MEETING NOTICE AND AGENDA

MANSFIELD INLAND WETLANDS AGENCY

Monday, April 4, 2016 ▪ 6:30 PM

Audrey P. Beck Municipal Building ▪ 4 South Eagleville Road ▪ Council Chambers

1. **Call to Order**

2. **Roll Call**

3. **Review of Minutes**
   a. 03-07-16– Meeting Minutes
   b. 03-16-16-Field Trip Notes

4. **Communications**
   a. Conservation Commission Minutes
   b. Monthly Business Memorandum

5. **Public Hearing**
   W1561– H. Raphaelson, Dog Lane, 2 lot subdivision
   Memo from Inland Wetlands Agent

6. **Old Business**
   a. **W1561– H. Raphaelson, Dog Lane, 2 lot subdivision**
   b. **W1562-Meadowbrook Gardens, 91 & 93 Meadowbrook Lane, 36 Units**
      Tabled pending 5/2/16 Public Hearing
   c. **W1563-Bicentennial Pond, Aquatic Weed Management and Sediment Removal**
      Memo from Inland Wetlands Agent

7. **New Business**
   a. **W1564- Storrs Lodges, 218 Units, Hunting Lodge Road (Parcel I.D. 15.21.3)**
      Memo from Inland Wetlands Agent
   b. **W1565- Uniglobe Investment, LLC., Meadowbrook Road, Sidewalk**
      Memo from Inland Wetlands Agent

8. **Reports from Officers and Committees**

9. **Other Communications and Bills**
   a. January/February 2016 CT Wildlife
   b. 3/8/16 US Army Corps of Engineers: Public Notice- Proposed Replacement and Revision of the Department Of The Army Connecticut General Permit (GP)
   c. Other

10. **Adjournment**

Charles Ausburger ▪ Binu Chandy ▪ JoAnn Goodwin ▪ Roswell Hall III ▪ Gregory Lewis ▪ Kenneth Rawn ▪ Bonnie Ryan
Vera Stearns Ward ▪ Susan Westa ▪ Paul Aho (A) ▪ Terry Berthelot (A)

DRAFT Minutes
Mansfield Inland Wetlands Agency
Regular Meeting
Monday, March 7, 2016
Council Chambers, Audrey P. Beck Municipal Building

Members present:	C. Ausburger, B. Chandy, R. Hall (6:33 p.m.), G. Lewis, K. Rawn, B. Ryan, V. Ward
Members absent:	J. Goodwin, S. Westa
Alternates present:	P. Aho, T. Berthelot
Staff present:	J. Kaufman, Wetlands Agent
	L. Painter, Director of Planning and Development

Vice Chair Ryan called the meeting to order at 6:30 p.m. and appointed alternates Aho and Berthelot to act in members' absence.

Approval of Minutes:

a. 2/01/2016 Regular Meeting:
Rawn MOVED and Lewis seconded to approve the 2/1/2016 minutes as written. MOTION PASSED. Chandy noted that she listened to the recording.

b. 2/16/2016 Special Meeting:
Rawn MOVED and Lewis seconded to approve the 2/16/2016 Special Meeting minutes as written. MOTION PASSED. Chandy noted that she listened to the recording.

Communications:

The Conservation Commission meeting minutes and Kaufman's monthly business memo were noted. Kaufman provided an update on the Mansfield Auto Part's site.

Old Business:

a. **W1561– H. Raphaelson, Dog Lane, 2 lot subdivision**
Tabled pending a 4/4/16 Public Hearing

New Business:

a. **W1562-Meadowbrook Gardens, 91 & 93 Meadowbrook Lane, 36 Units**
Rawn MOVED, Ward seconded, to:
1) Receive the application submitted by Uniglobe Investment (IWA File #W1562) under the Wetlands and Watercourses Regulations of the Town of Mansfield for construction of 36 dwelling units on property located at 91 & 93 Meadowbrook Lane as shown on a map dated 1/8/2016 and as described in application submissions, schedule a public hearing on May 2, 2016 and to refer said application to staff and the Conservation Commission for review and comments.
2) Authorize staff to engage the services of BSC Group to review the project to ensure that the stormwater will be managed in a manner that does not significantly impact wetlands. Pursuant to Chapter 122 of the Code of Ordinances, fees incurred for this review shall be the responsibility of the applicant. A deposit in the amount of the estimated cost shall be provided to the Town prior to issuance of a notice to proceed.

MOTION PASSED UNANIMOUSLY.

b. **W1563-Bicentennial Pond, Aquatic Weed Management and Sediment Removal**
Chandy MOVED, Hall seconded, to receive the application submitted by the Town of Mansfield, Assessor's Parcel ID 23.60.7 (IWA File #W1563) under the Wetlands and Watercourses Regulations of the Town of Mansfield for Aquatic Weed Management and Sediment Removal on property located at Bicentennial Pond as shown on a map dated 10/27/2015 and as described in application submissions, and to refer said application to staff and the Conservation Commission for review and comments. MOTION PASSED UNANIMOUSLY.

Reports from Officers and Committees:
None.

Other Communications:
None.

Adjournment:
Vice Chair Ryan declared the meeting adjourned at 6:46 p.m.

Respectfully submitted,

Vera S. Ward, Secretary

Field Trip Notes

MANSFIELD PLANNING AND ZONING COMMISSION
INLAND WETLANDS AGENCY
SPECIAL MEETING – FIELD TRIP
March 16, 2016

Members present:	B. Ryan, P. Aho
Conservation:	Q. Kessell (Item #1), N. Fachinetti (Item #1 & #2), M. Soares (Item #1), S. Lehman (Item #1 & #2)
Staff present:	Jennifer Kaufman, Inland Wetlands Agent; Janell Mullen, Assistant Planner

The field trip began at approximately 2:05 p.m.

W1561– H. Raphaelson, Dog Lane, 2 lot subdivision
Members were met on site by Ed Pelletier of Datum Engineering. Members observed current conditions, and site characteristics. No decisions were made. Mike Hveem from Joshua's Trust was present as well.

W1563-Bicentennial Pond, Aquatic Weed Management and Sediment Removal
Members observed current conditions, and site characteristics. No decisions were made.

PZC File #1258- Modification Request to a Gravel Permit, 1090 Stafford Road
Members were met on site by Philip DeSiato, DeSiato Sand & Gravel. Members observed current conditions, and site characteristics. No decisions were made.

PZC File #1339- Special Permit Application, Efficiency Unit, 152 Cedar Swamp Road
Members observed current conditions, and site characteristics. No decisions were made.

The field trip ended at approximately 3:30 p.m.

Town of Mansfield
CONSERVATION COMMISSION
Meeting of 16 March 2016
Council Chambers, Audrey P. Beck Building
(draft) MINUTES

Members present: Aline Booth (Alt.), Neil Facchinetti, Quentin Kessel, Scott Lehmann, Grant Meitzler, John Silander, Michael Soares. *Members absent*: Joan Buck (Alt.), Robert Dahn. *Others present*: Howard Raphaelson, Jim Wohl, Mark Kohan (W1561); Ed Pelletier (Datum Engineering, W1561 & W1562); Gerald Hardisty, Robert Magi, Edward Paul, Michael Yenke (W1562); Jennifer Kaufman (Wetlands Agent). {The "Others present" list is not complete, since some who attended regarding W1562 did not affix their names to the sign-in sheet.}

1. The meeting was **called to order** at 7:35p by Chair Quentin Kessel. Booth was designated a voting member for this meeting.

2. The **draft minutes** of the 17 February 2016 meeting were approved as written.

3. IWA referrals. {To accommodate visitors, the Commission deferred action on these referrals until all three applications had been presented and public comments regarding them heard. These minutes do not follow temporal order in this respect, but conclude each section with a record of the Commission's action, if any.}

a. W1561 (Raphaelson, Dog La). Ed Pelletier reviewed the application, which proposes to split a 14.85 acre parcel on the east side of Dog Lane into two lots: a roughly rectangular Lot 1 (2.36 ac, 250 ft of continuous frontage) and an irregularly shaped Lot 2, which wraps around Lot 1 (13.49 ac, continuous frontage of 56 ft to the south, and 415 ft to the north, of Lot 1). The 200 ft of continuous frontage required by the Town need not be in front of the house on Lot 2.

{The application was revised, after publication of the Agenda for this meeting, so that it no longer proposes to "subdivide" the 14.85-acre parcel. Instead, Lot 1 qualifies as a "first cut" with no subdivision of Lot 2 proposed at this time. The conservation easement on Lot 2 shown in the original application is absent from the revision.}

The parcel as a whole is mostly (perhaps 70%) wetland. The houses on Lots 1 and 2 (resp.) would be sited fairly close together on a low, forested knoll close to Dog Lane, 108 ft and 63 ft (resp.) from wetlands at their closest points. Their engineered septic systems, which have DPH approval, would be 58 ft and 50 ft (resp.) from wetlands, on a fairly gentle slope above them. A foundation drain for Lot 2 would discharge 8 ft from wetlands.

In a letter circulated by Kaufman, Kathryn Ratcliff (60 Bundy La) indicated that she and other abutters had not received up-to-date plans for the proposed development and expressed concern about the potential for nutrient loading of wetlands from septic leaching or system failure. Jim Wohl (128 Dog La), speaking at the meeting, also said that abutters have not seen the revised plans. He is not opposed to having one house on the knoll, but objected to squeezing two houses into this space; a second house increases the risk of a significant negative impact on wetlands, a risk which should be carefully assessed. Mark Kohan (127 Dog La) reiterated these concerns, noting that the parcel is extremely wet at some times of year.

In response, Mr. Pelletier said that the revised plans differ only slightly from the original proposal and not in respects relevant to the development's potential impact on wetlands. In his judgment, putting Lot 2's house in the proposed location was better for wetlands than locating it on an upland farther east, as that would necessitate a wetlands crossing. To questions from Lehmann, he replied that the alternative of placing just one house on the entire parcel had not been considered, but that an engineered septic system would be required even if just one house

were sited on the knoll. Discharge from a failed septic system could end up in wetlands, but the probability of such a failure is, in his view, quite small. The proposed foundation drains should not threaten wetlands, since the volume of ground-water discharged would be modest and not require treatment.

Kaufman noted that George Logan is preparing a wetlands report, which it is not yet ready. She observed that, while no conservation easement is required, the Commission could recommend such an easement to enhance protection of extensive wetlands on the parcel. Kessel pointed out that Lot 2 abuts Joshua's Trust land and wondered if the parcel's owner, Howard Raphaelson, could be interested in granting a trail easement on Lot 2 providing access to Whetten Woods from Dog Lane; such an easement could permit linking Storrs Center to the Nipmuck Trail via the Torrey Preserve. Mr. Raphaelson appeared willing to consider this.

After some discussion, the Commission agreed (**motion:** Silander, Kessel):

(1) to request that the April 4 hearing be kept open to May 2, so that the Commission could review the wetlands report at its April meeting; but
(2) to comment to the IWA that:

- At this time, the Commission is concerned about the potential for nutrient loading of down-slope wetlands from the engineered septic systems, and suggests moving these systems farther from wetlands or reducing the number of houses from two to one.
- The Commission suggests that the parcel's owner consider conservation easements to enhance wetlands protection and a trail easement across Lot 2 to provide for a future connection to Whetten Woods and Storrs Center from the Nipmuck Trail.

All were in favor, save Soares, who abstained as an interested Dog Lane resident. {Facchinetti, Kessel, Lehmann, & Soares viewed the site on the 16 March IWA/PZC Field Trip.}

b. W1562 & PZC1284-3 (Meadowbrook Gardens Multi-Family Development). This proposal, again introduced by Mr. Pelletier, would construct 36 1- and 2-bedroom residential units on a 4.6-acre site adjacent to the associated Whispering Glen development, now under construction to the east. The parcel is essentially flat from Meadowbrook Lane south to where it drops steeply to Conantville Brook; at its western edge is a more gradual slope to a watercourse on adjacent property. All development would occur on the level portion of the property. Four multi-unit buildings would be arrayed around a central open area, with parking around the outside. Slopes on the south and west would be undisturbed.

The nature of wetlands associated with Conantville Brook to the south and the watercourse to the west was reviewed by soil scientist Ed Paul. The application does not propose a conservation easement for these areas. However, Mr. Pelletier noted that the steep slope and wetlands below it at the south end of the Whispering Glen property are protected by a conservation easement, which could be extended to this new development.

The area is served by water and sewer lines, so the main potential impact on wetlands would be from runoff. Gerald Hardistry reviewed the proposed storm-water management system. Very porous sandy & gravelly soils should permit runoff from impervious surfaces – roofs, parking areas, sidewalks, roads – to be absorbed on site, save in extreme weather events. The system is designed to hold water from a once-in-50-years event. Roofs would drain to catch basins and dry wells in the central open area, parking areas to holding ponds and underground concrete galleries around the perimeter. In extreme events, overflow would be directed into the watercourse to the west via a drainage armored with rip-rap. Responding to a query from Silander about whether other approaches – rain gardens, green roofs, pervious pavement – had been considered, Mr. Haristry said that concerns about the longevity and maintenance

requirements of such systems dictated a more traditional approach.

The Whispering Glen project includes construction of a sidewalk on the south side of Meadowbrook Lane west to Sunny Acres. Soares suggested adding a walkway to give residents of Meadowbrook Gardens access to this sidewalk; Mr. Pelletier said this could be done.

Mr. Pelletier and his associates left the meeting at 8:55p. When the Commission returned to consideration of W1562, Kaufman reported that the density of this project had led the Town to hire a consultant to review the storm-water management system proposed for it. She suggested that the Commission consider the consultant's report at its April meeting. After some discussion, the Commission agreed unanimously (**motion:** Kessel, Silander) to pass along the following suggestions and comments to the IWA & PZC:

- The Commission urges that the conservation easement on the Whispering Glen parcel be extended to include the steep slope and wetlands at the southern end, and the undeveloped strip along the western side, of the Meadowbrook Gardens parcel.
- The Commission suggests additional plantings (a) along Meadowbrook Lane to screen the development and (b) at the rim of the steep slope above Conantville Brook to discourage dumping, driving over the edge, etc.
- The Commission suggests that more creative storm-water management measures (such as rain gardens) be utilized. It would appreciate the opportunity to comment further after it has seen the Town consultant's report on the proposed storm-water management system.
- The Commission is pleased to learn that the sidewalk from Whispering Glen to Sunny Acres will stay on the south side of Meadowbrook Lane. It suggests that the Meadowbrook Gardens project include a walkway to this sidewalk.
- Should regulations be changed to allow more unrelated people to occupy units in this development, additional parking space will be needed.

c. W1563 (Bicentennial Pond, Aquatic Weed Removal & Management). The Parks and Recreation Department proposes to remove aquatic weeds that have been encroaching on the 2.6-acre swimming area at Bicentennial Pond and to treat the Pond with herbicides to control growth of various nuisance plants. Weeds (and silt that has accumulated over the years from their decay) would be mechanically removed from the swimming area by what is essentially a large vacuum cleaner, and pumped into fabric tubes on shore to dewater. Once dry, this material would be hauled away for use as soil enrichment. Mechanical removal would be followed by treating the pond with herbicides to check the growth of a number of nuisance species, including water chestnut, which has recently been found at the inlet to the Pond. Its sharp spines would be a hazard for waders and swimmers, should it spread to the swimming area.

On the 3/16 IWA Field Trip, Facchinetti & Lehmann had been told that the herbicide treatments would be done in the spring, well before Bicentennial Pond was opened for swimming. However, Facchinetti noted that the 11/13/15 proposal from All Habitat Services, Inc. included in the packet mentions follow-up treatments of certain herbicides. For example, treatment with Flumioxazin to control Western Waterweed and Water Starwort is supposed to occur "at the beginning of the season and should be followed by additional applications 5-10 weeks apart." Kaufman agreed that the Town would need to negotiate and monitor the timing of treatments so as to avoid exposing swimmers to active herbicides.

4. Town conservation easements. The Town Attorney has not yet looked into whether a visit by Commission members to a Town-held conservation easement would constitute a "meeting" of the Commission (requiring public notice, opportunity for members of the public to attend, etc.), as a member of the Connecticut Freedom of Information Commission apparently believes. Meanwhile, Kaufman wants to upgrade the Town's "Model Conservation Agreement" (MCA). She distributed a copies of it, along with similar instruments used by Joshua's Trust and East

Haddam, and encouraged Commission members to suggest desirable changes in the Town's MCA.

5. Biking on Town trails. Kaufman distributed copies of a 14 March letter from the Connecticut Forest and Park Association (CFPA), which oversees blue-blazed trails in Connecticut, objecting to (1) permitting mountain biking on the Nipmuck Trail on Town land in Mansfield (e.g., Schoolhouse Brook Park and Fifty Foot) or (2) encouraging bikers to use the Trail as a connector between Town lands where they might be permitted on other trails. Given CFPA's position, proposals to open additional trails on Town land to biking seem ill-advised.

6. Zoning regulations. Booth reported that the Zoning Focus Group has begun meeting to review draft zoning regulations implementing the most recent Plan of Conservation and Development. Kaufman explained that the process of writing and reviewing these regulations will now proceed with the active involvement of the Focus Group.

7. Adjourned at 9:50p. Next meeting: 7:30p, Wednesday, 20 April 2016.

Scott Lehmann, Secretary, 20 March 2016.

Town of Mansfield

Inland Wetlands Agency

Date: March 31, 2016
To: Mansfield Inland Wetlands Agency
From: Jennifer Kaufman, Inland Wetlands Agent
Subject: Monthly Business Report

Mansfield Auto Parts - Route 32

On February 22nd, when I visited the site, I observed approximately 10 tires in the wetland. I returned on March 30th and they had cleared all but one tire and one inner tube. Upon being notified of this, they sent an employee to clear them out immediately. I have contacted CT DEEP to determine if they are in compliance and will report the status to the Agency when I hear back. I will continue to monitor this property.

Agent Approvals

- **A8- George and Janet Jones-49 Farrell Road-**Construction of 12x18 foot shed, over 75 feet from the edge of wetlands.

Town of Mansfield

Department of Planning and Development

Date: March 29, 2016

To: Mansfield Inland Wetlands Agency

From: Jennifer Kaufman, Inland Wetlands Agent

Subject: 128 Dog Lane (File #W1561)
H. Raphaelson
Description of work: Lot Split
Map Date: January 12, 2016, revised through March 16, 2016

Notifications

☒ The applicant has paid the required application fee
☒ The applicant has submitted certified mail receipts for notices mailed to abutters

Project Overview

On February 22, 2016, I requested that the applicants prepare a Wetlands and Assessment and Impact Analysis. This report was submitted to staff on March 28, 2016. Because this report had not been completed for the Conservation Commission Meeting on March 16, 2106, they have requested that the Public Hearing be kept open until May 2, 2016 so that they have the opportunity review and comment on this report at their April meeting.

Since you received the application on February 1, 2016 there have been the following changes and additional submissions:

1. In response to questions from Eastern Highlands Health District (EHHD), the applicants have submitted a revised plan (revised through March 16, 2016). The distance of both the primary and the reserve septic systems to the edge of wetlands has not changed. The proposed plan has been reviewed by EHHD and, based on this review, it is in compliance with the CT Public Health Code and Technical Standards.
2. After doing further research, it was determined that a subdivision is not required for this lot split as it is part of the "free cut" for this parcel. A Building Area Envelope, Development Area Envelope and Conservation Easement are not required for a lot split; and thus have been removed from the plan.
3. According to the DEEP Natural Diversity Database, state and/or federal listed species have been identified on this parcel. CT DEEP has prepared a review of the species and has submitted recommended protection strategies and best management practices to protect the listed species.

4. Civil Engineering Services, LLC, on behalf of the applicant, has submitted a letter addressing the issue of the impact of the proposed septic systems and stormwater discharge.

If the Agency is in agreement with the recommendation to continue the public hearing to May 2, 2016, the following motion is in order:

Recommendation/Suggested Motion

_____ MOVES, _____ seconds to open the public hearing on the lot split application (W1561) submitted by H. Raphaelson at 128 Dog Lane and continue it to May 2, 2016.

● Ecology
● Soil & Wetland Studies
● Water Quality Monitoring ● GPS
● Environmental Planning & Management
● Ecological Restoration & Habitat Mitigation
● Aquatic, Wildlife and Listed Species Surveys
● Application Reviews ● Permitting & Compliance

March 27, 2016

Town of Mansfield
Inland Wetlands Agency
14 Park Place
Mansfield, CT 06226-2217

Re: **WETLANDS ASSESSMENT & IMPACT ANALYSIS: *SUMMARY OF FINDINGS***
Raphaelson Estates, 2-lot Residential Subdivision
Dog Lane, Storrs, CT

REMA Job No.: 16-1903-MNS19

Dear Agency members:

At the request of the applicant, Howard A. Raphaelson, REMA ECOLOGICAL SERVICES, LLC (REMA) has prepared this document to be submitted as part of an application for a two-lot residential subdivision, currently before the Town of Mansfield's Inland Wetlands Agency ("IWA" "the Agency"). The project plans, reviewed by REMA, were prepared by Datum Engineering & Surveying, LLC, and dated 1/12/16, and revised through 3/16/16.

We are providing herein our *Summary of Findings* with an overview of the site's regulated resources and other environmental features, as well as an analysis of the proposal, as it relates to regulated wetlands and watercourses. This document presents the basis for our professional opinion that existing wetland and watercourse functions and values will not be degraded by the proposed activities.

In addition, we discuss the potential for the site's regulated wetlands and watercourses to be utilized as habitat for two "CT-listed" Species of Special Concern, namely the Appalachian brook crayfish (*Cambarus bartonii*), the wood turtle (*Glyptemys insculpta*). According to the

CT DEEP's Natural Diversity Database, the former species has been documented in Robert's Brook, while latter from the Fenton River. Robert's Brook, a perennial stream, is to the northwest of the subject site, in a different watershed than that of the site's intermittent streams[1], while the Fenton River is downgradient and to the north and east of the site.

Site visits, to obtain baseline data that allow for adequate descriptions of the regulated resources, were conducted on February 27th, and March 25th, 2016. During the second site visit we targeted the site's streams, documenting aquatic life, and specifically searching for the "CT-listed" crayfish.

Attached to this report are several figures (Figures 1 through 4) including a recent aerial photograph, as well as several annotated photographs with an emphasis on the site's regulated resources (Photos 1 through 14). Moreover, we also attach two inventory forms, one for the wetlands, and one for the site's eastern intermittent stream, and the CT Soil Survey of the subject site.

INTRODUCTION & OVERVIEW

The applicant proposes to subdivide a roughly 15.85-acre parcel ("the site," "the study area") into two lots, for the purpose of siting two single-family houses, which would be served by on-site wells and septic systems. The plan calls for the proposed houses to be built within the eastern uplands of the overall parcel, with access from Dog Lane. Direct impacts to wetlands and watercourses are not proposed, and proposed lot development activities will average 40-50 feet from the wetland boundaries.

Regulated wetland boundaries were delineated by John P. Ianni, Certified Professional Soil Scientist, and were verified in the field and found to be substantially accurate.

The *Summary of Findings* presented below is based on field investigations, secondary-source maps and documents, and the proposed project plans.

[1] The streams associated with the site show up as "dashed" blue lines in the USGS topographic map of the area (see Figure 1), indicating that they are not considered perennial. However, we believe these stream sto be "semi-perennial," that is, streams which may stop flowing in the summer of some years, but retain moisture within them to support some aquatic species.

2.0 SUMMARY OF FINDINGS

2.1 EXISTING CONDITIONS

- The overall 15.85-acre parcel is located in Storrs, Connecticut, roughly equal distance from Route 195 and the University of Connecticut to the west, and the Fenton River riparian corridor to the east (see Figure 1, attached). The surrounding landscape is comprised of undeveloped land and low to medium density residential landuses.

- The proposed development area is a roughly 2.2-acre wooded upland section of the property, which abuts Dog Lane to the northwest. Soils here are mapped as the well-drained Canton and Charlton (61) soil series complex.

- One contiguous wetland (i.e. Wetland A) is associated with the overall parcel, and extends off-site to the east and to the southwest (see Figure 2, attached). This is red maple dominated forested wetland, with *seasonally flooded*, *seasonally saturated*, and *saturated* hydrologic regimes (see appended definitions). The dominant hydro-geomorphic (HGM) classification of Wetland A, includes *groundwater slope*, and *groundwater depression*.

- Dominant overstory vegetation in Wetland A includes red maple, green ash, and American elm, while the locally dense understory supports spicebush, Japanese barberry (invasive), multiflora rose (invasive), and highbush blueberry. Due to the season of wetland characterization and inventory (early Spring), identifiable species of the herbaceous layer included skunk cabbage, ferns (sensitive, cinnamon, wood ferns), swamp dewberry, scouring rush, sedges, and a few others. Floristic diversity is likely moderately high in the herb stratum. It should be noted that there is a fairly severe infestation of Japanese barberry within Wetland A, particularly within its poorly drained sections on sloping terrain.

- Two intermittent streams are associated with Wetland A, one flows from the west into it via a culvert under Dog Lane (i.e. the northern stream), the other flows down moderate slopes from the south, past the development area (i.e. the eastern stream). Moderate intensity surveys were conducted along the two intermittent streams, in part in an effort to locate a "CT-listed" crayfish (*Cambarus bartonii*) (see also attached USEPA Stream Data Form).

- Wetland A can be characterized as having two sections: a poorly drained section on gentle slopes, associated with the eastern stream, and a very poorly drained section on nearly flat terrain, associated with the stream that forms after the confluence of the two tributaries.

- A formal functions and values assessment of Wetland A has not been conducted. However, it can be said that in general this wetland does offer several *principal* functions including *wildlife potential*, *groundwater discharge*, and *nutrient removal, retention and transformation*. While a significant portion of the wetland is dominated in the understory by invasive species, the very poorly drained section on nearly level terrain, is mostly free of invasives, and would likely be found to have a moderate level of floristic diversity. This fact and the presence of the two streams confer functional value to this wetland. We should also note, that while we did not specifically inventory, being that it was off-site, the far eastern section of Wetland A is flooded and likely provides breeding habitat for forest dwelling amphibians (a few spring peepers were heard chorusing during our March visit).

- A qualitative macro benthos survey of the eastern stream (watershed: +/-85.8 acres, see Figure 4), resulted in a moderately high number of the following taxa: mayflies [Ephemenoptera (E), Ephimerellidae, Baetidae], stoneflies [Plecoptera (P), Perlidae], and caddisflies [Trichoptera (T), Glossosomatidae]. Both the stoneflies and the mayflies were early instars (nymphs). The absence of later instars, particularly of the stoneflies, indicates that this stream is intermittent, not allowing for completion of the 1-2 year cycle to adult emergence. However, the presence of the EPT taxa, and a general paucity of diptera (e.g. midges, black flies, etc.) and other taxa of pollution tolerant macroinvertebrates, indicate good to very good water quality in the stream.

- *Cambarus bartonii*, known at the Appalachian brook crayfish, is one of eight crayfish species identified to date in Connecticut (by CT DEEP and others). It is listed in Connecticut as a Species of Special Concern. As of 2011, this species has been collected in 11 sites statewide, including Eagleville Brook[2], in Mansfield. Additional anecdotal data suggests that this species also exists in many small watercourses of northwestern CT. A moderate intensity search for crayfish species was conducted

[2] A recent email communication with Dawn McKay of CT DEEP's Natural Diversity Database, indicated that this species was also associated with Roberts Brook, located north west of the subject site. This could be an observation made since 2011 or an error in location.

along a roughly 320-stretch of the eastern stream. Roughly 75% of the stream channel was searched, but none where observed. Moreover, remnants of exoskeletons, typically found in crayfish streams, were not encountered. Crayfish breed in early Spring, so they are typically more conspicuous. We surmise that even though crayfish can survive in "semi-perennial" (i.e. higher order intermittent) streams, they prefer perennial streams with a robust and continuous supply of prey (e.g., insect larvae, amphibian eggs, etc.).

- The CT DEEP, via an email communication to the project engineer, in addition to the crayfish species, also indicated that wood turtle, another Species of Special Concern, was known from the vicinity of the site, and specifically the Fenton River riparian corridor. Figure 3 (attached), shows that the subject site is at least 2,000 feet upgradient and to the southwest of the Fenton River. While wood turtles are known to move long distances, usually 1,000 feet or more, in terrestrial, even wooded, habitats in search of foraging opportunities (and sometime nesting), they much prefer more open successional habitats. In addition to a paucity of preferred habitats at the site, and the sheer distance, the terrain is inhospitable for wood turtle travel, including roadways and moderately steep slopes. What comes in play is the ecological principle of energy conservation, especially for a cold-blooded animal. A wood turtle would not expend the energy to travel this far and under unfavorable conditions to utilize the subject site.

2. PROPOSED CONDITIONS

- There are *no* direct impacts to wetlands or watercourses proposed.

- Potential *indirect* impacts would be associated with the potential for erosion and sedimentation during the construction phase, and the potential degradation of water quality during the post-construction phase. Other potential indirect impacts, such as alteration of hydrology, or introduction of invasive species, would not be relevant at this site.

- The erosion and sedimentation controls shown on the plans are more than adequate to ensure protection of the regulated resources during construction. Cuts and fills are minimal, soils are predominately of medium texture, thus only moderately erosible,

the primary areas of earthwork are sufficiently far from the wetlands and watercourses, and slopes are not excessive. Diligent monitoring and maintenance of the controls, however, is of paramount importance.

- In general, the limit of disturbance (LD) shown on the plans allows for an average of about 40 feet of undisturbed upland to the wetlands and even more to the watercourses, on generally gentle slopes. This is a sufficiently wide protective zone both during and after construction.

- It has come to our attention that the Conservation Commission, as well as an adjacent property owner, has voiced concerns regarding the potential for the on-site septic systems to impact the wetlands and watercourses. We note that a slight adjustment to the septic system locations (primary field) is shown on the revised plans (3/16/16). For Lot #1, the closest the primary septic area is to a wetland boundary (following topographic contours) is +/- 66 feet, while for Lot #2, it is 94 feet.

- In the past, failed septic systems have resulted in the release of nutrients to wetland and aquatic systems, often resulting in the degradation of these habitats. This release typically increases rank vegetation that outcompete many other plant species, reducing diversity, and promotes growth of alga on stream substrate, smothering the aquatic habitat. Watershed-wide studies by federal agencies such as USEPA and the USGS had shown that, in general, the water quality of surface waters in watersheds that were sewered, was higher than those that were not (e.g. Heisig 1999)[3]. Today, with the revisions to the "health code" septic systems are much more stringently permitted, and their design is highly engineered and conservative.

- The potentially harmful constituent that is exported by septic systems is nitrate-nitrogen, which while naturally occurring is typically in the 0.3 to 0.6 mg/L range in non-impaired surface waters, based on our multi-year Connecticut experience[4].

- Specifically related to the subject site and septic systems we note the following:

[3] Heisig, P.M., 1999, Effects of unsewered residential land use on chloride and nitrate concentrations in stream baseflow in the Croton watershed,southeastern New York [abs]: EOS, Transactions, American Geophysical Union 1999 Spring Meeting, v. 80, no. 17, p. S123.
[4] In the early spring these concentrations can be between 1.0 and 1.5 mg/L, or even higher, but quickly subside as soon as vegetation starts taking up this nutrient.

- First, we have not collected a surface water sample to see if there is already elevated nitrate-nitrogen in the eastern stream, which would potentially be the recipient of nitrate-nitrogen from the septic systems. However, based on the type and abundance of emerging vegetation, and the presence of some macro-alga in the stream (e.g. filamentous green), it is likely that nitrate concentrations are low-moderate.

- Second, the assumption here is that shallow groundwater would flow from the septic system areas and be discharged to the eastern stream. While this might be the case during high flow and high groundwater periods, such as during the early Spring (when dilution of nitrate is high diminishing concentrations), during low flows, such as during late spring through early fall, that might not be the case at all, especially considering that the stream does not have much or any baseflow during those times. Technically, it is an intermittent stream.

- Third, the ultimate recipient of any excess nitrate-nitrogen is the larger, nearly level swamp in the northern and northeastern section of the overall property, with very poorly drained soils and dense vegetation. Flow velocities are reduced in the swamp, and water spreads out and interfaces with vegetation and soils. The presence of muck, which is high in organics, promotes denitrification, and nitrate-nitrogen (as well as other nitrogen species) is converted to atmospheric nitrogen. Then, of course, there is plant uptake, which is also quite high here during the growing season. Therefore, the wetland is able to take care of excess nitrogen without any impacts to the downgradient perennial watercourse, namely the Fenton River.

- The only quantitative tool that is available to us is a nitrate-nitrogen dilution analysis for each of the septic systems that are proposed. It is our understanding that the project engineer is conducting such an analysis, and will forward it directly to the Agency. We have not seen the results of this analysis, but we note that even concentrations of 4 to 7 mg/L would not be detrimental to the wetlands or the watercourse, because during the times of higher stream flows when nitrate-nitrogen laden discharge could be experienced here, there would immediately be significant dilution from surface flows generated in the +/-85.8-acre watershed.

- Finally, in our professional opinion, the primary sensitive receptor associated with the site is the Fenton River. But, as discussed above, the forested swamp will significantly attenuate nitrate-nitrogen levels, to nearly baseline, thus protecting this resource. Moreover, while the on-site eastern stream could receive some seasonal increases in nitrogen (during high flow and high dilution periods), based on vegetation and presence of macro-algae it is already a high-nutrient system and, thus, not sensitive. If the on-site stream was a perennial, cold-water habitat, and had a mesotrophic nutrient regime, some concerns would be warranted. But that is not the case at the subject site.

3.0 CONCLUSION

In conclusion, it is REMA's professional opinion that the proposed two-lot residential subdivision, if constructed as designed and shown on the revised plans, will not result in long-term adverse impacts to the site's regulated resources, or the functions and values that they provide. In the short-term (construction phase) it is important that diligence be exercised to minimize the risk for sedimentation into on-site and off-site wetlands and watercourses.

Please contact our office with any questions on the above.

Respectfully submitted,

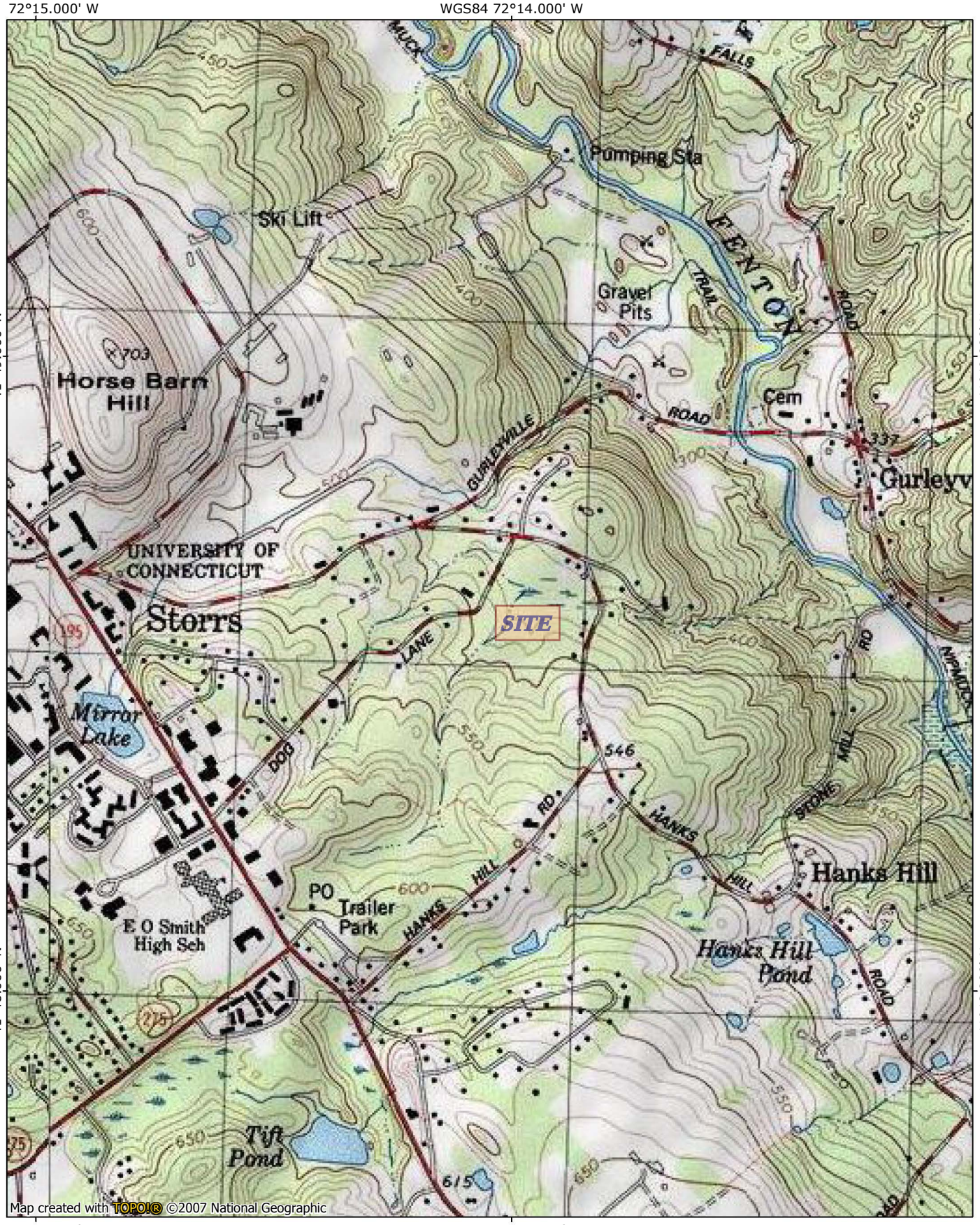
REMA ECOLOGICAL SERVICES, LLC

George T. Logan, MS, PWS, CSE
Professional Wetland Scientist/Registered Soil Scientist
Certified Senior Ecologist/Wildlife Biologist

VIA HAND-DELIVERY

Attachments: Figures 1 through 4, Photos 1 through 14, Wetland Classification & Characterization (Definitions); Wetland Delineation & Characterization Form; USEPA Stream Data Form, Web Soil Survey of Site

Figure 1: Site Locus; Raphaelson Estates, Dog Lane, Storrs, CT



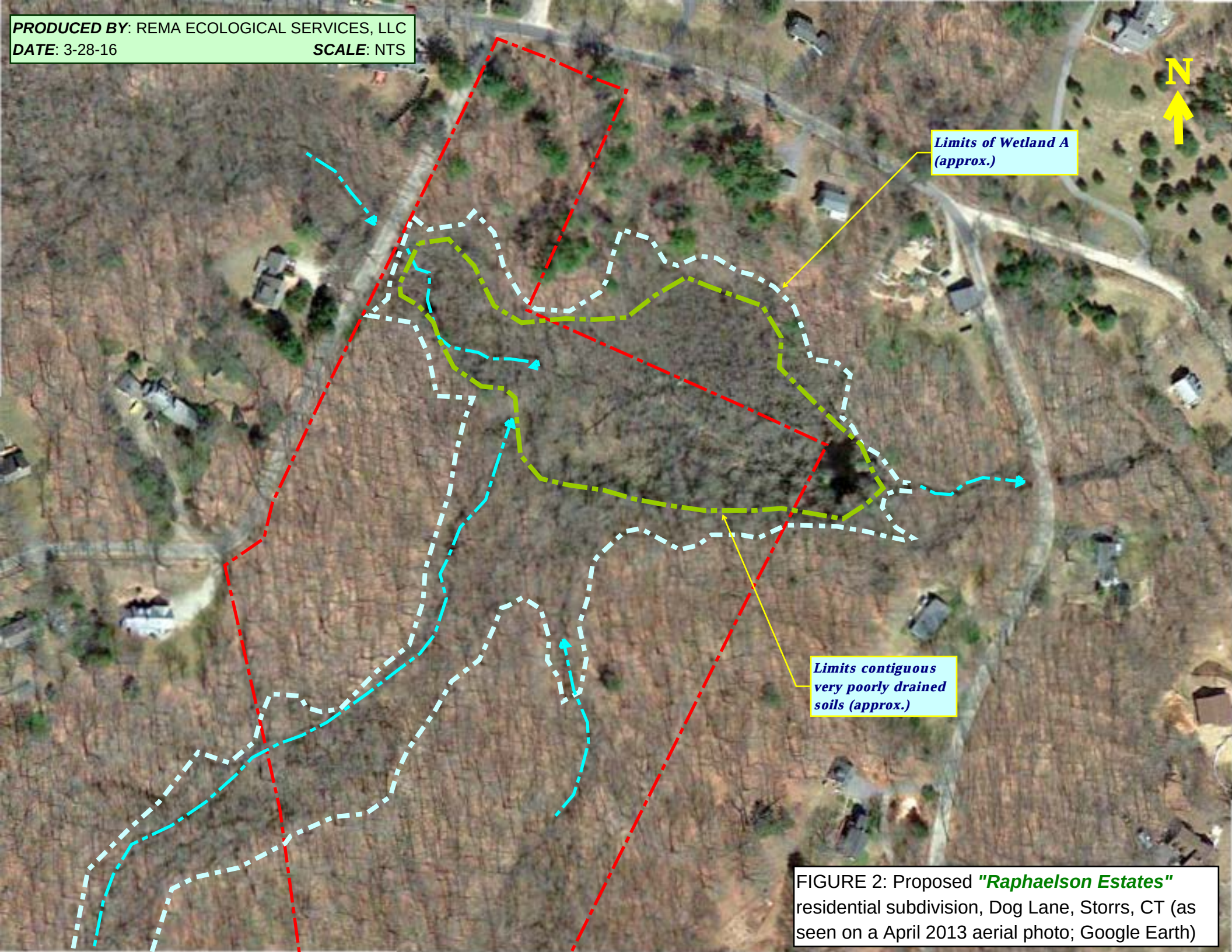


FIGURE 2: Proposed ***"Raphaelson Estates"*** residential subdivision, Dog Lane, Storrs, CT (as seen on a April 2013 aerial photo; Google Earth)

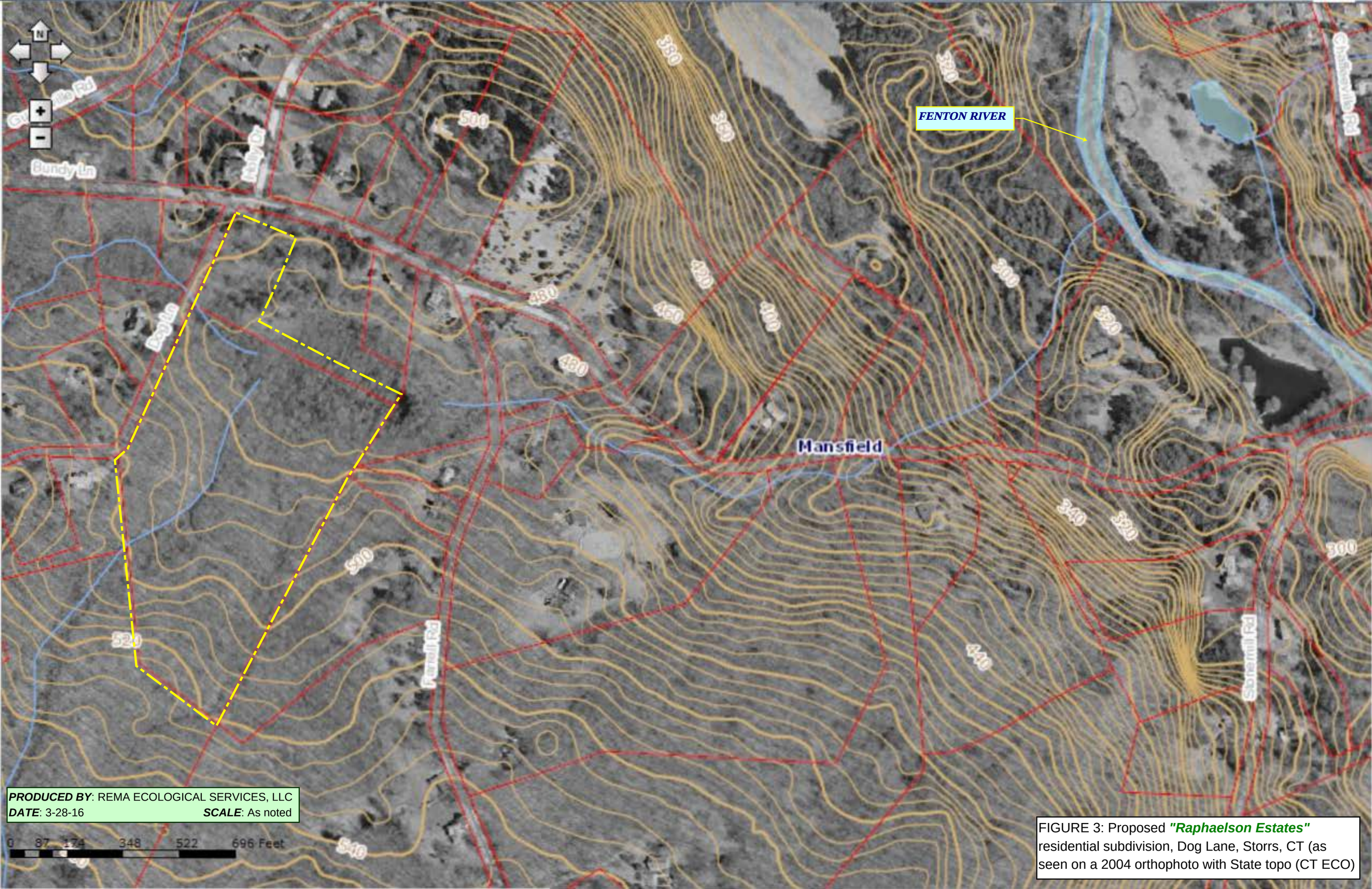


FIGURE 3: Proposed ***"Raphaelson Estates"*** residential subdivision, Dog Lane, Storrs, CT (as seen on a 2004 orthophoto with State topo (CT ECO)

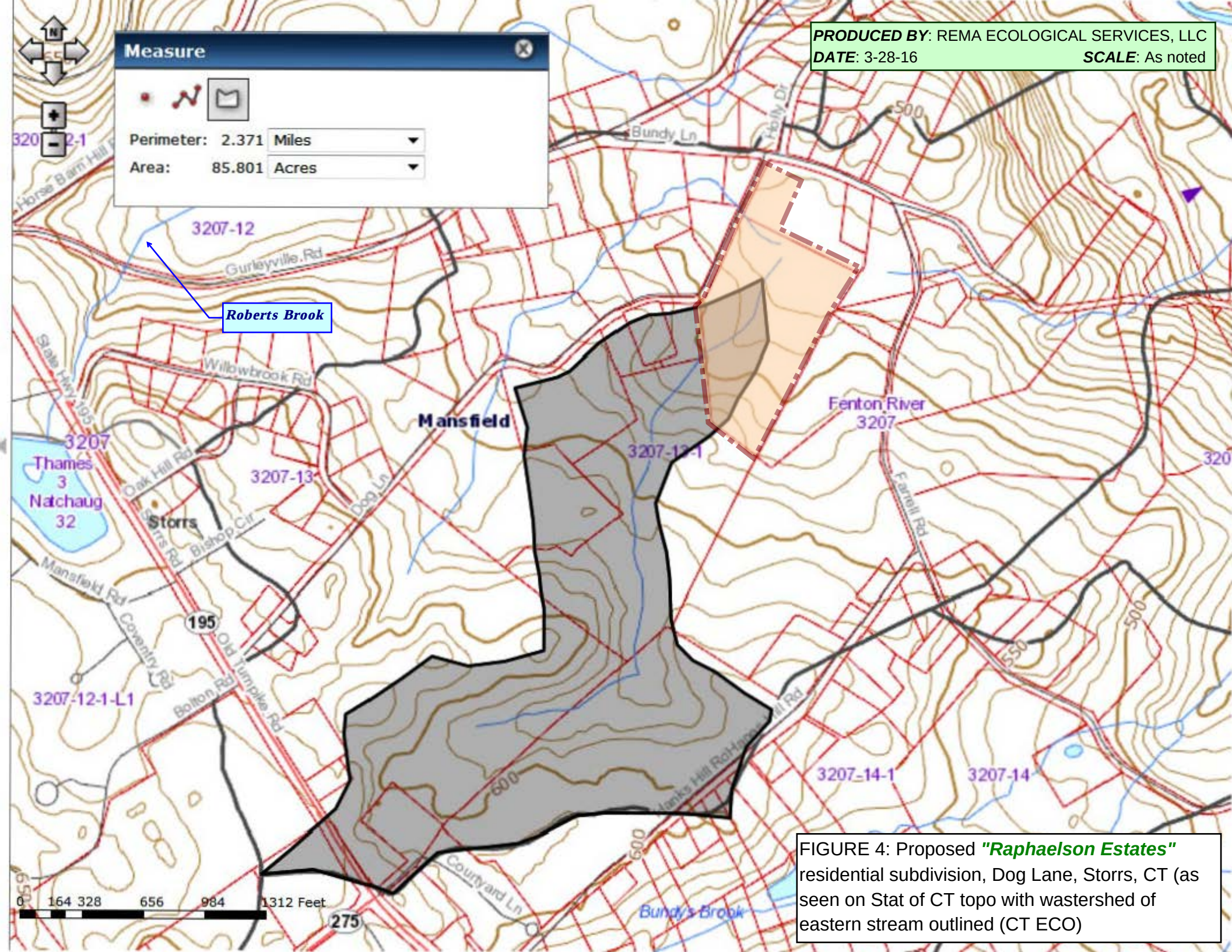


FIGURE 4: Proposed ***"Raphaelson Estates"*** residential subdivision, Dog Lane, Storrs, CT (as seen on Stat of CT topo with wastershed of eastern stream outlined (CT ECO)

Raphaelson Estates, Dog Lane, Storrs, CT
Photos taken February 27th, and March 25th, 2016, by REMA Ecological Services, LLC

Photo 1: Northern intermittent stream, just below culvert at Dog Lane; facing easterly

Photo 2: Same stream as in Photo 1, meandering through forested wetland north of the uplands for the two proposed lots; facing northwesterly

Raphaelson Estates, Dog Lane, Storrs, CT
Photos taken February 27th, and March 25th, 2016, by REMA Ecological Services, LLC

Photo 3: Poorly drained section of forested swamp north of uplands for the two proposed lots; facing southerly

Photo 4: Nearly level, very poorly drained section of forested swamp; receives flows from both of the site's streams; facing northeasterly

Raphaelson Estates, Dog Lane, Storrs, CT
Photos taken February 27th, and March 25th, 2016, by REMA Ecological Services, LLC

Photo 5: Moderate microtopography with bristly-stalked sedge hummocks in somewhat more open, very poorly drained section of northern section of on-site wetland

Photo 6: Poorly drained, Japanese barberry infested forested wetland on a slope, east of uplands for the two proposed residences; facing southeasterly

Raphaelson Estates, Dog Lane, Storrs, CT
Photos taken February 27th, and March 25th, 2016, by REMA Ecological Services, LLC

Photo 7: Eastern stream flowing towards very poorly drained, nearly flat section of on-site forested swamp (February); facing northerly

Photo 8: Same stream as above photo; facing southeasterly

Raphaelson Estates, Dog Lane, Storrs, CT
Photos taken February 27th, and March 25th, 2016, by REMA Ecological Services, LLC

Photo 9: Eastern stream; upstream view; survey was conducted here for "CT-listed" crayfish (*Cambarus bartonii*); no crayfish were observed; facing southerly

Photo 10: At the eastern branch boulders and cobbles are covered with mosses and liverworts, indicating year-round moisture, and good water quality.

Raphaelson Estates, Dog Lane, Storrs, CT
Photos taken February 27th, and March 25th, 2016, by REMA Ecological Services, LLC

Photo 11: Clear waters during higher flows in February 2016 in eastern tributary

Photo 12: View of eastern wetland corridor from uplands where proposed houses would be constructed; not green hue of barberry, and uplands on far side; facing southeasterly

Photo 13: Early instar (nymph) of stonefly; abundant at both of site's streams

Photo 14: Bluebird, one of several avians observed during the site visits (winter resident, migrant)

WETLAND DELINEATION & CHARACTERIZATION FIELD FORM

Project:	Raphaelson Estates, Dog Lane, Storrs, CT	**Wetland ID:**	**A**
Inspection Dates:	2/27/16 & 3/25/16	Wetland Flag Series:	WL-1 to WL-36
Inspector(s):	George T. Logan	NWI Classification Codes:[1]	**PFO1**

Weather/Field Conditions:	Sunny, cold/Overcast, cool	Snow/Frost Depth:	Trace/none
Soil Moisture:	☒ Wet	☒ Moist	☐ Dry
Type of Wetland Delineation:	☒ State	☐ Federal	☐ Other

HGM Classification

☐ Surface Water Slope	☒ Surface Water Depression
☒ Groundwater Slope	☒ Groundwater Depression

NWI Classification

System:

☒ Palustrine	☐ Lacustrine	☐ Riverine	☐ Estuarine

Class:

☒ Forested	☐ Scrub Shrub	☐ Emergent
☐ Aquatic Bed	☐ Unconsolidated Bottom	☐ Unconsolidated Shore

Subclass:

☒ Broad-leaved deciduous	☐ Needle-leaved evergreen	☐ Persistent
☐ Non-persistent	☐ Sand	☐ Mud
☐ Other:_____, _____		

Wetland Hydrology

☒ Seasonally Flooded	☒ Temporarily Flooded	☐ Semi-permanently Flooded
☒ Seasonally Saturated	☒ Saturated	☐ Permanently Flooded

Watercourse Type

☒ Intermittent	☐ Perennial	☐ Tidal
Comments: Two streams with confluence on site, show up as dashed lines on USGS topographic maps, indicating that they are not considered perennial; see separate EPA form		

Special Aquatic Habitats

☐ Vernal Pool	☐ Bog	☐ Fen
Comments: None found on site		

[1] The wetland unit could include more than one cover type. The dominant cover type is first.

Mapped Soil Series/Units

Soil Series (Map Unit Symbol)	WET	UP	DRAINAGE CLASS	NRCS MAPPED	FIELD CONFIRMED
Ridgebury, Leicester, Whitman (3)	☒	☐	PD, VPD	☒	☒
Sutton (51) fine sandy loam	☐	☒	MWD	☒	☒
Canton and Charlton (61)	☐	☒	WD	☒	☒
	☐	☐		☐	☐
	☐	☐		☐	☐
	☐	☐		☐	☐

ED=excessively drained; SED=somewhat excessively drained; WD=well drained; MWD=moderately well drained; SPD=somewhat poorly drained; PD=poorly drained; VPD=very poorly drained

Observed Plants[2]

TREES:	Green ash	Red maple	American elm
	Swamp white oak	Black gum	White pine
	Tulip tree		
SHRUBS:	American elm (s)	Japanese barberry	Winterberry
	Highbush blueberry	Multiflora rose	Elderberry
	Spicebush	Witherod	
HERBS:	Evergreen woodfern	Sensitive fern	Skunk cabbage
	Tussock sedge	Brstl.-Stalked sedge	Violets
	Soft rush	New York fern	Swamp dewberry
	Sphagnum mosses	Roughstem goldenrod	Sedges
	Penn. bittercress	Jack-in -the-pulpit	False nettle
	False nettle	Scouring rush	Stick tights
	Willow-herbs		
VINES:	Fox grape	Virginia creeper	Poison ivy

Observed Wildlife & Wildlife sign *(within wetland or nearby):*

Bluebird	Phoebe	Tufted titmouse	Blue jay	Spring peeper
W.B nuthatch	Downy woodpecker	Raccoon	Wh. Tailed deer	Two-line salandr.

Notes

This wetland ecological unit is comprised of a lower, nearly level, very poorly drained, more open canopied, forested wetland, where two intermittent streams meet, and a poorly drained hillside wetland, dominated by Japanese barberry in the understory. One tributary is culverted under Dog Lane to the north of the two proposed residential lots, the other flows down the hillside on to the east and south of these lots.

[2] Dominant plant species are underlined. Invasive species are double underlined. (s) = saplings

Watercourse Physical Characterization/Water Quality Field Data Sheet
(Adapted from Appendix 1-1 in U.S. EPA 1999) [1]

Station Descriptor:	RB-DL-1			
Date/Time:	3/25/16; 12:00 pm to 1:15 pm		Stream Origin:	Glacial Till
Investigator(s):	George T. Logan	Weather Conditions:	Overcast, light rain, 40s F	
Stream Name:	Unnamed Tributary to Fenton River		Watershed No.:	3207-13-1
Watershed Size:	~85.8 acres	Perennial? Semi	Stream Type:	Coldwater
Recent Precipitation:	Average		Station Type:	Riffle
Station Description/Location:	A roughly 320-foot stream stretch, starting at stream's entrance to level, very poorly drained wooded swamp, upstream to roughly opposite Wetland Flag #22, on proposed Lot 2			

PHYSICAL CHARACTERIZATION

RIPARIAN ZONE/INSTREAM FEATURES

1. *Predominant Surrounding Land Uses:*				
	☒ Forest	☐ Agricultural	☐ Commercial	☐ Industrial
	☐ Field/Pasture	☒ Residential	☐ Other:	
2. *Local Watershed Erosion:*				
	☐ None	☒ Light	☐ Moderate	☐ Heavy
3. *Local Watershed Non-Point Source Pollution:*				
	☐ No Evidence	☒ Some Potential Sources	☐ Obvious Sources	
4. *Estimated Stream Width:*	3-4 ft.			
Estimated Stream Depth:	Riffle 0.4-0.5 ft.	Run _____ ft.	Pool 0.7-0.9 ft.	
5. *High Water Mark*:	1.2 ft.			
6. *Velocity*	☐ Light	☒ Moderate	☐ Heavy	Measured: _____ ft./sec
7. *Dam Present*	☐ Yes	☒ No	Location:	
8. *Channelized*	☐ Yes	☒ No	Extent/Location:	
9. *Canopy Cover:*	☐ Open	☒ Partly Shaded	locally only, canopy more open	
	☐ Partly Open	☒ Shaded		
10. *Cover Objects:*	☒ Abundant	☐ Absent	11. *LWD (density):*	Moderate
	☐ Moderate	☐ Type: boulder, cobble, large woody debris (LWD)		

SEDIMENT/SUBSTRATE

1. *Sediment Odors*:	☒ Normal	☐ Petroleum	☐ Anaerobic
	☐ Sewage	☐ Chemical	☐ None
			☐ Other:
2. *Sediment Oils*:	☒ Absent	☐ Moderate	
	☐ Slight	☐ Profuse	
3. *Sediment Deposits*:			
	☐ Sludge	☐ Paper Fiber	☐ Relict Shells
	☐ Sawdust	☒ Sand	☐ Other:
4. *Are the undersides of stones which are not deeply embedded black?*		☐ Yes	☒ No

[1] Barbour M.T., J. Gerritsen, B.D. Snyder, and J.B. Stribling. 1999. Rapid Biassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates and Fish, Second Edition. EPA 841-B-99-002. U.S. Environmental Protection Agency; Office Water; Washington, D.C.

SEDIMENT/SUBSTRATE: *Continued*

INORGANIC SUBSTRATE COMPONENTS

Substrate Type	Diameter	% in Sampling Area
Bedrock		none
Boulder	> 10"	8%
Cobble	2.5 - 10"	65-70%
Gravel	0.1 - 2.5"	10-12%
Sand	gritty	5-8%
Silt		2%
Clay	slick	n/a

ORGANIC SUBSTRATE COMPONENTS

Substrate Type	Description	% in Sampling Area
Detritus	Sticks, wood, coarse plant materials (CPOM)	25%
Muck-Mud	Black, very fine organic (FPOM)	5%
Marl	Gray, shell fragments	n/a

Water Quality

1. Temperature :_____ C Conductivity: _____ µS _____ pH Dissolved Oxygen (DO) :_____ mg/L			
Other:			
2. Water Odors:	■ Normal	☐ Petroleum	☐ None
	☐ Sewage	☐ Chemical	☐ Other:
3. Water Surface Oils:	☐ Slick	☐ Globs	■ None
	☐ Sheen	☐ Flecks	
4. Turbidity:	■ Clear	☐ Turbid	☐ Water Color:
	☐ Slightly Turbid	☐ Opaque	

Riparian Vegetation *(50-foot buffer)*

■ Trees	■ Shrubs	☐ Grasses	*Dominant species present:* red maple, yellow birch, elm
■ Herbaceous	■ Mosses	☐ Other:	J. barberry, highbush blueberry, cinnamon fern

Aquatic Vegetation

■ Rooted emergent	☐ Rooted submergent	☐ Rooted floating	*Dominant species present:* Fillamentous green
☐ Free floating	■ Attached algae	☐ Other:	

Notes

Searches conducted for crayfish; none observed (alive or exoskeleton remnants); invertebrates included early instar mayflies and stoneflies, a few case caddisflies, a few Physa snails; conspicuous absence of black fly and midge larvae; several two-lined salamanders observed; minimum embededness of cobbles; high cover of mosses and liverworts on exposed hard surfaces; stream likely does not flow in summer but maintains some water in deeper pools and moisture throughout.

WETLANDS: *The Physical Environment*

WETLAND HYDROGEOMORPHIC CLASSIFICATION

Surface-Water Depression Wetlands: In these wetlands, precipitation and overland flow (surface runoff) collect in a depression where there is little or no groundwater discharge. Water leaves the wetland principally by evaporotranspiration and infiltration (groundwater recharge). The wetland hydrologic system lies above the local or regional groundwater system and is isolated from it by an unsaturated zone; thus, it is said to be "perched." In the glaciated Northeast, surface-water depression wetlands are most likely to form over bedrock or till deposits in topographically elevated areas of landscape; however, they may develop in lowland kettles or ice-block basins that formed in glaciolacustrine or fine-textured glaciofluvial deposits.

Surface-Water Slope Wetlands: These wetlands are located along the edge of stream or lake or on the sloping surface of a floodplain. They may occur on till or stratified drift but are commonly found on alluvium. While precipitation and overland flow also feed these wetlands, the principal source of water is the overflow of the adjacent water body. The sloping surface of the wetland permits water to drain readily back to the lake or river as its stage falls. As was the case with the previous class, the wetland surface usually lies well above the local water table, so groundwater discharge to the wetland is negligible or nonexistent. Groundwater recharge from the wetland is possible, depending on the permeability of underlying surficial deposits.

Groundwater Depression Wetlands: These wetlands occur where a basin intercepts the local groundwater table, so that groundwater discharge as well as precipitation and overland flow feed the wetland. Classic groundwater depression wetlands have no surface drainage leaving the site; however, occasional streamflow out may occur form basin overflow. Groundwater inflow may be continuous or seasonal, depending upon the depth of the basin and the degree of fluctuation of the local water table. During periods when the wetland water level is higher than the local groundwater table (e.g., after major precipitation events in dry season), groundwater recharge may occur. Groundwater may enter the wetland basin from all directions, or it may discharge in one area and recharge in another. In the glaciated Northeast, groundwater depression wetlands are most likely to occur in stratified drift, particularly in coarse-textured glaciofluvial deposits where relatively rapid movement between groundwater and surface water can occur.

Groundwater Slope Wetlands: These wetlands occur where groundwater discharges as springs or seeps at the land surface and drains away as streamflow. Most commonly, these wetlands occur on hillsides over till deposits or at the base of hills where stratified drift and till come into contact. Headwater wetlands are typically groundwater slope wetlands. The local water table slopes toward the wetland surface. Where groundwater flow is continuous, the soil remains saturated. At many sites, however, groundwater inputs cease during late summer or early fall as evaporotranspiration depletes soil moisture in the root zone, in which case the soil is only seasonally saturated. Permanent ponding of water is prevented by the sloping land surface, but water may collect temporarily in isolated depressions. Precipitation and overland flow provide additional water to the wetland on an intermittent basis. Groundwater recharge may occur in the wetland after such events, but amounts are likely to be negligible, especially where wetland soils have formed over dense lodgment till deposits. Where such deposits are present, groundwater slope wetlands may be fed primarily by shallow groundwater systems perched above the regional system.

Reference:

Golet, C.G., A.J.K. Calhoun, W.R. DeRagon, D.J. Lowry, and A.J. Gold. 1993. Ecology of Red Maple Swamps in the Glaciated Northeast: A Community Profile. USFWS. Biological Report No. 12

WETLANDS: *The Physical Environment*

SOIL DRAINAGE CLASSES

Excessively drained: Brightly colored; usually coarse-textured; rapid permeability; very low water-holding capacity; subsoil free of mottles

Somewhat excessively drained: Brightly colored; rather sandy; rapid permeability; low water-holding capacity; subsoil free of mottles

Well drained: Color usually bright yellow, red, or brown; drain excess water readily, but contain sufficient fine material to provide adequate moisture for plant growth; subsoil is free of mottles to a depth of at least 36 inches.

Moderately well drained: Generally any texture, but internal drainage is restricted to some degree; mottles common in the lower part of the subsoil, generally at a depth of 18 to 36 inches; may remain wet and cold later in spring; generally suited for agricultural use.

Somewhat poorly drained: Remain wet for long periods of time due to slow removal of water; generally have a slowly permeable layer within the profile or a high water table; mottles common in the subsoil at a depth of 8 to 18 inches.

Poorly drained: Dark, thick surface horizons commonly; gray colors usually dominate subsoil; water table at or near the surface during a considerable part of the year; mottles frequently found within 8 inches of the soil surface.

Very poorly drained: Generally thick black surface horizons and gray subsoil; saturated by high water table most of the year; usually occur in level or depressed sites and are frequently ponded with water.

Reference:

Wright, W. R., and E. H. Sautter. 1979. Soils of Rhode Island landscapes. R.I. Agric Exp. Station Bull. 429. 42 pp.

WETLANDS: *The Plant Community*

WETLAND CLASSES AND SUBCLASSES IN THE GLACIATED NORTHEAST

WETLAND CLASS	WETLAND SUBCLASS
Open Water	(OW-1) Vegetated (OW-2) Floating-leaved (OW-3) Non-vegetated
Deep Marsh	(DM-1) Dead Woody (DM-2) Shrub (DM-3) Sub-shrub (DM-4) Robust (DM-5) Narrow-leaved (DM-6) Broad-leaved
Shallow Marsh	(SM-1) Robust (SM-2) Narrow-leaved (SM-3) Broad-leaved
Meadow	(M-1) Ungrazed (M-2) Grazed
Shrub Swamp	(SS-1) Sapling (SS-2) Bushy (SS-3) Compact (SS-4) Aquatic
Wooded Swamp	(WS-1) Deciduous (WS-2) Evergreen
Bog	(BG-1A) Compact Shrub (BG-1B) Bushy Shrub (BG-2) Wooded (BG-3) Emergent

Note: Subclass (OW-2) has replaced (SM-4)
Seasonally Flooded Class (SF-1 & SF-2) has been removed

Reference:

Golet, F.C., and J.S. Larson. 1974. Classification of freshwater wetlands in the glaciated Northeast. USFWS Resour. Publ. 116. 56 pp.

WETLANDS: *The Physical Environment*

COMMON WATER REGIMES OF NORTHEASTERN WETLANDS

Seasonally flooded: Surface water is present for extended periods, especially early in the growing season, but is absent by the end of the season in most years. When surface water is absent, the water table is often near the land surface.

Temporarily flooded: Surface water is present for brief periods during the growing season, but the water table usually lies well below the soil surface for most of the season.

Seasonally saturated: The soil is saturated to the surface, especially early in the growing season, but unsaturated conditions prevail by the end of the season in most years. Surface water is absent except for groundwater seepage and overland flow.

Semi-permanently flooded: Surface water persists throughout the growing season in most years. When surface water is absent, the water table is usually at or very near the land surface.

Permanently flooded: Water covers the land surface throughout the year in all years. Vegetation is composed of obligate hydrophytes.

Saturated: The substratum is saturated to the surface for extended periods during the growing season, but surface water is seldom present. This water regime applies to permanently saturated, non-flooded wetlands such as bogs.

References:

Golet, F. C., A. J. K. Calhoun, W. R. DeRagon, D. J. Lowry and A. J. Gold. 1993. Ecology of Red Maple Swamps in the Glaciated Northeast: A Community Profile. U. S. Dep. Int. Fish Wild. Serv. Biol. Rep. 12, 152 pp.

Cowardin, L. M., V. Carter, F. C. Golet, and E. T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. U. S. Fish Wild. Serv. Biol. Serv. Program FWS-OBS 79/31. 103 pp.

Soil Map—State of Connecticut
(Raphaelson Estates, Dog Lane, Storrs, CT)

Map Scale: 1:4,370 if printed on A landscape (11" x 8.5") sheet.

N

0 50 100 200 300 Meters

0 200 400 800 1200 Feet

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

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

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

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: State of Connecticut
Survey Area Data: Version 14, Sep 22, 2015

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

Date(s) aerial images were photographed: Mar 28, 2011—May 12, 2011

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

Map Unit Legend

State of Connecticut (CT600)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
3	Ridgebury, Leicester, and Whitman soils, 0 to 8 percent slopes, extremely stony	15.4	17.5%
46B	Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony	19.6	22.3%
51B	Sutton fine sandy loam, 2 to 8 percent slopes, very stony	0.1	0.2%
60B	Canton and Charlton soils, 3 to 8 percent slopes	7.9	9.0%
61B	Canton and Charlton soils, 3 to 8 percent slopes, very stony	1.3	1.5%
61C	Canton and Charlton soils, 8 to 15 percent slopes, very stony	37.6	42.7%
62D	Canton and Charlton soils, 15 to 35 percent slopes, extremely stony	2.3	2.6%
73C	Charlton-Chatfield complex, 3 to 15 percent slopes, very rocky	3.5	4.0%
73E	Charlton-Chatfield complex, 15 to 45 percent slopes, very rocky	0.2	0.3%
Totals for Area of Interest		**88.0**	**100.0%**

Eastern Highlands Health District

4 South Eagleville Road • Mansfield CT 06268 • Tel: (860) 429-3325 • Fax: (860) 429-3321 • Web: www.EHHD.org

Subdivision Plan Review Memo

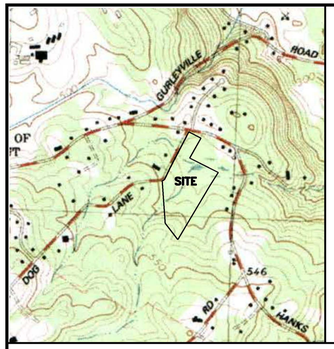
To: Edward Pelletier, L.S.
From: Sherry McGann, R.S.
Date: March 14, 2016
Re: Raphaelson Estates Subdivision – Dog Lane, Storrs, CT
Proposed 2 Lot Subdivision for Howard & Alice Raphaelson,
Plan Prepared by Datum Engineering & Surveying, LLC –
Dated 1/12/2016, Revised 3/7/2016

The above referenced subdivision plan has been reviewed for compliance with the State of Connecticut Public Health Code and Technical Standards. Based upon on our review, we have the following comments:

1. **Lot 1**
   - Lot 1 meets the State of Connecticut Public Health Code requirements for on-site subsurface sewage disposal (SSDS) and private water supply for a four-bedroom house.

2. **Lot 2**
   - Lot 2 meets the State of Connecticut Public Health Code requirements for on-site sewage disposal (SSDS) and private water supply for a four-bedroom house.

This plan may not be used for the construction of a SSDS. An engineer's plan (20 scale) must be submitted to the Health District for review and approval prior to application for permits to construct the subsurface sewage disposal system and well.



LOCATION MAP
SCALE : 1" = 1000'

REFERENCE MADE TO THE FOLLOWING MAPS:

1.) "AS-BUILT PLAN PREPARED FOR WILLIAM ZAVISTOSKI DOG LANE MANSFIELD, CONNECTICUT SCALE: 1" = 20' DATE: JUNE 16, 1998 DRAWN BY: SDK CHECKED BY: SAF SHEET 1 OF 1 FILIP ASSOCIATES 1875 STORRS ROAD, MANSFIELD, CT."

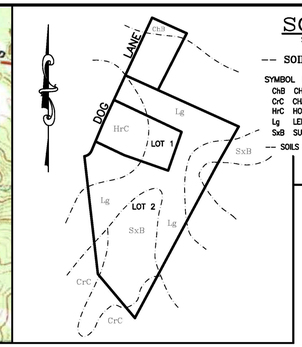
2.) "PLAN PREPARED FOR AUDREY & GENE BARBERET NO. 45 FARRELL ROAD STORRS, CONN. PLOT PLAN SCALE 1" = 20' DRN. R.M. DATE 7-24-84 TRD. D.C.K. FILE NO. 831137 SHEET NO 1 OF 1" PREPARED BY MEEHAN ASSOCIATES.

3.) "BOUNDARY SURVEY PREPARED FOR UCONN FOUNDATION, INC. DOG LANE & BUNDY LANE STORRS, CONNECTICUT SCALE: 1" = 40' DATE: JANUARY 6, 2012 DATUM ENGINEERING & SURVEYING, LLC 132 CONANTVILLE ROAD, MANSFIELD CENTER, CT. 06250 JOB NO. 211064".

APPROVED BY THE TOWN OF MANSFIELD INLAND WETLAND AGENCY

CHAIRMAN _____ DATE _____

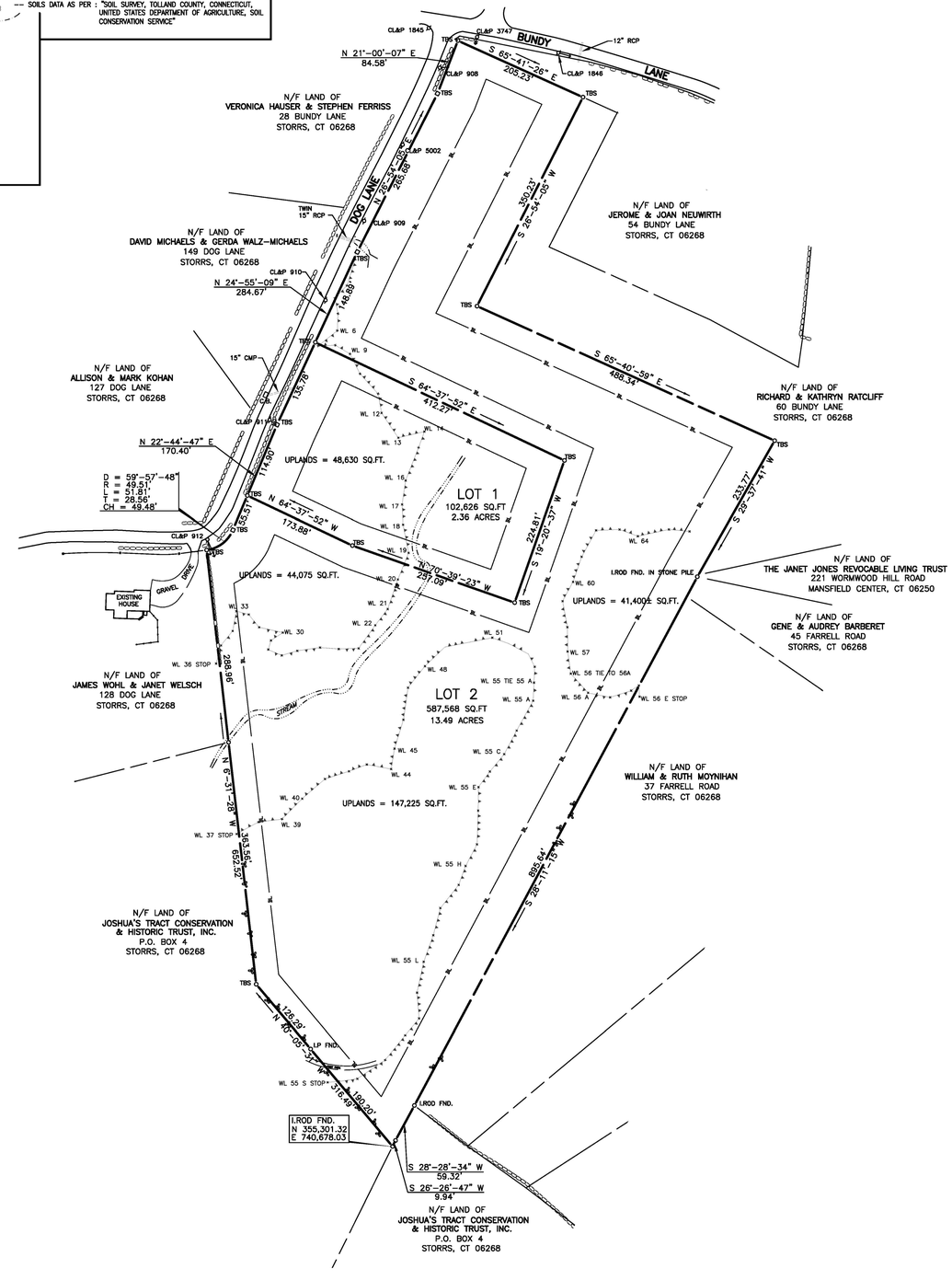
SOIL MAP
SCALE : 1" = 400'



-- SOILS LEGEND --

SYMBOL	DESCRIPTION
ChB	CHARLTON STONY FINE SANDY LOAM, 3 TO 8 PERCENT SLOPES
CrC	CHARLTON VERY STONY FINE SANDY LOAM, 3 TO 15 PERCENT SLOPES
HrC	HOLLIS VERY ROCKY FINE SANDY LOAM, 3 TO 15 PERCENT SLOPES
Lg	LEICESTER-RIDGEBURY-WHITMAN VERY STONY COMPLEX
SxB	SUTTON VERY STONY FINE SANDY LOAM, 3 TO 15 PERCENT SLOPES

-- SOILS DATA AS PER : "SOIL SURVEY, TOLLAND COUNTY, CONNECTICUT, UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE"



200 100 0 100 300
SCALE : 1" = 100'

THE WETLAND SOILS ON THIS SITE WERE IDENTIFIED IN THE FIELD USING THE CRITERIA REQUIRED BY CONNECTICUT P.A. 72-155 AS AMENDED BY CONN. P.A. 73-571, CONN. P.A. 87-338 AND P.A. 87-533. THE BOUNDARIES OF THESE SOILS AND OF IDENTIFIED WATERCOURSES ARE ACCURATELY REPRESENTED ON THIS PLAN.

JOHN P. IANNI _____ DATE

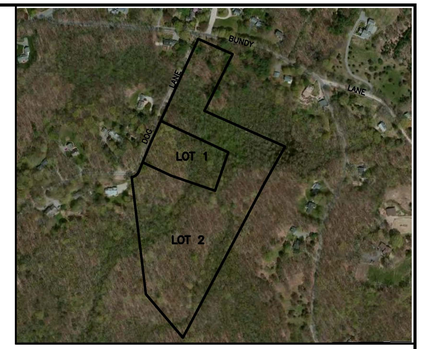
TOTAL PARCEL AREA 15.84 ACRES

AREA WITH OVER 15 PERCENT SLOPES – NONE
TOTAL AREA OF WETLANDS – 408,834 SQ.FT.±
PERCENT OF WETLANDS – 59.2%

ZONING TABLE

	REQUIRED	LOT 1	LOT 2
LOT AREA:	90,000 S.F.	102,626 S.F.	587,568 S.F.
LOT FRONTAGE:	200'	250.68'	606.47'
MIN. FRONT SETBACK:	60'	60'	60'
MIN. SIDE SETBACK:	35'	35'	35'
MIN. REAR SETBACK:	50'	575'±	560'±
BUILDABLE AREA:	40,000 S.F.	48,630 S.F.	44,075 S.F.*

*IN AREA OF PROPOSED HOUSE



AERIAL PHOTO
SCALE: 1" = 400'

BOUNDARY NOTES:

1.) STREETLINE ALONG DOG LANE (LOCAL ROAD PER ARTICLE III SECTION G.3 OF THE ZONING REGULATIONS) WAS ESTABLISHED 25 FEET FROM THE CENTERLINE OF THE EXISTING TRAVELLED WAY PER ARTICLE VIII SECTION 9 (HIGHWAY CLEARANCE SETBACKS) OF THE ZONING REGULATIONS.

2.) THE SUBJECT PROPERTY CONTAINS 15.84 ACRES.

NOTES:

1.) ALL PROPOSED LOTS CONTAIN 40,000 SQUARE FEET OF SUITABLE LAND FOR BUILDING AS DEFINED IN ARTICLE VIII, SECTION B.6 OF THE MANSFIELD ZONING REGULATIONS.

2.) UNDERGROUND UTILITIES
A. ALL WIRED UTILITY LINES SERVING STRUCTURES ON NEW LOTS SHALL BE INSTALLED UNDERGROUND. UTILITY LINES SHALL BE INSTALLED IN A SUITABLE CONDUIT SYSTEM UNLESS THE RESPONSIBLE UTILITY COMPANY DETERMINES THAT DIRECT BURIAL IS MORE APPROPRIATE.

B. UPON APPROVAL BY THE RESPONSIBLE UTILITY COMPANY, PLANS SHALL BE SUBMITTED TO DEPICT THE LOCATION OF ALL UNDERGROUND UTILITY EASEMENT AREAS.

3.) PURSUANT TO SUBDIVISION REGULATION PROVISIONS, (PARTICULARLY SECTIONS 7.4q, 7.5, AND 7.6) AND ZONING REGULATION PROVISIONS (PARTICULARLY ARTICLE VIII, SECTION 9.5 AND 9.6) THIS ACTION SPECIFICALLY APPROVES PROPOSED LOT AREAS AND THE DEPICTED BUILDING ENVELOPES, INCLUDING SETBACK WAIVERS FOR LOTS 1 & 2. UNLESS THE COMMISSION SPECIFICALLY AUTHORIZES REVISIONS, THE DEPICTED BUILDING ENVELOPES SHALL SERVE AS THE SETBACK LINES FOR ALL FUTURE STRUCTURES AND SITE IMPROVEMENTS, PURSUANT TO ARTICLE VIII OF THE ZONING REGULATIONS. THIS REQUIREMENT SHALL BE NOTED ON THE LAND RECORDS.

4.) PROPERTY LINE TO SERVE AS DEVELOPMENT AREA ENVELOPE LINE (DAE) EXCEPT WHERE DENOTED OTHERWISE ON LOTS.

--- LEGEND ---

PROPERTY LINE	
ABUTTER'S PROPERTY LINE	
BUILDING SETBACK LINE	BL. BL.
EXISTING ROAD	
LIMIT OF WETLANDS	
CONSERVATION EASEMENT	
STONE WALL	
UTILITY POLE	
VIRGINA RAIL FENCE REMAINS	
IRON ROD TO BE SET	T.B.S.
IRON ROD FOUND	I.ROD FND.
MONUMENT TO BE SET	T.B.S.

BOUNDARY PLAN
PREPARED FOR
HOWARD & ALICE RAPHAELSON
DOG LANE
STORRS, CONNECTICUT
OWNER & SUBDIVIDER
HOWARD A. & ALICE K. RAPHAELSON
119 TIMBER DRIVE
STORRS, CONNECTICUT 06268

SCALE: 1" = 100' DATE: JANUARY 12, 2016
REVISED: FEB. 10, 2016 (PER EHHD COMMENTS)
REVISED: MARCH 7, 2016 (ADDITIONAL SOIL TESTING)
REVISED: MARCH 16, 2016

THIS SURVEY AND MAP HAS BEEN PREPARED IN ACCORDANCE WITH SECTIONS 20-300b-1 THRU 20-300b-20 OF THE REGULATIONS OF CONNECTICUT STATE AGENCIES – "MINIMUM STANDARDS FOR SURVEYS AND MAPS IN THE STATE OF CONNECTICUT" AS ENDORSED BY THE CONNECTICUT ASSOCIATION OF LAND SURVEYORS, INC. IT IS A SUBDIVISION MAP BASED ON A DEPENDENT RESURVEY CONFORMING TO HORIZONTAL ACCURACY CLASS "A-2". THE PROPOSED PROPERTY LINES BETWEEN LOTS BEING AN ORIGINAL SURVEY. THIS SURVEY AND MAP IS INTENDED TO ENABLE DETERMINATION OF COMPLIANCE OR NON-COMPLIANCE WITH APPLICABLE MUNICIPAL OR STATUTORY REQUIREMENTS.

TO THE BEST OF MY KNOWLEDGE AND BELIEF THIS MAP IS SUBSTANTIALLY CORRECT AS NOTED HEREON.

EDWARD PELLETIER, L.S. #14203

ANY ORIGINAL OR DUPLICATE OF THIS MAP IS NOT VALID UNLESS IT BEARS THE EMBOSSED SEAL OF THE SURVEYOR WHOSE REGISTRATION NUMBER AND SIGNATURE APPEAR ABOVE. NO OTHER CERTIFICATION OR WARRANTY IS EXPRESSED OR IMPLIED.

SHEET 1 OF 2

DATUM
ENGINEERING & SURVEYING, LLC
132 CONANTVILLE ROAD
MANSFIELD CENTER, CT 06250
TEL (860)456-1357 FAX (860)456-1840

JOB NO.: 214044

CHECKED BY:_____ CORRECTIONS BY:_____

--- HOUSE SITE DEVELOPMENT ---

– THE FOLLOWING PROCEDURES FOR THE DEVELOPMENT OF THESE LOTS ARE RECOMMENDED:

1. THE LIMITS OF DISTURBANCE SHALL BE ESTABLISHED IN THE FIELD FOR THE PROPOSED RESIDENTIAL STRUCTURE. DISTURBANCE LIMITS OF 25–35 FEET BEYOND THE PHYSICAL DIMENSIONS OF THE STRUCTURE AND RELATED APPURTENANCES IS RECOMMENDED.
2. DRIVEWAY SHOULDERS SHOULD BE STABILIZED IMMEDIATELY UPON COMPLETION OF ROUGH GRADING. SHOULDER SEED BED PREPARATION SHOULD BE USED TO ENTRAP ANY SEDIMENT GENERATED FROM EXPOSED SOIL SURFACES. DRIVEWAY ROADBEDS SHALL BE STABILIZED WITH COMPACTED ROAD AGGREGATES AS SOON AS POSSIBLE.
3. TOPSOIL AND EXCAVATED SUBSOIL FROM THE FOUNDATION AREA SHOULD BE STOCKPILED WITHIN THE AREA OF DISTURBANCE IF NOT USED FOR ONSITE REGRADING. EACH STOCKPILE MUST BE ADEQUATELY RINGED WITH SEDIMENT CONTROL MATERIALS(i.e., HAY–BALES AND/OR SILT FENCE).
4. ANY ADDITIONAL STOCKPILING OF LUMBER AND BUILDING MATERIALS SHOULD ALSO BE CONFINED TO THE AREA OF DISTURBANCE. SIMILARLY, VEHICULAR MOVEMENT SHALL BE DIRECTED TO ESTABLISHED PARKING AREAS. DEVELOPMENT OF SEWAGE DISPOSAL LEACHING AREAS SHOULD BE STAGED TO FOLLOW HOUSE SITE PREPARATION. ONLY THE PRIMARY LEACHING SYSTEM NEED BE CLEARED OF EXISTING VEGETATION IN COORDINATION WITH THE APPROVED SEPTIC SYSTEM DESIGN. RESERVE AREA SHALL REMAIN UNDISTURBED IF SITE CONDITIONS PERMIT.
5. ONCE THE PROPOSED STRUCTURE IS ENCLOSED, ALL EFFORTS SHOULD BE MADE TO COMPLETE ON SITE IMPROVEMENTS SUCH AS WELL, FOOTING DRAIN, SEPTIC SYSTEM, DRIVEWAY, ETC.. THEREAFTER, ALL RAW SOIL AREAS SURROUNDING THE HOME SITE SHALL BE FINE GRADED AND MULCHED.

--- GENERAL NOTES ---

EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED PRIOR TO ANY EXCAVATION OR DISTURBANCE OF EXISTING GROUND. EXCAVATIONS WHICH MUST BE DEWATERED WILL BE PUMPED INTO AN EXCAVATED STILLING BASIN SURROUNDED WITH SILT FENCING. DEBRIS AND OTHER WASTE GENERATED FROM EQUIPMENT MAINTENANCE AND CONSTRUCTION WILL NOT BE DISCARDED ON THE SITE. IN THE EVENT OF CONFLICT BETWEEN THESE PLANS AND OTHER REGULATIONS, THE MORE STRINGENT SHALL APPLY.

A. SEED BED PREPARATION: FINE GRADE AND RAKE SOIL SURFACE TO REMOVE STONES LARGER THAN 2" DIAMETER. INSTALL NEEDED EROSION CONTROL DEVICES SUCH AS SURFACE WATER DIVERSIONS. APPLY LIMESTONE AT A MINIMUM RATE OF 2 TONS PER ACRE OR 90 LBS PER 1000 SQUARE FEET.
FERTILIZE WITH 10–10–10 AT A RATE OF 300 LBS. PER ACRE OR 7.5 LBS. PER 1000 SQUARE FEET. WORK LIME AND FERTILIZER INTO SOIL UNIFORMLY TO A DEPTH OF 4" WITH A WISK, SPRINGTOOTH HARROW OR OTHER SUITABLE EQUIPMENT FOLLOWING THE CONTOUR LINES.

B. SEED APPLICATION: APPLY GRASS SEED MIXTURE BY HAND, CYCLONE SEEDER OR HYDROSEEDER. INCREASE SEED MIXTURE BY 10 PERCENT IF HYDROSEEDING. LIGHTLY DRAG OR ROLL THE SEEDED SURFACE TO COVER SEED. SEED SHALL CONSIST OF A MIXTURE OF KENTUCKY BLUEGRASS (0.45 LBS/1000 SQ.FT.), CREEPING RED FESCUE (0.45 LBS./1000 SQ.FT.), AND PERENNIAL RYEGRASS (0.10 LBS./1000 SQ.FT.). SEEDING OF PERMANENT GRASS SEED SHALL BE DONE BETWEEN APRIL 15 THROUGH JUNE 15 AND AUGUST 15 THROUGH SEPTEMBER 15. IN THE EVENT SEEDING CANNOT BE COMPLETED DURING THE ABOVE DATES, A TEMPORARY GRASS SEED CONSISTING OF 1.0 LBS./1000 SQ.FT. OF ANNUAL RYE GRASS SHALL BE APPLIED. MOISTURE CONDITIONS SHALL BE SUPPLEMENTED FOR TEMPORARY SEEDING BETWEEN JUNE 15 AND AUGUST 15.

C. MULCHING: IMMEDIATELY FOLLOWING SEEDING, MULCH THE SEEDED SURFACE, WITH STRAW OR HAY AT A RATE OF 1.5 TO 2 TONS PER ACRE WHERE SLOPES EXCEED 10 PERCENT, SPREAD MULCH BY HAND OR MULCH BLOWER. PUNCH MULCH INTO SOIL SURFACE WITH TRACK MACHINE OR DISH HARROW SET STRAIGHT UP. MULCH MATERIAL SHOULD BE "SET" INTO SOIL SURFACE APPROXIMATELY 2–3 INCHES.

--- PLAN IMPLEMENTATION ---

DURING CONSTRUCTION IT SHALL BE THE RESPONSIBILITY OF HOWARD RAPHAELSON (860–429–1340) TO INSURE THE IMPLEMENTATION OF THIS EROSION & SEDIMENTATION CONTROL PLAN. THIS RESPONSIBILITY INCLUDES INSTALLATION AND MAINTENANCE OF CONTROL MEASURES, INFORMING ALL PARTIES ENGAGED ON THE SITE OF THE REQUIREMENTS AND OBJECTIVES OF THIS PLAN, AND NOTIFYING THE WETLAND AGENT OF ANY TRANSFER OF THIS RESPONSIBILITY AND FOR CONVEYING A COPY OF THE EROSION AND SEDIMENT PLAN IF AND WHEN TITLE OF THE LAND IS TRANSFERRED.

EDWARD PELLETIER, L.S. #14203

TEST HOLE DATA

TEST HOLES OBSERVED BY EHHD ON NOVEMBER 18, 2015

–TEST HOLE #1 (UNSUITABLE)
0"– 9" TOPSOIL
9"–18" MOTTLED SILT LOAM
18"–61" COMPACT MOTTLED GREY CLAY
ROOTS TO 17"
MOTTLING AT 9"
NO WATER
NO LEDGE

–TEST HOLE #2
0"–10" TOPSOIL
10"–19" BROWN SILT LOAM
19"–71" GREY MOTTLED GLACIAL TILL
ROOTS TO 24"
MOTTLING AT 19"
NO WATER
NO LEDGE

–TEST HOLE #3
0"– 8" TOPSOIL
8"–20" OB FINE SANDY LOAM
20"–64" MOTTLED SANDY LOAM TILL W/GRAVEL, COBBLES, STONES, BOULDERS
ROOTS TO 25"
MOTTLING AT 20"
NO WATER
NO LEDGE

–TEST HOLE #4
0"– 6" TOPSOIL
6"–24" GRAVELLY OB FINE SANDY LOAM
24"–74" MOTTLED SANDY LOAM TILL W/GRAVEL, COBBLES, STONES
ROOTS TO 26"
MOTTLING AT 24"
NO WATER
NO LEDGE

–TEST HOLE #5
0"– 4" TOPSOIL
4"–25" GRAVELLY OB FINE SANDY LOAM
25"–77" MOTTLED SANDY LOAM TILL W/COBBLES, STONES, BOULDERS
ROOTS TO 28"
MOTTLING AT 25"
NO WATER
NO LEDGE

–TEST HOLE #6
0"– 5" TOPSOIL
5"–27" GRAVELLY OB FINE SANDY LOAM
27"–64" MOTTLED SANDY LOAM TILL W/COBBLES, STONES, BOULDERS
ROOTS TO 29"
MOTTLING AT 27"
NO WATER
NO LEDGE

–TEST HOLE #7
0"– 4" TOPSOIL
4"–26" GRAVELLY OB FINE SANDY LOAM
26"–63" MOTTLED SANDY LOAM TILL W/COBBLES, STONES
ROOTS TO 25"
MOTTLING AT 26"

TEST HOLES OBSERVED BY EHHD ON MARCH 1, 2016

–TEST HOLE #100
0"– 6" TOPSOIL
6"–24" ORANGE/BROWN FINE SANDY LOAM
24"–50" GRAY MOTTLED SANDY LOAM TILL W/GRAVEL, COBBLES, STONES
50"–55" GROUND WATER
ROOTS TO 26"
MOTTLING AT 24"
SEEPAGE AT 25"
NO LEDGE

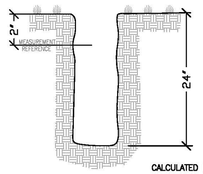
–TEST HOLE #101
0"– 7" TOPSOIL
7"–27" ORANGE/BROWN FINE SANDY LOAM
27"–69" GRAY/BROWN MOTTLED SANDY LOAM TILL W/GRAVEL, COBBLES, STONES
ROOTS TO 32"
MOTTLING AT 27"
NO WATER
NO LEDGE

–TEST HOLE #102
0"– 5" TOPSOIL
5"–25" ORANGE/BROWN FINE SANDY LOAM
25"–60" GRAY/BROWN MOTTLED SANDY LOAM TILL W/GRAVEL, COBBLES, STONES
60"–61" GROUND WATER
ROOTS TO 36"
MOTTLING AT 25"
NO SEEPAGE
NO LEDGE

PERCOLATION TEST #1

CONDUCTED BY DATUM ENGINEERING & SURVEYING, LLC. ON NOV. 21, 2015

PRESOAKED AT 3:25 P.M (11–20–15)



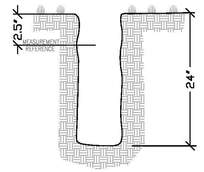
TIME	READING
8:37	8"
8:42	9–1/2"
8:47	10"
8:52	10–1/2"
8:57	11–1/2"
9:02	12"
9:07	12–1/2"
9:12	13"
9:17	13–1/2"
9:22	14"
9:27	14–1/2"
9:32	15"

CALCULATED PERCOLATION RATE: 10 MIN/IN

PERCOLATION TEST #1A

CONDUCTED BY DATUM ENGINEERING & SURVEYING, LLC. ON NOV. 21, 2015

PRESOAKED AT 3:20 P.M (11–20–15)



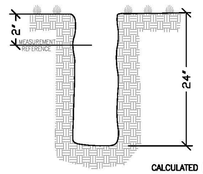
TIME	READING
8:34	7–1/2"
8:39	11"
8:44	13"
8:49	15–1/2"
8:54	16–1/2"
8:59	18"
9:04	19–1/2"
9:09	DRY
9:09	8"
9:14	9–1/2"
9:19	10–1/2"
9:24	12–1/2"
9:29	13–1/2"
9:34	14–1/2"
9:39	16"
9:44	16–1/2"
9:49	17"

CALCULATED PERCOLATION RATE: 10 MIN/IN

PERCOLATION TEST #2

CONDUCTED BY DATUM ENGINEERING & SURVEYING, LLC. ON NOV. 21, 2015

PRESOAKED AT 3:35 P.M (11–20–15)



TIME	READING
8:41	6–1/2"
8:46	9"
8:51	11"
8:56	12"
9:01	13"
9:06	14–1/2"
9:11	15–1/2"
9:16	16–1/2"
9:21	17"
9:26	17–1/2"
9:31	18"

CALCULATED PERCOLATION RATE: 10 MIN/IN

SIZING SUBSURFACE DISPOSAL SYSTEMS (FOR NEW DWELLINGS)

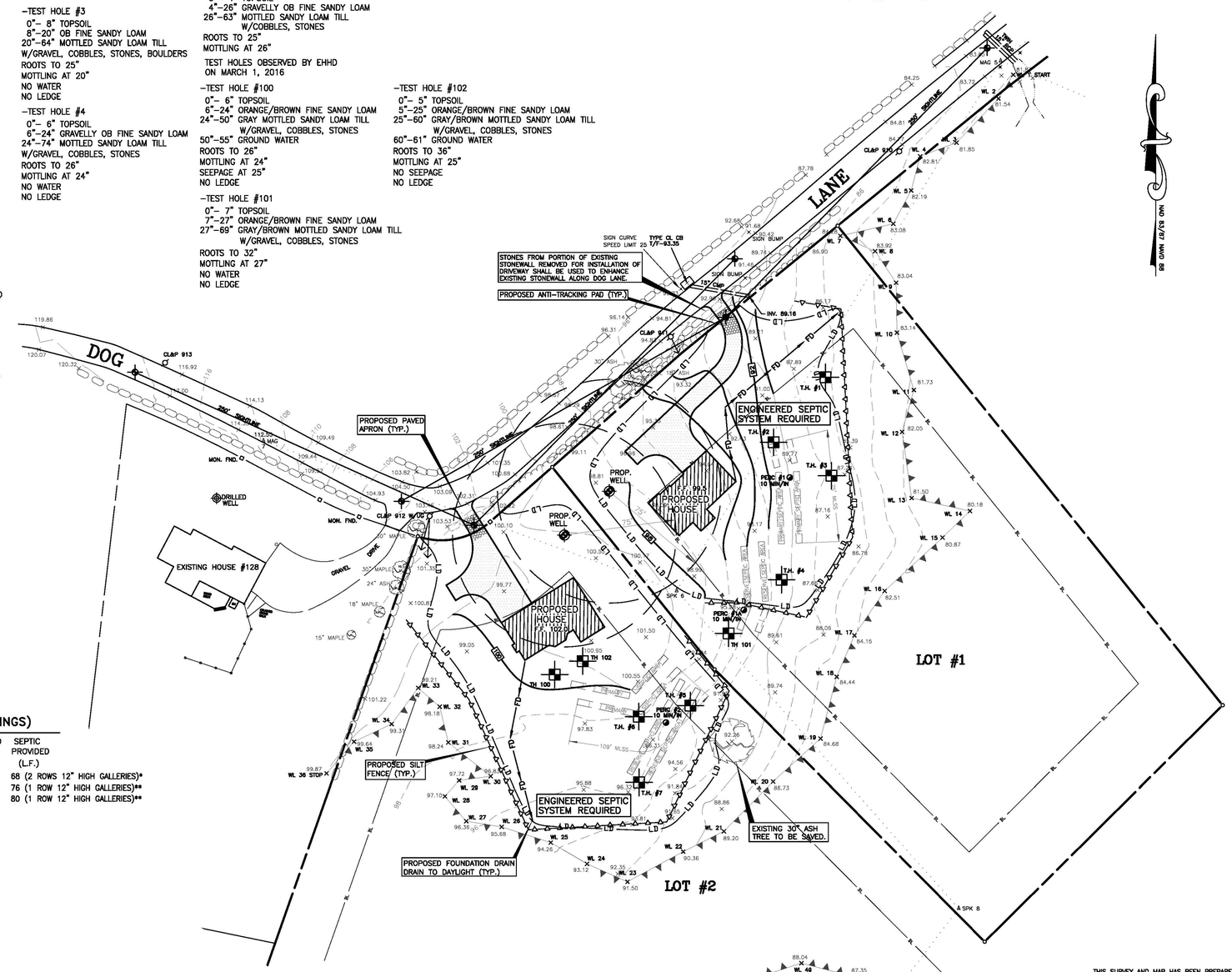
LOT NO.	SLOPE (%)	RESTRICTIVE LAYER (INCHES)	HYDRAULIC FACTOR	FLOW FACTOR	PERCOLATION FACTOR	REQUIRED MLSS (L.F.)	REQUIRED AREA (SQ.FT.)	SEPTIC PROVIDED (L.F.)
1	9.7	21	30	2.0	1.2	72	660	68 (2 ROWS 12" HIGH GALLERIES)*
2	4.0	26	42	2.0	1.2	100.8	660	76 (1 ROW 12" HIGH GALLERIES)**
								80 (1 ROW 12" HIGH GALLERIES)**

*MLSS = 75 L.F.
**MLSS = 105 L.F.

--- LEGEND ---

--- EXISTING --- --- PROPOSED ---

PROPERTY LINE
STONEWALL
TEST HOLE
EASEMENT LINE
SPOT ELEVATION
CONTOUR
WELL
LIMIT OF WETLANDS
PERCOLATION TEST
FOUNDATION DRAIN — FD —
SILT FENCE
BUILDING SETBACK LINE — B. —
UNDERGROUND UTILITIES — UTL —
LIMITS OF DISTURBANCE — LD — LD — LD —



80 40 0 40 120
SCALE : 1" = 40'

THE WETLAND SOILS ON THIS SITE WERE IDENTIFIED IN THE FIELD USING THE CRITERIA REQUIRED BY CONNECTICUT P.A. 72–155 AS AMENDED BY CONN. P.A. 73–571, CONN. P.A. 87–338 AND P.A. 87–533. THE BOUNDARIES OF THESE SOILS AND OF IDENTIFIED WATERCOURSES ARE ACCURATELY REPRESENTED ON THIS PLAN.

JOHN P. IANNI DATE

NOTES:

1.) THE DEPICTED SEPTIC SYSTEMS ARE SIZED FOR FOUR BEDROOM DWELLINGS.

2.) SOLAR ACCESS: PROPOSED HOUSES HAVE BEEN DEPICTED TO MAXIMIZE SOLAR HEAT GAIN AND MINIMIZING SOLAR HEAT LOSS AS SPECIFIED IN SECTION 4.6 OF THE TOWN OF MANSFIELD SUBDIVISION REGULATIONS.

2A.) RESIDENTIAL SITE PLAN DESIGNS SHALL INCORPORATE AT LEAST ONE OF THE FOLLOWING PASSIVE SOLAR AND OTHER ALTERNATIVE ENERGY TECHNOLOGIES:

a.) GARAGE POSITIONED ON THE NORTH OR WEST SIDE
b.) KITCHEN ON THE EAST SIDE
c.) PREDOMINATE DAYTIME LIVING SPACE WITH SOUTHERN EXPOSURE
d.) SOUTHERLY FACING BUILDING EAVES EXTENDED SO AS TO REDUCE SUMMER SUNLIT HEAT FROM ENTERING WINDOWS.
e.) GEOTHERMAL OR OTHER ACTIVE ALTERNATIVE ENERGY SOURCE.

3.) IT IS CERTIFIED WITH THE ACKNOWLEDGMENT BELOW, THAT THE DIMENSIONAL LOT REQUIREMENTS OF ARTICLE VIII, SECTION A OF THE TOWN OF MANSFIELD ZONING REGULATIONS HAVE BEEN MET.

4.) ALL PROPOSED LOTS CONTAIN 40,000 SQUARE FEET OF SUITABLE LAND FOR BUILDING AS DEFINED IN ARTICLE VIII, SECTION B.6 OF THE MANSFIELD ZONING REGULATIONS.

5.) ALL STUMP BURIAL HOLES ON INDIVIDUAL LOTS SHALL COMPLY WITH THE STATE OF CONNECTICUT DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION SOLID WASTE REGULATIONS.

6.) UNDERGROUND UTILITIES

6A. ALL WIRED UTILITY LINES SERVING STRUCTURES ON NEW LOTS SHALL BE INSTALLED UNDERGROUND. UTILITY LINES SHALL BE INSTALLED IN A SUITABLE CONDUIT SYSTEM UNLESS THE RESPONSIBLE UTILITY COMPANY DETERMINES THAT DIRECT BURIAL IS MORE APPROPRIATE;

6B. UPON APPROVAL BY THE RESPONSIBLE UTILITY COMPANY, PLANS SHALL BE SUBMITTED TO DEPICT THE LOCATION OF ALL UNDERGROUND UTILITY EASEMENT AREAS;

6C. ALL UNDER PAVEMENT CONDUITS SHALL BE INSTALLED PRIOR TO THE PAVING OF ANY STREETS OR DRIVEWAYS.

7.) UNLESS REVISIONS ARE SPECIFICALLY AUTHORIZED BY THE COMMISSION, THE BUILDING AREA ENVELOPE AS DEPICTED ON THESE FINAL PLANS SHALL SERVE AS THE SETBACK LINES FOR ALL FUTURE STRUCTURES AND SITE IMPROVEMENTS, PURSUANT TO ART. VIII OF THE ZONING REGULATIONS.

8.) PORTIONS OF THE DEPICTED BUILDING ENVELOPES ARE WITHIN AREAS REGULATED BY THE INLAND WETLAND AGENCY. ANY LAND DISTURBANCES WITHIN THESE AREAS THAT ARE NOT INCLUDED ON THE PLANS APPROVED BY THE INLAND WETLAND AGENCY MAY REQUIRE SUBSEQUENT APPROVAL BY THE AGENCY.

9.) ALL LOTS REQUIRE THE REMOVAL OR FILLING OF LESS THAN 500 CUBIC YARDS OF MATERIAL FOR THE CONSTRUCTION OF THE PROPOSED HOUSE AND DRIVEWAY AND LESS THAN 300 CUBIC YARDS FOR THE SEPTIC FILL.

10.) A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF CONNECTICUT SHALL DESIGN ON–SITE SUBSURFACE DISPOSAL SYSTEMS FOR ALL LOTS IN THIS SUBDIVISION.

11.) FOUNDATION DRAIN OUTLETS WITHIN 25 FEET OF PROPOSED SEPTIC SYSTEMS SHALL BE CONSTRUCTED OF SOLID PVC ASTM D 1785/ ASTM D 2665 (OR EQUAL) WITH RUBBER GASKET JOINTS.

12.) NO LOTS MAY BE SOLD UNTIL SUBDIVISION WORK IS COMPLETED AND APPROVED OR FULLY BONDED TO THE SATISFACTION OF THE MANSFIELD PLANNING AND ZONING COMMISSION.

13.) DURING HOUSE CONSTRUCTION EFFORTS SHALL BE MADE TO RETAIN AND PRESERVE EXISTING STONE WALLS. ANY STONE WALLS REMOVED DURING CONSTRUCTION SHALL BE RECONSTRUCTED ALONG BOUNDARY LINES AND/OR ENHANCE ADJACENT SEGMENTS OF EXISTING STONE WALLS.

14.) DRIVEWAY SIGHT LINES MEET OR EXCEED 250 FEET FOR ALL LOTS. NO PROPOSED DRIVEWAY SLOPES EXCEED 15 PERCENT.

15.) ALL SIGNIFICANT TREES PURSUANT TO SECTION 6.5.j.3 OF THE MANSFIELD SUBDIVISION REGULATIONS HAVE BEEN IDENTIFIED BASED ON A FIELD INSPECTION BY A LANDSCAPE ARCHITECT. ALL SIGNIFICANT TREES DEPICTED HEREON, NOT NOTED TO BE REMOVED, SHALL BE PROTECTED DURING ANY NEARBY CONSTRUCTION. PROTECTION SHALL CONSIST OF A 4 FOOT HIGH ORANGE KNITTED POLYETHYLENE BARRIER FENCE WITH POSTS PROVIDING A MINIMUM 10 FOOT RADIUS AROUND THE BASE UNTIL COMPLETION OF CONSTRUCTION ACTIVITIES.

16.) DEVELOPMENT OF INDIVIDUAL HOUSE SITES SHOULD CONSIDER LOW IMPACT DESIGNS PRACTICES FOR STORM WATER MANAGEMENT TO MINIMIZE DISTURBANCE, PRESERVE NATURAL FEATURES, REDUCE IMPERVIOUS COVER, FACILITATE INFILTRATION OPPORTUNITIES AND PRESERVATION OF STONE WALLS.

APPROVED BY THE TOWN OF MANSFIELD INLAND WETLAND AGENCY

CHAIRMAN DATE

SITE DEVELOPMENT PLAN

PREPARED FOR

HOWARD & ALICE RAPHAELSON

DOG LANE
STORRS, CONNECTICUT
OWNER & SUBDIVIDER
HOWARD A. & ALICE K. RAPHAELSON
119 TIMBER DRIVE
STORRS, CONNECTICUT 06268

SCALE: 1" = 40' DATE: JANUARY 12, 2016
REVISED: FEB. 10, 2016 (PER EHHD COMMENTS)
REVISED: FEB. 23, 2016 (SITE GRADING ADDED)
REVISED: MARCH 16, 2016

SHEET 2 OF 2

DATUM
ENGINEERING & SURVEYING, LLC
132 CONANTVILLE ROAD
MANSFIELD CENTER, CT 06250
TEL (860)456–1357 FAX (860)456–1840

JOB NO.: 214044

CHECKED BY:_____ CORRECTIONS BY:_____

THIS SURVEY AND MAP HAS BEEN PREPARED IN ACCORDANCE WITH SECTIONS 20–300b–1 THRU 20–300b–20 OF THE REGULATIONS OF CONNECTICUT STATE AGENCIES – "MINIMUM STANDARDS FOR SURVEYS AND MAPS IN THE STATE OF CONNECTICUT" AS ENDORSED BY THE CONNECTICUT ASSOCIATION OF LAND SURVEYORS, INC. IT IS A SUBDIVISION MAP BASED ON AN ORIGINAL SURVEY CONFORMING TO HORIZONTAL ACCURACY CLASS A–2 AND TOPOGRAPHIC SURVEY ACCURACY CLASS T–3. THIS SURVEY AND MAP IS INTENDED TO BE USED FOR THE CREATION OF PROPOSED PROPERTY LINES AND TO ENABLE DETERMINATION OF COMPLIANCE OR NON–COMPLIANCE WITH APPLICABLE MUNICIPAL OR STATUTORY REQUIREMENTS.

TO THE BEST OF MY KNOWLEDGE AND BELIEF THIS MAP IS SUBSTANTIALLY CORRECT AS NOTED HEREON.

EDWARD PELLETIER, R.L.S. 14203

ANY ORIGINAL OR DUPLICATE OF THIS MAP IS NOT VALID UNLESS IT BEARS THE EMBOSSED SEAL OF THE SURVEYOR WHOSE REGISTRATION NUMBER AND SIGNATURE APPEAR ABOVE. NO OTHER CERTIFICATION OR WARRANTY IS EXPRESSED OR IMPLIED.

Connecticut Department of

ENERGY &
ENVIRONMENTAL
PROTECTION

March 28, 2016

Mr. Edward A. Pelletier
Datum Engineering & Surveying, LLC
132 Conantville Road
Mansfield Center, CT 06250
e.pelletier@datumengr.com

Project: Two Lot Residential Development "Ralphaelson Estates" Located on the East Side of Dog Lane and just South of Bundy Lane in Storrs, Connecticut
NDDB Determination No.: 201603553

Dear Edward,

I have reviewed Natural Diversity Data Base maps and files regarding the area delineated on the map you provided for the proposed two-lot residential development known as "Ralphaelson Estates" located along the east side of Dog Lane and just south of Bundy Lane in Storrs, Connecticut. According to our records we have known extant populations of State Special Concern *Glyptemys insculpta* (wood turtle) and *Cambarus bartonii* (Appalachian brook crayfish) in the vicinity of the project site. I have included recommended protection strategies and best management practices for this state special concern turtle and crayfish.

Wood Turtle: Habitat destruction, degradation or alteration and fragmentation all threaten Wood Turtle populations. Turtles are also particularly vulnerable to any activity that consistently reduces adult survivorship. Disturbances to stream and riparian habitats and activities that change the hydrology of the stream, the physical habitat itself and water quality are all potentially detrimental activities for the Wood Turtle. Although Wood Turtles are found within forested areas, they prefer areas that do not have a fully closed canopy cover. The greatest concern during projects occurring in wood turtle habitat are turtles being run over and crushed by mechanized equipment. Reducing the frequency that motorized vehicles enter Wood Turtle habit**a**t would be beneficial in minimizing direct mortality of adults.

Recommended Protection Strategies for turtles:

Work should occur when these turtles are active (April 1st to September 30th) and I recommend the additional strategies in order to protect these turtles:

- Silt fencing should be installed around the work area prior to construction, please avoid erosion control products that are embedded with plastic netting as these can be fatal to wildlife;

- Where possible, AVOID installing sediment and erosion control materials from late August through September and from March through mid-May. These two time periods are when amphibians and reptiles are most active, moving to and from wetlands to breed;

- After silt fencing is installed and prior to construction, a sweep of the work area should be conducted to look for turtles;

- Workers should be apprised of the possible presence of turtles, and provided a description of the species (http://www.ct.gov/dep/cwp/view.asp?a=2723&q=473472&depNav_GID=1655);

- Any turtles that are discovered should be moved, unharmed, to an area immediately outside of the fenced area, and position in the same direction that it was walking;

- No vehicles or heavy machinery should be parked in any turtle habitat;

- Work conducted during early morning and evening hours should occur with special care not to harm basking or foraging individuals; and

- All silt fencing should be removed after work is completed and soils are stable so that reptile and amphibian movement between uplands and wetlands is not restricted.

- Stockpiles of soil should be cordoned off with silt fencing so turtles do not attempt to try and nest in them.

- Use native plantings if possible. Any plantings should be composed of species native to northeastern United States and appropriate for use in riparian habitat.

Appalachian Brook Crayfish

The Appalachian brook crayfish is a freshwater crustacean and can be found in streams, creeks and spring habitats. They dwell on the bottom and construct burrows called "chimneys" along the water's edge. Most of these burrows are underwater but the top sticks out and resembles a chimney. It is thought that this particular crayfish prefers cool or very cold water. It has a localized distribution in Connecticut and it is known to have been lost from one nearby stream, Eagleville Brook in Mansfield. Localized declines are attributed to general habitat destruction and loss. This species is most active at night because this is when it feed. It is a predator and scavenger relying on decaying organic remains but it may also catch small animals.

Recommended Protection Strategies for the Crayfish

- This project should provide an large buffer around any riparian areas
- Avoid removing trees or other vegetation from riparian areas but especially stream banks; if possible leave a wide buffer to prevent temperature fluctuations to any flowing water that may occur on this property
- Ensure that soil erosion and sedimentation controls are in place to prevent the streams or flowing water to be impacted during storm events while construction is taking place
- Ensure that no additional nutrient loading (fertilizers) or chemicals are used in this area to prevent degradation to the crayfish habitat

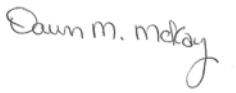
If these protection strategies are followed then the proposed activities will lessen the impact on the wood turtle and Appalachian brook crayfish. I have attached a fact sheet on the turtle and an information sheet on the crayfish. This determination is good for one year. Please re-submit an NDDB Request for Review if the scope of work changes or if work has not begun on this project by March 28, 2017.

Natural Diversity Data Base information includes all information regarding critical biological resources available to us at the time of the request. This information is a compilation of data collected over the years by the Department of Energy and Environmental Protection's Natural History Survey and

cooperating units of DEEP, private conservation groups and the scientific community. This information is not necessarily the result of comprehensive or site-specific field investigations. Consultations with the Data Base should not be substitutes for on-site surveys required for environmental assessments. Current research projects and new contributors continue to identify additional populations of species and locations of habitats of concern, as well as, enhance existing data. Such new information is incorporated into the Data Base as it becomes available.

Please contact me if you have further questions at (860) 424-3592, or dawn.mckay@ct.gov . Thank you for consulting the Natural Diversity Data Base. Also be advised that this is a preliminary review and not a final determination. A more detailed review may be conducted as part of any subsequent environmental permit applications submitted to DEEP for the proposed site.

Sincerely,



Dawn M. McKay
Environmental Analyst 3

WILDLIFE IN CONNECTICUT

STATE SPECIES OF SPECIAL CONCERN

Wood Turtle

Glyptemys insculpta

Background

Wood turtles may be found throughout Connecticut, but they have become increasingly rare due to their complex habitat needs. Wood turtles also have become more scarce in Fairfield County due to the fragmentation of suitable habitat by urban development.

© PAUL J. FUSCO

Range

Wood turtles can be found across the northeastern United States into parts of Canada. They range from Nova Scotia through New England, south into northern Virginia, and west through the Great Lakes region into Minnesota.

Description

The scientific name of the wood turtle, *Glyptemys insculpta*, refers to the deeply sculptured or chiseled pattern found on the carapace (top shell). This part of the shell is dark brown or black and may have an array of faint yellow lines radiating from the center of each chiseled, pyramid-like segment due to tannins and minerals accumulating between ridges. These segments of the carapace, as well as those of the plastron (bottom shell), are called scutes. The carapace also is keeled, with a noticeable ridge running from front to back. The plastron is yellow with large dark blotches in the outer corners of each scute. The black or dark brown head and upper limbs are contrasted by brighter pigments ranging from red and orange to a pale yellow on the throat and limb undersides. Orange hues are most typical for New England's wood turtles. The hind feet are only slightly webbed, and the tail is long and thick at the base. Adults weigh approximately 1.5 to 2.5 pounds and reach a length of 5 to 9 inches.

Habitat and Diet

Wood turtles use aquatic and terrestrial habitats at different times of the year. Their habitats include rivers and large streams, riparian forests (adjacent to rivers), wetlands, hayfields, and other early successional habitats. Terrestrial habitat that is usually within 1,000 feet of a suitable stream or river is most likely used. Preferred stream conditions include moderate flow, sandy or gravelly bottoms, and muddy banks.

Wood turtles are omnivorous and opportunistic. They are not picky eaters and will readily consume slugs, worms, tadpoles, insects, algae, wild fruits, leaves, grass, moss, and carrion.

Life History

From late spring to early fall, wood turtles can be found roaming their aquatic or terrestrial habitats. However, once temperatures drop in autumn, the turtles retreat to rivers and large streams for hibernation. The winter

is spent underwater, often tucked away below undercut riverbanks within exposed tree roots. Dissolved oxygen is extracted from the water, allowing the turtle to remain submerged entirely until the arrival of spring. Once warmer weather sets in, the turtles will become increasingly more active, eventually leaving the water to begin foraging for food and searching for mates. Travel up or down stream is most likely, as turtles seldom stray very far from their riparian habitats.

Females nest in spring to early summer, depositing anywhere from 4 to 12 eggs into a nest dug out of soft soil, typically in sandy deposits along stream banks or other areas of loose soil. The eggs hatch in late summer or fall and the young turtles may either emerge or remain in the nest for winter hibernation. As soon as the young turtles hatch, they are on their own and receive no care from the adults.

Turtle eggs and hatchlings are heavily preyed upon by a wide variety of predators, ranging from raccoons to birds and snakes. High rates of nest predation and hatchling mortality, paired with the lengthy amount of time it takes for wood turtles to reach sexual maturity, present a challenge to maintaining sustainable populations. Wood turtles live upwards of 40 to 60 years, possibly more.

Conservation Concerns

Loss and fragmentation of habitat are the greatest threats to wood turtles. Many remaining populations in Connecticut are low in numbers and isolated from one another by human-dominated landscapes. Turtles forced to venture farther and farther from appropriate habitat to find mates and nesting sites are more likely to be run over by cars, attacked by predators, or collected by people as pets.

Other sources of mortality include entanglements in litter and debris left behind by people, as well as strikes from mowing equipment used to maintain hayfields and other early successional habitats.

The wood turtle is imperiled throughout a large portion of its range and was placed under international trade regulatory protection through the Convention on International Trade in Endangered Species (CITES) in 1992. Wood turtles also have been included on the International Union for Conservation of Nature's (IUCN) Red List as a vulnerable species since 1996. They are listed as a species of special concern in Connecticut and protected by the Connecticut Endangered Species Act.

How You Can Help

- *Conserve riparian habitat. Maintaining a buffer strip of natural vegetation (minimum of 100 feet) along the banks of streams and rivers will protect wood turtle habitat and also help improve the water quality of the stream system. Stream banks that are manicured (cleared of natural shrubby and herbaceous vegetation) or armored by rip rap or stone walls will not be used by wood turtles or most other wildlife species.*
- *Do not litter. Wood turtles and other wildlife may accidentally ingest or become entangled in garbage and die.*
- *Leave turtles in the wild. They should never be kept as pets. Whether collected singly or for the pet trade, turtles that are removed from the wild are no longer able to be a reproducing member of a population. Every turtle removed reduces the ability of the population to maintain itself.*
- *Never release a captive turtle into the wild. It probably would not survive, may not be native to the area, and could introduce diseases to wild populations.*
- *As you drive, watch out for turtles crossing the road. Turtles found crossing roads in June and July are often pregnant females. They should* ***not*** *be collected but can be helped on their way. Without creating a traffic hazard or compromising safety, drivers are encouraged to avoid running over turtles that are crossing roads. Also, still keeping safety precautions in mind, you may elect to pick up turtles from the road and move them onto the side in the direction they are headed. Never relocate a turtle to another area that is far from where you found it.*
- *Learn more about turtles and their conservation concerns, and educate others.*
- *If you see a wood turtle, leave it in the wild, take a photograph, record the location where it was seen, and contact the Connecticut Department of Environmental Protection (DEP) Wildlife Division at dep.wildlife@ct.gov, or call 860-424-3011 to report your observation.*

State of Connecticut
Department of Environmental Protection
Bureau of Natural Resources
Wildlife Division
www.ct.gov/dep

4/2011

Search Site

Menu

Appalachian Brook Crayfish

Cambarus bartonii
Friday, August 3, 2012

Crayfish are one of the most common freshwater crustaceans in North America. Although this area is home to more than 30 different species, the Appalachian Brook Crayfish is one of the most widespread. Due to the great amount of intraspecific variation across its range, however, it is thought that *Cambarus bartonii* may actually represent a complex of several different species.

Cambarus bartonii is not particularly distinctive and can be difficult to identify. It is a small- to medium-sized crayfish, with a generally smooth body and smooth claws which curve slightly inwards. One of the characteristic features which separates it from other similar species is the possession of a smaller-than-average rostrum (the triangle-shaped part of the shell between the eyes). These crayfish are typically orange-brown in color, although blue morphs have been found of this species.

The Appalachian Brook Crayfish typically makes its home in the clear, cool water of rivers, lakes, and streams. It prefers more oxygenated water, and as such is often found in somewhat turbulent areas. These crayfish construct burrows under rocks and in the sediment on the bottom of the body of water. These burrows, which are painstakingly excavated by removing small rocks one at a time with the claws, can be surprisingly deep and complex. Burrows have been found to be as deep as 1 m, and may pass through several layers of rock and gravel; they also have long lateral passageways. In the process of digging these burrows, crayfish often create distinctive “chimneys,” which are the openings of their burrows built up

all around with the excavated sediment. These often protrude out of the water or are found on the banks of streams and ponds, and resemble their namesake.

These crayfish mate in spring and early summer. After mating, the female will carry the fertilized eggs attached to her pleopods (the small "legs" on the underside of the tail that are used for swimming). While she is carrying her eggs, the females are referred to as being "in berry," due to the resemblance of the cluster of eggs on her underside to a berry. After the eggs hatch, the young crayfish remain attached to her underside until shortly after their second molt. After separating from their mother and siblings, they young (typically around 5 mm in length) assume a lifestyle similar to their parents'. Namely, they eat anything they can find. Crayfish are predators on small insects, other invertebrates, and small vertebrates such as tadpoles; herbivores on algae and other water plants; and scavengers on recently dead animals.

Crayfish are possessed of an extraordinary sense of smell. It is estimated that 40% of their brain is devoted to the sense of smell, as opposed to less than 1% of a human's. By flicking their antennules (the small, paired sets of miniature antennae between the larger pair) constantly, they are able to detect both chemical cues and motion in their environment that could indicate food, a mate, or a predator. They also have chemical receptors located on their legs, the better to detect their surroundings.

Cambarus bartonii is vulnerable to many predators, humans not the least. This species and its relatives are collected for human consumption, a harvest that can be almost 1,000 tons worldwide. However, many of these crayfish are farmed, and those in our area are not under significant threat from humans. Their natural predators include raccoons, opossums, foxes, birds of prey, and many species of fish. Despite the many dangers, crayfish can live to be four years old in the wild.

This specimen was found in the Station Pond and is a male, judging by its reproductive organs. This species is somewhat sexually dimorphic, with males possessing slightly larger claws.

Hazel Galloway

Sources:

- Ariel Kahrl for help with identification
- http://animaldiversity.ummz.umich.edu/site/accounts/information/Cambarus...
- http://pinicola.ca/crayfishontario/cbartoniiacct.htm
- http://www.fcps.edu/islandcreekes/ecology/crayfish_(cambarus).htm
- http://www.sciencedaily.com/releases/2007/08/070831144229.htm

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College and Graduate School of Arts & Sciences

Maintained by Mountain Lake Biological Station

Mountain Lake Biological Station
434-982-5486
434-297-4907
Contact Us

485 McCormick Road
064 Gilmer Hall
PO Box 400327
Charlottesville, VA 22904-4325

Make a Gift

CIVIL ENGINEERING SERVICES, LLC

203 BOSTON HILL ROAD, ANDOVER CT 06232 PH: (860) 742- 0364 FAX: (860) 742-0364

March 30, 2016

Jennifer S. Kaufman
Environmental Planner
Inland Wetlands Agent
Town of Mansfield
4 South Eagleville Road
Mansfield CT 06268

RE: Howard & Alice Raphaelson
Dog Lane, Storrs

Dear Ms. Kaufman;

This letter is intended to address a couple of issues that have been raised concerning the Raphaelson's application for a property split and development of two building lots on the south side of Dog Lane Road in Storrs.

The first issue pertains to a question of how the development of the lots, and particularly on-site septic systems, will affect nitrogen loading. We have run calculations for determination of nitrogen loading and attached a copy of those calculations herewith.

The attached nitrogen loading calculations are based on the requirements for proposed developments on Cape Cod as prescribed in Technical Bulletin 91-001, by the Cape Cod Commission, Water Resources Office, April 1992. They are admittedly (admitted by the Cape Cod Commission) very conservative, and the final numbers generated by the calculations are typically combined and averaged with what the authors refer to as "actual" numbers that are based on a more realistic occupancy rate for bedrooms. Even so, using the numbers dictated under the Cape Cod "Title V" guidelines (and no diluting or averaging), we have a calculated nitrogen loading of 7.26 mg/l (or 7.26 ppm) which is an acceptable level to DPH and DEEP.

We understand that some concern was also expressed about an increase in off-site stormwater discharge due to the proposed development. I have attached a brief, and very conservative address of the impact one could reasonably expect from the proposed development. Contained within a drainage area of some 160 acres, with no impact at all on time of concentration, and with a large and relatively flat wetlands as a receiving body, we can assert that the impact of the proposed development on storm-water drainage to off-site properties will be negligible. SCS hydrographs of "pre" and "post" development conditions showed no change at all in peak storm

run-offs for 2, 5, 10, 25 or 50-year storm events.

I hope this letter and the attached calculations resolve any concerns you or the Commission may have regarding these issues. If you have any further questions, or wish to discuss these aspects of the project, please don't hesitate to call.

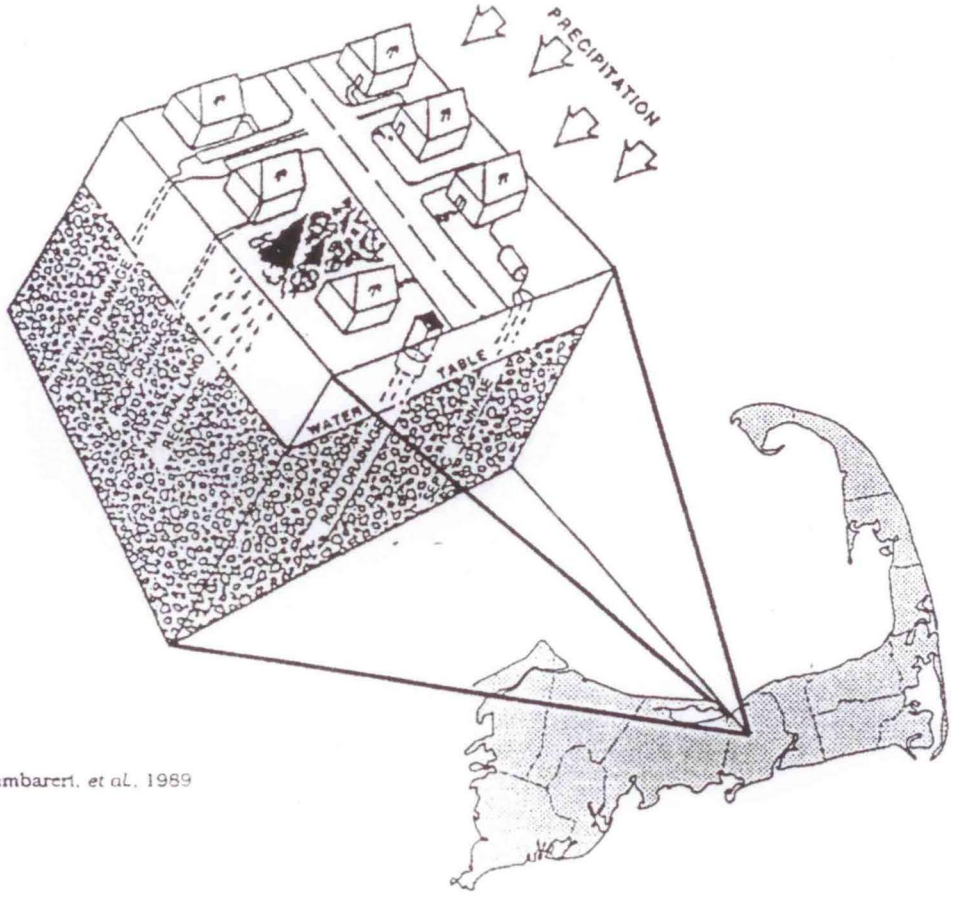
Sincerely,

Gerald E. Hardisty, P.E.

TECHNICAL BULLETIN 91-001 (FINAL)

NITROGEN LOADING

CAPE COD COMMISSION
WATER RESOURCES OFFICE
April, 1992



From Cambareri, *et al.*, 1989

Cape Cod Commission
3225 Main St.
P.O. Box 226
Barnstable, MA 02630
(508) 362-3828

Civil Engineering Services, LLC
203 Boston Hill Rd
ANDOVER, CT 06232
(860) 742-0364

JOB 214044 - Raphaelson
SHEET NO. 1 OF
CALCULATED BY GH DATE 3/28/16
CHECKED BY DATE
SCALE

Nitrogen Loading Calculations

Note: Calculations are based on Technical Bulletin 91-001 Cape Cod Commission, Water Resources Office, Apr 92

Lot #1 102,330 SF (2.34 AC.)

Wastewater: assume 4 bedrooms @ 110 gdg/bdrm

$$4\ \text{bdrm} \cdot \frac{110\ \text{gpd}}{\text{bdrm}} \cdot \frac{3.785\ \text{L}}{\text{gal}} = \frac{1665.4\ \text{L}}{\text{day}} \cdot \frac{35\ \text{mg}}{\text{L}} =$$

$$58,289\ \frac{\text{mg}}{\text{day}}$$

impervious surfaces:

drive: $2252\ \text{ft}^2 \left(\frac{40''}{4\text{yr}}\right)\left(\frac{\text{ft}}{12''}\right)\left(\frac{28.32\ \text{L}}{\text{ft}^3}\right)\left(\frac{4\text{yr}}{365\ \text{d}}\right) = 582\ \frac{\text{L}}{\text{d}} \cdot \left(\frac{1.5\ \text{mg}}{\text{L}}\right) = 873.6\ \text{mg/day}$

house: $1630\ \text{ft}^2 \left(\quad .25863 \quad\right) = 422\ \text{L/d}\ \left(0.75\ \frac{\text{mg}}{\text{L}}\right)$

$$= 316\ \frac{\text{mg}}{\text{d}}$$

Lawn: 28,137 (assumes to limits of disturbance)

$$-\ \frac{3,882}{24,255\ \text{SF}} \left(\frac{3\text{lb}}{1000\ \text{ft}^2\ \text{yr}}\right)\left(\frac{4\text{yr}}{365\ \text{d}}\right)\left(\frac{454000\ \text{mg}}{\text{lb}}\right)\left(\frac{0.25}{\text{factor}}\right) = 22,627\ \text{mg/d}$$

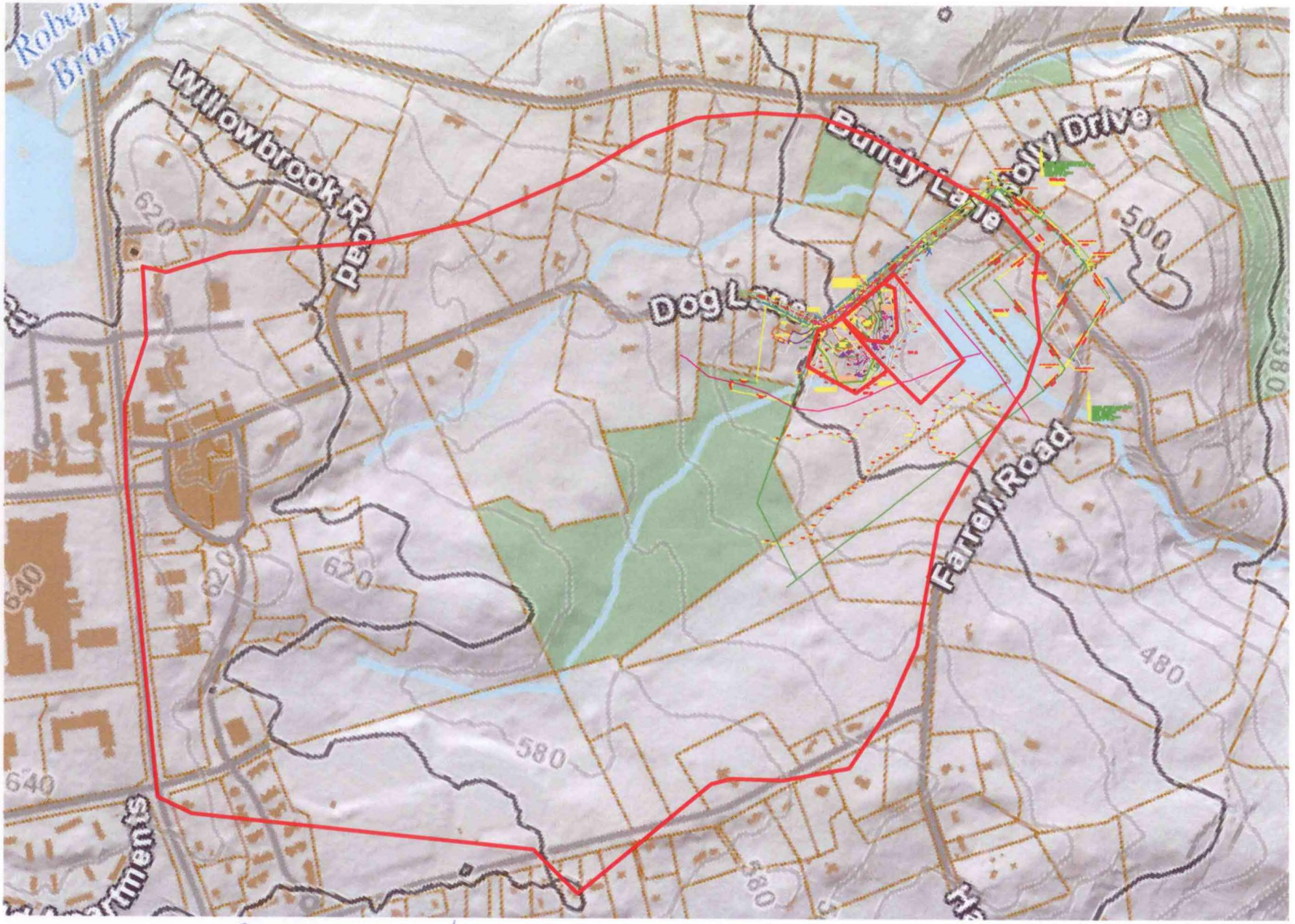
natural area: $102,330\ \text{SF} - 28,137\ \text{SF} = 74,193\ \text{SF}$

$$74193\ \text{ft}^2 \left(\frac{1.5\ \text{ft}}{4\text{yr}}\right)\left(\frac{28.32\ \text{L}}{\text{ft}^3}\right)\left(\frac{1\text{yr}}{365\ \text{d}}\right) = 8,635\ \text{L/d}$$

Summary:

TITLE V: $$\frac{58,289 + 874 + 316 + 22,627\ \text{mg}}{1665 + 583 + 421 + 8635\ \text{liters}} = 7.26\ \text{mg/L}$$

$$= 7.26\ \text{ppm}$$



RAPHAELSON - STORMWATER CONTRIBUTING AREA

Civil Engineering Services, LLC
203 Boston Hill Rd
ANDOVER, CT 06232
(860) 742-0364

JOB 214044 - Raphadson
SHEET NO. 1 OF
CALCULATED BY CH DATE 3/30/16
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Drainage to wetlands/pond;

Total Area: 7,131,583 SF = 163 Ac.

Lot #1 - impervious: 1960 SF Drive
1630 SF House
3590 SF imp.

Lot #2 - impervious: 1806 SF Drive
1940 SF House
3746 SF imp.

Assume we change a total of 7500 SF of woods (CN = 61) to impervious (CN = 98)
* Actually, hydrographs will round up to nearest 0.1 Ac, therefore use 0.2 Acres (8712 SF)

Pre-development;

$163 \text{ Ac} \cdot 61 = 9943 \text{ CN-A}$

$(162.8 \cdot 61) + (0.2)(98) = 9950.4 \text{ CN-A}$

$\%\text{ difference} = \frac{9950.4}{9943} \cdot 100\% = 0.07\%$

Take into account a substantial time of concentration, a receiving area of ponding/wetlands with additional time for attenuation and the resultant hydrographs show zero difference between "pre" and "post" conditions.

Town of Mansfield

Department of Planning and Development

Date: March 29, 2016

To: Mansfield Inland Wetlands Agency

From: Jennifer Kaufman, Inland Wetlands Agent

Subject: Bicentennial Pond (Assessor's Parcel ID 23.60.7). (File #W1563)
Town of Mansfield
Description of work: aquatic weed management and sediment removal
Map Date: 10/27/2015

Notifications

☒ The applicant has paid the required application fee
☒ The applicant has submitted certified mail receipts for notices mailed to abutters

Project Overview

To improve the recreational use and overall ecological health of Bicentennial Pond, the Town of Mansfield proposes to manage approximately 2.6 acres of nuisance aquatic species and remove accumulated soft organic matter and from the swimming area of Bicentennial Pond.

Organic Matter/Sediment Removal- Natural eutrophication and sedimentation deposited from surface runoff along with organic material buildup has accumulated in the beach area at Bicentennial Pond, requiring remediation to restore natural bottom depth and quality of the pond's recreational function. The work will be accomplished by using a compact, hydraulic sediment removal system (the "dredge"). The dredge is equipped with a trash pump that will extract the accumulated sediment from the pond bottom and pump it to a nearby dewatering area. The spoils will be dewatered using geotextile fabric tubes, which retain spoils material while filtering the water before it is returned to the pond in a clarified state. Once the spoils are completely dewatered they will be extracted from the containment membrane and placed in a "roll off dumpster and brought to a location determined by Mansfield Department of Public works, dried out, and reused. Approximately 15,000 square feet of the pond will be disturbed during the excavation and it is estimated that no more than 30 cubic yard of sediment and organic matter will be removed from the pond.

*Nuisance Aquatic Weed Management-*To improve the recreational experience and overall health of the pond, the Town of Mansfield proposes to work with a licensed contractor (All Habitat Services, Inc.) to complete an herbicide treatment to manage a population and of non-native, invasive Water Chestnut and other native nuisance aquatic weed species. This work will be conducted in accordance with a CT DEEP Aquatic Pesticide Use permit and state, and federal regulations.

The Conservation Commission reviewed the application on March 16, 2016 and raised concern that while the initial treatment will occur in late April/early May well before the swim/camp season, the All Habitat Services proposal indicated that there may need to be follow-up herbicide treatments that 5-10 weeks after

initial treatment, which falls within the swim/camp season at the pond. I have confirmed with All Habitat that the follow-up herbicide treatments can take place after the swim/camp season and still be effective in managing the aquatic weeds. Avoiding herbicide treatment during the swim/camp season should be added as a condition of approval.

Recommendation/Suggested Motion

_____ MOVES, _____ seconds to grant an Inland Wetlands License, pursuant to the Inland Wetlands and Watercourses Regulations of the Town of Mansfield to the Town of Mansfield (File #W1563) for aquatic weed management and sediment removal on property owned by the applicant and located at Bicentennial Pond (Assessor's Parcel ID 23.60.7) as shown on plans dated 10/27/2015 and as described in application submissions.

This action is based on a finding of no anticipated significant impact on the wetlands, and is conditioned on the following provisions being met:

1. Appropriate erosion and sedimentation controls shall be in place prior to the activity, maintained during the activity and removed when disturbed areas are completely stabilized;
2. Herbicide treatments shall be conducted in accordance with a CT DEEP Aquatics Pesticide Use Permit and shall be coordinated with the Town of Mansfield's Parks and Recreation Department to ensure that no treatments occur during the swim/camp season; and
3. Material removed from the pond will be immediately removed from the site for dewatering.

This approval is valid for five years (until April 4, 2021) unless additional time is requested by the applicant and granted by the Inland Wetlands Agency. The applicant shall notify the Wetlands Agent before any work begins and all work shall be completed within one year. Any extension of the activity period shall come before this Agency for further review and comment.

EASTERN CONNECTICUT CONSERVATION DISTRICT, INC.

238 West Town Street
Norwich, CT 06360-2111
(860) 887-4163, Ext. 400

139 Wolf Den Road
Brooklyn, CT 06234
860-774-9600

www.ConserveCT.org/eastern

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March 25, 2016

Jennifer Kaufman
Environmental Planner
Inland Wetlands Agent
Town of Mansfield
4 South Eagleville Road
Storrs-Mansfield, CT 06268

Re.: IWA File #W1563 Bicentennial Pond

Dear Ms. Kaufman,

On behalf of the Mansfield Inland Wetland Agency, you have asked the Eastern Connecticut Conservation District (ECCD) to review the above-referenced permit application for aquatic weed management and sediment removal at Bicentennial Pond, a 6.05 acre impoundment of Schoolhouse Brook, a tributary to the Fenton River.

Materials provided to ECCD for review include:

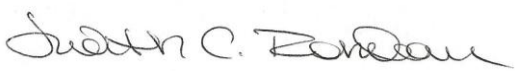
- Application for Permit – Mansfield Inland Wetland Agency (n.d.)
- Town of Mansfield Department of Planning and Development Memo dated March 2, 2016
- Scope of Services from All Habitat Services, Inc. dated November 13, 2015
- Email and attachment from Jennifer Kaufman, Town of Mansfield, to David Roach, All Habitat Services, Inc., dated March 17, 2016, regarding the timing of the aquatic herbicide applications

The purpose of the application is "…to improve the recreational use and overall ecological health of Bicentennial Pond." The Town of Mansfield (the applicant) proposes to remove organic material and sediment from the swimming area in order to restore the natural pond depth and improve the quality of recreational use. The applicant also proposes to treat the pond with aquatic herbicides to manage nuisance aquatic vegetation and the invasive aquatic plant *Trapa natans*.

Based on the project description provided by the contractor, All Habitat Services, Inc., the dredging process, including the removal of material from the pond, de-watering, and immediate removal of material from the site, will be conducted according to established industry standards and should minimize the impact to the pond from the material removal. The removal of the bottom sediments from the

swimming area will reduce available nutrients for aquatic plant growth, reducing the effects of eutrophication noted in recent years. Likewise, the proposal to manage nuisance aquatic vegetation complies with industry standards and is suitable to treat the aquatic species identified in the 10/27/15 plant survey. Therefore, based on our review of the application submission, in our professional opinion, there will be no anticipated significant impact on wetlands and watercourses due to the proposed activities.

Respectfully submitted,



Judith C. Rondeau
Natural Resource Specialist

Department of Planning and Development

Date: March 29, 2016

To: Mansfield Inland Wetlands Agency

From: Jennifer Kaufman, Inland Wetlands Agent

Subject: Receipt of New Application for Wetlands License
Hunting Lodge Road (Assessor's Parcel ID 15.21.3) (IWA File #1564)
Storrs Lodges LLC
Description of work: construction of a 218-unit apartment complex

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Project Description

The applicants propose to construct a 218 unit apartment complex known as the Lodges at Storrs, on a 45.9-acre parcel on the west side of Hunting Lodge Road, north of North Eagleville Road (Parcel ID 15.21.3). On February 1, 2016, the Mansfield Inland Wetlands Agency approved a wetland map amendment (File # W1549) for this parcel based on field delineation of the wetlands by a Registered Soil Scientist, pursuant to section 15.0 of the Mansfield Inland Wetlands and Watercourses Regulations (the Regulations).

The property is currently entirely forested. Of the 45.9-acre parcel, 6.7 acres are wetlands. The site also includes 1,439 linear feet of an unnamed tributary to Eagleville Brook. The eastern portion of the property drains to the Eagleville Brook. The western portion of the property drains to Cedar Swamp Brook. There is also a vernal pool located on the western edge of the property. The proposed development would result in the loss of 4,402 square feet (0.1 acres) of wetlands related to the construction of the main driveway crossing. The applicants propose in-kind mitigation in the form of both wetland restoration and creation. Construction will occur on approximately 9.4 acres within the Upland Review area.

The proposed activity may have a significant impact on wetlands. Therefore, a public hearing is warranted pursuant to section 9.0 of the Regulations. Further, because of the magnitude of the project, staff recommends that the Agency engage the services of an independent consultant. Section 8.6 of Mansfield's Inland Wetlands and Watercourses Regulations and the Fee Schedule established in Article V, Chapter 122, Section 122-12 of the Mansfield Code of Ordinances authorizes the Agency to hire independent consultants at the expense of an applicant when the Agency deems it necessary to do so.

In anticipation of this, staff prepared and distributed a Request for Proposal (RFP) in the following manner:

- Posted RFP on the State Contracting Portal and the Town Website
- Emailed RFP to firms that submitted a proposal for the Meadowbrook Gardens Project (File #W1562)
- Emailed RFP to Pietras Environmental, the firm that completed the review of the Wetland Map Amendment for the subject property.

Department of Planning and Development

After being informed by Pietras Environmental that they would not be submitting a proposal, staff forwarded the RFP to GEI Consultants and Michael Klein of Environmental Planning Services based on the recommendation of Tom Pietras. In full disclosure, the marketing manager for GEI Consultants is the spouse of a Town Public Works employee.

Proposals were received from BSC Group, GEI Consultants, and Environmental Planning Services, LLC/Nathan Jacobson Associates, Inc. and reviewed by Derek Dilaj, Assistant Town Engineer, Linda Painter, Director of Planning and Development, and Jennifer Kaufman, Inland Wetland Agent using criteria laid out in the RFP. The following are the scores identified for each firm based on the criteria identified in the RFP. The maximum score that could be obtained for each criteria was 10 points.

Criteria	BSC	GEI	Environmental Planning Services/Nathan Jacobson Associates
Completeness of Application	7	10	7
Background and Experience of the Consultant in Providing the Services (Examples of Similar Work Provided)	6	9	9
Effectiveness of Proposed Delivery System to Ensure Quality of Service and Timely Completion of Service	9	9	8
Background, Education, Qualification of Key Personnel	7	8	9
Professional Certifications	5	7	7
Familiarity with the Town	10	1	3
References	8	10	10
Budget	5	10	1
Total	**57**	**64**	**54**

Based on these criteria and reference checks, GEI Consultants ranked the highest. As such, staff recommends that the Agency retain GEI Consultants to assist staff and the Agency with review of the Storrs Lodges project. Copies of all three proposals are attached to this memo for your review. The Agency has the final decision on which firm, if any, to retain for this project.

Department of Planning and Development

☒ The project includes work in wetlands.

☒ The project includes work in the 150 foot upland review area.

☐ The project is located in a Public Water Supply Watershed.

Application Fees and Notifications

☒ The applicant has paid the required application fee

☒ The applicant has submitted copies of the notice mailed to neighbors and a list of abutters to be notified. Certified mail receipts must be submitted prior to action on the application.

☒ The applicant has submitted copies of notices provided to the Connecticut DPH and Windham Water Works. Certified mail receipts must be submitted prior to action on the application.

☒ Natural Diversity Database has been checked and state and/or federal listed species or significant natural communities have been identified on the property.

If the Agency agrees with the above recommendation, the following motion is in order.

Receipt Motion

_____ MOVES, _____ seconds to:

1) Receive the application submitted by Storrs Lodges LLC (IWA File #1564) under the Inland Wetlands and Watercourses Regulations of the Town of Mansfield for the construction of a 218-unit apartment complex on property owned by the applicants and located at Hunting Lodge Road (Assessor's Parcel ID 15.21.3) as shown on plans dated 3/18/2016 and as described in application submissions, schedule a public hearing on June 6, 2016, and to refer said application to the Conservation Commission for review and comment.
2) Authorize staff to engage the services of GEI Consultants to provide independent review of the application. Pursuant to section 8.6 of Mansfield's Inland Wetlands and Watercourses Regulations, fees incurred for this review will be the responsibility of the applicants; a deposit in the amount of the estimated cost shall be provided prior to issuance of a notice to proceed.

APPLICATION FOR PERMIT
MANSFIELD INLAND WETLANDS AGENCY
4 SOUTH EAGLEVILLE ROAD, STORRS, CT 06268
860-429-3015x6204 (DIRECT) TEL: 860-429-3330 OR
FAX: 860-429-6863

FOR OFFICE USE ONLY

File # W W1564
Fee Paid $1000
Official Date of Receipt 3-18-16

Applicants are referred to the Mansfield Inland Wetlands and Watercourses Regulations for complete requirements, and are obligated to follow them. For assistance, please contact the Inland Wetlands Agent at the telephone numbers above.

Please print or type or use similar format for computer; attach additional pages as necessary.

Part A - Applicant

Name STORRS LODGES, LLC

Mailing Address 30 DORSET CROSSING SUITE 600

SIMSBURY, CT Zip 06070

Phone 860-217-1700 Email tony@thekeystonecompanies.com

Title and Brief Description of Project

CONSTRUCTION OF 218 UNIT STUDENT APARTMENT COMPLEX UNDER THE DMR ZONE

Location of Project HUNTING LODGE ROAD PARCEL ID 15.21.3

Intended Start Date FALL 2016

Part B - Property Owner (if applicant is the owner, just write "same")

Name PONDE PLACE, LLC

Mailing Address SAME AS APPLICANT

Zip

Phone Email

Owner's written consent to the filing of this application, if owner is not the applicant:

Signature date

Applicant's interest in the land: (if other than owner) OPTIONEE

Part C - Project Description (attach extra pages, if necessary)

1) Describe in detail the proposed activity here or on an attached page. (**See guidelines at end of application)**
   Please include a description of all activity or construction or disturbance:
a) ***in*** the wetland/watercourse
b) ***in*** the area ***adjacent*** to (within 150 feet from the edge of) the wetland/watercourse, even if wetland/watercourse is ***off*** your property

SEE ATTACHED SHEET

2) Describe the amount or area of disturbance (in square feet or cubic yards or acres):
a) ***in*** the wetland/watercourse
b) ***in*** the area ***adjacent*** to (within 150 feet from the edge of) the wetland/watercourse, even if wetland/watercourse is **off** your property

WETLAND / WATERCOURSE = 4,402 S.F.
150' URU = 9.4 AC. ±

3) Describe the type of materials you are using for the project: CONVENTIONAL MATERIALS USED FOR RESIDENTIAL CONSTRUCTION. FILL WILL BE IMPORTED CLEAN SANDS & GRAVEL

a) include ***type*** of material used as fill or to be excavated SANDS & GRAVEL (LOAMY)
b) include ***volume*** of material to be filled or excavated
25,000 C.Y. ±

4) Describe measures to be taken to minimize or avoid any adverse impacts on the wetlands and regulated areas (silt fence, staked hay bales or other Erosion and Sedimentation control measures).
A FULL EROSION & SEDIMENTATION PLAN IS INCLUDED IN THE APPLICATION PLAN SET THAT INCLUDES ALL REQUIRED CONTROL MEASURES

Part D - Site Description

Describe the general character of the land. (Hilly? Flat? Wooded? Well drained? etc.)
THE SITE IS GENERALLY WOODED WITH GENTLE TO MODERATE SLOPES. OUTSIDE THE WETLAND AREAS THE SOILS ARE A MIXTURE OF WELL DRAINED TYPE B SOILS, SUCH AS WOODBRIDGE, CANTON & PAXTON

Part E - Alternatives

Have you considered any alternatives to your proposal that would meet your needs and might have less impact on the wetland/watercourse? Please list these alternatives.

SEE ATTACHED SHEET

Part F - Map/Site Plan (all applications) SEE PLANS DATED 3/18/16

1) Attach to the application a map or site plan showing **existing conditions** and the **proposed project** in relation to wetland/ watercourses. Scale of map or site plan should be 1" = 40'; if this is not possible, please indicate the scale that you are using. A sketch map may be sufficient for small, minor projects. **(See guidelines at end of application)**

2) Applicant's map date and date of last revision 3/18/16
3) Zone Classification RAR 90 WITH ZONE CHANGE TO DMR
4) Is your property in a flood zone? _____Yes __X__No _____ Don't Know

Part G - Major Applications Requiring Full Review and a Public Hearing

See Section 6 of the Mansfield Regulations for additional requirements.

Part H - Notice to Abutting Property Owners

1) Attach list of abutters, name, and address

2) **Proof of Written Notice to Abutters.** You must notify abutting (neighboring) property owners (any property immediately contiguous with the subject property, including those across the street) by certified mail, return receipt requested, stating that a wetland application is in progress, and that abutters may contact the Mansfield Inland Wetlands Agent for more information. Include a brief description of your project. ***Postal receipts of your notice to abutters must accompany your application.*** To generate an abutters list go to http://www.mainstreetmaps.com/CT/Mansfield/

Part I - Additional Notices, if necessary

Notice to Windham Water Works and CT Department of Public Health is attached. If this application is in the public watershed for the Windham Water Works (WWW), you must notify the WWW and the Department of Public Health of your project within 7 days of sending the application to Mansfield--sending it by certified mail, return receipt requested. Contact the Mansfield Inland Wetlands Agent to find out if you are in this watershed.

Notice to Adjoining Town. If your property is within 500 feet of an adjoining town, you must also send a copy of the application, on the same day you sent one to Mansfield, to the Inland Wetlands Agency of the adjoining town, by certified mail, return receipt requested.

The Statewide Reporting Form shall be part of the application and specified parts must be completed and returned with this application.

Part J - Other Impacts To Adjoining Towns, if applicable

1) Will a significant portion of the traffic to the completed project on the site use streets within the adjoining municipality to enter or exit the site?___Yes_X_No___Don't Know

2) Will sewer or water drainage from the project site flow through and impact the sewage or drainage system within the adjoining municipality?____ Yes __X__No ____ Don't Know

3) Will water run-off from the improved site impact streets or other municipal or private property within the adjoining municipality?____ Yes __X__No ____Don't Know

Part K - Additional Information from the Applicant

Set forth (or attach) any other information which would assist the Agency in evaluating your application. (*Please provide extra copies of any lengthy documents or reports, and extra copies of maps larger than 8.5" x 11", which are not easily copied.)*

Part L - Filing Fee

Application fees shall be in accordance with the current Mansfield Code of Ordinance fee Schedule, pursuant to Section 8-1c of the Connecticut General Statutes. The fee schedule includes provisions for applicant-funded consultant studies and reports. The current fee schedule is available in the Planning and Zoning office.

Note: The Agency may require additional information about the upland review area or about wetlands or watercourses affected by the regulated activity. If the Agency, upon review of your application, finds the activity proposed may involve a "significant activity" as defined in the Regulations, additional information and/or a public hearing may be required.

Certification

I hereby certify that:

- I am familiar with the information contained in this form and that such information is true and correct to the best of my knowledge.
- I understand the penalties for obtaining a permit through deception or through inaccurate or misleading information.

Anthony George — Signature

March 18, 2016 — Date

Authorization to Enter Property

The undersigned hereby consent to necessary and proper inspections of the above-mentioned property by members and agents of the Inland Wetlands Agency at reasonable times, both before and after the permit in question has been issued by the Agency.

Anthony George — Signature

March 18, 2016 — Date

Part C—Project Description:

1) The project includes the construction of 47 two-story residential buildings with 218 dwelling units providing housing a total of 692 UCONN students along with a Community Center Building and outdoor recreational areas. . There will be two 24 foot wide access driveways proposed. The main access drive to the development will be from Hunting Lodge Road. The second access drive from Northwood Road will be for limited emergency access and campus bus circulation. On-site parking will be constructed for 619 vehicles.

   Site work will be completed using conventional construction equipment and techniques. Little or no blasting or rock excavation is anticipated to construct the project based on soil characteristics on the property. Construction will take place over an 18-24 month period. The proposed storm drainage system incorporates Best Management Practices (BMP) and LID design techniques as described in the CTDEP stormwater regulations. The drainage system for the project discharges to the on-site wetland and watercourses. The project will be served by public water and sanitary sewer. A comprehensive Soil and Erosion Plan has been developed for the project and will be implemented throughout the duration of the construction of the development until all areas are fully stabilized. The project will submit a registration for the CTDEEP General Permit associated with site construction activities prior to the start of any construction.

   Every effort has been made to maintain a substantial buffer from the wetland and watercourse resources identified on the site. The proposed wetland crossing for the main driveway out to Hunting Lodge Road will be accomplished using a precast concrete arch bridge so there are minimal impacts to the wetlands at this location. There are no other direct impacts to wetlands on the property.

   a. The site contains approximately 6.7 acres (291,172 s,f,) of flagged wetlands. The only direct impact is the loss of 4,402 s.f. of wetlands related to the construction of the main driveway crossing. There are 1,439 l.f. of watercourses on the property. There will be no direct impact to watercourses.

   b. There are approximately 24.1 acres of 150 foot Upland Review Area on the property. The project includes building construction and site improvements within approximately 9.4 acres of the Upland Review Area

Part E –Alternatives

   a. Given the topographical features of the property and practical access limitations to existing public roadways, any development on this property would include access roads and public utility connections following basically the layout included in the proposed project. There are no other alternate road locations on the property. The property is currently zoned for residential use development under the RAR-90 zone. It the property were developed as a

single family development, it would require carving up the site into 2-acre lots with a minimum 200 feet of frontage along a public road. Developing the site in this manner would mean portions of wetlands and watercourses would fall within these lots subjecting them to the long-term impacts resulting from the use of the land in a conventional residential environment. The monitoring and enforcement of potential activities and impacts on these resources becomes difficult when they occur on individually owned residential properties.

b. Development of this property under a master planned development concept as proposed allows development to occur in selected upland areas and essentially sets aside the wetland and watercourse resources with appropriate buffers from the development in undisturbed portions of the property.

c. The one wetland crossing required to gain proper and safe roadway access to Hunting Lodge Road occurs at a location that has been used for such access for many years. The existing remains of this crossing need to be upgraded to current design standards providing for a minimum 24-foot wide paved roadway. Crossing the wetlands using conventional culverts was evaluated as a possible more cost effective alternate to the proposed precast arch bridge crossing. Due to the sensitive nature of the crossing location, a conventional culvert and fill installation was deemed to not be the most prudent alternative.

d. The applicant believes that the proposed project which restricts direct impacts to wetland and watercourse resources to a small area at the crossing for the main driveway to Hunting Lodge Road as the most prudent and feasible development alternative for the property.

THE LODGES AT STORRS
Hunting Lodge Road
Mansfield, Connecticut

Inland Wetlands & Watercourses Application

March 18, 2016

DEVELOPMENT TEAM

Developer/Applicant	Storrs Lodges, LLC
Land Owner	Ponde Place, LLC
Civil and Traffic Engineer	F. A. Hesketh & Associates, Inc.
Land Surveyor	F. A. Hesketh & Associates, Inc.
Environmental Consultant	REMA Ecological Services, LLC
Landscape Architect	F. A. Hesketh & Associates, Inc.
Soil Scientist	REMA Ecological Services, LLC
Legal Counsel	Thomas Fahey, Esquire

LIST OF DRAWINGS

	Title Sheet
MA-1	Master Plan
IW-1	Inland Wetlands Plan
LA-1 thru LA-4	Layout Plan
GR-1 thru GR-4	Grading and Drainage Plan
ER-1 thru ER-4	Soil Erosion & Sedimentation Control Plan
UT-1 and UT-2	Utility Plan
SDD-1 and SDD-2	Site Driveway Detail
SD-1 thru SD-6	Details
NT-1	Notes
PS-1	Property Survey
A-200	Building A and B Elevations
A-100	Building A and B Lower Level Plan

David S. Ziaks P.E. #13336

F. A. Hesketh & Associates, Inc.
6 Creamery Brook, East Granby, CT 06026
Civil & Traffic Engineers · Surveyors · Planners · Landscape Architects
Phone (860) 653-8000
Fax (860) 844-8600
e-mail mail@fahesketh.com

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THE LODGES AT STORRS

Zoning Data

Existing Zone: Rural Agricultural Residence 90 Zone (RAR-90)

Proposed Design Development District: Design Multiple Residence (DMR)

Density Requirement (Article 10 A.6.b):

Required: 5,000 square feet per Dwelling Unit
218 Dwelling Units x 5,000 square feet = 1,090,000 square feet

Provided: Total Lot Area = 2,000,645 square feet (45.93 acres)
Area of Wetlands = 291,172 square feet
Area of slopes over 15% = 137,100 ± square feet

Net Lot Area = 1,572,268 square feet (36.09 acres)

Minimum Lot Frontage (Article 8):

Required: 300 feet minimum

Provided: Hunting Lodge Road = 341.54 feet (77.50' + 264.04)
Northwood Road = 400.06 feet

MInimum Setback from Front Lot Line (Article 8):

Required: 50 feet minimum

Provided: 57 ± feet - Hunting Lodge Road
51 ± feet - Northwood Road

Minimum Setback from Side Lot Line (Article 8):

Required: 50 feet minimum

Provided: 51± feet

Minimum Setback from Rear Lot Line (Article 8):

Required: 50 feet minimum

Provided: 51± feet

Maximum Building Height (Article 10 A.6.d):

Required: 40 feet maximum

Proposed: 32 ± feet (see Architectural Plans)

Off-Street Parking (Article 10 D.5.a):

Required: .8 per Bedroom
692 Bedrooms x .8 spaces per bedroom = 554 required parking spaces

Proposed: 558 spaces

Minimum Distance Between Structures (Article 10 A.6.f):

Required: 20 feet minimum

Proposed: 22± feet

Minimum Floor Area (Article 10 A.6.e):

Required: 475 square feet for first three rooms
125 square feet for each additional room

Proposed: Each unit = 800± square feet

Minimum Open Space / Recreational Facilities (Article 10 A.6.h):

Required: 600 square feet per Dwelling Unit
218 Dwelling Units x 600 square feet per unit = 130,800 square feet

Proposed: 175,000 ± square feet Passive/Active Recreation Area

Maximum Building Ground Coverage (Article 8):

Required: 25 percent

Proposed: 174,690 Sq. Ft. or 8.8 percent

Building/Unit Data

Building Type "A" (32 Total)

128 Units
512 Bedrooms

Building Type "B" (15 Total)

90 Units
180 Bedrooms

Total

Buildings = 47
Units = 218
Bedrooms = 692

Building/Unit Parking Tabulation

Required: 554 spaces

Proposed: 24 Handicap Accessible spaces
124 Permeable Paver spaces
410 Standard spaces

558 Total spaces

Neighborhood Community Center Parking Tabulation

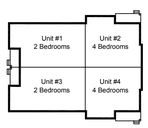
Proposed: 1 Handicap Accessible space
9 Permeable Paver Turf spaces
6 Standard spaces

16 Total spaces

Building "A"

See Architectural Plans for Specifics

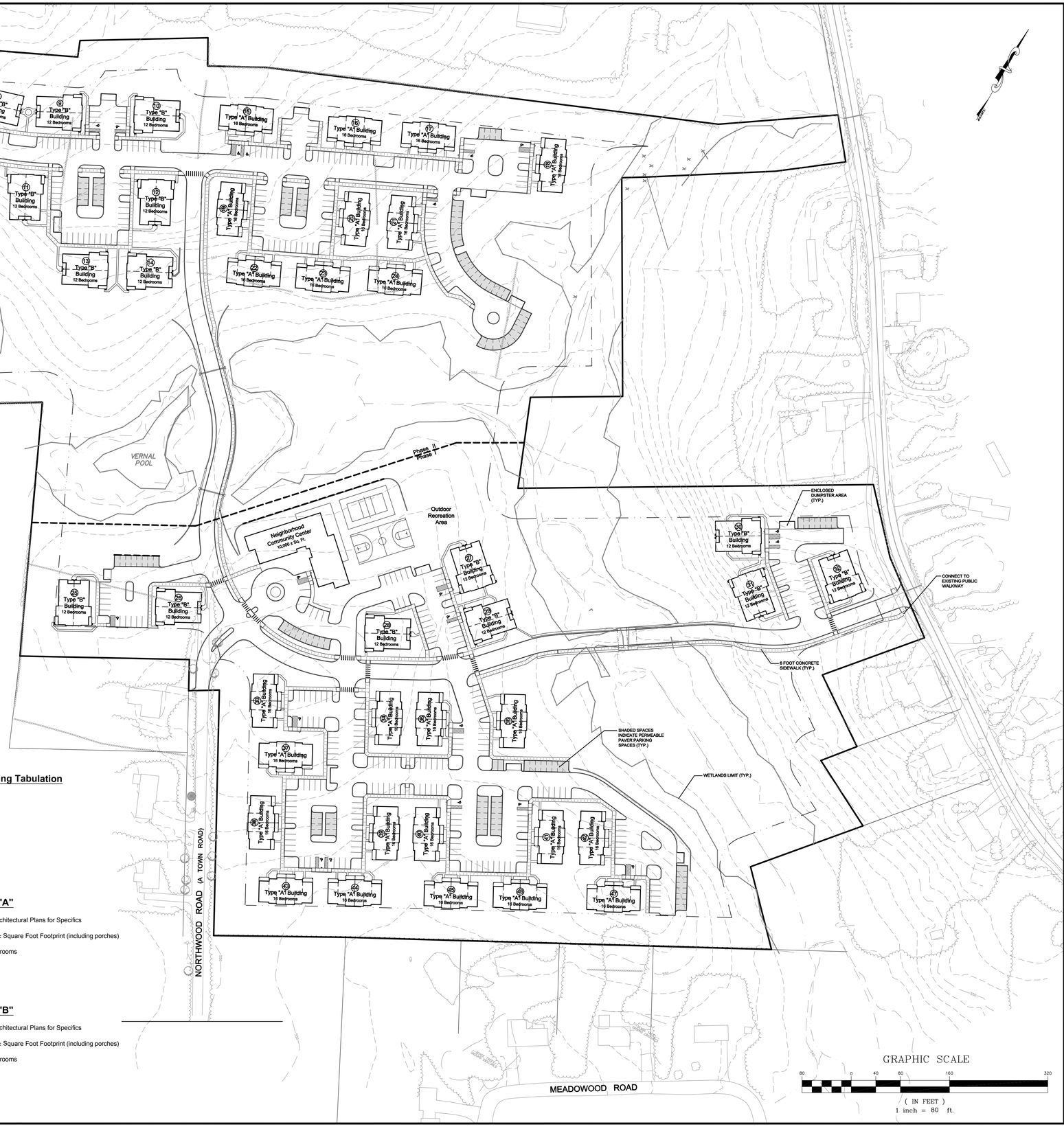
3,280 ± Square Foot Footprint (including porches)
4 Units
16 Bedrooms



Building "B"

See Architectural Plans for Specifics

3,982 ± Square Foot Footprint (including porches)
4 Units
12 Bedrooms



GRAPHIC SCALE
80 0 40 80 160 320
(IN FEET)
1 inch = 80 ft.

F. A. Hesketh & Associates, Inc.
6 Creamery Brook, East Granby, CT 06026
Phone (860) 653-8000
Fax (860) 844-8600
e-mail mail@fahesketh.com
Civil & Traffic Engineers • Surveyors • Planners • Landscape Architects

Revisions:

No.	Date	Description

MASTER PLAN
PREPARED FOR
STORRS LODGES, LLC
HUNTING LODGE ROAD
MANSFIELD, CONNECTICUT

Date: 03-18-2016 | Drawn by: KLL | Checked by: DSZ | Job no: 04161 | Sheet no: 1 OF 1
Scale: 1" = 80'

MA-1

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THE LODGES AT STORRS

F. A. Hesketh & Associates, Inc.
6 Creamery Brook, East Granby, CT 06026
Civil & Traffic Engineers · Surveyors · Planners · Landscape Architects
Phone (860) 653-8000
Fax (860) 844-8600
e-mail mail@fahesketh.com

Site Area =	**2,000,645 sf**
Total Disturbed Area =	**1,061,927 sf**
Wetlands Area =	**291,172 sf**
Wetland Disturbed =	**4,402 sf**
Wetland Restoration Area =	**6,400 sf**
Upland Review Area =	**1,048,182 sf**
Upland Review Disturbed =	**408,938 sf**
Watercourse Length =	**1,439 lf**
Watercourse Disturbed =	**0 lf**
Open Water Area =	**0 sf**

Upland Soil Classification - NRCS

46B - Woodbridge Fine Sandy Loam
60B - Canton & Charlton
61B - Canton & Charlton, very stony
73E - Charlton-Chatfield Complex, very rocky
85B - Paxton & Montauk, very stony

GRAPHIC SCALE
80 0 40 80 160 320
(IN FEET)
1 inch = 80 ft.

Revisions:

No.	Date	Description

INLAND WETLANDS PLAN
PREPARED FOR
STORRS LODGES, LLC
HUNTING LODGE ROAD
MANSFIELD, CONNECTICUT

Date: 03-18-16 | Drawn by: CAD | Job no: 04161
Scale: 1" = 80' | Checked by: DSZ | Sheet no: 1 OF 1

IW-1

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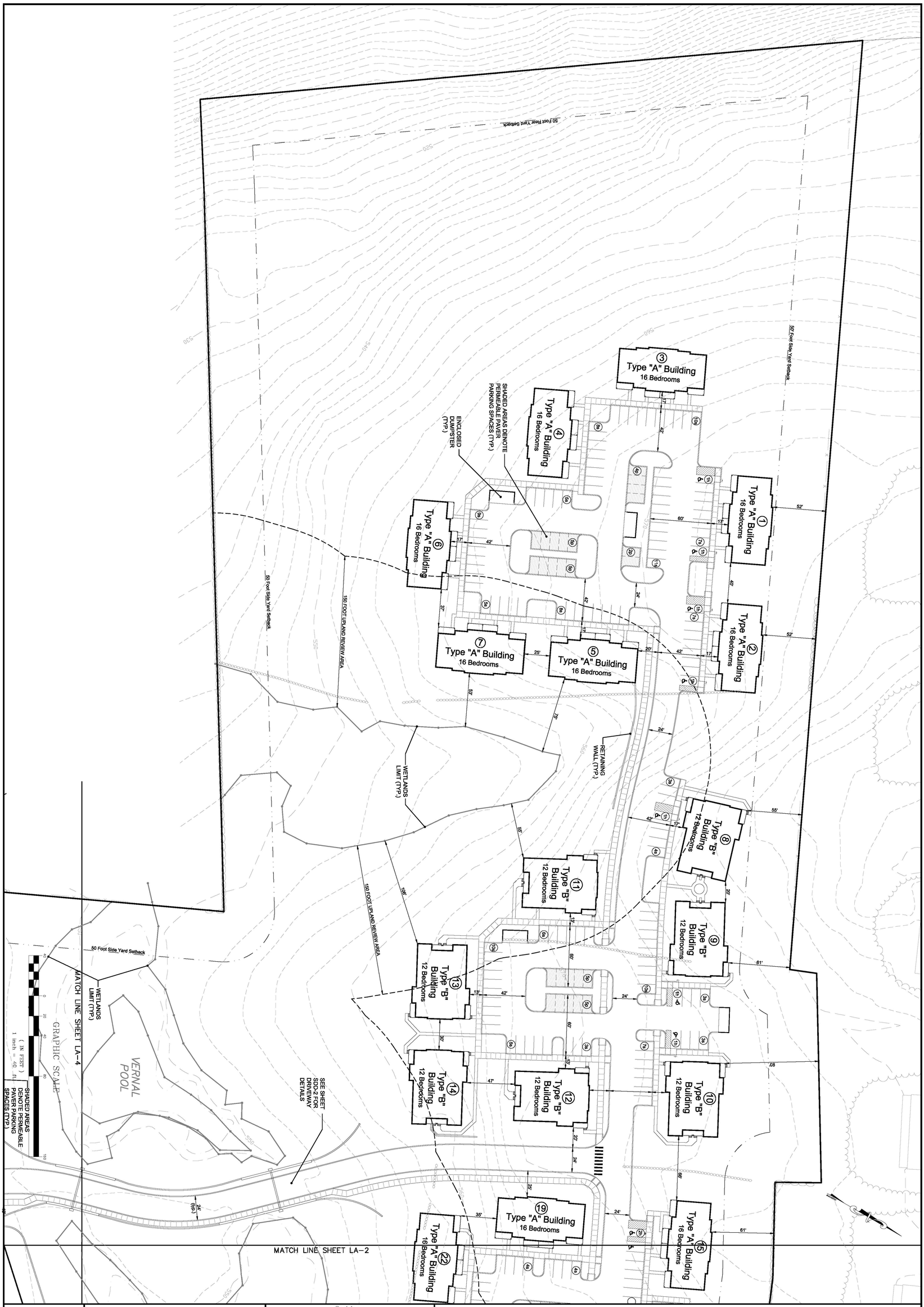

LA-1

LAYOUT PLAN
PREPARED FOR
STORRS LODGES, LLC
HUNTING LODGE ROAD
MANSFIELD, CONNECTICUT

Date: 03-18-2016	Drawn by: KLL
Scale: 1" = 40'	Checked by: DSZ
Job no: 04161	Sheet no: 1 OF 4

Revisions:

No.	Date	Description

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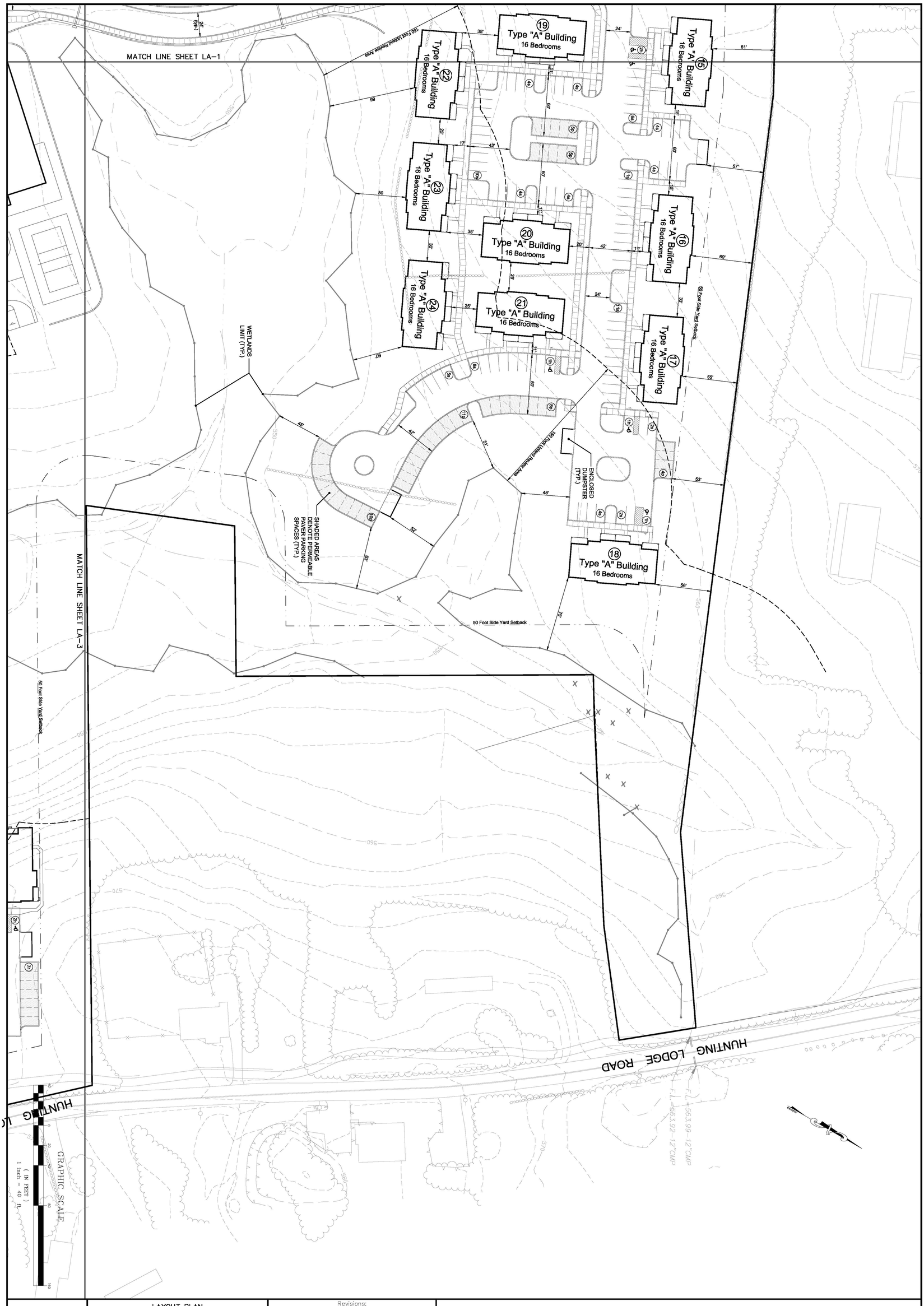

LA-2

LAYOUT PLAN
PREPARED FOR
STORRS LODGES, LLC
HUNTING LODGE ROAD
MANSFIELD, CONNECTICUT

Date: 03-18-2016	Drawn by: KLL	Job no: 04161	
Scale: 1" = 40'	Checked by: DSZ	Sheet no: 2 OF 4	

Revisions:		
No.	Date	Description

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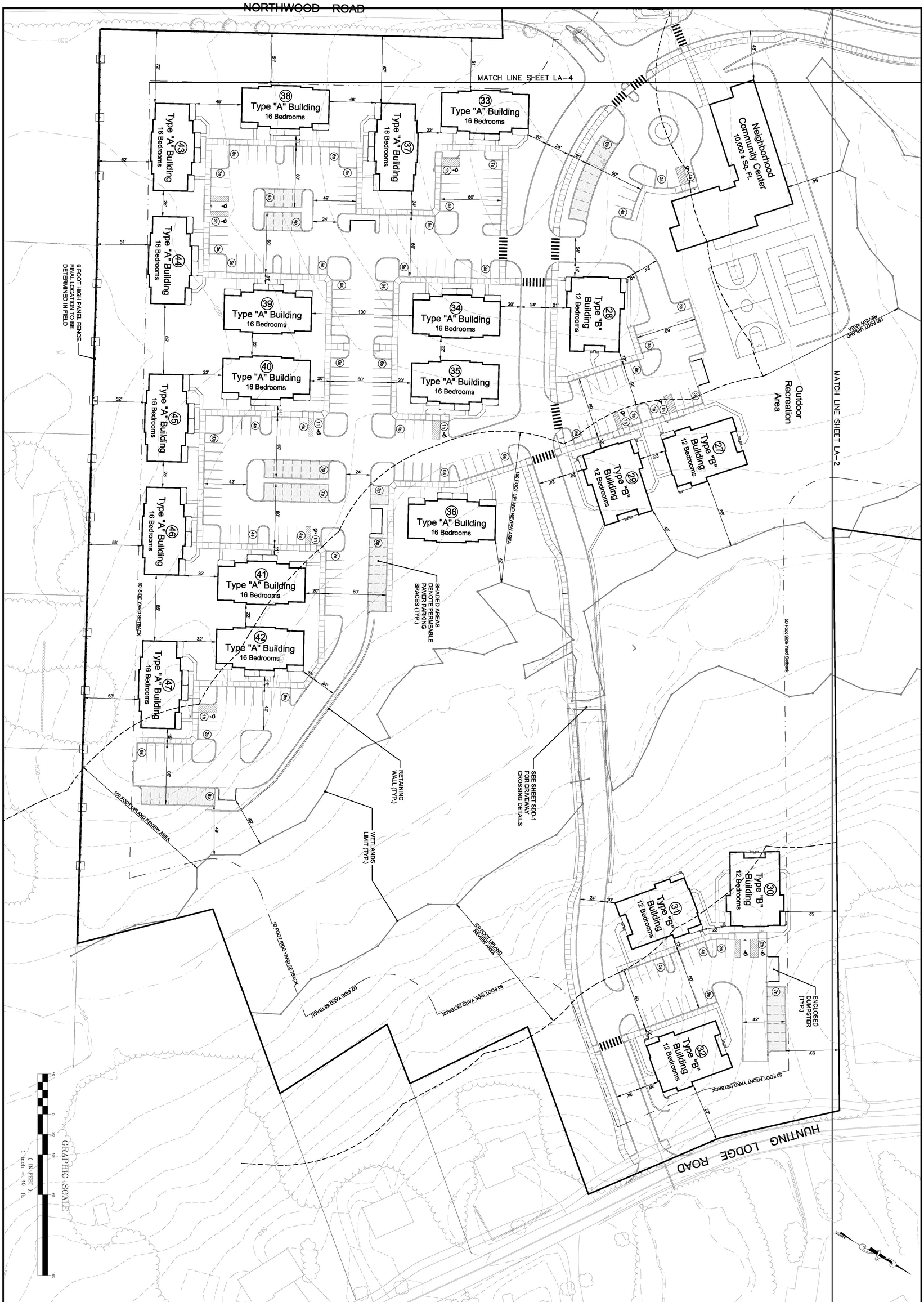

LA-3

LAYOUT PLAN
PREPARED FOR
STORRS LODGES, LLC
HUNTING LODGE ROAD
MANSFIELD, CONNECTICUT

Date: 03-18-2016 | Drawn by: KLL | Job no: 04161
Scale: 1" = 40' | Checked by: DSZ | Sheet no: 3 OF 4

Revisions:		
No.	Date	Description

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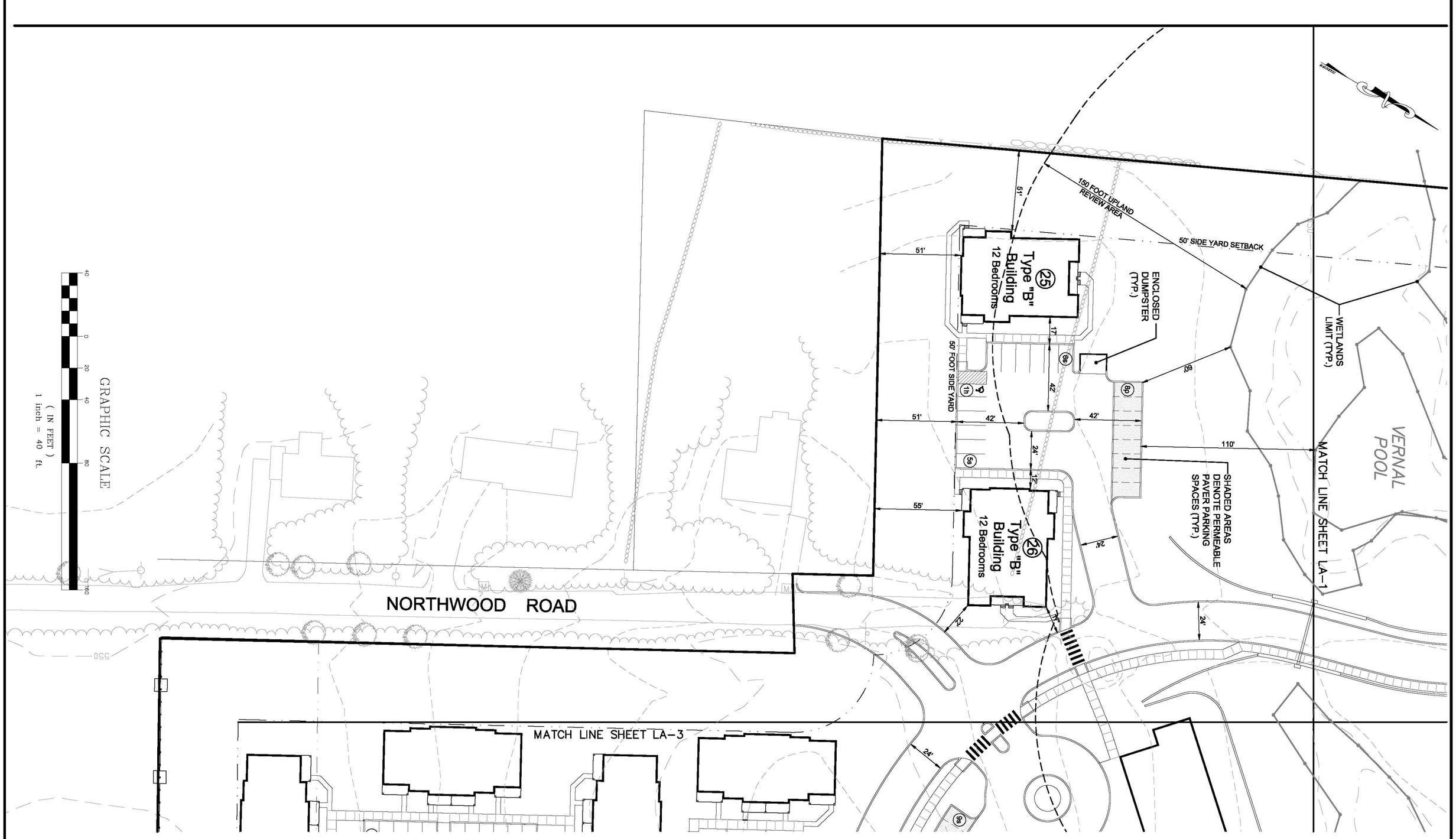

LA-4

LAYOUT PLAN

PREPARED FOR

STORRS LODGES, LLC

HUNTING LODGE ROAD

MANSFIELD, CONNECTICUT

Date: *03-18-2016*	Drawn by: *KLL*	Job no: *04161*
Scale: *1" = 40'*	Checked by: *DSZ*	Sheet no: *4 OF 4*

Revisions:

No.	Date	Description

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C.B.#X–TYPE 'C–L'
T.F.=568.00

66'–15" CPE
S=0.010

15"RCP OUTLET
WALL PENETRATION
F.L.=562.00

C.B.#X–TYPE 'C'
T.F.=572.24

D.M.H.#X
T.F.=571.35

136'–12" CPE
S=0.010

C.B.#X–TYPE 'C–L'
T.F.=569.50

C.B.#X–TYPE 'C'
T.F.=571.07

D.M.H.#X
T.F.=571.5

52'–12" CPE
S=0.010

C.B.#X–TYPE 'C–L'
T.F.=568.00

117'–12" CPE
S=0.010

30'–12" CPE
S=0.010

D.M.H.#X
T.F.=571.5

113'–12" CPE
S=0.010

C.B.#X–TYPE 'C'
T.F.=568.98

68'–12" CPE
S=0.055

SLAB=572.00

SLAB=572.00

SLAB=574.00

SLAB=573.00

92'–12" CPE
S=0.010

SLAB=572.40

SLAB=570.50

SLAB = 570.75 SILL= 569.75

SLAB 569.25 SILL= 568.25

SLAB=568.00
SILL=567.00

F.F.= 571.75 SILL= 570.75

F.F.= 570.25 SILL= 568.25

F.F.= 570.00 SILL= 566.00

F.F.= 565.50 SILL= 564.50

SLAB=563.50

T.W.=572.5
B.W.=564.0

T.W.=573.5
B.W.=566.0

71'–12" CPE
S=0.030

T.W.=573.0
B.W.=573.0

T.W.=569.5
B.W.=566.0

D.M.H.#X
T.F.=568.64

F.F.=574.00
SILL=573.00

F.F.=574.00
SILL=573.00

F.F.= 571.00 SILL= 570.50

F.F.= 570.00 SILL= 569.00

5'–15" RCP
S=0.010

OUTLET STR. #X
T.F.=562.97–S
T.F.=563.02–N

C.B.#X–TYPE 'C'
T.F.=565.25

64'–12"
S=0.010

C.B.#X–TYPE 'C'
T.F.=565.25

56'–12" CPE
S=0.010

D.M.H.#X
T.F.=565.07

BIO–RETENTION
BASIN #1

15" R.C.F.E.S #X
F.L.=556.00

35'–15" RCP
S=0.010

OUTLET STR. #X
T.F.=563.5–N
T.F.=563.3–S

10'–15" CPE
S=0.010

D.M.H.#X
T.F.=563.04

UNDERGROUND INFILTRATION SYSTEM
BOTTOM ELEV. = 557.00

C.B.#X–TYPE 'C'
DOUBLE TYPE II
T.F.=561.88

36'–15" CPE
S=0.010

D.M.H.#X
T.F.=563.65

UNDERGROUND INFILTRATION SYSTEM
BOTTOM ELEV. = 560.00

BIO–RETENTION
BASIN #2

15" R.C.F.E.S #X
F.L.=559.71

29'–15" RCP
S=0.010

OUTLET STR. #X
T.F.=567.6–NE
T.F.=567.6–SW

D.M.H.#X
T.F.=567.7

C.B.#X–TYPE 'C'
DOUBLE TYPE II
T.F.=565.93

51'–15" RCP
S=0.010

D.M.H.#X
T.F.=567.7

C.B.#X–TYPE 'C'
T.F.=570.74

BIO–RETENTION
BASIN #3

12" R.C.F.E.S #X
F.L.=556.00

D.M.H.#X
T.F.=559.5

C.B.#X–TYPE 'C'
T.F.=559.19

20'–12" CPE
S=0.005

C.B.#X–TYPE 'C'
T.F.=559.19

15'–12" CPE
S=0.005

C.B.#X–TYPE 'C'
T.F.=552.74

C.B.#X–TYPE 'C'
T.F.=552.74

20'–12" CLASS V RCP
S=0.005

113'–15" CLASS V RCP
S=0.005

C.B.#X–TYPE 'C'
T.F.=553.88

MATCH LINE SHEET GR–4

C.B.#X
TYPE 'C'
T.F.=554.30

BIO–RETENTION
BASIN #4

12" R.C.F.E.S #X
F.L.=551.50

244'–12" CPE
S=0.050

SLAB=567.50

F.F.=568.00
SILL=567.00

F.F.=568.00
SILL=567.00

12" R.C.F.E.S #X
F.L.=555.00

23'–12" RCP
S=0.005

STC 450I
T.F.=559.19

12" R.C.F.E.S #X
F.L.=550.00

17'–12" RCP
S=0.005

STC 450I
T.F.=553.85

MATCH LINE SHEET GR–2

PT = 18+80.60

PC = 15+31.87

PT = 16+33.80

PC = 14+79.54

UPLANDS

WETLANDS

VERNAL POOL

= PROPOSED SPOT GRADE

= PROPOSED ELEVATION CONTOUR

= PROPOSED CATCH BASIN

= PROPOSED MANHOLE

= PROPOSED HYDRODYNAMIC SEPARATORS

= PROPOSED STORM DRAIN CULVERT

F.D. = PROPOSED FOOTING DRAIN

= EXISTING ELEVATION CONTOUR

= EXISTING SPOT GRADE

SCALE

1" = 40'

1 inch = 40 ft.

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e-mail mail@fahesketh.com

No.	Date	Description
		Revisions:

GRADING & DRAINAGE PLAN

STORRS LODGES, LLC

HUNTING LODGE ROAD

MANSFIELD, CONNECTICUT

Date: 03–18–2016 | Drawn by: RJK | Job no: 04161

Scale: 1" = 40' | Checked by: DSZ | Sheet no: 1 OF 4

GR–1

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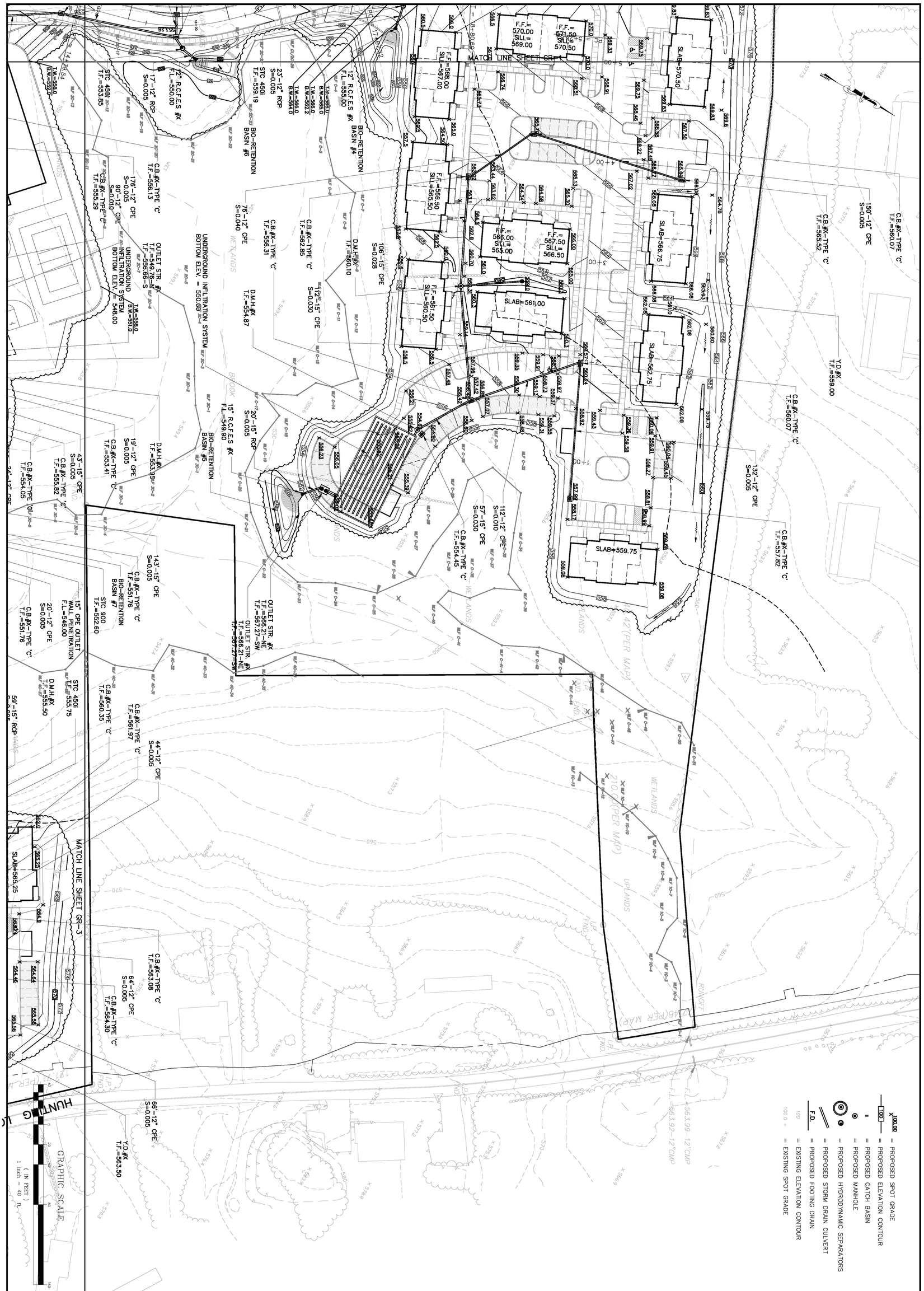

x100.00 = PROPOSED SPOT GRADE

100 = PROPOSED ELEVATION CONTOUR

= PROPOSED CATCH BASIN

= PROPOSED MANHOLE

= PROPOSED HYDRODYNAMIC SEPARATORS

F.D. = PROPOSED STORM DRAIN CULVERT

= PROPOSED FOOTING DRAIN

100 = EXISTING ELEVATION CONTOUR

100.0 + = EXISTING SPOT GRADE

GR-2

GRADING & DRAINAGE PLAN

PREPARED FOR

STORRS LODGES, LLC

HUNTING LODGE ROAD

MANSFIELD, CONNECTICUT

Date: 03-18-2016 | Drawn by: RJK | Job no: 04161

Scale: 1" = 40' | Checked by: DSZ | Sheet no: 2 OF 4

Revisions:

No.	Date	Description

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Civil & Traffic Engineers · Surveyors · Planners · Landscape Architects
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MATCH LINE SHEET GR-2

MATCH LINE SHEET GR-4

NORTHWOOD ROAD

HUNTING LODGE ROAD

17'-12" RCP S=0.005
C.B.#X-TYPE 'C' T.F.=556.13
OUTLET STR. #X T.F.=549.76-N T.F.=556.66-S
176'-12" CPE S=0.005
90'-12" CPE S=0.010
UNDERGROUND INFILTRATION SYSTEM BOTTOM ELEV. = 548.00
T.W.=558.0 B.W.=551.0
STC 450I T.F.=553.85
C.B.#X-TYPE 'C' T.F.=555.29
D.M.H.#X T.F.=553.35
19'-12" CPE S=0.005
C.B.#X-TYPE 'C' T.F.=553.41
143'-15" CPE S=0.005
C.B.#X-TYPE 'C' T.F.=551.76
BIO-RETENTION BASIN #7
STC 900 T.F.=552.60
44'-12" CPE S=0.005
C.B.#X-TYPE 'C' T.F.=561.97
C.B.#X-TYPE 'C' T.F.=560.35
C.B.#X-TYPE 'C' T.F.=563.08
64'-12" CPE S=0.005
C.B.#X-TYPE 'C' T.F.=564.30
66'-12" CPE S=0.005
Y.D.#X T.F.=563.50
43'-15" CPE S=0.005
C.B.#X-TYPE 'C' T.F.=555.82
15" CPE OUTLET WALL PENETRATION F.L.=546.00
STC 450I T.F.=555.75
20'-12" CPE S=0.005
D.M.H.#X T.F.=555.50
C.B.#X-TYPE 'C' T.F.=554.05
C.B.#X-TYPE 'C' T.F.=551.76
59'-15" RCP S=0.005
105'-15" CPE S=0.005
24'-12" CPE S=0.005
70'-12" CPE S=0.005
C.B.#X-TYPE 'C' T.F.=550.37
15" R.C.F.E.S #X F.L.=546.00
BIO-RETENTION BASIN #8
60'-12" CPE S=0.005
C.B.#X-TYPE 'C' T.F.=549.97
C.B.#X-TYPE 'C' T.F.=555.48
20'-12" CPE S=0.005
C.B.#X-TYPE 'C' T.F.=549.97
SLAB=565.25
F.F.=558.35
F.F.=566.50 SILL=565.50
F.F.=566.00 SILL=565.00
F.F.=560.50 SILL=559.50
SILL=565.00
SILL=556.00
24'-12" CPE S=0.005
UNDERGROUND INFILTRATION SYSTEM BOTTOM ELEV. = 555.00
C.B.#X TYPE 'C' T.F.=558.03
C.B.#X-TYPE 'C' T.F.=553.67
SEE SHEET SDD-1 FOR DETAIL
C.B.#X-TYPE 'C' T.F.=554.71
12'-12" CPE S=0.005
C.B.#X-TYPE 'C' T.F.=553.67
C.B.#X-TYPE 'C' T.F.=550.05
20'-12" CPE S=0.010
C.B.#X-TYPE 'C' T.F.=554.71
C.B.#X-TYPE 'C' T.F.=562.51
22'-12" CPE S=0.040
OUTLET STR. #X T.F.=561.40-N T.F.=561.20-S
54'-12" CPE S=0.005
18'-15" CPE S=0.010
80'-15" CPE S=0.050
55'-12" CPE S=0.010
D.M.H.#X T.F.=555.23
D.M.H.#X T.F.=550.95
96'-15" CPE S=0.020
C.B.#X-TYPE 'C' T.F.=559.31
D.M.H.#X T.F.=559.68
124'-12" CPE S=0.030
D.M.H.#X T.F.=549.93
18" RCP OUTLET WALL PENETRATION F.L.=544.00
20'-15" CPE S=0.040
T.W.=551.3 B.W.=551.0
T.W.=550.7 B.W.=545.7
T.W.=550.0 B.W.=545.7
OUTLET STR. #X T.F.=549.55-N T.F.=549.57-S
C.B.#X-TYPE 'C' T.F.=548.63
T.W.=550.0 B.W.=544.0
BIO-RETENTION BASIN #9
46'-12" CPE S=0.010
D.M.H.#X T.F.=550.25
T.W.=549.4 B.W.=544.0
70'-12" CPE S=0.010
Y.D.#X T.F.=557.0
22'-12" CPE S=0.010
T.W.=550.0 B.W.=544.0
T.W.=550.0 B.W.=545.8
C.B.#X-TYPE 'C' T.F.=549.34
116'-12" CPE S=0.013
C.B.#X-TYPE 'C' T.F.=554.83
T.W.=550.0 B.W.=550.0
SLAB=560.00
SLAB=561.0
SLAB=556.75
SLAB=558.85
SLAB=554.90
SLAB=554.50
SLAB=553.50
SLAB=553.50
SLAB=554.75
SLAB=552.00
SLAB=552.25
F.F.=560.25 SILL=558.25
F.F.=557.75 SILL=556.75
F.F.=558.00 SILL=557.00
F.F.=557.50 SILL=555.50
68'-12" CPE S=0.010
72'-12 CPE S=0.025
C.B.#X-TYPE 'C' T.F.=553.09
MAINTAIN EXISTING DRAINAGE PATTERN
180'-15" CPE S=0.010
C.B.#X-TYPE 'C' T.F.=555.10
C.B.#X-TYPE 'C' T.F.=555.10
Y.D.#X T.F.=
124'-12 CPE S=0.013
80'-18" CPE S=0.010
C.B.#X-TYPE 'C' T.F.=551.51
115'-18" CPE S=0.010
C.B.#X-TYPE 'C' T.F.=555.51
44'-18" CPE S=0.005
C.B.#X-TYPE 'C' T.F.=549.50
UNDERGROUND INFILTRATION SYSTEM BOTTOM ELEV. = 544.00
DRAINAGE RIGHT TO THE TOWN OF MANSFIELD. REF. #1 M.L.R. VOL. 81 PG. 204
WETLANDS
UPLANDS
I.P. FND.

100.00 = PROPOSED SPOT GRADE
100 = PROPOSED ELEVATION CONTOUR
= PROPOSED CATCH BASIN
= PROPOSED MANHOLE
= PROPOSED HYDRODYNAMIC SEPARATORS
= PROPOSED STORM DRAIN CULVERT
F.D. = PROPOSED FOOTING DRAIN
100 = EXISTING ELEVATION CONTOUR
100.0 + = EXISTING SPOT GRADE

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
1 inch = 40 ft.

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Revisions:

No.	Date	Description

GRADING & DRAINAGE PLAN
PREPARED FOR
STORRS LODGES, LLC
HUNTING LODGE ROAD
MANSFIELD, CONNECTICUT

Date: 03-18-2016 | Drawn by: RJK | Job no: 04161
Scale: 1" = 40' | Checked by: DSZ | Sheet no: 3 OF 4

GR-3

D:\2024\04161\2016 — January\Dbg102.dwg, GR-3, Mar. 17, 2016 - 7:23:04 PM

100.00 = PROPOSED SPOT GRADE

100 = PROPOSED ELEVATION CONTOUR

= PROPOSED CATCH BASIN

= PROPOSED MANHOLE

= PROPOSED HYDRODYNAMIC SEPARATORS

= PROPOSED STORM DRAIN CULVERT

F.D. = PROPOSED FOOTING DRAIN

100 = EXISTING ELEVATION CONTOUR

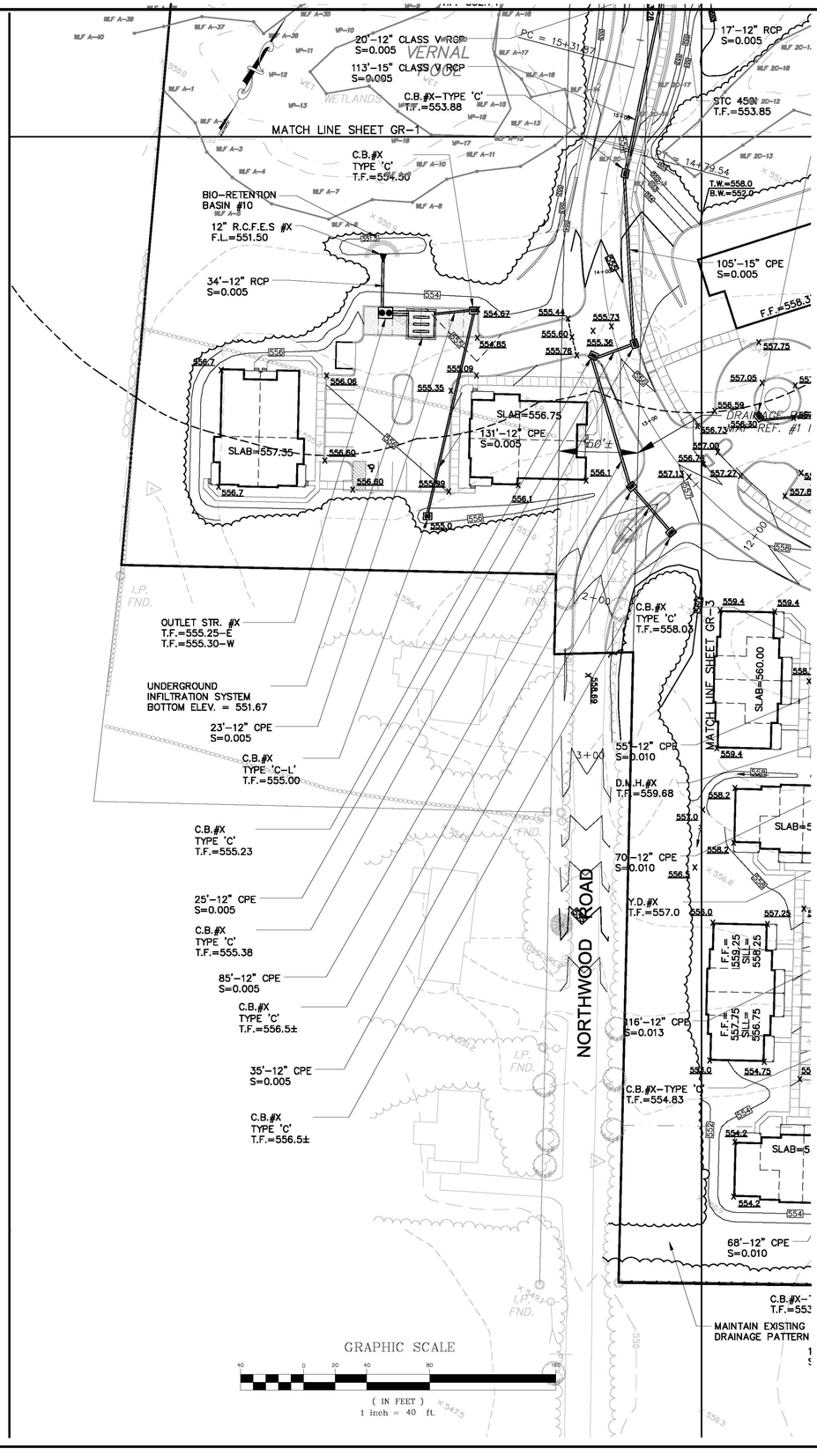
100.0 + = EXISTING SPOT GRADE

GRADING NOTES

1. SET/RAISE FRAMES OF ALL MANHOLES, CATCH BASINS, GAS AND WATER GATES, HAND HOLES, METER BOXES, AND ALL OTHER UTILITY APPURTENANCES TO MATCH PROPOSED FINISH GRADE.
2. SAW CUT EXISTING PAVEMENT ALONG LIMITS OF WORK. BLEND ALL NEW WORK TO MATCH EXISTING.
3. GRADE ALL AREAS TO PRECLUDE PONDING.
4. GRADE TRANSITIONS TO ROADWAYS TO MAINTAIN GUTTER FLOW AND PRECLUDE PONDING.

DRAINAGE SYSTEM NOTES:

1. RCP = REINFORCED CONCRETE PIPE CONFORMING TO CT DOT FORM 816, M.08.01–6, CLASS IV, UNLESS DESIGNATED ON DRAWINGS AS CLASS IV BY (C5).
2. F.E.S. = FLARED–END–SECTION OR REINFORCED CONCRETE CULVERT END CONFORMING TO CT DOT FORM 816, M.08.01–22.
3. PVC STORM DRAIN PIPE SHALL CONFORM TO CT DOT FORM 816, M.08.01–28.
4. CATCH BASINS, MANHOLES, AND OTHER DRAINAGE STRUCTURES SHALL CONFORM TO CT DOT 816, M.08.02 SPECIFICATIONS.
5. STC UNITS: PRECAST CONCRETE SEPARATOR STRUCTURES (CAPACITY AS SHOWN) AS MANUFACTURED BY RINKER MATERIALS CORPORATION (TEL. 800–909–7763)
6. FLOW LINE AND INVERT ELEVATIONS OF ALL STORM DRAIN ROOF LEADERS MUST BE COORDINATED WITH FINAL ARCHITECTURAL DRAWINGS. NOTIFY DESIGN ENGINEER OF CONFLICTS PRIOR TO START OF CONSTRUCTION.
7. UNDERGROUND UTILITIES DEPICTED ON THIS DRAWING ARE A COMPILATION OF FIELD SURVEY DATA, RECORD DESIGN PLANS, AND READILY AVAILABLE INFORMATION. NOT ALL UTILITIES MAY BE SHOWN, AND THOSE SHOWN MAY NOT BE ACCURATE. THE CONTRACTOR SHALL VERIFY ALL UTILITY LOCATIONS PRIOR TO START OF CONSTRUCTION OF UTILITIES. CONDUCT TEST PITS AT ALL UTILITY CROSSINGS AND POINT OF CONNECTIONS WITH EXISTING UTILITIES. NOTIFY DESIGN ENGINEER OF POTENTIAL CONFLICTS WITH PROPOSED ALIGNMENT AND GRADE.
8. CONTACT "CALL BEFORE YOU DIG" AT CALLING 1–800–922–4455 TO MARK THE LOCATION OF ALL UNDERGROUND UTILITIES AT LEAST 72 HOURS PRIOR TO START OF CONSTRUCTION.
9. ALL MATERIALS AND INSTALLATION PER EAST HARTFORD STANDARD SPECIFICATIONS, CT DOT FORM 816, OR CUSTODIAL UTILITY COMPANY SPECIFICATION, AS APPROPRIATE.
10. CONNECT ALL ROOF LEADERS AND FOOTING DRAINS INTO EXISTING OR NEW STORM DRAINAGE STRUCTURES AS SHOWN.
11. FOLLOW CT DOT PROCEDURES FOR DEMOLITION OF EXISTING PIPING INTO STRUCTURES AND FOR CONNECTION OF NEW PIPING INTO EXISTING STORM DRAIN STRUCTURES.
12. DEMOLISH EXISTING ON–SITE DRAINAGE SYSTEM BY REMOVING OLD PIPE AND STRUCTURES AND BACKFILLING AND COMPACTING TRENCHES IN CONTROLLED LAYERS WITH GRANULAR FILL. PRIOR TO DEMOLITION, VERIFY CONNECTIONS OF OFF–SITE PIPING AND NOTIFY DESIGN ENGINEER. FOLLOW ALL LOCAL, STATE, AND FEDERAL REQUIREMENTS FOR DEMOLITION ACTIVITIES.



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Revisions:

No.	Date	Description

GRADING & DRAINAGE PLAN
prepared for
STORRS LODGES, CT
HUNTING LODGE ROAD
MANSFIELD, CONNECTICUT

Date: 03–18–2016 | Job no: 04161
Scale: 1" = 40' | Drawn by: RJK | Checked by: DSZ | Sheet no: 4 OF 4

GR–4

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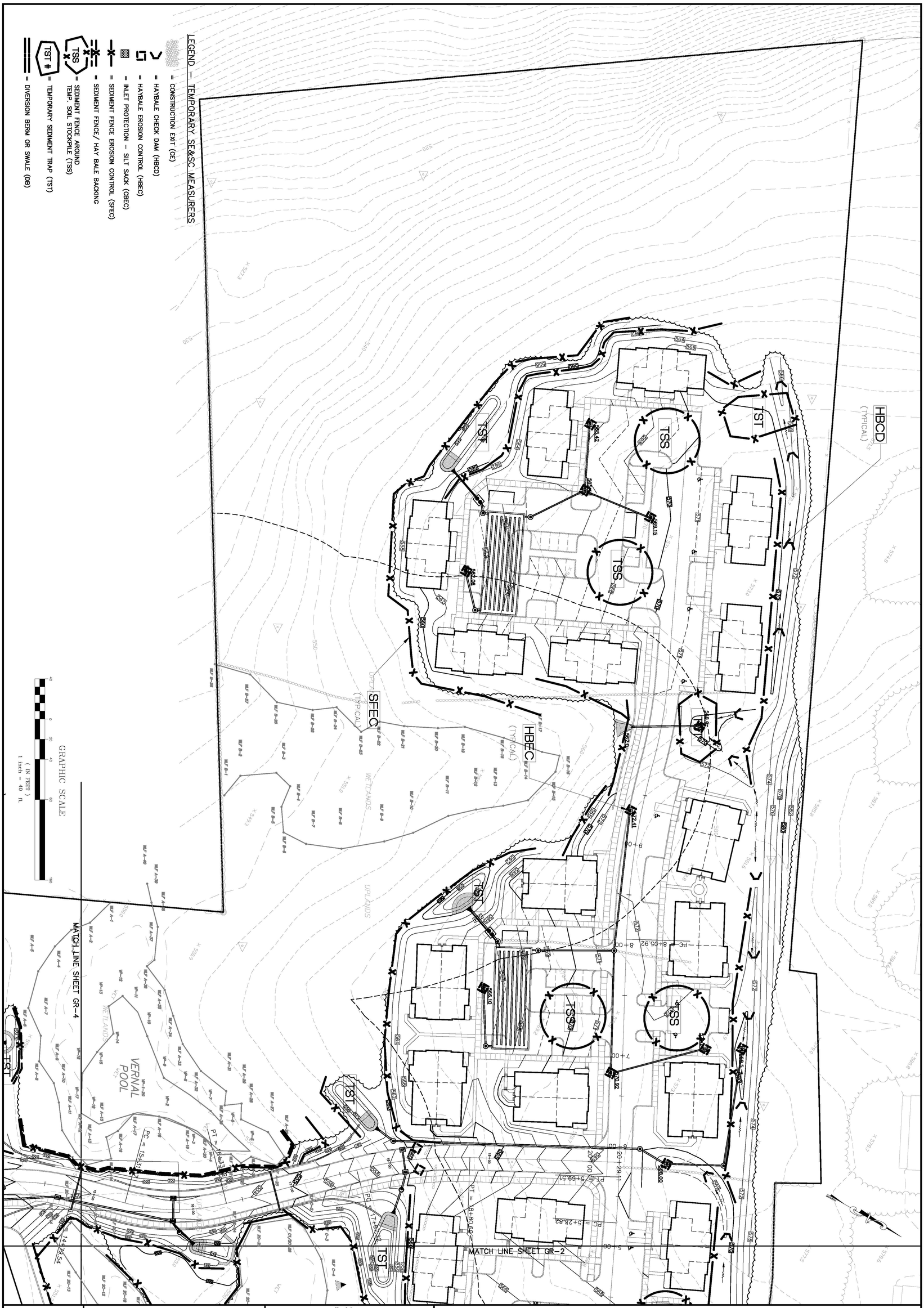

SOIL EROSION & SEDIMENTATION CONTROL PLAN

PREPARED FOR

STORRS LODGES, LLC

HUNTING LODGE ROAD

MANSFIELD, CONNECTICUT

Date: *03-18-2016*	Drawn by: *RJK*	Job no: *04161*	
Scale: *1" = 40'*	Checked by: *DSZ*	Sheet no: *1 OF 4*	

ER-1

Revisions:		
No.	Date	Description

THE LODGES AT STORRS

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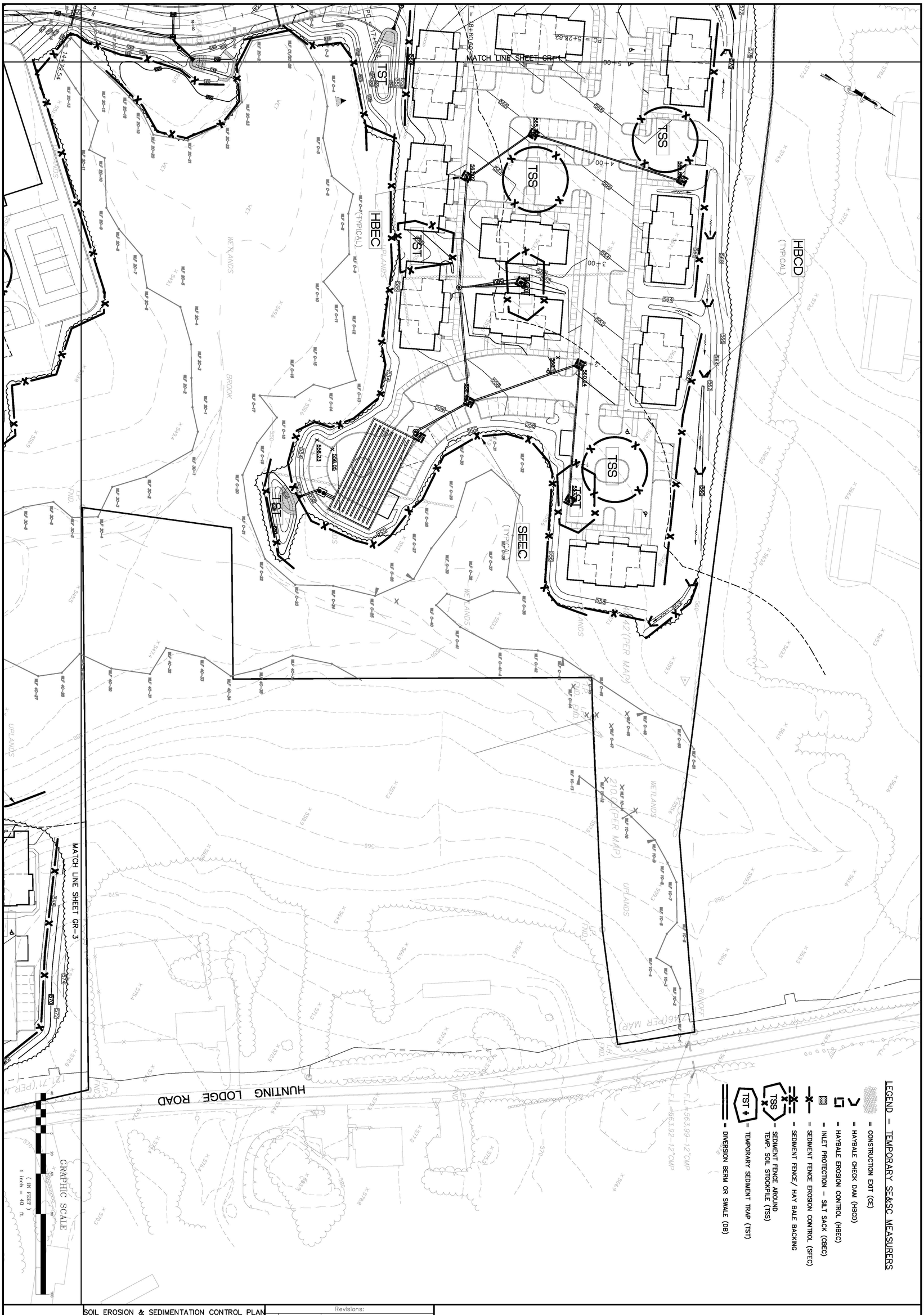

LEGEND – TEMPORARY SE&SC MEASURERS

- = CONSTRUCTION EXIT (CE)
- = HAYBALE CHECK DAM (HBCD)
- = HAYBALE EROSION CONTROL (HBEC)
- = INLET PROTECTION – SILT SACK (CBEC)
- = SEDIMENT FENCE EROSION CONTROL (SFEC)
- = SEDIMENT FENCE/ HAY BALE BACKING
- = SEDIMENT FENCE AROUND TEMP. SOIL STOCKPILE (TSS)
- = TEMPORARY SEDIMENT TRAP (TST)
- = DIVERSION BERM OR SWALE (DB)

ER-2

SOIL EROSION & SEDIMENTATION CONTROL PLAN

PREPARED FOR

STORRS LODGES, LLC

HUNTING LODGE ROAD

MANSFIELD, CONNECTICUT

Date: 03-18-2016	Drawn by: RJK	Job no: 04161
Scale: 1" = 40'	Checked by: DSZ	Sheet no: 2 OF 4

Revisions:		
No.	Date	Description

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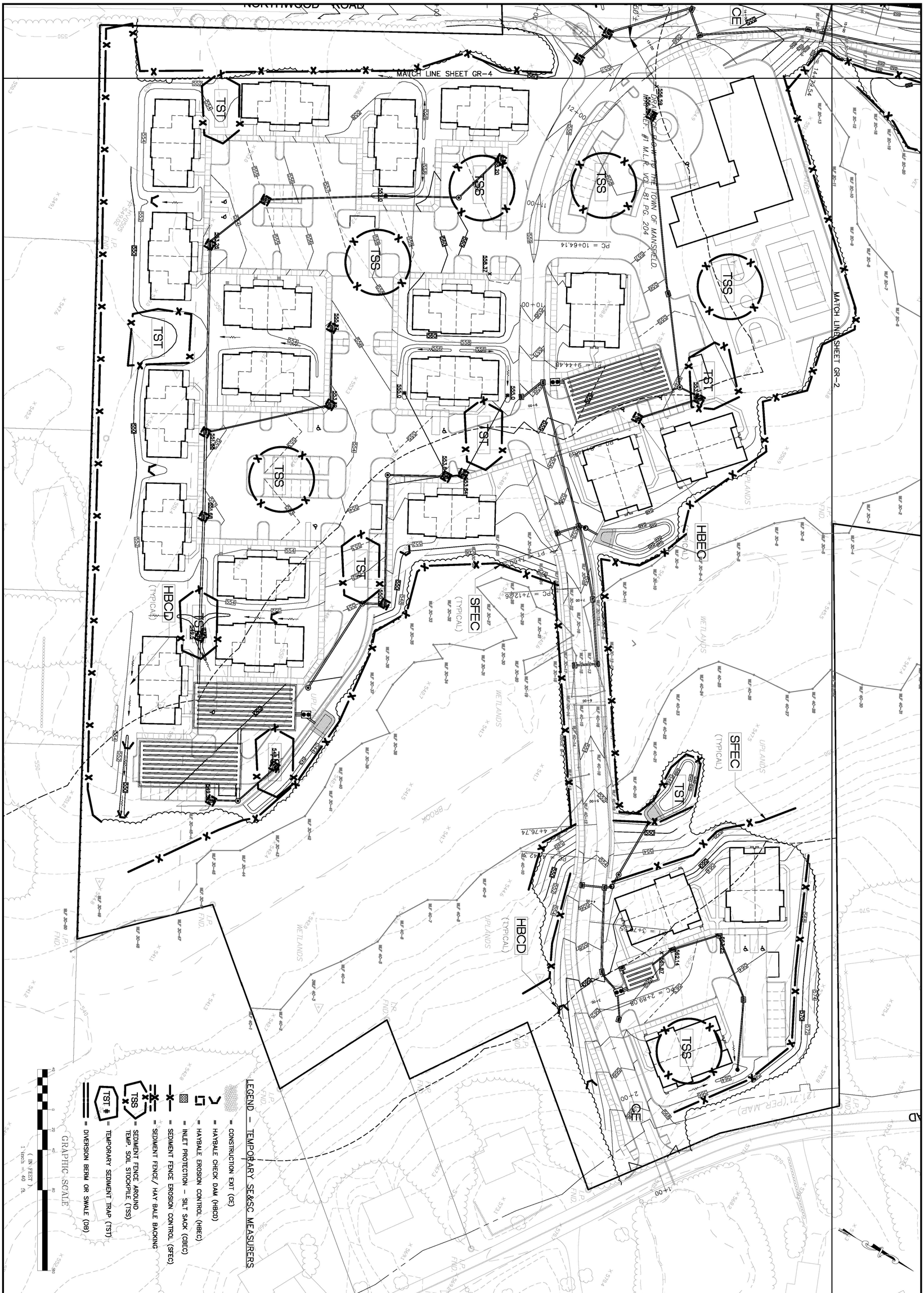

ER-3

SOIL EROSION & SEDIMENTATION CONTROL PLAN

PREPARED FOR

STORRS LODGES, LLC

HUNTING LODGE ROAD

MANSFIELD, CONNECTICUT

Date: 03-18-2016	Drawn by: RJK	Job no: 04161	
Scale: 1" = 40'	Checked by: DSZ	Sheet no: 3 OF 4	

Revisions:		
No.	Date	Description

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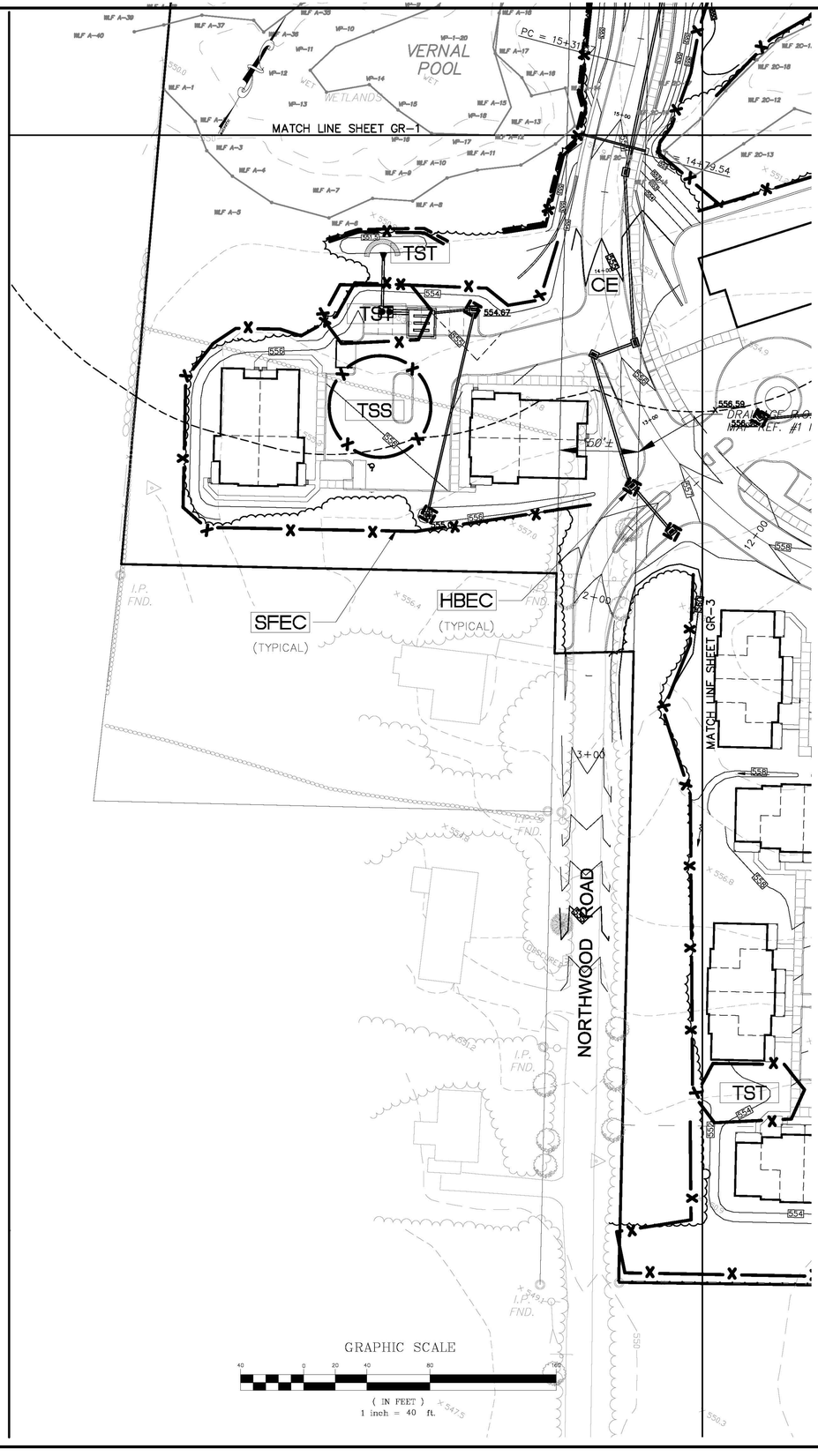
100.00	= PROPOSED SPOT GRADE
100	= PROPOSED ELEVATION CONTOUR
	= PROPOSED CATCH BASIN
	= PROPOSED MANHOLE
	= PROPOSED HYDRODYNAMIC SEPARATORS
	= PROPOSED STORM DRAIN CULVERT
F.D.	= PROPOSED FOOTING DRAIN
100	= EXISTING ELEVATION CONTOUR
100.0 +	= EXISTING SPOT GRADE

LEGEND – TEMPORARY SE&SC MEASURERS

	= CONSTRUCTION EXIT (CE)
	= HAYBALE CHECK DAM (HBCD)
	= HAYBALE EROSION CONTROL (HBEC)
	= INLET PROTECTION – SILT SACK (CBEC)
	= SEDIMENT FENCE EROSION CONTROL (SFEC)
	= SEDIMENT FENCE/ HAY BALE BACKING
TSS	= SEDIMENT FENCE AROUND TEMP. SOIL STOCKPILE (TSS)
TST #	= TEMPORARY SEDIMENT TRAP (TST)
	= DIVERSION BERM OR SWALE (DB)

GRADING NOTES

1. SET/RAISE FRAMES OF ALL MANHOLES, CATCH BASINS, GAS AND WATER GATES, HAND HOLES, METER BOXES, AND ALL OTHER UTILITY APPURTENANCES TO MATCH PROPOSED FINISH GRADE.
2. SAW CUT EXISTING PAVEMENT ALONG LIMITS OF WORK. BLEND ALL NEW WORK TO MATCH EXISTING.
3. GRADE ALL AREAS TO PRECLUDE PONDING.
4. GRADE TRANSITIONS TO ROADWAYS TO MAINTAIN GUTTER FLOW AND PRECLUDE PONDING.



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SOIL EROSION & SEDIMENTATION CONTROL PLAN

PREPARED FOR

STORRS LODGES, CT

HUNTING LODGE ROAD

MANSFIELD, CONNECTICUT

No.	Date	Revisions: Description

Date: *03-18-2016* | Drawn by: *RJK* | Job no: *04161*

Scale: *1" = 40'* | Checked by: *DSZ* | Sheet no: *4 OF 4*

ER-4

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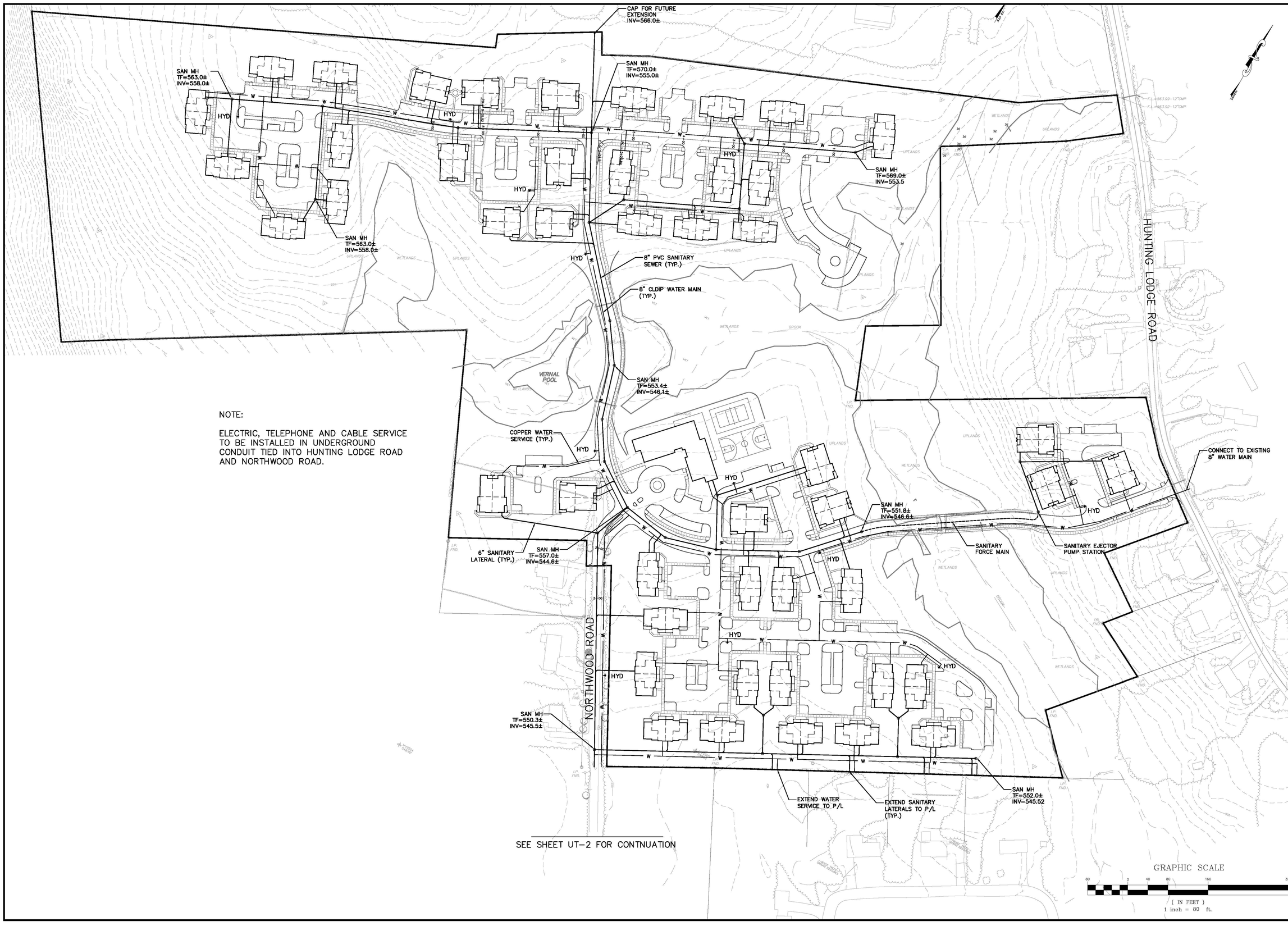

NOTE:

ELECTRIC, TELEPHONE AND CABLE SERVICE TO BE INSTALLED IN UNDERGROUND CONDUIT TIED INTO HUNTING LODGE ROAD AND NORTHWOOD ROAD.

SEE SHEET UT-2 FOR CONTNUATION

GRAPHIC SCALE

80 0 40 80 160 320

(IN FEET)
1 inch = 80 ft.

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Revisions:

No.	Date	Description

UTILITY PLAN

PREPARED FOR

STORRS LODGES, LLC

HUNTING LODGE ROAD
MANSFIELD, CONNECTICUT

Date: 03-18-16 | Scale: 1" = 80' | Drawn by: CAD | Checked by: DSZ | Job no: 04161 | Sheet no: 1 OF 1

UT-1

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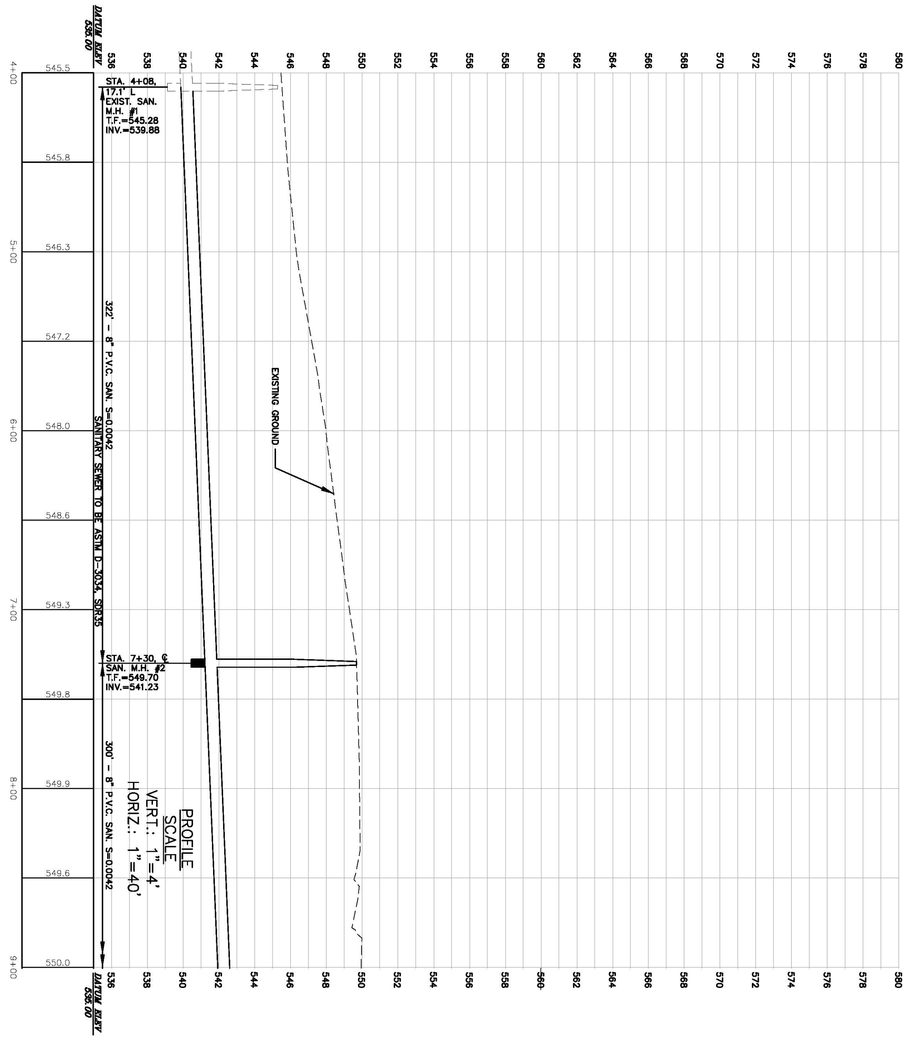

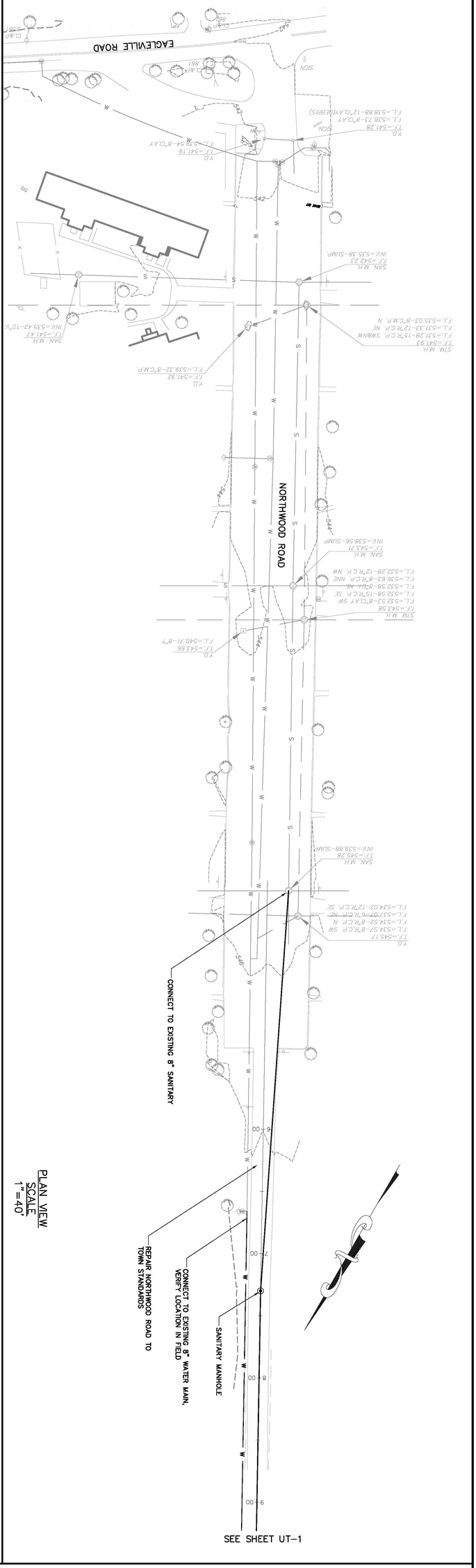

PLAN VIEW
SCALE
1"=40'

UT-2	NORTHWOOD ROAD UTILITY PLAN & PROFILE PREPARED FOR *STORRS LODGES, CT* HUNTING LODGE ROAD MANSFIELD, CONNECTICUT	Revisions: No. Date Description
	Date: 03-18-16 Drawn by: CAD Job no: 04161 Scale: A NOTED Checked by: DSZ Sheet no: 2 OF 2	

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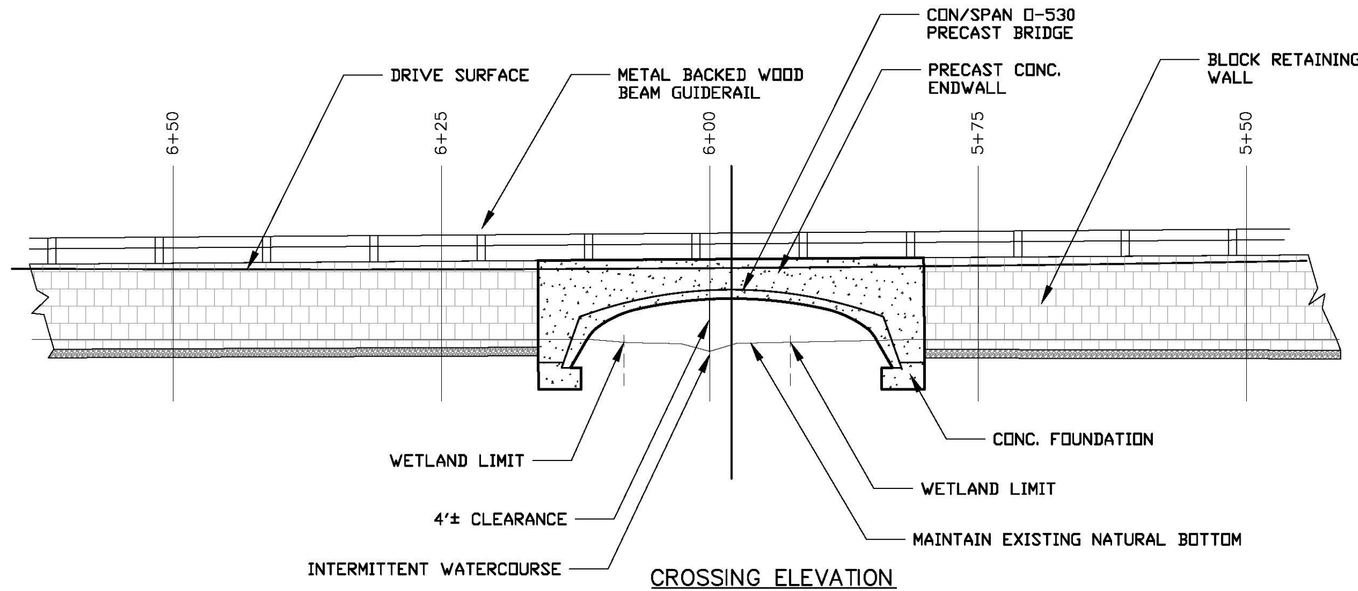
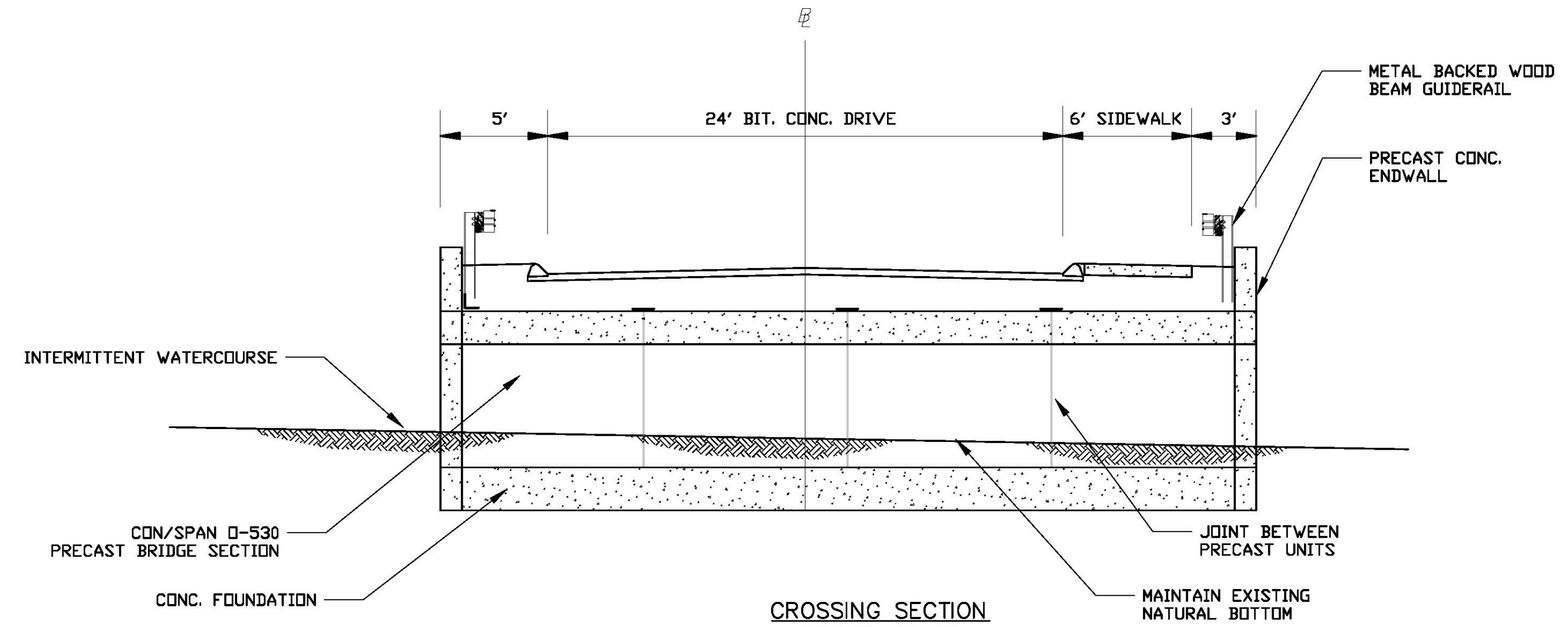
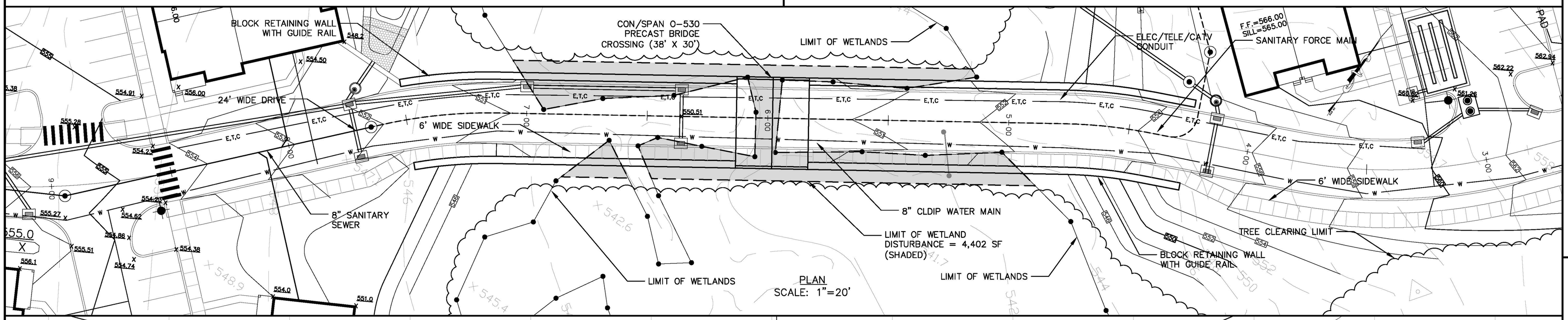


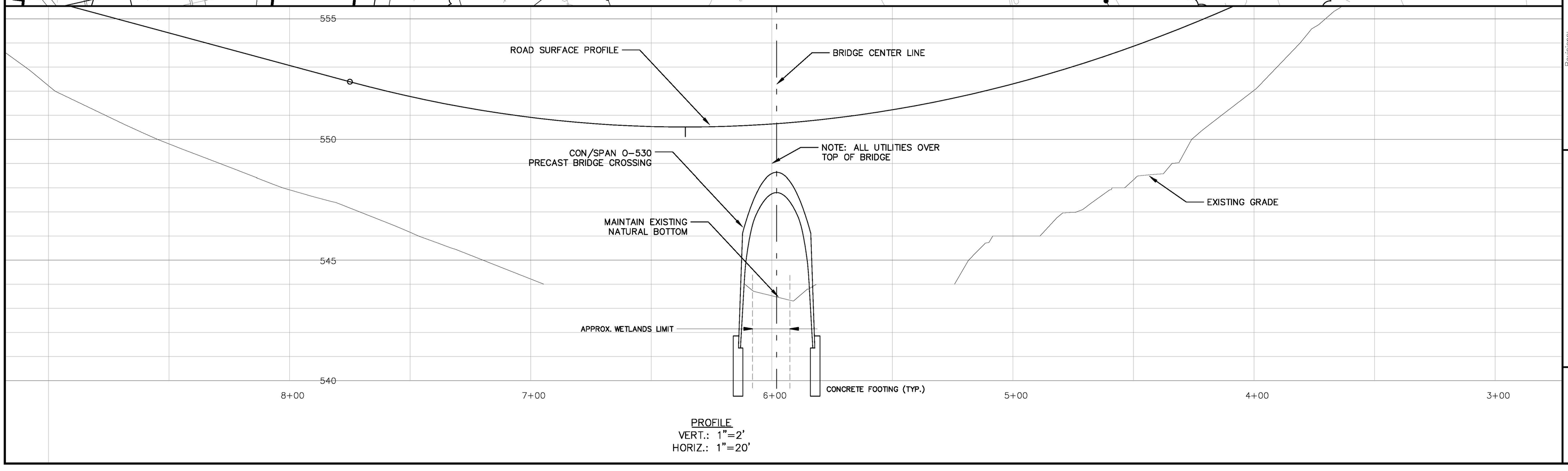
CROSSING ELEVATION
SCALE: 1"=10'



CROSSING SECTION
SCALE: 1"=5'



PLAN
SCALE: 1"=20'



PROFILE
VERT.: 1"=2'
HORIZ.: 1"=20'

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Revisions:

No.	Date	Description

SITE DRIVEWAY DETAIL
PREPARED FOR
STORRS LODGES, LLC
HUNTING LODGE ROAD
MANSFIELD, CONNECTICUT

Date: *03-18-2016* | Drawn by: *RJK* | Checked by: *DSZ* | Job no: *04161* | Sheet no: *1 OF 2*
Scale: *AS SHOWN*

SDD-1

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WETLAND RESTORATION NOTE:
PLANT SHRUBS AND TREES IN A MOSAIC WITH WET MEADOW

STONE CHECK DAM
VEGETATED SWALE
LEVEL SPREADER
LIMIT OF WETLANDS
BLOCK RETAINING WALL
ELEC/TELE/CATV CONDUIT
RIP RAP OUTLET PROTECTION/FOREBAY
BIORETENTION BASIN
6' WIDE BIT. CONC. SIDEWALK
E.T.C
19+00
18+00
17+00
16+00
15+00
14+00
DRIVE B
24' WIDE BIT. CONC. DRIVE WITH BIT. CONC. CURB
TREE CLEARING LIMIT
GUIDANCE FENCE (TYP.)
WETLAND RESTORATION (SEE NOTE)
STONE CHECK DAM
RIP RAP OUTLET PROTECTION/FOREBAY
LIMIT OF WETLANDS
WILDLIFE TUNNEL #1
BLOCK RETAINING WALL
8" SANITARY SEWER
8" CLDIP WATER MAIN
WILDLIFE TUNNEL #2
BLOCK RETAINING WALL
TREE CLEARING LIMIT
LIMIT OF WETLANDS
100' MIN.
GUIDANCE FENCE (TYP.)
UPLANDS
VERNAL POOL
WET
WETLANDS
566.10
554.67
556.59
x 561.2
x 550.9
x 550.0
x 553.2
x 554.9
x 553.6
x 554.8

GRAPHIC SCALE
(IN FEET)
1 inch = 20 ft.
20 0 10 20 40 80

SDD-2

SITE DRIVEWAY DETAIL – STA. 14+00–18+00
PREPARED FOR
STORRS LODGES, LLC
HUNTING LODGE ROAD
MANSFIELD, CONNECTICUT

Date: *03–18–2016*	Drawn by: *RJK*	Job no: *04161*
Scale: *AS SHOWN*	Checked by: *DSZ*	Sheet no: *2 OF 2*

Revisions:

No.	Date	Description

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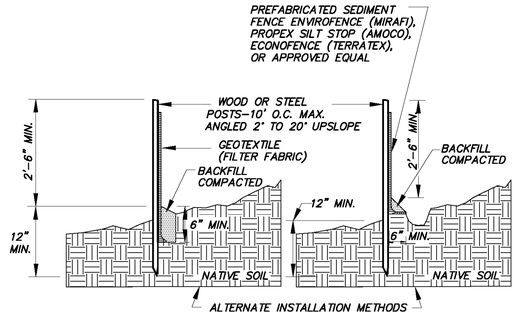
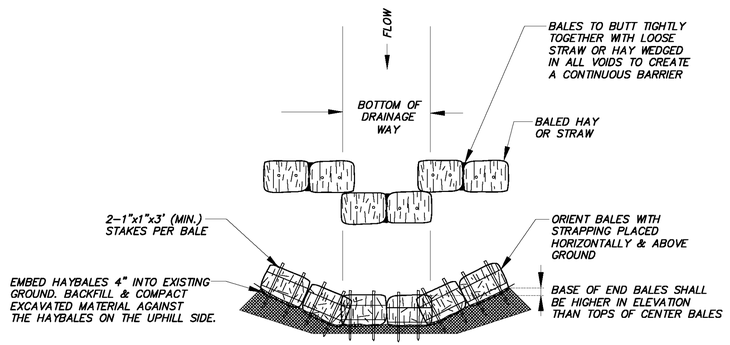


NOTE:
1. WOOD POSTS SHALL BE HARDWOOD 1 1/2" x 1 1/2" x 48" MIN. STEEL POST SHALL BE A MINIMUM OF 0.5 POUNDS PER LINEAR FOOT X 48".
2. JOINTS, WHEN REQUIRED, SHALL BE SPLICED & SECURELY SEALED TOGETHER, AT POST LOCATIONS ONLY, WITH A MINIMUM 6" OVERLAP.

SEDIMENT FENCE EROSION CONTROL (SFEC)

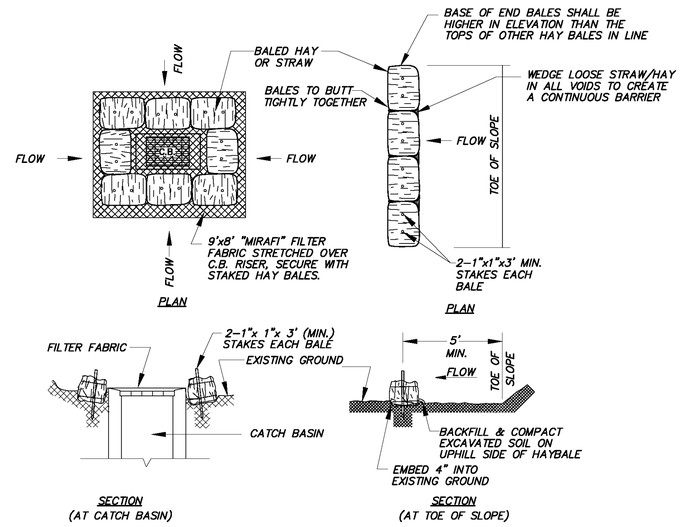
N.T.S.



PLAN

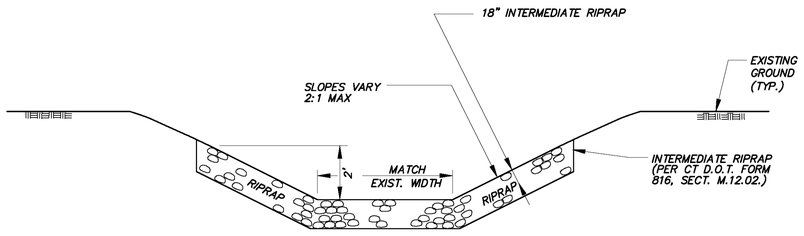
HAYBALE CHECK DAM (HBCD)

N.T.S.



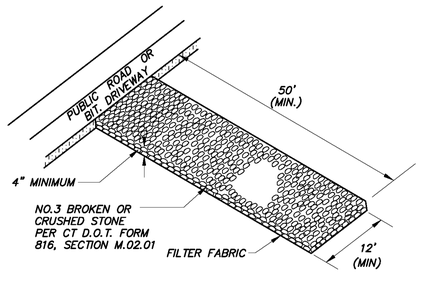
HAYBALE EROSION CONTROL (HBEC)

N.T.S.



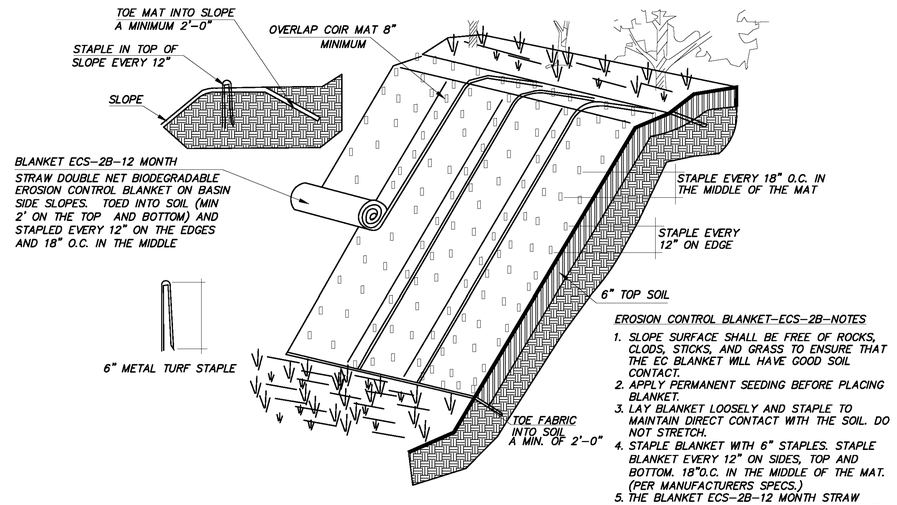
RIPRAP SWALE (RRSW)

N.T.S.



CONSTRUCTION EXIT (CE)

N.T.S.



EROSION CONTROL BLANKET–ECS–2B–NOTES
1. SLOPE SURFACE SHALL BE FREE OF ROCKS, CLODS, STICKS, AND GRASS TO ENSURE THAT THE EC BLANKET WILL HAVE GOOD SOIL CONTACT.
2. APPLY PERMANENT SEEDING BEFORE PLACING BLANKET.
3. LAY BLANKET LOOSELY AND STAPLE TO MAINTAIN DIRECT CONTACT WITH THE SOIL. DO NOT STRETCH.
4. STAPLE BLANKET WITH 6" STAPLES. STAPLE BLANKET EVERY 12" ON SIDES, TOP AND BOTTOM. 18"O.C. IN THE MIDDLE OF THE MAT. (PER MANUFACTURERS SPECS.)
5. THE BLANKET ECS–2B–12 MONTH STRAW DOUBLE NET BIODEGRADABLE EROSION CONTROL BLANKETS TO BE INSTALLED IN SECTIONS RUINNING FROM THE TOP TO THE BOTTOM OF THE SLOPE, ALONG THE ENTIRE AREAS AS SHOWN ON THE PLAN (PER MANUFACTURERS SPECIFICATIONS.)

NOTES:
1. USE ANTI–WASH/GEOJUTE PRODUCT OR APPROVED EQUAL
2. FOR USE ON SLOPES 2:1 OR GREATER

EROSION CONTROL BLANKET

N.T.S.

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Revisions:

No.	Date	Description

DETAILS
prepared for
STORRS LODGES, LLC
HUNTING LODGE ROAD
MANSFIELD, CONNECTICUT

Date: 03–18–2016 | Scale: AS NOTED | Checked by: DSZ | Drawn by: CAD | Job no: 04161 | Sheet no: 1 OF 6

SD–1

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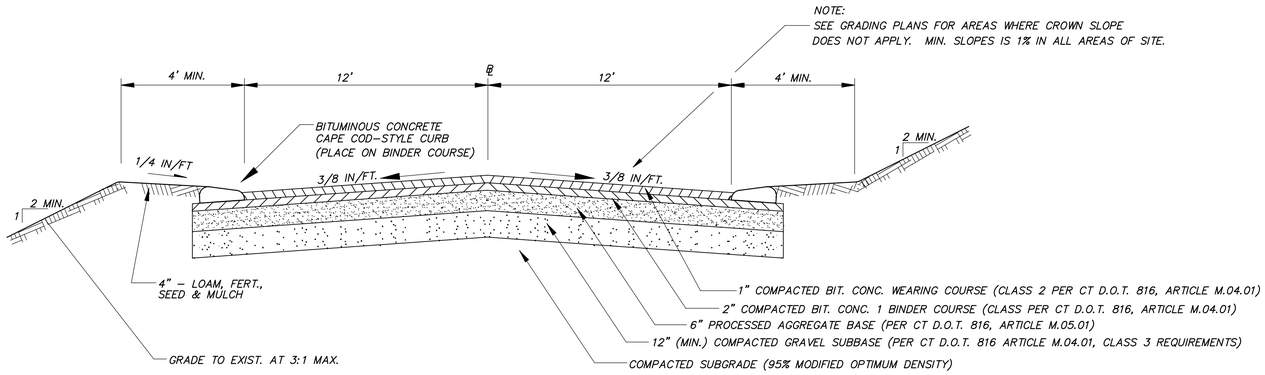
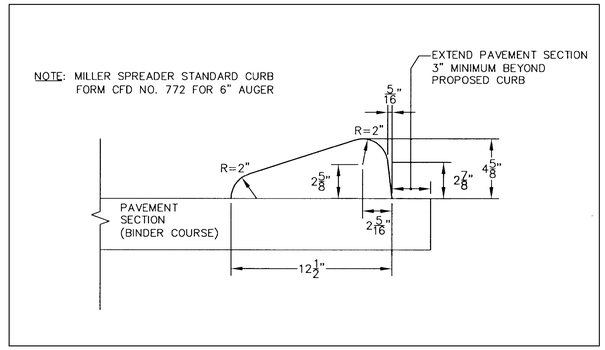


TYPICAL DRIVEWAY SECTION

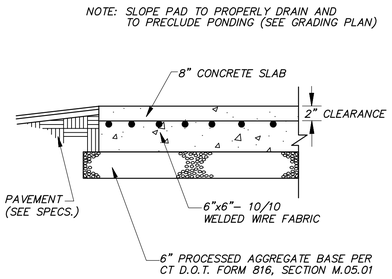
N.T.S.

NOTE: INSTALL UNDERDRAIN WHERE INDICATED ON PLAN/PROFILE SHEETS.



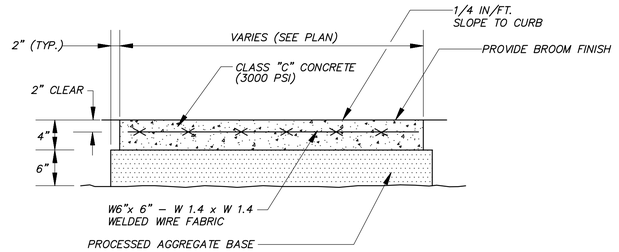
CAPE COD–STYLE CURB SECTION

N.T.S.



DUMPSTER PAD DETAIL

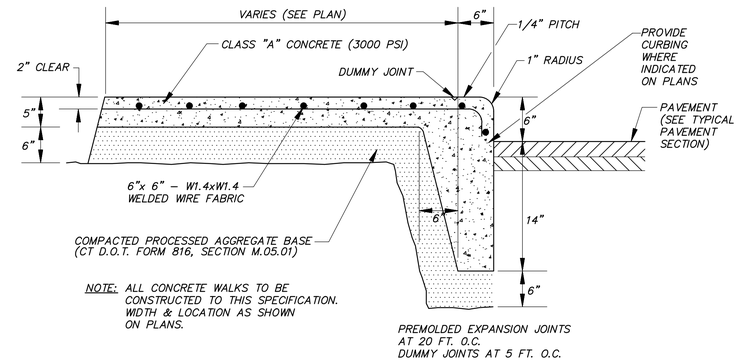
N.T.S.



EXPANSION JOINTS AT 20 FT. O.C.
DUMMY JOINTS AT 5 FT. O.C.
UNLESS OTHERWISE SPECIFIED

CONCRETE SIDEWALK DETAIL

N.T.S.

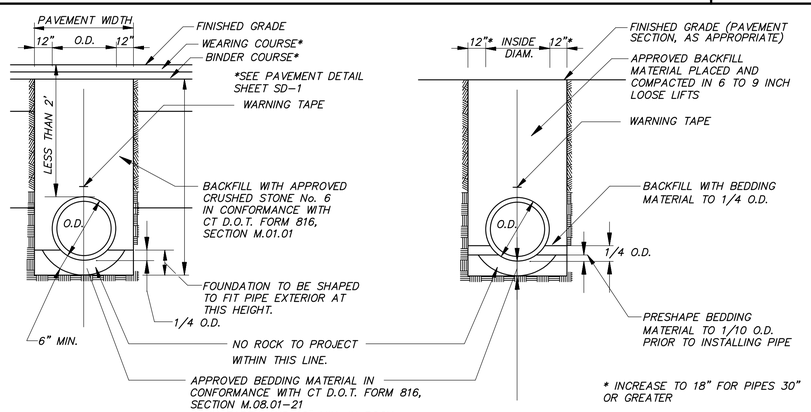


NOTE: ALL CONCRETE WALKS TO BE CONSTRUCTED TO THIS SPECIFICATION. WIDTH & LOCATION AS SHOWN ON PLANS.

PREMOLDED EXPANSION JOINTS
AT 20 FT. O.C.
DUMMY JOINTS AT 5 FT. O.C.

CONCRETE SIDEWALK & CURB DETAIL

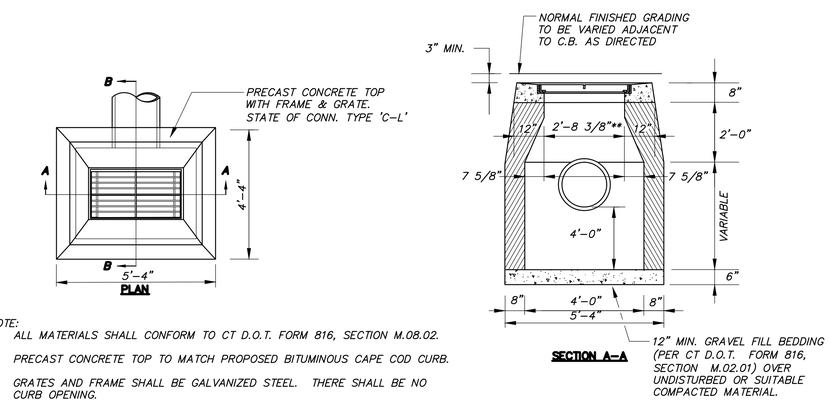
N.T.S.



SHALLOW PIPE WITH LESS THAN 2' OF COVER PIPE WITH MORE THAN 2' OF COVER

STORM SEWER TRENCH DETAIL

N.T.S.



NOTE:
1. ALL MATERIALS SHALL CONFORM TO CT D.O.T. FORM 816, SECTION M.08.02.
2. PRECAST CONCRETE TOP TO MATCH PROPOSED BITUMINOUS CAPE COD CURB.
3. GRATES AND FRAME SHALL BE GALVANIZED STEEL. THERE SHALL BE NO CURB OPENING.
4. INSTALL SNOUT HOOD TRAP AT OUTLET FROM EACH CATCH BASIN.

TYPE 'C–L' CATCH BASIN

N.T.S.

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Revisions:

No.	Date	Description

DETAILS
PREPARED FOR
STORRS LODGES, LLC
HUNTING LODGE ROAD
MANSFIELD, CONNECTICUT

Date 03–18–2016 | Scale: AS NOTED | Drawn by: CAD | Checked by: DSZ | Job no: 04161 | Sheet no: 2 OF 6

SD-2

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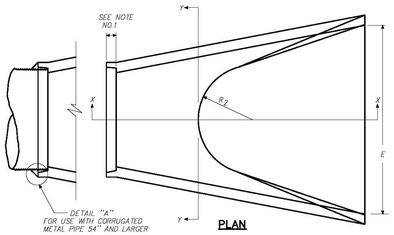
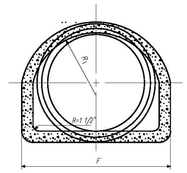
DETAIL "A"

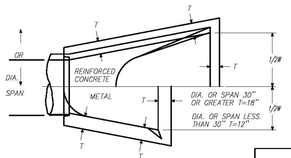


PLAN

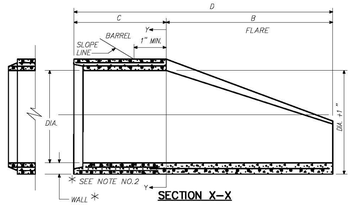
NOTES:
1/ JOINTS SHALL BE TONGUE AND GROOVE OR BELL AND SPIGOT AS REQUIRED TO CONFORM TO PIPE INSTALLED.
2/ WALL THICKNESS SHALL CONFORM TO PIPE THICKNESS.



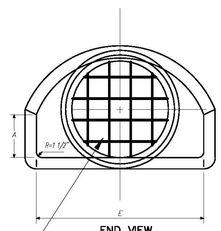
SECTION Y-Y



HORIZONTAL PAYMENT LIMITS FOR TRENCH EXCAVATION-CULVERT ENDS



SECTION X-X



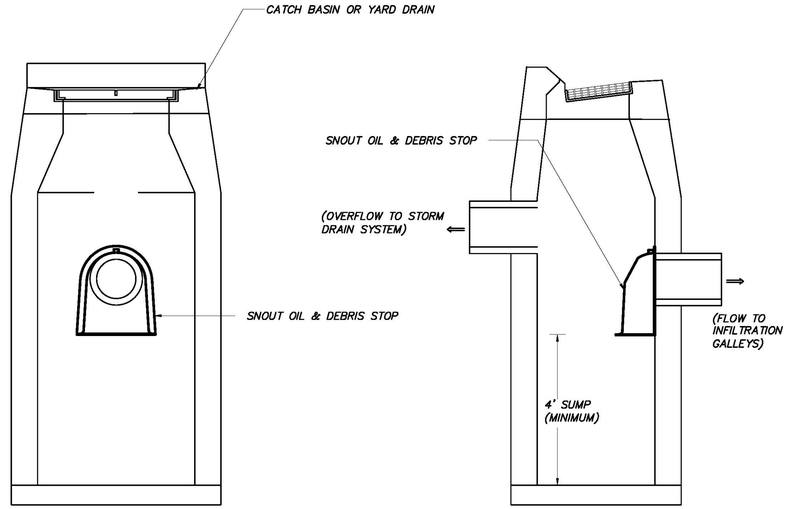
END VIEW

INSTALL BAR GRATE ON PIPES 36" DIA. OR GREATER (3/8" BARS WELDED AT 6"O.C. EACH WAY)

DIMENSIONS FOR REINFORCED CONCRETE CULVERT END										FLARE REINFORCEMENT ONE LAYER ONLY IN CENTER OF WALL	
DIA.	A	B	C	D	E	F	R_1	R_2		MIN. AREA OF LONGITUDINALS SQ. IN. PER FT.	MIN. AREA OF TRANSVERSE STEEL SQ. IN. PER FT.
12"	4"	2'-0"	4'-0 3/8"	6'-0 3/8"	2'-0"	1'-7 15/16"	13 1/4"	9"		0.048	0.048
15"	6"	2'-3"	3'-10"	6'-1"	2'-6"	2'-0 3/16"	1'-0 1/2"	11"		0.054	0.054
18"	9"	2'-3"	3'-10"	6'-1"	3'-0"	2'-5"	1'-3 1/2"	1'-0"		0.060	0.060
21"	9"	2'-1 1"	3'-2"	6'-1"	3'-6"	2'-7 1/2"	1'-4"	1'-1"		0.065	0.066
24"	9 1/2"	1'-7 1/2"	2'-6"	6'-1 1/2"	4'-0"	2'-9 3/16"	1'-4 13/16"	1'-2"		0.072	0.072
30"	1'-0"	4'-6"	1'-7 3/4"	6'-1 3/4"	5'-0"	3'-1"	1'-6 1/2"	1'-3"		0.084	0.084
36"	1'-3"	5'-3"	2'-10 3/4"	6'-1 3/4"	6'-0"	3'-11 3/8"	2'-0 5/16"	1'-8"		0.096	0.096
42"	1'-9"	5'-3"	2'-11"	8'-2"	6'-6"	4'-5 7/8"	2'-3 1/2"	1'-10"		0.108	0.108
48"	2'-0"	6'-0"	2'-2"	8'-2"	7'-0"	4'-8 1/2"	2'-4 1/2"	1'-10"		0.120	0.120

METAL & REINFORCED CONCRETE CULVERT END

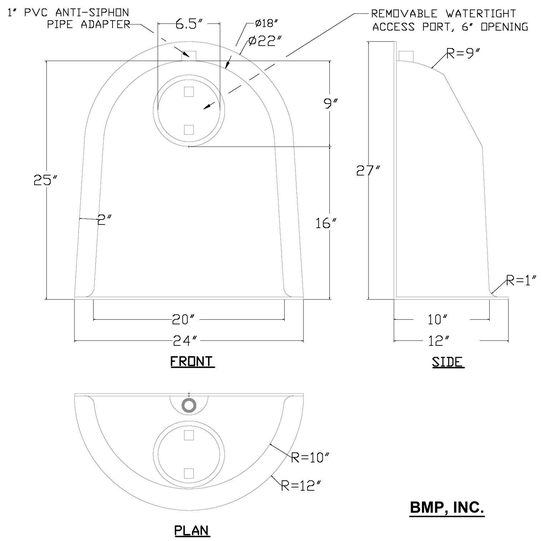
N.T.S.



NOTES:
1. CAST NOTCHED SECTIONS IN CORBEL RISER TO FACILITATE INSTALLATION OF THE TRAP HOOD AGAINST A CONTINUOUS VERTICAL WALL WITHIN THE INTERIOR OF CATCHBASIN OR MANHOLE, AS REQUIRED.
2. WHERE NOTCHING IS REQUIRED IN CORBELS, CONTRACTOR TO SUBMIT DETAILED SHOP DRAWINGS OF CATCHBASINS OR MANHOLE PRIOR TO CASTING
3. CATCHBASINS/MANHOLES TO HAVE 4' MINIMUM SUMPS.
4. CATCHBASINS INSTALLATION SHOWN. WHERE SHOWN ON PLANS, INSTALL IN MANHOLE STRUCTURES.

SNOUT HOOD TRAP FOR CATCH BASIN (TYPICAL)

N.T.S.



BMP, INC.

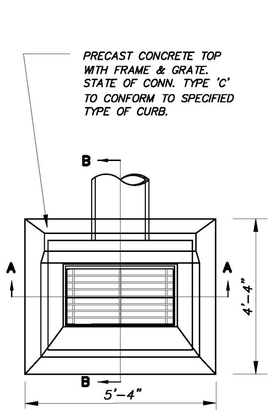
18F SNOUT OIL & DEBRIS STOP (SEE NOTE 10)

NOTE:
1. THE 18F MODEL SHOWN IS FOR ILLUSTRATIVE PURPOSES ONLY. CONTRACTOR SHALL SELECT APPROPRIATE MODEL FOR OUTLET PIPING SPECIFIED.

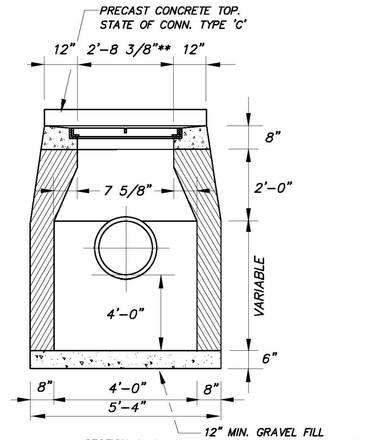
NOTES:
1. ALL HOODS AND TRAPS FOR CATCH BASINS AND WATER QUALITY STRUCTURES SHALL BE AS MANUFACTURED BY: BEST MANAGEMENT PRODUCTS, INC. 53 MT. ARCHER RD. LYME, CT 06371 (860) 434-0277, (860) 434-3195 FAX TOLL FREE: (800) 504-8008 OR (888) 354-7585 WEB SITE: www.bmpinc.com OR PRE-APPROVED EQUAL
2. ALL HOODS SHALL BE CONSTRUCTED OF A GLASS REINFORCED RESIN COMPOSITE WITH ISO GEL COAT EXTERIOR FINISH WITH A MINIMUM 0.125" LAMINATE THICKNESS.
3. ALL HOODS SHALL BE EQUIPPED WITH A WATERTIGHT ACCESS PORT, A MOUNTING FLANGE, AND AN ANTI-SIPHON VENT AS DRAWN. (SEE CONFIGURATION DETAIL)
4. THE SIZE AND POSITION OF THE HOOD SHALL BE DETERMINED BY OUTLET PIPE SIZE AS PER MANUFACTURER'S RECOMMENDATION.
5. THE BOTTOM OF THE HOOD SHALL EXTEND DOWNWARD A DISTANCE EQUAL TO 1/2 THE OUTLET PIPE DIAMETER WITH A MINIMUM DISTANCE OF 6" FOR PIPES <12" I.D.
6. THE ANTI-SIPHON VENT SHALL EXTEND ABOVE HOOD BY MINIMUM OF 3" AND A MAXIMUM OF 24" ACCORDING TO STRUCTURE CONFIGURATION.
7. THE SURFACE OF THE STRUCTURE WHERE THE HOOD IS MOUNTED SHALL BE FINISHED SMOOTH AND FREE OF LOOSE MATERIAL.
8. THE HOOD SHALL BE SECURELY ATTACHED TO STRUCTURE WALL WITH 3/8" STAINLESS STEEL BOLTS AND OIL-RESISTANT GASKET AS SUPPLIED BY MANUFACTURER. (SEE INSTALLATION DETAIL).
9. INSTALLATION INSTRUCTIONS SHALL BE FURNISHED WITH MANUFACTURER SUPPLIED INSTALLATION KIT. INSTALLATION KIT SHALL INCLUDE:
   A. INSTALLATION INSTRUCTIONS
   B. PVC ANTI-SIPHON VENT PIPE AND ADAPTER
   C. OIL-RESISTANT CRUSHED CELL FOAM GASKET WITH PSA BACKING
   D. 3/8" STAINLESS STEEL BOLTS
   E. ANCHOR SHIELDS
10. FOR MANHOLE APPLICATIONS, UTILIZE ROUND STYLE HOODS DESINGED FOR CIRCULAR STRUCTURES.

TRAP HOOD DETAIL

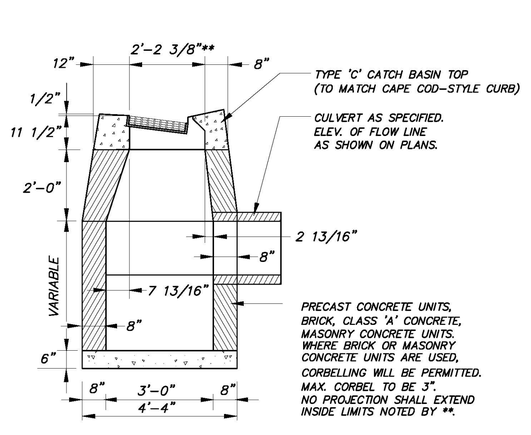
N.T.S.



PLAN



SECTION A-A



SECTION B-B

NOTE:
1. ALL MATERIALS SHALL CONFORM TO CT D.O.T. FORM 816, SECTION M.08.02.
2. PRECAST CONCRETE TOP TO MATCH PROPOSED BITUMINOUS CAPE COD CURB.
3. GRATES AND FRAME SHALL BE GALVANIZED STEEL. THERE SHALL BE NO CURB OPENING.
4. INSTALL SNOUT HOOD TRAP AT OUTLET FROM EACH CATCH BASIN.

TYPE 'C' CATCH BASIN

N.T.S.

THE LODGES AT STORRS

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Civil & Traffic Engineers - Surveyors - Planners - Landscape Architects

No.	Date	Description
		Revisions:

DETAILS
Prepared for
STORRS LODGES, LLC
HUNTING LODGE ROAD
MANSFIELD, CONNECTICUT

Date: 03-18-2016 | Scale: AS NOTED | Checked by: DSZ | Drawn by: CAD | Job no: 04161 | Sheet no: 3 OF 6

SD-3

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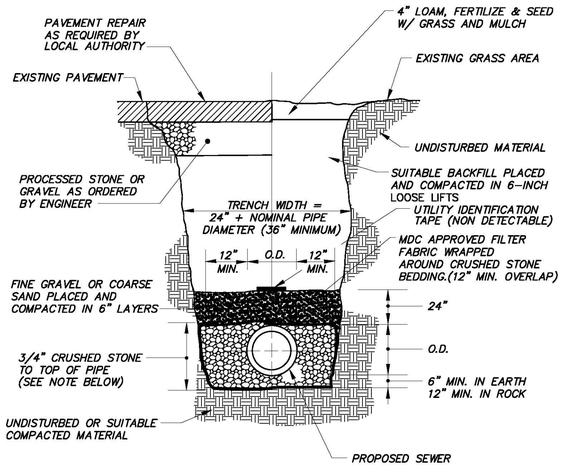
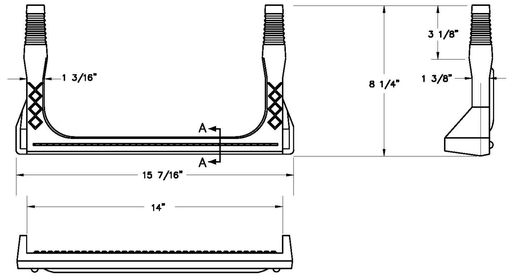
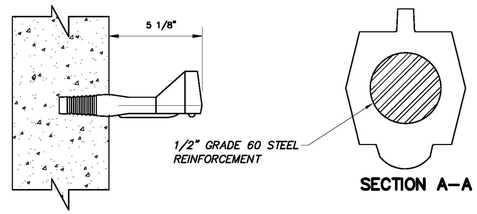


SANITARY SEWER TRENCH DETAIL

N.T.S.

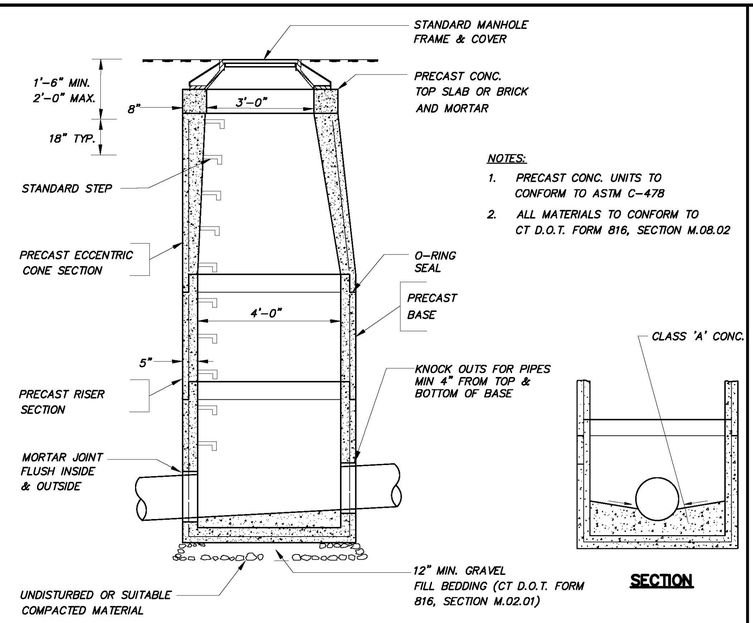


Copolymer Polypropylene Plastic



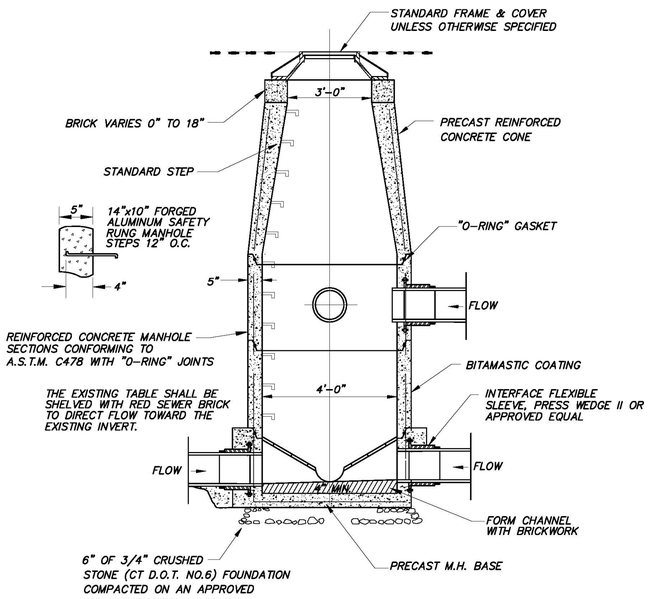
PLASTIC MANHOLE STEP

N.T.S.



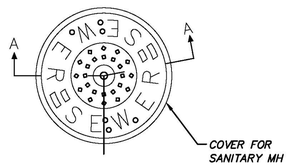
STORM SEWER MANHOLE

N.T.S.

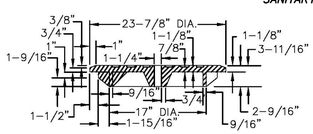


SANITARY SEWER MANHOLE

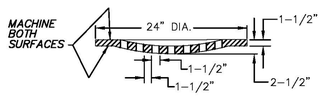
N.T.S.



NOTE:
THE LOWER SURFACE OF THE COVER AND THE CORRESPONDING UPPER SURFACE OF THE FRAME SHALL BE MACHINE FINISHED TO PROVIDE A SMOOTH FLAT CONTACT OR FIT WITHOUT ANY TENDENCY FOR THE COVER OR GRATE TO ROCK OR RATTLE.



SECTION A-A



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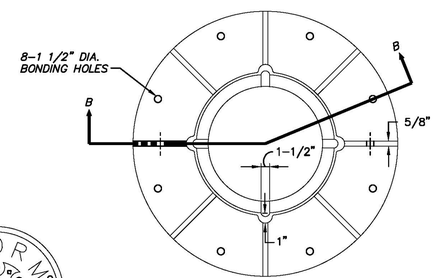
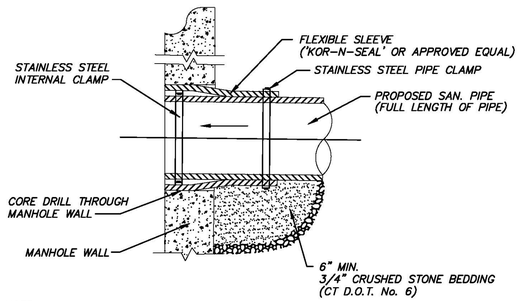


SECTION B-B

STANDARD FRAME AND COVER

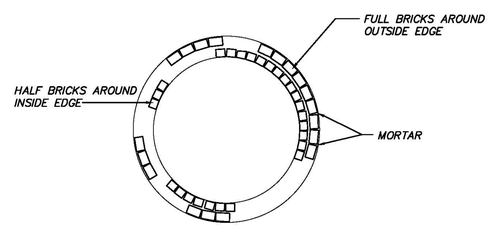
N.T.S.



NOTE:
ALL STRAPS AND BOLTS TO BE STAINLESS STEEL

TYPICAL MANHOLE SLEEVE DETAIL

N.T.S.



PLAN VIEW

BRICK LEVELING COURSE FOR MANHOLE

N.T.S.

THE LODGES AT STORRS

F. A. Hesketh & Associates, Inc.
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Revisions:

No.	Date	Description

DETAILS
prepared for
STORRS LODGES, LLC
HUNTING LODGE ROAD
MANSFIELD, CONNECTICUT

Date: 03-18-2016 | Drawn by: CAD | Checked by: DSZ | Job no: 04161 | Sheet no: 4 OF 6
Scale: AS NOTED

SD-4

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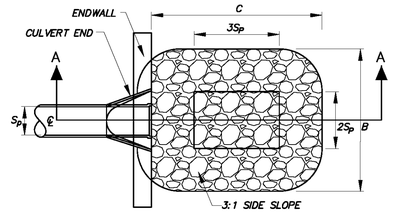
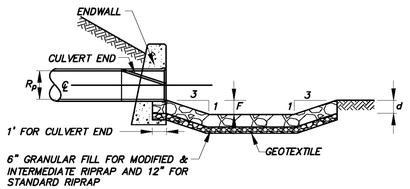


PLAN VIEW



SECTION A–A

LEGEND

S_p { MAX. INSIDE PIPE SPAN (NON CIRCULAR SECTIONS) / INSIDE PIPE DIAMETER (CIRCULAR SECTION)

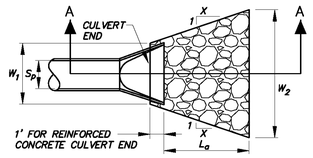
R_p { MAX. INSIDE PIPE RISE (NON CIRCULAR SECTIONS) / INSIDE PIPE DIAMETER (CIRCULAR SECTION)

d { 12" FOR MODIFIED RIPRAP / 18" FOR INTERMEDIATE RIPRAP / 36" FOR STANDARD RIPRAP

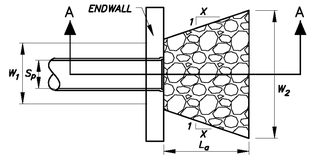
TYPE 1 F=0.5Rp
TYPE 2 F=Rp
C=3Sp+6F
B=2Sp+6F

PREFORMED SCOUR HOLE TYPE 1 AND TYPE 2

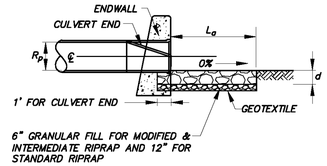
N.T.S.



CULVERT END PLAN VIEW



END WALL PLAN VIEW



SECTION A–A
CULVERT END AND END WALL

LEGEND

S_p { MAX. INSIDE PIPE SPAN (NON CIRCULAR SECTIONS) / INSIDE PIPE DIAMETER (CIRCULAR SECTION)

R_p { MAX. INSIDE PIPE RISE (NON CIRCULAR SECTIONS) / INSIDE PIPE DIAMETER (CIRCULAR SECTION)

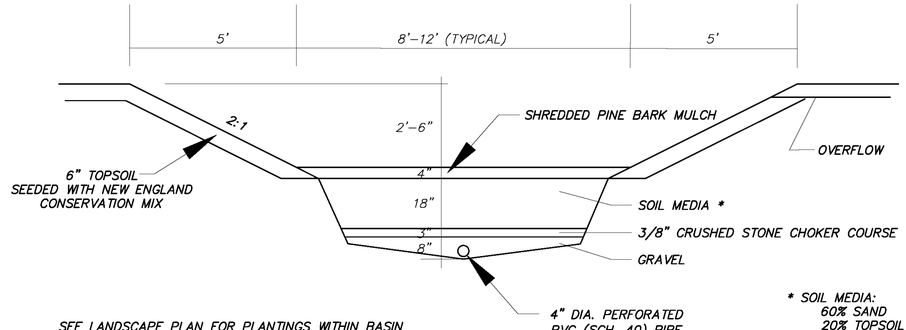
L_a { LENGTH OF RIPRAP APRON MEASURED FROM THE END OF CULVERT END SECTION OR FACE OF ENDWALL

d { 12" FOR MODIFIED RIPRAP / 18" FOR INTERMEDIATE RIPRAP / 36" FOR STANDARD RIPRAP

	X	W_1	W_2
TYPE A RIPRAP APRON	3	3Sp	3Sp+0.7 La
TYPE B RIPRAP APRON	5	3Sp	3Sp+0.4 La

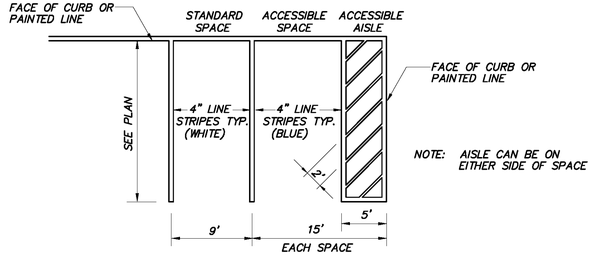
TYPE A & B RIPRAP APRON

N.T.S.



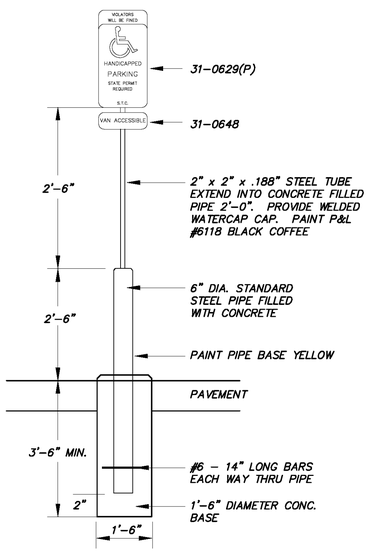
BIO–RETENTION BASIN

1"=2'



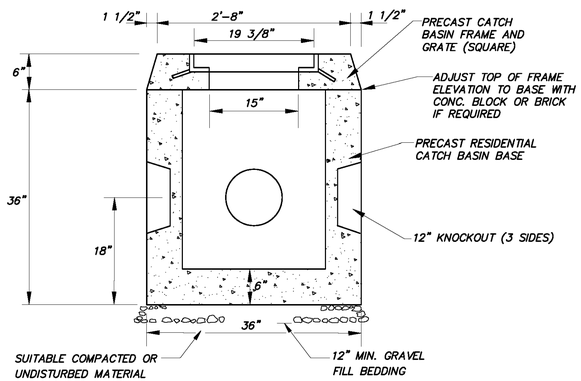
ACCESSIBLE PARKING SPACE LAYOUT

N.T.S.



ACCESSIBLE SPACE SIGN POST/BASE

N.T.S.



TYPE 'R' CATCH BASIN

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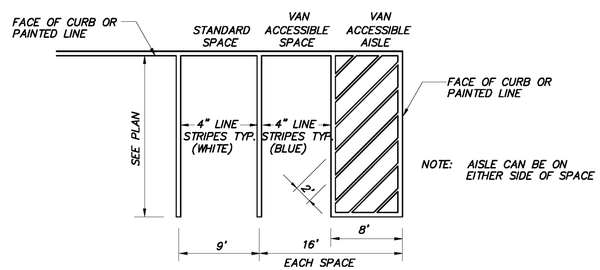

ACCESSIBLE VAN PARKING SPACE LAYOUT

N.T.S.

THE LODGES AT STORRS

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Civil & Traffic Engineers · Surveyors · Planners · Landscape Architects
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Revisions:

No.	Date	Description

DETAILS
PREPARED FOR
STORRS LODGES, LLC
HUNTING LODGE ROAD
MANSFIELD, CONNECTICUT

Job no: 04161 | Sheet no: 5 OF 6
Drawn by: DSZ | CAD | Checked by:
Date: 03–18–2016 | Scale: AS NOTED

SD-5

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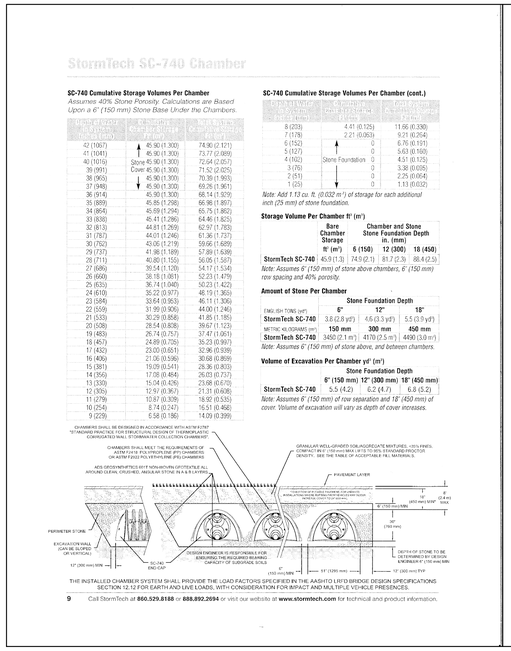
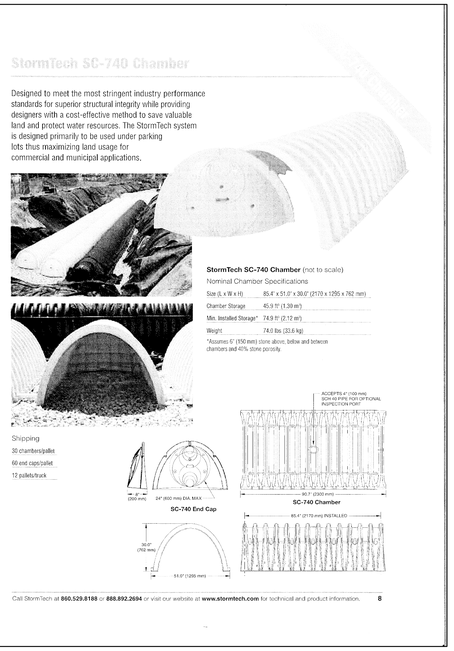
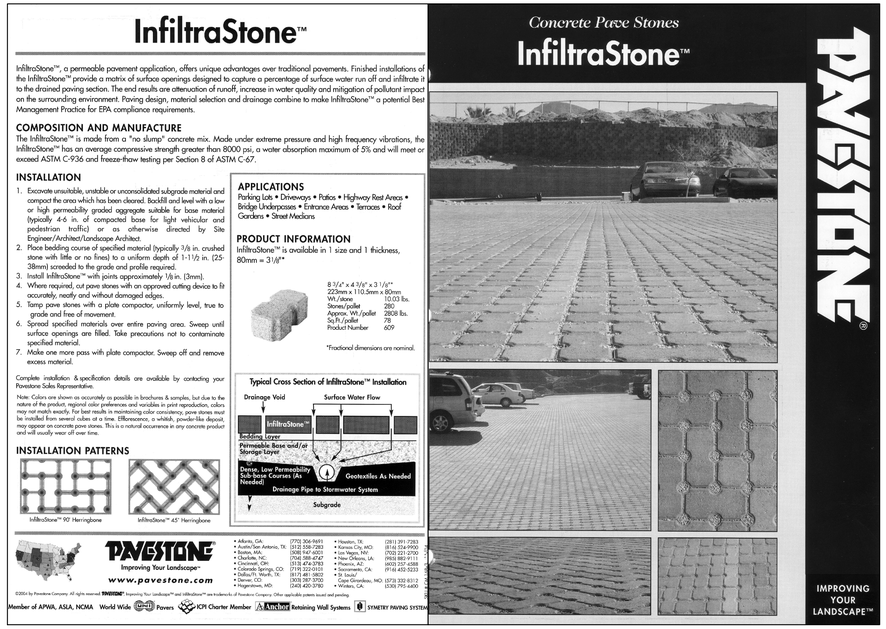




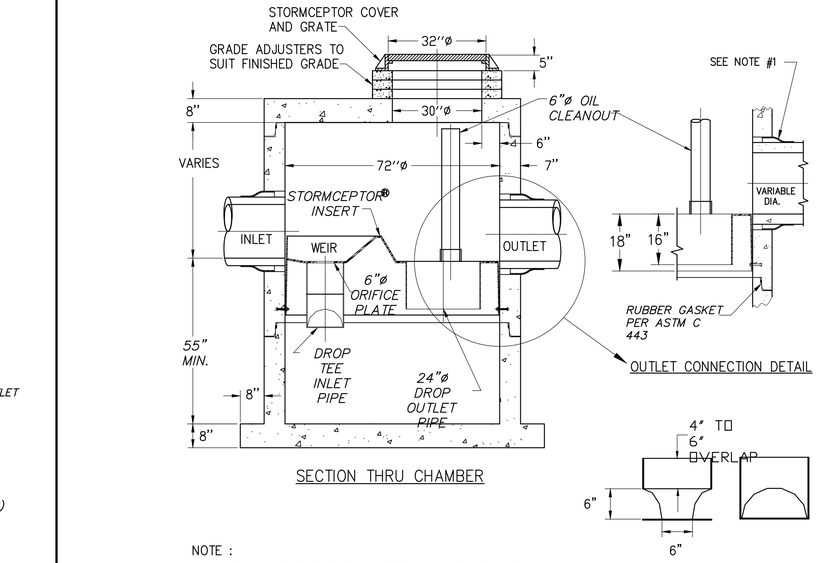
'STORMTECH' SC-740 LEACHING CHAMBER

N.T.S.



'PAVESTONE' PERVIOUS PAVEMENT SYSTEM

N.T.S.

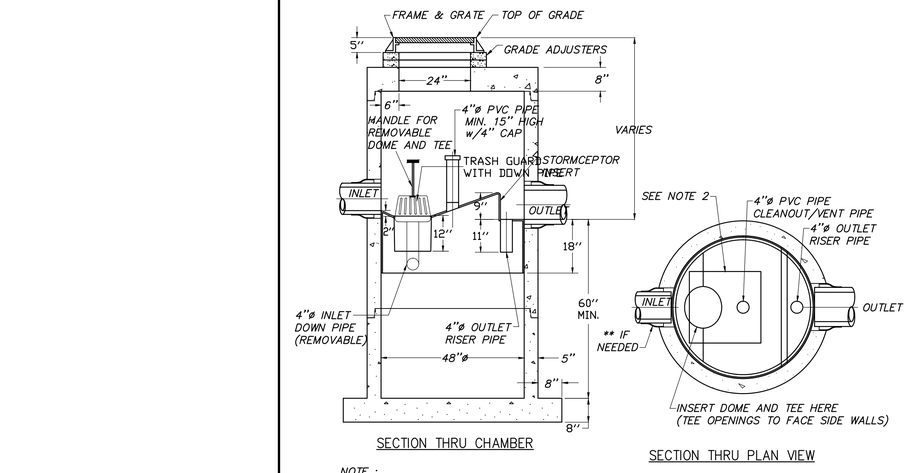


NOTE :

1. THE USE OF FLEXIBLE CONNECTIONS IS RECOMMENDED AT THE INLET AND OUTLET WHERE APPLICABLE.
2. THE COVER SHOULD BE POSITIONED OVER THE OUTLET DROP PIPE AND THE OIL CLEANOUT PIPE.
3. THE STORMCEPTOR SYSTEM IS PROTECTED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS: #4985148, #5498331, #5725760, #5753115, #5849181.

STORMCEPTOR STC 900

N.T.S.



SECTION THRU CHAMBER

SECTION THRU PLAN VIEW

NOTE :

1. THE USE OF FLEXIBLE CONNECTIONS IS RECOMMENDED AT THE OUTLET WHERE APPLICABLE.
2. THE COVER SHOULD BE POSITIONED OVER THE 4"ø CLEANOUT/VENT PIPE AND THE 4"ø INLET DOWN PIPE.
3. THE STORMCEPTOR SYSTEM IS PROTECTED BY ONE OR MORE OFF THE FOLLOWING U.S. PATENTS: #4985148, #5498331, #5725760, #5753115, #5849181.
4. CONTRACTOR TO PROVIDE CRANE TO SET UNIT (HEAVIEST SECTION WEIGHS 5000 LB)

STORMCEPTOR STC 450i

N.T.S.

THE LODGES AT STORRS

F. A. Hesketh & Associates, Inc.
6 Creamery Brook, East Granby, CT 06026
Civil & Traffic Engineers • Surveyors • Planners • Landscape Architects
Phone (860) 653-8000
Fax (860) 844-8600
e-mail mail@fahesketh.com

Revisions:

No.	Date	Description

DETAILS
PREPARED FOR
STORRS LODGES, LLC
HUNTING LODGE ROAD
MANSFIELD, CONNECTICUT

Date: 03-18-2016 | Drawn by: CAD | Checked by: DSZ | Job no: 04161 | Sheet no: 6 OF 6
Scale: AS NOTED

SD-6

C:\Users\dmelendez\appdata\Local\Temp\AcPublish_5776\LODdet102.dwg, SD-6, Mar. 17, 2016 - 5:42:13 PM

PROJECT DESCRIPTION:

The project site, The Lodges at Storrs, consists of a 45.93 acre parcel of undeveloped land located on the west side of Hunting Lodge Road, just south of the existing Carriage House Apartments. The applicant is proposing to construct a 692-bed student apartment complex consisting of 47 two story buildings and a 10,000 s.f. community building. The application includes on-site parking for approximately 558 vehicles. Best Management Practices (BMP's) are being employed on the drainage system. The crossing of the flagged wetlands from the main driveway out to Hunting Lodge Road is being accomplished using a pre-cast concrete arch bridge which minimizes the disturbance to the wetlands on the property.

CONSTRUCTION SEQUENCE:

In general, the overall project will follow the sequence below:

1. Contact "call before you dig" at 1-800-922-4455 at least 48 hours prior to the start of construction to have existing utilities marked.
2. A pre-construction meeting and authorization to proceed will be required prior to start of any construction, including demolition, removal of trees or stripping of land. Procedures for such pre-construction meeting and authorization to proceed shall be in accordance with Town and State requirements. The contractor is responsible for arranging this meeting with Town and State officials.
3. Install temporary traffic controls, construction fencing, as required, or as necessary to protect the public.
4. Install temporary soil erosion and sedimentation control measures as shown on the plan or as required to meet specific site conditions, including items listed below, prior to the start of any clearing, demolition or excavation.
5. Install sediment fence, hay bale check dams, and construction exits.
6. Stake clearing limits and flag trees to remain. No site clearing to begin until stakeout approved by the Town and Engineer.
7. Construct temporary sedimentation collection basins as directed by the Engineer.
8. Schedule and coordinate relocation of utilities, including water mains and other utilities indicated on the plans.
9. On Northwood Road and Hunting Lodge Road saw cut pavement and demolish pavement, curbing and landscaping required for installation of new utility services.
10. On Northwood Road install new water main and hydrants.
11. On Northwood Road install new sanitary sewer.
12. Complete site clearing and grubbing and begin rough grading.
13. Install borrow fill and grade pad sites for start of buildings and site improvements. Begin building foundations.
14. Begin installation of underground utilities.
15. Begin installation of the pre-cast concrete arch bridge crossing.
16. Install storm drainage structures and culverts, underground infiltration devices, and outlet structures. Install hay bales around drainage structures as they are completed.
17. Complete grading to subgrade.
18. Compact subgrade.
19. Place and regrade pavement base utilizing existing processed pavement material, as allowed, and additional gravel subbase and processed aggregate base as required.
20. Install pavement binder course and curbing.
21. Install concrete sidewalk, bike path, and other site amenities.
22. Install pavement wearing course.
23. Place topsoil and landscape materials.
24. Install pavement markings and signs.
25. Remove erosion controls after disturbed areas are landscaped and mulched or new lawn areas are stabilized, and as approved by the Town.
26. Remove sediment from storm drainage system and riprap aprons as required.
27. The approximate date for start of construction is the Fall of 2016 and the estimated completion date is the Summer of 2018.

EROSION CONTROL DEVICES:

Refer to the "Connecticut Guidelines For Soil Erosion And Sediment Control - 2002" (see Erosion and Sediment Control Note 3) when constructing erosion control devices shown on this plan.

HBEC - HAYBALE EROSION CHECKS shall be staked a minimum of five (5) feet from the base of disturbed slopes exceeding eight (8) feet in height, or at locations shown on the plans. Place haybales before starting a fill slope and after digging a cut slope. Heel haybales 4" into the soil. Stake haybales around the perimeter of all catch basins. Remove all sediment when deposits reach 1/2 bale height. Haybales must be replaced periodically.

SFEC - SEDIMENT FENCE EROSION CHECK: a synthetic textile barrier designed to filter sediment from surface water runoff. Placement shall be similar to HBEC and installation requires anchoring the fence bottom to prevent bypass. All sediment shall be removed if deposits reach one (1) foot in depth. Additional support (such as snow fence or wire fence) on the downhill face may be required to strengthen sediment fence in high flow locations.

CE - CONSTRUCTION EXIT: a broken stone pad providing a hard surface points where vehicles will leave the site. The construction exits reduce tracking of sediment into adjacent pavement. Excess sediment should be periodically removed from the stone surface.

RRPP - RIP RAP PLUNGE POOL: a riprap lined apron installed at a zero percent grade to absorb the initial impact of stormwater discharge from the storm drainage system and further reduce flow velocities to prevent erosion downstream. RROP is designed per the "Connecticut Department of Transportation, Drainage Manual - 2000"

RRSW - RIP RAP SWALE: a swale with rip rap lining installed to to absorb the energy of flowing stormwater and reduce flow velocities to prevent erosion of the channel.

FES - FLARED END SECTION: a precast concrete culvert or formed polyethylene end structure designed to spread runoff to greater width of flow.

EROSION AND SEDIMENT CONTROL NOTES

1. Disturbance of soil surfaces is regulated by State Law. All work shall comply with an approved "Erosion and Sediment Control Plan" to prevent or minimize soil erosion.
2. The installation and maintenance of erosion control devices is the responsibility of the land owner, developer, and the excavation contractor. Town officials shall be notified in writing of the name, address and telephone number of the individual responsible for this work (including any changes) at the required pre-construction conference.
3. The contractor shall use the "Connecticut Guidelines for Soil Erosion and Sediment Control" (2002), as amended as a guide in constructing the erosion and sediment controls indicated on these plans. The guidelines may be obtained from the Connecticut Department of Environmental Protection store, 79 Elm Street, Hartford, CT 06106-5127.
4. The contractor shall schedule operations to limit disturbance to the smallest practical area for the shortest possible time. Overall site disturbance shall be confined to those limits delineated on the plans.
5. The contractor is responsible for the timely installation, inspection, repair or replacement of erosion control devices to insure proper operation.
6. The contractor shall notify the design engineer of unsatisfactory erosion conditions not controlled by the erosion and sediment control plan and shall install additional measures as required.
7. All disturbed areas not covered by buildings, pavement, mulch or ground cover plantings shall be planted with grass.
8. Once 1/3 height occurs, accumulated sediment removed from erosion control devices is to be spread and stabilized in level, erosion resistant locations as general fill.
9. Special attention shall be given to the construction sequence outlined on the erosion and sediment control plan.
10. The contractor shall be responsible for cleaning any construction debris or sediment from existing roads as ordered by the Town and/or State, if any debris or sediment from construction activities enter onto these roadways.
11. Limit work within wetland areas to the least disturbance necessary for construction. Restore disturbed areas as closely as possible to their original natural state.
12. Additional dust control measures as specified in D.O.T. 816 Section 9.39, Section 9.42 and Section 9.43 shall be furnished by the contractor as site conditions warrant or as directed by Town or State officials.
13. The contractor is responsible for cleaning and removal of sediment and/or debris from the storm drainage system throughout the duration of the project (i.e. sumps, plunge pools, level spreaders, etc.)
14. Additional rolls of silt fence and haybales shall be maintained on site by the contractor for use during emergency conditions.
15. Due to the area of proposed disturbance, this project will require a stormwater permit from the Connecticut Department of Environmental Protection. A copy of this permit, and the required Stormwater Pollution Prevention Plan, shall be submitted to the town prior to the start of any construction.
16. The contractor is responsible for developing a final construction phasing plan submitted to the Engineer for approval prior to the start of site and/or off-site construction activities.

GENERAL NOTES:

1. Existing topography developed from aerial photogrammetrics and limited filed survey completed by F. A. Hesketh and Associates, Inc.
2. Bearings and coordinates depicted hereon refer to 1927 North American Datum (NAD 27).
3. Elevations depicted hereon are based on NGVD 29.
4. All work on this project shall be completed in conformance with the requirements of the various federal, State, and local permits issued for this project, including the Town of Mansfield Inland Wetland and Watercourses Commission permit and the Town of Mansfield Planning and Zoning Commission Site Plan and Special Permit approvals. The contractor is responsible for complying with the relevant conditons of approval/permits.
5. A pre-construction meeting and authorization to proceed will be required prior to start of any construction, including demolition, removal of trees or stripping of land. Procedures for such pre-construction meeting and authorization to proceed shall be in accordance with Town and State requirements. The contractor is responsible for arranging this meeting with Town and State officials.
6. Prior to any excavation the contractor shall verify all underground utilities by calling 1-800-922-4455 at least 48 hours in advance.
7. All work and materials to conform to Town of Mansfield standard specifications, D.O.T. Form 816 (as amended), custodial utility company specifications, the details shown on these plans, or the project specifications, as applicable.
8. Erosion and sedimentation control measures shall be installed and maintained in accordance with the plan, specifications, and the erosion and sedimentation control notes.
9. Drainage shall be maintained throughout the project so as not to cause flooding of roadways or damage to private property.
10. Connect all roof leaders into new storm sewer system.
11. Trees shall be flagged and approved, prior to removal.
12. Trees and vegetation identified to be saved shall be protected from construction equipment by suitable means approved by Town staff.
13. Removal of trees or other vegetation, or re-grading substantially different from that shown on the approved site plan, will not be permitted without prior authorization by the Town or State, as applicable.
14. No stumps are to be buried on site.
15. All debris shall be removed from the site by the contractor.
16. All exterior lighting shall not be directed onto abutting properties or roadways.
17. Handicapped accessible parking spaces shall be marked and signed in accordance with current state and town requirements.
18. Fire Lanes shall be marked and signed as required by the Fire Marshall. The contractor shall coordinate this work with the Fire Marshall prior to installation.

GENERAL GRADING NOTES:

1. Set frames of all manholes, catch basins, gas and water gates, hand holes, meter boxes, and all other utility appurtenances to match proposed finish grade.
2. On Northwood Road and Hunting Lodge Road, saw cut existing pavement along limits of work. construct pavement match detail to Town of Mansfield standards. Blend all new work to match existing.
3. Fine grade all areas to preclude ponding.
4. Grade transitions to roadways to maintain gutter flow, where present, and to preclude ponding.

SCHEDULE AND DESCRIPTION OF RESPONSIBILITY FOR MAINTENANCE OF THE ON-SITE STORM WATER SYSTEM:

1. Maintenance of the on-site storm water system is the responsibility of the property owner. This includes all biofilters, catch basins, stormceptor units, Stormtech infiltrators, system piping, manholes, roof leaders and system outfall and riprap.
2. The following schedule of maintenance shall be followed:

   a. In general, good housekeeping practices shall be incorporated into the routine site and facility maintenance plan to minimize deposition of sediment, litter and contaminants into the storm drainage system.

   b. Paved parking and loading areas and walks shall be swept of debris, sand, and litter at least twice annually, in particular, late spring after winter sanding operations, and in late fall after leaf litter cleanup.

   c. Biofilters, catch basins and stormceptor units shall be inspected annually, following spring site cleanup. Accumulated sediment and debris shall be removed and disposed of to approved off-site locations.

   d. Rip rap and crushed stone erosion control shall be inspected annually. Excess sediments shall be removed and repairs made when erosion is noted.
3. Maintenance records documenting system inspection and cleaning operations shall be maintained by the property owner and shall be made available for inspection by the Town as requested.

GENERAL UTILITY NOTES:

1. PVC drain pipe=sch. 40 PVC pipe, sewer pipe = SDR 35 PVC pipe w/ push-on gasketed joints.
2. CPE = corrugated polyethylene pipe conforming to CT DOT 816, M.08.01-25, type S.
3. The location of all utilities shown is approximate and are based on available as-built information from utility company records, the property owner, and limited survey data. All existing utilities may not be shown. The contractor is responsible for determining the exact location of all utilities on the site prior to the start of any construction activity and notifying the design site engineer of any adjustments to the plans which are necessary. Test pits will be required at all proposed utility crossings in order to determine underground utility locations and to identify potential conflicts with vertical and horizontal alignments shown on the plans. Test pits shall be completed by the contractor at his expense.
4. Contact "call before you dig" at 1-800-922-4455 to mark the location of all underground utilities at least 72 hours prior to start of construction.
5. Remove/abandon all existing utilities required for construction of site improvements whether or not shown on these plans. All work shall be in accordance with custodial utility company requirements.
6. Flow line and invert elevations of all storm and sanitary sewers must be coordinated with final architectural drawings. Notify design engineer of conflicts prior to start of construction.
7. All materials and installation per Town of Mansfield, CT DOT Form 816, or custodial utility company specification, as appropriate.
8. All new site utilities are to be installed underground unless indicated otherwise.
9. All utilities to be installed in accordance with utility company applicable requirements. Final location of utility connections is subject to revision by individual utility companies prior to the installation. The contractor is responsible for coordinating the work with the applicable utility companies.
10. Catch basins, manholes, and other drainage structures shall conform to CT DOT Form 816 Section M.08.02
11. Water service installation and existing water service termination is to be coordinated with CT Water Co. and UCONN facilities staff prior to the start of work by the contractor.
12. All work and materials for water main and service shall conform to UCONN specifications and requirements.
13. All water main and service piping shall be ANSI/AWWA C151/A21.51 C.L.D.I.P. Class 52, unless otherwise specified. All water service shall have a minimum cover of 4 1/2 feet.
14. All fittings and valves shall be mechanical joint and shall be restrained using joint retainer glands, and concrete thrust blocks, unless otherwise specified. All valves shall open left.
15. Fire hydrant locations shall be approved by the Mansfield Fire Marshall prior to installation. Coordination with the Fire Marshall is the responsibility of the contractor.
16. All work related to gas, electric, telephone and communication service shall be in accordance with the custodial utility company standards and specifications
17. All work and materials for sanitary sewer shall conform to UCONN specifications and requirements.

THE LODGES AT STORRS

FAH
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Civil & Traffic Engineers • Surveyors • Planners • Landscape Architects
Phone (860) 653-8000
Fax (860) 844-8600
e-mail mail@fahesketh.com

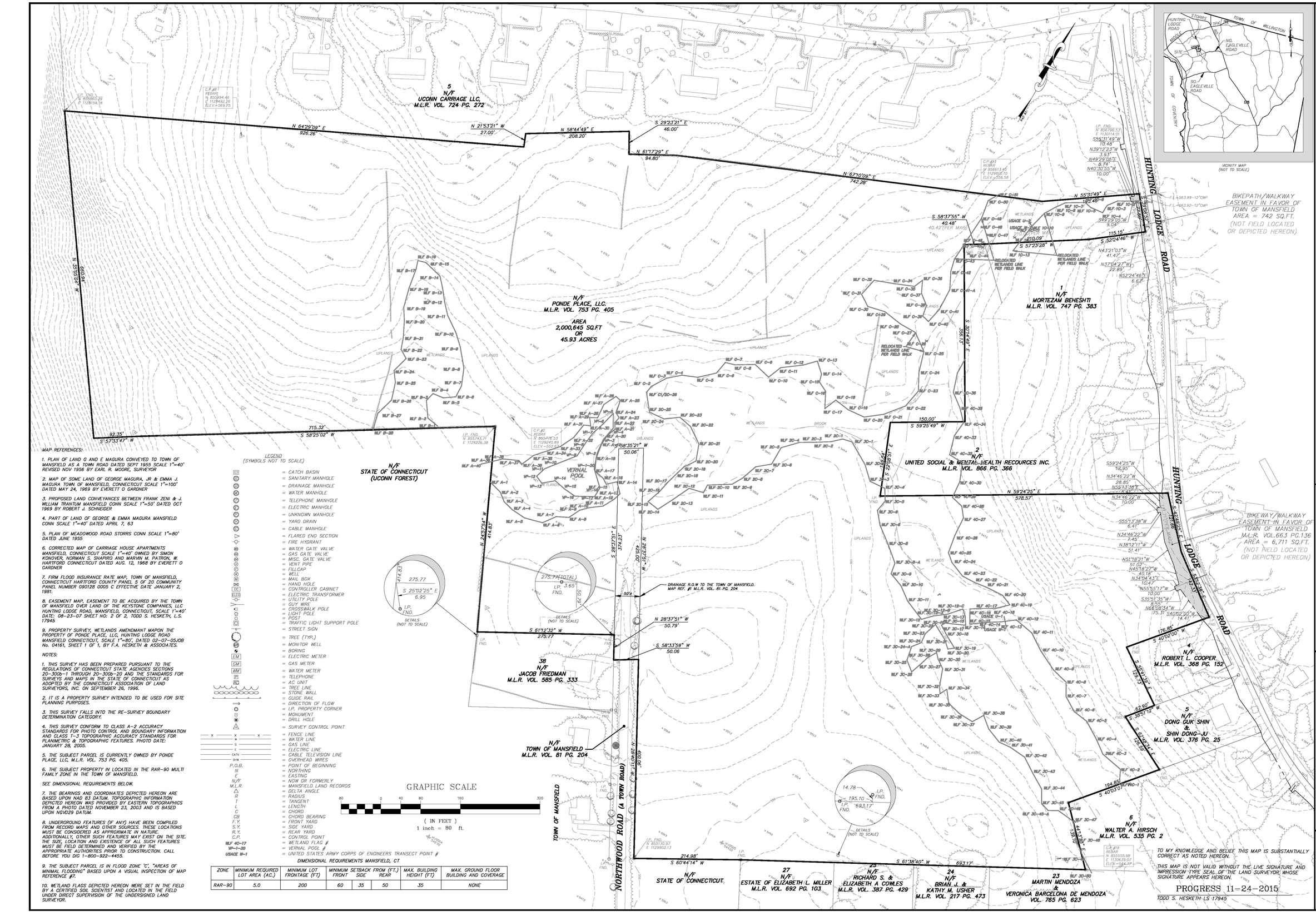
Revisions:

No.	Date	Description

NOTES
PREPARED FOR
STORRS LODGES, LLC
HUNTING LODGE ROAD
MANSFIELD, CONNECTICUT

Date: 03-18-2016 | Drawn by: CAD | Job no: 04161
Scale: N.T.S. | Checked by: DSZ | Sheet no: 1 OF 1

NT-1



MAP REFERENCES:

1. PLAN OF LAND G AND E MAGURA CONVEYED TO TOWN OF MANSFIELD AS A TOWN ROAD DATED SEPT 1955 SCALE 1"=40' REVISED NOV 1956 BY EARL R. MOORE, SURVEYOR
2. MAP OF SOME LAND OF GEORGE MAGURA, JR & EMMA J. MAGURA TOWN OF MANSFIELD, CONNECTICUT SCALE 1"=100' DATED MAY 24, 1969 BY EVERETT O GARDNER
3. PROPOSED LAND CONVEYANCES BETWEEN FRANK ZENI & J. WILLIAM TRANTUM MANSFIELD CONN SCALE 1"=50' DATED OCT 1969 BY ROBERT J. SCHNEIDER
4. PART OF LAND OF GEORGE & EMMA MAGURA MANSFIELD CONN SCALE 1"=40' DATED APRIL 7, 63
5. PLAN OF MEADOWOOD ROAD STORRS CONN SCALE 1"=80' DATED JUNE 1955
6. CORRECTED MAP OF CARRIAGE HOUSE APARTMENTS MANSFIELD, CONNECTICUT SCALE 1"=40' OWNED BY SIMON KONOVER, NORMAN S. SHAPIRO AND MARVIN M. PATRON, W. HARTFORD CONNECTICUT DATED AUG. 12, 1968 BY EVERETT O GARDNER
7. FIRM FLOOD INSURANCE RATE MAP, TOWN OF MANSFIELD, CONNECTICUT HARTFORD COUNTY PANEL 5 OF 20 COMMUNITY PANEL NUMBER 090128 0005 C EFFECTIVE DATE JANUARY 2, 1981.
8. EASEMENT MAP, EASEMENT TO BE ACQUIRED BY THE TOWN OF MANSFIELD OVER LAND OF THE KEYSTONE COMPANIES, LLC. HUNTING LODGE ROAD, MANSFIELD, CONNECTICUT, SCALE 1"=40' DATE: 08-23-07 SHEET NO: 2 OF 2, TODD S. HESKETH, L.S. 17945
9. PROPERTY SURVEY, WETLANDS AMENDMANT MAPON THE PROPERTY OF PONDE PLACE, LLC, HUNTING LODGE ROAD MANSFIELD CONNECTICUT, SCALE 1"=80', DATED 02-07-05JOB No. 04161, SHEET 1 OF 1, BY F.A. HESKETH & ASSOCIATES.

NOTES:

1. THIS SURVEY HAS BEEN PREPARED PURSUANT TO THE REGULATIONS OF CONNECTICUT STATE AGENCIES SECTIONS 20-300b-1 THROUGH 20-300b-20 AND THE STANDARDS FOR SURVEYS AND MAPS IN THE STATE OF CONNECTICUT AS ADOPTED BY THE CONNECTICUT ASSOCIATION OF LAND SURVEYORS, INC. ON SEPTEMBER 26, 1996.
2. IT IS A PROPERTY SURVEY INTENDED TO BE USED FOR SITE PLANNING PURPOSES.
3. THIS SURVEY FALLS INTO THE RE-SURVEY BOUNDARY DETERMINATION CATEGORY.
4. THIS SURVEY CONFORM TO CLASS A-2 ACCURACY STANDARDS FOR PHOTO CONTROL AND BOUNDARY INFORMATION AND CLASS T-3 TOPOGRAPHIC ACCURACY STANDARDS FOR PLANIMETRIC & TOPOGRAPHIC FEATURES. PHOTO DATE: JANUARY 28, 2005.
5. THE SUBJECT PARCEL IS CURRENTLY OWNED BY PONDE PLACE, LLC, M.L.R. VOL. 753 PG. 405.
6. THE SUBJECT PROPERTY IN LOCATED IN THE RAR-90 MULTI FAMILY ZONE IN THE TOWN OF MANSFIELD.

SEE DIMENSIONAL REQUIREMENTS BELOW.

7. THE BEARINGS AND COORDINATES DEPICTED HEREON ARE BASED UPON NAD 83 DATUM. TOPOGRAPHIC INFORMATION DEPICTED HEREON WAS PROVIDED BY EASTERN TOPOGRAPHICS FROM A PHOTO DATED NOVEMBER 23, 2003 AND IS BASED UPON NGVD29 DATUM.
8. UNDERGROUND FEATURES (IF ANY) HAVE BEEN COMPILED FROM RECORD MAPS AND OTHER SOURCES. THESE LOCATIONS MUST BE CONSIDERED AS APPROXIMATE IN NATURE. ADDITIONALLY, OTHER SUCH FEATURES MAY EXIST ON THE SITE. THE SIZE, LOCATION AND EXISTENCE OF ALL SUCH FEATURES MUST BE FIELD DETERMINED AND VERIFIED BY THE APPROPRIATE AUTHORITIES PRIOR TO CONSTRUCTION. CALL BEFORE YOU DIG 1-800-922-4455.
9. THE SUBJECT PARCEL IS IN FLOOD ZONE 'C', "AREAS OF MINIMAL FLOODING" BASED UPON A VISUAL INSPECTION OF MAP REFERENCE #7.
10. WETLAND FLAGS DEPICTED HEREON WERE SET IN THE FIELD BY A CERTIFIED SOIL SCIENTIST AND LOCATED IN THE FIELD UNDER DIRECT SUPERVISION OF THE UNDERSIGNED LAND SURVEYOR.

LEGEND
(SYMBOLS NOT TO SCALE)

= CATCH BASIN
= SANITARY MANHOLE
= DRAINAGE MANHOLE
= WATER MANHOLE
= TELEPHONE MANHOLE
= ELECTRIC MANHOLE
= UNKNOWN MANHOLE
= YARD DRAIN
= CABLE MANHOLE
= FLARED END SECTION
= FIRE HYDRANT
= WATER GATE VALVE
= GAS GATE VALVE
= MISC. GATE VALVE
= VENT PIPE
= FILLCAP
= WELL
= MAIL BOX
= HAND HOLE
= CONTROLLER CABINET
= ELECTRIC TRANSFORMER
= UTILITY POLE
= GUY WIRE
= CROSSWALK POLE
= LIGHT POLE
= POST
= TRAFFIC LIGHT SUPPORT POLE
= STREET SIGN
= TREE (TYP.)
= MONITOR WELL
= BORING
= ELECTRIC METER
= GAS METER
= WATER METER
= TELEPHONE
= AC UNIT
= TREE LINE
= STONE WALL
= GUIDE RAIL
= DIRECTION OF FLOW
= I.P. PROPERTY CORNER
= MONUMENT
= DRILL HOLE
= SURVEY CONTROL POINT
= FENCE LINE
= WATER LINE
= GAS LINE
= ELECTRIC LINE
= CABLE TELEVISION LINE
= OVERHEAD WIRES
= POINT OF BEGINNING
= NORTHING
= EASTING
= NOW OR FORMERLY
= MANSFIELD LAND RECORDS
= DELTA ANGLE
= RADIUS
= TANGENT
= LENGTH
= CHORD
= CHORD BEARING
= FRONT YARD
= SIDE YARD
= REAR YARD
= CONTROL POINT
= WETLAND FLAG #
= VERNAL POOL #
= UNITED STATES ARMY CORPS OF ENGINEERS TRANSECT POINT #

DIMENSIONAL REQUIREMENTS MANSFIELD, CT

ZONE	MINIMUM REQUIRED LOT AREA (AC.)	MINIMUM LOT FRONTAGE (FT)	MINIMUM SETBACK FROM (FT.) FRONT	SIDE	REAR	MAX. BUILDING HEIGHT (FT)	MAX. GROUND FLOOR BUILDING AND COVERAGE
RAR-90	5.0	200	60	35	50	35	NONE

F. A. Hesketh & Associates, Inc.
6 Creamery Brook, East Granby, CT 06026
Civil & Traffic Engineers • Surveyors • Planners • Landscape Architects
Phone (860) 653-8000
Fax (860) 844-8600
e-mail mail@fahesketh.com

No.	Date	Revisions: Description
1	06-27-07	MISC
2	10-27-15	WETLANDS / TITLE UPDATED
3	03-18-16	SUBMITTAL / TITLE

PROPERTY SURVEY
PREPARED FOR
STORRS LODGES, LLC.
HUNTING LODGE ROAD
MANSFIELD, CONNECTICUT

Date: 02-07-05 | Drawn by: RM | Job no: 04161
Scale: 1" = 80' | Checked by: TSH | Sheet no: 1 OF 1

PS-1

TO MY KNOWLEDGE AND BELIEF THIS MAP IS SUBSTANTIALLY CORRECT AS NOTED HEREON.

THIS MAP IS NOT VALID WITHOUT THE LIVE SIGNATURE AND IMPRESSION TYPE SEAL OF THE LAND SURVEYOR, WHOSE SIGNATURE APPEARS HEREON.

PROGRESS 11-24-2015
TODD S. HESKETH LS 17945

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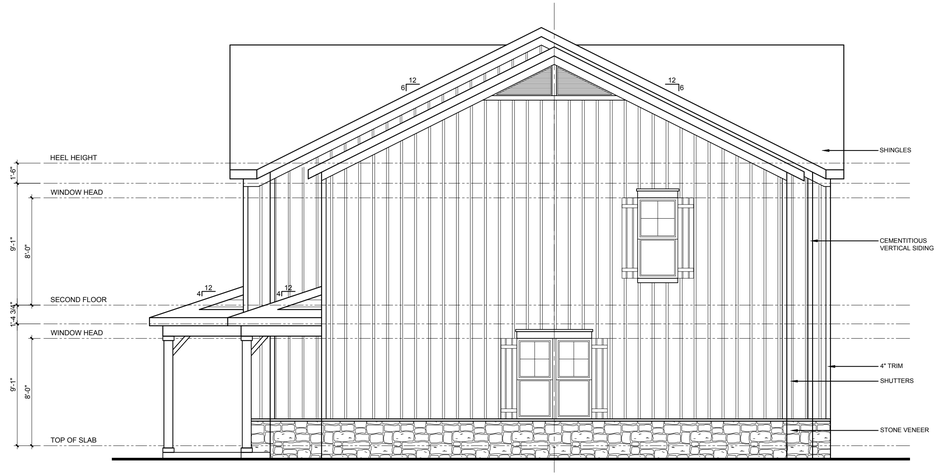
FRONT ELEVATION | SCALE: 3/16"=1'-0" | 1

REAR ELEVATION @ HIGH VIS. | SCALE: 3/16"=1'-0" | 2



SIDE ELEVATION @ HIGH VIS. | SCALE: 3/16"=1'-0" | 3

ARCHITECTURE+PLANNING

CLIENT:
EdR
COLLEGIATE HOUSING

CONSULTANT:
Consultant Name
Address 1
Address 2
P: ###.###.####
Website

SEAL

STORRS LODGE BUILDING A

CLIENT: EdR

REV	DATE	DESCRIPTION
		PRELIMINARY

DESIGN DELIVERABLE: _

ISSUE DATE:

PROJECT NUMBER: **20140673.00**

DRAWN BY: --

CHECKED BY: --

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SHEET TITLE:
FRONT AND REAR ELEVATIONS

SHEET NUMBER:
A-200

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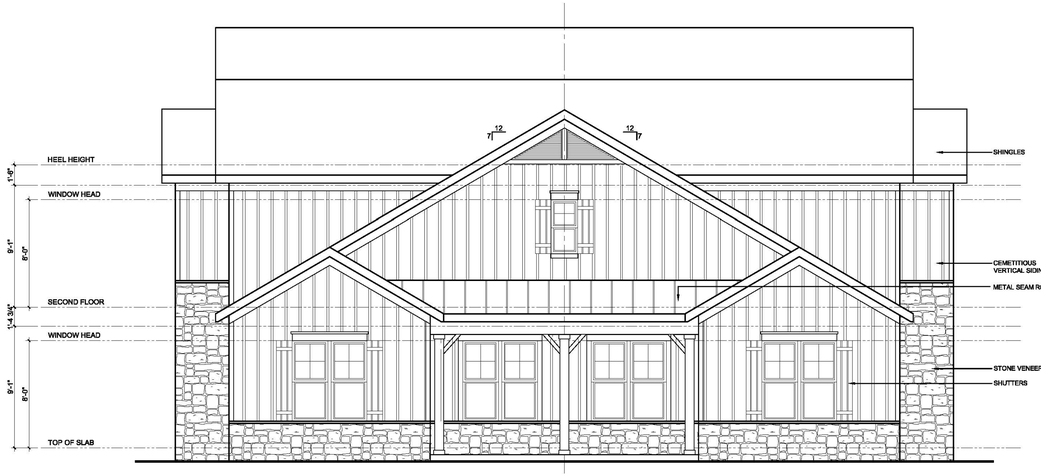
ELEVATION 3 | SCALE: 3/16"=1'-0" | 3

ELEVATION 2 | SCALE: 3/16"=1'-0" | 2



ELEVATION 1 | SCALE: 3/16"=1'-0" | 1

ktgy ARCHITECTURE+PLANNING

CLIENT:

EdR

COLLEGIATE HOUSING

CONSULTANT:

Consultant Name
Address 1
Address 2
P: ###.###.####
Website

SCALE

STORRS LODGE BUILDING B

CLIENT: EdR

REV	DATE	DESCRIPTION
1	02/26/2016	PRELIMINARY

DESIGN DELIVERABLE: _

ISSUE DATE:

PROJECT NUMBER: **20140673.00**

DRAWN BY: --

CHECKED BY: --

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SHEET TITLE:

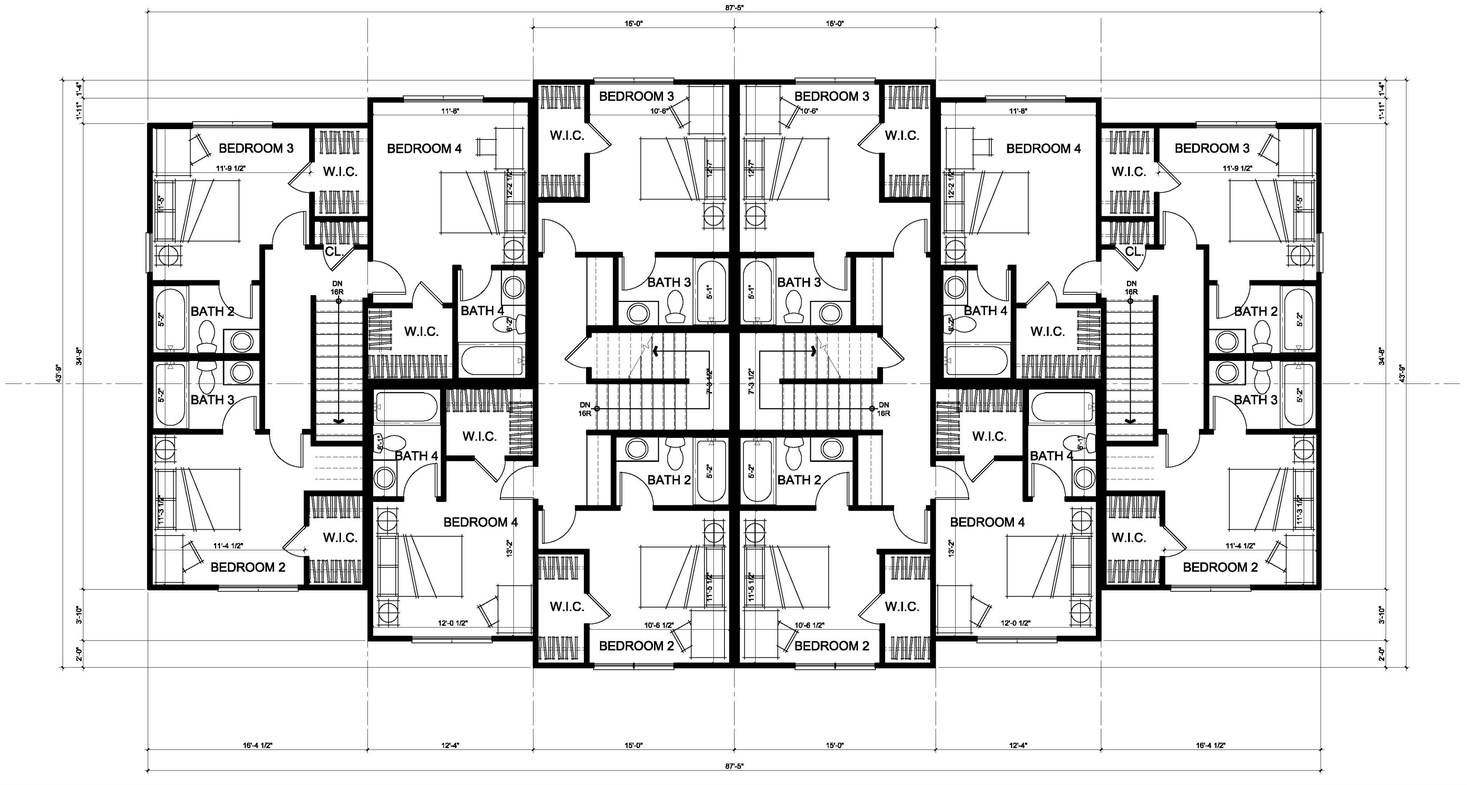
ELEVATIONS

SHEET NUMBER:

A-200

T:\Pre 2016\Single Family\EdR\20140673_Storrs Lodge\00_Building B\PDF\2016.03.14 SINGLE SHEET LAYOUT\Building B Elevations.dwg 3/14/2016 12:08:40 PM

LOWER LEVEL PLAN | SCALE: 1/4"=1'-0" | 1



UPPER LEVEL PLAN | SCALE: 1/4"=1'-0" | 2

T:\Pre 2016\Single Family\EdR\20140673_Storrs Lodge\00_Building A\Pdf\2016.03.14 - SINGLE SHEET\Building A Plans.dwg 3/14/2016 11:58:32 AM

ARCHITECTURE+PLANNING

CLIENT:
EdR
COLLEGIATE HOUSING

CONSULTANT:
Consultant Name
Address 1
Address 2
P: ###.###.####
Website

SEAL

STORRS LODGE BUILDING A

CLIENT: EdR

REV	DATE	PRELIMINARY DESCRIPTION

DESIGN DELIVERABLE: _
ISSUE DATE:

PROJECT NUMBER: **20140673.00**
DRAWN BY: --
CHECKED BY: --

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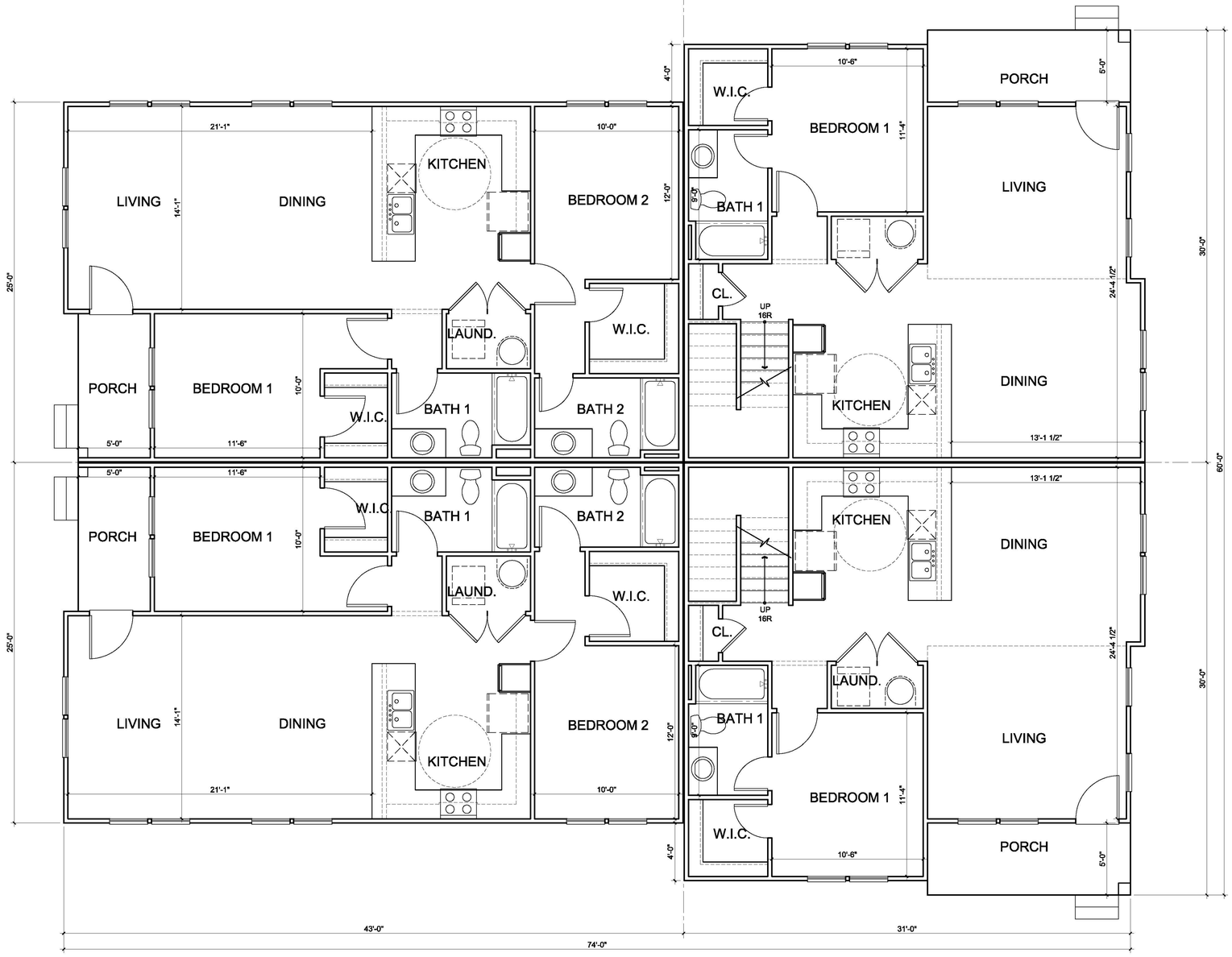
SHEET TITLE:
LOWER LEVEL PLAN

SHEET NUMBER:
A-100



ARCHITECTURE+PLANNING

CLIENT:
EdR
COLLEGIATE HOUSING

CONSULTANT:
Consultant Name
Address 1
Address 2
P: ###.###.####
Website

SEAL

STORRS LODGE BUILDING B

CLIENT: EdR

REV	DATE	DESCRIPTION
1	02/26/2016	PRELIMINARY

DESIGN DELIVERABLE: _
ISSUE DATE:

PROJECT NUMBER: **20140673.00**
DRAWN BY: --
CHECKED BY: --

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SHEET TITLE:
LOWER LEVEL PLAN

SHEET NUMBER:
A-100

LOWER LEVEL PLAN | SCALE: 1/4"=1'-0" | 1

I:\Single Family\EdR\20140673_Storrs Lodge\00_Building B\Design\Building B Plans.dwg 2/26/2016 4:48:27 PM

ENGINEERING DESIGN
AND
DRAINAGE REPORT

THE LODGES AT STORRS
MANSFIELD, CT

Prepared for:

Storrs Lodges, CT
Mansfield, CT
Applicant

Prepared by:

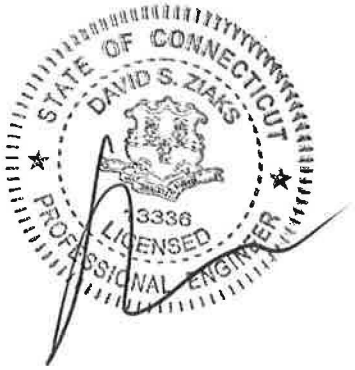
F. A. Hesketh
& Associates, Inc.

6 Creamery Brook
East Granby, CT 06026

860-653-8000

March 18, 2016

FAHA Project #04161



ENGINEERING DESIGN
AND
DRAINAGE REPORT

Prepared For

STORRS LODGES, LLC
MANSFIELD, CT

March 18, 2016

A. INTRODUCTION

The project site consists of a 45.93-acre parcel of land located on the west side of Hunting Lodge Road, as shown on the attached Property Survey, Sheet PS-1. The developer is proposing to develop the property under the zoning requirements for a DMR-Design Multiple Residence. The property is currently zoned RAR-90.

An application will be been made to the Town of Mansfield for an Inland Wetlands Permit, Zone Change and Special Use-Site Plan approvals for a proposed multi-family development to consist of 218 residential rental units for UCONN students. Under the current proposed Development Plan, the property will be developed with a mix of 47 two-story apartment buildings and a community center building with outdoor recreation area, as shown on the attached Master Plan, Sheet MA-1.

B. WATER SUPPLY

The project will be serviced by extension of the existing UCONN/CT Water public water supply system located in Northwood Road and Hunting Lodge Road through conventional service connections to the property. Fire hydrants will be provided throughout the development at the locations specified by the Mansfield Fire Marshal and water company personnel. All work and materials will conform to utility company standard water service specifications.

C. SANITARY SEWAGE DISPOSAL

The project will be serviced by extension of the existing UCONN sanitary sewer system located in Northwood Road through conventional service connections to the property. The applicant is currently reviewing with UCONN utility personnel the scope of public improvements required to the existing sanitary pumping station located to the south near Eagleville Road in order to properly accommodate the additional wastewater generated by the project. Wastewater generated from the Northwood Road residential area is pumped up Eagleville Road via a force main towards the UCONN campus to the

university's wastewater treatment plant for disposal. All work and materials will conform to UCONN sanitary sewer design specifications.

D. ELECTRIC, TELEPHONE and OTHER UTILITY SERVICES

The site will be serviced by underground connections to the public electrical and communication utility companies using standard service extensions to the existing systems located in Northwood Road and Hunting Lodge Road. All work and materials will conform to the applicable utility company specifications. The applicant is also in discussions with the gas company on the feasibility of providing gas service to the site.

E. ON-SITE STORM DRAINAGE DESIGN

The storm sewer collection system proposed for the project is comprised for the most part of a conventional catch basin and pipe system connected to underground infiltration systems and bio-retention treatment basins and swales at each of the outlets. The system design is based on a 10-year design storm using the Rational Method. All materials and equipment will follow Town of Mansfield and ConnDOT design specifications for small drainage collection systems.

The design goals for the on-site storm sewer system are as follows:

- Provide a system that has the hydraulic capacity for the 10-year design storm
- Create multiple discharge points around the Project Site to replicate existing runoff patterns to receiving wetlands and watercourses and the on-site vernal pool
- Create a Treatment Train that will provide a minimum of 80% TSS removal
- Provide for the necessary Water Quality Volume (WQV) and Groundwater Recharge Volume (GRV)
- Implement BMP and LID design techniques
- Provide outlet protection to minimize erosion issues and provide final treatment of runoff before discharge downstream

The overall Stormwater Management Plan for the project includes the implementation of Best Management Practices (BMP's) with Low Impact Design (LID) techniques to produce a Treatment Train to treat runoff consistent with the guidelines recommended by CTDEEP, as follows:

- Implementation of a comprehensive routine site cleaning and maintenance program
- Use of permeable paver units in selected overflow parking space areas
- Pre-cast catch basins with 4-foot precast sumps and hooded outlets
- Use of a combination of underground infiltration systems, bio-retention basins and in-line hydrodynamic separator structures prior to outlet discharge for primary treatment, along with the use of permeable pavers, flared end sections, and level spreaders for secondary treatment to meet the design goals of 80% TSS removals, Water Quality Volume (WQV) and Groundwater Recharge Volume (GRV)
- Discharge of roof leaders to multiple splash blocks around the buildings and connection to the underground infiltrator systems to the extent possible to promote infiltration

F. MACRO WATERSHED ANALYSIS

In accordance with Town Engineering Requirements, a comprehensive drainage and watershed analysis was completed. The computer printout for the macro analysis for the proposed Stormwater Management Plan is included in Appendix A. The hydrologic analysis and stormwater routing for the project site was completed using the software package Hydraflow by Intelisove utilizing the 2 thru 100-year storm events.

The purpose of the macro study was to determine the effect of stormwater runoff generated by the development on downstream watersheds and the need to incorporate detention and/or retention facilities in the various on-site sub-watersheds. The roughly 98-acre± Study Area falls partially within the watershed for Eagleville Brook and partially within the watershed for Cedar Swamp Brook. Eagleville Brook has a total watershed of approximately 2.4 sq. miles and Cedar Swamp Brook has a much larger watershed. Both brooks are tributary to the Willimantic River.

The limits of the Study Area under existing and proposed conditions are shown on the attached Watershed Maps (WS-1 and WS-2), Scale 1"=100'. In addition to the Project Site, the Study Area includes portions of neighboring parcels that discharge runoff to the site including a small watercourse tributary to Eagleville Brook that enters the northeasterly portion of the site and flows through the property to the south where is continues to an existing 24" drainage culvert under Eagleville Road to Eagleville Brook.

Eagleville Brook is listed as an impaired watercourse by CTDEEP. Both Eagleville Brook and Cedar Swamp Brook are rated as B/A or B/AA water quality, meaning that

the natural water quality is or may be threatened. Concerns with Eagleville Brook from both water quality and hydrological perspectives are well documented in several published studies, some of which remain ongoing. In addition, neighbors to the south of the project site down to Eagleville Road have expressed concerns with the effects of possible increases in flow caused by the development that could further exacerbate existing localized drainage issues they currently experience on their properties.

In order to assess the potential impacts to the downstream watersheds, the Study Area was divided into several subwatershed areas for both existing and proposed conditions. Each subwatershed area was analyzed separately and then combined to determine peak design flow at Design Points "X", "Y' and "Z". Under Existing Conditions, the Study Area (see Sheet WS-1) was broken up into nine (9) sub-watershed areas (A thru I) comprised of the Project Site (except for the westerly most portion of the property outside the development area), the portion of Carriage House Apartments to the north and residential properties to the east of Hunting Lodge Road that drain to the Project Site, and portions of the residential properties south of the Project Site down to Eagleville Road.

Under Proposed Conditions, the Study Area (see Sheet WS-2) is broken up similar to the Existing Conditions model. The Project Site is further broken up into 24 sub-watersheds that follow the drainage patterns created by the grading and drainage system layout in the proposed development.

Design Point "X" is located at the southerly side of the existing culverts under Eagleville Road. Design Point "Y" is located at the westerly portion of the site and indicates runoff to the Cedar Swamp Watershed. Design Point "Z" is located along the southerly property line of the Project Site at the point where the watercourse intersects the property line.

No credit was taken in the macro model calculations for infiltration or other LID design techniques that are included in the proposed site drainage system design. To be conservative, the drainage model treats all pavement types as impervious. The actual peak rates of runoff generated for all storm events will therefore be actually less than projected in the macro model results.

The goals of the Stormwater Management Plan are as follows:

- Implement treatment systems to meet CTDEEP Water Quality standards

- Match or reduce peak flow rates for all design storm events to the Eagleville Brook Watershed analyzed at Design Points "X" and "Z"
- Minimize any increase in peak flow rates for all design storm events to the Cedar Swamp Watershed to a negligible amount

Results and Conclusion

Initial modeling efforts indicated that substantial detention/retention capacity was needed for the drainage systems discharging to both watersheds in order to meet the goals of the design. Starting with Design Point "Y" the results of the macro hydraulic computer modeling indicate that the peak flow rates from the Project Site for the 2 thru 100-year storm events will be essentially maintained to the Cedar Swamp Brook Watershed. If you factor in the positive effects of the proposed infiltration system, natural storage of the downstream wetland corridor and the large heavily wooded upland along the entire westerly side of the site, peak flow rates, particularly for the more frequent storm events, will be considerably reduced under Proposed Conditions.

At the downstream Design Point "X" at Eagleville Road, there is very little change to peak flow rates and essentially no change to inlet elevations at the town owned culverts under the road. Therefore, there will be no measurable impact to the downstream Eagleville Brook watershed or the existing town drainage system.

At Design Point "Z", the model indicates there will be a measurable reduction in peak flow rates leaving the property for all storm events. Again, when you factor in effects of the infiltration system and other LID techniques incorporated into the analysis, there will a considerable reduction in peak flow leaving the site at the southerly property line under Proposed Conditions.

In conclusion, the model results indicate that all goals of the Stormwater Management Plan have been accomplished with the proposed design.

Water Quality Volume (WQV), Groundwater Recharge Volume (GRV), Treatment Train Analysis

The calculations provide a summary of the Water Quality Volume (WQV) calculations completed and indicates that more than sufficient capacity is provided through the combination of volumes in the infiltration systems and bio-retention basins.

With regards to Groundwater Recharge Volume (GRV), the underlying soil conditions in the development areas on the property fall generally as Group B soils meaning that they are conducive to groundwater infiltration techniques. The calculations provide a summary of the GRV calculations completed and indicate that more than sufficient capacity is provided through the combination of volumes in the infiltration systems.

Treatment Train Efficiency Calculations for the portion of the new drainage system discharging to the basins are attached. The TSS removal rate was determined to exceed the CTDEEP minimum requirement of 80%.

G. DRIVEWAY DESIGN AND WETLAND CROSSINGS

In order to minimize impervious coverage, proposed driveway widths are limited to 24 feet. On the main driveway from Hunting Lodge Road, the applicant is proposing to use a pre-cast concrete arch bridge with block retaining walls on both sides to minimize the footprint of the embankment and span the wetland corridor, as illustrated on Sheet SDD-1. The proposed site driveway is located over what appears to be the remains of a gravel driveway that once served the property. There is a natural breech in the existing filled embankment that allows the watercourse to pass through. This does create some ponding upstream of the crossing that the project wetlands consultant has recommended not be altered. The proposed crossing design eliminates any disturbance to the existing watercourse and minimizes the need to fill the adjoining wetland areas.

H. SOIL EROSION CONTROL PLAN

A soil and erosion control plan has been prepared in accordance with town and ConnDEP requirements. Prior to the start of site construction, the limits of clearing will be carefully staked out in the field and reviewed with town staff. Silt fencing will be installed around the entire perimeter of the site. Once the site clearing has been completed, rough grading of the site and installation of site improvements can commence.

The project contract specifications will require the contractor to prepare sub-phasing plans as the work progresses incorporating interim erosion control measures at every step. These plans will be submitted to the project engineer and construction manager for review and concurrence throughout the duration of site construction.

I. FEMA FLOOD ANALYSIS

According to the current FEMA FIRM for Eagleville Brook, no portion of the property falls within the Zone A (100-year BFE storm) limits.

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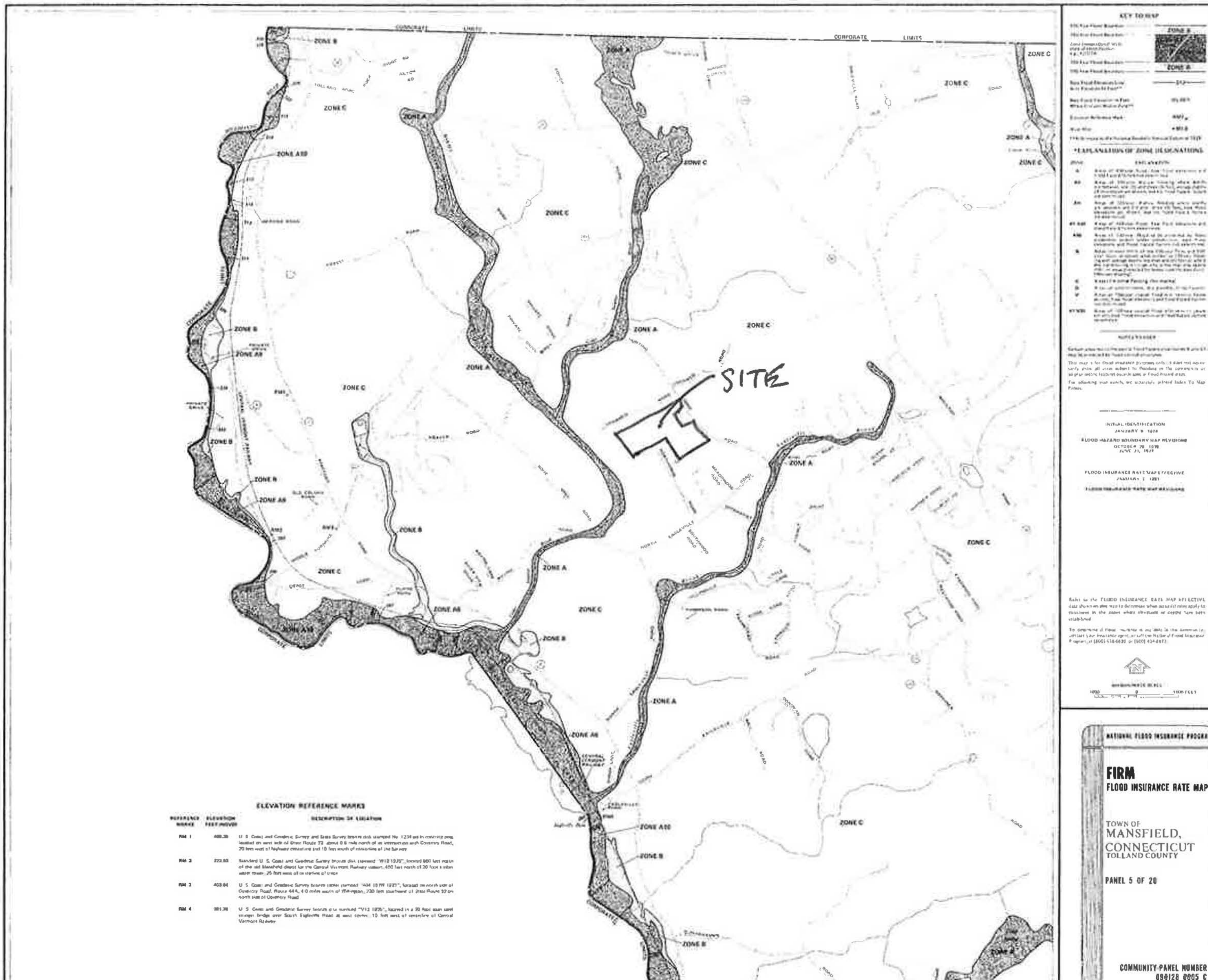
ELEVATION REFERENCE MARKS
SITE
ZONE A
ZONE B
ZONE C
ZONE A8
ZONE A9
ZONE A10
CORPORATE LIMITS
KEY TO MAP
EXPLANATION OF ZONE DESIGNATIONS
NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
TOWN OF
MANSFIELD,
CONNECTICUT
TOLLAND COUNTY
PANEL 5 OF 20
COMMUNITY-PANEL NUMBER
090128 0005 C
EFFECTIVE DATE:
JANUARY 2, 1981
federal emergency management agency
federal insurance administration

MAP REFERENCES:

1. PLAN OF LAND G AND E MAGURA CONVEYED TO TOWN OF MANSFIELD AS A TOWN ROAD DATED SEPT 1955 SCALE 1"=40' REVISED NOV 1956 BY EARL R. MOORE, SURVEYOR
2. MAP OF SOME LAND OF GEORGE MAGURA, JR & EMMA J. MAGURA TOWN OF MANSFIELD, CONNECTICUT SCALE 1"=100' DATED MAY 24, 1969 BY EVERETT O GARDNER
3. PROPOSED LAND CONVEYANCES BETWEEN FRANK ZEMI & J. WILLIAM TRANTUM MANSFIELD CONN SCALE 1"=50' DATED OCT 1969 BY ROBERT J. SCHNEIDER
4. PART OF LAND OF GEORGE & EMMA MAGURA MANSFIELD CONN SCALE 1"=40' DATED APRIL 7, 63
5. PLAN OF MEADOWOOD ROAD STORRS CONN SCALE 1"=80' DATED JUNE 1955
6. CORRECTED MAP OF CARRIAGE HOUSE APARTMENTS MANSFIELD, CONNECTICUT SCALE 1"=40' OWNED BY SIMON KONOVER, NORMAN S. SHAPIRO AND MARVIN M. PATRON, W. HARTFORD CONNECTICUT DATED AUG. 12, 1968 BY EVERETT O GARDNER
7. FIRM FLOOD INSURANCE RATE MAP, TOWN OF MANSFIELD, CONNECTICUT HARTFORD COUNTY PANEL 5 OF 20 COMMUNITY PANEL NUMBER 090128 0005 C EFFECTIVE DATE JANUARY 2, 1981.
8. EASEMENT MAP, EASEMENT TO BE ACQUIRED BY THE TOWN OF MANSFIELD GIVEN LAND OF THE KEYSTONE COMPANIES, LLC HUNTING LODGE ROAD, MANSFIELD, CONNECTICUT, SCALE 1"=40' DATE: 08-23-07 SHEET NO: 2 OF 2, TODD S. HESKETH, L.S. 17945
9. PROPERTY SURVEY, WETLANDS AMENDMENT MAPOH THE PROPERTY OF PONDE PLACE, LLC, HUNTING LODGE ROAD MANSFIELD CONNECTICUT, SCALE 1"=80', DATED 02-07-05,08 No. 04161, SHEET 1 OF 1, BY F.A. HESKETH & ASSOCIATES.

NOTES:

1. THIS SURVEY HAS BEEN PREPARED PURSUANT TO THE REGULATIONS OF CONNECTICUT STATE AGENCIES SECTIONS 20-300b-1 THROUGH 20-300b-20 AND THE STANDARDS FOR SURVEYS AND MAPS IN THE STATE OF CONNECTICUT AS ADOPTED BY THE CONNECTICUT ASSOCIATION OF LAND SURVEYORS, INC. ON SEPTEMBER 26, 1998.
2. IT IS A PROPERTY SURVEY INTENDED TO BE USED FOR SITE PLANNING PURPOSES.
3. THIS SURVEY FALLS INTO THE RE-SURVEY BOUNDARY DETERMINATION CATEGORY.
4. THIS SURVEY CONFORM TO CLASS A-2 ACCURACY STANDARDS FOR PHOTO CONTROL AND BOUNDARY INFORMATION AND CLASS T-3 TOPOGRAPHIC ACCURACY STANDARDS FOR PLANIMETRIC & TOPOGRAPHIC FEATURES. PHOTO DATE: JANUARY 28, 2005.
5. THE SUBJECT PARCEL IS CURRENTLY OWNED BY PONDE PLACE, LLC, M.L.R. VOL. 753 PG. 405.
6. THE SUBJECT PROPERTY IN LOCATED IN THE RAR-90 MULTI FAMILY ZONE IN THE TOWN OF MANSFIELD.

SEE DIMENSIONAL REQUIREMENTS BELOW.

