Furrow Engineering

October 13, 2015

Richard Harris, AICP
Town Planner
Town of South Hadley
116 Main Street, Room 204
South Hadley, Ma 001075

RE: Application for Site Plan Review for Addition to GG's Custom Metals, 785 New Ludlow Road, South Hadley, Massachusetts.

Dear Mr. Harris,

On behalf of Gerry Geoffrion, Furrow Engineering is submitting the attached application for Site Plan Review.

The following information is attached for your review:

- Town of South Hadley Application for Site Plan Review
- Town of South Hadley Application for Stormwater Permit
- Application Fee: $505.50
- Storm Water Management Narrative
- Engineered Site Plans (5-copies Full Size, 7-copies 11x17)

We look forward to working with the South Hadley Planning Board to ensure the design is in conformance with the Town By-Laws. We are available at your convenience to review the plans and supporting documents. If you have any questions, please feel free to contact us.

Sincerely,

Bryan Balicki, P.E.
Project Engineer

C.C. Gerry Geoffrion, GG's Custom Metals

Furrow Engineering
199 Servistar Industrial Way, Suite 2
Westfield, Massachusetts 01085
Tel: 413-562-4884

Furrow Engineering

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Furrow Engineering

I. Application for Site Plan Review

Furrow Engineering
199 Servistar Industrial Way, Suite 2
Westfield, Massachusetts 01085
Tel: 413-562-4884

FORM SPR

SOUTH HADLEY PLANNING BOARD

APPLICATION FOR SITE PLAN REVIEW

Date 10-13-15

File one completed application form together with ten (10) copies of the site plan with the Planning Board. One (1) copy of Form SPR shall be concurrently filed with the Town Clerk.

To the Planning Board:

The undersigned herewith submits the accompanying Site Plan for review as required by Section 12 of the Zoning By-Laws.

1. Applicant Gerry Geoffrion

   Address 785 New Ludlow Road

   South Hadley, Ma 01075

   Telephone 413-315-4344

2. Owner (if not applicant) GG's Realty, LLC

   Address Same

3. Site Plan Preparer Frank DeMarinis, P.E. Furrow Engineering

   Title or License President

   Address 199 Servistar Industrial Way, Suite 2, Westfield, Ma 01085

4. Deed of property recorded in the Hampshire County Registry of Deeds,
   Book 10485 Page 94

5. Location and description of property (street and number if any) _____

   785 New Ludlow Road

   Assessors Map # 9 Parcel # 10

6. Fee Paid: Yes $505.50 No _____

_____
Signature of Applicant

Town Clerk:

Date of Submission _____

Signature _____

Furrow Engineering

II. Application for Stormwater Permit

Furrow Engineering
199 Servistar Industrial Way, Suite 2
Westfield, Massachusetts 01085
Tel: 413-562-4884

FORM SWP

SOUTH HADLEY PLANNING BOARD

APPLICATION FOR STORMWATER PERMIT

Date _10-13-15____

Pursuant to the provisions of Article XVI of the Bylaws of the Town of South Hadley, the undersigned herewith submits the accompanying application for a Stormwater Management Permit as described below and detailed in the supporting documentation which is incorporated into and made part of this application.

PROJECT/SITE INFORMATION

Project/Site Name: GG's Custom Metals

Project/Site Location (Street Address): 785 New Ludlow Road

Assessor's Map 9 Parcel # 10 Total Parcel Size (square feet): 85,813 SF

Estimated Amount of Area to be Disturbed (square feet): 58,950 SF

Total Area of Impervious Surfaces (square feet): Existing: +/- 21,150 Proposed: +/- 29,470

Date Site Plan, Special Permit, or Definitive Subdivision Plan was approved: 11-8-2006 for original development.

General Description of Project**: Construction of a 7,030 SF addition to existing facility**

APPLICANT INFORMATION

Name: Gerry Geoffrion

Address: 785 New Ludlow Road

Telephone: 413-315-4344

Email: gg@ggscustommetals.com

OWNER INFORMATION
(if different from Applicant)

Name: GG's Realty

Address: Same

Telephone: Same

Email: Same

CONSULTING ENGINEER INFORMATION

Name: Frank DeMarinis, P.E. Furrow Engineering

Address 199 Servistar Industrial Way, Suite 2, Westfield, Ma

Telephone 413-562-4884

Email Address: Frank@sage-llc.com

I, as applicant, certify that the application and all attachments are correct and complete.

_____ _____

Signature of Applicant **Date**

FOR PLANNING BOARD OFFICE USE:

Amount of Application Fee: _____ Fee Paid? Yes ____ No _____

Furrow Engineering

III. Stormwater Management Narrative

Furrow Engineering
199 Servistar Industrial Way, Suite 2
Westfield, Massachusetts 01085
Tel: 413-562-4884

Furrow Engineering

October 8, 2015
Revised October 14, 2015

Janice Stone, South Hadley Conservation Commission Agent Fax: 413-538-7565
South Hadley Conservation Commission
South Hadley Town Hall
116 Main Street
South Hadley, MA 01075

RE: Proposed addition, 785 New Ludlow Road, South Hadley, Massachusetts,
Furrow No. 0655

Dear Ms. Stone:

On behalf of Gerry Geoffrion, Furrow Engineering is submitting this letter of supplementary information. Mr. Geoffrion previously submitted a Request for Determination of Applicability application. Included in this package are three (3) copies of certified engineered site plans.

In general, the applicant is requesting to construct a 7,030 SF addition to the existing facility on the site. The existing facility and associated site development were permitted through the Conservation Commission and Planning Board in 2006.

The existing conditions plan in this package was compiled based on As-Built records drawings and observations in the field by this office. This plan shows the site as it is currently developed today. The building, parking lot, and detentions basins shown were constructed in substantial conformance with the approved site design plans. Changes to the limit of pavement, and the configuration of the infiltration basins were identified on the As-Built plans.

Furrow Engineering reviewed The Stormwater Management Report dated September 29, 2006 (attached) prepared by Associated Builders for the original site development. We also revised a revised Stormwater Management Report dated December 7, 2007 which addressed the construction of only two basins and the revised site layout. The reports were reviewed for conformance with the current Massachusetts Department of Environmental Protection Stormwater Management Standards as well as the Town of South Hadley Stormwater Water Ordinance. It is our opinion that the Stormwater system as presented on the attached plans meets all current regulatory standards and town ordinances.

To manage the stormwater from the proposed addition and parking expansion, the third, eastern detention basin will be constructed. The basin will be constructed in accordance with the original approved design plans. This basin will adequately capture, treat, and infiltrate all runoff associated with the proposed work. The original basin was designed to mitigate 7,030 SF of future building roof, and 11,325 SF of future parking and driveways. The proposed plan includes

a 7,030 SF addition and 10,800 SF of parking. The proposed project results in less impervious surface than the basins were designed for.

The basin has been shown on the enclosed engineered site plans in the same configuration and size as it was original permitted. The only modification will be the addition of a sediment forebay to bring the basin into compliance with Mass DEP Stormwater Management Standards for TSS removal rates.

In response to questions raised in our phone conversations and emails provided by the applicant:

1)The loss of two forebays in the infiltration basin on the west side and the reduction in the amount of rip rap in both places. Does this still meet the stormwater standards in place at the time, with no forebay treatment?

-The proposed plans include the construction of the sediment forebays as designed on the original site plans. This will bring the basins into compliance with current stormwater standards. The rip rap as installed is sufficient to protect against erosion from the stormwater flows. The vegetation in the basins has been established, and there is no evidence of scour at the inlets to the existing basins.

2) Whether a sediment depth marker was installed in the forebay on the south side of the building (back of the building) as shown on the as-built plan.

-A sediment marker was not observed in the forebay.

3) Was the basin used during construction cleared of accumulated sediment before final grading and construction, as required in Item 14 at the top of the page of plan L3.1.

-As Furrow Engineering was not involved in the original construction of the project, we cannot answer this question. What we can confirm is that the basins are functioning as intended. There is no evidence or reports of the basins overflowing during or standing water present after storm events.

Please contact us at the numbers below at your convenience if you have any questions.

Sincerely,

Bryan Balicki, P.E.
Project Engineer

Frank DeMarinis, P.E.
President

C.C. Gerry Geoffrion

Stormwater Management Narrative

Standard 1-No New Untreated Discharges

No new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

-All stormwater runoff generated from the site will be directed into the onsite stormwater treatment system. This system consists of sediment forebays and infiltration basins.

Standard 2-Peak Rate Attenuation
Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for discharges to land subject to coastal storm flowage as defined in 310 CMR 10.04.

-The stormwater management for the addition was designed by Associated Builders as part of the original site permitting process. There are no changes proposed to the design of the addition and new parking areas and driveways. The amount of impervious surface does not exceed was originally designed. The applicant is proposing to construct the third basin as originally permitted. Additional treatment measures are proposed as discussed below.

Standard 3-Recharge

Loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures including environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This Standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook.

-The stormwater from the majority of the site, both existing flow, and the proposed addition runoff will be managed by a series infiltration basins. The basins are self-contained, and capture and infiltrate all runoff generated from the developed portions of the site. The proposed plan will exceed the requirements of standard 3.

Standard 4-Water Quality

Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This Standard is met when:

a. Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan, and thereafter are implemented and maintained;

b. Structural stormwater best management practices are sized to capture the required water quality volume determined in accordance with the Massachusetts Stormwater Handbook; and

c. Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.

-The MADEP's SMP requires the applicant to remove 80 % of the total suspended solids (TSS). The BMPs proposed for the subject project are catch basins with deep sumps, a Stormceptor catch basin, and an underground infiltration system. Furrow Engineering, has utilized the TSS removal rates suggested in the Stormwater Management Standards (Page 1-7). The best management practices proposed for this project are sized to capture 80% of TSS produced from the proposed project. The results of these calculations are shown below in Table 5.

Table 5: TSS Removal Rates

Best Management Practice (BMP)	*SMP TSS Removal Rate*	*Annual TSS Load entering the BMP [unit]*	*Amount of TSS Removed by the BMP*	***TSS remaining*** *after the BMP*
Infiltration basin with Forebay	*80%*	*1.00*	*0.80*	*0.20*
Total Percent of TSS Removed =			*80.0 %*	

There are three separate flow areas on the project, one to each of the three detention basins. The three basins all utilize the same TSS treatment train system. Forebays will be added to the inlets of the western basin to bring it into compliance.

Standard 5-Land Uses with Higher Potential Pollution Loads

For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable. If through source control and/or pollution prevention all land uses with higher potential pollutant loads cannot be completely protected from exposure to rain, snow, snow melt, and stormwater runoff, the proponent shall use the specific structural stormwater BMPs determined by the Department to be suitable for such uses as provided in the Massachusetts Stormwater Handbook. Stormwater discharges from land uses with higher potential pollutant loads shall also comply with the requirements of the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26-53 and the regulations promulgated there under at 314 CMR 3.00, 314 CMR 4.00 and 314 CMR 5.00.

-The proposed use does not qualify as a land use with higher potential pollutant loads. There will be no long term vehicle storage, storage of hazard chemicals etc. on site.

Standard 6-Critical Areas

Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply, and stormwater discharges near or to any other critical area, require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Handbook. A discharge is near a critical area if there is a strong likelihood of a significant impact occurring to said area, taking into account site-specific factors. Stormwater discharges to Outstanding Resource Waters and Special Resource Waters shall be removed and set back from the receiving water or wetland and receive the highest and best practical method of treatment. A “storm water discharge” as defined in 314 CMR 3.04(2)(a)1 or (b) to an Outstanding Resource Water or Special Resource Water shall comply with 314 CMR 3.00 and 314 CMR 4.00. Stormwater discharges to a Zone I or Zone A are prohibited unless essential to the operation of public water supply.

-The proposed project does not have any impact on areas of critical environmental concern. Also the site is not located within the Zone I or A wellhead protection.

Standard 7-Redevelopment Projects Subject to the Standards Only to the Maximum Extent Practicable

A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural best management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.

-*The proposed project fully complies with all required stormwater management standards.*

Standard 8-Construction Period Pollution Prevention and Erosion and Sedimentation Control

A plan to control construction-related impacts including erosion, sedimentation and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented.

-A construction period pollution prevention and erosion and sedimentation control plan has been developed and is included in this package.

Standard 9-Operation and Maintenance Plan

A long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed.

-An operation and maintenance plan has been developed and is a part of this stormwater management report. Please see the next section. A plan showing the locations of all BMP's is also included in this report.

Standard 10-Prohibition of Illicit Discharges

All illicit discharges to the stormwater management system are prohibited.

-***Illicit Discharge Compliance Statement:*** *The development of this site does not include the installation of a new stormwater management system. Any illicit connections found during construction will be corrected. The Long Term Pollution Prevention Plan also takes measure to prevent illicit discharges and ensure compliance with Standard 10.*

IV. Operation and Maintenance Narrative

Applicant:

Gerry Geoffrion
785 New Ludlow Road
South Hadley, MA

The party responsible for maintenance of the stormwater management system depicted on sheet C-3 Grading and Utilities Plan is the applicant.

A. Snow removal

1. The proposed snow removal storage areas are within the paved parking as shown on the project site plans. All melt water would be directed to and treated by the stormwater management system.

B. Infiltration Basin:

Basin will not be used as a siltation basin during construction.

The Infiltration Basin shall be maintained as follows:

1. The basin should be inspected for proper function and preventative maintenance be completed after every major storm during the first three months of operation and at least twice a year thereafter. Preventative maintenance shall include inspecting for:

-Signs of differential settlement
-Cracking
-Erosion
-Leakage in the embankment
-Tree growth on the embankments
-Condition of rip rap
-Sediment accumulation
-The health of the turf

2. Mow the buffer area, side slopes, and basin bottom at least twice a year. Trash debris, grass clippings and organic matter should be removed at this time.

3. Inspect and clean pretreatment (forebay) devices at least twice a year and after every major storm event. Rip Rap Forebay shall be replaced when sediment has accumulated above the level of the stone.

4. When inspecting basin and forebay area, check the condition of the Mirafi geotextile fabric within the stone berm. If fabrics integrity has been compromised, or deteriorated, remove and replace fabric and reset stone berm to original condition and grade.

5. Remove any sediment from the basin if standing water is present 48 to 72 hours after a storm event.

6. Sediment should be removed from the basin as necessary.

7. To remove sediment, wait until the floor of the basin is thoroughly dry. Use light equipment to remove the top layer, deeply till the remaining soil, and re-vegetate as soon as possible.

C. General Maintenance Practices

1. No landscaping, clearing or trimming of vegetation or trees shall be allowed within the resource areas delineated on the plans.

2. Grass clippings, excess landscape material or any debris shall NOT be disposed of within the forebay or the infiltration basin.

3. Paved access ways should be treated with sand and limited amounts of de-icing materials during the winter months. The parking areas shall be swept clean a minimum of two times per year for the first two years. If requested, based on the results of the inspection reports, the commission may reduce the required frequency of sweeping.

4. The bituminous berm shown on the perimeter of the parking lot shall be maintained in good working condition in perpetuity. The berm shall be inspected twice a year as part of the regular inspection of the other stormwater features. Any damaged berm shall be replaced so that runoff is directed to the infiltration basins.

VI. Inspection and Construction Schedule

A. Construction Schedule

1. Mobilize equipment on site.
2. Install erosion control barrier
3. Begin site preparation
4. Excavate for site utilities and drainage system.
5. Roadway/Parking Lot Construction
6. Building Construction
7. Final Grading and seeding of drainage system
8. Paving and Landscaping

B. Inspection Schedule

1. Project engineer shall inspect the drainage systems during general construction intervals.

2. Project engineer shall inspect the following specific phases of work:
   A. Installation of erosion control barrier
   B. Rough drainage system
   C. Final grading and seeding
   D. Follow-up inspection during the following growing season.

VII. Long Term and Construction Period Pollution Prevention and Erosion and Sedimentation Control

EROSION AND SEDIMENTATION CONTROLS:

STABILIZATION PRACTICES:

Temporary Stabilization: Any disturbed area where construction activity is suspended for more than fourteen days shall be seeded to stabilize erodible materials.

Permanent Stabilization: When an area has been graded to the final increment, it shall be seeded or sodded within fourteen days.

STRUCTURAL PRACTICES:

Sedimentation Control System: Sedimentation control systems consisting of silt fence or straw bale shall be installed along the limits of the project as shown on the plans (see attached plans). Where necessary, wings shall be added to the sedimentation control system along the toe of slope to prevent sediment from moving along and around the fence.

Catch Basin Protection: Catch basins shall be protected using filtration fabric sedimentation control systems as shown on the plans.

POST CONSTRUCTION STORM WATER MANAGEMENT:

Storm Drainage System: Storm water drainage for the paved surfaces will be provided by curb and gutters draining into a catch basin/storm drain system. The storm drain systems shall discharge as described in Section A.

Prior to discharge, the storm drainage system will be routed through the storm water management system designed to remove coarse sediments (road sand) from "first flush" storm events. In addition, catch basin utilizing hooded outlet inverts with deep sumps shall remove coarse sediments and retain floatable, gas, oil etc.

OTHER CONTROLS

WASTE DISPOSAL:

Waste Materials: All waste materials shall be collected and stored in a manner that will prevent materials from entering watercourses, wetlands, or other off site areas. Material shall be regularly collected and disposed of offsite in a manner consistent with all federal, state and local regulations.

Hazardous Waste: All hazardous waste materials shall be disposed of in a manner specified by State regulations and/or in accordance with the manufacturer's recommendations.

Sanitary Waste: During construction all sanitary waste will be collected in portable sanitary units. These units will be emptied as necessary by a qualified contractor and disposed of in accordance with all State and local regulations. After completion all sanitary waste will be directed into the on-site septic system.

OFF-SITE VEHICLE TRACKING:

The paved areas adjacent to the site entrance will be swept as needed to remove any excess mud, dirt or rock tracked from the site. The site was designed to balance the total cut with the total fill, eliminating most need for hauling material on and off site. Dump trucks hauling material from the construction site will be covered with a tarpaulin.

MAINTENANCE AND INSPECTION

INSPECTION SCHEDULE

DURING CONSTRUCTION:

All areas disturbed by construction that have not been finally stabilized will be inspected at least once every seven-calendar day. These areas will also be inspected following (within 24 hours) any storm in which 0.5 inches or more of rain occurs in a 24-hour period.

POST CONSTRUCTION:

All areas that have been temporarily or finally stabilized will be inspected at least once a month for three months following final stabilization.

INSPECTION PROCEDURES

PERSONNEL:

Inspections shall be conducted by qualified personnel provided by the contractor.

ITEMS TO BE INSPECTED:

The following items shall be inspected as described below:

Item	**Procedure**
Straw bales	Straw bale lines shall be inspected to insure that bales are intact and remain snugly butted to each other and firmly embedded in the ground. Depth of sediment behind the bales shall be noted.
Silt fence	Silt fence shall be inspected to insure that fence line is intact with no breaks or tears, and that the bottom of the fabric is securely buried in the ground. Areas where fence is excessively sagging or where support posts are broken or uprooted shall be noted. Depth of sediment behind the fence shall be noted.

Catch basin protection	Protective measures shall be inspected to insure that sediment is not entering the catch basins. Catch basin sumps shall be monitored for sediment deposition. Filter fabric and stone check dams shall be inspected to insure that it has not clogged.
Discharge points	All discharge points shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Discharge points shall also be inspected to insure that erosion protection measures at the discharge are functioning
Vehicle entrances/exits	Locations where vehicles enter or exit the site shall be inspected for evidence of off- site sediment tracking.
General	Construction areas and perimeter of the site shall be inspected for any evidence of debris that may blow or wash off site, and for debris that has blown or washed off site. Construction areas shall be inspected for any spills or unsafe storage of materials that could pollute off site waters.

REVISIONS TO POLLUTION CONTROL PLAN:

If the results of the inspections require modifications to the pollution control plan, the plans shall be revised as soon as practicable after the inspection. Changes to the plan shall be implemented within 7 calendar days following the inspection.

RECORD KEEPING:

A written report summarizing the scope of the inspection, the name(s) and qualifications of inspection personnel, the date and time of the inspection, major observations relative to the implementation of the pollution control plan, and actions taken shall be completed within 24 hours of the inspection. This report shall be signed by the responsible person designated by the registrant. This report shall be retained as part of the pollution control plan for at least three years after the date of the inspection.

MAINTENANCE:

GENERAL:

Maintenance procedures should be implemented as soon as possible after the need for maintenance is recognized. Contractors shall utilize good housekeeping practices to minimize the possibilities of spills or leaks of potential pollutants. Hazardous materials shall be handled with the utmost care in accordance with all regulations and the recommendations of the manufacturer.

MAINTENANCE OF EROSION CONTROLS: Erosion controls shall be maintained as noted below:

Item	Procedure
Straw bales	Any broken, excessively tilted or undermined straw bales shall be promptly replaced. When sediment builds up behind the straw bales to over one half of the height of the bales, the sediment shall be removed or a second layer of straw bales added.
Silt fence	Sediment shall be removed when it reaches one third of the height of the silt fence. Care shall be taken to avoid damaging the fence during cleanout. Any areas of damaged or torn fabric, broken posts or undermined fence shall be repaired.
Catch basin protection	Any damage to stone check dams or other protective measure shall be repaired immediately. Clogged filter fabric or stone check dams shall be replaced. Any sediment accumulated in the catch basin sumps shall be removed. Sediment shall be removed when it accumulates to one half the height of the stone check dam.
Discharge points	Any sediment or debris accumulated at discharge points shall be removed. Any damage to riprap shall be immediately repaired.
Vehicle entrances/exits	Any material tracked onto roadways shall be immediately cleaned up. If necessary, stabilized construction entrances shall be provided to minimize sediment tracking.
General	Any debris blowing or flowing off the site shall be immediately cleaned up. Any unsafe storage practices noted in the inspection shall be immediately remedied.

NON-STORM WATER DISCHARGES

GENERAL:

It is expected that the following non-storm water discharges may occur from the site during the construction period:

- Discharges from firefighting activities.
- Waters used for dust control.
- Drainage from watering vegetation.
- Pavement wash waters without use of detergent and where spills or leaks of hazardous materials have not occurred (unless cleanup has removed all spilled materials)
- Uncontaminated groundwater from dewatering operations.
- All non-stormwater discharges will be directed to the storm drainage system and/or discharge upstream of sediment and erosion controls.

Original Stormwater Management Reports

Stormwater Management Report

Dwight J. Pearl
Proposed Warehouse

Parcel D-1, New Ludlow Road
South Hadley, Massachusetts

Prepared for:

Dwight J. Pearl
P.O. Box 249
South Hadley, MA 01075

Prepared by:

ASSOCIATED BUILDERS, INC.
4 INDUSTRIAL DRIVE, SOUTH HADLEY, MA 01075

September 29, 2006

Introduction

Dwight J. Pearl is proposing to construct a 7,400 square foot warehouse on parcel D1, New Ludlow Road in South Hadley, Massachusetts. The scope of work for the project will include site grading, utility connections, construction of a 7,400 square foot pre-engineered metal building with associated paved parking and circulation areas and construction of a stormwater management system designed to accommodate future expansion.

Portions of the proposed work, including the proposed stormwater detention basin, portions of the paving and the building are located within the 100' Buffer Zone of a Bordering Vegetated Wetland that surrounds the parcel. Due to the proximity of the proposed work to the wetland, the proposed project is subject to the Massachusetts Wetlands Protection Act and consequently the Stormwater Management Policy.

This report describes the proposed stormwater management system, the methodologies used to design the system and how the system achieves compliance with the DEP Stormwater Management Policy by controlling stormwater peak flow rates, treating stormwater to improve the quality and providing recharge to groundwater.

Existing Conditions

The property, which is approximately 2 acres in size, is located on the south side of New Ludlow Road across the street from Fairway Wholesale in South Hadley, Massachusetts. The parcel is surrounded by wetlands on the south, east and west sides. The site has recently been excavated with several large, high piles of earth remaining. Based on USGS topographic maps and old aerial photographs, it appears that the site was previously a wooded area with a knoll towards the northeast corner of the property. Currently the site is unoccupied and barren with exposed sandy soils and scattered scrub brush. For the purpose of the drainage analysis, existing conditions will be considered conditions prior to the recent excavations. This will ensure that after the proposed project is complete that the drainage pathways and flow rates are maintained as they were before recent site work.

Based on preliminary soil investigations and onsite deep hole observations, it appears that the majority of the parcel consists of native soils. The soils consisted of fine to medium sand from the surface of the test pit to the bottom which ranged from 10' to 14' deep. These findings are consistent with the NRCS soil classifications. According to the NRCS mapping, the soils in the area of proposed construction consist of Hu, Hinckley-Merrimac Urban Land Complex and WnC, Windor loamy sands. Both these soils are in the soil hydrological group "A". A percolation test was performed in the area of the proposed detention basin to determine potential infiltration capacities. The testing yielded a percolation rate of 0.5 minutes per inch which is highly favorable for infiltration. Groundwater was greater than 10' below the existing grade. The NRCS Soil Map, corresponding soils data and soil testing results are attached herewith.

Proposed Conditions

The proposed development project will include construction of a 7,400 square foot building, associated paved parking and circulation areas, utility connections and a stormwater management system. As shown on the Drainage Maps enclosed herewith, the drainage design has been based on the maximum, future buildout in order to plan ahead and prevent having to disturb the detention basin at a later date. In addition the basin will provide a natural, stable buffer between any activities on the site and the adjacent wetland resource area.

Under proposed conditions, the overall stormwater pathways will be maintained. However, runoff from newly developed areas will be collected and routed through a series of best management practices prior to discharge. The project has been designed so that stormwater is directed to curb outlets in the paved areas which lead to sediment forebays and then into the proposed detention basin. The proposed detention basin is equipped with several stoned emergency overflows so that in the event that they exceed their capacity, stormwater will flow through a stone spillway into the surrounding thickly vegetated areas, into the adjacent wetlands. The proposed drainage areas are shown on the Proposed Conditions Drainage Map attached herewith.

The detention basin has been proposed in order to mitigate the potential increase in stormwater runoff peak flow rates associated with the increase in impervious area. The system is designed to maintain stormwater runoff peak flow rates at, or near, those for the 2, 10 and 100-year storm frequencies under conditions prior to recent excavations.

Drainage Analysis

For the purpose of the report, two analysis points were utilized to compare Existing and Proposed peak flow rates. The analysis design points were considered to be the edge of paving along New Ludlow Road and the proposed southern limit of work. Once again, the "Existing Conditions" refer to conditions prior to the recent excavations.

The hydrologic analysis was performed for Existing and Proposed Conditions for the 2, 10 and 100-year storm frequencies. Rainfall volumes used for this analysis were based on the Natural Resources Conservation Service (NRCS) Type III, 24-hour storm event for Hampden County and were 3.0", 4.5" and 6.5" for the 2, 10 and 100-year storm events respectively. Runoff coefficients were determined using NRCS Technical Release 55 (TR-55) methodology as provided in HydroCAD. Drainage areas used in the analyses were described in previous sections and are shown on the attached Drainage Maps. The HydroCAD model is based on the NRCS Technical Release 20 (TR-20) Model and the calculations are provided herewith. A summary of the peak flow rates for the Existing and Proposed Conditions are as follows:

Design Point	STORM FREQUENCY					
	2 Year		10 Year		100 Year	
	Existing	Proposed	Existing	Proposed	Existing	Proposed
1000 New Ludlow Rd.	0.0	0.0	0.0	0.1	0.0	0.3
2000 Southern Limit of Work	0.0	0.0	0.0	0.0	0.0	0.0
Detention Basin Peak Elevation	-	248.3	-	248.9	-	249.5
Note: Peak flow rates are expressed in **cf/sec** and elevations are expressed in **feet.**						

As shown in the above table, stormwater peak runoff rates under Proposed Conditions have been maintained at or near the peak flow rates for the 2, 10 and 100-year storm frequencies under Existing Conditions. There are slight increases anticipated in flow to the street, 0.1 cfs for the 10-year storm and 0.3 cfs for the 100-year storm. This increase is associated with the proposed and future driveway aprons. Due to physical limitations, i.e. the elevation difference between the site the roadway which is significantly lower, it was not possible to collect and direct runoff to the proposed detention basin. It is our opinion that the anticipated minimal increase in larger storm events will not adversely effect the surrounding environment.

