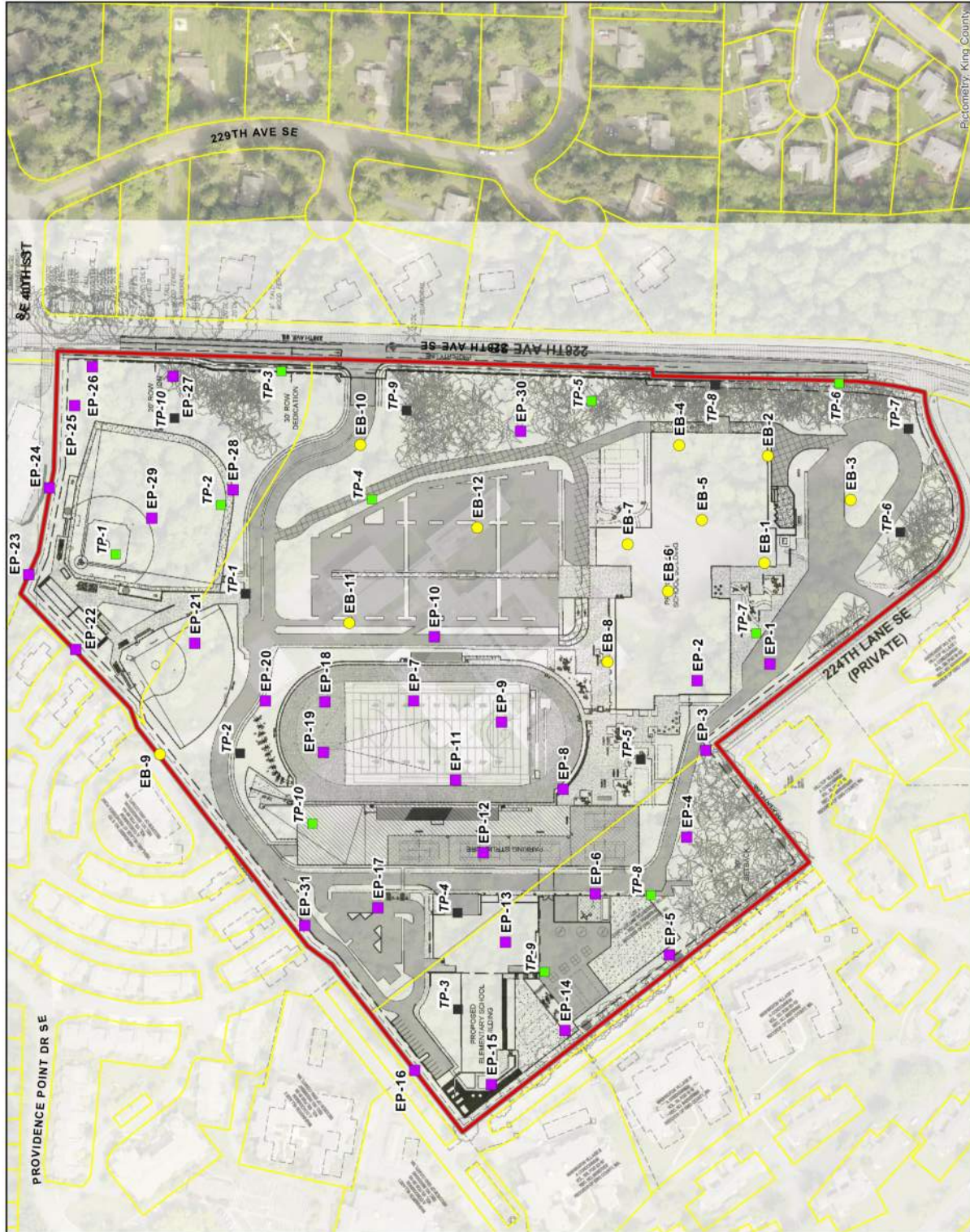
BLACK AND WHITE REPRODUCTION OF THIS COLOR ORIGINAL MAY REDUCE ITS
 EFFECTIVENESS AND LEAD TO INCORRECT INTERPRETATION



SITE AND EXPLORATION PLAN

ISSAQUAH HS #4 AND ES #17
 ISSAQUAH, WASHINGTON

PROJ NO. 180070E001 DATE: 9/19 FIGURE: 3



LEGEND:

CONTOUR INTERVAL = 1'

NOTE: LOCATION AND DISTANCES SHOWN ARE APPROXIMATE.

NOTES:

1. BASE MAP REFERENCE: AHB1, ISSAQUAH SCHOOL DISTRICT HIGH SCHOOL #4, GRADING PLAN, SHEET C4.7, FINAL DESIGN, 5/20/19

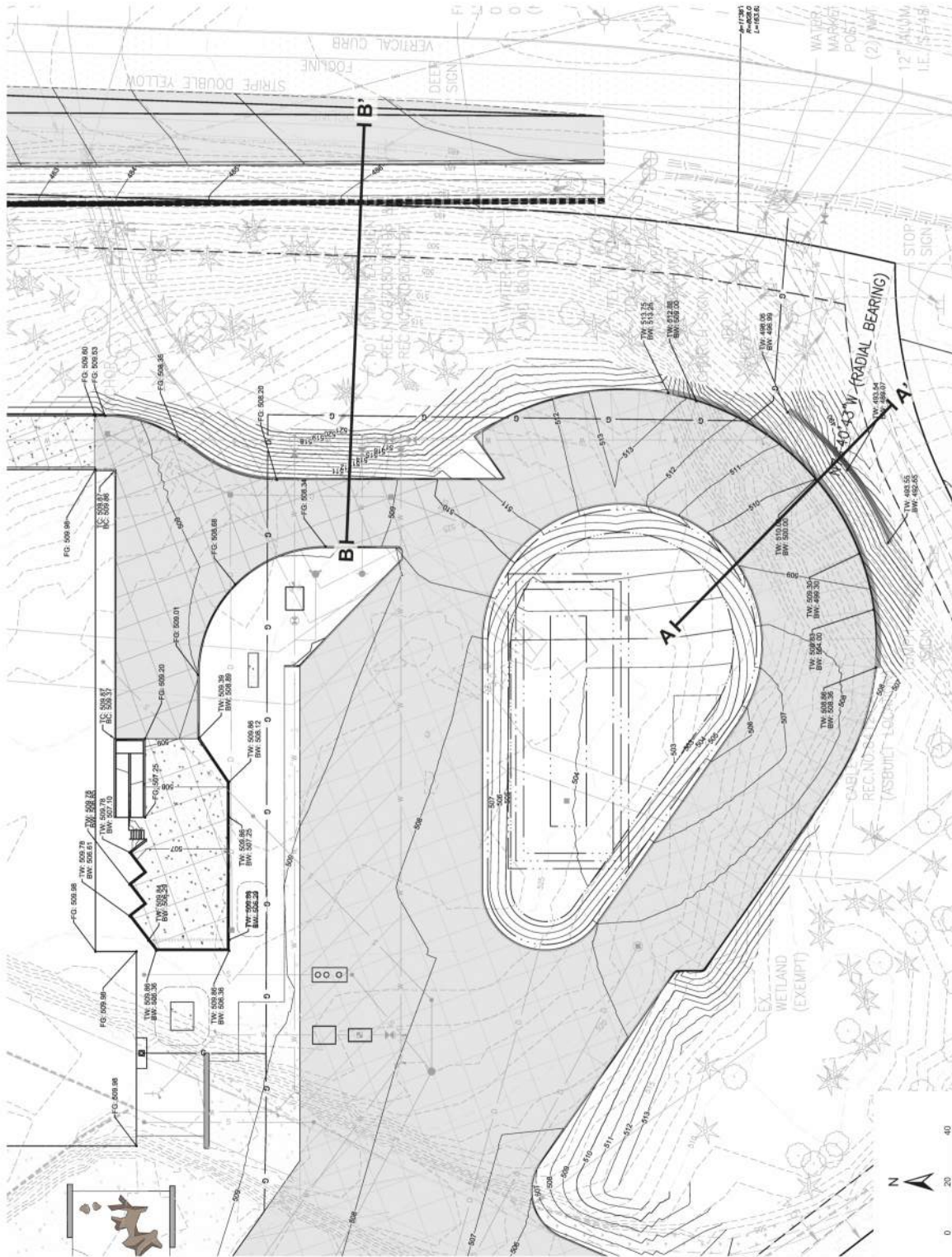
BLACK AND WHITE REPRODUCTION OF THIS COLOR ORIGINAL MAY REDUCE ITS EFFECTIVENESS AND LEAD TO INCORRECT INTERPRETATION.

**STEEP SLOPE AREAS**ISSAQUAH HS #4 AND ES #17
ISSAQUAH, WASHINGTON

PROJ. NO. 180070E001

DATE: 7/19

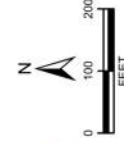
FIGURE: 4





DATA SOURCES / REFERENCES:
 SITE PLAN, ARRL ELEMENTARY SCHOOL SITE,
 ISDHS CHECK SET C7.0, 131119
 KING CO. STREETS, 1/18, PARCELS 4/18, AERIAL PICTOMETRY INT. 2018

LOCATIONS AND DISTANCES SHOWN ARE APPROXIMATE



BLACK AND WHITE REPRODUCTION OF THIS COLOR ORIGINAL MAY REDUCE ITS EFFECTIVENESS AND LEAD TO INCORRECT INTERPRETATION



LiDAR SHADED RELIEF MAP

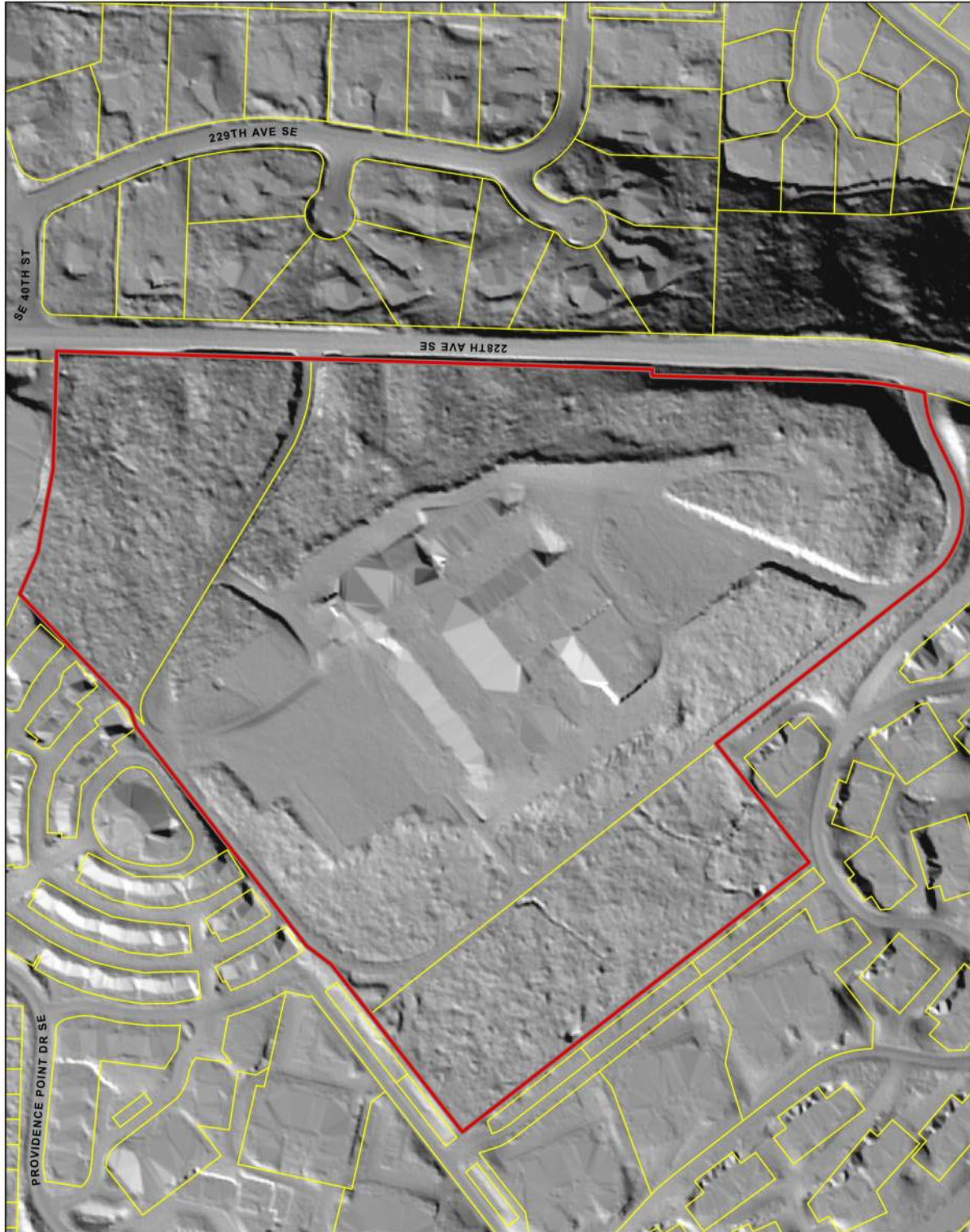
ISSAQUAH HS #4 AND ES #17
 ISSAQUAH, WASHINGTON

PROJ. NO. 180070E001

DATE: 8/19

FIGURE:

5



APPENDIX A

Exploration Logs

Coarse-Grained Soils - More than 50% ⁽¹⁾ Retained on No. 200 Sieve	Gravels - More than 50% ⁽¹⁾ of Coarse Fraction Retained on No. 4 Sieve	≤5% Fines ⁽⁵⁾		GW	Well-graded gravel and gravel with sand, little to no fines
		≥12% Fines ⁽⁵⁾		GP	Poorly-graded gravel and gravel with sand, little to no fines
		≤5% Fines ⁽⁵⁾		GM	Silty gravel and silty gravel with sand
		≥12% Fines ⁽⁵⁾		GC	Clayey gravel and clayey gravel with sand
Sands - 50% ⁽¹⁾ or More of Coarse Fraction Passes No. 4 Sieve	Sands - 50% ⁽¹⁾ or More of Coarse Fraction Passes No. 4 Sieve	≤5% Fines ⁽⁵⁾		SW	Well-graded sand and sand with gravel, little to no fines
		≤5% Fines ⁽⁵⁾		SP	Poorly-graded sand and sand with gravel, little to no fines
		≤5% Fines ⁽⁵⁾		SM	Silty sand and silty sand with gravel
		≥12% Fines ⁽⁵⁾		SC	Clayey sand and clayey sand with gravel
Fine-Grained Soils - 50% ⁽¹⁾ or More Passes No. 200 Sieve	Silt and Clays Liquid Limit Less than 50		ML	Silt, sandy silt, gravelly silt, silt with sand or gravel	
			CL	Clay of low to medium plasticity; silty, sandy, or gravelly clay, lean clay	
			OL	Organic clay or silt of low plasticity	
	Silt and Clays Liquid Limit 50 or More		MH	Elastic silt, clayey silt, silt with micaceous or diatomaceous fine sand or silt	
			CH	Clay of high plasticity, sandy or gravelly clay, fat clay with sand or gravel	
			OH	Organic clay or silt of medium to high plasticity	
Highly Organic Soils			PT	Peat, muck and other highly organic soils	

Terms Describing Relative Density and Consistency		
Coarse-Grained Soils	Density	SPT ⁽²⁾ blows/foot
	Very Loose	0 to 4
	Loose	4 to 10
	Medium Dense	10 to 30
	Dense	30 to 50
Fine-Grained Soils	Consistency	SPT ⁽²⁾ blows/foot
	Very Soft	0 to 2
	Soft	2 to 4
	Medium Stiff	4 to 8
	Stiff	8 to 15
Very Stiff	15 to 30	
Hard	>30	

Test Symbols	
G	= Grain Size
M	= Moisture Content
A	= Atterberg Limits
C	= Chemical
DD	= Dry Density
K	= Permeability

Component Definitions	
Descriptive Term	Size Range and Sieve Number
Boulders	Larger than 12"
Cobbles	3" to 12"
Gravel	3" to No. 4 (4.75 mm)
Coarse Gravel	3" to 3/4"
Fine Gravel	3/4" to No. 4 (4.75 mm)
Sand	No. 4 (4.75 mm) to No. 200 (0.075 mm)
Coarse Sand	No. 4 (4.75 mm) to No. 10 (2.00 mm)
Medium Sand	No. 10 (2.00 mm) to No. 40 (0.425 mm)
Fine Sand	No. 40 (0.425 mm) to No. 200 (0.075 mm)
Silt and Clay	Smaller than No. 200 (0.075 mm)

(3) Estimated Percentage		Moisture Content
Component	Percentage by Weight	
Trace	<5	Dry - Absence of moisture, dusty, dry to the touch
Some	5 to <12	Slightly Moist - Perceptible moisture
Modifier (silty, sandy, gravelly)	12 to <30	Moist - Damp but no visible water
Very modifier (silty, sandy, gravelly)	30 to <50	Very Moist - Water visible but not free draining
		Wet - Visible free water, usually from below water table

Symbols	
Sampler Type	Blows/6" or portion of 6"
2.0" OD Split-Spoon Sampler (SPT)	
Bulk sample	3.0" OD Split-Spoon Sampler
Grab Sample	3.25" OD Split-Spoon Ring Sampler
	3.0" OD Thin-Wall Tube Sampler (including Shelby tube)

--	--

(1) Percentage by dry weight	(4) Depth of ground water
(2) (SPT) Standard Penetration Test (ASTM D-1586)	▼ ATD = At time of drilling
(3) In General Accordance with Standard Practice for Description and Identification of Soils (ASTM D-2488)	▽ Static water level (date)
	(5) Combined USCS symbols used for fines between 5% and 12%

Classifications of soils in this report are based on visual field and/or laboratory observations, which include density/consistency, moisture condition, grain size, and plasticity estimates and should not be construed to imply field or laboratory testing unless presented herein. Visual-manual and/or laboratory classification methods of ASTM D-2487 and D-2488 were used as an identification guide for the Unified Soil Classification System.



associated
earth sciences
incorporated

EXPLORATION LOG KEY

FIGURE A1



associated
earth sciences
incorporated

Exploration Boring

Project Number
180070E001

Exploration Number
EB-1

Sheet
1 of 1

Project Name Issaquah HS #4 and ES #17

Location Issaquah, WA

Driller/Equipment Advance Drilling Technology / Track Rig

Hammer Weight/Drop 140# / 30 inches

Ground Surface Elevation (ft) 520

Datum NAVD 88

Date Start/Finish 6/25/19, 6/25/19

Hole Diameter (in) 7

Depth (ft)	S T	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot				Other Tests
								10	20	30	40	
				Asphalt - 3.5 inches								
				Vashon Lodgement Till								
		S-1		Moist, grayish tan, gravelly, very silty, SAND; nonstratified (SM).		16 21 12				▲33		
		S-2		Becomes mottled; some gravel.		7 14 19				▲33		
5		S-3		Contains a lens of gray silt at 5 to 6 feet.		6 12 23				▲35		
				Becomes very moist and gravelly below 6 feet.								
				Refusal on a rock at 7.5 feet. Moved over 2.5 feet and resumed drilling.								
10		S-4		Becomes gray.		19 22 18				▲40		
15		S-5				50/4"						
				Bottom of exploration boring at 15.5 feet due to refusal. No groundwater encountered.						▲50/4"		
20												
25												

Sampler Type (ST):



2" OD Split Spoon Sampler (SPT)



No Recovery

M - Moisture



3" OD Split Spoon Sampler (D & M)



Ring Sample

▽ Water Level ()

Grab Sample



Shelby Tube Sample

▼ Water Level at time of drilling (ATD)

Logged by: TJP

Approved by: CJK



associated
earth sciences
incorporated

Exploration Boring

Project Number
180070E001

Exploration Number
EB-2

Sheet
1 of 1

Project Name Issaquah HS #4 and ES #17

Location Issaquah, WA

Driller/Equipment Advance Drilling Technology / Track Rig

Hammer Weight/Drop 140# / 30 inches

Ground Surface Elevation (ft) 524

Datum NAVD 88

Date Start/Finish 6/25/19, 6/25/19

Hole Diameter (in) 7

Depth (ft)	S T	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot				Other Tests
								10	20	30	40	
		S-1		Forest Duff - 4 inches Vashon Lodgement Till Moist, reddish brown, gravelly, very silty, SAND (SM).			6 8 12		▲20			
		S-2		Becomes tan.			6 14 14			▲28		
5		S-3		Blowcounts are likely overstated, pounding on a rock. Difficult drilling.			50/4"					▲50/4"
10		S-4		Becomes mottled and very gravelly. Bottom of exploration boring at 11 feet due to refusal. No groundwater encountered. Moved over 3 feet and attempted to re-drill. Met refusal at 7.5 feet.			20 50/5"					▲50/5"
15												
20												
25												

Sampler Type (ST):



2" OD Split Spoon Sampler (SPT)



No Recovery

M - Moisture



3" OD Split Spoon Sampler (D & M)



Ring Sample

▽ Water Level ()

Grab Sample



Shelby Tube Sample

▼ Water Level at time of drilling (ATD)

Logged by: TJP

Approved by: CJK



associated
earth sciences
incorporated

Exploration Boring

Project Number
180070E001

Exploration Number
EB-3

Sheet
1 of 1

Project Name Issaquah HS #4 and ES #17

Location Issaquah, WA

Driller/Equipment Advance Drilling Technology / Track Rig

Hammer Weight/Drop 140# / 30 inches

Ground Surface Elevation (ft) 525

Datum NAVD 88

Date Start/Finish 6/25/19, 6/25/19

Hole Diameter (in) 7

Depth (ft)	S T	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot				Other Tests
								10	20	30	40	
		S-1		Forest Duff / Topsoil - 6 inches Blakely Harbor Formation Moist, mottled light brown, very silty, SAND, trace to some gravel (SM).		2 5 5		▲10				
5		S-2				8 8 11			▲19			
		S-3				6 9 13			▲22			
10		S-4		Becomes very moist.		7 11 19				▲30		
15		S-5		Trace fine gravel.		6 9 30					▲39	
20		S-6		Becomes tan gray with heavy orange brown mottling. Contains coal fragments.		12 13 22				▲35		
25		S-7		Becomes gravelly.		28 50/5"						▲50/5"
				Bottom of exploration boring at 26 feet No groundwater encountered.								

Sampler Type (ST):

☐ 2" OD Split Spoon Sampler (SPT)

☐ 3" OD Split Spoon Sampler (D & M)

☒ Grab Sample

☐ No Recovery

☐ Ring Sample

☒ Shelby Tube Sample

M - Moisture

▽ Water Level ()

▼ Water Level at time of drilling (ATD)

Logged by: TJP

Approved by: CJK



associated
earth sciences
incorporated

Exploration Boring

Project Number
180070E001

Exploration Number
EB-4

Sheet
1 of 1

Project Name Issaquah HS #4 and ES #17

Location Issaquah, WA

Driller/Equipment Advance Drilling Technology / Track Rig

Hammer Weight/Drop 140# / 30 inches

Ground Surface Elevation (ft) 514

Datum NAVD 88

Date Start/Finish 6/25/19, 6/25/19

Hole Diameter (in) 7

Depth (ft)	S T	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot				Other Tests
								10	20	30	40	
5		S-1		Fill Very moist, reddish brown, very silty, gravelly, SAND; nonstratified (SM).		5 4 5	▲9					
		S-2		Blakely Harbor Formation Very moist, reddish brown, gravelly, very silty, fine SAND; gravel fraction consists of angular sandstone fragments (SM).		2 2 3	▲5					
		S-3		Becomes tan and silty.		4 5 13	▲18					
10		S-4		Contains angular gray gravel; poor recovery.		21 50 50/6"						▲50/6"
15		S-5				38 50/3"						▲50/3"
20		S-6		Becomes gray and more lithified. Bottom of exploration boring at 20 feet due to refusal. No groundwater encountered.		50/5"						▲50/5"
25												

Sampler Type (ST):



2" OD Split Spoon Sampler (SPT)



No Recovery

M - Moisture



3" OD Split Spoon Sampler (D & M)



Ring Sample

▽ Water Level ()



Grab Sample



Shelby Tube Sample



Water Level at time of drilling (ATD)

Logged by: TJP

Approved by: CJK



associated
earth sciences
incorporated

Exploration Boring

Project Number
180070E001

Exploration Number
EB-5

Sheet
1 of 1

Project Name Issaquah HS #4 and ES #17

Location Issaquah, WA

Driller/Equipment Advance Drilling Technology / Track Rig

Hammer Weight/Drop 140# / 30 inches

Ground Surface Elevation (ft) 520

Datum NAVD 88

Date Start/Finish 6/25/19, 6/25/19

Hole Diameter (in) 7

Depth (ft)	S T	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot				Other Tests
								10	20	30	40	
5		S-1		Asphalt - 1.5 inches thick Vashon Lodgement Till Moist, brown, very gravelly, very silty, SAND; rounded gravel (SM).		18 19 50/6"						▲ 50/6"
		S-2		Blakely Harbor Formation Moist, gray, silty, SAND; contains angular rock fragments (SM).		22 38 50/6"						▲ 50/6"
		S-3		Orange brown mottling.		28 33 50/3"						▲ 50/3"
		S-4		Becomes more heavily mottled.		18 50/4"						▲ 50/4"
		S-5				50/4"						▲ 50/4"
10												
15				Bottom of exploration boring at 14 feet due to refusal. No groundwater encountered.								
20												
25												

Sampler Type (ST):



2" OD Split Spoon Sampler (SPT)



No Recovery

M - Moisture



3" OD Split Spoon Sampler (D & M)



Ring Sample

▽ Water Level ()



Grab Sample



Shelby Tube Sample



Water Level at time of drilling (ATD)

Logged by: TJP

Approved by: CJK



associated
earth sciences
incorporated

Exploration Boring

Project Number
180070E001

Exploration Number
EB-6

Sheet
1 of 1

Project Name Issaquah HS #4 and ES #17

Location Issaquah, WA

Driller/Equipment Advance Drilling Technology / Track Rig

Hammer Weight/Drop 140# / 30 inches

Ground Surface Elevation (ft) 520

Datum NAVD 88

Date Start/Finish 6/26/19, 6/26/19

Hole Diameter (in) 7

Depth (ft)	S T	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot				Other Tests
								10	20	30	40	
5				Asphalt - 2 inches								
		S-1		Vashon Lodgement Till Moist, grayish tan, gravelly, very silty, SAND; nonstratified (SM).			8 10 15		▲25			
		S-2		Some gravel.			12 21 27					▲48
		S-3		Trace gravel; contains scattered thin lenses (<1/8 inches thick) of fine sand.			18 11 18		▲29			
				Blakely Harbor Formation								
10		S-4		Gravelly drilling at 9 feet.			50/6"					▲50/6"
				Moist, yellowish tan to gray, silty, SAND; contains angular rock fragments (SM).								
		S-5					46 50/3"					▲50/3"
15				Bottom of exploration boring at 12.25 feet due to refusal. No groundwater encountered.								
20												
25												

Sampler Type (ST):

☐ 2" OD Split Spoon Sampler (SPT)

☐ 3" OD Split Spoon Sampler (D & M)

☒ Grab Sample

☐ No Recovery

☐ Ring Sample

☒ Shelby Tube Sample

M - Moisture

▽ Water Level ()

▼ Water Level at time of drilling (ATD)

Logged by: TJP

Approved by: CJK



associated
earth sciences
incorporated

Exploration Boring

Project Number
180070E001

Exploration Number
EB-7

Sheet
1 of 1

Project Name Issaquah HS #4 and ES #17

Location Issaquah, WA

Driller/Equipment Advance Drilling Technology / Track Rig

Hammer Weight/Drop 140# / 30 inches

Ground Surface Elevation (ft) 520

Datum NAVD 88

Date Start/Finish 6/26/19, 6/26/19

Hole Diameter (in) 7

Depth (ft)	S T	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6" Blows/ft	Blows/Foot				Other Tests
								10	20	30	40	
				Asphalt - 2.5 inches								
				Vashon Lodgement Till								
		S-1		Moist, grayish tan, gravelly, very silty, SAND; nonstratified (SM).		8 6 10			▲16			
		S-2				10 18 50/5"						▲50/5"
5		S-3		Poor recovery, driving a rock. Very difficult drilling.		25 50/5"						▲50/5"
		S-4		Becomes yellowish tan, very gravelly.		14 46 50/5"						▲50/5"
10		S-5		No recovery. Bottom of exploration boring at 10 feet due to refusal. No groundwater encountered.		50/1"						▲50/1"
15												
20												
25												

Sampler Type (ST):

☐ 2" OD Split Spoon Sampler (SPT)

☐ 3" OD Split Spoon Sampler (D & M)

☒ Grab Sample

☐ No Recovery

☐ Ring Sample

☒ Shelby Tube Sample

M - Moisture

▽ Water Level ()

▼ Water Level at time of drilling (ATD)

Logged by: TJP

Approved by: CJK



associated
earth sciences
incorporated

Exploration Boring

Project Number
180070E001

Exploration Number
EB-8

Sheet
1 of 1

Project Name Issaquah HS #4 and ES #17

Location Issaquah, WA

Driller/Equipment Advance Drilling Technology / Track Rig

Hammer Weight/Drop 140# / 30 inches

Ground Surface Elevation (ft) 520

Datum NAVD 88

Date Start/Finish 6/26/19, 6/26/19

Hole Diameter (in) 7

Depth (ft)	S T	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6" Blows/ft	Blows/Foot				Other Tests
								10	20	30	40	
5		S-1		Fill Moist, tan, gravelly, very silty, SAND (SM).		1 2 2	▲4					
		S-2		Trace tile debris.		3 3 4	▲7					
		S-3		Vashon Lodgement Till Moist, grayish tan, gravelly, very silty, SAND; nonstratified (SM).		5 10 14		▲24				
10		S-4		Becomes very moist. Drilling action becomes smoother at 12 feet. Drilling action becomes gravelly.		14 25 36						▲61
		S-5				18 36 36						▲72
		S-6		Becomes mottled with increased moisture.		16 15 20				▲35		
25		S-7		Possession Drift Very moist, blue gray, SILT; contains fine sand partings; massive; effervesces in hydrochloric acid (ML). Becomes laminated.		9 12 16				▲28		
				Bottom of exploration boring at 26.5 feet No groundwater encountered.								

Sampler Type (ST):

☐ 2" OD Split Spoon Sampler (SPT)

☐ 3" OD Split Spoon Sampler (D & M)

☒ Grab Sample

☐ No Recovery

☐ Ring Sample

☒ Shelby Tube Sample

M - Moisture

▽ Water Level ()

▼ Water Level at time of drilling (ATD)

Logged by: TJP

Approved by: CJK



associated
earth sciences
incorporated

Exploration Boring

Project Number
180070E001

Exploration Number
EB-9

Sheet
1 of 1

Project Name Issaquah HS #4 and ES #17

Location Issaquah, WA

Driller/Equipment Advance Drilling Technology / Track Rig

Hammer Weight/Drop 140# / 30 inches

Ground Surface Elevation (ft) 500

Datum NAVD 88

Date Start/Finish 6/26/19, 6/26/19

Hole Diameter (in) 7

Depth (ft)	S T	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot				Other Tests
								10	20	30	40	
				Asphalt - 1.5 inches								
				Fill								
		S-1		Moist, grayish tan and brown (mixed), gravelly, very silty, SAND; contains scattered organic debris (SM).		12 16 11				▲27		
				Vashon Lodgement Till								
		S-2		Very moist, tan gray, very silty, gravelly, SAND; nonstratified (SM).		6 9 12			▲21			
5												
		S-3		Becomes tan to grayish tan.		8 16 24					▲40	
10												
		S-4		Becomes moist.		16 24 30						▲54
15												
		S-5		Becomes very moist.		48 50/1"						▲50/1"
20												
		S-6				33 50/5"						▲50/5"
25												
		S-7		Poor recovery.		50/4"						▲50/4"
				Bottom of exploration boring at 25.5 feet No groundwater encountered.								

Sampler Type (ST):

☐ 2" OD Split Spoon Sampler (SPT)

☐ 3" OD Split Spoon Sampler (D & M)

☒ Grab Sample

☐ No Recovery

☐ Ring Sample

☒ Shelby Tube Sample

M - Moisture

▽ Water Level ()

▼ Water Level at time of drilling (ATD)

Logged by: TJP

Approved by: CJK



associated
earth sciences
incorporated

Exploration Boring

Project Number
180070E001

Exploration Number
EB-10

Sheet
1 of 1

Project Name Issaquah HS #4 and ES #17

Location Issaquah, WA

Driller/Equipment Advance Drilling Technology / Track Rig

Hammer Weight/Drop 140# / 30 inches

Ground Surface Elevation (ft) 465

Datum NAVD 88

Date Start/Finish 6/26/19, 6/26/19

Hole Diameter (in) 7

Depth (ft)	S T	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot				Other Tests
								10	20	30	40	
5		S-1		Blakely Harbor Formation Very moist, brown to tan, very silty, gravelly, SAND (SM).			5 5 8	▲13				
		S-2		Becomes moist, grayish tan, silty with angular gravel sized sedimentary rock fragments.			9 15 18		▲33			
		S-3		Becomes tan to yellowish tan.			11 15 22			▲37		
10		S-4		Becomes mottled and fine grained (siltstone); angular rock fragments still present.			50/5"					▲50/5"
15		S-5					13 29 50/5"					▲50/5"
20		S-6		Poor recovery. Bottom of exploration boring at 20 feet due to refusal. No groundwater encountered.			50/2"					▲50/2"
25												

Sampler Type (ST):

☐ 2" OD Split Spoon Sampler (SPT)

☐ 3" OD Split Spoon Sampler (D & M)

☒ Grab Sample

☐ No Recovery

☐ Ring Sample

☒ Shelby Tube Sample

M - Moisture

▽ Water Level ()

▼ Water Level at time of drilling (ATD)

Logged by: TJP

Approved by: CJK



associated
earth sciences
incorporated

Exploration Boring

Project Number
180070E001

Exploration Number
EB-11

Sheet
1 of 3

Project Name Issaquah HS #4 and ES #17

Location Issaquah, WA

Driller/Equipment Advance Drilling Technology / Track Rig

Hammer Weight/Drop 140# / 30 inches

Ground Surface Elevation (ft) 500

Datum NAVD 88

Date Start/Finish 6/27/19, 6/27/19

Hole Diameter (in) 7

Depth (ft)	S T	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot				Other Tests
								10	20	30	40	
				Vashon Lodgement Till								
		S-1		Very moist, grayish tan, very silty, gravelly, SAND; nonstratified (SM).		6 9 9			▲18			
		S-2		Becomes moist.		29 50/6"						▲50/6"
5		S-3		Met with refusal at 4 feet; moved over 4 feet and resumed drilling.		4 37 50/5"						▲50/5"
10		S-4		Becomes very moist.		50/3"						▲50/3"
15		S-5		Becomes very moist.		14 50/4"						▲50/4"
20		S-6				50/6"						▲50/6"
25		S-7		Becomes very moist, slightly less gravelly, and slightly more silty.		13 21 30						▲51
				Driller adding water (~1 to 2 gallons).								
				Olympia Nonglacial Sediments ?								
				Drilling action becomes smooth below ~28 feet.								

Sampler Type (ST):

☐ 2" OD Split Spoon Sampler (SPT)

☐ 3" OD Split Spoon Sampler (D & M)

☒ Grab Sample

☐ No Recovery

☐ Ring Sample

☒ Shelby Tube Sample

M - Moisture

▽ Water Level ()

▼ Water Level at time of drilling (ATD)

Logged by: TJP

Approved by: CJK



associated
earth sciences
incorporated

Exploration Boring

Project Number
180070E001

Exploration Number
EB-11

Sheet
2 of 3

Project Name Issaquah HS #4 and ES #17

Location Issaquah, WA

Driller/Equipment Advance Drilling Technology / Track Rig

Hammer Weight/Drop 140# / 30 inches

Ground Surface Elevation (ft) 500

Datum NAVD 88

Date Start/Finish 6/27/19, 6/27/19

Hole Diameter (in) 7

Depth (ft)	S T	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot				Other Tests
								10	20	30	40	
		S-8		Moist, tan gray, fine to medium SAND, some silt (SP-SM).		18 30 41						▲ 71
		S-9		Sand becomes tan, silty, and fine grained.		27 39						▲ 50/6"
				Moist, tan, SILT; nonplastic; massive; driller adding water (ML).		50/6"						
35		S-10				11 37						▲ 50/5"
						50/5"						
		S-11		Trace gravel.		27 50/6"						▲ 50/6"
40		S-12		Contains a lens (~3 inches thick) of lightly mottled, fine sandy, silt at ~40.5 feet.		20 39 50						▲ 50/6"
45		S-13				12 20 33						▲ 53
				Pre-Fraser Till								
				Gravelly drilling action at 48 feet.								
50		S-14		Moist, grayish tan, very silty, gravelly, SAND; nonstratified (SM).		20 32 48						▲ 80
55		S-15		Slight increase in moisture content. Becomes very moist and gray.		12 33 50/5"						▲ 50/5"

Sampler Type (ST):

☐ 2" OD Split Spoon Sampler (SPT)

☐ No Recovery

M - Moisture

☐ 3" OD Split Spoon Sampler (D & M)

☐ Ring Sample

▽ Water Level ()

☒ Grab Sample

☐ Shelby Tube Sample

▼ Water Level at time of drilling (ATD)

Logged by: TJP

Approved by: CJK



associated
earth sciences
incorporated

Exploration Boring

Project Number
180070E001

Exploration Number
EB-11

Sheet
3 of 3

Project Name Issaquah HS #4 and ES #17 Ground Surface Elevation (ft) 500
 Location Issaquah, WA Datum NAVD 88
 Driller/Equipment Advance Drilling Technology / Track Rig Date Start/Finish 6/27/19, 6/27/19
 Hammer Weight/Drop 140# / 30 inches Hole Diameter (in) 7

Depth (ft)	S T	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6" Blows/6"	Blows/Foot				Other Tests
								10	20	30	40	
		S-16		Driller adding water.		13 33 50/6"						▲ 50/6"
65		S-17				16 22 27						▲ 49
				Pre-Fraser Silt Drilling action becomes smooth below 68 feet.								
70		S-18		Moist, mottled tan, SILT; nonplastic; contains thin sand lens (~1 inch thick) at 71 feet; non-reactive in hydrochloric acid (ML).		17 27 40						▲ 67
75		S-19		Moist, grayish tan, very silty, fine SAND; frequent thin lenses (~2 inches thick) of silt (SM).		16 27 46						▲ 73
80		S-20		Blakely Harbor Formation Gravelly drilling action at 80 feet. Moist, gray, very silty, gravelly, SAND; nonstratified (SM).		50/6"						▲ 50/6"
85		S-21		Becomes greenish gray, very gravelly, and contains pink rock fragments.		40 50/3"						▲ 50/3"
				Bottom of exploration boring at 85.75 feet No groundwater encountered.								

