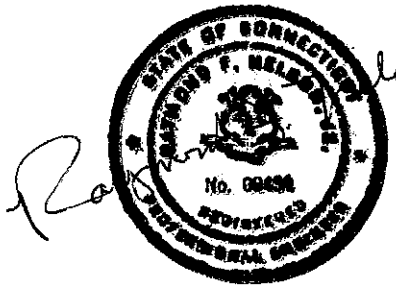
STORMWATER MANAGEMENT REPORT

FOR THE PROPOSED SITE DEVELOPMENT OF
360 BURNHAM STREET
SOUTH WINDSOR, CT

PREPARED FOR:
360 BURNHAM STREET, LLC
APPLICANT & PROPERTY OWNER

February 17, 2020



CONTENTS

REPORT NARRATIVE

PRE- & POST-DEVELOPMENT RUNOFF INPUT PARAMETERS

STORMWATER RUNOFF HYDROGRAPHS FOR EXISTING CONDITIONS

STORMWATER RUNOFF HYDROGRAPHS FOR PROPOSED CONDITIONS

WATER QUALITY VOLUMES (WQV) & WATER QUALITY FLOW (WQF) COMPUTATIONS

MAPS

STORM WATER MANAGEMENT REPORT

FOR THE PROPOSED SITE DEVELOPMENT OF
360 BURNHAM STREET
SOUTH WINDSOR, CT

INTRODUCTION

This Stormwater Management Report was prepared to address the requirements of Section II of the Town of South Windsor's *Public Improvement Specifications, Effective June 30, 2006,* as amended. The project site (hereinafter referred to as the "subject property" in this narrative) is located in an area which features a combination of developed industrial, commercial and moderate density residential properties, as well as some vacant and presently undeveloped properties. Burnham Street and its right-of way, on which the subject property has its frontage, is entirely located within the Town of East Hartford. The northern street line of Burnham Street is the present front boundary line of the subject property. The subject property, which is 6.6 acres in size, is presently undeveloped, although this property was used in the past for some unknown purpose, as remnants of past development on the property are evident, including old foundation locations. The entire property is shaped like the number "seven", with a dogleg to the west as viewed from its frontage on Burnham Street. For this land use proposal, approximately 1.5 acres of the property will be disturbed for the construction of the proposed development. The remainder of the property will remain "as-is" for the present development proposal.

The proposed development of the subject property will be the construction of 13 small business rental units in three separate buildings, with a total gross floor area of 13,400 square feet; construction of on-site storm water management facilities, including three storm water retention/infiltration basins with overflow discharges to either a catch basin on the north side of Burnham Street or to inland wetlands on the subject property; installation of on-site sanitary sewer, potable water supply, natural gas, electric and telecommunications facilities; other miscellaneous associated incidental construction; and land regrading and restoration, including earth cuts and fills, and finished landscaping.

MAPPING

A complete set of site development plans for this project has been prepared by Messier Survey, LLC and Raymond F. Nelson, Jr., P.E., Civil Engineer, and others, and is being submitted as part of an application to the Town of South Windsor Inland Wetlands Agency/Conservation Commission, Planning & Zoning Commission, and other Town bodies for approval of this project. These Site Development Plans are incorporated by reference as part of this report.

EXISTING STORM DRAINAGE FACILITIES AND STORMWATER RUNOFF PATTERNS

The only existing storm drainage facilities in the vicinity of the project site are those located in Burnham Street and its right-of-way, and are part of the Town of East Hartford's public infrastructure. The existing facilities include catch basins and connecting storm drainage piping. There are no constructed storm water management facilities on the subject property. At present, the storm water runoff pattern on much of the portion of the subject property to be developed is generally in an overall easterly to westerly direction across the property, either to a developed abutting property also fronting on Burnham Street, or to inland wetlands on the subject property. A small portion of the subject property along its eastern boundary drains to wetland areas in two locations on the subject property, which wetlands extend into the abutting property to the east. The topography of the portion of the subject property to be developed is quite flat, with surface elevations ranging from a low of about elevation 59.55 to a high of about elevation 63.7, as determined by the field survey performed for this project. The majority of the portion of the subject property to be developed is wooded. Some of the ground surface along the common

property line with the abutting developed property to the east features a gravel driveway and grassed area encroachment onto the subject property. The soil mapping units in the area of proposed development on the subject property, as mapped by the USDA NRCS, and as confirmed by George T. Logan, MS, PWS, CSE, Registered Soil Scientist, of REMA Ecological Services, LLC, are Ninigret Fine Sandy Loam in the upland area, Walpole Sandy Loam in the inland wetlands, and Udorthents-Urban Land Complex to the south of the north street line of Burnham Street.

PROPOSED STORMWATER MANAGEMENT CONSIDERATIONS FOR THE PROJECT SITE

Because the Town of East Hartford will not allow any stormwater runoff flow from the subject property to the existing storm water drainage system in Burnham Street less than that generated by a 100-year storm event, and due to the extreme flatness of the subject property and lack of any sufficient vertical elevation differential which would be required to construct a conventional stormwater runoff, conveyance and collection system to discharge to a water course or wetland on the property, the stormwater management system designed for this project will consist of three stormwater retention/ infiltration basins of sufficient volume capacity to accept in excess of the computed 100-year storm event runoff from the developed property. These basins have been designated as Basins No. 1, 2 and 3 on the project site development plan drawings.

Basin No. 1 will be located just to the north of the front property line of the subject property and to the east of the proposed driveway entrance to be constructed from Burnham Street. It will include an elevated catch basin which will connect to an existing catch basin in Burnham Street, to convey any flows reaching the basin in excess of the computed 100-year storm runoff.

Basin No. 2 will be located about midway into and on the west side of the portion of the subject property to be developed, and will have a riprap spillway to the adjacent inland wetland to convey any flows reaching the basin in excess of the computed 100-year storm runoff. The down-gradient sides of this basin will include a 3 foot wide level berm upgradient of adjacent inland wetland boundaries.

Basin No. 3 will be a long "J" shaped curvilinear basin which will be located along the east, south and west sides of the portion of the subject property to be developed. It will have the same level berm and overflow arrangement as Basin No. 2.

Virtually all of the stormwater runoff for the developed site will be directed to the basins. The exceptions will be the narrow strip of landscaped land between the proposed driveway and the western side property line of the subject property, and the narrow strips of landscaped land between the tops of the Basins No. 2 and 3 berms and adjacent downgradient wetlands boundaries and/or undisturbed existing vegetation. The tributary drainage area will also include a small area of hydraulically connected land on the abutting property to the east of the subject property, and within the right-of-way of Burnham Street.

DESIGN COMPUTATIONS

PEAK FLOW RATES & VOLUMES:

Peak flow rates and volumes for the existing (pre-development) and proposed (post-development) storm water runoff from the portion of the subject property to be developed, and hydraulically connected abutting properties were determined for the 2, 10, 25 and 100 year storm events, as required by the Ton of South Windsor's *Public Improvement Specifications*.

The design computations were performed using the Rational Method or Modified Rational Method, with the aid of the *Hydroflow Hydrographs 2004* computer software programs by InteliSOLVE, following manual determination of input parameters. Times of concentration were determined using the Seelye Nomograph.

WATER QUALITY VOLUME (WQV) & WATER QUALITY FLOW (WQF) :

Using the methodology detailed in Section 7 and Appendix B of the *2004 Connecticut Stormwater Quality Manual* by the Connecticut Department of Environmental Protection, the Water Quality Volume (WQV) and Water Quality Flow (WQF) for the stormwater runoff which will discharge to the proposed stormwater retention/infiltration basins for this project were computed.

Design computations for the storm water management analysis for this project, and maps depicting the tributary drainage areas for both the existing and the proposed conditions, are included as part of this report. It is to be noted that due the flatness of the subject property and limited variation in existing ground surface elevations, there are several distinct existing tributary drainage areas in the area of the property to be developed, whereas the individual tributary drainage areas will be larger once the site development occurs.

A summary of the computed values for the 100-year storm event, WQV, and WQF is as follows:

	Peak Runoff Rate (c.f.s.)	Runoff Volume (c.f.)	WQV (c.f.)	WQF (c.f.s.)	
Existing Drainage Area E1:	0.23	525	N/A	N/A	
Existing Drainage Area E2:	0.12	326	N/A	N/A	
Existing Drainage Area E3:	0.15	497	N/A	N/A	
Existing Drainage Area E4:	0.06	177	N/A	N/A	
Existing Drainage Area E5:	0.08	70	N/A	N/A	
Existing Drainage Area E6:	0.03	23	N/A	N/A	
Proposed Drainage Area P1:	1.71	2,190*	1,002	0.22	[Basin No. 1 volume = 2,310 c.f.]
Proposed Drainage Area P2:	2.34	2,941*	1,409	0.31	[Basin No. 2 volume = 3,725 c.f.]
Proposed Drainage Area P3:	0.78	3,106*	784	0.10	[Basin No. 3 volume = 4,036 c.f.]

*Computed by Modified Rational Method with 2xTc storm duration

DESIGN AND CONSTRUCTION DETAILS

Details of proposed storm water management facilities proposed for this project are included in the complete set of Site Development Plans for this project, as described above.

