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

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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 four storm water retention/infiltration basins with overflow discharges, as further described later in this narrative; 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 Government of 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, 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 four 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, 3 and 4 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 yard drain and pipe which will connect to a proposed subsurface stormwater infiltration system to be constructed under the proposed driveway pavement for this project, to convey any flows reaching the basin in excess of the computed 100-year storm runoff to the subsurface system.

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 located about midway into and on the east side of the portion of the subject property to be developed. It will have an elevated yard drain like Basin No.1, but the overflow from this basin will discharge to Basin No. 2.

Basin No. 4 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, the narrow strips of landscaped land between the tops of the Basins No. 2 and 4 berms and adjacent downgradient wetlands boundaries and/or undisturbed existing vegetation, and a very small localized area of lawn at the southeast corner of Proposed Building No. 2. 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

overflow from this basin, as there are with the other three retention/infiltration basins proposed for this project. This proposed subsurface infiltration system will comprise precast concrete leaching galleries and surrounding stone envelope, and will be located under the proposed driveway pavement on the site. The design capacity of this subsurface system will be 1331 cubic feet, or slightly more than 50% of the computed 100 year runoff volume for Retention/Infiltration Basin No. 1.

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, as follows. As indicated, all values are minimal in relation to the overall computed runoff and proposed retention/infiltration basin sizes.

	WQV (ac. ft./ c.f.)	WQF (c.f.s.)
Retention/Infiltration Basin No. 1:	.024 / 1033	0.22
Retention/Infiltration Basin No. 2:	.034 / 1481	0.35
Retention/Infiltration Basin No. 3:	.008 / 348	0.07
Retention/Infiltration Basin No. 4:	.007 / 305	0.06

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 = 1.464 acres)

AREA P1

Total area = 0.421 acres
0.293 acres impervious @ c=0.90
0.128 acres grass & landscaping @ c=0.30

Composite c factor: [(.293)(.9) + (.128)(.3)]/.421 = .72

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 = 125 ft. in grass swale
ΔV = 62.25 – 61.00 = 1.25 ft.
s = .010
Tt = 14 minutes

Segment 4:
ΔH = 39 ft. in grass basin
ΔV = 61.00 – 59.00 = 2.00 ft.
s = .051
Tt = 6 minutes

Total Tc = ∑ Tt for Segment 3 + Tt for Segment 4 = 20 minutes

AREA P2

Total area = 0.550 acres
0.424 acres impervious @ c=0.90
0.126 acres grass & landscaping @ c=0.30

Composite c factor: [(.424)(.9) + (.126)(.3)]/.550= .76

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 = 0.286 acres
0.093 acres impervious @ c=0.90
0.193 acres grass & landscaping @ c=0.30

Composite c factor: [(.093)(.9) + (.193)(.3)]/.286= .50

Tc: ΔH = 250 ft. in grass basin
ΔV = 63.30 – 61.00 = 2.30 ft.
s = .0092
Tc = 19 minutes

AREA P4

Total area = 0.206 acres
0.088 acres impervious @ c=0.90
0.118 acres grass & landscaping @ c=0.30

Composite c factor: [(.088)(.9) + (.118)(.3)]/.206= .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 = 61 ft. in grass basin
ΔV = 61.00 – 60.60 = 0.40 ft.
s = .0066
Tt = 10.9 minutes

Total Tc = ∑ Tt for Segment 3 + Tt for Segment 4 = 23 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 Plot