Sampler Type (ST):

- ☐ 2" OD Split Spoon Sampler (SPT)
☐ 3" OD Split Spoon Sampler (D & M)
☒ Grab Sample

- ☐ No Recovery
☐ Ring Sample
☒ Shelby Tube Sample

M - Moisture

▽ Water Level ()

▼ Water Level at time of drilling (ATD)

Logged by: TJP

Approved by: CJK



associated
earth sciences
incorporated

Exploration Boring

Project Number
180070E001

Exploration Number
EB-12

Sheet
1 of 1

Project Name Issaquah HS #4 and ES #17

Location Issaquah, WA

Driller/Equipment Advance Drilling Technology / Track Rig

Hammer Weight/Drop 140# / 30 inches

Ground Surface Elevation (ft) 505

Datum NAVD 88

Date Start/Finish 6/28/19, 6/28/19

Hole Diameter (in) 7

Depth (ft)	S T	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot				Other Tests
								10	20	30	40	
5		S-1		Vashon Lodgement Till Very moist, mottled tan, very silty, gravelly, SAND; nonstratified (SM).		5 9 9			▲18			
		S-2		Vashon Ice Contact Very moist, mottled tan, fine sandy, SILT, some gravel; nonplastic (ML).		4 5 6			▲11			
		S-3		Trace to some gravel.		4 6 10			▲16			
10		S-4		No gravel. Becomes blue gray below 11 feet.		5 10 15			▲25			
15		S-5		Blakely Harbor Formation Gravelly drilling action below 14.5 feet. Moist, purplish gray, silty, fine SAND, trace organics (SM).		15 41 50/4"						▲50/4"
		S-6		Becomes purplish greenish gray and fine to medium grained with some pebble gravel.		50/5"						▲50/5"
20				Bottom of exploration boring at 18 feet due to refusal. No groundwater encountered.								
25												

Sampler Type (ST):

☐ 2" OD Split Spoon Sampler (SPT)

☐ 3" OD Split Spoon Sampler (D & M)

☒ Grab Sample

☐ No Recovery

☐ Ring Sample

☒ Shelby Tube Sample

M - Moisture

▽ Water Level ()

▼ Water Level at time of drilling (ATD)

Logged by: TJP

Approved by: CJK

LOG OF EXPLORATION PIT NO. EP-1

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.	
	DESCRIPTION <u>Elev: 505 ft</u>	
	Topsoil - 6 inches	
	Weathered Vashon Lodgement Till	
1	Loose, very moist, brown, very silty, gravelly, SAND; abundant roots (SM).	
2	Becomes medium dense and tan below 2 feet.	
3		
	Vashon Lodgement Till	
4	Hard, very moist, grayish tan, fine sandy, SILT; oxidized fracture surfaces; nonstratified (ML).	
5		
6	Trace to some gravel below 6 feet.	
7		
8		
9	Bottom of exploration pit at depth 8.5 feet No seepage. No caving.	
10		
11		
12		

Issaquah HS #4 and ES #17 Issaquah, WA

Logged by: TJP

Approved by: CJK
C-2 - Page 33 of 95

a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Project No. 180070E001

12/12/18

LOG OF EXPLORATION PIT NO. EP-2

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.	
	DESCRIPTION <u>Elev: 510 ft</u>	
	Topsoil - 6 inches	
	Weathered Vashon Lodgement Till	
1	Loose, wet, reddish brown, very silty, gravelly, SAND (SM).	
2	Abundant roots to 2.5 feet. Becomes medium dense, very moist, and grayish tan below 2.5 feet.	
3		
	Vashon Lodgement Till	
4	Very dense, moist, grayish tan, very silty, gravelly, SAND; nonstratified (SM).	
5		
6		
7		
8		
	Bottom of exploration pit at depth 8 feet No seepage. No caving.	
9		
10		
11		
12		

Issaquah HS #4 and ES #17 Issaquah, WA

Logged by: TJP

Approved by: CJK
C-2 - Page 34 of 95



a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Project No. 180070E001

12/12/18

LOG OF EXPLORATION PIT NO. EP-3

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.	
	DESCRIPTION <u>Elev: 485 ft</u>	
	Topsoil - 8 inches	
1	Weathered Vashon Lodgement Till Loose, very moist, brown to reddish brown, very silty, gravelly, SAND (SM).	
2		
3	Abundant roots 0 to 2.5 feet. Becomes medium dense, increased moisture, and grayish tan with mottling below 2.5 feet.	
4	Vashon Lodgement Till Dense, very moist, grayish tan, very silty, gravelly, SAND; scattered cobbles; mottled above 5 feet (sandy till); nonstratified (SM).	
5		
6		
7		
8	Bottom of exploration pit at depth 8 feet No seepage. No caving.	
9		
10		
11		
12		

Issaquah HS #4 and ES #17 Issaquah, WA

Logged by: TJP

Approved by: CJK
C-2 - Page 35 of 95



a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Project No. 180070E001

12/13/19

LOG OF EXPLORATION PIT NO. EP-4

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered. DESCRIPTION <u>Elev: 480 ft</u>	
	Topsoil - 10 inches	
1	Blakely Harbor Formation Loose, very moist, brown, very silty, SAND, some gravel; abundant roots (SM).	
2		
3	Soft to medium stiff, very moist to wet, yellowish tan, SILT (ML).	
4		
5		
6	Medium dense to dense, very moist, yellowish tan, very silty, fine SAND (SM) and hard, fine sandy, SILT (ML); stratified (sandstone/siltstone).	
7		
8		
9		
10	Bottom of exploration pit at depth 9 feet Moderately rapid seepage 2 to 4 feet. Moderate sloughing 2 to 4 feet.	
11		
12		

Issaquah HS #4 and ES #17 Issaquah, WA

Logged by: TJP

Approved by: CJK
C-2 - Page 36 of 95

a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Project No. 180070E001

12/12/18

LOG OF EXPLORATION PIT NO. EP-5

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.	
	DESCRIPTION <u>Elev: 476 ft</u>	
	Topsoil - 6 inches	
	Weathered Vashon Lodgement Till	
1	Loose to medium dense, very moist, brown, very silty, gravelly, SAND; scattered cobbles; abundant roots (SM).	
2	Blakely Harbor Formation	
3	Medium dense to dense, very moist, yellowish tan, very silty, SAND (SM).	
4		
5		
6	Becomes very dense below 6 feet.	
7	Bottom of exploration pit at depth 7 feet No seepage. No caving.	
8		
9		
10		
11		
12		

Issaquah HS #4 and ES #17 Issaquah, WA

Logged by: TJP

Approved by: CJK
C-2 - Page 37 of 95

a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Project No. 180070E001

12/13/18

LOG OF EXPLORATION PIT NO. EP-6

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.	
	DESCRIPTION <u>Elev: 482 ft</u>	
	Topsoil - 6 inches	
	Weathered Vashon Lodgement Till	
1	Loose, very moist, reddish brown, very silty, gravelly, SAND (SM). Abundant roots 0 to 2 feet.	
2	Becomes medium dense and tan below 2 feet.	
3	Vashon Lodgement Till	
4	Dense, very moist, mottled grayish tan, very silty, gravelly, SAND; scattered cobbles and boulders; nonstratified (SM).	
5		
6		
7	Wet at 7 feet.	
8		
9		
10	Bottom of exploration pit at depth 9 feet Slow discontinuous seepage at 7 feet. No caving.	
11		
12		

Issaquah HS #4 and ES #17 Issaquah, WA

Logged by: TJP

Approved by: CJK
C-2 - Page 38 of 95



a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Project No. 180070E001

12/13/18

LOG OF EXPLORATION PIT NO. EP-7

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.	
	DESCRIPTION	<u>Elev: 505 ft</u>
	Fill	
	Loose, very moist, brown, very silty, gravelly, SAND (SM).	
1	Vashon Lodgement Till	
	Very dense, moist, tan gray, very silty, gravelly, SAND; nonstratified (SM).	
2	Very difficult digging.	
3		
4		
5		
	Bottom of exploration pit at depth 5 feet No seepage. No caving.	
6		
7		
8		
9		
10		
11		
12		

Issaquah HS #4 and ES #17 Issaquah, WA

Logged by: TJP

Approved by: CJK
C-2 - Page 39 of 95

a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Project No. 180070E001

12/10/18

LOG OF EXPLORATION PIT NO. EP-8

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.	
	DESCRIPTION	<u>Elev: 500 ft</u>
	Fill	
1	Loose, moist, brown, very silty, gravelly, SAND (SM).	
2		
3	Abundant roots 0 to 4 feet	
4	Becomes tan below 4 feet.	
5		
6		
7		
8	Weathered Vashon Lodgement Till	
	Medium dense, moist, reddish brown, very silty, gravelly, SAND (SM).	
9		
10	Clay pipe encountered at 10 feet in north end of excavation.	
	Vashon Lodgement Till	
11	Very dense, moist, grayish tan, very silty, SAND, some gravel; nonstratified (SM).	
	Bottom of exploration pit at depth 11 feet	
	No seepage. No caving.	
12		

Issaquah HS #4 and ES #17 Issaquah, WA

Logged by: TJP

Approved by: CJK
C-2 - Page 40 of 95

a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Project No. 180070E001

12/12/18

LOG OF EXPLORATION PIT NO. EP-9

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.	
	DESCRIPTION <u>Elev: 510 ft</u>	
	Fill	
1	Loose, very moist, brown, very silty, SAND, some gravel; contains pockets of clean sand (SM).	
	Vashon Lodgement Till	
2	Very dense, moist, grayish tan, very silty, gravelly, SAND; scattered cobbles and boulders; nonstratified (SM).	
3		
4		
5		
6		
7		
	Bottom of exploration pit at depth 7 feet No seepage. No caving.	
8		
9		
10		
11		
12		

Issaquah HS #4 and ES #17 Issaquah, WA

Logged by: TJP

Approved by: CJK
C-2 - Page 41 of 95



a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Project No. 180070E001

12/12/18

LOG OF EXPLORATION PIT NO. EP-10

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered. DESCRIPTION <u>Elev: 512 ft</u>
1	Weathered Vashon Lodgement Till Loose, very moist, brown, very silty, gravelly, SAND; abundant roots; wet at base (SM).
2	Vashon Lodgement Till Very dense, very moist, grayish tan, very silty, gravelly, SAND; scattered boulders and cobbles; nonstratified (SM).
3	Becomes moist below ~2.5 feet.
4	
5	
6	
7	Bottom of exploration pit at depth 6 feet Refusal due to boulder. Slow seepage at 1 foot. No caving.
8	
9	
10	
11	
12	

Issaquah HS #4 and ES #17 Issaquah, WA

Logged by: TJP

Approved by: CJK
C-2 - Page 42 of 95



a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Project No. 180070E001

12/12/18

LOG OF EXPLORATION PIT NO. EP-11

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.	
	DESCRIPTION	Elev: 512 ft
	Fill	
1	Loose, very moist to wet, brown, very silty, gravelly, SAND; contains trace wood debris (SM).	
2	Clay pipe and wires encountered at ~2 and 3 feet.	
3		
4		
5		
6	Vashon Lodgement Till	
7	Very dense, very moist, grayish tan, very silty, gravelly, SAND; nonstratified (SM).	
8	Bottom of exploration pit at depth 7 feet Slow seepage at ~2 feet. Moderately severe caving at ~2 feet.	
9		
10		
11		
12		

Issaquah HS #4 and ES #17 Issaquah, WA

Logged by: TJP

Approved by: CJK
C-2 - Page 43 of 95

a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Project No. 180070E001

12/12/18

LOG OF EXPLORATION PIT NO. EP-12

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.	
	DESCRIPTION <u>Elev: 492 ft</u>	
	Topsoil - 6 inches	
	Weathered Vashon Lodgement Till	
1	Dense, moist to very moist, reddish brown, very silty, gravelly, SAND; abundant roots (SM).	
2		
3		
4	Vashon Lodgement Till	
	Very dense, very moist, grayish tan, very silty, gravelly, SAND; nonstratified (SM).	
5		
6	Bottom of exploration pit at depth 5 feet No seepage. No caving. Broke water line during excavation; repaired.	
7		
8		
9		
10		
11		
12		

Issaquah HS #4 and ES #17 Issaquah, WA

Logged by: TJP

Approved by: CJK
C-2 - Page 44 of 95

a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Project No. 180070E001

12/12/18

LOG OF EXPLORATION PIT NO. EP-13

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.	
	DESCRIPTION	<u>Elev: 485 ft</u>
	Topsoil - 6 inches	
	Weathered Vashon Lodgement Till	
1	Loose, very moist, reddish brown, very silty, gravelly, SAND (SM).	
2		
	Abundant roots 0 to 2.5 feet. Becomes medium dense and grayish tan below 2.5 feet. Wet at base.	
3	Vashon Lodgement Till	
	Very dense, moist, grayish tan, very silty, gravelly, SAND; scattered cobbles; nonstratified (SM).	
4		
5		
6		
7		
8		
	Bottom of exploration pit at depth 8 feet Slow seepage at 3 feet. No caving.	
9		
10		
11		
12		

Issaquah HS #4 and ES #17 Issaquah, WA

Logged by: TJP

Approved by: CJK
C-2 - Page 45 of 95

a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Project No. 180070E001

12/13/18

LOG OF EXPLORATION PIT NO. EP-14

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.	
	DESCRIPTION <u>Elev: 476 ft</u>	
	Topsoil - 6 inches	
	Weathered Vashon Lodgement Till	
1	Loose, very moist, reddish brown, very silty, gravelly, SAND (SM).	
2		
	Wet at 2.5 feet. Abundant roots 0 to 2.5 feet.	
3	Becomes medium dense, very moist, and tan below 3 feet.	
	Vashon Lodgement Till	
4	Dense, very moist, tan, very silty, gravelly, SAND; scattered cobbles; nonstratified (SM).	
	Lightly mottled 3.5 to 4.5 feet. Becomes very dense below 4.5 feet.	
5		
6		
7		
	Bottom of exploration pit at depth 7 feet Slow seepage at 2.5 feet. No caving.	
8		
9		
10		
11		
12		

Issaquah HS #4 and ES #17 Issaquah, WA

Logged by: TJP

 Approved by: CJK
 C-2 - Page 46 of 95

 associated
 earth sciences
 incorporated

Project No. 180070E001

12/13/18

LOG OF EXPLORATION PIT NO. EP-15

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.	
	DESCRIPTION <u>Elev: 477 ft</u>	
	Topsoil - 8 inches	
1	Weathered Vashon Lodgement Till Loose, very moist, reddish brown, gravelly, very silty, SAND; scattered cobbles (SM).	
2		
3	Wet at 2.5 feet. Abundant roots 0 to 2.5 feet. Becomes medium dense and tan below 2.5 feet.	
4	Vashon Lodgement Till Dense, very moist, grayish tan, very silty, gravelly, SAND; scattered cobbles; nonstratified (SM). Mottled 3.5 to 5 feet.	
5		
6	Becomes very dense below ~6 feet.	
7		
8		
9	Bottom of exploration pit at depth 8 feet Moderately rapid seepage at 2.5 feet. No caving.	
10		
11		
12		

Issaquah HS #4 and ES #17 Issaquah, WA

Logged by: TJP

Approved by: CJK
C-2 - Page 47 of 95

a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Project No. 180070E001

12/13/18

LOG OF EXPLORATION PIT NO. EP-16

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered. DESCRIPTION <u>Elev: 480 ft</u>	
	Forest Duff Fill	
1	Very dense, moist, grayish brown, very silty, gravelly, SAND; scattered cobbles (SM).	
2	Medium dense to dense, moist, grayish brown, very gravelly, fine to medium SAND, trace silt; scattered cobbles (SP).	
3	Abundant wood debris below ~2.5 feet. Pockets of silty, sand below 3 feet.	
4	Vashon Lodgement Till	
5	Dense, very moist, gray, very silty, gravelly, SAND; scattered cobbles; nonstratified (SM).	
6	Becomes tan gray below 6 feet.	
7		
8		
9	Bottom of exploration pit at depth 8 feet No seepage. No caving.	
10		
11		
12		

Issaquah HS #4 and ES #17 Issaquah, WA

Logged by: TJP

Approved by: CJK
C-2 - Page 48 of 95

a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Project No. 180070E001

12/13/18

LOG OF EXPLORATION PIT NO. EP-17

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.	
	DESCRIPTION	<u>Elev: 489 ft</u>
	Topsoil - 6 inches	
	Weathered Vashon Lodgement Till	
1	Loose, very moist, reddish brown, very silty, gravelly, SAND (SM).	
2		
	Abundant roots 0 to 3 feet.	
3	Becomes medium dense and tan below 3 feet.	
4		
5	Vashon Lodgement Till	
	Dense, very moist, grayish tan, very silty, gravelly, SAND; scattered cobbles; nonstratified (SM).	
6		
7	Becomes very dense below 7 feet.	
8		
	Bottom of exploration pit at depth 8 feet No seepage. No caving.	
9		
10		
11		
12		

Issaquah HS #4 and ES #17 Issaquah, WA

Logged by: TJP

Approved by: CJK
C-2 - Page 49 of 95

a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Project No. 180070E001

12/13/18

LOG OF EXPLORATION PIT NO. EP-18

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.	
	DESCRIPTION <u>Elev: 501 ft</u>	
	Topsoil - 6 inches	
	Fill	
1	Medium dense, moist to very moist, grayish tan, fine to medium SAND, some silt; scattered wood debris; wet at 2 feet (SP-SM).	
2	Vashon Lodgement Till	
3	Very dense, very moist, grayish tan, very silty, gravelly, SAND; nonstratified (SM).	
4		
5	Bottom of exploration pit at depth 4.5 feet Refusal due to a large boulder. Slow seepage at 2 feet. No caving.	
6		
7		
8		
9		
10		
11		
12		

Issaquah HS #4 and ES #17 Issaquah, WA

Logged by: TJP

Approved by: CJK
C-2 - Page 50 of 95

a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Project No. 180070E001

12/12/18

LOG OF EXPLORATION PIT NO. EP-19

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.	
	DESCRIPTION	<u>Elev: 502 ft</u>
	Sod / Topsoil - 6 inches	
	Weathered Vashon Lodgement Till	
1	Medium dense, very moist, brown, gravelly, silty, SAND; wet at 1.5 feet (SM).	
	Vashon Lodgement Till	
2	Very dense, wet, grayish tan, very silty, gravelly, SAND; scattered cobbles; nonstratified (SM).	
3		
4		
5		
6		
7		
	Bottom of exploration pit at depth 7 feet Slow seepage at 1.5 feet. No caving.	
8		
9		
10		
11		
12		

Issaquah HS #4 and ES #17 Issaquah, WA

Logged by: TJP

Approved by: CJK
C-2 - Page 51 of 95



a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Project No. 180070E001

12/12/18

LOG OF EXPLORATION PIT NO. EP-20

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered. DESCRIPTION <u>Elev: 499 ft</u>	
	Sod / Topsoil - 6 inches	
	Vashon Lodgement Till	
1	Very dense, very moist, grayish tan, very silty, gravelly, SAND; scattered cobbles; nonstratified (SM). Becomes moist below ~1 foot.	
2		
3		
4	Becomes tan gray below ~4 feet.	
5		
6	Very difficult digging.	
	Bottom of exploration pit at depth 6 feet No seepage. No caving.	
7		
8		
9		
10		
11		
12		

Issaquah HS #4 and ES #17 Issaquah, WA

Logged by: TJP

Approved by: CJK
C-2 - Page 52 of 95



a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Project No. 180070E001

12/12/18

LOG OF EXPLORATION PIT NO. EP-21

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.	
	DESCRIPTION <u>Elev: 490 ft</u>	
	Topsoil - 6 inches	
	Weathered Vashon Lodgement Till	
1	Loose, moist, reddish brown to brown, very silty, gravelly, SAND (SM).	
2	Abundant roots 0 to 2 feet. Becomes medium dense, very moist, and tan below 2 feet.	
3	Wet at 3.5 feet.	
	Vashon Lodgement Till	
4	Very dense, moist, grayish tan, very silty, gravelly, SAND; nonstratified (SM). Mottled 3.5 to 4.5 feet.	
5		
6		
7		
8		
9		
10	Bottom of exploration pit at depth 9.5 feet Slow seepage at 3.5 feet. No caving.	
11		
12		

Issaquah HS #4 and ES #17 Issaquah, WA

Logged by: TJP

Approved by: CJK
C-2 - Page 53 of 95

a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Project No. 180070E001

12/10/18

LOG OF EXPLORATION PIT NO. EP-22

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.	
	DESCRIPTION Elev: 478 ft	
	Topsoil - 8 inches	
1	Weathered Vashon Lodgement Till Loose, moist, reddish brown, very silty, gravelly, SAND (SM). Abundant roots 0 to 2 feet.	
2	Becomes medium dense, very moist, and tan below 2 feet.	
3		
4	Vashon Lodgement Till	
5	Dense, moist, tan, very silty, gravelly, SAND; nonstratified (SM). Mottled 4 to 5 feet. Very dense and grayish tan below 5 feet.	
6		
7		
8		
9	Bottom of exploration pit at depth 8.5 feet No seepage. No caving.	
10		
11		
12		

Issaquah HS #4 and ES #17 Issaquah, WA

Logged by: TJP

Approved by: CJK
C-2 - Page 54 of 95

a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Project No. 180070E001

12/10/18

LOG OF EXPLORATION PIT NO. EP-23

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.	
	DESCRIPTION <u>Elev: 460 ft</u>	
	Topsoil - 6 inches	
	Weathered Vashon Lodgement Till	
1	Loose, moist, reddish brown, very silty, gravelly, SAND (SM).	
2	Becomes medium dense and tan below 2 feet. Abundant roots 0 to 2 feet.	
3	Vashon Lodgement Till	
4	Very dense, moist, grayish tan, very silty, gravelly, SAND; nonstratified (SM).	
5		
6		
7		
8	Bottom of exploration pit at depth 8 feet No seepage. No caving.	
9		
10		
11		
12		

Issaquah HS #4 and ES #17 Issaquah, WA

Logged by: TJP

Approved by: CJK
C-2 - Page 55 of 95



a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Project No. 180070E001

12/10/18

LOG OF EXPLORATION PIT NO. EP-24

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.	
	DESCRIPTION <u>Elev: 445 ft</u>	
	Topsoil - 6 inches	
	Weathered Vashon Lodgement Till	
1	Loose, moist, reddish brown, very silty, gravelly, SAND (SM).	
2		
3	Becomes medium dense and tan below 2.5 feet.	
	Vashon Lodgement Till	
4	Very dense, moist, grayish tan, very silty, gravelly, SAND; scattered cobbles and boulders; nonstratified (SM). Mottled 3.5 to 4.5 feet.	
5		
6		
7		
8		
9		
10	Bottom of exploration pit at depth 9 feet No seepage. No caving.	
11		
12		

Issaquah HS #4 and ES #17 Issaquah, WA

Logged by: TJP

Approved by: CJK
C-2 - Page 56 of 95

a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Project No. 180070E001

12/10/18

LOG OF EXPLORATION PIT NO. EP-25

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.	
	DESCRIPTION	<u>Elev: 425 ft</u>
	Topsoil - 6 inches	
	Weathered Vashon Lodgement Till	
1	Loose, moist, reddish brown, very silty, gravelly, SAND (SM).	
2		
3	Abundant roots 0 to 3 feet. Becomes medium dense and tan below 3 feet.	
4		
	Vashon Lodgement Till	
5	Very dense, moist, grayish tan, very silty, gravelly, SAND; scattered boulders and cobbles; nonstratified (SM). Mottled 4.5 to 6 feet.	
6		
7		
8		
9		
10		
11	Bottom of exploration pit at depth 10 feet No seepage. No caving.	
12		

Issaquah HS #4 and ES #17 Issaquah, WA

Logged by: TJP

Approved by: CJK
C-2 - Page 57 of 95

a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Project No. 180070E001

12/10/18

LOG OF EXPLORATION PIT NO. EP-26

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.	
	DESCRIPTION <u>Elev: 420 ft</u>	
	Topsoil - 6 inches	
	Weathered Vashon Lodgement Till	
1	Loose, moist, reddish brown, very silty, SAND, some gravel (SM).	
2	Abundant roots 0 to 2 feet. Becomes medium dense, very moist, and tan below 2 feet.	
3	Vashon Lodgement Till	
	Very dense, moist, grayish tan, very silty, gravelly, SAND; scattered cobbles; nonstratified (SM).	
4	Mottled 3 to 4 feet.	
5		
6		
7		
8		
	Bottom of exploration pit at depth 8 feet No seepage. No caving.	
9		
10		
11		
12		

Issaquah HS #4 and ES #17 Issaquah, WA

Logged by: TJP

Approved by: CJK
C-2 - Page 58 of 95

a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Project No. 180070E001

12/10/18

LOG OF EXPLORATION PIT NO. EP-27

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered. DESCRIPTION <u>Elev: 425 ft</u>
1	Topsoil - 6 inches Weathered Vashon Lodgement Till Loose, moist, reddish brown, very silty, gravelly, SAND; scattered cobbles (SM). Medium dense, very moist, and tan below 1.5 feet. Abundant roots 0 to 1.5 feet.
2	
3	Vashon Lodgement Till Very dense, moist, grayish tan, very silty, gravelly, SAND; nonstratified (SM).
4	
5	
6	
7	
8	
9	Bottom of exploration pit at depth 8 feet No seepage. No caving.
10	
11	
12	

Issaquah HS #4 and ES #17 Issaquah, WA

Logged by: TJP

Approved by: CJK
C-2 - Page 59 of 95

a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Project No. 180070E001

12/10/18

LOG OF EXPLORATION PIT NO. EP-28

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.	
	DESCRIPTION <u>Elev: 460 ft</u>	
	Topsoil - 6 inches	
	Weathered Vashon Lodgement Till	
1	Loose, moist, reddish brown, very silty, gravelly, SAND (SM).	
2		
3	Abundant roots 0 to 2.5 feet. Becomes medium dense, very moist, and tan below 2.5 feet.	
4	Vashon Lodgement Till	
5	Very dense, moist, tan, very silty, gravelly, SAND; scattered cobbles (SM).	
6		
7		
8		
9	Bottom of exploration pit at depth 8 feet No seepage. No caving.	
10		
11		
12		

Issaquah HS #4 and ES #17 Issaquah, WA

Logged by: TJP

Approved by: CJK
C-2 - Page 60 of 95

a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Project No. 180070E001

12/10/18

LOG OF EXPLORATION PIT NO. EP-29

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.	
	DESCRIPTION <u>Elev: 460 ft</u>	
	Topsoil - 6 inches	
	Weathered Vashon Lodgement Till	
1	Loose to medium dense, moist, reddish brown, very silty, gravelly, SAND; abundant roots (SM).	
2		
3		
	Vashon Lodgement Till	
4	Mottled 3.5 to 4.5 feet. Dense to very dense, moist, grayish tan, very silty, gravelly, SAND; scattered cobbles; nonstratified (SM).	
5		
6	Grades to tan gray below ~6 feet.	
7		
8		
9		
	Bottom of exploration pit at depth 9 feet No seepage. No caving.	
10		
11		
12		

Issaquah HS #4 and ES #17 Issaquah, WA

Logged by: TJP

Approved by: CJK
C-2 - Page 61 of 95



a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Project No. 180070E001

12/10/18

LOG OF EXPLORATION PIT NO. EP-30

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered. DESCRIPTION <u>Elev: 485 ft</u>	
	Topsoil - 8 inches	
1	Weathered Vashon Lodgement Till	
	Loose, moist, brown, very silty, gravelly, SAND (SM). Abundant roots 0 to 1.5 feet.	
2		
	Becomes medium dense, very moist, and tan below 2.5 feet.	
3		
4		
5		
6	Vashon Lodgement Till	
	Dense, moist, light yellowish tan, very silty, gravelly, SAND; scattered cobbles; nonstratified (SM).	
7		
8		
	Bottom of exploration pit at depth 8 feet No seepage. No caving. Note: The color and density of the Till at this location suggests that it contains a significant percentage of reworked material from the underlying bedrock.	
9		
10		
11		
12		

Issaquah HS #4 and ES #17 Issaquah, WA

Logged by: TJP

Approved by: CJK
C-2 - Page 62 of 95



a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Project No. 180070E001

12/13/18

LOG OF EXPLORATION PIT NO. EP-31

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered. DESCRIPTION <u>Elev: 490 ft</u>
	Topsoil - 8 inches
1	Weathered Vashon Lodgement Till
	Loose to medium dense, very moist, reddish brown, very silty, gravelly, SAND (SM).
2	
	Abundant roots 0 to 3 feet.
3	Wet at 3 feet. Becomes medium dense and grayish tan below 3 feet.
	Vashon Lodgement Till
4	Dense, very moist, grayish tan, very silty, gravelly, SAND; scattered cobbles; nonstratified (SM).
	Mottled 3.5 to 4.5 feet. Becomes very dense below 4.5 feet.
5	
6	
7	
8	
	Bottom of exploration pit at depth 8 feet Slow seepage at 3 feet. Minor sloughing at 3 feet.
9	
10	
11	
12	

Issaquah HS #4 and ES #17 Issaquah, WA

Logged by: TJP

Approved by: CJK
C-2 - Page 63 of 95

a s s o c i a t e d
e a r t h s c i e n c e s
i n c o r p o r a t e d

Project No. 180070E001

12/13/18

TEST PIT NUMBER TP-1

PAGE 1 OF 1



Earth Solutions NW
1805 - 136th Place N.E., Suite 201
Bellevue, Washington 98005
Telephone: 425-449-4704
Fax: 425-449-4711

CLIENT Plateau Campus, LLCPROJECT NAME Plateau Campus PropertyPROJECT NUMBER 3333PROJECT LOCATION Issaquah, WashingtonDATE STARTED 5/5/14COMPLETED 5/5/14

GROUND ELEVATION _____

TEST PIT SIZE _____

EXCAVATION CONTRACTOR NW Excavating

GROUND WATER LEVELS:

EXCAVATION METHOD _____

AT TIME OF EXCAVATION ---LOGGED BY SHACHECKED BY SSRAT END OF EXCAVATION ---NOTES Depth of Topsoil & Sod 10": bare soilAFTER EXCAVATION ---

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0					
			TPSL		TOPSOIL
		MC = 16.90% Fines = 24.00%			Brown silty SAND with gravel, loose to medium dense, moist (Weathered Till)
			SM		-mottled with light iron oxide staining, becomes dense
5		MC = 12.50%			-becomes very dense and unweathered, perched seepage
					7.0
					Test pit terminated at 7.0 feet below existing grade. Groundwater seepage encountered at 4.0 feet during excavation.
					Bottom of test pit at 7.0 feet.

GENERAL BH / TP / WELL 3333.GPJ GINT US GDT 6/6/14

		Earth Solutions NW 1805 - 136th Place N.E., Suite 201 Bellevue, Washington 98005 Telephone: 425-449-4704 Fax: 425-449-4711		TEST PIT NUMBER TP-3 PAGE 1 OF 1	
		CLIENT <u>Plateau Campus, LLC</u>		PROJECT NAME <u>Plateau Campus Property</u>	
PROJECT NUMBER <u>3333</u>		PROJECT LOCATION <u>Issaquah, Washington</u>			
DATE STARTED <u>5/5/14</u>		COMPLETED <u>5/5/14</u>		GROUND ELEVATION _____ TEST PIT SIZE _____	
EXCAVATION CONTRACTOR <u>NW Excavating</u>		EXCAVATION METHOD _____		GROUND WATER LEVELS: AT TIME OF EXCAVATION _____ AT END OF EXCAVATION _____ AFTER EXCAVATION _____	
LOGGED BY <u>SHA</u>		CHECKED BY <u>SSR</u>			
NOTES <u>Depth of Topsoil & Sod 12": lvy</u>					

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0					TOPSOIL
		MC = 15.70% Fines = 29.10%	TPSL	1.0	Brown silty SAND with gravel, loose to medium dense, moist (Weathered Till)
		MC = 8.00%	SM		-heavy perched seepage -becomes very dense and unweathered
5				5.0	Test pit terminated at 5.0 feet below existing grade. Groundwater seepage encountered at 1.5 feet during excavation. Bottom of test pit at 5.0 feet.

GENERAL BH / TP / WELL 3333.GPJ GINT US GDT 6/5/14

		Earth Solutions NW 1805 - 138th Place N.E., Suite 201 Bellevue, Washington 98005 Telephone: 425-449-4704 Fax: 425-449-4711		TEST PIT NUMBER TP-4 PAGE 1 OF 1	
		CLIENT <u>Plateau Campus, LLC</u>		PROJECT NAME <u>Plateau Campus Property</u>	
PROJECT NUMBER <u>3333</u>		PROJECT LOCATION <u>Issaquah, Washington</u>			
DATE STARTED <u>5/5/14</u>		COMPLETED <u>5/5/14</u>		GROUND ELEVATION _____ TEST PIT SIZE _____	
EXCAVATION CONTRACTOR <u>NW Excavating</u>		EXCAVATION METHOD _____		GROUND WATER LEVELS:	
LOGGED BY <u>SHA</u>		CHECKED BY <u>SSR</u>		AT TIME OF EXCAVATION _____	
NOTES <u>Depth of Topsoil & Sod 18" Ivy</u>				AT END OF EXCAVATION _____	
				AFTER EXCAVATION _____	

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0					TOPSOIL
		MC = 11.80%	TPSL	1.5	Brown silty SAND with gravel, loose and medium dense, moist (Weathered Till)
		MC = 12.00%			
5		MC = 12.10%	SM		-becomes very dense and unweathered
				8.0	Test pit terminated at 8.0 feet below existing grade. Groundwater seepage encountered at 3.5 feet during excavation. Bottom of test pit at 8.0 feet.

		Earth Solutions NW 1805 - 136th Place N.E., Suite 201 Bellevue, Washington 98005 Telephone: 425-449-4704 Fax: 425-449-4711		TEST PIT NUMBER TP-5 PAGE 1 OF 1	
		CLIENT <u>Plateau Campus, LLC</u>		PROJECT NAME <u>Plateau Campus Property</u>	
PROJECT NUMBER <u>3333</u>		PROJECT LOCATION <u>Issaquah, Washington</u>			
DATE STARTED <u>5/5/14</u>		COMPLETED <u>5/5/14</u>		GROUND ELEVATION _____ TEST PIT SIZE _____	
EXCAVATION CONTRACTOR <u>NW Excavating</u>		EXCAVATION METHOD _____		GROUND WATER LEVELS:	
LOGGED BY <u>SHA</u>		CHECKED BY <u>SSR</u>		AT TIME OF EXCAVATION _____	
NOTES <u>Depth of Topsoil & Sod 6": bare soil</u>				AT END OF EXCAVATION _____	
				AFTER EXCAVATION _____	

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0					
			TPSL	0.5	TOPSOIL Brown silty SAND with gravel, medium dense, moist (Fill)
5		MC = 14.30%		SM	-becomes medium dense to dense
10		MC = 16.80%			-native, unweathered till contact
				10.0	Test pit terminated at 10.0 feet below existing grade. No groundwater encountered during excavation. Bottom of test pit at 10.0 feet.

GENERAL BH/TP / WELL 3333.GPJ GINT US.GDT 5/5/14



Earth Solutions NW
1805 - 136th Place N.E., Suite 201
Bellevue, Washington 98005
Telephone: 425-449-4704
Fax: 425-449-4711

TEST PIT NUMBER TP-6

PAGE 1 OF 1

CLIENT Plateau Campus, LLCPROJECT NAME Plateau Campus PropertyPROJECT NUMBER 3393PROJECT LOCATION Issaquah, WashingtonDATE STARTED 5/5/14COMPLETED 5/5/14

GROUND ELEVATION _____

TEST PIT SIZE _____

EXCAVATION CONTRACTOR NW Excavating

GROUND WATER LEVELS:

EXCAVATION METHOD _____

AT TIME OF EXCAVATION —LOGGED BY SHACHECKED BY SSRAT END OF EXCAVATION —NOTES Depth of Topsoil & Sod 6": fernsAFTER EXCAVATION —

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0				
		TPSL	1/2"	0.5 TOPSOIL
				Brown silty SAND with gravel, medium dense, moist (Weathered Till)
		SM		-becomes very dense and unweathered
				4.0
				Test pit terminated at 4.0 feet below existing grade. No groundwater encountered during excavation. Bottom of test pit at 4.0 feet.

		Earth Solutions NW 1805 - 136th Place N.E., Suite 201 Bellevue, Washington 98005 Telephone: 425-449-4704 Fax: 425-449-4711		TEST PIT NUMBER TP-7 PAGE 1 OF 1	
		CLIENT <u>Plateau Campus, LLC</u>		PROJECT NAME <u>Plateau Campus Property</u>	
PROJECT NUMBER <u>3333</u>		PROJECT LOCATION <u>Issaquah, Washington</u>			
DATE STARTED <u>5/5/14</u> COMPLETED <u>5/5/14</u>		GROUND ELEVATION _____ TEST PIT SIZE _____			
EXCAVATION CONTRACTOR <u>NW Excavating</u>		GROUND WATER LEVELS:			
EXCAVATION METHOD _____		AT TIME OF EXCAVATION <u>—</u>			
LOGGED BY <u>SHA</u> CHECKED BY <u>SSR</u>		AT END OF EXCAVATION <u>—</u>			
NOTES <u>Depth of Topsoil & Sod 12": ferns</u>		AFTER EXCAVATION <u>—</u>			

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0					TOPSOIL
		MC = 15.80%	TPSL		1.0
			SM		Brown silty SAND with gravel, medium dense, moist (Weathered Till) -cobbles -becomes very dense and unweathered -cobbles down to terminus of test pit
		MC = 10.40% Fines = 11.30%			4.0
5					Brown poorly graded GRAVEL with silt and sand, dense, moist
		MC = 21.80%	GP-GM		
10					
					13.0
					Test pit terminated at 13.0 feet below existing grade. No groundwater encountered during excavation. Bottom of test pit at 13.0 feet.

GENERAL BH / TP / WELL 3333 GPJ GINT US GDT 6/2/14

		Earth Solutions NW 1805 - 136th Place N.E., Suite 201 Bellevue, Washington 98005 Telephone: 425-449-4704 Fax: 425-449-4711		TEST PIT NUMBER TP-9 PAGE 1 OF 1	
		CLIENT <u>Plateau Campus, LLC</u>		PROJECT NAME <u>Plateau Campus Property</u>	
PROJECT NUMBER <u>3333</u>		PROJECT LOCATION <u>Issaquah, Washington</u>			
DATE STARTED <u>5/5/14</u>		COMPLETED <u>5/5/14</u>		GROUND ELEVATION _____ TEST PIT SIZE _____	
EXCAVATION CONTRACTOR <u>NW Excavating</u>		EXCAVATION METHOD _____		GROUND WATER LEVELS:	
LOGGED BY <u>SHA</u>		CHECKED BY <u>SSR</u>		AT TIME OF EXCAVATION _____	
NOTES <u>Depth of Topsoil & Sod 12": duff</u>				AT END OF EXCAVATION _____	
				AFTER EXCAVATION _____	

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0					TOPSOIL
		MC = 23.20%	TPSL		1.0 Brown silty SAND with gravel, loose to medium dense, moist (Weathered Till)
			SM		-fractured -cobbles, mottled texture
					3.0 Brown poorly graded GRAVEL with silt and sand, dense, moist
5		MC = 17.20%	GP-GM		
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					
					

		Earth Solutions NW 1805 - 138th Place N.E., Suite 201 Bellevue, Washington 98005 Telephone: 425-449-4704 Fax: 425-449-4711		TEST PIT NUMBER TP-8 PAGE 1 OF 1	
		CLIENT <u>Plateau Campus, LLC</u>		PROJECT NAME <u>Plateau Campus Property</u>	
PROJECT NUMBER <u>3333</u>		PROJECT LOCATION <u>Issaquah, Washington</u>			
DATE STARTED <u>5/5/14</u>		COMPLETED <u>5/5/14</u>		GROUND ELEVATION _____ TEST PIT SIZE _____	
EXCAVATION CONTRACTOR <u>NW Excavating</u>		EXCAVATION METHOD _____		GROUND WATER LEVELS:	
LOGGED BY <u>SHA</u>		CHECKED BY <u>SSR</u>		AT TIME OF EXCAVATION _____	
NOTES <u>Depth of Topsoil & Sod 10": forest duff</u>				AT END OF EXCAVATION _____	
				AFTER EXCAVATION _____	

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0					TOPSOIL
			TPSL		1.0 Brown silty SAND with gravel, loose to medium dense, moist (Weathered Till)
5			SM		-becomes very dense and unweathered -cobbles
		MC = 19.70%			
				8.0	Test pit terminated at 8.0 feet below existing grade. No groundwater encountered during excavation. Bottom of test pit at 8.0 feet.

		Earth Solutions NW 1805 - 136th Place N.E., Suite 201 Bellevue, Washington 98005 Telephone: 425-449-4704 Fax: 425-449-4711		TEST PIT NUMBER TP-10 PAGE 1 OF 1	
		CLIENT <u>Plateau Campus, LLC</u>		PROJECT NAME <u>Plateau Campus Property</u>	
PROJECT NUMBER <u>3333</u>		PROJECT LOCATION <u>Issaquah, Washington</u>		DATE STARTED <u>5/5/14</u> COMPLETED <u>5/5/14</u>	
EXCAVATION CONTRACTOR <u>NW Excavating</u>		GROUND ELEVATION _____		TEST PIT SIZE _____	
EXCAVATION METHOD _____		GROUND WATER LEVELS:			
LOGGED BY <u>SHA</u> CHECKED BY <u>SSR</u>		AT TIME OF EXCAVATION _____			
NOTES <u>Depth of Topsoil & Sod 10": blackberry bushes</u>		AT END OF EXCAVATION _____			
AFTER EXCAVATION _____		TEST PIT SIZE _____			

DEPTH (ft)	SAMPLE TYPE NUMBER	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0				TOPSOIL
		TPSL	1.0	Brown silty SAND with gravel, medium dense, moist
		SM	3.0	-cobbles and weathered fractured bedrock
		GP-GM	5.0	Brown poorly graded GRAVEL with silt and sand, dense, moist
5				Test pit terminated at 5.0 feet below existing grade. No groundwater encountered during excavation. Bottom of test pit at 5.0 feet.

GENERAL BH / TP / WELL 3333.GPJ GINT US GDT 5/5/14

LOG OF TEST PIT NO. TP-1

FIGURE A-2

PROJECT NAME: Madison Pointe PROJ. NO: T-7252 LOGGED BY: CSD
 LOCATION: Issaquah, Washington SURFACE CONDS: Heavy Understory APPROX. ELEV: 466 Feet
 DATE LOGGED: July 8, 2015 DEPTH TO GROUNDWATER: N/A DEPTH TO CAVING: N/A

DEPTH (FT.)	SAMPLE NO.	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)	REMARKS
1		Brown silty SAND, fine grained, dry, heavy organic inclusions. (SM) (Topsoil)	Loose	7.1		
2	1					
3		Brown silty SAND with gravel, fine to medium grained, dry, roots. (SM)	Medium Dense	9.5		
4						
5						
6	2					
7		Gray silty SAND with gravel to SAND with silt and gravel, fine to medium grained, dry to moist, cemented. (SM/SP-SM)	Very Dense			
8						
9						
10						
11		Test pit terminated at approximately 10 feet. No groundwater seepage observed.				
12						
13						
14						
15						

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



**Terra
Associates, Inc.**
 Consultants in Geotechnical Engineering
 Geology and
 Environmental Earth Sciences

LOG OF TEST PIT NO. TP-2

FIGURE A-3

PROJECT NAME: Madison Pointe PROJ. NO: T-7252 LOGGED BY: CSD
 LOCATION: Issaquah, Washington SURFACE CONDS: Heavy Understory APPROX. ELEV: 464 Feet
 DATE LOGGED: July 8, 2015 DEPTH TO GROUNDWATER: N/A DEPTH TO CAVING: N/A

DEPTH (FT.)	SAMPLE NO.	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)	REMARKS
1		Brown silty SAND, fine grained, dry, heavy organic inclusions. (SM) (Topsoil)	Loose			
2	1	Brown silty SAND with gravel, fine to medium grained, dry, roots. (SM)	Medium Dense	9.2		
3						
4	2	Gray silty SAND with gravel, fine to medium grained, dry, cemented. (SM)	Dense	6.5		
5						
6						
7	3	Gray silty SAND with gravel to SAND with silt and gravel, fine to medium grained, moist, cemented. (SM/SP-SM)	Very Dense	8.1		
8						
9						
10						
11		Test pit terminated at approximately 10 feet. No groundwater seepage observed.				
12						
13						
14						
15						

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



**Terra
Associates, Inc.**
 Consultants in Geotechnical Engineering
 Geology and
 Environmental Earth Sciences

LOG OF TEST PIT NO. TP-3

FIGURE A-4

PROJECT NAME: Madison Pointe PROJ. NO: T-7252 LOGGED BY: CSD
 LOCATION: Issaquah, Washington SURFACE CONDS: Moderate Understory APPROX. ELEV: 438 Feet
 DATE LOGGED: July 8, 2015 DEPTH TO GROUNDWATER: N/A DEPTH TO CAVING: 0 to 3 Feet

DEPTH (FT.)	SAMPLE NO.	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)	REMARKS
1	1	(6 inches ORGANICS) Brown silty SAND with gravel to SAND with silt and gravel, fine to medium grained, dry, roots. (SM/SP-SM)	Medium Dense	5.7		
2						
3						
4						
5	2			4.9		
6		Gray silty SAND with gravel to SAND with silt and gravel, fine to medium grained, dry to moist, cemented, occasional cobble. (SM/SP-SM)	Very Dense			
7						
8						
9						
10		Test pit terminated at approximately 9 feet. No groundwater seepage observed. Minor caving observed in the upper 3 feet.				
11						
12						
13						
14						
15						

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



**Terra
Associates, Inc.**
 Consultants in Geotechnical Engineering
 Geology and
 Environmental Earth Sciences

LOG OF TEST PIT NO. TP-4

FIGURE A-5

PROJECT NAME: Madison Pointe PROJ. NO: T-7252 LOGGED BY: CSD
 LOCATION: Issaquah, Washington SURFACE CONDS: Minimal Understory APPROX. ELEV: 480 Feet
 DATE LOGGED: July 8, 2015 DEPTH TO GROUNDWATER: N/A DEPTH TO CAVING: N/A

DEPTH (FT.)	SAMPLE NO.	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)	REMARKS
1		Brown silty SAND, fine grained, dry, heavy organic inclusions. (SM) (Topsoil)	Loose			
2	1	Gray silty SAND with gravel, fine to medium grained, dry, some roots. (SM)	Dense	9.7		
3						
4						
5	2			23.7		
6						
7		Gray SILTSTONE, moist.	Very Dense			
8						
9	3			25.1		
10		Test pit terminated at approximately 10 feet. No groundwater seepage observed.				
11						
12						
13						
14						
15						

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



**Terra
Associates, Inc.**
 Consultants in Geotechnical Engineering
 Geology and
 Environmental Earth Sciences

LOG OF TEST PIT NO. TP-5

FIGURE A-6

PROJECT NAME: Madison Pointe PROJ. NO: T-7252 LOGGED BY: CSD
 LOCATION: Issaquah, Washington SURFACE CONDS: Moderate Understory APPROX. ELEV: 490 Feet
 DATE LOGGED: July 8, 2015 DEPTH TO GROUNDWATER: N/A DEPTH TO CAVING: N/A

DEPTH (FT.)	SAMPLE NO.	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)	REMARKS
1		Brown silty SAND, fine grained, dry, heavy organic inclusions. (SM) (Topsoil)	Loose			
2	1	Brown silty SAND with gravel, fine to medium grained, dry, large roots. (SM)	Medium Dense	9.0		
3						
4						
5						
6	2	Gray-brown silty SAND mixed with pieces of weathered SANDSTONE, fine to medium grained, dry, cobbles. (SM)	Very Dense	11.6		
7						
8						
9		*Sandstone pieces increase with depth, by 9 feet became difficult to excavate with 125 machine				
10		Test pit terminated at approximately 9 feet. No groundwater seepage observed.				
11						
12						
13						
14						
15						

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



**Terra
Associates, Inc.**
 Consultants in Geotechnical Engineering
 Geology and
 Environmental Earth Sciences

LOG OF TEST PIT NO. TP-6

FIGURE A-7

PROJECT NAME: Madison Pointe PROJ. NO: T-7252 LOGGED BY: CSD
 LOCATION: Issaquah, Washington SURFACE CONDS: Brush/Weeds APPROX. ELEV: 520 Feet
 DATE LOGGED: July 8, 2015 DEPTH TO GROUNDWATER: N/A DEPTH TO CAVING: N/A

DEPTH (FT.)	SAMPLE NO.	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)	REMARKS
1	1	(less than 1" ORGANICS) FILL: gray sandy silt, fine grained, dry, roots, minor construction debris, large piece of concrete.	Medium Dense	11.0		
2		Black silty SAND, fine to medium grained, dry, roots, heavy organic inclusions. (SM) (Topsoil)	Medium Dense			
3						
4	2		Dense	56.0		
5						
6		Red-brown SILTSTONE, very weathered, some cobbles, occasional boulders.				
7						
8						
9		@-9' material becomes less weathered, larger pieces	Very Dense			
10	3			46.6		
11		Test pit terminated at approximately 10 feet. No groundwater seepage observed.				
12						
13						
14						
15						

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



**Terra
Associates, Inc.**
 Consultants in Geotechnical Engineering
 Geology and
 Environmental Earth Sciences

LOG OF TEST PIT NO. TP-7

FIGURE A-8

PROJECT NAME: Madison Pointe PROJ. NO: T-7252 LOGGED BY: CSD
 LOCATION: Issaquah, Washington SURFACE CONDS: Heavy Understory APPROX. ELEV: 516 Feet
 DATE LOGGED: July 8, 2015 DEPTH TO GROUNDWATER: N/A DEPTH TO CAVING: N/A

DEPTH (FT.)	SAMPLE NO.	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)	REMARKS
1		Brown silty SAND, fine grained, dry, heavy organic inclusions. (SM) (Topsoil)	Loose			
2	1	Brown silty SAND with gravel, fine to medium grained, dry, roots. (SM)	Medium Dense	8.0		
3						
4						
5	2	Gray silty SAND with gravel to SAND with silt and gravel, fine to medium grained, dry, cemented. (SM/SP-SM)	Dense	5.9		
6						
7						
8		Test pit terminated at approximately 7 feet. No groundwater seepage observed.				
9						
10						
11						
12						
13						
14						
15						

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



**Terra
Associates, Inc.**
 Consultants in Geotechnical Engineering
 Geology and
 Environmental Earth Sciences

LOG OF TEST PIT NO. TP-8

FIGURE A-9

PROJECT NAME: Madison Pointe PROJ. NO: T-7252 LOGGED BY: CSD
 LOCATION: Issaquah, Washington SURFACE CONDS: Moderate Understory APPROX. ELEV: 482 Feet
 DATE LOGGED: July 8, 2015 DEPTH TO GROUNDWATER: N/A DEPTH TO CAVING: N/A

DEPTH (FT.)	SAMPLE NO.	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)	REMARKS
1		Brown silty SAND, fine grained, dry, heavy organic inclusions. (SM) (Topsoil)	Loose			
2	1			5.3		
3		Brown SAND with silt and gravel, fine to medium grained, dry, roots. (SP-SM)	Medium Dense			
4						
5			Dense			
6						
7	2	Gray silty SAND with gravel, fine to medium grained, dry to moist, cemented, some cobbles/boulders. (SM/SP-SM)	Very Dense	12.7		
8						
9						
10	3	Red-brown SANDSTONE, moist, weathered, difficult to excavate.	Very Dense	10.7		
11		Test pit terminated at approximately 10 feet. No groundwater seepage observed.				
12						
13						
14						
15						

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



Terra Associates, Inc.
 Consultants in Geotechnical Engineering
 Geology and
 Environmental Earth Sciences

LOG OF TEST PIT NO. TP-9

FIGURE A-10

PROJECT NAME: Madison Pointe PROJ. NO: T-7252 LOGGED BY: CSD
 LOCATION: Issaquah, Washington SURFACE CONDS: Moderate Understory APPROX. ELEV: 482 Feet
 DATE LOGGED: July 8, 2015 DEPTH TO GROUNDWATER: N/A DEPTH TO CAVING: N/A

DEPTH (FT.)	SAMPLE NO.	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)	REMARKS
1		Brown silty SAND, fine grained, dry, heavy organic inclusions. (SM) (Topsoil)	Loose			
2	1	Brown silty SAND with gravel, fine to medium grained, dry, roots. (SM)	Medium Dense	7.2		
3						
4						
5						
6	2	Gray silty SAND with gravel to SAND with silt and gravel, fine to medium grained, dry to moist, some cementation, occasional cobble/boulder. (SM/SP-SM)		8.0		
7			Very Dense			
8		*Soil becomes less cemented with depth.				
9	3	*At 9 feet soil becomes wet.		11.6		
10						
11		Test pit terminated at approximately 11 feet. No groundwater seepage observed.				
12						
13						
14						
15						

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.