INPUT DATA FOR EXISTING (PRE-DEVELOPMENT) & PROPOSED (POST-DEVELOPMENT) STORMWATER RUNOFF COMPUTATIONS
360 BURNHAM STREET, SOUTH WINDSOR, CT

EXISTING (Total drainage area = 1.495 acres)

AREA E1

Total area = 0.481 acres
- 0.022 acres gravel surface @ c=0.90
- 0.010 acres grass surface @ c=0.30
- 0.449 acres wooded @ c=0.10

Composite c factor: [(.022)(.9) + (.010)(.3) + (.449)(.1)]/.481 = .14

Tc: ΔH = 155 ft. through woods
ΔV = 63.92 - 61.14 = 2.78 ft.
s = .0179
Tc = 40 minutes

AREA E2

Total area = 0.201 acres
- 0.021 acres gravel surface @ c=0.90
- 0.013 acres grass surface @ c=0.30
- 0.167 acres wooded @ c=0.10

Composite c factor: [(.021)(.9) + (.013)(.3) + (.167)(.1)]/.201 = .20

Tc: ΔH = 174 ft. through woods
ΔV = 63.92 - 61.87 = 2.05 ft.
s = .0118
Tc = 46 minutes

AREA E3

Total area = 0.831 acres
- 0.831 acres wooded @ c=0.10

Tc: ΔH = 238 ft. through woods
ΔV = 63.26 - 60.83 = 2.43 ft.
s = .0102
Tc = 54 minutes

AREA E4

Total area = 0.133 acres
- 0.033 acres grass surface @ c=0.30
- 0.100 acres wooded @ c=0.10

Composite c factor: [(.033)(.3) + (.108)(.1)]/.133 = .16

Tc: ΔH = 193 ft. through woods
ΔV = 63.50 - 61.92 = 1.58 ft.
s = .0082
Tc = 51 minutes

AREA E5

Total area = 0.094 acres
0.094 acres wooded @ c=0.15

Tc: ΔH = 60 ft. through woods
ΔV = 63.40 - 59.55 = 3.85 ft.
s = .0642
Tc = 14 minutes

AREA E6

Total area = 0.035 acres
0.035 acres wooded @ c=0.15

Tc: ΔH = 30 ft. through woods
ΔV = 63.40 - 62.00 = 1.40 ft.
s = .0467
Tc = 11 minutes

PROPOSED (Total drainage area = 1.465 acres)

AREA P1

Total area = 0.417 acres
0.286 acres impervious @ c=0.90
0.131 acres grass & landscaping @ c=0.30

Composite c factor: [(.286)(.9) + (.131)(.3)]/.417 = .71

Tc: *Segment 1:*
ΔH = 45 ft. over roof and in gutter
[*Disregard for Tc computation*]

Segment 2:
ΔH =5 ft. over grass to grass swale
[*Disregard for Tc computation*]

Segment 3:
ΔH = 180 ft. in grass swale and grass basin
ΔV = 62.25 - 60.45 = 1.80 ft.
s = .010
Tc = 16 minutes

AREA P2

Total area = 0.552 acres
0.401 acres impervious @ c=0.90
0.151 acres grass & landscaping @ c=0.30

Composite c factor: [(.401)(.9) + (.151)(.3)]/.552= .74

Tc: *Segment 1:*
ΔH = 45 ft. over roof and in gutter
[*Disregard for Tc computation*]

Segment 2:
ΔH = 49 ft. over pavement surface from face of building to curb line
ΔV = 63.35 - 63.22 = 0.13 ft.
s = .0027

Segment 3:
ΔH = 79 ft. in pavement gutter along curb line
ΔV = 63.22 - 62.43 = 0.79 ft.
s = .010

Segment 4:
ΔH = 18 ft. in paved leakoff
ΔV = 62.43 - 61.21 = 1.22 ft.
s = .068

Segment 5:
ΔH = 41 ft. in culvert
ΔV = 61.21 - 61.00 = 0.21 ft.
s = .005

⇨ For stormwater runoff computations, use combined segments 2-5 for first leg of travel path:

ΔH = 187 ft.
ΔV = 63.35 - 61.00 = 2.35 ft.
s = .0126
c = 0.9
Tt = 5.16 minutes

Segment 6:
ΔH = 60 ft. in grass basin
ΔV = 61.00 - 60.40 = 0.60 ft.
s = .010
Tt = 10.04 minutes

Total Tc = ∑ Tt for combined Segments 2-5 + Tt for Segment 6 = 15 minutes

AREA P3

Total area = 0.496 acres
0.217 acres impervious @ c=0.90
0.279 acres grass & landscaping @ c=0.30

Composite c factor: [(.217)(.9) + (.279)(.3)]/.496= .56

Tc: *Segment 1:*
ΔH = 45 ft. over roof and in gutter
[*Disregard for Tc computation*]

Segment 2:
ΔH =5 ft. over grass to grass swale
[*Disregard for Tc computation*]

Segment 3:
ΔH = 106 ft. in grass swale
ΔV = 62.22 - 61.00 = 1.22 ft.
s = .0115
Tt = 12.4 minutes

Segment 4:
ΔH = 432 ft. in grass basin
ΔV = 61.00 - 60.78 = 0.22 ft.
s = .0005
Tt = 40.7 minutes

Total Tc = ∑ Tt for Segment 3 + Tt for Segment 4 = 53 minutes

Hydrograph Return Period Recap

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	------	------	0.10	------	------	0.15	0.19	0.21	0.23	EXISTING DRAINAGE AREA E1
2	Rational	------	------	0.05	------	------	0.08	0.10	0.11	0.12	EXISTING DRAINAGE AREA E2
3	Rational	------	------	0.06	------	------	0.11	0.12	0.14	0.15	EXISTING DRAINAGE AREA E3
4	Rational	------	------	0.02	------	------	0.04	0.05	0.05	0.06	EXISTING DRAIANGE AREA E4
5	Rational	------	------	0.04	------	------	0.06	0.07	0.08	0.08	EXISTING DRAIANGE AREA E5
6	Rational	------	------	0.02	------	------	0.02	0.03	0.03	0.03	EXISTING DRAIANGE AREA E6

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	Rational	0.10	1	40	230	---	-----	-----	EXISTING DRAINAGE AREA E1
2	Rational	0.05	1	46	138	---	-----	-----	EXISTING DRAINAGE AREA E2
3	Rational	0.06	1	54	210	---	-----	-----	EXISTING DRAINAGE AREA E3
4	Rational	0.02	1	51	75	---	-----	-----	EXISTING DRAIANGE AREA E4
5	Rational	0.04	1	14	31	---	-----	-----	EXISTING DRAIANGE AREA E5
6	Rational	0.02	1	11	10	---	-----	-----	EXISTING DRAIANGE AREA E6

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	Rational	0.15	1	40	370	---	---	---	EXISTING DRAINAGE AREA E1
2	Rational	0.08	1	46	222	---	---	---	EXISTING DRAINAGE AREA E2
3	Rational	0.11	1	54	342	---	---	---	EXISTING DRAINAGE AREA E3
4	Rational	0.04	1	51	121	---	---	---	EXISTING DRAIANGE AREA E4
5	Rational	0.06	1	14	48	---	---	---	EXISTING DRAIANGE AREA E5
6	Rational	0.02	1	11	16	---	---	---	EXISTING DRAIANGE AREA E6

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	Rational	0.19	1	40	446	---	-----	-----	EXISTING DRAINAGE AREA E1
2	Rational	0.10	1	46	265	---	-----	-----	EXISTING DRAINAGE AREA E2
3	Rational	0.12	1	54	403	---	-----	-----	EXISTING DRAINAGE AREA E3
4	Rational	0.05	1	51	143	---	-----	-----	EXISTING DRAIANGE AREA E4
5	Rational	0.07	1	14	59	---	-----	-----	EXISTING DRAIANGE AREA E5
6	Rational	0.03	1	11	19	---	-----	-----	EXISTING DRAIANGE AREA E6

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	Rational	0.23	1	40	545	---	-----	-----	EXISTING DRAINAGE AREA E1
2	Rational	0.12	1	46	326	---	-----	-----	EXISTING DRAINAGE AREA E2
3	Rational	0.15	1	54	497	---	-----	-----	EXISTING DRAINAGE AREA E3
4	Rational	0.06	1	51	177	---	-----	-----	EXISTING DRAIANGE AREA E4
5	Rational	0.08	1	14	70	---	-----	-----	EXISTING DRAIANGE AREA E5
6	Rational	0.03	1	11	23	---	-----	-----	EXISTING DRAIANGE AREA E6