Stormwater Management

The proposed stormwater management system has been designed in compliance with the DEP Stormwater Policy and will provide long-term protection of natural resources. The system will control water quality, improve stormwater runoff quality and provide groundwater recharge.

The following is a list of the Stormwater Standards and a description of how the project complies with each standard:

1. No new stormwater conveyances may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

Stormwater from the new construction will be directed through a series of best management practices such as sediment forebays and an extended detention basin prior to discharge. Proposed emergency overflows will be stabilized with riprap to reduce velocity and prevent erosion.

2. Stormwater management systems must be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates.

The proposed stormwater system has been designed with a detention basin to attenuate peak flow rates and essentially balance them for the 2, 10 and 100-year storm frequencies under Existing and Proposed Conditions. There is a slight increase anticipated in peak flow rates to the street, 0.1 cfs for the 10-year storm and 0.3 cfs for the 100-year storm which are explained in further detail under the Drainage Analysis Section of this Report. In our opinion, increases of this order of magnitude are not significant, and we do not expect them to adversely effect the surrounding environment.

3. Loss of annual recharge to groundwater should be minimized through the use of infiltration measures to the maximum extent practicable. The annual recharge from the post-development site should approximate the annual recharge from the pre-development site conditions based on soil types.

It is anticipated that the annual recharge to groundwater under Proposed Conditions will meet the annual recharge for Existing Conditions. The proposed detention basin will act as an infiltrating, retention basin with no outlet, just an emergency overflow weir. Percolation testing was performed in the area of the proposed detention basin which yielded a rate of 0.5 minutes per inch, which is an ideal scenario for infiltration.

4. For new development, stormwater management systems must be designed to remove 80-percent of the average annual load (post development conditions) of Total Suspended Solids (TSS). It is presumed that this standard is met when:

The estimated average TSS removal rate for the new construction is 80% as illustrated on the TSS worksheet attached herewith. This will be achieved by routing stormwater runoff from developed areas through a series of best management practices prior to discharge and by implementing non-structural best management practices. Stormwater will be directed to curb cuts flowing into sediment forebays and the detention basin.

5. Stormwater discharges to areas with higher potential pollutant loads require the use of specific stormwater management BMPs (listed in guidelines). The use of infiltration practices without pretreatment is prohibited.

The proposed project is not considered an area with higher pollutant loads per the Stormwater Policy.

6. Stormwater discharges to critical areas must utilize certain stormwater management BMP's approved for critical areas (listed in guidelines). Critical areas are Outstanding Resource Waters (ORWs), shellfish beds, swimming beaches, cold-water fisheries and recharge areas for public drinking water supplies.

The proposed project is not located in or adjacent to a critical area.

7. Redevelopment of previously developed sites must meet the Stormwater Management Standards to the maximum extent practicable. However, if it is not practicable to meet all the Standards, new (retrofitted or expanded) stormwater management systems must be designed to improve existing conditions.

The site is currently undeveloped.

8. Erosion and sediment controls must be implemented to prevent impacts during construction and land disturbance activities.

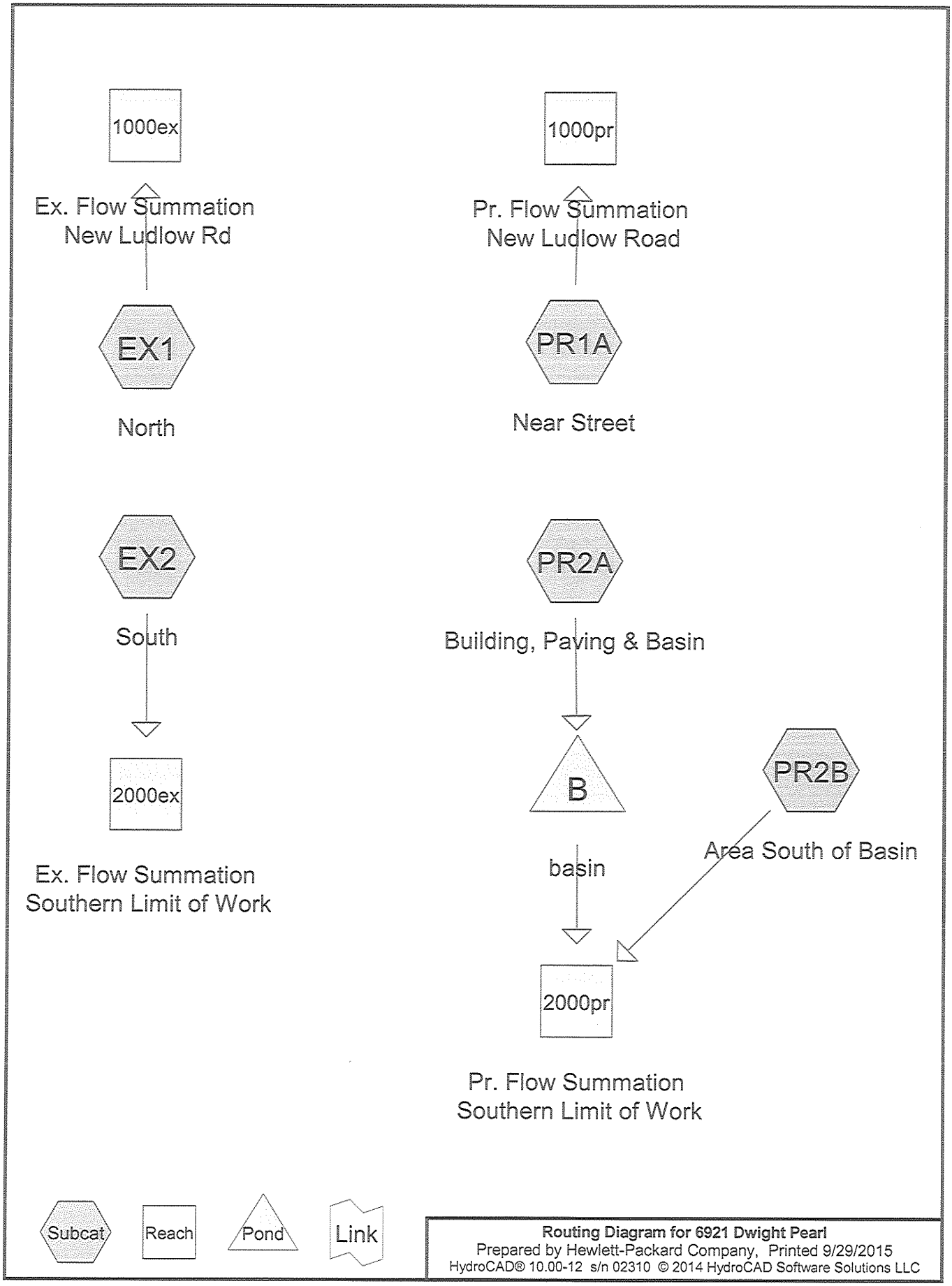
Temporary and permanent erosion control measures are shown on the plans and described in the Operation and Maintenance Plan attached herewith. In addition, further erosion control measures may be implemented for coverage under the NPDES General Permit for Storm Water Discharges from Construction Activities, which will be required for the proposed project.

9. All stormwater management systems must have an operation and maintenance plan to ensure that systems function as designed.

The Operation and Maintenance Plans enclosed herewith detail the proposed structural and non-structural best management practices to be utilized both during construction and indefinitely. It describes their purpose, recommends inspection and maintenance schedules and identifies parties responsible for inspection.

Summary

The project has been thoughtfully planned to meet the project goals while mitigating potential adverse impacts to the surrounding resource areas and to enhance protection to the surrounding environment. A stormwater management system in compliance with the Massachusetts Department of Protection Stormwater Management Policy has been incorporated into the design which will control water quantity, improve stormwater quality and provide groundwater recharge for proposed construction as well as future expansion.



Routing Diagram for 6921 Dwight Pearl
Prepared by Hewlett-Packard Company, Printed 9/29/2015

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.443	39	>75% Grass cover, Good, HSG A (PR1A, PR2A, PR2B)
0.034	98	Paved Driveway Entrances (PR1A)
1.562	30	Woods, Good, HSG A (EX1, EX2)
0.163	98	basin (PR2A)
0.260	98	future paving (PR2A)
0.161	98	future roof (PR2A)
0.332	98	paving (PR2A)
0.170	98	roof (PR2A)
3.125	**56**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
2.005	HSG A	EX1, EX2, PR1A, PR2A, PR2B
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
1.120	Other	PR1A, PR2A
3.125		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.443	0.000	0.000	0.000	0.000	0.443	>75% Grass cover, Good	PR1A, PR2A, PR2B
0.000	0.000	0.000	0.000	0.034	0.034	Paved Driveway Entrances	PR1A
1.562	0.000	0.000	0.000	0.000	1.562	Woods, Good	EX1, EX2
0.000	0.000	0.000	0.000	0.163	0.163	basin	PR2A
0.000	0.000	0.000	0.000	0.260	0.260	future paving	PR2A
0.000	0.000	0.000	0.000	0.161	0.161	future roof	PR2A
0.000	0.000	0.000	0.000	0.332	0.332	paving	PR2A
0.000	0.000	0.000	0.000	0.170	0.170	roof	PR2A
2.005	**0.000**	**0.000**	**0.000**	**1.120**	**3.125**	**TOTAL AREA**	

Time span=1.00-20.00 hrs, dt=0.03 hrs, 634 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EX1: North Runoff Area=27,802 sf 0.00% Impervious Runoff Depth>0.10"
Flow Length=100' Slope=0.1200 '/' Tc=5.6 min CN=30 Runoff=0.01 cfs 0.005 af

Subcatchment EX2: South Runoff Area=40,258 sf 0.00% Impervious Runoff Depth>0.10"
Flow Length=170' Slope=0.1400 '/' Tc=8.0 min CN=30 Runoff=0.02 cfs 0.007 af

Subcatchment PR1A: Near Street Runoff Area=7,453 sf 19.99% Impervious Runoff Depth>1.33"
Tc=5.0 min CN=51 Runoff=0.26 cfs 0.019 af

Subcatchment PR2A: Building, Paving & Runoff Area=55,793 sf 84.76% Impervious Runoff Depth>4.94"
Tc=5.0 min CN=89 Runoff=7.71 cfs 0.528 af

Subcatchment PR2B: Area South of Basin Runoff Area=4,814 sf 0.00% Impervious Runoff Depth>0.51"
Tc=5.0 min CN=39 Runoff=0.03 cfs 0.005 af

Reach 1000ex: Ex. Flow Summation New Ludlow Rd Inflow=0.01 cfs 0.005 af
Outflow=0.01 cfs 0.005 af

Reach 1000pr: Pr. Flow Summation New Ludlow Road Inflow=0.26 cfs 0.019 af
Outflow=0.26 cfs 0.019 af

Reach 2000ex: Ex. Flow Summation Southern Limit of Work Inflow=0.02 cfs 0.007 af
Outflow=0.02 cfs 0.007 af

Reach 2000pr: Pr. Flow Summation Southern Limit of Work Inflow=0.03 cfs 0.005 af
Outflow=0.03 cfs 0.005 af

Pond B: basin Peak Elev=249.45' Storage=6,598 cf Inflow=7.71 cfs 0.528 af
Discarded=1.64 cfs 0.527 af Primary=0.00 cfs 0.000 af Outflow=1.64 cfs 0.527 af

Total Runoff Area = 3.125 ac Runoff Volume = 0.564 af Average Runoff Depth = 2.16"
64.16% Pervious = 2.005 ac 35.84% Impervious = 1.120 ac

Summary for Subcatchment EX1: North

Runoff = 0.01 cfs @ 14.90 hrs, Volume= 0.005 af, Depth> 0.10"

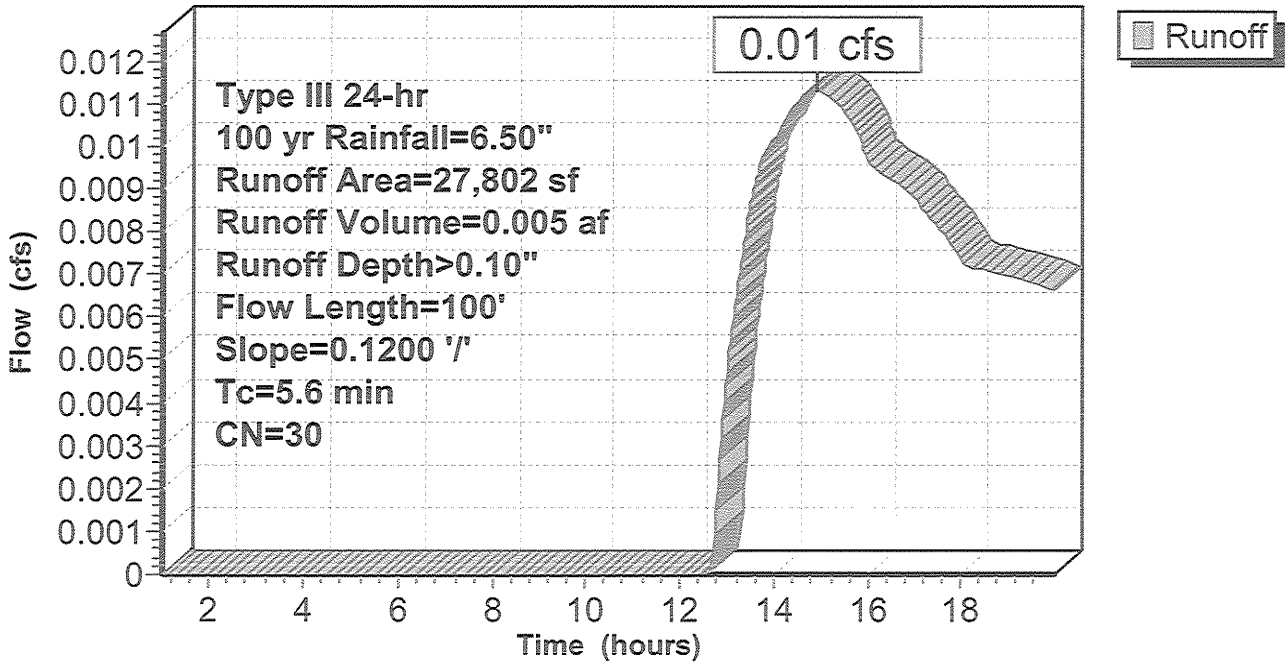
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs
Type III 24-hr 100 yr Rainfall=6.50"

Area (sf)	CN	Description
27,802	30	Woods, Good, HSG A
27,802		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	100	0.1200	0.30		**Lag/CN Method,**

Subcatchment EX1: North

Hydrograph



Summary for Subcatchment EX2: South

Runoff = 0.02 cfs @ 14.94 hrs, Volume= 0.007 af, Depth> 0.10"

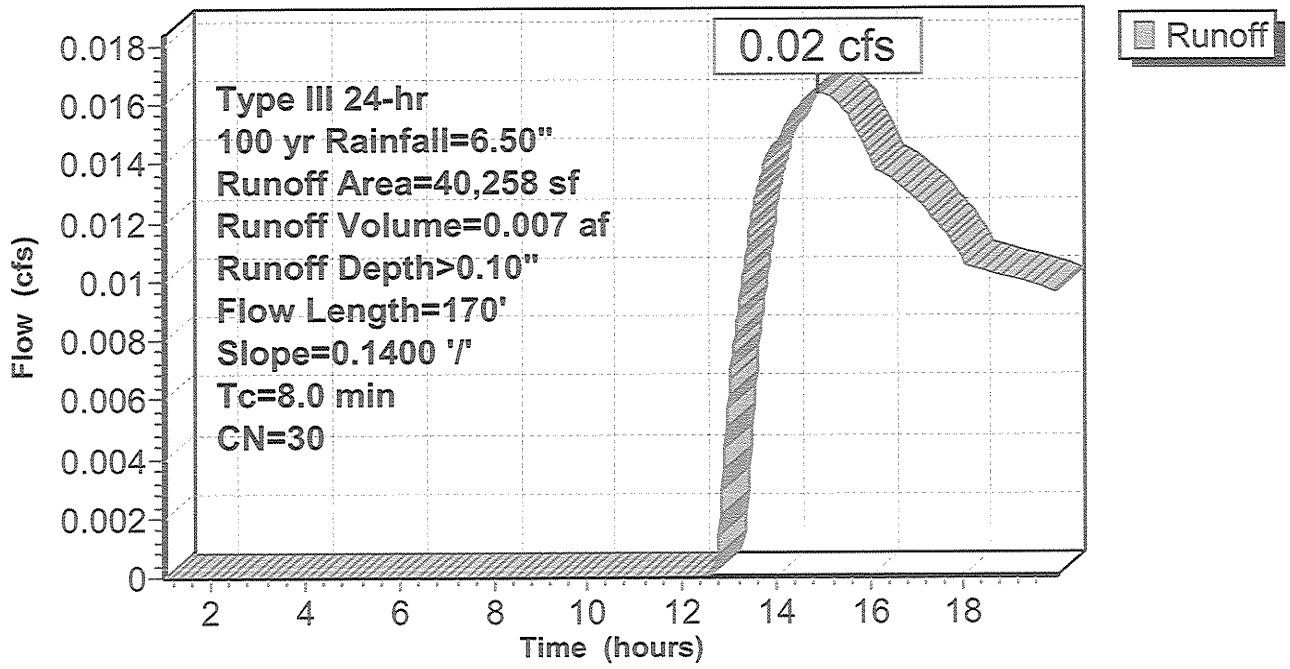
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs
Type III 24-hr 100 yr Rainfall=6.50"

Area (sf)	CN	Description
40,258	30	Woods, Good, HSG A
40,258		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	170	0.1400	0.35		**Lag/CN Method,**

Subcatchment EX2: South

Hydrograph



Summary for Subcatchment PR1A: Near Street

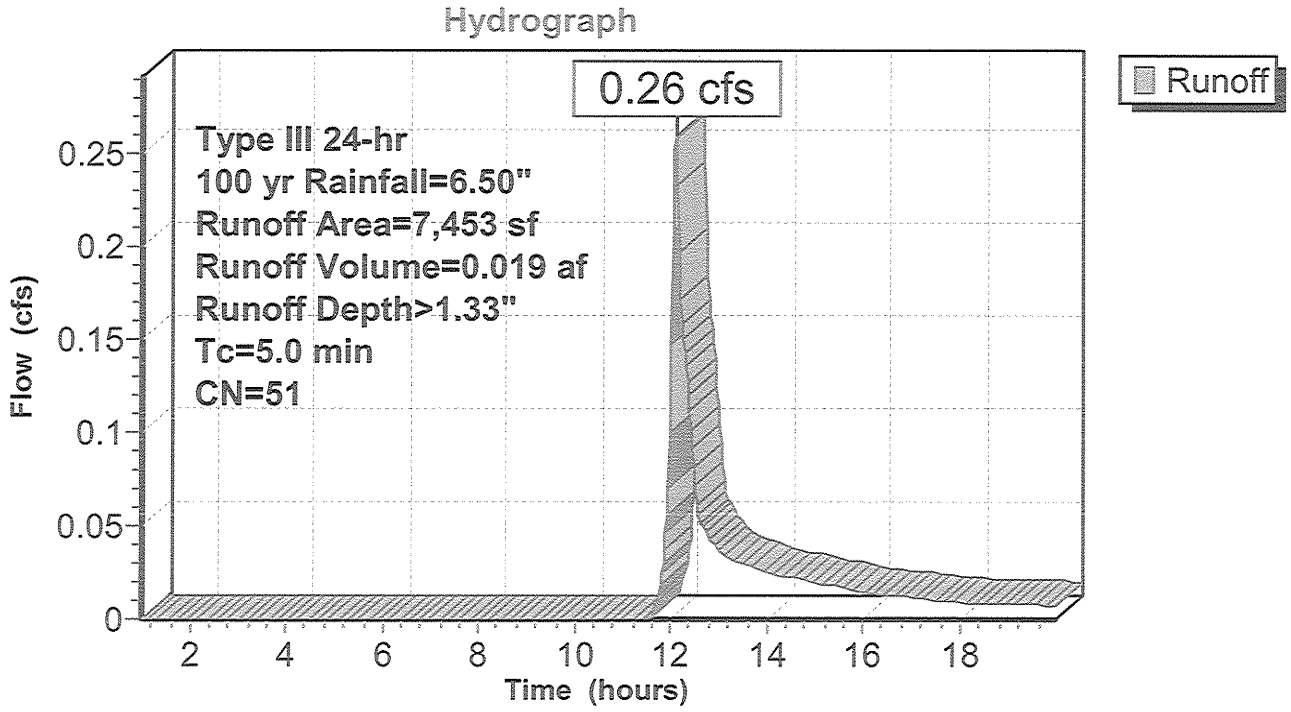
Runoff = 0.26 cfs @ 12.09 hrs, Volume= 0.019 af, Depth> 1.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs
Type III 24-hr 100 yr Rainfall=6.50"

	Area (sf)	CN	Description
*	1,490	98	Paved Driveway Entrances
	5,963	39	>75% Grass cover, Good, HSG A
	7,453	51	Weighted Average
	5,963		80.01% Pervious Area
	1,490		19.99% Impervious Area

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

Subcatchment PR1A: Near Street



Summary for Subcatchment PR2A: Building, Paving & Basin

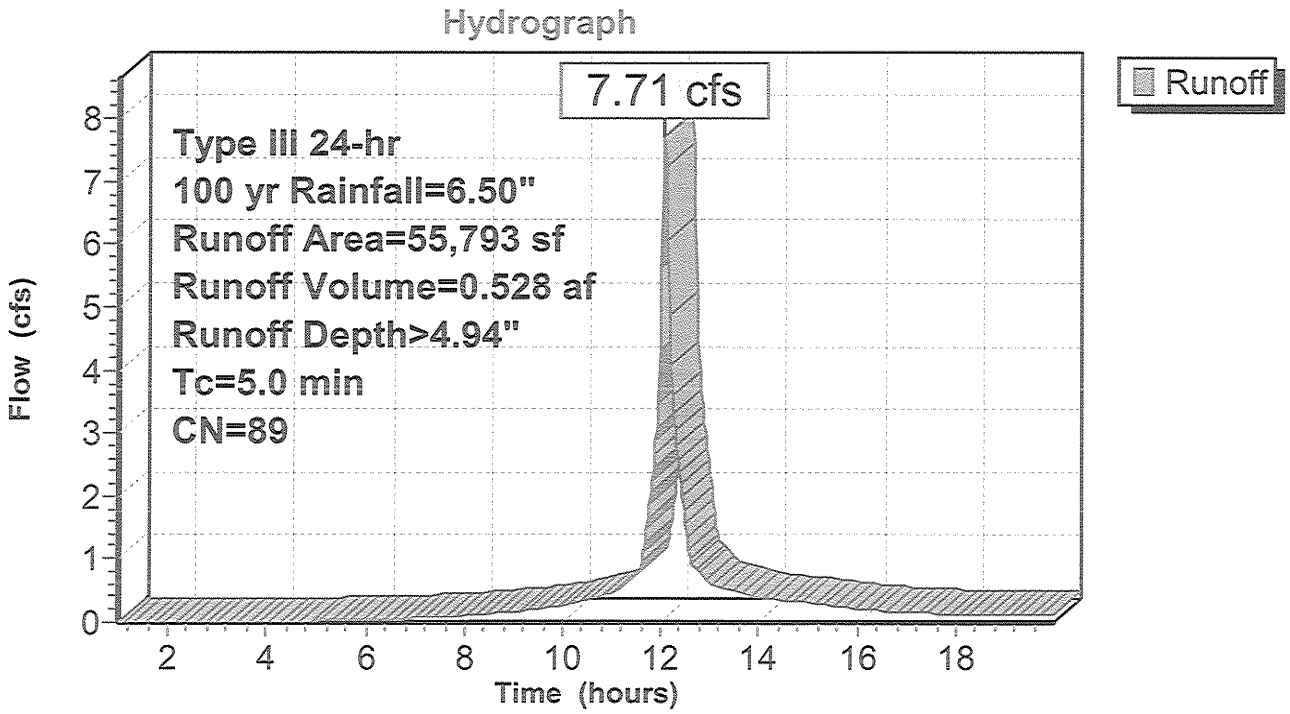
Runoff = 7.71 cfs @ 12.07 hrs, Volume= 0.528 af, Depth> 4.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs
Type III 24-hr 100 yr Rainfall=6.50"

	Area (sf)	CN	Description
*	14,441	98	paving
*	7,098	98	basin
	8,501	39	>75% Grass cover, Good, HSG A
*	7,400	98	roof
*	7,030	98	future roof
*	11,323	98	future paving
	55,793	89	Weighted Average
	8,501		15.24% Pervious Area
	47,292		84.76% Impervious Area

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

Subcatchment PR2A: Building, Paving & Basin



Summary for Subcatchment PR2B: Area South of Basin

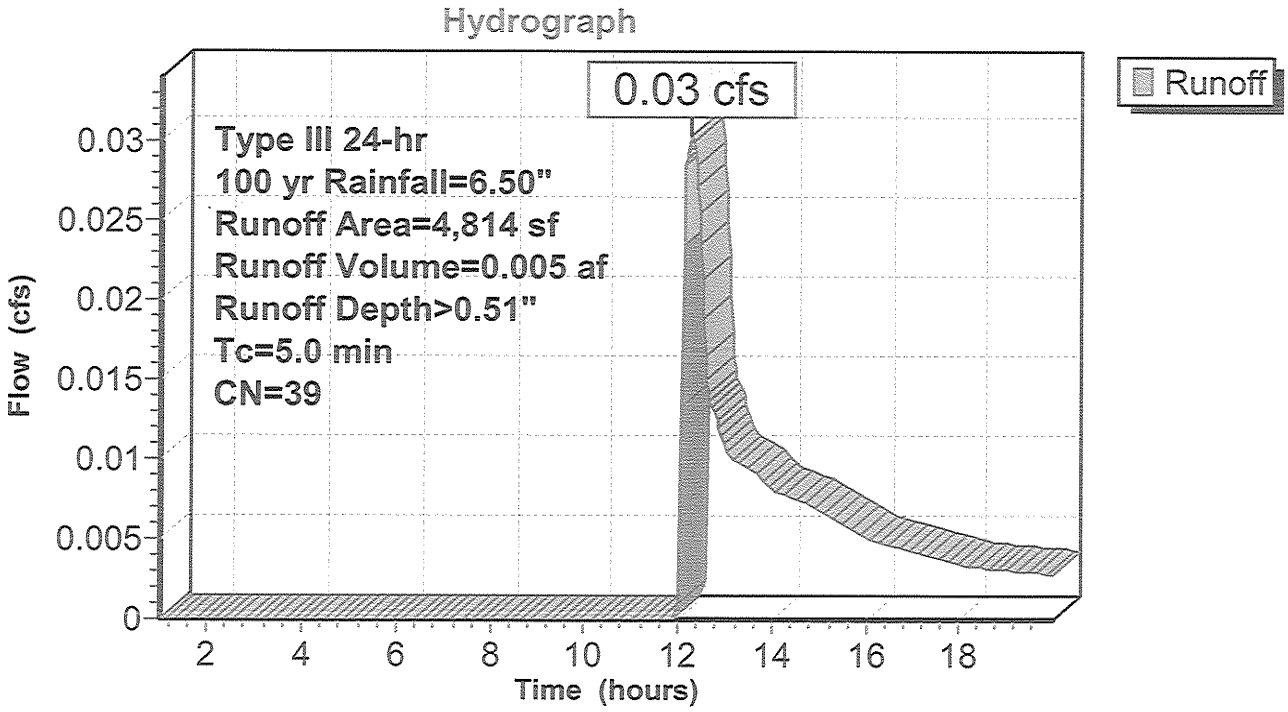
Runoff = 0.03 cfs @ 12.28 hrs, Volume= 0.005 af, Depth> 0.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs
Type III 24-hr 100 yr Rainfall=6.50"