Terra Associates, Inc.
 Consultants in Geotechnical Engineering
 Geology and
 Environmental Earth Sciences

LOG OF TEST PIT NO. TP-10

FIGURE A-11

PROJECT NAME: Madison Pointe PROJ. NO: T-7252 LOGGED BY: CSD
 LOCATION: Issaquah, Washington SURFACE CONDS: Moderate Understory APPROX. ELEV: 503 Feet
 DATE LOGGED: July 8, 2015 DEPTH TO GROUNDWATER: N/A DEPTH TO CAVING: N/A

DEPTH (FT.)	SAMPLE NO.	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)	REMARKS
1		Brown silty SAND, fine grained, dry, heavy organic inclusions. (SM) (Topsoil)	Loose			
2	1	Brown silty SAND with gravel, fine to medium grained, dry, roots. (SM)	Medium Dense	5.9		
3			Dense			
4			Very Dense			
5	2			9.6		
6						
7		Gray silty SAND with gravel, fine to medium grained, dry to moist, cemented, occasional cobble. (SM)				
8						
9						
10						
11						
12		Test pit terminated at approximately 11 feet. No groundwater seepage observed.				
13						
14						
15						

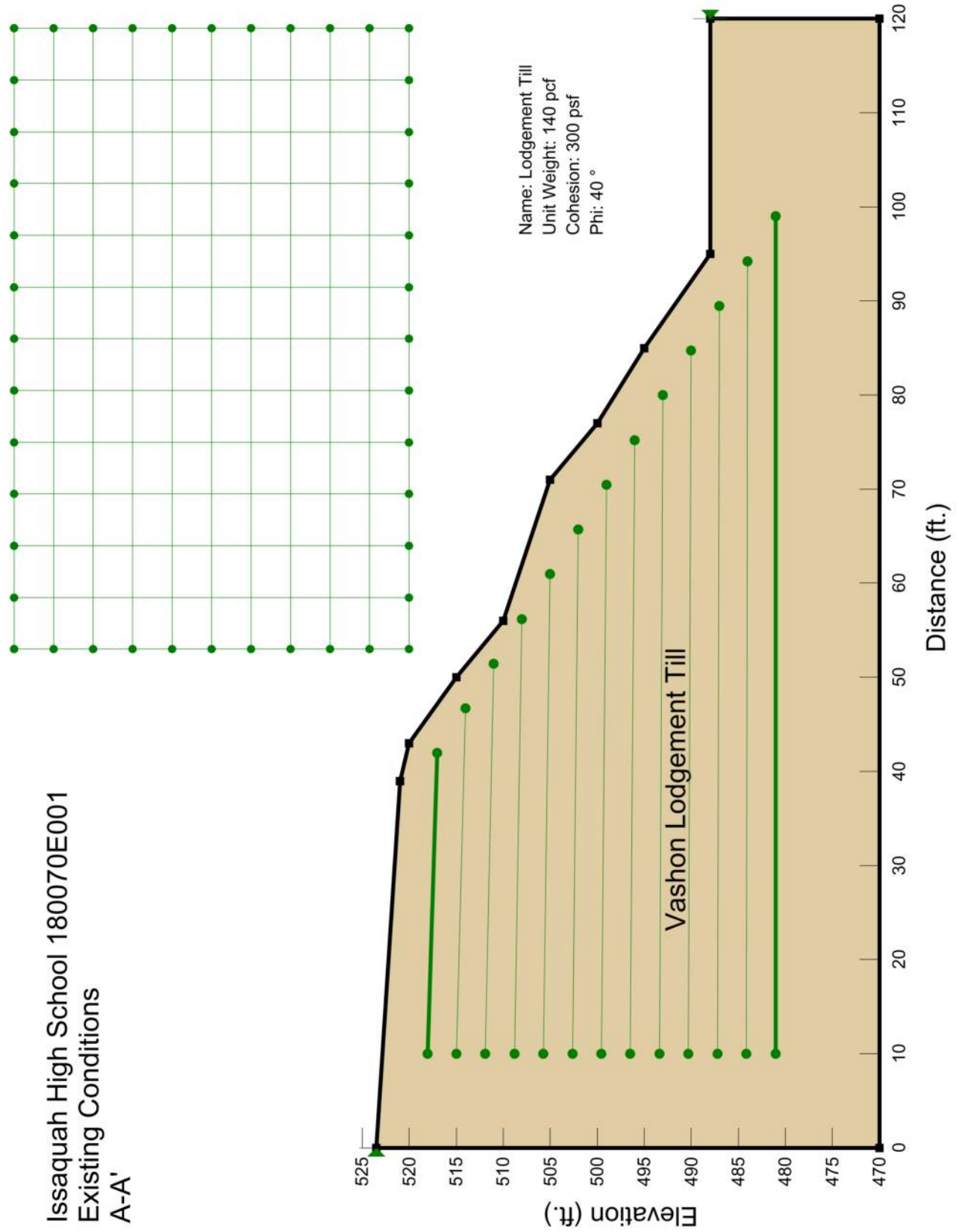
NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

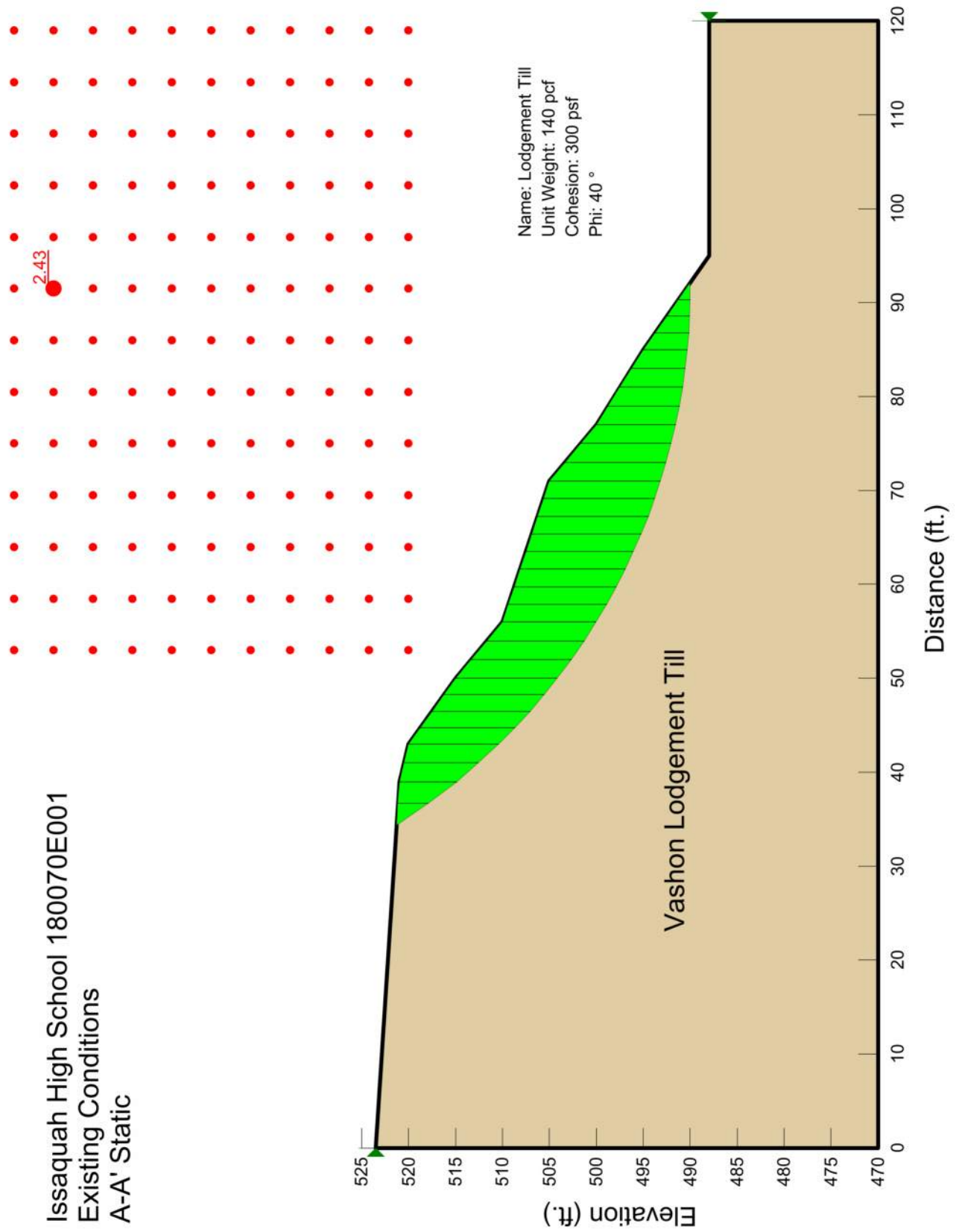


**Terra
Associates, Inc.**
 Consultants in Geotechnical Engineering
 Geology and
 Environmental Earth Sciences

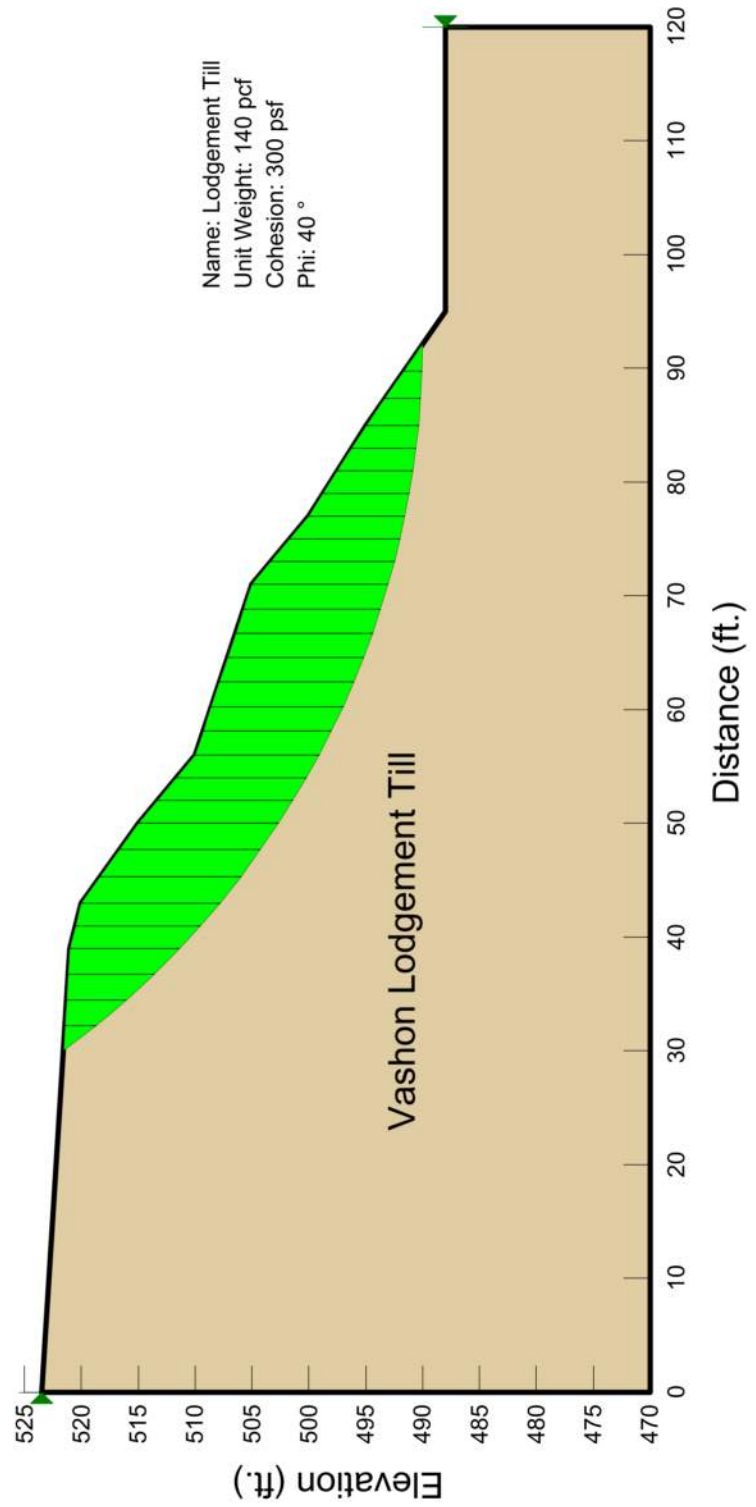
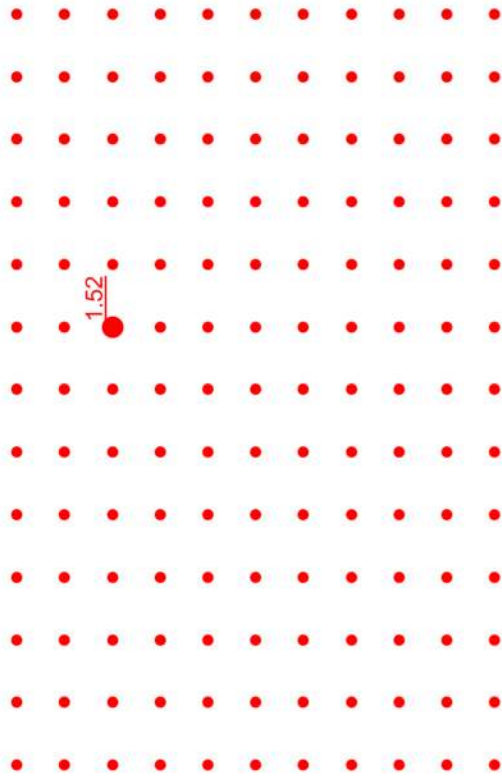
APPENDIX B

SLOPE/W Profiles

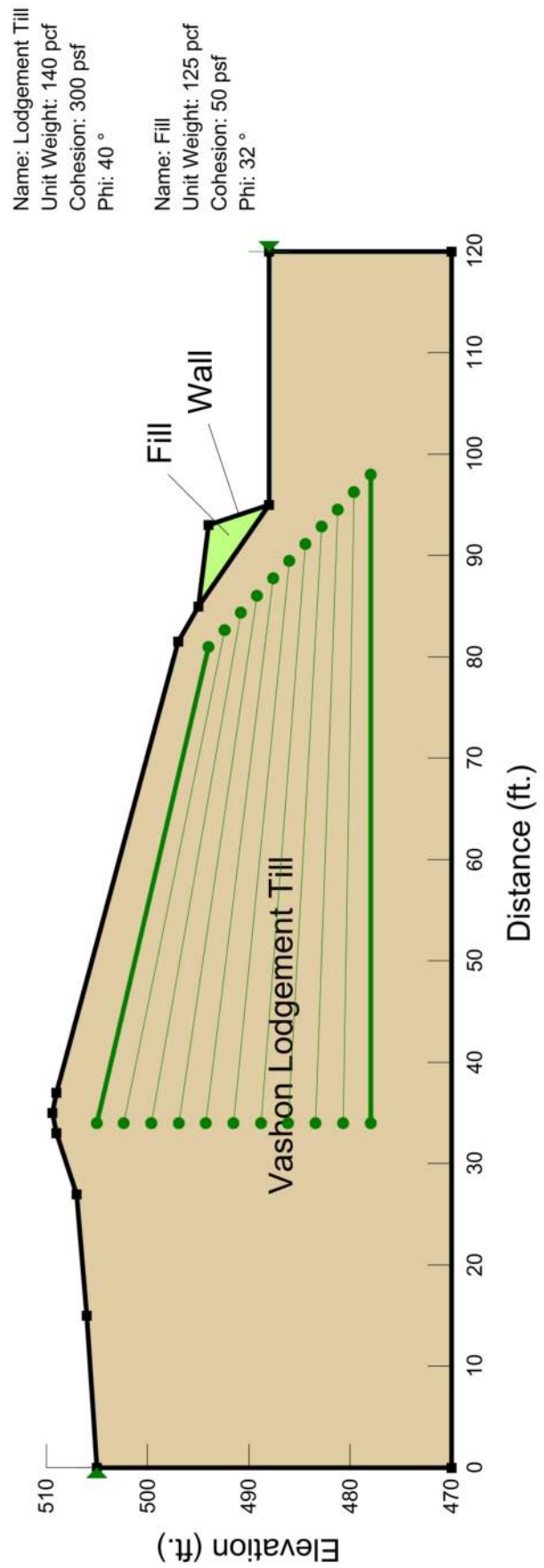
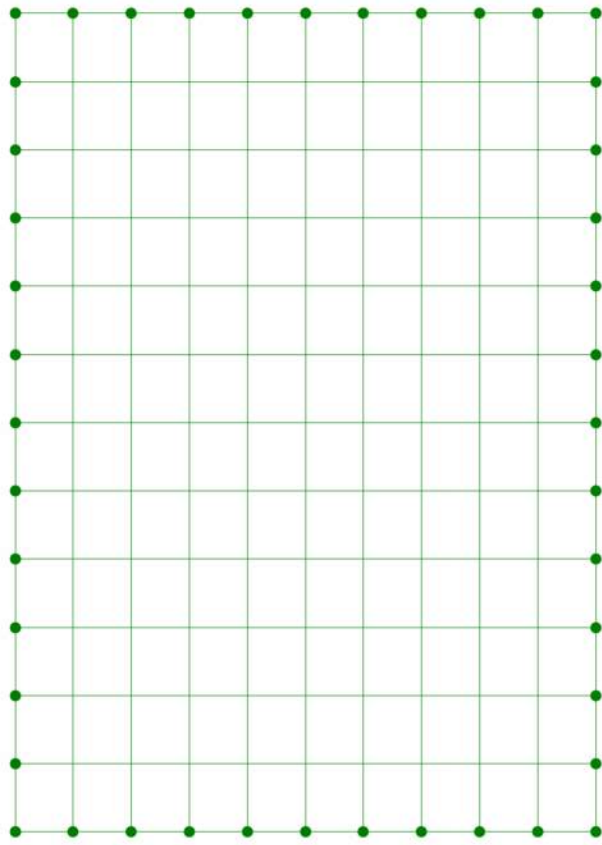




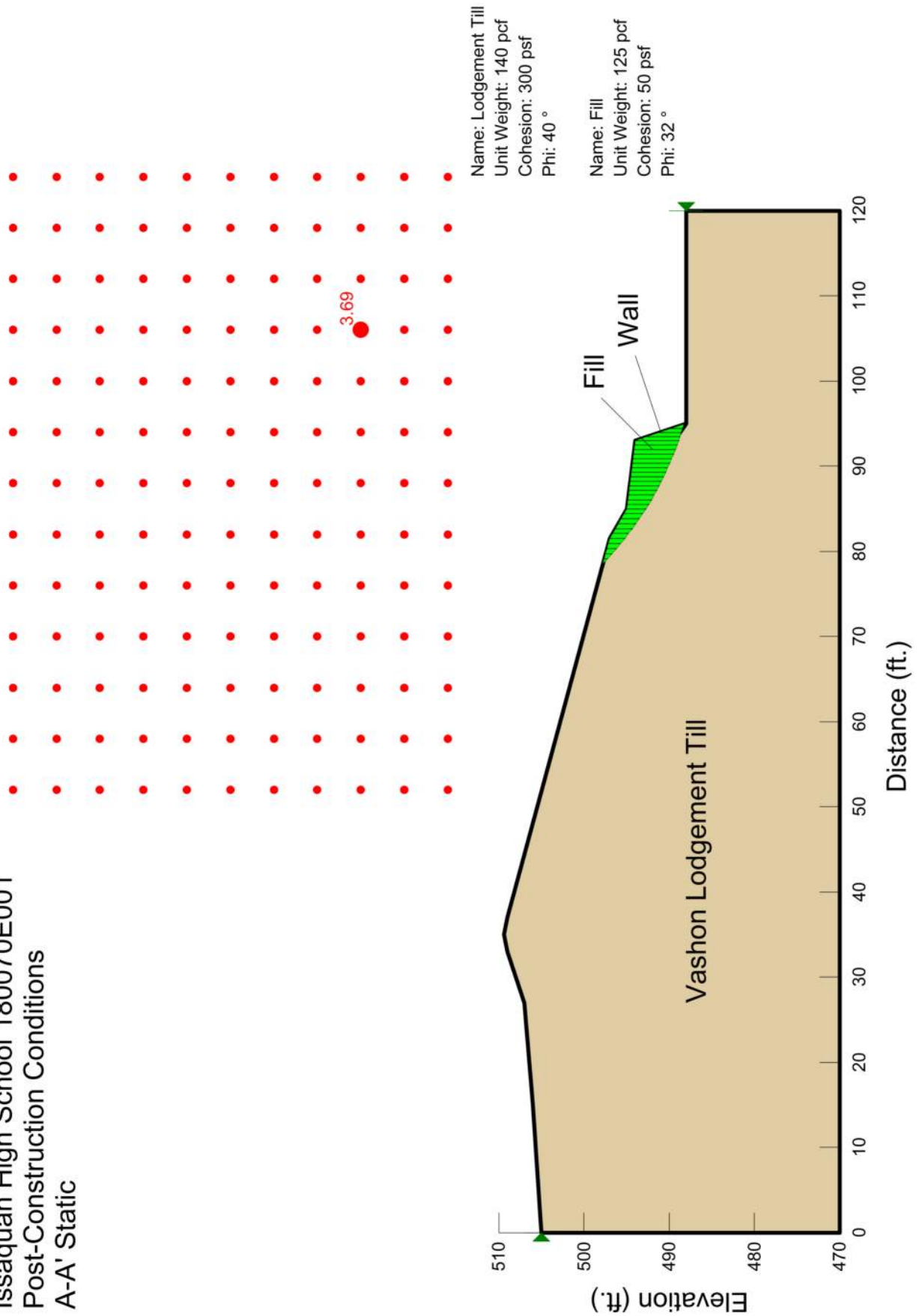
Issaquah High School 180070E001
Existing Conditions
A-A' Seismic - 0.26g



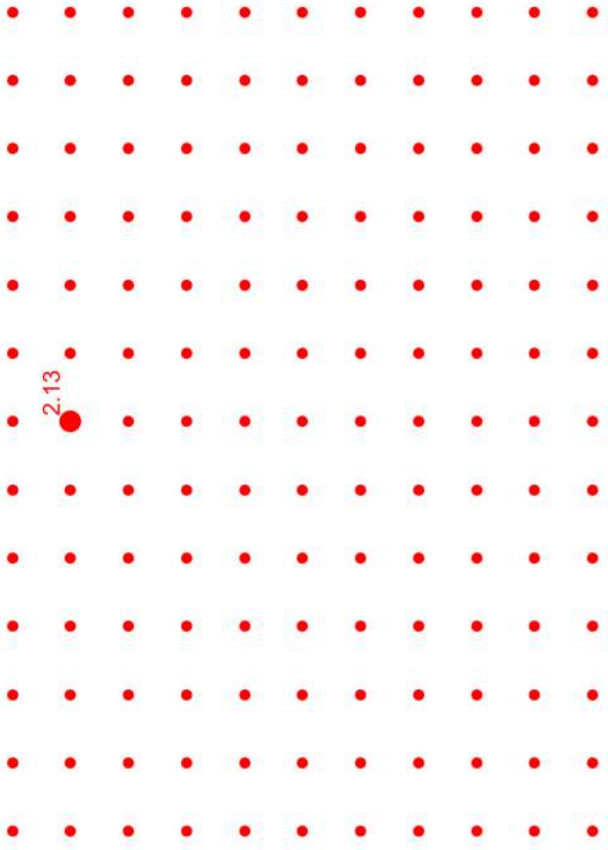
Issaquah High School 180070E001
Post-Construction Conditions
A-A'



Issaquah High School 180070E001
Post-Construction Conditions
A-A' Static

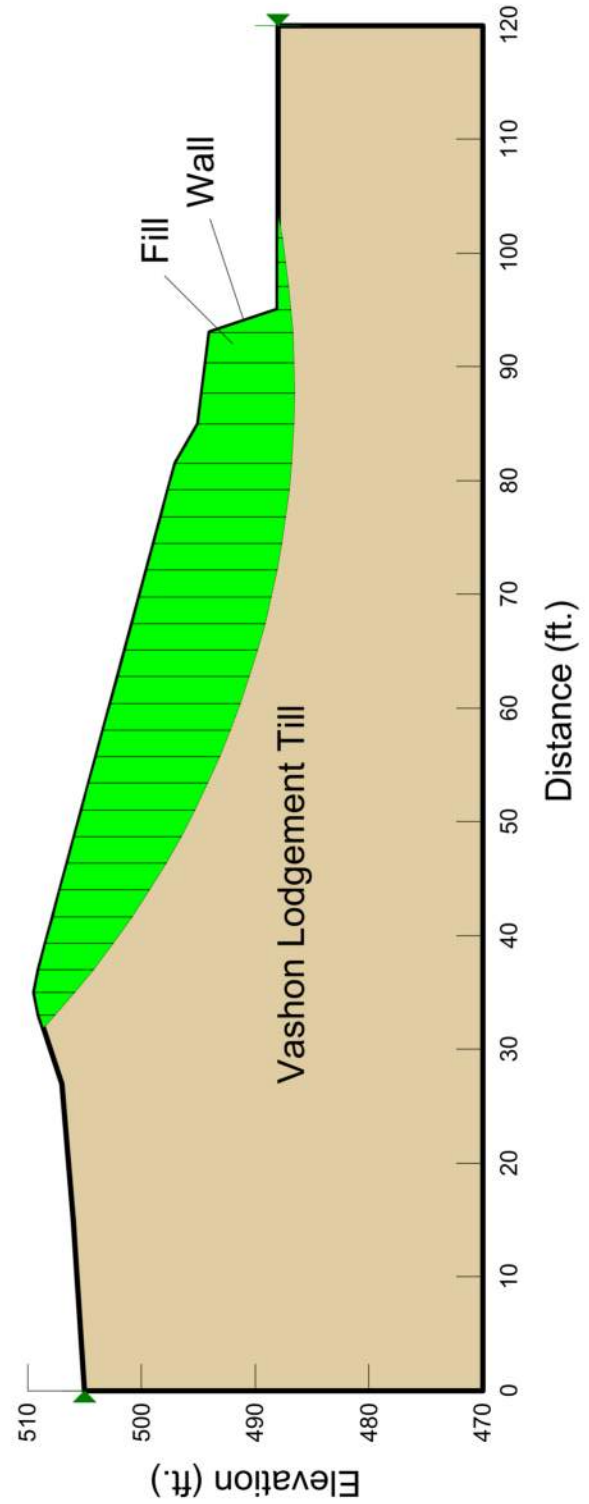


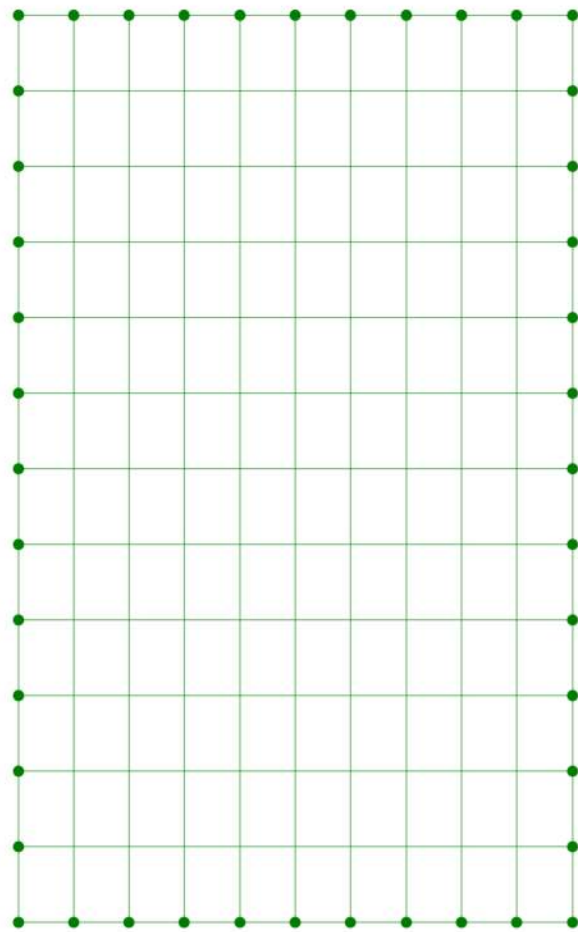
Issaquah High School 180070E001
Post-Construction Conditions
A-A' Seismic - 0.26g



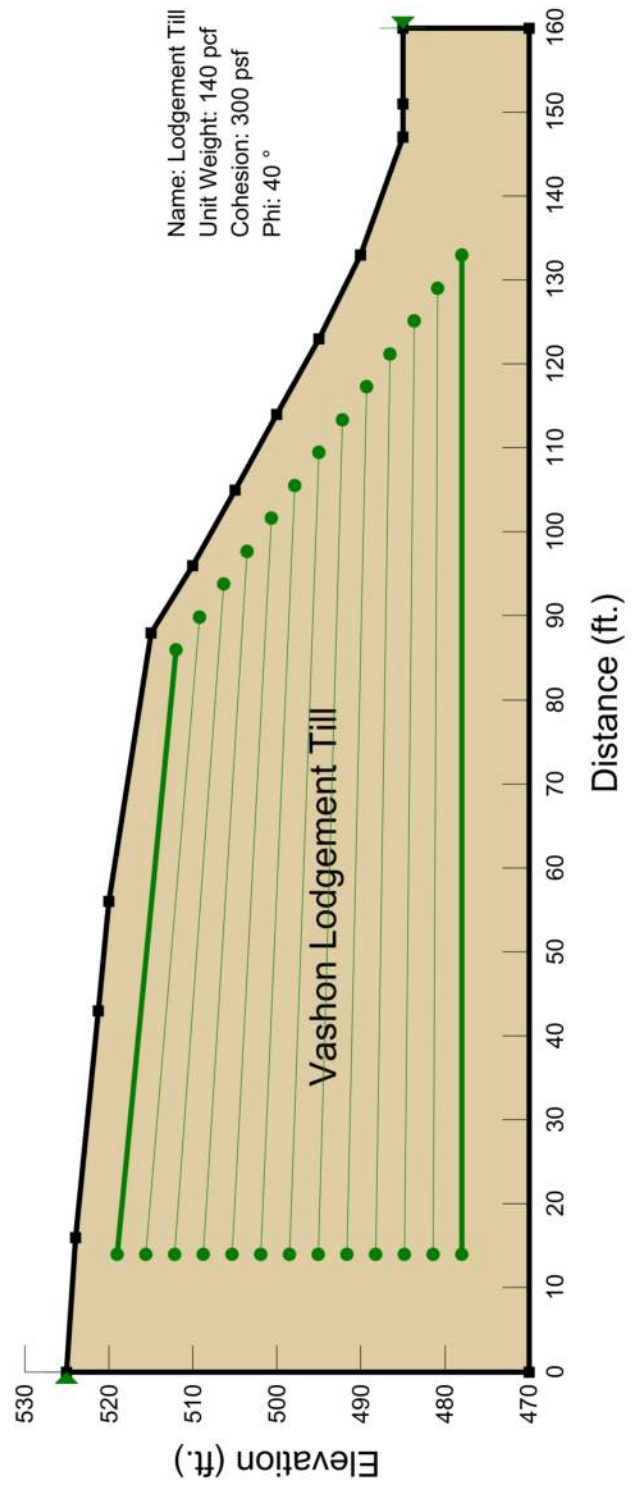
Name: Lodgement Till
Unit Weight: 140 pcf
Cohesion: 300 psf
Phi: 40 °

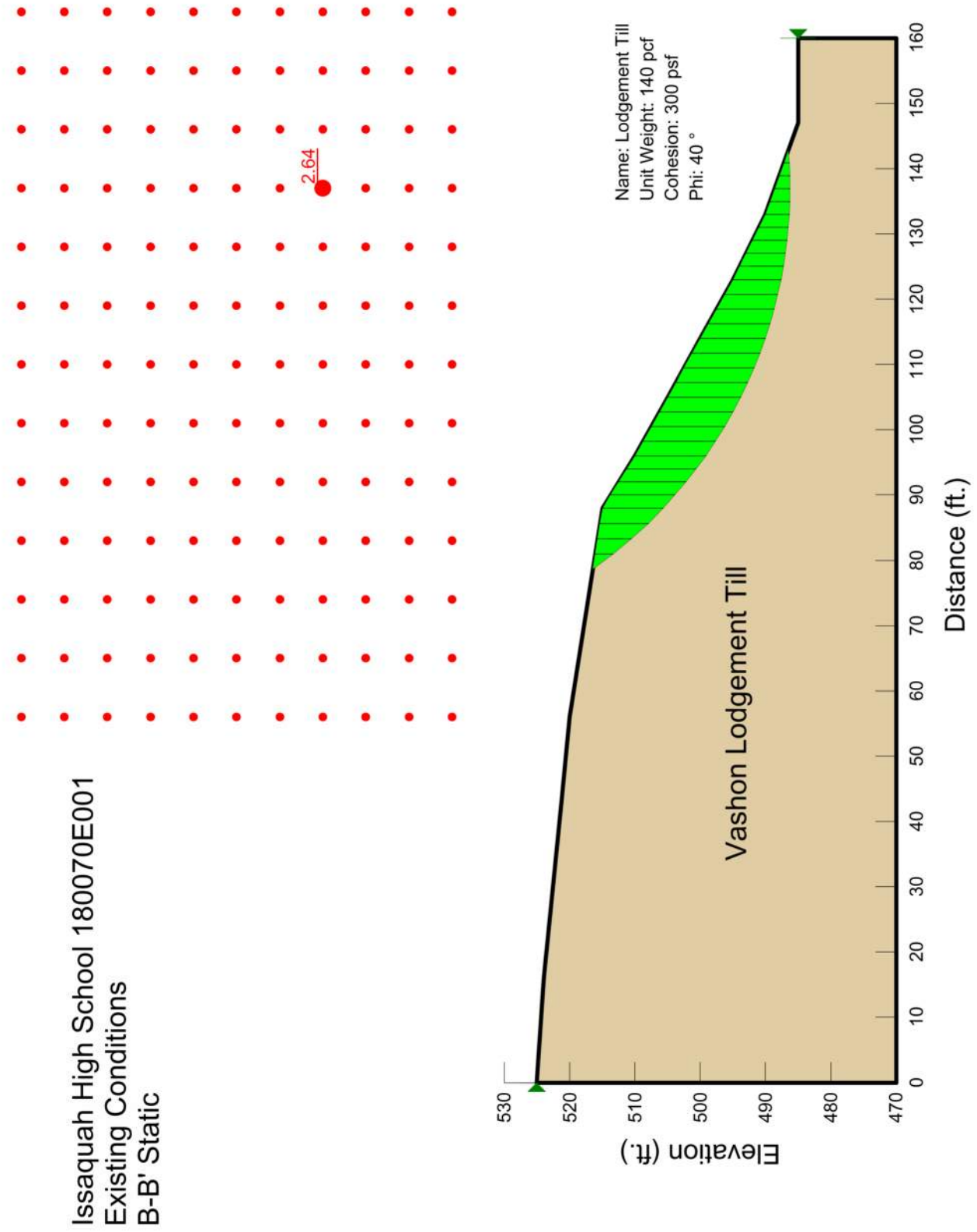
Name: Fill
Unit Weight: 125 pcf
Cohesion: 50 psf
Phi: 32 °

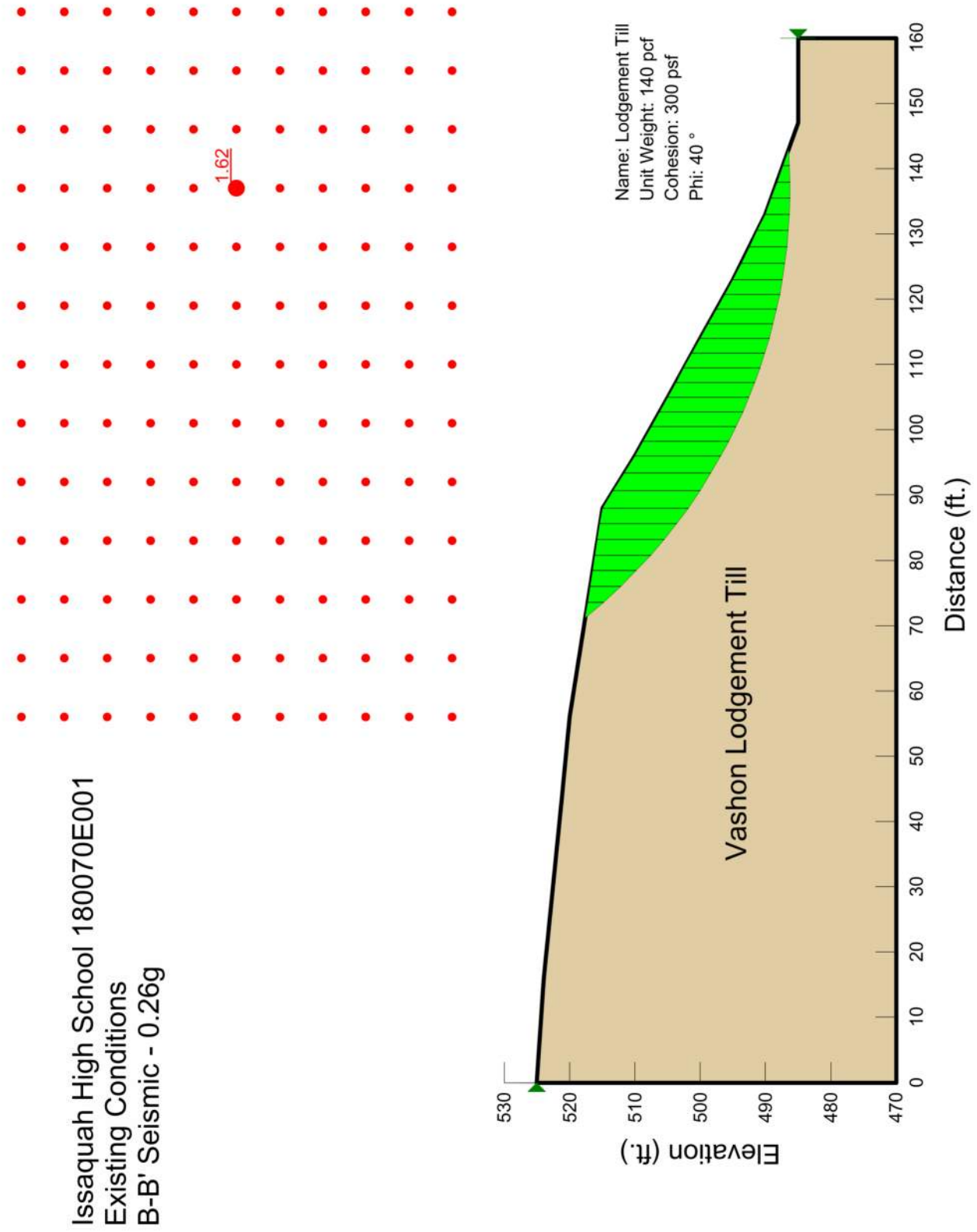




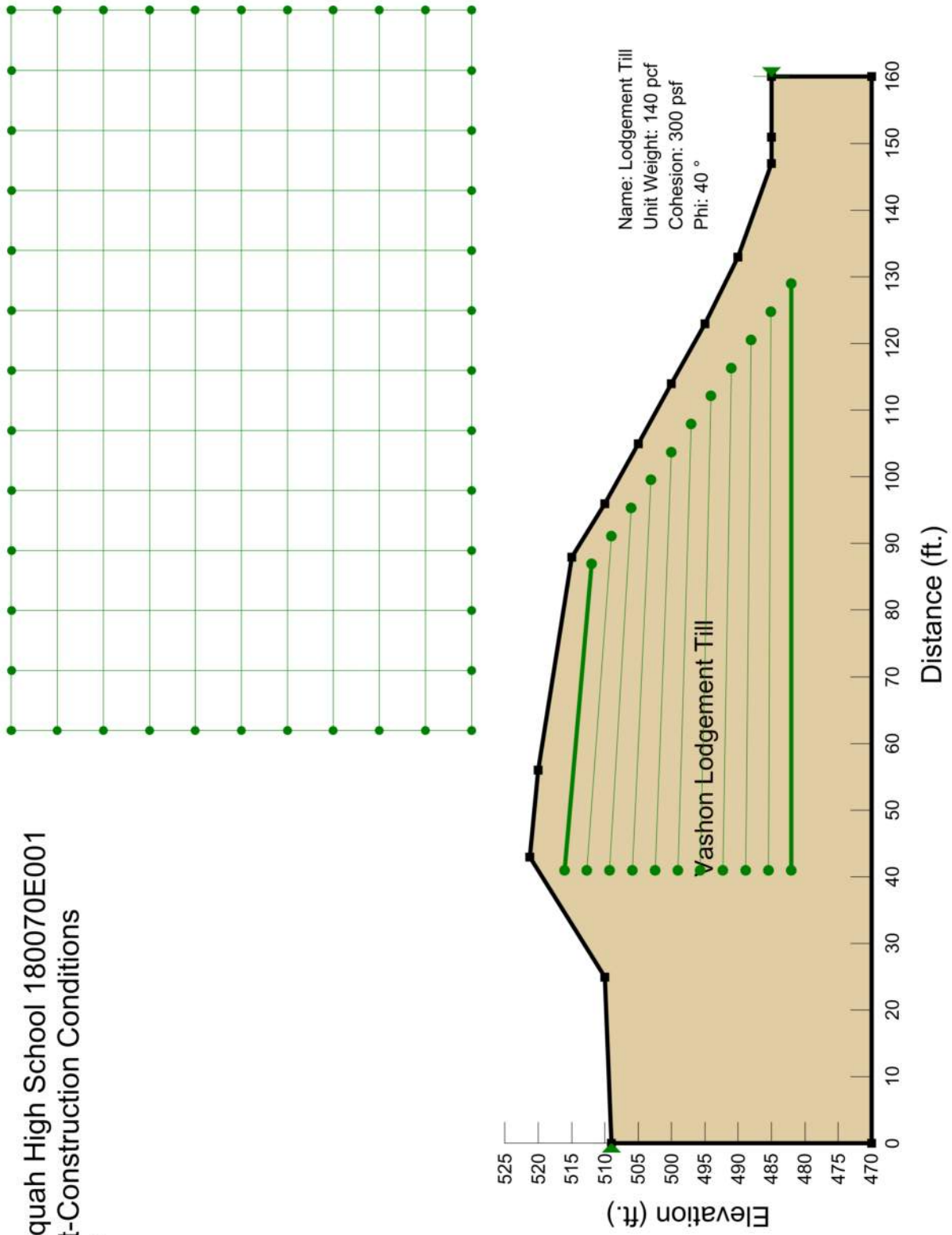
Issaquah High School 180070E001
Existing Conditions
B-B'