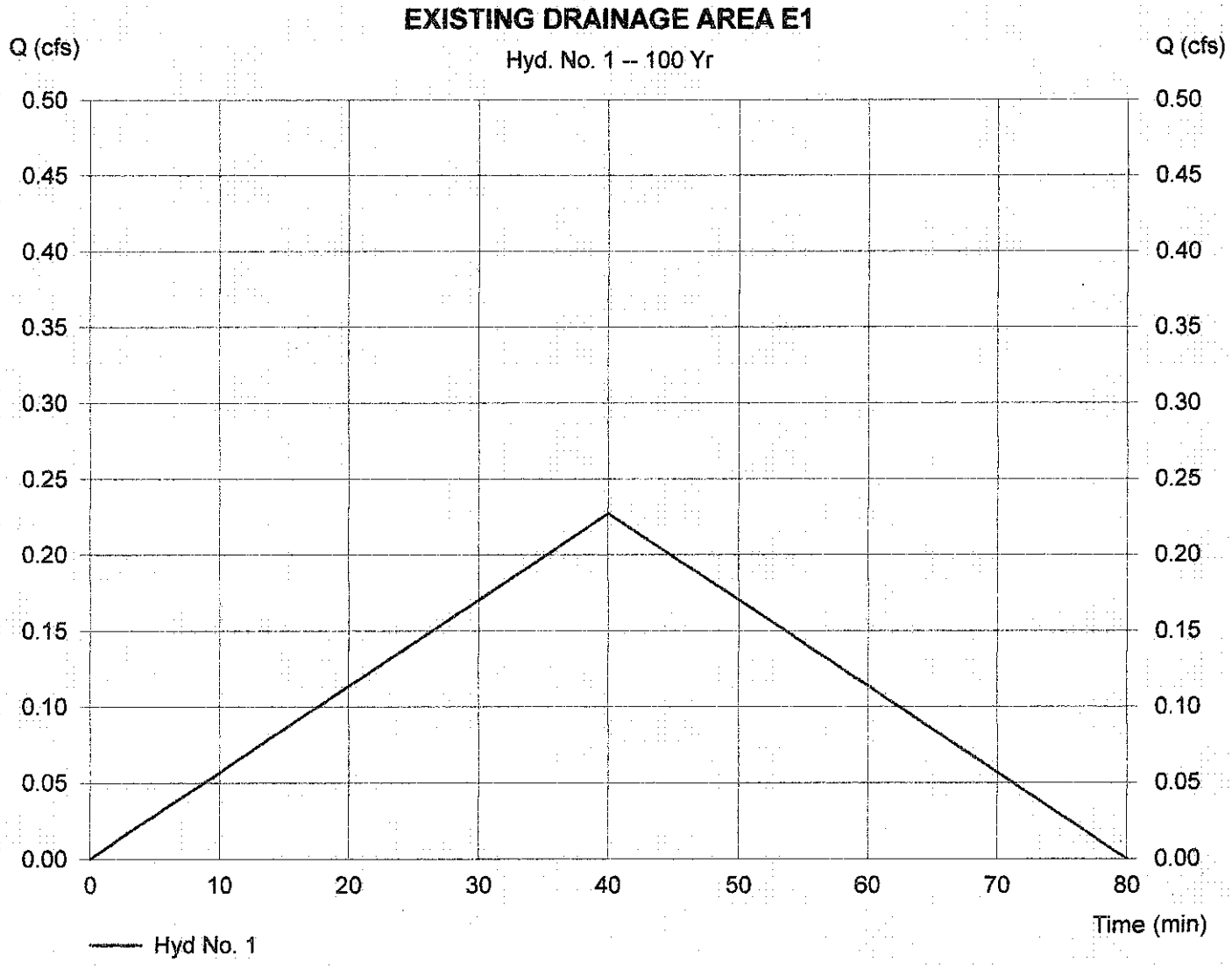
Hydrograph Plot

Hyd. No. 1

EXISTING DRAINAGE AREA E1

Hydrograph type	= Rational	Peak discharge	= 0.23 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 0.5 ac	Runoff coeff.	= 0.14
Intensity	= 3.370 in/hr	Tc by User	= 40 min
IDF Curve	= HARTFORD COUNTY.IDF	Asc/Rec limb fact	= 1/1

Hydrograph Volume = 545 cuft



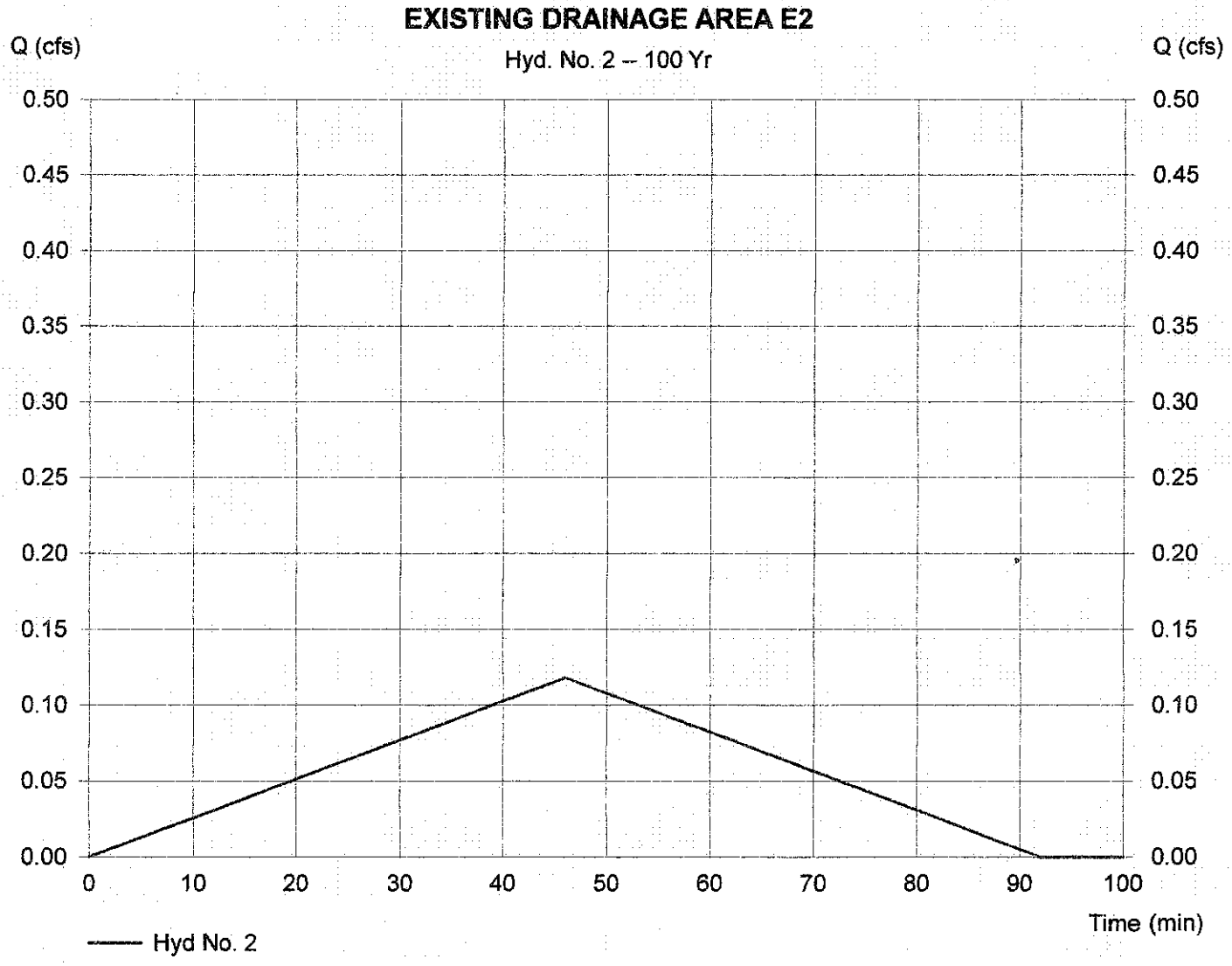
Hydrograph Plot

Hyd. No. 2

EXISTING DRAINAGE AREA E2

Hydrograph type	= Rational	Peak discharge	= 0.12 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 0.2 ac	Runoff coeff.	= 0.19
Intensity	= 3.089 in/hr	Tc by User	= 46 min
IDF Curve	= HARTFORD COUNTY.IDF	Asc/Rec limb fact	= 1/1

Hydrograph Volume = 326 cuft



Hydrograph Plot

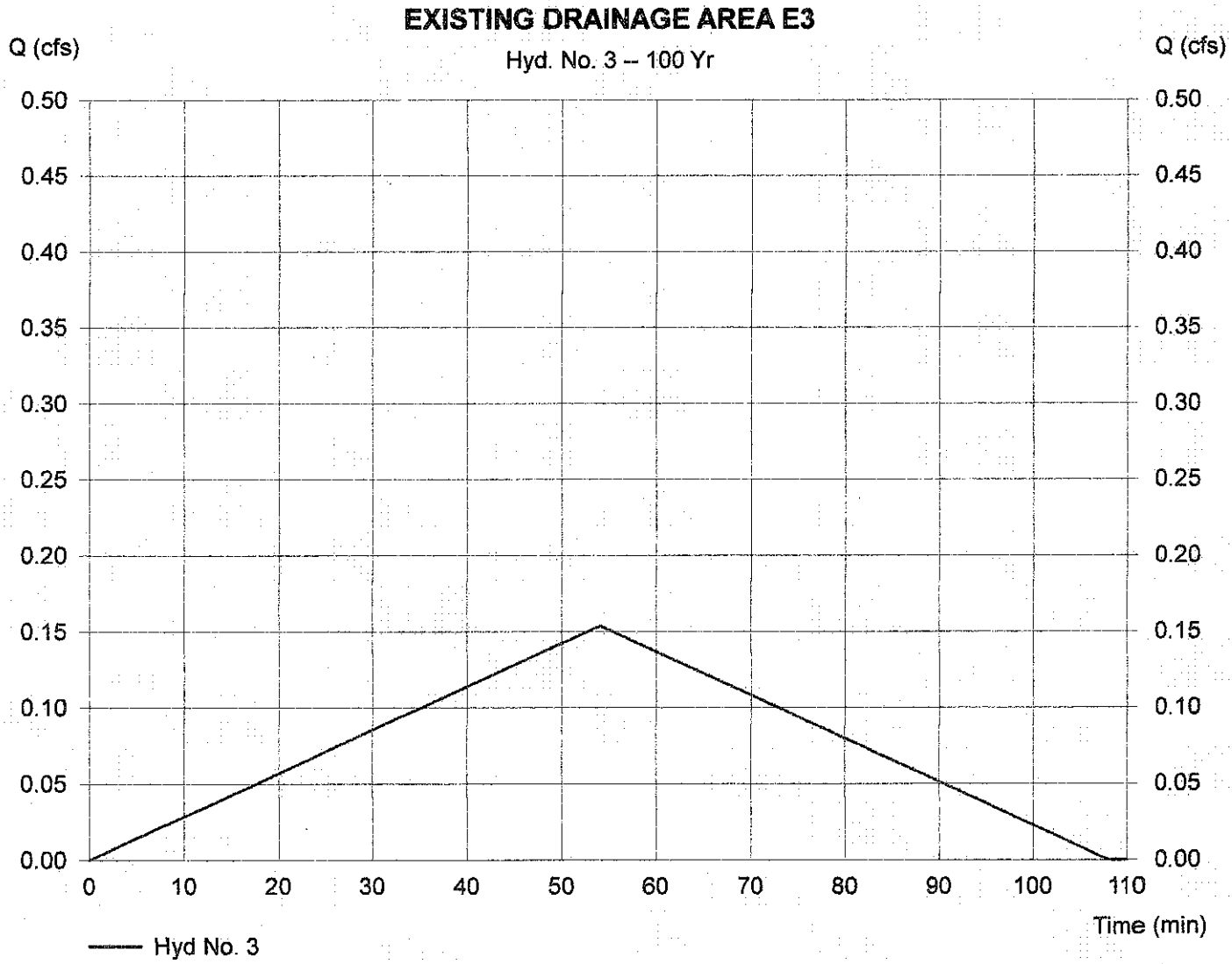
Hydraflow Hydrographs by Intelisolve | Monday, Feb 17 2020, 4:0 PM