Area (sf)	CN	Description
4,814	39	>75% Grass cover, Good, HSG A
4,814		100.00% Pervious Area

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

Subcatchment PR2B: Area South of Basin



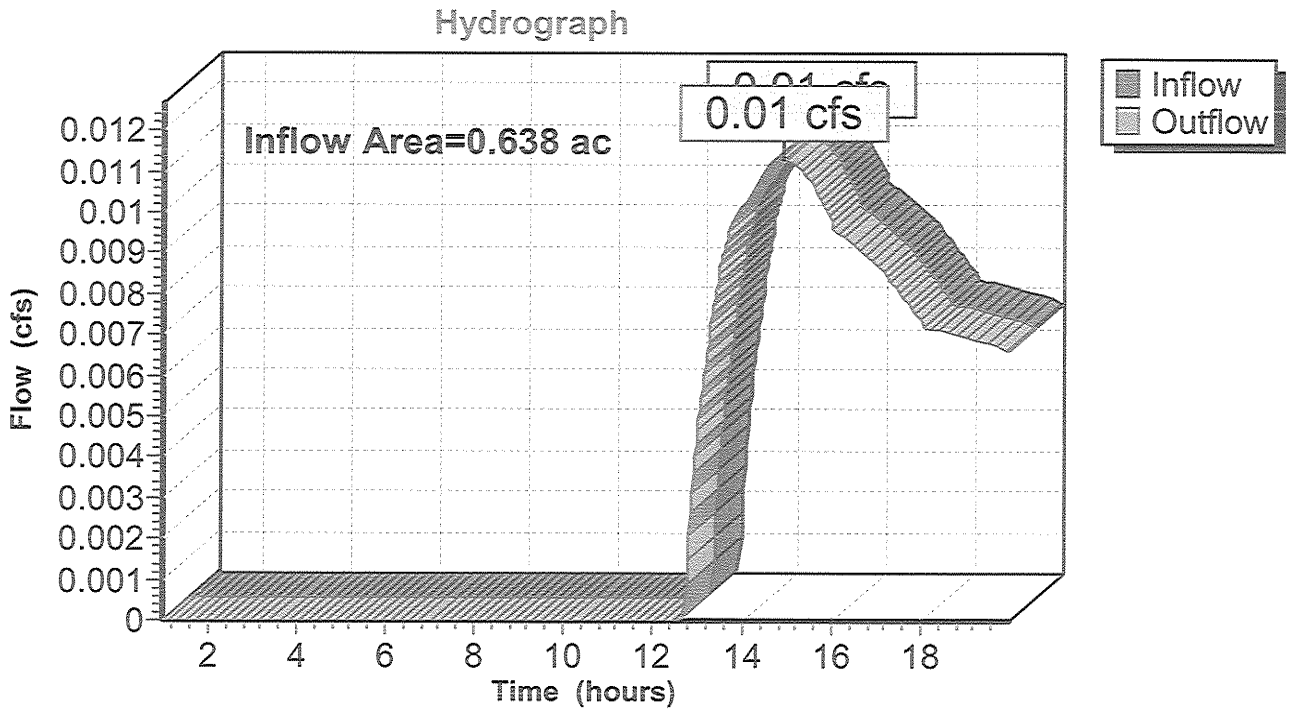
Summary for Reach 1000ex: Ex. Flow Summation New Ludlow Rd

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.638 ac, 0.00% Impervious, Inflow Depth > 0.10" for 100 yr event
Inflow = 0.01 cfs @ 14.90 hrs, Volume= 0.005 af
Outflow = 0.01 cfs @ 14.90 hrs, Volume= 0.005 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs

Reach 1000ex: Ex. Flow Summation New Ludlow Rd



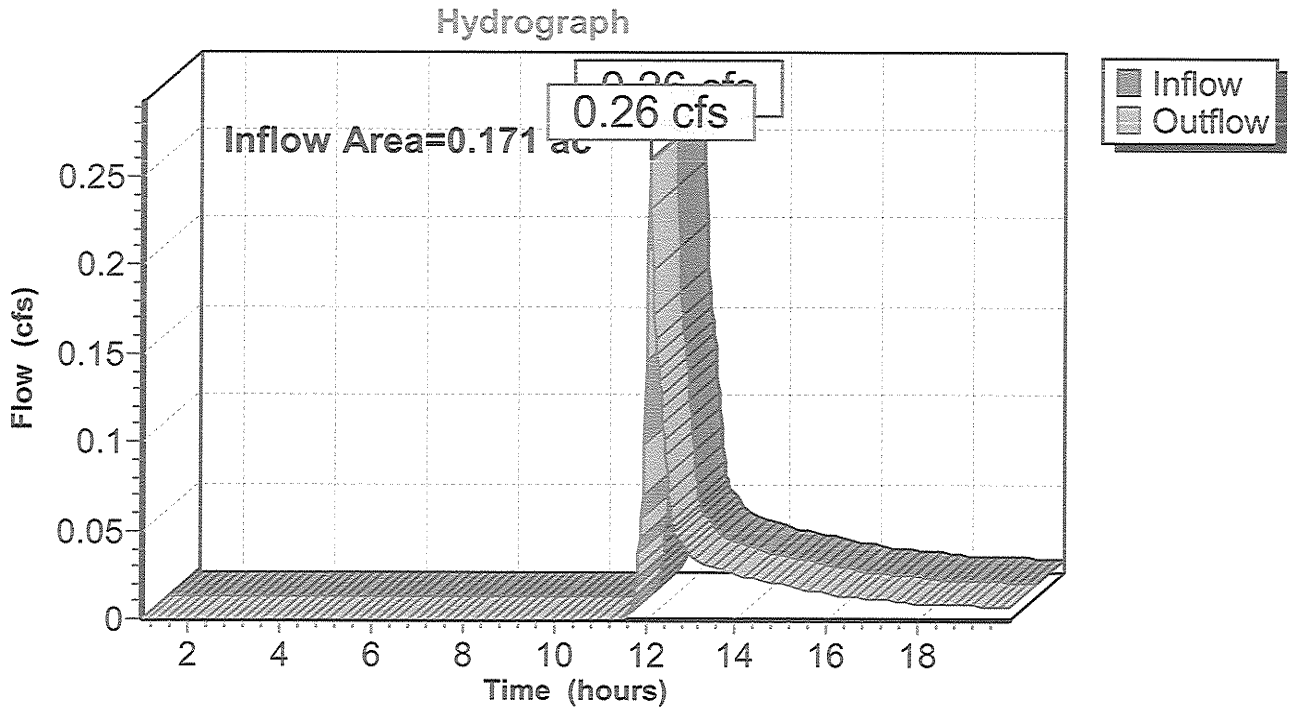
Summary for Reach 1000pr: Pr. Flow Summation New Ludlow Road

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.171 ac, 19.99% Impervious, Inflow Depth > 1.33" for 100 yr event
Inflow = 0.26 cfs @ 12.09 hrs, Volume= 0.019 af
Outflow = 0.26 cfs @ 12.09 hrs, Volume= 0.019 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs

Reach 1000pr: Pr. Flow Summation New Ludlow Road



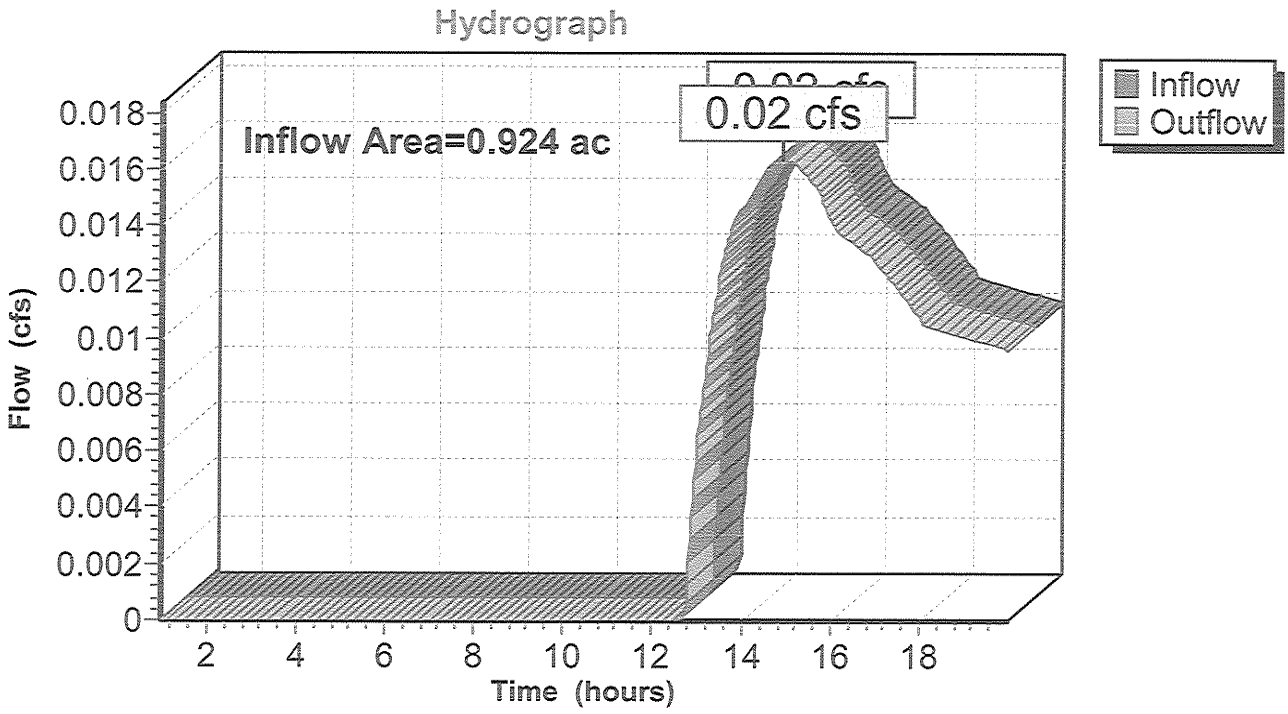
Summary for Reach 2000ex: Ex. Flow Summation Southern Limit of Work

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.924 ac, 0.00% Impervious, Inflow Depth > 0.10" for 100 yr event
Inflow = 0.02 cfs @ 14.94 hrs, Volume= 0.007 af
Outflow = 0.02 cfs @ 14.94 hrs, Volume= 0.007 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs

Reach 2000ex: Ex. Flow Summation Southern Limit of Work



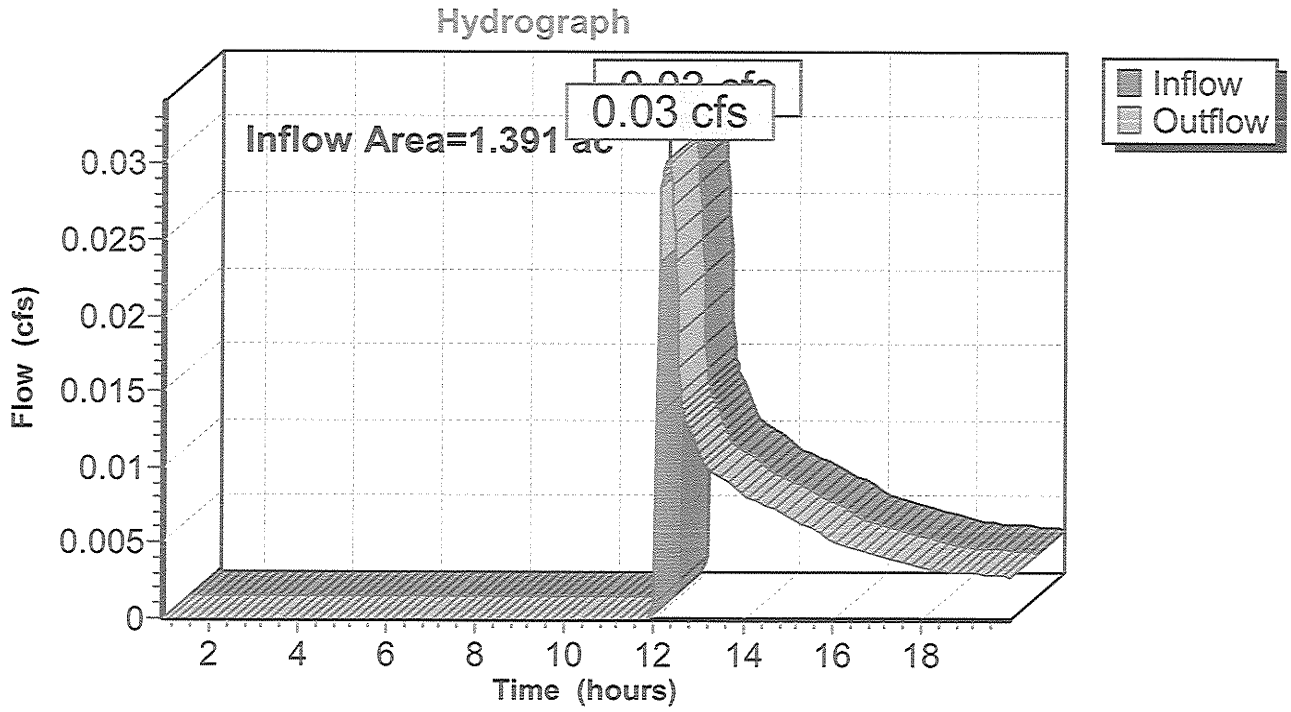
Summary for Reach 2000pr: Pr. Flow Summation Southern Limit of Work

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.391 ac, 78.03% Impervious, Inflow Depth > 0.04" for 100 yr event
Inflow = 0.03 cfs @ 12.28 hrs, Volume= 0.005 af
Outflow = 0.03 cfs @ 12.28 hrs, Volume= 0.005 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs

Reach 2000pr: Pr. Flow Summation Southern Limit of Work



Summary for Pond B: basin

Inflow Area = 1.281 ac, 84.76% Impervious, Inflow Depth > 4.94" for 100 yr event
Inflow = 7.71 cfs @ 12.07 hrs, Volume= 0.528 af
Outflow = 1.64 cfs @ 12.48 hrs, Volume= 0.527 af, Atten= 79%, Lag= 24.3 min
Discarded = 1.64 cfs @ 12.48 hrs, Volume= 0.527 af
Primary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs
Peak Elev= 249.45' @ 12.48 hrs Surf.Area= 5,802 sf Storage= 6,598 cf

Plug-Flow detention time= 29.1 min calculated for 0.527 af (100% of inflow)
Center-of-Mass det. time= 28.9 min (783.8 - 754.9)

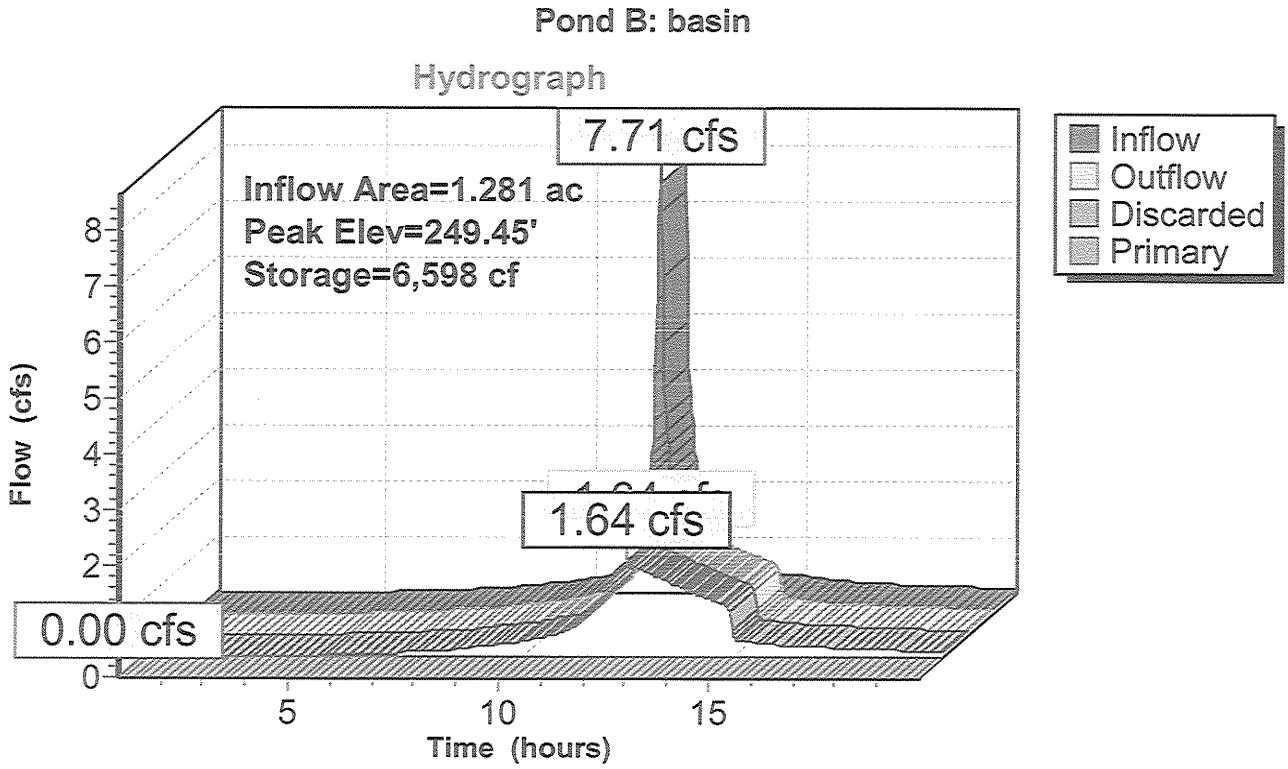
Volume	Invert	Avail.Storage	Storage Description
#1	248.00'	13,903 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
248.00	3,151	0	0
249.00	4,760	3,956	3,956
250.00	7,098	5,929	9,885
250.50	8,975	4,018	13,903

Device	Routing	Invert	Outlet Devices
#1	Primary	250.00'	**10.0' long x 4.0' breadth Broad-Crested Rectangular Weir X 2.00** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32
#2	Discarded	248.00'	**12.240 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.64 cfs @ 12.48 hrs HW=249.45' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 1.64 cfs)

Primary OutFlow Max=0.00 cfs @ 1.00 hrs HW=248.00' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)


Pond B: basin
Hydrograph
7.71 cfs
Inflow Area=1.281 ac
Peak Elev=249.45'
Storage=6,598 cf
1.64 cfs
0.00 cfs
Inflow
Outflow
Discarded
Primary
Flow (cfs)
0
2
3
4
5
6
7
8
5
10
15
Time (hours)

ASSOCIATED BUILDERS, INC.
4 Industrial Drive, South Hadley, MA 01075

Dwight J. Pearl - Proposed Warehouse
New Ludlow Road, South Hadley, MA
September 29, 2006

Stormwater Management Calculations

Water Quality Volume

Runoff Volume (in) Non-Critical Area	Total Impervious (sf)	Water Quality Volume (cf) (Runoff x Impervious/12)
0.5	27,080	1,128

Sediment Forebay Sizing

Forebay Location	Tributary Area (sf)	Sediment Over Tributary Area (inches)	Required Forebay Volume (cf)
Northwest Parking	6,737	0.1	56
West	2,669	0.1	22
South	9,529	0.1	79

TSS Removal Calculation Worksheet - Paved Areas (Except Loading Dock)

BMP	TSS Removal Rate	Starting TSS Load	Amount Removed	Remaining Load
Sweeping	10%	100%	10%	90%
Sediment Forebay	25%	90%	23%	68%
Detention Basin	70%	68%	47%	20%
SITE TSS Removal Rate		80%		

LETTER OF TRANSMITTAL

ASSOCIATED BUILDERS, INC.
4 INDUSTRIAL DRIVE
SOUTH HADLEY, MA 01075

TO: S. Hadley Planning Department	DATE: 12.07.07	JOB # 6921
Town Hall Room 205	ATTN: Richard L. Harris	
116 Main Street	RE: C & D Realty Trust – PB Review	
South Hadley, MA 01075	785 New Ludlow Road	
	South Hadley, MA	

WE ARE SENDING YOU

☑ ATTACHED ☐ UNDER SEPARATE COVER VIA

☐ SHOP DRAWINGS ☑ PRINTS ☐ PLANS ☐ SAMPLES

☐ CHANGE ORDER ☑ OTHER

COPIES	DATE	NO.	DESCRIPTION
3	12-7-07		Site Plan Modification Review Letter
3	12-7-07		Modified Construction Plans - 785 New Ludlow Road
3	12-7-07		Amended Stormwater Management Report & Drainage Calculations

☑ FOR YOUR USE ☑ AS REQUESTED ☐ FOR REVIEW AND COMMENT

☐ REVISE AND RESUBMIT

REMARKS

Please let us know if you have any comments.

Signed: Keith B. Laporte

IF ENCLOSURES ARE NOT AS NOTED, KINDLY NOTIFY US AT ONCE.

Phone 413.536.0021 Fax 413.536.0908

AB COPY

ASSOCIATED BUILDERS, INC.
4 INDUSTRIAL DRIVE • SOUTH HADLEY, MA 01075 • (413) 536-0021 FAX (413) 536-0908

December 7, 2007

Richard L. Harris, Planning Director
Town of South Hadley Planning Board
Town Hall Room 205
116 Main Street
South Hadley, MA 01075

RE: Site Plan Review – Plan Modifications
Dwight J. Pearl - Proposed 7,400 sf Warehouse Facility
785 New Ludlow Road, South Hadley, MA 01075

Dear Mr. Harris:

Associated Builders, Inc. previously assisted Dwight Pearl in obtaining site plan approval for the above referenced project. At this time, the majority of construction is complete. Therefore, the Applicant has requested a Certificate of Occupancy from the Building Inspector. Due to the fact that plan changes were made during construction, the Building Inspector is requiring that updated site plans be reviewed and approved by the Planning Board. As per his request, we have enclosed updated plans, per the attached plan list, illustrating the modifications made during construction.

The following is a summary of the changes made during construction:

- The Applicant decided that the future addition will not be constructed in the near future and consequently modified the plan to include 24' wide gravel drive around the northeast side of the facility onto New Ludlow Road. Please note that this entrance has been approved by the DPW.
- The eastern stormwater detention basin has not been constructed. The basins were previously designed to accommodate the future addition and associated additional paving. Given the fact that the future addition is not planned in the near future, the two detention basins will adequately control peak flow rates. Revised drainage calculations have been enclosed herewith.
- The limits of paving were altered as shown on the plan. The paved area in front of the building was placed directly adjacent to the building in lieu of providing a grass strip between the building and the paving. This reduced the limit of work, allowing vegetation along the street frontage to remain. Gravel was provided in lieu of paving along the back

side of the facility with the exception of a 9' strip of bituminous concrete paving and curbing along the southern edge. This was provided to prevent raveling of the pavement and to help collect and direct stormwater.

- The remaining two stormwater basins were constructed in general accordance with the original plans regarding the overall size, depths, emergency spillways, and the sediment forebay (for the southern basin). Stone swales were provided in lieu of the sediment forebays in the western basin.

Please contact me after you have had a chance to review these documents so we can discuss the proper course of action.

Sincerely,

Kimberly Masiuk

Associated Builders, Inc.
Kimberly M. Masiuk, P.E.

cc: Dwight J. Pearl (1)
C&D Realty Trust (1)
AB Project File (1)

PLAN LIST

SHEET #	TITLE	DWG DATE	REV DATE
SITE SURVEY (HERITAGE SURVEYS, INC.)			
5844PE01	TOPOGRAPHIC PLAN	07.10.06	
5844PE01	ANR - PLAN	09.22.06	
SITE PLANS (ASSOCIATED BUILDERS, INC.)			
L1.1	DEMOLITION PLAN	12.13.06	12.07.07
L2.1	LAYOUT & MATERIALS PLAN	12.13.06	12.07.07
L3.1	GRADING, UTILITIES & EROSION CONTROL PLAN	12.13.06	12.07.07
L4.1	SITE DETAILS (1)	12.13.06	12.07.07
L4.2	SITE DETAILS (2)	12.13.06	12.07.07
ARCHITECTURAL PLANS (ASSOCIATED BUILDERS, INC.)			
A1.0	BUILDING CODE REVIEW & EGRESS PLAN	12.13.06	
A2.1	FLOOR PLAN	12.13.06	
A3.1	EXTERIOR ELEVATIONS	12.13.06	
A4.1	BUILDING SECTIONS	12.13.06	
A6.1	WALL SECTIONS	12.13.06	
FOUNDATION PLANS (ASSOCIATED BUILDERS, INC.)			
S1.1	FOUNDATION PLAN	12.13.06	
S1.2	FOUNDATION SCHEDULES & DETAILS	12.13.06	
S3.1	ANCHOR BOLT & PIER DETAILS	12.13.06	

ASSOCIATED BUILDERS, INC.
4 INDUSTRIAL DRIVE, SOUTH HADLEY, MA 01075
PHONE (413) 536-0021 FAX (413) 536-0908
EMAIL: abuilders@abuilders.com

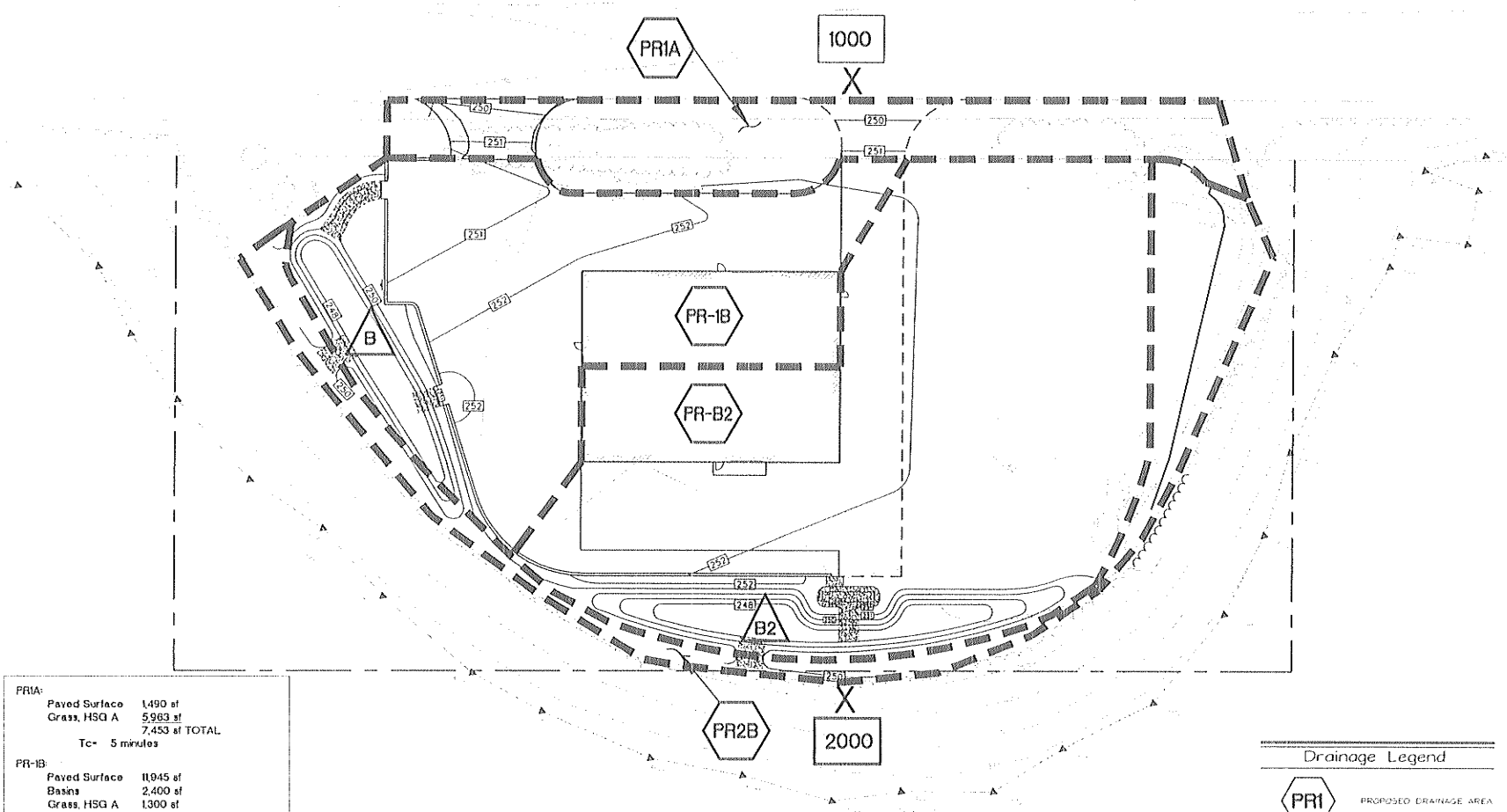
PROJ. #6921 - ISSUED FOR CONSTRUCTION - REV 1-12.07.07

This is an amendment to the previously filed and approved Stormwater Management Report dated September 29, 2006. The purpose of this amendment is to update the drainage calculations based on changes made during construction.