Hydraflow Hydrographs by Intelisolve

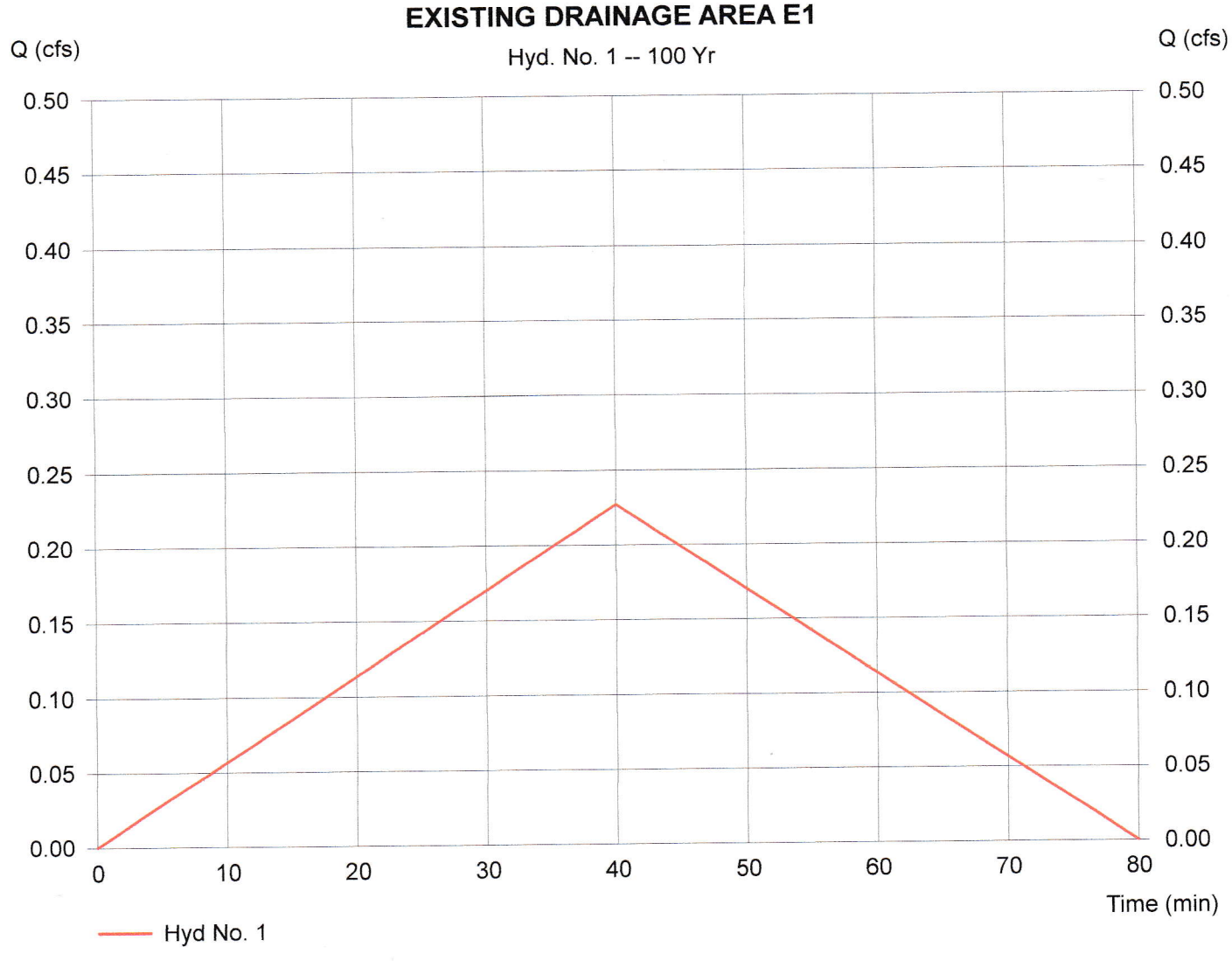
Thursday, Apr 30 2020, 8:24 PM

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

Hydraflow Hydrographs by Intelisolve

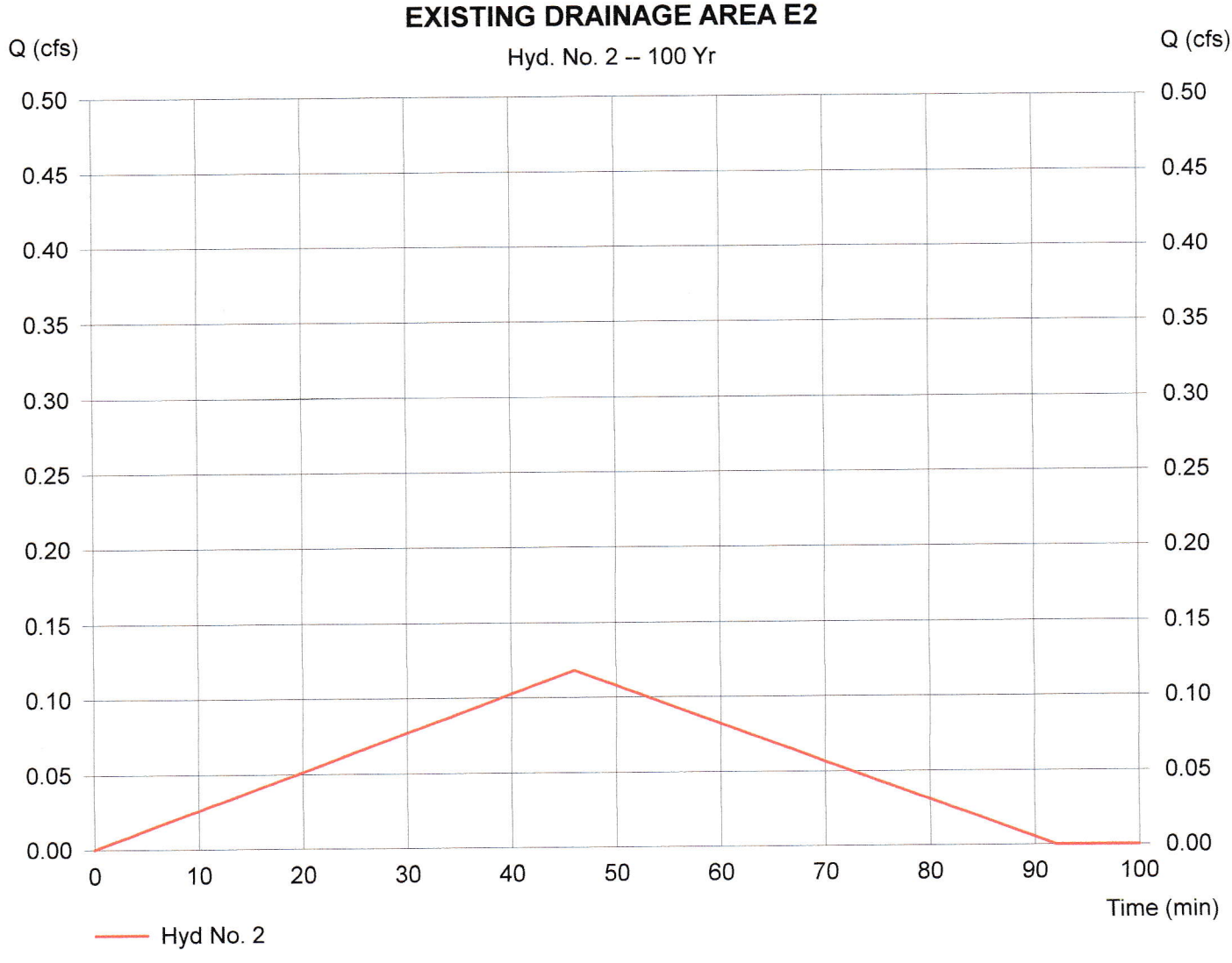
Thursday, Apr 30 2020, 8:25 PM

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

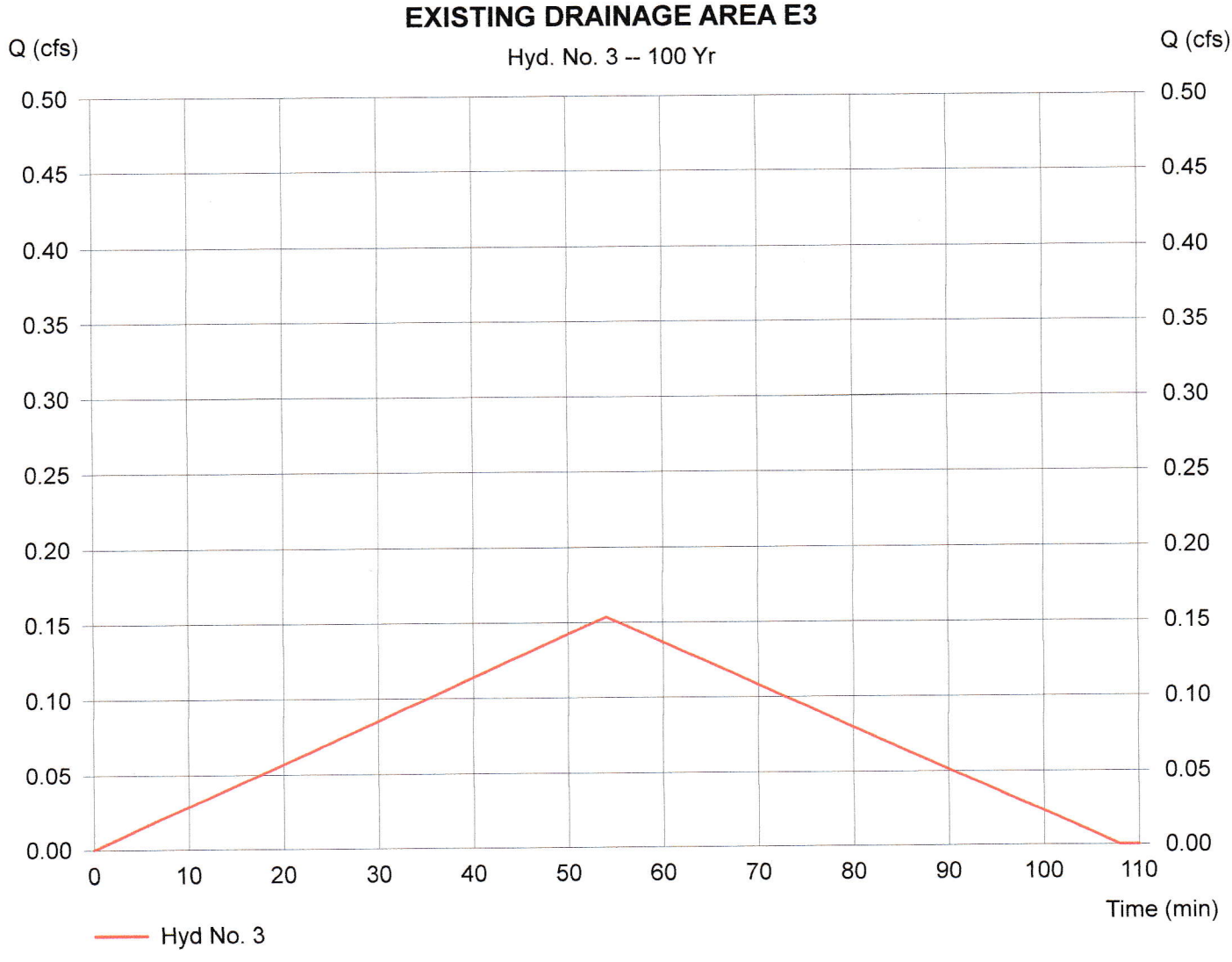