Hyd. No. 3

EXISTING DRAINAGE AREA E3

Hydrograph type	= Rational	Peak discharge	= 0.15 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 0.6 ac	Runoff coeff.	= 0.1
Intensity	= 2.786 in/hr	Tc by User	= 54 min
IDF Curve	= HARTFORD COUNTY.IDF	Asc/Rec limb fact	= 1/1

Hydrograph Volume = 497 cuft



Hydrograph Plot

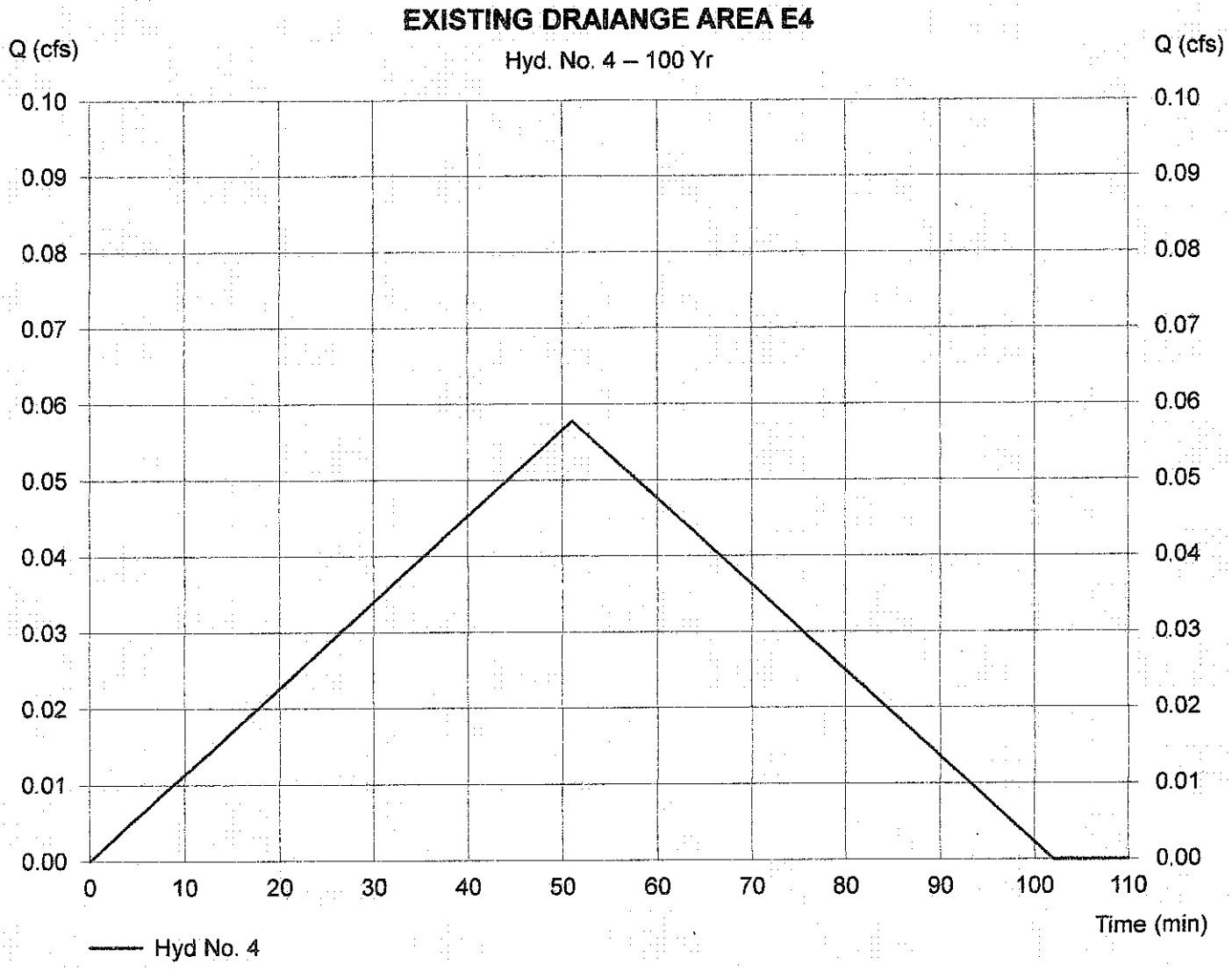
Hydraflow Hydrographs by Intelisolve | Monday, Feb 17 2020, 4:1 PM

Hyd. No. 4

EXISTING DRAIANGE AREA E4

Hydrograph type	= Rational	Peak discharge	= 0.06 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 0.1 ac	Runoff coeff.	= 0.15
Intensity	= 2.891 in/hr	Tc by User	= 51 min
IDF Curve	= HARTFORD COUNTY.IDF	Asc/Rec limb fact	= 1/1

Hydrograph Volume = 177 cuft



Hydrograph Plot

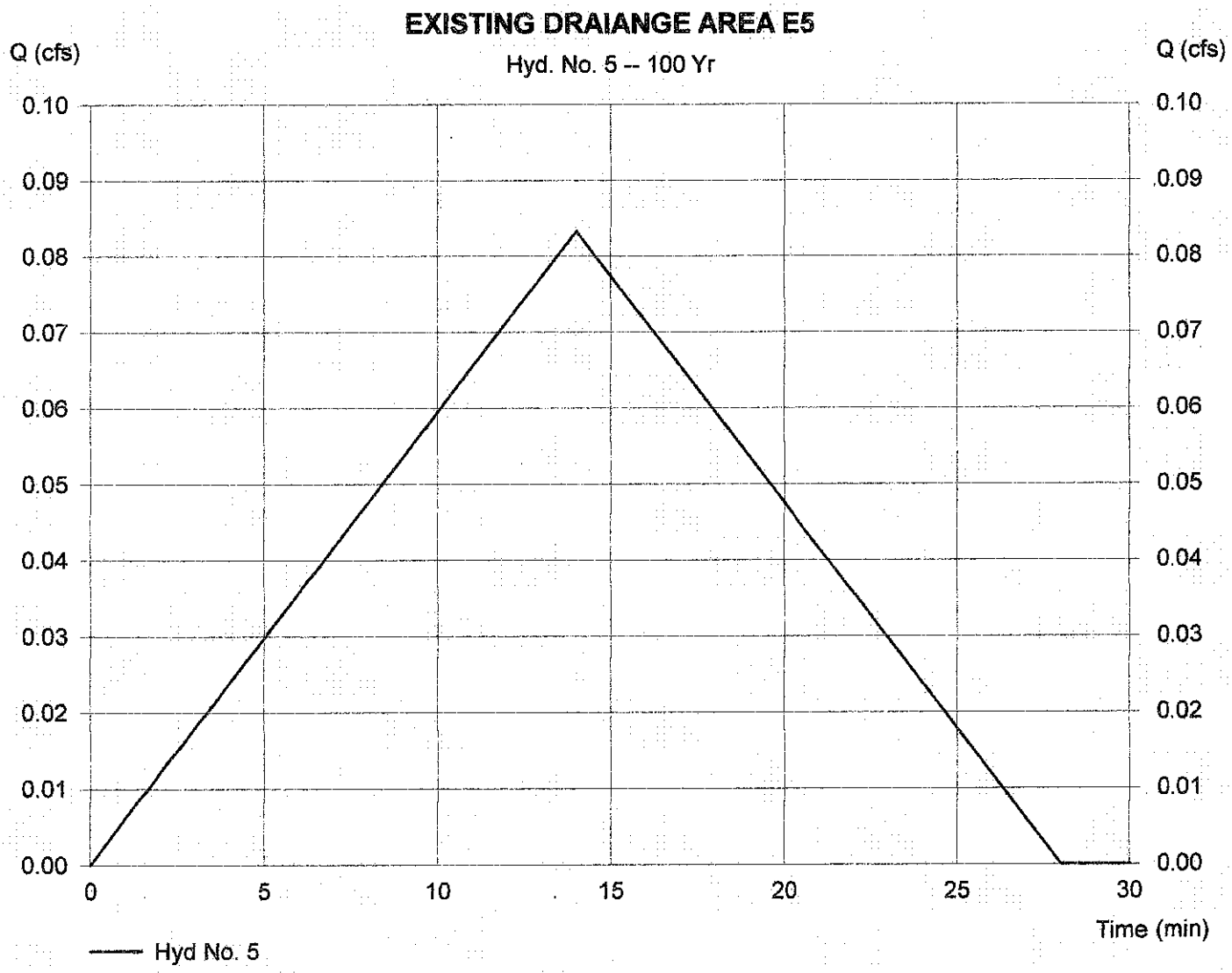
Hydraflow Hydrographs by Intelisolve | Monday, Feb 17 2020, 4:2 PM