7. THE BEARINGS AND COORDINATES DEPICTED HEREON ARE BASED UPON NAD 83 DATUM. TOPOGRAPHIC INFORMATION DEPICTED HEREON WAS PROVIDED BY EASTERN TOPOGRAPHICS FROM A PHOTO DATED NOVEMBER 23, 2003 AND IS BASED UPON NGVD29 DATUM.
8. UNDERGROUND FEATURES (IF ANY) HAVE BEEN COMPILED FROM RECORD MAPS AND OTHER SOURCES. THESE LOCATIONS MUST BE CONSIDERED AS APPROXIMATE IN NATURE. ADDITIONALLY, OTHER SUCH FEATURES MAY EXIST ON THE SITE. THE SIZE, LOCATION AND EXISTENCE OF ALL SUCH FEATURES MUST BE FIELD DETERMINED AND VERIFIED BY THE APPROPRIATE AUTHORITIES PRIOR TO CONSTRUCTION. CALL BEFORE YOU DIG 1-800-922-4455.
9. THE SUBJECT PARCEL IS IN FLOOD ZONE 'C', "AREAS OF MINIMAL FLOODING" BASED UPON A VISUAL INSPECTION OF MAP REFERENCE #7.
10. WETLAND FLAGS DEPICTED HEREON WERE SET IN THE FIELD BY A CERTIFIED SOIL SCIENTIST AND LOCATED IN THE FIELD UNDER DIRECT SUPERVISION OF THE UNDERSIGNED LAND SURVEYOR.

LEGEND
(SYMBOLS NOT TO SCALE)

- CB = CATCH BASIN
- SMH = SANITARY MANHOLE
- DMH = DRAINAGE MANHOLE
- WMH = WATER MANHOLE
- TMH = TELEPHONE MANHOLE
- EMH = ELECTRIC MANHOLE
- UMH = UNKNOWN MANHOLE
- YD = YARD DRAIN
- CMH = CABLE MANHOLE
- FES = FLARED END SECTION
- FH = FIRE HYDRANT
- WGV = WATER GATE VALVE
- GV = GAS GATE VALVE
- MGV = MISC. GATE VALVE
- VP = VENT PIPE
- FILLCAP = FILLCAP
- W = WELL
- MB = MAIL BOX
- HH = HAND HOLE
- CC = CONTROLLER CABINET
- ETS = ELECTRIC TRANSFORMER
- UP = UTILITY POLE
- GW = GUY WIRE
- CWP = CROSSWALK POLE
- LP = LIGHT POLE
- P = POST
- TLSP = TRAFFIC LIGHT SUPPORT POLE
- SIGN = STREET SIGN
- TREE = TREE (TYP.)
- MW = MONITOR WELL
- B = BORING
- EM = ELECTRIC METER
- GM = GAS METER
- WM = WATER METER
- TEL = TELEPHONE
- AC = AC UNIT
- TL = TREE LINE
- SW = STONE WALL
- GR = GUIDE RAIL
- FLOW = DIRECTION OF FLOW
- I.P. = I.P. PROPERTY CORNER
- MON = MONUMENT
- DH = DRILL HOLE
- SCP = SURVEY CONTROL POINT
- X — X = FENCE LINE
- W = WATER LINE
- G = GAS LINE
- E = ELECTRIC LINE
- CATV = CABLE TELEVISION LINE
- OHW = OVERHEAD WIRES
- P.O.B. = POINT OF BEGINNING
- N = NORTHING
- E = EASTING
- N/F = NOW OR FORMERLY
- M.L.R. = MANSFIELD LAND RECORDS
- Δ = DELTA ANGLE
- R = RADIUS
- T = TANGENT
- L = LENGTH
- C = CHORD
- CB = CHORD BEARING
- F.Y. = FRONT YARD
- S.Y. = SIDE YARD
- R.Y. = REAR YARD
- C.P. = CONTROL POINT
- WLF 40-42 = WETLAND FLAG #
- VP-1-20 = VERNAL POOL #
- USACE W-1 = UNITED STATES ARMY CORPS OF ENGINEERS TRANSECT POINT #

DIMENSIONAL REQUIREMENTS MANSFIELD, CT

ZONE	MINIMUM REQUIRED LOT AREA (AC.)	MINIMUM LOT FRONTAGE (FT)	MINIMUM SETBACK FROM (FT.) FRONT	SIDE	REAR	MAX. BUILDING HEIGHT (FT)	MAX. GROUND FLOOR BUILDING AND COVERAGE
RAR-90	5.0	200	60	35	50	35	NONE

F. A. Hesketh & Associates, Inc.
6 Creamery Brook, East Granby, CT 06026
Civil & Traffic Engineers · Surveyors · Planners · Landscape Architects
Phone (860) 653-8000
Fax (860) 844-8600
e-mail mail@fahesketh.com

Revisions:

No.	Date	Description
1	06-27-07	MISC
2	10-27-15	WETLANDS / TITLE UPDATED
3	03-18-16	SUBMITTAL / TITLE

PROPERTY SURVEY
PREPARED FOR
STORRS LODGES, LLC.
HUNTING LODGE ROAD
MANSFIELD, CONNECTICUT

Date: 02-07-05 | Drawn by: RM | Job no: 04161
Scale: 1" = 80' | Checked by: TSH | Sheet no.1 OF 1

PS-1

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THE LODGES AT STORRS

F. A. Hesketh & Associates, Inc.
6 Creamery Brook, East Granby, CT 06026
Civil & Traffic Engineers • Surveyors • Planners • Landscape Architects
Phone (860) 653-8000
Fax (860) 844-8000
e-mail info@fahesketh.com

Zoning Data

Existing Zone: Rural Agricultural Residence 90 Zone (RAR 90)

Proposed Design Development District: Design Multiple Residence (DMR)

Density Requirement (Article 10 A.6.b):

Required: 5,000 square feet per Dwelling Unit
218 Dwelling Units x 5,000 square feet = 1,090,000 square feet

Provided: Total Lot Area = 2,000,645 square feet (45.93 acres)
Area of Wetlands = 291,172 square feet
Area of slopes over 15% = 137,100 ± square feet

Net Lot Area = 1,572,268 square feet (36.09 acres)

Minimum Lot Frontage (Article 8):

Required: 300 feet minimum

Provided: Hunting Lodge Road = 341.54 feet (77.50' + 264.04)
Northwood Road = 400.05 feet

Minimum Setback from Front Lot Line (Article 8):

Required: 50 feet minimum

Provided: 57 ± feet - Hunting Lodge Road
51 ± feet - Northwood Road

Minimum Setback from Side Lot Line (Article 8):

Required: 50 feet minimum

Provided: 51± feet

Minimum Setback from Rear Lot Line (Article 8):

Required: 50 feet minimum

Provided: 51± feet

Maximum Building Height (Article 10 A.6.d):

Required: 40 feet maximum

Proposed: 32 ± feet (see Architectural Plans)

Off-Street Parking (Article 10 D.5.a):

Required: .8 per Bedroom
692 Bedrooms x .8 spaces per bedroom = 554 required parking spaces

Proposed: 558 spaces

Minimum Distance Between Structures (Article 10 A.6.f):

Required: 20 feet minimum

Proposed: 22± feet

Minimum Floor Area (Article 10 A.6.e):

Required: 475 square feet for first three rooms
125 square feet for each additional room

Proposed: Each unit = 800± square feet

Minimum Open Space / Recreational Facilities (Article 10 A.6.h):

Required: 600 square feet per Dwelling Unit
218 Dwelling Units x 600 square feet per unit = 130,800 square feet

Proposed: 175,000 ± square feet Passive/Active Recreation Area

Maximum Building Ground Coverage (Article 8)

Required: 25 percent

Proposed 174,690 Sq. Ft. or 8.8 percent

Building/Unit Data

Building Type "A" (32 Total)

128 Units
512 Bedrooms

Building Type "B" (15 Total)

90 Units
180 Bedrooms

Total

Buildings = 47
Units = 218
Bedrooms = 692

Building/Unit Parking Tabulation

Required: 554 spaces

Proposed: 24 Handicap Accessible spaces
124 Permeable Paver spaces
410 Standard spaces

558 Total spaces

Neighborhood Community Center Parking Tabulation

Proposed: 1 Handicap Accessible space
9 Permeable Paver Turf spaces
6 Standard spaces

16 Total spaces

Building "A"

See Architectural Plans for Specifics

3,280 ± Square Foot Footprint (including porches)
4 Units
16 Bedrooms

Building "B"

See Architectural Plans for Specifics

3,982 ± Square Foot Footprint (including porches)
4 Units
12 Bedrooms

VERNAL POOL

Neighborhood Community Center
10,000 ± Sq. Ft.

Outdoor Recreation Area

ENCLOSED DUMPSTER AREA (TYP.)

CONNECT TO EXISTING PUBLIC WALKWAY

8 FOOT CONCRETE SIDEWALK (TYP.)

SHADED SPACES INDICATE PERMEABLE PAVER PARKING SPACES (TYP.)

WETLANDS LIMIT (TYP.)

NORTHWOOD ROAD (A TOWN ROAD)

MEADOWOOD ROAD

GRAPHIC SCALE
(IN FEET)
1 inch = 80 ft.

No.	Date	Description

Revisions:

MASTER PLAN
PREPARED FOR
STORRS LODGES, LLC
HUNTING LODGE ROAD
MANSFIELD, CONNECTICUT

Date: 03-18-2016 | Drawn by: KLL | Job no: 04161
Scale: 1" = 80' | Checked by: DSZ | Sheet no: 1 OF 1

MA-1

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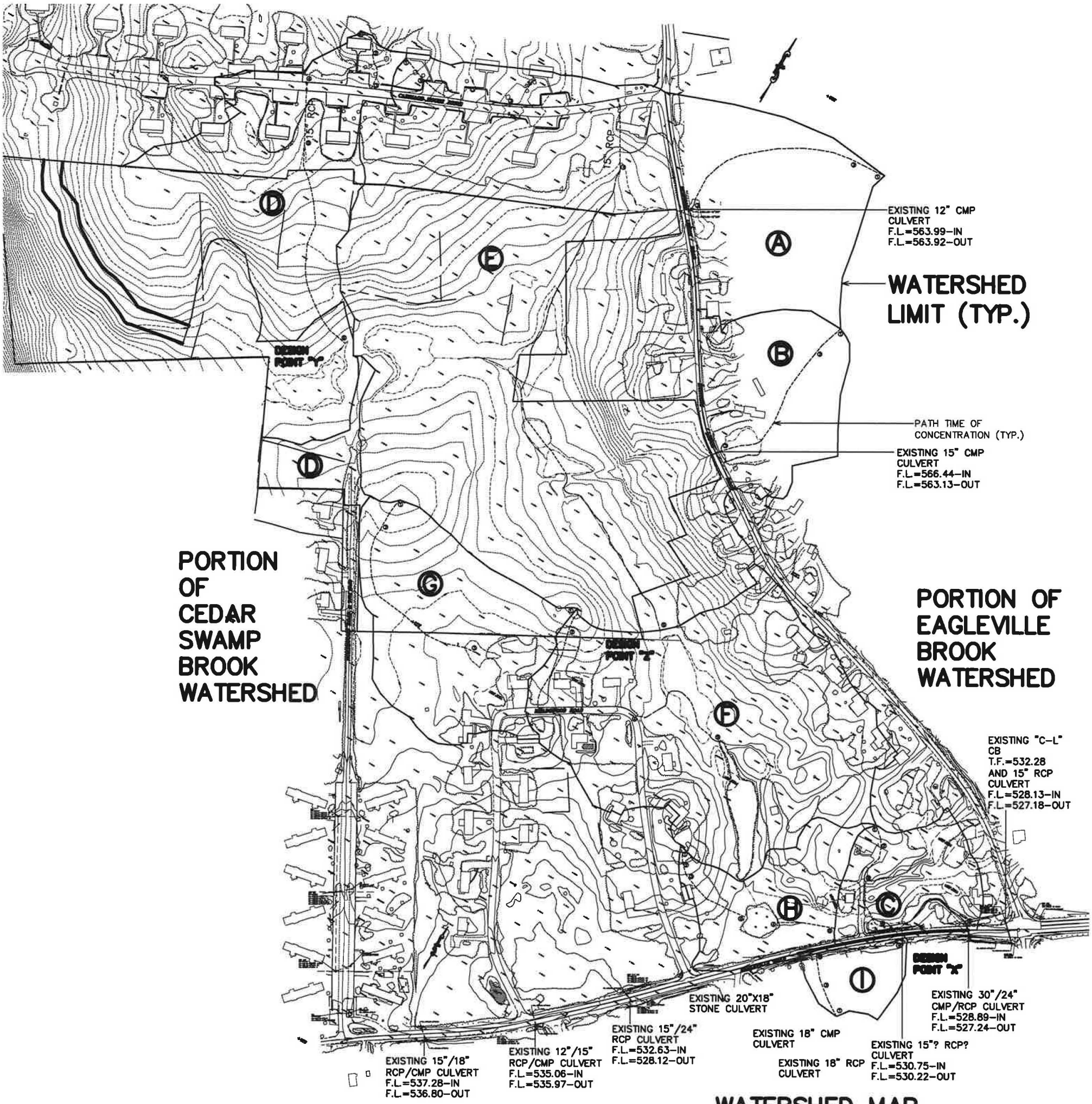
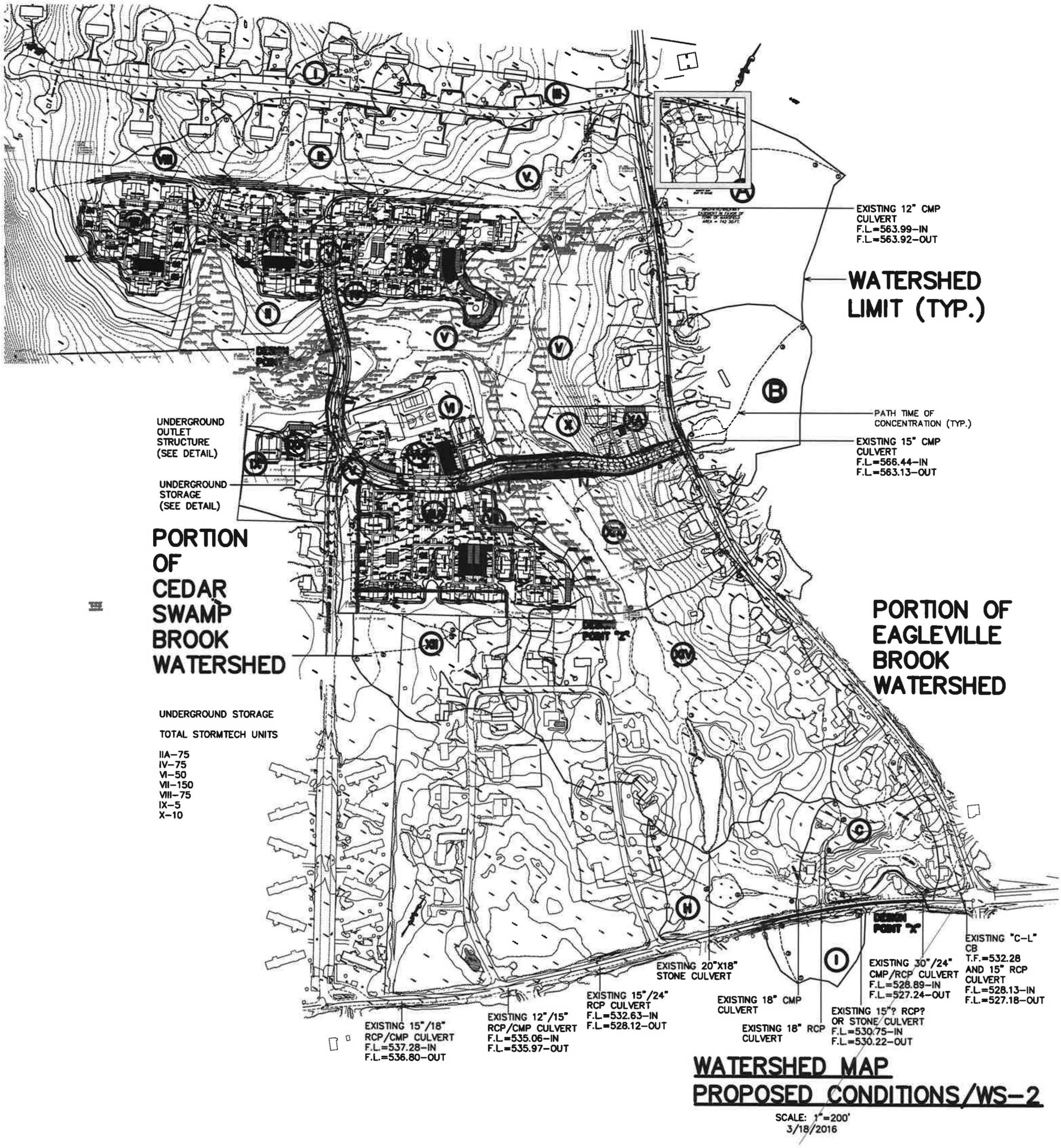


WATERSHED MAP
EXISTING CONDITIONS/WS-1

SCALE: 1"=100'
Revised: 3/18/16



WATERSHED MAP
PROPOSED CONDITIONS/WS-2

SCALE: 1"=200'
3/18/2016

PEAK FLOW SUMMARY-TABLE 1

EXISTING AND PROPOSED CONDITIONS

STORRS LODGES, CT

PLANS DATED 3/18/2016

STORM EVENT	EXISTING CONDITIONS							PROPOSED CONDITIONS						
	DESIGN POINT "X"			DESIGN POINT "Y"	DESIGN POINT "Z"			DESIGN POINT "X"			DESIGN POINT "Y"	DESIGN POINT "Z"		
	IN	OUT	ELEV	IN	IN	OUT	ELEV	IN	OUT	ELEV	IN	IN	OUT	ELEV
2(1)	3.6(2)	3.3	529.64(3)	9	22.7	8.7	541.9	3.6	3.2	529.64	10	11.8	6.8	541.69
10	5.2	4.6	529.83	12.9	33.6	16.3	542.1	5.2	4.6	529.83	13.9	18.8	12	542.04
25	6.1	5.4	529.92	15.2	39.6	20.4	542.15	6.1	5.4	529.92	16	23	15.6	542.08
50	6.8	6	529.99	16.9	44.2	23.6	542.2	6.8	6	529.99	17.6	26.8	18.1	542.12
100	7.4	6.6	530.05	18.5	48.8	28	542.23	7.4	6.6	530.05	19.8	30.5	20.6	542.16

(1) Return period (Years)
(2) Flow (CFS)
(3) Elevation (FT)

Design Point "X"- Eagleville Brook Watershed (North Eagleville Road)
Design Point "Y"- Cedar Swamp Brook Watershed (Northwood Road)
Design Point "Z"- Access Road (From Hunting Lodge Road)

ENGINEERING DESIGN
AND
DRAINAGE REPORT

THE LODGES AT STORRS
MANSFIELD, CT

Prepared for:

Storrs Lodges, CT
Mansfield, CT
Applicant

Prepared by:

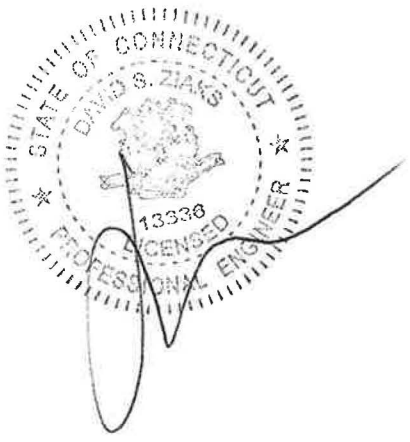
F. A. Hesketh
& Associates, Inc.

6 Creamery Brook
East Granby, CT 06026

860-653-8000

March 18, 2016
Revised March 24, 2016

FAHA Project #04161



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    - WATERSHED B
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ENGINEERING DESIGN
AND
DRAINAGE REPORT

Prepared For

STORRS LODGES, LLC
MANSFIELD, CT

March 18, 2016 (Revised March 24, 2016)

A. INTRODUCTION

The project site consists of a 45.93-acre parcel of land located on the west side of Hunting Lodge Road, as shown on the attached Property Survey, Sheet PS-1. The developer is proposing to develop the property under the zoning requirements for a DMR-Design Multiple Residence. The property is currently zoned RAR-90.

An application will be been made to the Town of Mansfield for an Inland Wetlands Permit, Zone Change and Special Use-Site Plan approvals for a proposed multi-family development to consist of 218 residential rental units for UCONN students. Under the current proposed Development Plan, the property will be developed with a mix of 47 two-story apartment buildings and a community center building with outdoor recreation area, as shown on the attached Master Plan, Sheet MA-1.

B. WATER SUPPLY

The project will be serviced by extension of the existing UCONN/CT Water public water supply system located in Northwood Road and Hunting Lodge Road through conventional service connections to the property. Fire hydrants will be provided throughout the development at the locations specified by the Mansfield Fire Marshal and water company personnel. All work and materials will conform to utility company standard water service specifications.

C. SANITARY SEWAGE DISPOSAL

The project will be serviced by extension of the existing UCONN sanitary sewer system located in Northwood Road through conventional service connections to the property. The applicant is currently reviewing with UCONN utility personnel the scope of public improvements required to the existing sanitary pumping station located to the south near Eagleville Road in order to properly accommodate the additional wastewater generated by the project. Wastewater generated from the Northwood Road residential area is pumped up Eagleville Road via a force main towards the UCONN campus to the

university's wastewater treatment plant for disposal. All work and materials will conform to UCONN sanitary sewer design specifications.

D. ELECTRIC, TELEPHONE and OTHER UTILITY SERVICES

The site will be serviced by underground connections to the public electrical and communication utility companies using standard service extensions to the existing systems located in Northwood Road and Hunting Lodge Road. All work and materials will conform to the applicable utility company specifications. The applicant is also in discussions with the gas company on the feasibility of providing gas service to the site.

E. ON-SITE STORM DRAINAGE DESIGN

The storm sewer collection system proposed for the project is comprised for the most part of a conventional catch basin and pipe system connected to underground infiltration systems and bio-retention treatment basins and swales at each of the outlets. The system design is based on a 10-year design storm using the Rational Method. All materials and equipment will follow Town of Mansfield and ConnDOT design specifications for small drainage collection systems. Detailed design calculations are included in Appendix B.

The design goals for the on-site storm sewer system are as follows:

- Provide a system that has the hydraulic capacity for the 10-year design storm
- Create multiple discharge points around the Project Site to replicate existing runoff patterns to receiving wetlands and watercourses and the on-site vernal pool
- Maintain or reduce peak flow to immediate residential neighborhood to the south
- Create a Treatment Train that will provide a minimum of 80% TSS removal
- Provide for calculated Water Quality Volume (WQV) and Groundwater Recharge Volume (GRV)
- Implement BMP and LID design techniques
- Provide riprap outlet protection to minimize erosion issues and provide final treatment of runoff before discharge downstream

The overall Stormwater Management Plan for the project includes the implementation of Best Management Practices (BMP's) with Low Impact Design (LID) techniques to

produce a Treatment Train to treat runoff consistent with the guidelines recommended by CTDEEP, as follows:

- Implementation of a comprehensive routine site cleaning and maintenance program
- Use of permeable paver units in selected overflow parking space areas
- Install pre-cast catch basins with 4-foot precast sumps and hooded outlets
- Use of a combination of underground infiltration systems, bio-retention basins and in-line hydrodynamic separator structures prior to outlet discharge for primary treatment, along with the use of permeable pavers, flared end sections, and level spreaders for secondary treatment to meet the design goals of 80% TSS removals, Water Quality Volume (WQV) and Groundwater Recharge Volume (GRV)
- Discharge of roof leaders not connected to the storm sewer system to multiple splash blocks around the building perimeter and connection to the underground infiltrator systems to the extent possible to promote infiltration

F. MACRO WATERSHED ANALYSIS

In accordance with Town Engineering Requirements, a comprehensive drainage and watershed analysis was completed. The computer printout for the macro analysis for the proposed Stormwater Management Plan is included in Appendix A. The hydrologic analysis and stormwater routing for the project site was completed using the software package Hydraflow by Intelisove utilizing the 2 thru 100-year storm events.

The purpose of the macro study was to determine the effect of stormwater runoff generated by the development on downstream watersheds and the need to incorporate detention and/or retention facilities in the various on-site sub-watersheds. The roughly 98-acre± Study Area falls partially within the watershed for Eagleville Brook and partially within the watershed for Cedar Swamp Brook. Eagleville Brook has a total watershed of approximately 2.4 sq. miles and Cedar Swamp Brook has a much larger watershed. Both brooks are tributary to the Willimantic River.

The limits of the Study Area under existing and proposed conditions are shown on the attached Watershed Maps (WS-1 and WS-2), Scale 1"=100'. In addition to the Project Site, the Study Area includes portions of neighboring parcels that discharge runoff to the site including a small watercourse tributary to Eagleville Brook that enters the northeasterly portion of the site and flows through the property to the south where is continues to an existing 24" drainage culvert under Eagleville Road to Eagleville Brook.

Eagleville Brook is listed as an impaired watercourse by CTDEEP. Both Eagleville Brook and Cedar Swamp Brook are rated as B/A or B/AA water quality, meaning that the natural water quality is or may be threatened. Concerns with Eagleville Brook from both water quality and hydrological perspectives are well documented in several published studies, some of which remain ongoing. In addition, neighbors to the south of the project site down to Eagleville Road have expressed concerns with the effects of possible increases in flow caused by the development that could further exacerbate existing localized drainage issues they currently experience on their properties.

In order to assess the potential impacts to the downstream watersheds, the Study Area was divided into several subwatershed areas for both existing and proposed conditions. Each subwatershed area was analyzed separately and then combined to determine peak design flow at Design Points "X", "Y' and "Z". Under Existing Conditions, the Study Area (see Sheet WS-1) was broken up into nine (9) sub-watershed areas (A thru I) comprised of the Project Site (except for the westerly most portion of the property outside the development area), the portion of Carriage House Apartments to the north and residential properties to the east of Hunting Lodge Road that drain to the Project Site, and portions of the residential properties south of the Project Site down to Eagleville Road.

Under Proposed Conditions, the Study Area (see Sheet WS-2) is broken up similar to the Existing Conditions model. The Project Site is further broken up into 24 sub-watersheds that follow the drainage patterns created by the grading and drainage system layout in the proposed development.

Design Point "X" is located at the southerly side of the existing culverts under Eagleville Road. Design Point "Y" is located at the westerly portion of the site and indicates runoff to the Cedar Swamp Watershed. Design Point "Z" is located along the southerly property line of the Project Site at the point where the watercourse intersects the property line.

No credit was taken in the macro model calculations for infiltration or other LID design techniques that are included in the proposed site drainage system design. To be conservative, the drainage model treats all pavement types as impervious. The actual peak rates of runoff generated for all storm events will therefore be actually less than projected in the macro model results.

The design goals of the Stormwater Management Plan are as follows:

- Implement treatment systems to meet CTDEEP Water Quality standards
- Match or reduce peak flow rates for all design storm events to the Eagleville Brook Watershed analyzed at Design Points "X" and "Z"
- Minimize any increase in peak flow rates for all design storm events to the Cedar Swamp Watershed to a negligible amount
- Maintain flow rates to the vernal pool
- Maintain or reduce peak flow rates to the lots in abutting residential neighborhood to the south

Results and Conclusion

Initial modeling efforts indicated that substantial detention/retention capacity was needed for the drainage systems discharging to both watersheds in order to meet the goals of the design. The results of the analysis are summarized in Table 1.

Starting with Design Point "Y", the results of the macro hydraulic computer modeling indicate that the peak flow rates from the Project Site for the 2 thru 100-year storm events will be essentially maintained to the Cedar Swamp Brook Watershed. If you factor in the positive effects of the proposed infiltration system, natural storage of the downstream wetland corridor and the large heavily wooded upland along the entire westerly side of the site, peak flow rates, particularly for the more frequent storm events, will be considerably reduced under Proposed Conditions.

At the downstream Design Point "X" at Eagleville Road, there is very little change to peak flow rates and essentially no change to inlet elevations at the town owned culverts under the road. Therefore, there will be no measurable impact to the existing town drainage system or the downstream Eagleville Brook watershed.

At Design Point "Z", the model indicates there will be a measurable reduction in peak flow rates leaving the property for all storm events. Again, when you factor in effects of the infiltration system and other LID techniques incorporated into the analysis, there will a considerable reduction in peak flow leaving the site at the southerly property line under Proposed Conditions.

Separate calculations were completed for runoff to the vernal pool and the portion of the residential neighborhood abutting to the south. Table 2 includes results for the overland flow to the vernal pool. The calculations show that flow conditions under

Proposed Conditions essentially match existing flow conditions to the pool meeting one of the design goals.

Table 3 includes the results of the calculations for peak runoff to the abutting neighborhood. As indicated, the peak flow to the neighborhood from runoff from the Project Site will be reduced for all storm events.

In conclusion, the modeling results indicate that all design goals of the Stormwater Management Plan will be accomplished with implementation of the proposed plan.

Water Quality Volume (WQV), Groundwater Recharge Volume (GRV), Treatment Train Analysis

The calculations included in Appendix A provide a summary of the Water Quality Volume (WQV) calculations completed and indicates that more than sufficient capacity is provided through the combination of volumes in the infiltration systems and bio-retention basins.

With regards to Groundwater Recharge Volume (GRV), the underlying soil conditions in the development areas on the property fall generally as Group B soils meaning that they are somewhat conducive to groundwater infiltration techniques. A calculation for required GRV is included in Appendix A and indicates that more than sufficient capacity is provided through the combination of volumes in the proposed infiltration systems and bio-retention basins.

Treatment Train Efficiency Calculations for the few portions of the new drainage system not connected to the infiltrators prior to final discharge are included in Appendix A. The TSS removal rate was determined to exceed the CTDEEP minimum requirement of 80% using inline hydrodynamic separator units in the design.

G. DRIVEWAY DESIGN AND WETLAND CROSSINGS

In order to minimize impervious coverage, proposed driveway widths are limited to 24 feet. On the main driveway from Hunting Lodge Road, the applicant is proposing to use a pre-cast concrete arch bridge with block retaining walls on both sides to minimize the footprint of the embankment and span the wetland corridor, as illustrated on Sheet SDD-1. The proposed site driveway is located over what appears to be the remains of a gravel driveway that once served the property. There is a natural breech in the existing filled embankment that allows the watercourse to pass through. This does

create some ponding upstream of the crossing that the project wetlands consultant has recommended not be altered. The proposed crossing design eliminates any disturbance to the existing watercourse and minimizes the need to fill the adjoining wetland areas.

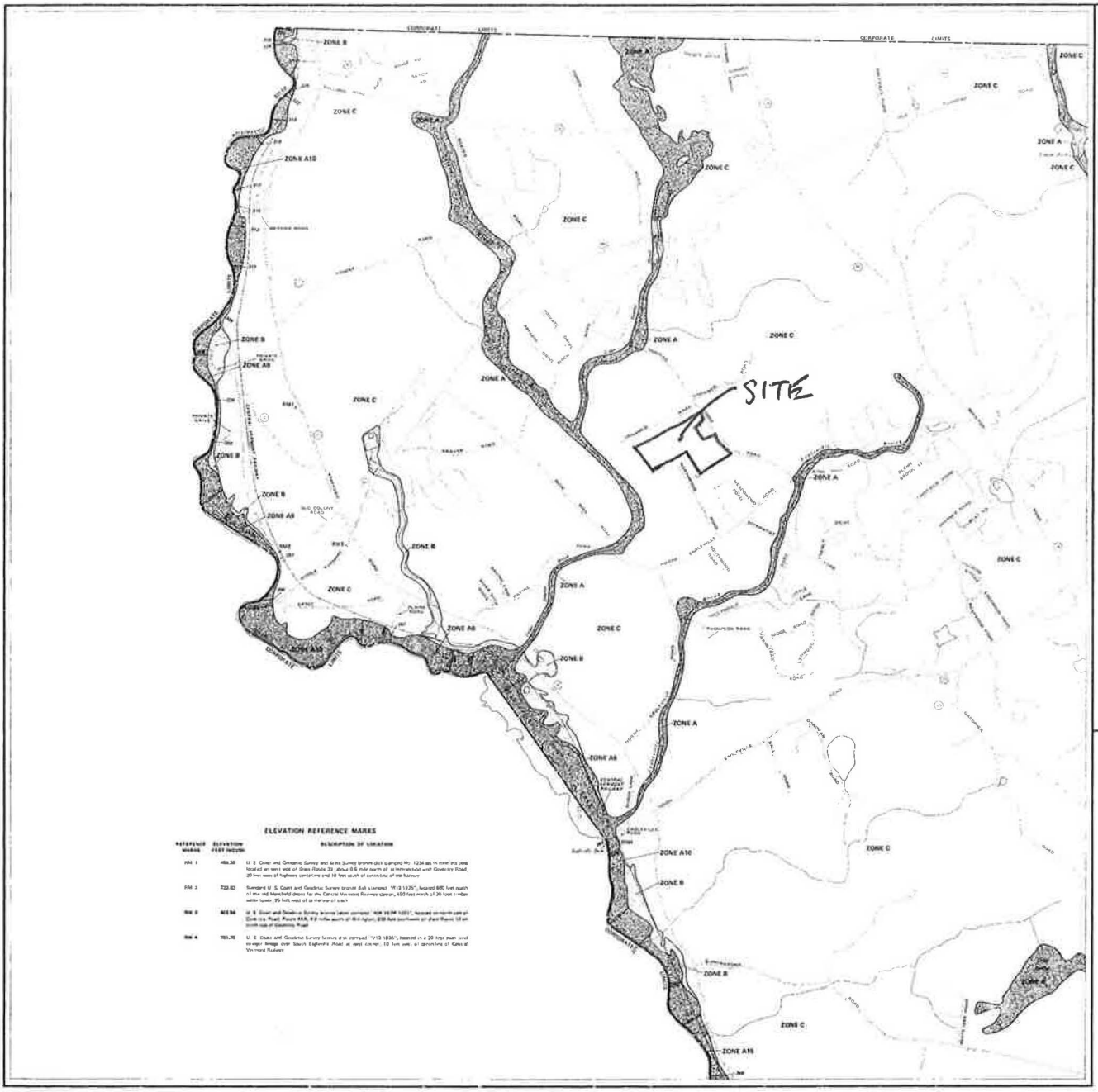
H. SOIL EROSION CONTROL PLAN

A soil and erosion control plan has been prepared in accordance with town and CTDEEP requirements. Prior to the start of site construction, the limits of clearing will be carefully staked out in the field and reviewed with town staff. Silt fencing will be installed around the entire perimeter of the site. Once the site clearing has been completed, rough grading of the site and installation of site improvements can commence.

The project contract specifications will require the contractor to prepare sub-phasing plans as the work progresses incorporating interim erosion control measures at every step. These plans will be submitted to the project engineer and construction manager for review and concurrence throughout the duration of site construction.

I. FEMA FLOOD ANALYSIS

According to the current FEMA FIRM for Eagleville Brook, no portion of the property falls within the Zone A (100-year BFE storm) limits.



KEY TO MAP

ZONE B

ZONE B

*EXPLANATION OF ZONE DESIGNATIONS

ZONE
EXPLANATION

A

A10

A8

B

C

V

V10

FLOOD INSURANCE RATE MAP EFFECTIVE JANUARY 2, 1981

Refer to the FLOOD INSURANCE RATE MAP EFFECTIVE date shown on this map to determine when actuarial rates apply to structures in the zones where elevations or depths have been established.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at (800) 638-6620 or (800) 424-8872.

APPROXIMATE SCALE

1000 0 1000 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

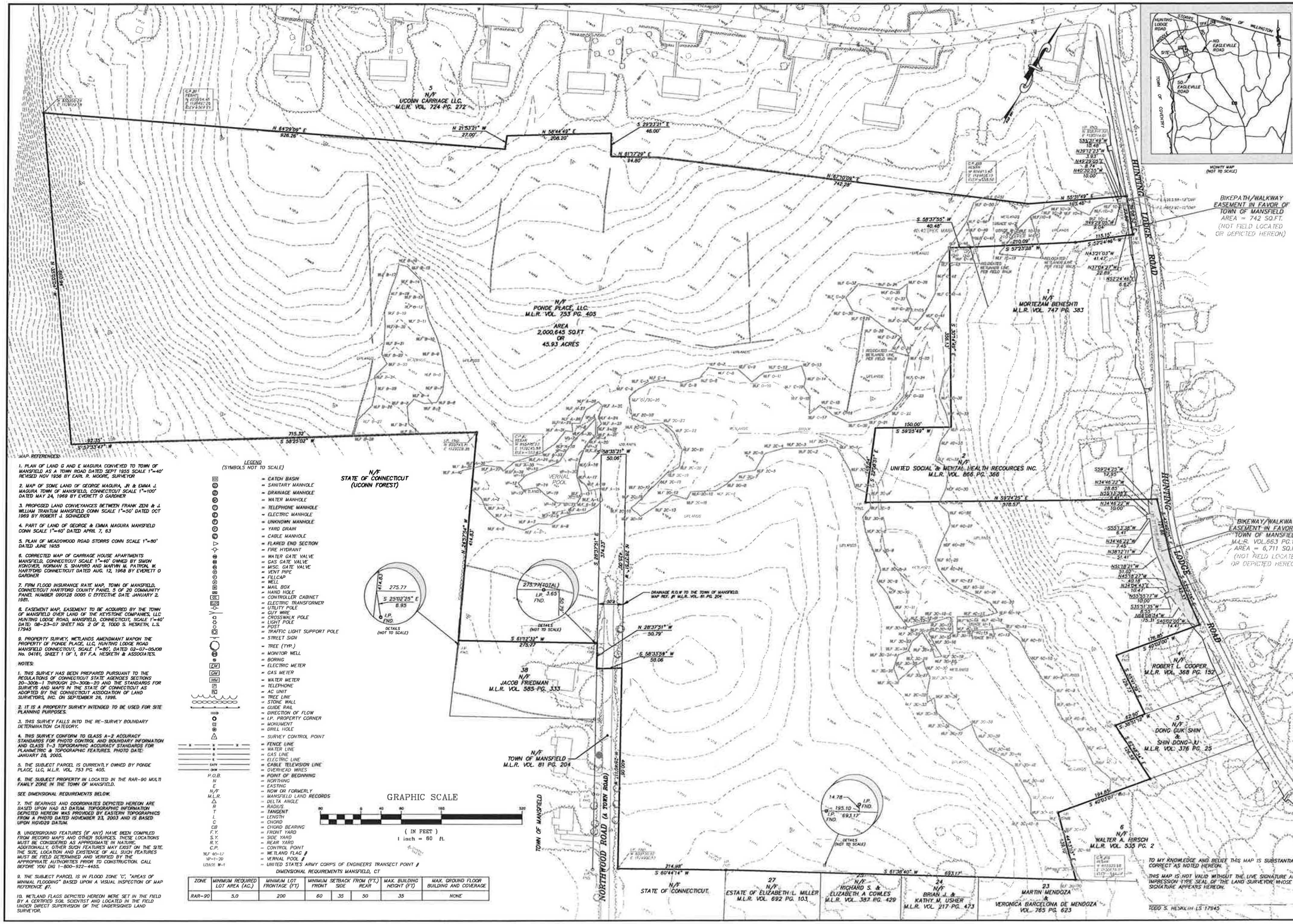
TOWN OF
MANSFIELD,
CONNECTICUT
TOLLAND COUNTY

PANEL 5 OF 20

COMMUNITY-PANEL NUMBER
090128 0005 C

EFFECTIVE DATE:
JANUARY 2, 1981

federal emergency management agency
federal insurance administration



MAP REFERENCES:

1. PLAN OF LAND G AND E MAGURA CONVEYED TO TOWN OF MANSFIELD AS A TOWN ROAD DATED SEPT 1955 SCALE 1"=40' REVISED NOV 1956 BY EARL R. MOORE, SURVEYOR

2. MAP OF SOME LAND OF GEORGE MAGURA, JR & EMMA J. MAGURA TOWN OF MANSFIELD, CONNECTICUT SCALE 1"=100' DATED MAY 24, 1969 BY EVERETT O GARDNER

3. PROPOSED LAND CONVEYANCES BETWEEN FRANK ZENI & J. WILLIAM TRANTUM MANSFIELD CONN SCALE 1"=50' DATED OCT 1969 BY ROBERT J. SCHNEIDER

4. PART OF LAND OF GEORGE & EMMA MAGURA MANSFIELD CONN SCALE 1"=40' DATED APRIL 7, 63

5. PLAN OF MEADOWOOD ROAD STORRS CONN SCALE 1"=80' DATED JUNE 1955

6. CORRECTED MAP OF CARRIAGE HOUSE APARTMENTS MANSFIELD, CONNECTICUT SCALE 1"=40' OWNED BY SIMON KONOVER, NORMAN S. SHAPIRO AND MARVIN M. PATRON, W. HARTFORD CONNECTICUT DATED AUG. 12, 1968 BY EVERETT O GARDNER

7. FIRM FLOOD INSURANCE RATE MAP, TOWN OF MANSFIELD, CONNECTICUT HARTFORD COUNTY PANEL 5 OF 20 COMMUNITY PANEL NUMBER 090128 0005 C EFFECTIVE DATE JANUARY 2, 1981.

8. EASEMENT MAP, EASEMENT TO BE ACQUIRED BY THE TOWN OF MANSFIELD OVER LAND OF THE KEYSTONE COMPANIES, LLC HUNTING LODGE ROAD, MANSFIELD, CONNECTICUT, SCALE 1'=40' DATE: 08-23-07 SHEET NO: 2 OF 2, TODD S. HESKETH, L.S. 17945

9. PROPERTY SURVEY, WETLANDS AMENDMANT MAPON THE PROPERTY OF PONDE PLACE, LLC, HUNTING LODGE ROAD MANSFIELD CONNECTICUT, SCALE 1"=80', DATED 02-07-05JOB No. 04161, SHEET 1 OF 1, BY F.A. HESKETH & ASSOCIATES.

NOTES:

1. THIS SURVEY HAS BEEN PREPARED PURSUANT TO THE REGULATIONS OF CONNECTICUT STATE AGENCIES SECTIONS 20-300b-1 THROUGH 20-300b-20 AND THE STANDARDS FOR SURVEYS AND MAPS IN THE STATE OF CONNECTICUT AS ADOPTED BY THE CONNECTICUT ASSOCIATION OF LAND SURVEYORS, INC. ON SEPTEMBER 26, 1996.

2. IT IS A PROPERTY SURVEY INTENDED TO BE USED FOR SITE PLANNING PURPOSES.

3. THIS SURVEY FALLS INTO THE RE-SURVEY BOUNDARY DETERMINATION CATEGORY.

4. THIS SURVEY CONFORM TO CLASS A-2 ACCURACY STANDARDS FOR PHOTO CONTROL AND BOUNDARY INFORMATION AND CLASS T-3 TOPOGRAPHIC ACCURACY STANDARDS FOR PLANIMETRIC & TOPOGRAPHIC FEATURES. PHOTO DATE: JANUARY 28, 2005.

5. THE SUBJECT PARCEL IS CURRENTLY OWNED BY PONDE PLACE, LLC, M.L.R. VOL. 753 PG. 405.

6. THE SUBJECT PROPERTY IN LOCATED IN THE RAR-90 MULTI FAMILY ZONE IN THE TOWN OF MANSFIELD.

SEE DIMENSIONAL REQUIREMENTS BELOW.

7. THE BEARINGS AND COORDINATES DEPICTED HEREON ARE BASED UPON NAD 83 DATUM. TOPOGRAPHIC INFORMATION DEPICTED HEREON WAS PROVIDED BY EASTERN TOPOGRAPHICS FROM A PHOTO DATED NOVEMBER 23, 2003 AND IS BASED UPON NGVD29 DATUM.

8. UNDERGROUND FEATURES (IF ANY) HAVE BEEN COMPILED FROM RECORD MAPS AND OTHER SOURCES. THESE LOCATIONS MUST BE CONSIDERED AS APPROXIMATE IN NATURE. ADDITIONALLY, OTHER SUCH FEATURES MAY EXIST ON THE SITE. THE SIZE, LOCATION AND EXISTENCE OF ALL SUCH FEATURES MUST BE FIELD DETERMINED AND VERIFIED BY THE APPROPRIATE AUTHORITIES PRIOR TO CONSTRUCTION. CALL BEFORE YOU DIG 1-800-922-4455.

9. THE SUBJECT PARCEL IS IN FLOOD ZONE 'C', "AREAS OF MINIMAL FLOODING" BASED UPON A VISUAL INSPECTION OF MAP REFERENCE #7.

10. WETLAND FLAGS DEPICTED HEREON WERE SET IN THE FIELD BY A CERTIFIED SOIL SCIENTIST AND LOCATED IN THE FIELD UNDER DIRECT SUPERVISION OF THE UNDERSIGNED LAND SURVEYOR.

LEGEND
(SYMBOLS NOT TO SCALE)

= CATCH BASIN
= SANITARY MANHOLE
= DRAINAGE MANHOLE
= WATER MANHOLE
= TELEPHONE MANHOLE
= ELECTRIC MANHOLE
= UNKNOWN MANHOLE
= YARD DRAIN
= CABLE MANHOLE
= FLARED END SECTION
= FIRE HYDRANT
= WATER GATE VALVE
= GAS GATE VALVE
= MISC. GATE VALVE
= VENT PIPE
= FILLCAP
= WELL
= MAIL BOX
= HAND HOLE
= CONTROLLER CABINET
= ELECTRIC TRANSFORMER
= UTILITY POLE
= GUY WIRE
= CROSSWALK POLE
= LIGHT POLE
= POST
= TRAFFIC LIGHT SUPPORT POLE
= STREET SIGN
= TREE (TYP.)
= MONITOR WELL
= BORING
EM = ELECTRIC METER
GM = GAS METER
WM = WATER METER
= TELEPHONE
= AC UNIT
= TREE LINE
= STONE WALL
= GUIDE RAIL
= DIRECTION OF FLOW
= I.P. PROPERTY CORNER
= MONUMENT
= DRILL HOLE
= SURVEY CONTROL POINT
= FENCE LINE
= WATER LINE
= GAS LINE
= ELECTRIC LINE
CATV = CABLE TELEVISION LINE
= OVERHEAD WIRES
P.O.B. = POINT OF BEGINNING
N = NORTHING
E = EASTING
N/F = NOW OR FORMERLY
M.L.R. = MANSFIELD LAND RECORDS
Δ = DELTA ANGLE
R = RADIUS
T = TANGENT
L = LENGTH
C = CHORD
CB = CHORD BEARING
F.Y. = FRONT YARD
S.Y. = SIDE YARD
R.Y. = REAR YARD
C.P. = CONTROL POINT
= WETLAND FLAG #
= VERNAL POOL #
= UNITED STATES ARMY CORPS OF ENGINEERS TRANSECT POINT #

DIMENSIONAL REQUIREMENTS MANSFIELD, CT

ZONE	MINIMUM REQUIRED LOT AREA (AC.)	MINIMUM LOT FRONTAGE (FT)	MINIMUM SETBACK FROM (FT.) FRONT	SIDE	REAR	MAX. BUILDING HEIGHT (FT)	MAX. GROUND FLOOR BUILDING AND COVERAGE
RAR-90	5.0	200	60	35	50	35	NONE

TO MY KNOWLEDGE AND BELIEF THIS MAP IS SUBSTANTIALLY CORRECT AS NOTED HEREON.

THIS MAP IS NOT VALID WITHOUT THE LIVE SIGNATURE AND IMPRESSION TYPE SEAL OF THE LAND SURVEYOR WHOSE SIGNATURE APPEARS HEREON.

TODD S. HESKETH LS 17945

PS-1

PROPERTY SURVEY
PREPARED FOR
STORRS LODGES, LLC.
HUNTING LODGE ROAD
MANSFIELD, CONNECTICUT

Date: 02-07-05	Drawn by: RM	Job no: 04161
Scale: 1" = 80'	Checked by: TSH	Sheet no: 1 OF 1

Revisions:

No.	Date	Description
1	06-27-07	MISC
2	10-27-15	WETLANDS / TITLE UPDATED
3	03-18-16	SUBMITTAL / TITLE

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Civil & Traffic Engineers · Surveyors · Planners · Landscape Architects
Phone (860) 653-8000
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THE LODGES AT STORRS

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Civil & Traffic Engineers · Surveyors · Planners · Landscape Architects

Zoning Data

Existing Zone: Rural Agricultural Residence 90 Zone (RAR-90)

Proposed Design Development District: Design Multiple Residence (DMR)

Density Requirement (Article 10 A.6.b):

Required: 5,000 square feet per Dwelling Unit
218 Dwelling Units x 5,000 square feet = 1,090,000 square feet

Provided: **Total Lot Area = 2,000,645 square feet (45.93 acres)**
Area of Wetlands = 291,172 square feet
Area of slopes over 15% = 137,100 ± square feet

Net Lot Area = 1,572,268 square feet (36.09 acres)

Minimum Lot Frontage (Article 8):

Required: 300 feet minimum

Provided: Hunting Lodge Road = 341.54 feet (77.50' + 264.04)
Northwood Road = 400.06 feet

Minimum Setback from Front Lot Line (Article 8):

Required: 50 feet minimum

Provided: 57 ± feet - Hunting Lodge Road
51 ± feet - Northwood Road

Minimum Setback from Side Lot Line (Article 8):

Required: 50 feet minimum

Provided: 51± feet

Minimum Setback from Rear Lot Line (Article 8):

Required: 50 feet minimum

Provided: 51± feet

Maximum Building Height (Article 10 A.6.d):

Required: 40 feet maximum

Proposed: 32 ± feet (see Architectural Plans)

Off-Street Parking (Article 10 D.5.a):

Required: .8 per Bedroom
692 Bedrooms x .8 spaces per bedroom = 554 required parking spaces

Proposed: 558 spaces

Minimum Distance Between Structures (Article 10 A.6.f):

Required: 20 feet minimum

Proposed: 22± feet

Minimum Floor Area (Article 10 A.6.e):

Required: 475 square feet for first three rooms
125 square feet for each additional room

Proposed: **Each unit = 800± square feet**

Minimum Open Space / Recreational Facilities (Article 10 A.6.h):

Required: 600 square feet per Dwelling Unit
218 Dwelling Units x 600 square feet per unit = 130,800 square feet

Proposed: 175,000 ± square feet Passive/Active Recreation Area

Maximum Building Ground Coverage (Article 8)

Required: 25 percent

Proposed 174,690 Sq. Ft. or 8.8 percent

Building/Unit Data

Building Type "A" (32 Total)

128 Units
512 Bedrooms

Building Type "B" (15 Total)

90 Units
180 Bedrooms

Total

Buildings = 47
Units = 218
Bedrooms = 692

Building/Unit Parking Tabulation

Required: 554 spaces

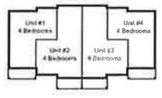
Proposed: 24 Handicap Accessible spaces
124 Permeable Paver spaces
410 Standard spaces

558 Total spaces

Neighborhood Community Center Parking Tabulation

Proposed: **1 Handicap Accessible space**
9 Permeable Paver Turf spaces
6 Standard spaces

16 Total spaces



Building "A"

See Architectural Plans for Specifics

3,280 ± Square Foot Footprint (including porches)
4 Units
16 Bedrooms

Building "B"

See Architectural Plans for Specifics

3,982 ± Square Foot Footprint (including porches)
4 Units
12 Bedrooms

VERNAL POOL

Outdoor Recreation Area

Neighborhood Community Center 10,000 ± Sq. Ft.

ENCLOSED DUMPSTER AREA (TYP.)

CONNECT TO EXISTING PUBLIC WATERMAIN

8 FOOT CONCRETE SIDEWALK (TYP.)

SHADED SPACES INDICATE PERMEABLE PAVER PARKING SPACES (TYP.)

WETLANDS LIMIT (TYP.)

NORTHWOOD ROAD (A TOWN ROAD)

MEADOWOOD ROAD

GRAPHIC SCALE
(IN FEET)
1 inch = 80 ft.

No.	Date	Description
		Revisions:

MASTER PLAN
PREPARED FOR
STORRS LODGES, LLC
HUNTING LODGE ROAD
MANSFIELD, CONNECTICUT

Date: 03-18-2016 | Drawn by: KLL | Job no: 04161
Scale: 1" = 80' | Checked by: DSZ | Sheet no: 1 OF 1

MA-1

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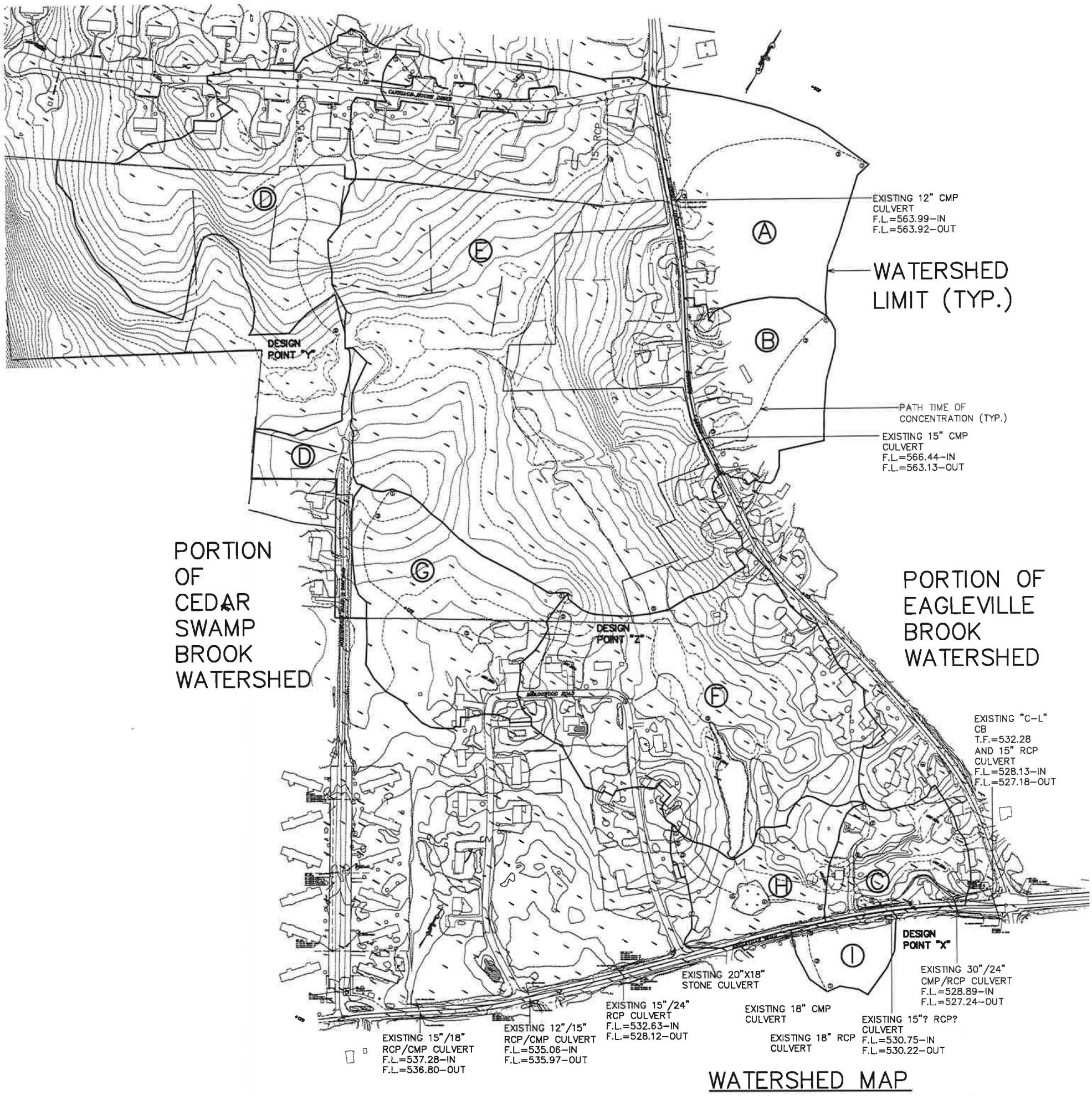
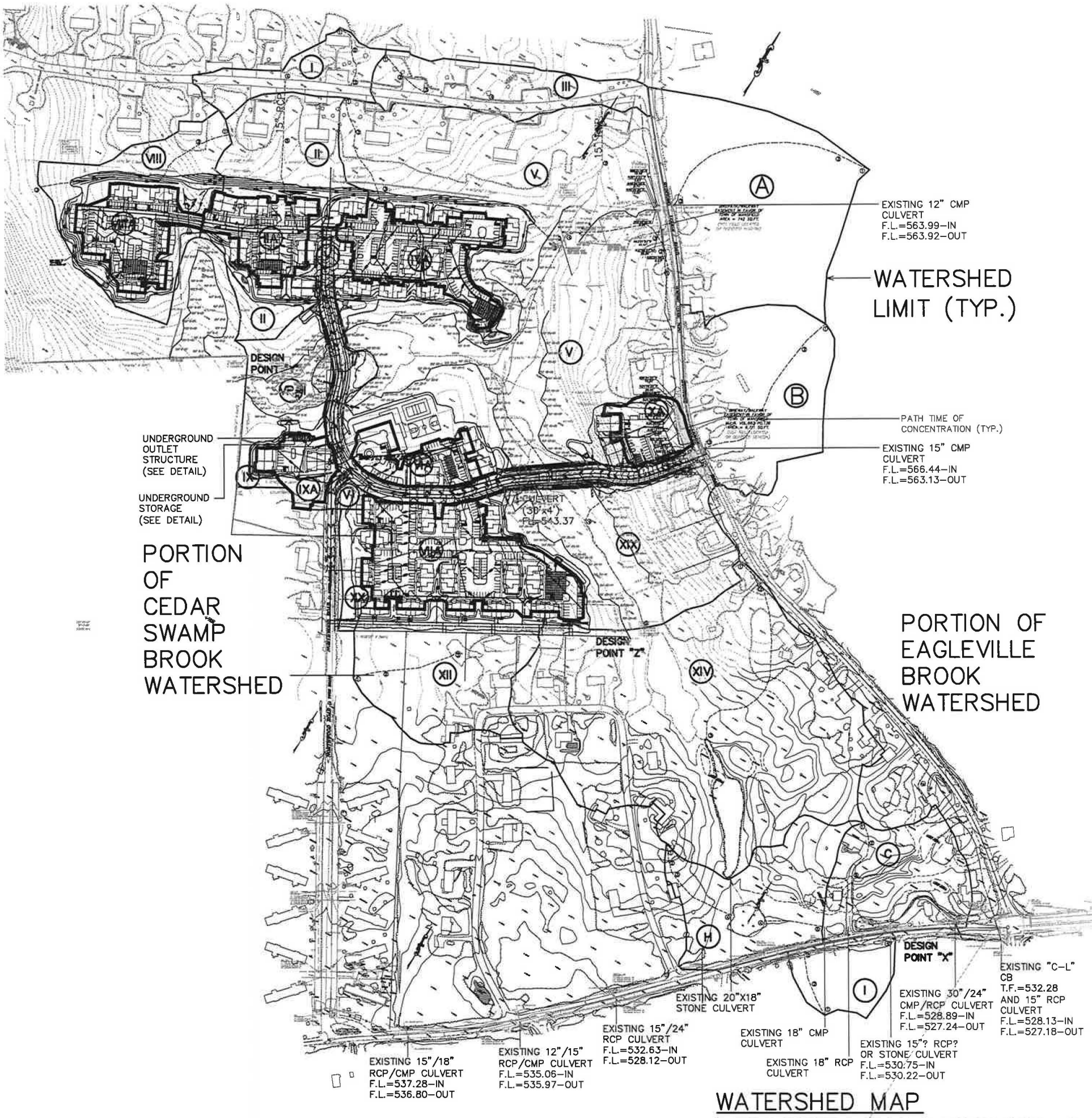


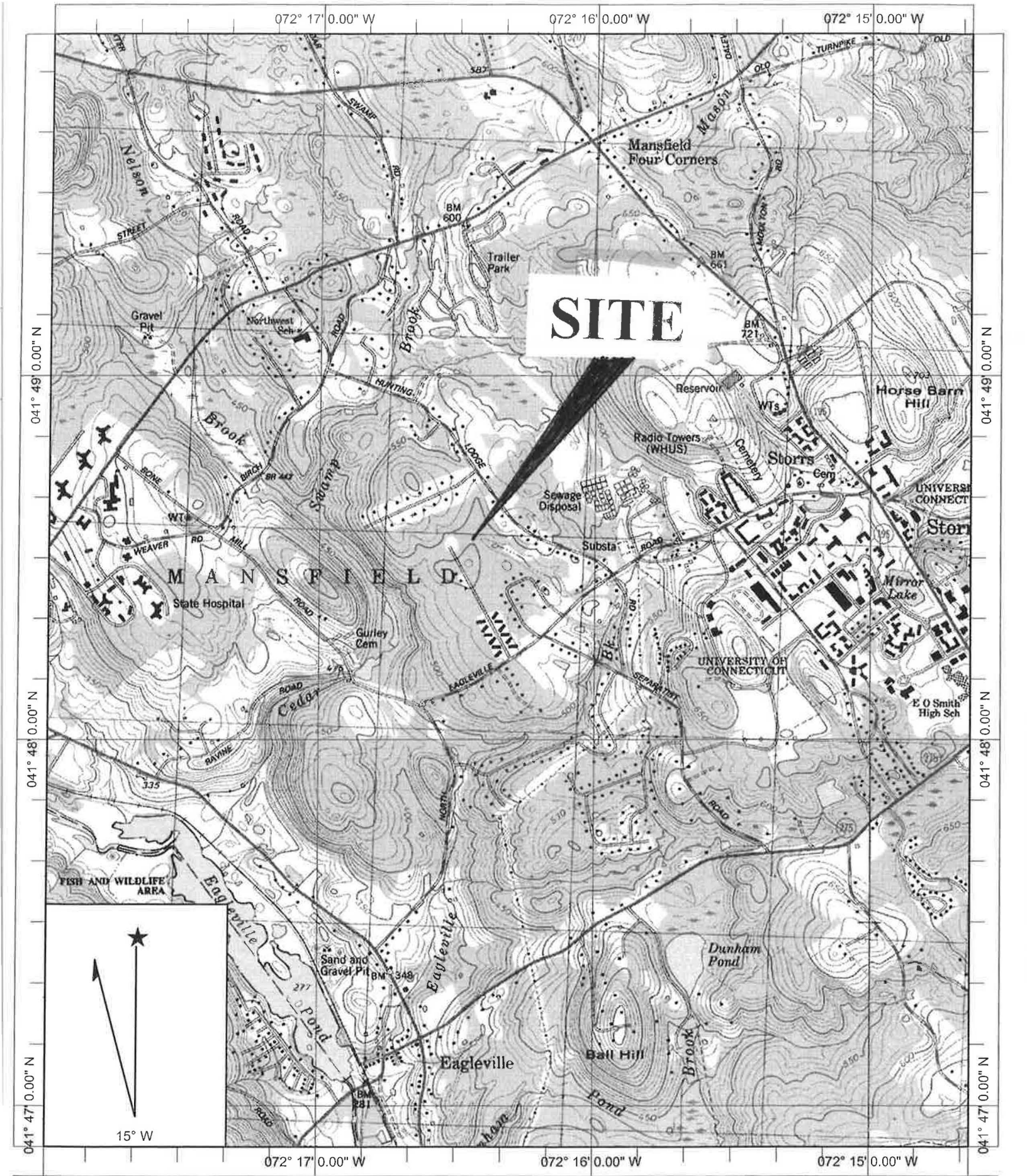
WATERSHED MAP
EXISTING CONDITIONS/WS–1

SCALE: 1"=150'
Revised: 3/18/16
Revised: 3/24/16



WATERSHED MAP
PROPOSED CONDITIONS/WS–2

SCALE: 1"=150'
3/18/2016
Revised: 3/24/2016



Name: COVENTRY
Date: 6/4/2007
Scale: 1 inch equals 2000 feet

Location: 041° 48' 24.8" N 072° 16' 18.6" W
Caption: LOCATION MAP
1"=200'

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PEAK FLOW SUMMARY-TABLE 1

EXISTING AND PROPOSED CONDITIONS

STORRS LODGES, CT

PLANS DATED 3/24/2016

STORM EVENT	EXISTING CONDITIONS							PROPOSED CONDITIONS						
	DESIGN POINT "X"			DESIGN POINT "Y"	DESIGN POINT "Z"			DESIGN POINT "X"			DESIGN POINT "Y"	DESIGN POINT "Z"		
	IN	OUT	ELEV	IN	IN	OUT	ELEV	IN	OUT	ELEV	IN	IN	OUT	ELEV
2(1)	3.6(2)	3.3	529.64(3)	10	22.7	8.7	541.9	3.6	3.3	529.64	9.9	13.7	7.8	541.81
10	5.2	4.6	529.83	14.4	33.6	16.3	542.1	5.2	4.7	529.83	13.6	21.2	14.1	542.06
25	6.1	5.4	529.92	16.9	39.6	20.4	542.15	6.1	5.4	529.92	15.7	26.4	17.9	542.12
50	6.8	6	529.99	18.8	44.2	23.6	542.2	6.8	6	529.99	17.2	30.6	20.9	542.16
100	7.4	6.6	530.05	20.7	48.8	28	542.23	7.4	6.6	530.05	18.7	35	24	542.2

(1) Return period (Years)
(2) Flow (CFS)
(3) Elevation (FT)

Design Point "X"- Eagleville Brook Watershed (North Eagleville Road)
Design Point "Y"- Cedar Swamp Brook Watershed (Northwood Road)
Design Point "Z"- Access Road (From Hunting Lodge Road)

PEAK FLOW SUMMARY-TABLE 2

VERNAL POOL #1

STORRS LODGES, CT

PLANS DATED 3/24/2016

STORM EVENT	EXISTING CONDITIONS			PROPOSED CONDITIONS		
	WATERSHED K			WATERSHED VP #1, II, IIA, IX & IXA		
	IN	**OUT**	**ELEV**	**IN**	**OUT**	**ELEV**
2(1)	**6.6(2)**	**0**	**550.07(3)**	**6**	**0**	**550.09**
10	**9.5**	**0**	**550.24**	**8.2**	**0**	**550.25**
25	**11.2**	**0**	**550.34**	**9.5**	**0**	**550.34**
50	**12.4**	**0**	**550.41**	**10.4**	**0**	**550.41**
100	**13.6**	**0**	**550.48**	**11.3**	**0**	**550.47**

(1) Return period (Years)
(2) Flow (CFS)
(3) Elevation (FT)

Design Point "X"- Eagleville Brook Watershed (North Eagleville Road)
Design Point "Y"- Cedar Swamp Brook Watershed (Northwood Road)
Design Point "Z"- Access Road (From Hunting Lodge Road)

PEAK FLOW SUMMARY-TABLE 3

WATERSHED G vs XII

STORRS LODGES, CT

PLANS DATED 3/24/2016

STORM EVENT	EXISTING CONDITIONS			PROPOSED CONDITIONS		
	WATERSHED "G"			WATERSHED "XII"		
	IN	**OUT**	**ELEV**	**IN**	**OUT**	**ELEV**
2(1)	**4.2(2)**	**0**	**546.2(3)**	**3.1**	**0**	**546.14**
10	**6.1**	**0**	**546.31**	**4.6**	**0**	**546.22**
25	**7.2**	**0**	**546.38**	**5.4**	**0**	**546.27**
50	**8**	**0**	**546.42**	**6**	**0**	**546.31**
100	**8.7**	**0**	**546.47**	**6.7**	**0**	**546.34**

(1) Return period (Years)
(2) Flow (CFS)
(3) Elevation (FT)

Design Point "X"- Eagleville Brook Watershed (North Eagleville Road)
Design Point "Y"- Cedar Swamp Brook Watershed (Northwood Road)
Design Point "Z"- Access Road (From Hunting Lodge Road)

APPENDIX A

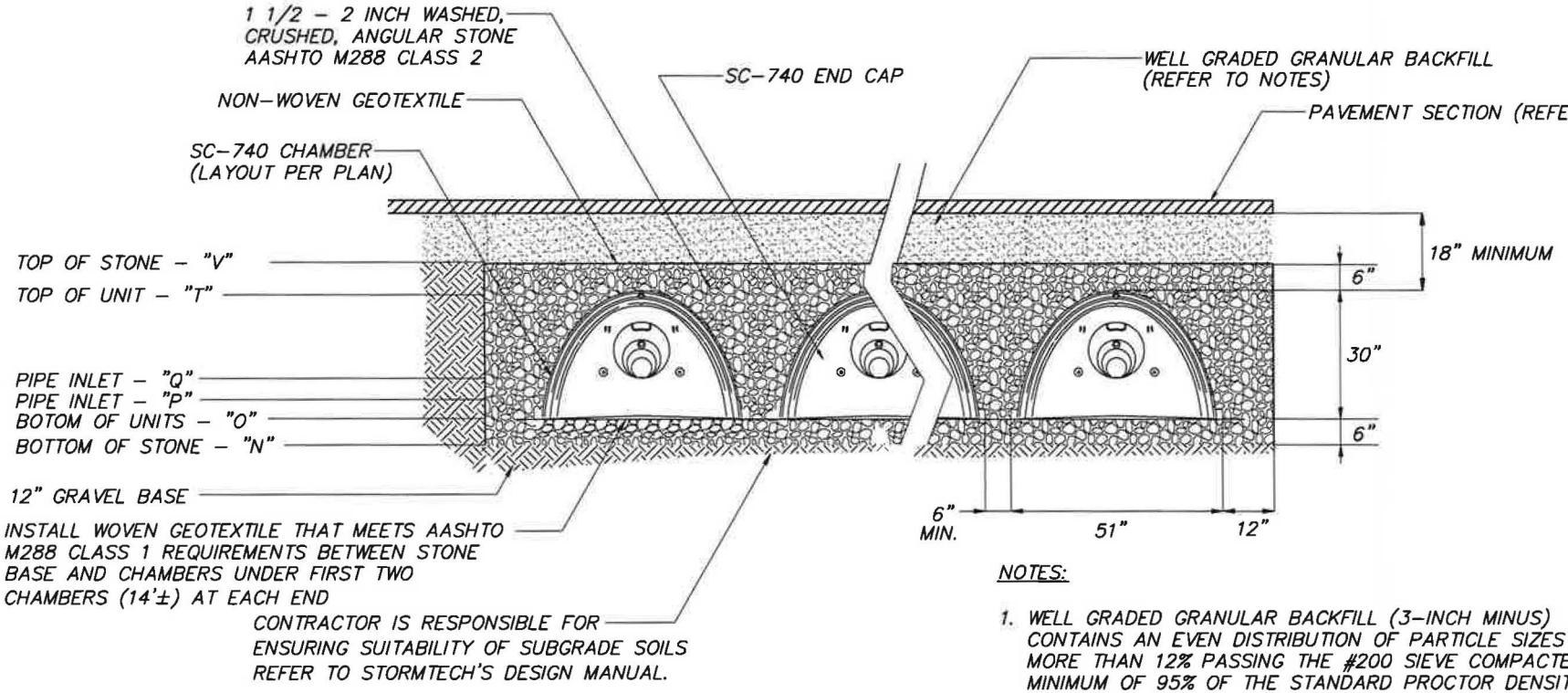
MACRO HYDROLOGIC ANALYSIS

STORRS LODGES
MANSFIELD, CT

March 18, 2016
Revised March 24, 2016

FAHA Project #04161

INPUT DATA

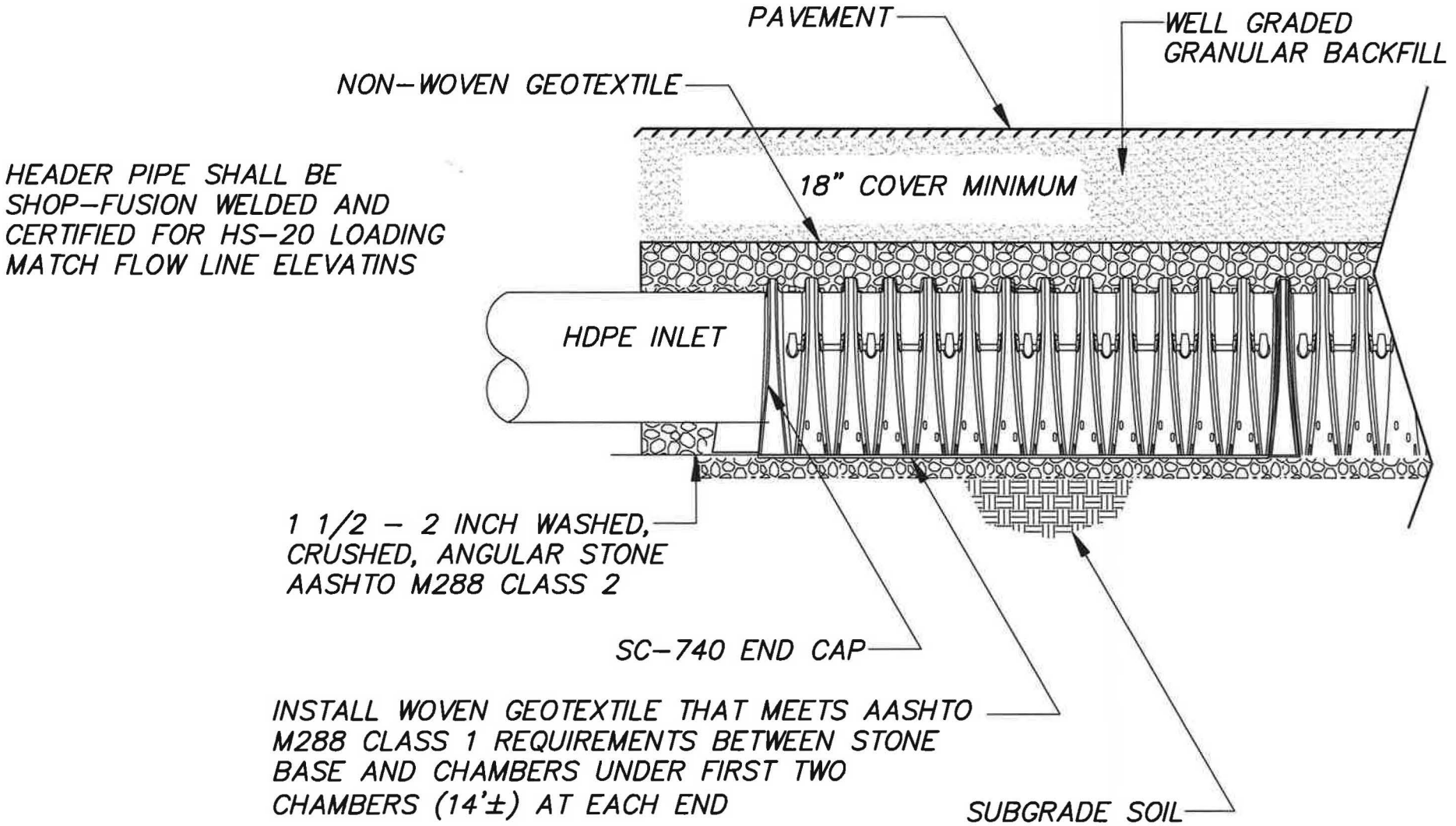


NOTES:

1. WELL GRADED GRANULAR BACKFILL (3–INCH MINUS) CONTAINS AN EVEN DISTRIBUTION OF PARTICLE SIZES WITH NO MORE THAN 12% PASSING THE #200 SIEVE COMPACTED TO A MINIMUM OF 95% OF THE STANDARD PROCTOR DENSITY. REFER TO THE TABLE OF ACCEPTABLE FILL MATERIALS IN STORMTECH'S DESIGN MANUAL, INSTALLATION MANUAL, OR WWW.STORMTECH.COM.

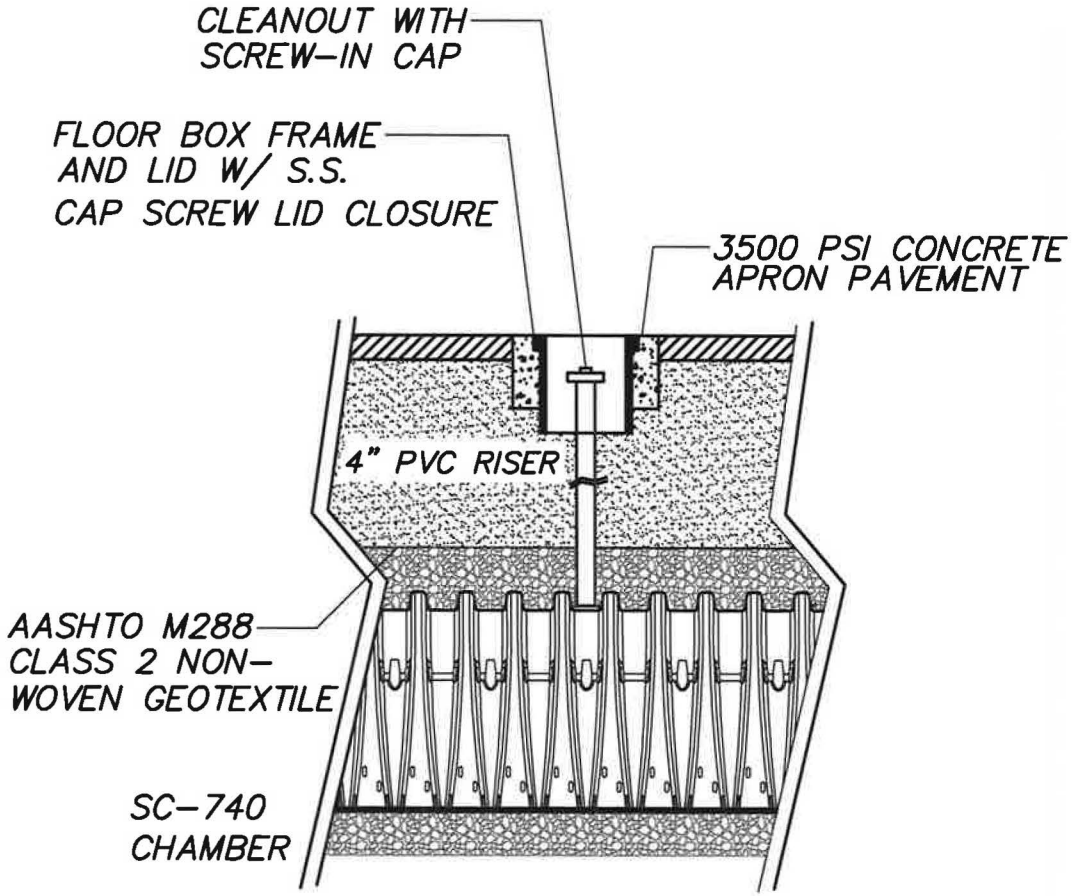
STORMTECH SC–740 CHAMBER SYSTEM
TYPICAL CROSS SECTION

N.T.S.



STORMTECH SC-740 CHAMBER SYSTEM
TYPICAL PROFILE - INLET ROW

N.T.S.



*REFER TO STORMTECH'S DESIGN MANUAL

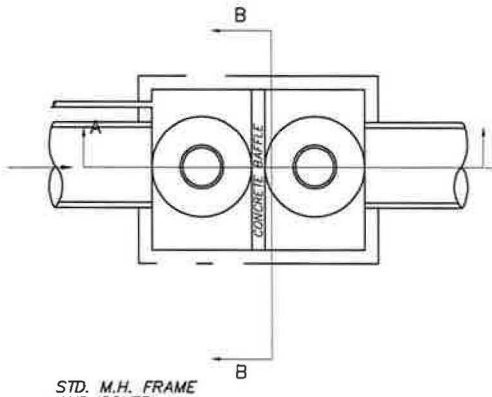
STORMTECH SC–740 CHAMBER SYSTEM INSPECTION PORT DETAIL

N.T.S.

	#	IIA	IVA	VIA	VIIA	VIIIA	IXA	XA
TOP OF STONE ("T"+6")	"V"	563.00	553.00	551.00	547.00	560.00	554.67	558.00
TOP OF UNIT ("O"+30")	"T"	562.50	552.50	550.50	546.50	559.50	554.17	557.50
PIPE INLET	"Q"	18"	18"	18"	18",15"	18"	12"	15"
		560.00	550.00	548.00	544.00	557.00	551.67	555.00
PIPE OUTLET	"P"	24"	18"	18"	24"	18"	12"	15"
		560.00	550.00	548.00	544.00	557.00	551.67	555.00
BOTTOM OF UNITS	"O"	560.00	550.00	548.00	544.00	557.00	551.67	555.00
BOTTOM OF STONE ("O"-6")	"N"	559.50	549.50	547.50	543.50	556.50	551.17	554.50

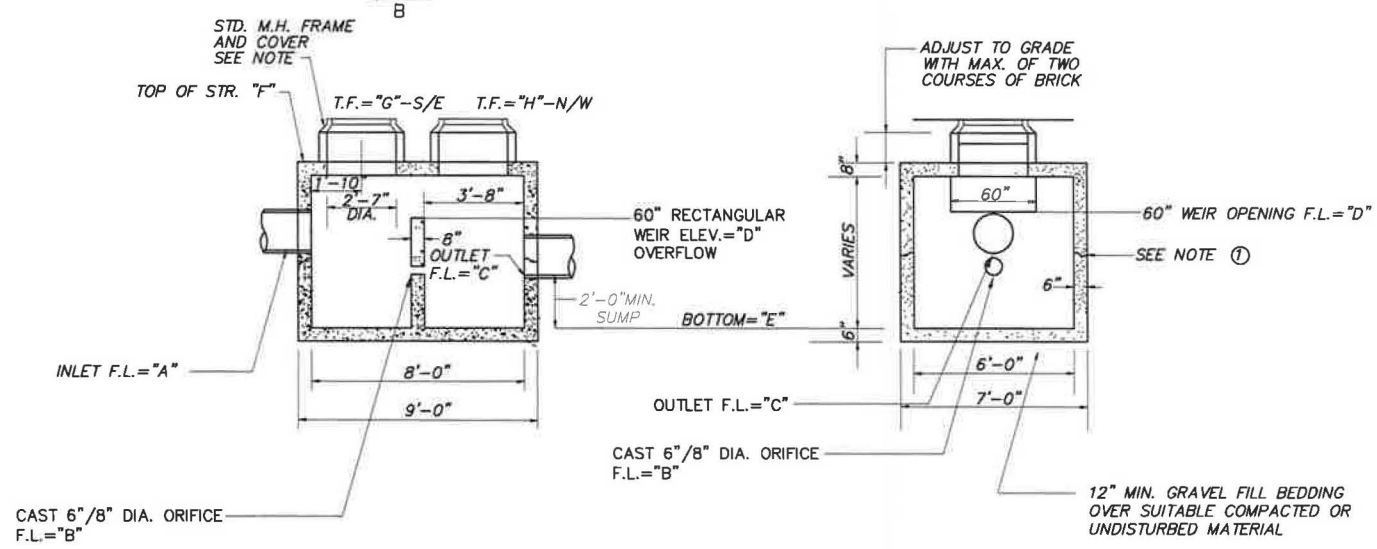
	#	IIA	IVA	VIA	VIIA	VIIIA	IXA	XA
INLET	"A"	24"	18"	18"	24"	18"	12"	15"
		560.00	550.00	548.00	544.00	557.00	551.67	555.00
ORIFICE (="O") *	"B"	560.00	550.00	548.00	544.00	557.00	551.67	555.00
OUTLET	"C"	18"	18"	15"	18"	15"	12"	15"
		559.90	550.00	547.74	544.00	556.35	551.67	554.00
WEIR ("B"+36")	"D"	563.00	553.00	551.00	547.81	560.00	554.67	558.00
BOTTOM ("C"-24")	"E"	557.90	548.00	545.74	542.00	554.35	549.67	552.00
TOP OF STR.	"F"	564.90	555.00	552.74	548.50	561.35	556.17	559.50
T.F. SOUTH OR EAST	"G"	567.55	556.27	556.66	549.57	563.30	556.67	561.20
T.F. NORTH OR WEST	"H"	567.45	556.21	556.75	549.55	563.50	556.70	561.40

* ALL ORIFICES ARE 6" EXCEPT FOR VIIIA = 8"



NOTES:

1. CONSTRUCTION JOINT – SEALED WITH 1" DIA. BUTYL RUBBER OR EQUIVALENT.
2. DESIGN LOADING – STANDARD UNITS: AASHTO H10–44.
   OPTIONAL UNITS: AASHTO HS20–44.
   STEEL REINFORCEMENT – ASTM A615, GRADE 60, 1" MIN. COVER.
   CONCRETE MINIMUM STRENGTH– 5,000 P.S.I. @ 28 DAYS.
   MAXIMUM HEIGHT OF EACH ADDITIONAL PIECE 4'–0".
3. MAXIMUM INSIDE HEIGHT FOR 2 PIECE CHAMBER 8'–0". ROOF AND SIDE WALL OPENINGS AS SPECIFIED.
4. ADJUST M.H. FRAME TO SUIT REQUIRED FIELD HEIGHT.



SECTION A–A

SECTION B–B

UNDERGROUND STORAGE OUTLET STRUCTURE # IIA, IVA, VIA, VIIA, VIIIA, IXA, & XA.

N.T.S.

THE LODGES AT STORRS
Mansfield, CT
Storage Capacity
Stormtech Units SC-740

STAGE	ELEVATION (Ft.)	INCREMENTAL STORAGE (C.F.)	TOTAL STORAGE (C.F.)	TOTAL INCREMENTAL STORAGE (C.F.)	TOTAL 14 UNITS STORAGE (C.F.)
0.00	27.50	0.00	0.00		0.00
0.50	28.00	6.76	6.76	94.64	94.64
1.00	28.50	14.55	21.31	203.70	298.34
1.50	29.00	13.92	35.23	194.88	493.22
2.00	29.50	12.96	48.19	181.44	674.66
2.50	30.00	11.47	59.66	160.58	835.24
3.00	30.50	8.48	68.14	118.72	953.96
3.50	31.00	6.76	74.90	94.64	1048.60

THE LODGES AT STORRS
Mansfield, CT
Storage Capacity
Stormtech Units SC-740

STAGE	ELEVATION (Ft.)	INCREMENTAL STORAGE (C.F.)	TOTAL STORAGE (C.F.)	TOTAL INCREMENTAL STORAGE (C.F.)	TOTAL 20 UNITS STORAGE (C.F.)
0.00	27.50	0.00	0.00		0.00
0.50	28.00	6.76	6.76	135.20	135.20
1.00	28.50	14.55	21.31	291.00	426.20
1.50	29.00	13.92	35.23	278.40	704.60
2.00	29.50	12.96	48.19	259.20	963.80
2.50	30.00	11.47	59.66	229.40	1193.20
3.00	30.50	8.48	68.14	169.60	1362.80
3.50	31.00	6.76	74.90	135.20	1498.00

THE LODGES AT STORRS
Mansfield, CT
Storage Capacity
Stormtech Units SC-740

STAGE	ELEVATION (Ft.)	INCREMENTAL STORAGE (C.F.)	TOTAL STORAGE (C.F.)	TOTAL INCREMENTAL STORAGE (C.F.)	TOTAL 50 UNITS STORAGE (C.F.)
0.00	27.50	0.00	0.00		0.00
0.50	28.00	6.76	6.76	338.00	338.00
1.00	28.50	14.55	21.31	727.50	1065.50
1.50	29.00	13.92	35.23	696.00	1761.50
2.00	29.50	12.96	48.19	648.00	2409.50
2.50	30.00	11.47	59.66	573.50	2983.00
3.00	30.50	8.48	68.14	424.00	3407.00
3.50	31.00	6.76	74.90	338.00	3745.00

THE LODGES AT STORRS
Mansfield, CT
Storage Capacity
Stormtech Units SC-740

STAGE	ELEVATION (Ft.)	INCREMENTAL STORAGE (C.F.)	TOTAL STORAGE (C.F.)	TOTAL INCREMENTAL STORAGE (C.F.)	TOTAL 70 UNITS STORAGE (C.F.)
0.00	27.50	0.00	0.00		0.00
0.50	28.00	6.76	6.76	473.20	473.20
1.00	28.50	14.55	21.31	1018.50	1491.70
1.50	29.00	13.92	35.23	974.40	2466.10
2.00	29.50	12.96	48.19	907.20	3373.30
2.50	30.00	11.47	59.66	802.90	4176.20
3.00	30.50	8.48	68.14	593.60	4769.80
3.50	31.00	6.76	74.90	473.20	5243.00

THE LODGES AT STORRS
Mansfield, CT
Storage Capacity
Stormtech Units SC-740

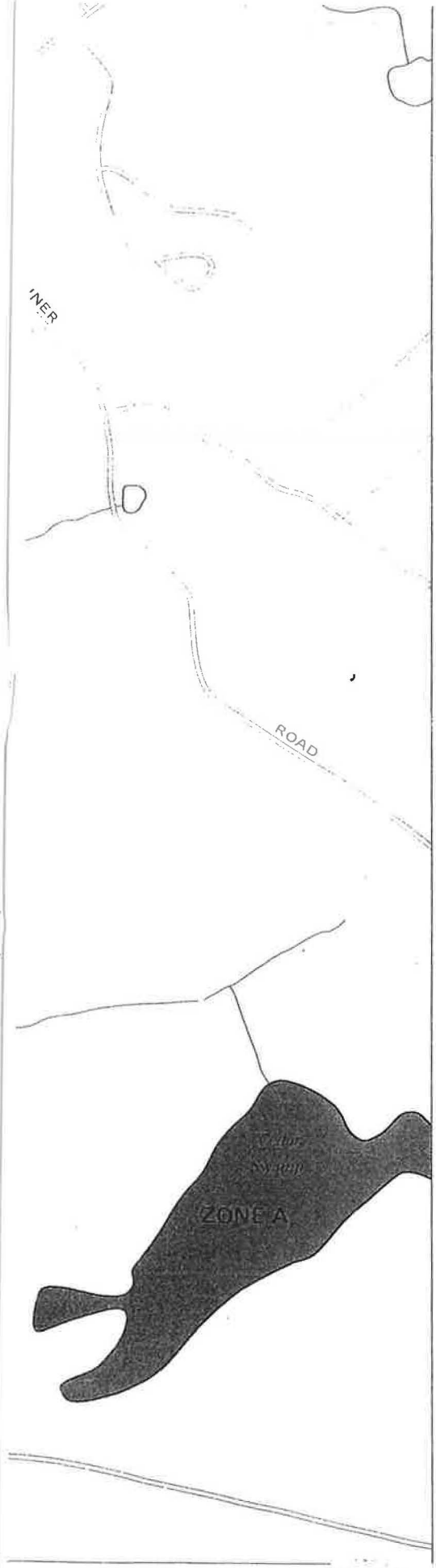
STAGE	ELEVATION (Ft.)	INCREMENTAL STORAGE (C.F.)	TOTAL STORAGE (C.F.)	TOTAL INCREMENTAL STORAGE (C.F.)	TOTAL 90 UNITS STORAGE (C.F.)
0.00	27.50	0.00	0.00		0.00
0.50	28.00	6.76	6.76	608.40	608.40
1.00	28.50	14.55	21.31	1309.50	1917.90
1.50	29.00	13.92	35.23	1252.80	3170.70
2.00	29.50	12.96	48.19	1166.40	4337.10
2.50	30.00	11.47	59.66	1032.30	5369.40
3.00	30.50	8.48	68.14	763.20	6132.60
3.50	31.00	6.76	74.90	608.40	6741.00

THE LODGES AT STORRS
Mansfield, CT
Storage Capacity
Stormtech Units SC-740

STAGE	ELEVATION (Ft.)	INCREMENTAL STORAGE (C.F.)	TOTAL STORAGE (C.F.)	TOTAL INCREMENTAL STORAGE (C.F.)	TOTAL 100 UNITS STORAGE (C.F.)
0.00	27.50	0.00	0.00		0.00
0.50	28.00	6.76	6.76	676.00	676.00
1.00	28.50	14.55	21.31	1455.00	2131.00
1.50	29.00	13.92	35.23	1392.00	3523.00
2.00	29.50	12.96	48.19	1296.00	4819.00
2.50	30.00	11.47	59.66	1147.00	5966.00
3.00	30.50	8.48	68.14	848.00	6814.00
3.50	31.00	6.76	74.90	676.00	7490.00

THE LODGES AT STORRS
Mansfield, CT
Storage Capacity
Stormtech Units SC-740

STAGE	ELEVATION (Ft.)	INCREMENTAL STORAGE (C.F.)	TOTAL STORAGE (C.F.)	TOTAL INCREMENTAL STORAGE (C.F.)	TOTAL 150 UNITS STORAGE (C.F.)
0.00	27.50	0.00	0.00		0.00
0.50	28.00	6.76	6.76	1014.00	1014.00
1.00	28.50	14.55	21.31	2182.50	3196.50
1.50	29.00	13.92	35.23	2088.00	5284.50
2.00	29.50	12.96	48.19	1944.00	7228.50
2.50	30.00	11.47	59.66	1720.50	8949.00
3.00	30.50	8.48	68.14	1272.00	10221.00
3.50	31.00	6.76	74.90	1014.00	11235.00



To determine if flood insurance is available in this community, contact your insurance agent, or call the National Flood Insurance Program, at (800) 638-6620, or (800) 424-8872.

APPROXIMATE SCALE

1000 0 1000 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

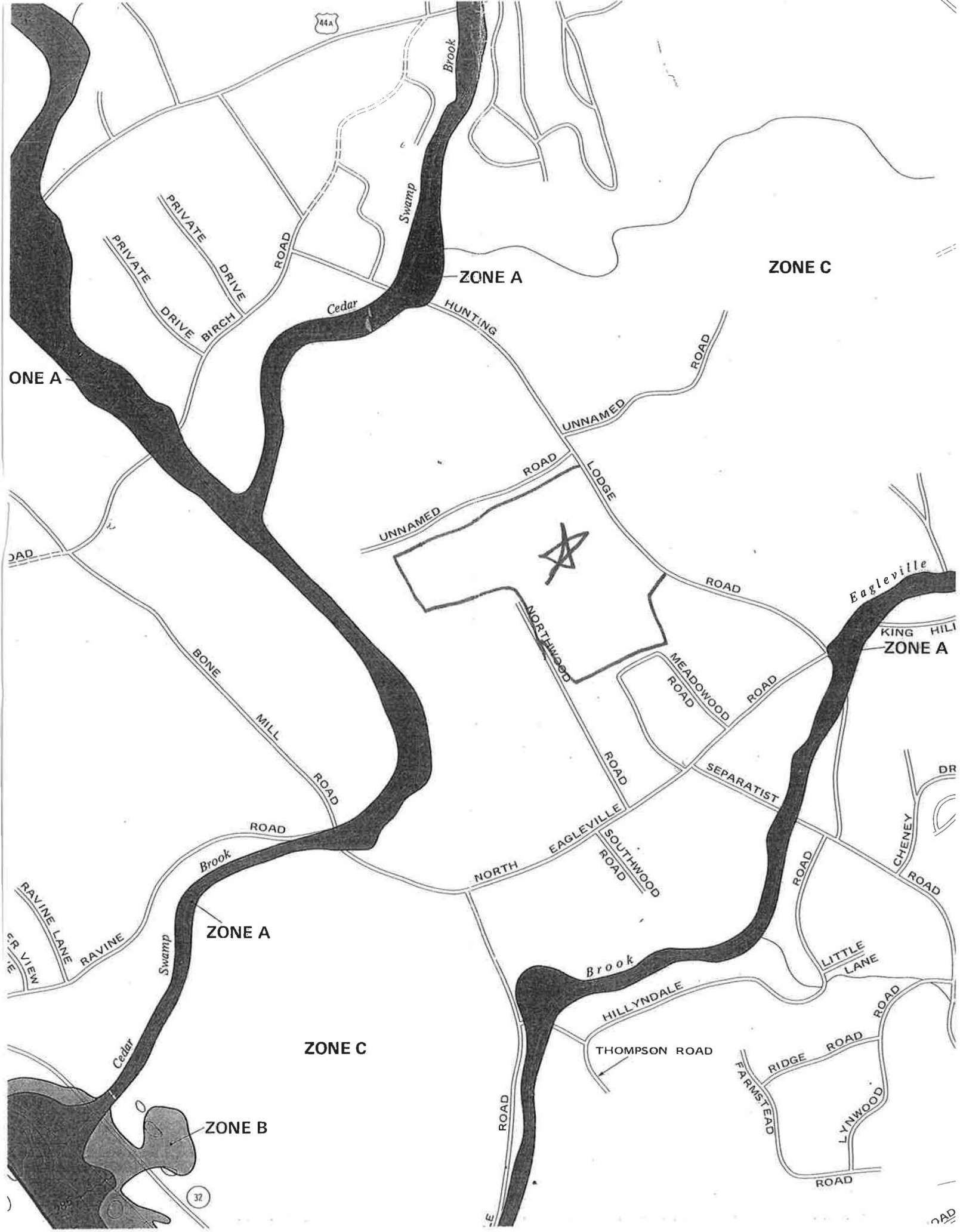
TOWN OF
MANSFIELD,
CONNECTICUT
TOLLAND COUNTY

PANEL 5 OF 20

COMMUNITY-PANEL NUMBER
090128 0005 C

EFFECTIVE DATE:
JANUARY 2, 1981

federal emergency management agency
federal insurance administration


ZONE A
ZONE C
ONE A
ZONE A
ZONE A
ZONE C
ZONE B
Brook
Swamp
Cedar
Swamp
Brook
Cedar
Brook
Eagleville
Brook
PRIVATE DRIVE
PRIVATE DRIVE
BIRCH
ROAD
HUNTING
ROAD
UNNAMED
ROAD
UNNAMED
ROAD
LODGE
ROAD
NORTHWOOD
ROAD
MEADOWOOD
ROAD
ROAD
BONE
MILL
ROAD
ROAD
SEPARATIST
ROAD
NORTH
EAGLEVILLE
ROAD
SOUTHWOOD
ROAD
ROAD
CHENEY
ROAD
RAVINE LANE
RAVINE
LITTLE
LANE
HILLYNDALE
THOMPSON ROAD
ROAD
RIDGE
ROAD
FARMSTEAD
LYNWOOD
ROAD
ROAD
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COMPUTER OUTPUT DATA

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04161e-2016-2.gpw

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Wednesday, Mar 30, 2016

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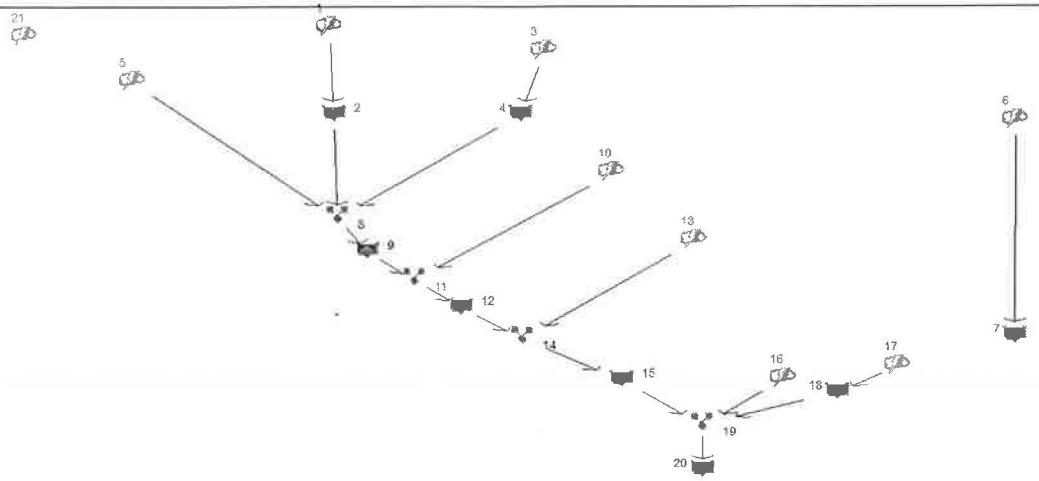
Watershed Model Schematic

Hydraflow Hydrographs by Intelisolve v9.1



Legend

Hyd.	Origin	Description
1	Rational	Watershed A
2	Reservoir	Watershed A
3	Rational	Watershed B
4	Reservoir	Watershed B
5	Rational	Watershed E
6	Rational	Watershed G
7	Reservoir	Watershed G
8	Combine	Watershed A+B+E
9	Reservoir	Watershed E-POINT Z
10	Rational	Watershed F
11	Combine	Watershed A+B+E+F
12	Reservoir	Watershed F
13	Rational	Watershed H
14	Combine	Watershed F+H
15	Reservoir	Watershed H
16	Rational	Watershed C
17	Rational	Watershed I
18	Reservoir	Watershed I
19	Combine	Watershed H+C+I
20	Reservoir	Watershed C-POINT X
21	Rational	Watershed D-POINT Y

Hydrograph Return Period Recap

Hydraflow Hydrographs by Intelisolve v9.1

Hyd. No.	Hydrograph type (origin)	Inflow Hyd(s)	Peak Outflow (cfs)								Hydrograph description
			1-Yr	2-Yr	3-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	
1	Rational	-------	-------	5.109	-------	-------	7.312	8.549	9.466	10.35	Watershed A
2	Reservoir	1	-------	1.946	-------	-------	2.822	3.158	3.353	3.537	Watershed A
3	Rational	-------	-------	3.906	-------	-------	5.507	6.396	7.054	7.676	Watershed B
4	Reservoir	3	-------	0.678	-------	-------	1.167	1.471	1.698	1.932	Watershed B
5	Rational	-------	-------	20.18	-------	-------	29.71	35.02	39.24	43.46	Watershed E
6	Rational	-------	-------	4.196	-------	-------	6.102	7.174	7.989	8.794	Watershed G
7	Reservoir	6	-------	0.007	-------	-------	0.007	0.007	0.007	0.007	Watershed G
8	Combine	2, 4, 5,	-------	22.67	-------	-------	33.59	39.56	44.19	48.82	Watershed A+B+E
9	Reservoir	8	-------	8.665	-------	-------	16.32	20.43	23.58	27.95	Watershed E-POINT Z
10	Rational	-------	-------	11.23	-------	-------	16.23	19.04	21.16	23.22	Watershed F
11	Combine	9, 10	-------	12.31	-------	-------	18.65	23.93	27.92	32.04	Watershed A+B+E+F
12	Reservoir	11	-------	0.723	-------	-------	1.089	3.112	4.871	6.650	Watershed F
13	Rational	-------	-------	2.781	-------	-------	4.003	4.691	5.204	5.704	Watershed H
14	Combine	12, 13	-------	2.848	-------	-------	4.100	4.805	5.332	6.650	Watershed F+H
15	Reservoir	14	-------	0.726	-------	-------	1.019	1.823	2.575	3.164	Watershed H
16	Rational	-------	-------	2.781	-------	-------	3.998	4.682	5.193	5.689	Watershed C
17	Rational	-------	-------	1.662	-------	-------	2.315	2.674	2.942	3.190	Watershed I
18	Reservoir	17	-------	1.643	-------	-------	2.292	2.648	2.913	3.161	Watershed I
19	Combine	15, 16, 18	-------	3.619	-------	-------	5.202	6.097	6.770	7.417	Watershed H+C+I
20	Reservoir	19	-------	3.284	-------	-------	4.649	5.386	5.989	6.576	Watershed C-POINT X
21	Rational	-------	-------	9.989	-------	-------	14.44	16.94	18.82	20.66	Watershed D-POINT Y

Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	Rational	5.109	1	17	6,957	----	------	------	Watershed A
2	Reservoir	1.946	1	34	6,874	1	565.38	4,594	Watershed A
3	Rational	3.906	1	14	4,238	----	------	------	Watershed B
4	Reservoir	0.678	1	32	4,090	3	566.82	3,470	Watershed B
5	Rational	20.18	1	29	47,456	----	------	------	Watershed E
6	Rational	4.196	1	22	7,534	----	------	------	Watershed G
7	Reservoir	0.007	1	59	1,109	6	546.20	7,409	Watershed G
8	Combine	22.67	1	29	58,187	2, 4, 5,	------	------	Watershed A+B+E
9	Reservoir	8.665	1	60	58,175	8	541.90	34,294	Watershed E-POINT Z
10	Rational	11.23	1	20	17,944	----	------	------	Watershed F
11	Combine	12.31	1	20	75,699	9, 10	------	------	Watershed A+B+E+F
12	Reservoir	0.723	1	265	64,772	11	538.91	59,610	Watershed F
13	Rational	2.781	1	19	4,163	----	------	------	Watershed H
14	Combine	2.848	1	19	66,357	12, 13	------	------	Watershed F+H
15	Reservoir	0.726	1	20	65,804	14	535.97	1,402	Watershed H
16	Rational	2.781	1	18	4,076	----	------	------	Watershed C
17	Rational	1.662	1	12	1,535	----	------	------	Watershed I
18	Reservoir	1.643	1	12	601	17	531.39	20.7	Watershed I
19	Combine	3.619	1	12	70,409	15, 16, 18	------	------	Watershed H+C+I
20	Reservoir	3.284	1	20	70,365	19	529.64	501	Watershed C-POINT X
21	Rational	9.989	1	20	16,002	----	------	------	Watershed D-POINT Y

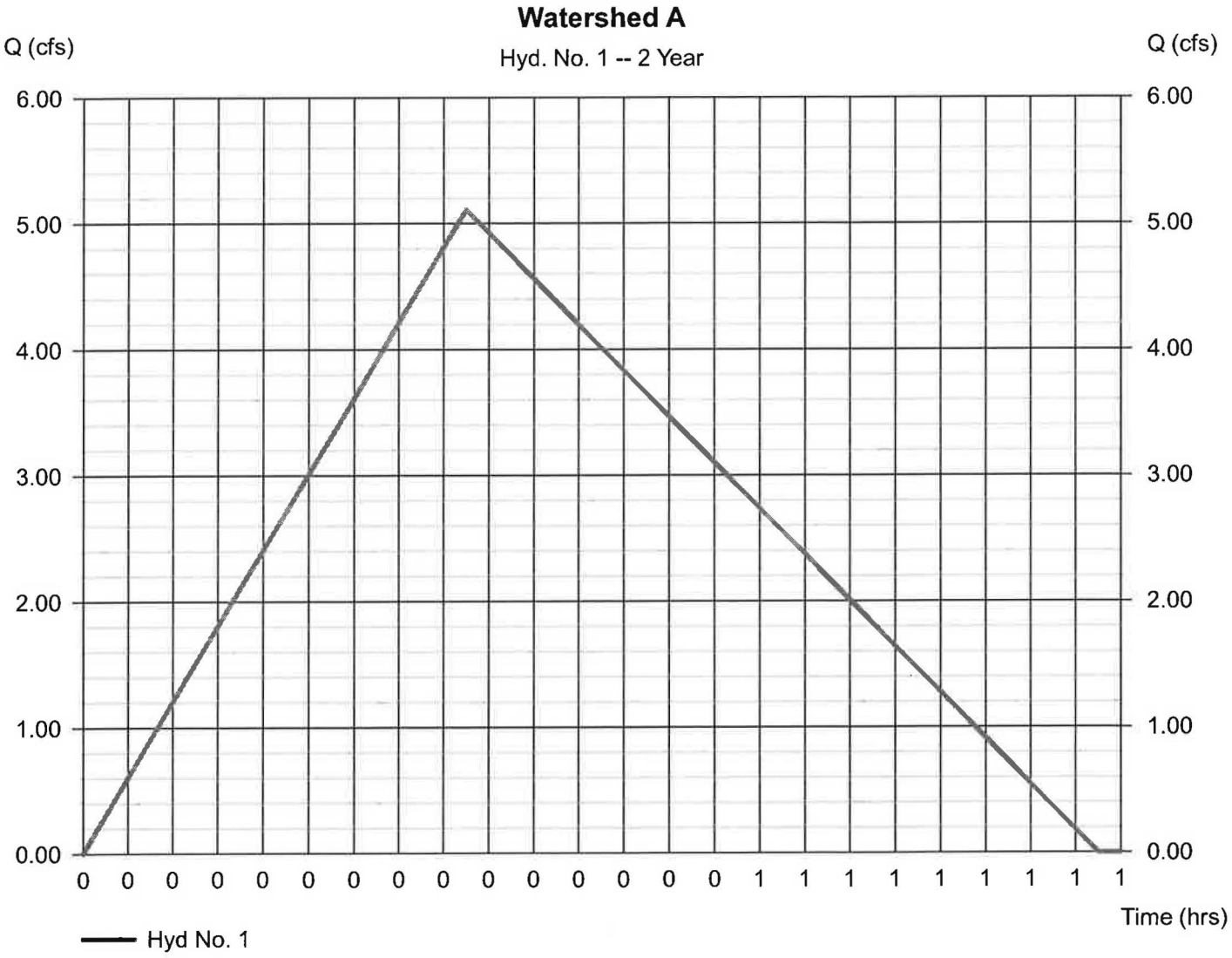
Hydrograph Report

Hyd. No. 1

Watershed A

Hydrograph type	= Rational	Peak discharge	= 5.109 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.28 hrs
Time interval	= 1 min	Hyd. volume	= 6,957 cuft
Drainage area	= 8.000 ac	Runoff coeff.	= 0.24*
Intensity	= 2.661 in/hr	Tc by TR55	= 17.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.400 x 0.90) + (0.500 x 0.30) + (7.100 x 0.20)] / 8.000



TR55 Tc Worksheet

Hyd. No. 1

Watershed A

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.400		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.20		0.00		0.00		
Land slope (%)	= 6.00		0.00		0.00		
Travel Time (min)	**= 13.84**	**+**	**0.00**	**+**	**0.00**	**=**	**13.84**
Shallow Concentrated Flow							
Flow length (ft)	= 624.00		0.00		0.00		
Watercourse slope (%)	= 3.36		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	= 2.96		0.00		0.00		
Travel Time (min)	**= 3.52**	**+**	**0.00**	**+**	**0.00**	**=**	**3.52**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	= 0.00		0.00		0.00		
Flow length (ft)	= 0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 17.00 min

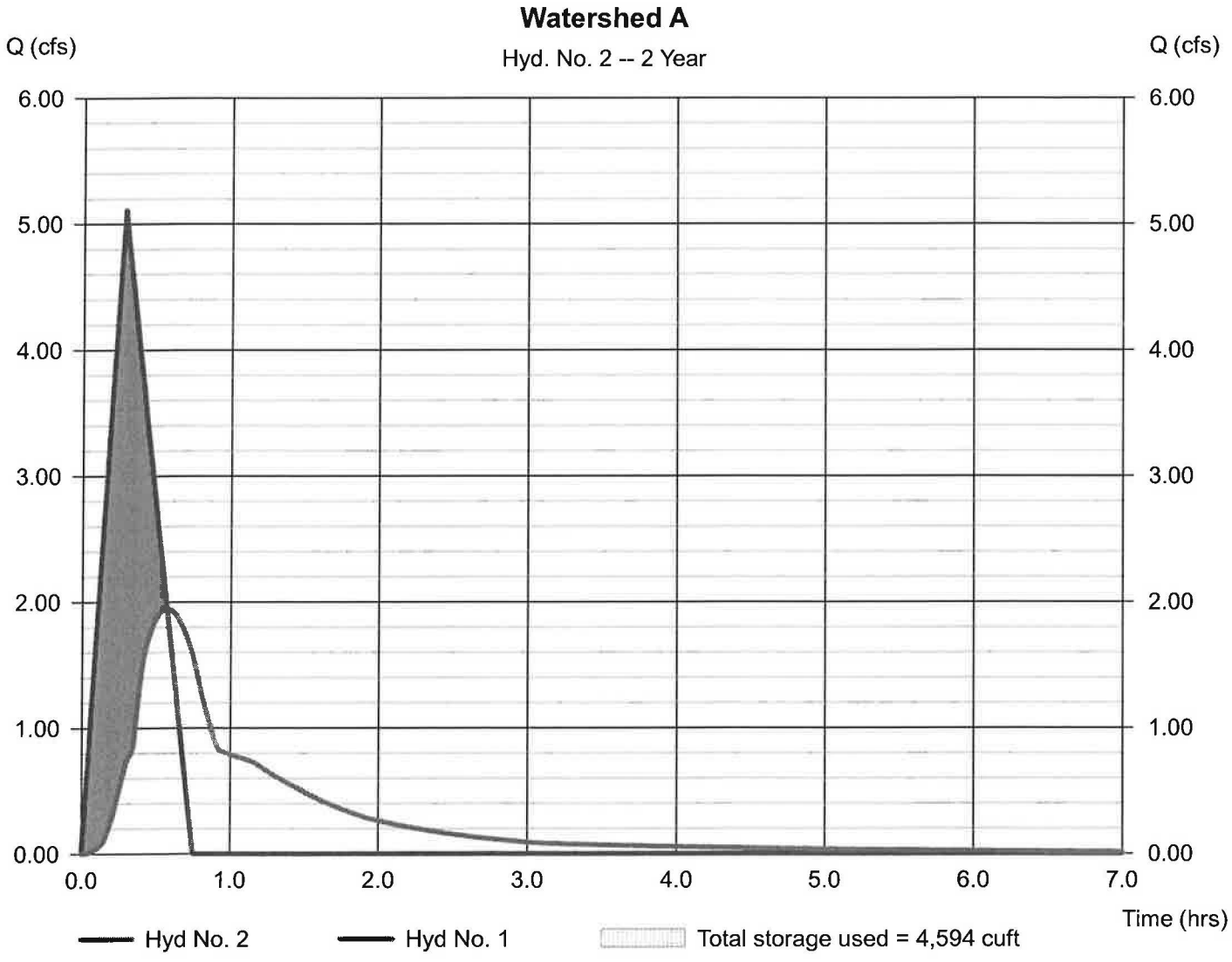
Hydrograph Report

Hyd. No. 2

Watershed A

Hydrograph type	= Reservoir	Peak discharge	= 1.946 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.57 hrs
Time interval	= 1 min	Hyd. volume	= 6,874 cuft
Inflow hyd. No.	= 1 - Watershed A	Max. Elevation	= 565.38 ft
Reservoir name	= Watershed A	Max. Storage	= 4,594 cuft

Storage Indication method used.



Pond No. 1 - Watershed A

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 563.99 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	563.99	1,590	0	0
0.01	564.00	1,600	16	16
2.01	566.00	5,440	6,660	6,675
3.11	567.10	5,500	6,016	12,692
4.01	568.00	6,000	5,173	17,865

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	0.00	0.00	0.00
Span (in)	= 12.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 563.99	0.00	0.00	0.00
Length (ft)	= 30.79	0.00	0.00	0.00
Slope (%)	= 0.23	0.00	0.00	n/a
N-Value	= .024	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 118.50	0.00	0.00	0.00
Crest El. (ft)	= 567.10	0.00	0.00	0.00
Weir Coeff.	= 2.60	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No
Exfil.(in/hr)	= 0.000 (by Wet area)			
TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	563.99	0.00	---	---	---	0.00	---	---	---	---	---	0.00
0.00	2	563.99	0.00 oc	---	---	---	0.00	---	---	---	---	---	0.00
0.00	3	563.99	0.00 oc	---	---	---	0.00	---	---	---	---	---	0.00
0.00	5	563.99	0.00 oc	---	---	---	0.00	---	---	---	---	---	0.00
0.00	6	563.99	0.00 oc	---	---	---	0.00	---	---	---	---	---	0.00
0.01	8	563.99	0.00 oc	---	---	---	0.00	---	---	---	---	---	0.00
0.01	10	564.00	0.00 oc	---	---	---	0.00	---	---	---	---	---	0.00
0.01	11	564.00	0.00 oc	---	---	---	0.00	---	---	---	---	---	0.00
0.01	13	564.00	0.00 oc	---	---	---	0.00	---	---	---	---	---	0.00
0.01	14	564.00	0.00 oc	---	---	---	0.00	---	---	---	---	---	0.00
0.01	16	564.00	0.00 oc	---	---	---	0.00	---	---	---	---	---	0.00
0.21	682	564.20	0.08 oc	---	---	---	0.00	---	---	---	---	---	0.08
0.41	1,348	564.40	0.28 oc	---	---	---	0.00	---	---	---	---	---	0.28
0.61	2,014	564.60	0.52 oc	---	---	---	0.00	---	---	---	---	---	0.52
0.81	2,680	564.80	0.73 oc	---	---	---	0.00	---	---	---	---	---	0.73
1.01	3,346	565.00	0.82 oc	---	---	---	0.00	---	---	---	---	---	0.82
1.21	4,012	565.20	1.53 oc	---	---	---	0.00	---	---	---	---	---	1.53
1.41	4,678	565.40	2.00 oc	---	---	---	0.00	---	---	---	---	---	2.00
1.61	5,344	565.60	2.39 oc	---	---	---	0.00	---	---	---	---	---	2.39
1.81	6,010	565.80	2.71 oc	---	---	---	0.00	---	---	---	---	---	2.71
2.01	6,675	566.00	3.01 oc	---	---	---	0.00	---	---	---	---	---	3.01
2.12	7,277	566.11	3.15 oc	---	---	---	0.00	---	---	---	---	---	3.15
2.23	7,879	566.22	3.30 oc	---	---	---	0.00	---	---	---	---	---	3.30
2.34	8,480	566.33	3.43 oc	---	---	---	0.00	---	---	---	---	---	3.43
2.45	9,082	566.44	3.57 oc	---	---	---	0.00	---	---	---	---	---	3.57
2.56	9,684	566.55	3.69 oc	---	---	---	0.00	---	---	---	---	---	3.69
2.67	10,285	566.66	3.81 oc	---	---	---	0.00	---	---	---	---	---	3.81
2.78	10,887	566.77	3.93 oc	---	---	---	0.00	---	---	---	---	---	3.93
2.89	11,489	566.88	4.05 oc	---	---	---	0.00	---	---	---	---	---	4.05
3.00	12,090	566.99	4.16 oc	---	---	---	0.00	---	---	---	---	---	4.16
3.11	12,692	567.10	4.27 oc	---	---	---	0.00	---	---	---	---	---	4.27
3.20	13,209	567.19	4.36 oc	---	---	---	8.32	---	---	---	---	---	12.68
3.29	13,726	567.28	4.44 oc	---	---	---	23.54	---	---	---	---	---	27.98
3.38	14,244	567.37	4.53 oc	---	---	---	43.26	---	---	---	---	---	47.79
3.47	14,761	567.46	4.61 oc	---	---	---	66.58	---	---	---	---	---	71.19
3.56	15,278	567.55	4.69 oc	---	---	---	93.05	---	---	---	---	---	97.74
3.65	15,796	567.64	4.77 oc	---	---	---	122.29	---	---	---	---	---	127.06

Continues on next page...

Watershed A

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
3.74	16,313	567.73	4.85 oc	---	---	---	154.16	---	---	---	---	---	159.00
3.83	16,830	567.82	4.92 oc	---	---	---	188.31	---	---	---	---	---	193.24
3.92	17,347	567.91	5.00 oc	---	---	---	224.71	---	---	---	---	---	229.71
4.01	17,865	568.00	5.07 oc	---	---	---	263.07	---	---	---	---	---	268.15

...End

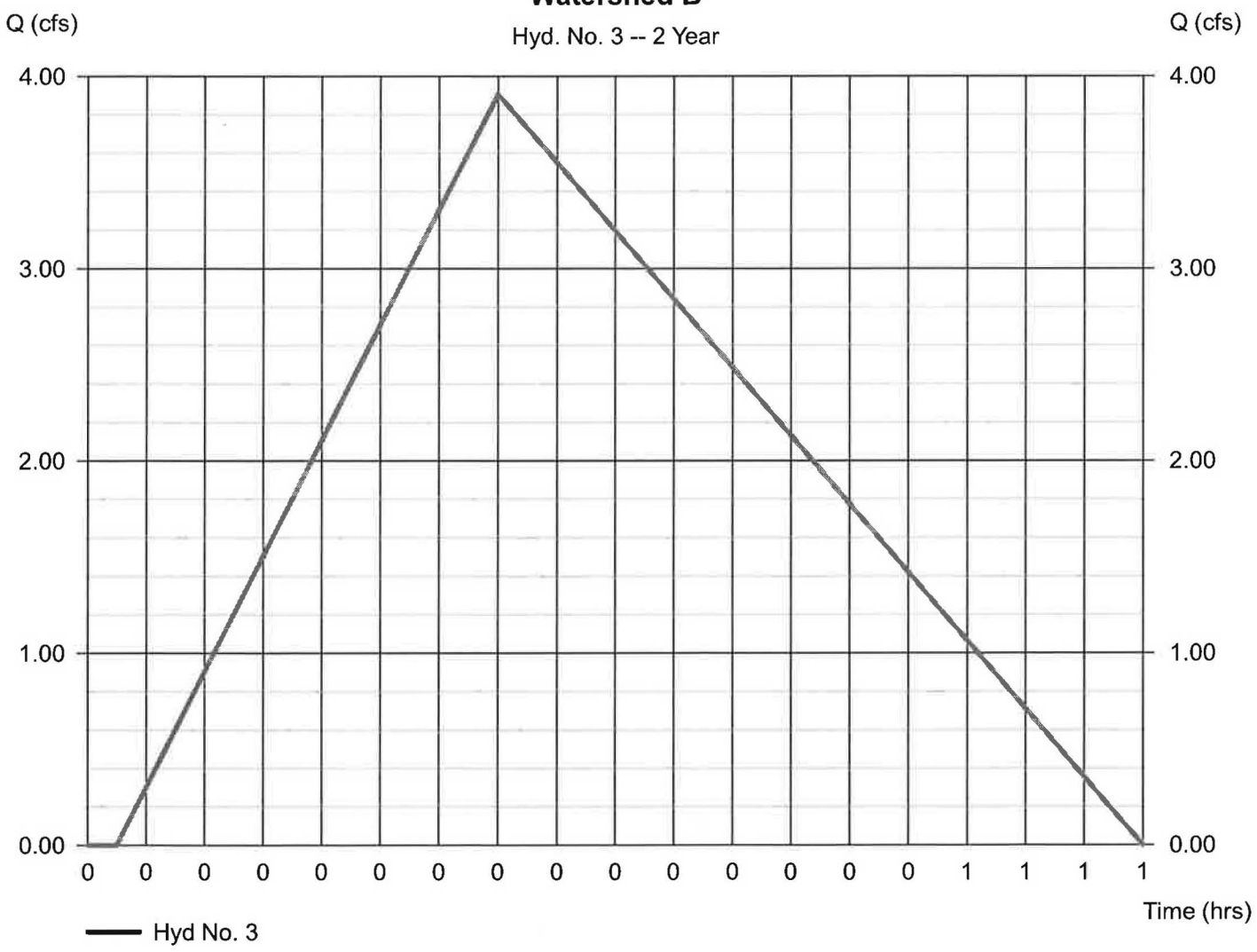
Hydrograph Report

Hyd. No. 3

Watershed B

Hydrograph type	= Rational	Peak discharge	= 3.906 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.23 hrs
Time interval	= 1 min	Hyd. volume	= 4,238 cuft
Drainage area	= 5.200 ac	Runoff coeff.	= 0.25*
Intensity	= 3.005 in/hr	Tc by TR55	= 13.54 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.300 x 0.90) + (0.500 x 0.30) + (4.400 x 0.20)] / 5.200



TR55 Tc Worksheet

Hyd. No. 3

Watershed B

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.400	0.011	0.011	
Flow length (ft)	= 100.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.20	0.00	0.00	
Land slope (%)	= 12.00	0.00	0.00	
Travel Time (min)	**= 10.49**	**+ 0.00**	**+ 0.00**	**= 10.49**
Shallow Concentrated Flow				
Flow length (ft)	= 479.00	0.00	0.00	
Watercourse slope (%)	= 2.62	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	= 2.61	0.00	0.00	
Travel Time (min)	**= 3.06**	**+ 0.00**	**+ 0.00**	**= 3.06**
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	= 0.00	0.00	0.00	
Flow length (ft)	= 0.0	0.0	0.0	
Travel Time (min)	**= 0.00**	**+ 0.00**	**+ 0.00**	**= 0.00**

Total Travel Time, Tc ..... 13.54 min

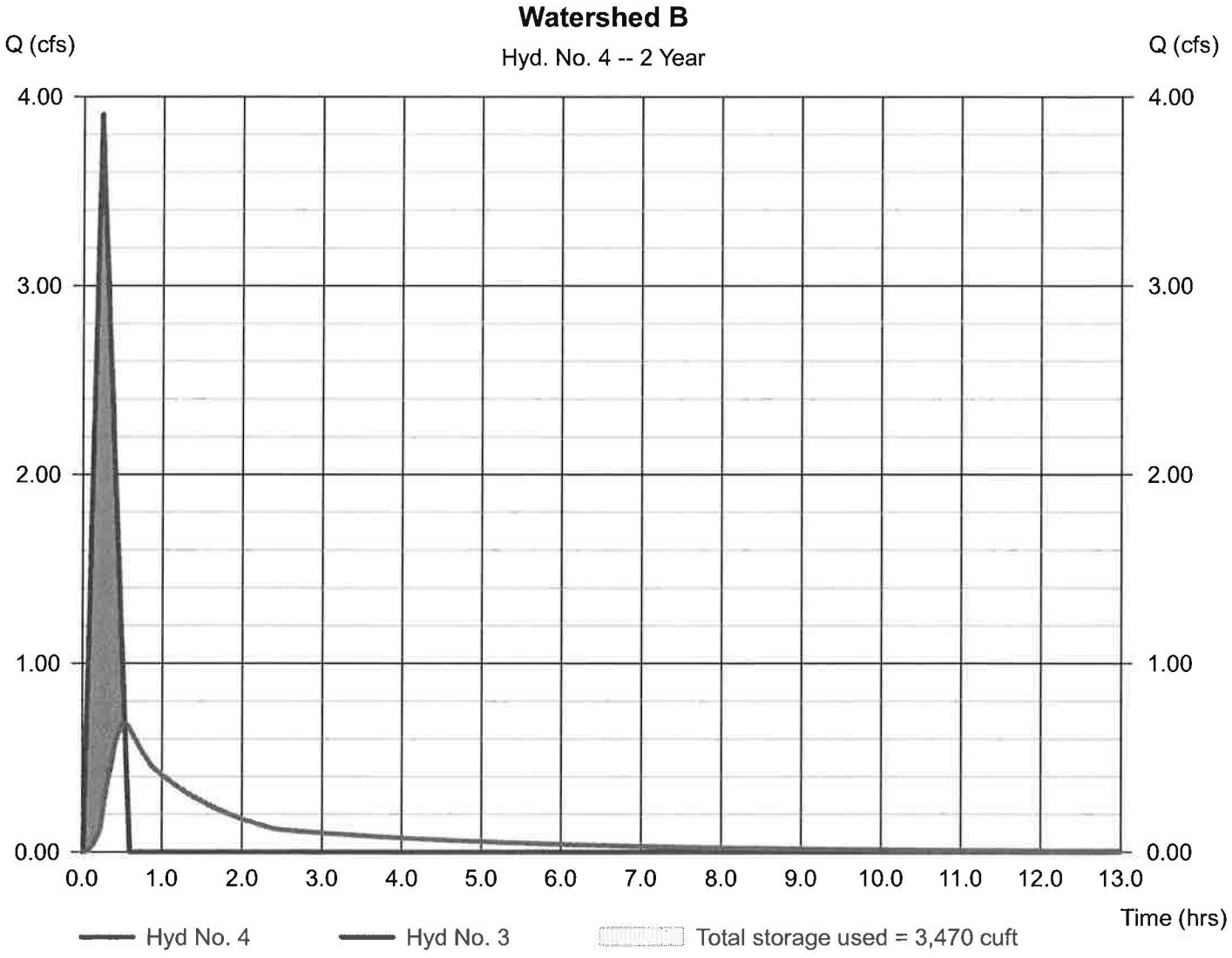
Hydrograph Report

Hyd. No. 4

Watershed B

Hydrograph type	= Reservoir	Peak discharge	= 0.678 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.53 hrs
Time interval	= 1 min	Hyd. volume	= 4,090 cuft
Inflow hyd. No.	= 3 - Watershed B	Max. Elevation	= 566.82 ft
Reservoir name	= Watershed B	Max. Storage	= 3,470 cuft

Storage Indication method used.



Pond Report

Pond No. 2 - Watershed B

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 566.44 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	566.44	8,300	0	0
1.56	568.00	10,080	14,313	14,313

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.00	0.00	0.00	0.00
Span (in)	= 15.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 566.44	0.00	0.00	0.00
Length (ft)	= 27.15	0.00	0.00	0.00
Slope (%)	= 12.19	0.00	0.00	n/a
N-Value	= .024	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	566.44	0.00	---	---	---	---	---	---	---	---	---	0.00
0.16	1,431	566.60	0.12 ic	---	---	---	---	---	---	---	---	---	0.12
0.31	2,863	566.75	0.46 ic	---	---	---	---	---	---	---	---	---	0.46
0.47	4,294	566.91	0.98 ic	---	---	---	---	---	---	---	---	---	0.98
0.62	5,725	567.06	1.65 ic	---	---	---	---	---	---	---	---	---	1.65
0.78	7,156	567.22	2.42 ic	---	---	---	---	---	---	---	---	---	2.42
0.94	8,588	567.38	3.25 ic	---	---	---	---	---	---	---	---	---	3.25
1.09	10,019	567.53	4.05 ic	---	---	---	---	---	---	---	---	---	4.05
1.25	11,450	567.69	4.67 ic	---	---	---	---	---	---	---	---	---	4.67
1.40	12,881	567.84	5.21 ic	---	---	---	---	---	---	---	---	---	5.21
1.56	14,313	568.00	5.71 ic	---	---	---	---	---	---	---	---	---	5.71

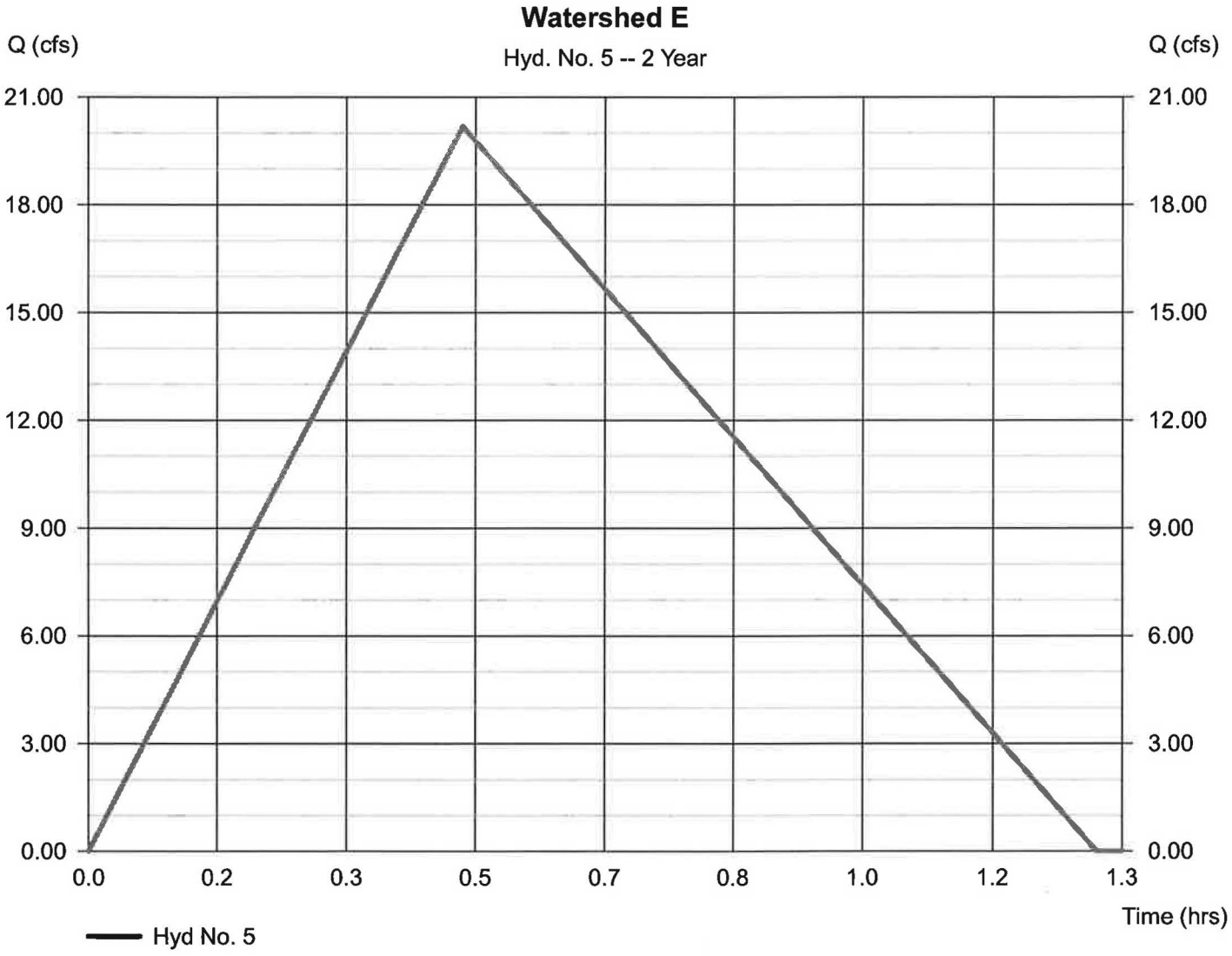
Hydrograph Report

Hyd. No. 5

Watershed E

Hydrograph type	= Rational	Peak discharge	= 20.18 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.48 hrs
Time interval	= 1 min	Hyd. volume	= 47,456 cuft
Drainage area	= 40.300 ac	Runoff coeff.	= 0.26*
Intensity	= 1.926 in/hr	Tc by TR55	= 29.36 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(2.100 x 0.90) + (7.700 x 0.30) + (30.500 x 0.20)] / 40.300



TR55 Tc Worksheet

Hyd. No. 5

Watershed E

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.240	0.016	0.011	
Flow length (ft)	= 95.0	75.0	0.0	
Two-year 24-hr precip. (in)	= 3.20	3.20	0.00	
Land slope (%)	= 3.15	5.33	0.00	
Travel Time (min)	**= 11.42**	**+ 0.88**	**+ 0.00**	**= 12.30**
Shallow Concentrated Flow				
Flow length (ft)	= 211.00	0.00	0.00	
Watercourse slope (%)	= 4.00	0.00	0.00	
Surface description	= Paved	Paved	Paved	
Average velocity (ft/s)	= 4.07	0.00	0.00	
Travel Time (min)	**= 0.86**	**+ 0.00**	**+ 0.00**	**= 0.86**
Channel Flow				
X sectional flow area (sqft)	= 1.23	1.50	0.00	
Wetted perimeter (ft)	= 3.93	4.24	0.00	
Channel slope (%)	= 1.65	1.13	0.00	
Manning's n-value	= 0.015	0.040	0.015	
Velocity (ft/s)	= 5.85	1.97	0.00	
Flow length (ft)	= 543.0	1732.0	0.0	
Travel Time (min)	**= 1.55**	**+ 14.65**	**+ 0.00**	**= 16.19**

Total Travel Time, Tc ..... 29.36 min

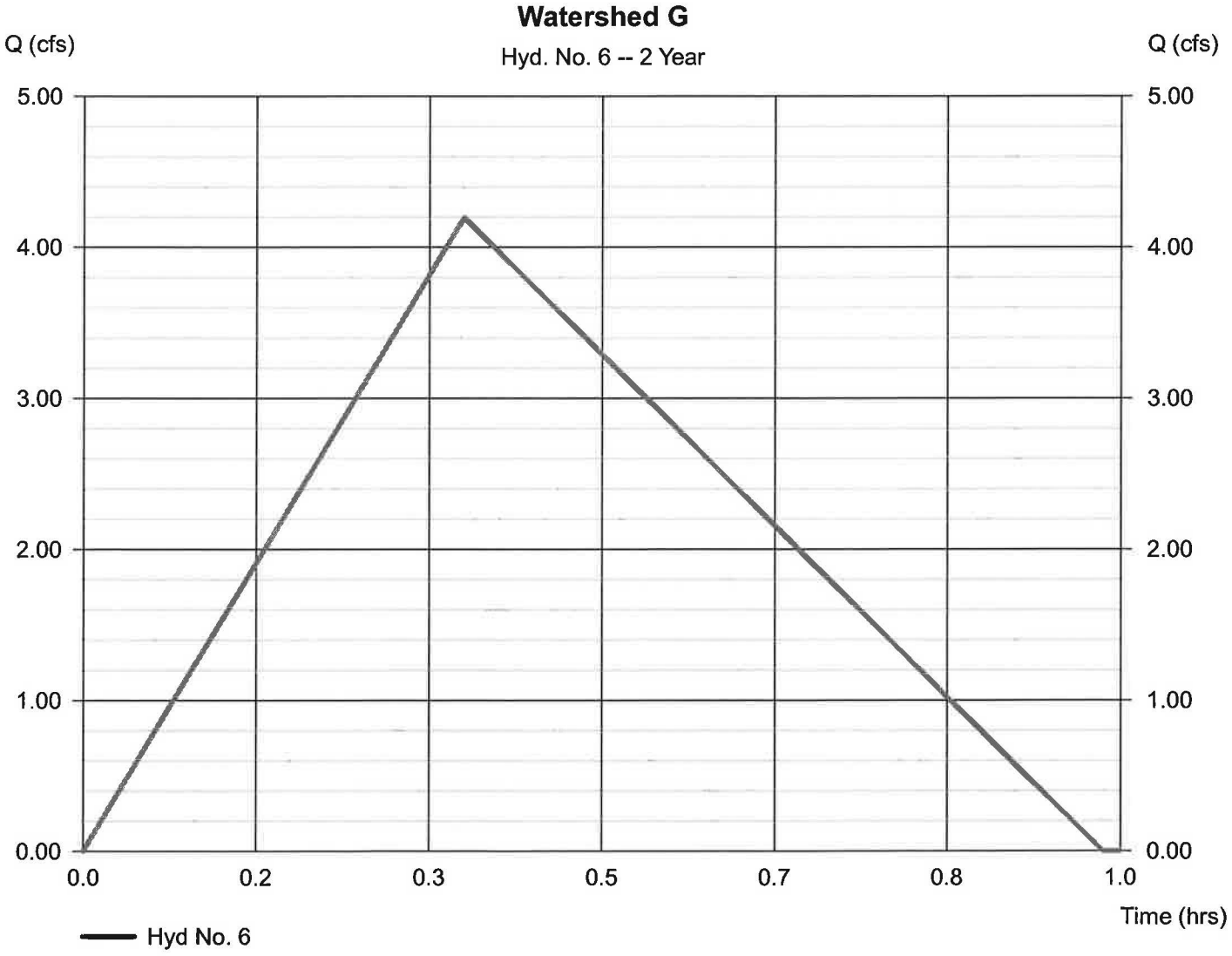
Hydrograph Report

Hyd. No. 6

Watershed G

Hydrograph type	= Rational	Peak discharge	= 4.196 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.37 hrs
Time interval	= 1 min	Hyd. volume	= 7,534 cuft
Drainage area	= 7.700 ac	Runoff coeff.	= 0.24*
Intensity	= 2.271 in/hr	Tc by TR55	= 22.41 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.300 x 0.90) + (0.800 x 0.30) + (6.600 x 0.20)] / 7.700



TR55 Tc Worksheet

Hyd. No. 6

Watershed G

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.400	0.011	0.011	
Flow length (ft)	= 100.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.20	0.00	0.00	
Land slope (%)	= 2.90	0.00	0.00	
Travel Time (min)	**= 18.51**	**+ 0.00**	**+ 0.00**	**= 18.51**
Shallow Concentrated Flow				
Flow length (ft)	= 598.00	0.00	0.00	
Watercourse slope (%)	= 2.50	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	= 2.55	0.00	0.00	
Travel Time (min)	**= 3.91**	**+ 0.00**	**+ 0.00**	**= 3.91**
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	= 0.00	0.00	0.00	
Flow length (ft)	= 0.0	0.0	0.0	
Travel Time (min)	**= 0.00**	**+ 0.00**	**+ 0.00**	**= 0.00**

Total Travel Time, Tc ..... 22.41 min

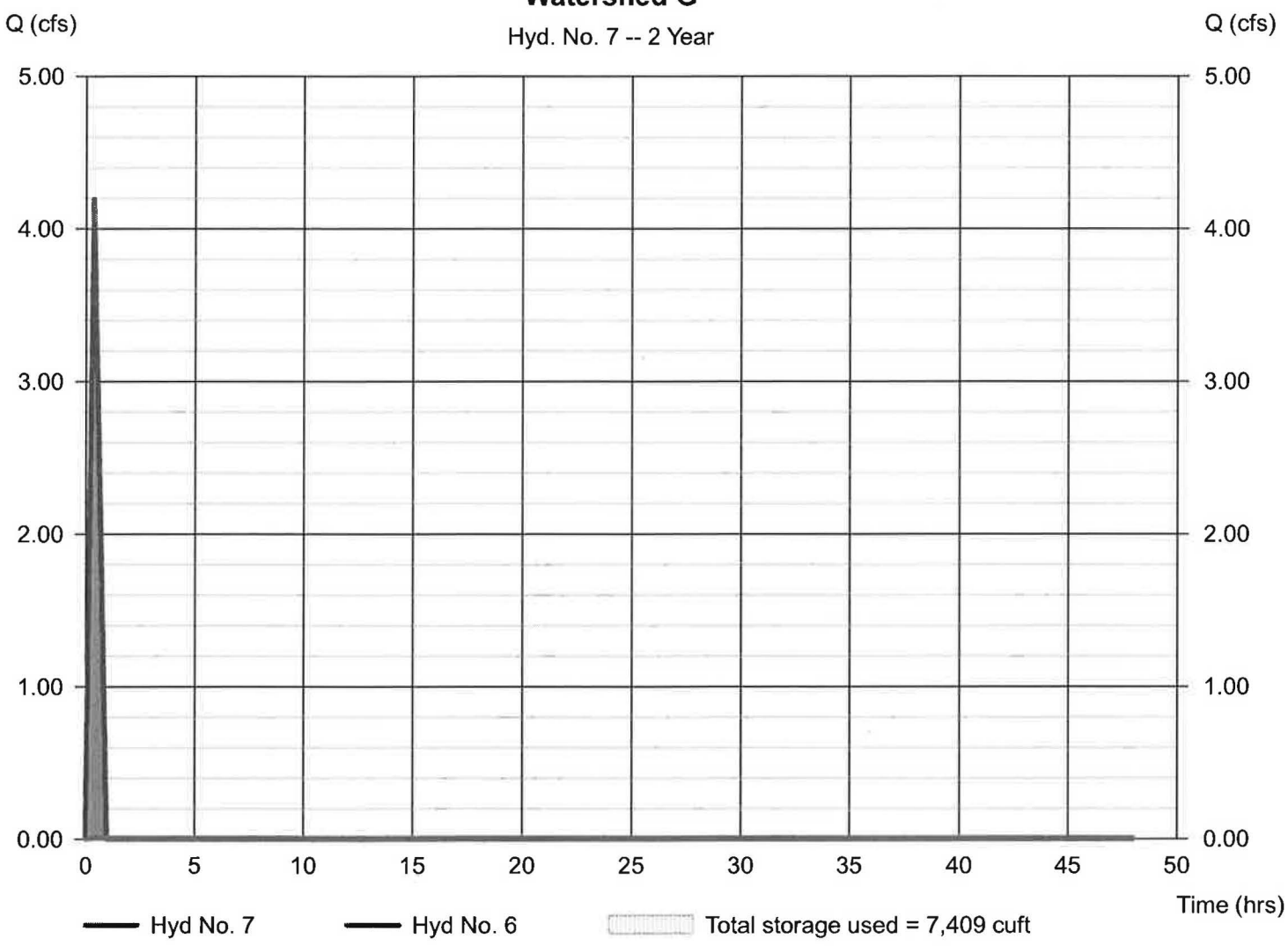
Hydrograph Report

Hyd. No. 7

Watershed G

Hydrograph type	= Reservoir	Peak discharge	= 0.007 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.98 hrs
Time interval	= 1 min	Hyd. volume	= 1,109 cuft
Inflow hyd. No.	= 6 - Watershed G	Max. Elevation	= 546.20 ft
Reservoir name	= Watershed G	Max. Storage	= 7,409 cuft

Storage Indication method used.



Pond No. 5 - Watershed G

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 545.20 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	545.20	00	0	0
0.80	546.00	5,000	1,333	1,333
2.80	548.00	67,000	60,196	61,529

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.50	0.00	0.00	0.00
Span (in)	= 0.50	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 545.20	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

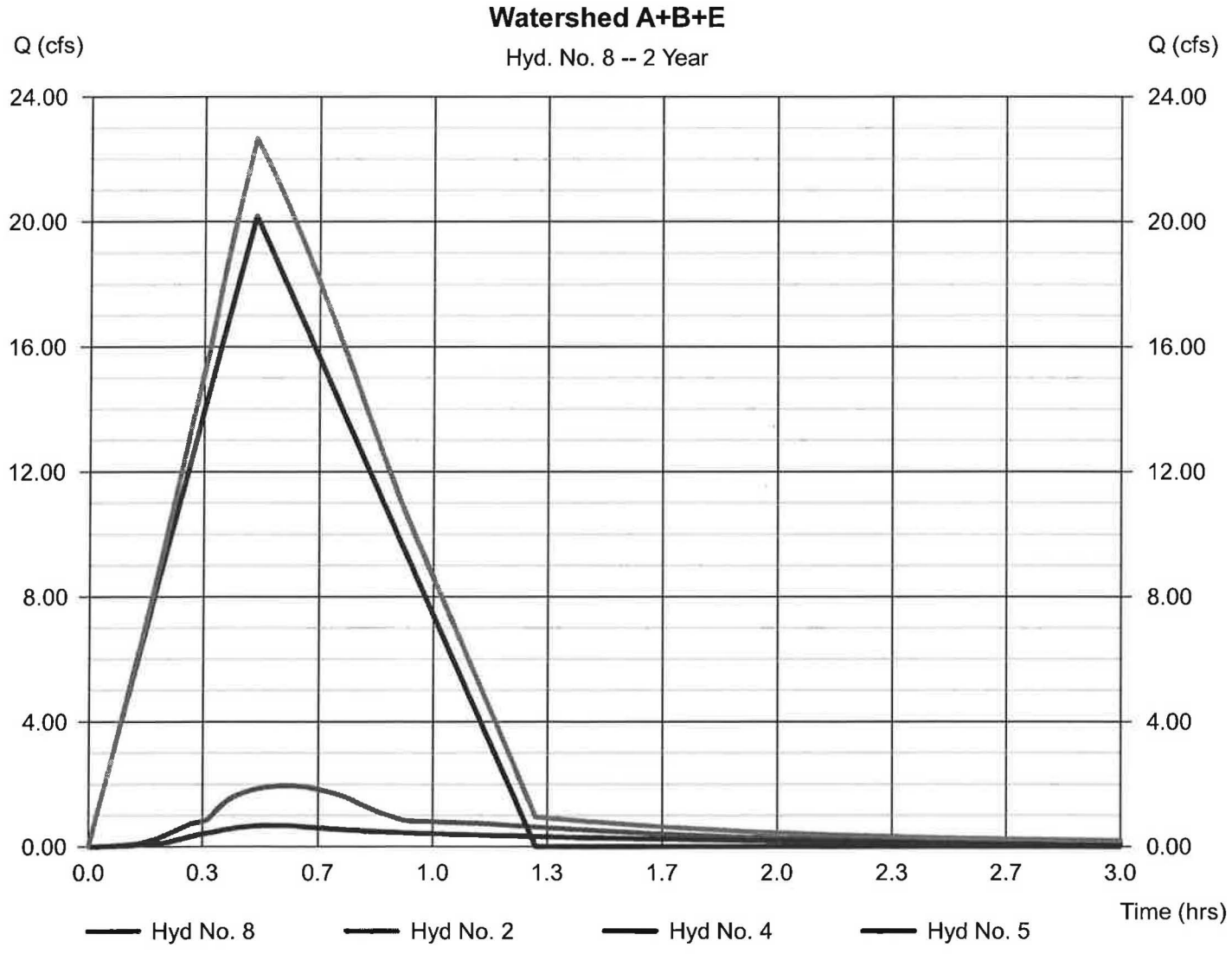
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	545.20	0.00	---	---	---	---	---	---	---	---	---	0.00
0.08	133	545.28	0.00 ic	---	---	---	---	---	---	---	---	---	0.00
0.16	267	545.36	0.00 ic	---	---	---	---	---	---	---	---	---	0.00
0.24	400	545.44	0.00 ic	---	---	---	---	---	---	---	---	---	0.00
0.32	533	545.52	0.00 ic	---	---	---	---	---	---	---	---	---	0.00
0.40	667	545.60	0.00 ic	---	---	---	---	---	---	---	---	---	0.00
0.48	800	545.68	0.00 ic	---	---	---	---	---	---	---	---	---	0.00
0.56	933	545.76	0.00 ic	---	---	---	---	---	---	---	---	---	0.00
0.64	1,067	545.84	0.01 ic	---	---	---	---	---	---	---	---	---	0.01
0.72	1,200	545.92	0.01 ic	---	---	---	---	---	---	---	---	---	0.01
0.80	1,333	546.00	0.01 ic	---	---	---	---	---	---	---	---	---	0.01
1.00	7,353	546.20	0.01 ic	---	---	---	---	---	---	---	---	---	0.01
1.20	13,372	546.40	0.01 ic	---	---	---	---	---	---	---	---	---	0.01
1.40	19,392	546.60	0.01 ic	---	---	---	---	---	---	---	---	---	0.01
1.60	25,412	546.80	0.01 ic	---	---	---	---	---	---	---	---	---	0.01
1.80	31,431	547.00	0.01 ic	---	---	---	---	---	---	---	---	---	0.01
2.00	37,451	547.20	0.01 ic	---	---	---	---	---	---	---	---	---	0.01
2.20	43,470	547.40	0.01 ic	---	---	---	---	---	---	---	---	---	0.01
2.40	49,490	547.60	0.01 ic	---	---	---	---	---	---	---	---	---	0.01
2.60	55,510	547.80	0.01 ic	---	---	---	---	---	---	---	---	---	0.01
2.80	61,529	548.00	0.01 ic	---	---	---	---	---	---	---	---	---	0.01

Hydrograph Report

Hyd. No. 8

Watershed A+B+E

Hydrograph type	= Combine	Peak discharge	= 22.67 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.48 hrs
Time interval	= 1 min	Hyd. volume	= 58,187 cuft
Inflow hyds.	= 2, 4, 5	Contrib. drain. area	= 40.300 ac



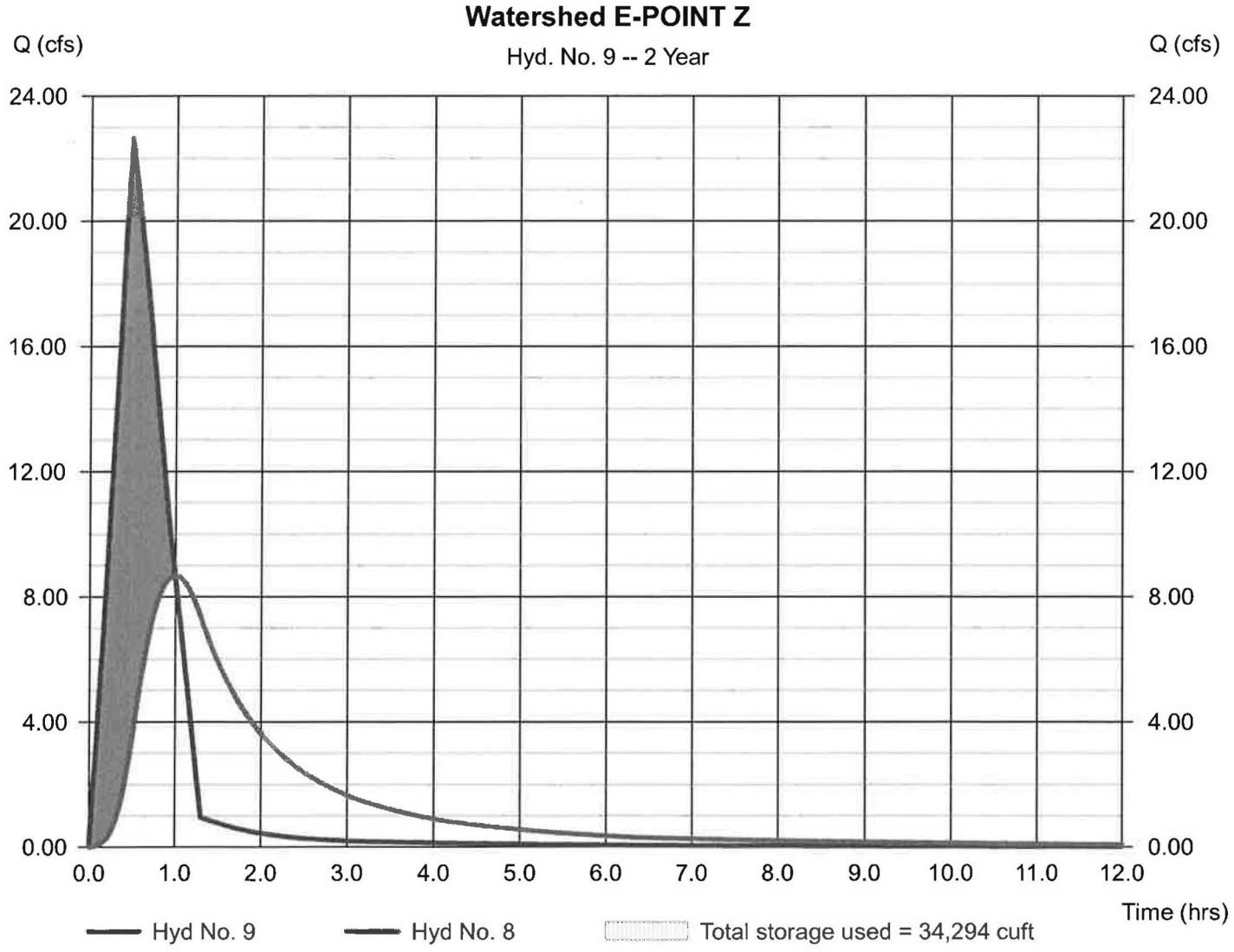
Hydrograph Report

Hyd. No. 9

Watershed E-POINT Z

Hydrograph type	= Reservoir	Peak discharge	= 8.665 cfs
Storm frequency	= 2 yrs	Time to peak	= 1.00 hrs
Time interval	= 1 min	Hyd. volume	= 58,175 cuft
Inflow hyd. No.	= 8 - Watershed A+B+E	Max. Elevation	= 541.90 ft
Reservoir name	= Watershed E	Max. Storage	= 34,294 cuft

Storage Indication method used.



Pond No. 9 - Watershed E

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 540.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	540.50	00	0	0
1.50	542.00	73,263	36,628	36,628
3.50	544.00	126,744	197,560	234,187

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 2.00	52.50	149.00	0.00
Crest El. (ft)	= 540.50	542.00	544.00	0.00
Weir Coeff.	= 2.60	2.60	2.60	3.33
Weir Type	= Broad	Broad	Broad	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	540.50	---	---	---	---	0.00	0.00	0.00	---	---	---	0.00
0.15	3,663	540.65	---	---	---	---	0.30	0.00	0.00	---	---	---	0.30
0.30	7,326	540.80	---	---	---	---	0.85	0.00	0.00	---	---	---	0.85
0.45	10,988	540.95	---	---	---	---	1.57	0.00	0.00	---	---	---	1.57
0.60	14,651	541.10	---	---	---	---	2.42	0.00	0.00	---	---	---	2.42
0.75	18,314	541.25	---	---	---	---	3.38	0.00	0.00	---	---	---	3.38
0.90	21,977	541.40	---	---	---	---	4.44	0.00	0.00	---	---	---	4.44
1.05	25,639	541.55	---	---	---	---	5.60	0.00	0.00	---	---	---	5.60
1.20	29,302	541.70	---	---	---	---	6.84	0.00	0.00	---	---	---	6.84
1.35	32,965	541.85	---	---	---	---	8.16	0.00	0.00	---	---	---	8.16
1.50	36,628	542.00	---	---	---	---	9.55	0.00	0.00	---	---	---	9.55
1.70	56,384	542.20	---	---	---	---	11.53	12.21	0.00	---	---	---	23.74
1.90	76,140	542.40	---	---	---	---	13.62	34.54	0.00	---	---	---	48.15
2.10	95,896	542.60	---	---	---	---	15.83	63.45	0.00	---	---	---	79.27
2.30	115,652	542.80	---	---	---	---	18.14	97.68	0.00	---	---	---	115.82
2.50	135,408	543.00	---	---	---	---	20.56	136.51	0.00	---	---	---	157.07
2.70	155,164	543.20	---	---	---	---	23.07	179.45	0.00	---	---	---	202.52
2.90	174,920	543.40	---	---	---	---	25.68	226.13	0.00	---	---	---	251.81
3.10	194,676	543.60	---	---	---	---	28.38	276.28	0.00	---	---	---	304.67
3.30	214,432	543.80	---	---	---	---	31.17	329.67	0.00	---	---	---	360.85
3.50	234,187	544.00	---	---	---	---	34.05	386.08	0.00	---	---	---	420.13

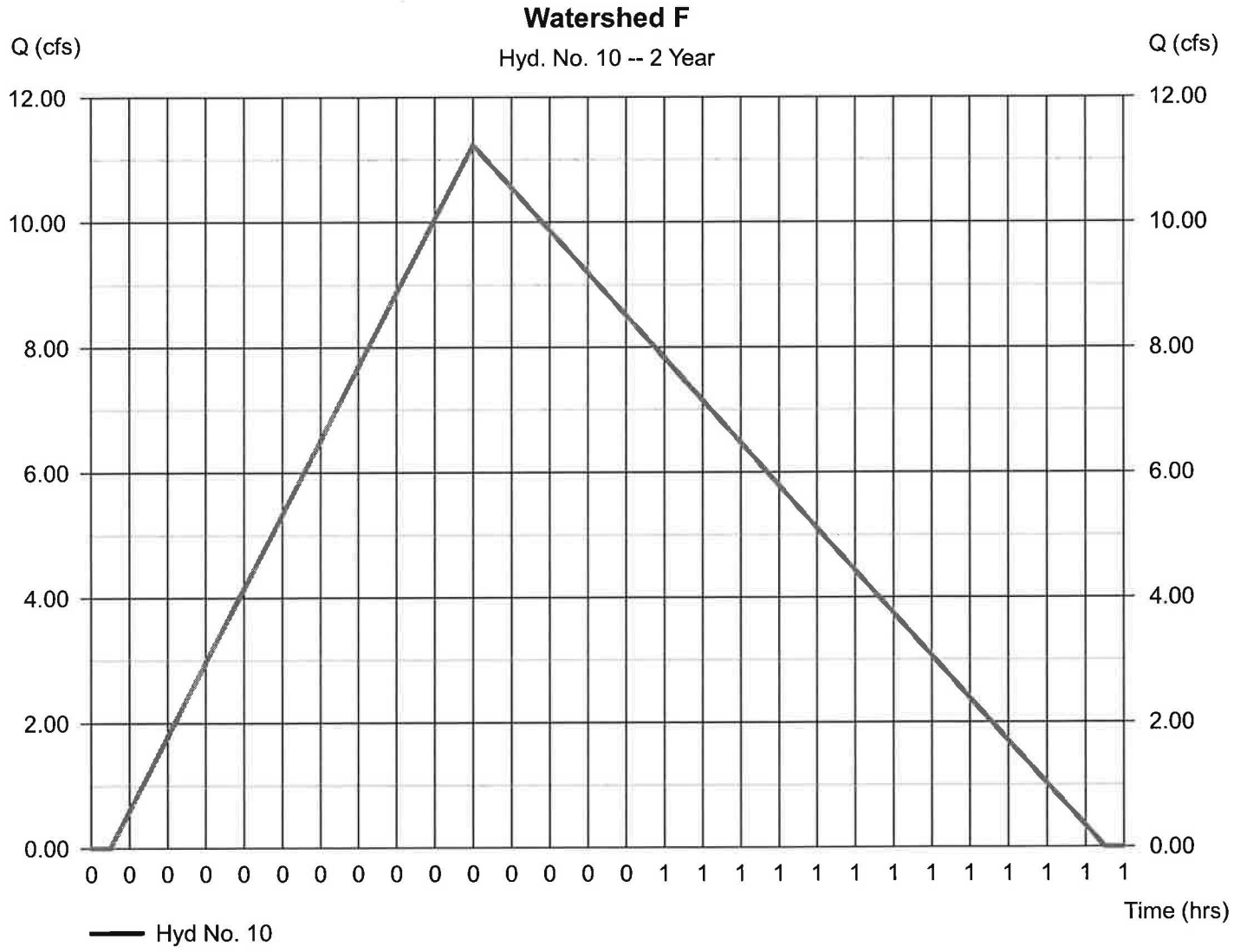
Hydrograph Report

Hyd. No. 10

Watershed F

Hydrograph type	= Rational	Peak discharge	= 11.23 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.33 hrs
Time interval	= 1 min	Hyd. volume	= 17,944 cuft
Drainage area	= 15.400 ac	Runoff coeff.	= 0.3*
Intensity	= 2.431 in/hr	Tc by TR55	= 19.94 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.000 x 0.90) + (5.100 x 0.30) + (8.800 x 0.20) + (0.500 x 1.00)] / 15.400



TR55 Tc Worksheet

Hyd. No. 10

Watershed F

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.400	0.016	0.011	
Flow length (ft)	= 100.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.20	0.00	0.00	
Land slope (%)	= 6.20	0.00	0.00	
Travel Time (min)	**= 13.66**	**+ 0.00**	**+ 0.00**	**= 13.66**
Shallow Concentrated Flow				
Flow length (ft)	= 242.00	319.00	0.00	
Watercourse slope (%)	= 0.82	1.70	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	= 1.46	2.65	0.00	
Travel Time (min)	**= 2.76**	**+ 2.01**	**+ 0.00**	**= 4.77**
Channel Flow				
X sectional flow area (sqft)	= 5.00	0.00	0.00	
Wetted perimeter (ft)	= 7.47	0.00	0.00	
Channel slope (%)	= 1.65	0.00	0.00	
Manning's n-value	= 0.040	0.015	0.015	
Velocity (ft/s)	= 3.66	0.00	0.00	
Flow length (ft)	= 333.0	0.0	0.0	
Travel Time (min)	**= 1.52**	**+ 0.00**	**+ 0.00**	**= 1.52**

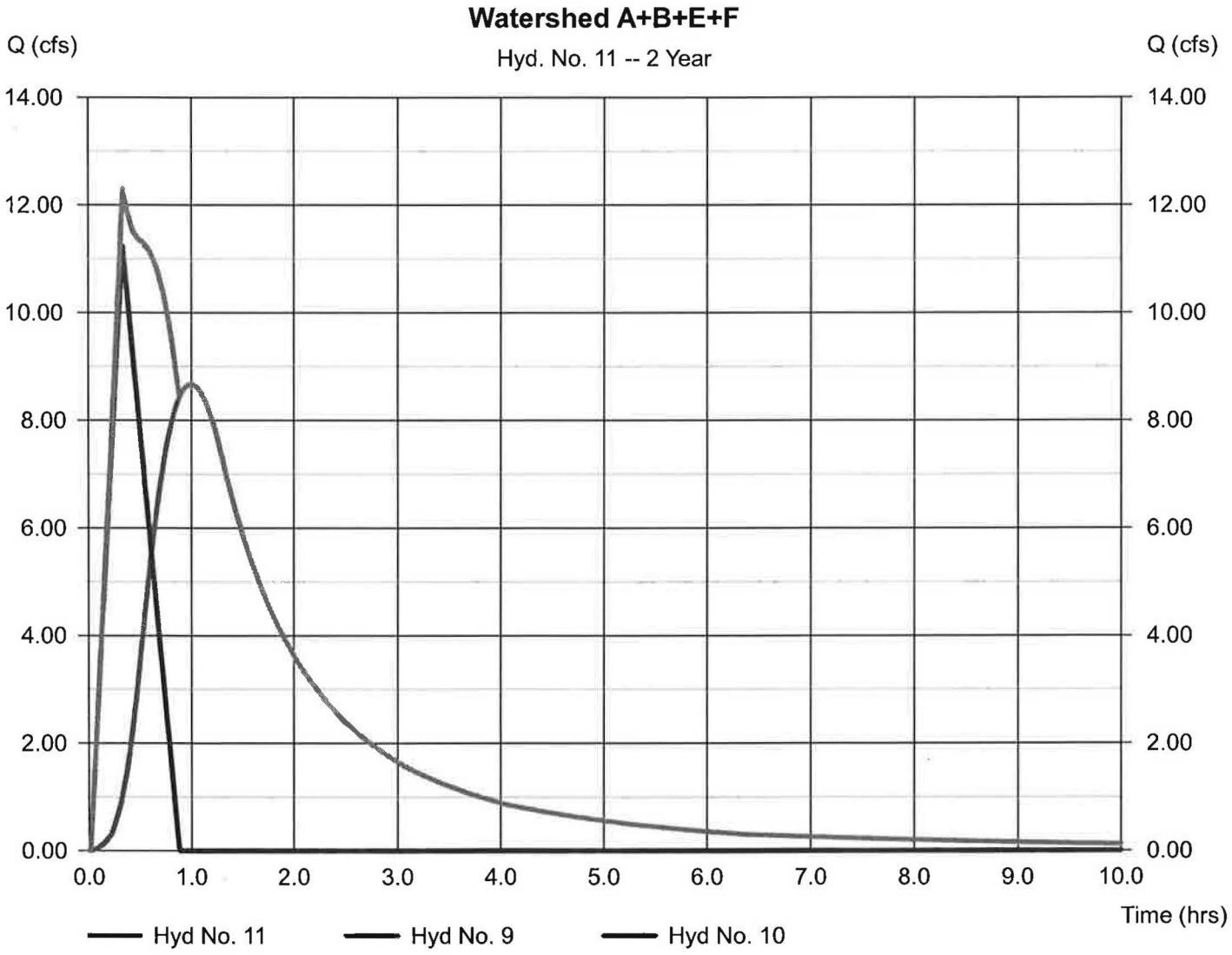
Total Travel Time, Tc ..... 19.94 min

Hydrograph Report

Hyd. No. 11

Watershed A+B+E+F

Hydrograph type	= Combine	Peak discharge	= 12.31 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.33 hrs
Time interval	= 1 min	Hyd. volume	= 75,699 cuft
Inflow hyds.	= 9, 10	Contrib. drain. area	= 15.400 ac



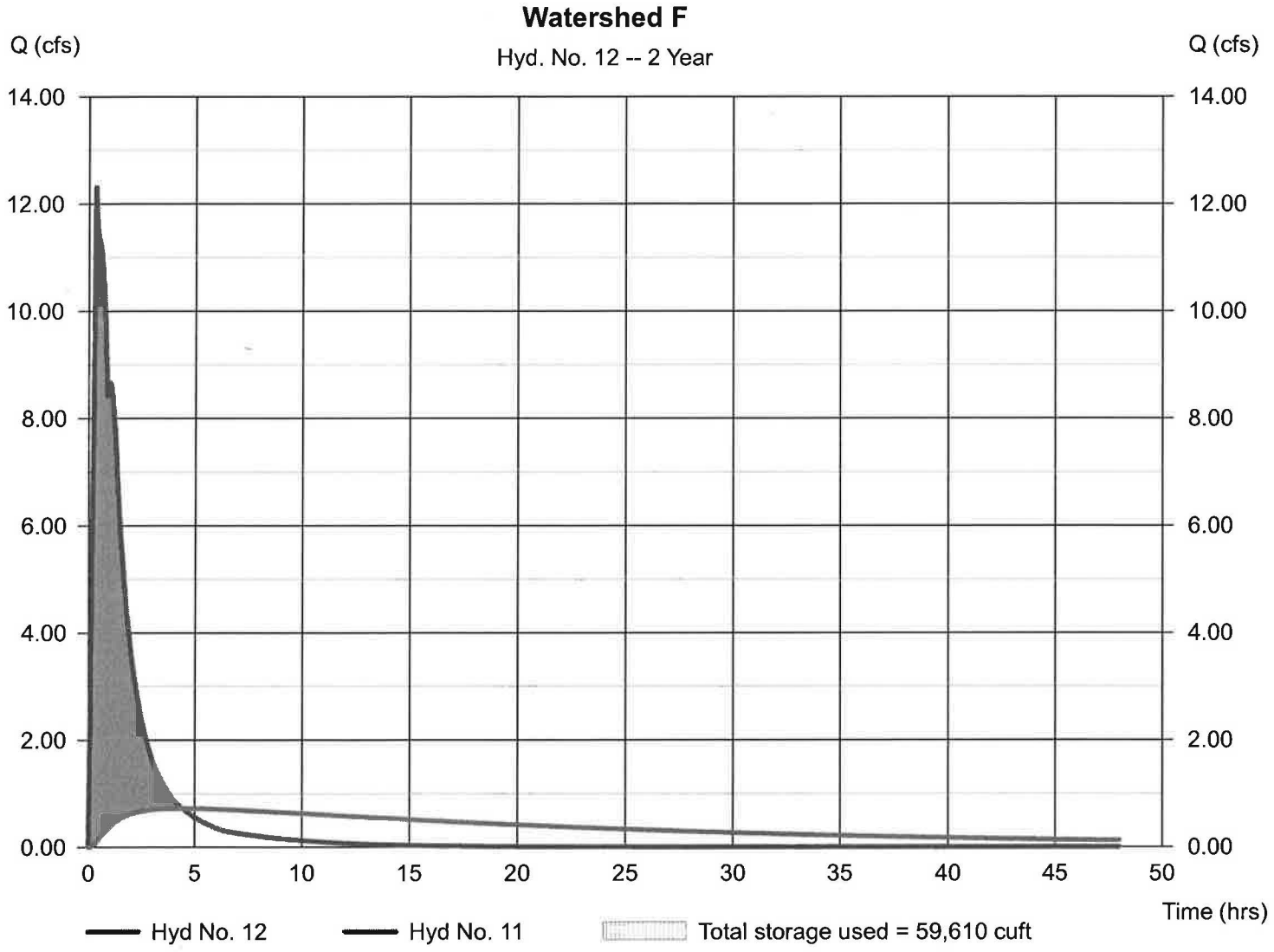
Hydrograph Report

Hyd. No. 12

Watershed F

Hydrograph type	= Reservoir	Peak discharge	= 0.723 cfs
Storm frequency	= 2 yrs	Time to peak	= 4.42 hrs
Time interval	= 1 min	Hyd. volume	= 64,772 cuft
Inflow hyd. No.	= 11 - Watershed A+B+E+F	Max. Elevation	= 538.91 ft
Reservoir name	= Watershed F	Max. Storage	= 59,610 cuft

Storage Indication method used.



Pond No. 3 - Watershed F

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 538.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	538.00	46,741	0	0
2.00	540.00	86,762	131,443	131,443

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	0.00	0.00	0.00
Span (in)	= 20.00	0.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 538.00	0.00	0.00	0.00
Length (ft)	= 5.75	0.00	0.00	0.00
Slope (%)	= 0.10	0.00	0.00	n/a
N-Value	= .015	.015	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 67.00	Inactive	0.00	0.00
Crest El. (ft)	= 540.00	0.00	0.00	0.00
Weir Coeff.	= 2.60	2.60	3.33	3.33
Weir Type	= Broad	Broad	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	538.00	0.00	---	---	---	0.00	---	---	---	---	---	0.00
0.20	13,144	538.20	0.15 oc	---	---	---	0.00	---	---	---	---	---	0.15
0.40	26,289	538.40	0.31 oc	---	---	---	0.00	---	---	---	---	---	0.31
0.60	39,433	538.60	0.47 oc	---	---	---	0.00	---	---	---	---	---	0.47
0.80	52,577	538.80	0.64 oc	---	---	---	0.00	---	---	---	---	---	0.64
1.00	65,722	539.00	0.80 oc	---	---	---	0.00	---	---	---	---	---	0.80
1.20	78,866	539.20	0.96 oc	---	---	---	0.00	---	---	---	---	---	0.96
1.40	92,010	539.40	1.13 oc	---	---	---	0.00	---	---	---	---	---	1.13
1.60	105,155	539.60	5.11 oc	---	---	---	0.00	---	---	---	---	---	5.11
1.80	118,299	539.80	8.69 oc	---	---	---	0.00	---	---	---	---	---	8.69
2.00	131,443	540.00	11.18 oc	---	---	---	0.00	---	---	---	---	---	11.18

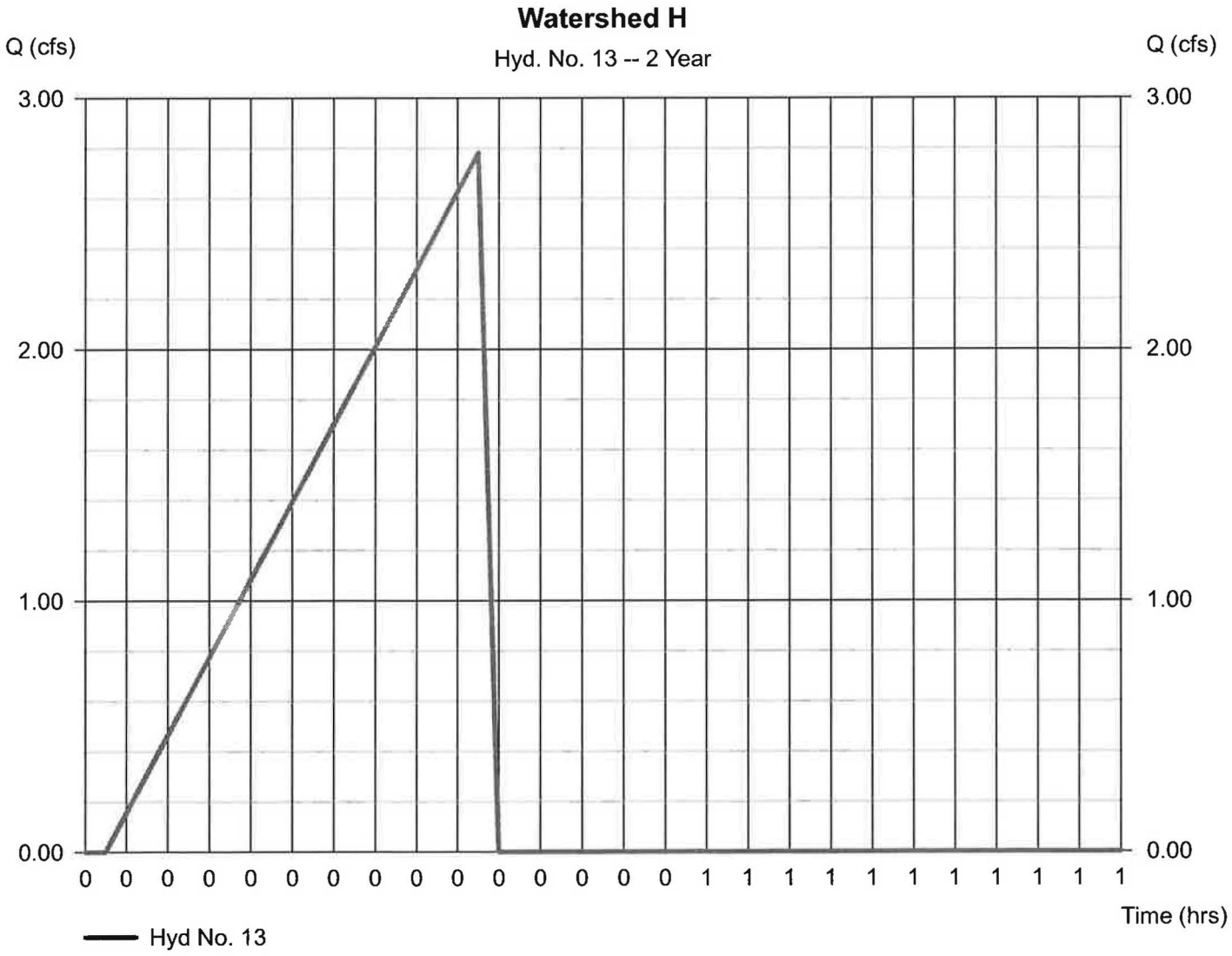
Hydrograph Report

Hyd. No. 13

Watershed H

Hydrograph type	= Rational	Peak discharge	= 2.781 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 4,163 cuft
Drainage area	= 3.800 ac	Runoff coeff.	= 0.29*
Intensity	= 2.524 in/hr	Tc by TR55	= 18.69 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.200 x 0.90) + (0.100 x 0.30) + (2.500 x 0.20) + (0.800 x 0.25) + (0.200 x 1.00)] / 3.800



TR55 Tc Worksheet

Hyd. No. 13

Watershed H

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.400	0.240	0.011	
Flow length (ft)	= 60.0	40.0	0.0	
Two-year 24-hr precip. (in)	= 3.20	3.20	0.00	
Land slope (%)	= 5.30	5.00	0.00	
Travel Time (min)	**= 9.66 +**	**4.75 +**	**0.00 =**	**14.42**
Shallow Concentrated Flow				
Flow length (ft)	= 229.00	0.00	0.00	
Watercourse slope (%)	= 4.30	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	= 3.35	0.00	0.00	
Travel Time (min)	**= 1.14 +**	**0.00 +**	**0.00 =**	**1.14**
Channel Flow				
X sectional flow area (sqft)	= 1.25	0.00	0.00	
Wetted perimeter (ft)	= 3.74	0.00	0.00	
Channel slope (%)	= 0.30	0.00	0.00	
Manning's n-value	= 0.040	0.015	0.015	
Velocity (ft/s)	= 0.98	0.00	0.00	
Flow length (ft)	= 184.0	0.0	0.0	
Travel Time (min)	**= 3.13 +**	**0.00 +**	**0.00 =**	**3.13**

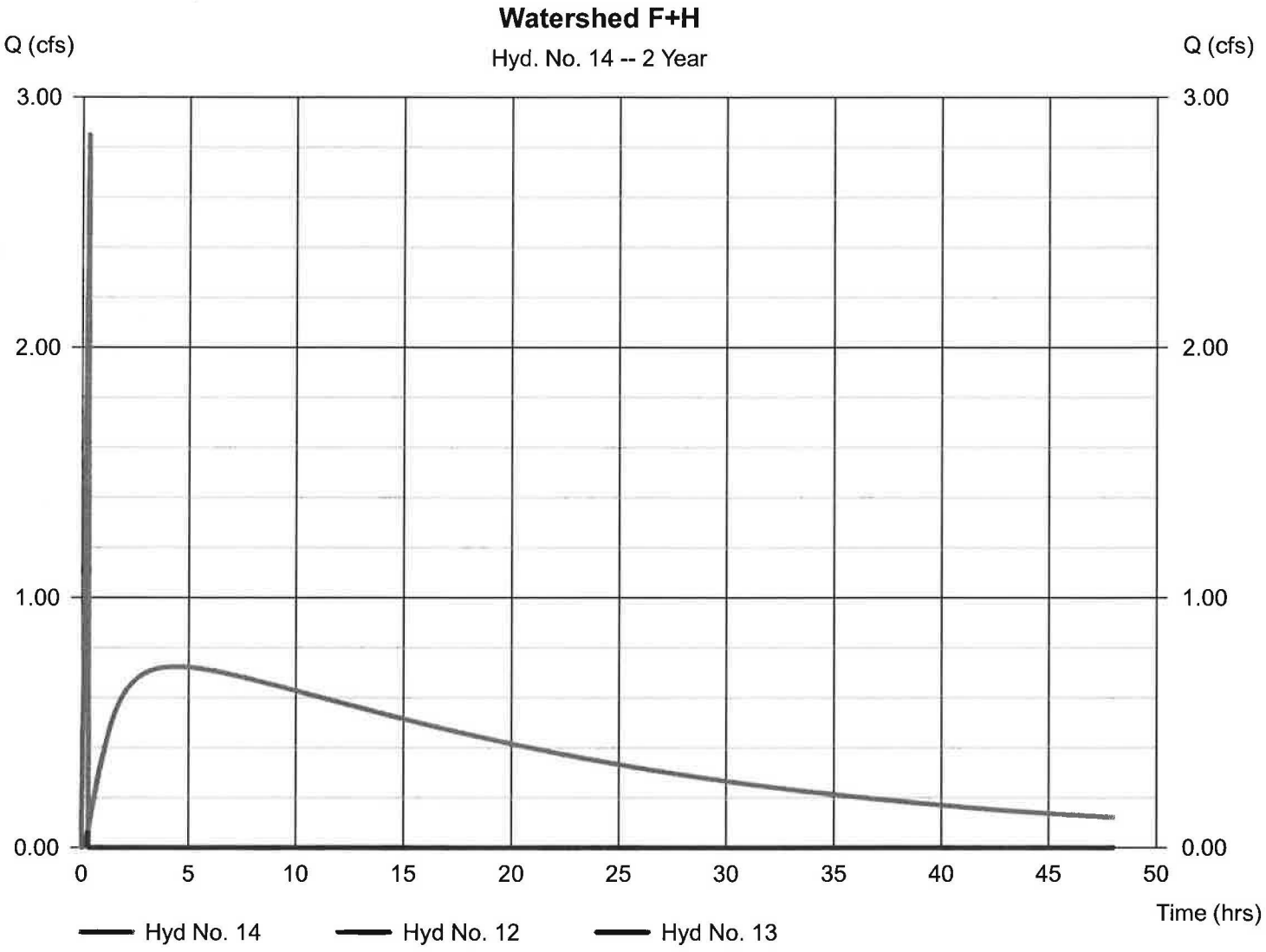
Total Travel Time, Tc ..... 18.69 min

Hydrograph Report

Hyd. No. 14

Watershed F+H

Hydrograph type	= Combine	Peak discharge	= 2.848 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 66,357 cuft
Inflow hyds.	= 12, 13	Contrib. drain. area	= 3.800 ac



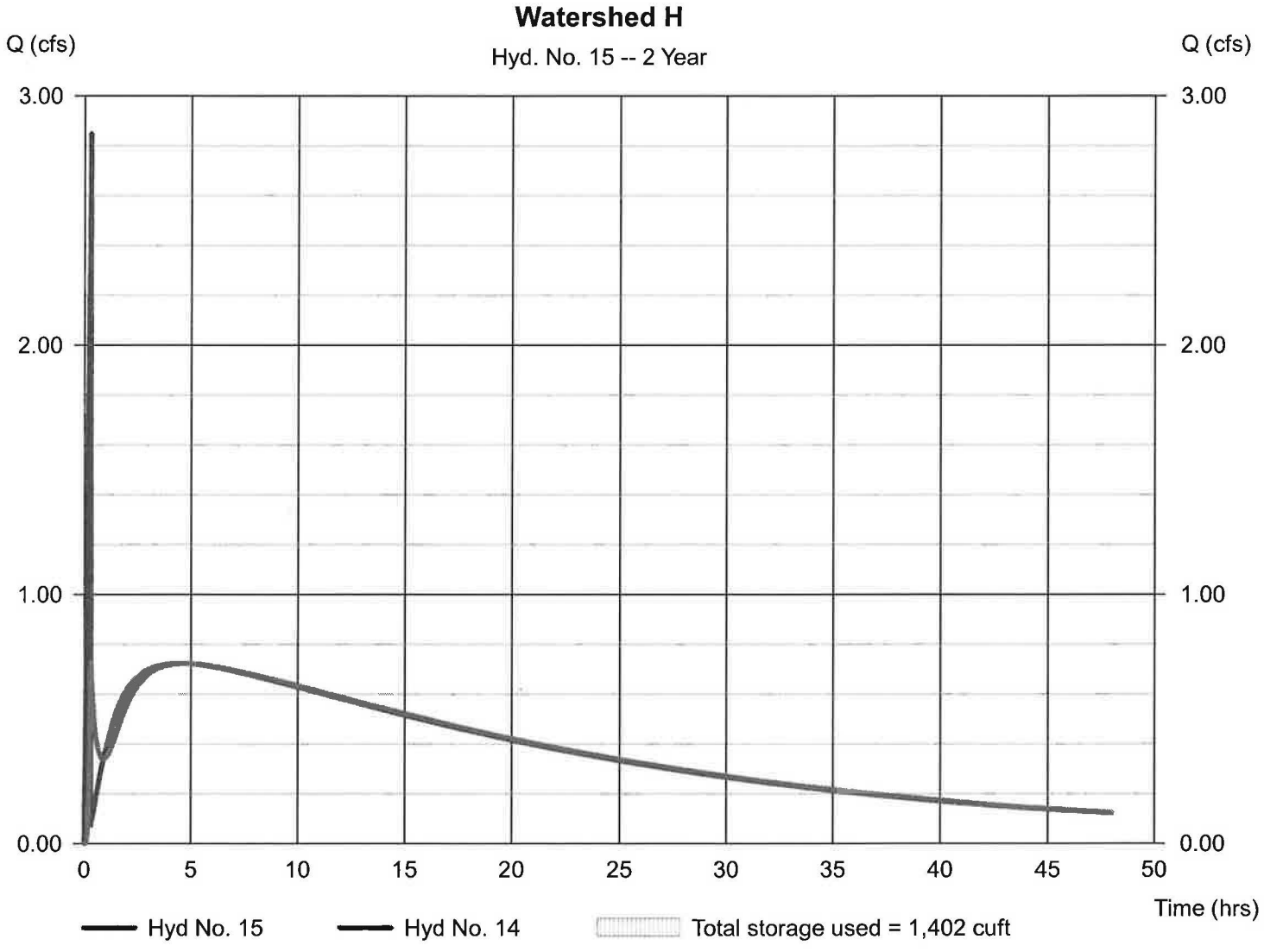
Hydrograph Report

Hyd. No. 15

Watershed H

Hydrograph type	= Reservoir	Peak discharge	= 0.726 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.33 hrs
Time interval	= 1 min	Hyd. volume	= 65,804 cuft
Inflow hyd. No.	= 14 - Watershed F+H	Max. Elevation	= 535.97 ft
Reservoir name	= Watershed H	Max. Storage	= 1,402 cuft

Storage Indication method used.



Pond Report

Pond No. 7 - Watershed H

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 535.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	535.50	00	0	0
0.50	536.00	9,000	1,500	1,500
2.50	538.00	62,000	63,075	64,575

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	0.00	0.00	0.00
Span (in)	= 18.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 535.50	0.00	0.00	0.00
Length (ft)	= 40.00	0.00	0.00	0.00
Slope (%)	= 0.50	0.00	0.00	n/a
N-Value	= .024	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	535.50	0.00	---	---	---	---	---	---	---	---	---	0.00
0.05	150	535.55	0.01 oc	---	---	---	---	---	---	---	---	---	0.01
0.10	300	535.60	0.04 oc	---	---	---	---	---	---	---	---	---	0.04
0.15	450	535.65	0.08 oc	---	---	---	---	---	---	---	---	---	0.08
0.20	600	535.70	0.14 oc	---	---	---	---	---	---	---	---	---	0.14
0.25	750	535.75	0.23 oc	---	---	---	---	---	---	---	---	---	0.23
0.30	900	535.80	0.32 oc	---	---	---	---	---	---	---	---	---	0.32
0.35	1,050	535.85	0.43 oc	---	---	---	---	---	---	---	---	---	0.43
0.40	1,200	535.90	0.55 oc	---	---	---	---	---	---	---	---	---	0.55
0.45	1,350	535.95	0.68 oc	---	---	---	---	---	---	---	---	---	0.68
0.50	1,500	536.00	0.82 oc	---	---	---	---	---	---	---	---	---	0.82
0.70	7,807	536.20	1.43 oc	---	---	---	---	---	---	---	---	---	1.43
0.90	14,115	536.40	2.08 oc	---	---	---	---	---	---	---	---	---	2.08
1.10	20,422	536.60	2.69 oc	---	---	---	---	---	---	---	---	---	2.69
1.30	26,730	536.80	3.16 oc	---	---	---	---	---	---	---	---	---	3.16
1.50	33,037	537.00	3.19 oc	---	---	---	---	---	---	---	---	---	3.19
1.70	39,345	537.20	4.51 oc	---	---	---	---	---	---	---	---	---	4.51
1.90	45,652	537.40	5.52 oc	---	---	---	---	---	---	---	---	---	5.52
2.10	51,960	537.60	6.37 oc	---	---	---	---	---	---	---	---	---	6.37
2.30	58,267	537.80	7.12 oc	---	---	---	---	---	---	---	---	---	7.12
2.50	64,575	538.00	7.80 oc	---	---	---	---	---	---	---	---	---	7.80

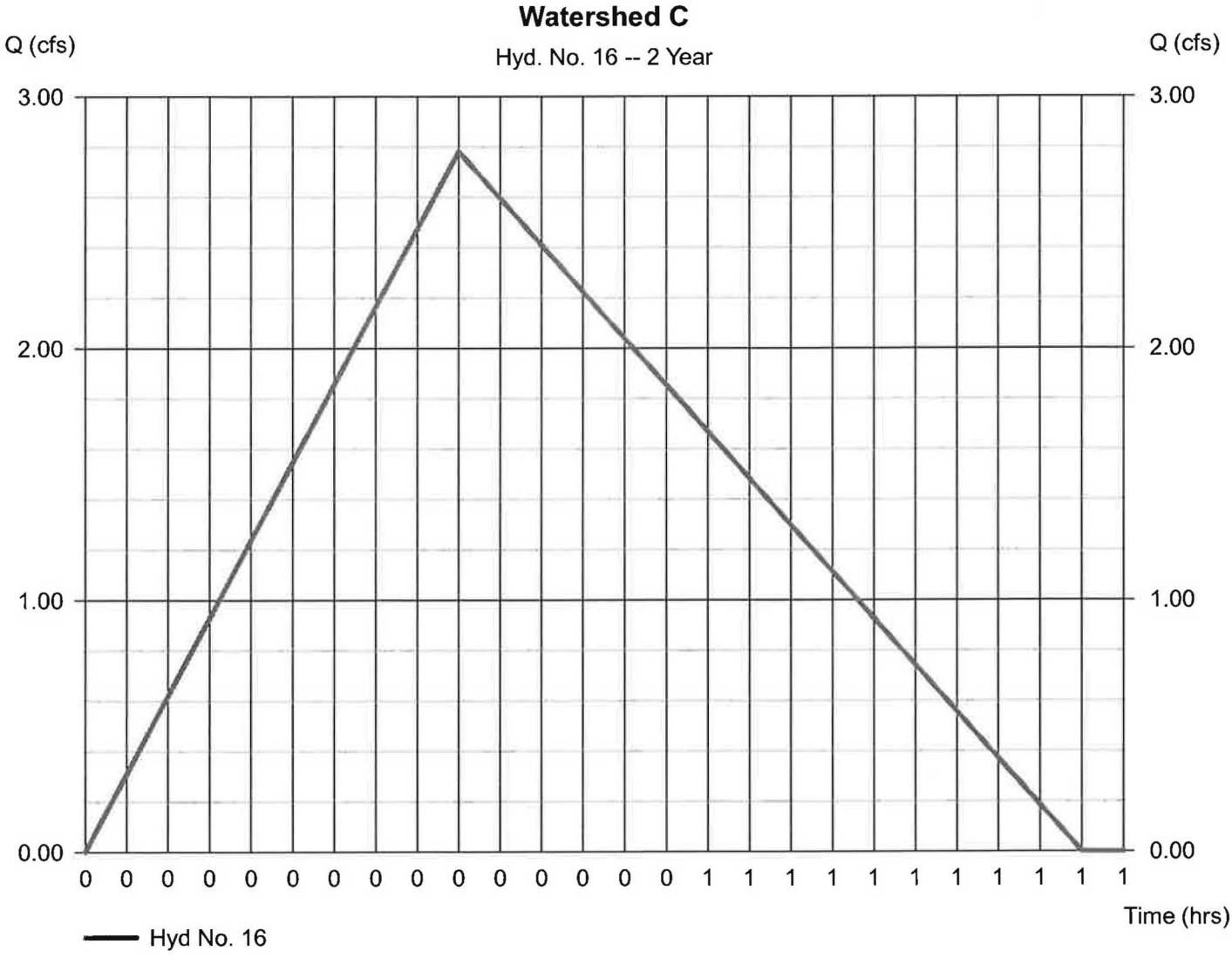
Hydrograph Report

Hyd. No. 16

Watershed C

Hydrograph type	= Rational	Peak discharge	= 2.781 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.30 hrs
Time interval	= 1 min	Hyd. volume	= 4,076 cuft
Drainage area	= 3.300 ac	Runoff coeff.	= 0.33*
Intensity	= 2.554 in/hr	Tc by TR55	= 18.30 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.400 x 0.90) + (1.200 x 0.30) + (1.400 x 0.20) + (0.300 x 0.25)] / 3.300



TR55 Tc Worksheet

Hyd. No. 16

Watershed C

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.240	0.011	0.011	
Flow length (ft)	= 72.0	116.0	0.0	
Two-year 24-hr precip. (in)	= 3.20	3.20	0.00	
Land slope (%)	= 1.00	3.27	0.00	
Travel Time (min)	**= 14.48 +**	**1.12 +**	**0.00 =**	**15.60**
Shallow Concentrated Flow				
Flow length (ft)	= 175.00	0.00	0.00	
Watercourse slope (%)	= 8.00	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	= 4.56	0.00	0.00	
Travel Time (min)	**= 0.64 +**	**0.00 +**	**0.00 =**	**0.64**
Channel Flow				
X sectional flow area (sqft)	= 5.00	0.00	0.00	
Wetted perimeter (ft)	= 7.47	0.00	0.00	
Channel slope (%)	= 0.90	0.00	0.00	
Manning's n-value	= 0.040	0.015	0.015	
Velocity (ft/s)	= 2.70	0.00	0.00	
Flow length (ft)	= 334.0	0.0	0.0	
Travel Time (min)	**= 2.06 +**	**0.00 +**	**0.00 =**	**2.06**

Total Travel Time, Tc ..... **18.30 min**

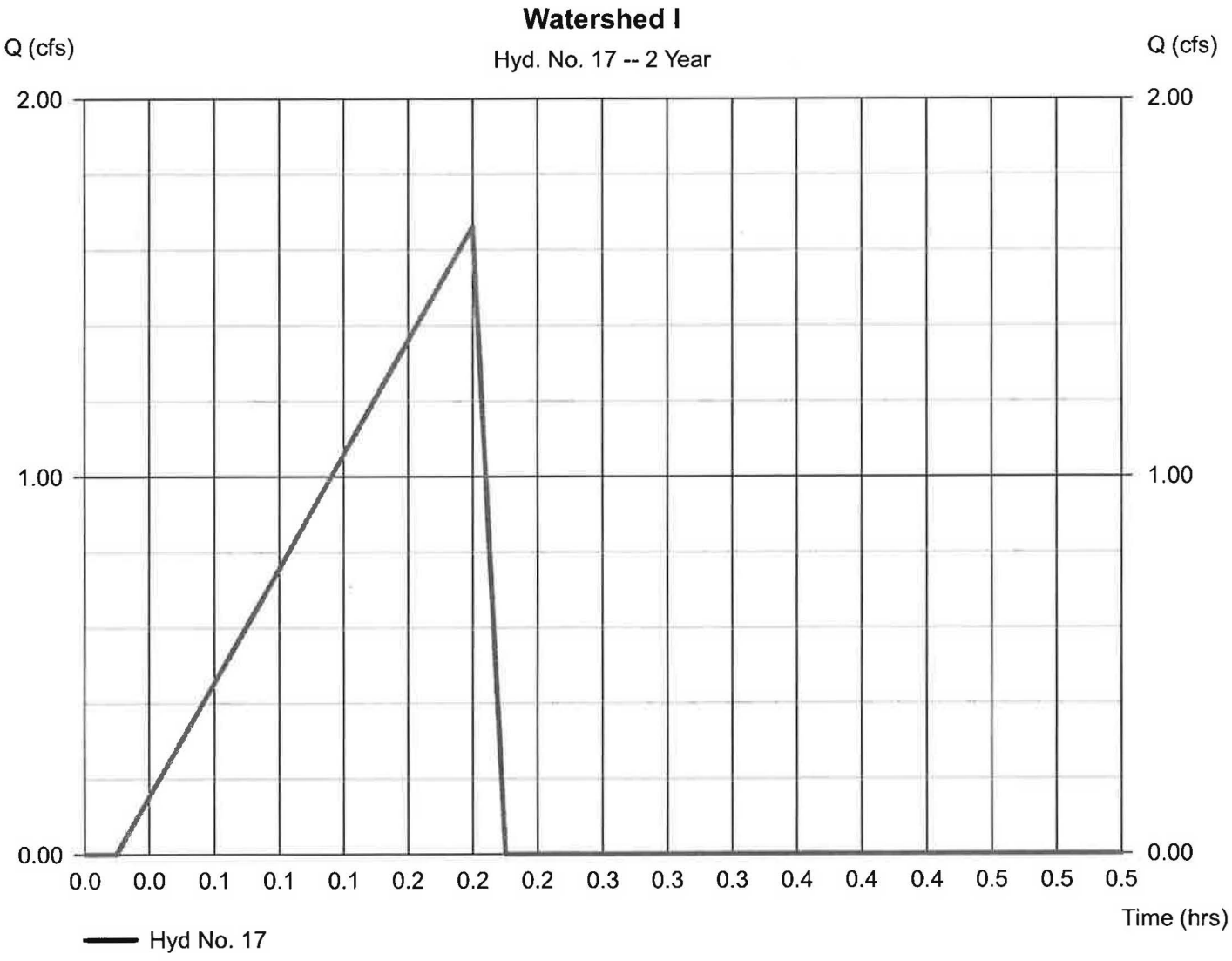
Hydrograph Report

Hyd. No. 17

Watershed I

Hydrograph type	= Rational	Peak discharge	= 1.662 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.20 hrs
Time interval	= 1 min	Hyd. volume	= 1,535 cuft
Drainage area	= 1.500 ac	Runoff coeff.	= 0.34*
Intensity	= 3.258 in/hr	Tc by TR55	= 11.53 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.200 x 0.90) + (0.700 x 0.30) + (0.600 x 0.20)] / 1.500



TR55 Tc Worksheet

Hyd. No. 17

Watershed I

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.240	0.011	0.011	
Flow length (ft)	= 100.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.20	0.00	0.00	
Land slope (%)	= 6.00	0.00	0.00	
Travel Time (min)	**= 9.20 +**	**0.00 +**	**0.00 =**	**9.20**
Shallow Concentrated Flow				
Flow length (ft)	= 113.00	274.00	0.00	
Watercourse slope (%)	= 6.20	1.45	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	= 4.02	2.45	0.00	
Travel Time (min)	**= 0.47 +**	**1.87 +**	**0.00 =**	**2.33**
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	= 0.00	0.00	0.00	
Flow length (ft)	= 0.0	0.0	0.0	
Travel Time (min)	**= 0.00 +**	**0.00 +**	**0.00 =**	**0.00**

Total Travel Time, Tc ..... 11.53 min

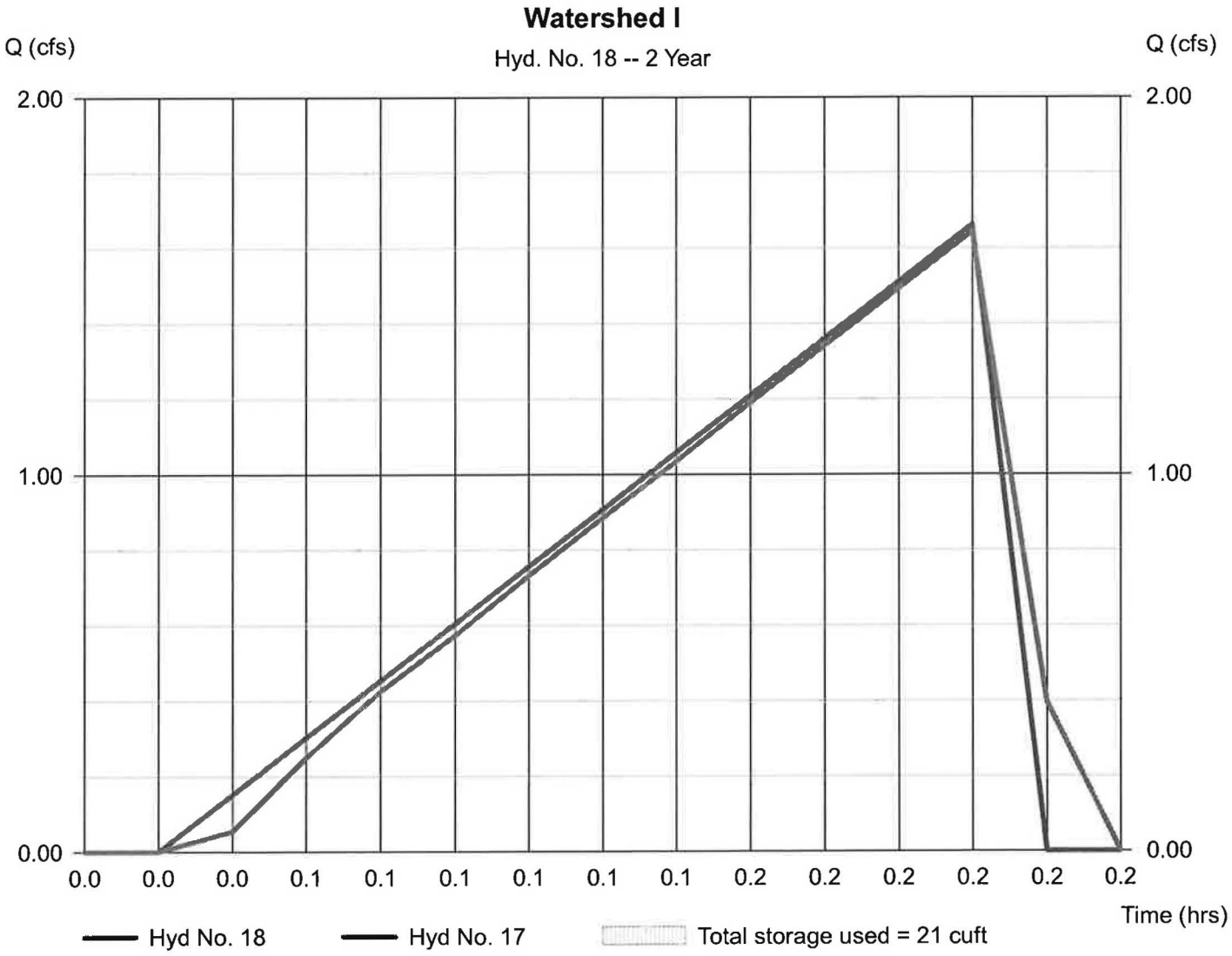
Hydrograph Report

Hyd. No. 18

Watershed I

Hydrograph type	= Reservoir	Peak discharge	= 1.643 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.20 hrs
Time interval	= 1 min	Hyd. volume	= 601 cuft
Inflow hyd. No.	= 17 - Watershed I	Max. Elevation	= 531.39 ft
Reservoir name	= Watershed I	Max. Storage	= 21 cuft

Storage Indication method used.



Pond Report

Pond No. 6 - Watershed I

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 530.75 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	530.75	00	0	0
1.25	532.00	100	42	42
3.25	534.00	200	294	336

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.00	0.00	0.00	0.00
Span (in)	= 15.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 530.75	0.00	0.00	0.00
Length (ft)	= 36.65	0.00	0.00	0.00
Slope (%)	= 1.44	0.00	0.00	n/a
N-Value	= .015	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

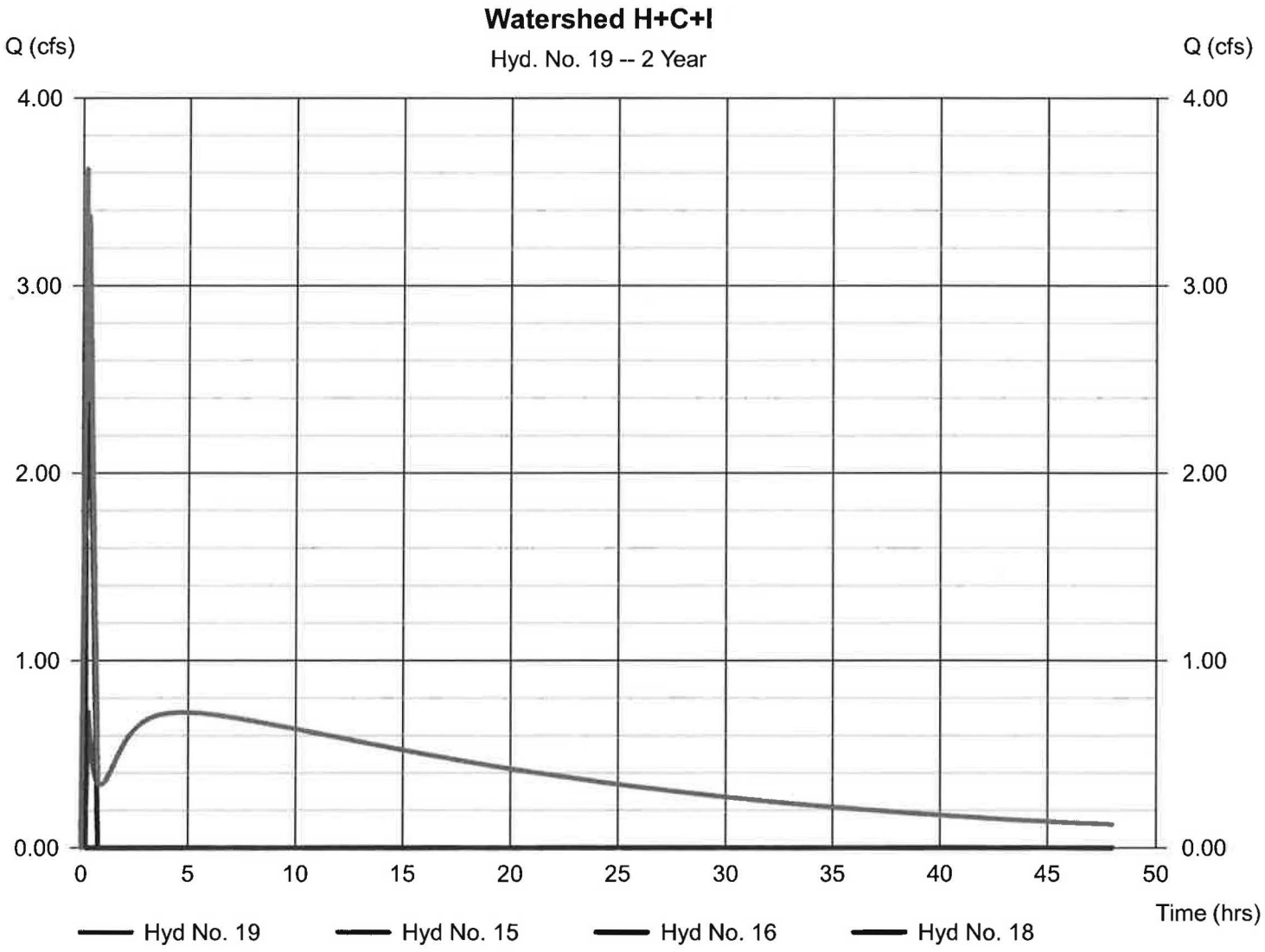
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	530.75	0.00	---	---	---	---	---	---	---	---	---	0.00
0.13	4	530.88	0.08 ic	---	---	---	---	---	---	---	---	---	0.08
0.25	8	531.00	0.30 ic	---	---	---	---	---	---	---	---	---	0.30
0.38	12	531.13	0.65 ic	---	---	---	---	---	---	---	---	---	0.65
0.50	17	531.25	1.10 ic	---	---	---	---	---	---	---	---	---	1.10
0.63	21	531.38	1.65 ic	---	---	---	---	---	---	---	---	---	1.65
0.75	25	531.50	2.27 ic	---	---	---	---	---	---	---	---	---	2.27
0.88	29	531.63	2.92 ic	---	---	---	---	---	---	---	---	---	2.92
1.00	33	531.75	3.58 ic	---	---	---	---	---	---	---	---	---	3.58
1.13	37	531.88	4.20 ic	---	---	---	---	---	---	---	---	---	4.20
1.25	42	532.00	4.42 oc	---	---	---	---	---	---	---	---	---	4.42
1.45	71	532.20	5.19 oc	---	---	---	---	---	---	---	---	---	5.19
1.65	101	532.40	5.86 oc	---	---	---	---	---	---	---	---	---	5.86
1.85	130	532.60	6.46 oc	---	---	---	---	---	---	---	---	---	6.46
2.05	159	532.80	7.01 oc	---	---	---	---	---	---	---	---	---	7.01
2.25	189	533.00	7.51 oc	---	---	---	---	---	---	---	---	---	7.51
2.45	218	533.20	7.98 ic	---	---	---	---	---	---	---	---	---	7.98
2.65	248	533.40	8.41 ic	---	---	---	---	---	---	---	---	---	8.41
2.85	277	533.60	8.81 ic	---	---	---	---	---	---	---	---	---	8.81
3.05	306	533.80	9.20 ic	---	---	---	---	---	---	---	---	---	9.20
3.25	336	534.00	9.57 ic	---	---	---	---	---	---	---	---	---	9.57

Hydrograph Report

Hyd. No. 19

Watershed H+C+I

Hydrograph type	= Combine	Peak discharge	= 3.619 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.20 hrs
Time interval	= 1 min	Hyd. volume	= 70,409 cuft
Inflow hyds.	= 15, 16, 18	Contrib. drain. area	= 3.300 ac



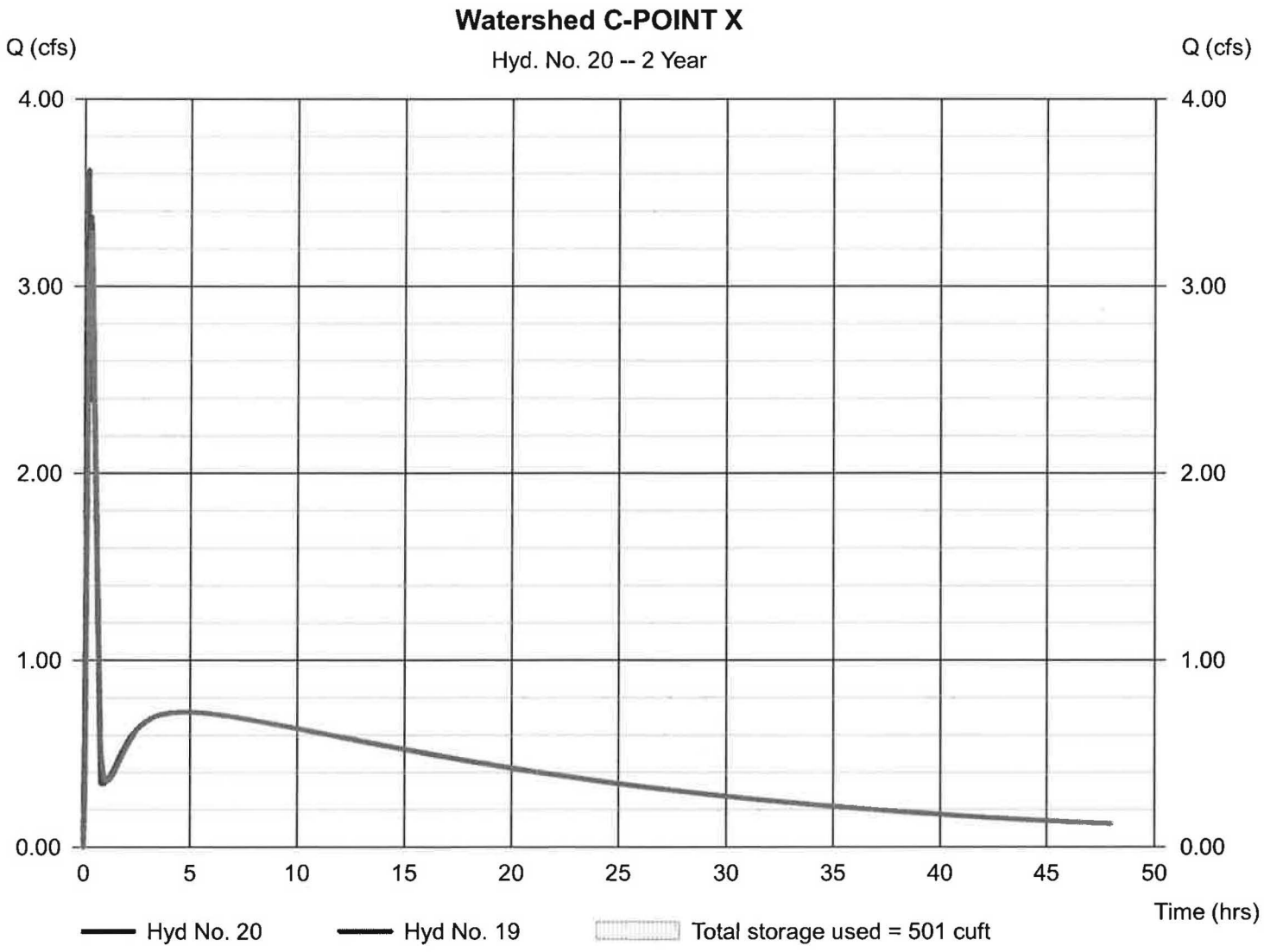
Hydrograph Report

Hyd. No. 20

Watershed C-POINT X

Hydrograph type	= Reservoir	Peak discharge	= 3.284 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.33 hrs
Time interval	= 1 min	Hyd. volume	= 70,365 cuft
Inflow hyd. No.	= 19 - Watershed H+C+I	Max. Elevation	= 529.64 ft
Reservoir name	= Watershed C	Max. Storage	= 501 cuft

Storage Indication method used.



Pond No. 8 - Watershed C

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 528.89 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	528.89	00	0	0
3.11	532.00	2,000	2,073	2,073
5.11	534.00	25,000	22,712	24,785
7.11	536.00	36,000	60,661	85,446

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	0.00	0.00	0.00
Span (in)	= 24.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 528.89	0.00	0.00	0.00
Length (ft)	= 133.50	0.00	0.00	0.00
Slope (%)	= 1.24	0.00	0.00	n/a
N-Value	= .024	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	528.89	0.00	---	---	---	---	---	---	---	---	---	0.00
0.31	207	529.20	0.59 ic	---	---	---	---	---	---	---	---	---	0.59
0.62	415	529.51	2.24 ic	---	---	---	---	---	---	---	---	---	2.24
0.93	622	529.82	4.73 ic	---	---	---	---	---	---	---	---	---	4.73
1.24	829	530.13	7.80 ic	---	---	---	---	---	---	---	---	---	7.80
1.56	1,037	530.44	11.13 ic	---	---	---	---	---	---	---	---	---	11.13
1.87	1,244	530.76	12.76 oc	---	---	---	---	---	---	---	---	---	12.76
2.18	1,451	531.07	12.78 oc	---	---	---	---	---	---	---	---	---	12.78
2.49	1,659	531.38	13.82 oc	---	---	---	---	---	---	---	---	---	13.82
2.80	1,866	531.69	14.79 oc	---	---	---	---	---	---	---	---	---	14.79
3.11	2,073	532.00	15.71 oc	---	---	---	---	---	---	---	---	---	15.71
3.31	4,344	532.20	16.26 oc	---	---	---	---	---	---	---	---	---	16.26
3.51	6,615	532.40	16.81 oc	---	---	---	---	---	---	---	---	---	16.81
3.71	8,887	532.60	17.33 oc	---	---	---	---	---	---	---	---	---	17.33
3.91	11,158	532.80	17.84 oc	---	---	---	---	---	---	---	---	---	17.84
4.11	13,429	533.00	18.33 oc	---	---	---	---	---	---	---	---	---	18.33
4.31	15,700	533.20	18.81 oc	---	---	---	---	---	---	---	---	---	18.81
4.51	17,971	533.40	19.28 oc	---	---	---	---	---	---	---	---	---	19.28
4.71	20,243	533.60	19.74 oc	---	---	---	---	---	---	---	---	---	19.74
4.91	22,514	533.80	20.19 oc	---	---	---	---	---	---	---	---	---	20.19
5.11	24,785	534.00	20.63 oc	---	---	---	---	---	---	---	---	---	20.63
5.31	30,851	534.20	21.06 oc	---	---	---	---	---	---	---	---	---	21.06
5.51	36,917	534.40	21.48 oc	---	---	---	---	---	---	---	---	---	21.48
5.71	42,983	534.60	21.89 oc	---	---	---	---	---	---	---	---	---	21.89
5.91	49,049	534.80	22.29 oc	---	---	---	---	---	---	---	---	---	22.29
6.11	55,115	535.00	22.69 oc	---	---	---	---	---	---	---	---	---	22.69
6.31	61,181	535.20	23.08 oc	---	---	---	---	---	---	---	---	---	23.08
6.51	67,247	535.40	23.47 oc	---	---	---	---	---	---	---	---	---	23.47
6.71	73,313	535.60	23.84 oc	---	---	---	---	---	---	---	---	---	23.84
6.91	79,379	535.80	24.22 oc	---	---	---	---	---	---	---	---	---	24.22
7.11	85,446	536.00	24.58 oc	---	---	---	---	---	---	---	---	---	24.58

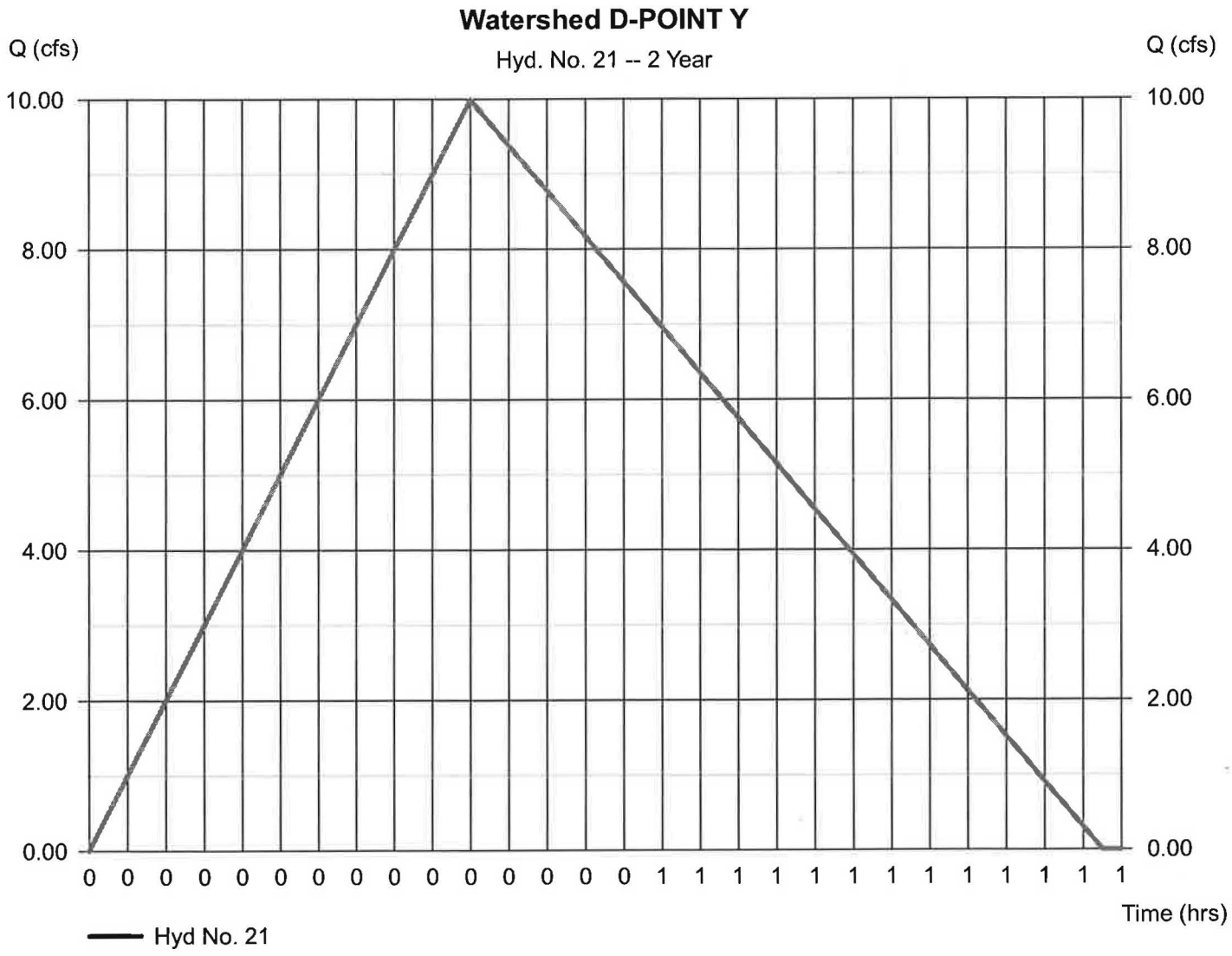
Hydrograph Report

Hyd. No. 21

Watershed D-POINT Y

Hydrograph type	= Rational	Peak discharge	= 9.989 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.33 hrs
Time interval	= 1 min	Hyd. volume	= 16,002 cuft
Drainage area	= 14.190 ac	Runoff coeff.	= 0.29*
Intensity	= 2.427 in/hr	Tc by TR55	= 20.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.500 x 0.90) + (1.750 x 0.30) + (10.940 x 0.20)] / 14.190



TR55 Tc Worksheet

Hyd. No. 21

Watershed D-POINT Y

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.240	0.011	0.011	
Flow length (ft)	= 100.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.20	0.00	0.00	
Land slope (%)	= 2.30	0.00	0.00	
Travel Time (min)	**= 13.49**	**+ 0.00**	**+ 0.00**	**= 13.49**
Shallow Concentrated Flow				
Flow length (ft)	= 107.00	206.00	0.00	
Watercourse slope (%)	= 7.57	0.49	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	= 4.44	1.42	0.00	
Travel Time (min)	**= 0.40**	**+ 2.43**	**+ 0.00**	**= 2.83**
Channel Flow				
X sectional flow area (sqft)	= 1.23	1.50	0.00	
Wetted perimeter (ft)	= 3.93	4.24	0.00	
Channel slope (%)	= 0.50	4.42	0.00	
Manning's n-value	= 0.015	0.040	0.015	
Velocity (ft/s)	= 3.22	3.91	0.00	
Flow length (ft)	= 194.0	678.0	0.0	
Travel Time (min)	**= 1.00**	**+ 2.89**	**+ 0.00**	**= 3.90**

Total Travel Time, Tc ..... 20.00 min

Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	Rational	7.312	1	17	9,956	----	------	------	Watershed A
2	Reservoir	2.822	1	34	9,848	1	565.88	6,257	Watershed A
3	Rational	5.507	1	14	5,974	----	------	------	Watershed B
4	Reservoir	1.167	1	31	5,770	3	566.95	4,695	Watershed B
5	Rational	29.71	1	29	69,874	----	------	------	Watershed E
6	Rational	6.102	1	22	10,956	----	------	------	Watershed G
7	Reservoir	0.007	1	59	1,170	6	546.31	10,780	Watershed G
8	Combine	33.59	1	29	85,149	2, 4, 5,	------	------	Watershed A+B+E
9	Reservoir	16.32	1	55	85,137	8	542.10	46,060	Watershed E-POINT Z
10	Rational	16.23	1	20	25,926	----	------	------	Watershed F
11	Combine	18.65	1	43	110,457	9, 10	------	------	Watershed A+B+E+F
12	Reservoir	1.089	1	236	95,217	11	539.36	89,119	Watershed F
13	Rational	4.003	1	19	5,992	----	------	------	Watershed H
14	Combine	4.100	1	19	97,499	12, 13	------	------	Watershed F+H
15	Reservoir	1.019	1	423	96,840	14	536.07	3,567	Watershed H
16	Rational	3.998	1	18	5,860	----	------	------	Watershed C
17	Rational	2.315	1	12	2,138	----	------	------	Watershed I
18	Reservoir	2.292	1	12	838	17	531.52	25.1	Watershed I
19	Combine	5.202	1	12	103,435	15, 16, 18	------	------	Watershed H+C+I
20	Reservoir	4.649	1	20	103,374	19	529.83	615	Watershed C-POINT X
21	Rational	14.44	1	20	23,125	----	------	------	Watershed D-POINT Y

Hydrograph Report

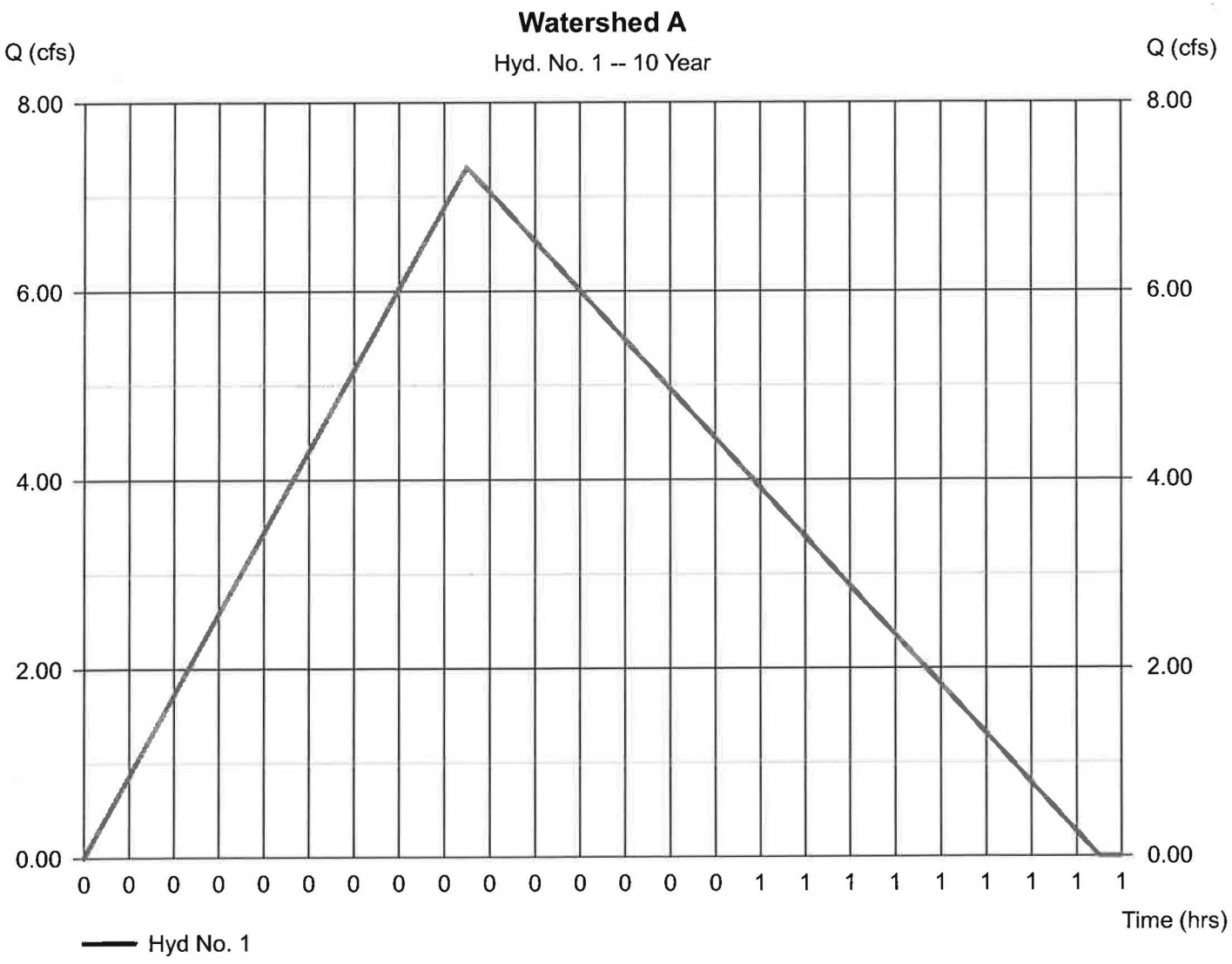
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 1

Watershed A

Hydrograph type	= Rational	Peak discharge	= 7.312 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.28 hrs
Time interval	= 1 min	Hyd. volume	= 9,956 cuft
Drainage area	= 8.000 ac	Runoff coeff.	= 0.24*
Intensity	= 3.808 in/hr	Tc by TR55	= 17.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.400 x 0.90) + (0.500 x 0.30) + (7.100 x 0.20)] / 8.000



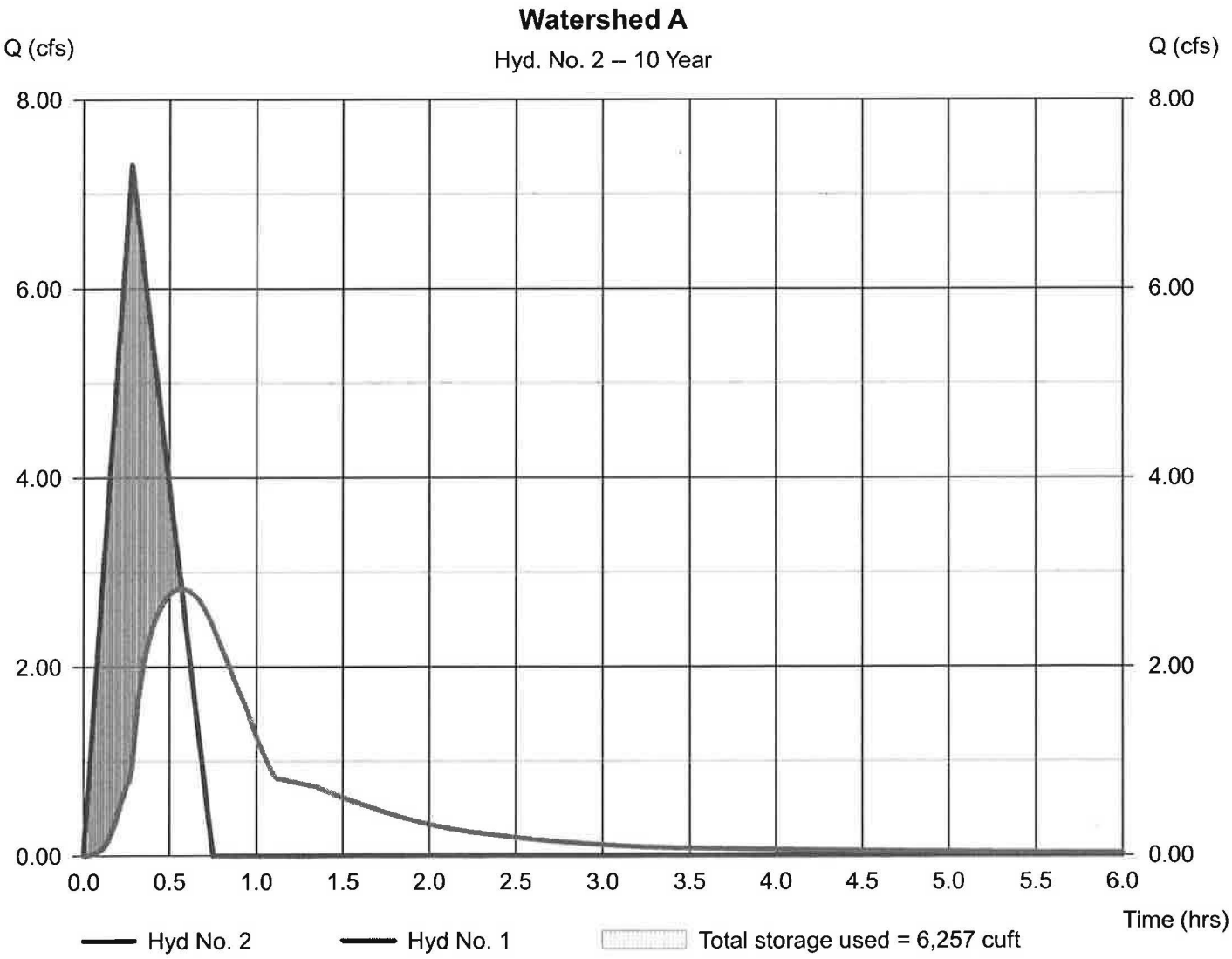
Hydrograph Report

Hyd. No. 2

Watershed A

Hydrograph type	= Reservoir	Peak discharge	= 2.822 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.57 hrs
Time interval	= 1 min	Hyd. volume	= 9,848 cuft
Inflow hyd. No.	= 1 - Watershed A	Max. Elevation	= 565.88 ft
Reservoir name	= Watershed A	Max. Storage	= 6,257 cuft

Storage Indication method used.



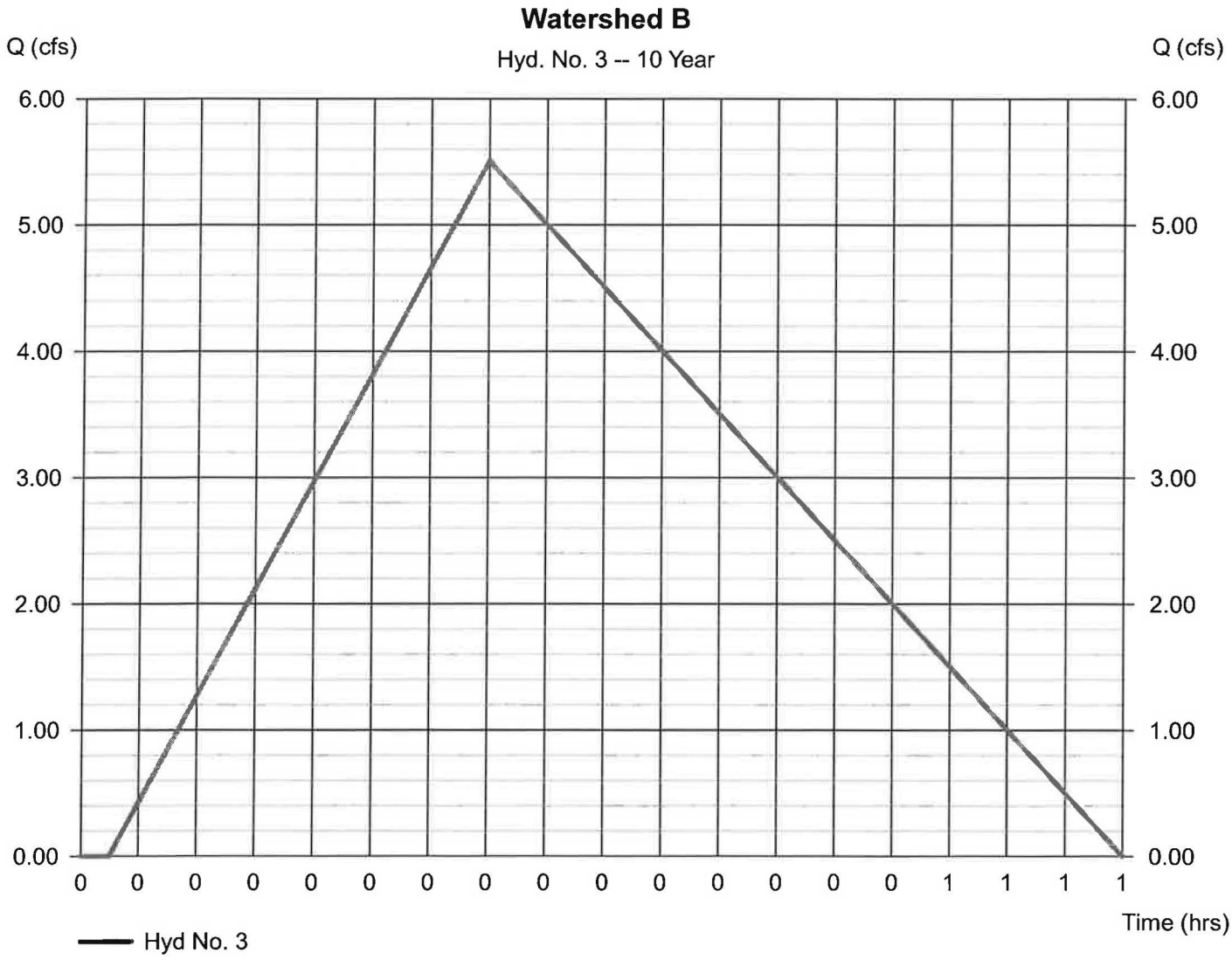
Hydrograph Report

Hyd. No. 3

Watershed B

Hydrograph type	= Rational	Peak discharge	= 5.507 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.23 hrs
Time interval	= 1 min	Hyd. volume	= 5,974 cuft
Drainage area	= 5.200 ac	Runoff coeff.	= 0.25*
Intensity	= 4.236 in/hr	Tc by TR55	= 13.54 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.300 x 0.90) + (0.500 x 0.30) + (4.400 x 0.20)] / 5.200



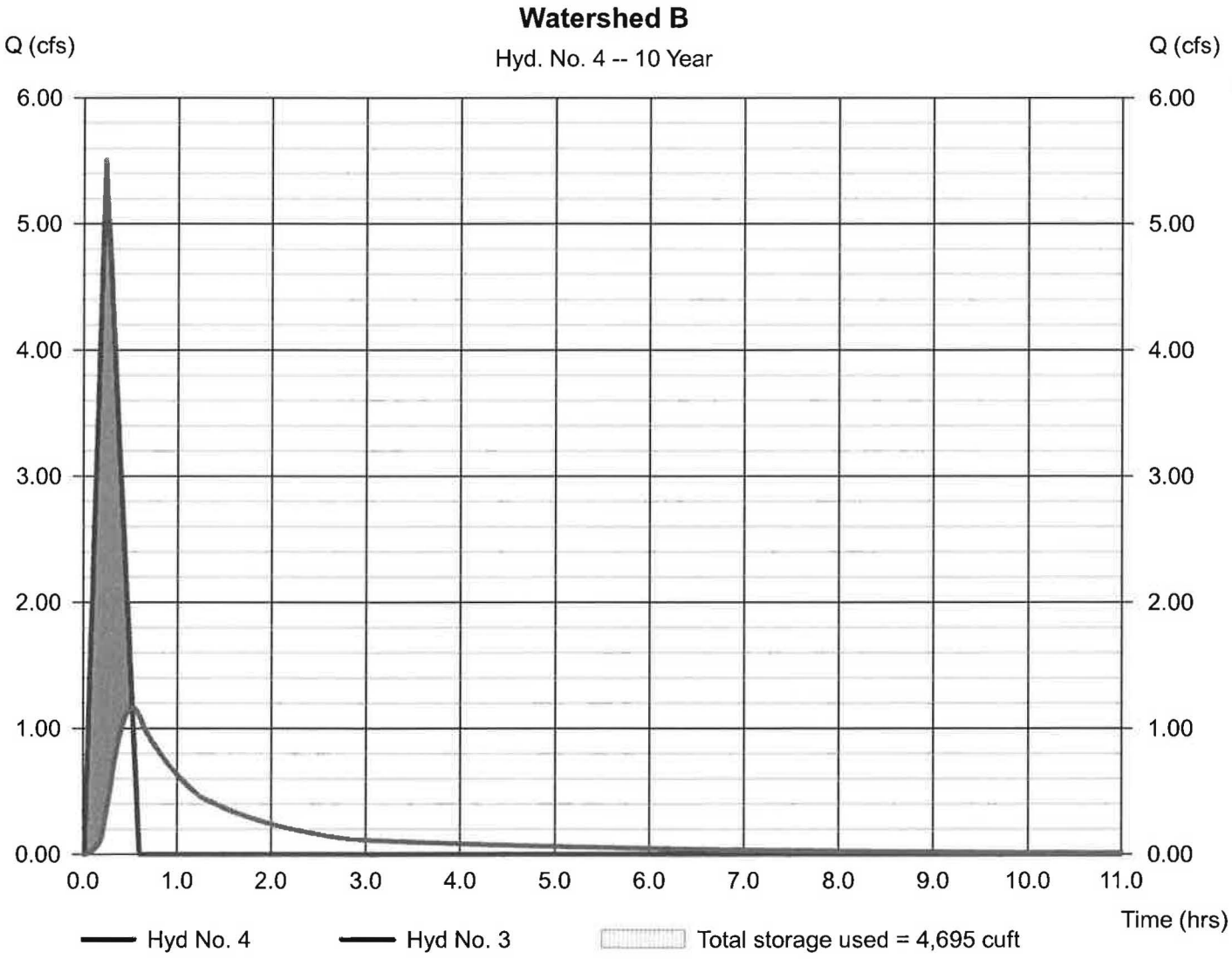
Hydrograph Report

Hyd. No. 4

Watershed B

Hydrograph type	= Reservoir	Peak discharge	= 1.167 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.52 hrs
Time interval	= 1 min	Hyd. volume	= 5,770 cuft
Inflow hyd. No.	= 3 - Watershed B	Max. Elevation	= 566.95 ft
Reservoir name	= Watershed B	Max. Storage	= 4,695 cuft

Storage Indication method used.



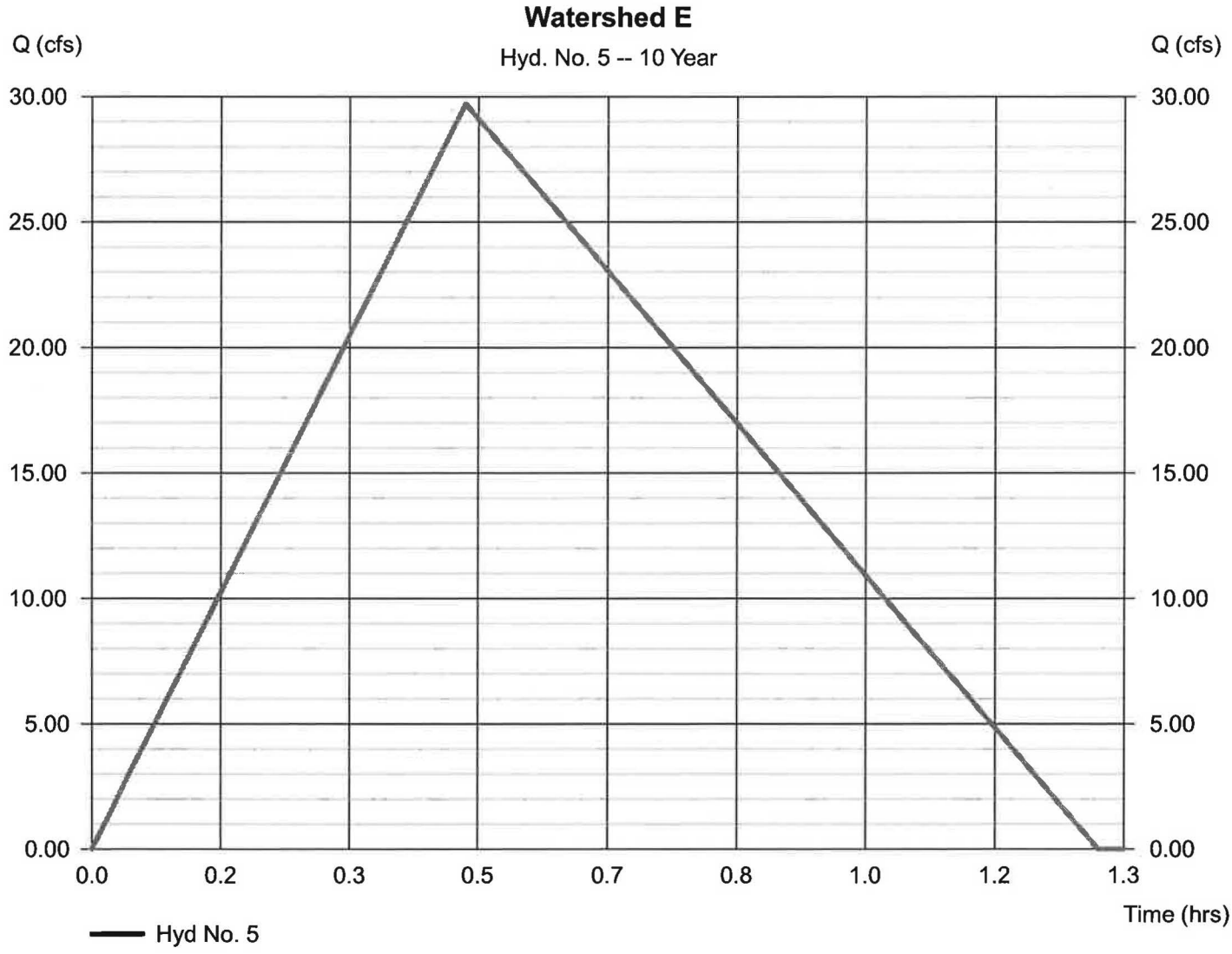
Hydrograph Report

Hyd. No. 5

Watershed E

Hydrograph type	= Rational	Peak discharge	= 29.71 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.48 hrs
Time interval	= 1 min	Hyd. volume	= 69,874 cuft
Drainage area	= 40.300 ac	Runoff coeff.	= 0.26*
Intensity	= 2.836 in/hr	Tc by TR55	= 29.36 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(2.100 x 0.90) + (7.700 x 0.30) + (30.500 x 0.20)] / 40.300



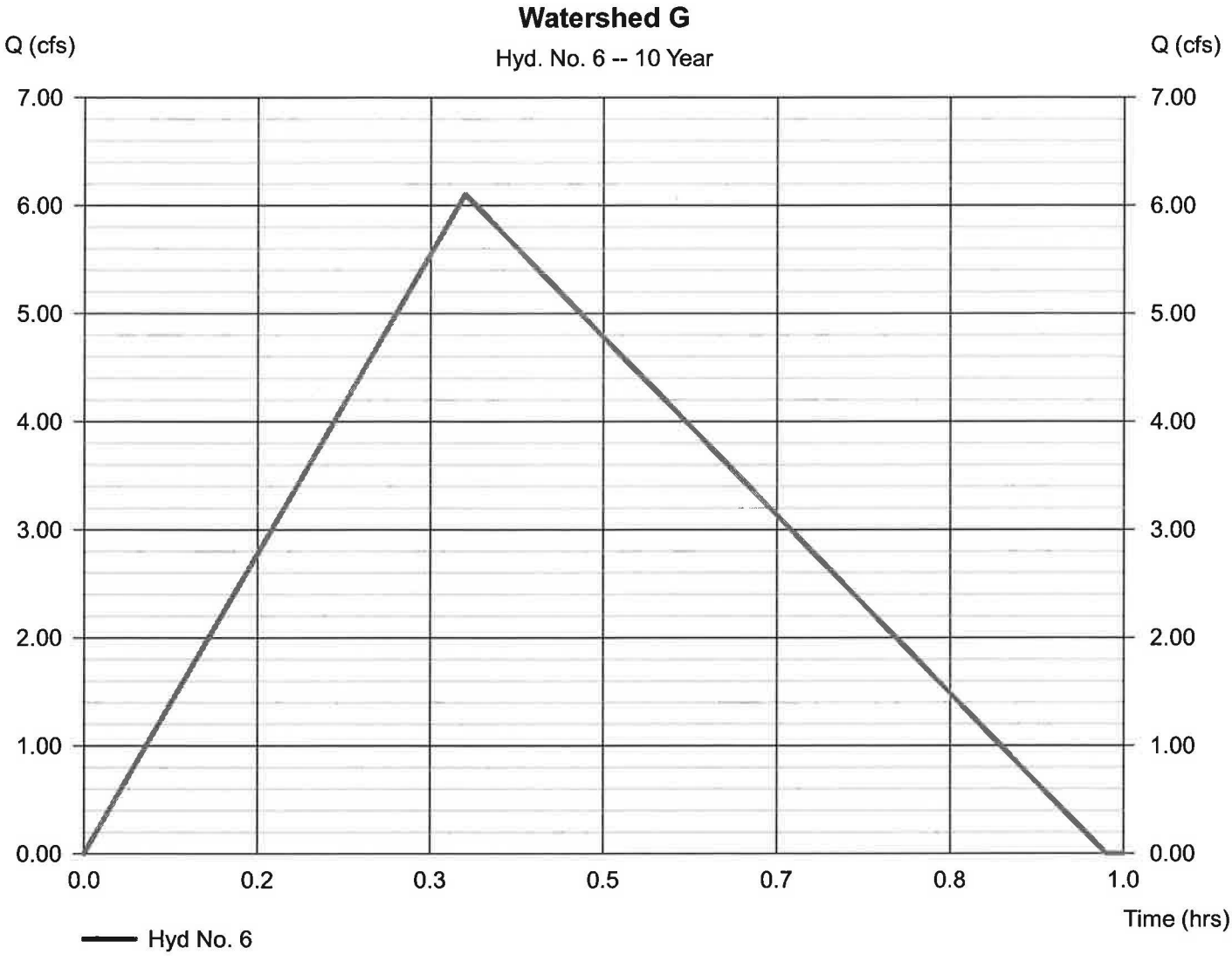
Hydrograph Report

Hyd. No. 6

Watershed G

Hydrograph type	= Rational	Peak discharge	= 6.102 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.37 hrs
Time interval	= 1 min	Hyd. volume	= 10,956 cuft
Drainage area	= 7.700 ac	Runoff coeff.	= 0.24*
Intensity	= 3.302 in/hr	Tc by TR55	= 22.41 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.300 x 0.90) + (0.800 x 0.30) + (6.600 x 0.20)] / 7.700



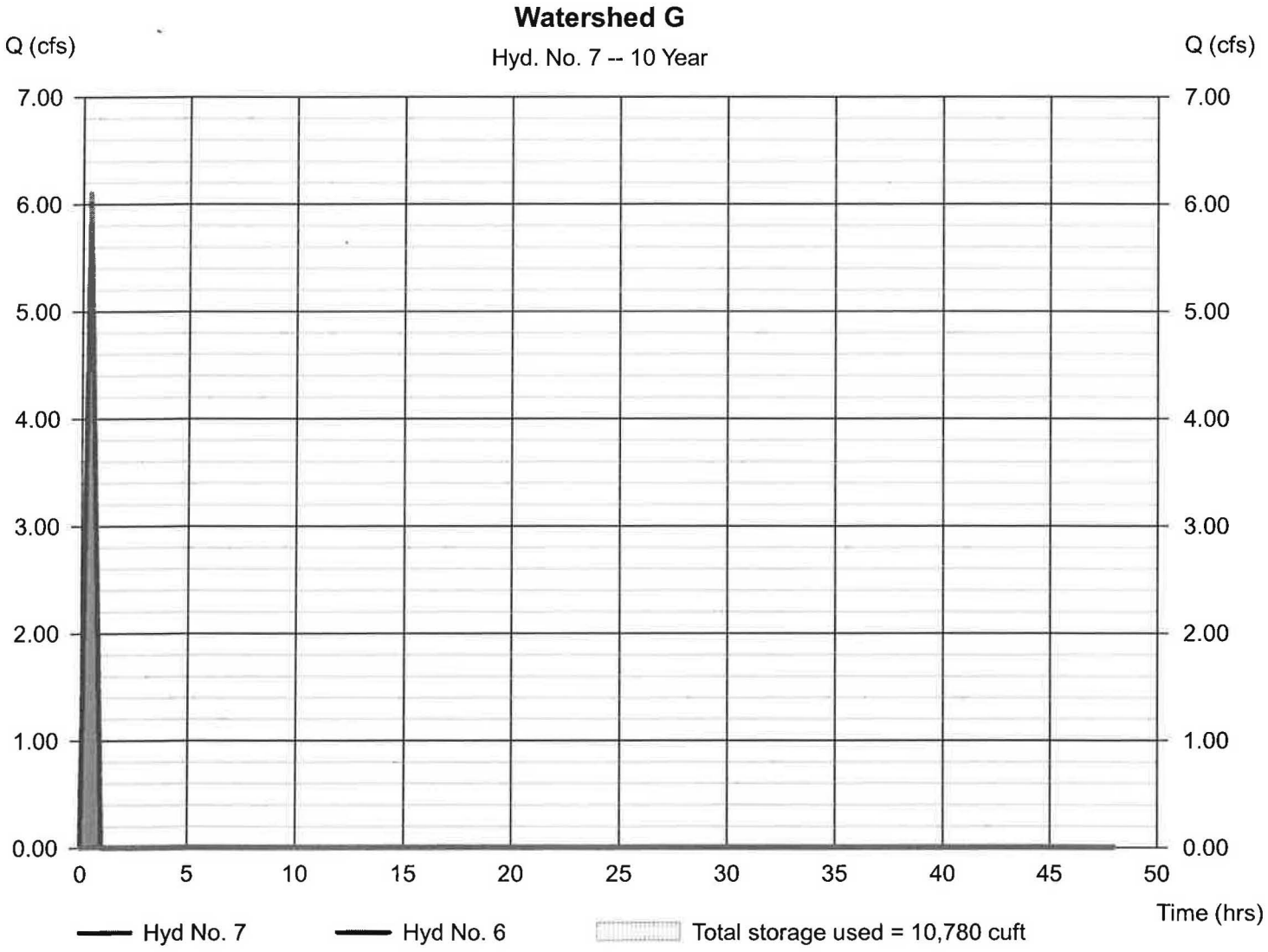
Hydrograph Report

Hyd. No. 7

Watershed G

Hydrograph type	= Reservoir	Peak discharge	= 0.007 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.98 hrs
Time interval	= 1 min	Hyd. volume	= 1,170 cuft
Inflow hyd. No.	= 6 - Watershed G	Max. Elevation	= 546.31 ft
Reservoir name	= Watershed G	Max. Storage	= 10,780 cuft

Storage Indication method used.

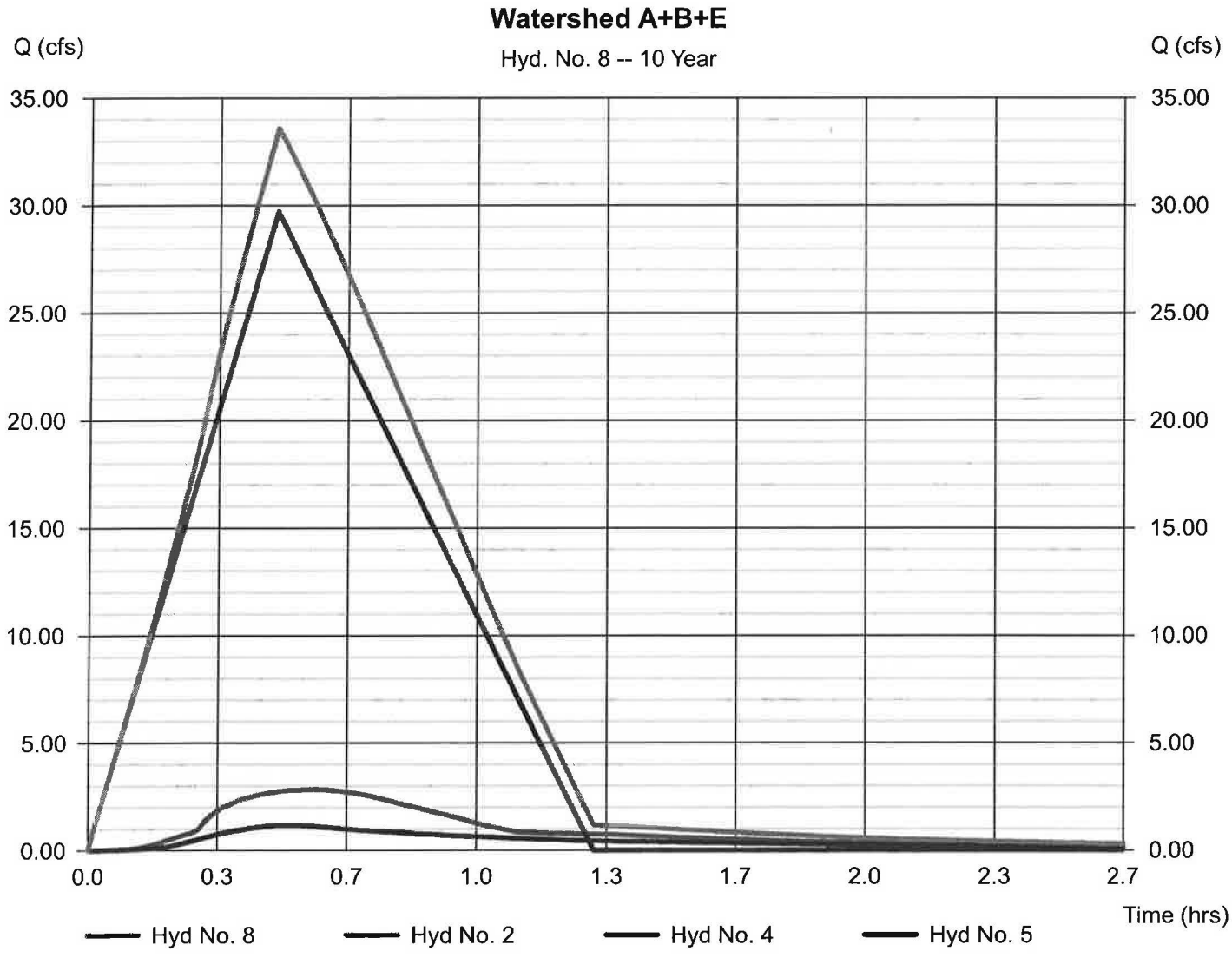


Hydrograph Report

Hyd. No. 8

Watershed A+B+E

Hydrograph type	= Combine	Peak discharge	= 33.59 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.48 hrs
Time interval	= 1 min	Hyd. volume	= 85,149 cuft
Inflow hyds.	= 2, 4, 5	Contrib. drain. area	= 40.300 ac



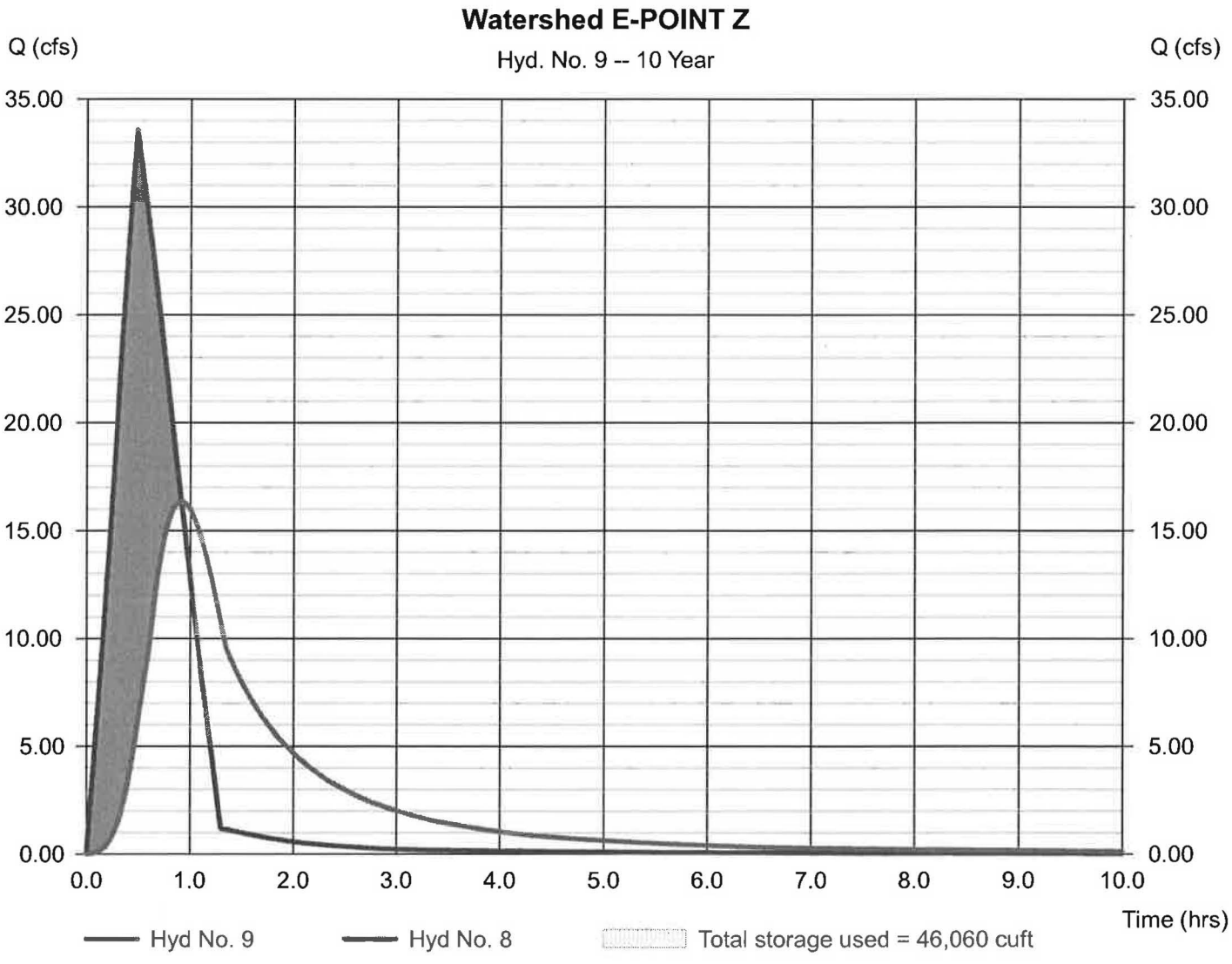
Hydrograph Report

Hyd. No. 9

Watershed E-POINT Z

Hydrograph type	= Reservoir	Peak discharge	= 16.32 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.92 hrs
Time interval	= 1 min	Hyd. volume	= 85,137 cuft
Inflow hyd. No.	= 8 - Watershed A+B+E	Max. Elevation	= 542.10 ft
Reservoir name	= Watershed E	Max. Storage	= 46,060 cuft

Storage Indication method used.



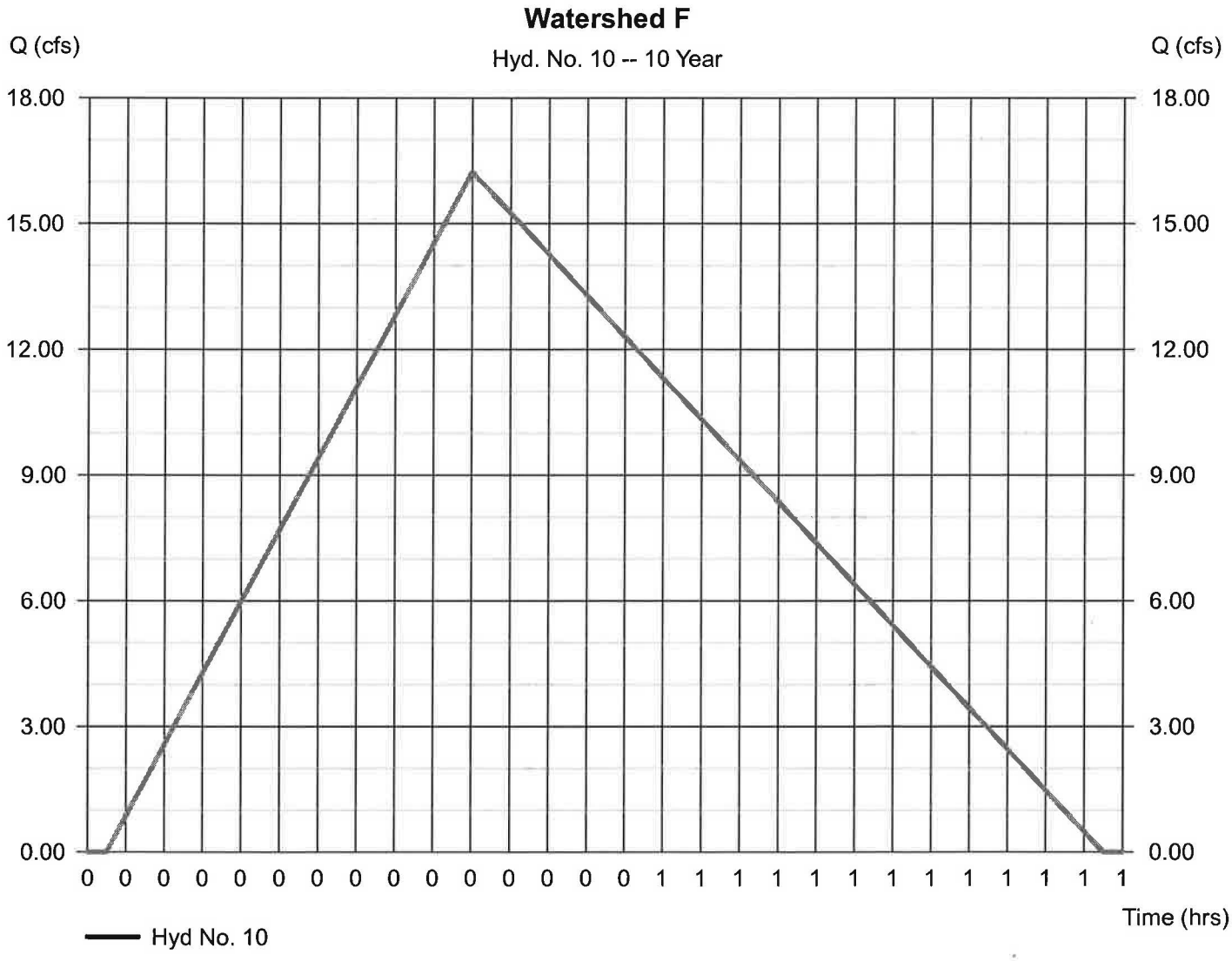
Hydrograph Report

Hyd. No. 10

Watershed F

Hydrograph type	= Rational	Peak discharge	= 16.23 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.33 hrs
Time interval	= 1 min	Hyd. volume	= 25,926 cuft
Drainage area	= 15.400 ac	Runoff coeff.	= 0.3*
Intensity	= 3.513 in/hr	Tc by TR55	= 19.94 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.000 x 0.90) + (5.100 x 0.30) + (8.800 x 0.20) + (0.500 x 1.00)] / 15.400

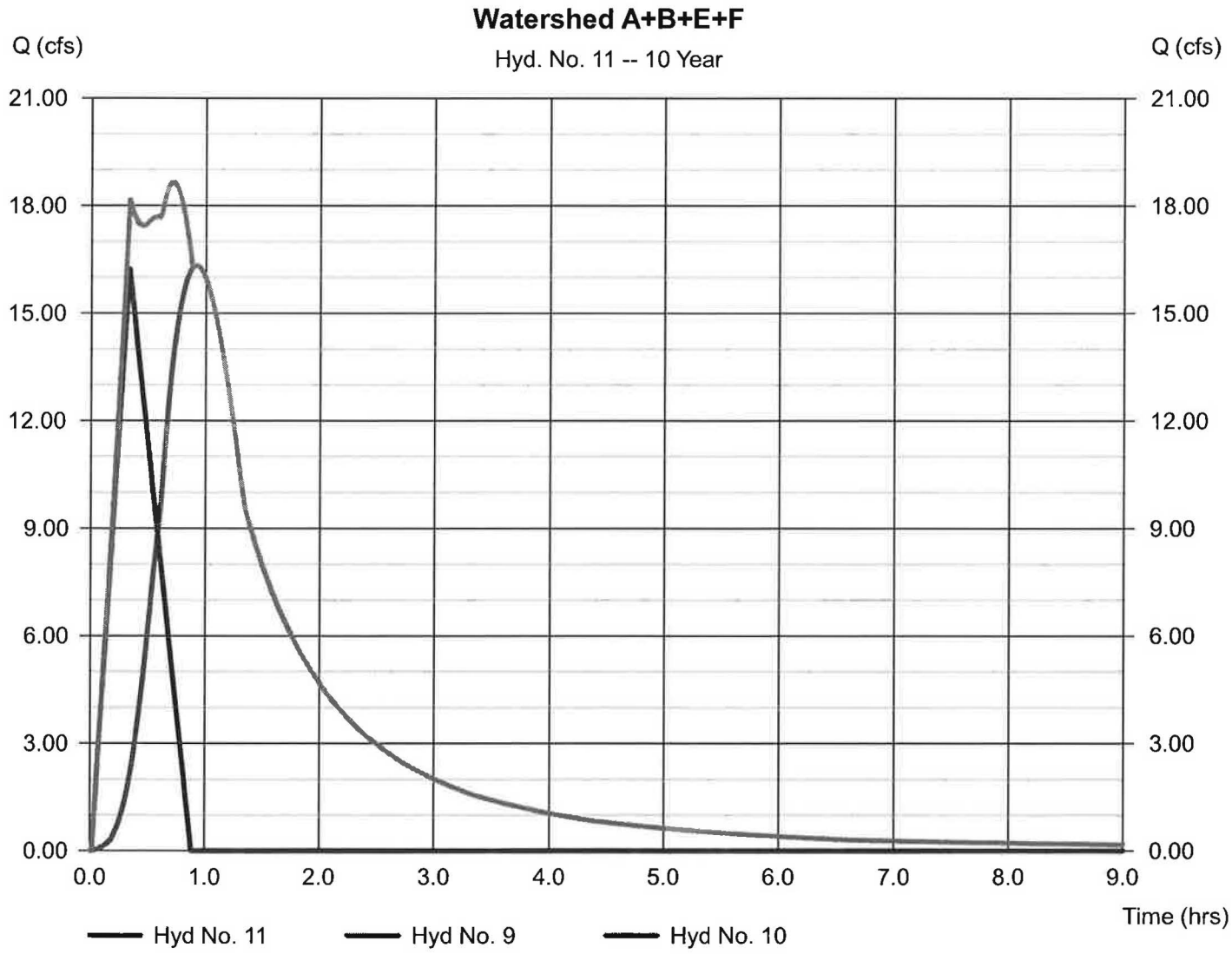


Hydrograph Report

Hyd. No. 11

Watershed A+B+E+F

Hydrograph type	= Combine	Peak discharge	= 18.65 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.72 hrs
Time interval	= 1 min	Hyd. volume	= 110,457 cuft
Inflow hyds.	= 9, 10	Contrib. drain. area	= 15.400 ac



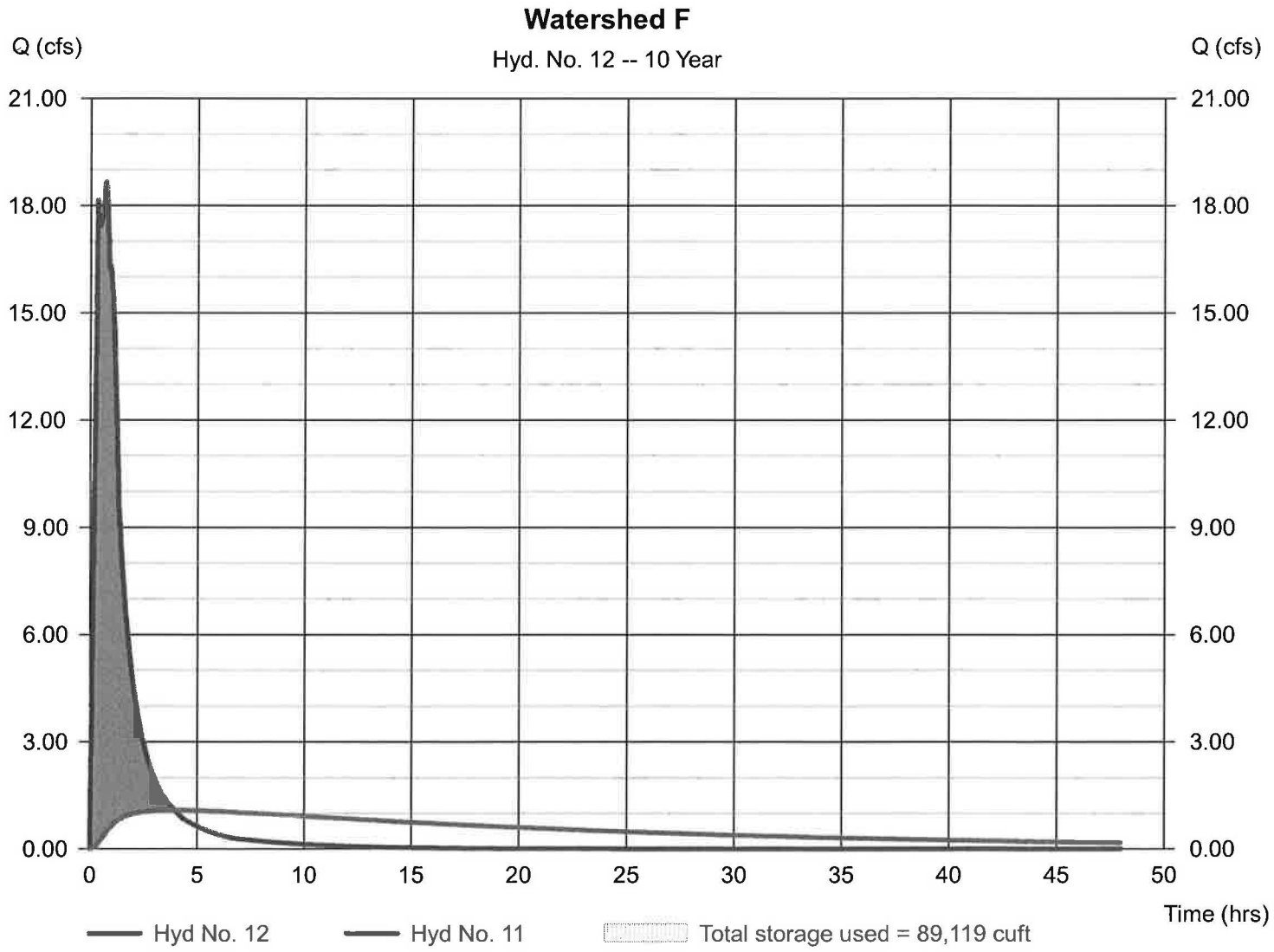
Hydrograph Report

Hyd. No. 12

Watershed F

Hydrograph type	= Reservoir	Peak discharge	= 1.089 cfs
Storm frequency	= 10 yrs	Time to peak	= 3.93 hrs
Time interval	= 1 min	Hyd. volume	= 95,217 cuft
Inflow hyd. No.	= 11 - Watershed A+B+E+F	Max. Elevation	= 539.36 ft
Reservoir name	= Watershed F	Max. Storage	= 89,119 cuft

Storage Indication method used.



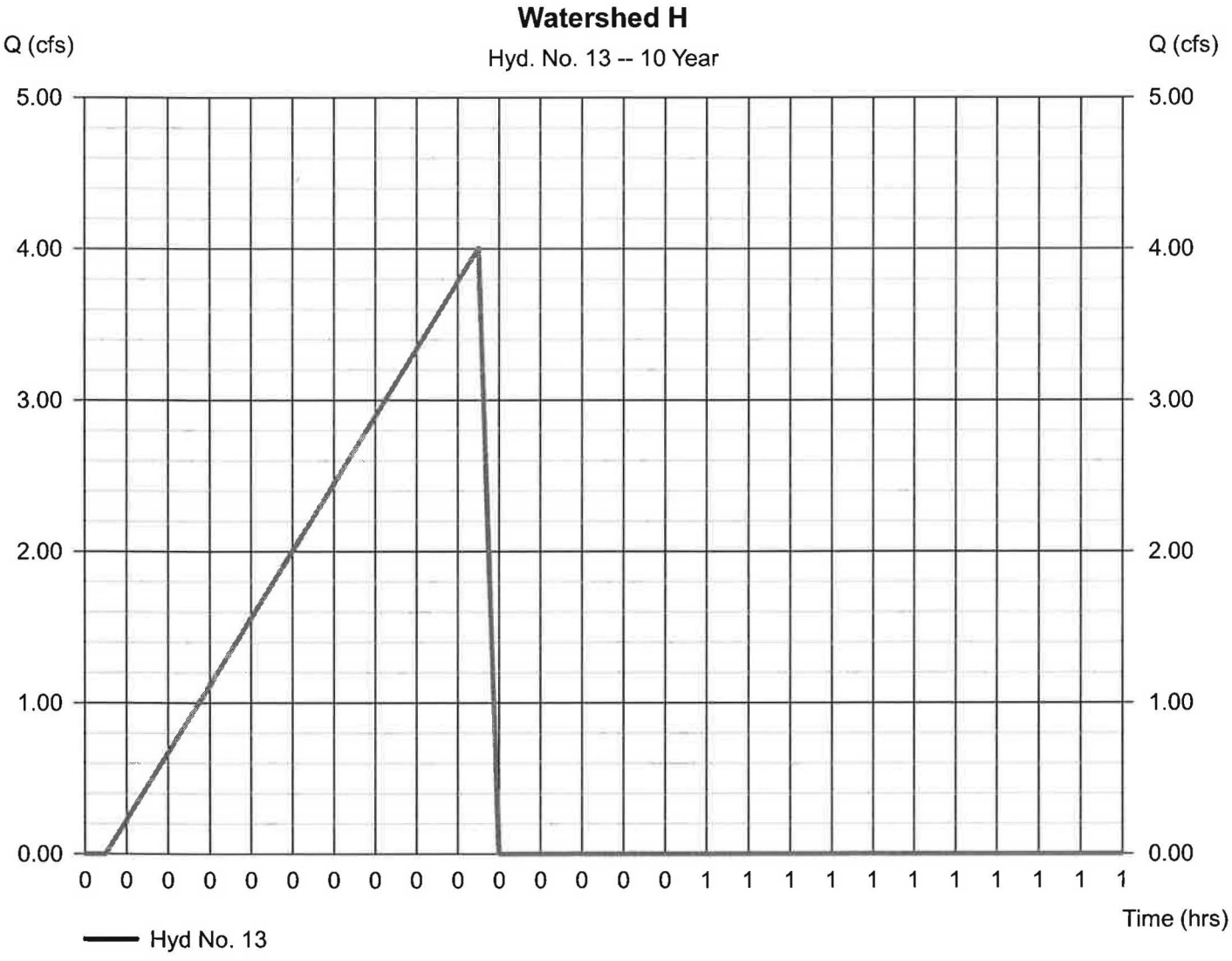
Hydrograph Report

Hyd. No. 13

Watershed H

Hydrograph type	= Rational	Peak discharge	= 4.003 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 5,992 cuft
Drainage area	= 3.800 ac	Runoff coeff.	= 0.29*
Intensity	= 3.633 in/hr	Tc by TR55	= 18.69 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.200 x 0.90) + (0.100 x 0.30) + (2.500 x 0.20) + (0.800 x 0.25) + (0.200 x 1.00)] / 3.800

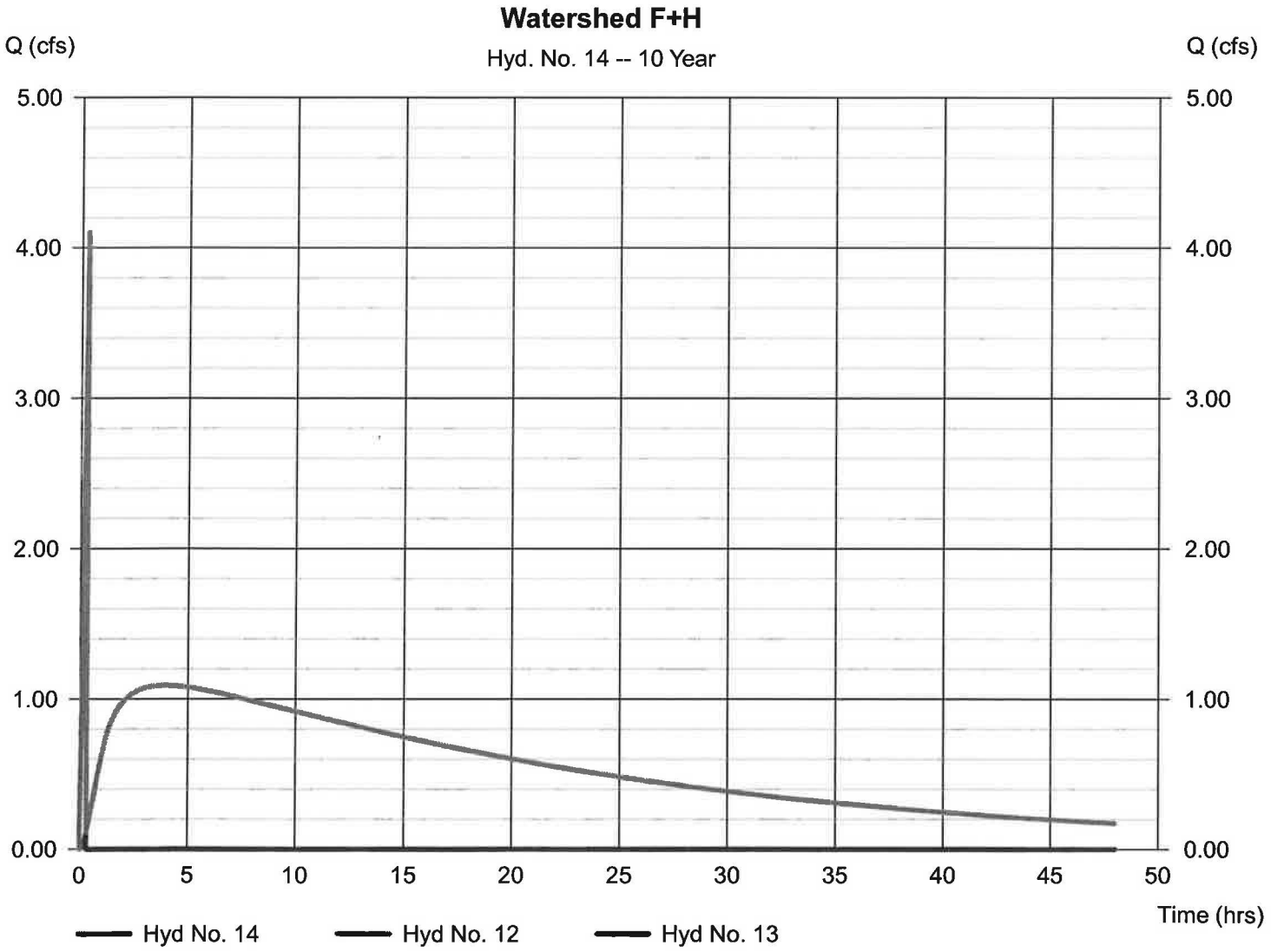


Hydrograph Report

Hyd. No. 14

Watershed F+H

Hydrograph type	= Combine	Peak discharge	= 4.100 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 97,499 cuft
Inflow hyds.	= 12, 13	Contrib. drain. area	= 3.800 ac



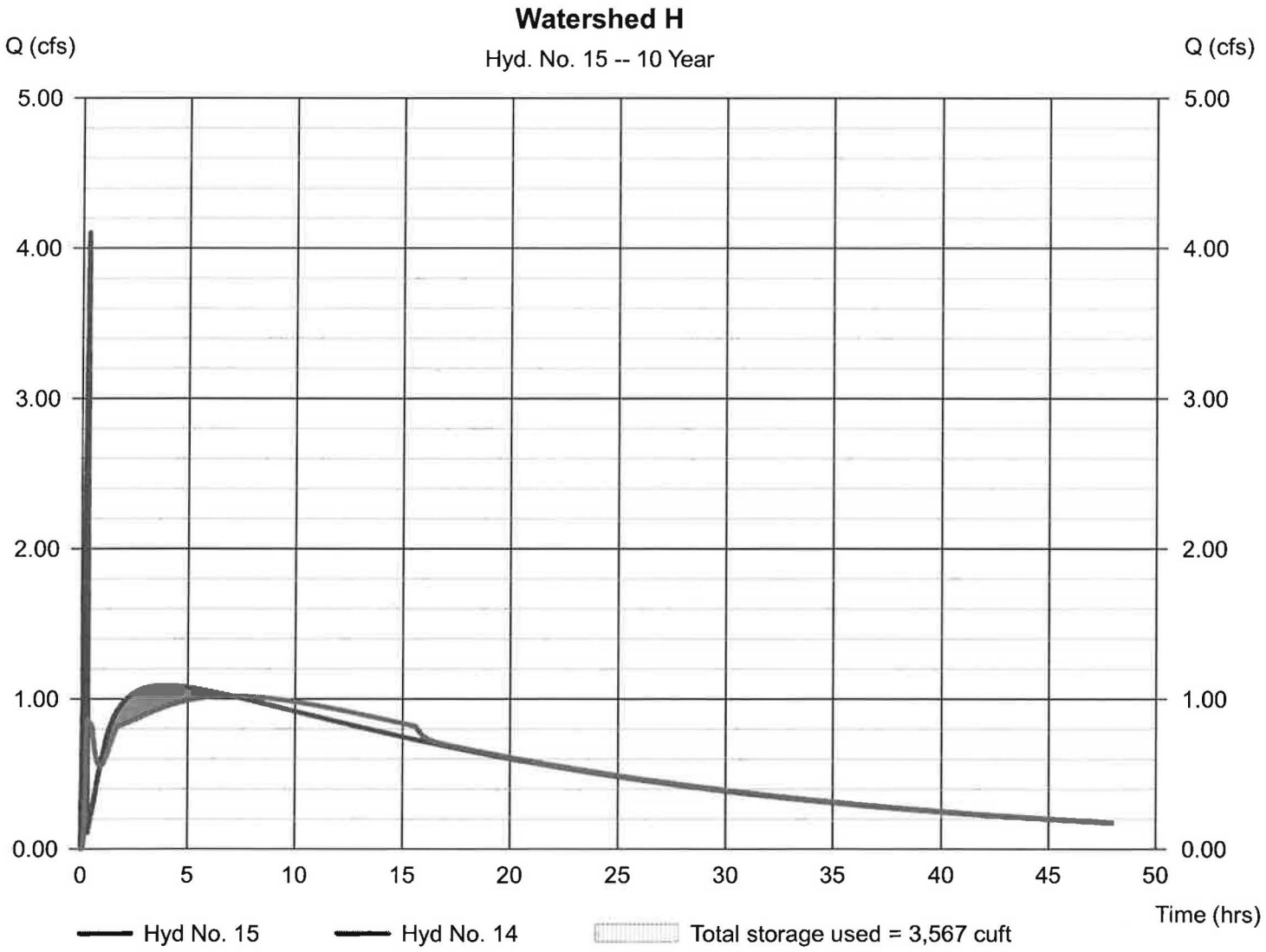
Hydrograph Report

Hyd. No. 15

Watershed H

Hydrograph type	= Reservoir	Peak discharge	= 1.019 cfs
Storm frequency	= 10 yrs	Time to peak	= 7.05 hrs
Time interval	= 1 min	Hyd. volume	= 96,840 cuft
Inflow hyd. No.	= 14 - Watershed F+H	Max. Elevation	= 536.07 ft
Reservoir name	= Watershed H	Max. Storage	= 3,567 cuft

Storage Indication method used.



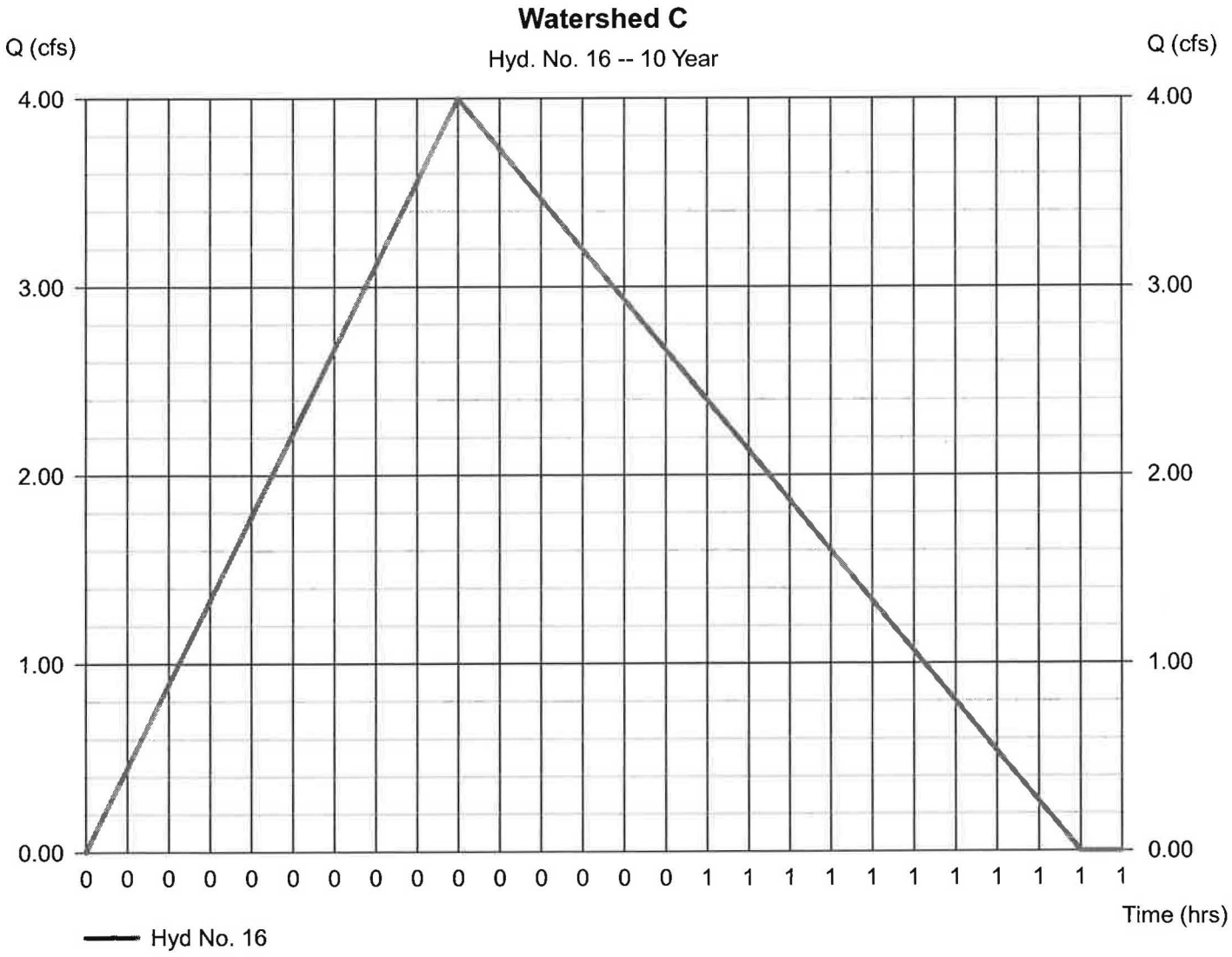
Hydrograph Report

Hyd. No. 16

Watershed C

Hydrograph type	= Rational	Peak discharge	= 3.998 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.30 hrs
Time interval	= 1 min	Hyd. volume	= 5,860 cuft
Drainage area	= 3.300 ac	Runoff coeff.	= 0.33*
Intensity	= 3.671 in/hr	Tc by TR55	= 18.30 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.400 x 0.90) + (1.200 x 0.30) + (1.400 x 0.20) + (0.300 x 0.25)] / 3.300



Hydrograph Report

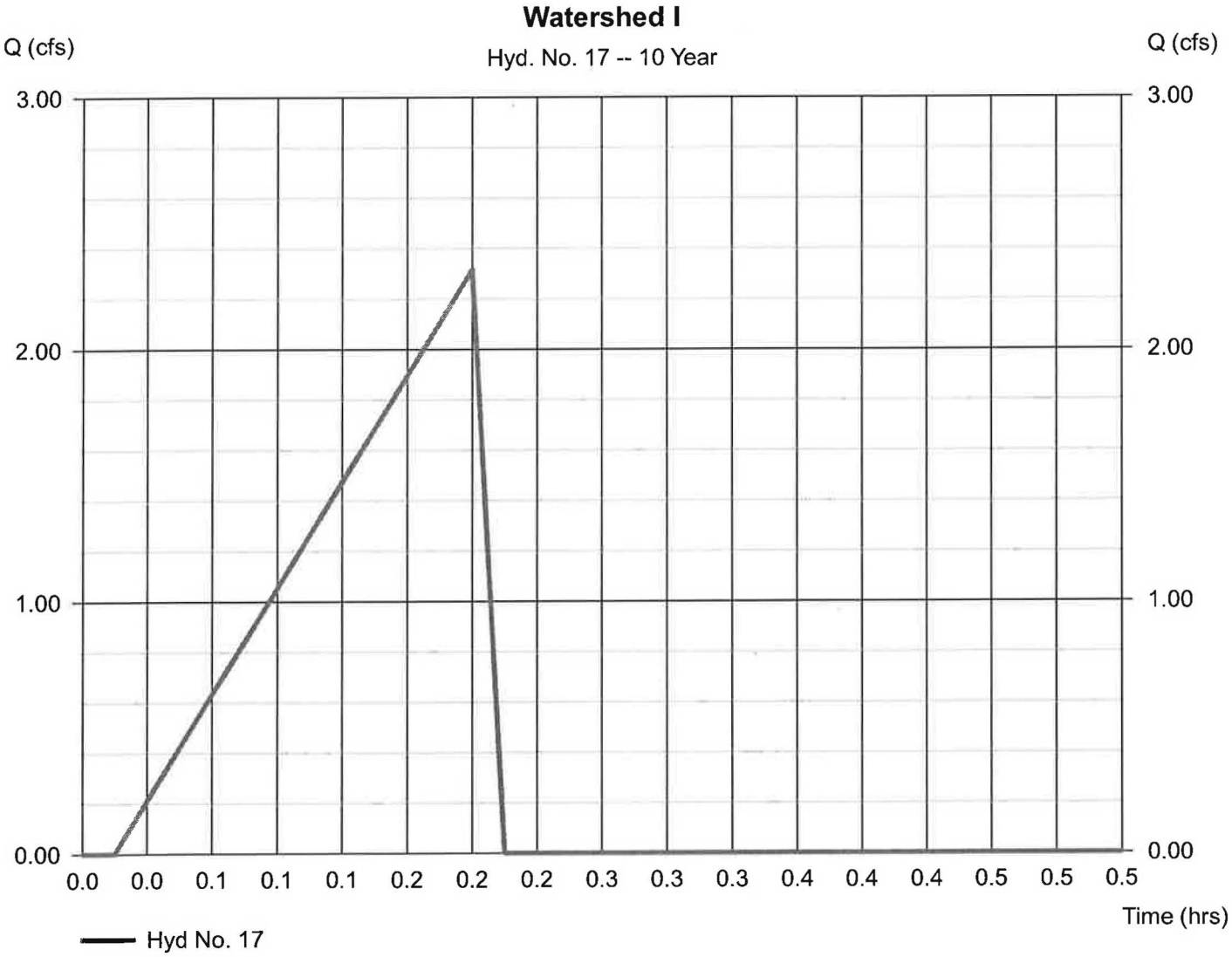
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 17

Watershed I

Hydrograph type	= Rational	Peak discharge	= 2.315 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.20 hrs
Time interval	= 1 min	Hyd. volume	= 2,138 cuft
Drainage area	= 1.500 ac	Runoff coeff.	= 0.34*
Intensity	= 4.539 in/hr	Tc by TR55	= 11.53 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.200 x 0.90) + (0.700 x 0.30) + (0.600 x 0.20)] / 1.500



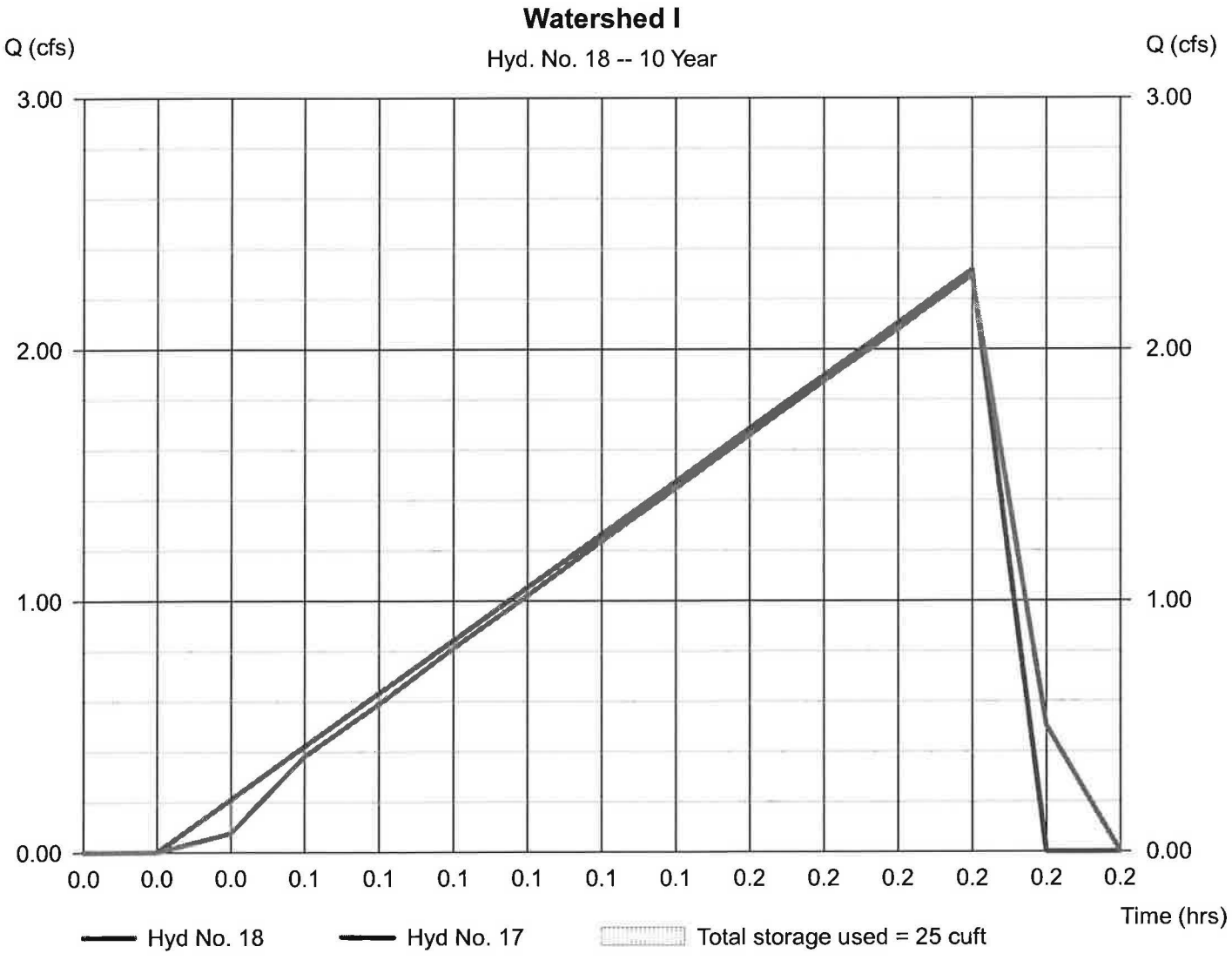
Hydrograph Report

Hyd. No. 18

Watershed I

Hydrograph type	= Reservoir	Peak discharge	= 2.292 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.20 hrs
Time interval	= 1 min	Hyd. volume	= 838 cuft
Inflow hyd. No.	= 17 - Watershed I	Max. Elevation	= 531.52 ft
Reservoir name	= Watershed I	Max. Storage	= 25 cuft

Storage Indication method used.

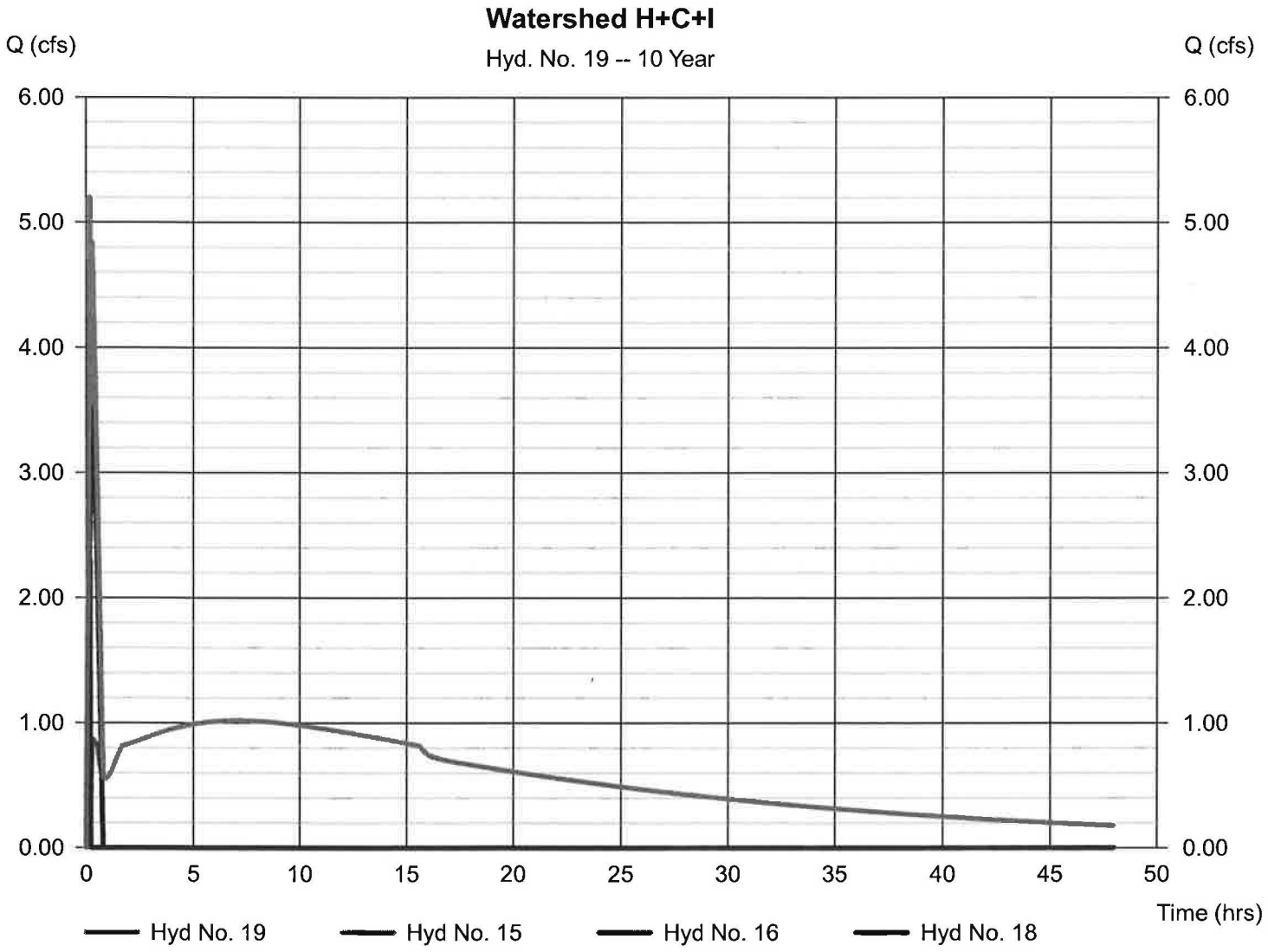


Hydrograph Report

Hyd. No. 19

Watershed H+C+I

Hydrograph type	= Combine	Peak discharge	= 5.202 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.20 hrs
Time interval	= 1 min	Hyd. volume	= 103,435 cuft
Inflow hyds.	= 15, 16, 18	Contrib. drain. area	= 3.300 ac



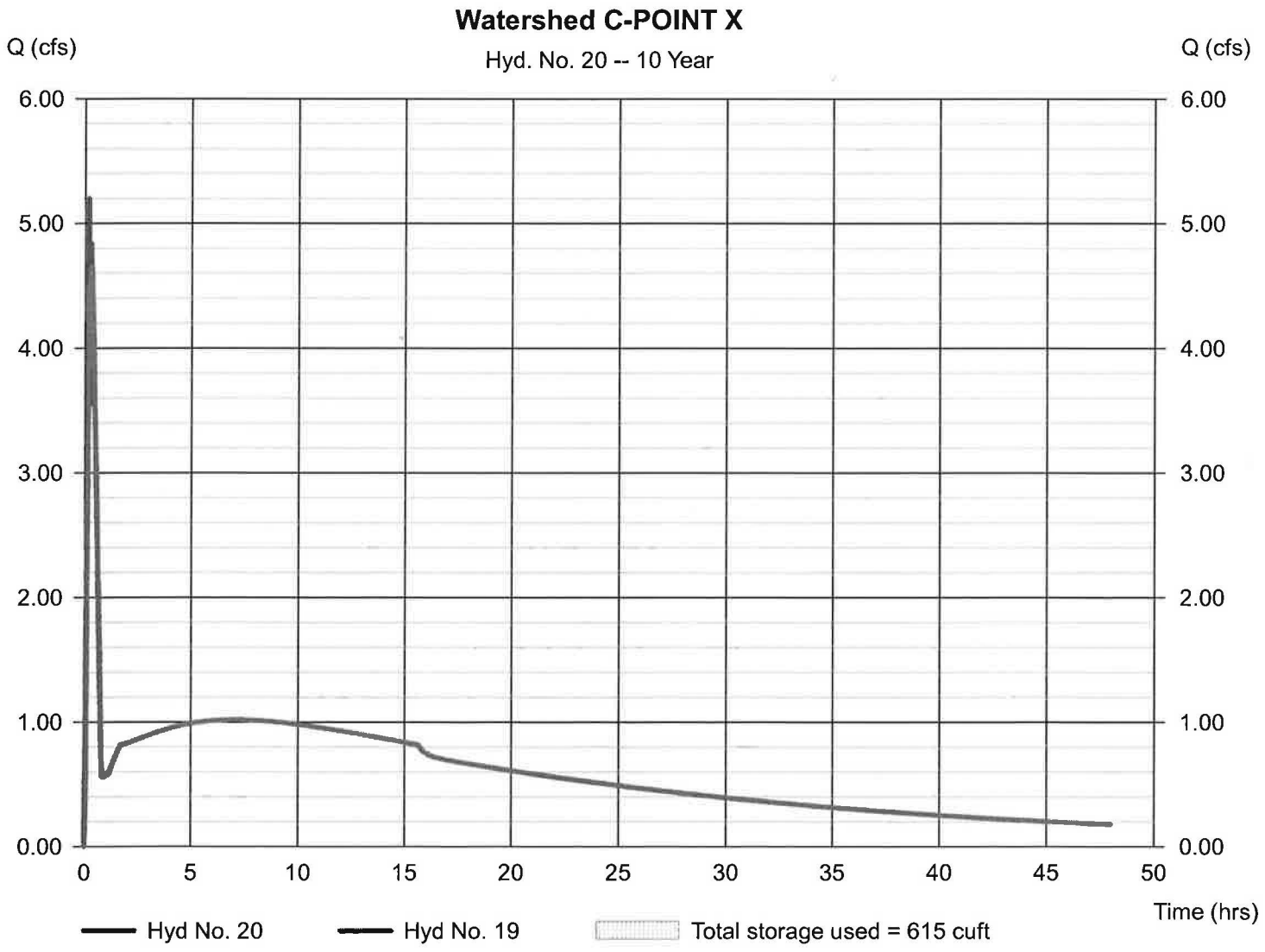
Hydrograph Report

Hyd. No. 20

Watershed C-POINT X

Hydrograph type	= Reservoir	Peak discharge	= 4.649 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.33 hrs
Time interval	= 1 min	Hyd. volume	= 103,374 cuft
Inflow hyd. No.	= 19 - Watershed H+C+I	Max. Elevation	= 529.83 ft
Reservoir name	= Watershed C	Max. Storage	= 615 cuft

Storage Indication method used.



Hydrograph Report

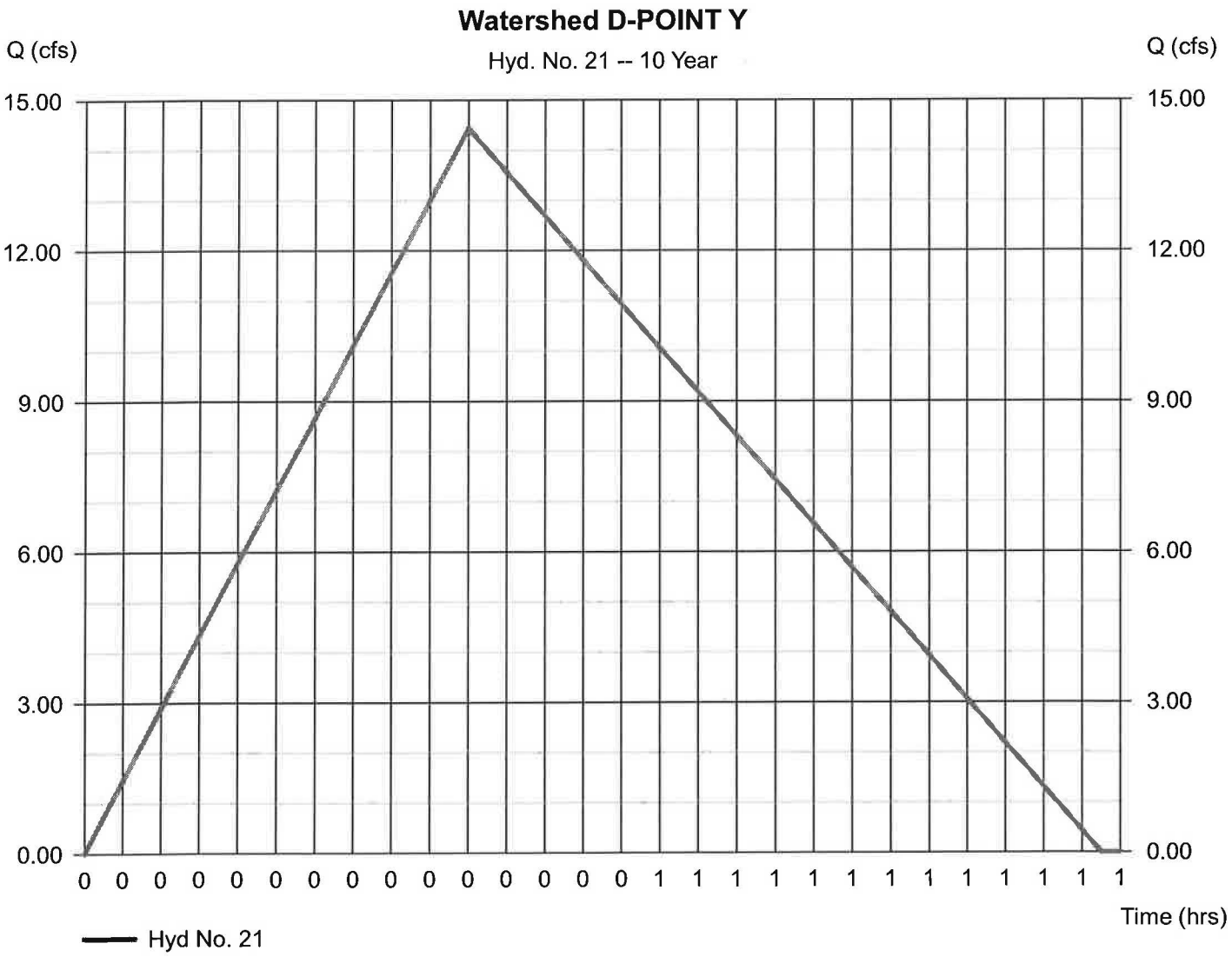
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 21

Watershed D-POINT Y

Hydrograph type	= Rational	Peak discharge	= 14.44 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.33 hrs
Time interval	= 1 min	Hyd. volume	= 23,125 cuft
Drainage area	= 14.190 ac	Runoff coeff.	= 0.29*
Intensity	= 3.508 in/hr	Tc by TR55	= 20.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.500 x 0.90) + (1.750 x 0.30) + (10.940 x 0.20)] / 14.190



Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	Rational	8.549	1	17	11,641	----	-------	-------	Watershed A
2	Reservoir	3.158	1	35	11,518	1	566.11	7,290	Watershed A
3	Rational	6.396	1	14	6,939	----	-------	-------	Watershed B
4	Reservoir	1.471	1	31	6,704	3	567.02	5,343	Watershed B
5	Rational	35.02	1	29	82,347	----	-------	-------	Watershed E
6	Rational	7.174	1	22	12,880	----	-------	-------	Watershed G
7	Reservoir	0.007	1	59	1,204	6	546.38	12,677	Watershed G
8	Combine	39.56	1	29	100,165	2, 4, 5,	-------	-------	Watershed A+B+E
9	Reservoir	20.43	1	54	100,153	8	542.15	51,779	Watershed E-POINT Z
10	Rational	19.04	1	20	30,420	----	-------	-------	Watershed F
11	Combine	23.93	1	41	129,862	9, 10	-------	-------	Watershed A+B+E+F
12	Reservoir	3.112	1	152	113,985	11	539.50	98,559	Watershed F
13	Rational	4.691	1	19	7,021	----	-------	-------	Watershed H
14	Combine	4.805	1	19	116,659	12, 13	-------	-------	Watershed F+H
15	Reservoir	1.823	1	248	115,985	14	536.32	11,578	Watershed H
16	Rational	4.682	1	18	6,864	----	-------	-------	Watershed C
17	Rational	2.674	1	12	2,470	----	-------	-------	Watershed I
18	Reservoir	2.648	1	12	968	17	531.60	27.4	Watershed I
19	Combine	6.097	1	12	123,696	15, 16, 18	-------	-------	Watershed H+C+I
20	Reservoir	5.386	1	19	123,631	19	529.92	666	Watershed C-POINT X
21	Rational	16.94	1	20	27,135	----	-------	-------	Watershed D-POINT Y

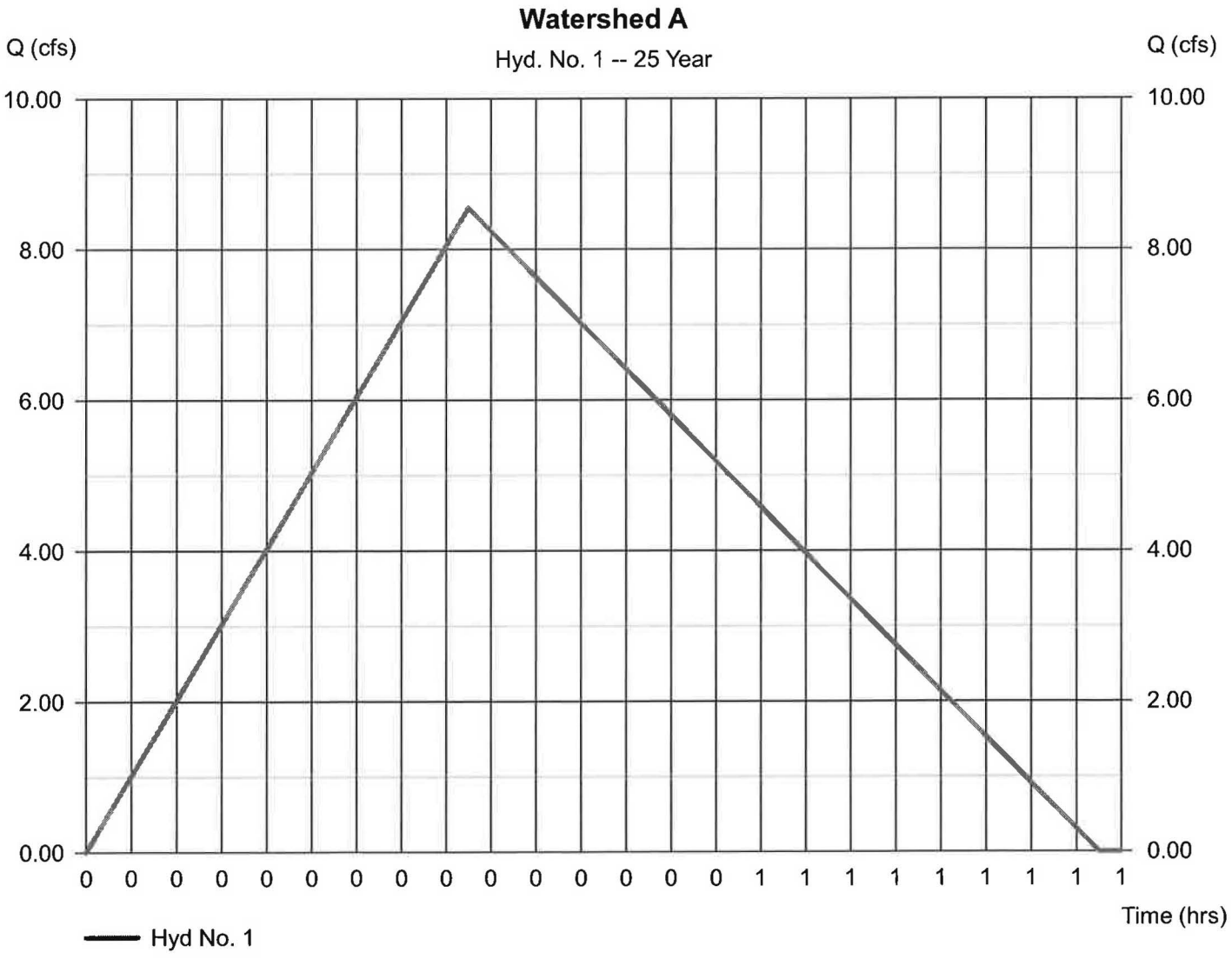
Hydrograph Report

Hyd. No. 1

Watershed A

Hydrograph type	= Rational	Peak discharge	= 8.549 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.28 hrs
Time interval	= 1 min	Hyd. volume	= 11,641 cuft
Drainage area	= 8.000 ac	Runoff coeff.	= 0.24*
Intensity	= 4.452 in/hr	Tc by TR55	= 17.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.400 x 0.90) + (0.500 x 0.30) + (7.100 x 0.20)] / 8.000



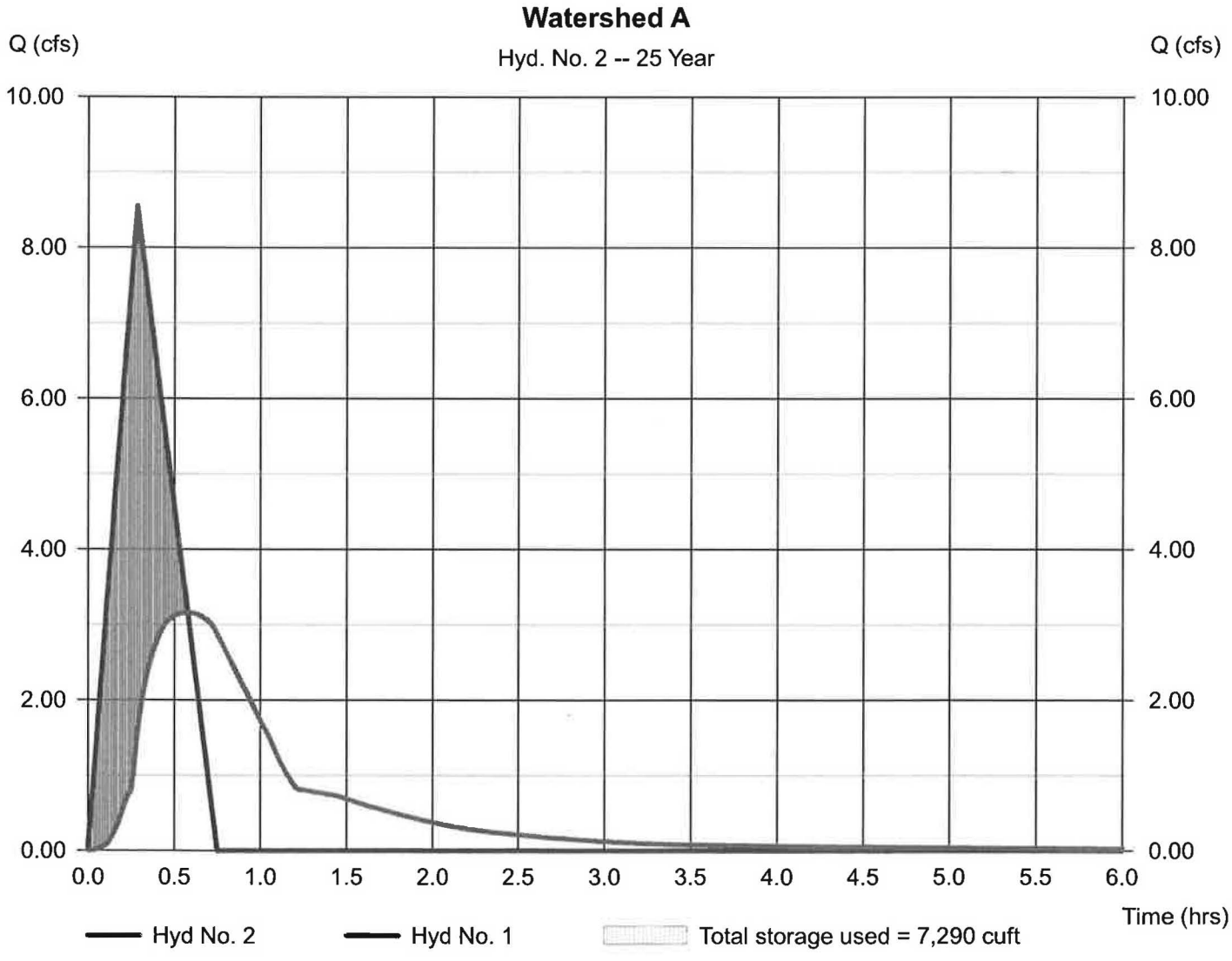
Hydrograph Report

Hyd. No. 2

Watershed A

Hydrograph type	= Reservoir	Peak discharge	= 3.158 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.58 hrs
Time interval	= 1 min	Hyd. volume	= 11,518 cuft
Inflow hyd. No.	= 1 - Watershed A	Max. Elevation	= 566.11 ft
Reservoir name	= Watershed A	Max. Storage	= 7,290 cuft

Storage Indication method used.



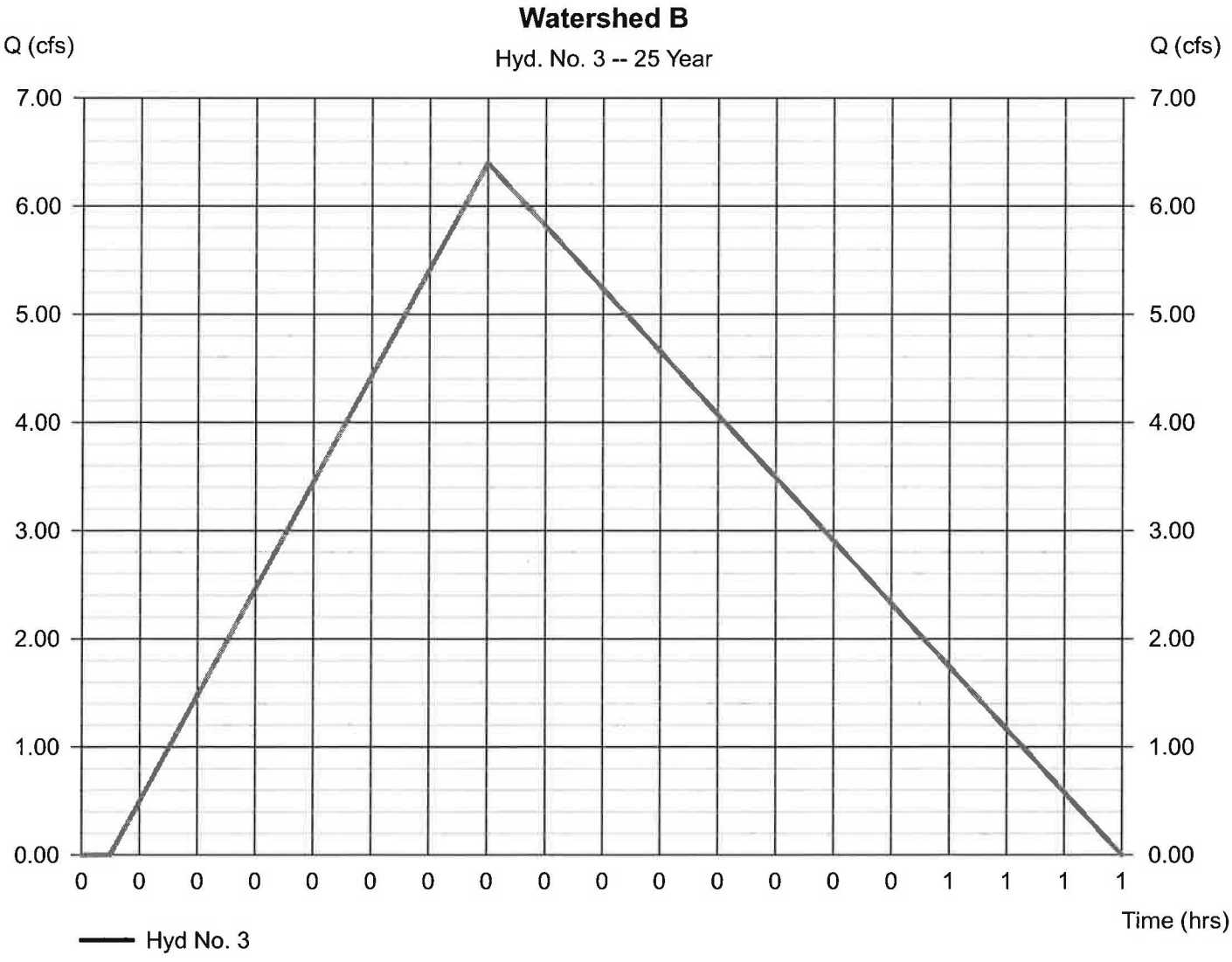
Hydrograph Report

Hyd. No. 3

Watershed B

Hydrograph type	= Rational	Peak discharge	= 6.396 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.23 hrs
Time interval	= 1 min	Hyd. volume	= 6,939 cuft
Drainage area	= 5.200 ac	Runoff coeff.	= 0.25*
Intensity	= 4.920 in/hr	Tc by TR55	= 13.54 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.300 x 0.90) + (0.500 x 0.30) + (4.400 x 0.20)] / 5.200



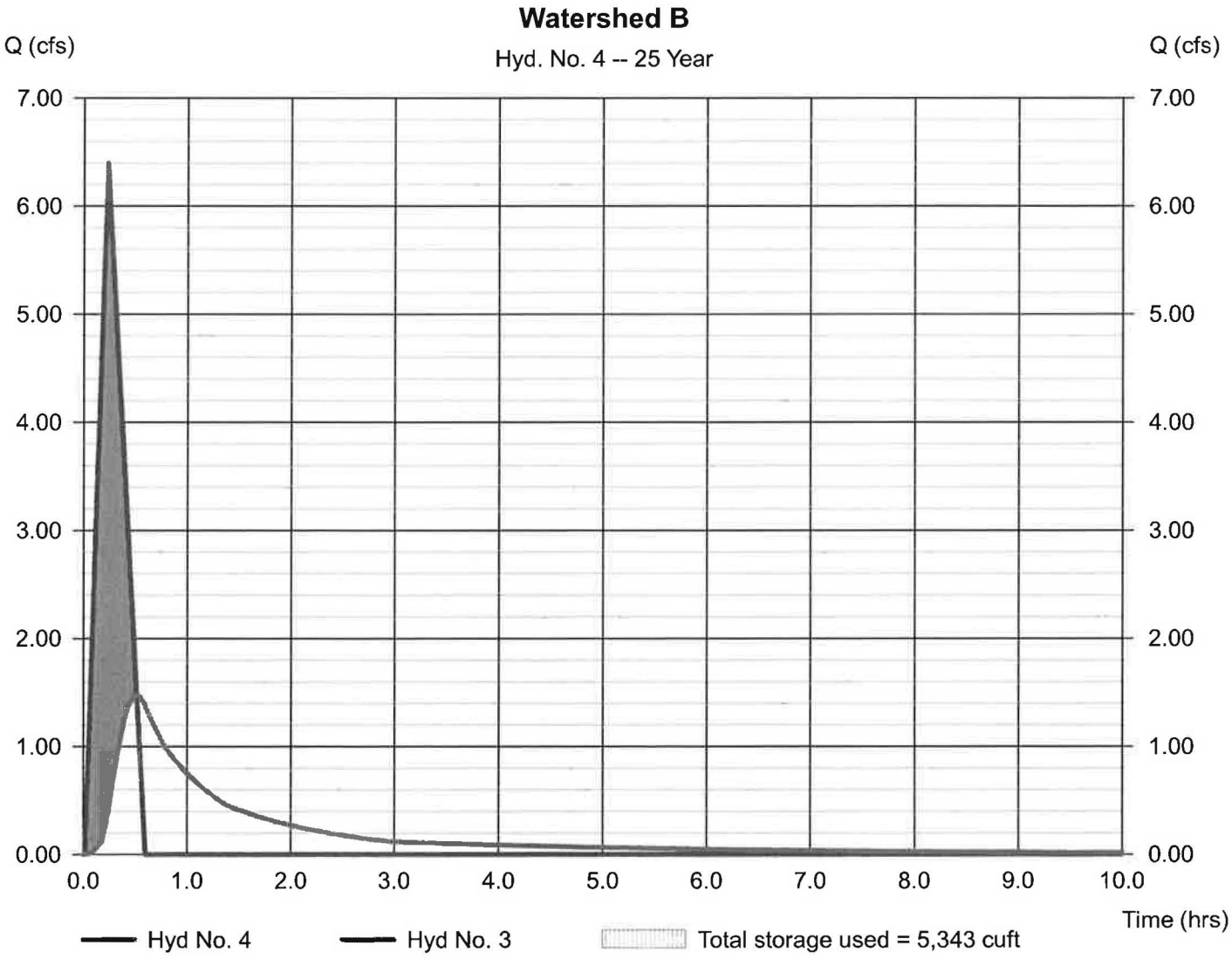
Hydrograph Report

Hyd. No. 4

Watershed B

Hydrograph type	= Reservoir	Peak discharge	= 1.471 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.52 hrs
Time interval	= 1 min	Hyd. volume	= 6,704 cuft
Inflow hyd. No.	= 3 - Watershed B	Max. Elevation	= 567.02 ft
Reservoir name	= Watershed B	Max. Storage	= 5,343 cuft

Storage Indication method used.



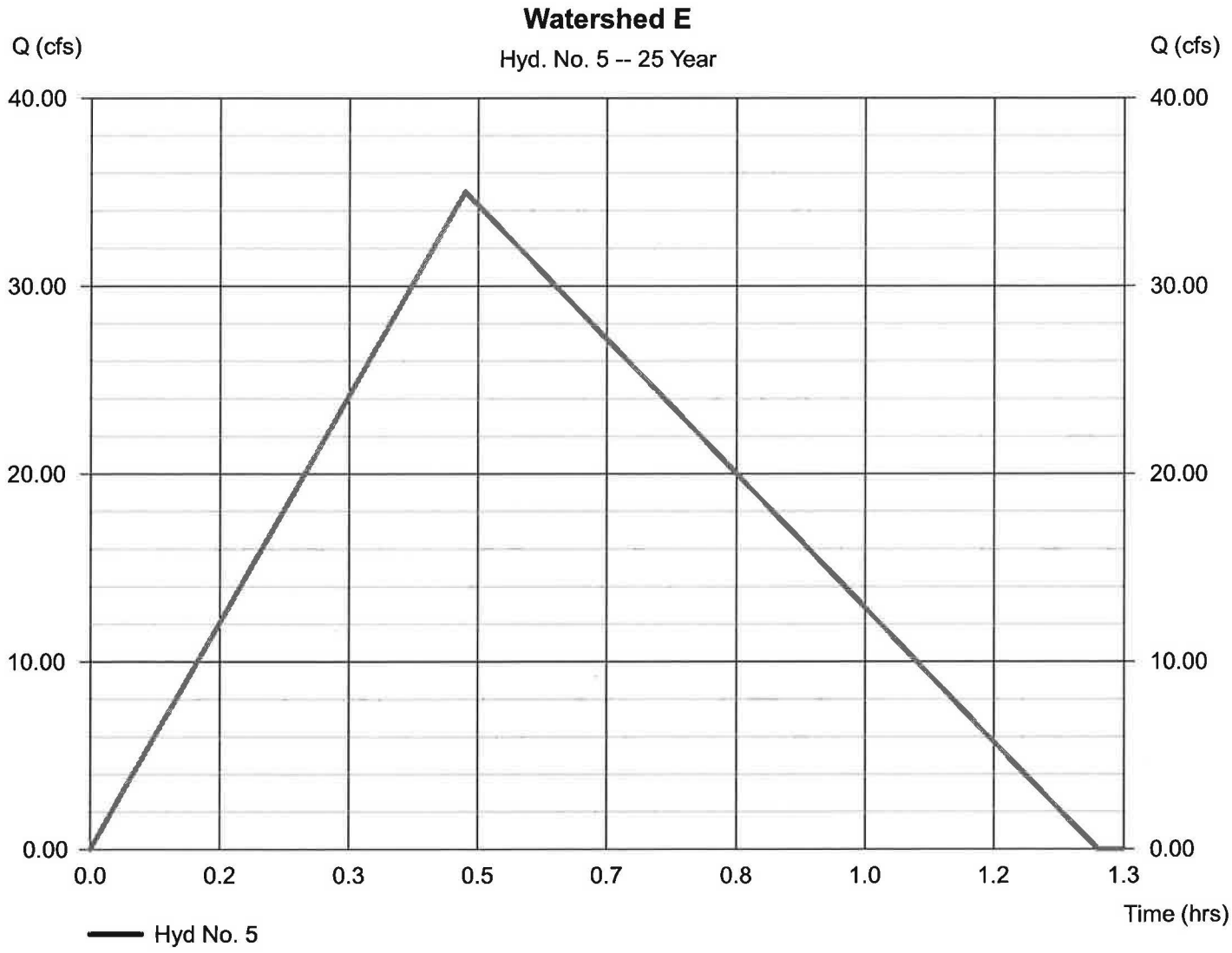
Hydrograph Report

Hyd. No. 5

Watershed E

Hydrograph type	= Rational	Peak discharge	= 35.02 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.48 hrs
Time interval	= 1 min	Hyd. volume	= 82,347 cuft
Drainage area	= 40.300 ac	Runoff coeff.	= 0.26*
Intensity	= 3.342 in/hr	Tc by TR55	= 29.36 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(2.100 x 0.90) + (7.700 x 0.30) + (30.500 x 0.20)] / 40.300



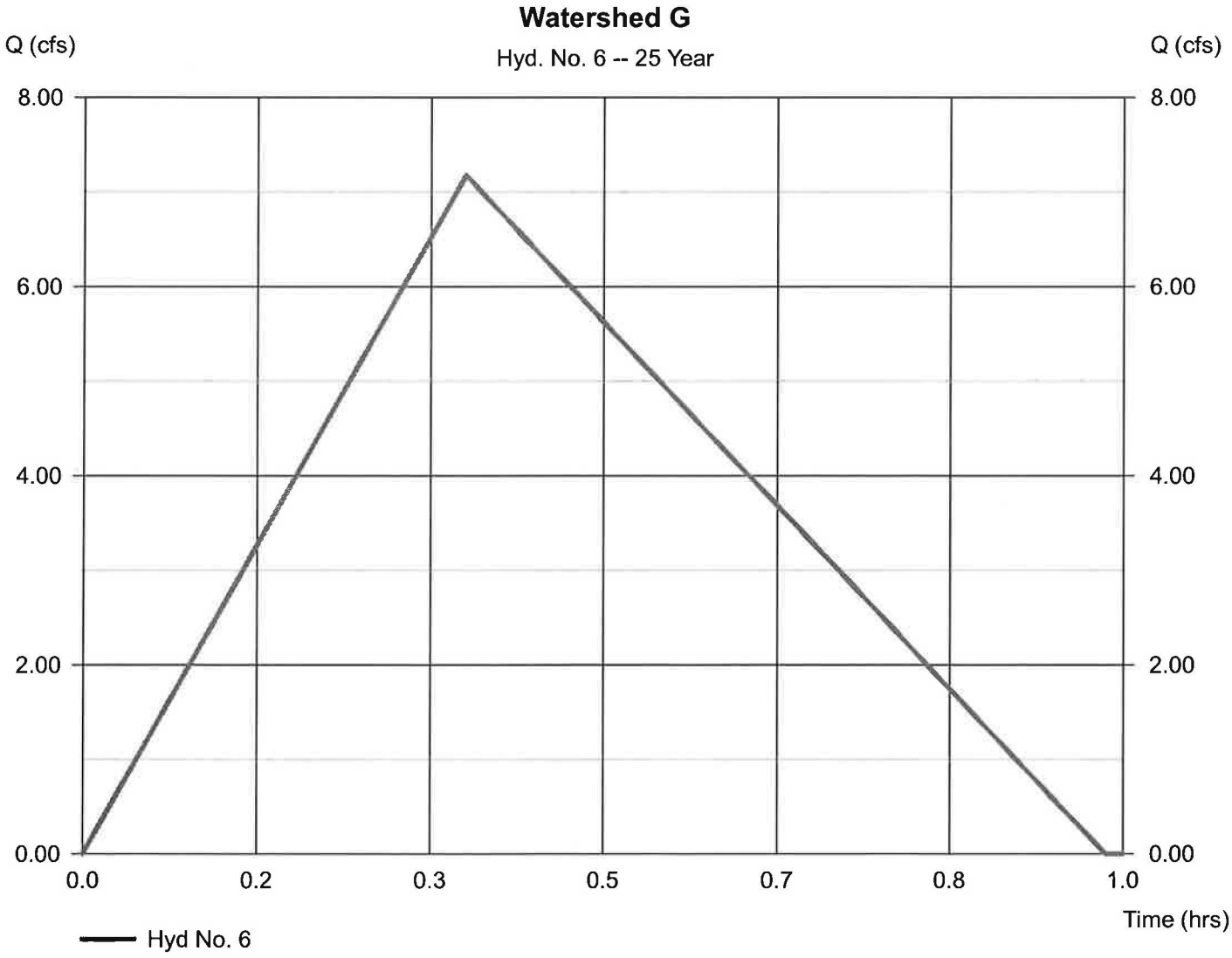
Hydrograph Report

Hyd. No. 6

Watershed G

Hydrograph type	= Rational	Peak discharge	= 7.174 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.37 hrs
Time interval	= 1 min	Hyd. volume	= 12,880 cuft
Drainage area	= 7.700 ac	Runoff coeff.	= 0.24*
Intensity	= 3.882 in/hr	Tc by TR55	= 22.41 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.300 x 0.90) + (0.800 x 0.30) + (6.600 x 0.20)] / 7.700



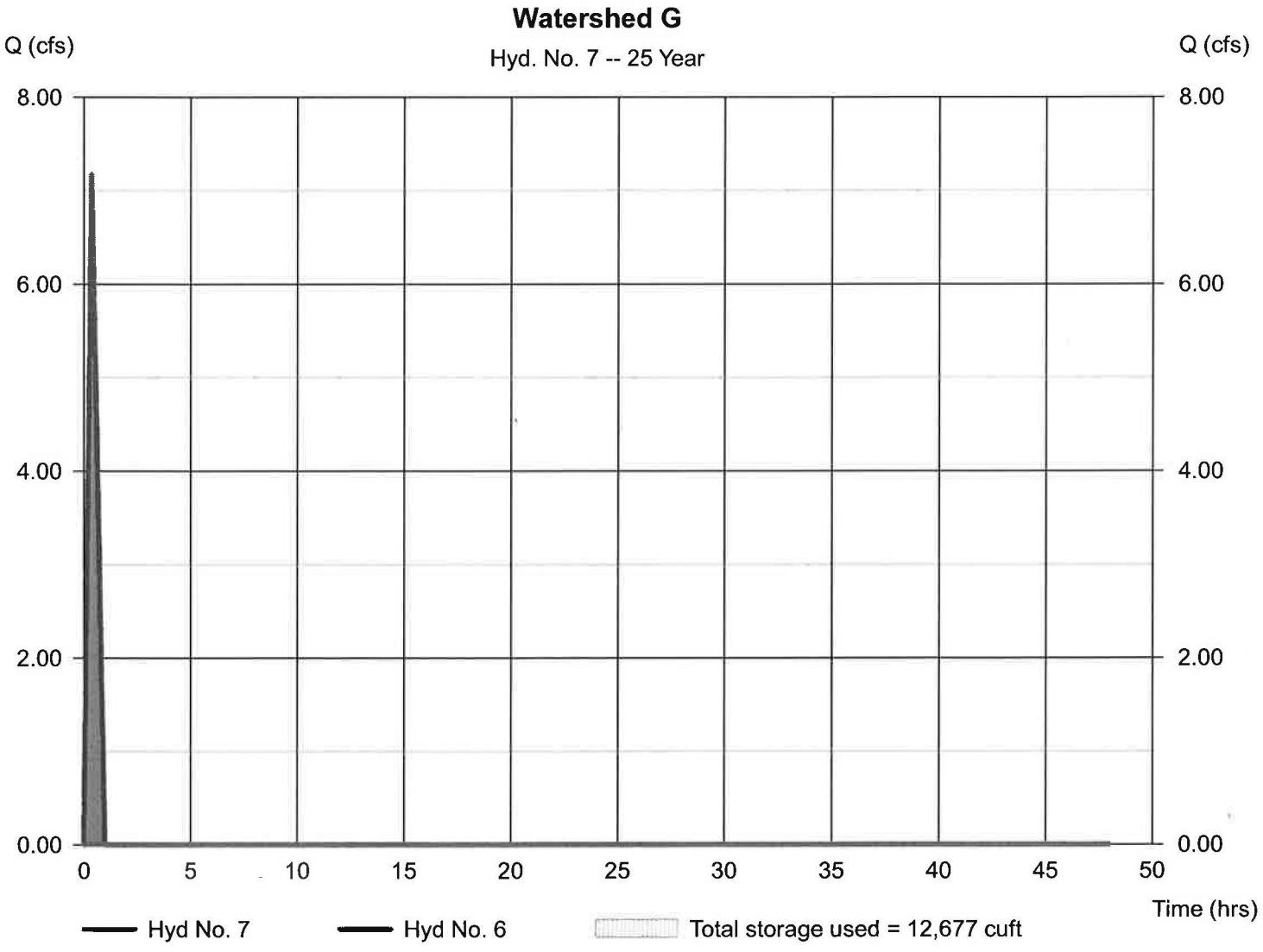
Hydrograph Report

Hyd. No. 7

Watershed G

Hydrograph type	= Reservoir	Peak discharge	= 0.007 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.98 hrs
Time interval	= 1 min	Hyd. volume	= 1,204 cuft
Inflow hyd. No.	= 6 - Watershed G	Max. Elevation	= 546.38 ft
Reservoir name	= Watershed G	Max. Storage	= 12,677 cuft

Storage Indication method used.

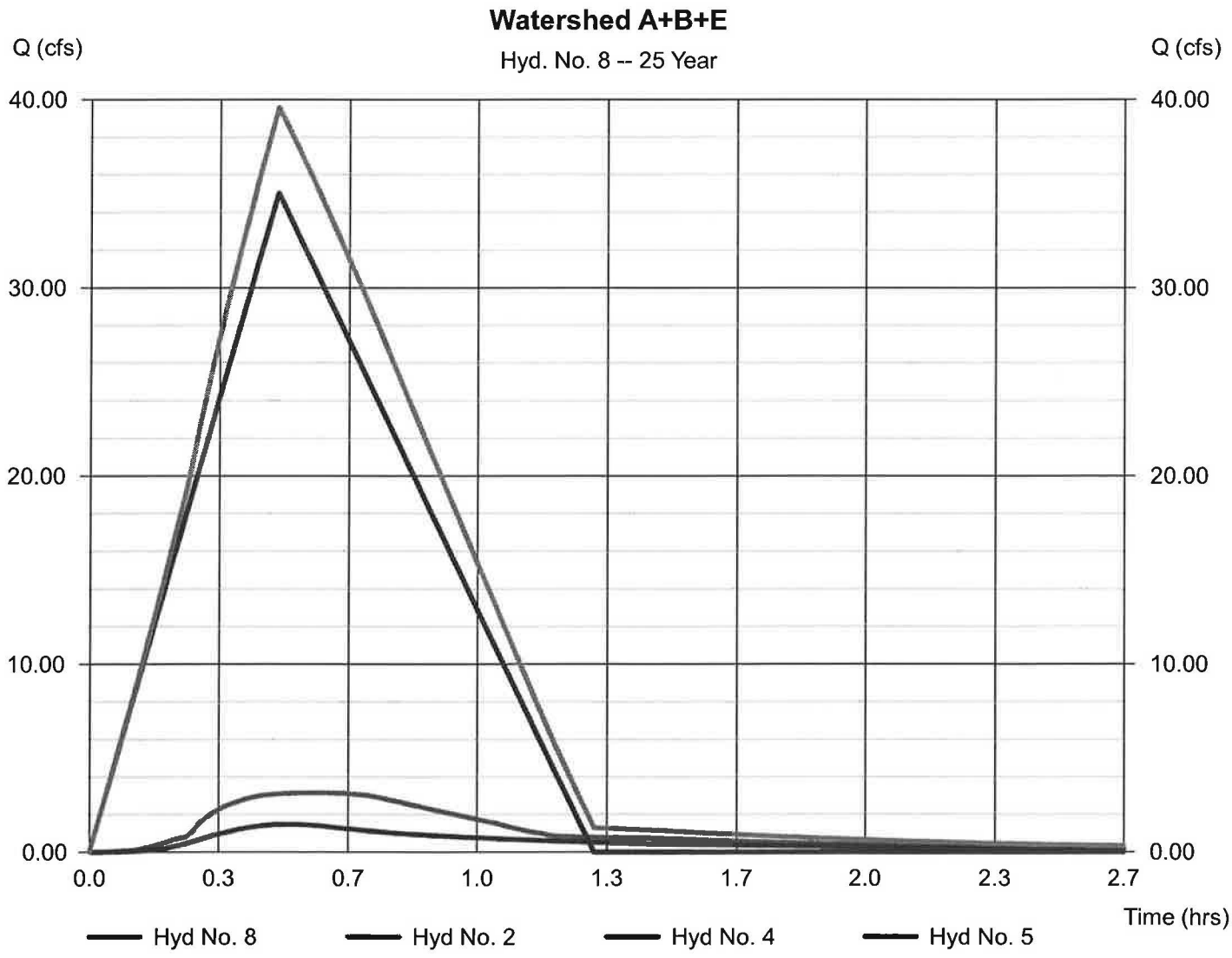


Hydrograph Report

Hyd. No. 8

Watershed A+B+E

Hydrograph type	= Combine	Peak discharge	= 39.56 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.48 hrs
Time interval	= 1 min	Hyd. volume	= 100,165 cuft
Inflow hyds.	= 2, 4, 5	Contrib. drain. area	= 40.300 ac



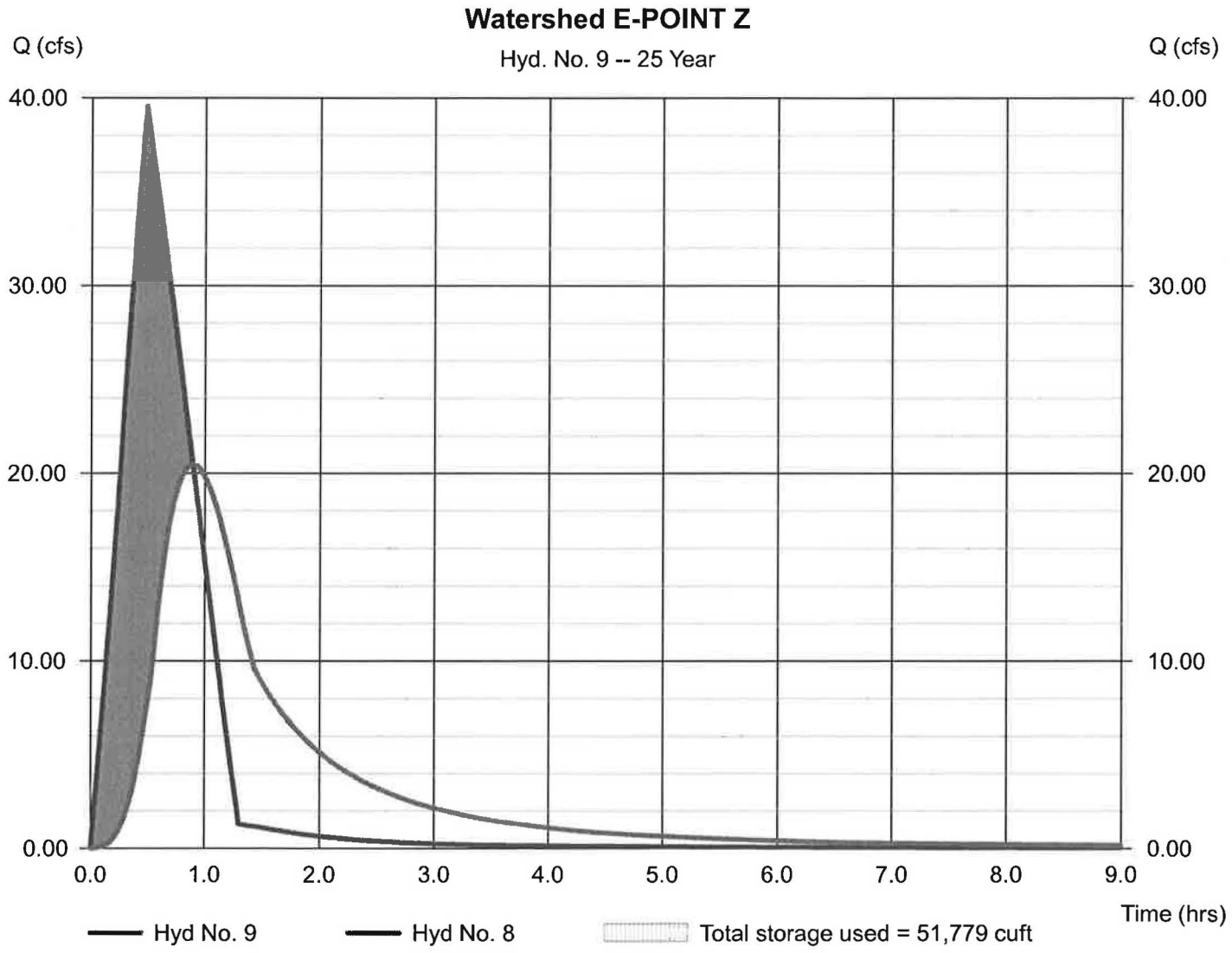
Hydrograph Report

Hyd. No. 9

Watershed E-POINT Z

Hydrograph type	= Reservoir	Peak discharge	= 20.43 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.90 hrs
Time interval	= 1 min	Hyd. volume	= 100,153 cuft
Inflow hyd. No.	= 8 - Watershed A+B+E	Max. Elevation	= 542.15 ft
Reservoir name	= Watershed E	Max. Storage	= 51,779 cuft

Storage Indication method used.



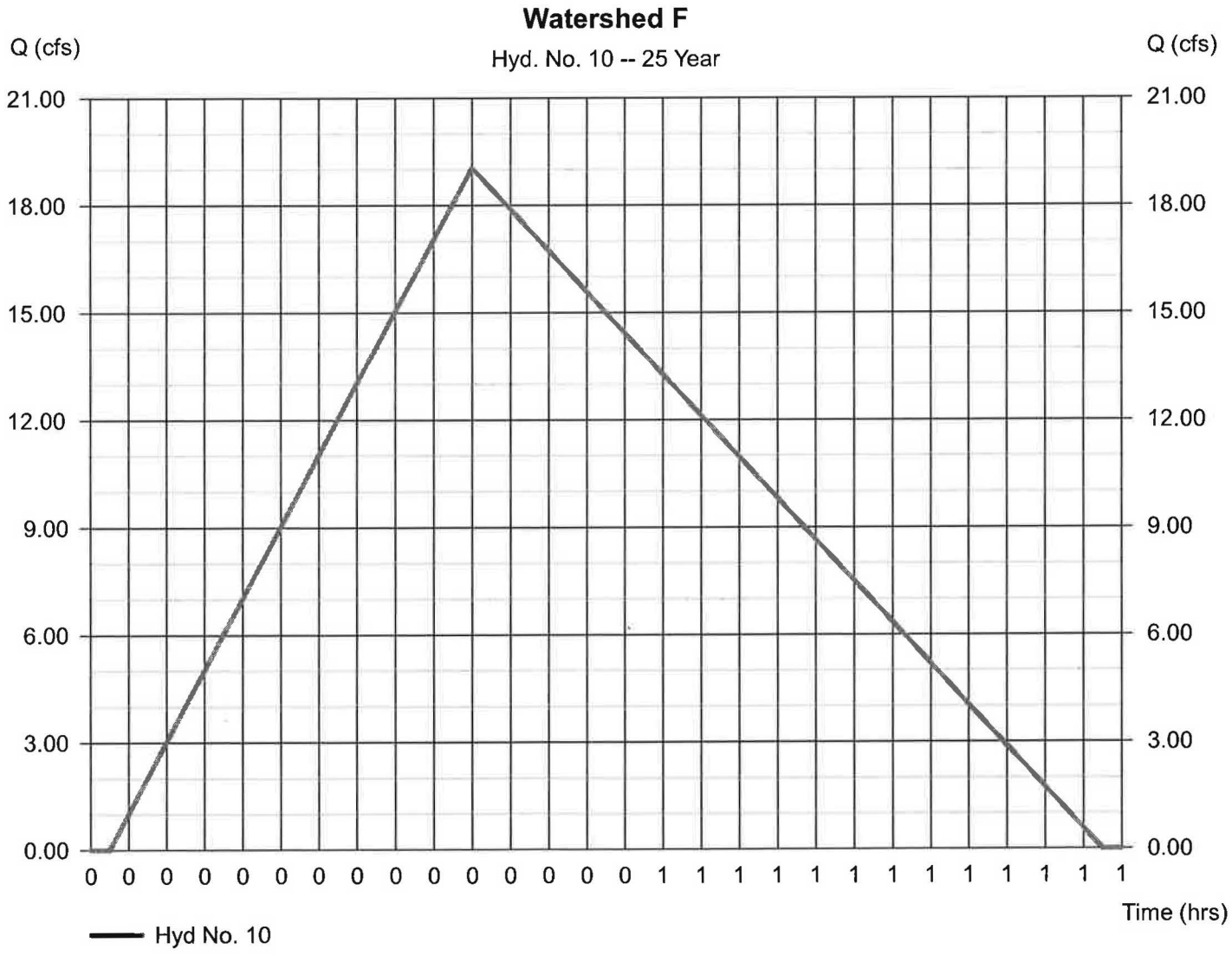
Hydrograph Report

Hyd. No. 10

Watershed F

Hydrograph type	= Rational	Peak discharge	= 19.04 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.33 hrs
Time interval	= 1 min	Hyd. volume	= 30,420 cuft
Drainage area	= 15.400 ac	Runoff coeff.	= 0.3*
Intensity	= 4.122 in/hr	Tc by TR55	= 19.94 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.000 x 0.90) + (5.100 x 0.30) + (8.800 x 0.20) + (0.500 x 1.00)] / 15.400

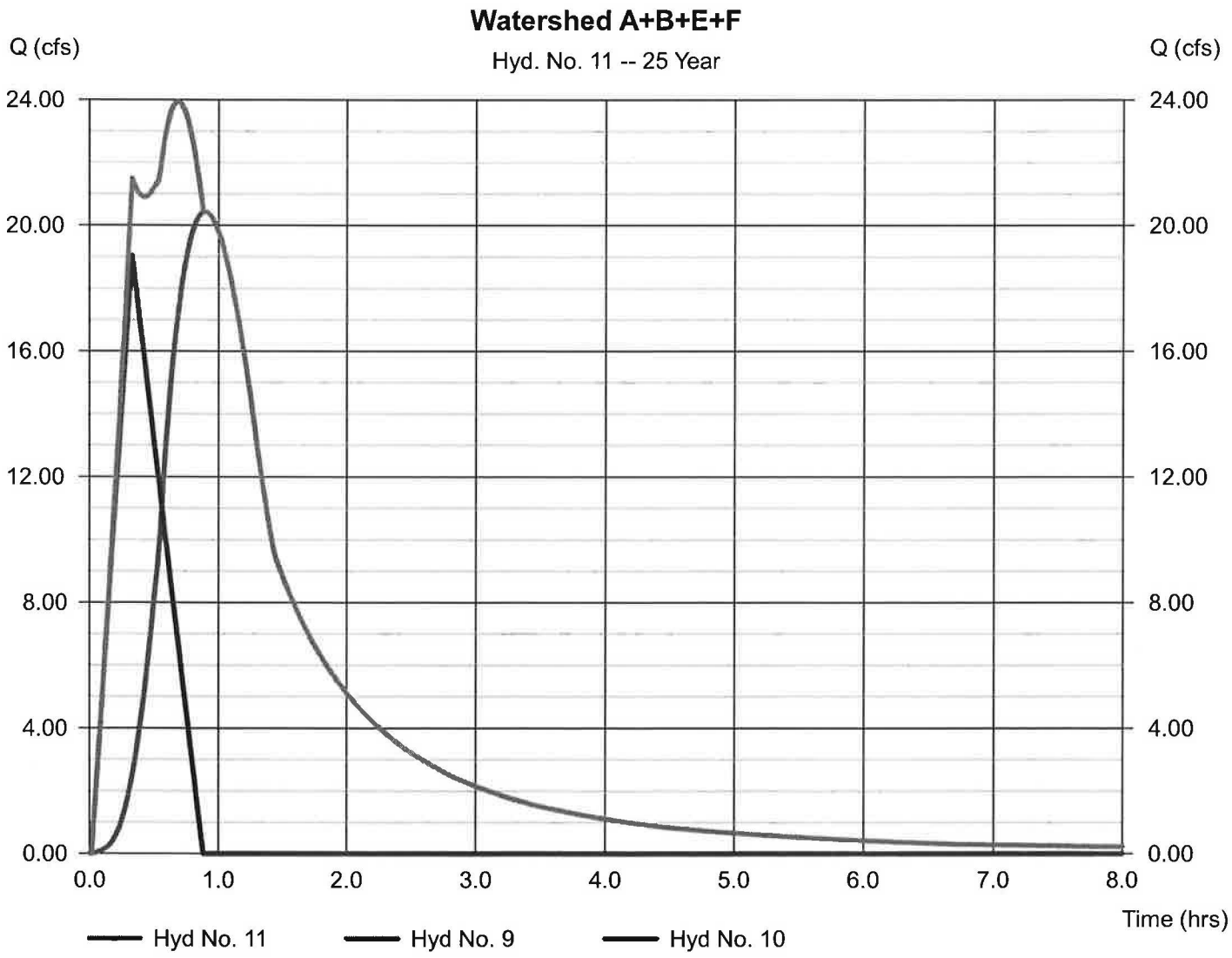


Hydrograph Report

Hyd. No. 11

Watershed A+B+E+F

Hydrograph type	= Combine	Peak discharge	= 23.93 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.68 hrs
Time interval	= 1 min	Hyd. volume	= 129,862 cuft
Inflow hyds.	= 9, 10	Contrib. drain. area	= 15.400 ac



Hydrograph Report

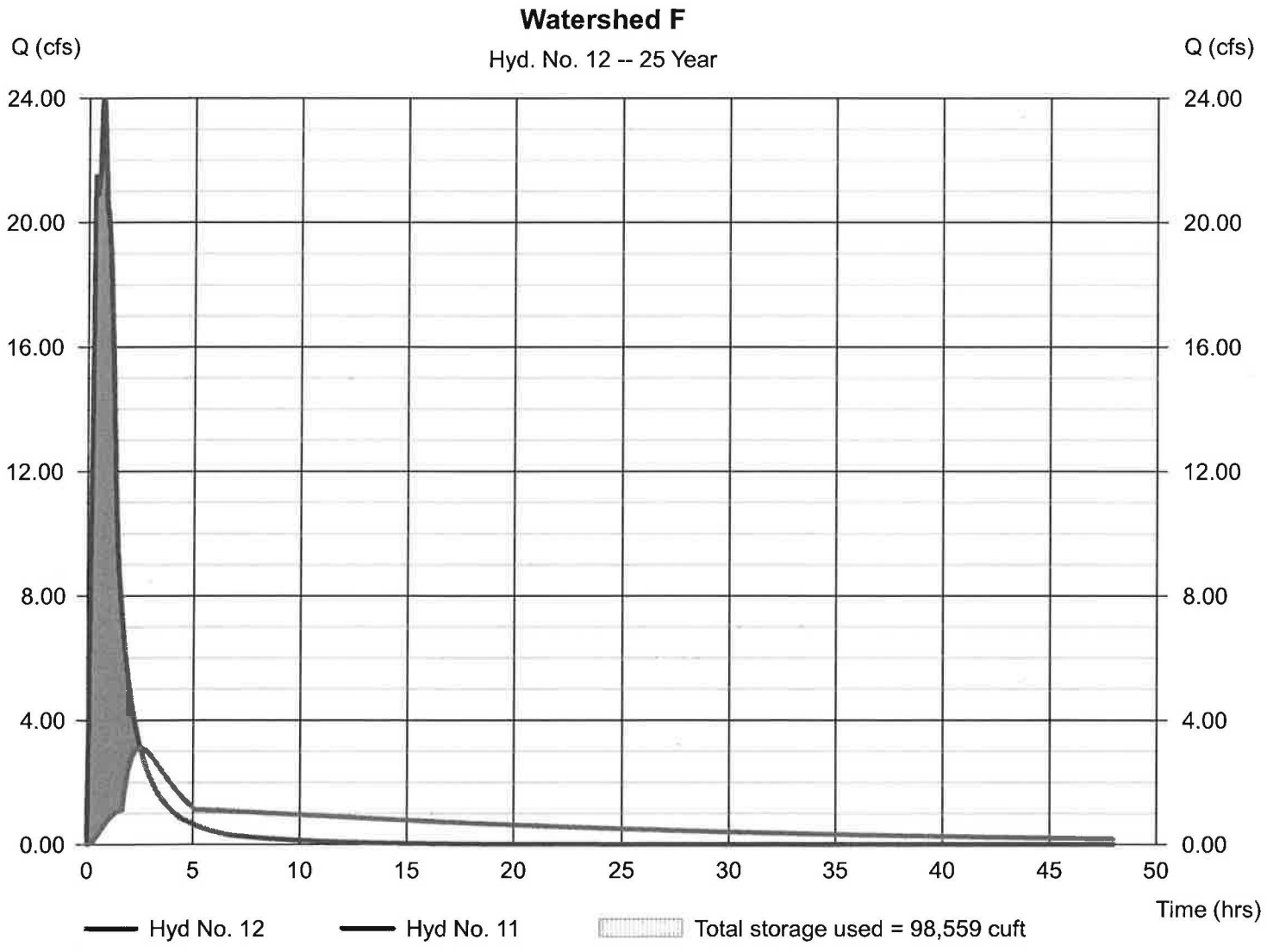
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 12

Watershed F

Hydrograph type	= Reservoir	Peak discharge	= 3.112 cfs
Storm frequency	= 25 yrs	Time to peak	= 2.53 hrs
Time interval	= 1 min	Hyd. volume	= 113,985 cuft
Inflow hyd. No.	= 11 - Watershed A+B+E+F	Max. Elevation	= 539.50 ft
Reservoir name	= Watershed F	Max. Storage	= 98,559 cuft

Storage Indication method used.