In general, the original design accounted for a future building addition and associated paving. The Applicant decided that the future addition will not be constructed in the near future and modified the plan accordingly. Due to the decrease in proposed impervious surfaces, it was possible to eliminate the eastern stormwater management basin and still attenuate peak flow rates. The revised calculations are enclosed herewith and the anticipated stormwater runoff for the 2, 10 and 100-year storm frequencies are as follows:

Design Point	STORM FREQUENCY					
	2 Year		10 Year		100 Year	
	Existing	Proposed	Existing	Proposed	Existing	Proposed
1000 New Ludlow Rd.	0.0	0.0	0.0	0.1	0.0	0.3
2000 Southern Limit of Work	0.0	0.0	0.0	0.0	0.0	0.0
Detention Basin B Peak Elevation	-	248.1	-	248.1	-	248.3
Detention Basin B2 Peak Elevation	-	248.0	-	248.4	-	249.2
Note: Peak flow rates are expressed in **cf/sec** and elevations are expressed in **feet.**						

In comparison to the previous Stormwater Management Report dated September 29, 2006, there has been no change with the exception of the peak elevation in the basins which has been reduced from 249.5' to 249.2'.



PR1A:
- Paved Surface 1,490 sf
- Grass, HSG A 5,963 sf
- 7,453 sf TOTAL
- Tc= 5 minutes

PR-1B:
- Paved Surface 11,945 sf
- Basins 2,400 sf
- Grass, HSG A 1,300 sf
- Roof 3,700 sf
- 19,345 sf TOTAL
- Tc= 5 minutes

PR-B2:
- Paved Surface 8,485 sf
- Basins 2,765 sf
- Grass, HSG A 19,900 sf
- Roof 3,700 sf
- 55,793 sf TOTAL
- Tc= 5 minutes

PR2B:
- Grass, HSG A 4,814 sf
- 4,814 sf TOTAL
- Tc= 5 minutes

Drainage Legend

- PR1 — PROPOSED DRAINAGE AREA
- B — DETENTION BASIN
- 1000 — DESIGN POINT
- DRAINAGE AREA BOUNDARY

REVISIONS

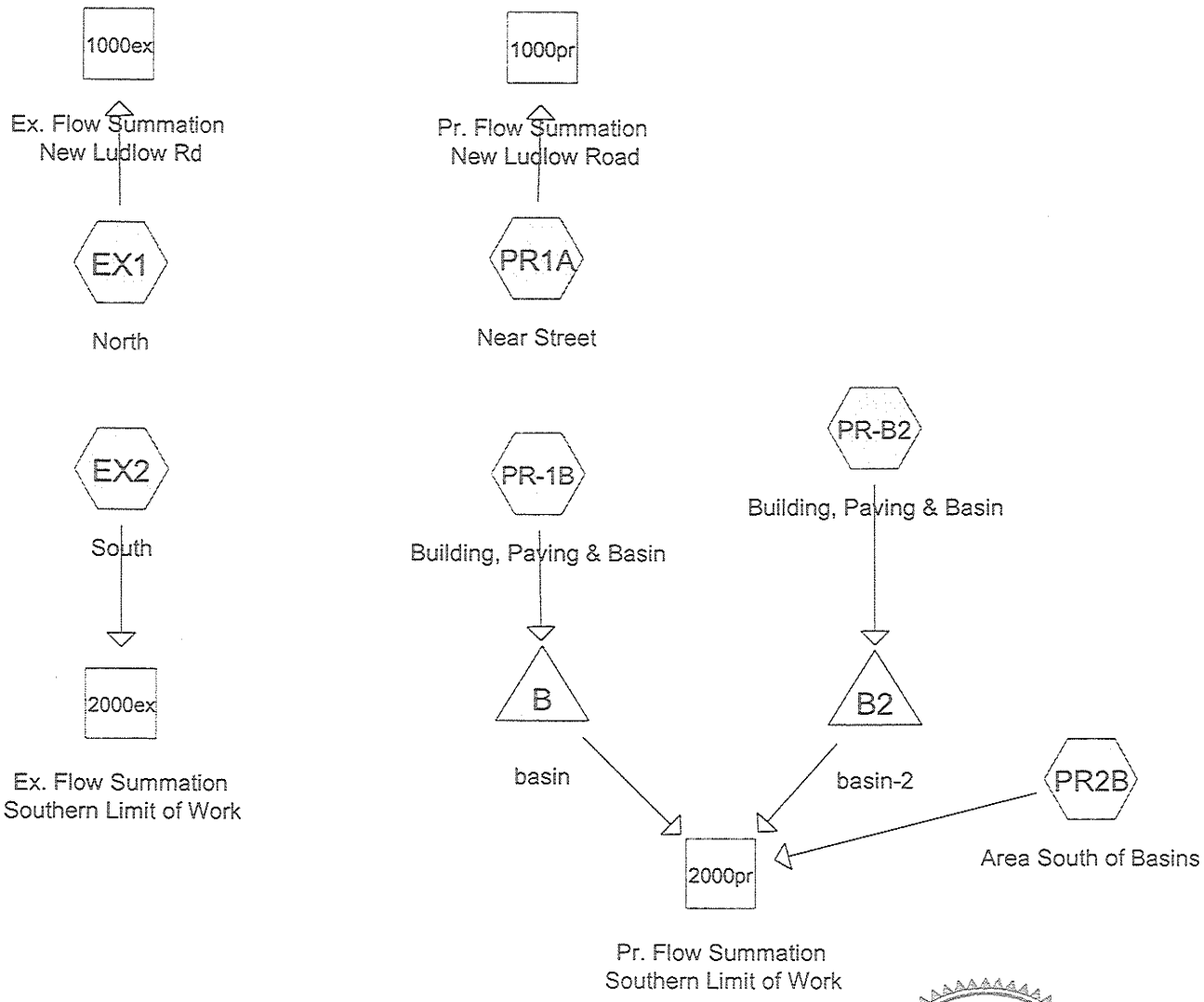
MARK	DATE	DRAWN	DESCRIPTION

ASSOCIATED BUILDERS, INC.
4 INDUSTRIAL DRIVE, SOUTH HADLEY, MA 01075
PHONE (413) 536-0021 FAX (413) 536-0908

PROPOSED CONDITIONS DRAINAGE MAP

Dwight Pearl
Proposed New Facility
785 New Ludlow Road, South Hadley, MA

DRAWN BY: KF
ISSUED FOR: CONSTRUCTION
DATE: 12.13.
SCALE: NO
JOB & SHEET#: 6921 DM



COMMONWEALTH OF MASSACHUSETTS
KIMBERLY
CIVIL
REGISTERED
PROFESSIONAL ENGINEER

12/7/09

Subcat Reach Pond Link

Drainage Diagram for CHECKS FOR 2 BASINS - 6921 Dwight Pearl
Prepared by {enter your company name here} 12/6/2007

Time span=1.00-20.00 hrs, dt=0.03 hrs, 634 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EX1: North Runoff Area=27,802 sf Runoff Depth=0.00"
Flow Length=100' Tc=5.6 min CN=30 Runoff=0.00 cfs 0.000 af

Subcatchment EX2: South Runoff Area=40,258 sf Runoff Depth=0.00"
Flow Length=170' Tc=8.0 min CN=30 Runoff=0.00 cfs 0.000 af

Subcatchment PR-1B: Building, Paving & Basin Runoff Area=19,345 sf Runoff Depth=2.22"
Tc=5.0 min CN=94 Runoff=1.21 cfs 0.082 af

Subcatchment PR-B2: Building, Paving & Basin Runoff Area=34,850 sf Runoff Depth=0.41"
Tc=5.0 min CN=64 Runoff=0.32 cfs 0.027 af

Subcatchment PR1A: Near Street Runoff Area=7,453 sf Runoff Depth=0.08"
Tc=5.0 min CN=51 Runoff=0.00 cfs 0.001 af

Subcatchment PR2B: Area South of Basins Runoff Area=4,814 sf Runoff Depth=0.00"
Tc=5.0 min CN=39 Runoff=0.00 cfs 0.000 af

Reach 1000ex: Ex. Flow Summation New Ludlow Rd Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach 1000pr: Pr. Flow Summation New Ludlow Road Inflow=0.00 cfs 0.001 af
Outflow=0.00 cfs 0.001 af

Reach 2000ex: Ex. Flow Summation Southern Limit of Work Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach 2000pr: Pr. Flow Summation Southern Limit of Work Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond B: basin Peak Elev=248.06' Storage=287 cf Inflow=1.21 cfs 0.082 af
Discarded=0.76 cfs 0.082 af Primary=0.00 cfs 0.000 af Outflow=0.76 cfs 0.082 af

Pond B2: basin-2 Peak Elev=248.02' Storage=34 cf Inflow=0.32 cfs 0.027 af
Discarded=0.29 cfs 0.027 af Primary=0.00 cfs 0.000 af Outflow=0.29 cfs 0.027 af

Total Runoff Area = 3.088 ac Runoff Volume = 0.111 af Average Runoff Depth = 0.43"

Subcatchment EX1: North

[45] Hint: Runoff=Zero

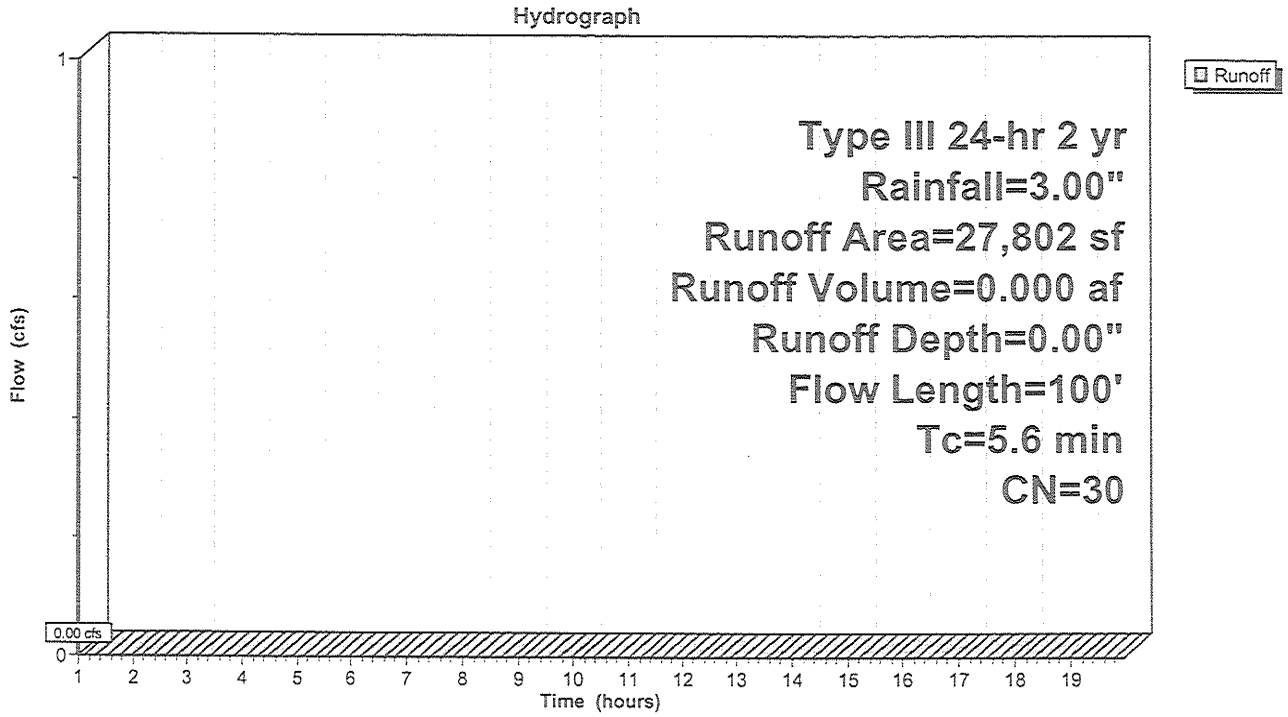
Runoff = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs
Type III 24-hr 2 yr Rainfall=3.00"

Area (sf)	CN	Description
27,802	30	Woods, Good, HSG A

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	100	0.1200	0.3		**Lag/CN Method,**

Subcatchment EX1: North



Subcatchment EX2: South

[45] Hint: Runoff=Zero

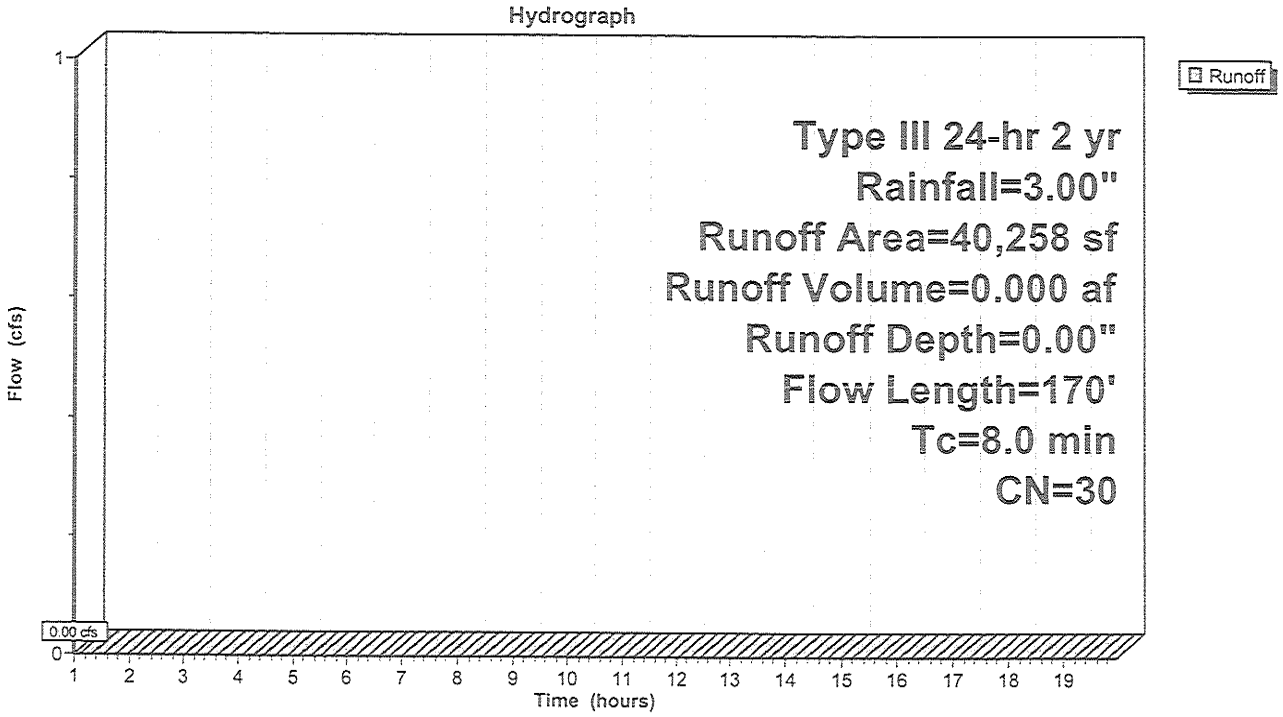
Runoff = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs
Type III 24-hr 2 yr Rainfall=3.00"

Area (sf)	CN	Description
40,258	30	Woods, Good, HSG A

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	170	0.1400	0.4		**Lag/CN Method,**

Subcatchment EX2: South



Subcatchment PR-1B: Building, Paving & Basin

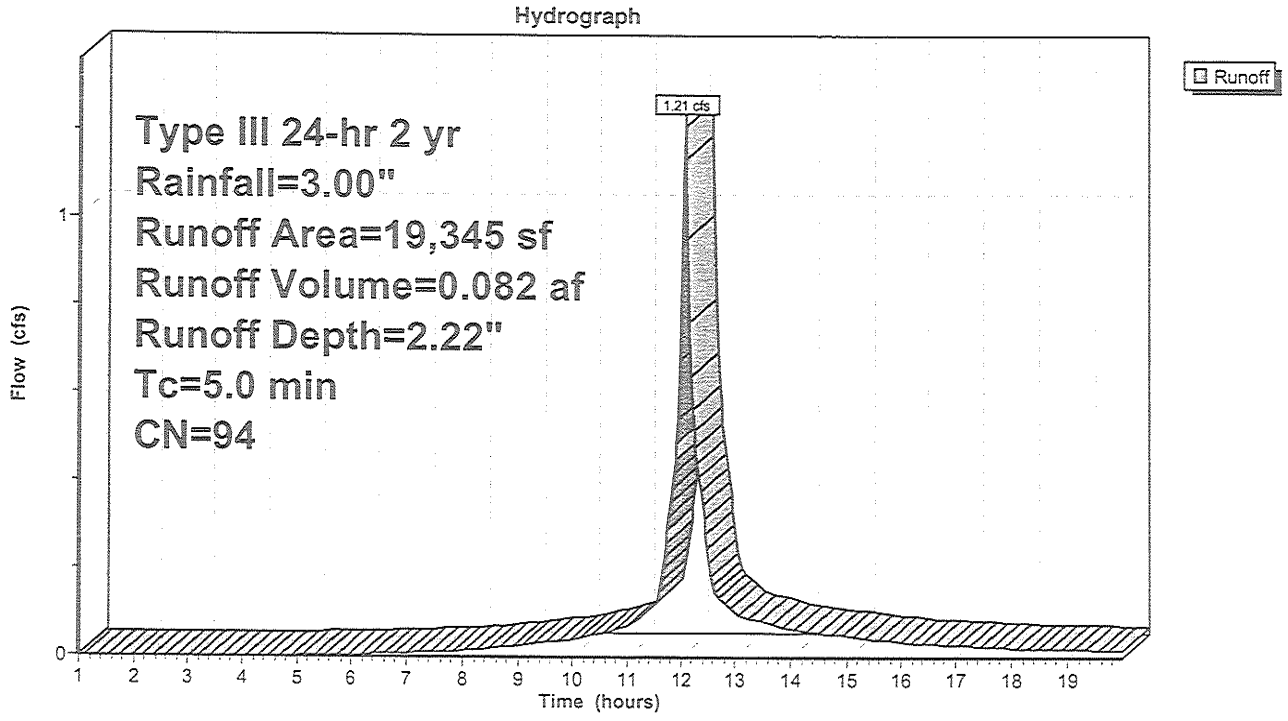
Runoff = 1.21 cfs @ 12.07 hrs, Volume= 0.082 af, Depth= 2.22"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs
Type III 24-hr 2 yr Rainfall=3.00"

Area (sf)	CN	Description
11,945	98	paving
2,400	98	basin
1,300	39	>75% Grass cover, Good, HSG A
3,700	98	roof
19,345	94	Weighted Average

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

Subcatchment PR-1B: Building, Paving & Basin



Subcatchment PR-B2: Building, Paving & Basin

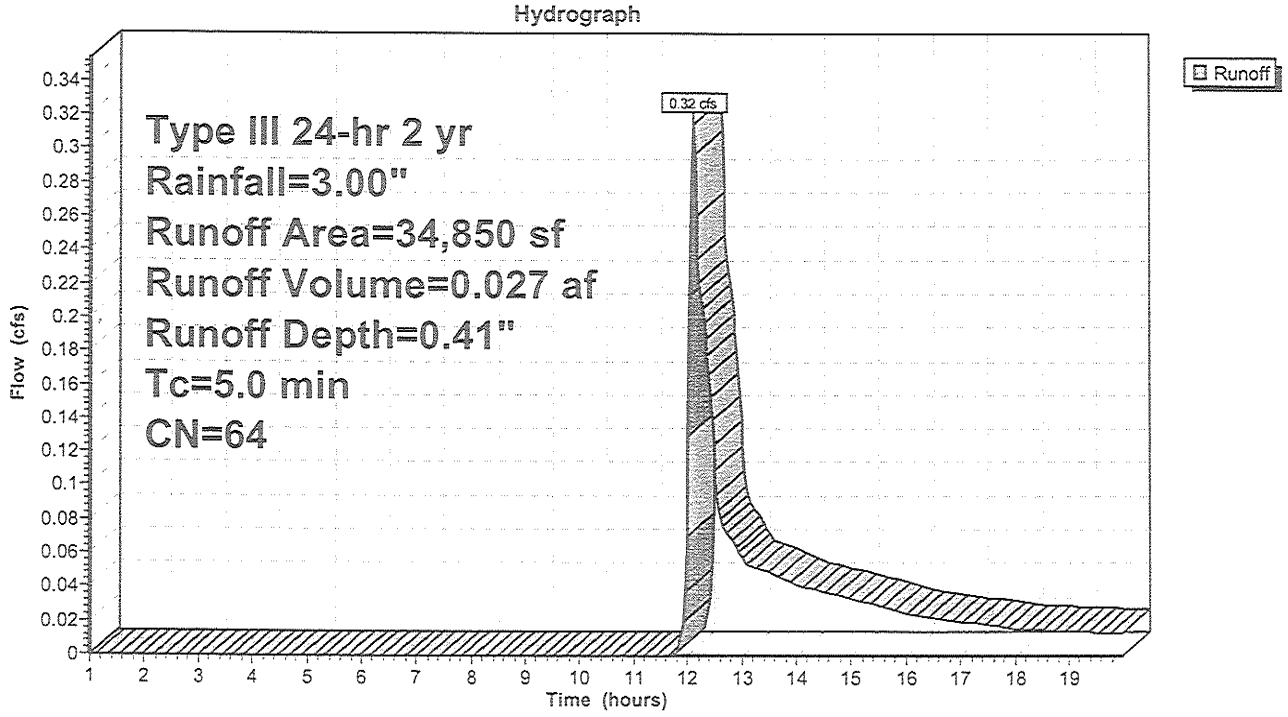
Runoff = 0.32 cfs @ 12.10 hrs, Volume= 0.027 af, Depth= 0.41"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs
Type III 24-hr 2 yr Rainfall=3.00"

Area (sf)	CN	Description
8,485	98	paving
2,765	98	basin
19,900	39	>75% Grass cover, Good, HSG A
3,700	98	roof
34,850	64	Weighted Average

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

Subcatchment PR-B2: Building, Paving & Basin



Subcatchment PR1A: Near Street

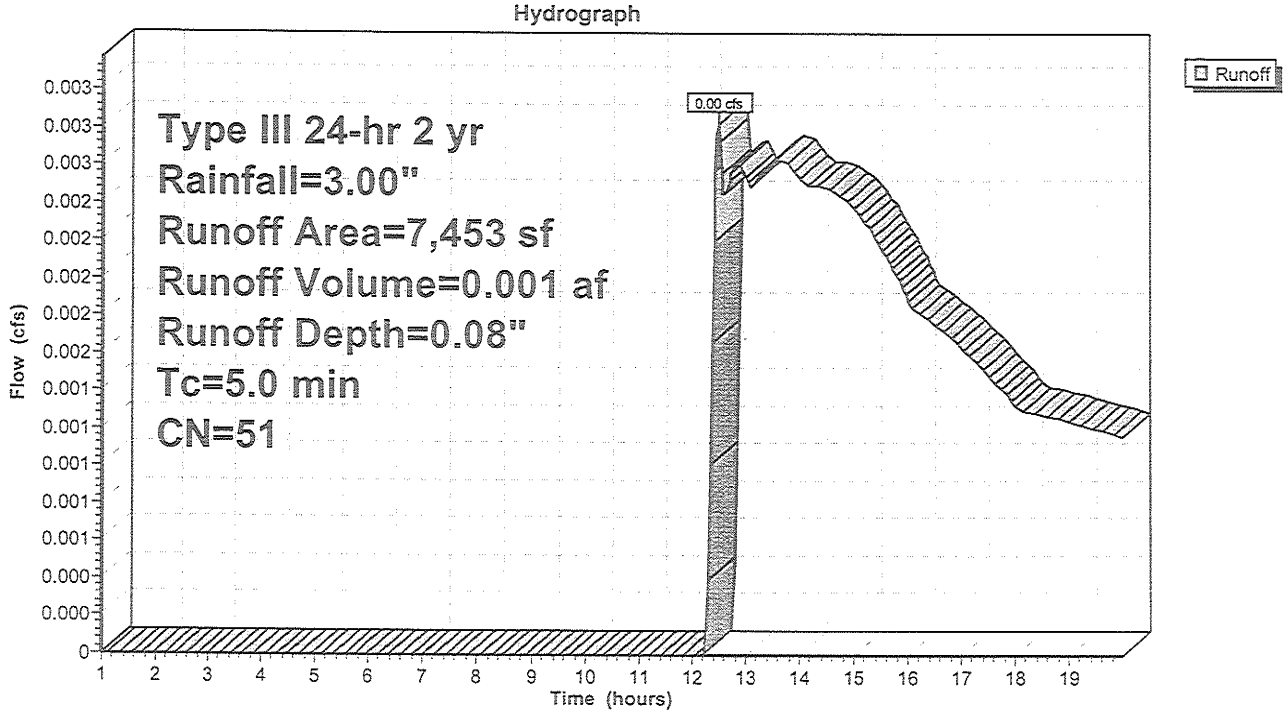
Runoff = 0.00 cfs @ 12.49 hrs, Volume= 0.001 af, Depth= 0.08"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs
Type III 24-hr 2 yr Rainfall=3.00"

Area (sf)	CN	Description
1,490	98	Paved Driveway Entrances
5,963	39	>75% Grass cover, Good, HSG A
7,453	51	Weighted Average