Hyd. No. 5

EXISTING DRAIANGE AREA E5

Hydrograph type	= Rational	Peak discharge	= 0.08 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 0.1 ac	Runoff coeff.	= 0.15
Intensity	= 5.903 in/hr	Tc by User	= 14 min
IDF Curve	= HARTFORD COUNTY.IDF	Asc/Rec limb fact	= 1/1

Hydrograph Volume = 70 cuft



Hydrograph Plot

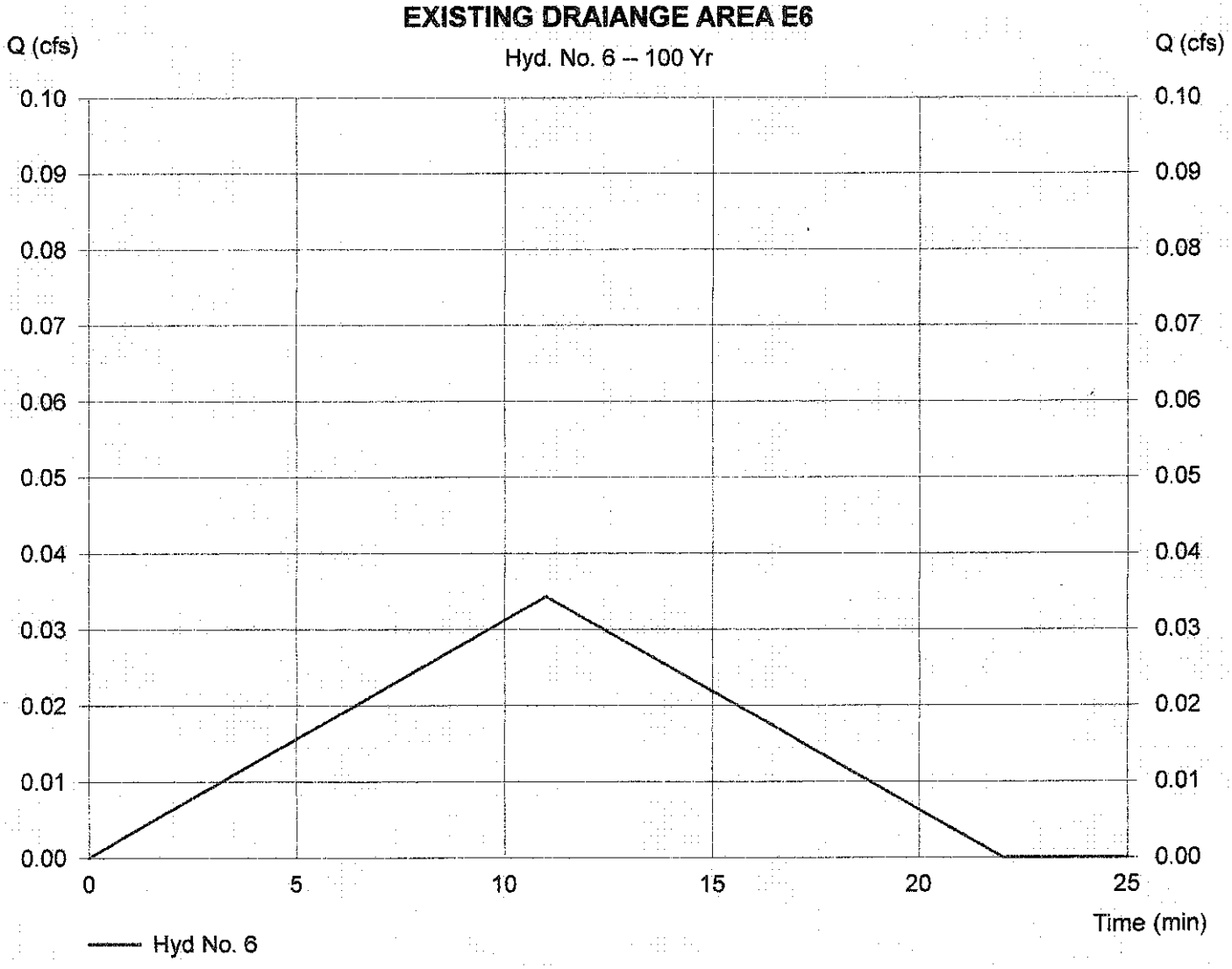
Hydraflow Hydrographs by Intelisolve | Monday, Feb 17 2020, 4:4 PM

Hyd. No. 6

EXISTING DRAIANGE AREA E6

Hydrograph type	= Rational	Peak discharge	= 0.03 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 0.0 ac	Runoff coeff.	= 0.15
Intensity	= 6.528 in/hr	Tc by User	= 11 min
IDF Curve	= HARTFORD COUNTY.IDF	Asc/Rec limb fact	= 1/1

Hydrograph Volume = 23 cuft



Hydrograph Return Period Recap

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	-----	-----	0.75	-----	-----	1.17	1.43	1.61	1.71	PROPOSED DRAINAGE AREA P1_
2	Mod. Rational	-----	-----	0.48	-----	-----	0.77	0.94	1.05	1.14	PROPOSED DRAINAGE AREA P1_
3	Rational	-----	-----	1.03	-----	-----	1.59	1.96	2.19	2.34	PROPOSED DRAIANGE AREA P2_
4	Mod. Rational	-----	-----	0.69	-----	-----	1.10	1.35	1.51	1.63	PROPOSED DRAINAGE AREA P2-
5	Rational	-----	-----	0.33	-----	-----	0.54	0.64	0.70	0.78	PROPOSED DRAINAGE AREA P3_
6	Mod. Rational	-----	-----	0.21	-----	-----	0.35	0.39	0.41	0.49	PROPOSED DRAINAGE AREA P3_

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	Rational	0.75	1	16	721	—	-----	-----	PROPOSED DRAINAGE AREA P1_
2	Mod. Rational	0.48	1	16	929	—	-----	-----	PROPOSED DRAINAGE AREA P1_
3	Rational	1.03	1	15	926	—	-----	-----	PROPOSED DRAIANGE AREA P2_
4	Mod. Rational	0.69	1	15	1,250	—	-----	-----	PROPOSED DRAINAGE AREA P2-
5	Rational	0.33	1	53	1,053	—	-----	-----	PROPOSED DRAINAGE AREA P3_
6	Mod. Rational	0.21	1	53	1,333	—	-----	-----	PROPOSED DRAINAGE AREA P3_

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	Rational	1.17	1	16	1,119	---	-----	-----	PROPOSED DRAINAGE AREA P1_
2	Mod. Rational	0.77	1	16	1,480	---	-----	-----	PROPOSED DRAINAGE AREA P1_
3	Rational	1.59	1	15	1,435	---	-----	-----	PROPOSED DRAIANGE AREA P2_
4	Mod. Rational	1.10	1	15	1,985	---	-----	-----	PROPOSED DRAINAGE AREA P2-
5	Rational	0.54	1	53	1,713	---	-----	-----	PROPOSED DRAINAGE AREA P3_
6	Mod. Rational	0.35	1	53	2,242	---	-----	-----	PROPOSED DRAINAGE AREA P3_

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	Rational	1.43	1	16	1,376	---	-----	-----	PROPOSED DRAINAGE AREA P1_
2	Mod. Rational	0.94	1	16	1,804	---	-----	-----	PROPOSED DRAINAGE AREA P1_
3	Rational	1.96	1	15	1,760	---	-----	-----	PROPOSED DRAIANGE AREA P2_
4	Mod. Rational	1.35	1	15	2,426	---	-----	-----	PROPOSED DRAINAGE AREA P2-
5	Rational	0.64	1	53	2,021	---	-----	-----	PROPOSED DRAINAGE AREA P3_
6	Mod. Rational	0.39	1	53	2,455	---	-----	-----	PROPOSED DRAINAGE AREA P3_

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	Rational	1.71	1	16	1,646	---	-----	-----	PROPOSED DRAINAGE AREA P1_
2	Mod. Rational	1.14	1	16	2,190	---	-----	-----	PROPOSED DRAINAGE AREA P1_
3	Rational	2.34	1	15	2,104	---	-----	-----	PROPOSED DRAIANGE AREA P2_
4	Mod. Rational	1.63	1	15	2,941	---	-----	-----	PROPOSED DRAINAGE AREA P2-
5	Rational	0.78	1	53	2,491	---	-----	-----	PROPOSED DRAINAGE AREA P3_
6	Mod. Rational	0.49	1	53	3,106	---	-----	-----	PROPOSED DRAINAGE AREA P3_