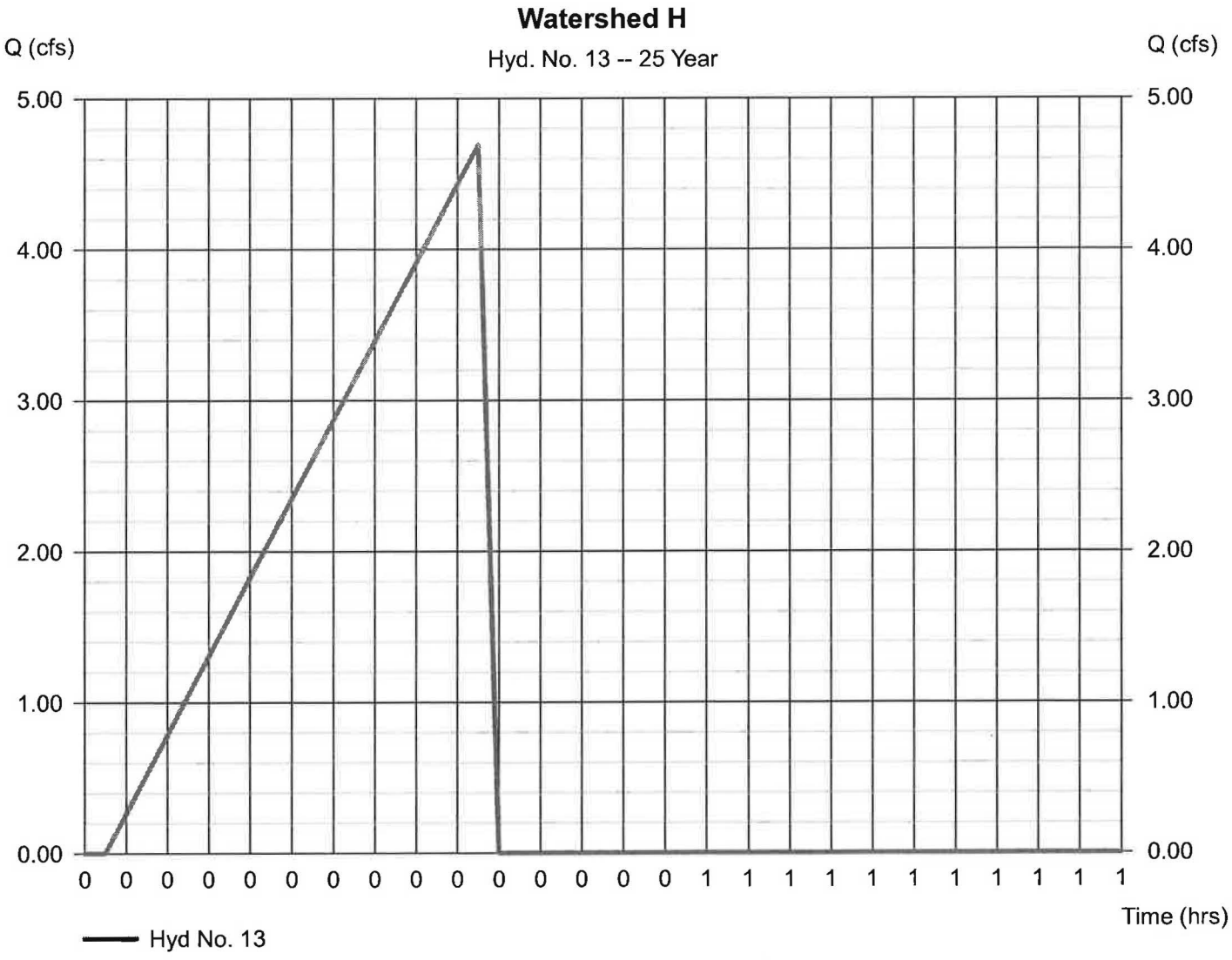
Hydrograph Report

Hyd. No. 13

Watershed H

Hydrograph type	= Rational	Peak discharge	= 4.691 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 7,021 cuft
Drainage area	= 3.800 ac	Runoff coeff.	= 0.29*
Intensity	= 4.257 in/hr	Tc by TR55	= 18.69 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.200 x 0.90) + (0.100 x 0.30) + (2.500 x 0.20) + (0.800 x 0.25) + (0.200 x 1.00)] / 3.800

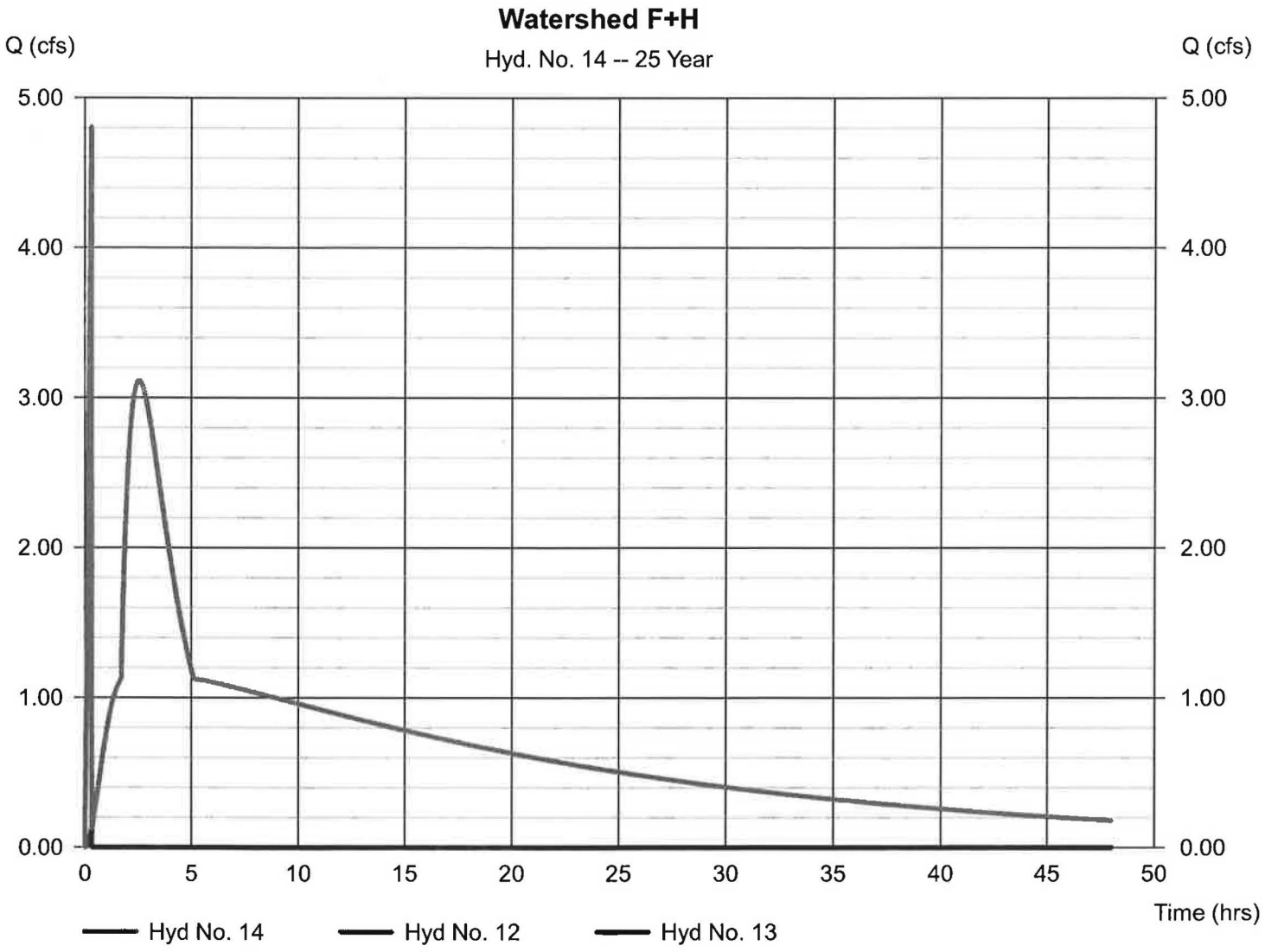


Hydrograph Report

Hyd. No. 14

Watershed F+H

Hydrograph type	= Combine	Peak discharge	= 4.805 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 116,659 cuft
Inflow hyds.	= 12, 13	Contrib. drain. area	= 3.800 ac



Hydrograph Report

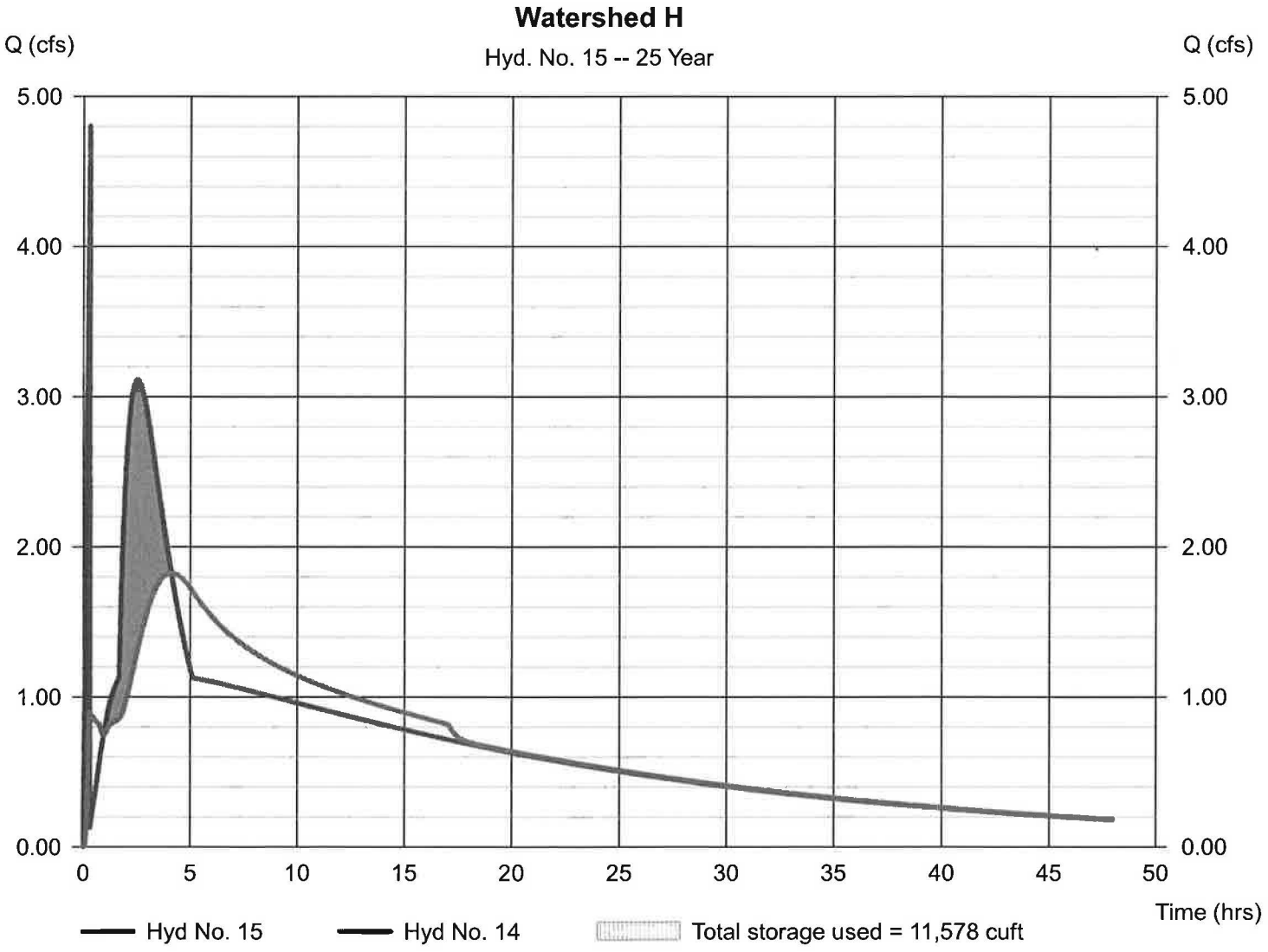
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 15

Watershed H

Hydrograph type	= Reservoir	Peak discharge	= 1.823 cfs
Storm frequency	= 25 yrs	Time to peak	= 4.13 hrs
Time interval	= 1 min	Hyd. volume	= 115,985 cuft
Inflow hyd. No.	= 14 - Watershed F+H	Max. Elevation	= 536.32 ft
Reservoir name	= Watershed H	Max. Storage	= 11,578 cuft

Storage Indication method used.



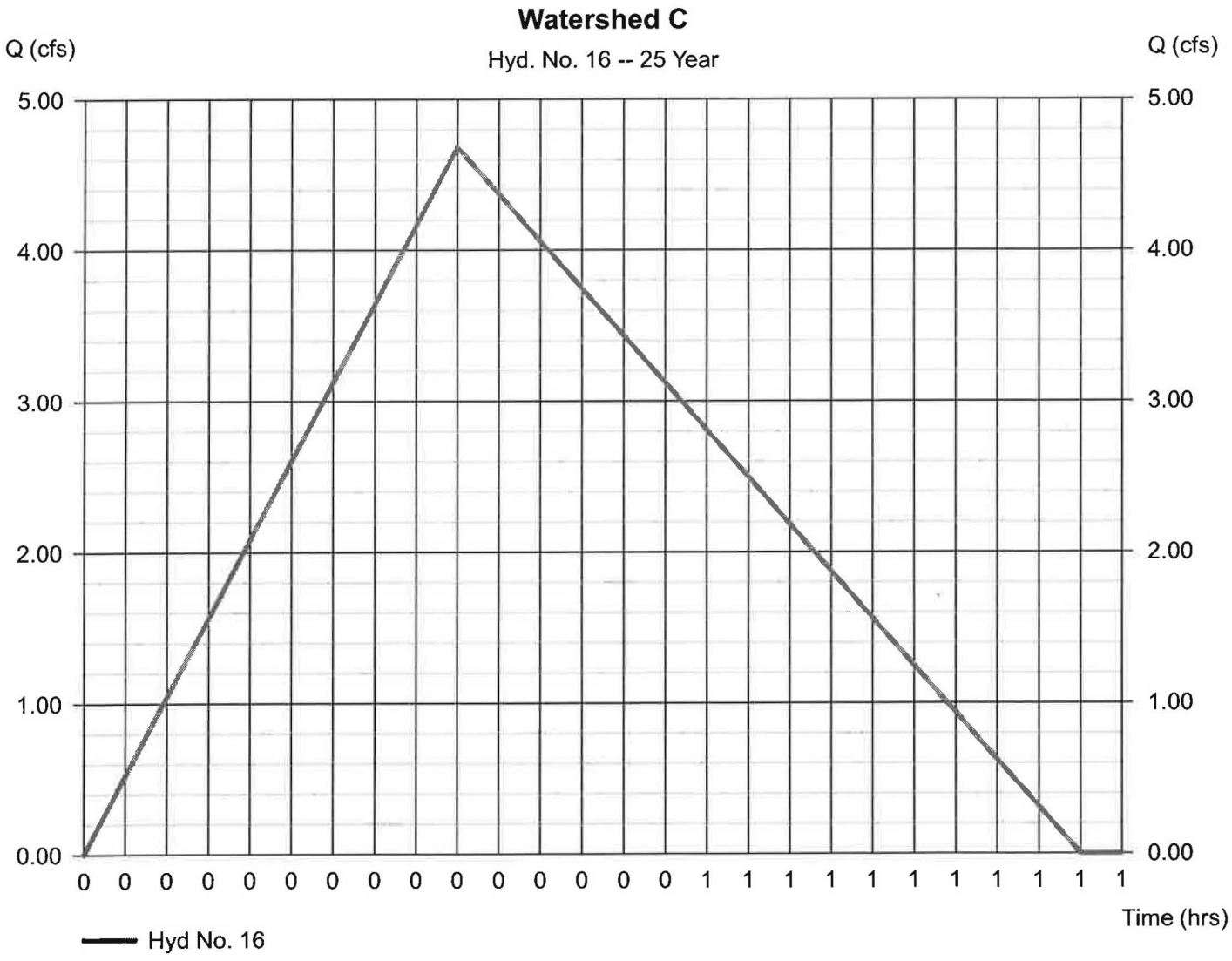
Hydrograph Report

Hyd. No. 16

Watershed C

Hydrograph type	= Rational	Peak discharge	= 4.682 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.30 hrs
Time interval	= 1 min	Hyd. volume	= 6,864 cuft
Drainage area	= 3.300 ac	Runoff coeff.	= 0.33*
Intensity	= 4.300 in/hr	Tc by TR55	= 18.30 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.400 x 0.90) + (1.200 x 0.30) + (1.400 x 0.20) + (0.300 x 0.25)] / 3.300



Hydrograph Report

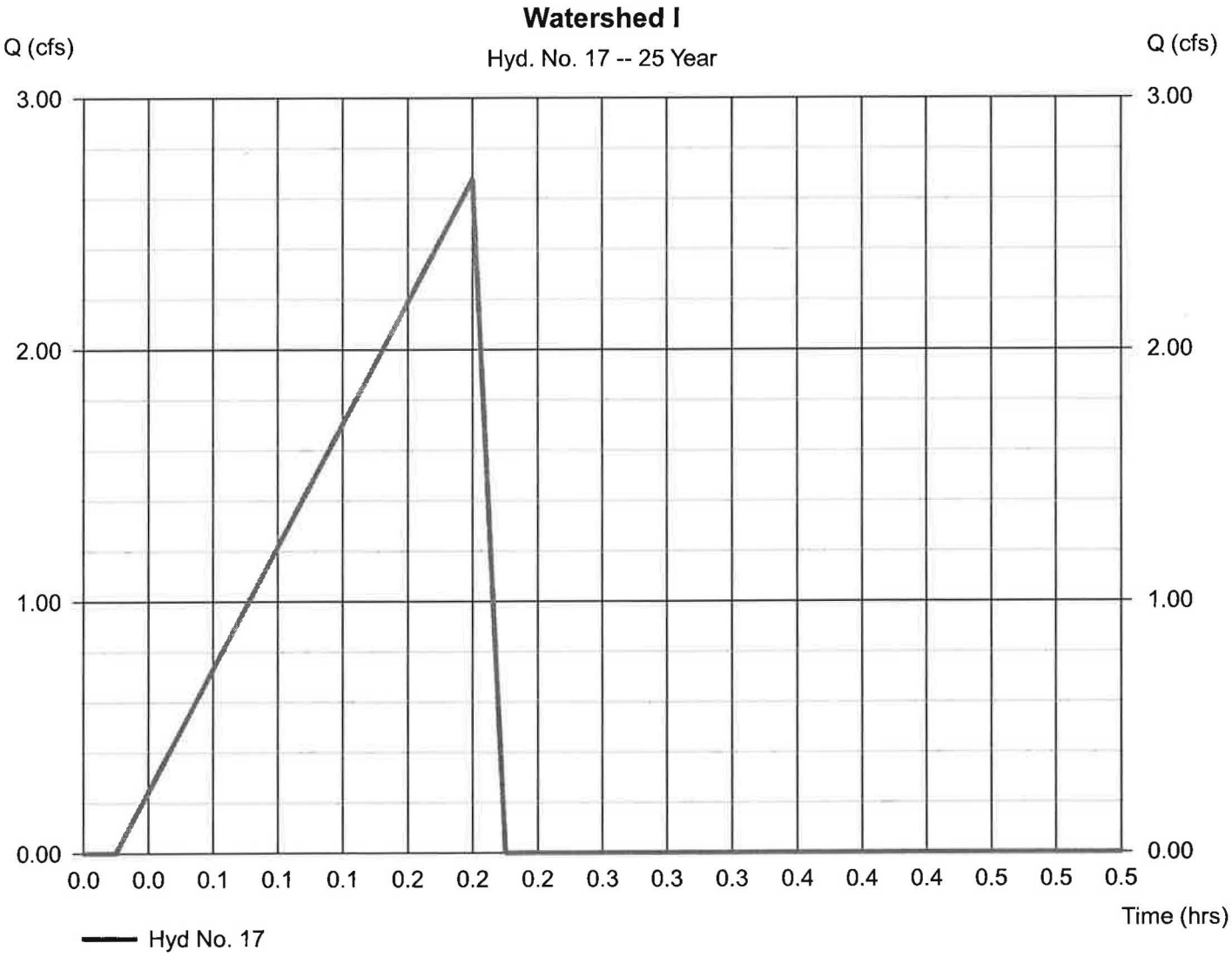
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 17

Watershed I

Hydrograph type	= Rational	Peak discharge	= 2.674 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.20 hrs
Time interval	= 1 min	Hyd. volume	= 2,470 cuft
Drainage area	= 1.500 ac	Runoff coeff.	= 0.34*
Intensity	= 5.244 in/hr	Tc by TR55	= 11.53 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.200 x 0.90) + (0.700 x 0.30) + (0.600 x 0.20)] / 1.500



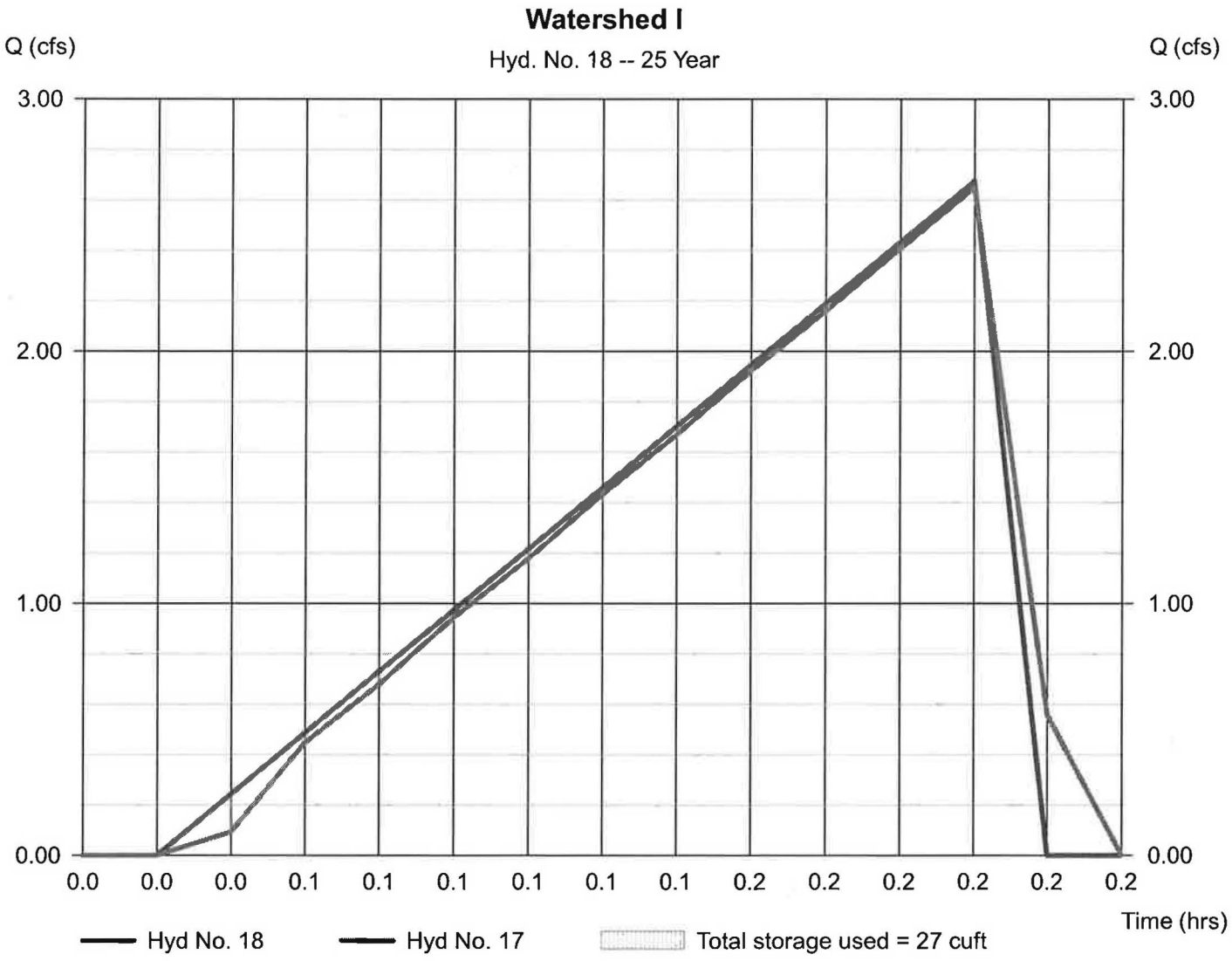
Hydrograph Report

Hyd. No. 18

Watershed I

Hydrograph type	= Reservoir	Peak discharge	= 2.648 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.20 hrs
Time interval	= 1 min	Hyd. volume	= 968 cuft
Inflow hyd. No.	= 17 - Watershed I	Max. Elevation	= 531.60 ft
Reservoir name	= Watershed I	Max. Storage	= 27 cuft

Storage Indication method used.

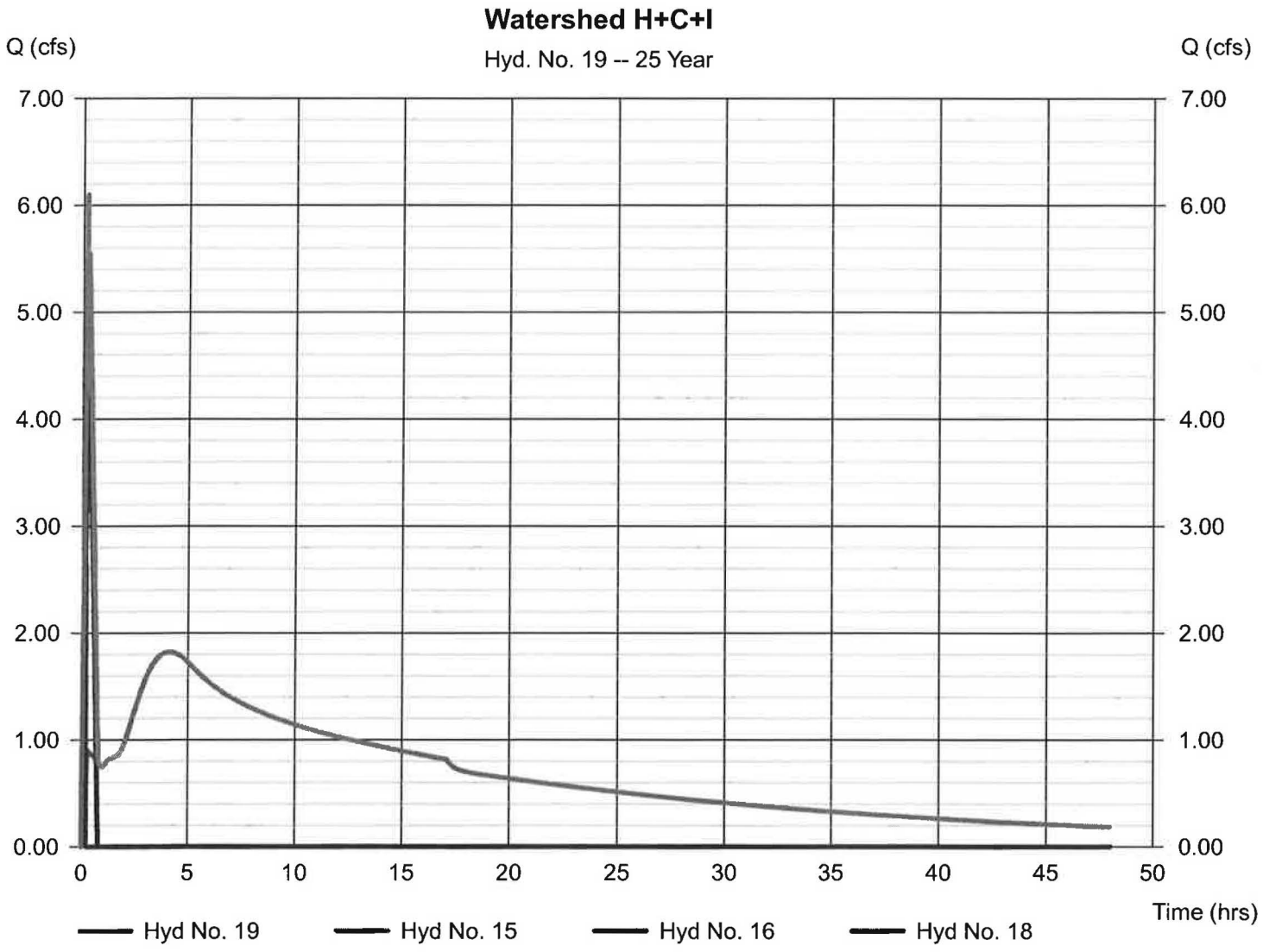


Hydrograph Report

Hyd. No. 19

Watershed H+C+I

Hydrograph type	= Combine	Peak discharge	= 6.097 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.20 hrs
Time interval	= 1 min	Hyd. volume	= 123,696 cuft
Inflow hyds.	= 15, 16, 18	Contrib. drain. area	= 3.300 ac



Hydrograph Report

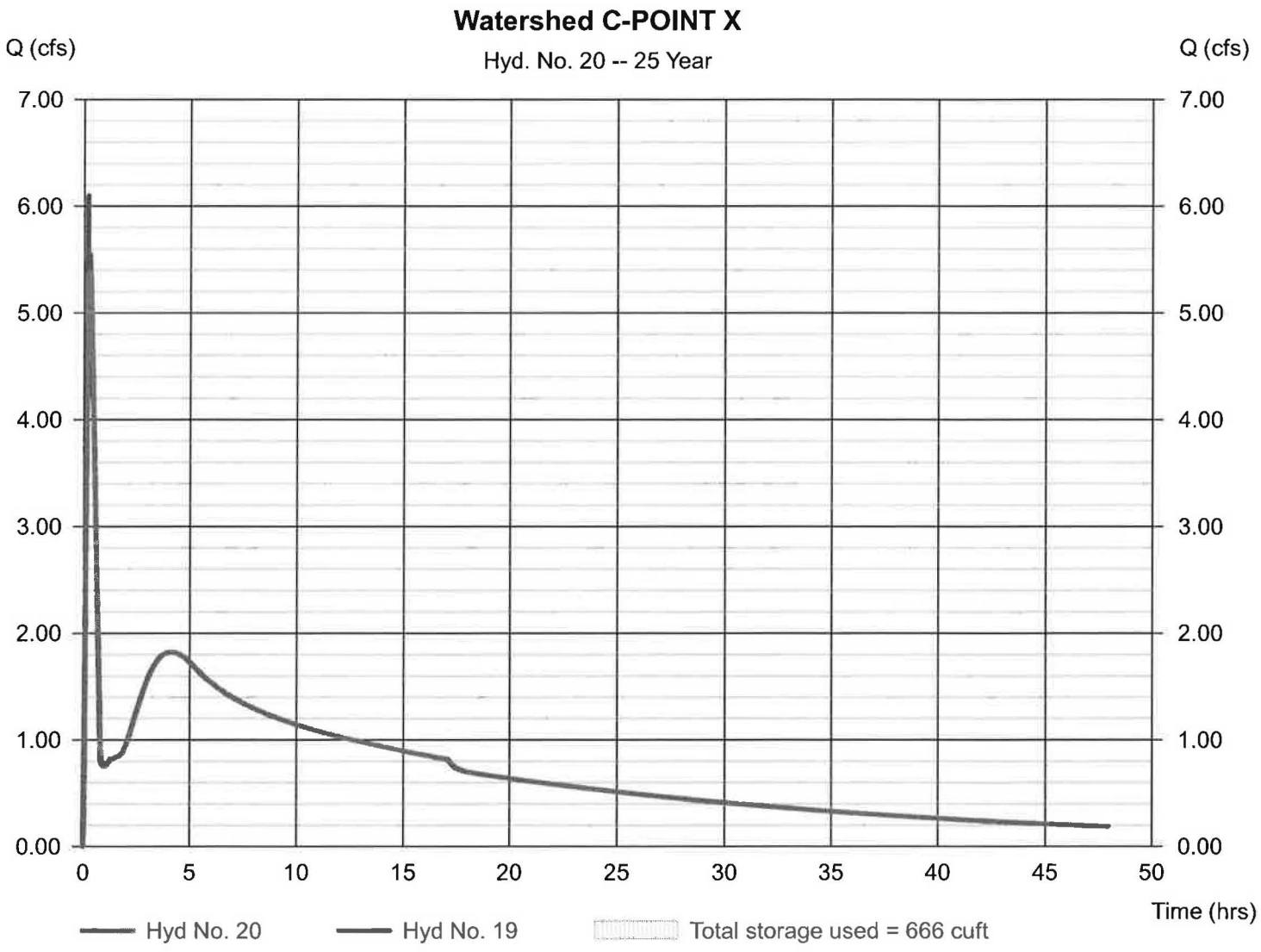
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 20

Watershed C-POINT X

Hydrograph type	= Reservoir	Peak discharge	= 5.386 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 123,631 cuft
Inflow hyd. No.	= 19 - Watershed H+C+I	Max. Elevation	= 529.92 ft
Reservoir name	= Watershed C	Max. Storage	= 666 cuft

Storage Indication method used.



Hydrograph Report

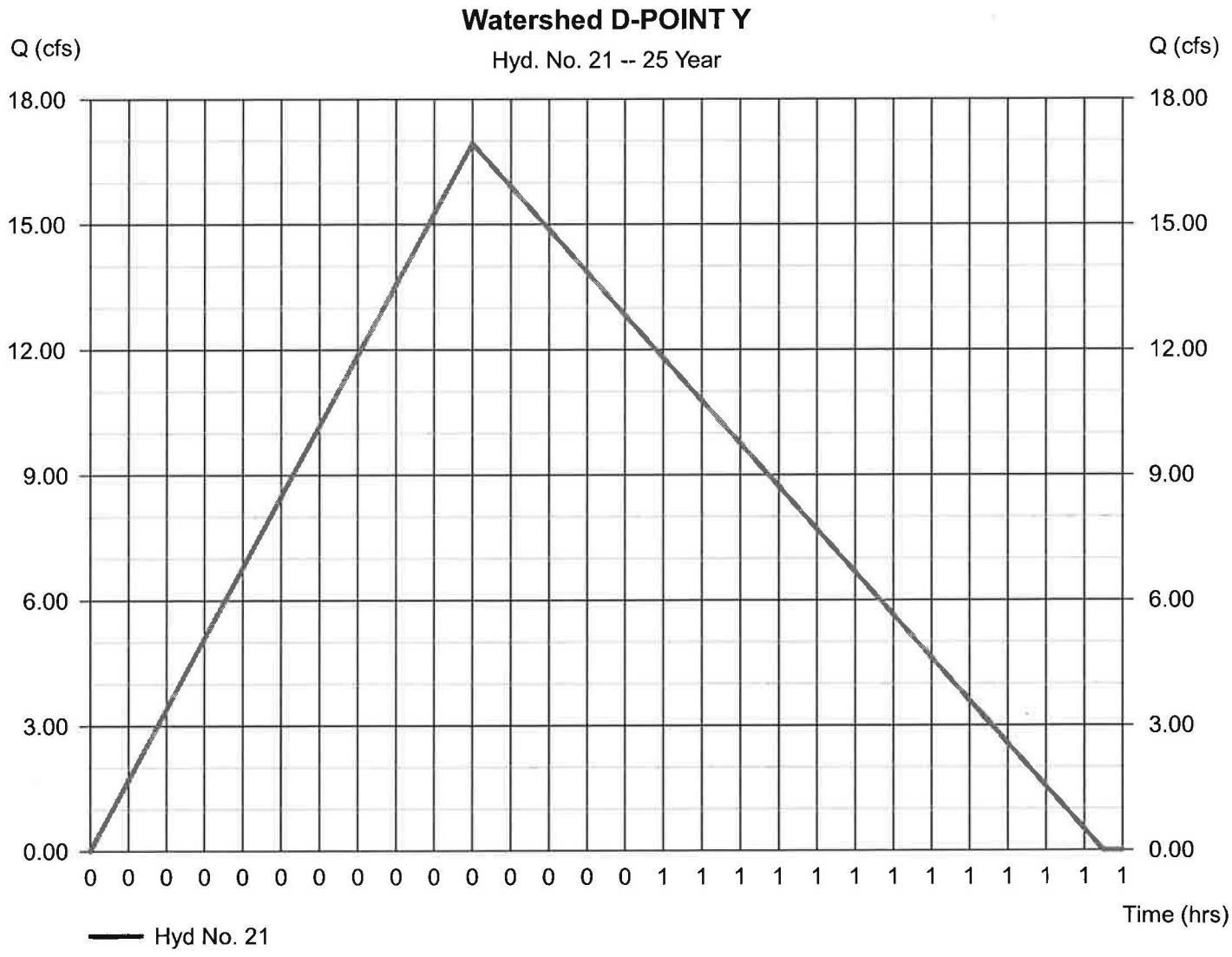
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 21

Watershed D-POINT Y

Hydrograph type	= Rational	Peak discharge	= 16.94 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.33 hrs
Time interval	= 1 min	Hyd. volume	= 27,135 cuft
Drainage area	= 14.190 ac	Runoff coeff.	= 0.29*
Intensity	= 4.116 in/hr	Tc by TR55	= 20.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.500 x 0.90) + (1.750 x 0.30) + (10.940 x 0.20)] / 14.190



Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	Rational	9.466	1	17	12,890	----	------	------	Watershed A
2	Reservoir	3.353	1	35	12,757	1	566.26	8,123	Watershed A
3	Rational	7.054	1	14	7,653	----	------	------	Watershed B
4	Reservoir	1.698	1	31	7,395	3	567.07	5,814	Watershed B
5	Rational	39.24	1	29	92,280	----	------	------	Watershed E
6	Rational	7.989	1	22	14,344	----	------	------	Watershed G
7	Reservoir	0.007	1	59	1,230	6	546.42	14,120	Watershed G
8	Combine	44.19	1	29	111,979	2, 4, 5,	------	------	Watershed A+B+E
9	Reservoir	23.58	1	53	111,966	8	542.20	56,164	Watershed E-POINT Z
10	Rational	21.16	1	20	33,794	----	------	------	Watershed F
11	Combine	27.92	1	40	144,970	9, 10	------	------	Watershed A+B+E+F
12	Reservoir	4.871	1	127	129,015	11	539.59	104,355	Watershed F
13	Rational	5.204	1	19	7,789	----	------	------	Watershed H
14	Combine	5.332	1	19	131,981	12, 13	------	------	Watershed F+H
15	Reservoir	2.575	1	227	131,306	14	536.56	19,195	Watershed H
16	Rational	5.193	1	18	7,612	----	------	------	Watershed C
17	Rational	2.942	1	12	2,717	----	------	------	Watershed I
18	Reservoir	2.913	1	12	1,065	17	531.65	29.1	Watershed I
19	Combine	6.770	1	12	139,849	15, 16, 18	------	------	Watershed H+C+I
20	Reservoir	5.989	1	12	139,784	19	529.99	707	Watershed C-POINT X
21	Rational	18.82	1	20	30,146	----	------	------	Watershed D-POINT Y

Hydrograph Report

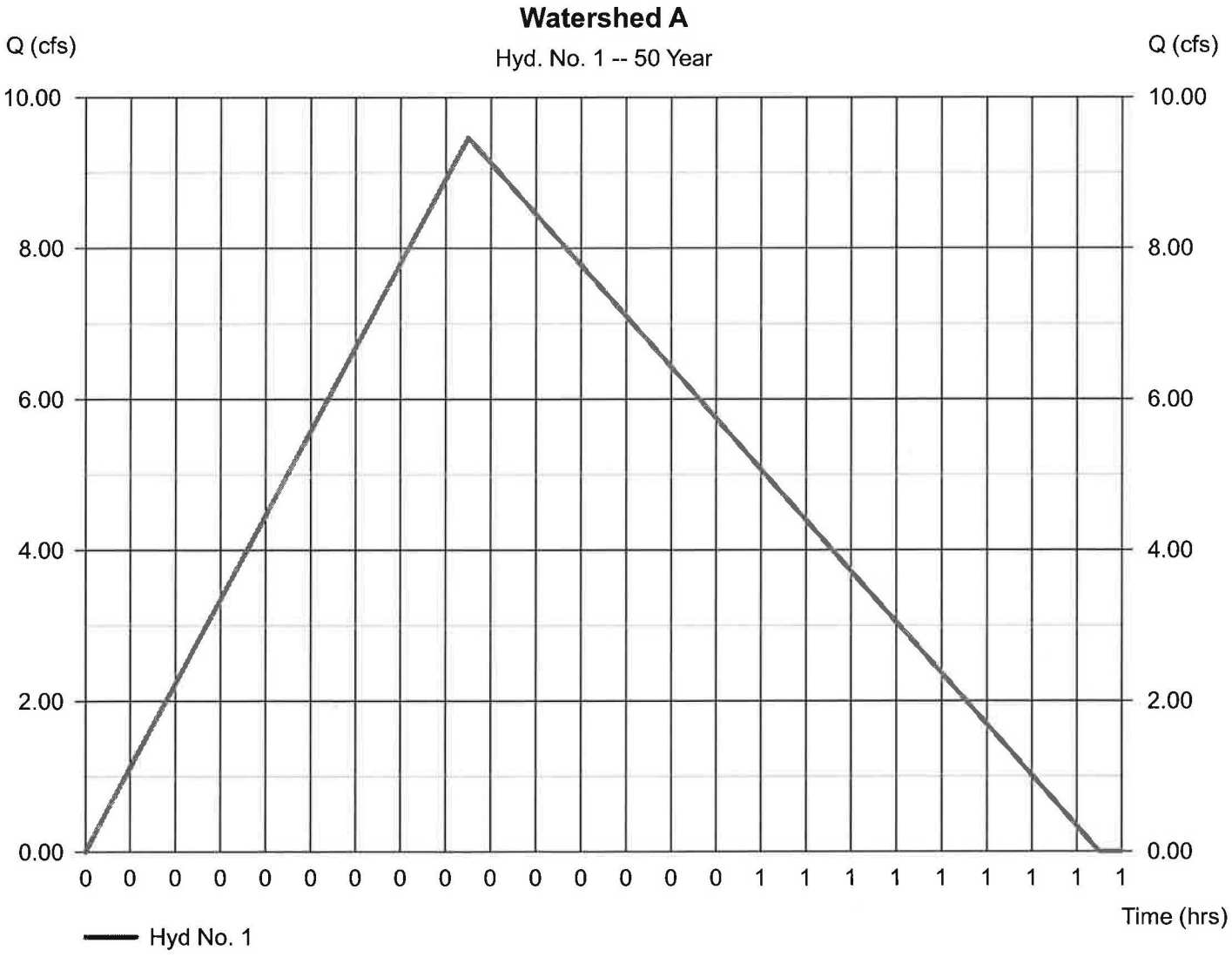
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 1

Watershed A

Hydrograph type	= Rational	Peak discharge	= 9.466 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.28 hrs
Time interval	= 1 min	Hyd. volume	= 12,890 cuft
Drainage area	= 8.000 ac	Runoff coeff.	= 0.24*
Intensity	= 4.930 in/hr	Tc by TR55	= 17.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.400 x 0.90) + (0.500 x 0.30) + (7.100 x 0.20)] / 8.000



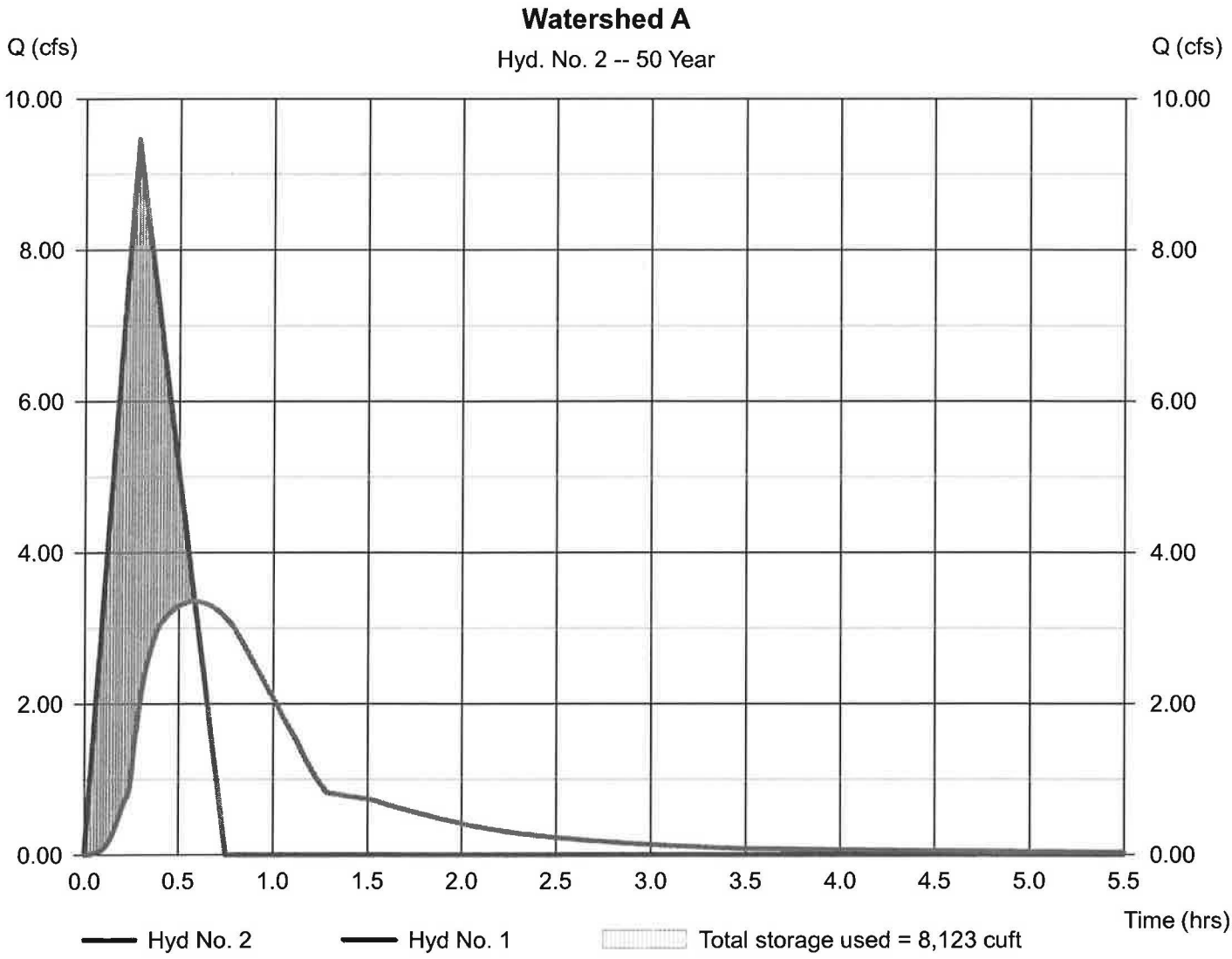
Hydrograph Report

Hyd. No. 2

Watershed A

Hydrograph type	= Reservoir	Peak discharge	= 3.353 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.58 hrs
Time interval	= 1 min	Hyd. volume	= 12,757 cuft
Inflow hyd. No.	= 1 - Watershed A	Max. Elevation	= 566.26 ft
Reservoir name	= Watershed A	Max. Storage	= 8,123 cuft

Storage Indication method used.



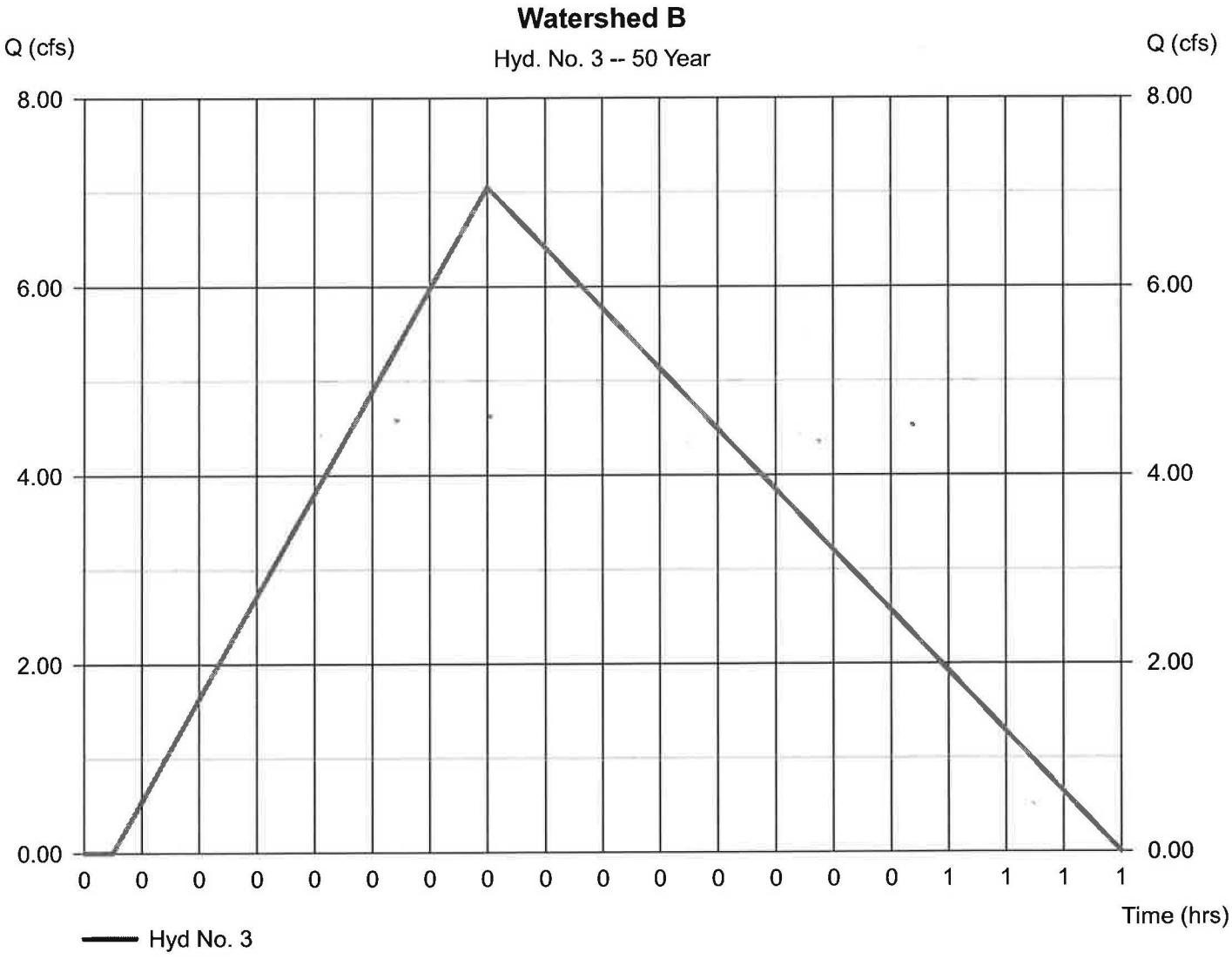
Hydrograph Report

Hyd. No. 3

Watershed B

Hydrograph type	= Rational	Peak discharge	= 7.054 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.23 hrs
Time interval	= 1 min	Hyd. volume	= 7,653 cuft
Drainage area	= 5.200 ac	Runoff coeff.	= 0.25*
Intensity	= 5.426 in/hr	Tc by TR55	= 13.54 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.300 x 0.90) + (0.500 x 0.30) + (4.400 x 0.20)] / 5.200



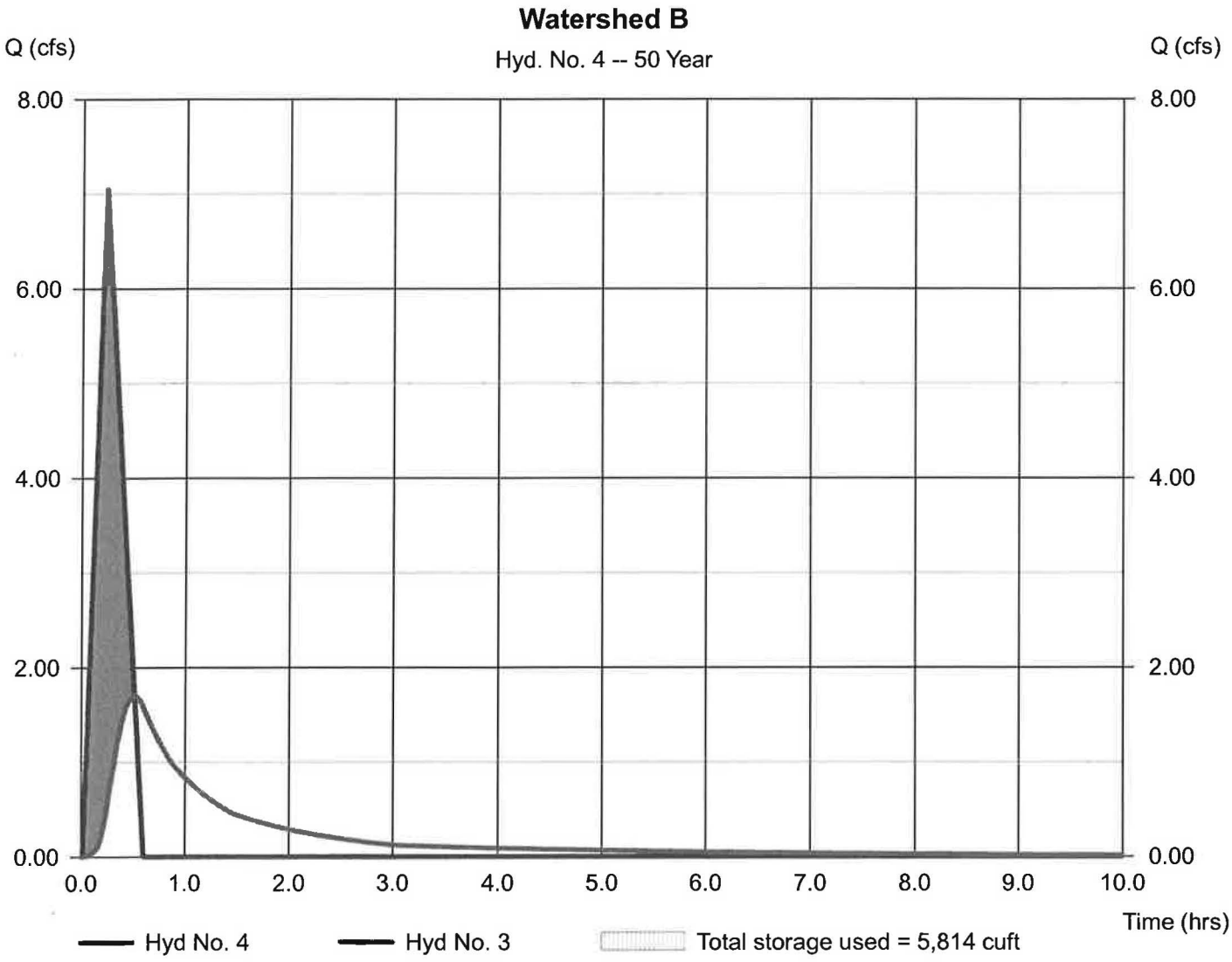
Hydrograph Report

Hyd. No. 4

Watershed B

Hydrograph type	= Reservoir	Peak discharge	= 1.698 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.52 hrs
Time interval	= 1 min	Hyd. volume	= 7,395 cuft
Inflow hyd. No.	= 3 - Watershed B	Max. Elevation	= 567.07 ft
Reservoir name	= Watershed B	Max. Storage	= 5,814 cuft

Storage Indication method used.



Hydrograph Report

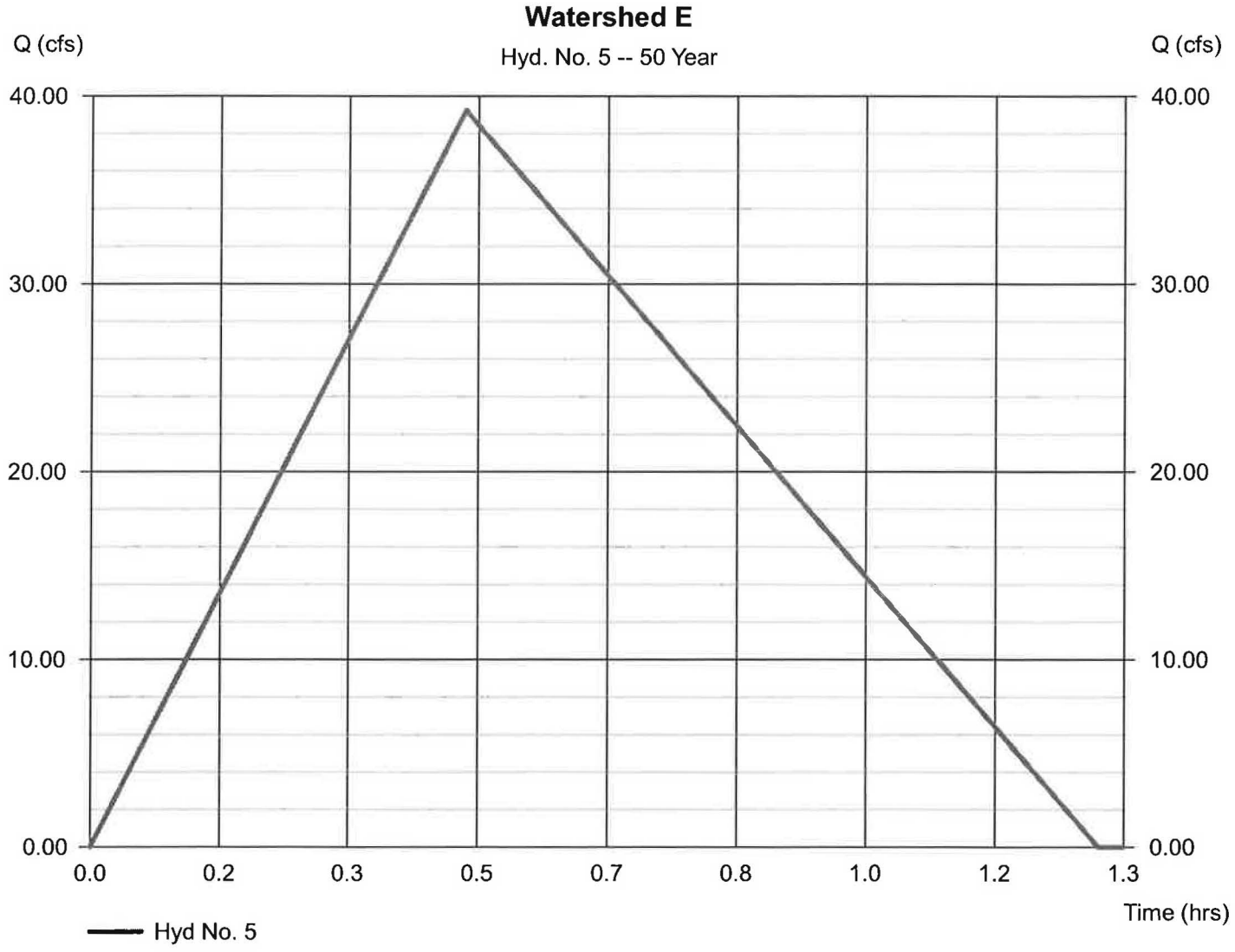
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 5

Watershed E

Hydrograph type	= Rational	Peak discharge	= 39.24 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.48 hrs
Time interval	= 1 min	Hyd. volume	= 92,280 cuft
Drainage area	= 40.300 ac	Runoff coeff.	= 0.26*
Intensity	= 3.745 in/hr	Tc by TR55	= 29.36 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(2.100 x 0.90) + (7.700 x 0.30) + (30.500 x 0.20)] / 40.300



Hydrograph Report

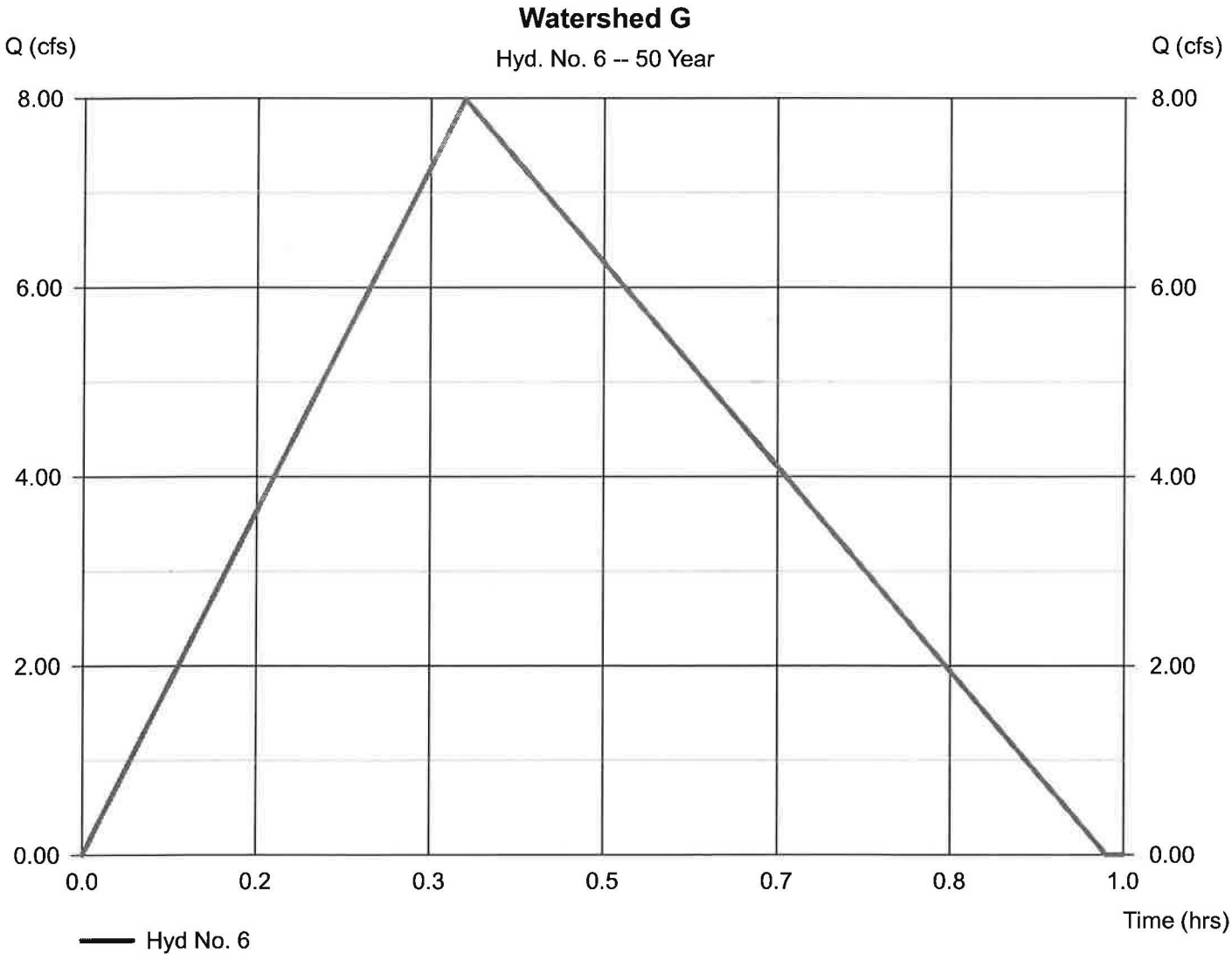
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 6

Watershed G

Hydrograph type	= Rational	Peak discharge	= 7.989 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.37 hrs
Time interval	= 1 min	Hyd. volume	= 14,344 cuft
Drainage area	= 7.700 ac	Runoff coeff.	= 0.24*
Intensity	= 4.323 in/hr	Tc by TR55	= 22.41 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.300 x 0.90) + (0.800 x 0.30) + (6.600 x 0.20)] / 7.700



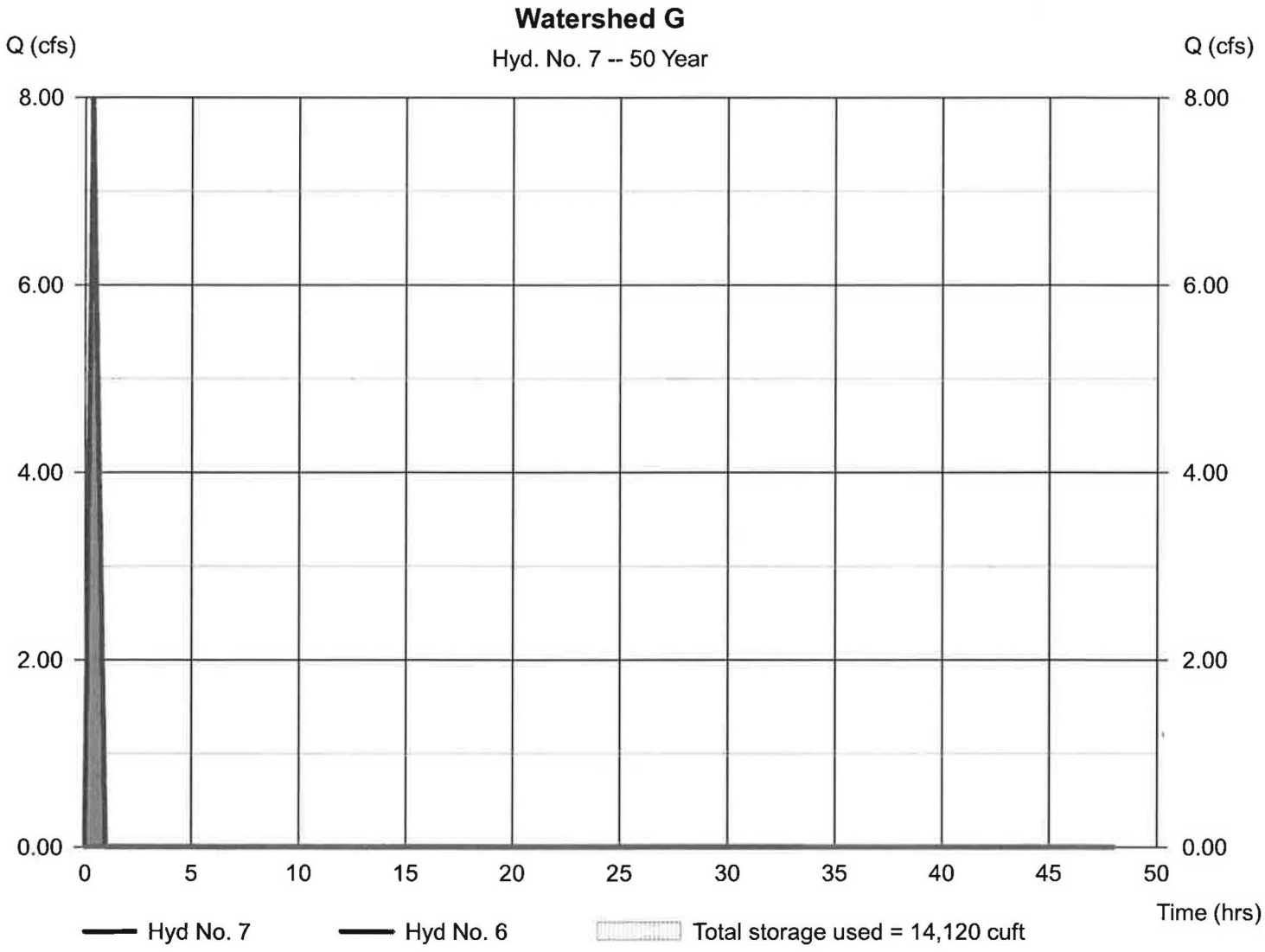
Hydrograph Report

Hyd. No. 7

Watershed G

Hydrograph type	= Reservoir	Peak discharge	= 0.007 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.98 hrs
Time interval	= 1 min	Hyd. volume	= 1,230 cuft
Inflow hyd. No.	= 6 - Watershed G	Max. Elevation	= 546.42 ft
Reservoir name	= Watershed G	Max. Storage	= 14,120 cuft

Storage Indication method used.

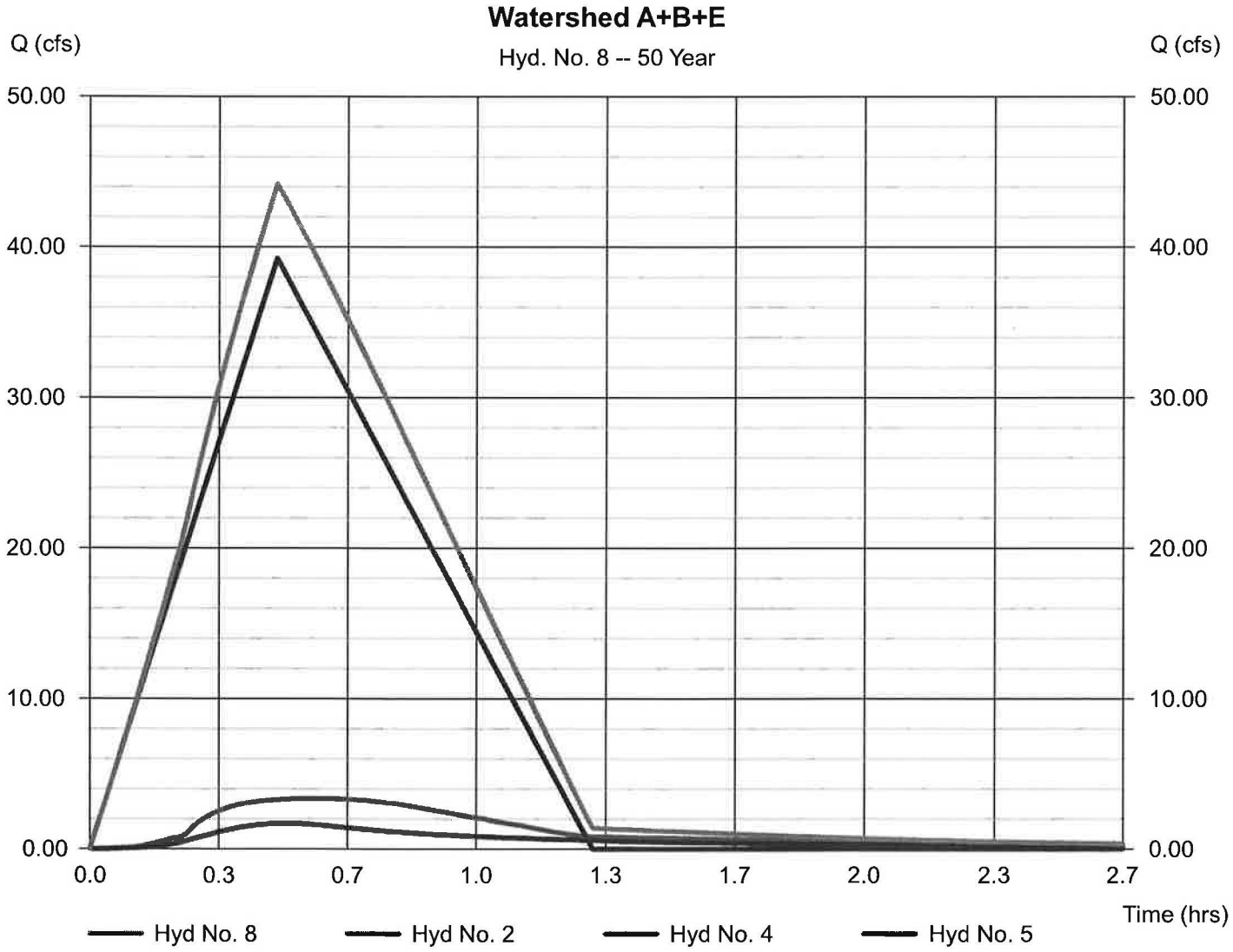


Hydrograph Report

Hyd. No. 8

Watershed A+B+E

Hydrograph type	= Combine	Peak discharge	= 44.19 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.48 hrs
Time interval	= 1 min	Hyd. volume	= 111,979 cuft
Inflow hyds.	= 2, 4, 5	Contrib. drain. area	= 40.300 ac



Hydrograph Report

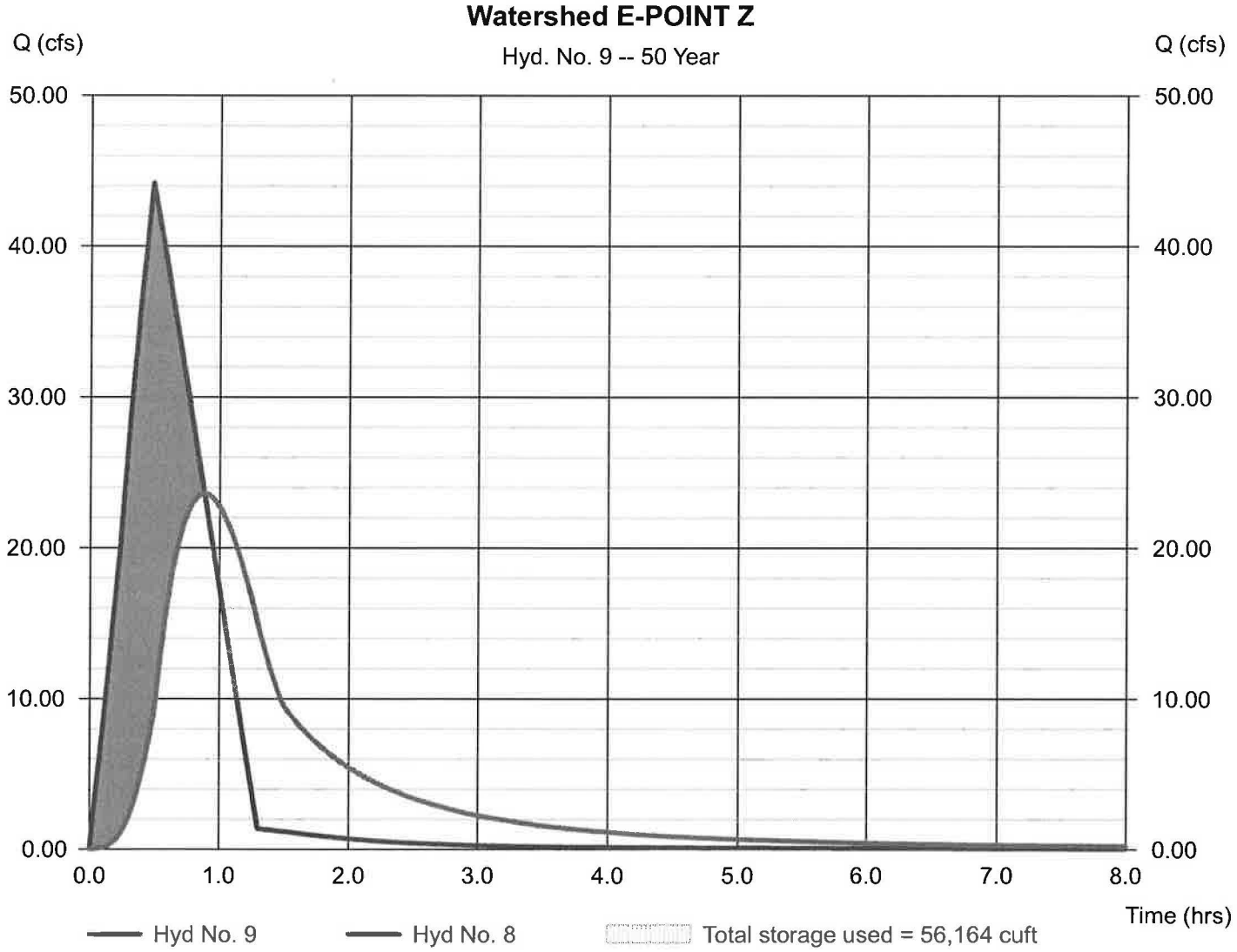
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 9

Watershed E-POINT Z

Hydrograph type	= Reservoir	Peak discharge	= 23.58 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.88 hrs
Time interval	= 1 min	Hyd. volume	= 111,966 cuft
Inflow hyd. No.	= 8 - Watershed A+B+E	Max. Elevation	= 542.20 ft
Reservoir name	= Watershed E	Max. Storage	= 56,164 cuft

Storage Indication method used.



Hydrograph Report

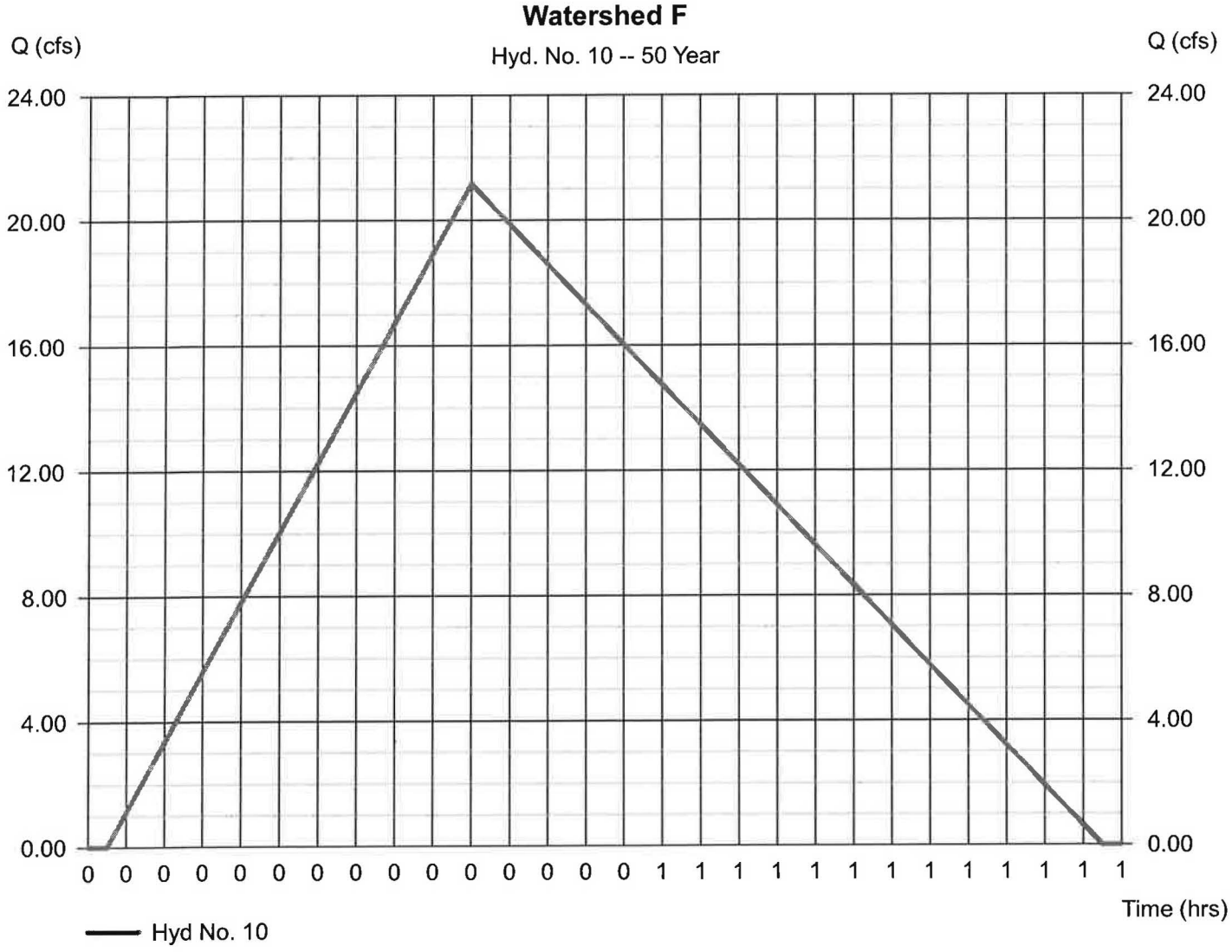
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 10

Watershed F

Hydrograph type	= Rational	Peak discharge	= 21.16 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.33 hrs
Time interval	= 1 min	Hyd. volume	= 33,794 cuft
Drainage area	= 15.400 ac	Runoff coeff.	= 0.3*
Intensity	= 4.579 in/hr	Tc by TR55	= 19.94 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.000 x 0.90) + (5.100 x 0.30) + (8.800 x 0.20) + (0.500 x 1.00)] / 15.400



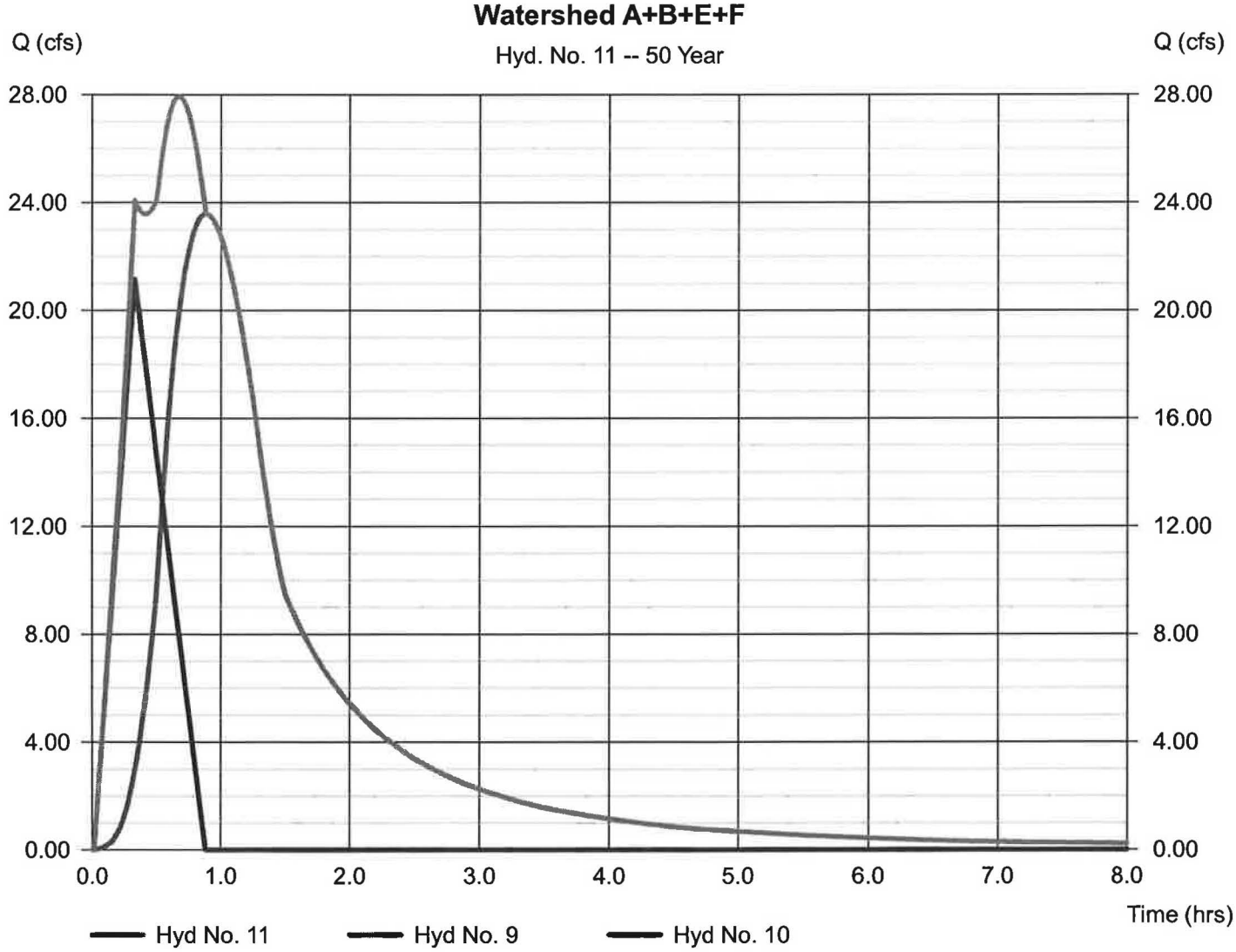
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 11

Watershed A+B+E+F

Hydrograph type	= Combine	Peak discharge	= 27.92 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.67 hrs
Time interval	= 1 min	Hyd. volume	= 144,970 cuft
Inflow hyds.	= 9, 10	Contrib. drain. area	= 15.400 ac



Hydrograph Report

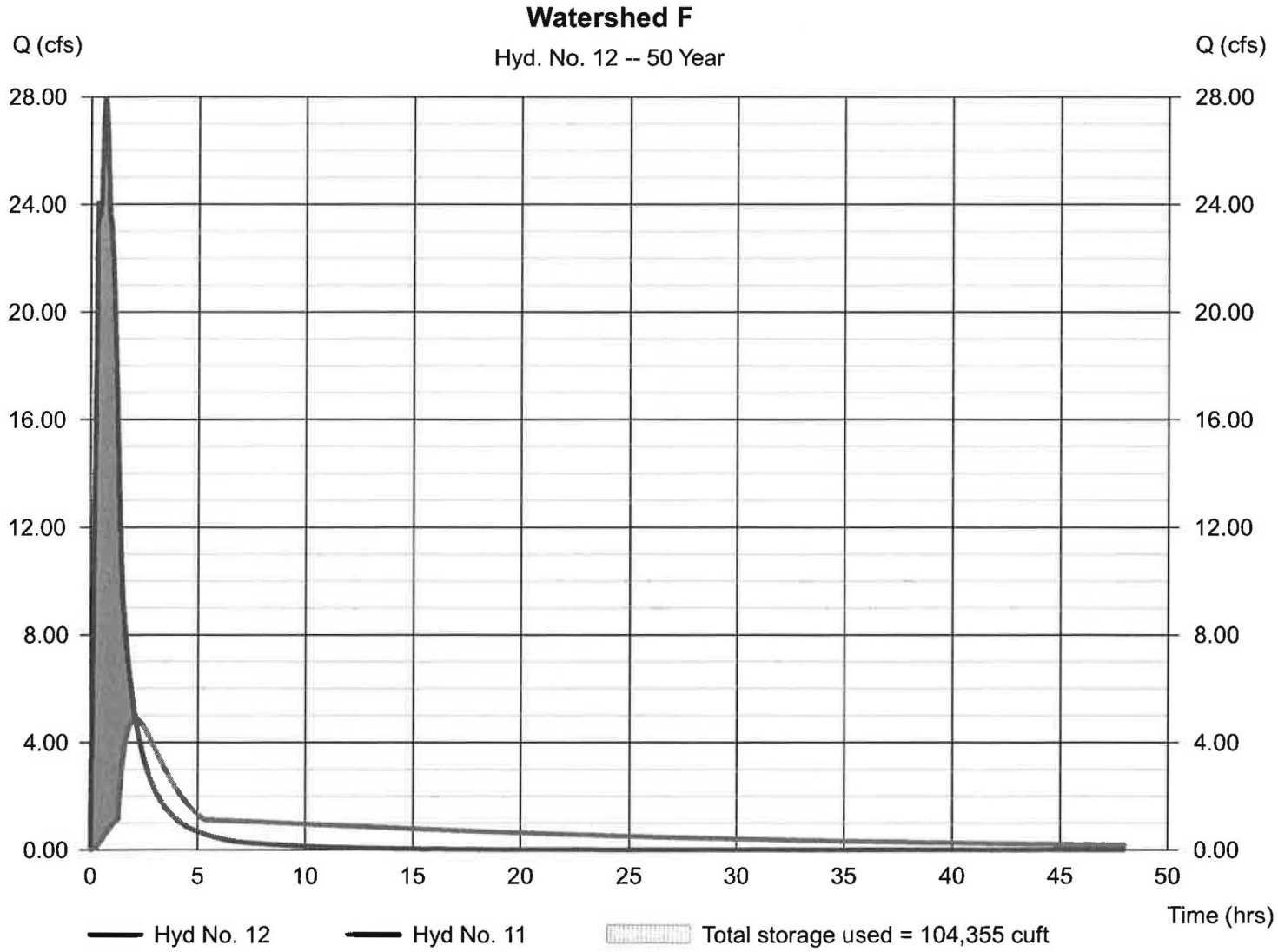
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 12

Watershed F

Hydrograph type	= Reservoir	Peak discharge	= 4.871 cfs
Storm frequency	= 50 yrs	Time to peak	= 2.12 hrs
Time interval	= 1 min	Hyd. volume	= 129,015 cuft
Inflow hyd. No.	= 11 - Watershed A+B+E+F	Max. Elevation	= 539.59 ft
Reservoir name	= Watershed F	Max. Storage	= 104,355 cuft

Storage Indication method used.



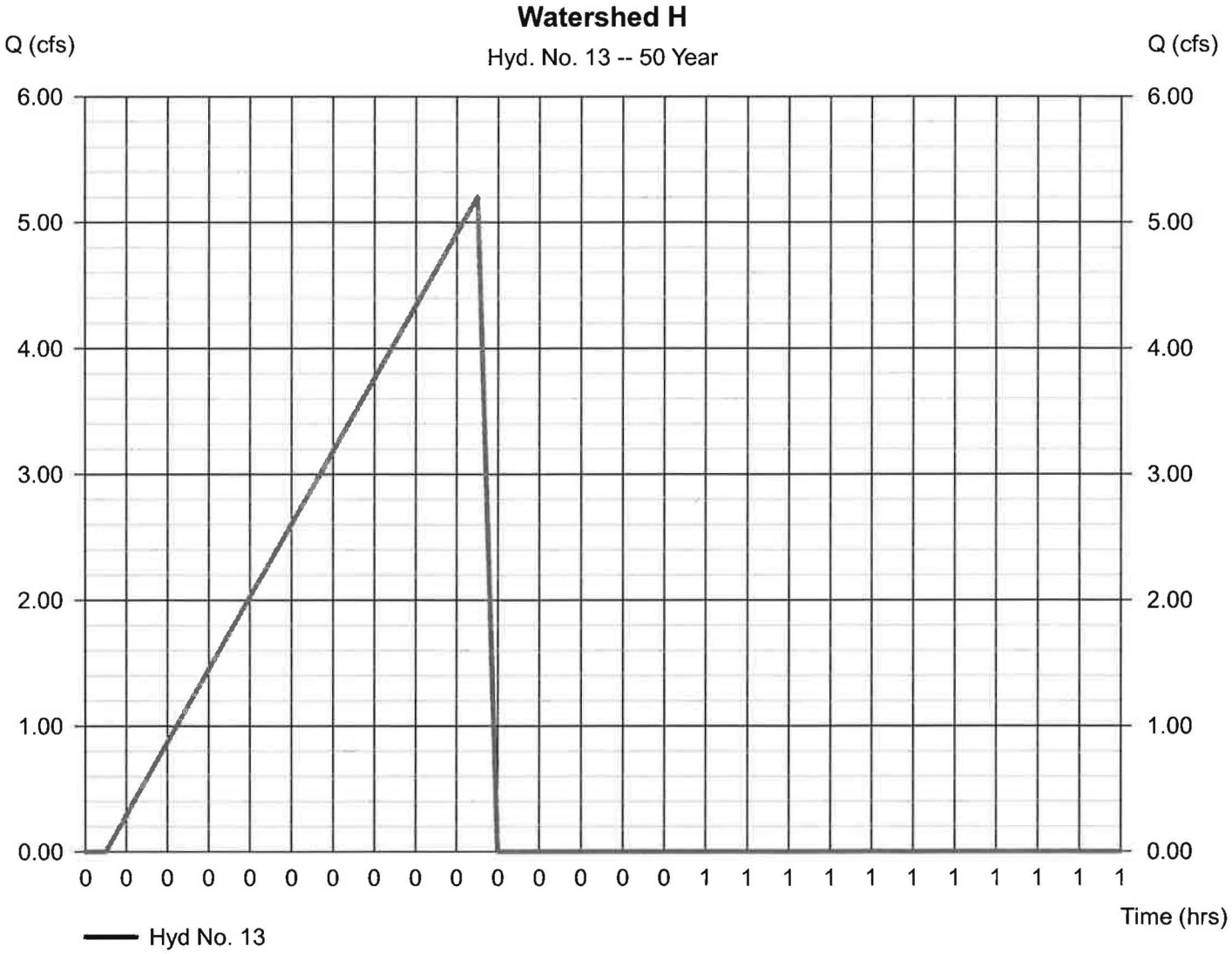
Hydrograph Report

Hyd. No. 13

Watershed H

Hydrograph type	= Rational	Peak discharge	= 5.204 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 7,789 cuft
Drainage area	= 3.800 ac	Runoff coeff.	= 0.29*
Intensity	= 4.722 in/hr	Tc by TR55	= 18.69 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.200 x 0.90) + (0.100 x 0.30) + (2.500 x 0.20) + (0.800 x 0.25) + (0.200 x 1.00)] / 3.800

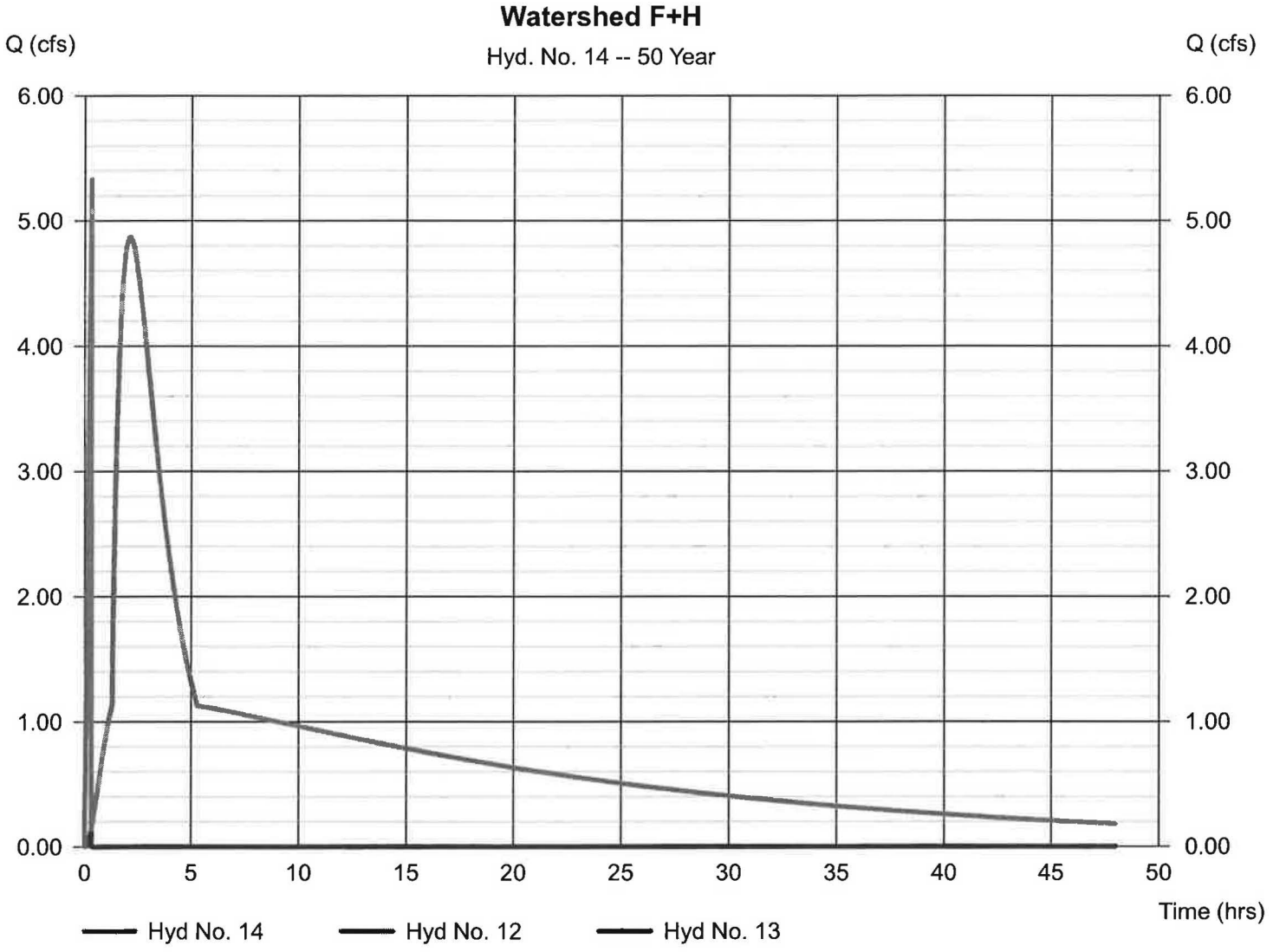


Hydrograph Report

Hyd. No. 14

Watershed F+H

Hydrograph type	= Combine	Peak discharge	= 5.332 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 131,981 cuft
Inflow hyds.	= 12, 13	Contrib. drain. area	= 3.800 ac



Hydrograph Report

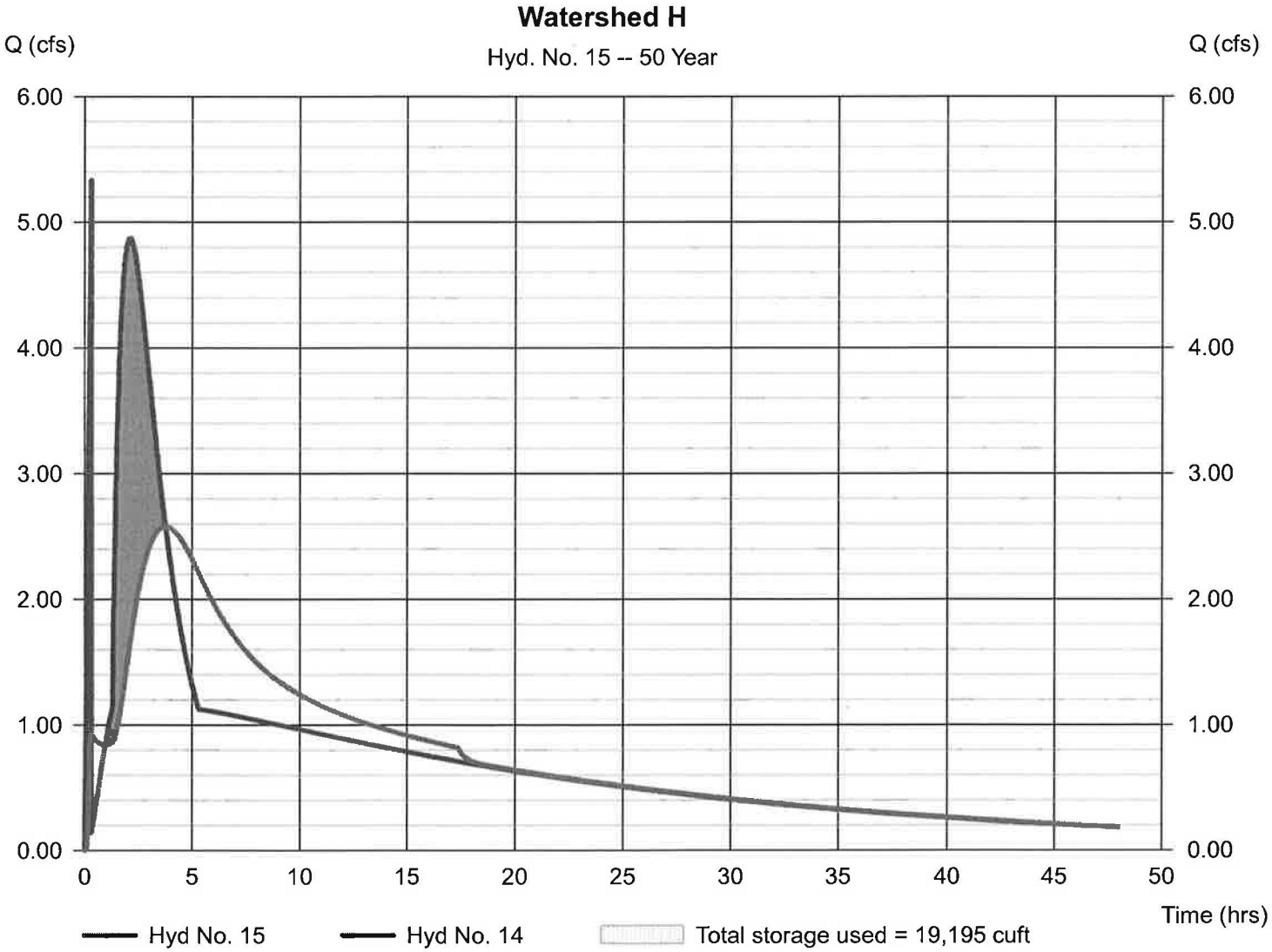
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 15

Watershed H

Hydrograph type	= Reservoir	Peak discharge	= 2.575 cfs
Storm frequency	= 50 yrs	Time to peak	= 3.78 hrs
Time interval	= 1 min	Hyd. volume	= 131,306 cuft
Inflow hyd. No.	= 14 - Watershed F+H	Max. Elevation	= 536.56 ft
Reservoir name	= Watershed H	Max. Storage	= 19,195 cuft

Storage Indication method used.



Hydrograph Report

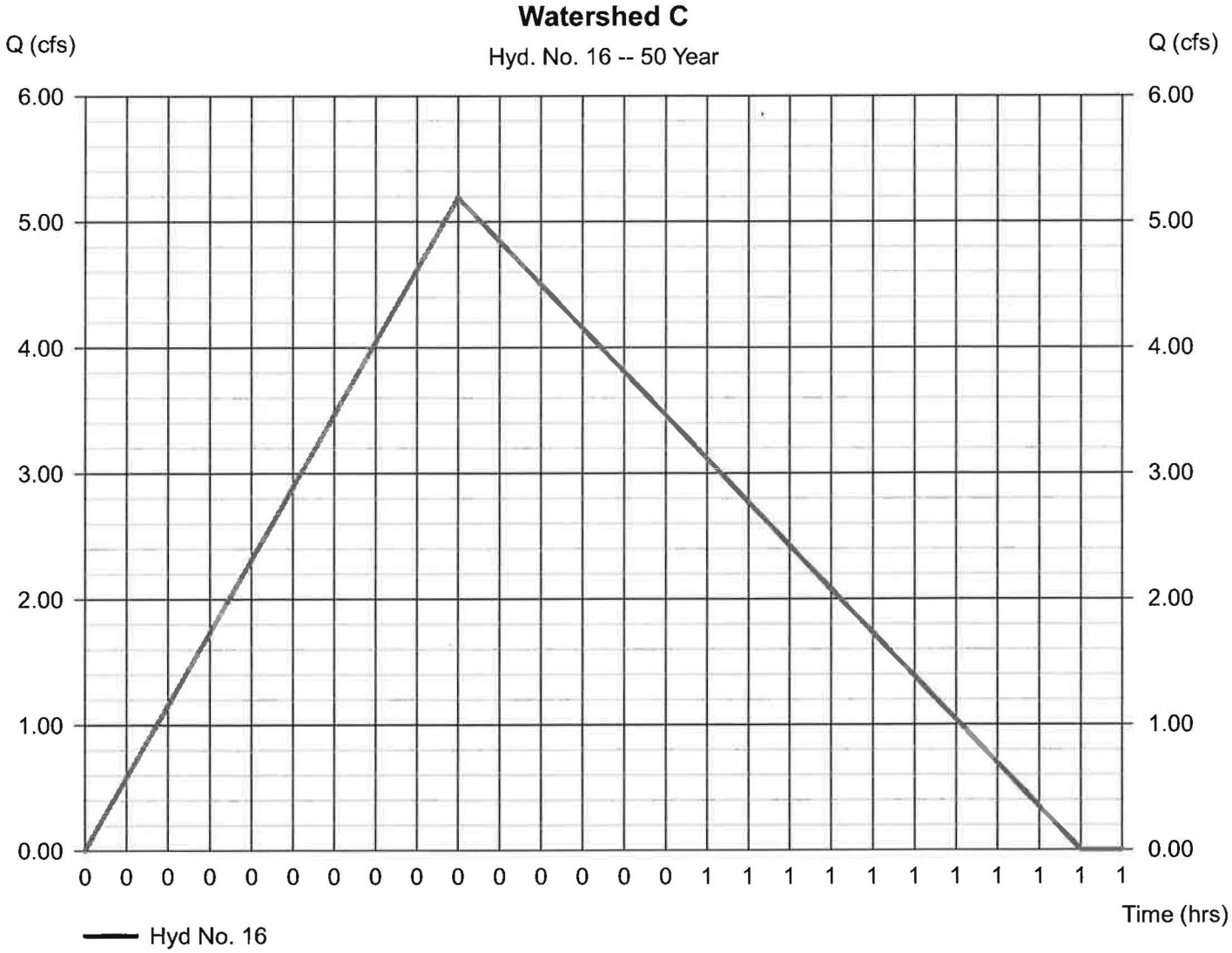
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 16

Watershed C

Hydrograph type	= Rational	Peak discharge	= 5.193 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.30 hrs
Time interval	= 1 min	Hyd. volume	= 7,612 cuft
Drainage area	= 3.300 ac	Runoff coeff.	= 0.33*
Intensity	= 4.768 in/hr	Tc by TR55	= 18.30 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.400 x 0.90) + (1.200 x 0.30) + (1.400 x 0.20) + (0.300 x 0.25)] / 3.300



Hydrograph Report

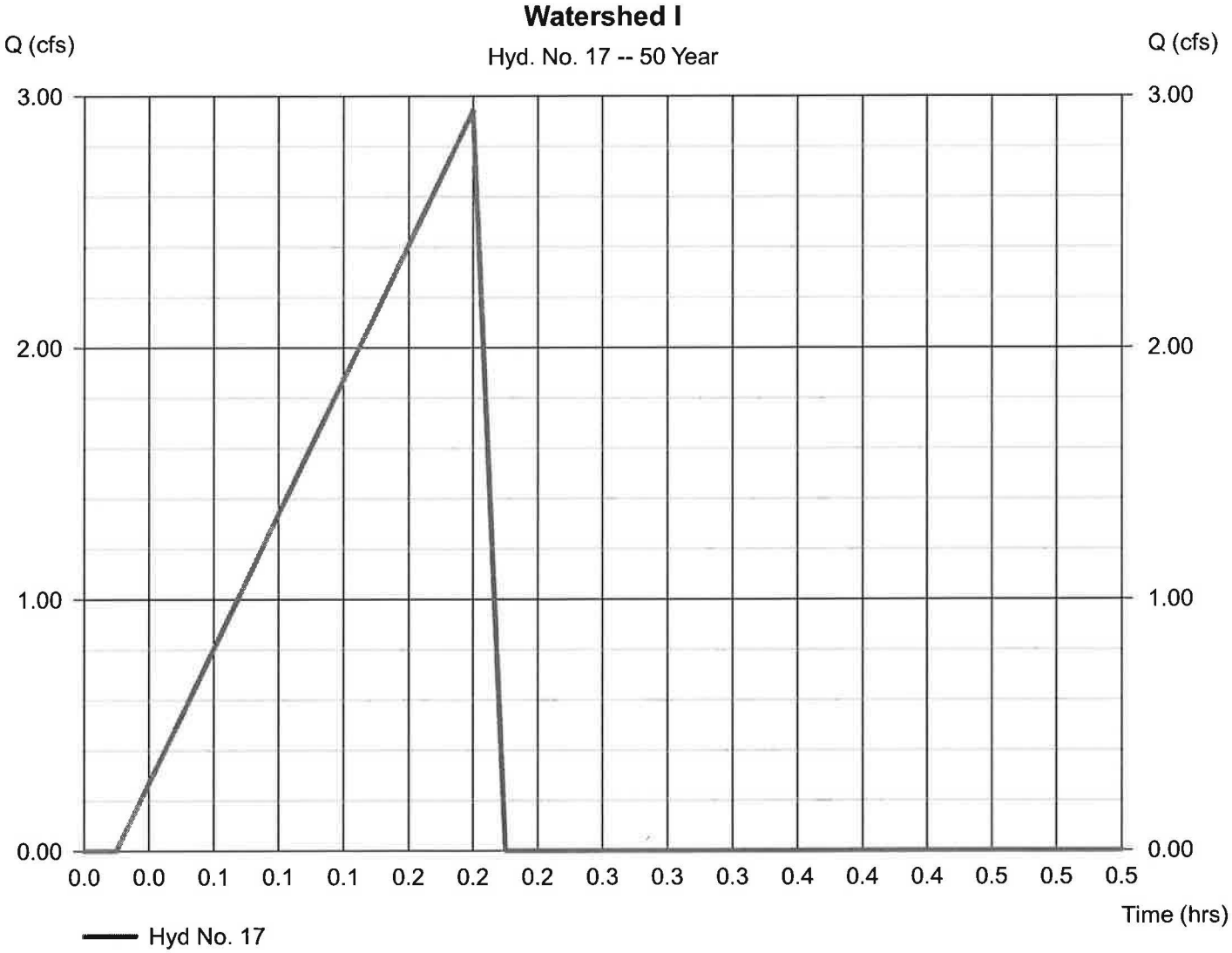
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 17

Watershed I

Hydrograph type	= Rational	Peak discharge	= 2.942 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.20 hrs
Time interval	= 1 min	Hyd. volume	= 2,717 cuft
Drainage area	= 1.500 ac	Runoff coeff.	= 0.34*
Intensity	= 5.769 in/hr	Tc by TR55	= 11.53 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.200 x 0.90) + (0.700 x 0.30) + (0.600 x 0.20)] / 1.500



Hydrograph Report

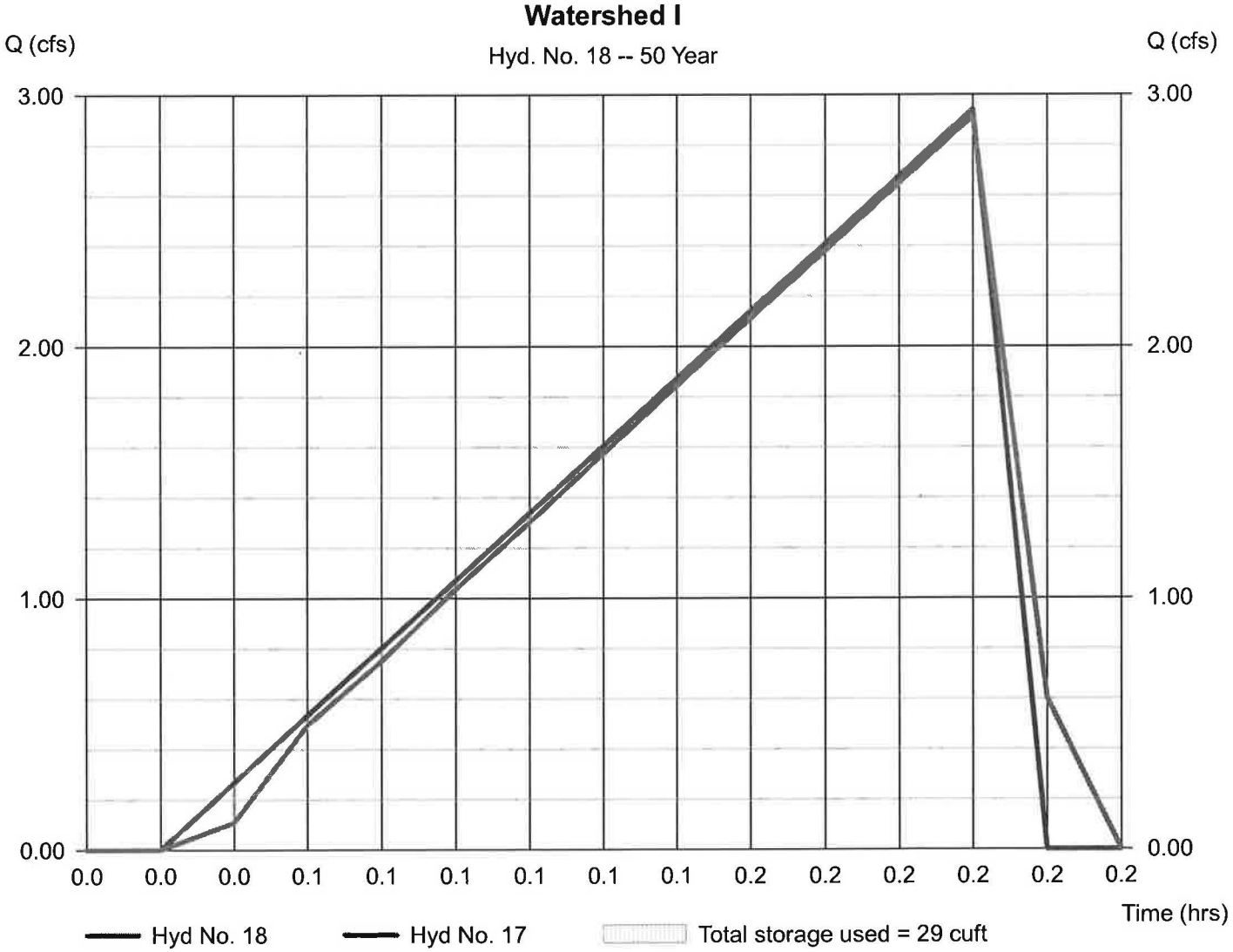
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 18

Watershed I

Hydrograph type	= Reservoir	Peak discharge	= 2.913 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.20 hrs
Time interval	= 1 min	Hyd. volume	= 1,065 cuft
Inflow hyd. No.	= 17 - Watershed I	Max. Elevation	= 531.65 ft
Reservoir name	= Watershed I	Max. Storage	= 29 cuft

Storage Indication method used.



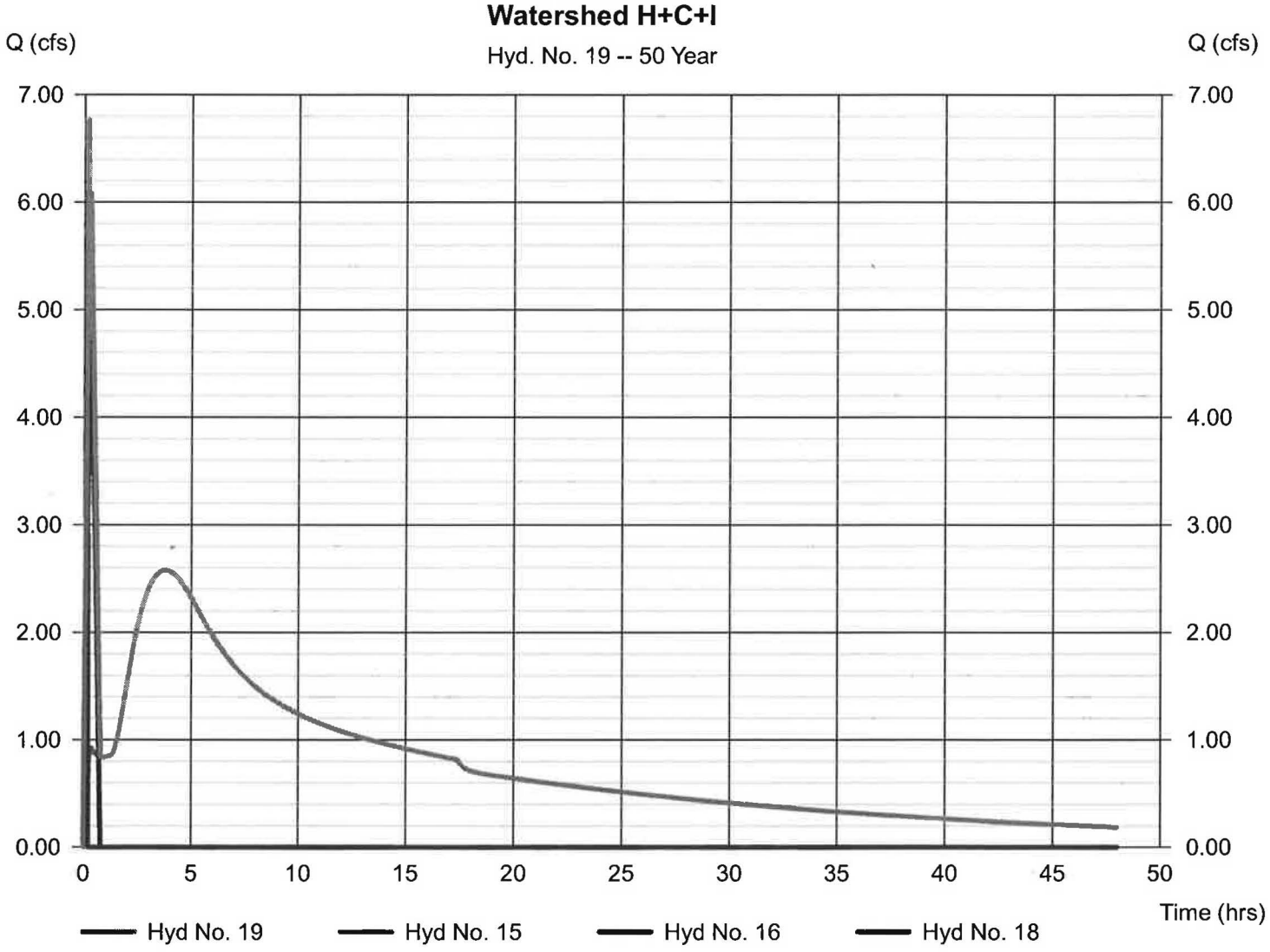
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 19

Watershed H+C+I

Hydrograph type	= Combine	Peak discharge	= 6.770 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.20 hrs
Time interval	= 1 min	Hyd. volume	= 139,849 cuft
Inflow hyds.	= 15, 16, 18	Contrib. drain. area	= 3.300 ac



Hydrograph Report

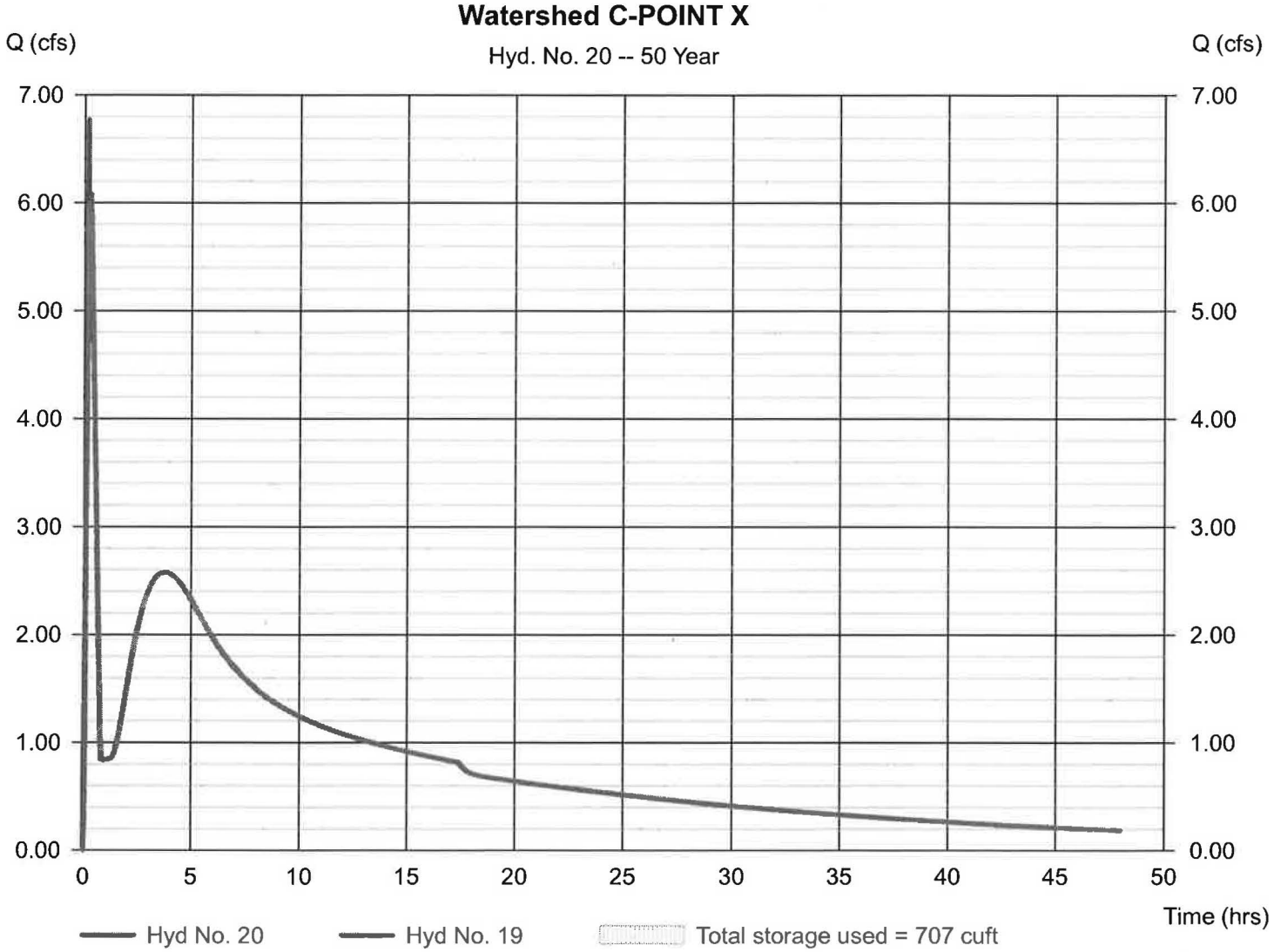
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 20

Watershed C-POINT X

Hydrograph type	= Reservoir	Peak discharge	= 5.989 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.20 hrs
Time interval	= 1 min	Hyd. volume	= 139,784 cuft
Inflow hyd. No.	= 19 - Watershed H+C+I	Max. Elevation	= 529.99 ft
Reservoir name	= Watershed C	Max. Storage	= 707 cuft

Storage Indication method used.



Hydrograph Report

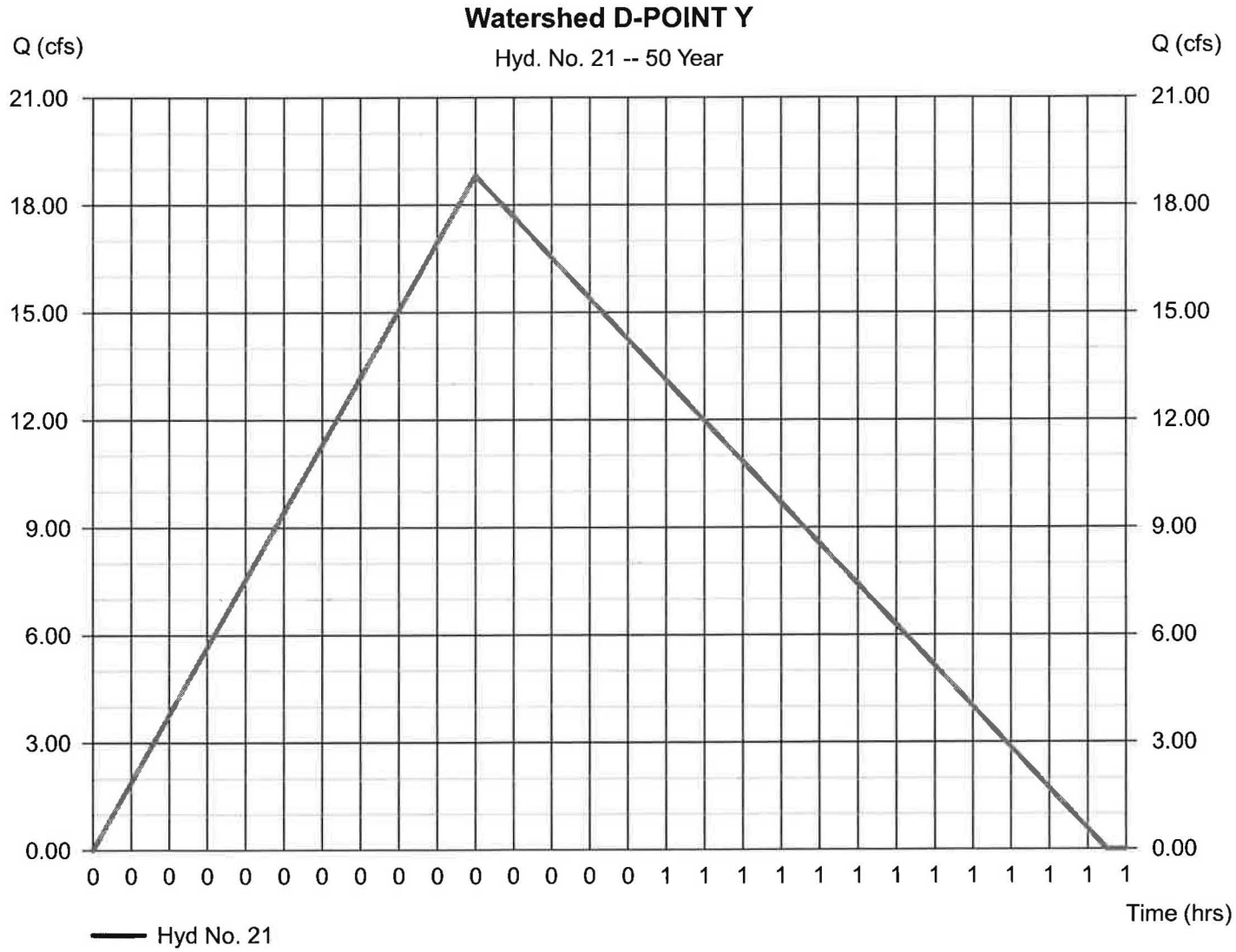
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 21

Watershed D-POINT Y

Hydrograph type	= Rational	Peak discharge	= 18.82 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.33 hrs
Time interval	= 1 min	Hyd. volume	= 30,146 cuft
Drainage area	= 14.190 ac	Runoff coeff.	= 0.29*
Intensity	= 4.573 in/hr	Tc by TR55	= 20.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.500 x 0.90) + (1.750 x 0.30) + (10.940 x 0.20)] / 14.190



Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	Rational	10.35	1	17	14,098	----	------	------	Watershed A
2	Reservoir	3.537	1	35	13,954	1	566.42	8,954	Watershed A
3	Rational	7.676	1	14	8,327	----	------	------	Watershed B
4	Reservoir	1.932	1	30	8,047	3	567.12	6,247	Watershed B
5	Rational	43.46	1	29	102,205	----	------	------	Watershed E
6	Rational	8.794	1	22	15,788	----	------	------	Watershed G
7	Reservoir	0.007	1	59	1,254	6	546.47	15,543	Watershed G
8	Combine	48.82	1	29	123,705	2, 4, 5,	------	------	Watershed A+B+E
9	Reservoir	27.95	1	51	123,693	8	542.23	59,791	Watershed E-POINT Z
10	Rational	23.22	1	20	37,095	----	------	------	Watershed F
11	Combine	32.04	1	44	159,921	9, 10	------	------	Watershed A+B+E+F
12	Reservoir	6.650	1	111	143,909	11	539.69	110,798	Watershed F
13	Rational	5.704	1	19	8,537	----	------	------	Watershed H
14	Combine	6.650	1	111	147,159	12, 13	------	------	Watershed F+H
15	Reservoir	3.164	1	219	146,483	14	536.82	27,363	Watershed H
16	Rational	5.689	1	18	8,339	----	------	------	Watershed C
17	Rational	3.190	1	12	2,946	----	------	------	Watershed I
18	Reservoir	3.161	1	12	1,155	17	531.70	30.7	Watershed I
19	Combine	7.417	1	12	155,830	15, 16, 18	------	------	Watershed H+C+I
20	Reservoir	6.576	1	12	155,764	19	530.05	747	Watershed C-POINT X
21	Rational	20.66	1	20	33,094	----	------	------	Watershed D-POINT Y

Hydrograph Report

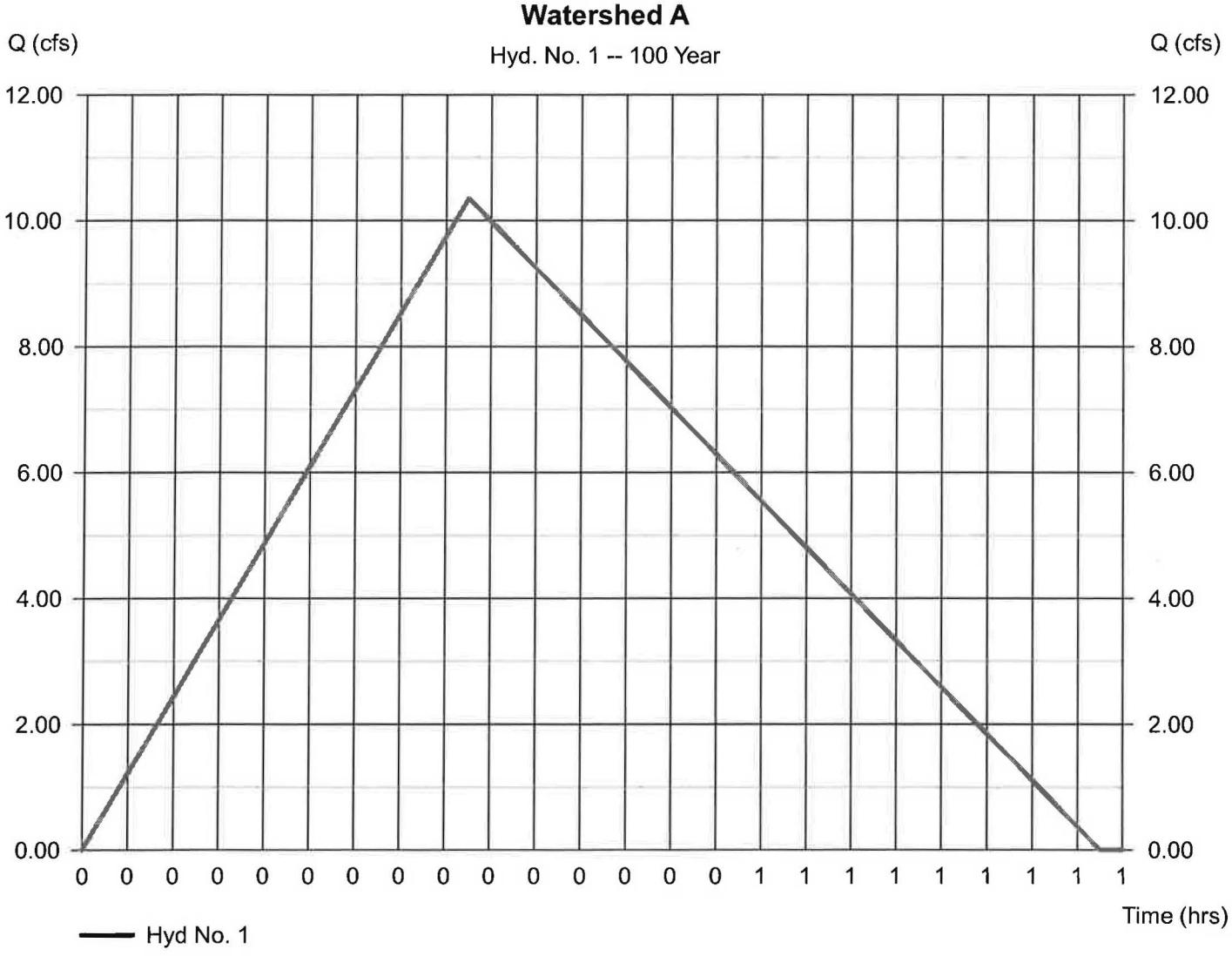
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 1

Watershed A

Hydrograph type	= Rational	Peak discharge	= 10.35 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.28 hrs
Time interval	= 1 min	Hyd. volume	= 14,098 cuft
Drainage area	= 8.000 ac	Runoff coeff.	= 0.24*
Intensity	= 5.392 in/hr	Tc by TR55	= 17.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.400 x 0.90) + (0.500 x 0.30) + (7.100 x 0.20)] / 8.000



Hydrograph Report

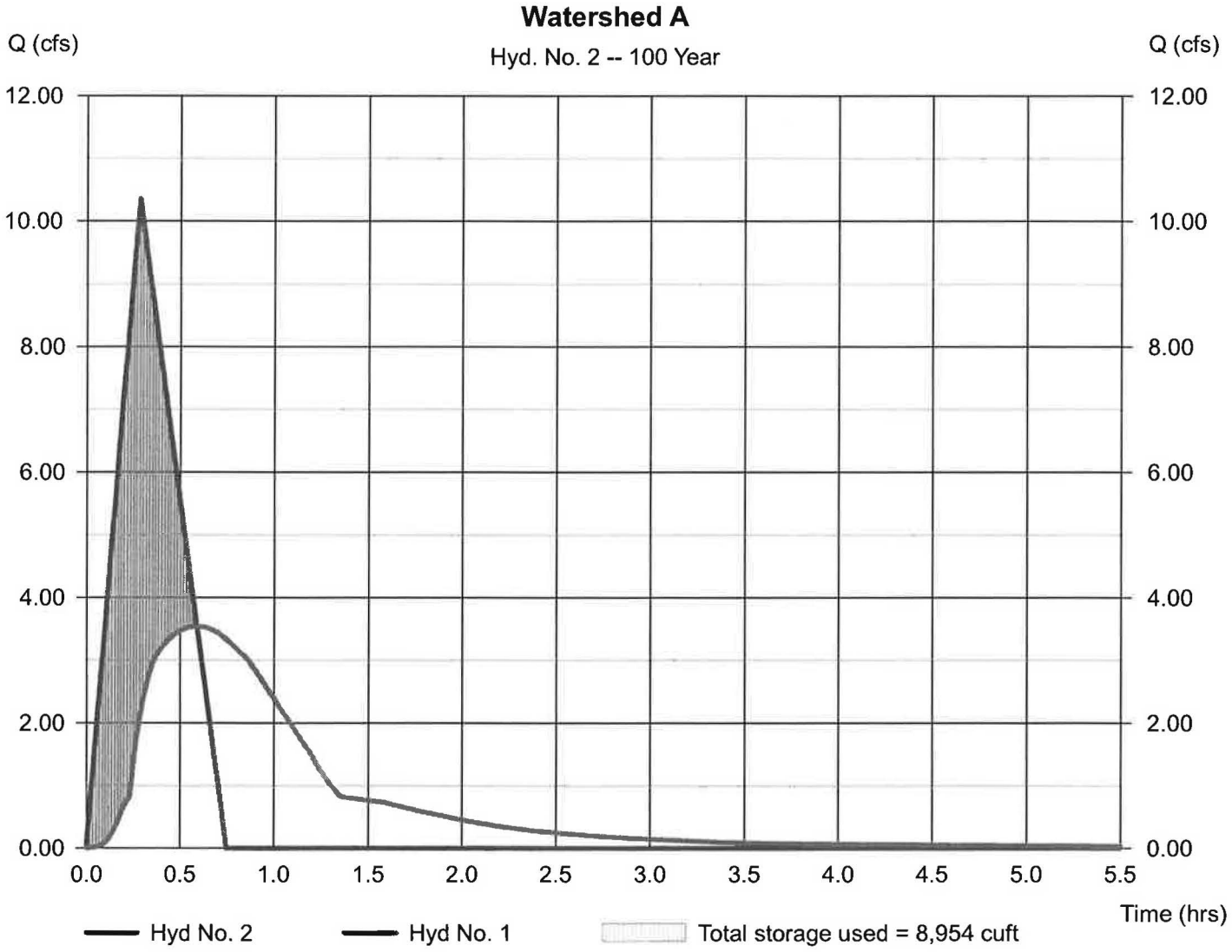
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 2

Watershed A

Hydrograph type	= Reservoir	Peak discharge	= 3.537 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.58 hrs
Time interval	= 1 min	Hyd. volume	= 13,954 cuft
Inflow hyd. No.	= 1 - Watershed A	Max. Elevation	= 566.42 ft
Reservoir name	= Watershed A	Max. Storage	= 8,954 cuft

Storage Indication method used.



Hydrograph Report

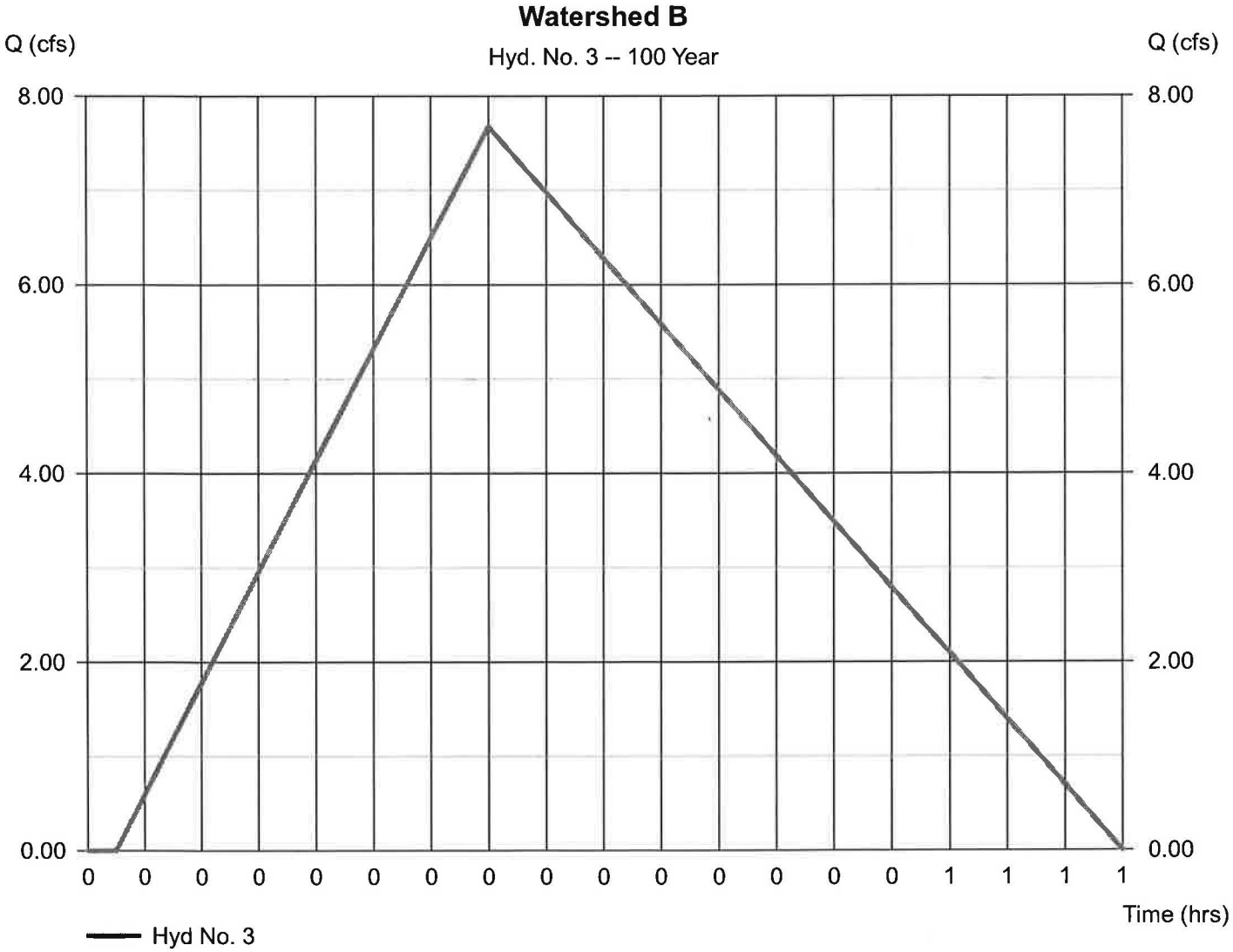
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 3

Watershed B

Hydrograph type	= Rational	Peak discharge	= 7.676 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.23 hrs
Time interval	= 1 min	Hyd. volume	= 8,327 cuft
Drainage area	= 5.200 ac	Runoff coeff.	= 0.25*
Intensity	= 5.904 in/hr	Tc by TR55	= 13.54 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.300 x 0.90) + (0.500 x 0.30) + (4.400 x 0.20)] / 5.200



Hydrograph Report

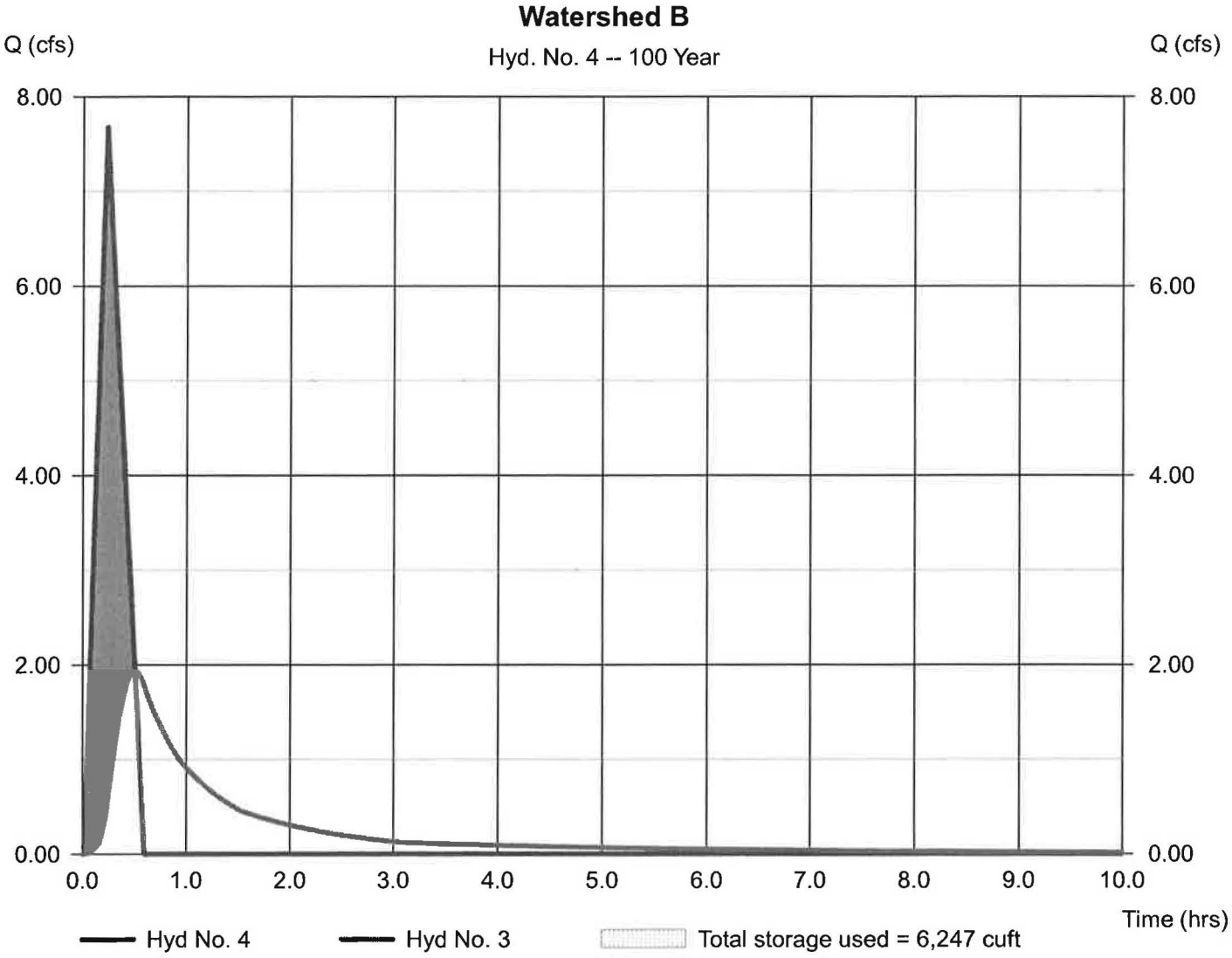
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 4

Watershed B

Hydrograph type	= Reservoir	Peak discharge	= 1.932 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.50 hrs
Time interval	= 1 min	Hyd. volume	= 8,047 cuft
Inflow hyd. No.	= 3 - Watershed B	Max. Elevation	= 567.12 ft
Reservoir name	= Watershed B	Max. Storage	= 6,247 cuft

Storage Indication method used.



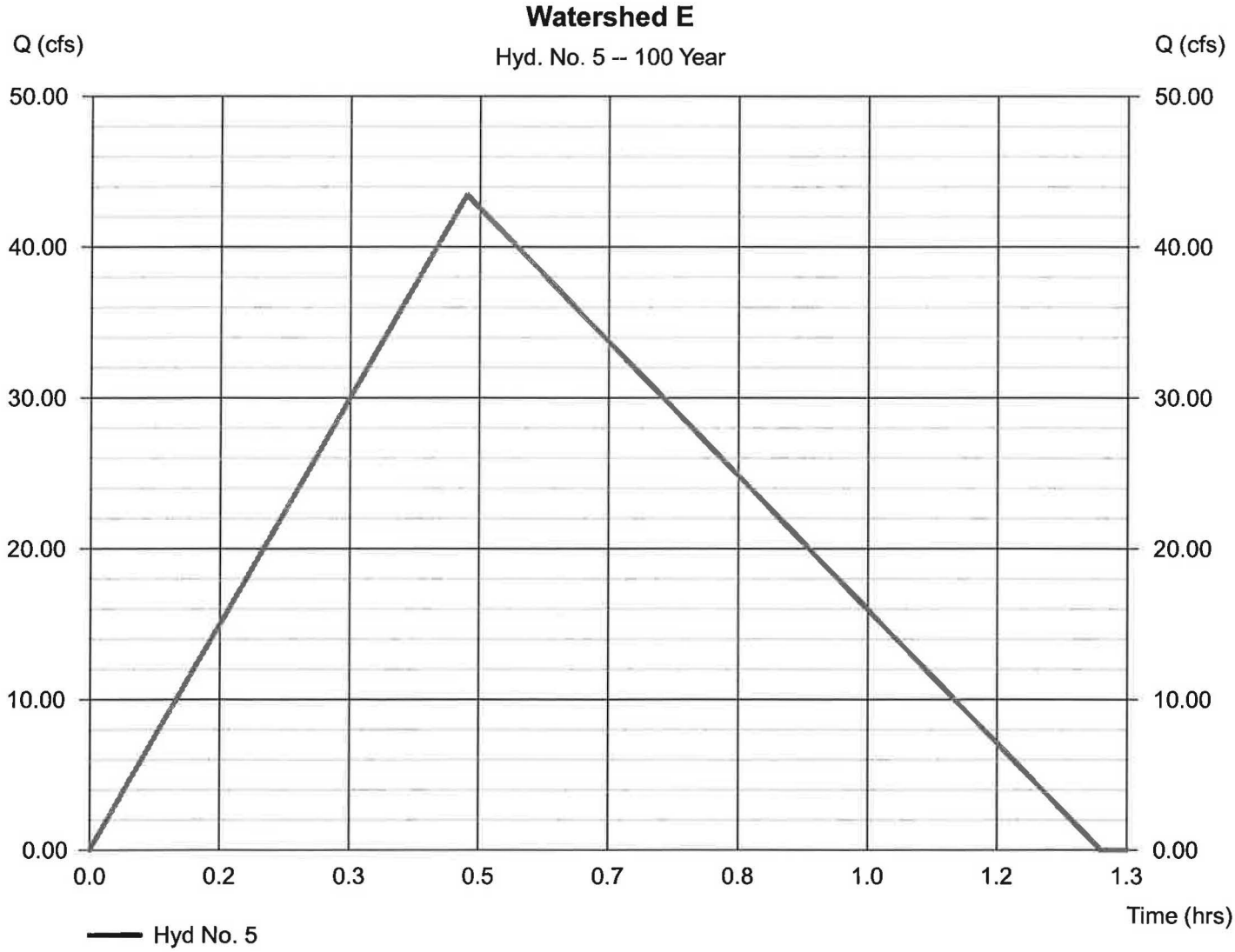
Hydrograph Report

Hyd. No. 5

Watershed E

Hydrograph type	= Rational	Peak discharge	= 43.46 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.48 hrs
Time interval	= 1 min	Hyd. volume	= 102,205 cuft
Drainage area	= 40.300 ac	Runoff coeff.	= 0.26*
Intensity	= 4.148 in/hr	Tc by TR55	= 29.36 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(2.100 x 0.90) + (7.700 x 0.30) + (30.500 x 0.20)] / 40.300



Hydrograph Report

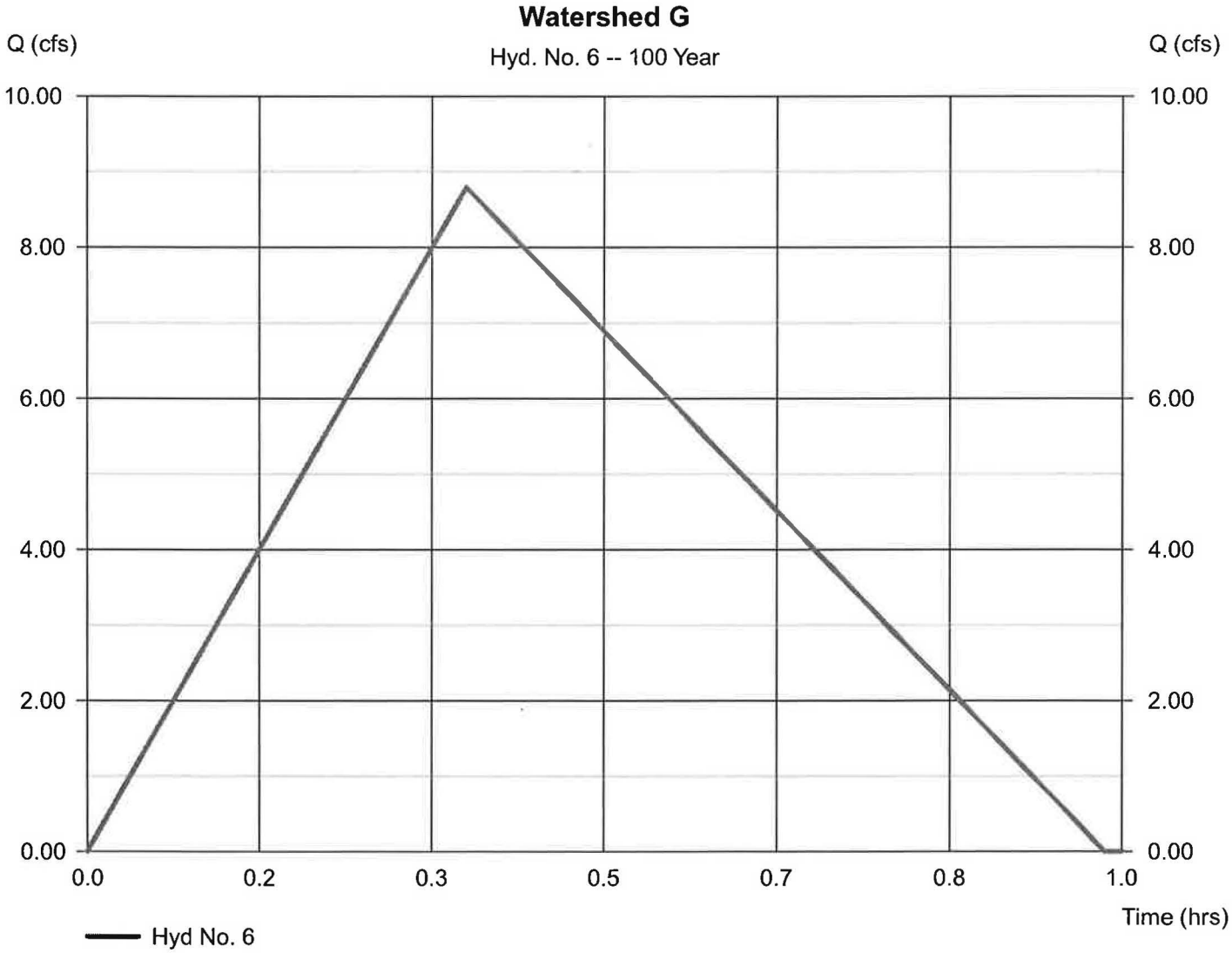
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 6

Watershed G

Hydrograph type	= Rational	Peak discharge	= 8.794 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.37 hrs
Time interval	= 1 min	Hyd. volume	= 15,788 cuft
Drainage area	= 7.700 ac	Runoff coeff.	= 0.24*
Intensity	= 4.758 in/hr	Tc by TR55	= 22.41 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.300 x 0.90) + (0.800 x 0.30) + (6.600 x 0.20)] / 7.700



Hydrograph Report

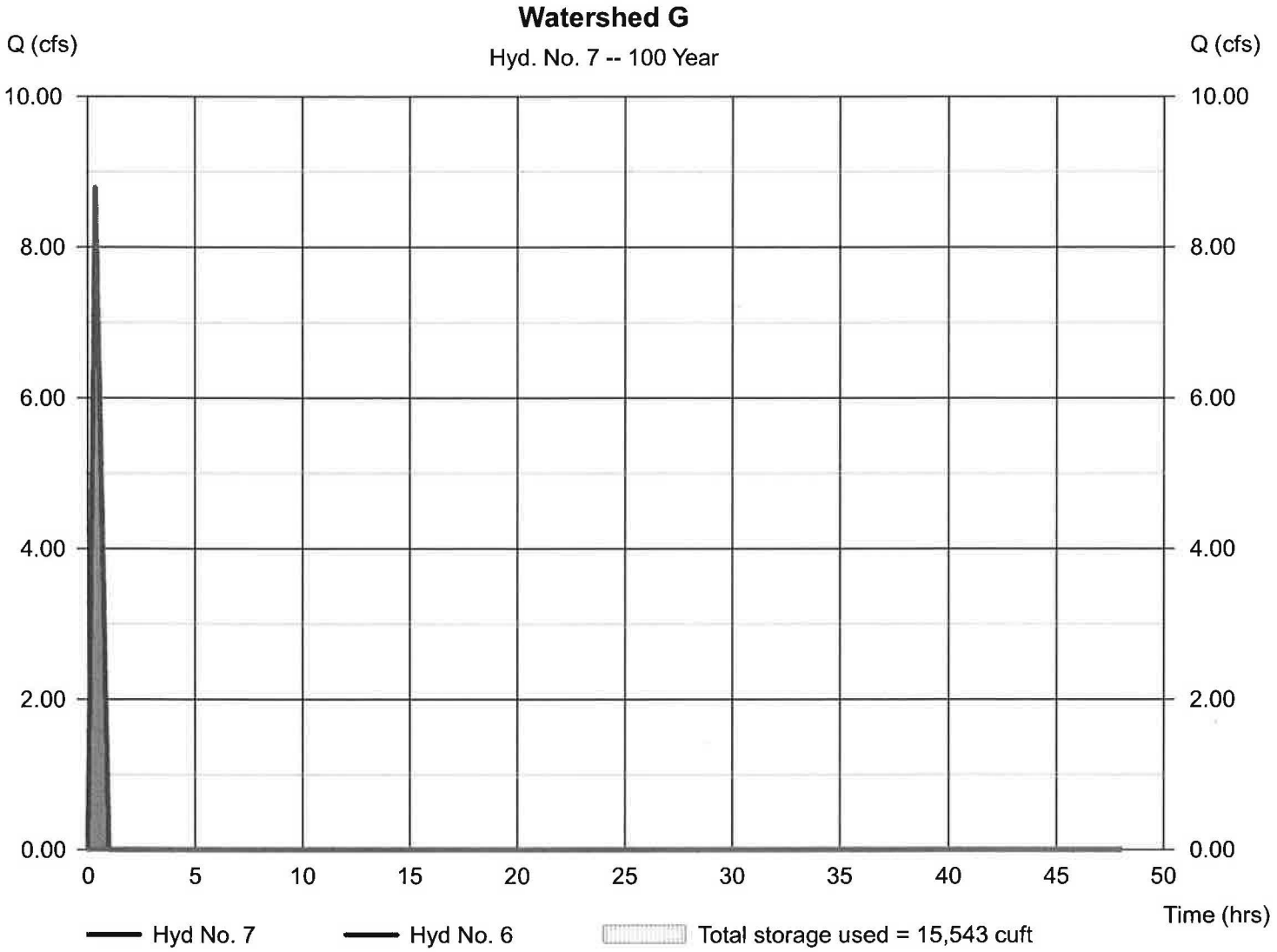
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 7

Watershed G

Hydrograph type	= Reservoir	Peak discharge	= 0.007 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.98 hrs
Time interval	= 1 min	Hyd. volume	= 1,254 cuft
Inflow hyd. No.	= 6 - Watershed G	Max. Elevation	= 546.47 ft
Reservoir name	= Watershed G	Max. Storage	= 15,543 cuft

Storage Indication method used.



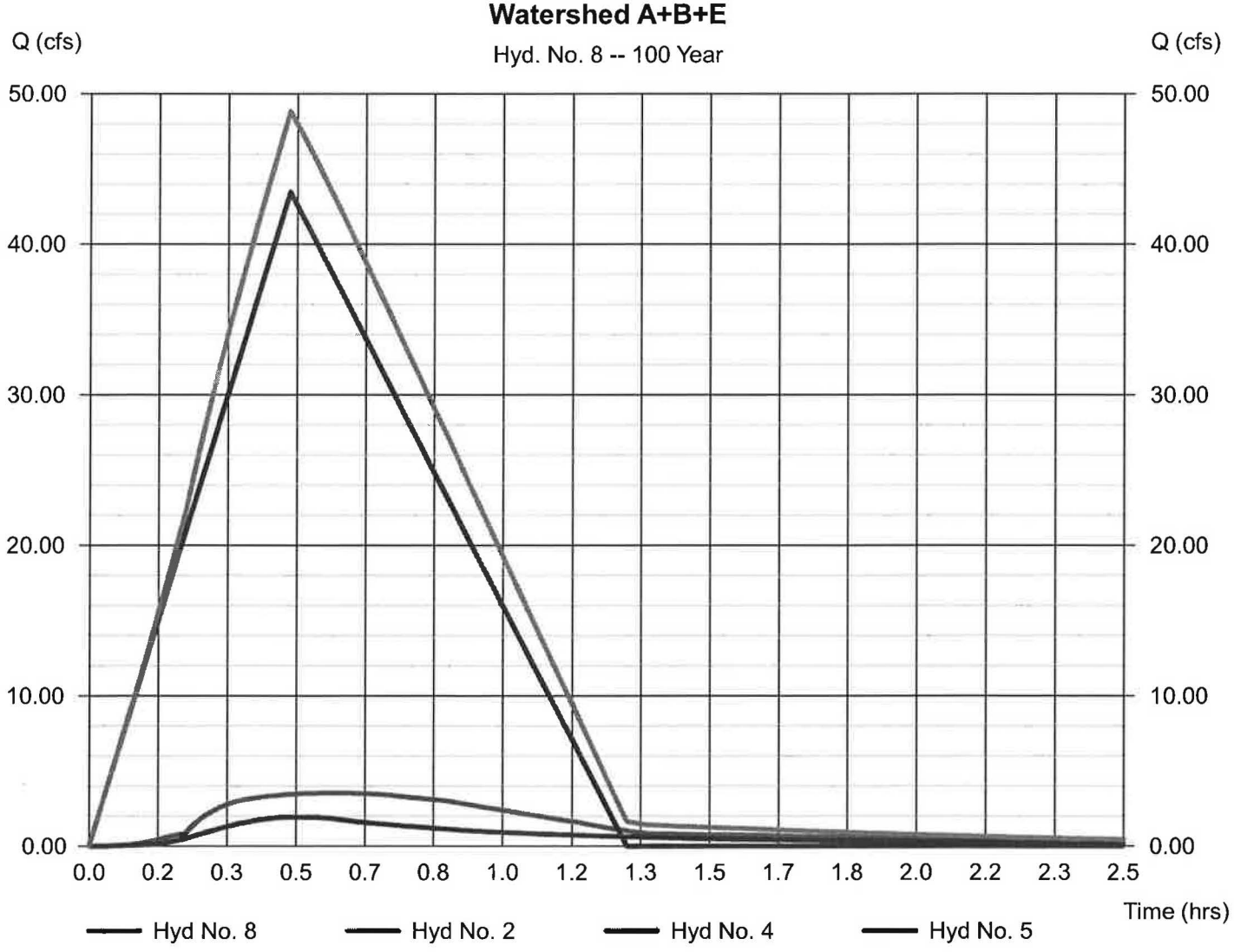
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 8

Watershed A+B+E

Hydrograph type	= Combine	Peak discharge	= 48.82 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.48 hrs
Time interval	= 1 min	Hyd. volume	= 123,705 cuft
Inflow hyds.	= 2, 4, 5	Contrib. drain. area	= 40.300 ac



Hydrograph Report

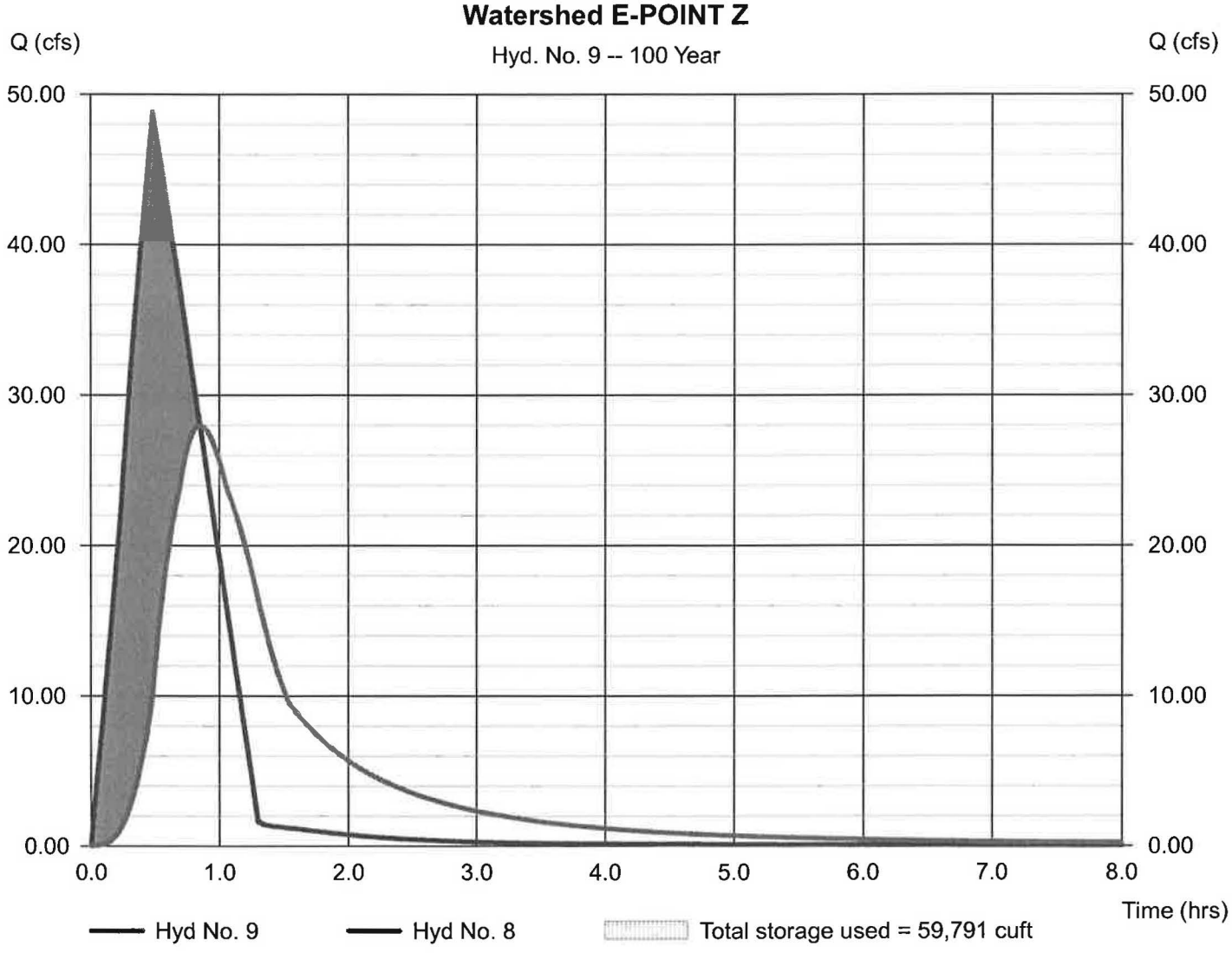
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 9

Watershed E-POINT Z

Hydrograph type	= Reservoir	Peak discharge	= 27.95 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.85 hrs
Time interval	= 1 min	Hyd. volume	= 123,693 cuft
Inflow hyd. No.	= 8 - Watershed A+B+E	Max. Elevation	= 542.23 ft
Reservoir name	= Watershed E	Max. Storage	= 59,791 cuft

Storage Indication method used.



Hydrograph Report

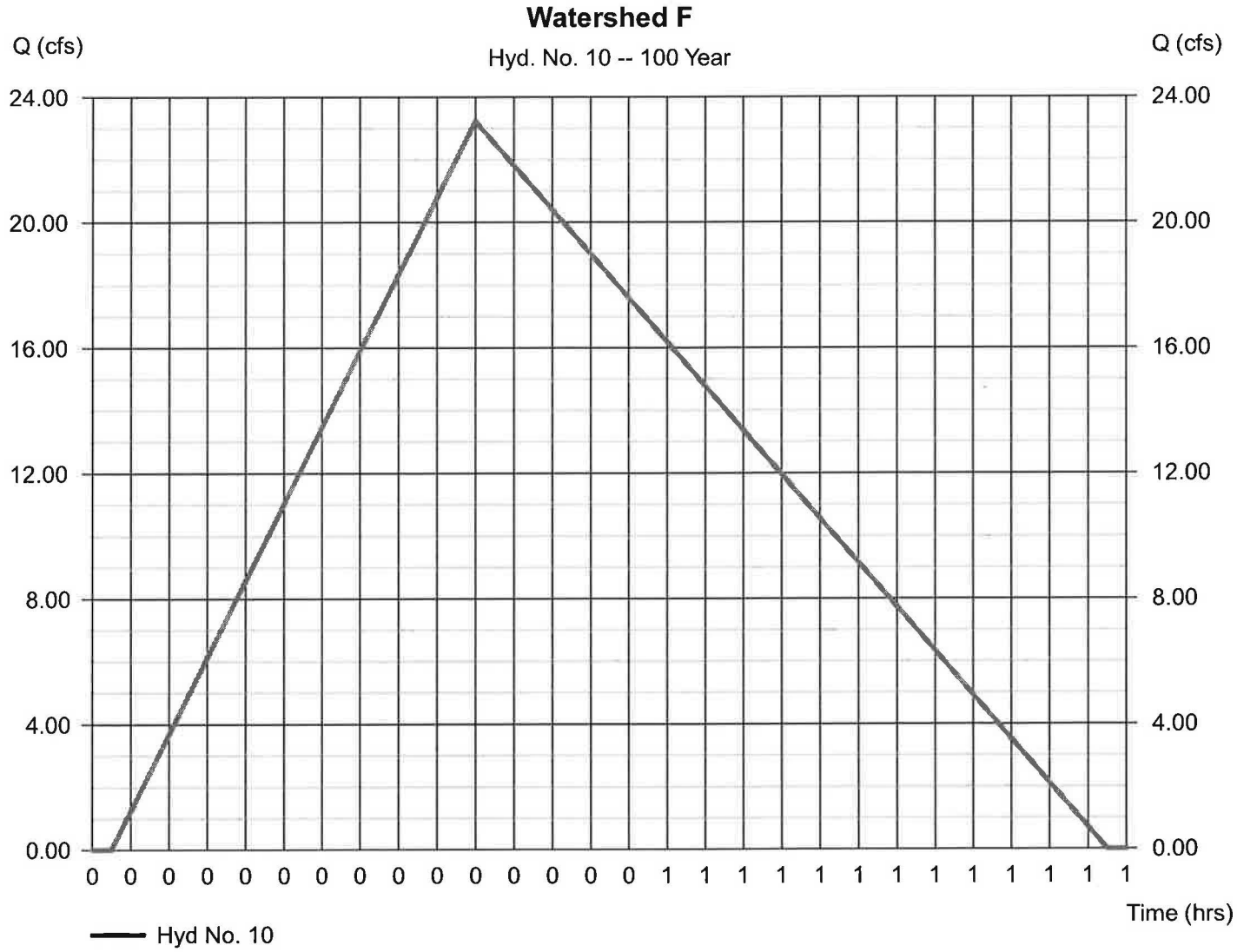
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 10

Watershed F

Hydrograph type	= Rational	Peak discharge	= 23.22 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.33 hrs
Time interval	= 1 min	Hyd. volume	= 37,095 cuft
Drainage area	= 15.400 ac	Runoff coeff.	= 0.3*
Intensity	= 5.027 in/hr	Tc by TR55	= 19.94 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.000 x 0.90) + (5.100 x 0.30) + (8.800 x 0.20) + (0.500 x 1.00)] / 15.400

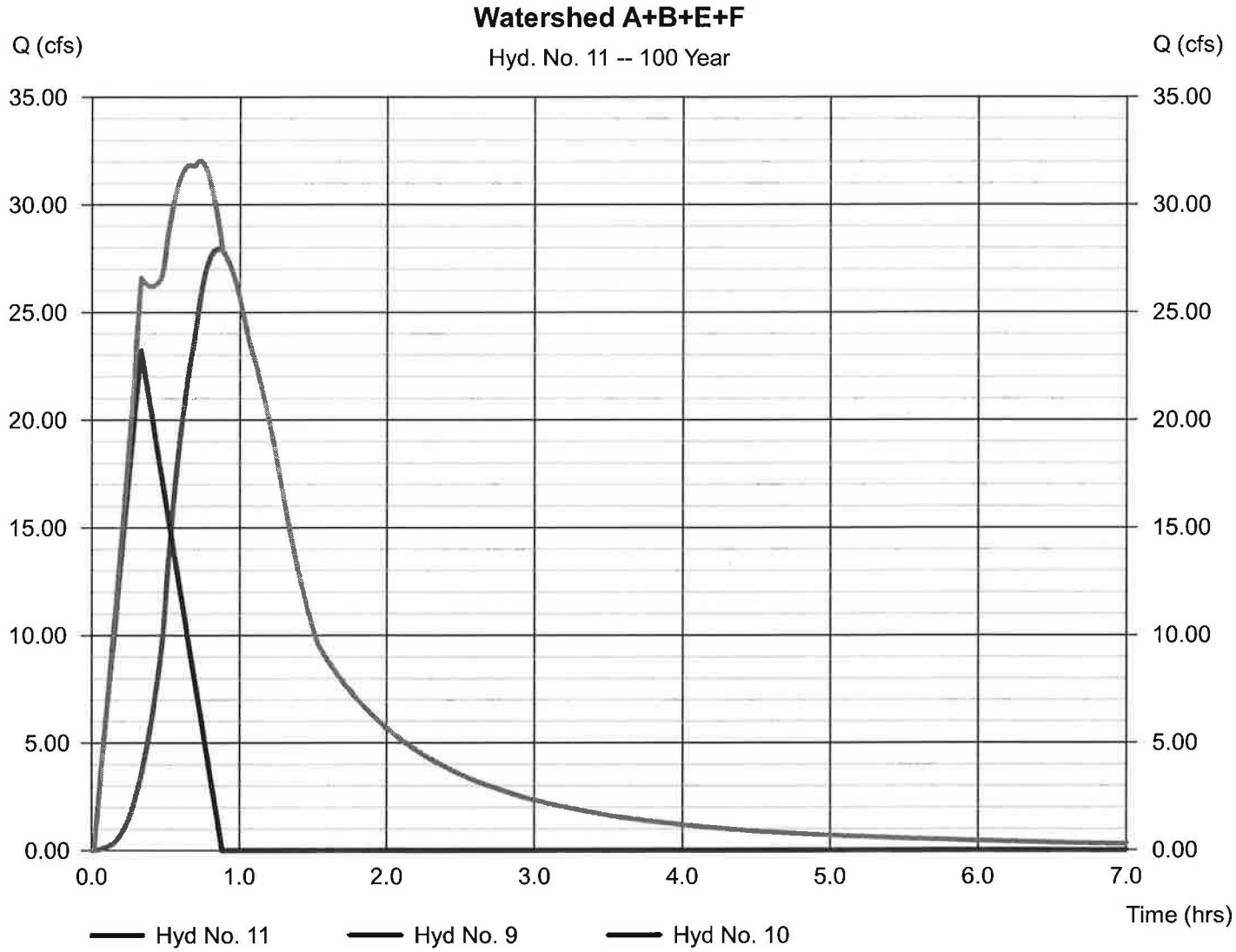


Hydrograph Report

Hyd. No. 11

Watershed A+B+E+F

Hydrograph type	= Combine	Peak discharge	= 32.04 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.73 hrs
Time interval	= 1 min	Hyd. volume	= 159,921 cuft
Inflow hyds.	= 9, 10	Contrib. drain. area	= 15.400 ac



Hydrograph Report

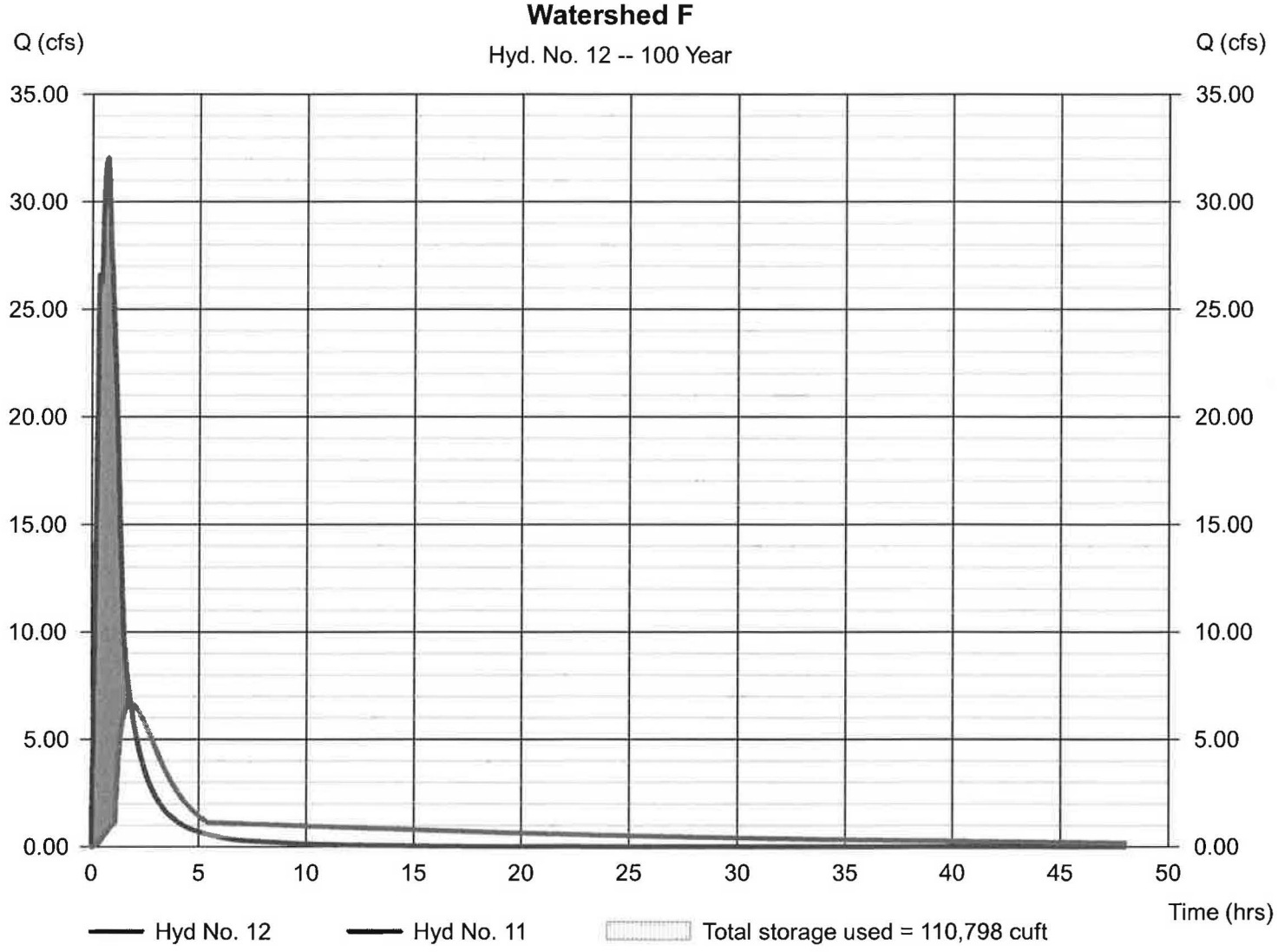
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 12

Watershed F

Hydrograph type	= Reservoir	Peak discharge	= 6.650 cfs
Storm frequency	= 100 yrs	Time to peak	= 1.85 hrs
Time interval	= 1 min	Hyd. volume	= 143,909 cuft
Inflow hyd. No.	= 11 - Watershed A+B+E+F	Max. Elevation	= 539.69 ft
Reservoir name	= Watershed F	Max. Storage	= 110,798 cuft

Storage Indication method used.



Hydrograph Report

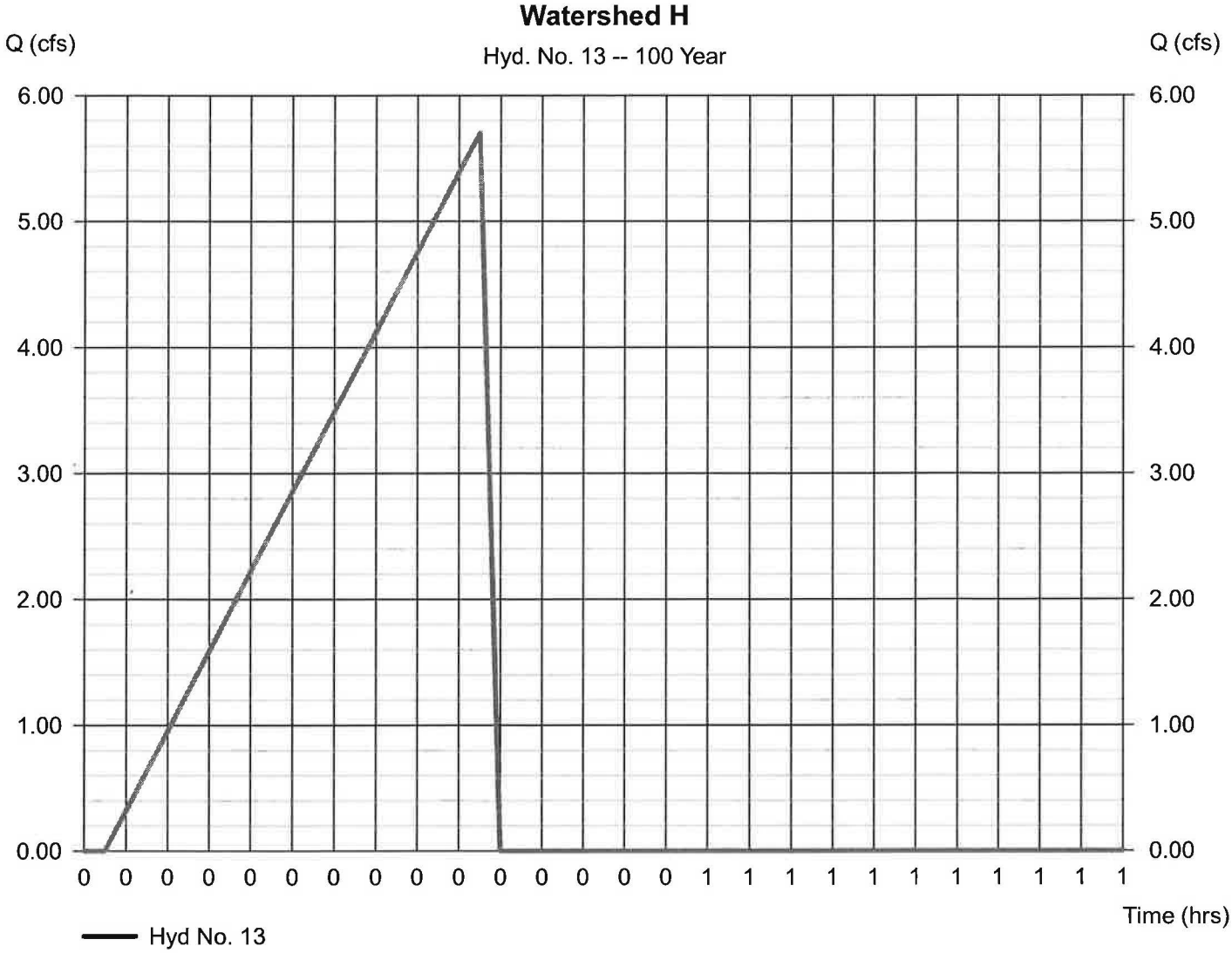
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 13

Watershed H

Hydrograph type	= Rational	Peak discharge	= 5.704 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 8,537 cuft
Drainage area	= 3.800 ac	Runoff coeff.	= 0.29*
Intensity	= 5.176 in/hr	Tc by TR55	= 18.69 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.200 x 0.90) + (0.100 x 0.30) + (2.500 x 0.20) + (0.800 x 0.25) + (0.200 x 1.00)] / 3.800



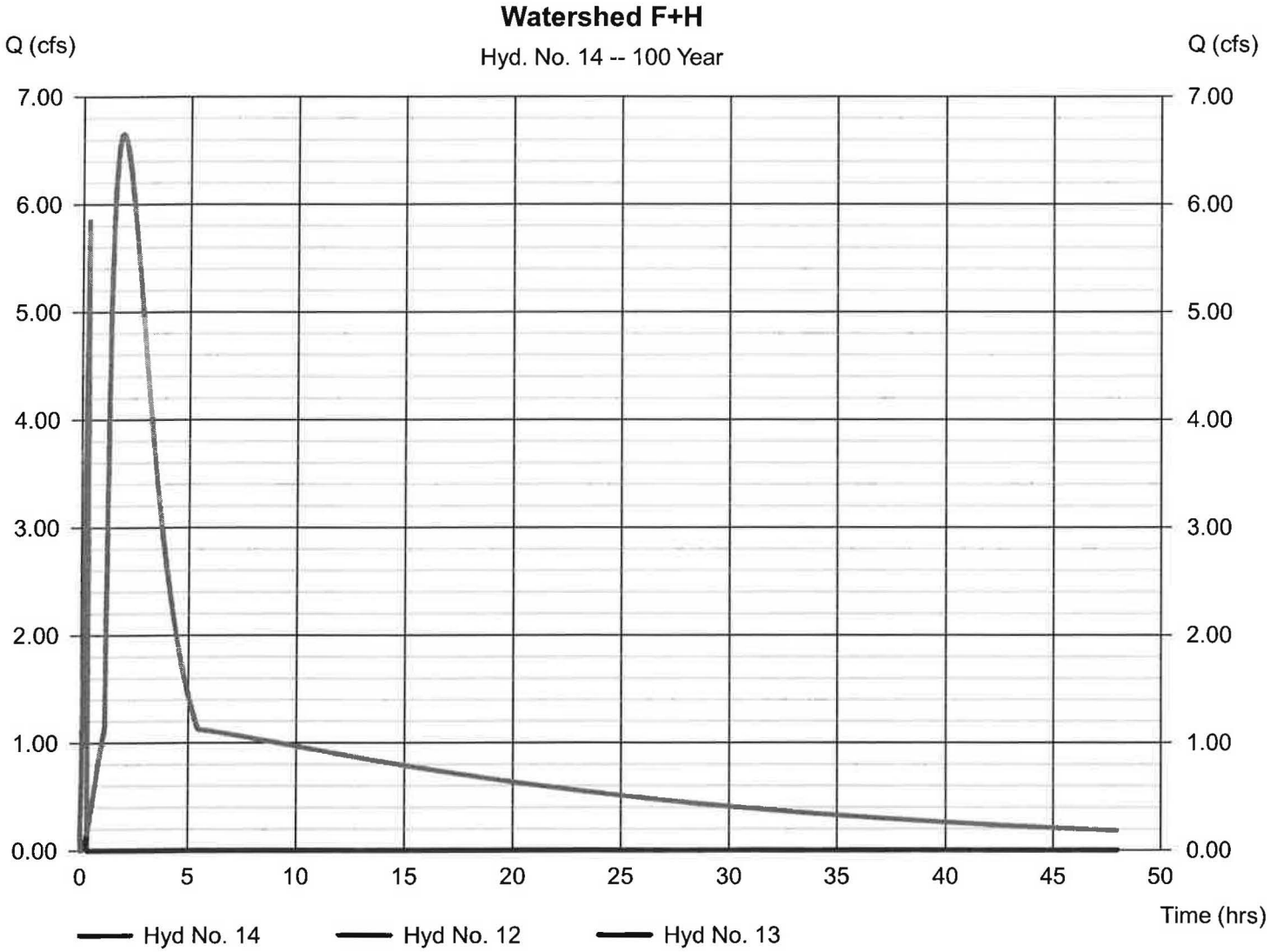
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 14

Watershed F+H

Hydrograph type	= Combine	Peak discharge	= 6.650 cfs
Storm frequency	= 100 yrs	Time to peak	= 1.85 hrs
Time interval	= 1 min	Hyd. volume	= 147,159 cuft
Inflow hyds.	= 12, 13	Contrib. drain. area	= 3.800 ac



Hydrograph Report

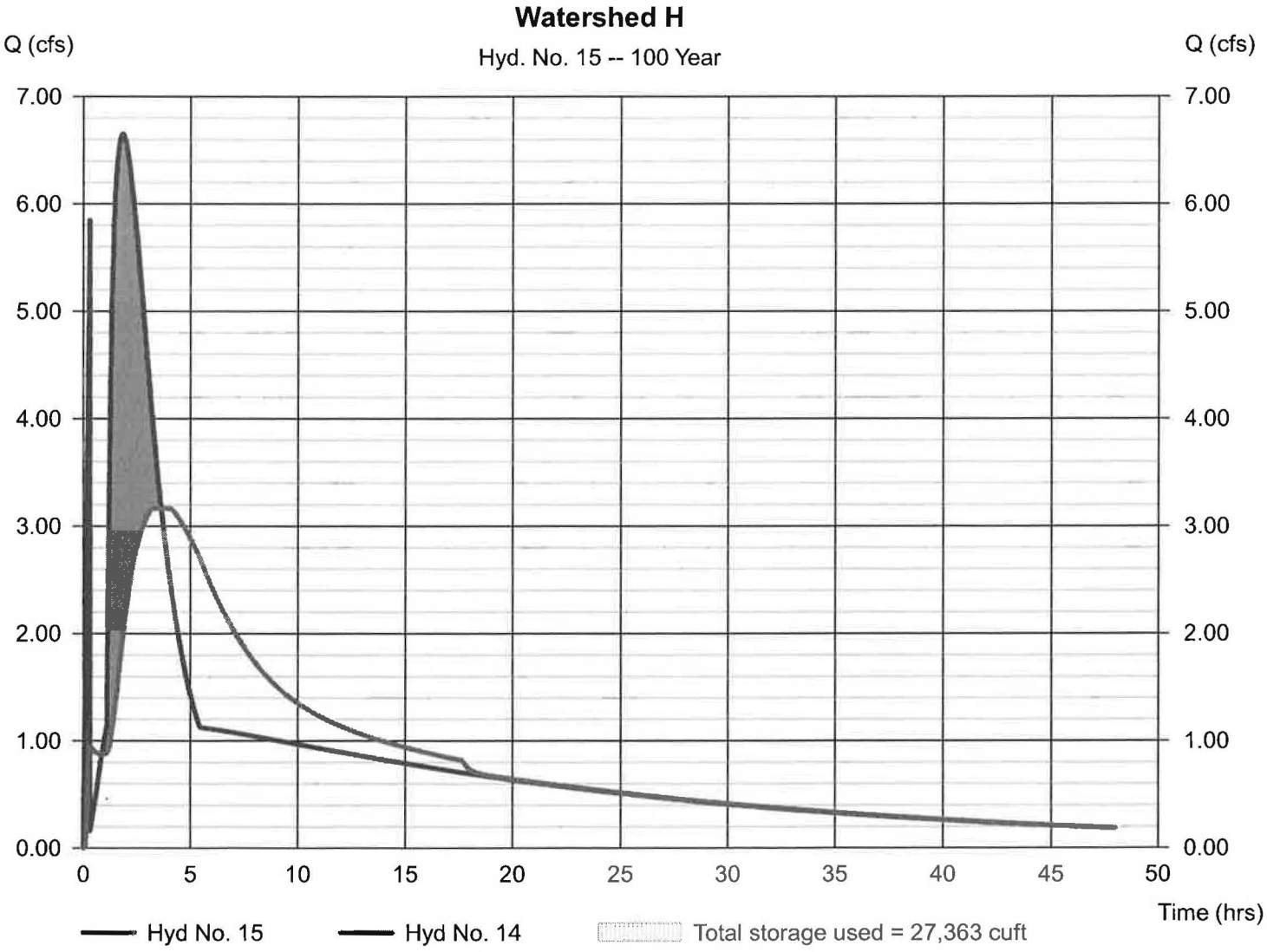
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 15

Watershed H

Hydrograph type	= Reservoir	Peak discharge	= 3.164 cfs
Storm frequency	= 100 yrs	Time to peak	= 3.65 hrs
Time interval	= 1 min	Hyd. volume	= 146,483 cuft
Inflow hyd. No.	= 14 - Watershed F+H	Max. Elevation	= 536.82 ft
Reservoir name	= Watershed H	Max. Storage	= 27,363 cuft

Storage Indication method used.



Hydrograph Report

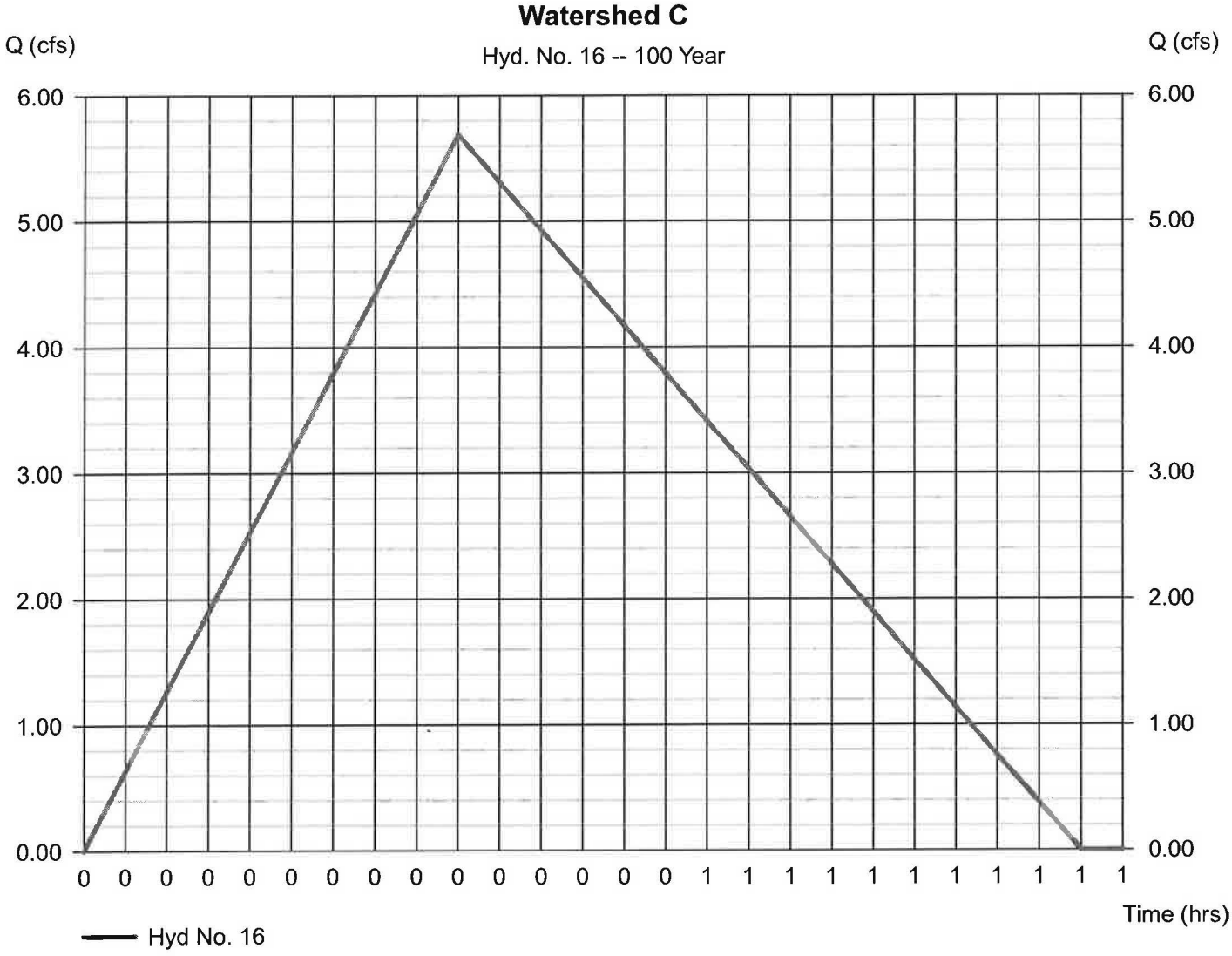
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 16

Watershed C

Hydrograph type	= Rational	Peak discharge	= 5.689 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.30 hrs
Time interval	= 1 min	Hyd. volume	= 8,339 cuft
Drainage area	= 3.300 ac	Runoff coeff.	= 0.33*
Intensity	= 5.224 in/hr	Tc by TR55	= 18.30 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.400 x 0.90) + (1.200 x 0.30) + (1.400 x 0.20) + (0.300 x 0.25)] / 3.300



Hydrograph Report

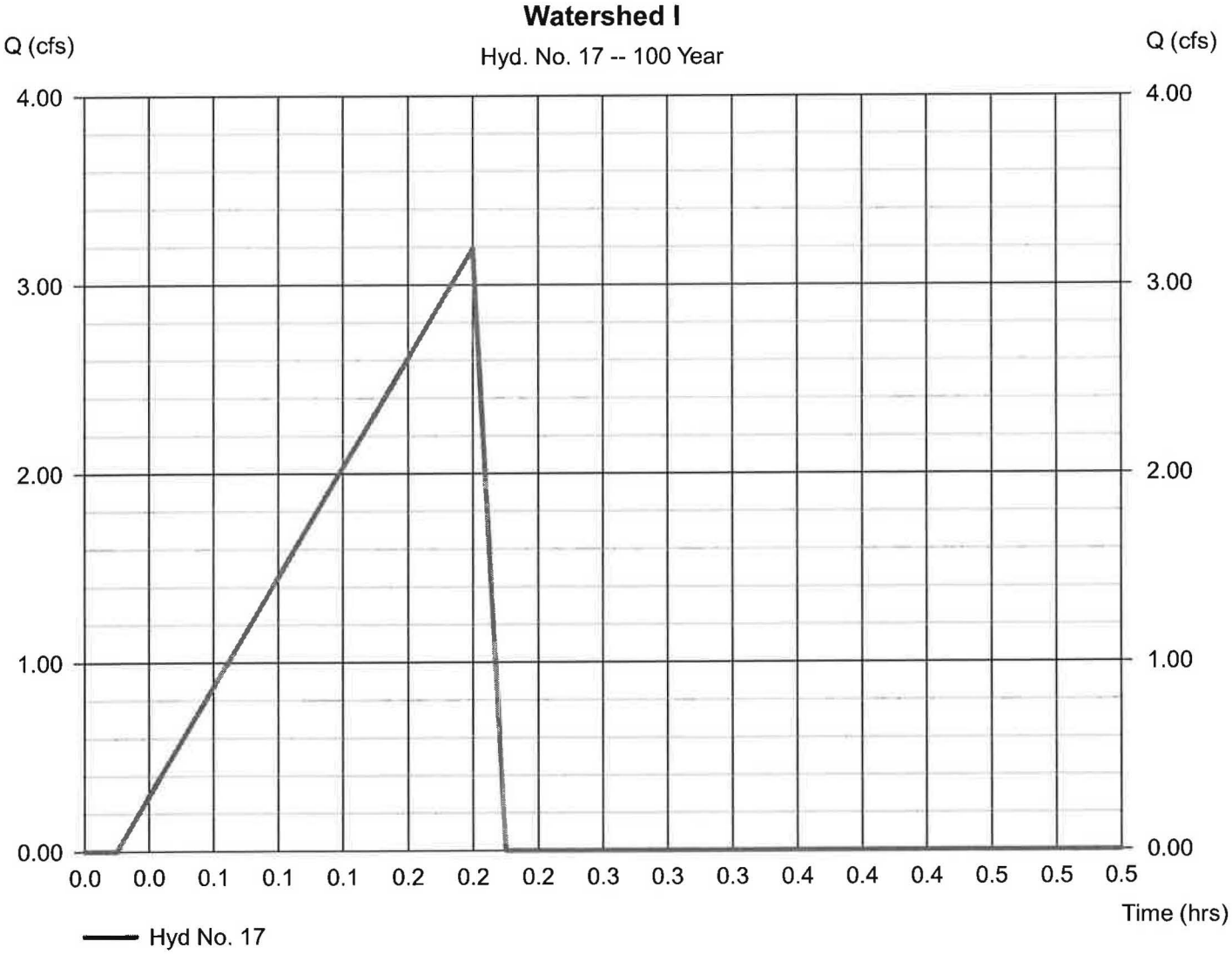
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 17

Watershed I

Hydrograph type	= Rational	Peak discharge	= 3.190 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.20 hrs
Time interval	= 1 min	Hyd. volume	= 2,946 cuft
Drainage area	= 1.500 ac	Runoff coeff.	= 0.34*
Intensity	= 6.255 in/hr	Tc by TR55	= 11.53 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.200 x 0.90) + (0.700 x 0.30) + (0.600 x 0.20)] / 1.500



Hydrograph Report

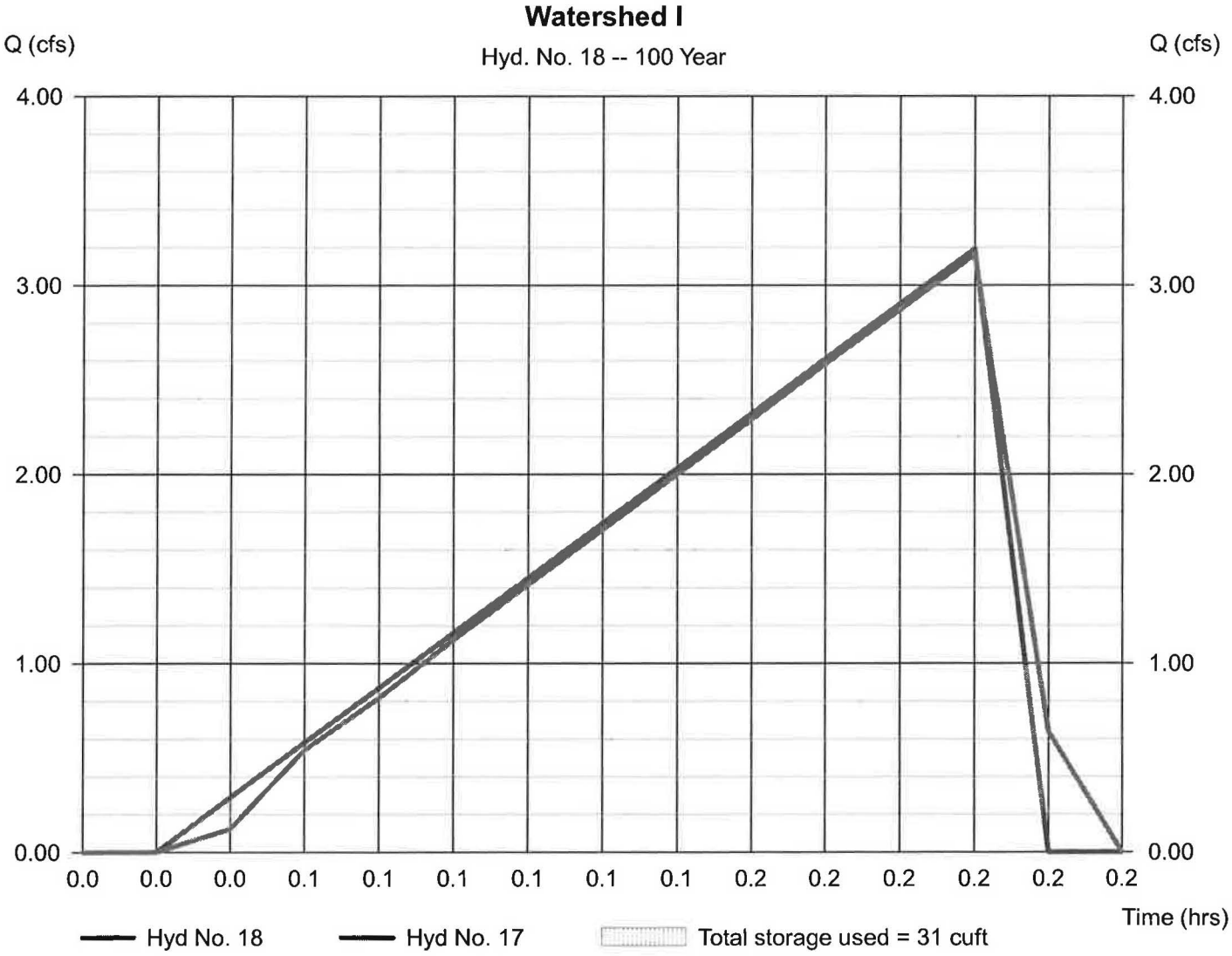
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 18

Watershed I

Hydrograph type	= Reservoir	Peak discharge	= 3.161 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.20 hrs
Time interval	= 1 min	Hyd. volume	= 1,155 cuft
Inflow hyd. No.	= 17 - Watershed I	Max. Elevation	= 531.70 ft
Reservoir name	= Watershed I	Max. Storage	= 31 cuft

Storage Indication method used.

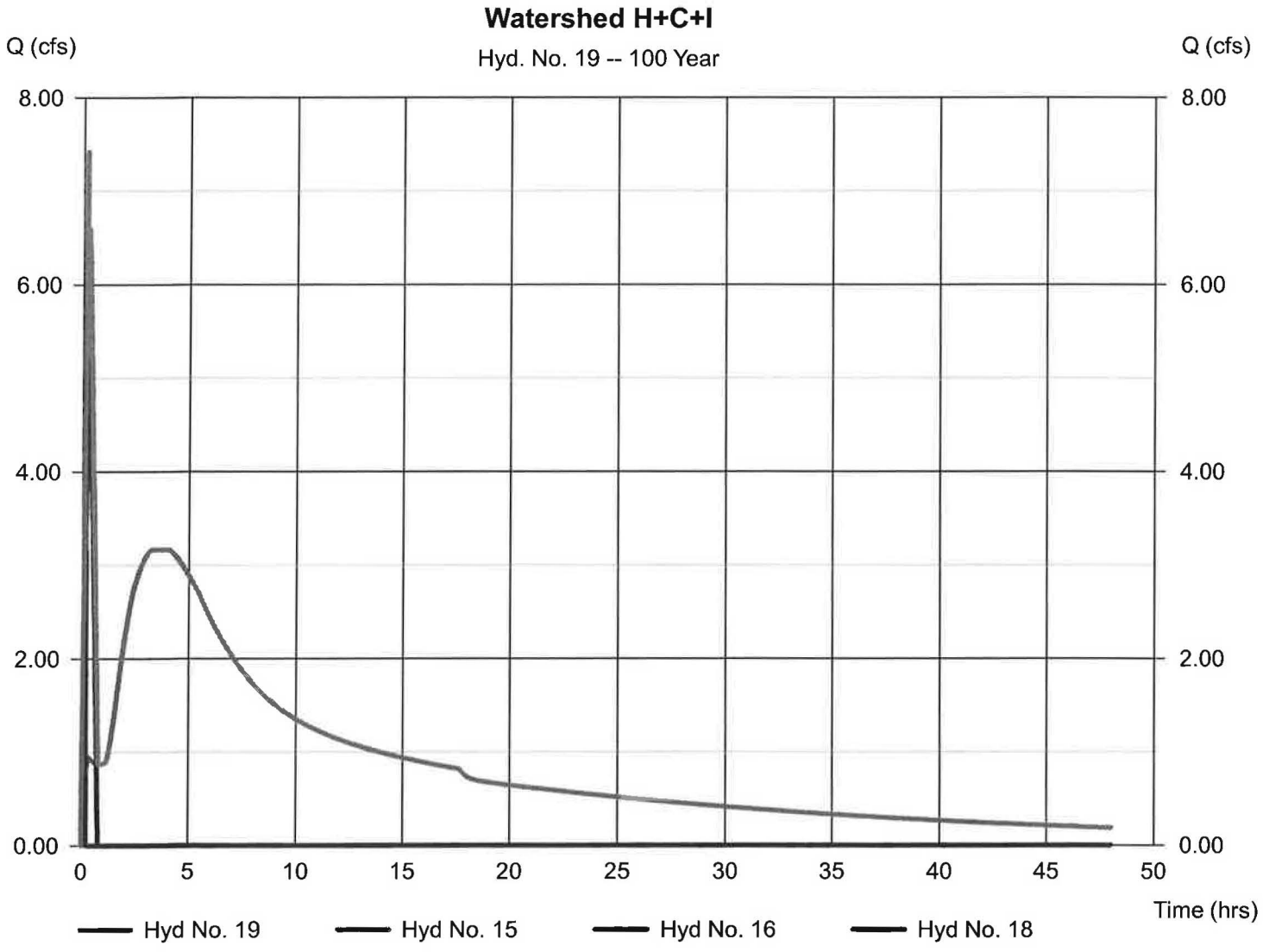


Hydrograph Report

Hyd. No. 19

Watershed H+C+I

Hydrograph type	= Combine	Peak discharge	= 7.417 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.20 hrs
Time interval	= 1 min	Hyd. volume	= 155,830 cuft
Inflow hyds.	= 15, 16, 18	Contrib. drain. area	= 3.300 ac



Hydrograph Report

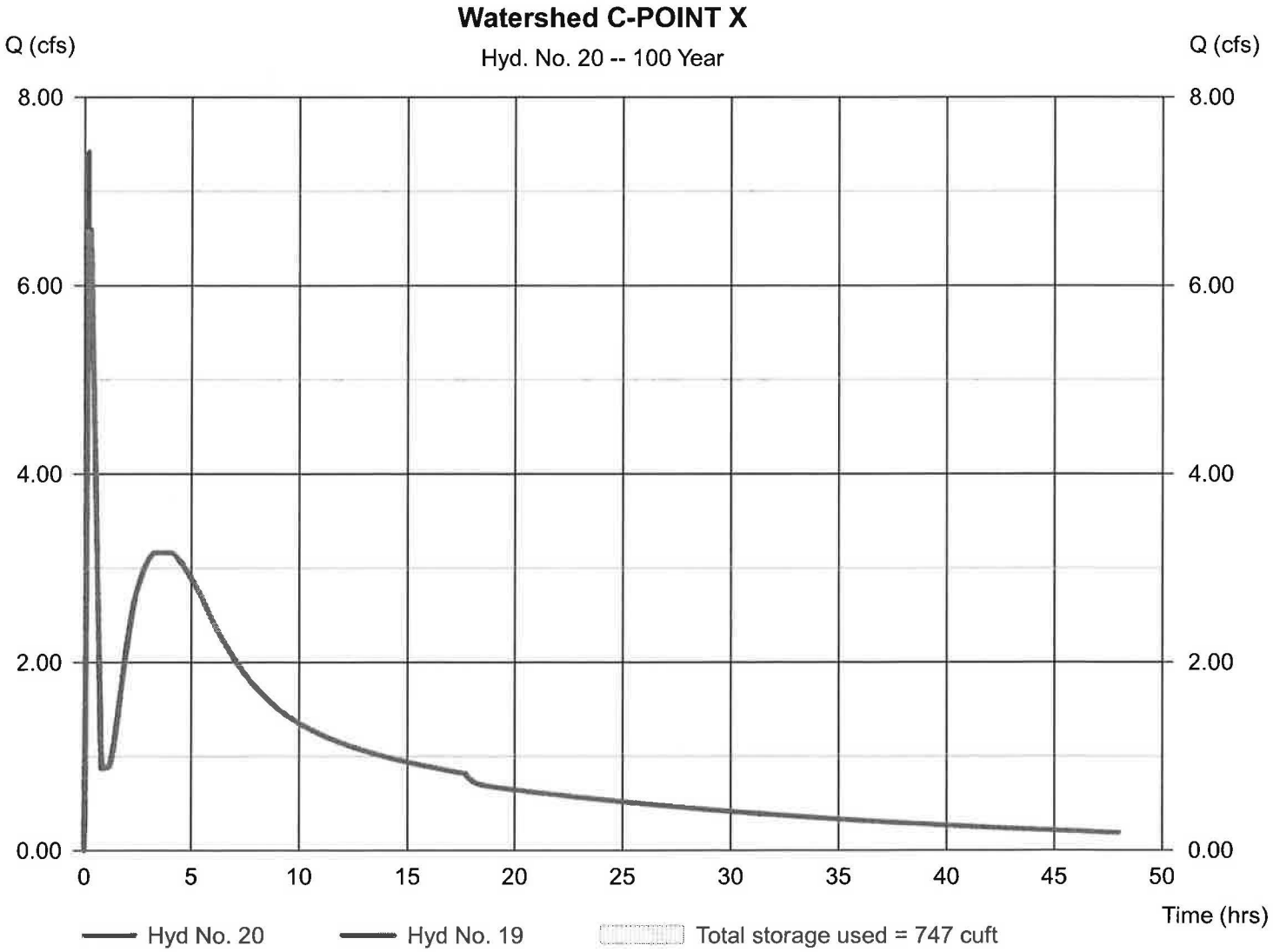
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 20

Watershed C-POINT X

Hydrograph type	= Reservoir	Peak discharge	= 6.576 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.20 hrs
Time interval	= 1 min	Hyd. volume	= 155,764 cuft
Inflow hyd. No.	= 19 - Watershed H+C+I	Max. Elevation	= 530.05 ft
Reservoir name	= Watershed C	Max. Storage	= 747 cuft

Storage Indication method used.



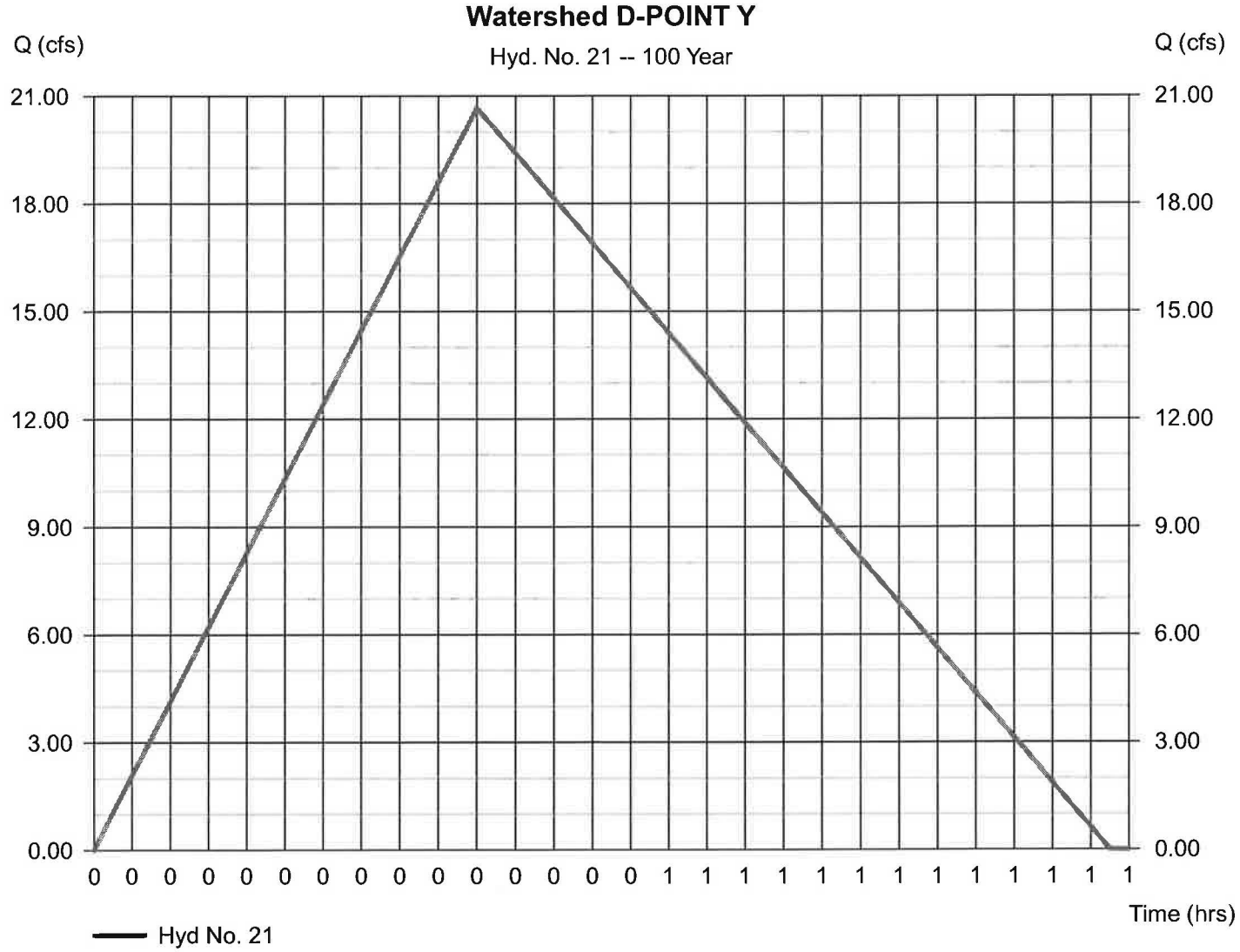
Hydrograph Report

Hyd. No. 21

Watershed D-POINT Y

Hydrograph type	= Rational	Peak discharge	= 20.66 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.33 hrs
Time interval	= 1 min	Hyd. volume	= 33,094 cuft
Drainage area	= 14.190 ac	Runoff coeff.	= 0.29*
Intensity	= 5.020 in/hr	Tc by TR55	= 20.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.500 x 0.90) + (1.750 x 0.30) + (10.940 x 0.20)] / 14.190



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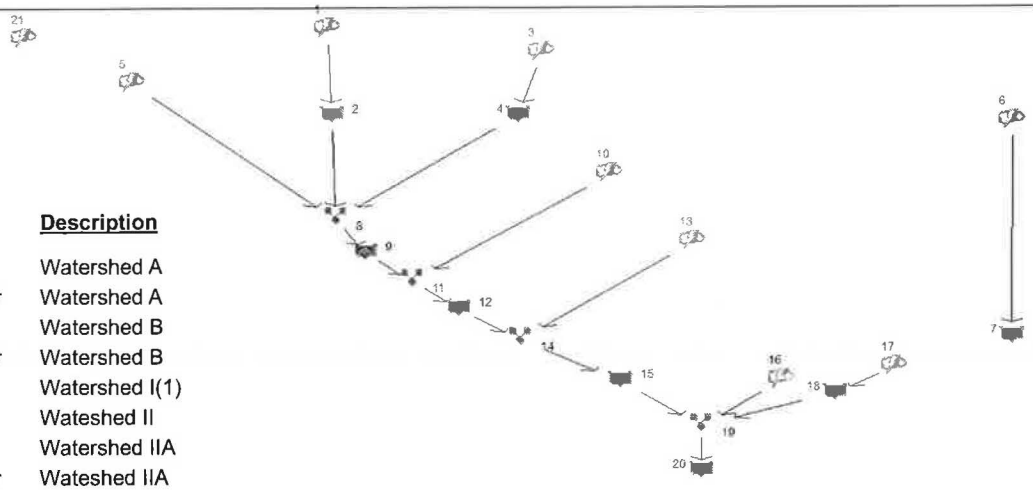
Watershed Model Schematic

Hydraflow Hydrographs by Intelisolve v9.1



Legend

Hyd.	Origin	Description
1	Rational	Watershed A
2	Reservoir	Watershed A
3	Rational	Watershed B
4	Reservoir	Watershed B
5	Rational	Watershed I(1)
6	Rational	Wateshed II
7	Rational	Watershed IIA
8	Reservoir	Wateshed IIA
9	Rational	Watershed VIII
10	Rational	Watershed VIIIA
11	Reservoir	Watershed VIIIA
12	Rational	Watershed IX
13	Rational	Watershed IXA
14	Reservoir	Watershed IXA
15	Combine	Combine
16	Combine	Watershed-Point Y
17	Rational	Watershed III
18	Rational	Watershed IV
19	Rational	Watershed IVA
20	Reservoir	Watershed IVA
21	Combine	Watershed A+III+VI
22	Rational	Watershed VI
23	Rational	Watershed VIA
24	Reservoir	Watershed VIA
25	Rational	Watershed VIIA
26	Reservoir	Watershed VIIA
27	Rational	Watershed X
28	Rational	Watershed V
29	Rational	Watershed XA
30	Reservoir	Watershed XA
31	Rational	Watershed VII
32	Combine	Combine
33	Reservoir	Watershed V
34	Rational	Watershed XII
35	Reservoir	Watershed XII
36	Rational	Watershed XIX
37	Combine	Watershed B+X+XI+XIX
38	Reservoir	Watershed XIX-POINT Z
39	Rational	Watershed XIV
40	Combine	Watershed XIV+XIX
41	Reservoir	Watershed XIV
42	Rational	Watershed H
43	Combine	Watershed XIV+H
44	Reservoir	Watershed H
45	Rational	Watershed C
46	Rational	Watershed I
47	Reservoir	Watershed I
48	Combine	Watershed H+C+I
49	Reservoir	Watershed C-POINT X
50	Rational	Watershed XX- To Northwood Road

Hydrograph Return Period Recap

Hydraflow Hydrographs by Intelisolve v9.1

Hyd. No.	Hydrograph type (origin)	Inflow Hyd(s)	Peak Outflow (cfs)								Hydrograph description
			1-Yr	2-Yr	3-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	
1	Rational	-------	-------	5.109	-------	-------	7.312	8.549	9.466	10.35	Watershed A
2	Reservoir	1	-------	1.946	-------	-------	2.822	3.158	3.353	3.537	Watershed A
3	Rational	-------	-------	3.906	-------	-------	5.507	6.396	7.054	7.676	Watershed B
4	Reservoir	3	-------	0.678	-------	-------	1.167	1.471	1.698	1.932	Watershed B
5	Rational	-------	-------	2.138	-------	-------	3.097	3.636	4.043	4.442	Watershed I(1)
6	Rational	-------	-------	2.924	-------	-------	4.213	4.939	5.482	6.011	Wateshed II
7	Rational	-------	-------	4.214	-------	-------	5.808	6.675	7.327	7.922	Watershed IIA
8	Reservoir	7	-------	1.025	-------	-------	1.244	1.364	1.459	1.555	Wateshed IIA
9	Rational	-------	-------	2.992	-------	-------	4.205	4.878	5.376	5.845	Watershed VIII
10	Rational	-------	-------	4.966	-------	-------	6.845	7.866	8.635	9.336	Watershed VIIIA
11	Reservoir	10	-------	1.012	-------	-------	1.224	1.336	1.418	1.512	Watershed VIIIA
12	Rational	-------	-------	0.009	-------	-------	0.012	0.014	0.016	0.017	Watershed IX
13	Rational	-------	-------	1.841	-------	-------	2.537	2.916	3.201	3.460	Watershed IXA
14	Reservoir	13	-------	0.960	-------	-------	1.202	1.332	1.430	1.537	Watershed IXA
15	Combine	5, 6, 8, 11,	-------	6.903	-------	-------	9.491	10.94	12.02	13.10	Combine
16	Combine	9, 12, 14, 15	-------	9.940	-------	-------	13.62	15.65	17.18	18.67	Watershed-Point Y
17	Rational	-------	-------	3.999	-------	-------	5.676	6.614	7.307	7.969	Watershed III
18	Rational	-------	-------	1.339	-------	-------	1.845	2.121	2.328	2.517	Watershed IV
19	Rational	-------	-------	6.196	-------	-------	8.541	9.816	10.78	11.65	Watershed IVA
20	Reservoir	19	-------	0.000	-------	-------	0.000	2.136	3.682	4.990	Watershed IVA
21	Combine	2, 17, 20	-------	4.482	-------	-------	6.410	9.452	12.03	14.25	Watershed A+III+VI
22	Rational	-------	-------	2.389	-------	-------	3.293	3.785	4.155	4.492	Watershed VI
23	Rational	-------	-------	3.263	-------	-------	4.498	5.169	5.674	6.134	Watershed VIA
24	Reservoir	23	-------	1.009	-------	-------	1.233	1.354	1.449	1.547	Watershed VIA
25	Rational	-------	-------	10.55	-------	-------	14.54	16.71	18.35	19.84	Watershed VIIA
26	Reservoir	25	-------	2.017	-------	-------	2.487	3.257	6.050	8.250	Watershed VIIA
27	Rational	-------	-------	1.037	-------	-------	1.430	1.643	1.804	1.950	Watershed X
28	Rational	-------	-------	18.16	-------	-------	26.45	31.10	34.66	38.17	Watershed V
29	Rational	-------	-------	1.737	-------	-------	2.394	2.751	3.020	3.265	Watershed XA
30	Reservoir	29	-------	1.019	-------	-------	1.297	1.453	1.745	2.400	Watershed XA
31	Rational	-------	-------	0.241	-------	-------	0.332	0.381	0.418	0.452	Watershed VII
32	Combine	21, 24, 28, 30,	-------	24.03	-------	-------	34.98	43.08	48.30	52.86	Combine
33	Reservoir	32	-------	11.45	-------	-------	17.96	22.58	26.20	30.03	Watershed V

Hydrograph Return Period Recap

Hydraflow Hydrographs by Intelisolve v9.1

Hyd. No.	Hydrograph type (origin)	Inflow Hyd(s)	Peak Outflow (cfs)								Hydrograph description
			1-Yr	2-Yr	3-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	
34	Rational	-------	-------	3.150	-------	-------	4.581	5.386	5.998	6.602	Watershed XII
35	Reservoir	34	-------	0.006	-------	-------	0.007	0.007	0.007	0.007	Watershed XII
36	Rational	-------	-------	4.673	-------	-------	6.603	7.678	8.472	9.225	Watershed XIX
37	Combine	4, 26, 33, 36	-------	13.69	-------	-------	21.24	26.41	30.63	34.97	Watershed B+X+XI+XIX
38	Reservoir	37	-------	7.807	-------	-------	14.06	17.92	20.92	24.04	Watershed XIX-POINT Z
39	Rational	-------	-------	11.21	-------	-------	16.21	19.02	21.13	23.19	Watershed XIV
40	Combine	38, 39	-------	12.05	-------	-------	17.63	20.83	23.33	27.56	Watershed XIV+XIX
41	Reservoir	40	-------	0.797	-------	-------	1.782	4.079	5.719	7.315	Watershed XIV
42	Rational	-------	-------	2.781	-------	-------	4.003	4.691	5.204	5.704	Watershed H
43	Combine	41, 42	-------	2.851	-------	-------	4.104	4.810	5.719	7.315	Watershed XIV+H
44	Reservoir	43	-------	0.796	-------	-------	1.248	2.295	2.988	3.366	Watershed H
45	Rational	-------	-------	2.781	-------	-------	3.998	4.682	5.193	5.689	Watershed C
46	Rational	-------	-------	1.662	-------	-------	2.315	2.674	2.942	3.190	Watershed I
47	Reservoir	46	-------	1.643	-------	-------	2.292	2.648	2.913	3.161	Watershed I
48	Combine	44, 45, 47	-------	3.620	-------	-------	5.203	6.098	6.771	7.419	Watershed H+C+I
49	Reservoir	48	-------	3.285	-------	-------	4.650	5.386	5.990	6.577	Watershed C-POINT X
50	Rational	-------	-------	0.878	-------	-------	1.211	1.392	1.528	1.652	Watershed XX- To Northwood Roa

Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	Rational	5.109	1	17	6,957	----	------	------	Watershed A
2	Reservoir	1.946	1	34	6,874	1	565.38	4,594	Watershed A
3	Rational	3.906	1	14	4,238	----	------	------	Watershed B
4	Reservoir	0.678	1	32	4,090	3	566.82	3,470	Watershed B
5	Rational	2.138	1	21	3,562	----	------	------	Watershed I(1)
6	Rational	2.924	1	19	4,464	----	------	------	Wateshed II
7	Rational	4.214	1	10	3,375	----	------	------	Watershed IIA
8	Reservoir	1.025	1	22	3,281	7	561.93	2,320	Wateshed IIA
9	Rational	2.992	1	13	3,116	----	------	------	Watershed VIII
10	Rational	4.966	1	10	3,978	----	------	------	Watershed VIIIA
11	Reservoir	1.012	1	23	3,866	10	558.90	2,912	Watershed VIIIA
12	Rational	0.009	1	10	7	----	------	------	Watershed IX
13	Rational	1.841	1	10	1,474	----	------	------	Watershed IXA
14	Reservoir	0.960	1	18	1,434	13	553.45	583	Watershed IXA
15	Combine	6.903	1	21	14,995	5, 6, 8, 11,	------	------	Combine
16	Combine	9.940	1	19	19,488	9, 12, 14, 15	------	------	Watershed-Point Y
17	Rational	3.999	1	15	4,804	----	------	------	Watershed III
18	Rational	1.339	1	10	1,072	----	------	------	Watershed IV
19	Rational	6.196	1	10	4,963	----	------	------	Watershed IVA
20	Reservoir	0.000	1	n/a	0	19	552.51	4,833	Watershed IVA
21	Combine	4.482	1	15	11,673	2, 17, 20	------	------	Watershed A+III+VI
22	Rational	2.389	1	10	1,914	----	------	------	Watershed VI
23	Rational	3.263	1	10	2,614	----	------	------	Watershed VIA
24	Reservoir	1.009	1	21	2,541	23	549.89	1,607	Watershed VIA
25	Rational	10.55	1	10	8,451	----	------	------	Watershed VIIA
26	Reservoir	2.017	1	23	8,218	25	546.27	6,348	Watershed VIIA
27	Rational	1.037	1	10	831	----	------	------	Watershed X
28	Rational	18.16	1	23	33,461	----	------	------	Watershed V
29	Rational	1.737	1	10	1,391	----	------	------	Watershed XA
30	Reservoir	1.019	1	17	1,353	29	556.92	459	Watershed XA
31	Rational	0.241	1	10	193	----	------	------	Watershed VII
32	Combine	24.03	1	23	48,805	21, 24, 28, 30,	------	------	Combine
33	Reservoir	11.45	1	42	48,798	32	543.69	25,411	Watershed V

Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
34	Rational	3.150	1	22	5,668	----	------	------	Watershed XII
35	Reservoir	0.006	1	59	1,072	34	546.14	5,557	Watershed XII
36	Rational	4.673	1	14	5,241	----	------	------	Watershed XIX
37	Combine	13.69	1	41	66,294	4, 26, 33, 36	------	------	Watershed B+X+XI+XIX
38	Reservoir	7.807	1	70	66,284	37	541.81	26,585	Watershed XIX-POINT Z
39	Rational	11.21	1	20	17,966	----	------	------	Watershed XIV
40	Combine	12.05	1	20	84,115	38, 39	------	------	Watershed XIV+XIX
41	Reservoir	0.797	1	297	71,972	40	539.00	65,543	Watershed XIV
42	Rational	2.781	1	19	4,163	----	------	------	Watershed H
43	Combine	2.851	1	19	73,557	41, 42	------	------	Watershed XIV+H
44	Reservoir	0.796	1	318	72,971	43	535.99	1,478	Watershed H
45	Rational	2.781	1	18	4,076	----	------	------	Watershed C
46	Rational	1.662	1	12	1,535	----	------	------	Watershed I
47	Reservoir	1.643	1	12	601	46	531.39	20.7	Watershed I
48	Combine	3.620	1	12	77,576	44, 45, 47	------	------	Watershed H+C+I
49	Reservoir	3.285	1	20	77,528	48	529.64	501	Watershed C-POINT X
50	Rational	0.878	1	10	704	----	------	------	Watershed XX- To Northwood Roa

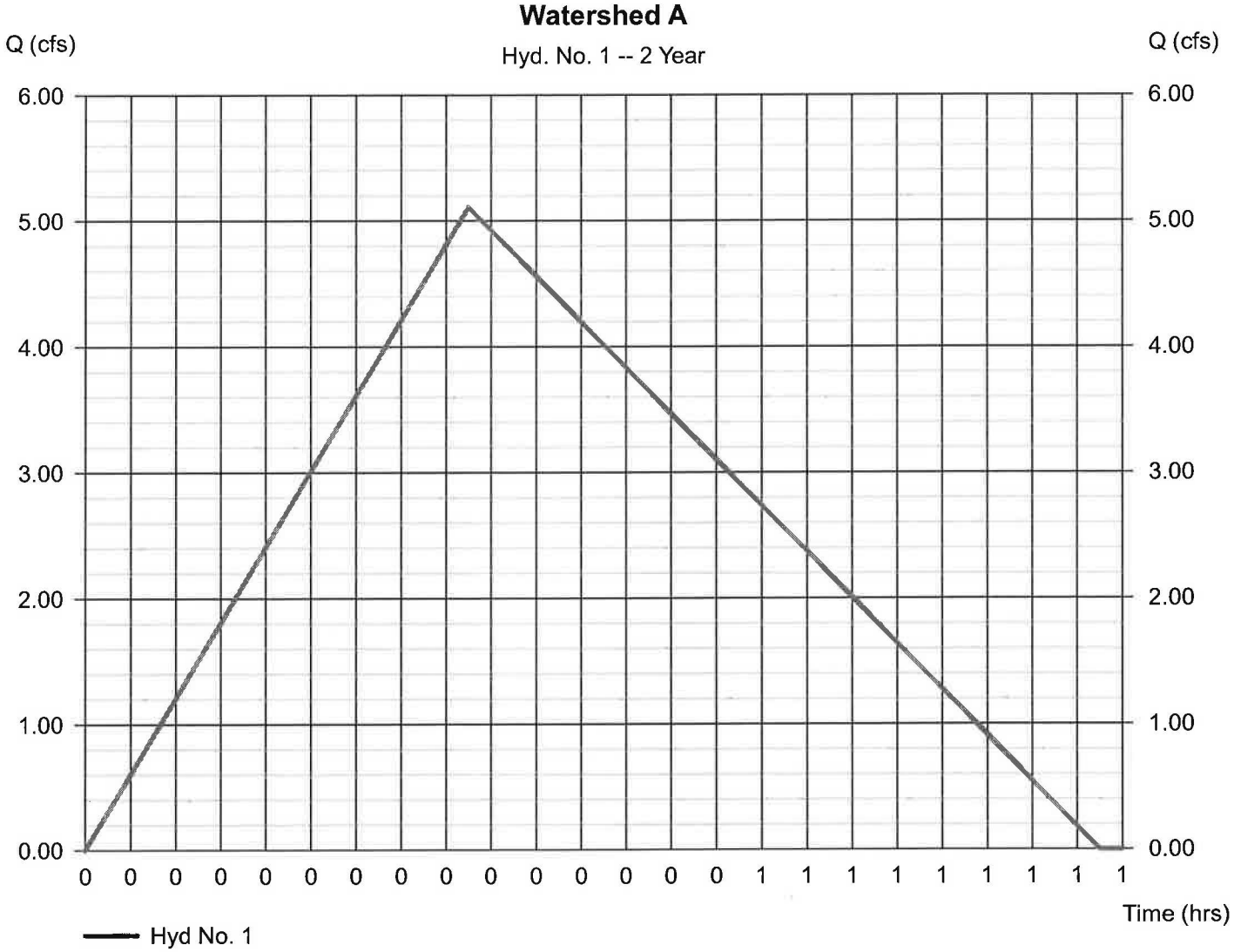
Hydrograph Report

Hyd. No. 1

Watershed A

Hydrograph type	= Rational	Peak discharge	= 5.109 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.28 hrs
Time interval	= 1 min	Hyd. volume	= 6,957 cuft
Drainage area	= 8.000 ac	Runoff coeff.	= 0.24*
Intensity	= 2.661 in/hr	Tc by TR55	= 17.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.400 x 0.90) + (0.500 x 0.30) + (7.100 x 0.20)] / 8.000



TR55 Tc Worksheet

Hyd. No. 1

Watershed A

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.400		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.20		0.00		0.00		
Land slope (%)	= 6.00		0.00		0.00		
Travel Time (min)	**= 13.84**	**+**	**0.00**	**+**	**0.00**	**=**	**13.84**
Shallow Concentrated Flow							
Flow length (ft)	= 624.00		0.00		0.00		
Watercourse slope (%)	= 3.36		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	= 2.96		0.00		0.00		
Travel Time (min)	**= 3.52**	**+**	**0.00**	**+**	**0.00**	**=**	**3.52**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	= 0.00		0.00		0.00		
Flow length (ft)	= 0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 17.00 min

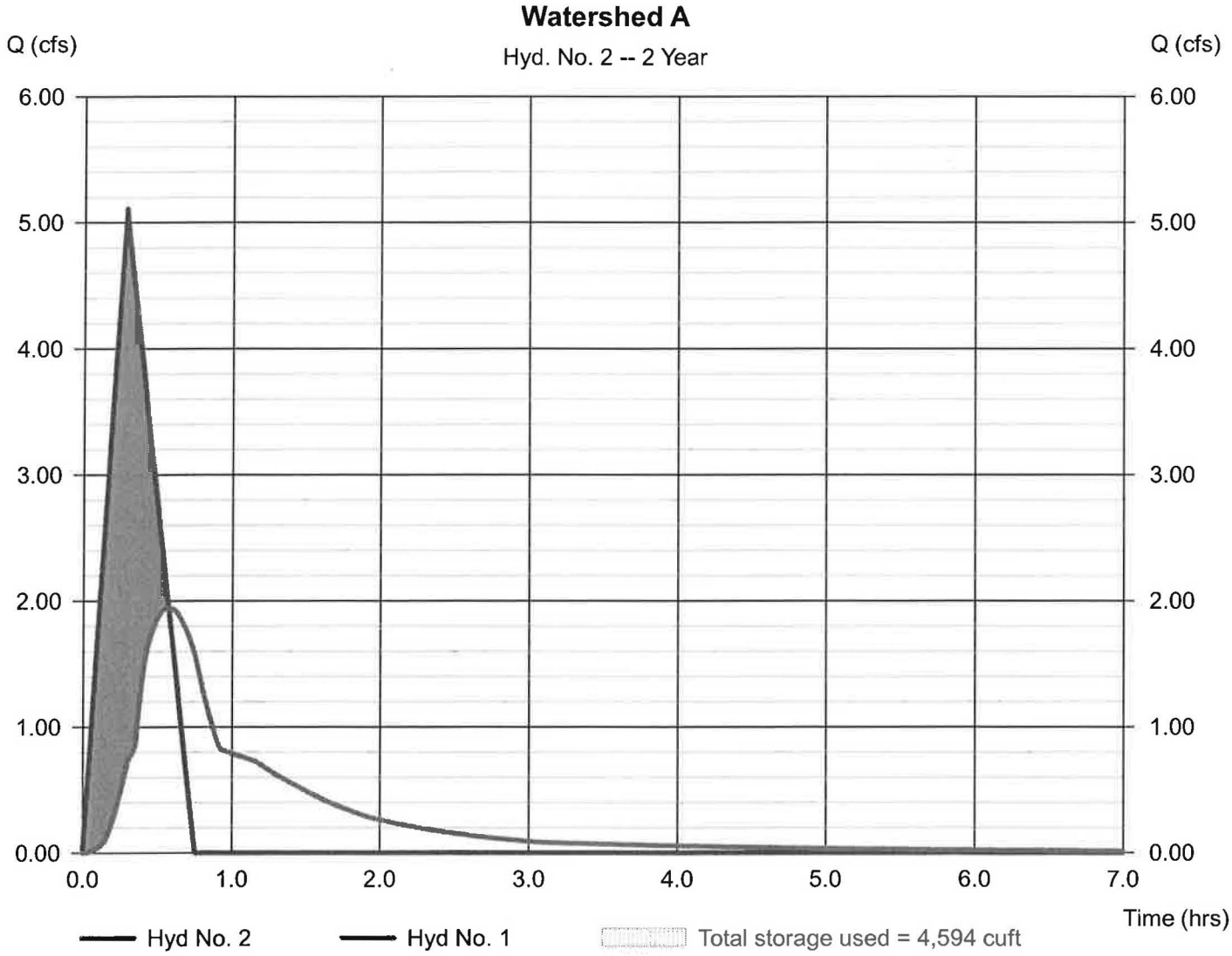
Hydrograph Report

Hyd. No. 2

Watershed A

Hydrograph type	= Reservoir	Peak discharge	= 1.946 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.57 hrs
Time interval	= 1 min	Hyd. volume	= 6,874 cuft
Inflow hyd. No.	= 1 - Watershed A	Max. Elevation	= 565.38 ft
Reservoir name	= Watershed A	Max. Storage	= 4,594 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - Watershed A

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 563.99 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	563.99	1,590	0	0
0.01	564.00	1,600	16	16
2.01	566.00	5,440	6,660	6,675
3.11	567.10	5,500	6,016	12,692
4.01	568.00	6,000	5,173	17,865

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	0.00	0.00	0.00
Span (in)	= 12.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 563.99	0.00	0.00	0.00
Length (ft)	= 30.79	0.00	0.00	0.00
Slope (%)	= 0.23	0.00	0.00	n/a
N-Value	= .024	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 118.50	0.00	0.00	0.00
Crest El. (ft)	= 567.10	0.00	0.00	0.00
Weir Coeff.	= 2.60	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	563.99	0.00	---	---	---	0.00	---	---	---	---	---	0.00
0.00	2	563.99	0.00 oc	---	---	---	0.00	---	---	---	---	---	0.00
0.00	3	563.99	0.00 oc	---	---	---	0.00	---	---	---	---	---	0.00
0.00	5	563.99	0.00 oc	---	---	---	0.00	---	---	---	---	---	0.00
0.00	6	563.99	0.00 oc	---	---	---	0.00	---	---	---	---	---	0.00
0.01	8	563.99	0.00 oc	---	---	---	0.00	---	---	---	---	---	0.00
0.01	10	564.00	0.00 oc	---	---	---	0.00	---	---	---	---	---	0.00
0.01	11	564.00	0.00 oc	---	---	---	0.00	---	---	---	---	---	0.00
0.01	13	564.00	0.00 oc	---	---	---	0.00	---	---	---	---	---	0.00
0.01	14	564.00	0.00 oc	---	---	---	0.00	---	---	---	---	---	0.00
0.01	16	564.00	0.00 oc	---	---	---	0.00	---	---	---	---	---	0.00
0.21	682	564.20	0.08 oc	---	---	---	0.00	---	---	---	---	---	0.08
0.41	1,348	564.40	0.28 oc	---	---	---	0.00	---	---	---	---	---	0.28
0.61	2,014	564.60	0.52 oc	---	---	---	0.00	---	---	---	---	---	0.52
0.81	2,680	564.80	0.73 oc	---	---	---	0.00	---	---	---	---	---	0.73
1.01	3,346	565.00	0.82 oc	---	---	---	0.00	---	---	---	---	---	0.82
1.21	4,012	565.20	1.53 oc	---	---	---	0.00	---	---	---	---	---	1.53
1.41	4,678	565.40	2.00 oc	---	---	---	0.00	---	---	---	---	---	2.00
1.61	5,344	565.60	2.39 oc	---	---	---	0.00	---	---	---	---	---	2.39
1.81	6,010	565.80	2.71 oc	---	---	---	0.00	---	---	---	---	---	2.71
2.01	6,675	566.00	3.01 oc	---	---	---	0.00	---	---	---	---	---	3.01
2.12	7,277	566.11	3.15 oc	---	---	---	0.00	---	---	---	---	---	3.15
2.23	7,879	566.22	3.30 oc	---	---	---	0.00	---	---	---	---	---	3.30
2.34	8,480	566.33	3.43 oc	---	---	---	0.00	---	---	---	---	---	3.43
2.45	9,082	566.44	3.57 oc	---	---	---	0.00	---	---	---	---	---	3.57
2.56	9,684	566.55	3.69 oc	---	---	---	0.00	---	---	---	---	---	3.69
2.67	10,285	566.66	3.81 oc	---	---	---	0.00	---	---	---	---	---	3.81
2.78	10,887	566.77	3.93 oc	---	---	---	0.00	---	---	---	---	---	3.93
2.89	11,489	566.88	4.05 oc	---	---	---	0.00	---	---	---	---	---	4.05
3.00	12,090	566.99	4.16 oc	---	---	---	0.00	---	---	---	---	---	4.16
3.11	12,692	567.10	4.27 oc	---	---	---	0.00	---	---	---	---	---	4.27
3.20	13,209	567.19	4.36 oc	---	---	---	8.32	---	---	---	---	---	12.68
3.29	13,726	567.28	4.44 oc	---	---	---	23.54	---	---	---	---	---	27.98
3.38	14,244	567.37	4.53 oc	---	---	---	43.26	---	---	---	---	---	47.79
3.47	14,761	567.46	4.61 oc	---	---	---	66.58	---	---	---	---	---	71.19
3.56	15,278	567.55	4.69 oc	---	---	---	93.05	---	---	---	---	---	97.74
3.65	15,796	567.64	4.77 oc	---	---	---	122.29	---	---	---	---	---	127.06

Continues on next page...

Watershed A

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
3.74	16,313	567.73	4.85 oc	---	---	---	154.16	---	---	---	---	---	159.00
3.83	16,830	567.82	4.92 oc	---	---	---	188.31	---	---	---	---	---	193.24
3.92	17,347	567.91	5.00 oc	---	---	---	224.71	---	---	---	---	---	229.71
4.01	17,865	568.00	5.07 oc	---	---	---	263.07	---	---	---	---	---	268.15

...End

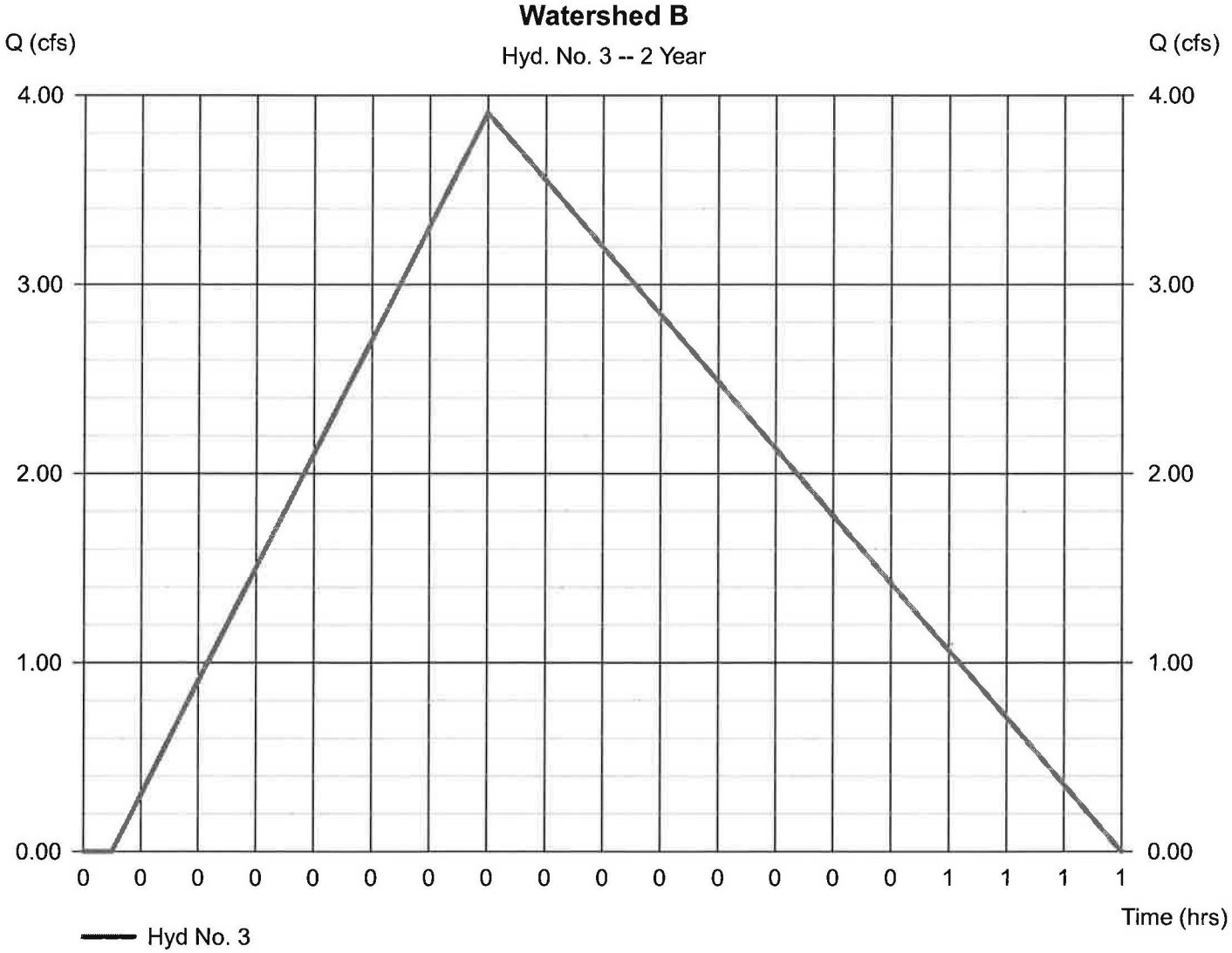
Hydrograph Report

Hyd. No. 3

Watershed B

Hydrograph type	= Rational	Peak discharge	= 3.906 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.23 hrs
Time interval	= 1 min	Hyd. volume	= 4,238 cuft
Drainage area	= 5.200 ac	Runoff coeff.	= 0.25*
Intensity	= 3.005 in/hr	Tc by TR55	= 13.54 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.300 x 0.90) + (0.500 x 0.30) + (4.400 x 0.20)] / 5.200



TR55 Tc Worksheet

Hyd. No. 3

Watershed B

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.400		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.20		0.00		0.00		
Land slope (%)	= 12.00		0.00		0.00		
Travel Time (min)	**= 10.49**	**+**	**0.00**	**+**	**0.00**	**=**	**10.49**
Shallow Concentrated Flow							
Flow length (ft)	= 479.00		0.00		0.00		
Watercourse slope (%)	= 2.62		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	= 2.61		0.00		0.00		
Travel Time (min)	**= 3.06**	**+**	**0.00**	**+**	**0.00**	**=**	**3.06**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	= 0.00		0.00		0.00		
Flow length (ft)	= 0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 13.54 min

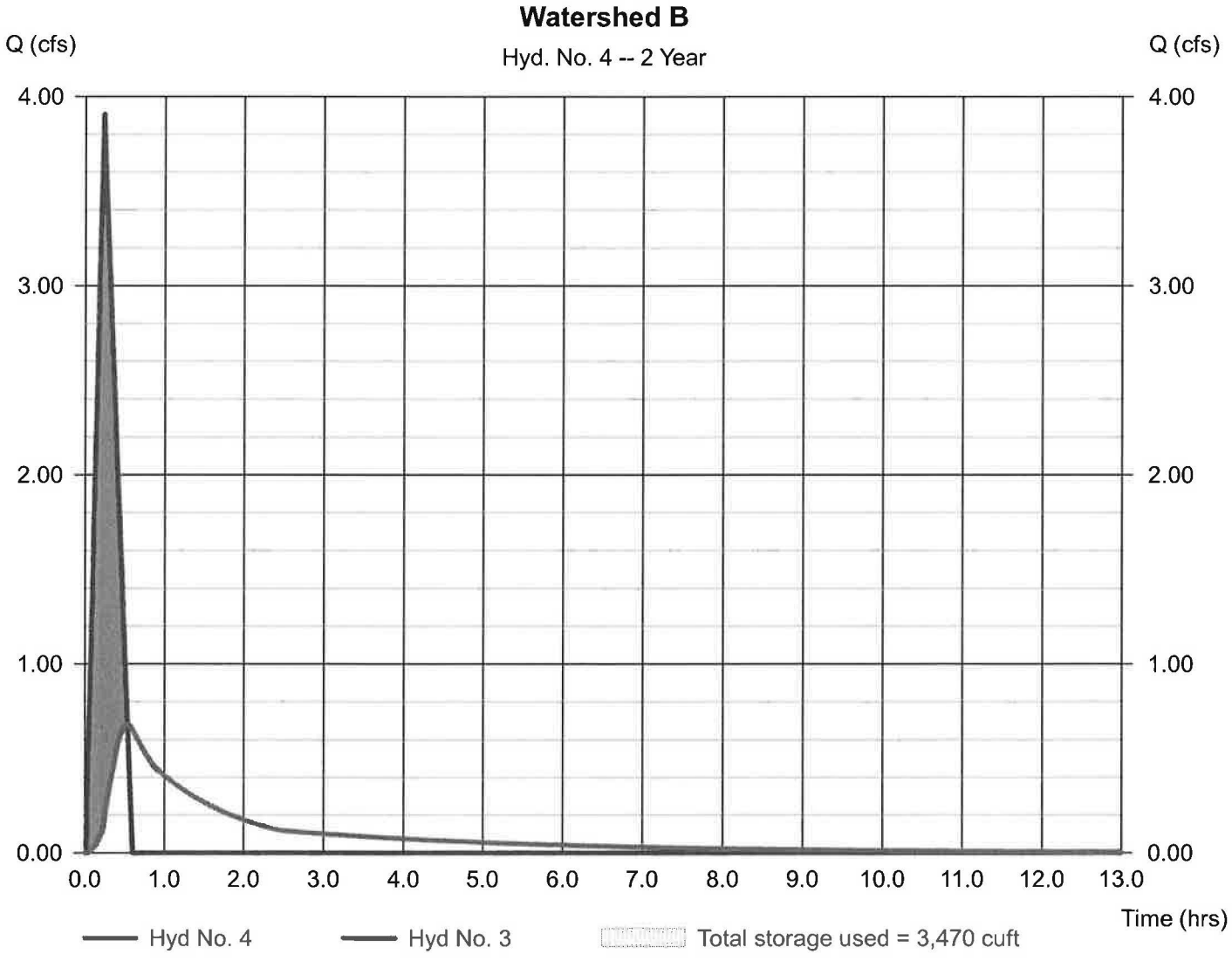
Hydrograph Report

Hyd. No. 4

Watershed B

Hydrograph type	= Reservoir	Peak discharge	= 0.678 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.53 hrs
Time interval	= 1 min	Hyd. volume	= 4,090 cuft
Inflow hyd. No.	= 3 - Watershed B	Max. Elevation	= 566.82 ft
Reservoir name	= Watershed B	Max. Storage	= 3,470 cuft

Storage Indication method used.



Pond No. 2 - Watershed B

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 566.44 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	566.44	8,300	0	0
1.56	568.00	10,080	14,313	14,313

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.00	0.00	0.00	0.00
Span (in)	= 15.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 566.44	0.00	0.00	0.00
Length (ft)	= 27.15	0.00	0.00	0.00
Slope (%)	= 12.19	0.00	0.00	n/a
N-Value	= .024	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	566.44	0.00	---	---	---	---	---	---	---	---	---	0.00
0.16	1,431	566.60	0.12 ic	---	---	---	---	---	---	---	---	---	0.12
0.31	2,863	566.75	0.46 ic	---	---	---	---	---	---	---	---	---	0.46
0.47	4,294	566.91	0.98 ic	---	---	---	---	---	---	---	---	---	0.98
0.62	5,725	567.06	1.65 ic	---	---	---	---	---	---	---	---	---	1.65
0.78	7,156	567.22	2.42 ic	---	---	---	---	---	---	---	---	---	2.42
0.94	8,588	567.38	3.25 ic	---	---	---	---	---	---	---	---	---	3.25
1.09	10,019	567.53	4.05 ic	---	---	---	---	---	---	---	---	---	4.05
1.25	11,450	567.69	4.67 ic	---	---	---	---	---	---	---	---	---	4.67
1.40	12,881	567.84	5.21 ic	---	---	---	---	---	---	---	---	---	5.21
1.56	14,313	568.00	5.71 ic	---	---	---	---	---	---	---	---	---	5.71

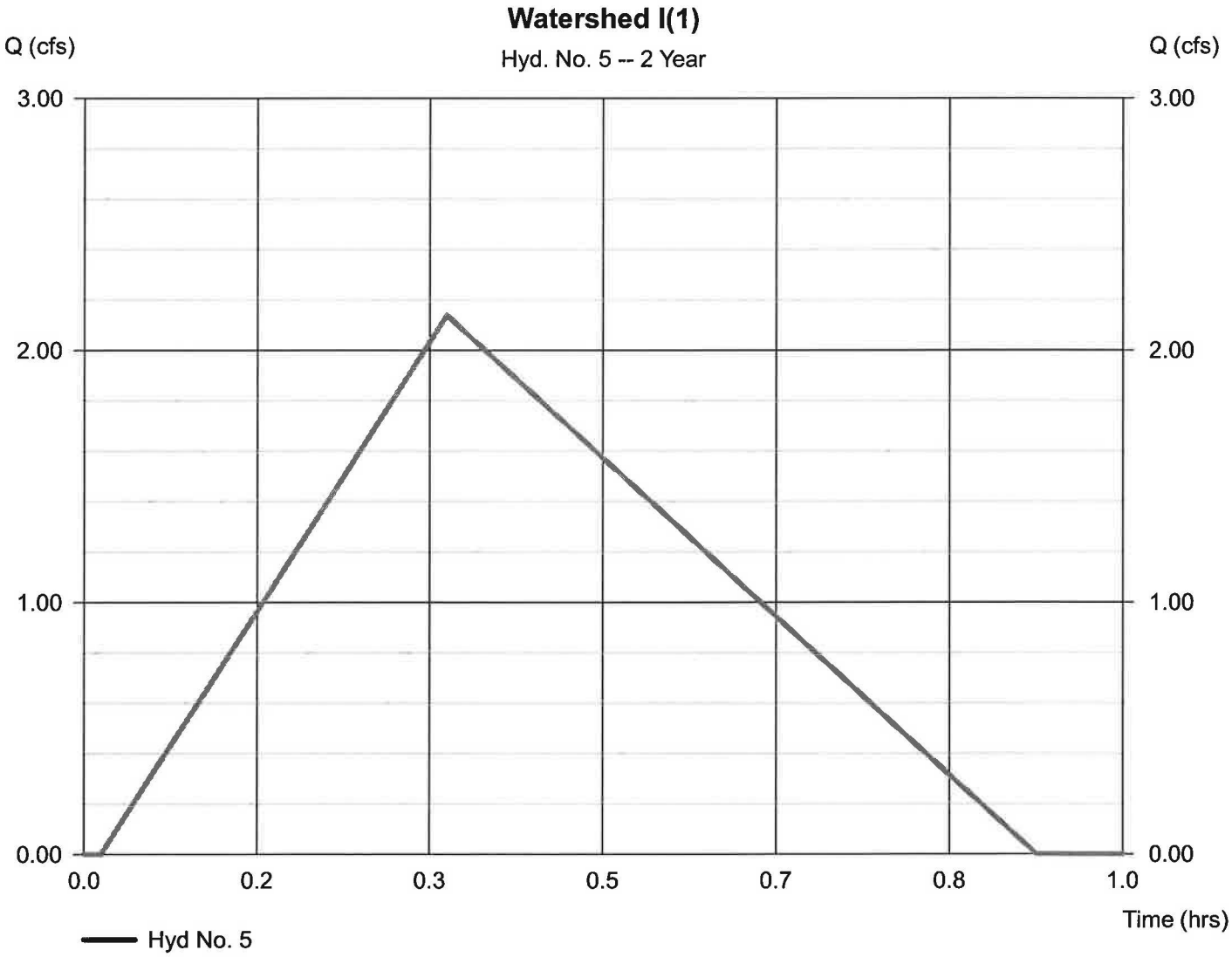
Hydrograph Report

Hyd. No. 5

Watershed I(1)

Hydrograph type	= Rational	Peak discharge	= 2.138 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.35 hrs
Time interval	= 1 min	Hyd. volume	= 3,562 cuft
Drainage area	= 1.700 ac	Runoff coeff.	= 0.53*
Intensity	= 2.373 in/hr	Tc by TR55	= 20.80 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.700 x 0.90) + (0.700 x 0.30) + (0.300 x 0.20)] / 1.700



TR55 Tc Worksheet

Hyd. No. 5

Watershed I(1)

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.240	0.016	0.011	
Flow length (ft)	= 100.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.20	0.00	0.00	
Land slope (%)	= 2.30	0.00	0.00	
Travel Time (min)	**= 13.49**	**+ 0.00**	**+ 0.00**	**= 13.49**
Shallow Concentrated Flow				
Flow length (ft)	= 107.00	206.00	0.00	
Watercourse slope (%)	= 7.57	0.49	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	= 4.44	1.42	0.00	
Travel Time (min)	**= 0.40**	**+ 2.43**	**+ 0.00**	**= 2.83**
Channel Flow				
X sectional flow area (sqft)	= 1.23	0.63	1.23	
Wetted perimeter (ft)	= 3.93	3.12	3.93	
Channel slope (%)	= 0.50	0.50	0.50	
Manning's n-value	= 0.015	0.040	0.015	
Velocity (ft/s)	= 3.22	0.90	3.22	
Flow length (ft)	= 194.0	90.0	348.0	
Travel Time (min)	**= 1.00**	**+ 1.67**	**+ 1.80**	**= 4.48**

Total Travel Time, Tc ..... 20.80 min

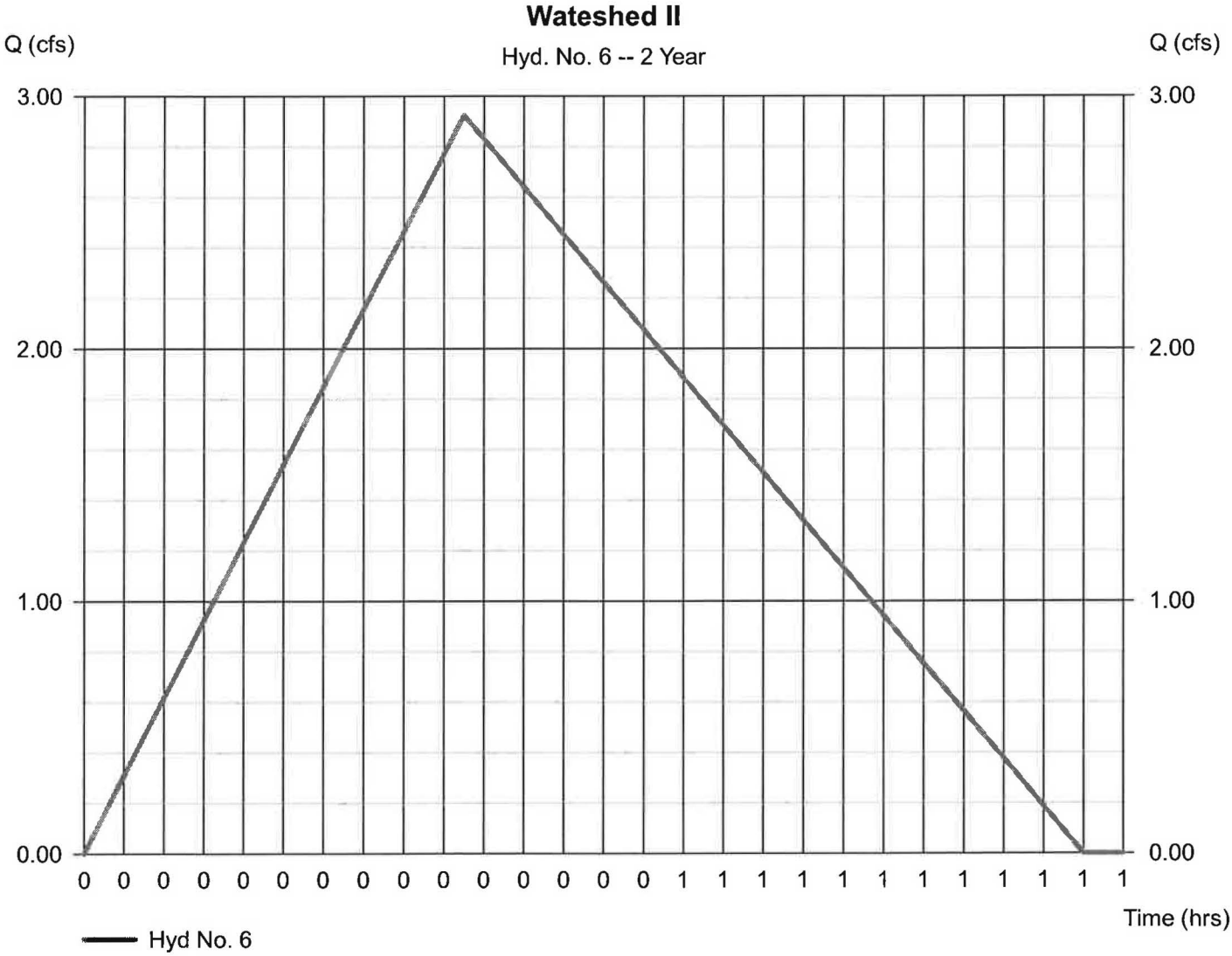
Hydrograph Report

Hyd. No. 6

Wateshed II

Hydrograph type	= Rational	Peak discharge	= 2.924 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 4,464 cuft
Drainage area	= 4.040 ac	Runoff coeff.	= 0.29*
Intensity	= 2.495 in/hr	Tc by TR55	= 19.06 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.230 x 0.90) + (1.940 x 0.30) + (1.870 x 0.20)] / 4.040



TR55 Tc Worksheet

Hyd. No. 6

Wateshed II

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.240	0.011	0.011	
Flow length (ft)	= 100.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.20	0.00	0.00	
Land slope (%)	= 3.20	0.00	0.00	
Travel Time (min)	**= 11.82**	**+ 0.00**	**+ 0.00**	**= 11.82**
Shallow Concentrated Flow				
Flow length (ft)	= 250.00	0.00	0.00	
Watercourse slope (%)	= 4.90	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	= 3.57	0.00	0.00	
Travel Time (min)	**= 1.17**	**+ 0.00**	**+ 0.00**	**= 1.17**
Channel Flow				
X sectional flow area (sqft)	= 1.23	0.00	0.00	
Wetted perimeter (ft)	= 3.93	0.00	0.00	
Channel slope (%)	= 0.50	0.00	0.00	
Manning's n-value	= 0.040	0.015	0.015	
Velocity (ft/s)	= 1.21	0.00	0.00	
Flow length (ft)	= 440.0	0.0	0.0	
Travel Time (min)	**= 6.07**	**+ 0.00**	**+ 0.00**	**= 6.07**

Total Travel Time, Tc ..... 19.06 min

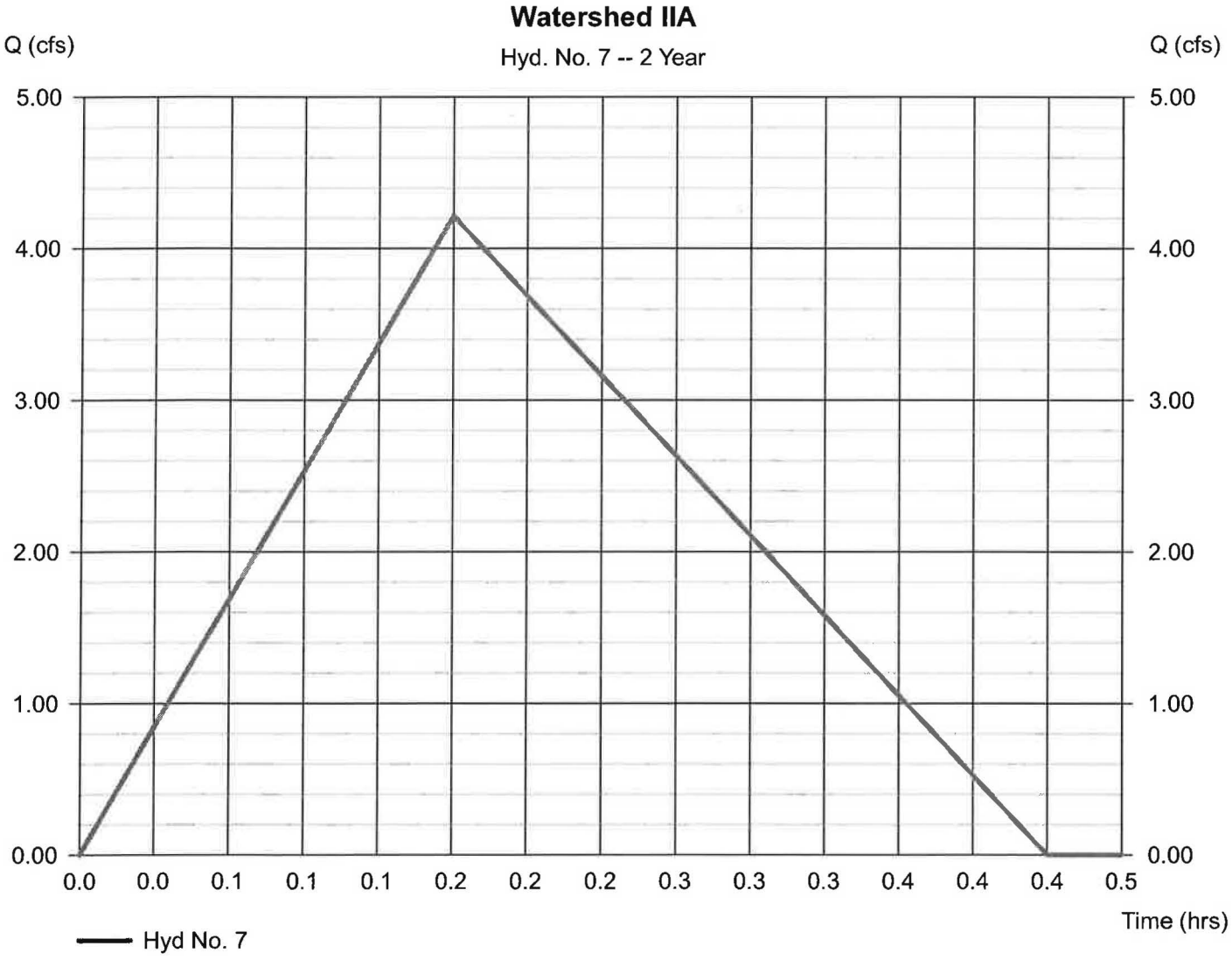
Hydrograph Report

Hyd. No. 7

Watershed IIA

Hydrograph type	= Rational	Peak discharge	= 4.214 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 3,375 cuft
Drainage area	= 1.530 ac	Runoff coeff.	= 0.79*
Intensity	= 3.486 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.250 x 0.90) + (0.280 x 0.30)] / 1.530



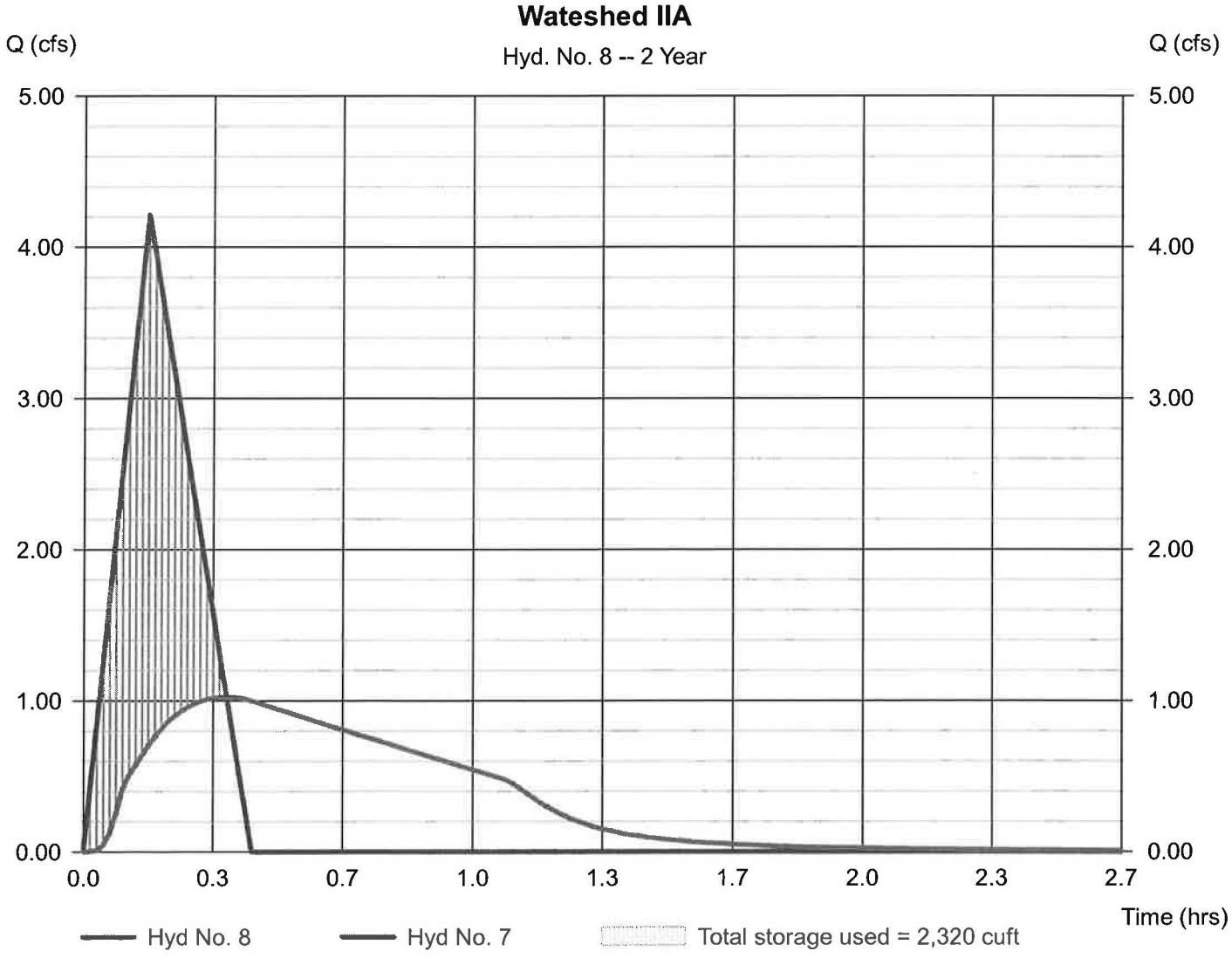
Hydrograph Report

Hyd. No. 8

Wateshed IIA

Hydrograph type	= Reservoir	Peak discharge	= 1.025 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.37 hrs
Time interval	= 1 min	Hyd. volume	= 3,281 cuft
Inflow hyd. No.	= 7 - Watershed IIA	Max. Elevation	= 561.93 ft
Reservoir name	= Watershed IIA	Max. Storage	= 2,320 cuft

Storage Indication method used.



Pond No. 20 - Watershed IIA

Pond Data

Pond storage is based on user-defined values.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	560.50	n/a	0	0
0.50	561.00	n/a	473	473
1.00	561.50	n/a	1,018	1,491
1.50	562.00	n/a	975	2,466
2.00	562.50	n/a	907	3,373
2.50	563.00	n/a	803	4,176
3.00	563.50	n/a	593	4,769
3.50	564.00	n/a	474	5,243

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 6.00	0.00	0.00	0.00
Span (in)	= 6.00	0.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 560.50	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 5.00	0.00	0.00	0.00
Crest El. (ft)	= 56305.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	560.50	0.00	---	---	---	0.00	---	---	---	---	---	0.00
0.05	47	560.55	0.01 ic	---	---	---	0.00	---	---	---	---	---	0.01
0.10	95	560.60	0.03 ic	---	---	---	0.00	---	---	---	---	---	0.03
0.15	142	560.65	0.07 ic	---	---	---	0.00	---	---	---	---	---	0.07
0.20	189	560.70	0.11 ic	---	---	---	0.00	---	---	---	---	---	0.11
0.25	237	560.75	0.17 ic	---	---	---	0.00	---	---	---	---	---	0.17
0.30	284	560.80	0.23 ic	---	---	---	0.00	---	---	---	---	---	0.23
0.35	331	560.85	0.30 ic	---	---	---	0.00	---	---	---	---	---	0.30
0.40	378	560.90	0.36 ic	---	---	---	0.00	---	---	---	---	---	0.36
0.45	426	560.95	0.43 ic	---	---	---	0.00	---	---	---	---	---	0.43
0.50	473	561.00	0.47 ic	---	---	---	0.00	---	---	---	---	---	0.47
0.55	575	561.05	0.52 ic	---	---	---	0.00	---	---	---	---	---	0.52
0.60	677	561.10	0.56 ic	---	---	---	0.00	---	---	---	---	---	0.56
0.65	778	561.15	0.60 ic	---	---	---	0.00	---	---	---	---	---	0.60
0.70	880	561.20	0.63 ic	---	---	---	0.00	---	---	---	---	---	0.63
0.75	982	561.25	0.67 ic	---	---	---	0.00	---	---	---	---	---	0.67
0.80	1,084	561.30	0.70 ic	---	---	---	0.00	---	---	---	---	---	0.70
0.85	1,186	561.35	0.73 ic	---	---	---	0.00	---	---	---	---	---	0.73
0.90	1,287	561.40	0.76 ic	---	---	---	0.00	---	---	---	---	---	0.76
0.95	1,389	561.45	0.79 ic	---	---	---	0.00	---	---	---	---	---	0.79
1.00	1,491	561.50	0.82 ic	---	---	---	0.00	---	---	---	---	---	0.82
1.05	1,589	561.55	0.85 ic	---	---	---	0.00	---	---	---	---	---	0.85
1.10	1,686	561.60	0.87 ic	---	---	---	0.00	---	---	---	---	---	0.87
1.15	1,784	561.65	0.90 ic	---	---	---	0.00	---	---	---	---	---	0.90
1.20	1,881	561.70	0.92 ic	---	---	---	0.00	---	---	---	---	---	0.92
1.25	1,979	561.75	0.95 ic	---	---	---	0.00	---	---	---	---	---	0.95
1.30	2,076	561.80	0.97 ic	---	---	---	0.00	---	---	---	---	---	0.97
1.35	2,174	561.85	0.99 ic	---	---	---	0.00	---	---	---	---	---	0.99
1.40	2,271	561.90	1.01 ic	---	---	---	0.00	---	---	---	---	---	1.01
1.45	2,369	561.95	1.04 ic	---	---	---	0.00	---	---	---	---	---	1.04
1.50	2,466	562.00	1.06 ic	---	---	---	0.00	---	---	---	---	---	1.06
1.55	2,557	562.05	1.08 ic	---	---	---	0.00	---	---	---	---	---	1.08
1.60	2,647	562.10	1.10 ic	---	---	---	0.00	---	---	---	---	---	1.10
1.65	2,738	562.15	1.12 ic	---	---	---	0.00	---	---	---	---	---	1.12

Continues on next page...

Watershed IIA

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
1.70	2,829	562.20	1.14 ic	---	---	---	0.00	---	---	---	---	---	1.14
1.75	2,920	562.25	1.16 ic	---	---	---	0.00	---	---	---	---	---	1.16
1.80	3,010	562.30	1.18 ic	---	---	---	0.00	---	---	---	---	---	1.18
1.85	3,101	562.35	1.20 ic	---	---	---	0.00	---	---	---	---	---	1.20
1.90	3,192	562.40	1.21 ic	---	---	---	0.00	---	---	---	---	---	1.21
1.95	3,282	562.45	1.23 ic	---	---	---	0.00	---	---	---	---	---	1.23
2.00	3,373	562.50	1.25 ic	---	---	---	0.00	---	---	---	---	---	1.25
2.05	3,453	562.55	1.27 ic	---	---	---	0.00	---	---	---	---	---	1.27
2.10	3,534	562.60	1.29 ic	---	---	---	0.00	---	---	---	---	---	1.29
2.15	3,614	562.65	1.30 ic	---	---	---	0.00	---	---	---	---	---	1.30
2.20	3,694	562.70	1.32 ic	---	---	---	0.00	---	---	---	---	---	1.32
2.25	3,775	562.75	1.34 ic	---	---	---	0.00	---	---	---	---	---	1.34
2.30	3,855	562.80	1.35 ic	---	---	---	0.00	---	---	---	---	---	1.35
2.35	3,935	562.85	1.37 ic	---	---	---	0.00	---	---	---	---	---	1.37
2.40	4,015	562.90	1.39 ic	---	---	---	0.00	---	---	---	---	---	1.39
2.45	4,096	562.95	1.40 ic	---	---	---	0.00	---	---	---	---	---	1.40
2.50	4,176	563.00	1.42 ic	---	---	---	0.00	---	---	---	---	---	1.42
2.55	4,235	563.05	1.43 ic	---	---	---	0.00	---	---	---	---	---	1.43
2.60	4,295	563.10	1.45 ic	---	---	---	0.00	---	---	---	---	---	1.45
2.65	4,354	563.15	1.46 ic	---	---	---	0.00	---	---	---	---	---	1.46
2.70	4,413	563.20	1.48 ic	---	---	---	0.00	---	---	---	---	---	1.48
2.75	4,472	563.25	1.49 ic	---	---	---	0.00	---	---	---	---	---	1.49
2.80	4,532	563.30	1.51 ic	---	---	---	0.00	---	---	---	---	---	1.51
2.85	4,591	563.35	1.52 ic	---	---	---	0.00	---	---	---	---	---	1.52
2.90	4,650	563.40	1.54 ic	---	---	---	0.00	---	---	---	---	---	1.54
2.95	4,710	563.45	1.55 ic	---	---	---	0.00	---	---	---	---	---	1.55
3.00	4,769	563.50	1.57 ic	---	---	---	0.00	---	---	---	---	---	1.57
3.05	4,816	563.55	1.58 ic	---	---	---	0.00	---	---	---	---	---	1.58
3.10	4,864	563.60	1.60 ic	---	---	---	0.00	---	---	---	---	---	1.60
3.15	4,911	563.65	1.61 ic	---	---	---	0.00	---	---	---	---	---	1.61
3.20	4,959	563.70	1.62 ic	---	---	---	0.00	---	---	---	---	---	1.62
3.25	5,006	563.75	1.64 ic	---	---	---	0.00	---	---	---	---	---	1.64
3.30	5,053	563.80	1.65 ic	---	---	---	0.00	---	---	---	---	---	1.65
3.35	5,101	563.85	1.66 ic	---	---	---	0.00	---	---	---	---	---	1.66
3.40	5,148	563.90	1.68 ic	---	---	---	0.00	---	---	---	---	---	1.68
3.45	5,196	563.95	1.69 ic	---	---	---	0.00	---	---	---	---	---	1.69
3.50	5,243	564.00	1.70 ic	---	---	---	0.00	---	---	---	---	---	1.70

...End

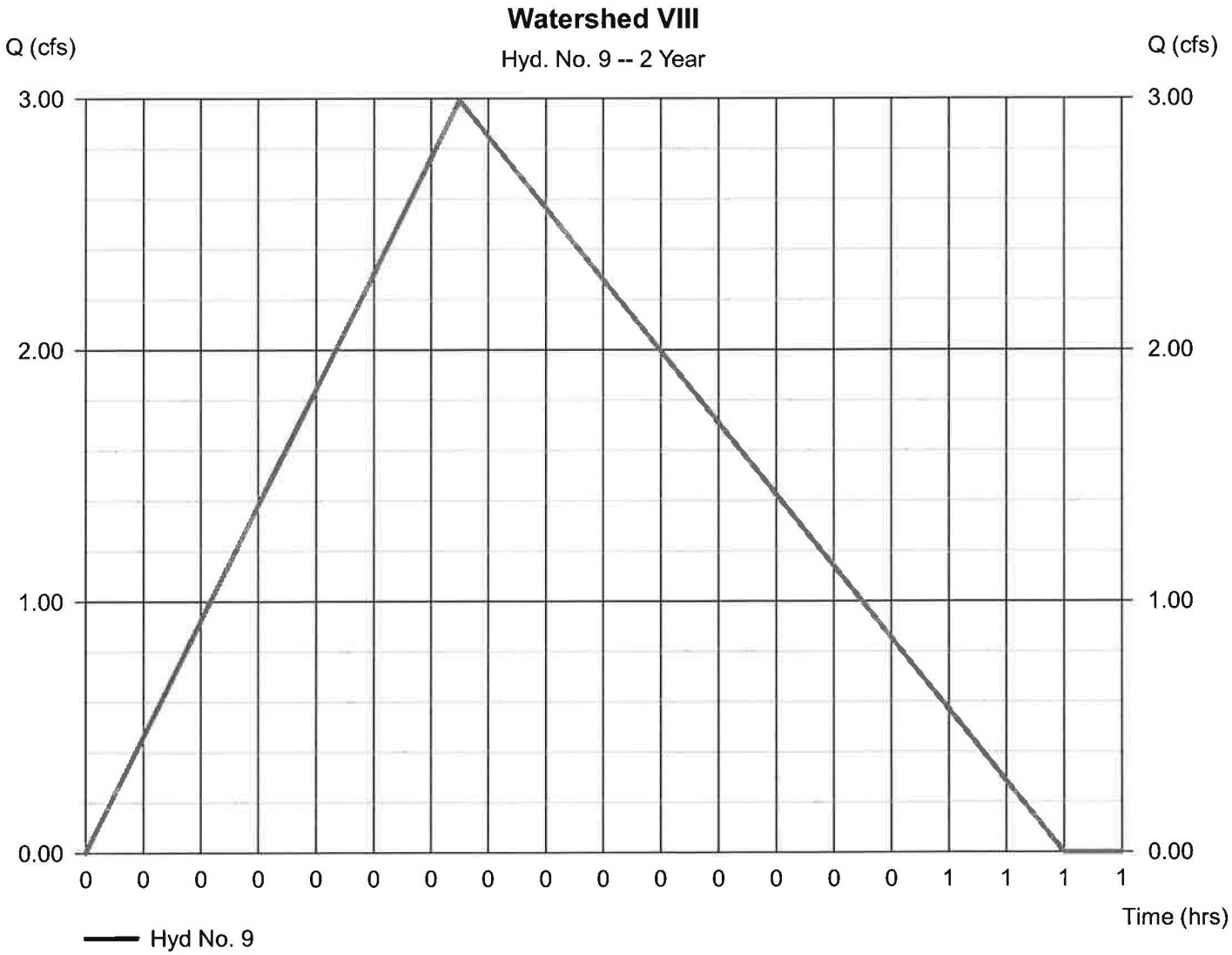
Hydrograph Report

Hyd. No. 9

Watershed VIII

Hydrograph type	= Rational	Peak discharge	= 2.992 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.22 hrs
Time interval	= 1 min	Hyd. volume	= 3,116 cuft
Drainage area	= 3.250 ac	Runoff coeff.	= 0.3*
Intensity	= 3.069 in/hr	Tc by TR55	= 13.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.320 x 0.90) + (1.120 x 0.30) + (1.810 x 0.20)] / 3.250



TR55 Tc Worksheet

Hyd. No. 9

Watershed VIII

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.240		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.20		0.00		0.00		
Land slope (%)	= 4.00		0.00		0.00		
Travel Time (min)	**= 10.81**	**+**	**0.00**	**+**	**0.00**	**=**	**10.81**
Shallow Concentrated Flow							
Flow length (ft)	= 553.00		0.00		0.00		
Watercourse slope (%)	= 5.70		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	= 3.85		0.00		0.00		
Travel Time (min)	**= 2.39**	**+**	**0.00**	**+**	**0.00**	**=**	**2.39**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	= 0.00		0.00		0.00		
Flow length (ft)	= 0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 13.00 min

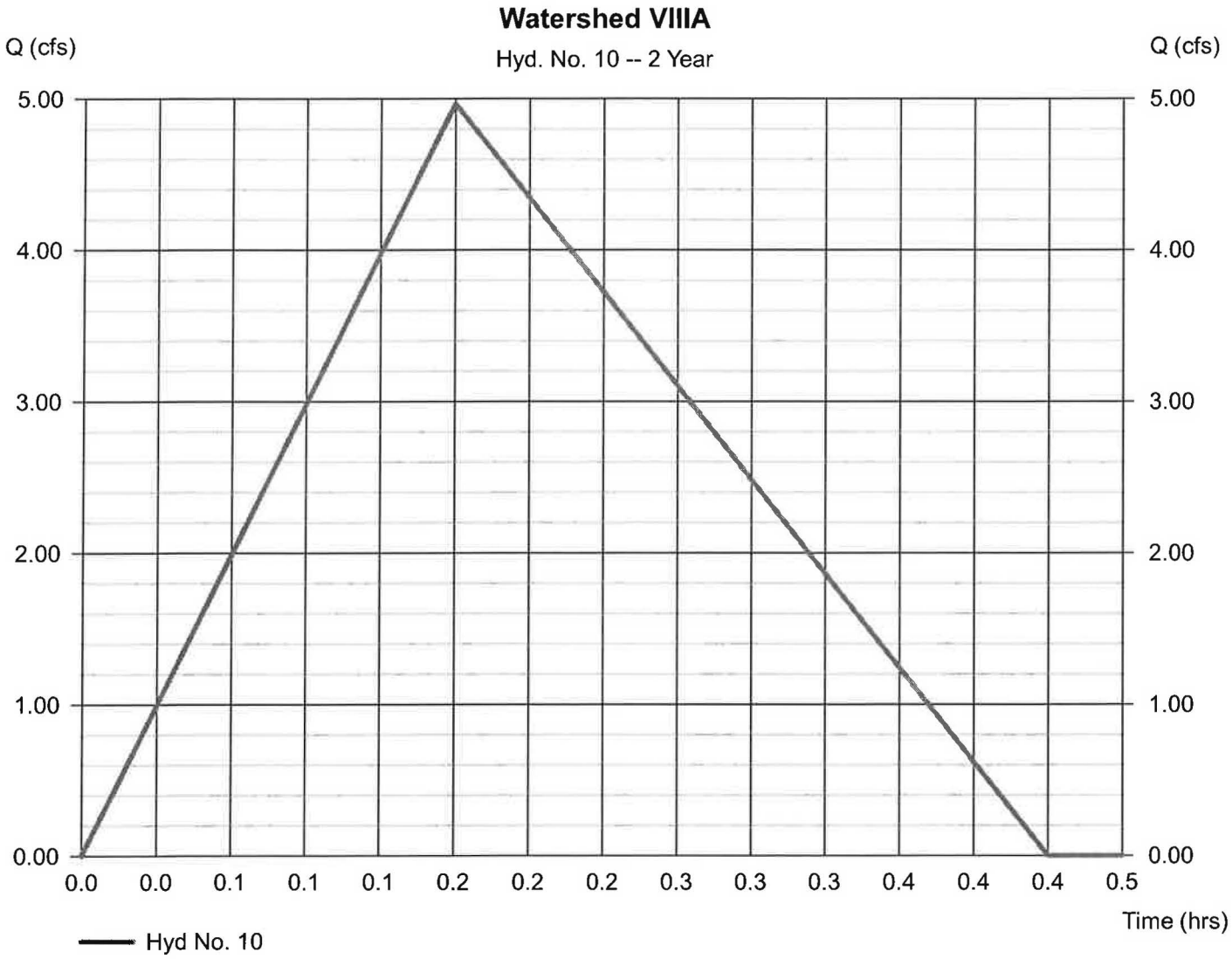
Hydrograph Report

Hyd. No. 10

Watershed VIIIA

Hydrograph type	= Rational	Peak discharge	= 4.966 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 3,978 cuft
Drainage area	= 1.850 ac	Runoff coeff.	= 0.77*
Intensity	= 3.486 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.460 x 0.90) + (0.390 x 0.30)] / 1.850



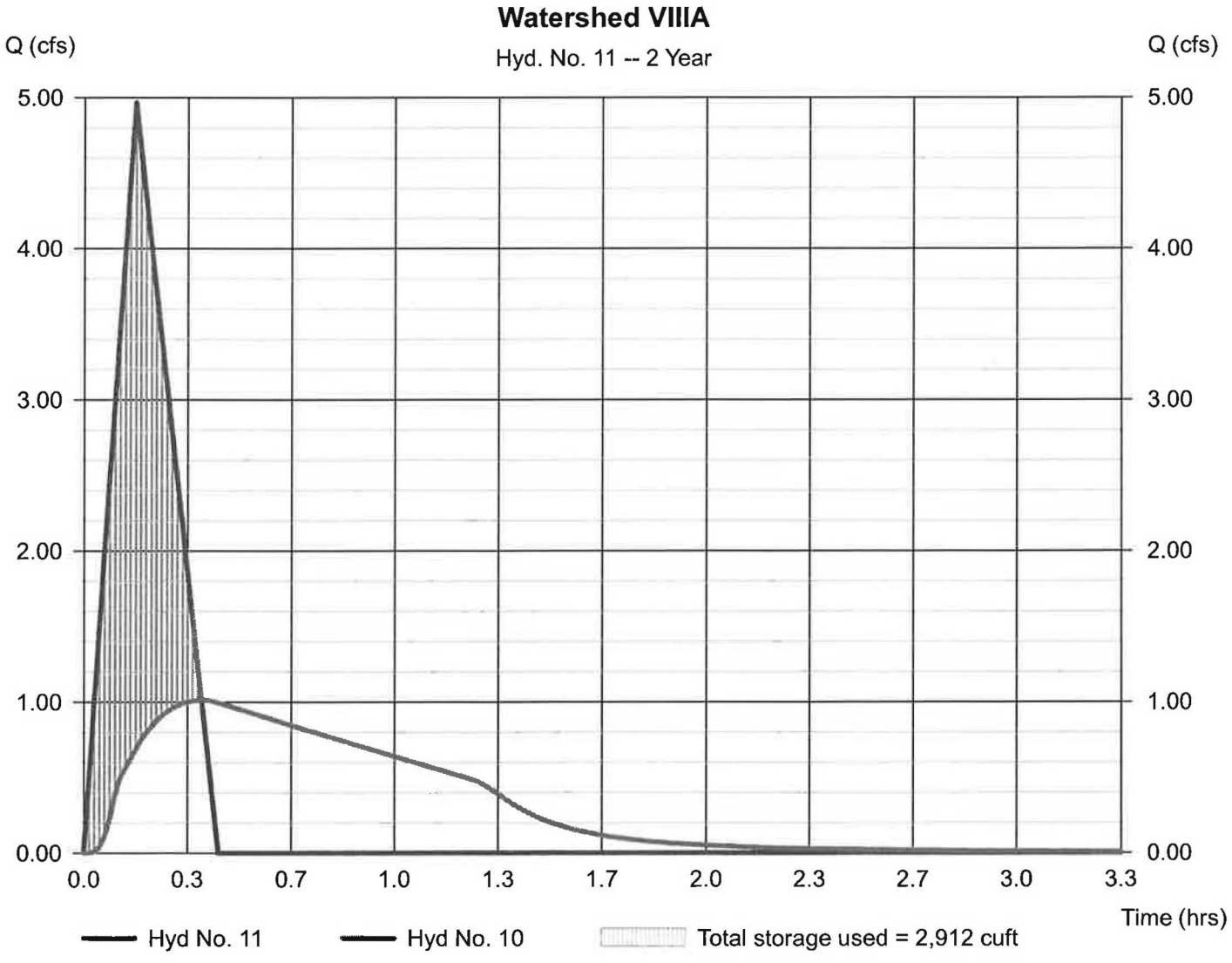
Hydrograph Report

Hyd. No. 11

Watershed VIIIA

Hydrograph type	= Reservoir	Peak discharge	= 1.012 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.38 hrs
Time interval	= 1 min	Hyd. volume	= 3,866 cuft
Inflow hyd. No.	= 10 - Watershed VIIIA	Max. Elevation	= 558.90 ft
Reservoir name	= Watershed VIIIA	Max. Storage	= 2,912 cuft

Storage Indication method used.



Pond No. 21 - Watershed VIIIA

Pond Data

Pond storage is based on user-defined values.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	557.50	n/a	0	0
0.50	558.00	n/a	608	608
1.00	558.50	n/a	1,309	1,917
1.50	559.00	n/a	1,253	3,170
2.00	559.50	n/a	1,167	4,337
2.50	560.00	n/a	1,032	5,369
3.00	560.50	n/a	763	6,132
3.50	561.00	n/a	609	6,741

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 6.00	0.00	0.00	0.00
Span (in)	= 6.00	0.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 557.50	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 5.00	0.00	0.00	0.00
Crest El. (ft)	= 560.50	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	557.50	0.00	---	---	---	0.00	---	---	---	---	---	0.00
0.05	61	557.55	0.01 ic	---	---	---	0.00	---	---	---	---	---	0.01
0.10	122	557.60	0.03 ic	---	---	---	0.00	---	---	---	---	---	0.03
0.15	182	557.65	0.07 ic	---	---	---	0.00	---	---	---	---	---	0.07
0.20	243	557.70	0.11 ic	---	---	---	0.00	---	---	---	---	---	0.11
0.25	304	557.75	0.17 ic	---	---	---	0.00	---	---	---	---	---	0.17
0.30	365	557.80	0.23 ic	---	---	---	0.00	---	---	---	---	---	0.23
0.35	426	557.85	0.30 ic	---	---	---	0.00	---	---	---	---	---	0.30
0.40	486	557.90	0.36 ic	---	---	---	0.00	---	---	---	---	---	0.36
0.45	547	557.95	0.43 ic	---	---	---	0.00	---	---	---	---	---	0.43
0.50	608	558.00	0.47 ic	---	---	---	0.00	---	---	---	---	---	0.47
0.55	739	558.05	0.52 ic	---	---	---	0.00	---	---	---	---	---	0.52
0.60	870	558.10	0.56 ic	---	---	---	0.00	---	---	---	---	---	0.56
0.65	1,001	558.15	0.60 ic	---	---	---	0.00	---	---	---	---	---	0.60
0.70	1,132	558.20	0.63 ic	---	---	---	0.00	---	---	---	---	---	0.63
0.75	1,263	558.25	0.67 ic	---	---	---	0.00	---	---	---	---	---	0.67
0.80	1,393	558.30	0.70 ic	---	---	---	0.00	---	---	---	---	---	0.70
0.85	1,524	558.35	0.73 ic	---	---	---	0.00	---	---	---	---	---	0.73
0.90	1,655	558.40	0.76 ic	---	---	---	0.00	---	---	---	---	---	0.76
0.95	1,786	558.45	0.79 ic	---	---	---	0.00	---	---	---	---	---	0.79
1.00	1,917	558.50	0.82 ic	---	---	---	0.00	---	---	---	---	---	0.82
1.05	2,042	558.55	0.85 ic	---	---	---	0.00	---	---	---	---	---	0.85
1.10	2,168	558.60	0.87 ic	---	---	---	0.00	---	---	---	---	---	0.87
1.15	2,293	558.65	0.90 ic	---	---	---	0.00	---	---	---	---	---	0.90
1.20	2,418	558.70	0.92 ic	---	---	---	0.00	---	---	---	---	---	0.92
1.25	2,544	558.75	0.95 ic	---	---	---	0.00	---	---	---	---	---	0.95
1.30	2,669	558.80	0.97 ic	---	---	---	0.00	---	---	---	---	---	0.97
1.35	2,794	558.85	0.99 ic	---	---	---	0.00	---	---	---	---	---	0.99
1.40	2,919	558.90	1.01 ic	---	---	---	0.00	---	---	---	---	---	1.01
1.45	3,045	558.95	1.04 ic	---	---	---	0.00	---	---	---	---	---	1.04
1.50	3,170	559.00	1.06 ic	---	---	---	0.00	---	---	---	---	---	1.06
1.55	3,287	559.05	1.08 ic	---	---	---	0.00	---	---	---	---	---	1.08
1.60	3,403	559.10	1.10 ic	---	---	---	0.00	---	---	---	---	---	1.10
1.65	3,520	559.15	1.12 ic	---	---	---	0.00	---	---	---	---	---	1.12

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Watershed VIIIA

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
1.70	3,637	559.20	1.14 ic	---	---	---	0.00	---	---	---	---	---	1.14
1.75	3,754	559.25	1.16 ic	---	---	---	0.00	---	---	---	---	---	1.16
1.80	3,870	559.30	1.18 ic	---	---	---	0.00	---	---	---	---	---	1.18
1.85	3,987	559.35	1.20 ic	---	---	---	0.00	---	---	---	---	---	1.20
1.90	4,104	559.40	1.21 ic	---	---	---	0.00	---	---	---	---	---	1.21
1.95	4,220	559.45	1.23 ic	---	---	---	0.00	---	---	---	---	---	1.23
2.00	4,337	559.50	1.25 ic	---	---	---	0.00	---	---	---	---	---	1.25
2.05	4,440	559.55	1.27 ic	---	---	---	0.00	---	---	---	---	---	1.27
2.10	4,543	559.60	1.29 ic	---	---	---	0.00	---	---	---	---	---	1.29
2.15	4,647	559.65	1.30 ic	---	---	---	0.00	---	---	---	---	---	1.30
2.20	4,750	559.70	1.32 ic	---	---	---	0.00	---	---	---	---	---	1.32
2.25	4,853	559.75	1.34 ic	---	---	---	0.00	---	---	---	---	---	1.34
2.30	4,956	559.80	1.35 ic	---	---	---	0.00	---	---	---	---	---	1.35
2.35	5,059	559.85	1.37 ic	---	---	---	0.00	---	---	---	---	---	1.37
2.40	5,163	559.90	1.39 ic	---	---	---	0.00	---	---	---	---	---	1.39
2.45	5,266	559.95	1.40 ic	---	---	---	0.00	---	---	---	---	---	1.40
2.50	5,369	560.00	1.42 ic	---	---	---	0.00	---	---	---	---	---	1.42
2.55	5,445	560.05	1.43 ic	---	---	---	0.00	---	---	---	---	---	1.43
2.60	5,522	560.10	1.45 ic	---	---	---	0.00	---	---	---	---	---	1.45
2.65	5,598	560.15	1.46 ic	---	---	---	0.00	---	---	---	---	---	1.46
2.70	5,674	560.20	1.48 ic	---	---	---	0.00	---	---	---	---	---	1.48
2.75	5,750	560.25	1.49 ic	---	---	---	0.00	---	---	---	---	---	1.49
2.80	5,827	560.30	1.51 ic	---	---	---	0.00	---	---	---	---	---	1.51
2.85	5,903	560.35	1.52 ic	---	---	---	0.00	---	---	---	---	---	1.52
2.90	5,979	560.40	1.54 ic	---	---	---	0.00	---	---	---	---	---	1.54
2.95	6,056	560.45	1.55 ic	---	---	---	0.00	---	---	---	---	---	1.55
3.00	6,132	560.50	1.57 ic	---	---	---	0.00	---	---	---	---	---	1.57
3.05	6,193	560.55	1.58 ic	---	---	---	0.19	---	---	---	---	---	1.77
3.10	6,254	560.60	1.60 ic	---	---	---	0.53	---	---	---	---	---	2.12
3.15	6,315	560.65	1.61 ic	---	---	---	0.97	---	---	---	---	---	2.58
3.20	6,376	560.70	1.62 ic	---	---	---	1.49	---	---	---	---	---	3.11
3.25	6,437	560.75	1.64 ic	---	---	---	2.08	---	---	---	---	---	3.72
3.30	6,497	560.80	1.65 ic	---	---	---	2.73	---	---	---	---	---	4.39
3.35	6,558	560.85	1.66 ic	---	---	---	3.45	---	---	---	---	---	5.11
3.40	6,619	560.90	1.68 ic	---	---	---	4.21	---	---	---	---	---	5.89
3.45	6,680	560.95	1.69 ic	---	---	---	5.02	---	---	---	---	---	6.72
3.50	6,741	561.00	1.70 ic	---	---	---	5.89	---	---	---	---	---	7.59

...End

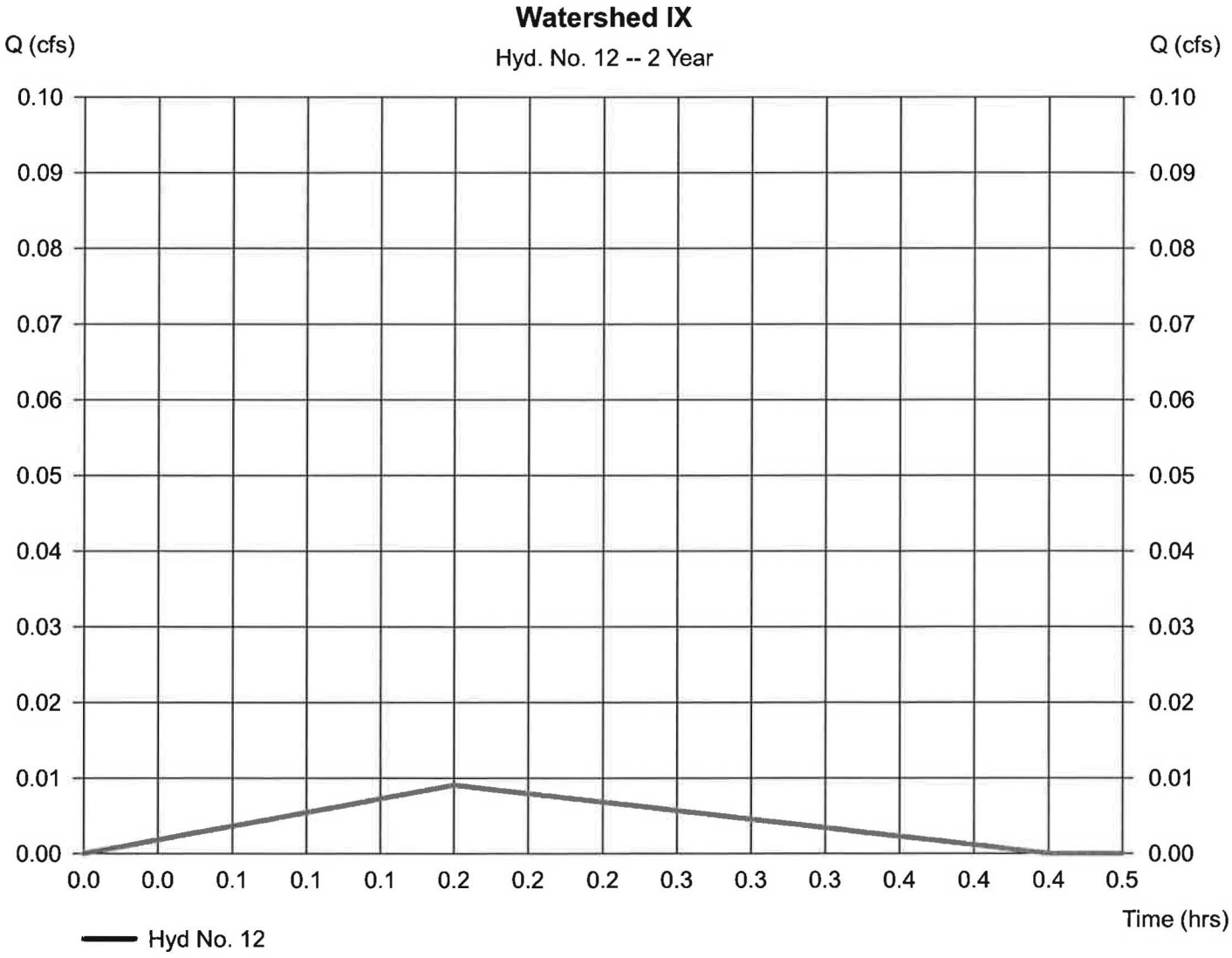
Hydrograph Report

Hyd. No. 12

Watershed IX

Hydrograph type	= Rational	Peak discharge	= 0.009 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 7 cuft
Drainage area	= 0.260 ac	Runoff coeff.	= 0.01*
Intensity	= 3.486 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.010 x 0.30)] / 0.260



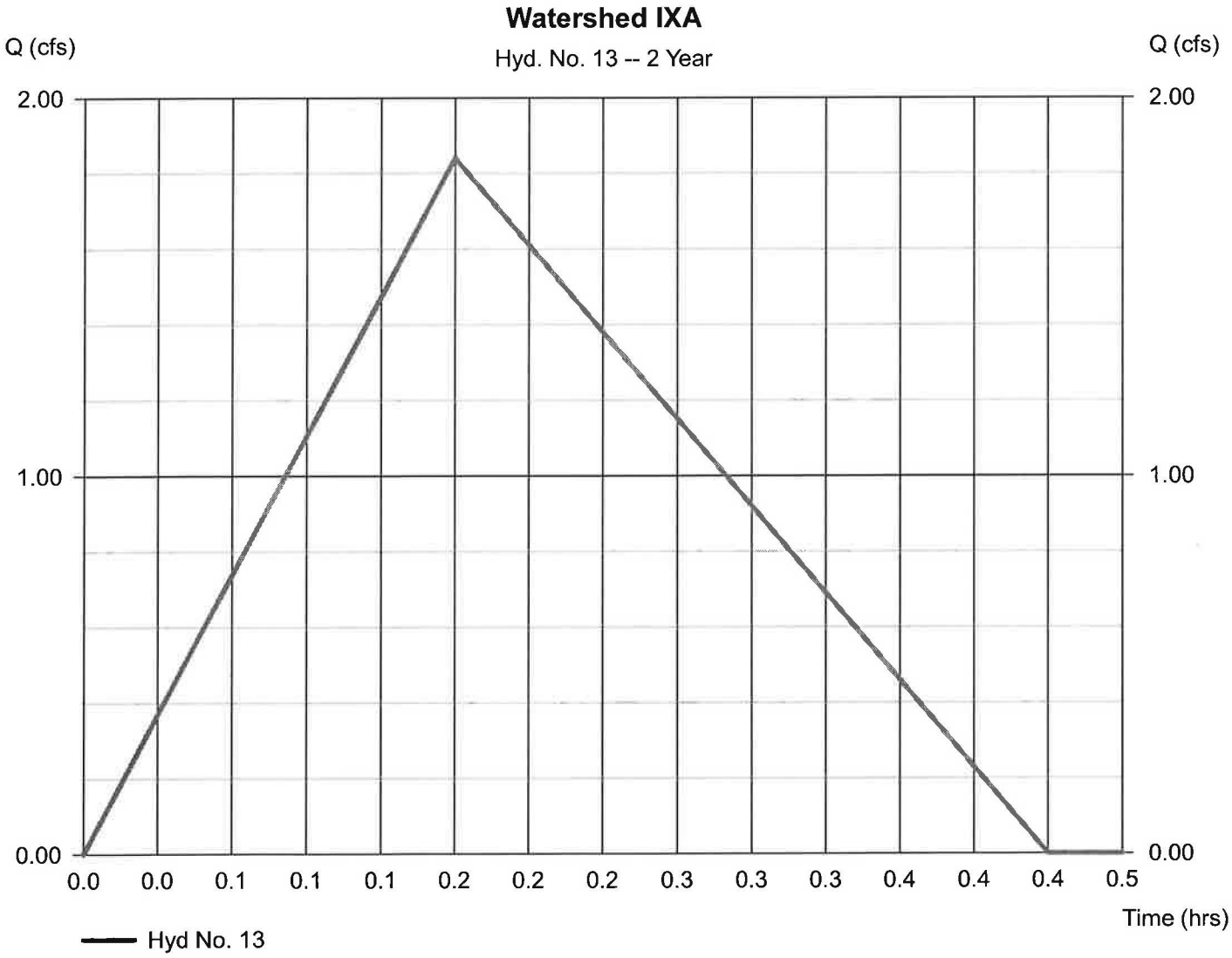
Hydrograph Report

Hyd. No. 13

Watershed IXA

Hydrograph type	= Rational	Peak discharge	= 1.841 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 1,474 cuft
Drainage area	= 0.880 ac	Runoff coeff.	= 0.6*
Intensity	= 3.486 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.460 x 0.90) + (0.260 x 0.30) + (0.160 x 0.20)] / 0.880



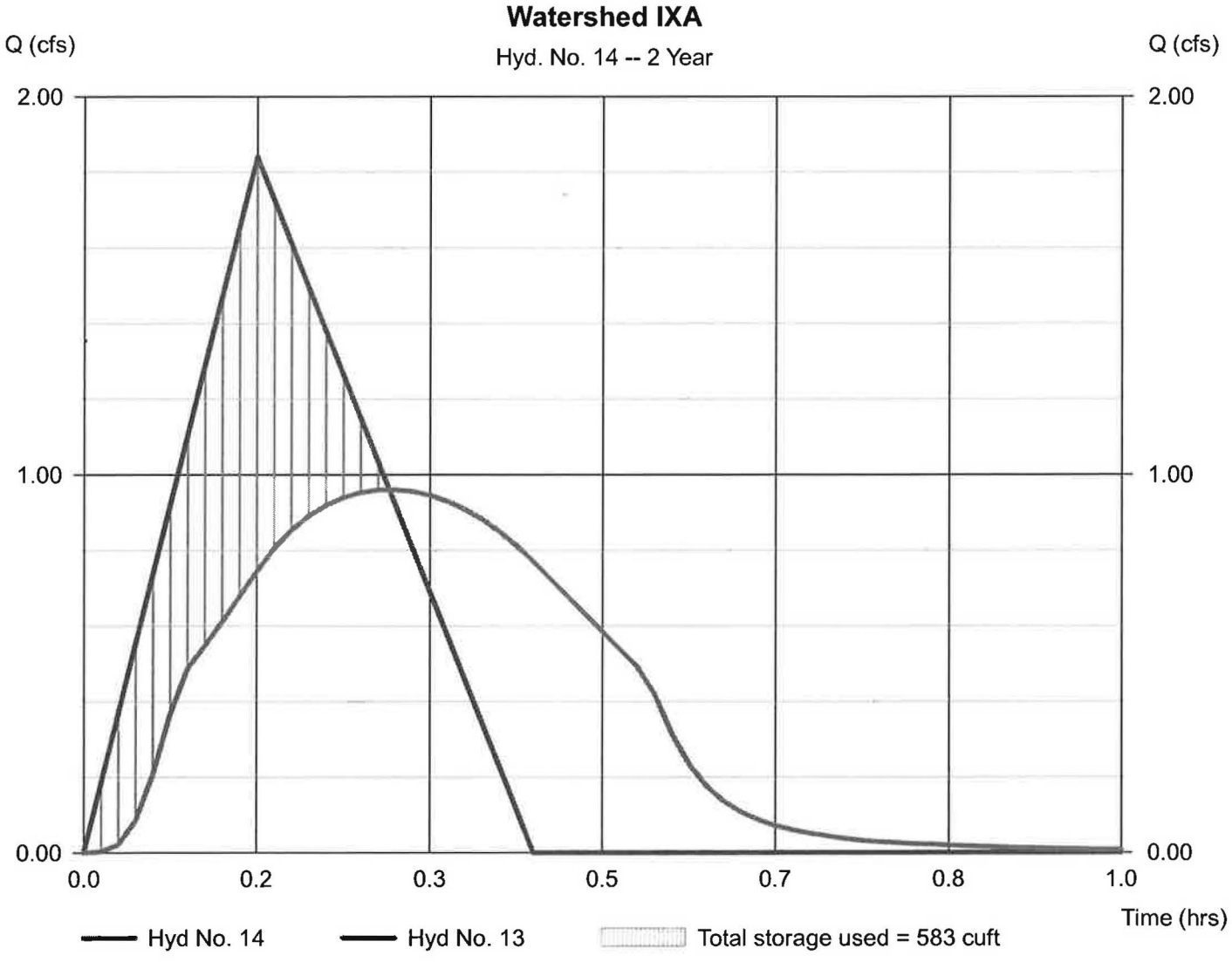
Hydrograph Report

Hyd. No. 14

Watershed IXA

Hydrograph type	= Reservoir	Peak discharge	= 0.960 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.30 hrs
Time interval	= 1 min	Hyd. volume	= 1,434 cuft
Inflow hyd. No.	= 13 - Watershed IXA	Max. Elevation	= 553.45 ft
Reservoir name	= Waatershed IXA	Max. Storage	= 583 cuft

Storage Indication method used.



Pond No. 22 - Waatershed IXA

Pond Data

Pond storage is based on user-defined values.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	552.17	n/a	0	0
0.50	552.67	n/a	135	135
1.00	553.17	n/a	291	426
1.50	553.67	n/a	278	704
2.00	554.17	n/a	259	963
2.50	554.67	n/a	230	1,193
3.00	555.17	n/a	169	1,362
3.50	555.67	n/a	136	1,498

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 6.00	0.00	0.00	0.00
Span (in)	= 6.00	0.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 552.17	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 5.00	0.00	0.00	0.00
Crest El. (ft)	= 555.17	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	552.17	0.00	---	---	---	0.00	---	---	---	---	---	0.00
0.05	14	552.22	0.01 ic	---	---	---	0.00	---	---	---	---	---	0.01
0.10	27	552.27	0.03 ic	---	---	---	0.00	---	---	---	---	---	0.03
0.15	41	552.32	0.07 ic	---	---	---	0.00	---	---	---	---	---	0.07
0.20	54	552.37	0.11 ic	---	---	---	0.00	---	---	---	---	---	0.11
0.25	68	552.42	0.17 ic	---	---	---	0.00	---	---	---	---	---	0.17
0.30	81	552.47	0.23 ic	---	---	---	0.00	---	---	---	---	---	0.23
0.35	95	552.52	0.30 ic	---	---	---	0.00	---	---	---	---	---	0.30
0.40	108	552.57	0.36 ic	---	---	---	0.00	---	---	---	---	---	0.36
0.45	122	552.62	0.43 ic	---	---	---	0.00	---	---	---	---	---	0.43
0.50	135	552.67	0.47 ic	---	---	---	0.00	---	---	---	---	---	0.47
0.55	164	552.72	0.52 ic	---	---	---	0.00	---	---	---	---	---	0.52
0.60	193	552.77	0.56 ic	---	---	---	0.00	---	---	---	---	---	0.56
0.65	222	552.82	0.60 ic	---	---	---	0.00	---	---	---	---	---	0.60
0.70	251	552.87	0.63 ic	---	---	---	0.00	---	---	---	---	---	0.63
0.75	281	552.92	0.67 ic	---	---	---	0.00	---	---	---	---	---	0.67
0.80	310	552.97	0.70 ic	---	---	---	0.00	---	---	---	---	---	0.70
0.85	339	553.02	0.73 ic	---	---	---	0.00	---	---	---	---	---	0.73
0.90	368	553.07	0.76 ic	---	---	---	0.00	---	---	---	---	---	0.76
0.95	397	553.12	0.79 ic	---	---	---	0.00	---	---	---	---	---	0.79
1.00	426	553.17	0.82 ic	---	---	---	0.00	---	---	---	---	---	0.82
1.05	454	553.22	0.85 ic	---	---	---	0.00	---	---	---	---	---	0.85
1.10	482	553.27	0.87 ic	---	---	---	0.00	---	---	---	---	---	0.87
1.15	509	553.32	0.90 ic	---	---	---	0.00	---	---	---	---	---	0.90
1.20	537	553.37	0.92 ic	---	---	---	0.00	---	---	---	---	---	0.92
1.25	565	553.42	0.95 ic	---	---	---	0.00	---	---	---	---	---	0.95
1.30	593	553.47	0.97 ic	---	---	---	0.00	---	---	---	---	---	0.97
1.35	621	553.52	0.99 ic	---	---	---	0.00	---	---	---	---	---	0.99
1.40	648	553.57	1.01 ic	---	---	---	0.00	---	---	---	---	---	1.01
1.45	676	553.62	1.04 ic	---	---	---	0.00	---	---	---	---	---	1.04
1.50	704	553.67	1.06 ic	---	---	---	0.00	---	---	---	---	---	1.06
1.55	730	553.72	1.08 ic	---	---	---	0.00	---	---	---	---	---	1.08
1.60	756	553.77	1.10 ic	---	---	---	0.00	---	---	---	---	---	1.10
1.65	782	553.82	1.12 ic	---	---	---	0.00	---	---	---	---	---	1.12

Continues on next page...

Waatershed IXA

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
1.70	808	553.87	1.14 ic	---	---	---	0.00	---	---	---	---	---	1.14
1.75	834	553.92	1.16 ic	---	---	---	0.00	---	---	---	---	---	1.16
1.80	859	553.97	1.18 ic	---	---	---	0.00	---	---	---	---	---	1.18
1.85	885	554.02	1.20 ic	---	---	---	0.00	---	---	---	---	---	1.20
1.90	911	554.07	1.21 ic	---	---	---	0.00	---	---	---	---	---	1.21
1.95	937	554.12	1.23 ic	---	---	---	0.00	---	---	---	---	---	1.23
2.00	963	554.17	1.25 ic	---	---	---	0.00	---	---	---	---	---	1.25
2.05	986	554.22	1.27 ic	---	---	---	0.00	---	---	---	---	---	1.27
2.10	1,009	554.27	1.29 ic	---	---	---	0.00	---	---	---	---	---	1.29
2.15	1,032	554.32	1.30 ic	---	---	---	0.00	---	---	---	---	---	1.30
2.20	1,055	554.37	1.32 ic	---	---	---	0.00	---	---	---	---	---	1.32
2.25	1,078	554.42	1.34 ic	---	---	---	0.00	---	---	---	---	---	1.34
2.30	1,101	554.47	1.35 ic	---	---	---	0.00	---	---	---	---	---	1.35
2.35	1,124	554.52	1.37 ic	---	---	---	0.00	---	---	---	---	---	1.37
2.40	1,147	554.57	1.39 ic	---	---	---	0.00	---	---	---	---	---	1.39
2.45	1,170	554.62	1.40 ic	---	---	---	0.00	---	---	---	---	---	1.40
2.50	1,193	554.67	1.42 ic	---	---	---	0.00	---	---	---	---	---	1.42
2.55	1,210	554.72	1.43 ic	---	---	---	0.00	---	---	---	---	---	1.43
2.60	1,227	554.77	1.45 ic	---	---	---	0.00	---	---	---	---	---	1.45
2.65	1,244	554.82	1.46 ic	---	---	---	0.00	---	---	---	---	---	1.46
2.70	1,261	554.87	1.48 ic	---	---	---	0.00	---	---	---	---	---	1.48
2.75	1,278	554.92	1.49 ic	---	---	---	0.00	---	---	---	---	---	1.49
2.80	1,294	554.97	1.51 ic	---	---	---	0.00	---	---	---	---	---	1.51
2.85	1,311	555.02	1.52 ic	---	---	---	0.00	---	---	---	---	---	1.52
2.90	1,328	555.07	1.54 ic	---	---	---	0.00	---	---	---	---	---	1.54
2.95	1,345	555.12	1.55 ic	---	---	---	0.00	---	---	---	---	---	1.55
3.00	1,362	555.17	1.57 ic	---	---	---	0.00	---	---	---	---	---	1.57
3.05	1,376	555.22	1.58 ic	---	---	---	0.19	---	---	---	---	---	1.77
3.10	1,389	555.27	1.60 ic	---	---	---	0.53	---	---	---	---	---	2.12
3.15	1,403	555.32	1.61 ic	---	---	---	0.97	---	---	---	---	---	2.58
3.20	1,416	555.37	1.62 ic	---	---	---	1.49	---	---	---	---	---	3.11
3.25	1,430	555.42	1.64 ic	---	---	---	2.08	---	---	---	---	---	3.72
3.30	1,444	555.47	1.65 ic	---	---	---	2.73	---	---	---	---	---	4.39
3.35	1,457	555.52	1.66 ic	---	---	---	3.45	---	---	---	---	---	5.11
3.40	1,471	555.57	1.68 ic	---	---	---	4.21	---	---	---	---	---	5.89
3.45	1,484	555.62	1.69 ic	---	---	---	5.02	---	---	---	---	---	6.72
3.50	1,498	555.67	1.70 ic	---	---	---	5.89	---	---	---	---	---	7.59

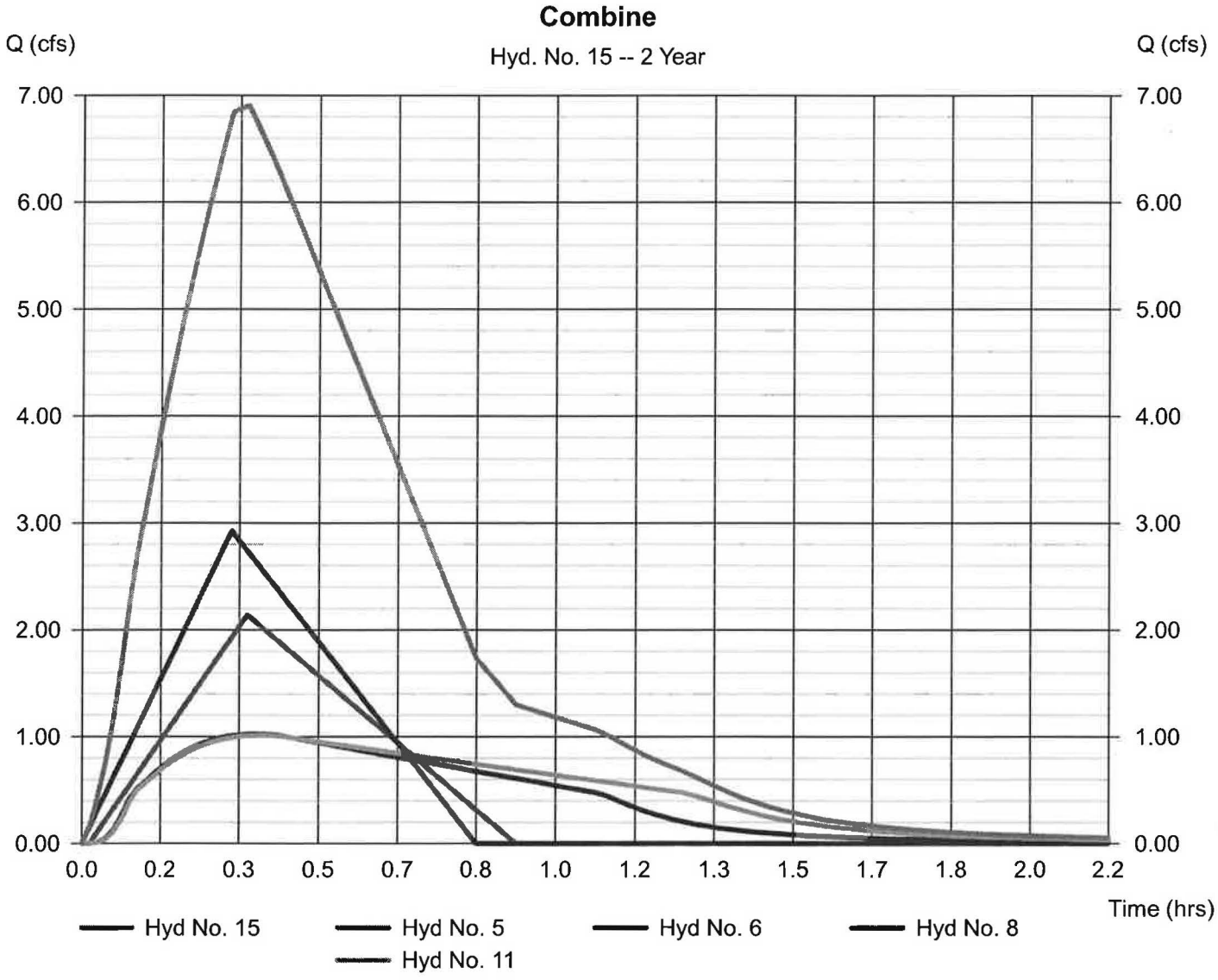
...End

Hydrograph Report

Hyd. No. 15

Combine

Hydrograph type	= Combine	Peak discharge	= 6.903 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.35 hrs
Time interval	= 1 min	Hyd. volume	= 14,995 cuft
Inflow hyds.	= 5, 6, 8, 11	Contrib. drain. area	= 5.740 ac

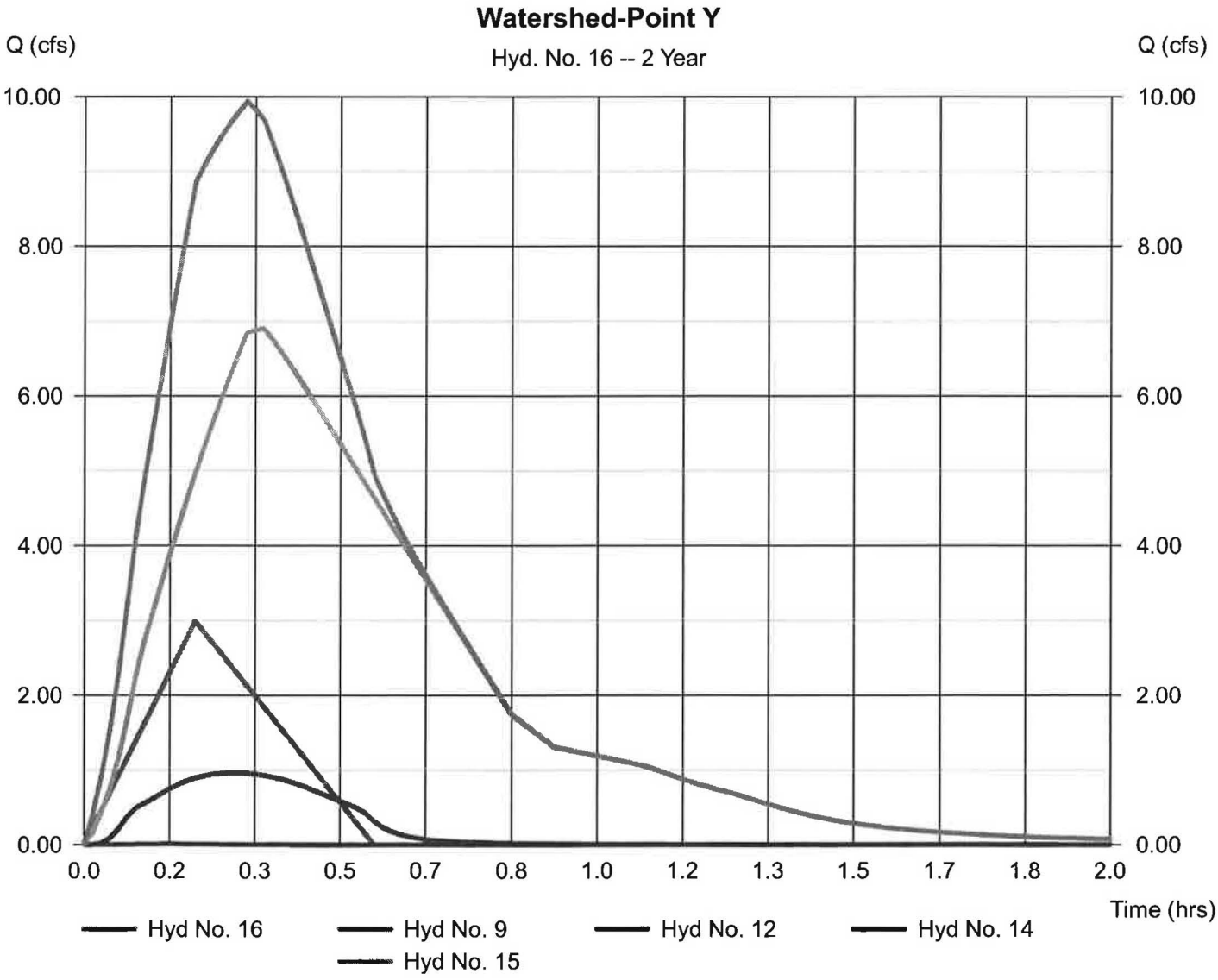


Hydrograph Report

Hyd. No. 16

Watershed-Point Y

Hydrograph type	= Combine	Peak discharge	= 9.940 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 19,488 cuft
Inflow hyds.	= 9, 12, 14, 15	Contrib. drain. area	= 3.510 ac



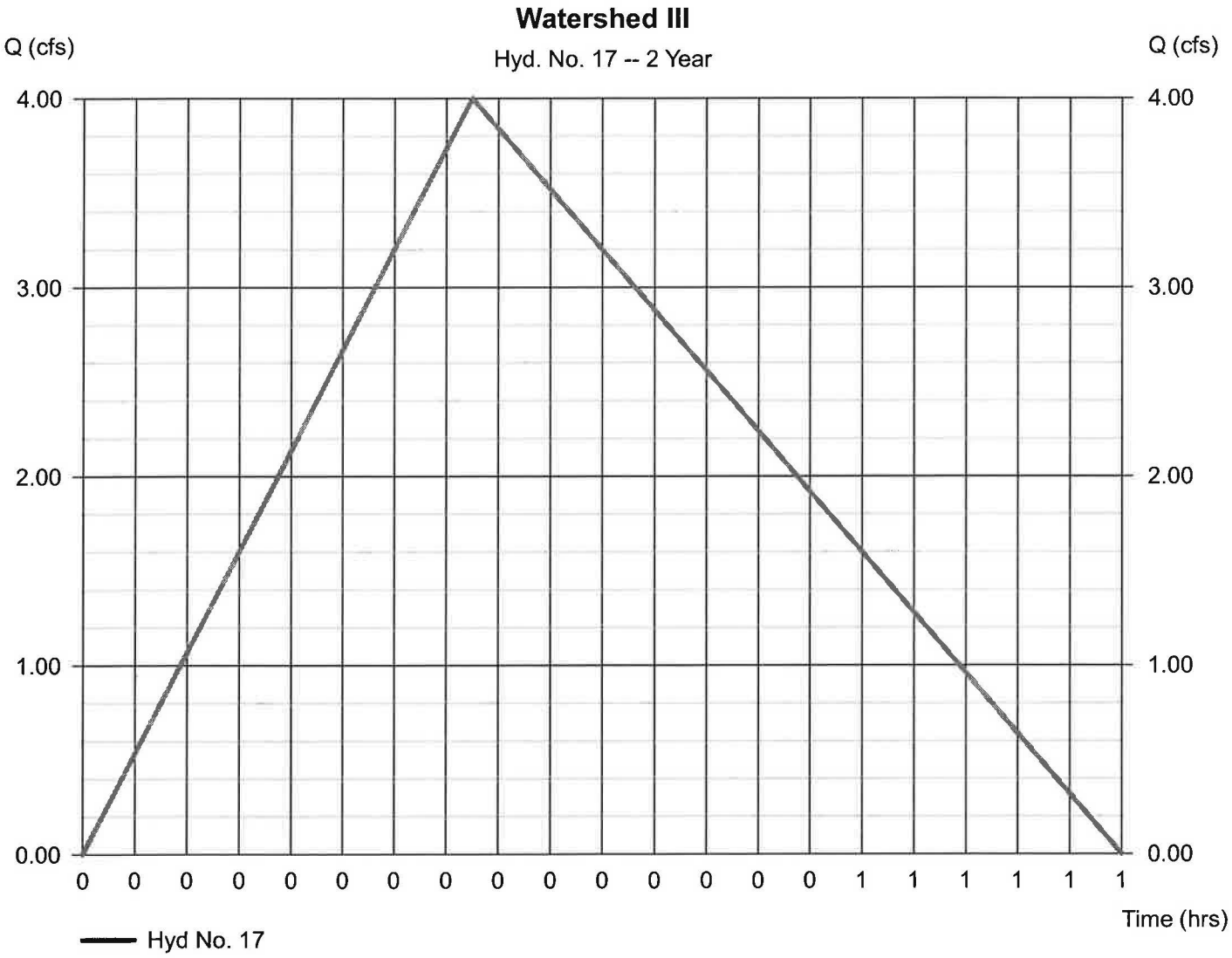
Hydrograph Report

Hyd. No. 17

Watershed III

Hydrograph type	= Rational	Peak discharge	= 3.999 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.25 hrs
Time interval	= 1 min	Hyd. volume	= 4,804 cuft
Drainage area	= 2.700 ac	Runoff coeff.	= 0.52*
Intensity	= 2.848 in/hr	Tc by TR55	= 15.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.000 x 0.90) + (1.700 x 0.30)] / 2.700



TR55 Tc Worksheet

Hyd. No. 17

Watershed III

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.240		0.016		0.011		
Flow length (ft)	= 95.0		75.0		0.0		
Two-year 24-hr precip. (in)	= 3.20		3.20		0.00		
Land slope (%)	= 3.15		5.33		0.00		
Travel Time (min)	**= 11.42**	**+**	**0.88**	**+**	**0.00**	**=**	**12.30**
Shallow Concentrated Flow							
Flow length (ft)	= 286.00		0.00		0.00		
Watercourse slope (%)	= 4.37		0.00		0.00		
Surface description	= Paved		Paved		Paved		
Average velocity (ft/s)	= 4.25		0.00		0.00		
Travel Time (min)	**= 1.12**	**+**	**0.00**	**+**	**0.00**	**=**	**1.12**
Channel Flow							
X sectional flow area (sqft)	= 1.23		0.00		0.00		
Wetted perimeter (ft)	= 3.93		0.00		0.00		
Channel slope (%)	= 1.65		0.00		0.00		
Manning's n-value	= 0.015		0.000		0.015		
Velocity (ft/s)	= 5.85		0.00		0.00		
Flow length (ft)	= 543.0		0.0		0.0		
Travel Time (min)	**= 1.55**	**+**	**0.00**	**+**	**0.00**	**=**	**1.55**

Total Travel Time, Tc ..... 15.00 min

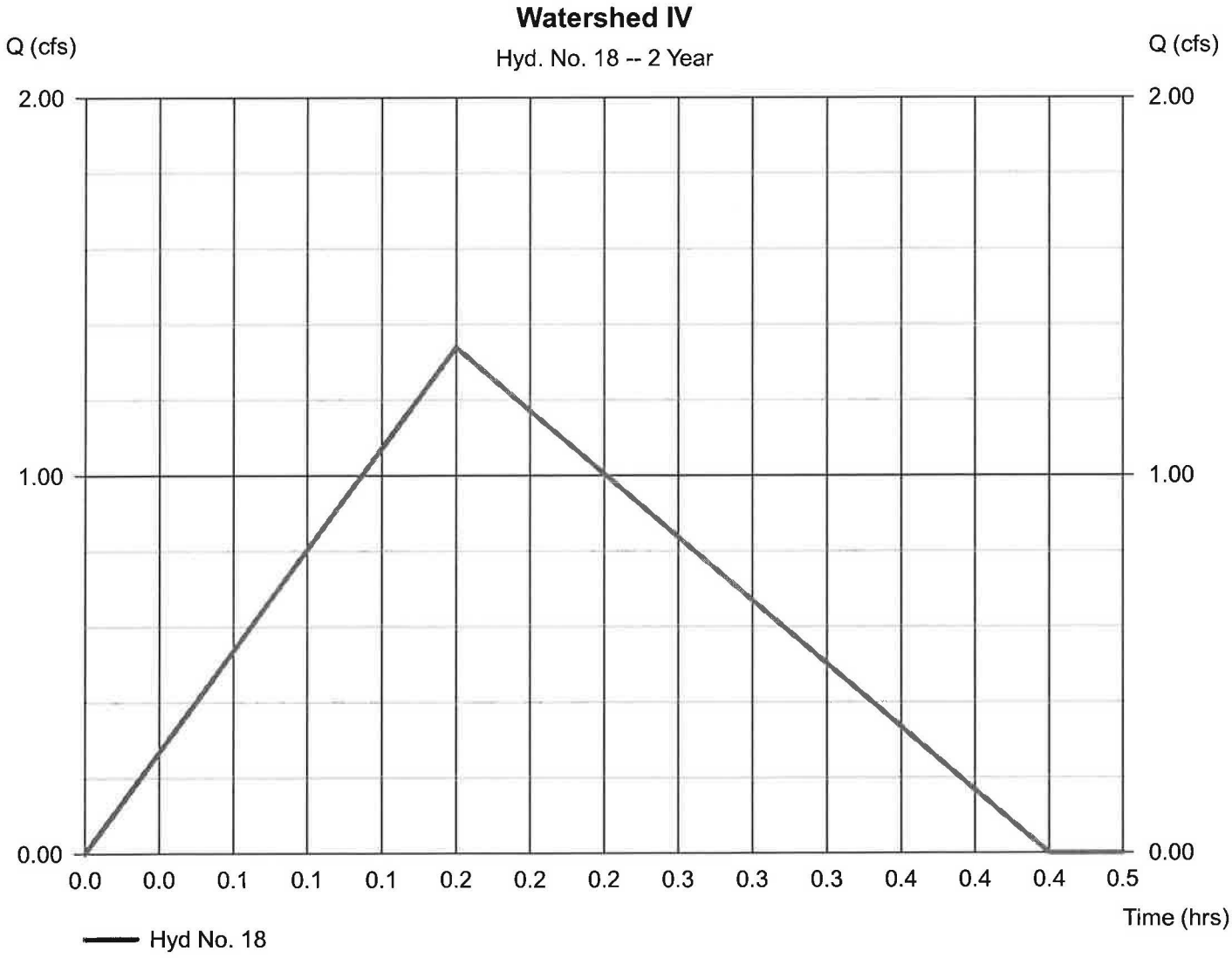
Hydrograph Report

Hyd. No. 18

Watershed IV

Hydrograph type	= Rational	Peak discharge	= 1.339 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 1,072 cuft
Drainage area	= 0.800 ac	Runoff coeff.	= 0.48*
Intensity	= 3.486 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.260 x 0.90) + (0.440 x 0.30) + (0.100 x 0.20)] / 0.800



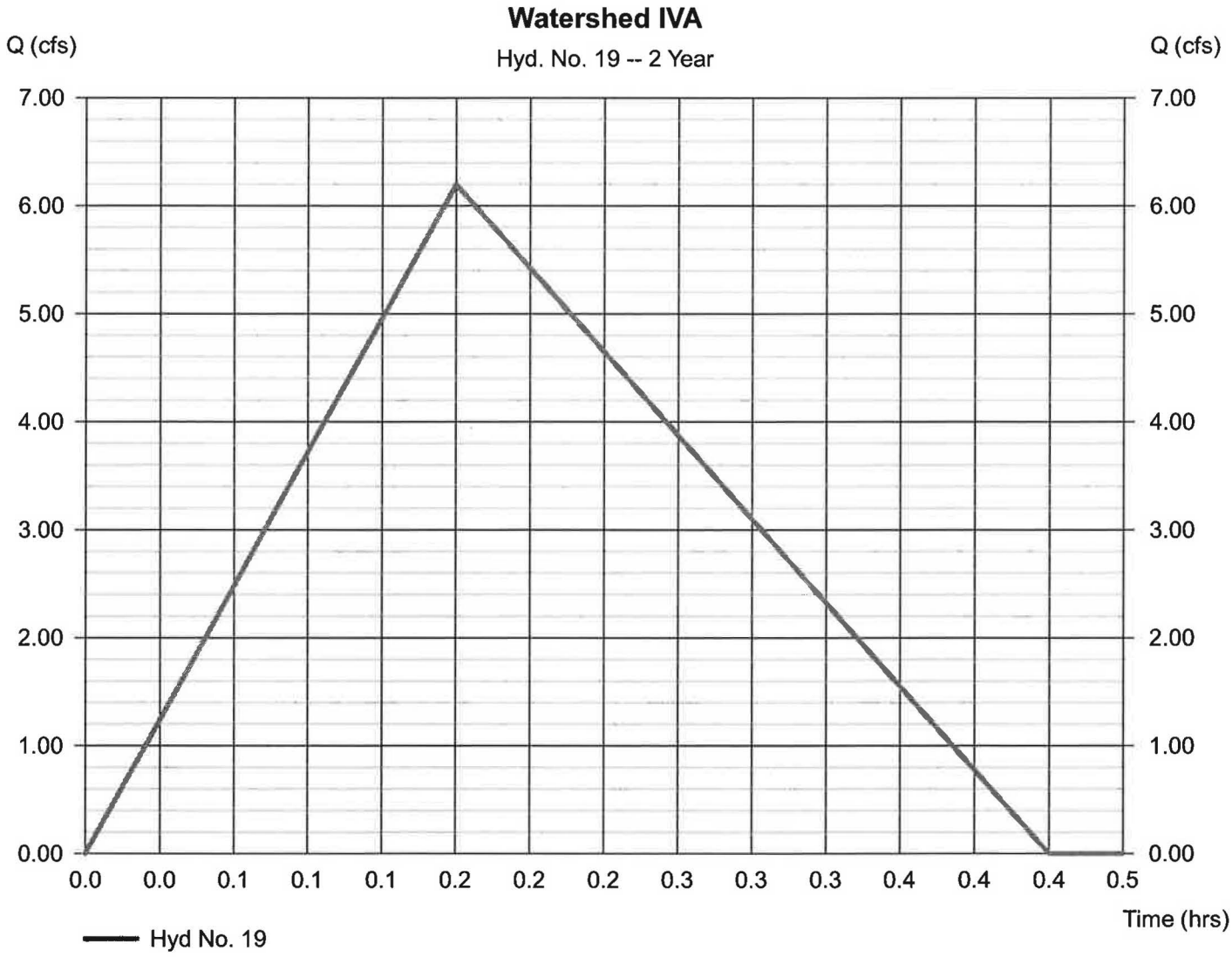
Hydrograph Report

Hyd. No. 19

Watershed IVA

Hydrograph type	= Rational	Peak discharge	= 6.196 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 4,963 cuft
Drainage area	= 2.370 ac	Runoff coeff.	= 0.75*
Intensity	= 3.486 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.770 x 0.90) + (0.600 x 0.30)] / 2.370



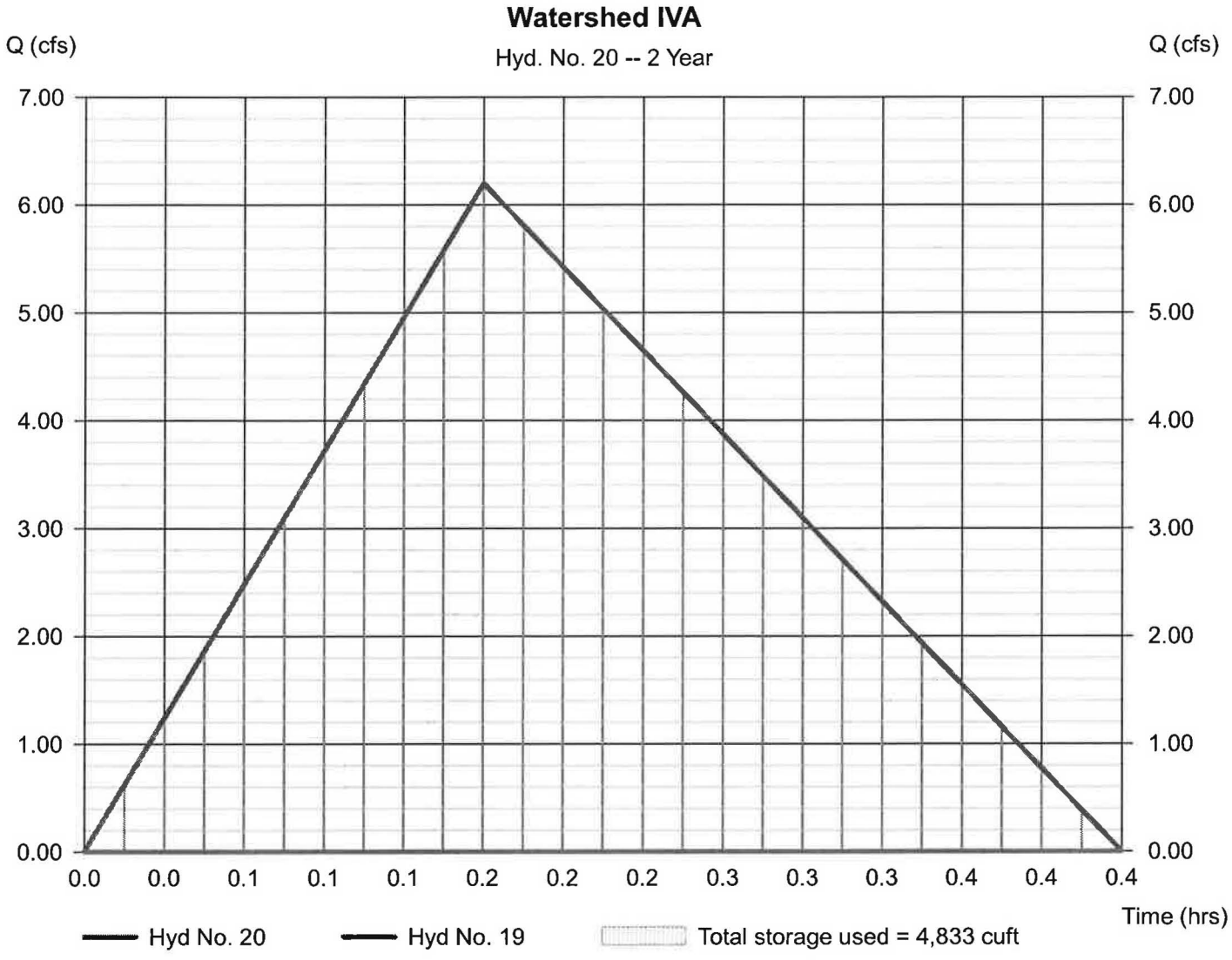
Hydrograph Report

Hyd. No. 20

Watershed IVA

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 2 yrs	Time to peak	= n/a
Time interval	= 1 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 19 - Watershed IVA	Max. Elevation	= 552.51 ft
Reservoir name	= Watershed IVA	Max. Storage	= 4,833 cuft

Storage Indication method used.



Pond No. 18 - Watershed IVA

Pond Data

Pond storage is based on user-defined values.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	550.50	n/a	0	0
0.50	551.00	n/a	676	676
1.00	551.50	n/a	1,455	2,131
1.50	552.00	n/a	1,392	3,523
2.00	552.50	n/a	1,296	4,819
2.50	553.00	n/a	1,147	5,966
3.00	553.50	n/a	848	6,814
3.50	554.00	n/a	676	7,490

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	Inactive	0.00	0.00	0.00
Span (in)	= 6.00	0.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 550.50	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 5.00	0.00	0.00	0.00
Crest El. (ft)	= 553.50	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	550.50	0.00	---	---	---	0.00	---	---	---	---	---	0.00
0.05	68	550.55	0.00	---	---	---	0.00	---	---	---	---	---	0.00
0.10	135	550.60	0.00	---	---	---	0.00	---	---	---	---	---	0.00
0.15	203	550.65	0.00	---	---	---	0.00	---	---	---	---	---	0.00
0.20	270	550.70	0.00	---	---	---	0.00	---	---	---	---	---	0.00
0.25	338	550.75	0.00	---	---	---	0.00	---	---	---	---	---	0.00
0.30	406	550.80	0.00	---	---	---	0.00	---	---	---	---	---	0.00
0.35	473	550.85	0.00	---	---	---	0.00	---	---	---	---	---	0.00
0.40	541	550.90	0.00	---	---	---	0.00	---	---	---	---	---	0.00
0.45	608	550.95	0.00	---	---	---	0.00	---	---	---	---	---	0.00
0.50	676	551.00	0.00	---	---	---	0.00	---	---	---	---	---	0.00
0.55	822	551.05	0.00	---	---	---	0.00	---	---	---	---	---	0.00
0.60	967	551.10	0.00	---	---	---	0.00	---	---	---	---	---	0.00
0.65	1,113	551.15	0.00	---	---	---	0.00	---	---	---	---	---	0.00
0.70	1,258	551.20	0.00	---	---	---	0.00	---	---	---	---	---	0.00
0.75	1,404	551.25	0.00	---	---	---	0.00	---	---	---	---	---	0.00
0.80	1,549	551.30	0.00	---	---	---	0.00	---	---	---	---	---	0.00
0.85	1,695	551.35	0.00	---	---	---	0.00	---	---	---	---	---	0.00
0.90	1,840	551.40	0.00	---	---	---	0.00	---	---	---	---	---	0.00
0.95	1,986	551.45	0.00	---	---	---	0.00	---	---	---	---	---	0.00
1.00	2,131	551.50	0.00	---	---	---	0.00	---	---	---	---	---	0.00
1.05	2,270	551.55	0.00	---	---	---	0.00	---	---	---	---	---	0.00
1.10	2,409	551.60	0.00	---	---	---	0.00	---	---	---	---	---	0.00
1.15	2,549	551.65	0.00	---	---	---	0.00	---	---	---	---	---	0.00
1.20	2,688	551.70	0.00	---	---	---	0.00	---	---	---	---	---	0.00
1.25	2,827	551.75	0.00	---	---	---	0.00	---	---	---	---	---	0.00
1.30	2,966	551.80	0.00	---	---	---	0.00	---	---	---	---	---	0.00
1.35	3,105	551.85	0.00	---	---	---	0.00	---	---	---	---	---	0.00
1.40	3,245	551.90	0.00	---	---	---	0.00	---	---	---	---	---	0.00
1.45	3,384	551.95	0.00	---	---	---	0.00	---	---	---	---	---	0.00
1.50	3,523	552.00	0.00	---	---	---	0.00	---	---	---	---	---	0.00
1.55	3,653	552.05	0.00	---	---	---	0.00	---	---	---	---	---	0.00
1.60	3,782	552.10	0.00	---	---	---	0.00	---	---	---	---	---	0.00
1.65	3,912	552.15	0.00	---	---	---	0.00	---	---	---	---	---	0.00

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Watershed IVA

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
1.70	4,041	552.20	0.00	---	---	---	0.00	---	---	---	---	---	0.00
1.75	4,171	552.25	0.00	---	---	---	0.00	---	---	---	---	---	0.00
1.80	4,301	552.30	0.00	---	---	---	0.00	---	---	---	---	---	0.00
1.85	4,430	552.35	0.00	---	---	---	0.00	---	---	---	---	---	0.00
1.90	4,560	552.40	0.00	---	---	---	0.00	---	---	---	---	---	0.00
1.95	4,689	552.45	0.00	---	---	---	0.00	---	---	---	---	---	0.00
2.00	4,819	552.50	0.00	---	---	---	0.00	---	---	---	---	---	0.00
2.05	4,934	552.55	0.00	---	---	---	0.00	---	---	---	---	---	0.00
2.10	5,048	552.60	0.00	---	---	---	0.00	---	---	---	---	---	0.00
2.15	5,163	552.65	0.00	---	---	---	0.00	---	---	---	---	---	0.00
2.20	5,278	552.70	0.00	---	---	---	0.00	---	---	---	---	---	0.00
2.25	5,393	552.75	0.00	---	---	---	0.00	---	---	---	---	---	0.00
2.30	5,507	552.80	0.00	---	---	---	0.00	---	---	---	---	---	0.00
2.35	5,622	552.85	0.00	---	---	---	0.00	---	---	---	---	---	0.00
2.40	5,737	552.90	0.00	---	---	---	0.00	---	---	---	---	---	0.00
2.45	5,851	552.95	0.00	---	---	---	0.00	---	---	---	---	---	0.00
2.50	5,966	553.00	0.00	---	---	---	0.00	---	---	---	---	---	0.00
2.55	6,051	553.05	0.00	---	---	---	0.00	---	---	---	---	---	0.00
2.60	6,136	553.10	0.00	---	---	---	0.00	---	---	---	---	---	0.00
2.65	6,220	553.15	0.00	---	---	---	0.00	---	---	---	---	---	0.00
2.70	6,305	553.20	0.00	---	---	---	0.00	---	---	---	---	---	0.00
2.75	6,390	553.25	0.00	---	---	---	0.00	---	---	---	---	---	0.00
2.80	6,475	553.30	0.00	---	---	---	0.00	---	---	---	---	---	0.00
2.85	6,560	553.35	0.00	---	---	---	0.00	---	---	---	---	---	0.00
2.90	6,644	553.40	0.00	---	---	---	0.00	---	---	---	---	---	0.00
2.95	6,729	553.45	0.00	---	---	---	0.00	---	---	---	---	---	0.00
3.00	6,814	553.50	0.00	---	---	---	0.00	---	---	---	---	---	0.00
3.05	6,882	553.55	0.00	---	---	---	0.19	---	---	---	---	---	0.19
3.10	6,949	553.60	0.00	---	---	---	0.53	---	---	---	---	---	0.53
3.15	7,017	553.65	0.00	---	---	---	0.97	---	---	---	---	---	0.97
3.20	7,084	553.70	0.00	---	---	---	1.49	---	---	---	---	---	1.49
3.25	7,152	553.75	0.00	---	---	---	2.08	---	---	---	---	---	2.08
3.30	7,220	553.80	0.00	---	---	---	2.73	---	---	---	---	---	2.73
3.35	7,287	553.85	0.00	---	---	---	3.45	---	---	---	---	---	3.45
3.40	7,355	553.90	0.00	---	---	---	4.21	---	---	---	---	---	4.21
3.45	7,422	553.95	0.00	---	---	---	5.02	---	---	---	---	---	5.02
3.50	7,490	554.00	0.00	---	---	---	5.89	---	---	---	---	---	5.89

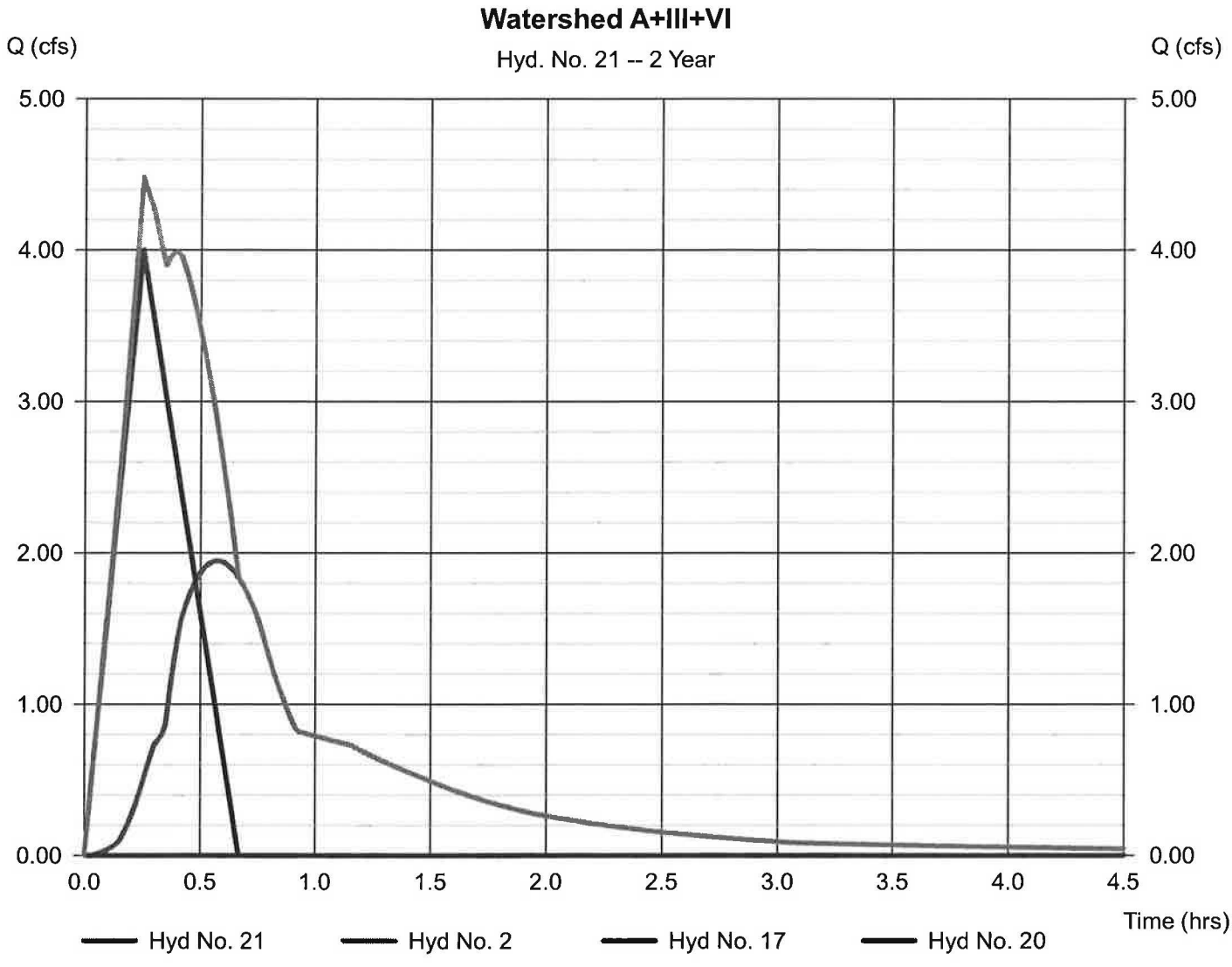
...End

Hydrograph Report

Hyd. No. 21

Watershed A+III+VI

Hydrograph type	= Combine	Peak discharge	= 4.482 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.25 hrs
Time interval	= 1 min	Hyd. volume	= 11,673 cuft
Inflow hyds.	= 2, 17, 20	Contrib. drain. area	= 2.700 ac



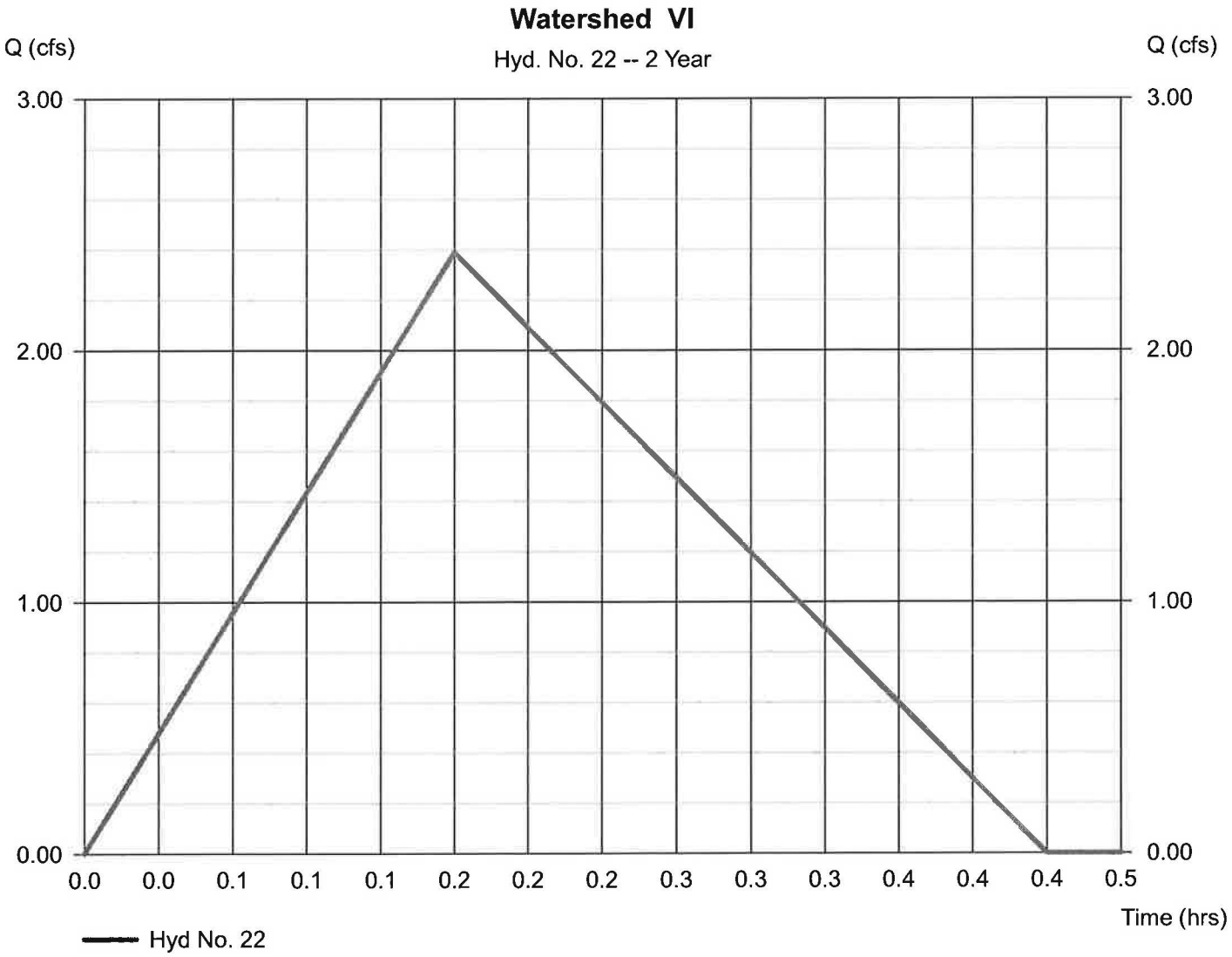
Hydrograph Report

Hyd. No. 22

Watershed VI

Hydrograph type	= Rational	Peak discharge	= 2.389 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 1,914 cuft
Drainage area	= 1.490 ac	Runoff coeff.	= 0.46*
Intensity	= 3.486 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.400 x 0.90) + (1.090 x 0.30)] / 1.490



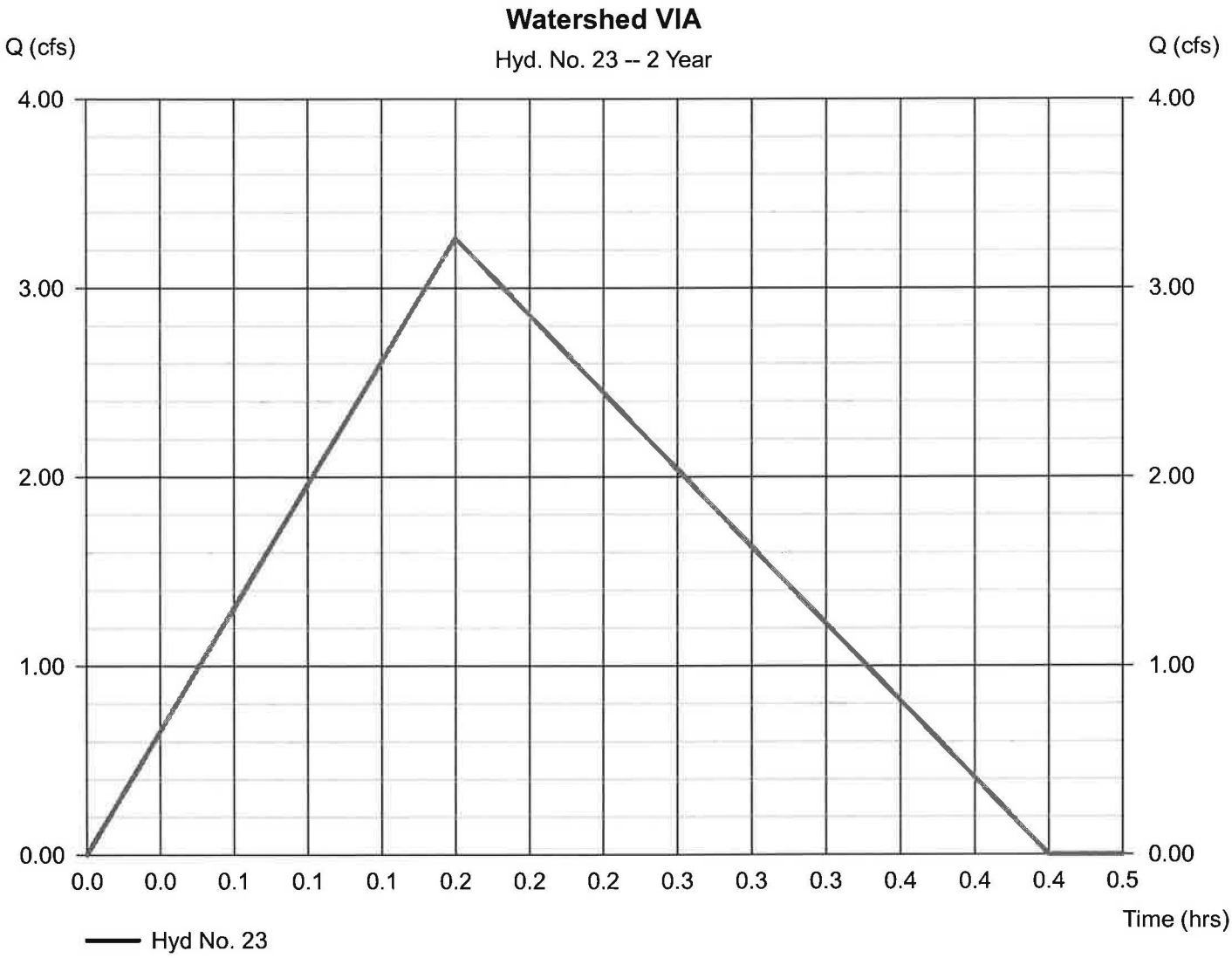
Hydrograph Report

Hyd. No. 23

Watershed VIA

Hydrograph type	= Rational	Peak discharge	= 3.263 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 2,614 cuft
Drainage area	= 1.170 ac	Runoff coeff.	= 0.8*
Intensity	= 3.486 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.970 x 0.90) + (0.200 x 0.30)] / 1.170



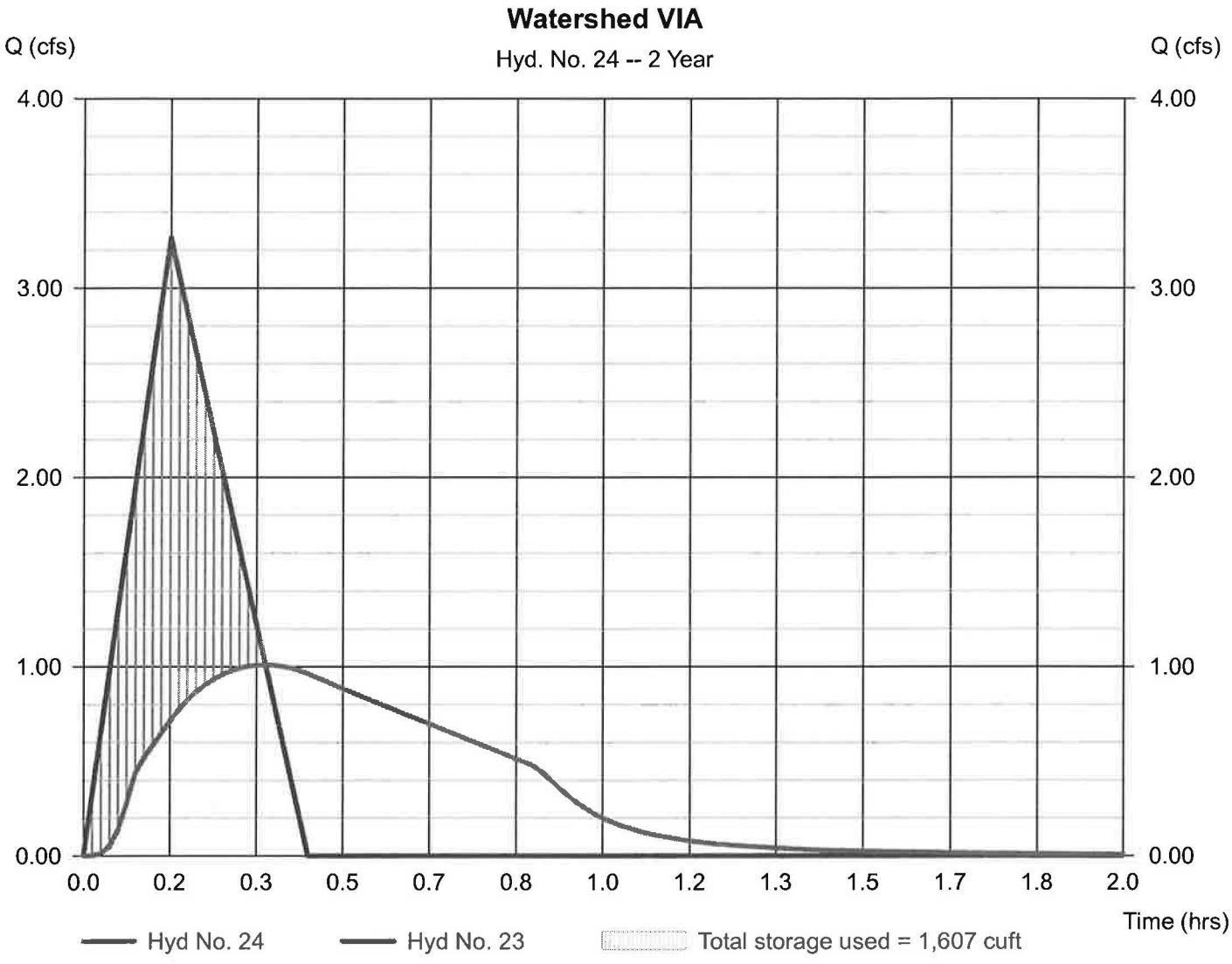
Hydrograph Report

Hyd. No. 24

Watershed VIA

Hydrograph type	= Reservoir	Peak discharge	= 1.009 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.35 hrs
Time interval	= 1 min	Hyd. volume	= 2,541 cuft
Inflow hyd. No.	= 23 - Watershed VIA	Max. Elevation	= 549.89 ft
Reservoir name	= Watershed VIA	Max. Storage	= 1,607 cuft

Storage Indication method used.