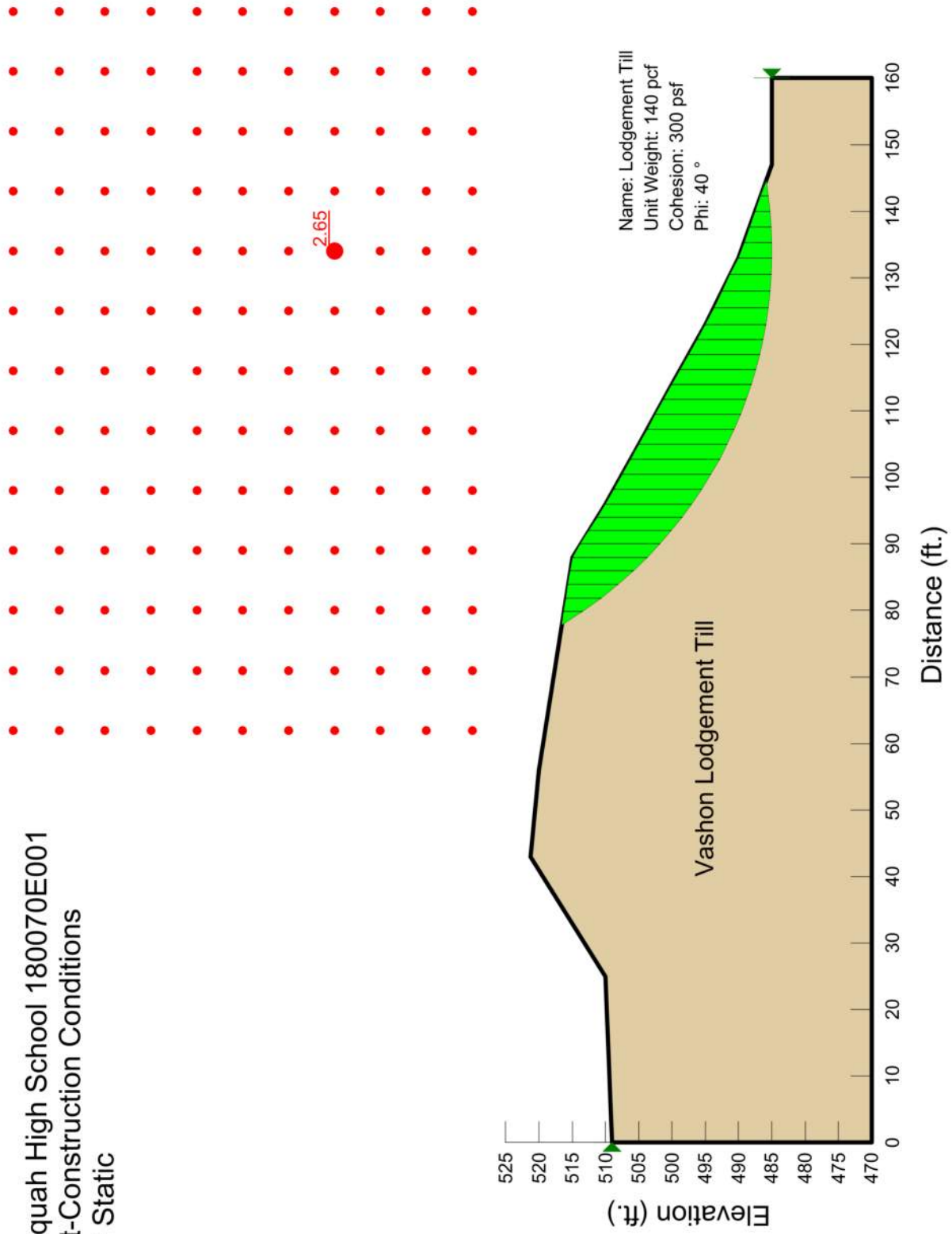




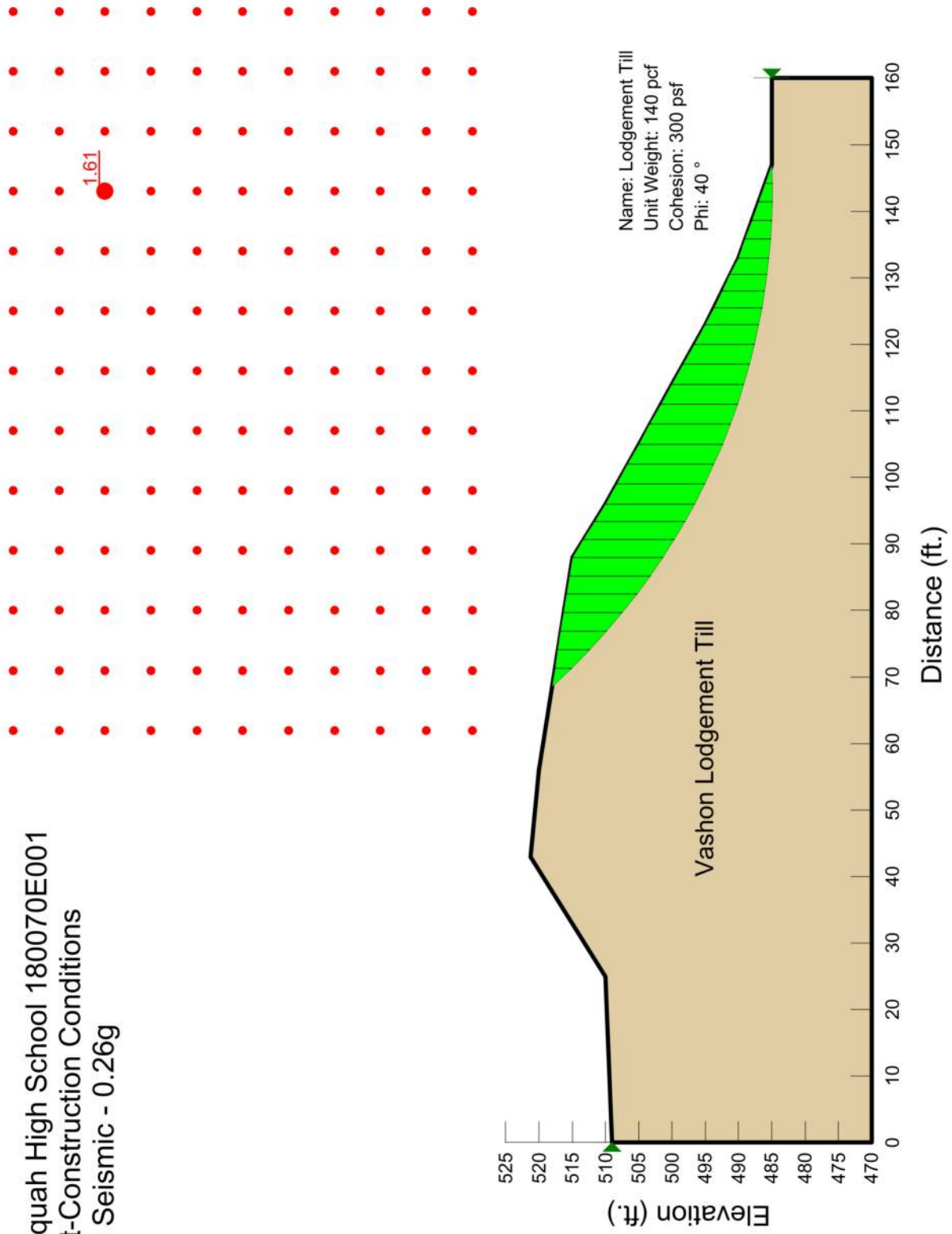
Issaquah High School 180070E001
Post-Construction Conditions
B-B'



Issaquah High School 180070E001
Post-Construction Conditions
B-B' Static



Issaquah High School 180070E001
Post-Construction Conditions
B-B' Seismic - 0.26g





CRITICAL AREA STUDY & WETLAND MITIGATION PLAN

FOR

ISSAQUAH SCHOOL DISTRICT -
HIGH SCHOOL #4 AND ELEMENTARY SCHOOL #17
ISSAQUAH, WA

Wetland Resources, Inc. Project #19183

Prepared By
Wetland Resources, Inc.
9505 19th Avenue SE, Suite 106
Everett, WA 98208
(425) 337-3174

Prepared For
Issaquah School District #411
Attn: Tom Mullins
5150 220th Ave SE
Issaquah, WA 98209

July 10, 2020

(this page intentionally left blank)

TABLE OF CONTENTS

1.0 INTRODUCTION	1
1.1 SITE DESCRIPTION.....	1
2.0 PROJECT DESCRIPTION	1
3.0 REVIEW OF EXISTING INFORMATION	2
4.0 WETLAND & STREAM CLASSIFICATION - COWARDIN SYSTEM	3
5.0 WETLAND & STREAM CLASSIFICATION – CITY OF ISSAQUAH	3
6.0 CRITICAL AREA DETERMINATION REPORT.....	3
6.1 METHODOLOGY	3
6.2 BOUNDARY DETERMINATION FINDINGS	5
6.2.1 Wetland B	5
6.2.2 Wetland C.....	6
6.2.3 Non-Wetland Areas.....	6
7.0 WILDLIFE	7
8.0 WETLAND FUNCTIONS AND VALUES ASSESSMENT	7
8.1 METHODOLOGY	7
8.2 EXISTING CONDITIONS.....	8
8.2.1 Wetland B	8
8.2.2 Wetland C.....	8
8.3 POST-MITIGATION FUNCTIONS AND VALUES.....	8
9.0 AVOIDANCE OF CRITICAL AREA IMPACTS	9
10.0 WETLAND IMPACT AND MITIGATION PLAN	9
11.0 USE OF THIS REPORT	11
12.0 REFERENCES	12

LIST OF APPENDICES

APPENDIX A: WETLAND RATING FORMS AND FIGURES

APPENDIX B: WETLAND DETERMINATION DATA FORMS

APPENDIX C: CRITICAL AREA STUDY MAPS (SHEETS 1-2/2)

1.0 INTRODUCTION

Wetland Resources, Inc. (WRI) conducted site visits on July 22, 2015 and September 8, 2016 to locate wetlands and streams occurring within and near the project site. An additional site visit was conducted on July 22, 2019 to review current site conditions. The subject site is a 40.8-acre property located at 4221 228th Avenue SE, in the City of Issaquah, Washington, (parcel #: 1624069001, 1624069029, 1624069031) within a portion of Section 16, Township 24N, Range 6E, W.M. Two access points to the subject site are located on 228th Avenue SE along the east side of the site. The purpose of this report is to present information about the wetlands on the site and applicable critical area regulations. Other critical areas (such as erosion or landslide hazard areas) are not discussed within this report.

1.1 SITE DESCRIPTION

Surrounding land use consists primarily of high-density single and multi-family residential development. The site is adjacent on three sides to the Providence Point neighborhood (north, south, and west), and Sammamish Highlands to the east. A church and other buildings that were previously on the site have been removed. A water tower is located in the southeast area of the site.

Topography is variable. The center of the site is relatively flat, with the remainder generally sloping down away from the center. Although the center of the property contains little or no vegetation, the edges contain forested areas with a shrub and groundcover understory. The forested areas along the northern and eastern edges of the property are vegetated with native species and have experienced minimal disturbance. The forested area within the southwest portion of the site is comprised primarily of native species, with patches of Himalayan blackberry. Disturbance in this area includes a network of trails, the remnants of a ropes course, trenches (containing no water), and a man-made pond lined with riprap.

There are two small Category IV wetlands (Wetland B and Wetland C) present on the subject site. The aforementioned man-made pond does not meet the definition of a wetland, and is therefore not regulated. Wetland B is located in the southern portion of the subject site in close proximity to the man-made pond. Wetland C is also located in the southern portion of the site, along the southern access road within an existing unmaintained ditch.

2.0 PROJECT DESCRIPTION

The Issaquah School District is proposing to construct a combined elementary school and high school campus to meet the needs of increasing enrollment within the district. This combined high school and elementary school campus will include: two school buildings, play areas, multiple athletic fields/courts, access driveways, bus loop, parking, and associated utility infrastructure. In order to construct a cohesive combined elementary and high school campus of a sufficient size to serve the district, impact to Wetland C is unavoidable. The northern portion of Wetland C will be filled to accommodate the high school bus loop, parking, and the grading associated with this infrastructure. Details about the wetland impact and proposed mitigation are provided in Section 9 and 10 of this report.

3.0 REVIEW OF EXISTING INFORMATION

Prior to conducting the site investigation, public resource information was reviewed to gather background information on the subject property and the surrounding area in regards to wetlands, streams, and other critical areas.

- USDA/NRCS Web Soil Survey: The majority of the site is predicted to have Alderwood Gravelly Sandy Loam, 8 to 15 percent and 15 to 30 percent slopes. A relatively small area in the southeast corner of the site is predicted to have Beausite gravelly sandy loam, 15-30 slopes.
- King County iMap: Laughing Jacobs Creek is identified as unclassified where it flows nearest to the site (900 feet). However, approximately 900 feet further downstream (~1300 feet from the site) iMap identifies the stream as “2S,” which is a non-shoreline salmon-bearing stream. Laughing Jacobs Creek flows southwest from Laughing Jacobs Lake, northeast of the site.
- Washington Department of Fish and Wildlife (WDFW) SalmonScape Interactive Mapping System: This public resource confirms that salmon use the downstream segment of Laughing Jacobs Creek. Both Coho and sockeye salmon have a documented presence. The upstream segment of the stream nearer to the site (~900 feet) does not have a documented or modeled salmon presence.
- WDFW Priority Habitat and Species (PHS) Interactive Map: Laughing Jacobs creek is associated with Coho and Sockeye in the downstream segment, and with resident coastal cutthroat through the entire run up to the lake. This explains the Type-F classification identified by DNR FPAMT. Additionally, a biodiversity corridor is identified approximately 900-feet to the southwest of the subject site. The site and surrounding areas are identified as potential Townsend’s big-eared bat (*Corynorhinus townsendii*) habitat. However, no nearby roosts are identified on official PHS maps provided by WDFW. Wetlands associated with Laughing Jacobs Lake and part of the creek are mapped east and northeast of the subject site.
- United States Fish and Wildlife Service (USFWS) National Wetlands Inventory: Confirms the presence of the wetlands identified by the *WDFW PHS Interactive Map*. Likewise, it does not map the nearer wetland areas identified by *NWMaps.net*.
- Washington Department of Natural Resources Forest Practices Application Mapping Tool (FPAMT): This public resource identifies Laughing Jacobs Creek as Type-F (fish-bearing) along its entirety up to Laughing Jacobs Lake, which is also a Type-F water.
- WDNR Wetlands of High Conservation Value interactive map: No resources are depicted on or in the vicinity of the subject site.

4.0 WETLAND & STREAM CLASSIFICATION - COWARDIN SYSTEM

According to the Cowardin System, as described in *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin 1979), the classification for the on-site critical areas are as follows:

Wetland B: Palustrine, Forested Wetland, Evergreen, Seasonally Flooded

Wetland C: Palustrine, Non-persistent Emergent Wetland, Saturated

5.0 WETLAND & STREAM CLASSIFICATION – CITY OF ISSAQUAH

Under Chapter 18.10 of the IMC the on-site critical areas are classified as follows:

Wetland B

Category IV wetland: This wetland scores a total of 15 points on the Wetland Rating Form for Western Washington, which equates to a Category IV rating. Wetland B has a multi-stratum vegetation structure comprising its forested vegetation class. This wetland scores 4 points (low) for habitat functions. In the City of Issaquah, Category IV wetlands less than 2,500 square feet in size do not require buffers.

Wetland C

Category IV wetland: This wetland scores a total of 15 points on the Wetland Rating Form for Western Washington, which equates to a Category IV rating. This wetland scores 4 points (low) for habitat functions. In the City of Issaquah, Category IV less than 2,500 square feet in size do not require buffers.

6.0 CRITICAL AREA DETERMINATION REPORT

6.1 METHODOLOGY

The Washington State Department of Ecology document *Determining the Ordinary High Water Mark on Streams in Washington State (Second Review Draft)* (Olson and Stockdale 2010) was used to determine the presence of any streams on the subject site. No streams were identified on the subject site.

Wetland conditions were evaluated using routine methodology described in the *2010 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)*, (referred to as the 2010 Regional Supplement). The methodology in the 2010 Regional Supplement coincides with the methodology described in the Washington State Wetlands Identification and Delineation Manual (Washington State Department of Ecology Publication #96-94, March 1997). Our findings are consistent with both manuals.

The following criteria descriptions were used in the boundary determination:

- 1.) Examination of the site for hydrophytic vegetation (species present and percent cover);

- 2.) Examination of the site for hydric soils;
- 3.) Determining the presence of wetland hydrology

Hydrophytic Vegetation Criteria

The *2010 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)* defines hydrophytic vegetation as the sum total of macrophytic plant life that occurs in areas where the frequency and duration of inundation or soil saturation produce permanently or periodically saturated soils of sufficient duration to exert a controlling influence on the plant species present. One of the most common indicators for hydrophytic vegetation is when more than 50 percent of a plant community consists of species rated “Facultative” and wetter on lists of plant species that occur in wetlands.

Soils Criteria and Mapped Description

The *2010 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)* defines hydric soils as those that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part. Field indicators are used for determining whether a given soil meets the definition for hydric soils.

According to NRCS Web Soil Survey, the soil map unit Alderwood Gravelly Sandy Loam, 8 to 15 and 15 to 30 percent slopes; and Beausite gravelly sandy loam, 15-30 slopes are predicted to occur on the subject property.

Alderwood Gravelly Sandy Loam, 8 to 15 percent slopes (AgC), is described as rolling with irregularly shaped areas ranging from 10 to about 600 acres in size. The A horizon ranges from very dark brown to dark brown. The B horizon is dark brown, grayish brown, and dark yellowish brown. Permeability is moderately rapid in the surface layer and subsoil and very slow in the substratum. Available water capacity is described as low. Included within this soil unit are the poorly drained Norma, Bellingham, Seattle, Tukwila, Shalcar soils, and Alderwood soils that have slopes more gentle or steeper than 8 to 15 percent. Included soil units make up no more than 30 percent of the total acreage.

Alderwood Gravelly Sandy Loam, 15 to 30 percent slopes (AgD), is made up of moderately well drained soils that have a weakly consolidated substratum at a depth of 24 to 40 inches. In a representative profile, the surface layer and subsoil are very dark brown, dark brown, and grayish brown gravelly sandy loam about 27 inches thick. The substratum is grayish-brown, weakly consolidated to strongly consolidated glacial till that extends to a depth of 60 inches and more. Soils included with this soil mapping make up no more than 30 percent of the total acreage. Some areas are up to 25 percent Everett soils that have slopes of 15 to 30 percent, and some areas are up to 2 percent Bellingham, Norma, and Seattle soils, which are in depressions. Runoff is medium, and the erosion hazard is severe.

Beausite Gravelly Sandy Loam, 15 to 30 percent slopes, is made up of well-drained soils that are underlain by sandstone at a depth of 20 to 40 inches. These soils formed in the glacial deposits. They are rolling to very steep. Slopes are 6 to 75 percent. Elevation is 600 to 2,000 feet. In a

representative profile, the surface layer and the upper part of the subsoil are dark-brown to dark yellowish-brown gravelly sandy loam that extends to a depth of about 19 inches. The lower part of the subsoil is olive-brown, very gravelly sandy loam. Fractured sandstone is at a depth of about 38 inches. Areas of this soil are 40 acres or more in size. Slopes are long. Some areas are up to 20-percent included Alderwood soils, which are underlain by andesite; some are 5-percent wet Norma and Seattle soils; some are up to 5-percent Beausite soils that have a gravelly loam surface layer and subsoil; and some are up to 10-percent soils that are similar to Beausite soils, but are more than 40 inches deep over sandstone. Runoff is rapid, and the hazard of erosion is severe.

Hydrology Criteria

The *2010 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)* states that “areas which are seasonally inundated and/or saturated to the surface for a consecutive number of days ≥ 12.5 percent of the growing season are wetlands, provided the soil and vegetation parameters are met. Areas inundated or saturated between 5 and 12.5 percent of the growing season in most years may or may not be wetlands. Areas saturated to the surface for less than 5 percent of the growing season are non-wetlands.” Field indicators are used for determining whether wetland hydrology parameters are met. Based on the results of the site investigation, three wetlands were identified on the subject property.

6.2 BOUNDARY DETERMINATION FINDINGS

During the July 2019 site visit, WRI confirmed that there were no changes to the wetland boundaries delineated in July 2015 and September 2016.

6.2.1 Wetland B

This wetland is located in the southern portion of the subject site. Wetland B is a small, depressional wetland, 280 square feet in size.

Dominant vegetation in Wetland B is represented by black cottonwood (*Populus balsamifera*; FAC) and salmonberry (*Rubus spectabilis*; FAC). All of the dominant species rate “facultative” or wetter, indicating that a hydrophytic vegetative community is present in the areas mapped as wetland.

Soils in this wetland from 0 to 10 inches below the surface have a Munsell color of very dark grayish brown (10YR 3/2) with a silt loam texture. From 10 to 11 inches below the surface, the soil is light brownish gray (10YR 6/2) with prominent yellowish brown (10YR 5/8) redoximorphic features, and has a fine sandy loam texture. The soil became restrictive at a depth of 11 inches. This soil profile meets the Depleted Below Dark Surface (A11) and Depleted Matrix (F3) hydric soil indicators. Soils were dry at the time of our July 2015 site visit, which is not unusual given the season and the particularly low rainfall experienced earlier in the year. However, an algal mat (B4) was present, which is a primary indicator of hydrology.

Field observations indicate that the area mapped as wetland is flooded, ponded, or saturated long enough during the growing season to develop anaerobic conditions in the upper part of the soils. Therefore, the vegetation, soil, and hydrologic criteria are all met for the on-site portion of Wetland B.

Wetland B scored a total of 15 points on the Wetland Rating Form for Western Washington, which equates to a Category IV rating. In the City of Issaquah, Category IV wetlands less than 2,500 square feet in size do not require buffers.

6.2.2 Wetland C

This wetland is a slope wetland located along an existing access road within a roadside ditch, in the southern portion of the subject site. Wetland C is 1,806 square feet in size. Water leaving Wetland C flows into a culvert and under the access road, where it enters a catch basin on the south side of the road. There is another stormdrain downslope of the southern access road within the residential development adjacent to the subject site. It appears the water from Wetland C enters the stormwater system associated with the adjacent development after leaving the catch basin on the site.

Dominant vegetation in the on-site portion of Wetland C is represented by reed canarygrass (*Phalaris arundinacea*; FACW) and soft rush (*Juncus effusus*; FACW). All of the dominant species rate “facultative” or wetter, indicating that a hydrophytic vegetative community is present in the areas mapped as wetland.

Soils in this wetland from 0 to 7 inches below the surface have a Munsell color of very dark grayish brown (10YR 3/2) with a sandy clay loam texture with redoximorphic features of dark yellowish brown (10YR 4/6). From 10 to 11 inches below the surface, the soil is dark grayish brown (10YR 4/2) with dark yellowish brown (10YR 4/6) redoximorphic features, and has a clay loam texture. Soils were moist at the time of our September 20, 2016 site visit.

Field observations indicate that the area mapped as wetland is flooded, ponded, or saturated long enough during the growing season to develop anaerobic conditions in the upper part of the soils. Therefore, the vegetation, soil, and hydrologic criteria are all met for the on-site portion of Wetland C.

Wetland C scored a total of 15 points on the Wetland Rating Form for Western Washington, which equates to a Category IV rating. In the City of Issaquah, Category IV less than 2,500 square feet in size do not require buffers.

6.2.3 Non-Wetland Areas

In the non-wetland areas adjacent to Wetlands B and C, dominant vegetation is represented by big-leaf maple (*Acer macrophyllum*; FACU), black cottonwood (*Populus balsamifera*; FAC), cascara (*Frangula purshiana*; FAC), bracken fern (*Pteridium aquilinum*; FACU), and trailing blackberry (*Rubus ursinus*; FACU). The majority of the dominant species do not rate “facultative” or wetter, indicating that a hydrophytic vegetative community is absent.

Typical soils in the areas adjacent to Wetlands B and C that are mapped as non-wetland have a Munsell color of very dark grayish brown (10YR 3/2), with a silt texture, for 0 to 5 inches beneath the soil surface. The underlying soil layer is olive brown (2.5YR 4/3) sandy loam, to at least 12 inches beneath the surface. This soil profile does not meet any hydric soil indicators. Soils were dry at the time of our July 2019 site investigation.

Hydrophytic vegetation and hydric soils are absent in these areas, and direct hydrologic indicators are lacking. Therefore, the areas adjacent to Wetlands B and C do not meet wetland criteria.

7.0 WILDLIFE

The on-site critical areas and their associated edges are continuous with a forested corridor located within the western portion of the subject site. However, the forested portions of the site are completely surrounded by neighboring high-intensity development, which effectively bisects potential movement corridors for wildlife; cutting them off. Nevertheless, the critical areas and their buffers do provide important habitat elements in the form of resources such as food, water, thermal cover, and hiding cover in close proximity. Given their small size, as well as the disturbance created by nearby development, the on-site critical areas provide relatively low quality wildlife habitat.

Black tailed deer (*Odocoileus hemionus columbianus*) were visually detected during our on-site investigations in July 2015 and September 2016. Other mammalian species expected to occur on the subject site include gray squirrels (*Sciurus* spp.), Douglas squirrels (*Tamiasciurus douglasii*), and raccoon (*Procyon lotor*). Avian activity (bird song) was strongly detected. Given the habitat available nearby, it is expected that the following avian species use the area: American Crow (*Corvus brachyrhynchos*), American Robin (*Turdus migratorius*), Steller's Jay (*Cyanocitta stelleri*), Black-capped Chickadee (*Parus atricapilla*), Dark-eyed Junco (*Junco hyemalis*), Song Sparrow (*Melospiza melodia*), Pacific Wren (*Troglodytes pacificus*), and Spotted Towhee (*Pipilo maculatus*).

These lists are not meant to be all-inclusive and may omit species that currently utilize or could utilize the site.

8.0 WETLAND FUNCTIONS AND VALUES ASSESSMENT

8.1 METHODOLOGY

The methodology for this functions and values assessment is based on professional opinion developed through past field analyses and interpretation. This assessment pertains specifically to the on-site wetlands, but is typical for assessments of similar systems common to western Washington.

Functions and Values Components

Wetlands in western Washington perform a variety of ecosystem functions. Included among the most important functions provided by wetlands are stormwater storage and flood flow attenuation, water quality improvement, and fish and wildlife habitat. An assessment of these functions for the project site is provided below.

8.2 EXISTING CONDITIONS

8.2.1 Wetland B

This 280 square foot Category IV wetland is located just southeast of the man-made pond, in the southern portion of the subject site. Wetland B is a forested depressional wetland with no outlet. This wetland is able to provide storage during times of increased stormwater runoff, but storage capacity is limited by the wetland's small size. The water quality functions provided by Wetland B are limited by its lack of persistent vegetation cover. Wetland B provides a low value for water quality and hydrologic functions. Wetland B only contains a fringe of forested vegetation around the perimeter, but has little or no vegetation within the interior of the wetland. The wetland's small size, lack of vegetation diversity and native food sources, as well as the lack of an undisturbed connection to other wetlands, limits the level of wildlife functions provided. Wetland B provides a low value for wildlife functions.

8.2.2 Wetland C

This 1,806 square foot Category IV wetland is located in a roadside ditch, in the southern portion of the subject site. Wetland C is a small, emergent wetland, with only one hydro period. Given that it's on a slope, it is able to provide very minimal live storage during periods of increased stormwater runoff. Its limited capacity for live storage provides a low value for water quality and hydrologic functions. Wetland C only contains emergent vegetation and is located alongside a road. The wetland's small size, lack of vegetation diversity, and lack of an undisturbed connection to other wetlands limits the level of wildlife functions provided. Wetland C provides a low value for wildlife functions.

8.3 POST-MITIGATION FUNCTIONS AND VALUES

The entirety of Wetland C will be impacted by the proposed development. As mitigation for the impact to Wetland C, 10,800 square feet of forested area containing significant trees will be protected. This protected forested area is adjacent to Wetland B.

All water exiting Wetland C currently goes into a stormwater system. After development of the site, all stormwater runoff within the area of Wetland C will also be collected by existing or proposed stormwater infrastructure. The proposed stormwater plan is designed to meet current water quality standards. No loss of hydrologic or water quality functions will occur as stormwater runoff within the area of Wetland C currently enters stormwater infrastructure and will be managed by stormwater infrastructure after development as well. Also, protecting forested area adjacent to Wetland B will allow for water velocity reduction and filtration of stormwater runoff prior to entering Wetland B. This will maintain the level of functions provided by Wetland B.

The impact to Wetland C will affect herbaceous vegetation. The mitigation area is forested, and contains native trees, shrubs, and herbaceous vegetation. This forested area provides greater vegetation diversity and structure than Wetland C currently does. Additionally, this forested area provides native food sources and opportunity for refuge for wildlife. The mitigation area will provide a greater value for wildlife functions than Wetland C currently provides.

9.0 AVOIDANCE OF CRITICAL AREA IMPACTS

Per IMC 18.10.490, proposed development on sites containing critical areas shall address mitigation sequencing. Mitigation sequencing steps from IMC 18.10.490.A are listed below in italics with WRI discussion following.

1. *Avoid impacts altogether by not taking a certain action or parts of an action;*

The two school buildings proposed are sized to accommodate the increasing enrollment in the Issaquah School District as well as programmatic needs and requirements. Internal driveways and the bus loop were designed to facilitate cueing and proper traffic circulation for drop-off and pick-up times. The sports fields and play areas are essential elements of elementary and high school campuses. In order to construct a cohesive combined elementary and high school campus with adequate parking, impact to Wetland C is unavoidable. No impact to Wetland B is proposed.

2. *Minimize impacts by limiting the degree or magnitude of the action and its implementation by using appropriate technology, or by taking affirmative steps to avoid or reduce impacts;*

No impact to Wetland B is proposed. Given the location and linear nature of Wetland C, it is not possible to reduce the impact to the wetland. The proposed impact to Wetland C is the minimum impact necessary to construct the combined elementary and high school campus.

3. *Rectify impacts by repairing, rehabilitating or restoring the affected environment;*

The impact to Wetland C will be permanent and cannot be restored.

4. *Compensate for the impact by replacing, restoring, creating, enhancing or providing substitute resources or environments;*

As compensation for the impact to Wetland C, a 10,800 square foot area of significant trees will be retained and protected in perpetuity. This is a 6:1 mitigation to impact ratio. Please see Section 10 below for further details of the wetland mitigation plan.

5. *Monitor the impact and the compensation projects and taking appropriate corrective measures.*

Since the mitigation proposed is retention of existing significant trees per IMC 18.10.720.B.3.d, no monitoring is proposed.

10.0 WETLAND IMPACT AND MITIGATION PLAN

The proposed project will impact the entirety of Wetland C, which is 1,806 square feet in size. Per IMC 18.10.720.B.3, *Category IV wetlands less than two thousand five hundred (2,500) square feet in size, that are not part of a wetland complex, may be altered if mitigation is provided to demonstrate no net loss of functions or values.* A discussion of functions and values is provided above, in Section 8 of this report. The code

lists criteria that shall apply in preferential order to avoid or mitigate impacts to these small Category IV wetlands. These criteria are listed below in italics with WRI discussion following.

a. Preserve the wetland or demonstrate through mitigation sequencing that avoidance or minimization of impacts have been considered; or

Mitigation sequencing has been addressed above, in Section 9 of this report.

b. Relocate the wetland on site by creating, re-establishing or rehabilitating a new, equal size wetland; or

To create a wetland, a source of natural hydrology is necessary. Generally, wetland creation is done adjacent to an existing wetland. On this site, the only other wetland is Wetland B, which is very small in size and is surrounded by trees. In order to create a wetland in this area, established vegetation would have to be removed. This would reduce the overall number of significant trees on the site and reduce the wildlife habitat quality in the area around Wetland B.

c. Enhance an equal area of another existing wetland on site, demonstrating equivalent or greater functions; or

No other wetland area of equal size exists on the subject site.

d. Protect significant on-site trees. Protect an area of significant trees equal to the wetland area or enhance an equal upland area with native tree planting. This shall not apply to areas already protected as critical area buffers and shall be in addition to the tree retention requirements in IMC 18.12.1385; or

The proposed mitigation plan protects significant trees in an area 10,800 square feet in size. The proposed protected area is adjacent to Wetland B. This is a 6:1 mitigation to impact ratio.

e. Off-site mitigation opportunities may be considered.

On-site mitigation is proposed.

11.0 USE OF THIS REPORT

This Critical Area Study and Wetland Mitigation Plan is supplied to Issaquah School District as a means of determining on-site wetland and stream conditions, as required by the City of Sammamish during the permitting process. This report is based largely on readily observable conditions and, to a lesser extent, on readily ascertainable conditions. No attempt has been made to determine hidden or concealed conditions.

The laws applicable to wetlands are subject to varying interpretations and may be changed at any time by the courts or legislative bodies. This report is intended to provide information deemed relevant in the applicant's attempt to comply with the laws now in effect.

The work for this report has conformed to the standard of care employed by wetland ecologists. No other representation or warranty is made concerning the work or this report, and any implied representation or warranty is disclaimed.

Wetland Resources, Inc.



Meryl Kamowski
Senior Ecologist

12.0 REFERENCES

- Cowardin, et al., 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Department of the Interior. FWS/OBS-79/31. December 1979.
- King County. 1973. Soil Survey of King County Area Washington.
- King County. Accessed July 2020. King County iMap Internet Mapping Tool. <http://www5.kingcounty.gov/iMAP/viewer.htm?mapset=kcproperty>.
- Lichvar, R.W, M. Butterwick, N.C. Melvin, and W.N. Kirchner. 2014. Western Mountains, Valleys, and Coast 2014 Regional Wetland Plant List. Phytoneuron 2014-41: 1-42.
- NRCS. Accessed July 2020. Web Soil Survey. United States Department of Agriculture. <http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>.
- US Army Corps of Engineers. 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0). Vicksburg, MS
- U.S. Fish & Wildlife Service. 2020a. *IPaC: Information for Planning and Conservation project planning tool*. <http://ecos.fws.gov/ipac/>.
- USFWS. 2019. National Wetlands Inventory (NWI) Online Mapper. <http://www.fws.gov/wetlands/Data/Mapper.html>.
- WA Department of Natural Resources. 2020a. *Forest Practices Activity Mapping Tool*. <http://fortress.wa.gov/dnr/app1/fpars/viewer.htm>
- WA Department of Natural Resources. 2020b. *Wetlands of High Conservation Value Map Viewer*. <https://www.dnr.wa.gov/NHPwetlandviewer>
- WDFW. Accessed July 2020. Priority Habitat and Species (PHS) Interactive Map. <http://apps.wdfw.wa.gov/phsontheweb/>.
- WDFW. Accessed July 2020. SalmonScape Online Mapping Application. <http://apps.wdfw.wa.gov/salmonscape/map.html>.

APPENDIX A: WETLAND RATING FORMS AND FIGURES

Wetland name or number **B**

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Wetland B (ISD HS #4 and ES #17) Date of site visit: 7/22/19Rated by MK Trained by Ecology? ☒ Yes ☐ No Date of training 3/2015HGM Class used for rating DEPRESSIONAL Wetland has multiple HGM classes? ☐ Y ☒ N**NOTE: Form is not complete without the figures requested (figures can be combined).**Source of base aerial photo/map King County**OVERALL WETLAND CATEGORY IV** (based on functions ☒ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

 Category I – Total score = 23 - 27 Category II – Total score = 20 - 22 Category III – Total score = 16 - 19☒ Category IV – Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
<i>Circle the appropriate ratings</i>				
Site Potential	H M ☐ L	H ☐ M L	H M ☐ L	
Landscape Potential	H ☐ M L	H ☐ M L	H M ☐ L	
Value	H ☐ M L	H ☐ M L	H ☐ M L	TOTAL
Score Based on Ratings	5	6	4	15

**Score for each
function based
on three
ratings
(order of ratings
is not
important)**

9 = H,H,H

8 = H,H,M

7 = H,H,L

7 = H,M,M

6 = H,M,L

6 = M,M,M

5 = H,L,L

5 = M,M,L

4 = M,L,L

3 = L,L,L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY
Estuarine	I II
Wetland of High Conservation Value	I
Bog	I
Mature Forest	I
Old Growth Forest	I
Coastal Lagoon	I II
Interdunal	I II III IV
None of the above	☒

Wetland name or number **B**

Maps and figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	1
Hydroperiods	D 1.4, H 1.2	1
Location of outlet (<i>can be added to map of hydroperiods</i>)	D 1.1, D 4.1	1
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	D 2.2, D 5.2	1
Map of the contributing basin	D 4.3, D 5.3	2
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	2
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	3
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	3

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream (<i>can be added to another figure</i>)	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of dense trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of dense, rigid trees, shrubs, and herbaceous plants (<i>can be added to figure above</i>)	S 4.1	
Boundary of 150 ft buffer (<i>can be added to another figure</i>)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

Wetland name or number **B**_____

HGM Classification of Wetlands in Western Washington

For questions 1-7, the criteria described must apply to the entire unit being rated.

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

NO – go to 2

YES – the wetland class is **Tidal Fringe** – go to 1.1

- 1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

NO – **Saltwater Tidal Fringe (Estuarine)**

YES – **Freshwater Tidal Fringe**

*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

NO – go to 3

YES – The wetland class is **Flats**

*If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?

._The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;

._At least 30% of the open water area is deeper than 6.6 ft (2 m).

NO – go to 4

YES – The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?

._The wetland is on a slope (*slope can be very gradual*),

._The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks,

._The water leaves the wetland **without being impounded**.

NO – go to 5

YES – The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?

._The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,

._The overbank flooding occurs at least once every 2 years.

Wetland name or number **B****NO** – go to 6**YES** – The wetland class is **Riverine****NOTE:** The Riverine unit can contain depressions that are filled with water when the river is not flooding

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

NO – go to 7**YES** – The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

NO – go to 8**YES** – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT** (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated		HGM class to use in rating
Slope + Riverine	☐	Riverine
Slope + Depressional	☐	Depressional
Slope + Lake Fringe	☐	Lake Fringe
Depressional + Riverine along stream within boundary of depression	☐	Depressional
Depressional + Lake Fringe	☐	Depressional
Riverine + Lake Fringe	☐	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	☐	Treat as ESTUARINE

*If you are still unable to determine which of the above criteria apply to your wetland, or if you have **more than 2 HGM classes** within a wetland boundary, classify the wetland as Depressional for the rating.*

Wetland name or number B

DEPRESSIONAL AND FLATS WETLANDS		
Water Quality Functions - Indicators that the site functions to improve water quality		
D 1.0. Does the site have the potential to improve water quality?		
D 1.1. Characteristics of surface water outflows from the wetland: ☒ Wetland is a depression or flat depression (QUESTION 7 on key) with no surface water leaving it (no outlet). points = 3 ☐ Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet. points = 2 ☐ Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 1 ☐ Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch. points = 1	3	
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic (use NRCS definitions). Yes = 4 No = 0	0	
D 1.3. Characteristics and distribution of persistent plants (Emergent, Scrub-shrub, and/or Forested Cowardin classes): ☐ Wetland has persistent, ungrazed, plants > 95% of area points = 5 ☐ Wetland has persistent, ungrazed, plants > ½ of area points = 3 ☒ Wetland has persistent, ungrazed plants > 1/10 of area points = 1 ☐ Wetland has persistent, ungrazed plants < 1/10 of area points = 0	1	
D 1.4. Characteristics of seasonal ponding or inundation: <i>This is the area that is ponded for at least 2 months. See description in manual.</i> ☐ Area seasonally ponded is > ½ total area of wetland points = 4 ☐ Area seasonally ponded is > ¼ total area of wetland points = 2 ☒ Area seasonally ponded is < ¼ total area of wetland points = 0	0	
Total for D 1	Add the points in the boxes above	4

Rating of Site Potential If score is: 12-16 = H 6-11 = M ✓ 0-5 = L Record the rating on the first page

D 2.0. Does the landscape have the potential to support the water quality function of the site?		
D 2.1. Does the wetland unit receive stormwater discharges?	Yes = 1 No = 0	0
D 2.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants?	Yes = 1 No = 0	1
D 2.3. Are there septic systems within 250 ft of the wetland?	Yes = 1 No = 0	0
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1-D 2.3?	Yes = 1 No = 0	0
Source _____		
Total for D 2	Add the points in the boxes above	1

Rating of Landscape Potential If score is: 3 or 4 = H ✓ 1 or 2 = M 0 = L Record the rating on the first page

D 3.0. Is the water quality improvement provided by the site valuable to society?		
D 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list?	Yes = 1 No = 0	0
D 3.2. Is the wetland in a basin or sub-basin where an aquatic resource is on the 303(d) list?	Yes = 1 No = 0	1
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (answer YES if there is a TMDL for the basin in which the unit is found)?	Yes = 2 No = 0	0
Total for D 3	Add the points in the boxes above	1

Rating of Value If score is: 2-4 = H ✓ 1 = M 0 = L Record the rating on the first page

--	--	--

Wetland name or number B**DEPRESSIONAL AND FLATS WETLANDS****Hydrologic Functions** - Indicators that the site functions to reduce flooding and stream degradation**D 4.0. Does the site have the potential to reduce flooding and erosion?****D 4.1. Characteristics of surface water outflows from the wetland:**

- | | | |
|--|------------|----------|
| ☒ Wetland is a depression or flat depression with no surface water leaving it (no outlet) | points = 4 | 4 |
| ☐ Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet | points = 2 | |
| ☐ Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch | points = 1 | |
| ☐ Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing | points = 0 | |

D 4.2. Depth of storage during wet periods: Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or if dry, the deepest part.

- | | | |
|---|------------|----------|
| ☐ Marks of ponding are 3 ft or more above the surface or bottom of outlet | points = 7 | 0 |
| ☐ Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet | points = 5 | |
| ☐ Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet | points = 3 | |
| ☐ The wetland is a "headwater" wetland | points = 3 | |
| ☐ Wetland is flat but has small depressions on the surface that trap water | points = 1 | |
| ☒ Marks of ponding less than 0.5 ft (6 in) | points = 0 | |

D 4.3. Contribution of the wetland to storage in the watershed: Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.

- | | | |
|---|------------|----------|
| ☐ The area of the basin is less than 10 times the area of the unit | points = 5 | 3 |
| ☒ The area of the basin is 10 to 100 times the area of the unit | points = 3 | |
| ☐ The area of the basin is more than 100 times the area of the unit | points = 0 | |
| ☐ Entire wetland is in the Flats class | points = 5 | |

Total for D 4

Add the points in the boxes above

7**Rating of Site Potential** If score is: 12-16 = H ✓ 6-11 = M 0-5 = L

Record the rating on the first page

D 5.0. Does the landscape have the potential to support hydrologic functions of the site?

D 5.1. Does the wetland receive stormwater discharges?	Yes = 1 ☐ No = ☐	0
D 5.2. Is >10% of the area within 150 ft of the wetland in land uses that generate excess runoff?	☒ Yes = 1 ☐ No = 0	1
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)?	Yes = 1 ☐ No = ☐	0
Total for D 5	Add the points in the boxes above	1

Rating of Landscape Potential If score is: 3 = H ✓ 1 or 2 = M 0 = L

Record the rating on the first page

D 6.0. Are the hydrologic functions provided by the site valuable to society?**D 6.1. The unit is in a landscape that has flooding problems. Choose the description that best matches conditions around the wetland unit being rated. Do not add points. Choose the highest score if more than one condition is met.**

The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds):

- | | | |
|--|------------|----------|
| ☐ • Flooding occurs in a sub-basin that is immediately down-gradient of unit. | points = 2 | 1 |
| ☒ • Surface flooding problems are in a sub-basin farther down-gradient. | points = 1 | |
| ☐ Flooding from groundwater is an issue in the sub-basin. | points = 1 | |
| ☐ The existing or potential outflow from the wetland is so constrained by human or natural conditions that the water stored by the wetland cannot reach areas that flood. Explain why _____ | points = 0 | |
| ☐ There are no problems with flooding downstream of the wetland. | points = 0 | |

D 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan?Yes = 2 ☐ No = ☐**0**

Total for D 6

Add the points in the boxes above

1**Rating of Value** If score is: 2-4 = H ✓ 1 = M 0 = L

Record the rating on the first page

Wetland name or number B**These questions apply to wetlands of all HGM classes.****HABITAT FUNCTIONS** - Indicators that site functions to provide important habitat**H 1.0. Does the site have the potential to provide habitat?**

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class. Check the Cowardin plant classes in the wetland. Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

- | | | |
|---|----------------------------------|----------|
| ☐ Aquatic bed | 4 structures or more: points = 4 | 0 |
| ☐ Emergent | 3 structures: points = 2 | |
| ☐ Scrub-shrub (areas where shrubs have > 30% cover) | 2 structures: points = 1 | |
| ☒ Forested (areas where trees have > 30% cover) | 1 structure: points = 0 | |

If the unit has a Forested class, check if:

- ☐ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

H 1.2. Hydroperiods

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

- | | | |
|--|-------------------------------------|----------|
| ☐ Permanently flooded or inundated | 4 or more types present: points = 3 | 2 |
| ☒ Seasonally flooded or inundated | 3 types present: points = 2 | |
| ☒ Occasionally flooded or inundated | 2 types present: points = 1 | |
| ☒ Saturated only | 1 type present: points = 0 | |
| ☐ Permanently flowing stream or river in, or adjacent to, the wetland | | |
| ☐ Seasonally flowing stream in, or adjacent to, the wetland | | |
| ☐ Lake Fringe wetland | 2 points | |
| ☐ Freshwater tidal wetland | 2 points | |

H 1.3. Richness of plant species

Count the number of plant species in the wetland that cover at least 10 ft².

Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle

If you counted: > 19 species

points = 2

5 - 19 species

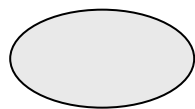
points = 1

< 5 species

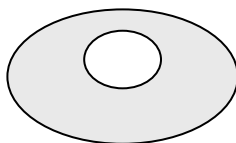
points = 0

1**H 1.4. Interspersion of habitats**

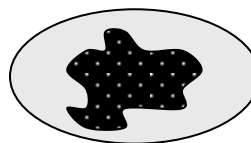
Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*



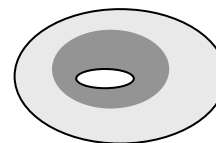
None = 0 points



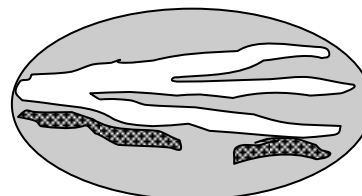
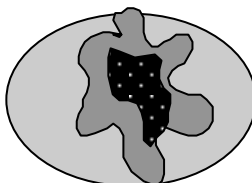
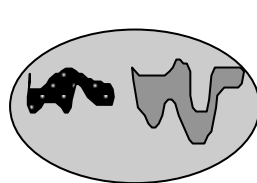
Low = 1 point



Moderate = 2 points

**0**

All three diagrams in this row are **HIGH** = 3points



Wetland name or number **B**

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. <i>The number of checks is the number of points.</i> ☐ Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long). ☐ Standing snags (dbh > 4 in) within the wetland ☐ Undercut banks are present for at least 6.6 ft (2 m) and/or overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present (<i>cut shrubs or trees that have not yet weathered where wood is exposed</i>) ☐ At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (<i>structures for egg-laying by amphibians</i>) ☐ Invasive plants cover less than 25% of the wetland area in every stratum of plants (<i>see H 1.1 for list of strata</i>)		0
Total for H 1	Add the points in the boxes above	3

Rating of Site Potential If score is: 15-18 = H 7-14 = M ☒ 0-6 = L

Record the rating on the first page

H 2.0. Does the landscape have the potential to support the habitat functions of the site?		
H 2.1. Accessible habitat (include <i>only habitat that directly abuts wetland unit</i>). <i>Calculate:</i> % undisturbed habitat <u>2</u> + [(% moderate and low intensity land uses)/2] <u>0</u> = <u>2</u> % If total accessible habitat is: ☐ > 1/3 (33.3%) of 1 km Polygon points = 3 ☐ 20-33% of 1 km Polygon points = 2 ☐ 10-19% of 1 km Polygon points = 1 ☒ < 10% of 1 km Polygon points = 0		0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. <i>Calculate:</i> % undisturbed habitat <u>38</u> + [(% moderate and low intensity land uses)/2] <u>5</u> = <u>43</u> % ☐ Undisturbed habitat > 50% of Polygon points = 3 ☐ Undisturbed habitat 10-50% and in 1-3 patches points = 2 ☒ Undisturbed habitat 10-50% and > 3 patches points = 1 ☐ Undisturbed habitat < 10% of 1 km Polygon points = 0		1
H 2.3. Land use intensity in 1 km Polygon: If ☒ > 50% of 1 km Polygon is high intensity land use points = (- 2) ☐ ≤ 50% of 1 km Polygon is high intensity points = 0		-2
Total for H 2	Add the points in the boxes above	-1

Rating of Landscape Potential If score is: 4-6 = H 1-3 = M ☒ < 1 = L

Record the rating on the first page

H 3.0. Is the habitat provided by the site valuable to society?		
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? <i>Choose only the highest score that applies to the wetland being rated.</i> Site meets ANY of the following criteria: points = 2 ☐ It has 3 or more priority habitats within 100 m (see next page) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) ☐ It is mapped as a location for an individual WDFW priority species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan ☒ Site has 1 or 2 priority habitats (listed on next page) within 100 m points = 1 ☐ Site does not meet any of the criteria above points = 0		1

Rating of Value If score is: 2 = H ☒ 1 = M 0 = L

Record the rating on the first page

Wetland name or number B

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp. <http://wdfw.wa.gov/publications/00165/wdfw00165.pdf> or access the list from here: <http://wdfw.wa.gov/conservation/phs/list/>)

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: **NOTE:** *This question is independent of the land use between the wetland unit and the priority habitat.*

- ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 1 ac (0.4 ha).
- ☐ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).
- ☐ **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.
- ☒ **Old-growth/Mature forests:** Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.
- ☐ **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).
- ☐ **Riparian:** The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- ☐ **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).
- ☐ **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.
- ☐ **Nearshore:** Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page*).
- ☐ **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.
- ☐ **Cliffs:** Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.
- ☐ **Talus:** Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
- ☒ **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

Wetland name or number **B****CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS**

Wetland Type	Category
<i>Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.</i>	
SC 1.0. Estuarine wetlands Does the wetland meet the following criteria for Estuarine wetlands? ☐ The dominant water regime is tidal, ☐ Vegetated, and ☐ With a salinity greater than 0.5 ppt Yes – Go to SC 1.1 No = Not an estuarine wetland	
SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? Yes = Category I No - Go to SC 1.2	Cat. I
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are <i>Spartina</i> , see page 25) ☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or unmowed grassland. ☐ The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. Yes = Category I No = Category II	Cat. I Cat. II
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? Yes – Go to SC 2.2 No – Go to SC 2.3 SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? Yes = Category I No = Not a WHCV SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf Yes – Contact WNHP/WDNR and go to SC 2.4 No = Not a WHCV SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? Yes = Category I No = Not a WHCV	Cat. I
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? <i>Use the key below. If you answer YES you will still need to rate the wetland based on its functions.</i> SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? Yes – Go to SC 3.3 No – Go to SC 3.2 SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? Yes – Go to SC 3.3 No = Is not a bog SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? Yes = Is a Category I bog No – Go to SC 3.4 NOTE: If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog. SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy? Yes = Is a Category I bog No = Is not a bog	Cat. I

Wetland name or number B

SC 4.0. Forested Wetlands Does the wetland have at least <u>1 contiguous acre</u> of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? <i>If you answer YES you will still need to rate the wetland based on its functions.</i> ☐ Old-growth forests (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more. ☐ Mature forests (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm). Yes = Category I No = Not a forested wetland for this section	Cat. I
SC 5.0. Wetlands in Coastal Lagoons Does the wetland meet all of the following criteria of a wetland in a coastal lagoon? ☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks ☐ The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (<i>needs to be measured near the bottom</i>) Yes – Go to SC 5.1 No = Not a wetland in a coastal lagoon SC 5.1. Does the wetland meet all of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100). ☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or unmowed grassland. ☐ The wetland is larger than 1/10 ac (4350 ft²) Yes = Category I No = Category II	Cat. I Cat. II
SC 6.0. Interdunal Wetlands Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? <i>If you answer yes you will still need to rate the wetland based on its habitat functions.</i> In practical terms that means the following geographic areas: ☐ Long Beach Peninsula: Lands west of SR 103 ☐ Grayland-Westport: Lands west of SR 105 ☐ Ocean Shores-Copalis: Lands west of SR 115 and SR 109 Yes – Go to SC 6.1 No = not an interdunal wetland for rating SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)? Yes = Category I No – Go to SC 6.2 SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger? Yes = Category II No – Go to SC 6.3 SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac? Yes = Category III No = Category IV	Cat I Cat. II Cat. III Cat. IV
Category of wetland based on Special Characteristics If you answered No for all types, enter "Not Applicable" on Summary Form	N/A

Wetland name or number _____

This page left blank intentionally

WETLAND RATING FIGURE 1- WETLAND B



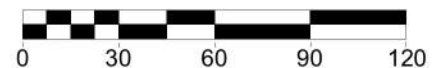
LEGEND

-  FORESTED VEGETATION
-  SATURATED ONLY
-  SEASONALLY FLOODED
-  OCCASIONALLY FLOODED

150' FROM WL BOUNDARY
C-3 - Page 29 of 61



Scale 1" = 60'



Wetland Resources, Inc.
Delineation / Mitigation / Restoration / Habitat Creation / Permit Assistance
9505 19th Avenue S.E. Suite 106 Everett, Washington 98208
Phone: (425) 337-3174
Fax: (425) 337-3045
Email: mailbox@wetlandresources.com

WETLAND RATING Wetland B

Issaquah School District #411
Attn: Tom Mullins
5150 220th Ave SE
Issaquah, WA 98029

Figure B-1
WRI Job # 19183
Rated by: AR

WETLAND RATING FIGURE 2- WETLAND B



**CONTRIBUTING BASIN
AREA RELATIVE TO
WETLAND UNIT IS 15.9:1**

LEGEND

- RELATIVELY UNDISTURBED
- LOW/MOD. INTENSITY
- HIGH INTENSITY
- ACCESSIBLE HABITAT
- WETLAND
- 1 KM FROM WETLAND
- CONTRIBUTING BASIN



Scale 1" = 1,000'



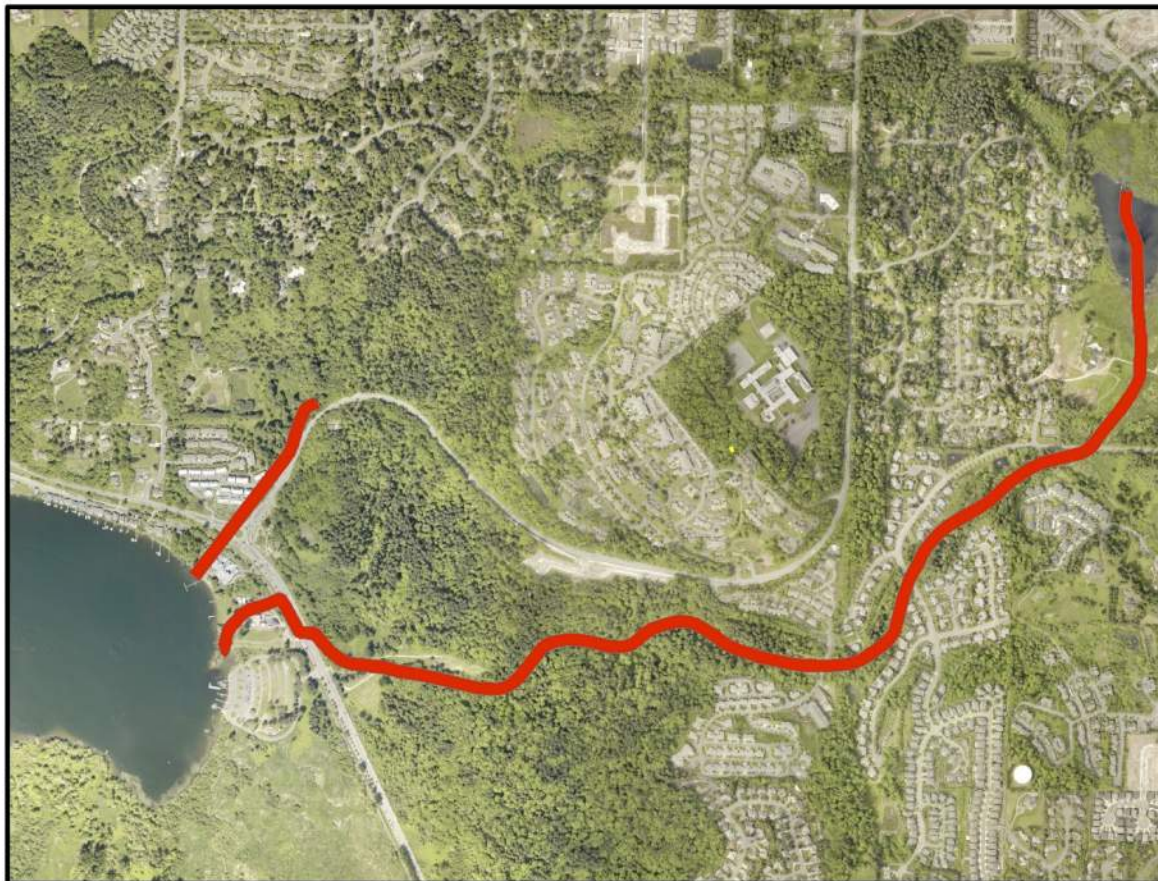
Wetland Resources, Inc.
 Delineation / Mitigation / Restoration / Habitat Creation / Permit Assistance
 9505 19th Avenue S.E. Suite 106 Everett, Washington 98208
 Phone: (425) 337-3174
 Fax: (425) 337-3045
 Email: mailbox@wetlandresources.com

**WETLAND RATING
Wetland B**

Issaquah School District #411
 Attn: Tom Mullins
 5150 220th Ave SE
 Issaquah, WA 98029

Figure B-2
 WRI Job # 19183
 Rated by: AR

WETLAND RATING FIGURE 3- WETLAND B



*There is no TMDL for the basin in which this wetland is found

LEGEND



WETLAND
LOCATION



AQUATIC RESOURCES
ON THE 303(d) LIST

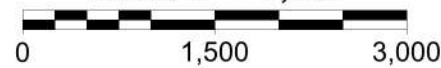


AQUATIC RESOURCES
WITH A TMDL

C-3 - Page 31 of 61



Scale 1" = 1,500'



Wetland Resources, Inc.

Delineation / Mitigation / Restoration / Habitat Creation / Permit Assistance

9505 19th Avenue S.E. Suite 106 Everett, Washington 98208

Phone: (425) 337-3174

Fax: (425) 337-3045

Email: mailbox@wetlandresources.com

WETLAND RATING Wetland B

Issaquah School District #411

Attn: Tom Mullins

5150 220th Ave SE

Issaquah, WA 98029

Figure B-3

WRI Job # 19183

Rated by: AR

Wetland name or number C

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Wetland C (ISD HS #4 and ES #17) Date of site visit: 7/22/19Rated by MK Trained by Ecology? ☒ Yes ☐ No Date of training 3/2015HGM Class used for rating SLOPE Wetland has multiple HGM classes? ☐ Y ☒ N**NOTE: Form is not complete without the figures requested (figures can be combined).**Source of base aerial photo/map King County**OVERALL WETLAND CATEGORY IV** (based on functions ☒ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

 Category I – Total score = 23 - 27 Category II – Total score = 20 - 22 Category III – Total score = 16 - 19☒ Category IV – Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
<i>Circle the appropriate ratings</i>				
Site Potential	H ☐ M ☒ L	H M ☐ L	H M ☐ L	
Landscape Potential	H ☐ M ☒ L	H ☐ M ☒ L	H M ☐ L	
Value	H ☐ M ☒ L	H ☐ M ☒ L	H ☐ M ☒ L	TOTAL
Score Based on Ratings	6	5	4	15

**Score for each
function based
on three
ratings
(order of ratings
is not
important)**

9 = H,H,H

8 = H,H,M

7 = H,H,L

7 = H,M,M

6 = H,M,L

6 = M,M,M

5 = H,L,L

5 = M,M,L

4 = M,L,L

3 = L,L,L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY
Estuarine	I II
Wetland of High Conservation Value	I
Bog	I
Mature Forest	I
Old Growth Forest	I
Coastal Lagoon	I II
Interdunal	I II III IV
None of the above	☒

Wetland name or number C

Maps and figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet (<i>can be added to map of hydroperiods</i>)	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	D 2.2, D 5.2	
Map of the contributing basin	D 4.3, D 5.3	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream (<i>can be added to another figure</i>)	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	1
Hydroperiods	H 1.2	1
Plant cover of dense trees, shrubs, and herbaceous plants	S 1.3	4
Plant cover of dense, rigid trees, shrubs, and herbaceous plants (<i>can be added to figure above</i>)	S 4.1	4
Boundary of 150 ft buffer (<i>can be added to another figure</i>)	S 2.1, S 5.1	1
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	2
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	3
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	3

Wetland name or number C

HGM Classification of Wetlands in Western Washington

For questions 1-7, the criteria described must apply to the entire unit being rated.

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

NO – go to 2

YES – the wetland class is **Tidal Fringe** – go to 1.1

- 1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

NO – **Saltwater Tidal Fringe (Estuarine)**

YES – **Freshwater Tidal Fringe**

*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

NO – go to 3

YES – The wetland class is **Flats**

*If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?

The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;

At least 30% of the open water area is deeper than 6.6 ft (2 m).

NO – go to 4

YES – The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?

The wetland is on a slope (*slope can be very gradual*),

The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks,

The water leaves the wetland **without being impounded**.

NO – go to 5

YES – The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?

___ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,

___ The overbank flooding occurs at least once every 2 years.

Wetland name or number **C**_____

NO – go to 6

YES – The wetland class is **Riverine****NOTE:** The Riverine unit can contain depressions that are filled with water when the river is not flooding

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

NO – go to 7

YES – The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

NO – go to 8

YES – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT** (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

*If you are still unable to determine which of the above criteria apply to your wetland, or if you have **more than 2 HGM classes** within a wetland boundary, classify the wetland as Depressional for the rating.*

Wetland name or number C**SLOPE WETLANDS****Water Quality Functions** - Indicators that the site functions to improve water quality

S 1.0. Does the site have the potential to improve water quality?		
S 1.1. Characteristics of the average slope of the wetland: <i>(a 1% slope has a 1 ft vertical drop in elevation for every 100 ft of horizontal distance)</i> ☐ Slope is 1% or less points = 3 ☐ Slope is > 1%-2% points = 2 ☐ Slope is > 2%-5% points = 1 ☒ Slope is greater than 5% points = 0		0
S 1.2. The soil <u>2</u> in below the surface (or duff layer) is true clay or true organic (use NRCS definitions): Yes = 3 No = 0		0
S 1.3. Characteristics of the plants in the wetland that trap sediments and pollutants: Choose the points appropriate for the description that best fits the plants in the wetland. <i>Dense means you have trouble seeing the soil surface (>75% cover), and uncut means not grazed or mowed and plants are higher than 6 in.</i> ☒ Dense, uncut, herbaceous plants > 90% of the wetland area points = 6 ☐ Dense, uncut, herbaceous plants > ½ of area points = 3 ☐ Dense, woody, plants > ½ of area points = 2 ☐ Dense, uncut, herbaceous plants > ¼ of area points = 1 ☐ Does not meet any of the criteria above for plants points = 0		6
Total for S 1 Add the points in the boxes above		6

Rating of Site Potential If score is: 12 = H ☒ 6-11 = M 0-5 = L

Record the rating on the first page

S 2.0. Does the landscape have the potential to support the water quality function of the site?		
S 2.1. Is > 10% of the area within 150 ft on the uphill side of the wetland in land uses that generate pollutants? Yes = 1 No = 0		1
S 2.2. Are there other sources of pollutants coming into the wetland that are not listed in question S 2.1? Other sources _____ Yes = 1 No = 0		0
Total for S 2 Add the points in the boxes above		1

Rating of Landscape Potential If score is: ☒ 1-2 = M 0 = L

Record the rating on the first page

S 3.0. Is the water quality improvement provided by the site valuable to society?		
S 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list? Yes = 1 No = 0		0
S 3.2. Is the wetland in a basin or sub-basin where water quality is an issue? <i>At least one aquatic resource in the basin is on the 303(d) list.</i> Yes = 1 No = 0		1
S 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? <i>Answer YES if there is a TMDL for the basin in which unit is found.</i> Yes = 2 No = 0		0
Total for S 3 Add the points in the boxes above		1

Rating of Value If score is: 2-4 = H ☒ 1 = M 0 = L

Record the rating on the first page

--	--

Wetland name or number C**SLOPE WETLANDS****Hydrologic Functions** - Indicators that the site functions to reduce flooding and stream erosion

S 4.0. Does the site have the potential to reduce flooding and stream erosion?

S 4.1. Characteristics of plants that reduce the velocity of surface flows during storms: Choose the points appropriate for the description that best fits conditions in the wetland. *Stems of plants should be thick enough (usually $> \frac{1}{8}$ in), or dense enough, to remain erect during surface flows.*

☐ Dense, uncut, **rigid** plants cover $> 90\%$ of the area of the wetland

points = 1

☒ All other conditions

points = 0

0

Rating of Site Potential If score is: 1 = M 0 = L

Record the rating on the first page

S 5.0. Does the landscape have the potential to support the hydrologic functions of the site?

S 5.1. Is more than 25% of the area within 150 ft upslope of wetland in land uses or cover that generate excess surface runoff?

Yes = 1 No = 0

1

Rating of Landscape Potential If score is: 1 = M 0 = L

Record the rating on the first page

S 6.0. Are the hydrologic functions provided by the site valuable to society?

S 6.1. Distance to the nearest areas downstream that have flooding problems:

☐ The sub-basin immediately down-gradient of site has flooding problems that result in damage to human or natural resources (e.g., houses or salmon redds) points = 2

☒ Surface flooding problems are in a sub-basin farther down-gradient

points = 1

☐ No flooding problems anywhere downstream

points = 0

1

S 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan?

Yes = 2 No = 0

0

Total for S 6

Add the points in the boxes above

1

Rating of Value If score is: 2-4 = H 1 = M 0 = L

Record the rating on the first page

NOTES and FIELD OBSERVATIONS:

Wetland name or number C**These questions apply to wetlands of all HGM classes.****HABITAT FUNCTIONS** - Indicators that site functions to provide important habitat**H 1.0. Does the site have the potential to provide habitat?**

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class. Check the Cowardin plant classes in the wetland. Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

- | | | |
|---|----------------------------------|----------|
| ☐ Aquatic bed | 4 structures or more: points = 4 | 0 |
| ☒ Emergent | 3 structures: points = 2 | |
| ☐ Scrub-shrub (areas where shrubs have > 30% cover) | 2 structures: points = 1 | |
| ☐ Forested (areas where trees have > 30% cover) | 1 structure: points = 0 | |
| <i>If the unit has a Forested class, check if:</i> | | |
| ☐ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon | | |

H 1.2. Hydroperiods

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

- | | | |
|--|-------------------------------------|----------|
| ☐ Permanently flooded or inundated | 4 or more types present: points = 3 | 0 |
| ☒ Seasonally flooded or inundated | 3 types present: points = 2 | |
| ☐ Occasionally flooded or inundated | 2 types present: points = 1 | |
| ☐ Saturated only | 1 type present: points = 0 | |
| | | |
| ☐ Permanently flowing stream or river in, or adjacent to, the wetland | | |
| ☐ Seasonally flowing stream in, or adjacent to, the wetland | | |
| ☐ Lake Fringe wetland | 2 points | |
| ☐ Freshwater tidal wetland | 2 points | |

H 1.3. Richness of plant species

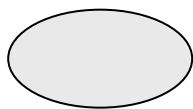
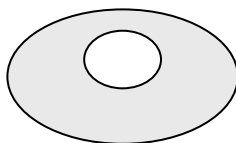
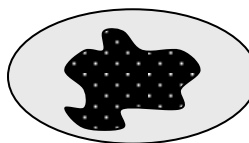
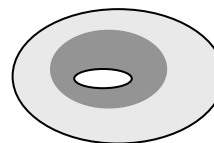
Count the number of plant species in the wetland that cover at least 10 ft².

*Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. **Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

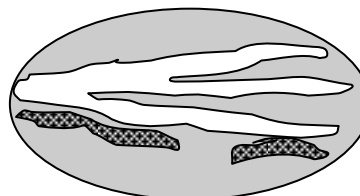
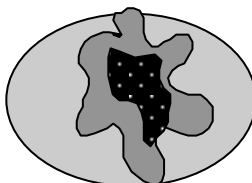
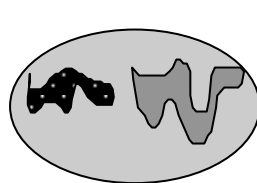
- | | | |
|------------------------------|-------------------|----------|
| If you counted: > 19 species | points = 2 | 1 |
| 5 - 19 species | points = 1 | |
| < 5 species | points = 0 | |

H 1.4. Interspersion of habitats

Decide from the diagrams below whether interspersions among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*

**None = 0 points****Low = 1 point****Moderate = 2 points****0**

All three diagrams in this row are **HIGH** = 3points



Wetland name or number C

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. <i>The number of checks is the number of points.</i> ☐ Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long). ☐ Standing snags (dbh > 4 in) within the wetland ☐ Undercut banks are present for at least 6.6 ft (2 m) and/or overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present (<i>cut shrubs or trees that have not yet weathered where wood is exposed</i>) ☐ At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (<i>structures for egg-laying by amphibians</i>) ☐ Invasive plants cover less than 25% of the wetland area in every stratum of plants (<i>see H 1.1 for list of strata</i>)		0
Total for H 1	Add the points in the boxes above	1

Rating of Site Potential If score is: 15-18 = H 7-14 = M ☒ 0-6 = L

Record the rating on the first page

H 2.0. Does the landscape have the potential to support the habitat functions of the site?		
H 2.1. Accessible habitat (include <i>only habitat that directly abuts wetland unit</i>). <i>Calculate:</i> % undisturbed habitat <u>1</u> + [(% moderate and low intensity land uses)/2] <u>0</u> = <u>2</u> % If total accessible habitat is: ☐ > 1/3 (33.3%) of 1 km Polygon points = 3 ☐ 20-33% of 1 km Polygon points = 2 ☐ 10-19% of 1 km Polygon points = 1 ☒ < 10% of 1 km Polygon points = 0		0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. <i>Calculate:</i> % undisturbed habitat <u>35</u> + [(% moderate and low intensity land uses)/2] <u>6</u> = <u>42</u> % ☐ Undisturbed habitat > 50% of Polygon points = 3 ☐ Undisturbed habitat 10-50% and in 1-3 patches points = 2 ☒ Undisturbed habitat 10-50% and > 3 patches points = 1 ☐ Undisturbed habitat < 10% of 1 km Polygon points = 0		1
H 2.3. Land use intensity in 1 km Polygon: If ☒ > 50% of 1 km Polygon is high intensity land use points = (- 2) ☐ ≤ 50% of 1 km Polygon is high intensity points = 0		-2
Total for H 2	Add the points in the boxes above	-1

Rating of Landscape Potential If score is: 4-6 = H 1-3 = M ☒ < 1 = L

Record the rating on the first page

H 3.0. Is the habitat provided by the site valuable to society?		
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? <i>Choose only the highest score that applies to the wetland being rated.</i> Site meets ANY of the following criteria: points = 2 ☐ It has 3 or more priority habitats within 100 m (see next page) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) ☐ It is mapped as a location for an individual WDFW priority species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan ☒ Site has 1 or 2 priority habitats (listed on next page) within 100 m points = 1 ☐ Site does not meet any of the criteria above points = 0		1

Rating of Value If score is: 2 = H ☒ 1 = M 0 = L

Record the rating on the first page

Wetland name or number C

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp. <http://wdfw.wa.gov/publications/00165/wdfw00165.pdf> or access the list from here: <http://wdfw.wa.gov/conservation/phs/list/>)

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: **NOTE:** *This question is independent of the land use between the wetland unit and the priority habitat.*

- ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 1 ac (0.4 ha).
- ☐ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).
- ☐ **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.
- ☒ **Old-growth/Mature forests:** Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.
- ☐ **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).
- ☐ **Riparian:** The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- ☐ **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).
- ☐ **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.
- ☐ **Nearshore:** Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page*).
- ☐ **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.
- ☐ **Cliffs:** Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.
- ☐ **Talus:** Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
- ☒ **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Rating System for Western WA: 2014 Update
Rating Form – Effective January 1, 2015
C-3 - Page 41 of 61

Wetland name or number C

SC 4.0. Forested Wetlands Does the wetland have at least <u>1 contiguous acre</u> of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? <i>If you answer YES you will still need to rate the wetland based on its functions.</i> ☐ Old-growth forests (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more. ☐ Mature forests (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm). Yes = Category I No = Not a forested wetland for this section	Cat. I
SC 5.0. Wetlands in Coastal Lagoons Does the wetland meet all of the following criteria of a wetland in a coastal lagoon? ☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks ☐ The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (<i>needs to be measured near the bottom</i>) Yes – Go to SC 5.1 No = Not a wetland in a coastal lagoon SC 5.1. Does the wetland meet all of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100). ☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or unmowed grassland. ☐ The wetland is larger than 1/10 ac (4350 ft²) Yes = Category I No = Category II	Cat. I Cat. II
SC 6.0. Interdunal Wetlands Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? <i>If you answer yes you will still need to rate the wetland based on its habitat functions.</i> In practical terms that means the following geographic areas: ☐ Long Beach Peninsula: Lands west of SR 103 ☐ Grayland-Westport: Lands west of SR 105 ☐ Ocean Shores-Copalis: Lands west of SR 115 and SR 109 Yes – Go to SC 6.1 No = not an interdunal wetland for rating SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)? Yes = Category I No – Go to SC 6.2 SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger? Yes = Category II No – Go to SC 6.3 SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac? Yes = Category III No = Category IV	Cat I Cat. II Cat. III Cat. IV
Category of wetland based on Special Characteristics If you answered No for all types, enter "Not Applicable" on Summary Form	

Wetland name or number _____

This page left blank intentionally

WETLAND RATING FIGURE 1- WETLAND C



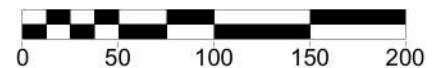
LEGEND

-  EMERGENT VEGETATION
-  PERMANENTLY FLOODED
-  150' FROM WL BOUNDARY

C-3 - Page 44 of 61



Scale 1" = 100'

*Wetland Resources, Inc.*

Delineation / Mitigation / Restoration / Habitat Creation / Permit Assistance

9505 19th Avenue S.E. Suite 106 Everett, Washington 98208

Phone: (425) 337-3174

Fax: (425) 337-3045

Email: mailbox@wetlandresources.com

**WETLAND RATING
Wetland C**

Issaquah School District #411

Attn: Tom Mullins

5150 220th Ave SE

Issaquah, WA 98029

Figure C-1

WRI Job # 19183

Rated by: AR

WETLAND RATING FIGURE 2- WETLAND C



LEGEND

- RELATIVELY UNDISTURBED
- LOW/MOD. INTENSITY
- HIGH INTENSITY
- ACCESSIBLE HABITAT
- WETLAND
- 1 KM FROM WETLAND
- CONTRIBUTING BASIN



Scale 1" = 1,000'

*Wetland Resources, Inc.*

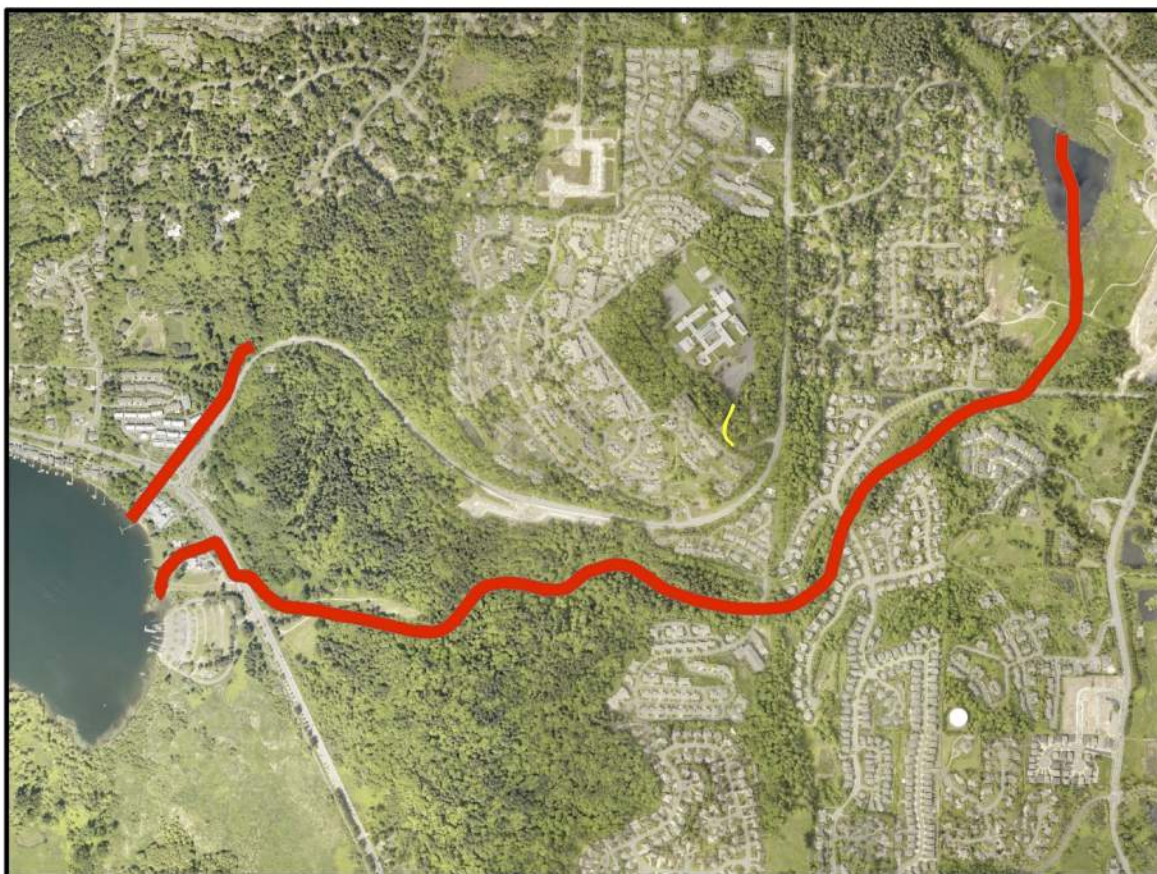
Delineation / Mitigation / Restoration / Habitat Creation / Permit Assistance
 9505 19th Avenue S.E. Suite 106 Everett, Washington 98208
 Phone: (425) 337-3174
 Fax: (425) 337-3045
 Email: mailbox@wetlandresources.com

WETLAND RATING
Wetland C

Issaquah School District #411
 Attn: Tom Mullins
 5150 220th Ave SE
 Issaquah, WA 98029

Figure C-2
 WRI Job # 19183
 Rated by: AR

WETLAND RATING FIGURE 3- WETLAND C



*There is no TMDL for the basin in which this wetland is found

LEGEND



WETLAND
LOCATION



AQUATIC RESOURCES
ON THE 303(d) LIST



AQUATIC RESOURCES
WITH A TMDL

C-3 - Page 46 of 61



Scale 1" = 1,500'

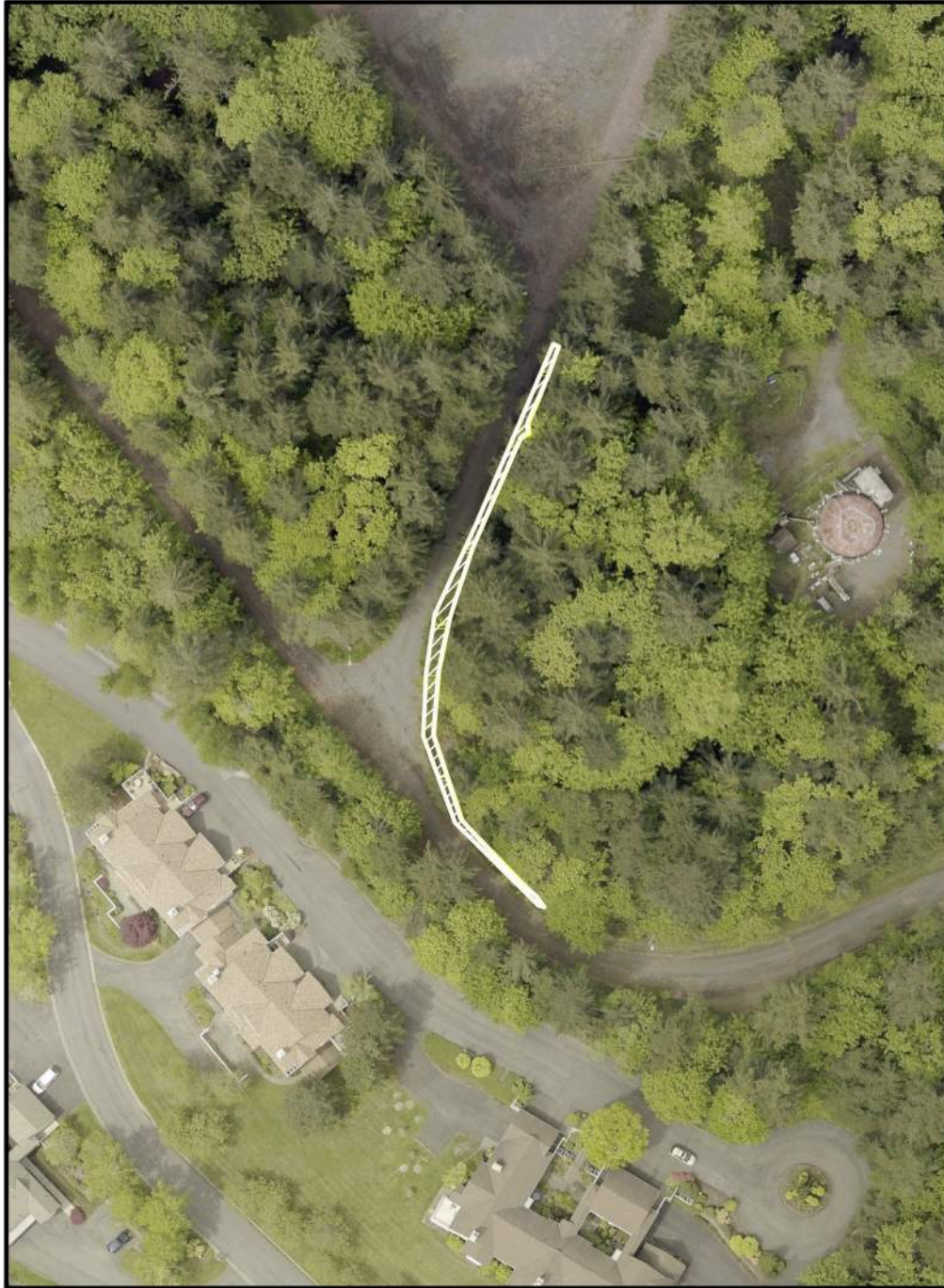


Wetland Resources, Inc.
Delineation / Mitigation / Restoration / Habitat Creation / Permit Assistance
9505 19th Avenue S.E. Suite 106 Everett, Washington 98208
Phone: (425) 337-3174
Fax: (425) 337-3045
Email: mailbox@wetlandresources.com

WETLAND RATING Wetland C

Issaquah School District #411
Attn: Tom Mullins
5150 220th Ave SE
Issaquah, WA 98029
Figure C-3
WRI Job # 19183
Rated by: AR

ISSAQUAH SD - HS #4 AND ES #17
WETLAND RATING FIGURE 4 - WETLAND C



Scale 1" = 100'



LEGEND

 WETLAND

 DENSE UNCUT HERBACEOUS

C-3 - Page 47 of 61

Wetland Resources, Inc.
Delineation / Mitigation / Restoration / Habitat Creation / Permit Assistance
9505 19th Avenue S.E. Suite 106 Everett, Washington 98208
Phone: (425) 337-3174
Fax: (425) 337-3045
Email: mailbox@wetlandresources.com

WETLAND RATING
Wetland C

Issaquah School District #411
Attn: Tom Mullins
5150 220th Ave SE
Issaquah, WA 98029

Figure C-4
WRI Job # 19183
Rated by: AR

APPENDIX B: WETLAND DETERMINATION DATA FORMS

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: 19183 Issaquah SD HS #4 and ES #17 City/County: Issaquah Sampling Date: 7/22/19
 Applicant/Owner: Issaquah School District State: WA Sampling Point: S1
 Investigator(s): Meryl Kamowski Section, Township, Range: S16, T24N, R6E, W.M.
 Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): >5%
 Subregion (LRR): LRR A Lat: 47.569597 Long: -122.039740 Datum: WGS 84
 Soil Map Unit Name: Alderwood gravelly sandy loam, 15 to 30 percent slopes NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ☐ No ☒ Hydric Soil Present? Yes ☐ No ☒ Wetland Hydrology Present? Yes ☐ No ☒	Is the Sampled Area within a Wetland? Yes ☐ No ☒
Remarks: Data pit taken within ditch by Wetland A	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 15 feet)	Absolute % Cover	Dominant Species?	Indicator Status															
1. <u>Acer macrophyllum</u>	<u>70</u>	<u>Y</u>	<u>FACU</u>	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0%</u> (A/B)														
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
<u>70</u> = Total Cover																		
Sapling/Shrub Stratum (Plot size: 10 feet)																		
1. <u>Rubus armeniacus</u>	<u>25</u>	<u>Y</u>	<u>FACU</u>	Prevalence Index worksheet: <table style="width: 100%;"> <tr> <th>Total % Cover of:</th> <th>Multiply by:</th> </tr> <tr> <td>OBL species <u>0</u></td> <td>x 1 = <u>0</u></td> </tr> <tr> <td>FACW species <u>0</u></td> <td>x 2 = <u>0</u></td> </tr> <tr> <td>FAC species <u>0</u></td> <td>x 3 = <u>0</u></td> </tr> <tr> <td>FACU species <u>125</u></td> <td>x 4 = <u>500</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>125</u> (A)</td> <td><u>500</u> (B)</td> </tr> </table> Prevalence Index = B/A = <u>4.0</u>	Total % Cover of:	Multiply by:	OBL species <u>0</u>	x 1 = <u>0</u>	FACW species <u>0</u>	x 2 = <u>0</u>	FAC species <u>0</u>	x 3 = <u>0</u>	FACU species <u>125</u>	x 4 = <u>500</u>	UPL species <u>0</u>	x 5 = <u>0</u>	Column Totals: <u>125</u> (A)	<u>500</u> (B)
Total % Cover of:	Multiply by:																	
OBL species <u>0</u>	x 1 = <u>0</u>																	
FACW species <u>0</u>	x 2 = <u>0</u>																	
FAC species <u>0</u>	x 3 = <u>0</u>																	
FACU species <u>125</u>	x 4 = <u>500</u>																	
UPL species <u>0</u>	x 5 = <u>0</u>																	
Column Totals: <u>125</u> (A)	<u>500</u> (B)																	
2. <u>Symphoricarpos albus</u>	<u>20</u>	<u>Y</u>	<u>FACU</u>															
3. <u>Oemleria cerasiformis</u>	<u>10</u>	<u>N</u>	<u>FACU</u>															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
<u>55</u> = Total Cover																		
Herb Stratum (Plot size: 5 feet)																		
1. _____	_____	_____	_____	Hydrophytic Vegetation Indicators: ☐ Rapid Test for Hydrophytic Vegetation ☐ Dominance Test is >50% ☐ Prevalence Index is ≤3.0 ¹ ☐ Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) ☐ Wetland Non-Vascular Plants ¹ ☐ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.														
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
8. _____	_____	_____	_____															
9. _____	_____	_____	_____															
10. _____	_____	_____	_____															
11. _____	_____	_____	_____															
_____ = Total Cover																		
Woody Vine Stratum (Plot size: _____)																		
1. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes ☐ No ☒														
2. _____	_____	_____	_____															
_____ = Total Cover																		
% Bare Ground in Herb Stratum _____																		

Remarks:

SOIL

Sampling Point: S1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features			Loc ²	Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹			
0-4	2.5Y 3/2	100	-	-	-	-	Cl Lo	
4-16	2.5Y 5/4	75	10YR 5/8	25	C	M	Cl Lo	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.) ☐ Histosol (A1) ☐ Histic Epipedon (A2) ☐ Black Histic (A3) ☐ Hydrogen Sulfide (A4) ☐ Depleted Below Dark Surface (A11) ☐ Thick Dark Surface (A12) ☐ Sandy Mucky Mineral (S1) ☐ Sandy Gleyed Matrix (S4) ☐ Sandy Redox (S5) ☐ Stripped Matrix (S6) ☐ Loamy Mucky Mineral (F1) (except MLRA 1) ☐ Loamy Gleyed Matrix (F2) ☐ Depleted Matrix (F3) ☐ Redox Dark Surface (F6) ☐ Depleted Dark Surface (F7) ☐ Redox Depressions (F8)	Indicators for Problematic Hydric Soils³: ☐ 2 cm Muck (A10) ☐ Red Parent Material (TF2) ☐ Very Shallow Dark Surface (TF12) ☐ Other (Explain in Remarks) ³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.
--	--

Restrictive Layer (if present): Type: _____ Depth (inches): _____	Hydric Soil Present? Yes ☐ No ☒
Remarks:	

HYDROLOGY

Wetland Hydrology Indicators:	
Primary Indicators (minimum of one required; check all that apply) ☐ Surface Water (A1) ☐ High Water Table (A2) ☐ Saturation (A3) ☐ Water Marks (B1) ☐ Sediment Deposits (B2) ☐ Drift Deposits (B3) ☐ Algal Mat or Crust (B4) ☐ Iron Deposits (B5) ☐ Surface Soil Cracks (B6) ☐ Inundation Visible on Aerial Imagery (B7) ☐ Sparsely Vegetated Concave Surface (B8)	Secondary Indicators (2 or more required) ☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) ☐ Salt Crust (B11) ☐ Aquatic Invertebrates (B13) ☐ Hydrogen Sulfide Odor (C1) ☐ Oxidized Rhizospheres along Living Roots (C3) ☐ Presence of Reduced Iron (C4) ☐ Recent Iron Reduction in Tilled Soils (C6) ☐ Stunted or Stressed Plants (D1) (LRR A) ☐ Other (Explain in Remarks) ☐ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) ☐ Drainage Patterns (B10) ☐ Dry-Season Water Table (C2) ☐ Saturation Visible on Aerial Imagery (C9) ☐ Geomorphic Position (D2) ☐ Shallow Aquitard (D3) ☐ FAC-Neutral Test (D5) ☐ Raised Ant Mounds (D6) (LRR A) ☐ Frost-Heave Hummocks (D7)
Field Observations: Surface Water Present? Yes ☐ No ☒ Depth (inches): _____ Water Table Present? Yes ☐ No ☒ Depth (inches): _____ Saturation Present? Yes ☐ No ☒ Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes ☐ No ☒
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks:	

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: 19183 Issaquah SD HS #4 and ES #17 City/County: Issaquah Sampling Date: 7/22/19
 Applicant/Owner: Issaquah School District State: WA Sampling Point: S2
 Investigator(s): Meryl Kamowski Section, Township, Range: S16, T24N, R6E, W.M.
 Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): >5%
 Subregion (LRR): LRR A Lat: 47.569597 Long: -122.039740 Datum: WGS 84
 Soil Map Unit Name: Alderwood gravelly sandy loam, 15 to 30 percent slopes NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ☒ No ☐ Hydric Soil Present? Yes ☒ No ☐ Wetland Hydrology Present? Yes ☒ No ☐	Is the Sampled Area within a Wetland? Yes ☒ No ☐
Remarks: Data pit taken within Wetland B	

VEGETATION – Use scientific names of plants.