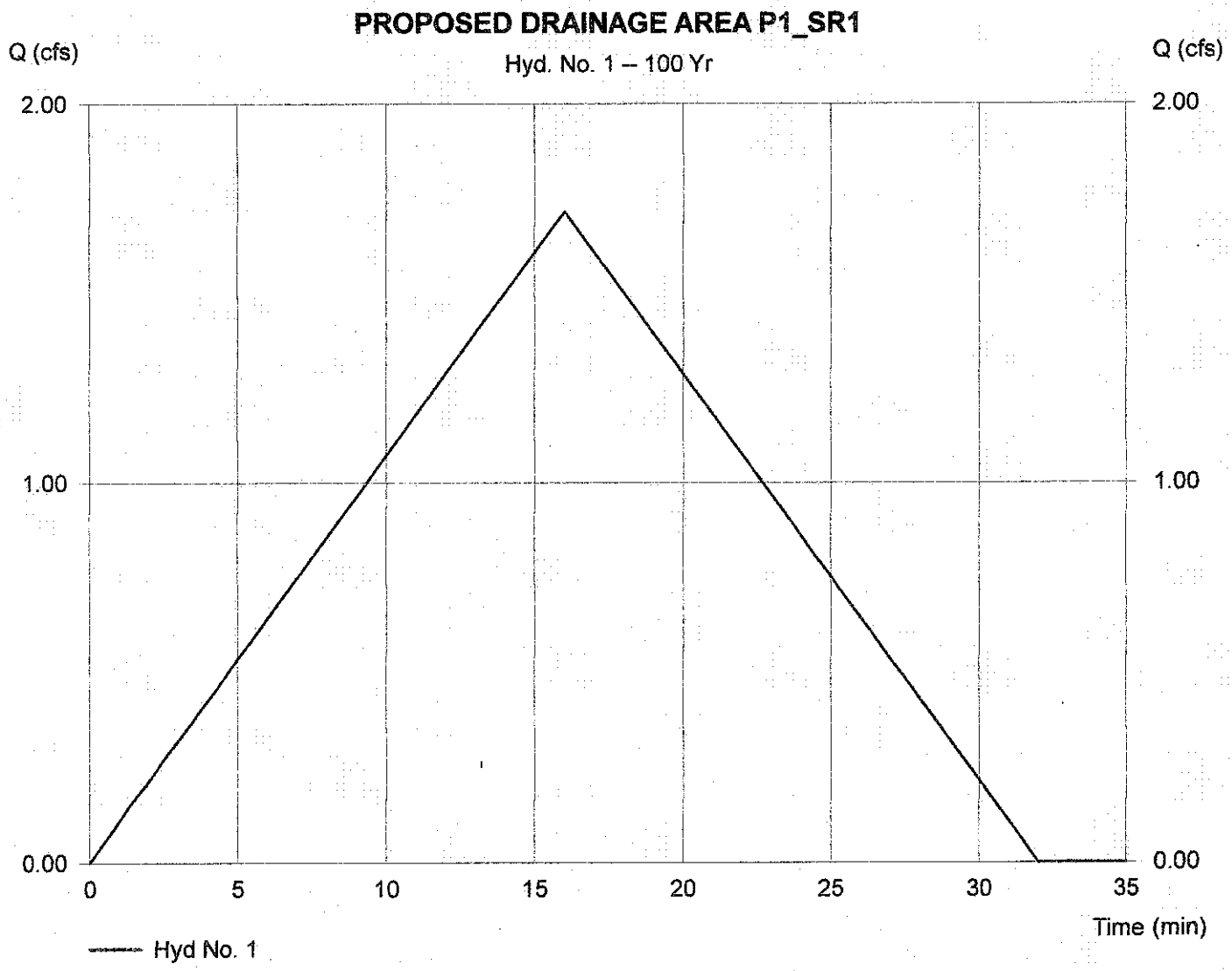
Hydrograph Plot

Hyd. No. 1

PROPOSED DRAINAGE AREA P1_SR1

Hydrograph type	= Rational	Peak discharge	= 1.71 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 0.4 ac	Runoff coeff.	= 0.74
Intensity	= 5.555 in/hr	Tc by User	= 16 min
IDF Curve	= HARTFORD COUNTY.IDF	Asc/Rec limb fact	= 1/1

Hydrograph Volume = 1,646 cuft



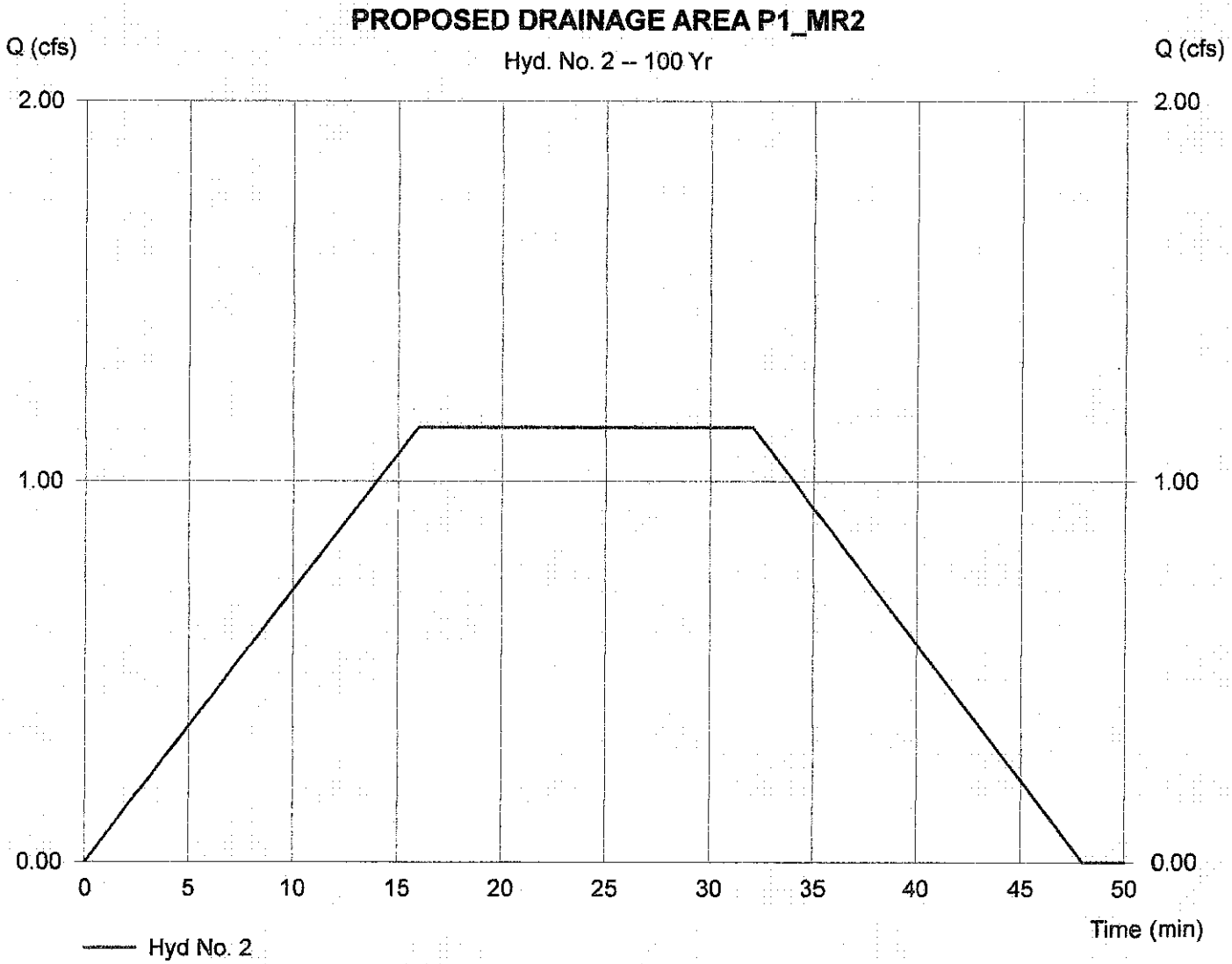
Hydrograph Plot

Hyd. No. 2

PROPOSED DRAINAGE AREA P1_MR2

Hydrograph type	= Mod. Rational	Peak discharge	= 1.14 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 0.4 ac	Runoff coeff.	= 0.71
Intensity	= 3.853 in/hr	Tc by User	= 16 min
IDF Curve	= HARTFORD COUNTY.IDF	Storm duration	= 2 x Tc