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

Subcatchment PR1A: Near Street



Subcatchment PR2B: Area South of Basins

[45] Hint: Runoff=Zero

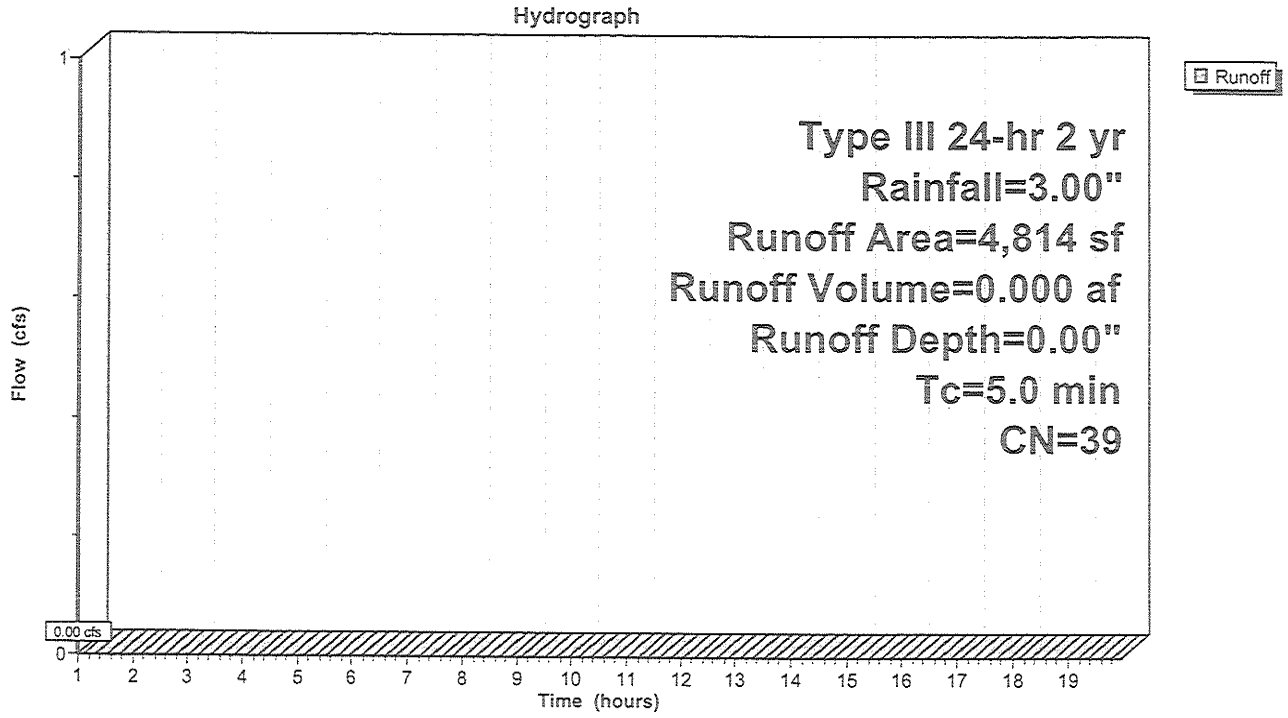
Runoff = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs
Type III 24-hr 2 yr Rainfall=3.00"

Area (sf)	CN	Description
4,814	39	>75% Grass cover, Good, HSG A

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

Subcatchment PR2B: Area South of Basins



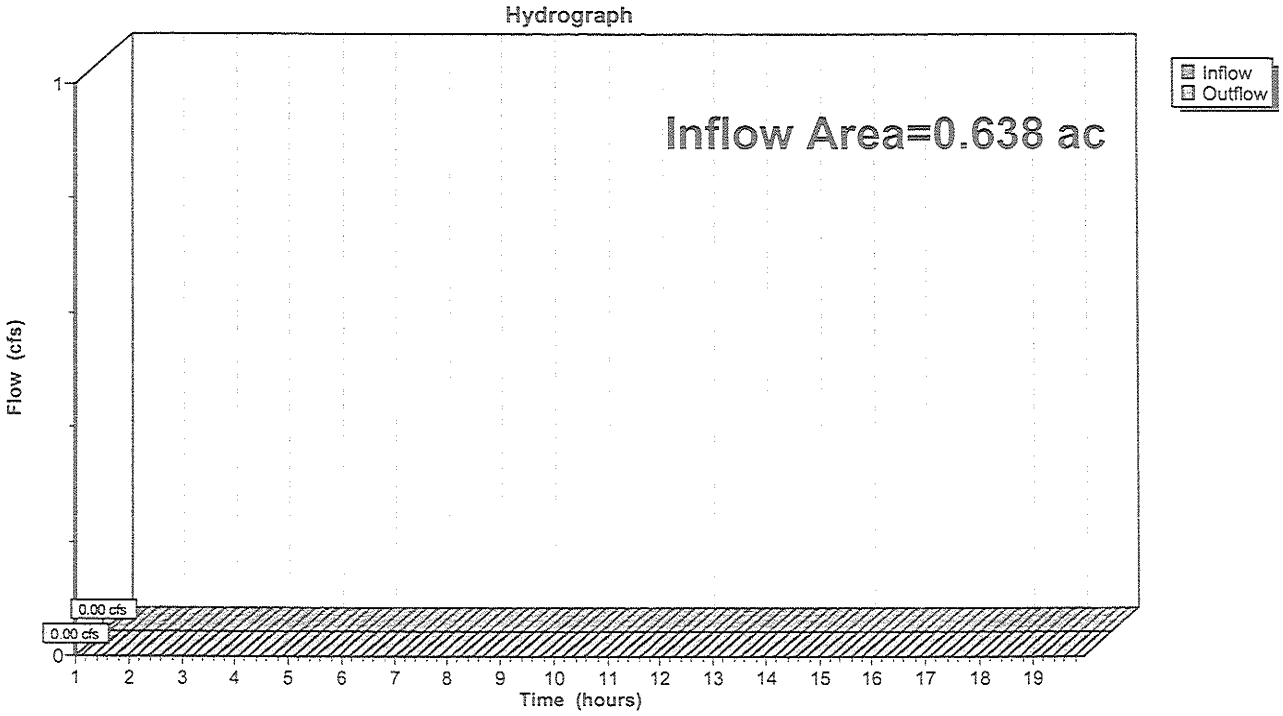
Reach 1000ex: Ex. Flow Summation New Ludlow Rd

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.638 ac, Inflow Depth = 0.00" for 2 yr event
Inflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs

Reach 1000ex: Ex. Flow Summation New Ludlow Rd



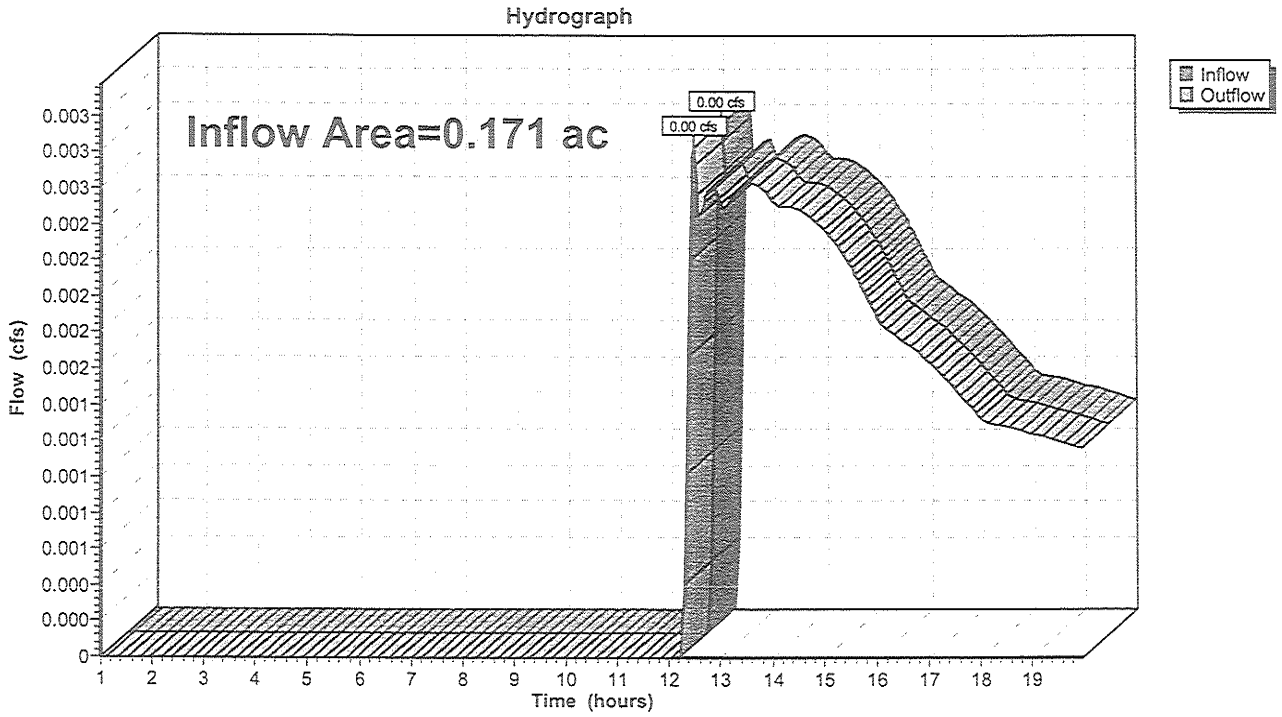
Reach 1000pr: Pr. Flow Summation New Ludlow Road

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.171 ac, Inflow Depth = 0.08" for 2 yr event
Inflow = 0.00 cfs @ 12.49 hrs, Volume= 0.001 af
Outflow = 0.00 cfs @ 12.49 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs

Reach 1000pr: Pr. Flow Summation New Ludlow Road



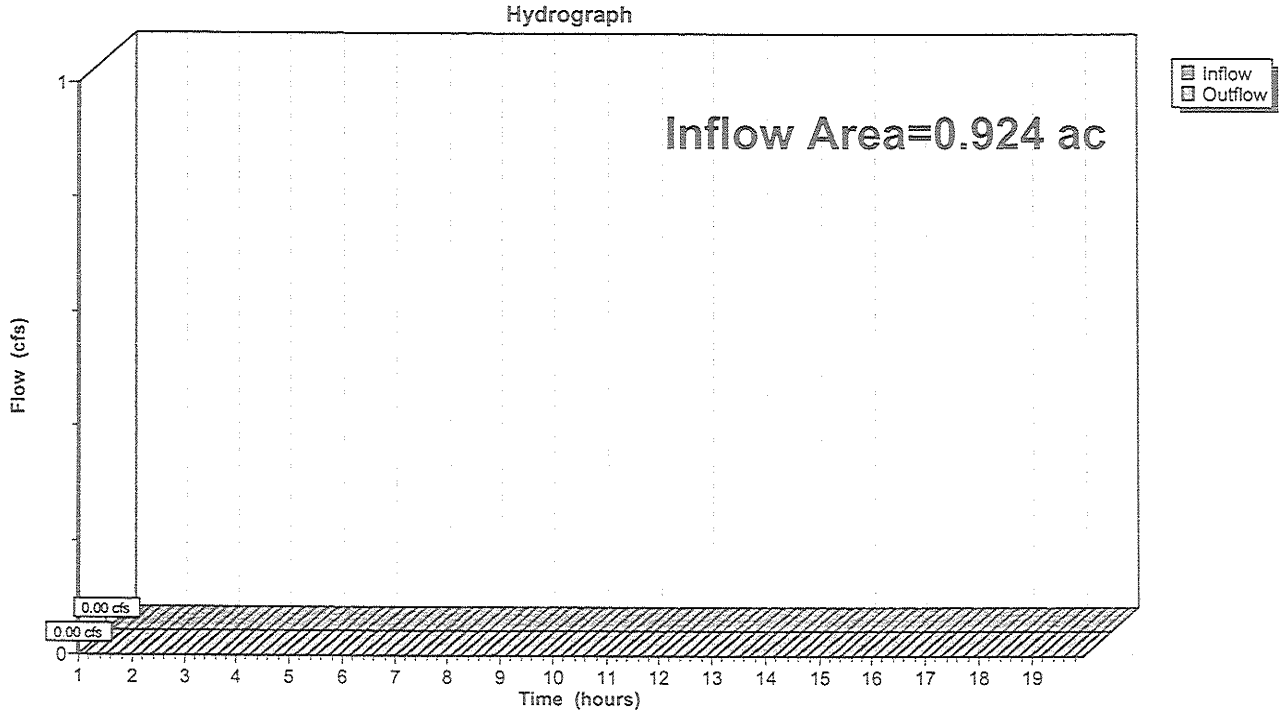
Reach 2000ex: Ex. Flow Summation Southern Limit of Work

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.924 ac, Inflow Depth = 0.00" for 2 yr event
Inflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs

Reach 2000ex: Ex. Flow Summation Southern Limit of Work



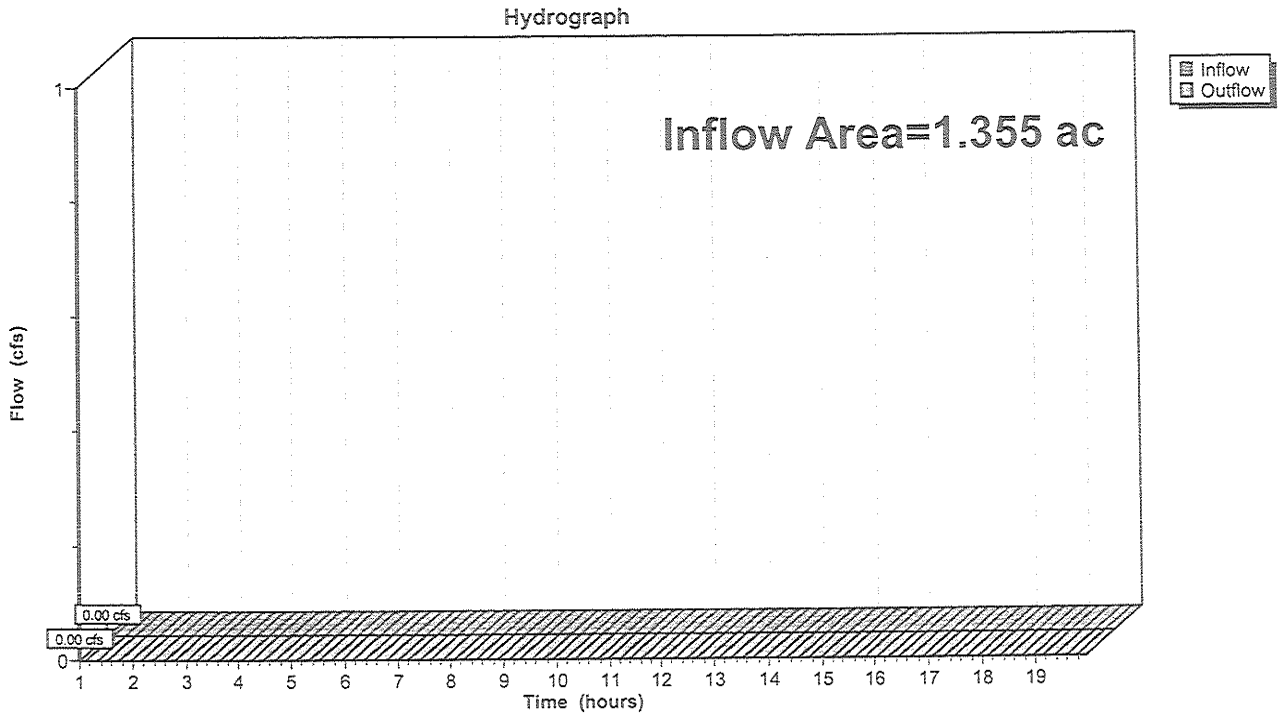
Reach 2000pr: Pr. Flow Summation Southern Limit of Work

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.355 ac, Inflow Depth = 0.00" for 2 yr event
Inflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs

Reach 2000pr: Pr. Flow Summation Southern Limit of Work



Pond B: basin

Inflow Area = 0.444 ac, Inflow Depth = 2.22" for 2 yr event
Inflow = 1.21 cfs @ 12.07 hrs, Volume= 0.082 af
Outflow = 0.76 cfs @ 12.17 hrs, Volume= 0.082 af, Atten= 38%, Lag= 5.6 min
Discarded = 0.76 cfs @ 12.17 hrs, Volume= 0.082 af
Primary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs
Peak Elev= 248.06' @ 12.17 hrs Surf.Area= 2,665 sf Storage= 287 cf
Plug-Flow detention time= 3.5 min calculated for 0.082 af (100% of inflow)
Center-of-Mass det. time= 3.1 min (761.3 - 758.2)

#	Invert	Avail.Storage	Storage Description
1	248.00'	14,081 cf	**Custom Stage Data (Prismatic)** Listed below

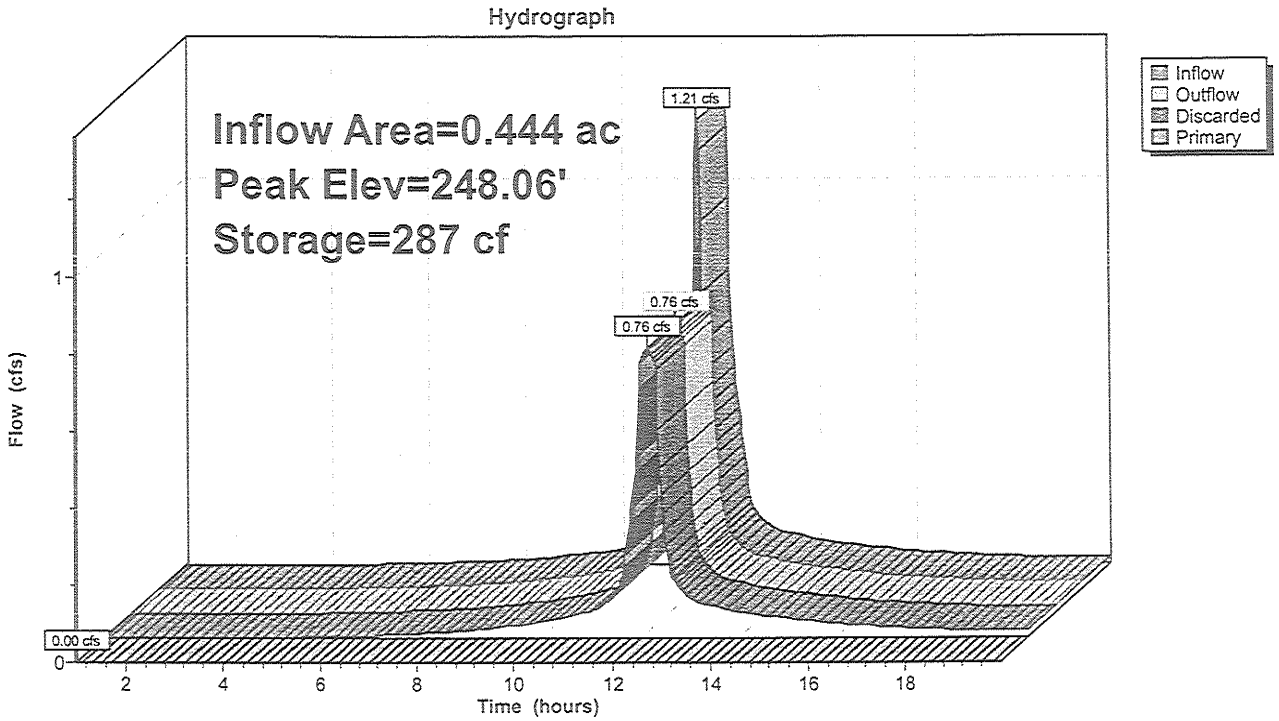
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
248.00	2,365	0	0
249.00	7,550	4,958	4,958
250.00	5,165	6,358	11,315
250.50	5,900	2,766	14,081

#	Routing	Invert	Outlet Devices
1	Primary	250.00'	**10.0' long x 4.0' breadth Broad-Crested Rectangular Weir X 2.00** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32
2	Discarded	0.00'	**0.017000 fpm Exfiltration over entire Surface area**

Discarded OutFlow Max=0.75 cfs @ 12.17 hrs HW=248.06' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.75 cfs)

Primary OutFlow Max=0.00 cfs @ 1.00 hrs HW=248.00' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Pond B: basin


Hydrograph
Inflow Area=0.444 ac
Peak Elev=248.06'
Storage=287 cf
1.21 cfs
0.76 cfs
0.76 cfs
0.00 cfs
Inflow
Outflow
Discarded
Primary
Flow (cfs)
0
1
2
4
6
8
10
12
14
16
18
Time (hours)

Pond B2: basin-2

Inflow Area = 0.800 ac, Inflow Depth = 0.41" for 2 yr event
Inflow = 0.32 cfs @ 12.10 hrs, Volume= 0.027 af
Outflow = 0.29 cfs @ 12.14 hrs, Volume= 0.027 af, Atten= 7%, Lag= 2.0 min
Discarded = 0.29 cfs @ 12.14 hrs, Volume= 0.027 af
Primary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs
Peak Elev= 248.02' @ 12.14 hrs Surf.Area= 1,142 sf Storage= 34 cf
Plug-Flow detention time= 1.9 min calculated for 0.027 af (100% of inflow)
Center-of-Mass det. time= 1.5 min (851.7 - 850.2)

#	Invert	Avail.Storage	Storage Description
1	248.00'	5,293 cf	**Custom Stage Data (Prismatic)** Listed below

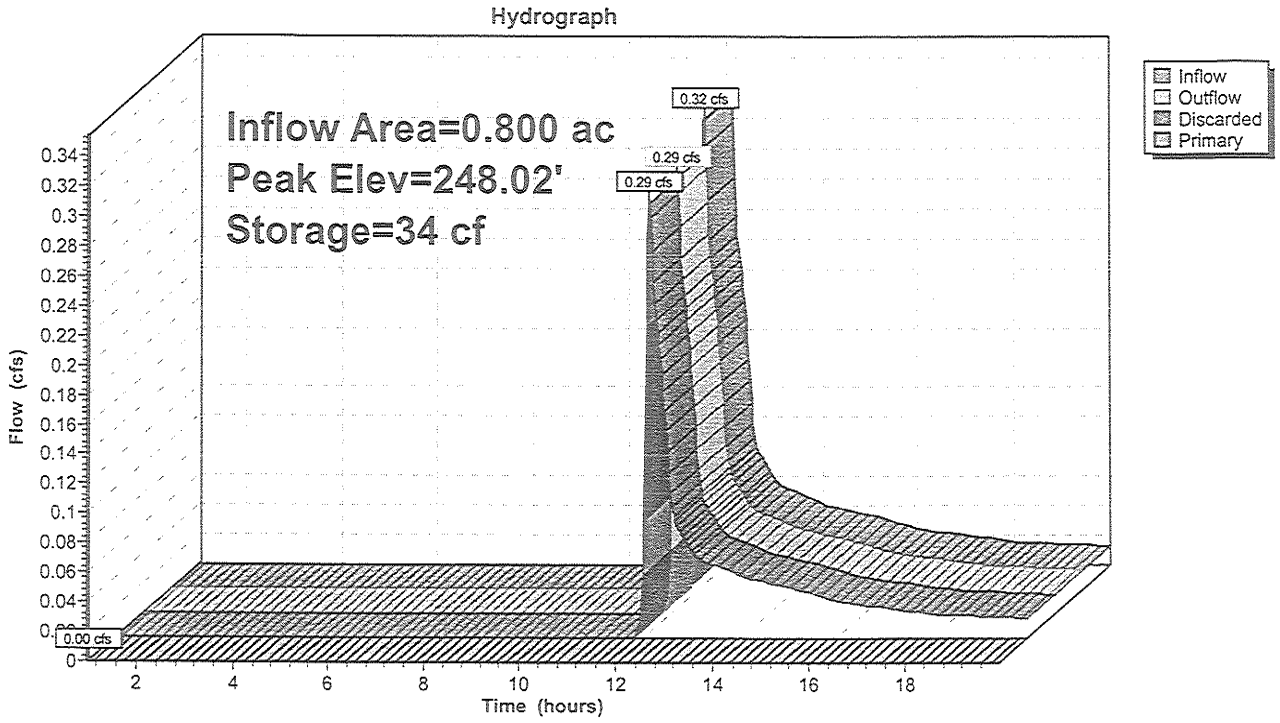
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
248.00	1,125	0	0
249.00	1,857	1,491	1,491
250.00	2,765	2,311	3,802
250.50	3,200	1,491	5,293

#	Routing	Invert	Outlet Devices
1	Primary	250.00'	**10.0' long x 4.0' breadth Broad-Crested Rectangular Weir X 2.00** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32
2	Discarded	0.00'	**0.017000 fpm Exfiltration over entire Surface area**

Discarded OutFlow Max=0.32 cfs @ 12.14 hrs HW=248.02' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.32 cfs)

Primary OutFlow Max=0.00 cfs @ 1.00 hrs HW=248.00' (Free Discharge)
└**1=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Pond B2: basin-2



Time span=1.00-20.00 hrs, dt=0.03 hrs, 634 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EX1: North Runoff Area=27,802 sf Runoff Depth=0.00"
Flow Length=100' Tc=5.6 min CN=30 Runoff=0.00 cfs 0.000 af

Subcatchment EX2: South Runoff Area=40,258 sf Runoff Depth=0.00"
Flow Length=170' Tc=8.0 min CN=30 Runoff=0.00 cfs 0.000 af

Subcatchment PR-1B: Building, Paving & Basin Runoff Area=19,345 sf Runoff Depth=3.62"
Tc=5.0 min CN=94 Runoff=1.92 cfs 0.134 af

Subcatchment PR-B2: Building, Paving & Basin Runoff Area=34,850 sf Runoff Depth=1.15"
Tc=5.0 min CN=64 Runoff=1.12 cfs 0.076 af

Subcatchment PR1A: Near Street Runoff Area=7,453 sf Runoff Depth=0.47"
Tc=5.0 min CN=51 Runoff=0.06 cfs 0.007 af

Subcatchment PR2B: Area South of Basins Runoff Area=4,814 sf Runoff Depth=0.08"
Tc=5.0 min CN=39 Runoff=0.00 cfs 0.001 af

Reach 1000ex: Ex. Flow Summation New Ludlow Rd Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach 1000pr: Pr. Flow Summation New Ludlow Road Inflow=0.06 cfs 0.007 af
Outflow=0.06 cfs 0.007 af

Reach 2000ex: Ex. Flow Summation Southern Limit of Work Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach 2000pr: Pr. Flow Summation Southern Limit of Work Inflow=0.00 cfs 0.001 af
Outflow=0.00 cfs 0.001 af

Pond B: basin Peak Elev=248.14' Storage=707 cf Inflow=1.92 cfs 0.134 af
Discarded=0.88 cfs 0.134 af Primary=0.00 cfs 0.000 af Outflow=0.88 cfs 0.134 af

Pond B2: basin-2 Peak Elev=248.39' Storage=576 cf Inflow=1.12 cfs 0.076 af
Discarded=0.40 cfs 0.076 af Primary=0.00 cfs 0.000 af Outflow=0.40 cfs 0.076 af

Total Runoff Area = 3.088 ac Runoff Volume = 0.218 af Average Runoff Depth = 0.85"