Pond No. 24 - Watershed VIA

Pond Data

Pond storage is based on user-defined values.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	548.50	n/a	0	0
0.50	549.00	n/a	338	338
1.00	549.50	n/a	727	1,065
1.50	550.00	n/a	696	1,761
2.00	550.50	n/a	648	2,409
2.50	551.00	n/a	574	2,983
3.00	551.50	n/a	424	3,407
3.50	552.00	n/a	338	3,745

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 6.00	0.00	0.00	0.00
Span (in)	= 6.00	0.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 548.50	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 5.00	0.00	0.00	0.00
Crest El. (ft)	= 551.50	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	548.50	0.00	---	---	---	0.00	---	---	---	---	---	0.00
0.05	34	548.55	0.01 ic	---	---	---	0.00	---	---	---	---	---	0.01
0.10	68	548.60	0.03 ic	---	---	---	0.00	---	---	---	---	---	0.03
0.15	101	548.65	0.07 ic	---	---	---	0.00	---	---	---	---	---	0.07
0.20	135	548.70	0.11 ic	---	---	---	0.00	---	---	---	---	---	0.11
0.25	169	548.75	0.17 ic	---	---	---	0.00	---	---	---	---	---	0.17
0.30	203	548.80	0.23 ic	---	---	---	0.00	---	---	---	---	---	0.23
0.35	237	548.85	0.30 ic	---	---	---	0.00	---	---	---	---	---	0.30
0.40	270	548.90	0.36 ic	---	---	---	0.00	---	---	---	---	---	0.36
0.45	304	548.95	0.43 ic	---	---	---	0.00	---	---	---	---	---	0.43
0.50	338	549.00	0.47 ic	---	---	---	0.00	---	---	---	---	---	0.47
0.55	411	549.05	0.52 ic	---	---	---	0.00	---	---	---	---	---	0.52
0.60	483	549.10	0.56 ic	---	---	---	0.00	---	---	---	---	---	0.56
0.65	556	549.15	0.60 ic	---	---	---	0.00	---	---	---	---	---	0.60
0.70	629	549.20	0.63 ic	---	---	---	0.00	---	---	---	---	---	0.63
0.75	702	549.25	0.67 ic	---	---	---	0.00	---	---	---	---	---	0.67
0.80	774	549.30	0.70 ic	---	---	---	0.00	---	---	---	---	---	0.70
0.85	847	549.35	0.73 ic	---	---	---	0.00	---	---	---	---	---	0.73
0.90	920	549.40	0.76 ic	---	---	---	0.00	---	---	---	---	---	0.76
0.95	992	549.45	0.79 ic	---	---	---	0.00	---	---	---	---	---	0.79
1.00	1,065	549.50	0.82 ic	---	---	---	0.00	---	---	---	---	---	0.82
1.05	1,135	549.55	0.85 ic	---	---	---	0.00	---	---	---	---	---	0.85
1.10	1,204	549.60	0.87 ic	---	---	---	0.00	---	---	---	---	---	0.87
1.15	1,274	549.65	0.90 ic	---	---	---	0.00	---	---	---	---	---	0.90
1.20	1,343	549.70	0.92 ic	---	---	---	0.00	---	---	---	---	---	0.92
1.25	1,413	549.75	0.95 ic	---	---	---	0.00	---	---	---	---	---	0.95
1.30	1,483	549.80	0.97 ic	---	---	---	0.00	---	---	---	---	---	0.97
1.35	1,552	549.85	0.99 ic	---	---	---	0.00	---	---	---	---	---	0.99
1.40	1,622	549.90	1.01 ic	---	---	---	0.00	---	---	---	---	---	1.01
1.45	1,691	549.95	1.04 ic	---	---	---	0.00	---	---	---	---	---	1.04
1.50	1,761	550.00	1.06 ic	---	---	---	0.00	---	---	---	---	---	1.06
1.55	1,826	550.05	1.08 ic	---	---	---	0.00	---	---	---	---	---	1.08
1.60	1,891	550.10	1.10 ic	---	---	---	0.00	---	---	---	---	---	1.10
1.65	1,955	550.15	1.12 ic	---	---	---	0.00	---	---	---	---	---	1.12

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Watershed VIA

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
1.70	2,020	550.20	1.14 ic	---	---	---	0.00	---	---	---	---	---	1.14
1.75	2,085	550.25	1.16 ic	---	---	---	0.00	---	---	---	---	---	1.16
1.80	2,150	550.30	1.18 ic	---	---	---	0.00	---	---	---	---	---	1.18
1.85	2,215	550.35	1.20 ic	---	---	---	0.00	---	---	---	---	---	1.20
1.90	2,279	550.40	1.21 ic	---	---	---	0.00	---	---	---	---	---	1.21
1.95	2,344	550.45	1.23 ic	---	---	---	0.00	---	---	---	---	---	1.23
2.00	2,409	550.50	1.25 ic	---	---	---	0.00	---	---	---	---	---	1.25
2.05	2,466	550.55	1.27 ic	---	---	---	0.00	---	---	---	---	---	1.27
2.10	2,524	550.60	1.29 ic	---	---	---	0.00	---	---	---	---	---	1.29
2.15	2,581	550.65	1.30 ic	---	---	---	0.00	---	---	---	---	---	1.30
2.20	2,639	550.70	1.32 ic	---	---	---	0.00	---	---	---	---	---	1.32
2.25	2,696	550.75	1.34 ic	---	---	---	0.00	---	---	---	---	---	1.34
2.30	2,753	550.80	1.35 ic	---	---	---	0.00	---	---	---	---	---	1.35
2.35	2,811	550.85	1.37 ic	---	---	---	0.00	---	---	---	---	---	1.37
2.40	2,868	550.90	1.39 ic	---	---	---	0.00	---	---	---	---	---	1.39
2.45	2,926	550.95	1.40 ic	---	---	---	0.00	---	---	---	---	---	1.40
2.50	2,983	551.00	1.42 ic	---	---	---	0.00	---	---	---	---	---	1.42
2.55	3,025	551.05	1.43 ic	---	---	---	0.00	---	---	---	---	---	1.43
2.60	3,068	551.10	1.45 ic	---	---	---	0.00	---	---	---	---	---	1.45
2.65	3,110	551.15	1.46 ic	---	---	---	0.00	---	---	---	---	---	1.46
2.70	3,153	551.20	1.48 ic	---	---	---	0.00	---	---	---	---	---	1.48
2.75	3,195	551.25	1.49 ic	---	---	---	0.00	---	---	---	---	---	1.49
2.80	3,237	551.30	1.51 ic	---	---	---	0.00	---	---	---	---	---	1.51
2.85	3,280	551.35	1.52 ic	---	---	---	0.00	---	---	---	---	---	1.52
2.90	3,322	551.40	1.54 ic	---	---	---	0.00	---	---	---	---	---	1.54
2.95	3,365	551.45	1.55 ic	---	---	---	0.00	---	---	---	---	---	1.55
3.00	3,407	551.50	1.57 ic	---	---	---	0.00	---	---	---	---	---	1.57
3.05	3,441	551.55	1.58 ic	---	---	---	0.19	---	---	---	---	---	1.77
3.10	3,475	551.60	1.60 ic	---	---	---	0.53	---	---	---	---	---	2.12
3.15	3,508	551.65	1.61 ic	---	---	---	0.97	---	---	---	---	---	2.58
3.20	3,542	551.70	1.62 ic	---	---	---	1.49	---	---	---	---	---	3.11
3.25	3,576	551.75	1.64 ic	---	---	---	2.08	---	---	---	---	---	3.72
3.30	3,610	551.80	1.65 ic	---	---	---	2.73	---	---	---	---	---	4.39
3.35	3,644	551.85	1.66 ic	---	---	---	3.45	---	---	---	---	---	5.11
3.40	3,677	551.90	1.68 ic	---	---	---	4.21	---	---	---	---	---	5.89
3.45	3,711	551.95	1.69 ic	---	---	---	5.02	---	---	---	---	---	6.72
3.50	3,745	552.00	1.70 ic	---	---	---	5.89	---	---	---	---	---	7.59

...End

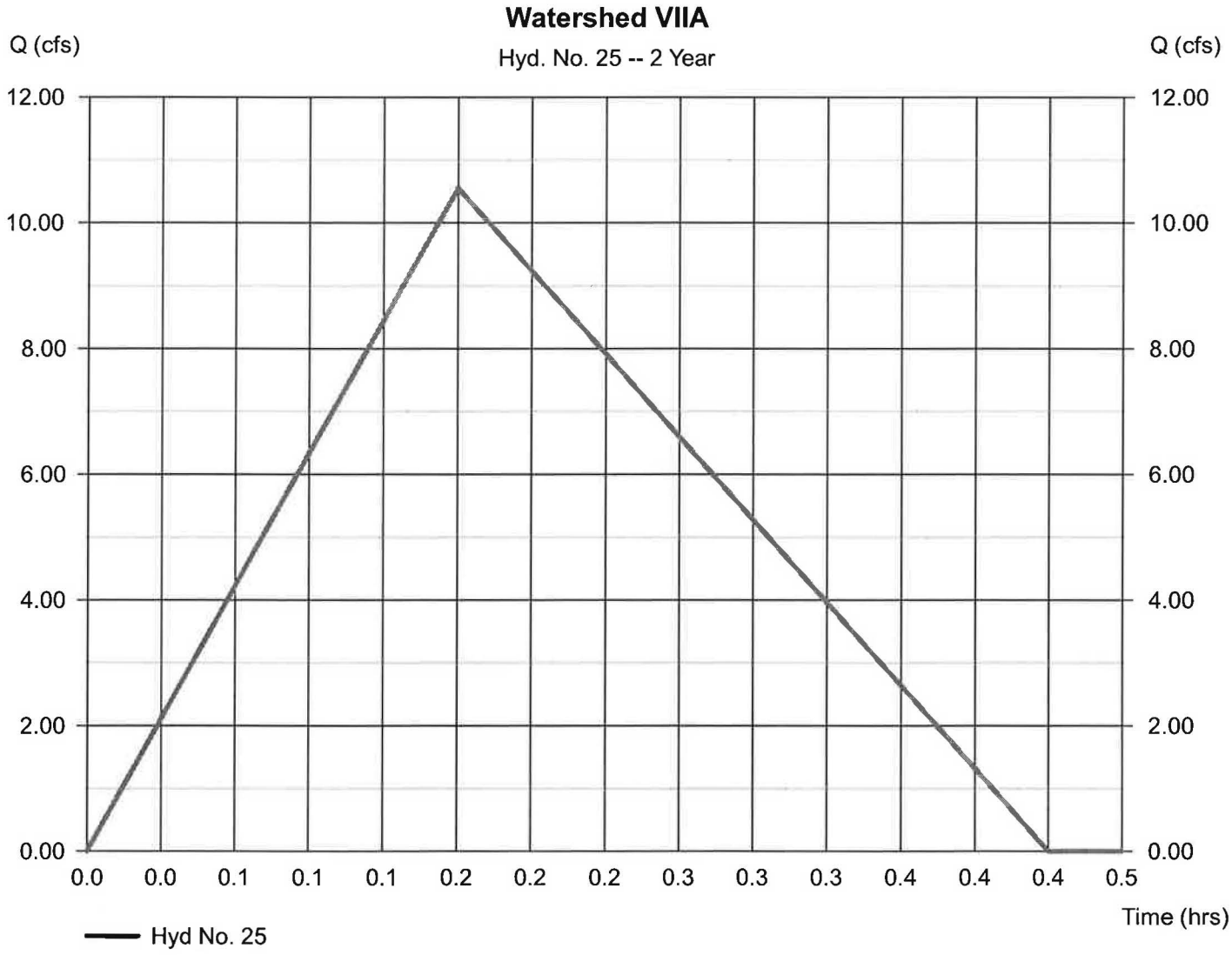
Hydrograph Report

Hyd. No. 25

Watershed VIIA

Hydrograph type	= Rational	Peak discharge	= 10.55 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 8,451 cuft
Drainage area	= 4.090 ac	Runoff coeff.	= 0.74*
Intensity	= 3.486 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(3.020 x 0.90) + (1.070 x 0.30)] / 4.090



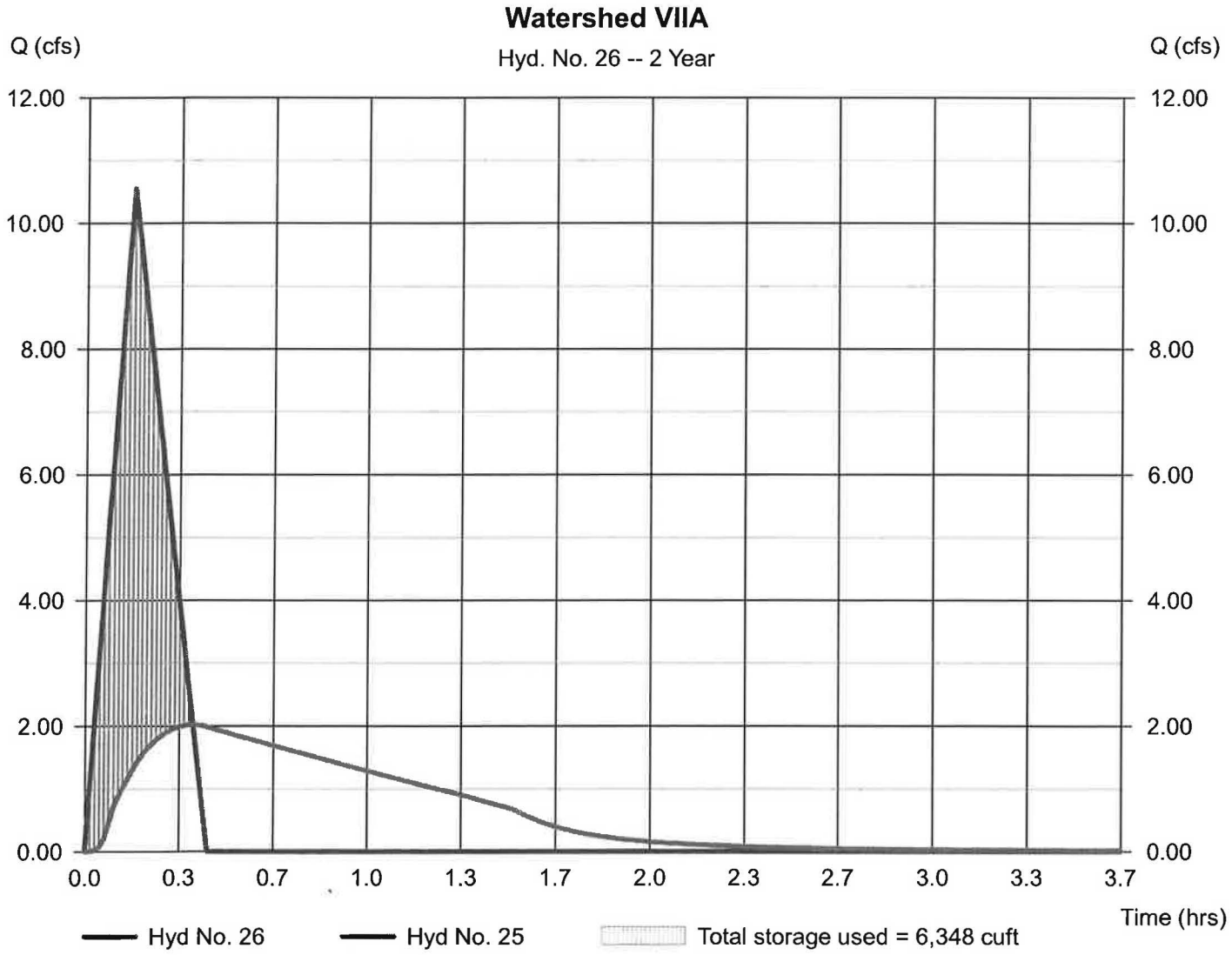
Hydrograph Report

Hyd. No. 26

Watershed VIIA

Hydrograph type	= Reservoir	Peak discharge	= 2.017 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.38 hrs
Time interval	= 1 min	Hyd. volume	= 8,218 cuft
Inflow hyd. No.	= 25 - Watershed VIIA	Max. Elevation	= 546.27 ft
Reservoir name	= Watershed VIIA	Max. Storage	= 6,348 cuft

Storage Indication method used.



Pond No. 5 - Watershed VIIA

Pond Data

Pond storage is based on user-defined values.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	544.50	n/a	0	0
0.50	545.00	n/a	1,014	1,014
1.00	545.50	n/a	2,182	3,196
1.50	546.00	n/a	2,088	5,284
2.00	546.50	n/a	1,944	7,228
2.50	547.00	n/a	1,721	8,949
3.00	547.50	n/a	1,272	10,221
3.50	548.00	n/a	1,014	11,235

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 8.00	0.00	0.00	0.00
Span (in)	= 8.00	0.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 544.50	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 5.00	0.00	0.00	0.00
Crest El. (ft)	= 547.50	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	544.50	0.00	---	---	---	0.00	---	---	---	---	---	0.00
0.05	101	544.55	0.01 ic	---	---	---	0.00	---	---	---	---	---	0.01
0.10	203	544.60	0.04 ic	---	---	---	0.00	---	---	---	---	---	0.04
0.15	304	544.65	0.08 ic	---	---	---	0.00	---	---	---	---	---	0.08
0.20	406	544.70	0.13 ic	---	---	---	0.00	---	---	---	---	---	0.13
0.25	507	544.75	0.20 ic	---	---	---	0.00	---	---	---	---	---	0.20
0.30	608	544.80	0.28 ic	---	---	---	0.00	---	---	---	---	---	0.28
0.35	710	544.85	0.37 ic	---	---	---	0.00	---	---	---	---	---	0.37
0.40	811	544.90	0.47 ic	---	---	---	0.00	---	---	---	---	---	0.47
0.45	913	544.95	0.57 ic	---	---	---	0.00	---	---	---	---	---	0.57
0.50	1,014	545.00	0.68 ic	---	---	---	0.00	---	---	---	---	---	0.68
0.55	1,232	545.05	0.78 ic	---	---	---	0.00	---	---	---	---	---	0.78
0.60	1,450	545.10	0.87 ic	---	---	---	0.00	---	---	---	---	---	0.87
0.65	1,669	545.15	0.95 ic	---	---	---	0.00	---	---	---	---	---	0.95
0.70	1,887	545.20	1.02 ic	---	---	---	0.00	---	---	---	---	---	1.02
0.75	2,105	545.25	1.08 ic	---	---	---	0.00	---	---	---	---	---	1.08
0.80	2,323	545.30	1.15 ic	---	---	---	0.00	---	---	---	---	---	1.15
0.85	2,541	545.35	1.21 ic	---	---	---	0.00	---	---	---	---	---	1.21
0.90	2,760	545.40	1.26 ic	---	---	---	0.00	---	---	---	---	---	1.26
0.95	2,978	545.45	1.32 ic	---	---	---	0.00	---	---	---	---	---	1.32
1.00	3,196	545.50	1.37 ic	---	---	---	0.00	---	---	---	---	---	1.37
1.05	3,405	545.55	1.42 ic	---	---	---	0.00	---	---	---	---	---	1.42
1.10	3,614	545.60	1.47 ic	---	---	---	0.00	---	---	---	---	---	1.47
1.15	3,822	545.65	1.52 ic	---	---	---	0.00	---	---	---	---	---	1.52
1.20	4,031	545.70	1.56 ic	---	---	---	0.00	---	---	---	---	---	1.56
1.25	4,240	545.75	1.61 ic	---	---	---	0.00	---	---	---	---	---	1.61
1.30	4,449	545.80	1.65 ic	---	---	---	0.00	---	---	---	---	---	1.65
1.35	4,658	545.85	1.69 ic	---	---	---	0.00	---	---	---	---	---	1.69
1.40	4,866	545.90	1.74 ic	---	---	---	0.00	---	---	---	---	---	1.74
1.45	5,075	545.95	1.78 ic	---	---	---	0.00	---	---	---	---	---	1.78
1.50	5,284	546.00	1.82 ic	---	---	---	0.00	---	---	---	---	---	1.82
1.55	5,478	546.05	1.85 ic	---	---	---	0.00	---	---	---	---	---	1.85
1.60	5,673	546.10	1.89 ic	---	---	---	0.00	---	---	---	---	---	1.89
1.65	5,867	546.15	1.93 ic	---	---	---	0.00	---	---	---	---	---	1.93

Continues on next page...

Watershed VIIA

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
1.70	6,062	546.20	1.96 ic	---	---	---	0.00	---	---	---	---	---	1.96
1.75	6,256	546.25	2.00 ic	---	---	---	0.00	---	---	---	---	---	2.00
1.80	6,450	546.30	2.04 ic	---	---	---	0.00	---	---	---	---	---	2.04
1.85	6,645	546.35	2.07 ic	---	---	---	0.00	---	---	---	---	---	2.07
1.90	6,839	546.40	2.10 ic	---	---	---	0.00	---	---	---	---	---	2.10
1.95	7,034	546.45	2.14 ic	---	---	---	0.00	---	---	---	---	---	2.14
2.00	7,228	546.50	2.17 ic	---	---	---	0.00	---	---	---	---	---	2.17
2.05	7,400	546.55	2.20 ic	---	---	---	0.00	---	---	---	---	---	2.20
2.10	7,572	546.60	2.23 ic	---	---	---	0.00	---	---	---	---	---	2.23
2.15	7,744	546.65	2.27 ic	---	---	---	0.00	---	---	---	---	---	2.27
2.20	7,916	546.70	2.30 ic	---	---	---	0.00	---	---	---	---	---	2.30
2.25	8,089	546.75	2.33 ic	---	---	---	0.00	---	---	---	---	---	2.33
2.30	8,261	546.80	2.36 ic	---	---	---	0.00	---	---	---	---	---	2.36
2.35	8,433	546.85	2.39 ic	---	---	---	0.00	---	---	---	---	---	2.39
2.40	8,605	546.90	2.42 ic	---	---	---	0.00	---	---	---	---	---	2.42
2.45	8,777	546.95	2.44 ic	---	---	---	0.00	---	---	---	---	---	2.44
2.50	8,949	547.00	2.47 ic	---	---	---	0.00	---	---	---	---	---	2.47
2.55	9,076	547.05	2.50 ic	---	---	---	0.00	---	---	---	---	---	2.50
2.60	9,203	547.10	2.53 ic	---	---	---	0.00	---	---	---	---	---	2.53
2.65	9,331	547.15	2.56 ic	---	---	---	0.00	---	---	---	---	---	2.56
2.70	9,458	547.20	2.59 ic	---	---	---	0.00	---	---	---	---	---	2.59
2.75	9,585	547.25	2.61 ic	---	---	---	0.00	---	---	---	---	---	2.61
2.80	9,712	547.30	2.64 ic	---	---	---	0.00	---	---	---	---	---	2.64
2.85	9,839	547.35	2.67 ic	---	---	---	0.00	---	---	---	---	---	2.67
2.90	9,967	547.40	2.69 ic	---	---	---	0.00	---	---	---	---	---	2.69
2.95	10,094	547.45	2.72 ic	---	---	---	0.00	---	---	---	---	---	2.72
3.00	10,221	547.50	2.74 ic	---	---	---	0.00	---	---	---	---	---	2.74
3.05	10,322	547.55	2.77 ic	---	---	---	0.19	---	---	---	---	---	2.96
3.10	10,424	547.60	2.80 ic	---	---	---	0.53	---	---	---	---	---	3.32
3.15	10,525	547.65	2.82 ic	---	---	---	0.97	---	---	---	---	---	3.79
3.20	10,627	547.70	2.85 ic	---	---	---	1.49	---	---	---	---	---	4.33
3.25	10,728	547.75	2.87 ic	---	---	---	2.08	---	---	---	---	---	4.95
3.30	10,829	547.80	2.89 ic	---	---	---	2.73	---	---	---	---	---	5.63
3.35	10,931	547.85	2.92 ic	---	---	---	3.45	---	---	---	---	---	6.37
3.40	11,032	547.90	2.94 ic	---	---	---	4.21	---	---	---	---	---	7.15
3.45	11,134	547.95	2.97 ic	---	---	---	5.02	---	---	---	---	---	7.99
3.50	11,235	548.00	2.99 ic	---	---	---	5.89	---	---	---	---	---	8.88

...End

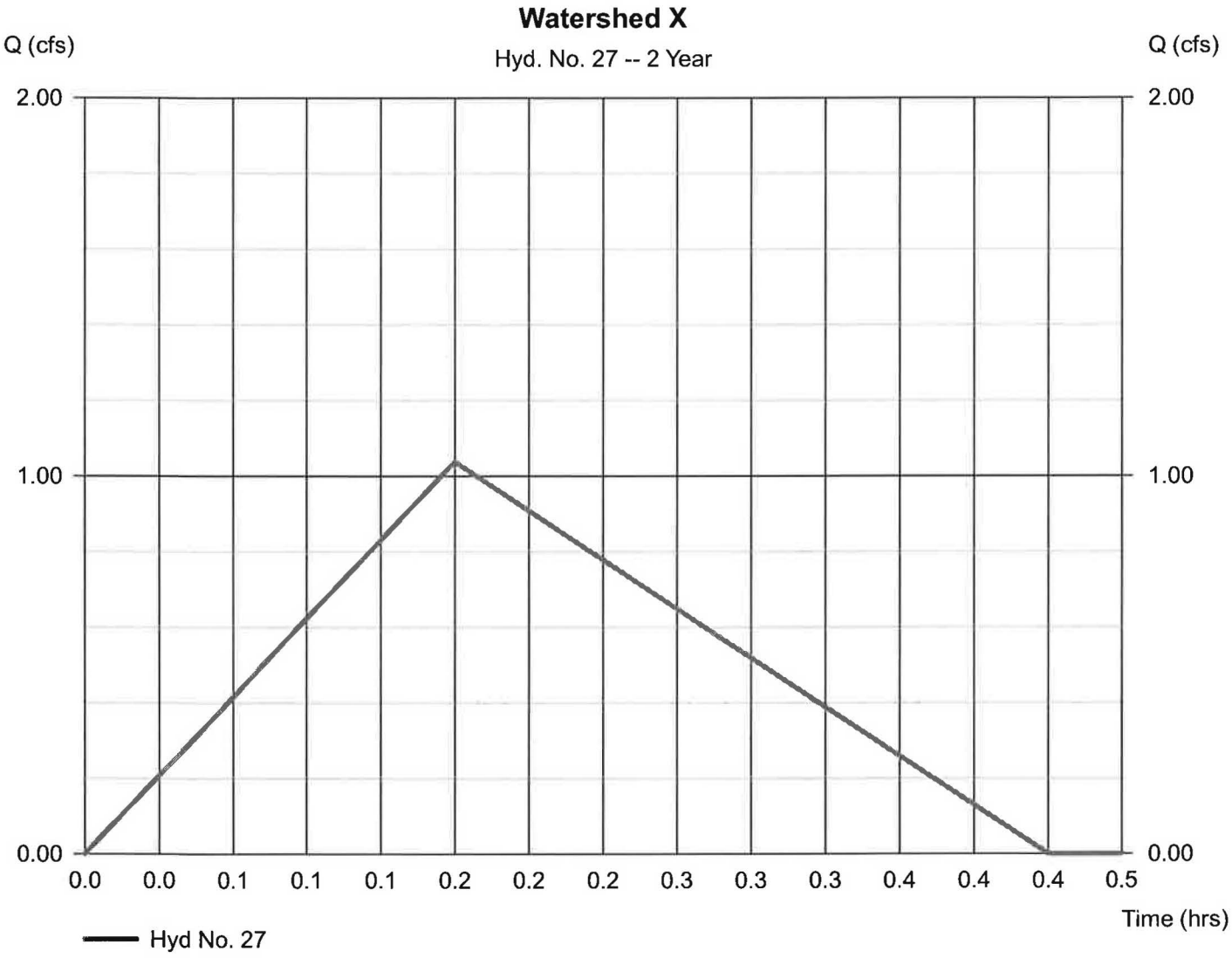
Hydrograph Report

Hyd. No. 27

Watershed X

Hydrograph type	= Rational	Peak discharge	= 1.037 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 831 cuft
Drainage area	= 0.930 ac	Runoff coeff.	= 0.32*
Intensity	= 3.486 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.100 x 0.90) + (0.410 x 0.30) + (0.420 x 0.20)] / 0.930



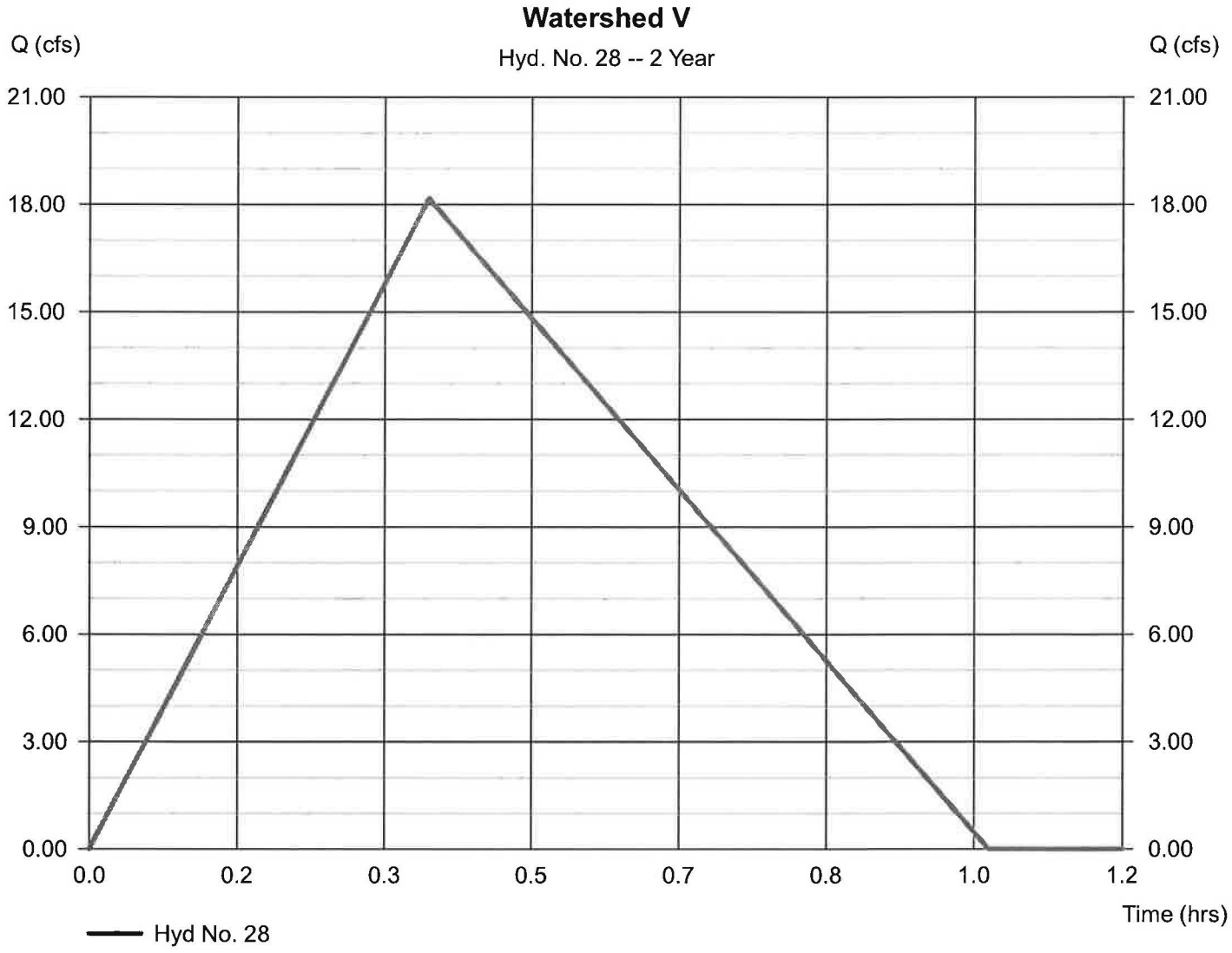
Hydrograph Report

Hyd. No. 28

Watershed V

Hydrograph type	= Rational	Peak discharge	= 18.16 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.38 hrs
Time interval	= 1 min	Hyd. volume	= 33,461 cuft
Drainage area	= 26.200 ac	Runoff coeff.	= 0.31*
Intensity	= 2.236 in/hr	Tc by TR55	= 23.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(2.500 x 0.90) + (10.640 x 0.30) + (13.060 x 0.20)] / 26.200



TR55 Tc Worksheet

Hyd. No. 28

Watershed V

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.240		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.20		0.00		0.00		
Land slope (%)	= 4.50		0.00		0.00		
Travel Time (min)	**= 10.32**	**+**	**0.00**	**+**	**0.00**	**=**	**10.32**
Shallow Concentrated Flow							
Flow length (ft)	= 248.00		0.00		0.00		
Watercourse slope (%)	= 5.20		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	= 3.68		0.00		0.00		
Travel Time (min)	**= 1.12**	**+**	**0.00**	**+**	**0.00**	**=**	**1.12**
Channel Flow							
X sectional flow area (sqft)	= 0.63		2.00		0.00		
Wetted perimeter (ft)	= 3.12		5.24		0.00		
Channel slope (%)	= 2.50		1.21		0.00		
Manning's n-value	= 0.040		0.040		0.015		
Velocity (ft/s)	= 2.01		2.15		0.00		
Flow length (ft)	= 623.0		797.0		0.0		
Travel Time (min)	**= 5.17**	**+**	**6.18**	**+**	**0.00**	**=**	**11.35**

Total Travel Time, Tc ..... 23.00 min

Hydrograph Report

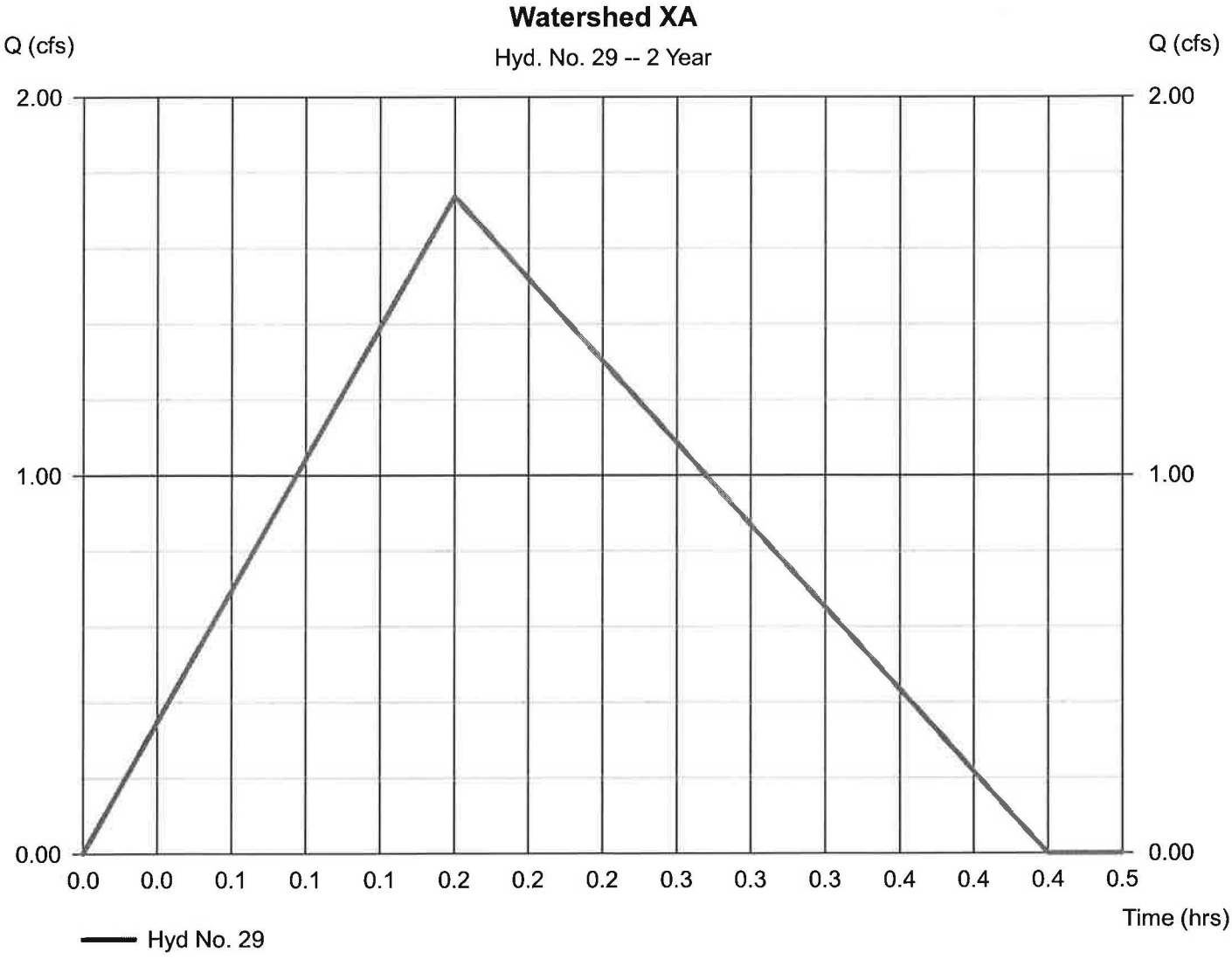
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 29

Watershed XA

Hydrograph type	= Rational	Peak discharge	= 1.737 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 1,391 cuft
Drainage area	= 0.940 ac	Runoff coeff.	= 0.53*
Intensity	= 3.486 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.390 x 0.90) + (0.350 x 0.30) + (0.200 x 0.20)] / 0.940



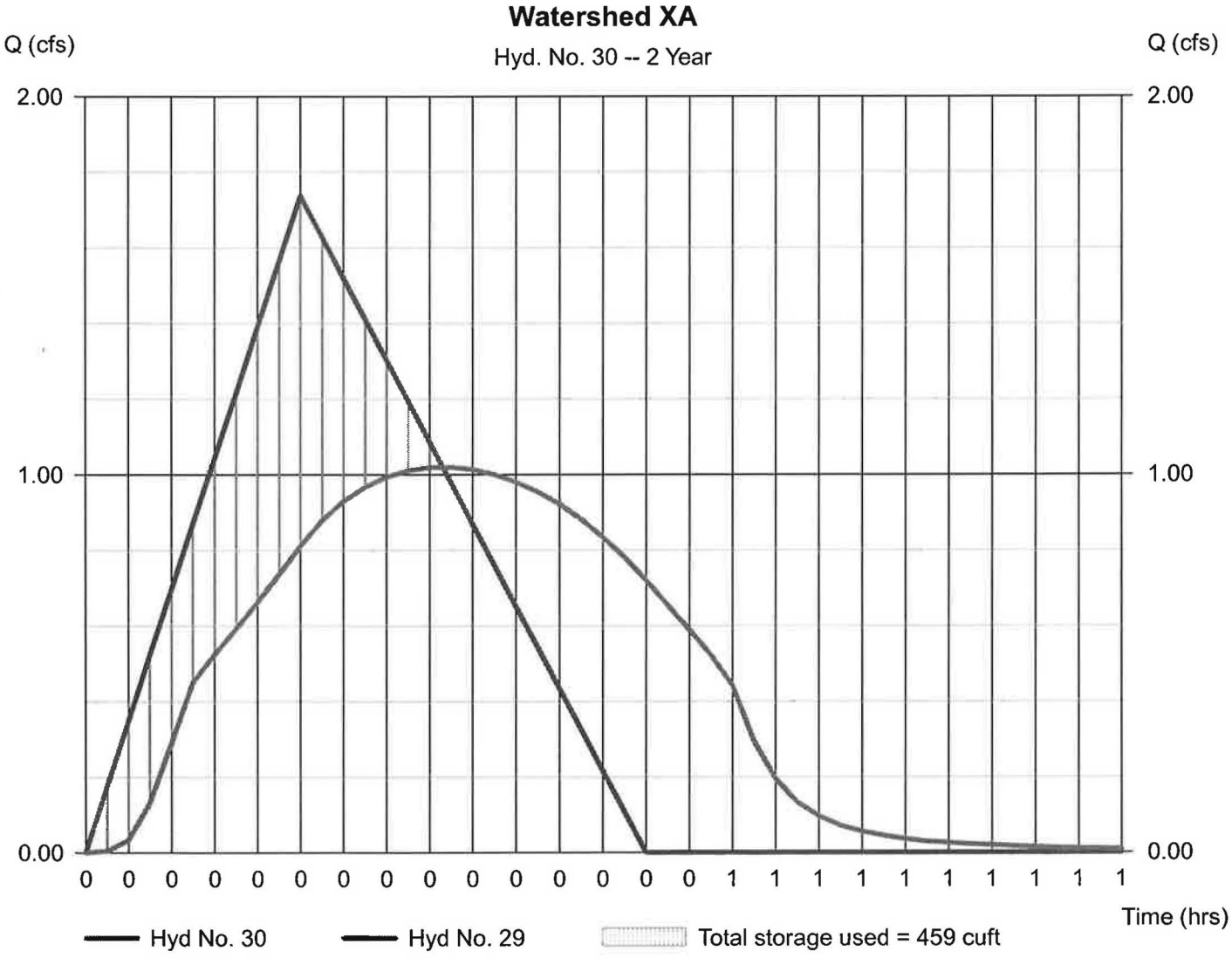
Hydrograph Report

Hyd. No. 30

Watershed XA

Hydrograph type	= Reservoir	Peak discharge	= 1.019 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.28 hrs
Time interval	= 1 min	Hyd. volume	= 1,353 cuft
Inflow hyd. No.	= 29 - Watershed XA	Max. Elevation	= 556.92 ft
Reservoir name	= Watershed XA	Max. Storage	= 459 cuft

Storage Indication method used.



Pond Report

Pond No. 23 - Watershed XA

Pond Data

Pond storage is based on user-defined values.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	555.50	n/a	0	0
0.50	556.00	n/a	94	94
1.00	556.50	n/a	204	298
1.50	557.00	n/a	195	493
2.00	557.50	n/a	181	674
2.50	558.00	n/a	161	835
3.00	558.50	n/a	118	953
3.50	559.00	n/a	95	1,048

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 6.00	0.00	0.00	0.00
Span (in)	= 6.00	0.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 555.50	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 5.00	0.00	0.00	0.00
Crest El. (ft)	= 558.50	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	555.50	0.00	---	---	---	0.00	---	---	---	---	---	0.00
0.05	9	555.55	0.01 ic	---	---	---	0.00	---	---	---	---	---	0.01
0.10	19	555.60	0.03 ic	---	---	---	0.00	---	---	---	---	---	0.03
0.15	28	555.65	0.07 ic	---	---	---	0.00	---	---	---	---	---	0.07
0.20	38	555.70	0.11 ic	---	---	---	0.00	---	---	---	---	---	0.11
0.25	47	555.75	0.17 ic	---	---	---	0.00	---	---	---	---	---	0.17
0.30	56	555.80	0.23 ic	---	---	---	0.00	---	---	---	---	---	0.23
0.35	66	555.85	0.30 ic	---	---	---	0.00	---	---	---	---	---	0.30
0.40	75	555.90	0.36 ic	---	---	---	0.00	---	---	---	---	---	0.36
0.45	85	555.95	0.43 ic	---	---	---	0.00	---	---	---	---	---	0.43
0.50	94	556.00	0.47 ic	---	---	---	0.00	---	---	---	---	---	0.47
0.55	114	556.05	0.52 ic	---	---	---	0.00	---	---	---	---	---	0.52
0.60	135	556.10	0.56 ic	---	---	---	0.00	---	---	---	---	---	0.56
0.65	155	556.15	0.60 ic	---	---	---	0.00	---	---	---	---	---	0.60
0.70	176	556.20	0.63 ic	---	---	---	0.00	---	---	---	---	---	0.63
0.75	196	556.25	0.67 ic	---	---	---	0.00	---	---	---	---	---	0.67
0.80	216	556.30	0.70 ic	---	---	---	0.00	---	---	---	---	---	0.70
0.85	237	556.35	0.73 ic	---	---	---	0.00	---	---	---	---	---	0.73
0.90	257	556.40	0.76 ic	---	---	---	0.00	---	---	---	---	---	0.76
0.95	278	556.45	0.79 ic	---	---	---	0.00	---	---	---	---	---	0.79
1.00	298	556.50	0.82 ic	---	---	---	0.00	---	---	---	---	---	0.82
1.05	318	556.55	0.85 ic	---	---	---	0.00	---	---	---	---	---	0.85
1.10	337	556.60	0.87 ic	---	---	---	0.00	---	---	---	---	---	0.87
1.15	357	556.65	0.90 ic	---	---	---	0.00	---	---	---	---	---	0.90
1.20	376	556.70	0.92 ic	---	---	---	0.00	---	---	---	---	---	0.92
1.25	396	556.75	0.95 ic	---	---	---	0.00	---	---	---	---	---	0.95
1.30	415	556.80	0.97 ic	---	---	---	0.00	---	---	---	---	---	0.97
1.35	435	556.85	0.99 ic	---	---	---	0.00	---	---	---	---	---	0.99
1.40	454	556.90	1.01 ic	---	---	---	0.00	---	---	---	---	---	1.01
1.45	474	556.95	1.04 ic	---	---	---	0.00	---	---	---	---	---	1.04
1.50	493	557.00	1.06 ic	---	---	---	0.00	---	---	---	---	---	1.06
1.55	511	557.05	1.08 ic	---	---	---	0.00	---	---	---	---	---	1.08
1.60	529	557.10	1.10 ic	---	---	---	0.00	---	---	---	---	---	1.10
1.65	547	557.15	1.12 ic	---	---	---	0.00	---	---	---	---	---	1.12

Continues on next page...

Watershed XA

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
1.70	565	557.20	1.14 ic	---	---	---	0.00	---	---	---	---	---	1.14
1.75	583	557.25	1.16 ic	---	---	---	0.00	---	---	---	---	---	1.16
1.80	602	557.30	1.18 ic	---	---	---	0.00	---	---	---	---	---	1.18
1.85	620	557.35	1.20 ic	---	---	---	0.00	---	---	---	---	---	1.20
1.90	638	557.40	1.21 ic	---	---	---	0.00	---	---	---	---	---	1.21
1.95	656	557.45	1.23 ic	---	---	---	0.00	---	---	---	---	---	1.23
2.00	674	557.50	1.25 ic	---	---	---	0.00	---	---	---	---	---	1.25
2.05	690	557.55	1.27 ic	---	---	---	0.00	---	---	---	---	---	1.27
2.10	706	557.60	1.29 ic	---	---	---	0.00	---	---	---	---	---	1.29
2.15	722	557.65	1.30 ic	---	---	---	0.00	---	---	---	---	---	1.30
2.20	738	557.70	1.32 ic	---	---	---	0.00	---	---	---	---	---	1.32
2.25	754	557.75	1.34 ic	---	---	---	0.00	---	---	---	---	---	1.34
2.30	771	557.80	1.35 ic	---	---	---	0.00	---	---	---	---	---	1.35
2.35	787	557.85	1.37 ic	---	---	---	0.00	---	---	---	---	---	1.37
2.40	803	557.90	1.39 ic	---	---	---	0.00	---	---	---	---	---	1.39
2.45	819	557.95	1.40 ic	---	---	---	0.00	---	---	---	---	---	1.40
2.50	835	558.00	1.42 ic	---	---	---	0.00	---	---	---	---	---	1.42
2.55	847	558.05	1.43 ic	---	---	---	0.00	---	---	---	---	---	1.43
2.60	859	558.10	1.45 ic	---	---	---	0.00	---	---	---	---	---	1.45
2.65	870	558.15	1.46 ic	---	---	---	0.00	---	---	---	---	---	1.46
2.70	882	558.20	1.48 ic	---	---	---	0.00	---	---	---	---	---	1.48
2.75	894	558.25	1.49 ic	---	---	---	0.00	---	---	---	---	---	1.49
2.80	906	558.30	1.51 ic	---	---	---	0.00	---	---	---	---	---	1.51
2.85	918	558.35	1.52 ic	---	---	---	0.00	---	---	---	---	---	1.52
2.90	929	558.40	1.54 ic	---	---	---	0.00	---	---	---	---	---	1.54
2.95	941	558.45	1.55 ic	---	---	---	0.00	---	---	---	---	---	1.55
3.00	953	558.50	1.57 ic	---	---	---	0.00	---	---	---	---	---	1.57
3.05	963	558.55	1.58 ic	---	---	---	0.19	---	---	---	---	---	1.77
3.10	972	558.60	1.60 ic	---	---	---	0.53	---	---	---	---	---	2.12
3.15	982	558.65	1.61 ic	---	---	---	0.97	---	---	---	---	---	2.58
3.20	991	558.70	1.62 ic	---	---	---	1.49	---	---	---	---	---	3.11
3.25	1,001	558.75	1.64 ic	---	---	---	2.08	---	---	---	---	---	3.72
3.30	1,010	558.80	1.65 ic	---	---	---	2.73	---	---	---	---	---	4.39
3.35	1,020	558.85	1.66 ic	---	---	---	3.45	---	---	---	---	---	5.11
3.40	1,029	558.90	1.68 ic	---	---	---	4.21	---	---	---	---	---	5.89
3.45	1,039	558.95	1.69 ic	---	---	---	5.02	---	---	---	---	---	6.72
3.50	1,048	559.00	1.70 ic	---	---	---	5.89	---	---	---	---	---	7.59

...End

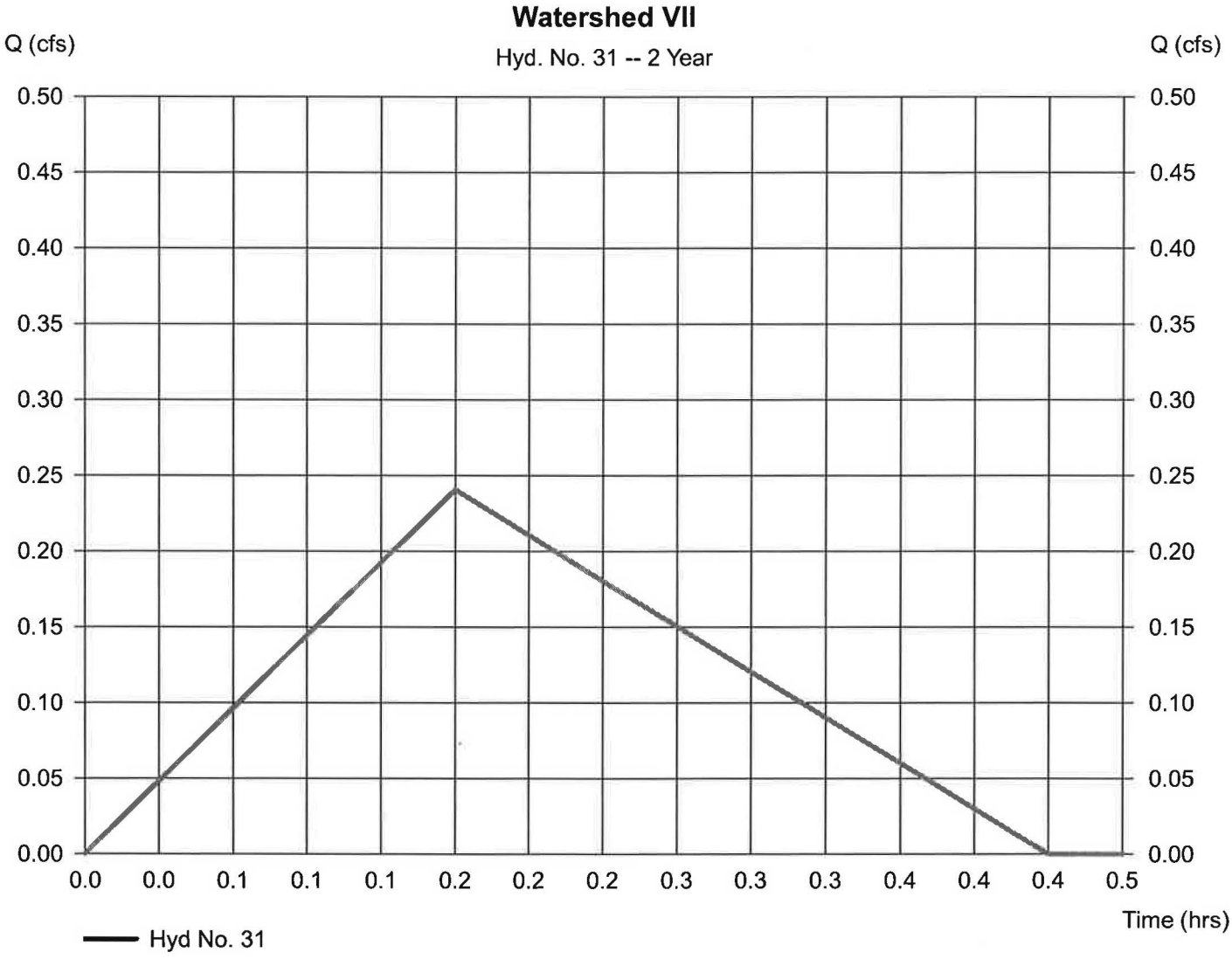
Hydrograph Report

Hyd. No. 31

Watershed VII

Hydrograph type	= Rational	Peak discharge	= 0.241 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 193 cuft
Drainage area	= 0.230 ac	Runoff coeff.	= 0.3*
Intensity	= 3.486 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.230 x 0.30)] / 0.230

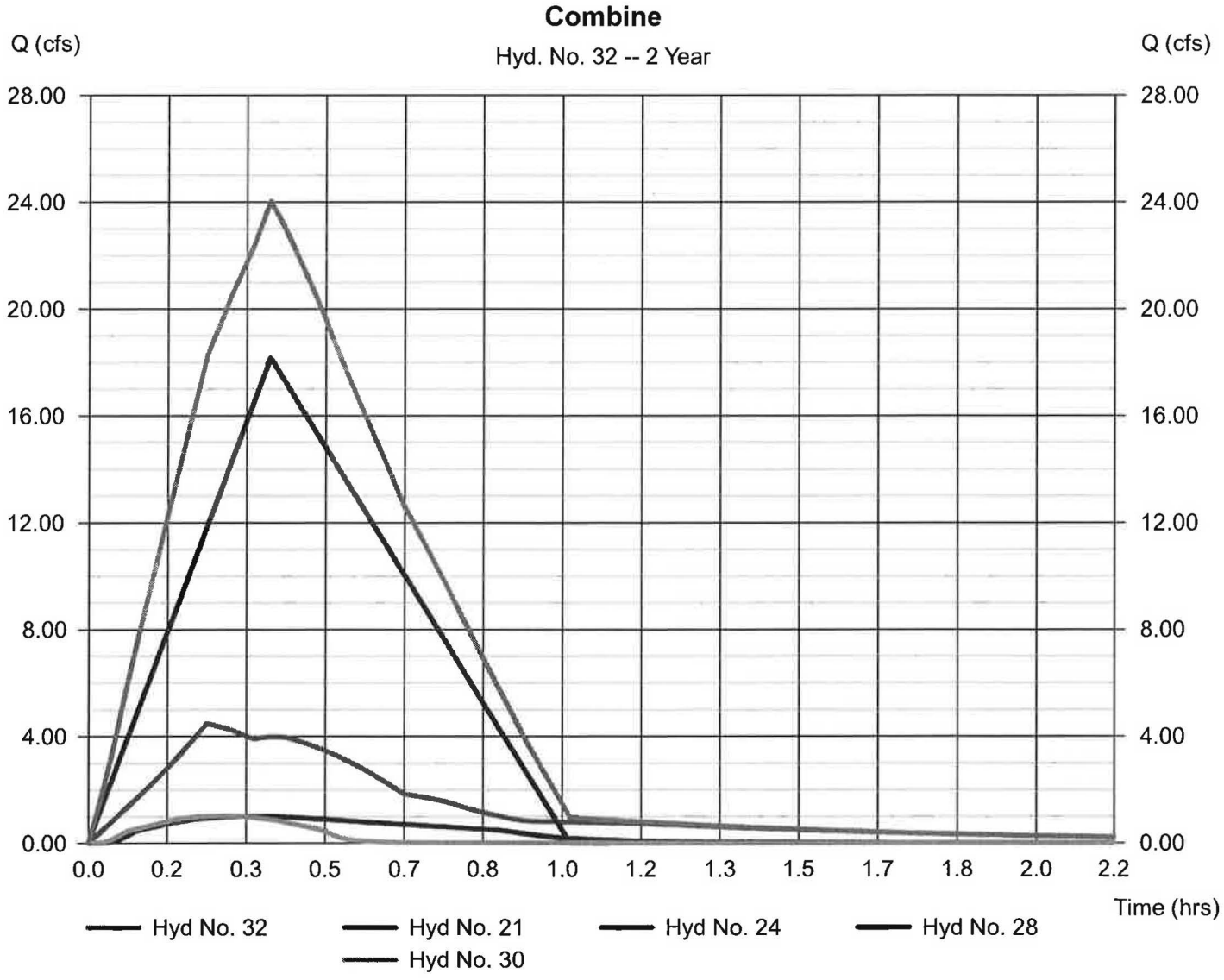


Hydrograph Report

Hyd. No. 32

Combine

Hydrograph type	= Combine	Peak discharge	= 24.03 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.38 hrs
Time interval	= 1 min	Hyd. volume	= 48,805 cuft
Inflow hyds.	= 21, 24, 28, 30	Contrib. drain. area	= 26.200 ac



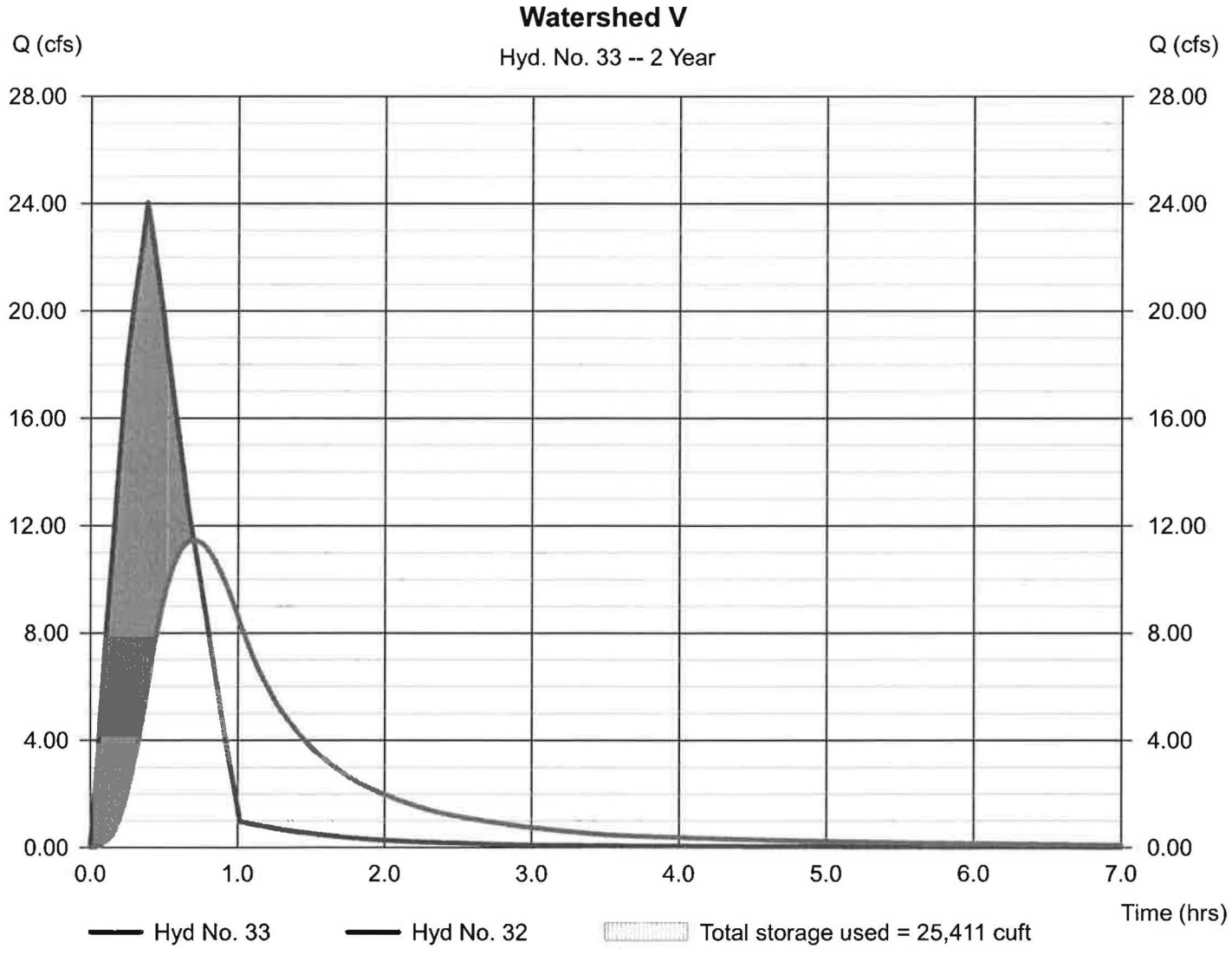
Hydrograph Report

Hyd. No. 33

Watershed V

Hydrograph type	= Reservoir	Peak discharge	= 11.45 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.70 hrs
Time interval	= 1 min	Hyd. volume	= 48,798 cuft
Inflow hyd. No.	= 32 - Combine	Max. Elevation	= 543.69 ft
Reservoir name	= Watershed X	Max. Storage	= 25,411 cuft

Storage Indication method used.



Pond Report

Pond No. 8 - Watershed X

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 542.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	542.00	12,381	0	0
2.00	544.00	17,842	30,054	30,054
4.00	546.00	50,278	65,374	95,428

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 2.00	11.00	156.00	0.00
Crest El. (ft)	= 542.00	544.00	546.00	0.00
Weir Coeff.	= 2.60	2.60	2.60	3.33
Weir Type	= Broad	Broad	Broad	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	542.00	---	---	---	---	0.00	0.00	0.00	---	---	---	0.00
0.20	3,005	542.20	---	---	---	---	0.47	0.00	0.00	---	---	---	0.47
0.40	6,011	542.40	---	---	---	---	1.32	0.00	0.00	---	---	---	1.32
0.60	9,016	542.60	---	---	---	---	2.42	0.00	0.00	---	---	---	2.42
0.80	12,022	542.80	---	---	---	---	3.72	0.00	0.00	---	---	---	3.72
1.00	15,027	543.00	---	---	---	---	5.20	0.00	0.00	---	---	---	5.20
1.20	18,033	543.20	---	---	---	---	6.84	0.00	0.00	---	---	---	6.84
1.40	21,038	543.40	---	---	---	---	8.61	0.00	0.00	---	---	---	8.61
1.60	24,043	543.60	---	---	---	---	10.53	0.00	0.00	---	---	---	10.53
1.80	27,049	543.80	---	---	---	---	12.56	0.00	0.00	---	---	---	12.56
2.00	30,054	544.00	---	---	---	---	14.71	0.00	0.00	---	---	---	14.71
2.20	36,592	544.20	---	---	---	---	16.97	2.56	0.00	---	---	---	19.53
2.40	43,129	544.40	---	---	---	---	19.33	7.24	0.00	---	---	---	26.57
2.60	49,666	544.60	---	---	---	---	21.80	13.29	0.00	---	---	---	35.09
2.80	56,204	544.80	---	---	---	---	24.36	20.47	0.00	---	---	---	44.83
3.00	62,741	545.00	---	---	---	---	27.02	28.60	0.00	---	---	---	55.62
3.20	69,279	545.20	---	---	---	---	29.77	37.60	0.00	---	---	---	67.37
3.40	75,816	545.40	---	---	---	---	32.60	47.38	0.00	---	---	---	79.98
3.60	82,353	545.60	---	---	---	---	35.52	57.89	0.00	---	---	---	93.41
3.80	88,891	545.80	---	---	---	---	38.52	69.07	0.00	---	---	---	107.60
4.00	95,428	546.00	---	---	---	---	41.60	80.89	0.00	---	---	---	122.49

Hydrograph Report

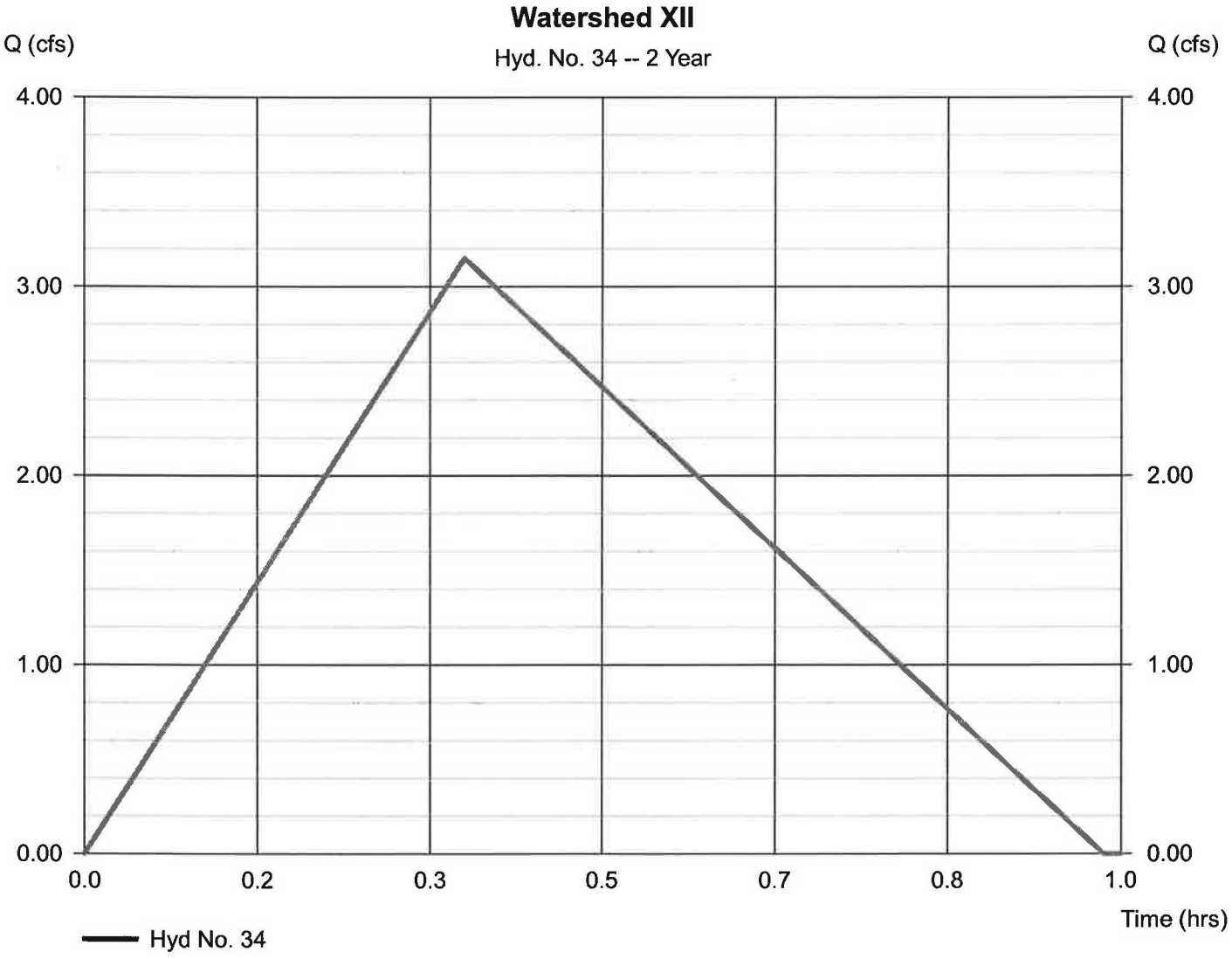
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 34

Watershed XII

Hydrograph type	= Rational	Peak discharge	= 3.150 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.37 hrs
Time interval	= 1 min	Hyd. volume	= 5,668 cuft
Drainage area	= 4.630 ac	Runoff coeff.	= 0.3*
Intensity	= 2.268 in/hr	Tc by TR55	= 22.47 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.490 x 0.90) + (1.430 x 0.30) + (2.710 x 0.20)] / 4.630



TR55 Tc Worksheet

Hyd. No. 34

Watershed XII

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.240		0.011		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.20		0.00		0.00		
Land slope (%)	= 0.80		0.00		0.00		
Travel Time (min)	**= 20.59**	**+**	**0.00**	**+**	**0.00**	**=**	**20.59**
Shallow Concentrated Flow							
Flow length (ft)	= 244.00		0.00		0.00		
Watercourse slope (%)	= 1.80		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	= 2.16		0.00		0.00		
Travel Time (min)	**= 1.88**	**+**	**0.00**	**+**	**0.00**	**=**	**1.88**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	= 0.00		0.00		0.00		
Flow length (ft)	= 0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 22.47 min

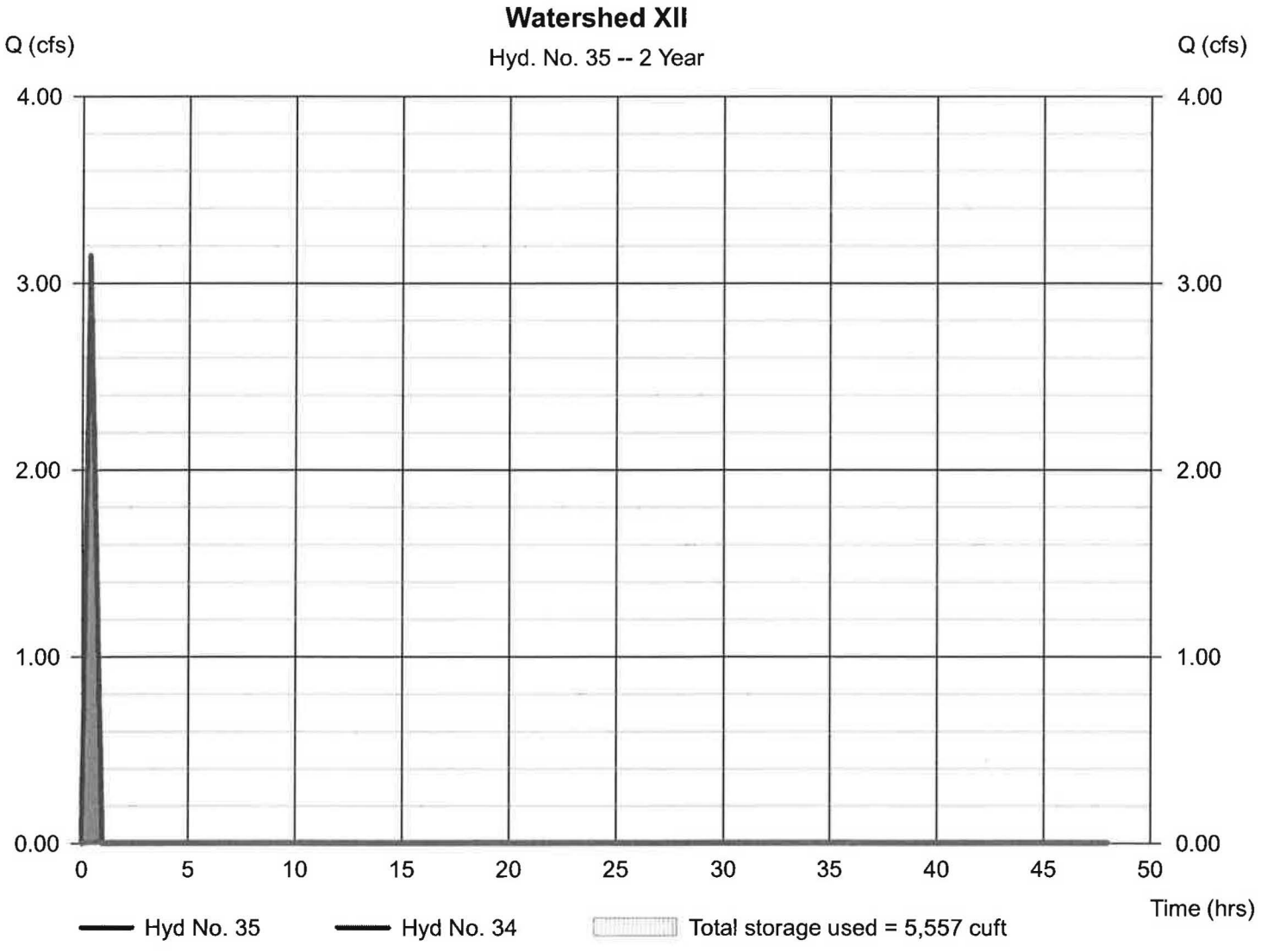
Hydrograph Report

Hyd. No. 35

Watershed XII

Hydrograph type	= Reservoir	Peak discharge	= 0.006 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.98 hrs
Time interval	= 1 min	Hyd. volume	= 1,072 cuft
Inflow hyd. No.	= 34 - Watershed XII	Max. Elevation	= 546.14 ft
Reservoir name	= Watershed XII	Max. Storage	= 5,557 cuft

Storage Indication method used.



Pond No. 10 - Watershed XII

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 545.20 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	545.20	00	0	0
0.80	546.00	5,000	1,333	1,333
2.80	548.00	67,000	60,196	61,529

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.50	0.00	0.00	0.00
Span (in)	= 0.50	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 545.20	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	545.20	0.00	---	---	---	---	---	---	---	---	---	0.00
0.08	133	545.28	0.00 ic	---	---	---	---	---	---	---	---	---	0.00
0.16	267	545.36	0.00 ic	---	---	---	---	---	---	---	---	---	0.00
0.24	400	545.44	0.00 ic	---	---	---	---	---	---	---	---	---	0.00
0.32	533	545.52	0.00 ic	---	---	---	---	---	---	---	---	---	0.00
0.40	667	545.60	0.00 ic	---	---	---	---	---	---	---	---	---	0.00
0.48	800	545.68	0.00 ic	---	---	---	---	---	---	---	---	---	0.00
0.56	933	545.76	0.00 ic	---	---	---	---	---	---	---	---	---	0.00
0.64	1,067	545.84	0.01 ic	---	---	---	---	---	---	---	---	---	0.01
0.72	1,200	545.92	0.01 ic	---	---	---	---	---	---	---	---	---	0.01
0.80	1,333	546.00	0.01 ic	---	---	---	---	---	---	---	---	---	0.01
1.00	7,353	546.20	0.01 ic	---	---	---	---	---	---	---	---	---	0.01
1.20	13,372	546.40	0.01 ic	---	---	---	---	---	---	---	---	---	0.01
1.40	19,392	546.60	0.01 ic	---	---	---	---	---	---	---	---	---	0.01
1.60	25,412	546.80	0.01 ic	---	---	---	---	---	---	---	---	---	0.01
1.80	31,431	547.00	0.01 ic	---	---	---	---	---	---	---	---	---	0.01
2.00	37,451	547.20	0.01 ic	---	---	---	---	---	---	---	---	---	0.01
2.20	43,470	547.40	0.01 ic	---	---	---	---	---	---	---	---	---	0.01
2.40	49,490	547.60	0.01 ic	---	---	---	---	---	---	---	---	---	0.01
2.60	55,510	547.80	0.01 ic	---	---	---	---	---	---	---	---	---	0.01
2.80	61,529	548.00	0.01 ic	---	---	---	---	---	---	---	---	---	0.01

Hydrograph Report

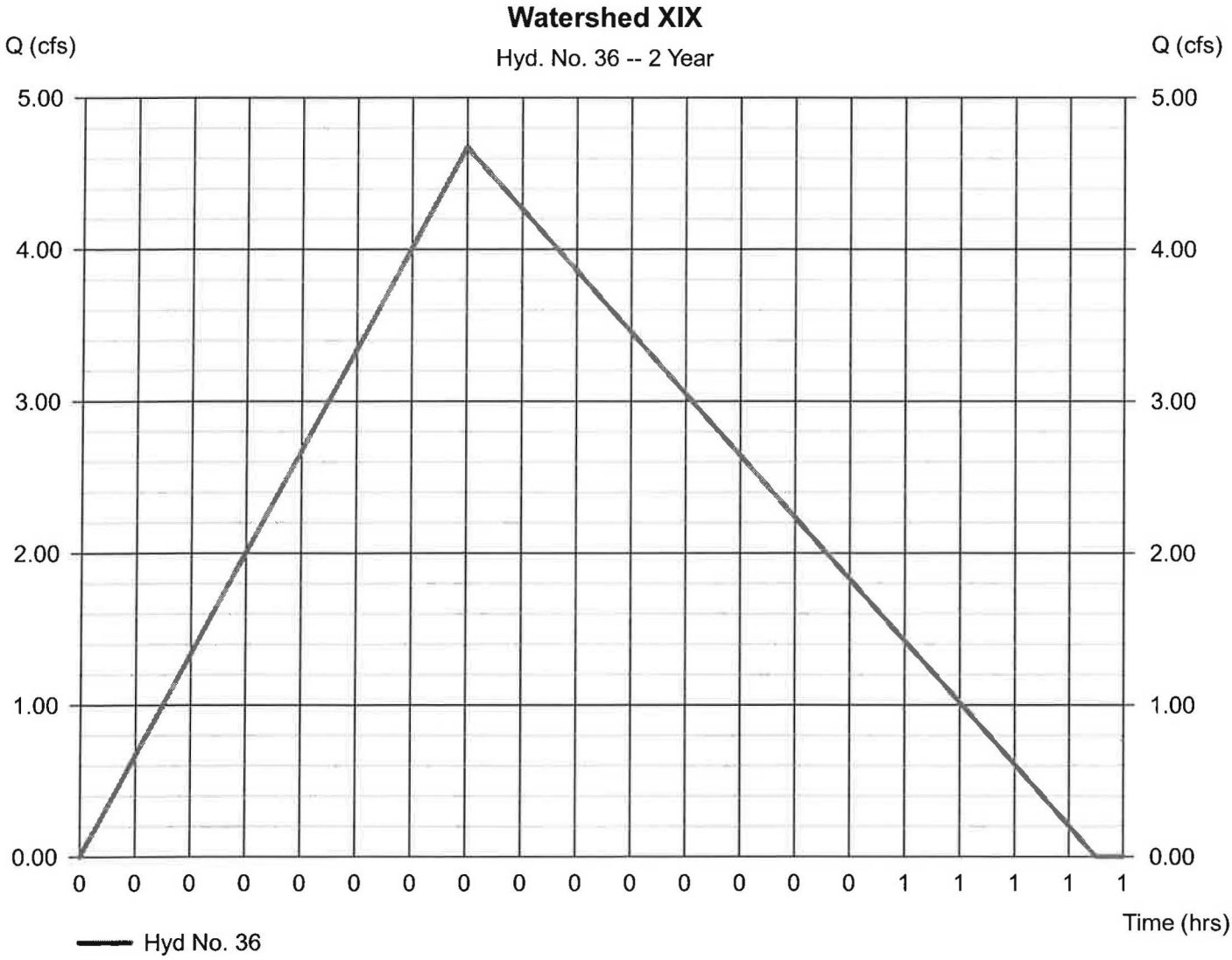
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 36

Watershed XIX

Hydrograph type	= Rational	Peak discharge	= 4.673 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.23 hrs
Time interval	= 1 min	Hyd. volume	= 5,241 cuft
Drainage area	= 5.860 ac	Runoff coeff.	= 0.27*
Intensity	= 2.954 in/hr	Tc by TR55	= 14.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.400 x 0.90) + (1.500 x 0.30) + (3.960 x 0.20)] / 5.860



TR55 Tc Worksheet

Hyd. No. 36

Watershed XIX

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.240		0.400		0.011		
Flow length (ft)	= 100.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.20		0.00		0.00		
Land slope (%)	= 6.90		0.00		0.00		
Travel Time (min)	**= 8.70**	**+**	**0.00**	**+**	**0.00**	**=**	**8.70**
Shallow Concentrated Flow							
Flow length (ft)	= 332.00		0.00		0.00		
Watercourse slope (%)	= 6.50		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	= 4.11		0.00		0.00		
Travel Time (min)	**= 1.35**	**+**	**0.00**	**+**	**0.00**	**=**	**1.35**
Channel Flow							
X sectional flow area (sqft)	= 5.00		0.00		0.00		
Wetted perimeter (ft)	= 7.47		0.00		0.00		
Channel slope (%)	= 0.30		0.00		0.00		
Manning's n-value	= 0.040		0.015		0.015		
Velocity (ft/s)	= 1.56		0.00		0.00		
Flow length (ft)	= 394.0		0.0		0.0		
Travel Time (min)	**= 4.21**	**+**	**0.00**	**+**	**0.00**	**=**	**4.21**

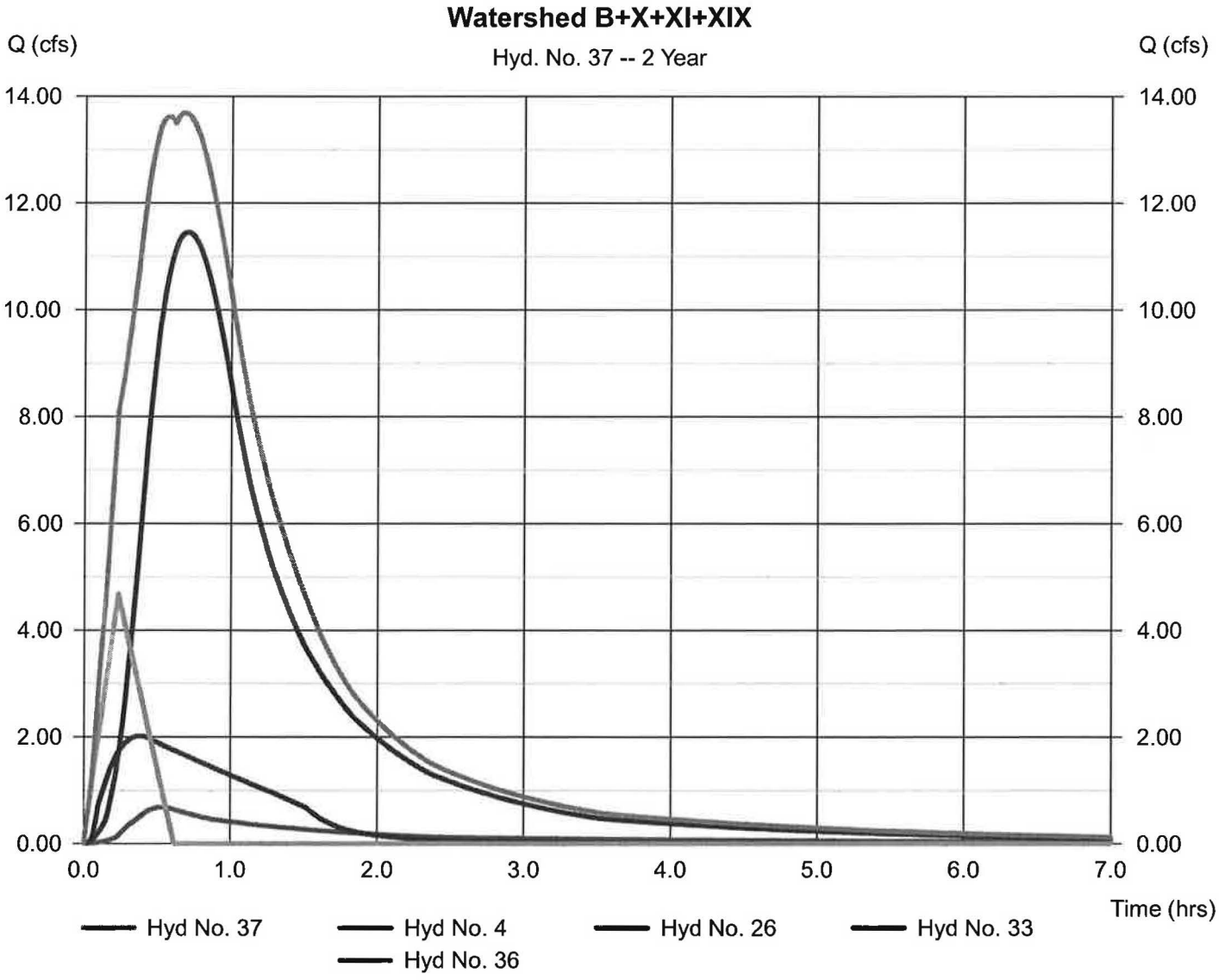
Total Travel Time, Tc ..... 14.00 min

Hydrograph Report

Hyd. No. 37

Watershed B+X+XI+XIX

Hydrograph type	= Combine	Peak discharge	= 13.69 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.68 hrs
Time interval	= 1 min	Hyd. volume	= 66,294 cuft
Inflow hyds.	= 4, 26, 33, 36	Contrib. drain. area	= 5.860 ac



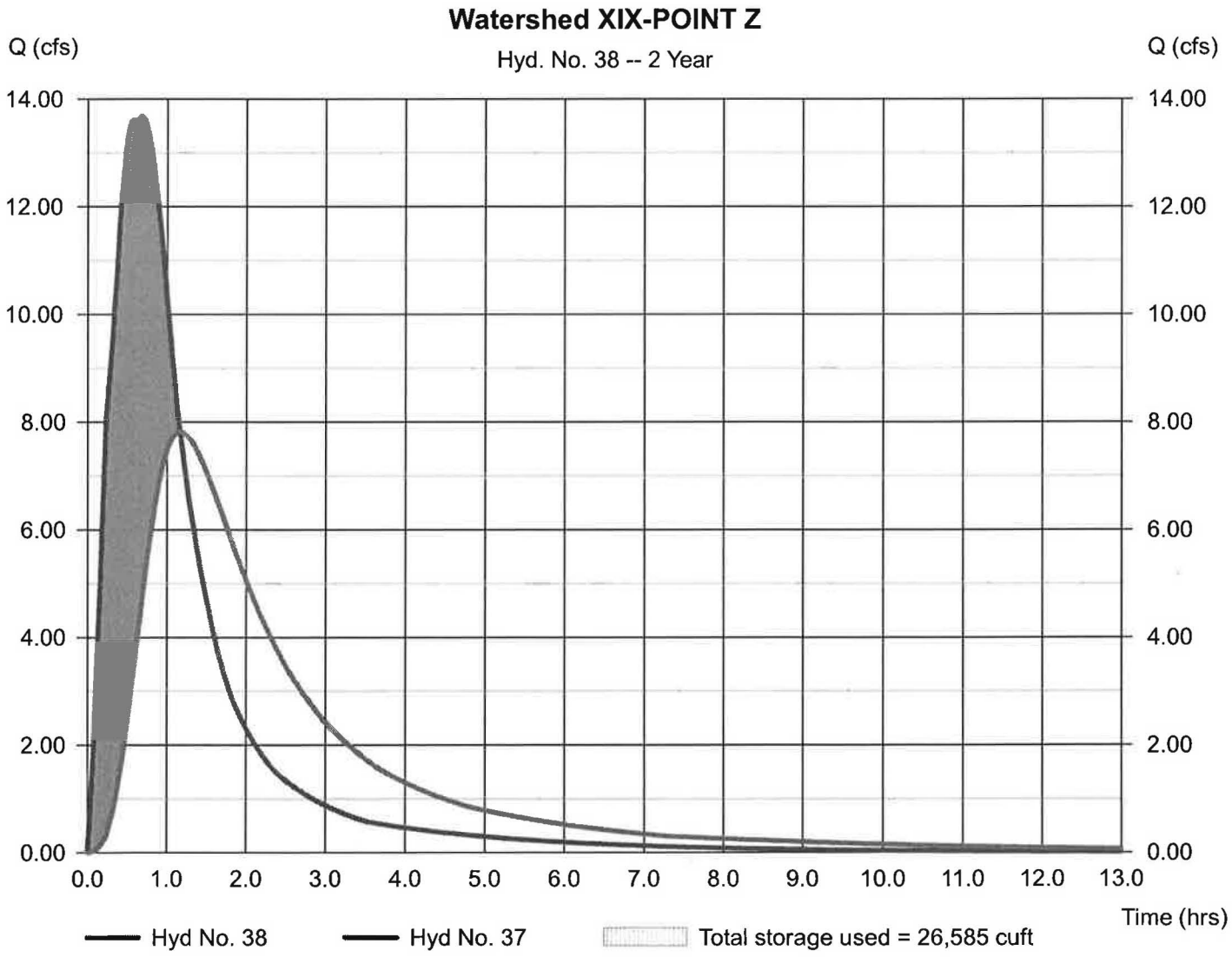
Hydrograph Report

Hyd. No. 38

Watershed XIX-POINT Z

Hydrograph type	= Reservoir	Peak discharge	= 7.807 cfs
Storm frequency	= 2 yrs	Time to peak	= 1.17 hrs
Time interval	= 1 min	Hyd. volume	= 66,284 cuft
Inflow hyd. No.	= 37 - Watershed B+X+XI+XIX	Max. Elevation	= 541.81 ft
Reservoir name	= Watershed XIX	Max. Storage	= 26,585 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Pond No. 19 - Watershed XIX

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 540.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	540.50	00	0	0
1.50	542.00	60,882	30,438	30,438
3.50	544.00	108,902	167,457	197,895

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 2.00	52.50	149.00	0.00
Crest El. (ft)	= 540.50	542.00	544.00	0.00
Weir Coeff.	= 2.60	2.60	2.60	3.33
Weir Type	= Broad	Broad	Broad	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	540.50	---	---	---	---	0.00	0.00	0.00	---	---	---	0.00
0.15	3,044	540.65	---	---	---	---	0.30	0.00	0.00	---	---	---	0.30
0.30	6,088	540.80	---	---	---	---	0.85	0.00	0.00	---	---	---	0.85
0.45	9,131	540.95	---	---	---	---	1.57	0.00	0.00	---	---	---	1.57
0.60	12,175	541.10	---	---	---	---	2.42	0.00	0.00	---	---	---	2.42
0.75	15,219	541.25	---	---	---	---	3.38	0.00	0.00	---	---	---	3.38
0.90	18,263	541.40	---	---	---	---	4.44	0.00	0.00	---	---	---	4.44
1.05	21,307	541.55	---	---	---	---	5.60	0.00	0.00	---	---	---	5.60
1.20	24,350	541.70	---	---	---	---	6.84	0.00	0.00	---	---	---	6.84
1.35	27,394	541.85	---	---	---	---	8.16	0.00	0.00	---	---	---	8.16
1.50	30,438	542.00	---	---	---	---	9.55	0.00	0.00	---	---	---	9.55
1.70	47,184	542.20	---	---	---	---	11.53	12.21	0.00	---	---	---	23.74
1.90	63,929	542.40	---	---	---	---	13.62	34.54	0.00	---	---	---	48.15
2.10	80,675	542.60	---	---	---	---	15.82	63.44	0.00	---	---	---	79.26
2.30	97,421	542.80	---	---	---	---	18.14	97.67	0.00	---	---	---	115.81
2.50	114,166	543.00	---	---	---	---	20.56	136.53	0.00	---	---	---	157.08
2.70	130,912	543.20	---	---	---	---	23.07	179.45	0.00	---	---	---	202.52
2.90	147,658	543.40	---	---	---	---	25.68	226.13	0.00	---	---	---	251.81
3.10	164,403	543.60	---	---	---	---	28.38	276.28	0.00	---	---	---	304.67
3.30	181,149	543.80	---	---	---	---	31.17	329.67	0.00	---	---	---	360.85
3.50	197,895	544.00	---	---	---	---	34.05	386.08	0.00	---	---	---	420.13

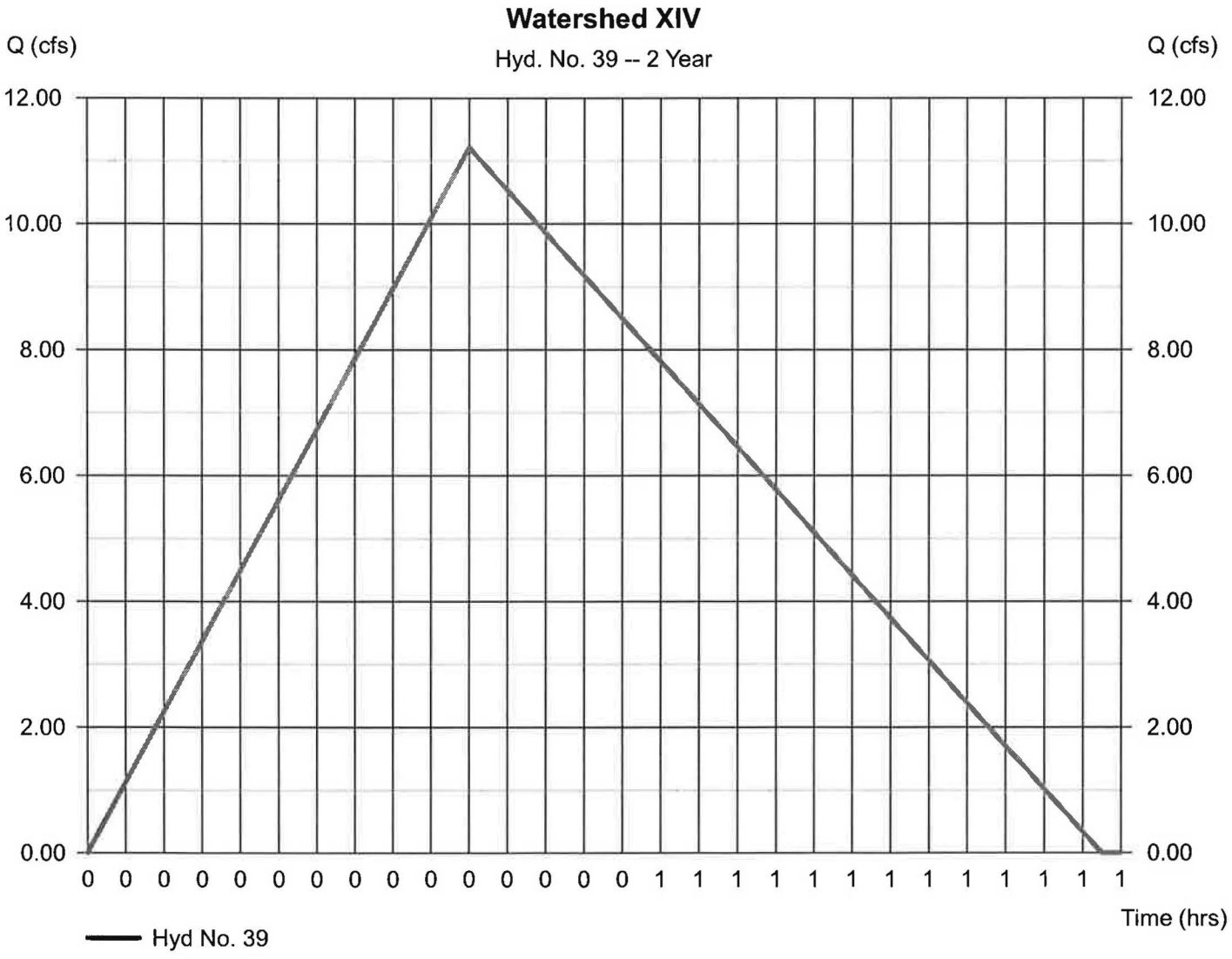
Hydrograph Report

Hyd. No. 39

Watershed XIV

Hydrograph type	= Rational	Peak discharge	= 11.21 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.33 hrs
Time interval	= 1 min	Hyd. volume	= 17,966 cuft
Drainage area	= 15.400 ac	Runoff coeff.	= 0.3*
Intensity	= 2.427 in/hr	Tc by TR55	= 20.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.000 x 0.90) + (5.100 x 0.30) + (8.800 x 0.20) + (0.500 x 1.00)] / 15.400



TR55 Tc Worksheet

Hyd. No. 39

Watershed XIV

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.400	0.011	0.011	
Flow length (ft)	= 100.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.20	0.00	0.00	
Land slope (%)	= 3.50	0.00	0.00	
Travel Time (min)	**= 17.17**	**+ 0.00**	**+ 0.00**	**= 17.17**
Shallow Concentrated Flow				
Flow length (ft)	= 613.00	0.00	0.00	
Watercourse slope (%)	= 3.67	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	= 3.09	0.00	0.00	
Travel Time (min)	**= 3.31**	**+ 0.00**	**+ 0.00**	**= 3.31**
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.040	0.015	0.015	
Velocity (ft/s)	= 0.00	0.00	0.00	
Flow length (ft)	= 0.0	0.0	0.0	
Travel Time (min)	**= 0.00**	**+ 0.00**	**+ 0.00**	**= 0.00**

Total Travel Time, Tc ..... 20.00 min

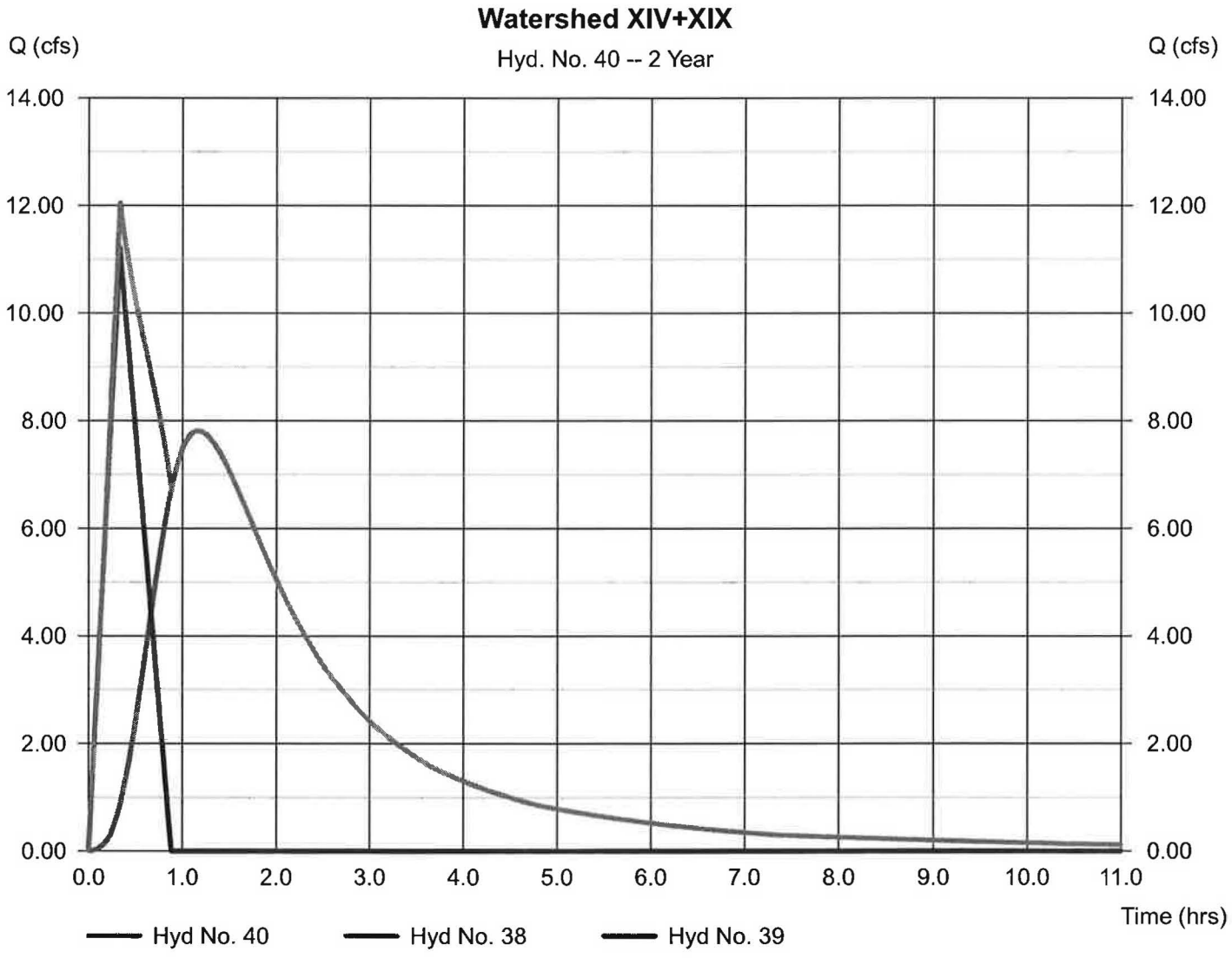
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 40

Watershed XIV+XIX

Hydrograph type	= Combine	Peak discharge	= 12.05 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.33 hrs
Time interval	= 1 min	Hyd. volume	= 84,115 cuft
Inflow hyds.	= 38, 39	Contrib. drain. area	= 15.400 ac



Hydrograph Report

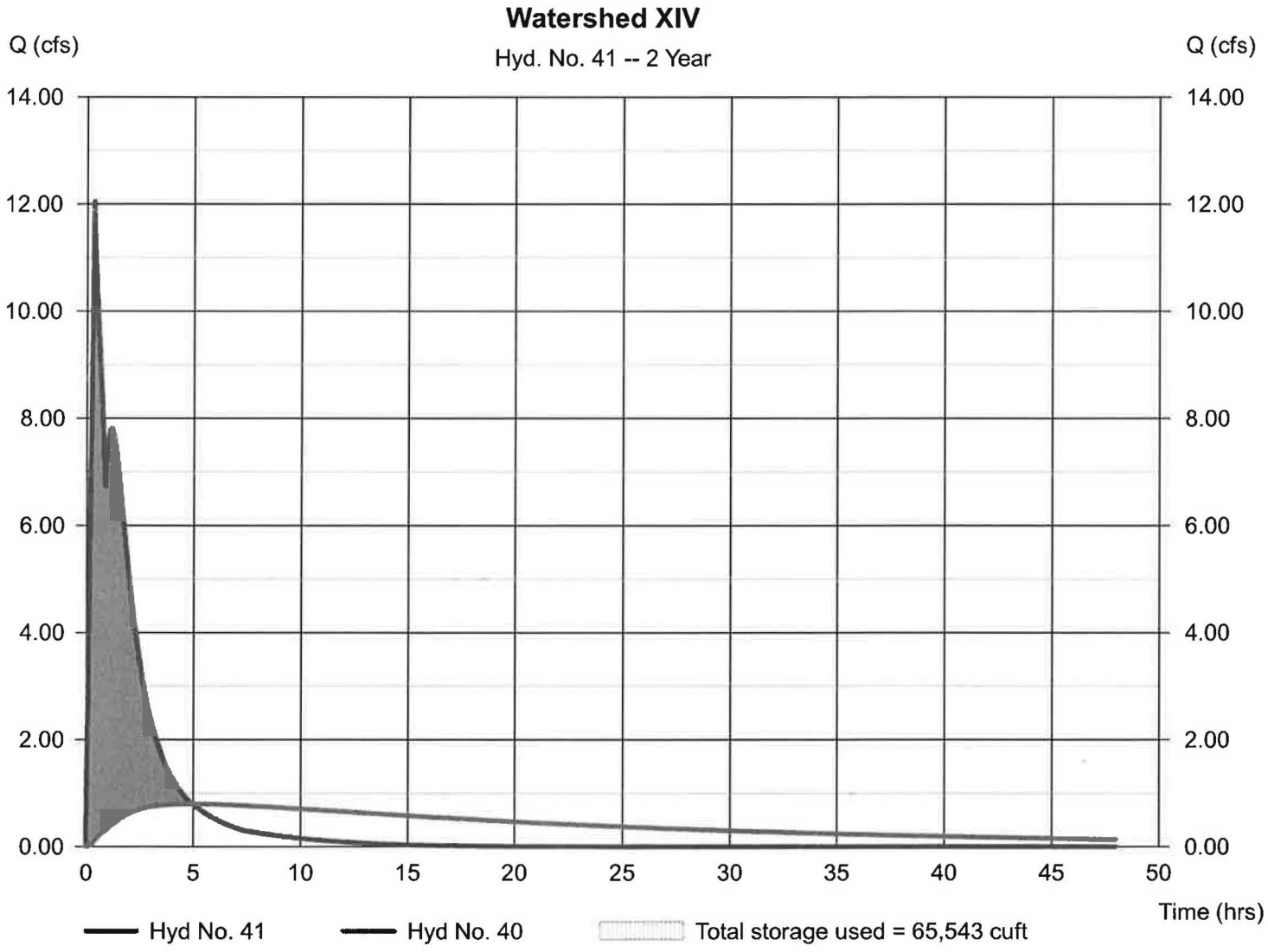
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 41

Watershed XIV

Hydrograph type	= Reservoir	Peak discharge	= 0.797 cfs
Storm frequency	= 2 yrs	Time to peak	= 4.95 hrs
Time interval	= 1 min	Hyd. volume	= 71,972 cuft
Inflow hyd. No.	= 40 - Watershed XIV+XIX	Max. Elevation	= 539.00 ft
Reservoir name	= Watershed XIV	Max. Storage	= 65,543 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Pond No. 3 - Watershed XIV

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 538.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	538.00	46,741	0	0
2.00	540.00	86,762	131,443	131,443
4.00	542.00	100,000	186,587	318,030

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	0.00	0.00	0.00
Span (in)	= 20.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	1
Invert El. (ft)	= 538.00	0.00	0.00	0.00
Length (ft)	= 5.75	0.00	0.00	0.00
Slope (%)	= 0.10	0.00	0.00	n/a
N-Value	= .015	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 67.00	0.00	0.00	0.00
Crest El. (ft)	= 540.00	0.00	0.00	0.00
Weir Coeff.	= 2.60	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	538.00	0.00	---	---	---	0.00	---	---	---	---	---	0.00
0.20	13,144	538.20	0.15 oc	---	---	---	0.00	---	---	---	---	---	0.15
0.40	26,289	538.40	0.31 oc	---	---	---	0.00	---	---	---	---	---	0.31
0.60	39,433	538.60	0.47 oc	---	---	---	0.00	---	---	---	---	---	0.47
0.80	52,577	538.80	0.64 oc	---	---	---	0.00	---	---	---	---	---	0.64
1.00	65,722	539.00	0.80 oc	---	---	---	0.00	---	---	---	---	---	0.80
1.20	78,866	539.20	0.96 oc	---	---	---	0.00	---	---	---	---	---	0.96
1.40	92,010	539.40	1.13 oc	---	---	---	0.00	---	---	---	---	---	1.13
1.60	105,155	539.60	5.11 oc	---	---	---	0.00	---	---	---	---	---	5.11
1.80	118,299	539.80	8.69 oc	---	---	---	0.00	---	---	---	---	---	8.69
2.00	131,443	540.00	11.18 oc	---	---	---	0.00	---	---	---	---	---	11.18
2.20	150,102	540.20	13.20 oc	---	---	---	15.58	---	---	---	---	---	28.79
2.40	168,761	540.40	14.96 oc	---	---	---	44.07	---	---	---	---	---	59.03
2.60	187,419	540.60	16.37 ic	---	---	---	80.97	---	---	---	---	---	97.34
2.80	206,078	540.80	17.24 ic	---	---	---	124.66	---	---	---	---	---	141.89
3.00	224,737	541.00	18.06 ic	---	---	---	174.22	---	---	---	---	---	192.27
3.20	243,395	541.20	18.84 ic	---	---	---	229.01	---	---	---	---	---	247.85
3.40	262,054	541.40	19.60 ic	---	---	---	288.59	---	---	---	---	---	308.19
3.60	280,713	541.60	20.32 ic	---	---	---	352.59	---	---	---	---	---	372.91
3.80	299,371	541.80	21.02 ic	---	---	---	420.72	---	---	---	---	---	441.75
4.00	318,030	542.00	21.70 ic	---	---	---	492.71	---	---	---	---	---	514.41

Hydrograph Report

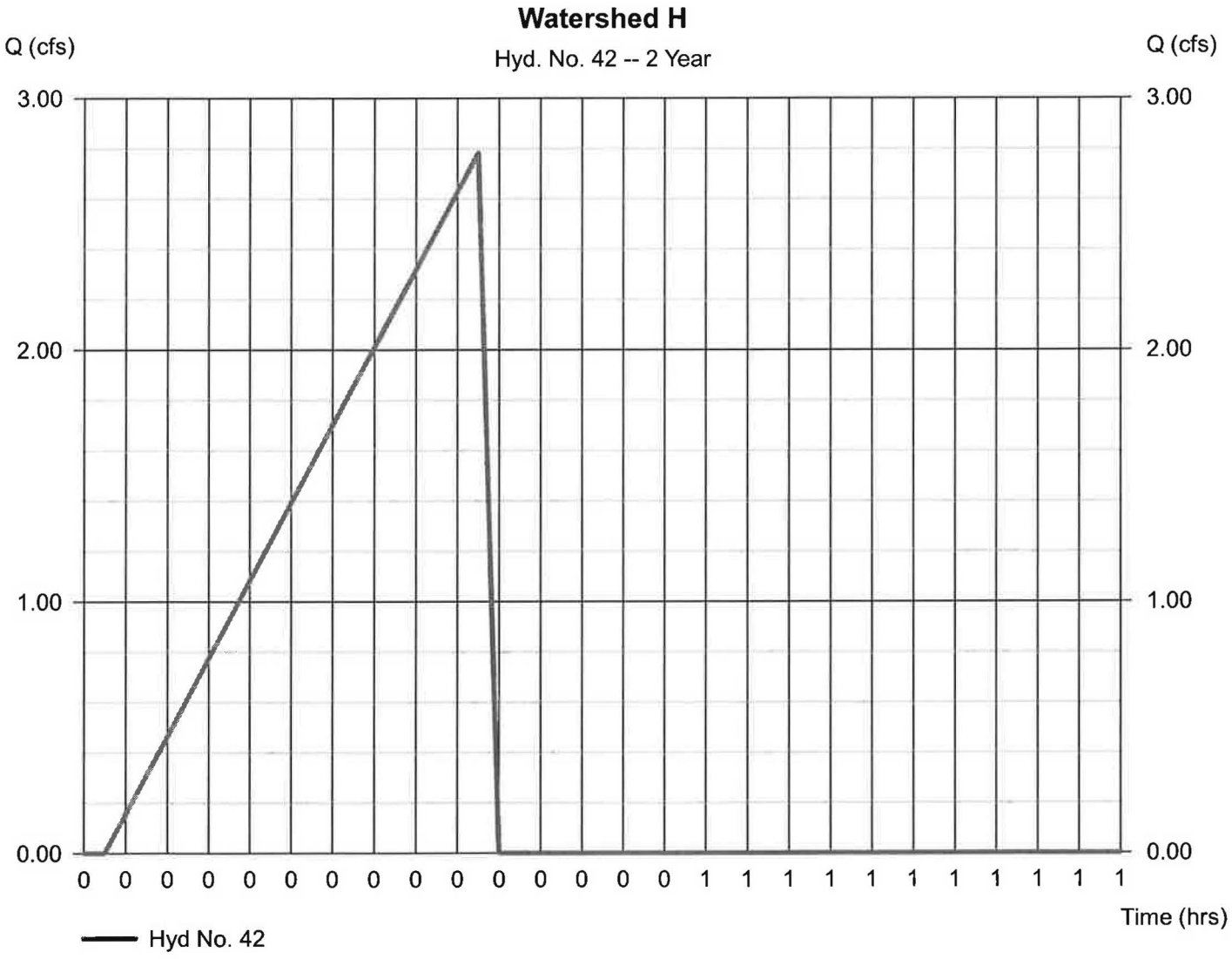
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 42

Watershed H

Hydrograph type	= Rational	Peak discharge	= 2.781 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 4,163 cuft
Drainage area	= 3.800 ac	Runoff coeff.	= 0.29*
Intensity	= 2.524 in/hr	Tc by TR55	= 18.69 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.200 x 0.90) + (0.100 x 0.30) + (2.500 x 0.20) + (0.800 x 0.25) + (0.200 x 1.00)] / 3.800



TR55 Tc Worksheet

Hyd. No. 42

Watershed H

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.400	0.240	0.011	
Flow length (ft)	= 60.0	40.0	0.0	
Two-year 24-hr precip. (in)	= 3.20	3.20	0.00	
Land slope (%)	= 5.30	5.00	0.00	
Travel Time (min)	**= 9.66 +**	**4.75 +**	**0.00 =**	**14.42**
Shallow Concentrated Flow				
Flow length (ft)	= 229.00	0.00	0.00	
Watercourse slope (%)	= 4.30	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	= 3.35	0.00	0.00	
Travel Time (min)	**= 1.14 +**	**0.00 +**	**0.00 =**	**1.14**
Channel Flow				
X sectional flow area (sqft)	= 1.25	0.00	0.00	
Wetted perimeter (ft)	= 3.74	0.00	0.00	
Channel slope (%)	= 0.30	0.00	0.00	
Manning's n-value	= 0.040	0.015	0.015	
Velocity (ft/s)	= 0.98	0.00	0.00	
Flow length (ft)	= 184.0	0.0	0.0	
Travel Time (min)	**= 3.13 +**	**0.00 +**	**0.00 =**	**3.13**

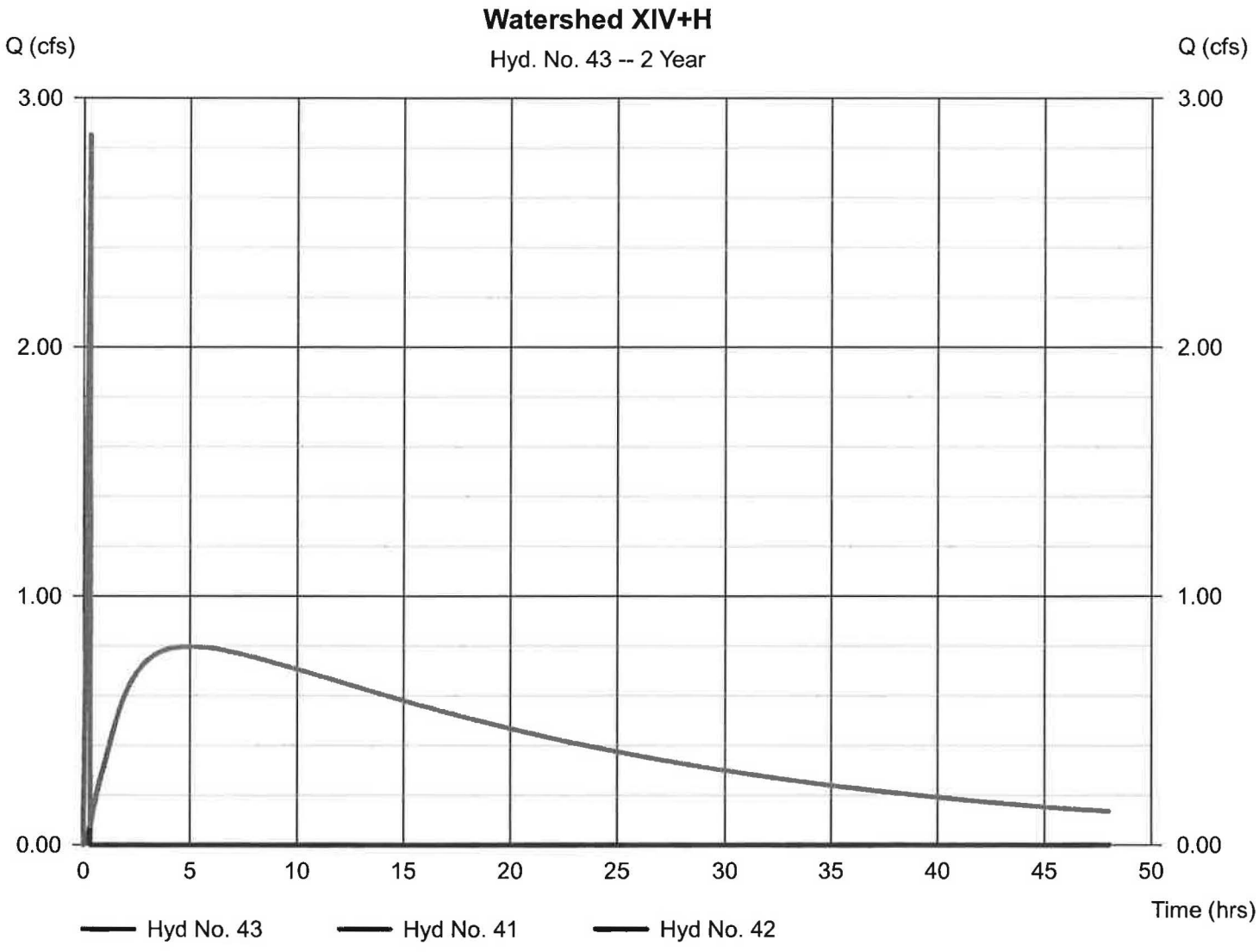
Total Travel Time, Tc ..... **18.69 min**

Hydrograph Report

Hyd. No. 43

Watershed XIV+H

Hydrograph type	= Combine	Peak discharge	= 2.851 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 73,557 cuft
Inflow hyds.	= 41, 42	Contrib. drain. area	= 3.800 ac



Hydrograph Report

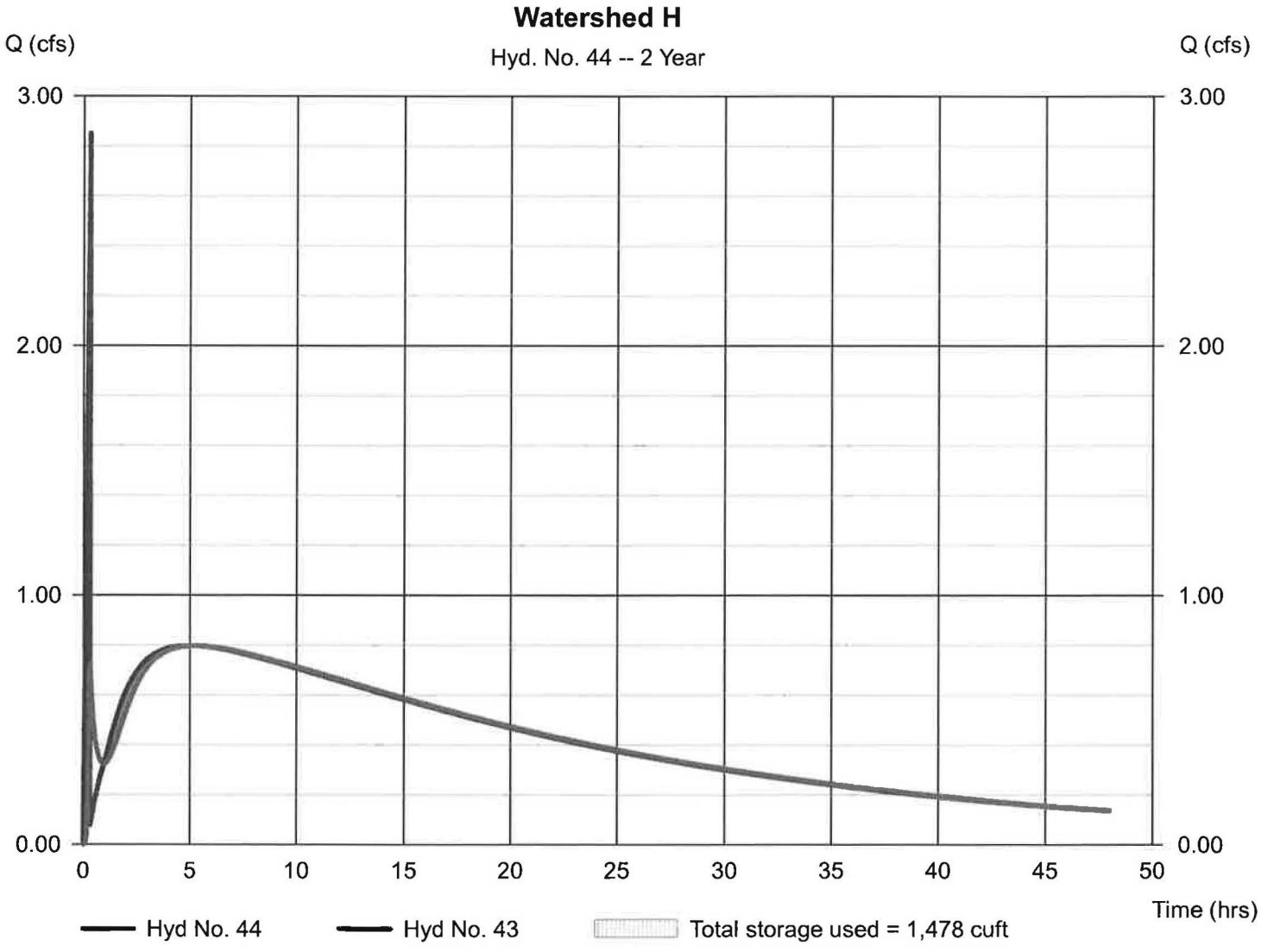
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 44

Watershed H

Hydrograph type	= Reservoir	Peak discharge	= 0.796 cfs
Storm frequency	= 2 yrs	Time to peak	= 5.30 hrs
Time interval	= 1 min	Hyd. volume	= 72,971 cuft
Inflow hyd. No.	= 43 - Watershed XIV+H	Max. Elevation	= 535.99 ft
Reservoir name	= Watershed H	Max. Storage	= 1,478 cuft

Storage Indication method used.



Pond Report

Pond No. 13 - Watershed H

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 535.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	535.50	00	0	0
0.50	536.00	9,000	1,500	1,500
2.50	538.00	62,000	63,075	64,575

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	0.00	0.00	0.00
Span (in)	= 18.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 535.50	0.00	0.00	0.00
Length (ft)	= 40.00	0.00	0.00	0.00
Slope (%)	= 0.50	0.00	0.00	n/a
N-Value	= .024	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	535.50	0.00	---	---	---	---	---	---	---	---	---	0.00
0.05	150	535.55	0.01 oc	---	---	---	---	---	---	---	---	---	0.01
0.10	300	535.60	0.04 oc	---	---	---	---	---	---	---	---	---	0.04
0.15	450	535.65	0.08 oc	---	---	---	---	---	---	---	---	---	0.08
0.20	600	535.70	0.14 oc	---	---	---	---	---	---	---	---	---	0.14
0.25	750	535.75	0.23 oc	---	---	---	---	---	---	---	---	---	0.23
0.30	900	535.80	0.32 oc	---	---	---	---	---	---	---	---	---	0.32
0.35	1,050	535.85	0.43 oc	---	---	---	---	---	---	---	---	---	0.43
0.40	1,200	535.90	0.55 oc	---	---	---	---	---	---	---	---	---	0.55
0.45	1,350	535.95	0.68 oc	---	---	---	---	---	---	---	---	---	0.68
0.50	1,500	536.00	0.82 oc	---	---	---	---	---	---	---	---	---	0.82
0.70	7,807	536.20	1.43 oc	---	---	---	---	---	---	---	---	---	1.43
0.90	14,115	536.40	2.08 oc	---	---	---	---	---	---	---	---	---	2.08
1.10	20,422	536.60	2.69 oc	---	---	---	---	---	---	---	---	---	2.69
1.30	26,730	536.80	3.16 oc	---	---	---	---	---	---	---	---	---	3.16
1.50	33,037	537.00	3.19 oc	---	---	---	---	---	---	---	---	---	3.19
1.70	39,345	537.20	4.51 oc	---	---	---	---	---	---	---	---	---	4.51
1.90	45,652	537.40	5.52 oc	---	---	---	---	---	---	---	---	---	5.52
2.10	51,960	537.60	6.37 oc	---	---	---	---	---	---	---	---	---	6.37
2.30	58,267	537.80	7.12 oc	---	---	---	---	---	---	---	---	---	7.12
2.50	64,575	538.00	7.80 oc	---	---	---	---	---	---	---	---	---	7.80

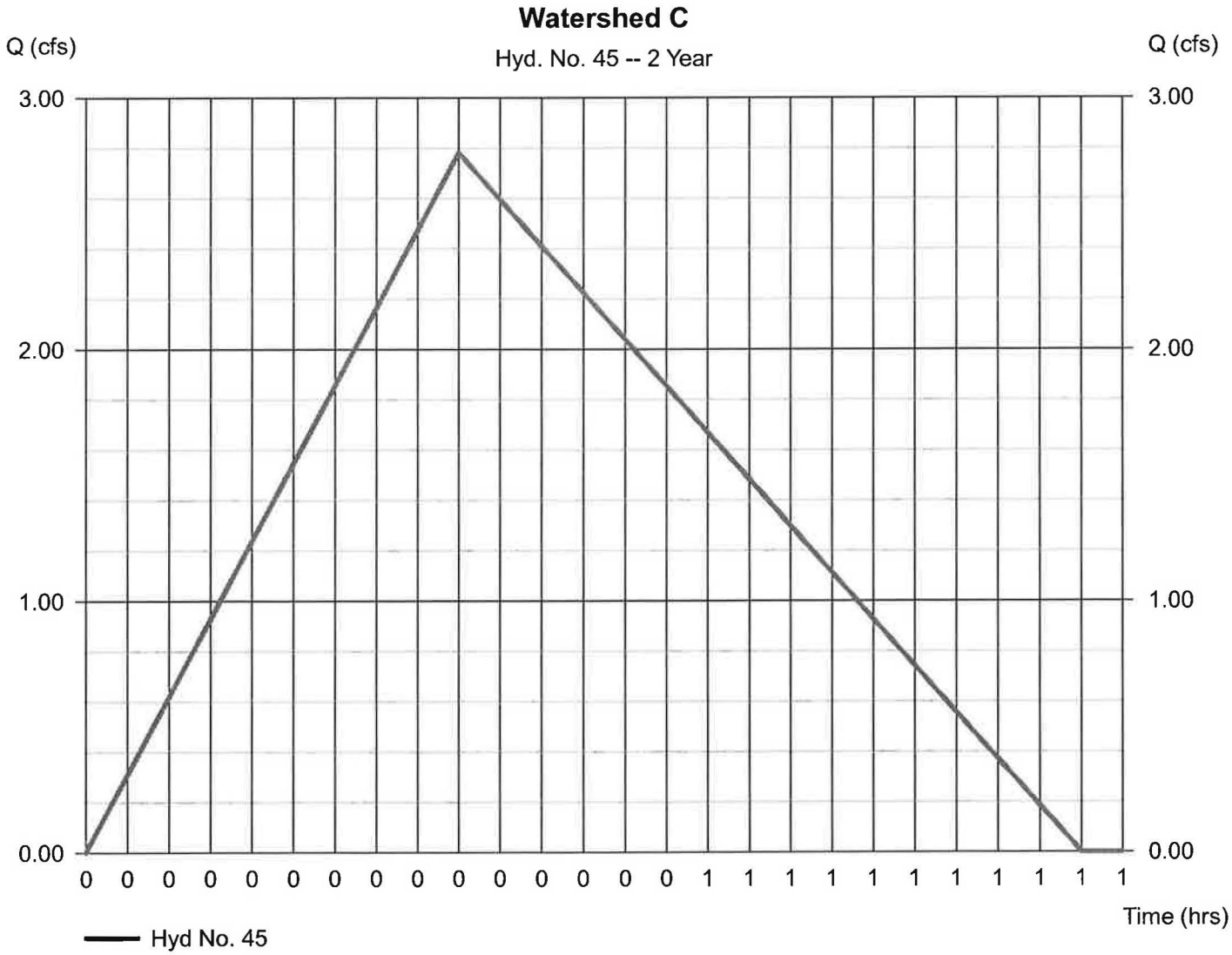
Hydrograph Report

Hyd. No. 45

Watershed C

Hydrograph type	= Rational	Peak discharge	= 2.781 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.30 hrs
Time interval	= 1 min	Hyd. volume	= 4,076 cuft
Drainage area	= 3.300 ac	Runoff coeff.	= 0.33*
Intensity	= 2.554 in/hr	Tc by TR55	= 18.30 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.400 x 0.90) + (1.200 x 0.30) + (1.400 x 0.20) + (0.300 x 0.25)] / 3.300



TR55 Tc Worksheet

Hyd. No. 45

Watershed C

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.240	0.011	0.011	
Flow length (ft)	= 72.0	116.0	0.0	
Two-year 24-hr precip. (in)	= 3.20	3.20	0.00	
Land slope (%)	= 1.00	3.27	0.00	
Travel Time (min)	**= 14.48**	**+ 1.12**	**+ 0.00**	**= 15.60**
Shallow Concentrated Flow				
Flow length (ft)	= 175.00	0.00	0.00	
Watercourse slope (%)	= 8.00	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	= 4.56	0.00	0.00	
Travel Time (min)	**= 0.64**	**+ 0.00**	**+ 0.00**	**= 0.64**
Channel Flow				
X sectional flow area (sqft)	= 5.00	0.00	0.00	
Wetted perimeter (ft)	= 7.47	0.00	0.00	
Channel slope (%)	= 0.90	0.00	0.00	
Manning's n-value	= 0.040	0.015	0.015	
Velocity (ft/s)	= 2.70	0.00	0.00	
Flow length (ft)	= 334.0	0.0	0.0	
Travel Time (min)	**= 2.06**	**+ 0.00**	**+ 0.00**	**= 2.06**

Total Travel Time, Tc ..... 18.30 min

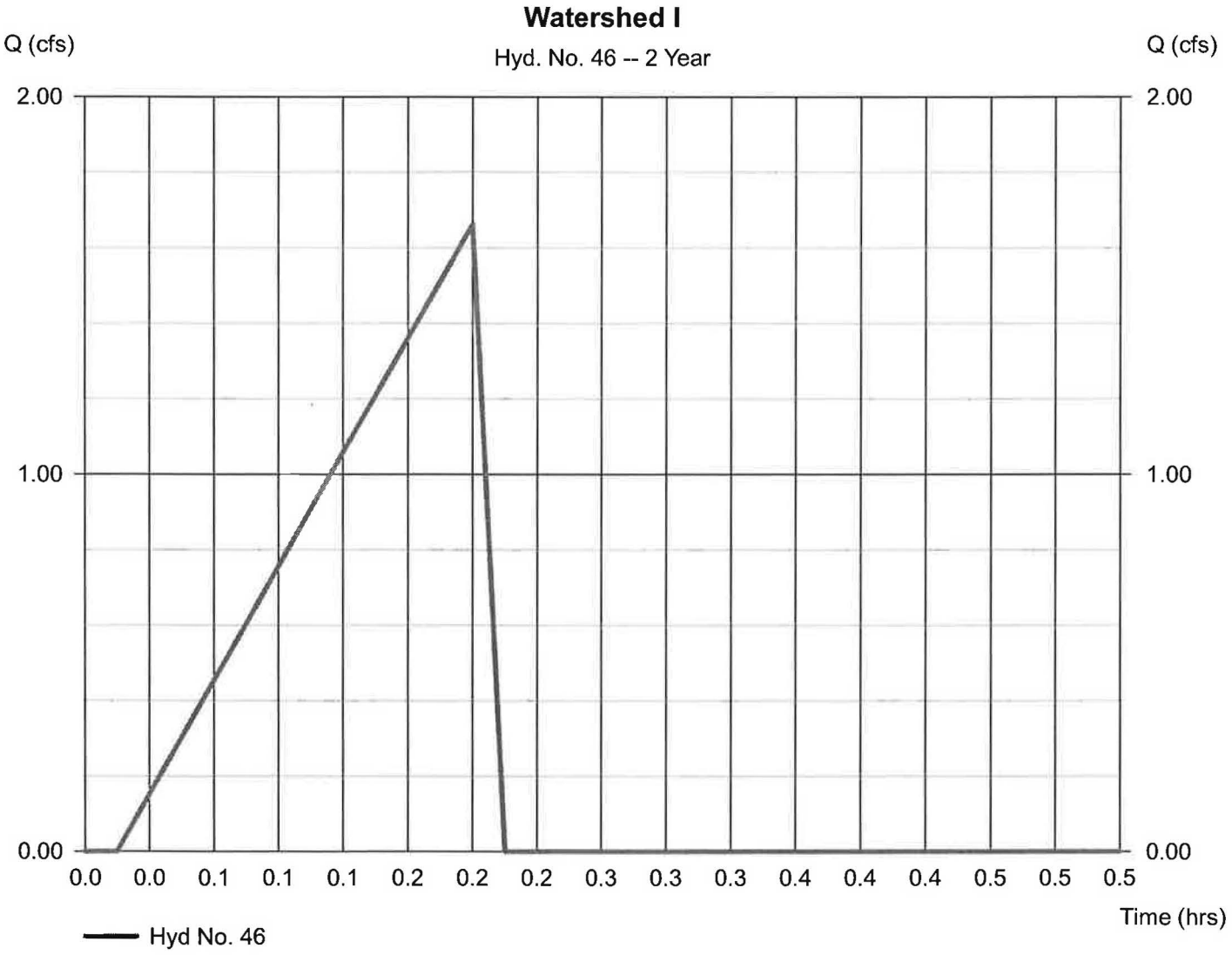
Hydrograph Report

Hyd. No. 46

Watershed I

Hydrograph type	= Rational	Peak discharge	= 1.662 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.20 hrs
Time interval	= 1 min	Hyd. volume	= 1,535 cuft
Drainage area	= 1.500 ac	Runoff coeff.	= 0.34*
Intensity	= 3.258 in/hr	Tc by TR55	= 11.53 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.200 x 0.90) + (0.700 x 0.30) + (0.600 x 0.20)] / 1.500



TR55 Tc Worksheet

Hyd. No. 46

Watershed I

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.240	0.011	0.011	
Flow length (ft)	= 100.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.20	0.00	0.00	
Land slope (%)	= 6.00	0.00	0.00	
Travel Time (min)	**= 9.20 +**	**0.00 +**	**0.00 =**	**9.20**
Shallow Concentrated Flow				
Flow length (ft)	= 113.00	274.00	0.00	
Watercourse slope (%)	= 6.20	1.45	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	= 4.02	2.45	0.00	
Travel Time (min)	**= 0.47 +**	**1.87 +**	**0.00 =**	**2.33**
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	= 0.00	0.00	0.00	
Flow length (ft)	= 0.0	0.0	0.0	
Travel Time (min)	**= 0.00 +**	**0.00 +**	**0.00 =**	**0.00**

Total Travel Time, Tc ..... 11.53 min

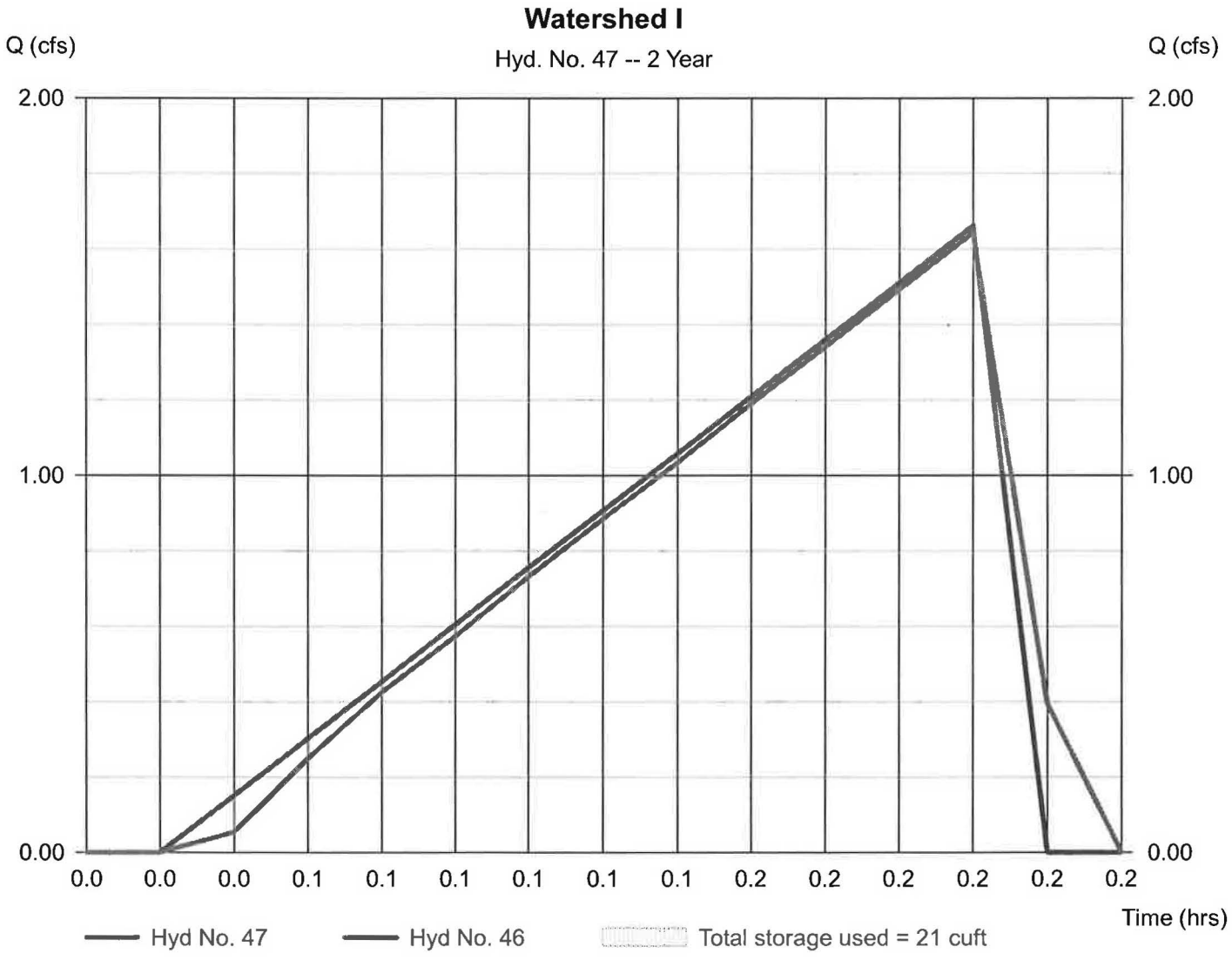
Hydrograph Report

Hyd. No. 47

Watershed I

Hydrograph type	= Reservoir	Peak discharge	= 1.643 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.20 hrs
Time interval	= 1 min	Hyd. volume	= 601 cuft
Inflow hyd. No.	= 46 - Watershed I	Max. Elevation	= 531.39 ft
Reservoir name	= Watershed I	Max. Storage	= 21 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs by Intelisolve v9.1 Wednesday, Mar 30, 2016

Pond No. 15 - Watershed I

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 530.75 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	530.75	00	0	0
1.25	532.00	100	42	42
3.25	534.00	200	294	336

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 15.00	0.00	0.00	0.00
Span (in)	= 15.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 530.75	0.00	0.00	0.00
Length (ft)	= 36.65	0.00	0.00	0.00
Slope (%)	= 1.44	0.00	0.00	n/a
N-Value	= .015	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

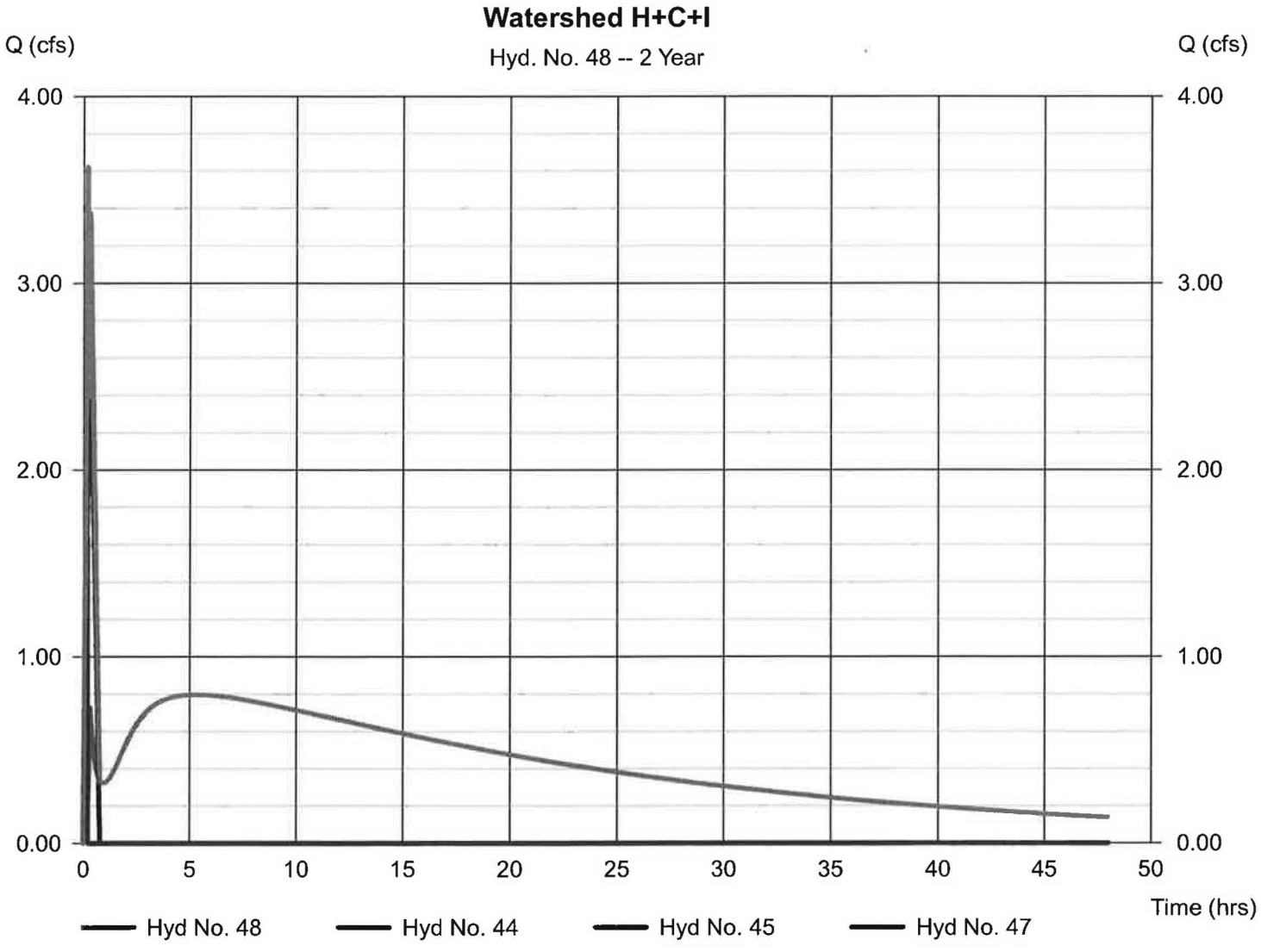
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	530.75	0.00	---	---	---	---	---	---	---	---	---	0.00
0.13	4	530.88	0.08 ic	---	---	---	---	---	---	---	---	---	0.08
0.25	8	531.00	0.30 ic	---	---	---	---	---	---	---	---	---	0.30
0.38	12	531.13	0.65 ic	---	---	---	---	---	---	---	---	---	0.65
0.50	17	531.25	1.10 ic	---	---	---	---	---	---	---	---	---	1.10
0.63	21	531.38	1.65 ic	---	---	---	---	---	---	---	---	---	1.65
0.75	25	531.50	2.27 ic	---	---	---	---	---	---	---	---	---	2.27
0.88	29	531.63	2.92 ic	---	---	---	---	---	---	---	---	---	2.92
1.00	33	531.75	3.58 ic	---	---	---	---	---	---	---	---	---	3.58
1.13	37	531.88	4.20 ic	---	---	---	---	---	---	---	---	---	4.20
1.25	42	532.00	4.42 oc	---	---	---	---	---	---	---	---	---	4.42
1.45	71	532.20	5.19 oc	---	---	---	---	---	---	---	---	---	5.19
1.65	101	532.40	5.86 oc	---	---	---	---	---	---	---	---	---	5.86
1.85	130	532.60	6.46 oc	---	---	---	---	---	---	---	---	---	6.46
2.05	159	532.80	7.01 oc	---	---	---	---	---	---	---	---	---	7.01
2.25	189	533.00	7.51 oc	---	---	---	---	---	---	---	---	---	7.51
2.45	218	533.20	7.98 ic	---	---	---	---	---	---	---	---	---	7.98
2.65	248	533.40	8.41 ic	---	---	---	---	---	---	---	---	---	8.41
2.85	277	533.60	8.81 ic	---	---	---	---	---	---	---	---	---	8.81
3.05	306	533.80	9.20 ic	---	---	---	---	---	---	---	---	---	9.20
3.25	336	534.00	9.57 ic	---	---	---	---	---	---	---	---	---	9.57

Hydrograph Report

Hyd. No. 48

Watershed H+C+I

Hydrograph type	= Combine	Peak discharge	= 3.620 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.20 hrs
Time interval	= 1 min	Hyd. volume	= 77,576 cuft
Inflow hyds.	= 44, 45, 47	Contrib. drain. area	= 3.300 ac



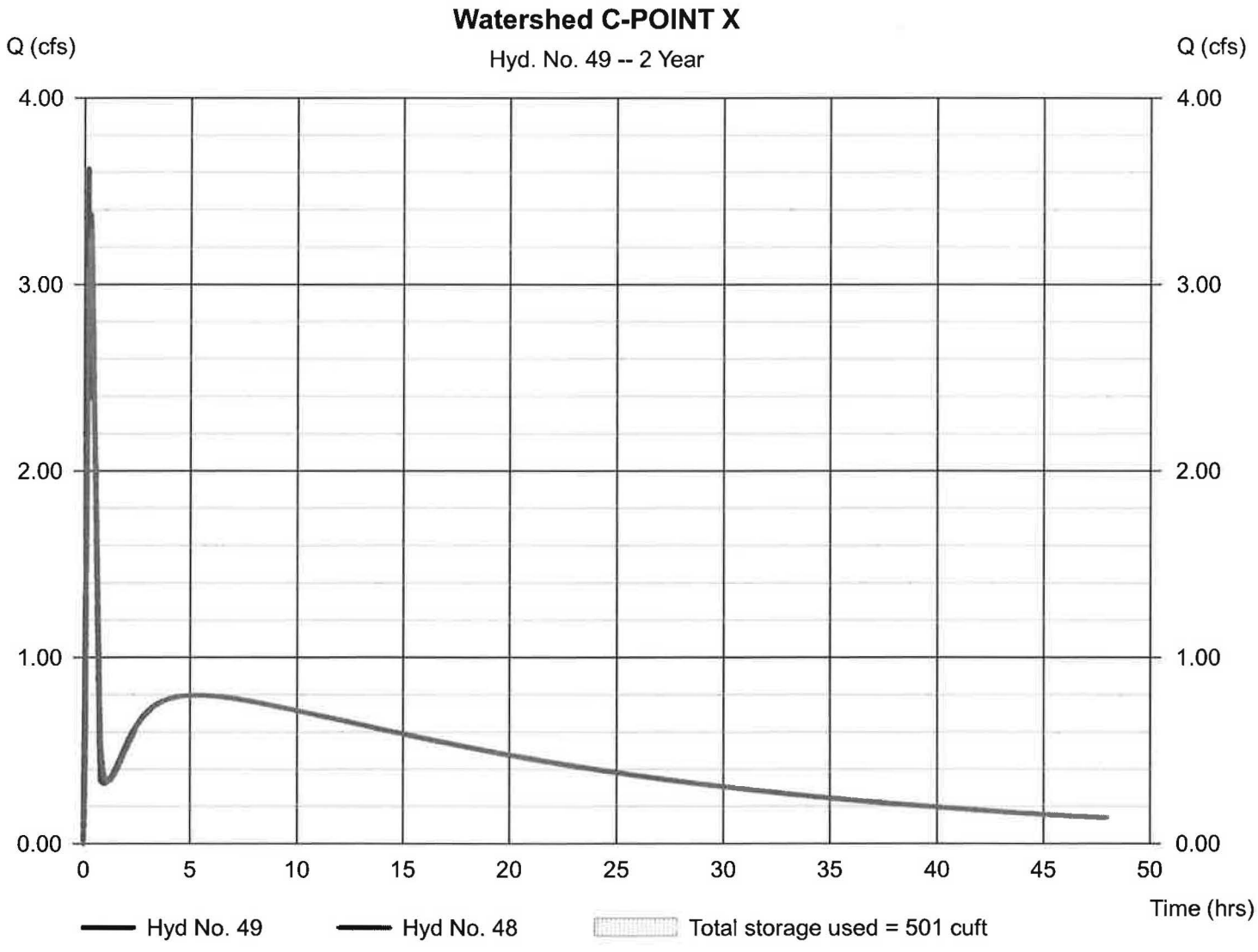
Hydrograph Report

Hyd. No. 49

Watershed C-POINT X

Hydrograph type	= Reservoir	Peak discharge	= 3.285 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.33 hrs
Time interval	= 1 min	Hyd. volume	= 77,528 cuft
Inflow hyd. No.	= 48 - Watershed H+C+I	Max. Elevation	= 529.64 ft
Reservoir name	= Watershed C	Max. Storage	= 501 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs by Intelisolve v9.1 Wednesday, Mar 30, 2016

Pond No. 14 - Watershed C

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 528.89 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	528.89	00	0	0
3.11	532.00	2,000	2,073	2,073
5.11	534.00	25,000	22,712	24,785
7.11	536.00	36,000	60,661	85,446

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	0.00	0.00	0.00
Span (in)	= 24.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 528.89	0.00	0.00	0.00
Length (ft)	= 133.50	0.00	0.00	0.00
Slope (%)	= 1.24	0.00	0.00	n/a
N-Value	= .024	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	528.89	0.00	---	---	---	---	---	---	---	---	---	0.00
0.31	207	529.20	0.59 ic	---	---	---	---	---	---	---	---	---	0.59
0.62	415	529.51	2.24 ic	---	---	---	---	---	---	---	---	---	2.24
0.93	622	529.82	4.73 ic	---	---	---	---	---	---	---	---	---	4.73
1.24	829	530.13	7.80 ic	---	---	---	---	---	---	---	---	---	7.80
1.56	1,037	530.44	11.13 ic	---	---	---	---	---	---	---	---	---	11.13
1.87	1,244	530.76	12.76 oc	---	---	---	---	---	---	---	---	---	12.76
2.18	1,451	531.07	12.78 oc	---	---	---	---	---	---	---	---	---	12.78
2.49	1,659	531.38	13.82 oc	---	---	---	---	---	---	---	---	---	13.82
2.80	1,866	531.69	14.79 oc	---	---	---	---	---	---	---	---	---	14.79
3.11	2,073	532.00	15.71 oc	---	---	---	---	---	---	---	---	---	15.71
3.31	4,344	532.20	16.26 oc	---	---	---	---	---	---	---	---	---	16.26
3.51	6,615	532.40	16.81 oc	---	---	---	---	---	---	---	---	---	16.81
3.71	8,887	532.60	17.33 oc	---	---	---	---	---	---	---	---	---	17.33
3.91	11,158	532.80	17.84 oc	---	---	---	---	---	---	---	---	---	17.84
4.11	13,429	533.00	18.33 oc	---	---	---	---	---	---	---	---	---	18.33
4.31	15,700	533.20	18.81 oc	---	---	---	---	---	---	---	---	---	18.81
4.51	17,971	533.40	19.28 oc	---	---	---	---	---	---	---	---	---	19.28
4.71	20,243	533.60	19.74 oc	---	---	---	---	---	---	---	---	---	19.74
4.91	22,514	533.80	20.19 oc	---	---	---	---	---	---	---	---	---	20.19
5.11	24,785	534.00	20.63 oc	---	---	---	---	---	---	---	---	---	20.63
5.31	30,851	534.20	21.06 oc	---	---	---	---	---	---	---	---	---	21.06
5.51	36,917	534.40	21.48 oc	---	---	---	---	---	---	---	---	---	21.48
5.71	42,983	534.60	21.89 oc	---	---	---	---	---	---	---	---	---	21.89
5.91	49,049	534.80	22.29 oc	---	---	---	---	---	---	---	---	---	22.29
6.11	55,115	535.00	22.69 oc	---	---	---	---	---	---	---	---	---	22.69
6.31	61,181	535.20	23.08 oc	---	---	---	---	---	---	---	---	---	23.08
6.51	67,247	535.40	23.47 oc	---	---	---	---	---	---	---	---	---	23.47
6.71	73,313	535.60	23.84 oc	---	---	---	---	---	---	---	---	---	23.84
6.91	79,379	535.80	24.22 oc	---	---	---	---	---	---	---	---	---	24.22
7.11	85,446	536.00	24.58 oc	---	---	---	---	---	---	---	---	---	24.58

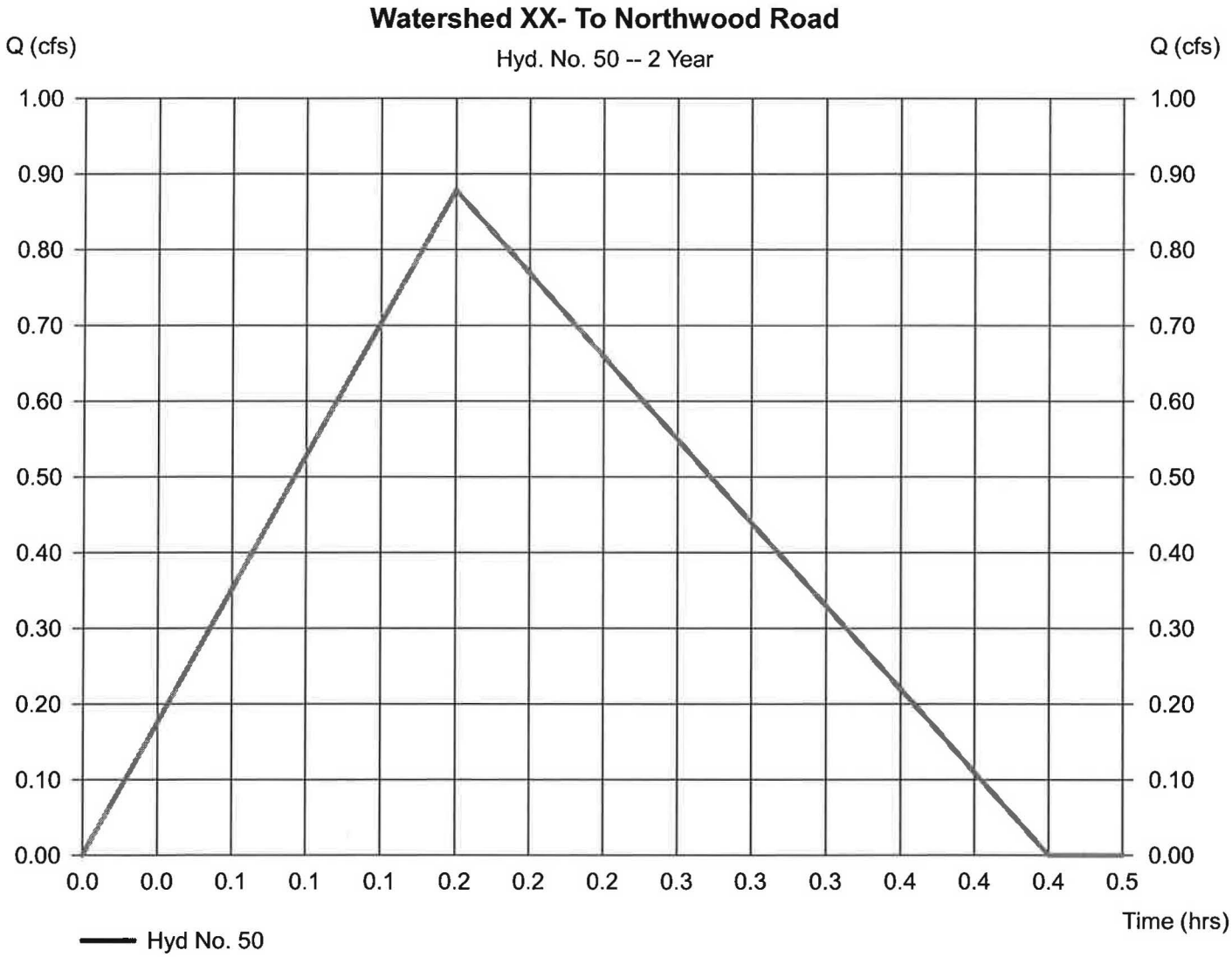
Hydrograph Report

Hyd. No. 50

Watershed XX- To Northwood Road

Hydrograph type	= Rational	Peak discharge	= 0.878 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 704 cuft
Drainage area	= 0.720 ac	Runoff coeff.	= 0.35*
Intensity	= 3.486 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.100 x 0.90) + (0.360 x 0.30) + (0.260 x 0.20)] / 0.720



Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	Rational	7.312	1	17	9,956	----	------	------	Watershed A
2	Reservoir	2.822	1	34	9,848	1	565.88	6,257	Watershed A
3	Rational	5.507	1	14	5,974	----	------	------	Watershed B
4	Reservoir	1.167	1	31	5,770	3	566.95	4,695	Watershed B
5	Rational	3.097	1	21	5,158	----	------	------	Watershed I(1)
6	Rational	4.213	1	19	6,432	----	------	------	Wateshed II
7	Rational	5.808	1	10	4,652	----	------	------	Watershed IIA
8	Reservoir	1.244	1	23	4,524	7	562.48	3,341	Wateshed IIA
9	Rational	4.205	1	13	4,379	----	------	------	Watershed VIII
10	Rational	6.845	1	10	5,483	----	------	------	Watershed VIIIA
11	Reservoir	1.224	1	23	5,331	10	559.43	4,163	Watershed VIIIA
12	Rational	0.012	1	10	10	----	------	------	Watershed IX
13	Rational	2.537	1	10	2,032	----	------	------	Watershed IXA
14	Reservoir	1.202	1	18	1,977	13	554.04	894	Watershed IXA
15	Combine	9.491	1	21	21,192	5, 6, 8, 11,	------	------	Combine
16	Combine	13.62	1	19	27,468	9, 12, 14, 15	------	------	Watershed-Point Y
17	Rational	5.676	1	15	6,820	----	------	------	Watershed III
18	Rational	1.845	1	10	1,478	----	------	------	Watershed IV
19	Rational	8.541	1	10	6,841	----	------	------	Watershed IVA
20	Reservoir	0.000	1	n/a	0	19	553.41	6,662	Watershed IVA
21	Combine	6.410	1	15	16,660	2, 17, 20	------	------	Watershed A+III+VI
22	Rational	3.293	1	10	2,638	----	------	------	Watershed VI
23	Rational	4.498	1	10	3,603	----	------	------	Watershed VIA
24	Reservoir	1.233	1	22	3,504	23	550.45	2,345	Watershed VIA
25	Rational	14.54	1	10	11,649	----	------	------	Watershed VIIA
26	Reservoir	2.487	1	23	11,333	25	547.03	9,007	Watershed VIIA
27	Rational	1.430	1	10	1,145	----	------	------	Watershed X
28	Rational	26.45	1	23	48,720	----	------	------	Watershed V
29	Rational	2.394	1	10	1,918	----	------	------	Watershed XA
30	Reservoir	1.297	1	17	1,866	29	557.64	717	Watershed XA
31	Rational	0.332	1	10	266	----	------	------	Watershed VII
32	Combine	34.98	1	23	70,424	21, 24, 28, 30,	------	------	Combine
33	Reservoir	17.96	1	40	70,418	32	544.14	34,464	Watershed V

Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
34	Rational	4.581	1	22	8,243	----	------	------	Watershed XII
35	Reservoir	0.007	1	59	1,122	34	546.22	8,089	Watershed XII
36	Rational	6.603	1	14	7,405	----	------	------	Watershed XIX
37	Combine	21.24	1	34	94,850	4, 26, 33, 36	------	------	Watershed B+X+XI+XIX
38	Reservoir	14.06	1	62	94,840	37	542.06	35,765	Watershed XIX-POINT Z
39	Rational	16.21	1	20	25,963	----	------	------	Watershed XIV
40	Combine	17.63	1	20	120,608	38, 39	------	------	Watershed XIV+XIX
41	Reservoir	1.782	1	225	104,393	40	539.43	94,176	Watershed XIV
42	Rational	4.003	1	19	5,992	----	------	------	Watershed H
43	Combine	4.104	1	19	106,674	41, 42	------	------	Watershed XIV+H
44	Reservoir	1.248	1	309	105,993	43	536.14	5,922	Watershed H
45	Rational	3.998	1	18	5,860	----	------	------	Watershed C
46	Rational	2.315	1	12	2,138	----	------	------	Watershed I
47	Reservoir	2.292	1	12	838	46	531.52	25.1	Watershed I
48	Combine	5.203	1	12	112,588	44, 45, 47	------	------	Watershed H+C+I
49	Reservoir	4.650	1	20	112,521	48	529.83	615	Watershed C-POINT X
50	Rational	1.211	1	10	970	----	------	------	Watershed XX- To Northwood Roa

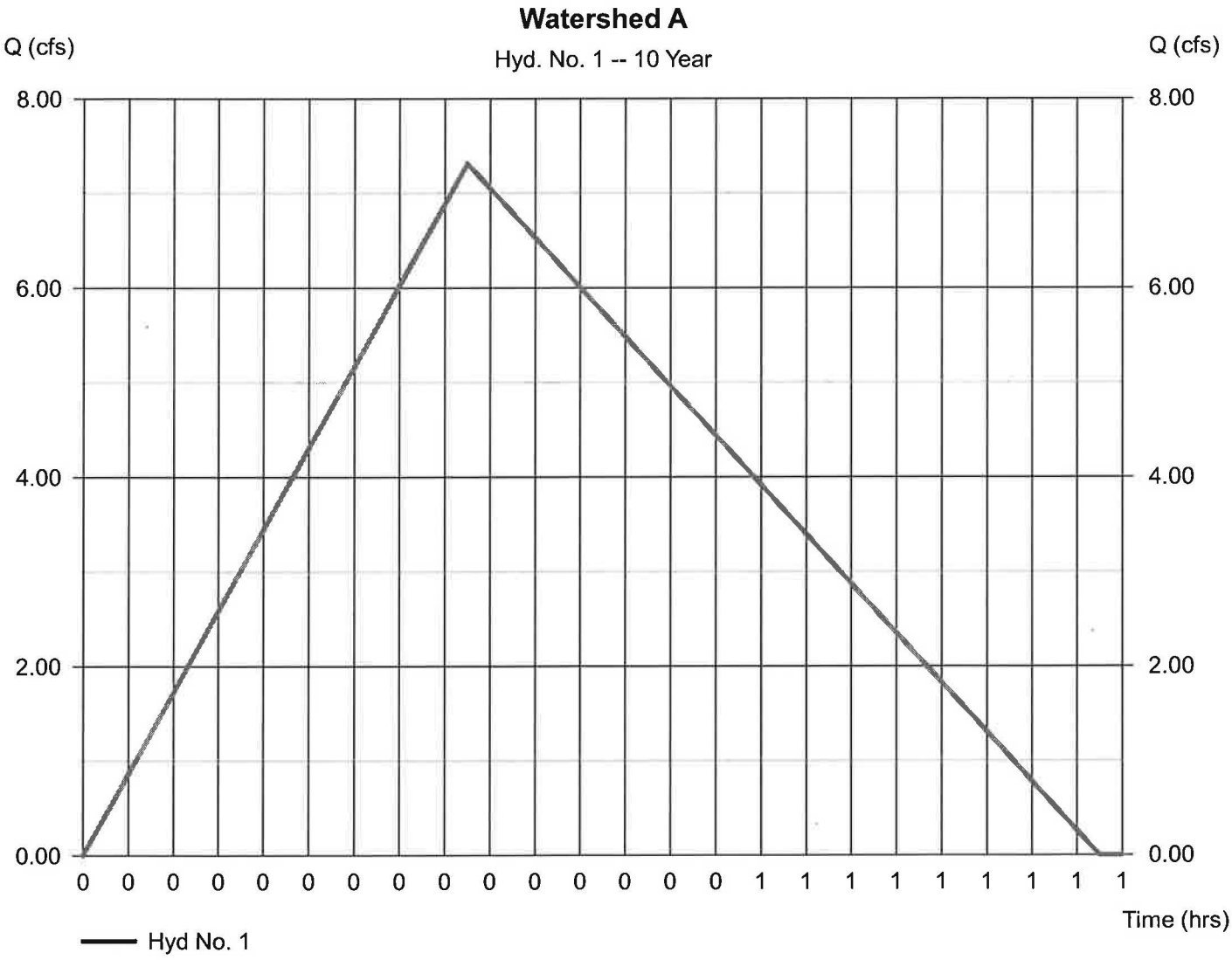
Hydrograph Report

Hyd. No. 1

Watershed A

Hydrograph type	= Rational	Peak discharge	= 7.312 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.28 hrs
Time interval	= 1 min	Hyd. volume	= 9,956 cuft
Drainage area	= 8.000 ac	Runoff coeff.	= 0.24*
Intensity	= 3.808 in/hr	Tc by TR55	= 17.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.400 x 0.90) + (0.500 x 0.30) + (7.100 x 0.20)] / 8.000



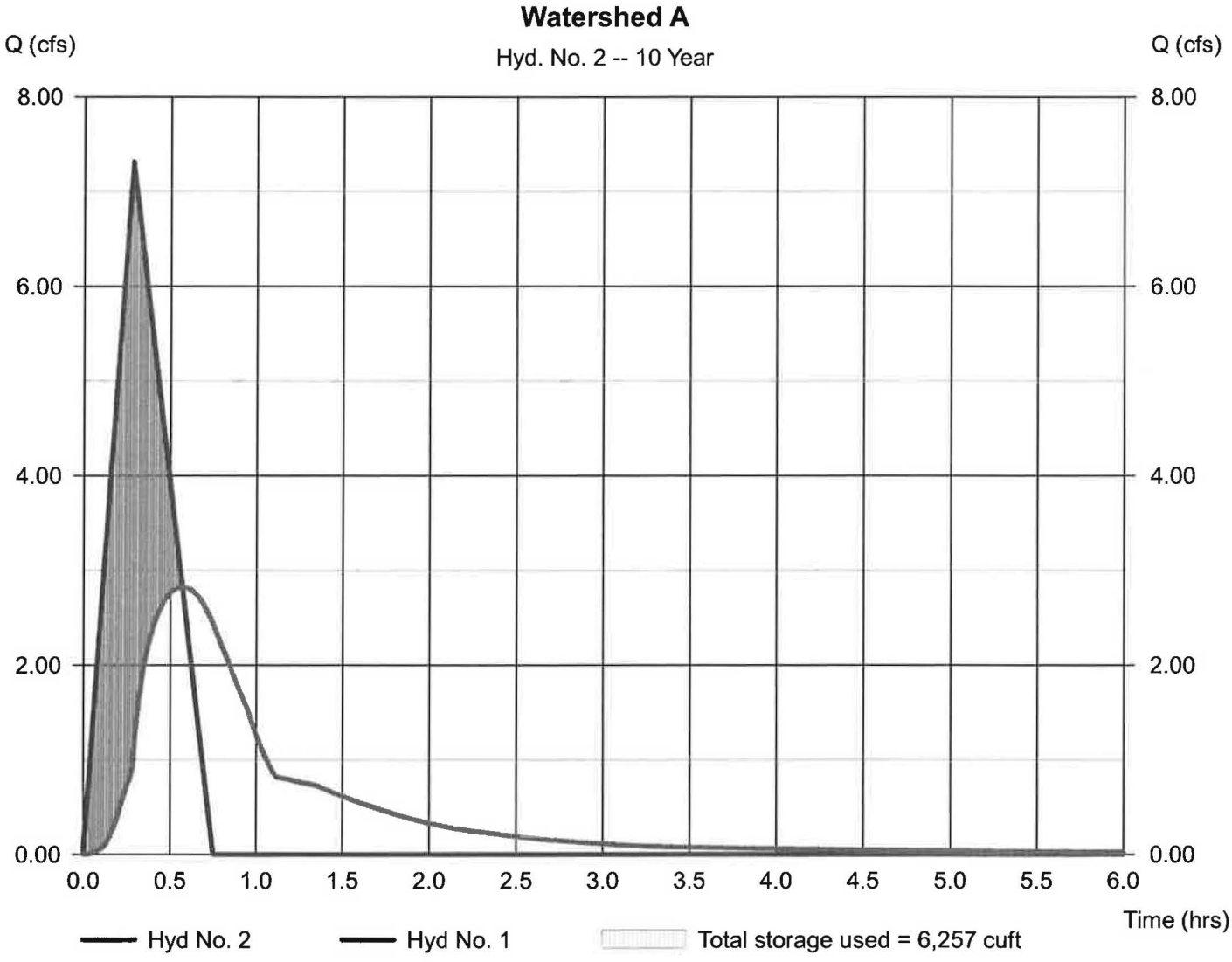
Hydrograph Report

Hyd. No. 2

Watershed A

Hydrograph type	= Reservoir	Peak discharge	= 2.822 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.57 hrs
Time interval	= 1 min	Hyd. volume	= 9,848 cuft
Inflow hyd. No.	= 1 - Watershed A	Max. Elevation	= 565.88 ft
Reservoir name	= Watershed A	Max. Storage	= 6,257 cuft

Storage Indication method used.



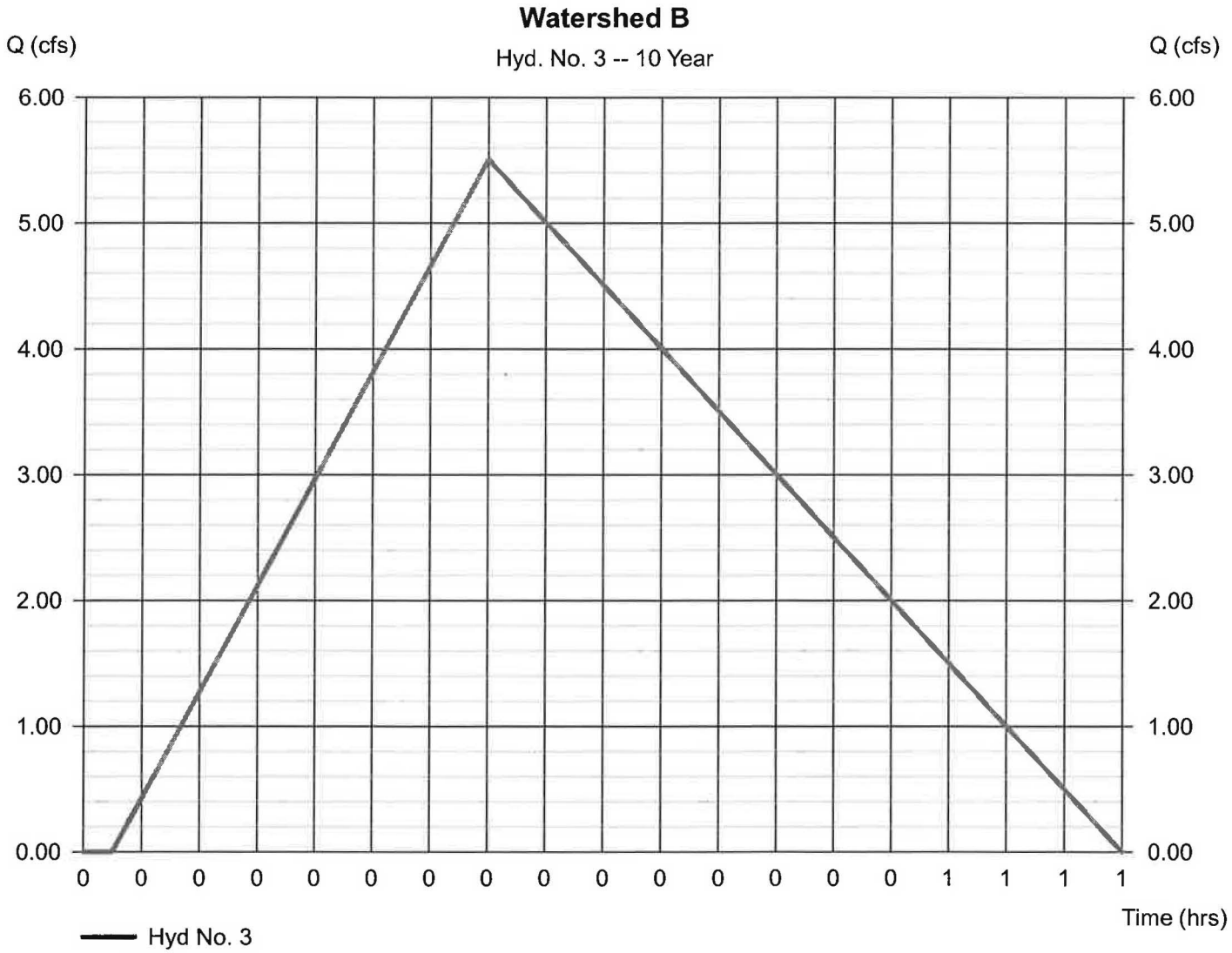
Hydrograph Report

Hyd. No. 3

Watershed B

Hydrograph type	= Rational	Peak discharge	= 5.507 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.23 hrs
Time interval	= 1 min	Hyd. volume	= 5,974 cuft
Drainage area	= 5.200 ac	Runoff coeff.	= 0.25*
Intensity	= 4.236 in/hr	Tc by TR55	= 13.54 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.300 x 0.90) + (0.500 x 0.30) + (4.400 x 0.20)] / 5.200



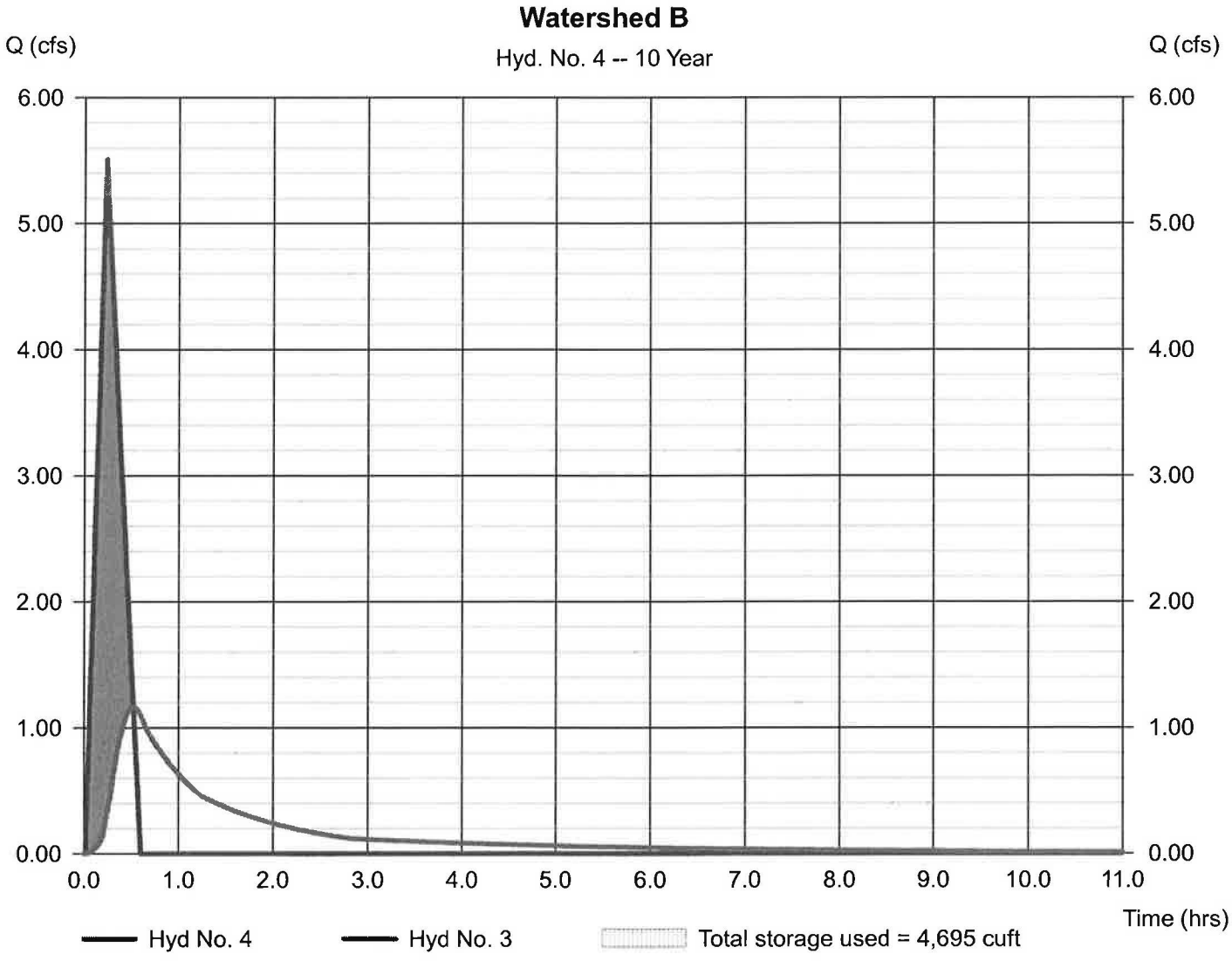
Hydrograph Report

Hyd. No. 4

Watershed B

Hydrograph type	= Reservoir	Peak discharge	= 1.167 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.52 hrs
Time interval	= 1 min	Hyd. volume	= 5,770 cuft
Inflow hyd. No.	= 3 - Watershed B	Max. Elevation	= 566.95 ft
Reservoir name	= Watershed B	Max. Storage	= 4,695 cuft

Storage Indication method used.



Hydrograph Report

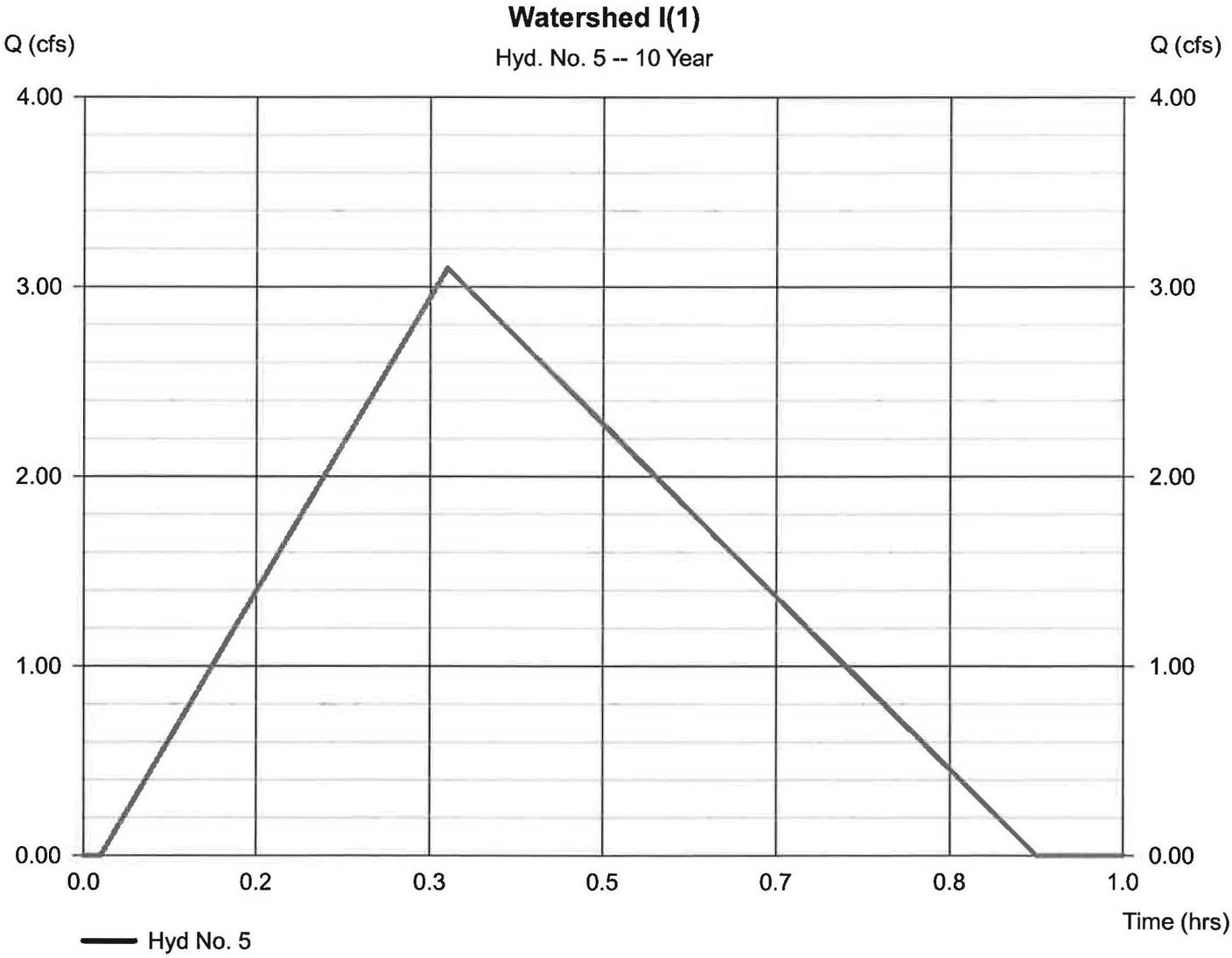
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 5

Watershed I(1)

Hydrograph type	= Rational	Peak discharge	= 3.097 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.35 hrs
Time interval	= 1 min	Hyd. volume	= 5,158 cuft
Drainage area	= 1.700 ac	Runoff coeff.	= 0.53*
Intensity	= 3.437 in/hr	Tc by TR55	= 20.80 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.700 x 0.90) + (0.700 x 0.30) + (0.300 x 0.20)] / 1.700



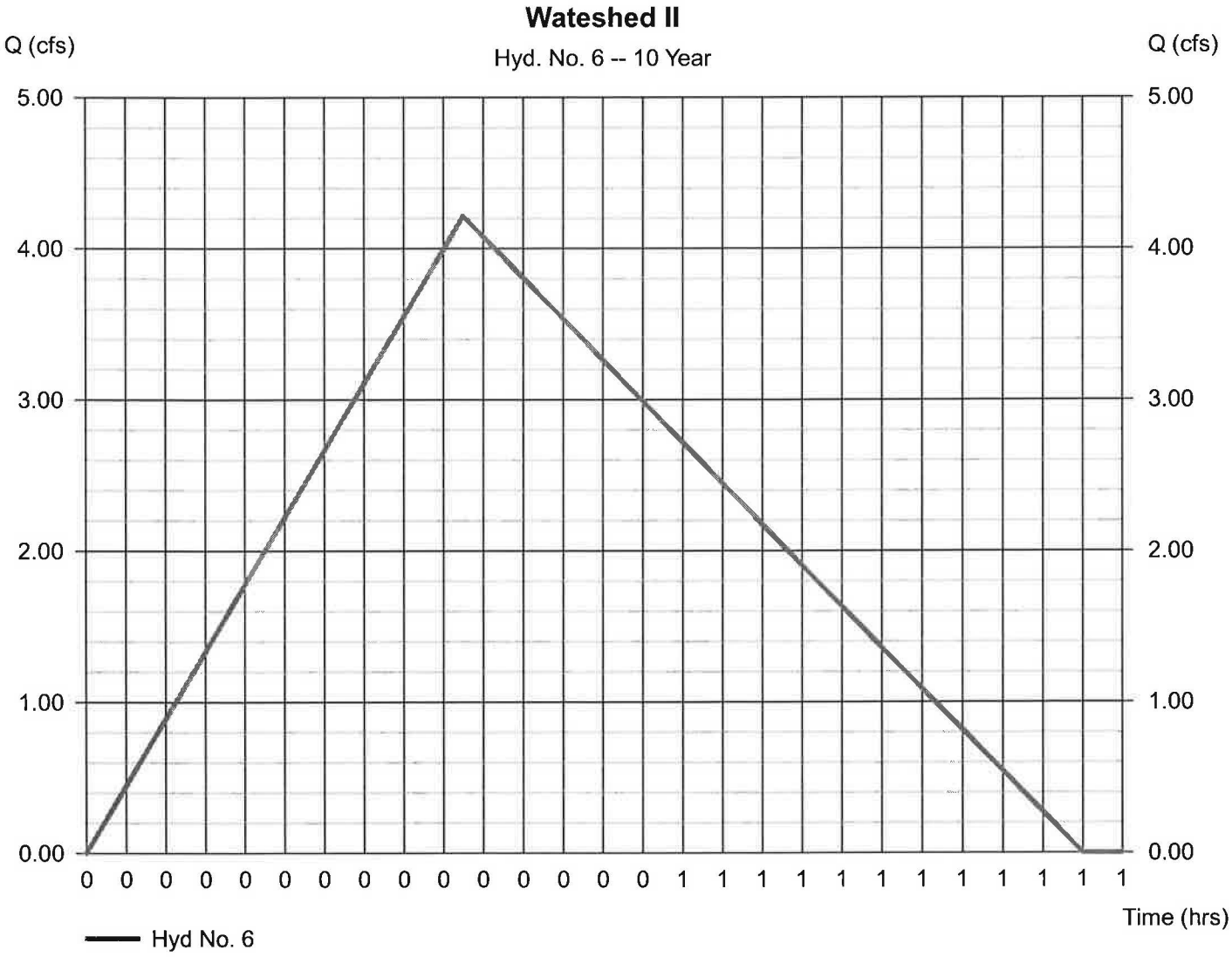
Hydrograph Report

Hyd. No. 6

Wateshed II

Hydrograph type	= Rational	Peak discharge	= 4.213 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 6,432 cuft
Drainage area	= 4.040 ac	Runoff coeff.	= 0.29*
Intensity	= 3.596 in/hr	Tc by TR55	= 19.06 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.230 x 0.90) + (1.940 x 0.30) + (1.870 x 0.20)] / 4.040



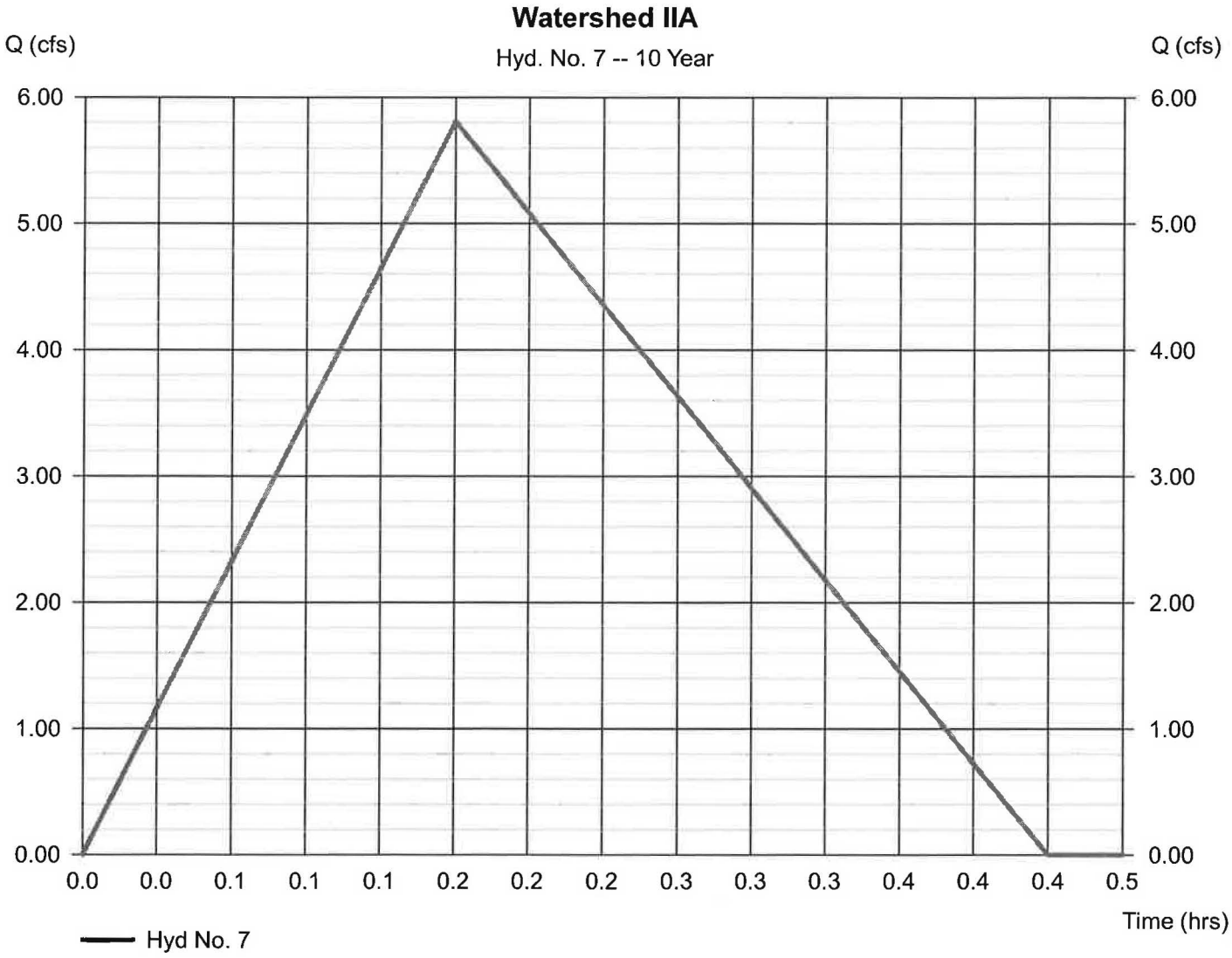
Hydrograph Report

Hyd. No. 7

Watershed IIA

Hydrograph type	= Rational	Peak discharge	= 5.808 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 4,652 cuft
Drainage area	= 1.530 ac	Runoff coeff.	= 0.79*
Intensity	= 4.805 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.250 x 0.90) + (0.280 x 0.30)] / 1.530



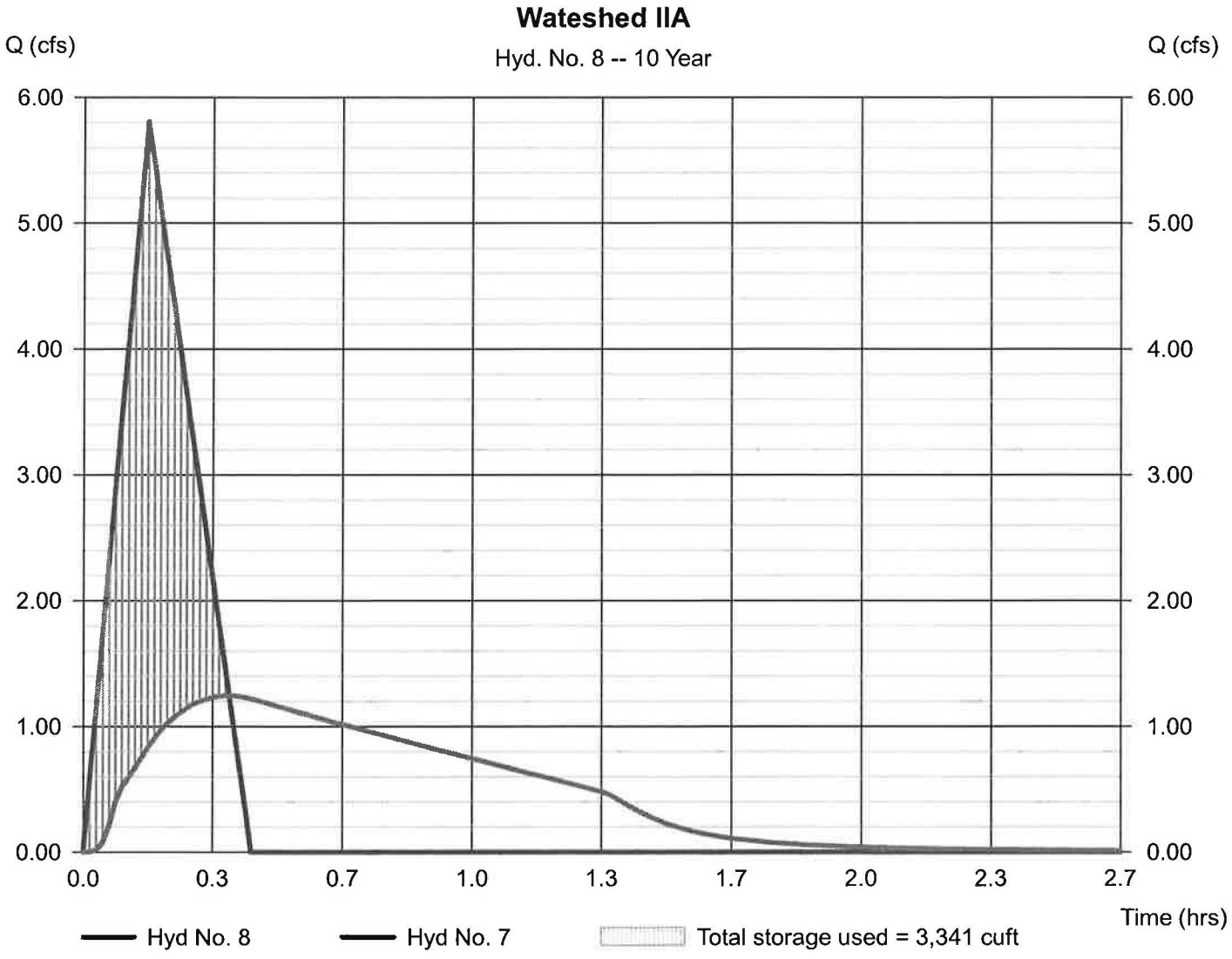
Hydrograph Report

Hyd. No. 8

Wateshed IIA

Hydrograph type	= Reservoir	Peak discharge	= 1.244 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.38 hrs
Time interval	= 1 min	Hyd. volume	= 4,524 cuft
Inflow hyd. No.	= 7 - Watershed IIA	Max. Elevation	= 562.48 ft
Reservoir name	= Watershed IIA	Max. Storage	= 3,341 cuft

Storage Indication method used.



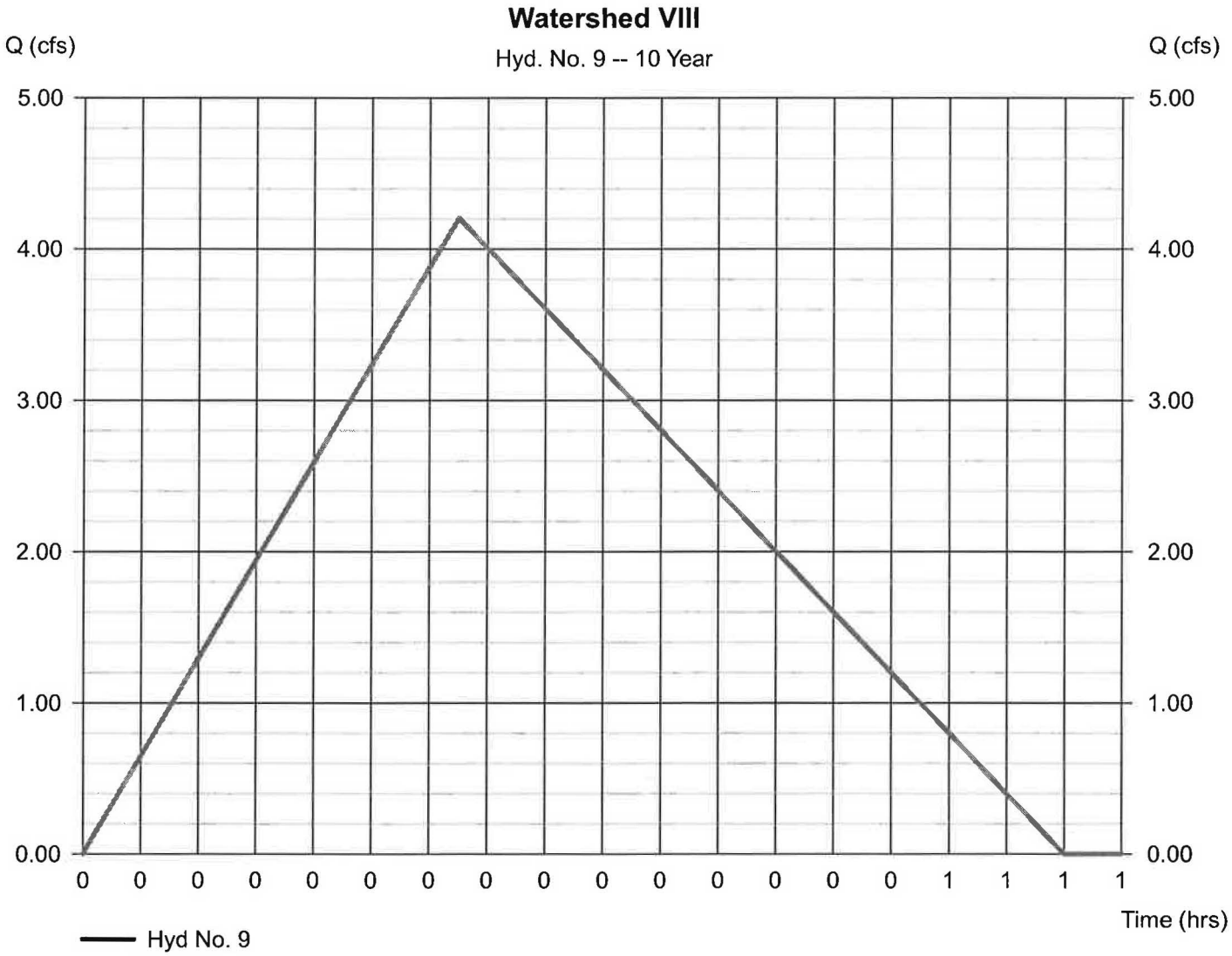
Hydrograph Report

Hyd. No. 9

Watershed VIII

Hydrograph type	= Rational	Peak discharge	= 4.205 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.22 hrs
Time interval	= 1 min	Hyd. volume	= 4,379 cuft
Drainage area	= 3.250 ac	Runoff coeff.	= 0.3*
Intensity	= 4.313 in/hr	Tc by TR55	= 13.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.320 x 0.90) + (1.120 x 0.30) + (1.810 x 0.20)] / 3.250



Hydrograph Report

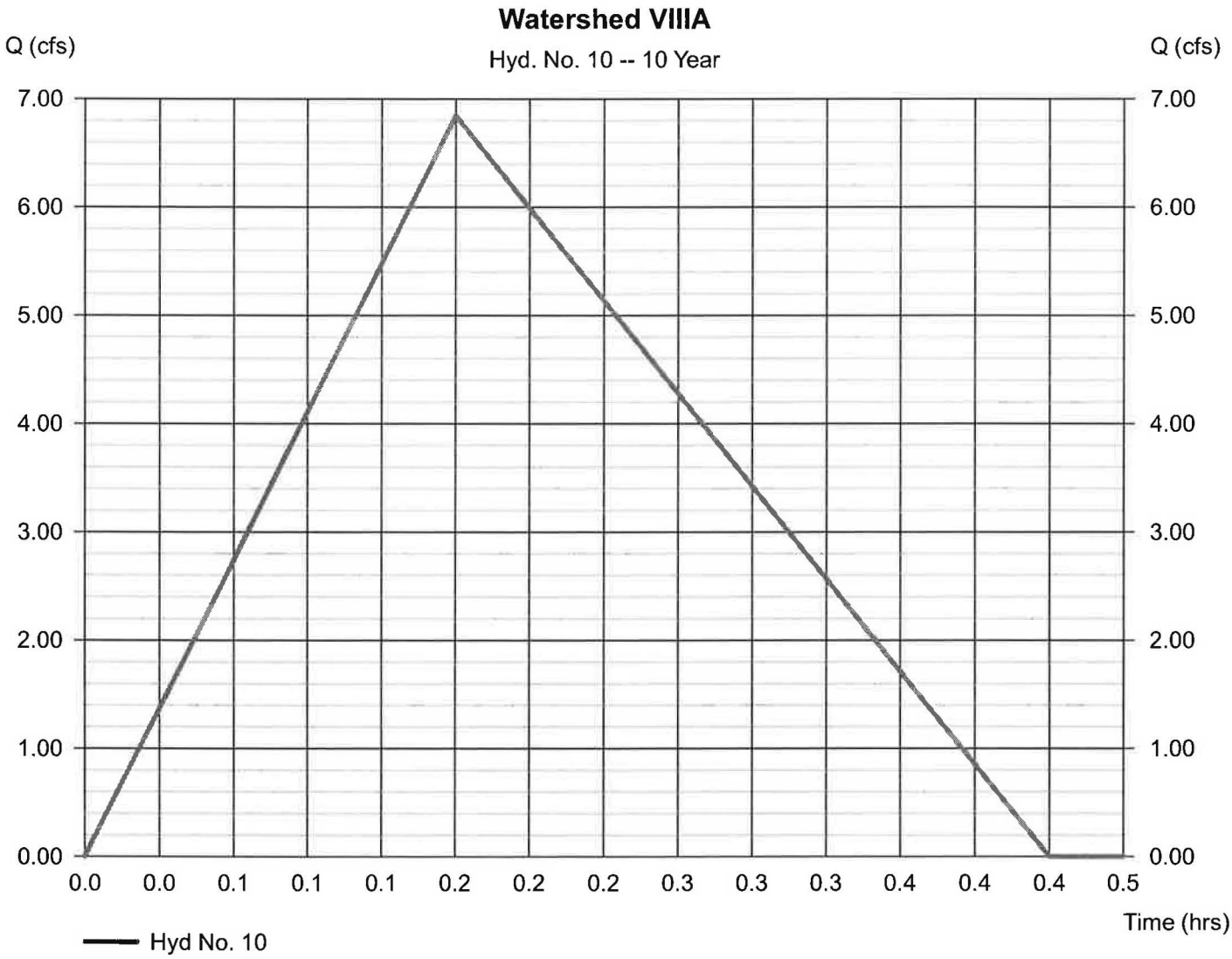
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 10

Watershed VIIIA

Hydrograph type	= Rational	Peak discharge	= 6.845 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 5,483 cuft
Drainage area	= 1.850 ac	Runoff coeff.	= 0.77*
Intensity	= 4.805 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.460 x 0.90) + (0.390 x 0.30)] / 1.850



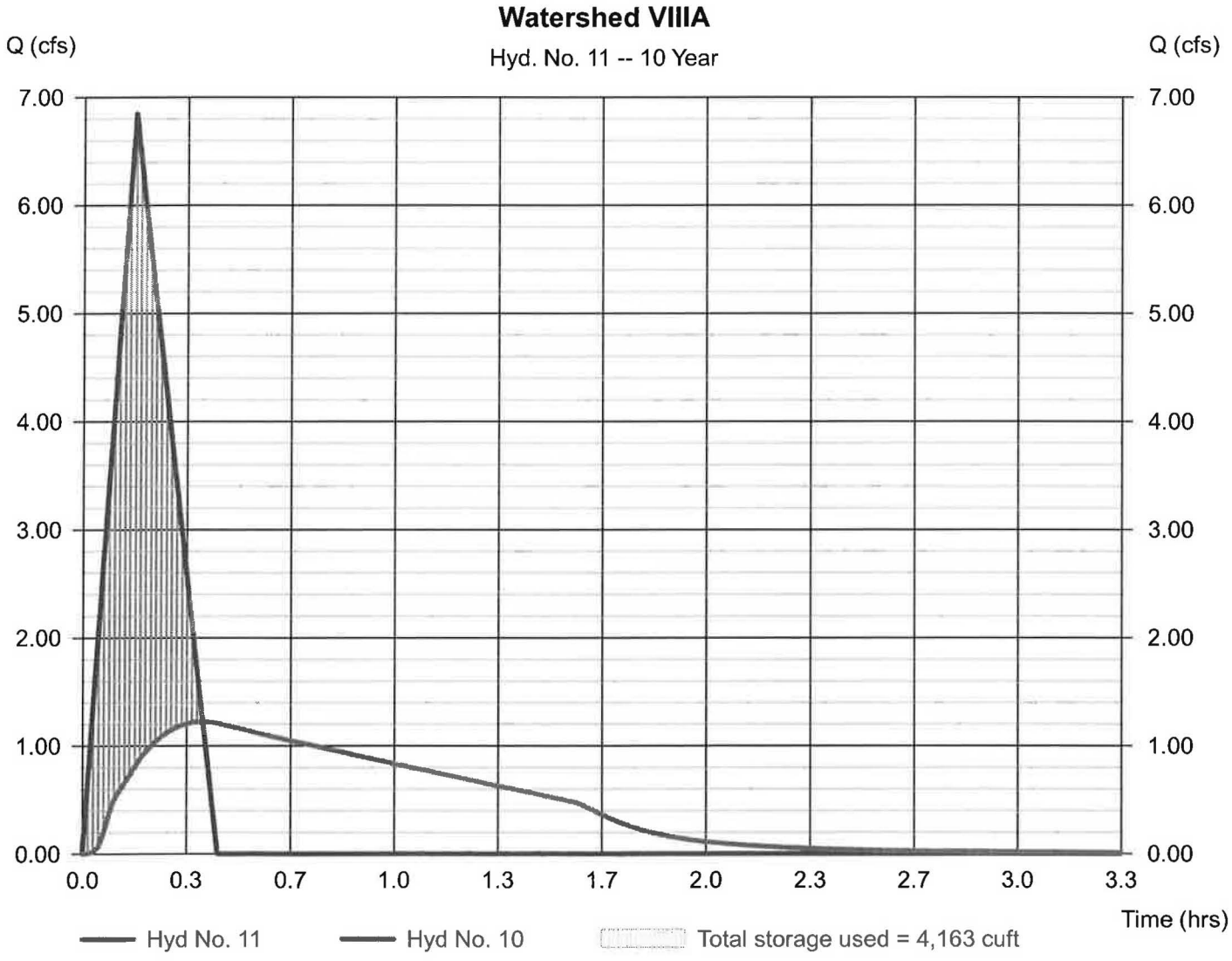
Hydrograph Report

Hyd. No. 11

Watershed VIIIA

Hydrograph type	= Reservoir	Peak discharge	= 1.224 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.38 hrs
Time interval	= 1 min	Hyd. volume	= 5,331 cuft
Inflow hyd. No.	= 10 - Watershed VIIIA	Max. Elevation	= 559.43 ft
Reservoir name	= Watershed VIIIA	Max. Storage	= 4,163 cuft

Storage Indication method used.



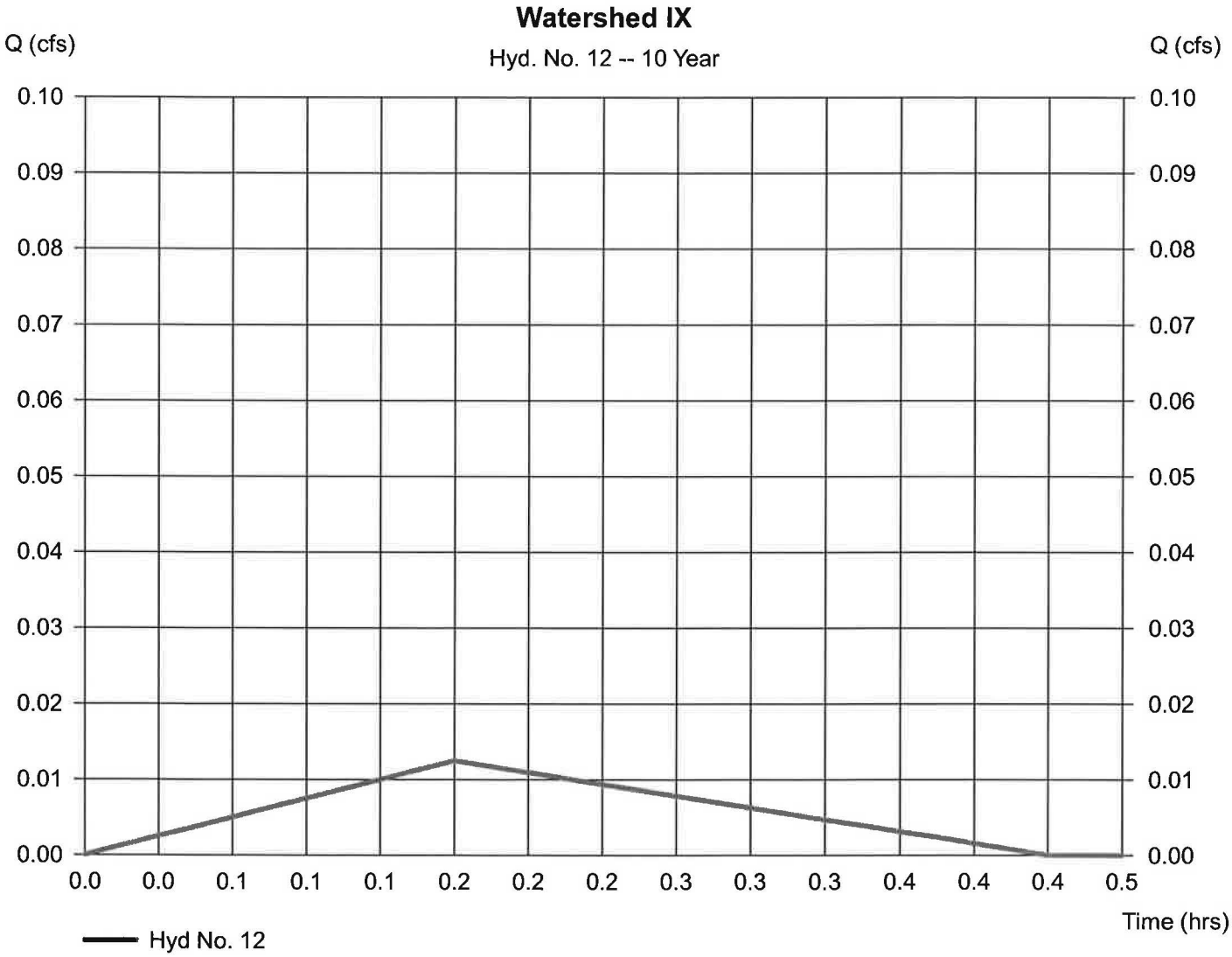
Hydrograph Report

Hyd. No. 12

Watershed IX

Hydrograph type	= Rational	Peak discharge	= 0.012 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 10 cuft
Drainage area	= 0.260 ac	Runoff coeff.	= 0.01*
Intensity	= 4.805 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.010 x 0.30)] / 0.260



Hydrograph Report

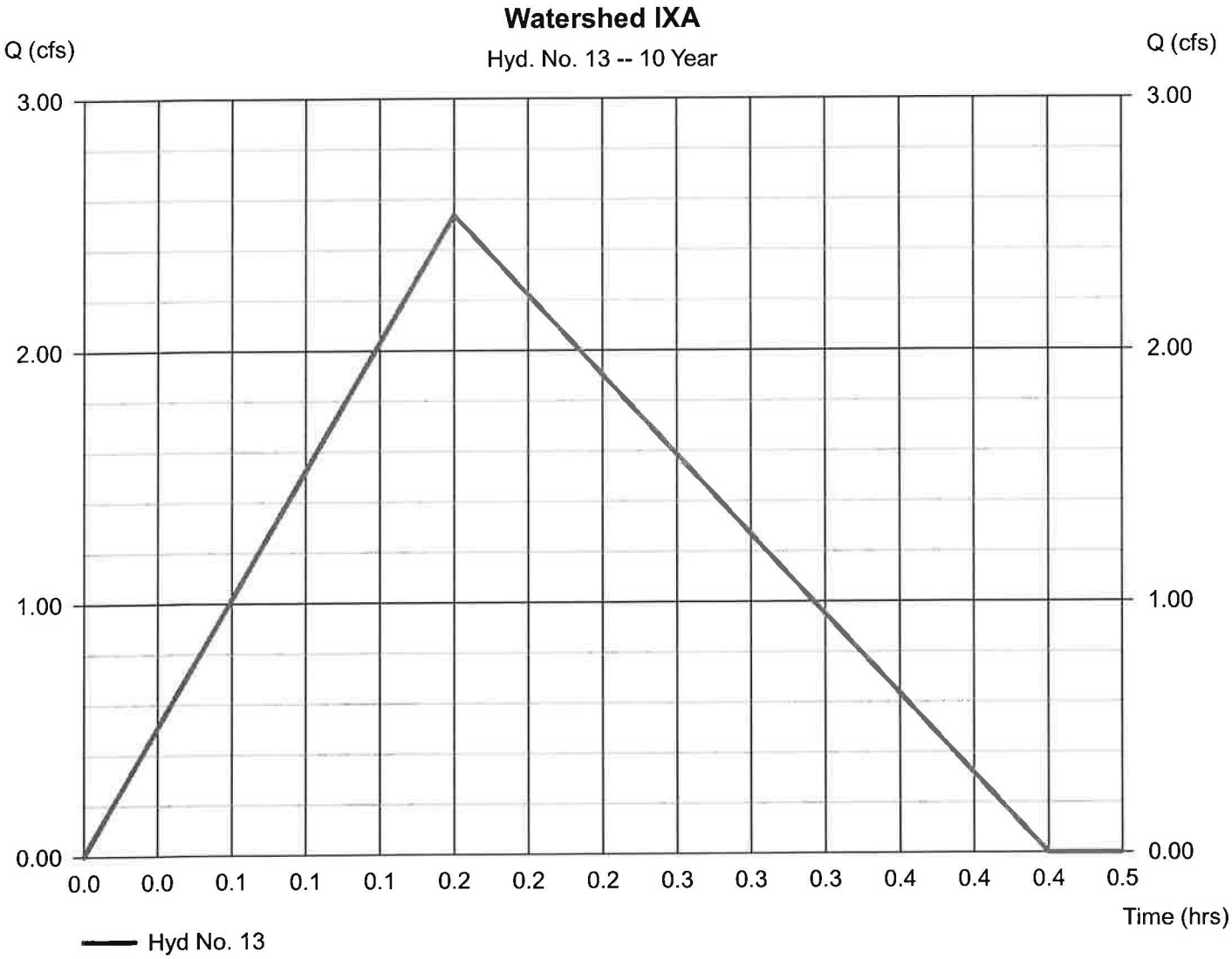
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 13

Watershed IXA

Hydrograph type	= Rational	Peak discharge	= 2.537 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 2,032 cuft
Drainage area	= 0.880 ac	Runoff coeff.	= 0.6*
Intensity	= 4.805 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.460 x 0.90) + (0.260 x 0.30) + (0.160 x 0.20)] / 0.880



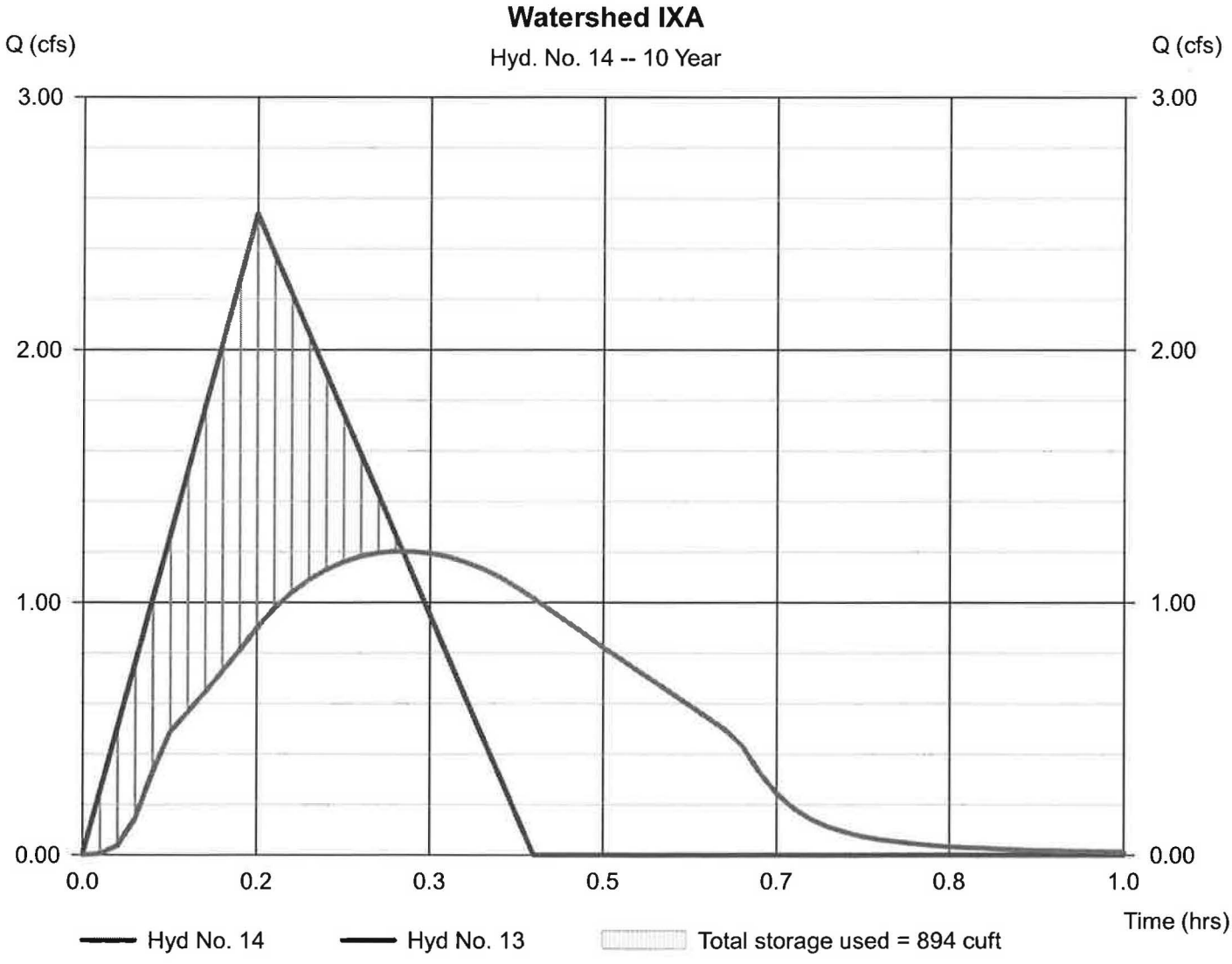
Hydrograph Report

Hyd. No. 14

Watershed IXA

Hydrograph type	= Reservoir	Peak discharge	= 1.202 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.30 hrs
Time interval	= 1 min	Hyd. volume	= 1,977 cuft
Inflow hyd. No.	= 13 - Watershed IXA	Max. Elevation	= 554.04 ft
Reservoir name	= Waatershed IXA	Max. Storage	= 894 cuft

Storage Indication method used.

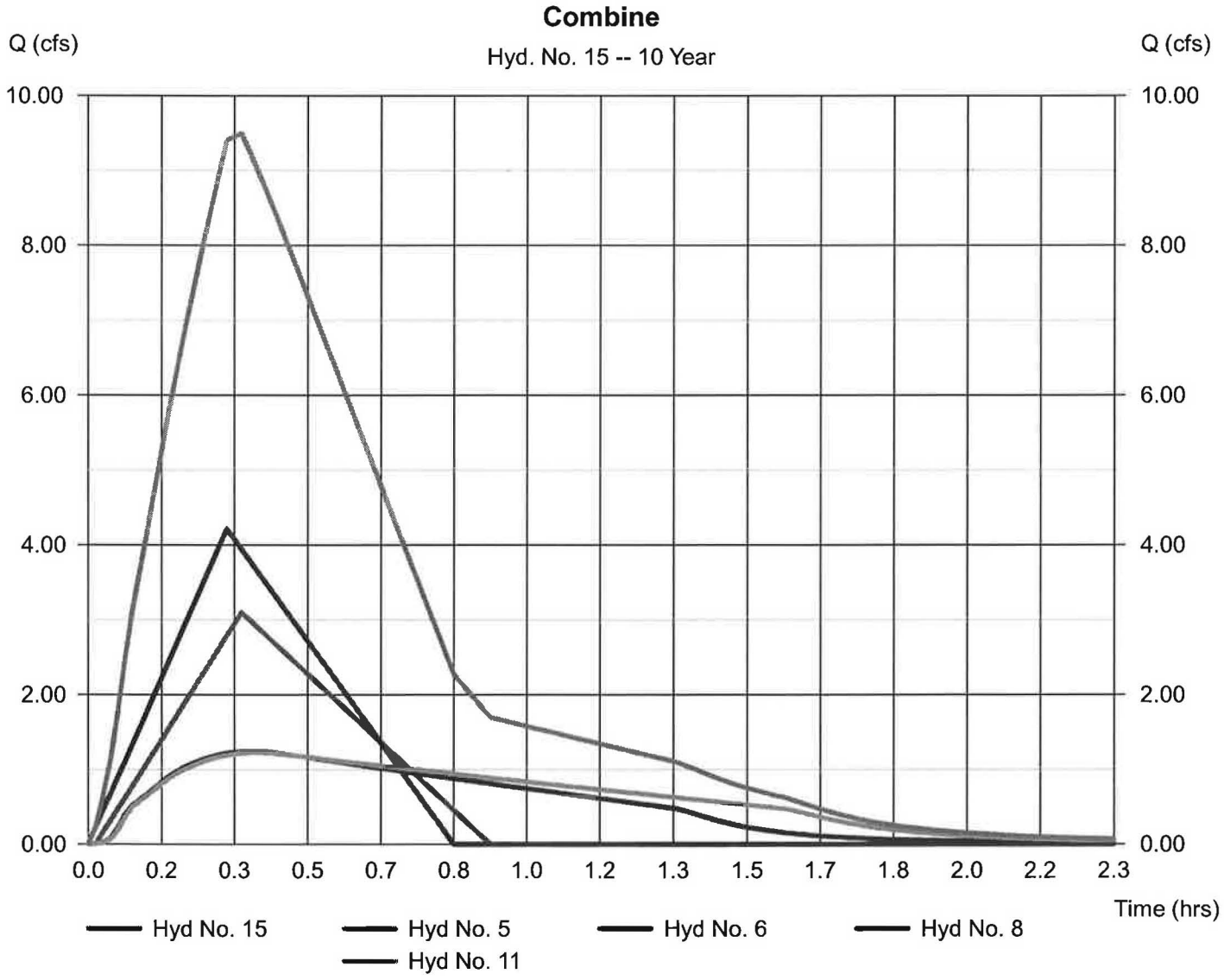


Hydrograph Report

Hyd. No. 15

Combine

Hydrograph type	= Combine	Peak discharge	= 9.491 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.35 hrs
Time interval	= 1 min	Hyd. volume	= 21,192 cuft
Inflow hyds.	= 5, 6, 8, 11	Contrib. drain. area	= 5.740 ac

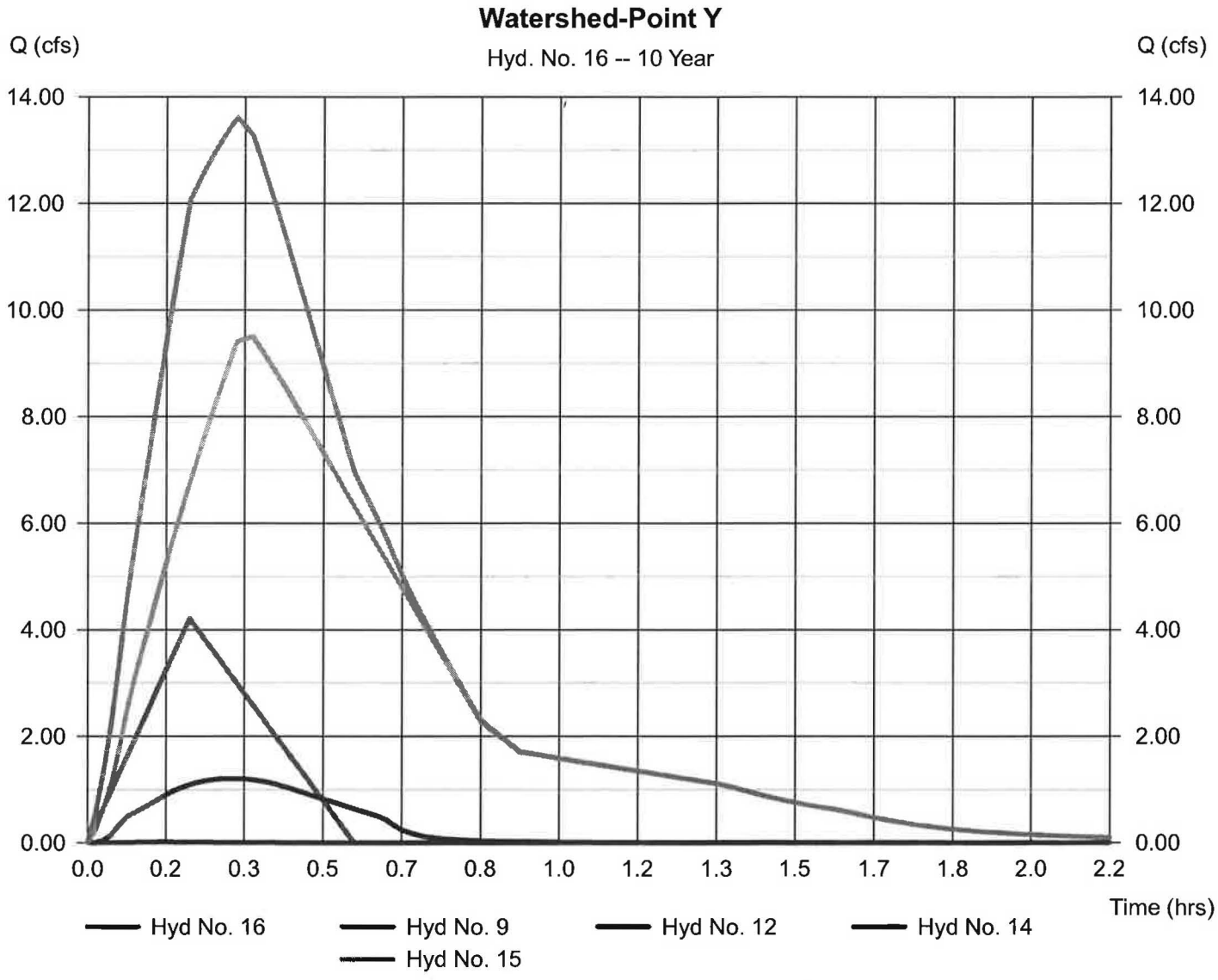


Hydrograph Report

Hyd. No. 16

Watershed-Point Y

Hydrograph type	= Combine	Peak discharge	= 13.62 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 27,468 cuft
Inflow hyds.	= 9, 12, 14, 15	Contrib. drain. area	= 3.510 ac



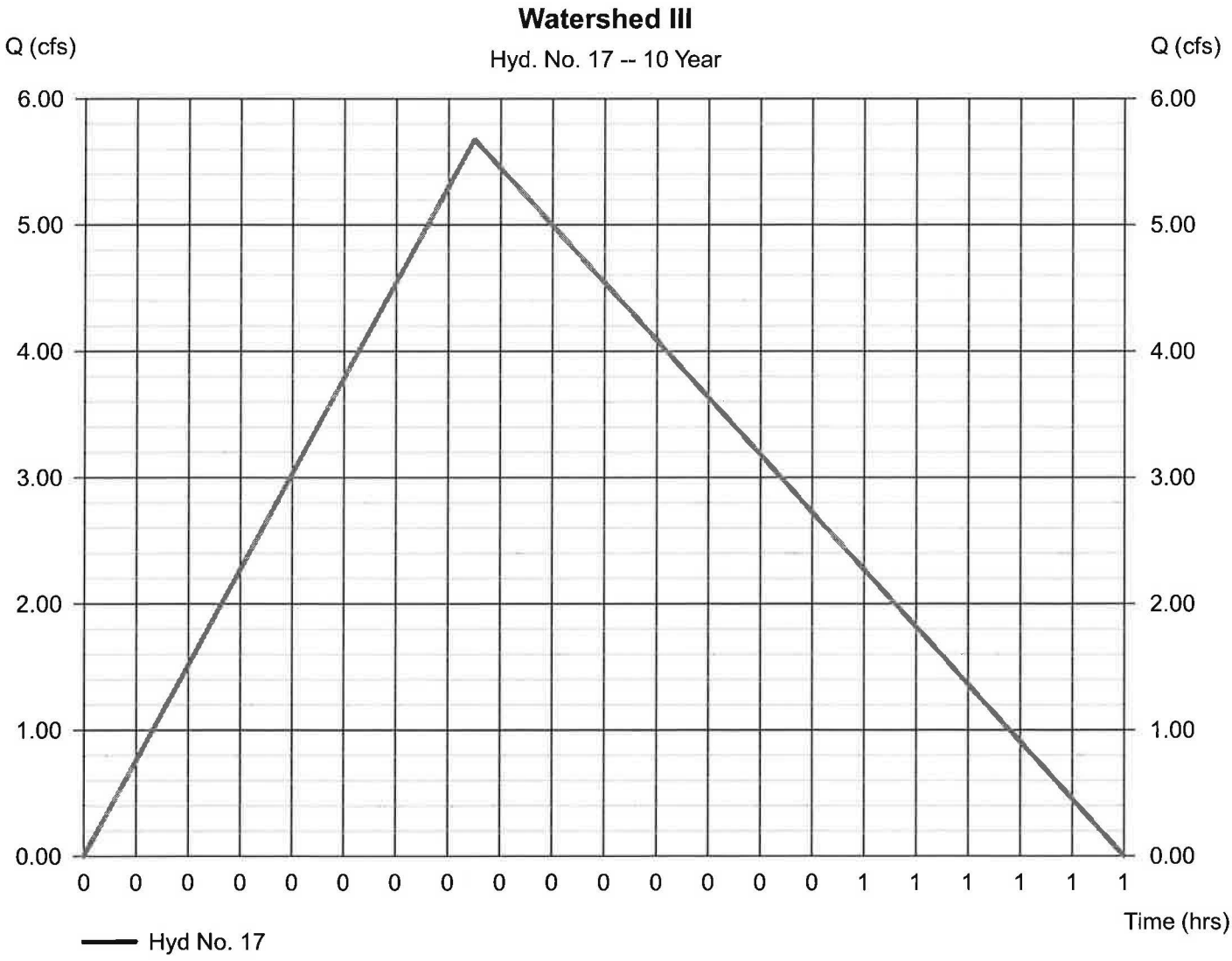
Hydrograph Report

Hyd. No. 17

Watershed III

Hydrograph type	= Rational	Peak discharge	= 5.676 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.25 hrs
Time interval	= 1 min	Hyd. volume	= 6,820 cuft
Drainage area	= 2.700 ac	Runoff coeff.	= 0.52*
Intensity	= 4.043 in/hr	Tc by TR55	= 15.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.000 x 0.90) + (1.700 x 0.30)] / 2.700



Hydrograph Report

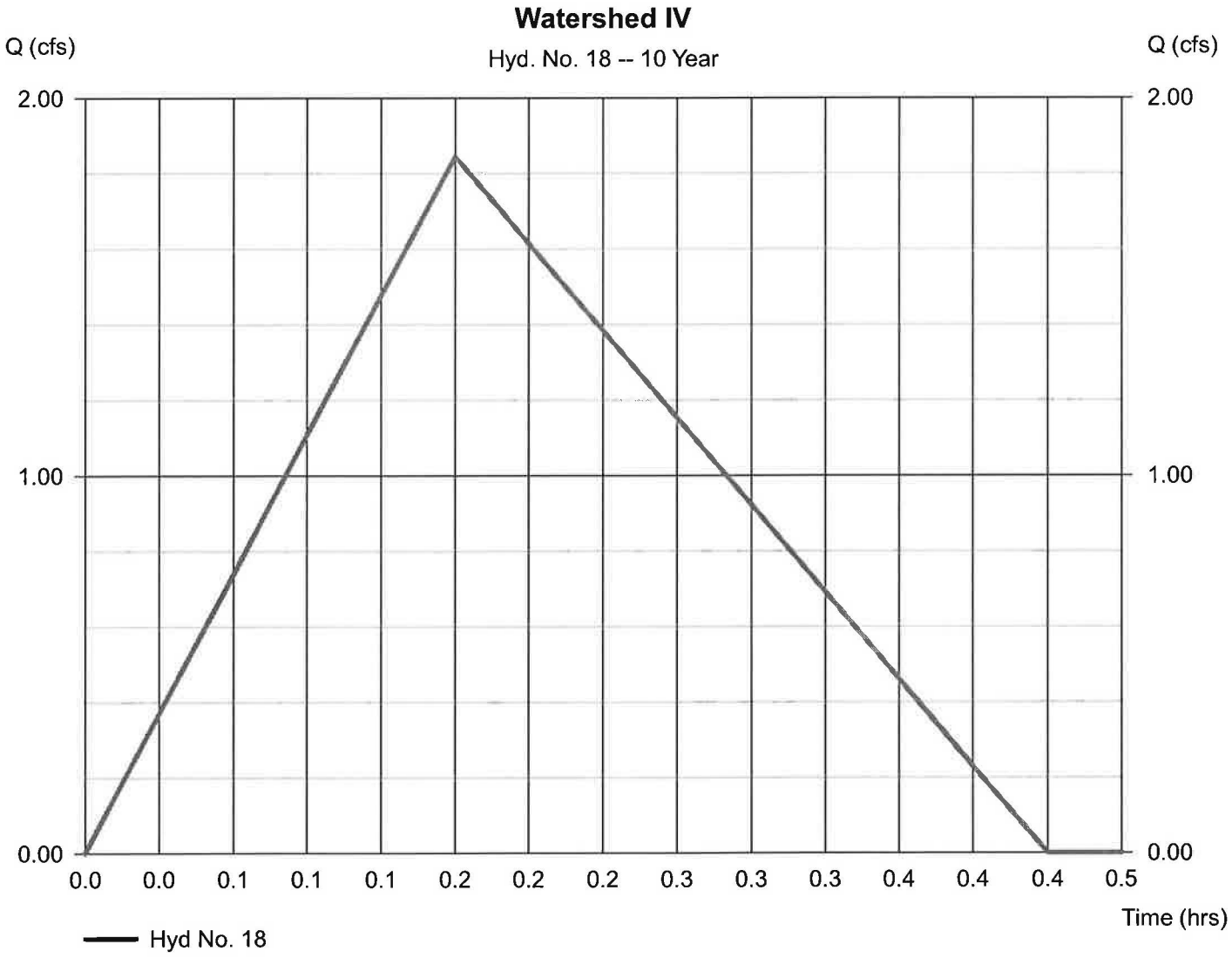
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 18

Watershed IV

Hydrograph type	= Rational	Peak discharge	= 1.845 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 1,478 cuft
Drainage area	= 0.800 ac	Runoff coeff.	= 0.48*
Intensity	= 4.805 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.260 x 0.90) + (0.440 x 0.30) + (0.100 x 0.20)] / 0.800



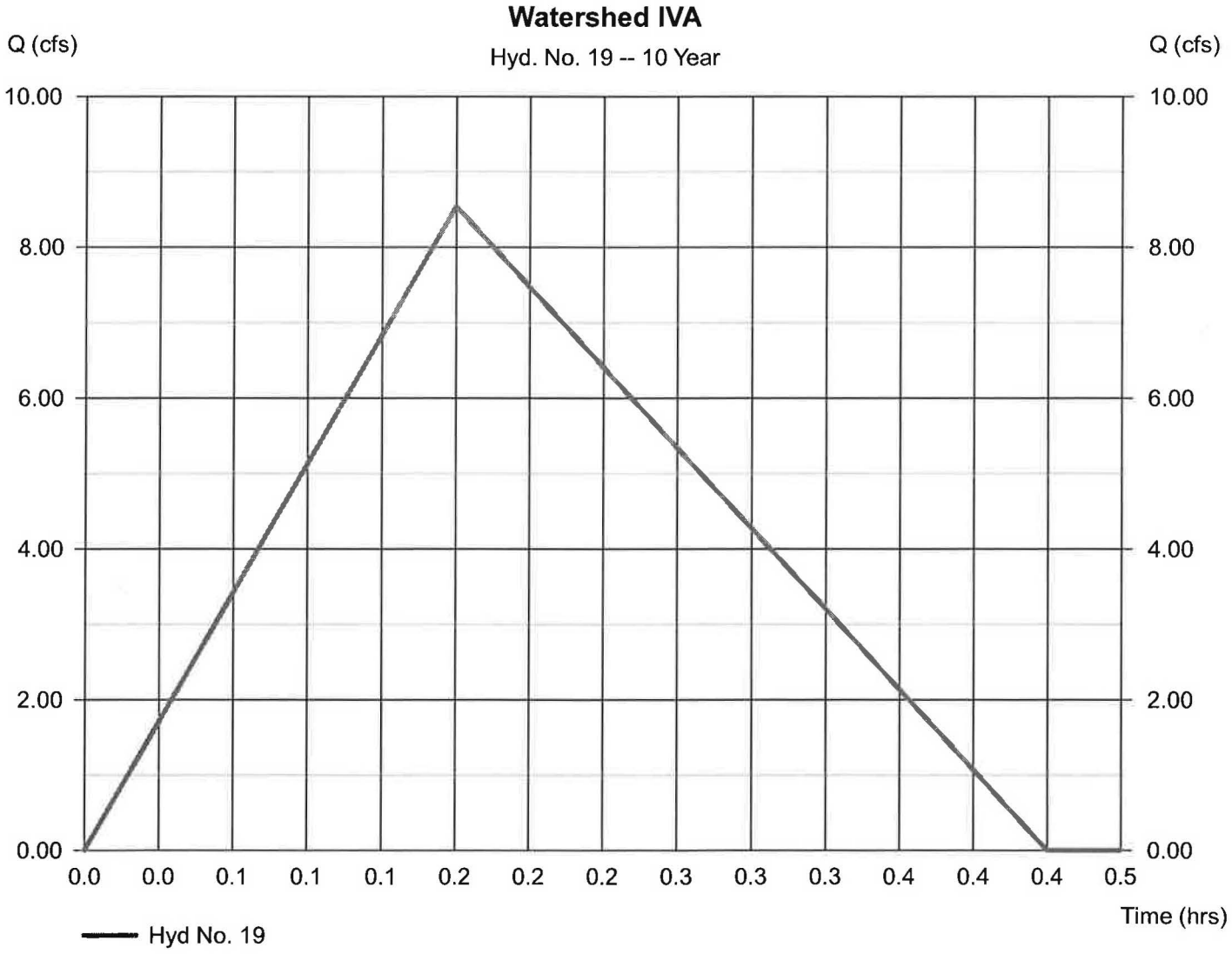
Hydrograph Report

Hyd. No. 19

Watershed IVA

Hydrograph type	= Rational	Peak discharge	= 8.541 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 6,841 cuft
Drainage area	= 2.370 ac	Runoff coeff.	= 0.75*
Intensity	= 4.805 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.770 x 0.90) + (0.600 x 0.30)] / 2.370



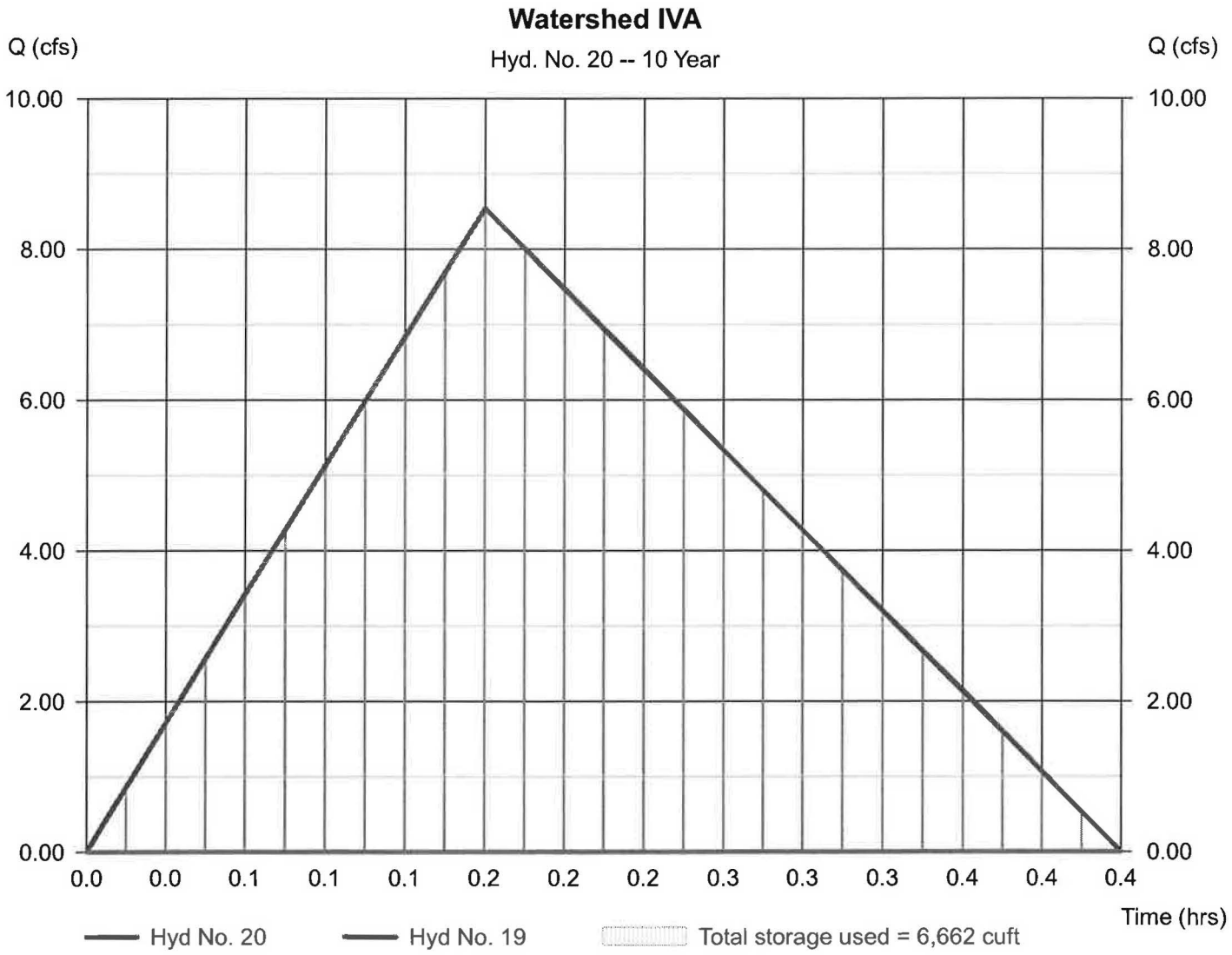
Hydrograph Report

Hyd. No. 20

Watershed IVA

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 10 yrs	Time to peak	= n/a
Time interval	= 1 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 19 - Watershed IVA	Max. Elevation	= 553.41 ft
Reservoir name	= Watershed IVA	Max. Storage	= 6,662 cuft

Storage Indication method used.

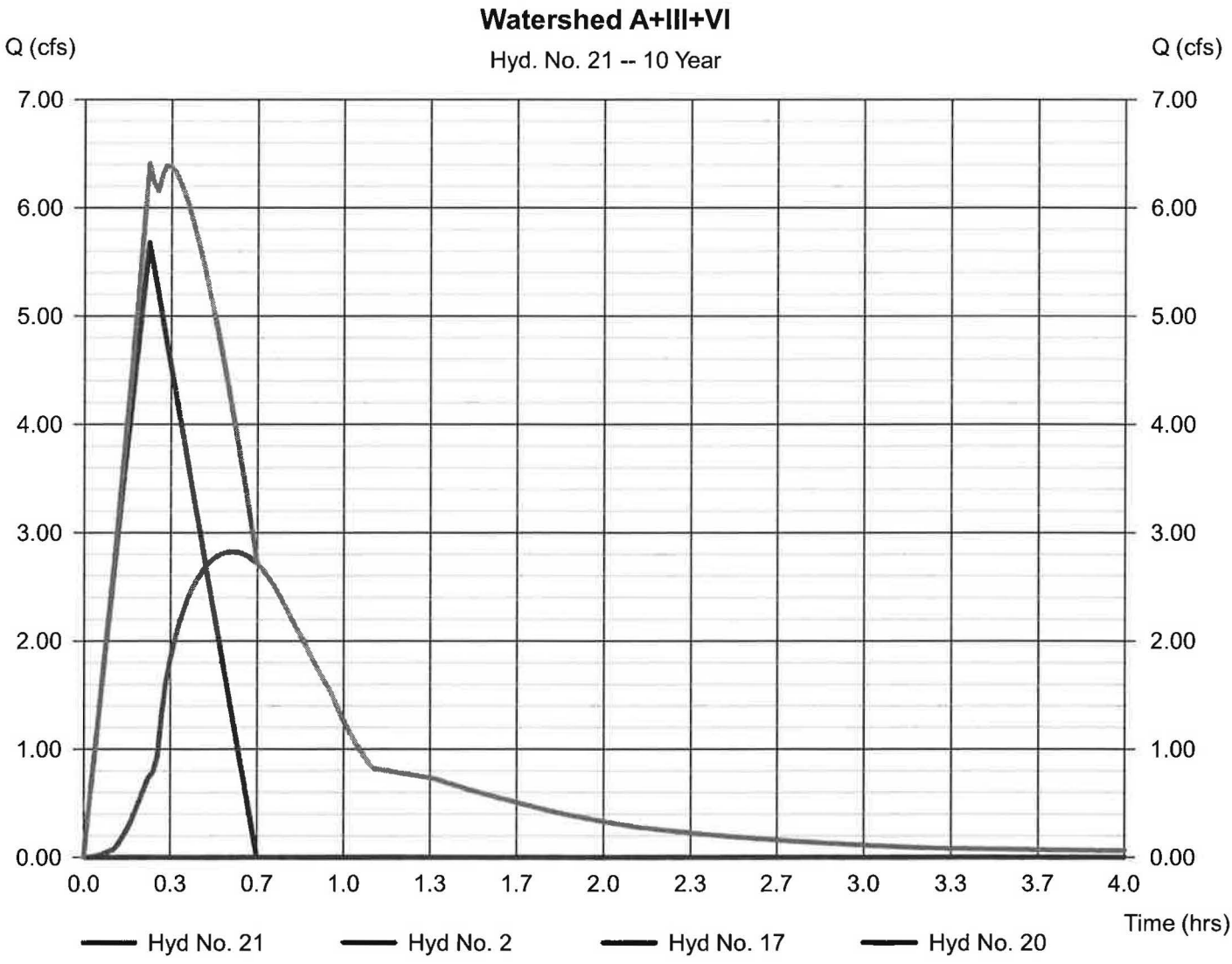


Hydrograph Report

Hyd. No. 21

Watershed A+III+VI

Hydrograph type	= Combine	Peak discharge	= 6.410 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.25 hrs
Time interval	= 1 min	Hyd. volume	= 16,660 cuft
Inflow hyds.	= 2, 17, 20	Contrib. drain. area	= 2.700 ac



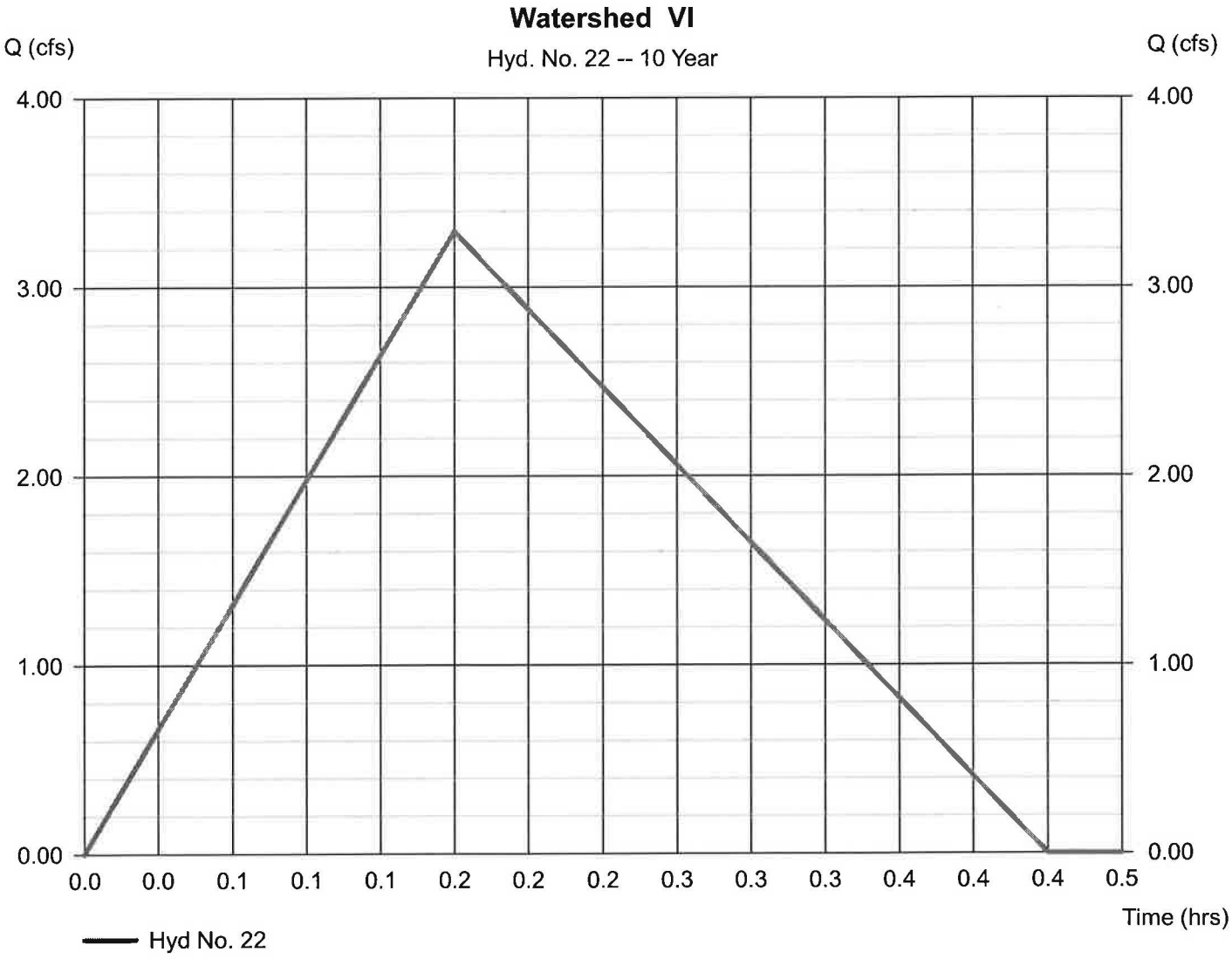
Hydrograph Report

Hyd. No. 22

Watershed VI

Hydrograph type	= Rational	Peak discharge	= 3.293 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 2,638 cuft
Drainage area	= 1.490 ac	Runoff coeff.	= 0.46*
Intensity	= 4.805 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.400 x 0.90) + (1.090 x 0.30)] / 1.490



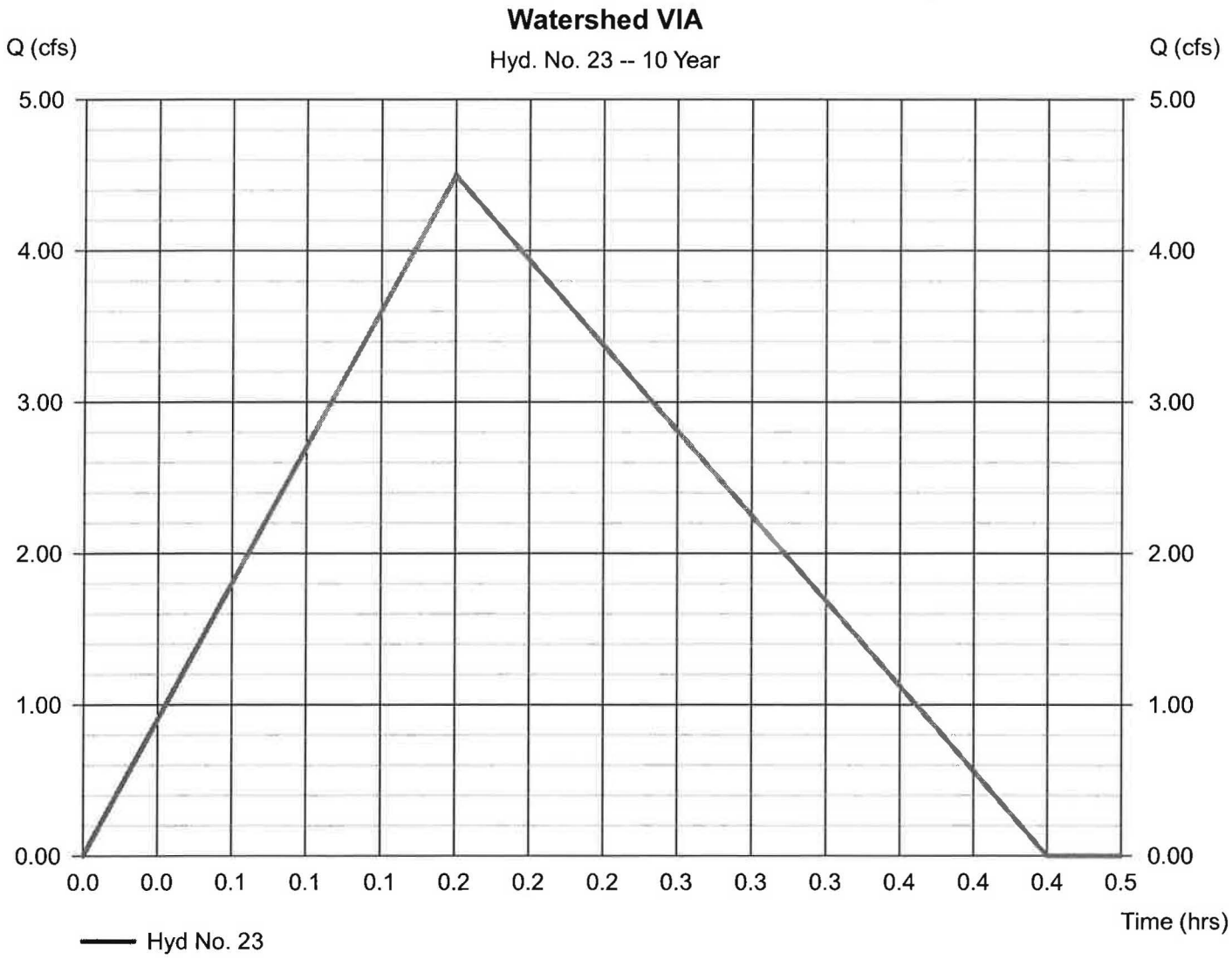
Hydrograph Report

Hyd. No. 23

Watershed VIA

Hydrograph type	= Rational	Peak discharge	= 4.498 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 3,603 cuft
Drainage area	= 1.170 ac	Runoff coeff.	= 0.8*
Intensity	= 4.805 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.970 x 0.90) + (0.200 x 0.30)] / 1.170



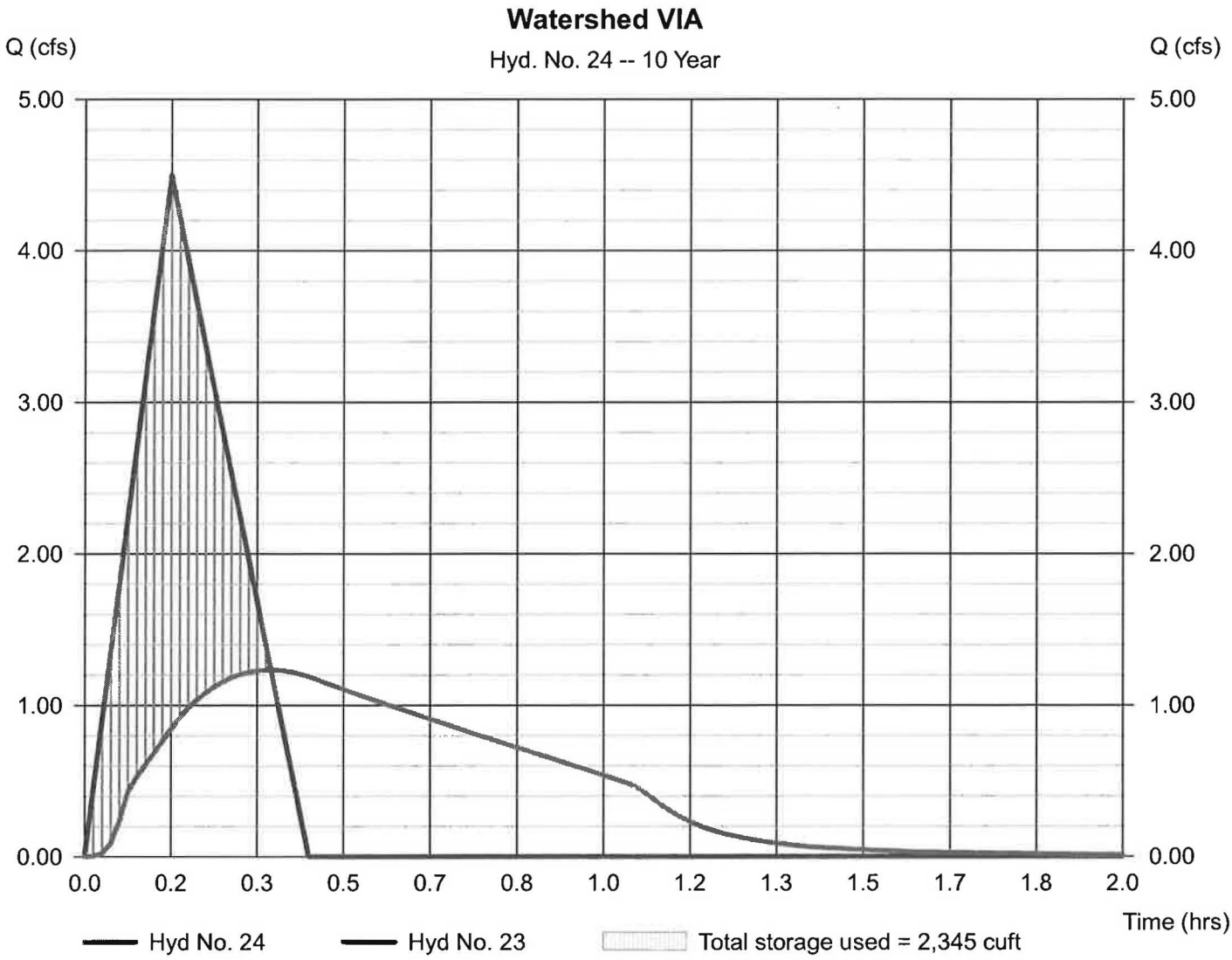
Hydrograph Report

Hyd. No. 24

Watershed VIA

Hydrograph type	= Reservoir	Peak discharge	= 1.233 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.37 hrs
Time interval	= 1 min	Hyd. volume	= 3,504 cuft
Inflow hyd. No.	= 23 - Watershed VIA	Max. Elevation	= 550.45 ft
Reservoir name	= Watershed VIA	Max. Storage	= 2,345 cuft

Storage Indication method used.



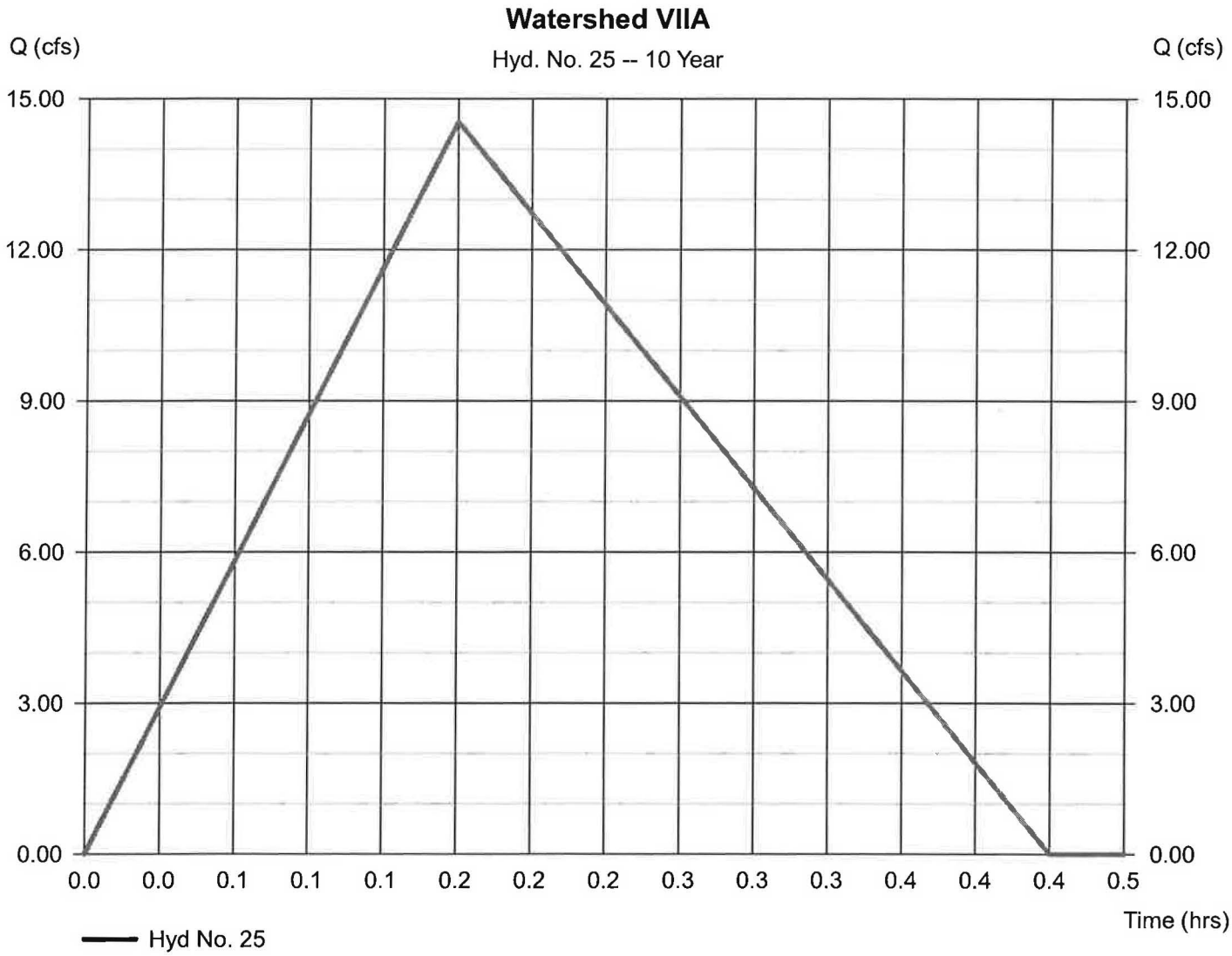
Hydrograph Report

Hyd. No. 25

Watershed VIIA

Hydrograph type	= Rational	Peak discharge	= 14.54 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 11,649 cuft
Drainage area	= 4.090 ac	Runoff coeff.	= 0.74*
Intensity	= 4.805 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(3.020 x 0.90) + (1.070 x 0.30)] / 4.090



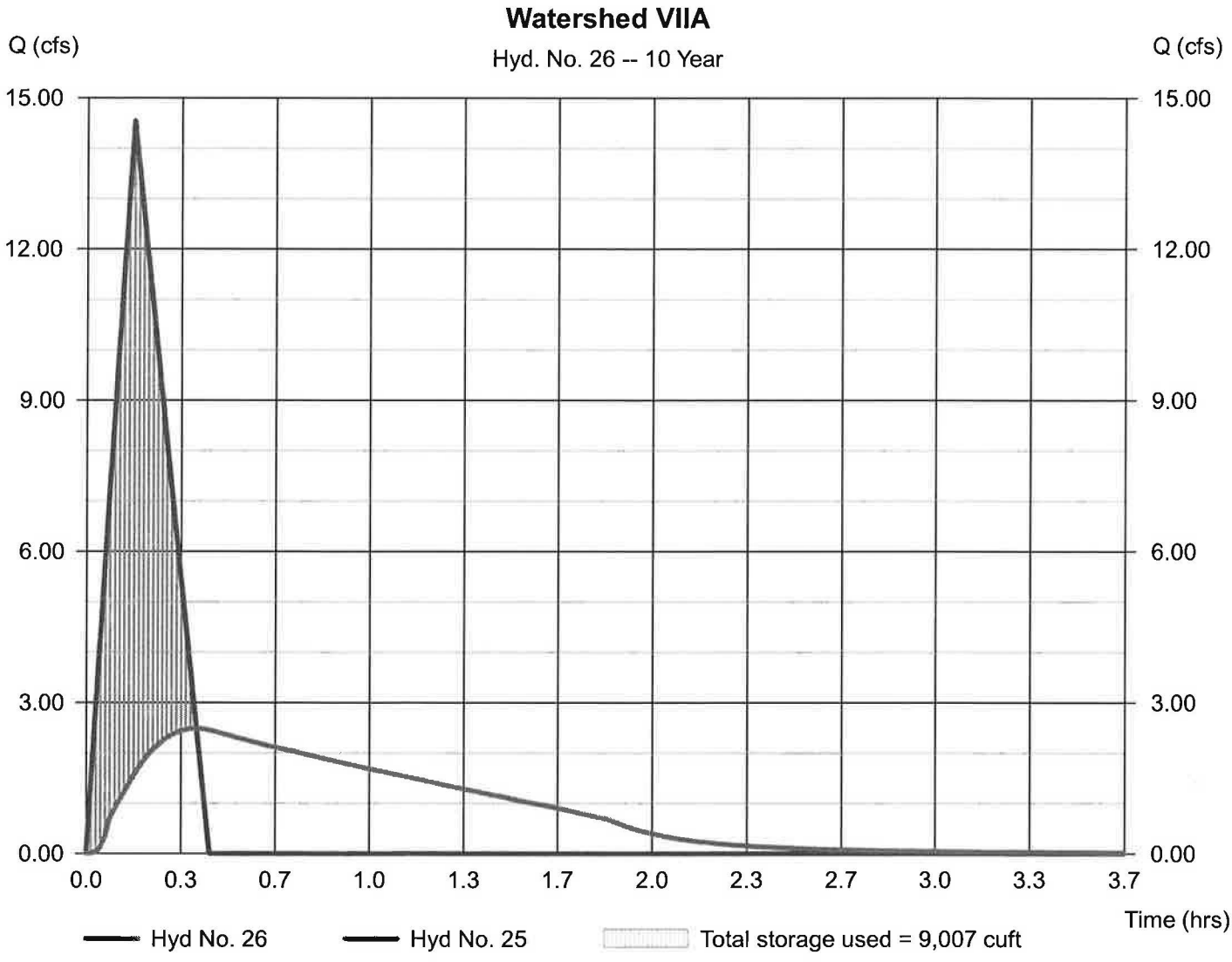
Hydrograph Report

Hyd. No. 26

Watershed VIIA

Hydrograph type	= Reservoir	Peak discharge	= 2.487 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.38 hrs
Time interval	= 1 min	Hyd. volume	= 11,333 cuft
Inflow hyd. No.	= 25 - Watershed VIIA	Max. Elevation	= 547.03 ft
Reservoir name	= Watershed VIIA	Max. Storage	= 9,007 cuft

Storage Indication method used.



Hydrograph Report

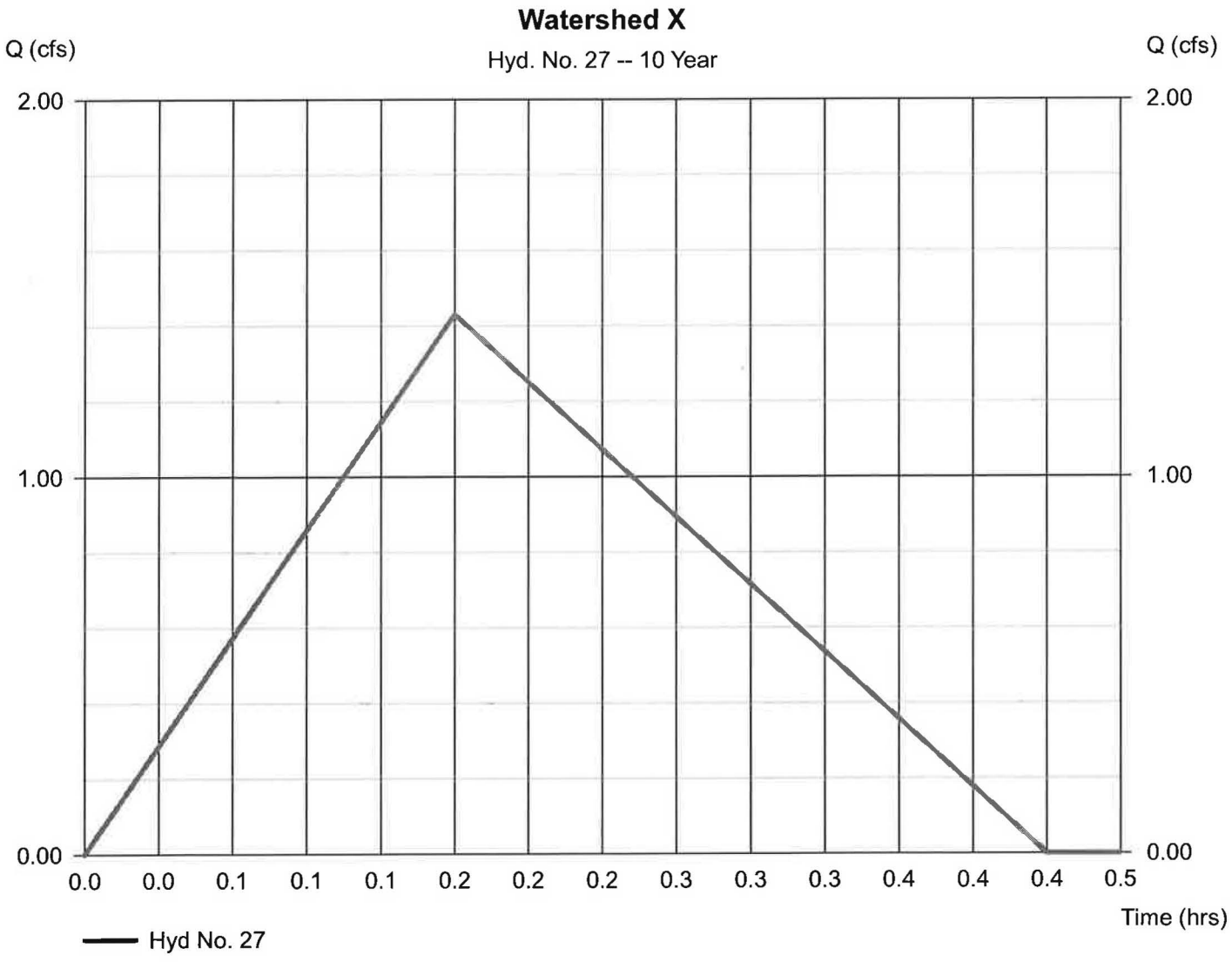
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 27

Watershed X

Hydrograph type	= Rational	Peak discharge	= 1.430 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 1,145 cuft
Drainage area	= 0.930 ac	Runoff coeff.	= 0.32*
Intensity	= 4.805 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.100 x 0.90) + (0.410 x 0.30) + (0.420 x 0.20)] / 0.930



Hydrograph Report

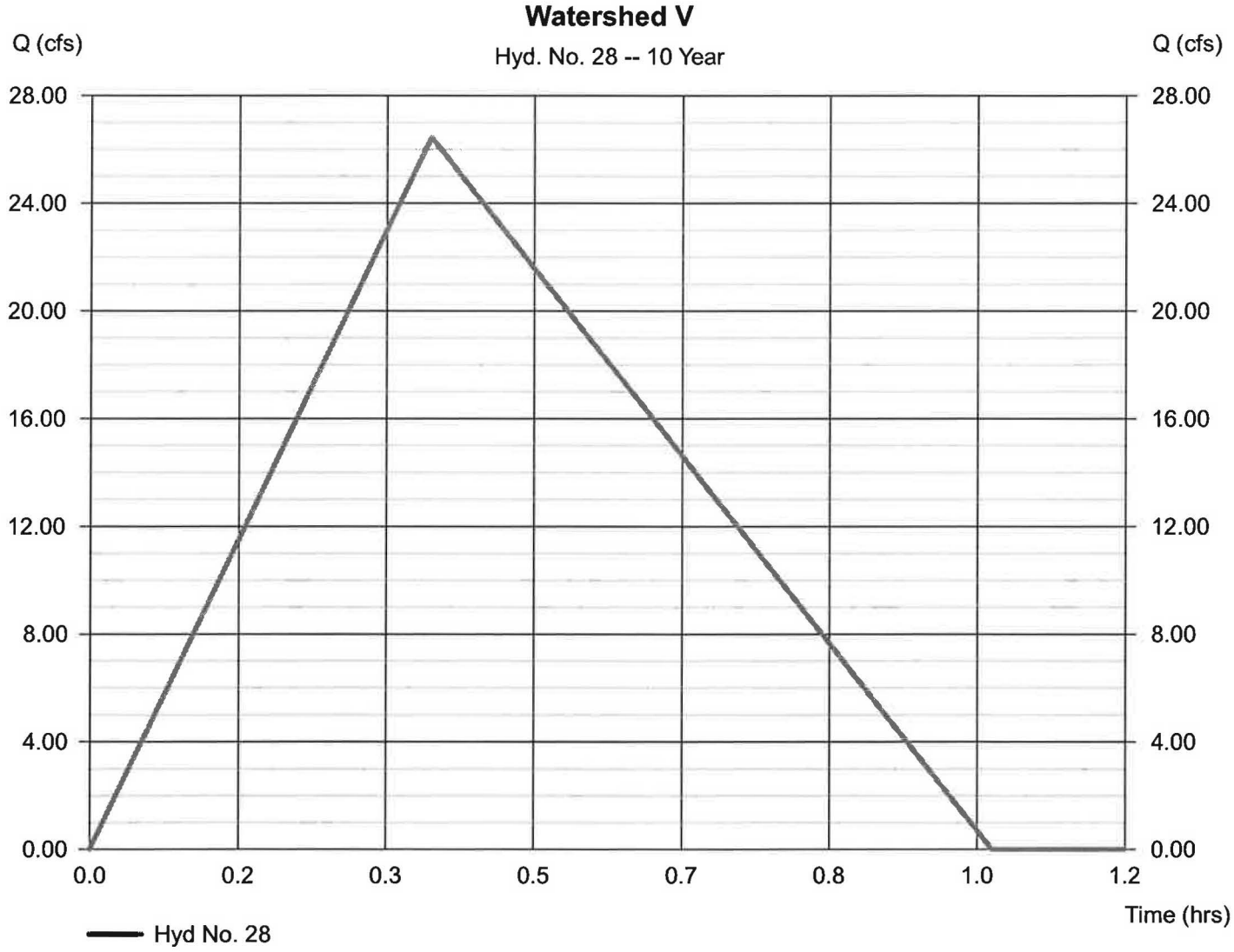
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 28

Watershed V

Hydrograph type	= Rational	Peak discharge	= 26.45 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.38 hrs
Time interval	= 1 min	Hyd. volume	= 48,720 cuft
Drainage area	= 26.200 ac	Runoff coeff.	= 0.31*
Intensity	= 3.256 in/hr	Tc by TR55	= 23.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(2.500 x 0.90) + (10.640 x 0.30) + (13.060 x 0.20)] / 26.200



Hydrograph Report

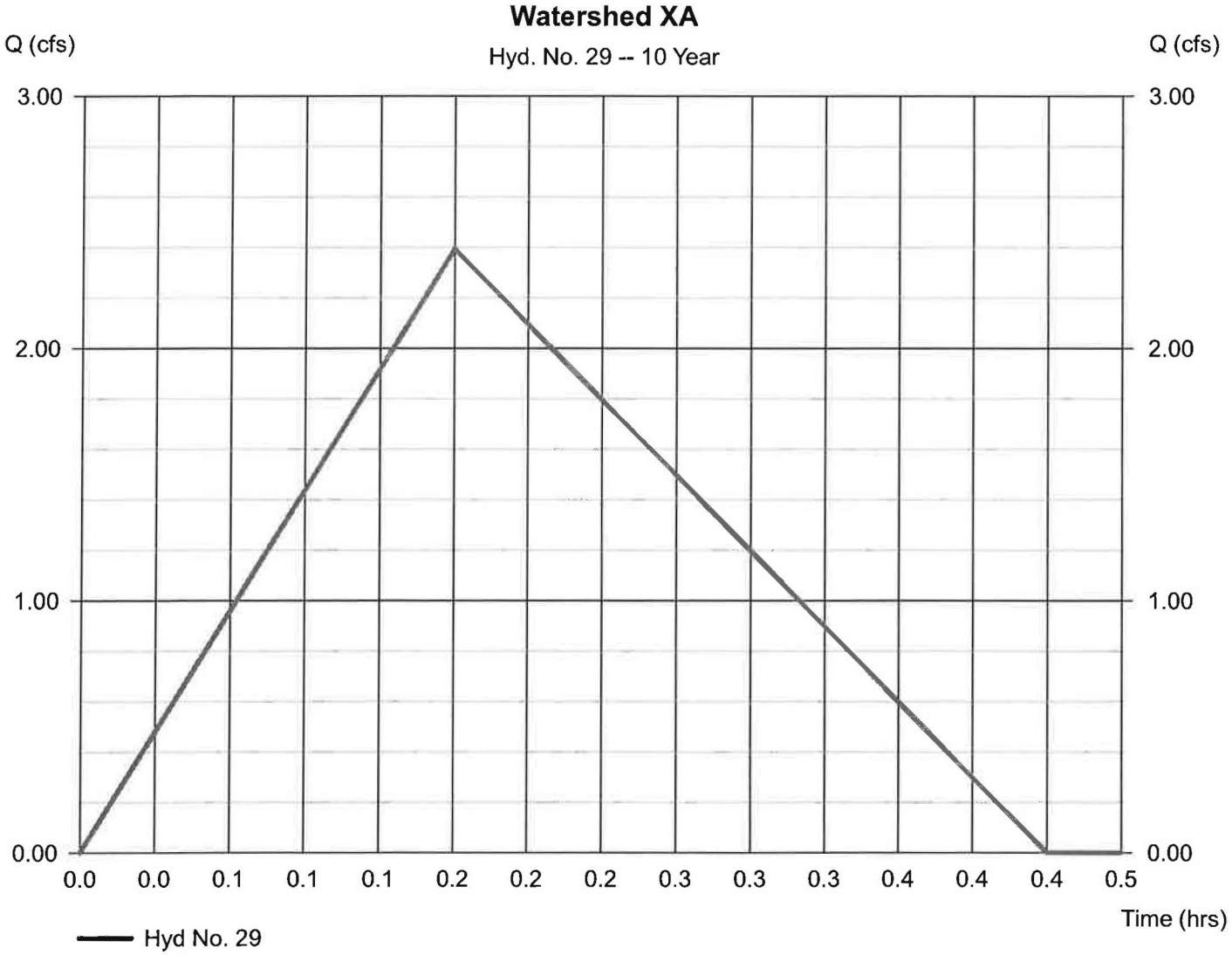
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 29

Watershed XA

Hydrograph type	= Rational	Peak discharge	= 2.394 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 1,918 cuft
Drainage area	= 0.940 ac	Runoff coeff.	= 0.53*
Intensity	= 4.805 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.390 x 0.90) + (0.350 x 0.30) + (0.200 x 0.20)] / 0.940



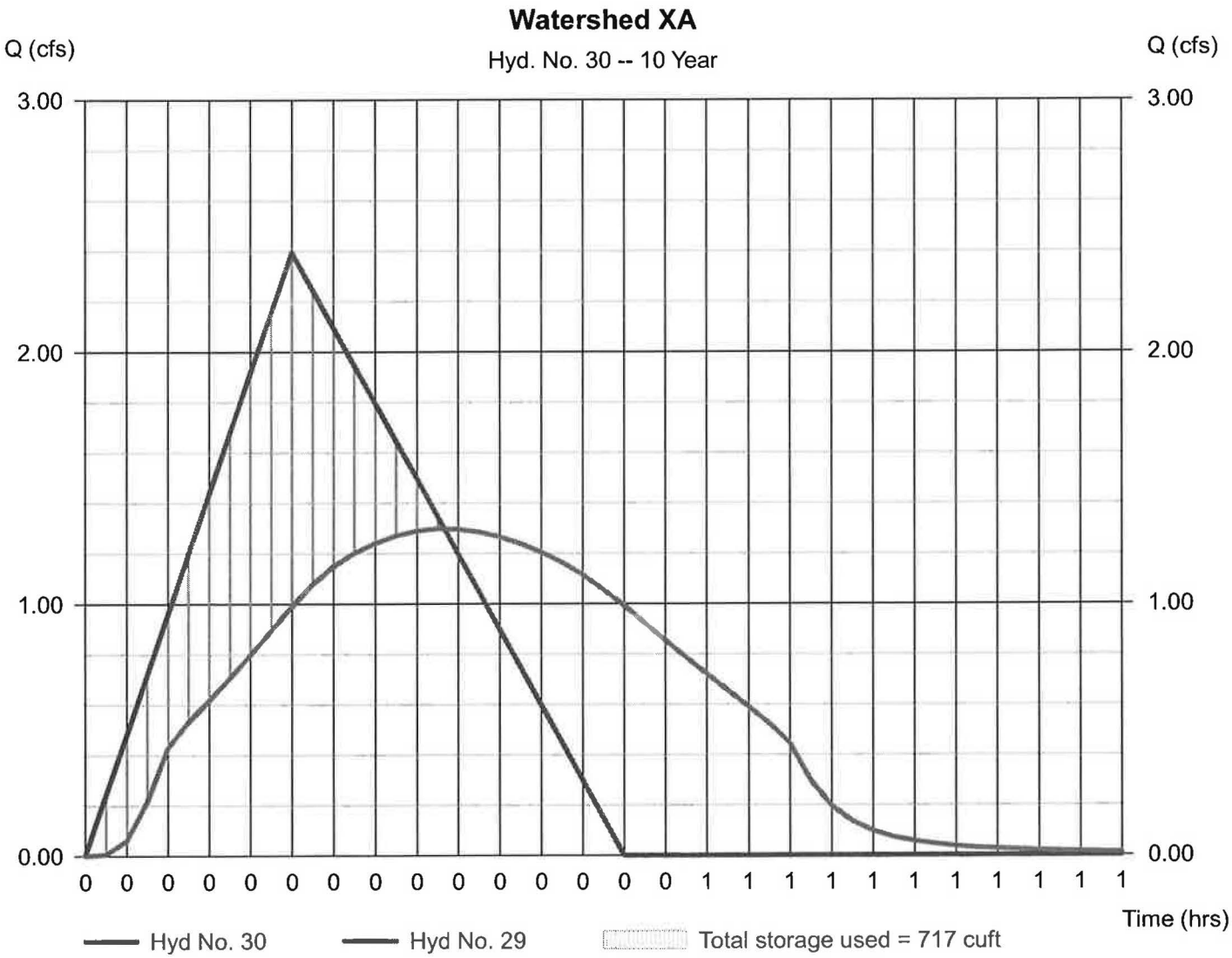
Hydrograph Report

Hyd. No. 30

Watershed XA

Hydrograph type	= Reservoir	Peak discharge	= 1.297 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.28 hrs
Time interval	= 1 min	Hyd. volume	= 1,866 cuft
Inflow hyd. No.	= 29 - Watershed XA	Max. Elevation	= 557.64 ft
Reservoir name	= Watershed XA	Max. Storage	= 717 cuft

Storage Indication method used.



Hydrograph Report

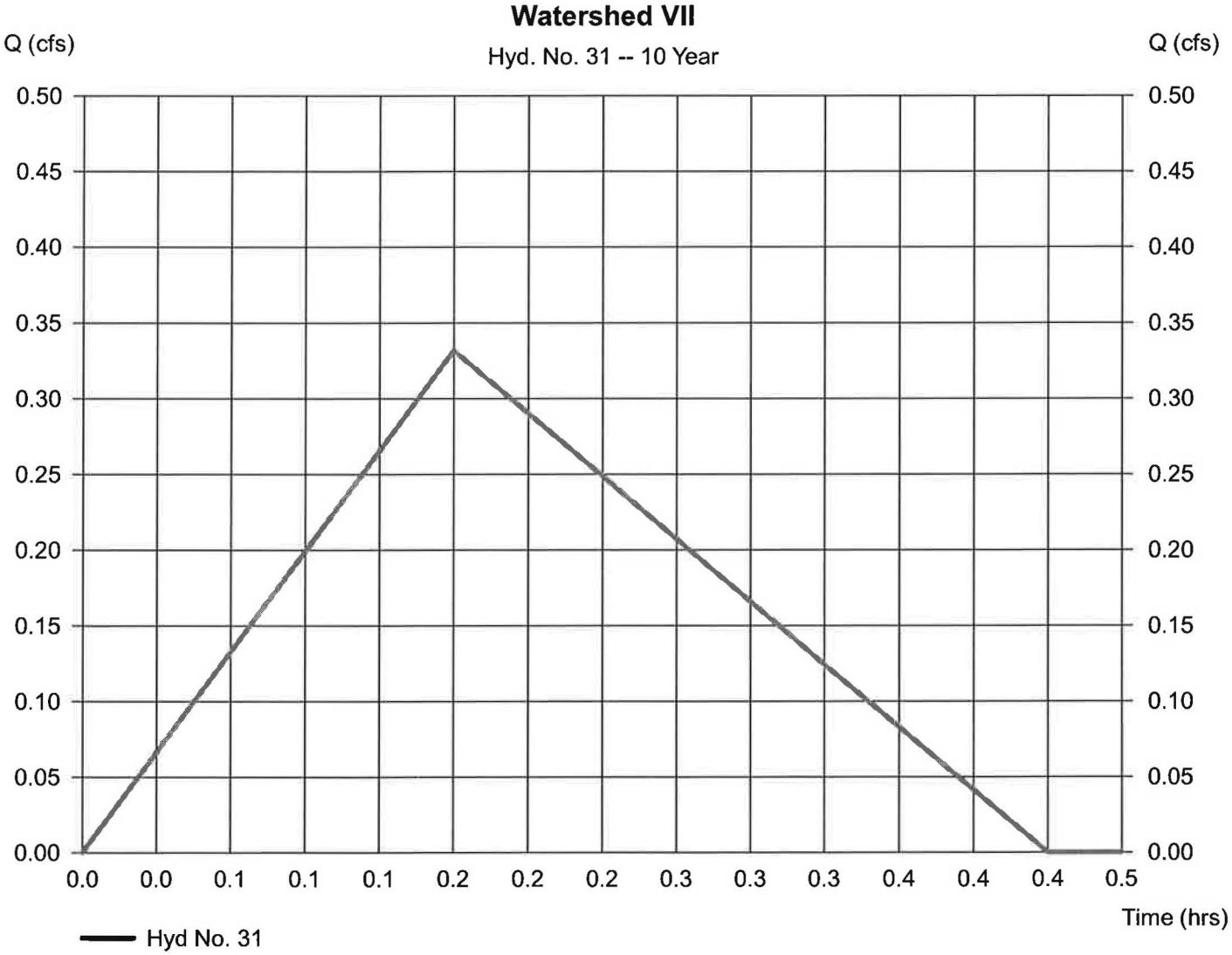
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 31

Watershed VII

Hydrograph type	= Rational	Peak discharge	= 0.332 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 266 cuft
Drainage area	= 0.230 ac	Runoff coeff.	= 0.3*
Intensity	= 4.805 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.230 x 0.30)] / 0.230

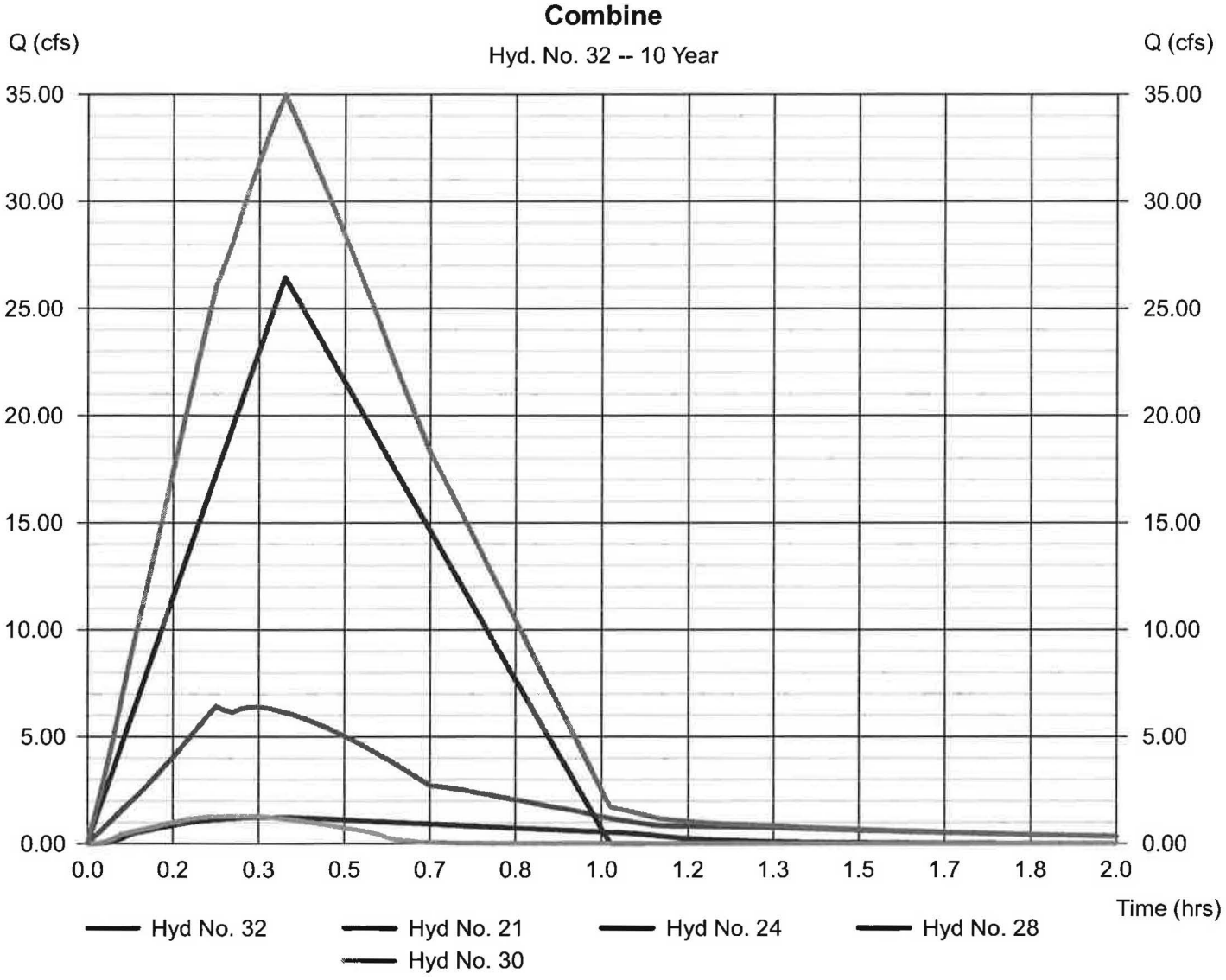


Hydrograph Report

Hyd. No. 32

Combine

Hydrograph type	= Combine	Peak discharge	= 34.98 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.38 hrs
Time interval	= 1 min	Hyd. volume	= 70,424 cuft
Inflow hyds.	= 21, 24, 28, 30	Contrib. drain. area	= 26.200 ac



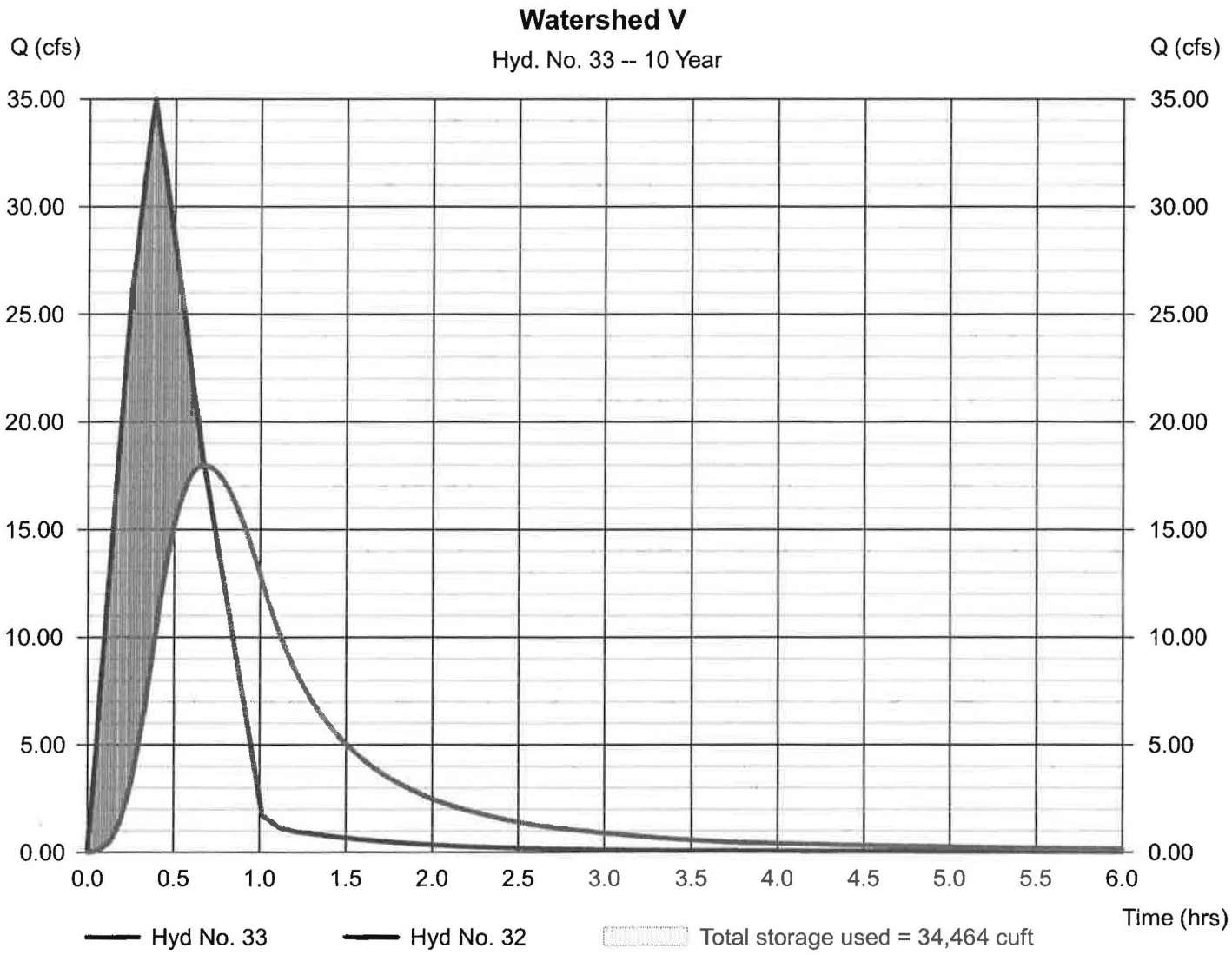
Hydrograph Report

Hyd. No. 33

Watershed V

Hydrograph type	= Reservoir	Peak discharge	= 17.96 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.67 hrs
Time interval	= 1 min	Hyd. volume	= 70,418 cuft
Inflow hyd. No.	= 32 - Combine	Max. Elevation	= 544.14 ft
Reservoir name	= Watershed X	Max. Storage	= 34,464 cuft

Storage Indication method used.



Hydrograph Report

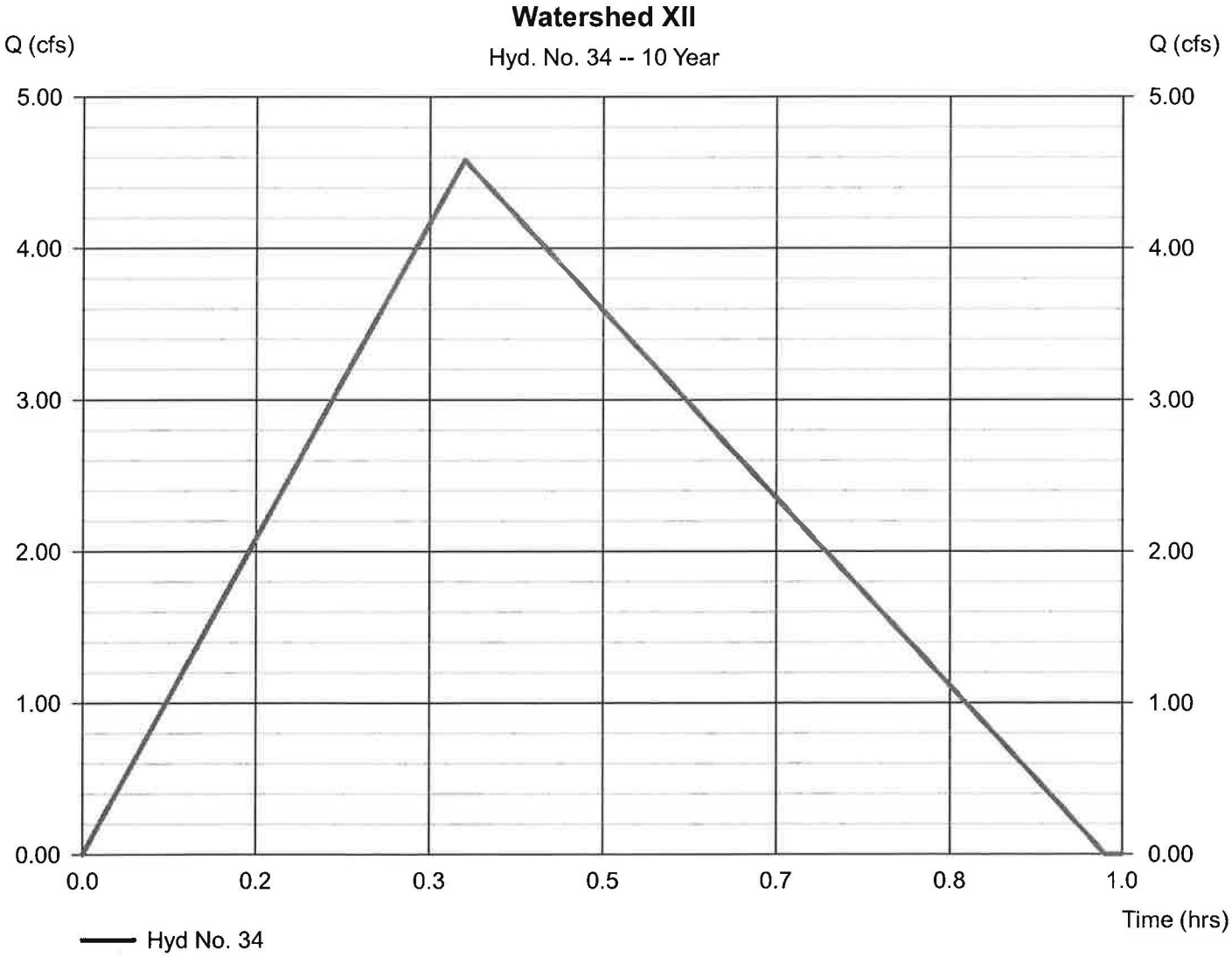
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 34

Watershed XII

Hydrograph type	= Rational	Peak discharge	= 4.581 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.37 hrs
Time interval	= 1 min	Hyd. volume	= 8,243 cuft
Drainage area	= 4.630 ac	Runoff coeff.	= 0.3*
Intensity	= 3.298 in/hr	Tc by TR55	= 22.47 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.490 x 0.90) + (1.430 x 0.30) + (2.710 x 0.20)] / 4.630



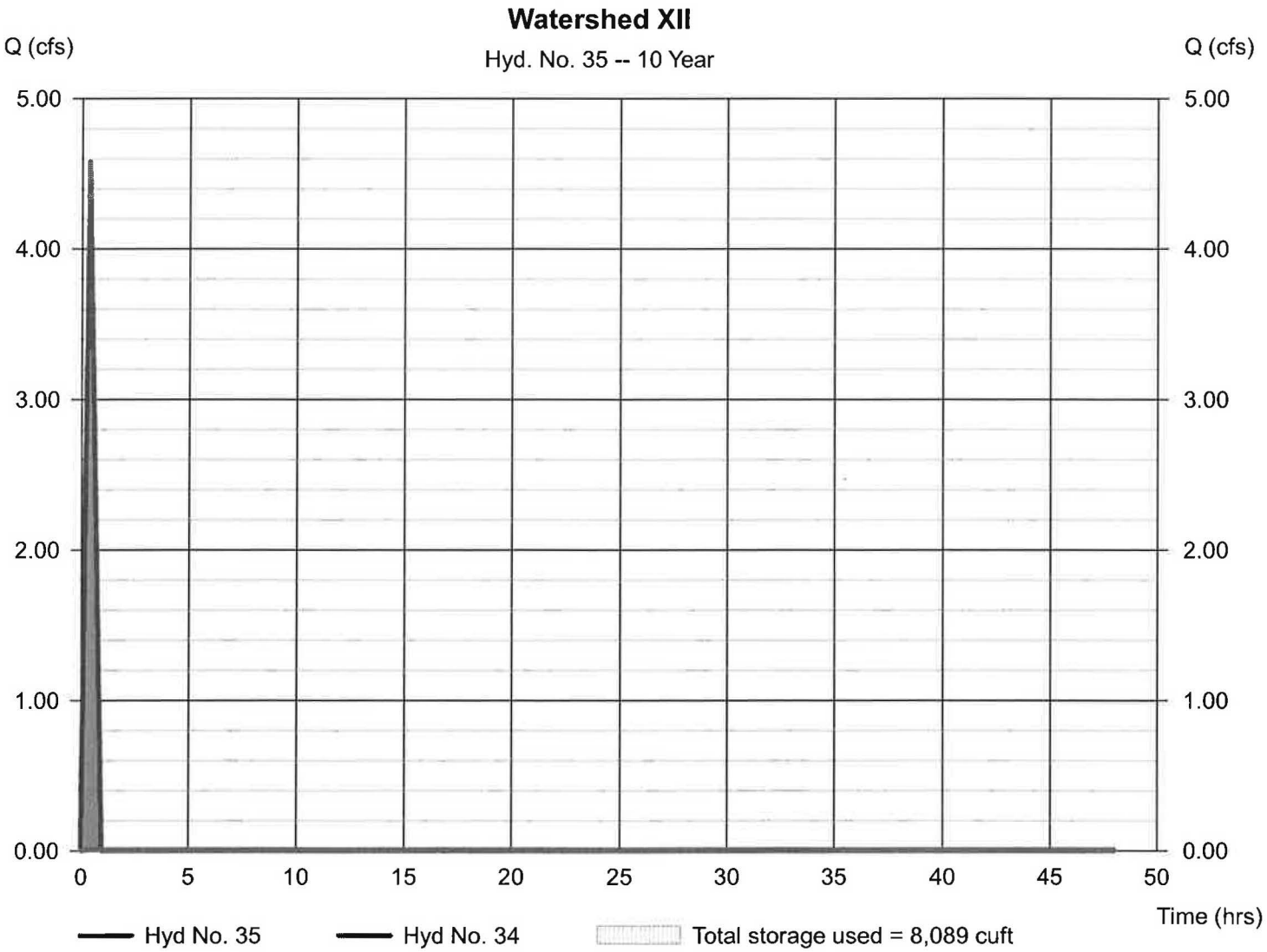
Hydrograph Report

Hyd. No. 35

Watershed XII

Hydrograph type	= Reservoir	Peak discharge	= 0.007 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.98 hrs
Time interval	= 1 min	Hyd. volume	= 1,122 cuft
Inflow hyd. No.	= 34 - Watershed XII	Max. Elevation	= 546.22 ft
Reservoir name	= Watershed XII	Max. Storage	= 8,089 cuft

Storage Indication method used.



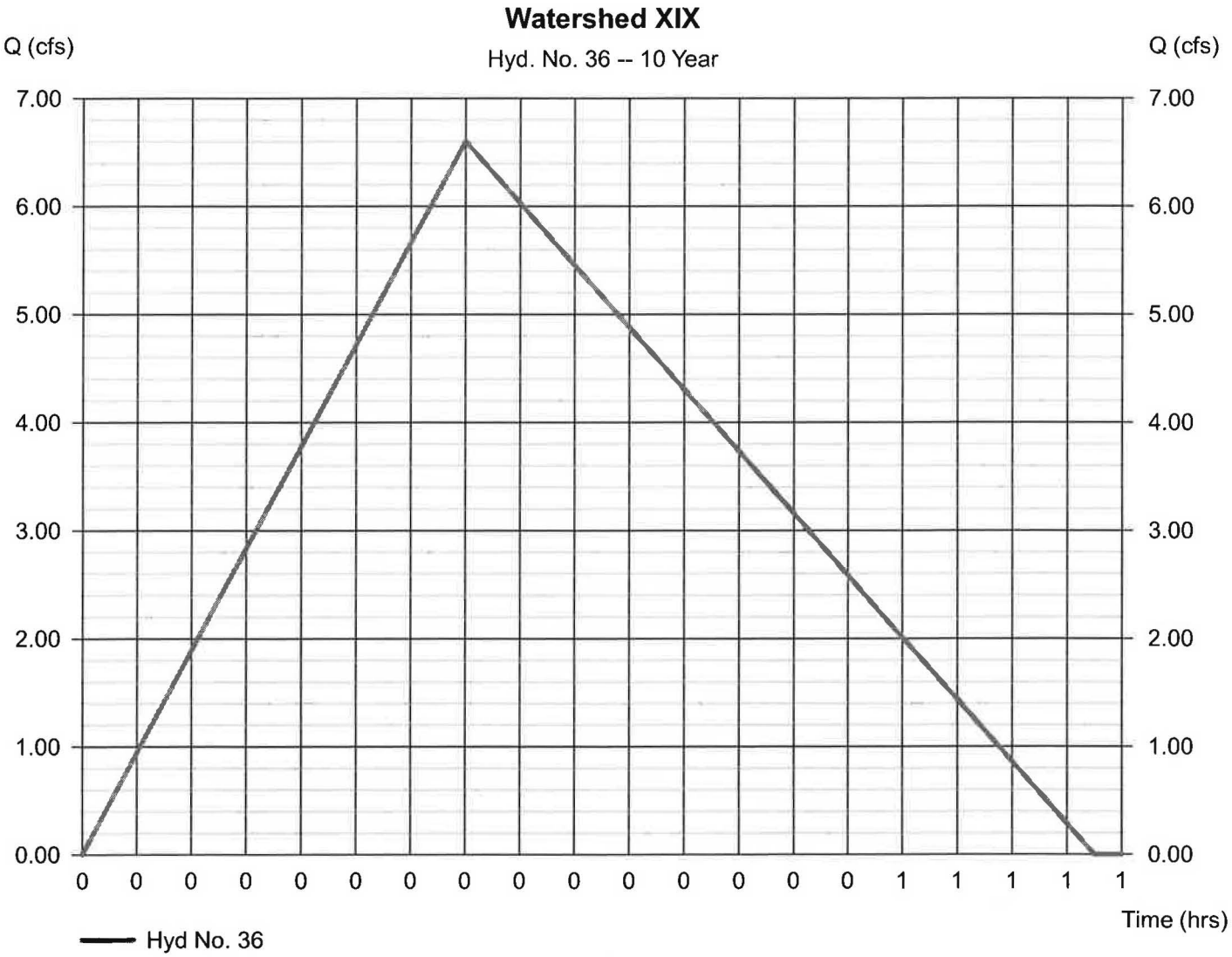
Hydrograph Report

Hyd. No. 36

Watershed XIX

Hydrograph type	= Rational	Peak discharge	= 6.603 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.23 hrs
Time interval	= 1 min	Hyd. volume	= 7,405 cuft
Drainage area	= 5.860 ac	Runoff coeff.	= 0.27*
Intensity	= 4.173 in/hr	Tc by TR55	= 14.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.400 x 0.90) + (1.500 x 0.30) + (3.960 x 0.20)] / 5.860

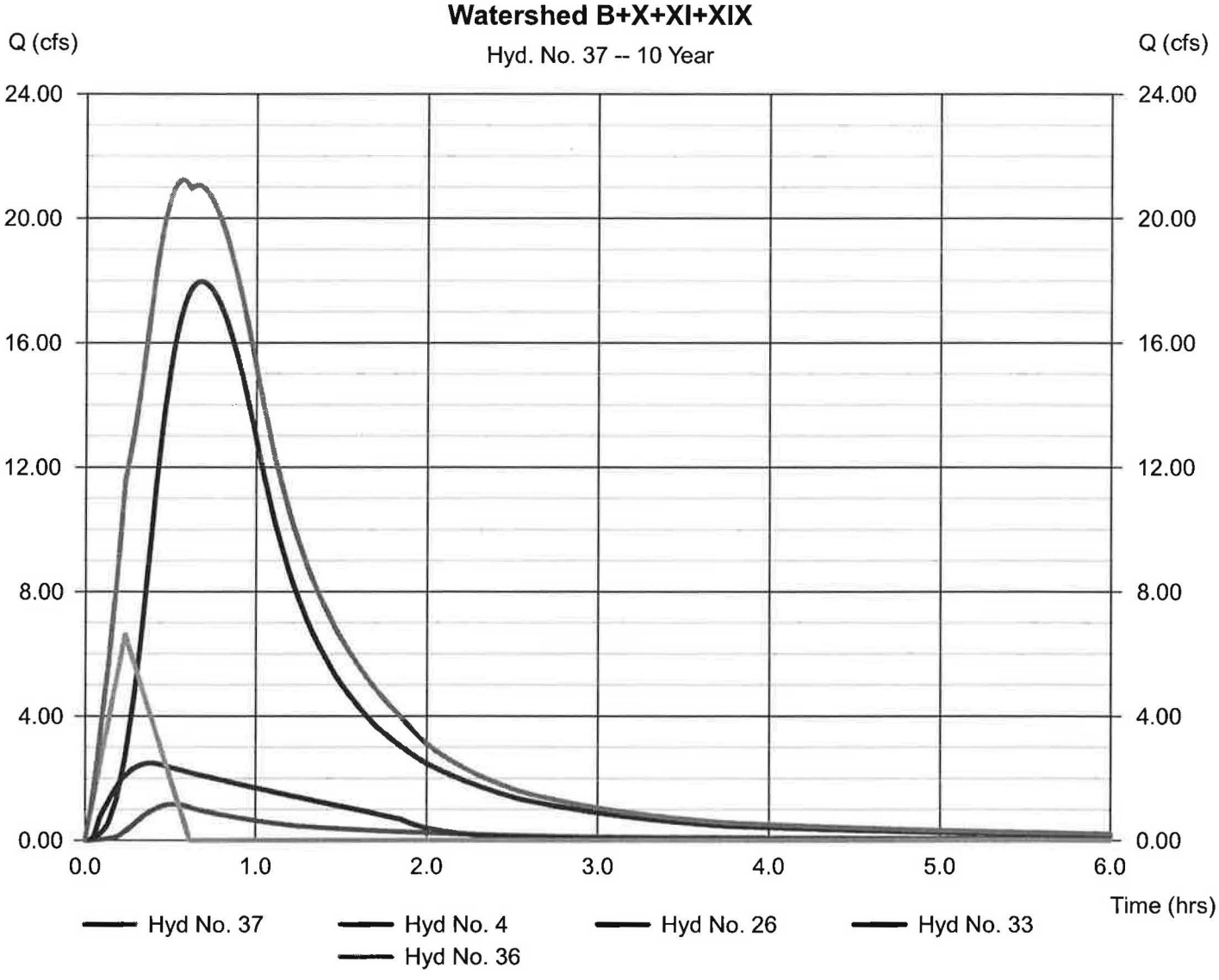


Hydrograph Report

Hyd. No. 37

Watershed B+X+XI+XIX

Hydrograph type	= Combine	Peak discharge	= 21.24 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.57 hrs
Time interval	= 1 min	Hyd. volume	= 94,850 cuft
Inflow hyds.	= 4, 26, 33, 36	Contrib. drain. area	= 5.860 ac



Hydrograph Report

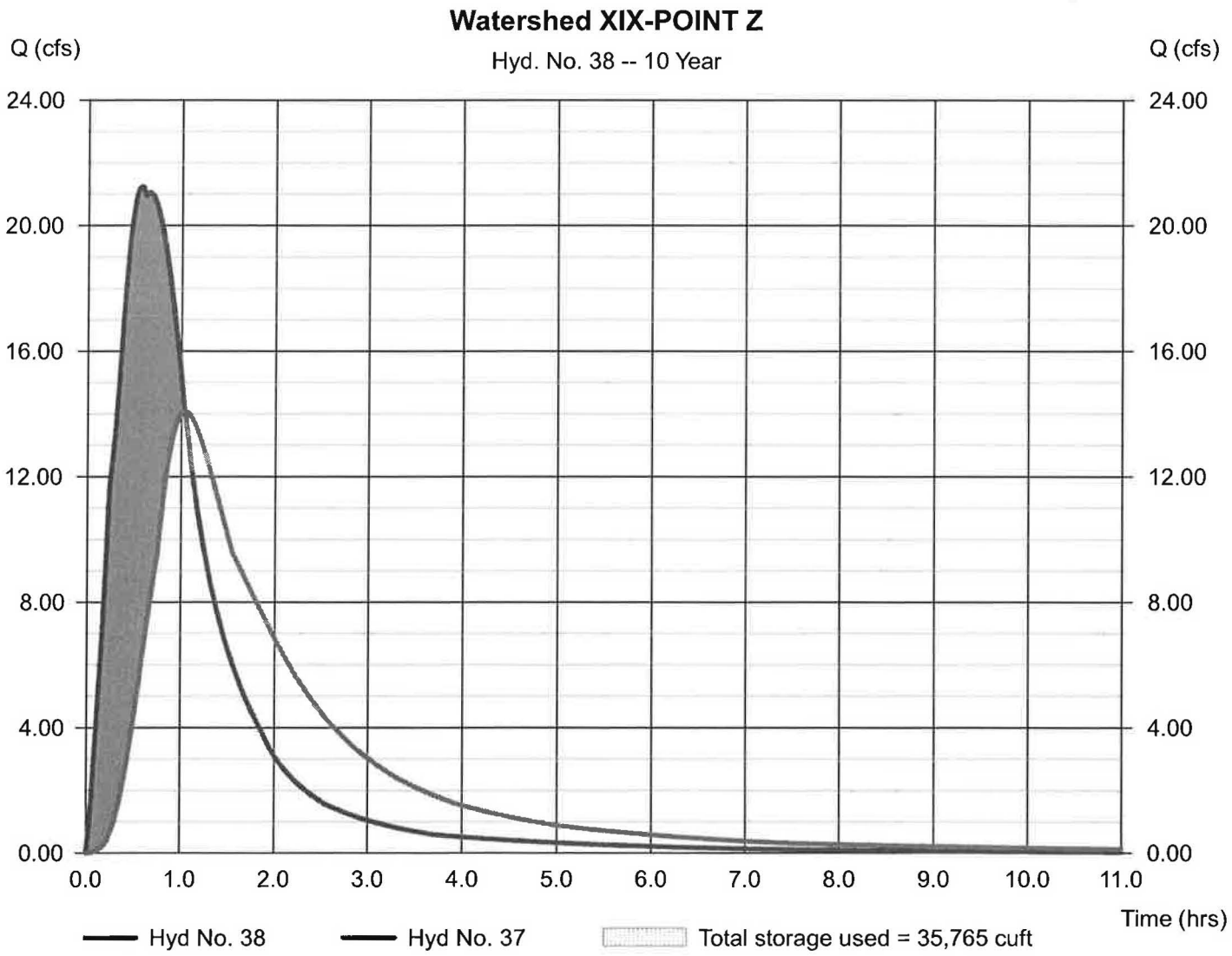
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 38

Watershed XIX-POINT Z

Hydrograph type	= Reservoir	Peak discharge	= 14.06 cfs
Storm frequency	= 10 yrs	Time to peak	= 1.03 hrs
Time interval	= 1 min	Hyd. volume	= 94,840 cuft
Inflow hyd. No.	= 37 - Watershed B+X+XI+XIX	Max. Elevation	= 542.06 ft
Reservoir name	= Watershed XIX	Max. Storage	= 35,765 cuft

Storage Indication method used.



Hydrograph Report

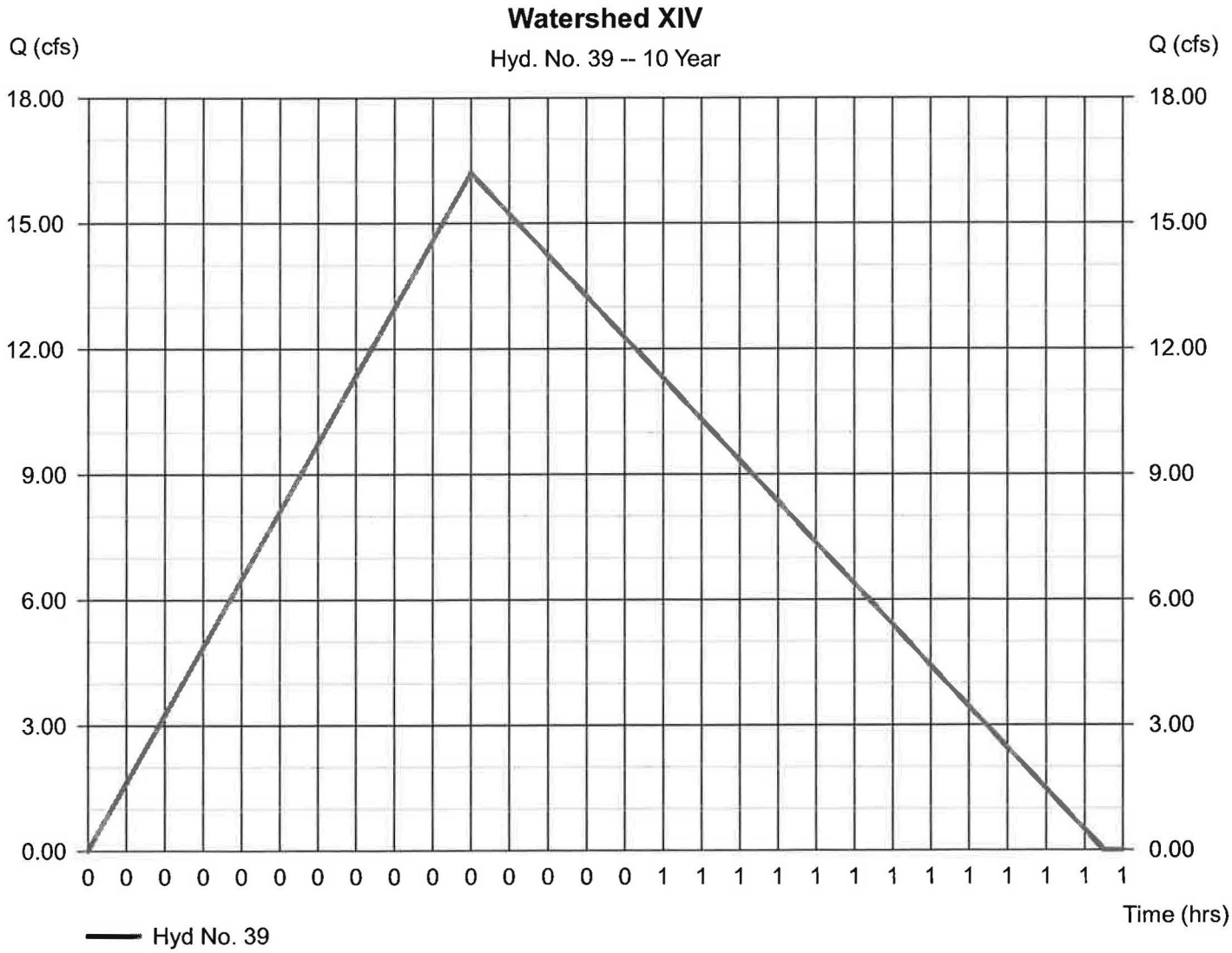
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 39

Watershed XIV

Hydrograph type	= Rational	Peak discharge	= 16.21 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.33 hrs
Time interval	= 1 min	Hyd. volume	= 25,963 cuft
Drainage area	= 15.400 ac	Runoff coeff.	= 0.3*
Intensity	= 3.508 in/hr	Tc by TR55	= 20.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.000 x 0.90) + (5.100 x 0.30) + (8.800 x 0.20) + (0.500 x 1.00)] / 15.400

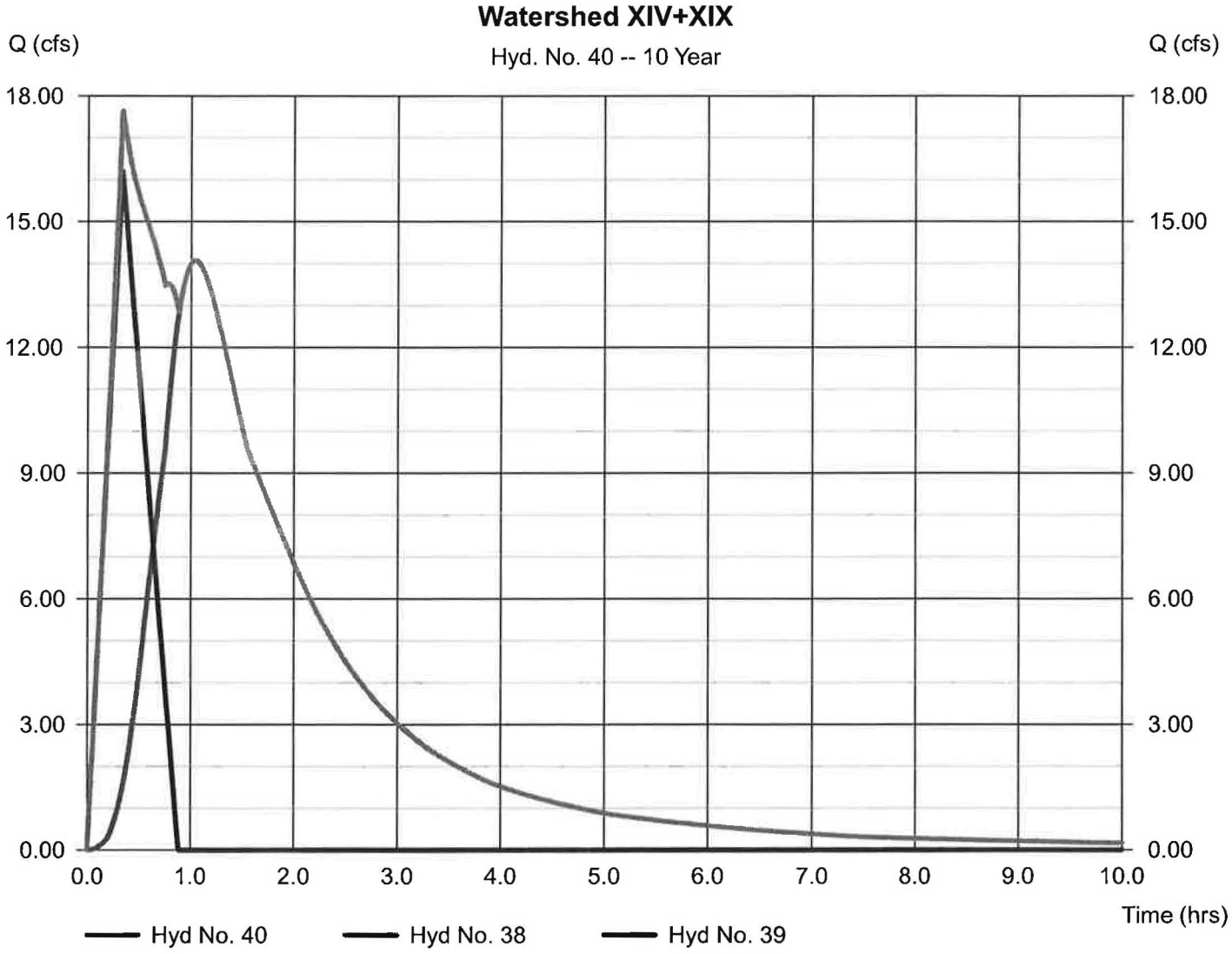


Hydrograph Report

Hyd. No. 40

Watershed XIV+XIX

Hydrograph type	= Combine	Peak discharge	= 17.63 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.33 hrs
Time interval	= 1 min	Hyd. volume	= 120,608 cuft
Inflow hyds.	= 38, 39	Contrib. drain. area	= 15.400 ac



Hydrograph Report

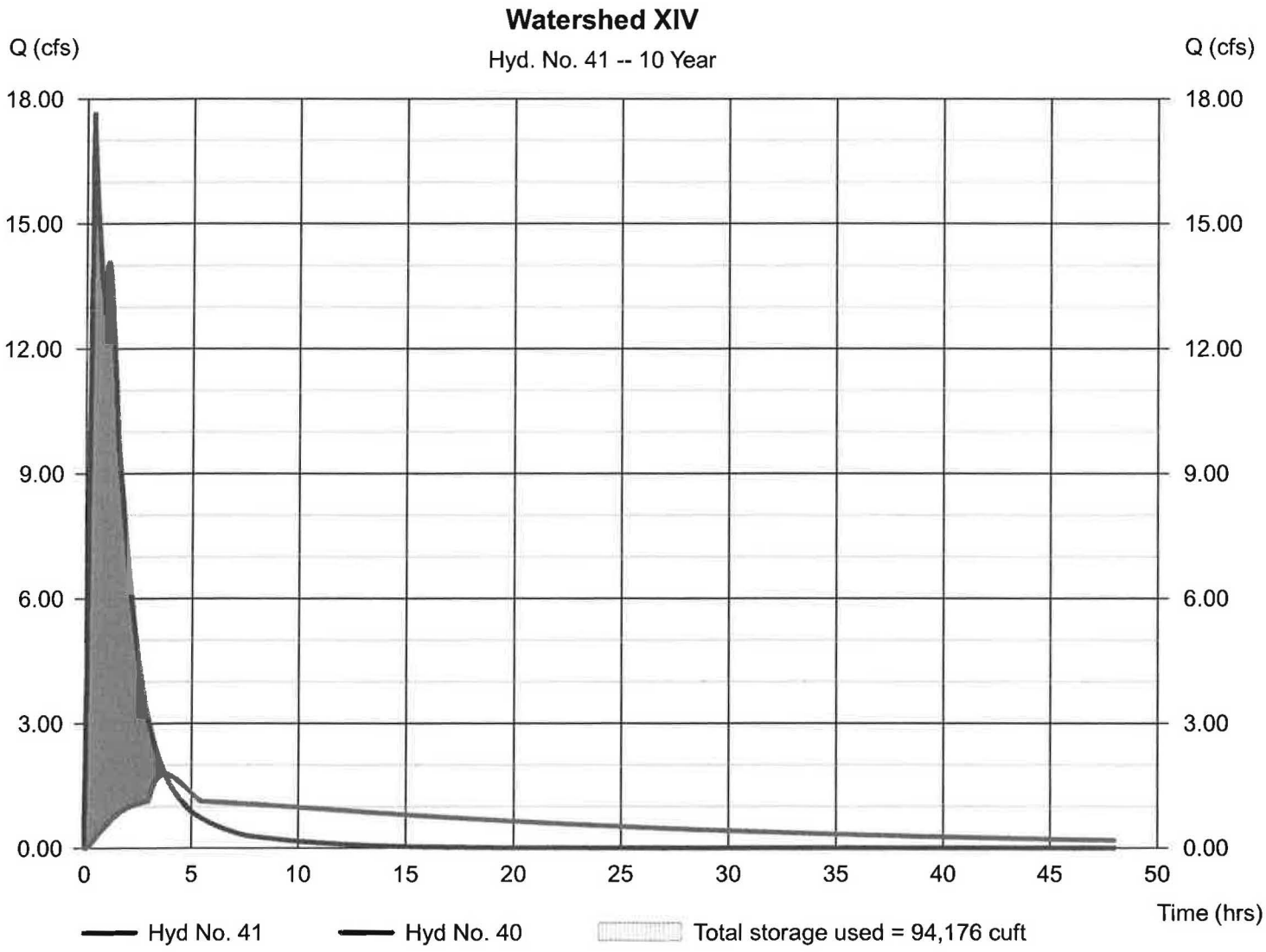
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 41

Watershed XIV

Hydrograph type	= Reservoir	Peak discharge	= 1.782 cfs
Storm frequency	= 10 yrs	Time to peak	= 3.75 hrs
Time interval	= 1 min	Hyd. volume	= 104,393 cuft
Inflow hyd. No.	= 40 - Watershed XIV+XIX	Max. Elevation	= 539.43 ft
Reservoir name	= Watershed XIV	Max. Storage	= 94,176 cuft

Storage Indication method used.



Hydrograph Report

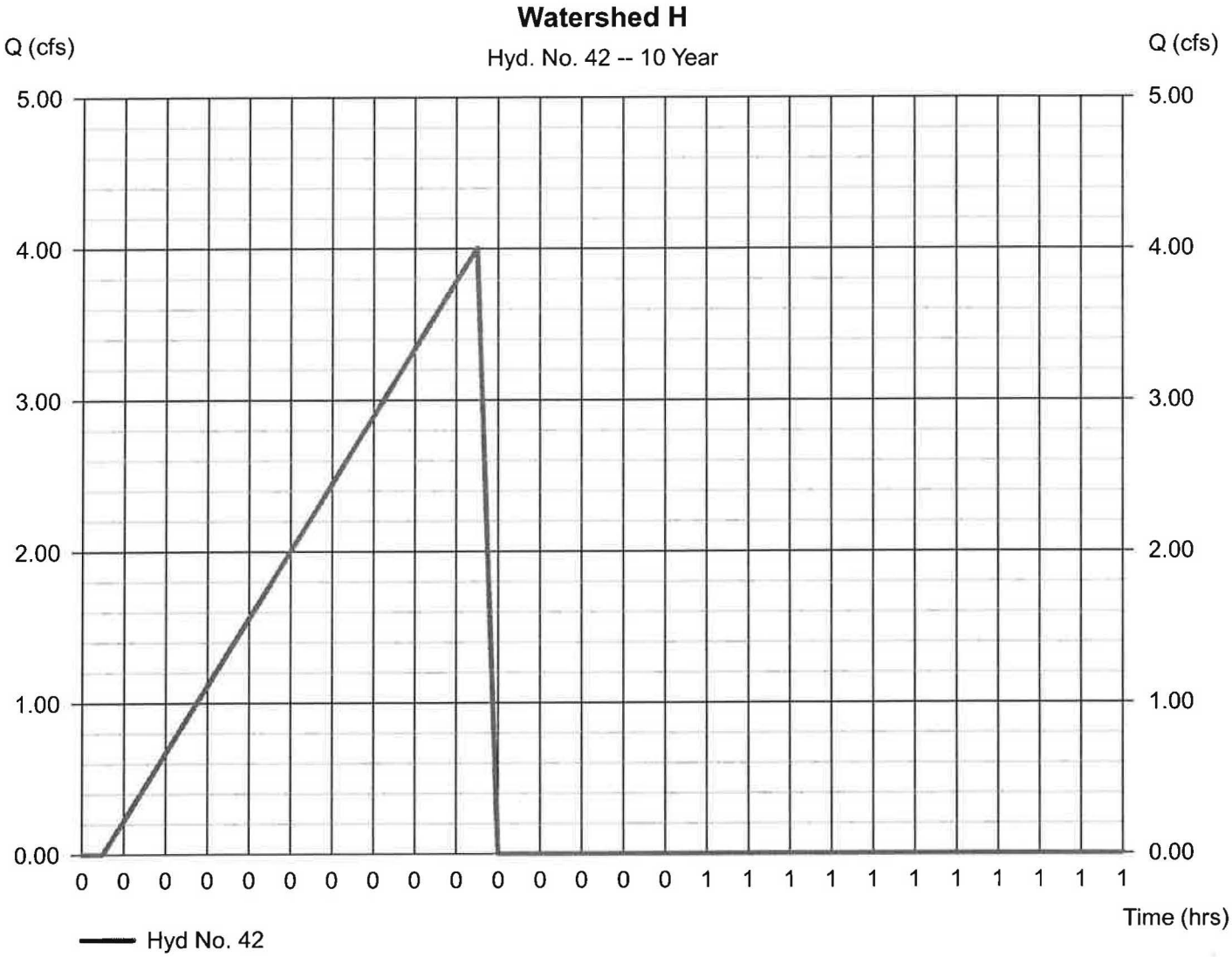
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 42

Watershed H

Hydrograph type	= Rational	Peak discharge	= 4.003 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 5,992 cuft
Drainage area	= 3.800 ac	Runoff coeff.	= 0.29*
Intensity	= 3.633 in/hr	Tc by TR55	= 18.69 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.200 x 0.90) + (0.100 x 0.30) + (2.500 x 0.20) + (0.800 x 0.25) + (0.200 x 1.00)] / 3.800



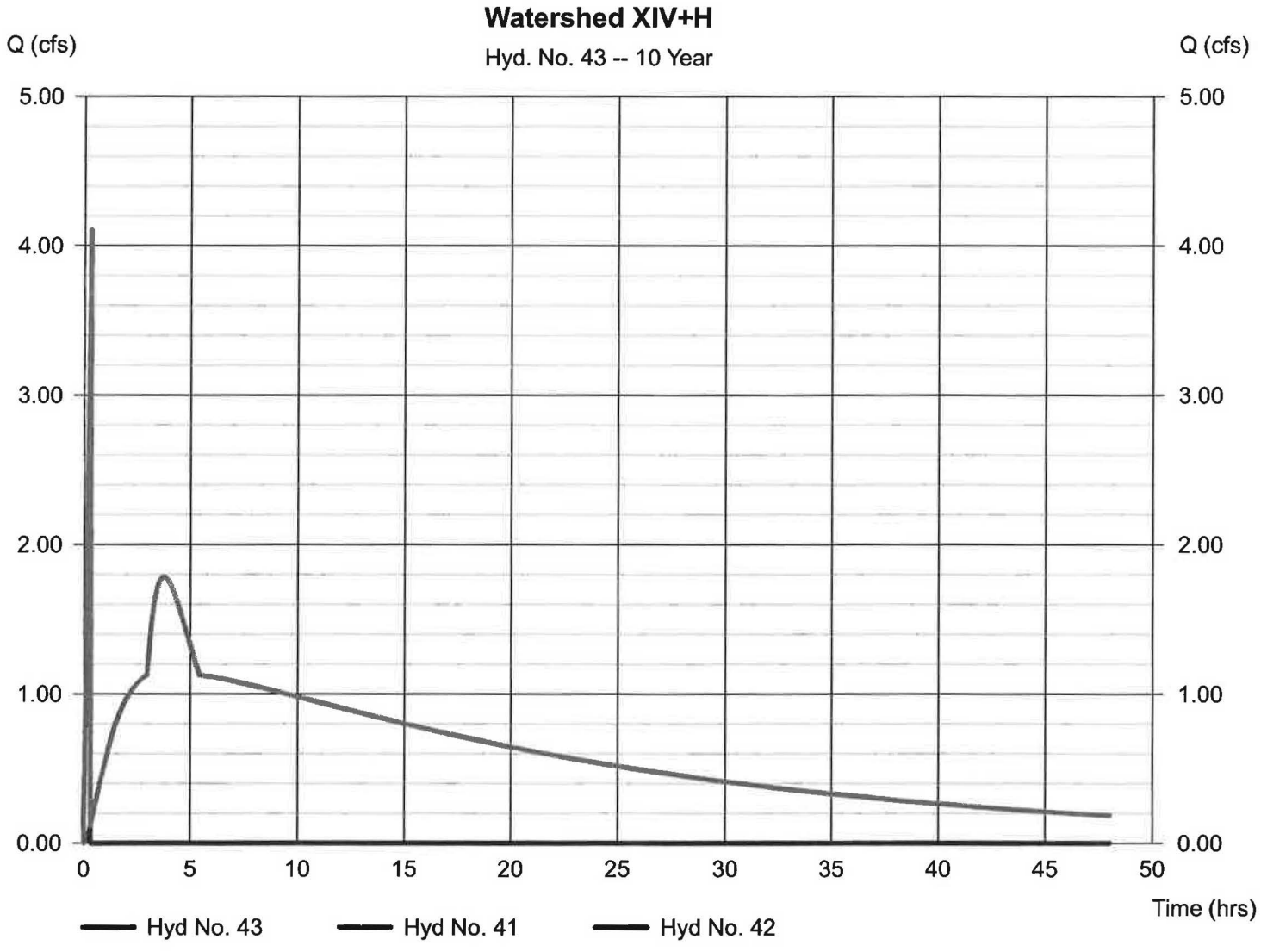
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 43

Watershed XIV+H

Hydrograph type	= Combine	Peak discharge	= 4.104 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 106,674 cuft
Inflow hyds.	= 41, 42	Contrib. drain. area	= 3.800 ac



Hydrograph Report

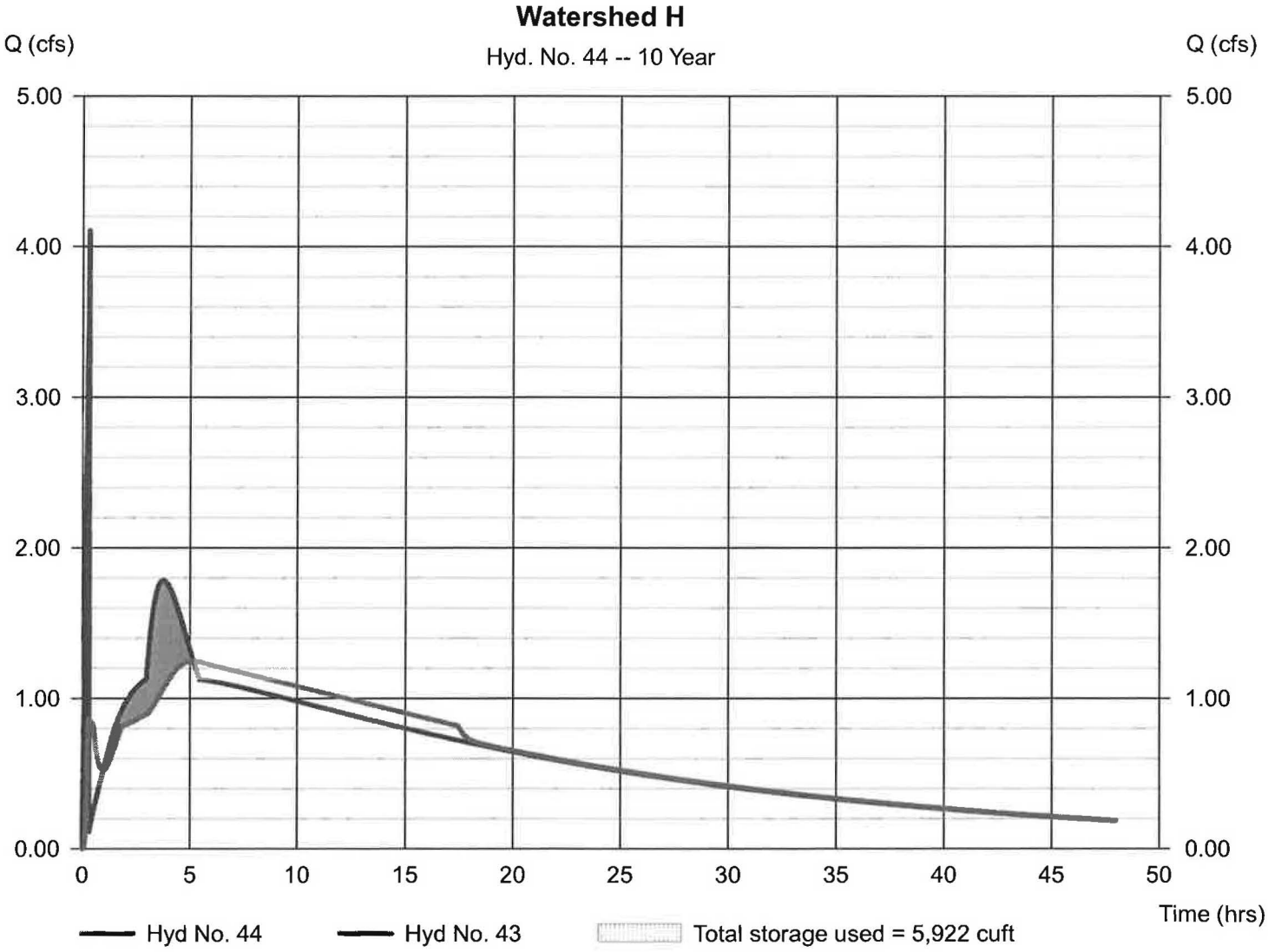
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 44

Watershed H

Hydrograph type	= Reservoir	Peak discharge	= 1.248 cfs
Storm frequency	= 10 yrs	Time to peak	= 5.15 hrs
Time interval	= 1 min	Hyd. volume	= 105,993 cuft
Inflow hyd. No.	= 43 - Watershed XIV+H	Max. Elevation	= 536.14 ft
Reservoir name	= Watershed H	Max. Storage	= 5,922 cuft

Storage Indication method used.



Hydrograph Report

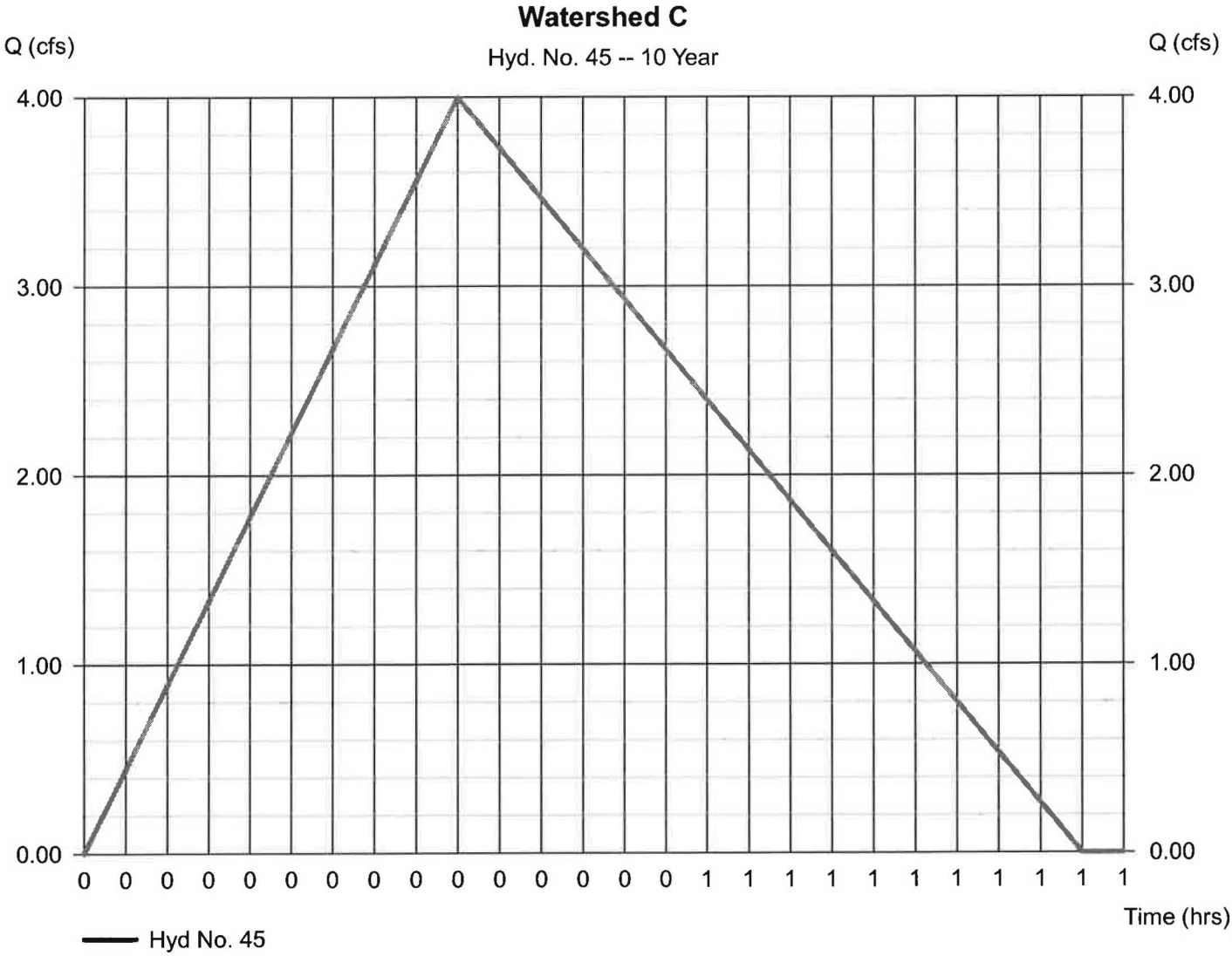
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 45

Watershed C

Hydrograph type	= Rational	Peak discharge	= 3.998 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.30 hrs
Time interval	= 1 min	Hyd. volume	= 5,860 cuft
Drainage area	= 3.300 ac	Runoff coeff.	= 0.33*
Intensity	= 3.671 in/hr	Tc by TR55	= 18.30 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.400 x 0.90) + (1.200 x 0.30) + (1.400 x 0.20) + (0.300 x 0.25)] / 3.300



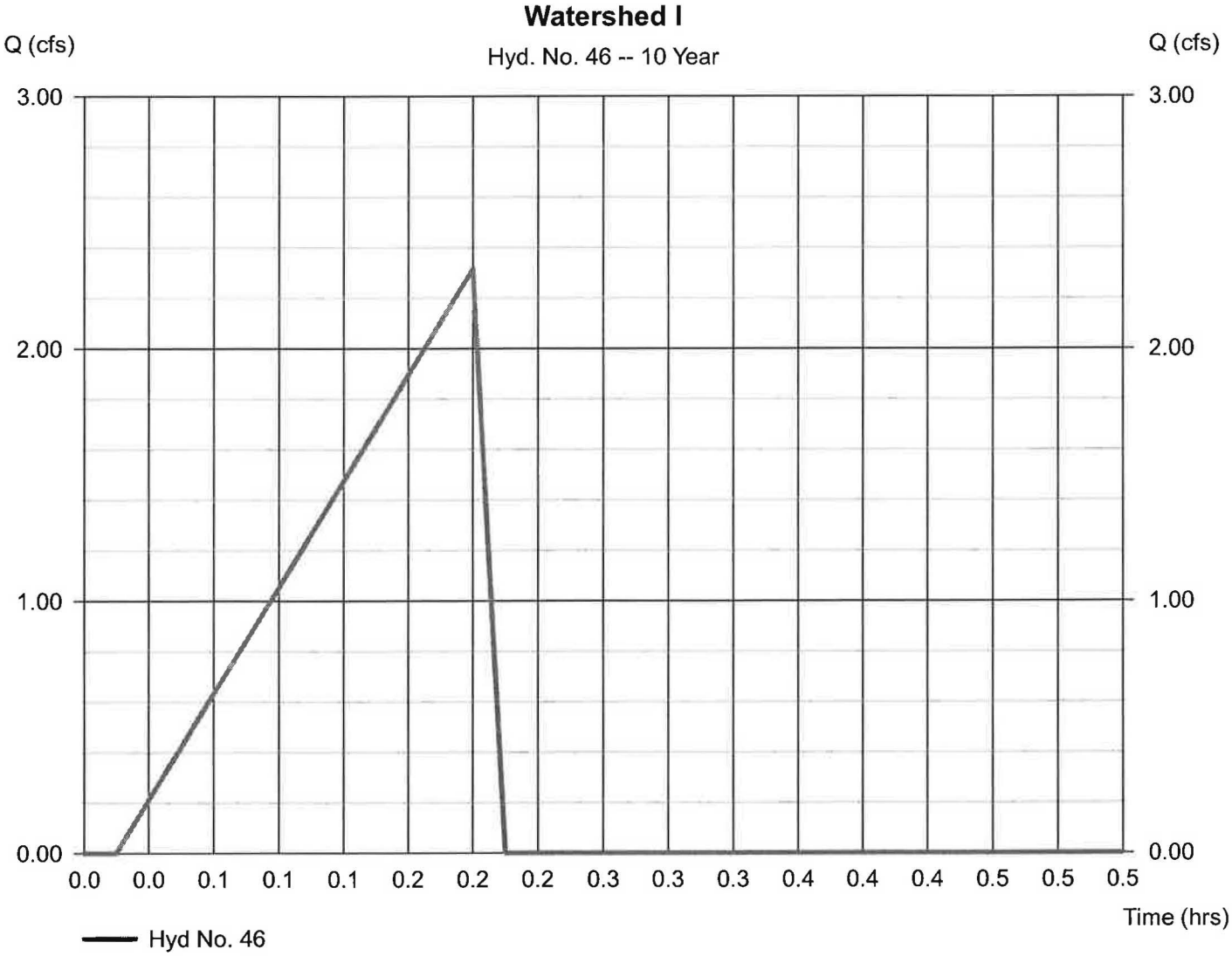
Hydrograph Report

Hyd. No. 46

Watershed I

Hydrograph type	= Rational	Peak discharge	= 2.315 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.20 hrs
Time interval	= 1 min	Hyd. volume	= 2,138 cuft
Drainage area	= 1.500 ac	Runoff coeff.	= 0.34*
Intensity	= 4.539 in/hr	Tc by TR55	= 11.53 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.200 x 0.90) + (0.700 x 0.30) + (0.600 x 0.20)] / 1.500



Hydrograph Report

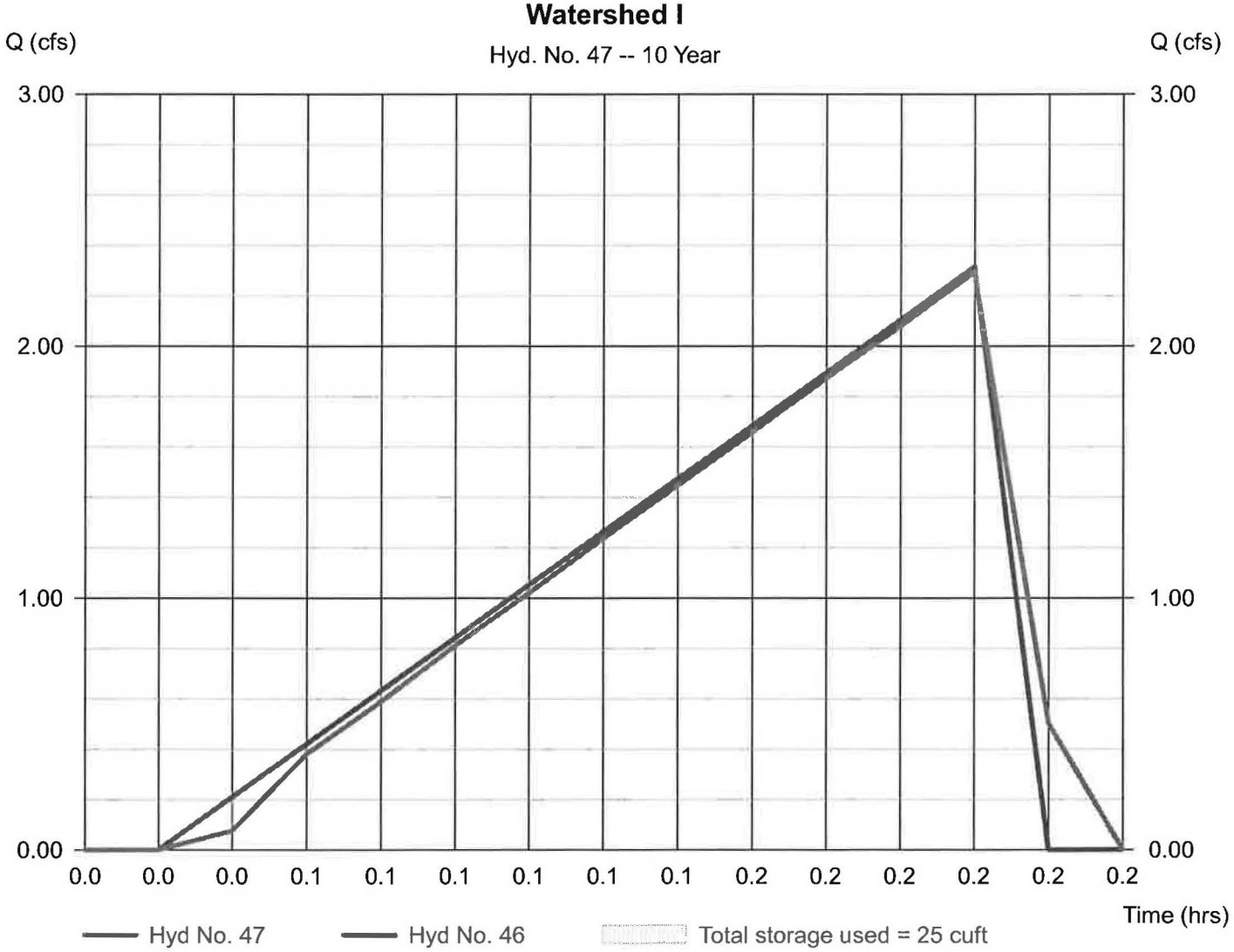
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 47

Watershed I

Hydrograph type	= Reservoir	Peak discharge	= 2.292 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.20 hrs
Time interval	= 1 min	Hyd. volume	= 838 cuft
Inflow hyd. No.	= 46 - Watershed I	Max. Elevation	= 531.52 ft
Reservoir name	= Watershed I	Max. Storage	= 25 cuft

Storage Indication method used.



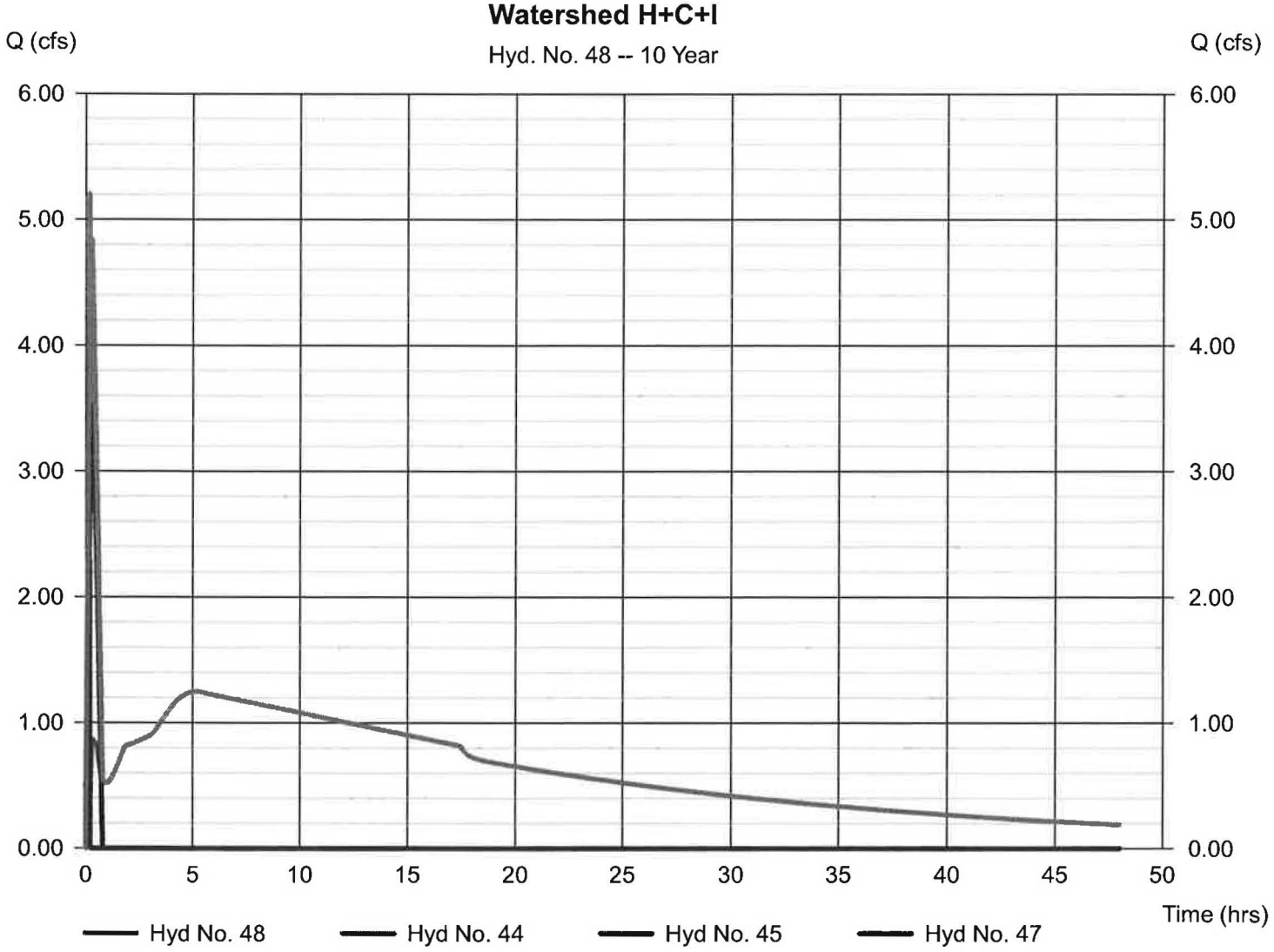
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 48

Watershed H+C+I

Hydrograph type	= Combine	Peak discharge	= 5.203 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.20 hrs
Time interval	= 1 min	Hyd. volume	= 112,588 cuft
Inflow hyds.	= 44, 45, 47	Contrib. drain. area	= 3.300 ac



Hydrograph Report

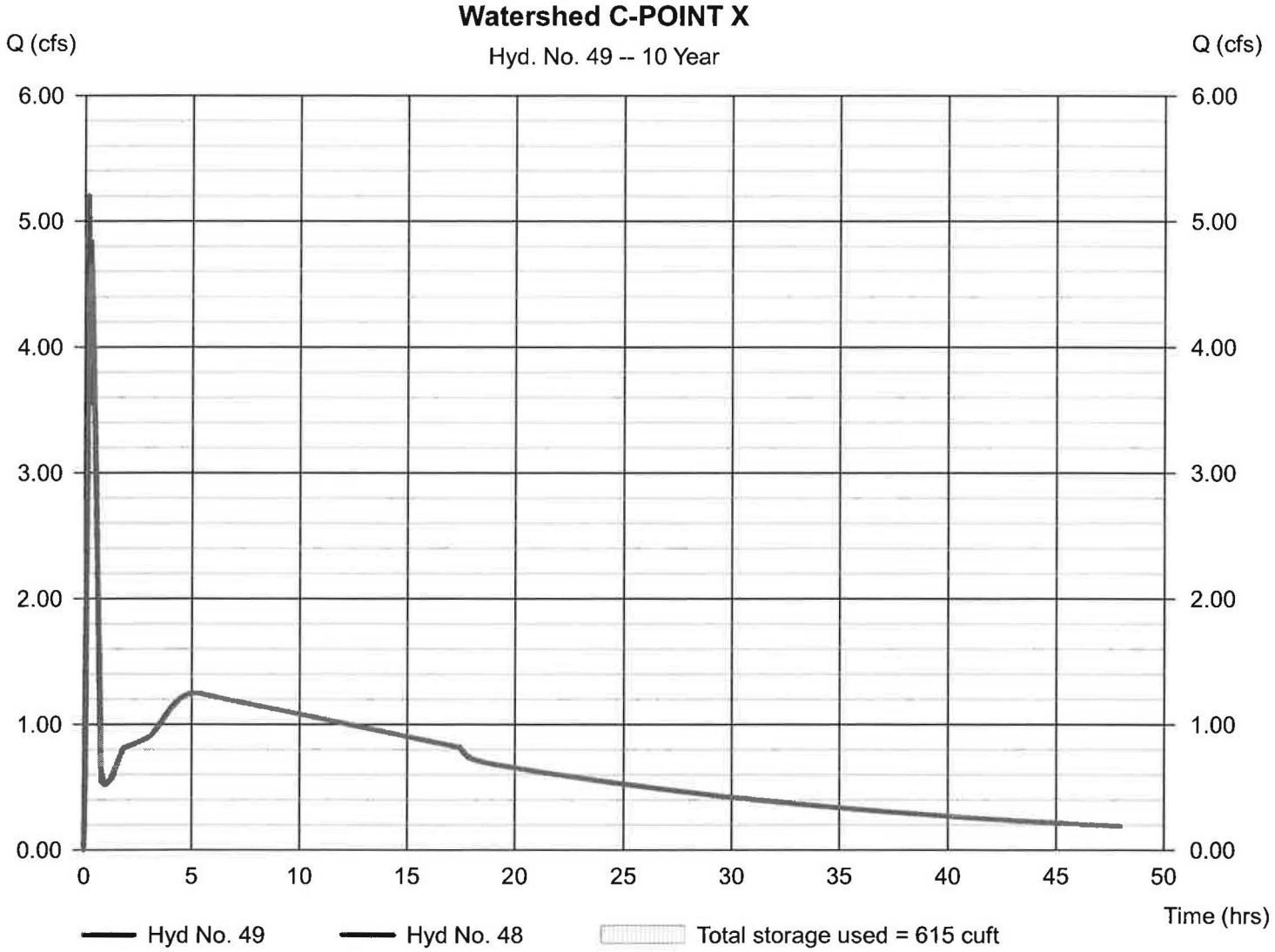
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 49

Watershed C-POINT X

Hydrograph type	= Reservoir	Peak discharge	= 4.650 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.33 hrs
Time interval	= 1 min	Hyd. volume	= 112,521 cuft
Inflow hyd. No.	= 48 - Watershed H+C+I	Max. Elevation	= 529.83 ft
Reservoir name	= Watershed C	Max. Storage	= 615 cuft

Storage Indication method used.