Hydrograph Volume = 2,190 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

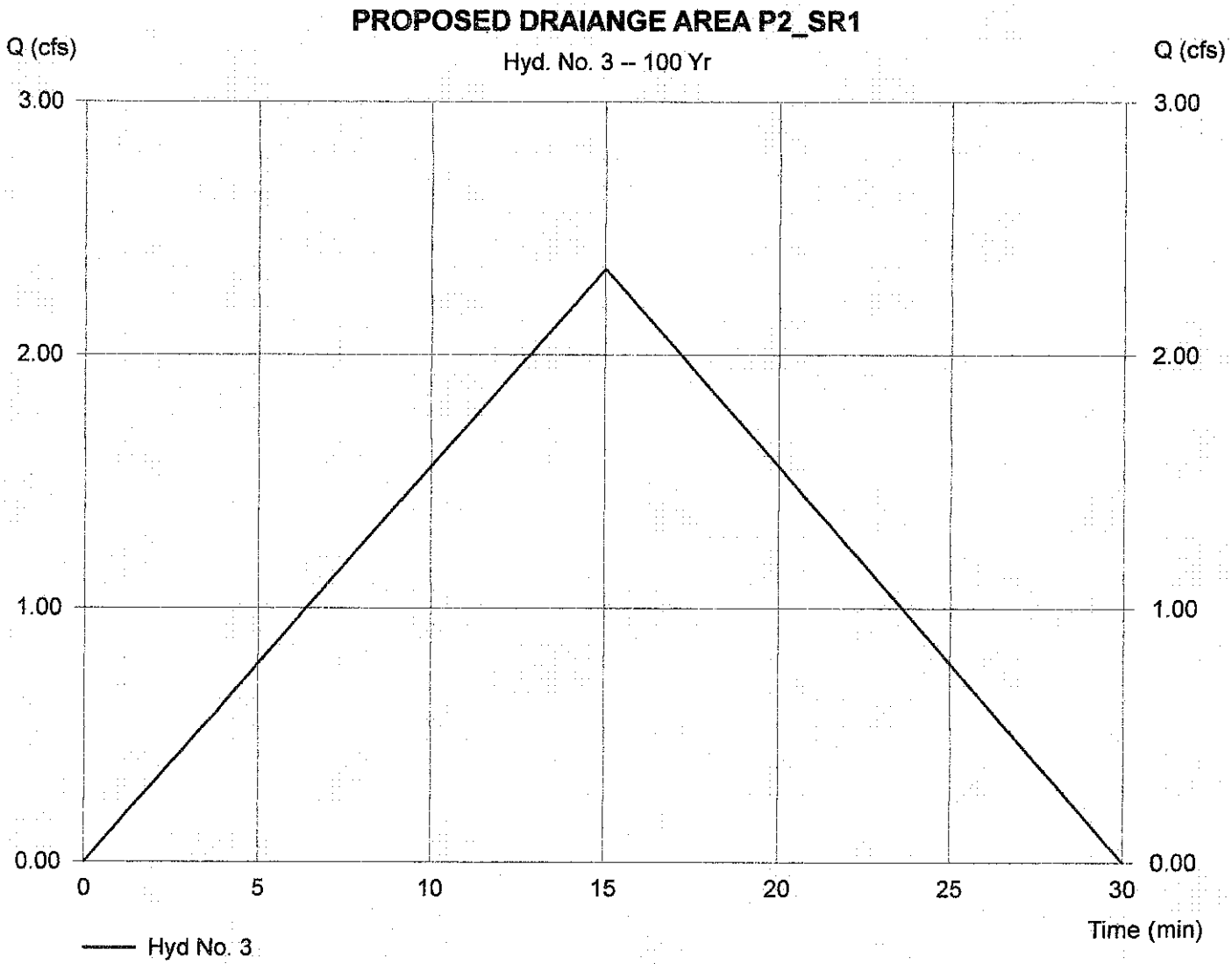
Monday, Feb 17 2020, 3:47 PM

Hyd. No. 3

PROPOSED DRAIANGE AREA P2_SR1

Hydrograph type	= Rational	Peak discharge	= 2.34 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 0.6 ac	Runoff coeff.	= 0.74
Intensity	= 5.723 in/hr	Tc by User	= 15 min
IDF Curve	= HARTFORD COUNTY.IDF	Asc/Rec limb fact	= 1/1

Hydrograph Volume = 2,104 cuft



Hydrograph Plot

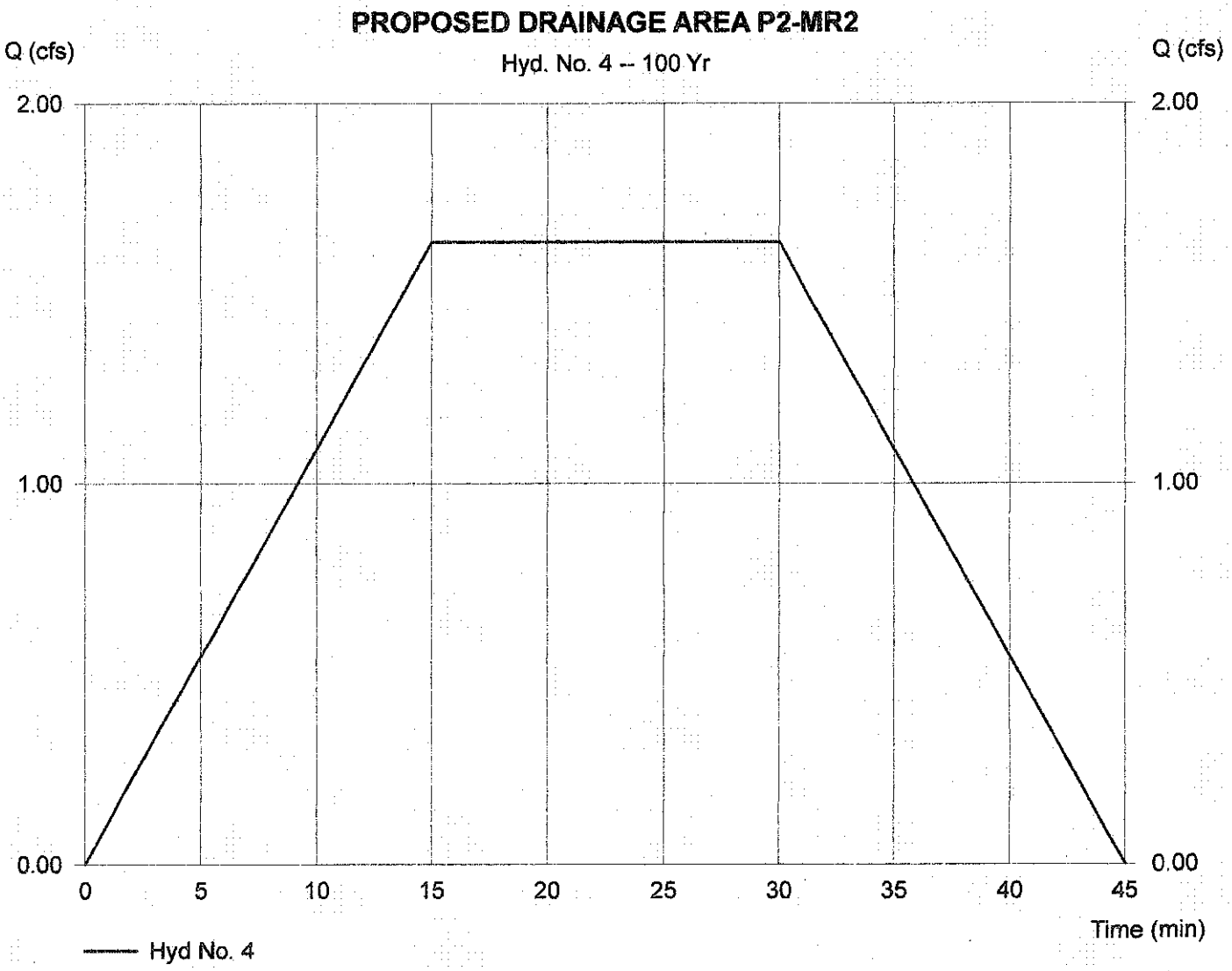
Hydraflow Hydrographs by Intelisolve | Monday, Feb 17 2020, 3:47 PM

Hyd. No. 4

PROPOSED DRAINAGE AREA P2-MR2

Hydrograph type	= Mod. Rational	Peak discharge	= 1.63 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 0.6 ac	Runoff coeff.	= 0.74
Intensity	= 4.000 in/hr	Tc by User	= 15 min
IDF Curve	= HARTFORD COUNTY.IDF	Storm duration	= 2 x Tc

Hydrograph Volume = 2,941 cuft



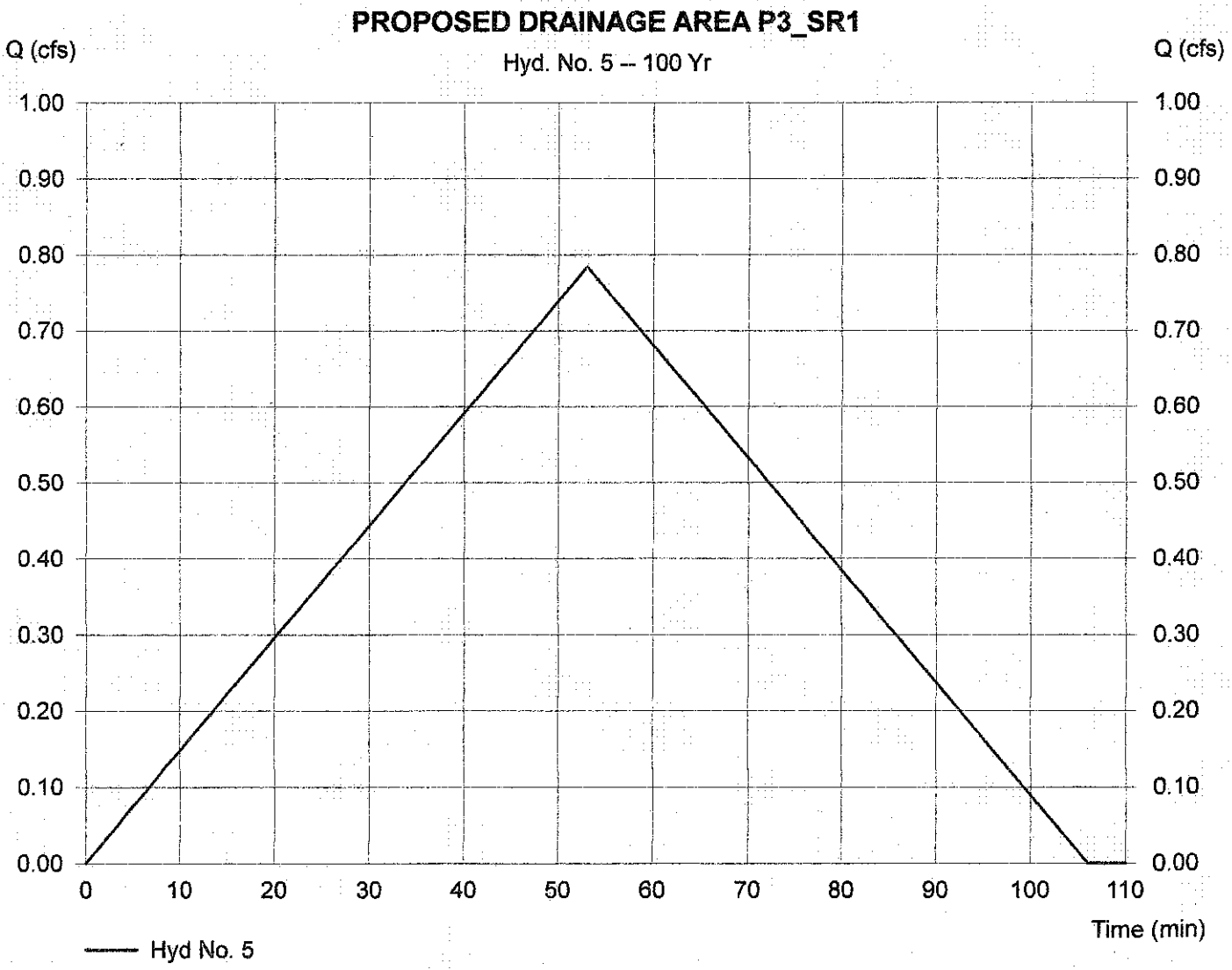
Hydrograph Plot

Hyd. No. 5

PROPOSED DRAINAGE AREA P3_SR1

Hydrograph type	= Rational	Peak discharge	= 0.78 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 0.5 ac	Runoff coeff.	= 0.56
Intensity	= 2.820 in/hr	Tc by User	= 53 min
IDF Curve	= HARTFORD COUNTY.IDF	Asc/Rec limb fact	= 1/1