Subcatchment EX1: North

[45] Hint: Runoff=Zero

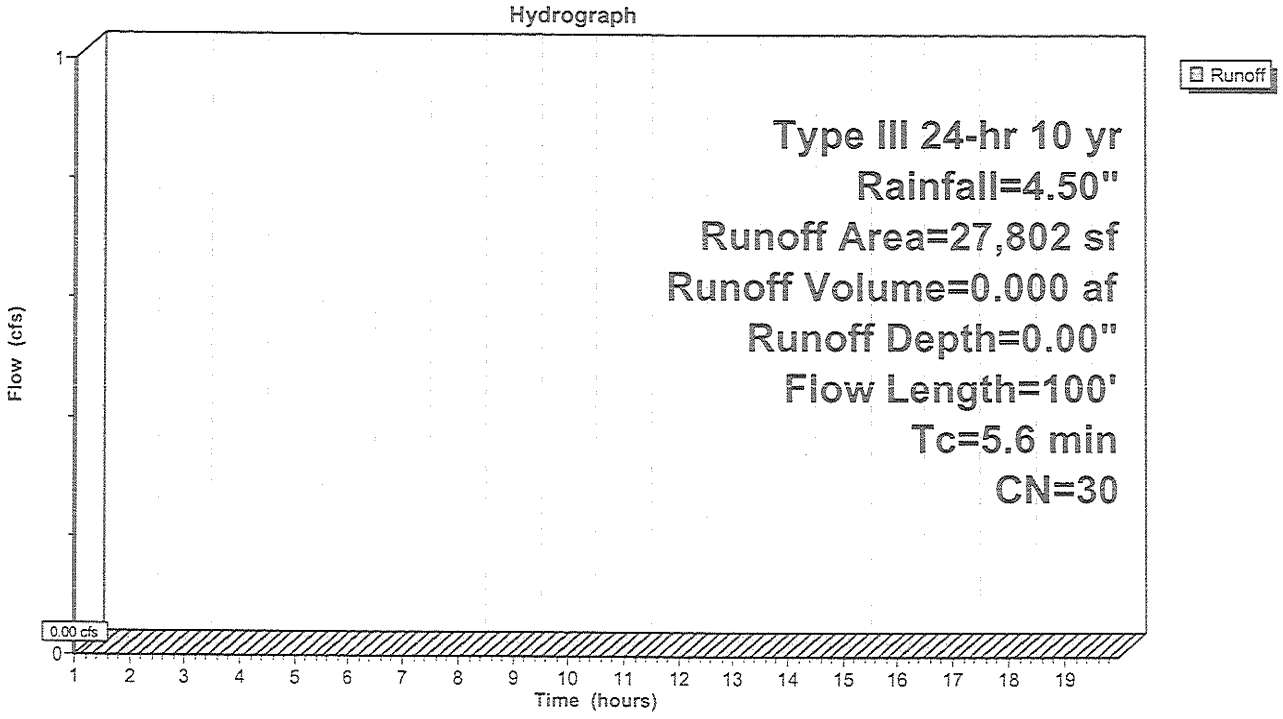
Runoff = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs
Type III 24-hr 10 yr Rainfall=4.50"

Area (sf)	CN	Description
27,802	30	Woods, Good, HSG A

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	100	0.1200	0.3		**Lag/CN Method,**

Subcatchment EX1: North



Subcatchment EX2: South

[45] Hint: Runoff=Zero

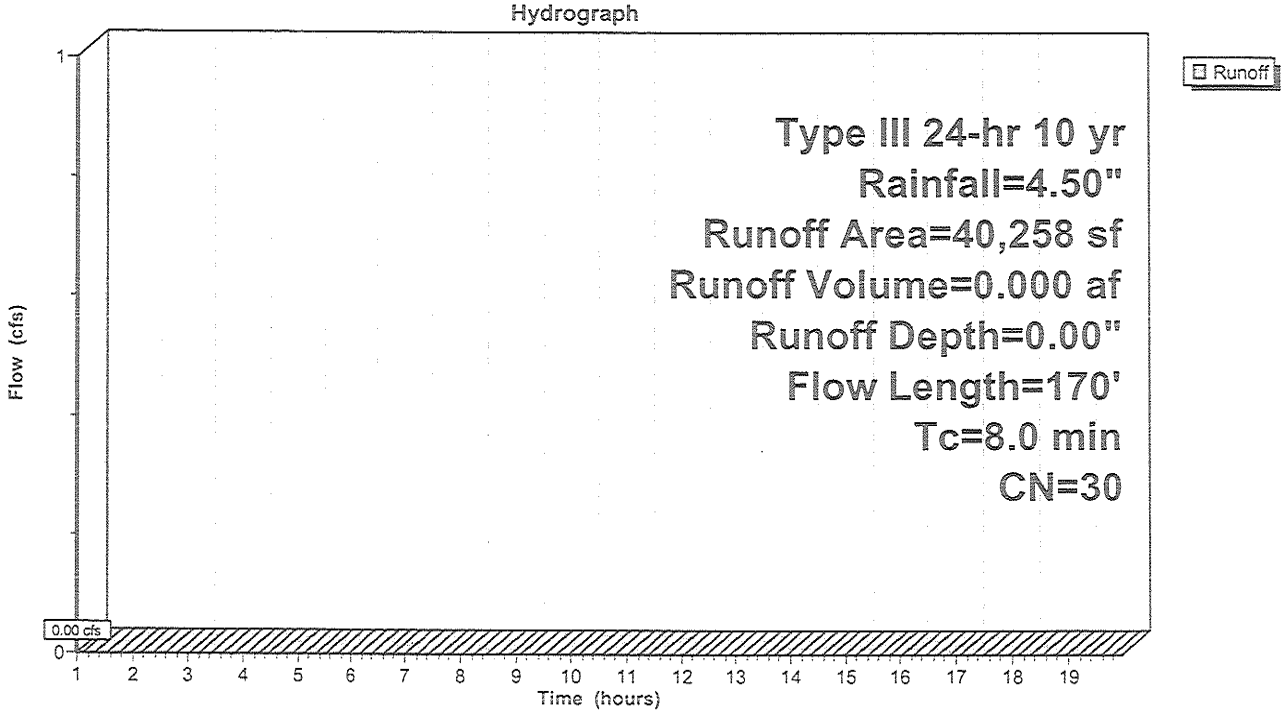
Runoff = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs
Type III 24-hr 10 yr Rainfall=4.50"

Area (sf)	CN	Description
40,258	30	Woods, Good, HSG A

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	170	0.1400	0.4		**Lag/CN Method,**

Subcatchment EX2: South



Subcatchment PR-1B: Building, Paving & Basin

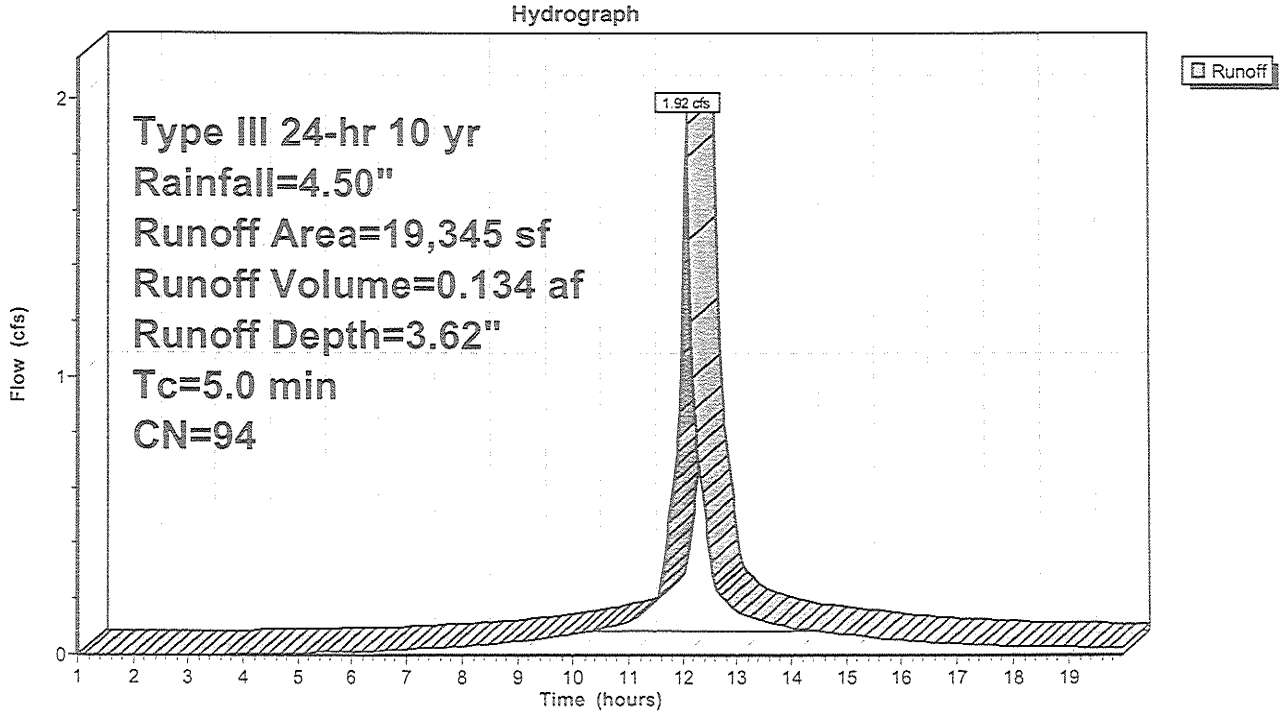
Runoff = 1.92 cfs @ 12.07 hrs, Volume= 0.134 af, Depth= 3.62"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs
Type III 24-hr 10 yr Rainfall=4.50"

Area (sf)	CN	Description
11,945	98	paving
2,400	98	basin
1,300	39	>75% Grass cover, Good, HSG A
3,700	98	roof
19,345	94	Weighted Average

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

Subcatchment PR-1B: Building, Paving & Basin



Subcatchment PR-B2: Building, Paving & Basin

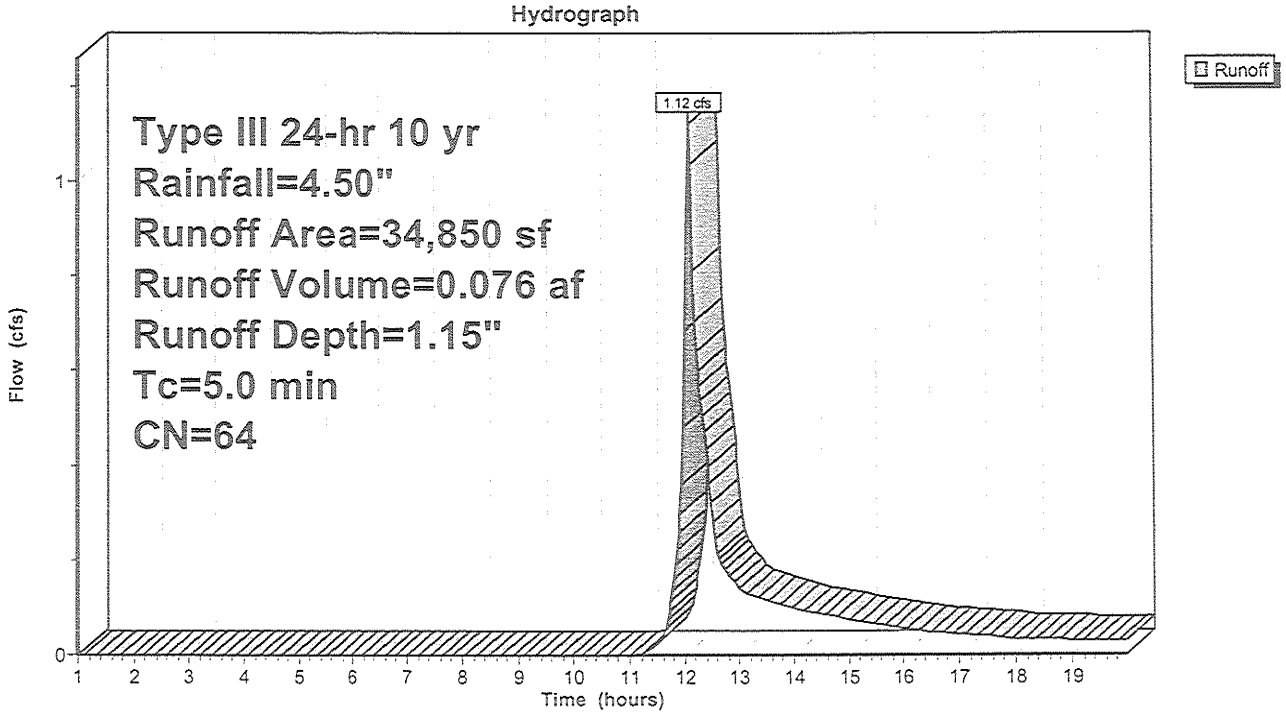
Runoff = 1.12 cfs @ 12.08 hrs, Volume= 0.076 af, Depth= 1.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs
Type III 24-hr 10 yr Rainfall=4.50"

Area (sf)	CN	Description
8,485	98	paving
2,765	98	basin
19,900	39	>75% Grass cover, Good, HSG A
3,700	98	roof
34,850	64	Weighted Average

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

Subcatchment PR-B2: Building, Paving & Basin



Subcatchment PR1A: Near Street

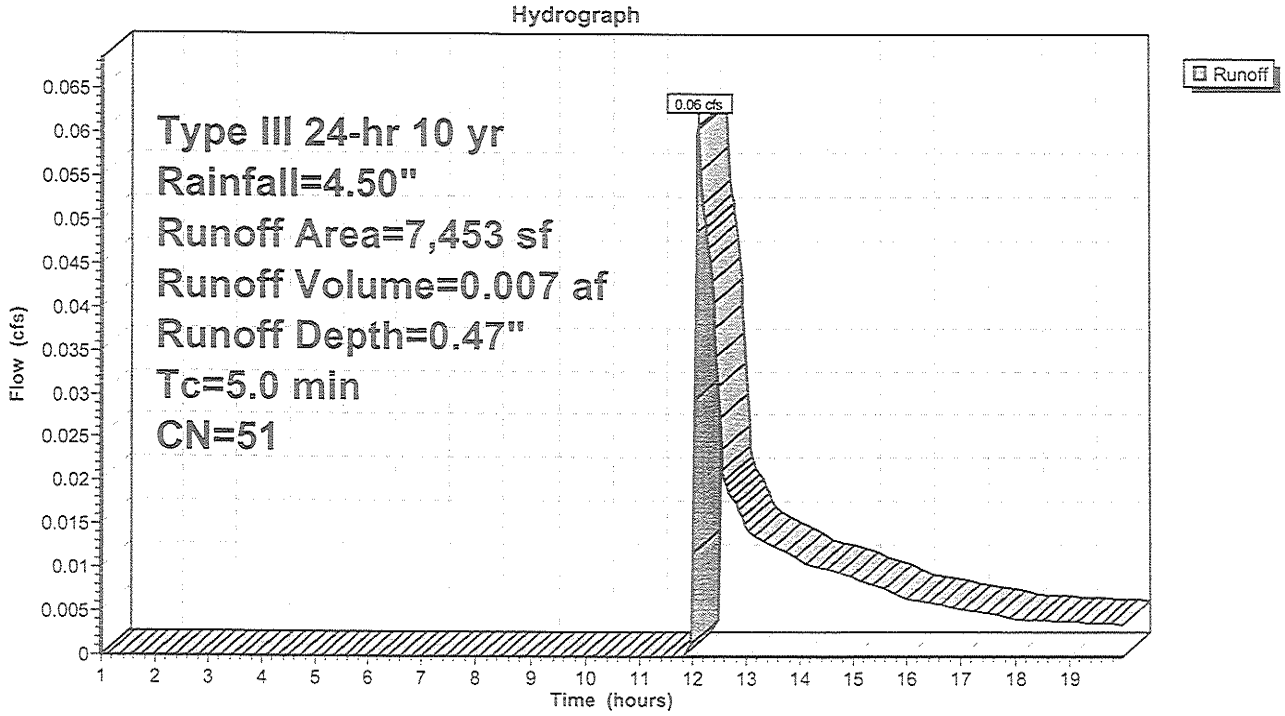
Runoff = 0.06 cfs @ 12.12 hrs, Volume= 0.007 af, Depth= 0.47"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs
Type III 24-hr 10 yr Rainfall=4.50"

Area (sf)	CN	Description
1,490	98	Paved Driveway Entrances
5,963	39	>75% Grass cover, Good, HSG A
7,453	51	Weighted Average

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

Subcatchment PR1A: Near Street



Subcatchment PR2B: Area South of Basins

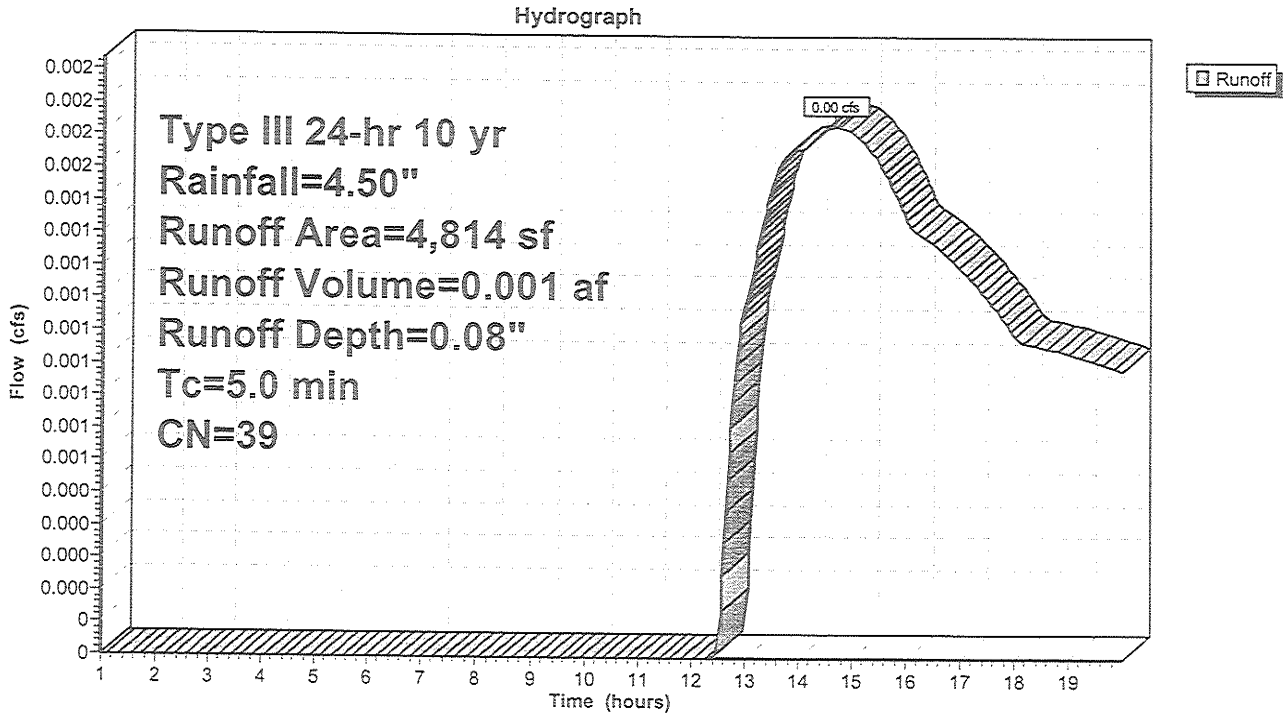
Runoff = 0.00 cfs @ 14.69 hrs, Volume= 0.001 af, Depth= 0.08"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs
Type III 24-hr 10 yr Rainfall=4.50"

Area (sf)	CN	Description
4,814	39	>75% Grass cover, Good, HSG A

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

Subcatchment PR2B: Area South of Basins



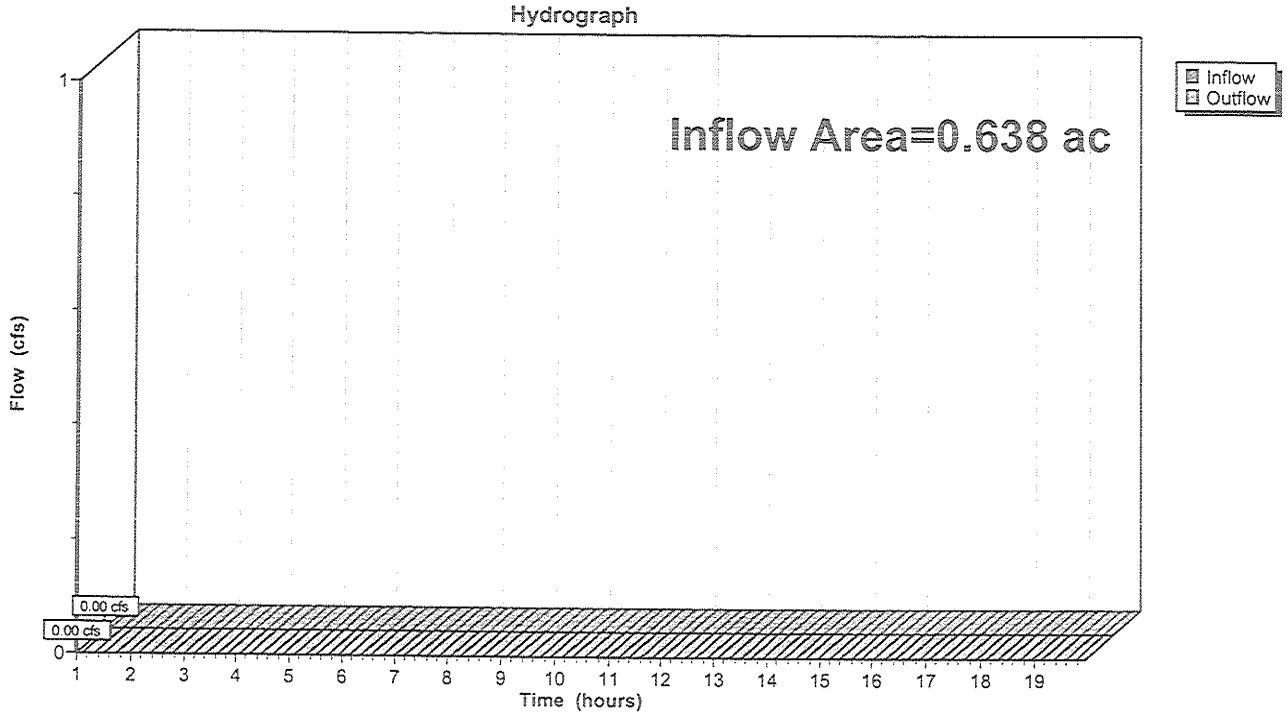
Reach 1000ex: Ex. Flow Summation New Ludlow Rd

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.638 ac, Inflow Depth = 0.00" for 10 yr event
Inflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs

Reach 1000ex: Ex. Flow Summation New Ludlow Rd



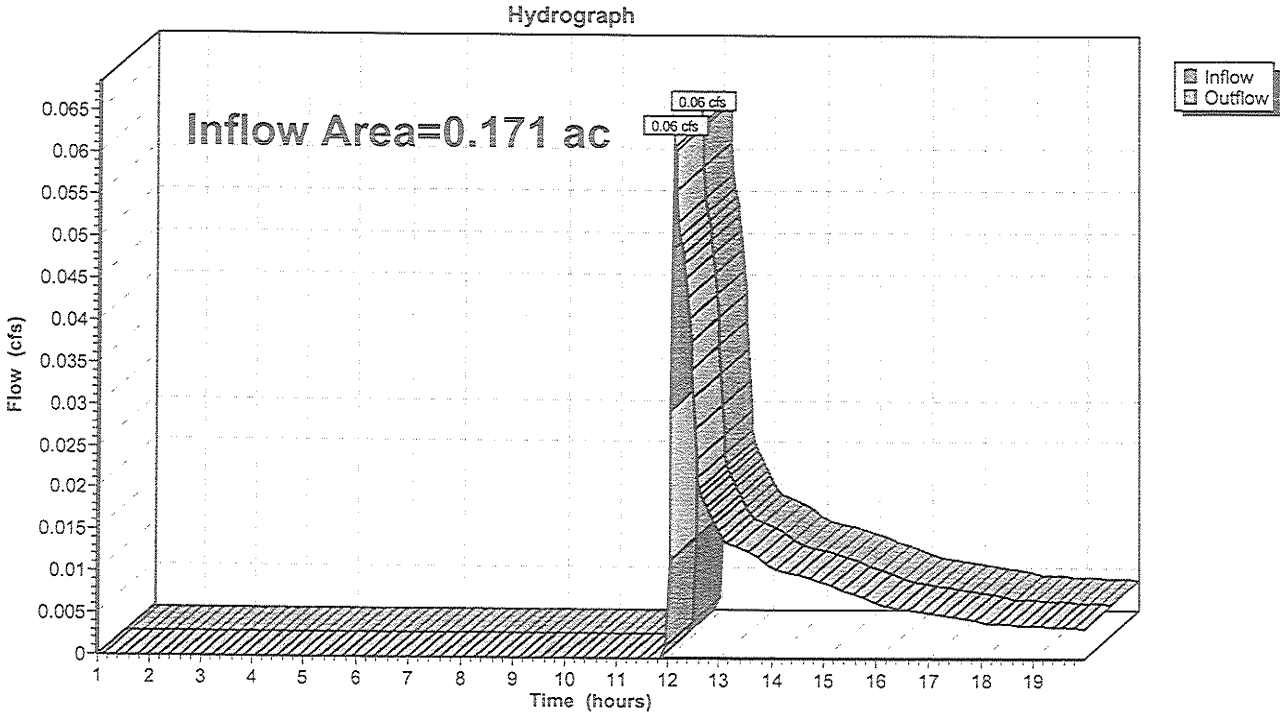
Reach 1000pr: Pr. Flow Summation New Ludlow Road

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.171 ac, Inflow Depth = 0.47" for 10 yr event
Inflow = 0.06 cfs @ 12.12 hrs, Volume= 0.007 af
Outflow = 0.06 cfs @ 12.12 hrs, Volume= 0.007 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs

Reach 1000pr: Pr. Flow Summation New Ludlow Road



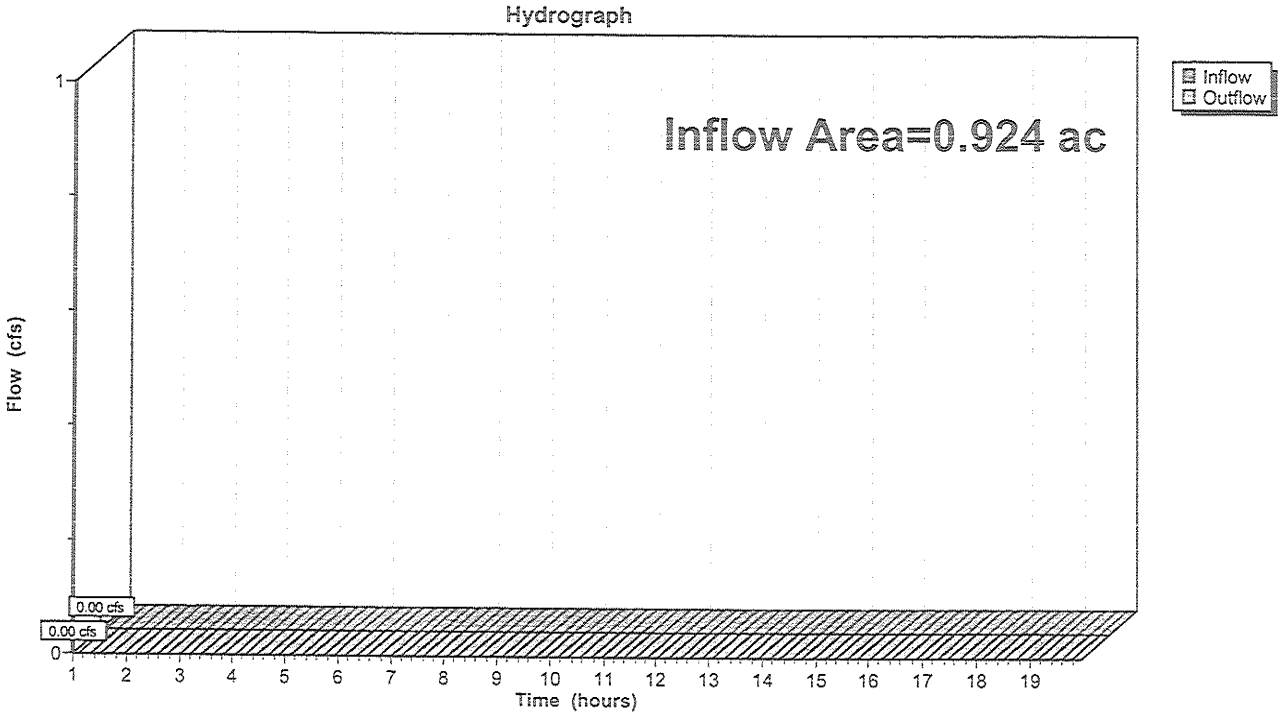
Reach 2000ex: Ex. Flow Summation Southern Limit of Work