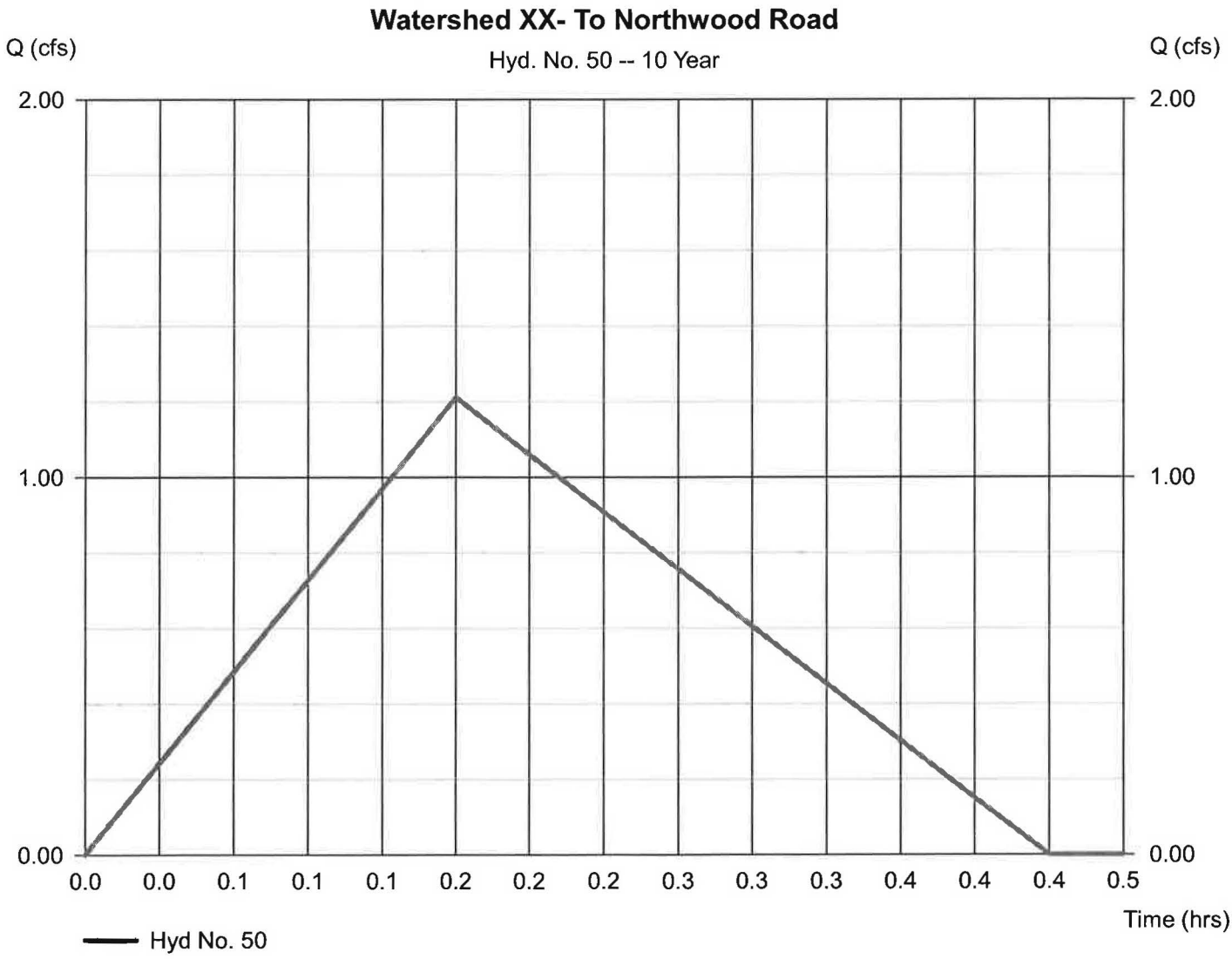
Hydrograph Report

Hyd. No. 50

Watershed XX- To Northwood Road

Hydrograph type	= Rational	Peak discharge	= 1.211 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 970 cuft
Drainage area	= 0.720 ac	Runoff coeff.	= 0.35*
Intensity	= 4.805 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.100 x 0.90) + (0.360 x 0.30) + (0.260 x 0.20)] / 0.720



Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	Rational	8.549	1	17	11,641	----	------	------	Watershed A
2	Reservoir	3.158	1	35	11,518	1	566.11	7,290	Watershed A
3	Rational	6.396	1	14	6,939	----	------	------	Watershed B
4	Reservoir	1.471	1	31	6,704	3	567.02	5,343	Watershed B
5	Rational	3.636	1	21	6,057	----	------	------	Watershed I(1)
6	Rational	4.939	1	19	7,540	----	------	------	Wateshed II
7	Rational	6.675	1	10	5,347	----	------	------	Watershed IIA
8	Reservoir	1.364	1	23	5,200	7	562.83	3,905	Wateshed IIA
9	Rational	4.878	1	13	5,080	----	------	------	Watershed VIII
10	Rational	7.866	1	10	6,301	----	------	------	Watershed VIIIA
11	Reservoir	1.336	1	23	6,128	10	559.75	4,851	Watershed VIIIA
12	Rational	0.014	1	10	12	----	------	------	Watershed IX
13	Rational	2.916	1	10	2,336	----	------	------	Watershed IXA
14	Reservoir	1.332	1	19	2,273	13	554.41	1,071	Watershed IXA
15	Combine	10.94	1	21	24,627	5, 6, 8, 11,	------	------	Combine
16	Combine	15.65	1	19	31,887	9, 12, 14, 15	------	------	Watershed-Point Y
17	Rational	6.614	1	15	7,947	----	------	------	Watershed III
18	Rational	2.121	1	10	1,699	----	------	------	Watershed IV
19	Rational	9.816	1	10	7,863	----	------	------	Watershed IVA
20	Reservoir	2.136	1	23	842	19	553.76	7,158	Watershed IVA
21	Combine	9.452	1	22	20,297	2, 17, 20	------	------	Watershed A+III+VI
22	Rational	3.785	1	10	3,032	----	------	------	Watershed VI
23	Rational	5.169	1	10	4,140	----	------	------	Watershed VIA
24	Reservoir	1.354	1	22	4,027	23	550.80	2,756	Watershed VIA
25	Rational	16.71	1	10	13,388	----	------	------	Watershed VIIA
26	Reservoir	3.257	1	23	13,026	25	547.59	10,406	Watershed VIIA
27	Rational	1.643	1	10	1,316	----	------	------	Watershed X
28	Rational	31.10	1	23	57,301	----	------	------	Watershed V
29	Rational	2.751	1	10	2,204	----	------	------	Watershed XA
30	Reservoir	1.453	1	18	2,145	29	558.12	861	Watershed XA
31	Rational	0.381	1	10	305	----	------	------	Watershed VII
32	Combine	43.08	1	23	83,387	21, 24, 28, 30,	------	------	Combine
33	Reservoir	22.58	1	39	83,380	32	544.29	39,430	Watershed V

Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
34	Rational	5.386	1	22	9,692	----	------	------	Watershed XII
35	Reservoir	0.007	1	59	1,148	34	546.27	9,513	Watershed XII
36	Rational	7.678	1	14	8,610	----	------	------	Watershed XIX
37	Combine	26.41	1	35	111,632	4, 26, 33, 36	------	------	Watershed B+X+XI+XIX
38	Reservoir	17.92	1	60	111,622	37	542.12	40,317	Watershed XIX-POINT Z
39	Rational	19.02	1	20	30,465	----	------	------	Watershed XIV
40	Combine	20.83	1	20	141,858	38, 39	------	------	Watershed XIV+XIX
41	Reservoir	4.079	1	164	125,499	40	539.55	101,746	Watershed XIV
42	Rational	4.691	1	19	7,021	----	------	------	Watershed H
43	Combine	4.810	1	19	128,172	41, 42	------	------	Watershed XIV+H
44	Reservoir	2.295	1	264	127,487	43	536.47	16,293	Watershed H
45	Rational	4.682	1	18	6,864	----	------	------	Watershed C
46	Rational	2.674	1	12	2,470	----	------	------	Watershed I
47	Reservoir	2.648	1	12	968	46	531.60	27.4	Watershed I
48	Combine	6.098	1	12	135,198	44, 45, 47	------	------	Watershed H+C+I
49	Reservoir	5.386	1	19	135,131	48	529.92	666	Watershed C-POINT X
50	Rational	1.392	1	10	1,115	----	------	------	Watershed XX- To Northwood Roa

Hydrograph Report

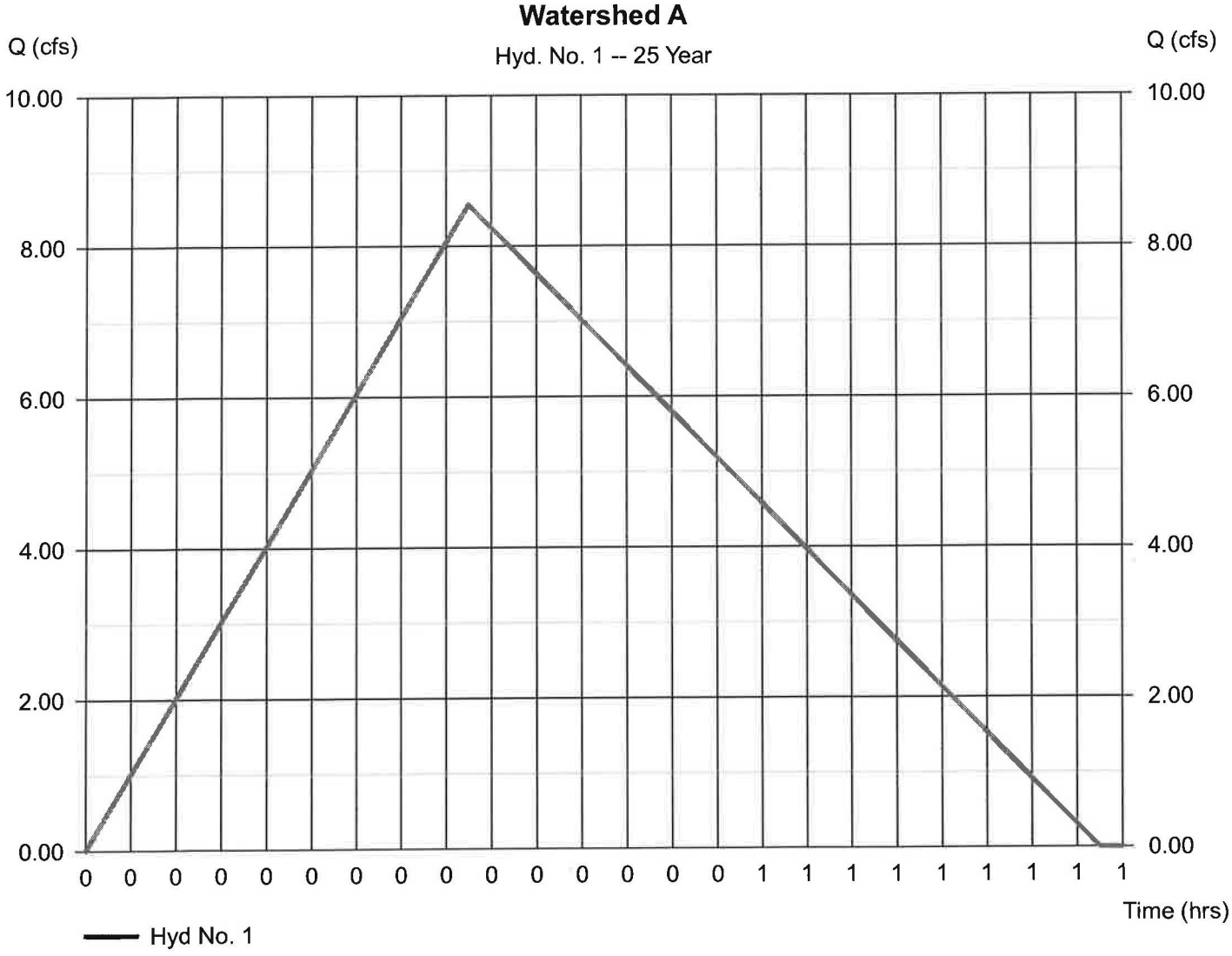
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 1

Watershed A

Hydrograph type	= Rational	Peak discharge	= 8.549 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.28 hrs
Time interval	= 1 min	Hyd. volume	= 11,641 cuft
Drainage area	= 8.000 ac	Runoff coeff.	= 0.24*
Intensity	= 4.452 in/hr	Tc by TR55	= 17.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.400 x 0.90) + (0.500 x 0.30) + (7.100 x 0.20)] / 8.000



Hydrograph Report

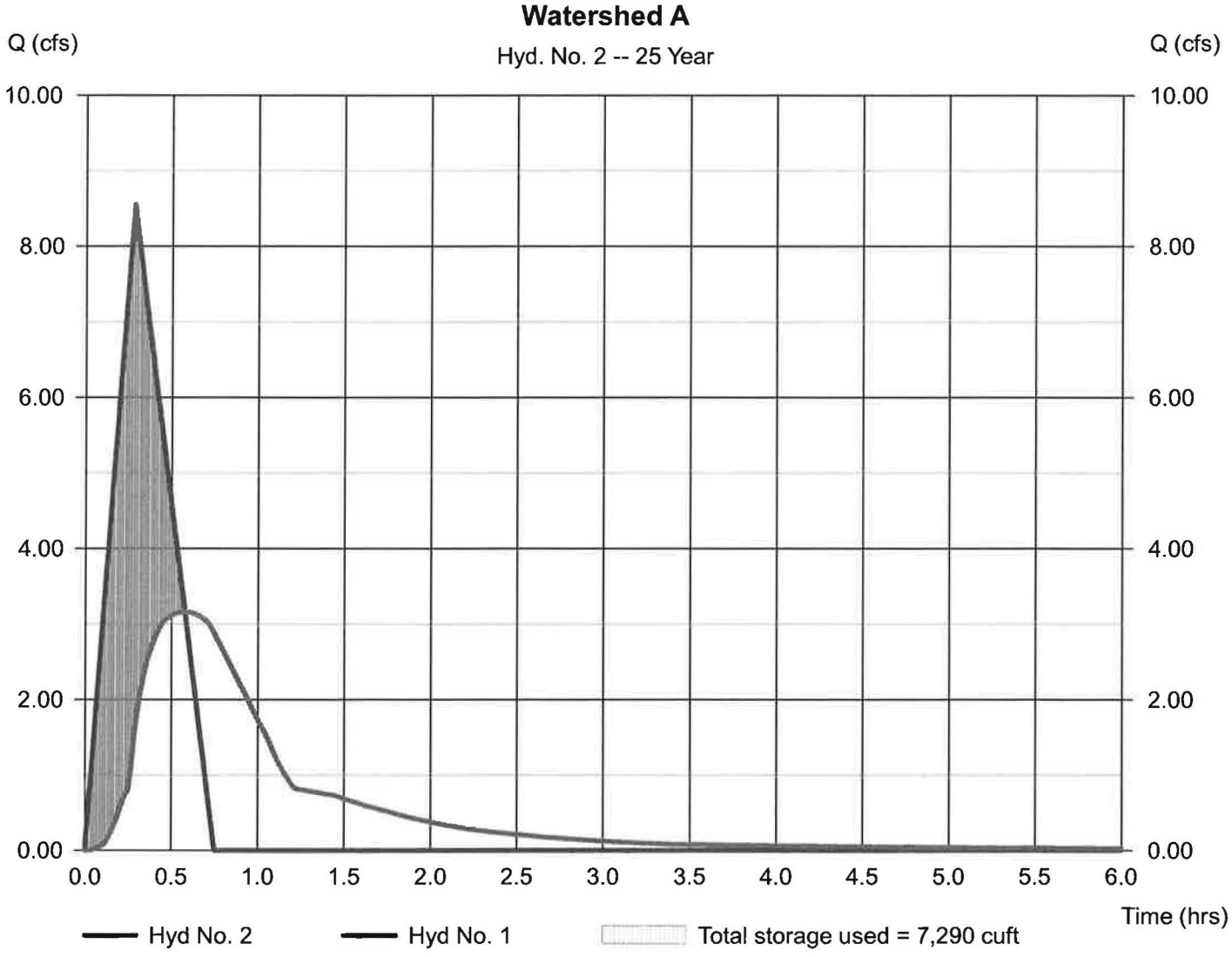
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 2

Watershed A

Hydrograph type	= Reservoir	Peak discharge	= 3.158 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.58 hrs
Time interval	= 1 min	Hyd. volume	= 11,518 cuft
Inflow hyd. No.	= 1 - Watershed A	Max. Elevation	= 566.11 ft
Reservoir name	= Watershed A	Max. Storage	= 7,290 cuft

Storage Indication method used.



Hydrograph Report

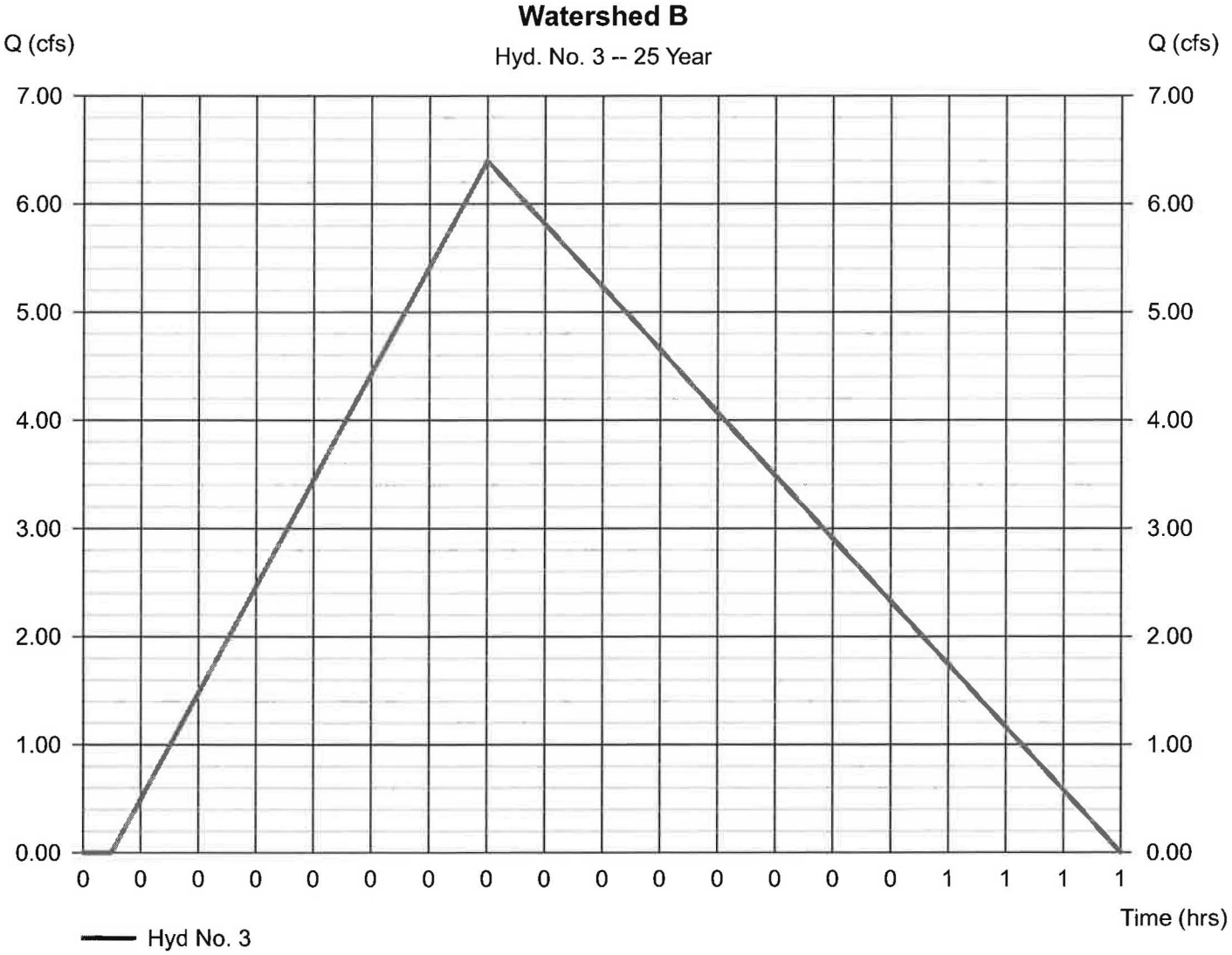
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 3

Watershed B

Hydrograph type	= Rational	Peak discharge	= 6.396 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.23 hrs
Time interval	= 1 min	Hyd. volume	= 6,939 cuft
Drainage area	= 5.200 ac	Runoff coeff.	= 0.25*
Intensity	= 4.920 in/hr	Tc by TR55	= 13.54 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.300 x 0.90) + (0.500 x 0.30) + (4.400 x 0.20)] / 5.200



Hydrograph Report

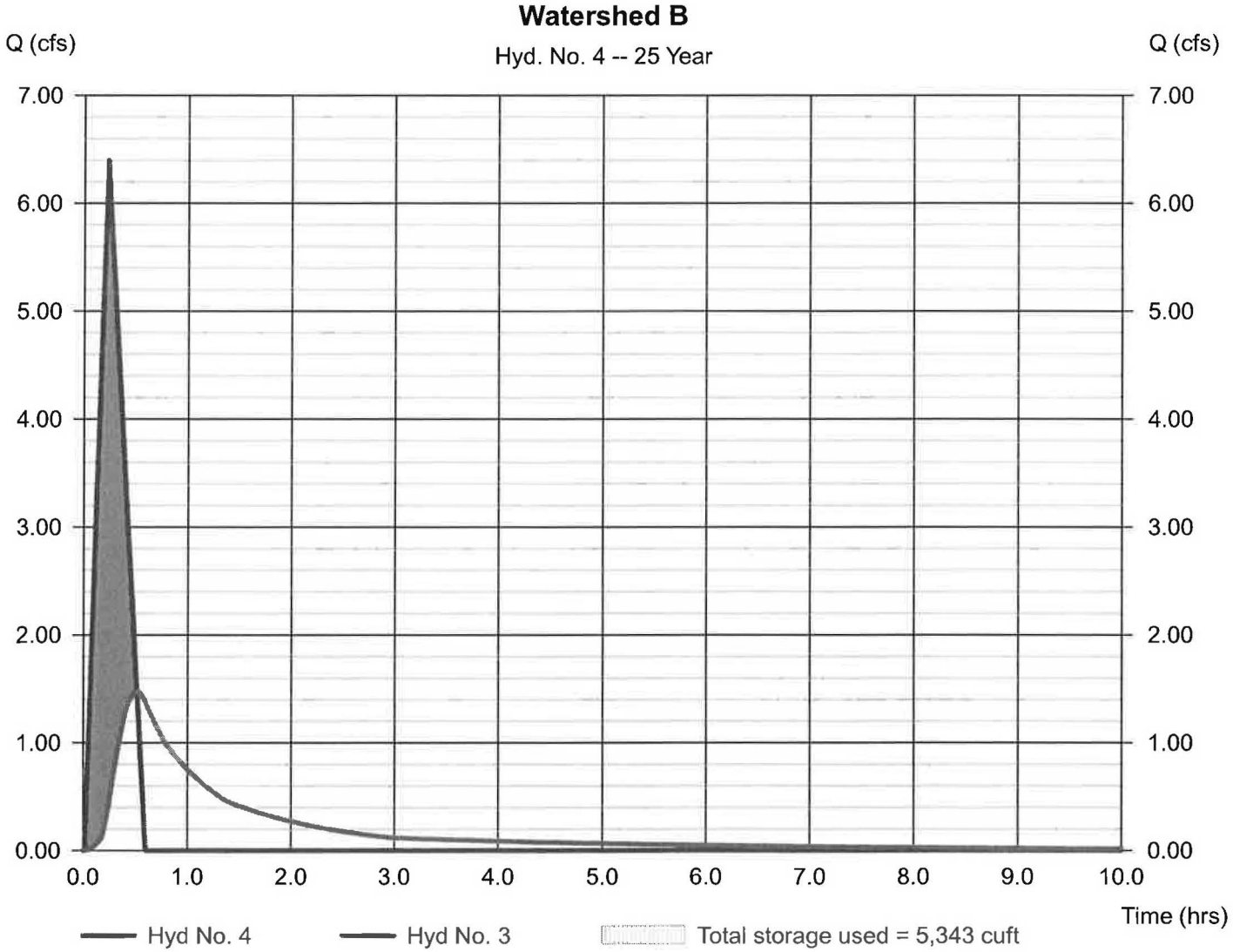
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 4

Watershed B

Hydrograph type	= Reservoir	Peak discharge	= 1.471 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.52 hrs
Time interval	= 1 min	Hyd. volume	= 6,704 cuft
Inflow hyd. No.	= 3 - Watershed B	Max. Elevation	= 567.02 ft
Reservoir name	= Watershed B	Max. Storage	= 5,343 cuft

Storage Indication method used.



Hydrograph Report

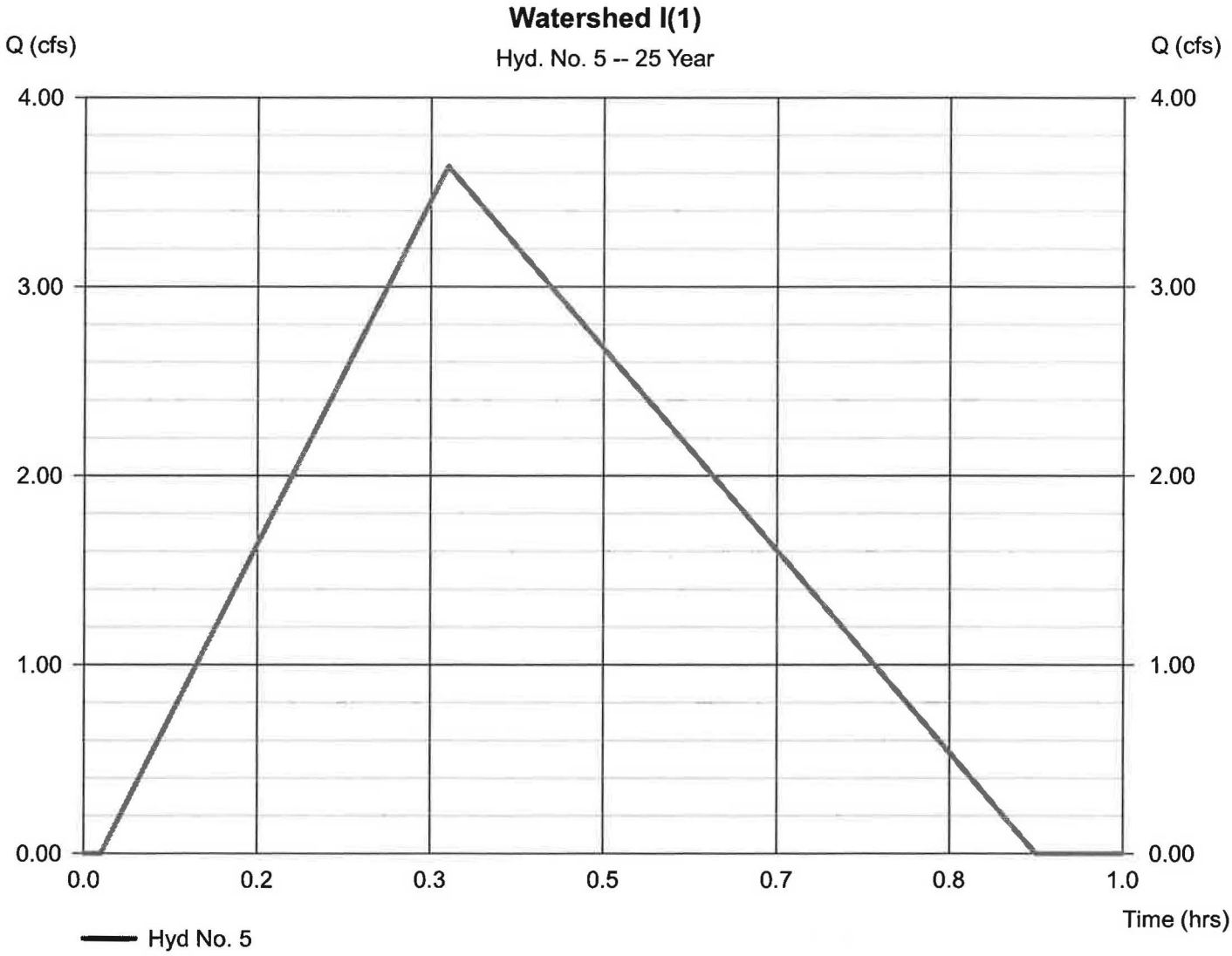
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 5

Watershed I(1)

Hydrograph type	= Rational	Peak discharge	= 3.636 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.35 hrs
Time interval	= 1 min	Hyd. volume	= 6,057 cuft
Drainage area	= 1.700 ac	Runoff coeff.	= 0.53*
Intensity	= 4.036 in/hr	Tc by TR55	= 20.80 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.700 x 0.90) + (0.700 x 0.30) + (0.300 x 0.20)] / 1.700



Hydrograph Report

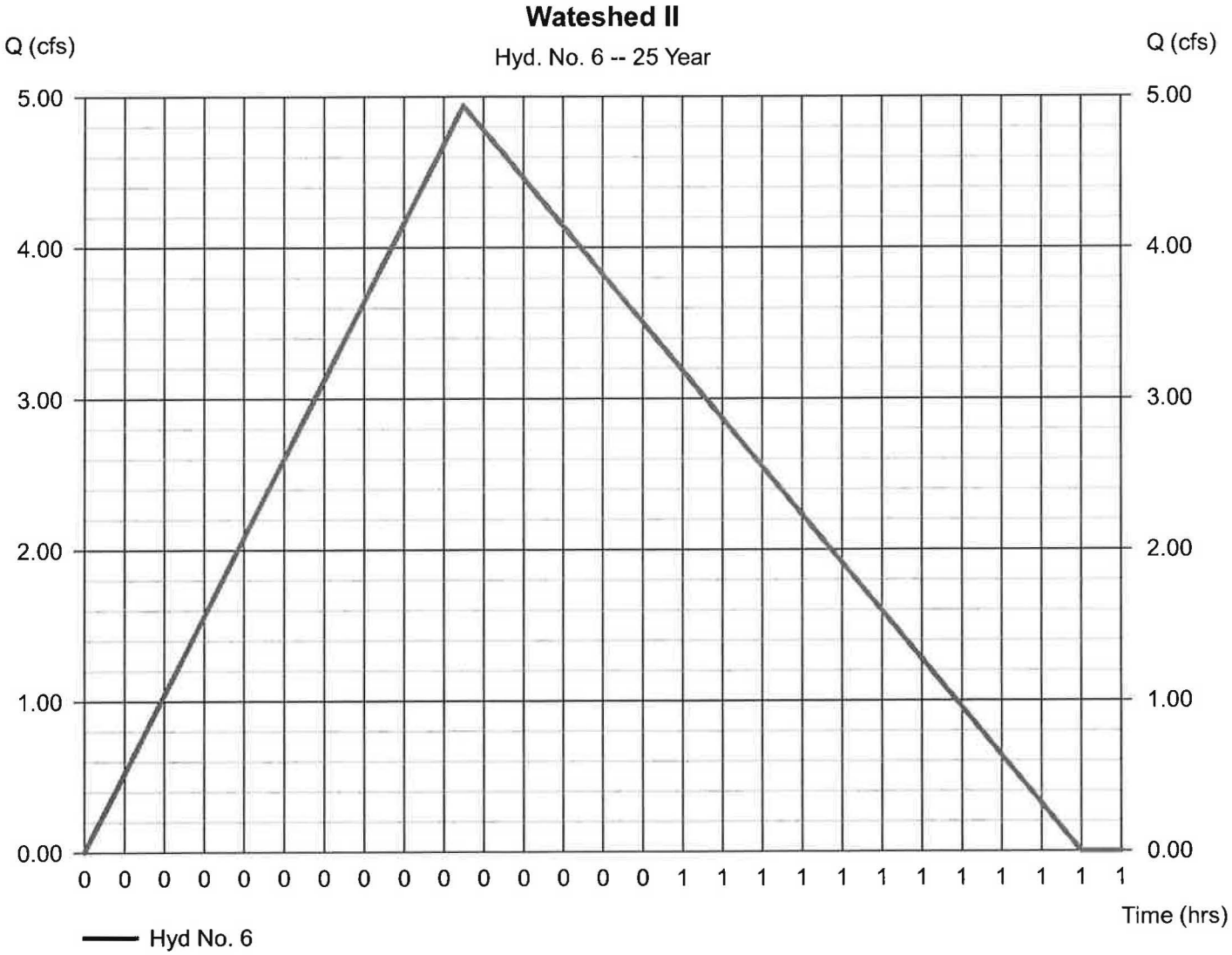
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 6

Wateshed II

Hydrograph type	= Rational	Peak discharge	= 4.939 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 7,540 cuft
Drainage area	= 4.040 ac	Runoff coeff.	= 0.29*
Intensity	= 4.216 in/hr	Tc by TR55	= 19.06 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.230 x 0.90) + (1.940 x 0.30) + (1.870 x 0.20)] / 4.040



Hydrograph Report

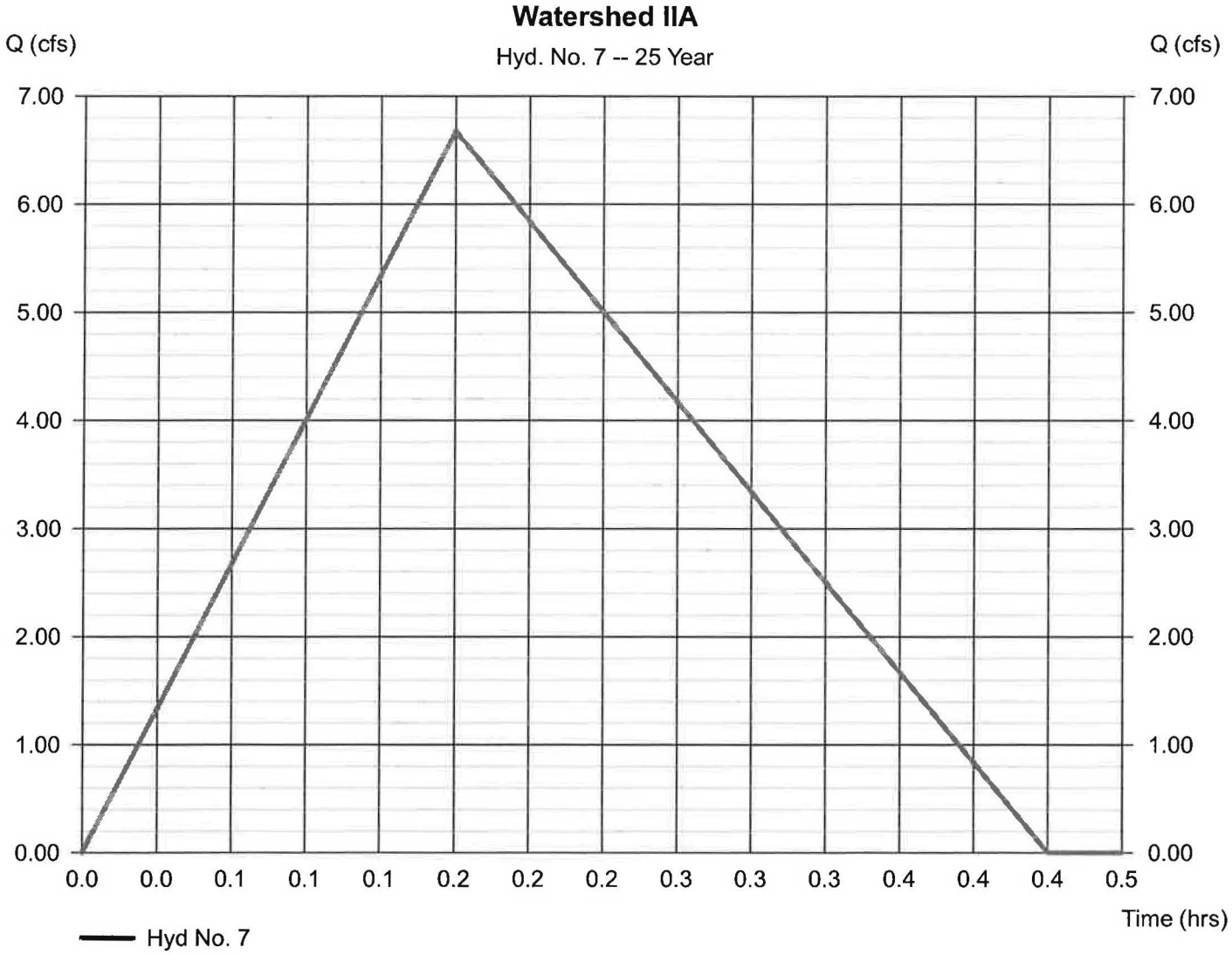
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 7

Watershed IIA

Hydrograph type	= Rational	Peak discharge	= 6.675 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 5,347 cuft
Drainage area	= 1.530 ac	Runoff coeff.	= 0.79*
Intensity	= 5.522 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.250 x 0.90) + (0.280 x 0.30)] / 1.530



Hydrograph Report

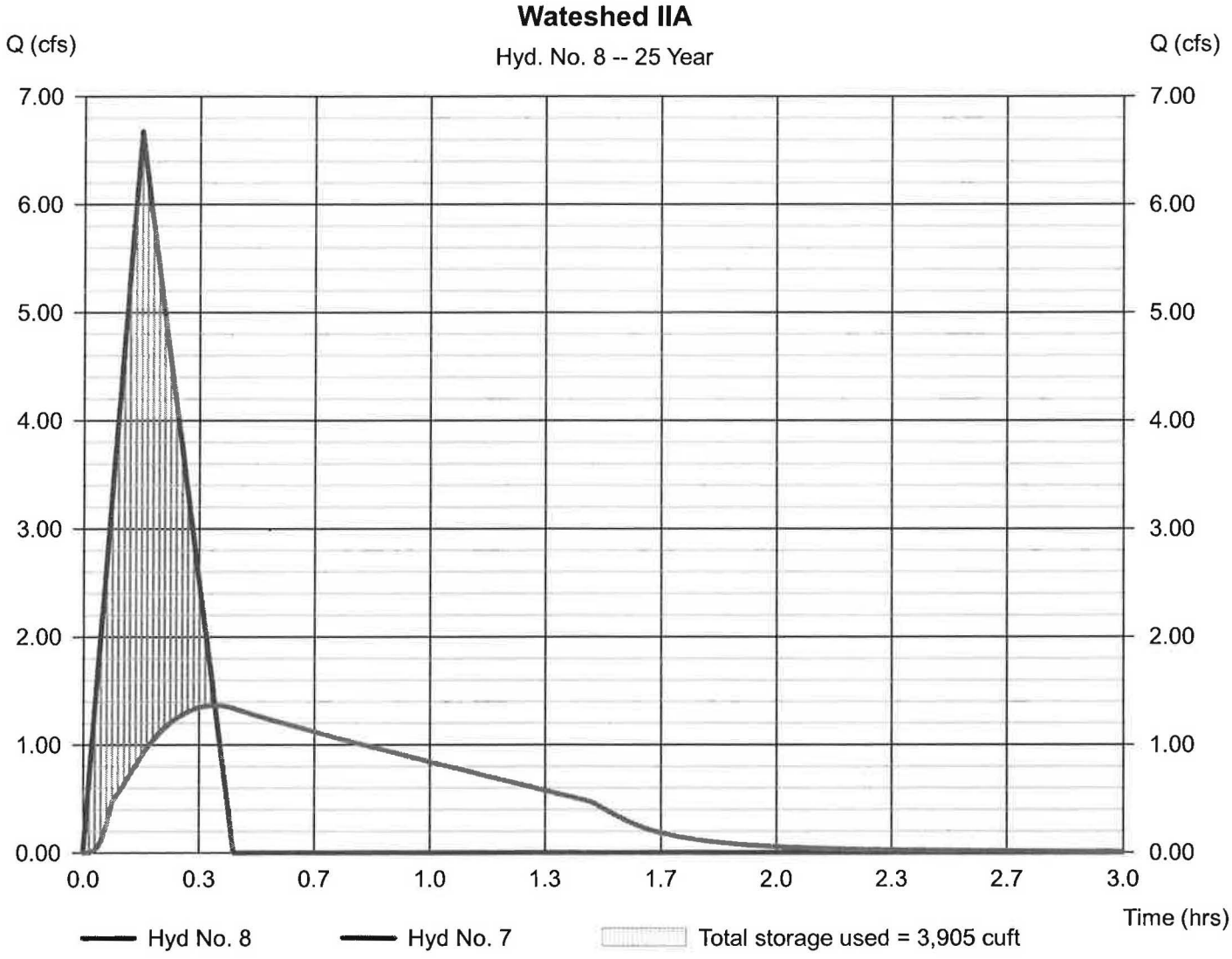
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 8

Wateshed IIA

Hydrograph type	= Reservoir	Peak discharge	= 1.364 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.38 hrs
Time interval	= 1 min	Hyd. volume	= 5,200 cuft
Inflow hyd. No.	= 7 - Watershed IIA	Max. Elevation	= 562.83 ft
Reservoir name	= Watershed IIA	Max. Storage	= 3,905 cuft

Storage Indication method used.



Hydrograph Report

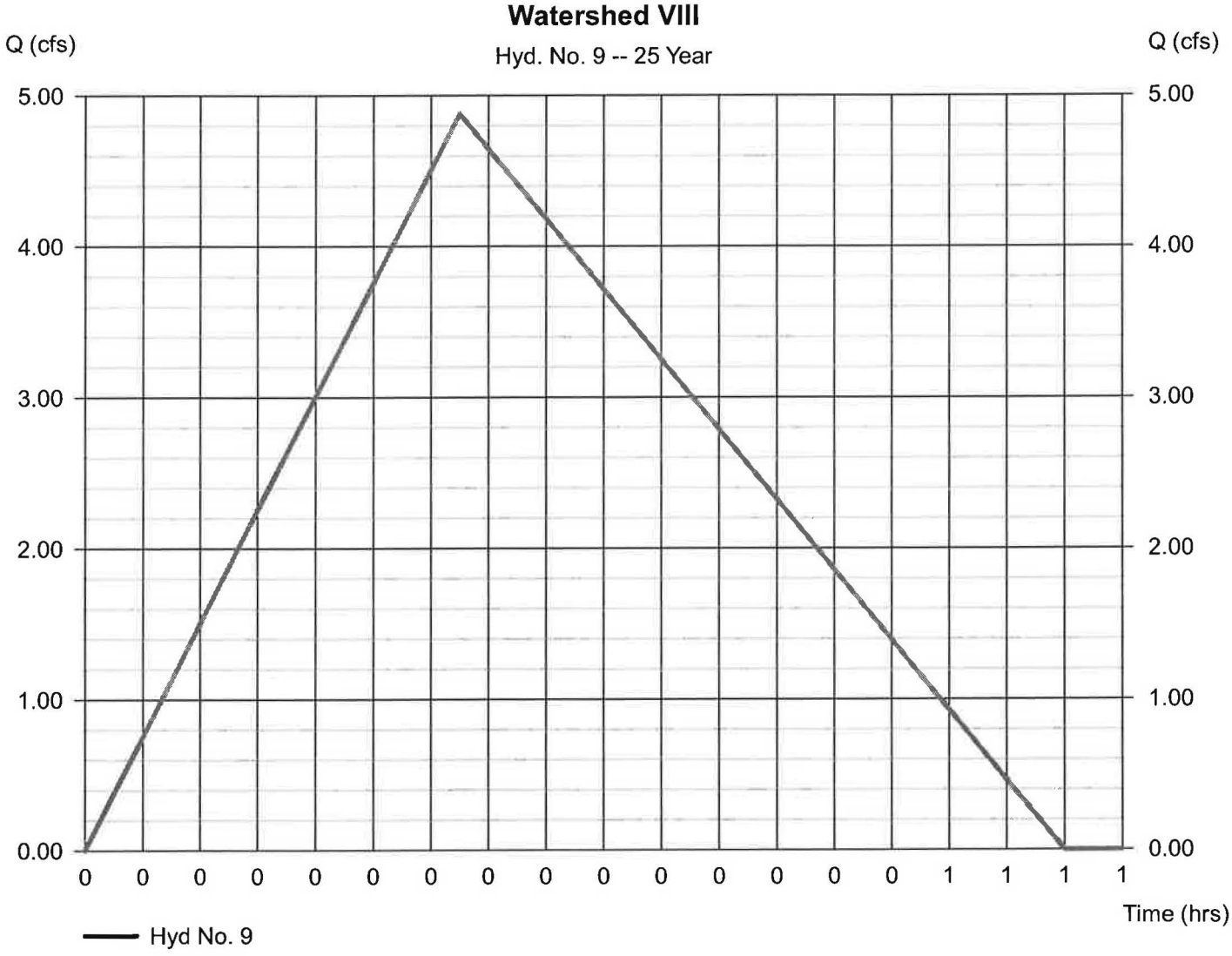
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 9

Watershed VIII

Hydrograph type	= Rational	Peak discharge	= 4.878 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.22 hrs
Time interval	= 1 min	Hyd. volume	= 5,080 cuft
Drainage area	= 3.250 ac	Runoff coeff.	= 0.3*
Intensity	= 5.003 in/hr	Tc by TR55	= 13.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.320 x 0.90) + (1.120 x 0.30) + (1.810 x 0.20)] / 3.250



Hydrograph Report

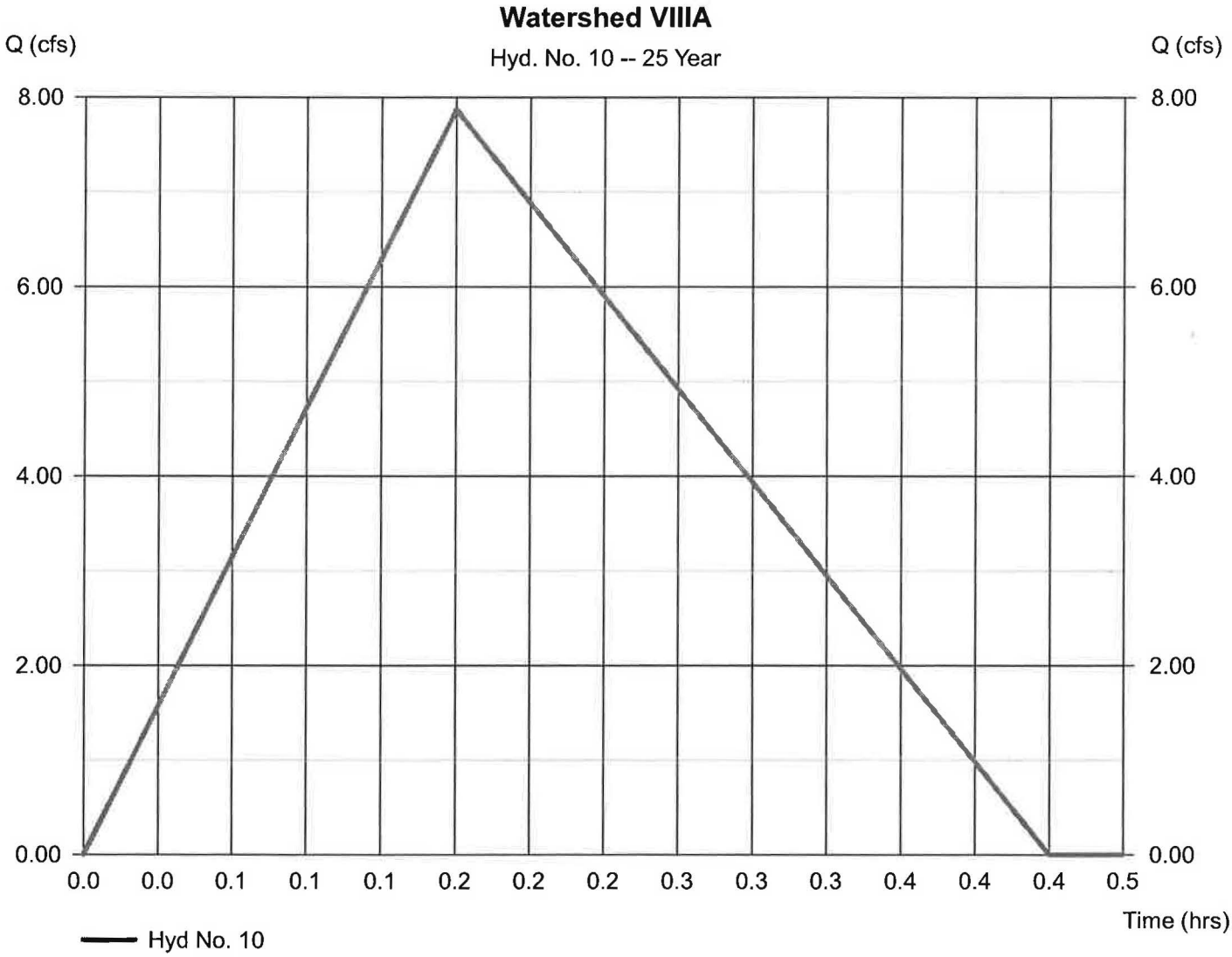
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 10

Watershed VIIIA

Hydrograph type	= Rational	Peak discharge	= 7.866 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 6,301 cuft
Drainage area	= 1.850 ac	Runoff coeff.	= 0.77*
Intensity	= 5.522 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.460 x 0.90) + (0.390 x 0.30)] / 1.850



Hydrograph Report

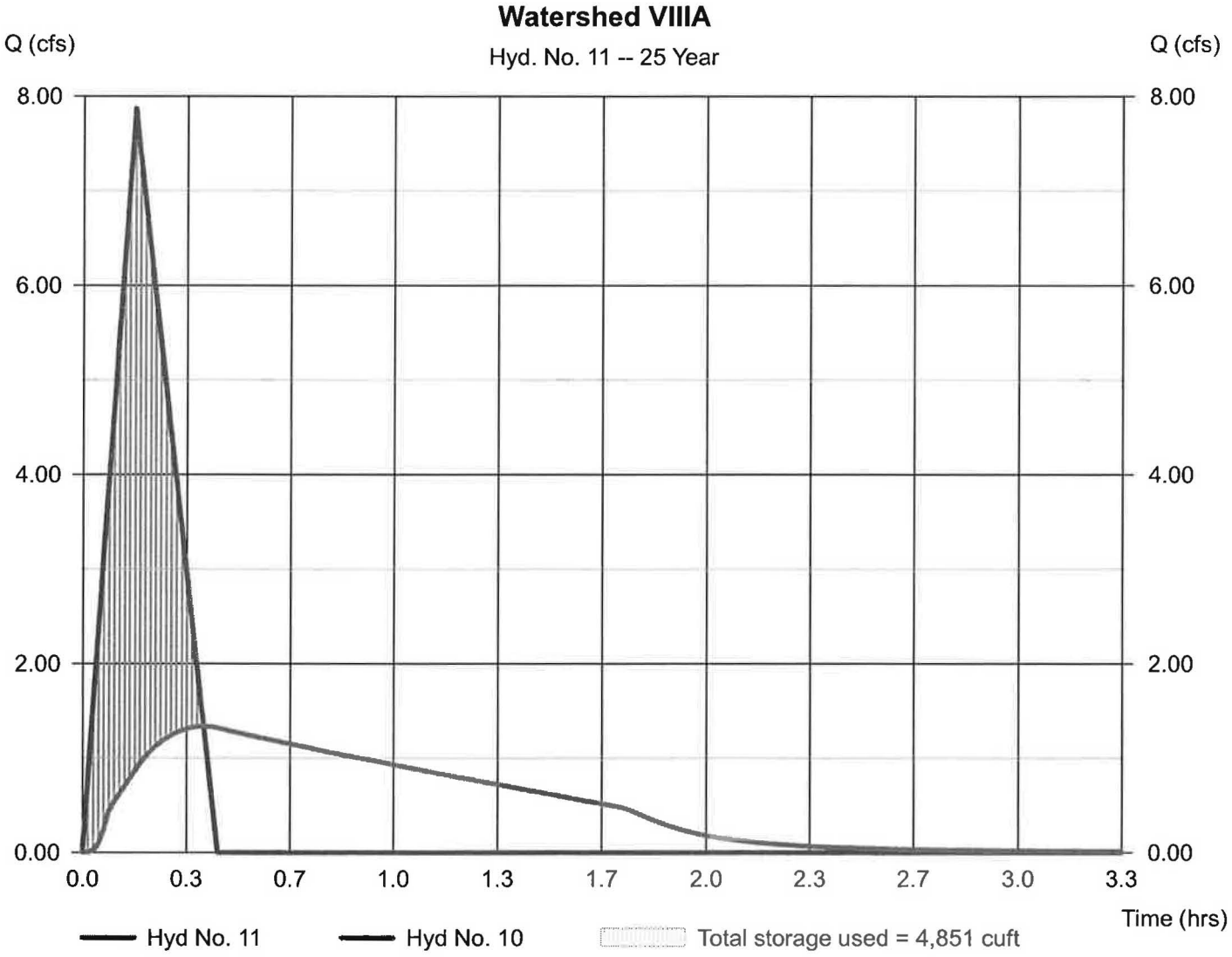
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 11

Watershed VIIIA

Hydrograph type	= Reservoir	Peak discharge	= 1.336 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.38 hrs
Time interval	= 1 min	Hyd. volume	= 6,128 cuft
Inflow hyd. No.	= 10 - Watershed VIIIA	Max. Elevation	= 559.75 ft
Reservoir name	= Watershed VIIIA	Max. Storage	= 4,851 cuft

Storage Indication method used.



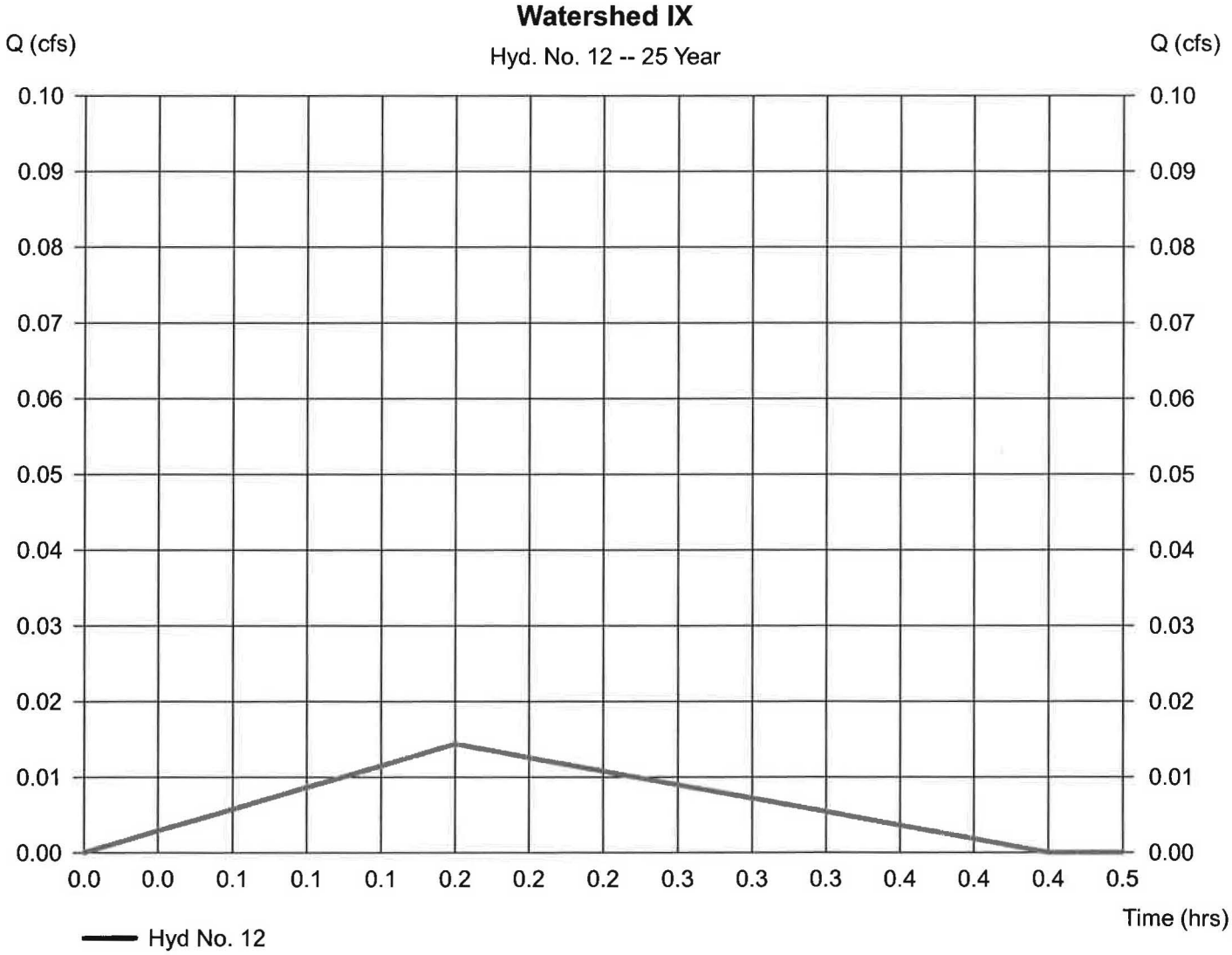
Hydrograph Report

Hyd. No. 12

Watershed IX

Hydrograph type	= Rational	Peak discharge	= 0.014 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 12 cuft
Drainage area	= 0.260 ac	Runoff coeff.	= 0.01*
Intensity	= 5.522 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.010 x 0.30)] / 0.260



Hydrograph Report

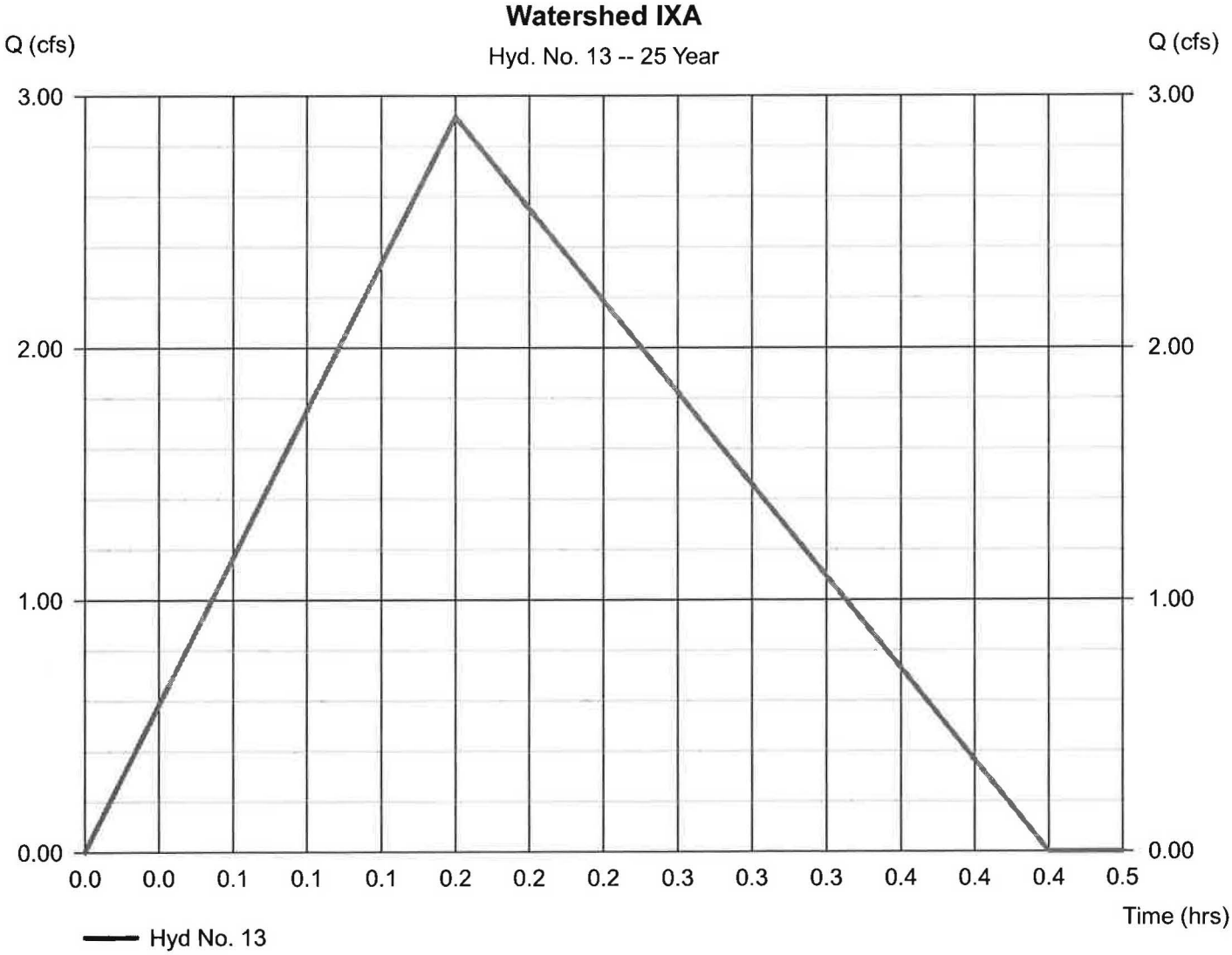
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 13

Watershed IXA

Hydrograph type	= Rational	Peak discharge	= 2.916 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 2,336 cuft
Drainage area	= 0.880 ac	Runoff coeff.	= 0.6*
Intensity	= 5.522 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.460 x 0.90) + (0.260 x 0.30) + (0.160 x 0.20)] / 0.880



Hydrograph Report

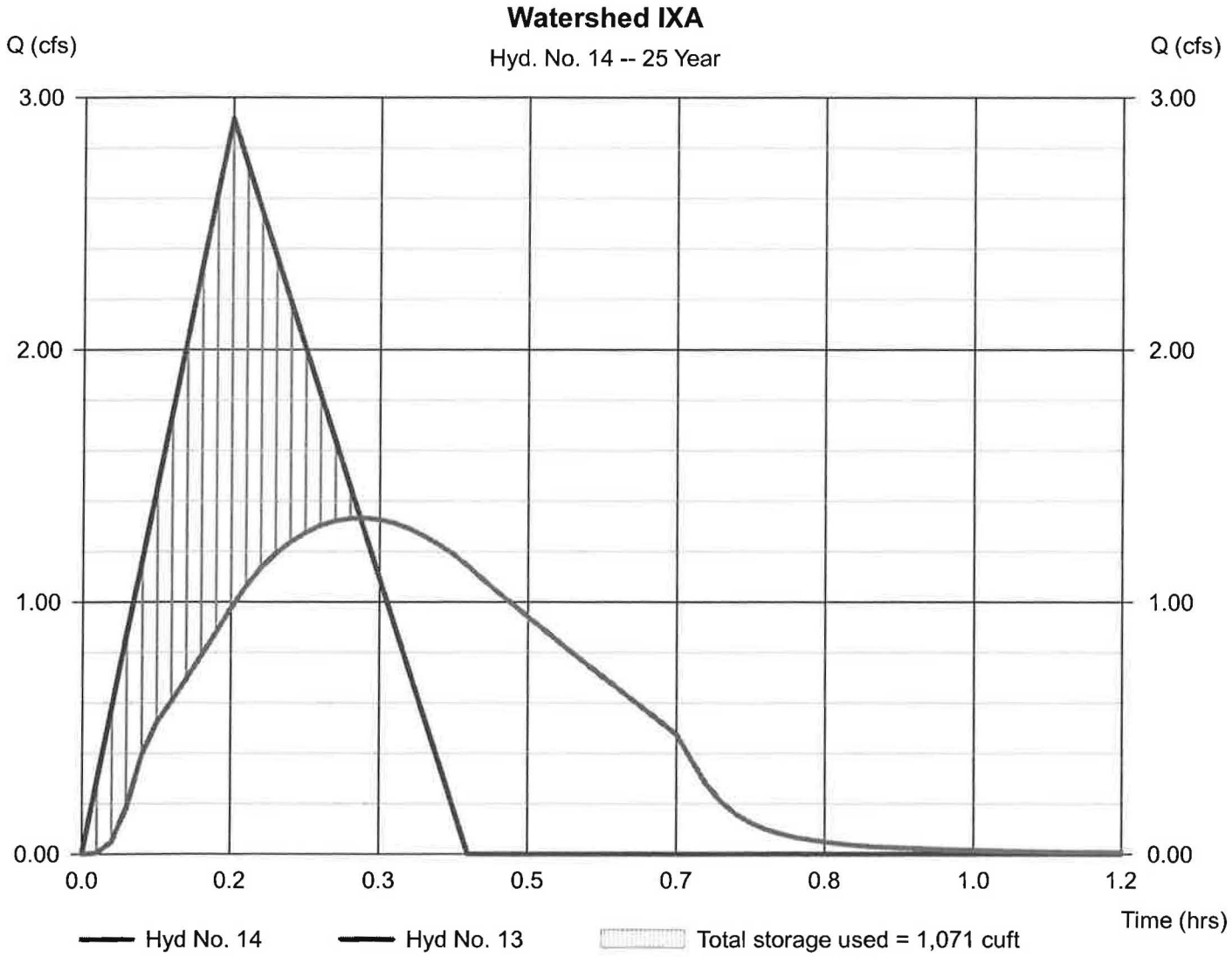
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 14

Watershed IXA

Hydrograph type	= Reservoir	Peak discharge	= 1.332 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 2,273 cuft
Inflow hyd. No.	= 13 - Watershed IXA	Max. Elevation	= 554.41 ft
Reservoir name	= Waatershed IXA	Max. Storage	= 1,071 cuft

Storage Indication method used.

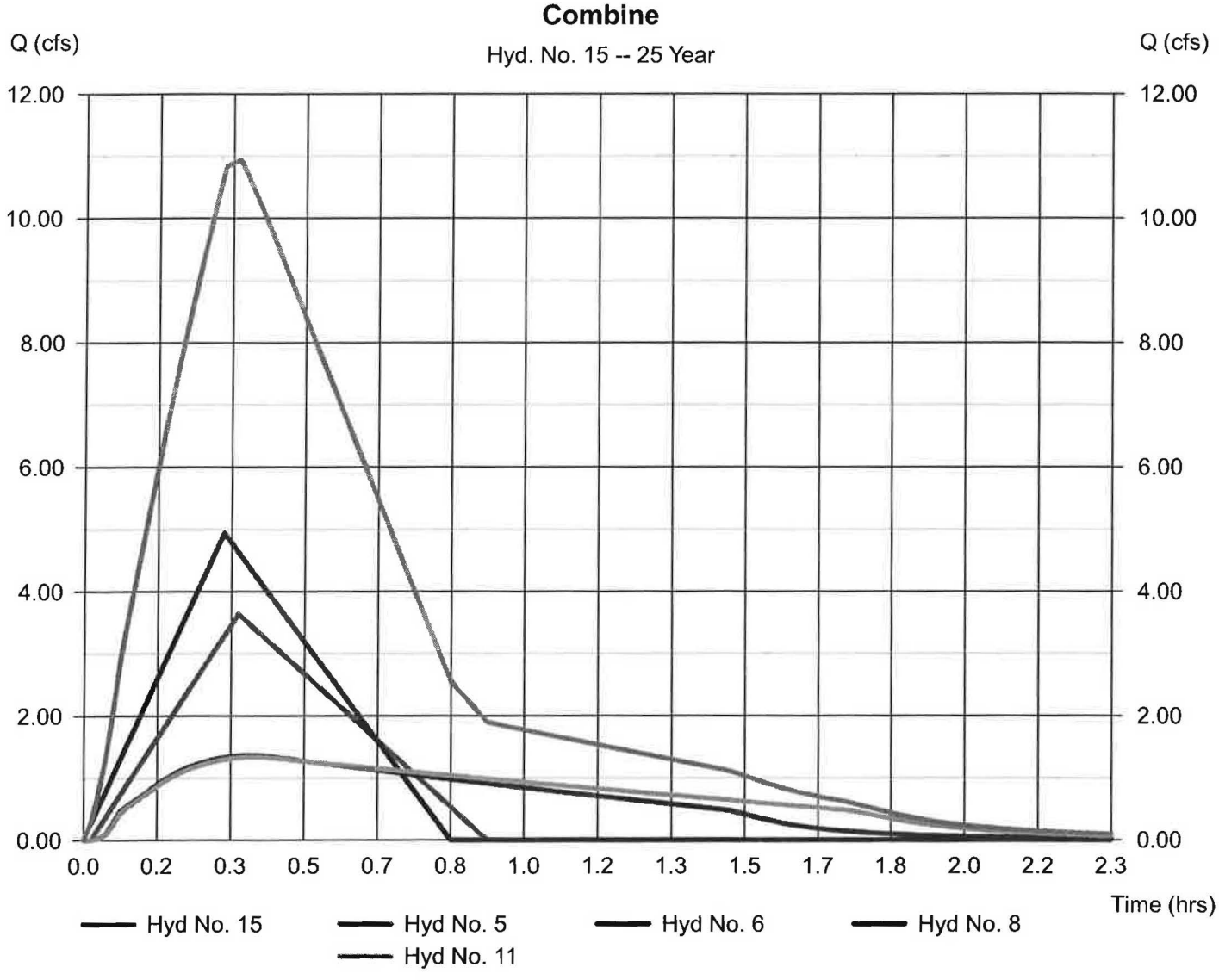


Hydrograph Report

Hyd. No. 15

Combine

Hydrograph type	= Combine	Peak discharge	= 10.94 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.35 hrs
Time interval	= 1 min	Hyd. volume	= 24,627 cuft
Inflow hyds.	= 5, 6, 8, 11	Contrib. drain. area	= 5.740 ac



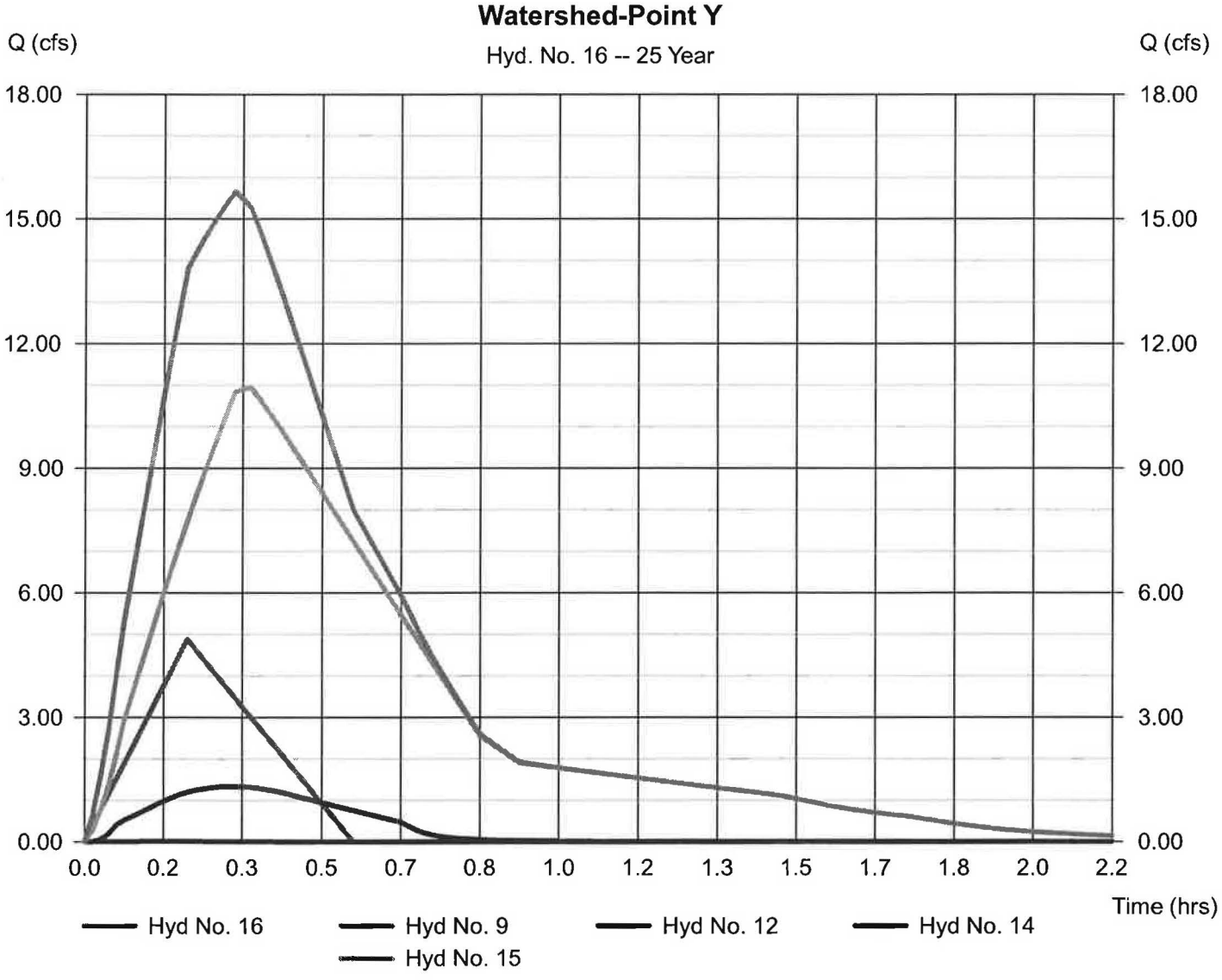
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 16

Watershed-Point Y

Hydrograph type	= Combine	Peak discharge	= 15.65 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 31,887 cuft
Inflow hyds.	= 9, 12, 14, 15	Contrib. drain. area	= 3.510 ac



Hydrograph Report

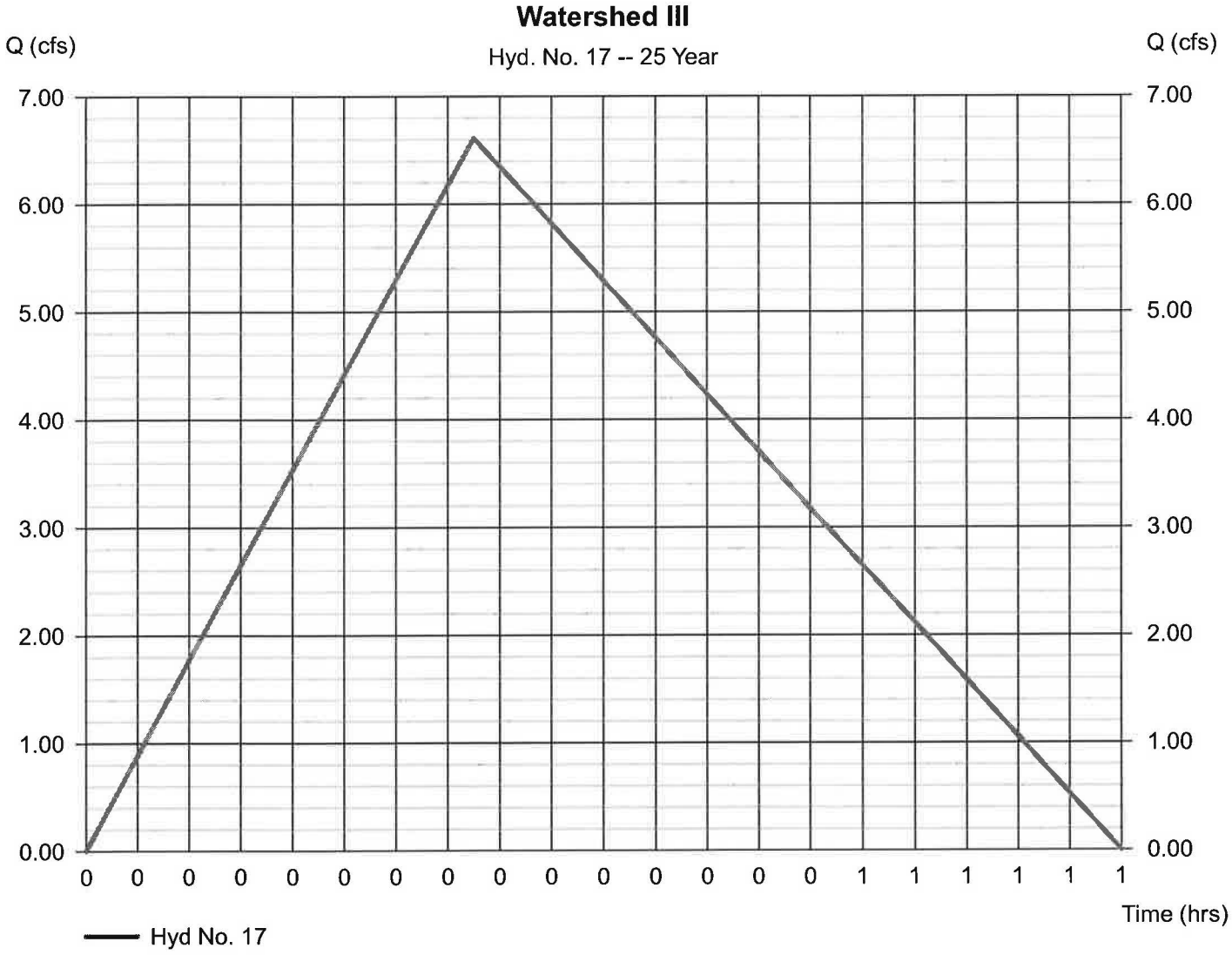
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 17

Watershed III

Hydrograph type	= Rational	Peak discharge	= 6.614 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.25 hrs
Time interval	= 1 min	Hyd. volume	= 7,947 cuft
Drainage area	= 2.700 ac	Runoff coeff.	= 0.52*
Intensity	= 4.711 in/hr	Tc by TR55	= 15.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.000 x 0.90) + (1.700 x 0.30)] / 2.700



Hydrograph Report

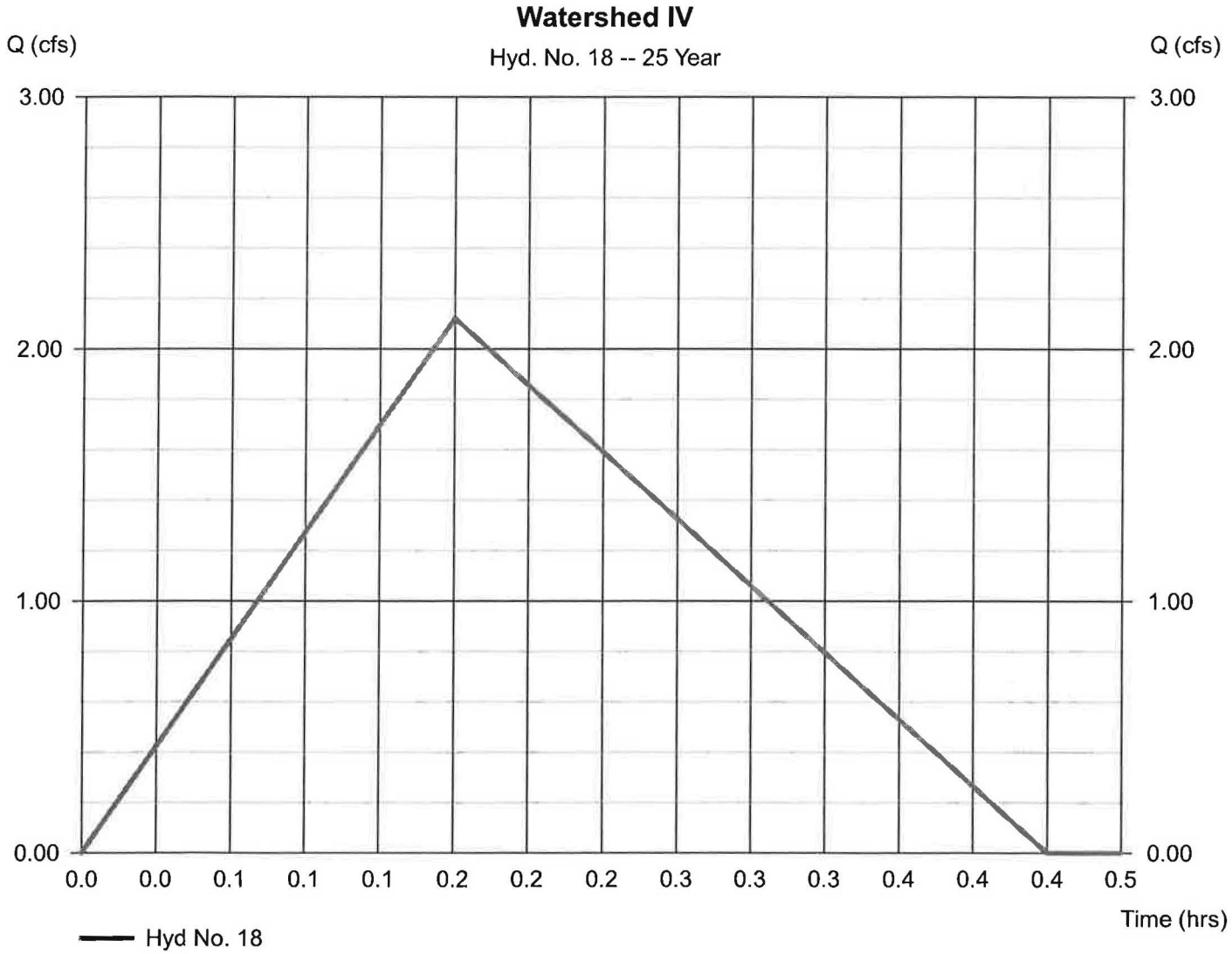
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 18

Watershed IV

Hydrograph type	= Rational	Peak discharge	= 2.121 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 1,699 cuft
Drainage area	= 0.800 ac	Runoff coeff.	= 0.48*
Intensity	= 5.522 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.260 x 0.90) + (0.440 x 0.30) + (0.100 x 0.20)] / 0.800



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 19

Watershed IVA

Hydrograph type	= Rational	Peak discharge	= 9.816 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 7,863 cuft
Drainage area	= 2.370 ac	Runoff coeff.	= 0.75*
Intensity	= 5.522 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.770 x 0.90) + (0.600 x 0.30)] / 2.370

Hydrograph Report

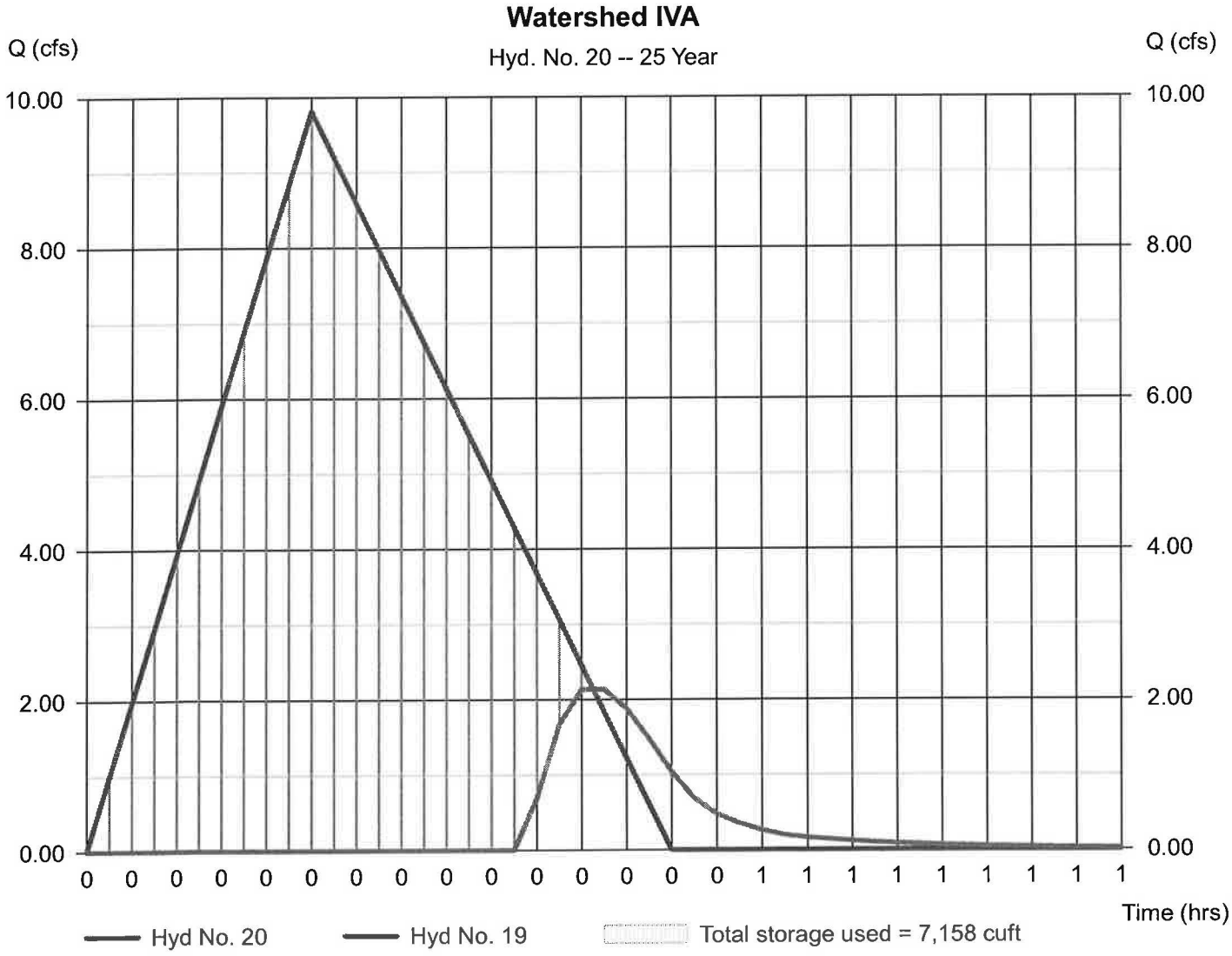
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 20

Watershed IVA

Hydrograph type	= Reservoir	Peak discharge	= 2.136 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.38 hrs
Time interval	= 1 min	Hyd. volume	= 842 cuft
Inflow hyd. No.	= 19 - Watershed IVA	Max. Elevation	= 553.76 ft
Reservoir name	= Watershed IVA	Max. Storage	= 7,158 cuft

Storage Indication method used.



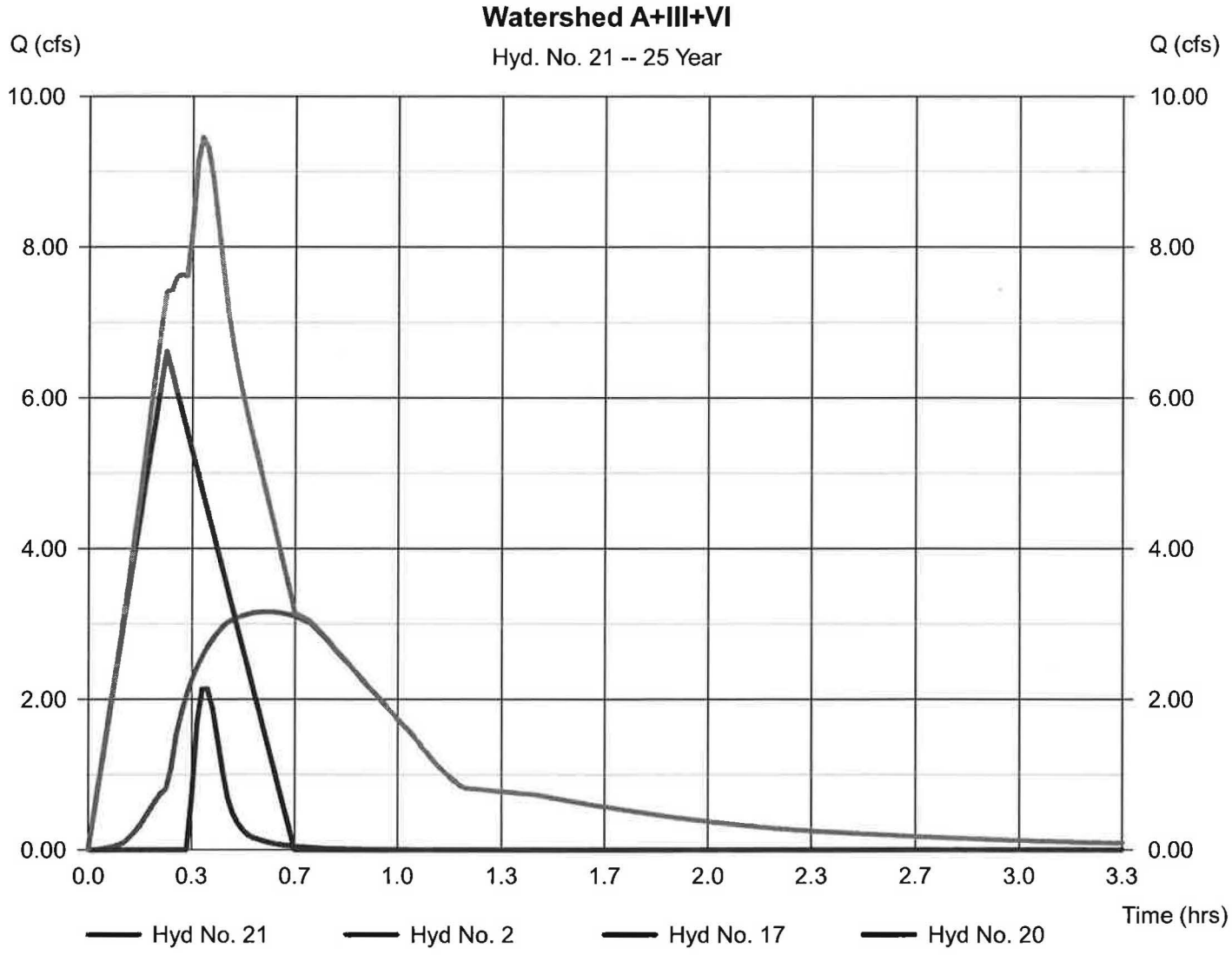
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 21

Watershed A+III+VI

Hydrograph type	= Combine	Peak discharge	= 9.452 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.37 hrs
Time interval	= 1 min	Hyd. volume	= 20,297 cuft
Inflow hyds.	= 2, 17, 20	Contrib. drain. area	= 2.700 ac



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 22

Watershed VI

Hydrograph type	= Rational	Peak discharge	= 3.785 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 3,032 cuft
Drainage area	= 1.490 ac	Runoff coeff.	= 0.46*
Intensity	= 5.522 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.400 x 0.90) + (1.090 x 0.30)] / 1.490

Hydrograph Report

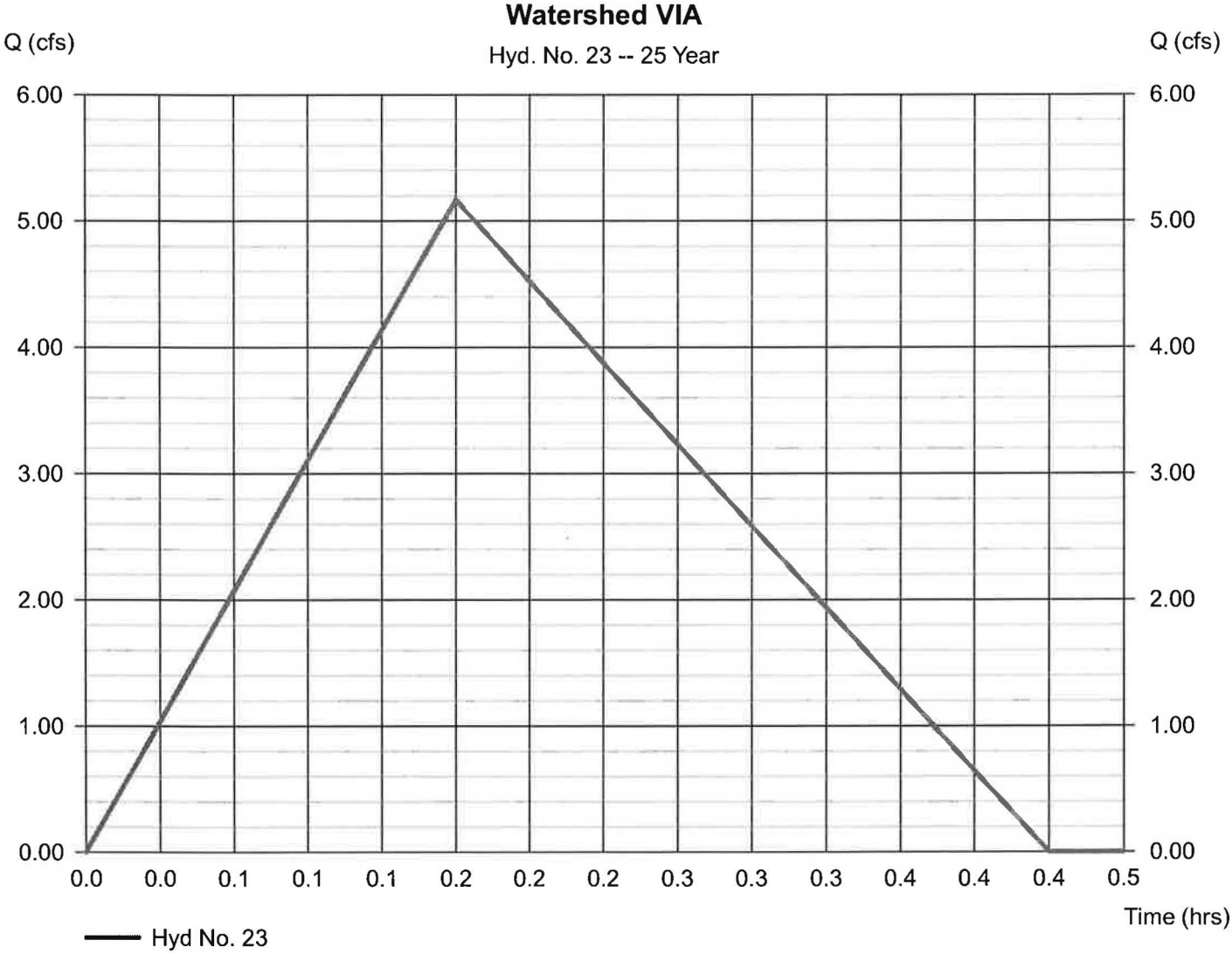
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 23

Watershed VIA

Hydrograph type	= Rational	Peak discharge	= 5.169 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 4,140 cuft
Drainage area	= 1.170 ac	Runoff coeff.	= 0.8*
Intensity	= 5.522 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.970 x 0.90) + (0.200 x 0.30)] / 1.170



Hydrograph Report

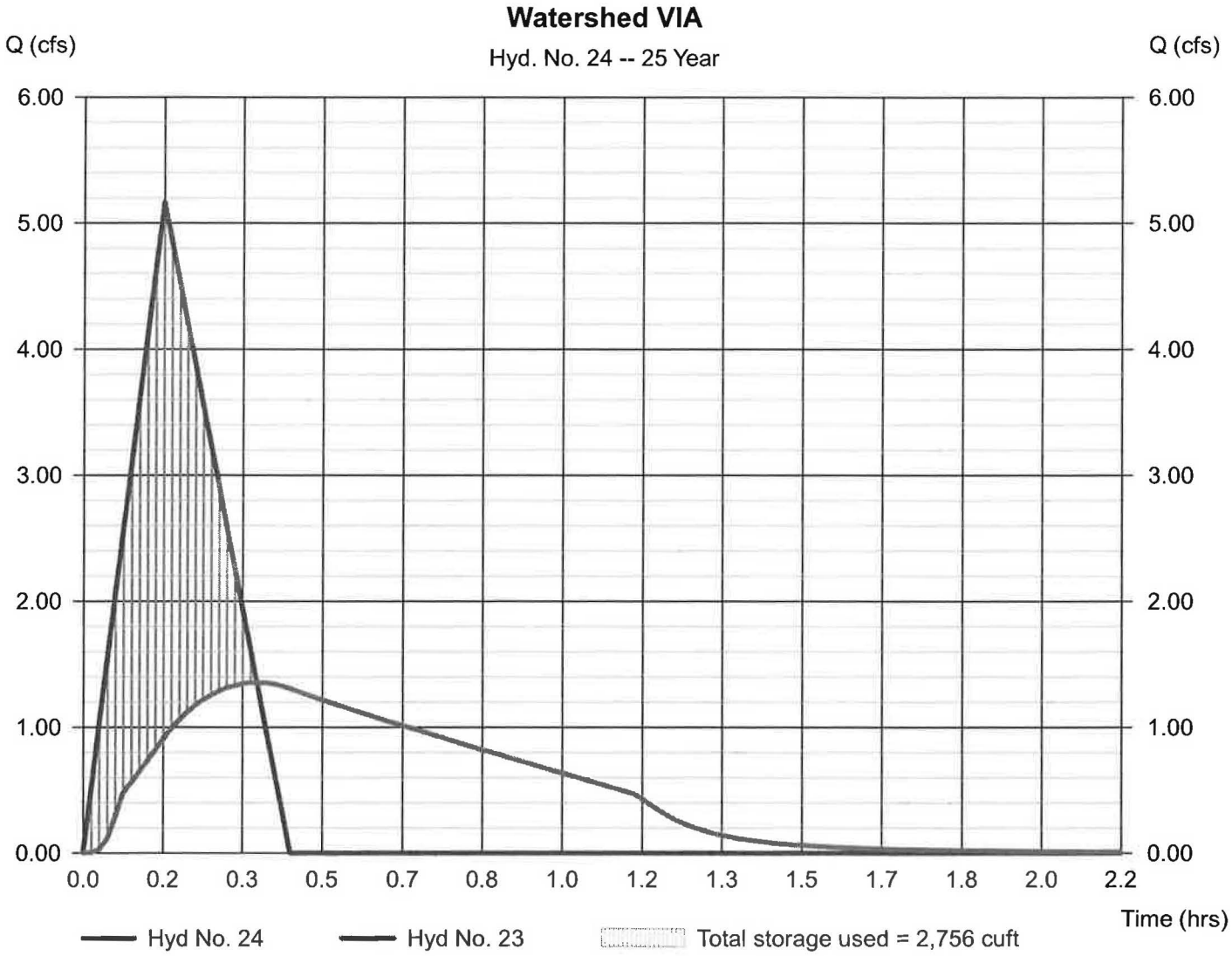
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 24

Watershed VIA

Hydrograph type	= Reservoir	Peak discharge	= 1.354 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.37 hrs
Time interval	= 1 min	Hyd. volume	= 4,027 cuft
Inflow hyd. No.	= 23 - Watershed VIA	Max. Elevation	= 550.80 ft
Reservoir name	= Watershed VIA	Max. Storage	= 2,756 cuft

Storage Indication method used.



Hydrograph Report

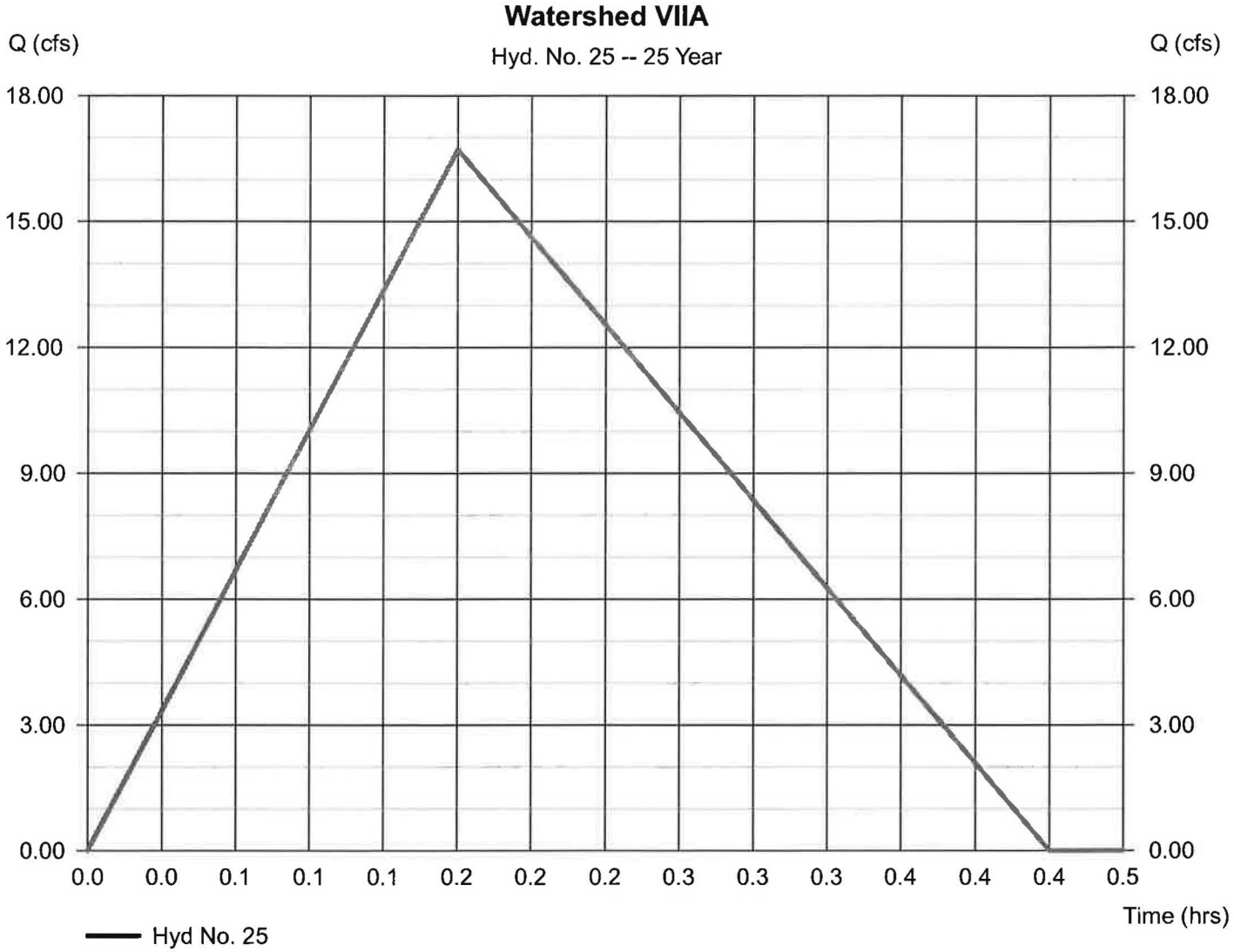
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 25

Watershed VIIA

Hydrograph type	= Rational	Peak discharge	= 16.71 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 13,388 cuft
Drainage area	= 4.090 ac	Runoff coeff.	= 0.74*
Intensity	= 5.522 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(3.020 x 0.90) + (1.070 x 0.30)] / 4.090



Hydrograph Report

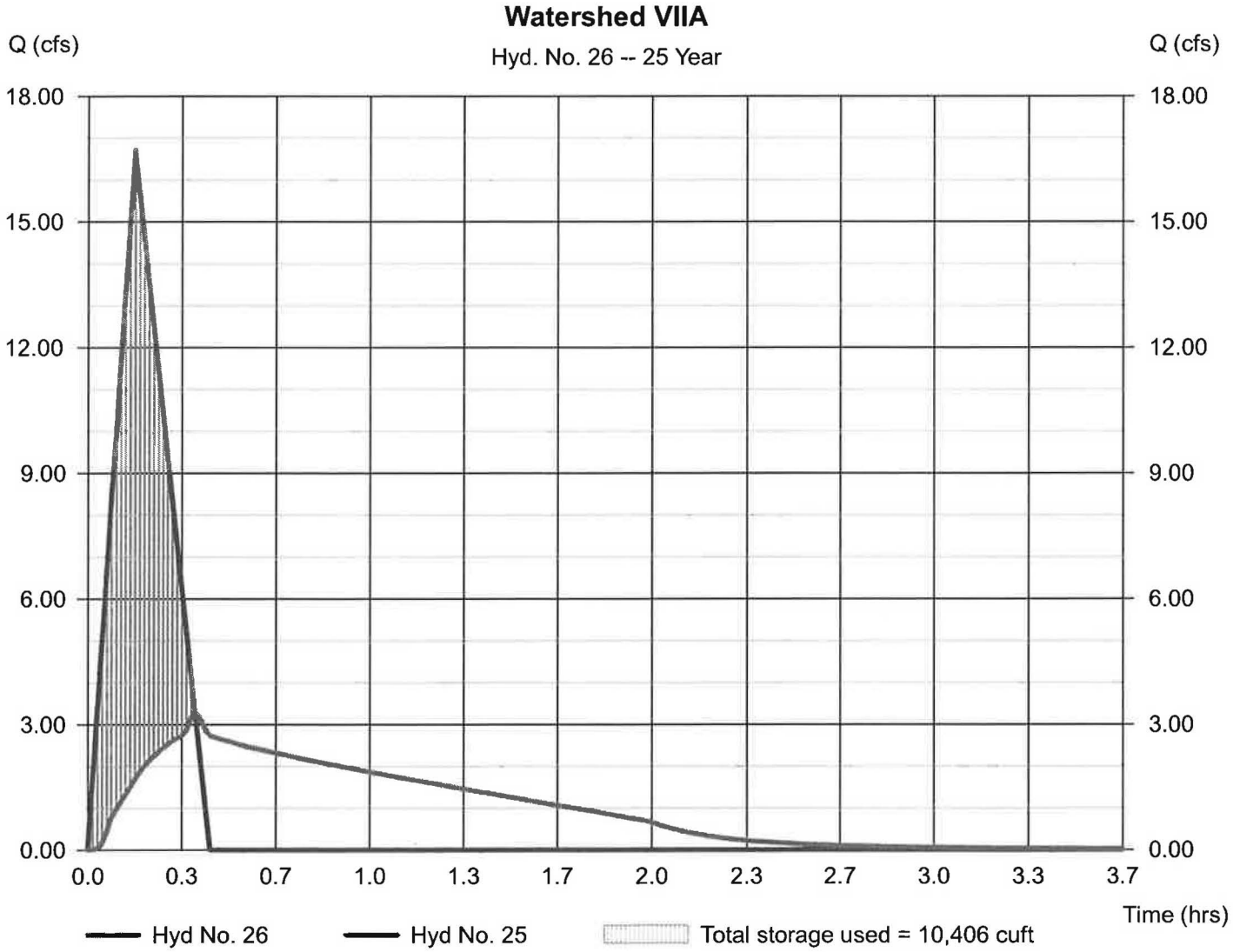
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 26

Watershed VIIA

Hydrograph type	= Reservoir	Peak discharge	= 3.257 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.38 hrs
Time interval	= 1 min	Hyd. volume	= 13,026 cuft
Inflow hyd. No.	= 25 - Watershed VIIA	Max. Elevation	= 547.59 ft
Reservoir name	= Watershed VIIA	Max. Storage	= 10,406 cuft

Storage Indication method used.



Hydrograph Report

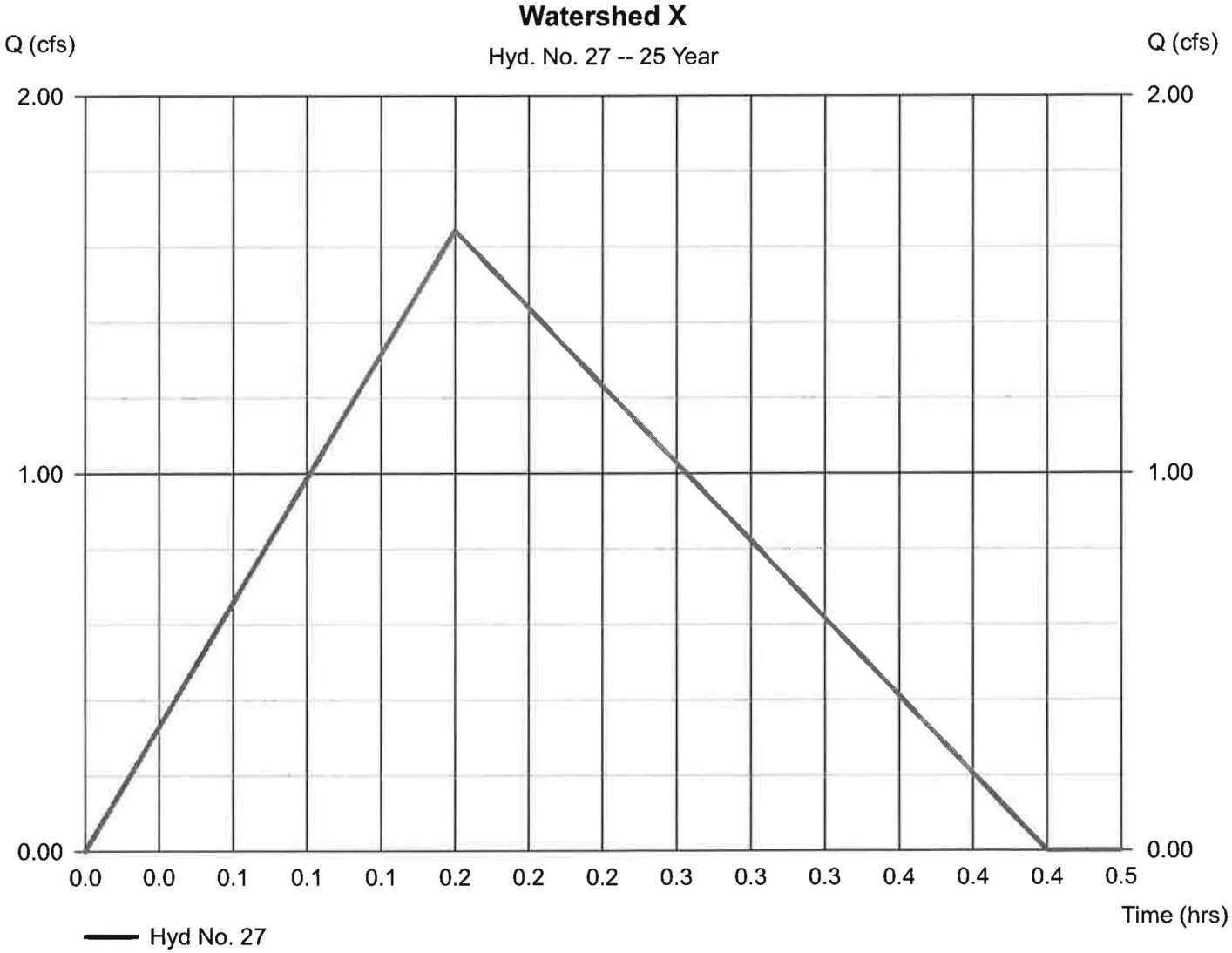
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 27

Watershed X

Hydrograph type	= Rational	Peak discharge	= 1.643 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 1,316 cuft
Drainage area	= 0.930 ac	Runoff coeff.	= 0.32*
Intensity	= 5.522 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.100 x 0.90) + (0.410 x 0.30) + (0.420 x 0.20)] / 0.930



Hydrograph Report

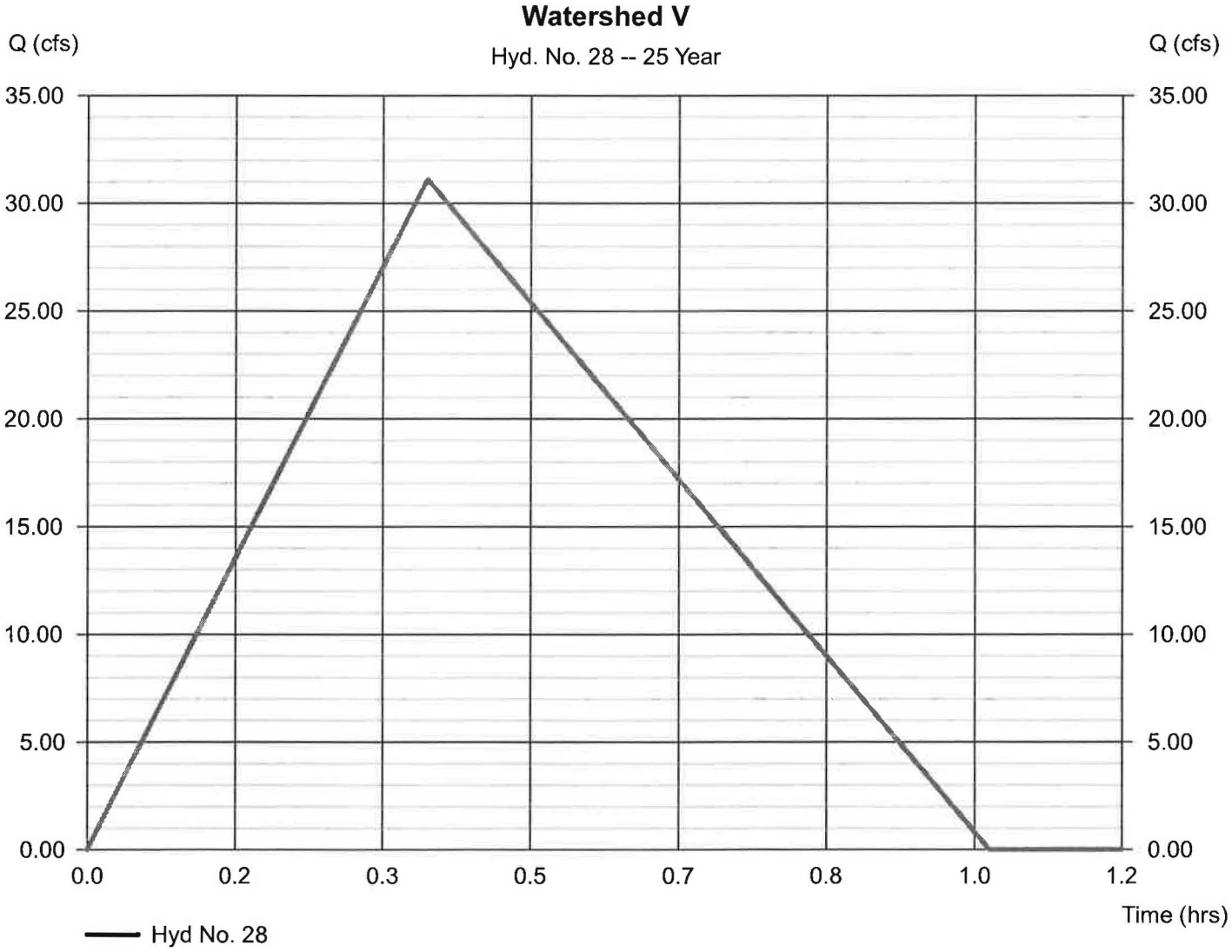
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 28

Watershed V

Hydrograph type	= Rational	Peak discharge	= 31.10 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.38 hrs
Time interval	= 1 min	Hyd. volume	= 57,301 cuft
Drainage area	= 26.200 ac	Runoff coeff.	= 0.31*
Intensity	= 3.829 in/hr	Tc by TR55	= 23.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(2.500 x 0.90) + (10.640 x 0.30) + (13.060 x 0.20)] / 26.200



Hydrograph Report

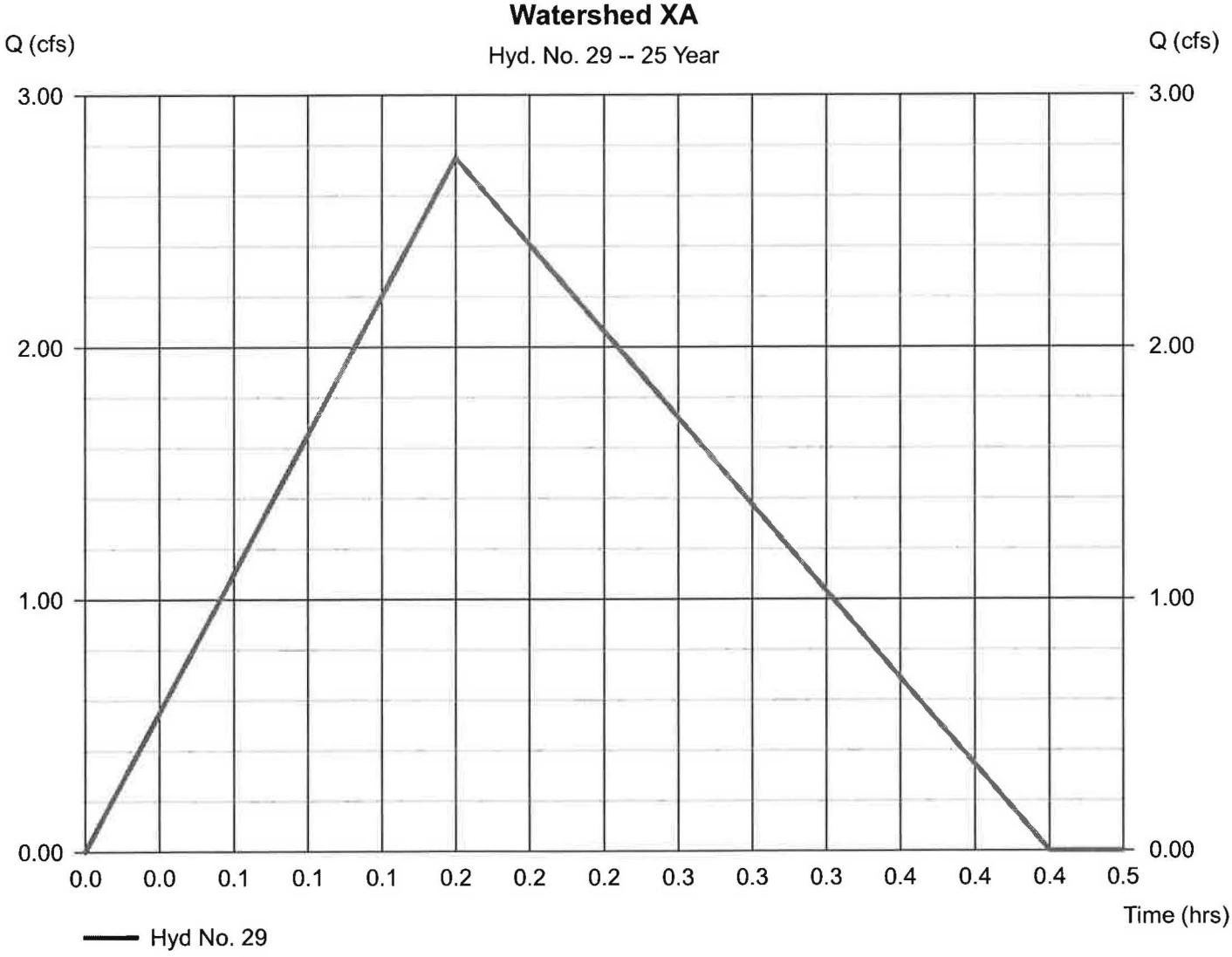
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 29

Watershed XA

Hydrograph type	= Rational	Peak discharge	= 2.751 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 2,204 cuft
Drainage area	= 0.940 ac	Runoff coeff.	= 0.53*
Intensity	= 5.522 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.390 x 0.90) + (0.350 x 0.30) + (0.200 x 0.20)] / 0.940



Hydrograph Report

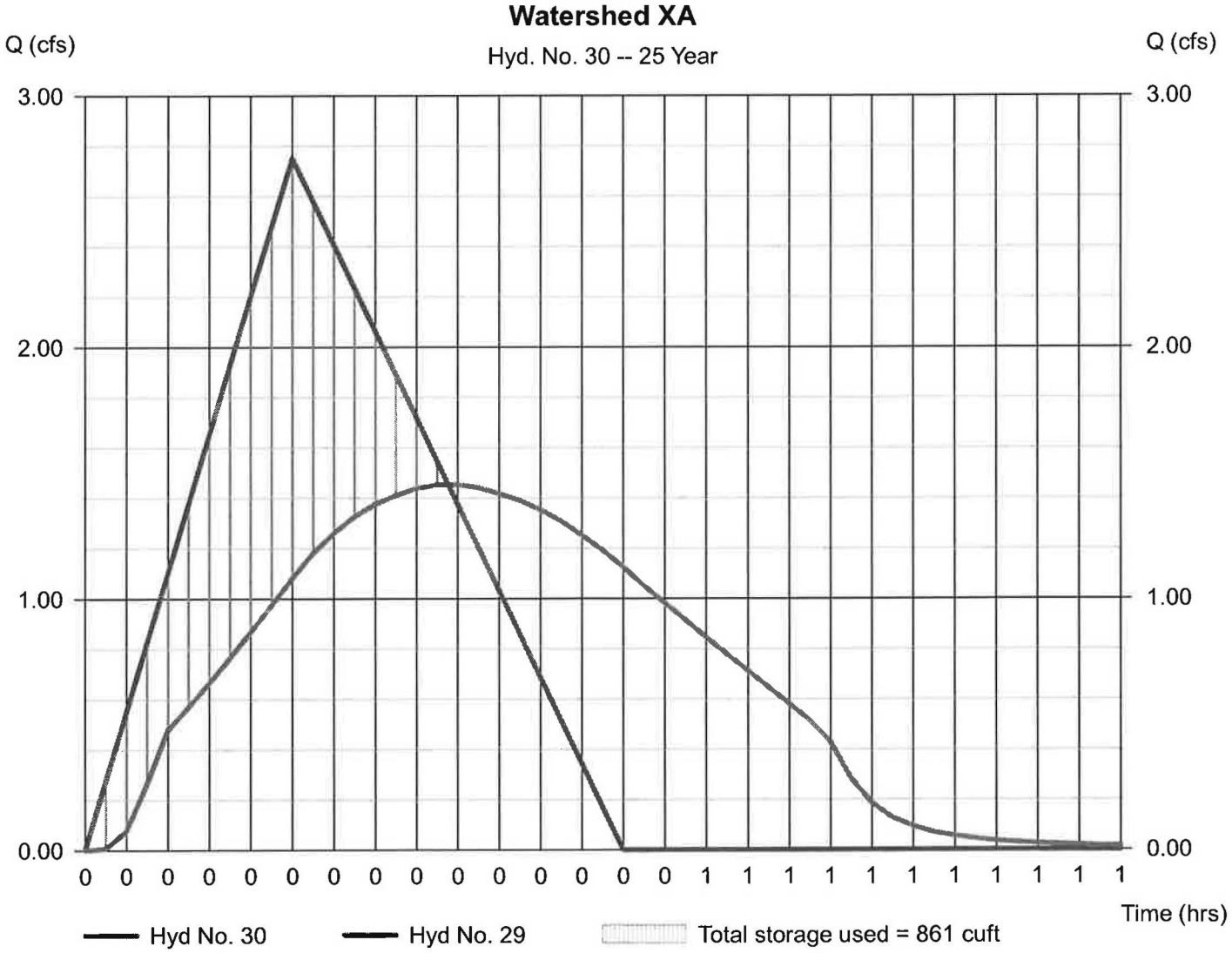
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 30

Watershed XA

Hydrograph type	= Reservoir	Peak discharge	= 1.453 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.30 hrs
Time interval	= 1 min	Hyd. volume	= 2,145 cuft
Inflow hyd. No.	= 29 - Watershed XA	Max. Elevation	= 558.12 ft
Reservoir name	= Watershed XA	Max. Storage	= 861 cuft

Storage Indication method used.



Hydrograph Report

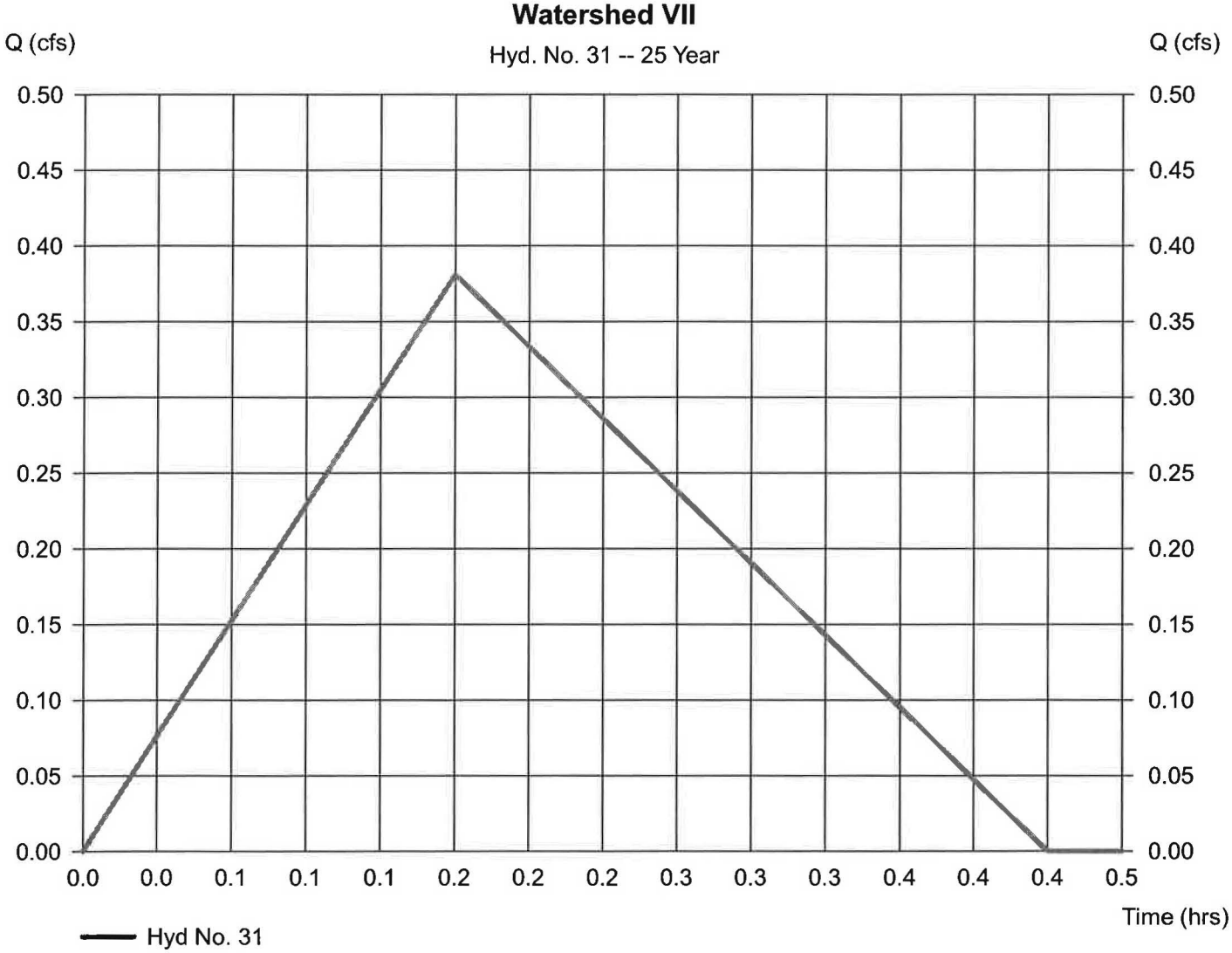
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 31

Watershed VII

Hydrograph type	= Rational	Peak discharge	= 0.381 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 305 cuft
Drainage area	= 0.230 ac	Runoff coeff.	= 0.3*
Intensity	= 5.522 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.230 x 0.30)] / 0.230



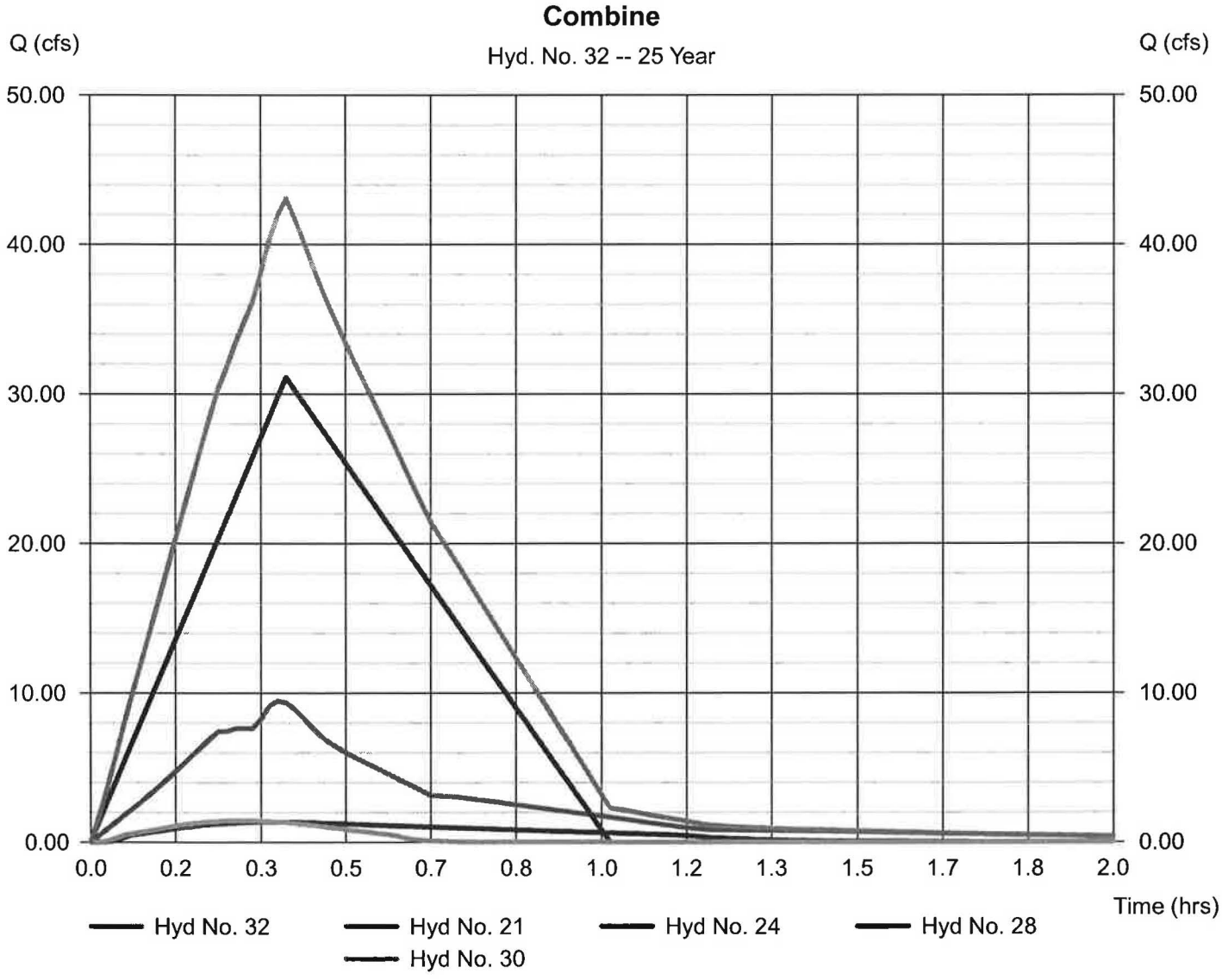
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 32

Combine

Hydrograph type	= Combine	Peak discharge	= 43.08 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.38 hrs
Time interval	= 1 min	Hyd. volume	= 83,387 cuft
Inflow hyds.	= 21, 24, 28, 30	Contrib. drain. area	= 26.200 ac



Hydrograph Report

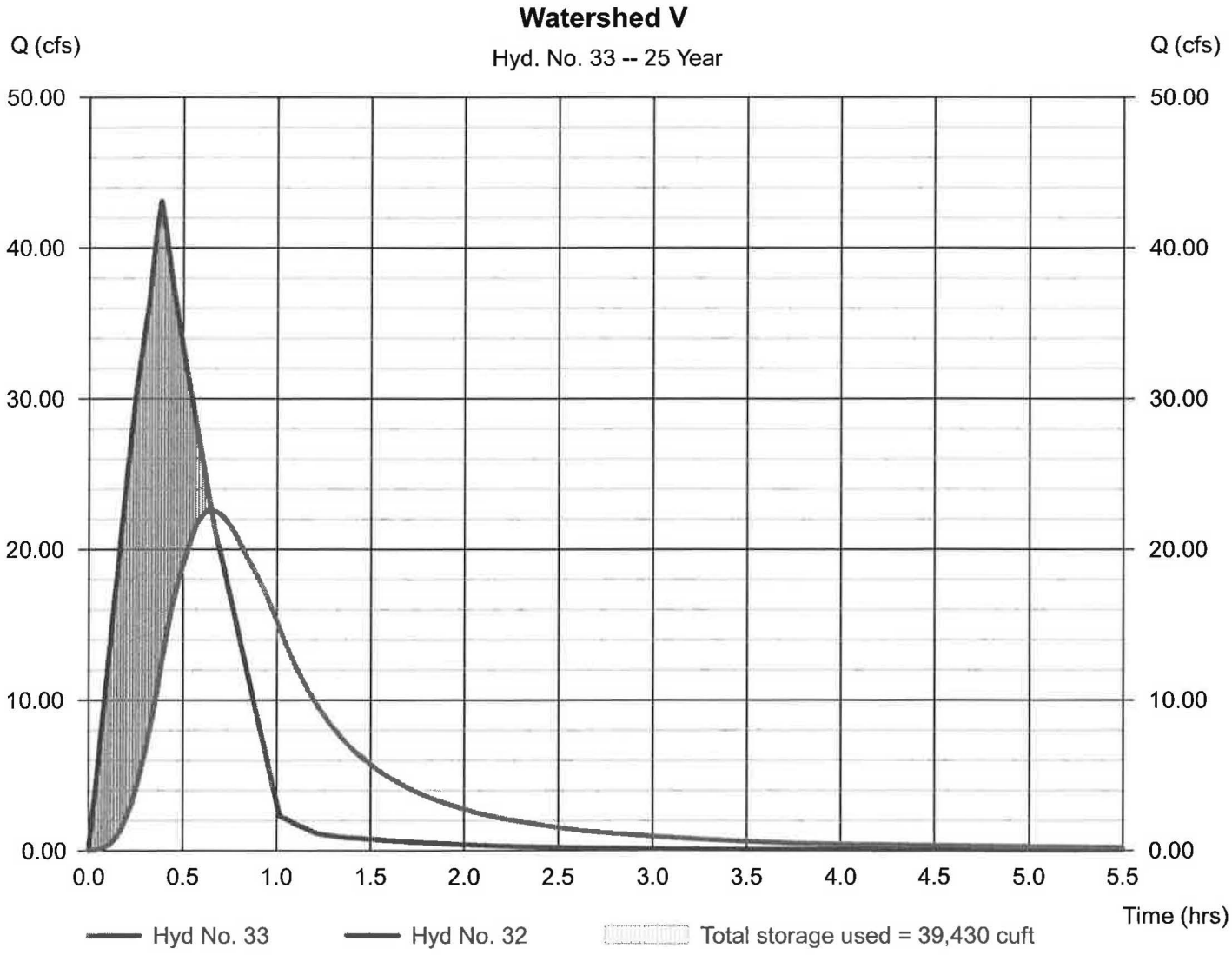
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 33

Watershed V

Hydrograph type	= Reservoir	Peak discharge	= 22.58 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.65 hrs
Time interval	= 1 min	Hyd. volume	= 83,380 cuft
Inflow hyd. No.	= 32 - Combine	Max. Elevation	= 544.29 ft
Reservoir name	= Watershed X	Max. Storage	= 39,430 cuft

Storage Indication method used.



Hydrograph Report

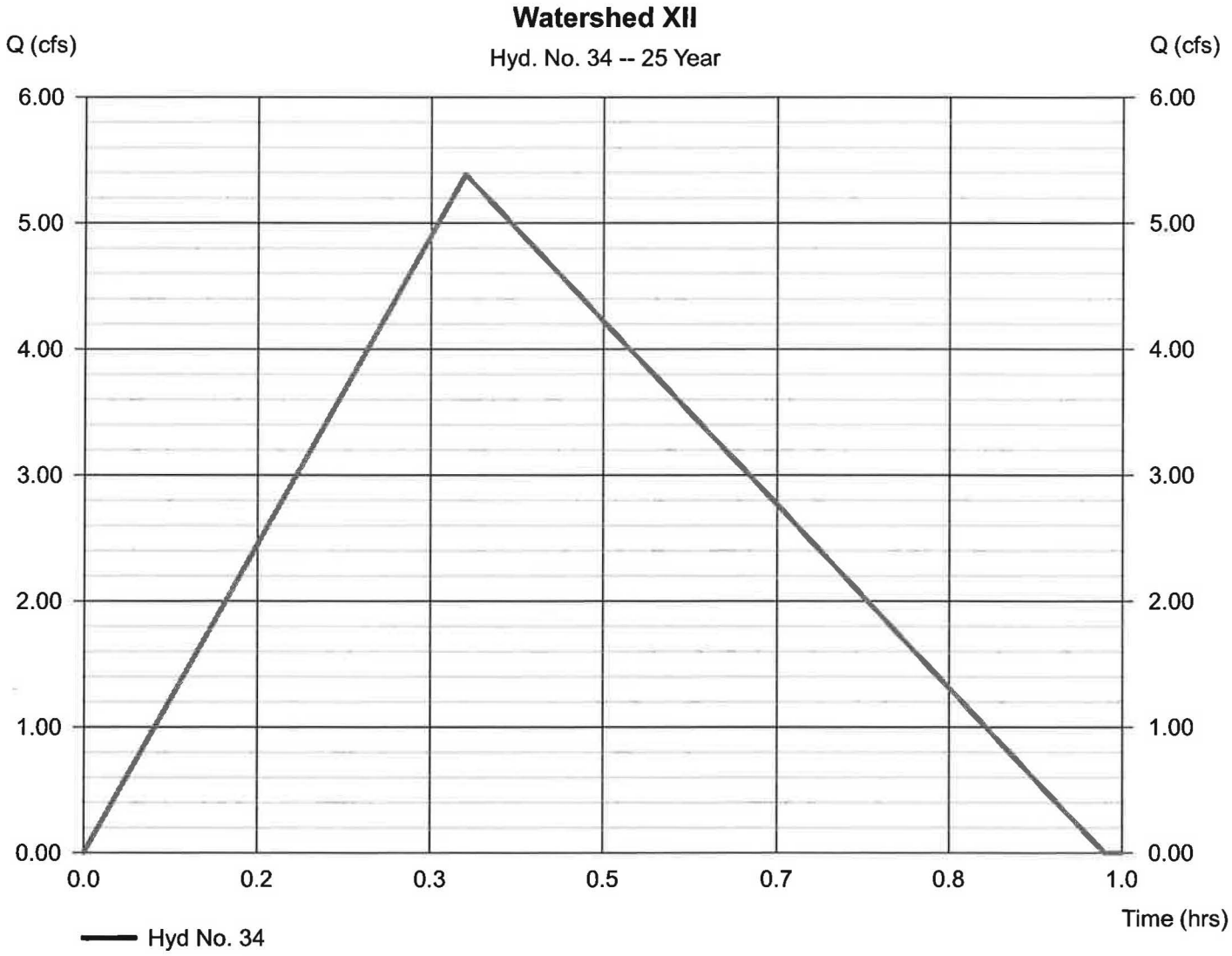
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 34

Watershed XII

Hydrograph type	= Rational	Peak discharge	= 5.386 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.37 hrs
Time interval	= 1 min	Hyd. volume	= 9,692 cuft
Drainage area	= 4.630 ac	Runoff coeff.	= 0.3*
Intensity	= 3.877 in/hr	Tc by TR55	= 22.47 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.490 x 0.90) + (1.430 x 0.30) + (2.710 x 0.20)] / 4.630



Hydrograph Report

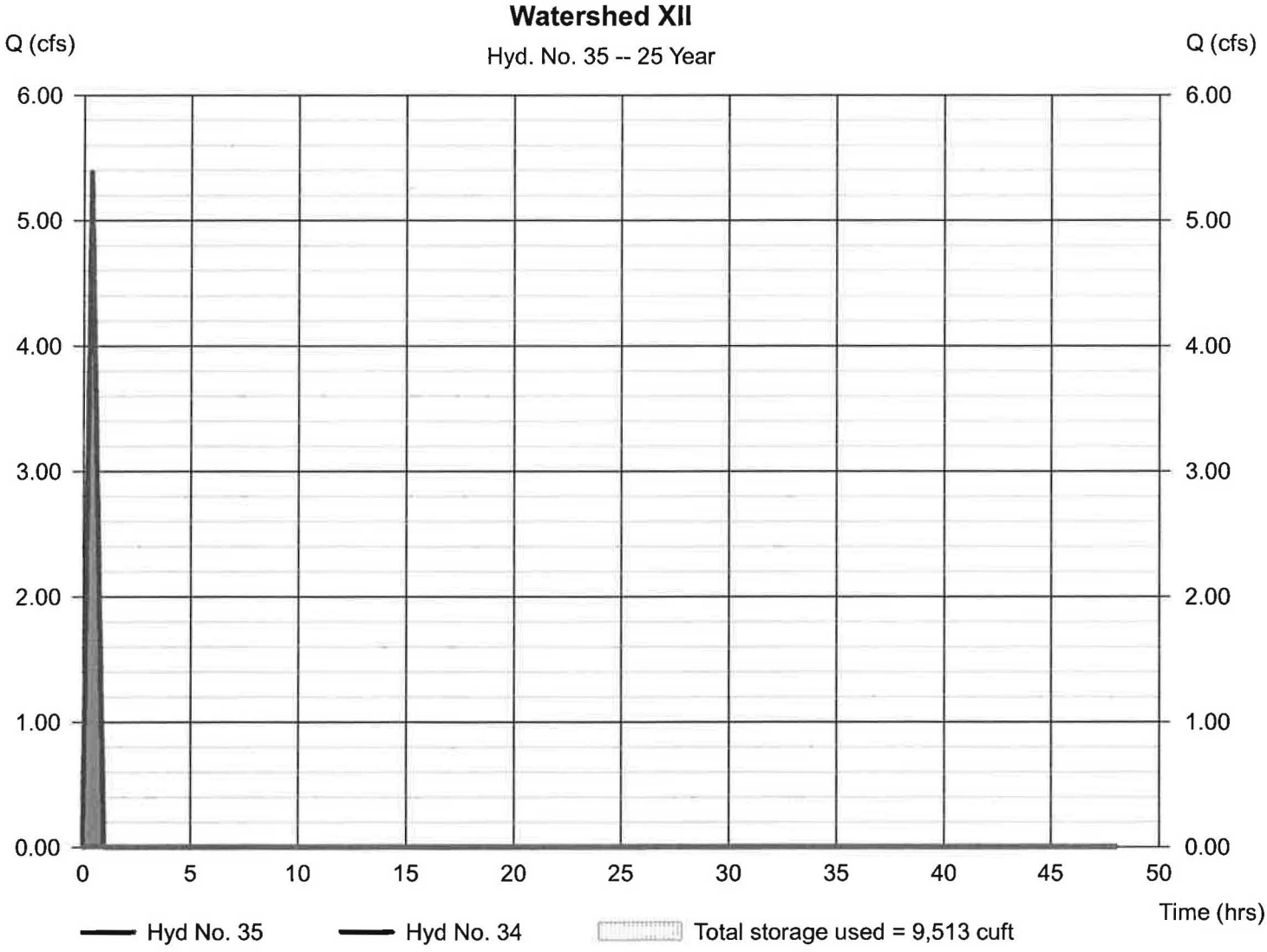
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 35

Watershed XII

Hydrograph type	= Reservoir	Peak discharge	= 0.007 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.98 hrs
Time interval	= 1 min	Hyd. volume	= 1,148 cuft
Inflow hyd. No.	= 34 - Watershed XII	Max. Elevation	= 546.27 ft
Reservoir name	= Watershed XII	Max. Storage	= 9,513 cuft

Storage Indication method used.



Hydrograph Report

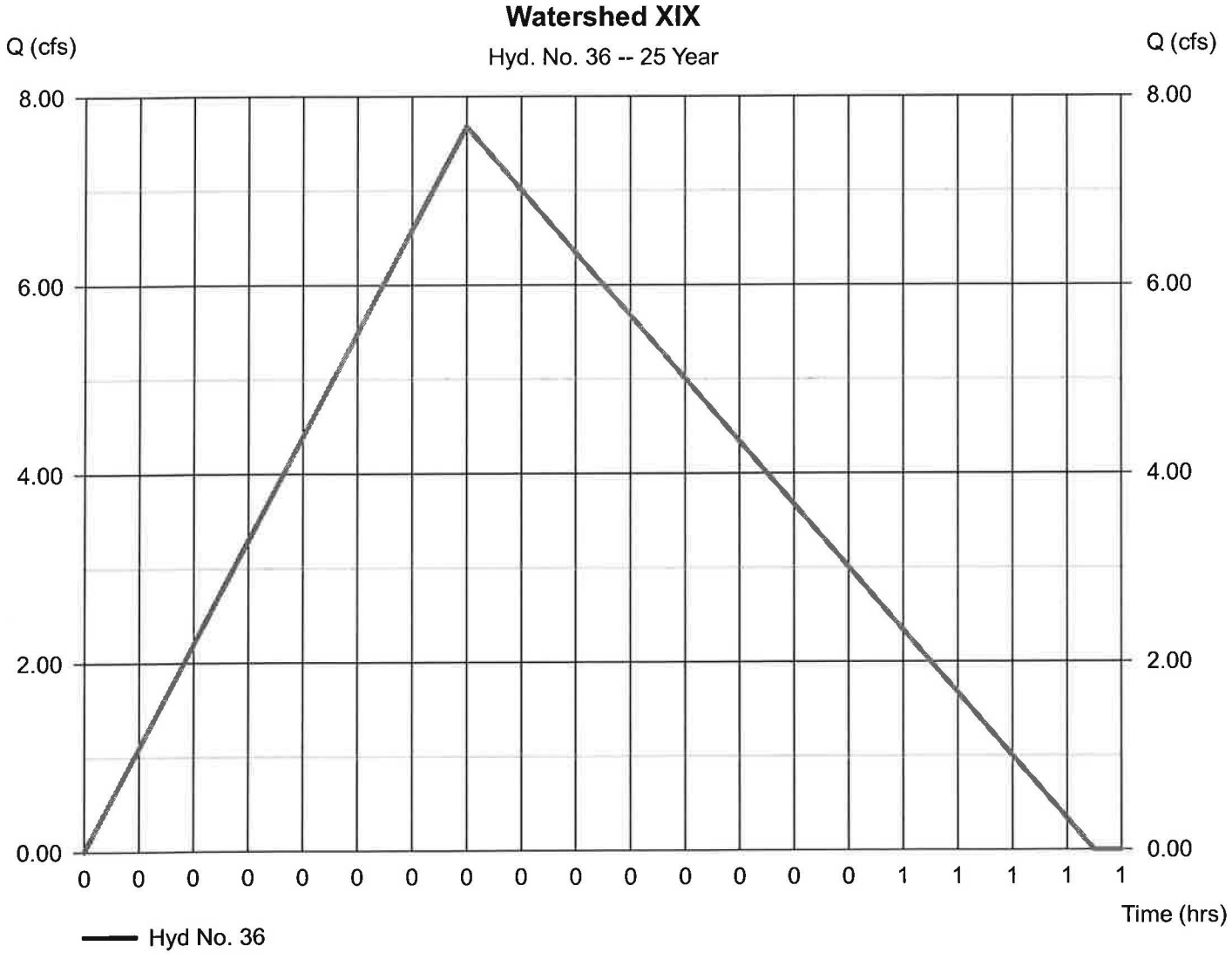
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 36

Watershed XIX

Hydrograph type	= Rational	Peak discharge	= 7.678 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.23 hrs
Time interval	= 1 min	Hyd. volume	= 8,610 cuft
Drainage area	= 5.860 ac	Runoff coeff.	= 0.27*
Intensity	= 4.852 in/hr	Tc by TR55	= 14.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.400 x 0.90) + (1.500 x 0.30) + (3.960 x 0.20)] / 5.860



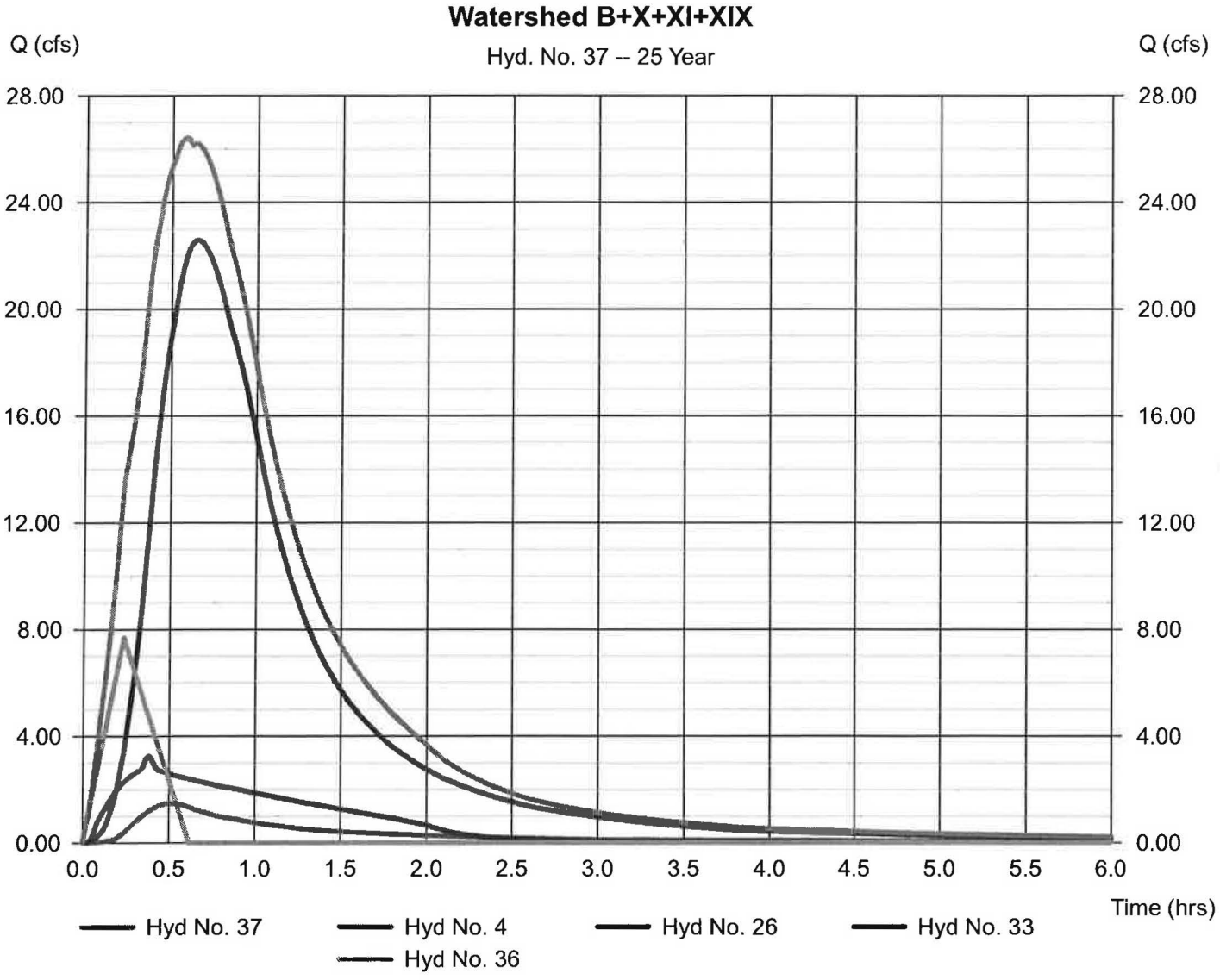
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 37

Watershed B+X+XI+XIX

Hydrograph type	= Combine	Peak discharge	= 26.41 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.58 hrs
Time interval	= 1 min	Hyd. volume	= 111,632 cuft
Inflow hyds.	= 4, 26, 33, 36	Contrib. drain. area	= 5.860 ac



Hydrograph Report

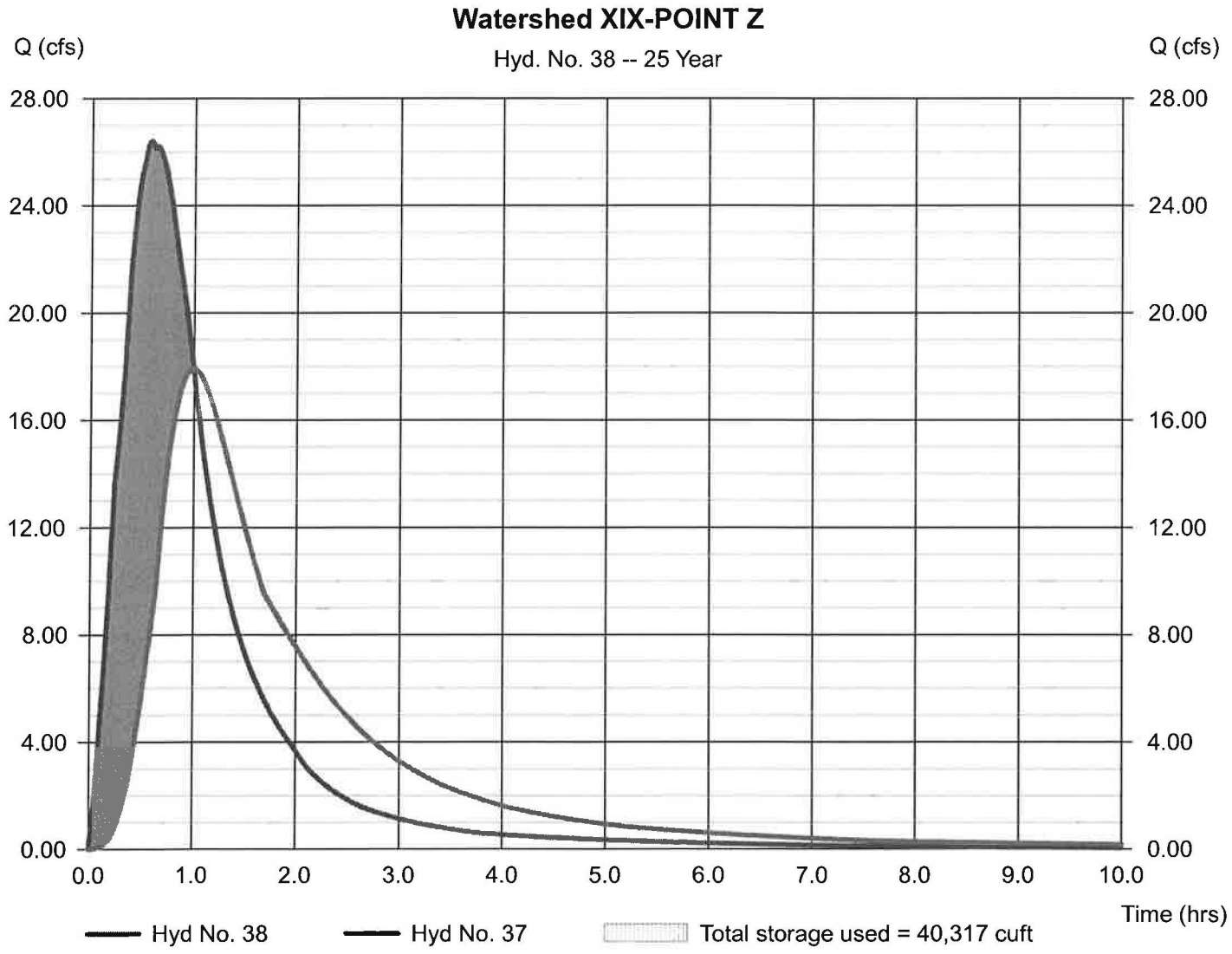
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 38

Watershed XIX-POINT Z

Hydrograph type	= Reservoir	Peak discharge	= 17.92 cfs
Storm frequency	= 25 yrs	Time to peak	= 1.00 hrs
Time interval	= 1 min	Hyd. volume	= 111,622 cuft
Inflow hyd. No.	= 37 - Watershed B+X+XI+XIX	Max. Elevation	= 542.12 ft
Reservoir name	= Watershed XIX	Max. Storage	= 40,317 cuft

Storage Indication method used.



Hydrograph Report

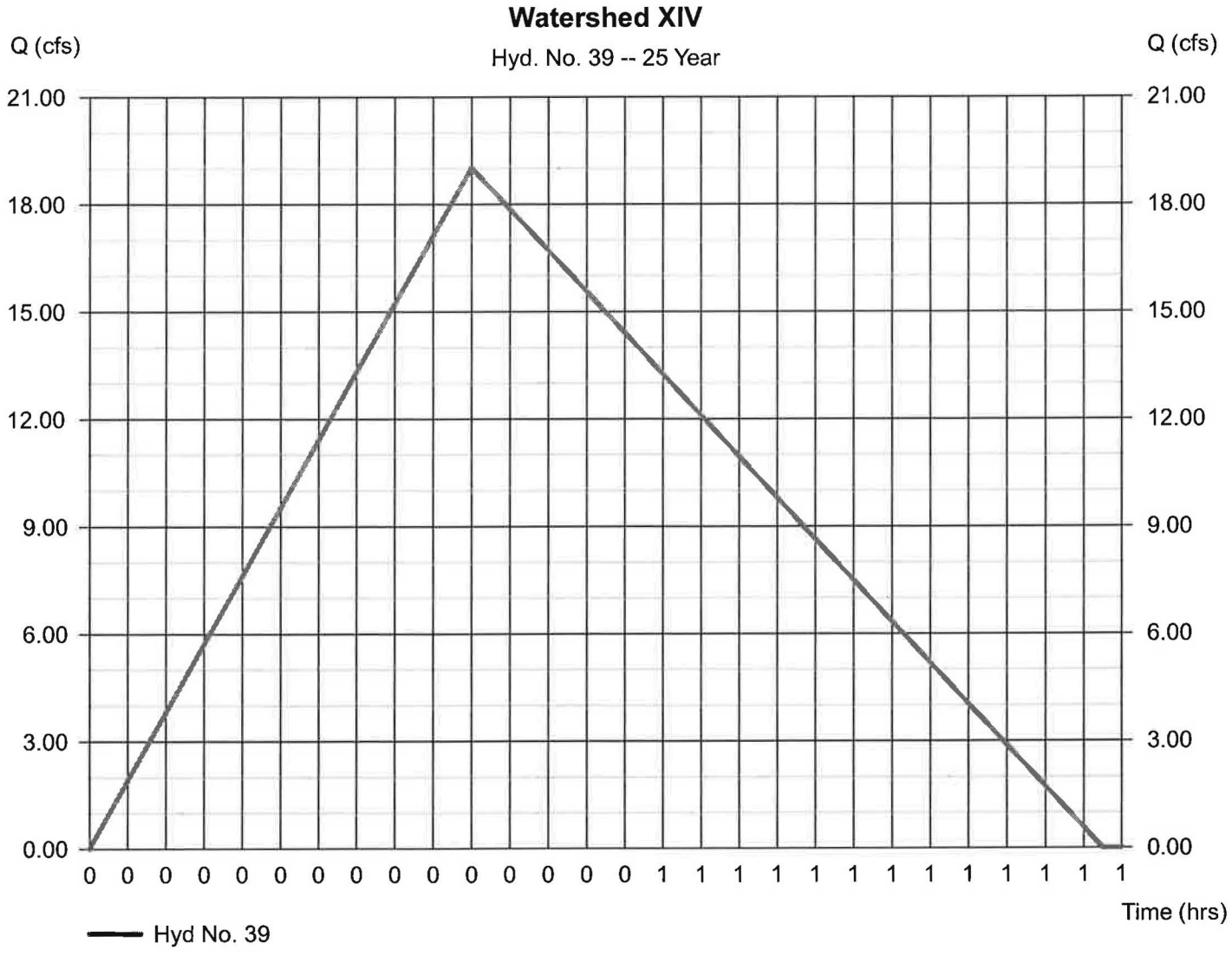
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 39

Watershed XIV

Hydrograph type	= Rational	Peak discharge	= 19.02 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.33 hrs
Time interval	= 1 min	Hyd. volume	= 30,465 cuft
Drainage area	= 15.400 ac	Runoff coeff.	= 0.3*
Intensity	= 4.116 in/hr	Tc by TR55	= 20.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.000 x 0.90) + (5.100 x 0.30) + (8.800 x 0.20) + (0.500 x 1.00)] / 15.400

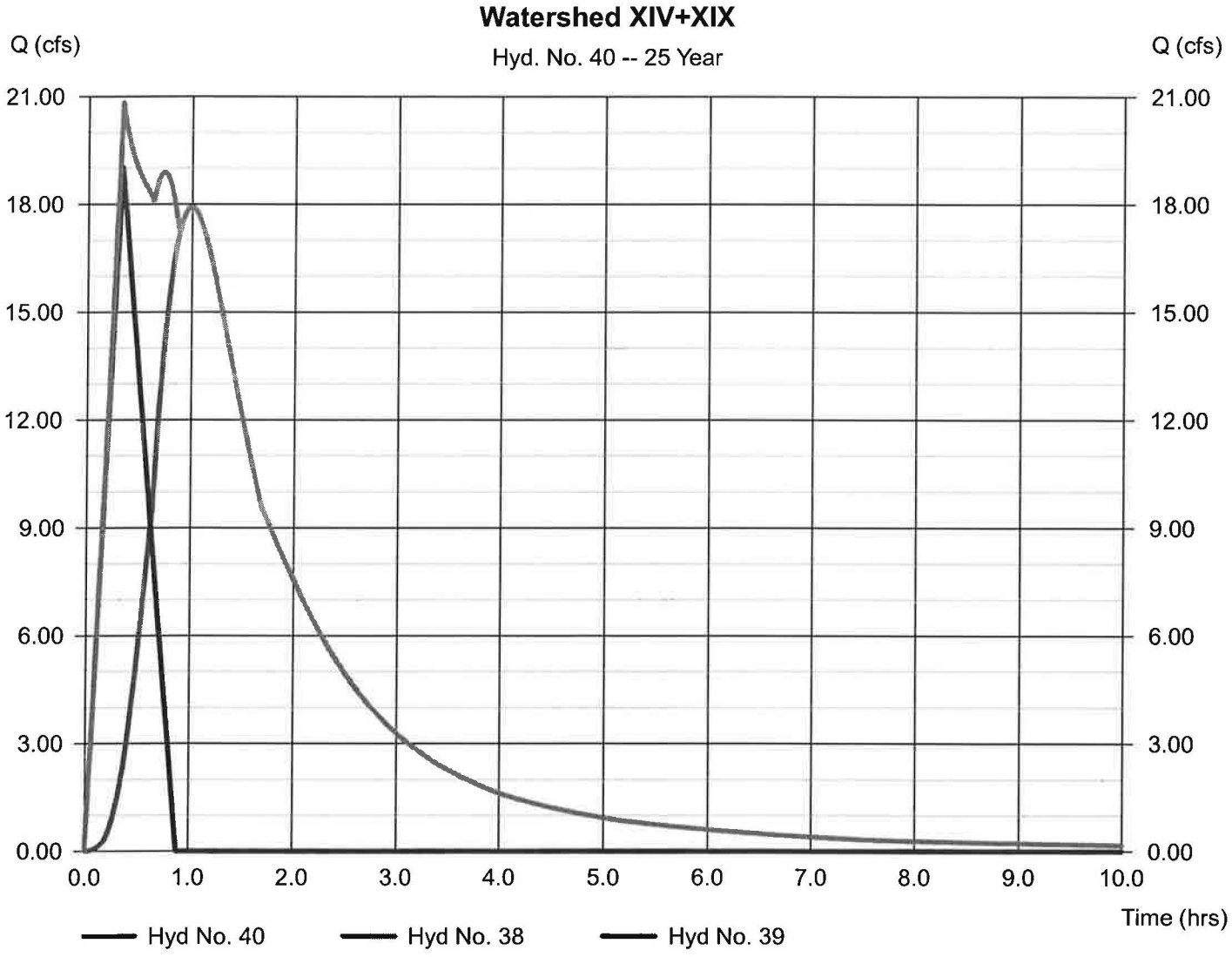


Hydrograph Report

Hyd. No. 40

Watershed XIV+XIX

Hydrograph type	= Combine	Peak discharge	= 20.83 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.33 hrs
Time interval	= 1 min	Hyd. volume	= 141,858 cuft
Inflow hyds.	= 38, 39	Contrib. drain. area	= 15.400 ac



Hydrograph Report

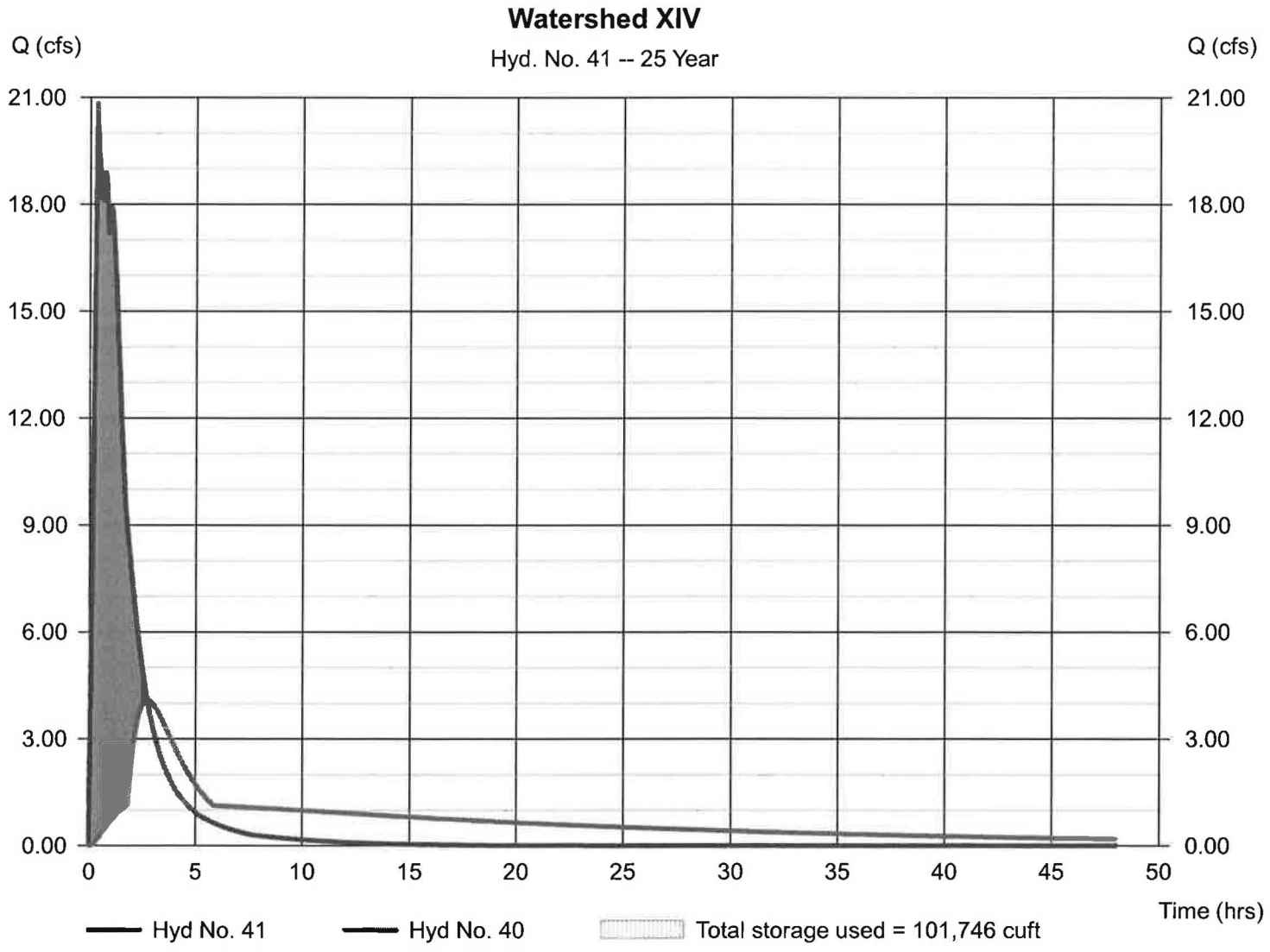
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 41

Watershed XIV

Hydrograph type	= Reservoir	Peak discharge	= 4.079 cfs
Storm frequency	= 25 yrs	Time to peak	= 2.73 hrs
Time interval	= 1 min	Hyd. volume	= 125,499 cuft
Inflow hyd. No.	= 40 - Watershed XIV+XIX	Max. Elevation	= 539.55 ft
Reservoir name	= Watershed XIV	Max. Storage	= 101,746 cuft

Storage Indication method used.



Hydrograph Report

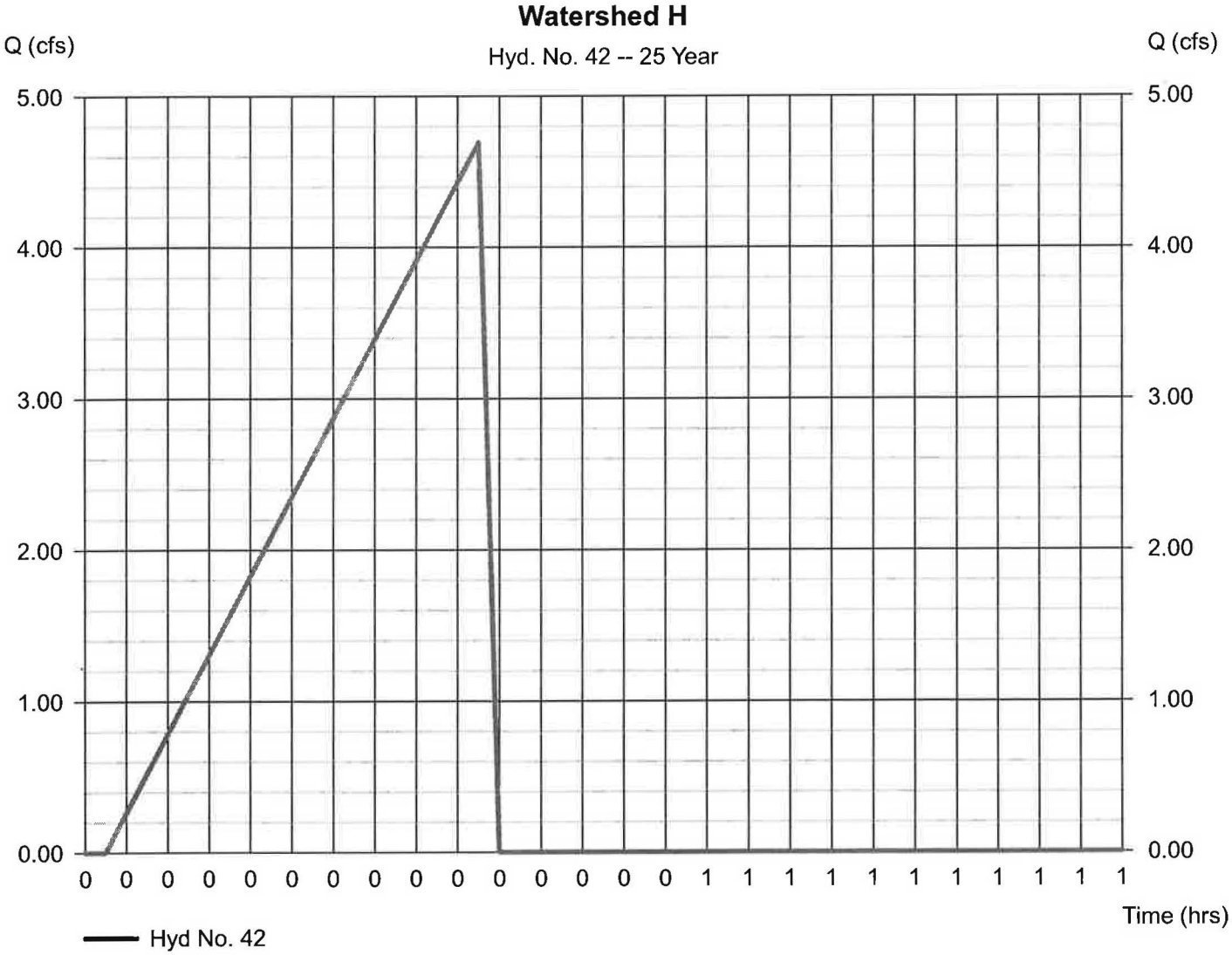
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 42

Watershed H

Hydrograph type	= Rational	Peak discharge	= 4.691 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 7,021 cuft
Drainage area	= 3.800 ac	Runoff coeff.	= 0.29*
Intensity	= 4.257 in/hr	Tc by TR55	= 18.69 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.200 x 0.90) + (0.100 x 0.30) + (2.500 x 0.20) + (0.800 x 0.25) + (0.200 x 1.00)] / 3.800

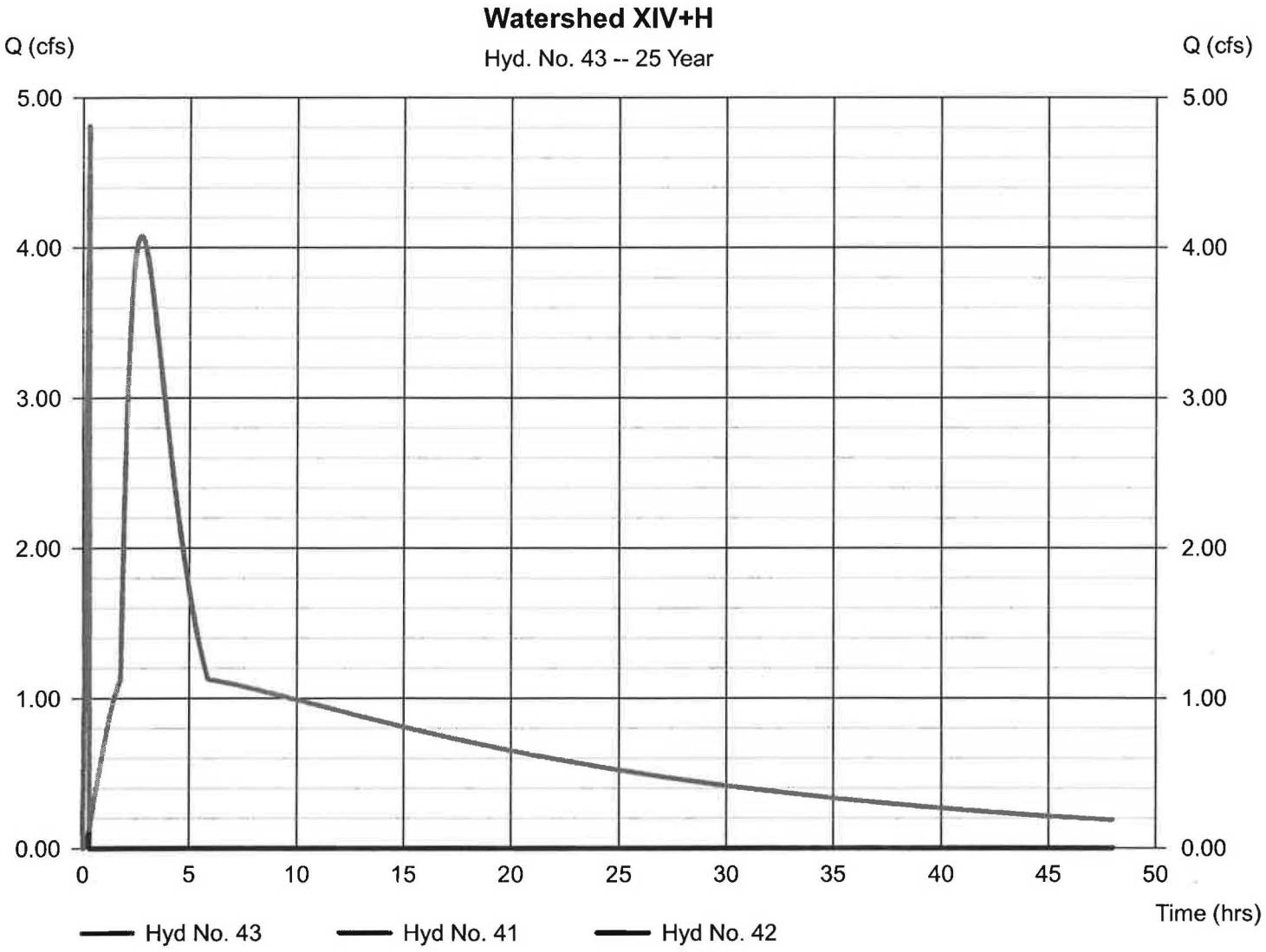


Hydrograph Report

Hyd. No. 43

Watershed XIV+H

Hydrograph type	= Combine	Peak discharge	= 4.810 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 128,172 cuft
Inflow hyds.	= 41, 42	Contrib. drain. area	= 3.800 ac



Hydrograph Report

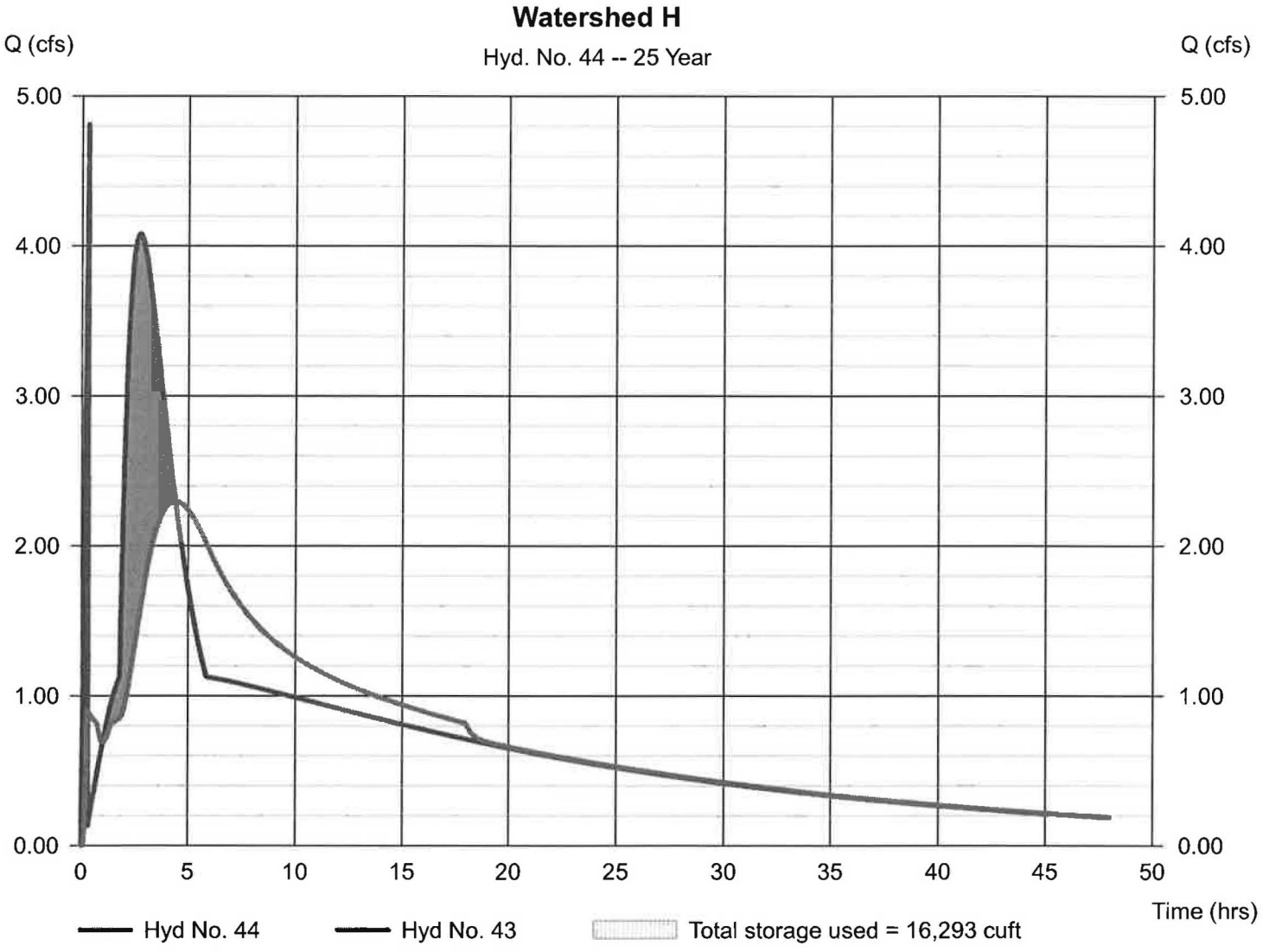
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 44

Watershed H

Hydrograph type	= Reservoir	Peak discharge	= 2.295 cfs
Storm frequency	= 25 yrs	Time to peak	= 4.40 hrs
Time interval	= 1 min	Hyd. volume	= 127,487 cuft
Inflow hyd. No.	= 43 - Watershed XIV+H	Max. Elevation	= 536.47 ft
Reservoir name	= Watershed H	Max. Storage	= 16,293 cuft

Storage Indication method used.



Hydrograph Report

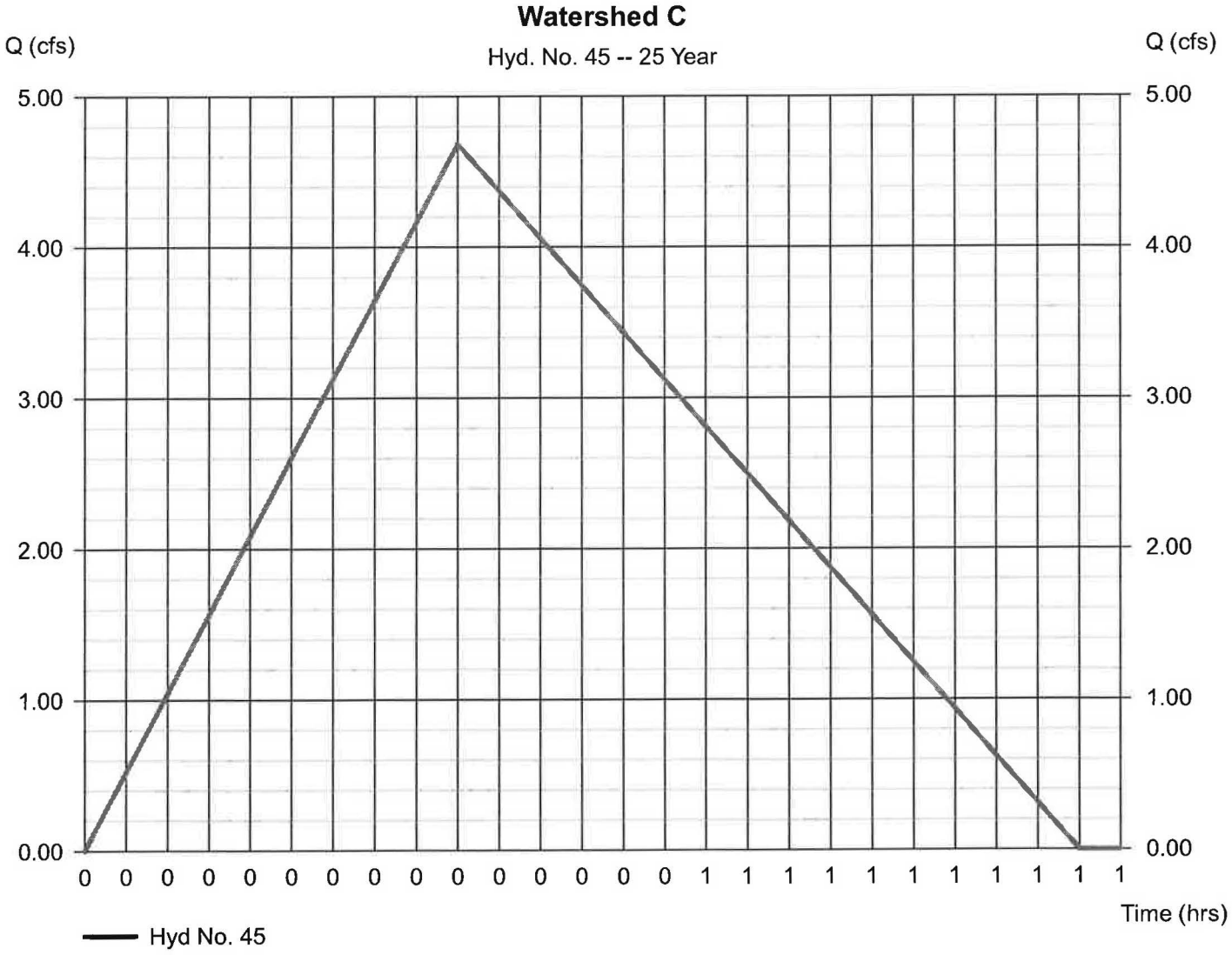
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 45

Watershed C

Hydrograph type	= Rational	Peak discharge	= 4.682 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.30 hrs
Time interval	= 1 min	Hyd. volume	= 6,864 cuft
Drainage area	= 3.300 ac	Runoff coeff.	= 0.33*
Intensity	= 4.300 in/hr	Tc by TR55	= 18.30 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.400 x 0.90) + (1.200 x 0.30) + (1.400 x 0.20) + (0.300 x 0.25)] / 3.300



Hydrograph Report

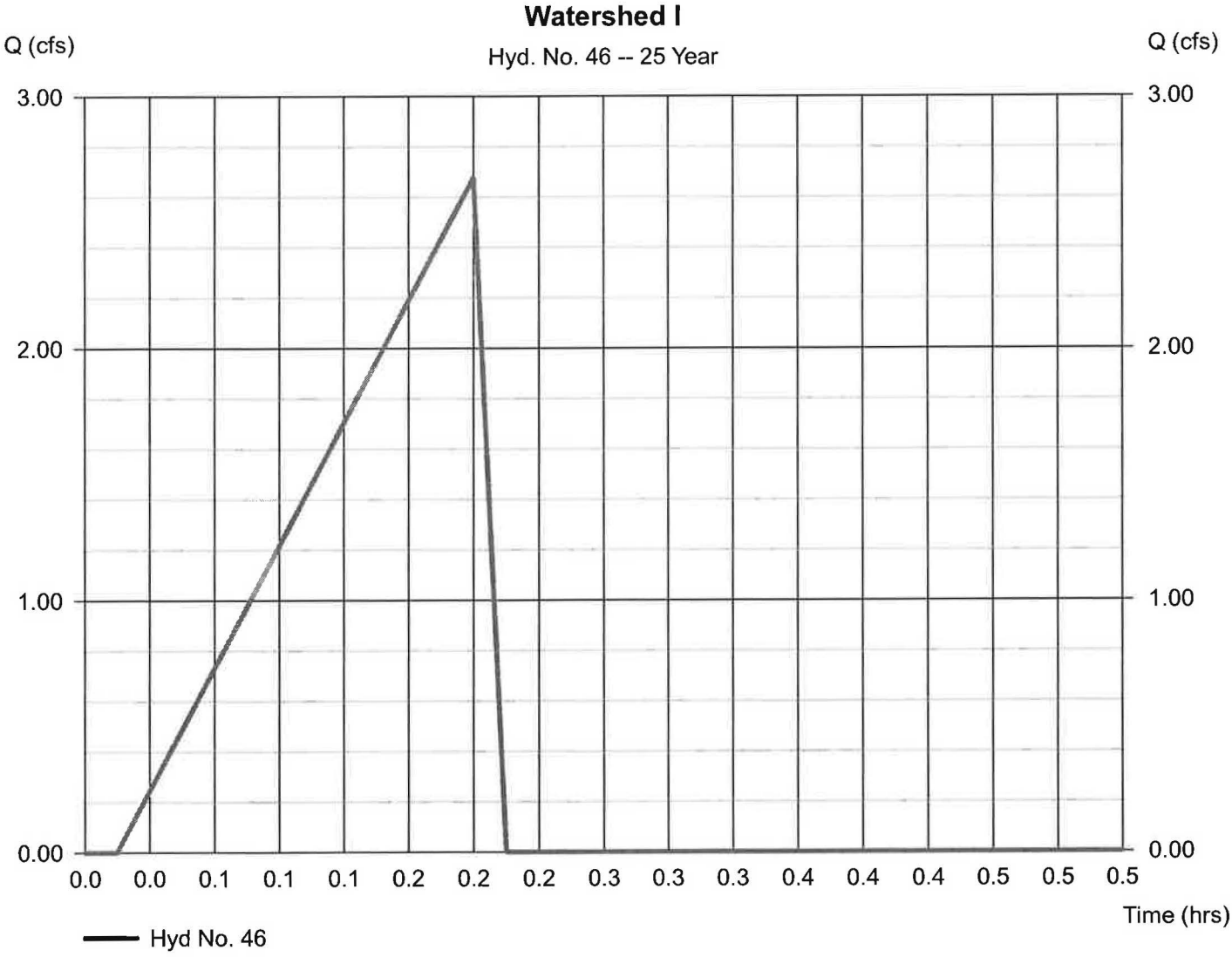
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 46

Watershed I

Hydrograph type	= Rational	Peak discharge	= 2.674 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.20 hrs
Time interval	= 1 min	Hyd. volume	= 2,470 cuft
Drainage area	= 1.500 ac	Runoff coeff.	= 0.34*
Intensity	= 5.244 in/hr	Tc by TR55	= 11.53 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.200 x 0.90) + (0.700 x 0.30) + (0.600 x 0.20)] / 1.500



Hydrograph Report

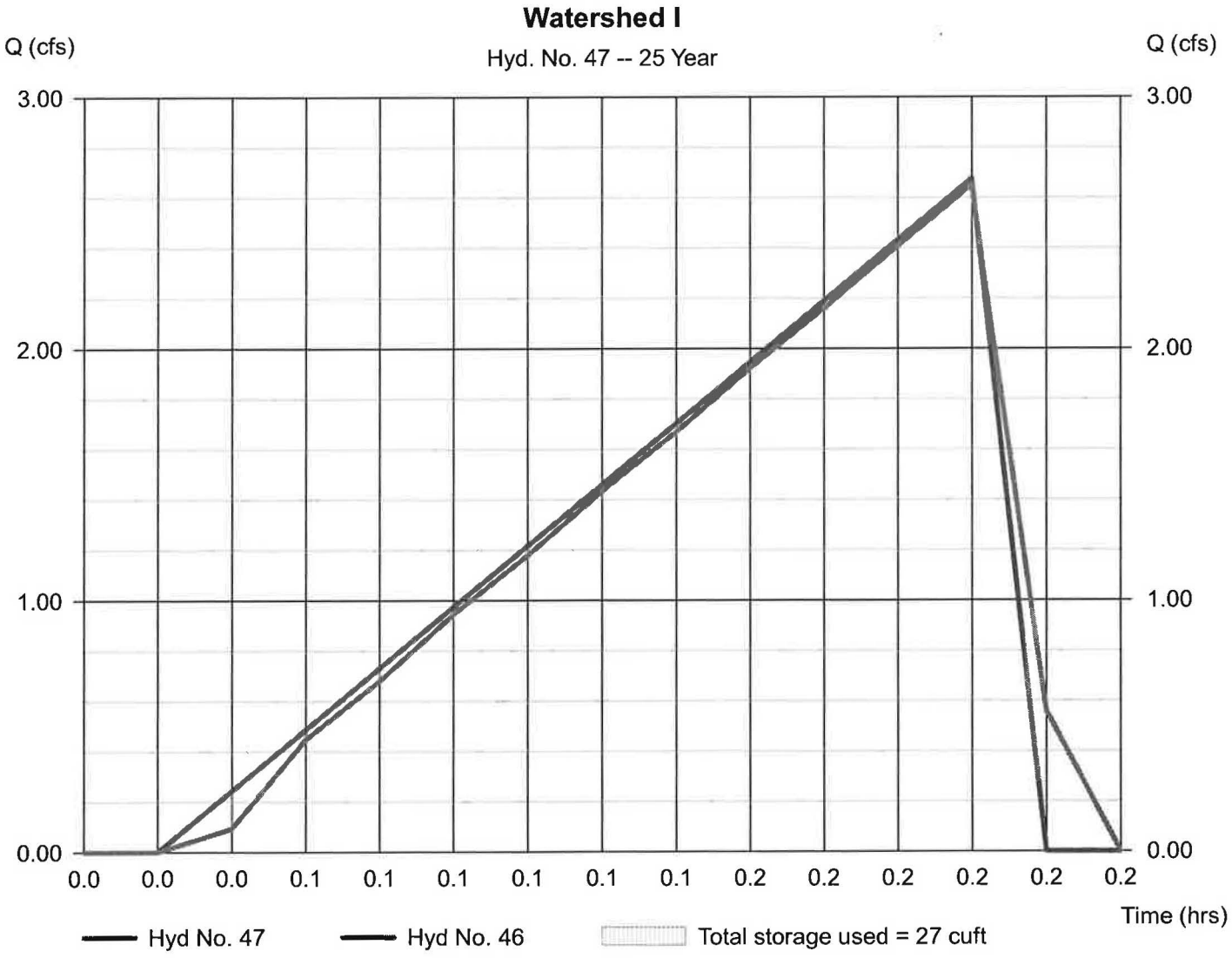
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 47

Watershed I

Hydrograph type	= Reservoir	Peak discharge	= 2.648 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.20 hrs
Time interval	= 1 min	Hyd. volume	= 968 cuft
Inflow hyd. No.	= 46 - Watershed I	Max. Elevation	= 531.60 ft
Reservoir name	= Watershed I	Max. Storage	= 27 cuft

Storage Indication method used.

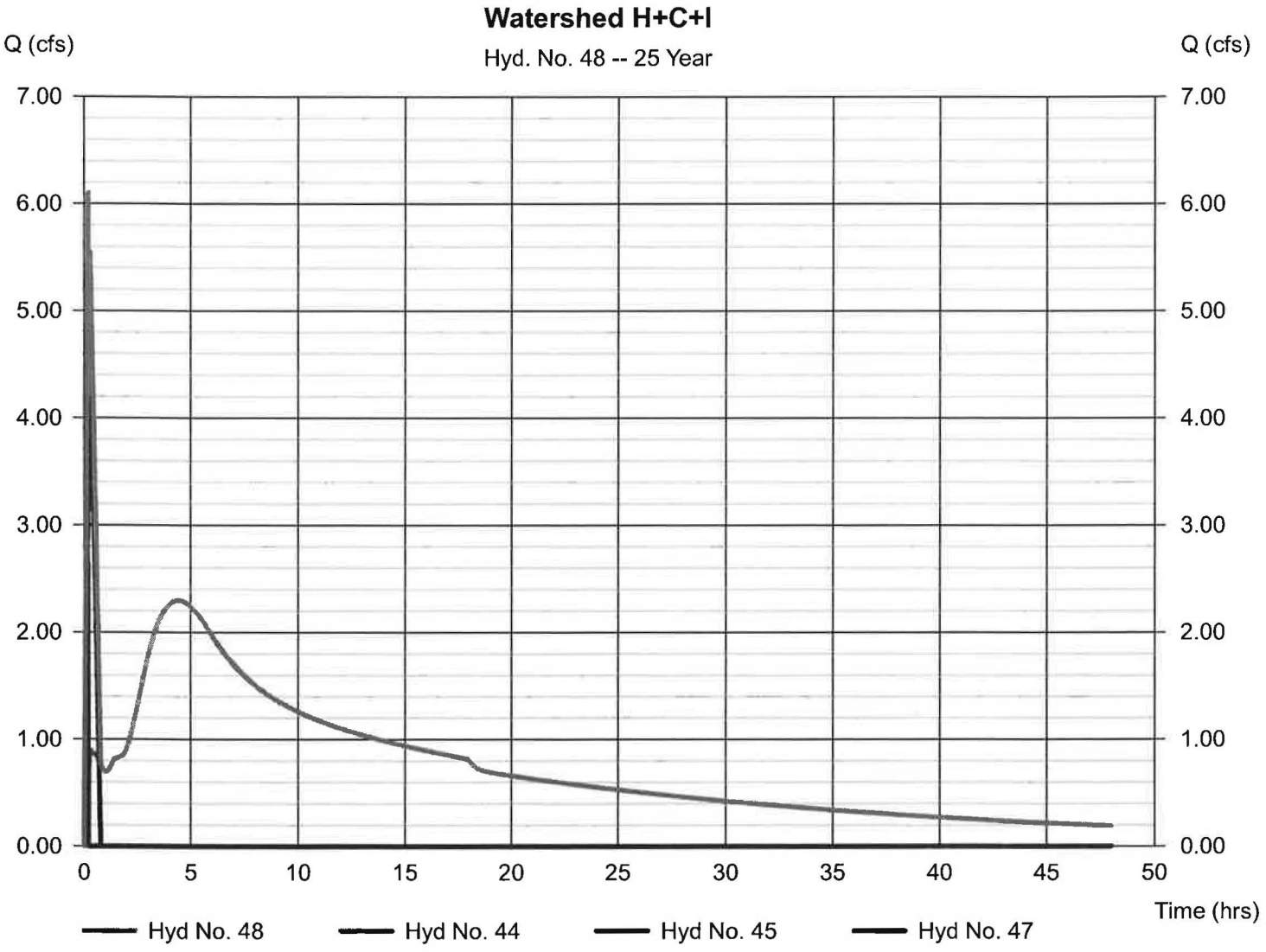


Hydrograph Report

Hyd. No. 48

Watershed H+C+I

Hydrograph type	= Combine	Peak discharge	= 6.098 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.20 hrs
Time interval	= 1 min	Hyd. volume	= 135,198 cuft
Inflow hyds.	= 44, 45, 47	Contrib. drain. area	= 3.300 ac



Hydrograph Report

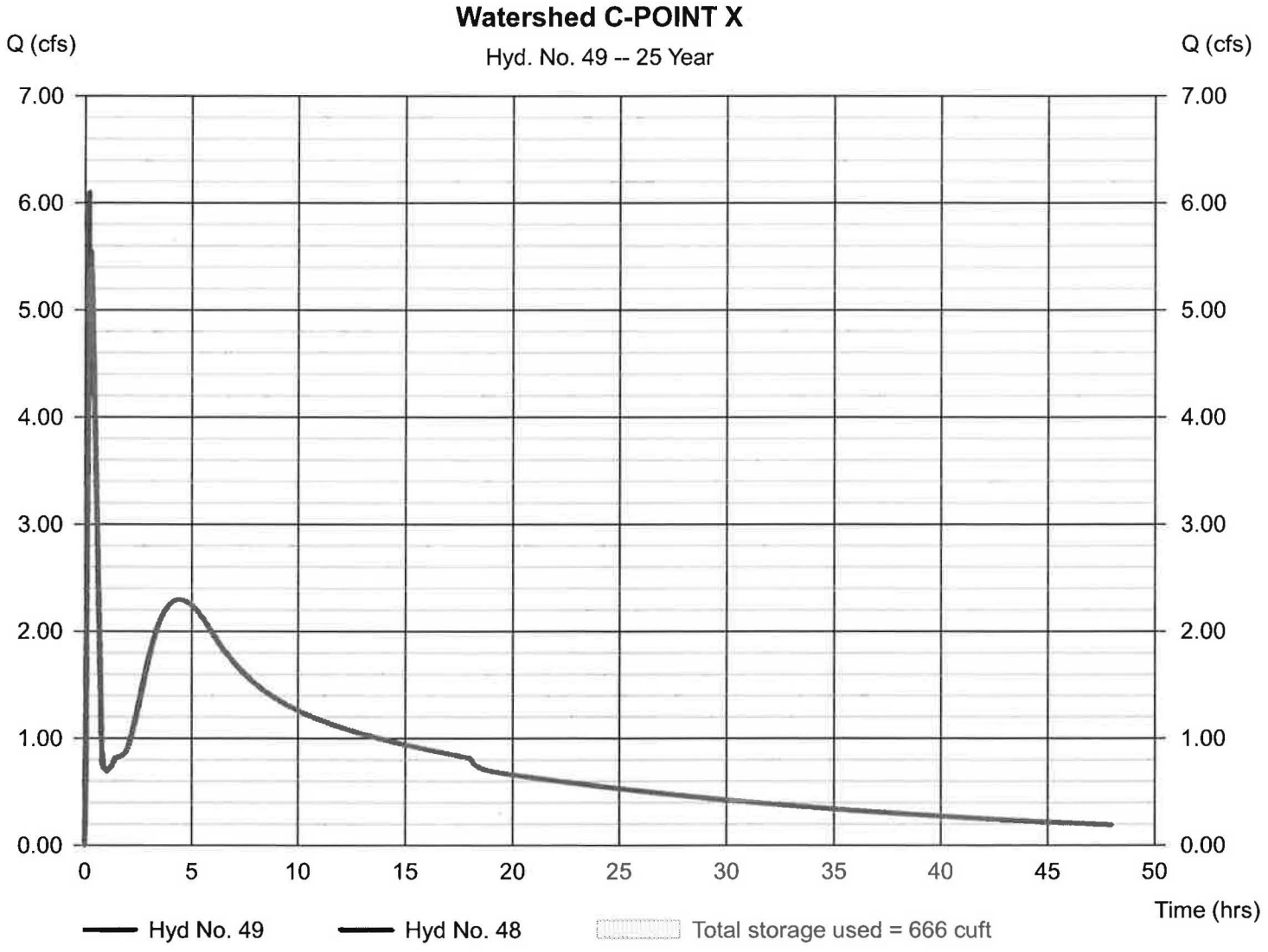
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 49

Watershed C-POINT X

Hydrograph type	= Reservoir	Peak discharge	= 5.386 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 135,131 cuft
Inflow hyd. No.	= 48 - Watershed H+C+I	Max. Elevation	= 529.92 ft
Reservoir name	= Watershed C	Max. Storage	= 666 cuft

Storage Indication method used.



Hydrograph Report

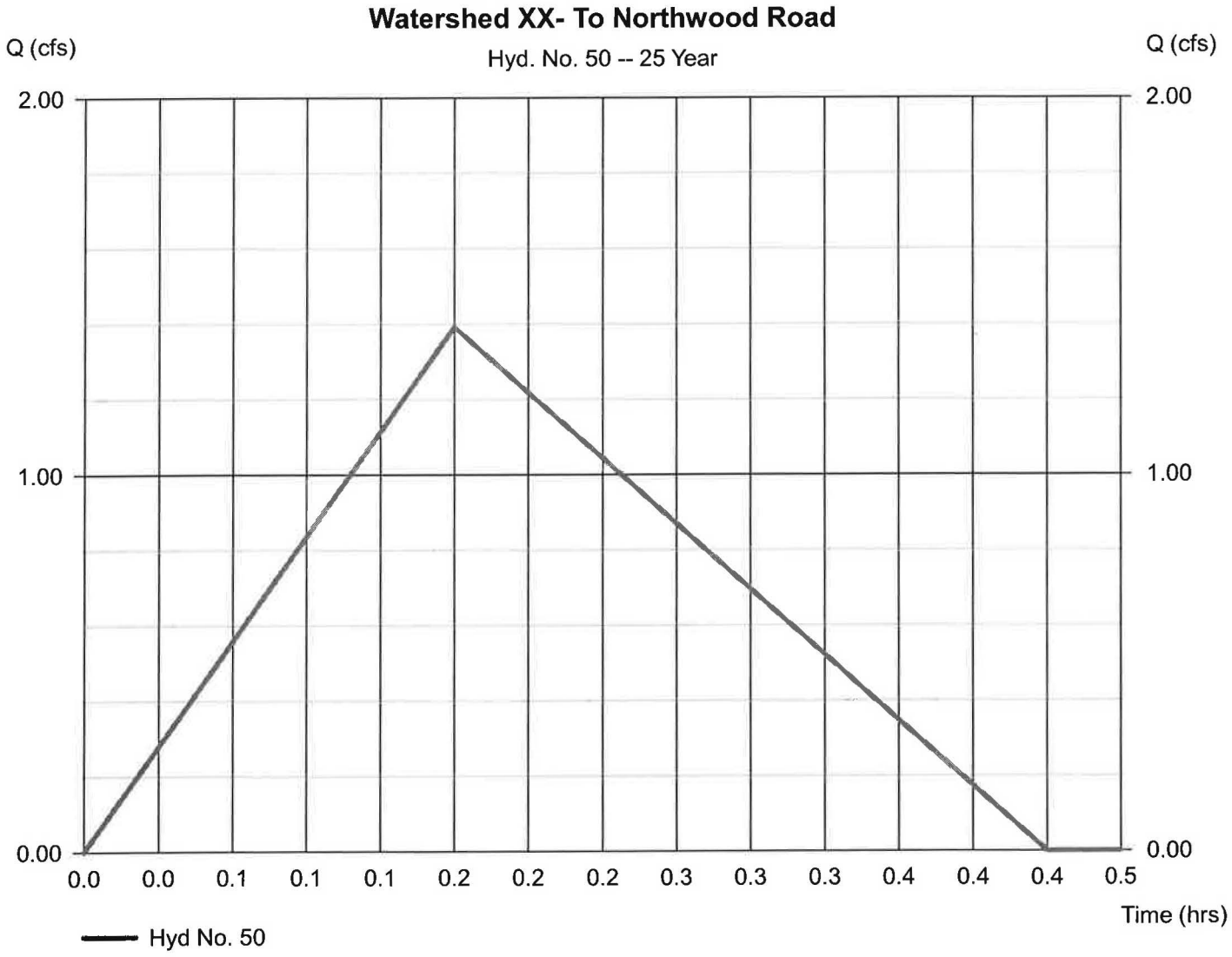
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 50

Watershed XX- To Northwood Road

Hydrograph type	= Rational	Peak discharge	= 1.392 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 1,115 cuft
Drainage area	= 0.720 ac	Runoff coeff.	= 0.35*
Intensity	= 5.522 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.100 x 0.90) + (0.360 x 0.30) + (0.260 x 0.20)] / 0.720



Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	Rational	9.466	1	17	12,890	----	------	------	Watershed A
2	Reservoir	3.353	1	35	12,757	1	566.26	8,123	Watershed A
3	Rational	7.054	1	14	7,653	----	------	------	Watershed B
4	Reservoir	1.698	1	31	7,395	3	567.07	5,814	Watershed B
5	Rational	4.043	1	21	6,735	----	------	------	Watershed I(1)
6	Rational	5.482	1	19	8,369	----	------	------	Wateshed II
7	Rational	7.327	1	10	5,869	----	------	------	Watershed IIA
8	Reservoir	1.459	1	23	5,709	7	563.13	4,331	Wateshed IIA
9	Rational	5.376	1	13	5,598	----	------	------	Watershed VIII
10	Rational	8.635	1	10	6,917	----	------	------	Watershed VIIIA
11	Reservoir	1.418	1	23	6,728	10	560.00	5,370	Watershed VIIIA
12	Rational	0.016	1	10	13	----	------	------	Watershed IX
13	Rational	3.201	1	10	2,564	----	------	------	Watershed IXA
14	Reservoir	1.430	1	19	2,495	13	554.71	1,206	Watershed IXA
15	Combine	12.02	1	21	27,209	5, 6, 8, 11,	------	------	Combine
16	Combine	17.18	1	19	35,200	9, 12, 14, 15	------	------	Watershed-Point Y
17	Rational	7.307	1	15	8,780	----	------	------	Watershed III
18	Rational	2.328	1	10	1,865	----	------	------	Watershed IV
19	Rational	10.78	1	10	8,631	----	------	------	Watershed IVA
20	Reservoir	3.682	1	21	1,590	19	553.87	7,308	Watershed IVA
21	Combine	12.03	1	20	23,116	2, 17, 20	------	------	Watershed A+III+VI
22	Rational	4.155	1	10	3,328	----	------	------	Watershed VI
23	Rational	5.674	1	10	4,545	----	------	------	Watershed VIA
24	Reservoir	1.449	1	22	4,421	23	551.10	3,066	Watershed VIA
25	Rational	18.35	1	10	14,696	----	------	------	Watershed VIIA
26	Reservoir	6.050	1	21	14,300	25	547.83	10,887	Watershed VIIA
27	Rational	1.804	1	10	1,445	----	------	------	Watershed X
28	Rational	34.66	1	23	63,849	----	------	------	Watershed V
29	Rational	3.020	1	10	2,419	----	------	------	Watershed XA
30	Reservoir	1.745	1	17	2,354	29	558.55	961	Watershed XA
31	Rational	0.418	1	10	335	----	------	------	Watershed VII
32	Combine	48.30	1	23	93,315	21, 24, 28, 30,	------	------	Combine
33	Reservoir	26.20	1	38	93,308	32	544.39	42,788	Watershed V

Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
34	Rational	5.998	1	22	10,794	----	------	------	Watershed XII
35	Reservoir	0.007	1	59	1,167	34	546.31	10,597	Watershed XII
36	Rational	8.472	1	14	9,501	----	------	------	Watershed XIX
37	Combine	30.63	1	34	124,406	4, 26, 33, 36	------	------	Watershed B+X+XI+XIX
38	Reservoir	20.92	1	57	124,396	37	542.16	43,855	Watershed XIX-POINT Z
39	Rational	21.13	1	20	33,845	----	------	------	Watershed XIV
40	Combine	23.33	1	20	157,988	38, 39	------	------	Watershed XIV+XIX
41	Reservoir	5.719	1	143	141,568	40	539.63	107,377	Watershed XIV
42	Rational	5.204	1	19	7,789	----	------	------	Watershed H
43	Combine	5.719	1	143	144,535	41, 42	------	------	Watershed XIV+H
44	Reservoir	2.988	1	248	143,848	43	536.73	24,391	Watershed H
45	Rational	5.193	1	18	7,612	----	------	------	Watershed C
46	Rational	2.942	1	12	2,717	----	------	------	Watershed I
47	Reservoir	2.913	1	12	1,065	46	531.65	29.1	Watershed I
48	Combine	6.771	1	12	152,391	44, 45, 47	------	------	Watershed H+C+I
49	Reservoir	5.990	1	12	152,324	48	529.99	707	Watershed C-POINT X
50	Rational	1.528	1	10	1,224	----	------	------	Watershed XX- To Northwood Roa

Hydrograph Report

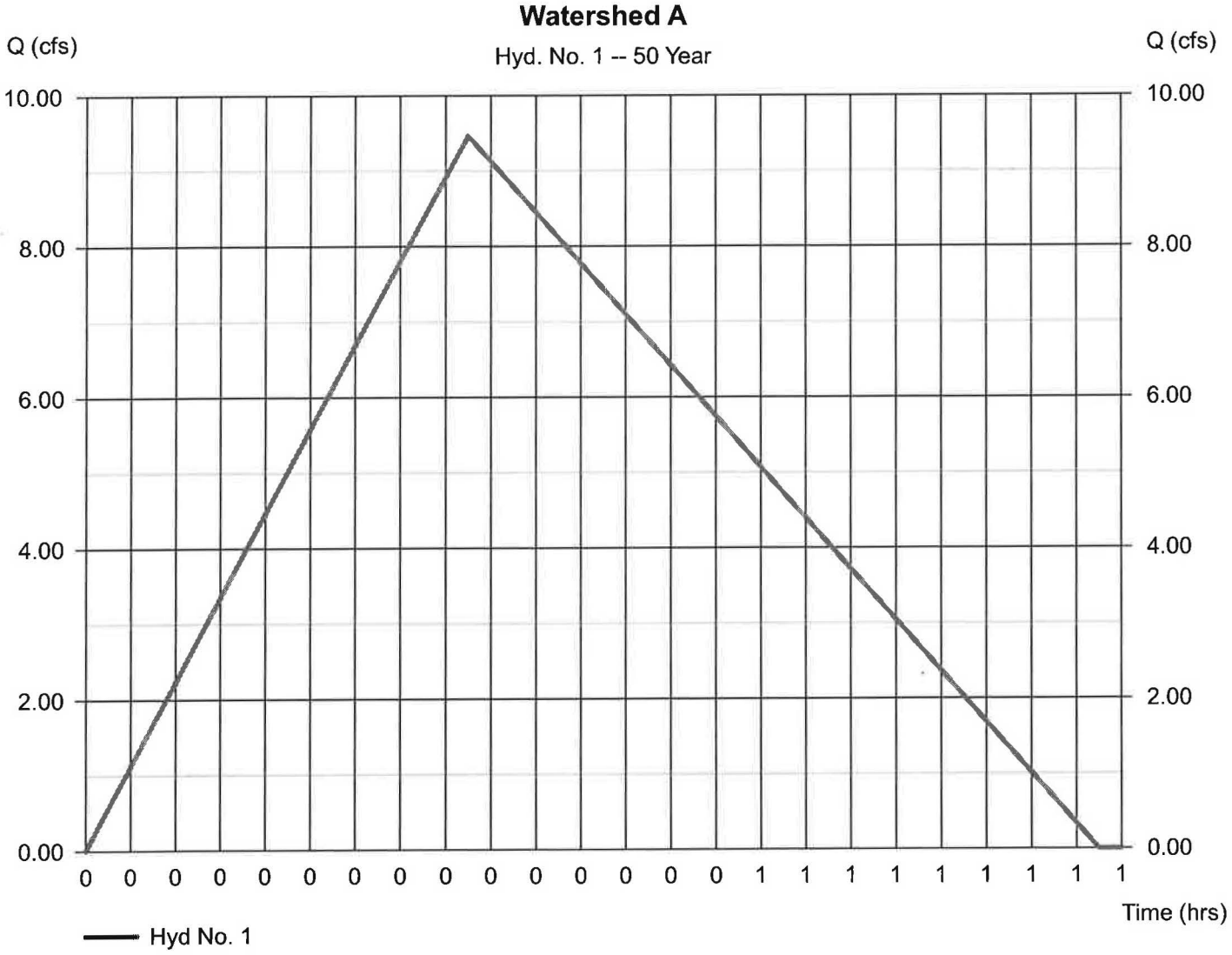
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 1

Watershed A

Hydrograph type	= Rational	Peak discharge	= 9.466 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.28 hrs
Time interval	= 1 min	Hyd. volume	= 12,890 cuft
Drainage area	= 8.000 ac	Runoff coeff.	= 0.24*
Intensity	= 4.930 in/hr	Tc by TR55	= 17.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.400 x 0.90) + (0.500 x 0.30) + (7.100 x 0.20)] / 8.000



Hydrograph Report

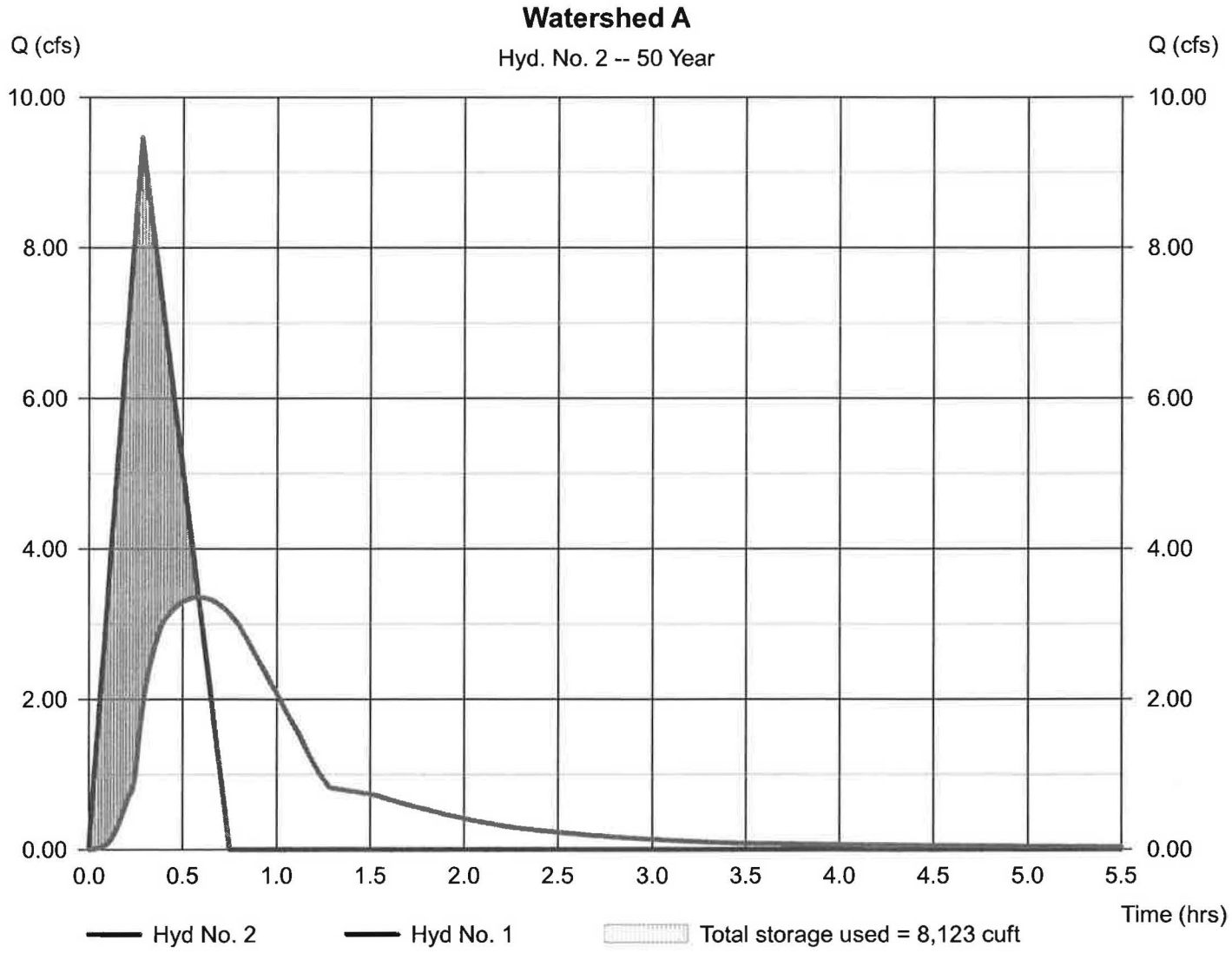
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 2

Watershed A

Hydrograph type	= Reservoir	Peak discharge	= 3.353 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.58 hrs
Time interval	= 1 min	Hyd. volume	= 12,757 cuft
Inflow hyd. No.	= 1 - Watershed A	Max. Elevation	= 566.26 ft
Reservoir name	= Watershed A	Max. Storage	= 8,123 cuft

Storage Indication method used.



Hydrograph Report

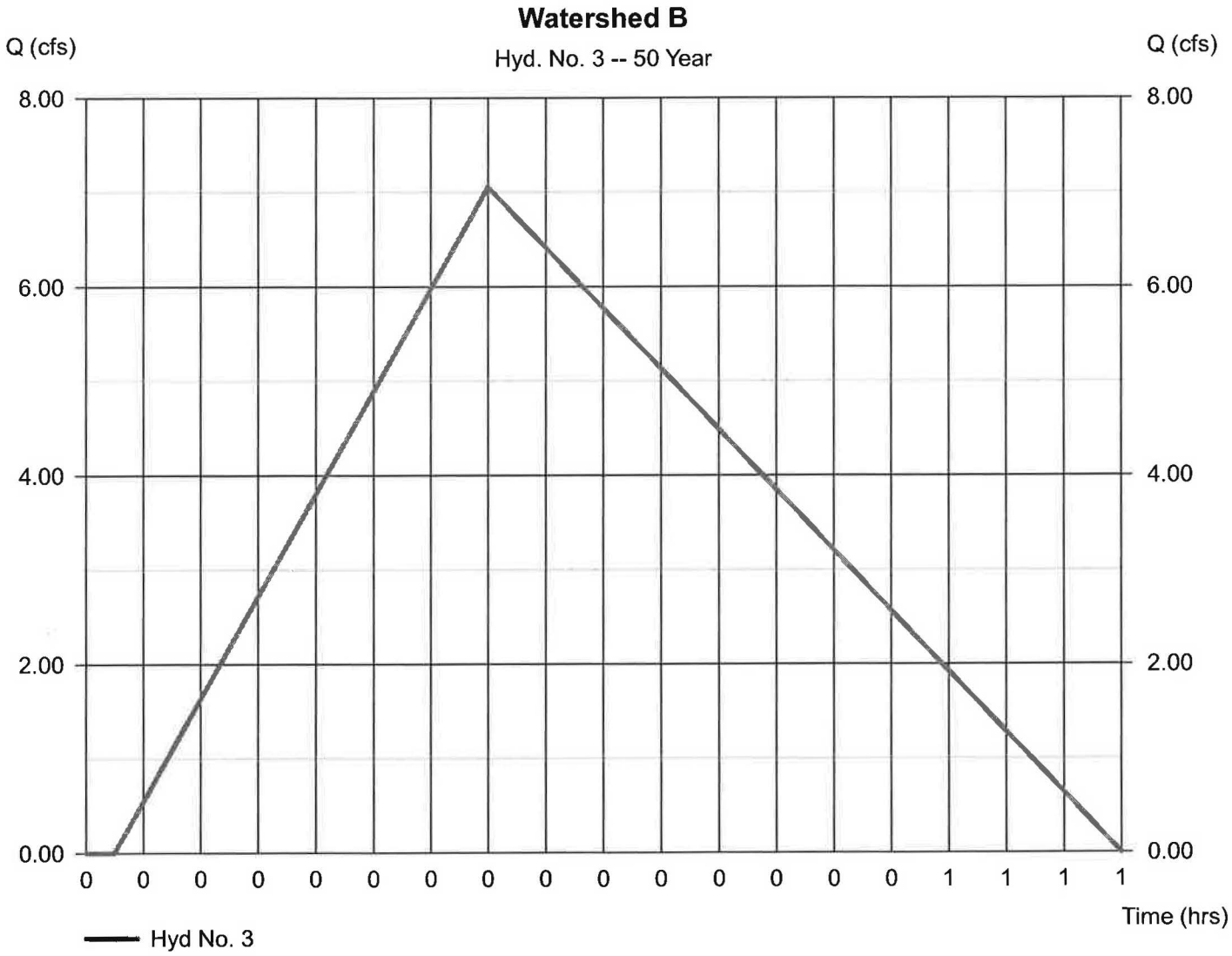
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 3

Watershed B

Hydrograph type	= Rational	Peak discharge	= 7.054 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.23 hrs
Time interval	= 1 min	Hyd. volume	= 7,653 cuft
Drainage area	= 5.200 ac	Runoff coeff.	= 0.25*
Intensity	= 5.426 in/hr	Tc by TR55	= 13.54 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.300 x 0.90) + (0.500 x 0.30) + (4.400 x 0.20)] / 5.200



Hydrograph Report

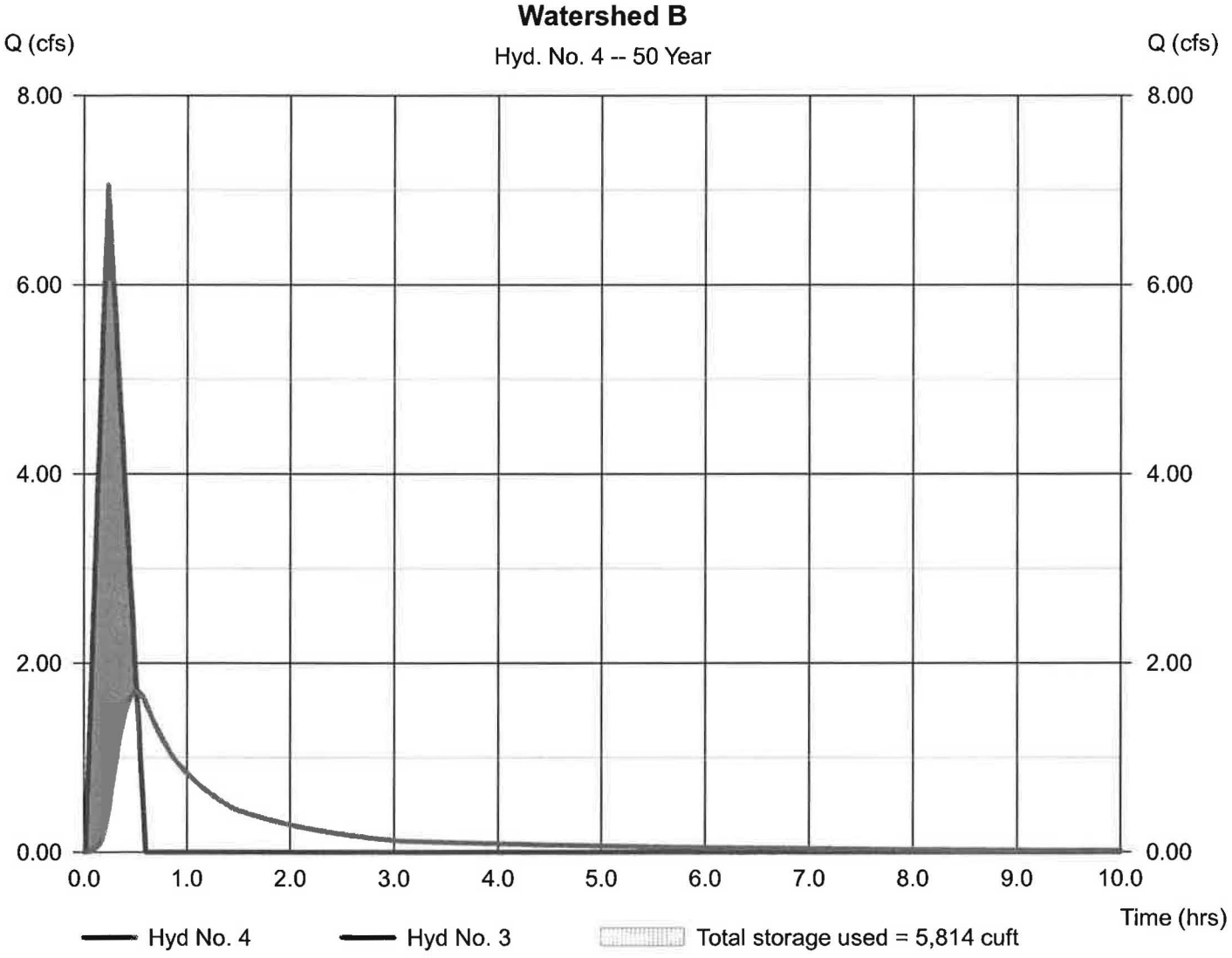
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 4

Watershed B

Hydrograph type	= Reservoir	Peak discharge	= 1.698 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.52 hrs
Time interval	= 1 min	Hyd. volume	= 7,395 cuft
Inflow hyd. No.	= 3 - Watershed B	Max. Elevation	= 567.07 ft
Reservoir name	= Watershed B	Max. Storage	= 5,814 cuft

Storage Indication method used.



Hydrograph Report

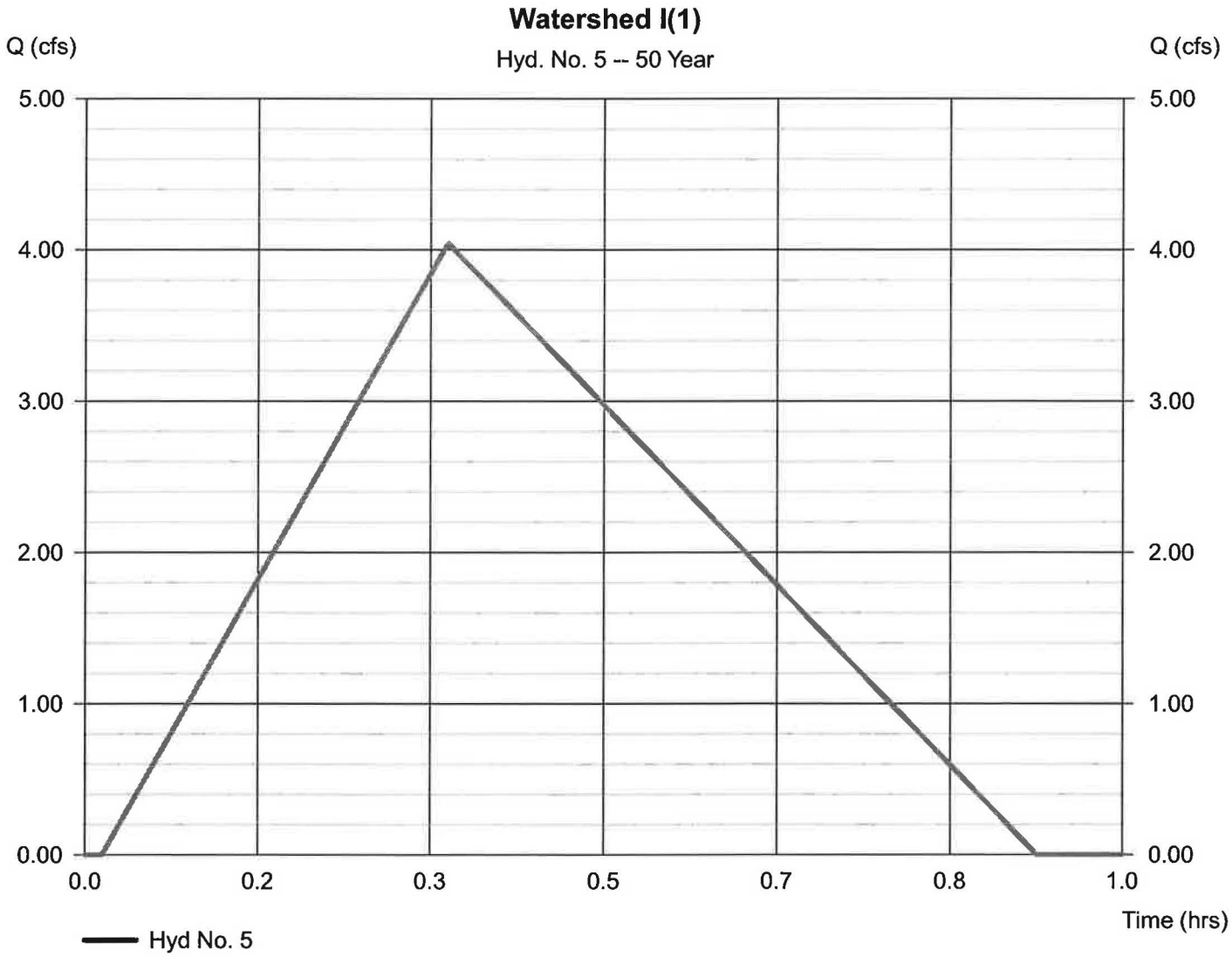
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 5

Watershed I(1)

Hydrograph type	= Rational	Peak discharge	= 4.043 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.35 hrs
Time interval	= 1 min	Hyd. volume	= 6,735 cuft
Drainage area	= 1.700 ac	Runoff coeff.	= 0.53*
Intensity	= 4.487 in/hr	Tc by TR55	= 20.80 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.700 x 0.90) + (0.700 x 0.30) + (0.300 x 0.20)] / 1.700



Hydrograph Report

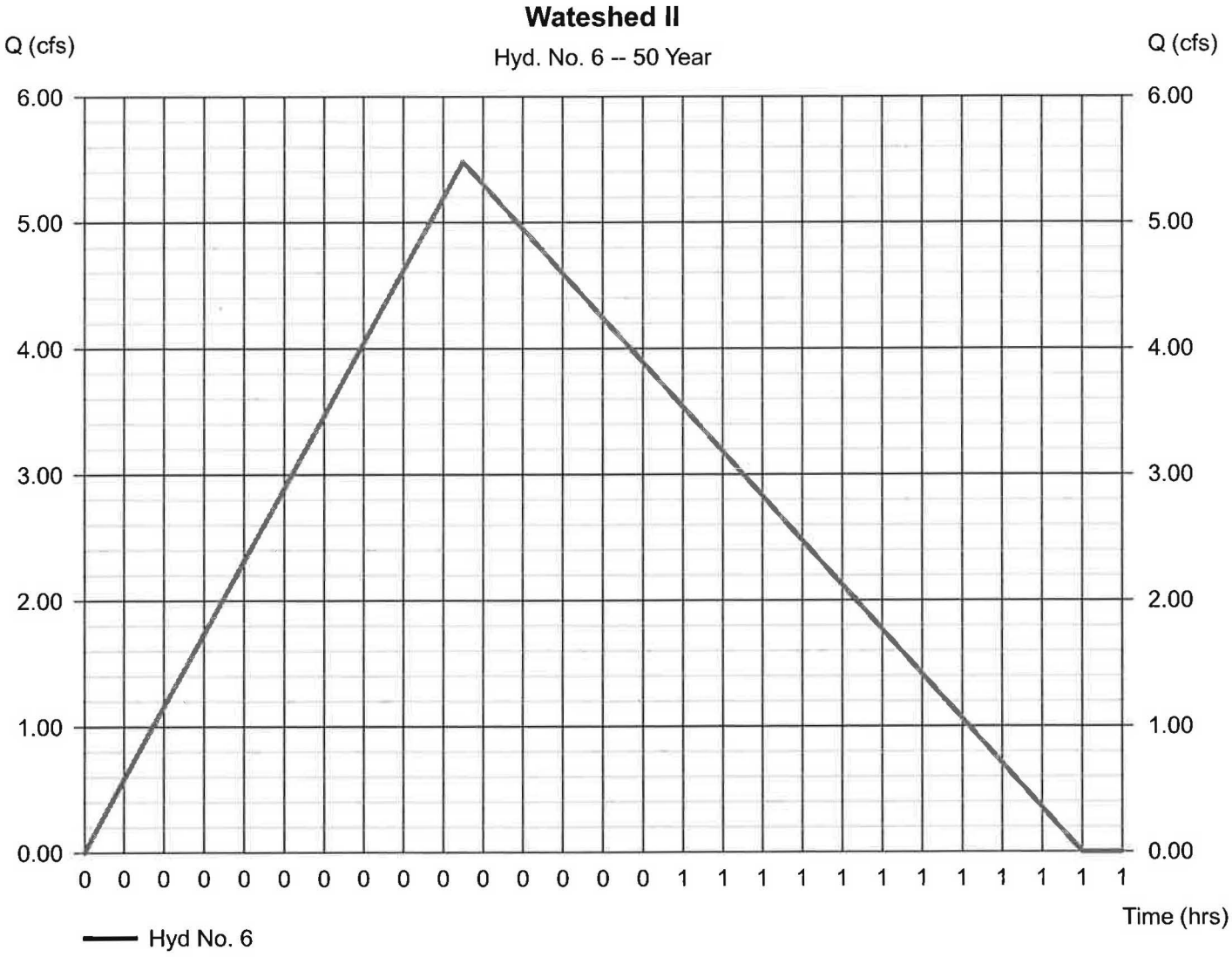
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 6

Wateshed II

Hydrograph type	= Rational	Peak discharge	= 5.482 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 8,369 cuft
Drainage area	= 4.040 ac	Runoff coeff.	= 0.29*
Intensity	= 4.679 in/hr	Tc by TR55	= 19.06 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.230 x 0.90) + (1.940 x 0.30) + (1.870 x 0.20)] / 4.040



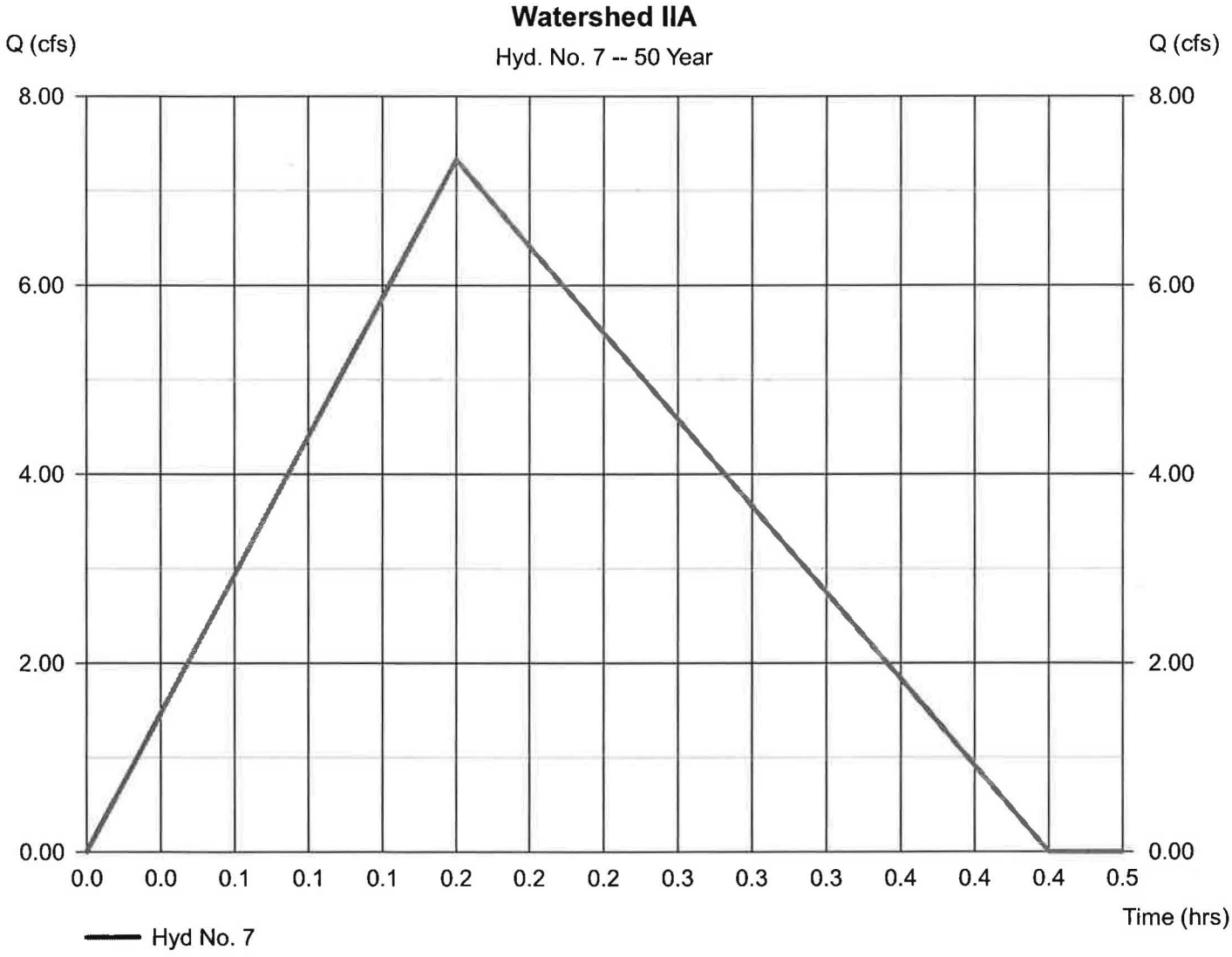
Hydrograph Report

Hyd. No. 7

Watershed IIA

Hydrograph type	= Rational	Peak discharge	= 7.327 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 5,869 cuft
Drainage area	= 1.530 ac	Runoff coeff.	= 0.79*
Intensity	= 6.062 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.250 x 0.90) + (0.280 x 0.30)] / 1.530



Hydrograph Report

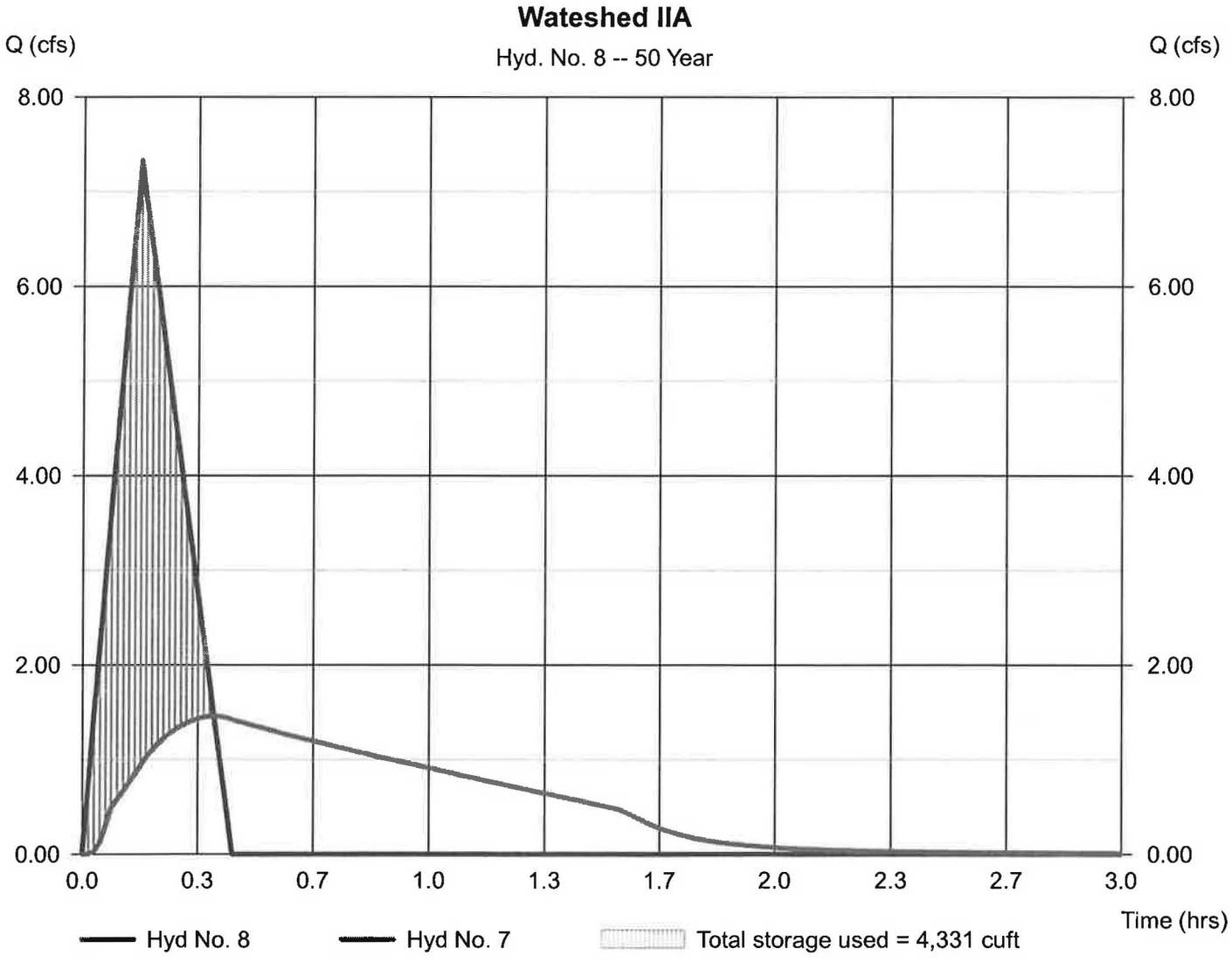
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 8

Wateshed IIA

Hydrograph type	= Reservoir	Peak discharge	= 1.459 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.38 hrs
Time interval	= 1 min	Hyd. volume	= 5,709 cuft
Inflow hyd. No.	= 7 - Watershed IIA	Max. Elevation	= 563.13 ft
Reservoir name	= Watershed IIA	Max. Storage	= 4,331 cuft

Storage Indication method used.



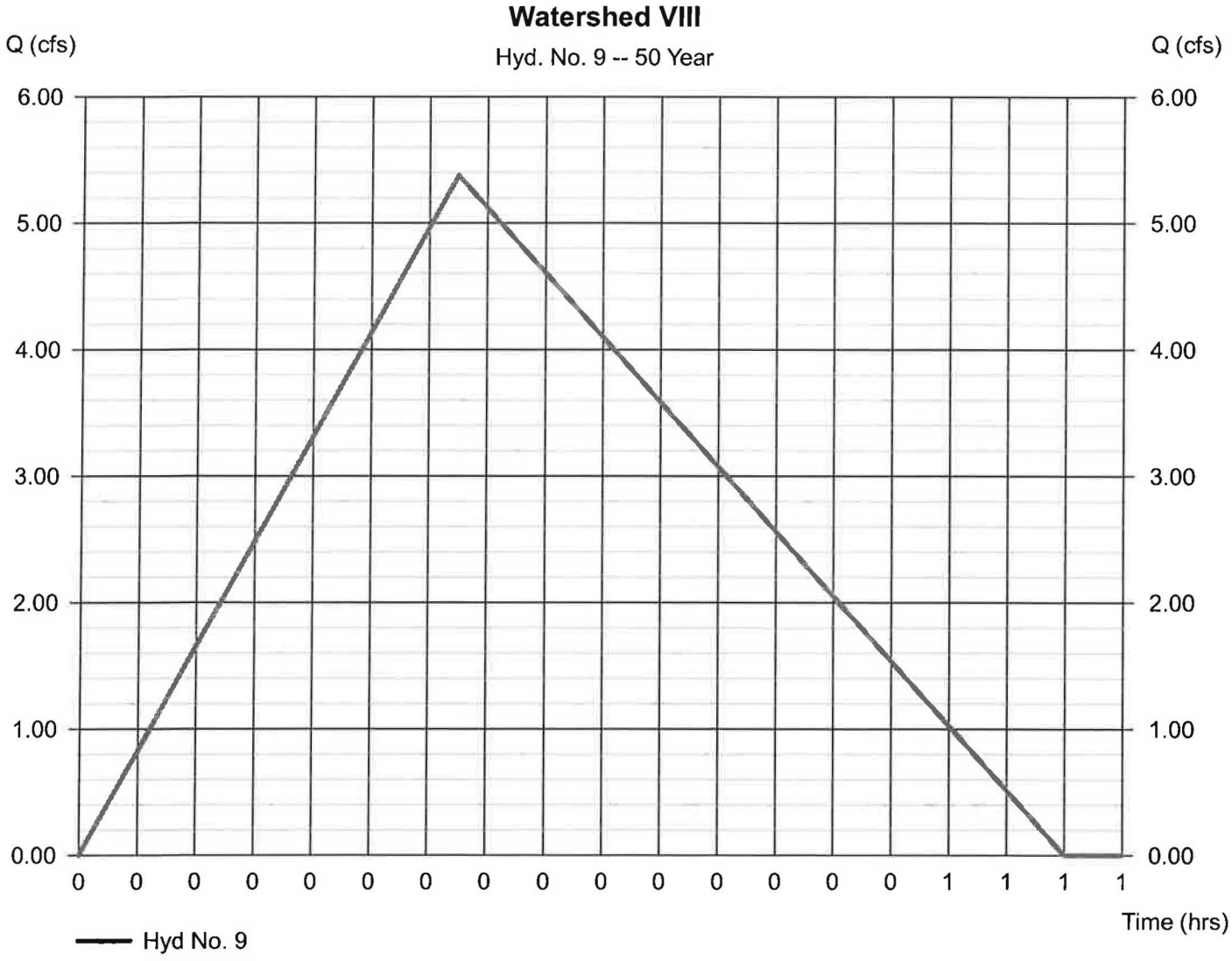
Hydrograph Report

Hyd. No. 9

Watershed VIII

Hydrograph type	= Rational	Peak discharge	= 5.376 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.22 hrs
Time interval	= 1 min	Hyd. volume	= 5,598 cuft
Drainage area	= 3.250 ac	Runoff coeff.	= 0.3*
Intensity	= 5.514 in/hr	Tc by TR55	= 13.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.320 x 0.90) + (1.120 x 0.30) + (1.810 x 0.20)] / 3.250



Hydrograph Report

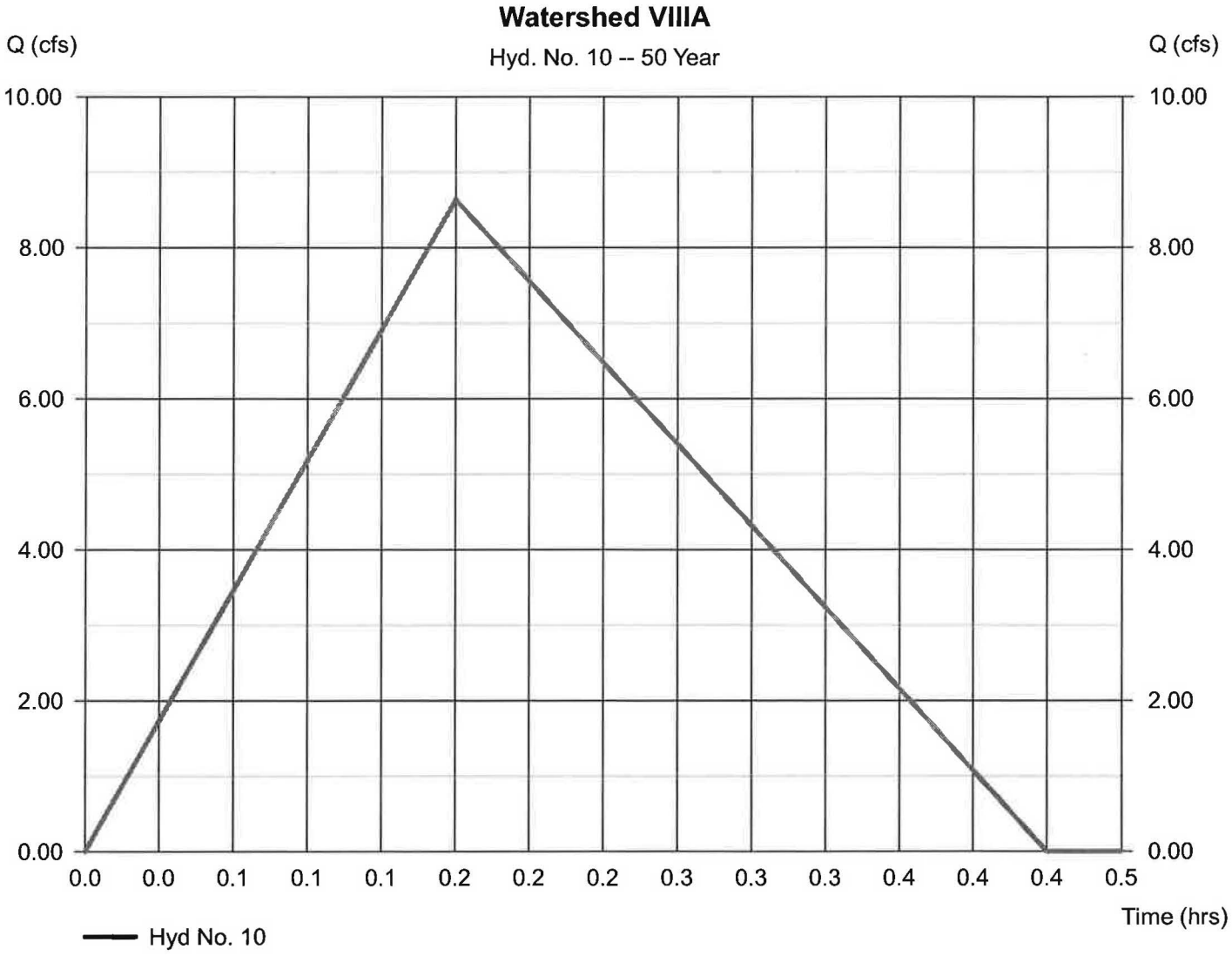
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 10

Watershed VIIIA

Hydrograph type	= Rational	Peak discharge	= 8.635 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 6,917 cuft
Drainage area	= 1.850 ac	Runoff coeff.	= 0.77*
Intensity	= 6.062 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.460 x 0.90) + (0.390 x 0.30)] / 1.850



Hydrograph Report

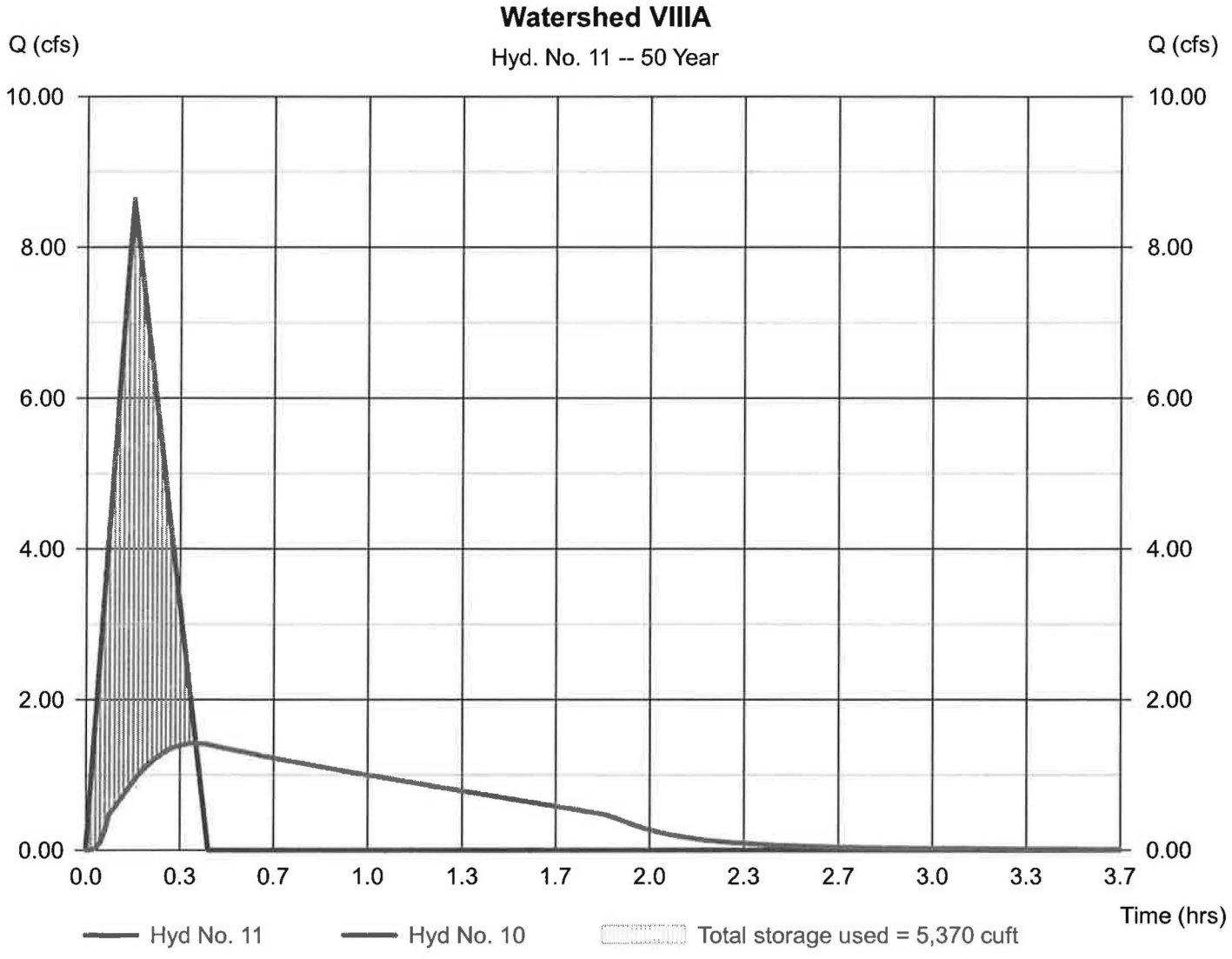
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 11

Watershed VIIIA

Hydrograph type	= Reservoir	Peak discharge	= 1.418 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.38 hrs
Time interval	= 1 min	Hyd. volume	= 6,728 cuft
Inflow hyd. No.	= 10 - Watershed VIIIA	Max. Elevation	= 560.00 ft
Reservoir name	= Watershed VIIIA	Max. Storage	= 5,370 cuft

Storage Indication method used.



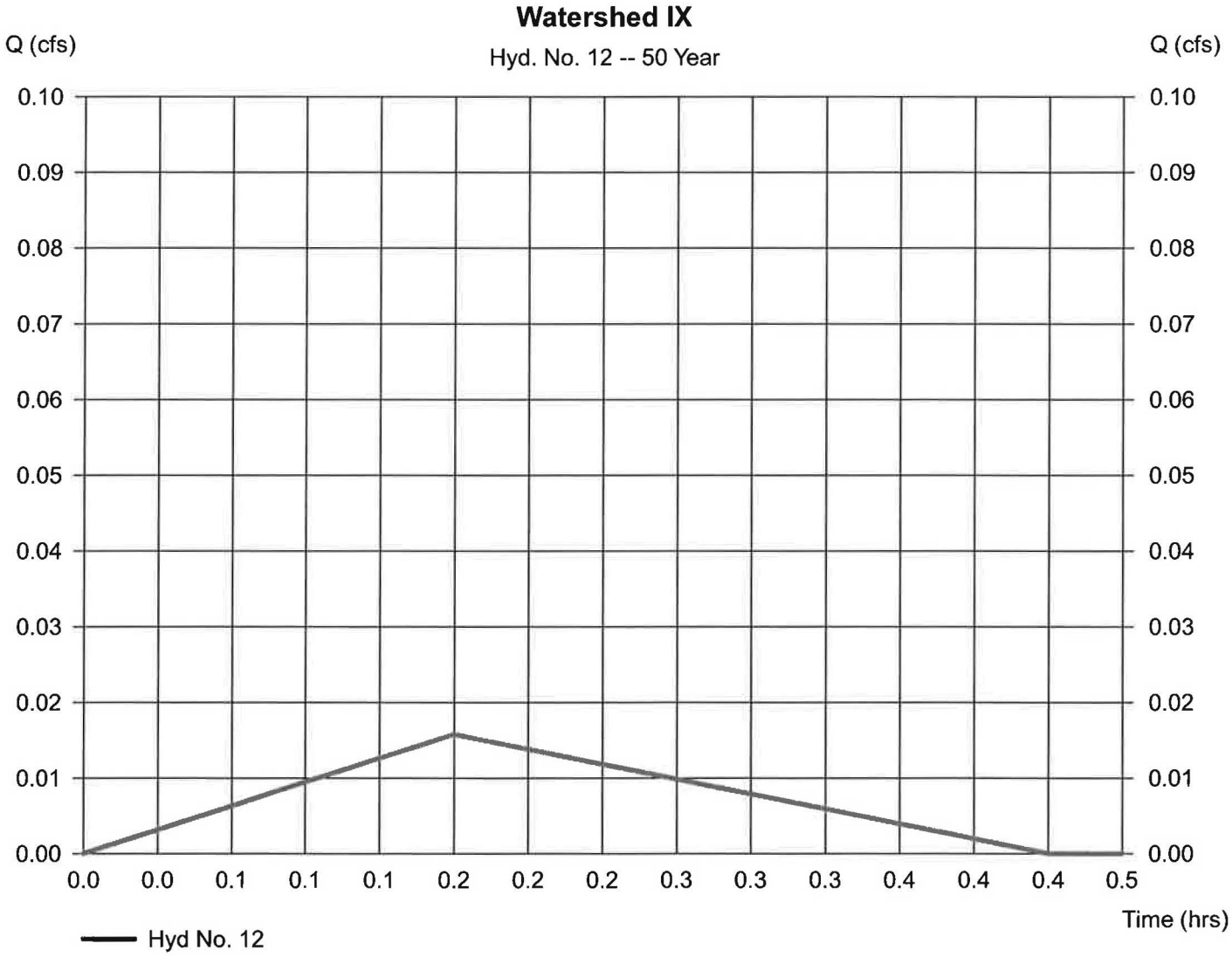
Hydrograph Report

Hyd. No. 12

Watershed IX

Hydrograph type	= Rational	Peak discharge	= 0.016 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 13 cuft
Drainage area	= 0.260 ac	Runoff coeff.	= 0.01*
Intensity	= 6.062 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.010 x 0.30)] / 0.260



Hydrograph Report

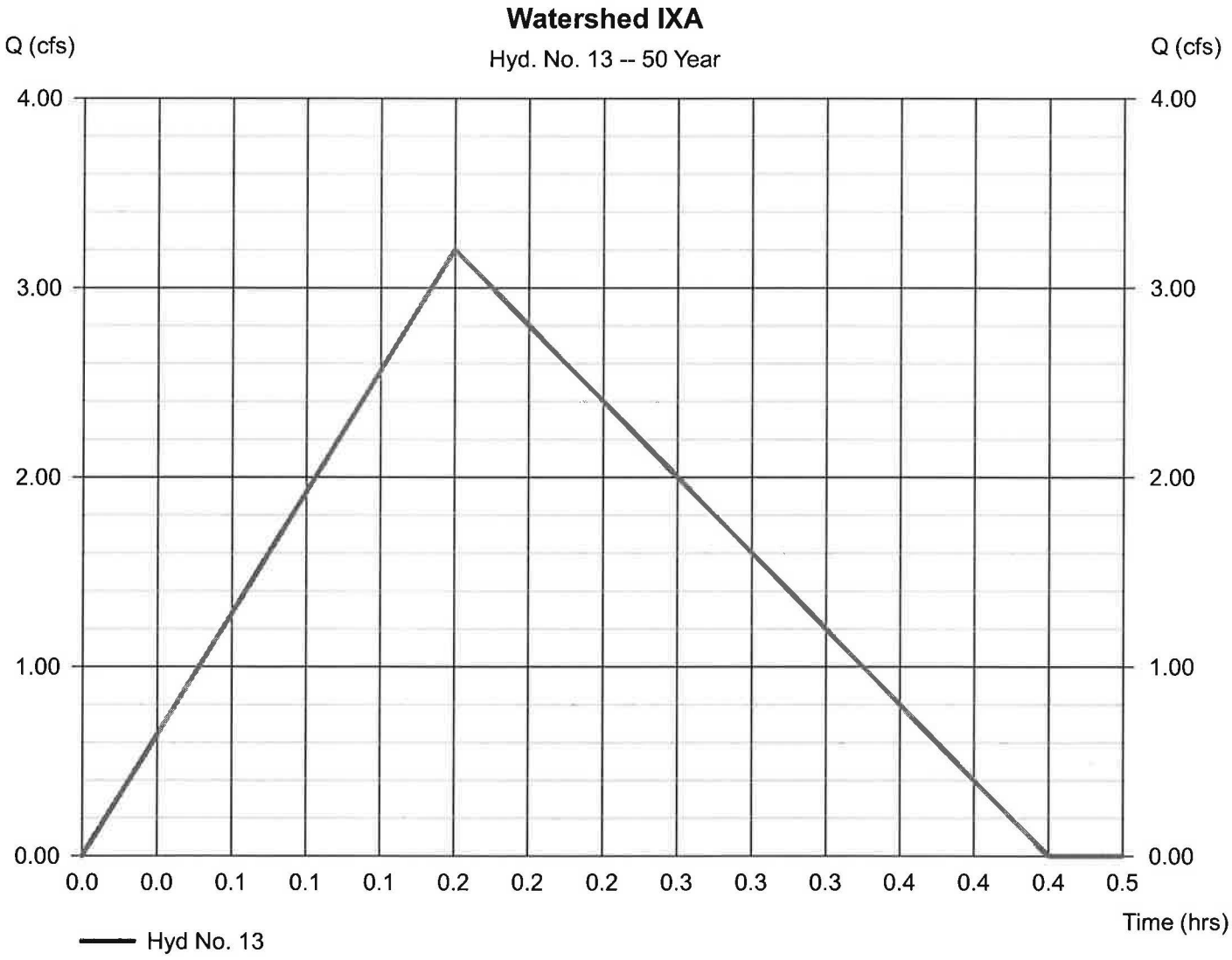
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 13

Watershed IXA

Hydrograph type	= Rational	Peak discharge	= 3.201 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 2,564 cuft
Drainage area	= 0.880 ac	Runoff coeff.	= 0.6*
Intensity	= 6.062 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.460 x 0.90) + (0.260 x 0.30) + (0.160 x 0.20)] / 0.880



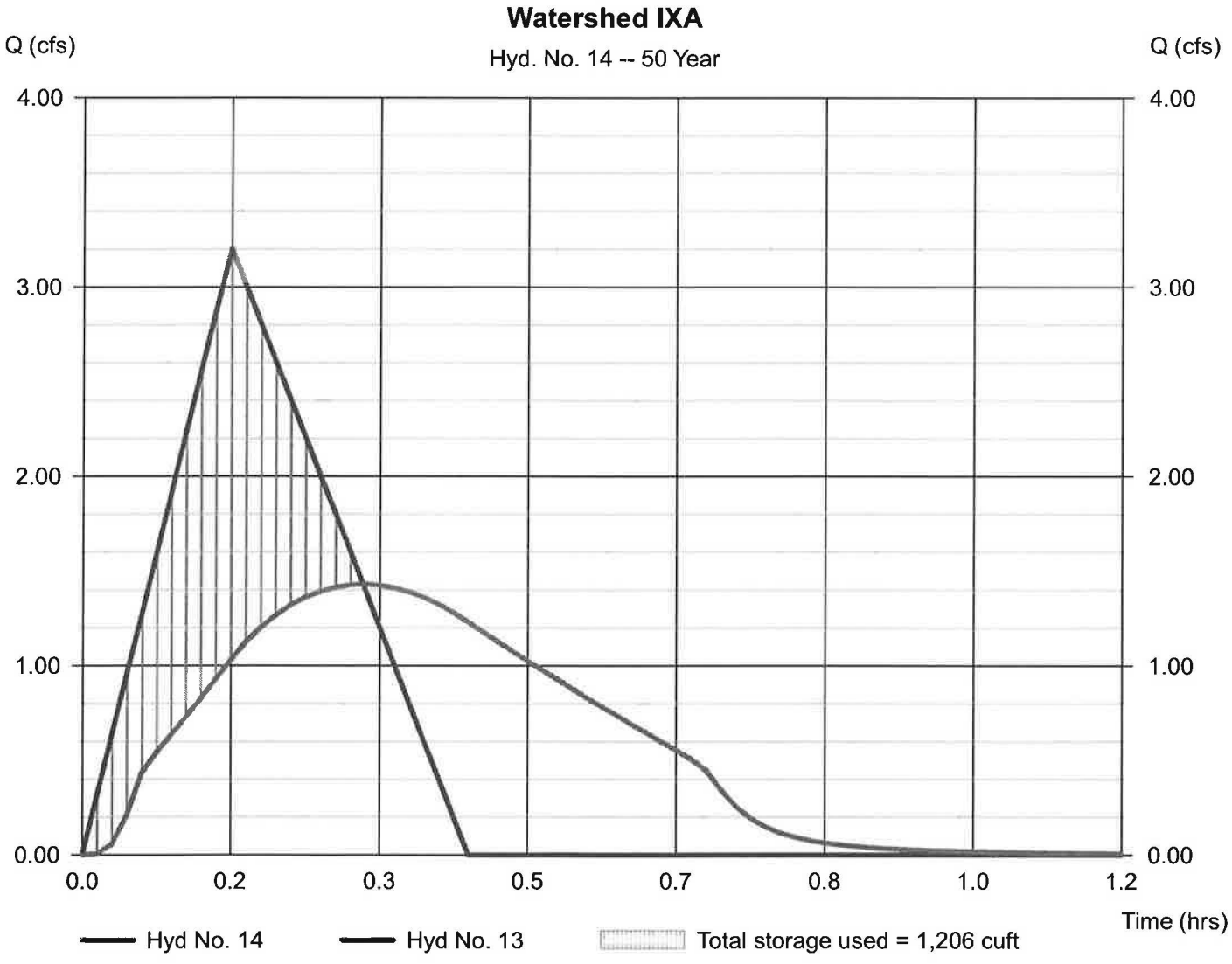
Hydrograph Report

Hyd. No. 14

Watershed IXA

Hydrograph type	= Reservoir	Peak discharge	= 1.430 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 2,495 cuft
Inflow hyd. No.	= 13 - Watershed IXA	Max. Elevation	= 554.71 ft
Reservoir name	= Waatershed IXA	Max. Storage	= 1,206 cuft

Storage Indication method used.

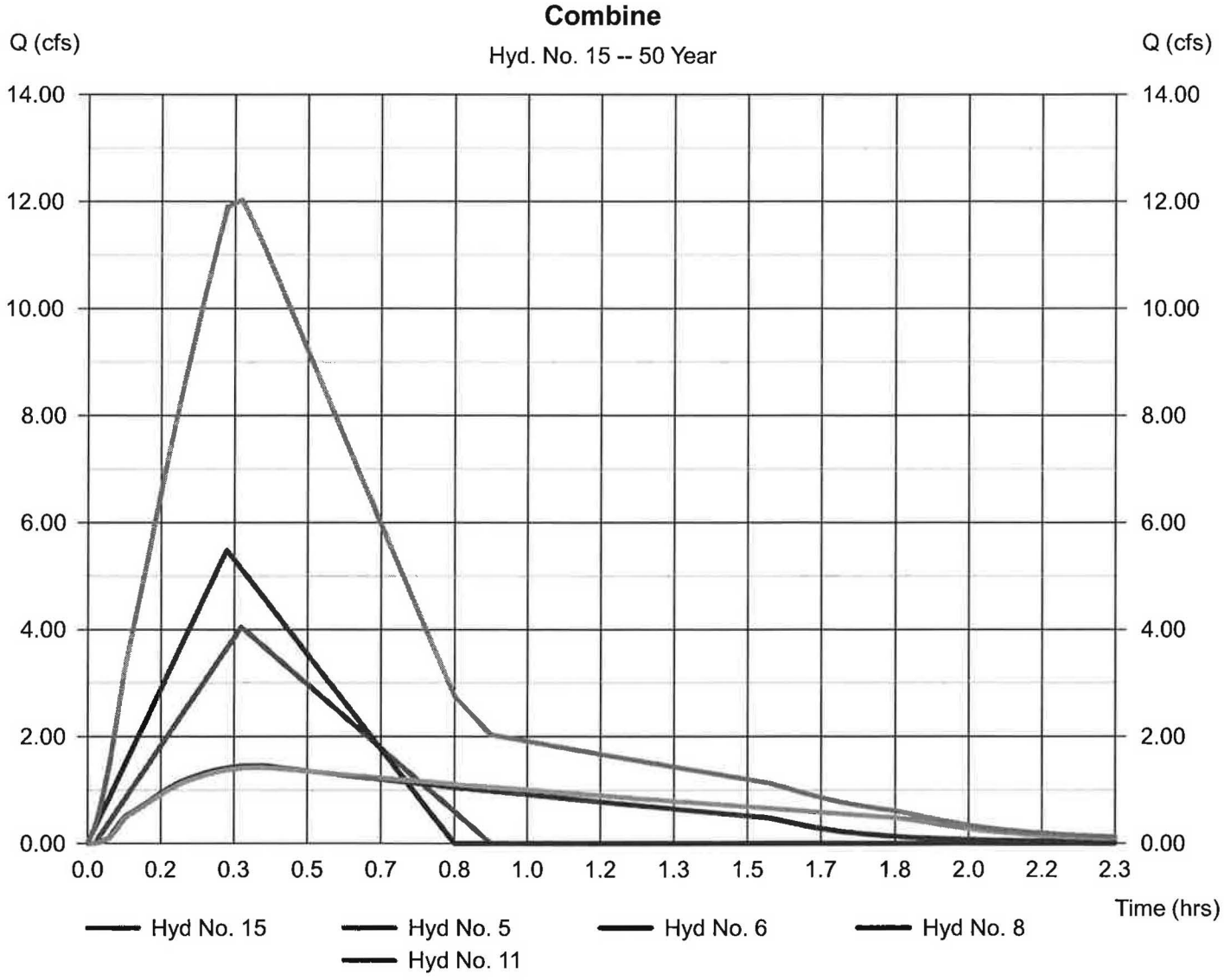


Hydrograph Report

Hyd. No. 15

Combine

Hydrograph type	= Combine	Peak discharge	= 12.02 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.35 hrs
Time interval	= 1 min	Hyd. volume	= 27,209 cuft
Inflow hyds.	= 5, 6, 8, 11	Contrib. drain. area	= 5.740 ac

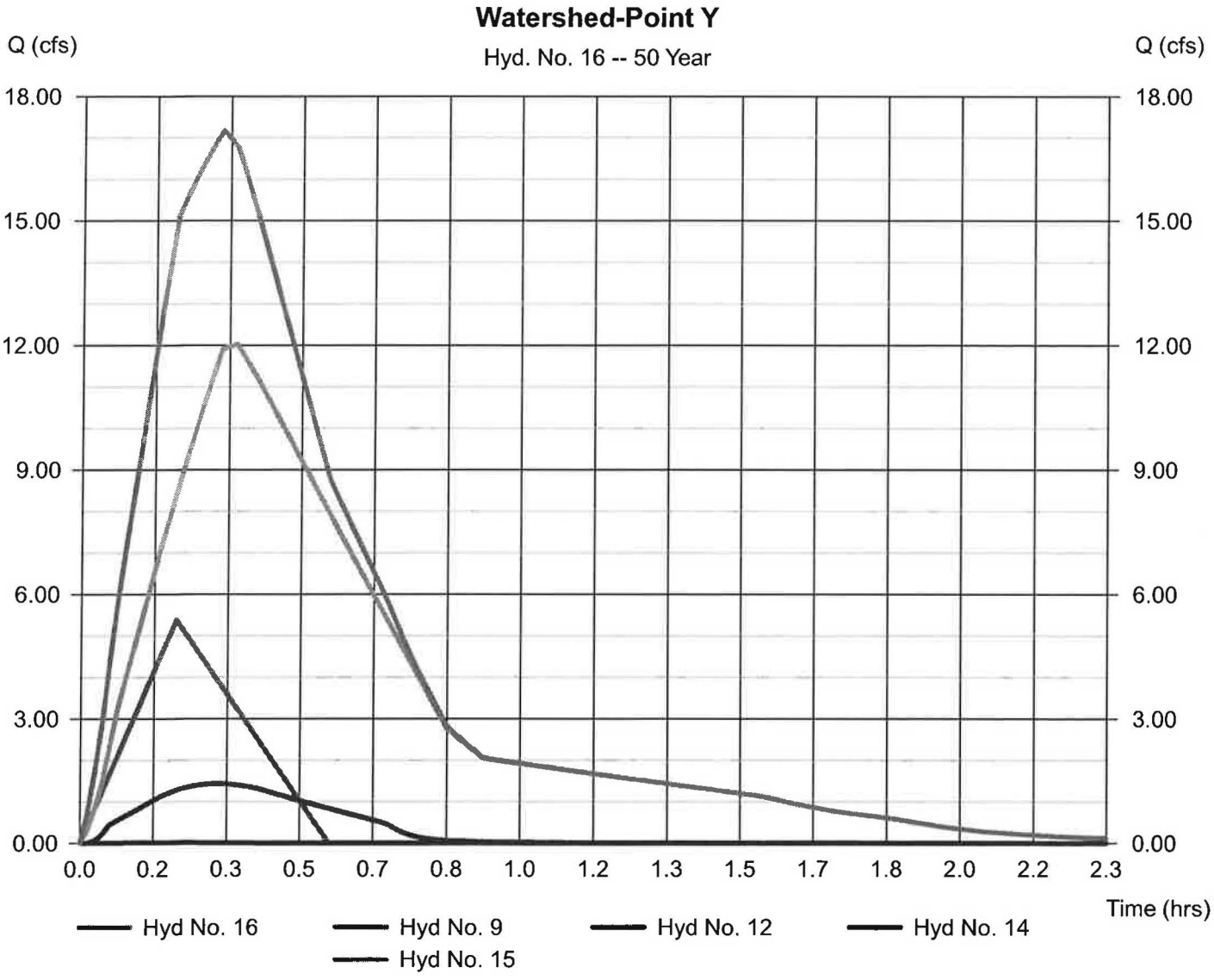


Hydrograph Report

Hyd. No. 16

Watershed-Point Y

Hydrograph type	= Combine	Peak discharge	= 17.18 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 35,200 cuft
Inflow hyds.	= 9, 12, 14, 15	Contrib. drain. area	= 3.510 ac



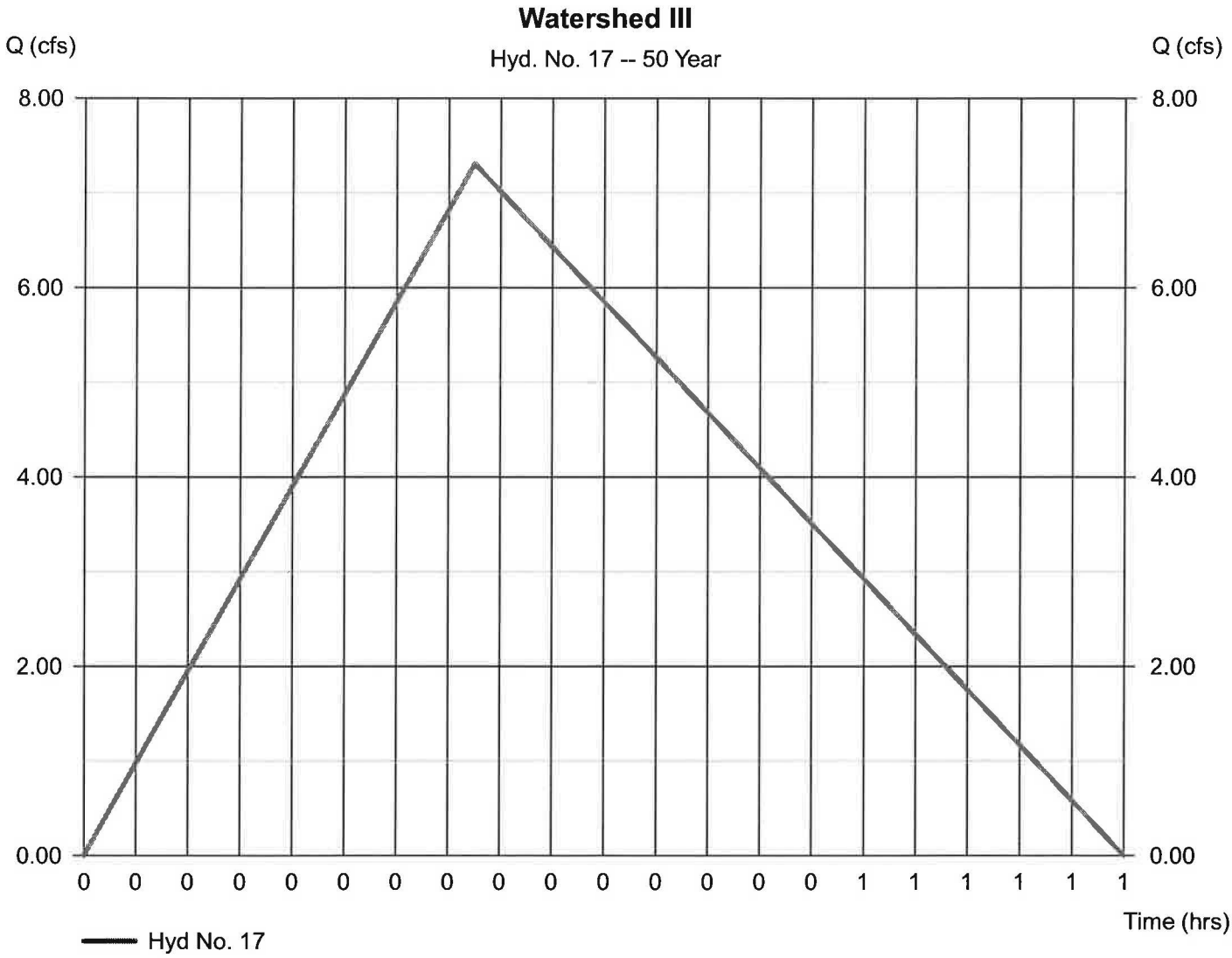
Hydrograph Report

Hyd. No. 17

Watershed III

Hydrograph type	= Rational	Peak discharge	= 7.307 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.25 hrs
Time interval	= 1 min	Hyd. volume	= 8,780 cuft
Drainage area	= 2.700 ac	Runoff coeff.	= 0.52*
Intensity	= 5.205 in/hr	Tc by TR55	= 15.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.000 x 0.90) + (1.700 x 0.30)] / 2.700



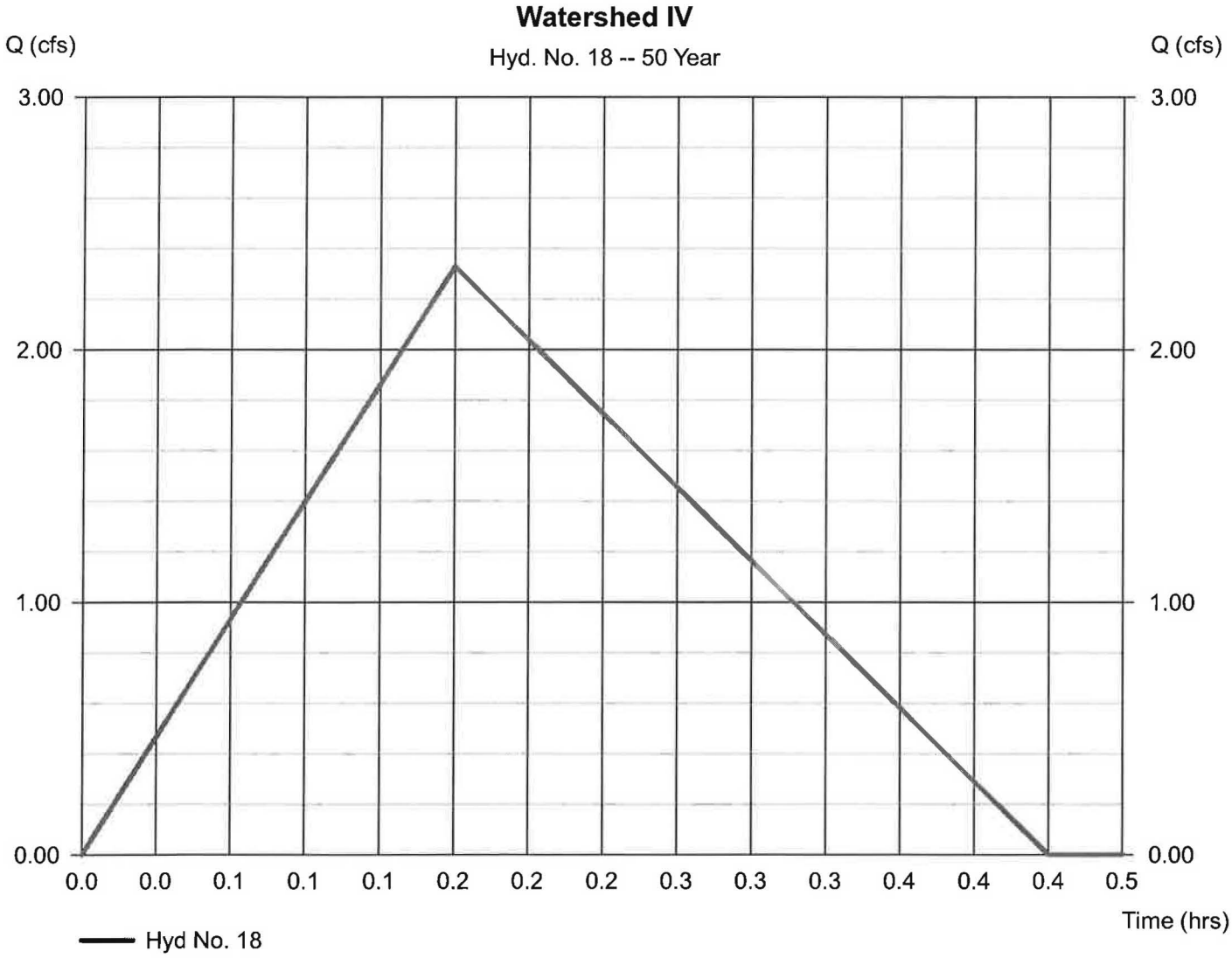
Hydrograph Report

Hyd. No. 18

Watershed IV

Hydrograph type	= Rational	Peak discharge	= 2.328 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 1,865 cuft
Drainage area	= 0.800 ac	Runoff coeff.	= 0.48*
Intensity	= 6.062 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.260 x 0.90) + (0.440 x 0.30) + (0.100 x 0.20)] / 0.800



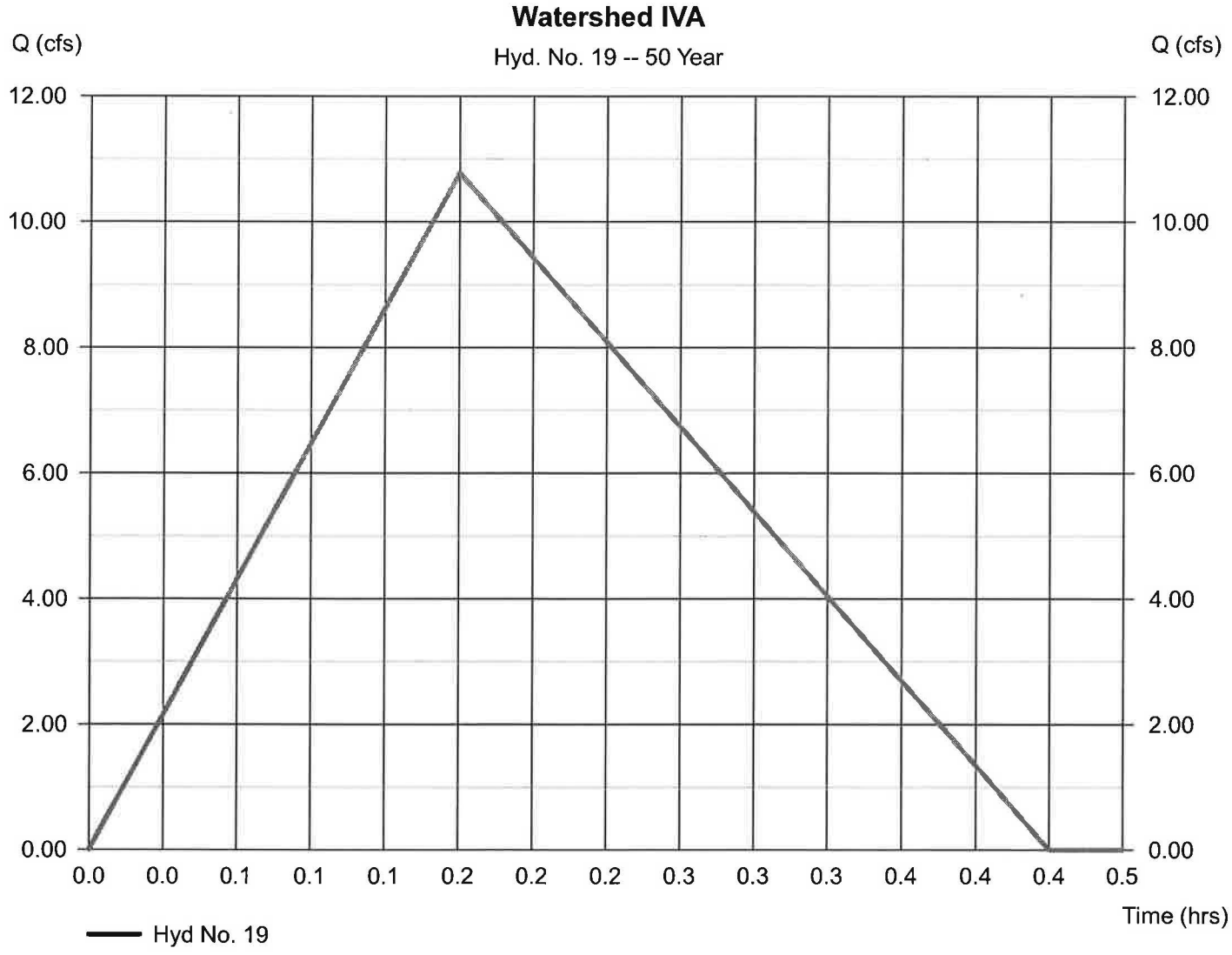
Hydrograph Report

Hyd. No. 19

Watershed IVA

Hydrograph type	= Rational	Peak discharge	= 10.78 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 8,631 cuft
Drainage area	= 2.370 ac	Runoff coeff.	= 0.75*
Intensity	= 6.062 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.770 x 0.90) + (0.600 x 0.30)] / 2.370



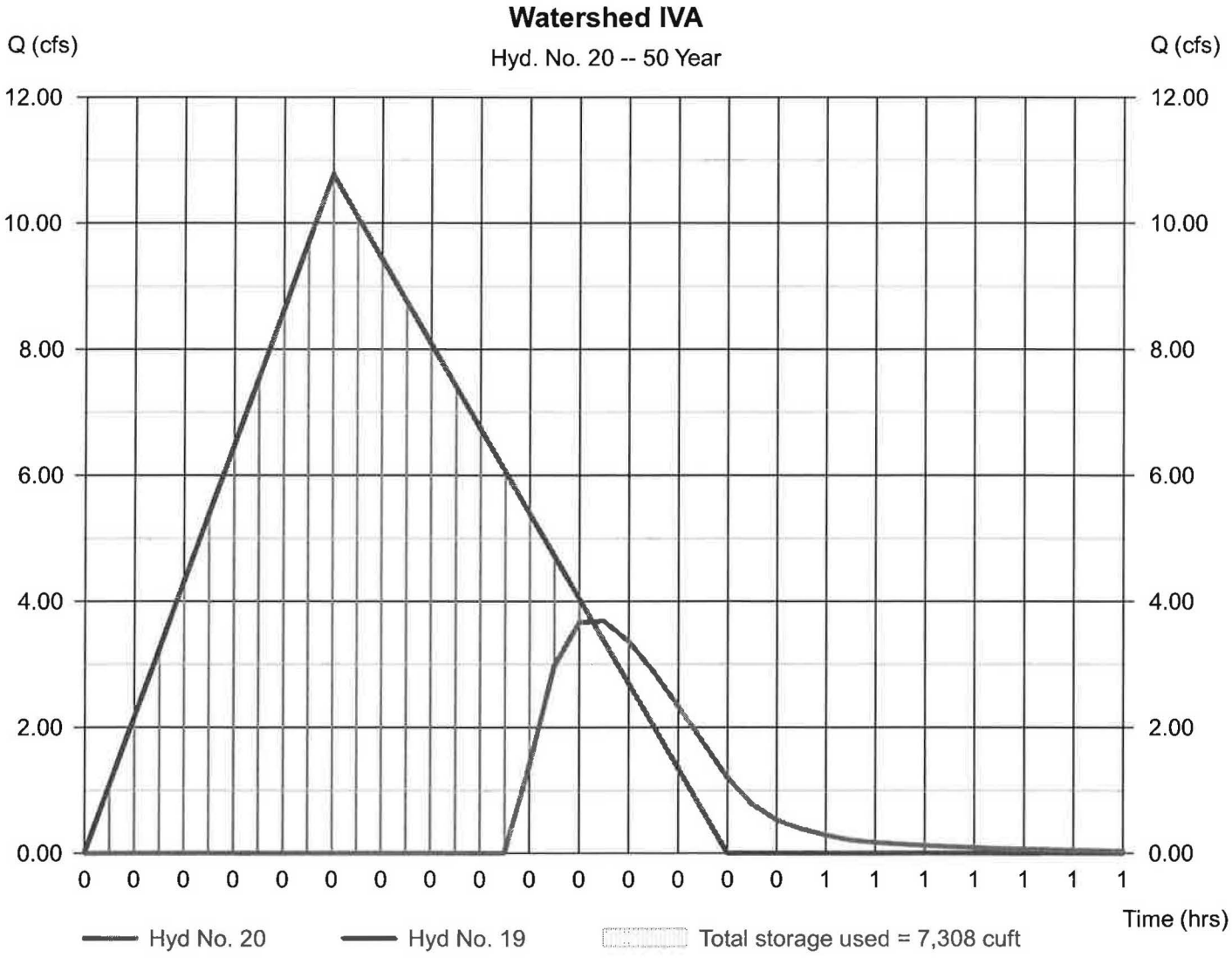
Hydrograph Report

Hyd. No. 20

Watershed IVA

Hydrograph type	= Reservoir	Peak discharge	= 3.682 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.35 hrs
Time interval	= 1 min	Hyd. volume	= 1,590 cuft
Inflow hyd. No.	= 19 - Watershed IVA	Max. Elevation	= 553.87 ft
Reservoir name	= Watershed IVA	Max. Storage	= 7,308 cuft

Storage Indication method used.

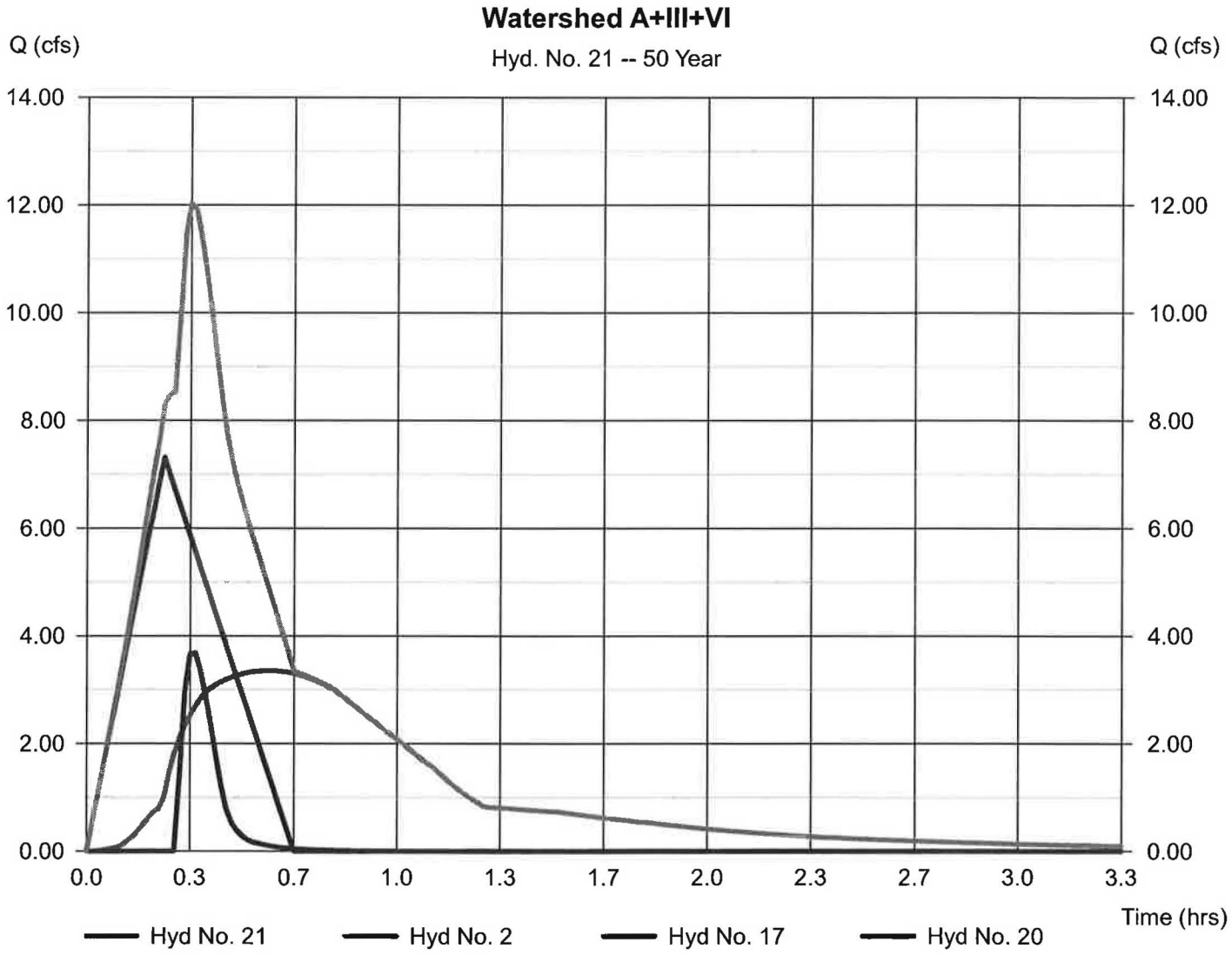


Hydrograph Report

Hyd. No. 21

Watershed A+III+VI

Hydrograph type	= Combine	Peak discharge	= 12.03 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.33 hrs
Time interval	= 1 min	Hyd. volume	= 23,116 cuft
Inflow hyds.	= 2, 17, 20	Contrib. drain. area	= 2.700 ac



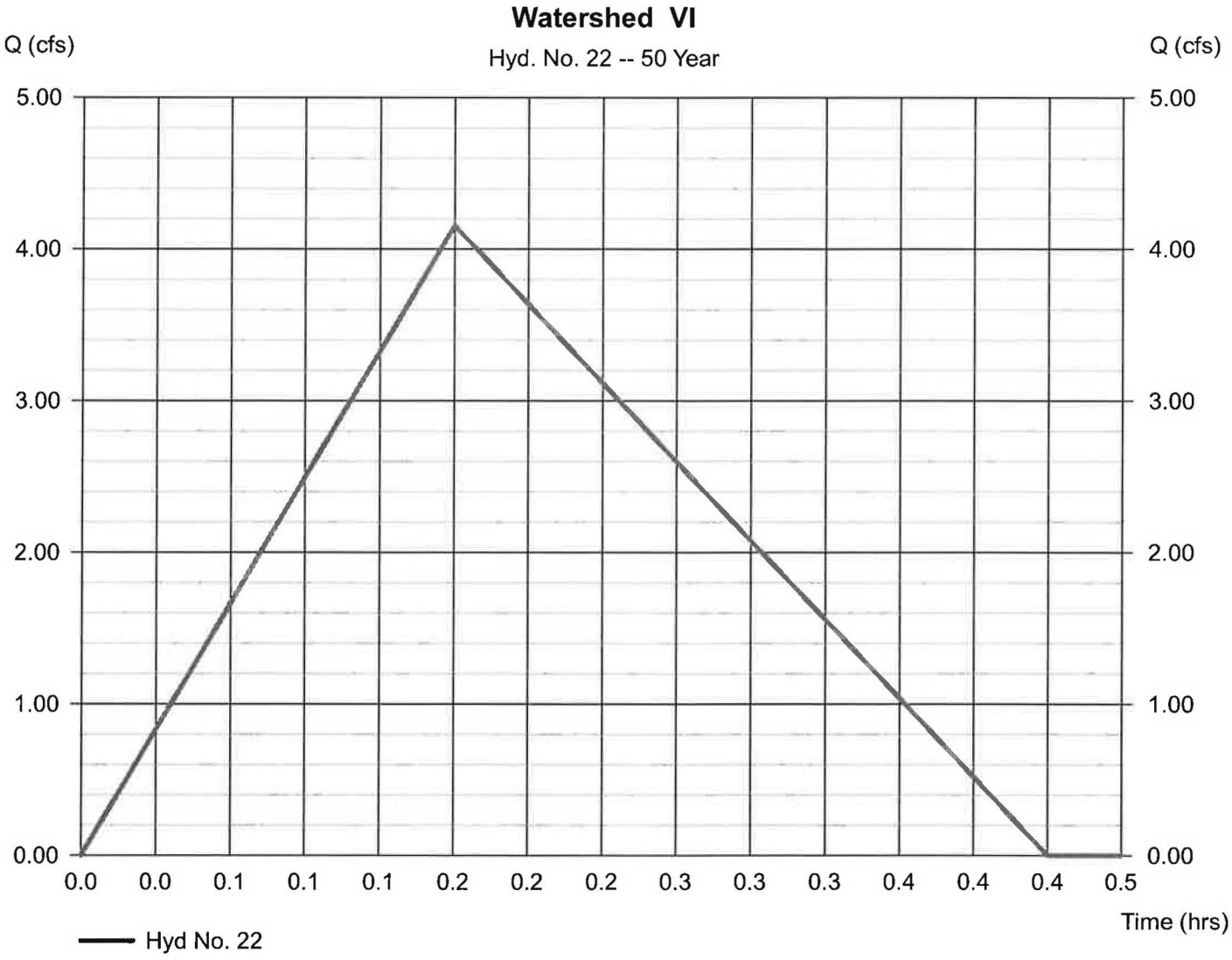
Hydrograph Report

Hyd. No. 22

Watershed VI

Hydrograph type	= Rational	Peak discharge	= 4.155 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 3,328 cuft
Drainage area	= 1.490 ac	Runoff coeff.	= 0.46*
Intensity	= 6.062 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.400 x 0.90) + (1.090 x 0.30)] / 1.490



Hydrograph Report

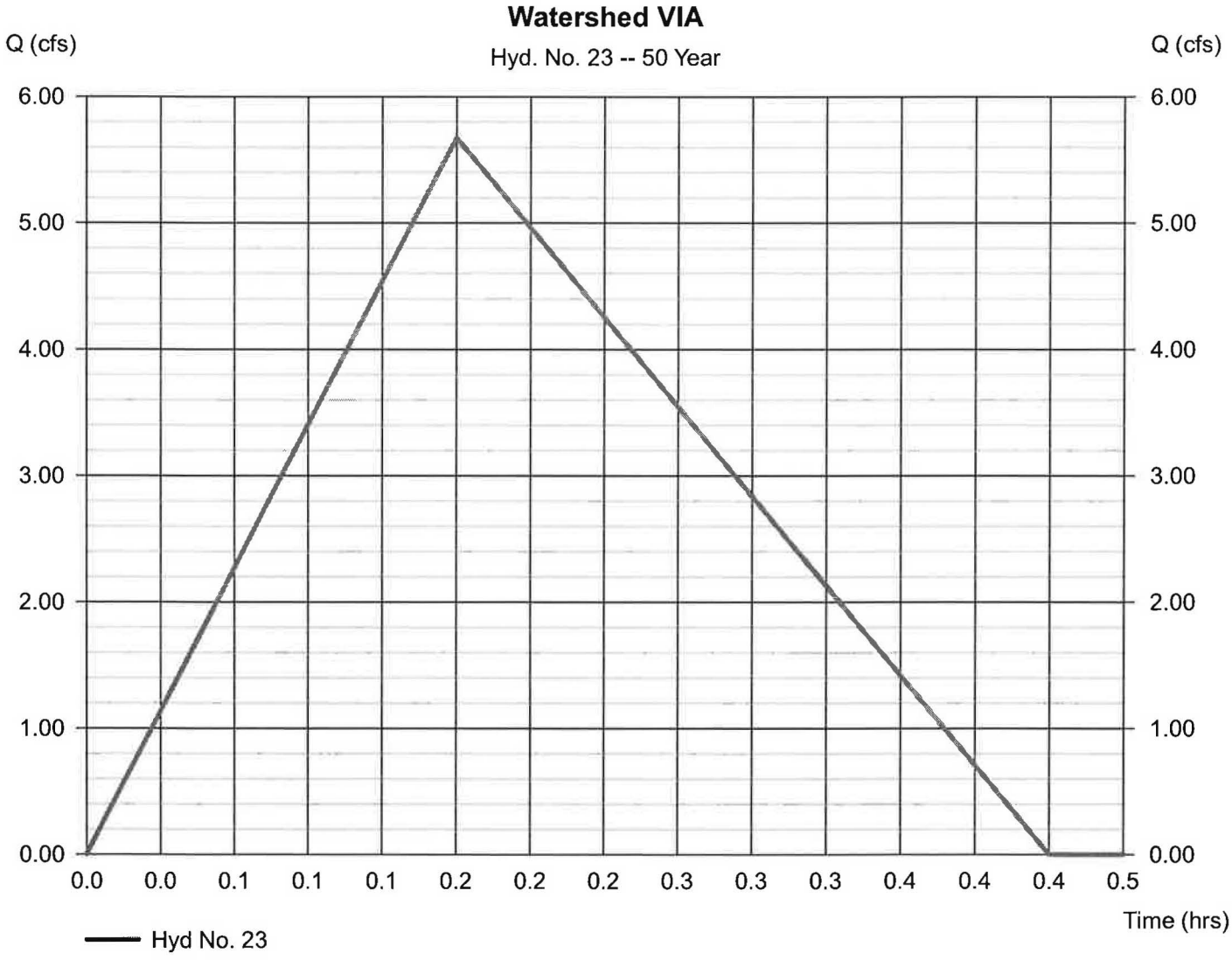
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 23

Watershed VIA

Hydrograph type	= Rational	Peak discharge	= 5.674 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 4,545 cuft
Drainage area	= 1.170 ac	Runoff coeff.	= 0.8*
Intensity	= 6.062 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.970 x 0.90) + (0.200 x 0.30)] / 1.170



Hydrograph Report

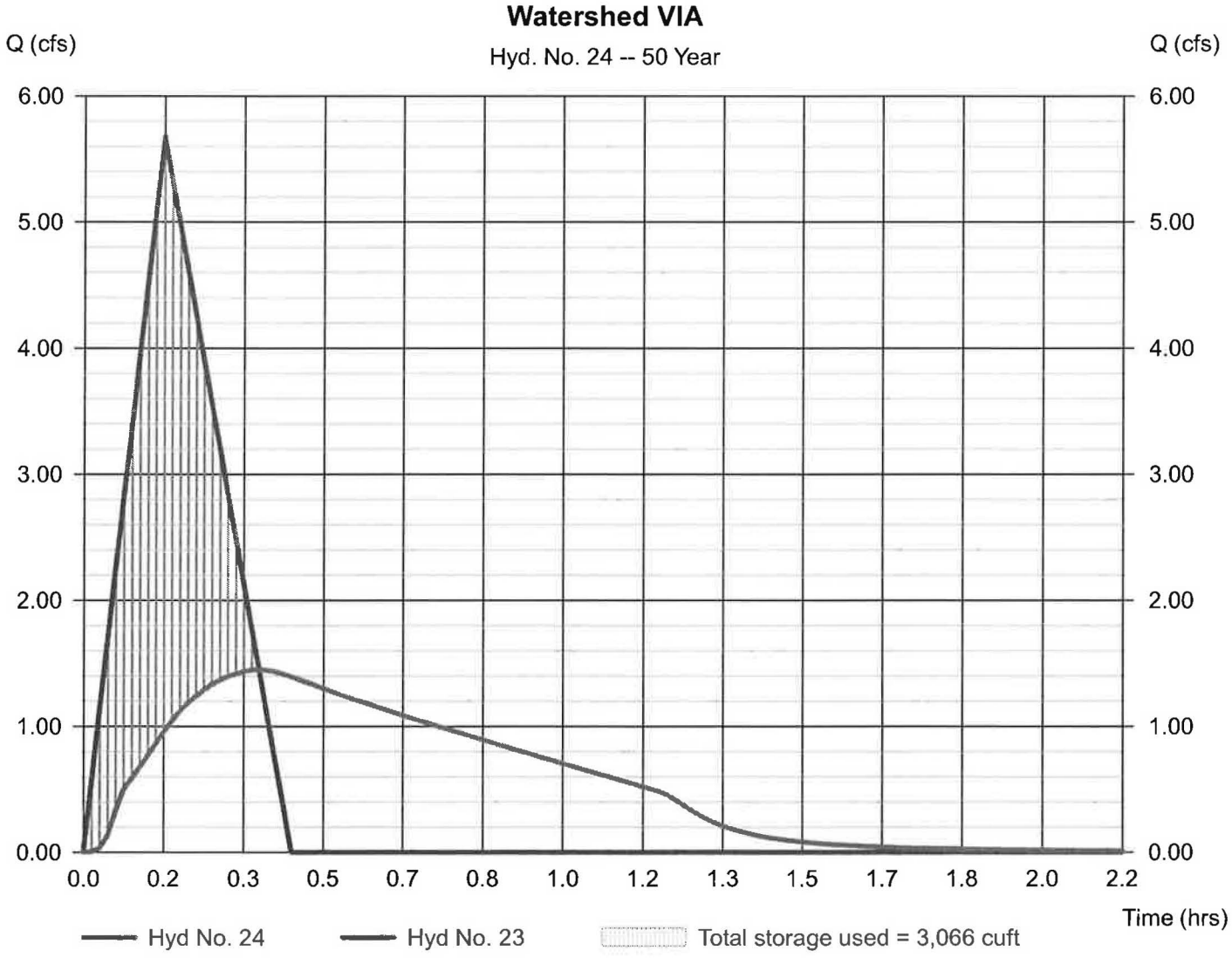
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 24

Watershed VIA

Hydrograph type	= Reservoir	Peak discharge	= 1.449 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.37 hrs
Time interval	= 1 min	Hyd. volume	= 4,421 cuft
Inflow hyd. No.	= 23 - Watershed VIA	Max. Elevation	= 551.10 ft
Reservoir name	= Watershed VIA	Max. Storage	= 3,066 cuft

Storage Indication method used.



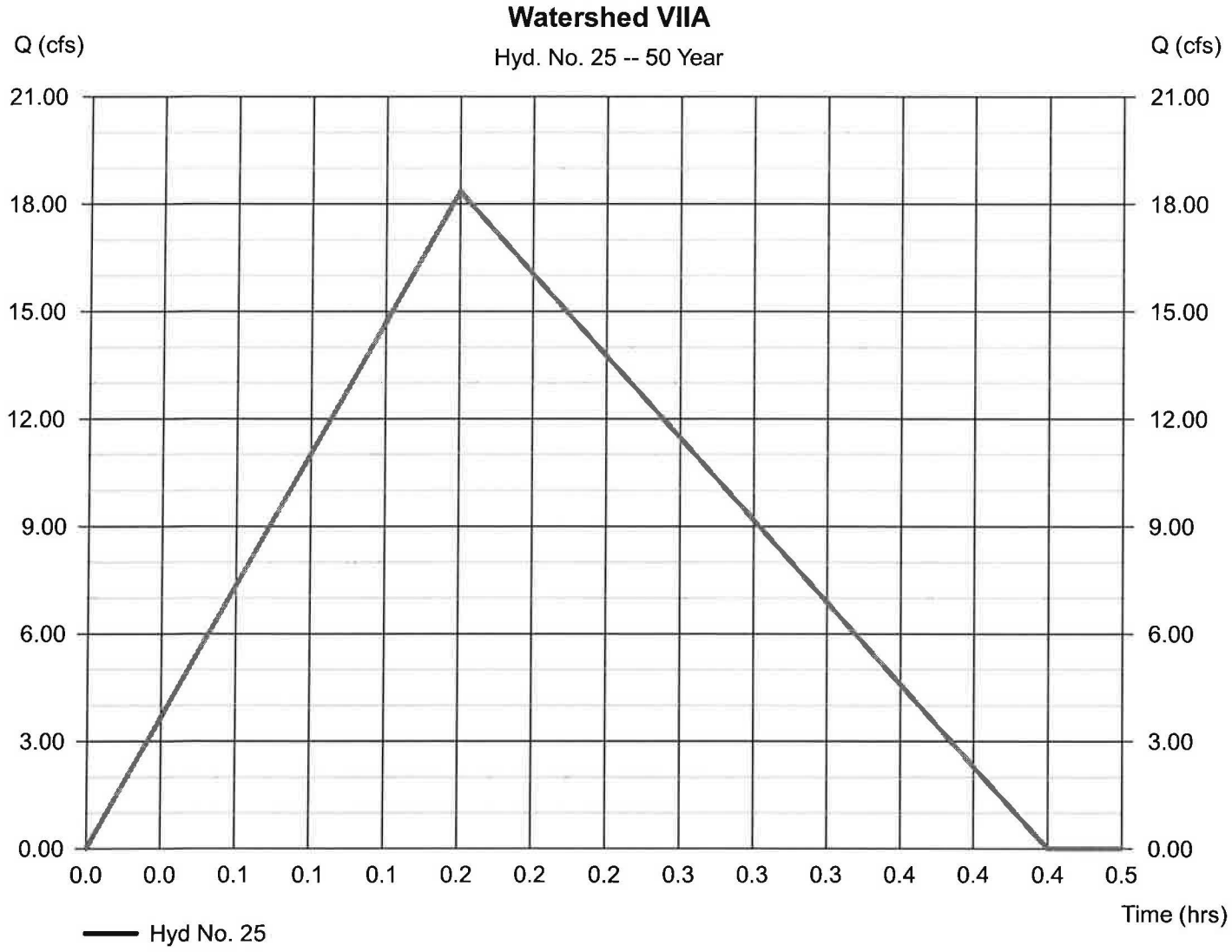
Hydrograph Report

Hyd. No. 25

Watershed VIIA

Hydrograph type	= Rational	Peak discharge	= 18.35 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 14,696 cuft
Drainage area	= 4.090 ac	Runoff coeff.	= 0.74*
Intensity	= 6.062 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(3.020 x 0.90) + (1.070 x 0.30)] / 4.090



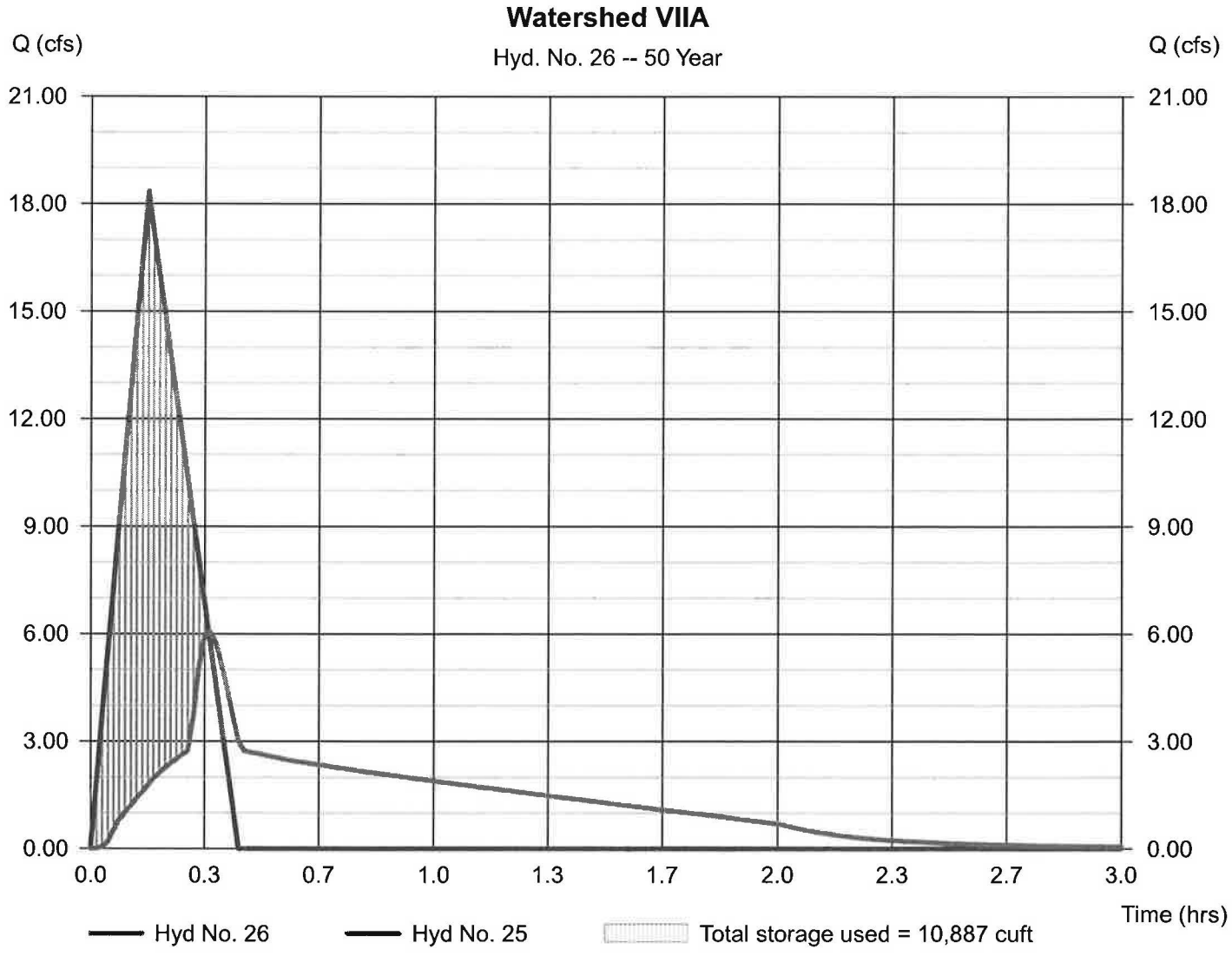
Hydrograph Report

Hyd. No. 26

Watershed VIIA

Hydrograph type	= Reservoir	Peak discharge	= 6.050 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.35 hrs
Time interval	= 1 min	Hyd. volume	= 14,300 cuft
Inflow hyd. No.	= 25 - Watershed VIIA	Max. Elevation	= 547.83 ft
Reservoir name	= Watershed VIIA	Max. Storage	= 10,887 cuft

Storage Indication method used.



Hydrograph Report

Hyd. No. 27

Watershed X

Hydrograph type	= Rational	Peak discharge	= 1.804 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 1,445 cuft
Drainage area	= 0.930 ac	Runoff coeff.	= 0.32*
Intensity	= 6.062 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.100 x 0.90) + (0.410 x 0.30) + (0.420 x 0.20)] / 0.930

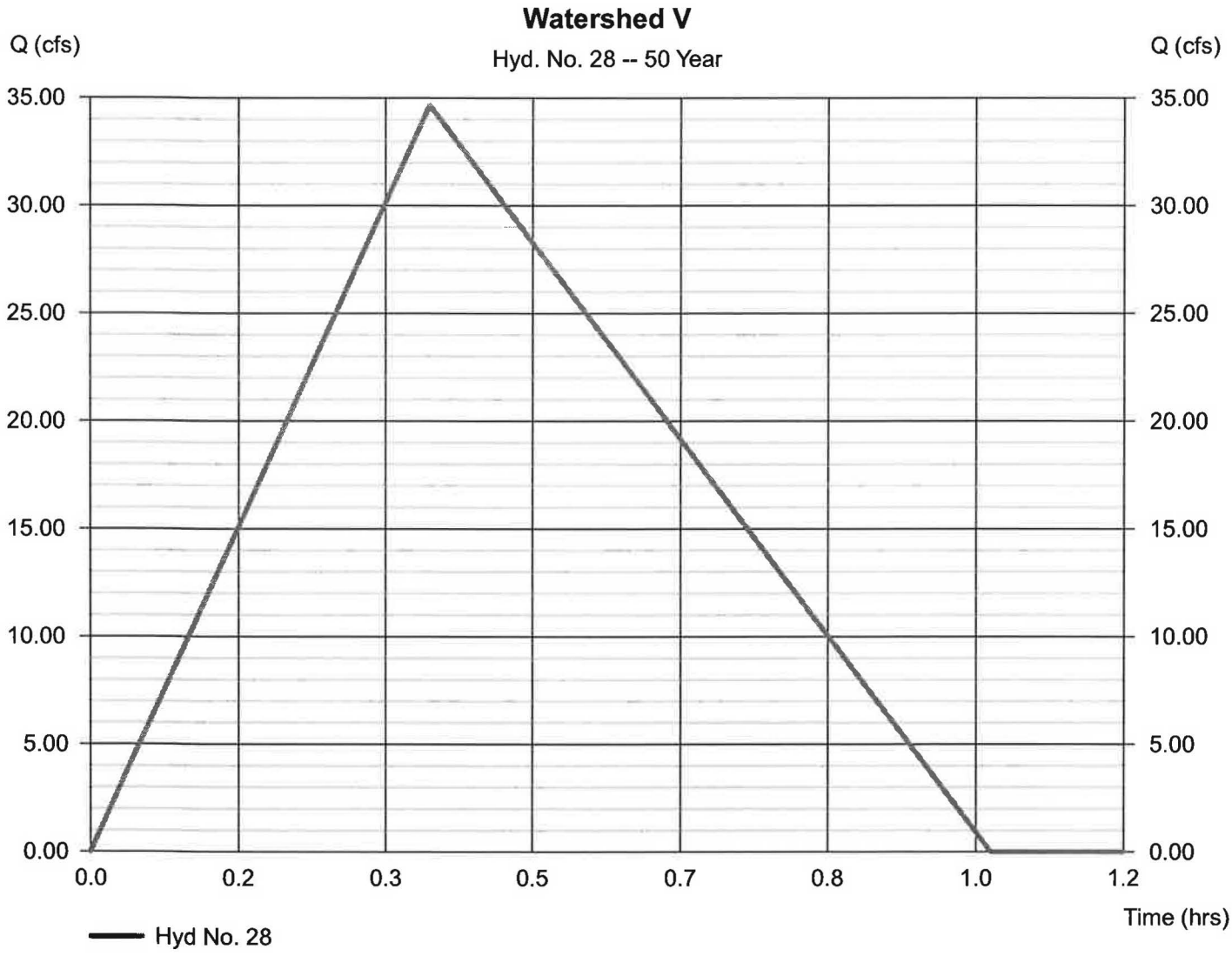
Hydrograph Report

Hyd. No. 28

Watershed V

Hydrograph type	= Rational	Peak discharge	= 34.66 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.38 hrs
Time interval	= 1 min	Hyd. volume	= 63,849 cuft
Drainage area	= 26.200 ac	Runoff coeff.	= 0.31*
Intensity	= 4.267 in/hr	Tc by TR55	= 23.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(2.500 x 0.90) + (10.640 x 0.30) + (13.060 x 0.20)] / 26.200



Hydrograph Report

Hyd. No. 29

Watershed XA

Hydrograph type	= Rational	Peak discharge	= 3.020 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 2,419 cuft
Drainage area	= 0.940 ac	Runoff coeff.	= 0.53*
Intensity	= 6.062 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.390 x 0.90) + (0.350 x 0.30) + (0.200 x 0.20)] / 0.940

Hydrograph Report

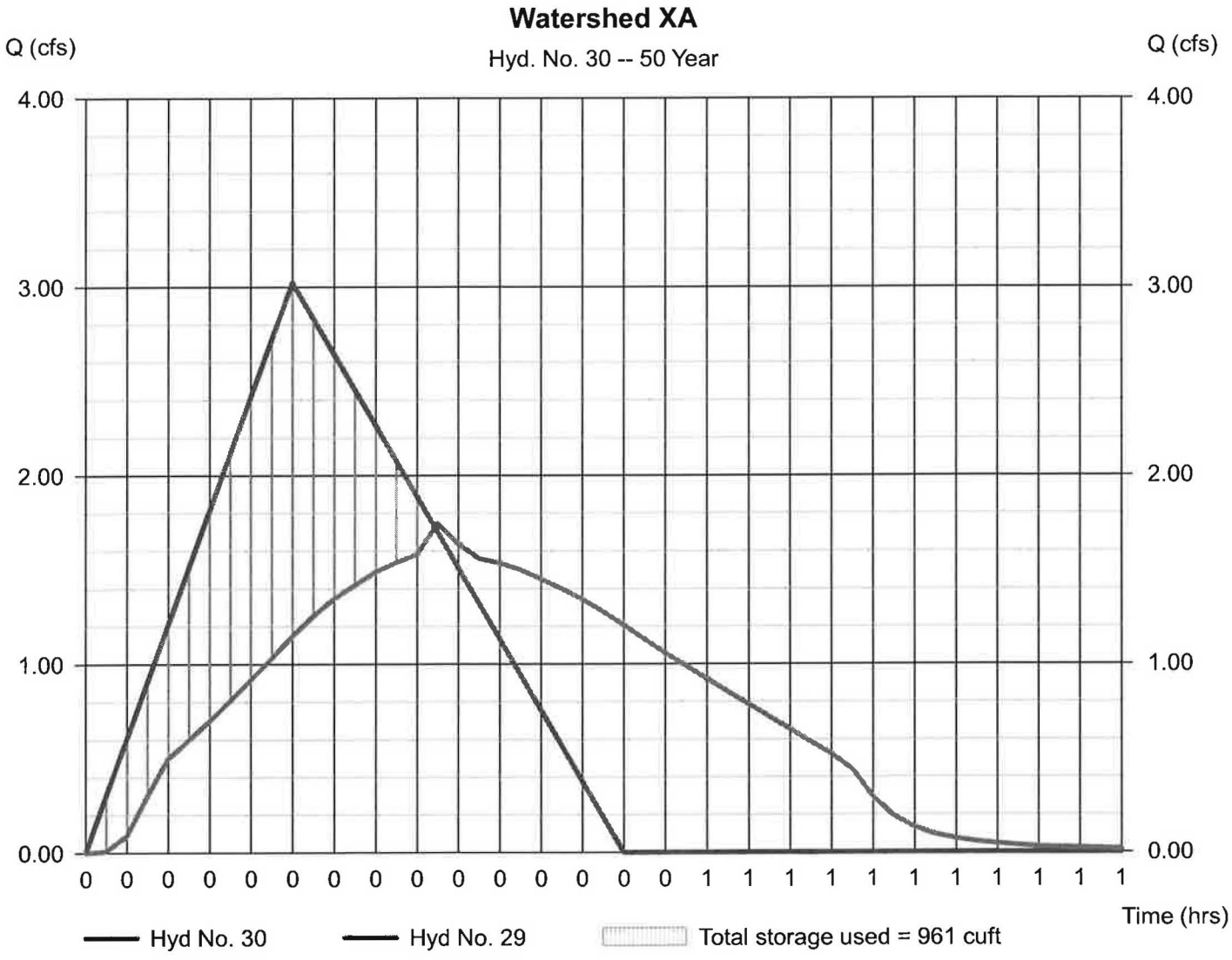
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 30

Watershed XA

Hydrograph type	= Reservoir	Peak discharge	= 1.745 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.28 hrs
Time interval	= 1 min	Hyd. volume	= 2,354 cuft
Inflow hyd. No.	= 29 - Watershed XA	Max. Elevation	= 558.55 ft
Reservoir name	= Watershed XA	Max. Storage	= 961 cuft

Storage Indication method used.



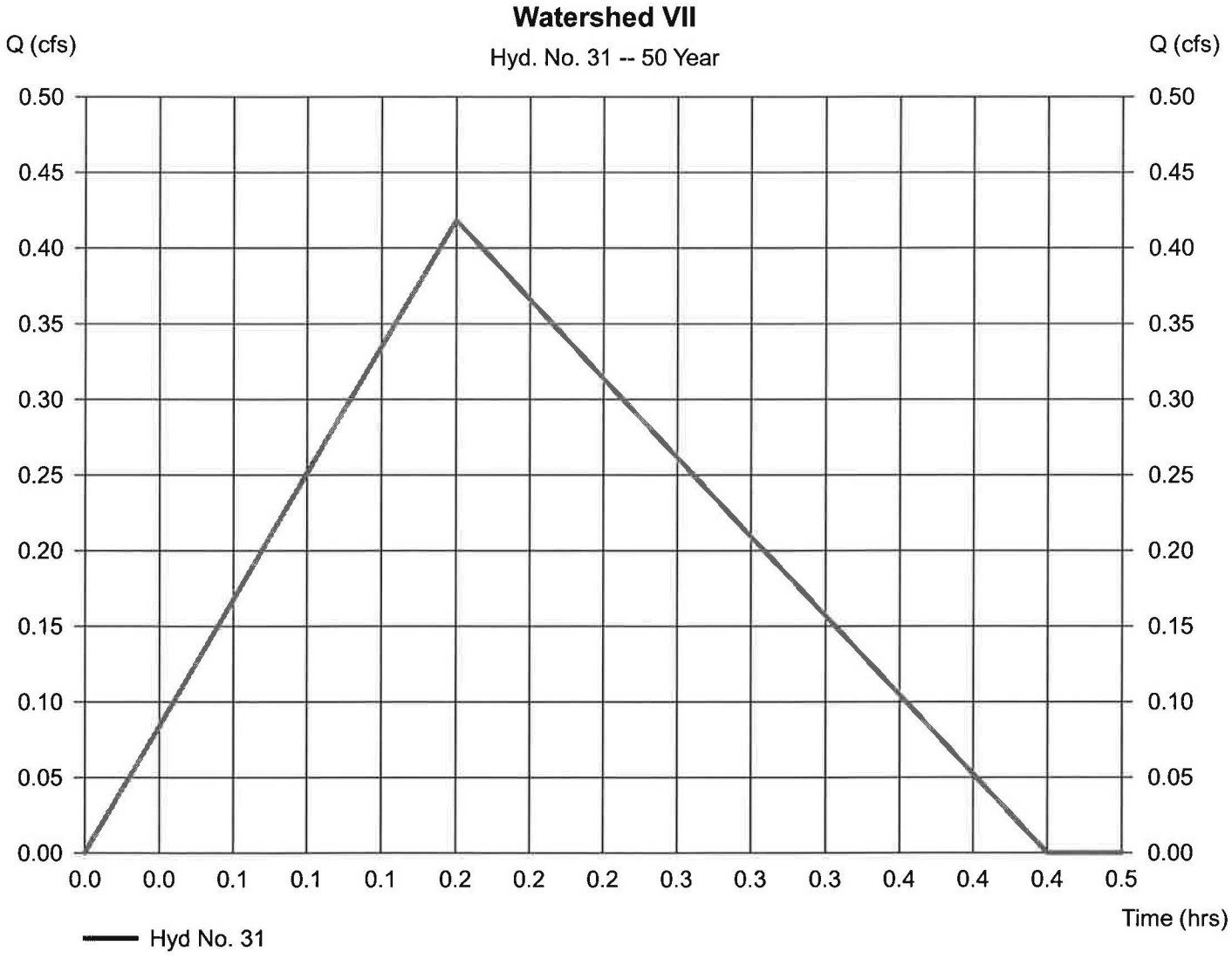
Hydrograph Report

Hyd. No. 31

Watershed VII

Hydrograph type	= Rational	Peak discharge	= 0.418 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 335 cuft
Drainage area	= 0.230 ac	Runoff coeff.	= 0.3*
Intensity	= 6.062 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.230 x 0.30)] / 0.230

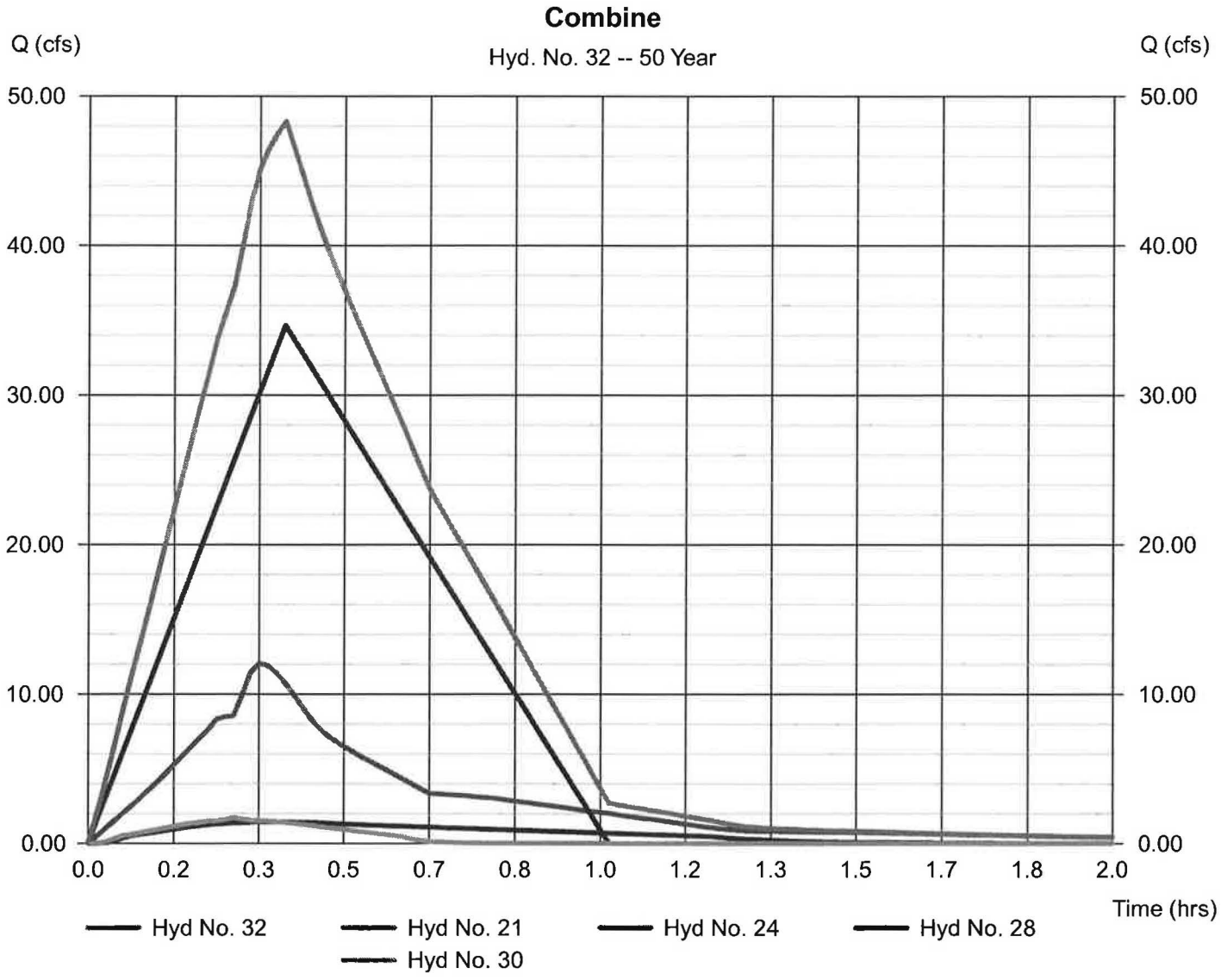


Hydrograph Report

Hyd. No. 32

Combine

Hydrograph type	= Combine	Peak discharge	= 48.30 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.38 hrs
Time interval	= 1 min	Hyd. volume	= 93,315 cuft
Inflow hyds.	= 21, 24, 28, 30	Contrib. drain. area	= 26.200 ac



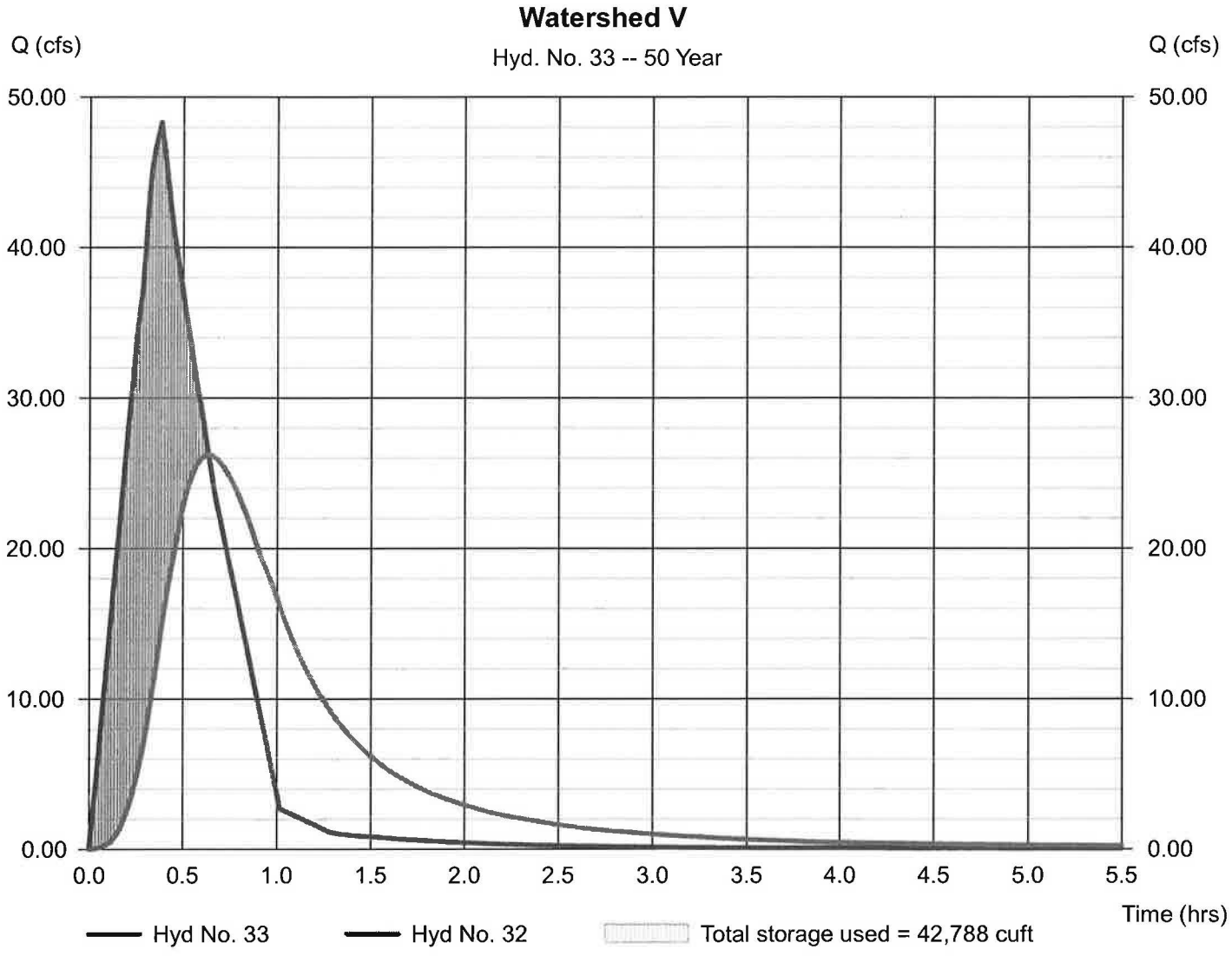
Hydrograph Report

Hyd. No. 33

Watershed V

Hydrograph type	= Reservoir	Peak discharge	= 26.20 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.63 hrs
Time interval	= 1 min	Hyd. volume	= 93,308 cuft
Inflow hyd. No.	= 32 - Combine	Max. Elevation	= 544.39 ft
Reservoir name	= Watershed X	Max. Storage	= 42,788 cuft

Storage Indication method used.



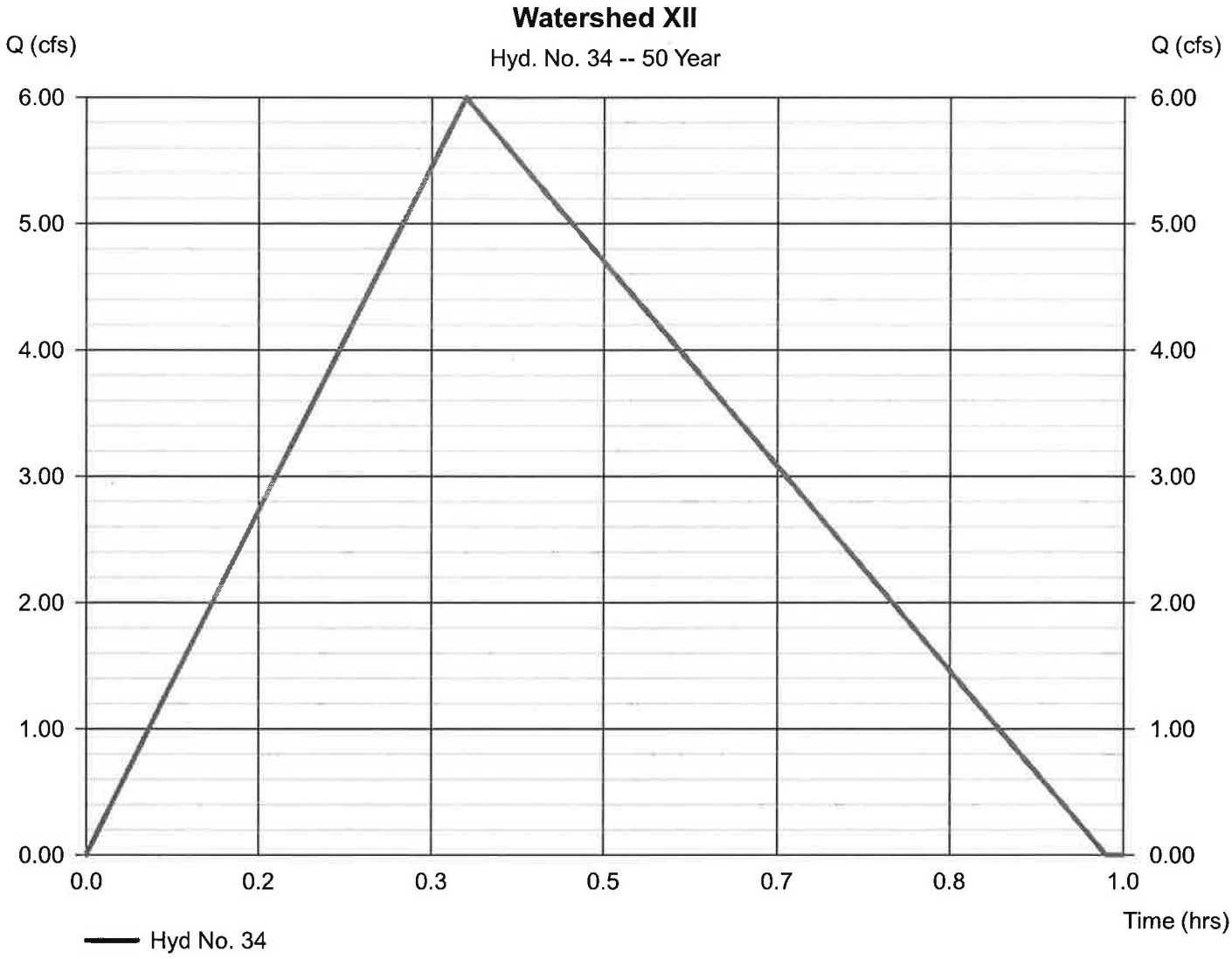
Hydrograph Report

Hyd. No. 34

Watershed XII

Hydrograph type	= Rational	Peak discharge	= 5.998 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.37 hrs
Time interval	= 1 min	Hyd. volume	= 10,794 cuft
Drainage area	= 4.630 ac	Runoff coeff.	= 0.3*
Intensity	= 4.318 in/hr	Tc by TR55	= 22.47 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.490 x 0.90) + (1.430 x 0.30) + (2.710 x 0.20)] / 4.630



Hydrograph Report

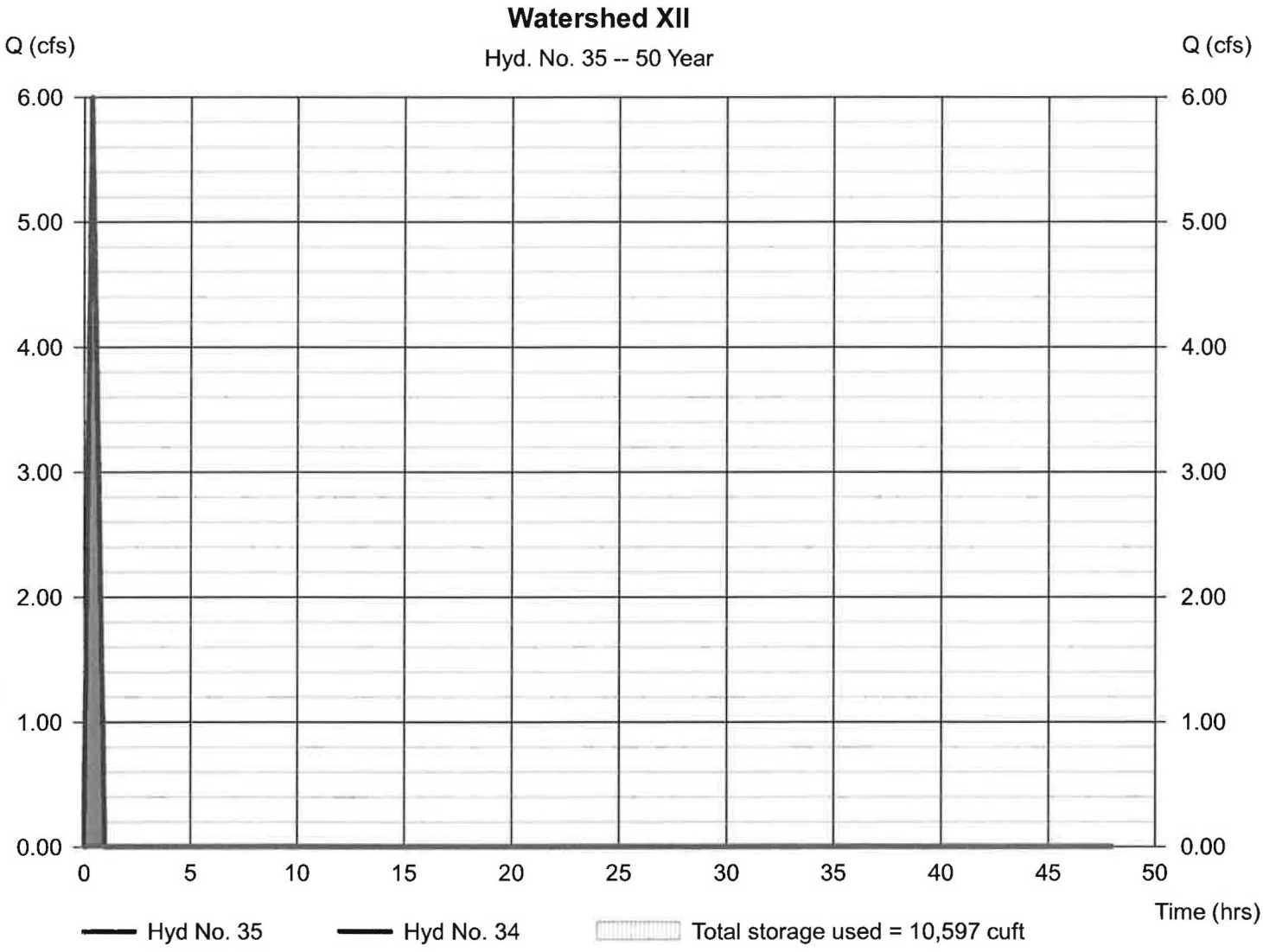
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 35

Watershed XII

Hydrograph type	= Reservoir	Peak discharge	= 0.007 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.98 hrs
Time interval	= 1 min	Hyd. volume	= 1,167 cuft
Inflow hyd. No.	= 34 - Watershed XII	Max. Elevation	= 546.31 ft
Reservoir name	= Watershed XII	Max. Storage	= 10,597 cuft

Storage Indication method used.



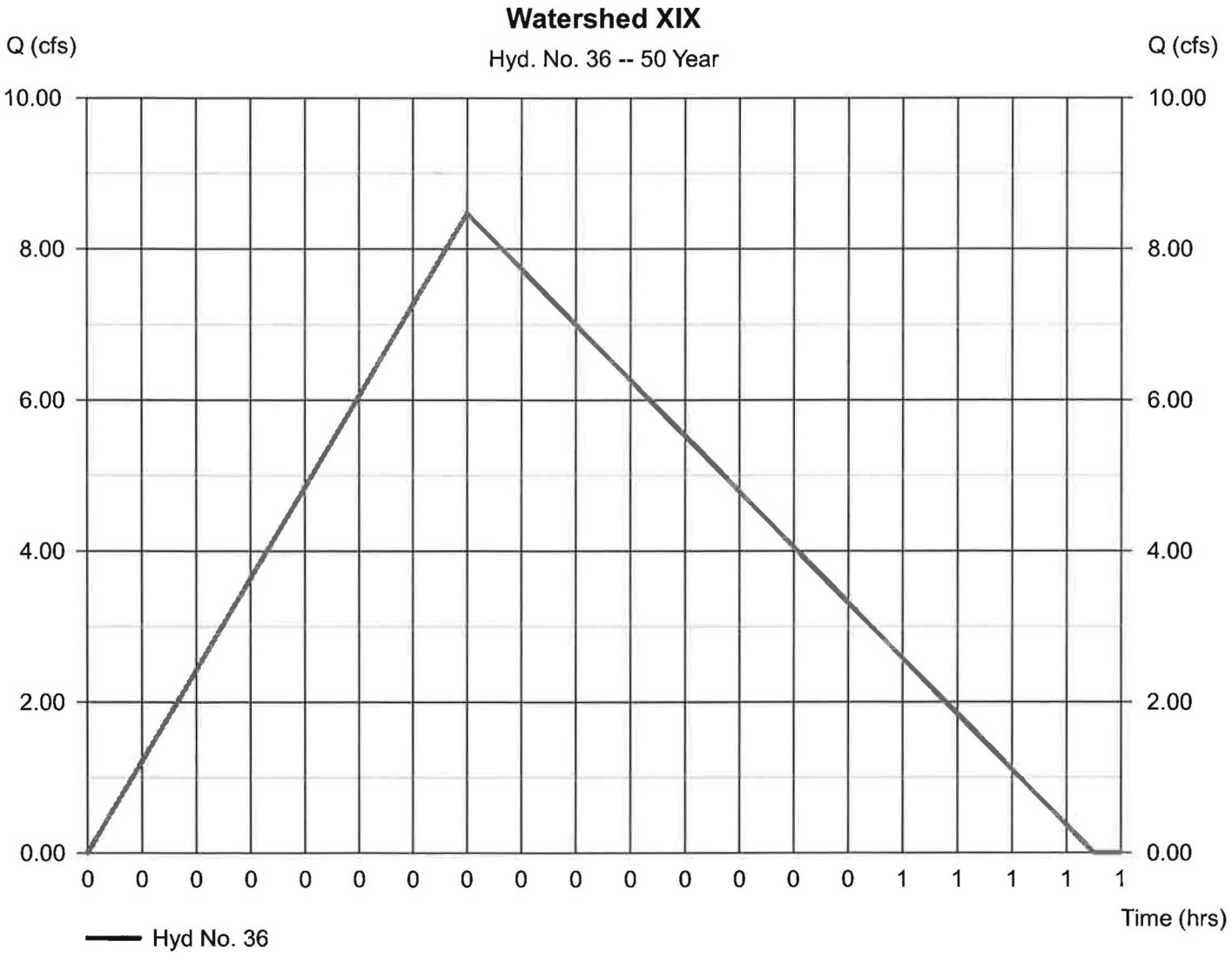
Hydrograph Report

Hyd. No. 36

Watershed XIX

Hydrograph type	= Rational	Peak discharge	= 8.472 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.23 hrs
Time interval	= 1 min	Hyd. volume	= 9,501 cuft
Drainage area	= 5.860 ac	Runoff coeff.	= 0.27*
Intensity	= 5.355 in/hr	Tc by TR55	= 14.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.400 x 0.90) + (1.500 x 0.30) + (3.960 x 0.20)] / 5.860

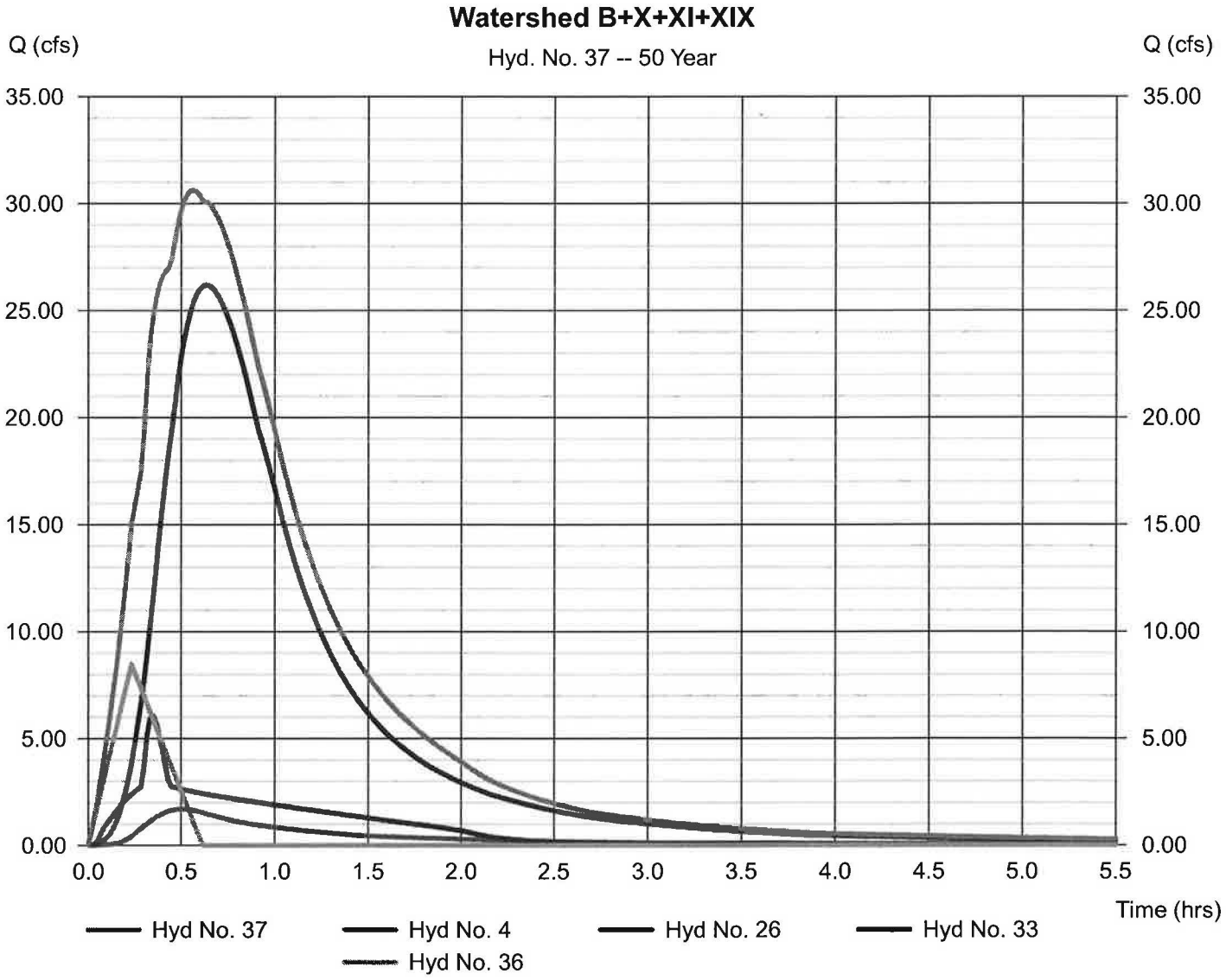


Hydrograph Report

Hyd. No. 37

Watershed B+X+XI+XIX

Hydrograph type	= Combine	Peak discharge	= 30.63 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.57 hrs
Time interval	= 1 min	Hyd. volume	= 124,406 cuft
Inflow hyds.	= 4, 26, 33, 36	Contrib. drain. area	= 5.860 ac



Hydrograph Report

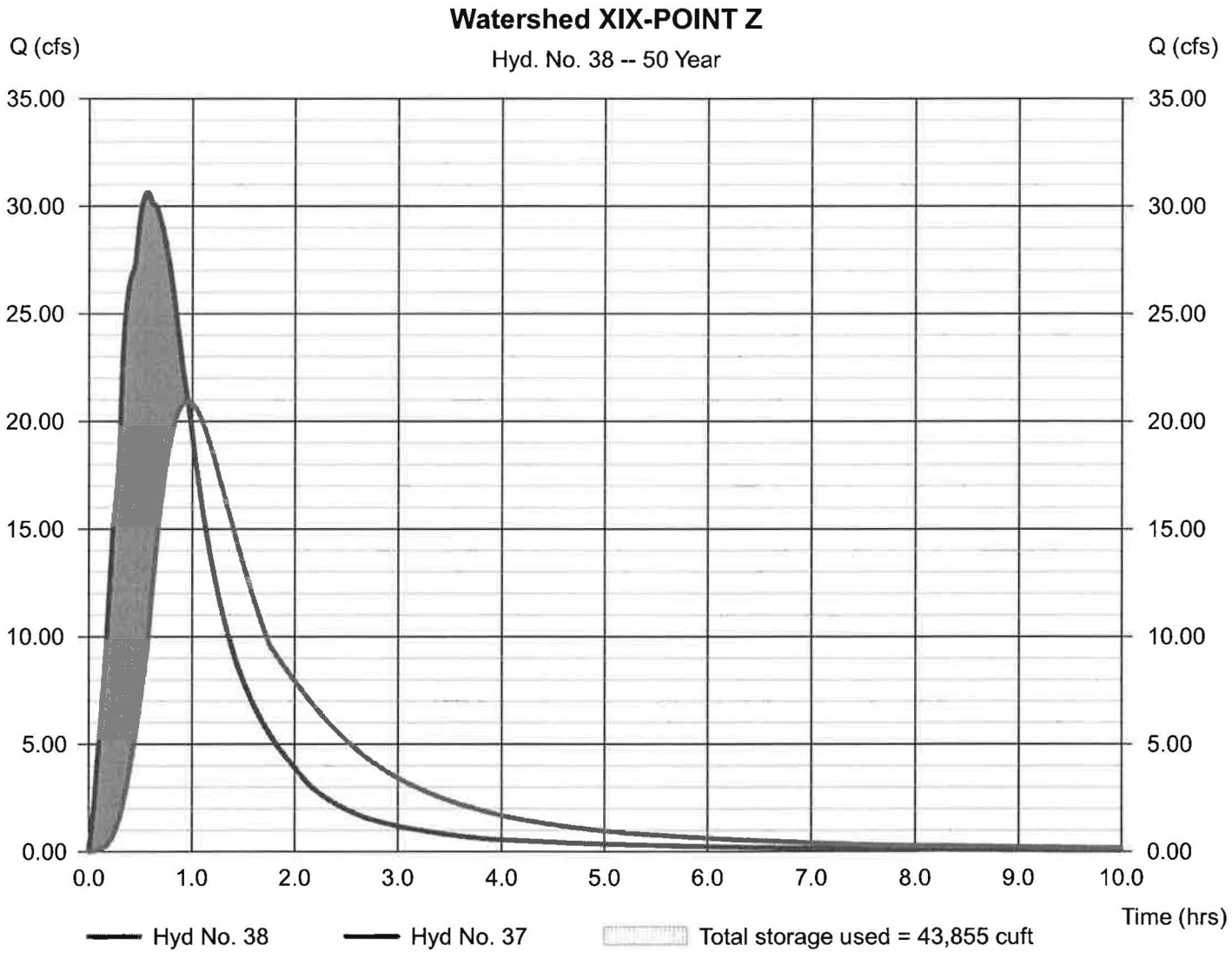
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 38

Watershed XIX-POINT Z

Hydrograph type	= Reservoir	Peak discharge	= 20.92 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.95 hrs
Time interval	= 1 min	Hyd. volume	= 124,396 cuft
Inflow hyd. No.	= 37 - Watershed B+X+XI+XIX	Max. Elevation	= 542.16 ft
Reservoir name	= Watershed XIX	Max. Storage	= 43,855 cuft

Storage Indication method used.



Hydrograph Report

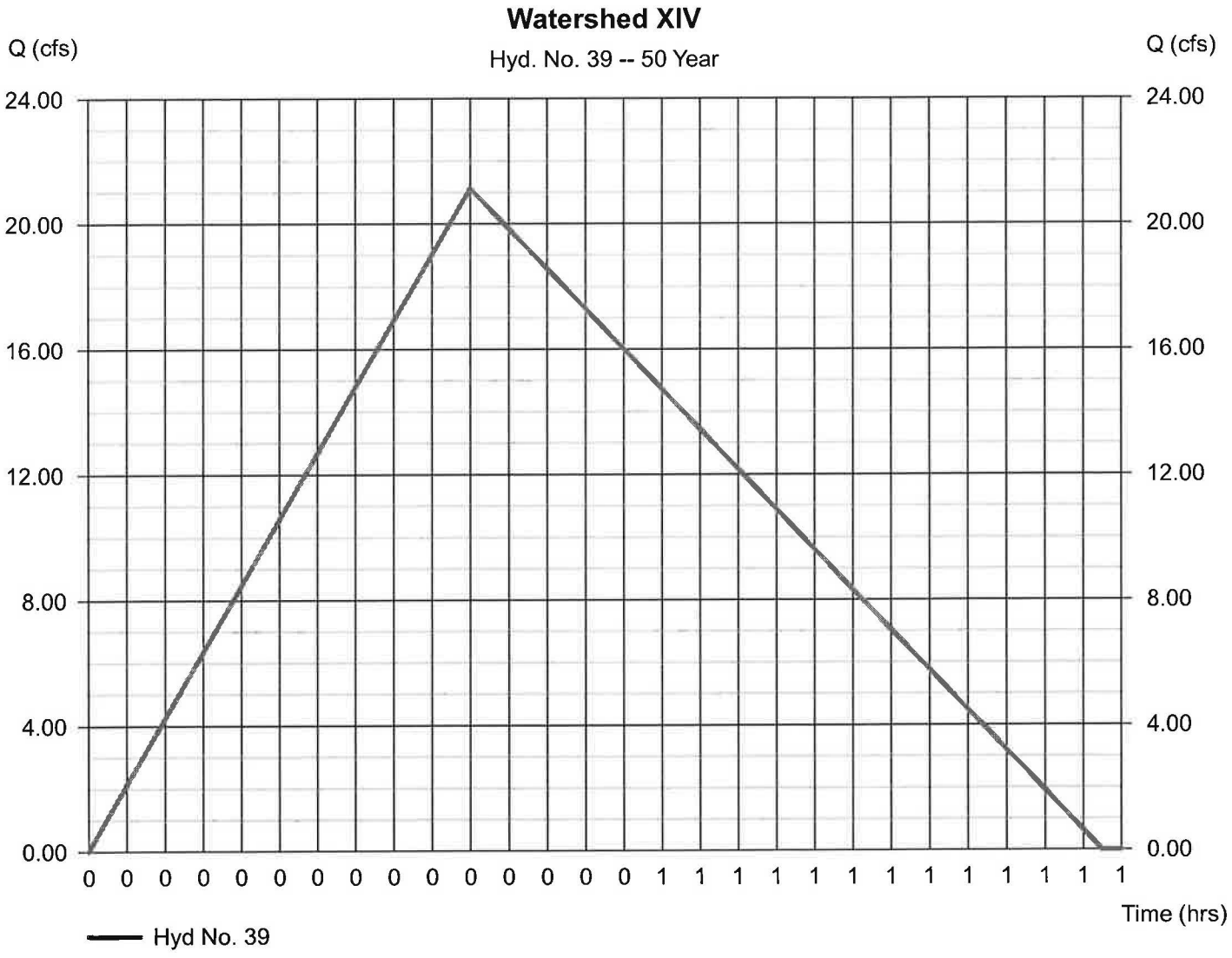
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 39

Watershed XIV

Hydrograph type	= Rational	Peak discharge	= 21.13 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.33 hrs
Time interval	= 1 min	Hyd. volume	= 33,845 cuft
Drainage area	= 15.400 ac	Runoff coeff.	= 0.3*
Intensity	= 4.573 in/hr	Tc by TR55	= 20.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.000 x 0.90) + (5.100 x 0.30) + (8.800 x 0.20) + (0.500 x 1.00)] / 15.400

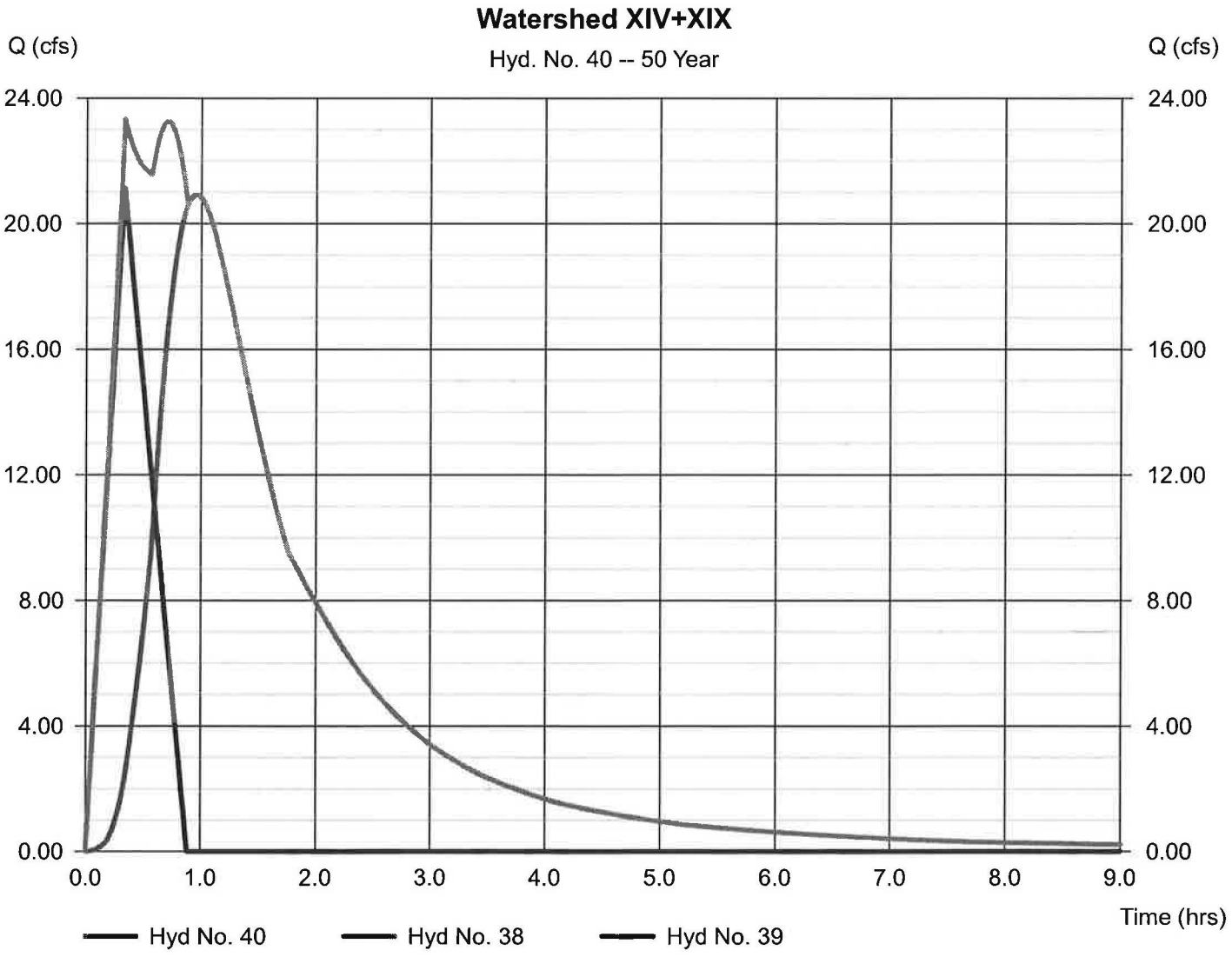


Hydrograph Report

Hyd. No. 40

Watershed XIV+XIX

Hydrograph type	= Combine	Peak discharge	= 23.33 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.33 hrs
Time interval	= 1 min	Hyd. volume	= 157,988 cuft
Inflow hyds.	= 38, 39	Contrib. drain. area	= 15.400 ac



Hydrograph Report

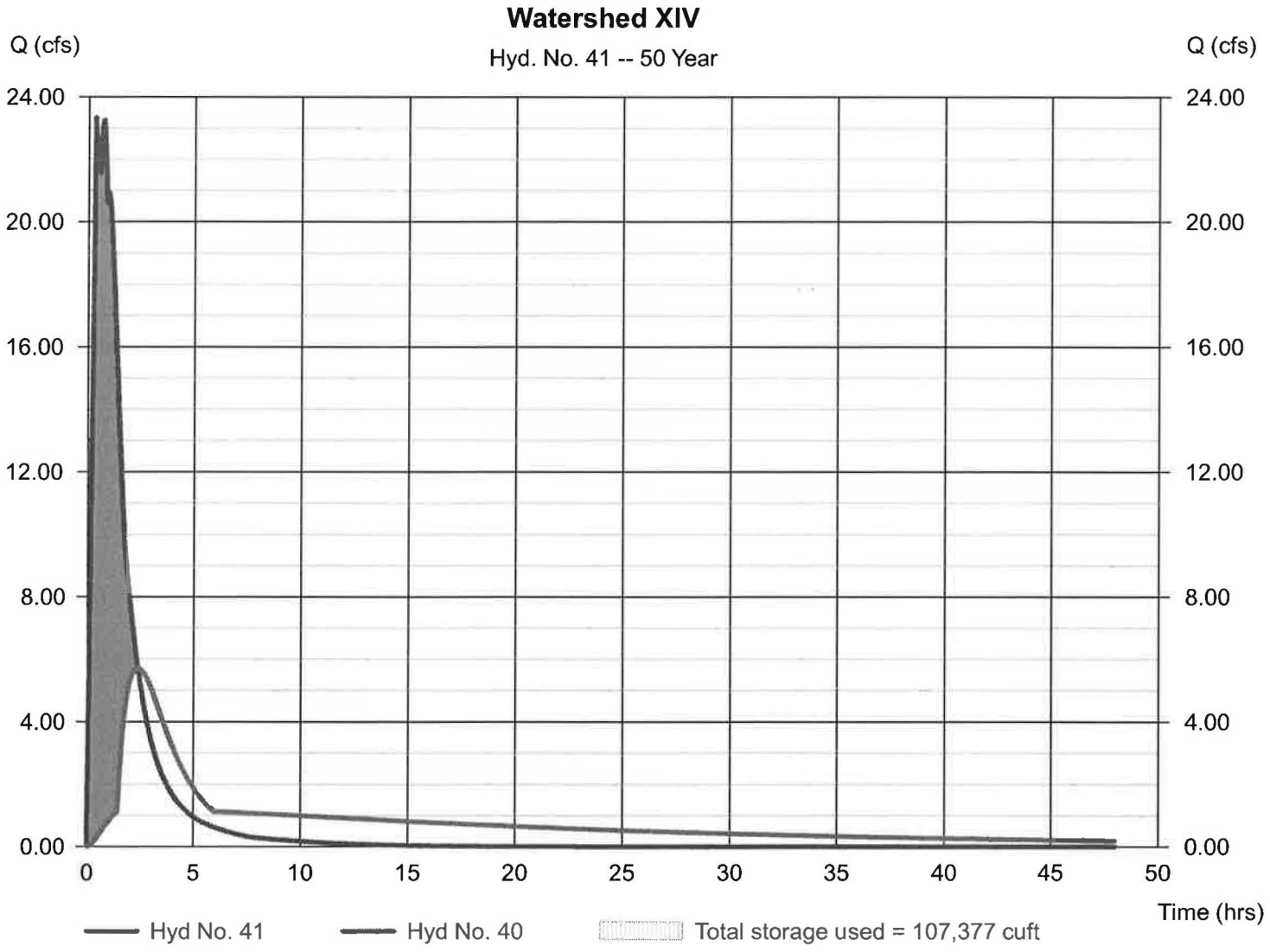
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 41

Watershed XIV

Hydrograph type	= Reservoir	Peak discharge	= 5.719 cfs
Storm frequency	= 50 yrs	Time to peak	= 2.38 hrs
Time interval	= 1 min	Hyd. volume	= 141,568 cuft
Inflow hyd. No.	= 40 - Watershed XIV+XIX	Max. Elevation	= 539.63 ft
Reservoir name	= Watershed XIV	Max. Storage	= 107,377 cuft

Storage Indication method used.