Thursday, Apr 30 2020, 8:26 PM

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

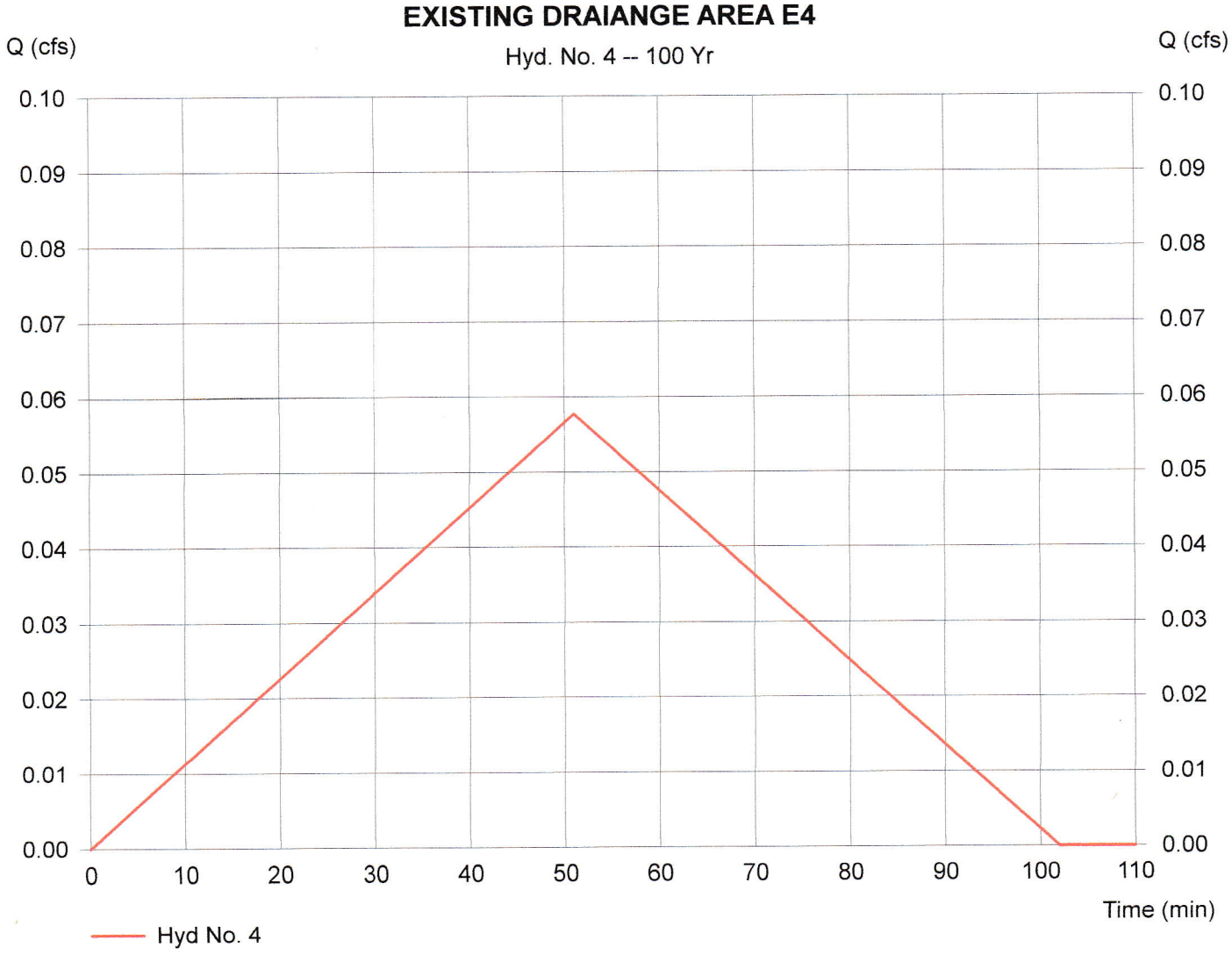
Thursday, Apr 30 2020, 8:26 PM

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

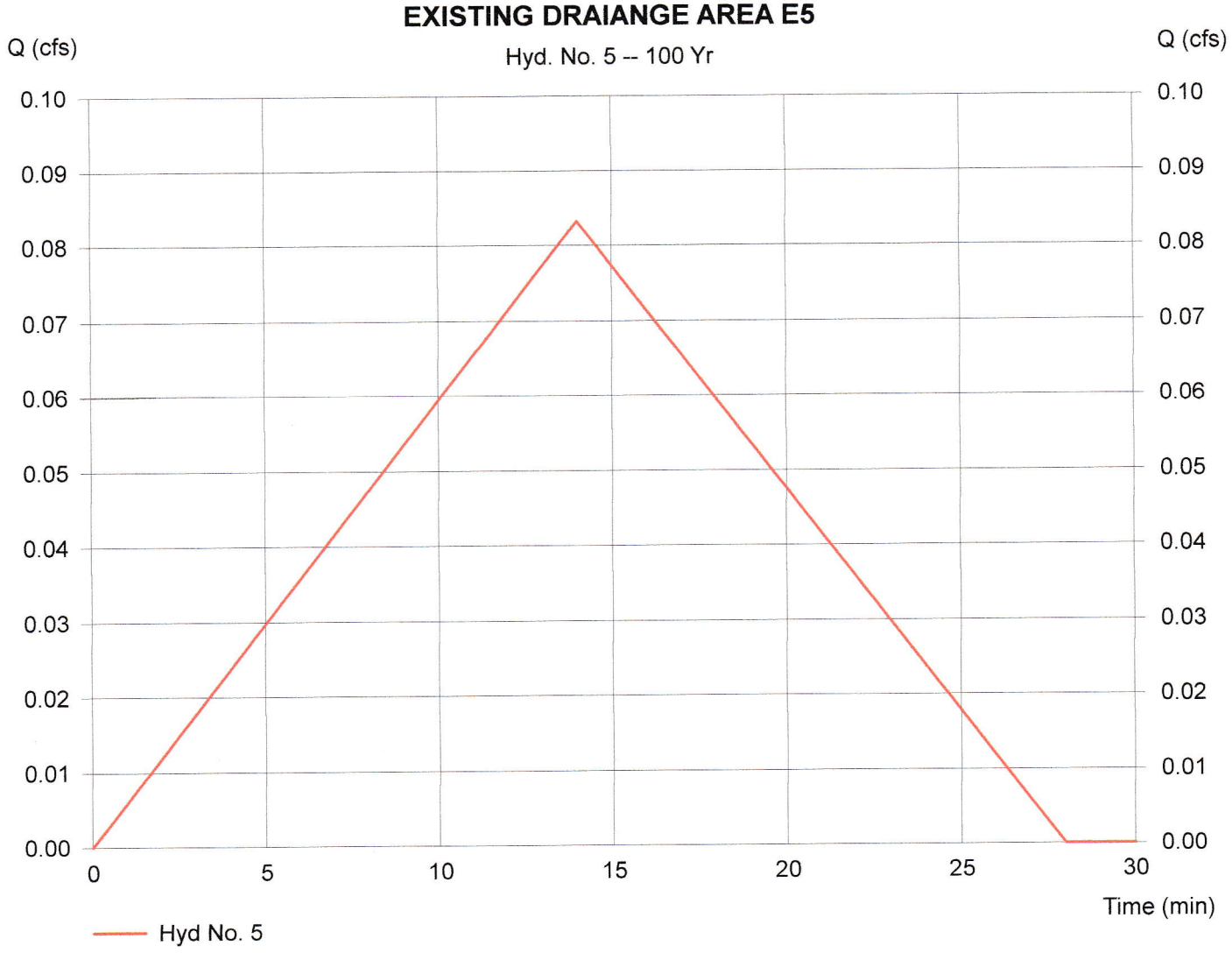
Thursday, Apr 30 2020, 8:27 PM

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