Hydrograph Volume = 2,491 cuft



Hydrograph Plot

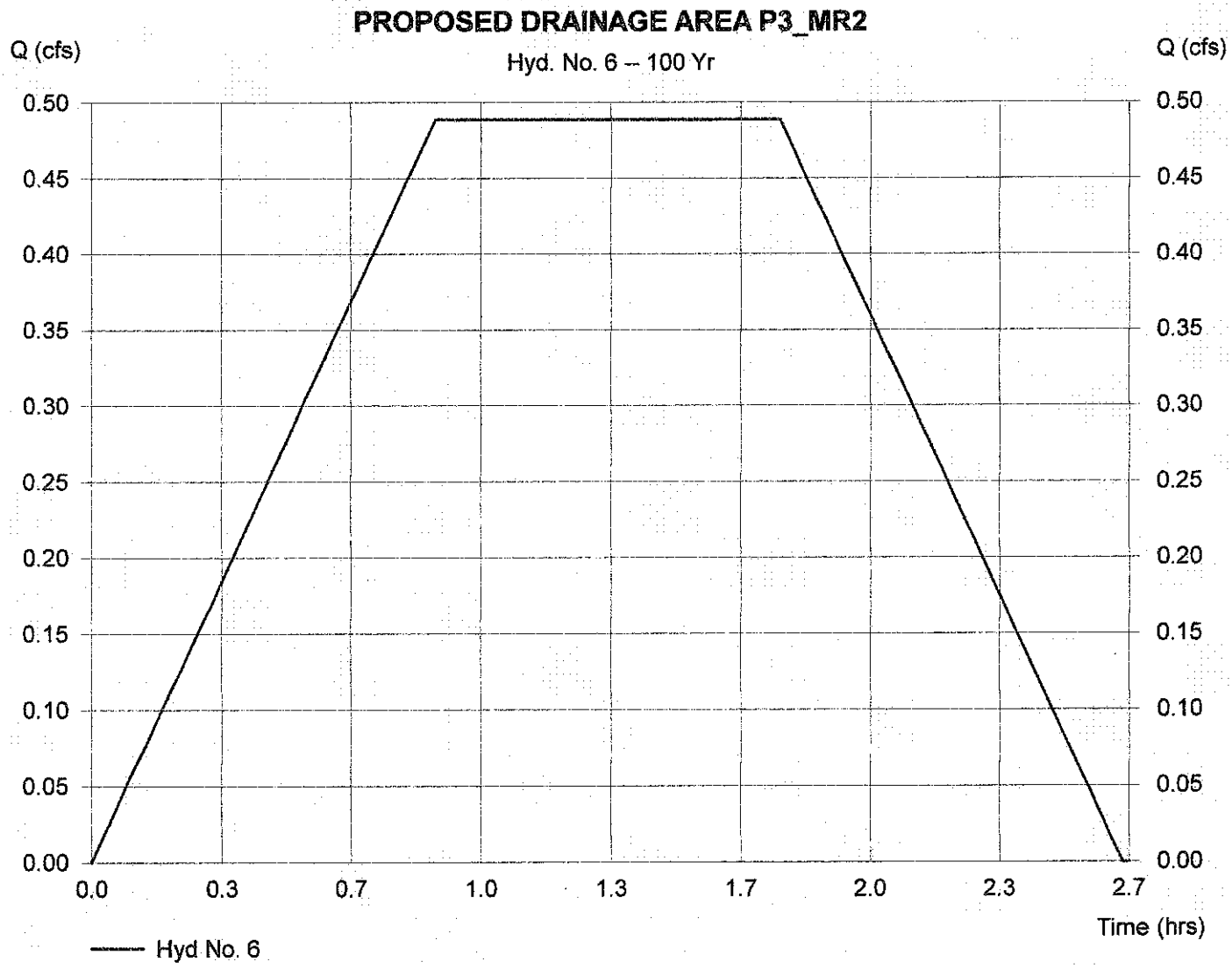
Hydraflow Hydrographs by Intelisolve | Monday, Feb 17 2020, 3:49 PM

Hyd. No. 6

PROPOSED DRAINAGE AREA P3_MR2

Hydrograph type	= Mod. Rational	Peak discharge	= 0.49 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 0.5 ac	Runoff coeff.	= 0.56
Intensity	= 1.758 in/hr	Tc by User	= 53 min
IDF Curve	= HARTFORD COUNTY.IDF	Storm duration	= 2 x Tc

Hydrograph Volume = 3,106 cuft



WATER QUALITY VOLUME (WQV) & WATER QUALITY FLOW (WQF) COMPUTATIONS FOR THE PROPOSED DEVELOPMENT OF THE PROPERTY AT 360 BURNHAM STREET, SOUTH WINDSOR, CT

[BASED ON CHAPTER 7 AND APPENDIX B OF THE *2004 CONNECTICUT STORMWATER QUALITY MANUAL* BY THE CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION]

FORMULAE:

WATER QUALITY VOLUME (acre-feet):	$WQV=(1in.)(R)(A)/12$
RUNOFF COEFFICIENT:	$R=0.05+0.009(I)$
RUNOFF DEPTH (feet):	Q=[WQV (acre-feet)] x [12 (inches/foot)] / Drainage Area (acres)
RUNOFF CURVE NUMBER:	$CN=1000/[10+5P+10Q-10(Q^2+1.25QP)^{½}]$
WATER QUALITY FLOW (cfs):	$WQF=(q_u)(A)(Q)$

(FOR POST-DEVELOPMENT STORMWATER RUNOFF TO BE DIRECTED TO ONE OF THREE PROPOSED RETENTION/INFILTRATION BASINS TO BE CONSTRUCTED ON THE SUBECT PROPERTY):

BASIN NO. 1 [DRAINAGE AREA P1]

Drainage Area (A) = 0.417acres; Impervious Cover (I) = 0.286 ac. [68.6% of total area]; Tc = 0.27 hr.

WQV: $R = 0.05 + 0.009(68.6) = 0.667$
$WQV = (1in.)(0.667)(0.417\ ac.)/12 =$ 0.023 ac.-ft. [1,002 cu. ft.]

WQF: $Q = (0.023\ ac.\text{-}ft.)(12\ in./ft.)/0.417\ ac. = 0.66\ in.$
$CN = 1000 / \{10 + (5)(1) + 10(0.66) - 10[(0.66)^2 + 1.25(0.66)(1)]^{½}\} = 96$
$I_a = 0.083$ [Table 4-I, TR-55]
$I_a/P = 0.083 / 1 = 0.083$
$q_u = 505$ [Exhibit 4-III, TR-55]
$WQF = (505)(0.417/640)(0.66) =$ 0.22 cfs

BASIN NO. 2 [DRAINAGE AREA P2]

Drainage Area (A) = 0.552 acres; Impervious Cover (I) = 0.401 ac. [72.6% of total area]; Tc = 0.25 hr.

WQV: $R = 0.05 + 0.009(72.6) = 0.703$
$WQV = (1in.)(0.703)(0.552\ ac.)/12 =$ 0.032 ac.-ft. [1,409 cu. ft.]

WQF: $Q = (0.032\ ac.\text{-}ft.)(12\ in./ft.)/0.552\ ac. = 0.70\ in.$
$CN = 1000 / \{10 + (5)(1) + 10(0.70) - 10[(0.70)^2 + 1.25(0.70)(1)]^{½}\} = 97$
$I_a = 0.062$ [Table 4-I, TR-55]
$I_a/P = 0.062 / 1 = 0.062$
$q_u = 520$ [Exhibit 4-III, TR-55]
$WQF = (520)(0.552/640)(0.70) =$ 0.31 cfs

BASIN NO. 3 [DRAINAGE AREA P3]

Drainage Area (A) = 0.496 acres; Impervious Cover (I) = 0.217 ac. [43.8% of total area]; Tc = 0.88 hr.

WQV: $R = 0.05 + 0.009(43.8) = 0.444$
$WQV = (1in.)(0.444)(0.496\ ac.)/12 =$ 0.018 ac.-ft. [784 cu. ft.]

WQF: $Q = (0.018\ ac.\text{-}ft.)(12\ in./ft.)/0.496\ ac. = 0.44\ in.$
$CN = 1000 / \{10 + (5)(1) + 10(0.44) - 10[(0.44)^2 + 1.25(0.44)(1)]^{½}\} = 93$

I_a = 0.151 [Table 4-I, TR-55]
I_a/P = 0.151/ 1 = 0.151
q_u = 300 [Exhibit 4-III, TR-55]
WQF = (300)(0.496/640)(0.44) = 0.10 cfs