Hydrograph Report

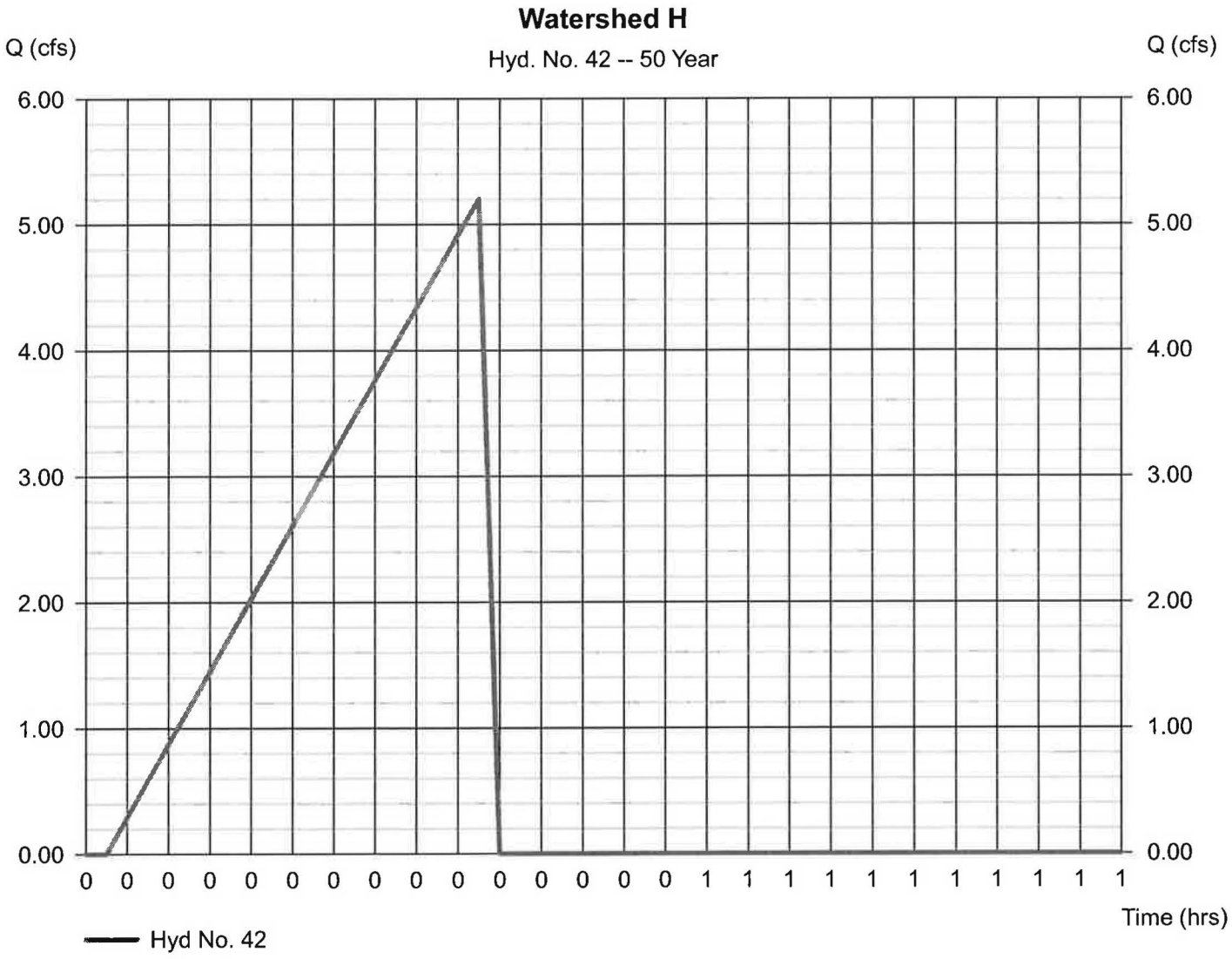
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 42

Watershed H

Hydrograph type	= Rational	Peak discharge	= 5.204 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 7,789 cuft
Drainage area	= 3.800 ac	Runoff coeff.	= 0.29*
Intensity	= 4.722 in/hr	Tc by TR55	= 18.69 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.200 x 0.90) + (0.100 x 0.30) + (2.500 x 0.20) + (0.800 x 0.25) + (0.200 x 1.00)] / 3.800

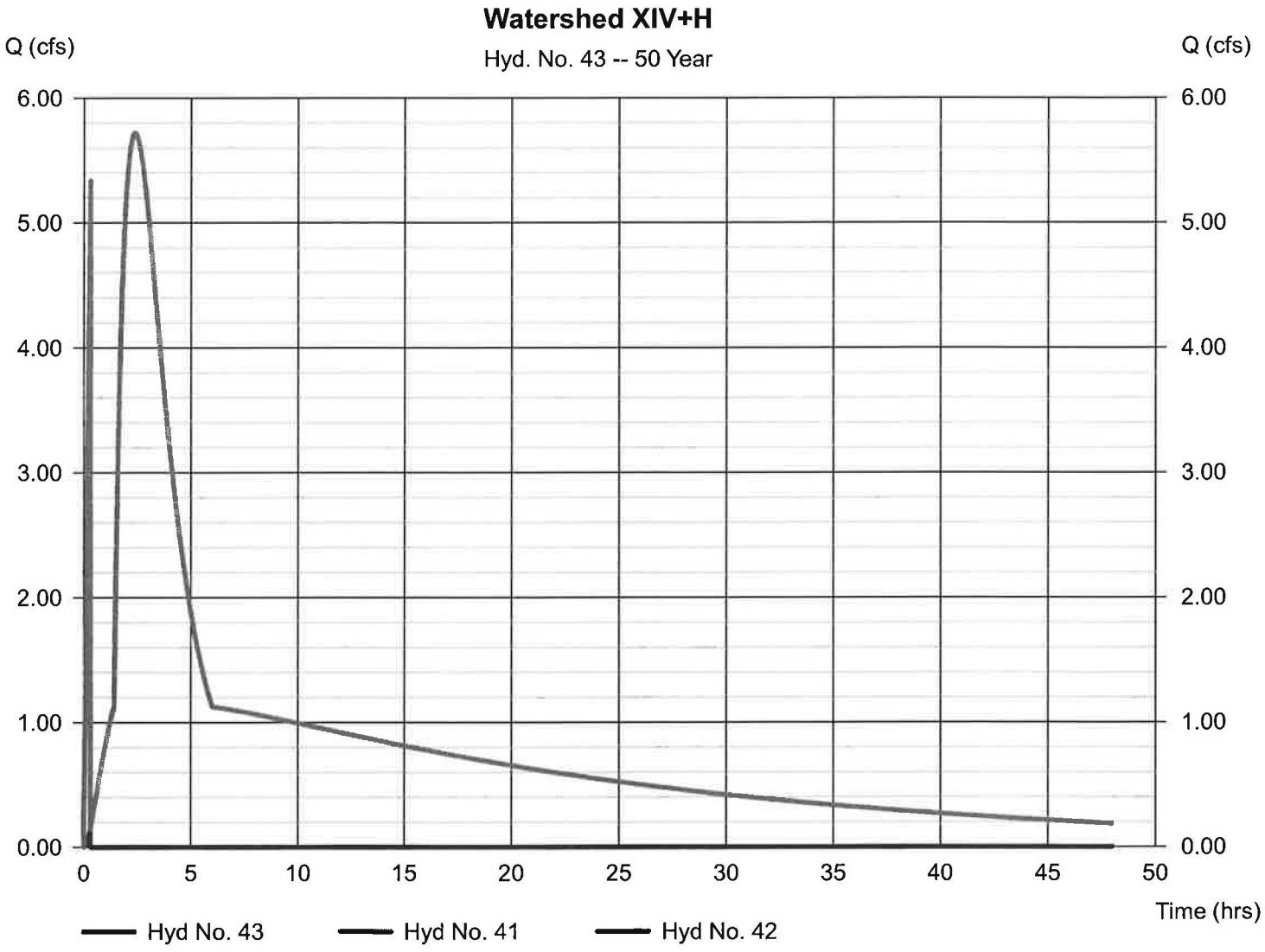


Hydrograph Report

Hyd. No. 43

Watershed XIV+H

Hydrograph type	= Combine	Peak discharge	= 5.719 cfs
Storm frequency	= 50 yrs	Time to peak	= 2.38 hrs
Time interval	= 1 min	Hyd. volume	= 144,535 cuft
Inflow hyds.	= 41, 42	Contrib. drain. area	= 3.800 ac



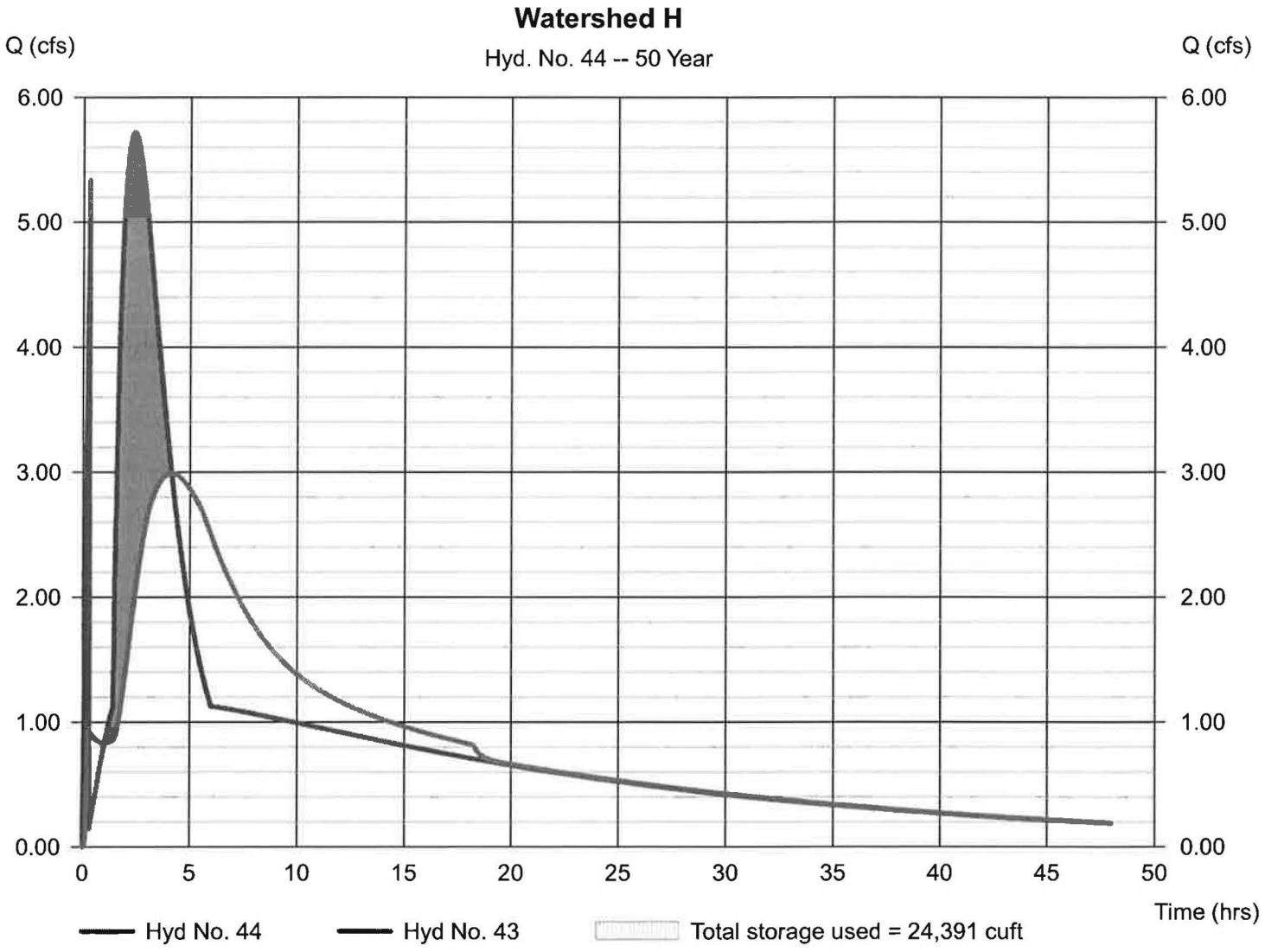
Hydrograph Report

Hyd. No. 44

Watershed H

Hydrograph type	= Reservoir	Peak discharge	= 2.988 cfs
Storm frequency	= 50 yrs	Time to peak	= 4.13 hrs
Time interval	= 1 min	Hyd. volume	= 143,848 cuft
Inflow hyd. No.	= 43 - Watershed XIV+H	Max. Elevation	= 536.73 ft
Reservoir name	= Watershed H	Max. Storage	= 24,391 cuft

Storage Indication method used.



Hydrograph Report

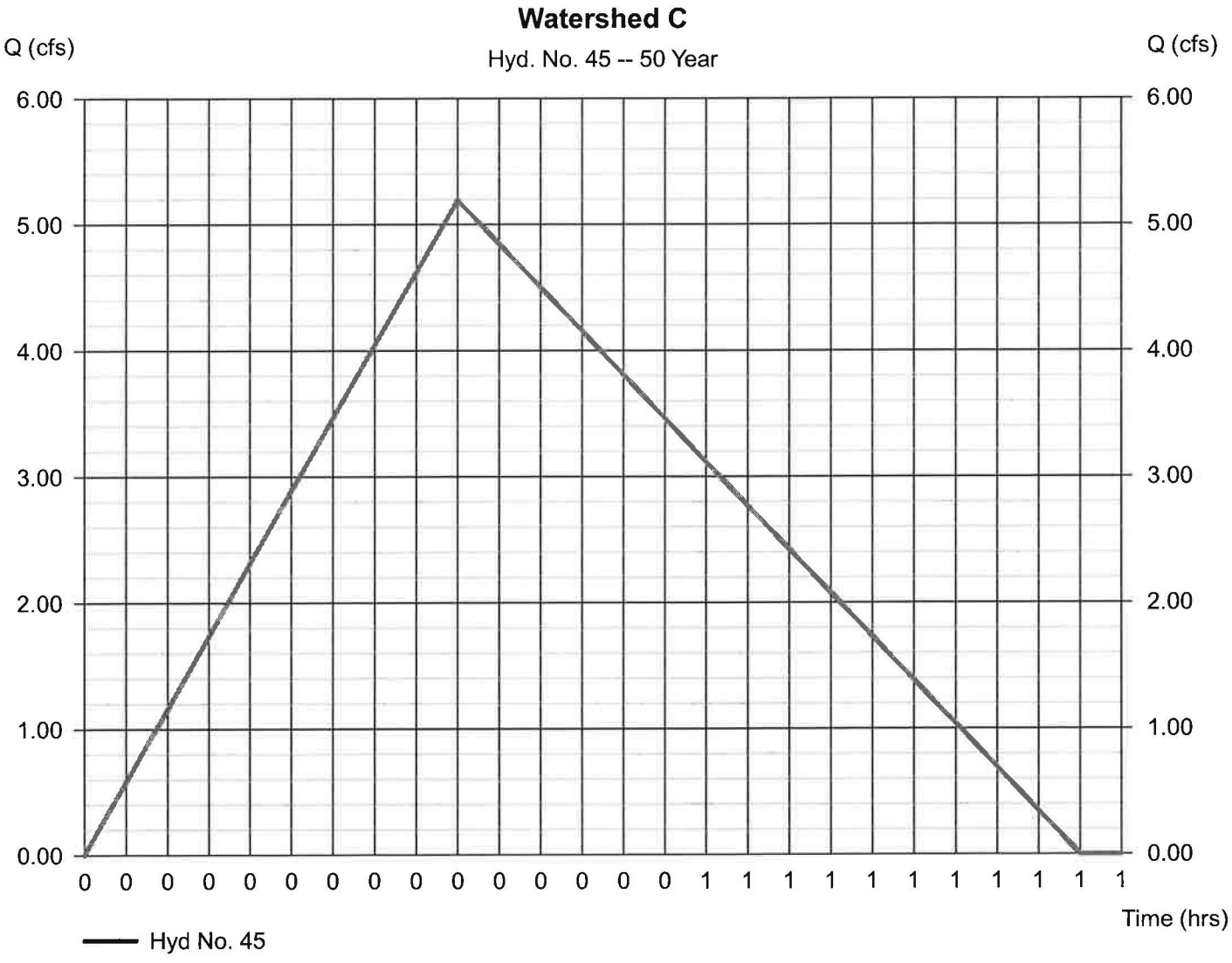
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 45

Watershed C

Hydrograph type	= Rational	Peak discharge	= 5.193 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.30 hrs
Time interval	= 1 min	Hyd. volume	= 7,612 cuft
Drainage area	= 3.300 ac	Runoff coeff.	= 0.33*
Intensity	= 4.768 in/hr	Tc by TR55	= 18.30 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.400 x 0.90) + (1.200 x 0.30) + (1.400 x 0.20) + (0.300 x 0.25)] / 3.300



Hydrograph Report

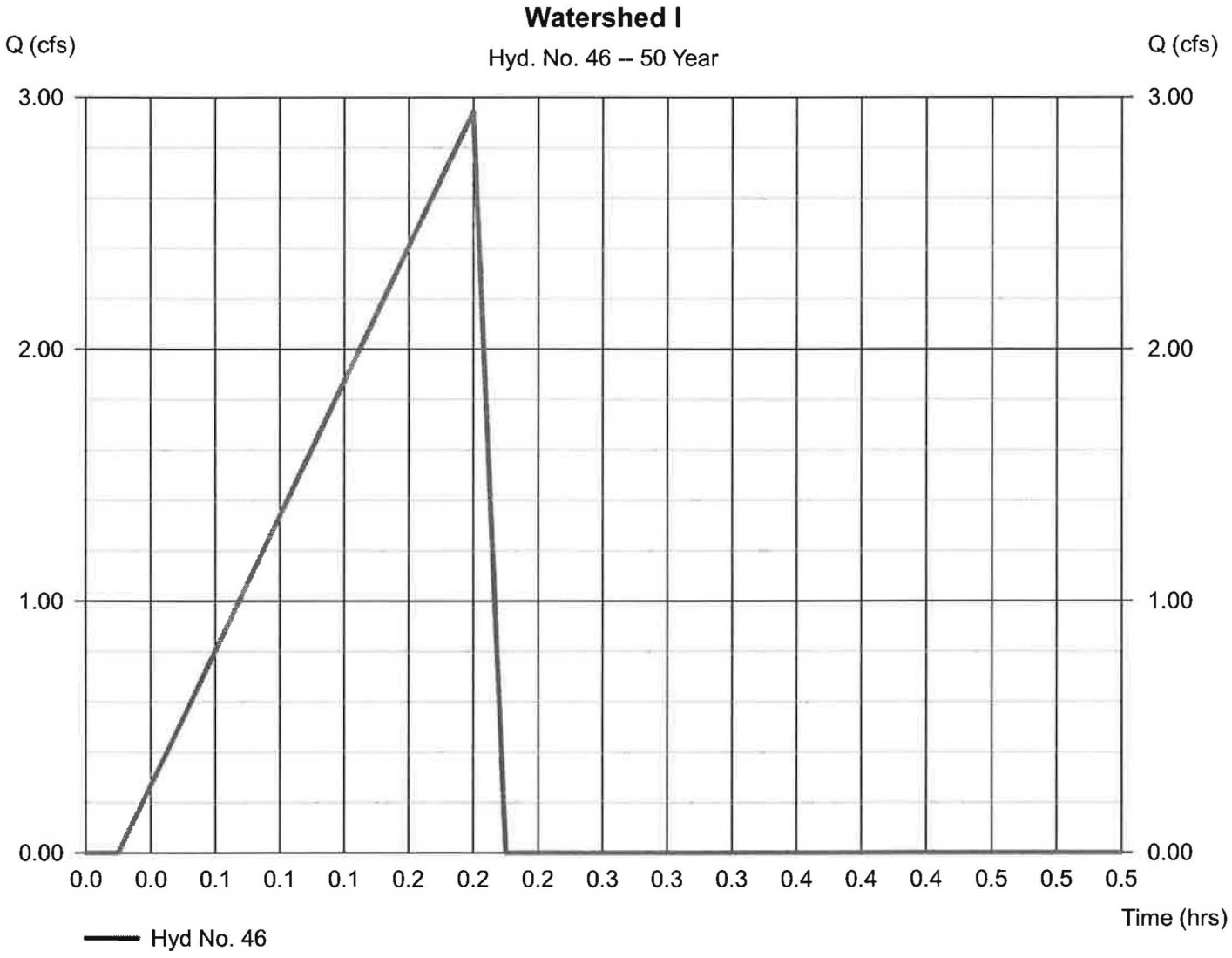
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 46

Watershed I

Hydrograph type	= Rational	Peak discharge	= 2.942 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.20 hrs
Time interval	= 1 min	Hyd. volume	= 2,717 cuft
Drainage area	= 1.500 ac	Runoff coeff.	= 0.34*
Intensity	= 5.769 in/hr	Tc by TR55	= 11.53 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.200 x 0.90) + (0.700 x 0.30) + (0.600 x 0.20)] / 1.500



Hydrograph Report

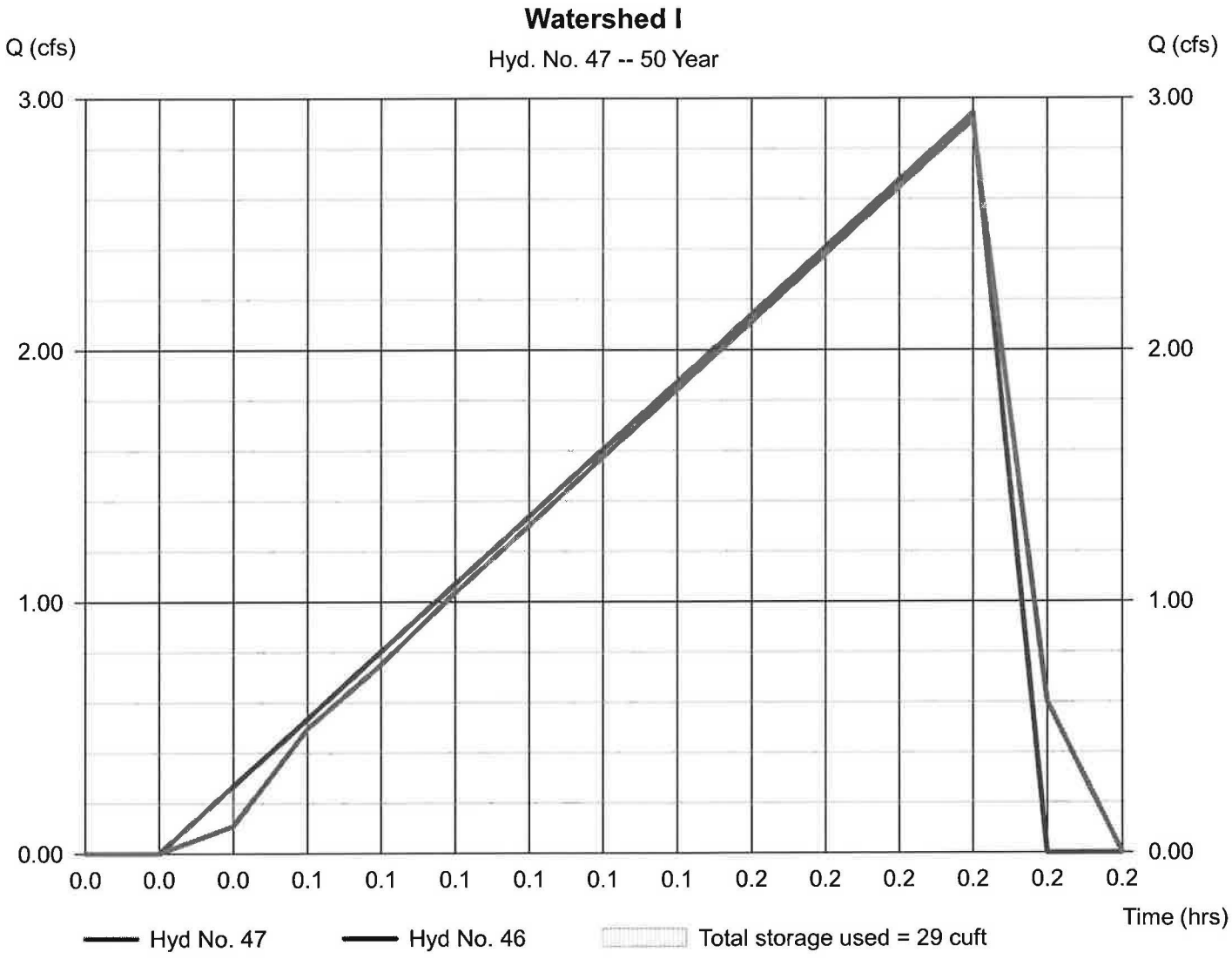
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 47

Watershed I

Hydrograph type	= Reservoir	Peak discharge	= 2.913 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.20 hrs
Time interval	= 1 min	Hyd. volume	= 1,065 cuft
Inflow hyd. No.	= 46 - Watershed I	Max. Elevation	= 531.65 ft
Reservoir name	= Watershed I	Max. Storage	= 29 cuft

Storage Indication method used.

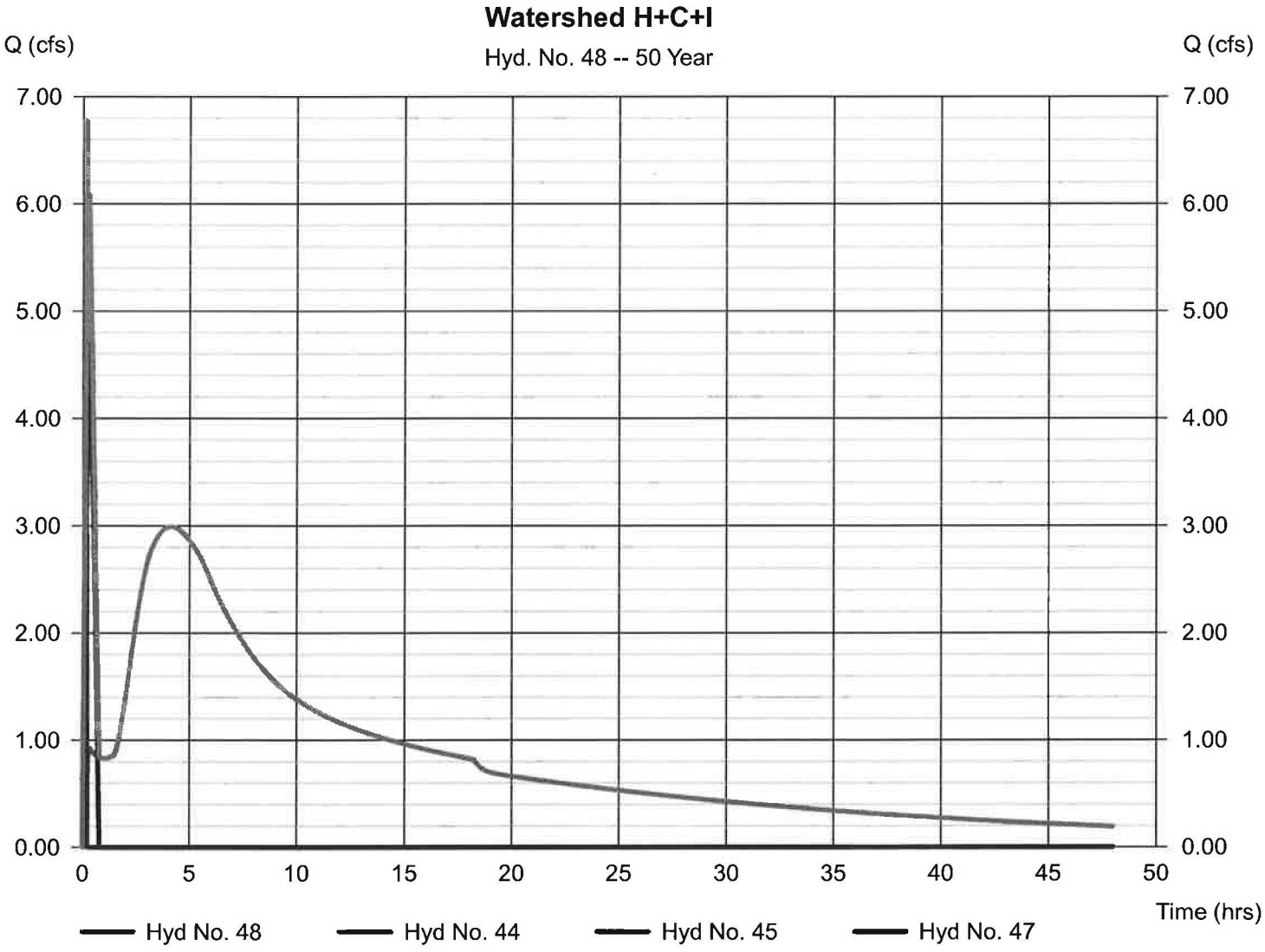


Hydrograph Report

Hyd. No. 48

Watershed H+C+I

Hydrograph type	= Combine	Peak discharge	= 6.771 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.20 hrs
Time interval	= 1 min	Hyd. volume	= 152,391 cuft
Inflow hyds.	= 44, 45, 47	Contrib. drain. area	= 3.300 ac



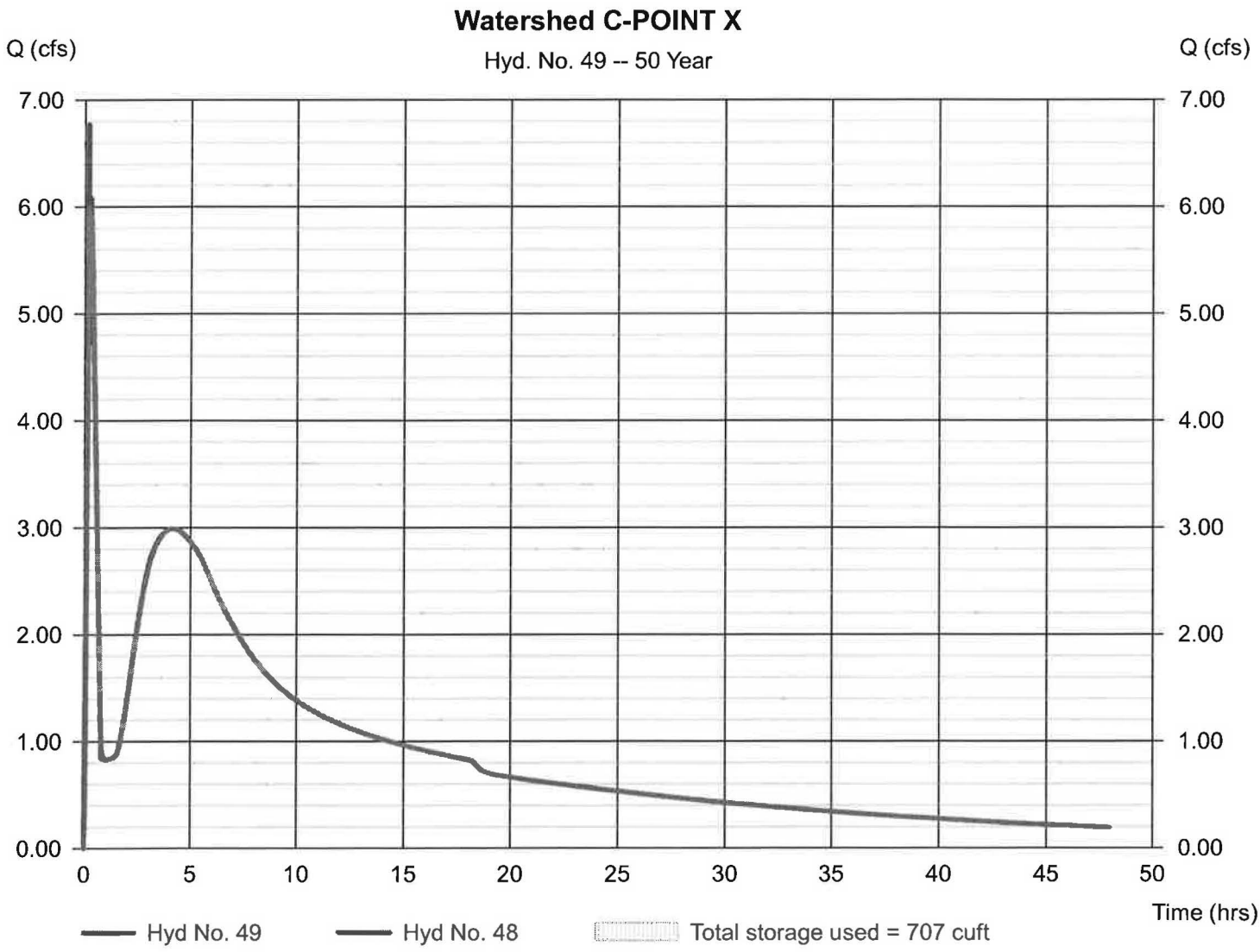
Hydrograph Report

Hyd. No. 49

Watershed C-POINT X

Hydrograph type	= Reservoir	Peak discharge	= 5.990 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.20 hrs
Time interval	= 1 min	Hyd. volume	= 152,324 cuft
Inflow hyd. No.	= 48 - Watershed H+C+I	Max. Elevation	= 529.99 ft
Reservoir name	= Watershed C	Max. Storage	= 707 cuft

Storage Indication method used.



Hydrograph Report

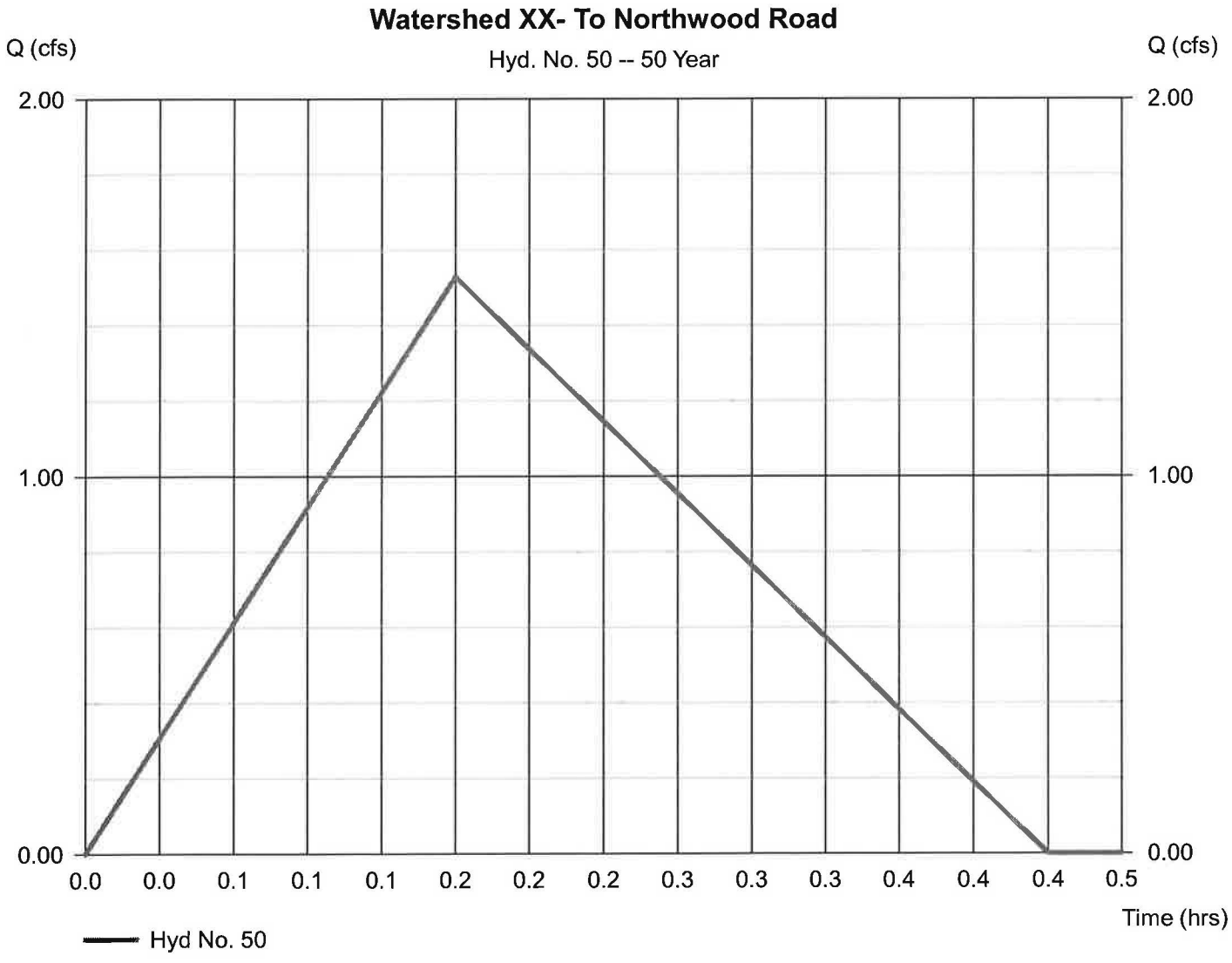
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 50

Watershed XX- To Northwood Road

Hydrograph type	= Rational	Peak discharge	= 1.528 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 1,224 cuft
Drainage area	= 0.720 ac	Runoff coeff.	= 0.35*
Intensity	= 6.062 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.100 x 0.90) + (0.360 x 0.30) + (0.260 x 0.20)] / 0.720



Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	Rational	10.35	1	17	14,098	----	------	------	Watershed A
2	Reservoir	3.537	1	35	13,954	1	566.42	8,954	Watershed A
3	Rational	7.676	1	14	8,327	----	------	------	Watershed B
4	Reservoir	1.932	1	30	8,047	3	567.12	6,247	Watershed B
5	Rational	4.442	1	21	7,400	----	------	------	Watershed I(1)
6	Rational	6.011	1	19	9,177	----	------	------	Wateshed II
7	Rational	7.922	1	10	6,345	----	------	------	Watershed IIA
8	Reservoir	1.555	1	23	6,173	7	563.46	4,717	Wateshed IIA
9	Rational	5.845	1	13	6,086	----	------	------	Watershed VIII
10	Rational	9.336	1	10	7,478	----	------	------	Watershed VIIIA
11	Reservoir	1.512	1	23	7,274	10	560.31	5,842	Watershed VIIIA
12	Rational	0.017	1	10	14	----	------	------	Watershed IX
13	Rational	3.460	1	10	2,772	----	------	------	Watershed IXA
14	Reservoir	1.537	1	19	2,697	13	555.07	1,326	Watershed IXA
15	Combine	13.10	1	21	29,659	5, 6, 8, 11,	------	------	Combine
16	Combine	18.67	1	19	38,332	9, 12, 14, 15	------	------	Watershed-Point Y
17	Rational	7.969	1	15	9,575	----	------	------	Watershed III
18	Rational	2.517	1	10	2,016	----	------	------	Watershed IV
19	Rational	11.65	1	10	9,331	----	------	------	Watershed IVA
20	Reservoir	4.990	1	19	2,272	19	553.95	7,420	Watershed IVA
21	Combine	14.25	1	19	25,789	2, 17, 20	------	------	Watershed A+III+VI
22	Rational	4.492	1	10	3,598	----	------	------	Watershed VI
23	Rational	6.134	1	10	4,914	----	------	------	Watershed VIA
24	Reservoir	1.547	1	22	4,780	23	551.43	3,346	Watershed VIA
25	Rational	19.84	1	10	15,888	----	------	------	Watershed VIIA
26	Reservoir	8.250	1	19	15,461	25	547.97	11,163	Watershed VIIA
27	Rational	1.950	1	10	1,562	----	------	------	Watershed X
28	Rational	38.17	1	23	70,319	----	------	------	Watershed V
29	Rational	3.265	1	10	2,615	----	------	------	Watershed XA
30	Reservoir	2.400	1	15	2,546	29	558.65	978	Watershed XA
31	Rational	0.452	1	10	362	----	------	------	Watershed VII
32	Combine	52.86	1	23	102,965	21, 24, 28, 30,	------	------	Combine
33	Reservoir	30.03	1	37	102,959	32	544.48	45,783	Watershed V

Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
34	Rational	6.602	1	22	11,881	----	------	------	Watershed XII
35	Reservoir	0.007	1	59	1,186	34	546.34	11,666	Watershed XII
36	Rational	9.225	1	14	10,345	----	------	------	Watershed XIX
37	Combine	34.97	1	34	136,707	4, 26, 33, 36	------	------	Watershed B+X+XI+XIX
38	Reservoir	24.04	1	55	136,697	37	542.20	47,394	Watershed XIX-POINT Z
39	Rational	23.19	1	20	37,154	----	------	------	Watershed XIV
40	Combine	27.56	1	41	173,573	38, 39	------	------	Watershed XIV+XIX
41	Reservoir	7.315	1	129	157,105	40	539.72	113,241	Watershed XIV
42	Rational	5.704	1	19	8,537	----	------	------	Watershed H
43	Combine	7.315	1	129	160,356	41, 42	------	------	Watershed XIV+H
44	Reservoir	3.366	1	247	159,668	43	537.03	33,900	Watershed H
45	Rational	5.689	1	18	8,339	----	------	------	Watershed C
46	Rational	3.190	1	12	2,946	----	------	------	Watershed I
47	Reservoir	3.161	1	12	1,155	46	531.70	30.7	Watershed I
48	Combine	7.419	1	12	169,015	44, 45, 47	------	------	Watershed H+C+I
49	Reservoir	6.577	1	12	168,948	48	530.05	747	Watershed C-POINT X
50	Rational	1.652	1	10	1,323	----	------	------	Watershed XX- To Northwood Roa

Hydrograph Report

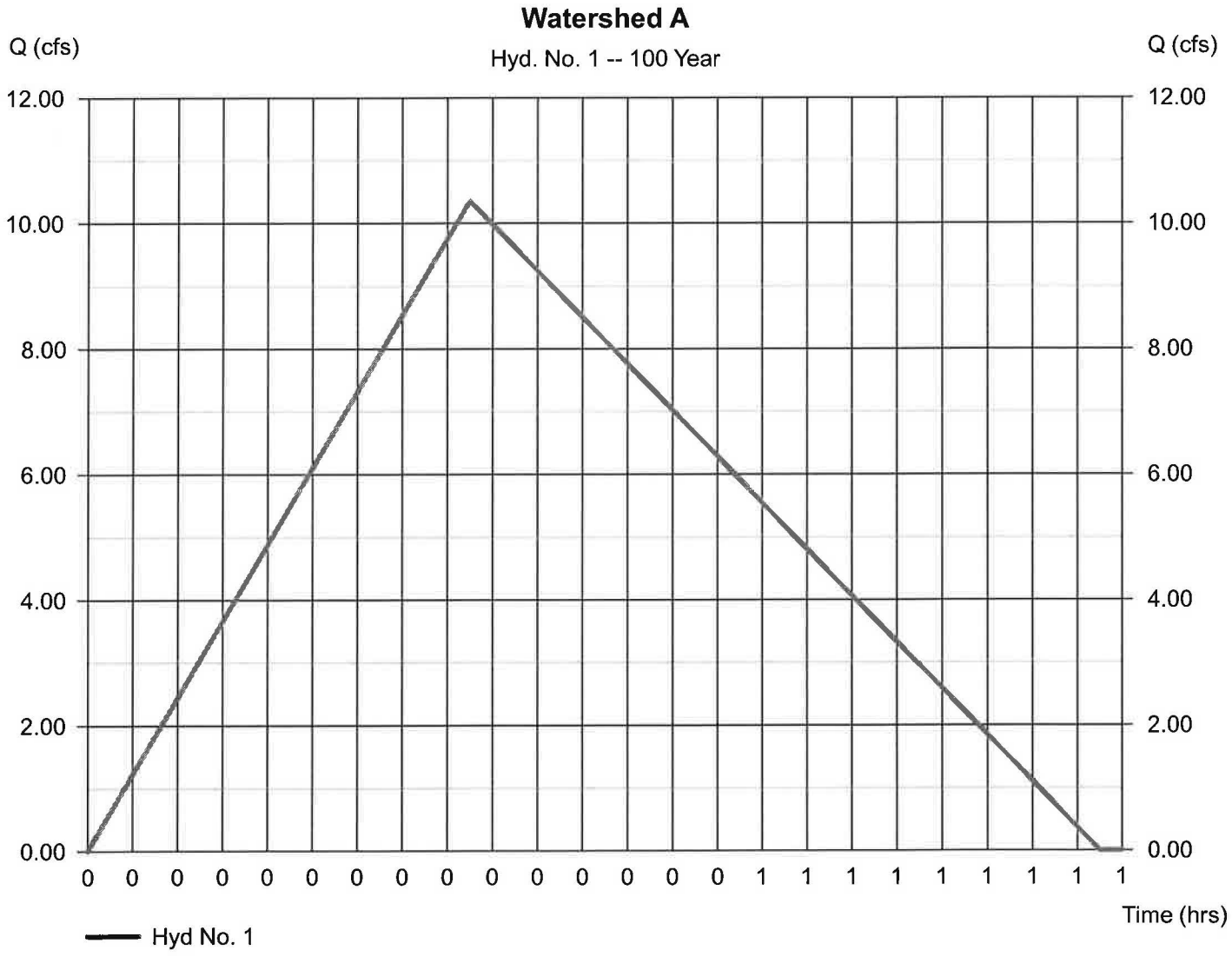
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 1

Watershed A

Hydrograph type	= Rational	Peak discharge	= 10.35 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.28 hrs
Time interval	= 1 min	Hyd. volume	= 14,098 cuft
Drainage area	= 8.000 ac	Runoff coeff.	= 0.24*
Intensity	= 5.392 in/hr	Tc by TR55	= 17.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.400 x 0.90) + (0.500 x 0.30) + (7.100 x 0.20)] / 8.000



Hydrograph Report

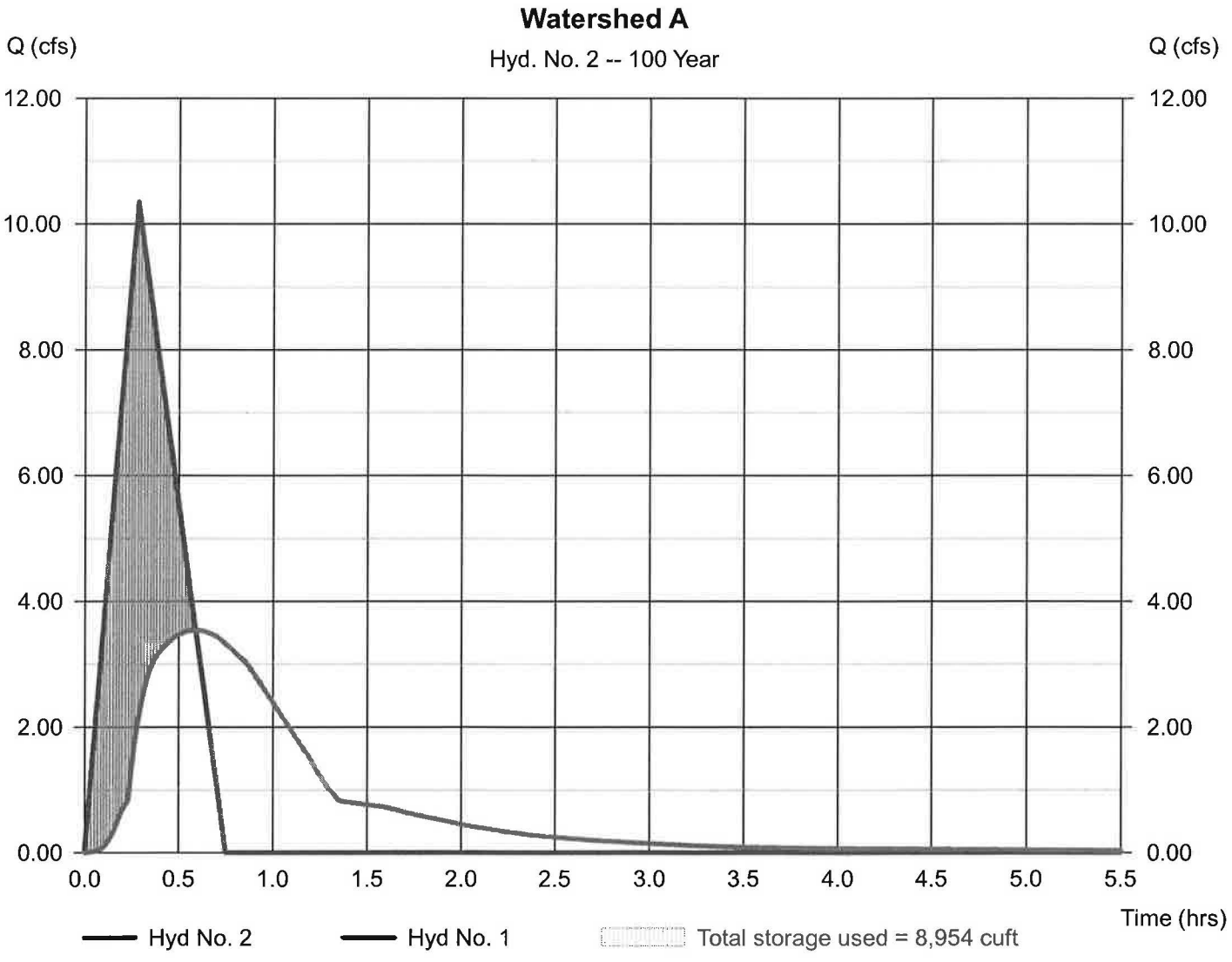
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 2

Watershed A

Hydrograph type	= Reservoir	Peak discharge	= 3.537 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.58 hrs
Time interval	= 1 min	Hyd. volume	= 13,954 cuft
Inflow hyd. No.	= 1 - Watershed A	Max. Elevation	= 566.42 ft
Reservoir name	= Watershed A	Max. Storage	= 8,954 cuft

Storage Indication method used.



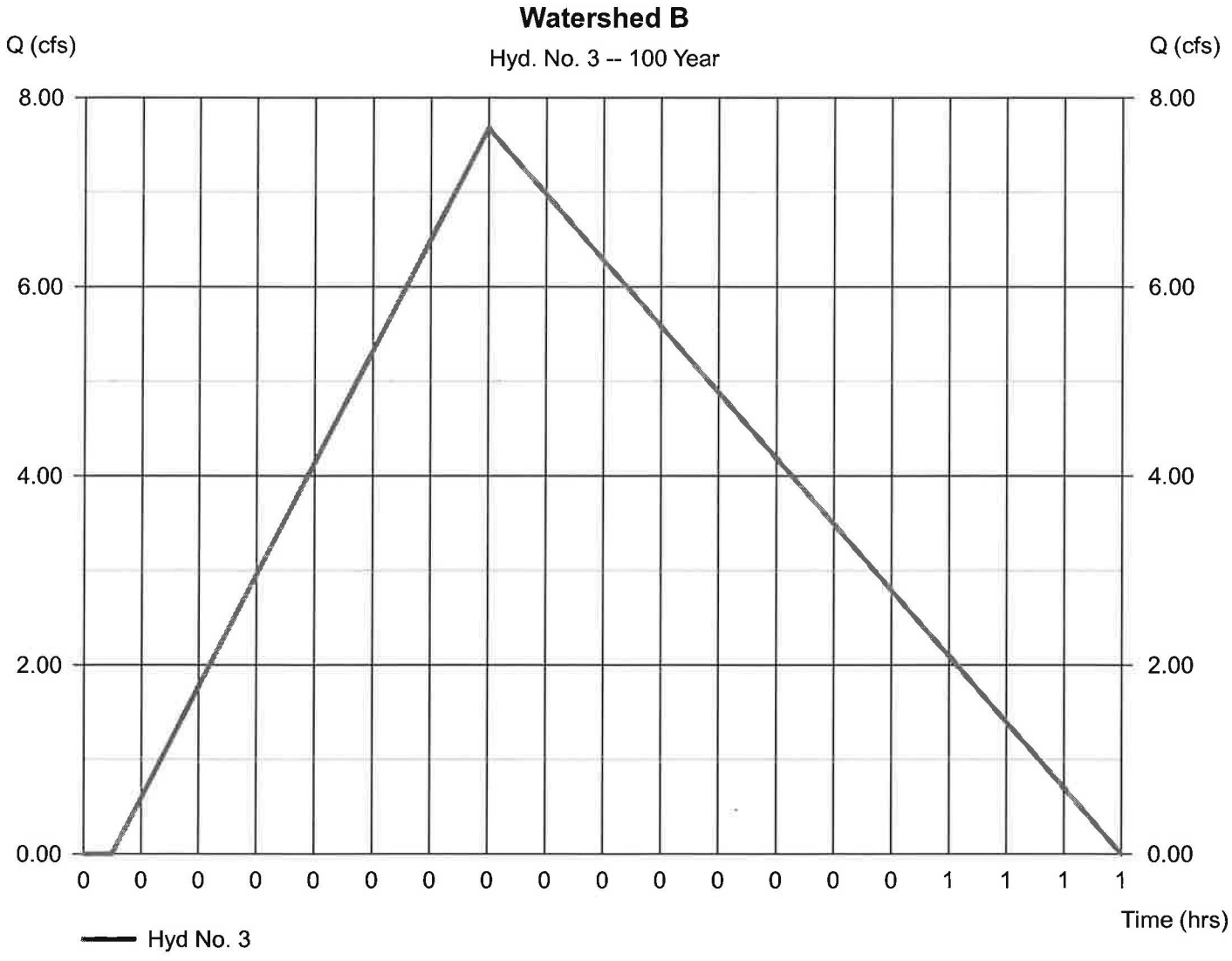
Hydrograph Report

Hyd. No. 3

Watershed B

Hydrograph type	= Rational	Peak discharge	= 7.676 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.23 hrs
Time interval	= 1 min	Hyd. volume	= 8,327 cuft
Drainage area	= 5.200 ac	Runoff coeff.	= 0.25*
Intensity	= 5.904 in/hr	Tc by TR55	= 13.54 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.300 x 0.90) + (0.500 x 0.30) + (4.400 x 0.20)] / 5.200



Hydrograph Report

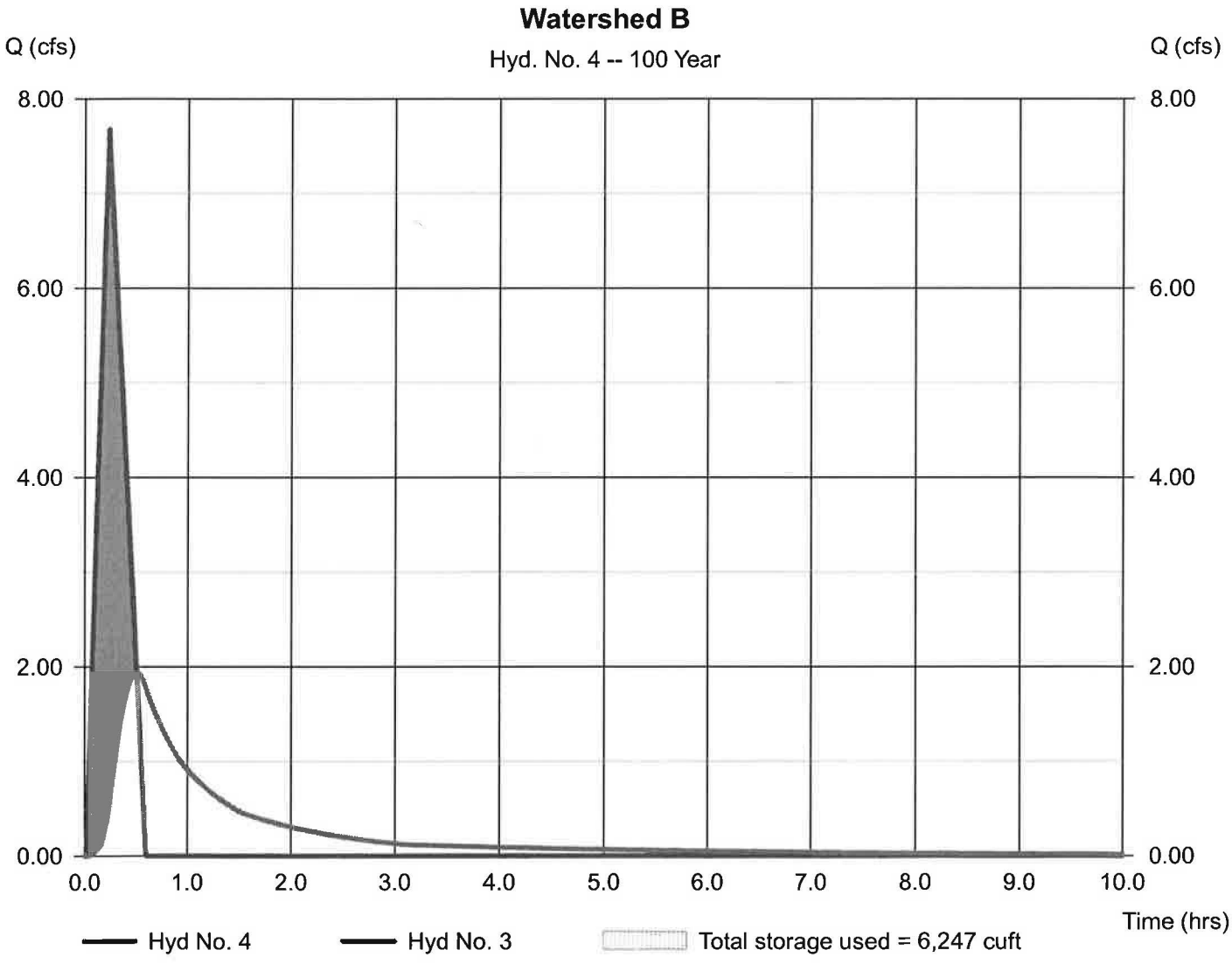
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 4

Watershed B

Hydrograph type	= Reservoir	Peak discharge	= 1.932 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.50 hrs
Time interval	= 1 min	Hyd. volume	= 8,047 cuft
Inflow hyd. No.	= 3 - Watershed B	Max. Elevation	= 567.12 ft
Reservoir name	= Watershed B	Max. Storage	= 6,247 cuft

Storage Indication method used.



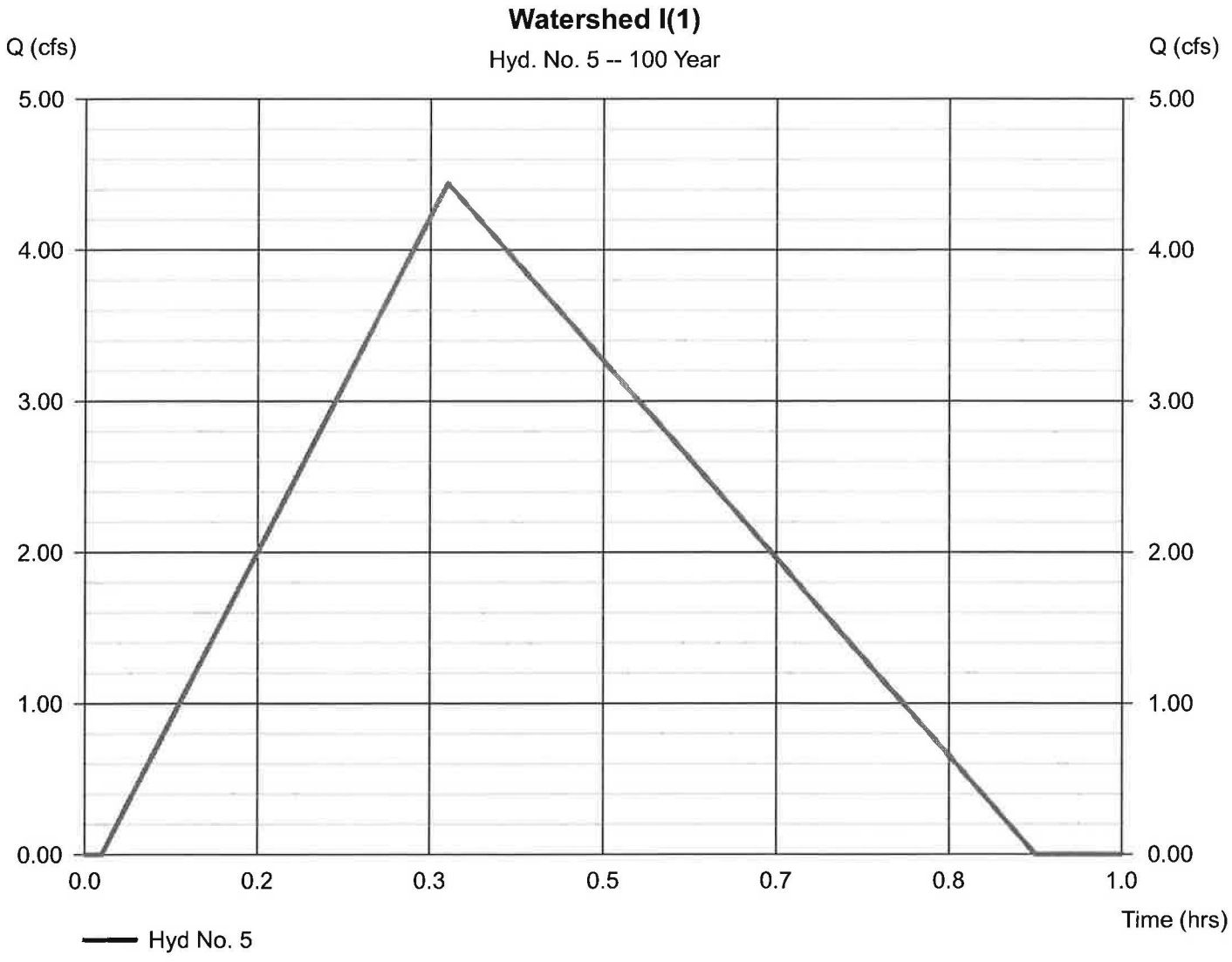
Hydrograph Report

Hyd. No. 5

Watershed I(1)

Hydrograph type	= Rational	Peak discharge	= 4.442 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.35 hrs
Time interval	= 1 min	Hyd. volume	= 7,400 cuft
Drainage area	= 1.700 ac	Runoff coeff.	= 0.53*
Intensity	= 4.930 in/hr	Tc by TR55	= 20.80 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.700 x 0.90) + (0.700 x 0.30) + (0.300 x 0.20)] / 1.700



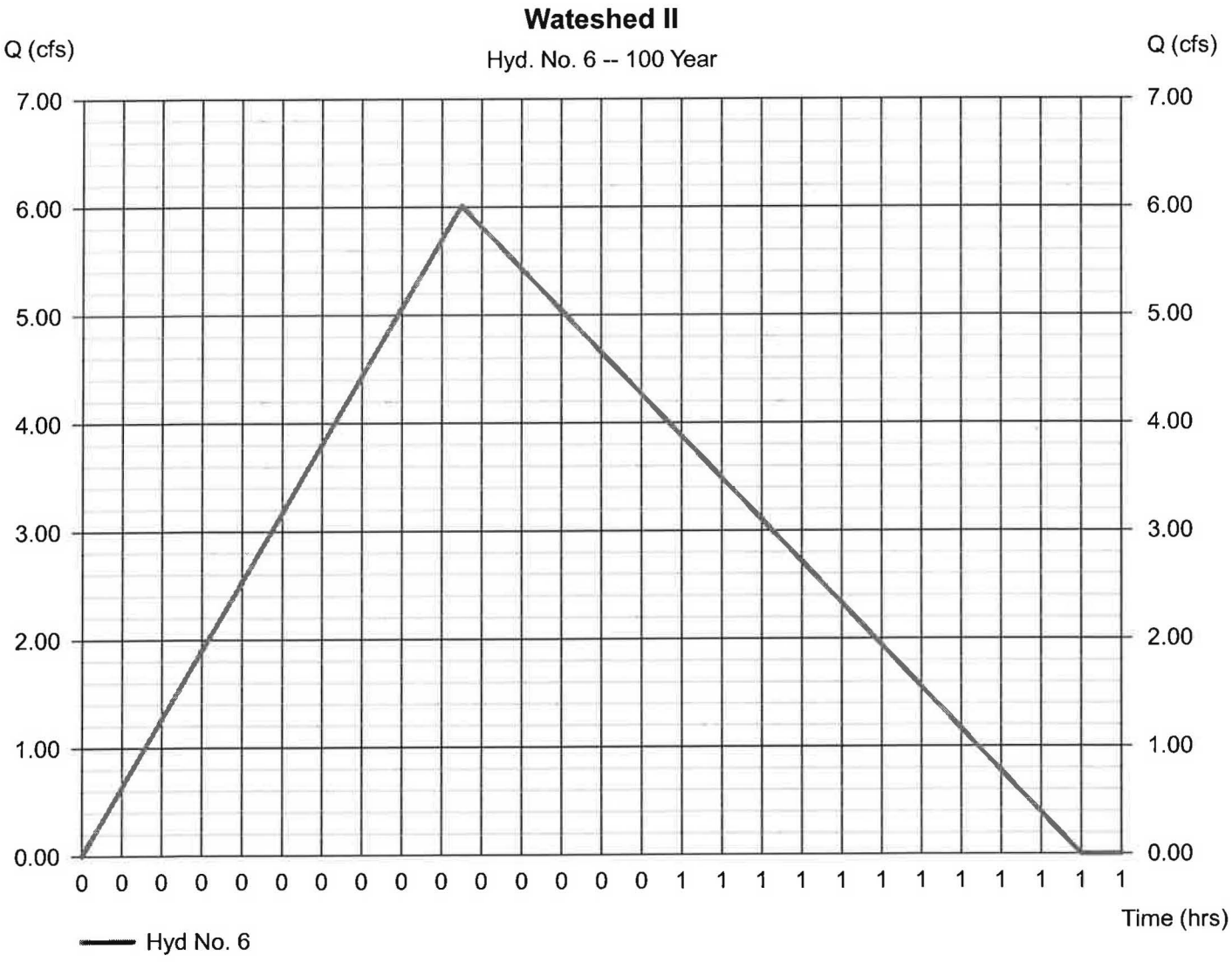
Hydrograph Report

Hyd. No. 6

Wateshed II

Hydrograph type	= Rational	Peak discharge	= 6.011 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 9,177 cuft
Drainage area	= 4.040 ac	Runoff coeff.	= 0.29*
Intensity	= 5.130 in/hr	Tc by TR55	= 19.06 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.230 x 0.90) + (1.940 x 0.30) + (1.870 x 0.20)] / 4.040



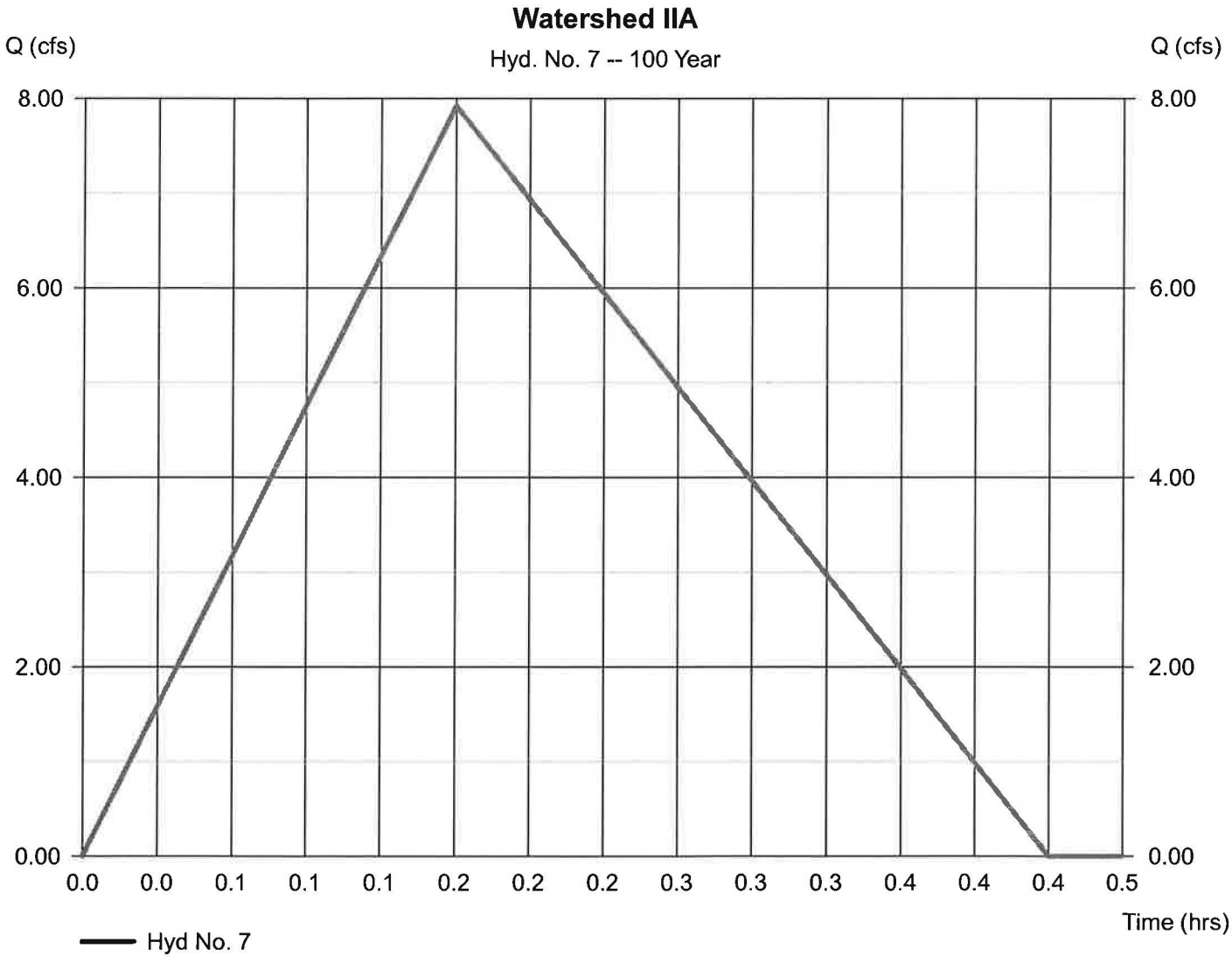
Hydrograph Report

Hyd. No. 7

Watershed IIA

Hydrograph type	= Rational	Peak discharge	= 7.922 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 6,345 cuft
Drainage area	= 1.530 ac	Runoff coeff.	= 0.79*
Intensity	= 6.554 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.250 x 0.90) + (0.280 x 0.30)] / 1.530



Hydrograph Report

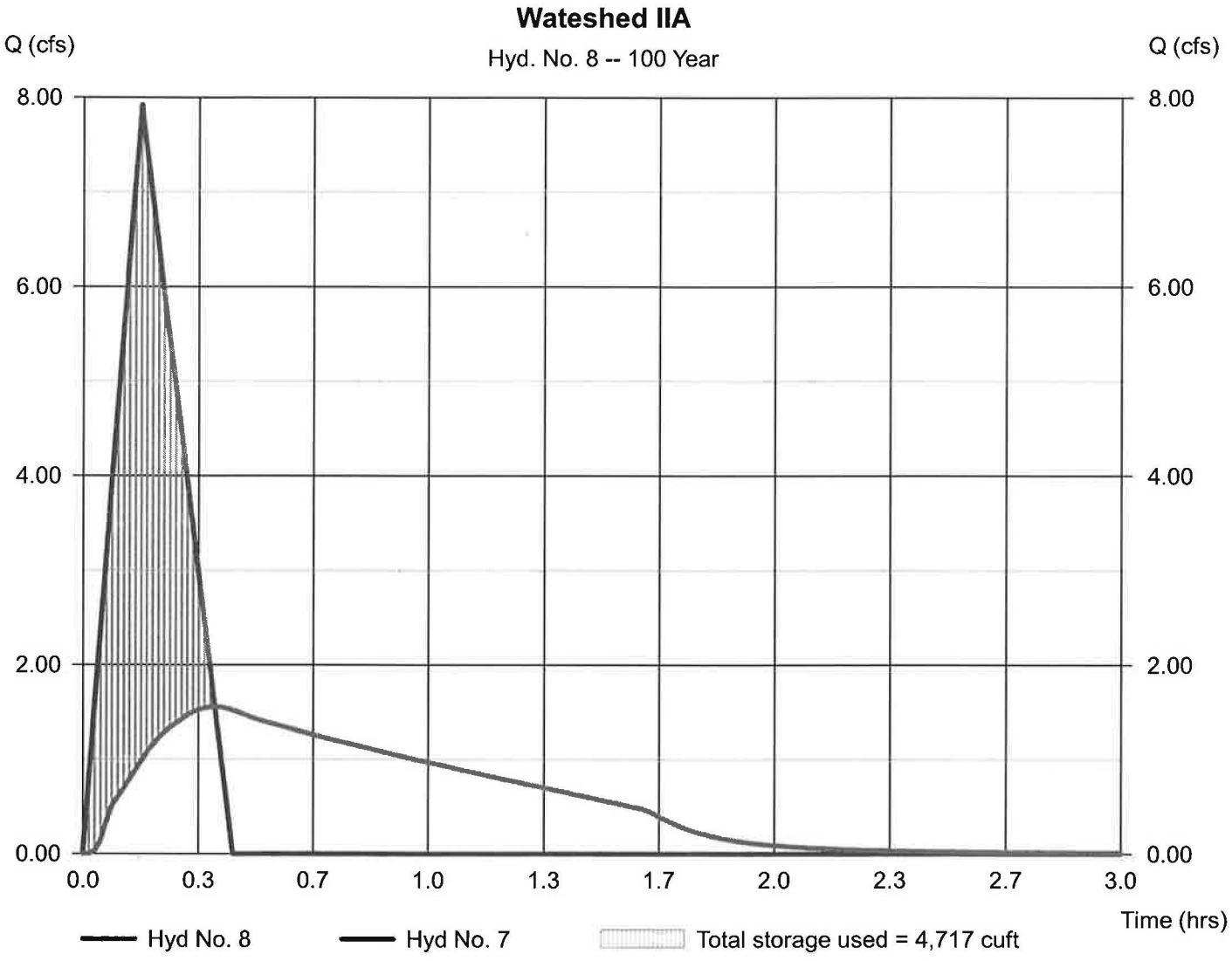
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 8

Wateshed IIA

Hydrograph type	= Reservoir	Peak discharge	= 1.555 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.38 hrs
Time interval	= 1 min	Hyd. volume	= 6,173 cuft
Inflow hyd. No.	= 7 - Watershed IIA	Max. Elevation	= 563.46 ft
Reservoir name	= Watershed IIA	Max. Storage	= 4,717 cuft

Storage Indication method used.



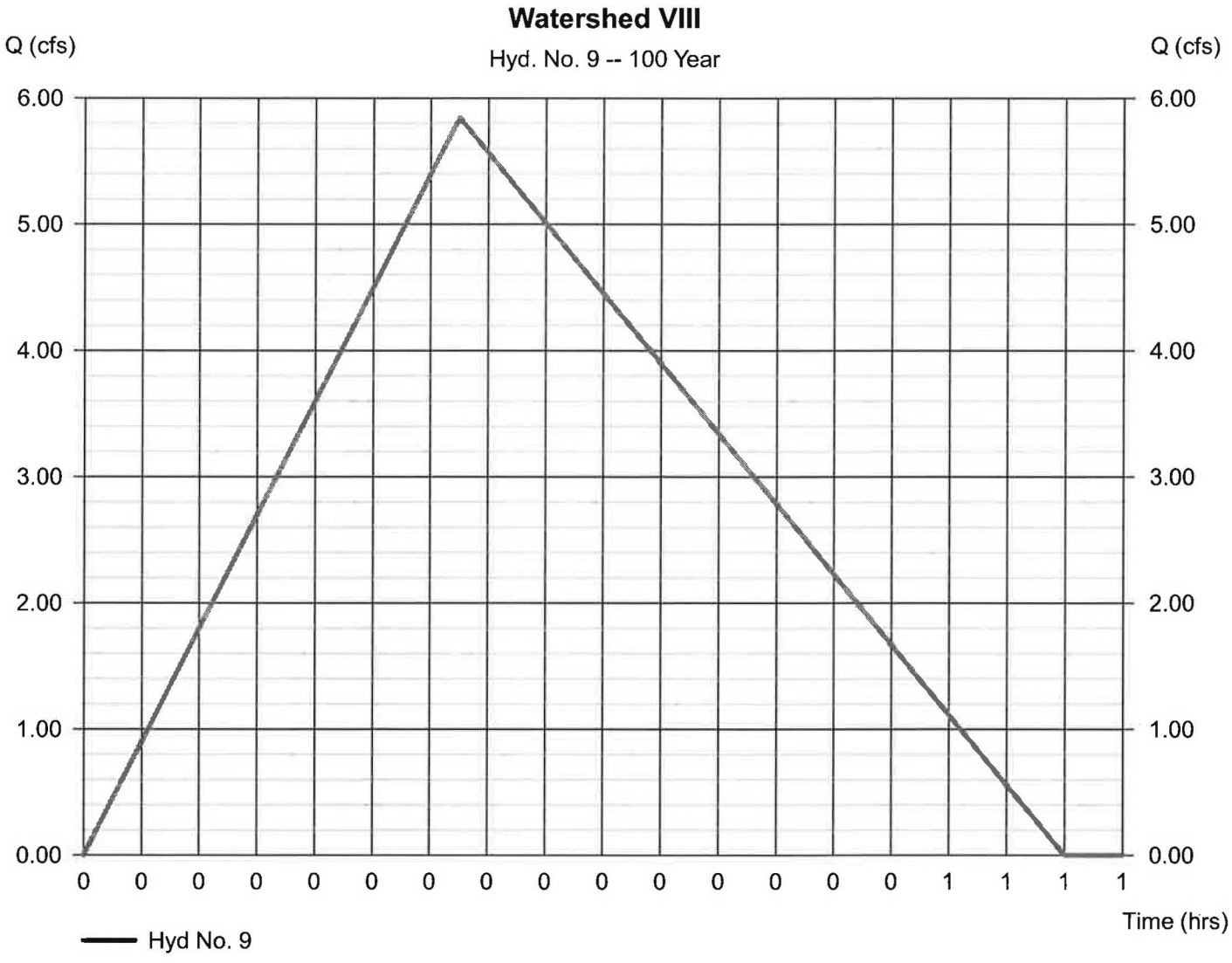
Hydrograph Report

Hyd. No. 9

Watershed VIII

Hydrograph type	= Rational	Peak discharge	= 5.845 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.22 hrs
Time interval	= 1 min	Hyd. volume	= 6,086 cuft
Drainage area	= 3.250 ac	Runoff coeff.	= 0.3*
Intensity	= 5.995 in/hr	Tc by TR55	= 13.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.320 x 0.90) + (1.120 x 0.30) + (1.810 x 0.20)] / 3.250



Hydrograph Report

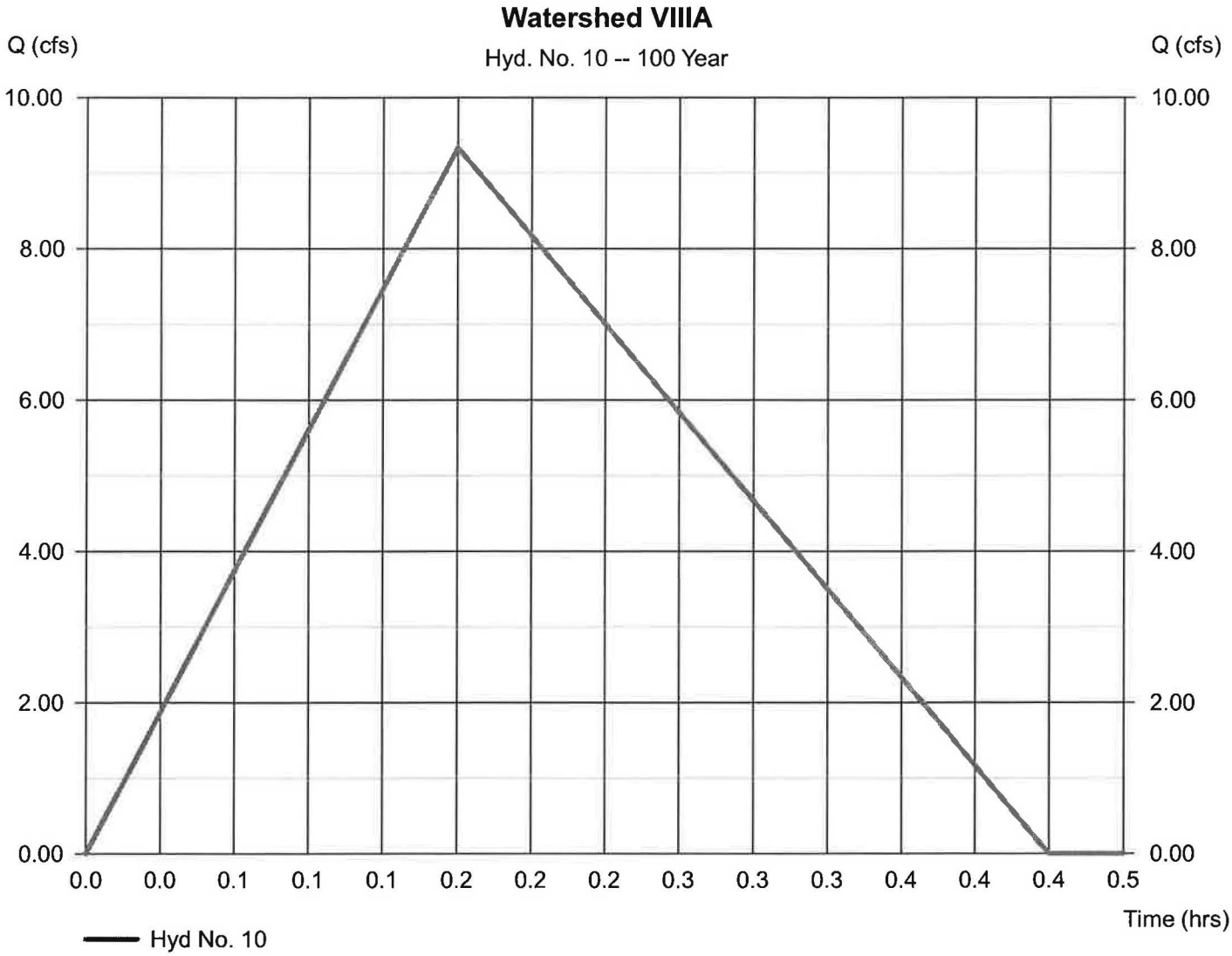
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 10

Watershed VIIIA

Hydrograph type	= Rational	Peak discharge	= 9.336 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 7,478 cuft
Drainage area	= 1.850 ac	Runoff coeff.	= 0.77*
Intensity	= 6.554 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.460 x 0.90) + (0.390 x 0.30)] / 1.850



Hydrograph Report

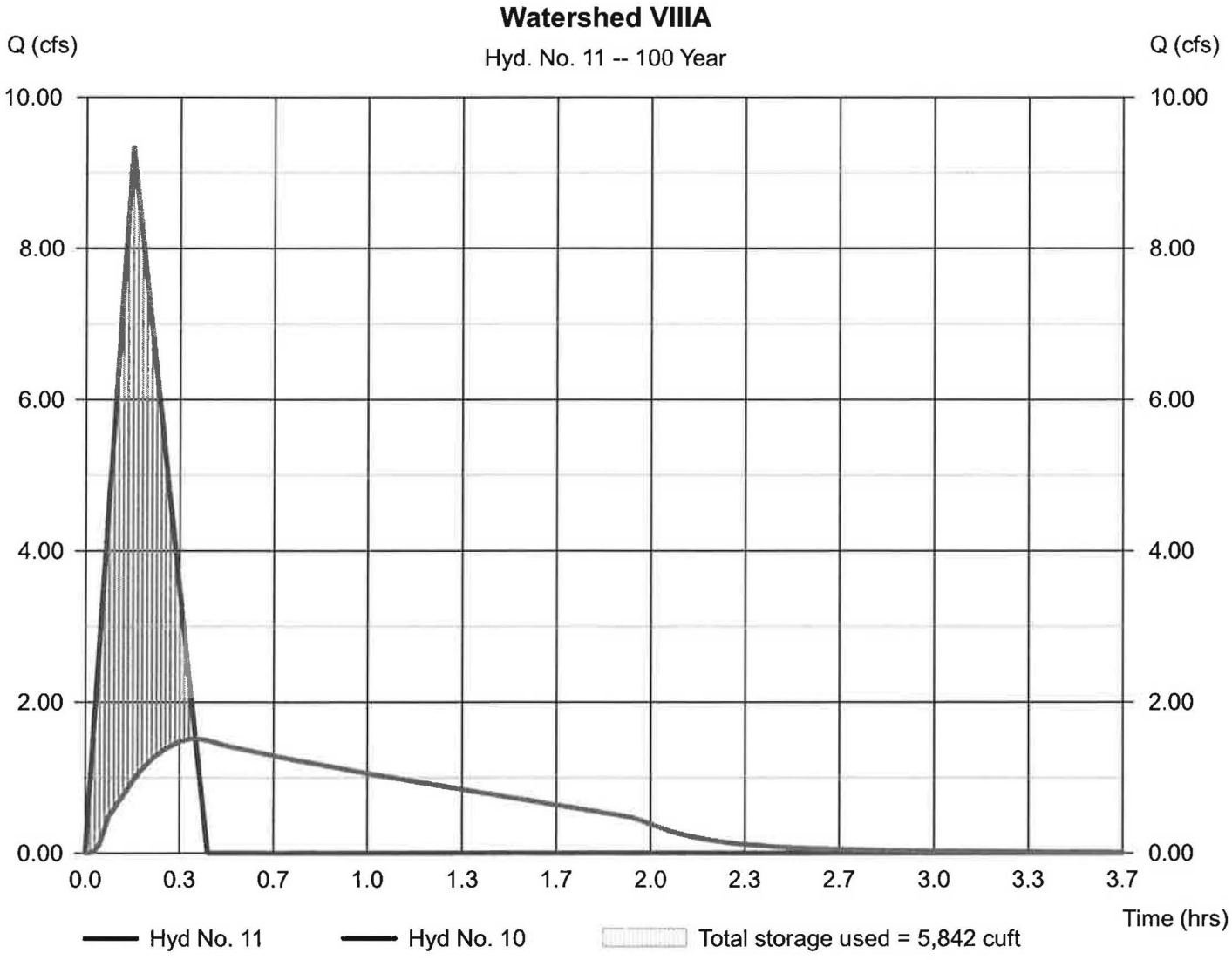
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 11

Watershed VIIIA

Hydrograph type	= Reservoir	Peak discharge	= 1.512 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.38 hrs
Time interval	= 1 min	Hyd. volume	= 7,274 cuft
Inflow hyd. No.	= 10 - Watershed VIIIA	Max. Elevation	= 560.31 ft
Reservoir name	= Watershed VIIIA	Max. Storage	= 5,842 cuft

Storage Indication method used.



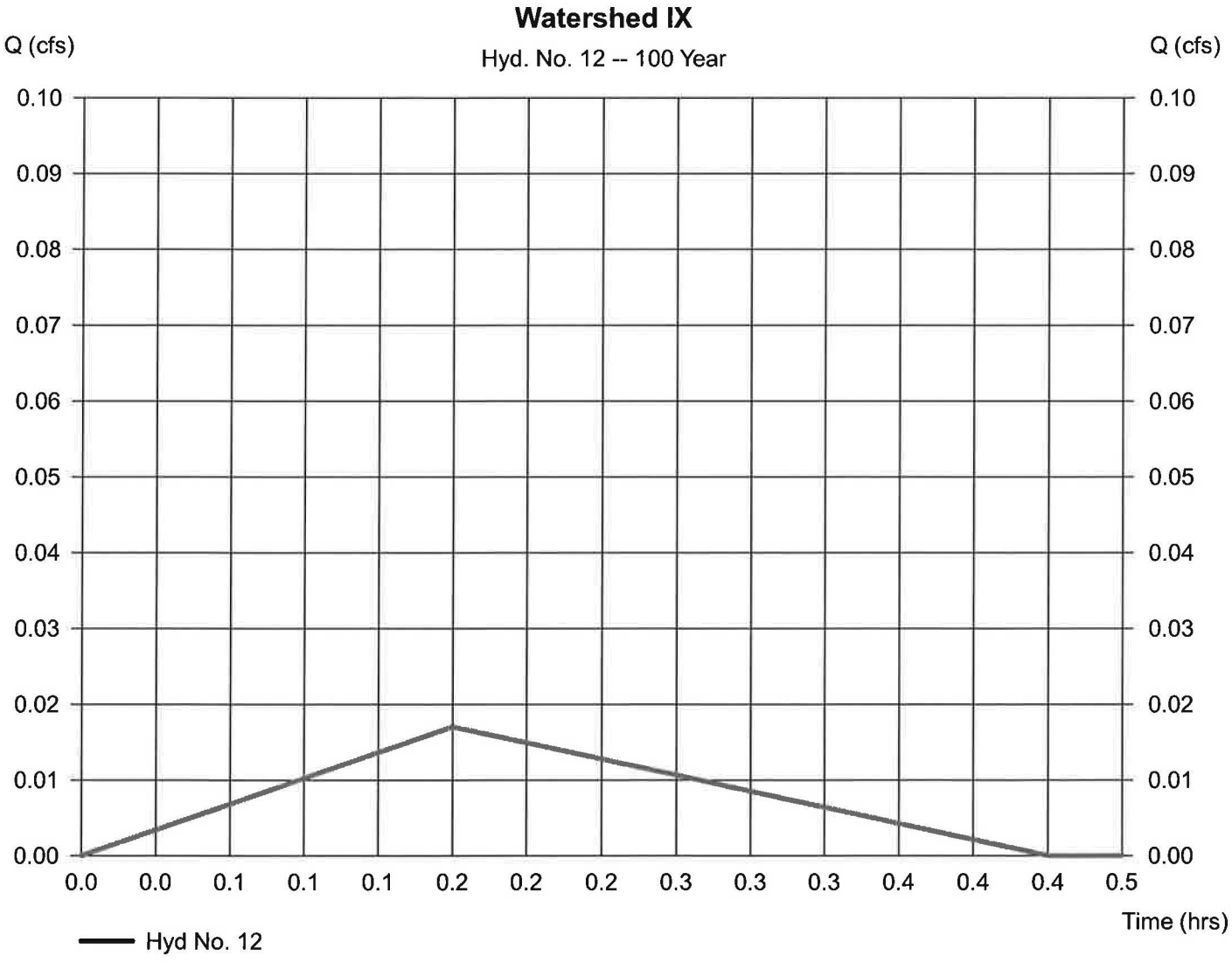
Hydrograph Report

Hyd. No. 12

Watershed IX

Hydrograph type	= Rational	Peak discharge	= 0.017 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 14 cuft
Drainage area	= 0.260 ac	Runoff coeff.	= 0.01*
Intensity	= 6.554 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.010 x 0.30)] / 0.260



Hydrograph Report

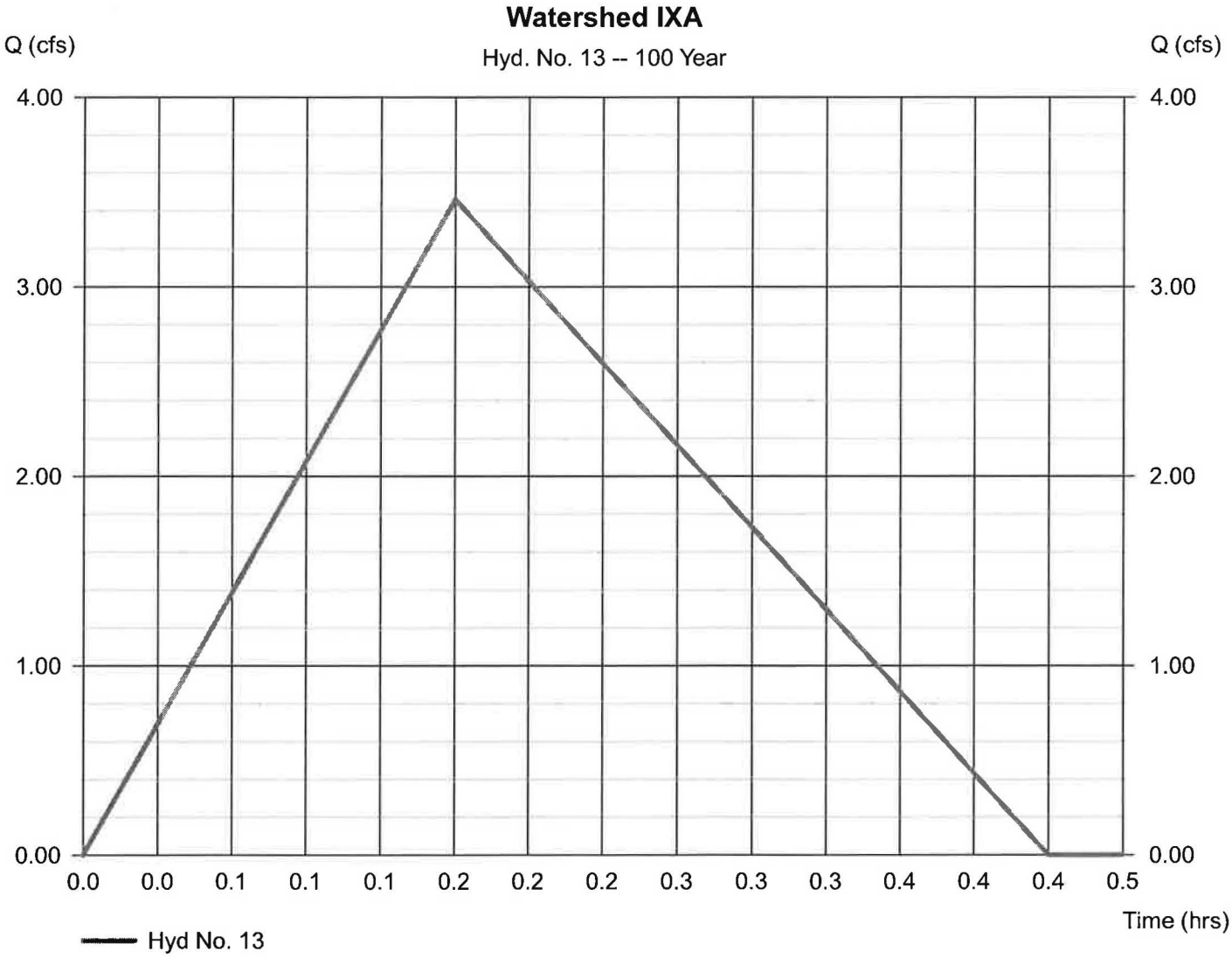
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 13

Watershed IXA

Hydrograph type	= Rational	Peak discharge	= 3.460 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 2,772 cuft
Drainage area	= 0.880 ac	Runoff coeff.	= 0.6*
Intensity	= 6.554 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.460 x 0.90) + (0.260 x 0.30) + (0.160 x 0.20)] / 0.880



Hydrograph Report

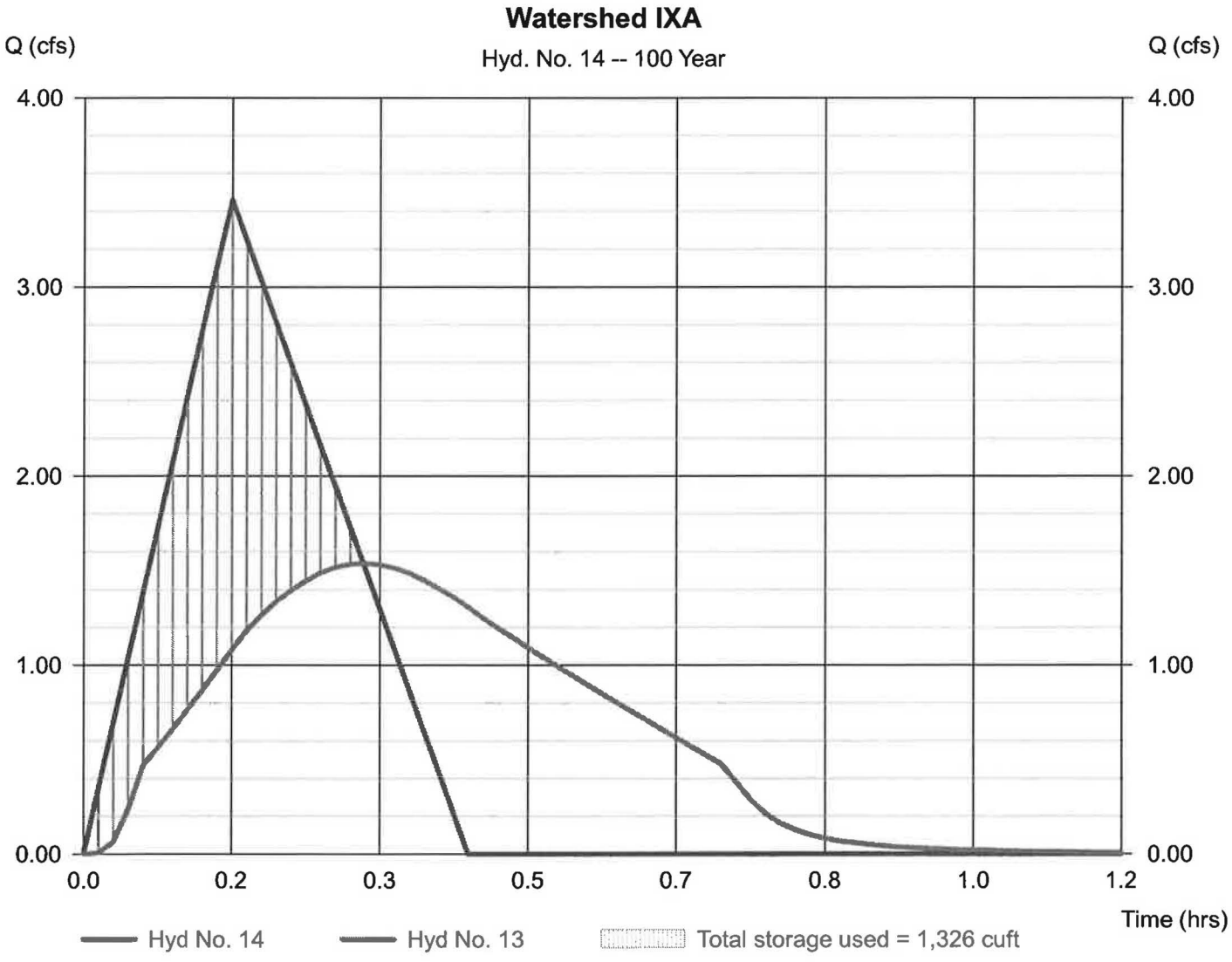
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 14

Watershed IXA

Hydrograph type	= Reservoir	Peak discharge	= 1.537 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 2,697 cuft
Inflow hyd. No.	= 13 - Watershed IXA	Max. Elevation	= 555.07 ft
Reservoir name	= Waatershed IXA	Max. Storage	= 1,326 cuft

Storage Indication method used.

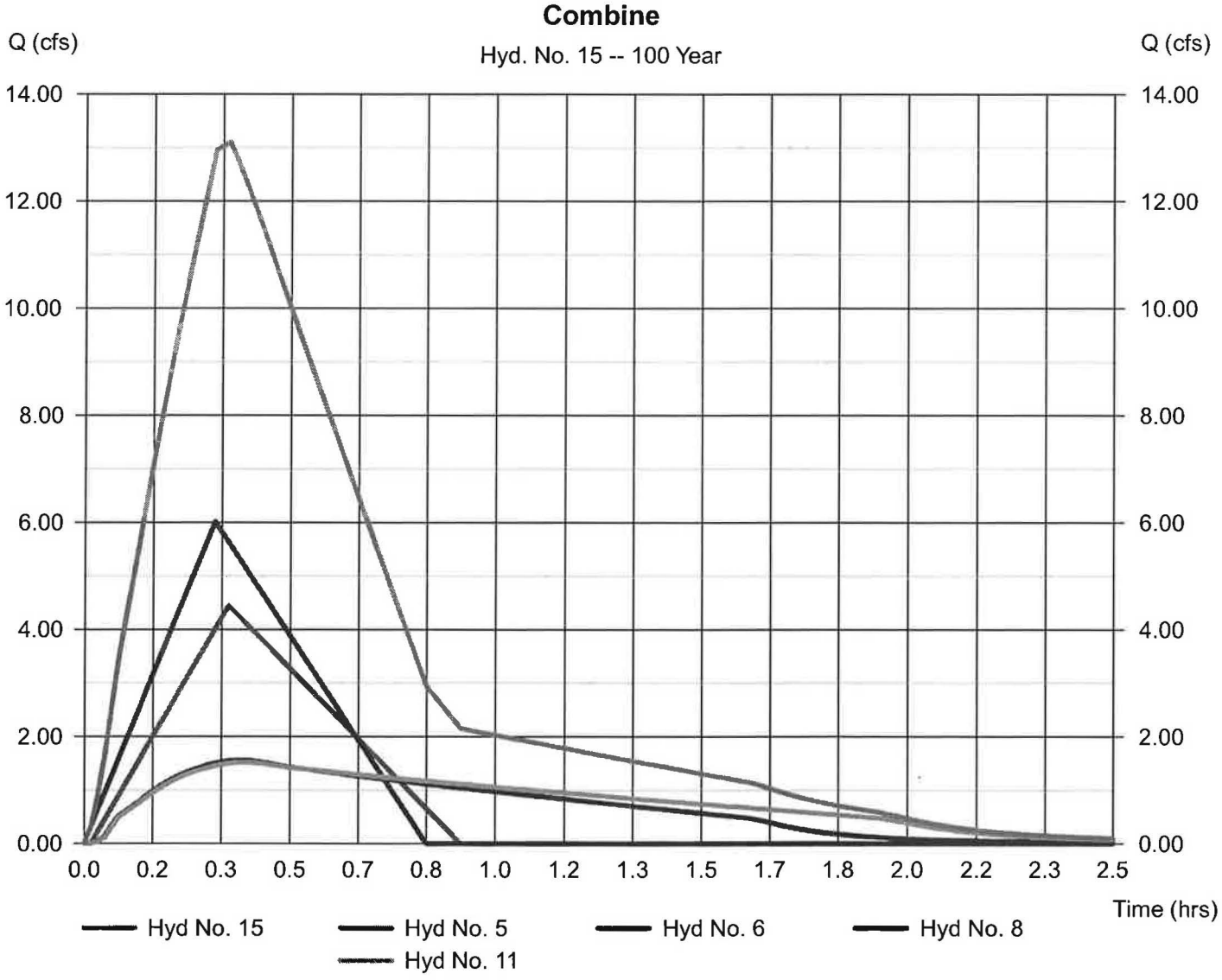


Hydrograph Report

Hyd. No. 15

Combine

Hydrograph type	= Combine	Peak discharge	= 13.10 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.35 hrs
Time interval	= 1 min	Hyd. volume	= 29,659 cuft
Inflow hyds.	= 5, 6, 8, 11	Contrib. drain. area	= 5.740 ac

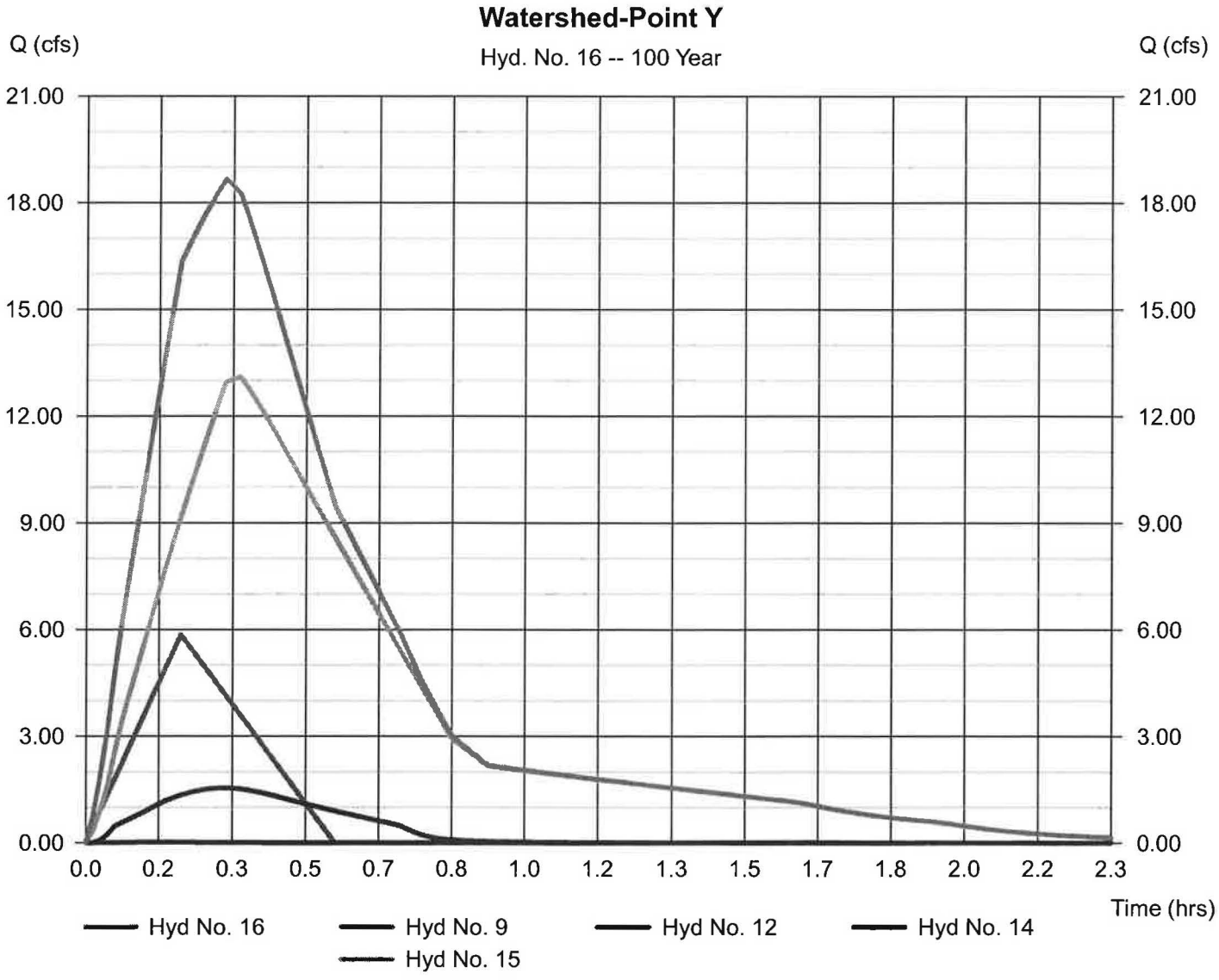


Hydrograph Report

Hyd. No. 16

Watershed-Point Y

Hydrograph type	= Combine	Peak discharge	= 18.67 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 38,332 cuft
Inflow hyds.	= 9, 12, 14, 15	Contrib. drain. area	= 3.510 ac



Hydrograph Report

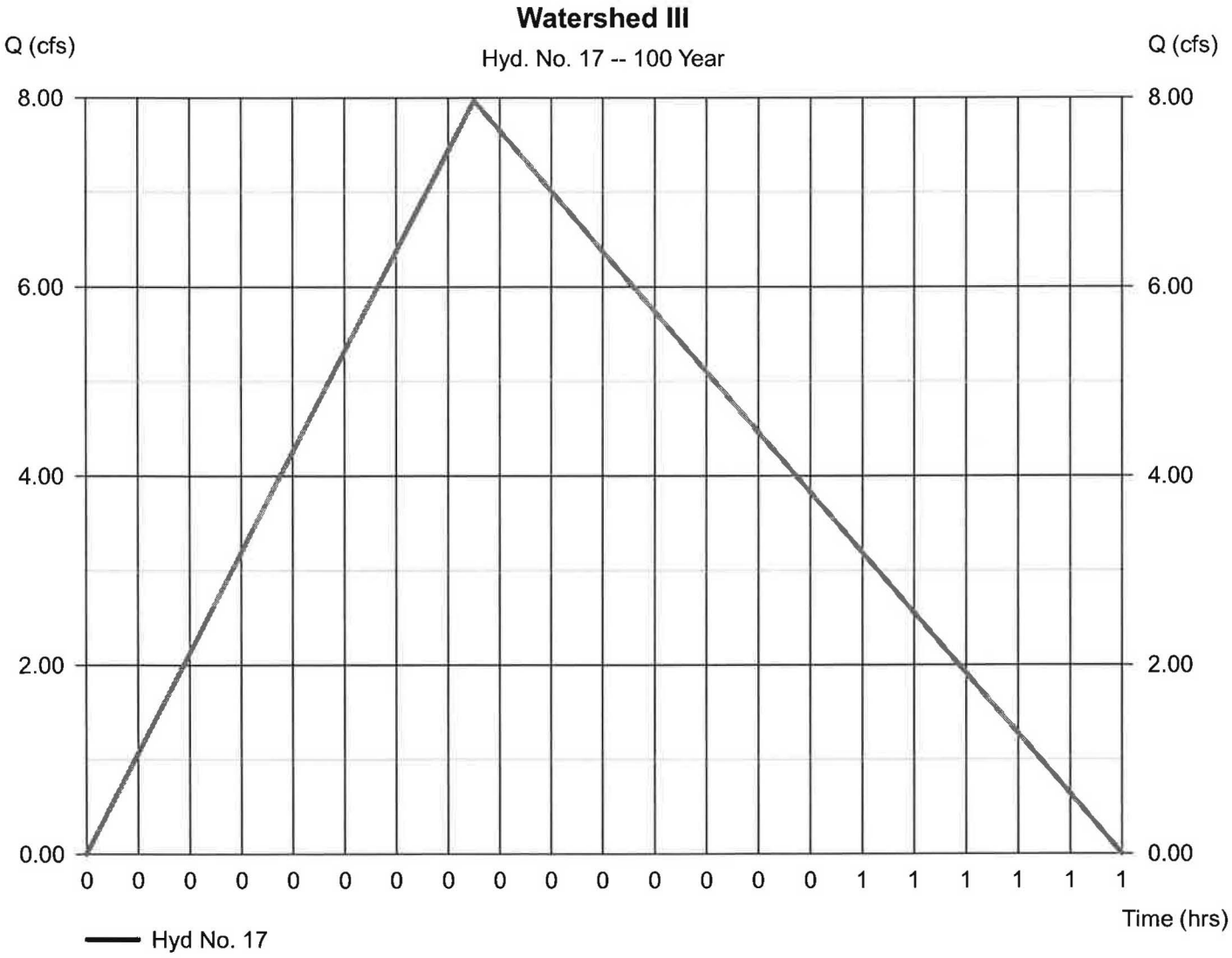
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 17

Watershed III

Hydrograph type	= Rational	Peak discharge	= 7.969 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.25 hrs
Time interval	= 1 min	Hyd. volume	= 9,575 cuft
Drainage area	= 2.700 ac	Runoff coeff.	= 0.52*
Intensity	= 5.676 in/hr	Tc by TR55	= 15.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.000 x 0.90) + (1.700 x 0.30)] / 2.700



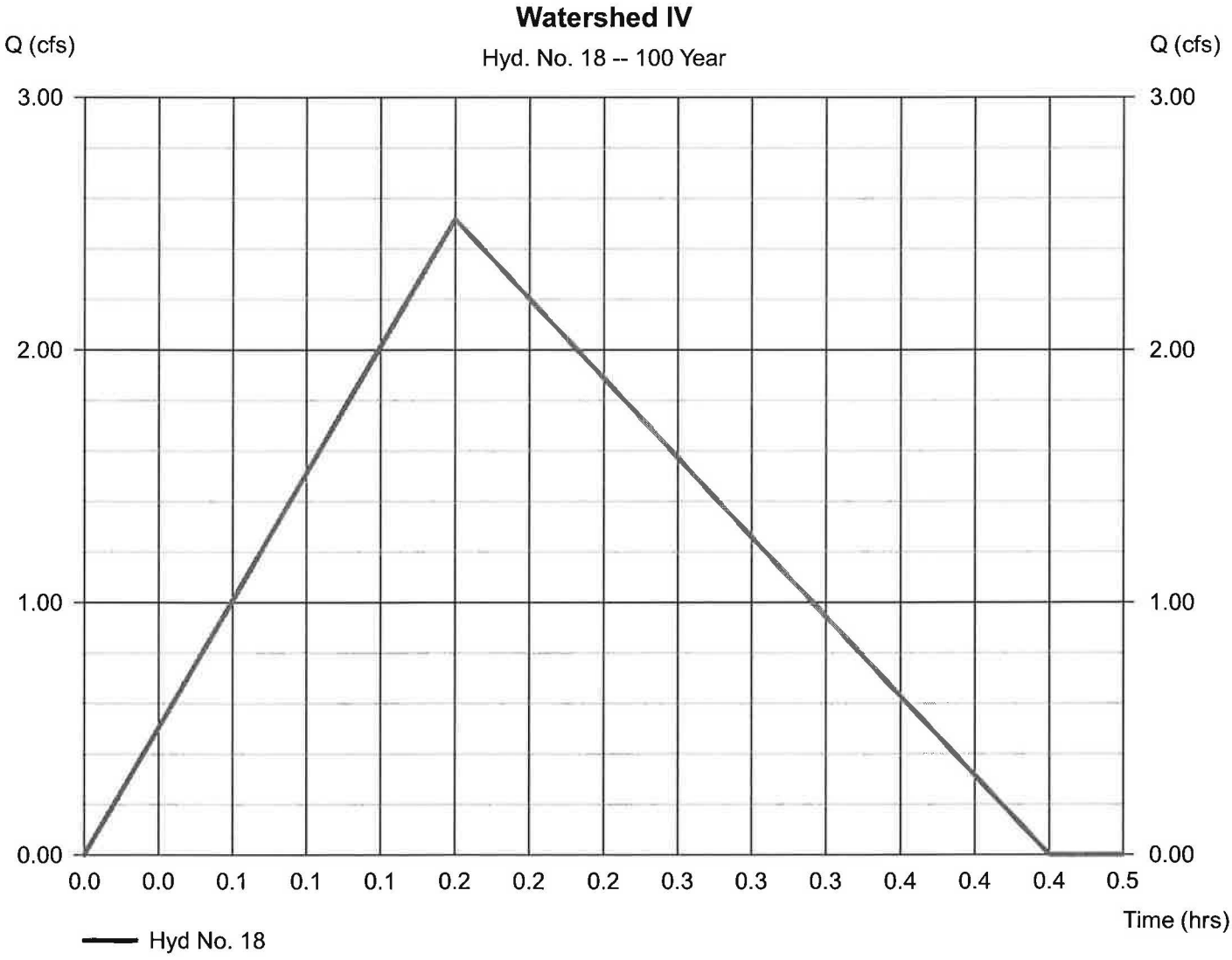
Hydrograph Report

Hyd. No. 18

Watershed IV

Hydrograph type	= Rational	Peak discharge	= 2.517 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 2,016 cuft
Drainage area	= 0.800 ac	Runoff coeff.	= 0.48*
Intensity	= 6.554 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.260 x 0.90) + (0.440 x 0.30) + (0.100 x 0.20)] / 0.800



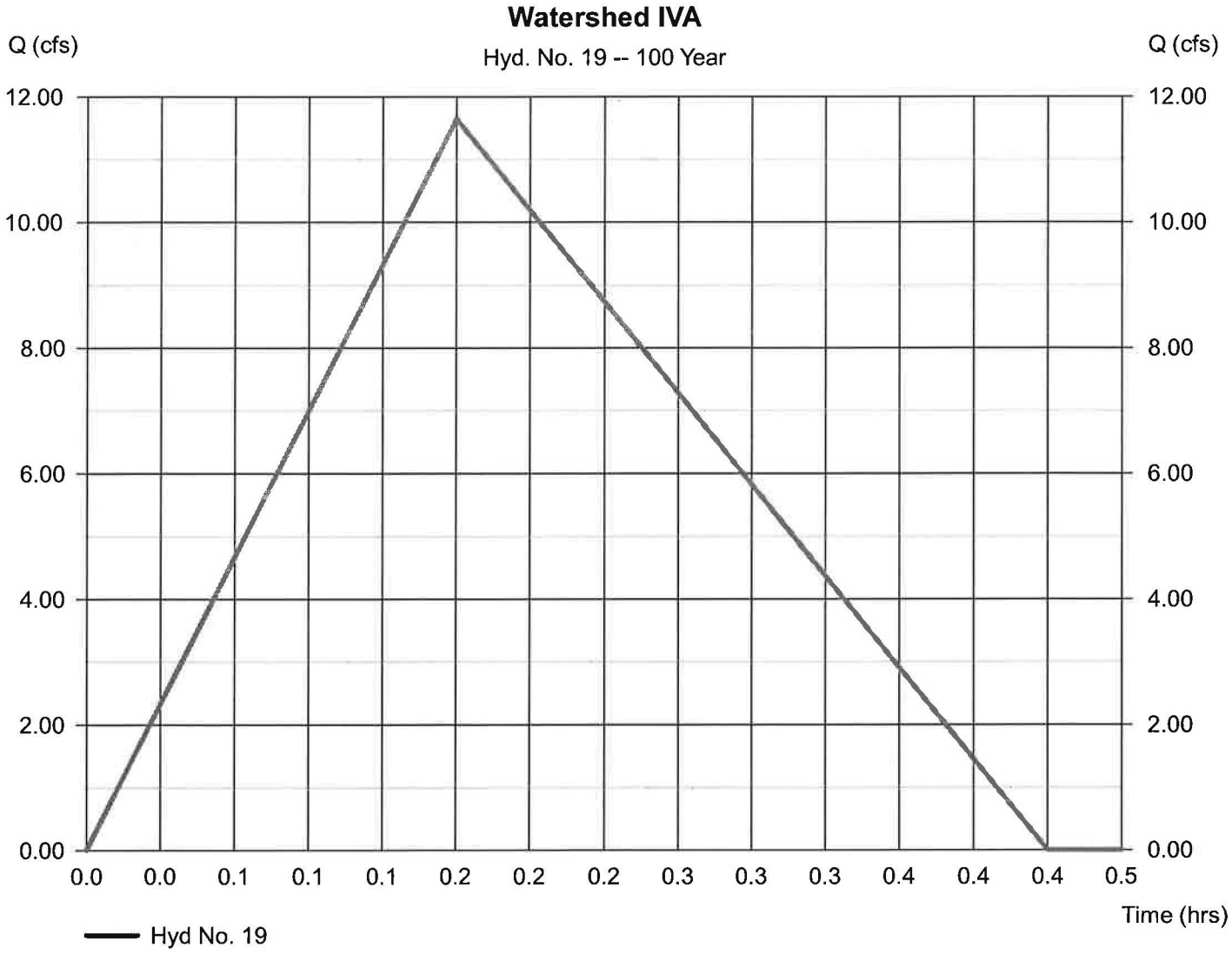
Hydrograph Report

Hyd. No. 19

Watershed IVA

Hydrograph type	= Rational	Peak discharge	= 11.65 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 9,331 cuft
Drainage area	= 2.370 ac	Runoff coeff.	= 0.75*
Intensity	= 6.554 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.770 x 0.90) + (0.600 x 0.30)] / 2.370



Hydrograph Report

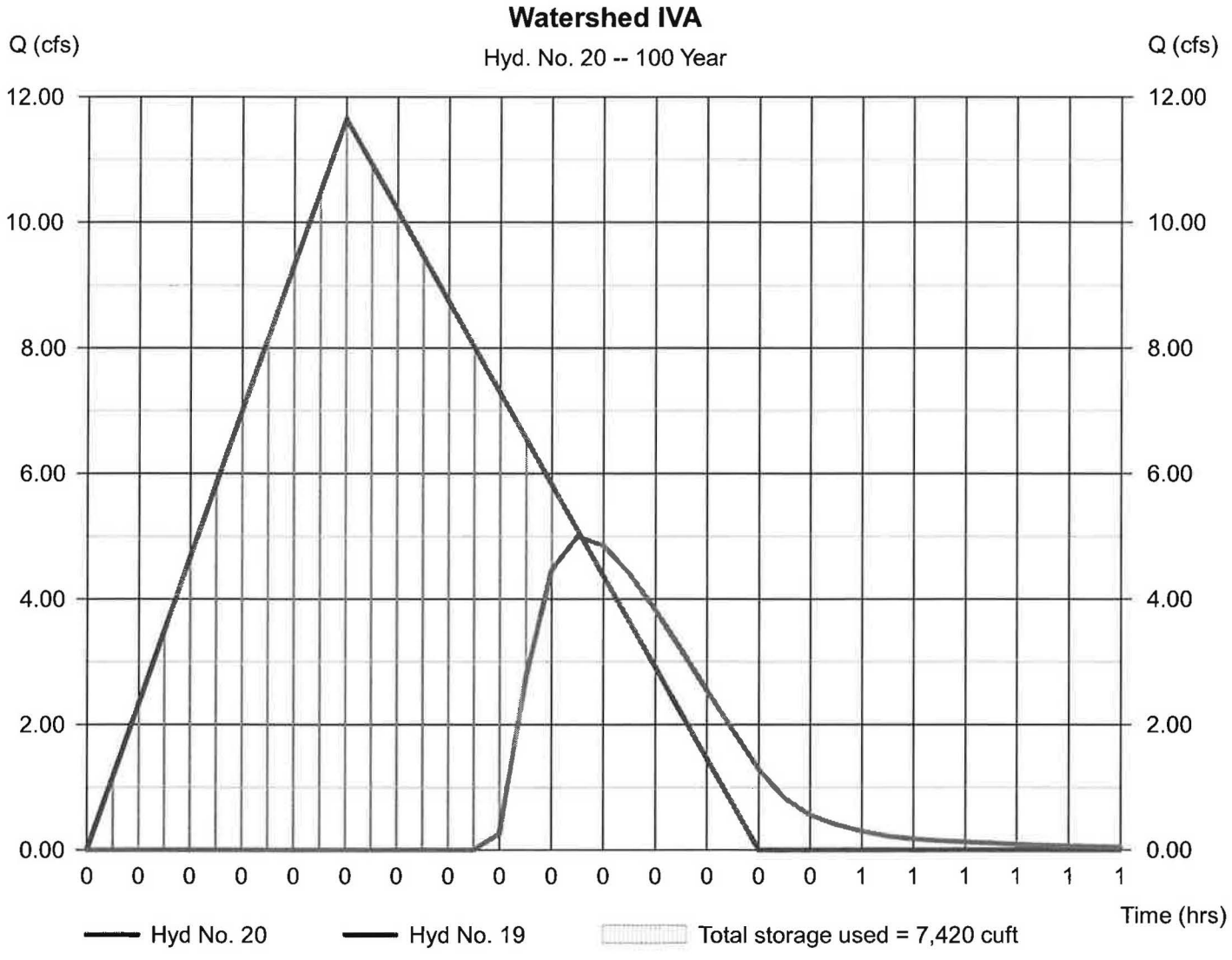
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 20

Watershed IVA

Hydrograph type	= Reservoir	Peak discharge	= 4.990 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 2,272 cuft
Inflow hyd. No.	= 19 - Watershed IVA	Max. Elevation	= 553.95 ft
Reservoir name	= Watershed IVA	Max. Storage	= 7,420 cuft

Storage Indication method used.

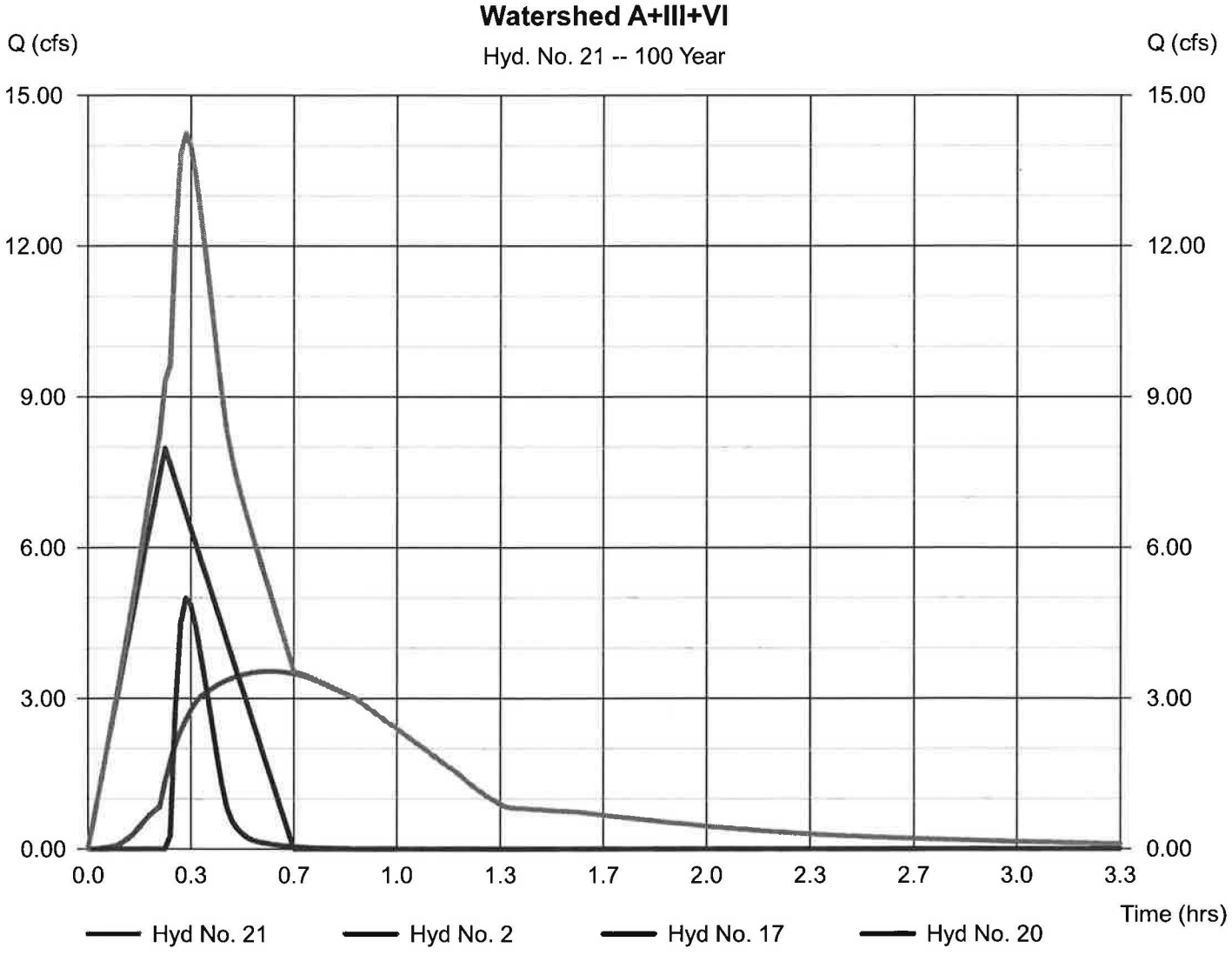


Hydrograph Report

Hyd. No. 21

Watershed A+III+VI

Hydrograph type	= Combine	Peak discharge	= 14.25 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 25,789 cuft
Inflow hyds.	= 2, 17, 20	Contrib. drain. area	= 2.700 ac



Hydrograph Report

Hyd. No. 22

Watershed VI

Hydrograph type	= Rational	Peak discharge	= 4.492 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 3,598 cuft
Drainage area	= 1.490 ac	Runoff coeff.	= 0.46*
Intensity	= 6.554 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.400 x 0.90) + (1.090 x 0.30)] / 1.490

Hydrograph Report

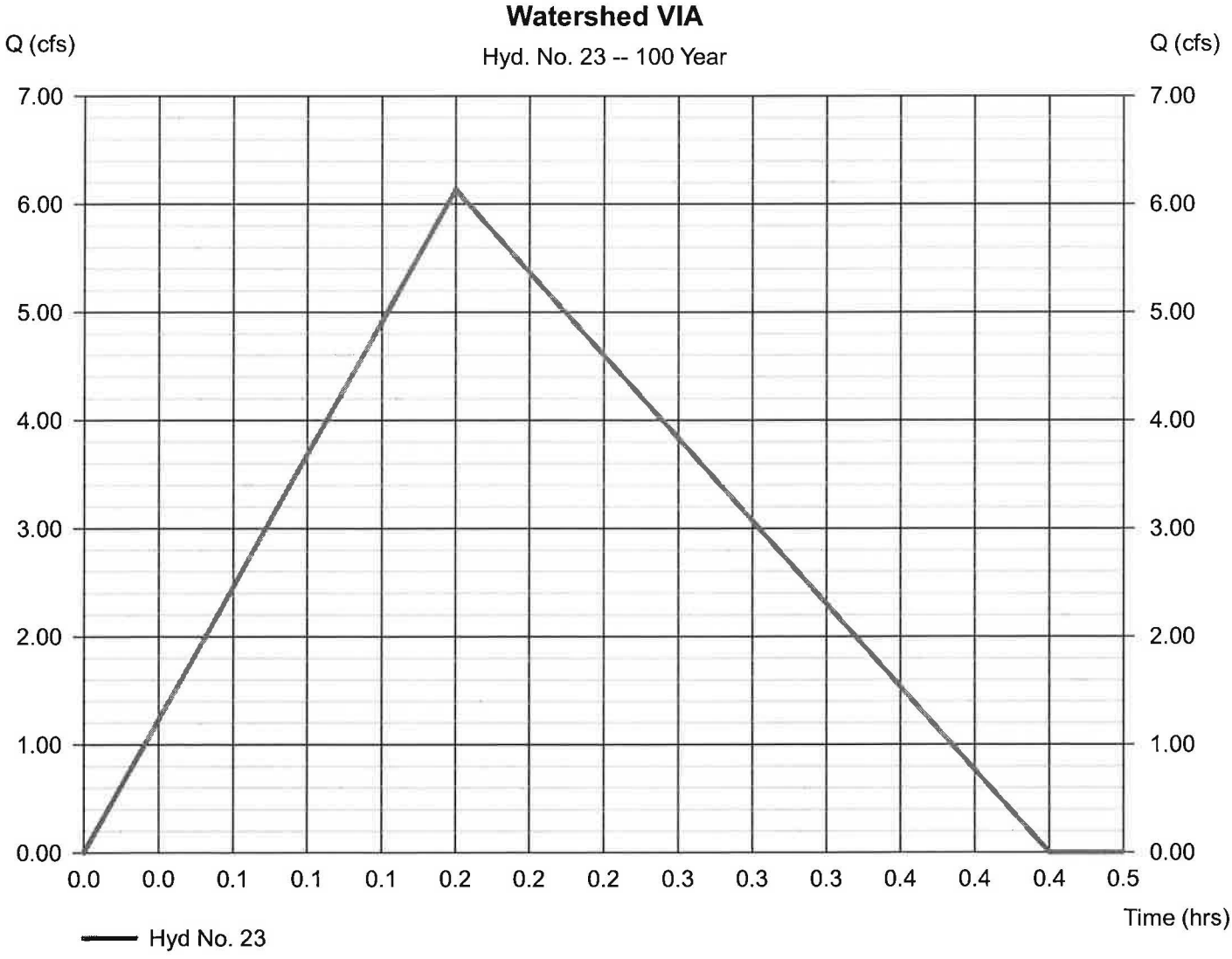
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 23

Watershed VIA

Hydrograph type	= Rational	Peak discharge	= 6.134 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 4,914 cuft
Drainage area	= 1.170 ac	Runoff coeff.	= 0.8*
Intensity	= 6.554 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.970 x 0.90) + (0.200 x 0.30)] / 1.170



Hydrograph Report

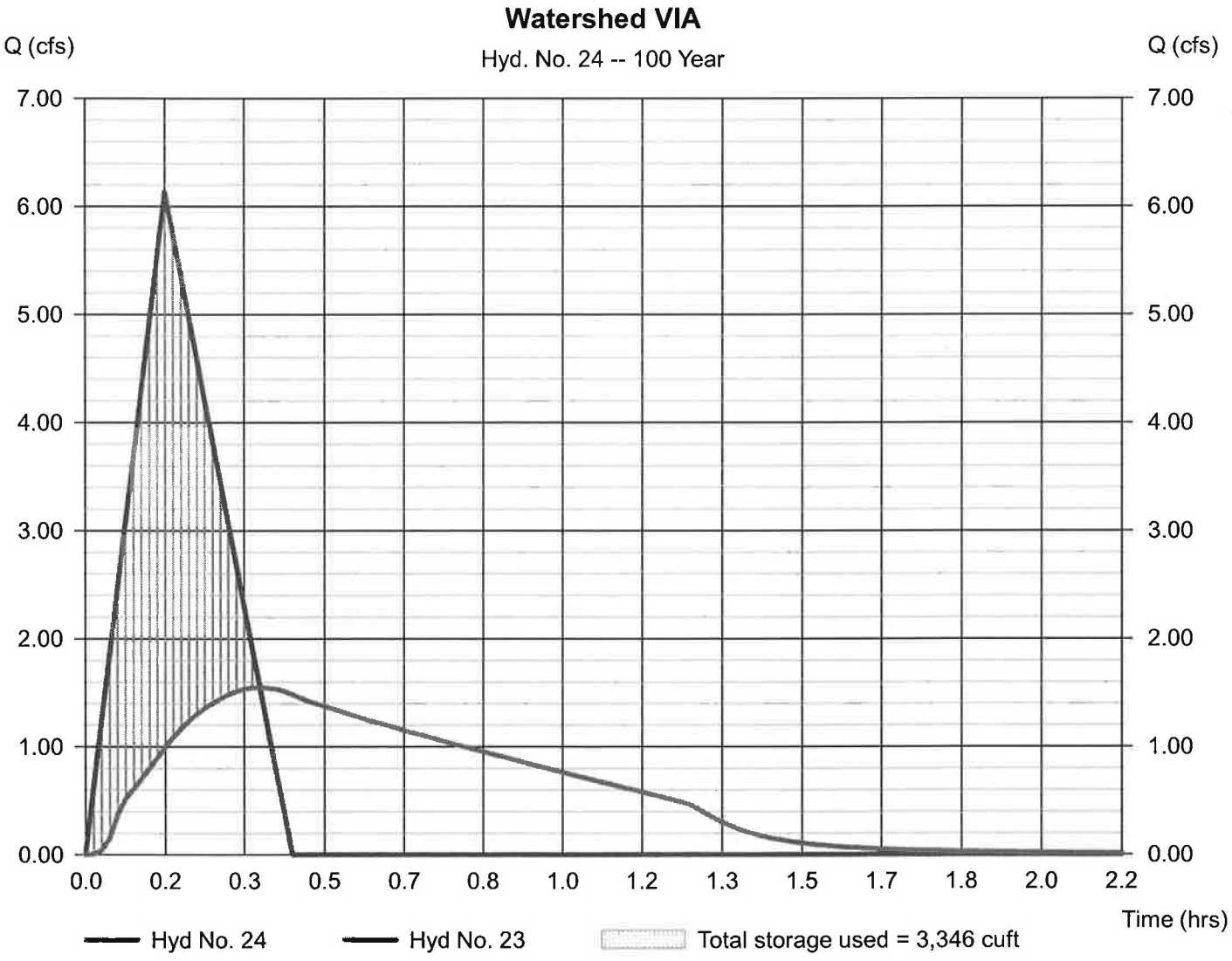
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 24

Watershed VIA

Hydrograph type	= Reservoir	Peak discharge	= 1.547 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.37 hrs
Time interval	= 1 min	Hyd. volume	= 4,780 cuft
Inflow hyd. No.	= 23 - Watershed VIA	Max. Elevation	= 551.43 ft
Reservoir name	= Watershed VIA	Max. Storage	= 3,346 cuft

Storage Indication method used.



Hydrograph Report

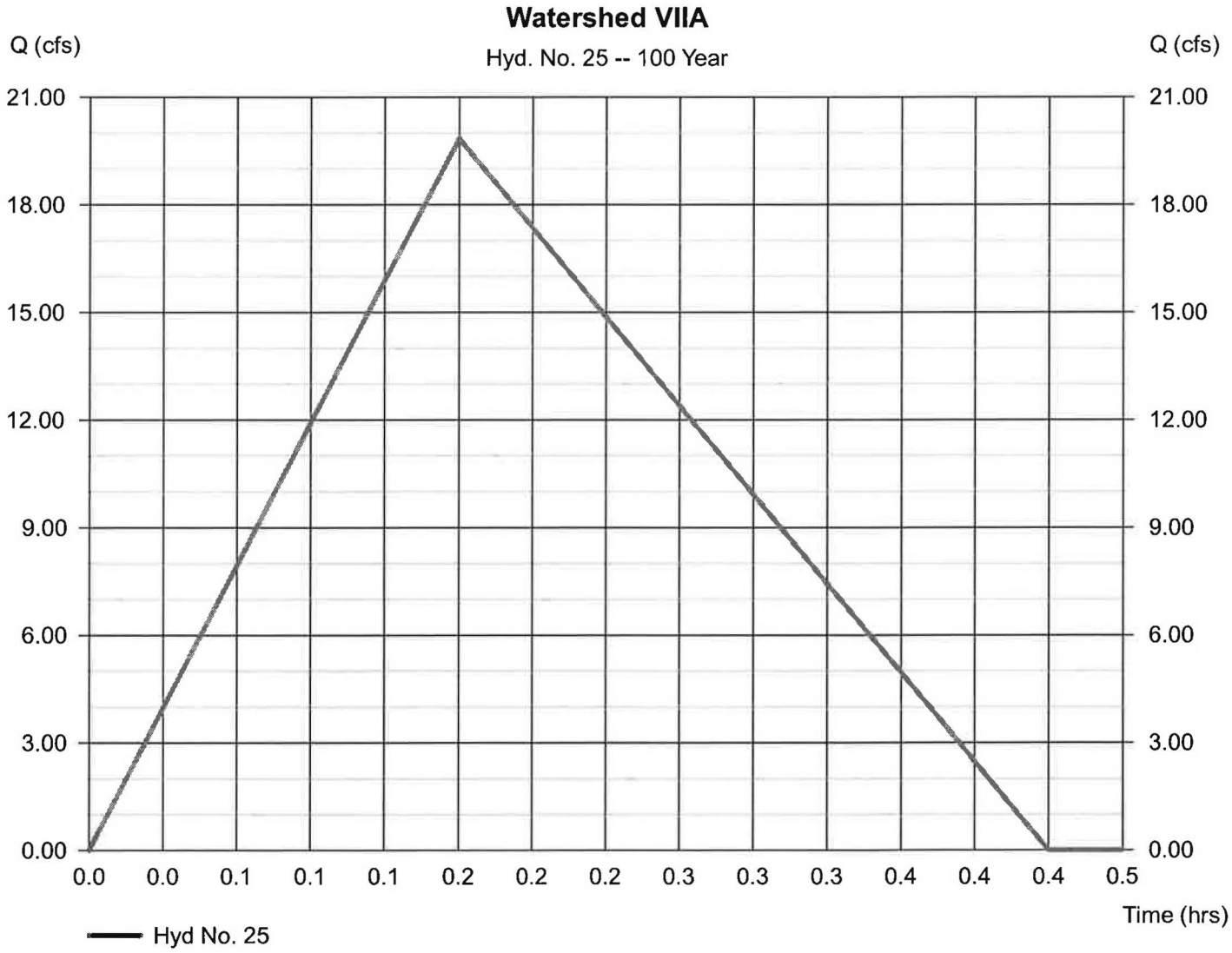
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 25

Watershed VIIA

Hydrograph type	= Rational	Peak discharge	= 19.84 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 15,888 cuft
Drainage area	= 4.090 ac	Runoff coeff.	= 0.74*
Intensity	= 6.554 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(3.020 x 0.90) + (1.070 x 0.30)] / 4.090



Hydrograph Report

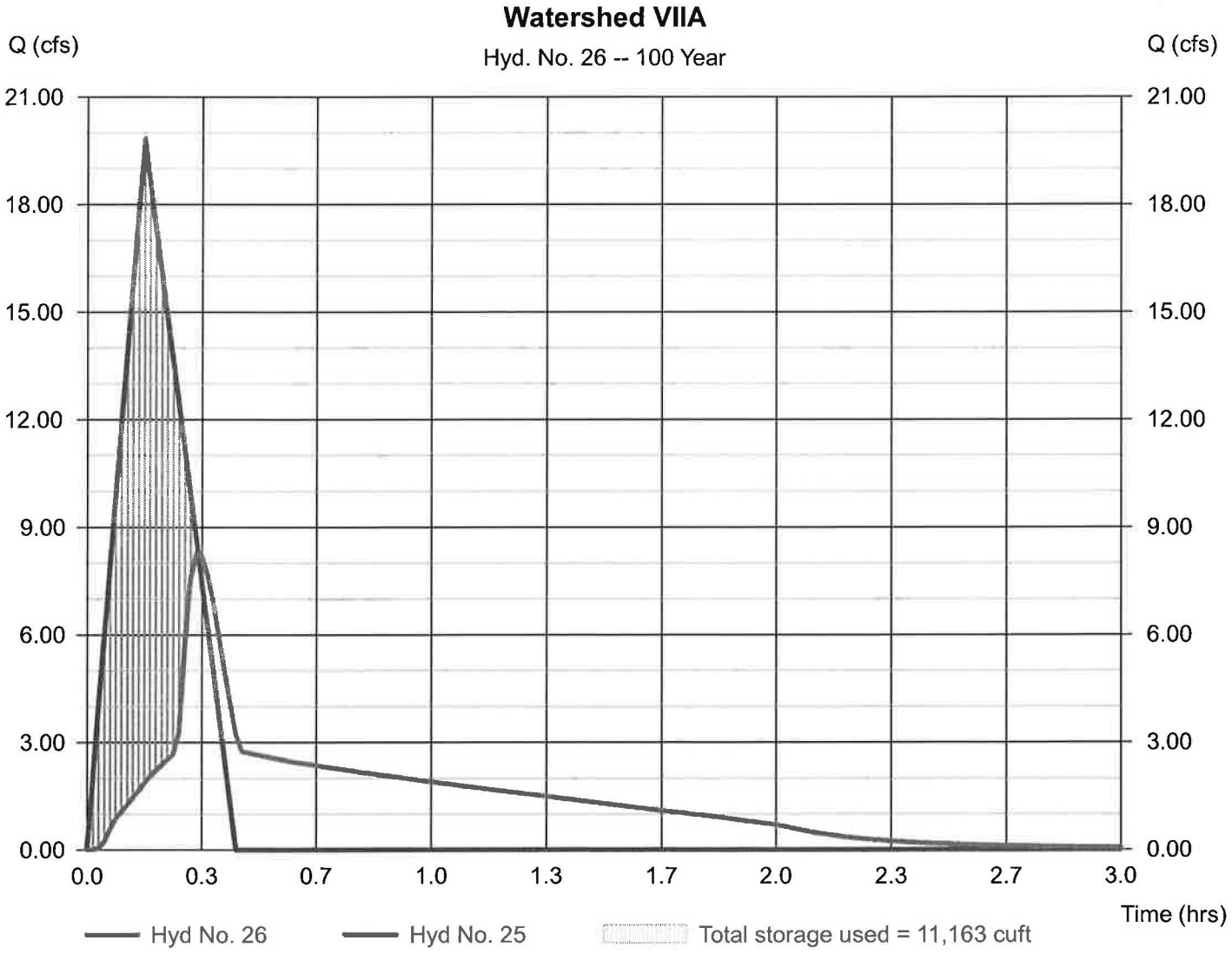
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 26

Watershed VIIA

Hydrograph type	= Reservoir	Peak discharge	= 8.250 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 15,461 cuft
Inflow hyd. No.	= 25 - Watershed VIIA	Max. Elevation	= 547.97 ft
Reservoir name	= Watershed VIIA	Max. Storage	= 11,163 cuft

Storage Indication method used.



Hydrograph Report

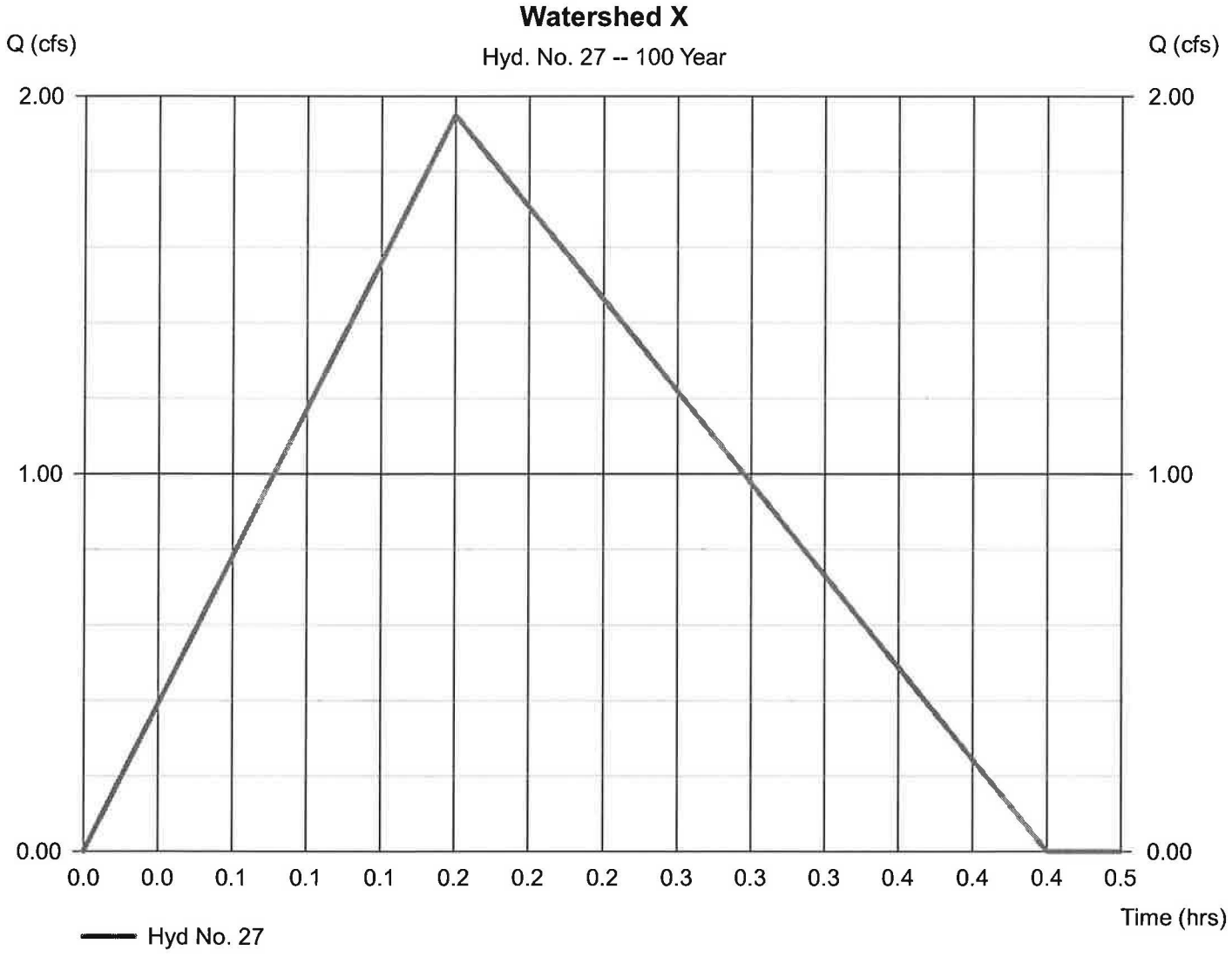
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 27

Watershed X

Hydrograph type	= Rational	Peak discharge	= 1.950 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 1,562 cuft
Drainage area	= 0.930 ac	Runoff coeff.	= 0.32*
Intensity	= 6.554 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.100 x 0.90) + (0.410 x 0.30) + (0.420 x 0.20)] / 0.930



Hydrograph Report

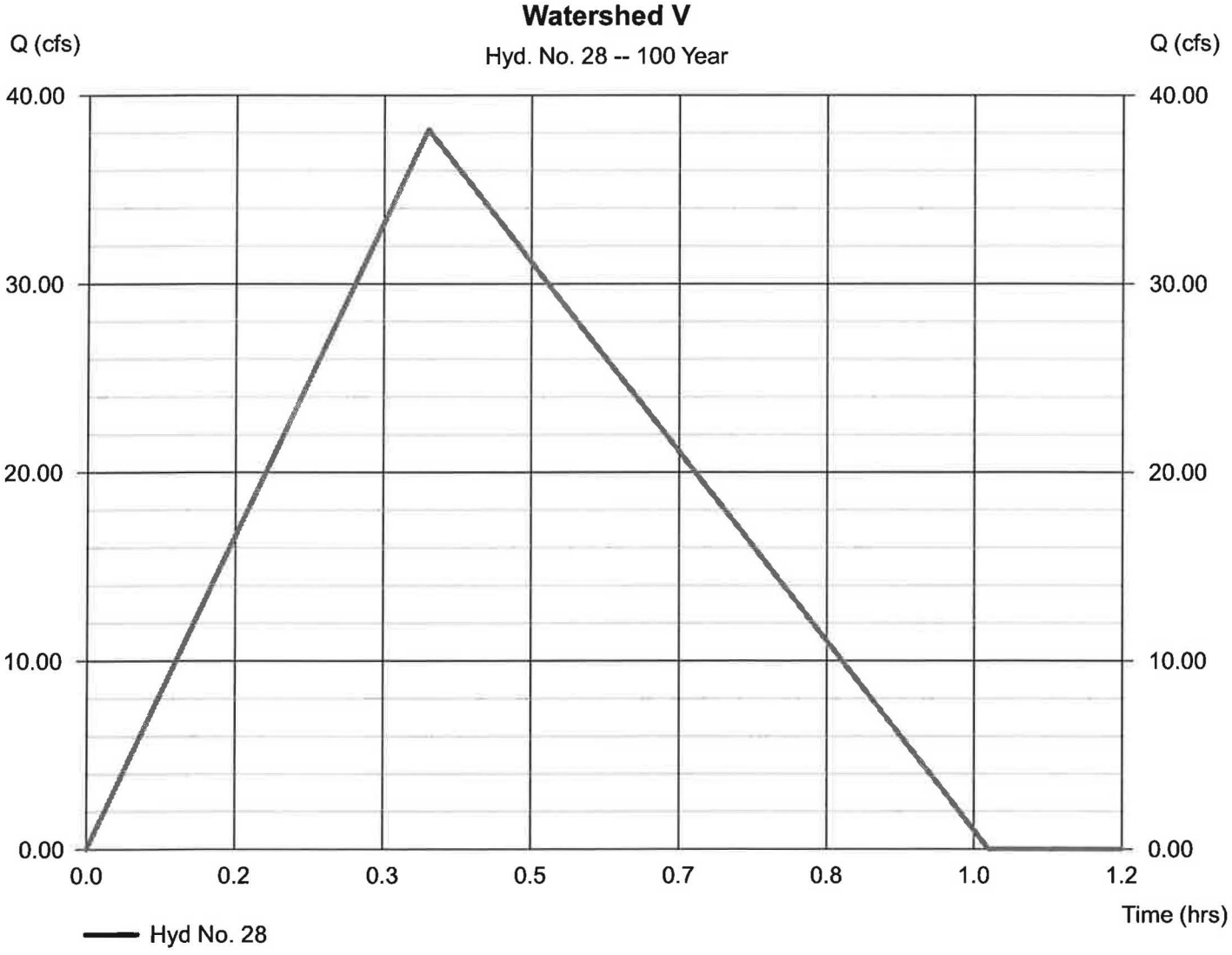
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 28

Watershed V

Hydrograph type	= Rational	Peak discharge	= 38.17 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.38 hrs
Time interval	= 1 min	Hyd. volume	= 70,319 cuft
Drainage area	= 26.200 ac	Runoff coeff.	= 0.31*
Intensity	= 4.699 in/hr	Tc by TR55	= 23.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(2.500 x 0.90) + (10.640 x 0.30) + (13.060 x 0.20)] / 26.200



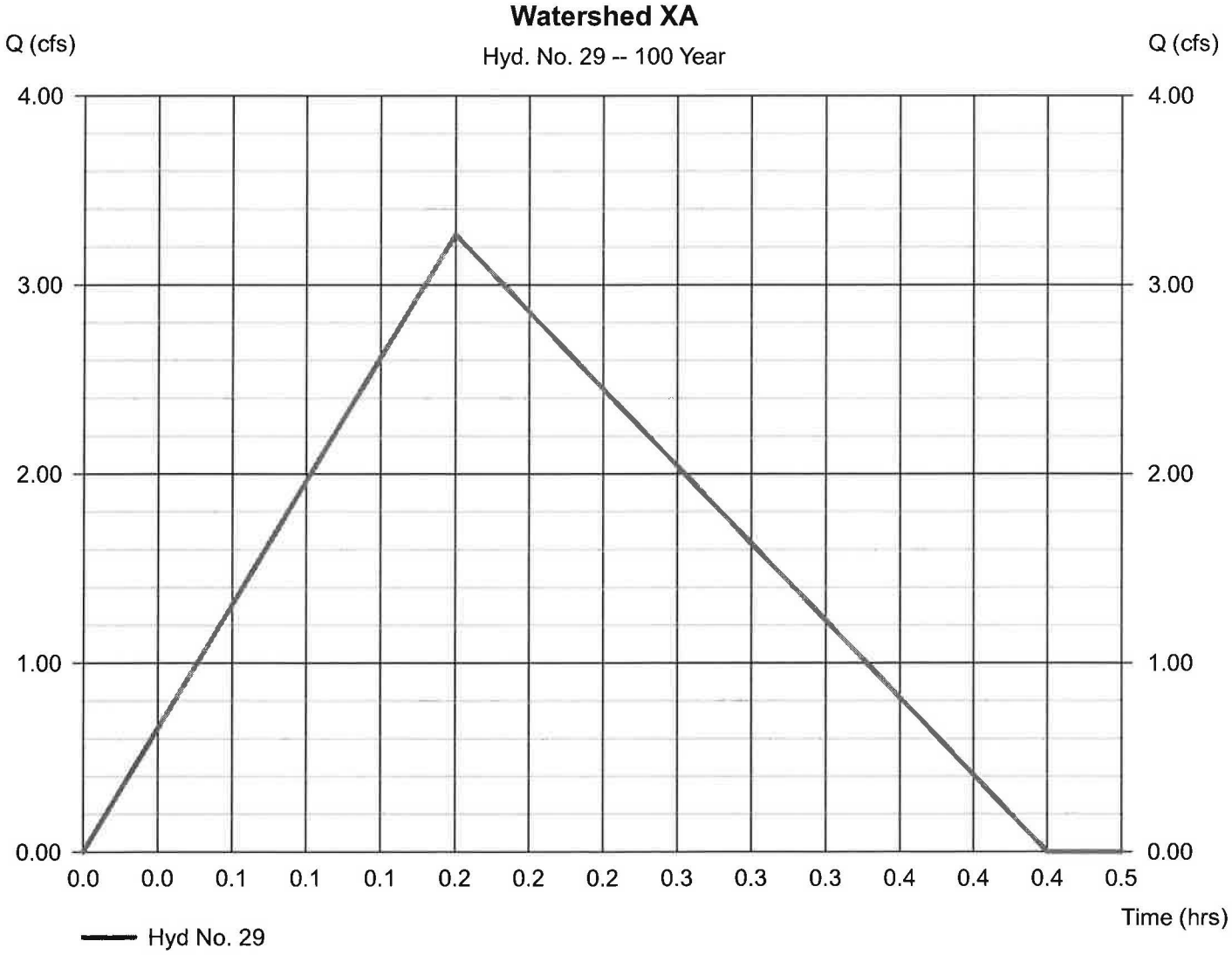
Hydrograph Report

Hyd. No. 29

Watershed XA

Hydrograph type	= Rational	Peak discharge	= 3.265 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 2,615 cuft
Drainage area	= 0.940 ac	Runoff coeff.	= 0.53*
Intensity	= 6.554 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.390 x 0.90) + (0.350 x 0.30) + (0.200 x 0.20)] / 0.940



Hydrograph Report

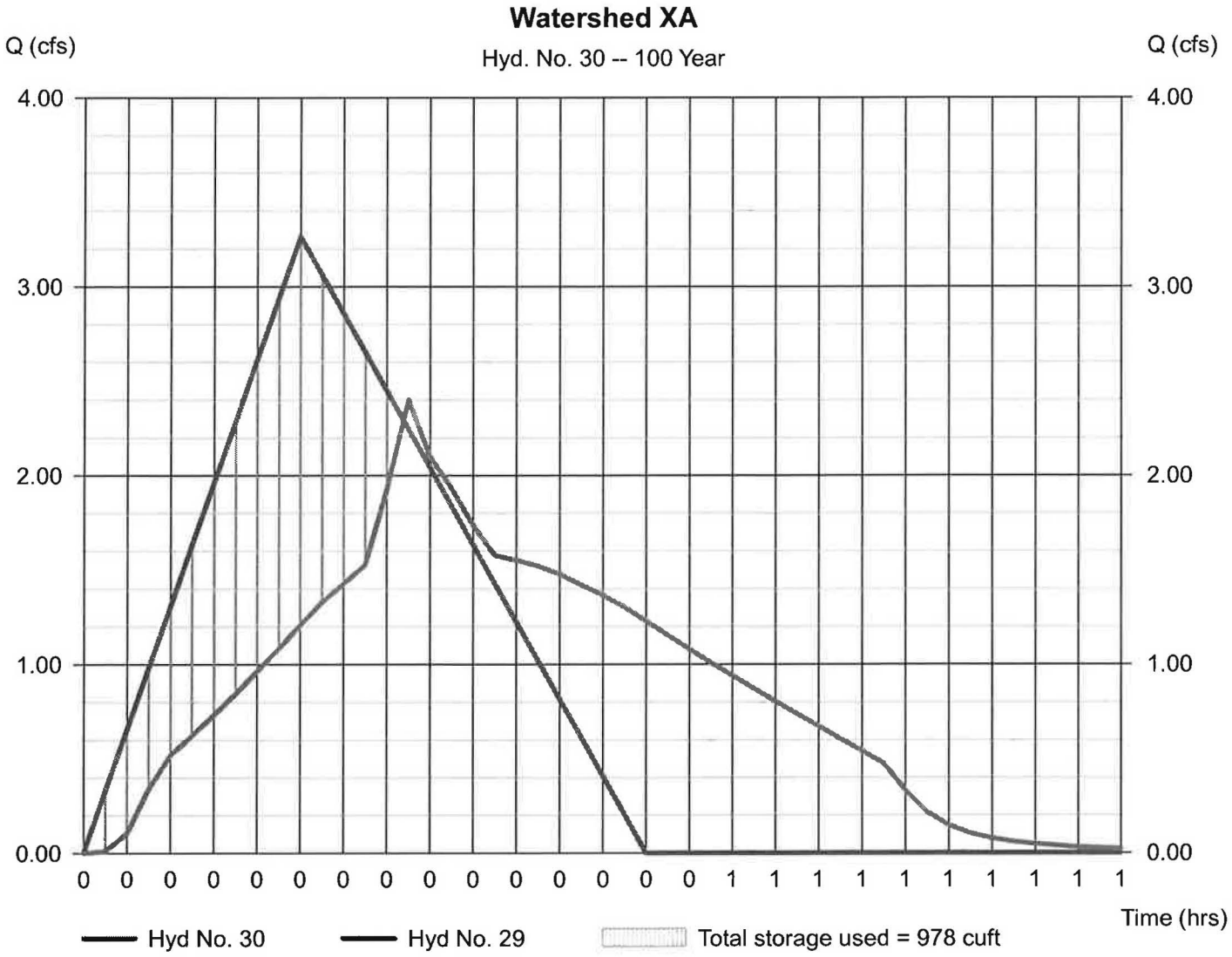
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 30

Watershed XA

Hydrograph type	= Reservoir	Peak discharge	= 2.400 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.25 hrs
Time interval	= 1 min	Hyd. volume	= 2,546 cuft
Inflow hyd. No.	= 29 - Watershed XA	Max. Elevation	= 558.65 ft
Reservoir name	= Watershed XA	Max. Storage	= 978 cuft

Storage Indication method used.



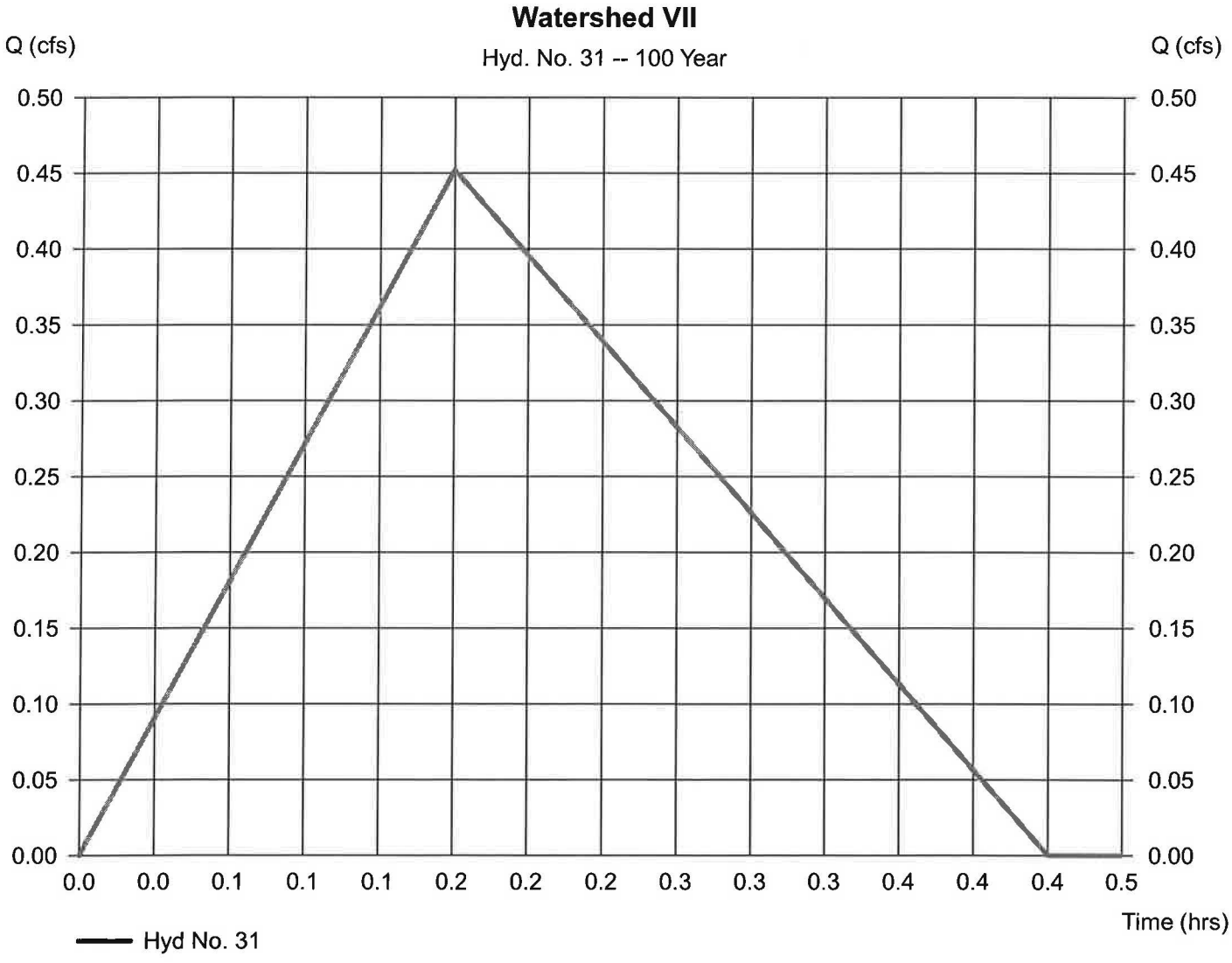
Hydrograph Report

Hyd. No. 31

Watershed VII

Hydrograph type	= Rational	Peak discharge	= 0.452 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 362 cuft
Drainage area	= 0.230 ac	Runoff coeff.	= 0.3*
Intensity	= 6.554 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.230 x 0.30)] / 0.230

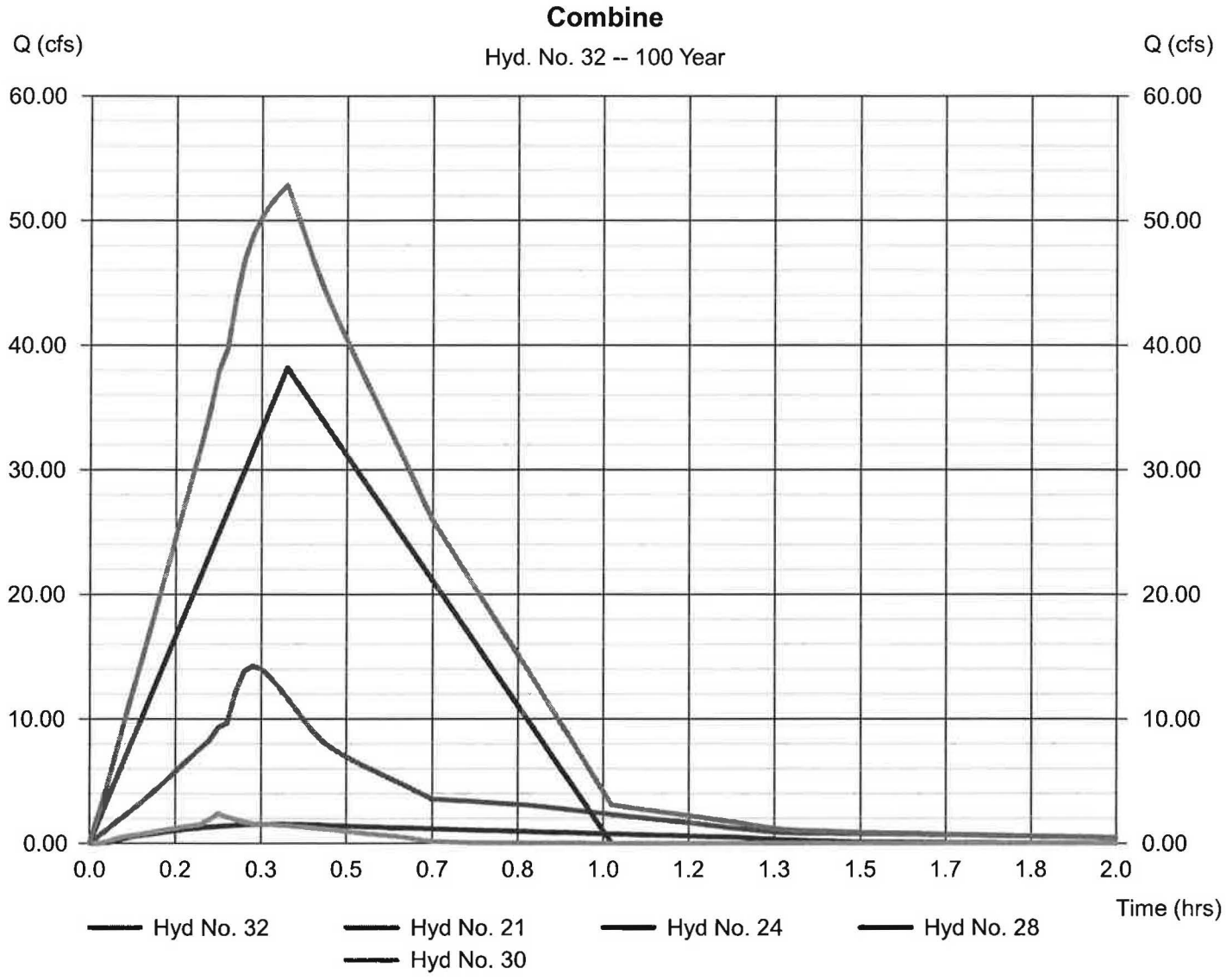


Hydrograph Report

Hyd. No. 32

Combine

Hydrograph type	= Combine	Peak discharge	= 52.86 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.38 hrs
Time interval	= 1 min	Hyd. volume	= 102,965 cuft
Inflow hyds.	= 21, 24, 28, 30	Contrib. drain. area	= 26.200 ac



Hydrograph Report

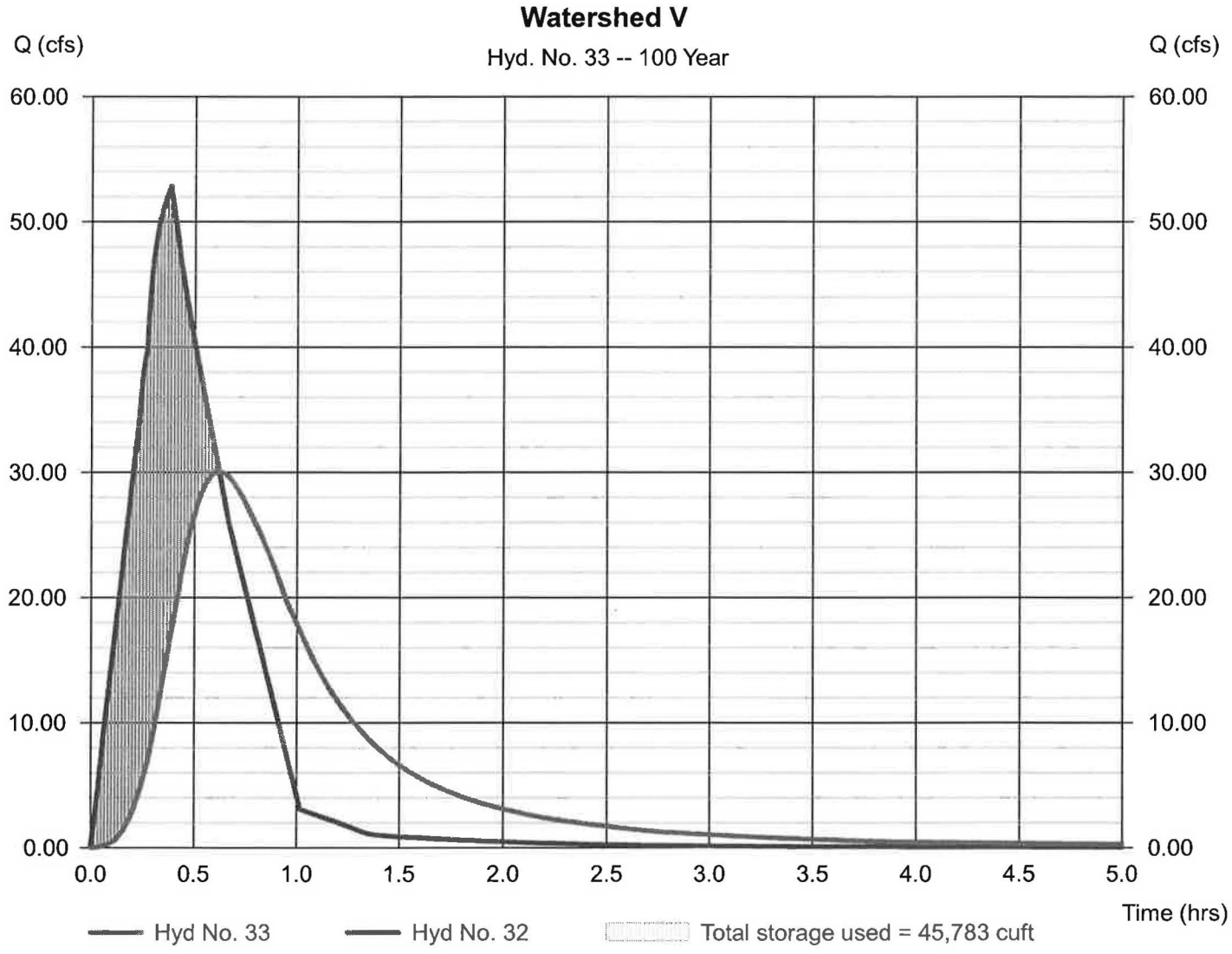
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 33

Watershed V

Hydrograph type	= Reservoir	Peak discharge	= 30.03 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.62 hrs
Time interval	= 1 min	Hyd. volume	= 102,959 cuft
Inflow hyd. No.	= 32 - Combine	Max. Elevation	= 544.48 ft
Reservoir name	= Watershed X	Max. Storage	= 45,783 cuft

Storage Indication method used.



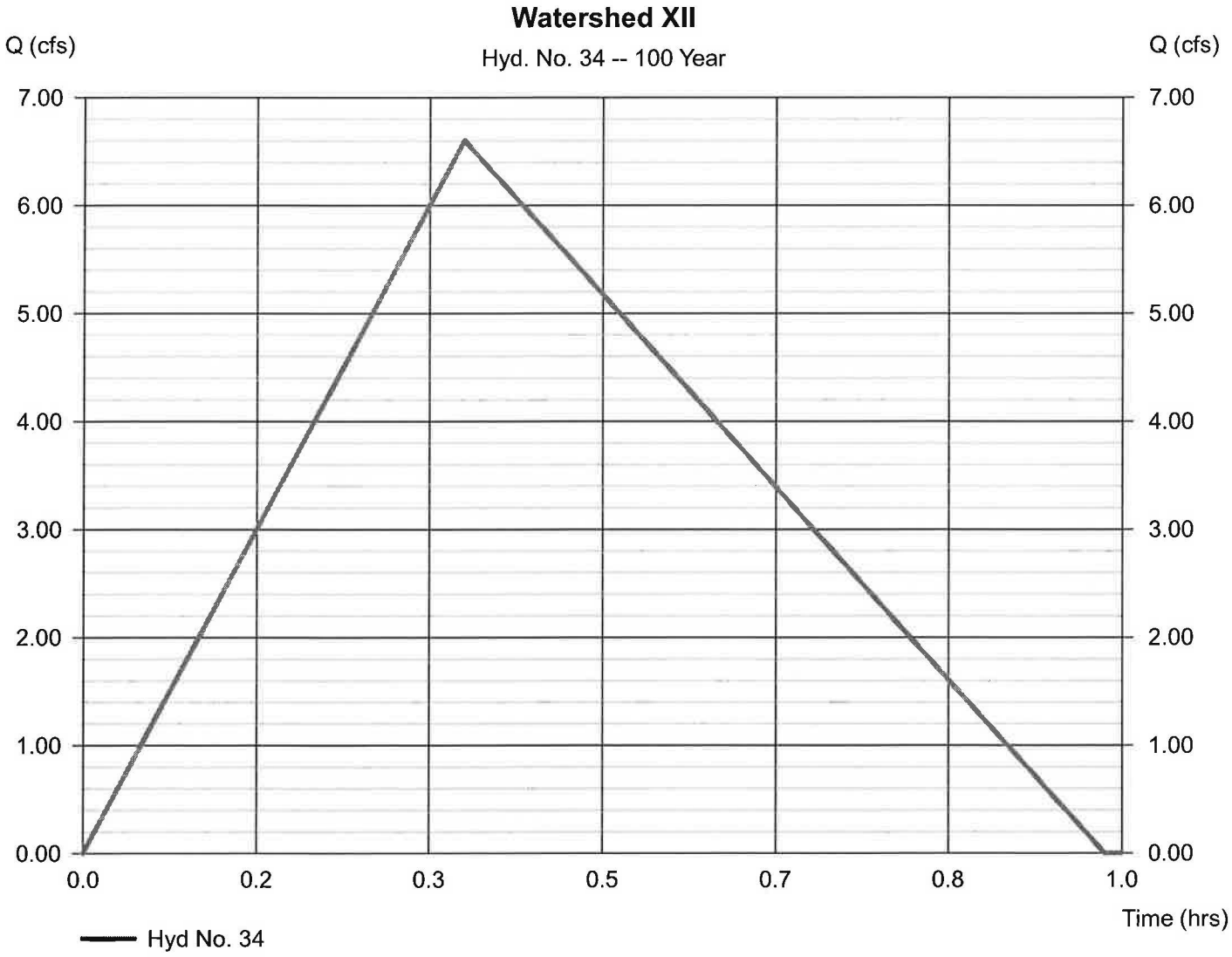
Hydrograph Report

Hyd. No. 34

Watershed XII

Hydrograph type	= Rational	Peak discharge	= 6.602 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.37 hrs
Time interval	= 1 min	Hyd. volume	= 11,881 cuft
Drainage area	= 4.630 ac	Runoff coeff.	= 0.3*
Intensity	= 4.753 in/hr	Tc by TR55	= 22.47 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.490 x 0.90) + (1.430 x 0.30) + (2.710 x 0.20)] / 4.630



Hydrograph Report

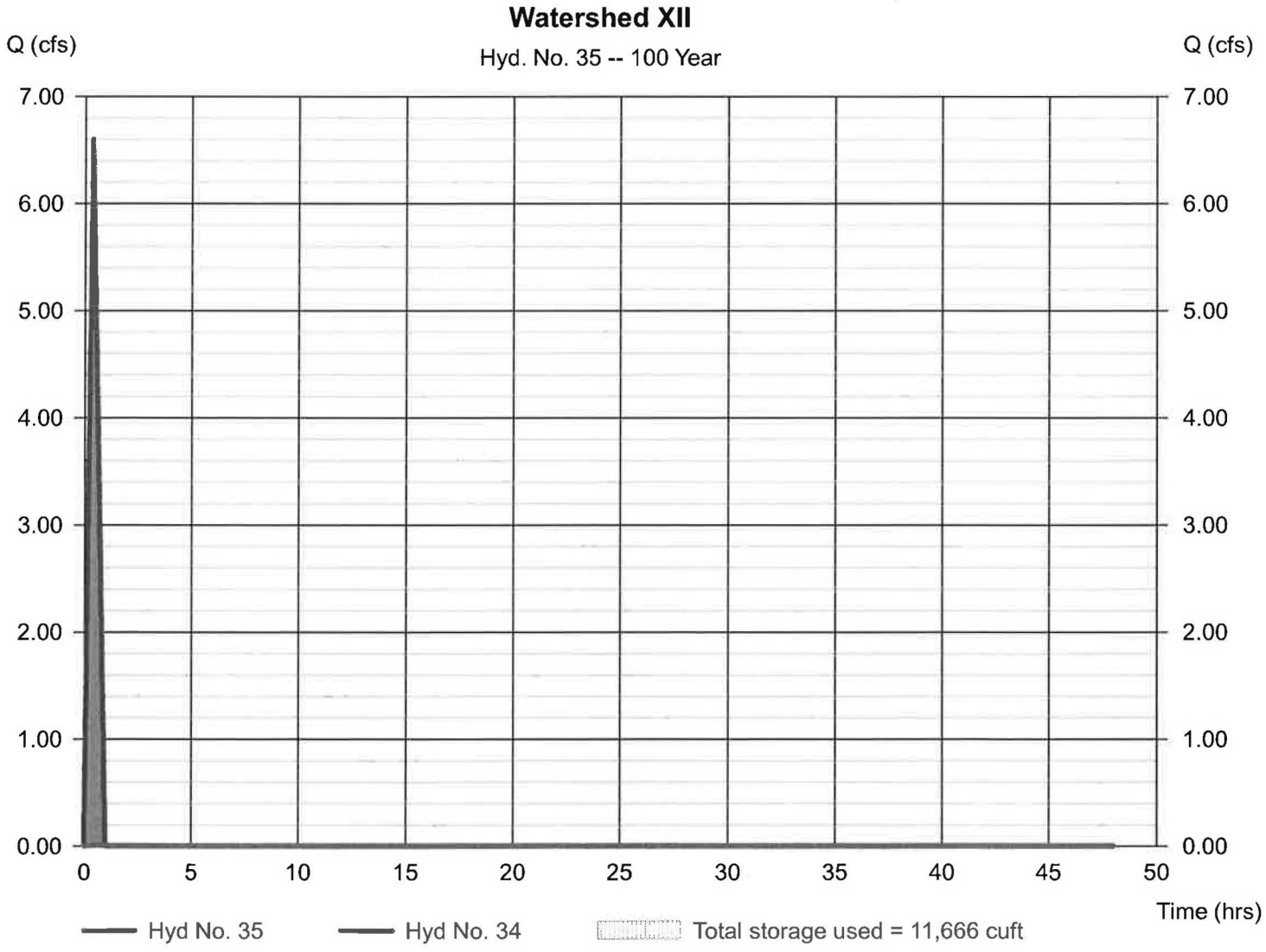
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 35

Watershed XII

Hydrograph type	= Reservoir	Peak discharge	= 0.007 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.98 hrs
Time interval	= 1 min	Hyd. volume	= 1,186 cuft
Inflow hyd. No.	= 34 - Watershed XII	Max. Elevation	= 546.34 ft
Reservoir name	= Watershed XII	Max. Storage	= 11,666 cuft

Storage Indication method used.



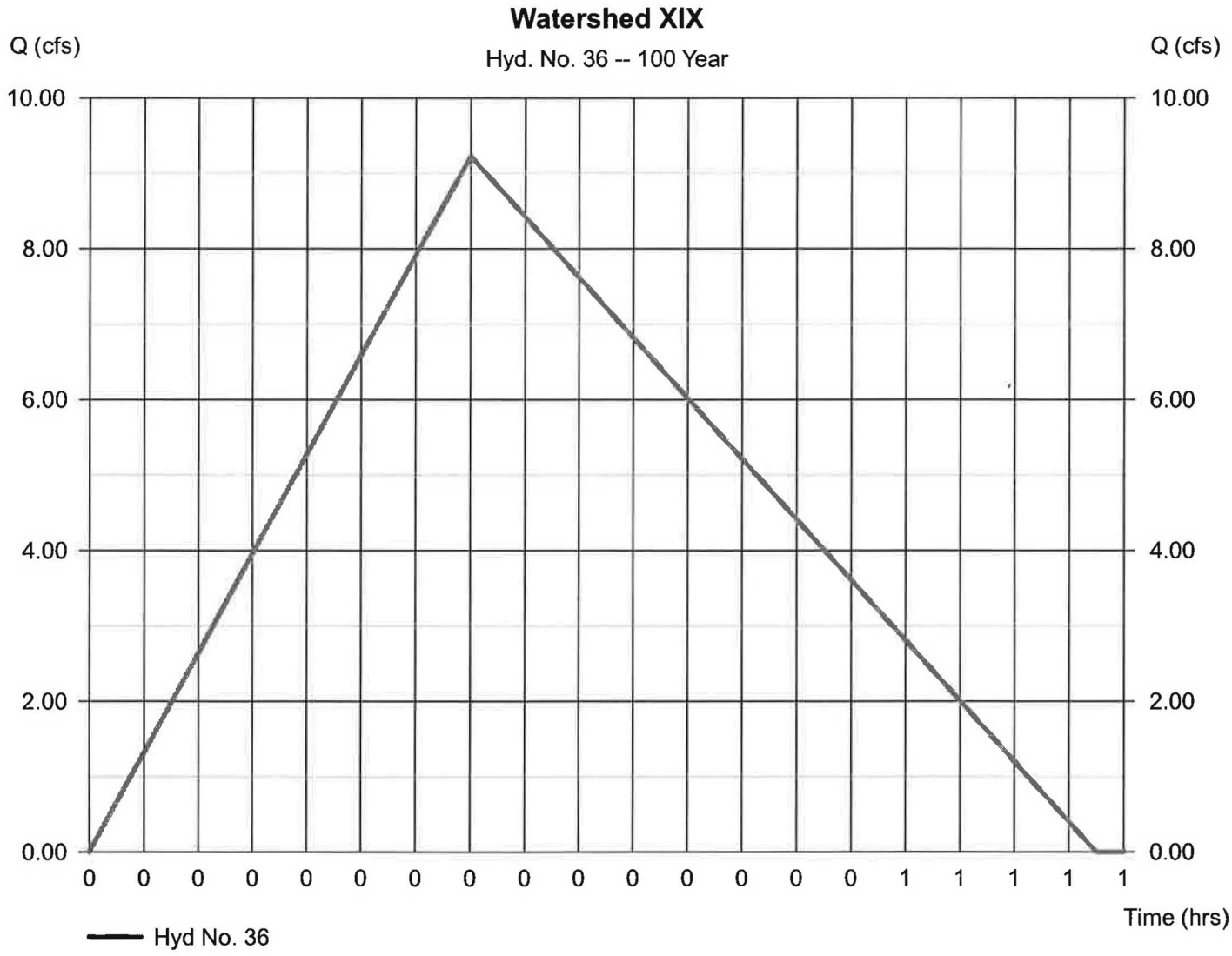
Hydrograph Report

Hyd. No. 36

Watershed XIX

Hydrograph type	= Rational	Peak discharge	= 9.225 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.23 hrs
Time interval	= 1 min	Hyd. volume	= 10,345 cuft
Drainage area	= 5.860 ac	Runoff coeff.	= 0.27*
Intensity	= 5.831 in/hr	Tc by TR55	= 14.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.400 x 0.90) + (1.500 x 0.30) + (3.960 x 0.20)] / 5.860



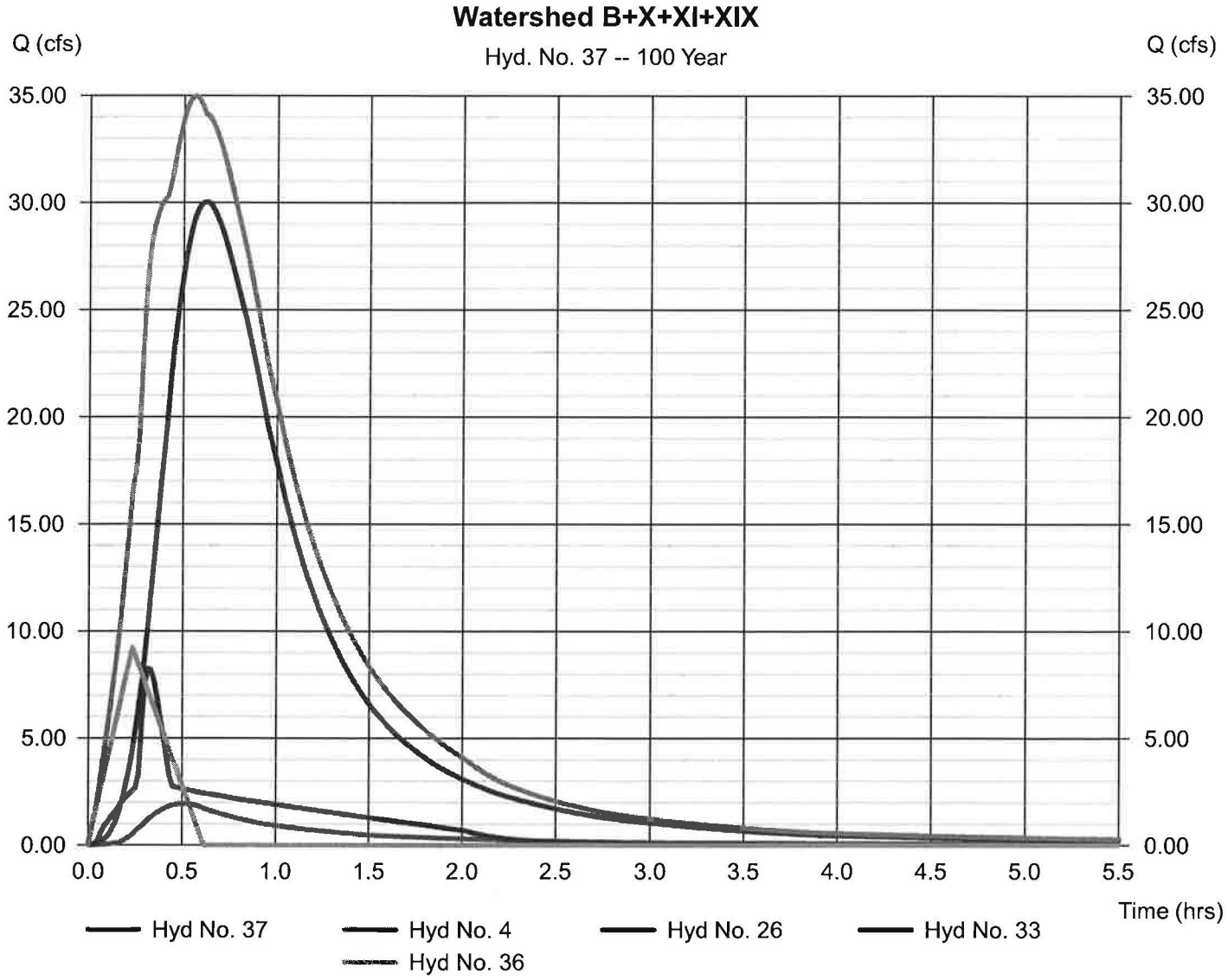
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 37

Watershed B+X+XI+XIX

Hydrograph type	= Combine	Peak discharge	= 34.97 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.57 hrs
Time interval	= 1 min	Hyd. volume	= 136,707 cuft
Inflow hyds.	= 4, 26, 33, 36	Contrib. drain. area	= 5.860 ac



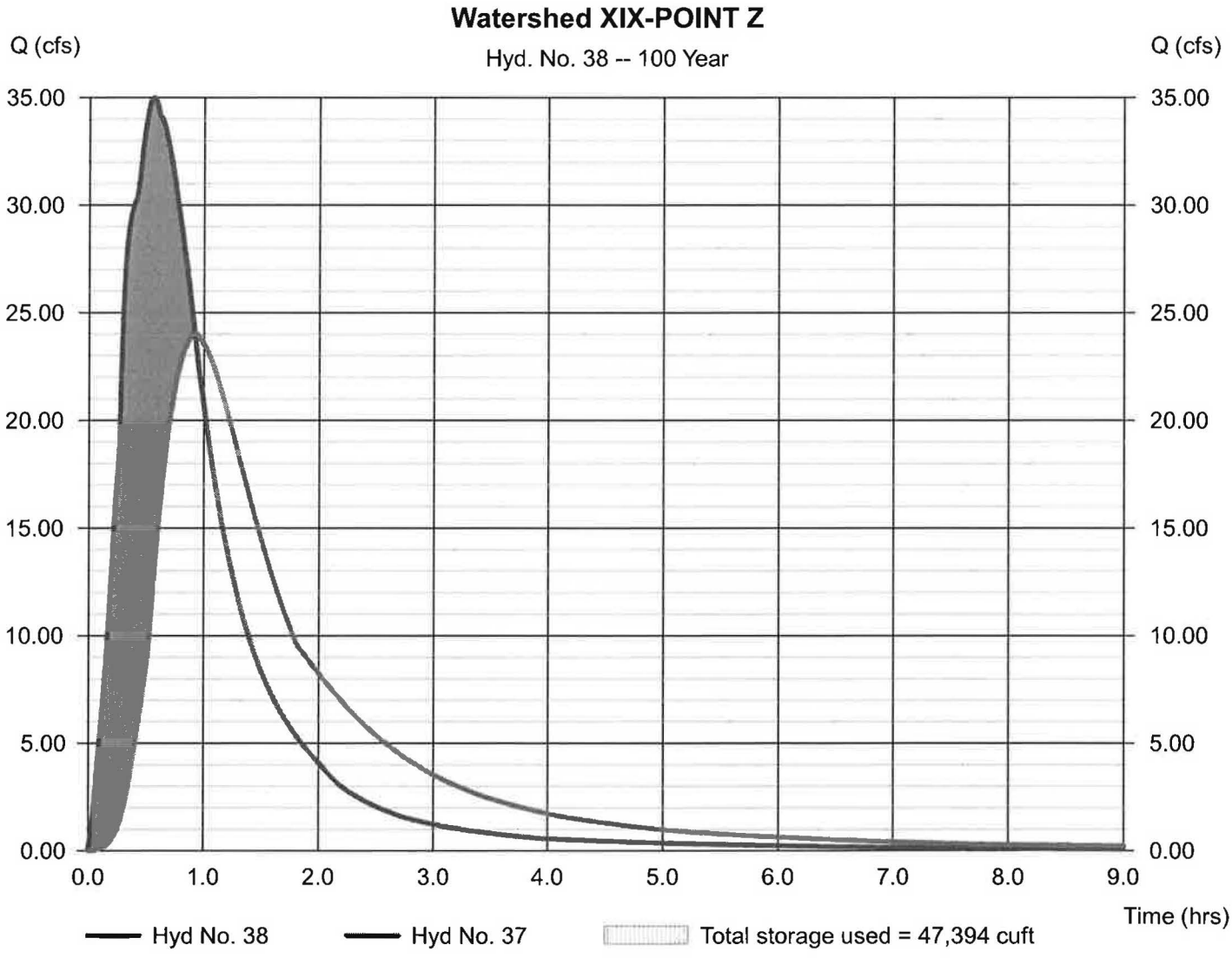
Hydrograph Report

Hyd. No. 38

Watershed XIX-POINT Z

Hydrograph type	= Reservoir	Peak discharge	= 24.04 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.92 hrs
Time interval	= 1 min	Hyd. volume	= 136,697 cuft
Inflow hyd. No.	= 37 - Watershed B+X+XI+XIX	Max. Elevation	= 542.20 ft
Reservoir name	= Watershed XIX	Max. Storage	= 47,394 cuft

Storage Indication method used.



Hydrograph Report

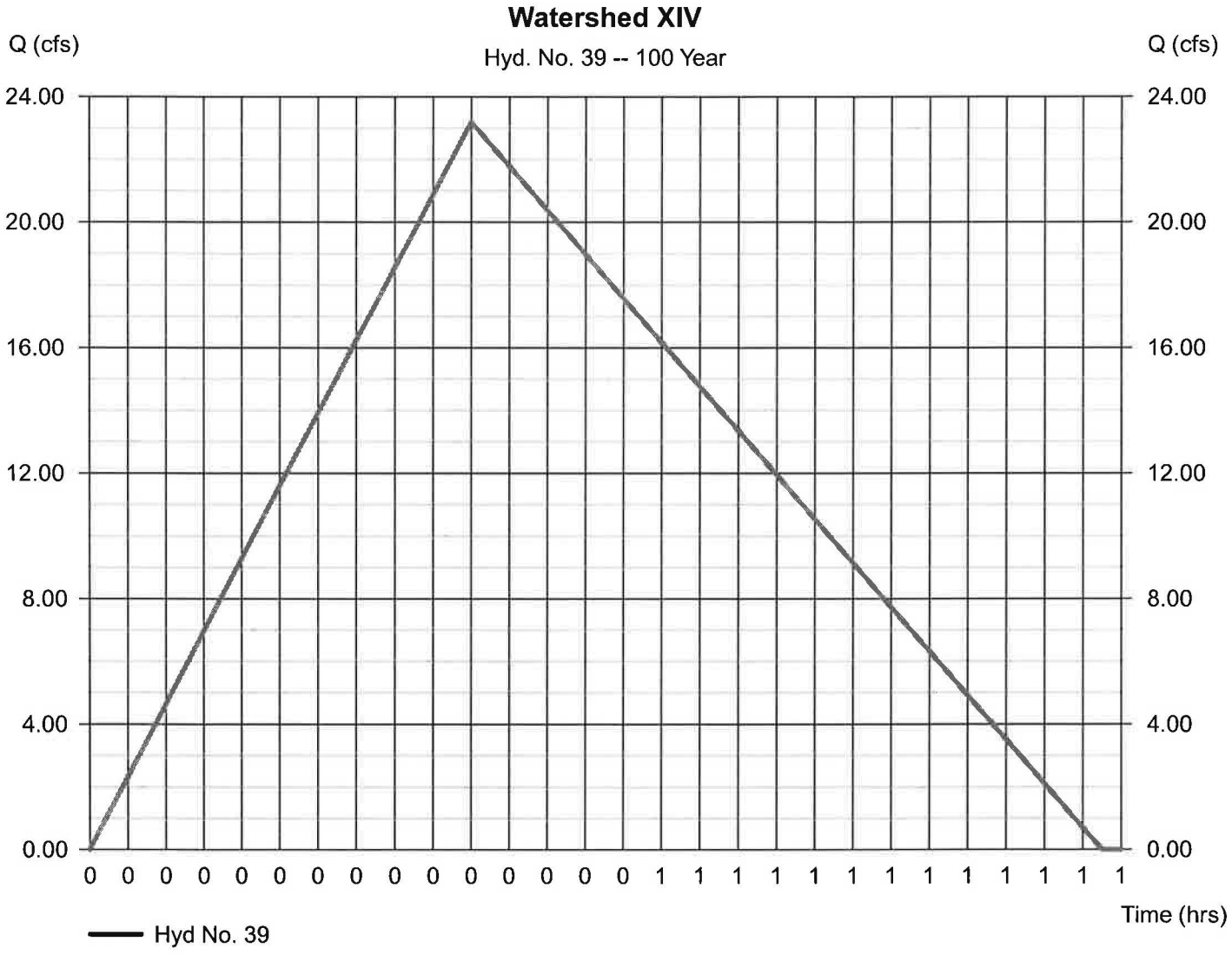
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 39

Watershed XIV

Hydrograph type	= Rational	Peak discharge	= 23.19 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.33 hrs
Time interval	= 1 min	Hyd. volume	= 37,154 cuft
Drainage area	= 15.400 ac	Runoff coeff.	= 0.3*
Intensity	= 5.020 in/hr	Tc by TR55	= 20.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.000 x 0.90) + (5.100 x 0.30) + (8.800 x 0.20) + (0.500 x 1.00)] / 15.400

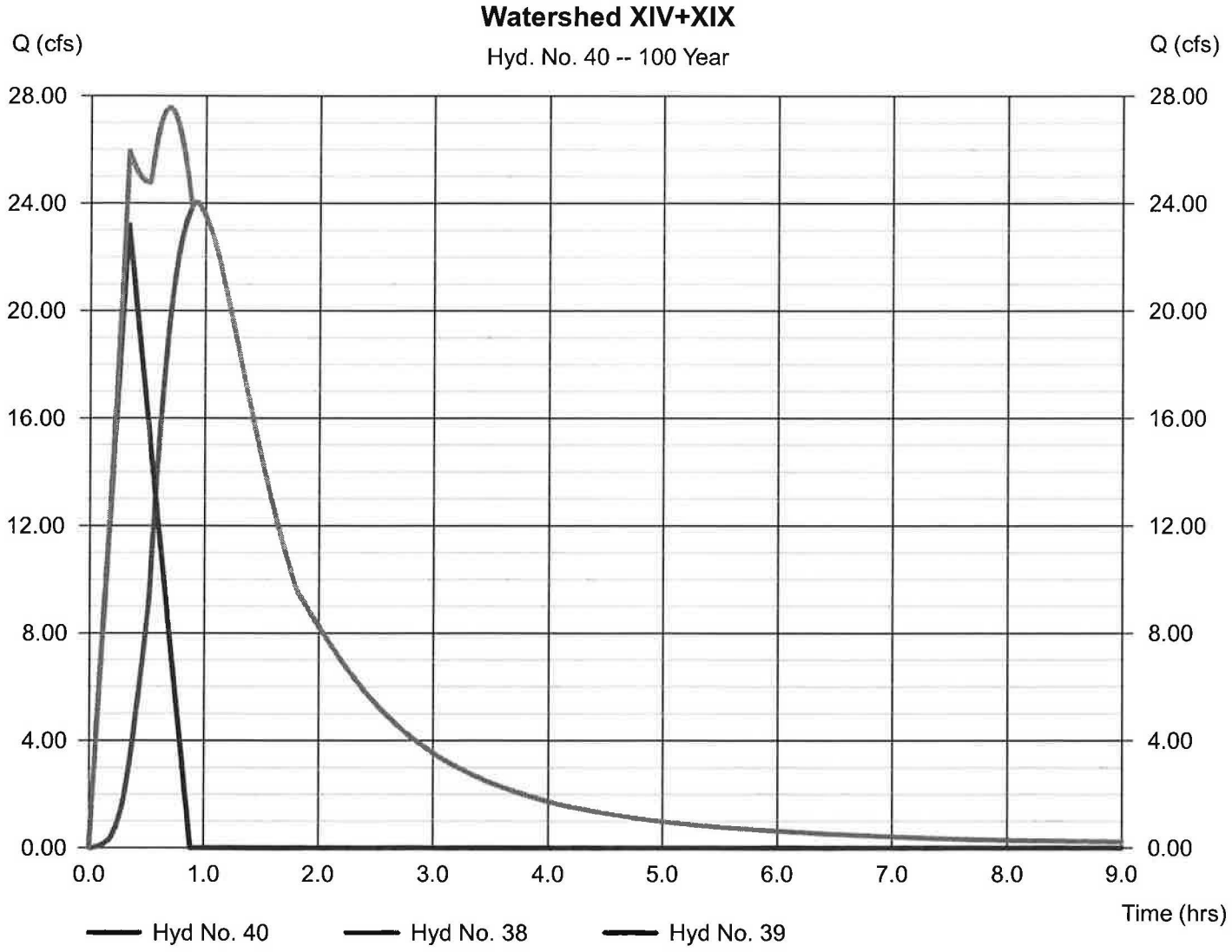


Hydrograph Report

Hyd. No. 40

Watershed XIV+XIX

Hydrograph type	= Combine	Peak discharge	= 27.56 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.68 hrs
Time interval	= 1 min	Hyd. volume	= 173,573 cuft
Inflow hyds.	= 38, 39	Contrib. drain. area	= 15.400 ac



Hydrograph Report

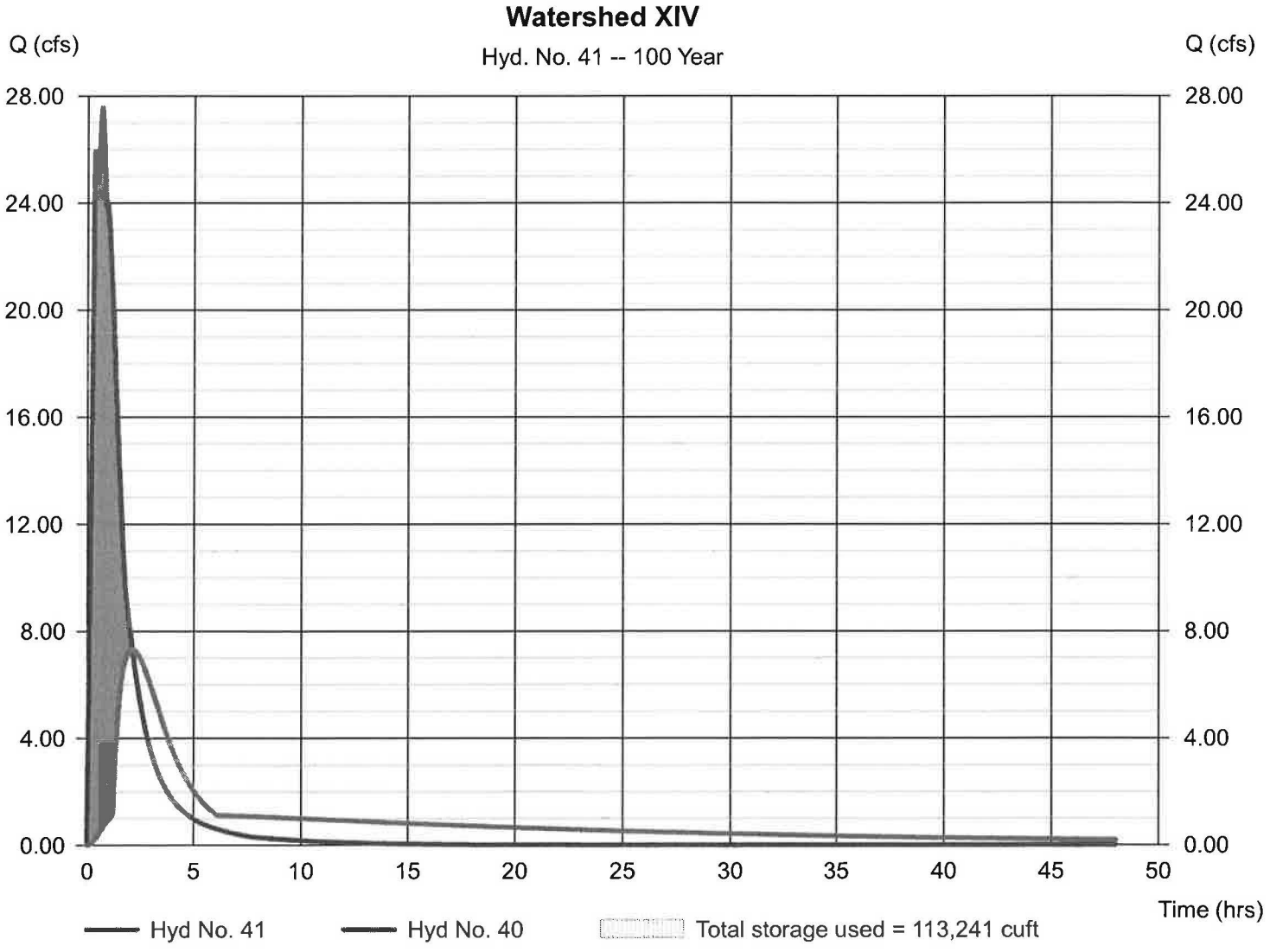
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 41

Watershed XIV

Hydrograph type	= Reservoir	Peak discharge	= 7.315 cfs
Storm frequency	= 100 yrs	Time to peak	= 2.15 hrs
Time interval	= 1 min	Hyd. volume	= 157,105 cuft
Inflow hyd. No.	= 40 - Watershed XIV+XIX	Max. Elevation	= 539.72 ft
Reservoir name	= Watershed XIV	Max. Storage	= 113,241 cuft

Storage Indication method used.



Hydrograph Report

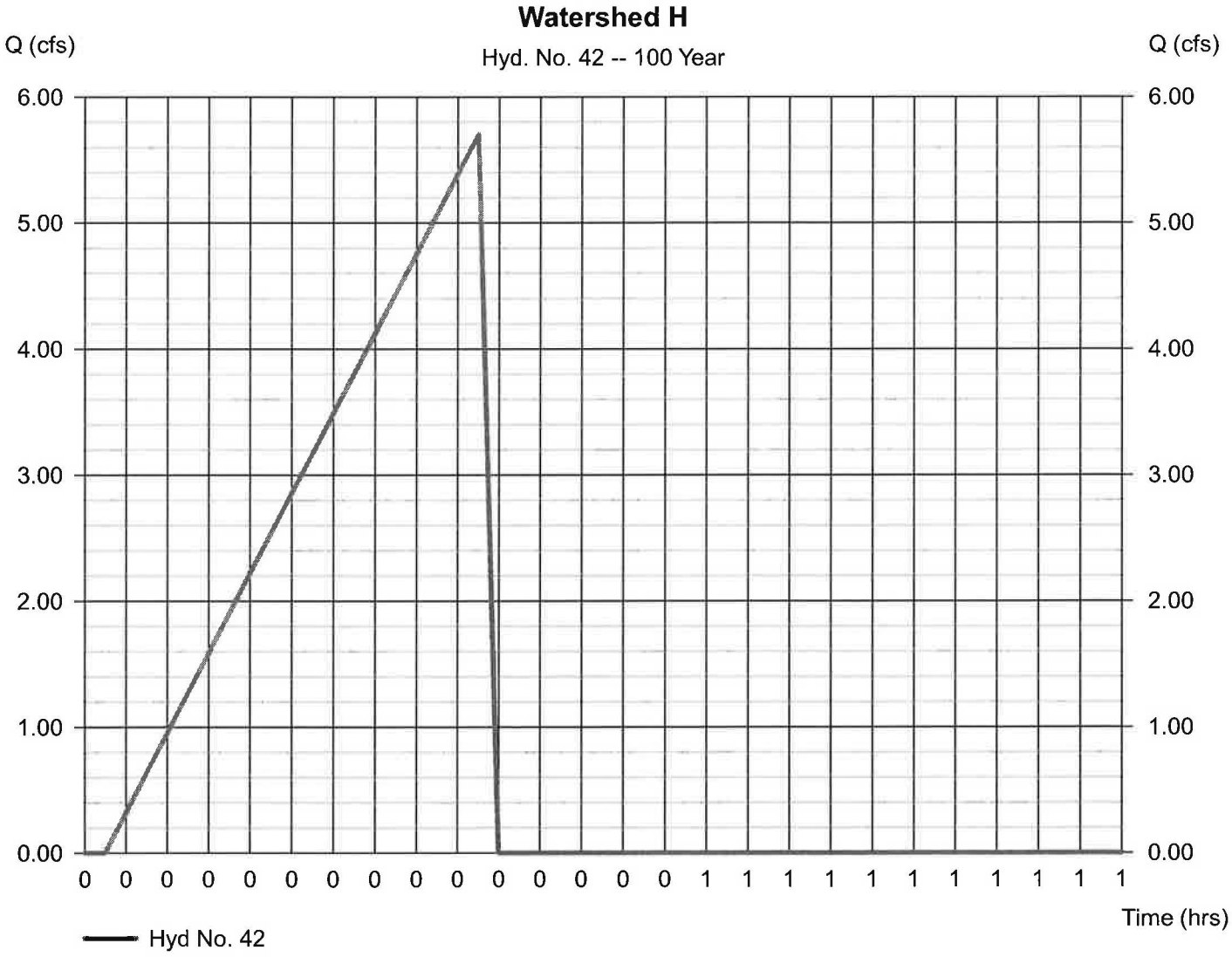
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 42

Watershed H

Hydrograph type	= Rational	Peak discharge	= 5.704 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 8,537 cuft
Drainage area	= 3.800 ac	Runoff coeff.	= 0.29*
Intensity	= 5.176 in/hr	Tc by TR55	= 18.69 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.200 x 0.90) + (0.100 x 0.30) + (2.500 x 0.20) + (0.800 x 0.25) + (0.200 x 1.00)] / 3.800



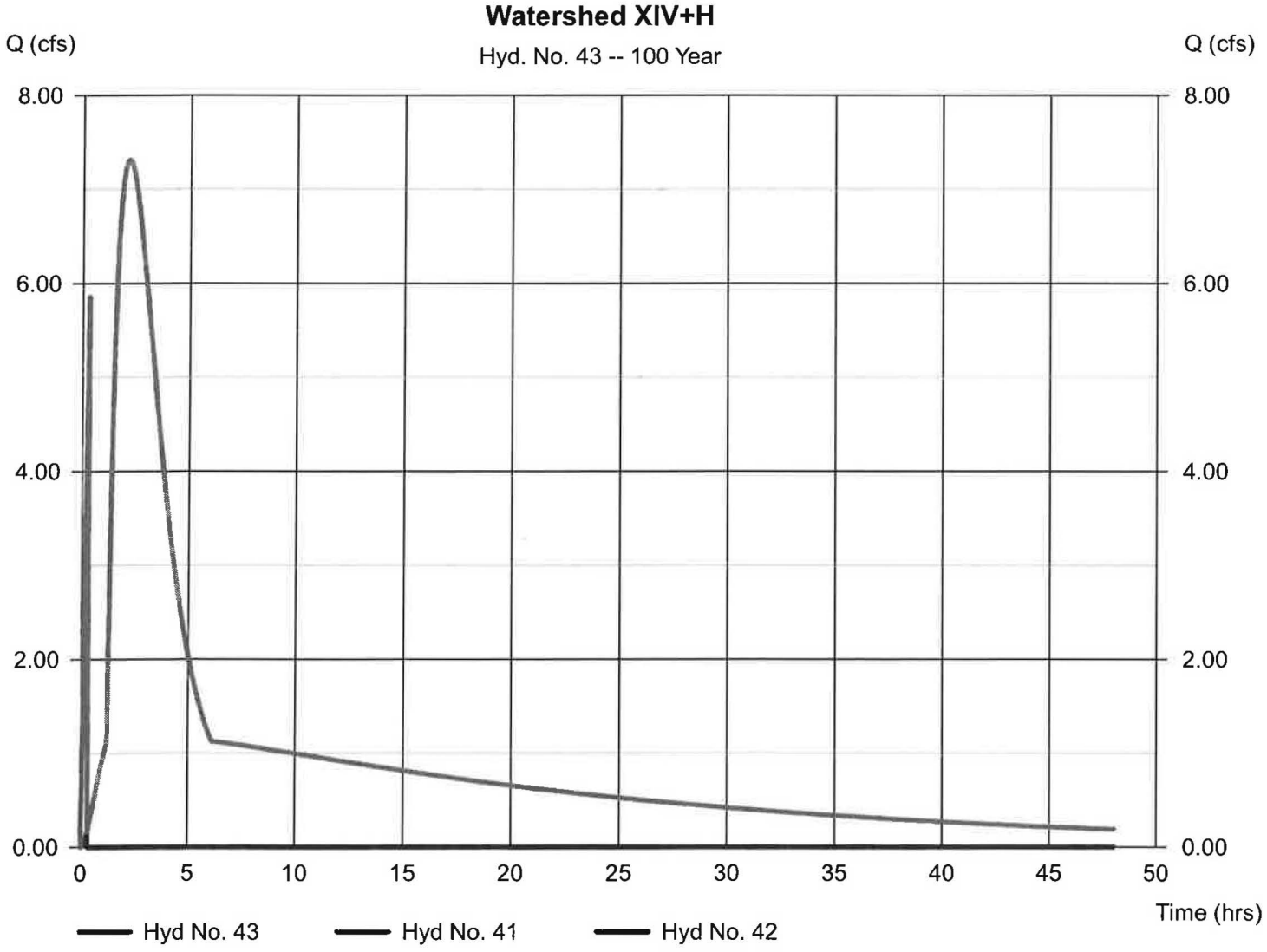
Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 43

Watershed XIV+H

Hydrograph type	= Combine	Peak discharge	= 7.315 cfs
Storm frequency	= 100 yrs	Time to peak	= 2.15 hrs
Time interval	= 1 min	Hyd. volume	= 160,356 cuft
Inflow hyds.	= 41, 42	Contrib. drain. area	= 3.800 ac



Hydrograph Report

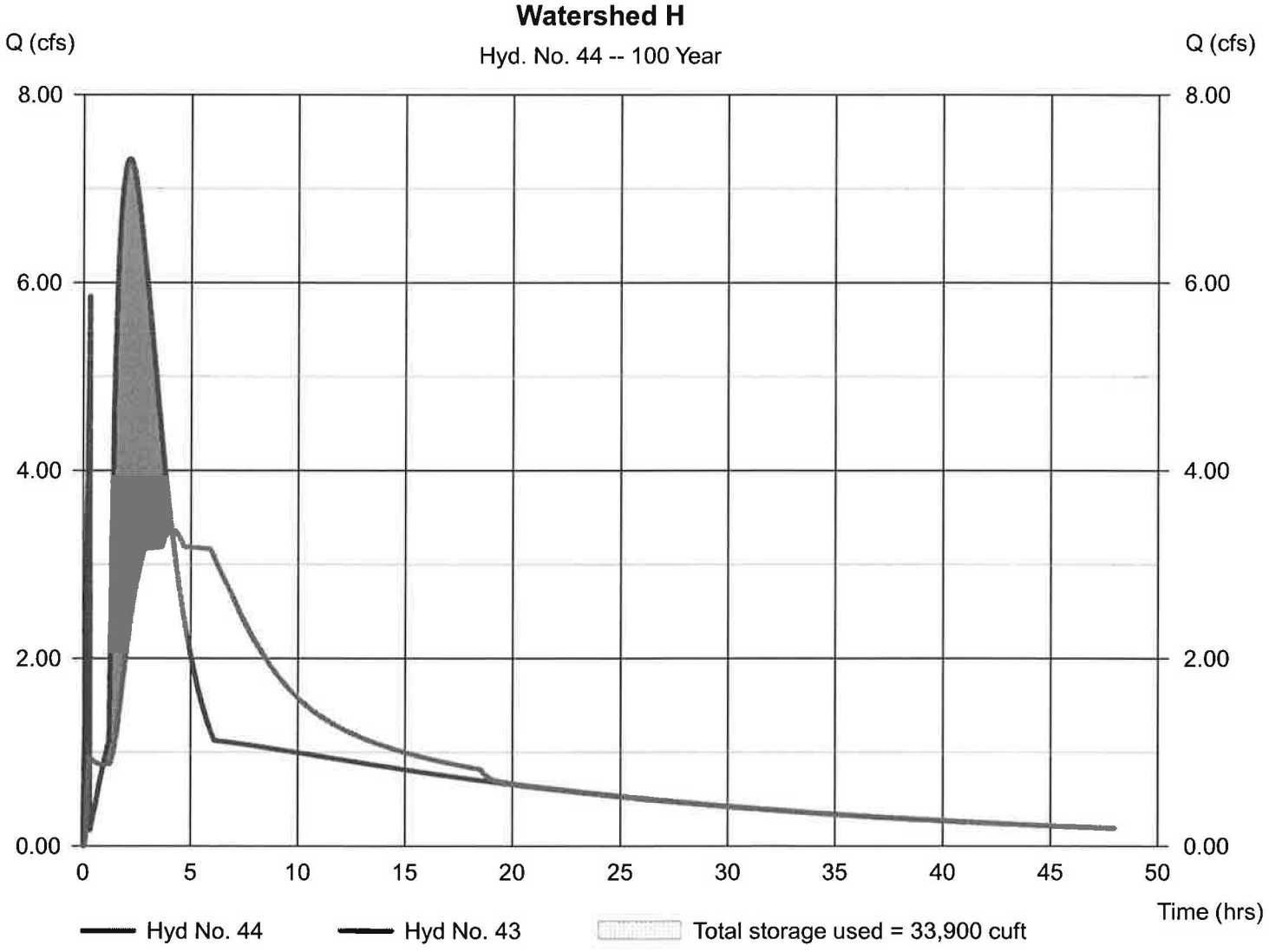
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 44

Watershed H

Hydrograph type	= Reservoir	Peak discharge	= 3.366 cfs
Storm frequency	= 100 yrs	Time to peak	= 4.12 hrs
Time interval	= 1 min	Hyd. volume	= 159,668 cuft
Inflow hyd. No.	= 43 - Watershed XIV+H	Max. Elevation	= 537.03 ft
Reservoir name	= Watershed H	Max. Storage	= 33,900 cuft

Storage Indication method used.



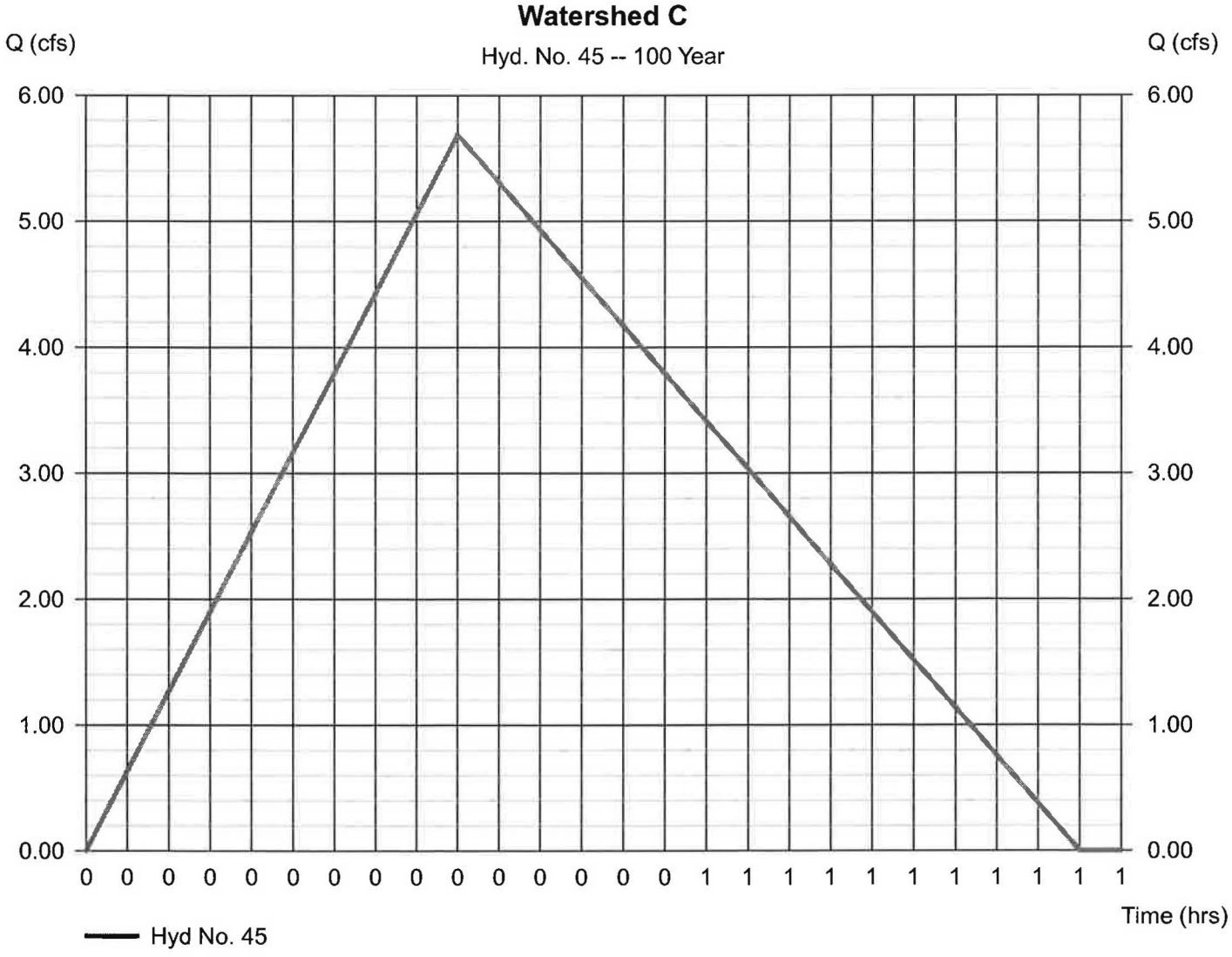
Hydrograph Report

Hyd. No. 45

Watershed C

Hydrograph type	= Rational	Peak discharge	= 5.689 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.30 hrs
Time interval	= 1 min	Hyd. volume	= 8,339 cuft
Drainage area	= 3.300 ac	Runoff coeff.	= 0.33*
Intensity	= 5.224 in/hr	Tc by TR55	= 18.30 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.400 x 0.90) + (1.200 x 0.30) + (1.400 x 0.20) + (0.300 x 0.25)] / 3.300



Hydrograph Report

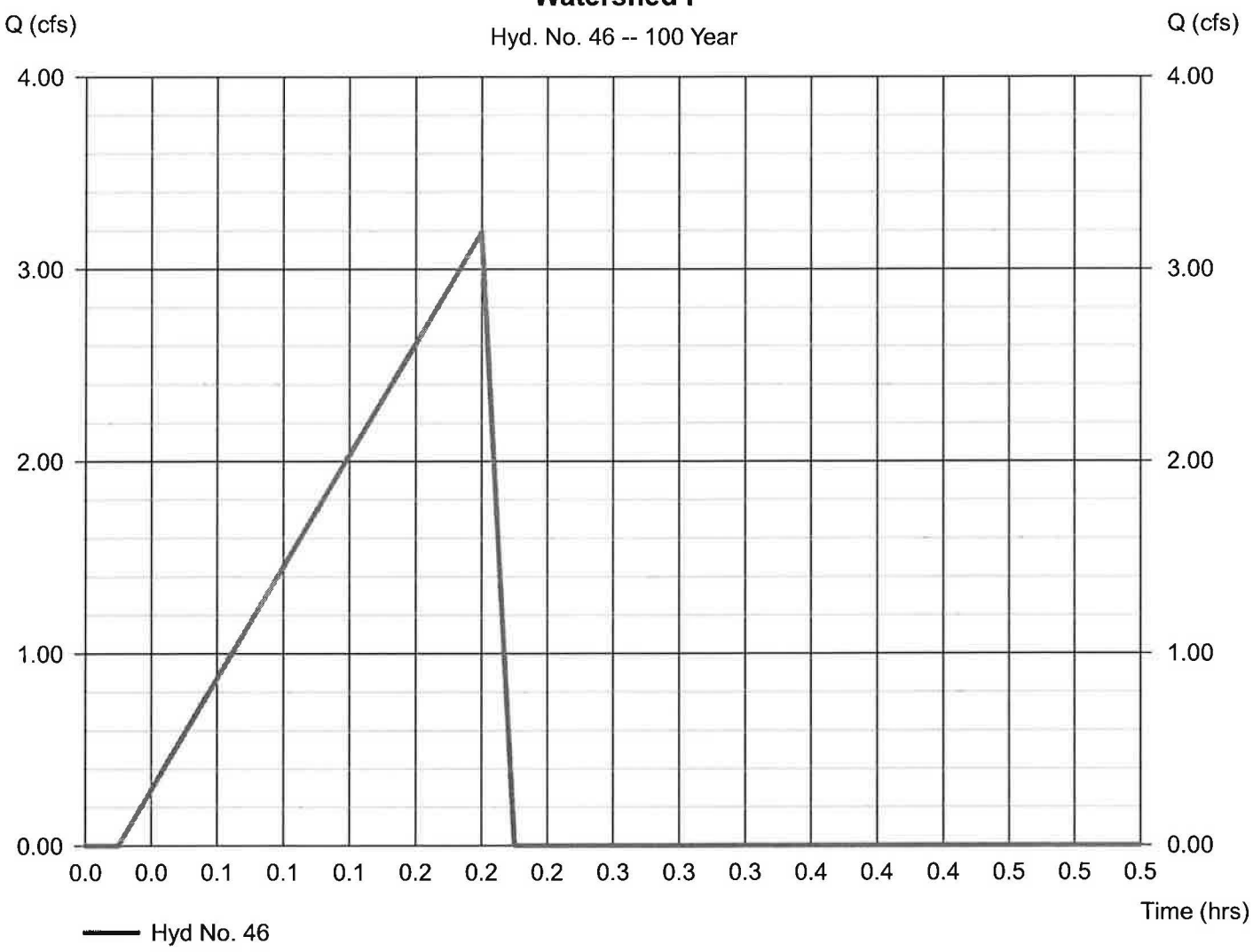
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 46

Watershed I

Hydrograph type	= Rational	Peak discharge	= 3.190 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.20 hrs
Time interval	= 1 min	Hyd. volume	= 2,946 cuft
Drainage area	= 1.500 ac	Runoff coeff.	= 0.34*
Intensity	= 6.255 in/hr	Tc by TR55	= 11.53 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.200 x 0.90) + (0.700 x 0.30) + (0.600 x 0.20)] / 1.500



Hydrograph Report

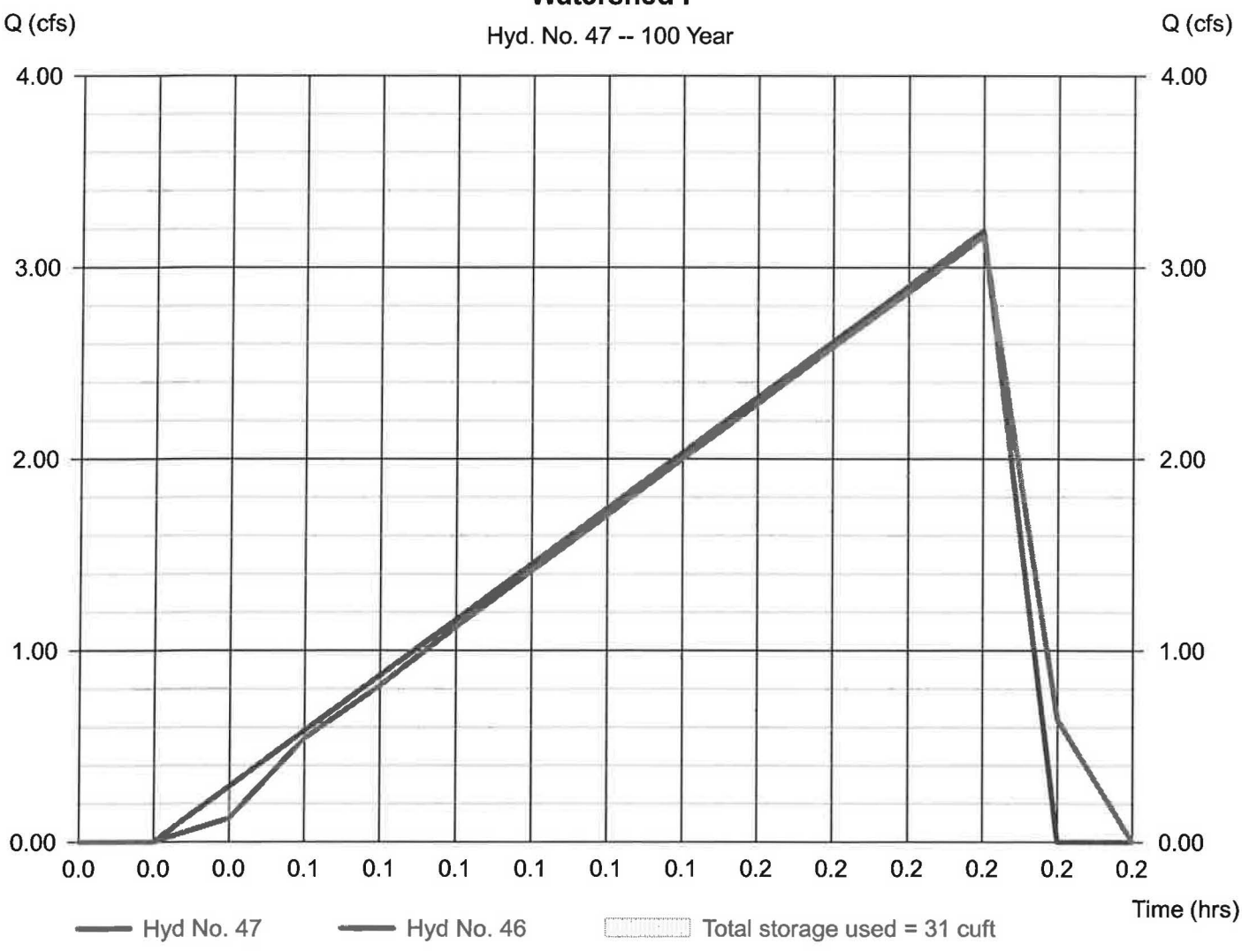
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 47

Watershed I

Hydrograph type	= Reservoir	Peak discharge	= 3.161 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.20 hrs
Time interval	= 1 min	Hyd. volume	= 1,155 cuft
Inflow hyd. No.	= 46 - Watershed I	Max. Elevation	= 531.70 ft
Reservoir name	= Watershed I	Max. Storage	= 31 cuft

Storage Indication method used.

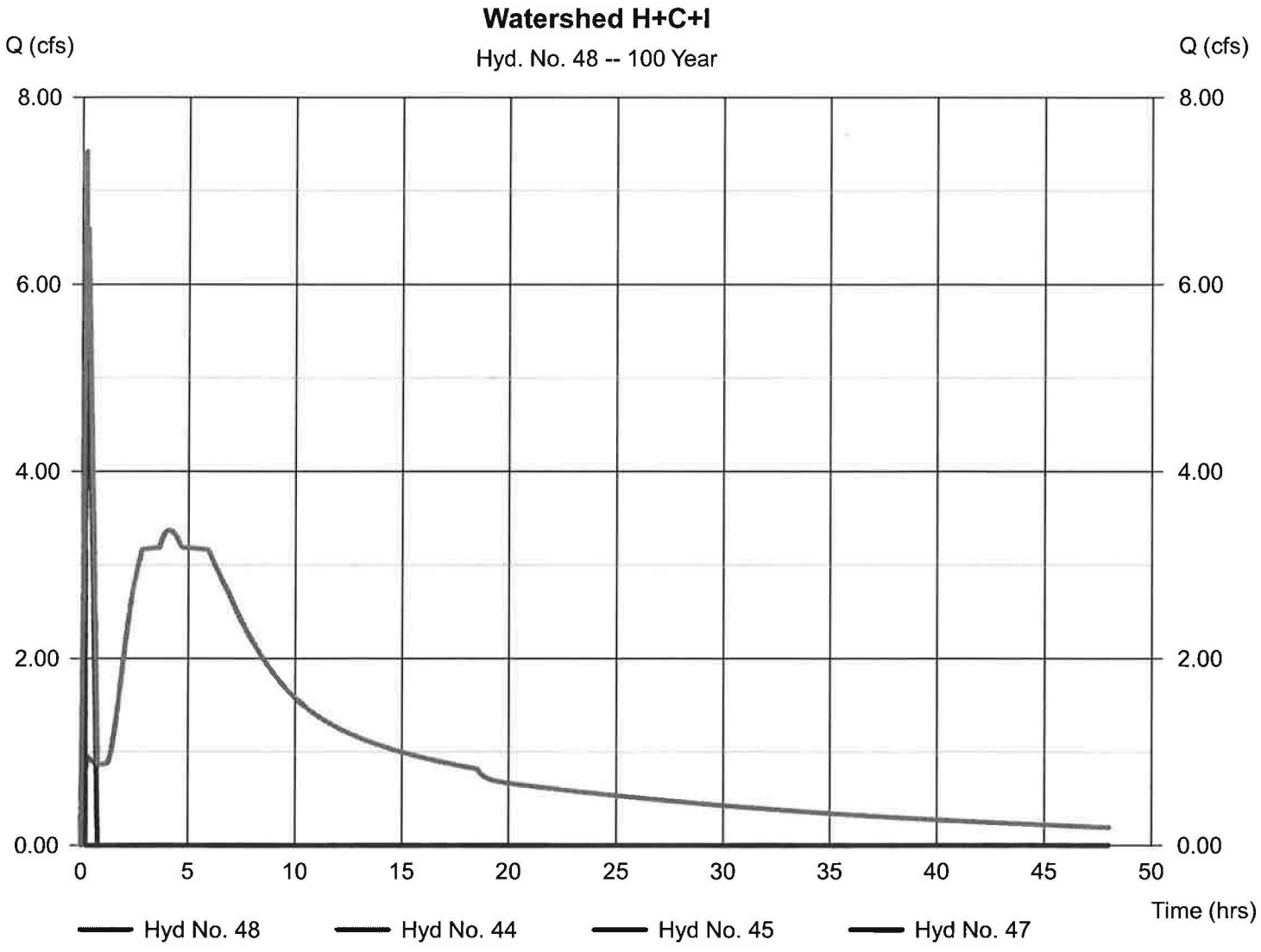


Hydrograph Report

Hyd. No. 48

Watershed H+C+I

Hydrograph type	= Combine	Peak discharge	= 7.419 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.20 hrs
Time interval	= 1 min	Hyd. volume	= 169,015 cuft
Inflow hyds.	= 44, 45, 47	Contrib. drain. area	= 3.300 ac



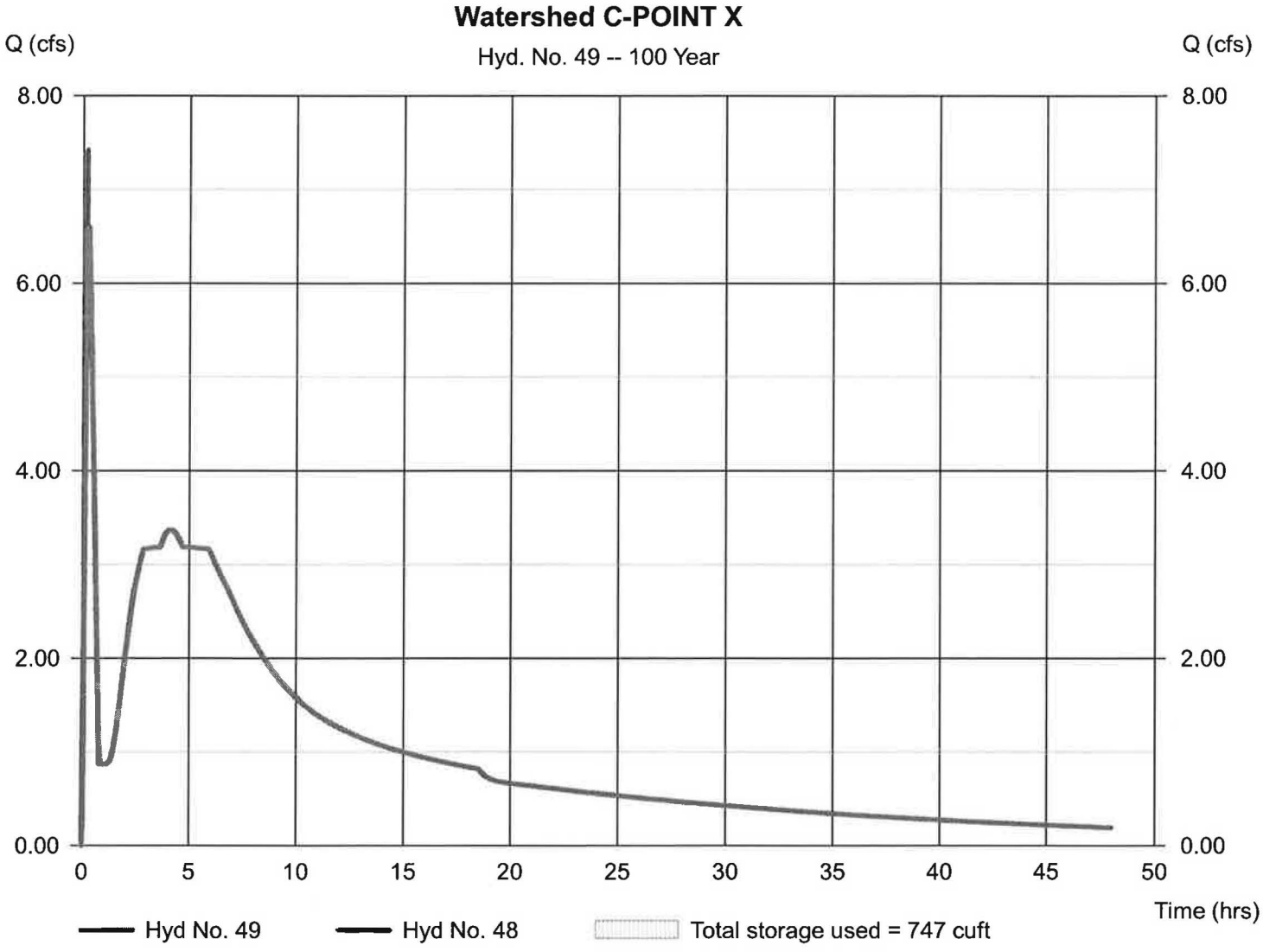
Hydrograph Report

Hyd. No. 49

Watershed C-POINT X

Hydrograph type	= Reservoir	Peak discharge	= 6.577 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.20 hrs
Time interval	= 1 min	Hyd. volume	= 168,948 cuft
Inflow hyd. No.	= 48 - Watershed H+C+I	Max. Elevation	= 530.05 ft
Reservoir name	= Watershed C	Max. Storage	= 747 cuft

Storage Indication method used.



Hydrograph Report

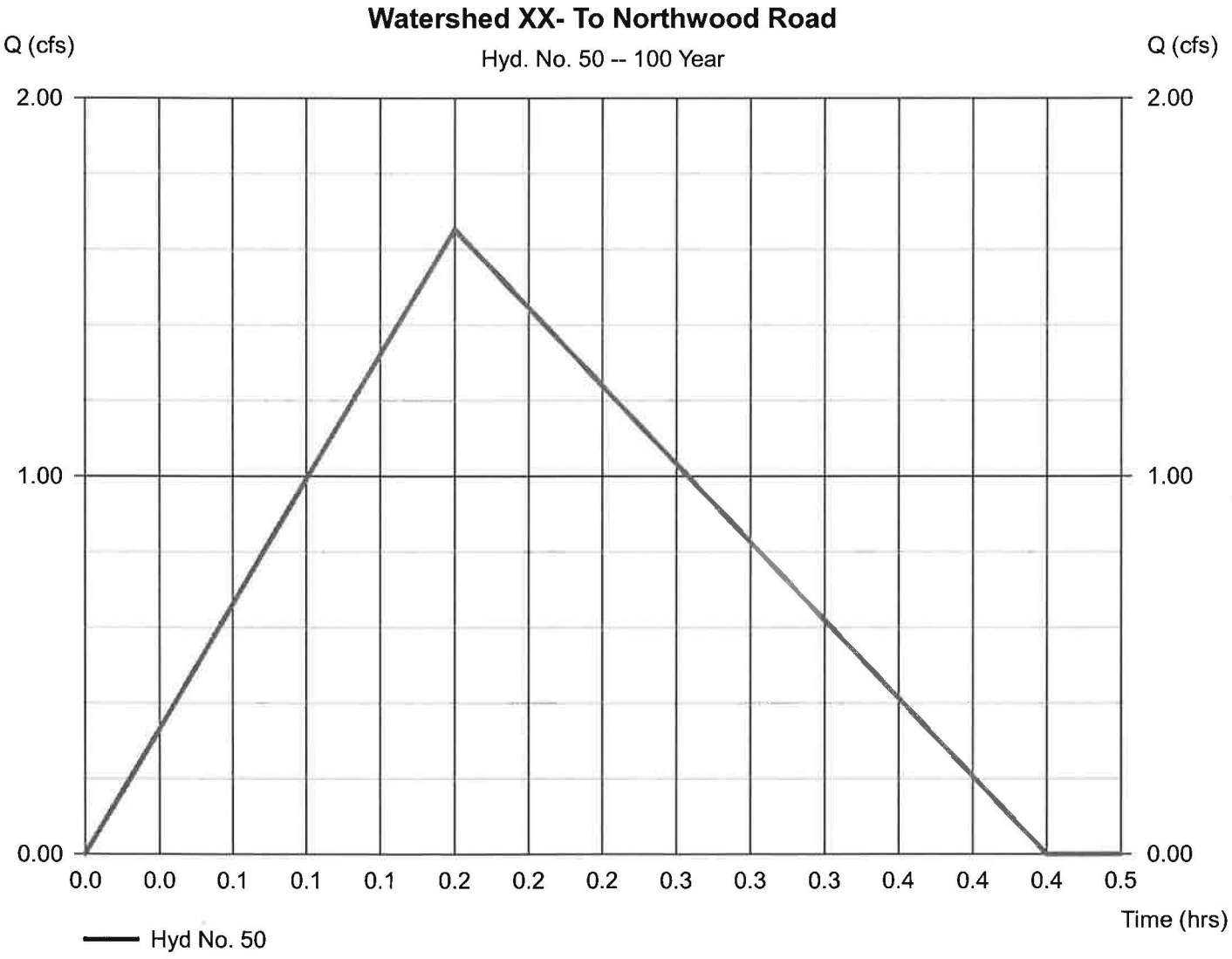
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 50

Watershed XX- To Northwood Road

Hydrograph type	= Rational	Peak discharge	= 1.652 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 1,323 cuft
Drainage area	= 0.720 ac	Runoff coeff.	= 0.35*
Intensity	= 6.554 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.100 x 0.90) + (0.360 x 0.30) + (0.260 x 0.20)] / 0.720



VERNAL POOL #1

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04161-2016-vp.gpw

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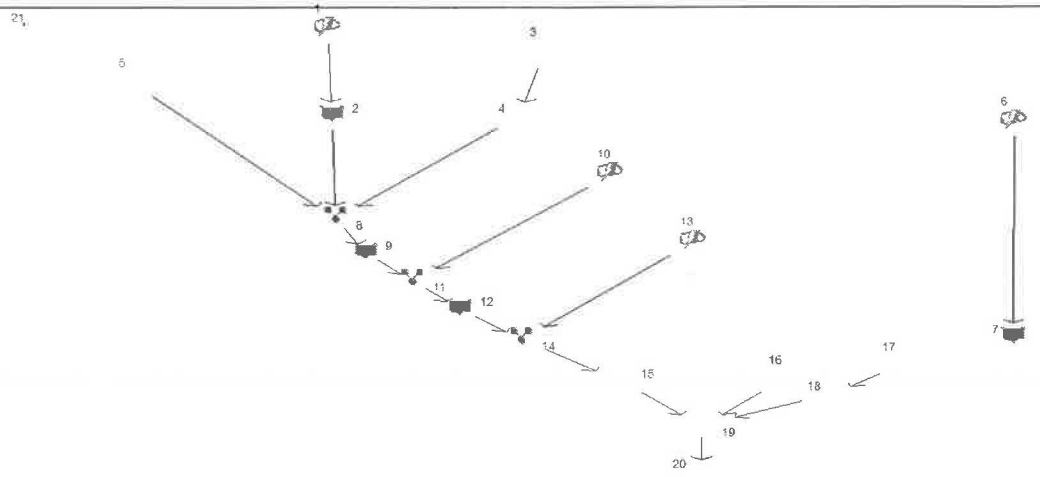
Watershed Model Schematic

Hydraflow Hydrographs by Intelisolve v9.1



Legend

Hyd.	Origin	Description
1	Rational	Vernal Pool #1-Existing-Watershed K
2	Reservoir	Vernal Pool #1-Ex.-K
6	Rational	Watershed II
7	Rational	Watershed IIA
8	Reservoir	Watershed IIA
9	Rational	Watershed IX
10	Rational	Watershed IXA
11	Reservoir	Watershed IXA
12	Rational	Watershed VP#1-Proposed
13	Combine	Vernal Pool-Ultimate-Proposed
14	Reservoir	Watershed VP #1-Propos

Hydrograph Return Period Recap

Hydraflow Hydrographs by Intelisolve v9.1

Hyd. No.	Hydrograph type (origin)	Inflow Hyd(s)	Peak Outflow (cfs)								Hydrograph description
			1-Yr	2-Yr	3-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	
1	Rational	-------	-------	6.575	-------	-------	9.501	11.15	12.39	13.60	Vernal Pool #1-Existing-Watershed
2	Reservoir	1	-------	0.017	-------	-------	0.020	0.022	0.023	0.024	Vernal Pool #1-Ex.-K
6	Rational	-------	-------	2.929	-------	-------	4.220	4.947	5.490	6.019	Watershed II
7	Rational	-------	-------	4.214	-------	-------	5.808	6.675	7.327	7.922	Watershed IIA
8	Reservoir	7	-------	1.025	-------	-------	1.244	1.364	1.459	1.555	Watershed IIA
9	Rational	-------	-------	0.236	-------	-------	0.325	0.373	0.410	0.443	Watershed IX
10	Rational	-------	-------	1.841	-------	-------	2.537	2.916	3.201	3.460	Watershed IXA
11	Reservoir	10	-------	0.960	-------	-------	1.202	1.332	1.430	1.537	Watershed IXA
12	Rational	-------	-------	1.058	-------	-------	1.529	1.795	1.994	2.189	Watershed VP#1-Proposed
13	Combine	6, 8, 9, 11, 12-----	6.000	-------	-------	8.233	9.474	10.40	11.33		Vernal Pool-Ultimate-Proposed
14	Reservoir	13	-------	0.017	-------	-------	0.020	0.022	0.023	0.024	Watershed VP #1-Propos

Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	Rational	6.575	1	20	10,533	----	------	------	Vernal Pool #1-Existing-Watershed
2	Reservoir	0.017	1	53	2,706	1	550.07	10,421	Vernal Pool #1-Ex.-K
6	Rational	2.929	1	19	4,457	----	------	------	Watershed II
7	Rational	4.214	1	10	3,375	----	------	------	Watershed IIA
8	Reservoir	1.025	1	22	3,281	7	561.93	2,320	Watershed IIA
9	Rational	0.236	1	10	189	----	------	------	Watershed IX
10	Rational	1.841	1	10	1,474	----	------	------	Watershed IXA
11	Reservoir	0.960	1	18	1,434	10	553.45	583	Watershed IXA
12	Rational	1.058	1	20	1,695	----	------	------	Watershed VP#1-Proposed
13	Combine	6.000	1	19	10,974	6, 8, 9, 11, 12	------	------	Vernal Pool-Ultimate-Proposed
14	Reservoir	0.017	1	131	2,771	13	550.09	10,801	Watershed VP #1-Propos

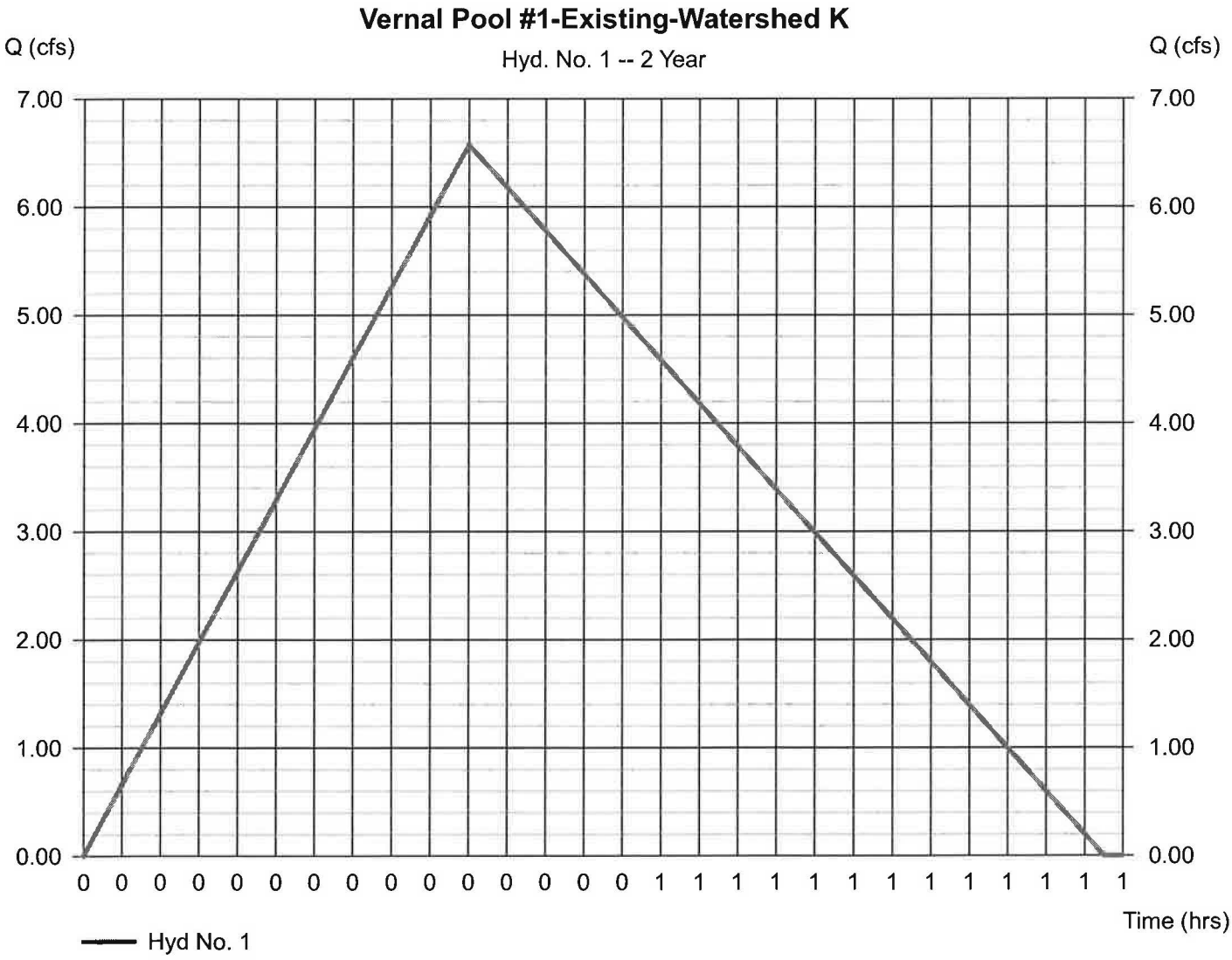
Hydrograph Report

Hyd. No. 1

Vernal Pool #1-Existing-Watershed K

Hydrograph type	= Rational	Peak discharge	= 6.575 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.33 hrs
Time interval	= 1 min	Hyd. volume	= 10,533 cuft
Drainage area	= 9.340 ac	Runoff coeff.	= 0.29*
Intensity	= 2.427 in/hr	Tc by TR55	= 20.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.000 x 0.90) + (1.400 x 0.30) + (6.940 x 0.20)] / 9.340



TR55 Tc Worksheet

Hyd. No. 1

Vernal Pool #1-Existing-Watershed K

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.240	0.011	0.011	
Flow length (ft)	= 100.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.20	0.00	0.00	
Land slope (%)	= 2.30	0.00	0.00	
Travel Time (min)	**= 13.49**	**+ 0.00**	**+ 0.00**	**= 13.49**
Shallow Concentrated Flow				
Flow length (ft)	= 107.00	206.00	0.00	
Watercourse slope (%)	= 7.57	0.49	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	= 4.44	1.42	0.00	
Travel Time (min)	**= 0.40**	**+ 2.43**	**+ 0.00**	**= 2.83**
Channel Flow				
X sectional flow area (sqft)	= 1.23	1.50	0.00	
Wetted perimeter (ft)	= 3.93	4.24	0.00	
Channel slope (%)	= 0.50	4.42	0.00	
Manning's n-value	= 0.015	0.040	0.015	
Velocity (ft/s)	= 3.22	3.91	0.00	
Flow length (ft)	= 194.0	678.0	0.0	
Travel Time (min)	**= 1.00**	**+ 2.89**	**+ 0.00**	**= 3.90**

Total Travel Time, Tc ..... 20.00 min

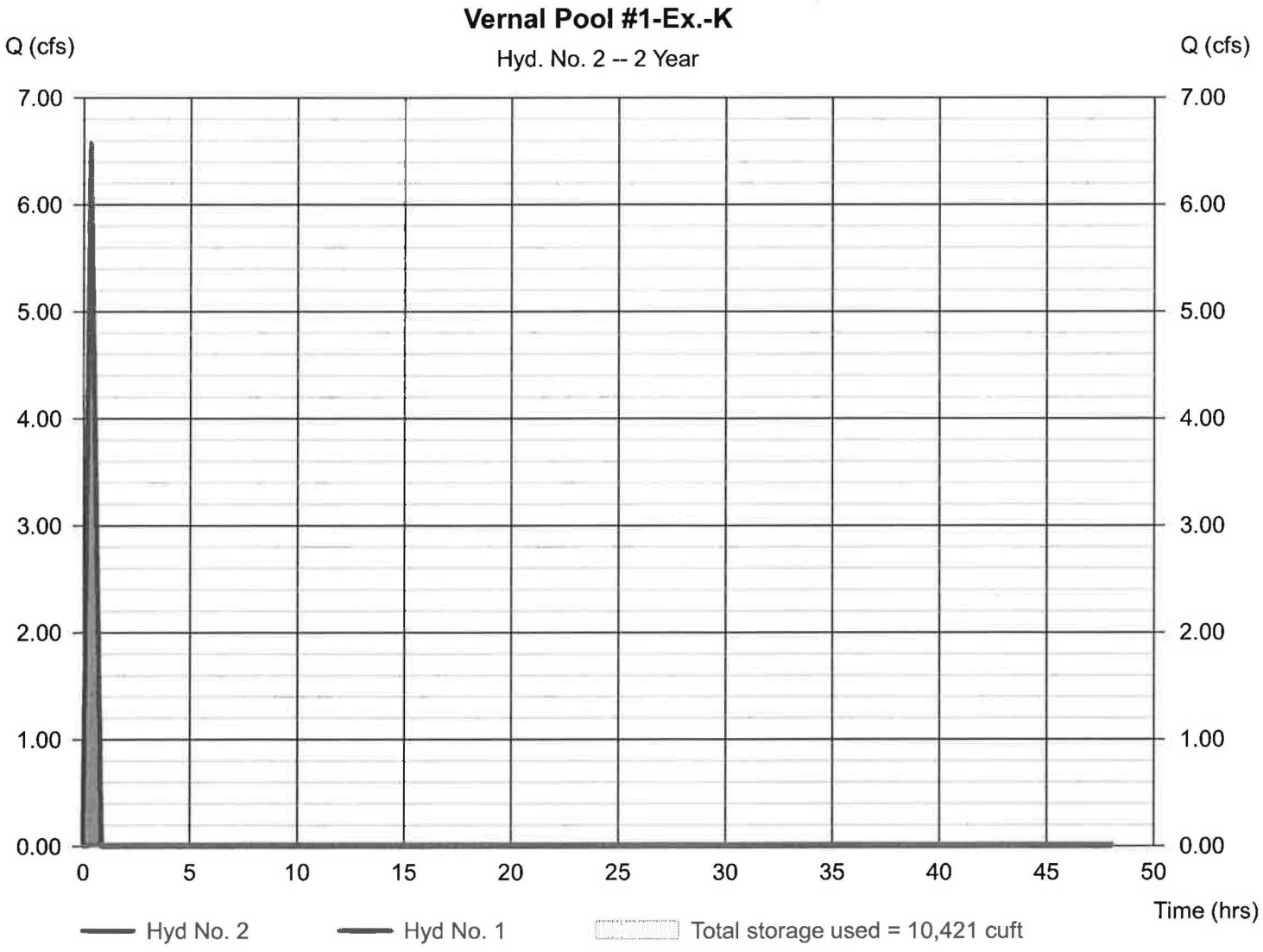
Hydrograph Report

Hyd. No. 2

Vernal Pool #1-Ex.-K

Hydrograph type	= Reservoir	Peak discharge	= 0.017 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.88 hrs
Time interval	= 1 min	Hyd. volume	= 2,706 cuft
Inflow hyd. No.	= 1 - Vernal Pool #1-Existing-Watershed K	Max. Elevation	= 550.07 ft
Reservoir name	= Vernal Pool #1-Existing	Max. Storage	= 10,421 cuft

Storage Indication method used.



Pond No. 1 - Vernal Pool #1-Existing

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 549.62 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	549.62	17,022	0	0
0.38	550.00	27,603	8,397	8,397
1.38	551.00	27,603	27,600	35,998

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 1.00	0.00	0.00	0.00
Span (in)	= 1.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 549.62	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	549.62	0.00	---	---	---	---	---	---	---	---	---	0.00
0.04	840	549.66	0.00 ic	---	---	---	---	---	---	---	---	---	0.00
0.08	1,679	549.70	0.00 ic	---	---	---	---	---	---	---	---	---	0.00
0.11	2,519	549.73	0.01 ic	---	---	---	---	---	---	---	---	---	0.01
0.15	3,359	549.77	0.01 ic	---	---	---	---	---	---	---	---	---	0.01
0.19	4,199	549.81	0.01 ic	---	---	---	---	---	---	---	---	---	0.01
0.23	5,038	549.85	0.01 ic	---	---	---	---	---	---	---	---	---	0.01
0.27	5,878	549.89	0.01 ic	---	---	---	---	---	---	---	---	---	0.01
0.30	6,718	549.92	0.01 ic	---	---	---	---	---	---	---	---	---	0.01
0.34	7,558	549.96	0.01 ic	---	---	---	---	---	---	---	---	---	0.01
0.38	8,397	550.00	0.02 ic	---	---	---	---	---	---	---	---	---	0.02
0.48	11,157	550.10	0.02 ic	---	---	---	---	---	---	---	---	---	0.02
0.58	13,917	550.20	0.02 ic	---	---	---	---	---	---	---	---	---	0.02
0.68	16,677	550.30	0.02 ic	---	---	---	---	---	---	---	---	---	0.02
0.78	19,437	550.40	0.02 ic	---	---	---	---	---	---	---	---	---	0.02
0.88	22,197	550.50	0.02 ic	---	---	---	---	---	---	---	---	---	0.02
0.98	24,957	550.60	0.03 ic	---	---	---	---	---	---	---	---	---	0.03
1.08	27,717	550.70	0.03 ic	---	---	---	---	---	---	---	---	---	0.03
1.18	30,478	550.80	0.03 ic	---	---	---	---	---	---	---	---	---	0.03
1.28	33,238	550.90	0.03 ic	---	---	---	---	---	---	---	---	---	0.03
1.38	35,998	551.00	0.03 ic	---	---	---	---	---	---	---	---	---	0.03

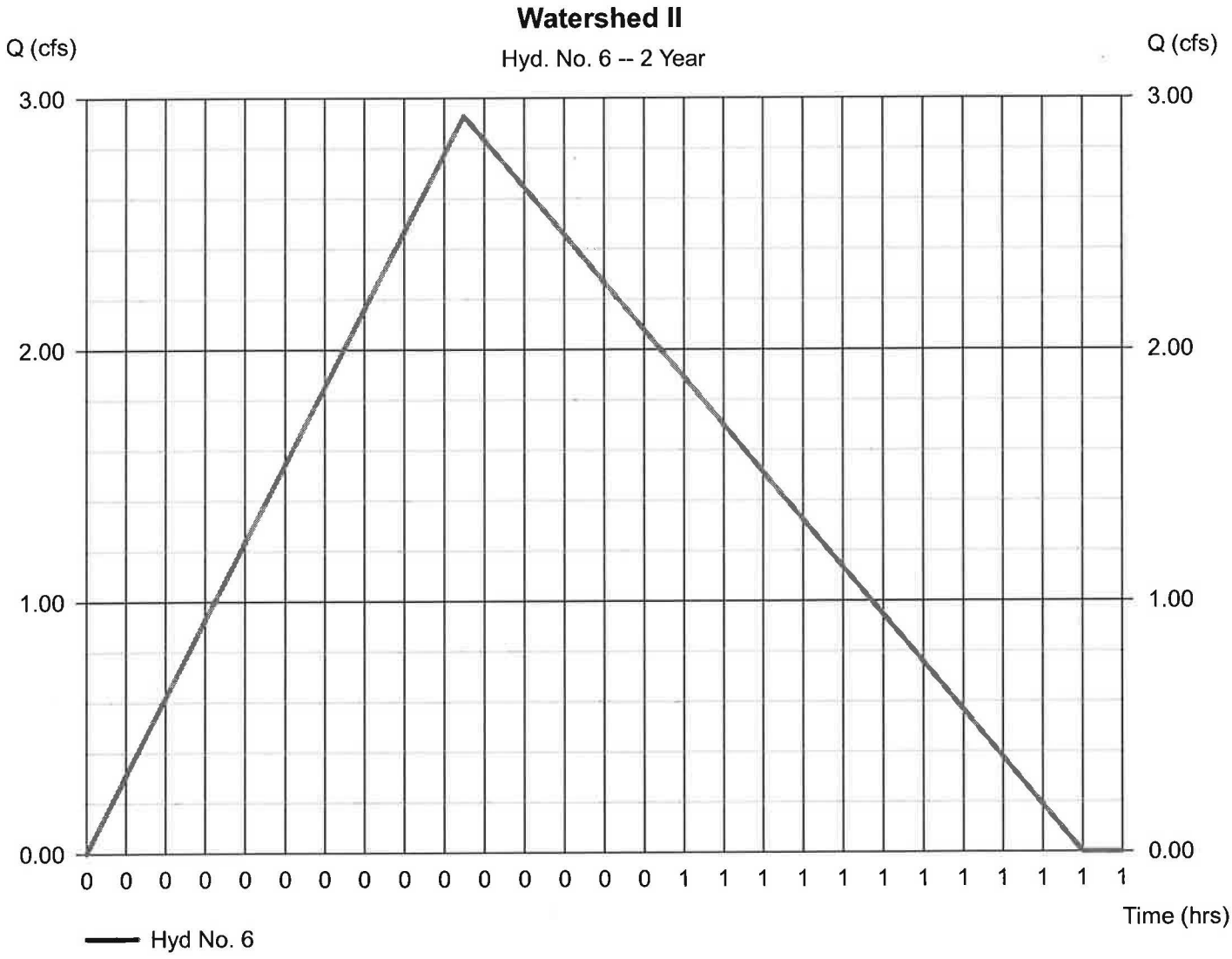
Hydrograph Report

Hyd. No. 6

Watershed II

Hydrograph type	= Rational	Peak discharge	= 2.929 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 4,457 cuft
Drainage area	= 4.040 ac	Runoff coeff.	= 0.29*
Intensity	= 2.500 in/hr	Tc by User	= 19.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.230 x 0.90) + (1.940 x 0.30) + (1.870 x 0.20)] / 4.040



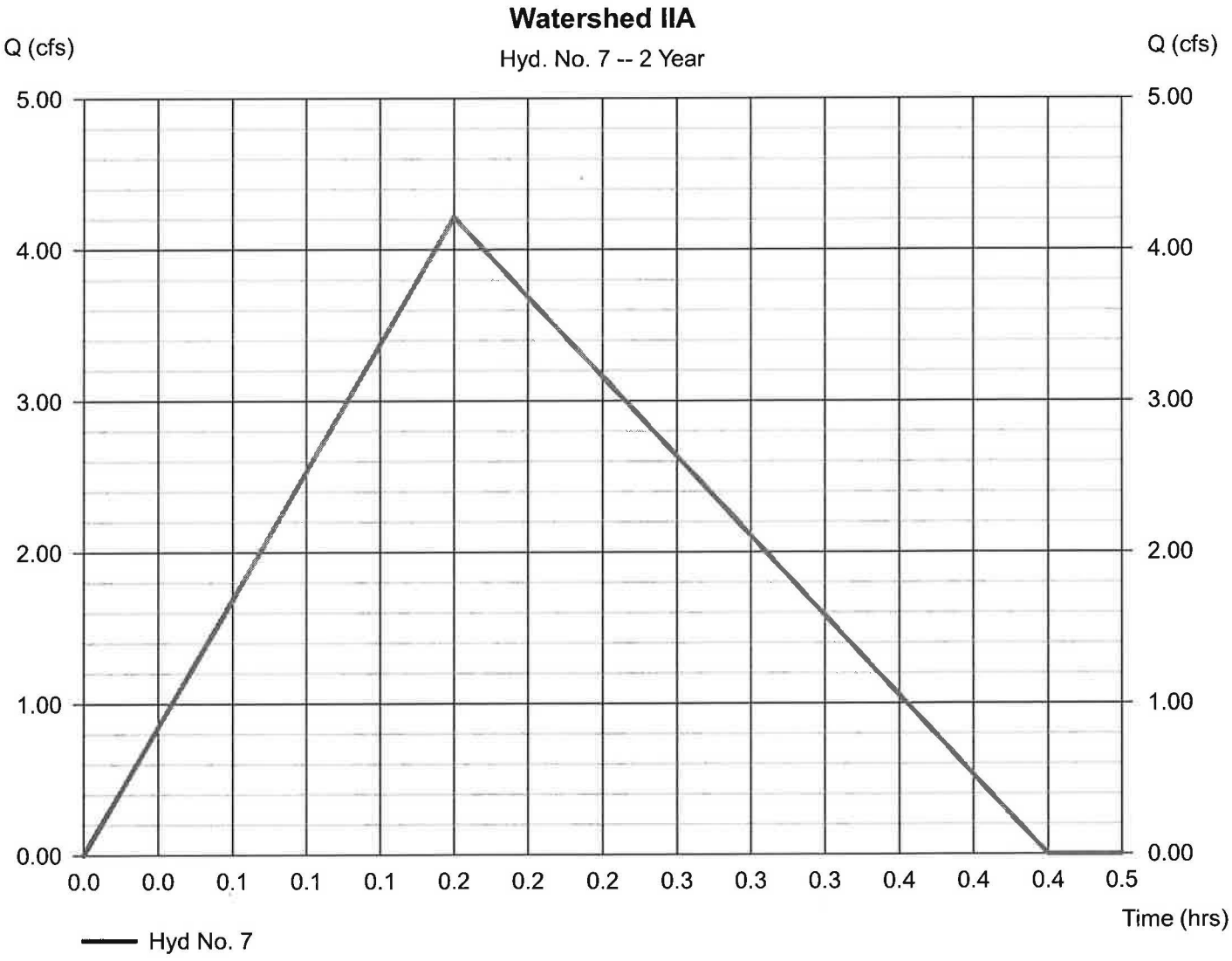
Hydrograph Report

Hyd. No. 7

Watershed IIA

Hydrograph type	= Rational	Peak discharge	= 4.214 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 3,375 cuft
Drainage area	= 1.530 ac	Runoff coeff.	= 0.79*
Intensity	= 3.486 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.250 x 0.90) + (0.280 x 0.30)] / 1.530



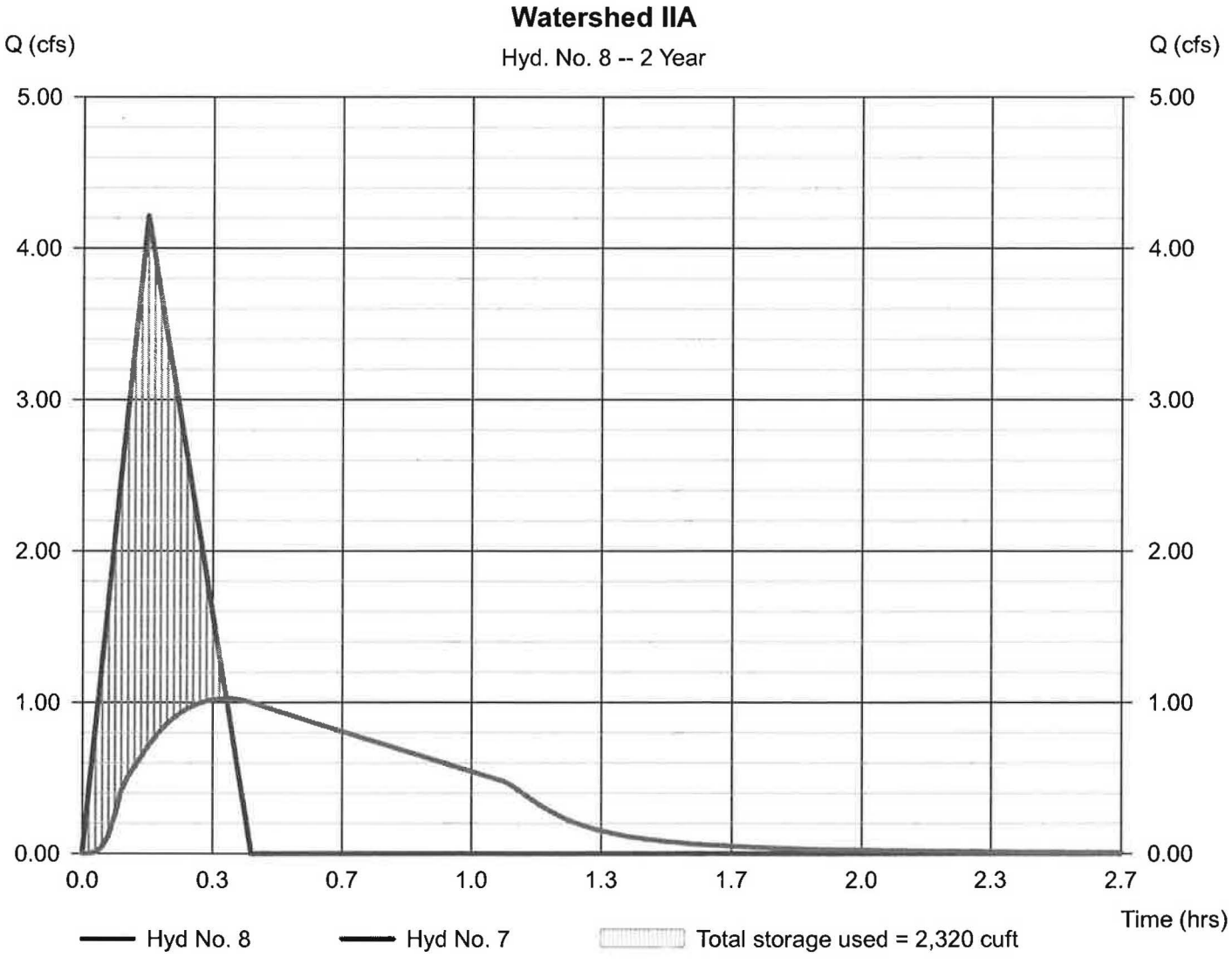
Hydrograph Report

Hyd. No. 8

Watershed IIA

Hydrograph type	= Reservoir	Peak discharge	= 1.025 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.37 hrs
Time interval	= 1 min	Hyd. volume	= 3,281 cuft
Inflow hyd. No.	= 7 - Watershed IIA	Max. Elevation	= 561.93 ft
Reservoir name	= Watershed IIA	Max. Storage	= 2,320 cuft

Storage Indication method used.



Pond No. 2 - Watershed IIA

Pond Data

Pond storage is based on user-defined values.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	560.50	n/a	0	0
0.50	561.00	n/a	473	473
1.00	561.50	n/a	1,018	1,491
1.50	562.00	n/a	975	2,466
2.00	562.50	n/a	907	3,373
2.50	563.00	n/a	803	4,176
3.00	563.50	n/a	593	4,769
3.50	564.00	n/a	474	5,243

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 6.00	0.00	0.00	0.00
Span (in)	= 6.00	0.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 560.50	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 5.00	0.00	0.00	0.00
Crest El. (ft)	= 563.50	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	560.50	0.00	---	---	---	0.00	---	---	---	---	---	0.00
0.05	47	560.55	0.01 ic	---	---	---	0.00	---	---	---	---	---	0.01
0.10	95	560.60	0.03 ic	---	---	---	0.00	---	---	---	---	---	0.03
0.15	142	560.65	0.07 ic	---	---	---	0.00	---	---	---	---	---	0.07
0.20	189	560.70	0.11 ic	---	---	---	0.00	---	---	---	---	---	0.11
0.25	237	560.75	0.17 ic	---	---	---	0.00	---	---	---	---	---	0.17
0.30	284	560.80	0.23 ic	---	---	---	0.00	---	---	---	---	---	0.23
0.35	331	560.85	0.30 ic	---	---	---	0.00	---	---	---	---	---	0.30
0.40	378	560.90	0.36 ic	---	---	---	0.00	---	---	---	---	---	0.36
0.45	426	560.95	0.43 ic	---	---	---	0.00	---	---	---	---	---	0.43
0.50	473	561.00	0.47 ic	---	---	---	0.00	---	---	---	---	---	0.47
0.55	575	561.05	0.52 ic	---	---	---	0.00	---	---	---	---	---	0.52
0.60	677	561.10	0.56 ic	---	---	---	0.00	---	---	---	---	---	0.56
0.65	778	561.15	0.60 ic	---	---	---	0.00	---	---	---	---	---	0.60
0.70	880	561.20	0.63 ic	---	---	---	0.00	---	---	---	---	---	0.63
0.75	982	561.25	0.67 ic	---	---	---	0.00	---	---	---	---	---	0.67
0.80	1,084	561.30	0.70 ic	---	---	---	0.00	---	---	---	---	---	0.70
0.85	1,186	561.35	0.73 ic	---	---	---	0.00	---	---	---	---	---	0.73
0.90	1,287	561.40	0.76 ic	---	---	---	0.00	---	---	---	---	---	0.76
0.95	1,389	561.45	0.79 ic	---	---	---	0.00	---	---	---	---	---	0.79
1.00	1,491	561.50	0.82 ic	---	---	---	0.00	---	---	---	---	---	0.82
1.05	1,589	561.55	0.85 ic	---	---	---	0.00	---	---	---	---	---	0.85
1.10	1,686	561.60	0.87 ic	---	---	---	0.00	---	---	---	---	---	0.87
1.15	1,784	561.65	0.90 ic	---	---	---	0.00	---	---	---	---	---	0.90
1.20	1,881	561.70	0.92 ic	---	---	---	0.00	---	---	---	---	---	0.92
1.25	1,979	561.75	0.95 ic	---	---	---	0.00	---	---	---	---	---	0.95
1.30	2,076	561.80	0.97 ic	---	---	---	0.00	---	---	---	---	---	0.97
1.35	2,174	561.85	0.99 ic	---	---	---	0.00	---	---	---	---	---	0.99
1.40	2,271	561.90	1.01 ic	---	---	---	0.00	---	---	---	---	---	1.01
1.45	2,369	561.95	1.04 ic	---	---	---	0.00	---	---	---	---	---	1.04
1.50	2,466	562.00	1.06 ic	---	---	---	0.00	---	---	---	---	---	1.06
1.55	2,557	562.05	1.08 ic	---	---	---	0.00	---	---	---	---	---	1.08
1.60	2,647	562.10	1.10 ic	---	---	---	0.00	---	---	---	---	---	1.10
1.65	2,738	562.15	1.12 ic	---	---	---	0.00	---	---	---	---	---	1.12

Continues on next page...

Watershed IIA

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
1.70	2,829	562.20	1.14 ic	---	---	---	0.00	---	---	---	---	---	1.14
1.75	2,920	562.25	1.16 ic	---	---	---	0.00	---	---	---	---	---	1.16
1.80	3,010	562.30	1.18 ic	---	---	---	0.00	---	---	---	---	---	1.18
1.85	3,101	562.35	1.20 ic	---	---	---	0.00	---	---	---	---	---	1.20
1.90	3,192	562.40	1.21 ic	---	---	---	0.00	---	---	---	---	---	1.21
1.95	3,282	562.45	1.23 ic	---	---	---	0.00	---	---	---	---	---	1.23
2.00	3,373	562.50	1.25 ic	---	---	---	0.00	---	---	---	---	---	1.25
2.05	3,453	562.55	1.27 ic	---	---	---	0.00	---	---	---	---	---	1.27
2.10	3,534	562.60	1.29 ic	---	---	---	0.00	---	---	---	---	---	1.29
2.15	3,614	562.65	1.30 ic	---	---	---	0.00	---	---	---	---	---	1.30
2.20	3,694	562.70	1.32 ic	---	---	---	0.00	---	---	---	---	---	1.32
2.25	3,775	562.75	1.34 ic	---	---	---	0.00	---	---	---	---	---	1.34
2.30	3,855	562.80	1.35 ic	---	---	---	0.00	---	---	---	---	---	1.35
2.35	3,935	562.85	1.37 ic	---	---	---	0.00	---	---	---	---	---	1.37
2.40	4,015	562.90	1.39 ic	---	---	---	0.00	---	---	---	---	---	1.39
2.45	4,096	562.95	1.40 ic	---	---	---	0.00	---	---	---	---	---	1.40
2.50	4,176	563.00	1.42 ic	---	---	---	0.00	---	---	---	---	---	1.42
2.55	4,235	563.05	1.43 ic	---	---	---	0.00	---	---	---	---	---	1.43
2.60	4,295	563.10	1.45 ic	---	---	---	0.00	---	---	---	---	---	1.45
2.65	4,354	563.15	1.46 ic	---	---	---	0.00	---	---	---	---	---	1.46
2.70	4,413	563.20	1.48 ic	---	---	---	0.00	---	---	---	---	---	1.48
2.75	4,472	563.25	1.49 ic	---	---	---	0.00	---	---	---	---	---	1.49
2.80	4,532	563.30	1.51 ic	---	---	---	0.00	---	---	---	---	---	1.51
2.85	4,591	563.35	1.52 ic	---	---	---	0.00	---	---	---	---	---	1.52
2.90	4,650	563.40	1.54 ic	---	---	---	0.00	---	---	---	---	---	1.54
2.95	4,710	563.45	1.55 ic	---	---	---	0.00	---	---	---	---	---	1.55
3.00	4,769	563.50	1.57 ic	---	---	---	0.00	---	---	---	---	---	1.57
3.05	4,816	563.55	1.58 ic	---	---	---	0.19	---	---	---	---	---	1.77
3.10	4,864	563.60	1.60 ic	---	---	---	0.53	---	---	---	---	---	2.12
3.15	4,911	563.65	1.61 ic	---	---	---	0.97	---	---	---	---	---	2.58
3.20	4,959	563.70	1.62 ic	---	---	---	1.49	---	---	---	---	---	3.11
3.25	5,006	563.75	1.64 ic	---	---	---	2.08	---	---	---	---	---	3.72
3.30	5,053	563.80	1.65 ic	---	---	---	2.73	---	---	---	---	---	4.39
3.35	5,101	563.85	1.66 ic	---	---	---	3.45	---	---	---	---	---	5.11
3.40	5,148	563.90	1.68 ic	---	---	---	4.21	---	---	---	---	---	5.89
3.45	5,196	563.95	1.69 ic	---	---	---	5.02	---	---	---	---	---	6.72
3.50	5,243	564.00	1.70 ic	---	---	---	5.89	---	---	---	---	---	7.59

...End

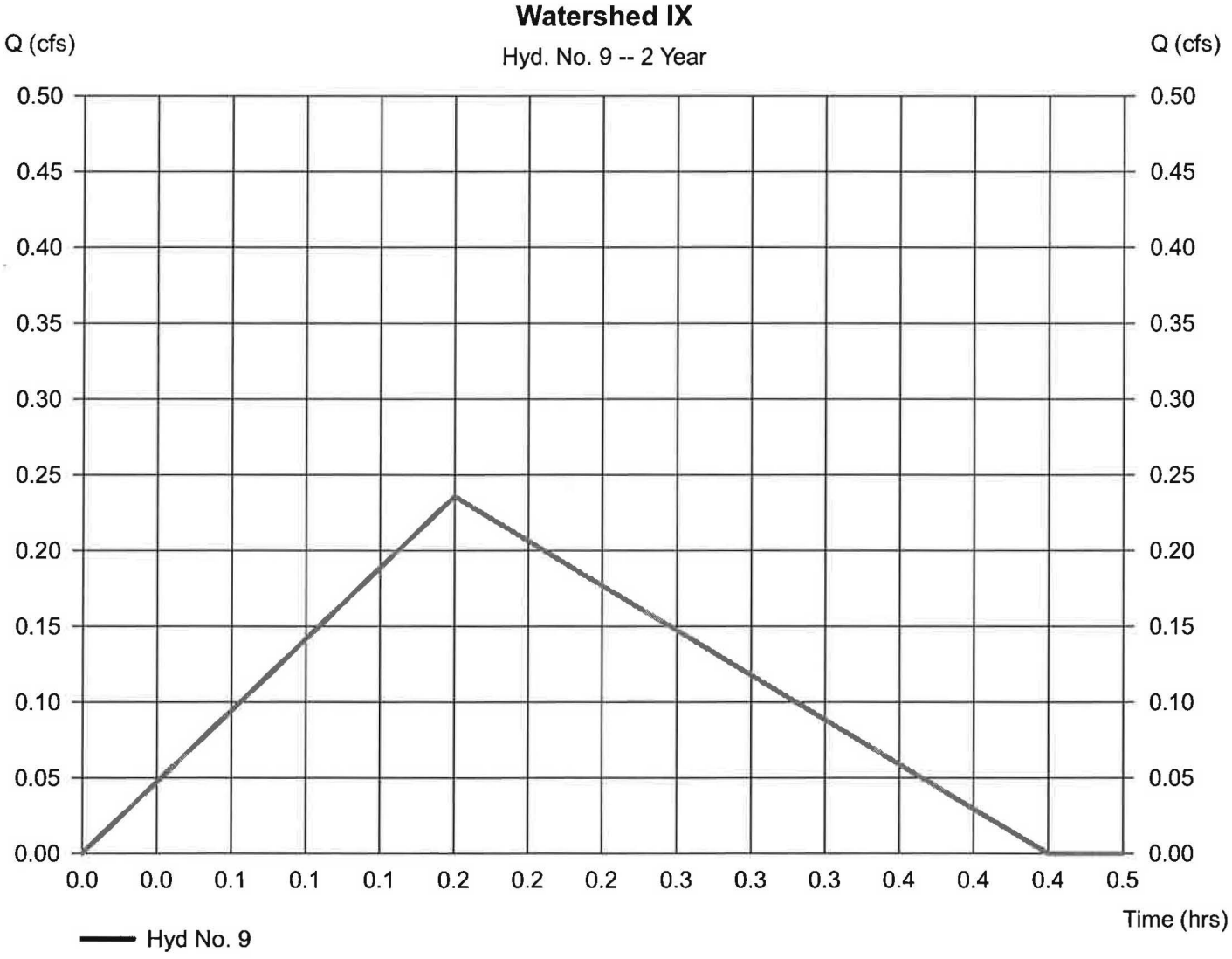
Hydrograph Report

Hyd. No. 9

Watershed IX

Hydrograph type	= Rational	Peak discharge	= 0.236 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 189 cuft
Drainage area	= 0.260 ac	Runoff coeff.	= 0.26*
Intensity	= 3.486 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.010 x 0.90) + (0.080 x 0.30) + (0.170 x 0.20)] / 0.260



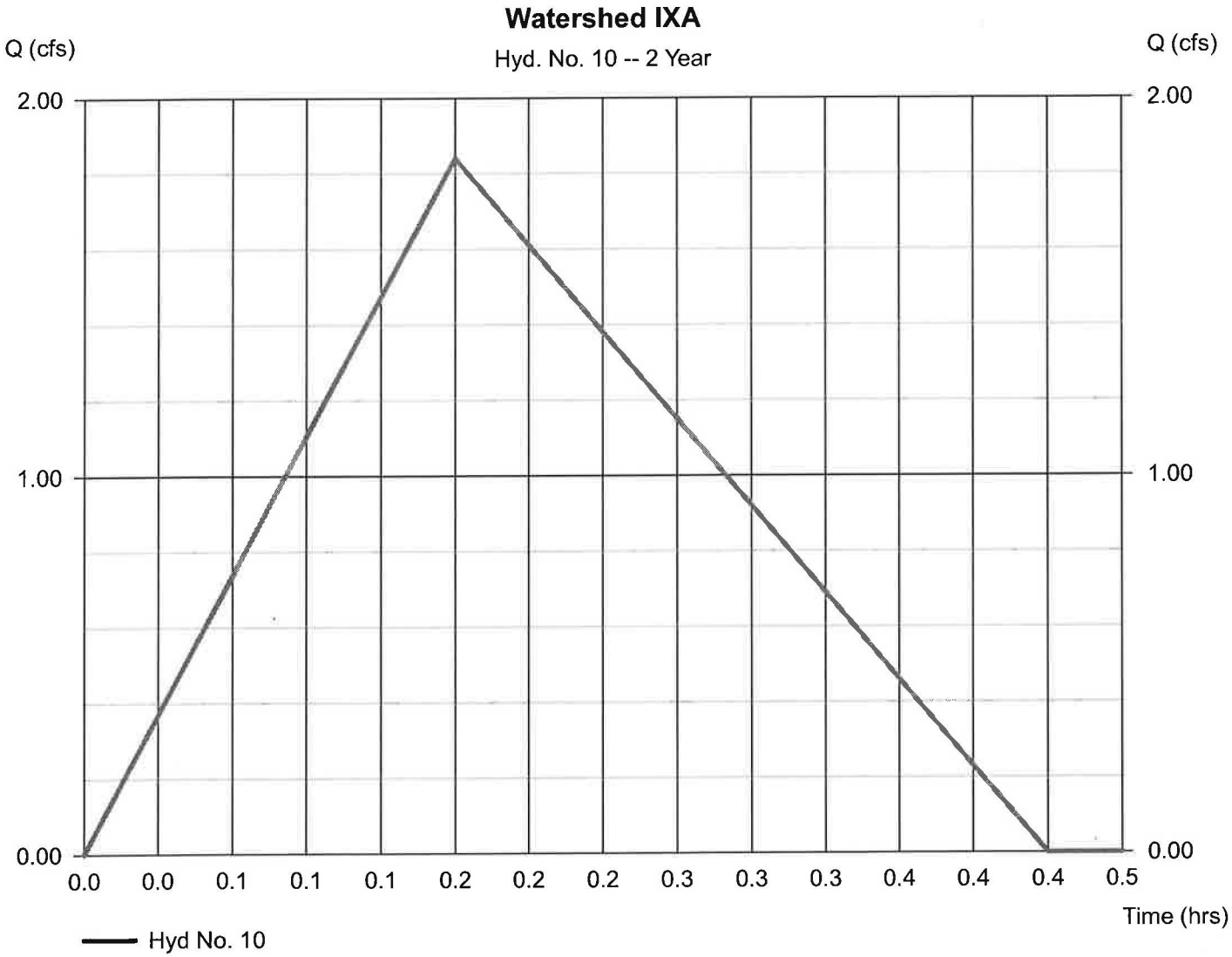
Hydrograph Report

Hyd. No. 10

Watershed IXA

Hydrograph type	= Rational	Peak discharge	= 1.841 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 1,474 cuft
Drainage area	= 0.880 ac	Runoff coeff.	= 0.6*
Intensity	= 3.486 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.460 x 0.90) + (0.260 x 0.33) + (0.160 x 0.20)] / 0.880



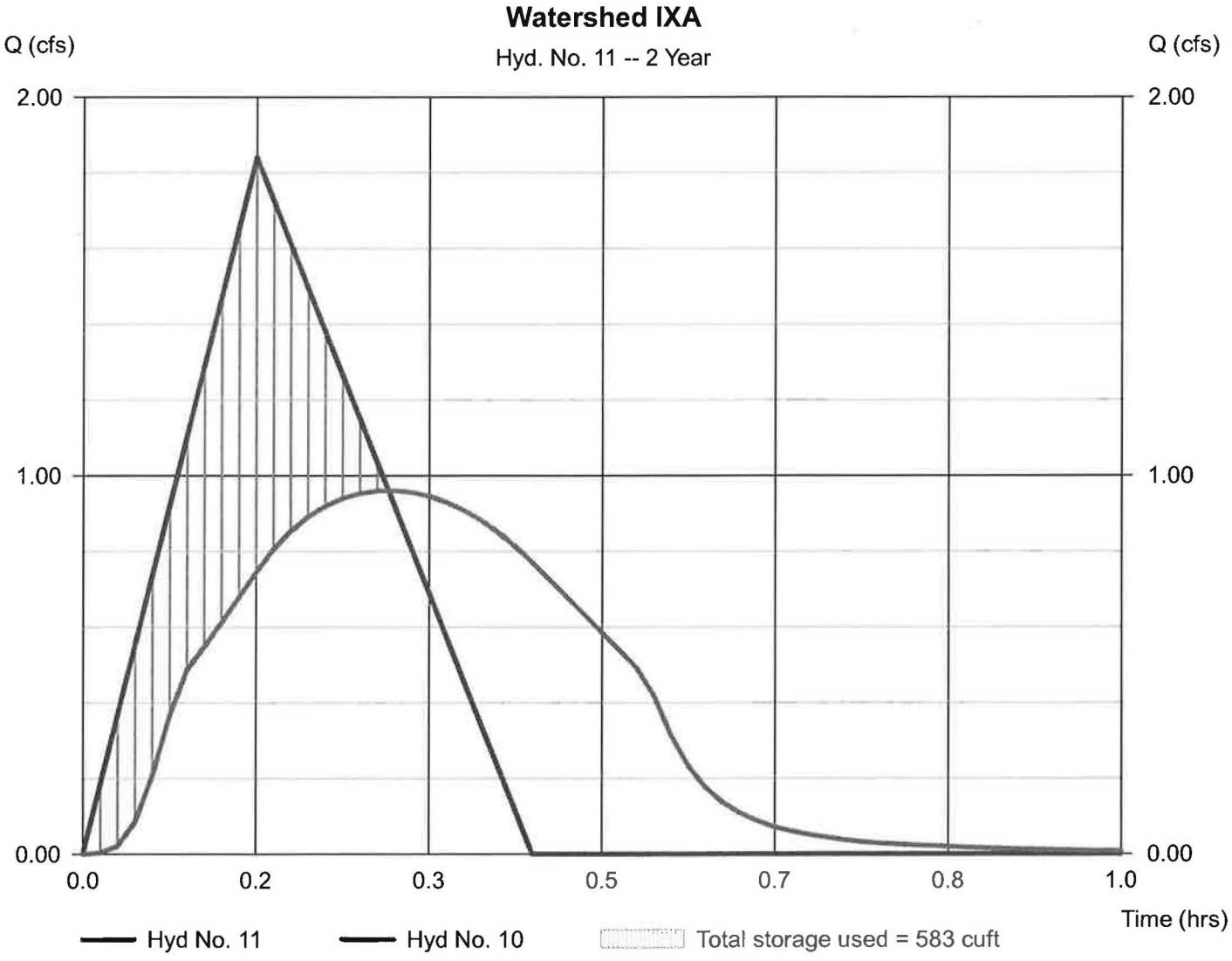
Hydrograph Report

Hyd. No. 11

Watershed IXA

Hydrograph type	= Reservoir	Peak discharge	= 0.960 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.30 hrs
Time interval	= 1 min	Hyd. volume	= 1,434 cuft
Inflow hyd. No.	= 10 - Watershed IXA	Max. Elevation	= 553.45 ft
Reservoir name	= Watershed IXA	Max. Storage	= 583 cuft

Storage Indication method used.



Pond No. 3 - Watershed IXA

Pond Data

Pond storage is based on user-defined values.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	552.17	n/a	0	0
0.50	552.67	n/a	135	135
1.00	553.17	n/a	291	426
1.50	553.67	n/a	278	704
2.00	554.17	n/a	259	963
2.50	554.67	n/a	230	1,193
3.00	555.17	n/a	169	1,362
3.50	555.67	n/a	136	1,498

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 6.00	0.00	0.00	0.00
Span (in)	= 6.00	0.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 552.17	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 5.00	0.00	0.00	0.00
Crest El. (ft)	= 555.17	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	552.17	0.00	---	---	---	0.00	---	---	---	---	---	0.00
0.05	14	552.22	0.01 ic	---	---	---	0.00	---	---	---	---	---	0.01
0.10	27	552.27	0.03 ic	---	---	---	0.00	---	---	---	---	---	0.03
0.15	41	552.32	0.07 ic	---	---	---	0.00	---	---	---	---	---	0.07
0.20	54	552.37	0.11 ic	---	---	---	0.00	---	---	---	---	---	0.11
0.25	68	552.42	0.17 ic	---	---	---	0.00	---	---	---	---	---	0.17
0.30	81	552.47	0.23 ic	---	---	---	0.00	---	---	---	---	---	0.23
0.35	95	552.52	0.30 ic	---	---	---	0.00	---	---	---	---	---	0.30
0.40	108	552.57	0.36 ic	---	---	---	0.00	---	---	---	---	---	0.36
0.45	122	552.62	0.43 ic	---	---	---	0.00	---	---	---	---	---	0.43
0.50	135	552.67	0.47 ic	---	---	---	0.00	---	---	---	---	---	0.47
0.55	164	552.72	0.52 ic	---	---	---	0.00	---	---	---	---	---	0.52
0.60	193	552.77	0.56 ic	---	---	---	0.00	---	---	---	---	---	0.56
0.65	222	552.82	0.60 ic	---	---	---	0.00	---	---	---	---	---	0.60
0.70	251	552.87	0.63 ic	---	---	---	0.00	---	---	---	---	---	0.63
0.75	281	552.92	0.67 ic	---	---	---	0.00	---	---	---	---	---	0.67
0.80	310	552.97	0.70 ic	---	---	---	0.00	---	---	---	---	---	0.70
0.85	339	553.02	0.73 ic	---	---	---	0.00	---	---	---	---	---	0.73
0.90	368	553.07	0.76 ic	---	---	---	0.00	---	---	---	---	---	0.76
0.95	397	553.12	0.79 ic	---	---	---	0.00	---	---	---	---	---	0.79
1.00	426	553.17	0.82 ic	---	---	---	0.00	---	---	---	---	---	0.82
1.05	454	553.22	0.85 ic	---	---	---	0.00	---	---	---	---	---	0.85
1.10	482	553.27	0.87 ic	---	---	---	0.00	---	---	---	---	---	0.87
1.15	509	553.32	0.90 ic	---	---	---	0.00	---	---	---	---	---	0.90
1.20	537	553.37	0.92 ic	---	---	---	0.00	---	---	---	---	---	0.92
1.25	565	553.42	0.95 ic	---	---	---	0.00	---	---	---	---	---	0.95
1.30	593	553.47	0.97 ic	---	---	---	0.00	---	---	---	---	---	0.97
1.35	621	553.52	0.99 ic	---	---	---	0.00	---	---	---	---	---	0.99
1.40	648	553.57	1.01 ic	---	---	---	0.00	---	---	---	---	---	1.01
1.45	676	553.62	1.04 ic	---	---	---	0.00	---	---	---	---	---	1.04
1.50	704	553.67	1.06 ic	---	---	---	0.00	---	---	---	---	---	1.06
1.55	730	553.72	1.08 ic	---	---	---	0.00	---	---	---	---	---	1.08
1.60	756	553.77	1.10 ic	---	---	---	0.00	---	---	---	---	---	1.10
1.65	782	553.82	1.12 ic	---	---	---	0.00	---	---	---	---	---	1.12

Continues on next page...

Watershed IXA

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
1.70	808	553.87	1.14 ic	---	---	---	0.00	---	---	---	---	---	1.14
1.75	834	553.92	1.16 ic	---	---	---	0.00	---	---	---	---	---	1.16
1.80	859	553.97	1.18 ic	---	---	---	0.00	---	---	---	---	---	1.18
1.85	885	554.02	1.20 ic	---	---	---	0.00	---	---	---	---	---	1.20
1.90	911	554.07	1.21 ic	---	---	---	0.00	---	---	---	---	---	1.21
1.95	937	554.12	1.23 ic	---	---	---	0.00	---	---	---	---	---	1.23
2.00	963	554.17	1.25 ic	---	---	---	0.00	---	---	---	---	---	1.25
2.05	986	554.22	1.27 ic	---	---	---	0.00	---	---	---	---	---	1.27
2.10	1,009	554.27	1.29 ic	---	---	---	0.00	---	---	---	---	---	1.29
2.15	1,032	554.32	1.30 ic	---	---	---	0.00	---	---	---	---	---	1.30
2.20	1,055	554.37	1.32 ic	---	---	---	0.00	---	---	---	---	---	1.32
2.25	1,078	554.42	1.34 ic	---	---	---	0.00	---	---	---	---	---	1.34
2.30	1,101	554.47	1.35 ic	---	---	---	0.00	---	---	---	---	---	1.35
2.35	1,124	554.52	1.37 ic	---	---	---	0.00	---	---	---	---	---	1.37
2.40	1,147	554.57	1.39 ic	---	---	---	0.00	---	---	---	---	---	1.39
2.45	1,170	554.62	1.40 ic	---	---	---	0.00	---	---	---	---	---	1.40
2.50	1,193	554.67	1.42 ic	---	---	---	0.00	---	---	---	---	---	1.42
2.55	1,210	554.72	1.43 ic	---	---	---	0.00	---	---	---	---	---	1.43
2.60	1,227	554.77	1.45 ic	---	---	---	0.00	---	---	---	---	---	1.45
2.65	1,244	554.82	1.46 ic	---	---	---	0.00	---	---	---	---	---	1.46
2.70	1,261	554.87	1.48 ic	---	---	---	0.00	---	---	---	---	---	1.48
2.75	1,278	554.92	1.49 ic	---	---	---	0.00	---	---	---	---	---	1.49
2.80	1,294	554.97	1.51 ic	---	---	---	0.00	---	---	---	---	---	1.51
2.85	1,311	555.02	1.52 ic	---	---	---	0.00	---	---	---	---	---	1.52
2.90	1,328	555.07	1.54 ic	---	---	---	0.00	---	---	---	---	---	1.54
2.95	1,345	555.12	1.55 ic	---	---	---	0.00	---	---	---	---	---	1.55
3.00	1,362	555.17	1.57 ic	---	---	---	0.00	---	---	---	---	---	1.57
3.05	1,376	555.22	1.58 ic	---	---	---	0.19	---	---	---	---	---	1.77
3.10	1,389	555.27	1.60 ic	---	---	---	0.53	---	---	---	---	---	2.12
3.15	1,403	555.32	1.61 ic	---	---	---	0.97	---	---	---	---	---	2.58
3.20	1,416	555.37	1.62 ic	---	---	---	1.49	---	---	---	---	---	3.11
3.25	1,430	555.42	1.64 ic	---	---	---	2.08	---	---	---	---	---	3.72
3.30	1,444	555.47	1.65 ic	---	---	---	2.73	---	---	---	---	---	4.39
3.35	1,457	555.52	1.66 ic	---	---	---	3.45	---	---	---	---	---	5.11
3.40	1,471	555.57	1.68 ic	---	---	---	4.21	---	---	---	---	---	5.89
3.45	1,484	555.62	1.69 ic	---	---	---	5.02	---	---	---	---	---	6.72
3.50	1,498	555.67	1.70 ic	---	---	---	5.89	---	---	---	---	---	7.59

...End

Hydrograph Report

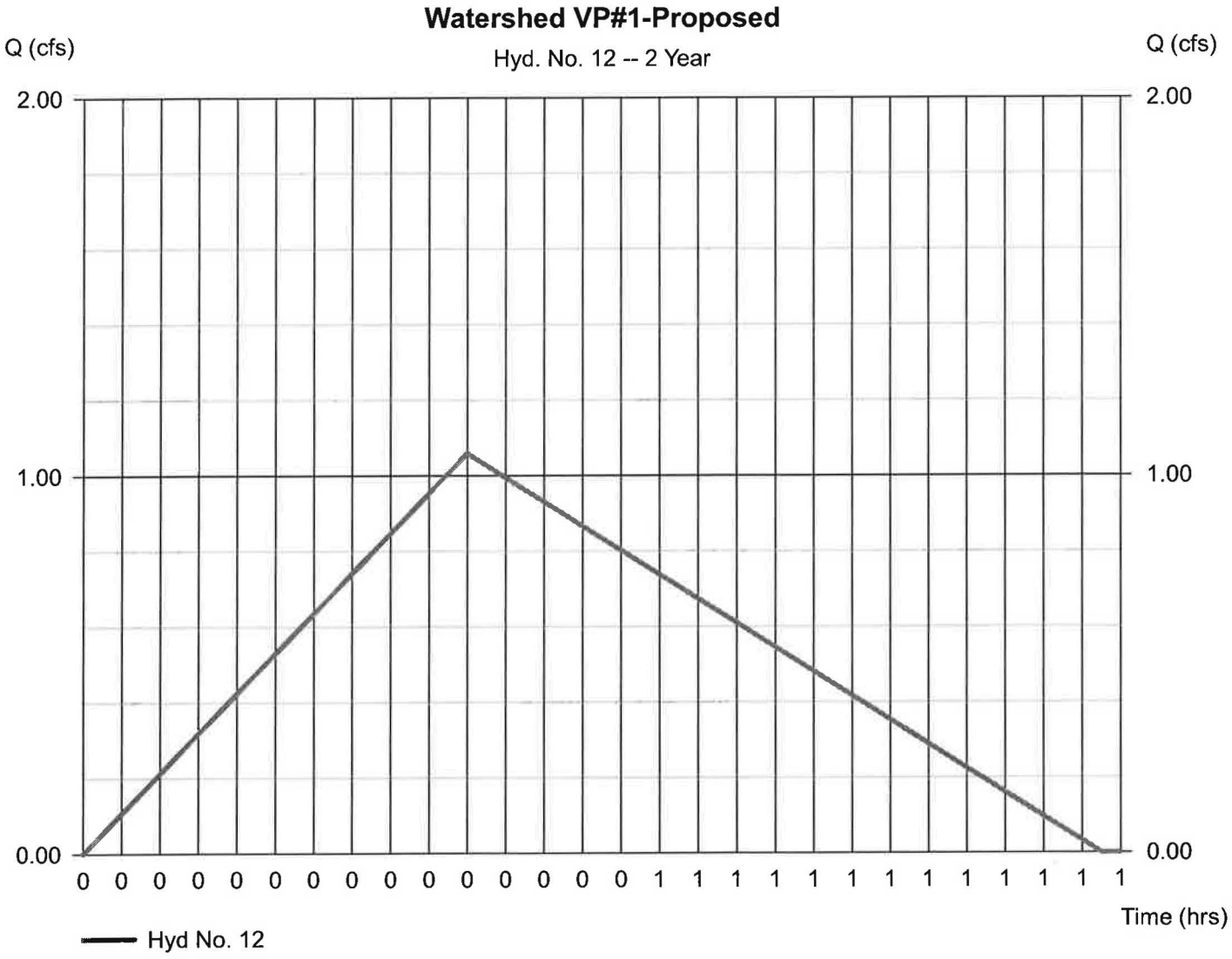
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 12

Watershed VP#1-Proposed

Hydrograph type	= Rational	Peak discharge	= 1.058 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.33 hrs
Time interval	= 1 min	Hyd. volume	= 1,695 cuft
Drainage area	= 2.180 ac	Runoff coeff.	= 0.2*
Intensity	= 2.427 in/hr	Tc by User	= 20.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(2.180 x 0.20)] / 2.180

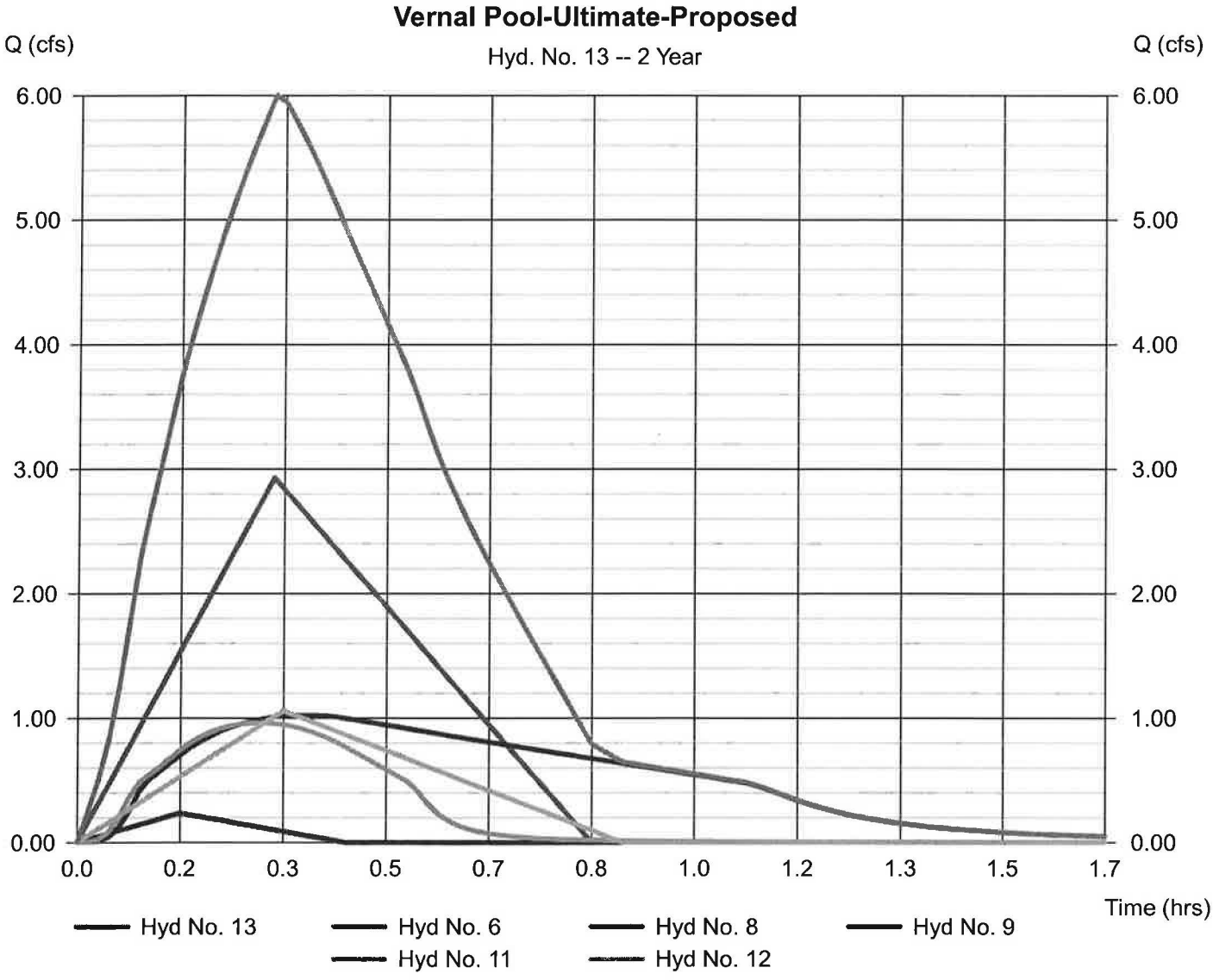


Hydrograph Report

Hyd. No. 13

Vernal Pool-Ultimate-Proposed

Hydrograph type	= Combine	Peak discharge	= 6.000 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 10,974 cuft
Inflow hyds.	= 6, 8, 9, 11, 12	Contrib. drain. area	= 6.480 ac



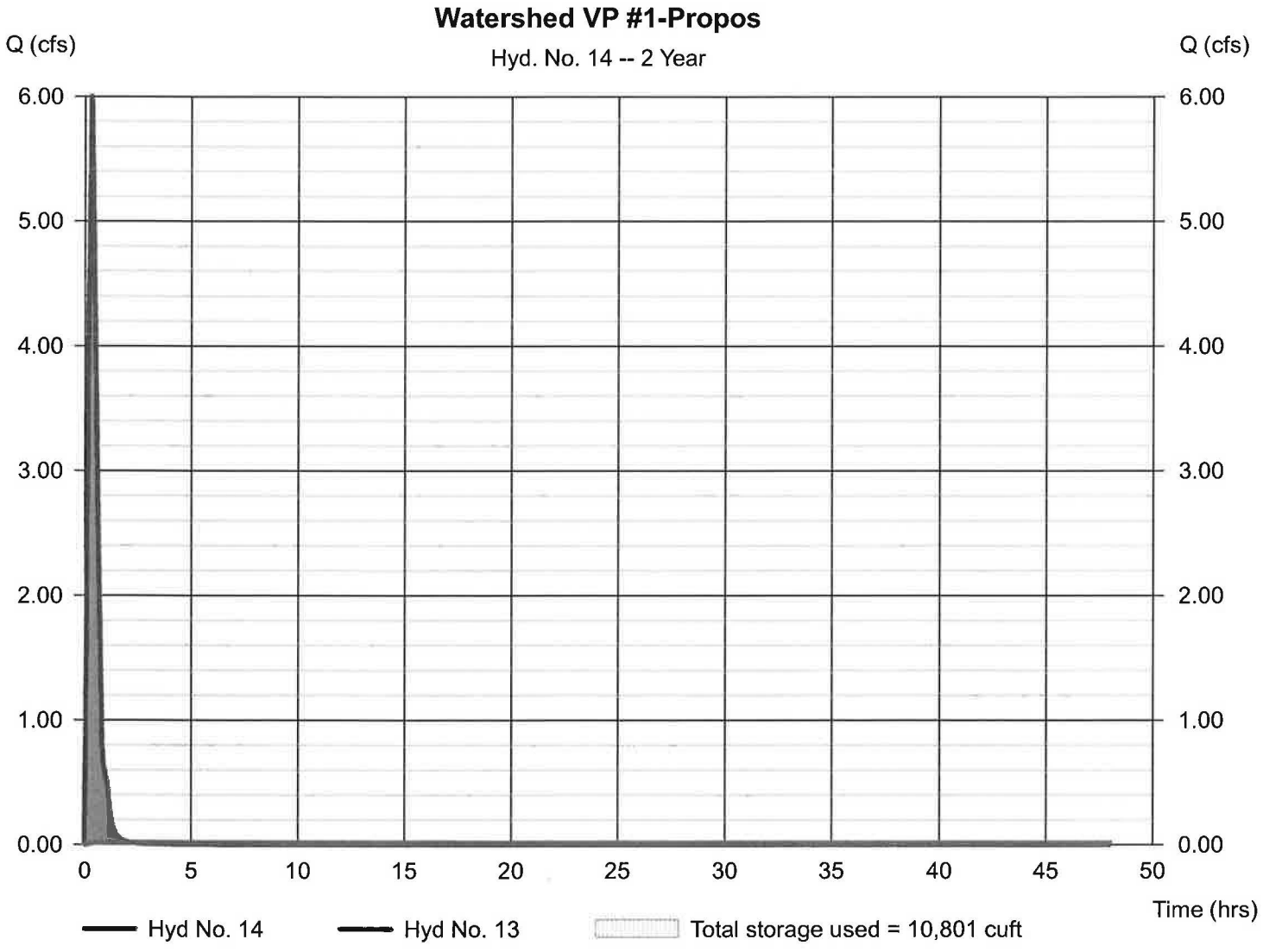
Hydrograph Report

Hyd. No. 14

Watershed VP #1-Propos

Hydrograph type	= Reservoir	Peak discharge	= 0.017 cfs
Storm frequency	= 2 yrs	Time to peak	= 2.18 hrs
Time interval	= 1 min	Hyd. volume	= 2,771 cuft
Inflow hyd. No.	= 13 - Vernal Pool-Ultimate-Proposed	Max. Elevation	= 550.09 ft
Reservoir name	= Watershed VP#1-Proposed	Max. Storage	= 10,801 cuft

Storage Indication method used.



Pond No. 4 - Watershed VP#1-Proposed

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 549.62 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	549.62	17,039	0	0
0.38	550.00	27,603	8,401	8,401
1.38	551.00	27,603	27,600	36,001

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	1.00	0.00	0.00
Span (in)	= 0.00	1.00	0.00	0.00
No. Barrels	= 0	1	0	0
Invert El. (ft)	= 0.00	549.62	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	549.62	---	0.00	---	---	---	---	---	---	---	---	0.00
0.04	840	549.66	---	0.00 ic	---	---	---	---	---	---	---	---	0.00
0.08	1,680	549.70	---	0.00 ic	---	---	---	---	---	---	---	---	0.00
0.11	2,520	549.73	---	0.01 ic	---	---	---	---	---	---	---	---	0.01
0.15	3,360	549.77	---	0.01 ic	---	---	---	---	---	---	---	---	0.01
0.19	4,200	549.81	---	0.01 ic	---	---	---	---	---	---	---	---	0.01
0.23	5,041	549.85	---	0.01 ic	---	---	---	---	---	---	---	---	0.01
0.27	5,881	549.89	---	0.01 ic	---	---	---	---	---	---	---	---	0.01
0.30	6,721	549.92	---	0.01 ic	---	---	---	---	---	---	---	---	0.01
0.34	7,561	549.96	---	0.01 ic	---	---	---	---	---	---	---	---	0.01
0.38	8,401	550.00	---	0.02 ic	---	---	---	---	---	---	---	---	0.02
0.48	11,161	550.10	---	0.02 ic	---	---	---	---	---	---	---	---	0.02
0.58	13,921	550.20	---	0.02 ic	---	---	---	---	---	---	---	---	0.02
0.68	16,681	550.30	---	0.02 ic	---	---	---	---	---	---	---	---	0.02
0.78	19,441	550.40	---	0.02 ic	---	---	---	---	---	---	---	---	0.02
0.88	22,201	550.50	---	0.02 ic	---	---	---	---	---	---	---	---	0.02
0.98	24,961	550.60	---	0.03 ic	---	---	---	---	---	---	---	---	0.03
1.08	27,721	550.70	---	0.03 ic	---	---	---	---	---	---	---	---	0.03
1.18	30,481	550.80	---	0.03 ic	---	---	---	---	---	---	---	---	0.03
1.28	33,241	550.90	---	0.03 ic	---	---	---	---	---	---	---	---	0.03
1.38	36,001	551.00	---	0.03 ic	---	---	---	---	---	---	---	---	0.03

Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	Rational	9.501	1	20	15,221	----	------	------	Vernal Pool #1-Existing-Watershed
2	Reservoir	0.020	1	53	3,251	1	550.24	15,067	Vernal Pool #1-Ex.-K
6	Rational	4.220	1	19	6,422	----	------	------	Watershed II
7	Rational	5.808	1	10	4,652	----	------	------	Watershed IIA
8	Reservoir	1.244	1	23	4,524	7	562.48	3,341	Watershed IIA
9	Rational	0.325	1	10	260	----	------	------	Watershed IX
10	Rational	2.537	1	10	2,032	----	------	------	Watershed IXA
11	Reservoir	1.202	1	18	1,977	10	554.04	894	Watershed IXA
12	Rational	1.529	1	20	2,450	----	------	------	Watershed VP#1-Proposed
13	Combine	8.233	1	19	15,517	6, 8, 9, 11, 12	------	------	Vernal Pool-Ultimate-Proposed
14	Reservoir	0.020	1	140	3,291	13	550.25	15,306	Watershed VP #1-Propos

Hydrograph Report

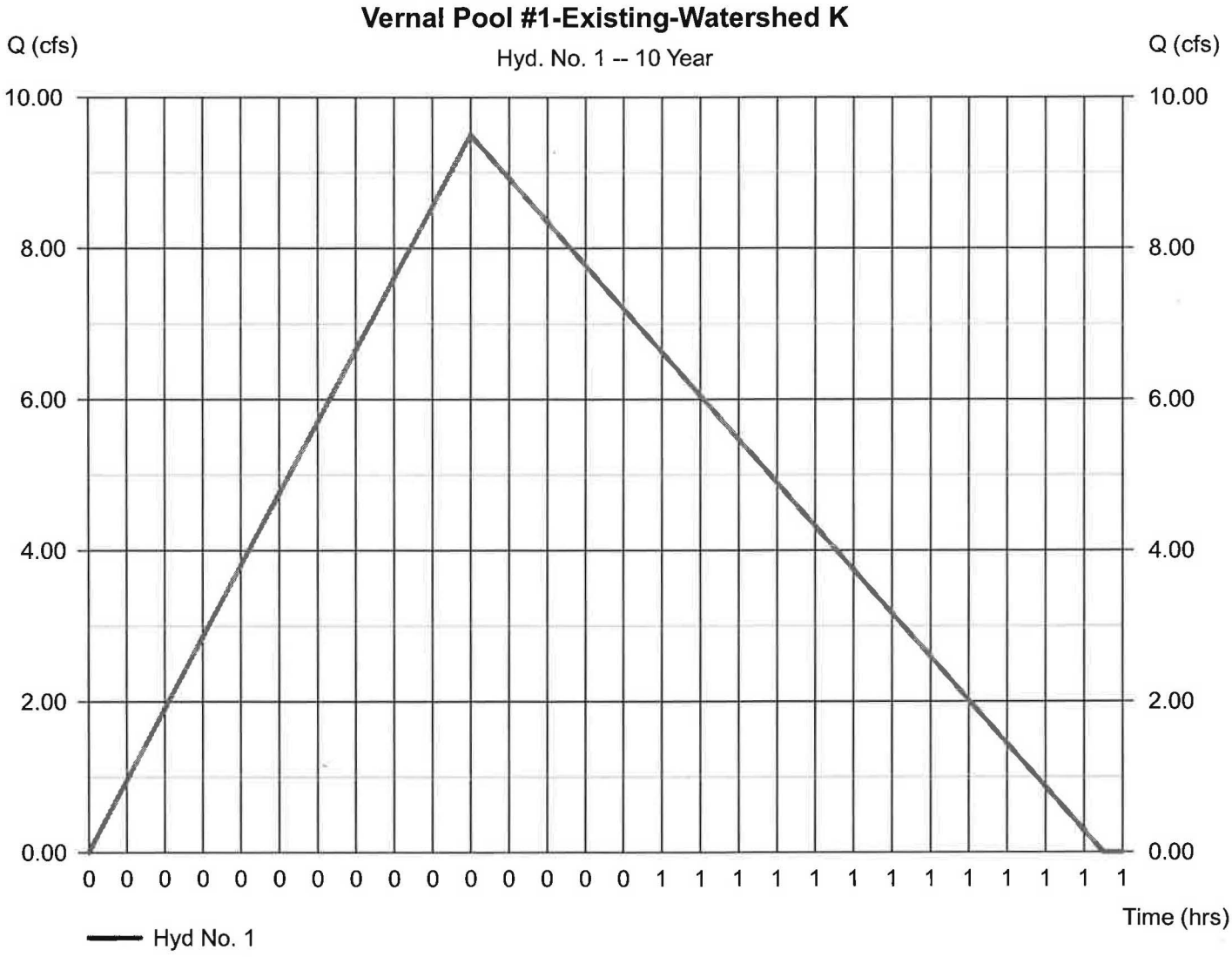
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 1

Vernal Pool #1-Existing-Watershed K

Hydrograph type	= Rational	Peak discharge	= 9.501 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.33 hrs
Time interval	= 1 min	Hyd. volume	= 15,221 cuft
Drainage area	= 9.340 ac	Runoff coeff.	= 0.29*
Intensity	= 3.508 in/hr	Tc by TR55	= 20.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.000 x 0.90) + (1.400 x 0.30) + (6.940 x 0.20)] / 9.340



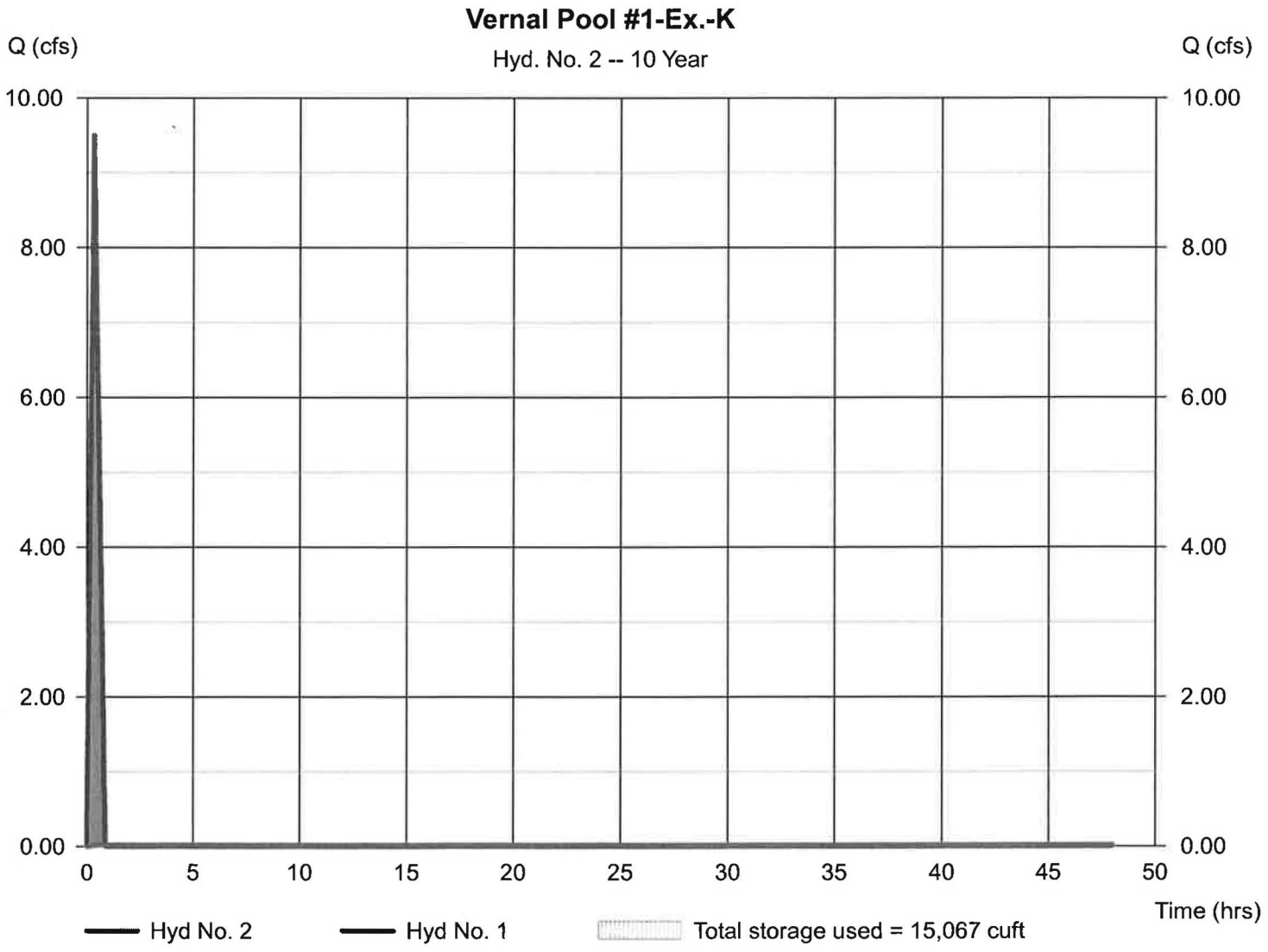
Hydrograph Report

Hyd. No. 2

Vernal Pool #1-Ex.-K

Hydrograph type	= Reservoir	Peak discharge	= 0.020 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.88 hrs
Time interval	= 1 min	Hyd. volume	= 3,251 cuft
Inflow hyd. No.	= 1 - Vernal Pool #1-Existing-Watershed K	Max. Elevation	= 550.24 ft
Reservoir name	= Vernal Pool #1-Existing	Max. Storage	= 15,067 cuft

Storage Indication method used.



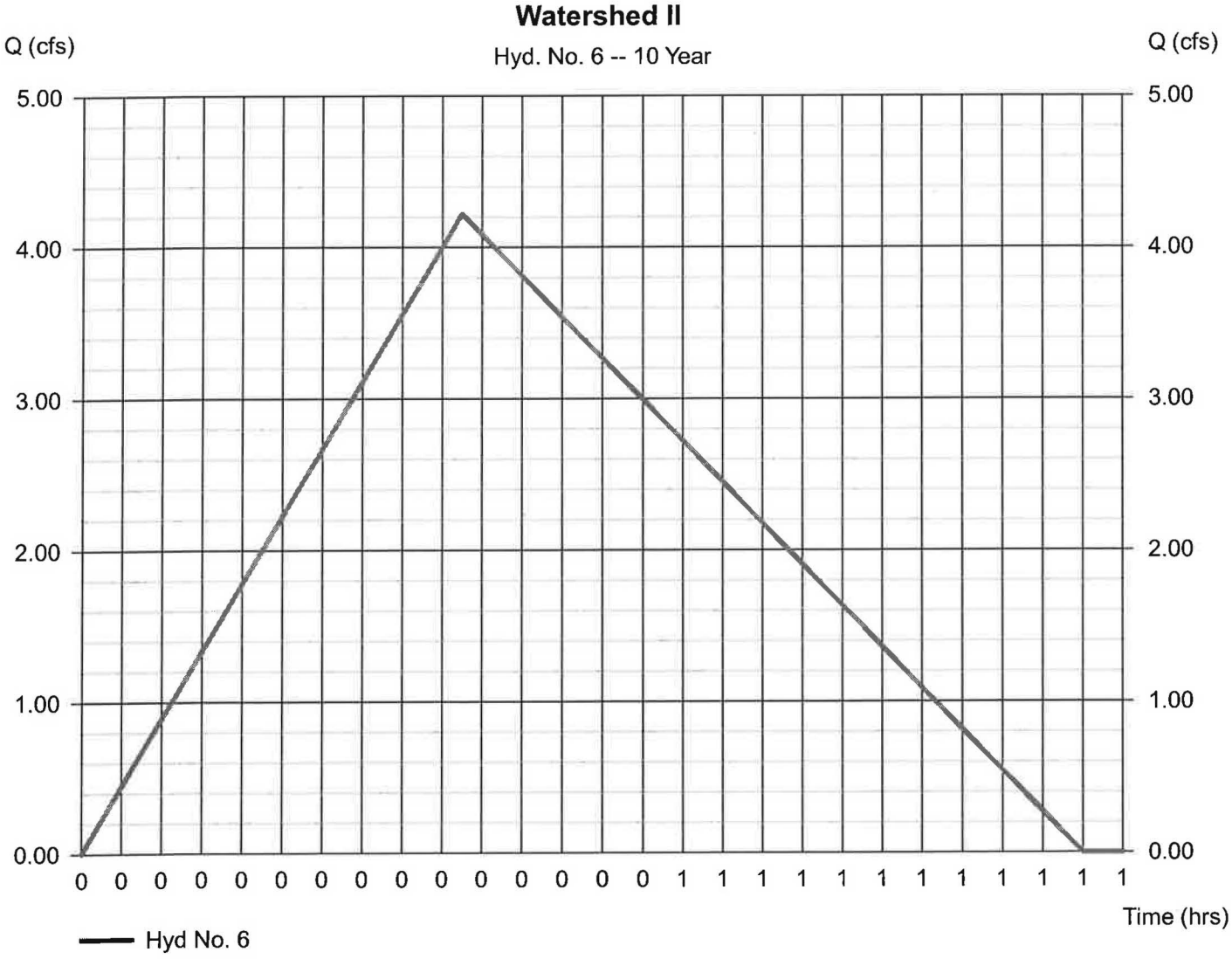
Hydrograph Report

Hyd. No. 6

Watershed II

Hydrograph type	= Rational	Peak discharge	= 4.220 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 6,422 cuft
Drainage area	= 4.040 ac	Runoff coeff.	= 0.29*
Intensity	= 3.602 in/hr	Tc by User	= 19.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.230 x 0.90) + (1.940 x 0.30) + (1.870 x 0.20)] / 4.040



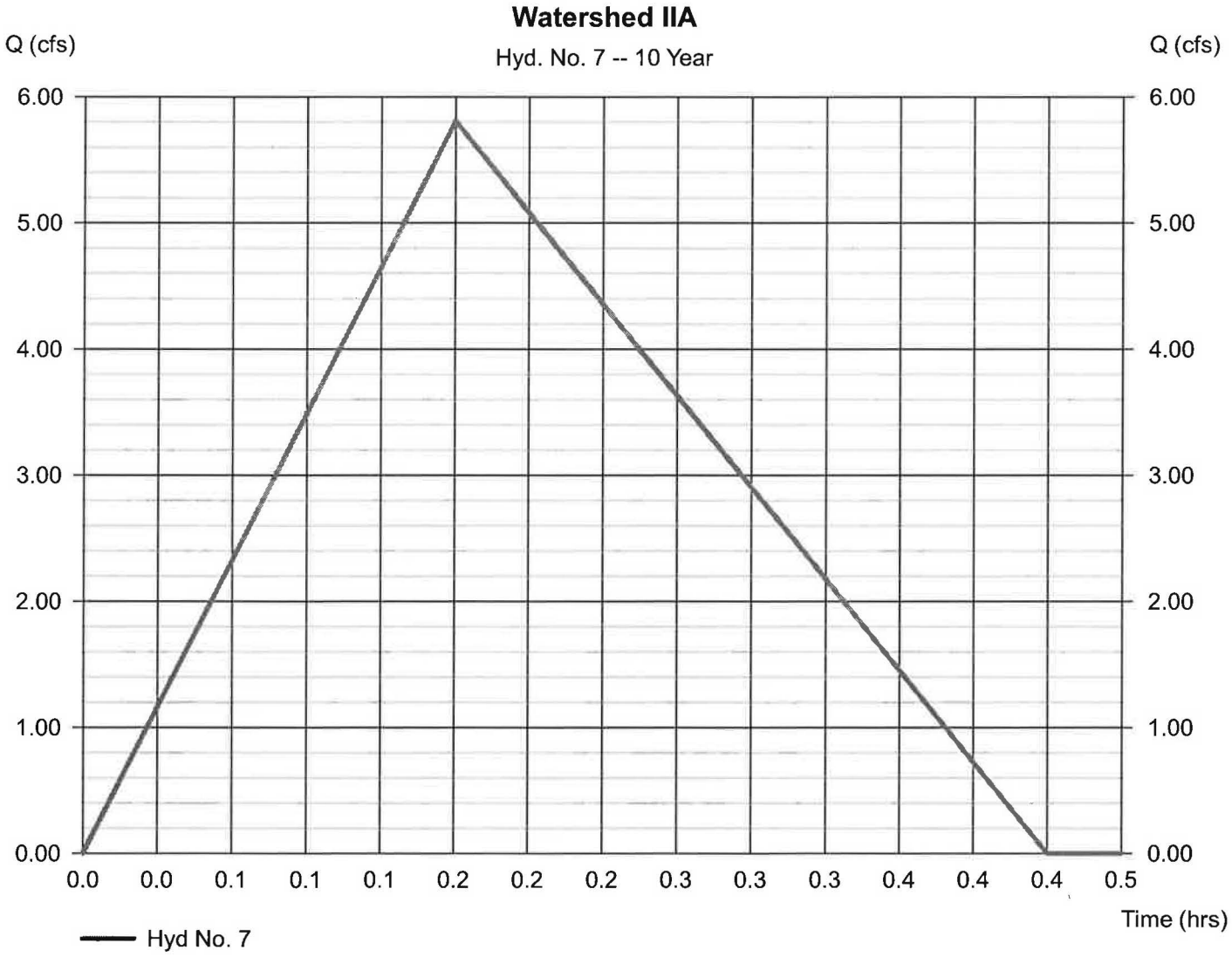
Hydrograph Report

Hyd. No. 7

Watershed IIA

Hydrograph type	= Rational	Peak discharge	= 5.808 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 4,652 cuft
Drainage area	= 1.530 ac	Runoff coeff.	= 0.79*
Intensity	= 4.805 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.250 x 0.90) + (0.280 x 0.30)] / 1.530



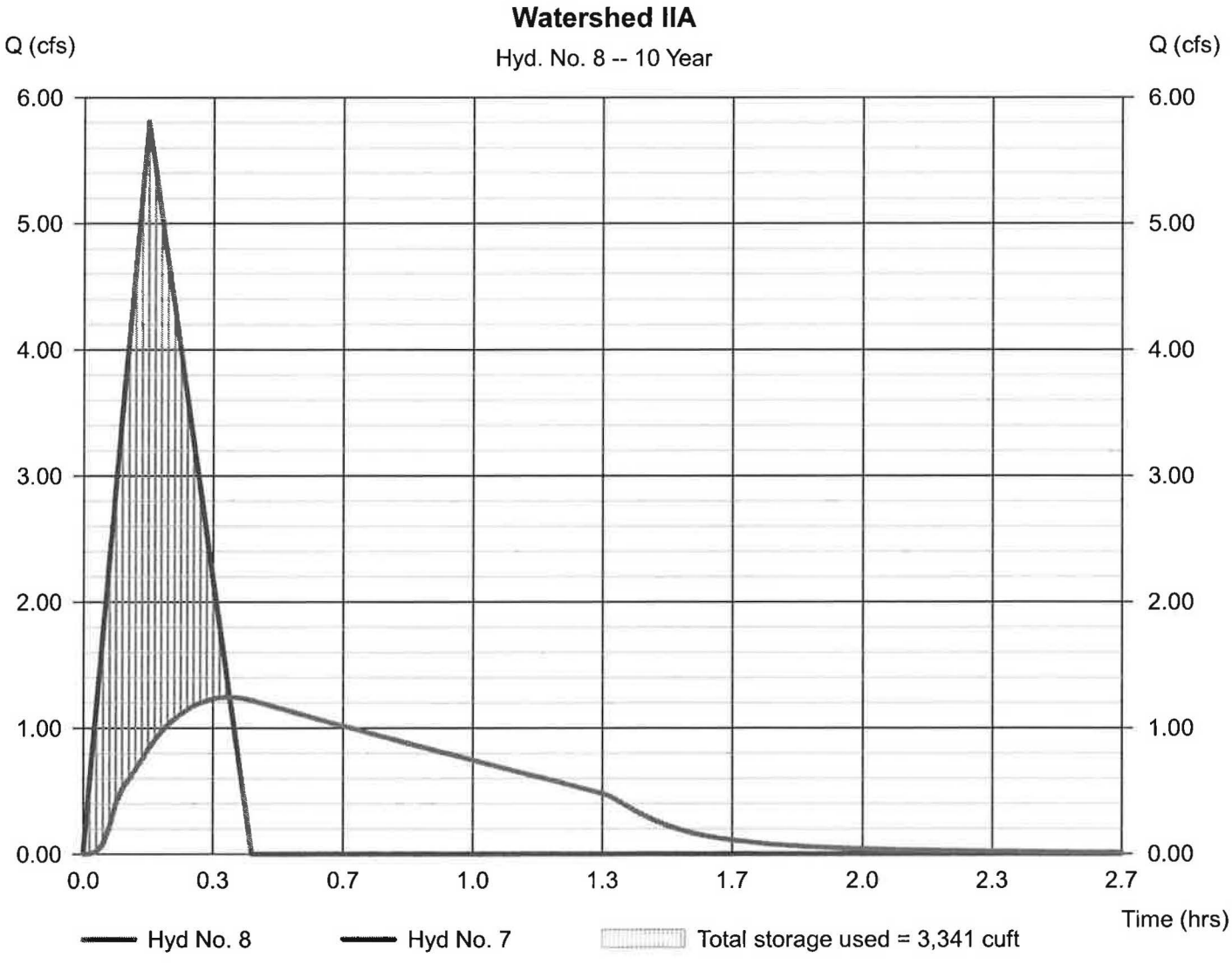
Hydrograph Report

Hyd. No. 8

Watershed IIA

Hydrograph type	= Reservoir	Peak discharge	= 1.244 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.38 hrs
Time interval	= 1 min	Hyd. volume	= 4,524 cuft
Inflow hyd. No.	= 7 - Watershed IIA	Max. Elevation	= 562.48 ft
Reservoir name	= Watershed IIA	Max. Storage	= 3,341 cuft

Storage Indication method used.



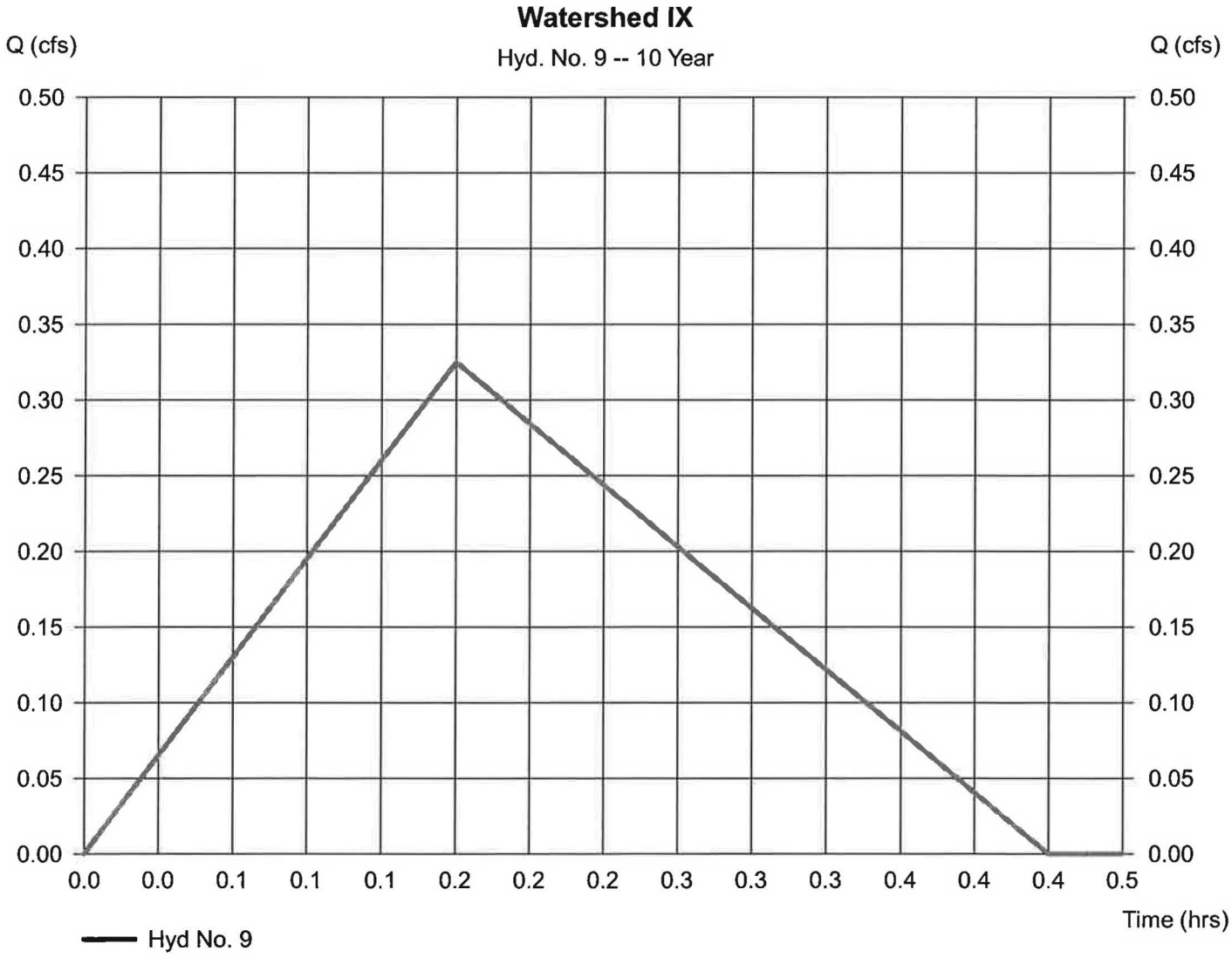
Hydrograph Report

Hyd. No. 9

Watershed IX

Hydrograph type	= Rational	Peak discharge	= 0.325 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 260 cuft
Drainage area	= 0.260 ac	Runoff coeff.	= 0.26*
Intensity	= 4.805 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.010 x 0.90) + (0.080 x 0.30) + (0.170 x 0.20)] / 0.260



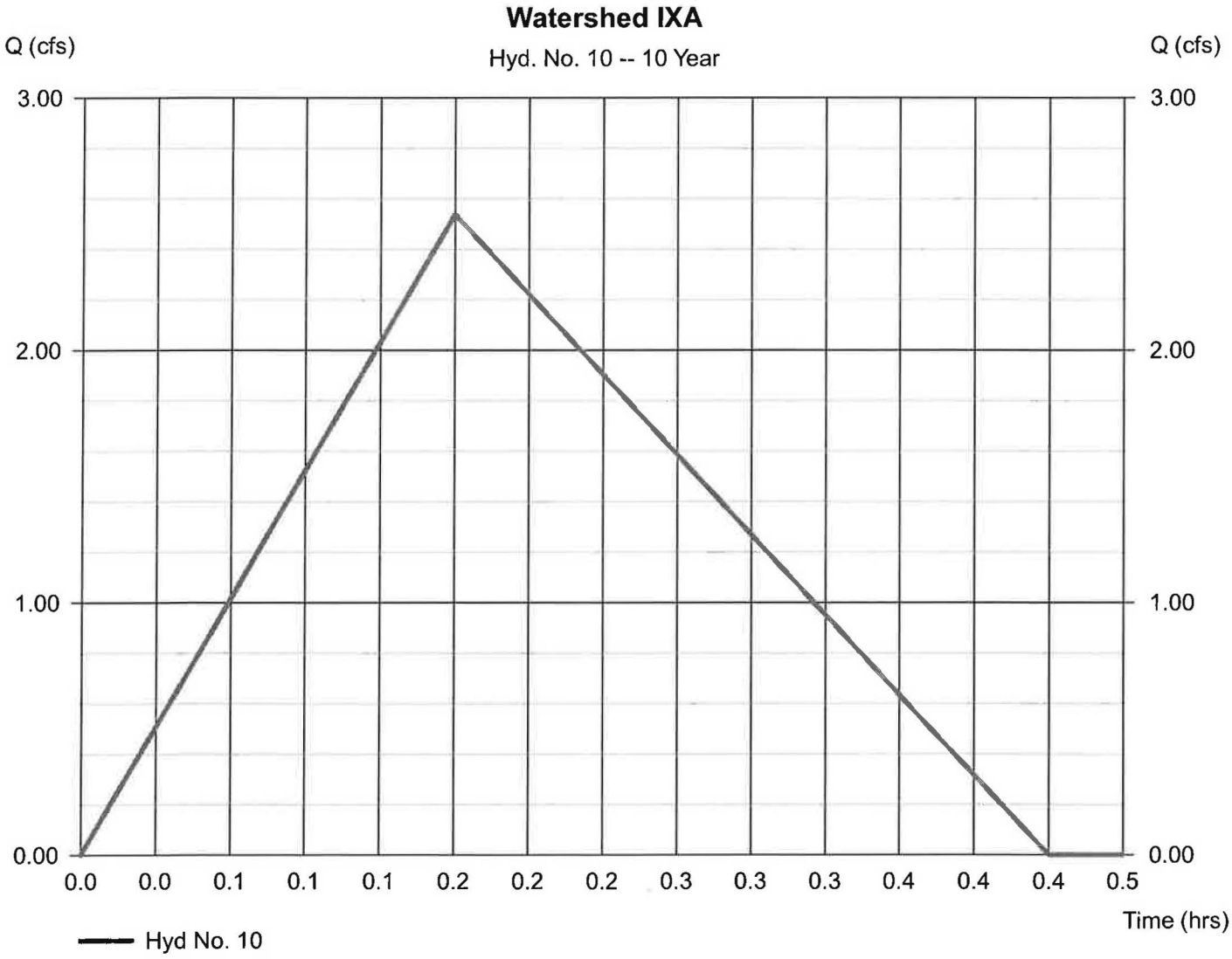
Hydrograph Report

Hyd. No. 10

Watershed IXA

Hydrograph type	= Rational	Peak discharge	= 2.537 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 2,032 cuft
Drainage area	= 0.880 ac	Runoff coeff.	= 0.6*
Intensity	= 4.805 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.460 x 0.90) + (0.260 x 0.33) + (0.160 x 0.20)] / 0.880



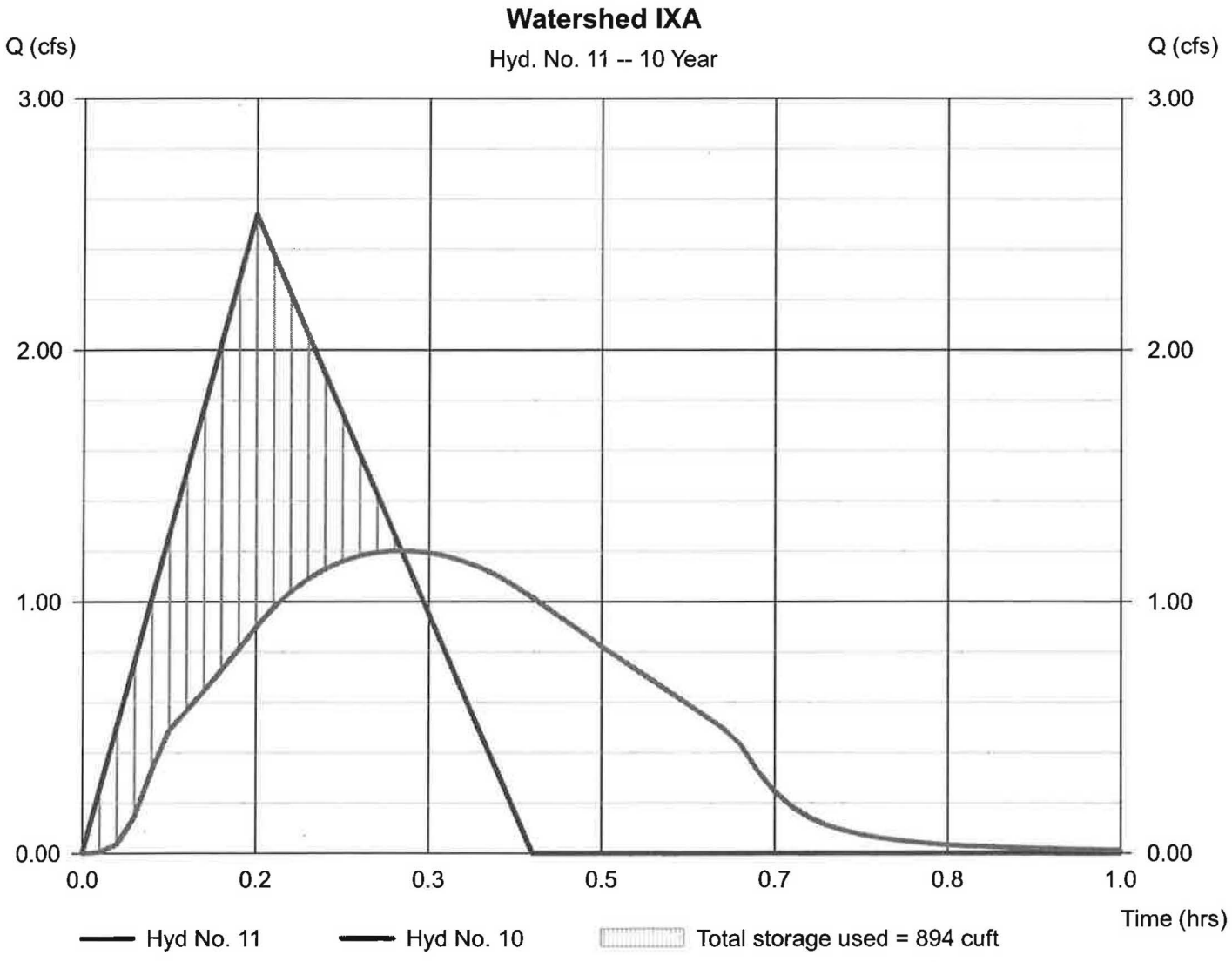
Hydrograph Report

Hyd. No. 11

Watershed IXA

Hydrograph type	= Reservoir	Peak discharge	= 1.202 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.30 hrs
Time interval	= 1 min	Hyd. volume	= 1,977 cuft
Inflow hyd. No.	= 10 - Watershed IXA	Max. Elevation	= 554.04 ft
Reservoir name	= Watershed IXA	Max. Storage	= 894 cuft

Storage Indication method used.



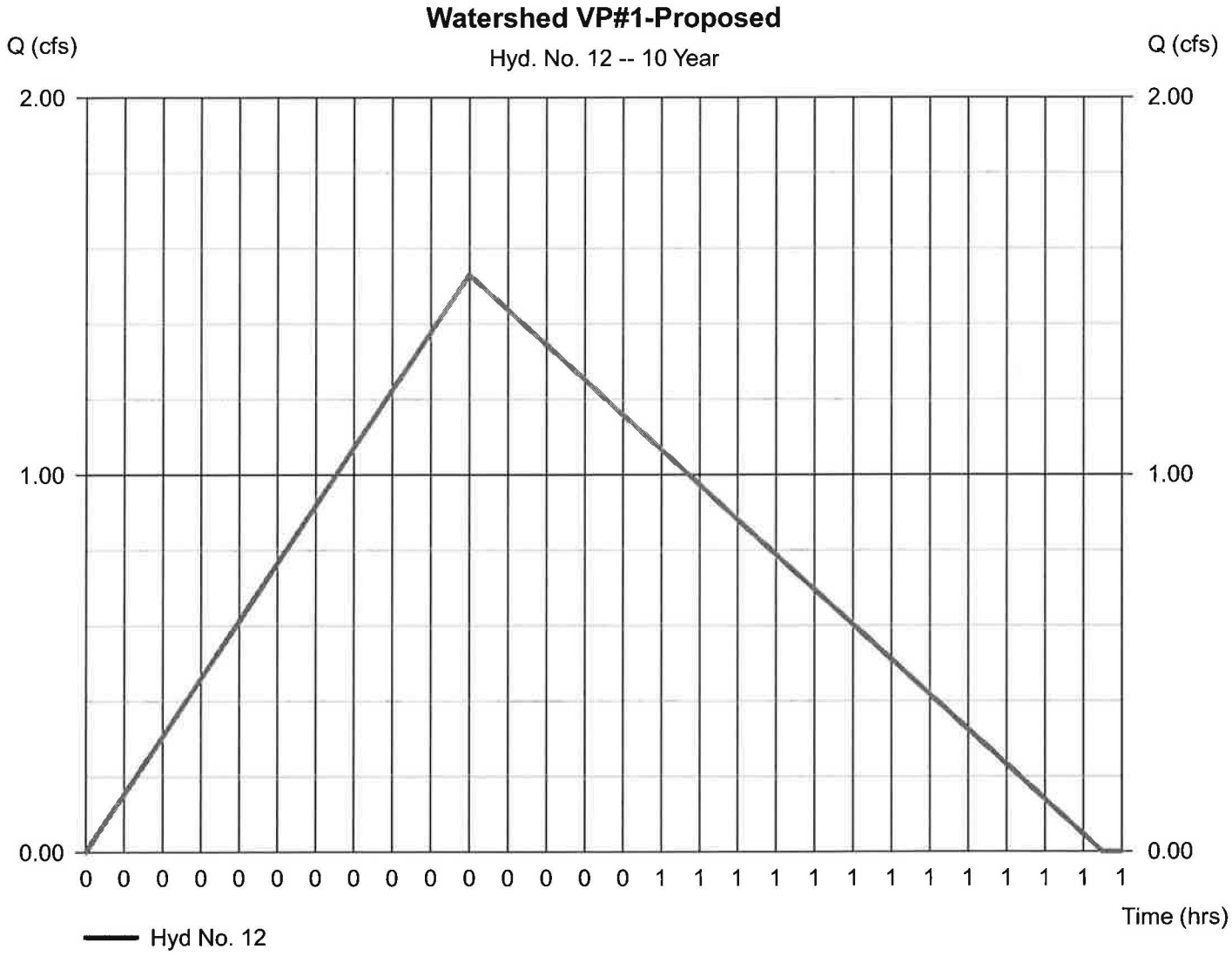
Hydrograph Report

Hyd. No. 12

Watershed VP#1-Proposed

Hydrograph type	= Rational	Peak discharge	= 1.529 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.33 hrs
Time interval	= 1 min	Hyd. volume	= 2,450 cuft
Drainage area	= 2.180 ac	Runoff coeff.	= 0.2*
Intensity	= 3.508 in/hr	Tc by User	= 20.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(2.180 x 0.20)] / 2.180

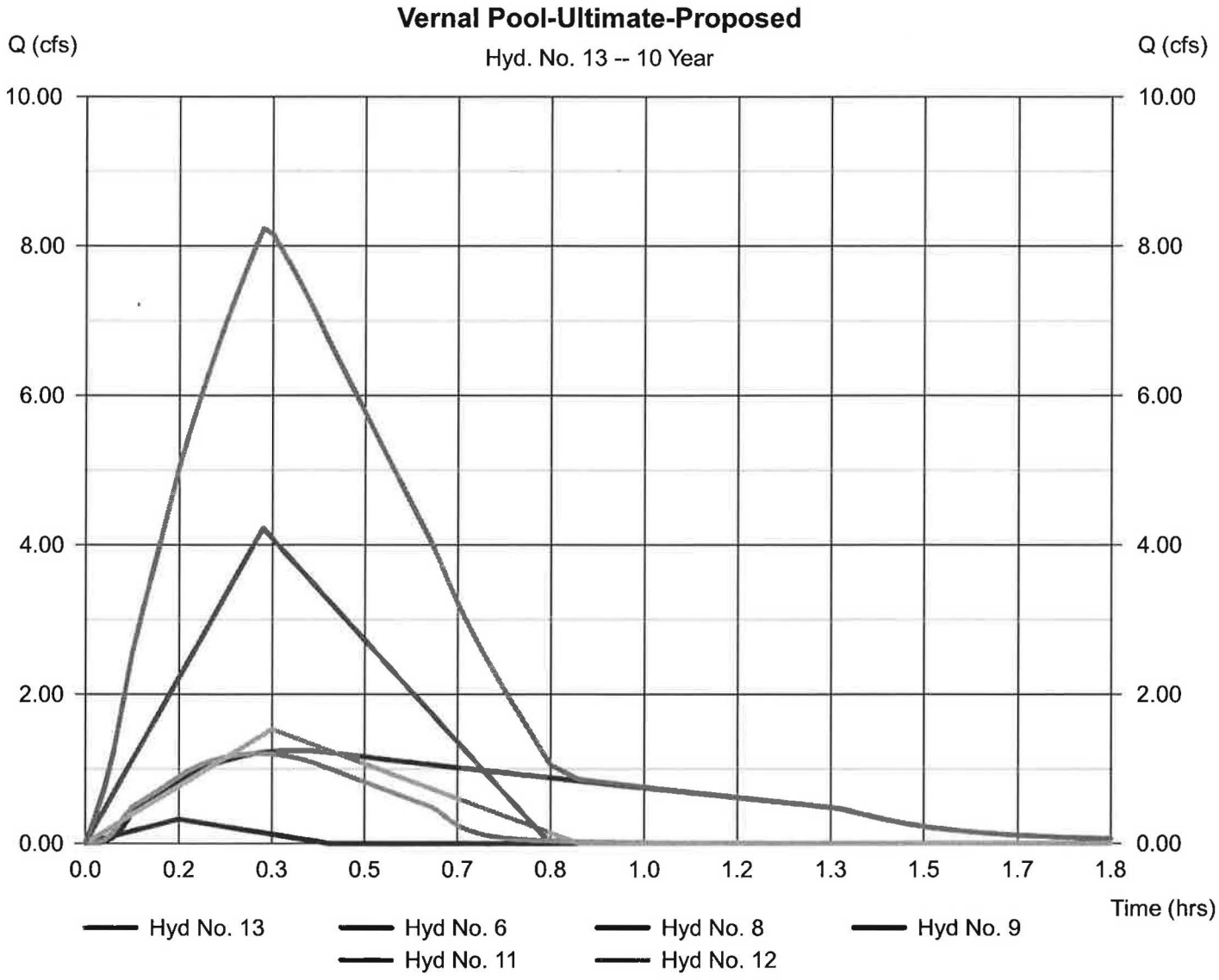


Hydrograph Report

Hyd. No. 13

Vernal Pool-Ultimate-Proposed

Hydrograph type	= Combine	Peak discharge	= 8.233 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 15,517 cuft
Inflow hyds.	= 6, 8, 9, 11, 12	Contrib. drain. area	= 6.480 ac



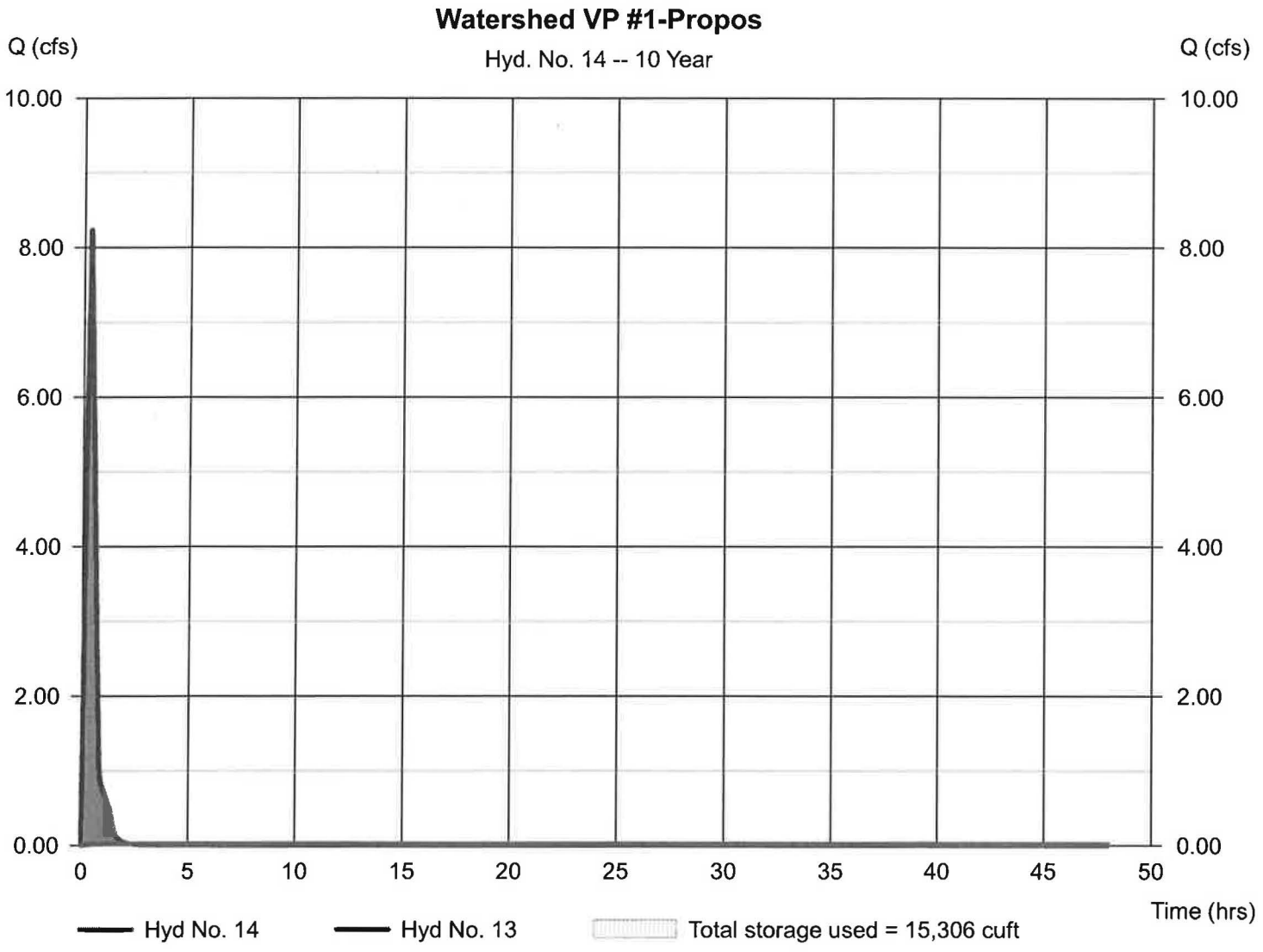
Hydrograph Report

Hyd. No. 14

Watershed VP #1-Propos

Hydrograph type	= Reservoir	Peak discharge	= 0.020 cfs
Storm frequency	= 10 yrs	Time to peak	= 2.33 hrs
Time interval	= 1 min	Hyd. volume	= 3,291 cuft
Inflow hyd. No.	= 13 - Vernal Pool-Ultimate-Proposed	Max. Elevation	= 550.25 ft
Reservoir name	= Watershed VP#1-Proposed	Max. Storage	= 15,306 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	Rational	11.15	1	20	17,861	----	------	------	Vernal Pool #1-Existing-Watershed
2	Reservoir	0.022	1	53	3,522	1	550.34	17,683	Vernal Pool #1-Ex.-K
6	Rational	4.947	1	19	7,528	----	------	------	Watershed II
7	Rational	6.675	1	10	5,347	----	------	------	Watershed IIA
8	Reservoir	1.364	1	23	5,200	7	562.83	3,905	Watershed IIA
9	Rational	0.373	1	10	299	----	------	------	Watershed IX
10	Rational	2.916	1	10	2,336	----	------	------	Watershed IXA
11	Reservoir	1.332	1	19	2,273	10	554.41	1,071	Watershed IXA
12	Rational	1.795	1	20	2,875	----	------	------	Watershed VP#1-Proposed
13	Combine	9.474	1	19	18,037	6, 8, 9, 11, 12	------	------	Vernal Pool-Ultimate-Proposed
14	Reservoir	0.022	1	145	3,548	13	550.34	17,806	Watershed VP #1-Propos

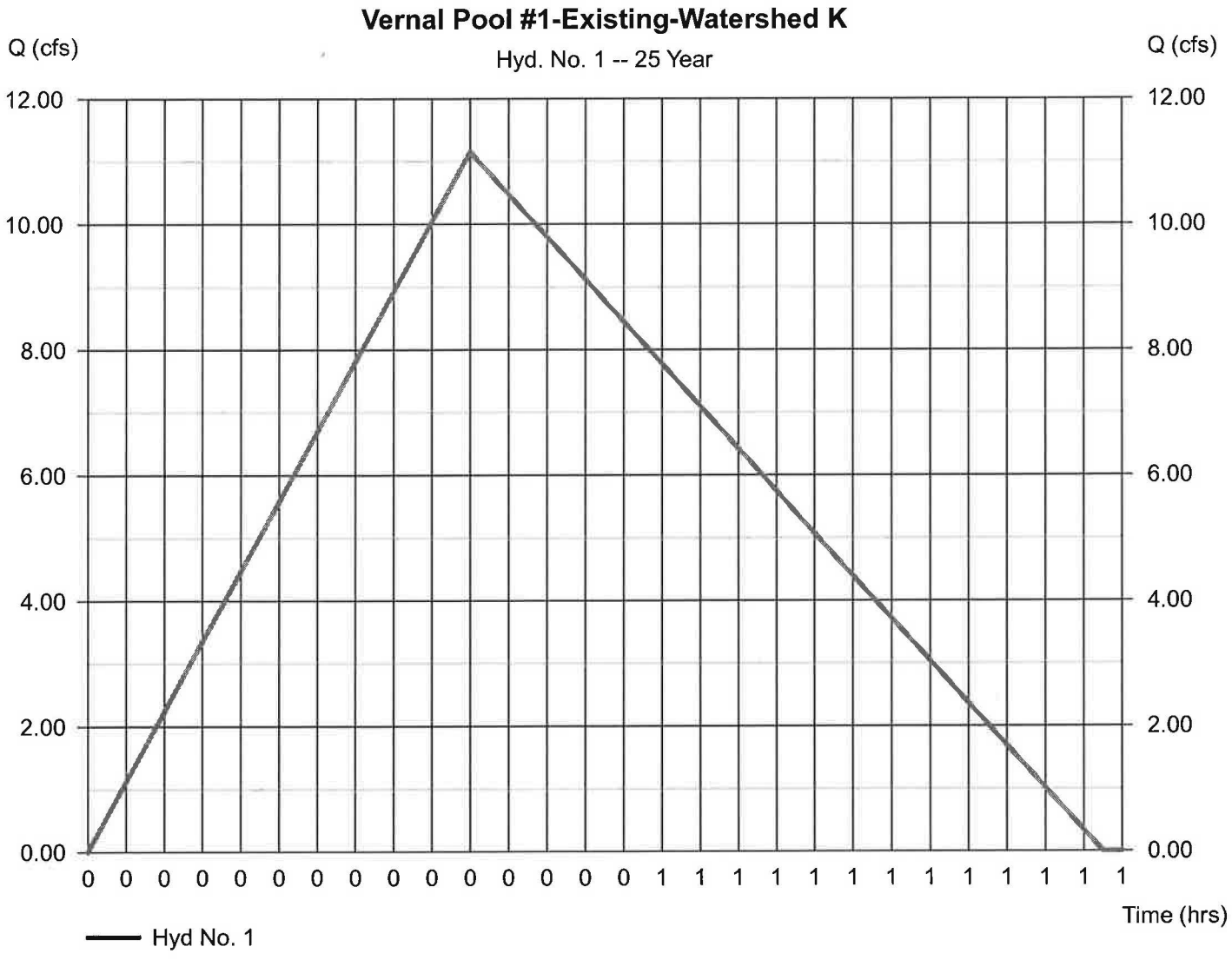
Hydrograph Report

Hyd. No. 1

Vernal Pool #1-Existing-Watershed K

Hydrograph type	= Rational	Peak discharge	= 11.15 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.33 hrs
Time interval	= 1 min	Hyd. volume	= 17,861 cuft
Drainage area	= 9.340 ac	Runoff coeff.	= 0.29*
Intensity	= 4.116 in/hr	Tc by TR55	= 20.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.000 x 0.90) + (1.400 x 0.30) + (6.940 x 0.20)] / 9.340



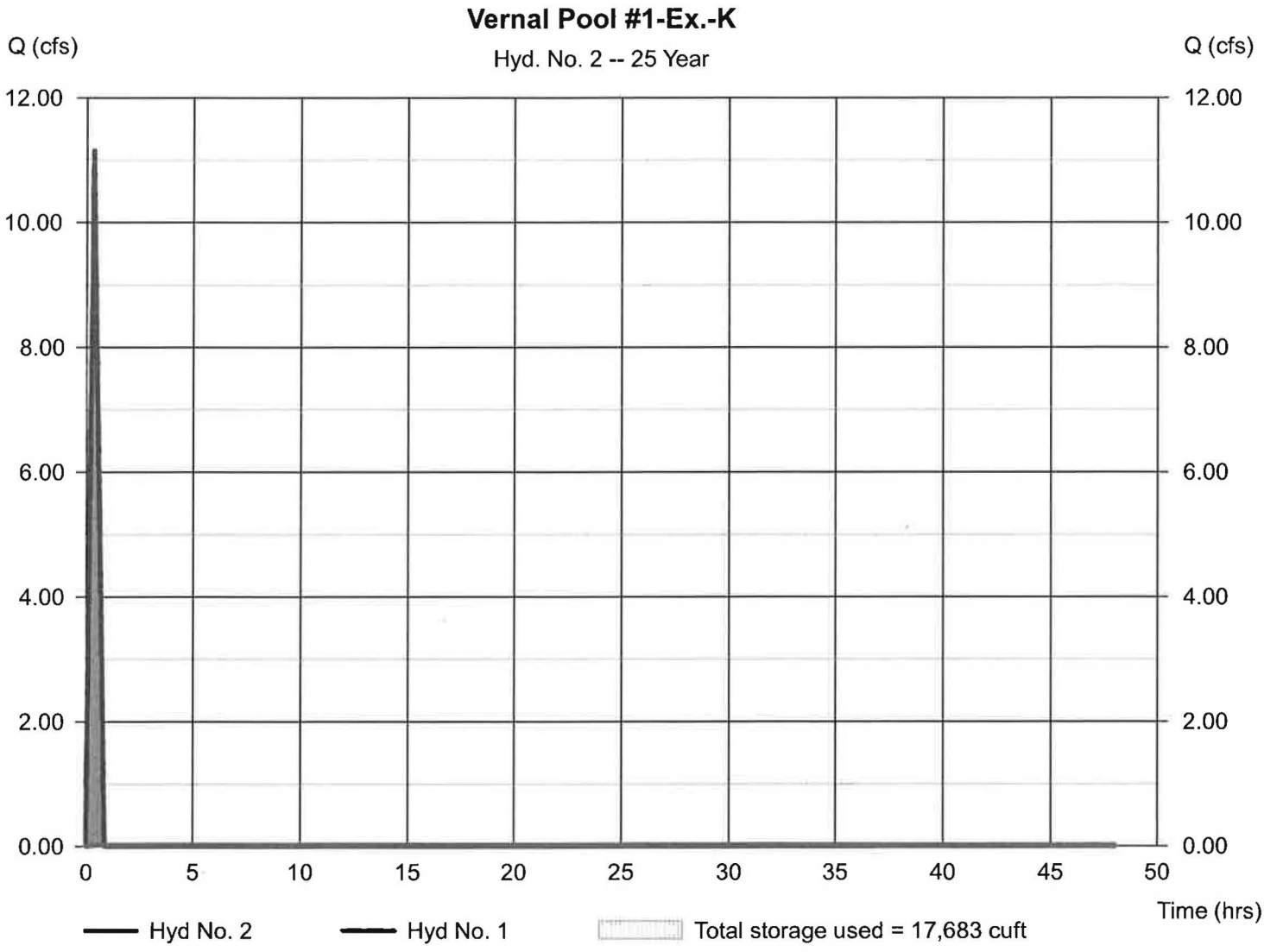
Hydrograph Report

Hyd. No. 2

Vernal Pool #1-Ex.-K

Hydrograph type	= Reservoir	Peak discharge	= 0.022 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.88 hrs
Time interval	= 1 min	Hyd. volume	= 3,522 cuft
Inflow hyd. No.	= 1 - Vernal Pool #1-Existing-Watershed K	Max. Elevation	= 550.34 ft
Reservoir name	= Vernal Pool #1-Existing	Max. Storage	= 17,683 cuft

Storage Indication method used.