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.924 ac, Inflow Depth = 0.00" for 10 yr event
Inflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs

Reach 2000ex: Ex. Flow Summation Southern Limit of Work



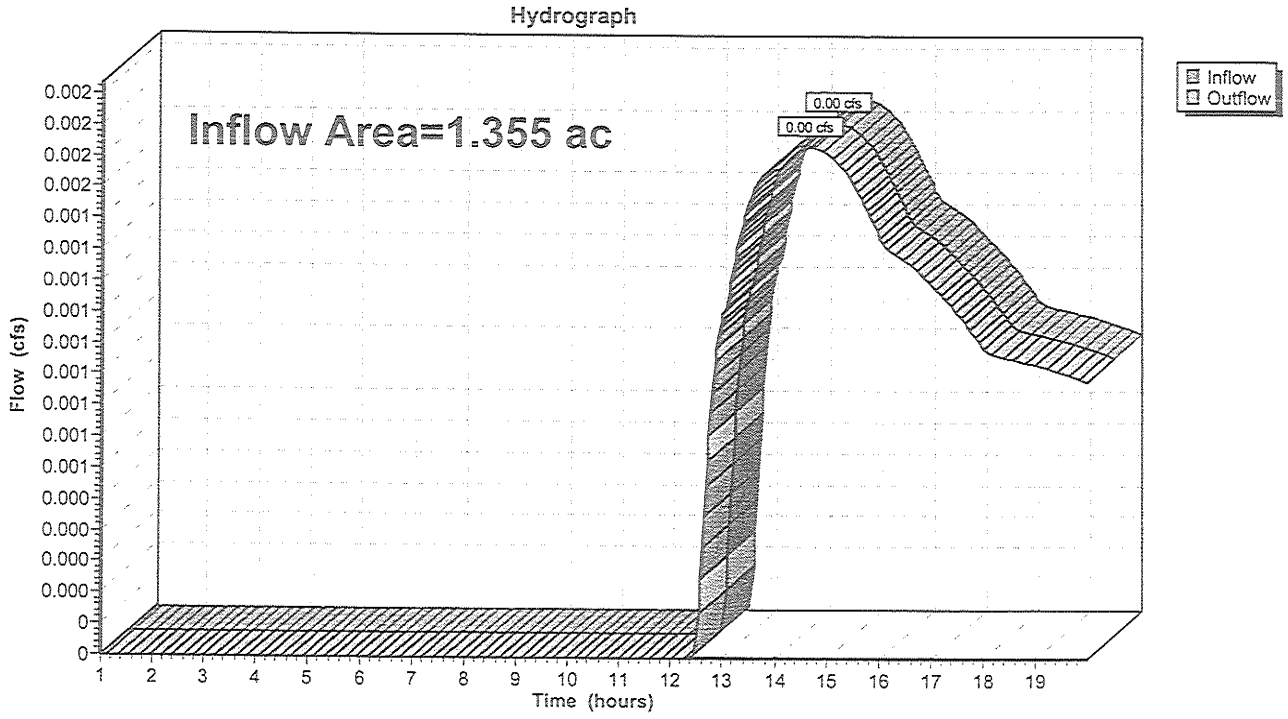
Reach 2000pr: Pr. Flow Summation Southern Limit of Work

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.355 ac, Inflow Depth = 0.01" for 10 yr event
Inflow = 0.00 cfs @ 14.69 hrs, Volume= 0.001 af
Outflow = 0.00 cfs @ 14.69 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs

Reach 2000pr: Pr. Flow Summation Southern Limit of Work



Pond B: basin

Inflow Area = 0.444 ac, Inflow Depth = 3.62" for 10 yr event
Inflow = 1.92 cfs @ 12.07 hrs, Volume= 0.134 af
Outflow = 0.88 cfs @ 12.22 hrs, Volume= 0.134 af, Atten= 54%, Lag= 9.2 min
Discarded = 0.88 cfs @ 12.22 hrs, Volume= 0.134 af
Primary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs
Peak Elev= 248.14' @ 12.22 hrs Surf.Area= 3,105 sf Storage= 707 cf
Plug-Flow detention time= 5.5 min calculated for 0.134 af (100% of inflow)
Center-of-Mass det. time= 5.1 min (751.8 - 746.7)

#	Invert	Avail.Storage	Storage Description
1	248.00'	14,081 cf	**Custom Stage Data (Prismatic)** Listed below

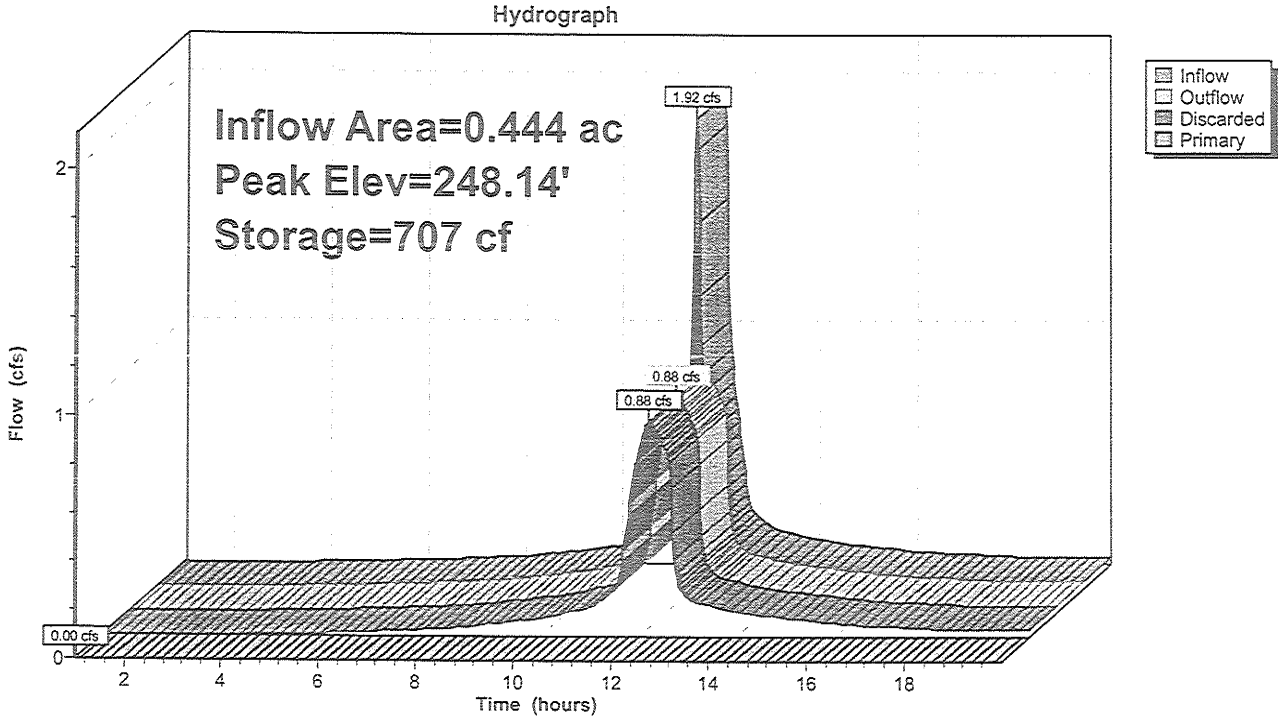
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
248.00	2,365	0	0
249.00	7,550	4,958	4,958
250.00	5,165	6,358	11,315
250.50	5,900	2,766	14,081

#	Routing	Invert	Outlet Devices
1	Primary	250.00'	**10.0' long x 4.0' breadth Broad-Crested Rectangular Weir X 2.00** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32
2	Discarded	0.00'	**0.017000 fpm Exfiltration over entire Surface area**

Discarded OutFlow Max=0.88 cfs @ 12.22 hrs HW=248.14' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.88 cfs)

Primary OutFlow Max=0.00 cfs @ 1.00 hrs HW=248.00' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Pond B: basin


Hydrograph
Inflow Area=0.444 ac
Peak Elev=248.14'
Storage=707 cf
1.92 cfs
0.88 cfs
0.88 cfs
0.00 cfs
Inflow
Outflow
Discarded
Primary
Flow (cfs)
0
1
2
2
4
6
8
10
12
14
16
18
Time (hours)

Pond B2: basin-2

Inflow Area = 0.800 ac, Inflow Depth = 1.15" for 10 yr event
Inflow = 1.12 cfs @ 12.08 hrs, Volume= 0.076 af
Outflow = 0.40 cfs @ 12.43 hrs, Volume= 0.076 af, Atten= 64%, Lag= 20.7 min
Discarded = 0.40 cfs @ 12.43 hrs, Volume= 0.076 af
Primary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs
Peak Elev= 248.39' @ 12.43 hrs Surf.Area= 1,408 sf Storage= 576 cf
Plug-Flow detention time= 9.1 min calculated for 0.076 af (100% of inflow)
Center-of-Mass det. time= 8.8 min (832.5 - 823.7)

#	Invert	Avail.Storage	Storage Description
1	248.00'	5,293 cf	**Custom Stage Data (Prismatic)** Listed below

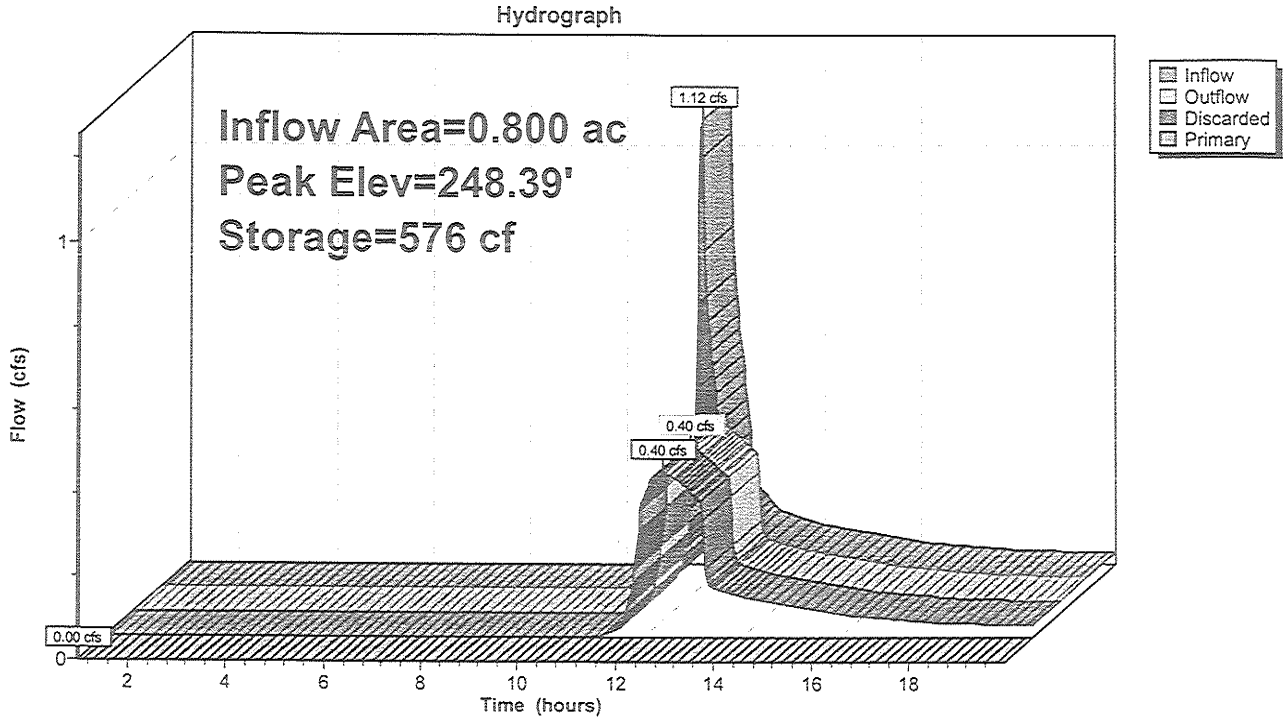
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
248.00	1,125	0	0
249.00	1,857	1,491	1,491
250.00	2,765	2,311	3,802
250.50	3,200	1,491	5,293

#	Routing	Invert	Outlet Devices
1	Primary	250.00'	**10.0' long x 4.0' breadth Broad-Crested Rectangular Weir X 2.00** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32
2	Discarded	0.00'	**0.017000 fpm Exfiltration over entire Surface area**

Discarded OutFlow Max=0.40 cfs @ 12.43 hrs HW=248.39' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.40 cfs)

Primary OutFlow Max=0.00 cfs @ 1.00 hrs HW=248.00' (Free Discharge)
└**1=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Pond B2: basin-2



Time span=1.00-20.00 hrs, dt=0.03 hrs, 634 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment EX1: North Runoff Area=27,802 sf Runoff Depth=0.10"
Flow Length=100' Tc=5.6 min CN=30 Runoff=0.01 cfs 0.005 af

Subcatchment EX2: South Runoff Area=40,258 sf Runoff Depth=0.10"
Flow Length=170' Tc=8.0 min CN=30 Runoff=0.02 cfs 0.007 af

Subcatchment PR-1B: Building, Paving & Basin Runoff Area=19,345 sf Runoff Depth=5.51"
Tc=5.0 min CN=94 Runoff=2.84 cfs 0.204 af

Subcatchment PR-B2: Building, Paving & Basin Runoff Area=34,850 sf Runoff Depth=2.42"
Tc=5.0 min CN=64 Runoff=2.49 cfs 0.161 af

Subcatchment PR1A: Near Street Runoff Area=7,453 sf Runoff Depth=1.33"
Tc=5.0 min CN=51 Runoff=0.26 cfs 0.019 af

Subcatchment PR2B: Area South of Basins Runoff Area=4,814 sf Runoff Depth=0.51"
Tc=5.0 min CN=39 Runoff=0.03 cfs 0.005 af

Reach 1000ex: Ex. Flow Summation New Ludlow Rd Inflow=0.01 cfs 0.005 af
Outflow=0.01 cfs 0.005 af

Reach 1000pr: Pr. Flow Summation New Ludlow Road Inflow=0.26 cfs 0.019 af
Outflow=0.26 cfs 0.019 af

Reach 2000ex: Ex. Flow Summation Southern Limit of Work Inflow=0.02 cfs 0.007 af
Outflow=0.02 cfs 0.007 af

Reach 2000pr: Pr. Flow Summation Southern Limit of Work Inflow=0.03 cfs 0.005 af
Outflow=0.03 cfs 0.005 af

Pond B: basin Peak Elev=248.29' Storage=1,427 cf Inflow=2.84 cfs 0.204 af
Discarded=1.09 cfs 0.204 af Primary=0.00 cfs 0.000 af Outflow=1.09 cfs 0.204 af

Pond B2: basin-2 Peak Elev=249.21' Storage=1,972 cf Inflow=2.49 cfs 0.161 af
Discarded=0.58 cfs 0.161 af Primary=0.00 cfs 0.000 af Outflow=0.58 cfs 0.161 af

Total Runoff Area = 3.088 ac Runoff Volume = 0.401 af Average Runoff Depth = 1.56"

Subcatchment EX1: North

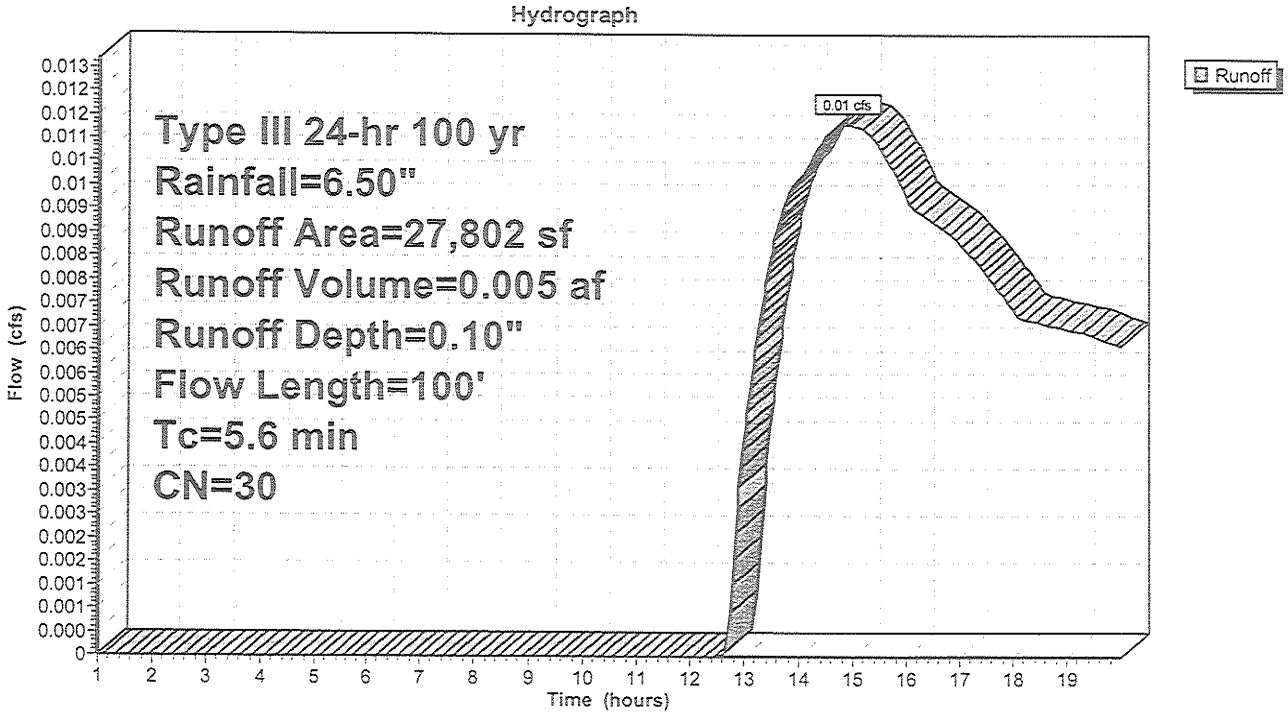
Runoff = 0.01 cfs @ 14.90 hrs, Volume= 0.005 af, Depth= 0.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs
Type III 24-hr 100 yr Rainfall=6.50"

Area (sf)	CN	Description
27,802	30	Woods, Good, HSG A

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	100	0.1200	0.3		**Lag/CN Method,**

Subcatchment EX1: North



Subcatchment EX2: South

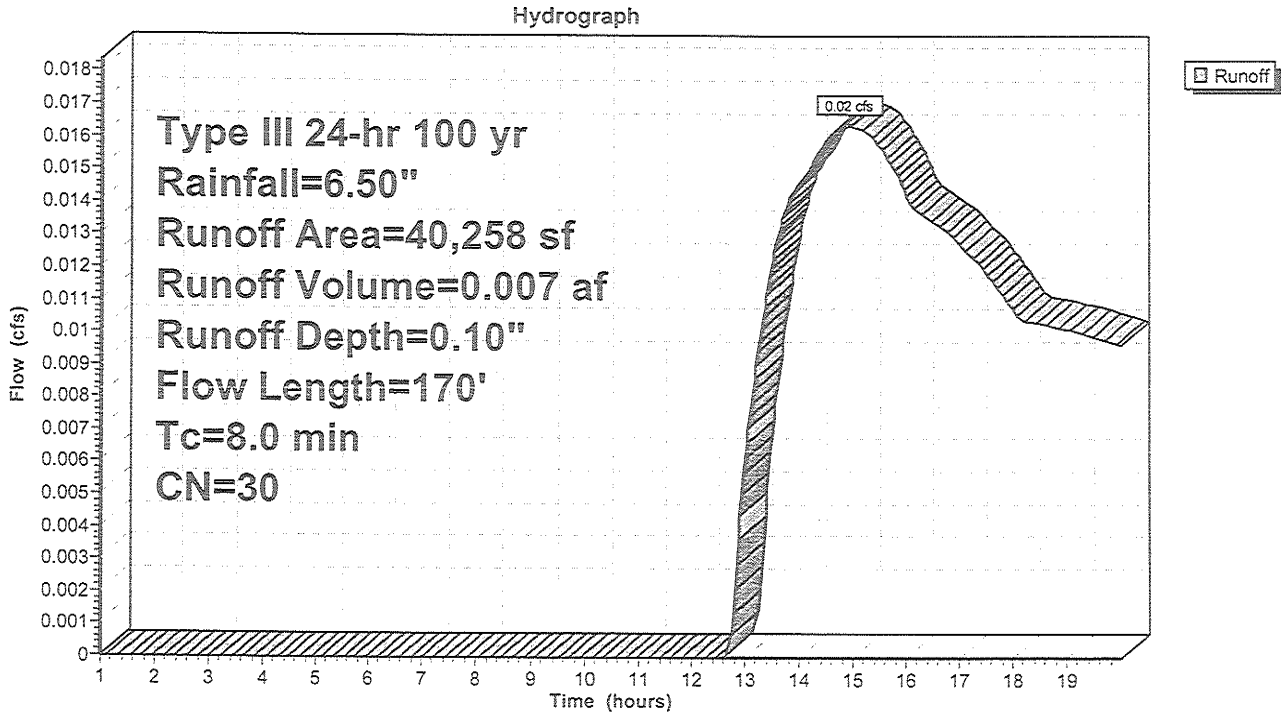
Runoff = 0.02 cfs @ 14.94 hrs, Volume= 0.007 af, Depth= 0.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs
Type III 24-hr 100 yr Rainfall=6.50"

Area (sf)	CN	Description
40,258	30	Woods, Good, HSG A

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	170	0.1400	0.4		**Lag/CN Method,**

Subcatchment EX2: South



Subcatchment PR-1B: Building, Paving & Basin

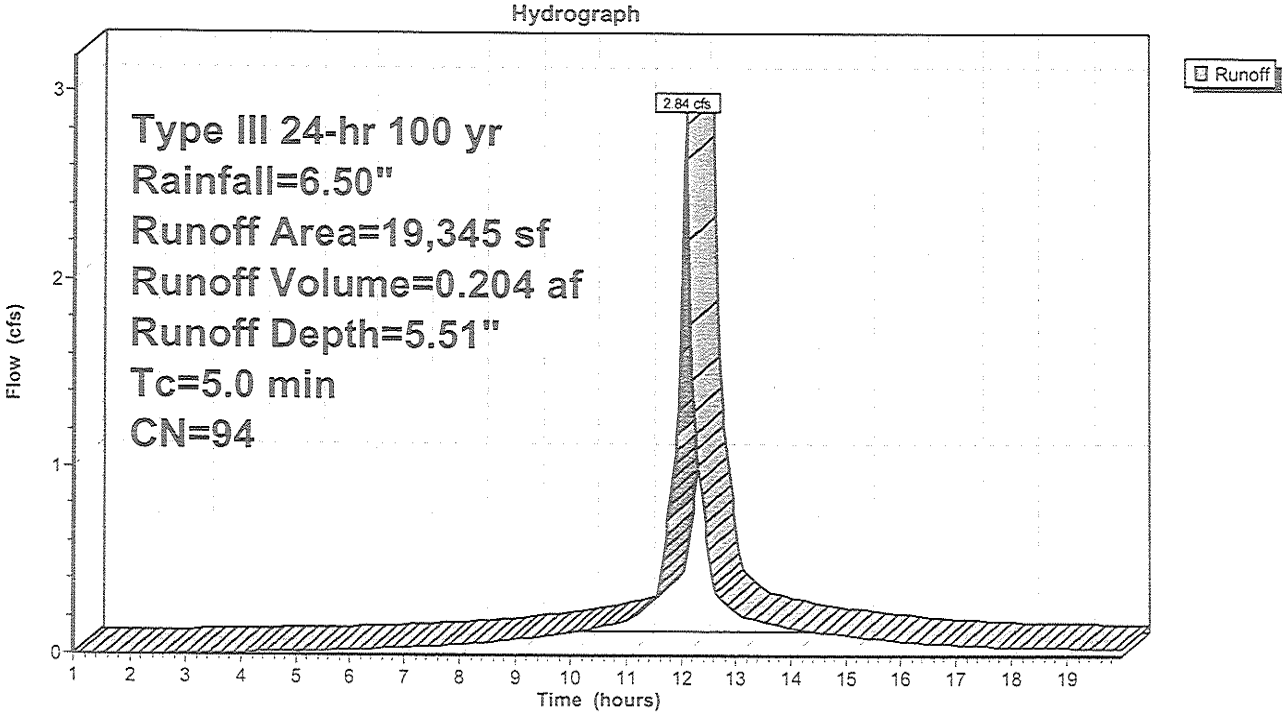
Runoff = 2.84 cfs @ 12.07 hrs, Volume= 0.204 af, Depth= 5.51"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs
Type III 24-hr 100 yr Rainfall=6.50"

Area (sf)	CN	Description
11,945	98	paving
2,400	98	basin
1,300	39	>75% Grass cover, Good, HSG A
3,700	98	roof
19,345	94	Weighted Average

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

Subcatchment PR-1B: Building, Paving & Basin



Subcatchment PR-B2: Building, Paving & Basin

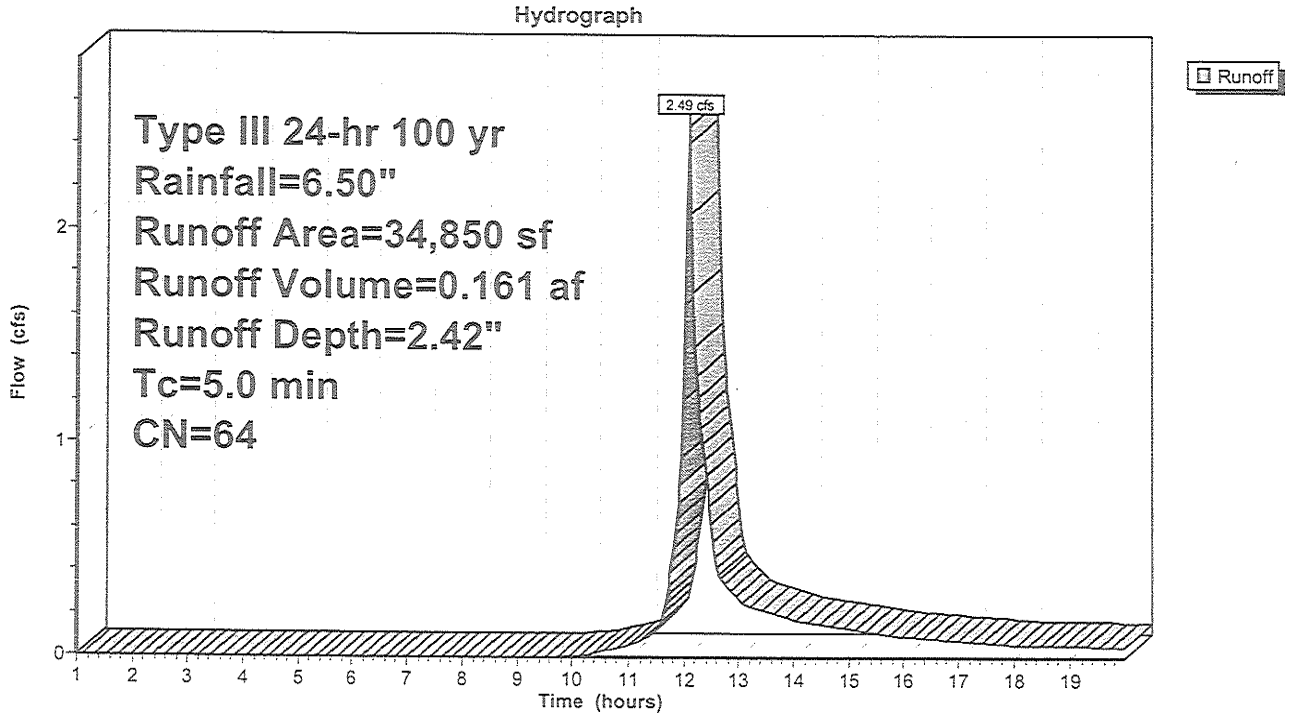
Runoff = 2.49 cfs @ 12.08 hrs, Volume= 0.161 af, Depth= 2.42"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs
Type III 24-hr 100 yr Rainfall=6.50"