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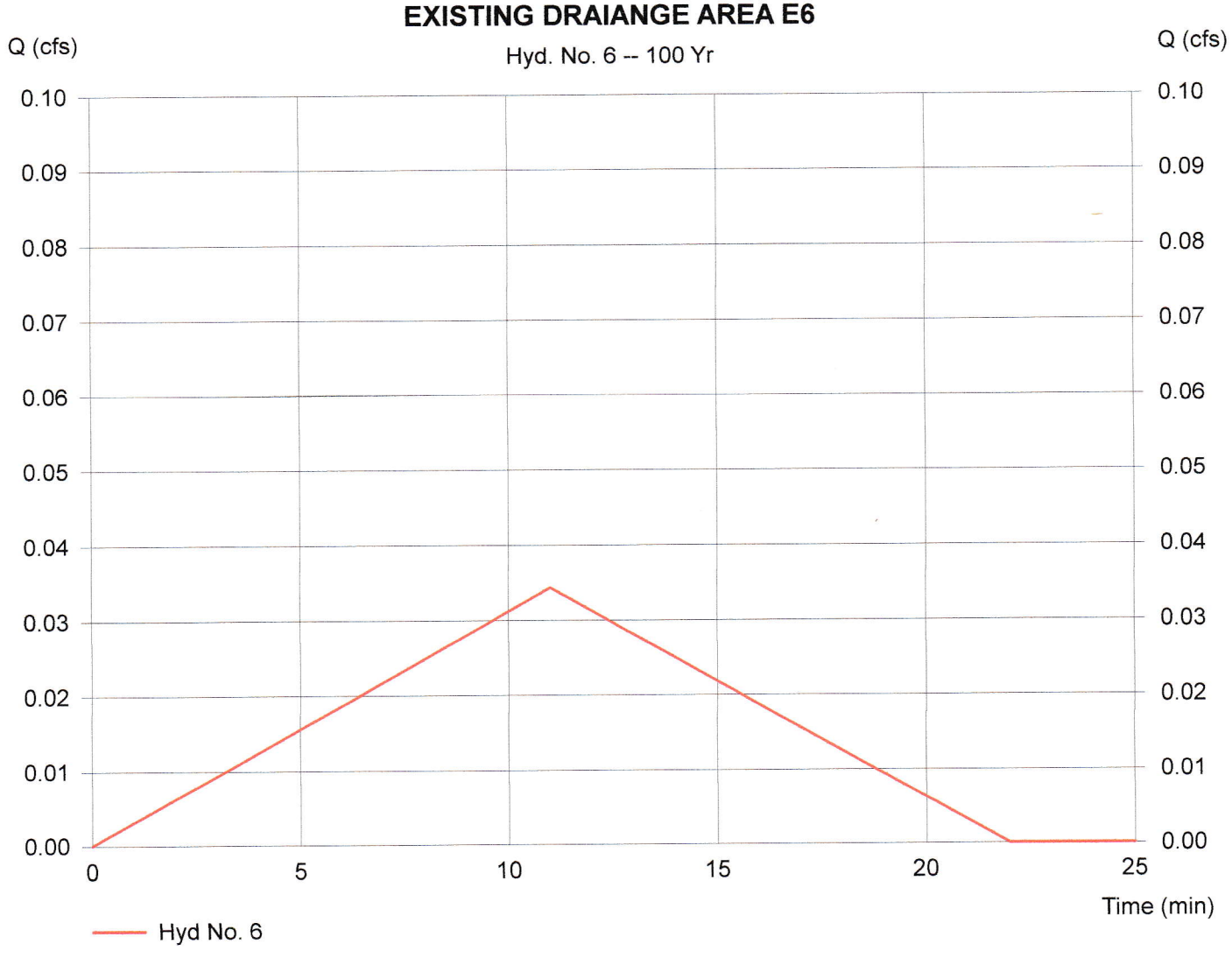
Hyd. No. 6

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	-------	-------	0.65	-------	-------	1.02	1.26	1.41	1.51	PROPOSED DRAINAGE AREA P1_ SR-1
2	Mod. Rational	-------	-------	0.43	-------	-------	0.69	0.84	0.93	1.02	PROPOSED DRAINAGE AREA P1_ MR-2
3	Rational	-------	-------	1.05	-------	-------	1.63	2.00	2.24	2.39	PROPOSED DRAIANGE AREA P2_ SR-1
4	Mod. Rational	-------	-------	0.71	-------	-------	1.13	1.38	1.55	1.67	PROPOSED DRAINAGE AREA P2- MR-2
5	Rational	-------	-------	0.32	-------	-------	0.49	0.61	0.68	0.73	PROPOSED DRAINAGE AREA P3_ SR-1
6	Mod. Rational	-------	-------	0.15	-------	-------	0.24	0.29	0.33	0.36	PROPOSED DRAINAGE AREA P3_ MR-2
7	Rational	-------	-------	0.23	-------	-------	0.36	0.44	0.50	0.53	PROPOSED DRAINAGE AREA P4_ SR-1
8	Mod. Rational	-------	-------	0.15	-------	-------	0.24	0.29	0.32	0.36	PROPOSED DRAINAGE AREA P4_ MR-2

Proj. file: 360 BURNHAM STREET_SOUTH WINDSOR_DSRCT_

Hydrograph Summary Report (100-YEAR STORM)