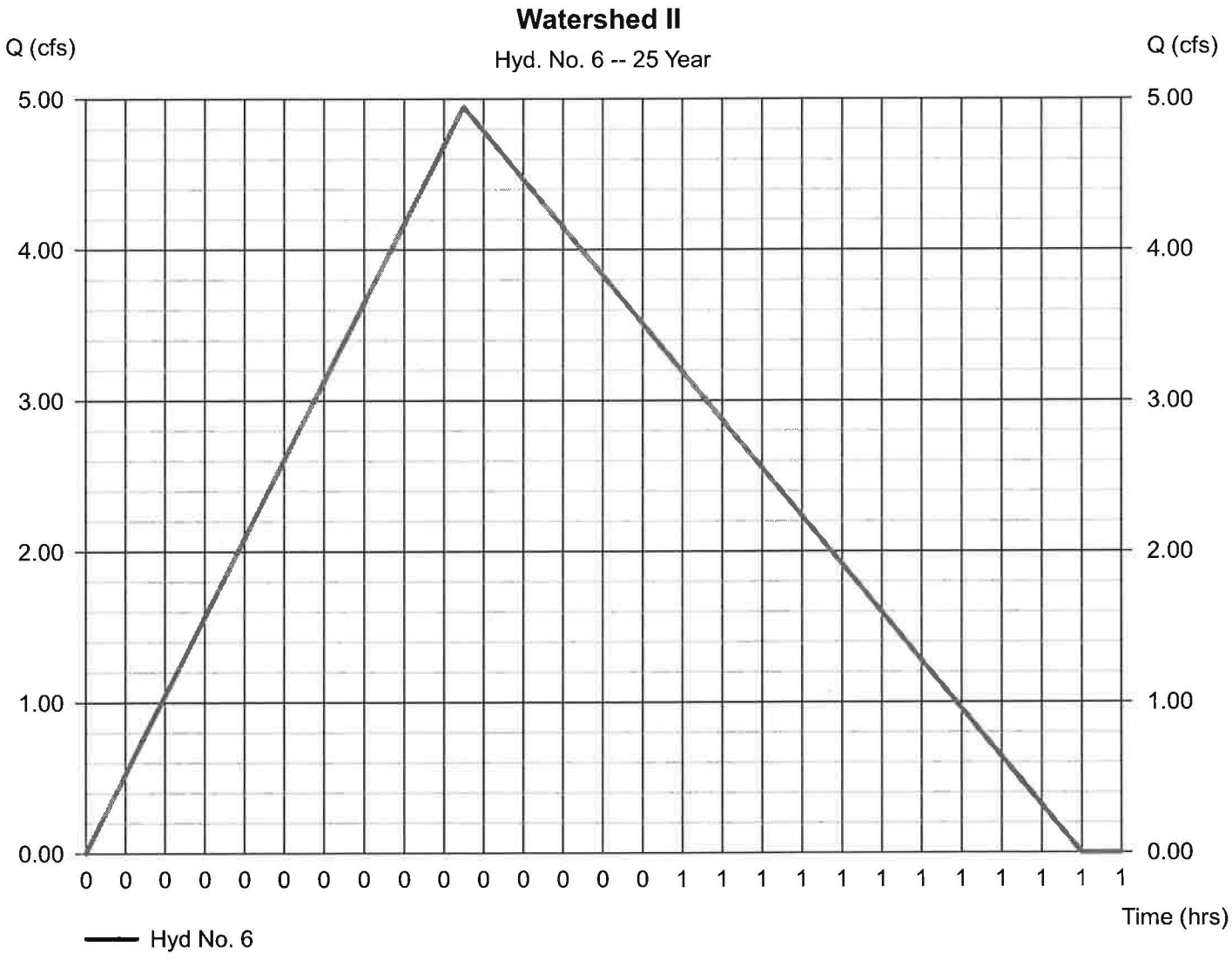
Hydrograph Report

Hyd. No. 6

Watershed II

Hydrograph type	= Rational	Peak discharge	= 4.947 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 7,528 cuft
Drainage area	= 4.040 ac	Runoff coeff.	= 0.29*
Intensity	= 4.222 in/hr	Tc by User	= 19.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.230 x 0.90) + (1.940 x 0.30) + (1.870 x 0.20)] / 4.040



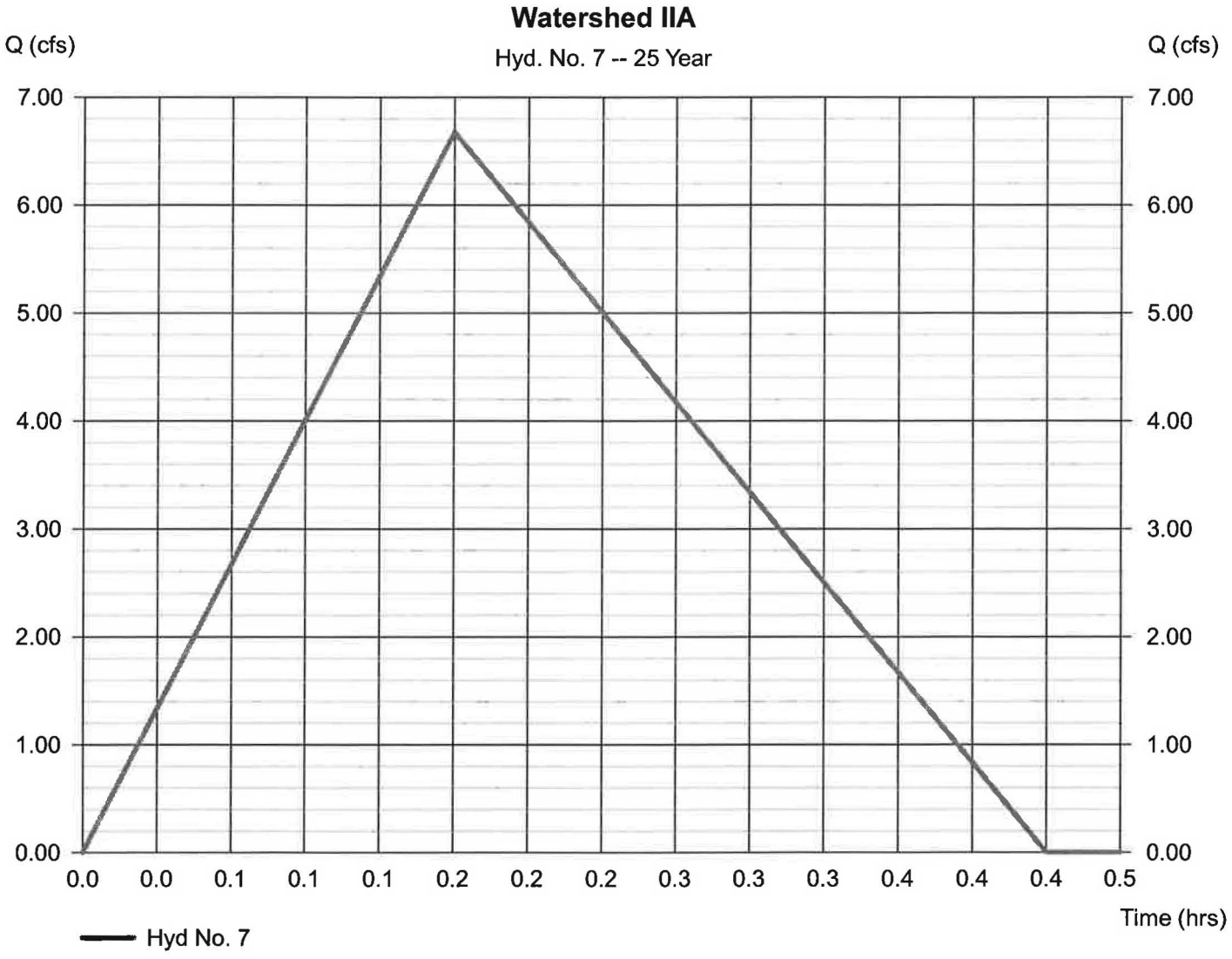
Hydrograph Report

Hyd. No. 7

Watershed IIA

Hydrograph type	= Rational	Peak discharge	= 6.675 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 5,347 cuft
Drainage area	= 1.530 ac	Runoff coeff.	= 0.79*
Intensity	= 5.522 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.250 x 0.90) + (0.280 x 0.30)] / 1.530



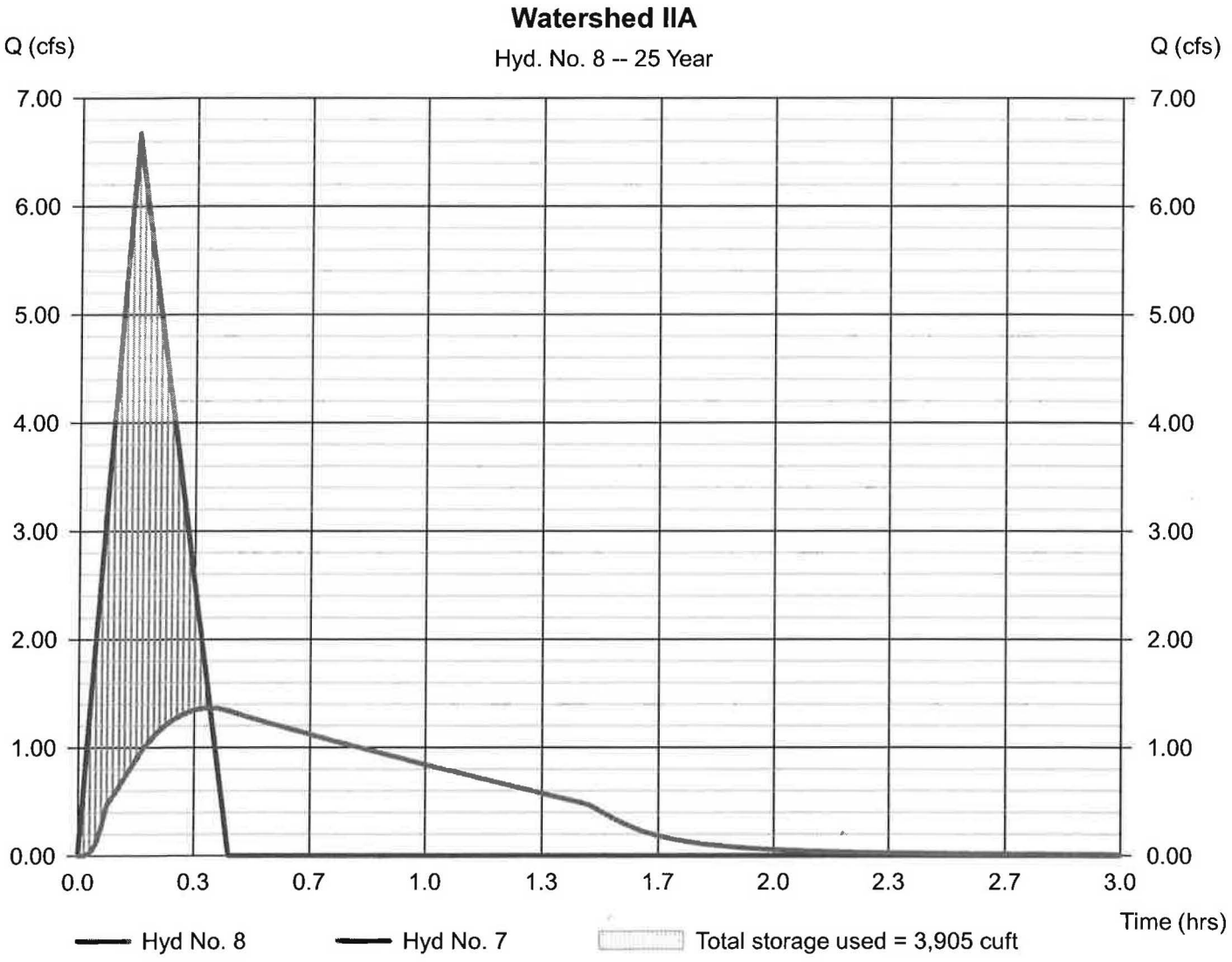
Hydrograph Report

Hyd. No. 8

Watershed IIA

Hydrograph type	= Reservoir	Peak discharge	= 1.364 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.38 hrs
Time interval	= 1 min	Hyd. volume	= 5,200 cuft
Inflow hyd. No.	= 7 - Watershed IIA	Max. Elevation	= 562.83 ft
Reservoir name	= Watershed IIA	Max. Storage	= 3,905 cuft

Storage Indication method used.



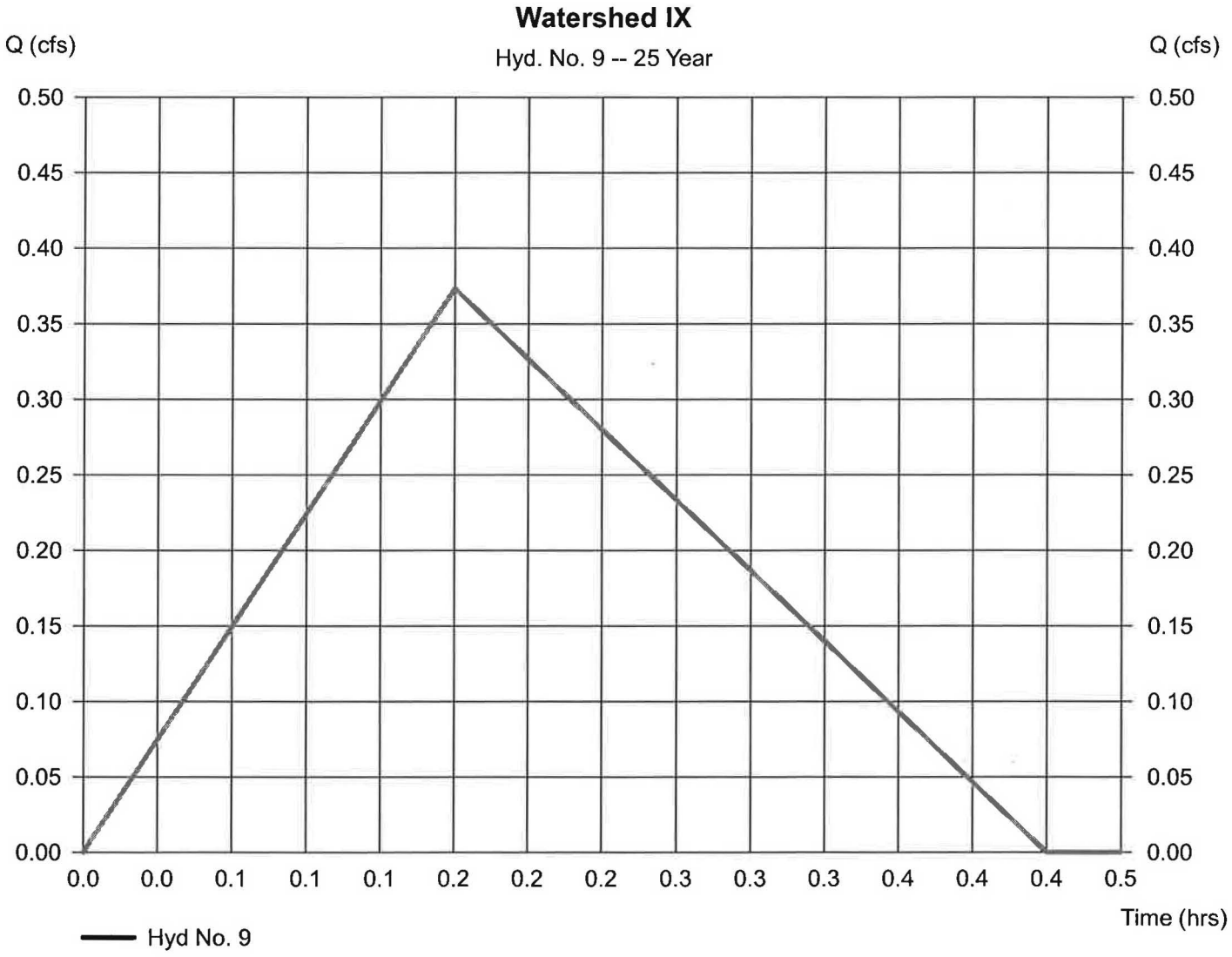
Hydrograph Report

Hyd. No. 9

Watershed IX

Hydrograph type	= Rational	Peak discharge	= 0.373 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 299 cuft
Drainage area	= 0.260 ac	Runoff coeff.	= 0.26*
Intensity	= 5.522 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.010 x 0.90) + (0.080 x 0.30) + (0.170 x 0.20)] / 0.260



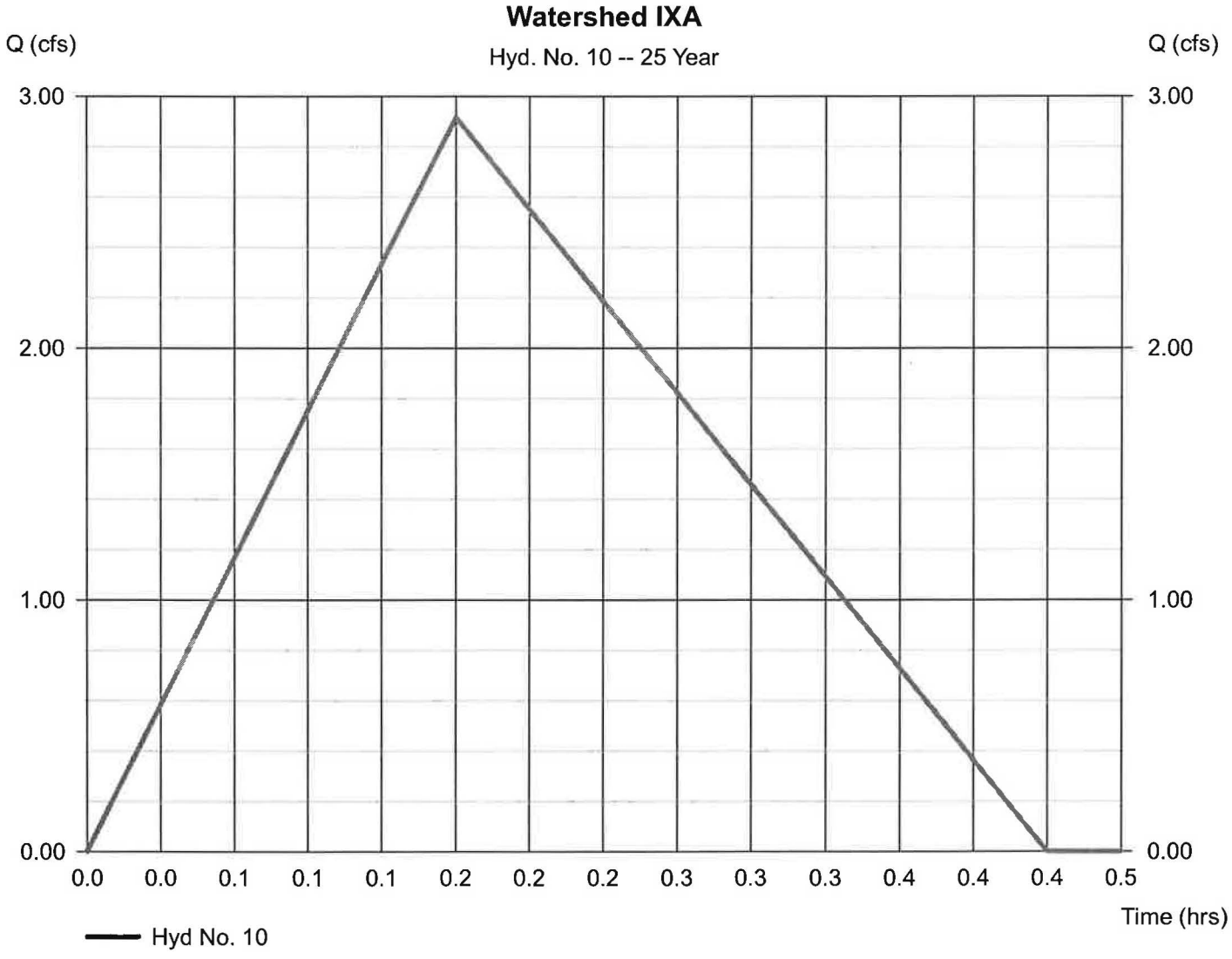
Hydrograph Report

Hyd. No. 10

Watershed IXA

Hydrograph type	= Rational	Peak discharge	= 2.916 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 2,336 cuft
Drainage area	= 0.880 ac	Runoff coeff.	= 0.6*
Intensity	= 5.522 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.460 x 0.90) + (0.260 x 0.33) + (0.160 x 0.20)] / 0.880



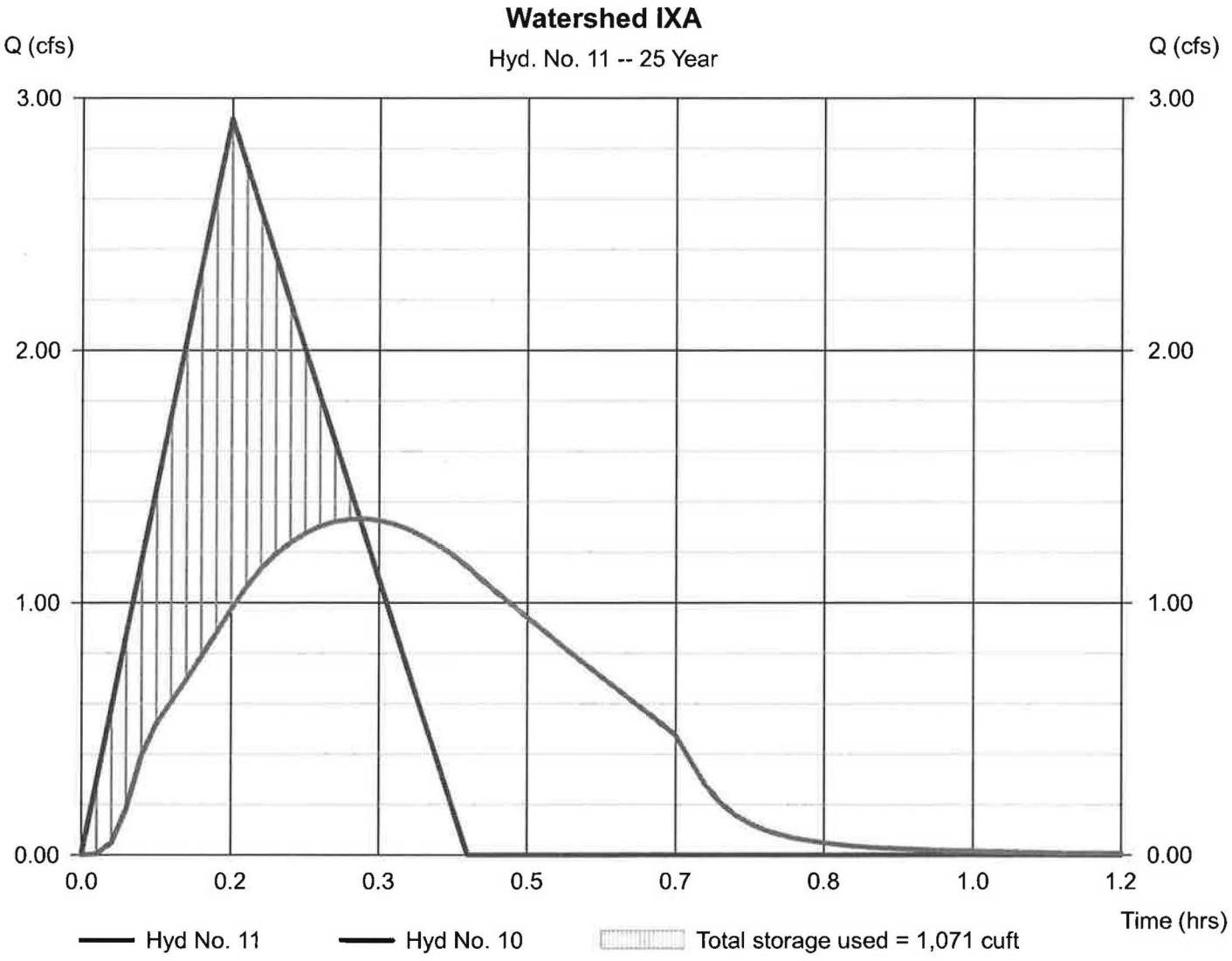
Hydrograph Report

Hyd. No. 11

Watershed IXA

Hydrograph type	= Reservoir	Peak discharge	= 1.332 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 2,273 cuft
Inflow hyd. No.	= 10 - Watershed IXA	Max. Elevation	= 554.41 ft
Reservoir name	= Watershed IXA	Max. Storage	= 1,071 cuft

Storage Indication method used.



Hydrograph Report

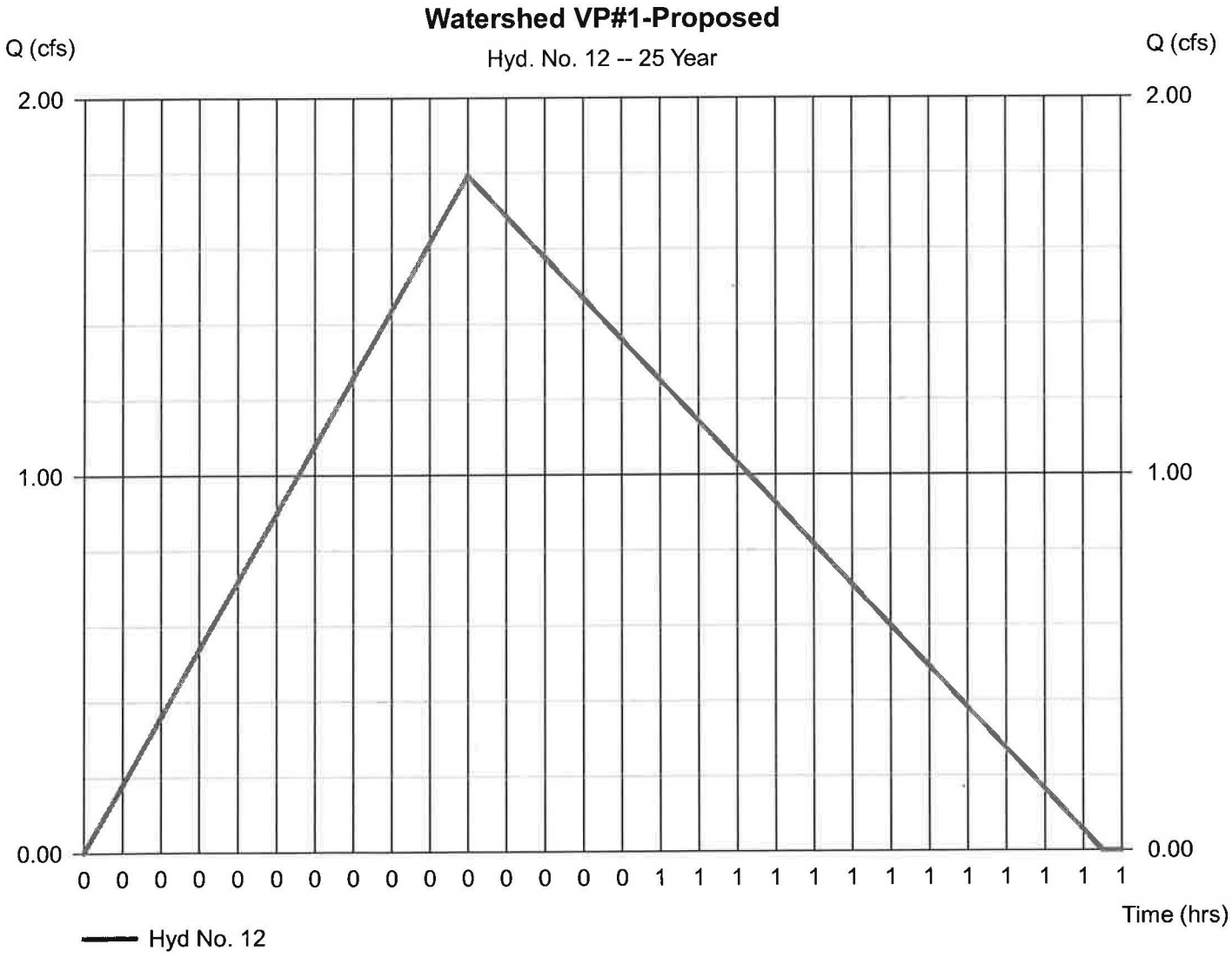
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 12

Watershed VP#1-Proposed

Hydrograph type	= Rational	Peak discharge	= 1.795 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.33 hrs
Time interval	= 1 min	Hyd. volume	= 2,875 cuft
Drainage area	= 2.180 ac	Runoff coeff.	= 0.2*
Intensity	= 4.116 in/hr	Tc by User	= 20.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(2.180 x 0.20)] / 2.180

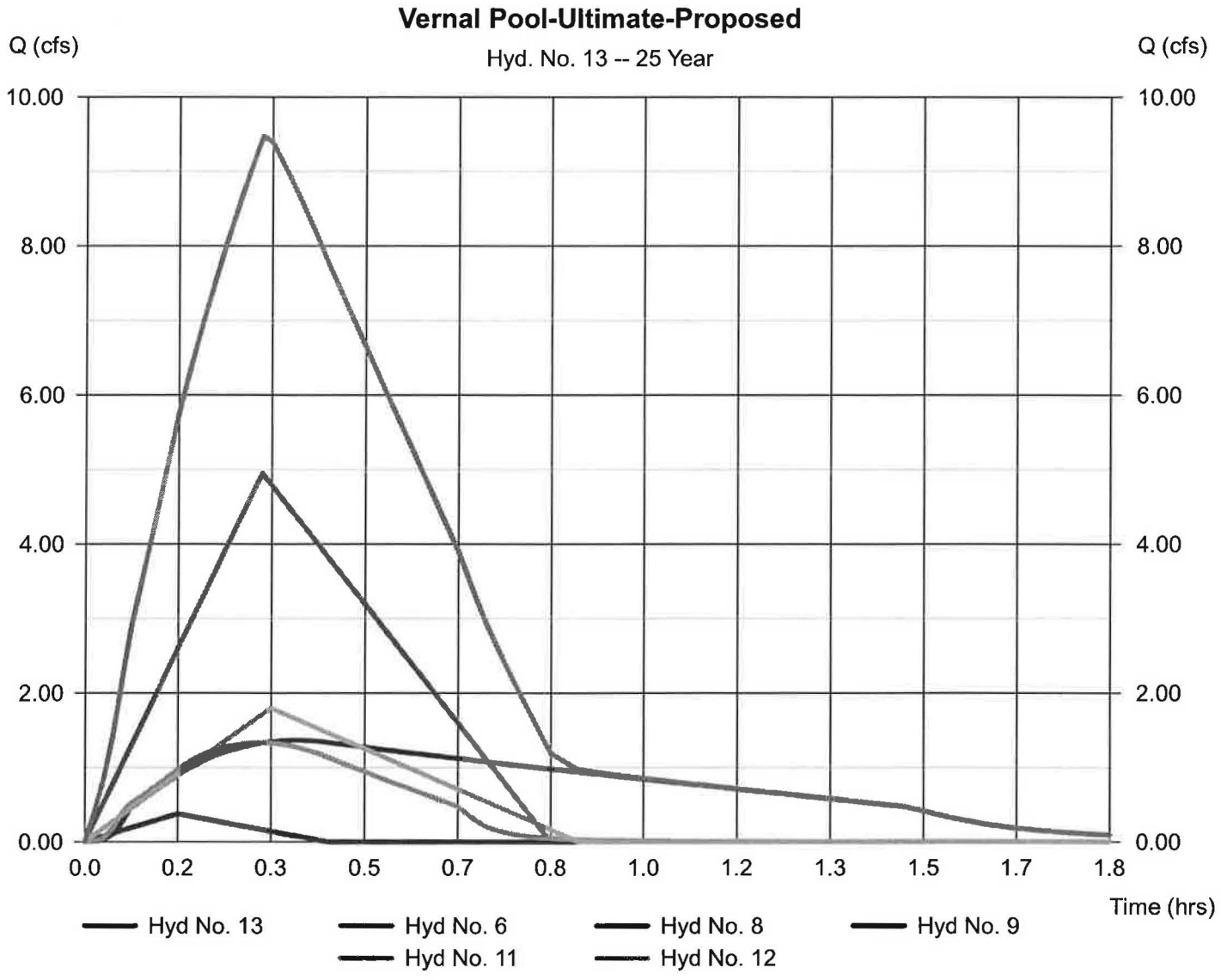


Hydrograph Report

Hyd. No. 13

Vernal Pool-Ultimate-Proposed

Hydrograph type	= Combine	Peak discharge	= 9.474 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 18,037 cuft
Inflow hyds.	= 6, 8, 9, 11, 12	Contrib. drain. area	= 6.480 ac



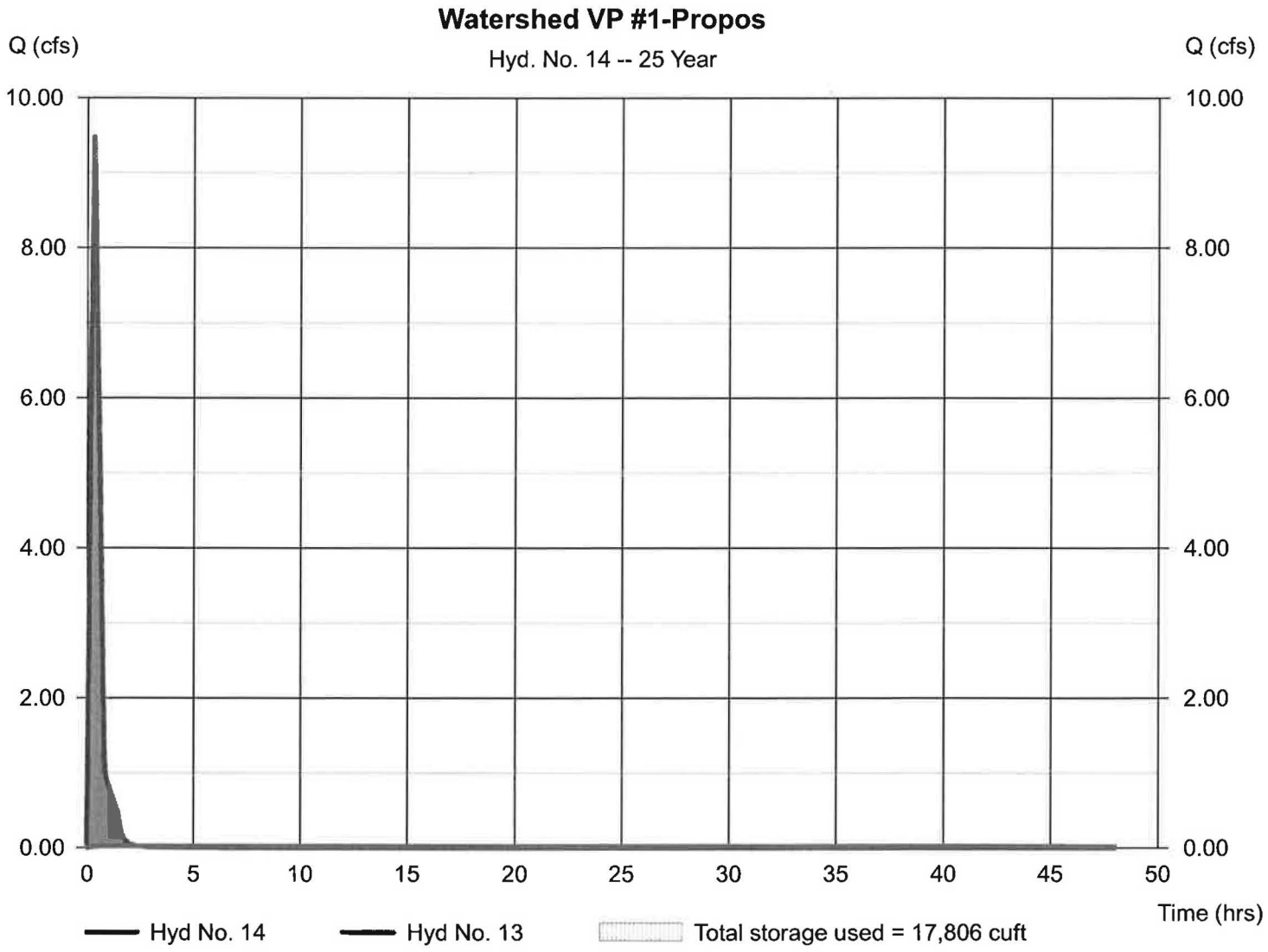
Hydrograph Report

Hyd. No. 14

Watershed VP #1-Propos

Hydrograph type	= Reservoir	Peak discharge	= 0.022 cfs
Storm frequency	= 25 yrs	Time to peak	= 2.42 hrs
Time interval	= 1 min	Hyd. volume	= 3,548 cuft
Inflow hyd. No.	= 13 - Vernal Pool-Ultimate-Proposed	Max. Elevation	= 550.34 ft
Reservoir name	= Watershed VP#1-Proposed	Max. Storage	= 17,806 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	Rational	12.39	1	20	19,842	----	------	------	Vernal Pool #1-Existing-Watershed
2	Reservoir	0.023	1	53	3,713	1	550.41	19,647	Vernal Pool #1-Ex.-K
6	Rational	5.490	1	19	8,355	----	------	------	Watershed II
7	Rational	7.327	1	10	5,869	----	------	------	Watershed IIA
8	Reservoir	1.459	1	23	5,709	7	563.13	4,331	Watershed IIA
9	Rational	0.410	1	10	328	----	------	------	Watershed IX
10	Rational	3.201	1	10	2,564	----	------	------	Watershed IXA
11	Reservoir	1.430	1	19	2,495	10	554.71	1,206	Watershed IXA
12	Rational	1.994	1	20	3,194	----	------	------	Watershed VP#1-Proposed
13	Combine	10.40	1	19	19,928	6, 8, 9, 11, 12	------	------	Vernal Pool-Ultimate-Proposed
14	Reservoir	0.023	1	148	3,730	13	550.41	19,683	Watershed VP #1-Propos

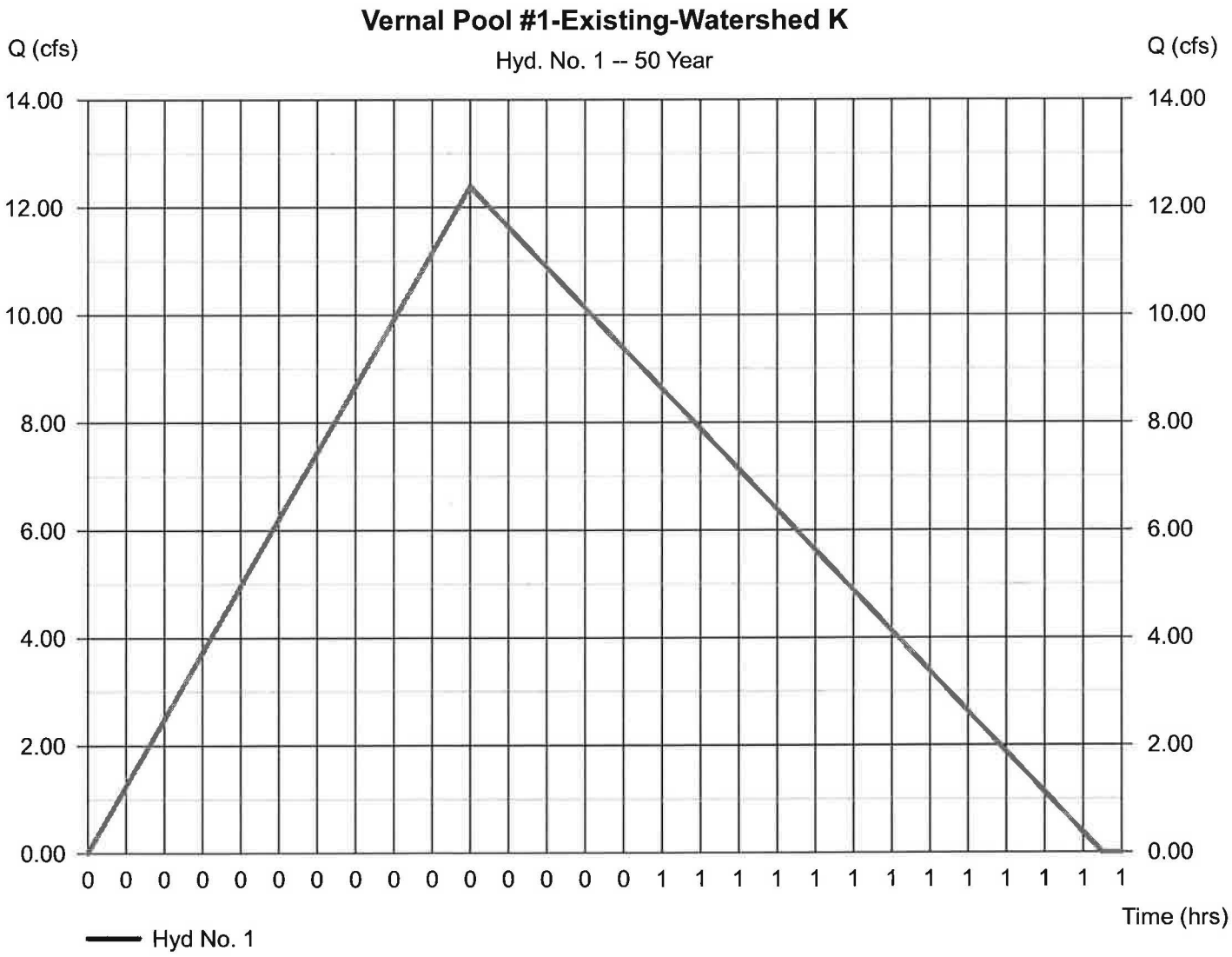
Hydrograph Report

Hyd. No. 1

Vernal Pool #1-Existing-Watershed K

Hydrograph type	= Rational	Peak discharge	= 12.39 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.33 hrs
Time interval	= 1 min	Hyd. volume	= 19,842 cuft
Drainage area	= 9.340 ac	Runoff coeff.	= 0.29*
Intensity	= 4.573 in/hr	Tc by TR55	= 20.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.000 x 0.90) + (1.400 x 0.30) + (6.940 x 0.20)] / 9.340



Hydrograph Report

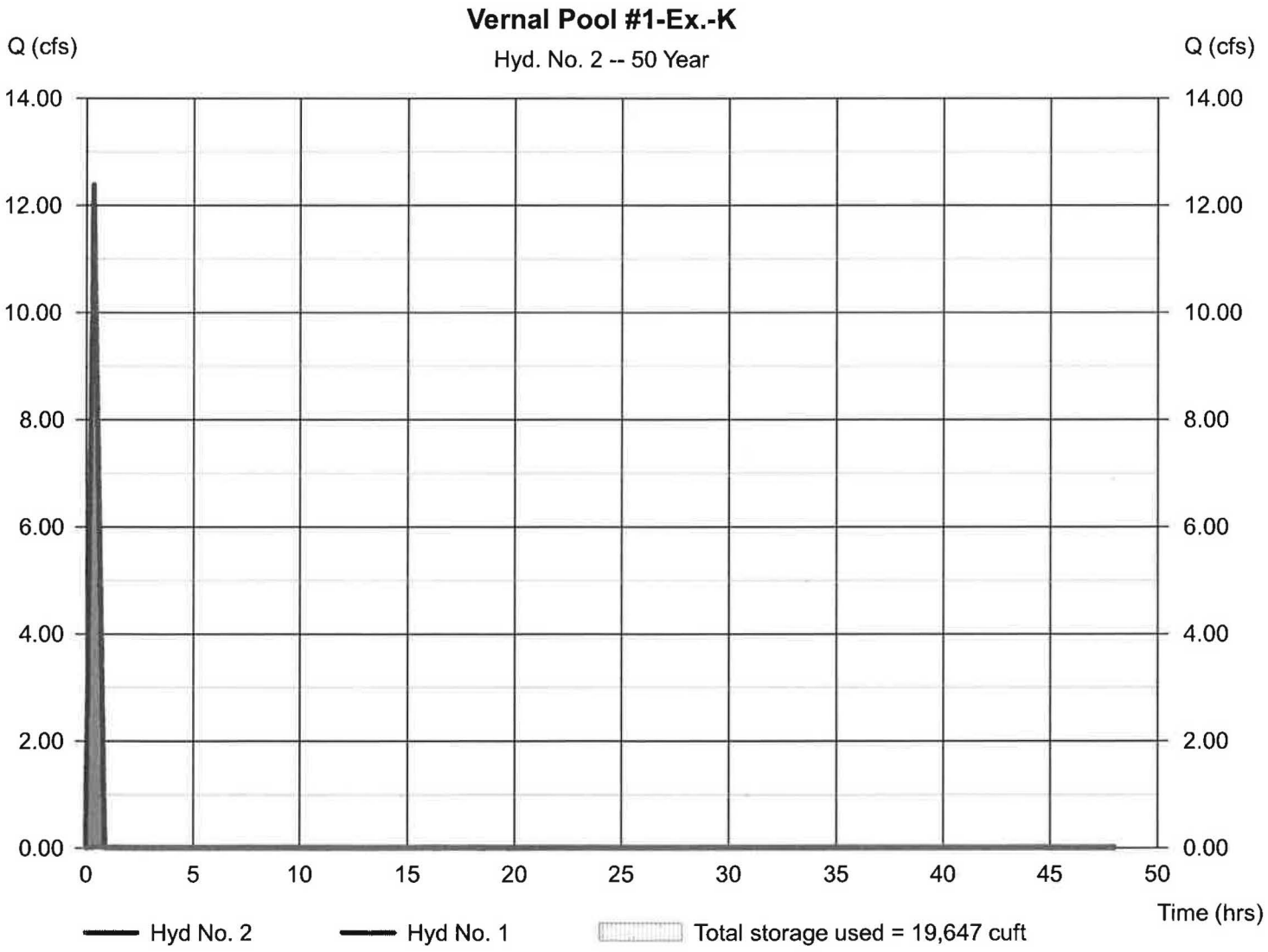
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 2

Vernal Pool #1-Ex.-K

Hydrograph type	= Reservoir	Peak discharge	= 0.023 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.88 hrs
Time interval	= 1 min	Hyd. volume	= 3,713 cuft
Inflow hyd. No.	= 1 - Vernal Pool #1-Existing-Watershed K	Max. Elevation	= 550.41 ft
Reservoir name	= Vernal Pool #1-Existing	Max. Storage	= 19,647 cuft

Storage Indication method used.



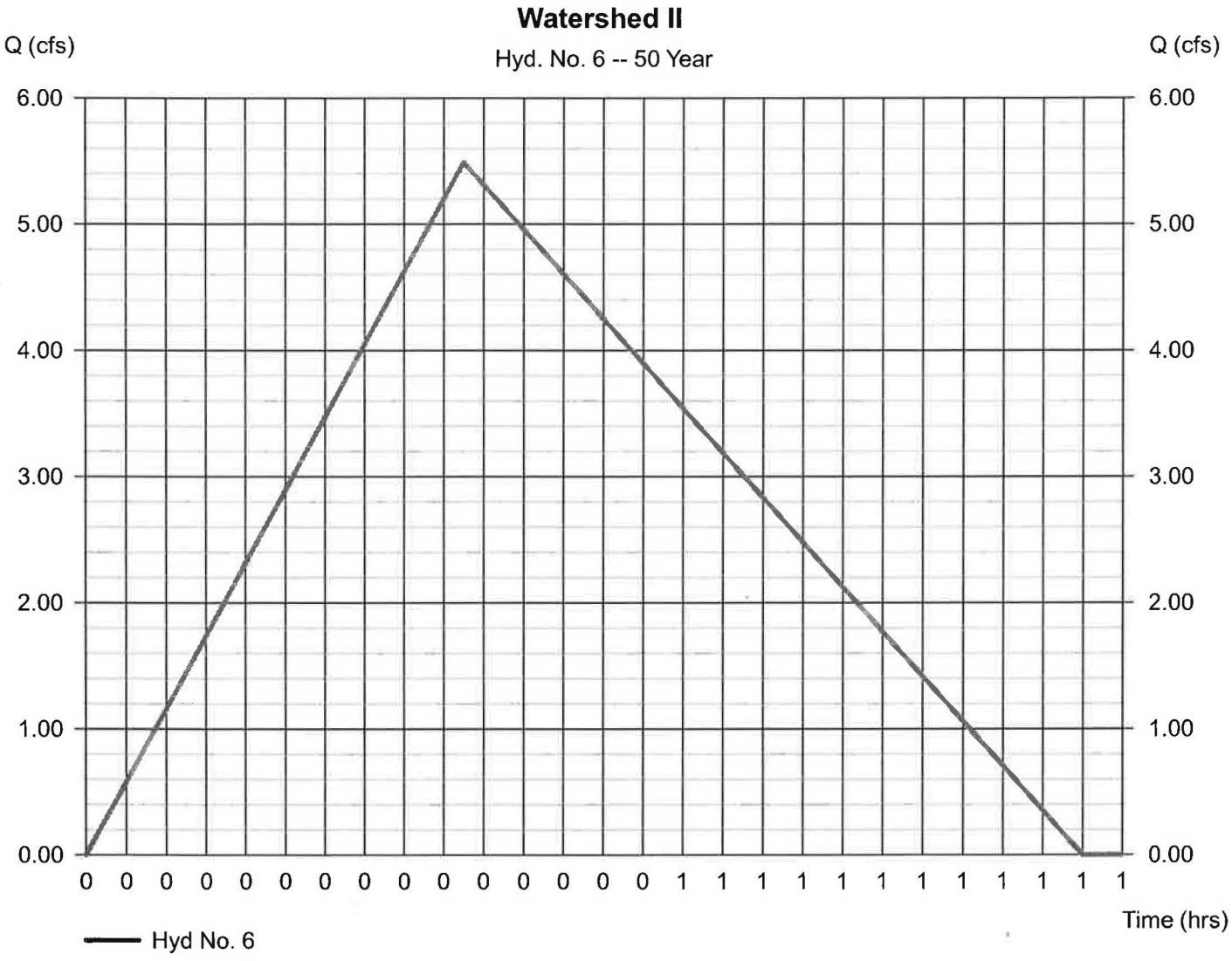
Hydrograph Report

Hyd. No. 6

Watershed II

Hydrograph type	= Rational	Peak discharge	= 5.490 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 8,355 cuft
Drainage area	= 4.040 ac	Runoff coeff.	= 0.29*
Intensity	= 4.686 in/hr	Tc by User	= 19.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.230 x 0.90) + (1.940 x 0.30) + (1.870 x 0.20)] / 4.040



Hydrograph Report

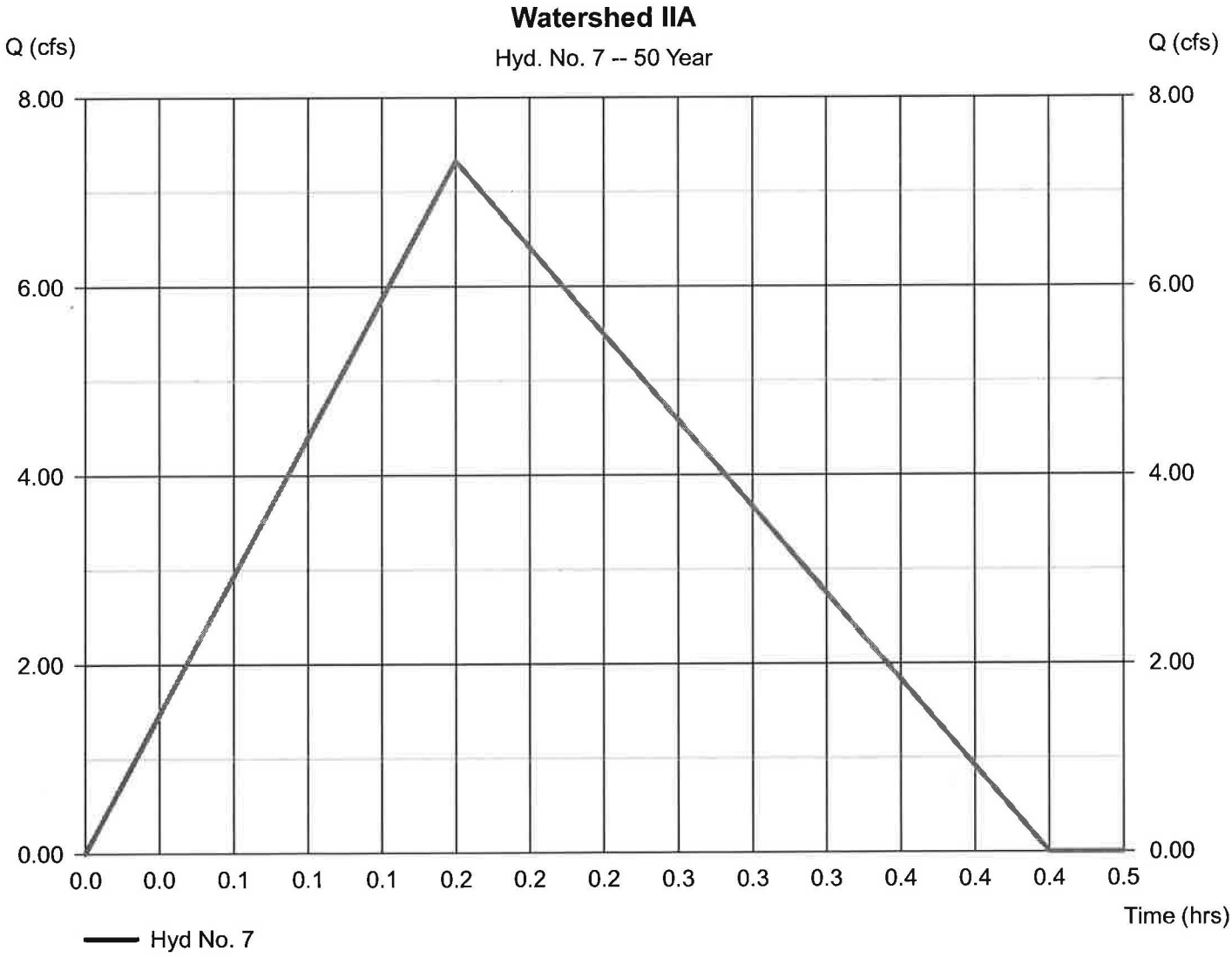
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 7

Watershed IIA

Hydrograph type	= Rational	Peak discharge	= 7.327 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 5,869 cuft
Drainage area	= 1.530 ac	Runoff coeff.	= 0.79*
Intensity	= 6.062 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.250 x 0.90) + (0.280 x 0.30)] / 1.530



Hydrograph Report

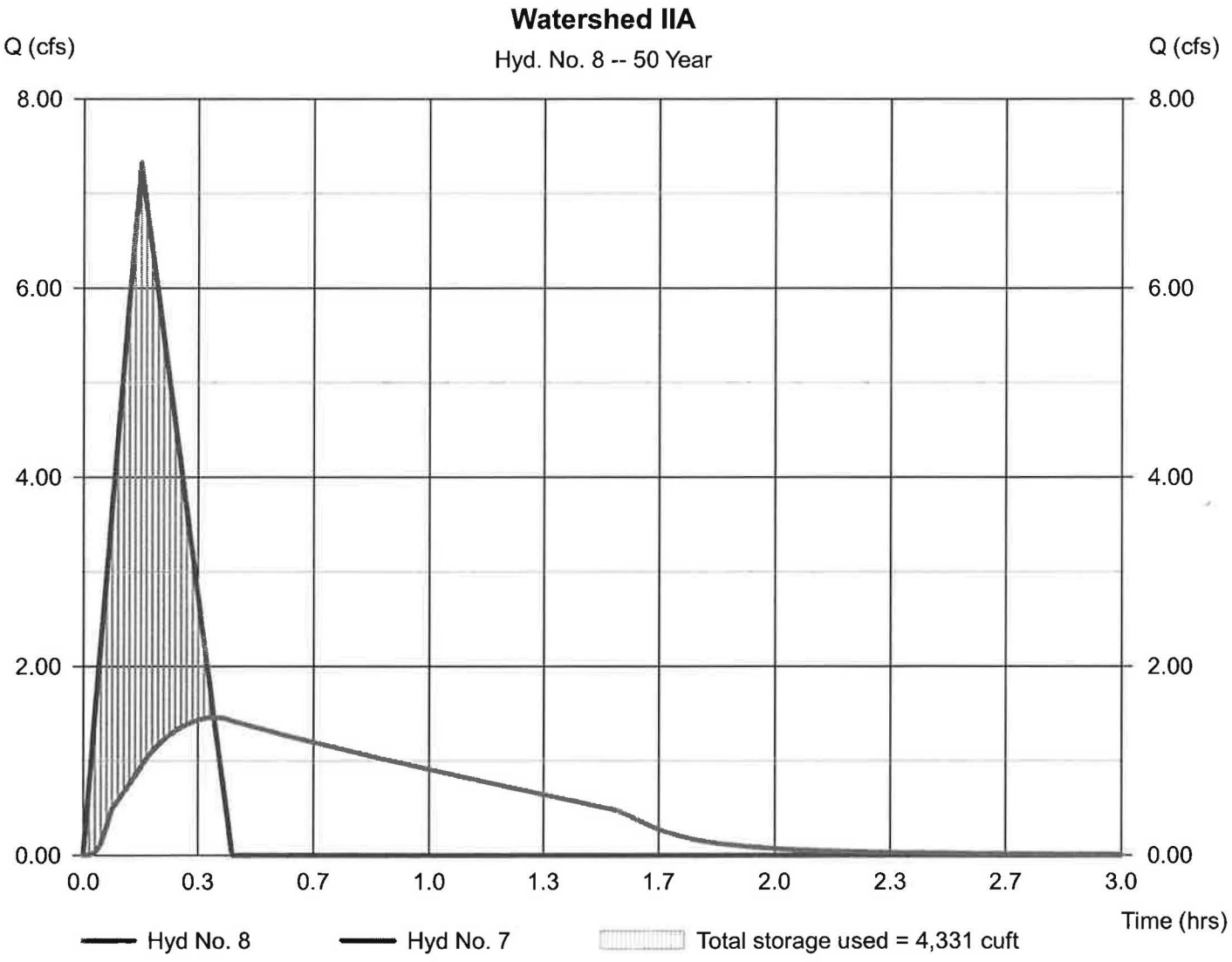
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 8

Watershed IIA

Hydrograph type	= Reservoir	Peak discharge	= 1.459 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.38 hrs
Time interval	= 1 min	Hyd. volume	= 5,709 cuft
Inflow hyd. No.	= 7 - Watershed IIA	Max. Elevation	= 563.13 ft
Reservoir name	= Watershed IIA	Max. Storage	= 4,331 cuft

Storage Indication method used.



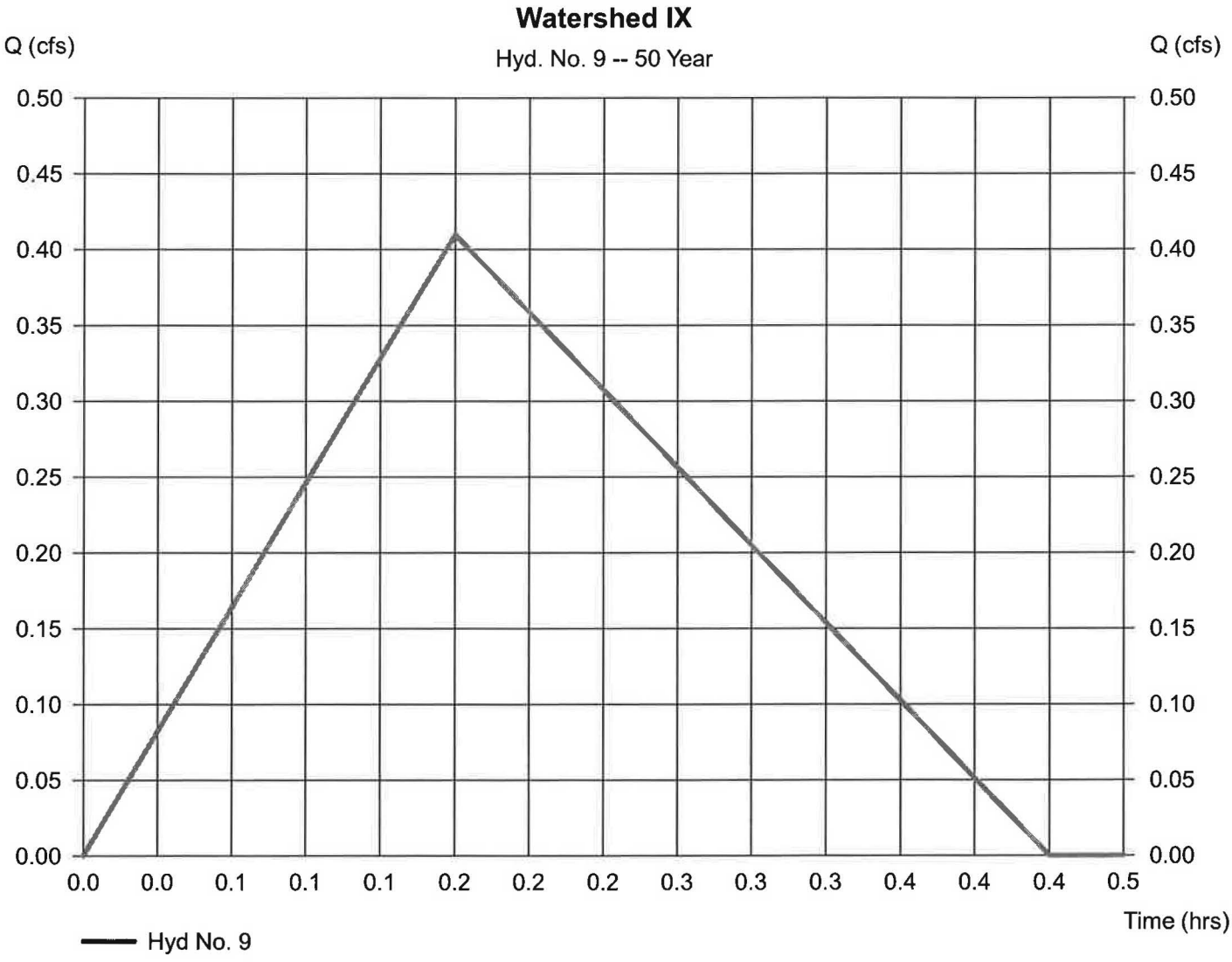
Hydrograph Report

Hyd. No. 9

Watershed IX

Hydrograph type	= Rational	Peak discharge	= 0.410 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 328 cuft
Drainage area	= 0.260 ac	Runoff coeff.	= 0.26*
Intensity	= 6.062 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.010 x 0.90) + (0.080 x 0.30) + (0.170 x 0.20)] / 0.260



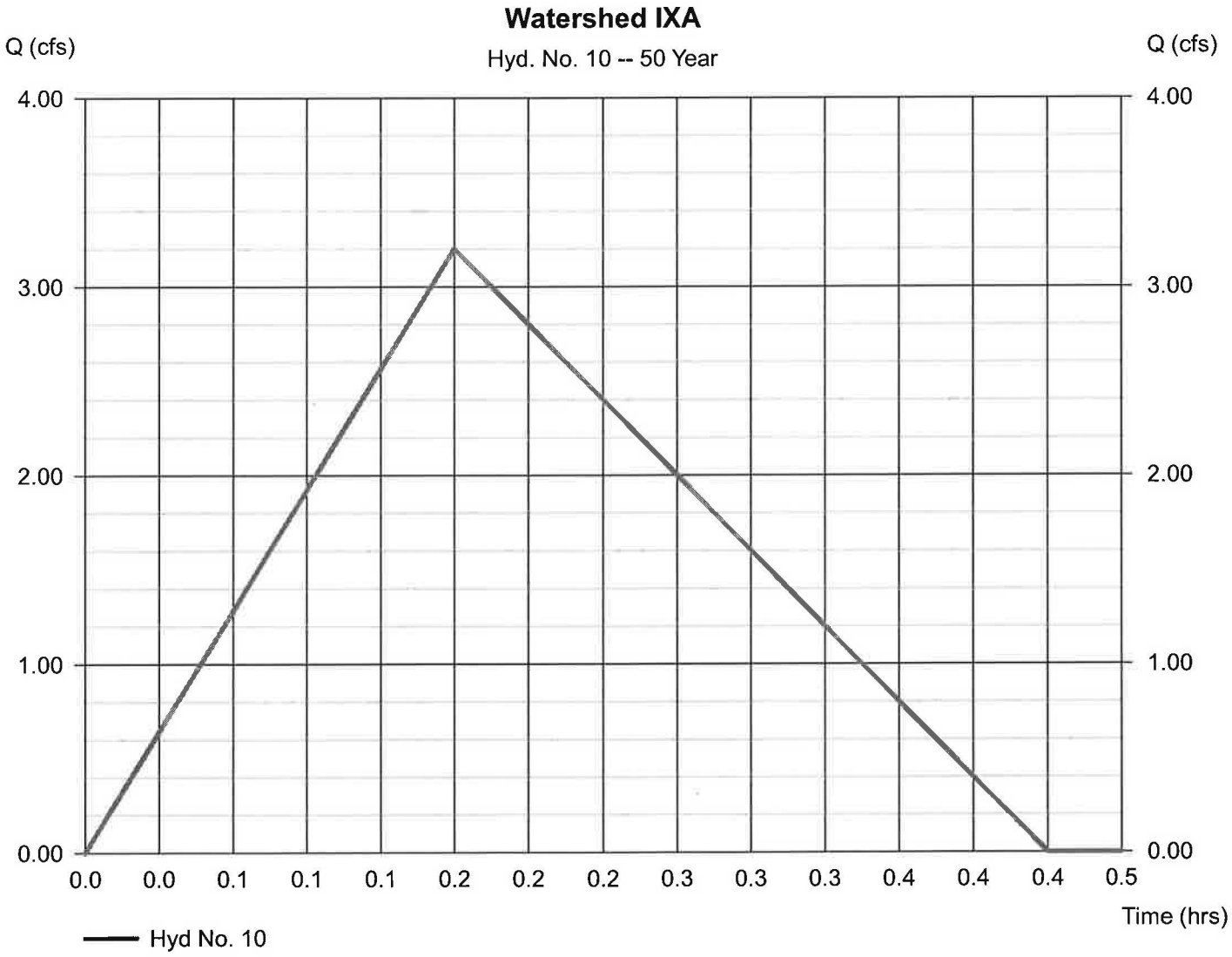
Hydrograph Report

Hyd. No. 10

Watershed IXA

Hydrograph type	= Rational	Peak discharge	= 3.201 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 2,564 cuft
Drainage area	= 0.880 ac	Runoff coeff.	= 0.6*
Intensity	= 6.062 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.460 x 0.90) + (0.260 x 0.33) + (0.160 x 0.20)] / 0.880



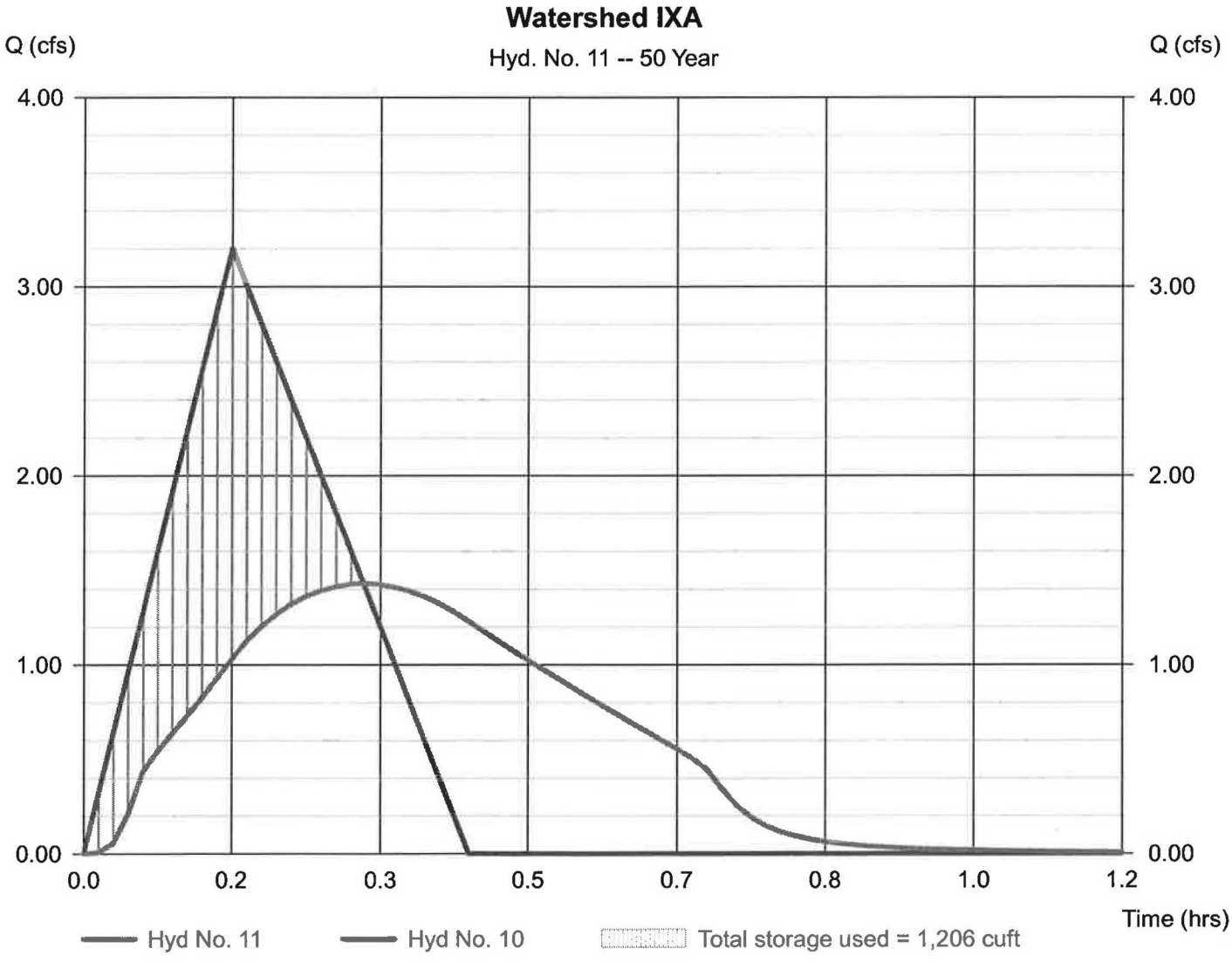
Hydrograph Report

Hyd. No. 11

Watershed IXA

Hydrograph type	= Reservoir	Peak discharge	= 1.430 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 2,495 cuft
Inflow hyd. No.	= 10 - Watershed IXA	Max. Elevation	= 554.71 ft
Reservoir name	= Watershed IXA	Max. Storage	= 1,206 cuft

Storage Indication method used.



Hydrograph Report

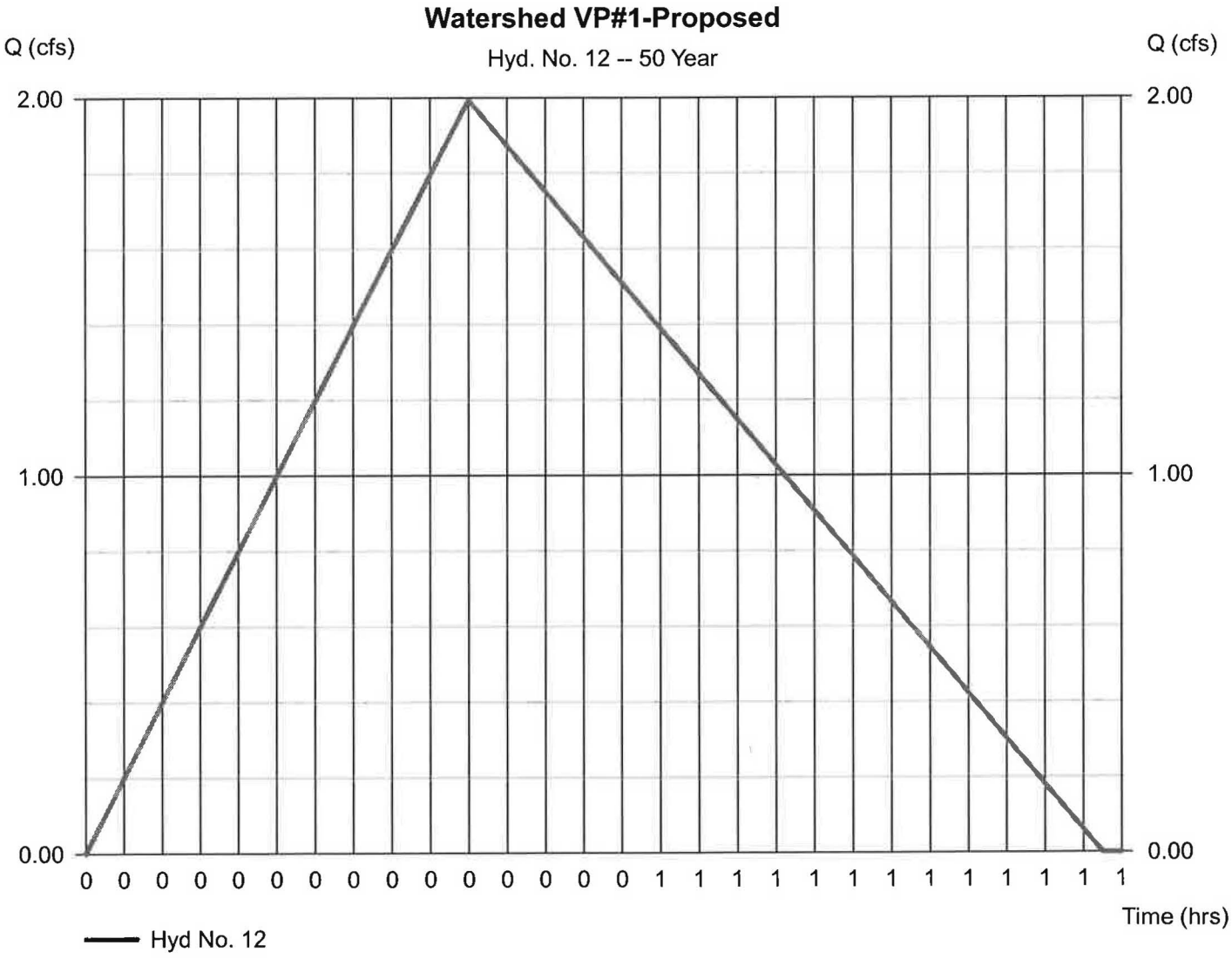
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 12

Watershed VP#1-Proposed

Hydrograph type	= Rational	Peak discharge	= 1.994 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.33 hrs
Time interval	= 1 min	Hyd. volume	= 3,194 cuft
Drainage area	= 2.180 ac	Runoff coeff.	= 0.2*
Intensity	= 4.573 in/hr	Tc by User	= 20.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(2.180 x 0.20)] / 2.180

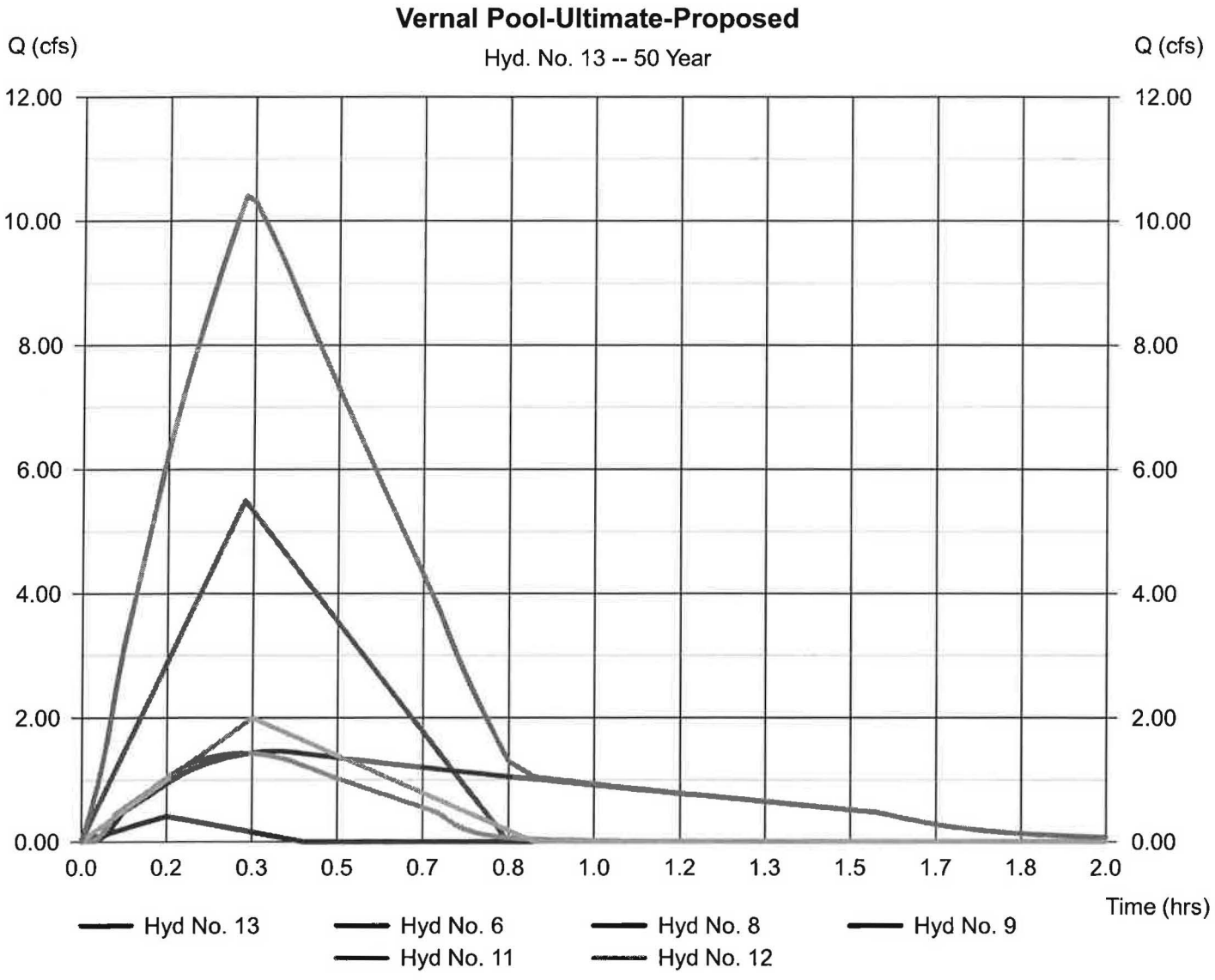


Hydrograph Report

Hyd. No. 13

Vernal Pool-Ultimate-Proposed

Hydrograph type	= Combine	Peak discharge	= 10.40 cfs
Storm frequency	= 50 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 19,928 cuft
Inflow hyds.	= 6, 8, 9, 11, 12	Contrib. drain. area	= 6.480 ac



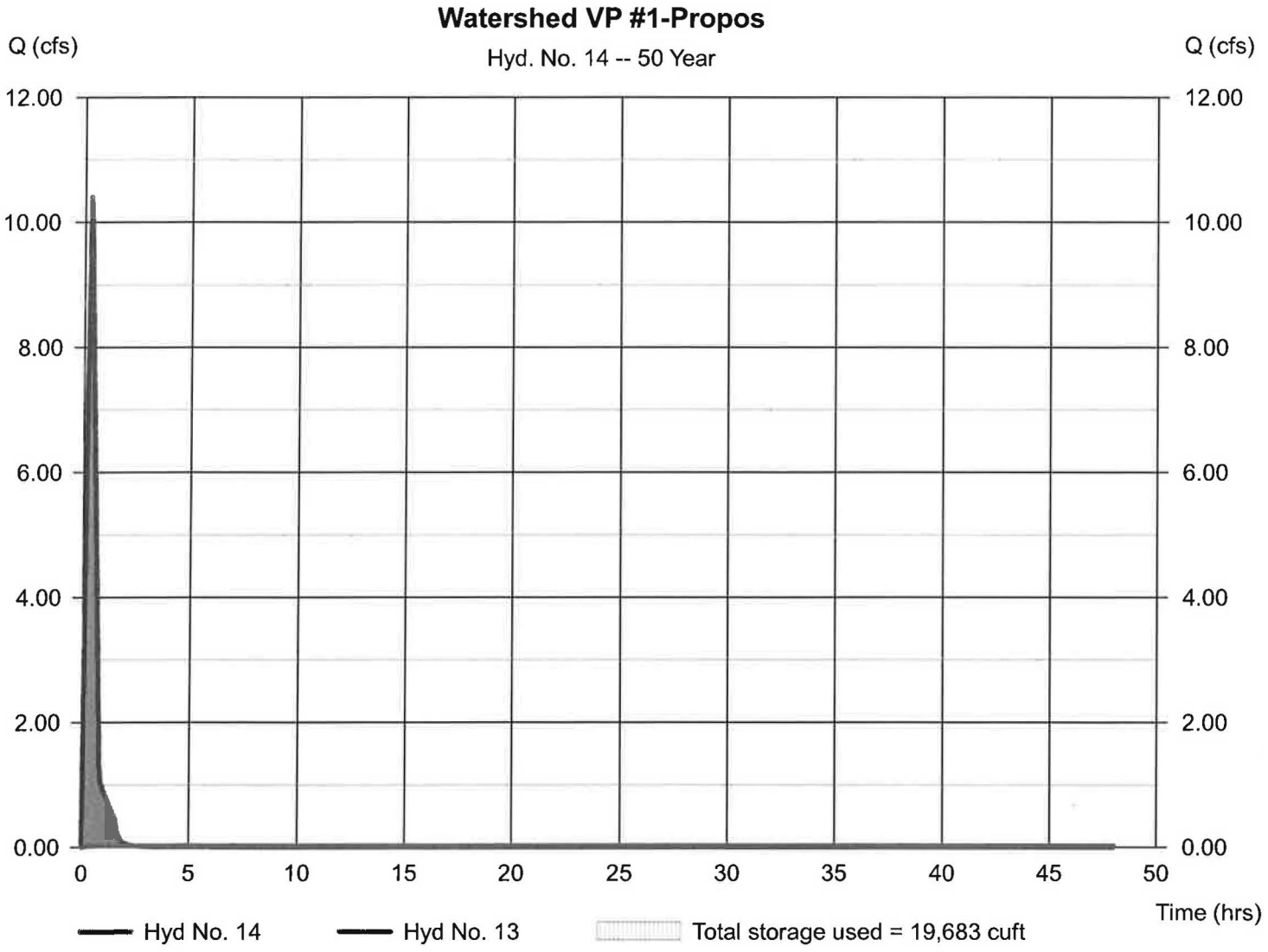
Hydrograph Report

Hyd. No. 14

Watershed VP #1-Propos

Hydrograph type	= Reservoir	Peak discharge	= 0.023 cfs
Storm frequency	= 50 yrs	Time to peak	= 2.47 hrs
Time interval	= 1 min	Hyd. volume	= 3,730 cuft
Inflow hyd. No.	= 13 - Vernal Pool-Ultimate-Proposed	Max. Elevation	= 550.41 ft
Reservoir name	= Watershed VP#1-Proposed	Max. Storage	= 19,683 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.1

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	Rational	13.60	1	20	21,783	----	------	------	Vernal Pool #1-Existing-Watershed
2	Reservoir	0.024	1	53	3,891	1	550.48	21,570	Vernal Pool #1-Ex.-K
6	Rational	6.019	1	19	9,161	----	------	------	Watershed II
7	Rational	7.922	1	10	6,345	----	------	------	Watershed IIA
8	Reservoir	1.555	1	23	6,173	7	563.46	4,717	Watershed IIA
9	Rational	0.443	1	10	355	----	------	------	Watershed IX
10	Rational	3.460	1	10	2,772	----	------	------	Watershed IXA
11	Reservoir	1.537	1	19	2,697	10	555.07	1,326	Watershed IXA
12	Rational	2.189	1	20	3,506	----	------	------	Watershed VP#1-Proposed
13	Combine	11.33	1	19	21,725	6, 8, 9, 11, 12	------	------	Vernal Pool-Ultimate-Proposed
14	Reservoir	0.024	1	151	3,895	13	550.47	21,466	Watershed VP #1-Propos

Hydrograph Report

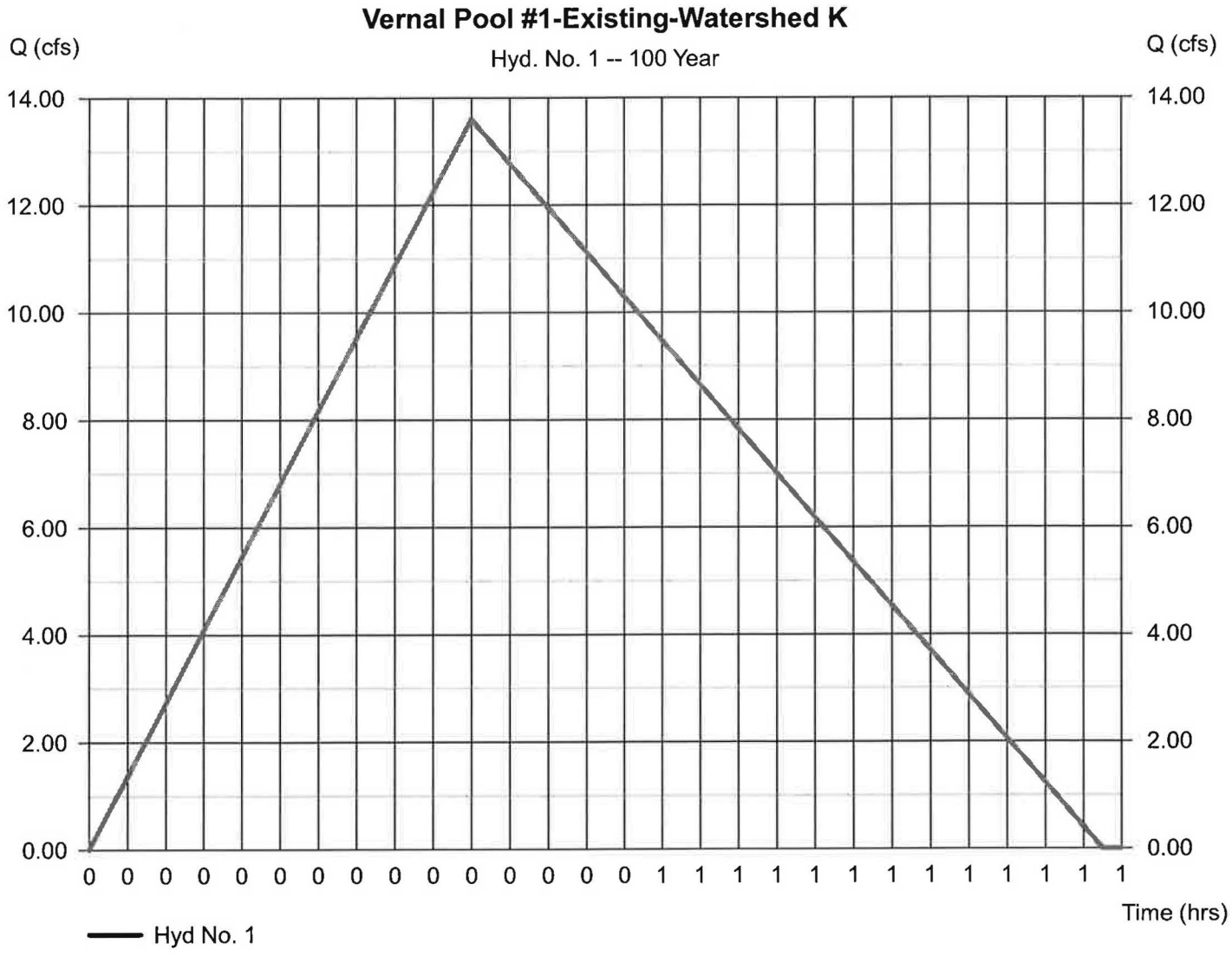
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 1

Vernal Pool #1-Existing-Watershed K

Hydrograph type	= Rational	Peak discharge	= 13.60 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.33 hrs
Time interval	= 1 min	Hyd. volume	= 21,783 cuft
Drainage area	= 9.340 ac	Runoff coeff.	= 0.29*
Intensity	= 5.020 in/hr	Tc by TR55	= 20.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.000 x 0.90) + (1.400 x 0.30) + (6.940 x 0.20)] / 9.340



Hydrograph Report

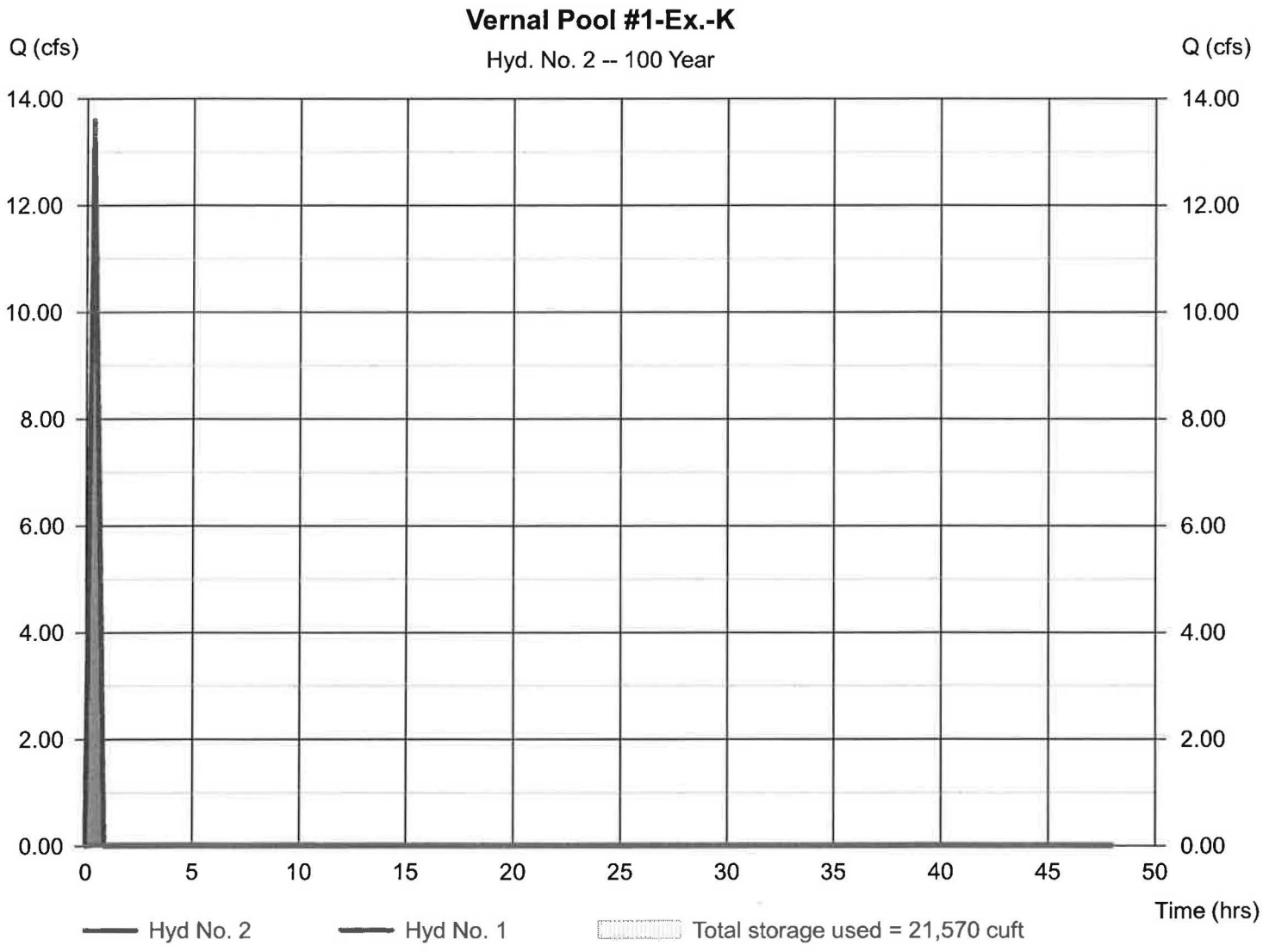
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 2

Vernal Pool #1-Ex.-K

Hydrograph type	= Reservoir	Peak discharge	= 0.024 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.88 hrs
Time interval	= 1 min	Hyd. volume	= 3,891 cuft
Inflow hyd. No.	= 1 - Vernal Pool #1-Existing-Watershed K	Max. Elevation	= 550.48 ft
Reservoir name	= Vernal Pool #1-Existing	Max. Storage	= 21,570 cuft

Storage Indication method used.



Hydrograph Report

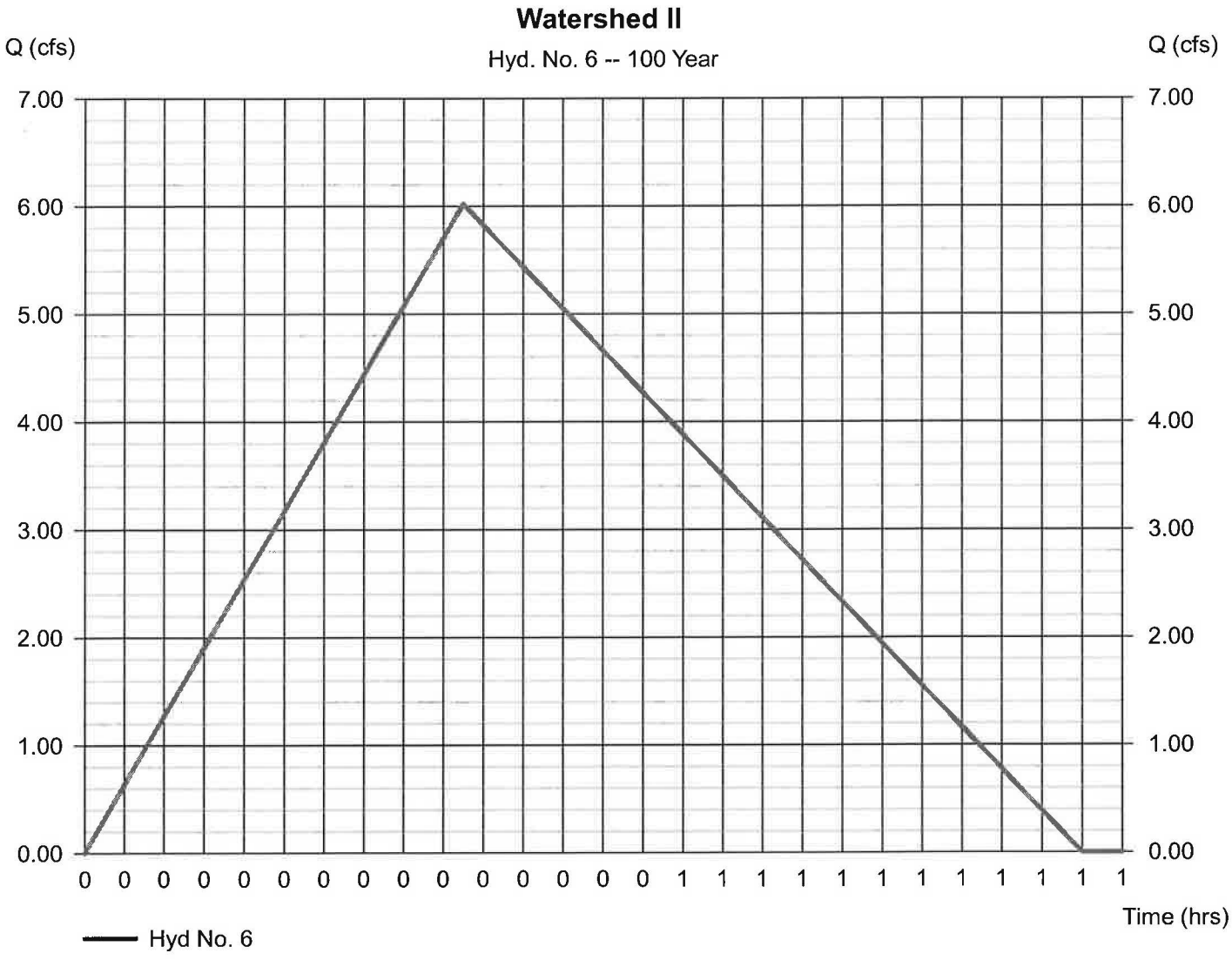
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 6

Watershed II

Hydrograph type	= Rational	Peak discharge	= 6.019 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 9,161 cuft
Drainage area	= 4.040 ac	Runoff coeff.	= 0.29*
Intensity	= 5.138 in/hr	Tc by User	= 19.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.230 x 0.90) + (1.940 x 0.30) + (1.870 x 0.20)] / 4.040



Hydrograph Report

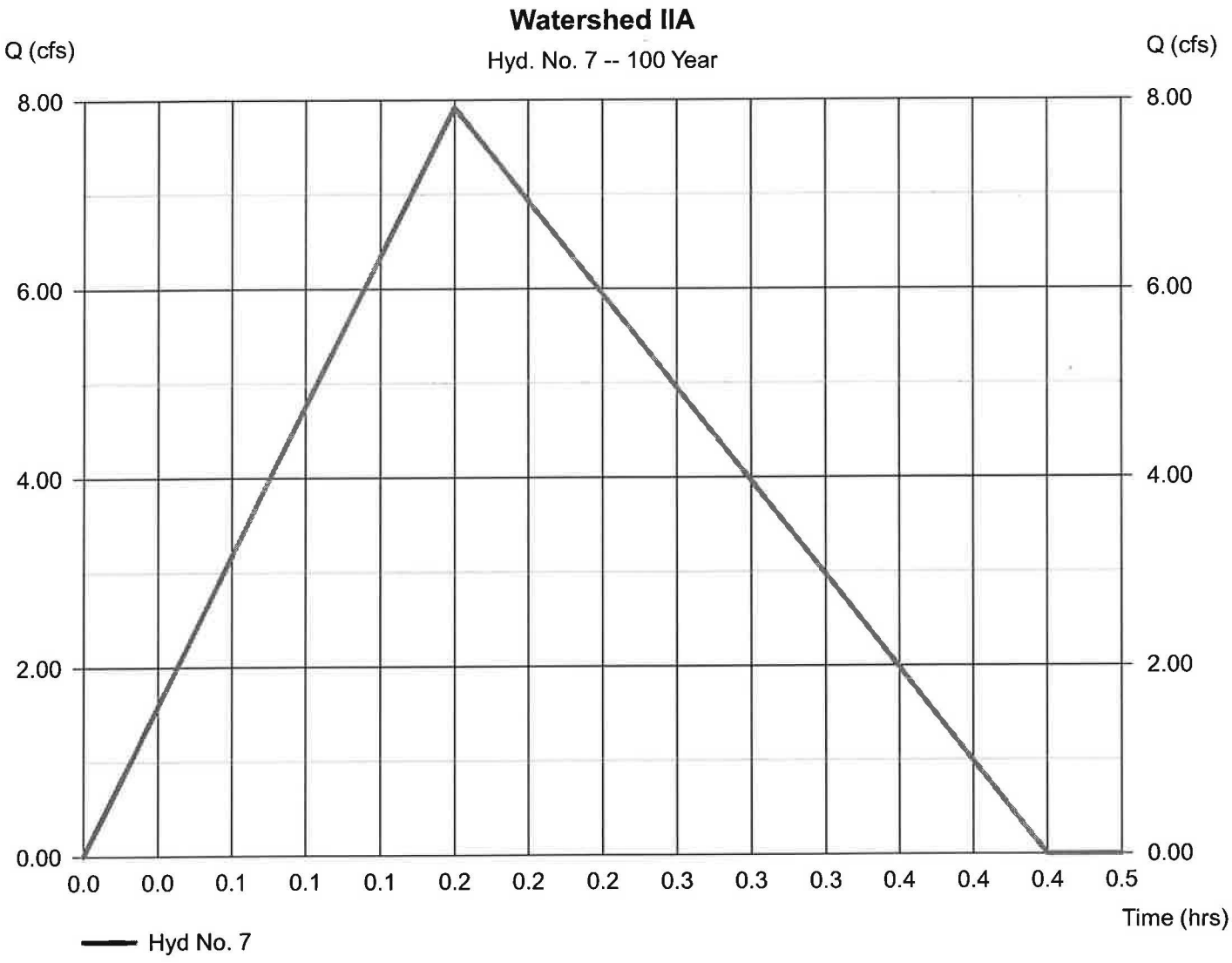
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 7

Watershed IIA

Hydrograph type	= Rational	Peak discharge	= 7.922 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 6,345 cuft
Drainage area	= 1.530 ac	Runoff coeff.	= 0.79*
Intensity	= 6.554 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(1.250 x 0.90) + (0.280 x 0.30)] / 1.530



Hydrograph Report

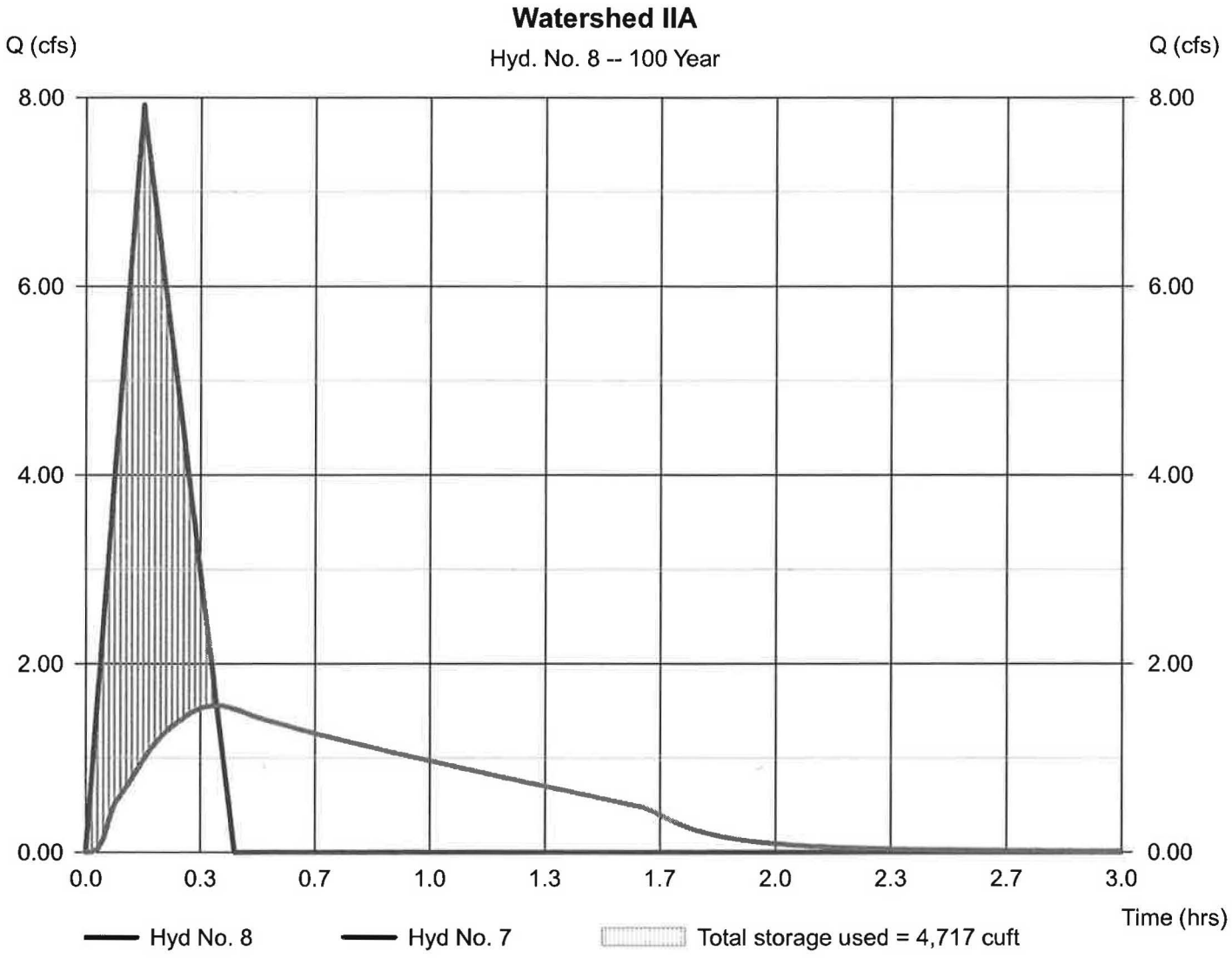
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 8

Watershed IIA

Hydrograph type	= Reservoir	Peak discharge	= 1.555 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.38 hrs
Time interval	= 1 min	Hyd. volume	= 6,173 cuft
Inflow hyd. No.	= 7 - Watershed IIA	Max. Elevation	= 563.46 ft
Reservoir name	= Watershed IIA	Max. Storage	= 4,717 cuft

Storage Indication method used.



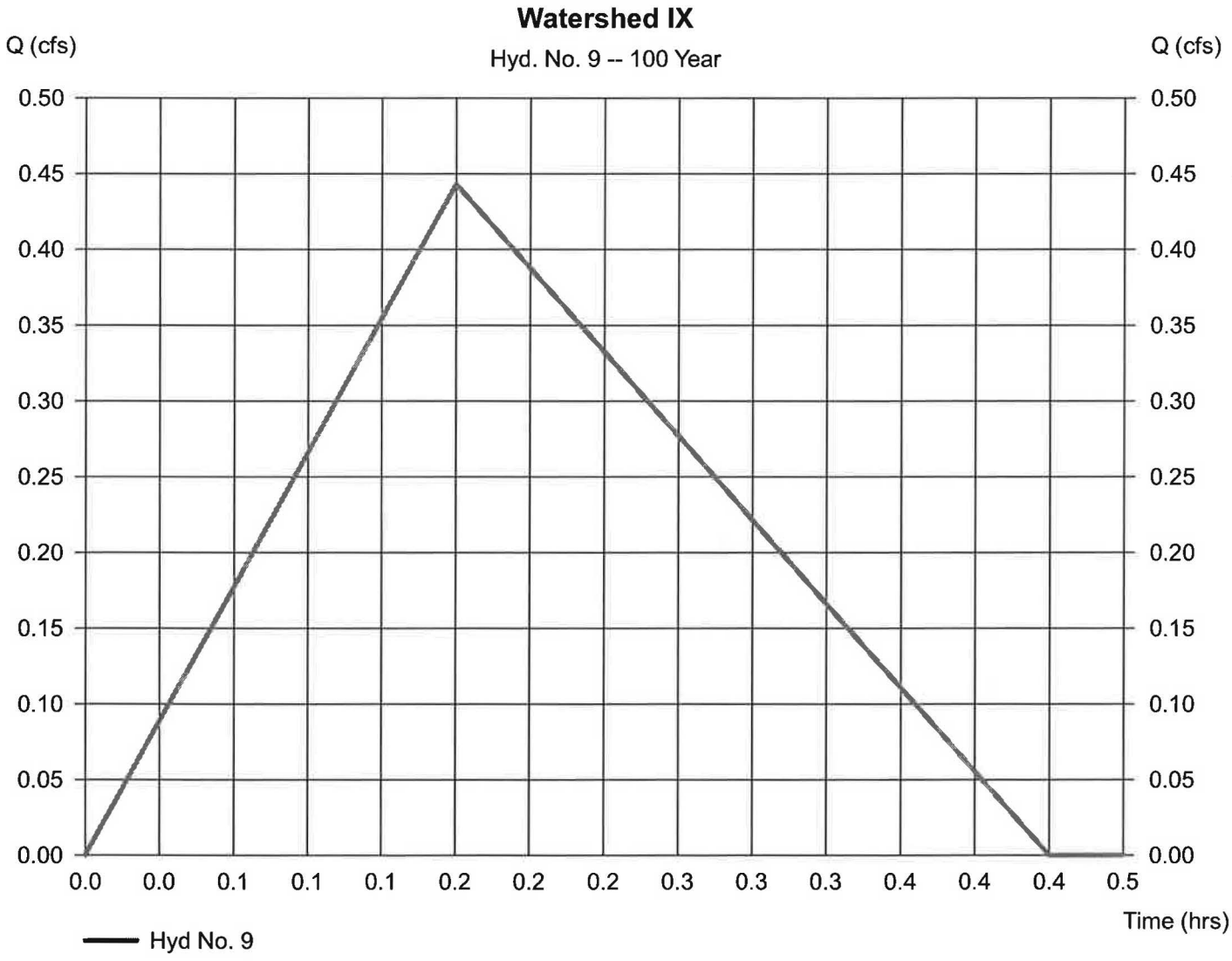
Hydrograph Report

Hyd. No. 9

Watershed IX

Hydrograph type	= Rational	Peak discharge	= 0.443 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 355 cuft
Drainage area	= 0.260 ac	Runoff coeff.	= 0.26*
Intensity	= 6.554 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.010 x 0.90) + (0.080 x 0.30) + (0.170 x 0.20)] / 0.260



Hydrograph Report

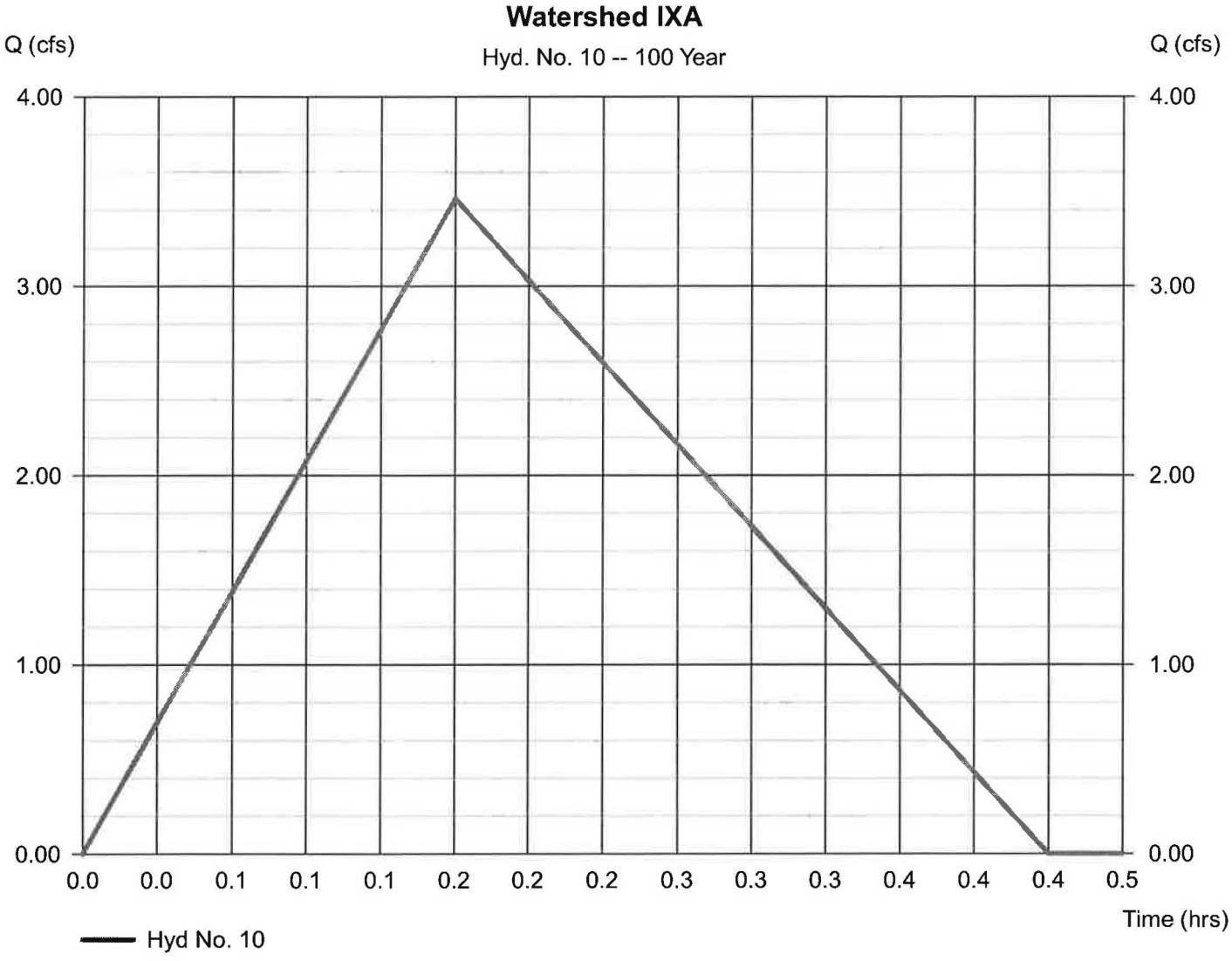
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 10

Watershed IXA

Hydrograph type	= Rational	Peak discharge	= 3.460 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 2,772 cuft
Drainage area	= 0.880 ac	Runoff coeff.	= 0.6*
Intensity	= 6.554 in/hr	Tc by User	= 10.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(0.460 x 0.90) + (0.260 x 0.33) + (0.160 x 0.20)] / 0.880



Hydrograph Report

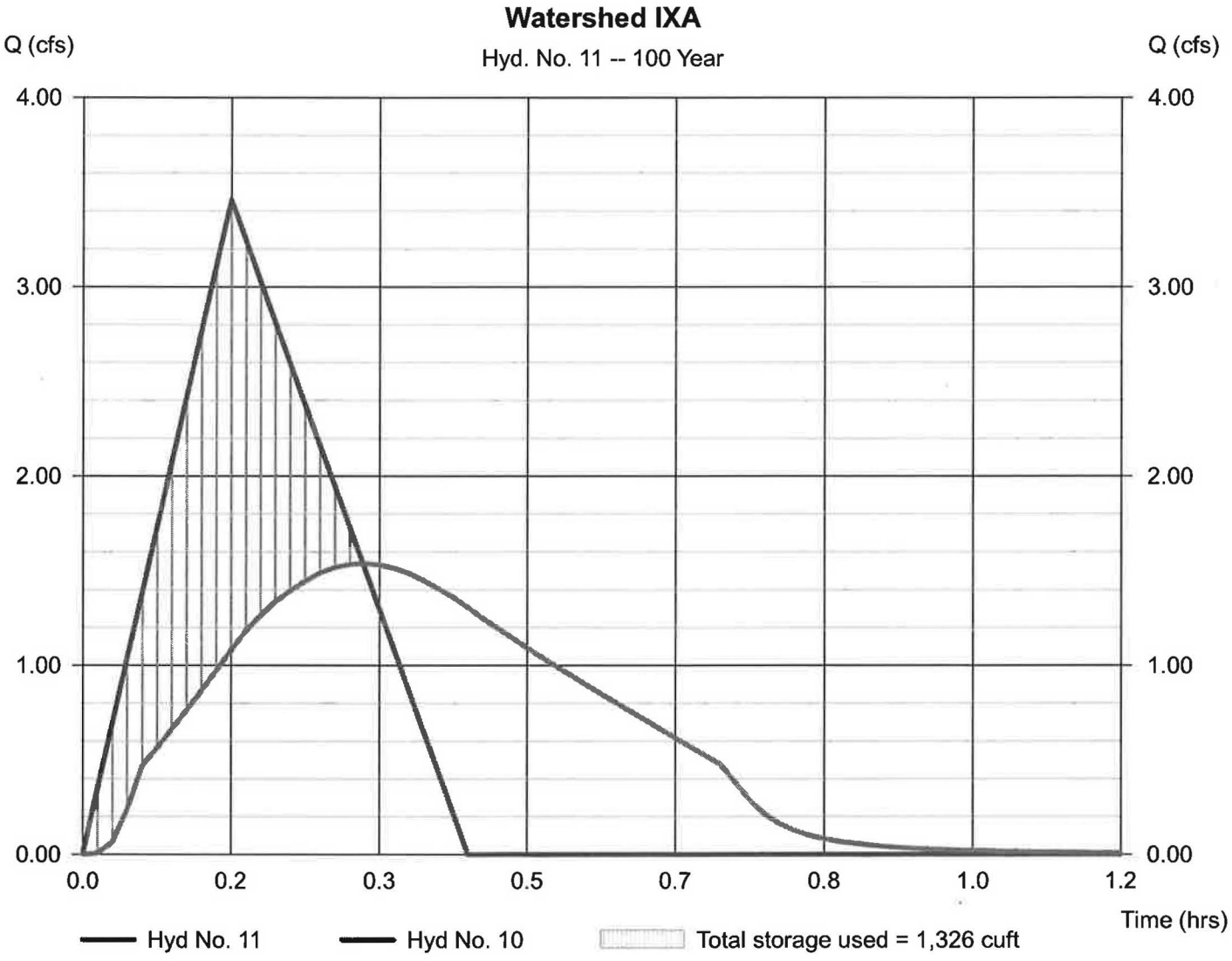
Hydraflow Hydrographs by Intelisolve v9.1 — Wednesday, Mar 30, 2016

Hyd. No. 11

Watershed IXA

Hydrograph type	= Reservoir	Peak discharge	= 1.537 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 2,697 cuft
Inflow hyd. No.	= 10 - Watershed IXA	Max. Elevation	= 555.07 ft
Reservoir name	= Watershed IXA	Max. Storage	= 1,326 cuft

Storage Indication method used.



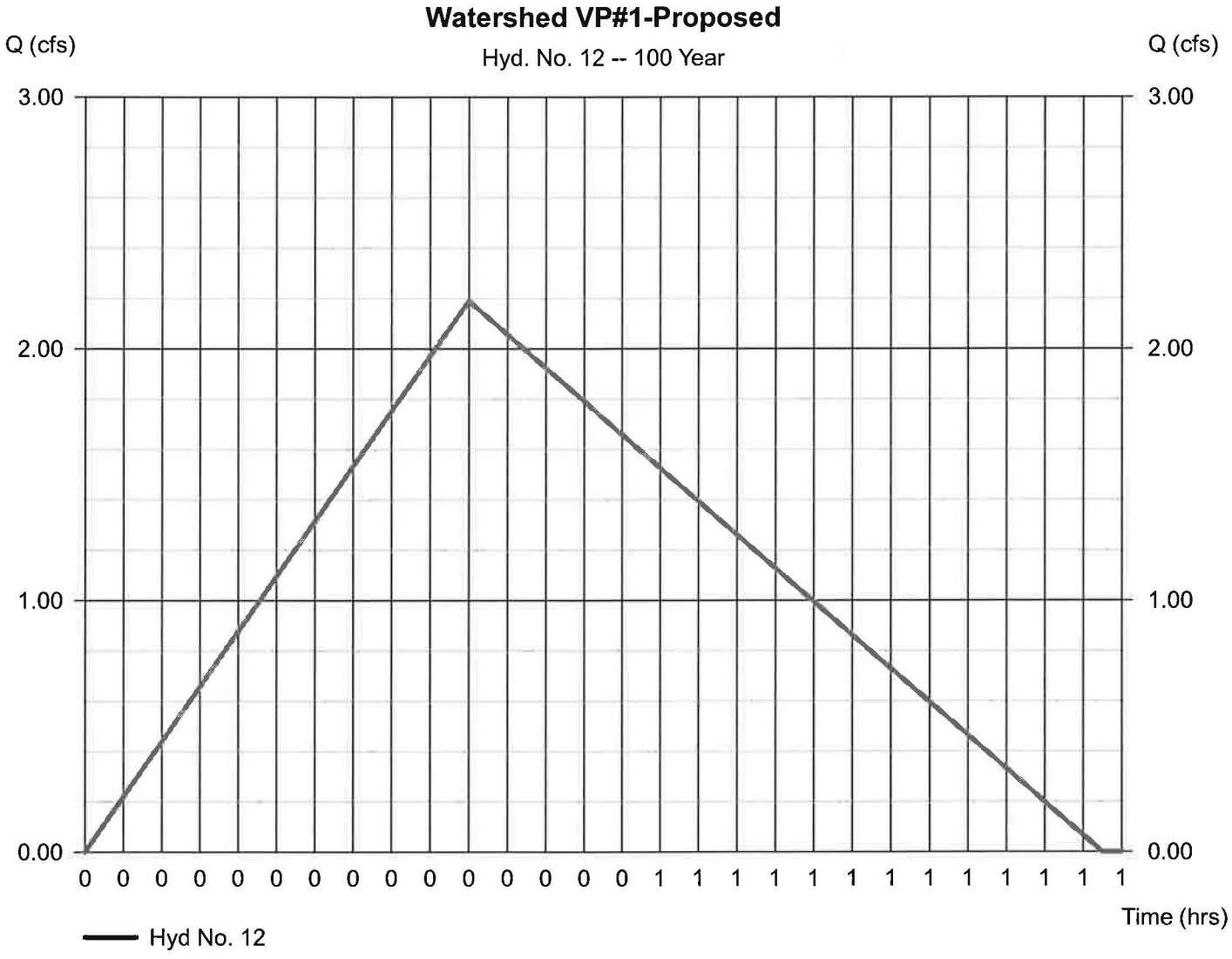
Hydrograph Report

Hyd. No. 12

Watershed VP#1-Proposed

Hydrograph type	= Rational	Peak discharge	= 2.189 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.33 hrs
Time interval	= 1 min	Hyd. volume	= 3,506 cuft
Drainage area	= 2.180 ac	Runoff coeff.	= 0.2*
Intensity	= 5.020 in/hr	Tc by User	= 20.00 min
IDF Curve	= Connecticut.IDF	Asc/Rec limb fact	= 1/1.67

* Composite (Area/C) = [(2.180 x 0.20)] / 2.180

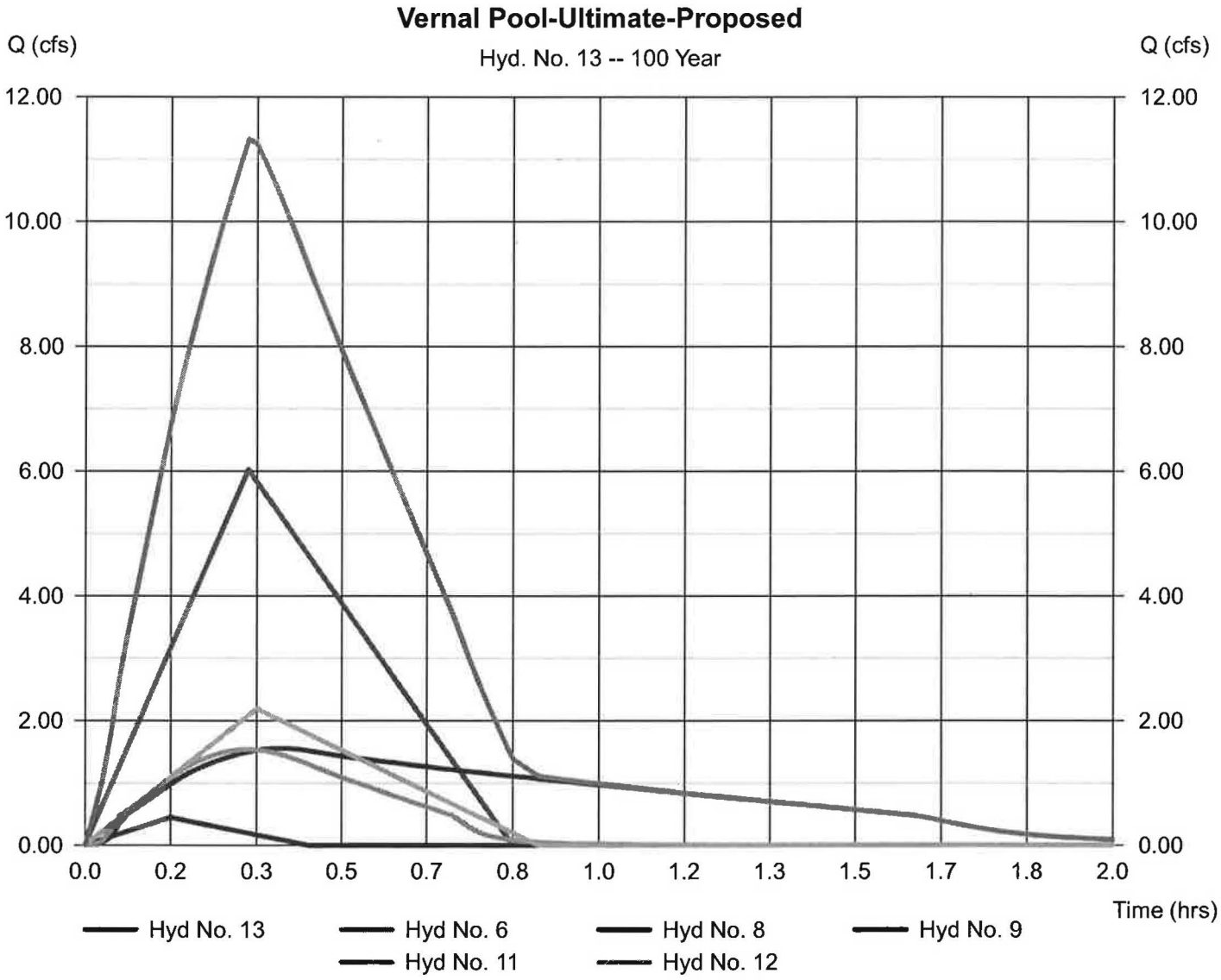


Hydrograph Report

Hyd. No. 13

Vernal Pool-Ultimate-Proposed

Hydrograph type	= Combine	Peak discharge	= 11.33 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.32 hrs
Time interval	= 1 min	Hyd. volume	= 21,725 cuft
Inflow hyds.	= 6, 8, 9, 11, 12	Contrib. drain. area	= 6.480 ac



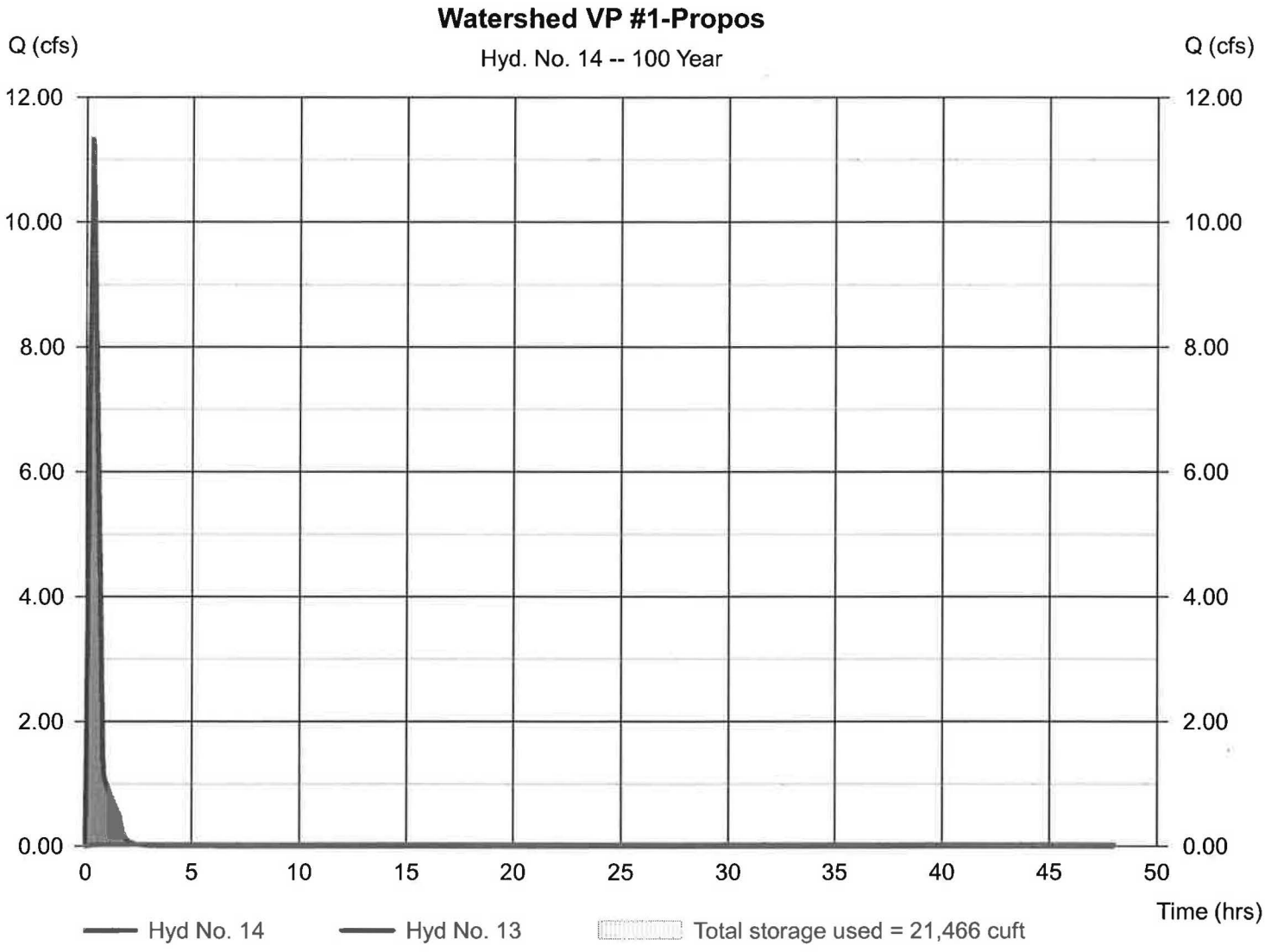
Hydrograph Report

Hyd. No. 14

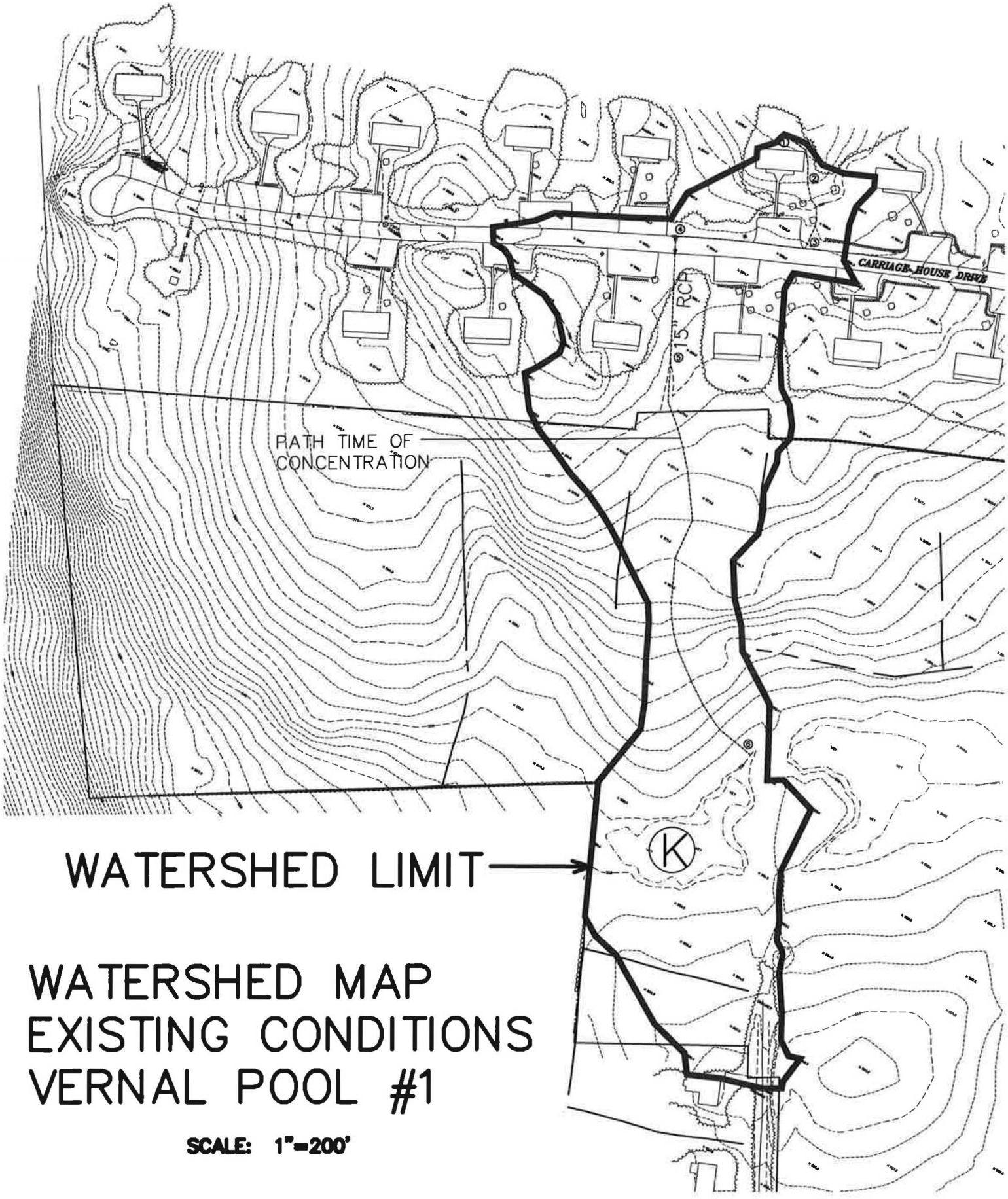
Watershed VP #1-Propos

Hydrograph type	= Reservoir	Peak discharge	= 0.024 cfs
Storm frequency	= 100 yrs	Time to peak	= 2.52 hrs
Time interval	= 1 min	Hyd. volume	= 3,895 cuft
Inflow hyd. No.	= 13 - Vernal Pool-Ultimate-Proposed	Max. Elevation	= 550.47 ft
Reservoir name	= Watershed VP#1-Proposed	Max. Storage	= 21,466 cuft

Storage Indication method used.

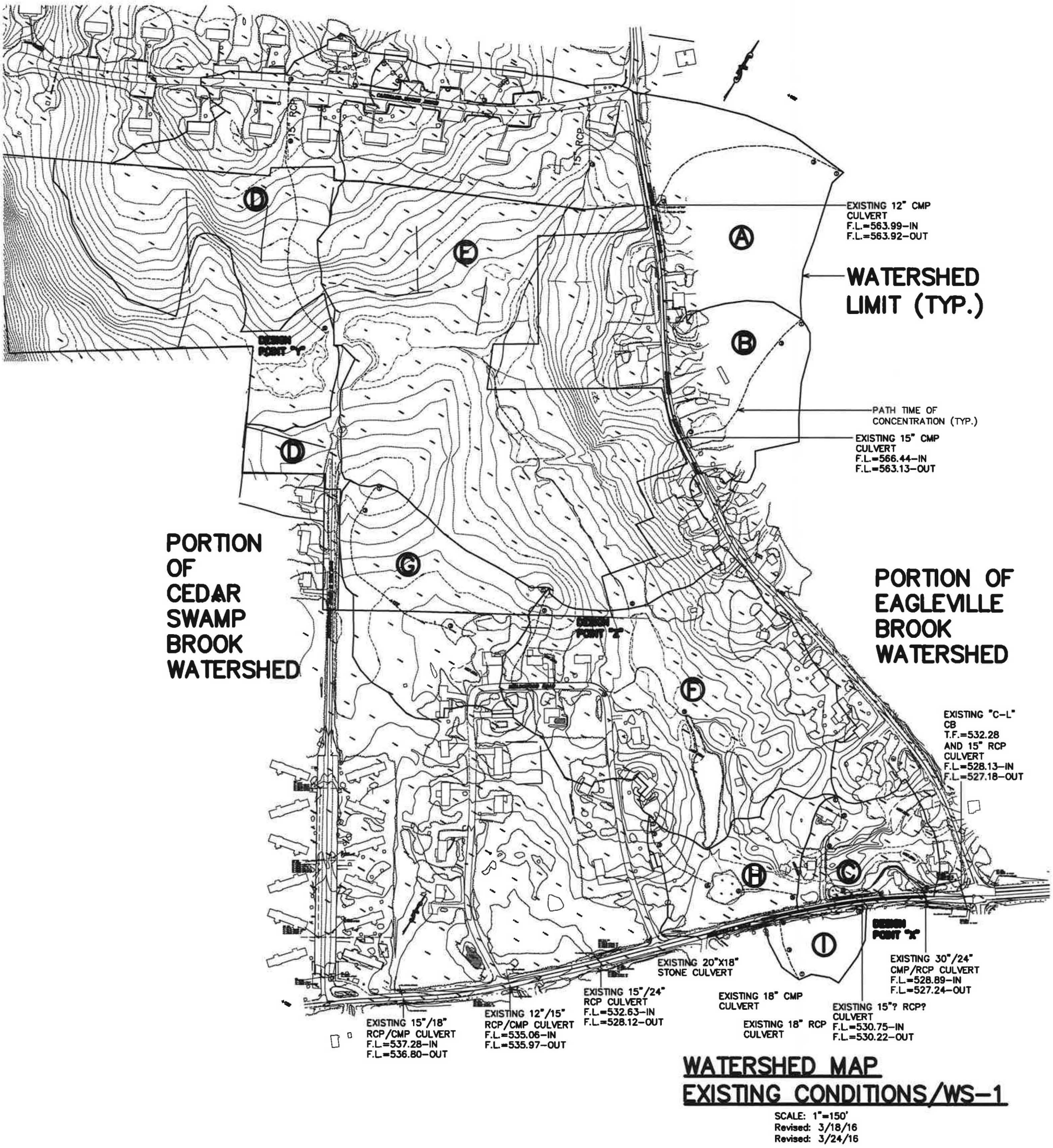


WATERSHED MAPS



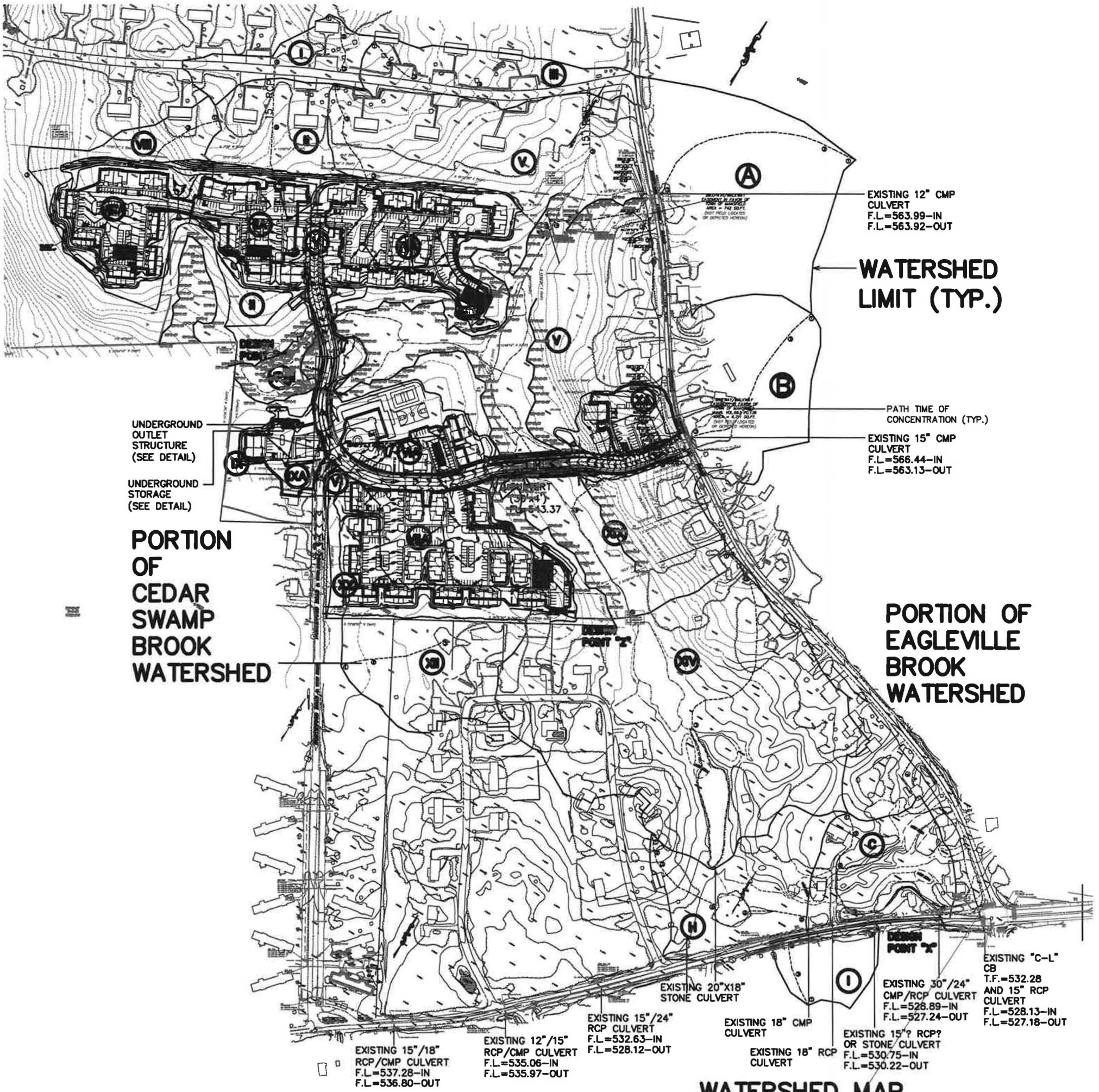
WATERSHED MAP
EXISTING CONDITIONS
VERNAL POOL #1

SCALE: 1"=200'



WATERSHED MAP
EXISTING CONDITIONS/WS-1

SCALE: 1"=150'
Revised: 3/18/16
Revised: 3/24/16



WATERSHED MAP
PROPOSED CONDITIONS/WS-2

SCALE: 1"=150'
3/18/2016
Revised: 3/24/2016

APPENDIX B

ON-SITE STORM DRAINAGE SYSTEM DESIGN

STORRS LODGES
MANSFIELD, CT

March 18, 2016
Revised March 24, 2016

FAHA Project #04161

SYSTEM A
SYSTEM B
SYSTEM C
SYSTEM D
SYSTEM F
SYSTEM G
SYSTEM H
UPLANDS
WETLANDS
UPLANDS
VERNAL POOL
MATCH LINE SHEET DA-1
MATCH LINE SHEET DA-4
GRAPHIC SCALE
(IN FEET)
1 inch = 40 ft.

LEGEND

- 100.00 = PROPOSED SPOT GRADE
- 100 = PROPOSED ELEVATION CONTOUR
- = PROPOSED CATCH BASIN
- = PROPOSED MANHOLE
- = PROPOSED HYDRODYNAMIC SEPARATORS
- = PROPOSED STORM DRAIN CULVERT
- F.D. = PROPOSED FOOTING DRAIN
- 100 = EXISTING ELEVATION CONTOUR
- 100.0 + = EXISTING SPOT GRADE
- A8 = DRAINAGE STRUCTURE ID
- = DRAINAGE SYSTEM WATERSHED LIMIT
- = BASIN/INLET WATERSHED LIMIT
- = LANDSCAPED AREAS

F. A. Hesketh & Associates, Inc.
6 Creamery Brook, East Granby, CT 06026
Civil & Traffic Engineers · Surveyors · Planners · Landscape Architects
Phone (860) 653-8000
Fax (860) 844-8600
e-mail mail@fahesketh.com

Revisions:

No.	Date	Description

DRAINAGE AREA MAP
PREPARED FOR
STORRS LODGES, LLC
HUNTING LODGE ROAD
MANSFIELD, CONNECTICUT

Date: 03-24-2016 | Drawn by: RJK | Job no: 04161
Scale: 1" = 40' | Checked by: DSZ | Sheet no: 1 OF 4

DA-1

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LEGEND

- 100.00 = PROPOSED SPOT GRADE
- 100 = PROPOSED ELEVATION CONTOUR
- = PROPOSED CATCH BASIN
- = PROPOSED MANHOLE
- G = PROPOSED HYDRODYNAMIC SEPARATORS
- = PROPOSED STORM DRAIN CULVERT
- F.D. = PROPOSED FOOTING DRAIN
- 100 = EXISTING ELEVATION CONTOUR
- 100.0 + = EXISTING SPOT GRADE
- A8 = DRAINAGE STRUCTURE ID
- = DRAINAGE SYSTEM WATERSHED LIMIT
- = BASIN/INLET WATERSHED LIMIT
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SYSTEM E

SYSTEM F

GRAPHIC SCALE
(IN FEET)
1 inch = 40 ft.

MATCH LINE SHEET GR–

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Revisions:

No.	Date	Description

DRAINAGE AREA MAP
PREPARED FOR
STORRS LODGES, LLC
HUNTING LODGE ROAD
MANSFIELD, CONNECTICUT

Date: 03-24-2016 | Drawn by: RJK | Job no: 04161
Scales: 1" = 40' | Checked by: DSZ | Sheet no: 2 OF 4

DA-2

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MATCH LINE SHEET GR-2

MATCH LINE SHEET GR-4

NORTHWOOD ROAD

HUNTING LODGE ROAD

SYSTEM I

SYSTEM J

SYSTEM K

SYSTEM L

SYSTEM M

SYSTEM N

SYSTEM O

DRAINAGE FLOWS TO THE TOWN OF MANSFIELD. M.C.F. #1 M.L.R. VOL. 81 PG. 204

F.F.=558.35

F.F.=560.50
SILL=559.50

SILL=555.00

SILL=556.00

F.F.=566.50
SILL=565.50

F.F.=566.00
SILL=565.00

SLAB=565.25

SLAB=560.00

SLAB=561.0

SLAB=556.75

F.F.=556.00
SILL=555.00

SLAB=558.85

F.F.=558.25
SILL=556.75

F.F.=558.00
SILL=555.50

SLAB=554.75

SLAB=552.00

SLAB=554.90

SLAB=554.50

SLAB=553.50

SLAB=553.50

SLAB=552.25

T.W.=558.0
B.W.=551.0

T.W.=558.0
B.W.=552.0

T.W.=551.3
B.W.=551.0

T.W.=550.7
B.W.=545.7

T.W.=550.0
B.W.=545.7

T.W.=550.0
B.W.=544.0

T.W.=549.4
B.W.=544.0

T.W.=550.0
B.W.=544.0

T.W.=550.0
B.W.=545.8

T.W.=550.0
B.W.=550.0

P.I. = 14+79.54

P.C. = 10+64.18

P.I. = 7+00.06

P.C. = 7+12.06

P.I. = 4+76.74

P.C. = 2+38.74

121.71' (PER MAP)

UPLANDS

WETLANDS

BROOK

I.P. FND.

F.D.

LEGEND

A8	= DRAINAGE STRUCTURE ID
	= DRAINAGE SYSTEM WATERSHED LIMIT
	= BASIN/INLET WATERSHED LIMIT
	= LANDSCAPED AREAS
100.00	= PROPOSED SPOT GRADE
100	= PROPOSED ELEVATION CONTOUR
	= PROPOSED CATCH BASIN
	= PROPOSED MANHOLE
	= PROPOSED HYDRODYNAMIC SEPARATORS
	= PROPOSED STORM DRAIN CULVERT
F.D.	= PROPOSED FOOTING DRAIN
100	= EXISTING ELEVATION CONTOUR
100.0 +	= EXISTING SPOT GRADE

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

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e-mail mail@fahesketh.com

No.	Date	Description
		Revisions:

DRAINAGE AREA MAP
PREPARED FOR
STORRS LODGES, LLC
HUNTING LODGE ROAD
MANSFIELD, CONNECTICUT

Date: 03-24-2016 | Drawn by: RJK | Job no: 04161
Scale: 1" = 40' | Checked by: DSZ | Sheet no: 3 OF 4

DA-3

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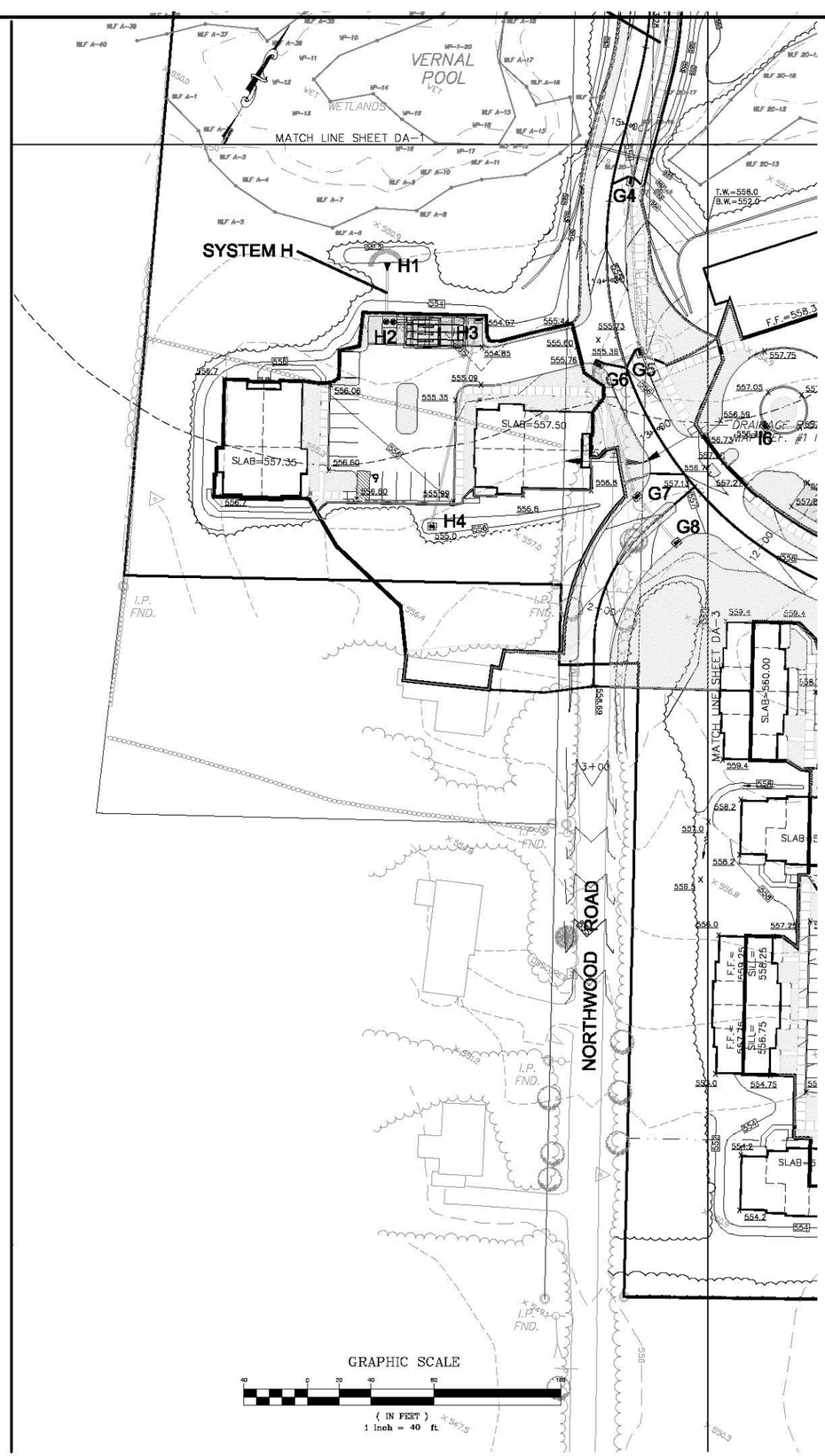
LEGEND

- x 100.00 = PROPOSED SPOT GRADE
- 100 = PROPOSED ELEVATION CONTOUR
- = PROPOSED CATCH BASIN
- = PROPOSED MANHOLE
- = PROPOSED HYDRODYNAMIC SEPARATORS
- = PROPOSED STORM DRAIN CULVERT
- F.D. = PROPOSED FOOTING DRAIN
- 100 = EXISTING ELEVATION CONTOUR
- 100.0 + = EXISTING SPOT GRADE
- A8 = DRAINAGE STRUCTURE ID
- = DRAINAGE SYSTEM WATERSHED LIMIT
- = BASIN/INLET WATERSHED LIMIT
- = LANDSCAPED AREAS



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Revisions:

No.	Date	Description

DRAINAGE AREA MAP
PREPARED FOR
STORRS LODGES, CT
HUNTING LODGE ROAD
MANSFIELD, CONNECTICUT

Date: 03-24-2016 | Drawn by: RJK | Job no: 04161
Scale: 1" = 40' | Checked by: DSZ | Sheet no: 4 OF 4

DA-4

Q:\2004\04161\2016 - January\LODDA103.dwg, DA-4, Mar. 29, 2016 - 2:57:22 PM

Storrs Lodges

DRAINAGE AREAS

Storm Drain Systems

March 24, 2016

Area #	Paved/Roof Area (S.F.)	Landscape Area (S.F.)	Wooded Area (S.F.)	Total Area (S.F.)	Paved/Roof Area (Acre)	Landscape Area (Acre)	Wooded Area (S.F.)	Total Area (Acre)
A4	39130	11364	0	50494	0.898	0.261	0.000	1.159
A7	4339	955	0	5294	0.100	0.022	0.000	0.122
A8	9742	2914	0	12656	0.224	0.067	0.000	0.291
A9	10615	1766	0	12381	0.244	0.041	0.000	0.284
B2	0	14164	4709	18873	0.000	0.325	0.108	0.433
C6	8501	1248	0	9749	0.195	0.029	0.000	0.224
C7	7736	654	0	8390	0.178	0.015	0.000	0.193
C8	8085	725	0	8810	0.186	0.017	0.000	0.202
C9	30406	9595	0	40001	0.698	0.220	0.000	0.918
D4	1230	25696	8837	35763	0.028	0.590	0.203	0.821
D6	4810	40447	48600	93857	0.110	0.929	1.116	2.155
E4	16534	5971	0	22505	0.380	0.137	0.000	0.517
E5	7456	1460	0	8916	0.171	0.034	0.000	0.205
E6	8515	2857	0	11372	0.195	0.066	0.000	0.261
E7	12522	3786	0	16308	0.287	0.087	0.000	0.374
E9	5475	3127	0	8602	0.126	0.072	0.000	0.197
E10	15950	5783	0	21733	0.366	0.133	0.000	0.499
E11	7233	1883	0	9116	0.166	0.043	0.000	0.209
E12	3420	1352	0	4772	0.079	0.031	0.000	0.110
F3	8386	3376	0	11762	0.193	0.078	0.000	0.270
F4	4769	7266	0	12035	0.109	0.167	0.000	0.276
G3	7880	673	0	8553	0.181	0.015	0.000	0.196
G4	3787	1669	0	5456	0.087	0.038	0.000	0.125
G5	5653	1618	0	7271	0.130	0.037	0.000	0.167
G6	1252	999	0	2251	0.029	0.023	0.000	0.052

Storrs Lodges
DRAINAGE AREAS
Storm Drain Systems

March 24, 2016

Area #	Paved/Roof Area (S.F.)	Landscape Area (S.F.)	Wooded Area (S.F.)	Total Area (S.F.)	Paved/Roof Area (Acre)	Landscape Area (Acre)	Wooded Area (S.F.)	Total Area (Acre)
G7	3553	868	0	4421	0.082	0.020	0.000	0.101
G8	5272	9063	0	14335	0.121	0.208	0.000	0.329
G9	6407	3292	0	9699	0.147	0.076	0.000	0.223
H3	19734	3149	0	22883	0.453	0.072	0.000	0.525
H4	0	8220	6825	15045	0.000	0.189	0.157	0.345
I3	19698	8211	0	27909	0.452	0.188	0.000	0.641
I4	5801	1976	0	7777	0.133	0.045	0.000	0.179
I5	3643	5399	0	9042	0.084	0.124	0.000	0.208
I6	12991	3720	0	16711	0.298	0.085	0.000	0.384
J3	2813	1328	0	4141	0.065	0.030	0.000	0.095
J4	1257	522	0	1779	0.029	0.012	0.000	0.041
J5	4895	0	0	4895	0.112	0.000	0.000	0.112
J6	7636	0	0	7636	0.175	0.000	0.000	0.175
J7	2682	803	0	3485	0.062	0.018	0.000	0.080
J8	3174	567	0	3741	0.073	0.013	0.000	0.086
J9	2725	3712	0	6437	0.063	0.085	0.000	0.148
K1	4938	9330		14268	0.113	0.214	0.000	0.328
K2	12697	2687		15384	0.291	0.062	0.000	0.353
K3	16078	5482		21560	0.369	0.126	0.000	0.495
K4	5092	1114		6206	0.117	0.026	0.000	0.142
K5	10858	2293		13151	0.249	0.053	0.000	0.302
K6	3310	2154		5464	0.076	0.049	0.000	0.125
K7	4560	5488		10048	0.105	0.126	0.000	0.231
K8	25370	5526		30896	0.582	0.127	0.000	0.709
K9	2341	516		2857	0.054	0.012	0.000	0.066
K10	1727	2385		4112	0.040	0.055	0.000	0.094
K12	7766	1470		9236	0.178	0.034	0.000	0.212

STORM DRAINAGE SYSTEM DESIGN COMPUTATION SHEET

F. A. Hesketh & Associates, Inc.

Civil & Traffic Engineers - Surveyors

Planners - Landscape Architects

JOB: Storrs Lodges - 04161

CALCULATED BY: GAH DATE: March 24, 2016

CHECKED BY: _____ DATE: _____ .

Storrs Lodges

COVER CONDITION	PAVEMENT/ROOF		LANDSCAPED		WOODED				TOTAL		
RUNOFF 'C'	C_1=0.90		C_2= 0.30		C_3= 0.20		C_4=				
DRAINAGE AREA (Ac.)	A_1	$(AxC)_1$	A_2	$(AxC)_2$	A_3	$(AxC)_3$	A_4	$(AxC)_4$	A	AxC	C
A4	0.898	0.808	0.261	0.078	0.000	0.000		0.000	1.159	0.887	0.765
A7	0.100	0.090	0.022	0.007	0.000	0.000		0.000	0.122	0.096	0.792
A8	0.224	0.201	0.067	0.020	0.000	0.000		0.000	0.291	0.221	0.762
A9	0.244	0.219	0.041	0.012	0.000	0.000		0.000	0.284	0.231	0.814
B2	0.000	0.000	0.325	0.098	0.108	0.022		0.000	0.433	0.119	0.275
C6	0.195	0.176	0.029	0.009	0.000	0.000		0.000	0.224	0.184	0.823
C7	0.178	0.160	0.015	0.005	0.000	0.000		0.000	0.193	0.164	0.853
C8	0.186	0.167	0.017	0.005	0.000	0.000		0.000	0.202	0.172	0.851
C9	0.698	0.628	0.220	0.066	0.000	0.000		0.000	0.918	0.694	0.756
D4	0.028	0.025	0.590	0.177	0.203	0.041		0.000	0.821	0.243	0.296
D6	0.110	0.099	0.929	0.279	1.116	0.223		0.000	2.155	0.601	0.279
E4	0.380	0.342	0.137	0.041	0.000	0.000		0.000	0.517	0.383	0.741
E5	0.171	0.154	0.034	0.010	0.000	0.000		0.000	0.205	0.164	0.802
E6	0.195	0.176	0.066	0.020	0.000	0.000		0.000	0.261	0.196	0.749
E7	0.287	0.259	0.087	0.026	0.000	0.000		0.000	0.374	0.285	0.761
E9	0.126	0.113	0.072	0.022	0.000	0.000		0.000	0.197	0.135	0.682
E10	0.366	0.330	0.133	0.040	0.000	0.000		0.000	0.499	0.369	0.740
E11	0.166	0.149	0.043	0.013	0.000	0.000		0.000	0.209	0.162	0.776
E12	0.079	0.071	0.031	0.009	0.000	0.000		0.000	0.110	0.080	0.730
F3	0.193	0.173	0.078	0.023	0.000	0.000		0.000	0.270	0.197	0.728
F4	0.109	0.099	0.167	0.050	0.000	0.000		0.000	0.276	0.149	0.538
G3	0.181	0.163	0.015	0.005	0.000	0.000		0.000	0.196	0.167	0.853
G4	0.087	0.078	0.038	0.011	0.000	0.000		0.000	0.125	0.090	0.716
G5	0.130	0.117	0.037	0.011	0.000	0.000		0.000	0.167	0.128	0.766

STORM DRAINAGE SYSTEM DESIGN COMPUTATION SHEET

F. A. Hesketh & Associates, Inc.

Civil & Traffic Engineers - Surveyors

Planners - Landscape Architects

JOB: Storrs Lodges - 04161

CALCULATED BY: GAH DATE: March 24, 2016

CHECKED BY: _____ DATE: _____ .

Storrs Lodges

COVER CONDITION	PAVEMENT/ROOF		LANDSCAPED		WOODED				TOTAL		
RUNOFF 'C'	C_1=0.90		C_2= 0.30		C_3= 0.20		C_4=				
DRAINAGE AREA (Ac.)	A_1	$(AxC)_1$	A_2	$(AxC)_2$	A_3	$(AxC)_3$	A_4	$(AxC)_4$	A	AxC	C
G6	0.029	0.026	0.023	0.007	0.000	0.000		0.000	0.052	0.033	0.634
G7	0.082	0.073	0.020	0.006	0.000	0.000		0.000	0.101	0.079	0.782
G8	0.121	0.109	0.208	0.062	0.000	0.000		0.000	0.329	0.171	0.521
G9	0.147	0.132	0.076	0.023	0.000	0.000		0.000	0.223	0.155	0.696
H3	0.453	0.408	0.072	0.022	0.000	0.000		0.000	0.525	0.429	0.817
H4	0.000	0.000	0.189	0.057	0.157	0.031		0.000	0.345	0.088	0.255
I3	0.452	0.407	0.188	0.057	0.000	0.000		0.000	0.641	0.464	0.723
I4	0.133	0.120	0.045	0.014	0.000	0.000		0.000	0.179	0.133	0.748
I5	0.084	0.075	0.124	0.037	0.000	0.000		0.000	0.208	0.112	0.542
I6	0.298	0.268	0.085	0.026	0.000	0.000		0.000	0.384	0.294	0.766
J3	0.065	0.058	0.030	0.009	0.000	0.000		0.000	0.095	0.067	0.708
J4	0.029	0.026	0.012	0.004	0.000	0.000		0.000	0.041	0.030	0.724
J5	0.112	0.101	0.000	0.000	0.000	0.000		0.000	0.112	0.101	0.900
J6	0.175	0.158	0.000	0.000	0.000	0.000		0.000	0.175	0.158	0.900
J7	0.062	0.055	0.018	0.006	0.000	0.000		0.000	0.080	0.061	0.762
J8	0.073	0.066	0.013	0.004	0.000	0.000		0.000	0.086	0.069	0.809
J9	0.063	0.056	0.085	0.026	0.000	0.000		0.000	0.148	0.082	0.554
K1	0.113	0.102	0.214	0.064	0.000	0.000		0.000	0.328	0.166	0.508
K2	0.291	0.262	0.062	0.019	0.000	0.000		0.000	0.353	0.281	0.795
K3	0.369	0.332	0.126	0.038	0.000	0.000		0.000	0.495	0.370	0.747
K4	0.117	0.105	0.026	0.008	0.000	0.000		0.000	0.142	0.113	0.792
K5	0.249	0.224	0.053	0.016	0.000	0.000		0.000	0.302	0.240	0.795
K6	0.076	0.068	0.049	0.015	0.000	0.000		0.000	0.125	0.083	0.663
K7	0.105	0.094	0.126	0.038	0.000	0.000		0.000	0.231	0.132	0.572
K8	0.582	0.524	0.127	0.038	0.000	0.000		0.000	0.709	0.562	0.793
K9	0.054	0.048	0.012	0.004	0.000	0.000		0.000	0.066	0.052	0.792
K10	0.040	0.036	0.055	0.016	0.000	0.000		0.000	0.094	0.052	0.552
K12	0.178	0.160	0.034	0.010	0.000	0.000		0.000	0.212	0.171	0.805

STORM DRAINAGE SYSTEM DESIGN COMPUTATION SHEET

F. A. Hesketh & Associates, Inc.

Civil & Traffic Engineers - Surveyors

Planners - Landscape Architects

JOB: Storrs Lodges - 04161

CALCULATED BY: GAH DATE: March 24, 2016

CHECKED BY: _____ DATE: _____ .

Storrs Lodges

COVER CONDITION	PAVEMENT/ROOF		LANDSCAPED		WOODED				TOTAL		
RUNOFF 'C'	C_1=0.90		C_2= 0.30		C_3= 0.20		C_4=				
DRAINAGE AREA (Ac.)	A_1	$(AxC)_1$	A_2	$(AxC)_2$	A_3	$(AxC)_3$	A_4	$(AxC)_4$	A	AxC	C
L5	0.183	0.165	0.019	0.006	0.000	0.000		0.000	0.202	0.171	0.845
L7	0.115	0.103	0.016	0.005	0.000	0.000		0.000	0.131	0.108	0.827
L8	0.103	0.093	0.042	0.013	0.000	0.000		0.000	0.145	0.105	0.726
M2	0.353	0.318	0.092	0.028	0.000	0.000		0.000	0.445	0.345	0.776
M3	0.101	0.091	0.016	0.005	0.000	0.000		0.000	0.117	0.096	0.819
N4	0.030	0.027	0.035	0.010	0.000	0.000		0.000	0.064	0.037	0.577
N5	0.029	0.026	0.004	0.001	0.000	0.000		0.000	0.033	0.027	0.822
N7	0.053	0.047	0.023	0.007	0.000	0.000		0.000	0.076	0.054	0.719
N8	0.130	0.117	0.042	0.013	0.000	0.000		0.000	0.173	0.130	0.752
O2	0.209	0.188	0.065	0.020	0.000	0.000		0.000	0.274	0.207	0.757
O4	0.041	0.037	0.020	0.006	0.000	0.000		0.000	0.060	0.042	0.705
O5	0.113	0.101	0.133	0.040	0.056	0.011		0.000	0.301	0.152	0.506
O6	0.029	0.026	0.025	0.007	0.000	0.000		0.000	0.054	0.034	0.627
O7	0.000	0.000	0.093	0.028	0.132	0.026		0.000	0.226	0.054	0.241

Storrs Lodges
DRAINAGE AREAS
Storm Drain Systems - Water Quality Volume Calculations

March 24, 2016

WQV = (1")(R)(A)/12

R= volumetric runoff coefficient= 0.05+0.009 (I)
I = percent impervious coverage
A = site area, in acres

Watershed	Storm Drain System	Area (acres)	I	R	Required WQV (Ac-Ft)	Required WQV (C.F.)	Required WQV (C.F.)	Provided WQV			TSS Removal * (%)
								U.G. Storage (C.F.)	Biofiltration Basin (C.F.)	Total (C.F.)	
VIIIA	System A	1.855	79.0	0.761	0.1176	5124	**5124**	6741	1269	**8010**	NA
	System B**	0.433	0.0	0.050	0.0018	79	**79**	NA	NA	NA	NA
IIA	System C	1.537	81.7	0.785	0.1006	4381	**4381**	5243	1777	**7020**	NA
	System D	2.976	4.7	0.092	0.0229	997	**997**	NA	1044	**1044**	NA
IVA	System E	2.372	74.6	0.721	0.1426	6212	**6212**	7490	1796	**9286**	NA
	System F	0.546	55.3	0.548	0.0249	1086	**1086**	NA	2222	**2222**	87%
	System G ***	1.193	65.0	0.635	0.0631	2750	**2750**	NA	394	**394**	85%
IXA	System H	0.871	52.0	0.518	0.0376	1638	**1638**	1498	260	**1758**	NA
VIA	System I	1.41	68.6	0.667	0.0784	3416	**5437**	3745	2381	**6126**	NA
	System J	0.737	78.4	0.756	0.0464	2021					81%
VIIA	System K	3.057	71.1	0.690	0.1758	7656	**10638**	11235	1298	**12533**	NA
	System L	0.478	83.9	0.805	0.0321	1397					
	System M	0.562	80.8	0.777	0.0364	1586					
	System N	0.346	69.9	0.679	0.0196	853	**2298**	1048	2381	**3429**	88%
XA	System O	0.915	42.8	0.435	0.0332	1445					NA

* via Hydrodynamic Separator
** impervious area is existing off-site area
*** Oversized hydrodynamic separator specified to attain 85% TSS Removal.

Storrs Lodges
DRAINAGE AREAS

Storm Drain Systems
Water Quality/biofoltration Basin Volume Calcula

March 24, 2016

System D

Contour	Area (S.F.)	El. Diff. (FT)	Volume (C.F.)	Cum. Vol. (C.F.)
554	188			
		1	354.5	354.5
555	521			
		1	689.5	1044
556	858			

System E

Contour	Area (S.F.)	El. Diff. (FT)	Volume (C.F.)	Cum. Vol. (C.F.)
548	435			
		1	650	650
549	865			
		1	1145.5	1795.5
550	1426			

System F

Contour	Area (S.F.)	El. Diff. (FT)	Volume (C.F.)	Cum. Vol. (C.F.)
553	684			
		1	885.5	885.5
554	1087			
		1	1334.5	2220
555	1582			

System G

Contour	Area (S.F.)	El. Diff. (FT)	Volume (C.F.)	Cum. Vol. (C.F.)
549	260			
		1	393.5	393.5
550	527			

Storrs Lodges
DRAINAGE AREAS

Storm Drain Systems
Water Quality/biofoltration Basin Volume Calcula

March 24, 2016

System H

Contour	Area (S.F.)	El. Diff. (FT)	Volume (C.F.)	Cum. Vol. (C.F.)
550.5	0			
		1	260	260
551.5	520			

System J

Contour	Area (S.F.)	El. Diff. (FT)	Volume (C.F.)	Cum. Vol. (C.F.)
544	742			
		1	950.5	950.5
545	1159			
		1	1430.5	2381
546	1702			

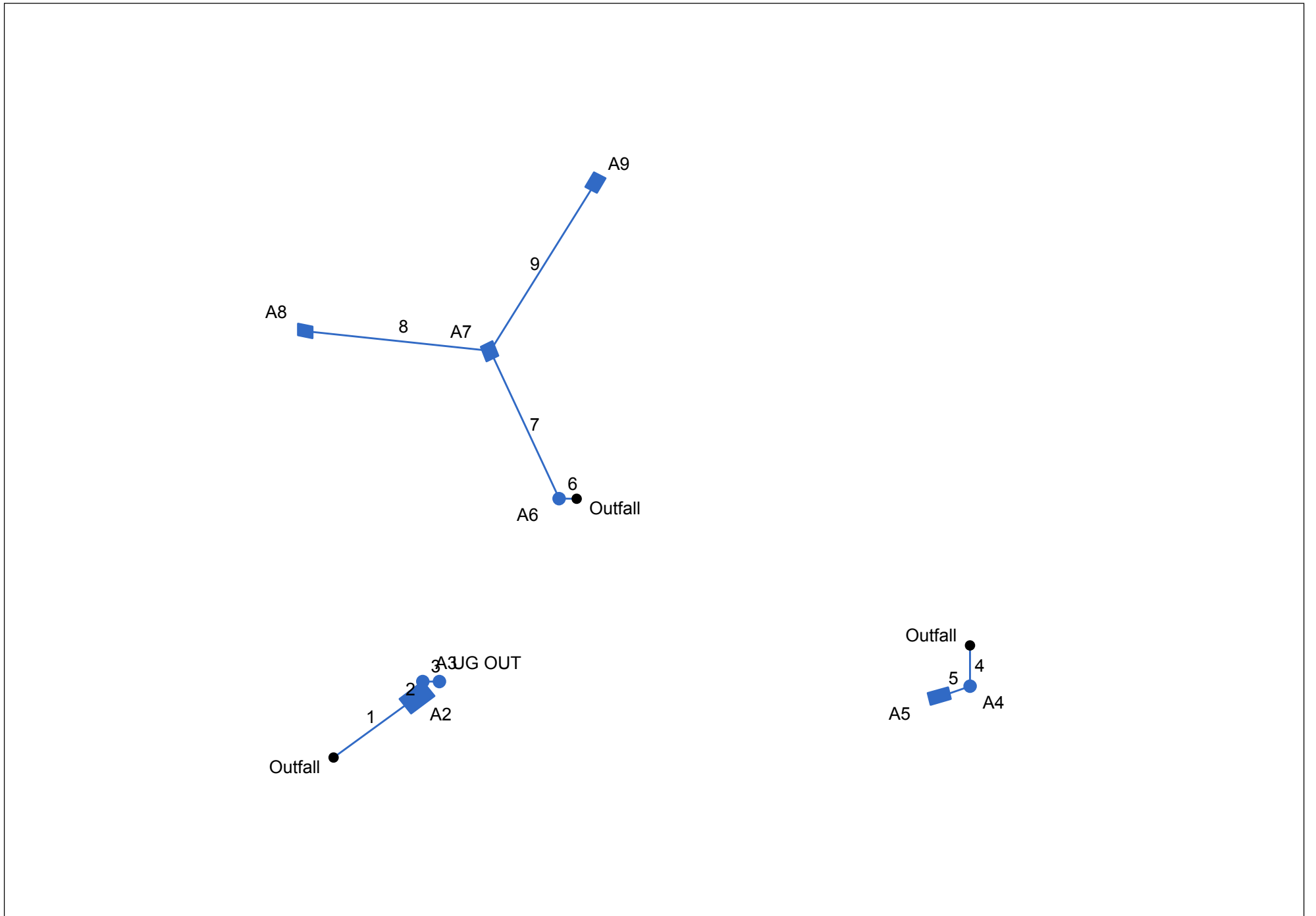
System M

Contour	Area (S.F.)	El. Diff. (FT)	Volume (C.F.)	Cum. Vol. (C.F.)
543	1083			
		1	1298	1298
544	1513			

System N

Contour	Area (S.F.)	El. Diff. (FT)	Volume (C.F.)	Cum. Vol. (C.F.)
544	742			
		1	950.5	950.5
545	1159			
		1	1430.5	2381
546	1702			

STORRS-SYSTEM A



Project File: SYSTEM-A.stm	Number of lines: 9	Date: 03-29-2016

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	35	0.00	0.00	0.00	0.00	0.00	0.0	0.1	0.0	6.45	6.46	6.00	15	1.00	556.00	556.35	557.02	557.38	558.00	563.30	A1-A2
2	1	6	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	6.45	0.00	3.65	18	0.00	557.00	557.00	558.50	558.52	563.30	563.42	A2-A3
3	2	6	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	6.45	0.00	3.65	18	0.00	557.00	557.00	558.57	558.58	563.42	563.04	A3-UG
4	End	14	0.00	1.16	0.00	0.00	0.89	0.0	5.1	6.0	5.33	0.00	3.34	18	0.00	557.00	557.00	558.25	558.29	563.65	563.65	OUT-A5
5	4	12	1.16	1.16	0.77	0.89	0.89	5.0	5.0	6.0	5.35	7.00	5.64	15	1.00	558.00	558.12	558.82	559.14	563.65	562.32	A5-A4
6	End	6	0.00	0.69	0.00	0.00	0.54	0.0	5.8	5.8	3.12	0.00	1.76	18	0.00	557.00	557.00	558.50	558.50	565.07	565.00	OUT - A6
7	6	56	0.12	0.69	0.79	0.09	0.54	5.0	5.5	5.9	3.17	3.86	5.23	12	1.00	560.68	561.24	561.37	562.00	565.00	565.25	A6-A7
8	7	64	0.29	0.29	0.76	0.22	0.22	5.0	5.0	6.0	1.32	2.73	1.68	12	0.50	561.24	561.56	562.55	562.63	565.25	565.25	A7-A8
9	7	68	0.28	0.28	0.81	0.23	0.23	5.0	5.0	6.0	1.36	9.05	2.62	12	5.50	561.24	564.98	562.55	565.47	565.25	568.98	A7-A9

STORRS-SYSTEM A | Number of lines: 9 | Run Date: 03-29-2016

NOTES: Intensity = 54.74 / (Inlet time + 10.80) ^ 0.80; Return period = 10 Yrs. ; c = cir e = ellip b = box

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.	Junction Type
1	A1-A2	6.45	15	Cir	35	556.00	556.35	1.000	557.02	557.38	n/a	558.28 i	End	Manhole
2	A2-A3	6.45	18	Cir	6	557.00	557.00	0.000	558.50*	558.52*	n/a	558.57 i	1	Manhole
3	A3-UG	6.45	18	Cir	6	557.00	557.00	0.000	558.57*	558.58*	0.21	558.79	2	Manhole
4	OUT-A5	5.33	18	Cir	14	557.00	557.00	0.000	558.25	558.29	n/a	558.39 i	End	Manhole
5	A5-A4	5.35	15	Cir	12	558.00	558.12	1.000	558.82	559.14	n/a	559.71 i	4	Combination
6	OUT - A6	3.12	18	Cir	6	557.00	557.00	0.000	558.50*	558.50*	0.04	558.55	End	Manhole
7	A6-A7	3.17	12	Cir	56	560.68	561.24	1.000	561.37	562.00	n/a	562.55 i	6	Combination
8	A7-A8	1.32	12	Cir	64	561.24	561.56	0.500	562.55*	562.63*	0.04	562.67	7	Combination
9	A7-A9	1.36	12	Cir	68	561.24	564.98	5.500	562.55	565.47	n/a	565.72 i	7	Combination

STORRS-SYSTEM A | Number of lines: 9 | Run Date: 03-29-2016

NOTES: Return period = 10 Yrs. ; *Surcharged (HGL above crown). ; i - Inlet control.

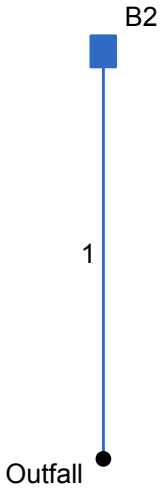
Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q byp (cfs)	Junc type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp line No
							Ht (in)	L (ft)	area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	A2	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
2	A3	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
3	UG OUT	6.45*	0.00	0.00	6.45	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
4	A4	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
5	A5	5.35	0.00	5.35	0.00	Comb	3.0	5.85	6.26	4.62	1.35	Sag	2.70	0.030	0.030	0.000	0.23	7.78	0.40	7.78	2.0	Off
6	A6	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
7	A7	0.57	0.00	0.57	0.00	Comb	3.0	2.73	3.14	2.31	1.35	Sag	1.35	0.030	0.030	0.000	-0.05	-1.56	0.12	0.78	2.0	Off
8	A8	1.32	0.00	1.32	0.00	Comb	3.0	2.73	3.14	2.31	1.35	Sag	1.35	0.030	0.030	0.000	0.03	1.11	0.20	1.30	2.0	Off
9	A9	1.36	0.00	1.36	0.00	Comb	3.0	2.73	3.14	2.31	1.35	Sag	1.35	0.030	0.030	0.000	0.04	1.44	0.21	1.44	2.0	Off

STORRS-SYSTEM A | Number of lines: 9 | Run Date: 03-29-2016

NOTES: Inlet N-Values = 0.016 ; Intensity = 54.74 / (Inlet time + 10.80) ^ 0.80; Return period = 10 Yrs. ; * Indicates Known Q added. All curb inlets are Horiz throat.

STORRS-SYSTEM B



Project File: SYSTEM-B.stm	Number of lines: 1	Date: 03-28-2016

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	66	0.43	0.43	0.28	0.12	0.12	10.0	10.0	4.8	0.58	7.00	2.50	15	1.00	562.00	562.66	562.30	562.96	572.50	568.00	OUT - B2

STORRS-SYSTEM B | Number of lines: 1 | Run Date: 03-28-2016

NOTES: Intensity = 54.74 / (Inlet time + 10.80) ^ 0.80; Return period = 10 Yrs. ; c = cir e = ellip b = box

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.	Junction Type
1	OUT - B2	0.58	15	Cir	66	562.00	562.66	1.000	562.30	562.96	n/a	563.03 i	End	Grate

STORRS-SYSTEM B | Number of lines: 1 | Run Date: 03-28-2016

NOTES: Return period = 10 Yrs. ; i - Inlet control.

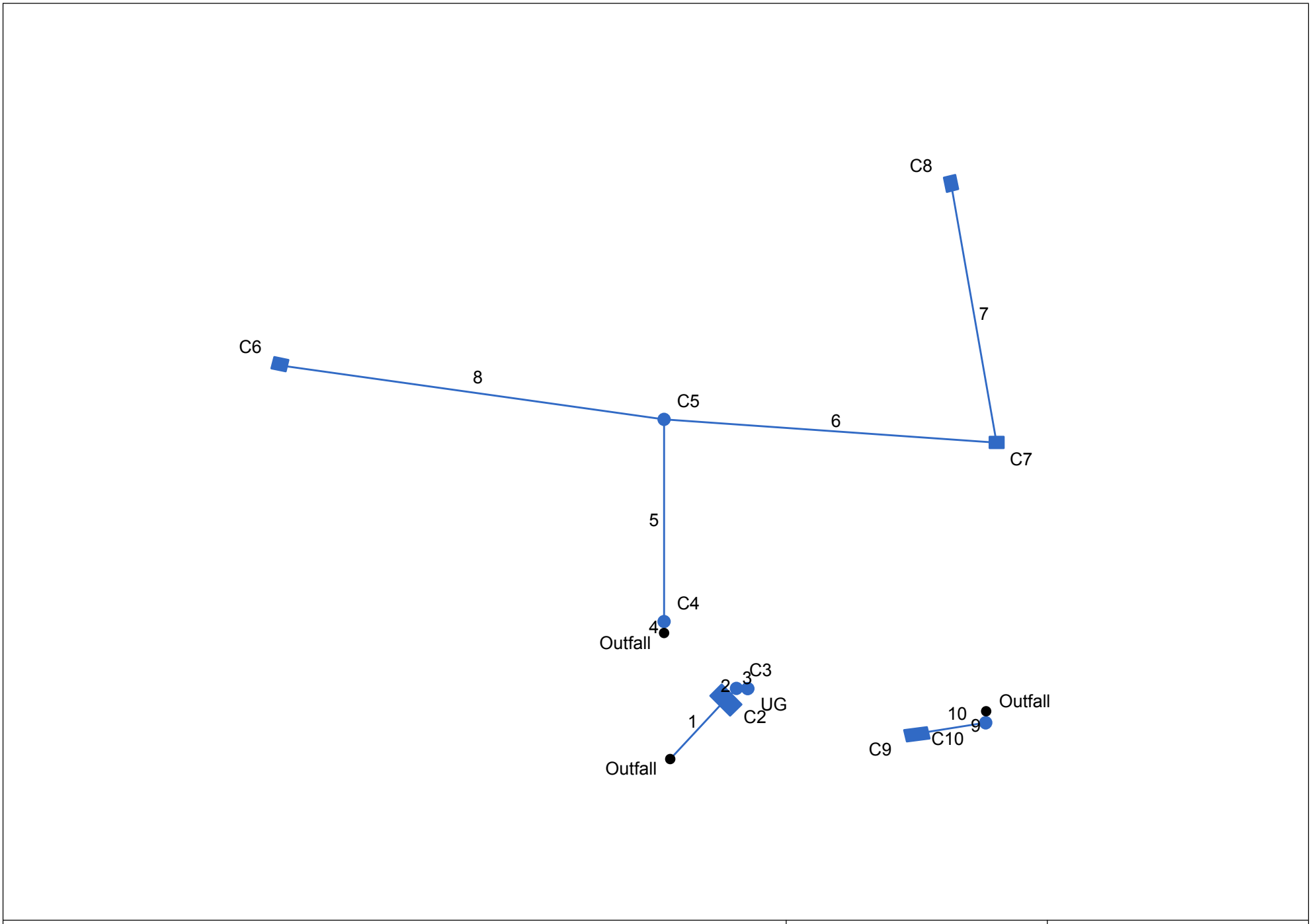
Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q byp (cfs)	Junc type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp line No
							Ht (in)	L (ft)	area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	B2	0.58	0.00	0.58	0.00	Grate	0.0	0.00	3.13	2.31	1.35	Sag	2.00	0.050	0.020	0.000	0.01	0.14	0.11	1.10	2.0	Off

STORRS-SYSTEM B | Number of lines: 1 | Run Date: 03-28-2016

NOTES: Inlet N-Values = 0.016 ; Intensity = 54.74 / (Inlet time + 10.80) ^ 0.80; Return period = 10 Yrs. ; * Indicates Known Q added. All curb inlets are Horiz throat.

STORRS-SYSTEM C



Project File: SYSTEM-C.stm	Number of lines: 10	Date: 03-29-2016

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	29	0.00	0.00	0.00	0.00	0.00	0.0	0.1	0.0	6.92	9.21	5.49	18	0.66	559.71	559.90	560.71	560.91	562.71	562.97	OUT-C2
2	1	5	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	6.92	0.00	2.20	24	0.00	560.00	560.00	562.00	562.00	562.97	568.64	C2-C3
3	2	4	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	6.92	0.00	2.20	24	0.00	560.00	560.00	562.06	562.07	568.64	567.70	C3-UG
4	End	4	0.00	0.61	0.00	0.00	0.51	0.0	6.9	5.5	2.80	0.00	3.31	18	0.00	560.00	560.00	560.71	560.74	562.20	568.64	UG-C4
5	4	71	0.00	0.61	0.00	0.00	0.51	0.0	6.4	5.6	2.87	7.72	6.92	12	4.00	562.68	565.52	563.10	566.24	568.64	571.35	C4-C5
6	5	117	0.22	0.42	0.82	0.18	0.35	5.0	5.6	5.8	2.04	2.74	2.67	12	0.50	565.52	566.11	566.71	567.00	571.35	570.74	C5-C7
7	6	92	0.20	0.20	0.85	0.17	0.17	5.0	5.0	6.0	1.02	2.73	1.78	12	0.50	566.11	566.57	567.06	567.13	570.74	571.07	C7-C8
8	5	136	0.19	0.19	0.85	0.16	0.16	5.0	5.0	6.0	0.97	3.86	3.60	12	1.00	567.38	568.74	567.72	569.16	571.35	572.24	C5-C6
9	End	4	0.00	0.92	0.00	0.00	0.70	0.0	5.2	5.9	4.15	0.00	3.83	18	0.00	560.00	560.00	560.87	560.90	566.20	566.42	UG-C10
10	9	24	0.92	0.92	0.76	0.70	0.70	5.0	5.0	6.0	4.19	4.95	4.52	15	0.50	562.06	562.18	562.94	563.06	566.42	565.93	C10-C9

STORRS-SYSTEM C | Number of lines: 10 | Run Date: 03-29-2016

NOTES: Intensity = 54.74 / (Inlet time + 10.80) ^ 0.80; Return period = 10 Yrs. ; c = cir e = ellip b = box

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.	Junction Type
1	OUT-C2	6.92	18	Cir	29	559.71	559.90	0.655	560.71	560.91	n/a	561.54 i	End	Manhole
2	C2-C3	6.92	24	Cir	5	560.00	560.00	0.000	562.00*	562.00*	0.06	562.06	1	Manhole
3	C3-UG	6.92	24	Cir	4	560.00	560.00	0.000	562.06*	562.07*	0.08	562.14	2	Manhole
4	UG-C4	2.80	18	Cir	4	560.00	560.00	0.000	560.71	560.74	n/a	560.92 i	End	Manhole
5	C4-C5	2.87	12	Cir	71	562.68	565.52	4.000	563.10	566.24	n/a	566.71 i	4	Manhole
6	C5-C7	2.04	12	Cir	117	565.52	566.11	0.504	566.71	567.00	n/a	567.06 i	5	Combination
7	C7-C8	1.02	12	Cir	92	566.11	566.57	0.500	567.06	567.13	n/a	567.18 i	6	Combination
8	C5-C6	0.97	12	Cir	136	567.38	568.74	1.000	567.72	569.16	n/a	569.33 i	5	Combination
9	UG-C10	4.15	18	Cir	4	560.00	560.00	0.000	560.87	560.90	n/a	561.18 i	End	Manhole
10	C10-C9	4.19	15	Cir	24	562.06	562.18	0.500	562.94	563.06	n/a	563.51 i	9	Combination

STORRS-SYSTEM C | Number of lines: 10 | Run Date: 03-29-2016

NOTES: Return period = 10 Yrs. ; *Surcharged (HGL above crown). ; i - Inlet control.

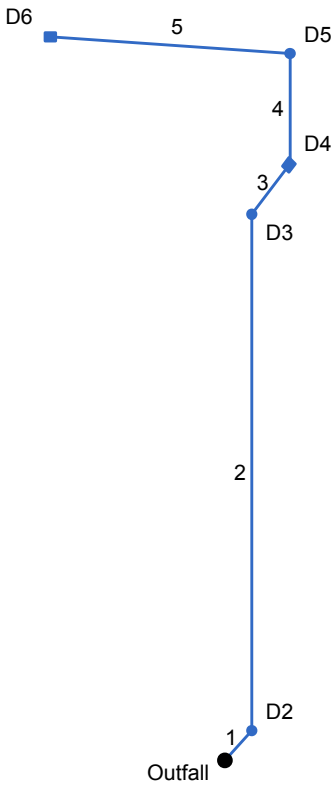
Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q byp (cfs)	Junc type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp line No
							Ht (in)	L (ft)	area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	C2	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
2	C3	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
3	UG	6.92*	0.00	0.00	6.92	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
4	C4	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
5	C5	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
6	C7	1.08	0.00	1.08	0.00	Comb	3.0	2.73	3.14	2.31	1.35	Sag	1.35	0.030	0.030	0.000	0.01	0.44	0.18	1.17	2.0	Off
7	C8	1.02	0.00	1.02	0.00	Comb	3.0	2.73	3.14	2.31	1.35	Sag	1.35	0.030	0.030	0.000	0.00	0.11	0.17	1.11	2.0	Off
8	C6	0.97	0.00	0.97	0.00	Comb	3.0	2.73	3.14	2.31	1.35	Sag	1.35	0.030	0.030	0.000	0.00	0.11	0.17	1.11	2.0	Off
9	C10	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
10	C9	4.19	0.00	4.19	0.00	Comb	3.0	5.85	6.26	2.31	1.35	Sag	2.70	0.030	0.030	0.000	0.26	8.78	0.43	8.78	2.0	Off

STORRS-SYSTEM C | Number of lines: 10 | Run Date: 03-29-2016

NOTES: Inlet N-Values = 0.016 ; Intensity = 54.74 / (Inlet time + 10.80) ^ 0.80; Return period = 10 Yrs. ; * Indicates Known Q added. All curb inlets are Horiz throat.

STORRS-SYSTEM D



Project File: SYSTEM-D.stm	Number of lines: 5	Date: 03-28-2016

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	19	0.00	2.98	0.00	0.00	0.85	0.0	11.7	4.5	3.84	4.00	5.50	12	1.26	556.00	556.24	556.83	557.07	558.00	559.50	D1-D2
2	1	244	0.00	2.98	0.00	0.00	0.85	5.0	10.9	4.7	3.96	7.11	5.32	12	3.39	556.24	564.52	557.86	565.36	559.50	571.50	D2-D3
3	2	30	0.82	2.98	0.30	0.25	0.85	5.0	10.7	4.7	3.97	4.05	5.06	12	1.10	564.52	564.85	566.18	566.50	571.50	568.00	D3-D4
4	3	52	0.00	2.16	0.00	0.00	0.60	5.0	10.5	4.7	2.85	3.86	3.63	12	1.00	564.85	565.37	566.53	566.82	568.00	571.50	D4-D5
5	4	113	2.16	2.16	0.28	0.60	0.60	10.0	10.0	4.8	2.91	3.86	3.70	12	1.00	565.37	566.50	567.02	567.66	571.50	569.50	D5-D6

STORRS-SYSTEM D | Number of lines: 5 | Run Date: 03-28-2016

NOTES: Intensity = 54.74 / (Inlet time + 10.80) ^ 0.80; Return period = 10 Yrs. ; c = cir e = ellip b = box

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.	Junction Type
1	D1-D2	3.84	12	Cir	19	556.00	556.24	1.264	556.83	557.07	n/a	557.86 i	End	Manhole
2	D2-D3	3.96	12	Cir	244	556.24	564.52	3.393	557.86	565.36	n/a	566.18 i	1	Manhole
3	D3-D4	3.97	12	Cir	30	564.52	564.85	1.100	566.18*	566.50*	n/a	566.53 i	2	Grate
4	D4-D5	2.85	12	Cir	52	564.85	565.37	1.000	566.53*	566.82*	0.20	567.02	3	Manhole
5	D5-D6	2.91	12	Cir	113	565.37	566.50	1.000	567.02*	567.66*	n/a	567.71 i	4	Grate

STORRS-SYSTEM D | Number of lines: 5 | Run Date: 03-28-2016

NOTES: Return period = 10 Yrs. ; *Surcharged (HGL above crown). ; i - Inlet control.

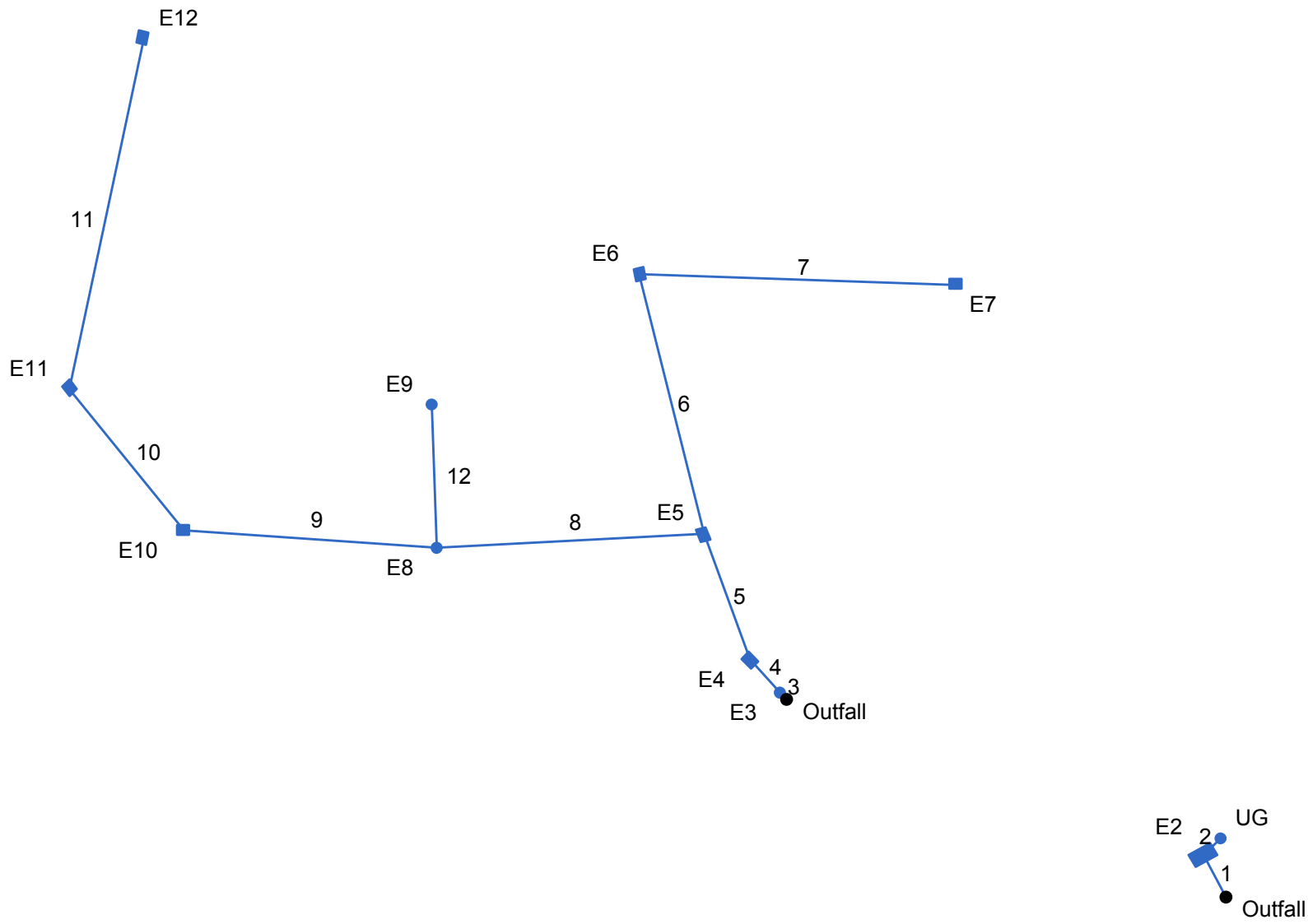
Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q byp (cfs)	Junc type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp line No
							Ht (in)	L (ft)	area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	D2	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
2	D3	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
3	D4	1.47	0.00	1.47	0.00	Grate	0.0	0.00	3.14	2.31	1.35	Sag	1.35	0.030	0.030	0.000	0.05	1.53	0.21	1.53	2.0	Off
4	D5	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
5	D6	2.91	0.00	2.91	0.00	Grate	0.0	0.00	3.14	2.31	1.35	Sag	1.35	0.030	0.030	0.000	0.17	5.58	0.33	5.58	2.0	Off

STORRS-SYSTEM D | Number of lines: 5 | Run Date: 03-28-2016

NOTES: Inlet N-Values = 0.016 ; Intensity = 54.74 / (Inlet time + 10.80) ^ 0.80; Return period = 10 Yrs. ; * Indicates Known Q added. All curb inlets are Horiz throat.

STORRS-SYSTEM E



Project File: SYSTEM-E.stm	Number of lines: 12	Date: 03-28-2016

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	20	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	9.14	7.42	5.17	18	0.50	549.90	550.00	551.40	551.55	554.00	556.21	OUT-E2
2	1	10	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	9.14	0.00	5.17	18	0.00	550.00	550.00	552.07	552.14	556.21	556.00	E2-UG
3	End	4	0.00	2.38	0.00	0.00	1.78	0.0	10.8	4.7	8.30	0.00	4.70	18	0.00	550.00	550.00	551.50	551.53	556.00	554.87	UG-E3
4	3	19	0.52	2.38	0.74	0.38	1.78	5.0	10.7	4.7	8.32	7.69	4.71	18	0.54	550.75	550.85	552.25	552.35	554.87	554.45	E3-E4
5	4	56	0.21	1.86	0.80	0.17	1.39	5.0	10.6	4.7	6.56	8.57	5.35	15	1.50	551.10	551.94	552.73	553.18	554.45	556.31	E3-E5
6	5	112	0.26	0.63	0.75	0.20	0.48	5.0	6.0	5.7	2.71	5.12	4.04	12	1.76	552.19	554.16	553.90	554.86	556.31	560.07	E5-E6
7	6	132	0.37	0.37	0.76	0.28	0.28	5.0	5.0	6.0	1.68	2.73	2.45	12	0.50	554.16	554.82	555.31	555.55	560.07	557.82	E6-E7
8	5	112	0.00	1.02	0.00	0.00	0.75	5.0	10.2	4.8	3.58	6.32	4.93	12	2.69	552.19	555.20	553.90	556.00	556.31	560.10	E5-E8
9	8	106	0.50	0.82	0.74	0.37	0.61	5.0	9.8	4.8	2.97	6.23	4.94	12	2.60	555.98	558.74	556.68	559.47	560.10	562.85	E8-E10
10	9	76	0.21	0.32	0.78	0.16	0.24	5.0	9.1	5.0	1.22	7.70	2.46	12	3.99	558.74	561.77	559.97	562.24	562.85	565.53	E10-E11
11	10	150	0.11	0.11	0.73	0.08	0.08	5.0	5.0	6.0	0.48	2.73	1.67	12	0.50	561.77	562.52	562.46	562.81	565.53	565.52	E11-E12
12	8	60	0.20	0.20	0.68	0.14	0.14	5.0	5.0	6.0	0.81	2.73	1.04	12	0.50	555.20	555.50	556.68	556.71	560.10	559.00	E8-E9

STORRS-SYSTEM E | Number of lines: 12 | Run Date: 03-28-2016

NOTES: Intensity = 54.74 / (Inlet time + 10.80) ^ 0.80; Return period = 10 Yrs. ; c = cir e = ellip b = box

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.	Junction Type
1	OUT-E2	9.14	18	Cir	20	549.90	550.00	0.500	551.40*	551.55*	n/a	552.07 i	End	Manhole
2	E2-UG	9.14	18	Cir	10	550.00	550.00	0.000	552.07*	552.14*	0.42	552.56	1	Manhole
3	UG-E3	8.30	18	Cir	4	550.00	550.00	0.000	551.50*	551.53*	n/a	551.88 i	End	Manhole
4	E3-E4	8.32	18	Cir	19	550.75	550.85	0.537	552.25	552.35	n/a	552.73 i	3	Combination
5	E3-E5	6.56	15	Cir	56	551.10	551.94	1.500	552.73	553.18	n/a	553.90 i	4	Combination
6	E5-E6	2.71	12	Cir	112	552.19	554.16	1.759	553.90	554.86	n/a	555.31 i	5	Combination
7	E6-E7	1.68	12	Cir	132	554.16	554.82	0.500	555.31	555.55	n/a	555.67 i	6	Combination
8	E5-E8	3.58	12	Cir	112	552.19	555.20	2.688	553.90	556.00	n/a	556.68 i	5	Manhole
9	E8-E10	2.97	12	Cir	106	555.98	558.74	2.604	556.68	559.47	n/a	559.97 i	8	Combination
10	E10-E11	1.22	12	Cir	76	558.74	561.77	3.987	559.97	562.24	n/a	562.46 i	9	Combination
11	E11-E12	0.48	12	Cir	150	561.77	562.52	0.500	562.46	562.81	n/a	562.90 i	10	Combination
12	E8-E9	0.81	12	Cir	60	555.20	555.50	0.500	556.68*	556.71*	0.02	556.73	8	Grate

STORRS-SYSTEM E | Number of lines: 12 | Run Date: 03-28-2016

NOTES: Return period = 10 Yrs. ; *Surcharged (HGL above crown). ; i - Inlet control.

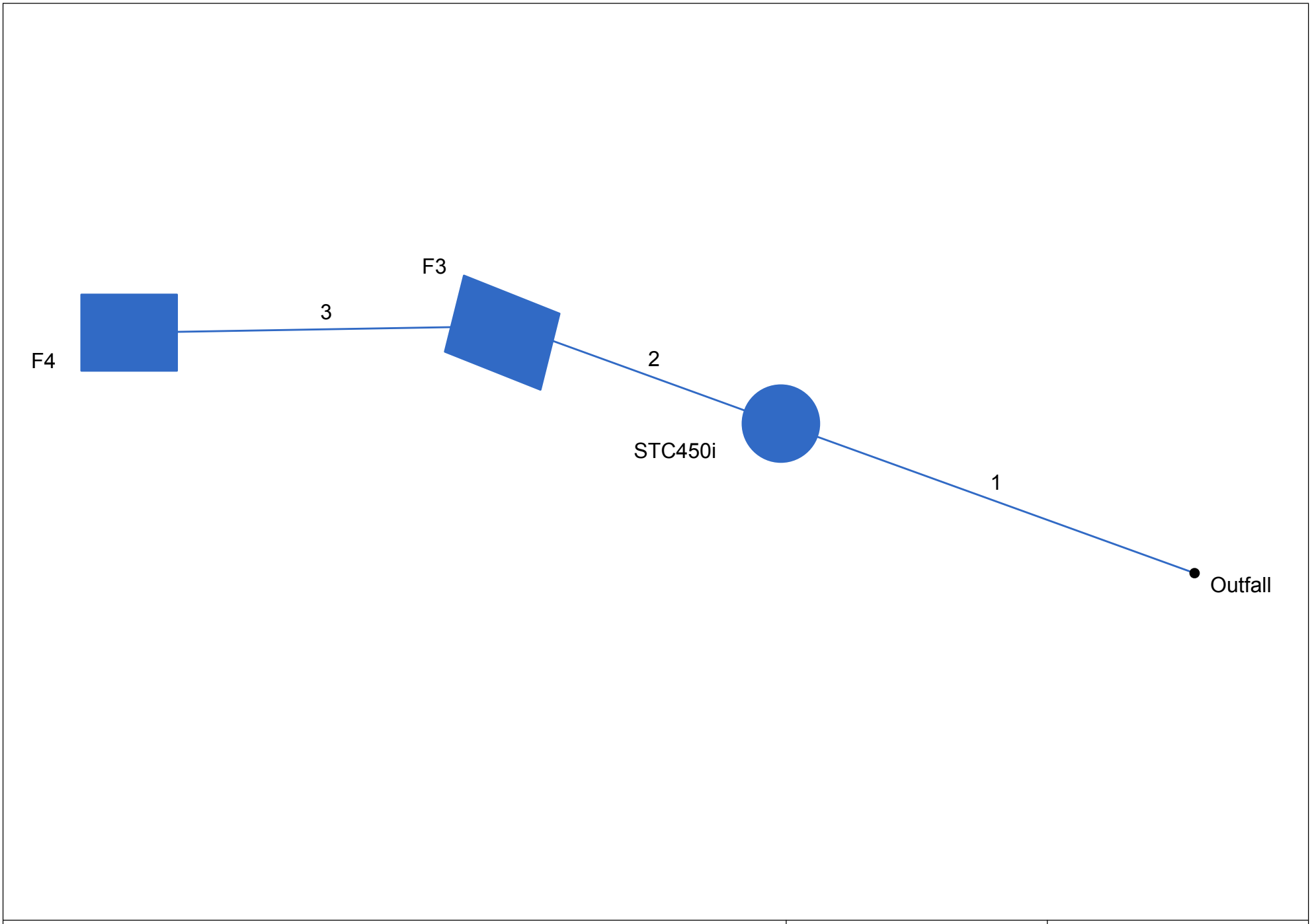
Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q byp (cfs)	Junc type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp line No
							Ht (in)	L (ft)	area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	E2	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
2	UG	9.14*	0.00	0.00	9.14	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
3	E3	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
4	E4	2.30	0.44	2.74	0.00	Comb	3.0	2.73	3.14	2.31	1.35	Sag	1.35	0.030	0.030	0.000	0.16	5.44	0.33	5.44	2.0	Off
5	E5	1.01	0.35	0.92	0.44	Comb	3.0	2.73	0.00	2.31	1.35	0.035	1.35	0.030	0.030	0.013	0.14	4.63	0.25	2.81	2.0	4
6	E6	1.17	0.00	0.82	0.35	Comb	3.0	2.73	0.00	2.31	1.35	0.030	1.35	0.030	0.030	0.013	0.14	4.50	0.25	2.61	2.0	5
7	E7	1.68	0.00	1.68	0.00	Comb	3.0	2.73	3.14	2.31	1.35	Sag	1.35	0.030	0.030	0.000	0.07	2.44	0.24	2.44	2.0	Off
8	E8	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
9	E10	2.22	0.00	2.22	0.00	Comb	3.0	2.73	3.14	2.31	1.35	Sag	1.35	0.030	0.030	0.000	0.11	3.78	0.28	3.78	2.0	Off
10	E11	0.98	0.00	0.98	0.00	Comb	3.0	2.73	3.14	2.31	1.35	Sag	1.35	0.030	0.030	0.000	0.00	0.11	0.17	1.11	2.0	Off
11	E12	0.48	0.00	0.48	0.00	Comb	3.0	2.73	3.14	2.31	1.35	Sag	1.35	0.030	0.030	0.000	-0.06	-1.89	0.11	0.72	2.0	Off
12	E9	0.81	0.00	0.81	0.00	Grate	0.0	0.00	1.00	1.00	1.00	Sag	1.35	0.030	0.030	0.000	0.03	1.16	0.20	1.31	2.0	Off

STORRS-SYSTEM E | Number of lines: 12 | Run Date: 03-28-2016

NOTES: Inlet N-Values = 0.016 ; Intensity = 54.74 / (Inlet time + 10.80) ^ 0.80; Return period = 10 Yrs. ; * Indicates Known Q added. All curb inlets are Horiz throat.

STORRS-SYSTEM F



Project File: SYSTEM-F.stm	Number of lines: 3	Date: 03-28-2016

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	23	0.00	0.55	0.00	0.00	0.35	0.0	5.4	5.9	2.05	3.79	4.09	12	1.13	555.00	555.26	555.61	555.87	557.00	559.19	OUT-STC450i
2	1	15	0.27	0.55	0.73	0.20	0.35	5.0	5.3	5.9	2.06	2.82	3.59	12	0.53	555.51	555.59	556.22	556.25	559.19	559.19	STC450i-F3
3	2	20	0.28	0.28	0.54	0.15	0.15	5.0	5.0	6.0	0.91	2.73	1.21	12	0.50	555.59	555.69	556.55	556.56	559.19	559.19	F3-F4

STORRS-SYSTEM F | Number of lines: 3 | Run Date: 03-28-2016

NOTES: Intensity = 54.74 / (Inlet time + 10.80) ^ 0.80; Return period = 10 Yrs. ; c = cir e = ellip b = box

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.	Junction Type
1	OUT-STC450i	2.05	12	Cir	23	555.00	555.26	1.131	555.61	555.87	n/a	556.22 i	End	Manhole
2	STC450i-F3	2.06	12	Cir	15	555.51	555.59	0.534	556.22	556.25	n/a	556.55 i	1	Combination
3	F3-F4	0.91	12	Cir	20	555.59	555.69	0.500	556.55	556.56	0.02	556.58	2	Combination

STORRS-SYSTEM F | Number of lines: 3 | Run Date: 03-28-2016

NOTES: Return period = 10 Yrs. ; i - Inlet control.

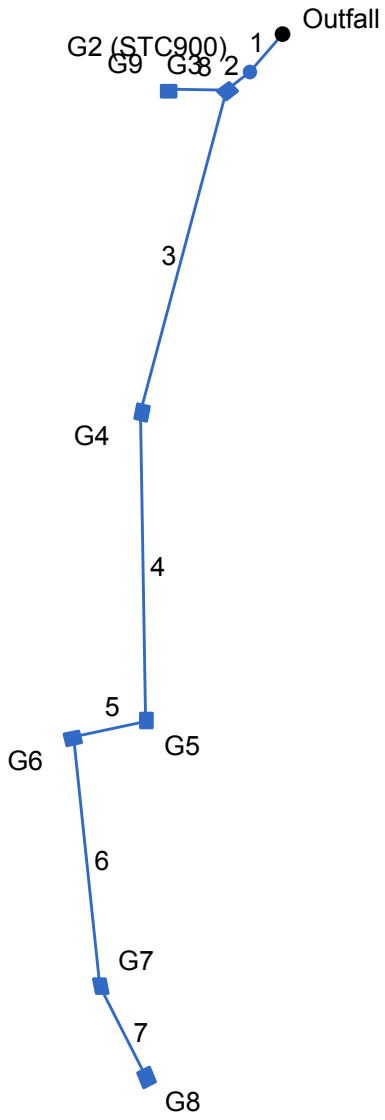
Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q byp (cfs)	Junc type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp line No
							Ht (in)	L (ft)	area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	STC450i	0.00	0.49	0.00	0.49	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
2	F3	1.18	0.26	0.95	0.49	Comb	3.0	2.73	0.00	2.31	1.35	0.027	1.35	0.030	0.030	0.013	0.15	4.93	0.27	3.31	2.0	1
3	F4	0.91	0.00	0.65	0.26	Comb	3.0	2.73	0.00	2.31	1.35	0.010	1.35	0.030	0.030	0.013	0.15	5.00	0.27	3.41	2.0	2

STORRS-SYSTEM F | Number of lines: 3 | Run Date: 03-28-2016

NOTES: Inlet N-Values = 0.016 ; Intensity = 54.74 / (Inlet time + 10.80) ^ 0.80; Return period = 10 Yrs. ; * Indicates Known Q added. All curb inlets are Horiz throat.

STORRS-SYSTEM G



Project File: SYSTEM-G.stm	Number of lines: 8	Date: 03-28-2016

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	17	0.00	1.20	0.00	0.00	0.83	0.0	12.3	4.4	3.68	4.95	4.42	15	0.59	550.00	550.10	550.80	550.90	552.00	553.85	OUT-G2 (STC900
2	1	10	0.20	1.20	0.85	0.17	0.83	5.0	12.2	4.4	3.69	4.95	3.17	15	0.50	550.18	550.23	551.32	551.34	553.85	552.74	G2 (STC900)-G3
3	2	113	0.13	0.78	0.72	0.09	0.51	5.0	11.4	4.6	2.31	4.97	2.43	15	0.50	550.23	550.80	551.45	551.56	552.74	553.88	G3-G4
4	3	105	0.17	0.65	0.77	0.13	0.41	5.0	10.7	4.7	1.93	4.97	2.83	15	0.50	550.80	551.33	551.70	551.89	553.88	555.38	G4-G5
5	4	25	0.05	0.48	0.63	0.03	0.28	5.0	10.6	4.7	1.33	5.04	1.77	15	0.52	551.33	551.46	552.14	552.14	555.38	555.23	G5-G6
6	5	85	0.10	0.43	0.78	0.08	0.25	10.0	10.0	4.8	1.20	5.31	3.08	12	1.89	551.71	553.32	552.25	553.79	555.23	556.50	G6-G7
7	6	35	0.33	0.33	0.52	0.17	0.17	5.0	5.0	6.0	1.03	2.77	2.15	12	0.51	553.32	553.50	554.00	554.02	556.50	556.50	G7-G8
8	2	20	0.22	0.22	0.70	0.16	0.16	5.0	5.0	6.0	0.93	2.73	1.18	12	0.50	550.23	550.33	551.45	551.46	552.74	552.74	G3-G9

STORRS-SYSTEM G | Number of lines: 8 | Run Date: 03-28-2016

NOTES: Intensity = 54.74 / (Inlet time + 10.80) ^ 0.80; Return period = 10 Yrs. ; c = cir e = ellip b = box

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.	Junction Type
1	OUT-G2 (STC900)	3.68	15	Cir	17	550.00	550.10	0.588	550.80	550.90	n/a	551.32 i	End	Manhole
2	G2 (STC900)-G3	3.69	15	Cir	10	550.18	550.23	0.500	551.32	551.34	n/a	551.45 i	1	Combination
3	G3-G4	2.31	15	Cir	113	550.23	550.80	0.504	551.45	551.56	n/a	551.70 i	2	Combination
4	G4-G5	1.93	15	Cir	105	550.80	551.33	0.505	551.70	551.89	n/a	552.14 i	3	Combination
5	G5-G6	1.33	15	Cir	25	551.33	551.46	0.520	552.14	552.14	0.09	552.23	4	Combination
6	G6-G7	1.20	12	Cir	85	551.71	553.32	1.894	552.25	553.79	n/a	554.00 i	5	Combination
7	G7-G8	1.03	12	Cir	35	553.32	553.50	0.514	554.00	554.02	n/a	554.12 i	6	Combination
8	G3-G9	0.93	12	Cir	20	550.23	550.33	0.500	551.45*	551.46*	0.02	551.49	2	Combination

STORRS-SYSTEM G | Number of lines: 8 | Run Date: 03-28-2016

NOTES: Return period = 10 Yrs. ; *Surcharged (HGL above crown). ; i - Inlet control.

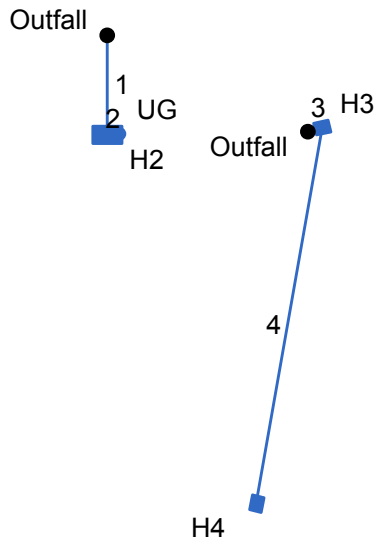
Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q byp (cfs)	Junc type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp line No
							Ht (in)	L (ft)	area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	G2 (STC900)	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
2	G3	1.02	0.19	1.21	0.00	Comb	3.0	2.73	3.14	2.31	1.35	Sag	1.35	0.030	0.030	0.000	0.02	0.78	0.19	1.24	2.0	Off
3	G4	0.56	0.20	0.57	0.19	Comb	3.0	2.73	0.00	2.31	1.35	0.013	1.35	0.030	0.030	0.013	0.13	4.47	0.25	2.61	2.0	2
4	G5	0.78	0.00	0.58	0.20	Comb	3.0	2.73	0.00	2.31	1.35	0.013	1.35	0.030	0.030	0.013	0.14	4.53	0.25	2.68	2.0	3
5	G6	0.19	0.00	0.19	0.00	Comb	3.0	2.73	0.00	2.31	1.35	0.013	1.35	0.030	0.030	0.013	0.08	2.67	0.15	0.96	2.0	8
6	G7	0.38	0.00	0.38	0.00	Comb	3.0	2.73	3.14	2.31	1.35	Sag	1.35	0.030	0.030	0.000	-0.08	-2.56	0.09	0.59	2.0	Off
7	G8	1.03	0.00	1.03	0.00	Comb	3.0	2.73	3.14	2.31	1.35	Sag	1.35	0.030	0.030	0.000	0.00	0.11	0.17	1.11	2.0	Off
8	G9	0.93	0.00	0.93	0.00	Comb	3.0	2.73	3.14	2.31	1.35	Sag	1.35	0.030	0.030	0.000	-0.01	-0.22	0.16	1.04	2.0	Off

STORRS-SYSTEM G | Number of lines: 8 | Run Date: 03-28-2016

NOTES: Inlet N-Values = 0.016 ; Intensity = 54.74 / (Inlet time + 10.80) ^ 0.80; Return period = 10 Yrs. ; * Indicates Known Q added. All curb inlets are Horiz throat.

STORRS-SYSTEM H



Project File: SYSTEM-H.stm	Number of lines: 4	Date: 03-28-2016

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	34	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	3.10	2.73	3.95	12	0.50	551.50	551.67	552.50	552.67	553.00	555.25	OUT-H2
2	1	4	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	3.10	0.00	3.95	12	0.00	551.67	551.67	552.96	552.98	555.25	555.00	H2-UG
3	End	5	0.53	0.88	0.82	0.43	0.53	5.0	5.9	5.7	3.02	0.00	3.84	12	0.00	551.67	551.67	552.67	552.70	555.00	554.50	UG-H3
4	3	131	0.35	0.35	0.26	0.09	0.09	5.0	5.0	6.0	0.55	2.74	1.07	12	0.50	551.83	552.49	552.93	552.97	554.50	555.00	H3-H4

STORRS-SYSTEM H | Number of lines: 4 | Run Date: 03-28-2016

NOTES: Intensity = 54.74 / (Inlet time + 10.80) ^ 0.80; Return period = 10 Yrs. ; c = cir e = ellip b = box

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.	Junction Type
1	OUT-H2	3.10	12	Cir	34	551.50	551.67	0.500	552.50	552.67	n/a	552.96 i	End	Manhole
2	H2-UG	3.10	12	Cir	4	551.67	551.67	0.000	552.96*	552.98*	0.24	553.23	1	Manhole
3	UG-H3	3.02	12	Cir	5	551.67	551.67	0.000	552.67*	552.70*	n/a	552.93 i	End	Combination
4	H3-H4	0.55	12	Cir	131	551.83	552.49	0.504	552.93	552.97	0.03	553.01	3	Grate

STORRS-SYSTEM H | Number of lines: 4 | Run Date: 03-28-2016

NOTES: Return period = 10 Yrs. ; *Surcharged (HGL above crown). ; i - Inlet control.

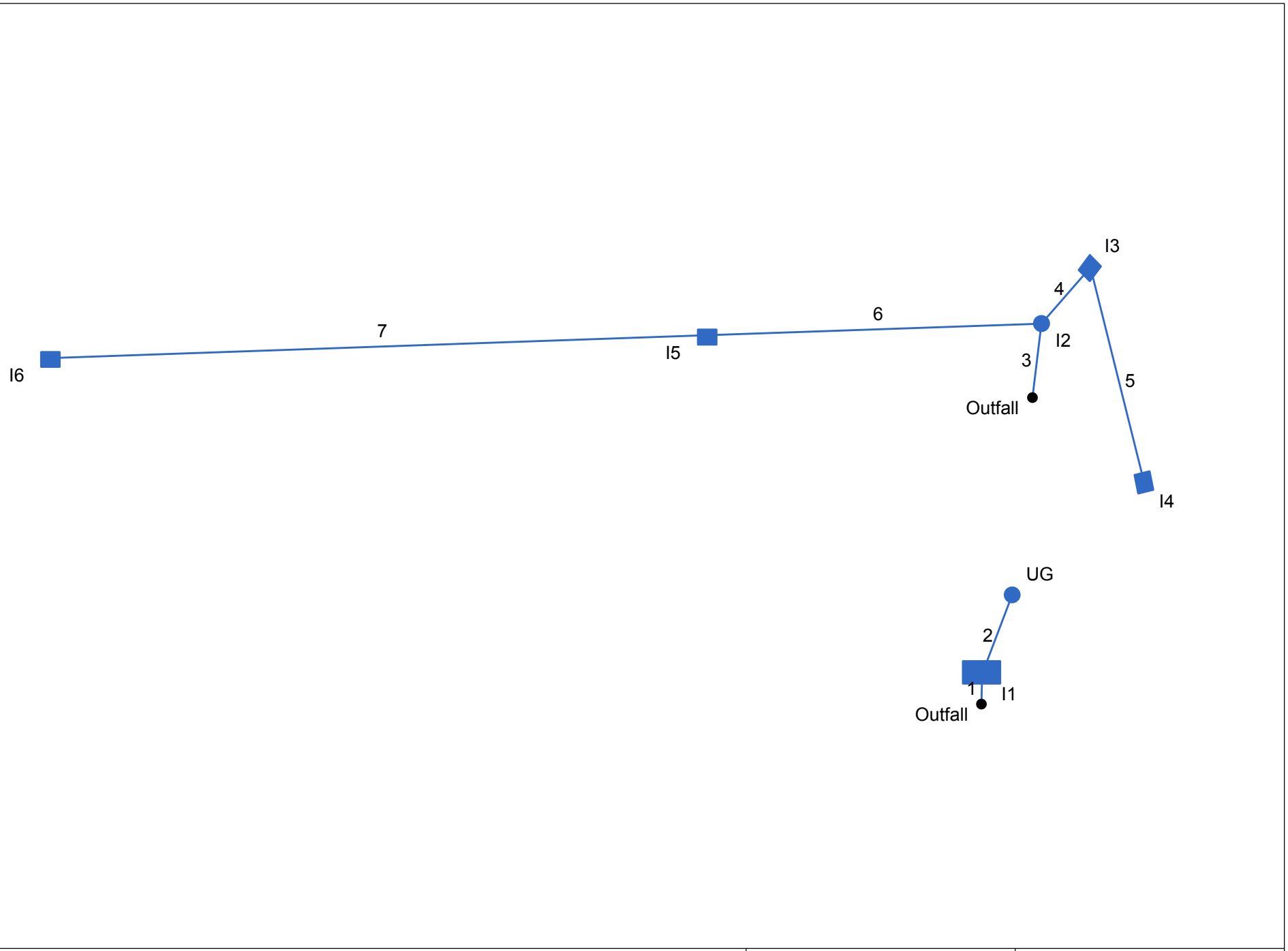
Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q byp (cfs)	Junc type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp line No
							Ht (in)	L (ft)	area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	H2	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
2	UG	3.10*	0.00	0.00	3.10	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
3	H3	2.60	0.00	2.60	0.00	Comb	3.0	2.73	3.14	2.31	1.35	Sag	1.35	0.030	0.030	0.000	0.15	5.11	0.32	5.11	2.0	Off
4	H4	0.55	0.00	0.55	0.00	Grate	0.0	0.00	3.14	2.31	1.35	Sag	1.35	0.030	0.030	0.000	-0.06	-1.91	0.11	0.71	2.0	Off

STORRS-SYSTEM H | Number of lines: 4 | Run Date: 03-28-2016

NOTES: Inlet N-Values = 0.016 ; Intensity = 54.74 / (Inlet time + 10.80) ^ 0.80; Return period = 10 Yrs. ; * Indicates Known Q added. All curb inlets are Horiz throat.

STORRS-SYSTEM I



Project File: SYSTEM-I.stm	Number of lines: 7	Date: 03-29-2016

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	8	0.00	0.00	0.00	0.00	0.00	0.0	0.2	0.0	5.51	8.57	5.57	15	1.50	547.62	547.74	548.56	548.68	555.82	556.66	OUT-I1
2	1	23	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	5.51	0.00	3.12	18	0.00	548.00	548.00	549.50	549.55	556.66	556.00	I1-UG
3	End	20	0.00	1.41	0.00	0.00	1.00	0.0	6.8	5.5	5.51	0.00	3.12	18	0.00	548.00	548.00	549.50	549.55	554.00	553.95	UG-I2
4	3	20	0.64	0.82	0.72	0.46	0.60	5.0	5.4	5.9	3.50	3.86	5.39	12	1.00	550.00	550.20	550.75	551.00	553.95	553.41	I2-I3
5	4	60	0.18	0.18	0.75	0.14	0.14	5.0	5.0	6.0	0.81	2.73	1.03	12	0.50	550.20	550.50	551.65	551.68	553.41	554.05	I3-I4
6	3	90	0.21	0.59	0.54	0.11	0.41	5.0	6.2	5.7	2.30	5.46	5.48	12	2.00	550.00	551.80	550.45	552.44	553.95	555.29	I2-I5
7	6	176	0.38	0.38	0.77	0.29	0.29	5.0	5.0	6.0	1.75	2.73	2.88	12	0.50	551.80	552.68	552.83	553.29	555.29	556.13	I5-I6

STORRS-SYSTEM I | Number of lines: 7 | Run Date: 03-29-2016

NOTES: Intensity = 54.74 / (Inlet time + 10.80) ^ 0.80; Return period = 10 Yrs. ; c = cir e = ellip b = box

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.	Junction Type
1	OUT-I1	5.51	15	Cir	8	547.62	547.74	1.500	548.56	548.68	n/a	549.37 i	End	Manhole
2	I1-UG	5.51	18	Cir	23	548.00	548.00	0.000	549.50*	549.55*	0.15	549.70	1	Manhole
3	UG-I2	5.51	18	Cir	20	548.00	548.00	0.000	549.50*	549.55*	0.15	549.70	End	Manhole
4	I2-I3	3.50	12	Cir	20	550.00	550.20	1.000	550.75	551.00	n/a	551.65 i	3	Curb-Horiz
5	I3-I4	0.81	12	Cir	60	550.20	550.50	0.500	551.65*	551.68*	0.02	551.70	4	Combination
6	I2-I5	2.30	12	Cir	90	550.00	551.80	2.000	550.45	552.44	n/a	552.83 i	3	Combination
7	I5-I6	1.75	12	Cir	176	551.80	552.68	0.500	552.83	553.29	n/a	553.55 i	6	Combination

STORRS-SYSTEM I | Number of lines: 7 | Run Date: 03-29-2016

NOTES: Return period = 10 Yrs. ; *Surcharged (HGL above crown). ; i - Inlet control.

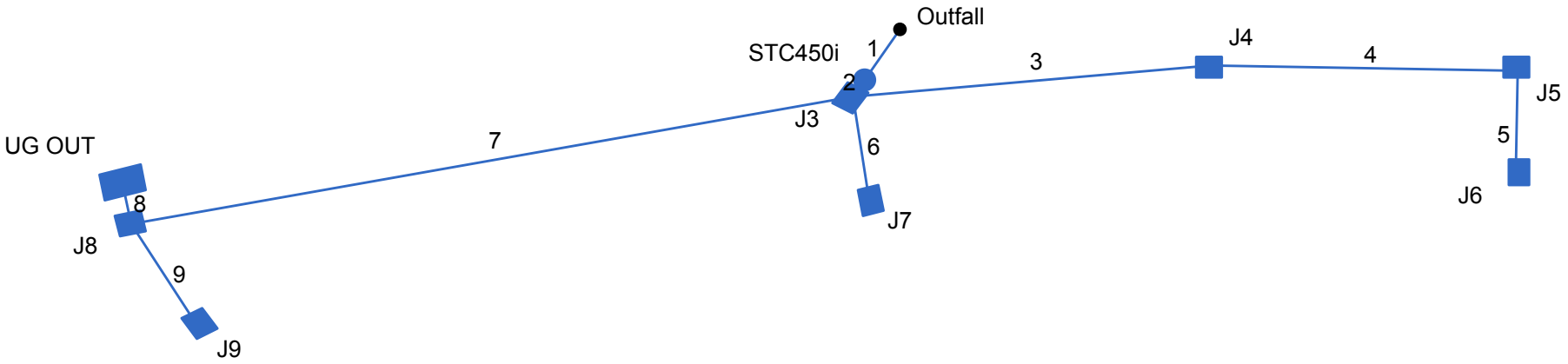
Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q byp (cfs)	Junc type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp line No
							Ht (in)	L (ft)	area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	I1	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
2	UG	5.51*	0.00	0.00	5.51	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
3	I2	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
4	I3	2.76	0.00	2.76	0.00	Curb	3.0	2.73	0.00	0.00	0.00	Sag	1.35	0.030	0.030	0.000	0.38	12.55	0.54	12.55	2.0	Off
5	I4	0.81	0.00	0.81	0.00	Comb	3.0	2.73	3.14	2.31	1.35	Sag	1.35	0.030	0.030	0.000	-0.02	-0.56	0.15	0.98	2.0	Off
6	I5	0.68	0.67	1.35	0.00	Comb	3.0	2.73	3.14	2.31	1.35	Sag	1.35	0.030	0.030	0.000	0.04	1.44	0.21	1.44	2.0	Off
7	I6	1.75	0.00	1.08	0.67	Comb	3.0	2.73	0.00	2.31	1.35	0.020	1.35	0.030	0.030	0.013	0.17	5.63	0.29	4.28	2.0	6

STORRS-SYSTEM I | Number of lines: 7 | Run Date: 03-29-2016

NOTES: Inlet N-Values = 0.016 ; Intensity = 54.74 / (Inlet time + 10.80) ^ 0.80; Return period = 10 Yrs. ; * Indicates Known Q added. All curb inlets are Horiz throat.

STORRS-SYSTEM J



Project File: SYSTEM-J.stm	Number of lines: 9	Date: 03-28-2016

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	12	0.00	0.75	0.00	0.00	0.58	0.0	6.1	5.7	8.78	17.33	5.24	24	0.50	546.00	546.06	547.05	547.11	552.00	552.60	OUT-STC900
2	1	4	0.10	0.75	0.71	0.07	0.58	5.0	6.1	5.7	8.78	27.39	3.49	24	1.25	546.14	546.19	547.67	547.66	552.60	551.76	STC900-J3
3	2	70	0.04	0.33	0.72	0.03	0.29	5.0	5.5	5.8	1.69	3.23	2.15	12	0.70	546.19	546.68	547.80	547.93	551.76	550.37	J3-J4
4	3	60	0.11	0.29	0.90	0.10	0.26	5.0	5.1	5.9	1.55	2.73	1.98	12	0.50	546.68	546.98	547.98	548.07	550.37	549.97	J4-J5
5	4	20	0.18	0.18	0.90	0.16	0.16	5.0	5.0	6.0	0.97	2.73	1.24	12	0.50	546.98	547.08	548.20	548.22	549.97	549.97	J5-J6
6	2	20	0.08	0.08	0.76	0.06	0.06	5.0	5.0	6.0	0.36	2.73	2.34	12	0.50	548.16	548.26	548.41	548.52	551.76	551.76	J7-J3
7	2	143	0.09	0.24	0.81	0.07	0.16	5.0	5.2	5.9	6.43	7.00	5.24	15	1.00	546.19	547.62	547.80	549.01	551.76	555.82	J3-J8
8	7	8	0.00	0.00	0.00	0.00	0.00	5.0	5.0	0.0	5.51	8.57	4.49	15	1.50	547.62	547.74	549.55	549.59	555.82	556.66	UG-OUT-J8
9	7	24	0.15	0.15	0.55	0.08	0.08	5.0	5.0	6.0	0.49	3.86	2.93	12	1.00	552.24	552.48	552.48	552.78	555.82	555.48	J8-J9

STORRS-SYSTEM J

Number of lines: 9

Run Date: 03-28-2016

NOTES: Intensity = 54.74 / (Inlet time + 10.80) ^ 0.80; Return period = 10 Yrs. ; c = cir e = ellip b = box

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.	Junction Type
1	OUT-STC900	8.78	24	Cir	12	546.00	546.06	0.500	547.05	547.11	n/a	547.67 i	End	Manhole
2	STC900-J3	8.78	24	Cir	4	546.14	546.19	1.250	547.67	547.66	n/a	547.80 i	1	Combination
3	J3-J4	1.69	12	Cir	70	546.19	546.68	0.700	547.80*	547.93*	0.04	547.97	2	Combination
4	J4-J5	1.55	12	Cir	60	546.68	546.98	0.500	547.98*	548.07*	0.09	548.17	3	Combination
5	J5-J6	0.97	12	Cir	20	546.98	547.08	0.500	548.20*	548.22*	0.02	548.24	4	Combination
6	J7-J3	0.36	12	Cir	20	548.16	548.26	0.500	548.41	548.52	n/a	548.58 i	2	Combination
7	J3-J8	6.43	15	Cir	143	546.19	547.62	1.000	547.80*	549.01*	n/a	549.55 i	2	Combination
8	UG-OUT-J8	5.51	15	Cir	8	547.62	547.74	1.500	549.55*	549.59*	0.31	549.91	7	Manhole
9	J8-J9	0.49	12	Cir	24	552.24	552.48	1.000	552.48	552.78	n/a	552.87 i	7	Combination

STORRS-SYSTEM J | Number of lines: 9 | Run Date: 03-28-2016

NOTES: Return period = 10 Yrs. ; *Surcharged (HGL above crown). ; i - Inlet control.

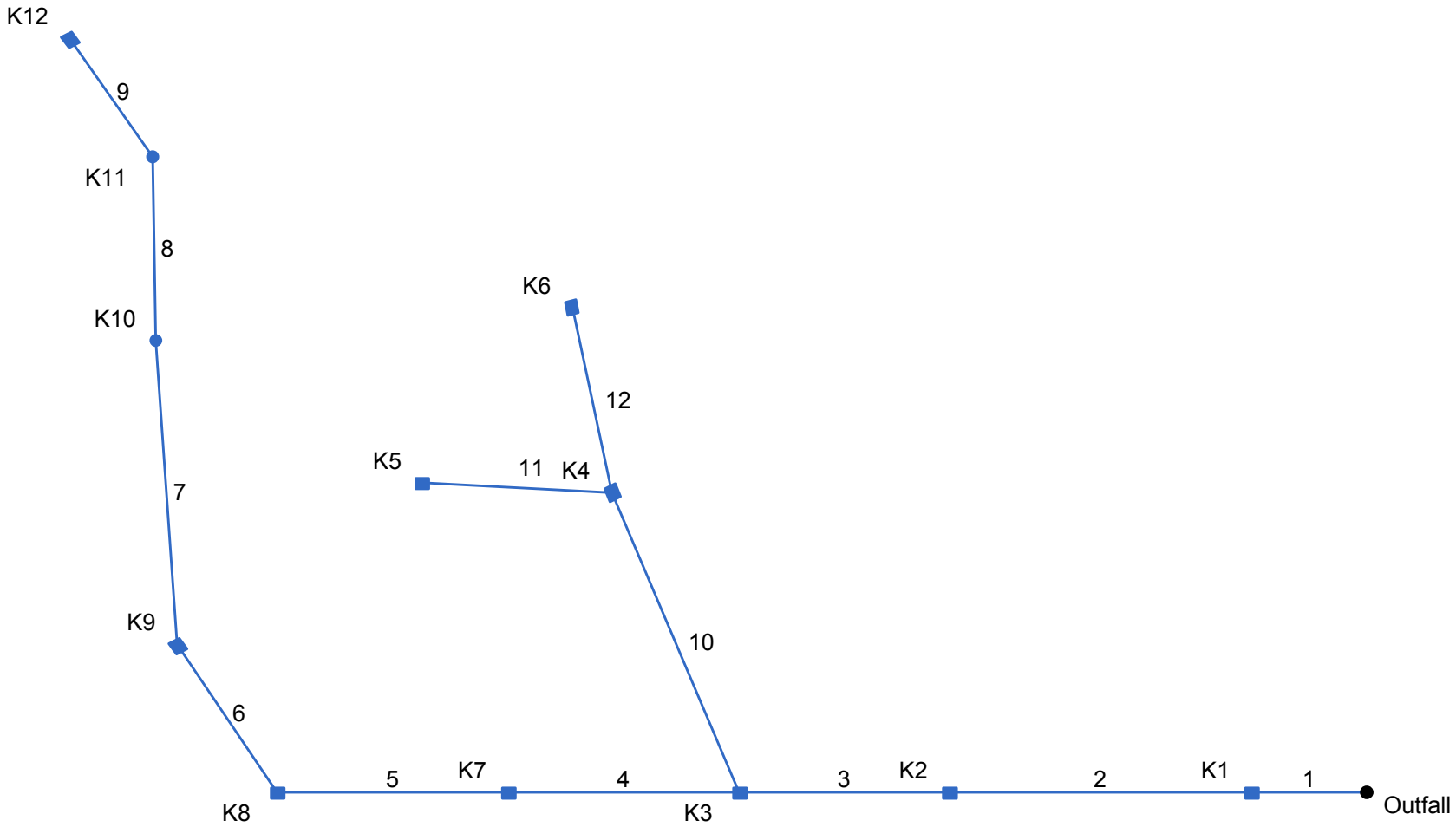
Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q byp (cfs)	Junc type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp line No
							Ht (in)	L (ft)	area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	STC450i	0.00	0.10	0.00	0.10	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
2	J3	0.43	0.12	0.45	0.10	Comb	3.0	2.73	0.00	2.31	1.35	0.027	1.35	0.030	0.030	0.013	0.10	3.47	0.19	1.24	2.0	1
3	J4	0.17	0.00	0.17	0.00	Comb	3.0	2.73	0.00	2.31	1.35	0.010	1.35	0.030	0.030	0.013	0.08	2.70	0.15	0.97	2.0	2
4	J5	0.59	0.00	0.59	0.00	Comb	3.0	2.73	3.14	2.31	1.35	Sag	1.35	0.030	0.030	0.000	-0.05	-1.56	0.12	0.78	2.0	Off
5	J6	0.97	0.00	0.97	0.00	Comb	3.0	2.73	3.14	2.31	1.35	Sag	1.35	0.030	0.030	0.000	0.00	0.11	0.17	1.11	2.0	Off
6	J7	0.36	0.08	0.38	0.07	Comb	3.0	2.73	0.00	2.31	1.35	0.027	1.35	0.030	0.030	0.013	0.10	3.20	0.18	1.15	2.0	2
7	J8	0.44	0.00	0.38	0.06	Comb	3.0	2.73	0.00	2.31	1.35	0.027	1.35	0.030	0.030	0.013	0.10	3.17	0.18	1.14	2.0	2
8	UG OUT	5.51*	0.00	0.00	5.51	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
9	J9	0.49	0.00	0.41	0.08	Comb	3.0	2.73	0.00	2.31	1.35	0.027	1.35	0.030	0.030	0.013	0.10	3.33	0.18	1.19	2.0	6

STORRS-SYSTEM J | Number of lines: 9 | Run Date: 03-28-2016

NOTES: Inlet N-Values = 0.016 ; Intensity = 54.74 / (Inlet time + 10.80) ^ 0.80; Return period = 10 Yrs. ; * Indicates Known Q added. All curb inlets are Horiz throat.

STORRS-SYSTEM K



Project File: SYSTEM-K.stm	Number of lines: 12	Date: 03-28-2016

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	44	0.33	3.06	0.51	0.17	2.23	5.0	9.5	4.9	10.90	12.86	6.88	18	1.50	544.00	544.66	545.26	545.92	550.68	549.50	OUT-K1
2	1	115	0.35	2.73	0.80	0.28	2.06	5.0	8.8	5.0	10.39	11.38	5.88	18	1.00	545.30	546.45	547.17	548.13	549.50	551.51	K1-K2
3	2	80	0.50	2.38	0.75	0.38	1.78	5.0	8.2	5.2	9.18	9.52	5.19	18	0.70	546.45	547.01	548.82	549.34	551.51	551.51	K2-K3
4	3	88	0.23	1.31	0.57	0.13	0.97	5.0	7.6	5.3	5.12	5.87	4.17	15	0.70	547.26	547.88	550.08	550.55	551.51	552.00	K3-K7
5	4	88	0.71	1.08	0.79	0.56	0.84	5.0	7.1	5.4	4.54	6.24	3.70	15	0.80	547.88	548.58	550.74	551.11	552.00	553.09	K7-K8
6	5	68	0.07	0.37	0.79	0.06	0.27	5.0	6.6	5.5	1.52	6.68	2.17	12	3.00	548.83	550.87	551.54	551.63	553.09	554.83	K8-K9
7	6	116	0.09	0.30	0.55	0.05	0.22	5.0	5.8	5.7	1.26	6.34	2.65	12	2.70	550.87	554.00	551.66	554.48	554.83	557.00	K9-K10
8	7	70	0.00	0.21	0.00	0.00	0.17	0.0	5.4	5.9	1.00	4.05	2.42	12	1.10	554.00	554.77	554.70	555.19	557.00	559.68	K10-K11
9	8	55	0.21	0.21	0.81	0.17	0.17	5.0	5.0	6.0	1.02	2.75	2.60	12	0.51	554.77	555.05	555.38	555.48	559.68	558.03	K11-K12
10	3	124	0.14	0.57	0.79	0.11	0.44	5.0	5.5	5.8	2.55	4.53	3.88	12	1.38	548.51	550.22	550.19	550.90	551.51	553.22	K3-K4
11	10	72	0.30	0.30	0.80	0.24	0.24	5.0	5.0	6.0	1.44	3.86	2.70	12	1.00	550.22	550.94	551.32	551.45	553.22	555.10	K4-K5
12	10	72	0.13	0.13	0.66	0.09	0.09	5.0	5.0	6.0	0.51	2.73	0.73	12	0.50	550.22	550.58	551.32	551.33	553.22	555.00	K5-K6

STORRS-SYSTEM K | Number of lines: 12 | Run Date: 03-28-2016

NOTES: Intensity = 54.74 / (Inlet time + 10.80) ^ 0.80; Return period = 10 Yrs. ; c = cir e = ellip b = box

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.	Junction Type
1	OUT-K1	10.90	18	Cir	44	544.00	544.66	1.500	545.26	545.92	n/a	547.17 i	End	Grate
2	K1-K2	10.39	18	Cir	115	545.30	546.45	1.000	547.17*	548.13*	n/a	548.82 i	1	Combination
3	K2-K3	9.18	18	Cir	80	546.45	547.01	0.700	548.82*	549.34*	0.59	549.93	2	Combination
4	K3-K7	5.12	15	Cir	88	547.26	547.88	0.705	550.08*	550.55*	0.14	550.68	3	Grate
5	K7-K8	4.54	15	Cir	88	547.88	548.58	0.795	550.74*	551.11*	0.27	551.39	4	Combination
6	K8-K9	1.52	12	Cir	68	548.83	550.87	3.000	551.54	551.63	n/a	551.66 i	5	Combination
7	K9-K10	1.26	12	Cir	116	550.87	554.00	2.698	551.66	554.48	n/a	554.70 i	6	Grate
8	K10-K11	1.00	12	Cir	70	554.00	554.77	1.100	554.70	555.19	n/a	555.38 i	7	Manhole
9	K11-K12	1.02	12	Cir	55	554.77	555.05	0.509	555.38	555.48	n/a	555.66 i	8	Combination
10	K3-K4	2.55	12	Cir	124	548.51	550.22	1.379	550.19	550.90	n/a	551.32 i	3	Combination
11	K4-K5	1.44	12	Cir	72	550.22	550.94	1.000	551.32	551.45	n/a	551.70 i	10	Combination
12	K5-K6	0.51	12	Cir	72	550.22	550.58	0.500	551.32	551.33	0.01	551.34	10	Combination

STORRS-SYSTEM K | Number of lines: 12 | Run Date: 03-28-2016

NOTES: Return period = 10 Yrs. ; *Surcharged (HGL above crown). ; i - Inlet control.

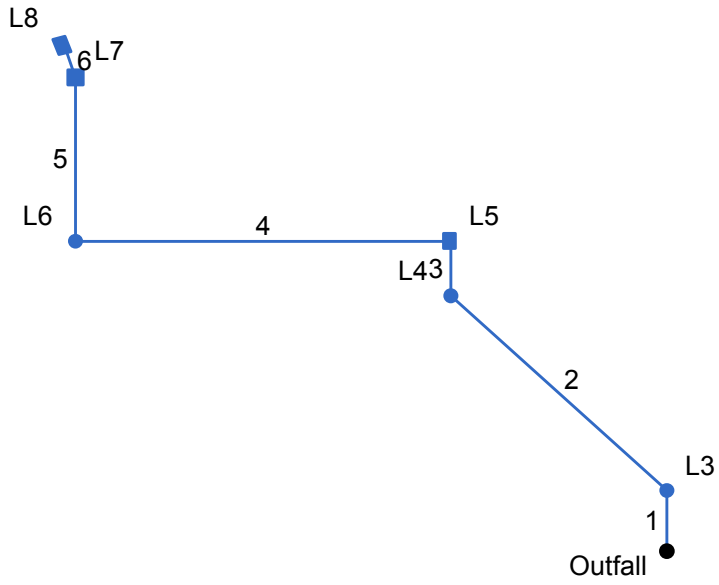
Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q byp (cfs)	Junc type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp line No
							Ht (in)	L (ft)	area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	K1	1.01	0.00	1.01	0.00	Grate	0.0	0.00	3.14	2.31	1.35	Sag	1.35	0.050	0.020	0.000	0.04	0.78	0.16	1.15	2.0	Off
2	K2	1.68	0.00	1.68	0.00	Comb	3.0	2.73	3.14	2.31	1.35	Sag	1.35	0.030	0.030	0.000	0.07	2.44	0.24	2.44	2.0	Off
3	K3	2.25	0.00	2.25	0.00	Comb	3.0	2.73	3.14	2.31	1.35	Sag	1.35	0.030	0.030	0.000	0.12	4.11	0.29	4.11	2.0	Off
4	K7	0.79	0.00	0.79	0.00	Grate	0.0	0.00	3.14	2.31	1.35	Sag	1.35	0.030	0.030	0.000	-0.03	-0.90	0.14	0.91	2.0	Off
5	K8	3.36	0.00	3.36	0.00	Comb	3.0	5.88	6.26	4.62	1.35	Sag	1.35	0.030	0.030	0.000	0.12	4.11	0.29	4.11	2.0	Off
6	K9	0.33	0.00	0.33	0.00	Comb	3.0	2.73	3.14	2.31	1.35	Sag	1.35	0.030	0.030	0.000	-0.09	-2.89	0.08	0.52	2.0	Off
7	K10	0.30	0.00	0.30	0.00	Grate	0.0	0.00	1.00	1.00	1.00	Sag	1.35	0.030	0.030	0.000	-0.06	-2.13	0.10	0.67	2.0	Off
8	K11	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
9	K12	1.02	0.00	1.02	0.00	Comb	3.0	2.73	3.14	2.31	1.35	Sag	1.35	0.030	0.030	0.000	0.00	0.11	0.17	1.11	2.0	Off
10	K4	0.66	0.00	0.66	0.00	Comb	3.0	2.73	3.14	2.31	1.35	Sag	1.35	0.030	0.030	0.000	-0.04	-1.22	0.13	0.85	2.0	Off
11	K5	1.44	0.00	1.44	0.00	Comb	3.0	2.73	3.14	2.31	1.35	Sag	1.35	0.030	0.030	0.000	0.04	1.44	0.21	1.44	2.0	Off
12	K6	0.51	0.00	0.51	0.00	Comb	3.0	2.73	3.14	2.31	1.35	Sag	1.35	0.030	0.030	0.000	-0.06	-1.89	0.11	0.72	2.0	Off

STORRS-SYSTEM K | Number of lines: 12 | Run Date: 03-28-2016

NOTES: Inlet N-Values = 0.016 ; Intensity = 54.74 / (Inlet time + 10.80) ^ 0.80; Return period = 10 Yrs. ; * Indicates Known Q added. All curb inlets are Horiz throat.

STORRS-SYSTEM L



Project File: SYSTEM-L.stm	Number of lines: 6	Date: 03-28-2016

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	20	0.00	0.48	0.00	0.00	0.39	0.0	7.0	5.4	2.11	0.00	1.72	15	0.00	544.00	544.00	545.25	545.27	550.00	549.93	UG-L3
2	1	96	0.00	0.48	0.00	0.00	0.39	0.0	6.4	5.6	2.17	2.73	3.86	12	0.50	544.81	545.29	545.48	545.96	549.93	550.95	L3-L4
3	2	18	0.20	0.48	0.85	0.17	0.39	5.0	6.3	5.6	2.18	2.73	2.80	12	0.50	545.29	545.38	546.28	546.33	550.95	550.05	L4-L5
4	3	124	0.00	0.28	0.00	0.00	0.22	0.0	5.4	5.9	1.27	7.72	2.53	12	4.00	545.38	550.34	546.38	550.82	550.05	555.23	L5-L6
5	4	54	0.13	0.28	0.83	0.11	0.22	5.0	5.1	6.0	1.30	2.73	2.72	12	0.50	550.34	550.61	551.05	551.12	555.23	553.67	L6-L7
6	5	12	0.15	0.15	0.73	0.11	0.11	5.0	5.0	6.0	0.66	2.73	1.15	12	0.50	550.61	550.67	551.33	551.33	553.67	553.67	L7-L8

STORRS-SYSTEM L | Number of lines: 6 | Run Date: 03-28-2016

NOTES: Intensity = 54.74 / (Inlet time + 10.80) ^ 0.80; Return period = 10 Yrs. ; c = cir e = ellip b = box

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.	Junction Type
1	UG-L3	2.11	15	Cir	20	544.00	544.00	0.000	545.25*	545.27*	0.04	545.30	End	Manhole
2	L3-L4	2.17	12	Cir	96	544.81	545.29	0.500	545.48	545.96	n/a	546.28 i	1	Manhole
3	L4-L5	2.18	12	Cir	18	545.29	545.38	0.500	546.28	546.33	n/a	546.38 i	2	Combination
4	L5-L6	1.27	12	Cir	124	545.38	550.34	4.000	546.38	550.82	n/a	551.05 i	3	Manhole
5	L6-L7	1.30	12	Cir	54	550.34	550.61	0.500	551.05	551.12	n/a	551.33 i	4	Combination
6	L7-L8	0.66	12	Cir	12	550.61	550.67	0.500	551.33	551.33	0.02	551.35	5	Combination

STORRS-SYSTEM L | Number of lines: 6 | Run Date: 03-28-2016

NOTES: Return period = 10 Yrs. ; *Surcharged (HGL above crown). ; i - Inlet control.

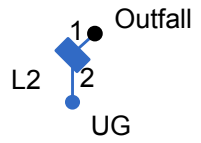
Inlet Report

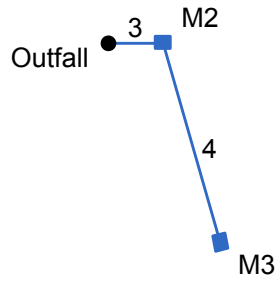
Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q byp (cfs)	Junc type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp line No
							Ht (in)	L (ft)	area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	L3	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
2	L4	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
3	L5	1.02	0.00	1.02	0.00	Comb	3.0	2.73	3.14	2.31	1.35	Sag	1.35	0.030	0.030	0.000	0.00	0.11	0.17	1.11	2.0	Off
4	L6	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
5	L7	0.65	0.00	0.65	0.00	Comb	3.0	2.73	3.14	2.31	1.35	Sag	1.35	0.030	0.030	0.000	-0.04	-1.22	0.13	0.85	2.0	Off
6	L8	0.66	0.00	0.66	0.00	Comb	3.0	2.73	3.14	2.31	1.35	Sag	1.35	0.030	0.030	0.000	-0.04	-1.22	0.13	0.85	2.0	Off

STORRS-SYSTEM L | Number of lines: 6 | Run Date: 03-28-2016

NOTES: Inlet N-Values = 0.016 ; Intensity = 54.74 / (Inlet time + 10.80) ^ 0.80; Return period = 10 Yrs. ; * Indicates Known Q added. All curb inlets are Horiz throat.

STORRS-SYSTEM M





Project File: SYSTEM-M.stm	Number of lines: 4	Date: 03-28-2016

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	10	0.00	0.00	0.00	0.00	0.00	0.0	0.1	0.0	10.00	0.00	3.18	24	0.00	544.00	544.00	546.00	546.02	550.00	549.55	OUT-L2
2	1	16	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	10.00	0.00	3.18	24	0.00	544.00	544.00	546.14	546.17	549.55	549.55	L2-UG
3	End	18	0.45	0.57	0.78	0.35	0.45	5.0	6.5	5.6	2.50	0.00	3.44	15	0.00	544.00	544.00	544.65	544.81	550.25	548.63	UG-M2
4	3	68	0.12	0.12	0.82	0.10	0.10	5.0	5.0	6.0	0.59	2.73	2.70	12	0.50	546.00	546.34	546.32	546.67	548.63	549.34	M2-M1

STORRS-SYSTEM M

Number of lines: 4

Run Date: 03-28-2016

NOTES: Intensity = 54.74 / (Inlet time + 10.80) ^ 0.80; Return period = 10 Yrs. ; c = cir e = ellip b = box

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.	Junction Type
1	OUT-L2	10.00	24	Cir	10	544.00	544.00	0.000	546.00*	546.02*	0.12	546.14	End	Manhole
2	L2-UG	10.00	24	Cir	16	544.00	544.00	0.000	546.14*	546.17*	0.16	546.32	1	Manhole
3	UG-M2	2.50	15	Cir	18	544.00	544.00	0.000	544.65	544.81	n/a	544.95 i	End	Combination
4	M2-M1	0.59	12	Cir	68	546.00	546.34	0.500	546.32	546.67	n/a	546.77 i	3	Combination

STORRS-SYSTEM M | Number of lines: 4 | Run Date: 03-28-2016

NOTES: Return period = 10 Yrs. ; *Surcharged (HGL above crown). ; i - Inlet control.

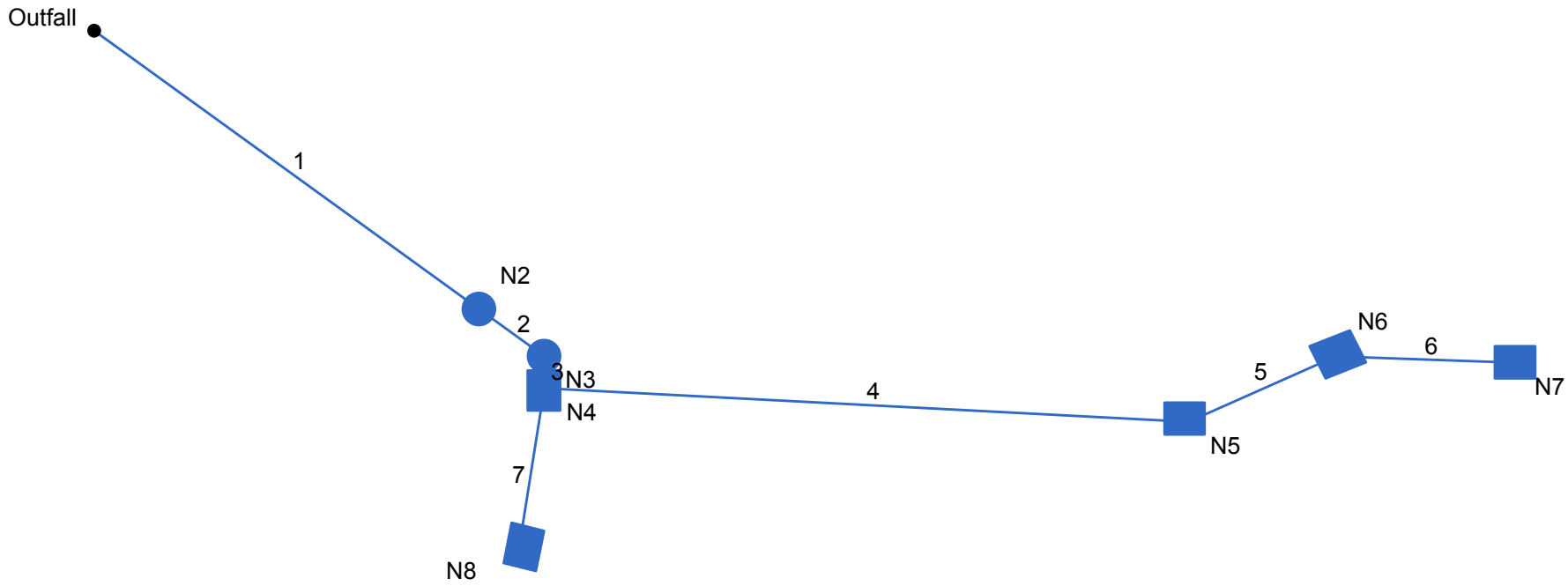
Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q byp (cfs)	Junc type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp line No
							Ht (in)	L (ft)	area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	L2	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
2	UG	10.00*	0.00	0.00	10.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
3	M2	2.10	0.00	2.10	0.00	Comb	3.0	2.73	3.14	2.31	1.35	Sag	1.35	0.030	0.030	0.000	0.10	3.44	0.27	3.44	2.0	Off
4	M3	0.59	0.00	0.59	0.00	Comb	3.0	2.73	3.14	2.31	1.35	Sag	1.35	0.030	0.030	0.000	-0.05	-1.56	0.12	0.78	2.0	Off

STORRS-SYSTEM M | Number of lines: 4 | Run Date: 03-28-2016

NOTES: Inlet N-Values = 0.016 ; Intensity = 54.74 / (Inlet time + 10.80) ^ 0.80; Return period = 10 Yrs. ; * Indicates Known Q added. All curb inlets are Horiz throat.

STORRS-SYSTEM N



Project File: SYSTEM-N.stm	Number of lines: 7	Date: 03-28-2016

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	59	0.00	0.34	0.00	0.00	0.24	0.0	5.9	5.7	4.23	9.13	4.94	15	2.00	546.00	547.18	546.82	548.00	548.00	555.50	OUT-N2
2	1	10	0.00	0.34	0.00	0.00	0.24	0.0	5.8	5.7	4.23	4.95	4.53	15	0.50	551.13	551.18	552.02	552.07	555.50	555.75	N2-STC450i
3	2	4	0.06	0.34	0.58	0.03	0.24	5.0	5.8	5.8	4.24	9.89	3.45	15	2.00	551.18	551.26	552.51	552.53	555.75	554.71	STC450i-N4
4	3	80	0.03	0.11	0.82	0.02	0.08	5.0	5.3	5.9	3.32	12.71	3.58	15	3.30	551.26	553.90	552.60	554.63	554.71	559.17	N4-N5
5	4	20	0.00	0.08	0.00	0.00	0.06	5.0	5.1	5.9	3.17	4.95	2.77	15	0.50	553.90	554.00	555.04	555.07	559.17	561.20	N5-N6
6	5	22	0.08	0.08	0.72	0.06	0.06	5.0	5.0	6.0	0.35	9.41	3.97	12	5.95	557.70	559.01	557.83	559.26	561.20	562.51	N6-N7
7	3	20	0.17	0.17	0.75	0.13	0.13	5.0	5.0	6.0	0.76	2.73	0.97	12	0.50	551.51	551.61	552.60	552.60	554.71	554.71	N4-N8

STORRS-SYSTEM N | Number of lines: 7 | Run Date: 03-28-2016

NOTES: Intensity = 54.74 / (Inlet time + 10.80) ^ 0.80; Return period = 10 Yrs. ; c = cir e = ellip b = box

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.	Junction Type
1	OUT-N2	4.23	15	Cir	59	546.00	547.18	2.000	546.82	548.00	n/a	548.51 i	End	Manhole
2	N2-STC450i	4.23	15	Cir	10	551.13	551.18	0.500	552.02	552.07	n/a	552.51 i	1	Manhole
3	STC450i-N4	4.24	15	Cir	4	551.18	551.26	2.000	552.51*	552.53*	n/a	552.60 i	2	Combination
4	N4-N5	3.32	15	Cir	80	551.26	553.90	3.300	552.60	554.63	n/a	555.04 i	3	Combination
5	N5-N6	3.17	15	Cir	20	553.90	554.00	0.500	555.04	555.07	n/a	555.11 i	4	Combination
6	N6-N7	0.35	12	Cir	22	557.70	559.01	5.955	557.83	559.26	n/a	559.32 i	5	Combination
7	N4-N8	0.76	12	Cir	20	551.51	551.61	0.500	552.60	552.60	0.01	552.62	3	Combination

STORRS-SYSTEM N | Number of lines: 7 | Run Date: 03-28-2016

NOTES: Return period = 10 Yrs. ; *Surcharged (HGL above crown). ; i - Inlet control.

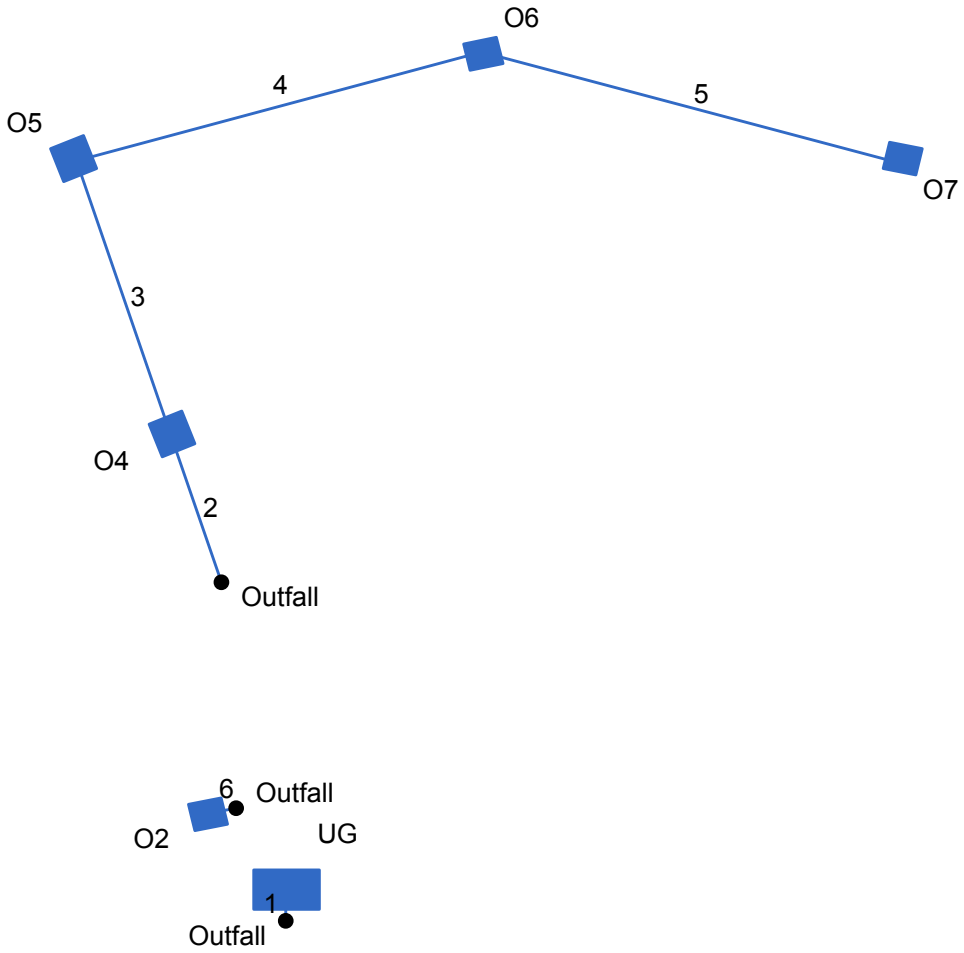
Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q byp (cfs)	Junc type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp line No
							Ht (in)	L (ft)	area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	N2	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
2	N3	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
3	N4	0.21	0.53	0.74	0.00	Comb	3.0	2.73	3.14	2.31	1.35	Sag	1.35	0.030	0.030	0.000	-0.03	-0.89	0.14	0.91	2.0	Off
4	N5	0.15	1.33	0.94	0.53	Comb	3.0	2.73	0.00	2.31	1.35	0.013	1.35	0.030	0.030	0.013	0.17	5.73	0.30	4.38	2.0	3
5	N6	2.83*	0.00	1.50	1.33	Comb	3.0	2.73	0.00	2.31	1.35	0.013	1.35	0.030	0.030	0.013	0.22	7.30	0.36	6.31	2.0	4
6	N7	0.35	0.00	0.35	0.00	Comb	3.0	2.73	0.00	2.31	1.35	0.013	1.35	0.030	0.030	0.013	0.10	3.33	0.18	1.20	2.0	Off
7	N8	0.76	0.00	0.76	0.00	Comb	3.0	2.73	3.14	2.31	1.35	Sag	1.35	0.030	0.030	0.000	-0.03	-0.89	0.14	0.91	2.0	Off

STORRS-SYSTEM N | Number of lines: 7 | Run Date: 03-28-2016

NOTES: Inlet N-Values = 0.016 ; Intensity = 54.74 / (Inlet time + 10.80) ^ 0.80; Return period = 10 Yrs. ; * Indicates Known Q added. All curb inlets are Horiz throat.

STORRS-SYSTEM O



Project File: SYSTEM-O.stm	Number of lines: 6	Date: 03-28-2016

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	5	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0	2.83	0.00	2.31	15	0.00	555.00	555.00	556.25	556.26	561.20	561.50	N6-UG
2	End	24	0.06	0.64	0.71	0.04	0.28	5.0	6.2	5.7	1.60	4.57	3.40	15	0.50	555.00	555.12	555.51	555.63	561.50	561.97	UG-O4
3	2	44	0.30	0.58	0.51	0.15	0.24	5.0	5.9	5.7	1.38	6.10	4.90	12	2.50	558.11	559.21	558.43	559.71	561.97	563.08	O4-O5
4	3	64	0.05	0.28	0.63	0.03	0.09	5.0	5.4	5.9	0.51	4.72	1.67	12	1.50	559.21	560.17	559.95	560.47	563.08	564.30	O5-O6
5	4	66	0.23	0.23	0.24	0.06	0.06	5.0	5.0	6.0	0.33	2.72	1.69	12	0.50	560.17	560.50	560.56	560.74	564.30	563.50	O6-O7
6	End	4	0.27	0.27	0.76	0.21	0.21	5.0	5.0	6.0	1.23	2.73	3.37	12	0.50	555.00	555.02	555.47	555.49	561.50	560.35	UG-O2

STORRS-SYSTEM O

Number of lines: 6

Run Date: 03-28-2016

NOTES: Intensity = 54.74 / (Inlet time + 10.80) ^ 0.80; Return period = 10 Yrs. ; c = cir e = ellip b = box

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.	Junction Type
1	N6-UG	2.83	15	Cir	5	555.00	555.00	0.000	556.25*	556.26*	0.08	556.34	End	Manhole
2	UG-O4	1.60	15	Cir	24	555.00	555.12	0.500	555.51	555.63	n/a	555.84 i	End	Curb-Horiz
3	O4-O5	1.38	12	Cir	44	558.11	559.21	2.500	558.43	559.71	n/a	559.95 i	2	Curb-Horiz
4	O5-O6	0.51	12	Cir	64	559.21	560.17	1.500	559.95	560.47	n/a	560.56 i	3	Grate
5	O6-O7	0.33	12	Cir	66	560.17	560.50	0.499	560.56	560.74	n/a	560.80 i	4	Combination
6	UG-O2	1.23	12	Cir	4	555.00	555.02	0.500	555.47	555.49	n/a	555.71 i	End	Combination

STORRS-SYSTEM O | Number of lines: 6 | Run Date: 03-28-2016

NOTES: Return period = 10 Yrs. ; *Surcharged (HGL above crown). ; i - Inlet control.

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q byp (cfs)	Junc type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp line No
							Ht (in)	L (ft)	area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	UG	2.83*	0.00	0.00	2.83	MH	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.0	Off
2	O4	0.26	0.00	0.26	0.00	Curb	3.0	2.73	0.00	0.00	0.00	Sag	1.35	0.030	0.030	0.000	0.08	2.54	0.24	2.54	2.0	Off
3	O5	0.92	0.00	0.92	0.00	Curb	3.0	2.73	0.00	0.00	0.00	Sag	1.35	0.030	0.030	0.000	0.18	5.99	0.35	5.99	2.0	Off
4	O6	0.19	0.00	0.19	0.00	Grate	0.0	0.00	3.14	2.31	1.35	Sag	1.35	0.030	0.030	0.000	-0.11	-3.76	0.05	0.35	2.0	Off
5	O7	0.33	0.00	0.33	0.00	Comb	3.0	2.73	3.14	2.31	1.35	Sag	1.35	0.030	0.030	0.000	-0.09	-2.89	0.08	0.52	2.0	Off
6	O2	1.23	0.00	1.23	0.00	Comb	3.0	2.73	3.14	2.31	1.35	Sag	1.35	0.030	0.030	0.000	0.02	0.78	0.19	1.24	2.0	Off

STORRS-SYSTEM O | Number of lines: 6 | Run Date: 03-28-2016

NOTES: Inlet N-Values = 0.016 ; Intensity = 54.74 / (Inlet time + 10.80) ^ 0.80; Return period = 10 Yrs. ; * Indicates Known Q added. All curb inlets are Horiz throat.

Stormceptor Design Summary

PCSWMM for Stormceptor

Project Information

Date	3/25/2016
Project Name	Storrs Lodges
Project Number	04161
Location	System F

Designer Information

Company	FAHA
Contact	G. Hesketh

Notes

N/A

Drainage Area

Total Area (ac)	0.546
Imperviousness (%)	55.3

The Stormceptor System model STC 450i achieves the water quality objective removing 87% TSS for a Fine (organics, silts and sand) particle size distribution.

Rainfall

Name	MANSFIELD HOLLOW LAKE
State	CT
ID	4488
Years of Records	1984 to 1997
Latitude	41°27'0"N
Longitude	72°6'36"W

Water Quality Objective

TSS Removal (%)	80

Upstream Storage

Storage (ac-ft)	Discharge (cfs)
0	0

Stormceptor Sizing Summary

Stormceptor Model	TSS Removal %
STC 450i	**87**
STC 900	92
STC 1200	92
STC 1800	92
STC 2400	94
STC 3600	95
STC 4800	96
STC 6000	96
STC 7200	97
STC 11000	98
STC 13000	98
STC 16000	98

Particle Size Distribution

Removing silt particles from runoff ensures that the majority of the pollutants, such as hydrocarbons and heavy metals that adhere to fine particles, are not discharged into our natural water courses. The table below lists the particle size distribution used to define the annual TSS removal.

Fine (organics, silts and sand)

Particle Size µm	Distribution %	Specific Gravity	Settling Velocity ft/s		Particle Size µm	Distribution %	Specific Gravity	Settling Velocity ft/s
20	20	1.3	0.0013					
60	20	1.8	0.0051					
150	20	2.2	0.0354					
400	20	2.65	0.2123					
2000	20	2.65	0.9417					

Stormceptor Design Notes

- Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor.
- Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal.
- Only the STC 450i is adaptable to function with a catch basin inlet and/or inline pipes.
- Only the Stormceptor models STC 450i to STC 7200 may accommodate multiple inlet pipes.
- Inlet and outlet invert elevation differences are as follows:

Inlet and Outlet Pipe Invert Elevations Differences

Inlet Pipe Configuration	STC 450i	STC 900 to STC 7200	STC 11000 to STC 16000
Single inlet pipe	3 in.	1 in.	3 in.
Multiple inlet pipes	3 in.	3 in.	Only one inlet pipe.

- Design estimates are based on stable site conditions only, after construction is completed.
- Design estimates assume that the storm drain is not submerged during zero flows. For submerged applications, please contact your local Stormceptor representative.
- Design estimates may be modified for specific spills controls. Please contact your local Stormceptor representative for further assistance.
- For pricing inquiries or assistance, please contact Rinker Materials 1 (800) 909-7763 www.rinkerstormceptor.com

Stormceptor Design Summary

PCSWMM for Stormceptor

Project Information

Date	3/25/2016
Project Name	Storrs Lodges
Project Number	04161
Location	System G

Designer Information

Company	FAHA
Contact	G. Hesketh

Notes

N/A

Drainage Area

Total Area (ac)	1.193
Imperviousness (%)	65

The Stormceptor System model STC 900 achieves the water quality objective removing 85% TSS for a Fine (organics, silts and sand) particle size distribution.

Rainfall

Name	MANSFIELD HOLLOW LAKE
State	CT
ID	4488
Years of Records	1984 to 1997
Latitude	41°27'0"N
Longitude	72°6'36"W

Water Quality Objective

TSS Removal (%)	80

Upstream Storage

Storage (ac-ft)	Discharge (cfs)
0	0

Stormceptor Sizing Summary

Stormceptor Model	TSS Removal %
STC 450i	78
STC 900	**85**
STC 1200	85
STC 1800	86
STC 2400	89
STC 3600	89
STC 4800	92
STC 6000	92
STC 7200	93
STC 11000	95
STC 13000	95
STC 16000	96

Particle Size Distribution

Removing silt particles from runoff ensures that the majority of the pollutants, such as hydrocarbons and heavy metals that adhere to fine particles, are not discharged into our natural water courses. The table below lists the particle size distribution used to define the annual TSS removal.

Fine (organics, silts and sand)

Particle Size µm	Distribution %	Specific Gravity	Settling Velocity ft/s		Particle Size µm	Distribution %	Specific Gravity	Settling Velocity ft/s
20	20	1.3	0.0013					
60	20	1.8	0.0051					
150	20	2.2	0.0354					
400	20	2.65	0.2123					
2000	20	2.65	0.9417					

Stormceptor Design Notes

- Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor.
- Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal.
- Only the STC 450i is adaptable to function with a catch basin inlet and/or inline pipes.
- Only the Stormceptor models STC 450i to STC 7200 may accommodate multiple inlet pipes.
- Inlet and outlet invert elevation differences are as follows:

Inlet and Outlet Pipe Invert Elevations Differences

Inlet Pipe Configuration	STC 450i	STC 900 to STC 7200	STC 11000 to STC 16000
Single inlet pipe	3 in.	1 in.	3 in.
Multiple inlet pipes	3 in.	3 in.	Only one inlet pipe.

- Design estimates are based on stable site conditions only, after construction is completed.
- Design estimates assume that the storm drain is not submerged during zero flows. For submerged applications, please contact your local Stormceptor representative.
- Design estimates may be modified for specific spills controls. Please contact your local Stormceptor representative for further assistance.
- For pricing inquiries or assistance, please contact Rinker Materials 1 (800) 909-7763 www.rinkerstormceptor.com

Stormceptor Design Summary

PCSWMM for Stormceptor

Project Information

Date	3/25/2016
Project Name	Storrs Lodges
Project Number	04161
Location	System J

Designer Information

Company	FAHA
Contact	G. Hesketh

Notes

N/A

Drainage Area

Total Area (ac)	0.737
Imperviousness (%)	78.4

The Stormceptor System model STC 450i achieves the water quality objective removing 81% TSS for a Fine (organics, silts and sand) particle size distribution.

Rainfall

Name	MANSFIELD HOLLOW LAKE
State	CT
ID	4488
Years of Records	1984 to 1997
Latitude	41°27'0"N
Longitude	72°6'36"W

Water Quality Objective

TSS Removal (%)	80

Upstream Storage

Storage (ac-ft)	Discharge (cfs)
0	0

Stormceptor Sizing Summary

Stormceptor Model	TSS Removal %
STC 450i	**81**
STC 900	87
STC 1200	88
STC 1800	88
STC 2400	91
STC 3600	91
STC 4800	93
STC 6000	93
STC 7200	95
STC 11000	96
STC 13000	96
STC 16000	97

Particle Size Distribution

Removing silt particles from runoff ensures that the majority of the pollutants, such as hydrocarbons and heavy metals that adhere to fine particles, are not discharged into our natural water courses. The table below lists the particle size distribution used to define the annual TSS removal.

Fine (organics, silts and sand)

Particle Size µm	Distribution %	Specific Gravity	Settling Velocity ft/s		Particle Size µm	Distribution %	Specific Gravity	Settling Velocity ft/s
20	20	1.3	0.0013					
60	20	1.8	0.0051					
150	20	2.2	0.0354					
400	20	2.65	0.2123					
2000	20	2.65	0.9417					

Stormceptor Design Notes

- Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor.
- Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal.
- Only the STC 450i is adaptable to function with a catch basin inlet and/or inline pipes.
- Only the Stormceptor models STC 450i to STC 7200 may accommodate multiple inlet pipes.
- Inlet and outlet invert elevation differences are as follows:

Inlet and Outlet Pipe Invert Elevations Differences

Inlet Pipe Configuration	STC 450i	STC 900 to STC 7200	STC 11000 to STC 16000
Single inlet pipe	3 in.	1 in.	3 in.
Multiple inlet pipes	3 in.	3 in.	Only one inlet pipe.

- Design estimates are based on stable site conditions only, after construction is completed.
- Design estimates assume that the storm drain is not submerged during zero flows. For submerged applications, please contact your local Stormceptor representative.
- Design estimates may be modified for specific spills controls. Please contact your local Stormceptor representative for further assistance.
- For pricing inquiries or assistance, please contact Rinker Materials 1 (800) 909-7763 www.rinkerstormceptor.com

Stormceptor Design Summary

PCSWMM for Stormceptor

Project Information

Date	3/25/2016
Project Name	Storrs Lodges
Project Number	04161
Location	System N

Designer Information

Company	FAHA
Contact	G. Hesketh

Notes

N/A

Drainage Area

Total Area (ac)	0.346
Imperviousness (%)	69.9

The Stormceptor System model STC 450i achieves the water quality objective removing 88% TSS for a Fine (organics, silts and sand) particle size distribution.

Rainfall

Name	MANSFIELD HOLLOW LAKE
State	CT
ID	4488
Years of Records	1984 to 1997
Latitude	41°27'0"N
Longitude	72°6'36"W

Water Quality Objective

TSS Removal (%)	80

Upstream Storage

Storage (ac-ft)	Discharge (cfs)
0	0

Stormceptor Sizing Summary

Stormceptor Model	TSS Removal %
STC 450i	**88**
STC 900	93
STC 1200	93
STC 1800	93
STC 2400	95
STC 3600	95
STC 4800	97
STC 6000	97
STC 7200	97
STC 11000	98
STC 13000	98
STC 16000	99

Particle Size Distribution

Removing silt particles from runoff ensures that the majority of the pollutants, such as hydrocarbons and heavy metals that adhere to fine particles, are not discharged into our natural water courses. The table below lists the particle size distribution used to define the annual TSS removal.

Fine (organics, silts and sand)

Particle Size µm	Distribution %	Specific Gravity	Settling Velocity ft/s		Particle Size µm	Distribution %	Specific Gravity	Settling Velocity ft/s
20	20	1.3	0.0013					
60	20	1.8	0.0051					
150	20	2.2	0.0354					
400	20	2.65	0.2123					
2000	20	2.65	0.9417					

Stormceptor Design Notes

- Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor.
- Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal.
- Only the STC 450i is adaptable to function with a catch basin inlet and/or inline pipes.
- Only the Stormceptor models STC 450i to STC 7200 may accommodate multiple inlet pipes.
- Inlet and outlet invert elevation differences are as follows:

Inlet and Outlet Pipe Invert Elevations Differences

Inlet Pipe Configuration	STC 450i	STC 900 to STC 7200	STC 11000 to STC 16000
Single inlet pipe	3 in.	1 in.	3 in.
Multiple inlet pipes	3 in.	3 in.	Only one inlet pipe.

- Design estimates are based on stable site conditions only, after construction is completed.
- Design estimates assume that the storm drain is not submerged during zero flows. For submerged applications, please contact your local Stormceptor representative.
- Design estimates may be modified for specific spills controls. Please contact your local Stormceptor representative for further assistance.
- For pricing inquiries or assistance, please contact Rinker Materials 1 (800) 909-7763 www.rinkerstormceptor.com

FAH
F. A. Hesketh & Associates, Inc.
6 Creamery Brook
East Granby, CT 06026
Civil & Traffic Engineers • Surveyors • Planners • Landscape Architects

JOB 04161 - STORRS
SHEET NO. _____ OF _____
CALCULATED BY DSZ DATE 3/24/16
CHECKED BY _____ DATE _____
SCALE _____

GROUNDWATER RECHARGE VOLUME (GRV)

PER CTDEEP SECTION 7.5.1 :

$$GRV = \frac{(D)(A)(I)}{12} \quad \text{(IN AC-FT)}$$

D = 0.25 (TABLE 7-4 - SOIL GROUP B)

A = 18.9 AC

I = 64.8% OR 0.648 (AVERAGED)

$$\text{REQ'D GRV} = \frac{(0.25)(18.9)(0.648)}{12} = 0.26 \text{ AC-FT}$$

INFILTRATION STORAGE PROVIDED = 1.2 AC-FT

∴ GRV IS MET WITH DESIGN

Storrs Lodges
DRAINAGE AREAS
Storm Drain Systems - Water Quality Volume Calculations

(USED FOR GRV)

March 24, 2016

WQV = (1")(R)(A)/12

R= volumetric runoff coefficient= 0.05+0.009 (I)
I = percent impervious coverage
A = site area, in acres

Watershed	Storm Drain System	Area (acres)	I (AVG)	R	Required WQV (Ac-Ft)	Required WQV (C.F.)	Required WQV (C.F.)	Provided WQV U.G. Storage (C.F.)	Provided WQV Biofiltration Basin (C.F.)	Provided WQV Total (C.F.)	TSS Removal * (%)
VIIIA	System A	1.855	79.0	0.761	0.1176	5124	**5124**	6741	1269	**8010**	NA
	~~System B**~~	~~0.433~~	~~0.0~~	~~0.050~~	~~0.0018~~	~~79~~	~~**79**~~	~~NA~~	~~NA~~	~~NA~~	~~NA~~
IIA	System C	1.537	81.7	0.785	0.1006	4381	**4381**	5243	1777	**7020**	NA
	System D	2.976	4.7	0.092	0.0229	997	**997**	NA	1044	**1044**	NA
IVA	System E	2.372	74.6	0.721	0.1426	6212	**6212**	7490	1796	**9286**	NA
	System F	0.546	55.3	0.548	0.0249	1086	**1086**	NA	2222	**2222**	87%
	System G ***	1.193	65.0	0.635	0.0631	2750	**2750**	NA	394	**394**	85%
IXA	System H	0.871	52.0	0.518	0.0376	1638	**1638**	1498	260	**1758**	NA
VIA	System I	1.41	68.6	0.667	0.0784	3416	**5437**	3745	2381	**6126**	NA
	System J	0.737	78.4	0.756	0.0464	2021					81%
VIIA	System K	3.057	71.1	0.690	0.1758	7656					
	System L	0.478	83.9	0.805	0.0321	1397	**10638**	11235	1298	**12533**	NA
	System M	0.562	80.8	0.777	0.0364	1586					
	System N	0.346	69.9	0.679	0.0196	853	**2298**	1048	2381	3429	88%
XA	System O	~~0.916~~ 18.9	~~42.8~~ 64.8	0.435	0.0332	1445					~~NA~~

1.2 AC-FT

* via Hydrodynamic Separator
** impervious area is existing off-site area
*** Oversized hydrodynamic separator specified to attain 85% TSS Removal.

7.5.1 Groundwater Recharge Volume (GRV)

Description

The groundwater recharge criterion is intended to maintain pre-development annual groundwater recharge volumes by capturing and infiltrating stormwater runoff. The objective of the groundwater recharge criterion is to maintain water table levels, stream baseflow, and wetland moisture levels. Maintaining pre-development groundwater recharge conditions can also reduce the volume requirements dictated by the other sizing criteria (i.e., water quality, channel protection, and peak flow control) and the overall size and cost of stormwater treatment practices.

The groundwater recharge volume (GRV) is the post-development design recharge volume (i.e., on a storm event basis) required to minimize the loss of annual pre-development groundwater recharge. The GRV is determined as a function of annual pre-development recharge for site-specific soils or surficial materials, average annual rainfall volume, and amount of impervious cover on a site. Several approaches can be used to calculate the GRV:

- ***Hydrologic Soil Group Approach:*** *This method was first developed and adopted by the state of Massachusetts, and has since been implemented in several other states including Maryland and Vermont. This approach involves determining the average annual pre-development recharge volume at a site based on the existing site hydrologic soil groups (HSG) as defined by the United States Natural Resources Conservation Service (NRCS) County Soil Surveys (MADEP, 1997). Based on this approach, the GRV can be calculated as the depth of runoff to be recharged, multiplied by the area of impervious cover, as shown below:*

$$GRV = \frac{(D)(A)(I)}{12}$$

where: GRV = groundwater recharge volume (ac-ft)
D = depth of runoff to be recharged (inches), see **Table 7-4**
A = site area (acres)
I = post-development site imperviousness (decimal, not percent) for new development projects or the net increase in site imperviousness for re-development projects

Table 7-4
Groundwater Recharge Depth

NRCS Hydrologic Soil Group	Average Annual Recharge	Groundwater Recharge Depth (D)
A	9 inches/year	0.4 inches
B	12 inches/year	0.25 inches
C	6 inches/year	0.10 inches
D	3 inches/year	0 inches (waived)

Source: MADEP, 1997.
NRCS – Natural Resources Conservation Service

Where more than one hydrologic soil group is present on a site, a composite or weighted recharge value should be calculated based upon the relative area of each soil group. The GRV should be infiltrated in the most permeable soil group available on the site.

- ***USGS Surficial Materials Approach:*** *This approach is similar to the above hydrologic soil group method, except the pre-development average annual recharge quantities and recharge depths are based on the predominant surficial materials classifications on the site (coarse-grained stratified drift versus glacial till and bedrock) as determined from U.S. Geological Survey (USGS) mapping. In areas underlain by coarse-grained stratified drift, average annual recharge is approximately three times greater than from till and bedrock areas. Areas of coarse-grained stratified drift and till/bedrock can be obtained from USGS 7.5-minute topographic maps of 1:24,000 scale, available from the USGS and DEP. Estimates of average annual recharge values for these materials are available from the Connecticut Water Resources Inventory Bulletins prepared jointly by the USGS and DEP for the major drainage basins throughout the state.*

● Ecology
● Soil & Wetland Studies
● Water Quality Monitoring ● GPS
● Environmental Planning & Management
● Ecological Restoration & Habitat Mitigation
● Aquatic, Wildlife and Listed Species Surveys
● Application Reviews ● Permitting & Compliance

March 18, 2016

Town of Mansfield
Inland Wetlands Commission
14 Park Place
Mansfield, CT 06226-2217

Re: **WETLANDS ASSESSMENT & IMPACT ANALYSIS: *SUMMARY OF FINDINGS***
Storrs Lodges, Connecticut
Hunting Lodge Road, Mansfield, CT

REMA Job No.: 15-1860-MNS18

Dear Commissioners:

REMA ECOLOGICAL SERVICES, LLC (REMA) has prepared this document to be submitted as part of an application for a student housing project, currently before the Town of Mansfield's Inland Wetlands Commission ("IWC" "the Commission"). The project plans, were prepared by F. A. Hesketh & Associates, Inc., and are dated 3/18/16. This housing project, catering to UConn students, is proposed in western Mansfield, about half a mile northeast of the campus center at Storrs.

We are providing herein our *Summary of Findings* with an overview of the site's regulated resources and other environmental features, as well as an analysis of the proposal, as it relates to regulated wetlands and watercourses. This document presents the basis for our professional opinion that existing wetland and watercourse functions and values will not be degraded by the proposed activities, taking into consideration some of the benefits from the proposed mitigation.

INTRODUCTION & OVERVIEW

The applicant proposes to construct this residential housing project on a 45.9-acre property ("the site"), with roughly 6.7-acres of wetlands, and 1,439 linear feet of intermittent watercourse. The plan calls for 47 buildings, 218 units, and 692 bedrooms. The number of parking spaces would 558, close to the minimum allowed by Town zoning. Stormwater management includes pervious pavement, below-ground infiltrator galleys, and discharges to infiltration swales or water quality basins.

It should be noted that a very different application for high density student housing had previously been submitted for the subject site in 2008/2009 (i.e. Ponde Place Residential Apartment Community). This report encompasses some of the baseline ecological work in the Environmental Review Team (ERT) report (April 2009), and in the Wetlands Report, dated 7/5/07, prepared by wetland scientist and vernal pool specialist Edward Pawlak, Principal of CT Ecosystems, LLC.

Approximately 4,402 square feet (0.1 acres) of *direct* impacts to wetlands will be associated with the entry road and an emergency access road from Hunting Lodge Road. The former would cross the primary stream corridor, Wetland C, while the latter will pass between Wetlands A and C1. The wetland crossing from Hunting Lodge Road is unavoidable. Moreover, roughly 9.38 acres of encroachment to the 150-foot wide upland review area (URA) is proposed.

Regulated wetland boundaries were delineated by George T. Logan, Certified Soil Scientist, wildlife ecologist, and Professional Wetland Scientist (PWS). In 2015, the wetland boundaries were accepted by the IWC, via a Town wetlands map amendment application. Mr. Logan and other REMA natural resource professionals visited the site on 12 different occasions in the fall of 2015, and winter of 2015/2016, to obtain baseline wetland and upland data. REMA coordinated closely with Hesketh & Associates, Inc. (FHA), as the site plan was developed. The extremely tight timeline for submission did not allow for a full review of the storm water management system, before submission of the application, but REMA will complete our review in the near future, and make any final recommendations.

Attached to this report, Figures A1, and 1 through 5 show the topography, road network, soil series, and vegetation cover types in the site vicinity. They include both recent and historic aerial photos taken in different seasons, and show vegetation cover types and wetland

distribution on the site. Moreover, the attached, annotated photo-record provides information on wetland soils, plants, hydrologic regime, and microtopography, and the size-class distribution of different sections of forest.

Additional supplementary documents will follow, to be submitted under separate cover, including, wetland/watercourse functions and values forms, water quality testing by a CT-certified laboratory (nutrient parameters), and additional soils data.

The *Summary of Findings* presented below is based on field investigations, secondary-source maps and documents, and the proposed project plans.

2.0 SUMMARY OF FINDINGS

2.1 EXISTING CONDITIONS

Site Location and Landscape Setting

- The 45.93-acre parcel is located in Mansfield, Connecticut, about half a mile southwest of the University of Connecticut campus center. It is only 0.75 miles south of Route 44, the main east-west through-road. It is bounded to the north by student housing along Carriage House Drive and to the east by Hunting Lodge Road. Additional student housing and single-family house residential developments, associated with Northwood Road, are to the south of the site. To the west is a rural landscape with undeveloped forested land, and then large, open fields.

Topography

- The site is mostly level to gently sloping. Only the western hill has moderate slopes. The highest elevation is roughly 572.7, on the western hilltop, upgradient of the western headwaters seepage Wetland (WB), the only high-gradient stream at the site. The eastern intermittent watercourse is a moderate to low gradient (Wetlands C3 to C4) stream. Microtopography is most pronounced in WA, the west central wetland with an embedded vernal pool habitat, with classic shrub islands and vegetated tree bases, surrounded by inundation, on a seasonal basis. Moderate to slight microtopography is found throughout the WC wetlands.

Cover Types

- The property is currently entirely forested. A 1970 CTDEEP aerial photo (Figure 5, attached) shows only one unvegetated fill area at the terminus of Northwood Road. Although the entire site is seen to be wooded in archived aerial photographs dating back to 1934, with the noted above exception, it is likely that selective logging has taken place in the 20th century. Even so, portions of two of the eastern wetlands, WC2 and WC3, have a "woodland" cover type (20% to 60% cover), because a very poorly drained hydrologic regime has limited tree growth.

Geology

- Bedrock is in the Hebron formation, with biotite and calc-silicate gneiss. Plan Sheet IW-1 shows the distribution of soil series, per the USDA-NRCS soil survey (also see the attached *On-Site Soil Investigation & Wetland Delineation Report*). Soils derived from this bedrock are coarse loamy, free-draining, and moderately fertile. Surficial materials are characterized as thin till and include both ablation and lodgement till, the latter with a hard pan. Charlton- Chatfield complex (85) includes deep coarse loamy soils (Charlton) and shallow, coarse-loamy upland soils over bedrock (Chatfield series). This mapping unit is limited to the far western portion of the site. Associated wetland soils are the Leicester, Ridgebury, Whitman (3) fine sandy loams, a soil series complex.

  Deep, coarse loamy upland soils without a compact hardpan in the Charlton and Canton series (Mapping Unit 73) are on the east side between the Wetland C3 and C4 corridor and Hunting Lodge Road. In the central portion of the site are deep, upland till soils with a densic horizon (hardpan) in the Paxton and Montauk series, and in the Woodbridge (46) series.

Wetlands Summary

- Wetlands total 6.7 acres (see Figure A1, attached). The eastern on-site stream segment is an unnamed tributary of Eagleville Brook, to the south, and is roughly 1,439 linear feet long on-site. The eastern wetland units (WC1 to WC4) are all part of this stream system. Two intermittent, seasonal headwaters wetlands, labeled WA and WB drain toward Cedar Swamp Brook, which is offsite to the west, flowing

southerly, shown in Photos 39 to 41. Both Cedar Swamp Brook and Eagleville Brook are tributaries of Willimantic River. The watershed divide is an old farm road built on fill, the extension of the northern terminus of Northwood Road, bisecting a seasonally flooded red maple swamp.

Cedar Swamp Brook Watershed

- Wetland A (WA), contains an embedded vernal pool habitat, with moderately high productivity for wood frog, as documented by Ed Pawlak, for the prior application. A total of 53 wood frog egg masses were counted on April 20th, 2007 and water depth was 8 inches, but only a few spotted salamander egg masses; the pool likely dries out too soon for successful metamorphosis of salamanders, in most years. Large woody debris is common, but density of shrubs within the vernal pool is low; one small, young patch of buttonbush was observed. Red maple is dominant, including one three-foot dimeter tree; healthy slippery elms were also noted. Herbs are sparse in ponded areas: royal fern patches and cinnamon fern on pool margins. Herbs and mosses are concentrated on tree bases: small wood ferns, sedges, Virginia creeper, small patches of sphagnum mosses and unidentified seedlings on tree bases.

- The 150-foot URA of Wetland A, which includes the 100-foot vernal pool envelope, is entirely forested, except for the dirt roadbed of the unpaved extension of Northwood Road. To the south and southeast of the pool, the moist, mixed hardwood forest has a dense understory dominated by Japanese barberry. The infestation that began along the unpaved roadway south of Northwood Drive, in the filled area, visible in the 1970 aerial photo (Figure 5). Japanese barberry is present, but has not yet become dominant in the URA to the north of the pool, which also has moist, nearly level soils, suitable for wood frog hibernation, an herb stratum dominated by hay-scented fern, and a diverse tree stratum including hickory and beech. The shrub stratum north of the pool is low in density, though one clump of wild currant was observed. This genus includes several rare species in Connecticut, but is only possible to reliably identify in early spring, when in bloom.

- Wetland B (WB) is a moderate to high gradient headwaters wetland, 80 to 120 feet wide. Saturation was observed in mid fall in the central channel, and higher flow volumes occur in times of seasonal high water. Water quality is expected to be excellent, as the small watershed is entirely forested. Bristly dewberry, Christmas

fern, and spinulose wood fern are dominant herbs. Agrimony was also observed. Spicebush and red maple are the dominant woody species, and shagbark hickory and beech are present as well. Some dieback of spicebush was noted. Clumps of barberry average about five to eight feet across, and thirty feet apart within the wetland. Barberry is also present in the URA. The most important portion of its upland review area is the upgradient hillside, its water source.

Eagleville Brook Watershed

- The eastern wetland system has a watershed of 112 acres per the 2009 ERT. Much of the eastern URA of this wetland is off-site, owned by others. An old woods road on a historic fill causeway crosses this broad wetland at the location selected for the entry road. This old road impounded the south-flowing stream, creating an area of flooding (likely temporary to seasonal). WC3, the portion to the north of the causeway, averages only about eighty feet wide, and very poorly drained soils are limited to narrow zones adjacent to the stream. WC 4, which begins south of the entry road, is much wider, up to 240 feet wide. Both tributary wetlands flow into the steam from the west, from on-site sub-watersheds (i.e., WC1 and WC2).

- Adjacent wetlands throughout the system are red maple swamp, but tree maturity and density, is variable depending on hydrologic regime. Tree and shrub density is low in the partially impounded, saturated portion of Wetland WC3, though trees rooted on the old causeway overhang the very poorly drained areas. Sizable very poorly drained areas also occur in the western terrace of WC4 and the small northwestern seepage wetland, WC2. These two areas also have a low percent cover of tree canopy, dead over-turned trees, and soils high in organic matter.

- The extensive western stream terrace of WC4 has an interesting assemblage of herbs of saturated, but well–oxygenated and mineral rich conditions. In addition to skunk cabbage and Jack-in-the-pulpit, which tolerate a wide range of nutrient regimes, species of mesotrophic to oligotrophic wetland communities were also observed: abundant golden ragwort, swamp saxifrage, Carrion-flower, skullcaps, swamp violet, and occasional turtlehead, the host plant of the declining and uncommon Baltimore checkerspot butterfly. Native Pennsylvania bittercress grows within the steam channel. A swath of Cinnamon fern is dominant along the wetland boundary in

poorly drained to somewhat poorly drained soil. An old stone "culvert" was also noted.

- In WC2 small evergreen sedges and skunk cabbage are dominants, and sphagnum and other mosses are more abundant. A network of moss-covered fallen logs creates small-scale microtopography. Shrub diversity was moderately high, including healthy arrowwood viburnum.

- WC1 is a much larger wetland than WC2, with substantial disturbance at its western end, due to fill placement and proliferation of Asiatic bittersweet and Japanese barberry. Red maples include immature pole size trees and multi-trunk sprout trees. At the eastern end, adjacent to the outlet stream, one white oak, a wolf tree, is over three feet in diameter. Highbush blueberry is also a dominant shrub, though barberry is locally the most abundant, within the wetland and in adjacent to filled areas. Footing is firmer than in the terrace of WC4, indicating that the dominant soil drainage type is poorly drained rather than very poorly drained.

- The distance between Hunting Lodge Road and the east side of this semi-perennial stream corridor (i.e. Wetland C3 and C4) averages about two hundred feet. The forest slopes down moderately steeply from four residential back yards. Sugar maple and ashes are both dominant trees. The forest community in the URA to the west of WC4 and south of WC1 has undisturbed moderately well-drained Woodbridge soils and includes a substantial evergreen component. A mix of age classes includes mature trees and understory species characteristic of mixed white pine-hardwood forest: low blueberries, sheep laurel, and starflower. To the west of WC3 at the northern end of the site the URA consists of moist mixed hardwood forest, largely with a sparse, low diversity understory (still largely free of barberry), and a short gentle slope down to the wetland boundary. Soils are pervious, in the well-drained Canton-Charlton mapping unit (62).

- The 2009 ERT reported moderately impaired water quality downgradient of the site. Water quality testing has not been completed by REMA, but field observations indicate that the diversity and productivity of aquatic life is limited, by seasonal low flow and non-point source pollution. One stream salamander was observed in WC3 and some hydropsychid net spinner caddisflies, but no stone flies, mayflies or hellgrammites. However, plants indicative of clean water do occur on the stream

terrace of WC4. REMA will likely provide a more robust macro-benthos bioassessment in the near future, when water samples are collected from the site's stream.

2.2 PROPOSED CONDITIONS

Overview

- The proposal would entail the development and construction of multi-unit residential buildings, associated parking areas and driveways, recreational and community amenities, and other infrastructure improvements, including stormwater conveyance, storage, and renovation. These residential units would be served by public sewer and water. The primary access would be from Hunting Lodge Road, to the east, while emergency only access would be from the south, through an extension of Northwood Road. Forty-seven (47) buildings would be concentrated at four distinct site locations (i.e. westerly, north-central, southeastern, and eastern). Two building types (i.e. Type "A" and Type "B") will contain 218 units, and 692 bedrooms. These units will be rented to students at the University of Connecticut.

- Many buildings (i.e. 24) of the proposed residential community would lie outside the 150-foot upland review area (URA) to the site's regulated wetlands, and only 10 would be located completely within the URA. Portions of the access and internal circulation driveways, the neighborhood community center, outdoor athletic fields, and the nine (9) stormwater management facilities (e.g. water quality basins, swales, and level-spreaders), would encroach into the URAs of the on-site wetlands. Of the 24 acres of URA on the subject site, the encroachment within it would be 9.38 acres, or 39% of the total.

- A total of 4,402 square feet (0.10 acres) of *direct* wetland impacts are proposed, in order to provide access to the developable portions of the site from Hunting Lodge Road. The proposed location is that of an old woods road, which would represent a roughly 4,675 square foot reduction of wetland impacts for a roadway crossing at this location, without this pre-existing wetland impact. Overall, this wetland impact is of *low intensity* and does not unduly alter or compromise the functions and values provided by Wetlands C3 and C4. We should note that the existing "breach" of the old road crossing, which allows passage of the intermittent watercourse, will be

maintained by using a precast bridge with a 30-foot wide span and a 4-foot vertical clearance. This will not only allow for passage of wildlife, but also ensure that the hydrology of Wetland C3, upgradient of the crossing, will not be altered.

- Potential *indirect* wetland impacts would be associated with both long-term (post-construction) and short-term (during construction) impacts, particularly erosion and sedimentation during the construction phase, and nutrients in stormwater discharge, and proximity to the wetlands, in the post-construction phase.

- Adequate sedimentation and erosion controls are found in the submitted plans, but extra care should be taken due to the sloping terrain and sensitivity of some of the regulated resources to sediment. Because sediment continues to be a phosphorus source for many years following construction, it will important to rigorously comply with CT DEEP's 2002 *Connecticut Erosion & Sedimentation Control Guidelines* specifying temporary stabilization for all areas not being actively graded. Fortunately, the somewhat more sensitive vernal pool-type habitat associated with Wetland A (see Figure A1, attached), is hydrologically isolated from the site's primary wetland corridor (Wetland C1 – C4), and proposed development is at least 100 feet away. It is recommended that in addition to the silt fence and or staked haybales, Silt-Sox tube barriers be placed immediately downgradient of all perimeter controls bordering wetlands, in several critical areas, such as upgradient and to the north of Wetland A (the vernal pool wetland), and upgradient and to the north of Wetland B, the western hillside seepage wetland.
- Because most of the on-site and the off-site wetlands are in large part fed by groundwater seepage, stormwater generated on impervious surfaces at the site will be infiltrated, and level spreaders will disperse discharge from several water quality basins or water quality swales.

- REMA has not, as of yet, had the opportunity to review calculations that show that the various stormwater treatment systems are sized to detain and treat the Water Quality Volume (WQV), as specified in CT DEEP's 2004 Stormwater Quality Manual ("the Manual"). Following this submission, we will provide a more detailed analysis of the stormwater management system, from a stormwater quality renovation perspective.

- The relatively low intensity of landscaping maintenance practices, that are associated with a development proposal of this type, with relatively small lawn areas, greatly minimize the potential for adverse impacts from excess fertilizer runoff and long-lasting pesticides and herbicides that could pass though the storm water basins. In contrast, an upscale, single-family residential land use would present a substantially greater risk to the regulated resources.

- The configuration of the building clusters is such that parking lots and roadways have to a large extent been placed *within* building clusters, such that the buildings themselves will shield wildlife in adjacent forested wetlands and uplands from idling vehicles, parking lot lighting, reducing indirect disturbance from added ambient noise, nighttime illumination, and human disturbance.

- Regarding proposed wetland buffers and the proximity of the buildings to the wetlands, we note that for the most part the development has maintained a minimum 40-foot undisturbed wetland buffer to all wetlands, and a 100-foot undisturbed wetland buffer to Wetland A, and its embedded vernal pool habitat. This was a recommendation made by REMA at the start of the development feasibility analysis for the site. In fact, a greater than 40-foot wetland buffer is being proposed in many areas, such as around Wetland B, the hillside seepage wetland.

- Amphibian migration and movement between Wetland A and the site's eastern uplands and wetlands, will be maintained through the use of two state-of-the-art wildlife tunnels proposed between Wetland A and Wetland C1, under the western access and circulation roadway. These are similar to the design selected for the newly constructed entrance roadway to the UConn Tech Park.

- In-kind mitigation (i.e. wetland restoration and creation) to off-set the direct impacts to wetlands, is proposed adjacent and to west of Wetland C1 (see submitted plans). This is an area of past wetland disturbance, as seen in Figure 5 (attached). Approximately 6,400 square feet of productive wetland shall be restored at this location, through removal of the old fill, placement of suitable, organically-enriched topsoil, and planting and seeding with appropriate native species (trees, shrubs, and herbs), similar to those present within the site's wetlands. REMA will be submitting a detailed Wetland Mitigation Implementation Plan in the near future.

- Additional wetland mitigation (i.e. wetland restoration/enhancement), in the form of invasive plant removal, is being proposed for several large sections of Wetlands C3 and C4, which locally have dense infestations of Japanese barberry (*Berberis thunbergii*). In total a minimum of 77,000 square feet (1.76 acres) of Wetland C3 and C4 (and possibly other wetland areas also) will be targeted for invasive shrub eradication and control (i.e. Japanese barberry, multiflora rose, firebush). REMA will develop a detailed Invasives Plant Species Management Plan, which will include a multi-year monitoring plan, based on our experience, and the latest guidance from the CT DEEP and the Nature Conservancy.

3.0 CONCLUSION

In conclusion, it is REMA's professional opinion that the proposal, if constructed as designed and shown on the plans, will not result in long-term adverse impacts to the site's regulated resources, or the functions and values that they provide. In the short-term (construction phase) it is important that diligence be exercised to minimize the risk for sedimentation into on-site and off-site wetlands and watercourses.

Please feel free to contact our office with any questions on the above.

Respectfully submitted,

REMA ECOLOGICAL SERVICES, LLC

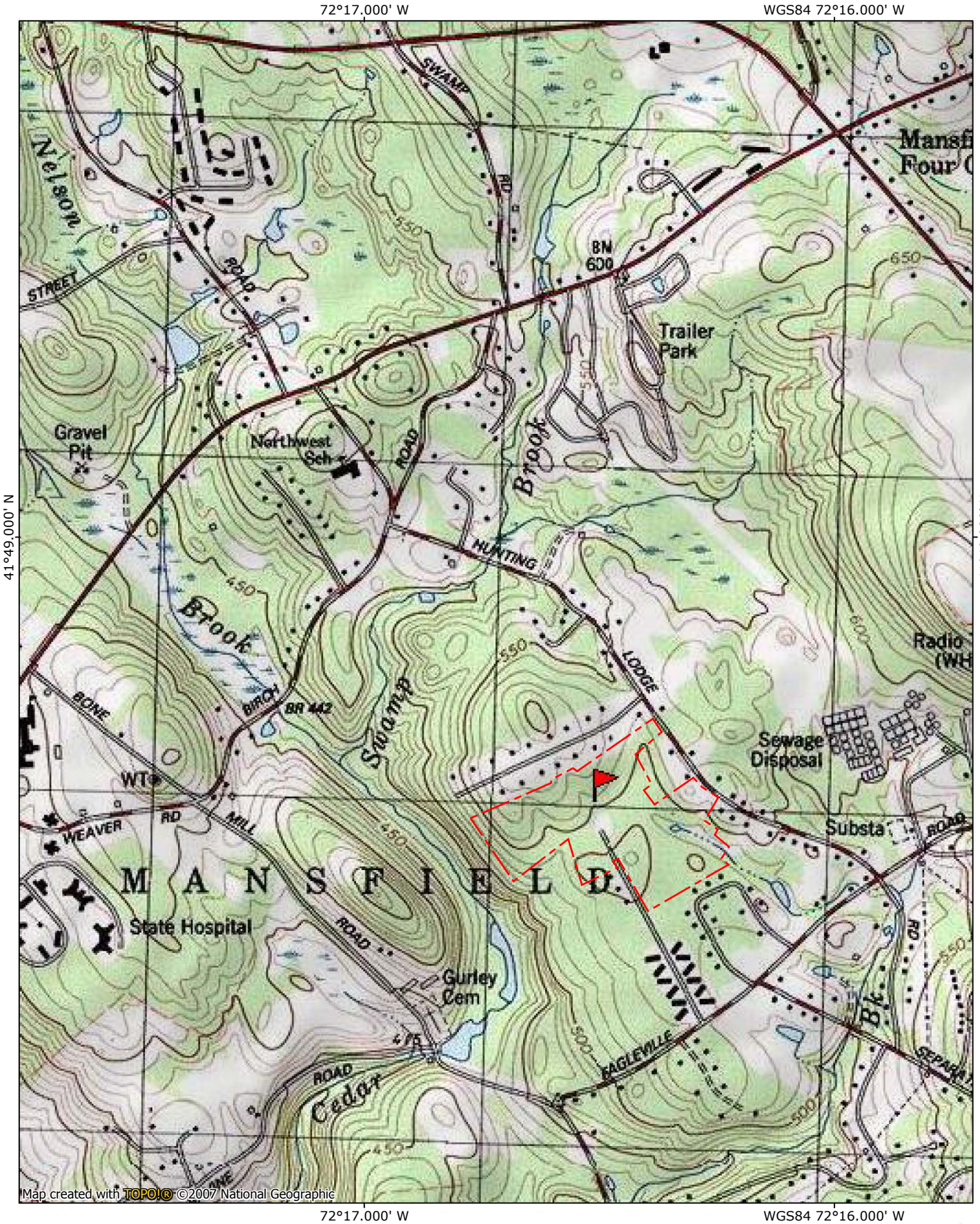
Sigrun N. Gadwa, MS, PWS
Professional Wetland Scientist
Registered Soil Scientist

George T. Logan, MS, PWS, CE
Professional Wetland Scientist
Registered Soil Scientist, Certified Senior Ecologist

VIA HAND-DELIVERY

Attachments: Figures 1 through 5, and A1, Photos 1 through 56, On-Site Soil Investigation & Wetland Delineation Report

Figure 1: Site Locus; Storrs Lodges, Hunting Lodge Road, Mansfield, CT



PRODUCED BY: REMA ECOLOGICAL SERVICES, LLC
DATE: 3-17-16 ***SCALE***: NTS

FIGURE 2: Proposed ***"Storrs Lodges"*** residential community, Mansfield, CT (as seen on a 5-6-15 aerial photo; Google Earth)

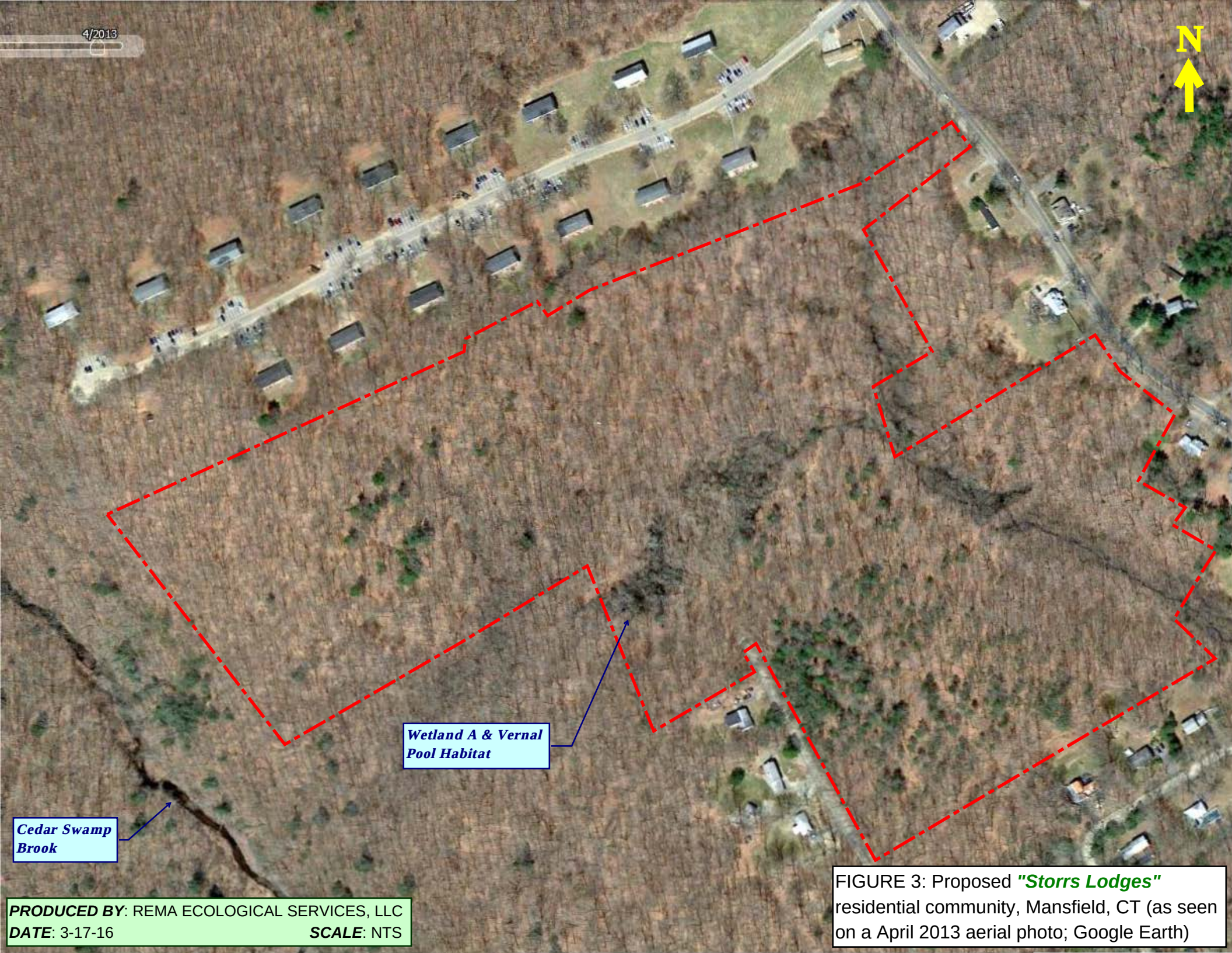


FIGURE 3: Proposed ***"Storrs Lodges"*** residential community, Mansfield, CT (as seen on a April 2013 aerial photo; Google Earth)

PRODUCED BY: REMA ECOLOGICAL SERVICES, LLC
DATE: 3-17-16 ***SCALE***: NTS

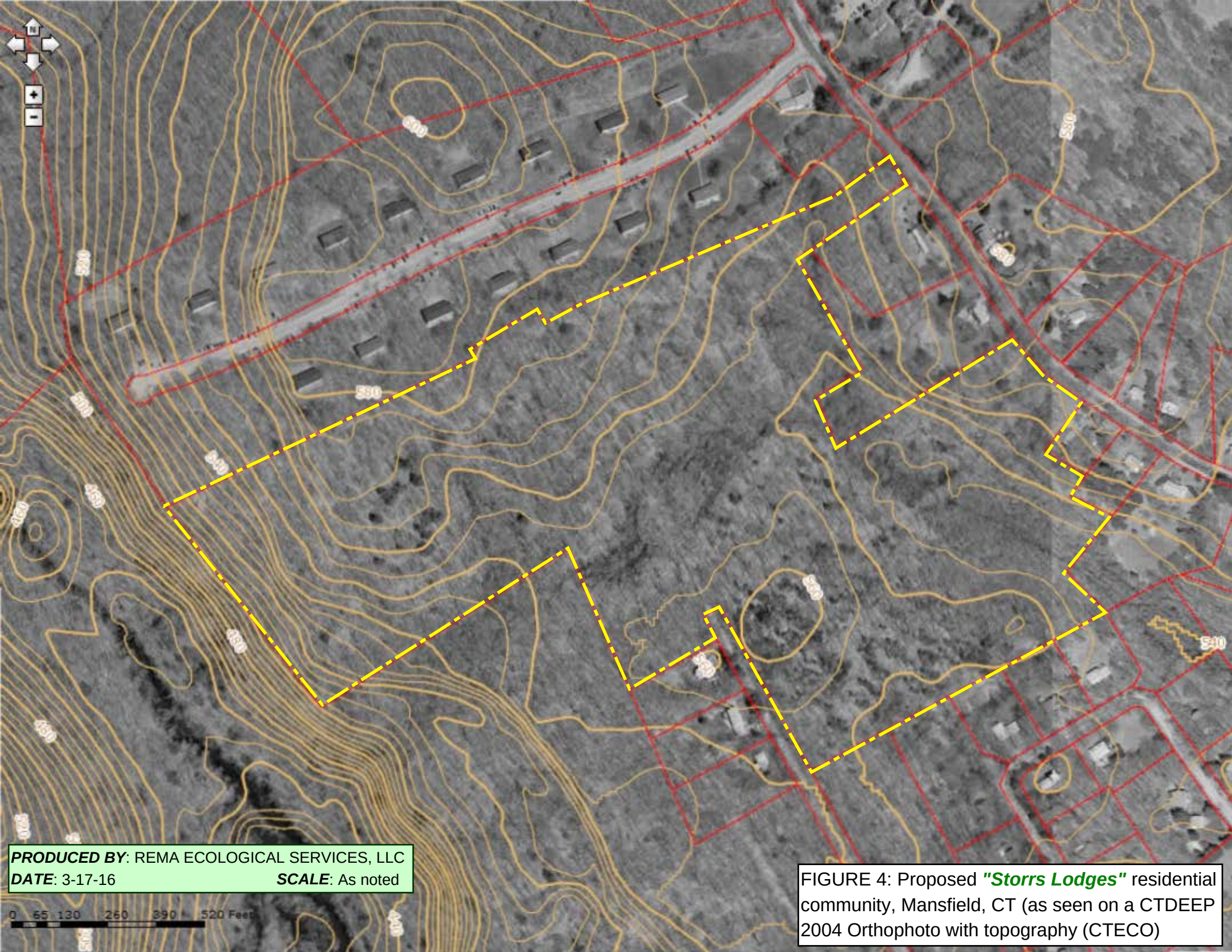


FIGURE 4: Proposed ***"Storrs Lodges"*** residential community, Mansfield, CT (as seen on a CTDEEP 2004 Orthophoto with topography (CTECO)

FIGURE 5: Proposed ***"Storrs Lodges"*** residential community, Mansfield, CT (as seen on an March 1970 aerial photo; CT

PRODUCED BY: REMA ECOLOGICAL SERVICES, LLC
DATE: 3-17-16 ***SCALE***: NTS

F. A. Hesketh & Associates, Inc.
6 Creamery Brook, East Granby, CT 06026
Civil & Traffic Engineers · Surveyors · Planners · Landscape Architects
Phone (860) 653-8000
Fax (860) 844-8600
e-mail mail@fahesketh.com

WETLAND MAP AMENDMENT
ON PROPERTY OF
PONDE PLACE, LLC.
HUNTING LODGE ROAD
MANSFIELD, CONNECTICUT

PROPERTY SURVEY

Date: 02-07-05 | Drawn by: RM | Job no: 04161
Scale: 1" = 80' | Checked by: TSH | Sheet no: 1 OF 1

PS-1

Revisions:

No.	Date	Description
1	08-27-07	MISC
2	10-27-15	WETLANDS / TITLE UPDATED
3	11-30-2015	WETLANDS MAP AMENDMENT/TITLE
4	01-08-16	REVISED WETLAND LINE PER FIELD WALK

VICINITY MAP
(NOT TO SCALE)

MAP REFERENCES:

1. PLAN OF LAND G AND E MAGURA CONVEYED TO TOWN OF MANSFIELD AS A TOWN ROAD DATED SEPT 1955 SCALE 1"=40' REVISED NOV 1956 BY EARL R. MOORE, SURVEYOR
2. MAP OF SOME LAND OF GEORGE MAGURA, JR & EMMA J. MAGURA TOWN OF MANSFIELD, CONNECTICUT SCALE 1"=100' DATED MAY 24, 1969 BY EVERETT O GARDNER
3. PROPOSED LAND CONVEYANCES BETWEEN FRANK ZENI & J. WILLIAM TRANTUM MANSFIELD CONN SCALE 1"=50' DATED OCT 1969 BY ROBERT J. SCHNEIDER
4. PART OF LAND OF GEORGE & EMMA MAGURA MANSFIELD CONN SCALE 1"=40' DATED APRIL 7, 63
5. PLAN OF MEADOWOOD ROAD STORRS CONN SCALE 1"=80' DATED JUNE 1955
6. CORRECTED MAP OF CARRIAGE HOUSE APARTMENTS MANSFIELD, CONNECTICUT SCALE 1"=40' OWNED BY SIMON KONOVER, NORMAN S. SHAPIRO AND MARVIN M. PATRON, W. HARTFORD CONNECTICUT DATED AUG. 12, 1968 BY EVERETT O GARDNER
7. FIRM FLOOD INSURANCE RATE MAP, TOWN OF MANSFIELD, CONNECTICUT HARTFORD COUNTY PANEL 5 OF 20 COMMUNITY PANEL NUMBER 090128 0005 C EFFECTIVE DATE JANUARY 2, 1981.
8. EASEMENT MAP, EASEMENT TO BE ACQUIRED BY THE TOWN OF MANSFIELD OVER LAND OF THE KEYSTONE COMPANIES, LLC HUNTING LODGE ROAD, MANSFIELD, CONNECTICUT, SCALE 1"=40' DATE: 08-23-07 SHEET NO: 2 OF 2, TODD S. HESKETH, L.S. 17945.

NOTES:

1. THIS SURVEY HAS BEEN PREPARED PURSUANT TO THE REGULATIONS OF CONNECTICUT STATE AGENCIES SECTIONS 20-300b-1 THROUGH 20-300b-20 AND THE STANDARDS FOR SURVEYS AND MAPS IN THE STATE OF CONNECTICUT AS ADOPTED BY THE CONNECTICUT ASSOCIATION OF LAND SURVEYORS, INC. ON SEPTEMBER 26, 1996.
2. IT IS A PROPERTY SURVEY INTENDED TO BE SUBMITTED TO THE TOWN OF MANSFIELD AS PART OF A WETLANDS MAP AMENDMENT APPLICATION.
3. THIS SURVEY FALLS INTO THE RE-SURVEY BOUNDARY DETERMINATION CATEGORY.
4. THIS SURVEY CONFORM TO CLASS A-2 ACCURACY STANDARDS FOR PHOTO CONTROL AND BOUNDARY INFORMATION AND CLASS T-3 TOPOGRAPHIC ACCURACY STANDARDS FOR PLANIMETRIC & TOPOGRAPHIC FEATURES. PHOTO DATE: JANUARY 28, 2005.
5. THE SUBJECT PARCEL IS CURRENTLY OWNED BY PONDE PLACE, LLC, M.L.R. VOL. 753 PG. 405.
6. THE SUBJECT PROPERTY IN LOCATED IN THE RAR-90 MULTI FAMILY ZONE IN THE TOWN OF MANSFIELD.

SEE DIMENSIONAL REQUIREMENTS BELOW.

7. THE BEARINGS AND COORDINATES DEPICTED HEREON ARE BASED UPON NAD 83 DATUM. TOPOGRAPHIC INFORMATION DEPICTED HEREON WAS PROVIDED BY EASTERN TOPOGRAPHICS FROM A PHOTO DATED NOVEMBER 23, 2003 AND IS BASED UPON NGVD29 DATUM.
8. UNDERGROUND FEATURES (IF ANY) HAVE BEEN COMPILED FROM RECORD MAPS AND OTHER SOURCES. THESE LOCATIONS MUST BE CONSIDERED AS APPROXIMATE IN NATURE. ADDITIONALLY, OTHER SUCH FEATURES MAY EXIST ON THE SITE. THE SIZE, LOCATION AND EXISTENCE OF ALL SUCH FEATURES MUST BE FIELD DETERMINED AND VERIFIED BY THE APPROPRIATE AUTHORITIES PRIOR TO CONSTRUCTION. CALL BEFORE YOU DIG 1-800-922-4455.
9. THE SUBJECT PARCEL IS IN FLOOD ZONE 'C', "AREAS OF MINIMAL FLOODING" BASED UPON A VISUAL INSPECTION OF MAP REFERENCE #7.
10. WETLAND FLAGS DEPICTED HEREON WERE SET IN THE FIELD BY A CERTIFIED SOIL SCIENTIST AND LOCATED IN THE FIELD UNDER DIRECT SUPERVISION OF THE UNDERSIGNED LAND SURVEYOR.
11. WETLANDS AS DIGITIZED FROM MAP ENTITLED, WETLANDS/WATERCOURSES/WATERBODIES PLAN OF CONSERVATION AND DEVELOPMENT, APRIL 2006

LEGEND
(SYMBOLS NOT TO SCALE)

- = CATCH BASIN
- = SANITARY MANHOLE
- = DRAINAGE MANHOLE
- = WATER MANHOLE
- = TELEPHONE MANHOLE
- = ELECTRIC MANHOLE
- = UNKNOWN MANHOLE
- = YARD DRAIN
- = CABLE MANHOLE
- = FLARED END SECTION
- = FIRE HYDRANT
- = WATER GATE VALVE
- = GAS GATE VALVE
- = MISC. GATE VALVE
- = VENT PIPE
- = FILLCAP
- = WELL
- = MAIL BOX
- = HAND HOLE
- = CONTROLLER CABINET
- = ELECTRIC TRANSFORMER
- = UTILITY POLE
- = GUY WIRE
- = CROSSWALK POLE
- = LIGHT POLE
- = POST
- = TRAFFIC LIGHT SUPPORT POLE
- = STREET SIGN
- = TREE (TYP.)
- = MONITOR WELL
- = BORING
- = ELECTRIC METER
- = GAS METER
- = WATER METER
- = TELEPHONE
- = AC UNIT
- = TREE LINE
- = STONE WALL
- = GUIDE RAIL
- = DIRECTION OF FLOW
- = I.P. PROPERTY CORNER
- = MONUMENT
- = DRILL HOLE
- = SURVEY CONTROL POINT
- = FENCE LINE
- = WATER LINE
- = GAS LINE
- = ELECTRIC LINE
- = CABLE TELEVISION LINE
- = OVERHEAD WIRES
- = POINT OF BEGINNING
- = NORTHING
- = EASTING
- = NOW OR FORMERLY
- = MANSFIELD LAND RECORDS
- = DELTA ANGLE
- = RADIUS
- = TANGENT
- = LENGTH
- = CHORD
- = CHORD BEARING
- = FRONT YARD
- = SIDE YARD
- = REAR YARD
- = CONTROL POINT
- = WETLAND FLAG #
- = VERNAL POOL #
- = UNITED STATES ARMY CORPS OF ENGINEERS TRANSECT POINT #

DIMENSIONAL REQUIREMENTS MANSFIELD, CT

ZONE	MINIMUM REQUIRED LOT AREA (AC.)	MINIMUM LOT FRONTAGE (FT)	MINIMUM SETBACK FROM (FT.) FRONT	SIDE	REAR	MAX. BUILDING HEIGHT (FT)	MAX. GROUND FLOOR BUILDING AND COVERAGE
RAR-90	5.0	200	60	35	50	35	NONE

GRAPHIC SCALE
80 0 40 80 160 320
(IN FEET)
1 inch = 80 ft.

I HAVE REVIEWED THIS PLAN AND FIND THAT THE WETLAND BOUNDARIES DEPICTED HEREON SUBSTANTIALLY REFLECT THE SOILS-BASED WETLAND DELINEATIONS CONDUCTED IN THE FIELD IN ACCORDANCE WITH THE CONNECTICUT STATUTES, IN OCTOBER 2015.

George T. Logan, MS, CPWS, CSE
Registered Soil Scientist
Certified Professional Wetland Scientist
Date: 11/24/15

TO MY KNOWLEDGE AND BELIEF THIS MAP IS SUBSTANTIALLY CORRECT AS NOTED HEREON.

THIS MAP IS NOT VALID WITHOUT THE LIVE SIGNATURE AND IMPRESSION TYPE SEAL OF THE LAND SURVEYOR, WHOSE SIGNATURE APPEARS HEREON.

TODD S. HESKETH, LS 17945

© 2004 \04161\Survey\WETLAND AMENDMENT 3.dwg, WMA, Jan. 12, 2016 - 11:19:59 AM

"*Storrs Lodges*," a Proposed Residential Community, Hunting Lodge Road, Mansfield, CT
Photos taken in the Fall of 2015 and Winter of 2016, by REMA Ecological Services, LLC

Photo 1: Wetland A (with embedded vernal pool habitat); early Fall 2015; facing westerly

Photo 2: Wetland A; a forested swamp; western section; facing westerly

"*Storrs Lodges*," a Proposed Residential Community, Hunting Lodge Road, Mansfield, CT
Photos taken in the Fall of 2015 and Winter of 2016, by REMA Ecological Services, LLC

Photo 3: Wetland A; seasonally saturated section; early Fall 2015; facing westerly

Photo 4: Wetland A; no inundation in mid-Fall 2015; blue/green flagging denotes edge of vernal pool habitat; pink/blue is the wetland boundary; facing northerly

"*Storrs Lodges*," a Proposed Residential Community, Hunting Lodge Road, Mansfield, CT
Photos taken in the Fall of 2015 and Winter of 2016, by REMA Ecological Services, LLC

Photo 5: Wetland A; northeastern section; December 2015; facing northerly

Photo 6: Wetland A; northeastern section; January 2016; facing southwesterly

Photo 7: Wetland A; east-central section; February 2016; seasonally flooded pool near capacity; facing southerly

Photo 8: Wetland B; northcentral section; September 2015; facing southerly

Photo 9: Wetland B; seasonally saturated northern section; October 2015; facing southerly

Photo 10: Wetland B; southern section; September 2015; wall in background is at the property boundary; facing southwesterly

Photo 11: Wetland C1; seasonally saturated to seasonally flooded wooded swamp; central section; September 2015; floristic diversity is moderately high; facing easterly

Photo 12: Wetland C1; west-central section; October 2015; section filled in the late 1960s at far edge of wetland (background); facing southwesterly

Photo 13: Wetland C1; seasonally saturated southern section grades to moist uplands in background; central section; September 2015; facing southerly

Photo 14: Wetland C1 experiences seasonal groundwater seepage; Sphagnum mosses and sedge species are locally common

Photo 15: Wetland C1; view of westernmost section from on top of old fill (area of proposed wetland restoration); September 2015; facing southwesterly

Photo 16: Outlet intermittent stream from Wetland C1 connects to intermittent stream of site's main, north-south oriented wetland corridor; facing westerly

Photo 17: Large white oak (a "wolf tree") just south of the outlet stream for Wetland C1; facing southwesterly

Photo 18: Wetland C2; a seasonally saturated forested wetland seep, discharging easterly to Wetland C3; facing easterly

Photo 19: Wetland C3; site's main riparian corridor; a seasonally flooded, seasonally saturated, and saturated forested swamp; facing southwesterly

Photo 20: Wetland C2; a significant proportion of wetland is very poorly drained, seasonally flooded, and devoid of shrubs and trees; facing southerly

Photo 21: Wetland C3; central section; October 2015; note invasive Japanese barberry (common throughout); facing northerly

Photo 22: Wetland C3; upper portion; showing intermittent stream; facing northerly

Photo 23: Wetland C3; uppermost section; December 2015; sandy deposits originate at discharge from Hunting Lodge Road; facing northerly

Photo 24: Wetland C3 extends off-site to the north; September 2015; note last flag (C-51) at northern property border; facing northeasterly

Photo 25: Wetland C3; stream flows through the central nearly flat mucky section (very poorly drained); facing southeasterly

Photo 26: A few sections of stream within Wetland C3 have small riffles; two-lined salamanders were noted here.

Photo 27: Wetland C3; along southeastern edge, a seasonally saturated poorly drained zone; note cinnamon fern "zone;"facing southerly

Photo 28: Seasonally saturated, poorly drained "transitional" wetland grades into uplands with similar vegetation; facing southerly

Photo 29: One of two off-site, piped discharges to Wetland C3; facing northerly

Photo 30: Stormwater discharge to Wetland C3 from Hunting Lodge Road; located at the far northeastern corner of the site; facing northerly

Photo 31: Soils in the central sections of Wetlands C3 and C4 are very poorly drained, as seen in this soil core with mucky topsoil and nearly glayed sandy subsoil

Photo 32: Wetland C4; typical view of central section; Wetland C4 has more trees than Wetland C3; facing southerly

Photo 33: Wetland boundary of WC4, indicated by flag; note the wide poorly drained zone above the very poorly drained portion of wetland with stream; facing northeasterly

Photo 34: Upper section of Wetland C4; old farm road crossing, separating WC3 and WC4 is the far background; facing northerly

Photo 35: Southernmost section of Wetland C4; facing northeasterly

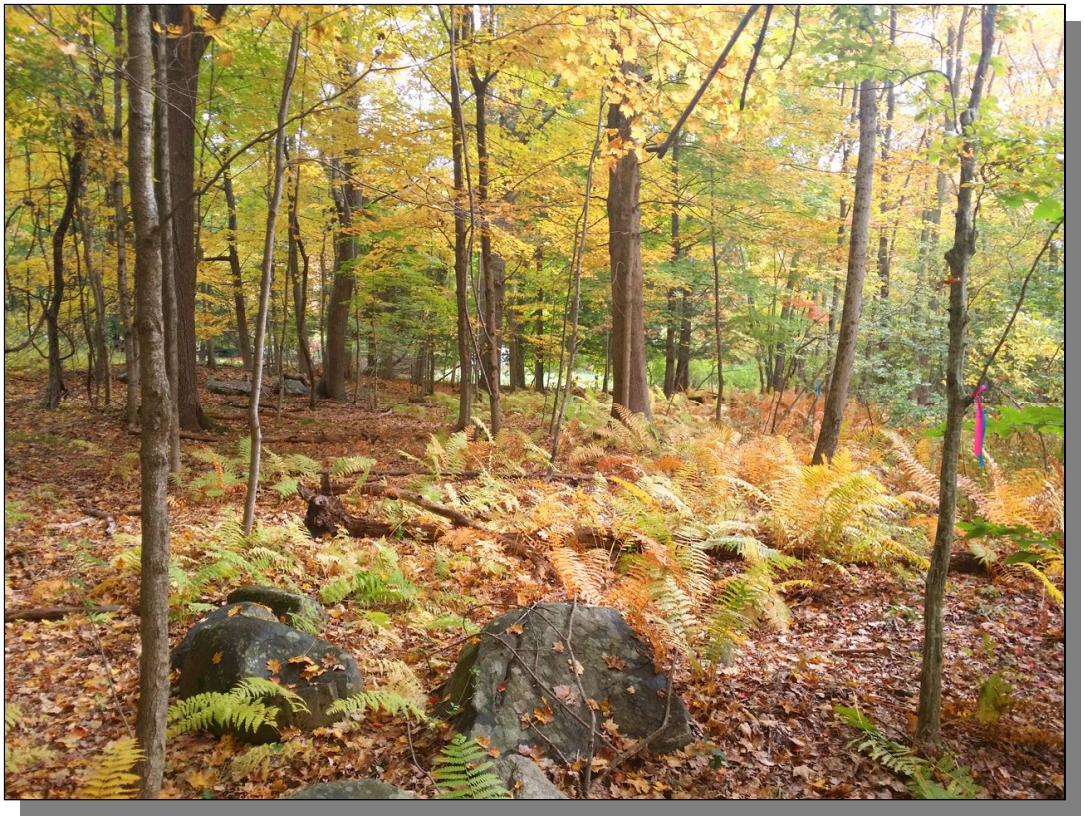


Photo 36: Eastern edge of Wetland C4 near property boundary; note "cinnamon fern zone" which can be found on both sides of the wetland boundary; facing southeasterly

Photo 37: Wetland C4 outlet stream near southern property boundary; facing southeasterly (downstream)

Photo 38: Wetland C4 intermittent stream near southern site boundary; facing westerly (upstream)

Photo 39: Cedar Swamp Brook just westerly of subject site; facing northwesterly (upstream)

Photo 40: Cedar Swam Brook flows within a steep sided "ravine"; facing southeasterly (downstream)

Photo 41: Cedar Swamp Brook; qualitative macro-benthos survey at this riffle, revealed the stream to be moderately impaired; facing northwesterly (upstream)

Photo 42: Stormflow from the western section of the subject site, including Wetland A and B flows down the steep slope above Cedar Swamp Brook; facing northeasterly

Photo 43: This is the uphill section of the broad swale that drains a portion of the subject site towards Cedar Swamp Brook; facing southwesterly

Photo 44: Off-site wetland, with heavy Japanese barberry infestation, downgradient of the western section of the site that drains to Cedar Swamp Brook; facing easterly

Photo 45: The old farm road wetland crossing (left side of photo); note pink/blue wetland boundary markers; facing northerly

Photo 46: Old farm road crossing will be the location of the main roadway into the site from Hunting Lodge Road; WC3 to right, and WC4 to left of photo; facing southwesterly

Photo 47: Breach in old farm roadbed will be maintained in order not to alter the hydrology of Wetland C3, upstream; facing northwesterly

Photo 48: Old wetland fill area, adjacent to Wetland C1, will be removed and wetland conditions restored and planted; facing northerly

Photo 49: Large boulders were placed at edge of old fill and Wetland C1; facing northerly

Photo 50: Old wetland fill area, adjacent to Wetland C1, is replete with invasives; trees include "pioneer" species such as aspens; facing northerly

Photo 51: Uplands east of Wetland C3; facing easterly

Photo 52: Maturing deciduous forest in the north-central section of subject site; facing northwesterly

Photo 53: Upland woods within the westernmost development area at the site; facing southerly

Photo 54: Woods (upland) at the far western area of the subject site just beyond the development envelope; note well casing; facing southwesterly

Photo 55: Upland woods within the southeastern section of the site, designated for development; facing easterly

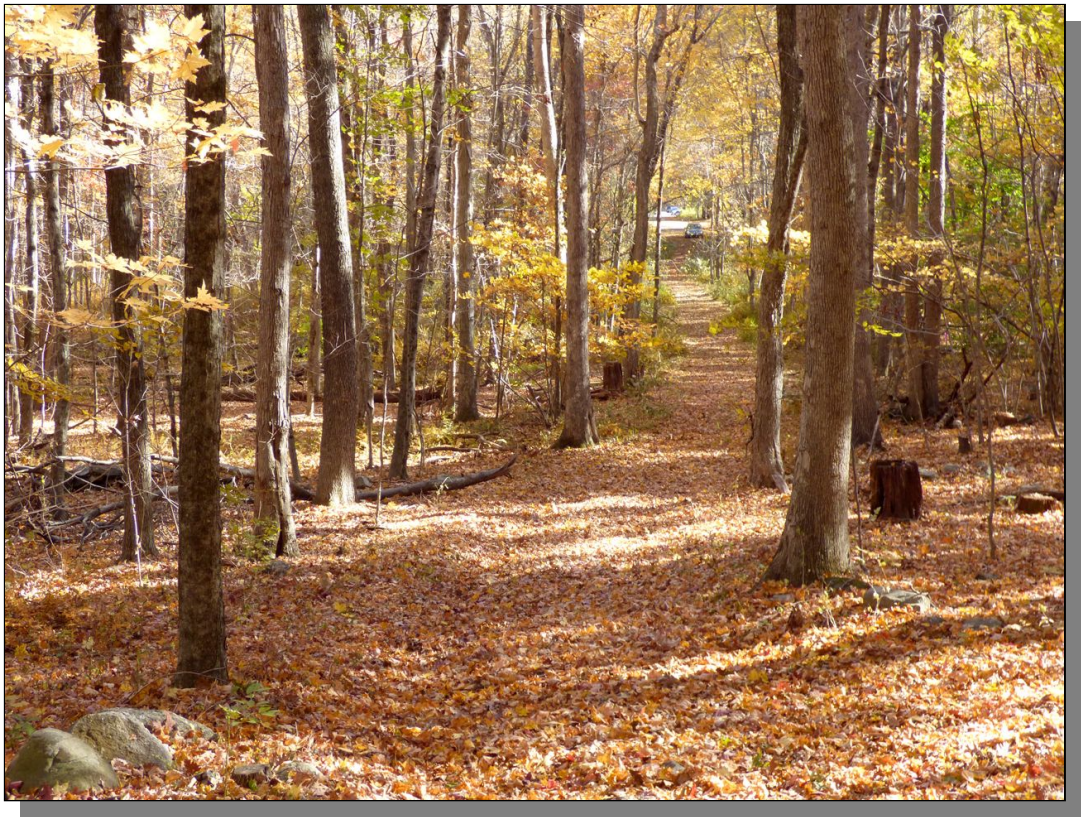


Photo 56: Existing woods road (extending north of Northwood Road) n the southwesterly section of the site; facing southeasterly

REMA ECOLOGICAL SERVICES, LLC
164 East Center Street, Suite 8
Manchester, CT 06040
860.649.REMA (7362)

REPORT DATE: November 25, 2015

ON-SITE SOIL INVESTIGATION & WETLAND DELINEATION REPORT

PROJECT NAME & SITE LOCATION:
+/- 45.93 acres
Hunting Lodge Road
Mansfield, CT

REMA Job No.: 15-1860-MNS18
Field Investigation Date(s): 10/1, 10/9, 10/10/2015
Field Investigation Method(s):
- ☒ Spade and Auger
- ☐ Backhoe Test Pits
- ☐ Other:

REPORT PREPARED FOR:
EdR
999 South Shady Grove Road
Suite 600
Memphis, TN 38120

Field Conditions:
Weather: Mostly sunny to cloudy, 50s to 70s
Soil Moisture: low-moderate
Snow Depth: none
Frost Depth: none

Purpose of Investigation:
- ☒ Wetland Delineation/Flagging in Field
- ☐ Wetland Mapping on Sketch Plan or Topographic Plan
- ☐ High Intensity Soil Mapping by Soil Scientist
- ☒ Medium Intensity Soil Mapping from *The Soil Survey of Connecticut* Maps (USDA-NRCS)
- ☐ Other:

Base Map Source: CT Soil Survey web (USDA-NRCS) Figure A (attached)

Wetland Boundary Marker Series: RES-A-1 to RES-A-40 (open line), RES-B-1 to RES-B-28 (open line), RES-C-1 to RES-C-51 tied to RES-2C-1 to RES-2C-28 tied to RES-3C-1 to 3C-50, RES-1C-1 to RES-1C-13, and RES-4C-1 to RES-4C-36 (all open lines)

General Site Description/Comments: The "study area" or "site" is a roughly 49.93-acre, residentially-zoned parcel, westerly of Hunting Lodge Road, and northerly, easterly, and westerly of the northern terminus of Northwood Road, in Mansfield, CT. The site is predominately wooded and undisturbed, except for historic disturbances associated with filling just northerly of the terminus of Northwood Road, and with a crossing over the site's eastern wetland corridor and stream to connect Hunting Lodge Road with Northwood Road. The soils within the study area are both disturbed and undisturbed in nature, and are derived from glacial till (i.e. unstratified sand, silt & rock), both with and without a hardpan, and with rocky/sandy fill in the areas noted. The disturbed upland soils are identified as the Udorthents (306) soil mapping unit. The undisturbed upland soils are the well drained Paxton and Montauk (85), Canton and Charlton (60), and Charlton and Chatfield (73) soil series complexes, and the moderately well drained Woodbridge (46) soil series, while the undisturbed wetland soils belong to the poorly and very poorly drained Ridgebury, Leicester, and Whitman (3) soil series complex. The site's regulated wetland areas include a seasonally saturated to seasonally flooded eastern forested corridor associated with an intermittent stream, tributary to Eagleville Brook, and western forested wetlands, including a hillside seep and vernal pool habitat, that drain westerly to Cedar Swamp Brook. All of the forested wetlands are red-maple dominated swamps, with typical understory species (e.g. spicebush, highbush blueberry). However, the eastern forested wetland understory is dominated by Japanese barberry, and invasive shrub.

ON-SITE SOIL INVESTIGATION & WETLAND DELINEATION REPORT *(CONTINUED)*

PROJECT NAME & SITE LOCATION: +/- 45.93 acres
Hunting Lodge Road, Mansfield, CT

SOIL MAP UNITS

Upland Soils

Montauk loam (85). This series consists of very deep, well drained soils formed in till derived primarily from granitic materials. These soils are on upland till plains and moraines. Slope ranges from 0 to 35 percent. Saturated hydraulic conductivity is moderately high or high in the solum and low to moderately high in the substratum. Mean annual temperature is about 49 degrees F, and mean annual precipitation is about 45 inches. Thickness of the solum and depth to the firm till substratum typically ranges from 20 to 38 inches but the range currently includes 18 to 38. Rock fragments range from 3 to 35 percent in the solum and 5 to 50 percent in the C horizon. The soil ranges from extremely acid to moderately acid throughout.

Paxton fine sandy loam (85). This series consists of deep, well drained soils formed in a coarse-loamy mantle underlain by firm, compact glacial till on uplands. They are nearly level to very steep soils on till plains, low ridges and drumloidal landforms. The soils formed in acid glacial till derived mainly from schist, gneiss or granite. In tilled areas, these soils have a dark brown fine sandy loam surface layer 8 inches thick. The subsoil from 8 to 26 inches is dark yellowish brown and olive brown fine sandy loam. The substratum from 26 to 60 inches is olive, very firm and brittle gravelly fine sandy loam.

Udorthents (306). This soil mapping unit consists of well drained to moderately well drained soils that have been altered by cutting, filling, or grading. The areas either have had two feet or more of the upper part of the original soil removed or have more than two feet of fill material on top of the original soil. Udorthents or Made Land soils can be found on any soil parent material but are typically fluvial on glacial till plains and outwash plains and stream terraces.

Woodbridge fine sandy loam (46). This series consists of deep, moderately well drained soils formed in a coarse-loamy mantle underlain by firm, compact glacial till on uplands. They are nearly level to moderately steep soils on till plains, low ridges and drumloidal landforms. The soils formed in acid glacial till derived mainly from schist, gneiss or granite. In tilled areas, these soils typically have a very dark grayish brown fine sandy loam surface layer 7 inches thick. The subsoil from 7 to 30 inches is dark yellowish brown and light olive brown fine sandy loam, mottled below 18 inches. The substratum from 30 to 60 inches is light olive brown, very firm and brittle gravelly fine sandy loam.

Charlton very stony fine sandy loam (73). This series consists of very deep, well drained coarse-loamy soils formed in friable, glacial till on uplands. They are nearly level to very steep soils on till plains and hills. The soils formed in acid glacial till derived mainly from schist, gneiss or granite. In tilled areas, these soils have a surface layer of dark brown fine sandy loam 8 inches thick. The subsoil from 8 to 26 inches is yellowish brown fine sandy loam and sandy loam. The substratum from 26 to 60 inches or more is grayish brown gravelly fine sandy loam.

Chatfield loam (73). This series consists of moderately deep, well drained, and somewhat excessively drained soils formed in till. They are nearly level to very steep soils on glaciated plains, hills, and ridges. Slope ranges from 0 to 70 percent. Crystalline bedrock is at depths of 20 to 40 inches. Permeability is moderate or moderately rapid. In tilled areas, these soils have a surface layer that is very dark to dark grayish brown loam up to 8 inches thick. The subsoil from 8 to 26 inches is brown, flaggy silt loam.

Canton stony fine sandy loam (61). This series consists of deep, well drained soils formed in a coarse-loamy mantle underlain by sandy glacial till on uplands. They are nearly level to very steep soils on till plains and hills. The soils formed in acid glacial till derived mainly from schist, gneiss or granite. Typically, these soils have a surface layer of very dark grayish brown fine sandy loam 2 inches thick. The subsoil from 2 to 23 inches is yellowish brown fine sandy loam, gravelly fine sandy loam and gravelly sandy loam. The substratum from 23 to 60 inches is pale brown gravelly loamy sand.

ON-SITE SOIL INVESTIGATION & WETLAND DELINEATION REPORT *(CONTINUED)*

PROJECT NAME & SITE LOCATION: +/- 45.93 acres
Hunting Lodge Road, Mansfield, CT

SOIL MAP UNITS

Wetland Soils

Ridgebury fine sandy loam (3). This soil series consists of deep, poorly and somewhat poorly drained soils formed in a coarse-loamy mantle underlain by firm, compact glacial till on uplands. They are nearly level to moderately steep soils on till plains, low ridges and drumloidal landforms. The soils formed in acid glacial till derived mainly from schist, gneiss or granite. Typically these soils have a black sandy loam surface layer 6 inches thick. The mottled subsoil from 6 to 16 inches is olive gray sandy loam. The mottled substratum from 16 to 60 inches is a light olive brown and olive, very firm and brittle gravelly sandy loam.

Leicester fine sandy loam (3). This series, which is some Connecticut counties is found only in complex with the Ridgebury and Whitman series, consists of deep, poorly drained loamy soils formed in friable glacial till on uplands. They are nearly level to gently sloping soils in drainage ways and low lying positions on till covered uplands. The soils formed in acid glacial till derived mainly from schist, gneiss or granite. Typically, these soils have a surface layer of black fine sandy loam 6 inches thick. The subsoil from 6 to 23 inches is grayish brown, mottled fine sandy loam. The substratum from 26 to 60 inches or more is dark yellowish brown, mottled, friable, gravelly fine sandy loam.

Whitman fine sandy loam (3). This series, which is some Connecticut counties is only mapped in complex with the Ridgebury and Leicester series, consists of deep, very poorly drained soils formed in a coarse-loamy mantle underlain by firm, compact glacial till on uplands. They are nearly level and gently sloping soils on till plains, low ridges and drumloidal landforms. The soils formed in acid glacial till derived mainly from schist, gneiss or granite. Typically these soils have a black fine sandy loam surface layer 8 inches thick. The mottled subsoil from 8 to 15 inches is gray sandy loam. The mottled substratum from 15 to 60 inches is firm, olive gray to gray dense glacial till.

Any accompanying soil logs and soil maps, and the on-site soil investigation narrative are in accordance with the taxonomic classification of the National Cooperative Soil Survey of the USDA Natural Resource Conservation Service, and with the Connecticut Soil Legend (DEP Bulletin No.5, 1983), as amended by USDA-NRCS. Jurisdictional wetland boundaries were delineated pursuant to the Connecticut General Statutes (CGS Sections 22a-36 to 22a-45), as amended. The site investigation was conducted and/or reviewed by the undersigned Registered Soil Scientist(s) [registered with the Society of Soil Scientists of Southern New England (SSSSNE) in accordance with the standards of the Federal Office of Personnel Management].

Respectfully submitted,

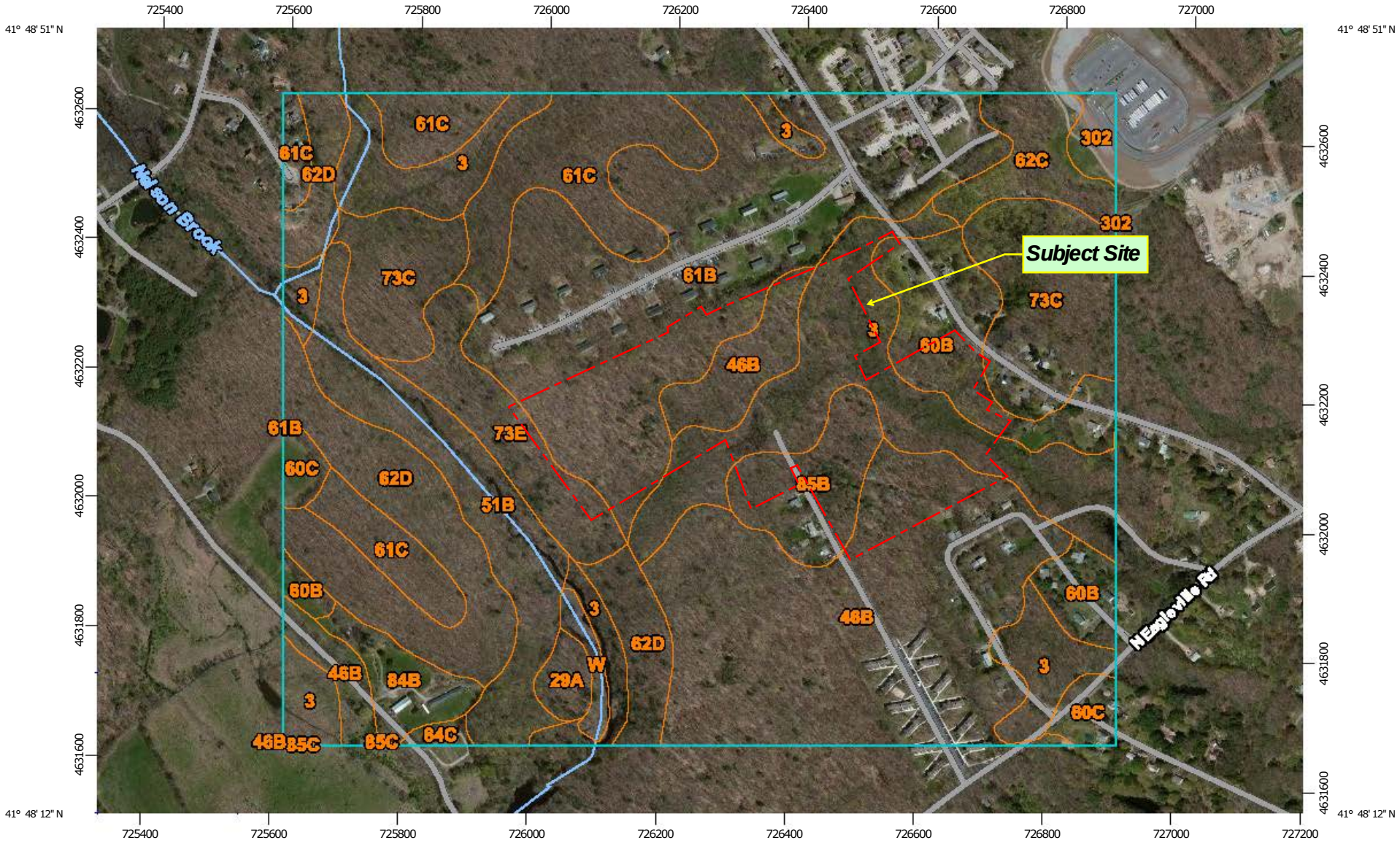
REMA ECOLOGICAL SERVICES, LLC

George T. Logan

George T. Logan, MS, PWS, CSE
Registered Soil Scientist, Professional Wetland Scientist
Field Investigator/Senior Reviewer

FIGURE A: Ponde Place, LLC property, Hunting Lodge Road, Mansfield, CT; showing soil types on a 2004 orthophoto (CT ECO)

Soil Map—State of Connecticut
(Proposed Storrs Lodges, Hunting Lodge Road, Mansfield, CT)



Map Scale: 1:8,550 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 100 200 400 600

Feet
0 400 800 1600 2400

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

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: State of Connecticut
Survey Area Data: Version 14, Sep 22, 2015

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

Date(s) aerial images were photographed: Mar 28, 2011—May 12, 2011

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

Map Unit Legend

State of Connecticut (CT600)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
3	Ridgebury, Leicester, and Whitman soils, 0 to 8 percent slopes, extremely stony	46.6	14.4%
29A	Agawam fine sandy loam, 0 to 3 percent slopes	2.2	0.7%
46B	Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony	62.2	19.2%
51B	Sutton fine sandy loam, 2 to 8 percent slopes, very stony	17.9	5.5%
60B	Canton and Charlton soils, 3 to 8 percent slopes	18.0	5.6%
60C	Canton and Charlton soils, 8 to 15 percent slopes	4.1	1.3%
61B	Canton and Charlton soils, 3 to 8 percent slopes, very stony	58.0	17.9%
61C	Canton and Charlton soils, 8 to 15 percent slopes, very stony	25.2	7.8%
62C	Canton and Charlton soils, 3 to 15 percent slopes, extremely stony	7.3	2.2%
62D	Canton and Charlton soils, 15 to 35 percent slopes, extremely stony	28.2	8.7%
73C	Charlton-Chatfield complex, 3 to 15 percent slopes, very rocky	24.0	7.4%
73E	Charlton-Chatfield complex, 15 to 45 percent slopes, very rocky	10.5	3.2%
84B	Paxton and Montauk fine sandy loams, 3 to 8 percent slopes	5.3	1.7%
84C	Paxton and Montauk fine sandy loams, 8 to 15 percent slopes	0.9	0.3%
85B	Paxton and Montauk fine sandy loams, 3 to 8 percent slopes, very stony	9.2	2.9%
85C	Paxton and Montauk fine sandy loams, 8 to 15 percent slopes, very stony	0.1	0.0%
302	Dumps	2.1	0.7%
W	Water	1.8	0.5%
Totals for Area of Interest		**323.5**	**100.0%**

REQUEST FOR PROPOSALS ▪ INLAND WETLAND APPLICATION REVIEW

TOWN OF MANSFIELD ▪ MARCH 22, 2016

OVERVIEW

The Town of Mansfield is seeking proposals to provide technical review of an Inland Wetlands License Application for a 218 unit apartment complex known as the Lodges at Storrs, which is proposed to be constructed on a 45-acre parcel on the west side of Hunting Lodge Road, north of North Eagleville Road (Parcel ID 15.21.3, File # W-1564). On February 1, 2016, the Mansfield Inland Wetland Agency approved a wetland map amendment (File # W1559) for this parcel based on field delineation of the wetlands by a Registered Soil Scientist, pursuant to section 15.0 of the Mansfield Inland Wetlands and Watercourses Regulations.

SCOPE OF SERVICES

- **Application Review**- Includes review of all pertinent mapping, reports, and other application materials. All materials can be downloaded at http://www.mansfieldct.gov/content/1904/1932/14344.aspx.
- Site Visit- Conduct site visit to observe upland and wetland/watercourse conditions.
- Initial Comment Letter-Prepare comment letter based on application review and site visit. Comments shall address the potential of significant impact to the wetlands of all proposed regulated activities as defined by the Mansfield Inland Wetland and Watercourses Regulations. Because of the scale of this project, a complete review of this project will include reviewing the on-site stormwater management system as it relates to wetland impact.
- Staff/Applicant Meeting- Attend meeting with staff and applicant to review comments and answer questions.
- Follow-Up Comments - Prepare comments in response to applicant's revised plans.
- IWA Public Hearing- Attend Inland Wetlands Agency Public Hearing(s).

The primary staff liaison for the project will be Jennifer Kaufman, Environmental Planner/Inland Wetlands Agent.

TENTATIVE SCHEDULE

The following schedule has been established based on statutory timeframes for review of applications and is subject to change as the project progresses.

- Wednesday, March 30 2016: Proposals Due
- Monday, April 4, 2016: IWA receives application, schedules public hearing and selects consultant
- Week of April 4, 2016: Negotiate and execute contract. A copy of the Town's standard professional services agreement and insurance requirements are attached to this RFP as Exhibit A and Exhibit B, respectively.
- April 25, 2016: Consultant submits report with recommendations for changes to the plan/conditions of approval.
- May 10, 2016: Applicant submits revised plans based on consultant and staff recommendations.
- May 25, 2016: Consultant submits updated report based on revised plans.
- June 6, 2016: Public Hearing – Consultant representative to present findings/recommendations and answer questions from the Agency

*As the applicant is required to pay for the Agency's expert consultant, a Purchase Order will not be approved until we receive a deposit from the applicant for the estimated contract amount.

SELECTION CRITERIA

The following criteria will be used to evaluate responses to the RFP:

- The background and experience of the Consultant in providing the range of services requested.
- The demonstrated effectiveness of the Consultant's proposed delivery system to ensure quality service and timely completion of services.
- The background, education, qualifications and relevant experience of key personnel to be assigned to this contract, especially those of the day-to-day project manager and licensed engineers and soil scientists. Key staff must have and maintain all applicable Connecticut licenses, including but not limited to: Professional Engineer, Registered Soil Scientist, Certified Professional Wetland Scientist, and Landscape Architect.
- References attesting to the quality of services performed and/or demonstrated ability of the Consultant.
- Proposer's demonstrated knowledge and familiarity with the Town and the areas where work is proposed.
- Cost of services.

SUBMISSION OF PROPOSALS

Interested consultants should submit proposals containing the following information by email to richardjl@MansfieldCT.org by 12:00 p.m. on Wednesday, March 30, 2016:

- Letter of Interest
- Cost Estimate (Please use the format below)
- Qualifications of staff that will perform the work
- Examples of similar work performed
- References

Questions regarding the RFP should be directed to staff at the above email address.

Task	Hours	Rate	Travel	Expenses	Total
Application Review					
Personnel					
Site Visit					
Personnel					
Comment Letter					
Personnel					
Response Letter					
Personnel					
Staff/Applicant Meeting					
Personnel					
IWA Meetings					
Personnel					
Hourly Rate for Additional Services					
				Total:	

Request for Proposals: Inland Wetland Application Review

TOWN OF MANSFIELD

Submitted by

GEI Consultants, Inc.
455 Winding Brook Drive, Suite 201
Glastonbury, CT 06033
T: 860.368.5300
F: 860.368.5307

March 30, 2016

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Appendix A - Resumes A1

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Section 1 - Letter of Interest

March 29, 2016

VIA EMAIL: richardjl@MansfieldCT.org

Consulting Engineers and Scientists

Town of Mansfield
Inland Wetland Agency
Ms. Jennifer Kaufman, Environmental Planner/Inland Wetlands Agent
Audrey P. Beck Municipal Building
4 South Eagleville Road
Mansfield, CT 06268

RE: RFP – Inland Wetland Application Review

Dear Ms. Kaufman:

GEI Consultants, Inc. (GEI) is pleased to submit this proposal to assist in reviewing the Inland Wetlands License Application for a 218 unit apartment complex known as the Lodges at Storrs, which is proposed to be constructed on a 45-acre parcel on the west side of Hunting Lodge Road, north of North Eagleville Road (Parcel ID 15.21.3, File # W-1564) to the Town of Mansfield, CT. Kimberly Bradley, a Senior Ecologist/Wetland Scientist, is interested in serving as key consultant to the Town of Mansfield Inland Wetland Agency. Tom Pietras, of Pietras Environmental Group, has previously verified the wetland boundaries of the application site for the Town of Mansfield, and contacted us to recommend GEI submit a proposal to support the application review.

GEI brings professional expertise and experience to the Town of Mansfield including:

- Key personnel who are not only technical wetland experts, but have served on their local inland wetland agencies which provide an in-depth understanding of the process and requirements of the CT IWWA.
- A strong reputation for serving municipal clients throughout the State of Connecticut.
- Extensive in-house resources and experts available to provide innovative recommendations and solutions if required based on site/permit-specific conditions.

If you have any questions or require additional information concerning GEI's qualifications please contact me at the office at (860) 368-5414 or my cell phone at (860) 917-0670.

Very truly yours,

GEI CONSULTANTS, INC.

Kimberly Bradley
Senior Consultant/Ecologist

John H. McGrane, P.E., CFM
Senior Professional

KB:jcl
Attachments

B:\Marketing\Proposals\Mansfield, Town of, Wetland_043016\Working Files\Letter of Interest Town of Mansfield.docx

GEI Consultants, Inc.
455 Winding Brook Drive, Suite 201, Glastonbury, CT 06033
860.368.5300 fax: 860.368.5307

Section 2 – Project Understanding & Methodology

PROJECT UNDERSTANDING

The intent of the Request for Proposal for the Town of Mansfield is to seek a Qualified Consultant to assist in providing a technical review of an Inland Wetlands License Application for a 218 unit apartment complex known as the Lodges at Storrs, which is proposed to be constructed on a 45-acre parcel on the west side of Hunting Lodge Road, north of North Eagleville Road (Parcel ID 15.21.3, File # W-1564).

GEI Consultants, Inc. (GEI) has extensive knowledge and experience with inland wetland delineation, assessment, mitigation and permitting. We have also provided wetlands permit review expertise to various municipalities including field verification of delineations and resource inventories, resource impact evaluations, and stormwater management design review. We have worked extensively with our in-house engineers, and engineering clients in the development of permitting packages for activities in and near regulated Connecticut wetlands, and served on a volunteer basis for wetland commissions in our own communities.

We understand that the selected consultant will be directly responsible for a variety of services including, but not limited to, the following:

- Application Review - Includes review of all pertinent mapping, reports, and other application materials.
- Site Visit - Conduct site visit to observe upland and wetland/watercourse conditions.
- Initial Comment Letter - Prepare comment letter based on application review and site visit. Comments shall address the potential of significant impact to the wetlands of all proposed regulated activities as defined by the Mansfield Inland Wetland and Watercourses Regulations including reviewing the on-site stormwater management system as it relates to wetland impact.
- Staff/Applicant Meeting - Attend meeting with staff and applicant to review comments and answer questions.
- Follow-Up Comments - Prepare comments in response to applicant's revised plans.
- IWA Public Hearing - Attend Inland Wetlands Agency Public Hearing(s).

METHODOLOGY

In GEI's experience providing Inland Wetland Application review services for municipalities, the methodology implemented to address requests from the Inland Wetland Agency may be dependent on the specific conditions of the permit application being reviewed. Therefore, it is understood that as a consultant to the Inland Wetland Agency, GEI as a designated agent will serve the needs of the Agency within the context of the Town of Mansfield Inland Wetlands and Watercourses Regulations.

It is understood that the Town of Mansfield has received an Inland Wetlands License Application for a 218 unit apartment complex known as the Lodges at Storrs, which is proposed to be constructed on a 45-acre parcel on the west side of Hunting Lodge Road, north of North Eagleville Road (Parcel ID 15.21.3, File # W-1564).

As an initial step in the application review process, all application files will be obtained from the Town of Mansfield (as available on the Inland Wetland Agency website). Other supporting documents referenced in application files, such as the 2009 Environmental Review Team Report for the proposed Ponde Place Residential Apartment Community, may be reviewed. The application will be reviewed to assess its merits in the context of requirements set forth in Sections 10.0 of the "Inland Wetlands and Watercourses Regulations Town of Mansfield, Connecticut" (Effective date February 15, 2012).

A Site visit will be scheduled through the Town of Mansfield. The site visit will ideally provide the GEI with Town representatives, as well as the applicant or their technical representatives to review existing conditions of wetland and watercourse resources and adjacent uplands, and discuss the proposed development in the context of existing conditions.

Following application review and site visit activities, a comment letter will be prepared addressing the potential of significant impact to the inland wetlands and watercourses of all proposed regulated activities as defined by the Mansfield Inland Wetland and Watercourses Regulations. GEI's Professional Engineer and Wetland Scientist will review the proposed on-site stormwater management system as it relates to wetland impact.

Professional comments and recommendations will be submitted for review by the Town of Mansfield Environmental Planner/Inland Wetlands Agent and the applicant. GEI will attend a meeting to review the comments and discuss any questions the Town, applicant, or applicants technical representatives have pertaining to application review. GEI will then provide a follow-up letter of response to and plan revisions that may result from the application review process.

Finally, GEI will attend the Inland Wetlands Agency Public Hearing, to present the application review comment letters and response process, and be available in support of the Inland Wetland Agency.