Stratum	Absolute % Cover	Dominant Species?	Indicator Status	Notes
Tree Stratum (Plot size: 15 feet)				
1. <u>Populus balsamifera</u>	<u>25</u>	<u>Y</u>	<u>FAC</u>	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
	<u>25</u>	= Total Cover		
Sapling/Shrub Stratum (Plot size: 10 feet)				
1. <u>Rubus spectabilis</u>	<u>10</u>	<u>Y</u>	<u>FAC</u>	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
	<u>10</u>	= Total Cover		
Herb Stratum (Plot size: 5 feet)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
	_____	= Total Cover		
Woody Vine Stratum (Plot size: _____)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
	_____	= Total Cover		
% Bare Ground in Herb Stratum _____				

Dominance Test worksheet:
 Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
 Total Number of Dominant Species Across All Strata: 2 (B)
 Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>0</u> (A)	<u>0</u> (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:
☐ Rapid Test for Hydrophytic Vegetation
☒ Dominance Test is >50%
☐ Prevalence Index is ≤3.0¹
☐ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
☐ Wetland Non-Vascular Plants¹
☐ Problematic Hydrophytic Vegetation¹ (Explain)
¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOILSampling Point: S2**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

Depth (inches)	Matrix		Redox Features			Loc ²	Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹			
0-10	10YR 3/2	100	-	-	-	-	Si Lo	
10-11	10YR 6/2	100	10YR 5/8	5	C	M	FSL	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.²Location: PL=Pore Lining, M=Matrix.**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- | | |
|---|--|
| ☐ Histosol (A1) | ☐ Sandy Redox (S5) |
| ☐ Histic Epipedon (A2) | ☐ Stripped Matrix (S6) |
| ☐ Black Histic (A3) | ☐ Loamy Mucky Mineral (F1) (except MLRA 1) |
| ☐ Hydrogen Sulfide (A4) | ☐ Loamy Gleyed Matrix (F2) |
| ☒ Depleted Below Dark Surface (A11) | ☒ Depleted Matrix (F3) |
| ☐ Thick Dark Surface (A12) | ☐ Redox Dark Surface (F6) |
| ☐ Sandy Mucky Mineral (S1) | ☐ Depleted Dark Surface (F7) |
| ☐ Sandy Gleyed Matrix (S4) | ☐ Redox Depressions (F8) |

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☒ No ☐

Remarks:

Soil impenetrable after 11 inches of depth.

HYDROLOGY**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- | | |
|--|--|
| ☐ Surface Water (A1) | ☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) |
| ☐ High Water Table (A2) | ☐ Salt Crust (B11) |
| ☐ Saturation (A3) | ☐ Aquatic Invertebrates (B13) |
| ☐ Water Marks (B1) | ☐ Hydrogen Sulfide Odor (C1) |
| ☐ Sediment Deposits (B2) | ☐ Oxidized Rhizospheres along Living Roots (C3) |
| ☐ Drift Deposits (B3) | ☐ Presence of Reduced Iron (C4) |
| ☒ Algal Mat or Crust (B4) | ☐ Recent Iron Reduction in Tilled Soils (C6) |
| ☐ Iron Deposits (B5) | ☐ Stunted or Stressed Plants (D1) (LRR A) |
| ☐ Surface Soil Cracks (B6) | ☐ Other (Explain in Remarks) |
| ☐ Inundation Visible on Aerial Imagery (B7) | |
| ☐ Sparsely Vegetated Concave Surface (B8) | |

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
☐ Drainage Patterns (B10)
☐ Dry-Season Water Table (C2)
☐ Saturation Visible on Aerial Imagery (C9)
☐ Geomorphic Position (D2)
☐ Shallow Aquitard (D3)
☐ FAC-Neutral Test (D5)
☐ Raised Ant Mounds (D6) (**LRR A**)
☐ Frost-Heave Hummocks (D7)

Field Observations:Surface Water Present? Yes ☐ No ☒ Depth (inches): _____Water Table Present? Yes ☐ No ☒ Depth (inches): _____Saturation Present? Yes ☐ No ☒ Depth (inches): _____
(includes capillary fringe)Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: 19183 Issaquah SD HS #4 and ES #17 City/County: Issaquah Sampling Date: 7/22/19
 Applicant/Owner: Issaquah School District State: WA Sampling Point: S3
 Investigator(s): Meryl Kamowski Section, Township, Range: S16, T24N, R6E, W.M.
 Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): >5%
 Subregion (LRR): LRR A Lat: 47.569597 Long: -122.039740 Datum: WGS 84
 Soil Map Unit Name: Alderwood gravelly sandy loam, 15 to 30 percent slopes NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ☐ No ☒ Hydric Soil Present? Yes ☐ No ☒ Wetland Hydrology Present? Yes ☐ No ☒	Is the Sampled Area within a Wetland? Yes ☐ No ☒
Remarks: Data pit taken within a ditch near on-site wetland areas.	

VEGETATION – Use scientific names of plants.

Stratum	Plot size	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: 15 feet)					
1. <u>Acer macrophyllum</u>		<u>35</u>	<u>Y</u>	<u>FACU</u>	
2. <u>Frangula purshiana</u>		<u>25</u>	<u>Y</u>	<u>FAC</u>	
3. <u>Populus balsimifera</u>		<u>15</u>	<u>Y</u>	<u>FAC</u>	
4. _____					
		<u>75</u>	<u>= Total Cover</u>		
Sapling/Shrub Stratum (Plot size: 10 feet)					
1. _____					
2. _____					
3. _____					
4. _____					
5. _____					
			<u>= Total Cover</u>		
Herb Stratum (Plot size: 5 feet)					
1. <u>Pteridium aquilinum</u>		<u>10</u>	<u>Y</u>	<u>FACU</u>	
2. _____					
3. _____					
4. _____					
5. _____					
6. _____					
7. _____					
8. _____					
9. _____					
10. _____					
11. _____					
		<u>10</u>	<u>= Total Cover</u>		
Woody Vine Stratum (Plot size: _____)					
1. <u>Rubus ursinus</u>		<u>10</u>	<u>Y</u>	<u>FACU</u>	
2. _____					
		<u>10</u>	<u>= Total Cover</u>		
% Bare Ground in Herb Stratum _____					

Remarks:

Dominance Test worksheet:
 Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
 Total Number of Dominant Species Across All Strata: 5 (B)
 Percent of Dominant Species That Are OBL, FACW, or FAC: 40 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>40</u>	x 3 = <u>120</u>
FACU species <u>55</u>	x 4 = <u>220</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>95</u> (A)	<u>340</u> (B)

 Prevalence Index = B/A = 3.58

Hydrophytic Vegetation Indicators:
☐ Rapid Test for Hydrophytic Vegetation
☐ Dominance Test is >50%
☐ Prevalence Index is ≤3.0¹
☐ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
☐ Wetland Non-Vascular Plants¹
☐ Problematic Hydrophytic Vegetation¹ (Explain)
¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☒

SOILSampling Point: S3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features			Loc ²	Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹			
0-5	10YR 3/2	100	-	-	-	-	Si Lo	
5-12	2.5Y 4/3	100	-	-	-	-	Fi Sa Lo	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.) ☐ Histosol (A1) ☐ Histic Epipedon (A2) ☐ Black Histic (A3) ☐ Hydrogen Sulfide (A4) ☐ Depleted Below Dark Surface (A11) ☐ Thick Dark Surface (A12) ☐ Sandy Mucky Mineral (S1) ☐ Sandy Gleyed Matrix (S4)	Indicators for Problematic Hydric Soils³: ☐ 2 cm Muck (A10) ☐ Red Parent Material (TF2) ☐ Very Shallow Dark Surface (TF12) ☐ Other (Explain in Remarks)
☐ Sandy Redox (S5) ☐ Stripped Matrix (S6) ☐ Loamy Mucky Mineral (F1) (except MLRA 1) ☐ Loamy Gleyed Matrix (F2) ☐ Depleted Matrix (F3) ☐ Redox Dark Surface (F6) ☐ Depleted Dark Surface (F7) ☐ Redox Depressions (F8)	³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): Type: _____ Depth (inches): _____	Hydric Soil Present? Yes ☐ No ☒
Remarks:	

HYDROLOGY

Wetland Hydrology Indicators:			
Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (2 or more required)	
☐ Surface Water (A1) ☐ High Water Table (A2) ☐ Saturation (A3) ☐ Water Marks (B1) ☐ Sediment Deposits (B2) ☐ Drift Deposits (B3) ☐ Algal Mat or Crust (B4) ☐ Iron Deposits (B5) ☐ Surface Soil Cracks (B6) ☐ Inundation Visible on Aerial Imagery (B7) ☐ Sparsely Vegetated Concave Surface (B8)	☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) ☐ Salt Crust (B11) ☐ Aquatic Invertebrates (B13) ☐ Hydrogen Sulfide Odor (C1) ☐ Oxidized Rhizospheres along Living Roots (C3) ☐ Presence of Reduced Iron (C4) ☐ Recent Iron Reduction in Tilled Soils (C6) ☐ Stunted or Stressed Plants (D1) (LRR A) ☐ Other (Explain in Remarks)	☐ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) ☐ Drainage Patterns (B10) ☐ Dry-Season Water Table (C2) ☐ Saturation Visible on Aerial Imagery (C9) ☐ Geomorphic Position (D2) ☐ Shallow Aquitard (D3) ☐ FAC-Neutral Test (D5) ☐ Raised Ant Mounds (D6) (LRR A) ☐ Frost-Heave Hummocks (D7)	
Field Observations: Surface Water Present? Yes ☐ No ☒ Depth (inches): _____ Water Table Present? Yes ☐ No ☒ Depth (inches): _____ Saturation Present? Yes ☐ No ☒ Depth (inches): _____ (includes capillary fringe)		Wetland Hydrology Present? Yes ☐ No ☒	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			
Remarks:			

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: 19183 Issaquah SD HS #4 and ES #17 City/County: Issaquah Sampling Date: 7/22/2019
 Applicant/Owner: Issaquah School District State: WA Sampling Point: S4
 Investigator(s): Meryl Kamowski Section, Township, Range: S16, T24N, R6E, W.M.
 Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): >5%
 Subregion (LRR): LRR A Lat: 47.569597 Long: -122.039740 Datum: WGS 84
 Soil Map Unit Name: Alderwood gravelly sandy loam, 15 to 30 percent slopes NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ☒ No ☐ Hydric Soil Present? Yes ☒ No ☐ Wetland Hydrology Present? Yes ☒ No ☐	Is the Sampled Area within a Wetland? Yes ☒ No ☐
Remarks: Data pit taken within Wetland C	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
				_____ = Total Cover
Sapling/Shrub Stratum (Plot size: _____)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
				_____ = Total Cover
Herb Stratum (Plot size: 5 feet)				
1. <u>Phalaris arundinacea</u>	<u>90</u>	<u>Y</u>	<u>FacW</u>	
2. <u>Juncus effusus</u>	<u>10</u>	<u>N</u>	<u>FacW</u>	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
				<u>100</u> = Total Cover
Woody Vine Stratum (Plot size: _____)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
				_____ = Total Cover
% Bare Ground in Herb Stratum _____				

Remarks:

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>0</u> (A)	<u>0</u> (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0¹
- ☐ Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants¹
- ☐ Problematic Hydrophytic Vegetation¹ (Explain)
- ¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present?

Yes ☒ No ☐

SOILSampling Point: S4**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

Depth (inches)	Matrix		Redox Features		Type ¹	Loc ²	Texture	Remarks
	Color (moist)	%	Color (moist)	%				
0-7	10YR 3/2	93	10YR 4/6	7	C	M	sacI	
7-15	10YR 4/2	90	10YR 4/6	5	C	M	sacI	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.²Location: PL=Pore Lining, M=Matrix.**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- | | |
|--|--|
| ☐ Histosol (A1) | ☐ Sandy Redox (S5) |
| ☐ Histic Epipedon (A2) | ☐ Stripped Matrix (S6) |
| ☐ Black Histic (A3) | ☐ Loamy Mucky Mineral (F1) (except MLRA 1) |
| ☐ Hydrogen Sulfide (A4) | ☐ Loamy Gleyed Matrix (F2) |
| ☐ Depleted Below Dark Surface (A11) | ☒ Depleted Matrix (F3) |
| ☐ Thick Dark Surface (A12) | ☐ Redox Dark Surface (F6) |
| ☐ Sandy Mucky Mineral (S1) | ☐ Depleted Dark Surface (F7) |
| ☐ Sandy Gleyed Matrix (S4) | ☐ Redox Depressions (F8) |

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☒ No ☐

Remarks:

HYDROLOGY**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- | | |
|--|--|
| ☐ Surface Water (A1) | ☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) |
| ☐ High Water Table (A2) | ☐ Salt Crust (B11) |
| ☒ Saturation (A3) | ☐ Aquatic Invertebrates (B13) |
| ☐ Water Marks (B1) | ☐ Hydrogen Sulfide Odor (C1) |
| ☐ Sediment Deposits (B2) | ☐ Oxidized Rhizospheres along Living Roots (C3) |
| ☐ Drift Deposits (B3) | ☐ Presence of Reduced Iron (C4) |
| ☐ Algal Mat or Crust (B4) | ☐ Recent Iron Reduction in Tilled Soils (C6) |
| ☐ Iron Deposits (B5) | ☐ Stunted or Stressed Plants (D1) (LRR A) |
| ☐ Surface Soil Cracks (B6) | ☐ Other (Explain in Remarks) |
| ☐ Inundation Visible on Aerial Imagery (B7) | |
| ☐ Sparsely Vegetated Concave Surface (B8) | |

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
☐ Drainage Patterns (B10)
☐ Dry-Season Water Table (C2)
☐ Saturation Visible on Aerial Imagery (C9)
☐ Geomorphic Position (D2)
☐ Shallow Aquitard (D3)
☐ FAC-Neutral Test (D5)
☐ Raised Ant Mounds (D6) (**LRR A**)
☐ Frost-Heave Hummocks (D7)

Field Observations:Surface Water Present? Yes ☐ No ☒ Depth (inches): _____Water Table Present? Yes ☐ No ☒ Depth (inches): _____Saturation Present? Yes ☒ No ☐ Depth (inches): 0
(includes capillary fringe)Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: 19183 Issaquah SD HS #4 and ES #17 City/County: Issaquah Sampling Date: July 22, 2019
 Applicant/Owner: Issaquah School District State: WA Sampling Point: S5
 Investigator(s): Meryl Kamowski Section, Township, Range: S16, T24N, R6E, W.M.
 Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): >5%
 Subregion (LRR): LRR A Lat: 47.569597 Long: -122.039740 Datum: WGS 84
 Soil Map Unit Name: Alderwood gravelly sandy loam, 15 to 30 percent slopes NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ☐ No ☒ Hydric Soil Present? Yes ☐ No ☒ Wetland Hydrology Present? Yes ☐ No ☒	Is the Sampled Area within a Wetland? Yes ☐ No ☒
Remarks: Data pit taken within a ditch near on-site wetland areas.	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 15 feet)	Absolute % Cover	Dominant Species?	Indicator Status															
1. <u>Acer macrophyllum</u>	65	Y	FACU	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across All Strata: <u>0</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)														
2. <u>Pseudotsuga menziesii</u>	20	Y	FACU															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
		85	= Total Cover															
Sapling/Shrub Stratum (Plot size: 10 feet)																		
1. <u>Mahonia nervosa</u>	25	Y	FACU	Prevalence Index worksheet: <table style="width: 100%;"> <tr> <th>Total % Cover of:</th> <th>Multiply by:</th> </tr> <tr> <td>OBL species <u>0</u></td> <td>x 1 = <u>0</u></td> </tr> <tr> <td>FACW species <u>0</u></td> <td>x 2 = <u>0</u></td> </tr> <tr> <td>FAC species <u>0</u></td> <td>x 3 = <u>0</u></td> </tr> <tr> <td>FACU species <u>100</u></td> <td>x 4 = <u>400</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>100</u> (A)</td> <td><u>400</u> (B)</td> </tr> </table>	Total % Cover of:	Multiply by:	OBL species <u>0</u>	x 1 = <u>0</u>	FACW species <u>0</u>	x 2 = <u>0</u>	FAC species <u>0</u>	x 3 = <u>0</u>	FACU species <u>100</u>	x 4 = <u>400</u>	UPL species <u>0</u>	x 5 = <u>0</u>	Column Totals: <u>100</u> (A)	<u>400</u> (B)
Total % Cover of:	Multiply by:																	
OBL species <u>0</u>	x 1 = <u>0</u>																	
FACW species <u>0</u>	x 2 = <u>0</u>																	
FAC species <u>0</u>	x 3 = <u>0</u>																	
FACU species <u>100</u>	x 4 = <u>400</u>																	
UPL species <u>0</u>	x 5 = <u>0</u>																	
Column Totals: <u>100</u> (A)	<u>400</u> (B)																	
2. <u>Pseudotsuga menziesii (sapling)</u>	15	N	FACU															
3. <u>Oemleria cerasiformis</u>	15	N	FACU															
4. _____	_____	_____	_____															
		55	= Total Cover															
Herb Stratum (Plot size: 5 feet)																		
1. <u>Polystichum munitum</u>	35	Y	FACU	Hydrophytic Vegetation Indicators: ☐ Rapid Test for Hydrophytic Vegetation ☐ Dominance Test is >50% ☐ Prevalence Index is ≤3.0 ¹ ☐ Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) ☐ Wetland Non-Vascular Plants ¹ ☐ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.														
2. <u>Rubus ursinus</u>	25	Y	FACU															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
8. _____	_____	_____	_____															
9. _____	_____	_____	_____															
10. _____	_____	_____	_____															
11. _____	_____	_____	_____															
		60	= Total Cover															
Woody Vine Stratum (Plot size: _____)																		
1. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes ☐ No ☒														
2. _____	_____	_____	_____															
		_____	= Total Cover															
% Bare Ground in Herb Stratum _____																		

Remarks:

SOIL

Sampling Point: S5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features			Loc ²	Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹			
0-5	10YR 2/2	100	-	-	-	-	Sa Lo	
5-12	10YR 3/3	100	-	-	-	-	Sa Lo	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.) ☐ Histosol (A1) ☐ Histic Epipedon (A2) ☐ Black Histic (A3) ☐ Hydrogen Sulfide (A4) ☐ Depleted Below Dark Surface (A11) ☐ Thick Dark Surface (A12) ☐ Sandy Mucky Mineral (S1) ☐ Sandy Gleyed Matrix (S4) ☐ Sandy Redox (S5) ☐ Stripped Matrix (S6) ☐ Loamy Mucky Mineral (F1) (except MLRA 1) ☐ Loamy Gleyed Matrix (F2) ☐ Depleted Matrix (F3) ☐ Redox Dark Surface (F6) ☐ Depleted Dark Surface (F7) ☐ Redox Depressions (F8)	Indicators for Problematic Hydric Soils³: ☐ 2 cm Muck (A10) ☐ Red Parent Material (TF2) ☐ Very Shallow Dark Surface (TF12) ☐ Other (Explain in Remarks) ³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.
--	--

Restrictive Layer (if present): Type: _____ Depth (inches): _____	Hydric Soil Present? Yes ☐ No ☒
Remarks:	

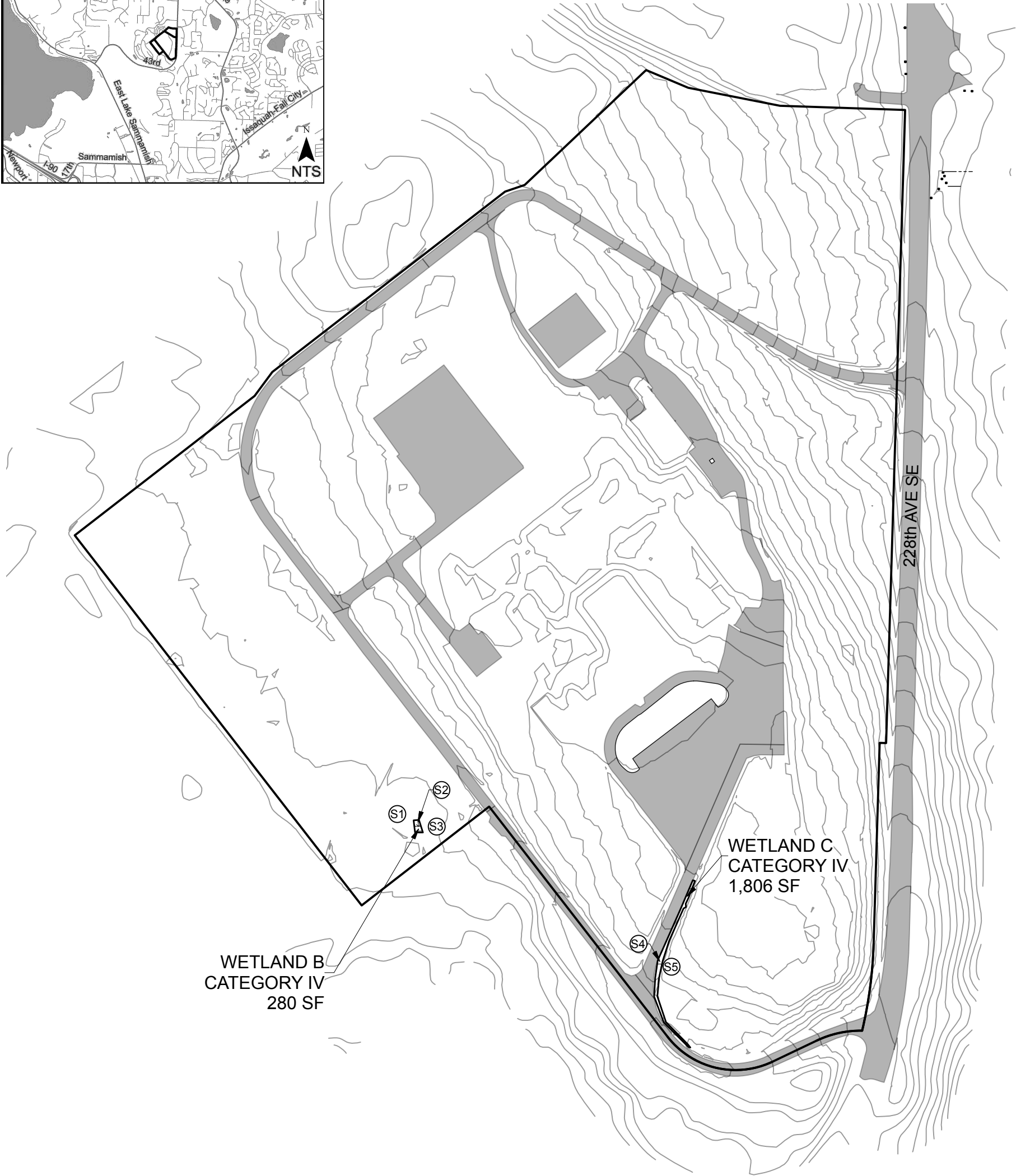
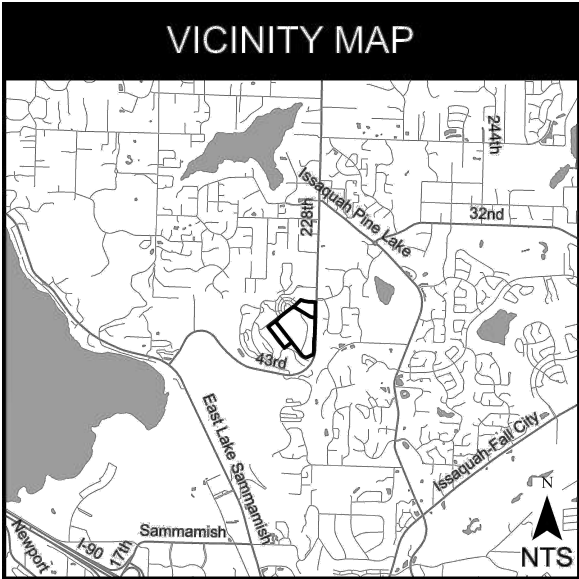
HYDROLOGY

Wetland Hydrology Indicators:			
Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (2 or more required)	
☐ Surface Water (A1) ☐ High Water Table (A2) ☐ Saturation (A3) ☐ Water Marks (B1) ☐ Sediment Deposits (B2) ☐ Drift Deposits (B3) ☐ Algal Mat or Crust (B4) ☐ Iron Deposits (B5) ☐ Surface Soil Cracks (B6) ☐ Inundation Visible on Aerial Imagery (B7) ☐ Sparsely Vegetated Concave Surface (B8)	☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) ☐ Salt Crust (B11) ☐ Aquatic Invertebrates (B13) ☐ Hydrogen Sulfide Odor (C1) ☐ Oxidized Rhizospheres along Living Roots (C3) ☐ Presence of Reduced Iron (C4) ☐ Recent Iron Reduction in Tilled Soils (C6) ☐ Stunted or Stressed Plants (D1) (LRR A) ☐ Other (Explain in Remarks)	☐ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) ☐ Drainage Patterns (B10) ☐ Dry-Season Water Table (C2) ☐ Saturation Visible on Aerial Imagery (C9) ☐ Geomorphic Position (D2) ☐ Shallow Aquitard (D3) ☐ FAC-Neutral Test (D5) ☐ Raised Ant Mounds (D6) (LRR A) ☐ Frost-Heave Hummocks (D7)	
Field Observations: Surface Water Present? Yes ☐ No ☒ Depth (inches): _____ Water Table Present? Yes ☐ No ☒ Depth (inches): _____ Saturation Present? Yes ☐ No ☒ Depth (inches): _____ (includes capillary fringe)		Wetland Hydrology Present? Yes ☐ No ☒	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			
Remarks:			

APPENDIX C: CRITICAL AREA STUDY MAPS

CRITICAL AREA STUDY - EXISTING CONDITIONS MAP
ISSAQUAH SCHOOL DISTRICT - HIGH SCHOOL #4 AND ELEMENTARY #17

PORTION OF SECTION 16, TOWNSHIP 24N, RANGE 6E, W.M.



LEGEND

 WETLAND

 DATA SITES

C-3 - Page 60 of 61



Scale 1" = 200'



0 100 200 300 400

Wetland Resources, Inc.

Delineation / Mitigation / Restoration / Habitat Creation / Permit Assistance

9505 19th Avenue S.E., Suite 106 Everett, Washington 98208
Phone: (425) 337-3174
Fax: (425) 337-3045
Email: mailbox@wetlandresources.com

Critical Area Study - Existing Conditions Map
Issaquah School District - High School #4 and Elementary School #17
Jurisdiction

Issaquah School District
Attn: Tom Mullins
565 NW Holly Street
Issaquah, WA 98027

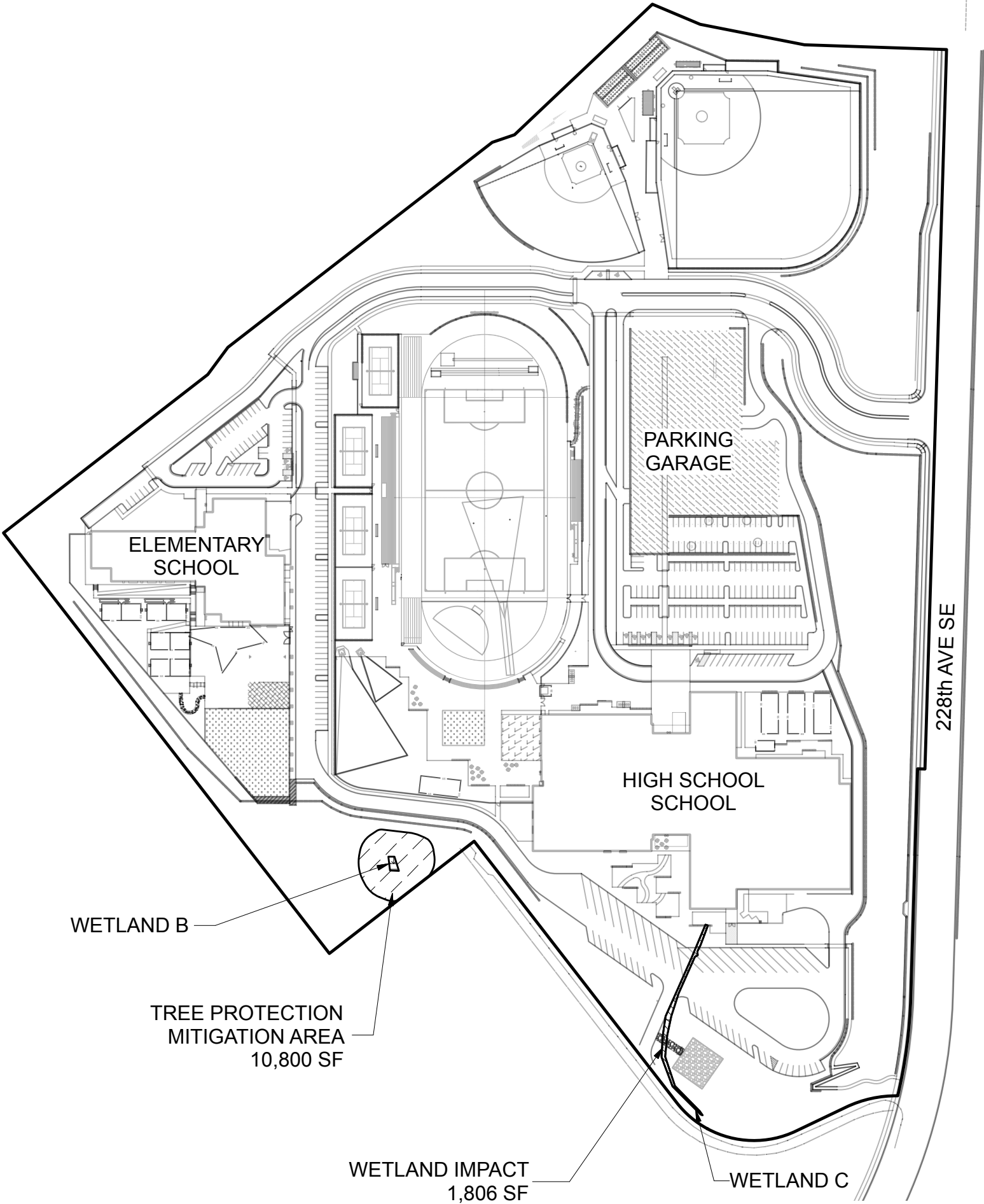
Sheet 1/2
WRI Job#: 19183
Drawn by: MK
Date: 7/10/2020

Critical Area Study & Wetland Mitigation Map

CRITICAL AREA STUDY - PROPOSED DEVELOPMENT AND MITIGATION MAP

ISSAQUAH SCHOOL DISTRICT - HIGH SCHOOL #4 AND ELEMENTARY #17

PORTION OF SECTION 16, TOWNSHIP 24N, RANGE 6E, W.M.



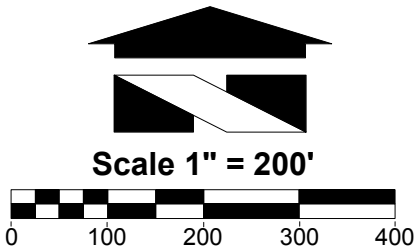
LEGEND

WETLAND

WETLAND IMPACT

MITIGATION AREA

C-3 - Page 61 of 61



**Wetland Resources, Inc.**

Delineation / Mitigation / Restoration / Habitat Creation / Permit Assistance

9505 19th Avenue S.E., Suite 106 Everett, Washington 98208

Phone: (425) 337-3174

Fax: (425) 337-3045

Email: mailbox@wetlandresources.com

Critical Area Study - Proposed Development and Mitigation Map

Issaquah School District - High School #4 and Elementary School #17

City of Issaquah

Issaquah School District

Attn: Tom Mullins

565 NW Holly Street

Issaquah, WA 98027

Sheet 2/2

WRI Job#: 19183

Drawn by: MK

Date: 7/10/2020

Appendix D

Operation and Maintenance Manual



Operation and Maintenance Manual

PREPARED FOR:

Issaquah School District No. 411
565 NW Holly Street
Issaquah, WA 98027

PROJECT:

Issaquah High School and
Elementary School
4227 228th Avenue SE,
Issaquah, WA 98029
2180412.10

PREPARED BY:

Charles Stout, PE
Project Engineer

REVIEWED BY:

Todd Sawin, PE, DBIA, LEED AP
Principal

DATE:

September 2020
Revised February 2021
Revised April 2021

Operation and Maintenance Manual

PREPARED FOR:

Issaquah School District No. 411
565 NW Holly Street
Issaquah, WA 98027

PROJECT:

Issaquah High School and
Elementary School
4227 228th Avenue SE,
Issaquah, WA 98029
2180412.10

PREPARED BY:

Charles Stout, PE
Project Engineer

REVIEWED BY:

Todd Sawin, PE, DBIA, LEED AP
Principal

DATE:

September 2020
Revised February 2021
Revised April 2021

I hereby state that this [Operation and Maintenance Manual](#) for the [Issaquah High School and Elementary School](#) project has been prepared by me or under my supervision, and meets the standard of care and expertise that is usual and customary in this community for professional engineers. I understand that [City of Issaquah](#) does not and will not assume liability for the sufficiency, suitability, or performance of drainage facilities prepared by me.

Table of Contents

Section	Page
1.0 Introduction	1
2.0 Responsibility.....	1
3.0 Onsite Stormwater Facilities Requiring Maintenance.....	1
4.0 Inspection and Maintenance Frequencies.....	3
5.0 Instructions for Person Maintaining Stormwater System.....	3
6.0 Annual Cost of Maintenance.....	3
7.0 Conclusion.....	3

Exhibits

Attachment A

Maintenance Standards

Attachment B

Storm Drainage Plans

1.0 Introduction

The Issaquah High School and Elementary School project proposes redevelopment of the existing City Church property as well as clearing and grading of the undeveloped portions of the site. The proposed project improvements for Issaquah High School and Elementary School include two new school buildings, parking areas, a large parking garage, sports fields, tennis courts, playgrounds, a water system, a sewer system, stormwater drainage facilities, flow control facilities, and stormwater quality facilities. The center of the project site will be relatively flat, similar to existing conditions, with retaining walls along the east side of the property to transition to existing grades near the 228th Ave SE right-of-way. Existing native vegetation, with dense tree coverage, will be maintained along the project boundary to provide a buffer between the proposed school development and surrounding residential properties. Larger tree protection areas are also provided on the existing eastern slope of the property, along the private Providence Heights Loop, and around the existing wetland located on the southern end of the project site.

The project site address is 4227 228th Avenue, SE, Issaquah, Washington 98029. The site is bordered by 228th Avenue SE to the east and residential properties to the north, west, and south. The site is located on three separate tax parcels: 1624069001, 1624069029, and 1624069031. The project site totals 40.8 acres in size. The project site is located in the northeast quadrant of Section 16, Township 24 North, Range 6 East, in the City of Issaquah, King County, Washington.

Issaquah School District No. 411 will be responsible for maintaining the onsite drainage facilities. This report presents a maintenance program that meets the requirements of Volume V of the Washington State Department of Ecology (DOE) 2012 Stormwater Management Manual of Western Washington as Amended in December 2014 (*SMMWW*) and the City of Issaquah 2017 Stormwater Design Manual Addendum (*ISDMAI*). Onsite project improvements include catch basins, conveyance pipes, roof drain lines, footing drain lines, OldCastle BioPod Biofilter Underground treatment structures, and ACF Environmental R-Tank detention facilities.

2.0 Responsibility

Operation and maintenance of all proposed onsite stormwater facilities and Best Management Practices (BMPs) will be the responsibility of the owner, Issaquah School District No. 411. The main contact at the school district is Royce Nourigat, whose contact information is as follows:

Royce Nourigat
Issaquah School District No. 411
565 NW Holly Street,
Issaquah, WA 98027
Phone: (425) 837-7037

This Operation and Maintenance Manual shall be kept onsite at all times at the Issaquah High School office. This report shall be made available to the City of Issaquah for inspection.

3.0 Onsite Stormwater Facilities Requiring Maintenance

As previously mentioned, maintenance of all onsite stormwater structures and BMPs is the responsibility of Issaquah School District No. 411; Royce Nourigat is the contact. Below is a list of all onsite stormwater structures requiring maintenance:

- Catch Basin/Area Drain
- Control Structure/Flow Splitter

- Energy Dissipaters
- OldCastle Infrastructure, Inc. BioPod Biofilters – Underground with Internal Bypass
- OldCastle Infrastructure, Inc. BioPod Biofilters – Underground without Internal Bypass
- ACF R-Tank Stormwater HD Detention System

Five separate onsite BioPod Biofilter Underground structures are proposed to provide both enhanced and phosphorus water quality treatment to all runoff generated onsite. BioPod structures use a tree box filter design for filtration, sorption, and biological uptake to remove total suspended solids, dissolved metals, nutrients, gross solids, trash, and debris, as well as petroleum hydrocarbons from stormwater runoff. BioPod Biofilter structures have a General Use Level Designation (GULD) for Basic, Enhanced, and Phosphorus treatment from the DOE. All proposed onsite pollution generating surfaces discharge to one of these treatment structures prior to leaving the project site.

Seven separate onsite ACF R-Tank HD detention systems are proposed onsite to provide detention for the proposed school buildings, parking areas, sidewalks, landscape areas, natural and artificial turf areas, and access roads.

Refer to the attached stormwater plans in Attachment B for the locations of each stormwater facility, along with detailed drawings showing overall dimensions and locations of stormwater inflow and outflow.

3.1 Maintenance Responsibility

Proposed stormwater facilities will be maintained by one of three different groups: the property owner, the City of Issaquah, or the City of Sammamish. Below is a breakdown of the different maintenance responsibilities.

Issaquah School District:

The property owner is responsible for all onsite stormwater facilities. This includes all of the Basin 1, Basin 3, and Basin 5 stormwater facilities as well as most of the Basin 2, Basin 4, Basin 6, and Basin 7 stormwater facilities.

Basin 2 discharges runoff to the proposed frontage improvements, within the City of Sammamish. All stormwater facilities upstream of and including BPU-2, directly downstream of Detention 2, are the responsibility of the property owner.

Basins 4, 6, and 7 discharge runoff to the existing roadside conveyance system within the SE 43rd Way right-of-way, within the City of Issaquah, near the southeast corner of the project site. All stormwater facilities upstream of SDCB 070 are the responsibility of the property owner.

City of Issaquah:

The City of Issaquah is responsible for offsite stormwater facilities that are located within the City of Issaquah SE 43rd Way right-of-way. These stormwater facilities are limited to one catch basin, SDCB 070, and its associated conveyance pipes as well as the discharge pipe from onsite structure SDCB 071. These structures and conveyance pipes are at least partially located within the City of Issaquah right-of-way.

City of Sammamish:

The City of Sammamish is responsible for offsite stormwater facilities that are located within the City of Sammamish 228th Ave SE right-of-way. This includes all of the proposed catch basins located within the 228th Ave SE right-of-way (SDCB 001 – SDCB 016 and SDCB 128 – SDCB 131). The City of Sammamish is also responsible for Detention 8 and BPU-6.

4.0 Inspection and Maintenance Frequencies

Inspection and maintenance of the drainage facilities shall follow standards specified in the *SMMWW*. Additional inspections and maintenance may be required to respond to unusual storm events or reduced performance of treatment and flow control facilities. A copy of the *SMMWW* maintenance standards is included as Attachment A and may be photocopied and used for inspection records. Annual inspection reports should be completed, kept onsite, and must be available for review by City of Issaquah personnel.

5.0 Instructions for Person Maintaining Stormwater System

Attachment A contains drainage facility maintenance standards. Complete a checklist for all facilities per the following schedule:

- Monthly from November through April.
- Once in late summer (preferably September).
- After any major storm event (items marked “S” only).

Using photocopies of Attachment A, check off the problems that are noted each time the facility is inspected. Document inspection comments, defects identified, and the corrective action taken. The maintenance standards should be kept on file and used to prepare the annual report. For questions, contact the city of Issaquah Public Works Department.

6.0 Annual Cost of Maintenance

The following is an estimate of the average cost of maintenance for the onsite stormwater conveyance, treatment, and infiltration facilities within the scope of this project

Vactor truck @ \$170 / hour x 24 hours	\$4,080
Personnel @ \$25 / hour x 48 hour	1,200
Dumping Fees @ \$45 / ton x 6 ton	270
Sweep Parking Lots Once Yearly	6,000
Vegetation Maintenance	9,000
Total Estimated Annual Cost	\$20,550

7.0 Conclusion

This Operations and Maintenance Manual has been developed for the operation of the Issaquah High School and Elementary School onsite drainage facilities and BMPs. This manual has been prepared within the guidelines of the *SMMWW*. If this plan is implemented, the owner can expect the drainage facilities to function as intended.

This analysis is based on data and records either supplied to or obtained by AHBL, Inc. These documents are referenced within the text of the analysis. The analysis has been prepared utilizing procedures and practices within the standard accepted practices of the industry. We conclude that this project, as proposed, will not create any new problems within the existing downstream drainage system.

This project will not noticeably aggravate any existing downstream problems due to either water quality or quantity.

AHBL, Inc.

Charles Stout, PE
Project Engineer

CHS/lsk

February 2021

Q:\2018\2180412\10_CIV\NON_CAD\REPORTS\Onsite TIR\Appendix\Appendix D_Maintenance\20200831 RPT (O&M) 2180412.10.docx

Attachment A

Maintenance Standards



R-TANK OPERATION, INSPECTION & MAINTENANCE

Operation

Your ACF R-Tank System has been designed to function in conjunction with the engineered drainage system on your site, the existing municipal infrastructure, and/or the existing soils and geography of the receiving watershed. Unless your site included certain unique and rare features, the operation of your R-Tank System will be driven by naturally occurring systems and will function autonomously. However, upholding a proper schedule of Inspection & Maintenance is critical to ensuring continued functionality and optimum performance of the system.

Inspection

Both the R-Tank and all stormwater pre-treatment features incorporated into your site must be inspected regularly. Inspection frequency for your system must be determined based on the contributing drainage area, but should never exceed one year between inspections (six months during the first year of operation).

Inspections may be required more frequently for pre-treatment systems. You should refer to the manufacturer requirements for the proper inspection schedule.

With the right equipment your inspection and measurements can be accomplished from the surface without physically entering any confined spaces. If your inspection does require confined space entry, you **MUST** follow all local/regional requirements as well as OSHA standards.

R-Tank Systems may incorporate Inspection Ports, Maintenance Ports, and/or adjoining manholes. Each of these features are easily accessed by removing the lid at the surface. With the cover removed, a visual inspection can be performed to identify sediment deposits within the structure. Using a flashlight, ALL access points should be examined to complete a thorough inspection.

Inspection Ports

Usually located centrally in the R-Tank System, these perforated columns are designed to give the user a base-line sediment depth across the system floor.

Maintenance Ports

Usually located near the inlet and outlet connections, you'll likely find deeper deposits of heavier sediments when compared to the Inspection Ports.

Manholes

Most systems will include at least two manholes - one at the inlet and another at the outlet. There may be more than one location where stormwater enters the system, which would result in additional manholes to inspect.

Bear in mind that these manholes often include a sump below the invert of the pipe connecting to the R-Tank. These sumps are designed to capture sediment before it reaches the R-Tank, and they should be kept clean to ensure they function properly. However, existence of sediment in the sump does **NOT** necessarily mean sediment has accumulated in the R-Tank.

After inspecting the bottom of the structure, use a mirror on a pole (or some other device) to check for sediment or debris in the pipe connecting to the R-Tank.

R-TANK OPERATION INSPECTION & MAINTENANCE

If sediment or debris is observed in any of these structures, you should determine the depth of the material. This is typically accomplished with a stadia rod, but you should determine the best way to obtain the measurement.

All observations and measurements should be recorded on an Inspection Log kept on file. We've included a form you can use at the end of this guideline.

Maintenance

The R-Tank System should be back-flushed once sediment accumulation has reached 6" or 15% of the total system height. Use the chart below as a guideline to determine the point at which maintenance is required on your system.

R-Tank Unit	Height	Max Sediment Dept
Mini	9.5"	1.5"
Single	17"	3"
Double	34"	5"
Triple	50"	6"
Quad	67"	6"
Pent	84"	6"

Before any maintenance is performed on your system, be sure to plug the outlet pipe to prevent contamination of the adjacent systems.

To back-flush the R-Tank, water is pumped into the system through the Maintenance Ports as rapidly as possible. Water should be pumped into ALL Maintenance Ports. The turbulent action of the water moving through the R-Tank will suspend sediments which may then be pumped out.

If your system includes an Outlet Structure, this will be the ideal location to pump contaminated water out of the system. However, removal of back-flush water may be accomplished through the Maintenance Ports, as well.

For systems with large footprints that would require extensive volumes of water to properly flush the system, you should consider performing your maintenance within 24 hours of a rain event. Stormwater entering the system will aid in the suspension of sediments and reduce the volume of water required to properly flush the system.

Once removed, sediment-laden water may be captured for disposal or pumped through a Dirtbag™ (if permitted by the locality).



2831 Cardwell Road
Richmond, Virginia, 23234
800.448.3636
FAX 804.743.7779
acfenvironmental.com

Step-By-Step Inspection & Maintenance Routine

1) Inspection

- a. Inspection Port
 - i. Remove Cap
 - ii. Use flashlight to detect sediment deposits
 - iii. If present, measure sediment depth with stadia rod
 - iv. Record results on Maintenance Log
 - v. Replace Cap
- b. Maintenance Port/s
 - i. Remove Cap
 - ii. Use flashlight to detect sediment deposits
 - iii. If present, measure sediment depth with stadia rod
 - iv. Record results on Maintenance Log
 - v. Replace Cap
 - vi. Repeat for ALL Maintenance Ports
- c. Adjacent Manholes
 - i. Remove Cover
 - ii. Use flashlight to detect sediment deposits
 - iii. If present, measure sediment depth with stadia rod, accounting for depth of sump (if present)
 - iv. Inspect pipes connecting to R-Tank
 - v. Record results on Maintenance Log
 - vi. Replace Cover
 - vii. Repeat for ALL Manholes that connect to the R-Tank

2) Maintenance

- a. Plug system outlet to prevent discharge of back-flush water
- b. Determine best location to pump out back-flush water
- c. Remove Cap from Maintenance Port
- d. Pump water as rapidly as possible (without over-topping port) into system until at least 1" of water covers system bottom
- e. Replace Cap
- f. Repeat at ALL Maintenance Ports
- g. Pump out back-flush water to complete back-flushing
- h. Vacuum all adjacent structures and any other structures or stormwater pre-treatment systems that require attention
- i. Sediment-laden water may be captured for disposal or pumped through a Dirtbag™.
- j. Replace any remaining Caps or Covers
- k. Record the back-flushing event in your Maintenance Log with any relevant specifics



R-Tank Maintenance Log

Company Responsible for Maintenance:

Contact: _____

Phone Number:

Site Name: _____

Location: _____

System Owner: _____

[illegible]

V-4.6 Maintenance Standards for Drainage Facilities

The facility-specific maintenance standards contained in this section are intended to be conditions for determining if maintenance actions are required as identified through inspection. They are not intended to be measures of the facility's required condition at all times between inspections. In other words, exceedence of these conditions at any time between inspections and/or maintenance does not automatically constitute a violation of these standards. However, based upon inspection observations, the inspection and maintenance schedules shall be adjusted to minimize the length of time that a facility is in a condition that requires a maintenance action.