Area (sf)	CN	Description
8,485	98	paving
2,765	98	basin
19,900	39	>75% Grass cover, Good, HSG A
3,700	98	roof
34,850	64	Weighted Average

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

Subcatchment PR-B2: Building, Paving & Basin



Subcatchment PR1A: Near Street

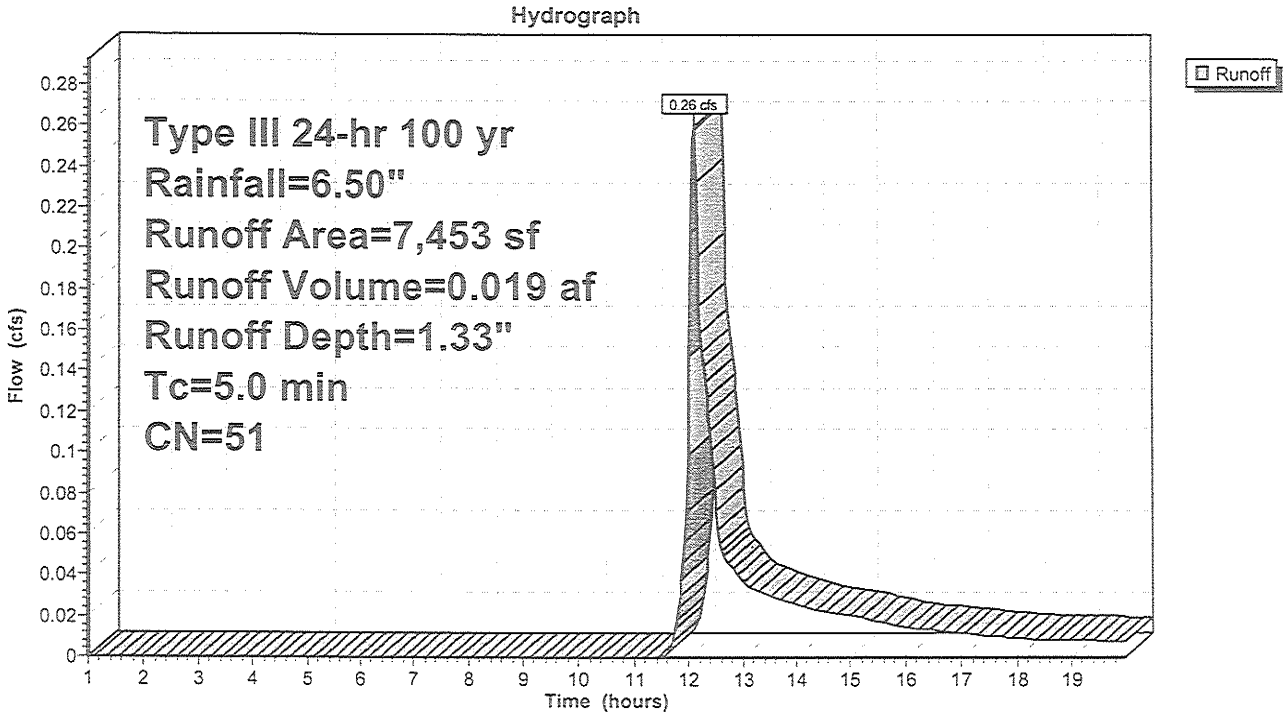
Runoff = 0.26 cfs @ 12.09 hrs, Volume= 0.019 af, Depth= 1.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs
Type III 24-hr 100 yr Rainfall=6.50"

Area (sf)	CN	Description
1,490	98	Paved Driveway Entrances
5,963	39	>75% Grass cover, Good, HSG A
7,453	51	Weighted Average

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

Subcatchment PR1A: Near Street



Subcatchment PR2B: Area South of Basins

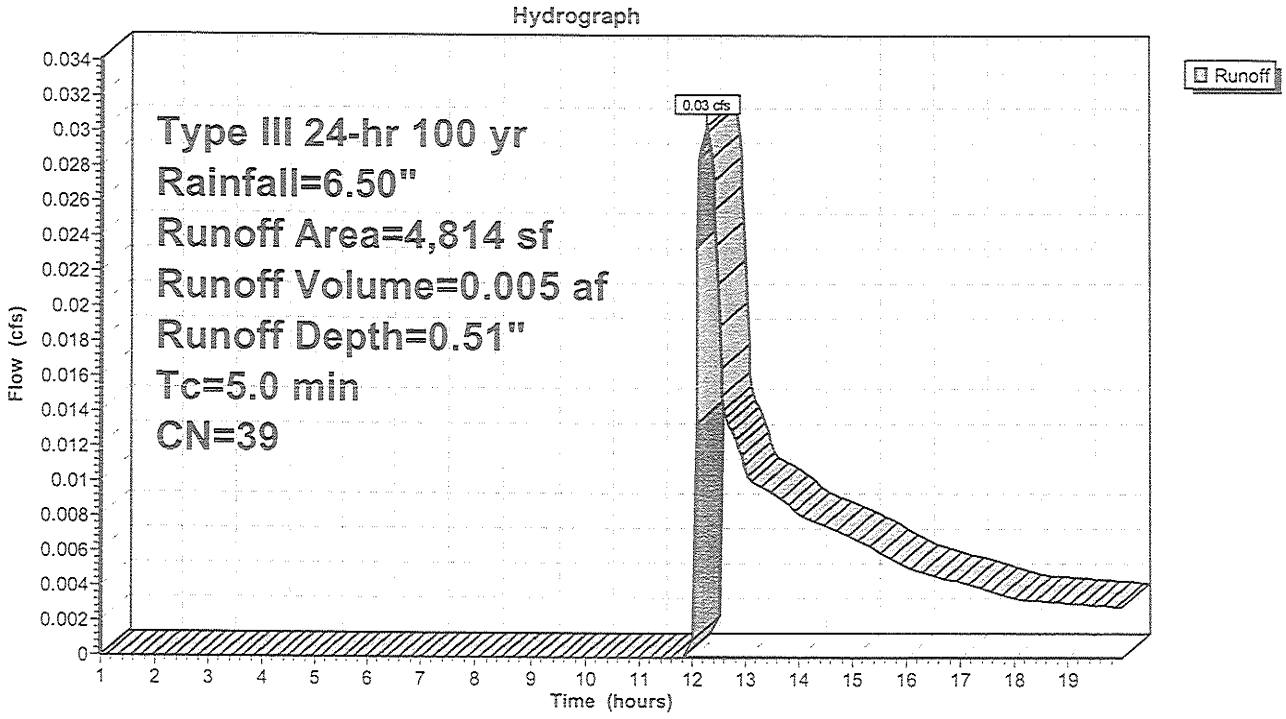
Runoff = 0.03 cfs @ 12.28 hrs, Volume= 0.005 af, Depth= 0.51"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs
Type III 24-hr 100 yr Rainfall=6.50"

Area (sf)	CN	Description
4,814	39	>75% Grass cover, Good, HSG A

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

Subcatchment PR2B: Area South of Basins



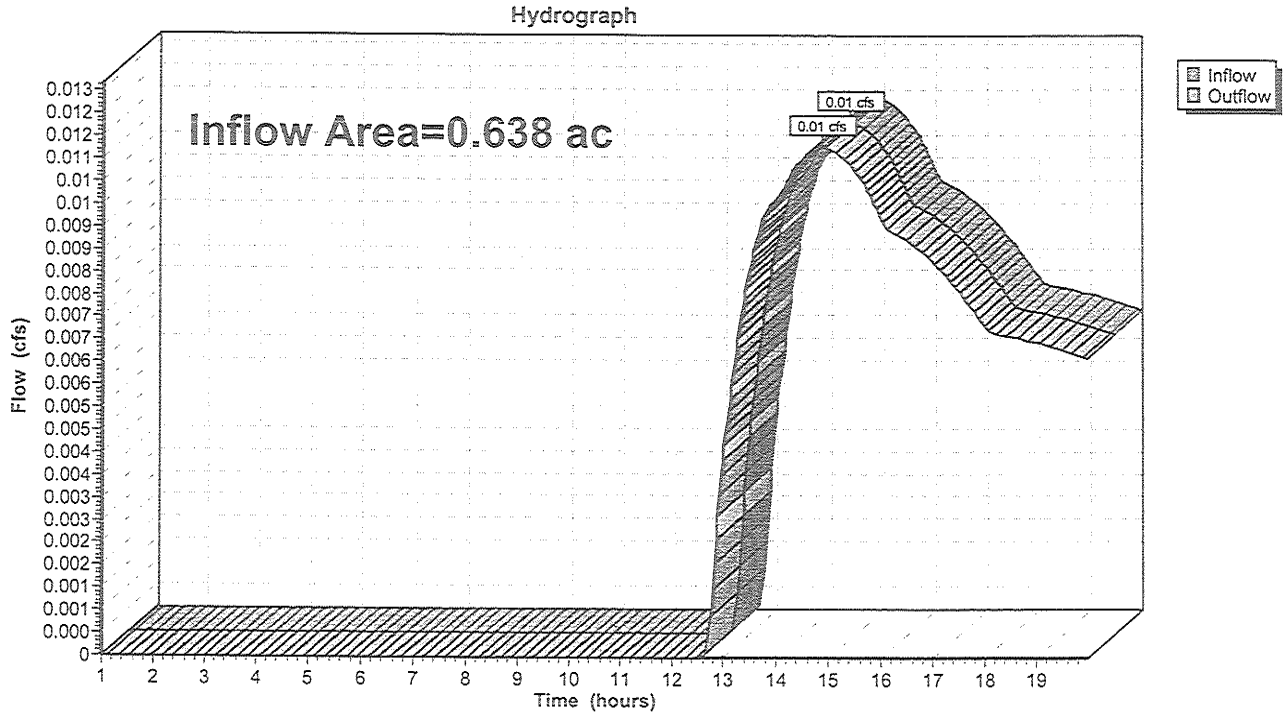
Reach 1000ex: Ex. Flow Summation New Ludlow Rd

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.638 ac, Inflow Depth = 0.10" for 100 yr event
Inflow = 0.01 cfs @ 14.90 hrs, Volume= 0.005 af
Outflow = 0.01 cfs @ 14.90 hrs, Volume= 0.005 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs

Reach 1000ex: Ex. Flow Summation New Ludlow Rd



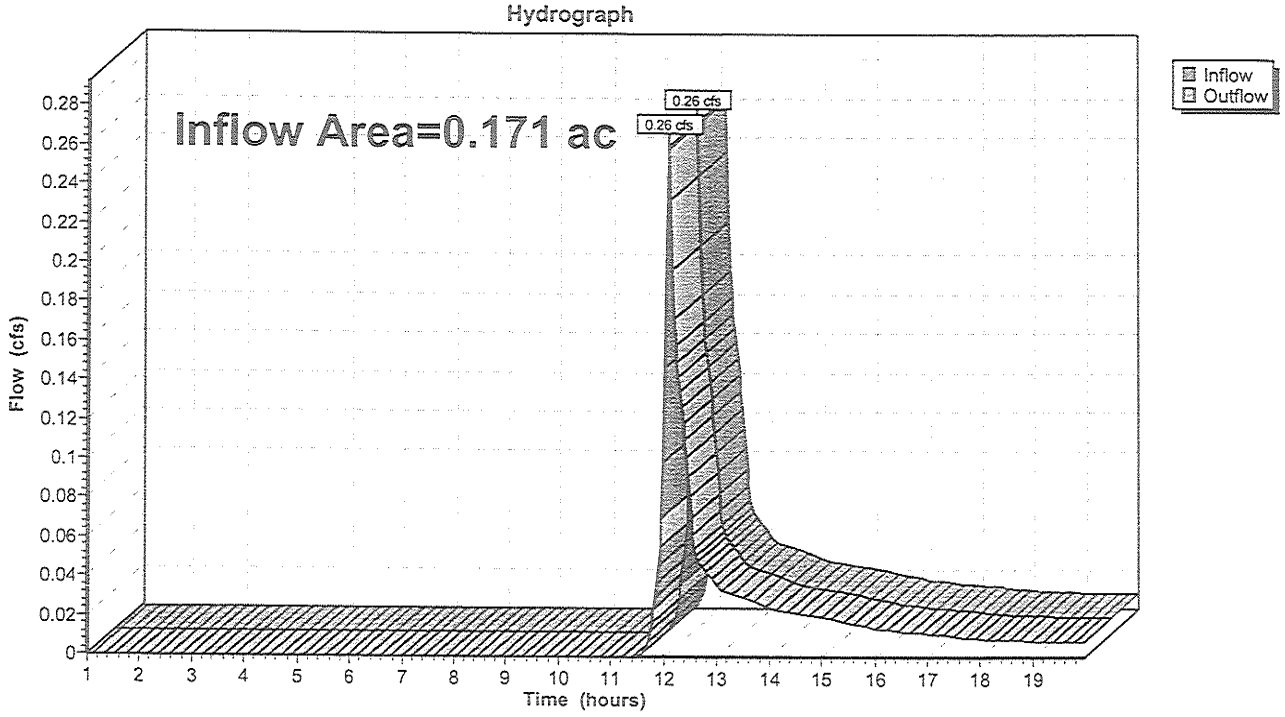
Reach 1000pr: Pr. Flow Summation New Ludlow Road

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.171 ac, Inflow Depth = 1.33" for 100 yr event
Inflow = 0.26 cfs @ 12.09 hrs, Volume= 0.019 af
Outflow = 0.26 cfs @ 12.09 hrs, Volume= 0.019 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs

Reach 1000pr: Pr. Flow Summation New Ludlow Road



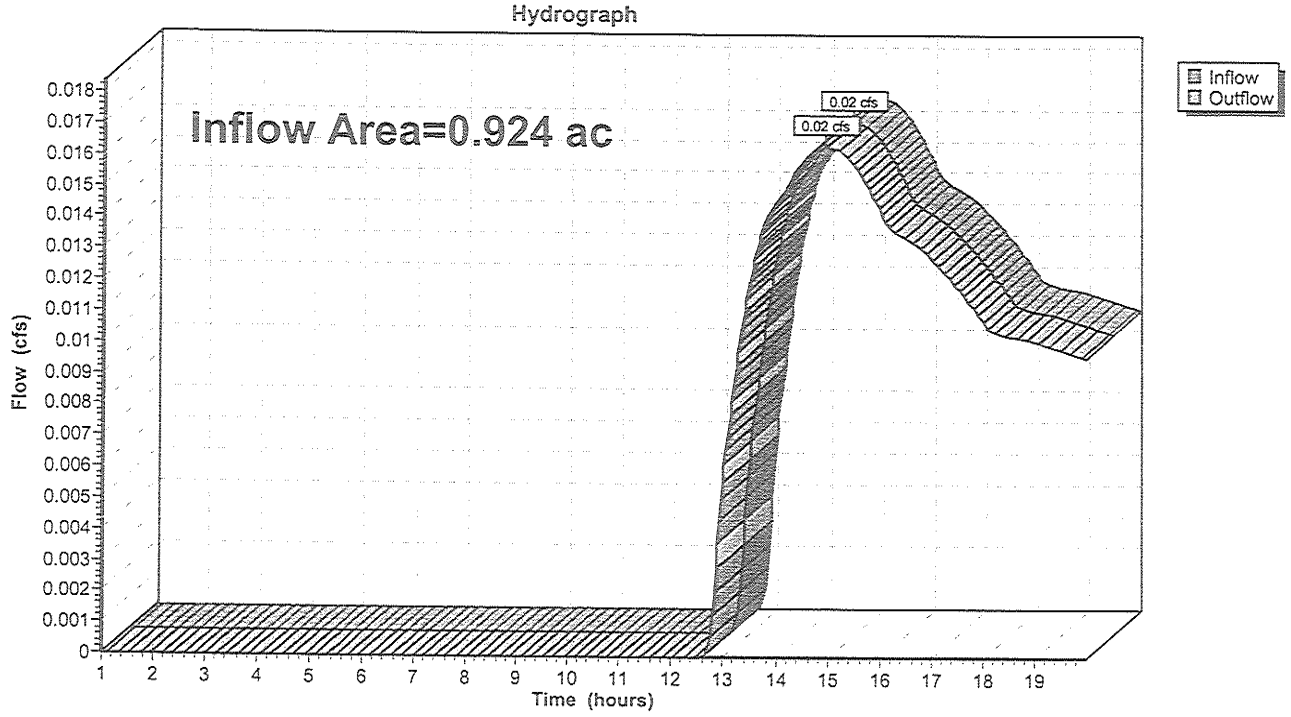
Reach 2000ex: Ex. Flow Summation Southern Limit of Work

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.924 ac, Inflow Depth = 0.10" for 100 yr event
Inflow = 0.02 cfs @ 14.94 hrs, Volume= 0.007 af
Outflow = 0.02 cfs @ 14.94 hrs, Volume= 0.007 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs

Reach 2000ex: Ex. Flow Summation Southern Limit of Work



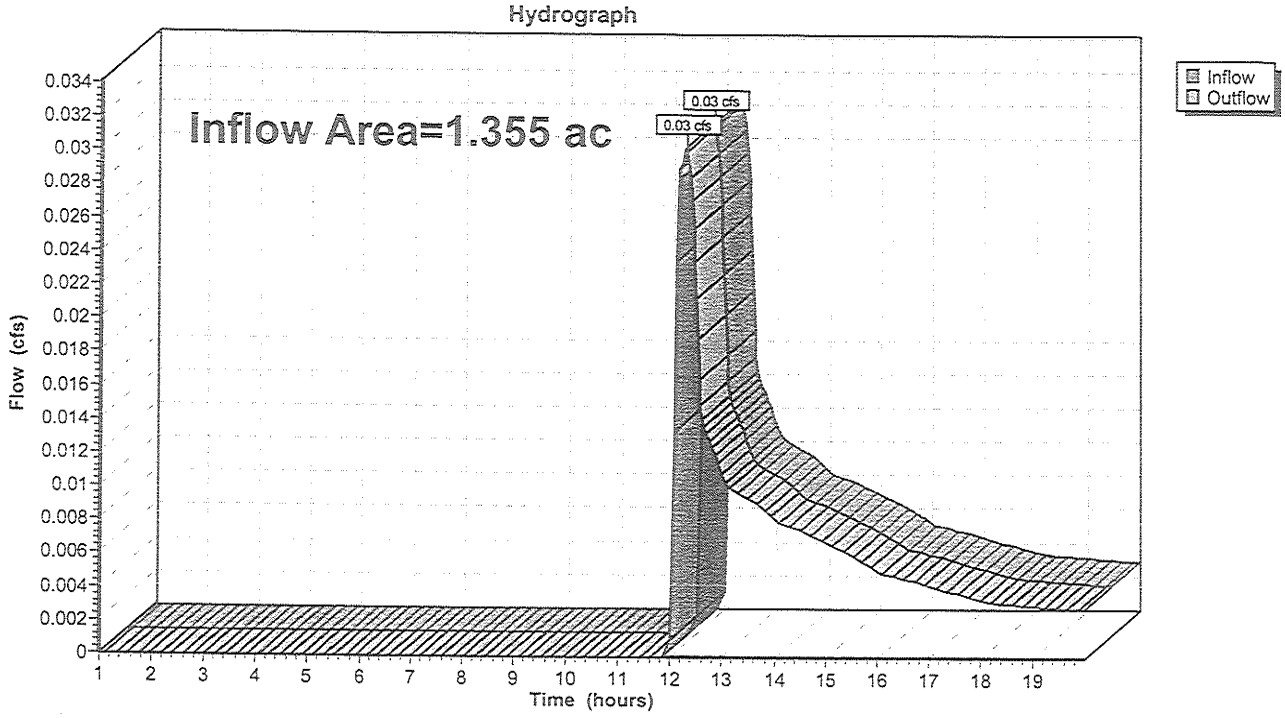
Reach 2000pr: Pr. Flow Summation Southern Limit of Work

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.355 ac, Inflow Depth = 0.04" for 100 yr event
Inflow = 0.03 cfs @ 12.28 hrs, Volume= 0.005 af
Outflow = 0.03 cfs @ 12.28 hrs, Volume= 0.005 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs

Reach 2000pr: Pr. Flow Summation Southern Limit of Work



Pond B: basin

Inflow Area = 0.444 ac, Inflow Depth = 5.51" for 100 yr event
Inflow = 2.84 cfs @ 12.07 hrs, Volume= 0.204 af
Outflow = 1.09 cfs @ 12.28 hrs, Volume= 0.204 af, Atten= 62%, Lag= 12.7 min
Discarded = 1.09 cfs @ 12.28 hrs, Volume= 0.204 af
Primary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs
Peak Elev= 248.29' @ 12.28 hrs Surf.Area= 3,858 sf Storage= 1,427 cf
Plug-Flow detention time= 8.5 min calculated for 0.203 af (100% of inflow)
Center-of-Mass det. time= 8.1 min (745.4 - 737.3)

#	Invert	Avail.Storage	Storage Description
1	248.00'	14,081 cf	**Custom Stage Data (Prismatic)** Listed below

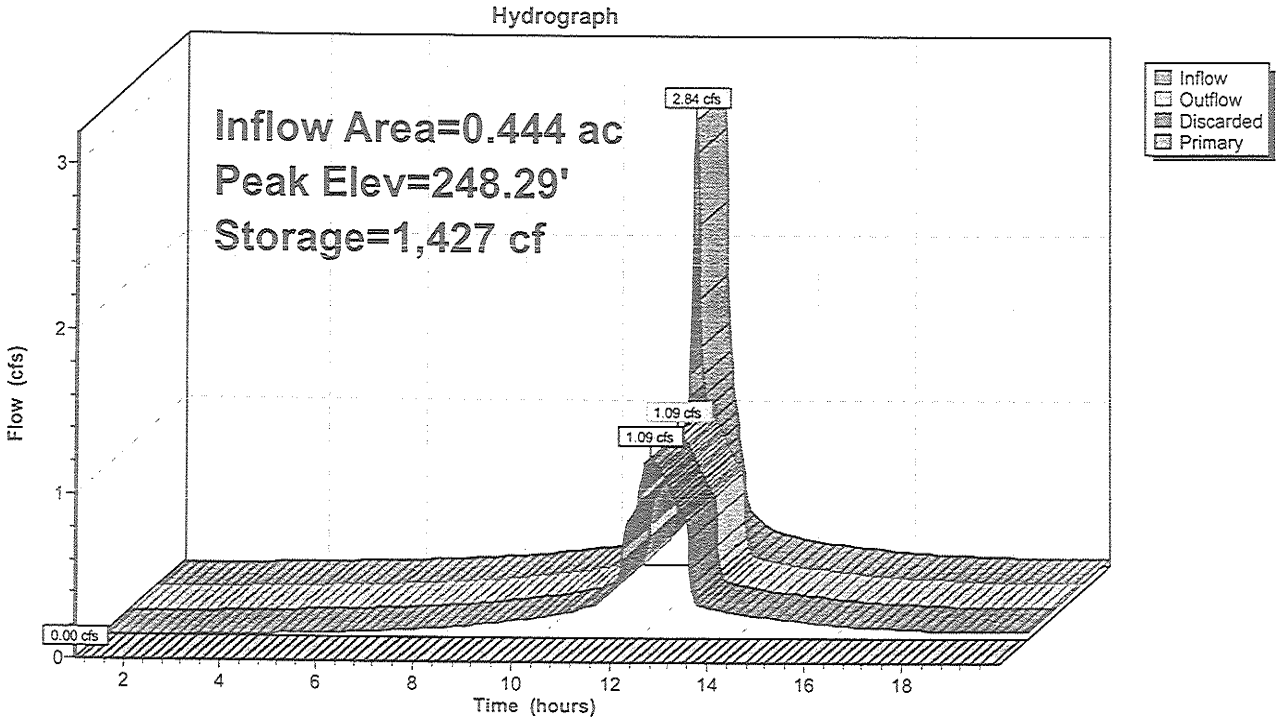
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
248.00	2,365	0	0
249.00	7,550	4,958	4,958
250.00	5,165	6,358	11,315
250.50	5,900	2,766	14,081

#	Routing	Invert	Outlet Devices
1	Primary	250.00'	**10.0' long x 4.0' breadth Broad-Crested Rectangular Weir X 2.00** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32
2	Discarded	0.00'	**0.017000 fpm Exfiltration over entire Surface area**

Discarded OutFlow Max=1.09 cfs @ 12.28 hrs HW=248.29' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 1.09 cfs)

Primary OutFlow Max=0.00 cfs @ 1.00 hrs HW=248.00' (Free Discharge)
└**1=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Pond B: basin


Hydrograph
Inflow Area=0.444 ac
Peak Elev=248.29'
Storage=1,427 cf
2.84 cfs
1.09 cfs
1.09 cfs
0.00 cfs
Inflow
Outflow
Discarded
Primary
Flow (cfs)
Time (hours)
0
1
2
3
2
4
6
8
10
12
14
16
18

Pond B2: basin-2

Inflow Area = 0.800 ac, Inflow Depth = 2.42" for 100 yr event
Inflow = 2.49 cfs @ 12.08 hrs, Volume= 0.161 af
Outflow = 0.58 cfs @ 12.51 hrs, Volume= 0.161 af, Atten= 77%, Lag= 25.6 min
Discarded = 0.58 cfs @ 12.51 hrs, Volume= 0.161 af
Primary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 1.00-19.99 hrs, dt= 0.03 hrs
Peak Elev= 249.21' @ 12.51 hrs Surf.Area= 2,046 sf Storage= 1,972 cf
Plug-Flow detention time= 27.1 min calculated for 0.161 af (100% of inflow)
Center-of-Mass det. time= 26.7 min (833.6 - 806.9)

#	Invert	Avail.Storage	Storage Description
1	248.00'	5,293 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
248.00	1,125	0	0
249.00	1,857	1,491	1,491
250.00	2,765	2,311	3,802
250.50	3,200	1,491	5,293

#	Routing	Invert	Outlet Devices
1	Primary	250.00'	**10.0' long x 4.0' breadth Broad-Crested Rectangular Weir X 2.00** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32
2	Discarded	0.00'	**0.017000 fpm Exfiltration over entire Surface area**

Discarded OutFlow Max=0.58 cfs @ 12.51 hrs HW=249.21' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.58 cfs)

Primary OutFlow Max=0.00 cfs @ 1.00 hrs HW=248.00' (Free Discharge)
└**1=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Pond B2: basin-2