Section 3 - Cost Estimate

	Hours	Rate	Travel	Expenses	Total
Application Review	14	110.00 x 10 hrs. 160.00 x 4 hrs.		$10.00	$1750.00
Personnel		Senior Professional/ Wetland Scientist ($110.00) Professional Engineer ($160.00)			
Site Visit	8	110.00	25.00		$905.00
Personnel		Senior Professional ($110.00)			
Comment Letter	6	110.00 x 4 hrs. 160.00 x 2 hrs.		20.00	$780.00
Personnel		Senior Professional/ Wetland Scientist ($110.00) Professional Engineer ($160.00)			
Response Letter	4	110.00 x 3 hrs. 160.00 x 1 hr.		20.00	$ 510.00
Personnel		Senior Professional/ Wetland Scientist ($110.00) Professional Engineer ($160.00)			
Staff/Applicant Meeting	3	110.00 x 3 hrs.	25.00		$ 345.00
Personnel		Senior Professional ($110.00)			
IWA Meetings	6 (two meetings)	110.00	50.00		$ 710.00
Personnel		Senior Professional ($110.00)			
Hourly Rate for Additional		110.00 160.00			
		Senior Professional/ Wetland Scientist ($110.00) Professional Engineer ($160.00)		**Total:**	$ 5000.00

Section 4 - Qualifications of Staff

GEI is a full-service environmental, water resources, geotechnical, and ecological consulting firm with 37 offices and 700 people nationwide. GEI provides services to a broad spectrum of public and private sector clients and has completed hundreds of projects for municipalities related to:

- Wetland delineation and assessment;
- Wetland/habitat restoration;
- Permit preparation and review;
- Erosion and sedimentation controls and stormwater system review and monitoring;
- Natural resource inventories and conservation planning support;
- Geotechnical engineering; and
- Contaminated site investigation, engineering design, and remediation.

Our Glastonbury, Connecticut office will provide the staff and management personnel to support the Town of Mansfield's Inland Wetland Agency. The address and contact information for the Glastonbury office is as follows:

GEI Consultants, Inc.
455 Winding Brook Drive, Suite 201
Glastonbury, CT 06357
Phone: 860-368-5300
Fax: 860.368.5307

We selected our key project staff based on their experience on similar projects, projected workload, and ability to meet the project needs. We anticipate that our key consulting professional Kimberly Bradley, a Senior Professional/Wetland Scientist, possesses the technical expertise and experience and understanding of Connecticut Inland Wetland regulations to address any permitting/regulatory or site specific circumstances that may be encountered within the process of wetland application review.

Below are brief bios of key staff members. Full resumes (including background, education and experience) for the key staff and the support staff are included in Appendix A.

KIMBERLY BRADLEY (GEI)

Kimberly is an ecologist and project manager with over seven years of professional consulting experience in wetland delineation and assessment, wetland function and value assessments, environmental impact assessments, completing natural resource inventories to inform conservation planning decisions, aquatic ecology and toxicology and ecological risk assessment, and bio-monitoring. She has served as a consultant to several municipalities for wetland application review and wetland evaluation and permitting services. Ms. Bradley has been an invited speaker at the Connecticut Association of Wetland Scientists annual meeting. Currently, she serves as a member of

the East Lyme Inland Wetland Agency for which she is completing the 2014 CTDEEP Municipal Inland Wetlands Agency Comprehensive Training Program.

Ms. Bradley will serve as a key consulting professional to the Town of Mansfield Inland Wetland and Watercourse Agency. She will manage coordination of requests from the Agency and provide oversight of all the technical and financial aspects of the project. She will perform review tasks and field visits, complete review analysis and reports, and provide testimony/presentation of findings and recommendations during Inland Wetland and Watercourse Agency meetings.

JOHN MCGRANE, P.E. (GEI)

John McGrane is a Professional Engineer and Certified Floodplain Manager (CFM) with technical and management experience in infrastructure operations and related capital projects. Having served in engineering and construction administration positions with both private and public sector entities, Mr. McGrane has a unique perspective on implementation of infrastructure projects. Mr. McGrane also has an extensive background in street and utility engineering; urban and suburban land development; and electric power plant construction. Since 2006, Mr. McGrane has been an appointee of the Town of Farmington's Water Pollution Control Agency. He has served as Vice Chairman, and currently is serving in the capacity of Secretary.

Prior to joining GEI in April, 2011, Mr. McGrane held positions with the City of Hartford, CT Department of Public Works, most recently as its Assistant Director/City Engineer, and Director of the Greater Hartford Flood Commission. As City Engineer, Mr. McGrane managed DPW's Capital Improvement Program, which had a budget of up to $40 Million annually. This included authority for infrastructure design and construction, contract administration, and long-range capital planning for streets, drainage, bridges, and flood control projects. As lead technical professional in Connecticut's capital city, Mr. McGrane had a visible presence in the general public, and achieved a sound reputation for integrity, accurate project representation, and effective public communications.

KRISTEN PONAK (GEI)

Ms. Kristen Ponak is a GIS expert that will provide GIS mapping and evaluation services based on the need of the Town of Mansfield Inland Wetland Agency. Ms. Ponak is proficient at GIS design/analysis and has applied these GIS skills to various site assessments, water resources, and geotechnical projects, assisting with data input for various groundwater hydrology modeling projects, and data management for both environmental and geotechnical projects. She has a natural resources background and can provide technical support in tasks required for the evaluation of wetland permits.

EXPERT SUPPORT STAFF

GEI's national service groups provides direct access to broad spectrum of professionals with expertise in the areas of engineering, environmental sciences, and ecology. Scientists with backgrounds in environmental remediation, soils science, botany, wildlife biology, and wetland sciences will be available for assistance if the site conditions for complex permit application reviews warrant. Specifically, the following staff member is located in Long Island, New York office and is available to provide expert advice if needed:

LAURA SCHWANOF, RLA (GEI)

Ms. Laura Schwanof is a registered Landscape Architect with over 33 years of experience as an environmental and ecological practitioner. Her expertise includes landscape design, soil conservation and stormwater management, wetland assessments and restoration and ecological enhancement, upland habitat restoration, stream bank and shoreline stabilization planning, environmental permitting, coastal zone and site planning, and ecological inventories of flora and fauna.

Section 5 – Qualifications and References for Relevant Work

While we feel our extensive experience speaks to our capabilities, the best way for you to judge us is by having you speak directly with current and past clients. Please find a list of municipalities and associated references for which we have provided similar services to those described in the Request for Proposal. We would encourage you to contact one or more of the following individuals for more information on our relevant project experience, including information on GEI's overall competency, program implementation, and project scheduling and cost-efficiency.

TOWN OF SOUTH WINDSOR: FIRE DEPARTMENT COMPLEX REVIEW

Client: Town of South Windsor, CT
Reference: Jeffery Folger, Senior Environmental Planner/Conservation Officer
Phone: (860) 644-2511, ext. 229; jeffrey.folger@southwindsor.org

GEI performed a threatened and endangered species survey, wetland function and value assessment, wetland impact assessment, environmental due diligence Phase I Assessment, and review of best management practices and design of a stormwater treatment to support the review of a proposed development of a fire department complex. GEI presented findings and recommendations to the Inland Wetland Agency, and the facility was successfully permitted and completed with a large portion of the site maintained as conservation open space based on the natural resources inventory and evaluation.

TOWN OF EAST LYME: GATEWAY DEVELOPMENT APPLICATION REVIEW

Client: Town of East Lyme
Reference: Gary Goeschel, Director of Planning/Inland Wetlands Agent
Phone: (860) 691-4105; GGoeschel@eltownhall.com

GEI provided technical review of site conditions, wetland delineation verification, and review of environmental reports included within a wetland permit application for a proposed multi-unit residential development on an approximately 196 acres parcel. GEI provided recommendations to the Town of East Lyme Inland Wetland Agency for best management practices for development in areas of inland wetlands and vernal pools.

CITY OF HARTFORD: GOODWIN AND POPE PARK POND RESTORATION

Client: City of Hartford, CT
Reference: P. Bob Umashanker, City Engineer, Department of Public Works
Phone: 860-522-4888 x6527; umasb001@hartford.gov

GEI is providing as Soil Science/Wetland Science services for a pond restoration project in two Hartford parks. The project requires pond sediment characterization, dredging design, and permitting. Provided sediment analytical data review. GEI completed Connecticut and ACOE wetland delineations for the ponds and surrounding wetland areas and conducted wetland and wildlife characterization surveys. Wetland enhancement/restoration planting schemes for aquatic, emergent, herbaceous, shrub, and tree zones along pond perimeters were developed and pond bottom re-grading recommendations were provided. GEI supported the completion of state, federal, and local wetland permit applications for the project. GEI Consultants served as a subconsultant to BETA Group, Inc. for this project.

TOWN OF EAST HARTFORD: GATEWAY DEVLEOPMENT REVIEW

Client: Town of East Hartford, CT
Reference: Denise Horan, Town Engineer
Phone: 860-291-7384, dhoran@easthartfordct.gov

GEI conducted a comprehensive ecological/ and tidal wetlands site evaluation with emphases on ACOE wetland delineation, wetlands function and values assessment, mitigation and threatened and endangered species target survey and management for the Town of East Hartford, CT in support of state and federal permitting requirements as component of the Connecticut River levee accreditation and flood control management program.

Appendix A - Resumes

Kimberly B. Bradley
Senior Scientist/Ecologist

resume

Kimberly Bradley is a wetland scientist/ecologist with over eight years of professional consulting experience, specializing in the areas of wetland delineation, assessment, and restoration, ecological risk assessment, and environmental impact assessment. She has experience planning, managing, and participating in projects involving environmental and ecological field sampling and analysis of both aquatic and terrestrial ecosystems, permitting support, and remedial investigation and design. She has authored technical presentations and articles and provided public outreach activities focused on risk communication and environmental planning. Currently, she is in a workgroup with the Connecticut Institute for Coastal Resiliency and Adaptation (CIRCA) promoting the establishment of living shoreline and green infrastructure approaches in coastal and waterfront regions to support re-establishment of coastal processes to increase resiliency.

Ms. Bradley's previous graduate studies and background in research included internships and fellowships with the National Undersea Research Center, National Marine Fisheries Service, and University of Connecticut. Ms. Bradley is in the process of obtaining her Professional Wetland Scientist certification from the Society of Wetland Scientists. She actively participates in service volunteer organizations such as CT Envirothon Steering Committee, the Town of East Lyme Inland Wetland Agency.

PROJECT EXPERIENCE

Gateway Wetland Development Application Review, Town of East Lyme, East Lyme, CT. Managed the technical review of site conditions, and environmental reports included within a wetland permit application for a proposed multi-unit residential development on an approximately 196 acre parcel. GEI provided recommendations to the Town of East Lyme Inland Wetland Commission for best management practices for development in areas of inland wetlands and vernal pools.

Hartford Park Ponds Dredging, City of Hartford, DPW, Hartford, CT. Performed Connecticut state-level and ACOE wetland delineations, served as field lead for sediment sampling activities, and responsible for permitting tasks associated with dredge design for the restoration of two ponds located in parks within the City of Hartford, CT.

South Windsor Fire Department Site, Town of South Windsor, South Windsor, CT. Performed an environmental due diligence Phase I Environmental Site Assessment, threatened and endangered species survey, wetland function and value assessment, review of potential ecological impacts, and best management practices for stormwater treatment for the development of a proposed fire department and preservation of high quality open space.

EDUCATION

M.S., Biological Oceanography, University of Connecticut
B.S., Environmental Science/Biology, University of Connecticut

EXPERIENCE IN THE INDUSTRY

10 years

EXPERIENCE WITH GEI

8 year(s)

CERTIFICATIONS

40-HR OSHA HAZWOPER
Certified Army Corp of Engineers Wetland Delineation
Climate Change Adaptation Academy
CPR, AED, and First Aid
Training for Municipal Inland Wetland Agencies - Comprehensive Training Program
WAW Living Shorelines - Types, Tools, and Techniques
Wetlands Construction Training

Ecological Resource Evaluation, Town of Glastonbury, CT, Glastonbury, CT. Performed a review of ecological resources and assessed potential impacts and best management practices for the potential development of a town-owned property. Included field surveys, data management and report preparation, and client meetings.

Regional Framework for Coastal Resilience in Southern Connecticut, Southern CT Council of Governments/ The Nature Conservancy/ Greater Bridgeport Business Council , Various, CT. Serving as GEI's Project Manager on a team with Malone & MacBroom Inc to inventory coastal resiliency projects across ten coastal municipalities and assess the potential to incorporate living shoreline and green infrastructure techniques. The project in funded through a National Fish and Wildlife Foundation Hurricane Sandy Coastal Resiliency Grant. GEI will support the design of four selected projects in Spring 2016.

East Hartford Levee Bulkhead Replacement & Permitting Support, Town of East Hartford, East Hartford, CT. Conducted a comprehensive ecological and tidal wetlands site evaluation with emphases on ACOE wetland delineation, wetlands function and values assessment, mitigation and threatened and endangered species target survey and management for the Town of East Hartford, CT in support of state and federal permitting requirements as component of the Connecticut River levee accreditation and flood control management program. Provided coordination with the engineering project team and CTDEEP.

Meadow Hill Pond Ecological Assessment Permitting and Design, Town of East Hartford, East Hartford, CT. Provided permitting and design support for the dredge and restoration of a flood storage pond.

South Windsor Distribution Center, Scannell Properties, South Windsor, CT. Supported the wetland assessment and mitigation design and oversaw correspondence with CTDEEP and site habitat review for Connecticut listed Threatened, Endangered and Species of Special concern for a property proposed for a large commercial development. Presented at several Inland Wetland Agency and Planning and Zoning meetings.

Preserve Phase I Update and Baseline Documentation Report, The Nature Conservancy of CT Field Office, Old Saybrook, CT. Managing a Phase I Environmental Site Assessment Update and completion of a Conservation Easement/Baseline Documentation Report required for oversight of an easement placed on 891.9 acres of a 1,000 acre parcel purchased by the State of Connecticut and Town of Old Saybrook for conservation purposes.

Jilson Farms Vernal Pool & Threatened and Endangered Species Review, Shepard Companies, South Windsor, CT. Project Manager overseeing the review of vernal pool conditions, and correspondence with CTDEEP and site habitat review for Connecticut listed Threatened, Endangered and Species of Special concern for a property proposed for development.

Petrauskas Property Survey, Mr. Albert Petrauskas, Farmington, CT. Project Manager overseeing the review of vernal pool conditions, and correspondence with CTDEEP and site habitat review for Connecticut listed Threatened, Endangered and Species of Special concern for a property proposed for development.

Bashan Lake Shoreline Stabilization, East Haddam, CT. Project Manager coordinating the design and implementation of a hybrid living shoreline stabilization project on Bashan Lake in East Haddam, CT.

Carla's Pasta Wetland Assessment Report Update, The Dennis Group, LLC, South Windsor, CT. Performed a wetland function and value assessment, developed a wetland mitigation plan, and supported the coordination of mitigation efforts for a state endangered beetle at a site proposed for expansion of a commercial property. Successfully presented and obtain appropriate Inland Wetland Permits for the local municipality.

Taine Mountain Preserve II - Phase I, The Trust for Public Land, Burlington, CT. Project Manager overseeing the completion of a Phase I Environmental Site Assessment for an approximately 54 acre parcel of open space proposed to be retained for conservation purposes.

Environmental Consulting, Eagle Environmental, Inc., Multiple Sites, CT. Reviewed and managed completion of site inspections and statutory checklists for compliance with National Environmental Policy Act (NEPA) in support of residential hurricane disaster relief reconstruction and rehabilitation projects.

ESA Phase I, The Trust for Public Land, Old Saybrook, CT. Managed a Phase I Environmental Site Assessment of a 1,000 acre parcel proposed for purchase by Trust for Public Land and the Town of Old Saybrook for conservation purposes.

Plainville DOT Bridge Ecological Reports, Lenard Engineering, Inc., Plainfield, CT. Completed a wetland delineation and wetland function and value assessment and completed an ecological report as a component of the permitting requirements for upgrades to a CTDOT bridge.

Wetland Delineation Riverside, Zuvic, Carr and Associates, East Hartford, CT. Provided a ACOE wetland delineation and function and value assessment for upgrades and construction of two docks adjacent to Goodwin College.

Technical Assistance for Brownfields for USEPA Regions 1, 2 & 3, New Jersey Institute of Technology, Newark, NJ. Collaborated with NJIT to complete an environmental technical review and alternatives analysis of open space options for two vacant sites adjacent to Johnson's Creek in the City of Bridgeport, CT. The alternatives analysis included consideration of living shoreline approaches. Collaborated with NJIT to support the development and presentation of a webinar entitled *"Creating Living Shorelines to Enhance Brownfields Sites."*

Environmental Program Review and Light Fixture Plant Demolition, Hubbell Incorporated, Hanson, MA. Member of a multidisciplinary team performing a remediation under the Massachusetts Contingency Plan. Lead ecologist overseeing delineation, investigation and sampling activities in site wetlands. Supporting wetland permitting tasks and evaluation of restoration alternatives and coordination with stakeholders to develop alternatives for future site uses.

Lake Restorations, De Bruin Engineering, P.C., Westbury, NY. Supported the review and evaluation of a planting plan for a pond dredge and restoration effort.

Wetland Mitigation Monitoring Atlantic Highlands, New Jersey Natural Gas Company, Confidential Location. Developed and Ecological Evaluation approach to support remedial action selection for an urbanized creek considered an area of concern for a Former MGP site.

Ecological Risk Assessment of Former Manufactured Gas Plant, AGL Resources, Inc., Confidential Location. Field Team Leader and task leader for the development of an Ecological Risk Assessment including implementation of field sampling activities and data analysis and reporting. This project involved bioavailability analysis, toxicity testing, benthic invertebrate analysis, and wetland delineation and assessment. Provided coordination between the engineering and design team, risk assessment team, client and regulators.

Emergency Engineering Services, Kerite Company, Seymour, CT. Site review, ecological inventory, ACOE Wetland Function and Value Assessment and CT Natural Diversity Database Request in support state permitting requirements for in-stream construction with the Bladens River.

Lenoir Car Works Site Remediation, Norfolk Southern Corporation, Lenoir City, TN. Supported review of a previous wetland delineation report and ACOE permitting tasks as a component of remedial design.

United States Coast Guard (USCG) Fire Island Vegetation Survey, Childs Engineering Corporation, Babylon, NY. Provided an ecological conditions and vegetation survey and inventory USCG property on Fire Island, NY which was being reviewed for potential placement of dredge spoils.

Former Canton Airport Construction Management, Massachusetts Dept. of Conservation & Recreation, Canton, MA. Provide technical assistance and report preparation for Method 3 Stage I Ecological Risk Assessments at several sites.

Phase I ESA & Wetland Values Assessment, Mr. Robert Urso, South Windsor, CT. Performed a threatened and endangered species survey on the property, ACOE Wetland Function and Value Assessment, and Wetland Impact Assessment in support of planned development and currently working with CTDEEP and South Windsor Wetland/ Conservation Officer for regulatory oversight of endangered plants and insects present.

Near-Term Activity at 14 Lords Hill Rd, Mystic Industrial Park, LLC, Stonington, CT. Performed ecological inventory and CTDEEP Scoping-level Ecological Risk Assessment at a site in North Stonington, CT.

Ecological Assessment of Nippon Outfall, ERO Resources Corporation, Denver, CO. Performed Environmental Impact Assessment specifically assessing risks to marine resources from installation of a submerged outfall pipe in support of a National Park Service project related to the Elwha dam removal project in Port Angeles, WA.

Threatened & Endangered Species Survey, Mr. Robert Urso, South Windsor, CT. Performed a threatened and endangered species survey on the property, ACOE Wetland Function and Value Assessment, and Wetland Impact Assessment in support of planned development and currently working with CTDEEP and South Windsor Wetland/ Conservation Officer for regulatory oversight of endangered plants and insects present.

Stewardship Permit, MacDermid, Inc., Confidential Location. Provided field efforts including groundwater sampling, soil sampling, subsurface soil classification and sampling, groundwater well installation. Task manager for the completion of an ecological resource inventory and complete a screening-level ecologic risk assessment (SLERA) focused on potential impacts to Steele Brook adjacent to the site.

Multiple Site Characterizations, National Grid, Multiple, NY. Developed NYS Fish and Wildlife Resource Impact Analysis for 11 LIPA sites throughout New York City and Long Island, NY.

Former Shaffer Paper Property Remediation Design, Massachusetts Dept. of Conservation & Recreation, Dorchester, MA. Provided technical and project planning support, data analysis, and report preparation efforts for Massachusetts Contingency Plan Method 3 Stage I Environmental Screening and advised the environmental project team on ecological implications of approaches including the potential scope of a Stage II Ecological Risk Assessments versus remedial alternatives at the Site.

Decay-Resistant Tree Species, Electric Power Research Institute, Research Desk Work, CT. Conducted a literature review and developed a white paper investigating potential shifts in distribution of utility pole tree species based on climate change predictions using general circulation models, and associated vegetation distribution mathematical models.

PUBLICATIONS & PRESENTATIONS

UCONN Climate Adaptation Academy: Living Shoreline Workshop I: *What Are Living Shorelines/Where do they work*? Platform Presentation co-presented with Laura Schwanof. January 9, 2015.

Connecticut Association of Wetland Scientists Annual Meeting 2013. *Ecological Risk Assessment of Contaminated Site Impacts in Wetlands: When Is the Cure Worse than the Disease?* Invited Platform Presentation. March 21, 2013.

Society of Wetland Scientists Mid-Atlantic Chapter Conference 2012. *Ecological Risk Assessment of Contaminated Site Impacts in Wetlands: When Is the Cure Worse than the Disease?* Platform Presentation. December 7, 2012.

SETAC North America 33th Annual Meeting. Looking Back to See Ahead: The Current and Future Role of Ecological Risk Assessment in Sediment Remedial Decisions. Special Symposium: *21st Century Environmental Risk Assessment.* Platform Presentation. November 13, 2012.

Bradley, K.B., Gensemer, R.W., Neauhauser, E. 2012. Weighing Options for Risk-based Sediment Preliminary Remediation Goals at MGP Sediment Sites Part II. The GEI MGP Reporter. Spring 2012. Volume 19, Issue 2.

SETAC North America 32th Annual Meeting. *Residual Ecological Risk Assessment Case Study: Assessing Risk in Wetlands Habitat.* Poster Presentation. November 16, 2011.

Gensemer, R.W., Bradley, K.B., 2012. Weighing Options for Risk-based Sediment Preliminary Remediation Goals at MGP Sediment Sites Part II. The GEI MGP Reporter. Spring 2012. Volume 19, Issue 1.

Gensemer, R.W., Bradley K.B., Claytor, C. 2010. Stuck in the Mud: Multiple Causes of Ecological Risk in Sediment. The GEI MGP Reporter. Fall 2010.

SETAC North America 31th Annual Meeting. *Stuck in the Mud: Consideration of Physical Stressors in Ecological Risk Assessment at Urban Sediment Remediation Sites*. Platform Presentation. November 9, 2010.

SETAC North America 29th Annual Meeting. *Ecotoxicological Evaluations as Decision-making Tools for MGP Sediment Remediation Projects*. Poster. November 20, 2008.

Northeast Sustainable Communities Workshop. Brownfields and Water: Sustainable Approaches to Restoration of Water Systems. Panelist.

PROFESSIONAL ASSOCIATIONS

Society of Environmental Toxicology and Chemistry, Member
Environmental Professional Organization of Connecticut, Member
American Fisheries Society, Member
Society of Wetland Scientists, Associate Member
Connecticut Envirothon, Member & Aquatics Station Chair, Steering Committee
Niantic River Watershed Workgroup, Member
Connecticut Inland Wetland Agency of East Lyme, Member, Alternate

John H. McGrane, P.E., CFM
Senior Professional

resume

John McGrane is a Professional Engineer and Certified Floodplain Manager (CFM) with technical and management experience in infrastructure operations and related capital projects. Having served in engineering and construction administration positions with both private and public sector entities, Mr. McGrane has a unique perspective on implementation of infrastructure projects. Mr. McGrane also has an extensive background in street and utility engineering; urban and suburban land development; and electric power plant construction. Since 2006, Mr. McGrane has been an appointee of the Town of Farmington's Water Pollution Control Agency. He has served as Vice Chairman, and currently is serving in the capacity of Secretary.

Prior to joining GEI in April, 2011, Mr. McGrane held positions with the City of Hartford, CT Department of Public Works, most recently as its Assistant Director/City Engineer, and Director of the Greater Hartford Flood Commission. As City Engineer, Mr. McGrane managed DPW's Capital Improvement Program, which had a budget of up to $40 Million annually. This included authority for infrastructure design and construction, contract administration, and long-range capital planning for streets, drainage, bridges, and flood control projects. As lead technical professional in Connecticut's capital city, Mr. McGrane had a visible presence in the general public, and achieved a sound reputation for integrity, accurate project representation, and effective public communications.

PROJECT EXPERIENCE

Levee Civil Work Repair Project, Town of East Hartford, East Hartford, CT. Mr. McGrane served as GEI's project manager for three separate construction administration contracts for Rehabilitation of Flood Control Pump Stations, Connecticut River Sheet Pile Bulkhead and Tie-back Installation, and General Levee Civil Works Repairs. This also included management of several separate contracts designed to meet directives by the U.S. Army Corps of Engineers for compliance reasons. These services included piezometer installation and long term monitoring of ground water levels using data loggers to track levee under-seepage; and monitoring of floodwall crack progression and long term movement of floodwalls.

New London Hurricane Barrier FEMA Certification, City of New London Dept. of Public Works, New London, CT. Mr. McGrane served as GEI's project manager for the accreditation of the New London, CT Hurricane Barrier in 2011. This project was completed in an expedited manner to meet a looming FEMA deadline, and resulted in an accreditation being granted without interruption of flood protection status afforded by the hurricane barrier. Mr. McGrane subsequently managed an effort that was successful in appealing a proposed FEMA flood zone map revision that had potential negative impacts on many properties behind the hurricane barrier and in other unprotected areas.

EDUCATION
M.S., Management, Rensselaer Polytechnic Institute
B.S., Civil Engineering, University of Connecticut

EXPERIENCE IN THE INDUSTRY
36 years

EXPERIENCE WITH GEI
3 year(s)

REGISTRATIONS AND LICENSES
Professional Engineer, CT No. 13678

CERTIFICATIONS
Certified Floodplain Manager (CFM)

GEI Consultants

Murphy Pond and Bell Pond Dams Hydro Power Study, Town of Wethersfield, Wethersfield, CT. Mr. McGrane completed a feasibility study for two hydroelectric installations on the Goff Brook in Wethersfield, CT. Goff Brook contains of number of old mill dams which were historically used for water powered equipment. Although the equipment has long since ceased to be in service, the dams remain and it is the desire to utilize at least two of the dams for generation of hydroelectric power for resale onto the existing power grid. The report included flow duration and head information, opinions of cost, extent of permitting involvement, and estimates of the overall economic feasibility based on projected payback periods for the options considered.

Clean Water Project - Geotechnical Services, Metropolitan District Commission, Multiple, CT. Mr. McGrane has served as Project Manager for various tasks that GEI has performed under this agreement including environmental pre-characterization of excavation sites to determine degree and type of contamination prior to construction; geotechnical evaluations relating to pipe settlements, building vibrations, and other impacts related to utility construction. Mr. McGrane also managed the preparation of construction contract documents for handling and disposal of contaminated soils generated by prospective contractors working within the City of Hartford on Clean Water Project construction activities. Mr. McGrane also provided expert guidance in relation to proposed construction activities that required technical evaluation relating to the City of Hartford's adjacent flood control infrastructure.

PREVIOUS EXPERIENCE

Flood Control Infrastructure Management

Mr. McGrane served as Director of the Greater Hartford Flood Commission which has authority for regulation of flood plain development and stewardship of Hartford's extensive Flood Protection System, the largest of its kind in New England. This system consists of major earthen and concrete levees, multiple stormwater pump stations, and major hydraulic conduits. Mr. McGrane successfully managed a multi-year program which secured critical FEMA Levee Accreditation, and a favorable U.S. Army Corps of Engineers rating of the system. As a key representative of the City of Hartford, Mr. McGrane also served an important role as Hartford's primary liaison with the U.S. Army Corps of Engineers, Federal Emergency Management Agency, the Metropolitan District Commission, and State of Connecticut agencies including the Department of Environmental Protection and Department of Transportation.

Street Infrastructure Design, Maintenance, and Operation

As Hartford's City Engineer, Mr. McGrane had authority for urban infrastructure functions including reconstruction and rehabilitation of streets and bridges; underground utility reconstruction impact mitigation; and maintenance functions needed to optimize component life cycle. Similar positions held in suburban municipalities in Greater Hartford included serving in public works director capacities for the Towns of Farmington, CT, and Glastonbury, CT. In these positions, Mr. McGrane was also extensively involved in municipal land use planning, local regulatory permit approval processes, and evaluation of environmental and public impacts associated with development projects.

Sewage Treatment Facility Operation and Management

As Director of Public Works & Development Services for the Town of Farmington, CT, Mr. McGrane had overall management authority for its sewage treatment facility and associated collection system consisting of gravity sewers a series of pump stations. This included management of the system's overall operation, capital improvement projects, and other activities undertaken for operational needs and regulatory compliance. Mr. McGrane has continued his involvement in a stewardship role, currently serving as a member of the Farmington Water Pollution Control Authority.

Other Municipal Public Works Operations

Mr. McGrane also had extensive involvement in the management of ongoing operational functions including solid waste collection and disposal programs; street and highway maintenance efforts; building and grounds maintenance; and building inspection and enforcement activities.

Power Generation Facilities

During construction of the Millstone Unit 3 Nuclear Power Station in Waterford, CT, Mr. McGrane was employed by its owner, Northeast Utilities, in a construction engineering and construction management capacity. Projects included primarily structural, piping, and pressure vessel installations. Mr. McGrane was also involved in major retrofit projects on the Millstone Unit 1 and Unit 2 power plants pursuant to Nuclear Regulatory Commission mandates. Also under management in this position were various projects on hydro-electric and fossil fuel power generation facilities.

Private Consulting Engineering- Land and Site Development

Mr. McGrane began his career in the private consulting field, and worked with the Connecticut based civil engineering firms of Dicesare-Bentley Engineers, Inc., and Kratzert-Jones Engineers, Inc. Mr. McGrane gained fundamental experience with these firms which concentrated in the areas of land development engineering, regulatory permit approval assistance for private developers, and design of related infrastructure including roadways, drainage, sewers, and other site components.

PROFESSIONAL ASSOCIATIONS

Town of Farmington Water Pollution Control Authority

Association of State Floodplain Managers, Certified Floodplain Manager (CFM)

KRISTEN A. PONAK, GISP

STAFF SCIENTIST/GIS ANALYST

resume

Ms. Kristen Ponak is a Scientist and certified GIS Professional for GEI who performs GIS design/analysis, Web-GIS deployment, and 3D visualization, and graphic support for public outreach and communication. She has applied these GIS skills to various environmental site assessments, water resources projects, ecological studies and geotechnical projects. Kristen also has experience with: environmental research; groundwater, sediment, and subsurface soil sampling and classification; ecological field assessments; and, ACOE wetland delineations.

RELEVANT PROJECT EXPERIENCE

The Shepard Companies- Jilson Farm T&E Species Survey and Wetland Evaluation. Filed a NDDB request to CT DEEP and performed a CT Threatened and Endangered Species survey on a property being proposed for development. Generated GIS maps of historical and updated wetland and vernal pool overlays for Client meetings and supporting technical documents for the inland wetland permitting.

Regional Framework for Coastal Resilience in Southern CT SCROG. Conducted initial site inventory of coastal projects within project area, maintaining online based GIS database of inventoried sites to be selected for possible green infrastructure/coastal resiliency design. Presented at stakeholder meetings with SCROG, The Nature Conservancy, and various municipalities.

NEPA Statutory Checklists for HUD-DR Program- Various sites along Long Island Sound, Connecticut. Inspected properties, and developed GIS maps and checklists of environmental and ecological resources of various sites required for applications to the HUD Disaster Relief Program in support of residential hurricane disaster relief reconstruction and rehabilitation projects.

Natural Resource Baseline Inventory- The Trust for Public Land, Old Saybrook, CT. Developed and implemented ArcGIS Mobile Application to streamline data collection process from field to reporting.

New London Clean-up Grant Permit Support City of New London. Responsible for all inland and tidal wetland permitting package submittals for USACE, CT DEEP OLISP, and New London Inland Wetlands Commission. In addition, provided GIS support for community and public outreach.

EDUCATION

M.A. Ecology/Environmental Science, Central Connecticut State University

B.S., GIS/Web Technology, University of Connecticut

EXPERIENCE IN THE INDUSTRY

11 years

EXPERIENCE WITH GEI

7 years

CERTIFICATIONS

GISP, #91035

OSHA 40-hour HAZWOPER,
OSHA HAZWOPER 8-hr retraining,
CPR and First aid Certified

PROFESSIONAL MEMBERSHIPS:

CT Society of Women Environmental Professionals

Society of Conservation GIS

GEI Consultants

Ren Faire Site Due Diligence Environmental and Ecological Services, RW Orange County, LLC. Assisted with ACOE wetland-delineation, GPS and GIS mapping of various sites in the New York area.

Phase 1/Phase 2 Environmental Site Assessment Former Unisys Corporation, Waterbury, CT. Oversaw geophysical and EMI survey as part of the site assessment. Maintains geodatabase of project data and performs GIS analysis to develop and illustrate a conceptual site model for reporting.

Stewardship Permit MacDermid, Inc.- Waterbury, CT. Provided field support for environmental subsurface soil and groundwater sampling, compiled project data into a geodatabase for analysis in developing a conceptual site model and provided graphic support for reporting.

Stamford Hurricane & Shore Protection Evaluation Project, City of Stamford WPCA, Stamford, CT. Created GIS maps and figures delineating project boundaries, wetland boundaries, land use, soils and surficial geology of project area. Digitized historic maps outlining historic shoreline conditions of the region to be used in conjunction with geomorphology analysis.

GIS Multi-Criteria Decision Analysis/Site Suitability Analysis for Energy Storage Facilities in New York, AES Energy Storage, LLC. Performed GIS spatial analysis with multi-criteria decision making techniques to support site suitability screening for energy storage facilities in the metro New York area and Long Island, New York.

Crab Meadow Watershed Study and Stewardship Plan- Town of Huntington, New York. Developed and maintained GIS geodatabase of watershed's data inventory, provides graphic support for public outreach, and developed web-gis based outputs for outreach and analysis.

Perennial Pepperweed Management Plan-West Meadow Beach, Town of Brookhaven, New York. Created and mapped Perennial Pepperweed patches for early detection, and management along West Meadow Beach.

Remedial Investigation/Design – Urban Waterway and MGP Sites, Brooklyn, NY (Confidential Client). Designed and developed a custom web-based GIS application and geodatabase for the project displaying various spatial and tabular data. Provided field support for events such as groundwater monitoring, CSO sampling, benthic invertebrate and sediment/surface water sampling.

Dam Failure Analyses & Inundation Mapping, Multiple Dams, Massachusetts Water Resources Authority. Designed and updated GIS-based Emergency Action Plan inundation maps for multiple dams according to Federal Energy Regulatory Commission (FERC) standards. Worked with H&H outputs from Geo-Ras and incorporated them into ArcGIS plans.

PUBLICATIONS

ArcNews Online – Summer 2007 – "Creating a GIS to Monitor the Shoreline of Connecticut's Largest Lake" M. Tarsi, K. Ponak, and L.J. Marsicano.

PRESENTATIONS

Connecticut Conference on Natural Resources – March 2015, Storrs, Connecticut. "Mobile Field Data Collection for Natural Resource Baseline Inventories"

Laura A. Schwanof, RLA
Senior Ecologist

resume

Ms. Laura Schwanof has 34 years of work experience related to environmental planning & permitting, natural resources inventory and assessment, wetland delineation, and ecological restoration design. Her areas of expertise include watershed planning, soil and water conservation, terrestrial and wetland ecology, coastal zone and site planning. She is licensed and registered as a Landscape Architect in New York State.

EDUCATION
B.S., Forest Biology, SUNY Environmental Science and Forestry

EXPERIENCE IN THE INDUSTRY
34 years

EXPERIENCE WITH GEI
15 years

PROFESSIONAL REGISTRATIONS
Landscape Architect, NY No. 001479-1

PROJECT EXPERIENCE

Ms. Schwanof is intricately familiar with Long Island's coastline and the associated estuarine ecosystem, as well as the erosion, water quality and flooding problems facing coastal communities in the dynamic marine environment. Her professional design skills have been acutely focused on wetland restoration and coastal stabilization projects that protect rare species, promote indigenous plants and incorporate innovative bioengineering techniques wherever practical and feasible. She has conducted several training programs for universities, professional organizations and the Cooperative Extension Program focused on habitat analysis, wetland restoration, and living shorelines. Ms. Schwanof has contributed to numerous environmental studies conducted in the Peconic and South Shore Estuary Reserves, as well as the Long Island Sound, as follows.

U.S. Army Corps of Engineers (USACE) Task Orders:

- Historic Vegetation Zonation Changes Associated with Breach and Overwash Events;
- Submerged Aquatic Vegetation of L.I. South Shore Embayments;
- DEIS for the Interim Erosion Protection Project, Fire Island Inlet to Moriches Inlet;
- West of Shinnecock EAF;
- Storm Damage Reduction Reformulation Study: Mitigation Screening;
- Storm Damage Reduction Reformulation Study: Data Gap Analysis/Interim Progress Memorandum;
- Storm Damage Reduction Reformulation Study: Barrier Island Breach and Overwash Impacts, A Position Paper; and
- Reformulation Study for Fire Island to Montauk Point.

Ms. Schwanof has also co-authored coastal zone planning documents and Draft Local Waterfront Revitalization Plans, including the following:

- The Crab Meadow Watershed Hydrologic Study and Stewardship Plan for the Town of Huntington;
- The North Shore Embayments Watershed Management Plan for Suffolk County Department of Health Services (SCDHS);

- Submerged Aquatic Vegetation Study for the Peconic Estuary Program (PEP);
- PEP Tidal Creeks Characterization Study ;
- PEP Eelgrass Study;
- Subwatershed Management Plan for Scudder's Pond Village of Sea Cliff;
- Mattituck Creek Watershed Analysis for the Town of Southold;
- Stormwater Management Component of the Harbor Management Plan for the Oyster Bay/Cold Spring Harbor Complex for the Town of Oyster Bay;
- Shoreline Study for the Village of Sea Cliff;
- The Environmental Impacts of Barrier Island Breaching; and Coastal Hazard Planning for Select Municipalities for the New York State Department of State (NYSDOS).

As a Landscape Architect, Ms. Schwanof is adept at preparing detailed landscape plans, grading plans, soil erosion and sediment control plans, and associated technical specifications. She has also prepared and conducted long-term monitoring plans for restoration projects to comply with state and federal permitting requirements, to meet agency performance requirements, and to establish ecological function and ensure overall project success.

Ms. Schwanof has performed shop drawing reviews and provided quality control inspection services on many of her design projects. She is currently providing such services for a mile long Hempstead Harbor Shoreline Trail project for the Town of North Hempstead. Ms. Schwanof is also collaborating with major NYC design and construction firms and the NYC Department of Parks and Recreation on the Far Rockaway Boardwalk and USACE Dune and Beach Restoration project.

During 2013 and 2014, Ms. Schwanof assisted GEI's Geotechnical Engineers with the environmental permitting, Bluff Stability Repair and rock revetment design for a coastal estate bordering Long Island Sound in Lloyd Harbor, NY. The project involves installation of steel sheet piling, a rock revetment at the toe of the bluff, gravity revetment walls to flank the sides, tree protection and grading on the upper bluff face to accommodate the installation of brush mattresses and live stakes. GEI has received final state and Village approvals, and the project is scheduled for installation sometime during the winter of 2014 and early spring 2015.

During 2012-2013, Ms. Schwanof prepared the conceptual plans and provided agency permitting coordination for the proposed Bardo Boatyard in Mill Basin, Brooklyn NY. This project involved conversion of an underutilized and deteriorated 0.3 acre industrial waterfront parcel into an active marina and boatyard storage. The project incorporated installation of a new steel bulkhead, raising the site elevation to improve storm and flood protection, provision of dry dock storage to accommodate 24-26 boats, a new boat launch, and a tidal wetland restoration.

Since 2010, Ms. Schwanof assisted the Village of Port Jefferson with SEQRA reviews, conducting storm damage assessments, and coordination with the County Emergency Management Agency, FEMA and SEMO. Work resulting from those efforts included the preparation of design plans to modify and repair the Village's stone revetment at East Beach; the repair and extension of the Town jetties at Mount Sinai Harbor; beach replenishment; parking lot, stormwater drainage and park facility upgrades; wetland restoration; engineering cost estimates; and securing the necessary environmental permits.

Other related project experience includes:

- Design & Installation of Four Stormwater Treatment Wetlands/Bioswales on Conscience Bay for the Village of Old Field;
- Rehabilitation of 4 Pond Systems for the NCDPW;
- Design of a 35-acre Nature Preserve & Trail System for Arverne East Development;
- SPDES MS4 Stormwater Outfall and Wetlands Inventory for NYSDOT Regions 8,10 and 11;
- Hempstead Harbor Tidal Cove Restoration;
- West Meadow Beach Restoration for the Town of Brookhaven;

- NCDPW Massapequa Creek & Pond Restoration; and
- Fresh Kills Landfill Wetland Creation for the NYC Department of Sanitation (DSNY).

Ms. Schwanof began her career with the USDA Soil Conservation Service, serving Nassau, Suffolk, and Dutchess Counties. She accompanied the Soil Survey Team while mapping was conducted for the Nassau County Soil Survey, prepared Interim Soil Survey Reports before the official soil survey was published and the Table of Trees, Shrubs ad Groundcovers that is keyed to the various Soil Series in the Soil Survey of Nassau County. While covering Nassau County, Ms. Schwanof coordinated the Shoreline Vegetation Steering Committee, conducted two workshops for NYSDEC, NY Sea Grant Extension, Cornell Cooperative Extension and municipalities regarding vegetative shoreline stabilization measures. She also collected seed stock for vegetative propagation at the USDA Big Flats and Cape May Plant Materials Centers, and conducted field trials for saltmeadow cordgrass (*Spartina patens*). As a USDA Soil Conservationist, Ms. Schwanof developed Resources Management Plans for farms, nursery operations, schools, and municipal properties which assessed the ambient condition of water bodies (e.g., streams, ponds, flood plains, etc.), soil, vegetation, livestock and wildlife resources, and projected future scenarios with and without recommended Best Management Practices. Plans focused on soil erosion and stormwater control, wildlife habitat management, crop sustainability, and vegetative stabilization measures for critically eroding areas, such as steep slopes, bluff faces, cut banks, sand/gravel pits and eroding shoreline areas.

PROFESSIONAL ASSOCIATIONS

Society of Wetland Scientists
Long Island Native Plant Initiative (Board Member)
American Society of Landscape Architects
Long Island Botanical Society
Society of Ecological Restoration
The Nature Conservancy

PRESENTATIONS

Creating Living Shorelines to Enhance Brownfields Sites". 2014 New Jersey Institute of Technology, NJ.
"Green Shoreline Projects on Long Island". 2013 New York Sea Grant Extension, Hauppauge, NY.
"An Ecosystem Approach to Landscape Design". 2011 Long Island Native Plant Symposium, Riverhead, NY.
"Green Solutions for Shoreline Stabilization". NYWEA. 2010, 82nd Annual Meeting, New York City, NY.
"Green Alternatives for Shoreline Protection and Restoration". 2006 In-house training, NYSDEC, Setauket, NY.
Hempstead Harbor Tidal Wetland Restoration Project, NY". 2003 Sixth Wetlands Workshop, Atlantic City, NJ

AWARDS

1993 ASLA Design Competition - Hofstra University Bird Sanctuary, Uniondale, NY

March 30, 2016

Jessie L. Richard
Town of Mansfield
Planning and Community Development
4 South Eagleville Road
Storrs, CT 06268

RE: Inland Wetland Application Review
Lodges at Storrs

Dear Ms. Richard:

Environmental Planning Services, LLC (EPS) and Nathan L. Jacobson and Associates, Inc. (NLJA) are pleased to submit this proposal for consulting services per the Request for Proposals issued by your office. Both firms have over three decades of experience serving public and private clients in Connecticut and throughout southern New England. EPS has specialized in wetland and biological surveys, functional analysis, impact assessment and permitting since 1983. All three of our staff are registered soil scientists and professional wetland scientists, and each brings additional specialized expertise to the tasks at hand. Eric Davison is also a wildlife biologist with extensive experience conducting field surveys for birds, reptiles, amphibians and vernal pools. James Cowen is also a skilled botanist and native landscape designer with experience in wetland and stormwater plant design and state-listed flora. EPS' project team will be headed by Principal Wetland Scientist Michael Klein, who specializes in impact assessment and permitting. Both Mr. Davison and Mr. Klein also have served as members of Inland Wetlands and Watercourses Agencies.

While the bulk of EPS' business is for private clients, we also have provided professional services to more than 15 Connecticut municipalities. We are currently one of two wetland/soil science firms providing application review services on a regular basis for the Town of Brookfield. We have also been engaged for individual complex application reviews in Seymour, Ellington, Groton (City), Enfield, East Windsor, Warren, Bethany, and Norwalk.

Nathan L. Jacobson and Associates has provided a full range of engineering services to private and public clients since 1972. NLJA serves as town engineer in 14 communities and as engineer for a specific board or commission in 6 others (all on a continuing basis - some up to 43 years). They have also been retained by a number of communities that have professional staff to provide third party reviews of controversial projects (i.e. - East Haven, New London, Stonington, etc.). While the bulk of NLJA's business is for municipal clients, they also have a substantial list of private clients.

89 Belknap Road
West Hartford, CT 06117
Phone 860-236-1578 Fax
michael.klein@epsct.com

10 Maple Street
Chester, CT 06412
Phone 860-322-4524 Fax
eric.davison@epsct.com

138 Mystic Road
North Stonington, CT 06359
Phone 860-535-0625 Fax
james.cowen@epsct.com

www.epsct.com

I have attached a spreadsheet with the estimated level of effort and cost associated with each of the tasks identified in the RFP. The total estimated fee, including travel and expenses, is $24,893.00. I have also attached Qualifications for both firms, and resumes of the personnel that will be assigned to the project. We have reviewed the proposed schedule and the work can be accommodated within the time frame allotted. As you can see, a substantial portion of the cost is associated with the engineering review, which includes review of the stormwater design, hydrologic modelling and erosion and sediment controls.

I have also attached Qualification Statements for both firms, and resumes of the personnel who will be assigned to the project, if we are selected.

Yours truly,

Michael S. Klein, Principal
Soil Scientist
Professional Wetland Scientist

attach.

cc: G. Jacobson

LEVEL OF EFFORT/COST ESTIMATE FOR PEER REVIEW
THE LODGES at STORRS

	PERSONNEL	HOURS	RATE	TRAVEL	EXPENSES		SUBTOTAL
Application Review							
Pre and post development	Prof. Wetland Scientist	6	$95.00	0	0	$570.00	
Water Quality treatment	Principal Wetland Scientist	6	$175.00	0	0	$1,050.00	
Erosion & Sediment control	Principal Engineer	22	$135.70	0	0	$2,985.00	
Wetland functions & values	Project Engineer	30	$105.60	0	0	$2,957.00	
Mitigation	Engineering Technician	24	$66.50	0	0	$1,589.00	
Historical aerials	Geologist	2	$114.50	0	0	$229.00	
Published data							**$9,380.00**
Site visit							
Walk site, photographs,	Prof. Wetland Scientist	8	$95.00	$44.00	$0.00	$804.00	
recon of general area.	Principal Wetland Scientist	8	$175.00		$0.00	$1,400.00	
	Principal Engineer	8	$135.70	$43.00	$0.00	$1,132.00	
	Project Engineer	1	$105.60			$106.00	
							$3,442.00
Comment Letter							
Detailed comments on plans,	Prof. Wetland Scientist	4	$95.00	0	$0.00	$380.00	
and reports; requests for	Principal Wetland Scientist	6	$175.00	0	$0.00	$1,050.00	
additional information, .	Principal Engineer	16	$135.70	0	$0.00	$2,171.00	
identify deficiencies.	Project Engineer	4	$105.60	0	$0.00	$422	
							$4,023
Response Letter							
including review of revisions	Prof. Wetland Scientist	4	$95.00	0	$0.00	$1,400.00	
	Principal Wetland Scientist	8	$175.00	0	$0.00	$1,900.00	
	Principal Engineer	14	$135.70	0	$0.00	$422.00	
	Project Engineer	4	$105.60	0	$0.00	$700.00	
							$4,422.00
Staff/Applicant meeting							
	Principal Wetland Scientist	4	$175.00	$44.00	$0.00	$380.00	
	Prof. Wetland Scientist	4	$95.00	0	$0.00	$586.00	
	Project Engineer	4	$105.60	$0.00	$0.00	$586.00	
	Principal Engineer	4	$135.70	$43.00	$0.00	$744.00	
							$2,296.00
IWA hearings (each)							
(assume 4 hrs/mtg)	Principal Wetland Scientist	4	$700.00	$44.00	$0.00	$744.00	
	Principal Engineer	4	$543.00	$43.00	$0.00	$586.00	
							$1,330.00
Hourly rates	Principal Wetland Scientist		$175.00				
	Prof. Wetland Scientist		$95.00				
	Landscape Designer		$100.00				
	Principal Engineer		$135.70				
	Project Engineer		$105.60				
	Engineering Technician		$66.20				
	Geologist		$114.60				
TOTAL							**$24,893.00**

MEMO

TO: Alexis Cherichetti, Norden Place project team

FROM: Michael Klein

RE: Review of revised plans

DATE: 9.21.09

I have reviewed the revised plans and Long Term Habitat Management Plan. In general, the documents are much improved. Given the relatively low values of the resources affected, the proposed mitigation is conceptually acceptable. There are still additional details that remain to be provided. The applicant has been made aware of most of these issues during our meetings in preparation for the public hearing. Regardless of that fact, I believe that many of these can be addressed with conditions of approval, if the agency is inclined to approve the proposed activities. The most important issues that have not been adequately addressed include:

- Conservation Easement extent and language
- Success monitoring, including standards for invasives control
- Financial assurances (i.e., bonding). Without adequate financial assurances for success of the mitigation and invasives management, I would not recommend approval.
- Additional details on wetland disturbance required to install the proposed channel stabilization measures. These are likely to be the largest area of wetland disturbance necessary to implement the site plan.

My specific comments are as follows:

REVISED PLANS (ENGINEERING, EROSION CONTROL, WETLAND MITIGATION, AND LANDSCAPING) Revised through 9.10.09

All areas proposed for treatment in either the Long Term Management Plan or the Wetland Mitigation Plan should be encompassed within the Conservation Easement.

Detention Basin 1 will require regular maintenance and should not be within the Conservation Easement.

The Conservation Easement has not been revised as requested. The easement limit and language proposed by the applicant is not acceptable.

There is wetland creation/invasives management monitoring plan prepared by Land-tech should be referenced on the plans. Recommended language is as follows:

> Success of the created wetlands, channel stabilization, invasives removal, and wetland enhancements shall be monitored for five full growing seasons after all wetland

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msklein52@comcast.net

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138 Mystic Road
North Stonington, CT 06359
Phone 860-535-0625 Fax
jrcowen@comcast.net

construction and planting is completed. The work shall be performed by a wetland scientist. The 5th year monitoring shall include an assessment of the overall success of the mitigation program, by a 3rd party wetland scientist (not the designer or owner's monitor for years 1-4.) In the event that the assessment concludes that the plan has not been successful, recommended remedial measures shall be implemented by the applicant, unless specific permission otherwise is granted by the wetland agency or its staff. If substantial remedial measures are required, the 3rd party wetland scientist shall recommend any additional monitoring and appropriate success standards.

Deer repellent or other form of browsing control is required. It should be maintained regularly until all trees and shrubs are well established. Monitoring reports should include comments on extent of deer browse. Also consider adjusting the shrub and tree specifications accordingly.

Sheet C5.4
General Notes 16 & 26 should be coordinated and make clear that ALL dewatering wastewaters shall pass through a sediment control basin as per CT DEP E&S Guidelines.

Section F Sequence should clarify that topsoil removed from areas containing invasives is not be re-used with wetland mitigation areas or long term management areas.

What provisions have been made to transfer responsibility for maintenance wetland mitigation areas, conservation easements and stormwater controls post construction? Semi-annual reports to the Commission staff are recommended.

Sheet C6.2
Detention basin outlet elevation and fill berm details show that portions of Basins 1 and 2 will be below the low level outlet. Seed mixes are not acceptable in that (ponded) condition. Please revise details and planting notes to indicate use of plugs or potted plants.

WM.01 Planting notes

General

1. Replace "environmental monitor" with "wetland scientist" for "under supervision of" throughout the plans. An overall site monitor may be required, but this does not remove the need for a wetland specialist to supervise the wetland mitigation and enhancement.
2. Adjustments of species planted shall be approved by the wetland scientist and the City of Norwalk Inland Wetland Agency staff. The number of plantings shall be at least as many as shown on the drawings, unless specific approval is granted by the Inland Wetland Agency (or their designee, if the Commission so chooses).
3. Extensive areas are proposed to be planted with warm season grasses. How will these areas be stabilized if they are brought to final grade between May 15 and October 20? Given the relatively slow maturation of warm season grasses, consider use of a nurse crop. This is especially important given the presence of an extensive invasive plant seed bank at the site.

4. Moving the typical sections for the rip-rap channels and level spreaders from the detail sheets to the Wetland Mitigation Plan does NOT address the issue raised in our meetings and my memos. It appears that heavy equipment operation, tree removal, placement of fill, and re-grading will be required within the wetlands to install these features. The engineer should provide the Commission with the extent of the work, as well as a construction sequence and restoration plan for these areas, which are entirely within wetlands.

Wetland 1

1. We do not agree that canopy thinning is appropriate in Wetlands 1 and 4. Additional sunlight will likely promote growth of invasives in the seed bank.
2. How much disturbance and tree removal will be required to install the rip-rap channel (see comment above)?
3. Dead trees should not be removed unless they are an imminent safety hazard. Diseased trees should only be removed if they represent a significant threat to the health of surrounding trees. Replace "undesirable" with invasive
4. The number of trees and shrubs for all buffer areas is too small/ the spacing is too large.
5. Does seed mix referenced in #6 apply to buffer or wetlands? It may not be acceptable for both uses.
6. Provide restoration specifications for areas within wetland disturbed for installation of rip-rap channel lining.
7. Proposed soil moisture conditions are likely too dry for *Rhododendron viscosum*.
8. *Lindera benzoin* is adapted to full shade. The buffer areas are likely to be very sunny for several to many years. Consider adjusting the shrub specifications accordingly.

Wetland 4

1. Please verify the proper cut and treat herbicide sequence for *Phragmites*
2. The seed mix for the wetland as shown is not acceptable. It is 2/3 Roadside matrix mix, which includes non-native cool season grasses and shrubs. It should be NEWP Wet meadow mix only.
3. Proposed soil moisture conditions are likely too dry for *Rhododendron viscosum*. Consider adjusting the shrub specifications accordingly.
4. *Lindera benzoin* is adapted to full shade. The buffer areas are likely to be very sunny for several to many years. Consider adjusting the shrub specifications accordingly.
5. Without considerable micro-topographic variation, the wet meadow is likely to be too dry to support wetland wildlife and for *Acorus calamus*. Creation of shallow ponding areas that are suitable for wetland wildlife and where *Acorus* can thrive.
6. Consider replacing or reducing numbers of *Chelone glabra* and *Lobelia syphilitica*. They are not typically found in wet meadows and may not be strong competitors with invasives.
7. The numbers of tree, shrub and herb plantings are insufficient for the areas they are designed to cover. This is especially true for the herbaceous plants, given the likelihood of invasives re-growth. Areas planted with herbaceous plugs should be 1' o.c.

LONG TERM HABITAT MANAGEMENT AND INVASIVE SPECIES MANAGEMENT PLAN (LTHMP, by Land Tech, revised through 9.10.09)

1. Please provide bond estimate for construction, planting, monitoring and potential remedial actions, as previously requested.
2. All areas subject to LTHMP actions must be within the conservation easement.
3. Greenbriar is native and should be deleted from the table on p. 5.
4. The following non-native, invasive species are either confirmed or very likely to be present at the site. The table and report should be revised as necessary. This is especially critical with respect to Purple Loosestrife (*Lythrum salicaria*).

    a. *Microstegium vimineum* present
    b. *Lythrum salicaria* present
    c. *Lonicera morrowii* present?/potential
    d. *Robinia pseudoacacia* present?/potential
    e. *Phalaris arundinaceae* potential

5. Please revise note on top p. 6 to remove "to the extent practical" and replace with "unless specifically authorized by the Norwalk Inland Wetland agency or its staff".
6. We agree that total eradication of invasives at this site is not feasible. Therefore quantitative or semi-quantitative success standards are required to facilitate enforcement.
7. Revise seed mix for wetlands. NEWP Wetmix or equal should be used at 1 lb/1750 sq. ft. (or as per manufacturer's recommendations). The Roadside Matrix wet meadow mix is not acceptable.
8. Small and medium stems WILL be pulled by hand or weed wrench to the extent possible.
9. Emphasize that cut stump herbicide treatments must occur immediately after cutting.
10. Removal of topsoil and use of manufactured or certified weed and invasive free topsoil should be required within wetlands and upland review areas, as well as areas that drain directly to wetlands, to minimize spread of invasives.
11. Revise seed mix for south side of accessway to NEWP Roadside Matrix Mix for dry or moist sites as applicable.
12. The initial period of invasives management should be implemented separately from other routine maintenance. A specific monitoring and management program for invasives shall be developed, separate from other site maintenance, until the results are acceptable to the Town and the bond is released.
13. The practices listed under Preventive Measures should be mandatory, unless other practices are specifically approved by Norwalk Inland Wetland Agency staff.
14. Revise the Monitoring Plan to include monthly, growing season water table elevations (referenced to ground surface) at one shallow groundwater well in each of the two wetland creations areas. Wells shall be installed per ACOE ERDC TN-WRAP-05 "Technical Standard for Water-Table Monitoring of Potential Wetland Sites" and illustrated in the attached drawing, modified to extend to monitor the upper 20".
15. Monitoring reports shall be submitted to the Norwalk Inland Wetland Agency by July 1 and January 1 of each year, and include recommended remedial actions.

16. Success standards should be revised to include metrics to document declining dominance by invasives and increasing dominance by native hydrophytes.
17. Provide recommended control strategies for *Lythrum, Microstegium, Lonicera morrowii,* and *Robinia.*
18. The monitoring plan shall include a final assessment after 5 years, performed by a wetland scientist not associated with the permitting or design team. The report should address the extent to which the creation areas exhibit/support wetland hydrology, vegetation and soils and the continued threat (if any) from invasive species, as well as any final remedial action recommendations, as well as the extent to which monitoring and bonding may need to be extended.
19. The note on p. 9 shall be expanded to include "construction and planting" as well as weekly progress reports to the Norwalk Inland Wetland Agency.
20. The permit plans and the LTMP shall include a mandatory pre-construction meeting with the contractor(s) responsible for implementing the wetland mitigation and invasives removal, the general contractor, site contractor, site monitor and Norwalk Inland Wetland Agency staff.

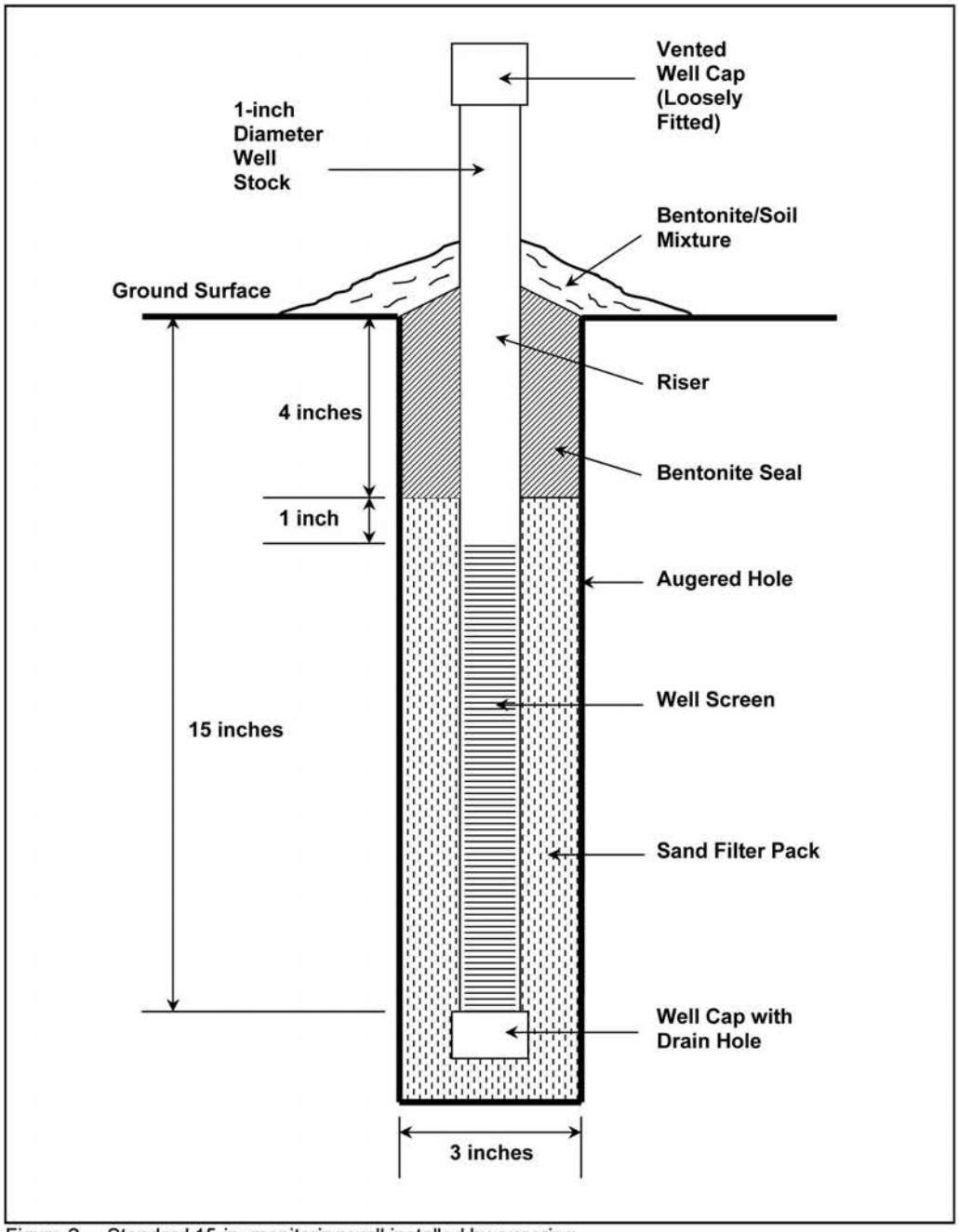

Figure 2. Standard 15-in. monitoring well installed by augering

Wetland Creation

1. How will the grass-lined level spreader be vegetated? Unless there is an extended period of no rainfall, the bottom will likely be inundated. Seed mixes are not appropriate for this condition.
2. How much tree removal and soil disturbance will be required for the channel improvements? Plans should address restoration of these areas.
3. 12" of topsoil certified to be weed and invasives free is required.
4. In the event that manufactured topsoil is used, the total organic carbon (not organic matter) of the final manufactured topsoil should be 8-12%. Alternatively, a 50:50 mix of aged leaf compost and sand or subsoil can be used. spread over the restoration. Any backfill in these areas shall be certified to be weed and invasives free.
5. Seed mix for the wetland as shown is not acceptable. It is 2/3 Roadside matrix mix, which includes non-native cool season grasses and shrubs. It should be NEWP Wet meadow mix only.
6. Include a requirement for 1-2% coarse particulate organic matter, placed so as not to become floatable during storm events.

Wetland 5

1. Please verify the proper cut and treat herbicide sequence for *Phragmites*
2. Seed mix for the wetland as shown is not acceptable. It is 2/3 Roadside matrix mix, which includes non-native cool season grasses and shrubs. It should be NEWP Wet meadow mix only.
3. Please revise call-out to indicate that *Phragmites* control is not confined to the wetland area.

LP.1

Planting Notes:

1. Significant portions of the detention basin bottoms seem likely to be inundated, based on the outlet detail. Provide alternate planting specification that does not require seed.
2. Please expand Note 9 to indicate that in the event of a conflict between the LP series and the WM series, the WM series shall govern for all areas within wetlands, watercourses and their upland review areas.

February 25, 2013

Ms. Katherine Daniel, AICP
Inland Wetlands Commission
Town of Brookfield
100 Pocono Road
Brookfield, Connecticut 06804

Re: Sewer Line Crossing
High Meadow/Carriage Homes, Ledgewood, and Newbury Crossing

Dear Ms. Daniel:

I am writing to report the results of our review of the referenced application. Our report is based on a site visit on February 21, 2013; a review of publicly available natural resource data, including high resolution aerial photography, CT DEEP GIS datasets, NRCS soil mapping, and FEMA flood maps; and an examination of the following documents prepared by the applicant:

- Wetland Application, High Meadow/Carriage Homes, Ledgewood and Newbury Crossing. Birdsall Services Group, January 2013.
- Soils and Wetlands Report, Brookfield Sewer Project, Newbury Crossing, Ledgewood and High Meadows Condominiums, Brookfield, CT. Cynthia Rabinowitz, Soil Scientist, 30 June 2011.
- Wetland Assessment and Restoration Plan for Newbury Crossing, Ledgewood and High Meadow Sanitary Sewer Installation. Jodie Chase Ecologist, January 14, 2013.
- Wood Turtle Survey for Proposed Sewer Extension, Pocono Road, Brookfield, CT October 10, 2011.
- Engineering Plans by Birdsall Services Group, dated 9/12/2012
    - Sheet C-01 Wetlands Plan
    - Sheet C-10 Sewer Improvement Plan 2 of 6
    - Sheet C-11 Sewer Improvement Plan 3 of 6
    - Sheet C-15 Sewer profiles, 1 of 6
    - Sheet C-16 Sewer profiles, 2 of 6
    - Sheet C-17 Sewer profiles, 3 of 6
    - Sheet C-21 Crossing A Plan and Section
    - Sheet C-22 Crossing B Plan and Section
    - Sheet C-23 Crossing C Plan and Section
    - Sheet C-24 Crossing D Plan and Section
    - Sheet C-25 Wetland Planting Plan and Construction Sequence 1 of 2
    - Sheet C-26 Wetland Planting Plan and Construction Sequence 2 of 2
    - Sheet C-27 Construction Details Sheet 1 of 3
    - Sheet C-28 Construction Details Sheet 2 of 3

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- Sheet C-29 Construction Details Sheet 3 of 3

GENERAL SITE CONDITIONS AND PROPOSED ACTIVITY

The project site (bounded by Pocono Road, Silvermine Road, and Ledgewood Drive) consists of a west facing bedrock-controlled hillside, developed for multi-family residential uses, which slopes down to a nearly level riparian wetland associated with an unnamed tributary of the Still River. Several watercourses drain the hillside in the project area. The hillside soils are derived from glacial till (Hollis-Charlton-Rock Outcrop association). The level soils at the base of the slope are derived from glacial outwash and alluvium (Agawam-Hinckley-Haven association).

The Brookfield Water Pollution Control Authority has filed an application for activities in and adjacent to wetlands, associated with installation of a gravity sewer, force main and pump station, to connect the existing residences to the town's sewer system. The route of the proposed sewer requires several watercourse crossings and a wetland crossing, totaling 537'. Once the sewers have been installed, the existing sub-surface sewage disposal systems will be abandoned. Given the fixed locations of the effluent source, the existing town sewer in Pocono Road, and the wetlands and watercourses that lie between them, there does not appear to be a reasonable alternative to the proposed wetland and watercourse crossing. However, please note that we are not qualified to assess the technical feasibility of accessing the town sewer system at different locations, nor does the application examine alternative construction techniques, such as directional drilling.

WETLAND DELINEATION

It was not feasible or necessary to perform a detailed confirmation of the flagged wetland boundary for several reasons:

1. There was 6-12" of snow cover at the time of the field inspection.
2. As noted above, the physical relationships require the crossings.
3. There were at least two (and possibly three) sets of wetland flags present.

However the boundaries appear to be reasonable based on a few soil borings, the site topography, vegetation, and landscape position of the flagging.

WETLAND ASSESSMENT AND RESTORATION PLAN

The narrative description of the wetland is largely correct, but there are several aspects of the report that should be revised:

1. The Wetland Class and Hydrogeomorphic (not Hydrogeologic as per the report) Classification sections are only partially correct. They appear to focus primarily on respect to the wetlands adjacent to the intermittent watercourses in the glacial till hillside. The report does not correctly characterize the productivity of the outwash/alluvial wetland or correctly identify its hydrogeomorphic classification or functions.
2. The report should identify the principal functions of the wetland system at the site.
3. The focus on Wood Turtle winter habitat does not recognize wide ranging nature of this species, or the landscape scale factors necessary for long term viability of Wood Turtle populations and fails to acknowledge that the limited field data cannot support any conclusions regarding use of the site by that state-listed species.
4. A copy of the CT DEEP NDDB Wood Turtle letter should be provided. Their letters typically advise the applicant to retain an experienced herpetologist, and that the survey report should include the following information:

a. the education and experience of the investigators with respect to field surveys for this state-listed species, including the number of surveys conducted, and the number of wood turtles observed.
b. It should also indicate the time of day at the beginning and end of each field survey, as well as weather conditions. This information is especially relevant due to the impact of field conditions on movement and activity patterns of this species.
c. A list of all amphibians and reptiles identified in the field during the survey.

5. As a result of the late summer-early fall timing of the wood turtle survey, no conclusions can be drawn with respect to the use of the site by this state-listed species. They are well-camouflaged turtles and easily overlooked due to the high-density of groundcover vegetation present at that time of year. The report notes that the herb layer "is lush and dense reaching 100% cover over much of its area". Late spring is the optimal survey period when the vegetation is less dense and the turtles are more active.
6. Similarly, no conclusions can be drawn with respect to the presence or absence of vernal pool amphibians, and hence potential impacts, due to their seasonal activity patterns. Early-mid spring is the appropriate survey period.
7. Given these timing issues, the applicant and/or their consultants should justify their decision not to collect additional data during the biologically appropriate seasons in 2012.
8. The impact assessment states that the sewer right of way "must be kept clear of trees". How will that occur, given the likely seedfall from adjacent wooded areas?
9. The restoration plan should account for potential seasonal impacts on breeding movements, migration, and foraging activity of wood turtles and vernal pool amphibians and consider the appropriate timing and controls. The measures described for their protection does not fully reflect current best management practices in this specialized field, as recognized by CT DEEP.
10. The sediment and erosion control and restoration plans requires additional detail, before a conclusion can be drawn as their efficacy. Without reviewing those details, we do not agree with the conclusions contained in the report.

PLAN REVIEW

Regulated activities B, C, and E occur in existing roads and/or developed areas. They are unlikely to cause any significant adverse impact, with one important caveat. Proper measures are required to control dewatering discharges and sediment. In our judgment, the plans require more detail in these areas, as will be addressed below. Most of our comments are focused on the wetland crossing (unlettered), watercourse crossings A and D, and the proposed restoration/mitigation plan.

Wetland Crossing

The activity consists of installation of approximately 475 l.f. of force main in the bottomland wetland, and the crossing of two watercourses within the wetland. Temporary disturbance of 10,062 sq. ft. of wetlands and two watercourse crossings are proposed. The soils in this area are Walpole and Scarboro series, which have a seasonal high water table at or near the surface for extended periods of time. The Scarboro series often has a mucky surface, up to about 12" thick. These conditions represent substantial challenges during construction, most particularly associated with dewatering the excavation. The underlying sands and gravels are highly permeable and there is likely to be substantial groundwater stored in these materials. As a result

of these conditions, very careful attention must be paid to the construction means and methods, erosion and sediment controls, and restoration plans. Our comments and questions on this activity are as follows:

1. Will swamp mats or other temporary fill be required? If so, where? Storage locations should be identified and the specifications for the mats should include washing to remove potential invasive species propagules prior to their being mobilized at the site.
2. Additional detail on dewatering should be provided.
    a. Sediment removal capabilities of the noted Dirtbag filters, in terms of flow rates/volumes and particle size removal.
    b. Discharge locations.
3. The plans note that the sewer in this area will be constructed on concrete supports. Please indicate how the temporary sheeting will be installed and removed, and how the crushed stone base and compacted sand and gravel surface are consistent with the proposed restoration of the wetland.
4. The manhole detail indicates special grading will be used if the manhole extends above existing grade. Does this note apply in the wetland, and if so, please provide additional detail in the grading.
5. Will a maintenance access road or path be required? Is so, a detail should be provided, and this area should be considered as a permanent impact.
6. What excavation equipment will be required? How will it operate on the very soft soils? The Commission may wish to consider requiring use of low ground pressure equipment to limit soil compaction and rutting.
7. Where will topsoil stockpiles be located?
8. Is the 30' construction right of way adequate to allow for equipment operation, dewatering, stockpiling of the various soil horizons, etc?
9. What is the time period required for the construction in the wetland? When does the applicant anticipate starting and finishing work in this area?
10. The easterly of the two stream crossings in the wetland is located at a meander and precise stream and bank location does not appear to have been located in the field. Will the construction easement/disturbance impinge on the stream?
11. Our field inspection revealed two additional ponded areas (14"-16" deep) directly on and immediately adjacent to the flagged alignment, approximately 50-60' east of the railroad embankment. They may be embedded vernal pools. If these areas support breeding by vernal pool obligates, the current alignment will adversely affect their productivity and function.

Wetland and Watercourse Crossing A

The activity at this location consists of installation of the force main under an existing watercourse with very narrow flanking wetlands. Based on a review of Sheet C-21, we note the following:

1. Hay bales are not appropriate to control sediment in an active watercourse, or an area draining more than 2 acres. Other measures are required.
2. Sanitary manhole 11A is located approximately 2' from the wetland boundary in a steeply sloping area immediately adjacent to the brook and has a high potential for construction-related impacts. Can this manhole be shifted?
3. The paved leak-off immediately west of the proposed crossing and pump station has caused significant gulley erosion and destabilized the stream banks, resulting in

sedimentation in the stream and wetland. Can this ongoing problem be rectified in conjunction with the proposed work?

4. Additional details regarding dewatering means and methods are recommended. Can this work be scheduled in the dry season to minimize the required pumping?
5. How large are the areas contributing to the 12" and 24" culverts immediately upstream of the crossing. How will the contractor control these discharges during storm events?
6. No details are provided for restoration of the stream, its banks or the (admittedly narrow) wetland. The call out "Area to be restored per wetland scientists recommendations in the field" is not adequate.

Wetland and Watercourse Crossing D

The activity at this location consists of installation of the force main under an existing watercourse with very narrow flanking wetlands.

1. Additional details regarding dewatering means and methods are recommended. Can this work be scheduled in the dry season to minimize the required pumping?
2. Hay bales are not appropriate to control sediment in an active watercourse, or an area draining more than 2 acres. Other measures are required. Additional details regarding dewatering means and methods are recommended. Can this work be scheduled in the dry season to minimize the required pumping?
3. No details are provided for restoration of the stream, its banks or the (admittedly narrow) wetland. The call out "Area to be restored per wetland scientists recommendations in the field" is not adequate.

Wetland Planting Plan and Construction Sequence

Conceptually, the plan and sequence shown on Sheets C-25 and C-26 is appropriate. However, some modifications and additional details are recommended:

1. References to the Corps should be replaced with Town of Brookfield.
2. Invasive species, including =burning bush (*Euonymous alata*) and multiflora rose (*Rosa multiflora*) are widespread in the wetland. A detailed invasive species control plan is required.
3. Chipped on-site woody material should not be used as mulch, due to the presence of invasive plants and the high nitrogen demand from wood chips. Only straw (not hay), salt hay, or synthetics should be used.
4. The sequence should be revised to require oversight of the construction process by a soil scientist, and additional details provided on stripping, storing, and replacing soil horizons during construction.
5. The plans should specify that under no circumstances should the final grade in the right-of-way exceed the adjoining undisturbed areas on either side.
6. The suggestions for topsoil handling (or approved equal) should be made mandatory.
7. If jute netting is to be used to help stabilize watercourse crossings, the engineer should demonstrate that it will be stable for anticipated velocities.
8. A detail should be provided for the appropriate watercourse crossing material.
9. The detail for the dewatering filter bag allows for placing it on aggregate or straw. This should be clarified. If aggregate is used, it constitutes additional temporary fill that should be accounted for in the impact calculations and restoration plans. If hay is used instead of straw, it can be a significant source of weeds and invasive plants.

10. Temporary sediment and erosion control devices shall be maintained until the site has been stabilized, as confirmed by the Commission or its representative.
11. The sequence should require use of a water-storing polymer if plantings are installed during the period June 15-August 15, unless waived by the Commission or its representative.
12. The correct seeding rate for WetMix is 1 lb/2500 s.f.
13. Any substitutions of plant materials should require approval by the wetland scientist.
14. There is substantial deer activity in the wetland at the site. In our judgment, a robust herbivory control plan is mandatory.
15. A cost estimate for the restoration and monitoring work should be submitted for review. The estimate should include construction oversight by wetlands and soil scientists as appropriate, plant and animal salvage, long term monitoring and an appropriate contingency. This is in addition to the erosion and sediment control bond.

Plant List

Some of the plant groups are shown more than once on the plans. It is unclear whether the plant numbers for each plant group refer to each time the group is specified, or in total for the site. We have the following specific comments:

1. The numbers of woody plants does not appear to be adequate for restoration of the area shown (approximately 1/3 acre wetland plus non-wetland). Approximately 160-170 woody plants are required.
2. The number of herbaceous plants shown is not adequate to support the proposal to cut the recommended seeding rate for WetMix in half.
3. Sand Bar Willow (*Salix exigua*) is threatened in CT. Planting it at the site is counter to CT DEEP guidance.
4. Sand Cherry (*Prunus depressa*) is not native to CT and should not be planted at the site.
5. Four tubelings are not sufficient to stabilize the stream banks that will be affected.
6. Bayberry (*Morella pensylvanica*) may not be appropriate for the area specified.

Detail sheets

Comments on the following details were noted above:

1. Sanitary precast reinforced concrete manhole assembly.
2. Sediment bag pumped silt control system.
3. Concrete cradle.

They should be revised or clarified.

Our other comments on the detail sheets are:

1. Where will the sump pit detail be used? If it applies to the stream and wetland crossings, the locations should be identified, along with details for restoration. If it does not apply to the wetlands work, the detail should be clearly labeled accordingly.
2. The Northwest Conservation District soil erosion and sediment control notes for stabilization specifications conflict with the restoration plans for the wetlands and watercourses. They should be modified or clearly labeled as not applicable in those areas, with a note indicating where the applicable specifications can be found.
3. The temporary and permanent ground stabilization specifications conflict with the restoration plans for the wetlands and watercourses. They should be modified or clearly

labeled as not applicable in those areas, with a note indicating where the applicable specifications can be found.

In summary, we are not in a position to assess the need for the proposed wetland crossings, or the feasibility of alternative access points. If no other alternative is available, the conceptual approach taken by the applicant is appropriate. However, additional information and construction details are required to fully protect the significant resource area through which the sewer line is proposed to cross.

If you have any questions on our findings, please feel free to call me so that I can explain them in more detail.

Yours truly,

Michael S. Klein, Principal
Soil Scientist
Wetland Scientist

NATHAN L. JACOBSON & ASSOCIATES, INC. is a twenty-one person consulting civil and environmental engineering firm that provides technical services to governmental agencies, municipalities and private clients.

Our goal is to maintain and enhance the environmental quality of life through the application of the latest engineering technology with a sensitivity to the social, economic, aesthetic and environmental impact of every project.

The firm, established in 1972 by Nathan L. Jacobson, P.E., was specifically created to provide a personalized service to its clients. In order to provide the comprehensive integrated services required on most projects, the firm has been staffed to provide diverse expertise in supporting engineering and technical disciplines. On unusually complex projects, staff members team with specialty consultants, who share the same commitment to quality and service, and who have maintained long term working relationships with Nathan L. Jacobson & Associates.

Since formation of the firm, a wide range of engineering projects have been completed within ten principal service sectors including municipal engineering, roads, bridges, water supply, wastewater collection & treatment, site planning, water resources, stormwater management, recreational facilities, and land survey. For more information on our service sectors and representative projects, visit our website at **www.nlja.com**.

In 1986, Nathan L. Jacobson & Associates, Inc. became a Professional Engineering Corporation in the State of Connecticut. Since that date the ownership of the firm has been expanded to include Geoffrey L. Jacobson, P.E., Bernard F. Baker, P.E., J. Howard Pfrommer, P.E., Brian C. Curtis, P.E., Wade M. Thomas, CPESC, CPSWQ and Thomas H. Fenton, P.E.

In 1994 Nathan L. Jacobson & Associates, Inc. formed an affiliate corporation, Land Survey & Technical Services, Inc., which, under the direction of Jeffrey A. Sanborn, L.S., provides professional land surveying services.

Nathan L. Jacobson & Associates, Inc. office is fully computerized with in-house electronic data processing capabilities for Computer Aided Design & Drafting (AutoCAD Civil 3D), Geographic Information Systems (ArcView and ArcGIS), engineering analysis and design, financial management, project management reporting, word processing, project planning and scheduling, and large format color scanning and plotting. To permit quick and efficient interaction with our clients, we utilize an electronic document management system (docSTAR) to store, retrieve and transmit paperless file documents. In addition, our surveyors utilize GPS based data acquisition technology, and our construction inspectors are equipped with laptop computers to transmit daily communications to project engineers.

SERVICE SECTORS

- **Municipal Engineering**
- **Roads**
- **Bridges**
- **Land Survey**
- **Water Supply**
- **Wastewater Collection & Treatment**
- **Site Planning**
- **Water Resources**
- **Stormwater Management**
- **Recreational Facilities**

We take special pride in our talented and dedicated professional staff, which is experienced in a wide range of engineering projects. These staff members, who have strong backgrounds individually and in working together as a project oriented team, include: eight licensed professional engineers; a geologist, who is a CPESC Certified Professional in Erosion and Sediment Control and a CPSWQ Certified Professional in Storm Water Quality; an environmental/GIS analyst; two CADD operators; and three engineering technician/construction inspectors all of whom are NICET, NETTCP and ACI Certified. Our affiliate Land Survey company includes a licensed land surveyor and two survey technicians. We are equally proud of our administrative staff members, who provide excellent support services for the technical staff as well as our clients.

We constantly seek to improve the skills of our staff with routine in-house technical webinars and product information seminars; encouraging their attendance at technology transfer seminars and conferences; and, continuing their education at the university level via a continuing education program funded by the firm. We also maintain a technical publications and product information library for in-house research.

In addition to maintaining a strong and stable technical staff, Nathan L. Jacobson & Associates, Inc. is a conservatively run organization with a sound financial position. By maintaining both staff and financial stability, we have been able to concentrate our energy in solving challenging technical problems.

Into our fifth decade of operation, we continue to adhere to our original goal of developing a highly competent firm of between twenty and twenty-five persons who have the capability of tackling both large and small projects; where the experience of the principals is applied to solving technical rather than administrative problems; that is not encumbered with excessive unproductive administrative staff and overhead; and, that is flexible so as to provide personalized service to its clients. Thus, we offer a stable and highly motivated technical staff that has the unique experience, resources and flexibility to provide **quality services** to our clients.

PROFESSIONAL SOCIETIES

- American Concrete Institute
- American Council of Engineering Companies
- American Public Works Association
- American Society for Testing and Materials
- American Society of Civil Engineers
- American Water Works Association
- Concrete Reinforcing Steel Institute
- Connecticut Association of Land Surveyors
- Construction Specifications Institute
- International Erosion Control Association
- National Society of Professional Engineers
- National Ground Water Association
- New England Water Environment Association
- New England Water Works Association
- Precast/Prestressed Concrete Institute
- Water Environment Federation

ORGANIZATIONS

- Connecticut Conference of Municipalities (Associate)
- Connecticut Council of Small Towns (Associate)
- Middlesex County Chamber of Commerce

MUNICIPALITIES

Andover, Connecticut
Bolton, Connecticut
Borough of Fenwick, Connecticut
Brewster, New York
Bridgewater, Connecticut
Brookfield, Connecticut
Canton, Connecticut
Charlemont, Massachusetts
Chester, Connecticut
Clinton, Connecticut
Columbia, Connecticut
Coventry, Connecticut
Cromwell, Connecticut
Deep River, Connecticut
Durham, Connecticut
Derby, Connecticut
East Haddam, Connecticut
East Hampton, Connecticut
East Lyme, Connecticut
East Haven, Connecticut
Essex, Connecticut
Guilford, Connecticut
Haddam, Connecticut
Hampton, Connecticut
Hebron, Connecticut
Killingworth, Connecticut
Lebanon, Connecticut
Ledyard, Connecticut
Lyme, Connecticut
Madison, Connecticut
Mansfield, Connecticut
Marlborough, Connecticut
Meriden, Connecticut
Middlefield, Connecticut
Middletown, Connecticut
Monroe, Connecticut
Montville, Connecticut
New Haven, Connecticut
New London, Connecticut
Newburgh, New York
North Salem, New York
Old Lyme, Connecticut
Old Saybrook, Connecticut
Portland, Connecticut
Redding, Connecticut
Salem, Connecticut
Somers, New York
Southbury, Connecticut
Southeast, New York
Southington, Connecticut
Stafford, Connecticut
Stonington, Connecticut
Tolland, Connecticut
Waterford, Connecticut
Westbrook, Connecticut
Westport, Connecticut
Weston, Connecticut
Willington, Connecticut
Woodbridge, Connecticut
Woodbury, Connecticut
Woodbury, New York

GOVERNMENT

Connecticut Department of Administrative Services
Connecticut Department of Energy & Environmental Protection
Connecticut Department of Transportation
United States Navy
United States Soil Conservation Service
University of Connecticut

Town Green, Marlborough, CT

Municipal Engineering includes all of the civil and environmental engineering services required to address the complex infrastructure, environmental and land use issues facing municipal governments. Projects that enhance economic development opportunities, improve the quality of life enjoyed and expected by the community, or that address regulatory mandates are developed with budget conscious, innovative and functional design solutions. For more than four decades, Nathan L. Jacobson & Associates professional staff have provided comprehensive on-call engineering support services to public works, land use, and recreation departments including project budgeting, public presentations, grants procurement, regulatory compliance, disaster assistance, studies, permitting, design, construction services, land use reviews and communications with residents.

Our municipal assignments have included a wide variety of projects and services including the following:

Haddam Firehouse
Haddam, CT

PREPARATION OF MUNICIPAL REGULATIONS/ ORDINANCES

- Road and Drainage Regulations
- Driveway Ordinance and Specifications
- Storm Water Management Regulations
- Land Subdivision Regulations
- Sewer Use Ordinance
- Industrial Waste Ordinance
- Water Service Regulations
- Flood Plain Management Ordinance

Main Street Walks
Hebron, CT

PUBLIC WORKS PROJECTS - GENERAL

- Municipal Parking Lots
- Storm Drainage Improvements
- Stormwater Treatment
- Road Improvements
- Bridge Inspections
- Bridge Rehabilitation and Replacement
- Dam Evaluations/Improvements
- Retaining Walls
- Sidewalk Improvements

Jennings Pond Dam
Chester, CT

Bartlett Sheet Pump Station
Portland, CT

Brewster Heights Waste Water Treatment Plant
Southeast, NY

Burnt Hill Park
Hebron, CT

- Public Works Buildings
- Fuel Storage & Dispensing Facilities
- Salt Storage Facilities
- Streetscapes
- Stormwater Discharge Permits & Monitoring
- Stormwater Pollution Prevention Plans
- Watershed Management Studies
- Flood Studies
- Fish Ladders

PUBLIC WORKS PROJECTS - WATER/SEWER/SOLID WASTE

- Water Distribution System Improvements
- Landfill Expansion and Closure Plans
- Landfill Monitoring
- Bulky Waste Expansion and Closure Plans
- Recycle Transfer Stations
- Leaf Compost Plans
- Sewage Treatment Facilities
- Groundwater and Surface Water Treatment Facilities
- Water Storage Tanks
- Water Supply Plans
- Water Distribution System Modeling - Water Meter Replacement Programs
- Sewage Collection System Improvements
- Sewage Pump Stations
- Septage Lagoon Closures
- Groundwater Contamination Studies
- Industrial Pretreatment Studies

RECREATIONAL PROJECTS

- Boat Launches
- Baseball Fields
- Soccer Fields
- Football Fields
- Tennis Courts
- Bikeways & Trails
- Basketball Courts

CONSULTATION TO PLANNING AND ZONING/INLAND WETLANDS COMMISSIONS

Acting in the above capacity, Nathan L. Jacobson & Associates have reviewed more than 4,000 submissions for proposed developments. Project sites have ranged in size from less than one acre to one thousand acres, including subdivisions ranging from 3 to more than 250 lots; multi-family housing projects of up to 400 units; small industrial buildings and warehouses of a

Cherry Hill Road Bridge
Middlefield, CT

Hydrodynamic Seperator
Lake Wangumbaug, Coventry, CT

Walkley Hill Road
Haddam, CT

Ed Bills Pond Fish Ladder
Lyme, CT

few thousand square feet to corporate industrial parks with over 1,000,000 square feet of area; small commercial buildings to regional shopping centers; gravel pits and quarries; and recreational projects including golf courses, driving ranges, skating rinks and a water park. Nathan L. Jacobson & Associates also administer the Flood Plain Management Regulations for coastal and inland communities to ensure compliance with FEMA Regulations.

In addition to review of proposed development plans, Nathan L. Jacobson & Associates also typically prepare estimates for bonding purposes and are responsible for inspection of construction to enforce conditions of approval, and to ensure compliance with Town Standards. All of Nathan L. Jacobson & Associates construction inspectors have both NICET and NETTCP certifications.

GRANT ASSISTANCE

Nathan L. Jacobson & Associates have assisted a number of its Municipal clients in applying for and obtaining Planning and Construction grants from Federal and State Agencies. Programs that we have participated in include the following:

- ISTEA/TEA-21 Grants
- Rural Development Administration Grants and Loans
- Community Development Block Grants
- Connecticut DEP Clean Water Fund Grants and Loans
- USEPA Construction Grants Program
- Connecticut DOT State Local Public Bridge Program
- Connecticut DOT Federal Local Bridge Program
- Connecticut Department of Housing
- USEPA Research and Demonstration Grant
- Local Public Works Program Grants
- Connecticut Department of Economic Development Water Facility Planning Grant
- U.S. Department of Housing & Urban Development Grant
- Federal Aid Urban System
- Connecticut DEP Potable Water Grant Program
- FEMA Disaster Assistance Program
- New York State Safer Off System Roads Program
- Connecticut DEP Lake Eutrophication Abatement Grant Program
- Surface Transportation Program Grants
- Long Island Sound License Plate Program Grants
- Small Town Economic Assistance Program Grants
- Local Transportation Capital Improvement Program (LOTCIP)

EDUCATION

Clarkson College of Technology
Bachelor of Science in Civil and Environmental Engineering with Distinction, 1976

PROFESSIONAL REGISTRATION

Professional Engineer - Connecticut

Professional Engineer - New York

HONORARY SOCIETIES

Tau Beta Pi

Chi Epsilon

PROFESSIONAL SOCIETIES

American Society of Civil Engineers

American Public Works Association

PROFESSIONAL HISTORY

PRESIDENT / TREASURER

Nathan L. Jacobson & Associates, Inc. - Chester, Connecticut
January 1998 to Present

VICE PRESIDENT / TREASURER / CORPORATE SECRETARY

Nathan L. Jacobson & Associates, Inc. - Chester, Connecticut
June 1986 to January 1998

ASSOCIATE

Nathan L. Jacobson & Associates - Chester, Connecticut
June 1980 to June 1986

PRINCIPAL ENGINEER

Nathan L. Jacobson & Associates - Chester, Connecticut
June 1980 to Present

Responsible for coordination of municipal engineering services to numerous clients in Connecticut and New York State. Design projects include road and storm drainage system improvements, recreational facilities, sidewalks, bikeways, boat launches, sewage collection systems, water distribution systems, parking lots, bank stabilization projects, navigation channel improvements and dredging projects. Also, landfill closure plans, recycle/transfer facilities, shore erosion and protection studies, coastal area management planning, administration of Town Wide Flood Plain Management Ordinance, preparation of Local, State and Federal environmental permit applications, wastewater facilities planning, and site planning for municipal, residential, commercial, and industrial projects. Review of site development and subdivision plans for conformance with town land use regulations and inspections for conformance with construction specifications.

PROJECT ENGINEER

Nathan L. Jacobson & Associates - Chester, Connecticut
June 1978 to June 1980

Responsible charge for design, inspection and review of general civil projects including roads and storm drainage in Middlefield, Connecticut, Southeast, New York and Ridgefield, Connecticut; road reconstruction and drainage improvement projects in Killingworth and Chester, Connecticut and Southeast, New York; and various development projects in Connecticut and New York State including water distribution and sewage collection facilities. Design of sedimentation facilities and piping systems, and cost estimating for the Washington Lake Water Filtration Plant in Newburgh, New York. Design of flocculation and sedimentation facilities for the Mt. Higby Water Treatment Plant in Middletown, Connecticut. Design of Industrial wastewater treatment facilities for The Sibley Company, Haddam, Connecticut. Responsible for providing Town Engineering assistance on various municipal projects and to town boards and commissions in Portland, Connecticut, Middlefield, Connecticut, Chester, Connecticut, Killingworth, Connecticut, Brewster, New York and Southeast, New York. Design of waterfront facilities including piers, marinas, and small boat launching facilities for governmental agencies and private clients. Shore erosion and protection studies and channel improvement projects including local, state and federal permits.

STAFF ENGINEER

Nathan L. Jacobson & Associates - Chester, Connecticut
May 1976 to June 1978

201 Facility Plan for Wastewater Treatment and Collection Facilities in Southeast, New York. 201 Combined Sewer Overflow Study for Newburgh, New York; Design of Water Mains, Sanitary Sewer and Storm Drains for Manufacturing Facility in Middlefield, Connecticut; Water Treatment Facility, Newburgh, New York; Infiltration/Inflow Study, Brewster, New York; various municipal projects including roads, drainage, and sewers in Connecticut and New York State.

ENGINEERING INTERN

Nathan L. Jacobson & Associates - Chester, Connecticut
May 1973 to May 1976

Topographic survey, field inspection, quantity and cost estimates, soils testing and drafting on various projects throughout Connecticut and New York State.

OTHER ACTIVITIES

Board of Directors - Camp Hazen YMCA (Board President & Facilities Committee Chairman)
Board of Directors - Essex Savings Bank (Investment Committee Chairman)
Chairman - Middlesex County Chamber of Commerce Chester/Deep River/Essex Division
Past Chairman - Pattaconk Yacht Club Audit Committee
Past Member - Chester Meeting House Renovation Committee
Past Member - Town of Chester Board of Assessors
Past Member - Board of Directors, Chester Bank
Past Member - Town of Chester Town Hall Building Committee
Past Member - Region 4 Education Foundation Board of Directors
Past Member - Chester Village Zoning District Study Committee

EDUCATION

Virginia Polytechnic Institute and State University
Bachelor of Science in Civil Engineering, 2004

PROFESSIONAL REGISTRATION

Professional Engineer - Connecticut

Professional Engineer - New York

CERTIFICATIONS

Certified Professional in AutoCAD Civil3D 2013 software

Certified Professional in AutoCAD 2013 software

Autodesk Expert Elite Member

PUBLICATIONS

Mastering AutoCAD Civil 3D 2013

PROFESSIONAL HISTORY

ASSOCIATE

Nathan L. Jacobson & Associates, Inc. - Chester, Connecticut
September 2014 to Present

PROJECT ENGINEER

Nathan L. Jacobson & Associates, Inc. - Chester, Connecticut
September 2009 to Present

Design, cost estimate, permitting (Army Corps of Engineers Category II permit, DEP Flood Management Certification, and local permitting), and construction administration of culvert and wingwall replacement for the replacement of Old Colchester Road over Oxoboxo Lake in Montville, Connecticut. DOT Flood Management Certification including hydrology, hydraulic, floodway, scour, and storm drainage reports for the replacement of Village Street Bridge over the Deep River in Deep River, Connecticut. Review of site development and subdivision plans for conformance with Town Land Use Regulations, including quantity/cost estimates. General civil projects including site layout, roadway design, grading and erosion control, stormwater management, hydraulic and hydrologic analyses, and permitting for municipal infrastructure improvement projects in Old Saybrook, Haddam, Salem ,Portland and Marlborough, Connecticut.

Attended seminars for Autodesk University in 2010, 2011 and 2012, including presenting lectures at Autodesk University 2011 and Autodesk University 2012 about the AutoCAD Civil 3D software.

Utilization of the various computer applications including: AutoCAD Civil3D 2012, Autodesk Storm and Sanitary Analysis, Bentley PondPack, Bentley StormCAD, Bentley CulvertMaster, Bentley FlowMaster, Hydraflow Hydrographs, HEC-RAS, HEC-HMS, Win TR-55, and AutoTurn.

ENGINEER

Nathan L. Jacobson & Associates, Inc. - Chester, Connecticut
November 2004 to September 2009

Design and applicable permitting of road realignment, parking lots, sidewalks, and storm drainage for

Town Center Enhancements Phases I, II, &, III in Marlborough, Connecticut; access drives, parking lots, sidewalks, storm drainage systems, and recreational facilities for Burnt Hill Park in Hebron, Connecticut; parking lot redesign and retaining walls for Quinnipiac University in Hamden, Connecticut; culvert and wingwall replacement, roadwork, and Army Corps of Engineers Category II permit for Burr Hill Road in Killingworth, Connecticut; road realignment for Alders Bridge Road in Killingworth, Connecticut; and various other municipal projects. Review of site development and subdivision plans for conformance with Town Land Use Regulations, including quantity/cost estimates. General civil projects including site layout, roadway design, erosion control, stormwater management, hydraulic and hydrologic analyses, and general engineering calculations in Connecticut and New York State.

Attended seminars for Low Impact Development Applications for HEC-RAS Computer Workshop (ASCE) in 2008; Water Resource Management (ASCE) in 2007; and Stormwater Systems Modeling Applying PondPack in 2005.

EDUCATION

University of Connecticut
Master of Science in Geology with a concentration in Hydrogeology, 1992

State University of New York - College at Fredonia
Bachelor of Science in Geology, 1980

CERTIFICATIONS

Certified Professional in Erosion and Sediment Control No. 2698 (CPESC)

Certified Professional in Storm Water Quality No. 0056 (CPSWQ)

PROFESSIONAL SOCIETIES

Association of Ground Water Scientists and Engineers/A Division of the National Water Well Association

International Erosion Control Association

PROFESSIONAL HISTORY

ASSOCIATE

Nathan L. Jacobson & Associates, Inc. - Chester, Connecticut
April 1998 to Present

Responsible for municipal conformance to the EPA NPDES Phase II Stormwater Program as implemented by the CTDEP via the General Permit for the Discharge of Stormwater from Small Municipal Separate Storm Sewer Systems (MS4) for ten Connecticut municipalities. Services provided to date include preparation of the Part A and Part B Registrations (Stormwater Management Plan), Annual Reports, Stormwater Sampling, Urbanized Area Stormwater Outfall Mapping, and Illicit Discharge Detection & Elimination Ordinance Coordination.

Responsible for all municipal engineering services for a Connecticut community, including numerous public works projects, review of site development plans and subdivision plans for conformance with town land use regulations, and inspections for conformance with construction specifications.

GEOLOGIST

Nathan L. Jacobson & Associates, Inc. - Chester, Connecticut
May 1988 to Present

Preparation and review of site specific land use applications with particular emphasis on the potential impacts on inland wetlands, site hydrology and site hydrogeology based on soil and/or bedrock hydrologic and hydrogeologic properties. Site plan design, development analysis, and hydrologic design of stormwater drainage systems and stormwater treatment facilities.

Responsible for hydrogeologic analysis, concept design, final design and preparation of concept design and construction reports on large-scale subsurface soil absorption systems for wastewater disposal; supervision of subsurface investigations and construction phase quality control for large-scale subsurface soil absorption systems; development and supervision of subsurface exploration programs for water, sewer and road improvement projects; geologic and hydrogeologic investigations for various projects. Development of computer programs for hydrogeologic analysis and design of large scale subsurface soil absorption systems which include consideration of hydraulic capacity, travel time, nitrogen dilution and phosphorous uptake.

SENIOR TECHNICIAN

Nathan L. Jacobson & Associates, Inc. - Chester, Connecticut
October 1986 to May 1988

Responsible for field investigations, drafting of concept design and final design drawings for various projects.

EXPLORATION GEOLOGIST

The Marlin Oil Company - Denver, Colorado
February 1982 to April 1986

Responsible for a highly successful oil and gas limited partnership wildcat exploratory program. This program resulted in four oil field discoveries with total reserves conservatively estimated at 1.5 million barrels of oil. Responsibilities and duties included the generation and presentation of wildcat drilling prospects, wellsite geological supervision, field development, regional geological mapping, and out of house prospect evaluation.

LOGGING GEOLOGIST

Exploration Logging, U.S.A., Inc. - Denver, Colorado
February 1981 to May 1981

Responsible for wellsite geological supervision of oil and gas drilling operations, including formation evaluation, stratigraphic interpretation, generation of descriptive lithologic logs and general wellsite consultation.

OTHER ACTIVITIES

Member - Town of Waterford Conservation Commission since 1994
Former Trustee - Waterford Crossroads Presbyterian Church

CONTINUING EDUCATION

Certified Professional in Erosion and Sediment Control and Certified Professional in Storm Water Quality must maintain certification by accumulating a minimum of sixty Professional Development Units (60 PDUs) every three years.

Jacobson

November 8, 2013

Mr. Lawrence M. Sullivan, P.E.
Town Engineer
Town Hall
152 Elm Street
Stonington, CT 06378

Re: Old Mystic Estates Subdivision
Whitehall Avenue (Route 27)
Stormwater Quality Basins
2.4.1, 2.4.2 and 2.2.1
Engineering Review
Stonington, CT
NLJ #1086-0001

Dear Mr. Sullivan:

In accordance with your request, we have reviewed the following items of information that you provided to us with regard to the subject stormwater quality basins:

Item 1: Drawing titled "Project Phasing and Erosion and Sedimentation Control Index, Clairemont", drawing sheet 20 of 75, dated October 31, 2002, last revised November 19, 2003, prepared by DiCesare-Bentley Engineers, Inc.

Item 2: Partial copies of drawings for Stormwater Management Basin SMB-3, including data for Test Pits T-B3A, T-B3B and T-B3C; Stormwater Management Basin SMB-2, including data for Test Pits T-B2A, T-B2B and T-B2C; and, Stormwater Management Basin 1, including data for Test Pits T-B1A and T-B1B.

Item 3: E-mail from Ted Hart of Milone & MacBroom to Lawrence Sullivan, dated August 19, 2013, regarding capacity of culvert under Jerry Browne Road, including a plan view sketch and a photograph.

Item 4: E-mail from Ted Hart of Milone & MacBroom to Keith Brynes and Lawrence Sullivan, dated August 29, 2013, including an August 29, 2013 letter to Mr. Larry Sullivan, P.E. from Ted Hart, P.E. of Milone & MacBroom, and engineering calculations and sketches for improvements to the catch basin and pipe that convey water from the swale on Lots 46, 47 and 48.

Item 5: E-mail from Ted Hart of Milone & MacBroom to Lawrence Sullivan, dated August 29, 2013, including a sketch/summary calculation sheet for the capacity of the revised catch basin top in the swale on Lot 46.

Nathan L. Jacobson & Associates, Inc.
Nathan L. Jacobson & Associates, P.C. (NY)
86 Main Street P.O. Box 337 Chester, Connecticut 06412-0337
Tel 860.526.9591 Fax 860.526.5416
Consulting Civil and Environmental Engineers Since 1972

Item 6: E-mail from Dan Kroeber of Milone & MacBroom to Lawrence Sullivan, dated July 30, 2013, including a copy of existing and proposed watershed sketches and a sketch showing drainage improvements on Lots 46, 47 and 48.

Item 7: E-mail from Ted Hart of Milone & MacBroom to Lawrence Sullivan, dated September 27, 2013, including a memorandum from David Murphy, P.E. and Ted Hart, P.E. of Milone & MacBroom to Larry Sullivan regarding the Old Mystic Estates Stormwater Basins.

Item 8: E-mail from Ted Hart of Milone & MacBroom to Keith Brynes and Lawrence Sullivan, dated August 29, 2013, including an August 29, 2013 memorandum to Larry Sullivan and Tom Collier from David Murphy, P.E. of Milone & MacBroom regarding Old Mystic Estates Stormwater Basins, and a resume for David Murphy.

Item 9: E-mail from Ted Hart of Milone & MacBroom to Lawrence Sullivan, dated September 30, 2013, including an attached GIS Geology Map.

Item 10: E-mail from Ted Hart of Milone & MacBroom to Lawrence Sullivan, dated September 10, 2013, including a copy of a power point presentation prepared by Milone & MacBroom titled "Old Mystic Estates, Public Hearing August 2013".

Item 11: E-mail from Ted Hart of Milone & MacBroom to Lawrence Sullivan, dated September 30, 2013, including an August 29, 2013 letter to Mr. Larry Sullivan, P.E. from Ted Hart, P.E. of Milone & MacBroom with attached cross-section sketches.

Item 12: E-mail from Ted Hart of Milone & MacBroom to Ted Hart, Keith Brynes and Lawrence Sullivan, dated September 29, 2013, including a sketch showing location of cross sections.

Item 13: E-mail from Ted Hart of Milone & MacBroom to Lawrence Sullivan, dated September 30, 2013, including summary calculations based on extreme rainfall conditions.

Item 14: E-mail from Ted Hart of Milone & MacBroom to Lawrence Sullivan and Keith Brynes, dated September 30, 2013, including e-mail exchanges dated June 7, 2013, July 19, 2013 and July 23, 2013 between Ted Hart of Milone & MacBroom and Art Christian of the CTDEEP.

In addition to reviewing the above noted items of information that you provided to us, we also reviewed the following information accessed directly from the Milone and MacBroom FTP site:

Item A: Document titled "Engineering Report, Old Mystic Estates, Whitehall Avenue (CT. Route 234), Stonington, Connecticut", dated May 24, 2013, revised August 13, 2013, prepared by Milone & MacBroom.

Item B: Set of two drawings titled "Old Mystic Estates" including "Existing Conditions Watershed Map" and "Proposed Conditions Watershed Map", dated May 22, 3013, prepared by Milone & MacBroom.

Item C: Set of eight drawings titled "Old Mystic Estates, Whitehall Avenue (CT. Route 27), Stonington, Connecticut", including "Title Sheet", "Lot Line Adjustment Plan", "Site Development Plan", "Sediment & Erosion Control Plan", "Storm Drainage Plan and Profile (On-Site)" - Sheet 4 only, "Sediment and Erosion Control Details and Specifications" and "Site Details" - 2 sheets, Title Sheet last dated August 13, 2013, prepared by Milone & MacBroom.

As you are aware, I also accompanied you on a drive thru of subdivision and the immediate surrounding area including Bertram Lane, Whitehall Avenue, Jerry Browne Road and the Whitehall Condominiums, as well as a brief site walk of the area where Stormwater Quality Basins 2.4.1, 2.4.2 and 2.2.1 are proposed.

Based on my discussion with you, it is my understanding that the proposed stormwater conveyance and retention/infiltration system modifications to the previously approved subdivision drawings were prompted by flooding that occurred at the Whitehall Condominiums in 2010, prior to any significant development within the section of the Old Mystic Estates Subdivision that drains to an existing pond

on the condominium property. A subsequent investigation of the existing pond determined that it did not have a piped outlet. Based on a further review by the town of the original drainage analysis for the Old Mystic Estates Subdivision, it was found that the analysis was based on an invalid assumption that the pond had a piped outlet. As such, given the increased volume of surface runoff that would be directed to the pond as a result of development of the Old Mystic Estates Subdivision, the town stopped work on the section of the Old Mystic Estates Subdivision that would drain to this pond until a revised analysis was completed and the subdivision plans modified to eliminate any increase in runoff volume or peak discharge rate. While various solutions were investigated, the solution that is the focus of our review includes rerouting of stormwater flows to three new Stormwater Quality (retention/infiltration) Basins located in the vicinity of original lots #41 and #42. In this regard, we did not review information pertaining to the unrelated storm drainage improvements that have already been constructed to address another storm drainage issue up-gradient from the McGlinchey property in the vicinity of lots #46, #47 and #48 (Items 4, 5 and 6 above). In addition, since you have already reviewed the storm drainage calculations in the Engineering Report identified as Item A above; we did not review these calculations other than to familiarize ourselves with the results.

The principal guidelines in Connecticut for the design and construction of stormwater basins are included in the 2004 Connecticut Stormwater Quality Manual, the Connecticut Department of Transportation Drainage Manual, and the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control. Portions of pertinent sections from the first two publications are attached, with underlined and clouded text that I have added for emphasis. While stormwater retention/infiltration basins can be an effective means for attenuating increases in peak discharge rates, reducing runoff volume, recharging groundwater, and providing water quality benefits, siting them in an area with suitable physical attributes, incorporating recommended design features, and ensuring proper construction and maintenance are all of importance in creating a functioning system with a reasonable chance of acceptable performance. Even given the proper attention to the above noted considerations, it is important to understand that infiltration basins do have limitations. Principal among these are their susceptibility to clogging, which requires more frequent inspection and maintenance, as well as reduced performance that can occur during winter months when the soil structure can become frozen.

We have the following comments regarding the proposed retention/infiltration basins:

1. The 2004 Stormwater Quality Manual states that "Infiltration basins ... should be located at least 50-feet from slopes greater than 15 percent, since steep slopes can cause water leakage in the lower portions of the basin ...". The proposed basins do not satisfy this recommended design criteria. As noted on the basin cross sections included in Item 12 above, earth berms will be created on the westerly (lower) side of the retention/infiltration basins to allow for the required depth of impounded stormwater, which will rise above the existing ground surface within basins 2.4.1 and 2.4.2. While it has been assumed that there will be a vertical infiltration component through the bottom of the basin and into the bedrock fractures, there would also appear to be a horizontal flow component through the existing soil profile above the rock, which depending on the depths of overburden on the down gradient slope, may result in seeps or breakouts.

2. The 2004 Stormwater Quality Manual recommends the excavation of a minimum of three test pits for each basin in order to determine localized soil conditions including the depth to bedrock and the depth to seasonal high groundwater table. No test pit data or test pit locations are shown on the design drawings, included within the Engineering Report, or other items of information provided to us. Test pit data included in Item 2 above at existing stormwater management basins SMB-1 and SMB-2, as well as proposed stormwater management basin SMB-3 (located immediately down gradient of the proposed retention/infiltration basins), reveal variable depths to rock and groundwater (no test pit dates provided to indicate at what time of year measurements were taken) ranging from no refusal to refusal at 8-inches, and no groundwater observed to groundwater observed at 31-inches. While soil permeability test data is provided in the Engineering Report at four locations, no information was provided regarding the locations of these tests, the depth at which the samples were obtained, the method of sampling (in situ or re-compacted) and the computational method utilized (note that the last column of data would appear to be minutes per inch and not inches per minute).

3. The 2004 Stormwater Quality Manual recommends that the bottom of an infiltration facility be located 3-feet above the seasonal high groundwater table, and the Connecticut Department of Transportation Drainage Manual recommends that it be located 5-feet above the seasonal high groundwater table. Regardless of the criterion that is utilized, as noted in the preceding comment, neither test pit nor groundwater monitoring data appears to have been provided. Based on a review of the Site Development Plan included in Item C above, the bottom of basins 2.4.1, 2.4.2 and 2.2.1 are located entirely in cuts, with the depth of cuts ranging from 4-feet to

12-feet, 3-feet to 11-feet and 5-feet to 21-feet respectively. It would therefore appear likely that the seasonal high groundwater table will be intercepted. Based on my field observations, it should be further noted that construction of the proposed off-road storm drain from catch basin 10A in Bertram Lane to the discharge point into proposed retention/infiltration basin 2.2.1, at depths of up to 19-feet, is also likely to intercept groundwater and divert it to the basin through the pipe bedding material. If the seasonal high groundwater table exists above the bottom of the basin, or groundwater drains into it, a loss of storage and retention capacity would occur. In addition, without the recommended separation distance between the seasonal high groundwater table and the bottom of basin, there may not be adequate pollutant attenuation and treatment within an unsaturated soil zone resulting in an increased risk and potential for groundwater pollution.

4. The 2004 Stormwater Quality Manual recommends that the bottom of an infiltration facility be located 3-feet above bedrock, and the Connecticut Department of Transportation Drainage Manual recommends that it be located 5-feet above bedrock. As noted in the preceding comment, the proposed retention/infiltration basins are located entirely in cuts, with the deepest cuts located along the eastern (uphill) sides, which may require blasting into rock. In fact, the Site Development Plan included in Item C above shows a rock face wall along the eastern side of retention/infiltration basin 2.2.1, and the memorandum from the project hydrogeologist identified as Item 8 above states that the basins will be constructed in rock. We have the following comments in this regard:

   A. In the aforementioned memorandum from the project hydrogeologist, information from published sources and observations from an existing on-site stormwater management basin are used to support a conclusion that the underlying bedrock has sufficient fractures to support the proposed design infiltration rate. It should first be understood, that the referenced Bedrock Geologic Map of Connecticut was prepared at an approximate scale of 1-inch = 2-miles, and that the accuracy inherent in the original mapping maybe diminished when enlarging it to a small site specific location. More importantly, based on the information identified as Item 2 above, we note that the existing referenced stormwater basin, which you have indicated is basin SMB-2, had three test pits located within the footprint of the basin bottom. The test pit data indicates that no refusal was encountered in test pits T-B2B or T-B2C, both of which were excavated to a depth of 8-feet. At these test pit locations the proposed bottom of basin was designed to be in 4-foot and 7-foot cuts

respectively. Refusal in test pit T-B2a was encountered at a depth of 5-feet, with the proposed bottom of basin in a 6-foot cut, which would indicate this corner of the basin would have required to be cut one foot into rock. If the groundwater gradient mimics the surficial topography, which drops in elevation to the northwest, it would suggest that the direction of groundwater flow would be towards test pit T-B2B located in the northwest corner of the basin where no refusal was encountered and the natural underlying soil was identified as a "grey fine medium sand with gravel, trace of silt, medium compact". As such, it would appear that the observed infiltration rate of one vertical foot per day may possibly include a horizontal flow component through the soil structure rather than solely a vertical flow through bedrock fractures. The conclusion that the observed infiltration rate "demonstrates that the bedrock is readily recharged by overlying water"; "is directly related to the degree of fracturing"; and "demonstrates that the bedrock is well fractured", would appear to be somewhat speculative.

B. Given the lack of any test pit data within the proposed retention/infiltration basins; the project hydrogeologists statement that the proposed basins will be constructed in rock; the documented subsurface conditions in SMB-2 which indicate that most of the basin was constructed in an area where no refusal was encountered; it is also our opinion that the project hydrogeologists statements in the same memorandum referenced above that "the three proposed basins will likely have infiltration rates that are similar to the existing basin" and that "in summary, the most appropriate indicator of the performance of the proposed basins is the observed performance of the existing stormwater basin" is not supported by the noted dissimilarities in the documentation presented.

C. The memorandum from the project hydrogeologist and project executive identified as Item 7 above states that rock encountered in the basins will be over excavated by 2-feet and covered with an 18-inch depth of soil removed during excavation of the retention basins, upon which a 6-inch depth of topsoil will be placed. The total 2-foot depth of material between the bottom of the basin and bedrock does not conform to the previously identified guidelines. Furthermore, no specific construction procedure or sampling/testing/quality control procedure has been established for ensuring that the excavated soil material, that will need to be properly segregated and stored during some period of time when the blasting and rock removal occurs, is properly replaced and re-compacted such that the original in-place permeabilities on which the design is based will be realized.

D. In this same memorandum, it is stated that "There are not any methods of testing or otherwise characterizing the bedrock that would provide additional information. Bedrock cores are too narrow in focus and do not provide spatial information about fractures. Geophysical methods would merely provide depth to bedrock and large-scale changes in rock type". This statement further underscores the uncertainties in reliably determining the extent of bedrock fractures, which as discussed above, relies on anecdotal evidence that may not be representative of the anticipated conditions that exist at the location of the proposed retention/infiltration basins. It is also worth noting that based on our firms experience in the review of several thousand municipal land use applications; I cannot recall a single instance where a stormwater retention basin was specifically designed to rely on infiltration through bedrock fractures. In fact, even where stormwater detention (not retention) basins are located within close proximity to rock, we have typically recommended the use of impermeable liners or materials to prevent the infiltration of stormwater into bedrock fractures to avoid the potential for groundwater contamination.

5. The proposed emergency spillway from basin 2.2.1 is located approximately 200-feet to the northeast of Jerry Browne Road and more than 40-feet higher in elevation. The only means of conveying any emergency overflows under Jerry Browne Road would be via a double grate catch basin inlet located adjacent to the roadway with a 15-inch diameter outlet pipe that discharges on the southwest side of the road. Given the steeply sloping wooded hillside between the proposed emergency spillway and the double grate catch basin, an overflow would most likely result in scouring and surface erosion with soil and forest litter carried down the hillside with the potential for clogging the catch basin grate and flowing across Jerry Browne Road. Consideration should therefore be given to constructing an overflow channel down the hillside along with a culvert of adequate size to convey flows under Jerry Browne Road.

   We have the following additional comments regarding the proposed emergency spillways:

   A. Based on the proposed grading shown on the Site Development Plan included in Item C above, the emergency spillway for basin 2.4.1 would appear to discharge down the maintenance access driveway instead of directly into basin 2.4.2, which we presume is the design intent. To preclude any bypass and to protect against surface erosion, the rip rap spillway should be extended to the bottom of basin 2.4.2. Similar provisions should also be incorporated for the emergency spillway for basin 2.4.2.

B. The 2002 Connecticut Guidelines for Soil Erosion and Sediment Control recommend that emergency spillways have a control section at least 20-feet in length. The emergency spillway for basin 2.4.2 should be modified accordingly.

C. The side slopes of emergency spillways should be protected with rip rap.

D. Contours need to be refined at the emergency spillways for basins 2.4.1 and 2.2.1 (spillway elevations are 1-foot lower than proposed contours on either side of the embankment).

6. We have the following comments regarding the maintenance access driveway:

A. At the Bertram Lane curb cut, the driveway should rise at least 6-inches in elevation above the roadway gutter line to prevent the diversion of runoff down the maintenance access driveway.

B. Surface runoff from lot #20 will be concentrated along the east side of the maintenance access driveway where it will flow to a low point and then discharge across the driveway from east to west and down the 3H:1V side slope into basin 2.4.1. Provisions should be incorporated to ensure that this concentrated runoff does not create an erosion problem.

C. Given the slopes in some of the steeper sections, consideration should be given to paving the driveway surface.

D. Consideration should be given to installing some type of protective barrier where steep grades drop off from the edge of the driveway.

E. Provisions should be made for a turnaround at the end of the driveway at basin 2.2.1

7. While proposed retention/infiltration basins 2.4.1 and 2.2.1 are proposed to be utilized as temporary sediment traps during construction, for reasons that are apparent, the 2004 Connecticut Stormwater Quality Manual states that infiltration practices should not be used as temporary sediment basins during construction.

Should you have any questions, please do not hesitate to contact me.

Jacobson

Very truly yours,

NATHAN L. JACOBSON & ASSOCIATES, INC.

Geoffrey L. Jacobson, P.E.

BSC GROUP
Transportation ▪ Energy ▪ Land Development

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Glastonbury, CT 06033

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www.bscgroup.com

March 30, 2016

Ms. Jessie L. Richard
Town of Mansfield
Planning and Community Development
4 South Eagleville Road
Storrs, CT 06268
Via email: Richardjl@mansfieldct.org

RE: Qualifications to Provide Engineering Services for Review of the Lodges at Storrs Development

Dear Ms. Richard:

BSC Group is pleased to submit our proposal to provide engineering services for the review of the Lodges at Storrs development. We are familiar with the Town of Mansfield's regulations having led multiple projects on the UConn Storrs campus, as well as having provided site development services for a new day care located in the Town of Mansfield Storrs Center. We are currently providing review services and development of a review report of the Meadowbrook Garden Special Permit application and Inland Wetland license, and have proposed the same key team members for the Lodges at Storrs effort.

In addition to our familiarity with your community, we offer strong qualifications to serve your needs, including:

- Experience serving numerous municipal planning boards, departments, and committees to provide plan review services
- Available and committed project manager with extensive experience in site design and site review projects
- Skilled and available ecological scientist to provide rapid, thorough, and pragmatic response to the wetlands component including identification of potential significant impact to the wetlands

Each of the above strengths is expanded upon in our enclosed proposal in addition to our presentation of a brief project understanding, scope, and associated costs. We recognize the speedy turnaround of this project, and are prepared to meet with you immediately upon selection. Please contact BSC Project Manager, Mr. Will Walter, PE at 860-652-8227 (Extension 4558) or by e-mail at wwalter@bscgroup.com to answer any questions you may have regarding our submittal.

Very truly yours,

BSC Group-Connecticut, Inc.

Kurt A. Prochorena, PE, LEED AP
Vice President and Principal

Engineers
Environmental Scientists
Custom Software Developers
Landscape Architects
Planners
Surveyors

Hallmarks of BSC's Review Approach

- Recommendations for pragmatic plan changes to support design standards
- Rapid response to review assignments to keep projects on track
- Clearly-documented recommendations
- Adherence to community bylaws and regulations
- Promotion of win-win scenarios to promote outcomes that meet the community's long-term vision

BSC Group Responds to the Town of Mansfield

BSC Group appreciates the opportunity to provide our approach and qualifications for engineering technical review services of the Inland Wetlands License Application for the 218 unit apartment complex known as the Lodges at Storrs, which is proposed to be constructed on a 45-acre parcel on the west side of Hunting Lodge Road, north of North Eagleville Road (Parcel ID 15.21.3, File # W-1564).

We have organized our response to address the requirements of your request:

- About BSC Group
- Project Understanding, Scope and Costs
- Qualifications and Approach to Similar Work
- Key Personnel
- Client References

About BSC Group

Founded in 1965, BSC Group, Inc. is an interdisciplinary consulting firm with four New England offices in Glastonbury, Connecticut and throughout Massachusetts. BSC has provided planning, design, permitting, spatial data management and construction phase services for municipal, state, and private sector clients throughout New England for more than five decades. Our broad range of services includes:

- Civil/site engineering design and review
- Environmental analysis, planning, documentation, and regulatory assistance
- Transportation and traffic planning/engineering
- Roadway and intersection planning and design
- Landscape architecture and streetscape design
- Structural design for bridges and other transportation structures
- Surveying, mapping, and geographic information system services

BSC Group has used this interdisciplinary expertise to assist municipalities in their review of proposed development projects within their communities. BSC regularly offers plan review services individually, as well as through a comprehensive, interdisciplinary review process that considers site planning and civil engineering, as well as traffic impacts, landscape architecture, site use, and environmental impacts.

BSC Group takes pride in providing a comprehensive review approach to site development projects, promoting positive outcomes for both Mansfield and the project proponent.

Project Understanding, Scope and Costs

BSC has prepared the following scope and fee based upon our understanding of your needs and circumstances, summarized as follows.

- The Town of Mansfield (the "Town") is seeking expert review of an Inland Wetlands License Application for a 218 unit apartment complex known as the Lodges at Storrs, which is proposed to be constructed on a 45-acre parcel on the west side of Hunting Lodge Road, north of North Eagleville Road (Parcel ID 15.21.3, File # W-1564).
- The project applied for an Inland Wetland License. The application is dated March 18, 2016.
- In addition to the above-mentioned application, the application also included a full set of plans by FA Hesketh, an Engineering Design and Drainage Report by FA Hesketh and a Wetlands Assessment & Impact Analysis report by REMA Ecological Services, LLC. The computations and backup data for the engineering report was not included in the on-line package. It is assumed that all backup data and computations will be made available to BSC should we be selected to conduct the peer review.
- The Town is seeking expert review of the following:
  - Wetlands – identification of potential significant impact to the wetlands of all proposed regulated activities.
  - Stormwater Management System – review of the stormwater management in as it relates to the wetland impact.

Scope of Services

BSC's scope of services is presented in the following two phases:

- Phase 1 – Initial Review and Report
- Phase 2 – Follow-on Services

Phase 1 – Initial Review and Report

BSC Group's scope of services for this phase will consist of the following:

- Visit the site to view existing conditions on the site. Our site visit will be performed by a civil engineer (CT licensed PE) and soil scientist (CT license).
- Research the Town Inland Wetlands regulations and Town Zoning Regulations that are pertinent to stormwater design construction in regulated areas and correspond with staff as necessary.

BSC Group professionals visiting the proposed Lodges at Storrs site and conducting the existing conditions review are registered Connecticut professionals in the disciplines of engineering and soil science.

- Review the plan sets submitted for an Inland Wetlands License, as well as the accompanying Engineering Report and Wetlands Assessment & Impact Analysis, for adherence to the applicable local and state requirements.
- Prepare a peer review report that documents our review of the plans and reports and contains our recommendations for any plan modifications we believe are necessary for the applicant to comply with the requirements.
- Attend a meeting with the staff and the applicant to review our comments and answer questions.
- Attend an Inland Wetlands Agency Public Hearing.

Phase 2 – Follow-on Services

Our scope of services for providing follow-on services consists of the following:

- Review the applicant's revised plans, that are based on our initial report recommendations.
- Prepare an updated peer review report that considers the revised plans.
- Attend meetings with the applicant, Town staff, and/or Town commissions, beyond the meetings listed above, as requested by Town staff.

Fee for Services

BSC will perform the Scope of Services presented for a lump sum fee for Phase 1 and on an hourly basis for Phase 2, as follows:

Basic Services	Fee
▪ Phase 1 – Initial Review and Report	$10,000
▪ Phase 2 – Follow-on Services	$150/hour

The fees above are lump sum and include labor and reimbursables.

Qualifications and Approach to Similar Work

BSC Group has provided site plan review services to numerous municipalities and is currently working with the Town of Mansfield on the review of the Meadowbrook development. We have current on-call contracts to provide plan review services for seven communities including the nearby Town of Tolland. Additionally, we are frequently called upon by municipal boards (Planning Boards, Conservation Commissions, and Zoning Boards of Appeals) to peer review large projects, many of which are industrial, commercial, or

BSC Group understands the review turnaround requirements of the Lodges at Storrs proposed project and is prepared to thoroughly respond by the early April due date.

mixed-use developments. Importantly, all reviews undertaken by BSC Group have been consistently marked by the following:

- Interdisciplinary Review Team - BSC Group applies the expertise of civil engineers and ecological scientists to provide a comprehensive review approach to our site plan projects. These professionals work in concert with one another to assure that review comments and proposed amendments/mitigation coalesce with the findings of the other members of the review team. For the review of the Lodges at Storrs project, the availability of BSC experienced personnel currently working together on Meadowbrook Garden helps to facilitate an accelerated review process.
- Ability to Provide Clear and Relevant Guidance to Land Use Boards - BSC Group has reviewed and interpreted bylaws and regulations for municipalities throughout New England. In providing review services, we effectively and fairly balance long-term community objectives with immediate project needs to promote economic development and carefully managed growth. Many of our staff sit on Planning Boards, Economic Development Commissions, and Conservation Commissions within their home communities, allowing them to review projects with a special understanding of municipal bylaws and the intent behind them.
- Track Record of Conducting Timely Reviews - BSC recognizes the necessity of supporting the Town of Mansfield in responding to permit application in a timely fashion. We are able to commit to rapid review and response through our ability to provide seasoned, qualified, and available personnel to provide the review services.
- Clear, Detailed Review Reports - The preparation of reports to clearly and concisely identify concerns and potential resolutions is essential to the rapid and successful review of proposed projects. BSC's reports provide adequate detail to allow project proponents a full understanding of any findings, the bylaws/regulations that support them, and potential solutions to meet the requirements.
- Promotion of Win-Win Outcomes - The site plan review process offers opportunities for "win-win" outcomes for the community and the project proponent. Effective communication with the project proponent through clearly-communicated goals can help both the Town and the proponent achieve site plans that result in positive outcomes such as traffic mitigation, recreational open space, utility upgrades, and enhanced stormwater management systems.
- Appreciation of the Concerns of Neighbors and Abutters - BSC's plan review services consider the interests of all stakeholders to promote positive outcomes that advance long-term economic development. Our comprehensive review team is skilled in evaluating the impacts of proposed

BSC Group will apply both our municipal peer review expertise as well as local design experience to the Town of Mansfield's project.

development on the local community, and overall quality of life. Our review team not only considers impacts but also recommends solutions and mitigation that achieve consensus and project support.

Highlights of Peer Review Projects

BSC Group is pleased to highlight our most recent peer review work performed on behalf of Connecticut municipalities. These projects represent our review work in civil (stormwater) engineering, wetlands, and erosion and sedimentation control as well as ongoing work with the Town of Mansfield:

- **Meadowbrook Garden, Mansfield, CT** - On behalf of the Town of Mansfield, BSC Group is providing technical review of the Meadowbrook Garden development. Currently underway, this technical review includes examination of the stormwater design, traffic impact study, sanitary sewer design and potential impacts to wetlands for the Special Permit application and Inland Wetlands license for the Meadowbrook Gardens Application, 91-93 Meadowbrook Lane, Mansfield Center, Connecticut. The review is being summarized in a peer review report to the Town of Mansfield.
- **University of Connecticut Northwoods Apartments, Storrs, CT** - BSC designed improvements to a UConn residence parking lot and approach roadway. Because the project was targeted under the University's Eagleville Brook Impervious Cover Total Maximum Daily Load (ICY-TMDL), a variety of Low Impact Development methods were applied, including bioswales, rain gardens, and pervious pavements. Additional landscaping was designed to accent key points on the site while attenuating runoff from the buildings' roofs.
- **University of Connecticut Parking Lot 9 Reconstruction, Storrs, CT** - BSC Group designed the reconstruction of two parking lots at the campus's gateway area. Like the Northwoods Apartments project, the project was targeted under UConn's Eagleville Brook IC-TMDL program, necessitating careful planning and design of stormwater management methods. Following an extensive review of potential approaches to stormwater management, BSC prepared the final design, which includes low impact strategies, such as two rain gardens and vegetated bioretention swale.
- **Charles Barrow STEM School, Windham, CT** - As part of BSC's site plan for a new K-8 public magnet school, BSC incorporated numerous sustainable design solutions. These include two courtyards with "ponds" that collect rain water from the building's roof, a nature path, an outdoor "classroom" complete with natural stone seats selected from the site, and several educational spaces including a vegetable garden, butterfly garden, sensory garden, and sundial. The design also incorporated significant low impact components such as rain gardens and bio infiltration swales. The facility was awarded a Silver LEED Certification.

BSC Group's site design for the Charles H. Barrows STEM Academy in Windham incorporated a variety of LID techniques, including rain gardens.

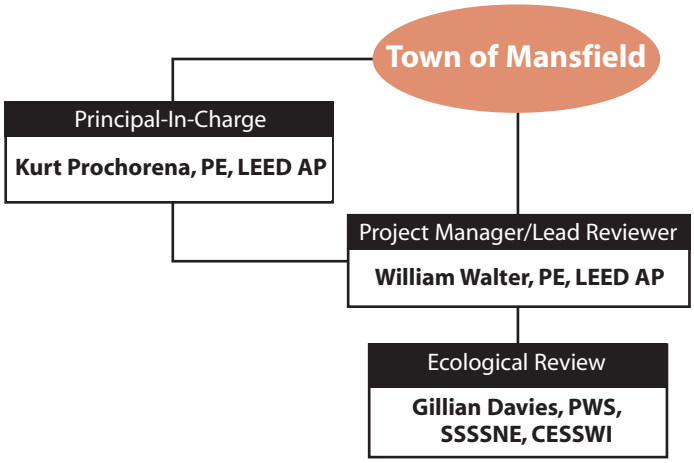
- 60 Merrimac Street Notice of Intent, Amesbury, MA - BSC conducted peer review for the redevelopment of an old mill complex on the banks of the Merrimac River. Peer review required analysis of project status under Riverfront Protection Act, as well as Wetlands Protection Act and local Wetlands Ordinance. The project also required evaluation of Applicant's requests for waivers from local Ordinance provisions.

Key Personnel to Review Lodges at Storrs

BSC's qualifications for this project are demonstrated by the capabilities of our proposed staff. The organization chart below graphically depicts our proposed team. Notably, project manager William Walter, PE, LEED AP will serve as the Town of Mansfield's day-to-day contact, providing direct review responses, as well as overall project oversight. He will be supported by a skilled environmental scientist with extensive expertise in the key components of this review.

In addition to BSC's technical expertise, this project will have the full support of Kurt Prochorena, PE, LEED AP, Principal-In-Charge. Mr. Prochorena will provide corporate-level authority for the review contract. Kurt Prochorena is an engineer with more than 25 years of experience in site design and stormwater management. As principal-in-charge of BSC Group's Glastonbury office, Kurt provides senior oversight all of BSC's projects in Connecticut.

The qualifications of BSC's technical team are summarized for your consideration; resumes demonstrating technical expertise conclude our response to the Town of Mansfield.



BSC Group offers an experienced peer review team of professionals who have worked successfully together on previous projects.

- William Walter, PE, LEED AP, Project Manager - A senior associate and manager of civil engineering services at BSC Group Glastonbury with 21 years of experience, Will offers exceptional understanding of stormwater management systems and low impact development. He has provided civil engineering design for numerous municipal projects, including school buildings and public safety buildings, as well as private land development projects that have undergone Planning Board review in their host communities. He regularly applies LID stormwater management solutions to his design projects, including the use of stormwater infiltration swales and rain gardens. Will is familiar with the Town of Mansfield's regulations having served as the project manager for multiple projects on the UConn Storrs campus, as well as a recent project located in the Town of Mansfield Storrs Center and the ongoing review of the Meadowbrook Gardens Special Permit and Inland Wetlands license applications.
- Gillian Davies, PWS, SSSSNE, CESSWI - With a graduate degree in environmental studies from Yale University, we are pleased to complete our proposed team with Gillian Davies who offers extensive experience in plan review from an ecological science perspective. She applies her 30 years of professional experience to the review and recommendation of stormwater management systems for municipalities in Connecticut and Massachusetts. Notably, Gillian has recently assumed the presidency of the Society of Professional Wetland Scientists. Gillian is working closely with Will Walter on the ongoing review of the Meadowbrook Gardens Special Permit and Inland Wetlands license applications.

Client References

BSC Group is proud of our track record of service to the firm's municipal clients, and we are pleased to offer the following references who can attest to our past performance in providing timely, responsive, and cost-effective service.

Project: Charles H. Barrows STEM Academy, Windham, CT

Contact: Norman Benjamin
ARCADIS
213 Court Street, Suite 700
Middletown, CT 06457
Phone: 860-503-1500
E-mail: norman.benjamin@arcadis-us.com

BSC Group is pleased to offer these references for the Town of Mansfield's consideration.

Project: Review Services to the Amesbury ConComm, Amesbury, MA

Contact: John Lopez
Conservation Administrator
62 Friend Street
Amesbury MA 01913
E-mail: conservation@amesburyma.gov
Phone: 978-388-8110 x317

Will Walter, PE, LEED AP

Manager of Civil Engineering/Senior Associate

EDUCATION

B.S., Civil Engineering
Worcester Polytechnic Institute

REGISTRATIONS

Professional Engineer in CT

LEED Accredited Professional

AFFILIATIONS

U.S. Green Building Council (USGBC)

BACKGROUND

Mr. Walter is BSC-Glastonbury's manager of civil engineering with design and project management experience in all aspects relating to land development, including permitting, site demolition, grading and drainage, utilities, erosion & sediment control, and construction phase services. He is experienced in total site design to meet the design criteria and performance standards of numerous local, state, and federal guidelines and requirements, including local zoning and inland wetland requirements, state DOT stormwater design requirements, state DEEP stormwater quality requirements, state DEEP erosion and sediment control requirements, federal NPDES requirements, as well as LEED requirements.

PROJECT EXPERIENCE

Technical Peer Review of Meadowbrook Gardens, Mansfield, CT

Project Manager providing technical review of the Meadowbrook Garden development. Currently underway, this technical review includes examination of the stormwater design, traffic impact study, sanitary sewer design and potential impacts to wetlands for the Special Permit application and Inland Wetlands license for the Meadowbrook Gardens Application, 91-93 Meadowbrook Lane, Mansfield Center, Connecticut. The review is being summarized in a peer review report to the Town of Mansfield.

On-Call Peer Review Engineering Services, Tolland, CT

Project Manager for ongoing on-call engineering services to the Town of Tolland, CT. Under this contract, BSC is positioned to provide the Town with as-needed peer review of applications to the local land use commissions.

Rand Whitney Paper Company, Newtown, CT

Project Manager for the design and permitting of an expansion of the existing 100,000 square foot manufacturing building to approximately 300,000 square feet, including associated site features. The site design included overcoming significant grading and drainage challenges, lighting, site circulation and parking, utilities and erosion control. The drainage improvements included on-site detention and water quality treatment. The site design also included renovation of approximately 300 linear feet of the adjacent roadway. The permits included an inland wetlands permit through the Inland Wetlands & Watercourses Commission, a site plan approval through the Planning & Zoning Commission and an administrative decision through the Office of the State Traffic Authority.

Town of Ledyard Middle School, Ledyard, CT

Project Manager for integrated site design services in support of a renovation/expansion project comprised of an expansion and renovation of the 75,000 square-foot renovation to 93,000 square feet. Site design includes parking & circulation, grading & drainage, utilities, landscaping, demolition and erosion control on a 36 acres site. The project also includes an analysis of the existing septic

system as well as coordination with the local health department, CT DPH and CT DEEP. Permitting includes local permitting through the Town of Ledyard and the State of Connecticut Department of Education's Office of Schools Facilities (OSF).

Town of Ellington Crystal Lake School, Ellington, CT

Project Manager/Lead Civil Engineer for integrated site design services in support of a renovation/expansion project comprised of a 30,000 square-foot renovation and a 20,000 square-foot addition. BSC designed extensive improvements to the 16 acre site, including revised grading, new access drives, parking, and bus loading/unloading areas, four new athletic fields, four new play areas, a walking path, and two wetlands crossings. The team was responsible for stormwater management, traffic/parking, landscape improvements, design of the new athletic and playground facilities, design of the walking path, and site permitting through the Town of Ellington and the State of Connecticut Department of Education's Office of Schools Facilities (OSF).

Charles H. Barrows STEM Academy, Windham, CT

Project Manager for survey, civil engineering and landscape architecture for design and permitting of a new 600 student magnet school serving grades pre-K through 8. Working with the project architect, the BSC team is designing all site aspects related to the new school facility, including site layout planning, a comprehensive traffic study to assess effects of the new facility on local vehicular movements, the design of new utilities, drop-off and parking facilities, athletic fields, and stormwater management systems. The design also incorporates significant LID components, and will be targeted for LEED certification.

University of Connecticut Basketball Complex, Storrs, CT

Project Manager for the site design associated with the 75,000 square foot men's and women's basketball practice facility on the University's Storrs Campus. Site design involved utility planning, utility design, grading & drainage, demolition, erosion control, surveying and permitting through CT DEEP. The project achieved LEED Silver status.

Mercyknoll, West Hartford, CT

Project Manager for site design of a 94-bed addition to continuing care facilities, including design and oversight of survey, wetlands delineation, site demolition, permitting, drainage, utilities, and erosion control. The project included immediate design and permitting of the 94-bed addition, as well as master planning for the entire 53-acre campus.

On-Call Engineering Services, New Britain, CT

Civil Engineer for ongoing on-call engineering services to the City of New Britain, CT. Under this contract, BSC provided the City with comprehensive engineering services to effectively and economically develop, utilize, and maintain its varied infrastructure and facility assets.

Shelley Lane Subdivision, Glastonbury, CT

Civil Engineer for design support of all aspects of civil design for a 37-lot subdivision, including lot layout, roadway design, stormwater management, utility design, and erosion and sediment control. Stormwater management was designed to 2004 DEP Stormwater Quality Manual. Erosion control was designed to 2002 Connecticut Erosion and Sedimentation Guidelines.

Gillian T. Davies, PWS, SSSSNE, NHCWS, CESSWI

Senior Ecological Scientist

EDUCATION

M.E.S., Environmental Studies 1991
Yale University

B.A., Psychology 1985
Williams College

Certificate of Completion in the New England Regional Soil Science Certificate Program, University of Massachusetts

REGISTRATIONS

Professional Wetland Scientist, Society of Wetland Scientists

Registered Soil Scientist, Society of Soil Scientists of Southern New England

Certified Wetland Scientist, State of New Hampshire

Certified Erosion, Sediment, and Storm Water Inspector, Envirocert International, Inc.

AFFILIATIONS

Society of Wetlands Scientists – International

Current Position: President Elect

New England Chapter

Current Position: Past President

Past Positions: President, Vice President

Association of Massachusetts Wetlands Scientists

Past Positions: Past President, President, Vice President

BACKGROUND

Ms. Davies is a senior wetland/soil scientist in the Worcester office of BSC Group, and brings a broad range of experience to her position. She has managed and participated in numerous natural resource projects as a private consultant working for consulting companies and also as an independent contractor. Her consulting work encompasses state and federal permitting, wetland delineation including difficult wetland soils analysis, impact analysis, wildlife habitat evaluation, endangered/threatened species issues, mitigation planning, design and monitoring, expert witness, and environmental construction/post-construction inspection. She has worked on projects in Massachusetts, Maine, Connecticut, New York, Maryland and North Carolina.

Ms. Davies currently serves as President-Elect of the Society of Wetland Scientists and will assume responsibilities as President in June 2016. She also serves as Past President of the New England Chapter of SWS. In her work for SWS, she chaired the program committee for the 2015 international SWS Annual Meeting, themed "Changing Climate. Changing Wetlands". Ms. Davies has served on the MA Executive Office of Energy & Environmental Affairs (EEA) Adaptation Subcommittee to the Global Warming Solutions Act Implementation Advisory Committee. In addition, she served as Chair of the Inland Wetlands Adaptation Subcommittee to the Natural Resources and Habitat Subcommittee to the EEA Climate Change Adaptation Advisory Committee. In this capacity, she worked with other natural resource professionals to craft an advisory document that identified the specific vulnerabilities of inland wetland resources to anticipated changes in Massachusetts climate, and adaptive strategies for managing wetland resources as these changes occur. The findings in this document have been incorporated into the Massachusetts Climate Change Adaptation Report (September, 2011) that is intended to guide climate adaptation policy in the Commonwealth of Massachusetts.

Ms. Davies has been working as a wetland scientist since 1991, is a Professional Wetland Scientist (Society of Wetland Scientists); a Registered Soil Scientist (Society of Soil Scientists of Southern New England); a Certified Wetland Scientist in the State of New Hampshire; and a Certified Erosion, Sediment, and Stormwater Inspector with EnviroCert International, Inc.

PROJECT EXPERIENCE

Technical Wetlands Peer Review of Meadowbrook Gardens, Mansfield, CT
Soil Scientist providing technical review of the Meadowbrook Garden Inland Wetlands Application. Currently underway, this technical review includes examination of the Town Inland Wetlands regulations and Town Zoning Regulations that are pertinent to stormwater design, traffic design and construction in regulated areas as well as review of the plan sets submitted for Special Permit Application, the

Inland Wetlands License, and the accompanying Wetlands Impact Study. Provide review for adherence to the applicable local and state requirements potential impacts to wetlands for the Special Permit application and Inland Wetlands license for the Meadowbrook Gardens Application, 91-93 Meadowbrook Lane, Mansfield Center, Connecticut. The review is being summarized in a peer review report to the Town of Mansfield.

Polylok Inc. Site, Wallingford, CT
Senior Wetland/Soil Scientist delineated wetlands on highly disturbed site in accordance with state and local regulations.

East Haddam Road, East Hampton, CT
Senior Wetland/Soil Scientist reviewed eight-acre site for potential hydric soils and watercourses in accordance with state and local regulations. Two watercourses were identified.

Ashford Realty Trust, Ashford, CT
Senior Wetland/Soil Scientist performed hydric soils/wetland delineation on 90-acre site in accordance with state and local regulations. Site was heavily forested with thick understory and stony soils.

Vona Property, East Haddam, CT
Senior Wetland/Soil Scientist delineated areas containing hydric soils on 41-acre site in accordance with state and local regulations and conducted wildlife habitat evaluation. Property contained meadow, shrub/scrub and forested areas.

Peer Review Services to the Amesbury Conservation Commission, Amesbury, MA
Project Manager/Senior Wetland/Soil Scientist for the review of applications before the Amesbury Conservation Commission. Representative task assignments are described below.

127 Kimball Road NOI. Conducted peer review for site improvements to lakeshore property at Lake Attitash. Project included a local wetlands ordinance waiver request, as well as review under the Massachusetts Wetlands Protection Act.

Locke Hill Lane Subdivision NOI Peer Review, *MA DEP Appeal Process Peer Review, and Construction Monitoring.* Reviewed project NOI and represented Conservation Commission throughout the MA DEP appeal process. Project plans were modified as a result of both the NOI peer review and appeal processes. Construction of subdivision required crossing a wetland and constructing a wetland mitigation area. Managed team of Environmental Monitors during construction phase. Monitoring effort included monitoring success of the constructed wetland mitigation area, as well as erosion and sedimentation control for site with steeply graded topography.

157 Congress Street ANRAD Peer Review and Representation in MA DEP appeal process. Reviewed wetland resource area delineations, including Riverfront Area, on forested property, and represented the Conservation Commission during the MA DEP appeal process. Wetland resource area delineation that was approved following BSC peer review was upheld during MA DEP appeal process.

60 Merrimac Street NOI. Conducted peer review for project to redevelop an old mill complex on the banks of the Merrimac River. Peer review required analysis of

GOVERNMENT SERVICE

MA Executive Office of Energy and Environmental Affairs Adaptation Subcommittee to the Global Warming Solutions Act Implementation Advisory Committee (2013)

MA Executive Office of Energy and Environmental Affairs Natural Resources and Habitat Subcommittee to the Climate Change Adaptation Advisory Committee (2009)

Chairperson, Inland Wetlands Adaptation Subcommittee to the EOEEA Natural Resources and Habitat Subcommittee (2009)

MA DEP Wetlands & Waterways Circuit Rider (1999-2003)

Stow Conservation Commission (1992-1994)

project status under Riverfront Protection Act, as well as Wetlands Protection Act and local Wetlands Ordinance. Project required evaluation of Applicant's requests for waivers from local Ordinance provisions.

Woodsom Farms Soccer Field Wetland Delineation. Conducted winter review of wetland delineation in mowed fields, based on assessment of soils.

CVS, Macy Street ANRAD, NOI and Environmental Monitoring. Conducted peer review of ANRAD and NOI for a mixed-use redevelopment project. Abutter and Conservation Commission concerns were incorporated into peer review, and project resulted in improved stormwater management, mitigation wetland creation for buffer zone impacts, and a long-term invasive species management plan for the site. Following peer review of project permit applications, is providing environmental monitoring services for construction and post-construction phases, including monitoring of construction of wetland mitigation area.

Bailey's Pond NOI. Conducted peer review of NOI, including Riverfront delineation following beaver activity and assessment of site for status as previously developed, degraded site. Provided consulting services to Amesbury Conservation Commission through MassDEP appeal process, where Commission decision was successfully defended.

Lion's Mouth Road ANRAD and NOI. Conducted peer review of ANRAD and NOI, including addressing abutter concerns, evaluating onsite stream for perennial/intermittent status, and Bordering Vegetated Wetland delineation. Following erosion and sedimentation violations during construction phase, provided assessment of damages and remedial actions necessary.

Meadowbrook Estates DEIR. Conducted peer review of DEIR documents for land development project.

Macy Street Mixed Use Development. Provided peer review services for both the Conservation Commission and Planning Board for a mixed use development consisting of retail, commercial office, and residential components. Reviewed wetland delineations, Notice of Intent application and site design for compliance with the Massachusetts Wetlands Protection Act, local bylaws and regulations, and general engineering standards.

Potential Wetland Violation Investigation, City of Newton Utilities Department, Newton, MA.
Project Manager/Senior Wetland/Soil Scientist evaluated ditch dredging activity to determine whether a violation of MA Wetlands Protection Act had occurred and met onsite with Utilities Department and Conservation Commission staff to resolve issues.

Georgetown Conservation Commission, Georgetown, MA
Project Manager/Senior Wetland/Soil Scientist providing as-needed peer review services to the Georgetown Conservation Commission. Representative assignments are described below.

1 Industrial Way Fill Violation, Georgetown, MA. Conducted assessment of wetland boundary that had been buried by several feet of fill material. Evaluation of buried soils led to identification of large wetland area that had been filled.

Turning Leaf NOI, Georgetown, MA. Peer review of this NOI for a 24 unit subdivision required several rounds of review in order to bring the proposed project into compliance with the Georgetown Wetlands Protection Bylaw. Regulated resources included Bordering Vegetated Wetland, Vernal Pool/Isolated Vegetated Wetland, Bordering Land Subject to Flooding, and Buffer Zones.

Georgetown Middle/High School NOI, Georgetown, MA. Reviewed NOI documents, Bordering Vegetated Wetland boundary, Land Subject to Flooding and Riverfront Area boundary. BSC evaluated Applicant's request for waivers to the Georgetown Wetlands Protection Bylaw, and compliance with provisions of the Riverfront Protection Act, as well as compliance with local and state wetlands regulations.

0 East Main Street, Georgetown, MA. Conducted peer review of ANRAD on an approximately 25-acre site with difficult-to-analyze soils. Wetland delineation required substantial revision as a result of peer review process.

Sunfield Solar 12 Megawatt Solar Array, Spencer Conservation Commission, Spencer, MA
Senior Wetland/Soil Scientist and Certified Erosion, Sediment and Storm Water Inspector provided Environmental Monitoring services for construction project to install large solar array in close proximity to wetlands.

81 Russell Street ANRAD review, Carlisle Conservation Commission, Carlisle, MA
Project Manager/Senior Wetland/Soil Scientist conducted peer review of ANRAD wetland resource delineation that included evaluation of Bordering Vegetated Wetlands, Riverfront Area, Certified Vernal Pools, Bordering Land Subject to Flooding, and area of illegal fill placed on top of Bordering Vegetated Wetlands.

Westford Conservation Commission, Westford, MA
Senior Wetland/Soil Scientist providing as-needed peer review services to the Westford Conservation Commission. Representative assignments are described below.

Cornerstone Square Commercial Center ANRAD, NOI, DEIR, FEIR Peer Review. Performed peer review for a 31-acre site commercial development proposal, reviewed wetland resource area boundaries for compliance with state and local regulations, reviewed and provided comments on DEIR and FEIR, evaluated NOI for compliance with state and local regulations. Issues included vernal pools, infringement into locally-regulated no work/build zones, development of substantive alternatives analysis, compliance with local bylaw, cumulative impacts, evaluation of impacts to wetland functions and values (especially wildlife habitat functions).

Town of Westford Master Plan. Assisted the Town of Westford in development of the Natural Resources section of the town's Master Plan.

TEACHING/EDUCATION

Massachusetts Department of Environmental Protection, Clearwater Estates Revision

Co-Editor for revision and development of training modules for the Clearwater Estates Development Simulation Reference Manual and Training Program.

Charles River Watershed, Merrimac River Watershed, SuAsCoShaw Rivers Watersheds, Conservation Commission Networks, Massachusetts
Circuit Rider coordinated monthly wetlands training and networking meetings for Conservation Commissions on a watershed basis. Conducted presentations for some of the trainings, organized guest speakers for others. Provided technical advice on MA DEP wetlands regulations.

Presentations (Representative Listing)

National Academies of Sciences, Engineering & Medicine Transportation Research Board 95th Annual Meeting, Washington, D.C., poster presentation, "Using and Interpreting IRIS Tubes to Assess Wetland Mitigation Success and Development of Hydric Soils in Created Wetlands: Massachusetts Department of Transportation Case Study in Lincoln, MA, 2016.

Chigu Center International Forum on Coastal Wetlands, Tainan County, Taiwan, presenter, "Wetlands and Climate Change – Wetlands, Climate Change and the Carbon Cycle", 2015

National Taiwan Normal University, Taipei, Taiwan, presenter, Wetlands and Climate Change – Wetlands, Climate Change and the Carbon Cycle", 2015

Massachusetts Association of Conservation Commissions, presenter, "Current Science on Wetlands and Climate Change: Impacts, Carbon Mitigation, and Adaptation", 2015

Boston Bar Association, co-presenter, "Advising Municipalities and Developers on Climate Change and Adaptation", 2015

Massachusetts Association of Conservation Commissions, co-presenter, "Wetlands and Climate Change: Their Functions, Roles, and Protecting Your Community's Resiliency", 2014

Association of Massachusetts Wetland Scientists, co-presenter, "U.S. Field Indicators of Hydric Soils in Massachusetts", 2012

Association of Massachusetts Wetland Scientists, co-presenter, "Difficult Inland Wetland Delineations", 2006 and 2007

Massachusetts Association of Conservation Commissions, co-presenter, "Soil Science- Field Skills Workshop", 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013

Massachusetts Association of Conservation Commissions, co-presenter, "Hydric Soil Workshop: Field Identification, Documentation, and Delineation", 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013

Massachusetts Association of Conservation Commissions, Annual Environmental Conference: co-presenter, Hydric Soils (Advanced Credit Course), 2001, 2002, 2003, 2004, 2005, 2006, 2007

University of Massachusetts, Lowell, guest-lectured a one-evening graduate level class on soils for "Wetland Ecology" course, 2001, 2003

Department of Planning and Development

Date: March 30, 2016

To: Mansfield Inland Wetlands Agency

From: Jennifer Kaufman, Inland Wetlands Agent

Subject: Receipt of New Application for Wetlands License
Meadowbrook Lane (73 Meadowbrook Lane to Sunny Acres Park) (IWA File #W1565)
Uniglobe Investment, LLC
Description of work: construction of a sidewalk

Project Description

The applicants propose to construct a 5 foot bituminous sidewalk starting at the Whispering Glen multifamily apartment complex at 73 Meadowbook Lane to Sunny Acres Park. The sidewalk will be installed in the Town Right of Way and was a condition of approval by PZC (PZC File #1283). Construction of the sidewalk includes a block retaining wall and installation of a new catch basin to direct stormwater from the edge of pavement to the brook through paved leak offs. The applicants estimate that there will be approximately 72 square feet of disturbance to in the wetlands and approximately 2800 square feet of disturbance in the upland review area.

Because the sidewalk is for a public infrastructure enhancement and will be constructed in the Town Right of Way, the applicants are requesting that the Agency waive the application fee. Pursuant to Section 19.6.A. of the Regulations, if the activity applied for would clearly result in substantial public benefit to the environment or to the public health and safety, the Agency may waive all or part of the application fee.

☒ The project includes work in wetlands.
☒ The project includes work in the 150 foot upland review area.
☐ The project is located in a Public Water Supply Watershed.

Application Fees and Notifications

☐ The applicant has paid the required application fee (Request for Fee Waiver)
☒ The applicant has submitted copies of the notice mailed to neighbors and a list of abutters to be notified. Certified mail receipts must be submitted prior to action on the application.

Receipt Motion

_____ MOVES, _____ seconds to receive the application submitted by Uniglobe Investment, LLC (IWA File #W1565) under the Wetlands and Watercourses

Department of Planning and Development

Regulations of the Town of Mansfield for the construction of a sidewalk on property located at Meadowbrook Lane (73 Meadowbrook Lane to Sunny Acres Park) as shown on a map dated 9/21/2015 and as described in application submissions, to refer said application to staff and the Conservation Commission for review and comments, and waive the application fee pursuant to section 19.6.A of Mansfield's Inland Wetlands and Watercourses Regulations.

APPLICATION FOR PERMIT
MANSFIELD INLAND WETLANDS AGENCY
4 SOUTH EAGLEVILLE ROAD, STORRS, CT 06268
860-429-3015x6204 (DIRECT) TEL: 860-429-3330 OR
FAX: 860-429-6863

FOR OFFICE USE ONLY

File #
W_____
Fee Paid _____
Official Date of Receipt _____

Applicants are referred to the Mansfield Inland Wetlands and Watercourses Regulations for complete requirements, and are obligated to follow them. For assistance, please contact the Inland Wetlands Agent at the telephone numbers above.

Please print or type or use similar format for computer; attach additional pages as necessary.

Part A - Applicant

Name Uniglobe Investment, LLC

Mailing Address 73 Meadowbrook Lane

Mansfield Center, CT Zip 06250

Phone Scott Garrett 203-260-5325 Email scott.garrett13@gmail.com
and/or Bob Magi 203-692-5222 Email rmagi1@icloud.com

Title and Brief Description of Project

Reference File# W1424, Special Permit File# 1284-2, PZC File# 1283

Construction of walkway associated with the Whispering Glen project.

Location of Project 73 Meadowbrook Lane - 290' North of Circle Drive

Intended Start Date April 2016

Part B - Property Owner (if applicant is the owner, just write "same")

Name same as applicant

Mailing Address _____

_____ Zip _____

Phone _____ Email _____

Owner's written consent to the filing of this application, if owner is not the applicant:

Signature _____ date _____

Applicant's interest in the land: (if other than owner) _____

Part C - Project Description (attach extra pages, if necessary)

1) Describe in detail the proposed activity here or on an attached page. (**See guidelines at end of application)**
   Please include a description of all activity or construction or disturbance:
a) ***in*** the wetland/watercourse
b) ***in*** the area ***adjacent*** to (within 150 feet from the edge of) the wetland/watercourse, even if wetland/watercourse is ***off*** your property

Construction of block retaining wall, 5' wide bituminous walk and installation of new catch basin to direct storm water from edge of pavement presently directed to brook by means of paved leakoffs.

a) Rip-rap stilling basin for catch basin outlet.

b) Block retaining wall and bituminous walk.

2) Describe the amount or area of disturbance (in square feet or cubic yards or acres):
a) ***in*** the wetland/watercourse
b) ***in*** the area ***adjacent*** to (within 150 feet from the edge of) the wetland/watercourse, even if wetland/watercourse is **off** your property
a) 72 sq.ft. ±

b) 2800 sq.ft. ±

3) Describe the type of materials you are using for the project: Bituminous pavement for walk, process gravel for base, concrete blocks for retaining wall, rip-rap for stilling basin.

a) include ***type*** of material used as fill or to be excavated gravel fill
b) include ***volume*** of material to be filled or excavated Approximately 20 yds of gravel fill between retaining wall and edge of Meadowbrook Lane.

4) Describe measures to be taken to minimize or avoid any adverse impacts on the wetlands and regulated areas (silt fence, staked hay bales or other Erosion and Sedimentation control measures).
   Silt fencing will be used to minimize erosion and sediment from traveling down gradient into brook.

Part D - Site Description

Describe the general character of the land. (Hilly? Flat? Wooded? Well drained? etc.)
Majority of proposed walk is flat except in the area of existing brook crossing.

Part E - Alternatives

Have you considered any alternatives to your proposal that would meet your needs and might have less impact on the wetland/watercourse? Please list these alternatives.

Yes, original design for walk was proposed on the other side of Meadowbrook Lane.

Part F - Map/Site Plan (all applications)

1) Attach to the application a map or site plan showing **existing conditions** and the **proposed project** in relation to wetland/ watercourses. Scale of map or site plan should be 1" = 40'; if this is not possible, please indicate the scale that you are using. A sketch map may be sufficient for small, minor projects. **(See guidelines at end of application)**

2) Applicant's map date and date of last revision September 21, 2015

3) Zone Classification R-20

4) Is your property in a flood zone? _____Yes __X__No _____ Don't Know

Part G - Major Applications Requiring Full Review and a Public Hearing

See Section 6 of the Mansfield Regulations for additional requirements.

Part H - Notice to Abutting Property Owners

1) Attach list of abutters, name, and address

2) **Proof of Written Notice to Abutters.** You must notify abutting (neighboring) property owners (any property immediately contiguous with the subject property, including those across the street) by certified mail, return receipt requested, stating that a wetland application is in progress, and that abutters may contact the Mansfield Inland Wetlands Agent for more information. Include a brief description of your project. ***Postal receipts of your notice to abutters must accompany your application.*** To generate an abutters list go to http://www.mainstreetmaps.com/CT/Mansfield/

Part I - Additional Notices, if necessary

Notice to Windham Water Works and CT Department of Public Health is attached. If this application is in the public watershed for the Windham Water Works (WWW), you must notify the WWW and the Department of Public Health of your project within 7 days of sending the application to Mansfield--sending it by certified mail, return receipt requested. Contact the Mansfield Inland Wetlands Agent to find out if you are in this watershed.

Notice to Adjoining Town. If your property is within 500 feet of an adjoining town, you must also send a copy of the application, on the same day you sent one to Mansfield, to the Inland Wetlands Agency of the adjoining town, by certified mail, return receipt requested.

The Statewide Reporting Form shall be part of the application and specified parts must be completed and returned with this application.

Part J - Other Impacts To Adjoining Towns, if applicable

1) Will a significant portion of the traffic to the completed project on the site use streets within the adjoining municipality to enter or exit the site?___Yes_X_No___Don't Know

2) Will sewer or water drainage from the project site flow through and impact the sewage or drainage system within the adjoining municipality?____ Yes _X_No ____ Don't Know

3) Will water run-off from the improved site impact streets or other municipal or private property within the adjoining municipality?____ Yes _X_No ____Don't Know

Part K - Additional Information from the Applicant

Set forth (or attach) any other information which would assist the Agency in evaluating your application. (*Please provide extra copies of any lengthy documents or reports, and extra copies of maps larger than 8.5" x 11", which are not easily copied.)*

Part L - Filing Fee

Application fees shall be in accordance with the current Mansfield Code of Ordinance fee Schedule, pursuant to Section 8-1c of the Connecticut General Statutes. The fee schedule includes provisions for applicant-funded consultant studies and reports. The current fee schedule is available in the Planning and Zoning office.

Note: The Agency may require additional information about the upland review area or about wetlands or watercourses affected by the regulated activity. If the Agency, upon review of your application, finds the activity proposed may involve a "significant activity" as defined in the Regulations, additional information and/or a public hearing may be required.

Certification

I hereby certify that:

- I am familiar with the information contained in this form and that such information is true and correct to the best of my knowledge.
- I understand the penalties for obtaining a permit through deception or through inaccurate or misleading information.

_____ _____

Signature Date

Authorization to Enter Property

The undersigned hereby consent to necessary and proper inspections of the above-mentioned property by members and agents of the Inland Wetlands Agency at reasonable times, both before and after the permit in question has been issued by the Agency.

_____ _____

Signature Date

DATUM ENGINEERING & SURVEYING, LLC
132 Conantville Road
Mansfield Center, CT 06250

Phone: 860-456-1357
Fax: 860-456-1840
Edward Pelletier, L.S.
Email: e.pelletier@datumengr.com

March 29, 2016

Inland Wetlands Agency
Town of Mansfield
4 South Eagleville Road
Storrs, CT 06268

Re: Whispering Glen, 73 Meadowbrook Lane, Mansfield

Request for Waiver of Application Fee

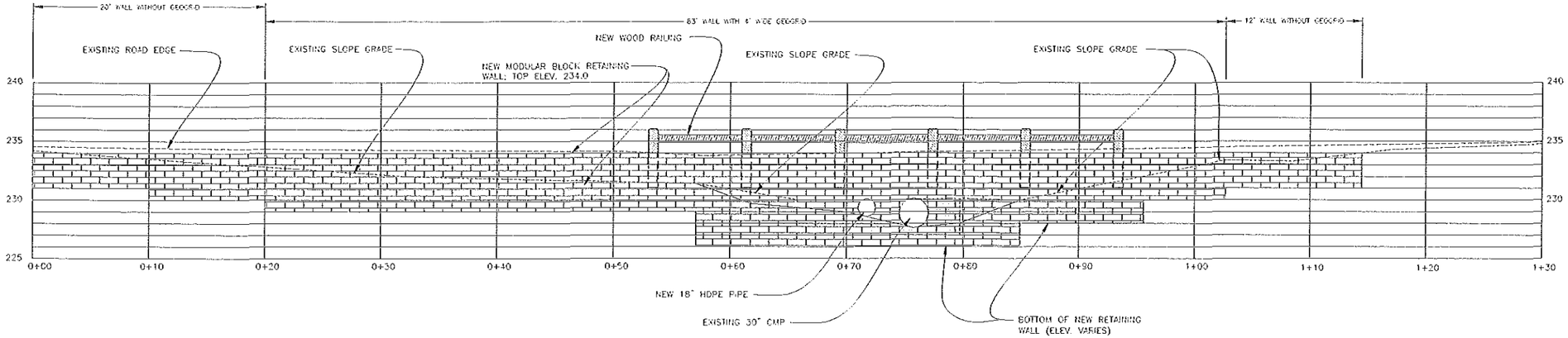
Uniglobe Investment, LLC is requesting a waiver of the Inland Wetlands Application fee as the proposed walkway project will be for public enhancement/infrastructure improvement.

Respectfully submitted,

Datum Engineering & Surveying, LLC

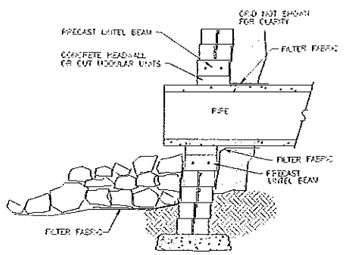
Edward Pelletier, L.S.

cc: file

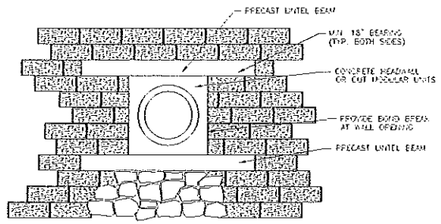


DOWNSTREAM WALL ELEVATION

SCALE: 1" = 5'



SECTION



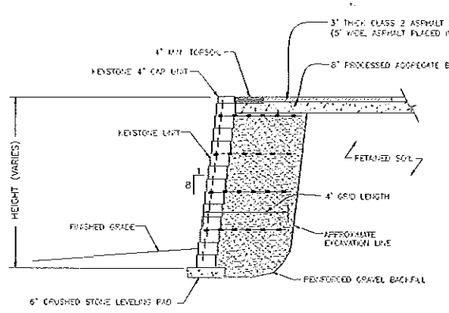
PROFILE

LINTEL NOTES:

1. SUBMIT SHOP DRAWING FOR FINAL BEAM SIZE, REINFORCEMENT, AND CONFIGURATION TO BE APPROVED BY ENGINEER.
2. LINTEL BEAMS SHALL BE PRECAST WITH MIN. 7 DAYS CURE.
3. HEIGHT OF BEAM SHALL CORRESPOND TO HEIGHT OF MODULAR UNIT(S).
4. PLACE LINTEL ON COURSE ABOVE DRAINAGE PIPE.
5. PIPE TO EXTEND BEYOND BASE COURSE OF WALL NO LESS THAN 6".
6. GEOTEXTILE FABRIC SHALL BE INSTALLED AROUND PIPE OPENING.
7. LINTEL TO EXTEND MINIMUM 18" EITHER SIDE OF OPENING.

WALL WITH PIPE PENETRATION

NOT TO SCALE

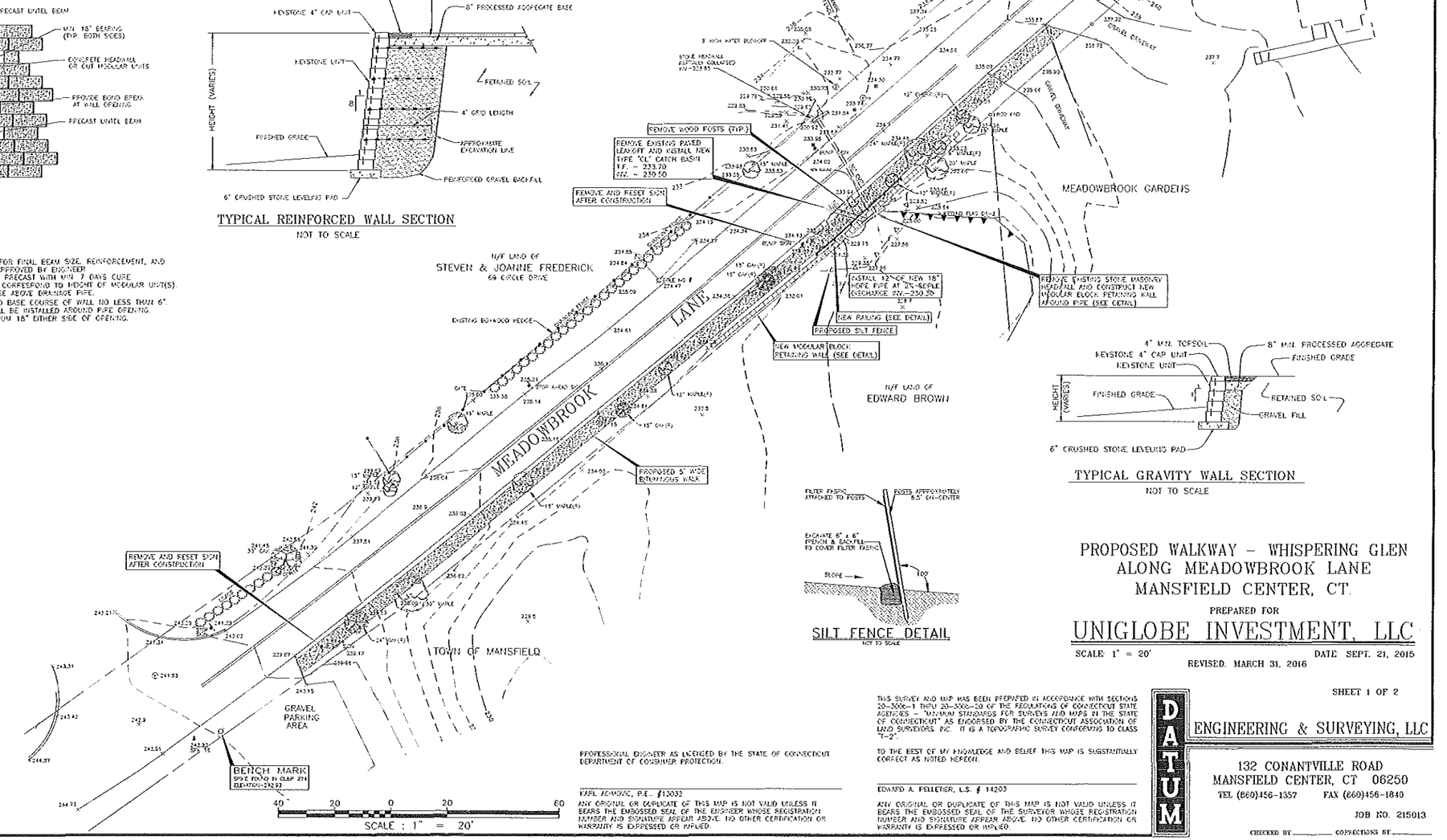


TYPICAL REINFORCED WALL SECTION

NOT TO SCALE

NOTES

1. MODULAR WALL UNITS SHALL BE KEYSTONE RETAINING WALL STANDARD SERIES II UNITS MANUFACTURED IN ACCORDANCE WITH ASTM C-90 AND ASTM C-140 AND SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI, STANDARD WEIGHT, WITH A MAXIMUM ABSORPTION OF 8%.
2. CONNECTION PINS SHALL BE 1/2" DIAMETER THERMOSET ISOPTHALIC POLYESTER RESIN-PULTRUDED FIBERGLASS REINFORCEMENT RODS SUPPLIED BY KEYSTONE.
3. FILL FOR UNITS SHALL BE FREE DRAINING CRUSHED STONE OR GRAVEL, 1/2" TO 3/4" AGGREGATE.
4. BACKFILL MATERIAL FOR ALL WALL SECTIONS SHALL BE A FREE DRAINING COMPACTED GRAVEL CONFORMING TO THE MATERIAL SPECIFICATIONS OF SECTION M.02.06, GRADATION A, OF CONNECTICUT DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROADS, BRIDGES AND INCIDENTAL CONSTRUCTION, FORM 816, LATEST REVISION.
5. GEOGRID SHALL BE MIRAGRID 2XT, AS MANUFACTURED BY TENCATE GEOSYNTHETICS.
6. ALL INSTALLATION (INCLUDING WALL SECTIONS AND GEOGRID) SHALL FOLLOW KEYSTONE DESIGN AND CONSTRUCTION MANUAL. CONTRACTOR TO PROVIDE SHOP DRAWINGS FROM BLOCK SUPPLIER FOR REVIEW AND APPROVAL SUBSEQUENT TO EXCAVATION AND IDENTIFICATION OF ANY SITE UTILITIES, NOTING ANY DEVIATIONS IN GEOGRID LAYOUT DUE TO POTENTIAL CONFLICTS WITH UTILITIES OR DRAINAGE FEATURES.
7. FENCING OR RAILING SHALL BE PLACED BEHIND THE NEW RETAINING WALL UNLESS OTHERWISE DIRECTED.
8. PROCESSED AGGREGATE FOR THE ASPHALT SIDEWALK BASE AREAS SHALL CONFORM TO THE MATERIAL SPECIFICATIONS OF SECTION M.05.01-1 OF DOT FORM 816, LATEST REVISION, EXCEPT THAT THE MAXIMUM AGGREGATE SHALL BE NO GREATER THAN 1" IN SIZE.
9. EXCAVATION, FILLING, BACKFILLING, AND COMPACTION SHALL BE IN CONFORMITY WITH THEIR RESPECTIVE SECTIONS OF DOT FORM 816. IN NO CASE SHALL LIFTS EXCEED 6 INCHES FOR MATERIALS BENEATH OR ADJACENT TO STRUCTURES OR 12 INCHES FOR ALL OTHER AREAS PRIOR TO COMPACTION. DRY DENSITY OF EACH LAYER FOR INDIVIDUAL MATERIALS AFTER COMPACTION SHALL BE NOT LESS THAN 95% FOR RANDOM FILL, 95% FOR GRAVEL FILL AND 100% FOR STRUCTURAL FILL WHEN TESTED IN ACCORDANCE WITH AASHTO T180, METHOD D.



SILT FENCE DETAIL

NOT TO SCALE

TYPICAL GRAVITY WALL SECTION

NOT TO SCALE

PROPOSED WALKWAY - WHISPERING GLEN ALONG MEADOWBROOK LANE MANSFIELD CENTER, CT.

PREPARED FOR

UNIGLOBE INVESTMENT, LLC

SCALE 1" = 20'

DATE SEPT. 21, 2015

REVISED. MARCH 31, 2016

PROFESSIONAL ENGINEER AS LICENSED BY THE STATE OF CONNECTICUT DEPARTMENT OF CONSUMER PROTECTION.

KARL ADAMOVIC, P.E., #12032

ANY ORIGINAL OR DUPLICATE OF THIS MAP IS NOT VALID UNLESS IT BEARS THE EMBOSSED SEAL OF THE ENGINEER WHOSE REGISTRATION NUMBER AND SIGNATURE APPEAR ABOVE. NO OTHER CERTIFICATION OR WARRANTY IS EXPRESSED OR IMPLIED.

THIS SURVEY AND MAP WAS PREPARED IN ACCORDANCE WITH SECTIONS 20-300b-1 THRU 20-300b-20 OF THE REGULATIONS OF CONNECTICUT STATE AGENCIES - "MINIMUM STANDARDS FOR SURVEYS AND MAPS IN THE STATE OF CONNECTICUT" AS ENDORSED BY THE CONNECTICUT ASSOCIATION OF LAND SURVEYORS, INC. IT IS A TOPOGRAPHIC SURVEY CONFORMING TO CLASS "T-2".

TO THE BEST OF MY KNOWLEDGE AND BELIEF THIS MAP IS SUBSTANTIALLY CORRECT AS NOTED HEREON.

EDWARD A. FELLETIER, L.S. # 14203

ANY ORIGINAL OR DUPLICATE OF THIS MAP IS NOT VALID UNLESS IT BEARS THE EMBOSSED SEAL OF THE SURVEYOR WHOSE REGISTRATION NUMBER AND SIGNATURE APPEAR ABOVE. NO OTHER CERTIFICATION OR WARRANTY IS EXPRESSED OR IMPLIED.

DATUM
ENGINEERING & SURVEYING, LLC
132 CONANTVILLE ROAD
MANSFIELD CENTER, CT 06250
TEL (860)456-1357 FAX (860)456-1840

SHEET 1 OF 2

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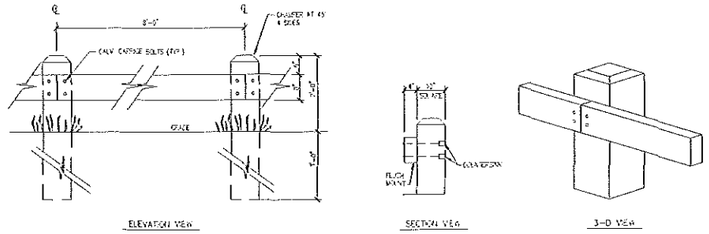

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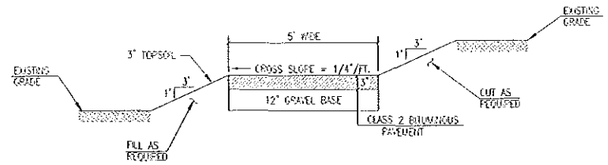

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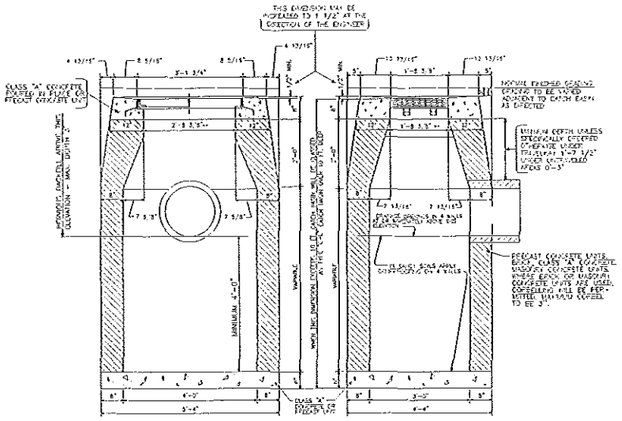

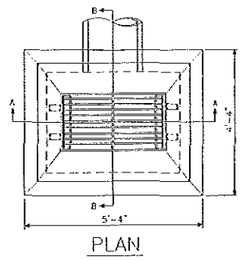

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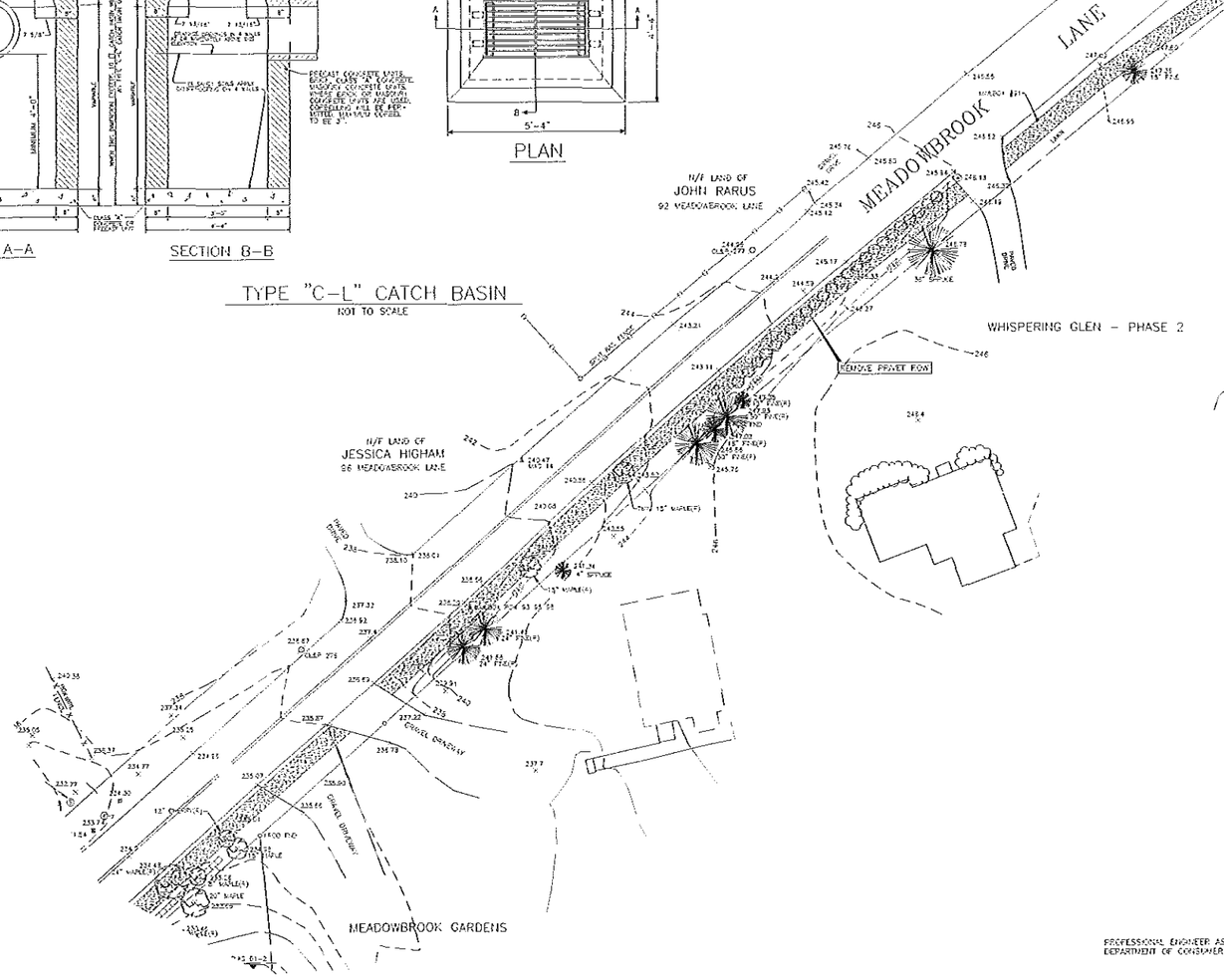

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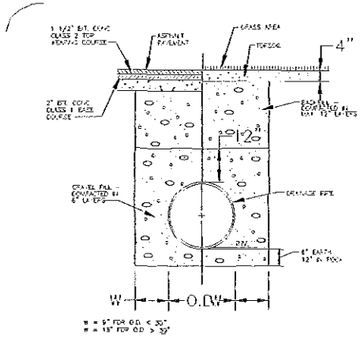
2 CONTOUR	246
UTILITY POLE	
TREE LINE	
STONEWALL	
SPLIT RAIL FENCE	
CHAINLINK FENCE	
EDGE PAVEMENT	
BITUMINOUS WALKWAY	
SPOT ELEVATION	105.6
STORM DRAINAGE PIPE	
FIRE HYDRANT	
TREE TO BE REMOVED	15" MAPLE (R)
SILT FENCE	



PROPOSED WALKWAY - WHISPERING GLEN
ALONG MEADOWBROOK LANE
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SCALE: 1" = 20' DATE: SEPT. 21, 2015
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SHEET 2 OF 2

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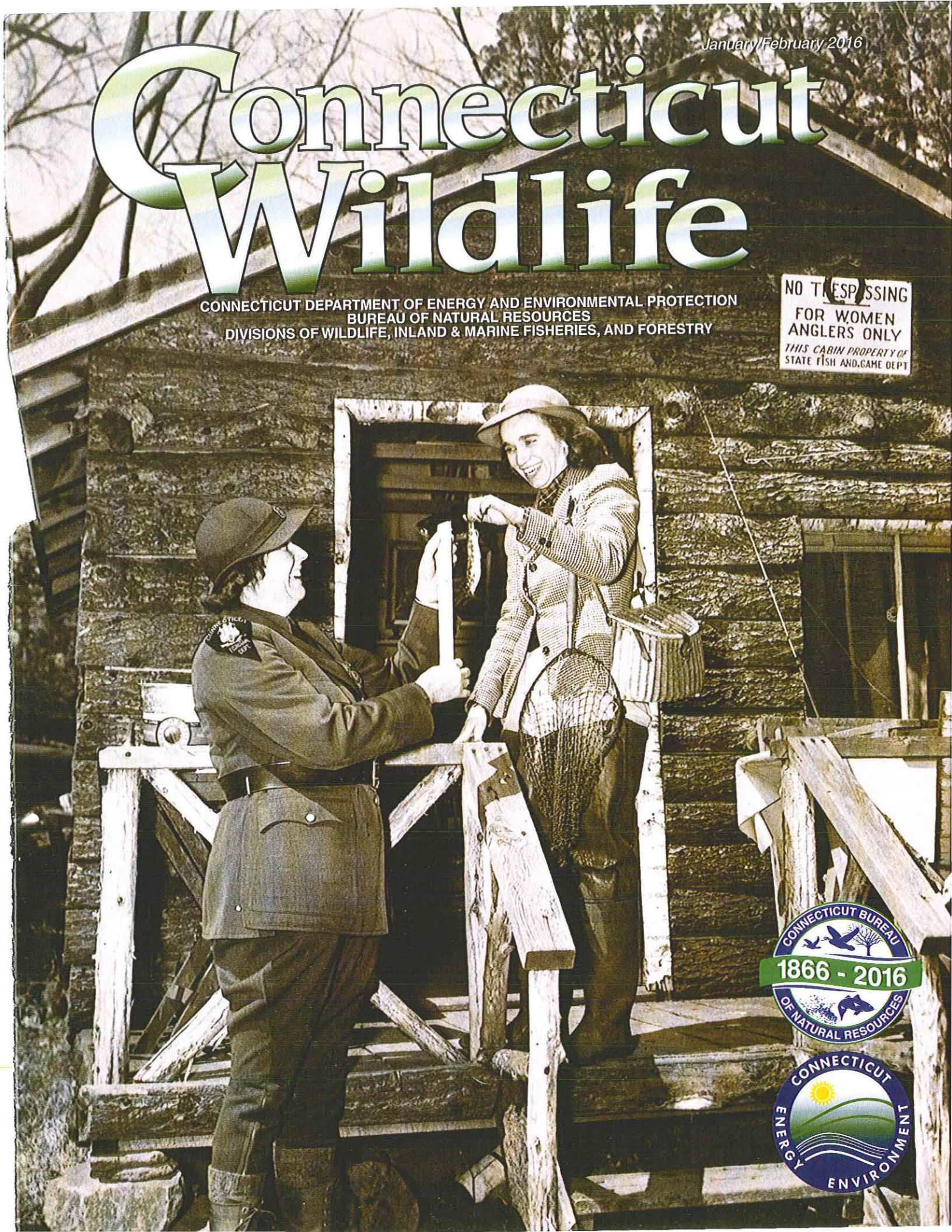
January/February 2016

Connecticut Wildlife

CONNECTICUT DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION
BUREAU OF NATURAL RESOURCES
DIVISIONS OF WILDLIFE, INLAND & MARINE FISHERIES, AND FORESTRY



From the Bureau Chief's Desk

Celebrating 150 Years: A Legacy of Progress and Change

This year we will be celebrating the 150th Anniversary of Natural Resource Conservation in Connecticut. We are humbled and inspired by the accomplishments of the many dedicated fisheries, wildlife, forestry, and law enforcement professionals who have preceded us and we are honored and privileged to be entrusted to advance this mission into the next 150 years.

*Our mission is "**To conserve and enhance Connecticut's fish, wildlife and forest resources and to enhance opportunities for public use and appreciation.**" While not formally adopted until 2011, this mission statement has been implicit in our actions ever since the creation of the Fish Commission in 1866. It was central to the establishment of the Board of Fisheries and Game and the appointment of the first Game Wardens in 1895, and the designation of our first State Forest in 1903. It is why we replanted forests, established fish hatcheries, introduced game species, restored native species, and it is why we continue to conserve land, improve habitat, and scientifically manage and harvest fish, wildlife, and forest products.*

Connecticut in 1866 was a very different place than it is today. The Civil War had just ended and much of North America was in the latter stages of the Industrial Revolution. There was a need to rebuild our nation and restore the natural resources on which the Northeast depended. The Connecticut landscape in 1866 resembled neither the wilderness encountered by early European colonists or the mosaic we see today. Forests were largely absent, agricultural development was extensive, and our waterways had been harnessed for water power.

However, the work undertaken by the three-person Fish Commission in 1866 was not, at its essence, any different from that facing managers today: To conserve and enhance our natural resources for the benefit of fish, wildlife, forests, and people. In so doing, our predecessors began to regulate fisheries, re-connect habitats, and introduce game species believed to be better suited to Connecticut in the late 1800s (e.g. freshwater bass from the Midwest, brown trout from Europe). This was all done in the same spirit as our more recent efforts to scientifically manage harvests and timber production, improve habitats, and restore native wildlife populations (e.g. bald eagles and turkeys).

Today, this legacy of progress and change continues as our talented biologists, foresters, and EnCon Officers, along with our many partners, grapple with the new challenges of invasive species, climate change, conserving habitat in the face of development, and managing the interface between people and restored wildlife. Together, we can keep moving the needle to ensure that future generations have the opportunity to enjoy the outdoors in the manner in which we have been blessed. Please join us in making 2016 a year for celebrating our past and for setting the stage for the next 150 years of resource conservation in Connecticut.

William Hyatt, Chief, Bureau of Natural Resources

Cover:

CT's first female Deputy Warden, Edith A. Stoehr, at the "Woman's Fishing Cabin" (with an unidentified female angler) located near the Branford River where a section was set aside specifically for women anglers (see page 11).

Photo courtesy of retired Connecticut Conservation Officer Pat Hayes.

Connecticut Wildlife

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The Federal Aid in Wildlife Restoration Program was initiated by sportsmen and conservationists to provide states with funding for wildlife management and research programs, habitat acquisition, wildlife management area development, and hunter education programs. Connecticut Wildlife contains articles reporting on Wildlife Division projects funded entirely or in part with federal aid monies.

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Celebrating 150 Years of Natural Resource Conservation

Written by Mike Beauchene, Judy Prill, Alan Levere, and Kathy Herz, DEEP

From the coastline of Long Island Sound, to the central river valleys, and across the eastern and western highlands, Connecticut is a state rich with natural resources. Our diverse landscapes provide habitat for a remarkable number of fish and wildlife.

In the 1600s, the state's colonists viewed the natural world as both a provider and an adversary. For these settlers, the land and water offered all they needed, with plenty to spare. Unfortunately, this abundance would not last.

Over the next 200 years, a growing population placed a greater demand on the state's natural resources. Forests were cleared to establish farmland and provide wood for fuel and lumber for housing. Many rivers were dammed and streams were choked with sediment from eroding soil. Fish and wildlife were harvested at will to provide food and fur. Some wildlife, such as wolf, bobcat, and bear, were viewed as "harmful beasts" needing to be eliminated to protect livestock and crops. By the mid-1800s, most of the state's forest, fish, and wildlife resources, which once seemed limitless, were gone.

Connecticut's leaders took action and, in 1866, passed legislation creating a Fisheries Commission. Over the next 30 years, this commission and its wardens worked to restore fish populations by establishing catch limits and stocking millions of native fish, such as salmon, shad, flounder, and brook trout. They introduced new fish, including bass, walleye, bluegill, carp, and rainbow and brown trout. In 1895, efforts were expanded to protect Connecticut's wildlife, and the Commission was renamed the "State Commission of Fisheries and Game." Soon after, Special Game Protectors were appointed to assist local wardens in the enforcement of fish and game laws.

In 1901, a State Forester was designated to address the reforestation of barren lands. Connecticut had a solid foundation to move forward with restoration, conservation, and preservation of its natural resources. This led to many successes over the next few decades -- lakes and ponds were once again brimming with fish, white-tailed deer were on the increase, and cleared land was returning to forest. Commission records documented a vibrant commercial fishery, with Connecticut ports landing over 15 million pounds of fish and shellfish annually.

Following World War II, the nation experienced unprecedented industrial growth. Advances in chemistry, engineering, and power supply enabled mass production of many goods. Waste products from manufacturing and everyday life were treated by simply burying, discharging to rivers, or burning. By the late 1960s, environmental problems had reached a crisis point. Smoggy cities and polluted rivers were an increasingly common sight. Toxic chemicals were killing fish and wildlife. Connecticut addressed this new challenge by passing innovative legislation, such as the Clean Water Act of 1967 that required improved treatment of sewage and industrial wastewater.

P. J. FUSCO

Rob Klee (right), DEEP Commissioner, and Bill Hyatt, Chief of the Bureau of Natural Resources, pose with a Governor's proclamation for the 150th Anniversary at a recent kick-off event.

To further address air, water, and waste pollution, Connecticut created the Department of Environmental Protection in 1971. This new agency also brought together a number of separate boards and commissions, including those focused on fish, forests, and wildlife. Advances in technology enabled its scientists to better track and collect data on the range, population sizes, and health of our plants and animals.

Connecticut has enjoyed great successes, such as the return of osprey, wild turkey, and bald eagle, and the restoration of habitat for many other animals and plants. Today, almost 60% of our state is covered in forest, and some species are reaching numbers that have not been seen for over 300 years. Each year, our natural resources support over 9,000 jobs and contribute more than one billion dollars to the state's economy.

Being densely populated, Connecticut is continually presented with challenges to its natural resources, such as loss, degradation and fragmentation of habitat, and competition from invasive plants and animals. DEEP's Bureau of Natural Resources continues to foster the partnerships developed over the past 150 years. Wildlife and Forestry Action Plans, created and supported by these diverse groups, provide the direction and guidance needed to addresses problems now facing our resources. We must continue to work together and share this information so that future generations can enjoy Connecticut's natural beauty.

The words of the State Board of Fish and Game Commissioners in 1926 still resonate today: "*Our policy must therefore lie along the line of ... providing opportunity to all who appreciate the best things in life [and] go afield for the benefit of body, mind, and spirit. Youth and old age have a right to demand this of us. We must not disappoint them for we are the trustees of their generation.*"

A History of Wildlife Conservation in Connecticut

Written by Paul Fusco, based in part on writings developed by former Wildlife Division Director Dale May

From the early days when the Connecticut Fish Commission was created in 1866, to 1895 when the Commission was expanded into the Board of Fisheries and Game, and then to the DEEP Wildlife Division of today, Connecticut's wildlife has faced many challenges and successes. With the depletion of wild populations by the 1800s, there came an awakening that led to protective legislation and regulation. By the 1930s, many felt it was necessary to find a way to pay for wildlife conservation, resulting in landmark legislation – the Federal Aid in Wildlife Restoration (Pittman-Robertson) Act – which created stable and dedicated federal funding that is allocated to the states for wildlife restoration and management. Building on this early legislation, wildlife conservation went through a period of environmental quality and species awareness. Today, advanced methodology and specialized staff play key roles in maintaining and improving on past conservation successes.

P. J. FUSCO

Wood ducks recovered from near extirpation with the help of federal laws and the installation of special nest boxes.

Late 1800s – Exploitation

By the late 1800s, once abundant natural resources were diminished due to unsustainable use, and many wildlife species were on a fast track to extinction. The high demand for wildlife from market hunting and the millinery trade led to greatly reduced populations and even the extinction of some animals, including the passenger pigeon, once thought to be the most numerous bird on the planet. Other birds were at high risk, including egrets, terns, and plovers, whose feathers, and sometimes whole bodies, were used to decorate fashionable hats. Many shorebird populations have not recovered to this day.

During this time, wildlife habitat in our state was lost to agriculture and human development. So much forest had been cut that some animal populations declined severely or were virtually eliminated from Connecticut, like the beaver and wild turkey.

- ***1813:*** *Wild turkeys were extirpated (gone) in Connecticut.*
- ***1842:*** *Beavers were extirpated in Connecticut.*
- ***1850:*** *Connecticut became one of the first states to enact a law protecting nongame birds.*
- ***1866:*** *The Connecticut Fisheries Commission was established.*
- ***1882:*** *The last passenger pigeons in the state were documented from a roost north of Hartford.*
- ***1895:*** *The Board of Fisheries and Game began and the first state game wardens were appointed.*

Early 1900s – Regulation

By the turn of the twentieth century, public apathy towards wildlife was replaced by growing concern, leading to the establishment of laws that would protect and regulate wildlife in Connecticut and the nation. Citizens, mainly sportsmen and bird advocates, began to voice their concerns, which were heard by politicians and others. During this time, state agencies assumed a role to protect and regulate some wildlife. As this movement gained momentum, the federal government began taking on a greater role. Laws started to take shape, beginning with the landmark Lacey Act of 1900, which banned interstate trafficking and trade in illegally taken wildlife (and plants). The country had its first "Conservation President" in Theodore Roosevelt, who authorized the nation's first national wildlife refuge, Pelican Island, off the east coast of Florida in 1903.

In 1916, the U.S. government signed a treaty with Great Britain (on behalf of Canada) to protect birds that spend time in both countries. It was the first time two nations had acted to protect birds across borders. The Migratory Bird Treaty (and the resulting Migratory Bird Treaty Act of 1918) is one of the oldest wildlife protection laws and is celebrating its centennial this year. The treaty has been expanded to include Mexico, Japan, and Russia (and to address the tribal use of bird feathers).

- ***1907:*** *The sale of hunting licenses began in Connecticut.*
- ***1907:*** *The spring hunting season for waterfowl was closed in the state.*
- ***1914:*** *Beaver reintroduction began with the establishment of a colony in Union by a private individual.*
- ***1914:*** *The passenger pigeon officially became extinct.*

Mid-1900s – Restoration and Management

Laws and regulations alone could not help depleted wildlife populations recover; science and management practices also were needed. Once Aldo Leopold's ground breaking book, *Game Management*, was published in 1933, the science of wildlife management became widely accepted.

Adequate and stable funding was needed to accomplish wildlife and habitat management projects and protect habitat. The federal Migratory Bird Hunting (Duck) Stamp Act (1934) and Federal Aid in Wildlife Restoration Act (1937) set the framework to pay for wildlife and habitat protection and restoration. Under the Duck Stamp Act, all waterfowl hunters 16 years of age and over must annually purchase a federal Duck Stamp. The money goes directly into a dedicated fund for the purchase and management of wetland habitat across the country. These properties became the building blocks of the National Wildlife Refuge system, and were central to waterfowl and bird conservation throughout the twentieth century. The Federal Aid in Wildlife Restoration Program is the nation's oldest and most successful wildlife restoration program. Through the purchases of firearms, ammunitions, and archery equipment, the Program is a successful user pay, user benefit program, providing grant funds to state fish and wildlife agencies for projects to restore, conserve, manage, and enhance wild birds and mammals and

their habitats. Projects also include providing public use and access to wildlife resources, hunter education, and development and management of shooting ranges. The Federal Aid in Wildlife Restoration Act included a prohibition against the diversion of license fees paid by hunters for any other purpose than the administration of state fish and wildlife agencies.

- ***1932:*** *A waterfowl restoration program was initiated in Connecticut. Wood ducks had almost disappeared from the state. Nest boxes were erected in wooded swamps to provide nest sites and help the wood duck population recover.*
- ***1935:*** *Predator control was a common practice. The state began paying bounties for bobcat pelts.*
- ***1950s:*** *Nesting bald eagles disappeared from Connecticut.*
- ***1956:*** *A hunter safety program began in Connecticut. (It eventually became the Conservation Education/Firearms Safety Program in 1982.)*

DEEP - WILDLIFE DIVISION

As part of a Pittman-Robertson project, Wildlife Division biologist Steve Jackson releases one of the first wild turkeys to be reintroduced in Connecticut.

Late 1900s to 2000s – Conservation and Awareness

The late 1900s saw a popular awareness take root that led to modern day environmental and wildlife conservation. This movement was built upon previous successes in conservation but added a real concern for environmental protection. The 1960s and 1970s brought environmental quality into the mix, starting with the classic book from Rachael Carson, *Silent Spring,* in 1962. Toxic chemicals and pollution became the new emerging battleground. The first Earth Day, celebrated on April 22, 1970, set the stage with a channeling of 1960s energy to bring environmental concern to the forefront. New federal laws – the Clean Air Act of 1970, Clean Water Act of 1972, and Endangered Species Act of 1973 – brought wildlife and habitat conservation into the modern age.

Use of the organochlorine pesticide DDT was banned in Connecticut in 1969 and the United States in 1972. DDT contamination of food items eaten by raptors, like the osprey, bald eagle, and peregrine falcon, is widely accepted as a major reason why populations of many raptor species declined in the mid-twentieth century. DDT accumulated in the food chain and, when contaminated food was ingested by the birds, it caused them to lay eggs with weakened shells that cracked when the birds incubated their eggs. Ospreys were at a record low in Connecticut in 1974 when there were only nine active nests. With DDT no longer being used, ospreys were able to reproduce successfully and, with the help of nesting platforms, the population began to grow rapidly into the present day where nesting pairs number well over 200.

Gone from Connecticut since 1813, wild turkeys were reintroduced to the state beginning in 1975. Through the management technique of release, trap, and transfer, wild turkeys were successfully reestablished in the state.

Projects were intiated to provide nest boxes and wood to build boxes so that the public could have a role in bringing back the eastern bluebird, which had long suffered from a lack of natural nest cavities.

- ***1963:*** *The first coyote was documented in Connecticut when one was killed in Kensington.*
- ***1971:*** *The Connecticut Department of Environmental Protection was established.*
- ***1975:*** *Connecticut held its first regulated deer hunting season.*
- ***1986:*** *The Nonharvested Wildlife Program was established.*
- ***1992:*** *Connecticut's Endangered and Threatened Species Act was established.*
- **1992:** *A pair of bald eagles nested successfully for the first time in almost 40 years.*
- ***2011:*** *The Connecticut Department of Energy and Environmental Protection was launched.*

Today and into the Future

The DEEP Wildlife Division of today faces some difficult challenges now and into the future, including a lack of adequate funding, continuing habitat loss and degradation, climate change, emerging wildlife diseases, invasive species, and a public that spends less time outdoors and is losing its connection to nature. As the Wildlife Division attempts to tackle these challenges, there are a number of actions people can take to help.

You Can Make a Difference

- *Support efforts to connect people with nature and increase wildlife viewing opportunities.*
- *Support funding for natural resource conservation.*
- *Become involved with local conservation organizations and sportsmen's clubs.*
- *Purchase Duck Stamps (federal and state).*

Education and Outreach Are Essential

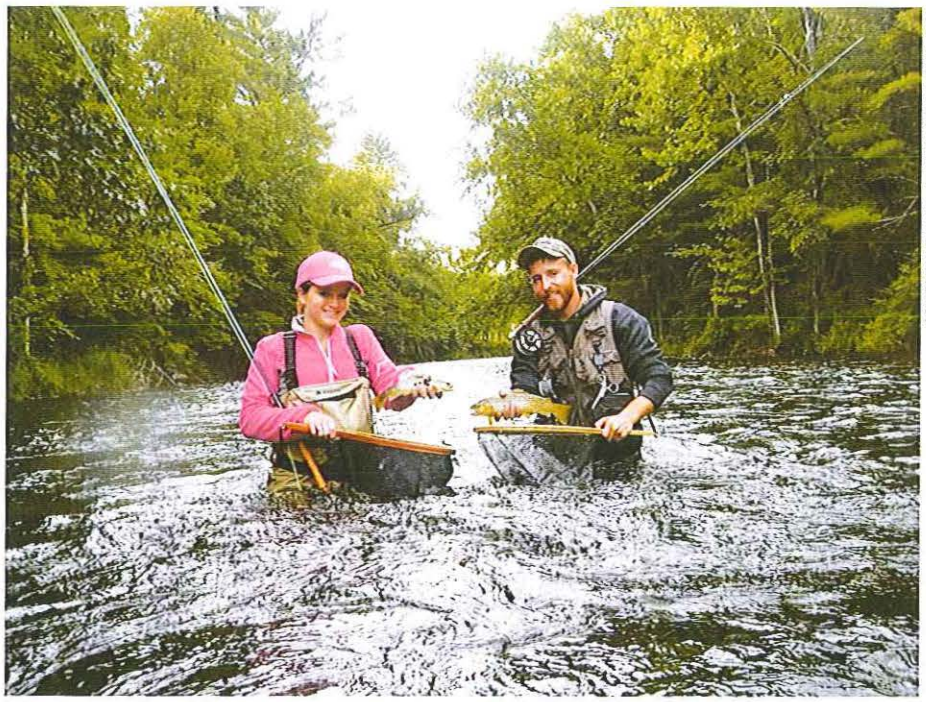
The need for wildlife information by the public has increased through the years. The Wildlife Division sometimes finds itself interacting with a public with varying interests that often conflict with management goals. Many of these conflicts result from a misunderstanding of wildlife management practices and principles by a growing urban population that is lacking a connection with the natural world. In response, the Division's Outreach Program develops educational materials, reports, magazines, informational exhibits, special events, and news releases to foster a better understanding and respect for wildlife. The program also spreads information through the DEEP website (www.ct.gov/deep/wildlife) and the Connecticut Fish and Wildlife Facebook page (www.Facebook.com/CTFishandWildlife). The Wildlife Division's volunteer Master Wildlife Conservationists have been instrumental in providing wildlife education and outreach at countless events and other public venues.

Inland Fisheries – Never Better!

Written by Pete Aarrestad and Mike Beauchene, DEEP Inland Fisheries Division

Fishermen are famous for their stories, many of which begin with "Back in the day…," leading the audience to believe from the storytellers' account that fishing in current times pales in comparison. It is a reasonable approach, as reflection allows us to put today's concerns on hold for a bit – to escape the here and now – in exchange for playing a highlight reel of catches and fishing trips gone by, with all of the legendary big ones that got away.

In reality, today's Inland Fisheries Division has developed a diversity of fishing opportunities within a 10-minute drive or short bus ride for almost every resident of the state. Our mission is to "advance the conservation, enhancement, restoration, use, and appreciation of Connecticut's inland and diadromous (migratory) fisheries and fish habitats." Our programs, financed by the revenue from fishing licenses and Federal Sport Fish Restoration Fund dollars, have supported our mission and the outcomes have created a win-win for people and fish.



COURTESY R. LASS, for DEEP INLAND FISHERIES

Inland recreational fisheries are continually improving. Decades of conservation, preservation, and water quality improvement now provide incredible fishing opportunities in our rivers (above) and lakes (next page).

Getting Started

The Inland Fisheries Division can trace its roots back to May 1866 when the General Assembly, in response to the extirpation of Atlantic salmon from the Connecticut River and the fear that American shad would follow a similar fate, granted the authority to the Governor to create a "Fish Commission." Three commissioners were appointed and charged with: 1) protecting sea fish in the Connecticut River; 2) introducing new species of fish; 3) protecting fish generally in our waters; 4) reporting such facts and suggestions as may be material to the next session of the legislature; and 5) communicating with fish commissioners in other New England states on the restoration of sea fish.

The commissioners took their charge seriously and, within a decade, had implemented a series of fishing regulations on gear type, harvest, and seasons while concurrently stocking millions of American shad and Atlantic salmon fry (recently hatched fish that are capable of feeding on their own) to re-populate waters. Several new species also were stocked to diversify the fisheries (see table of first introductions). These early fish commissioners were fish culturists with an insatiable urge and mandate to

CT DEEP HISTORICAL ARCHIVES (2)

Fish introductions were intended to create a source of food as well as recreation. Some fish types did not become established, while others are now a major part of our inland fish populations.

COURTESY P. FINUCANE, for DEEP INLAND FISHERIES

Just over 500,000 people currently fish Connecticut's waters each year, contributing $446 million to the economy and supporting 6,625 jobs.

experiment with new species, leading to the stocking of a diversity of fishes across the state. Seth Green, S.F Baird, John W. Titicomb, and Reverend William Clift were early leaders in the field, advising fisheries decisions in Connecticut and eventually playing key roles in the formation of the American Fisheries Society (1870) and the U. S. Fish Commission (1871).

Fisheries Created and Restored

With time, our waters became well populated with fish. Previous fish restoration functioned under the assumption that all stocking was beneficial. The commissioners thought if a new species could be introduced into a pond, then better fishing would follow. Information on fish population dynamics was not yet available and, as a result, the feeding habits and amount of forage (food items) available in a waterbody were not considerations. This created waters where multiple game species had to compete for the same prey. Competition among the game species for food often created stunted populations (fish have slow growth rates and do not reach a large size) in many lakes and ponds.

By the 1930s, recreational angling began to gain popularity when many waters were "restored" and "filled" with fish. With this growth came the demand for the commissioners to stock larger, catchable size fish versus small fry and fingerlings. Stocking switched from a "put-grow-and-take model" to a "put-and-take" model. To obtain the larger fish, the state acquired several trout hatcheries and purchased harvestable size warmwater species from commercial fishermen. For approximately 10 years (1920s to 1930s), additional warmwater species were collected by seining public drinking supply reservoirs, which just as today, were generally off limits to the public.

Introduction of Fish Species to Connecticut

Fish Species	First Introduced	Established vs. Self-sustaining
Smallmouth Bass	1860s	Yes
Chinook Salmon	1873	No
Carp	1881	Yes
Rainbow Trout	1884	No
Largemouth Bass	1890s	Yes
Lake Trout	1893	No
Brown Trout	1893	Yes
Walleye	1911	No
Round Whitefish	1920s	No
Kokanee Salmon	1920s	No
Steelhead	1921	No
Bluegill	Unknown	Yes
Calico Bass	1950s	Yes
Sea-run Brown Trout	1950s	Yes
Channel Catfish/White Catfish	1950s	Yes
Northern Pike	1950s	Yes

Fisheries Management As a Science

An increase in awareness of environmental quality in the 1960s and 1970s, coupled with new technologies available to biologists, such as "electrofishing" and computers, changed the way fisheries were managed. With access to new types of data, fisheries could be managed more efficiently by determining the potential of a waterbody, then stocking an appropriate number of fish. In addition, the combination of fisheries population data with harvest data enabled modification of early regulations (minimum sizes, creel limits, and seasons) on a waterbody specific basis.

Today's Inland Fisheries Division staff continue to use the latest tools and science for the collection and analysis of fish population data. These data are used to conserve species, reconnect fish to formerly inaccessible habitat, and enhance recreational angler satisfaction.

Now and into the Future

Just over 500,000 people currently fish Connecticut's waters each year, contributing $446 million to the economy and supporting 6,625 jobs. Connecticut's fisheries will face many challenges over the next 50 years, including an increase in human population and development; shifts in air and water temperatures; and expansion and contraction in the distribution of fish species. The Inland Fisheries Division will continue to provide for high angler satisfaction rates and actively recruit, retain, and reactivate anglers. Effectively managing our inland fisheries and aquatic habitat while serving societal needs will require the continued collaboration between the sporting community, environmental advocates, members of the fishing industry, and policy makers. So, the next time a fish story starts with "back in the day…," keep in mind that the best may be yet to come.

Some of the information for this article was obtained from: *2015. Southwick Associates. Economic Contributions of Recreational Fishing: U.S. Congressional Districts. Produced for the American Sportfishing Association.*

Celebrating a Long History of Fishery Resource Protection

Written by Penny Howell, DEEP Marine Fisheries Division

This year, 2016, will mark the 150th anniversary of the state legislature's establishment of a commission responsible for protecting the state's fisheries. The year will be marked by several special events to commemorate Connecticut's leadership role in natural resource conservation and management. The state agency tasked with supporting and protecting the ecological services provided by Connecticut's natural resources has been given many names over the past 150 years. The original Connecticut Fisheries Commission, established in 1866, was transformed into the Connecticut Board of Fisheries and Game in 1895. It was then enlarged in 1959 to the Department of Agriculture and Natural Resources, and eventually becoming the Bureau of Natural Resources in the Connecticut Department of Environmental Protection (DEP) in 1971 (now known as the Department of Energy & Environmental Protection). The first DEP Commissioner, Dan Lufkin, went on to guide the development of a newly-established federal Environmental Protection Agency (EPA), and, in 2009, former DEP Commissioner Gina McCarthy followed in Lufkin's footsteps to take over as the current EPA Administrator.

Following are a few historical highlights of marine and anadromous resource protection:

1866: The Connecticut Fisheries Commission was tasked with assessing the shad and salmon fisheries in order to rebuild and sustain those valuable fisheries. The commissioners repeatedly reported that fishways were needed on all major rivers and streams, and that "refuse matter from mills and factories" needed to be cleaned up.

1916: A hatchery built in the Noank section of Stonington produced millions of lobster juveniles in summer and billions of winter flounder larvae in winter. The hatchery was totally destroyed in the 1938 Hurricane and rebuilt farther inland in 1940, but fell vacant after World War II.

1946: The Atlantic States Marine Fisheries Commission was formed by all 15 Atlantic coastal states as a governing body to manage state fisheries resources on an interstate level.

1976: The U.S. Congress passed the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson Act), which established rules for stock restoration and sustainability for fish harvested by commercial and recreational fisheries. The Federal Aid in Sport Fish Restoration Act, first established in 1950, was strengthened and expanded.

In the same year, the ongoing Connecticut River Shad Monitoring Program began. This monitoring program involves the collection of juvenile American shad and blueback herring at seven stations on a weekly basis from July through October. The 2015 shad index was the eighth highest in the 38-year time series.

1984: The ongoing Long Island Sound Trawl Survey began. To date, the Survey has identified 108 finfish species in their catches, with two new species observed in 2015. Mid-Atlantic and tropical species are becoming more common as the Sound's water warms.

In the same year, the coast-wide Marine Recreational Fisheries Statistical Survey (MRFSS) began. In 2008, it was revamped as the Marine Recreational Information Program (MRIP).

2011: A world record striped bass was caught in Long Island Sound. Connecticut angler harvest of black seabass exceeded 300,000 fish, one of many mid-Atlantic species increasing in abundance in the Sound.

2014: Juveniles of the coast-wide endangered Atlantic sturgeon were caught during DEEP surveys of the Connecticut River. Genetic testing confirmed that the sturgeon were most likely produced locally in the river. This was the first confirmed reproduction of this species in the Connecticut River since the mid-1800s when the original Fisheries Commission was established!

(Top photo) Robert Huey of Essex holding his shad catch sometime in the 1930s.

PHOTO COUTESY OF ARCADIA PUBLISHING

(Bottom photo) A yearling Atlantic sturgeon captured by CT DEEP researchers in the Connecticut River in May 2014. This fish represents the first evidence of a reproducing population of endangered Atlantic sturgeon in the river in 150 years.

PHOTO: CT DEEP MARINE FISHERIES

Learn more about 150 Years of Natural Resource Conservation at www.ct.gov/deep/NaturalResources150 and www.Facebook.com/CTFishandWildlife.

U.S. Fish and Wildlife Service Proposes New Wildlife Refuge in Connecticut

Agency invites feedback on draft plan and environmental assessment

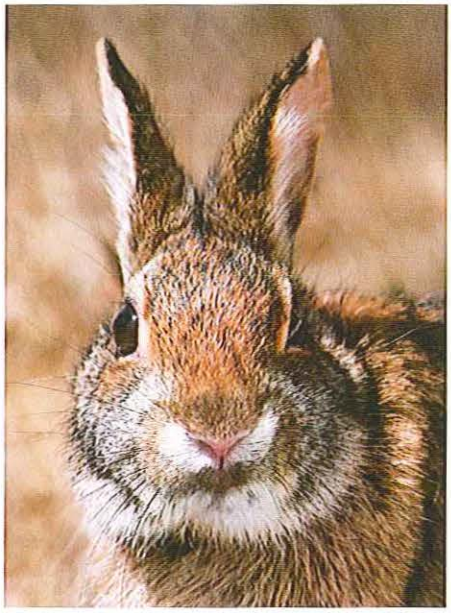
Over the past century, many shrublands and young forests across the Northeast have been cleared for development or have grown into mature forests. As these habitats have disappeared from much of the landscape, the populations of more than 65 songbirds, mammals, reptiles, pollinators, and other wildlife that depend on them have fallen alarmingly.

The U.S. Fish and Wildlife Service, state wildlife agencies, private landowners, and dozens of conservation organizations have responded to this urgency by restoring and protecting shrublands and young forest throughout the landscape of New England and New York. Despite significant progress, conservationists have determined that more permanently protected and managed land is needed to restore wildlife populations and return balance to Northeast woodlands.

To address this need, the Service is proposing to establish Great Thicket National Wildlife Refuge -- dedicated to managing shrubland habitat for wildlife to benefit Connecticut residents and visitors. Through coordination with conservation partners, the Service has determined that areas of southeastern New London and western Litchfield counties could provide important habitat for shrubland wildlife and help connect existing conservation areas. Additionally, the agency identified nine areas in Maine, Massachusetts, New Hampshire, New York, and Rhode Island.

"This exciting region-wide effort will also assist in local conservation work," said Rick Potvin, Refuge Manager of Stewart B. McKinney National Wildlife Refuge. "The Service has worked with the Connecticut Department of Energy and Environmental Protection to focus this proposal where we can best conserve wildlife. If this proposed plan is approved, the option to sell, place a conservation easement or to enter into any habitat agreement with our agency would be totally up to the landowner."

"We've had incredible success in restoring New England's only native rabbit and its habitat. Yet our work is far from done," said Rick Jacobson, New England Cottontail Executive Committee chair and DEEP Wildlife Division Director. "We need to preserve and manage more land as shrublands and young forest to continue to advance conservation for the cottontail. But this isn't just about a rabbit. It's about American woodcock, ruffed grouse, golden-winged warblers, monarch butterflies, and a whole suite of wildlife that depend on this habitat."



New England cottontail

PHOTO BY P. J. FUSCO

Other wildlife that would benefit include box and spotted turtles, whip-poorwill, and blue-winged warblers.

Executive Director Stewart Hudson of Audubon Connecticut noted that the organization's Audubon Center in Sharon could be within the potential focus area. "We look forward to working with the U.S. Fish and Wildlife Service to achieve our common conservation goals on our property, and to protect adjacent parcels through partnerships with local landowners," Hudson said. "Audubon has played a lead role in working with private owners in this area—the creation of Great Thicket Wildlife Refuge by the Service would provide additional tools for working with them to improve habitat for golden-winged warblers, ruffed grouse, and other shrubland species, while also helping protect forest birds, such as wood thrush and scarlet tanagers."

A land protection plan and environmental assessment is an early step in a public process that examines whether the Service can establish a national wildlife refuge. The draft Great Thicket National Wildlife Refuge Land Protection Plan explains the need for land conservation, complements existing conservation activities, and describes each of the 10 focus areas across the six states. At this stage in the process, the Service invites public comment on the draft plan, which will shape the final decision.

If the plan is approved after the public comment period, the agency could begin working with willing and interested landowners in Connecticut to acquire up to 4,000 acres through conservation easements or fee-title acquisition. Current refuge staff would manage all acquired lands within existing resources.

This process would take decades, as the Service works strictly with willing sellers only and depends on funding availability to make purchases. Lands within an acquisition boundary would not become part of the refuge unless their owners sell or donate them to the Service; the boundary has no impact on property use or who an owner can choose to sell to.

Connecticut DEEP and the Service have already partnered with private landowners in the Sharon and Ledyard areas to improve habitat for shrubland and young forest wildlife, including the New England cottontail. The state has also improved habitat in the Pachaug State Forest.

The Service will accept comments through March 4, 2016 by:

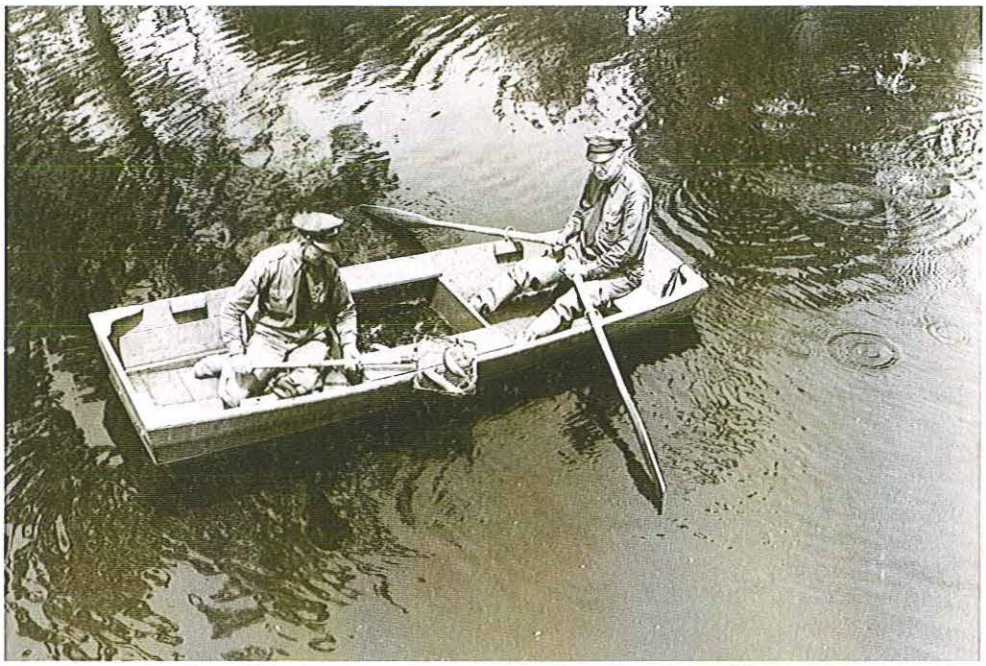
- Email at northeastplanning@fws.gov with "Great Thicket LPP" in the subject line;
- Mail to Beth Goldstein, Natural Resources Planner, U.S. Fish and Wildlife Service, 300 Westgate Center Drive, Hadley, MA; 01035-9589
- Fax to 413-253-8480

The draft plan and all related documents are available at http://www.fws.gov/northeast/refuges/planning/lpp/greatthicketLPP.html.

From "Special Protectors" to EnCon Police Officers

Written by Bill Myers, Retired State Conservation Officer and Curator, CT Conservation Officer's Association Archives

In the mid-1800s, Connecticut's abundant fish and wildlife were beginning to suffer distress and decline due to a variety of reasons. One reason was a lack of regulatory management for the taking, harvesting, and possession of fish and wildlife. To correct this situation, a realization came to be that fish and wildlife needed laws for management and protection. A concerned attitude was developing towards the protection of fish, wildlife, and wildlife habitat. By the mid- to late 1800s, a trend began to emerge to protect fish and wildlife populations in Connecticut, as well as across the entire country.



Deputy Warden Robert White (left) and Deputy Warden Eugene Johnson (right) stocking trout in the Mill River in Hamden, circa 1948, from a wooden stocking boat with a live well.

PHOTO TAKEN BY DEPUTY WARDEN DONALD DEANE

On June 21, 1869, the first bill passed by the Connecticut General assembly became law, which allowed the towns of the state to appoint "Fish Wardens" to apply and enforce fishing regulations protecting the various species of fish. Thus began the era for "Wildlife Law Enforcement and Protection" in Connecticut.

In 1895, legislation was passed to allow the Connecticut Board of Fisheries and Game to appoint "Special Protectors" for state fish and wildlife protection and enforcement. Over many decades, having evolved through numerous titles, functions, and duties, we now have the present "State Environmental Conservation Police," which is part of the DEEP Bureau of Outdoor Recreation. Of all of the various titles given over the years, the title of "Fish and Game Warden" seemed to perpetuate in time, lasting for generations, including today, and is clearly well-liked and understood.

A True Story About Deputy Warden Eugene H. Johnson

Eugene H. Johnson, from East Haven, was born in 1883. He was hired and first served as a part-time "Special Protector" for the State Board of Fisheries and Game before later being appointed on June 1, 1923, as a full-time State Deputy Game Warden. Johnson started work under the old "fee" based system which he remembered with great distaste. Special Protectors were "rewarded" and paid with a fee, based on the number of arrests that were made by wardens.

During Deputy Johnson's early days of employment, no transportation was furnished to Special Game Protectors or Deputy Game Wardens. Much of his patrol was on foot or bicycle, with the occasional use of a bus, trolly, or train. He was in excellent physical condition due to his employment as a farm hand in Guilford and participation in bicycle racing at the Lighthouse Park Race Track in New Haven.

Being an ardent hunter and fisherman, Johnson would combine his patrol with hunting and fishing trips. He owned about 60 acres and a camp at West Lake in Guilford, which served as his headquarters. Deputy Johnson spent a great deal of his time at this camp. He would hike on foot across Connecticut on trips lasting a week or more, staying at camps he knew of, such as the "Coal-Pit-Hut" which was erected by charcoal burners near an old charcoal kiln on Race Hill Road in North Madison. This hut was quite a crude affair made of wood slabs leaning against a stone wall. Another camp he used was located off the West River in Guilford, which consisted of boards taken from a nearby sawmill. During these trips, Johnson lived off the land as much as possible with fish and game, berries, fruit, and an occasional stop at a farmhouse to purchase eggs and raw milk.

Transportation was a problem. The State Game Warden (the supervisor, one for each county) was assigned a car, but deputy wardens were not at this time. The State Warden would pick up his deputy on occasions when extra help was needed, but usually it was up to the deputy warden to get to and from places the best way he could. For example, Deputy Johnson would meet the fish stocking truck in New Haven, and then stock the area brooks in lower New Haven County, ending up on Beacon Hill Brook late in the day on the Naugatuck town line. From this point, the stocking truck would return to the hatchery and Johnson would have to walk into Beacon Falls to take a bus back to New Haven so that he could eventually return to his home in East Haven.

Songbird hunting (which became illegal with the passing of the federal Migratory Bird Treaty Act of 1918) was quite prevalent in the New Haven area at this time, and Deputy Johnson recalled making many arrests for this type of violation.

Deputy Johnson also recalled that while checking two

illegal deer poachers in the East Haven/North Haven area, one of the men shoved a loaded double barrel shotgun into his stomach. Deputy Johnson was able to get out his revolver and a short struggle ensued until he got possession of the shotgun without injury and placed the two poachers under arrest.

Deputy Johnson knew the New Haven/Middlesex County areas better than most. He was well liked and well known by everybody, and had extensive knowledge of the terrain. With decades of experience, he knew where to be at the right place and time.

When Deputy Warden Eugene Johnson retired in 1954 at the age of 71, one of the last "old time" Game Wardens was gone. While countless others have retired since that time, few can boast of the varied experiences Johnson had during his 30 plus years of time with the State Board of Fisheries and Game as a deputy game warden. About this same time, all of the Deputy Wardens changed titles and became known as Conservation Officers, and the old eight district system was changed to a four district system. The duties and responsibilities of the new Conservation Officer were considerably different from that of a Deputy Warden. Speed and diversity were emphasized to fit the needs of an accelerating urbanized society and state. It is quite difficult in today's world to visualize the relatively unhurried way in which Deputy Johnson patrolled as a Special Fish and Game Protector, in a by-gone era that once existed, but is now forever gone.

Edith A. Stoehr: Connecticut's First Female Game Warden

In the "Twentieth Biennial Report of the State Board of Fisheries and Game, for the years 1932-34," Arthur L. Clark, Acting Chief of the Division of Wildlife Restoration, covered the topic of "Women in Sports:"

"To encourage women to take a more active interest in the sport of fishing, a trout stream was leased in North Branford and maintained for their exclusive use in the spring of 1933. Miss Edith A. Stoehr was appointed warden and assigned to the Branford River. In the fall she was assigned to the public shooting ground in Farmington of which a small portion was reserved for the exclusive use of women.
Miss Stoehr was the first woman to be uniformed and appointed to regular active duties as a game warden. She is particularly fitted for these duties which are mostly concerned with offering encouragement and instruction in the sports of fishing and hunting with particular reference to the skillful use of fishing tackle and firearms.
The action by the Board has been met with encouraging response and many women have used these training areas. Since that time, Pennsylvania, New Jersey and other states have adopted a similar program and policy."

Miss Stoehr, who was from South Wethersfield, won the appointment as the first female game warden in Connecticut by winning a fly-casting contest against four other women. Chief Game Warden Joseph Williamson decided that the contest would be the best way to select the new warden after a number of women applied for the job. A section of the Branford River, where Miss Stoehr was assigned, was stocked with trout and a nearby spacious log cabin lodge was built in 1940 to act as the headquarters for the "fisherwomen" who used the area. A clever photo caption from 1941 about the female only trout stream stated "*Remember when men used to be able to get away from women for a spell by going fishing? Well, now women anglers don't want any men around and they can get their wish on the Branford River, reputed to be the only stream of its kind in New England and one of three in the country, where fishing is exclusively for women."

Efforts to encourage women to participate in hunting and fishing were just as ambitious in the 1930s as they are today. Although state hunting and fishing areas for exclusive use by women no longer exist in Connecticut, women have the opportunity to be introduced to hunting and fishing through DEEP's Conservation Education/Firearms Safety (CE/FS) and Connecticut Aquatic Resources Education (CARE) Programs, as well as through the efforts of local sportsmen's clubs and mentoring programs.

The first female game warden in Connecticut was hired in 1933. In 2016, DEEP's Environmental Conservation Police Division currently has seven female officers in the field.

Edith A. Stoehr as she appeared in the casting contest held in the Branford River in 1933 to determine the first female game warden in Connecticut.

Chief Warden A. Joseph Williamson pinning badges on Edith Stoehr (left), Deputy Warden, and Miss Lois Stevens, Assistant Warden, after the two had won a fly-casting contest to determine the holders of the position to supervise and also act as angling instructors for women anglers on a section of the Branford River.

PHOTO COURTESY OF RETIRED CONNECTICUT CONSERVATION OFFICER PAT HAYES

Connecticut's Spirit of the Sound – The Herring Gull

Article and photography by Paul Fusco, DEEP Wildlife Division

Herring gulls are short distance migrants. Some birds will move south for winter, while others move into Connecticut from farther north.

Winter plumage in adults is characterized by dusky dark streaking on the head, nape, and upper breast.

Early on a flat-water morning, with tiny waves lapping at the beach, the herring gull's intrepid call brings alive the stillness as if to be the bearer of reveille for all to start the day. Being a standard year-long fixture along the Connecticut shoreline, the herring gull is one of our state's most familiar birds. Known in vernacular terms as a "seagull," the herring gull would more properly be called a "coast gull," as it is strongly associated with coastal habitat and not so much with the open sea.

Everyone that has been to a Connecticut beach has encountered the opportunistic herring gull. Its diet not only consists of fish, mollusks, and crabs, but at times the bird is known to take handouts from people and also raid picnic lunches. It will scavenge as well.

Description

This large, heavy set, white gull has a light gray mantle (topside of back and wings). The outer primary wing feathers are tipped in black with white spots. In winter, dusky dark spots and streaks are visible on the head and nape. The bill and iris of adults are yellow. During the breeding season, adults have a bright red spot toward the tip of the lower mandible. The legs are flesh colored, although in the breeding season there may be an uncommon occurrence of a bird showing a yellowish tint to the legs.

Herring gulls are four-year gulls, meaning that it takes four years to reach maturity and attain full adult plumage. Immature birds are highly variable and sometimes difficult to identify to species and age in the field. Generally, immature birds have plumage with varying amounts of brown, according to their age, with younger birds having the most brown.

Behavior

Herring gulls are bold and at times aggressive. They have a strong, heavy bill that is used as a weapon in predatory instances to kill prey with a series of stab, grab, and shake actions. The sharp, slightly hooked tip of the bill is used to tear into food.

Herring gulls are predators of nests, eggs, young, and adults of other coastal birds, including plovers, terns, sandpipers, and alcids. In some locations, their impact on breeding bird colonies can be devastating, requiring that management action be taken against the gulls to protect the other usually less common birds.

Well-known for their opportunistic scavenging behavior at landfills and along waterfronts, these gulls will also sometimes follow boats, waiting for garbage or fish scraps to be thrown overboard. When foraging on shellfish, herring gulls will carry their quarry up to a height of 30 or more feet and then drop the mollusk onto a hard surface, such as rocks or a paved road, to break open the shell.

Nesting takes place singly or in loose colonies, mainly on offshore rocks and is-

Herring gulls have a varied diet. Along the shoreline they will consume fish, crabs, mollusks, and as seen above, sea stars. They are also known to prey upon the eggs and young of other coastal birds, including tern, plovers and sandpipers.

lands that offer protection from mammalian predators. The nest is normally a shallow hollow in sand or gravel, or on rocks. It may be built with grasses, seaweed, feathers, and plastic. Two or three bluish, greenish, or grayish eggs spotted with dark brown or black are incubated for about 26 days before they hatch. The young will fledge in six to seven weeks.

Ranging over large expanses of northern North America during the breeding season, these birds will migrate short distances to more milder parts of the continent for winter. Wintering habitat includes coastlines, large lakes and rivers, and landfills.

Vocalizations are varied and include a loud laugh-like "*yucca, yucca yucca*," as well as a softer "*mew, mew*" and also a short "*keeyer.*"

Conservation

Victimized by feather and egg hunters in the late 1800s, the Atlantic Coast population of herring gulls came close to being eliminated. Following bird protection laws that were enacted in the early 1900s, herring gull numbers were able to steadily grow until the late 1960s when the population was found to be in decline. The decline since then has been steep, averaging over three percent per year, resulting in a cumulative decline of approximately 78%, according to North American Breeding Bird Survey data from the National Audubon Society and U.S. Geological Survey. Reasons for the decline are thought to include a combination of the closing of landfills, reduction in offshore commercial fishing operations and their waste, competition with the larger great black-backed gull, nest site competition with cormorants, and possible nest disturbance by humans and pets. Although the population is in decline, herring gulls are still numerous.

The next time you are at the beach on an early summer morning, take a moment to note the raucous call of *kyuk,-kyuk,-kyuk* given by this lively denizen of Connecticut's shoreline, the herring gull.

Above: A first year herring gull with mostly brown plumage.

Below: A transitioning second winter bird.

This herring gull displays its breeding plumage, with a clean, white head and bright red bill spot.

Forest Action Plan Revision Latest Tool for Protecting Connecticut's Forests

Written by Daniel Peracchio, DEEP Division of Forestry

In 2010, the DEEP Division of Forestry completed the Connecticut Forest Resource Assessment and Strategy, now known as the Connecticut Forest Action Plan. This plan was required by the U.S. Forest Service and described and analyzed the current conditions of Connecticut's forests, identified issues and challenges facing these landscapes, and laid out a set of visions for the future of our forests and strategies and action steps to meet these visions. In 2015, the Division of Forestry completed an internal review and revision of the 2010 Forest Action Plan to make sure the plan was relevant and also describe some success stories related to the U.S. Forest Service's national priorities. The Forest Action Plan is a useful tool to try to best manage Connecticut's ever-changing forested landscape.

The last large virgin forest in Connecticut shortly before it was harvested in 1912. Property of Mr. Carrington Phelps in Colebrook, CT.

PHOTO COURTESY OF THE CONNECTICUT AGRICULTURAL EXPERIMENT STATION ARCHIVES

Looking Back

Once trees returned after the retreat of the glaciers, Connecticut was almost entirely forested until the arrival of European settlers. These settlers slowly began clearing the forests for wood products and establishing small farms and homesteads. As the state's population increased, the amount of forest clearing greatly accelerated to the point that Connecticut was only about 25 percent forested by about 1820. This landscape looked much different than the Connecticut of today. Large virgin forests were few and mostly in hard to reach places, and forest-dwelling wildlife populations had dropped dramatically.

Forests began to retake the land in the mid- to late 1800s as agricultural land was abandoned for more productive land to the west. As forests became more prominent in the landscape, many in Connecticut saw a need for research, education, conservation, and management to protect this burgeoning new resource from degradation. In the 1860s, the State Board of Agriculture started discussing forestry topics. Early forestry research got underway when the Connecticut Agricultural Experiment Station was founded in 1875, the first of its kind in the nation. Around the turn of the century, several other important events occurred, such as the establishment of the Connecticut Forest and Park Association (1895), Yale School of Forestry (1900), State Forester position (1901), original Tree Warden Law, first state forest (1903), first forest fire law (1905), 10 Mill Tax Law (1913), and original Arborist Licensing Law (1919), which encourages proper forestry techniques and forest protection, as well as educates the public about the importance of forestland.

Throughout the 20th century, many challenges arose that threatened the character of Connecticut's forests. Fires, diseases, insects, storms, poor harvesting techniques, and conversion to non-forest all required some sort of planning response so that Connecticut's forests could remain abundant and healthy. Throughout this time, what is now the Division of Forestry and its partners have been working to protect this great resource through education and outreach, laws, conservation, and on-the-ground work.

The Forest Action Plan is the latest tool to engage stakeholders and provide a vision and direction for managing Connecticut's forest resources in the short and long-term. The five-year review and the next major update, which will be completed in 2020, are important steps to make sure we are best using limited resources to manage, conserve, and protect the forested landscape. Connecticut is currently about 55 percent forested, much of which is under threat of development, and planning and coordination with partners and stakeholders is needed to retain as much of that forest as possible.

More information on the plan can be found at www.ct.gov/deep/ForestActionPlan.

Got Wood?

Article and photos by Jerry Milne, DEEP Division of Forestry

The Connecticut Grown Program for Forest Products now includes heat-treated firewood from Back to Basics, a company located on Main Street in Terryville. Owner Dave Perugini began using a kiln to treat firewood in June 2015, and has seen a steady increase in demand. He purchases truckloads of 20-foot long logs harvested from sustainably managed forests in Connecticut, and then cuts and splits the logs to firewood size. The pieces are dropped into metal bins that hold a half cord. Twelve bins (six cords total) are placed in the kiln and heat treated for 48 hours. The core temperature of the wood reaches 200 degrees F, well beyond the U.S. Department of Agriculture recommendation of 160 degrees F for 75 minutes.

"The heat treatment kills all insects, including invasive exotics such as emerald ash borer and Asian longhorned beetle," said Perugini.

Moving firewood from one location to another is the main reason why invasive insects have spread so quickly around the country. Unlike "seasoned wood," for which there is no standard measurement, Perugini can document how long his wood has been treated with computer printouts for each batch. Because the wood is dried to a low moisture content, it can be burned immediately.

"We can deliver one cord of firewood at a time, which is convenient for customers because they don't need a lot of room in their yard to store wood," continued Perugini. "We also sell shrink wrapped packages of one cubic foot at our store."

By law in Connecticut, firewood can only be sold by the cord (128 cubic feet) or fraction of a cord, unless packaged in quantities of less than 1/8 cord (16 cubic feet), as regulated by the Department of Consumer Protection (www.ct.gov/dcp).

In 2011, the Connecticut Grown Program added forest products to the more traditional list of agricultural goods, such as fruits and vegetables. "I have to keep records of where the wood I buy is coming from to qualify for the program," said Perugini. A list of businesses in the Connecticut Grown Program for Forest Products, including contact information for Back to Basics, can be found at www.ct.gov/deep/forestry.

(Above) The processor cuts and splits logs to 16-inch lengths. (Bottom) Bins of firewood ready for heat treating in the kiln.

The heat treatment kills all insects, including invasive exotics such as emerald ash borer and Asian longhorned beetle.

New Projects Funded by Income Tax Check-off Program

Connecticut residents who are passionate about wildlife and the state's natural area preserves have a great opportunity to support those programs through the Endangered Species/Wildlife Income Tax Check-off Fund. The tax check-off program is an important way for state taxpayers to donate a portion of their tax refund to directly benefit endangered and threatened wildlife, other nongame wildlife, natural area preserves, and watchable wildlife.

Since the fund's inception in 1993, donations have helped finance habitat restoration, species monitoring, public outreach, construction of wildlife viewing areas, and a variety of other activities. Following are short descriptions of projects that will be conducted in 2016 and are partially or totally funded through the Connecticut Endangered Species/Wildlife Income Tax Check-off Fund.

N. DEBARROS, NATURAL DIVERSITY DATABASE PROGRAM (3)

(Left) Brown bog sedge (*Carex buxbaumii*) is an endangered denizen of fens and wet meadows. (Right) Once more common, yellow-fringed orchid (*Platanthera ciliaris*) is threatened by development, natural succession, and invasive species.

State-Listed Plant Field Work

Connecticut's Endangered, Threatened and Special Concern Species List includes 331 plants. Botanical field work will be conducted with emphasis on locating new populations of state-listed plant species and updating known locations of priority species. All populations of state-listed plant species that are found during the field work will be documented with photos and reporting forms, and submitted to DEEP's Natural Diversity Data Base. This information is critically important to the process of updating the state Endangered Species List. It also is used in the evaluation of property reviews for state land acquisition and in the environmental permit review process.

Monitoring Ospreys Using Citizen Science

After experiencing historic lows in the early 1970s, Connecticut's osprey population has made a dramatic comeback following the ban of the pesticide DDT. The number of nests has increased into the hundreds across the state. Documenting and monitoring these nests would be impossible without the help of volunteer nest monitors and *Osprey Nation*, a citizen science project launched by the Connecticut Audubon Society in partnership with the DEEP Wildlife Division in 2014 to catalog and collect information about the state's nesting ospreys. This project will provide resources to continue to coordinate volunteers and compile observations.

Stream Salamanders Living within Exurban Watersheds*

Small mammals, amphibians, and many other kinds of wildlife that live in woodlands are often displaced or experience high mortality rates when those areas are developed for new homes. Over time, the forest regrows and populations may rebound; however, habitat quality may slowly decline. This project examines the impacts of these habitat changes and the ability of stream salamanders to persist over time. Information obtained from this project will help with future management and land-use decisions.

Bog rosemary (*Andromeda polifolia*) can be found in bogs or fens associated with lakes.

** Exurban is a semirural region lying just beyond the suburbs of a city.*

Connecticut's nesting ospreys are monitored with the help of a citizen science project known as Osprey Nation.

PHOTO BY P. J. FUSCO

Installation of Monofilament Fishing Line Receptacles

In 2008, tax check-off funding was used by DEEP to construct and install monofilament fishing line recycling receptacles at several popular fishing locations and boat launches. Since then, monofilament line has been recovered from every receptacle by volunteer monitors and the waste line was sent to a company for recycling. The success of these receptacles prompted a number of conservation groups to put up and monitor their own at additional areas. DEEP continues to receive inquiries about putting up more receptacles, so this project is an extension of the original effort. To continue to heighten public awareness about the negative impacts of fishing line debris on aquatic life, especially birds (gulls, osprey, etc.), this project will provide educational signs detailing these hazards and more receptacles to lessen the amount of waste line that enters the environment. The receptacles will be installed at select boat launches and fishing areas where stewards and volunteers are able to monitor and maintain them. Line will be disposed of by shipping it to a recycling center.

P. J. FUSCO

Two-lined salamanders are a common stream species that may be at risk from development.

Conservation and Stewardship of State Endangered and Threatened Species

Connecticut's Endangered, Threatened and Special Concern Species List includes large, charismatic animals like the bald eagle and more elusive ones like the timber rattlesnake, both of which can engage public interest. However, because the bald eagle and timber rattlesnake are sensitive to human disturbance, this interest sometimes leads to intrusion at nest and den sites that can be detrimental to the conservation and recovery of these listed species. This project will involve the use of video and still photos to help limit illegal collection of rattlesnakes and disturbances to both bald eagles and rattlesnakes. Cameras will be installed at certain bald eagle nests and rattlesnake dens so that DEEP staff can monitor and evaluate the degree of any threats, enforce laws, and engage public outreach. Footage obtained from the cameras will be shared with the public so that they can safely watch the animals without causing disturbance. It is anticipated that being able to observe bald eagles and rattlesnakes up-close through photos and video will foster a sense of stewardship critical to wildlife conservation.

Assessment of Heavy Metal and Organic Contaminants in Snapping Turtles

Snapping turtles are a long-lived and poorly understood species in Connecticut. Heavy metal and organic contaminants that build up over time in these aquatic turtles can have dramatic effects on their reproductive success. This study will provide a better understanding of the current types and amounts of contaminants in snapping turtles and also help biologists understand the biological effects of these contaminants in wildlife populations. Information from the study will be essential to ensuring that this iconic reptile remains part of Connecticut's wildlife heritage.

You Can Make a Difference

Connecticut residents have a unique opportunity to make a difference for our state's wildlife and natural area preserves by donating to the Endangered Species/Wildlife Income Tax Check-off Fund, thus supporting important projects and research. To contribute, residents can choose one of the following options:

- Donate when submitting your 2015 Connecticut Income Tax Return; or
- Contribute directly by sending a check payable to DEEP Endangered Species/Wildlife Fund to DEEP Bureau of Financial Support Services, 79 Elm Street, Hartford, CT 06106-5127

Thank you for your support!

Using waste receptacles like the one above can help prevent situations where wildlife become entangled and die, as seen in the photo on the right of an osprey in Old Lyme.

PHOTOS: ABOVE: P. FUSCO, RIGHT: COURTESY H. GOLET

THEN and NOW

(Left) During the 1950s through the 1970s, many anglers measured their success on the traditional opening day by being able to harvest their "daily limit." Beginning in the 1980s and still growing in popularity today, many anglers now favor "catch and release." While eating a healthy meal of freshly caught fish is still very popular, many anglers prefer to release their catch unharmed.

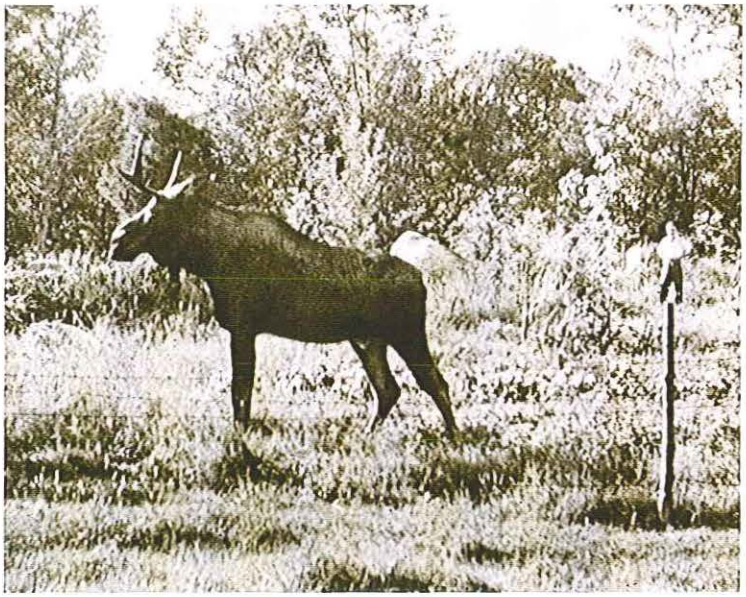
(Right) The future of our sport lies with our youth. In recent years, the number of people participating in fishing has been steadily increasing, reversing the continual decrease experienced over the past 20 years. The Bureau of Natural Resources is proud to offer free "learn to fish" classes, our youth fishing passport, a 50% reduction in license fees for 16-17 year olds, and electronic distribution of fish-related information via newsletters and social media. Today's anglers still seek the thrill of the catch. Help us to grow the sport that we all enjoy so much – take someone fishing!

P. J. FUSCO

The first recorded release of ring-necked pheasants for the purpose of hunting was in 1908 when 88 birds were released in Windsor Locks. Pheasants, which could be produced on game farms, were brought into Connecticut to reduce hunting pressure on native gamebirds, which were declining due to population cycles and changing land uses. During the early days of pheasant stocking, helicopters were occasionally used to release pheasants at hunting areas.

Today's pheasant program focuses on the release of adult birds by DEEP Wildlife Division staff during the fall hunting season and is funded through the sale of pheasant stamps and hunting licenses. No helicopters are used in the process!

Pheasant liberation by helicopter in Suffield, October,1949. Photo by D. N. Deane



On September 15, 1956, Victor Piecyk took the first photograph ever of a moose in Connecticut. The moose was observed on his farm along Route 44 in Warrenville (Ashford). Although moose had been seen in the state before that time, none of the moose had been photographed. Therefore, the Connecticut Board of Fisheries and Game considered this the first official record of moose in Connecticut. The Board passed an emergency regulation on September 18, 1956, that gave full protection to moose. Unfortunately, this protection did not extend to the Warrenville moose which was reportedly shot on September 17, two days after being photographed. The next time a moose was observed in the state was in October 1964.

It is unclear whether moose were ever native to Connecticut. If moose did exist here during colonial times, they occurred in small numbers because Connecticut is at the southern fringe of their range. In 1935, George Gilbert Goodwin wrote in *The Mammals of Connecticut*: "The moose, if ever native to Connecticut, has long since disappeared from within the limits of this state."

During the 1980s and 1990s, moose populations in Maine, Vermont, and New Hampshire increased dramatically because of favorable habitat conditions and limited hunting. This resulted in a southerly expansion of New England moose populations and an increased frequency of dispersing moose wandering into Connecticut. Evidence of a resident, breeding moose population in our state was first documented in 1998. Today, the Wildlife Division estimates that population has grown to approximately 100 moose, mainly in extreme northern Connecticut. Biologists have been studying the distribution of moose in Connecticut, as well as whether or not the conditions and habitat in the state can support an increasing moose population. (The moose in the photo on the right was immobilized and fitted with a radio collar for the research.)

Electrofishing is a common, efficient, and non-lethal tool biologists use to collect fish from a waterbody. A controlled amount of electricity momentarily stuns the fish that are within the electric field. Biologists often only have a few seconds to net fish before it swims away. Once netted, biologists identify the species, collect measurements, take a sample of scales or fin clip, and safely return the fish unharmed.

The photo on the left represents the early days of the technology. Advances in electrical circuitry enabled biologists to safely control the use of electricity to collect fish. Connecticut was one of the early leaders in developing the science. Robert Jones, a leading fisheries biologist, led this Northeast Electrofishing Clinic in Lakeville in 1961.

Today's fisheries staff uses a combination of portable electrofishing equipment (right) and specially designed boats to sample fish populations. The data generated from electrofishing surveys are used in a variety of ways, such as determining species occurrence and abundance, population structure, the distribution of species, genetic relationships, and growth rates.

FROM THE FIELD

CT's Wildlife Action Plan Approved by the U.S. Fish and Wildlife Service

DEEP recently received federal approval of Connecticut's revised Wildlife Action Plan (WAP) – the blueprint for proactively conserving our fish and wildlife, including their habitats, for the next decade. The approval of the WAP by the U.S. Fish and Wildlife Service builds on the knowledge gained over the last 10 years through implementation of the first Plan and establishes a framework for collaborative conservation efforts by many partners at local, statewide, and landscape scales. Approval of the plan also allows Connecticut to remain eligible to receive federal funding through the State Wildlife Grants Program for wildlife management and conservation projects.

The WAP revision was completed by DEEP with the assistance of numerous scientific experts and conservation organizations throughout Connecticut. During development of the WAP, scientific experts and stakeholders reviewed the best available scientific information on the status of wildlife species and identified those species with the greatest conservation need. The strategy identifies 469 species of "Greatest Conservation Need," including 28 mammals, 95 birds, 31 reptiles and amphibians, 73 fish, and 242 invertebrates.

Conservation actions to address threats to Connecticut's wildlife will be coordinated with key partners, including the U.S. Fish and Wildlife Service, U.S. Forest Service, Natural Resources Conservation Service, U.S. Army Corps of Engineers, Office of Policy and Management, The Nature Conservancy, Partners In Flight, Connecticut Audubon Society, Audubon Connecticut, Connecticut Forest and Park Association, many sportsmen's and conservation organizations, tribal groups, watershed groups, land trusts, private landowners, and many others.

P. J. FUSCO

Since 2001, Connecticut has received more than $8.5 million in federal funds under the State Wildlife Grants program. These funds – along with money allocated by the state, and dollars raised through the sale of a special wildlife license plate and a state income tax check-off – have been used to support programs aimed at protecting declining species. To maintain eligibility for the federal wildlife grants, all of the states, U.S. territories, and the District of Columbia were required by Congress to develop and obtain U.S. Fish and Wildlife Service approval of a comprehensive wildlife conservation plan.

Connecticut's Wildlife Action Plan can be viewed on the DEEP's web site at: www.ct.gov/deep/WildlifeActionPlan.

DEEP Chimney Watch Monitoring Translates to IBA Designation

Based on the past five years of CT DEEP organized chimney swift roost inventory and monitoring, Audubon Connecticut has designated chimneys of Mitchell Elementary School and Woodbury Middle School, both in Woodbury and part of Regional School District 14, as Important Bird Areas (IBA) for chimney swifts. The chimney swift has been identified by the International Union for the Conservation of Nature as near threatened. Chimney swifts are aerial insectivores that are most known for their amazing flight demonstrations when they gather in enormous flocks around large chimneys during migration. Chimneys are used as night-time roosts. The Mitchell Elementary School chimney hosts 100 or more swifts during summer, while the Woodbury Middle School chimney serves as a major fall migration roost with close to 800 birds observed on one occasion. Known as the "Woodbury chimney swift roost," both of these schools and the surrounding area have also been designated as a globally Important Bird Area.

According to Corrie Folsom-O'Keefe, Audubon Connecticut Important Bird Areas Program Coordinator, by recognizing this area as an IBA, awareness about chimney swifts will increase among Regional School District 14 students, parents, and teachers. Increased awareness leads to good stewardship and conservation. Audubon Connecticut is organizing a June event so that students and their families can watch these amazing birds as they swirl into the chimneys at the schools.

Chimney swifts have been declining since the 1960s possibly because of a shift in diet that coincided with the use of the pesticide DDT (DDT was banned nationwide in 1972) and increased threats to migratory and wintering grounds.

The Woodbury chimney swift roost is the 28th addition to Audubon Connecticut's Important Bird Areas inventory, but the first focused on chimney swift conservation. The IBA program is a voluntary, non-regulatory global effort coordinated in the United States by the National Audubon Society. More details about IBAs can be found at www.audubon.org/bird/iba/index.html.

The overall goal of Audubon Connecticut's IBA program is to identify a network of key areas in the state that support sustainable populations of birds in greatest need of conservation. For official recognition as an IBA, the site must meet one or more of a set of standardized scientific criteria that were developed by a committee of bird experts from throughout the state. Once an area is identified as an IBA, Audubon Connecticut works with local residents and other conservation partners to increase awareness about birds and the importance of the area to greatest conservation need species, improve habitat in the area, and find funding to support these efforts.

How can you help chimney swifts?
If you have nesting swifts nearby, keep residential chimneys open for nesting. The birds pose no health risk and eat a third of their body weight in insects each day! When landscaping your yard, choose native species, and avoid pesticide use. You will promote a better balance of native invertebrate food for the birds. Also, identify and protect important roosting areas, such as the roost sites in Woodbury. Roost sites provide a place where swifts can rest and conserve enough energy to finish their 3,000 mile trip to the Amazon Basin every year. Best of all, it is quite entertaining to watch dozens of swifts swirl through the sky as they enter roosting chimneys.

Learn more about DEEP chimney swift research at www.ct.gov/deep/chimneyswift.

2016-17 Migratory Bird Hunting Season Frameworks Proposed Earlier this Year

As a result of steady or improving population numbers, the U.S. Fish and Wildlife Service (USFWS) recently announced it is proposing continued liberal game bird season lengths and bag limits for the 2016-17 hunting seasons.

Each year, the USFWS works in partnership with states from four Flyway Councils (Pacific, Central, Mississippi, and Atlantic) to establish regulatory frameworks for hunting season lengths, dates, and bag limits. States select their individual seasons from within the federal frameworks.

The USFWS recently implemented a streamlined process for setting annual migratory game bird hunting seasons and bag limits. Beginning with the 2016-2017 hunting seasons, the previous two-cycle regulatory practice is now compressed into a single, annual process. Biological data from the past year are now used to set hunting season dates and project appropriate harvest limits for each game species. The change gives biologists more time to analyze bird survey data that inform the USFWS's regulatory decisions and gives the public more time to weigh in on proposed rules. The change will also ensure administrative procedures do not delay the opening of state hunting seasons.

The 2016-2017 federal frameworks propose duck hunting season lengths of 60 days in the Atlantic Flyway, which includes Connecticut. Proposed regulations for geese also are largely unchanged from 2015-2016 seasons, and in several cases are very liberal in an attempt to reduce the abundance of geese (e.g., resident Canada geese).

Although most migratory game bird populations remain abundant, when and where birds will be encountered depends on many factors. Food availability, habitat and weather conditions, and other factors all influence local bird abundance, distribution, behavior, and ultimately, hunter success. The USFWS's reports on the status and harvest of migratory game bird populations and information about migratory bird management across North America are available at www.fws.gov/birds/surveys-and-data/reports-and-publications/population-status.php.

P. J. FUSCO

Every year, DEEP holds a public meeting to provide interested parties an opportunity to comment on the proposed hunting season regulations for the upcoming migratory bird seasons. In past years, the meeting was typically held in late July or early August. With the new process for setting migratory bird season frameworks, the meeting will be held earlier this year – it is scheduled for Friday, April 1, 2016, from 6:00 PM-8:00 PM at the upstairs conference room at Cabela's (475 East Hartford Blvd. N, East Hartford). During the meeting, DEEP will present their proposed regulations and take all public comment. Final hunting season dates will be formulated shortly after the comments are compiled and evaluated. Hunters are reminded that DEEP takes comments on the migratory bird hunting regulations year round. However, the April 2016 meeting serves to finalize the regulations and is being held just prior to when DEEP will make its final season selections to the USFWS.

Wild Turkey Hunting Safety Seminars

Two Wild Turkey Hunting Safety Seminars are scheduled for Saturday, April 2, and Saturday, April 24, 2016. These annual events are coordinated by the DEEP Wildlife Division's Conservation Education/Firearms Safety (CE/FS) Program and the public is invited to attend. Both seminars are offered free-of-charge.

Both experienced and first-time turkey hunters stand to benefit from attending one of these seminars which provide "A-Z" hunting information, including safe hunting practices, specialized equipment, calls and decoys, site setup, and other strategies for harvesting turkeys. The seminars have valuable information for every participant. A Wildlife Division biologist will also present information about wild turkey biology, population trends, and management history in Connecticut.

Participants will have an opportunity to pattern their shotguns for turkey hunting following classroom instruction. Those who wish to do so must bring the shotgun they intend to use during the upcoming spring turkey hunting season, ammunition and a shotgun choke appropriate for turkey hunting, and eye and ear protection.

Interested individuals **are required to register** for one of these seminars by calling the DEEP Wildlife Division at 860-424-3015, Monday through Friday, from 8:30 AM to 4:30 PM.

- **April 2**; 8:00 AM to 2:00 PM, at the Fairfield County Fish and Game Protective Association, 310 Hammertown Road, in Monroe.
- **April 24**; 8:30 AM to 12:30 PM, at the DEEP Wildlife Division's Franklin Wildlife Management Area, 391 Route 32, in North Franklin.

2016 Spring Turkey Junior Hunter Training Days: April 16-23

Regulations designate certain days for youth hunting in Connecticut. On these days, licensed junior hunters (12 to 15 years of age) may hunt when accompanied by a licensed adult hunter 18 years of age or older. The adult mentor may not carry a firearm and, at all times, must remain within physical contact in a position to provide direct supervision and instruction. These training days provide junior hunters with an opportunity to learn safe and effective hunting practices from experienced hunters.

SPRING TURKEY - SATURDAY, APRIL 16 through SATURDAY, APRIL 23 (excluding Sunday)

Private Land: Licensed junior hunter must have a valid spring season private land turkey permit and written consent from landowner. Adult mentor must have a valid spring season turkey permit and written consent from the landowner. Adult mentor may assist in calling turkeys.

State Land: Licensed junior hunter must have a spring season state land turkey permit. Adult mentor must have a valid spring season turkey permit. Adult mentor may assist in calling turkeys.

Hunting hours for Junior Hunter Training Days only: 1/2 hour before sunrise to 5:00 PM. Harvested turkeys must be tagged and reported.

Learn more about Junior Hunter Training Day opportunities on the DEEP website at www.ct.gov/deep/juniorhunter.

Frank Shaw Retires from State Service After 28 Years

Written by Roger Wolfe, DEEP Wildlife Division

On October 1, 2015, DEEP's Wildlife Division and Engineering and Field Support Services Division announced the retirement of Francis (Frank) Shaw after 28 years of state service. A native of Madison, Frank and his family have a long history of living and working along the shoreline. He and his brothers used to help their grandfather farm salt hay on some of the marshes that today make up Hammonasset Beach State Park. Coincidentally, Frank's brother Dan retired from DEEP as a Mosquito Control Specialist in 2009.

R. WOLFE

Frank Shaw holds a proclamation from Governor Dannel Malloy thanking him for his 28 years of state service.

Frank started his career with the state as a Mosquito Control Specialist in 1987 when the Mosquito Control Unit was part of the state Health Department. During this time, Frank performed field inspections for mosquitoes in coastal marshes from the Rhode Island border to the Connecticut River and applied larvacides and adulticides to those communities when mosquito numbers were high. The crews also deployed and maintained light traps for adult mosquito surveillance and followed up on mosquito complaints that came into the office. In addition, they maintained many of the ditches, drainage ways, and water control structures along the coast to ensure tidal circulation and prevent flooding and stagnation of water which could produce mosquitoes. Much of this was done by hand, but specialized low ground pressure equipment that could traverse the soft marsh soils also was used.

During a budget crisis in late 1991, Frank and the rest of the Mosquito Control Unit were temporarily laid off; they were rehired in January 1992. However, it remained a rocky time for the Unit, and for state government as a whole, because during 1992, the Mosquito Control Unit was removed from the state budget and the entire crew was to be laid off on June 30. Fortunately, a number of visionary people in the DEP Office of Long Island Sound Programs and the Bureau of Natural Resources were able to seize this opportunity to gain an experienced crew and the specialized equipment necessary to perform wetland restoration on Connecticut's tidal marshes. On July 1, 1992, the Mosquito Control Unit of the state Health Department was transferred to the DEP Bureau of Support Services as a Wetland Restoration Unit under the supervision of Paul Capotosto. Later, with the retirement of Ed (Buzz) Spencer in 1998, Frank was promoted to Wetland Restoration Supervisor. The new unit did not perform operational mosquito control per se, yet worked on coastal wetland restoration projects, including culvert replacement and tidal flow restoration, wildlife habitat enhancement, and control of common reed (*Phragmites*). Much of the funding for this unit came from grants and non-state funds.

Although this wetland restoration program flourished and gained national notoriety, with no state-organized mosquito control program in place, mosquito populations went essentially unchecked for the next four years. In summer 1996, high levels of Eastern equine encephalitis (EEE) virus were detected by the Connecticut Agricultural Experiment Station in mosquitoes in southeastern Connecticut, resulting in the aerial application of pesticides to several towns in that part of the state. The following year, Public Act 97-289 was passed which appropriated general funds to recreate a Mosquito Management Unit in the DEEP Wildlife Division. The Unit was then blended with the Wetland Restoration Unit of DEEP's Bureau of Support Services to create the Wetland Habitat and Mosquito Management (WHAMM) Program, which still exists today.

Although Frank supervised employees in both units on a day-to-day basis, he was often pulled in two directions, being called on to do tasks from both the Wildlife Division and Field Support Services Division. Despite the changes throughout his career, Frank's dedication and work ethic remained steadfast and his local knowledge and experience in Connecticut's tidal marshes were often called upon to help make wetland restoration and mosquito management decisions. In 2000, this knowledge and experience earned him the Northeastern Mosquito Control Association's David Scott Memorial Award. Frank Shaw's 28 years of experience, knowledge of local coastal history, and connections with landowners have been an invaluable asset to the DEEP's WHAMM Program, and he will be missed.

Conservation Calendar

Dec-March ..... **Observe eagles at Shepaug Hydro Eagle View in Southbury** – The Eagle View is open on Wednesdays, Saturdays, and Sundays from late December through mid-March, from 9:00 AM-1:00 PM. To schedule a free visit, go to http://reservations.shepaugeagles.com or call 1-800-368-8954.

January-April ..... Donate to the Endangered Species/Wildlife Income Tax Check-off Fund on your 2015 Connecticut Income Tax form. Learn more on page 16 and at www.ct.gov/deep/EndangeredSpecies.

April 3 ..... The Friends of American Legion and Peoples State Forests (FALPS) is sponsoring a program by DEEP Inland Fisheries Biologist Edward Machowski about the **"History of Fisheries Projects in Connecticut."** The presentation will be held from 1:00 PM-2:30 PM at the Barkhamsted Senior Center, 109 West River Road, Barkhamsted. The program is FREE and no registration is required. Everyone is welcome to attend. For questions, please refer to the FALPS Facebook page (www.Facebook.com/ctfalps), call 860-882-9632, or email ctfalps@gmail.com.

May 7 ..... Free Fishing Day and No Child Left Inside: Great Park Pursuit and CARE Family Fishing Day at Stratton Brook State Park, in Simsbury. More details can be found at www.ct.gov/ncli.

Fishing and Hunting Season Dates

April 9 ..... Opening Day of Trout Season; 6:00 AM

April 16-23 ..... Junior Spring Turkey Hunter Training Days (excluding Sunday)

April 27- May 28 ..... Spring Turkey Hunting Season

May 7 ..... Statewide Free Fishing Day (no license needed)

June 19 ..... First Free Fishing License Day (free 1-day license is needed and is available starting 3 weeks prior to the event at www.ct.gov/deep/sportsmenlicensing).

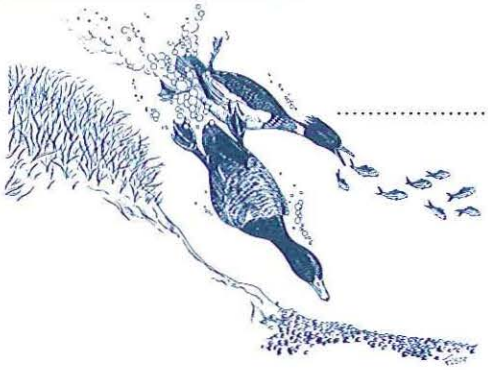
Consult the 2016 Connecticut Hunting & Trapping Guide and the 2016 Connecticut Angler's Guide (available by mid-March) for specific season dates and details. Printed guides can be found at DEEP facilities, town halls, bait and tackle shops, and outdoor equipment stores. Guides also are available on the DEEP website (www.ct.gov/deep/hunting; www.ct.gov/deep/fishing). Go to www.ct.gov/deep/sportsmenlicensing to purchase Connecticut hunting, trapping, and fishing licenses, as well as required deer, turkey, and migratory bird permits and stamps. The system accepts payment by VISA or MasterCard.

Follow the 150th Anniversary of the DEEP Bureau of Natural Resources at www.ct.gov/deep/NaturalResources150 and on our Facebook page at www.Facebook.com/CTFishandWildlife. Check out our historical timeline, learn about upcoming events, and view a video that highlights the history of natural resources in Connecticut from the 1600s to present day.

Find us on Facebook

www.facebook.com/CTFishandWildlife

Connecticut Wildlife



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CT DEEP HISTORICAL ARCHIVES

Although coyotes had been observed in Connecticut since the 1950s, this coyote was the first official one documented in the state when it was killed in 1963 near the Kensington State Fish Hatchery in Kensington. Look for a more detailed story about the first coyote in a future issue of *Connecticut Wildlife*.

US Army Corps
of Engineers ®
New England District
696 Virginia Road
Concord, MA 01742-2751

PUBLIC NOTICE

60-DAY PUBLIC NOTICE

Date: March 8, 2016
Comment Due Date: May 8, 2016
E-mail: diane.m.ray@usace.army.mil

PROPOSED REPLACEMENT AND REVISION OF THE DEPARTMENT OF THE ARMY CONNECTICUT GENERAL PERMIT (GP)

The New England District, U.S. Army Corps of Engineers, 696 Virginia Road, Concord, MA 01742-2751 hereby proposes to replace and revise the statewide Connecticut General Permit (GP), pursuant to 33 CFR Part 325.5(c) (1) with a series of multiple GPs covering activity-specific categories. The revised GPs will continue to authorize activities in waters of the United States within the State of Connecticut and Lands Located within the exterior boundaries of an Indian Reservation with minimal individual and cumulative adverse environmental impacts.

The existing GP expires on July 15, 2016 and we propose to reissue the GPs for another five years prior to that date. The revised GPs will continue the expedited review process for activities in Corps jurisdiction under Section 404 of the Clean Water Act, Section 10 of the Rivers and Harbors Act of 1899, and Section 103 of the Marine Protection, Research and Sanctuaries Act.

General Permits are used as a way to streamline state and Federal regulatory programs. The New England District has already had success with streamlining these programs with the use of GPs throughout New England. This public notice is being issued in accordance with 33 CFR 325.3(b) to coordinate reissuance of the GPs with Federal resource agencies, state agencies and the public.

The revised GP organizes eligible work into twenty-two (22) activity-specific categories. This was intended to satisfy the requirements of Section 404(e) of the Clean Water Act, which allows the Corps to issue general permits for activities that are similar in nature and will cause only minimal individual and cumulative adverse environmental effects. Identifying specific activities allows the Corps to adequately assess cumulative impacts of permitted activities, as well as fully assess impacts on threatened and endangered species. The proposed GPs retain the function and utility of the existing Connecticut GP and are not expected to result in significant substantive changes to how activities in waters of the U.S. are regulated in the State of Connecticut.

All GP authorizations would be subject to the applicability requirements, procedures, and conditions contained in the GP documentation. Project eligibility under these GPs will fall into two Categories as more fully described in Appendix A - General Permits. Individual GP authorizations are not valid until all other required Federal, state and local permits and/or certifications are obtained.

Projects with minimal individual and cumulative effects on the aquatic environment will be approved administratively under these GPs. Representatives of the Corps, state agencies and the Federal resource agencies (U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency, and National Marine Fisheries Service) will continue to review those activities requiring a Pre-Discharge Notification to the Corps as outlined within the GPs. Projects that do not meet the terms and conditions of the GPs, including those that have the potential for more than minimal effects, will require an Individual Permit. The Individual Permit review process is detailed at 33 CFR 325, Processing of Department of the Army Permits. Reissuance of the GPs will not alter the Individual Permit review procedures, or Federal exemptions, which are not necessarily the same as the State of Connecticut's exemptions.

Essential Fish Habitat

In 1996, the Magnuson-Stevens Fishery Conservation and Management Act was amended to require the Federal fishery management councils (Councils) to designate Essential Fish Habitat (EFH) for all Federally-managed fish species. Essential Fish Habitat is broadly defined as those waters and substrates necessary to fish for spawning, feeding, breeding, and growth to maturity. Section 305 (b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act requires that Federal agencies proposing to authorize, fund, or to undertake actions which may adversely affect EFH consult with National Marine Fisheries Service (NMFS) regarding the action. Accordingly, the Corps has and continues to consult with NMFS regarding the actions permitted under the GP. For certain types of actions that will likely result in no more than minimal adverse effects to EFH individually and cumulatively, NMFS may issue a statement of General Concurrence in accordance with the requirements of 50 CFR 600.920(f).

Water Quality Certification (WQC) and Coastal Zone Management (CZM) Consistency

The Corps is simultaneously requesting that the Connecticut Department of Energy & Environmental Protection (DEEP), Inland Water Resources Division, the Connecticut DEEP Office of Long Island Sound (OLISP) and the New York State Department of State determine whether to issue, deny or waive WQC and CZM Consistency, respectively. The Connecticut DEEP will issue a notice regarding their tentative determination, therefore please send comments regarding WQC/Section 401 to that agency.

Proposed Changes:

We propose the changes and improvements listed in **CT GP Cover Sheet & General Permit List**, **Section 1** – Review Categories-Application Procedures – Inland, **Section 2** – Review Categories-Application Procedures – Coastal, **Appendix A** – General Permits (combined Coastal and Inland Table), **Appendix B** – General Conditions, **Appendix C** - Aquaculture Conditions, **Appendix D** – Contacts, **Appendix E** – Self-verification form and **Appendix F** – Definitions. Appendix A replaces both the existing Appendix 1 – Inland Waters and Wetlands, Waters of the U.S. Definition of Categories and Appendix 2 – Coastal Definition of Categories. Appendix A combines the aforementioned Appendices 1 and 2.

Comments

We are seeking public comment in order to properly evaluate the proposed GPs in Connecticut. Anyone wishing to comment is encouraged to do so in writing within the comment period specified in this notice. Comments should be submitted to: Ms. Diane M. Ray, Regulatory Division, U.S. Army Corps of Engineers, 696 Virginia Road, Concord, Massachusetts 01742-2751. If you have any questions, please contact Ms. Ray at (978) 318-8831 or diane.m.ray@usace.army.mil.

Any person may request, in writing, within the comment period specified in this notice, that a public hearing be held to consider this proposal. Requests for a public hearing shall specifically state the reasons for holding a public hearing. The Corps holds public hearings for the purpose of obtaining public comments when that is the best means for understanding a wide variety of concerns from a diverse segment of the public.

Jennifer L. McCarthy
Chief, Regulatory Division

Applicant: General Public, State of Connecticut & Lands Located within Boundaries of an Indian Reservation

Effective Date: July 15, 2016
Expiration Date: July 15, 2021

DEPARTMENT OF THE ARMY GENERAL PERMITS FOR THE STATE OF CONNECTICUT & LANDS LOCATED WITHIN THE BOUNDARIES OF AN INDIAN RESERVATION[1]

The New England District of the U.S. Army Corps of Engineers (Corps) hereby issues twenty-two (22) General Permits (GPs) for activities subject to Corps jurisdiction in waters of the United States (U.S.), including navigable waters, within boundaries of the State of Connecticut and lands located within the exterior boundaries of an Indian reservation. These GPs are issued in accordance with Corps regulations at 33 CFR 320 - 332 [see 33 CFR 325.5(c)(1)], and authorizes activity-specific categories of work that are similar in nature and cause no more than minimal individual and cumulative adverse environmental impacts. These GPs will provide protection to the aquatic environment and the public interest while effectively authorizing activities that have no more than minimal individual and cumulative adverse environmental effects.

GENERAL CRITERIA

In order for activities to qualify for these GPs, they must meet the terms and eligibility criteria and stipulations listed in Appendix A – Eligible Activities as well as the general conditions.

Projects may qualify for the following:

- Self-Verification (inland) Self -Verification Notification Form (SVNF) is required
- Self-Verification (coastal) – SVNF NOT required. Corps relies on CT DEEP, OLISP submittals.
- Pre-Construction Notification (PCN) – No work may proceed until written authorization from the Corps is received.
    - Inland - Application to and written approval from the Corps is required.
    - Coastal - Notification to Corps provided by CT DEEP, OLISP or by applicants as necessary.

If your project is ineligible for Self-Verification (SV), it may qualify for either a PCN or an Individual Permit. The thresholds for activities eligible for Self-Verification and PCN are defined in the Appendix A. These GPs do not affect the Corps Individual Permit review process or activities exempt from Corps regulation.

[1] Indian reservation lands are considered a sovereign nation, and are therefore acknowledged separately from the State of Connecticut for purposes of this General Permit.

Connecticut General Permits

1. Aids to Navigation
2. Repair, replacement and maintenance of authorized or grandfathered structures/fills
3. Moorings
4. Pile-supported structures and floats, including boat lifts/hoists and other miscellaneous structures/work
5. Boat ramps/marine railways
6. Utility line activities
7. Dredging, disposal of dredged material, beach nourishment, rock removal & rock relocation
8. Discharges of dredged or fill material incidental to the construction of bridges
9. Shoreline and bank stabilization projects
10. Aquatic habitat restoration, establishment and enhancement activities
11. Fish and wildlife harvesting, enhancement and attraction devices and activities
12. Oil spill and hazardous material cleanup
13. Cleanup of hazardous and toxic waste
14. Scientific measurements devices
15. Survey activities
16. Aquaculture projects and fisheries
17. New/expanded developments & recreational facilities
18. Linear transportation projects
19. Energy generation and renewable energy facilities and hydropower projects
20. Mining activities
21. Temporary fill not associated with a project within Corps jurisdiction
22. Agricultural Activities

SECTION 1

REVIEW CATEGORIES & APPLICATION PROCEDURES FOR PROJECTS WITHIN INLAND WATERS AND WETLANDS WITHIN THE STATE OF CONNECTICUT & LANDS LOCATED WITHIN THE EXTERIOR BOUNDARIES OF AN INDIAN RESERVATION

I. ACTIVITIES COVERED:

The discharge of dredged or fill material into Waters of the United States, which is regulated by the Corps under Section 404 of the Clean Water Act (CWA), see 33 CFR 328.

II. REVIEW PROCESS:

1. State and Local Approvals:

In order for authorizations under these GPs to be valid and before commencing any work within Corps jurisdiction, applicants must apply for and obtain any of the following required State approvals as well as any local approvals (see **General Condition 1**):

Water Quality Certification (WQC) under Section 401 of the Federal CWA (33 USC Sec. 1341). Section 401(a)(1) of the Clean Water Act requires that applicants obtain a WQC or waiver from the state water pollution control agency which in Connecticut is the Connecticut Department of Energy and Environmental Protection (CT DEEP) or U. S. EPA for Indian reservation lands to discharge dredged or fill material into waters of the U.S.

The CT DEEP, Inland Water Resources Division (CT DEEP IWRD) has conditionally granted WQC for Self-Verification (SV) activities in inland wetlands and waterways provided those activities meet the criteria as contained in the attached definition of categories.

The U.S. EPA granted WQC for Self-Verification activities located on land within the exterior boundaries of an Indian Reservation.

The CT DEEP- IWRD has denied WQC for Pre-Construction Notification (PCN) activities in inland wetlands and waterways, until the Commissioner issues a written 401 eligibility determination.

2. General Permit Review Categories:

a. Self-Verification – An application to the Corps is NOT required. However, submittal of the attached Self Verification Form at Appendix E to the Corps and CT DEEP, IWRD is required prior to commencement of work authorized by these GPs.

Eligibility Criteria

Activities in Connecticut and lands located within the exterior boundaries of an Indian reservation that meet the following criteria are eligible under Self-verification of this General Permit:

- are subject to Corps jurisdiction (See **General Condition 2**),
- meet the definition of Self-Verification in the attached Appendix A - General Permits, and
- meet the General Conditions of the GPs

Project proponents seeking Self-Verification authorizations must comply with the General Conditions and other federal laws such as the National Historic Preservation Act, the Endangered Species Act (ESA) and the Wild and Scenic Rivers Act. Therefore, consultation with the Corps and/or outside experts, such as the Connecticut Commission on Culture and Tourism and any appropriate Indian tribes, is recommended when there is a high likelihood of the presence of resources of concern.

b. Pre-Construction Notification (PCN) – An application to the Corps is required.

Projects not eligible under Self-Verification of the GPs may be screened under PCN, provided they meet the criteria as defined in the attached Definition of Categories for PCN activities.

Eligibility Criteria

Activities in Connecticut and lands located within the exterior boundaries of an Indian reservation that meet the following criteria are eligible under PCN of this General Permit:

- are subject to Corps jurisdiction (See **General Condition** 2),
- meet the definition of PCN in the attached **Appendix A** – General Permits, and
- meet the General Conditions of the GPs

3. Applying for an authorization through the PCN process:

A Corps application form (ENG Form 4345) is required for PCN activities and can be found on our website along with instructions, regulations and guidance:
http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits/ObtainaPermit.aspx

Applicants must also submit two copies of the following to the Corps, on a CD or hard copy:

- application form
- 8.5” x 11” drawings and one large-scale drawing,
- wetlands functions and values assessment,
- Federal wetland delineation documentation (data sheets),
- The CT DEEP addendum found at:
  http://www.ct.gov/deep/lib/deep/Permits_and_Licenses/LandUse_General_Permits/Inland_Water_General_Permits/CT_addendum_app.pdf
- correspondence with the Connecticut Commission on Culture and Tourism and Tribal Historic Preservation Officer indicating coordination with these entities,
- an Invasive Species Control Plan (See **General Condition 27**), and
- a plan describing any proposed mitigation.

Applicants must concurrently submit three copies of the following to the CT DEEP at the address below:

- the Corps application form,
- 8.5" x 11" drawings, large scale drawings;
- wetlands functions and values assessment,
- Federal wetlands delineation documentation (data sheets),
- CT DEEP addendum, and
- a plan describing any proposed mitigation.

State of Connecticut
Department of Energy & Environmental Protection
Central Permit Processing Unit
79 Elm Street
Hartford, CT 06106-5127

NOTE: Applicants must submit all project revisions and modifications to both agencies.

The Corps will coordinate review of all PCN activities with federal and state agencies to ensure that the proposed activity results in no more than a minimal impact to the aquatic environment. To be eligible and subsequently authorized, an activity must meet the eligibility criteria in 2. General Permit Review Categories above and result in no more than minimal impacts to the aquatic environment as determined by the Corps in conjunction with the interagency review team which consists of federal and state resource agencies. This may require project modifications involving avoidance, minimization, and/or compensatory mitigation for unavoidable impacts to ensure the net effects of a project are minimal.

Written approval from the Corps for PCN activities is required before work can commence.

Emergency Situation Procedures: 33 CFR 325.2 (e) (4) states that an "emergency" is a situation which would result in an unacceptable hazard to life, a significant loss of property, or an immediate, unforeseen and significant economic hardship if corrective action requiring a permit is not undertaken within a time period less than the normal time needed to process the application under standard procedures." Notification to the Corps and CT DEEP – IWRD is required. The Corps will determine if a project qualifies as an emergency and will work with all applicable agencies to expedite authorization in emergency situations. If the project qualifies as an emergency, authorization under Self-verification or PCN of the GPs is not required.

Individual Permit Procedures: Work that is **NOT** eligible under PCN as defined in the attached **Appendix A** – General Permits, or that does not meet the terms and conditions of the GPs, will require review under the Corps Individual Permit procedures (see 33 CFR Part 325.1). The applicant shall submit the appropriate application materials (including the Corps ENG 4345 application form) to the Corps of Engineers. General information and application forms can be obtained at the Corps web site noted in Paragraph 3 above. An individual Water Quality Certification is required from the CT DEEP, IWRD before Corps' permit issuance. **The application form and instructions for Section 401 Water Quality Certification are available from the Connecticut DEEP web site at http://www.ct.gov/deep/cwp/view.asp?a=2709&q=324168&depNav_GID=1643.**

SECTION 2:
REVIEW CATEGORIES & APPLICATION PROCEDURES FOR PROJECTS WITHIN TIDAL, COASTAL AND NAVIGABLE WATERS WITHIN THE STATE OF CONNECTICUT

Connecticut's coastal area is statutorily defined as: all lands and waters within the municipalities of Greenwich, Stamford, Darien, Norwalk, Westport, Fairfield, Bridgeport, Stratford, Shelton, Milford, Borough of Woodmont, Orange, West Haven, New Haven, Hamden, North Haven, East Haven, Branford, Guilford, Madison, Clinton, Westbrook, Deep River, Chester, Essex, Borough of Fenwick, Old Saybrook, Lyme, Old Lyme, East Lyme, Waterford, New London, Montville, Norwich, Preston, Ledyard, Groton (city, Town and Long Point Borough), Mystic and Stonington (Town & Borough) [Section 22a-94(a) CGS].

Navigable Waters: Navigable waters of the United States are those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. The Connecticut River has been determined to be a navigable water of the United States. [Refer to Title 33 CFR Part 329]

I. ACTIVITIES COVERED:

- Work and structures that are located in, under or over any navigable water of the U.S. (defined at 33 CFR 329) that affect the course, location, condition, or capacity of such waters; or the excavating from or depositing material in navigable waters. (Regulated by the Corps under Section 10 of the Rivers and Harbors Act of 1899);

- The discharge of dredged or fill material into waters of the U.S. (defined at 33 CFR 328), which is regulated by the Corps under Section 404 of the Clean Water Act (CWA)

II. REVIEW PROCESS:

1. Connecticut Department of Energy & Environmental Protection, Office of Long Island Sound Programs (DEEP OLISP) approvals:

In order for authorizations under these GPs to be valid and before commencing any work within Corps jurisdiction, applicants are responsible for applying for and obtaining any of the following required State or local approvals (see **General Condition 1**):

Water Quality Certification (WQC) Issuance or waiver under Section 401 of the Federal CWA (33 USC Section 1341). Section 401(a)(1) of the Clean Water Act requires that applicants obtain a WQC or waiver from the state water pollution control agency (CT DEEP) or EPA for Indian reservation lands to discharge dredged or fill material into waters of the U.S.

Coastal Zone Management Consistency (CZM) - Concurrence under Section 307 of the Federal CZM Act of 1972, as amended. Section 307(c) of the CZM of 1972, as amended, requires applicants to obtain a certification or waiver from CT DEEP OLISP that the activity complies with the state's CZM program for activities affecting a state's Coastal Area.

Project proponents involving dredging/excavation and associated disposal within the Byram River must also coordinate with NY DOS directly to obtain a certification or waiver that the activity complies with NYDOS' CZM program. Also, all projects with disposal at any of the Long Island Sound Disposal Sites require NY DOS CZM consistency. Additional information can be found at their website: **http://www.dos.ny.gov/opd/programs/consistency/.**

2. Corps Authorizations

a. Self-Verification (SV) – No application/notification is required to be submitted to the Corps by the applicant. However, DEEP OLISP will forward copies of application packages and their approvals to the Corps on a weekly basis. If the Corps determines that a project meets this category, the Corps will forward verification of eligibility to the applicant.

Eligibility Criteria
Activities in Connecticut and lands located within the exterior boundaries of an Indian reservation may proceed without application or notification to the Corps if they:

- are subject to Corps jurisdiction
- meet the definition of non-reporting in **Appendix A** – General Permits, and
- meet the General Conditions of the GPs

Note: Activities subject to Corps jurisdiction that are NOT regulated by the DEEP OLISP will be subject to the Preconstruction Notification (PCN) screening requirements of the GPs as noted below.

Project proponents seeking eligibility under the SV category must comply with the General Conditions of the GPs and other federal laws such as the National Historic Preservation Act, the Endangered Species Act (ESA) and the Wild and Scenic Rivers Act. Therefore, consultation with the Corps and/or outside experts such as the Connecticut Commission on Culture and Tourism and any appropriate Indian tribes is recommended when there is a likelihood of the presence of resources of concern.

b. Preconstruction Notification (PCN) (notification/application and written authorization required)

Projects not eligible under the SV category of the GPs may be screened under PCN category, provided they meet the criteria.

Eligibility Criteria
Activities in Connecticut and lands located within the exterior boundaries of an Indian reservation that meet the following criteria **require written approval from the Corps**:

- are subject to Corps jurisdiction,
- meet the definition of PCN in this Section, and
- meet the General Conditions of the GPs

3. Applying for authorization through the PCN process:

a. CT DEEP, OLISP regulated activities

Structures and Dredging Permit Applications: Applicants/agents shall submit to the Corps, a copy of the DEEP Permit Consultation Form for U.S. Army Corps of Engineers Review along with project plans. The Corps will then coordinate this information with the interagency review team (see paragraph 4 below) and then return the form to applicants/agents for their submission to DEEP OLISP.

Certificates of Permission (COPs), General Permits (GPs) and Modifications: OLISP will forward copies of application packages and approvals to the Corps. If a project is determined to meet any of the PCN activities and is complete, the Corps will coordinate these projects with the interagency review team. If the Corps determines that an Individual permit or additional information is required, the Corps will coordinate directly with the applicant/agent.

NOTE: For projects which involve dredging and open water disposal - Applicants/agents must submit requests for sampling plans to the DEEP, OLISP and the Corps simultaneously, as well as other required information specific to dredging/open water disposal, a detailed open water disposal site alternative analysis, and a completed New York State, Department of State (NYS DOS) Federal Consistency Assessment Form found at http://nyswaterfronts.com/downloads/pdfs/fcaf2.pdf. Please see our website at http://www.nae.usace.army.mil/Regulatory/ for a list of all required additional information.

b. Aquaculture activities regulated by the Connecticut Department of Agriculture

This refers to marine- and land-based aquaculture activities, including associated structures regulated by the Department of Agriculture, Bureau of Aquaculture (DA/BA), Connecticut General Statutes Section 22-11h.

Applicants should apply directly to the DA/BA using the Joint Application for Aquaculture form found at: http://www.nae.usace.army.mil/reg/Permits/CT_AquacultureApplication.pdf . The DA/BA will forward a copy of the aquaculture application package to the Corps, the State of Connecticut Department of Energy & Environmental Protection's (CT DEEP) Boating Division, Marine Fisheries Division, Office of Long Island Sound Programs (OLISP), and CT DEEP, Inland Water Resources Division (IWRD) for activities impacting inland waters.

These application packages for marine-based activities will be screened by the Corps, the Federal resource agencies, and the CT DEEP, OLISP with input from the CT DEEP Boating and Marine Fisheries Divisions. Screening will also initiate review of the application by the CT DEEP OLISP for Coastal Zone Management consistency concurrence. The CT DEEP OLISP will make a determination on the completeness of the application for CZM consistency review and/or the eligibility of the activity for state aquaculture permit exemption within 30 days from the date of the screening meeting.

4. Review Procedures:

The Corps will coordinate review of all PCN activities with federal and state agencies (interagency review team), as necessary. To be eligible and subsequently authorized, an activity must meet the eligibility criteria listed above and result in no more than minimal impacts to the aquatic environment as determined by the Corps. This may require project modifications involving avoidance, minimization, and/or compensatory mitigation for unavoidable impacts to ensure the net effects of a project are minimal. Applicants are responsible for applying for the appropriate state and local approvals. Authorizations under these GPs are not valid until all required CT DEEP, OLISP authorizations are granted.

Emergency Situation Procedures: 33 CFR 325.2 (e)(4) states that an "emergency" is a situation which would result in an unacceptable hazard to life, a significant loss of property, or an immediate, unforeseen and significant economic hardship if corrective action requiring a permit is not undertaken within a time period less than the normal time needed to process the application under standard procedures." Notification to the Corps is required. The Corps will determine if a project qualifies as an emergency and will work with all applicable agencies to expedite authorization in emergency situations. If the project qualifies as an emergency, authorization under these General Permits is not required.

Individual/Standard Permit Procedures: Work that is not eligible under PCN activities as described therein or that does not meet the terms and general conditions of the GPs, will require the submission of an application to the Corps for an Individual Permit (see 33 CFR Part 325.1). The applicant should submit the appropriate application form and materials at the earliest possible date. General information and application forms can be obtained at our website at **http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits/ObtainaPermit.aspx** or by calling us. Individual WQC and CZM consistency concurrence are required, when applicable, from the State of Connecticut before Corps issuance of an individual permit. The Corps encourages applicants to concurrently apply for a Corps Individual Permit and state permits.

APPENDIX A – GENERAL PERMITS

GP 1. AIDS TO NAVIGATION & TEMPORARY RECREATIONAL STRUCTURES (Section 10; navigable waters of the United States)

The placement of aids to navigation and regulatory markers which are approved by and installed in accordance with the requirements of the U.S. Coast Guard (see 33 CFR, chapter I, subchapter C, part 66)

Self-Verification (SV) Eligible	**Preconstruction Notification (PCN) Eligible**
Temporary buoys, markers, floats, etc. for recreational use during specific events, provided they are removed within 30 days after use is discontinued No structures within Corps Federal Navigation Projects (FNP)	Work not eligible for SV Aids to navigation or temporary markers, floats, etc. that are within a Corps FNP Aids to navigation or temporary markers, floats, etc. that are not to be removed within 30 days

GP 2. REPAIR OR MAINTENANCE OF EXISTING CURRENTLY SERVICEABLE, AUTHORIZED OR GRANDFATHERED STRUCTURES & FILLS (Section 10 & 404; tidal and non-tidal waters of the U.S.) Repair, rehabilitation, or replacement of any previously authorized, currently serviceable structure, or fill, or of any currently serviceable structure or fill authorized by 33 CFR 330.3, provided that the structure or fill is not to be put to uses differing from those uses specified or contemplated for it in the original permit or the most recently authorized modification. Minor deviations in the structure's configuration or filled area, including those due to changes in materials, construction techniques, requirements of other regulatory agencies, or current construction codes or safety standards that are necessary to make the repair, rehabilitation, or replacement are authorized.

Self-Verification (SV) Eligible	**Preconstruction Notification (PCN) Eligible**
Removal of previously authorized structures or fills. **NOTE:** Removal of bridge structures are covered under **GP 8**, if the Coast Guard issues a bridge permit. Any stream channel modification is limited to the minimum necessary for the repair, rehabilitation, or replacement of the structure or fill; such modifications, including the removal of material from the stream channel, must be immediately adjacent to the project or within the boundaries of the structure or fill. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary discharges, such as sandbag cofferdams, access fills, etc. are necessary for construction activities or dewatering of construction sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The areas affected by temporary fills must be re-vegetated as appropriate. Any bank stabilization measures not directly associated with the structure will require a separate authorization under Activity 9.	Work not eligible for SV Included is the removal of accumulated sediments and debris in the vicinity of existing structures (e.g., bridges, culverted road crossings, water intake structures, etc.) and/or the placement of new or additional riprap to protect the structure. The placement of new or additional riprap must be the minimum necessary to protect the structure or to ensure the safety of the structure. The removal of sediment is limited to the minimum necessary to restore the waterway in the vicinity of the structure to the approximate dimensions that existed when the structure was built, but cannot extend farther than 200 feet in any direction from the structure. Excavated materials must be deposited and retained in an area that has no waters of the United States unless otherwise specifically approved by the district engineer. Drawdown of impoundment for dam/levee repair is eligible provided it does not exceed 18 months and there is no permanent change in water elevation of the impoundment. Work to previously approved tide gates without a State permitting agency or Corps-approved operation and maintenance plan or changes affect the hydraulic regime.

GP 3. MOORINGS (Section 10; navigable waters of the U. S.)
Private, non-commercial, non-rental, single-boat moorings & temporary moorings or moorings to facilitate construction or dredging; minor relocation of previously authorized moorings and mooring field expansions, boundary reconfigurations or modifications of previously authorized mooring fields and maintenance and replacement of moorings.
Moorings within Federal Navigation channels are not authorized by this GP.

Self-Verification (SV) Eligible	**Preconstruction Notification (PCN) Eligible**
1. Private, non-commercial, non-rental, single-boat moorings and temporary moorings to facilitate construction or dredging provided: No moorings within Federal anchorages Not located in **Special Aquatic Sites (SAS)** which includes wetlands, mud flats, vegetated shallows (permanently inundated areas that support rooted aquatic vegetation such as eel grass, celery grass, and tape grass), riffle and pool complexes. Not located in shellfish beds Authorized by local harbormaster/town When existing, authorized moorings in SAS are going to be replaced, they should be replaced with low impact mooring technology that prevents mooring chains from resting or dragging on the bottom substrate at all tides and helical anchors, or equivalent SAS protection systems where practicable. 2. Minor relocation of previously authorized moorings, provided: Authorized by the local harbormaster/town Not located in SAS	Work not listed as eligible for SV Moorings associated with an existing boating facility***** Private moorings without harbormaster or local approval. Moorings located such that they, and/or vessels docked or moored at them, are within the buffer zone of the horizontal limits of a Federal Anchorage. The buffer zone is equal to 3 times the authorized depth of that channel. ****Facilities that provide for a fee, rent, or sell mooring space, such as marinas, yacht clubs, boat clubs, boat yards, town facilities, dockominiums, etc.*** ***Locating new individual moorings in SAS, including eelgrass, should be avoided to the maximum extent practicable. If SAS cannot be avoided, plans should show elastic mooring systems that prevent mooring chains from resting or dragging on the bottom substrate at all tides or helical anchors, or equivalent SAS protection systems, where practicable. For moorings that appear to impact SAS, the Corps may require an eelgrass survey.***

GP 4. PILE-SUPPORTED STRUCTURES & FLOATS, INCLUDING BOAT LIFTS/HOISTS & OTHER MISCELLANEOUS STRUCTURES & WORK (Section 10; navigable waters of the U.S.) New, expansions, reconfigurations or modifications of structures for navigation access including floats and boat/float lifts. Not authorized are structures associated with a new boating facility.

Self-Verification (SV) Eligible	**Preconstruction Notification (PCN) Eligible**
Private residential piers with a length limit not to exceed 40' beyond mean high water and to a depth of -4' mean low water and limited to 4' in width. Pile-supported structures/floats may not be positioned over SAS. Floats must be supported at least 18" above the intertidal and shallow sub-tidal substrate during all tidal cycles. No structures or floats can be located within the buffer zone (3x the authorized depth of the FNP) of the horizontal limits of FNPs. No structures or floats can extend across >25% of the waterway width at mean low water. No new structures within 25' of property line extensions. No new structures or floats associated with boating facilities. No new pile-supported structures within Shellfish Concentration Areas as designated by the Connecticut Department of Environmental Protection, Coastal Area Management Program under CGS Sec. 22a-90 Reconfiguration of existing authorized structures; private or commercial, provided those structures do not extend beyond the existing perimeter of the facility or encroach into SAS.	Work not eligible for SV New structures within an existing boating facility provided those structures do not extend beyond the existing perimeter of the facility Structures or work in or affecting tidal or navigable waters that are not defined under any other GP activity.

GP 5. BOAT RAMPS AND MARINE RAILWAYS (Sections 10 and 404; tidal and non-tida waters of the U.S.)

Activities required for the construction of boat ramps and marine railways, including excavation and fill.

Not authorized are under GP 5: a) permanent impacts that are >1 acre in non-tidal waters and wetlands, >½ acre in tidal waters, >1000 SF in tidal SAS other than vegetated shallows, or >100 SF in tidal vegetated shallows; and b) dredging in navigable waters of the U.S. (see **GP** 7)

Self-Verification (SV) Eligible	**Preconstruction Notification (PCN) Eligible**
Permanent impacts are ≤5000 SF in non-tidal waters and wetlands. Work not allowed in navigable waters of the U.S.	Work not eligible for SV Permanent impacts are: >5000 SF to ≤1 acre in non-tidal waters and wetlands; or ≤1/2 acre in tidal waters; or located in non-tidal SAS other than wetlands (see limits above) Work occurs in navigable waters of the U.S.; or Boat ramps are located within 25 feet of property line extensions unless the properties are owned by the same owner. If so, the Corps may require a letter of no objection from the abutter(s).

GP 6. UTILITY LINE ACTIVITIES (Sections 10 & 404; tidal and non-tidal waters of the U.S.) Activities required for the construction, maintenance, repair, & removal of utility lines (e.g. electric, water, sewer, gas or cable), including excavation, bedding and backfill, outfall and intake structures, and associated facilities within Corps jurisdiction, provided the activity does not result in the loss of greater than 1 acre of waters of the United States for each single and complete project. Included is the construction or maintenance of foundations for overhead utility line towers, poles, and anchors in all waters of the United States, provided the foundations are the minimum size necessary and separate footings for each tower leg (rather than a larger single pad) are used where feasible.

Self-Verification (SV) Eligible	**Preconstruction Notification (PCN) Eligible**
No fill in tidal waters. No submarine utility lines in tidal waters. No new culvert crossings of perennial streams ≤5,000 square feet (SF) of inland waterway and/or wetland fill (permanent and temporary). Access roads: The construction of permanent access roads is allowed for the construction and maintenance of utility lines, including overhead power lines, utility line substations, and metering & compression stations, in non-tidal waters of the United States, provided the activity, in combination with all other activities included in one single and complete project, does not cause the loss of greater than 5,000 s.f. of non-tidal waters of the United States. Access roads must be constructed so that the length of the road minimizes any adverse effects on waters of the United States and must be as near as possible to pre-construction contours and elevations (e.g., at grade corduroy roads or geotextile/gravel roads). Access roads constructed above pre-construction contours and elevations in waters of the United States must be properly bridged or culverted to maintain surface flows. Temporary fills: Temporary fills necessary to conduct the utility line activity are also allowed, provided the utility line activity is **within** Corps jurisdiction. If the utility line activity is not within Corps jurisdiction then see Activity 21 for temporary fills, etc. No storage of equipment in wetlands. **NOTE**: Construction mats of any area necessary to conduct activities do not count towards the 5,000 s.f. threshold and should be removed as soon as work is completed.	Work not eligible for SV. Overhead utility lines constructed over Section 10 waters and submarine utility lines that are routed in or under such waters. Installation of new, permanent culvert crossings of perennial streams. >5000 SF to ≤1 acre of inland waterway and/or wetland fill (permanent and temporary). Fill area includes all permanent and temporary fill and regulated discharges associated with excavation.

GP 7. DREDGING (Section 10; navigable waters of the U.S.), DISPOSAL OF DREDGED MATERIAL (Sections 10, 404 &103; tidal waters of the U.S.), BEACH NOURISHMENT (Sections 10 & 404; tidal and non-tidal waters of the U.S.); ROCK REMOVAL (Section 10, navigable waters of the U.S.) and ROCK RELOCATION (Sections 10 & 404; tidal and non-tidal waters of the U.S) New dredging and maintenance dredging, including: a) Disposal of dredged material at a confined aquatic disposal, beach nourishment, near shore, designated open water or ocean water disposal site, provided the Corps finds the dredged material to be suitable for such disposal; (b) Beach nourishment not associated with dredging; (c) Rock removal and relocation for navigation.

Not authorized is new dredging where the primary purpose is sand mining for beach nourishment.

Self-Verification (SV) Eligible	**Preconstruction Notification (PCN) Eligible**
Maintenance dredging (with any amount of yardage) provided: Contained upland disposal Proper siltation controls used & maintained to prevent runback into waterway/wetland No impacts to SAS or shellfish beds No work in the Connecticut River Work occurs from October 1 through January 15.	Work not eligible for SV. Maintenance, new, or improvement dredging Disposal options include upland disposal, open water disposal, confined aquatic disposal cells (CAD cells), near-shore disposal or beach nourishment. Beach nourishment <1,000 sf of impacts to tidal SAS other than vegetated shallows or <100 sf of impacts to vegetated shallows.

GP 8. DISCHARGES OF DREDGED OR FILL MATERIAL INCIDENTAL TO THE CONSTRUCTION OF BRIDGES (Sections 10 & 404; navigable waters of the U.S.)

Discharges of dredged or fill material incidental to the construction and modification of bridges across navigable waters of the U.S., including cofferdams abutments, foundation seals, piers, and temporary construction and access fills **provided that the USCG authorizes the construction of the bridge structure under Section 9 of the Rivers and Harbors Act of 1899 or other applicable laws**. A USCG Authorization Act Exemption or a STURRA (144h) exemption do not constitute USCG authorization.

Self-Verification (SV) Eligible	**Preconstruction Notification (PCN) Eligible**
No new or previously unauthorized fills other than discharges of dredged or fill material incidental to the construction of bridges across navigable waters of the U.S., including cofferdams, abutments, foundation seals, piers, and temporary construction and access fills provided the U.S. Coast Guard issues a bridge permit or appropriate approval. No fill in the Connecticut River	Work not listed as eligible for SV <1 acre waterway/wetland fill and/or excavation. Causeways and approach fills.

GP 9. SHORELINE AND BANK STABILIZATION PROJECTS (Sections 10 & 404; tidal and non-tidal waters of the U.S.) Bank stabilization activities necessary for erosion protection along the banks of lakes, ponds, streams, estuarine and ocean waters, and any other open waters. Includes bulkheads, seawalls, riprap, revetments/slope protection and similar structures as well as vegetative planting, soil bioengineering or alternative techniques that are a combination of the two (e.g. living shorelines), specifically for the purpose of shoreline protection.
Stream channelization activities are not authorized under this GP.

Self-Verification (SV) Eligible	**Preconstruction Notification (PCN) Eligible**
Shoreline stabilization projects <200 linear feet (or 100 feet, if both stream banks) provided: ≤1 cubic yard of fill per linear foot placed between the high tide line (HTL) and mean low water (MLW) provided no discharge of fill material within SAS, including mudflats, tidal wetlands, SAV and/or shellfish beds. Soft stabilization measures such as bioengineered fiber roll revetments or equivalent, wherever practicable. Alternative designs are favored over hardened shorelines provided the natural shoreline configuration is not significantly altered, natural processes or ecological function are not limited and will be eroded by normal or expected high flows (properly anchored trees and treetops may be used in low energy areas) No vertical stone structures or embankments angled steeper than 1H:1V. No new bulkheads. ≤1 cubic yard of fill per linear foot placed waterward of ordinary high water (OHW) and no fill within the streambed beyond the toe of slope of the stream bank. No fill within the streambed beyond the toe of slope of the stream bank Work limited to the low-flow period June 1 through September 30 in non-tidal waters. However, installation and removal of cofferdams, constructed from clean material is allowed at any time. No materials of a type, or is placed in any location, or in any manner, that will impair surface water flow into or out of any waters of the United States.	Work not eligible for SV. >200 feet in length >1 cubic yard of fill per linear foot average along the bank waterward of the plane of OHW or HTL. The slope of the structure is steeper than 1V:3H in lakes/ponds; and 1V:1H in non-tidal streams and tidal waters and streams. Fill waterward of the HTL in coastal waters including alternative stabilization techniques that are a combination of soft and hard shoreline stabilization techniques that will affect SAS, change the natural shoreline configuration or alter natural or ecological processes.

GP 10. AQUATIC HABITAT RESTORATION, ESTABLISHMENT & ENHANCEMENT ACTIVITIES (Sections 10 and 404; tidal and non-tidal waters of the U.S.) Activities in waters of the United States associated with the restoration, enhancement and establishment of non-tidal and tidal wetlands and riparian areas, including invasive, non-native or nuisance species control; the restoration and enhancement of non-tidal streams and other non-tidal open waters; the relocation of non-tidal waters, including non-tidal streams & associated wetlands for reestablishment of a natural stream morphology and reconnection of the floodplain; the restoration and enhancement of shellfish, finfish and wildlife; and the rehabilitation or enhancement of tidal streams, tidal wetlands and tidal open waters; provided those activities result in net increases in aquatic resource functions and services. Conversions of wetlands to open water are not allowed.

Artificial reefs are not eligible under **GP 10.**

Self-Verification (SV) Eligible	**Preconstruction Notification (PCN) Eligible**
Pro-active salt marsh restoration work for the purposes of restoring subsiding marsh surfaces and dieback areas. No new ditching to eliminate mosquito breeding habitat No thin layer deposition No fill for purposes of converting marsh to upland Placement of seed shellfish, spatted-shell or cultch in tidal waters for the restoration or enhancement of existing, publicly-managed, recreational shellfish beds provided there is no impact to SAS (e.g. SAV) and does not result in degradation of habitat for other aquatic resources. ≤5,000 square feet (SF) of inland waterway and/or wetland fill (permanent and temporary) provided the activity is supported in writing by a local, state, or non-Corps Federal environmental resource management agency. No stream channelization.	Work not eligible for SV Aquatic habitat restoration, establishment, and enhancement of tidal wetlands and riparian areas provided those activities are proactive and result in net increases in aquatic resource functions and services as decided by the Corps in consultation with federal and state agencies, such that the net effects are beneficial. Pro-active salt marsh restoration work that includes draining of ponded dieback areas through excavation of runnels with handheld tools or low-impact ground equipment; blocking or unclogging of historic mosquito ditches to restore tidal flushing; excavation of new salt pannes to increase shorebird and waterfowl foraging habitat and placing excavated materials on the marsh surface for establishing suitable vegetative beds. Pond or lake reestablishment or restoration Water impoundments Dam removals Integrated Marsh Management in tidal wetlands for combined wetland enhancement and mosquito control and reduction.

GP 11. FISH & WILDLIFE HARVESTING, ENHANCEMENT AND ATTRACTION DEVICES AND ACTIVITIES (Sections 10 and 404; tidal and non-tidal waters of the U.S.)

Activities in waters of the United States associated with fish and wildlife harvesting devices including pound nets, crab traps, crab dredging, eel pots, lobster traps, duck blinds, and clam and oyster digging, fish aggregating devices, and small fish attraction devices such as open water fish concentrators (sea kites, etc.). Impoundments or semi-impoundments of waters of the U.S. for the culture of holding of motile species such as lobster and new fish weirs with an impoundment area.

Artificial reefs are not authorized under this GP.

Self-Verification (SV) Eligible	**Preconstruction Notification (PCN) Eligible**
Activities associated with fish and wildlife harvesting devices including pound nets, crab traps, crab dredging, eel pots, lobster traps, duck blinds, clam and oyster digging, small fish aggregating and attraction devices such as open water fish concentrators (sea kites, etc.)	Work not eligible for SV Impoundments or semi-impoundments of waters of the U.S. for the culture or holding of motile species such as lobster and new fish weirs with an impounded area ≤1/2 acre Devices located in tidal SAS, including salt marsh and SAV.

GP 12. OIL SPILL AND HAZARDOUS MATERIAL CLEANUP (Sections 10 and 404; tidal and non-tidal waters of the U.S.) Special Aquatic Sites must be restored in place at the same elevation.	
Self-Verification (SV) Eligible	**Preconstruction Notification (PCN) Eligible**
1. Activities conducted in response to a discharge or release of oil and hazardous substances that are subject to the National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR 300) including containment, cleanup, and mitigation efforts, provided that the activities are done under either: The Spill Prevention, Control and Countermeasure Plan required by 40 CFR 112.3; or The direction or oversight of the Federal on-site coordinator designated by 40 CFR 300; or Any approved existing State, regional or local contingency plan provided that the Regional Response Team concurs with the proposed response efforts or does not object to the response effort. 2. Activities required for the cleanup of oil releases in waters of the U.S. from electrical equipment that are governed by EPA's polychlorinated biphenyl (PCB) spill response regulations at 40 CFR 761. 3. Booms placed in navigable waters for hazardous and toxic waste containment, absorption and prevention, provided they are removed upon completion of the cleanup.	Work not eligible for SV Permanent structures or impacts for spill response training exercises The activity is planned or scheduled, not an emergency response, and will cause turbidity or sediment resuspension in tidal waters or streams.

GP 13. CLEANUP OF HAZARDOUS AND TOXIC WASTE (Sections 10 and 404; tidal and non-tidal waters of the U.S.) Specific activities to effect the containment, stabilization or removal of hazardous or toxic waste materials, including court ordered remedial action plans or related settlements which are performed, ordered or sponsored by a government agency with established legal or regulatory authority. Not authorized is the establishment of new disposal sites or the expansion of existing sites used for the disposal of hazardous or toxic waste.

Self-Verification (SV) Eligible	**Preconstruction Notification (PCN) Eligible**
Impacts are ≤5,000 SF in non-tidal waters and wetlands Booms placed in navigable waters for oil and hazardous substance containment, absorption and prevention, provided they are removed upon completion of the cleanup. **Notes:** 1. Activities undertaken entirely on a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) site by authority of CERCLA as approved or required by EPA, are not required to obtain permits under Section 404 of the CWA or Section 10 of the Rivers and Harbors Act. 2. For non-tidal waters of the U.S., permittees have up to two weeks following commencement of these activities to submit the SVNF.	Work eligible for SV Work in navigable waters of the U.S. other than booms placed for hazardous and toxic waste containment, absorption and prevention.

GP 14. SCIENTIFIC MEASUREMENT DEVICES (Sections 10 and 404; tidal and non-tidal waters of the U.S.) Scientific devices for measuring and recording scientific data, such as staff gauges, tide and current gauges, meteorological stations, water recording and biological observation devices, water quality testing and improvement devices, and similar structures. Also eligible are small temporary weirs and flumes constructed primarily to record water quantity and velocity. Upon completion of the use of the device to measure and record scientific data, the measuring device and any other structures or fills associated with that device (e.g., foundations, anchors, buoys, lines, etc.) must be removed to the maximum extent practicable.

Self-Verification (SV) Eligible	**Preconstruction Notification (PCN) Eligible**
Impacts are ≤5,000 SF in non-tidal waters and wetlands. Temporary devices in tidal waters that do not restrict movement of aquatic organisms and will not adversely affect the course, condition or capacity of a waterway for navigation. Temporary devices in tidal wetlands with impacts ≤100 s.f.	Work not eligible for SV Impacts >5,000 SF to < 1 acre in non-tidal wetlands Impacts >100 s.f. to < ½ acre in tidal wetlands Impacts in tidal SAS Permanent devices in tidal and non-tidal waters

GP 15. SURVEY ACTIVITIES (Sections 10 and 404; tidal and non-tidal waters of the U.S.) Survey activities such as soil borings, core sampling, seismic exploratory operations, plugging of seismic shot holes and other exploratory-type bore holes, exploratory trenching and historic resources surveys.

Self-Verification (SV) Eligible	**Preconstruction Notification (PCN) Eligible**
Impacts ≤5,000 SF in non-tidal waters and wetlands. No fill or work in tidal SAS (e.g. tidal wetlands or SAV beds). No permanent structures or drilling and discharge of excavated material from test wells for oil and gas exploration allowed. **NOTE**: Construction mats of any area necessary to conduct activities do not count towards the 5,000 s.f. threshold and should be removed as soon as work is completed.	Work not eligible for SV Impacts >5,000 SF to <1 acre in non-tidal waters and wetlands Impacts ≤ ½ acre in tidal wetlands Impacts in tidal SAS

GP 16. AQUACULTURE PROJECTS AND FISHERIES (Sections 10 and 404, navigable waters of the US) No shellfish dredging, including mechanical or hydraulic in SAS, including SAV, no placement of cultch in beds of SAV. Depth of cultch or spatted-shell limited to the minimum necessary for full coverage of the framed bed bottom & must not result in visible degradation of habitat for other aquatic resources. All structures must be permitted by State of Connecticut Navigation Safety/Boating Access Unit and marked in conformance with applicable State or U.S. Coast Guard Aids to Navigation.
NOTE: All facilities must be installed and operated in compliance with the attached Appendix C Aquaculture Conditions

Self-Verification (SV) Eligible	**Preconstruction Notification (PCN) Eligible**
Placement of seed shellfish, spatted-shell or cultch for commercial shellfish aquaculture on leased grounds when performed in compliance with the conditions in Section 5 h. of the CT DEEP General Permit for Coastal Maintenance (DEEP-OLISP-GP-2015-02). The placement of aids to navigation and regulatory markers to demarcate gear areas when approved by and installed in accordance with the requirements of the U.S. Coast Guard (see 33 CFR, chapter I, subchapter C, part 66). The installation of temporary (< six months) structures for research, educational or experimental aquaculture gear impacting ≤1,000 SF for indigenous species under the direct supervision of the Dept. of Agricultural, Bureau of Aquaculture provided there is no adverse effect to navigation. Suspended cages or nets located wholly below and within the footprint of an existing authorized fixed or floating structure provided there is a vertical clearance of at least 2 feet between the bottom of the gear and the sea floor at mean low water.	Work not eligible for SV. Vertical-drop longlines for the culture of shellfish or other marine organisms, such as kelp and seaweed. Cages, trays, racks, netting or other structures on the ocean bottom or floating on the water surface for the rearing or depuration of cultured shellfish. Installation of intake and discharge structures for a land-based hatchery. Research, educational or experimental aquaculture gear for indigenous species that exceed >1,000 SF. Shellfish dredging, either mechanical or hydraulic in SAS. Activities that involve a change from authorized gear for bottom culture to floating or suspended gear.

GP 17. NEW/EXPANDED DEVELOPMENTS & RECREATIONAL FACILITIES (Section 404, non-tidal waters of the U.S.) Discharges of dredged or fill material for the construction or expansion of developments and/or recreational facilities. Fill area includes all temporary and permanent fill, and regulated discharges associated with excavation. Note: For residential subdivisions, the aggregate total loss of waters authorized by GP 17 cannot exceed one acre. This includes any loss of waters of the United States associated with the development of individual subdivision lots.

Self-Verification (SV) Eligible	**Preconstruction Notification (PCN) Eligible**
≤5,000 square feet (SF) of inland waterway and/or wetland fill (permanent and temporary) provided: No impacts to SAS other than wetlands (e.g. riffle and pool stream habitat, shellfish beds). **NOTE**: Construction mats of any area necessary to conduct activities do not count towards the 5,000 s.f. threshold and should be removed as soon as work is completed.	Work not eligible for SV Permanent impacts are >5,000 SF to <1 acre in non-tidal waters and wetlands Impacts to non-tidal SAS other than wetlands

GP 18. LINEAR TRANSPORTATION PROJECTS (Section 404, non-tidal waters of the U.S.) Activities required for the construction, expansion, modification, or improvement of linear transportation projects (e.g., driveways, roads, highways, railways, trails, airport runways, and taxiways) and attendant features.

Self-Verification (SV) Eligible	**Preconstruction Notification (PCN) Eligible**
≤5,000 square feet (SF) of inland waterway and/or wetland fill (permanent and temporary) provided: No work in SAS other than wetlands. River, stream and brook work and crossings: No slip lining No in-stream work involving fill or excavation in flowing waters In-stream work limited to the low-flow period, June 1 through September 30 No stream relocations No dams or dikes **NOTE**: 1. Construction mats of any area necessary to conduct activities do not count towards the 5,000 s.f. threshold and should be removed as soon as work is completed. 2. Work must be performed in accordance with Stream Crossing Best Management Practices located at: http://www.nae.usace.army.mil/Missions/Regulatory.aspx go to State General Permits, Resources, Best Management Practices.	Work not eligible for SV >5,000 square feet (SF) to <1 acre of inland waterway and/or wetland fill. Installation of new permanent culvert crossings of perennial streams. Construction of features that will, or by default, result in detention or retention of stormwater in inland waters and wetlands.

GP 19. ENERGY GENERATION & RENEWABLE ENERGY GENERATION FACILITIES (Sections 10 and 404; tidal and non-tidal waters of the U.S.) and HYDROPOWER PROJECTS (Section 404; tidal and non-tidal waters of the U.S.)

Structures and work in navigable waters of the U.S. and discharges of dredged or fill material into tidal and non-tidal waters of the U.S. for the construction, expansion, modification or removal of: (a) Land-based renewable energy production facilities, including attendant features; (b) Water-based wind or hydrokinetic renewable energy generation pilot projects and their attendant features; and (c) Discharges of dredged or fill material associated with hydropower projects.

Attendant features may include, but are not limited to, land-based collection and distribution facilities, control facilities, and parking lots. For each single and complete project in (b) above, no more than 10 generation units (e.g., wind turbines or hydrokinetic devices) are authorized in navigable waters of the U.S.

Self-Verification (SV) Eligible	**Preconstruction Notification (PCN) Eligible**
For land-based facilities: ≤5,000 square feet (SF) of inland waterway and/or wetland fill (permanent and temporary) provided: No stream channelization, relocation or loss of streambed including impoundments No new water-based wind or hydrokinetic renewable energy generation pilot projects, and hydropower projects are eligible. **NOTE**: Construction mats of any area necessary to conduct activities do not count towards the 5,000 s.f. threshold and should be removed as soon as work is completed.	Work not eligible for SV *For land-based facilities, permanent impacts are:* >5000 SF to ≤1 acre in non-tidal waters and wetlands, or ≤1/2 acre in tidal waters; or located in non-tidal SAS other than wetlands Stream channelization, relocation or loss of streambed including impoundments occur *For water-based wind or hydrokinetic renewable energy generation pilot projects, and hydropower projects permanent impacts are:* >5000 SF to ≤1 acre in non-tidal waters and wetlands, or ≤1/2 acre in tidal waters

GP 20. MINING ACTIVITIES (Section 404; non-tidal waters of the U.S.)
Discharges of dredged or fill material into non-tidal waters and wetlands for mining activities, except for coal mining and metallic mineral mining activities

Self-Verification (SV) Eligible	**Preconstruction Notification (PCN) Eligible**
≤5,000 square feet (SF) of inland waterway and/or wetland fill (permanent and temporary) provided: No stream channelization, relocation or loss of streambed including impoundments, or discharge of tailings into streams **NOTE**: Construction mats of any area necessary to conduct activities do not count towards the 5,000 s.f. threshold and should be removed as soon as work is completed.	Work not eligible for SV Permanent impacts are: >5000 SF to ≤1 acre in non-tidal waters and wetland or in SAS other than non-tidal wetlands Stream channelization, relocation or loss of streambed including impoundments, or discharge of tailings into streams occurs

GP 21. TEMPORARY FILL NOT ASSOCIATED WITH A PROJECT WITHIN CORPS JURISDICTION (Section 404, non-tidal waters of the U.S.) Temporary discharges, such as sandbag/earth cofferdams, access fills, etc., necessary for construction activities or dewatering of construction sites.

Self-Verification (SV) Eligible	**Preconstruction Notification (PCN) Eligible**
≤5,000 square feet (SF) of temporary inland waterway and/or wetland fill provided: Temporary discharges are in place for <2 years. **NOTE**: Construction mats of any area necessary to conduct activities do not count towards the 5,000 s.f. threshold and should be removed as soon as work is completed.	Work not eligible for SV

GP 22. AGRICULTURAL ACTIVITIES (Section 404, non-tidal waters of the United States)

Discharges of dredged or fill material in non-tidal waters of the U.S. for agricultural activities with impact to non-tidal waters and wetlands such as pads for barn/greenhouse, mechanized land clearing, land leveling and installation of drainage tiles for irrigation. Also includes the relocation or modification of existing, serviceable drainage ditches in wetlands and farm ponds for livestock, food and fiber production and horticultural nursery irrigation purposes.

Not authorized under **GP** 22 are the construction of farm ponds in perennial streams.

Note: Some discharges for agricultural activities may qualify for an exemption under Section 404(f)(1) of the Clean Water Act (see 33 CFR 323.4). **GP** 22 is intended to cover those agricultural discharges that do not qualify for agricultural exemption and/or are subject to the recapture provision under section 404(f)(2) of the Act.

GP 22 Does not authorize aquaculture fish ponds in waters of the U.S.

Self-Verification (SV) Eligible	**Preconstruction Notification (PCN) Eligible**
≤5,000 square feet (SF) of inland waterway and/or wetland fill (permanent and temporary)	Work not eligible for SV Work that does not qualify for exemption under Section 404(f) of the Clean water Act. Permanent and temporary impacts are >5000 SF to <1 acre in non-tidal waters and wetlands or will impact non-tidal SAS, other than non-tidal wetlands. New drainage ditches in wetlands. Stream channelization, relocation, impoundments, loss of streambed or farm ponds in non-perennial streams will occur. The activity causes turbidity or sediment suspension in non-tidal streams

APPENDIX B - GENERAL CONDITIONS

1. Other Permits. Permittees must obtain other Federal, State, or local authorizations required by law. Applicants are responsible for applying for and obtaining all required State or local approvals. Work that is not regulated by the State, but is subject to Corps jurisdiction, may be eligible for this GP.

2. Federal Jurisdiction.

a**.** Applicability of the GPs shall be evaluated with reference to Federal jurisdictional limits. Applicants are responsible for ensuring that the limits depicted satisfy the Federal criteria defined at 33 CFR 328 "Waters of the U.S." and 33 CFR 329 "Navigable Waters of the U.S."

NOTE: Waters of the U.S. include the subcategories "navigable waters of the U.S." and "wetlands."

b. Pre-Construction Notification (PCN) Eligible projects require an application to the Corps which must include a delineation of wetlands, other special aquatic sites, and other waters such as lakes and ponds and perennial, intermittent, and ephemeral streams that are on the project site. Wetland delineations must be prepared in accordance with the current federal method required by the Corps. For Corps Wetland Delineation Manual, regional supplements and data sheets, and the National List of Plant Species that Occur in Wetlands, visit our website at http://www.nae.usace.army.mil/Missions/Regulatory.aspx and then click on "Jurisdictional and Wetlands". The Natural Resources Conservation Service (NRCS) publishes the current hydric soil definition, criteria and lists which can be found at http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/use/hydric/. For the Field Indicators for Identifying Hydric Soils in New England, visit: www.neiwpcc.org/hydricsoils.asp.

3. Minimal Effects. Projects shall have no more than minimal direct, indirect, and secondary adverse environmental effects. Project proponents shall identify all indirect and secondary effects to the extent reasonable and practicable. All PCNs should include this information.

4. Mitigation (Avoidance, Minimization, and Compensatory Mitigation)

a. Activities must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the U.S. to the maximum extent practicable at the project site (i.e., on site). Consideration of mitigation (avoiding, minimizing, rectifying, reducing, or compensating) is required to the extent necessary to ensure that the adverse effects to the aquatic environment are no more than minimal.

b. Applicants should consider riparian/forested buffers for stormwater management and low impact development (LID) best management practices (BMPs) to reduce impervious cover and manage stormwater to minimize impacts to the maximum extent practicable.

c. Compensatory mitigation[1] for effects to waters of the U.S., including direct, secondary and temporal[2], will generally be required for permanent impacts that exceed the SV area limits, and may be required for temporary impacts that exceed the SV area limits, to offset unavoidable impacts which remain after all appropriate and practicable avoidance and minimization has been achieved and to ensure that the adverse effects to the aquatic environment are no more than minimal. Proactive restoration projects or temporary impact work with no secondary effects may generally be excluded from this requirement.

5. Discretionary Authority. Notwithstanding compliance with the terms and conditions of this permit, the Corps retains discretionary authority to require an Individual Permit review based on concerns for the aquatic environment or for any other factor of the public interest [33 CFR 320.4(a)]. This authority is invoked on a case-by-case basis whenever the Corps determines that the potential consequences of the proposal warrant Individual Permit review based on the concerns stated above. This authority may be invoked for projects with cumulative environmental impacts that are more than minimal, or if there is a special resource or concern

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[1] Compensatory mitigation projects provided to offset losses of aquatic resources must comply with the applicable provisions of 33 CFR 332. See also the New England District Compensatory Mitigation Guidance at http://www.nae.usace.army.mil/Missions/Regulatory/Mitigation.aspx

[2] Temporal loss: The time lag between the losses of aquatic resource functions caused by the permitted impacts and the replacement of aquatic resource functions at the compensatory mitigation site(s) (33 CFR 332.2).

associated with a particular project. Whenever the Corps notifies an applicant that an Individual Permit may be required, authorization under these GPs is voided and no work may be conducted until a Corps Individual Permit is obtained or until the Corps notifies the applicant that further review has demonstrated that the work may be reviewed under these GPs.

6. Single and Complete Projects means the total project proposed or accomplished by one owner/developer or partnership or other association of owners/developers. The GPs shall not be used for piecemeal work and shall be applied to single and complete projects.

a. Proponents must quantify any permanent fill associated with the single and complete project that has occurred since October 5, 1984 and provide that information in the PCN. For real estate subdivisions created or subdivided after October 5, 1984, a PCN is required for any discharge which would cause the aggregate total loss of waters of the U.S. for the entire subdivision to exceed 5,000 square feet.

b. For non-linear projects, a single and complete project must have independent utility. Portions of a multi-phase project that depend upon other phases of the project do not have independent utility. Phases of a project that would be constructed, even if the other phases were not built, can be considered as separate single and complete projects with independent utility.

c. Unless the Corps determines the activity has independent utility, all components of a single project and/or all planned phases of a multi-phased project (e.g., subdivisions should include all work such as roads, utilities, and lot development) shall be treated together as constituting one single and complete project.

d. For linear projects such as power lines or pipelines with multiple crossings, a "single and complete project" is all crossings of a single water of the U.S. (i.e. single waterbody) at a specific location. For linear projects crossing a single waterbody several times at separate and distant locations, each crossing is considered a single and complete project. However, individual channels in a braided stream or river, or individual arms of a large, irregularly-shaped wetland or lake, etc., are not separate waterbodies, and crossings of such features cannot be considered separately. If any crossing requires a PCN review or an individual permit review, then the entire linear project shall be reviewed as one project under PCN or the individual permit procedures.

7. Historic Properties.

a. No undertaking shall cause effects (defined at 33 CFR 325 Appendix C and 36 CFR 800) on properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places[3], including previously unknown historic properties within the permit area, unless the Corps or another Federal action agency has satisfied the consultation requirements of Section 106 of the National Historic Preservation Act (NHPA). The State Historic Preservation Officer (SHPO), Tribal Historic Preservation Officer (THPO) and the National Register of Historic Places can assist with locating information on: i) previously identified historic properties; and ii) areas with potential for the presence of historic resources, which may require identification and evaluation by qualified historic preservation and/or archaeological consultants in consultation with the Corps and the SHPO and/or THPO(s).

b. For activities eligible for SV (inland projects), proponents must ensure and document that the activity will not cause effects as stated in 7(a). Proponents must submit an application to the Corps if the authorized activity may cause effects as stated in 7(a) as soon as possible to ensure that the Corps is aware of any potential effects of the permitted activity on any historic property to ensure all Section 106 requirements.

c. All PCN (inland projects): i) show notification to the SHPO and applicable THPO(s)[4] for their identification of historic properties, ii) state which historic properties may be affected by the proposed work or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties, and iii) include any available documentation from the SHPO or THPO(s) indicating that there are or are not historic properties affected. Starting consultation early in project planning can save proponents time and money.

[3] The majority of historic properties are not listed on the National Register of Historic Places and may require identification and evaluation by qualified historic preservation and/or archaeological consultants in consultation with the Corps and the SHPO and/or THPO(s).

[4] Appendix E, 3(a) & (b). Historic Resources, provides contact information and each tribe's "area of concern."

d. If you discover any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by this permit, you must immediately notify the district engineer of what you have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The district engineer will initiate the Federal, Tribal and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

8. Corps Property and Federal Projects

a. In addition to any authorization under these GPs, proponents must contact the Corps Real Estate Division at (978) 318-8585 for work occurring on or potentially affecting Corps properties and/or Corps-controlled easements to initiate reviews and determine what real estate instruments are necessary to perform work. Permittees may not commence work on Corps properties and/or Corps-controlled easements until they have received any required Corps real estate documents evidencing site-specific permission to work.

b. Any proposed temporary or permanent modification or use of a Federal project (including but not limited to a levee, dike, floodwall, channel, anchorage, seawall, bulkhead, jetty, wharf, pier or other work built but not necessarily owned by the United States), which would obstruct or impair the usefulness of the Federal project in any manner, and/or would involve changes to the authorized Federal project's scope, purpose, and/or functioning that go beyond minor modifications required for normal operations and maintenance, is not eligible for SV and will also require review and approval by the Corps pursuant to 33 USC 408. Where Section 408 is applicable, a decision on a Department of the Army general permit application will not be rendered prior to the decision on a Section 408 request.

9. National Lands. Activities that impinge upon the value of any National Wildlife Refuge, National Forest, National Marine Sanctuary or any area administered by the National Park Service, U. S. Fish and Wildlife Service (USFWS) or U.S. Forest Service are not eligible for SV.

10. Wild and Scenic Rivers. Any activity that occurs in the designated main stem of, within 0.25 miles up or downstream of the designated main stem of, or in tributaries within 0.25 miles of the designated main stem of a National Wild and Scenic River, or that has the potential to alter flows within a river within the National Wild and Scenic River System is not eligible for SV regardless of the size of the impacts unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status. This condition applies to both designated Wild and Scenic Rivers and rivers officially designated by Congress as study rivers for possible inclusion while such rivers are in official active study status.

As of July 15, 2016, affected rivers in Connecticut include: the West Branch of the Farmington River from Colebrook to Canton (designated river); the Eightmile River and tributaries in Salem, Lyme and East Haddam (designated river); and the Lower Farmington River from Canton to Windsor (study river – including its tributary Salmon Brook). Additional information can be found at: http://www.rivers.gov/connecticut.php

11. Federal Threatened and Endangered Species.

a. No activity is authorized which: a) is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify the critical habitat of such species; b) "may affect" a listed species or critical habitat, unless Section 7 consultation addressing the effects of the proposed activity has been completed; or c) violates the ESA.

b. An application to the Corps is required if a threatened or endangered species, a species proposed for listing as threatened or endangered, or designated or proposed critical habitat (all hereinafter referred to as "listed species or habitat") under U.S. Fish and Wildlife Service (USFWS) jurisdiction is present in the action area[5]. Applicants must determine this from the Official Species List, which they must obtain from

[5] The "Endangered Species Consultation Handbook – Procedures for Conducting Consultation and Conference Activities under Section 7 of the ESA," defines action area as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. (50 CFR 402.02)."

http://ecos.fws.gov/ipac. This USFWS IPaC website will record the request and immediately email the list to you. Include the list with all applications. (Note: An activity remains SV eligible if the Official Species List states northern long-eared bats (Myotis septentrionalis) are present and the activity will not cut or remove trees ≥3 inches dbh. Contact the Corps (see page 55) if cutting or clearing trees ≥3 inches dbh and the activity is otherwise SV eligible.)

For listed species or habitat under NMFS jurisdiction, the Corps has determined that all work eligible for SV will have no effect on listed species or habitat; therefore project proponents are not required to check for listed species or habitat for work that is SV eligible.

c. Federal agencies should follow their own procedures for complying with the requirements of the ESA. Work may be eligible for SV if another Federal agency has satisfied the requirements of Section 7 of the ESA. Upon request, permittees must provide the Corps with the appropriate documentation to demonstrate compliance with those requirements.

12. Essential Fish Habitat. As part of the review process, the Corps will coordinate with the National Marine Fisheries Service (NMFS) in accordance with the 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act (MSA) to protect and conserve the habitat of marine, estuarine and anadromous finfish, mollusks, and crustaceans. This habitat is termed "Essential Fish Habitat," (EFH) and is broadly defined to include "those waters and substrate necessary to fish for spawning, breeding, feeding and growth to maturity." All species managed under the MSA have had EFH designations. There are 61 species with EFH in the coastal waters of southern New England. Applicants may be required to describe and identify potential impacts to EFH. For instance, in Connecticut, this act protects Atlantic salmon (*Salmo salar*) habitat. Any work in the main stem or tributary streams of the Connecticut River watershed that are being managed for Atlantic salmon are **NOT** eligible for authorization under SV of these GPs because the activity requires screening for potential impacts to designated EFH. Conservation recommendations regarding the protection of EFH for species managed under the MSA made by NMFS will normally be included as special conditions in any permit issued by the Corps. Information on the location of EFH can be obtained from NMFS. The NMFS has established a web site at www.nero.nmfs.gov/RO/DOC/appguide1.html.

13. Navigation.

a. No activity may cause more than a minimal adverse effect on navigation.

b. Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States.

c. Any structure or work that extends closer to the horizontal limits of any Corps Federal Navigation Project (see Appendix H) than a distance of three times the project's authorized depth shall be subject to removal at the owner's expense prior to any future Corps dredging or the performance of periodic hydrographic surveys. This is applicable to SV and PCN.

d. There shall be no unreasonable interference with navigation by the existence or use of the activity authorized herein, and no attempt shall be made by the permittee to prevent the full and free use by the public of all navigable waters at or adjacent to the activity authorized herein.

e. The permittee understands and agrees that if future U.S. operations require the removal, relocation, or other alteration of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the U.S. No claim shall be made against the U.S. on account of any such removal or alteration.

f. An application to the Corps is required for all work in, over or under an FNP or its buffer zone[13] unless otherwise indicated in Appendix 1.

14. Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following: (a) damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes; (b) damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the U.S. in the public interest; (c) damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit;

(d) design or construction deficiencies associated with the permitted work; (e) damage claims associated with any future modification, suspension, or revocation of this permit.

15. Heavy Equipment in Wetlands. Operating heavy equipment other than fixed equipment (drill rigs, fixed cranes, etc.) within wetlands shall be minimized, and such equipment shall not be stored, maintained or repaired in wetlands, to the maximum extent practicable. Where construction requires heavy equipment operation in wetlands, the equipment shall either have low ground pressure (typically <3 psi), or it shall be placed on swamp/construction/timber mats (herein referred to as "construction mats") that are adequate to support the equipment in such a way as to minimize disturbance of wetland soil and vegetation. Construction mats are to be placed in the wetland from the upland or from equipment positioned on swamp mats if working within a wetland. Dragging construction mats into position is prohibited. Other support structures that are capable of safely supporting equipment may be used with written Corps authorization. Similarly, the permittee may request written authorization from the Corps to waive use of mats during frozen or dry conditions. An adequate supply of spill containment equipment shall be maintained on site. Construction mats should be managed in accordance with the Construction Mat BMPs at
http://www.nae.usace.army.mil/Portals/74/docs/regulatory/StateGeneralPermits/NEGP/BMPConstructionMats21Jan2015.pdf

16. Temporary Fill.

a. Temporary fill, construction mats and corduroy roads shall be **entirely** removed as soon as they are no longer needed to construct the authorized work. Temporary fill shall be placed in its original location or disposed of at an upland site and suitably contained to prevent its subsequent erosion into waters of the U.S.

b. All temporary fill and disturbed soils shall be stabilized to prevent its eroding into waters of the U.S. where it is not authorized. Work shall include phased or staged development to ensure only areas under active development are exposed and to allow for stabilization practices as soon as practicable. Temporary fill must be placed in a manner that will prevent it from being eroded by expected high flows.

c. Unconfined temporary fill authorized for discharge into waters of the U.S. shall consist of material that minimizes impacts to water quality (e.g. washed stone, stone, etc.).

d. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable when temporary structures, work, and discharges of dredged or fill material, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Materials shall be placed in a location and manner that does not adversely impact surface or subsurface water flow into or out of the wetland. Temporary fill authorized for discharge into wetlands shall be placed on geotextile fabric or other appropriate material laid on the pre-construction wetland grade where practicable to minimize impacts and to facilitate restoration to the original grade. Construction mats are excluded from this requirement.

e. Construction debris and/or deteriorated materials shall not be located in waters of the U.S.

17. Restoration of Inland Wetland Areas.

a. Upon completion of construction, all disturbed wetland areas (the disturbance of these areas must be authorized) shall be stabilized with a wetland seed mix containing only plant species native to New England and shall not contain any species listed in the "Invasive and Other Unacceptable Plant Species" Appendix D in the "New England District Compensatory Mitigation Guidance" found at
http://www.nae.usace.army.mil/Portals/74/docs/regulatory/Mitigation/CompensatoryMitigationGuidance.pdf

b. The introduction or spread of invasive plant species in disturbed areas shall be controlled. If swamp or timber mats are to be used, they shall be thoroughly cleaned before re-use.

c. In areas of authorized temporary disturbance, if trees are cut they shall be cut at or above ground level and not uprooted in order to prevent disruption to the wetland soil structure and to allow stump sprouts to revegetate the work area, unless otherwise authorized.

d. Wetland areas where permanent disturbance is not authorized shall be restored to their original condition and elevation, which under no circumstances shall be higher than the pre-construction elevation. Original condition means careful protection and/or removal of existing soil and vegetation, and replacement back to the original location such that the original soil layering and vegetation schemes are approximately the same, unless otherwise authorized.

18. Coastal Bank Stabilization. Projects involving construction or reconstruction/maintenance of bank stabilization structures within Corps jurisdiction should be designed to minimize environmental effects, effects to neighboring properties, scour, etc. to the maximum extent practicable. For example, vertical bulkheads should only be used in situations where reflected wave energy can be tolerated. This generally eliminates bodies of water where the reflected wave energy may interfere with or impact on harbors, marinas, or other developed shore areas. A revetment is sloped and is typically employed to absorb the direct impact of waves more effectively than a vertical seawall. It typically has a less adverse effect on the beach in front of it, abutting properties and wildlife. For more information on this topic, go to the Corps Coastal Engineering Manual (supersedes the Shore Protection Manual), located at http://chl.erdc.usace.army.mil. Select "Products/ Services," "Publications." Part 5, Chapter 7-8, a (2) c.

19. Soil Erosion, Sediment and Erosion Controls.

a. Adequate sedimentation and erosion control management measures, practices and devices, such as phased construction, installation of sediment control barriers (i.e. silt fence, vegetated filter strips, geotextile silt fences, erosion control mixes, hay bales or other devices) downhill of all exposed areas, retention of existing vegetated buffers, application of temporary mulching during construction, and permanent seeding and stabilization shall be installed and properly maintained to reduce erosion and retain sediment on-site during and after construction. They shall be capable of preventing erosion; of collecting sediment, suspended and floating materials; and of filtering fine sediment.

b. Temporary sediment control barriers shall be removed upon completion of work, but not until all disturbed areas are permanently stabilized. The sediment collected by these sediment barriers shall be removed and placed at an upland location and stabilized to prevent its later erosion into a waterway or wetland.

c. All exposed soil and other fills shall be permanently stabilized at the earliest practicable date.

20. Aquatic Life Movements & Management of Water Flows.

a. No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. Unless otherwise stated, activities impounding water in a stream require a PCN to ensure impacts to aquatic life species are avoided and minimized. All permanent and temporary crossings of waterbodies (e.g., streams, wetlands) shall be:

i. Suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species; and

ii. Properly aligned and constructed to prevent bank erosion or streambed scour both adjacent to and inside the culvert. Permanent and temporary crossings of wetlands shall be suitably culverted, spanned or bridged in such a manner as to preserve hydraulic and ecological connectivity between the wetlands on either side of the road.

b. To avoid adverse impacts on aquatic organisms, the low flow channel/thalweg shall remain unobstructed during periods of low flow, except when it is necessary to perform the authorized work.

c. To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization and storm water management activities. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the preconstruction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

21. Discharge of Pollutants. All activities involving any discharge of pollutants into waters of the U.S. authorized under these GPs shall be consistent with applicable water quality standards, effluent limitations, standards of performance, prohibitions, and pretreatment standards and management practices established pursuant to the CWA (33 U.S.C. 1251), and applicable state and local laws. If applicable water quality standards, limitations, etc., are revised or modified during the term of this permit, the authorized work shall be

modified to conform with these standards within 6 months of the effective date of such revision or modification, or within a longer period of time deemed reasonable by the District Engineer in consultation with the Regional Administrator of the EPA. Applicants may presume that state water quality standards are met with issuance of the Section 401 WQC (Applicable only to the Section 404 activity).

22. Spawning, Breeding, and Migratory Areas

a. Jurisdictional activities and impacts such as excavations, discharges of dredged or fill material, and/or suspended sediment producing activities in jurisdictional waters that provide value as fish migratory areas, fish and shellfish spawning or nursery areas, or amphibian and migratory bird breeding areas, during spawning or breeding seasons shall be avoided and minimized to the maximum extent practicable.

b. Jurisdictional activities in waters of the United States that provide value as breeding areas for migratory birds must be avoided to the maximum extent practicable. The permittee is responsible for obtaining any "take" permits required under the USFWS's regulations governing compliance with the Migratory Bird Treaty Act or the Bald and Golden Eagle Protection Act. The permittee should contact the appropriate local office of the USFWS to determine if such "take" permits are required for a particular activity.

25. Storage of Seasonal Structures. Coastal structures, such as pier sections and floats, that are removed from the waterway for a portion of the year (often referred to as seasonal structures) shall be stored in an upland location, located above mean high water (MHW) and **not** in tidal wetlands. These seasonal structures may be stored on the fixed, pile-supported portion of the structure that is seaward of MHW. This is intended to prevent structures from being stored on the marsh substrate and the substrate seaward of MHW.

26. Environmental Functions and Values. The permittee shall make every reasonable effort to carry out the construction or operation of the work authorized herein in a manner that minimizes any adverse impacts on existing fish, wildlife, and the environmental to the extent practicable. The permittee will discourage the establishment or spread of plant species identified as non-native invasive species by any federal or state agency.

27. Vernal Pools.

a. Only vernal pools that meet the current definition of waters of the U.S. are regulated by the Corps.

b. Direct and indirect adverse effects to all vernal pools (VPs), including their envelopes and critical terrestrial habitats (VP Management Areas), shall be avoided and minimized to the maximum extent practicable. Site clearing, grading, and construction activities associated with a regulated activity in the VP Management Area may cause these adverse effects to the VP.

c. When any regulated activities occur within 750 feet of a vernal pool, the following management practices must be followed for all work within any VP Management Area (750' of a VP's edge) *in order to qualify for SV*:

i. No disturbance within the VP Depression or VP Envelope (area within 100 feet of the VP Depression's edge)– does not apply to temporary impact associated with construction mats in previously disturbed areas of existing utility projects or linear transportation projects provided there is a Vegetation Management Plan that avoids, minimizes and mitigates impacts to aquatic resources.

ii. Maintain a minimum of 75% of the Critical Terrestrial Habitat (area within 100-750 feet of the VP Depression's edge) as unfragmented forest with at least a partly-closed canopy of overstory trees to provide shade, deep litter and woody debris;

iii. Maintain or restore forest corridors connecting wetlands and significant vernal pools;

iv. Minimize forest floor disturbance;

v. Maintain native understory vegetation and downed woody debris; and

vi. Cape Cod style-curbing or no curbing options shall be used on new roads to facilitate amphibian passage.

d. A PCN is required for any regulated activity within 750' of a vernal pool when all work within the VP Management Area does not comply with the SV requirements in (c) above. Information on directional buffers in accordance with the VP Directional Buffer Guidance document may be provided in order to demonstrate minimal impact and avoid compensation requirements. Conservation of the un-impacted area within the VP Management Area will often be required.

28. Invasive Species.

a. The introduction, spread, or the increased risk of invasion of invasive plant or animal species on the project site, into new or disturbed areas, or areas adjacent to the project site caused by the site work shall be avoided. Hence, swamp and timber mats shall be thoroughly cleaned before reuse.

b. Unless otherwise directed by the Corps, all applications for PCN inland projects proposing fill in Corps jurisdiction shall include an Invasive Species Control Plan. Additional information can be found at www.hort.uconn.edu/cipwg/

29. Permit/Authorization Letter On-Site. For PCN projects, the permittee shall ensure that a copy of these GPs and the accompanying authorization letter are at the work site (and the project office) whenever work is being performed, and that all personnel with operational control of the site ensure that all appropriate personnel performing work are fully aware of its terms and conditions. The entire permit authorization shall be made a part of any and all contracts and sub-contracts for work that affects areas of Corps jurisdiction at the site of the work authorized by these GPs. This shall be achieved by including the entire permit authorization in the specifications for work. The term "entire permit authorization" means these GPs, including General Conditions and the authorization letter (including its drawings, plans, appendices and other attachments) and also includes permit modifications. If the authorization letter is issued after the construction specifications, but before receipt of bids or quotes, the entire permit authorization shall be included as an addendum to the specifications. If the authorization letter is issued after receipt of bids or quotes, the entire permit authorization shall be included in the contract or sub-contract as a change order. Although the permittee may assign various aspects of the work to different contractors or sub-contractors, all contractors and sub-contractors shall be obligated by contract to comply with all environmental protection provisions contained within the entire authorization letter, and no contract or sub-contract shall require or allow unauthorized work in areas of Corps jurisdiction.

30. Inspections. The permittee shall allow the Corps to make periodic inspections at any time deemed necessary in order to ensure that the work is being or has been performed in accordance with the terms and conditions of this permit. The Corps may also require post-construction engineering drawings for completed work or post-dredging survey drawings for any dredging work. To facilitate the inspection process, the following forms are required:

a. For **SV Coastal** projects, the permittee shall complete and return the **Compliance Certification Form** which will be attached to your verification letter.
b. For **SV Inland** projects, the permittee shall complete and return to the Corps the **Appendix E Self-Verification Form.** For all PCN projects, the permittee shall complete and return to the Corps both the **Work-Start Notification Form** and the **Compliance Certification Form** which will be provided as attachments with each authorization letter.

31. Maintenance. The permittee shall maintain the activity authorized by these GPs in good condition and in conformance with the terms and conditions of this permit. This does not include maintenance of dredging projects. Maintenance dredging is subject to the review thresholds in Appendix A – General Permit #7 as well as any conditions included in a written Corps authorization. Maintenance dredging includes only those areas and depths previously authorized and dredged. Some maintenance activities may not be subject to regulation under Section 404 in accordance with 33 CFR 323.4(a) (2).

32. Property Rights. These GPs do not convey any property rights, either in real estate or material, or any exclusive privileges, nor does it authorize any injury to property or invasion of rights or any infringement of federal, state, or local laws or regulations.

33. Transfer of GP Verifications. When the work authorized by these GPs are still in existence at the time the property is transferred, the terms and conditions, including any special conditions, will continue to be binding on the entity or individual who received the authorization, as well as the new owner(s) of the property. If the permittee sells the property associated with a General Permit authorization, the permittee may transfer the General Permit authorization to the new owner by submitting a letter to the Corps to validate the transfer. A copy of the General Permit authorization letter must be attached to the letter, and the letter must include the

following statement: “The terms and conditions of these General Permits, including any special conditions, will continue to be binding on the new owner(s) of the property”. This letter should be signed by both the seller and new property owner(s).

34. Modification, Suspension, and Revocation. This permit and any individual authorizations issued thereof may either be modified, suspended, or revoked in whole or in part pursuant to the policies and procedures of 33 CFR 325.7; and any such action shall not be the basis for any claim for damages against the United States.

35. Special Conditions. The Corps may impose other special conditions on a project authorized pursuant to this general permit that are determined necessary to minimize adverse environmental effects or based on any other factor of the public interest. These may be based on concerns from CT DEEP or a Federal resource agency. Failure to comply with all conditions of the authorization, including special conditions, will constitute a permit violation and may subject the permittee to criminal, civil, or administrative penalties and/or restoration.

36. False or Incomplete Information. If the Corps makes a determination regarding the eligibility of a project under this permit, and subsequently discovers that it has relied on false, incomplete, or inaccurate information provided by the permittee, the authorization will not be valid, and the U.S. government may institute appropriate legal proceedings.

37. Abandonment. If the permittee decides to abandon the activity authorized under this General Permit, unless such abandonment is merely the transfer of property to a third party, he/she may be required to restore the area to the satisfaction of the Corps.

38. Enforcement cases. These GPs do not apply to any existing or proposed activity in Corps jurisdiction associated with an on-going Corps or EPA enforcement action, until such time as the enforcement action is resolved or the Corps determines that the activity may proceed independently without compromising the enforcement action.

39. Duration of Authorization. These GPs expire five years from the date issued as listed at the top of the cover sheet. Activities authorized by these GPs that have either commenced (i.e., are under construction) or are under contract to commence in reliance upon this authorization will have an additional year from the expiration date to complete the work. The permittee must be able to document to the Corps’ satisfaction that the project was under construction or under contract by the appropriate date. If work is not completed within the one year extended timeframe, the permittee must contact the Corps. The Corps may issue a new authorization provided the project meets the terms and conditions of the CT GPs current at the time.

Activities authorized under these GPs will remain authorized until they expire, unless discretionary authority has been exercised on a case-by-case basis to modify, suspend, or revoke the authorization in accordance with 33 CFR 325.2(e)(2).

Activities completed under the SV or PCN authorizations of these GPs will continue to be authorized after its expiration date.

DISTRICT ENGINEER DATE

APPENDIX C

GENERAL PERMIT - STANDARD AQUACULTURE
TERMS AND CONDITIONS

DEPARTMENT OF THE ARMY/STATE OF CONNECTICUT

2016 Connecticut General Permit

1. Aquaculture activities under this General Permit as identified within Appendix 2, Section F are subject to the current General Permit Conditions and Requirements of the Connecticut General Permit.

2. The project proponent must receive all applicable local and state authorizations for shellfish and aquaculture related activities from Connecticut Department of Agriculture, Bureau of Aquaculture (CT DA/BA) and the Connecticut Department of Environmental protection (CT DEP) including a CT DA/BA lease and/or license in accordance with Connecticut General Statutes (CGS) §22-11h, register, if required, with CT DEP Office of Long Island Sound Programs (OLISP) under the *General Permit for Minor Aquaculture Activities and/or General Permit for Placement of Cultch*, and be in receipt of a *Permit for Regulatory Markers* from CT DEP Boating Division, if one is required.

3. Before the authorized structures are installed the project proponent **must** submit a permit application and receive authorization for Regulatory Markers (Link to Regulatory Marker Permit) from the CT DEP Boating Division, Navigation Safety/Boating Access Unit, P.O. Box 280, 333 Ferry Road, Old Lyme, CT 06371-0280. If CT DEP Boating regulation does not apply, the applicant shall contact the U.S. Coast Guard (USCG), First District; Aids to Navigation Branch at 408 Atlantic Avenue, Boston, MA 02110-3350 (800-848-3942) to coordinate the proper buoy markers. The permittee shall install and maintain lights, markings and other features as the CT DEP/USCG requires. Note: Documentation of this coordination will be necessary for existing operations that seek reconfigurations and/or new approvals for structures from the Dept. of Army and for authorizations from the CT DA/BA.

4. Gear may not be located over or within beds of submerged aquatic vegetation (SAV) such as eelgrass or turtle grass, and coastal wetlands (salt marsh), nor shall such beds or vegetated marsh areas be damaged or removed. Routine lease activity including cage maintenance, washing etc. shall not occur within 25 feet of the edge of beds of SAV.

5. All gear shall be designed and deployed in such a manner as to limit, to the greatest extent practicable, negative impacts on avian resources such as, but not limited to, shore birds, wading birds or members of the waterfowl group. This is meant to include nesting, feeding or resting activities by migratory birds identified at 50 CFR 10.13.

6. Installation of structures, their mooring tackle and lines and any attendant vessels shall not create a hazard or interfere with existing navigation uses in the waterway, and structures shall be set back from the Federal Navigation Project (FNP) a distance of at least 200 feet. A list of Connecticut FNP projects can be obtained from the U.S Army Corps of Engineers website (Link to Federal Navigation Projects).

7. The right of the public to traverse or utilize the waters not physically occupied by authorized structures and/or moored vessels within the areal limits of the authorized gear perimeter shall not be impeded.

8. The placement of cultch shall occur only in appropriate locations for working the bed bottom and colonization by oysters, based upon factors of salinity, water quality, water circulation patterns, and substrate composition and such placement shall not create or exacerbate adverse impact to any aquatic resource (finfish, shellfish, marine mammals, coastal birds), water quality, Essential Fish Habitat[1] or Special Aquatic Sites[2].

9. New applications of cultch and spatted-shell for the purposes of enhancement or restoration of a native shellfish population and for bottom cultivation associated with commercial shellfish aquaculture on leased grounds cannot be placed within SAV and is limited to the minimum amount necessary for coverage of the target area.

10. The permittee shall be responsible to remove all gear and associated equipment within any leased or designated shellfish area in the event that the operator surrenders or loses the right to its use. [3]

[1] Essential Fish Habitat: Those waters and substrate necessary to fish for spawning, breeding, feeding and growth to maturity.

[2] Special Aquatic Sites: Include Wetlands (inland and salt marsh), intertidal mud flats, vegetated shallow (permanently inundated areas that support rooted aquatic vegetation such as eelgrass, celery grass and tapegrass), and coral reefs. Per $) CFR Part 230 Subpart E.

[3] In some situations, a performance bond may be required.

11. The subject aquaculture activity shall not discernibly interfere with natural sedimentation and erosion processes.

12. To be eligible for authorization under Category 1 of this permit, an upwelling device and/or work floats cannot exceed two units or a combined total square footage of 160 square feet. These structures must be permitted by State of Connecticut Navigation Safety/Boating Access Unit and/or marked in conformance with applicable State or U.S. Coast Guard Aids to Navigation.

13. Suspended cages or nets for the rearing or grow out of shellfish are permitted under this category, provided they are located wholly below and within the footprint of an existing, authorized fixed or floating structure and provided there is a vertical clearance of at least 2 feet between the bottom of the gear and the sea floor at MLW. The structures that the gear will be adhered to must be in conformance with the structures permit for that "site."

14. Aquaculture projects authorized herein shall not interfere with public shore access at or below mean high water or interfere with the access to any riparian or littoral property.

APPENDIX D

CONTACTS FOR CONNECTICUT GENERAL PERMIT:

1. FEDERAL

U.S. Army Corps of Engineers
New England District, Regulatory Division
696 Virginia Road
Concord, Massachusetts 01742-2751
(800) 343-4789 or (978) 318-8335
(978) 318-8303 - fax

National Park Service
North Atlantic Region
15 State Street
Boston, Massachusetts 02109
(617) 223-5203
(Wild & Scenic Rivers)

Federal Endangered Species (F&WS):
U.S. Fish and Wildlife Service
70 Commercial Street, Suite 300
Concord, New Hampshire 03301-5087
(603) 223-2541

Federal Endangered Species & EFH (NMFS)
National Marine Fisheries Service
55 Great Republic Drive
Gloucester, MA 01930
Phone: (978) 281-9102
(978) 281-9301 - fax

U.S. Environmental Protection Agency, Region I
5 Post Office Square, Suite 100
Boston, Massachusetts 02109
(617) 918-2000

Department of Agriculture
Bureau of Aquaculture
P. O. Box 97
190 Rogers Avenue
Milford, Connecticut 06460
(203) 874-0696

2. STATE OF CONNECTICUT

Department of Energy & Environmental Protection

(Coastal Projects)
Office of Long Island Sound Programs
79 Elm Street
Hartford, Connecticut 06106-5127
(860) 424-3034

(Inland Projects)
Inland Water Resources Division
79 Elm Street
Hartford, Connecticut 06106-5127
(860) 424-3019

(Mashantucket Pequot Tribal Nation)
Department of Natural Resources Protection &
Regulatory Affairs
550 Trolley Line Boulevard
P. O. Box 3202
Mashantucket, Connecticut 06338-3202

(Aquaculture Projects)
Connecticut Department of Agriculture
Bureau of Aquaculture & Laboratory
PO Box 97
Milford, CT 06460
(203) 874-0696

(State Endangered Species)
Bureau of Natural Resources
Wildlife Division
Natural Diversity Data
Base
79 Elm Street
Hartford, Connecticut 06106-5127
(860) 424-3011

3. HISTORIC PROPERTIES

Tribal Historic Preservation Officers

Mashantucket Pequot Tribal Nation
Marissa Trumbull, THPO
550 Trolley Line Boulevard
P. O. Box 3202
Mashantucket, Connecticut 06338-3202
Phone (860) 396-6887
Fax (860) 396-6914

Mohegan Tribe of Indians of Connecticut
James Quinn, Tribal Historic Preservation Officer
13 Crow Hill Rd.
Uncasville, CT 06382
Phone (860) 862-6393
Fax (860) 862-6395

Archaeological Information
Connecticut Commission on Culture and Tourism
Historic Preservation & Museum Division
One Constitution Plaza, 2nd Floor
Hartford, Connecticut 06103-6103
(860) 424-3005

4. ORGANIZATIONAL WEBSITES

U. S. Army Corps of Engineers www.nae.usace.army.mil/missions/regulatory.aspx
U. S. Army Corps of Engineers Headquarters www.usace.army.mil (click "Services for the Public")
U.S. Environmental Protection Agency www.epa.gov/owow/wetlands/
National Marine Fisheries Service www.nmfs.noaa.gov
U.S. Fish and Wildlife Service www.fws.gov
National Park Service www.nps.gov/rivers/index.html/
Federal Emergency Management Agency www.fema.gov
Connecticut Dept. of Energy & Environmental Protection http://www.ct.gov/deep/site/default.asp
Connecticut Dept. of Agriculture, Bureau of Aquaculture & Laboratory
http://www.ct.gov/doag/cwp/view.asp?a=3768&q=451508&doagNav=
U.S. Environmental Protection Agency, Region 1 – Low Impact Development-practices and state-specific resources, including CT DEP Stormwater Quality Manual www.epa.gov/ne/topics/water/lid.html
U.S. Environmental Protection Agency – Green Infrastructure website www.epa.gov/greeninfrastructure

US Army Corps of Engineers®
New England District

Appendix E: Self-Verification Form
(Required for all Inland Projects in Connecticut
NOT required if work is done within exterior boundaries of Mashantucket)

Before work commences, complete **all** fields (write "none" if applicable) attach state or local approval(s) and **plans** to this form and mail to:

U.S. Army Corps of Engineers, Permits & Enforcement Branch B,
696 Virginia Road, Concord, MA 01742-2751

Connecticut Department of Energy & Environmental Protection,
CT DEEP, Inland Water Resources Division, 79 Elm Street,
Hartford, CT 06106-5127

****

State or local Permit Number: _____
Date of State or local Permit: _____
State/local Project Manager: _____

Permittee: _____
Address, City, State & Zip: _____
Phone(s) and Email: _____

Contractor: _____
Address, City, State & Zip: _____
Phone(s) and Email: _____

Consultant/Engineer/Designer: _____
Address, City, State & Zip: _____
Phone(s) and Email: _____

Wetland/Soil Scientist Consultant: _____
Address, City, State & Zip: _____
Phone(s) and Email: _____

Project Location (provide detailed description & locus map): _____
_____
Address, City, State & Zip: _____
Latitude/Longitude Coordinates: _____
Waterway Name: _____
Project Purpose (include all aspects of the project including those not within Corps jurisdiction):
_____
_____

Work Description: _____
_____
_____
_____

Work will be done under the following GPs (Check all that have associated impacts):

_____Repair, replacement and maintenance of authorized or grandfathered structures/fills
_____Boat ramps/marine railways
_____Utility line activities
_____Shoreline stabilization projects
_____Aquatic habitat restoration, establishment and enhancement activities
_____Fish and wildlife harvesting, enhancement and attraction devices and activities
_____Oil Spill and Hazardous material cleanup
_____Cleanup of hazardous and toxic waste
_____Scientific measurements devices
_____Survey activities
_____New/expanded developments & recreational facilities
_____Linear transportation projects
_____Energy generation & renewable energy facilities and hydropower projects
_____Mining activities
_____Temporary fills not associated with a project within Corps jurisdiction
_____Agriculture activities

Area of total wetland impacts: temporary _____SF permanent _____SF
Area of total waterway impacts: temporary _____SF permanent_____SF

Does your project include any secondary impacts? Yes _____ No _____
(**Secondary Impacts include but are not limited to impacts to inland waters or wetlands drained, dredged, flooded, cleared or degraded resulting from a single and complete project. See General Condition 3.**

If YES, describe here: _____
_____
_____
_____

Proposed Work Dates: Start: _____ Finish: _____

Your name/signature below, as permittee, confirms that your project a) meets the self-verification criteria and b) that you accept and agree to comply with the applicable terms and conditions in the Connecticut General Permit.

APPENDIX F. DEFINITIONS

Artificial Reef: A structure which is constructed or placed in waters for the purpose of enhancing fishery resources and commercial and recreational fishing opportunities.

Boating facilities: These provide, rent or sell mooring space, such as marinas, yacht clubs, boat yards, dockominiums, town facilities, land/home owners, etc. Not classified as boating facilities are piers shared between two abutting properties or town mooring fields that charge an equitable user fee based on the actual costs incurred.

Currently serviceable: Useable as is or with some minor maintenance, but not so degraded as to essentially require reconstruction.

Dredged material & discharge of dredged material: These are defined at 33 CFR 323.2(c) and (d). The term dredged material means material that is excavated or dredged from waters of the U.S.

Enhancement: The manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s), but may also lead to a decline in other aquatic resource function(s). Enhancement does not result in a gain in aquatic resource area.

Expansions: Work that increases the footprint of fill, depth of basin or drainage feature, structures or floats, or slip capacity.

Fill material & discharge of fill material: These are defined at 33 CFR 323.2(e) and (f). The term fill material is defined as material placed in waters of the U.S. where the material has the effect of either replacing any portion of a water of the U.S. with dry land or changing the bottom elevation of any portion of a water of the U.S.

Federal navigation projects (FNPs): These areas are maintained by the Corps; authorized, constructed and maintained on the premise that they will be accessible and available to all on equal terms; and are comprised of Corps Federal anchorages, Federal channels and Federal turning basins. Information, including the limits, is provided at http://www.nae.usace.army.mil/Missions/Navigation.aspx

FNP Buffer Zone: The buffer zone of a Corps FNP is equal to three times the authorized depth of the FNP.

Individual Permit: A Department of the Army authorization that is issued following a case-by-case evaluation of a specific structure or work in accordance with the procedures of 33 CFR 322, or a specific project involving the proposed discharge(s) in accordance with the procedures of 33 CFR 323, and in accordance with the procedures of 33 CFR 325 and a determination that the proposed discharge is in the public interest pursuant to 33 CFR 320.

Living Shoreline: A term used to describe a combination of mostly naturally derived materials including plants, shell and rock or manufactured rock-like surfaces that are used along a shoreline exhibiting erosion to dissipate wave energy and to collect naturally deposited sediment.

Maintenance: Maintenance does not include any modification that changes the character, scope, or size of the original fill design.

Navigable waters of the United States: Navigable waters of the United States are those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. The Connecticut River has been determined to be a Navigable water of the United States. Refer to Title 33 CFR Part 329.

Ordinary High Water Mark (OHW): A line on the shore established by the fluctuations of water and indicated by physical characteristics, or by other appropriate means that consider the characteristics of the surrounding areas. See 33 CFR 328.3(e).

Practicable: Available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.

Rehabilitation: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function, but does not result in a gain in aquatic resource area.

Restoration: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource. For the purpose of tracking net gains in aquatic resource area, restoration is divided into two categories: reestablishment and rehabilitation.

Secondary effects: These are effects on an aquatic ecosystem that are associated with a discharge of dredged or fill materials, but do not result from the actual placement of the dredged or fill material. Information about secondary effects on aquatic ecosystems shall be considered prior to the time final Section 404 action is taken by permitting authorities. Some examples of secondary effects on an aquatic ecosystem are a) aquatic areas drained, flooded, fragmented, or mechanically cleared, b) fluctuating water levels in an impoundment and downstream associated with the operation of a dam, c) septic tank leaching and surface runoff from residential or commercial developments on fill, and d) leachate and runoff from a sanitary landfill located in waters of the U.S. See 40 CFR 230.11(h).

Shellfish dredging: Shellfish dredging typically consists of a net on a frame towed behind a boat to capture shellfish and leave the sediment behind. Dredges may skim the surface, utilize hydraulic jets, toothed rakes or suction apparatus.

Special aquatic sites: These include inland and saltmarsh wetlands, mud flats, vegetated shallows (submerged aquatic vegetation), sanctuaries and refuges, coral reefs, and riffle and pool complexes. These are defined at 40 CFR 230.3 and listed in 40 CFR 230 Subpart E.

Streambed: The substrate of the stream channel between the OHW marks. The substrate may be bedrock or inorganic particles that range in size from clay to boulders. Wetlands contiguous to the streambed, but outside of the OHW marks, are not considered part of the streambed.

Stream channelization: The manipulation of a stream's course, condition, capacity, or location that causes more than minimal interruption of normal stream processes. A channelized stream remains a water of the United States.

Temporary impacts: Temporary impacts include waters of the U.S. that are temporarily filled, flooded, excavated, drained or mechanically cleared because of the regulated activity.

Tide gates: Structures such as duckbills, flap gates, manual and self-regulating tide gates, etc. that regulate or prevent upstream tidal flows.

Vernal pools (VPs): VPs are depressional wetland basins that typically go dry in most years and may contain inlets or outlets, typically of intermittent flow. Vernal pools range in both size and depth depending upon landscape position and parent material(s). VPs support one or more of the following obligate indicator species: wood frog, spotted salamander, blue-spotted salamander, marbled salamander, Jefferson's salamander and fairy shrimp. However, they should preclude sustainable populations of predatory fish. The Corps may determine that a waterbody should not be designated as a VP based on available evidence.

Weir: A barrier across a river designed to alter the flow characteristics. In most cases, weirs take the form of a barrier, smaller than most conventional dams, across a river that causes water to pool behind the structure (not unlike a dam) and allows water to flow over the top. Weirs are commonly used to alter the flow regime of the river, prevent flooding, measure discharge and help render a river navigable.

Waters of the U.S.: Waters of the United States are defined in Title 33 CFR Part 328. These waters include more than navigable waters of the U.S. and are the waters where permits are required for the discharge of dredged or fill material pursuant to Section 404 of the Clean Water Act. Waters of the U.S. include jurisdictional wetlands.