Table V-4.5.2(3) Maintenance Standards - Closed Detention Systems (Tanks/Vaults)

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is Performed
Storage Area	Plugged Air Vents	One-half of the cross section of a vent is blocked at any point or the vent is damaged.	Vents open and functioning.
	Debris and Sediment	Accumulated sediment depth exceeds 10% of the diameter of the storage area for 1/2 length of storage vault or any point depth exceeds 15% of diameter. (Example: 72-inch storage tank would require cleaning when sediment reaches depth of 7 inches for more than 1/2 length of tank.)	All sediment and debris removed from storage area.
	Joints Between Tank/Pipe Section	Any openings or voids allowing material to be transported into facility. (Will require engineering analysis to determine structural stability).	All joint between tank/pipe sections are sealed.
	Tank Pipe Bent Out of Shape	Any part of tank/pipe is bent out of shape more than 10% of its design shape. (Review required by engineer to determine structural stability).	Tank/pipe repaired or replaced to design.
	Vault Structure Includes Cracks in Wall, Bottom, Damage to Frame and/or Top Slab	Cracks wider than 1/2-inch and any evidence of soil particles entering the structure through the cracks, or maintenance/inspection personnel determines that the vault is not structurally sound. Cracks wider than 1/2-inch at the joint of any inlet/outlet pipe or any evidence of soil particles entering the vault through the walls.	Vault replaced or repaired to design specifications and is structurally sound. No cracks more than 1/4-inch wide at the joint of the inlet/outlet pipe.
Manhole	Cover Not in Place	Cover is missing or only partially in place. Any open manhole requires maintenance.	Manhole is closed.

**Table V-4.5.2(3) Maintenance Standards - Closed Detention Systems
(Tanks/Vaults) (continued)**

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is Performed
	Locking Mechanism Not Working	Mechanism cannot be opened by one maintenance person with proper tools. Bolts into frame have less than 1/2 inch of thread (may not apply to self-locking lids).	Mechanism opens with proper tools.
	Cover Difficult to Remove	One maintenance person cannot remove lid after applying normal lifting pressure. Intent is to keep cover from sealing off access to maintenance.	Cover can be removed and reinstalled by one maintenance person.
	Ladder Rungs Unsafe	Ladder is unsafe due to missing rungs, misalignment, not securely attached to structure wall, rust, or cracks.	Ladder meets design standards. Allows maintenance person safe access.
Catch Basins	See "Catch Basins" (No. 5)	See "Catch Basins" (No. 5).	See "Catch Basins" (No. 5).

Table V-4.5.2(4) Maintenance Standards - Control Structure/Flow Restrictor

Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
General	Trash and Debris (Includes Sediment)	Material exceeds 25% of sump depth or 1 foot below orifice plate.	Control structure orifice is not blocked. All trash and debris removed.
	Structural Damage	Structure is not securely attached to manhole wall. Structure is not in upright position (allow up to 10% from plumb). Connections to outlet pipe	Structure securely attached to wall and outlet pipe. Structure in correct position. Connections to outlet pipe are water tight; structure repaired or replaced and works as

Table V-4.5.2(4) Maintenance Standards - Control Structure/Flow Restrictor (continued)

Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
		are not watertight and show signs of rust. Any holes - other than designed holes - in the structure.	designed. Structure has no holes other than designed holes.
Cleanout Gate	Damaged or Missing	Cleanout gate is not watertight or is missing. Gate cannot be moved up and down by one maintenance person. Chain/rod leading to gate is missing or damaged. Gate is rusted over 50% of its surface area.	Gate is watertight and works as designed. Gate moves up and down easily and is watertight. Chain is in place and works as designed. Gate is repaired or replaced to meet design standards.
Orifice Plate	Damaged or Missing	Control device is not working properly due to missing, out of place, or bent orifice plate.	Plate is in place and works as designed.
	Obstructions	Any trash, debris, sediment, or vegetation blocking the plate.	Plate is free of all obstructions and works as designed.
Overflow Pipe	Obstructions	Any trash or debris blocking (or having the potential of blocking) the overflow pipe.	Pipe is free of all obstructions and works as designed.
Manhole	See "Closed Detention Systems" (No. 3).	See "Closed Detention Systems" (No. 3).	See "Closed Detention Systems" (No. 3).
Catch Basin	See "Catch Basins" (No. 5).	See "Catch Basins" (No. 5).	See "Catch Basins" (No. 5).

Table V-4.5.2(5) Maintenance Standards - Catch Basins

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is performed
General	Trash & Debris	Trash or debris which is located immediately in front of the catch basin opening or is blocking inletting capacity of the basin by more than 10%. Trash or debris (in the basin) that exceeds 60 percent of the sump depth as measured from the bottom of basin to invert of the lowest pipe into or out of the basin, but in no case less than a minimum of six inches clearance from the debris surface to the invert of the lowest pipe. Trash or debris in any inlet or outlet pipe blocking more than 1/3 of its height. Dead animals or vegetation that could generate odors that could cause complaints or dangerous gases (e.g., methane).	No Trash or debris located immediately in front of catch basin or on grate opening. No trash or debris in the catch basin. Inlet and outlet pipes free of trash or debris. No dead animals or vegetation present within the catch basin.
	Sediment	Sediment (in the basin) that exceeds 60 percent of the sump depth as measured from the bottom of basin to invert of the lowest pipe into or out of the basin, but in no case less than a minimum of 6 inches clearance from the sediment surface to the invert of the lowest pipe.	No sediment in the catch basin
	Structure Damage to Frame and/or Top Slab	Top slab has holes larger than 2 square inches or cracks wider than 1/4 inch. (Intent is to make sure no material is running into basin).	Top slab is free of holes and cracks. Frame is sit-

Table V-4.5.2(5) Maintenance Standards - Catch Basins (continued)

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is performed
		Frame not sitting flush on top slab, i.e., separation of more than 3/4 inch of the frame from the top slab. Frame not securely attached	ting flush on the riser rings or top slab and firmly attached.
	Fractures or Cracks in Basin Walls/ Bottom	Maintenance person judges that structure is unsound. Grout fillet has separated or cracked wider than 1/2 inch and longer than 1 foot at the joint of any inlet/outlet pipe or any evidence of soil particles entering catch basin through cracks.	Basin replaced or repaired to design standards. Pipe is regouted and secure at basin wall.
	Settlement/ Misalignment	If failure of basin has created a safety, function, or design problem.	Basin replaced or repaired to design standards.
	Vegetation	Vegetation growing across and blocking more than 10% of the basin opening. Vegetation growing in inlet/outlet pipe joints that is more than six inches tall and less than six inches apart.	No vegetation blocking opening to basin. No vegetation or root growth present.
	Contamination and Pollution	See "Detention Ponds" (No. 1).	No pollution present.
Catch Basin Cover	Cover Not in Place	Cover is missing or only partially in place. Any open catch basin requires maintenance.	Catch basin cover is closed
	Locking Mechanism Not	Mechanism cannot be opened by one maintenance person with proper tools. Bolts into	Mechanism opens with

Table V-4.5.2(5) Maintenance Standards - Catch Basins (continued)

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is performed
	Working	frame have less than 1/2 inch of thread.	proper tools.
	Cover Difficult to Remove	One maintenance person cannot remove lid after applying normal lifting pressure. (Intent is keep cover from sealing off access to maintenance.)	Cover can be removed by one maintenance person.
Ladder	Ladder Rungs Unsafe	Ladder is unsafe due to missing rungs, not securely attached to basin wall, misalignment, rust, cracks, or sharp edges.	Ladder meets design standards and allows maintenance person safe access.
Metal Grates (If Applicable)	Grate opening Unsafe	Grate with opening wider than 7/8 inch.	Grate opening meets design standards.
	Trash and Debris	Trash and debris that is blocking more than 20% of grate surface inletting capacity.	Grate free of trash and debris.
	Damaged or Missing.	Grate missing or broken member(s) of the grate.	Grate is in place and meets design standards.

Table V-4.5.2(7) Maintenance Standards - Energy Dissipaters

Maintenance Components	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is Performed
External:			
Rock Pad	Missing or Moved Rock	Only one layer of rock exists above native soil in area five square feet or larger, or any exposure of native soil.	Rock pad replaced to design standards.
	Erosion	Soil erosion in or adjacent to rock pad.	Rock pad replaced to design standards.
Dispersion Trench	Pipe Plugged with Sediment	Accumulated sediment that exceeds 20% of the design depth.	Pipe cleaned/flushed so that it matches design.
	Not Discharging Water Properly	Visual evidence of water discharging at concentrated points along trench (normal condition is a "sheet flow" of water along trench). Intent is to prevent erosion damage.	Trench redesigned or rebuilt to standards.
	Perforations Plugged.	Over 1/2 of perforations in pipe are plugged with debris and sediment.	Perforated pipe cleaned or replaced.

**Table V-4.5.2(7) Maintenance Standards - Energy Dissipaters
(continued)**

Maintenance Components	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is Performed
	Water Flows Out Top of "Distributor" Catch Basin.	Maintenance person observes or receives credible report of water flowing out during any storm less than the design storm or its causing or appears likely to cause damage.	Facility rebuilt or redesigned to standards.
	Receiving Area Over-Saturated	Water in receiving area is causing or has potential of causing landslide problems.	No danger of landslides.
Internal:			
Manhole/Chamber	Worn or Damaged Post, Baffles, Side of Chamber	Structure dissipating flow deteriorates to 1/2 of original size or any concentrated worn spot exceeding one square foot which would make structure unsound.	Structure replaced to design standards.
	Other Defects	See "Catch Basins" (No. 5).	See "Catch Basins" (No. 5).

Table V-4.5.2(15) Maintenance Standards - Manufactured Media Filters

Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
Below Ground Vault	Sediment Accumulation	Sediment depth exceeds 0.25-inches.	No sediment deposition

**Table V-4.5.2(15) Maintenance Standards - Manufactured Media Filters
(continued)**

Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
	mulation on Media.		its which would impede permeability of the compost media.
	Sediment Accumulation in Vault	Sediment depth exceeds 6-inches in first chamber.	No sediment deposits in vault bottom of first chamber.
	Trash/Debris Accumulation	Trash and debris accumulated on compost filter bed.	Trash and debris removed from the compost filter bed.
	Sediment in Drain Pipes/Clean-Outs	When drain pipes, clean-outs, become full with sediment and/or debris.	Sediment and debris removed.
	Damaged Pipes	Any part of the pipes that are crushed or damaged due to corrosion and/or settlement.	Pipe repaired and/or replaced.
	Access Cover Damaged/Not Working	Cover cannot be opened; one person cannot open the cover using normal lifting pressure, corrosion/deformation of cover.	Cover repaired to proper working specifications or replaced.
	Vault Structure Includes Cracks in Wall, Bottom, Damage to Frame and/or Top Slab	Cracks wider than 1/2-inch or evidence of soil particles entering the structure through the cracks, or maintenance/inspection personnel determine that the vault is not structurally sound. Cracks wider than 1/2-inch at the joint of any inlet/outlet pipe or evidence of soil particles entering through the cracks.	Vault replaced or repairs made so that vault meets design specifications and is structurally sound. Vault repaired so that no cracks exist wider than 1/4-inch at the joint of the inlet/outlet pipe.
	Baffles	Baffles corroding, cracking warping, and/or showing signs of failure as determined by maintenance/inspection person.	Baffles repaired or replaced to specifications.

**Table V-4.5.2(15) Maintenance Standards - Manufactured Media Filters
(continued)**

Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
	Access Ladder Damaged	Ladder is corroded or deteriorated, not functioning properly, not securely attached to structure wall, missing rungs, cracks, and mis-aligned.	Ladder replaced or repaired and meets specifications, and is safe to use as determined by inspection personnel.
Below Ground Cart-ridge Type	Media	Drawdown of water through the media takes longer than 1 hour, and/or overflow occurs frequently.	Media cartridges replaced.
	Short Circuiting	Flows do not properly enter filter cartridges.	Filter cartridges replaced.



BIOPOD™ SYSTEM

WITH STORMMIX™ MEDIA

Inspection and Maintenance Guide





BioPod™ Biofilter with StormMix™ Biofiltration Media

Description

The BioPod™ Biofilter System (BioPod) is a stormwater biofiltration treatment system used to remove pollutants from stormwater runoff. Impervious surfaces and other urban and suburban landscapes generate a variety of contaminants that can enter stormwater and pollute downstream receiving waters unless treatment is provided. The BioPod system uses proprietary StormMix™ biofiltration media to capture and retain pollutants including total suspended solids (TSS), metals, nutrients, gross solids, trash and debris as well as petroleum hydrocarbons.

Function

The BioPod system uses engineered, high-flow rate filter media to remove stormwater pollutants, allowing for a smaller footprint than conventional bioretention systems. Contained within a compact precast concrete vault, the BioPod system consists of a biofiltration chamber and an optional integrated high-flow bypass with a contoured inlet rack to minimize scour. The biofiltration chamber is filled with horizontal layers of aggregate (which may or may not include an underdrain), biofiltration media and mulch. Stormwater passes vertically down through the mulch and biofiltration media for treatment. The mulch provides pretreatment by retaining most of the solids or sediment. The biofiltration media provides further treatment by retaining finer sediment and dissolved pollutants. The aggregate allows the media bed to drain evenly for discharge through an underdrain pipe or by infiltration.

Configuration

The BioPod system can be configured with either an internal or external bypass. The internal bypass allows both water quality and bypass flows to enter the treatment vault. The water quality flows are directed to the biofiltration chamber while the excess flows are diverted over the bypass weir without entering the biofiltration chamber. Both the treatment and bypass flows are combined in the outlet area prior to discharge from the structure. BioPod units without an internal bypass are designed such that only treatment flows enter the treatment structure. When the system has exceeded its treatment capacity, ponding will force bypass flows to continue down the gutter to the nearest standard catch basin or other external bypass structure.

The BioPod system can be configured as a tree box filter with tree and grated inlet, as a planter box filter with shrubs, grasses and an open top, or as an underground filter with access risers, doors and a subsurface inlet pipe. The optional internal bypass may be incorporated with any of these configurations. In addition, an open bottom configuration may be used to promote infiltration and groundwater recharge. The configuration and size of the BioPod system is designed to meet the requirements of a specific project.

Inspection & Maintenance Overview

State and local regulations require all stormwater management systems to be inspected on a regular basis and maintained as necessary to ensure performance and protect downstream receiving waters. Without maintenance, excessive pollutant buildup can limit system performance by reducing the operating capacity of the system and increasing the potential for scouring of pollutants during periods of high flow.

Some configurations of the BioPod may require periodic irrigation to establish and maintain vegetation. Vegetation will typically become established about two years after planting. Irrigation requirements are ultimately dependent on climate, rainfall and the type of vegetation selected.

Maintenance Frequency

Periodic inspection is essential for consistent system performance and is easily completed. Inspection is typically conducted a minimum of twice per year, but since pollutant transport and deposition varies from site to site, a site-specific maintenance frequency should be established during the first two or three years of operation.

Inspection Equipment

The following equipment is helpful when conducting BioPod inspections:

- Recording device (pen and paper form, voice recorder, iPad, etc.)
- Suitable clothing (appropriate footwear, gloves, hardhat, safety glasses, etc.)
- Traffic control equipment (cones, barricades, signage, flagging, etc.)
- Manhole hook or pry bar
- Flashlight
- Tape measure

Inspection Procedures

BioPod inspections are visual and are conducted without entering the unit. To complete an inspection, safety measures including traffic control should be deployed before the access covers or tree grates are removed. Once the covers have been removed, the following items should be checked and recorded (see form provided on page 6) to determine whether maintenance is required:

- If the BioPod unit is equipped with an internal bypass, inspect the contoured inlet rack and outlet chamber and note whether there are any broken or missing parts. In the unlikely event that internal parts are broken or missing, contact Oldcastle Stormwater at (800) 579-8819 to determine appropriate corrective action.
- Note whether the curb inlet, inlet pipe, or – if the unit is equipped with an internal bypass – the inlet rack is blocked or obstructed.
- If the unit is equipped with an internal bypass, observe, quantify and record the accumulation of trash and debris in the inlet rack. The significance of accumulated trash and debris is a matter of judgment. Often, much of the trash and debris may be removed manually at the time of inspection if a separate maintenance visit is not yet warranted.
- If it has not rained within the past 24 hours, note whether standing water is observed in the biofiltration chamber.
- Finally, observe, quantify and record presence of invasive vegetation and the amount of trash and debris and sediment load in the biofiltration chamber. Erosion of the mulch and biofiltration media bed should also be recorded. Sediment load may be rated light, medium or heavy depending on the conditions. Loading characteristics may be determined as follows:
 - o Light sediment load – sediment is difficult to distinguish among the mulch fibers at the top of the mulch layer; the mulch appears almost new.
 - o Medium sediment load – sediment accumulation is apparent and may be concentrated in some areas; probing the mulch layer reveals lighter sediment loads under the top 1" of mulch.
 - o Heavy sediment load – sediment is readily apparent across the entire top of the mulch layer; individual mulch fibers are difficult to distinguish; probing the mulch layer reveals heavy sediment load under the top 1" of mulch.

Often, much of the invasive vegetation and trash and debris may be removed manually at the time of inspection if a separate maintenance visit is not yet warranted.

Maintenance Indicators

Maintenance should be scheduled if any of the following conditions are identified during inspection:

- The concrete structure is damaged or the tree grate or access cover is damaged or missing.
- The curb inlet or inlet rack is obstructed.
- Standing water is observed in the biofiltration chamber more than 24 hours after a rainfall event (use discretion if the BioPod is located downstream of a storage system that attenuates flow).
- Trash and debris in the inlet rack cannot be easily removed at the time of inspection.
- Trash and debris, invasive vegetation or sediment load in the biofiltration chamber is heavy or excessive erosion has occurred.

Maintenance Equipment

The following equipment is helpful when conducting BioPod maintenance:

- Suitable clothing (appropriate footwear, gloves, hardhat, safety glasses, etc.)
- Traffic control equipment (cones, barricades, signage, flagging, etc.)
- Manhole hook or pry bar
- Flashlight
- Tape measure
- Rake, hoe, shovel and broom
- Bucket
- Pruners
- Vacuum truck (optional)

Maintenance Procedures

Maintenance should be conducted during dry weather when no flows are entering the system. All maintenance may be conducted without entering the BioPod structure. Once safety measures such as traffic control are deployed, the access covers may be removed and the following activities may be conducted to complete maintenance:

- Remove all trash and debris from the curb inlet and inlet rack manually or by using a vacuum truck as required.
- Remove all trash and debris and invasive vegetation from the biofiltration chamber manually or by using a vacuum truck as required.
- If the sediment load is medium or light but erosion of the biofiltration media bed is evident, redistribute the mulch with a rake or replace missing mulch as appropriate. If erosion persists, rocks may be placed in the eroded area to help dissipate energy and prevent recurring erosion.
- If the sediment load is heavy, remove the mulch layer using a hoe, rake, shovel and bucket, or by using a vacuum truck as required. If the sediment load is particularly heavy, inspect the surface of the biofiltration media once the mulch has been removed. If the media appears clogged with sediment, remove and replace one or two inches of biofiltration media prior to replacing the mulch layer.
- Prune vegetation as appropriate and replace damaged or dead plants as required.
- Replace the tree grate and/or access covers and sweep the area around the BioPod to leave the site clean.
- All material removed from the BioPod during maintenance must be disposed of in accordance with local environmental regulations. In most cases, the material may be handled in the same manner as disposal of material removed from sumped catch basins or manholes.

Natural, shredded hardwood mulch should be used in the BioPod. Timely replacement of the mulch layer according to the maintenance indicators described above should protect the biofiltration media below the mulch layer from clogging due to sediment accumulation. However, whenever the mulch is replaced, the BioPod should be visited 24 hours after the next major storm event to ensure that there is no standing water in the biofiltration chamber. Standing water indicates that the biofiltration media below the mulch layer is clogged and must be replaced. Please contact Oldcastle Infrastructure at (800) 579-8819 to purchase the proprietary StormMix™ biofiltration media.



BioPod Tree Module



BioPod Media Module



BioPod Planter Module



BioPod Media Vault

BioPod Inspection & Maintenance Log

BioPod Model_____

Inspection Date_____

Location_____

Condition of Internal Components

Notes:

☐ Good ☐ Damaged ☐ Missing

Curb Inlet or Inlet Rack Blocked

Notes:

☐ Yes ☐ No

Standing Water in Biofiltration Chamber

Notes:

☐ Yes ☐ No

Trash and Debris in Inlet Rack

Notes:

☐ Yes ☐ No

Trash and Debris in Biofiltration Chamber

Notes:

☐ Yes ☐ No

Invasive Vegetation in Biofiltration Chamber

Notes:

☐ Yes ☐ No

Sediment in Biofiltration Chamber

Notes:

☐ Light ☐ Medium ☐ Heavy

Erosion in Biofiltration Chamber

Notes:

☐ Yes ☐ No

Maintenance Requirements

☐ **Yes - Schedule Maintenance** ☐ **No - Schedule Re-Inspection**

BIOPOD™ SYSTEM

WITH STORMMIX™ MEDIA

OUR MARKETS



**BUILDING
STRUCTURES**



COMMUNICATIONS



WATER



ENERGY



TRANSPORTATION



Oldcastle Infrastructure™
A CRH COMPANY

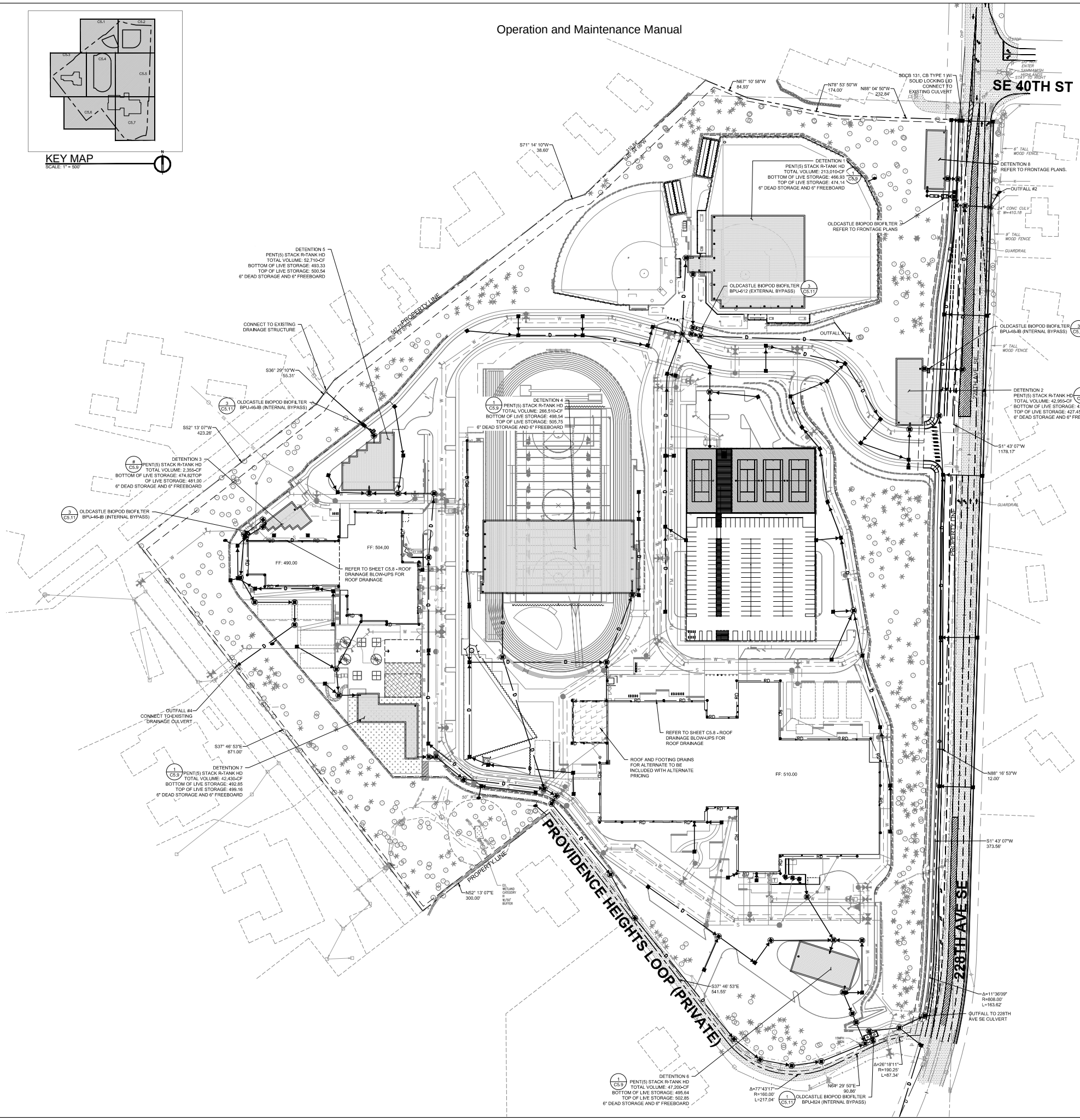
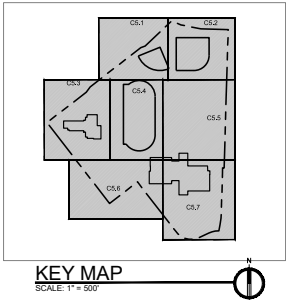
www.oldcastleinfrastructure.com
800-579-8819



December 2018 v.1

Attachment B

Storm Drainage Plans



GRAPHIC SCALE
0 30 60 120
1" = 60 FEET

LEGEND

- RIGHT OF WAY/PROPERTY LINE
- CENTERLINE
- BUILDING OUTLINE
- STORM DRAIN
- ROOF DRAIN
- FOOTING DRAIN
- WALL DRAIN
- UNDERDRAIN (REFER TO LANDSCAPE PLANS)
- INTERCEPTOR SWALE
- CATCH BASIN TYPE 2
- CATCH BASIN TYPE 1 / YARD DRAIN
- CLEANOUT
- DOWNSPOUT
- DETENTION MAINTENANCE PORT
- OUTFALL PROTECTION
- SANITARY SIDE SEWER
- SANITARY SEWER CLEANOUT
- DOMESTIC WATER SERVICE LINE
- IRRIGATION SERVICE LINE
- FIRE SUPPRESSION SERVICE
- METER
- NATURAL GAS SERVICE
- NATURAL GAS METER

- STORM DRAINAGE NOTES**
1. BARE GALVANIZED METAL SHALL NOT BE USED FOR MATERIALS THAT CONVEY STORMWATER, SUCH AS ROOFS, CANOPIES, SIDING, GUTTERS, DOWNSPOUTS, ROOF DRAINS AND PIPES. ANY GALVANIZED MATERIALS SHALL HAVE AN INERT, NON-LEACHABLE FINISH, SUCH AS BAKED ENAMEL, FLUOROCARBON PAINT (SUCH AS KYNAR OR HYLAR), FACTORY-APPLIED EPOXY, PURE ALUMINUM, OR ASPHALT COATING. ACRYLIC PAINT, POLYESTER PAINT, FIELD-APPLIED, AND PART ZINC (SUCH AS GALVALUME) COATINGS ARE NOT ACCEPTABLE.
 2. BURIED UTILITIES ARE SHOWN IN THEIR APPROXIMATE LOCATION. PRIOR TO INSTALLATION OF ANY PROJECT IMPROVEMENTS, CONTRACTOR SHALL VERIFY LOCATION AND ELEVATION OF EXISTING UTILITIES. IN THE EVENT OF ANY DISCREPANCY FROM THE INFORMATION PRESENTED ON THESE PLANS, CONTRACTOR SHALL NOTIFY THE DESIGN ENGINEER.
 3. CONSTRUCT ALL UTILITIES IN CONFORMANCE WITH THE STORM AND ROOF DRAIN TRENCH SECTION DETAIL UNLESS NOTED OTHERWISE.
 4. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT QUANTITY AND LOCATION OF DOWNSPOUTS. DOWNSPOUT CONNECTIONS PER DETAIL.
 5. ALL STORM PIPES CONNECTING TO CONCRETE STRUCTURES SHALL BE GROUTED TO ASSURE CONNECTION AT STRUCTURE IS WATERTIGHT.
 6. ROOF AND FOOTING DRAIN TIGHT LINES ARE LOCATED ON DRAWINGS FOR CLARITY AND ARE TO BE INSTALLED IN ACCORDANCE WITH APPLICABLE CODES. CONSTRUCT FOOTING DRAINS PER DETAIL.
 7. ALL STORM DRAINAGE AND ROOF DRAIN LINE CLEANOUTS SHALL COMPLY WITH THE CLEANOUT DETAIL.
 8. ALL CATCH BASINS ARE TO BE SITUATED SUCH THAT THE OUTSIDE EDGE OF THE FRAME IS AT THE FACE OF THE CURB OR FLOW LINE OF GUTTER (WHERE APPLICABLE).
 9. ALL ON-SITE STORM DRAINAGE PIPE SHALL BE CPEP UNLESS NOTED OTHERWISE.
 10. ALL ROOF DRAIN LINES SHALL BE PER SIZE ON PLANS. HAVE A MINIMUM SLOPE OF 1.00% AND MINIMUM COVER OF 1' UNLESS NOTED OTHERWISE. PIPE MATERIAL SHALL BE PVC SDR35 UNLESS NOTED OTHERWISE.
 11. ALL TYPE 2 CATCH BASINS SHALL HAVE AN INSIDE DIAMETER OF 48" UNLESS NOTED OTHERWISE.
 12. ALL AREA DRAIN STRUCTURES SHALL HAVE AN INSIDE DIAMETER OF 12" UNLESS NOTED OTHERWISE.
 13. ALL STRUCTURE GRATES SHALL BE LOCKING UNLESS NOTED OTHERWISE. GRATES SHALL CONFORM TO THE FOLLOWING UNLESS NOTED OTHERWISE:
VANED - WSDOT STANDARD PLAN 8-30.30-01
HERRINGBONE - WSDOT STANDARD PLAN 8-30.30-01
SOLID - WSDOT STANDARD PLANS 8-30.30-02 AND 8-30.70-03
BEEHIVE - OLYMPIC FOUNDRY PART NO. SMOB8H OR APPROVED EQUIVALENT
 14. ALL RETAINING WALLS WILL REQUIRE TIGHTLINE DRAINS BEHIND THEM. OUTFALL RETAINING WALL FOOTING DRAIN TO NEAREST DRAINAGE STRUCTURE/DAYLIGHT LOCATION UNLESS OTHERWISE NOTED.
 15. ALL STORMWATER OUTFALLS THAT DO NOT CONNECT TO A CATCH BASIN WILL REQUIRE RIP-RAP OUTFALL PROTECTION.
 16. ALTERNATIVE DETENTION FACILITIES MAY BE EVALUATED USING THE PROVIDED DETENTION VOLUMES.
 17. ALL WATER AND SEWER CROSSINGS WITH STORM ARE SHOWN ON THEIR RESPECTIVE PLAN SET.

bassetti architects

71 Columbia Street, Suite 500
Seattle, Washington 98104
T (206) 340 9500 F (206) 340 9519

CIVIL ENGINEER
AHBL
1200 6th Avenue, Suite 1620
Seattle, WA 98101
T (206) 267 2425

LANDSCAPE ARCHITECT
AHBL
1200 6th Avenue, Suite 1620
Seattle, WA 98101
T (206) 267 2425

STRUCTURAL ENGINEER
PCS
1011 Western Avenue, Suite 910
Seattle, WA 98104
T (206) 352 9076

MECHANICAL ENGINEER
Hargis
1201 Third Avenue, Suite 600
Seattle, WA 98101
T (206) 448 3376

ELECTRICAL ENGINEER
Travis Fitzmaurice & Associates
1200 Western Ave N, Suite 350
Seattle, WA 98109
T (206) 267 7228

THEATER
PLA Designs
5285 NE Elm Young Pkwy, Ste B500
Hillsboro, OR 97124
T (503) 642 2168

GENERAL CONTRACTOR
Skanska
221 7th Ave N, Suite 400
Seattle, WA 98109
T (206) 726-0000

NOTICE
THIS PLAN IS THE PROPERTY OF BASSETTI ARCHITECTS. IT IS TO BE USED ONLY FOR THE PROJECT AND SITE SPECIFICALLY IDENTIFIED HEREON. IT IS NOT TO BE REPRODUCED, COPIED, OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT THE WRITTEN PERMISSION OF BASSETTI ARCHITECTS.

REVISIONS

NO.	DATE	DESCRIPTION
1	4/2/2021	ISSUED FOR PERMIT

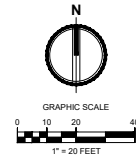
ISSAQUAH SCHOOL DISTRICT
NO. 411
ISSAQUAH HS #4
AND
ES #17

4221 228TH AVE SE, ISSAQUAH, WA 98029

JOB NO. 1982
ISSUE DATE: 4/2/2021
Jurisdiction Stamp Area

OVERALL STORM DRAINAGE PLAN

C5.0



LEGEND

_____	RIGHT OF WAY/PROPERTY LINE
_____ - _____	CENTERLINE
_____	BUILDING OUTLINE
_____ D _____	STORM DRAIN 
_____ RD _____	ROOF DRAIN 
_____ - - - - -	FOOTING DRAIN 
_____ U _____	UNDERDRAIN (REFER TO LANDSCAPE PLANS)
_____ > _____	CONVEYANCE DITCH 
	CATCH BASIN TYPE 2
	CATCH BASIN TYPE 1 / YARD DRAIN
•	CLEANOUT 
•	DOWNSPOUT 
	DETENTION/MANAGEMENT PORT  
_____ S _____	SANITARY SIDE SEWER 
_____ S _____	SANITARY SEWER CLEANOUT 
_____ W _____	DOMESTIC WATER SERVICE LINE 
_____ I _____	IRRIGATION SERVICE LINE 
_____ F _____	FIRE SUPPRESSION SERVICE 
	METER
_____ G _____	NATURAL GAS SERVICE 
	NATURAL GAS METER

- | | | |
|---|---|------------|
| 1 | CONNECT DOWNSPOUT TO ROOF DRAINAGE NETWORK. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT QUANTITY AND LOCATIONS OF DOWNSPOUTS. | 1
CS.10 |
| 2 | PROVIDE POSITIVE DRAINAGE OF LANDSCAPING TO ADJACENT CATCH BASIN / AREA DRAIN. | |
| 3 | CONNECT FOOTING DRAIN TO STORM DRAINAGE SYSTEM WITH 4" SOLID PVC SDR35 PIPE WITH A MINIMUM SLOPE OF 2% (MINIMUM 15LF). | |



#

REVISIONS

DATE

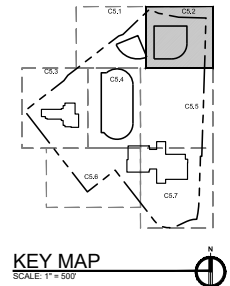
4221 228TH AVE SE; ISSAQUAH,
WA 98029

JOB NO: 1802

ISSUE DATE: 4/2/2021

Jurisdiction Stamp Area

C5.1

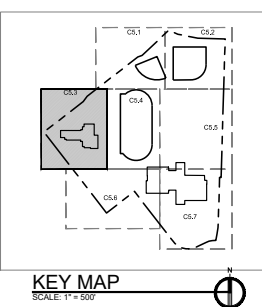


STORM STRUCTURE TABLE	
STRUCTURE NAME	STRUCTURE DETAILS
BPL1 - INLET	
BR101-1	RM = +47.21 (8" W)
N 21159.67	
E 21160.00	
BPL1-OUTLET	
BR101-2	RM = +46.21 (8" S)
N 21153.29	
E 21153.69	
SDCB 001	RM = +45.52
48" TYPE 2 CB	RM = +40.65 (10" E)
N 21146.57	RM = +40.15 (24" E)
E 134565.57	
SDCB 002	RM = +45.81
48" TYPE 2 CB	RM = +40.68 (18" E)
SOIL COUING LED	RM = +40.38 (18" E)
N 21138.97	
E 134569.12	
SDCB 003	RM = +45.58
48" TYPE 2 CB	RM = +40.68 (18" E)
N 21126.96	RM = +45.96 (1" S)
E 134569.12	
SDCB 008	RM = +47.49
48" TYPE 2 CB	RM = +46.33 (18" E)
SOIL COUING LED	RM = +46.33 (18" E)
N 21143.17	RM = +46.36 (18" E)
E 134314.01	
SDCB 009	RM = +47.58
48" TYPE 2 CB	RM = +46.50 (18" E)
SOIL COUING LED	RM = +46.50 (18" E)
N 21149.16	
E 134549.99	
SDCB 040	RM = +47.97
54" TYPE 2 CB	RM = +46.71 (18" E)
SOIL COUING LED	RM = +46.71 (18" E)
N 21160.26	RM = +46.74 (8" S)
E 134549.99	
SDCB 041	RM = +47.97
54" TYPE 2 CB	RM = +46.93 (18" E)
SOIL COUING LED	RM = +46.93 (18" E)
N 21160.62	
E 134549.99	
SDCB 042	RM = +48.66
54" TYPE 2 CB	RM = +48.60 (18" E)
SOIL COUING LED	RM = +48.60 (18" E)
N 21160.62	
E 134549.99	

1	CONNECT DOWNSPOUT TO ROOF DRAINAGE NETWORK. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT QUANTITY AND LOCATIONS OF DOWNSPOUTS.	1 CS.10
2	PROVIDE POSITIVE DRAINAGE OF LANDSCAPING TO ADJACENT CATCH BASIN / AREA DRAIN.	
3	CONNECT FOOTING DRAIN TO STORM DRAINAGE SYSTEM WITH 4" SOLID PVC SDR35 PIPE WITH A MINIMUM SLOPE OF 2% (MINIMUM 15LF).	

- | | | |
|---|---|------------|
| 1 | CONNECT DOWNSPOUT TO ROOF DRAINAGE NETWORK. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT QUANTITY AND LOCATIONS OF DOWNSPOUTS. | 1
CS.10 |
| 2 | PROVIDE POSITIVE DRAINAGE OF LANDSCAPING TO ADJACENT CATCH BASIN / AREA DRAIN. | |
| 3 | CONNECT FOOTING DRAIN TO STORM DRAINAGE SYSTEM WITH 4" SOLID PVC SDR35 PIPE WITH A MINIMUM SLOPE OF 2% (MINIMUM 15LF). | |

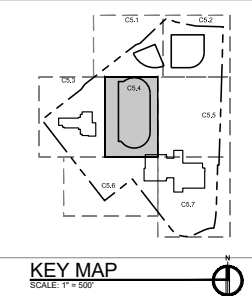
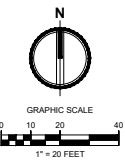
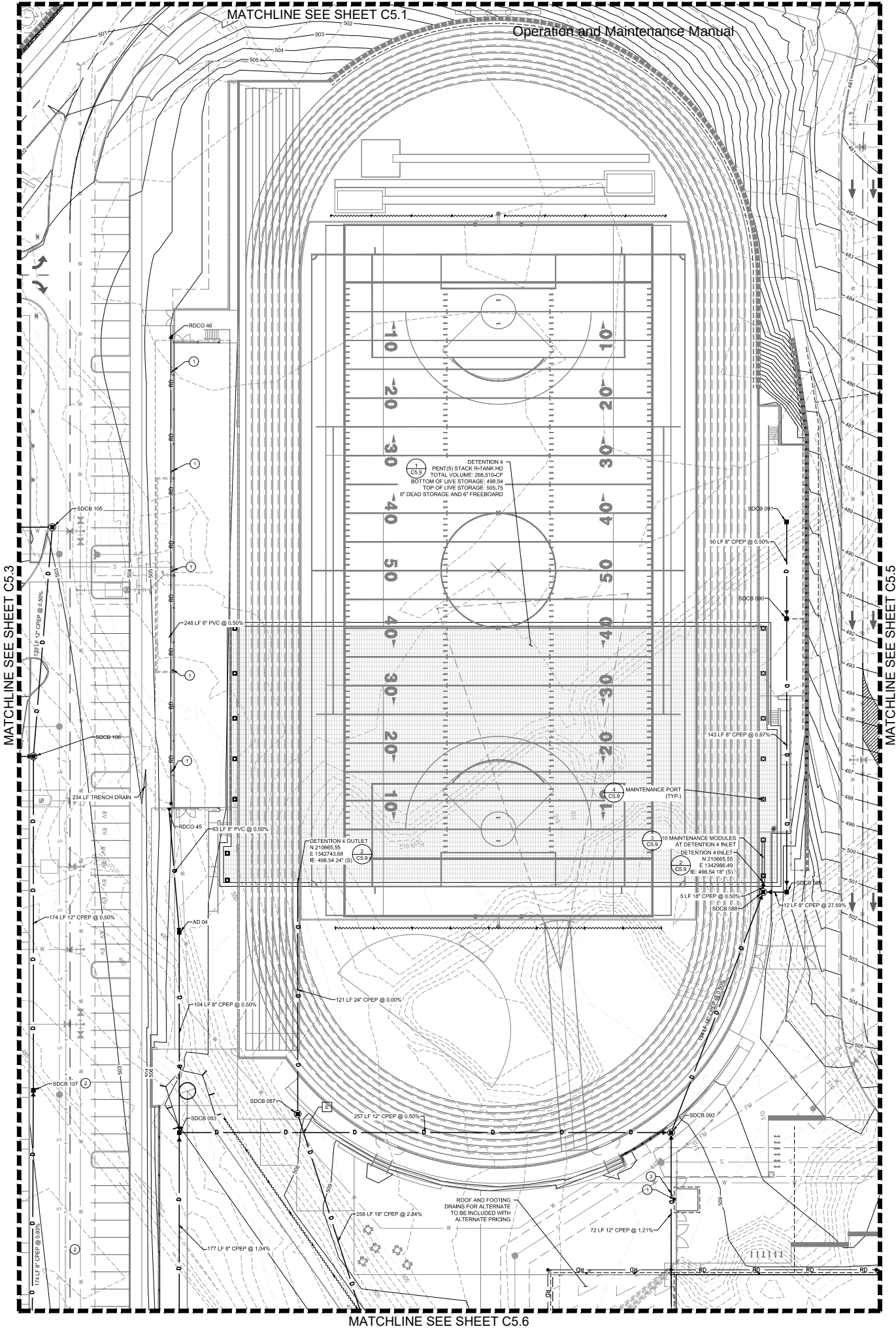
_____	RIGHT OF WAY/PROPERTY LINE
_____ — _____	CENTERLINE
=====	BUILDING OUTLINE
D _____	STORM DRAIN ② C8.10
RD _____	ROOF DRAIN ② C8.10
_____	FOOTING DRAIN ③ C8.10
_____ — U _____	UNDERDRAIN (REFER TO LANDSCAPE PLANS)
_____ > _____	CONVEYANCE DITCH ① C4.1
	CATCH BASIN TYPE 2
	CATCH BASIN TYPE 1/YARD DRAIN
	CLEANOUT ④ C8.10
	DOWNSPOUT ③ C5.10
D _____	DETENTION MAINTENANCE PORT ④ C8.9 ⑧ C8.1
	SANITARY SIDE SEWER ② C8.10
	SANITARY SEWER CLENOT ④ C8.10
W _____	DOMESTIC WATER SERVICE LINE ② C8.10
I _____	IRRIGATION SERVICE LINE ② C8.10
F _____	FIRE SUPPRESSION SERVICE ② C8.10
	METER
G _____	NATURAL GAS SERVICE ② C8.10
	NATURAL GAS METER



STORM STRUCTURE TABLE	
STRUCTURE NAME	STRUCTURE DETAILS
SDCB 070	RM = 486.75 (8' 0")
CB TYPE 1	IE = 484.58 (8' 0")
N 1206922.09	IE = 484.52 (8' 0")
E 1324226.95	IE = 484.22 (8' 0")
SDCB 071	RM = 490.27
54" DIA. 12" CB W/	IE = 486.87 (8' 0")
SOLID LOCKING LID	IE = 485.97 (8' 0")
CONNECTION	
E 132281.37	
SDCB 072	RM = 490.26
CB TYPE 1	IE = 487.55 (8' 0")
N 2121012.91	IE = 487.55 (8' 0")
E 1324379.89	
SDCB 073	RM = 490.47
CB TYPE 1	IE = 487.76 (8' 0")
N 210667.92	IE = 487.76 (8' 0")
E 1324227.70	
SDCB 086	RM = 501.90
54" DIA. 12" CB W/	IE = 484.78 (8' 0")
SOLID LOCKING LID	IE = 483.33 (12" NW)
CONNECTION	IE = 493.33 (12" NE)
N 210959.00	
E 1324550.93	
SDCB 088A	RM = 502.15
CB TYPE 1	IE = 484.78 (12" SE)
N 210979.28	IE = 484.78 (12" NW)
E 1324550.92	
SDCB 099	RM = 503.14
48" TYPE 2 CB	IE = 494.54 (12" E)
N 210850.05	IE = 494.54 (12" E)
E 1324550.92	IE = 494.54 (12" E)
N 210850.05	IE = 494.54 (12" E)
E 1324550.92	IE = 494.54 (12" E)
SDCB 100	RM = 502.62
CB TYPE 1	IE = 490.28 (8' 0")
N 210850.05	IE = 492.27 (8' 0")
E 1324354.61	
SDCB 101	RM = 502.35
CB TYPE 1	IE = 490.69 (8' 0")
N 2121012.92	IE = 490.69 (8' 0")
E 1324116.14	
SDCB 102	RM = 502.67
CB TYPE 1	IE = 490.69 (8' 0")
N 2121012.92	IE = 490.69 (8' 0")
E 1324564.35	IE = 490.69 (12" NE)
IE = 490.69 (12" NE)	
SDCB 103	RM = 502.25
CB TYPE 1	IE = 497.48 (8' 0")
N 210921.86	IE = 497.48 (8' 0")
E 1324556.35	
SDCB 104	RM = 501.15
CB TYPE 1	IE = 498.44 (8' 0")
N 211031.44	IE = 498.44 (8' 0")
E 1324552.10	
SDCB 127	RM = 501.08
48" TYPE 1 CB	IE = 496.77 (8' 0")
N 210745.35	IE = 496.44 (12" E)
E 1324552.10	IE = 496.44 (12" E)
SDCB 128	RM = 501.58
48" TYPE 2 CB	IE = 496.68 (12" NE)
N 210745.35	IE = 496.68 (12" NE)
E 1324432.97	IE = 496.68 (12" NE)
SDCB 129	RM = 500.16
CB TYPE 1	IE = 490.71 (12" SE)
N 2120564.05	IE = 490.71 (12" SE)
E 1324559.29	
TDG #1	
3" THICK FIBERGLASS	
CONNECTION	IE = 497.90 (8' 0")
N 210731.30	

1. CONNECT DOWNSPOUT TO ROOF DRAINAGE NETWORK. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT QUANTITY AND LOCATIONS OF DOWNSPOUTS.
2. PROVIDE POSITIVE DRAINAGE OF LANDSCAPING TO ADJACENT CATCH BASIN / AREA DRAIN.
3. CONNECT FOOTING DRAIN TO STORM DRAINAGE SYSTEM WITH 4" SOLID PVC SDR PIPE WITH A MINIMUM SLOPE OF 2% (MINIMUM 15LF).