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	1.51	1	20	1,813	----	------	------	PROPOSED DRAINAGE AREA P1_ SR1
2	Mod. Rational	1.02	1	20	2,452	----	------	------	PROPOSED DRAINAGE AREA P1_MR2
3	Rational	2.39	1	15	2,153	----	------	------	PROPOSED DRAIANGE AREA P2_SR1
4	Mod. Rational	1.67	1	15	3,010	----	------	------	PROPOSED DRAINAGE AREA P2- MR2
5	Rational	0.73	1	19	834	----	------	------	PROPOSED DRAINAGE AREA P3_SR1
6	Mod. Rational	0.36	1	19	817	----	------	------	PROPOSED DRAINAGE AREA P3_MR2
7	Rational	0.53	1	23	738	----	------	------	PROPOSED DRAINAGE AREA P4_ SR1
8	Mod. Rational	0.36	1	23	983	----	------	------	PROPOSED DRAINAGE AREA P4_ MR2

360 BURNHAM STREET_SOUTH W

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

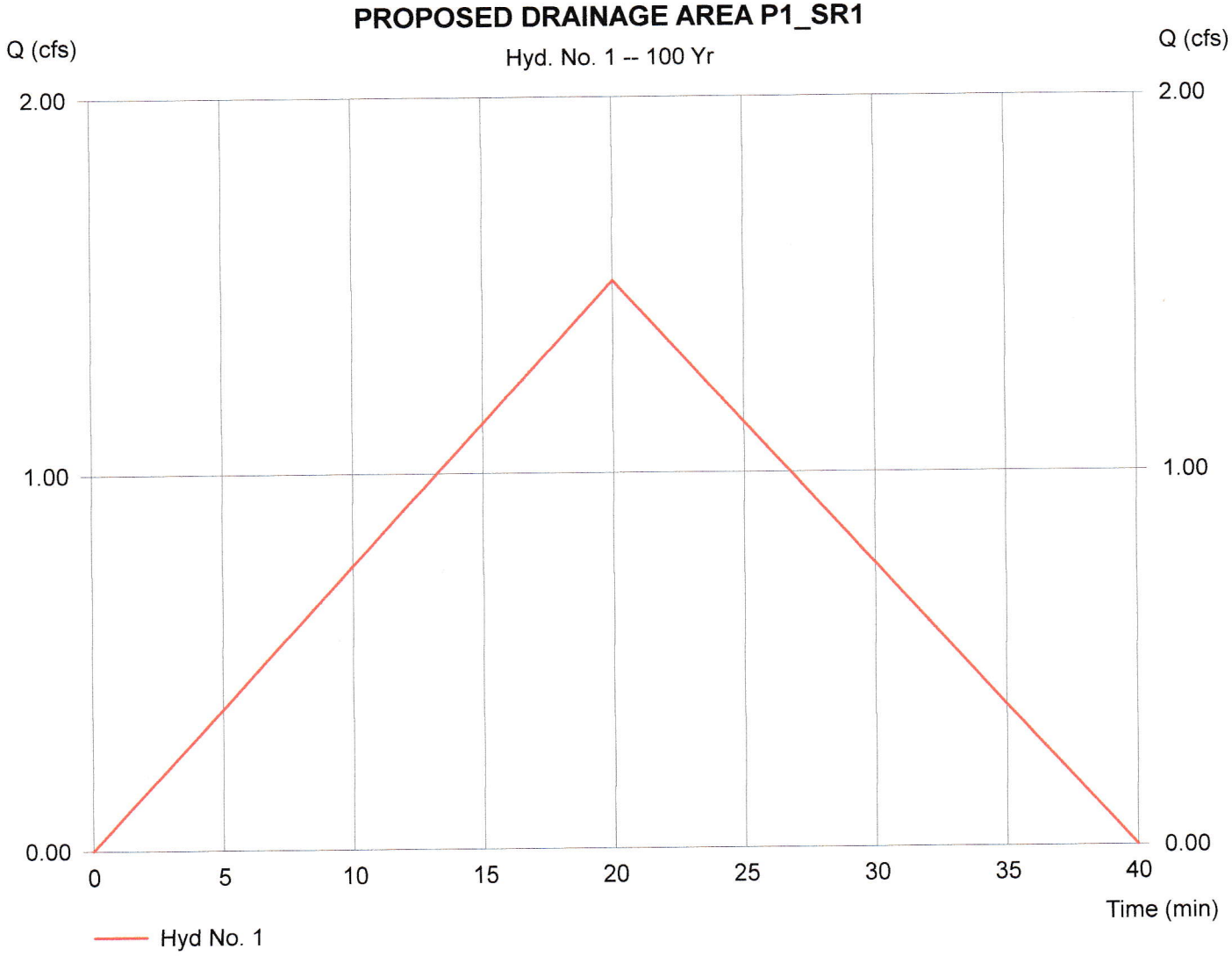
Thursday, Apr 30 2020, 7:52 PM

Hyd. No. 1

PROPOSED DRAINAGE AREA P1_SR1

Hydrograph type	= Rational	Peak discharge	= 1.51 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 0.4 ac	Runoff coeff.	= 0.72
Intensity	= 4.983 in/hr	Tc by User	= 20 min
IDF Curve	= HARTFORD COUNTY.IDF	Asc/Rec limb fact	= 1/1