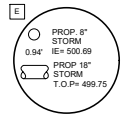
—————	RIGHT OF WAY/PROPERTY LINE	
— — — — —	CENTERLINE	
—————	BUILDING OUTLINE	
— D —	STORM DRAIN	2 C&S,10
— RD —	ROOF DRAIN	2 C&S,10
— — — — —	FOOTING DRAIN	3 C&S,10
— U —	UNDERDRAIN (REFER TO LANDSCAPE PLANS)	
> — — — — —	CONVEYANCE DITCH	1 C&S,1
●	CATCH BASIN TYPE 2	
■	CATCH BASIN TYPE 1 / YARD DRAIN	
•	CLEANOUT	4 C&S,10
▪	DOWNSPOUT	3 C&S,10
■	DETENTION MAINTENANCE PORT	4 C&S,9 8 C&S,10
S —	SANITARY SIDE SEWER	2 C&S,10
⊗	SANITARY SEWER CLEANOUT	4 C&S,10
W —	DOMESTIC WATER SERVICE LINE	2 C&S,10
I —	IRRIGATION SERVICE LINE	2 C&S,10
F —	FIRE SUPPRESSION SERVICE	2 C&S,10
M	METER	
G —	NATURAL GAS SERVICE	2 C&S,10
N	NATURAL GAS METER	



STORM STRUCTURE TABLE	
STRUCTURE NAME	STRUCTURE DETAILS
AD 04 AREA DRAIN N 210835.56 E 1342681.86	RM = 506.59 IE = 501.87 (8" S) IE = 501.87 (8" N)
RDCO 45 CLEANOUT N 210702.54 E 1342676.69	RM = 505.80 IE = 502.19 (8" N) IE = 502.19 (8" S)
RDCO 46 CLEANOUT N 210949.71 E 1342676.69	RM = 505.94 IE = 503.42 (8" S)
SDCB 087 54" TYPE 2 CB W/ SOLID LOCKING LID CONTROL STRUCTURE N 210544.80 E 1342743.68	RM = 507.82 IE = 498.54 (24" N) IE = 498.54 (18" S)
SDCB 088 48" TYPE 2 CB W/ SOLID LOCKING LID N 210660.55 E 1342686.49	RM = 507.04 IE = 498.56 (18" S) IE = 498.56 (18" N) IE = 498.40 (8" E)
SDCB 089 CB TYPE 1 W/ SOLID LOCKING LID N 210660.55 E 1342686.72	RM = 505.69 IE = 502.77 (8" N) IE = 502.77 (8" W)
SDCB 090 CB TYPE 1 N 210803.14 E 1342686.70	RM = 507.12 IE = 504.16 (8" N) IE = 504.16 (8" S)
SDCB 091 CB TYPE 1 N 210853.60 E 1342686.70	RM = 507.12 IE = 504.41 (8" S)
SDCB 092 48" TYPE 2 CB W/ SOLID LOCKING LID N 210535.08 E 1342686.43	RM = 509.32 IE = 499.74 (12" S) IE = 499.24 (18" N) IE = 499.74 (12" W)
SDCB 093 CB TYPE 1 N 210535.08 E 1342681.86	RM = 506.98 IE = 501.02 (12" E) IE = 501.35 (8" N) IE = 501.35 (8" S)
SDCB 106 48" TYPE 2 CB N 210850.92 E 1342615.69	RM = 503.27 IE = 495.38 (12" W) IE = 495.38 (12" S)
SDCB 106 48" TYPE 2 CB N 210731.30 E 1342605.77	RM = 502.46 IE = 495.98 (12" S) IE = 495.98 (12" N) IE = 496.48 (6" W)
SDCB 107 CB TYPE 1 N 210507.11 E 1342605.77	RM = 502.08 IE = 496.85 (12" N) IE = 497.19 (8" S)

- KEY NOTES**
1. CONNECT DOWNSPOUT TO ROOF DRAINAGE NETWORK. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT QUANTITY AND LOCATIONS OF DOWNSPOUTS.
 2. PROVIDE POSITIVE DRAINAGE OF LANDSCAPING TO ADJACENT CATCH BASIN / AREA DRAIN.
 3. CONNECT FOOTING DRAIN TO STORM DRAINAGE SYSTEM WITH 4" SOLID PVC SDR35 PIPE WITH A MINIMUM SLOPE OF 2% (MINIMUM 15LF).

STORM CROSSINGS



LEGEND

- RIGHT OF WAY/PROPERTY LINE
- CENTERLINE
- BUILDING OUTLINE
- D — STORM DRAIN (CS.10)
- RD — ROOF DRAIN (CS.10)
- FOOTING DRAIN (CS.10)
- U — UNDERDRAIN (REFER TO LANDSCAPE PLANS)
- CONVEYANCE DITCH (CS.11)
- CATCH BASIN TYPE 2
- CATCH BASIN TYPE 1 / YARD DRAIN
- CLEANOUT (CS.10)
- DOWNSPOUT (CS.10)
- DETENTION MAINTENANCE PORT (CS.9, CS.10, CS.11)
- S — SANITARY SIDE SEWER (CS.10)
- SANITARY SEWER CLENOUT (CS.10)
- W — DOMESTIC WATER SERVICE LINE (CS.10)
- I — IRRIGATION SERVICE LINE (CS.10)
- F — FIRE SUPPRESSION SERVICE (CS.10)
- METER
- G — NATURAL GAS SERVICE (CS.10)
- NATURAL GAS METER

bassetti architects

71 Columbia Street, Suite 500
Seattle, Washington 98104
T (206) 340 9500 F (206) 340 9519

CIVIL ENGINEER
AHBL
1200 6th Avenue, Suite 1620
Seattle, WA 98101
T (206) 267 2425

LANDSCAPE ARCHITECT
AHBL
1200 6th Avenue, Suite 1620
Seattle, WA 98101
T (206) 267 2425

STRUCTURAL ENGINEER
PCS
1911 Western Avenue, Suite 810
Seattle, WA 98104
T (206) 392 6076

MECHANICAL ENGINEER
Hargis
1201 Third Avenue, Suite 600
Seattle, WA 98101
T (206) 448 3376

ELECTRICAL ENGINEER
Travis Fitzmaurice & Associates
1200 Western Ave N, Suite 359
Seattle, WA 98109
T (206) 267 7228

THEATER
PLA Designs
5385 NE Elm Young Pkwy, Ste B500
Wilson, OR 97124
T (503) 642 2168

GENERAL CONTRACTOR
Skanska
221 Yale Ave N, Suite 400
Seattle, WA 98109
T (206) 326-0000

ONE ROW
AT FULL SIZE

Civil Engineers
Structural Engineers
Landscape Architects
Community Planners
Natural Resource Ecologists
Land Surveyors
Historians

AHBL
TACOMA • SEATTLE
SPOKANE • TRI-CITIES
2215 North 30th Street, Suite 300 Tacoma, WA 98403
253.363.2422 TEL 253.363.2572 FAX www.AHBL.com WEB

NOTICE
THIS DRAWING IS THE PROPERTY OF BASSETTI ARCHITECTS. IT IS TO BE USED ONLY FOR THE PROJECT AND SITE SPECIFICALLY IDENTIFIED HEREON. IT IS NOT TO BE REPRODUCED, COPIED, OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT THE WRITTEN PERMISSION OF BASSETTI ARCHITECTS.

ISSAQUAH SCHOOL DISTRICT
NO. 411
**ISSAQUAH HS #4
AND
ES #17**

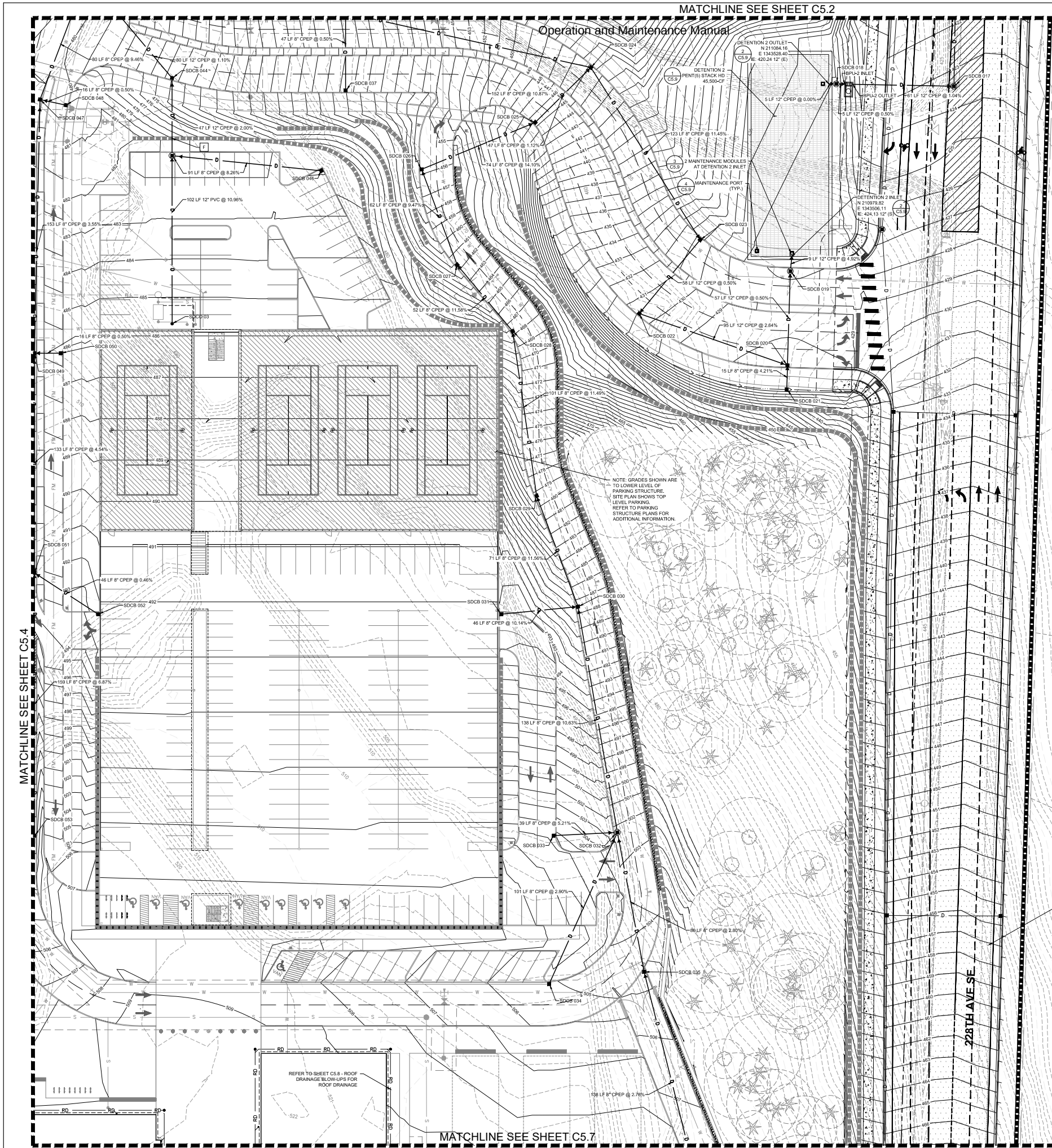
4221 128TH AVE SE, ISSAQUAH,
WA 98029

JOB NO. 1882
ISSUE DATE: 4/20/2021
Jurisdiction Stamp Area

**STORM
DRAINAGE
BLOW-UPS**

C5.4

PERMIT DOCUMENTS



STORM STRUCTURE TABLE

STRUCTURE NAME	STRUCTURE DETAILS
BPU-1 INLET	RM = 502.26 IE = 499.55 (8" N)
BPU-2 OUTLET	RM = 504.78 IE = 501.55 (8" E)
SDCB 001	RM = 502.26 IE = 499.55 (8" N)
SDCB 002	RM = 504.78 IE = 501.55 (8" E)
SDCB 003	RM = 502.26 IE = 499.55 (8" N)
SDCB 004	RM = 504.78 IE = 501.55 (8" E)
SDCB 005	RM = 502.26 IE = 499.55 (8" N)
SDCB 006	RM = 504.78 IE = 501.55 (8" E)
SDCB 007	RM = 502.26 IE = 499.55 (8" N)
SDCB 008	RM = 504.78 IE = 501.55 (8" E)
SDCB 009	RM = 502.26 IE = 499.55 (8" N)
SDCB 010	RM = 504.78 IE = 501.55 (8" E)
SDCB 011	RM = 502.26 IE = 499.55 (8" N)
SDCB 012	RM = 504.78 IE = 501.55 (8" E)
SDCB 013	RM = 502.26 IE = 499.55 (8" N)
SDCB 014	RM = 504.78 IE = 501.55 (8" E)
SDCB 015	RM = 502.26 IE = 499.55 (8" N)
SDCB 016	RM = 504.78 IE = 501.55 (8" E)
SDCB 017	RM = 502.26 IE = 499.55 (8" N)
SDCB 018	RM = 504.78 IE = 501.55 (8" E)
SDCB 019	RM = 502.26 IE = 499.55 (8" N)
SDCB 020	RM = 504.78 IE = 501.55 (8" E)
SDCB 021	RM = 502.26 IE = 499.55 (8" N)
SDCB 022	RM = 504.78 IE = 501.55 (8" E)
SDCB 023	RM = 502.26 IE = 499.55 (8" N)
SDCB 024	RM = 504.78 IE = 501.55 (8" E)
SDCB 025	RM = 502.26 IE = 499.55 (8" N)
SDCB 026	RM = 504.78 IE = 501.55 (8" E)
SDCB 027	RM = 502.26 IE = 499.55 (8" N)
SDCB 028	RM = 504.78 IE = 501.55 (8" E)
SDCB 029	RM = 502.26 IE = 499.55 (8" N)
SDCB 030	RM = 504.78 IE = 501.55 (8" E)
SDCB 031	RM = 502.26 IE = 499.55 (8" N)
SDCB 032	RM = 504.78 IE = 501.55 (8" E)
SDCB 033	RM = 502.26 IE = 499.55 (8" N)
SDCB 034	RM = 504.78 IE = 501.55 (8" E)

KEY NOTES

- CONNECT DOWNSPOUT TO ROOF DRAINAGE NETWORK. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT QUANTITY AND LOCATIONS OF DOWNSPOUTS.
- PROVIDE POSITIVE DRAINAGE OF LANDSCAPING TO ADJACENT CATCH BASIN / AREA DRAIN.
- CONNECT FOOTING DRAIN TO STORM DRAINAGE SYSTEM WITH 4" SOLID PVC SDR35 PIPE WITH A MINIMUM SLOPE OF 2% (MINIMUM 15.1').

LEGEND

- RIGHT OF WAY/PROPERTY LINE
- CENTERLINE
- BUILDING OUTLINE
- STORM DRAIN
- ROOF DRAIN
- FOOTING DRAIN
- UNDERDRAIN (REFER TO LANDSCAPE PLANS)
- CONVEYANCE DITCH
- CATCH BASIN TYPE 2
- CATCH BASIN TYPE 1 / YARD DRAIN
- CLEANOUT
- DOWNSPOUT
- DETENTION MAINTENANCE PORT
- SANITARY SIDE SEWER
- SANITARY SEWER CLEANOUT
- DOMESTIC WATER SERVICE LINE
- IRRIGATION SERVICE LINE
- FIRE SUPPRESSION SERVICE
- METER
- NATURAL GAS SERVICE
- NATURAL GAS METER

STORM CROSSINGS

BASE OF WALL 10' ELEV. 476.76
PROP 12" STORM T.O.P. 472.22

KEY MAP

SCALE: 1" = 500'

REVISIONS

NO.	DATE	DESCRIPTION
1	4/22/2021	ISSUED FOR PERMIT

STORM DRAINAGE BLOW-UPS

C5.5

bassetti architects

71 Columbia Street, Suite 500
Seattle, Washington 98104
T (206) 340 9500 F (206) 340 9519

CIVIL ENGINEER
AHBL
1200 6th Avenue, Suite 1520
Seattle, WA 98101
T (206) 267 2425

LANDSCAPE ARCHITECT
AHBL
1200 6th Avenue, Suite 1520
Seattle, WA 98101
T (206) 267 2425

STRUCTURAL ENGINEER
PCS
1011 Western Avenue, Suite 810
Seattle, WA 98104
T (206) 352 5076

MECHANICAL ENGINEER
Hargis
1201 Third Avenue, Suite 600
Seattle, WA 98101
T (206) 448 3376

ELECTRICAL ENGINEER
Travis Fitzmaurice & Associates
1200 Western Ave N, Suite 309
Seattle, WA 98109
T (206) 267 7228

THEATER
PLA Designs
5385 NE Elmer Young Pkwy, Ste B500
Bellevue, WA 98004
T (206) 442 2168

GENERAL CONTRACTOR
Skanska
221 Yale Ave N, Suite 400
Seattle, WA 98109
T (206) 226-0002

ONE NOW
AT FULL SCALE

AWHBL
TACOMA • SEATTLE
SPOKANE • TRI-CITIES
2215 North 30th Street, Suite 300 Tacoma, WA 98403
253.383.2422 TEL 253.383.2575 FAX www.ahbl.com WEB

NOTICE
THIS DOCUMENT IS THE PROPERTY OF BASSETTI ARCHITECTS. IT IS TO BE USED ONLY FOR THE PROJECT AND SITE SPECIFICALLY IDENTIFIED HEREON. IT IS NOT TO BE REPRODUCED, COPIED, OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, WITHOUT THE WRITTEN PERMISSION OF BASSETTI ARCHITECTS.

ISSAQUAH SCHOOL DISTRICT
NO. 411
**ISSAQUAH HS #4
AND
ES #17**

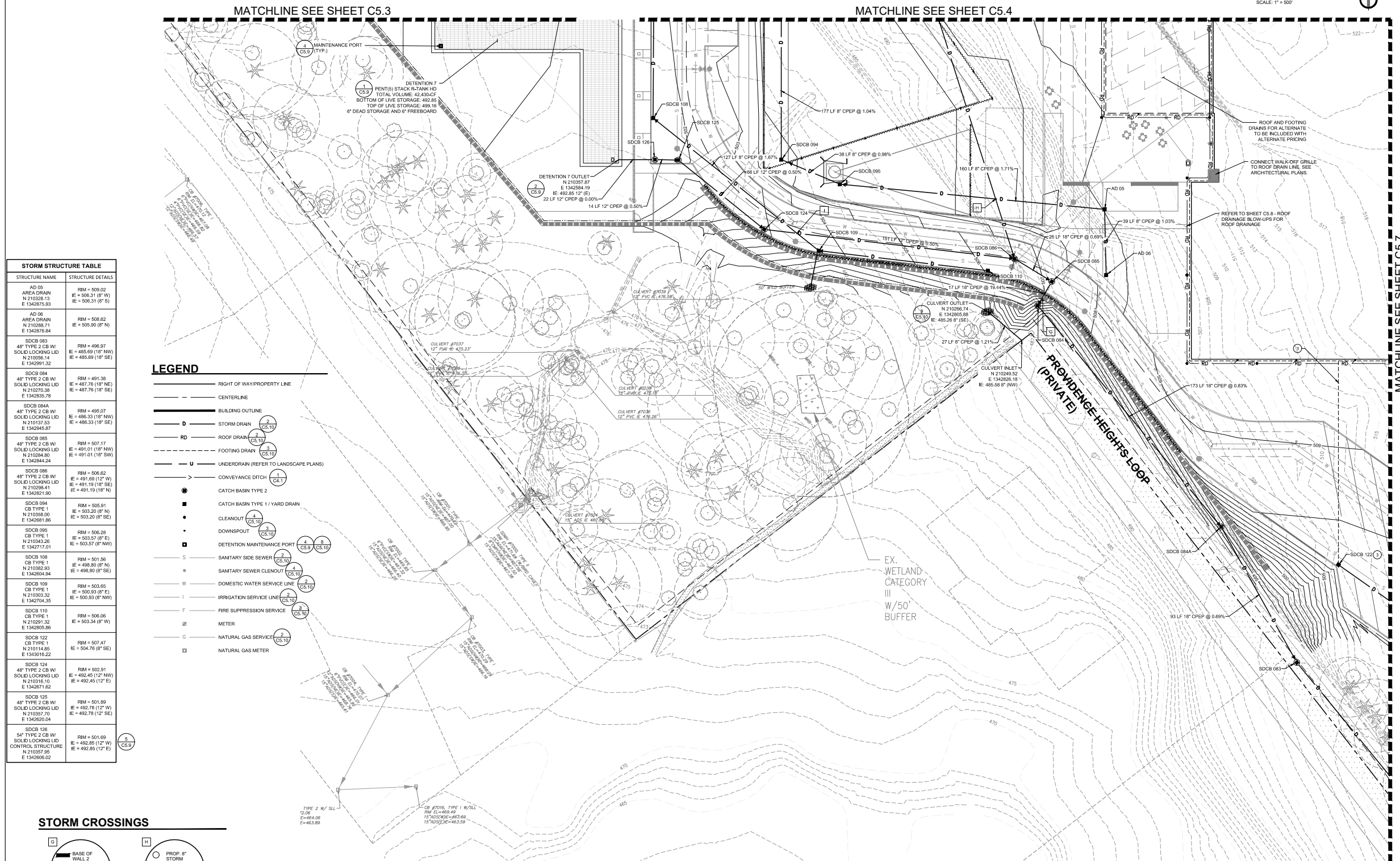
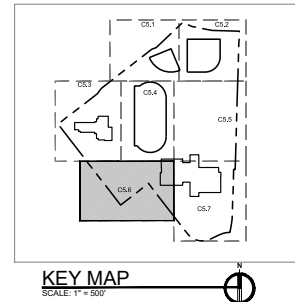
4221 228TH AVE SE, ISSAQUAH,
WA 98029

JOB NO. 1802
ISSUE DATE: 4/22/2021
Jurisdiction Stamp Area

STORM DRAINAGE BLOW-UPS

C5.5

PERMIT DOCUMENTS



STORM STRUCTURE TABLE	
STRUCTURE NAME	STRUCTURE DETAILS
AD 08 AREA DRAIN N103028.13 E150435.53	IRM = 509.02 IE = 485.09 (1° NW) IE = 504.31 (0° S)
AD 06 AREA DRAIN N103086.71 E116844.84	IRM = 508.82 IE = 505.00 (0° E)
SDCB 083 46° TYPE 2 C B W SOLID LOCKING LID N103056.14 E120056.14	IRM = 496.87 IE = 485.09 (1° NW) IE = 485.69 (1° SE)
SDCB 094 46° TYPE 2 C B W SOLID LOCKING LID N103073.30 E124835.78	IRM = 491.38 IE = 487.76 (1° NW) IE = 487.76 (1° NW)
SDCB 094 46° TYPE 2 C B W SOLID LOCKING LID N120107.53 E120137.57	IRM = 495.07 IE = 486.33 (1° NW) IE = 486.33 (1° NW)
SDCB 085 46° TYPE 2 C B W SOLID LOCKING LID N102048.89 E126424.24	IRM = 507.17 IE = 491.01 (1° NW) IE = 491.01 (1° NW)
SDCB 096 46° TYPE 2 C B W SOLID LOCKING LID N102042.90 E124821.30	IRM = 506.62 IE = 491.69 (1° NW) IE = 491.19 (1° NW) IE = 491.19 (1° NW)
SDCB 094 46° TYPE 2 C B W SOLID LOCKING LID N103308.00 E124861.86	IRM = 505.91 IE = 502.20 (0° S) IE = 503.20 (0° S)
SDCB 095 46° TYPE 2 C B W SOLID LOCKING LID N103432.36 E124859.54	IRM = 506.28 IE = 498.80 (0° NW) IE = 498.80 (0° NW)
SDCB 094 46° TYPE 2 C B W SOLID LOCKING LID N103302.83 E124859.54	IRM = 501.56 IE = 498.80 (0° NW) IE = 498.80 (0° NW)
SDCB 109 46° TYPE 2 C B W SOLID LOCKING LID N120103.32 E124704.35	IRM = 503.65 IE = 500.00 (0° E) IE = 500.00 (0° E)
SDCB 110 46° TYPE 2 C B W SOLID LOCKING LID N120114.88 E124704.35	IRM = 506.06 IE = 503.34 (0° E) IE = 503.34 (0° E)
SDCB 124 46° TYPE 2 C B W SOLID LOCKING LID N120115.10 E124716.62	IRM = 502.91 IE = 492.45 (1° NW) IE = 492.45 (1° NW)
SDCB 125 46° TYPE 2 C B W SOLID LOCKING LID N10307.70 E124005.04	IRM = 501.39 IE = 492.78 (1° NW) IE = 492.78 (1° NW)
SDCB 126 54° TYPE 2 C B W CONCRETE STRUCTURE N124006.02 E124006.02	IRM = 501.69 IE = 492.85 (1° NW) IE = 492.85 (1° NW)

G

BASE OF WALL 2
4.11'
ELEV= 495.50

PROP 18" STORM
T.O.P= 491.39

H

PROP. 8" STORM
11.42' IE= 505.18

PROP 18" STORM
T.O.P= 493.76

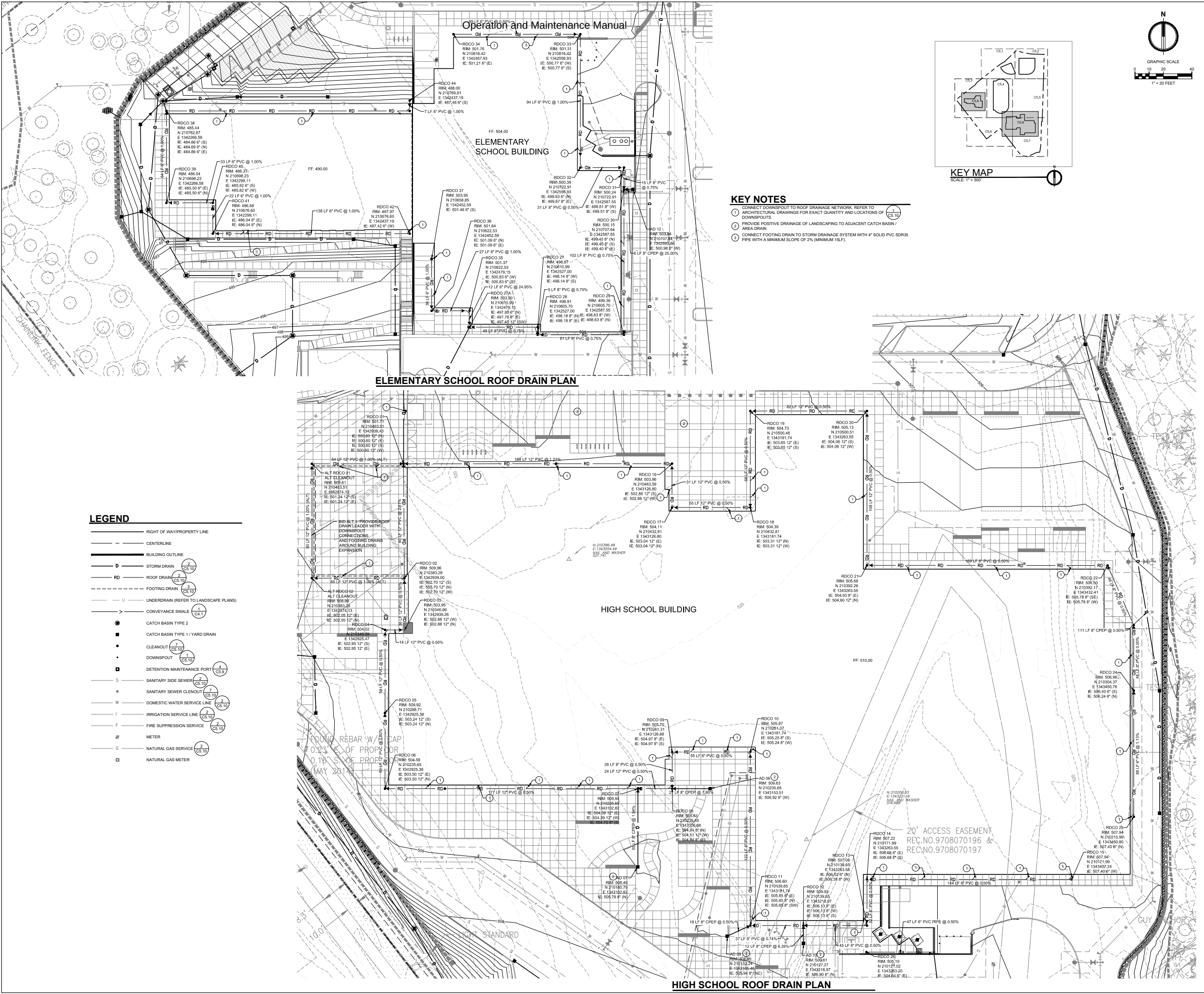
I

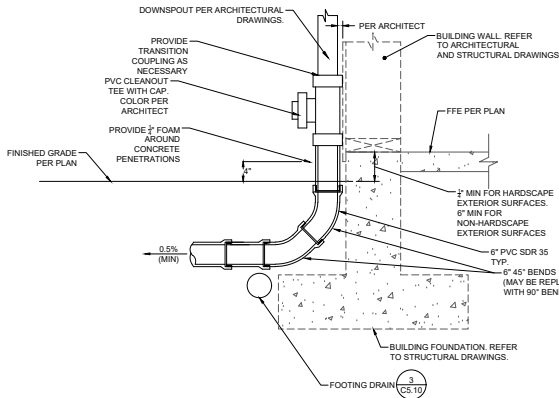
PROP. 8" STORM
7.30' IE= 505.65

PROP 12" STORM
T.O.P= 493.35

KEY NOTES

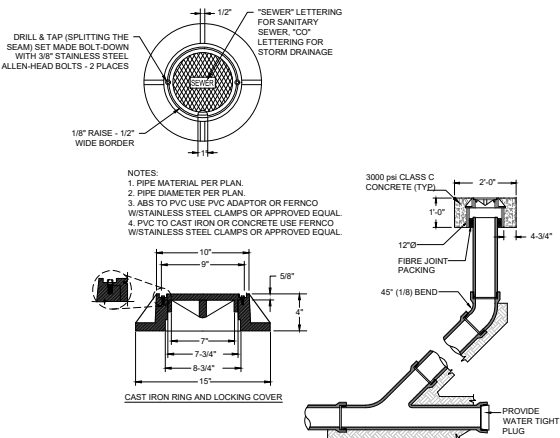
1	CONNECT DOWNSPOUT TO ROOF DRAINAGE NETWORK. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT QUANTITY AND LOCATIONS OF DOWNSPOUTS.	1 (C5.10)
2	PROVIDE POSITIVE DRAINAGE OF LANDSCAPING TO ADJACENT CATCH BASIN / AREA DRAIN.	
3	CONNECT FOOTING DRAIN TO STORM DRAINAGE SYSTEM WITH 4" SOLID PVC SDR35 PIPE WITH A MINIMUM SLOPE OF 2% (MINIMUM 15LF).	



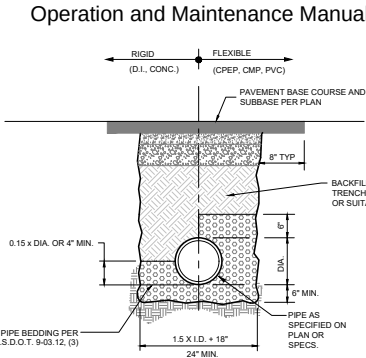


- NOTES:
1. REFER TO ARCHITECTURAL DRAWINGS FOR DOWNSPOUT LOCATIONS.
 2. FITTINGS SHOWN ARE TO CONVEY INTENT OF ROOF DRAIN CONNECTION AS IT RELATES TO FOOTINGS AND GRADE BEAMS DEPENDING ON ACTUAL FOOTING/GRADE BEAM CONFIGURATION AT DOWNSPOUT LOCATIONS. ADDITIONAL FITTINGS MAY BE REQUIRED OR FITTINGS SHOWN MAY BE SWAPPED/DELETED TO MAKE MORE EFFICIENT CONNECTION.

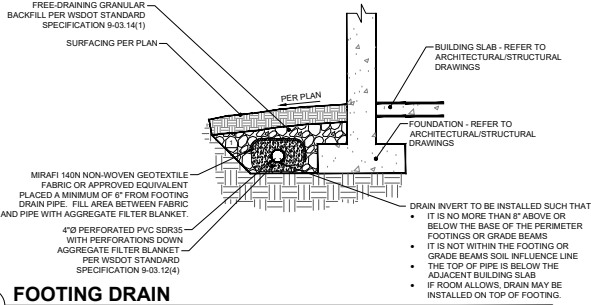
1 ROOF DOWNSPOUT CONNECTION
NOT TO SCALE



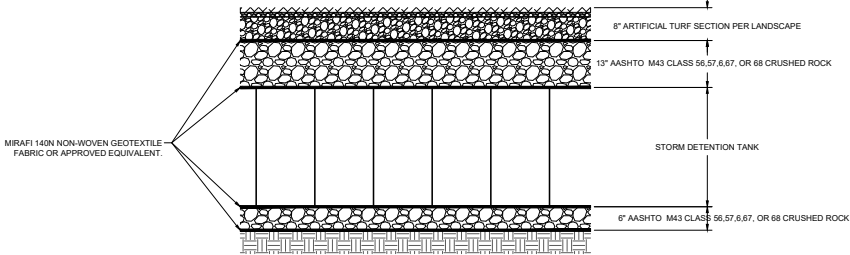
2 TRENCHING SECTION
NOT TO SCALE



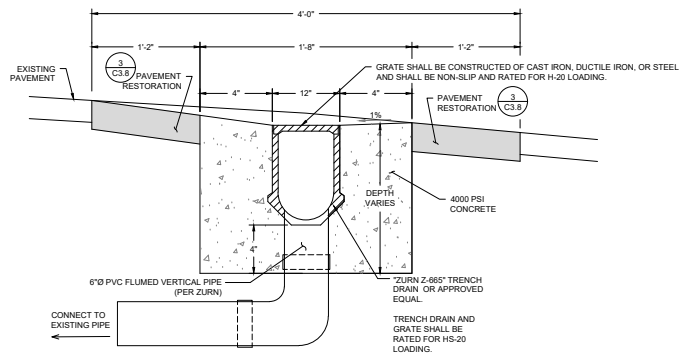
3 FOOTING DRAIN
NOT TO SCALE



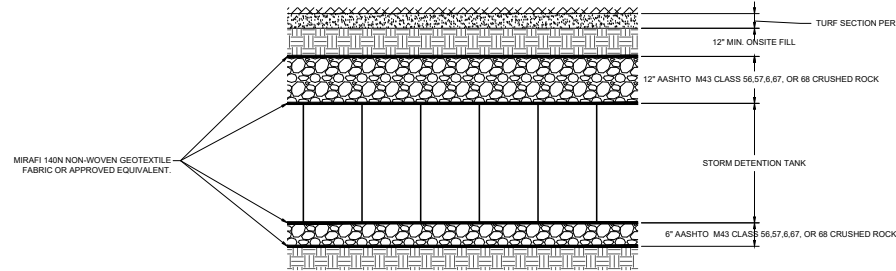
4 CLEANOUT
NOT TO SCALE



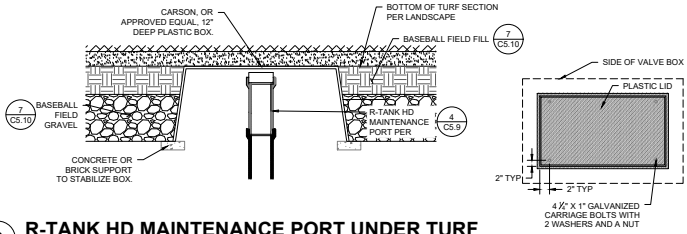
5 ARTIFICIAL TURF DETENTION SECTION
NOT TO SCALE



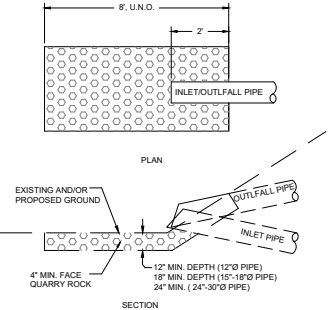
6 TRENCH DRAIN
NOT TO SCALE



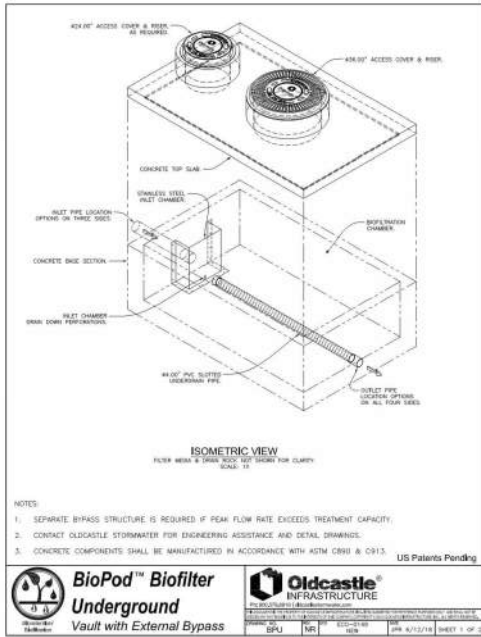
7 BASEBALL FIELD DETENTION SECTION
NOT TO SCALE



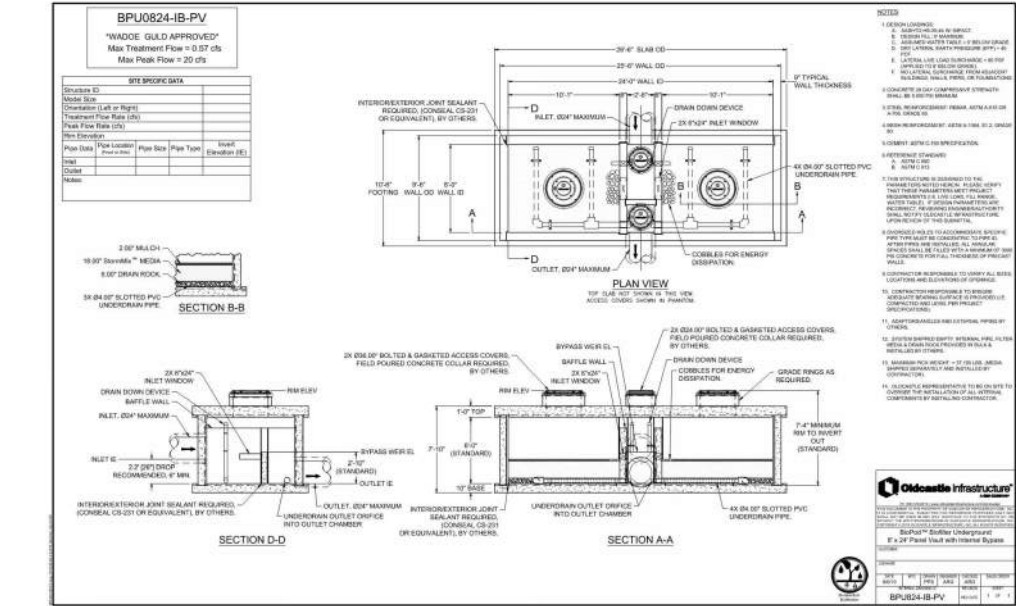
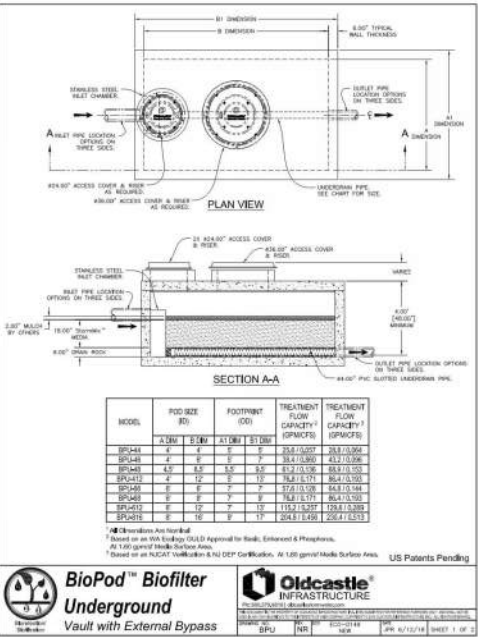
8 R-TANK HD MAINTENANCE PORT UNDER TURF
NOT TO SCALE



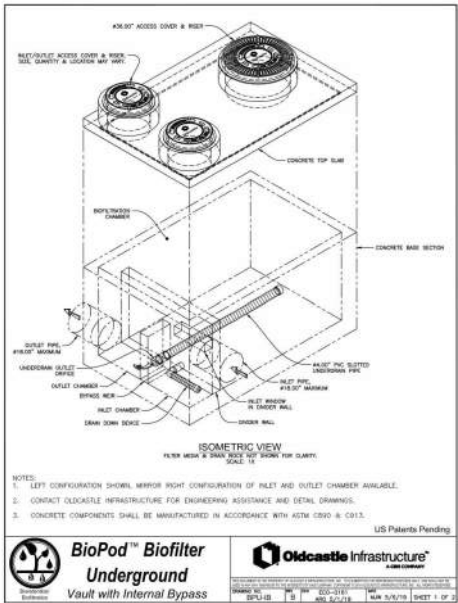
9 OUTFALL PROTECTION
NOT TO SCALE



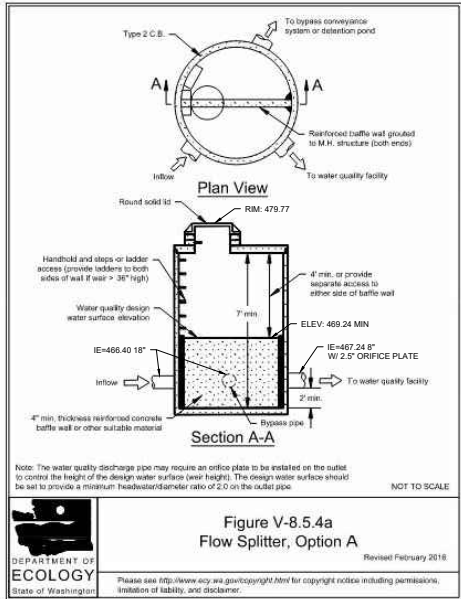
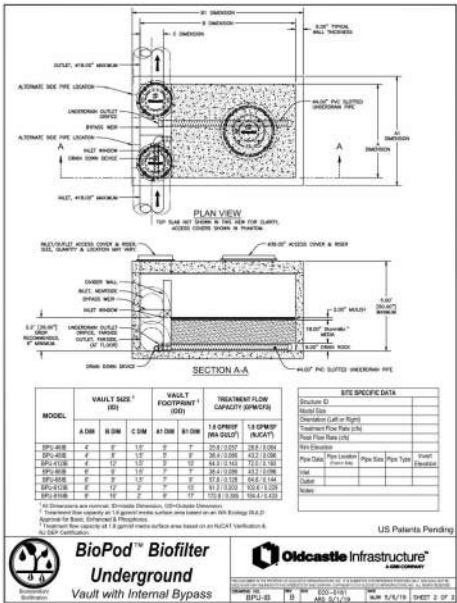
1 OLDCASTLE UNDERGROUND BIOPOD BIOFILTER WITHOUT INTERNAL BYPASS
NOT TO SCALE



2 OLDCASTLE 8X24 UNDERGROUND BIOPOD BIOFILTER WITH INTERNAL BYPASS
NOT TO SCALE



3 OLDCASTLE UNDERGROUND BIOPOD BIOFILTER WITH INTERNAL BYPASS
NOT TO SCALE



4 SDCB 040 - FLOW SPLITTER
NOT TO SCALE