Hydrograph Volume = 1,813 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

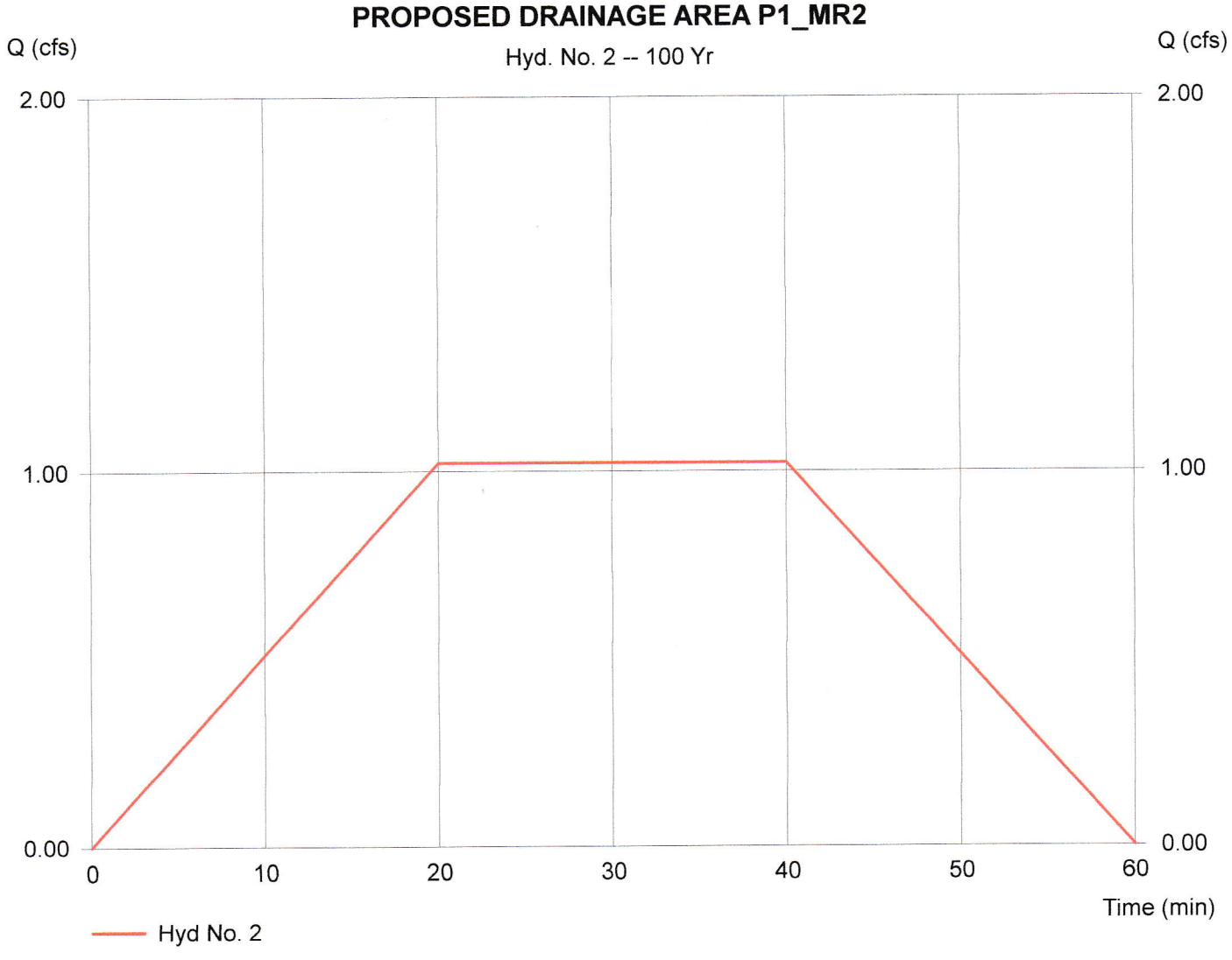
Thursday, Apr 30 2020, 8:4 PM

Hyd. No. 2

PROPOSED DRAINAGE AREA P1_MR2

Hydrograph type	= Mod. Rational	Peak discharge	= 1.02 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 0.4 ac	Runoff coeff.	= 0.72
Intensity	= 3.370 in/hr	Tc by User	= 20 min
IDF Curve	= HARTFORD COUNTY.IDF	Storm duration	= 2 x Tc

Hydrograph Volume = 2,452 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

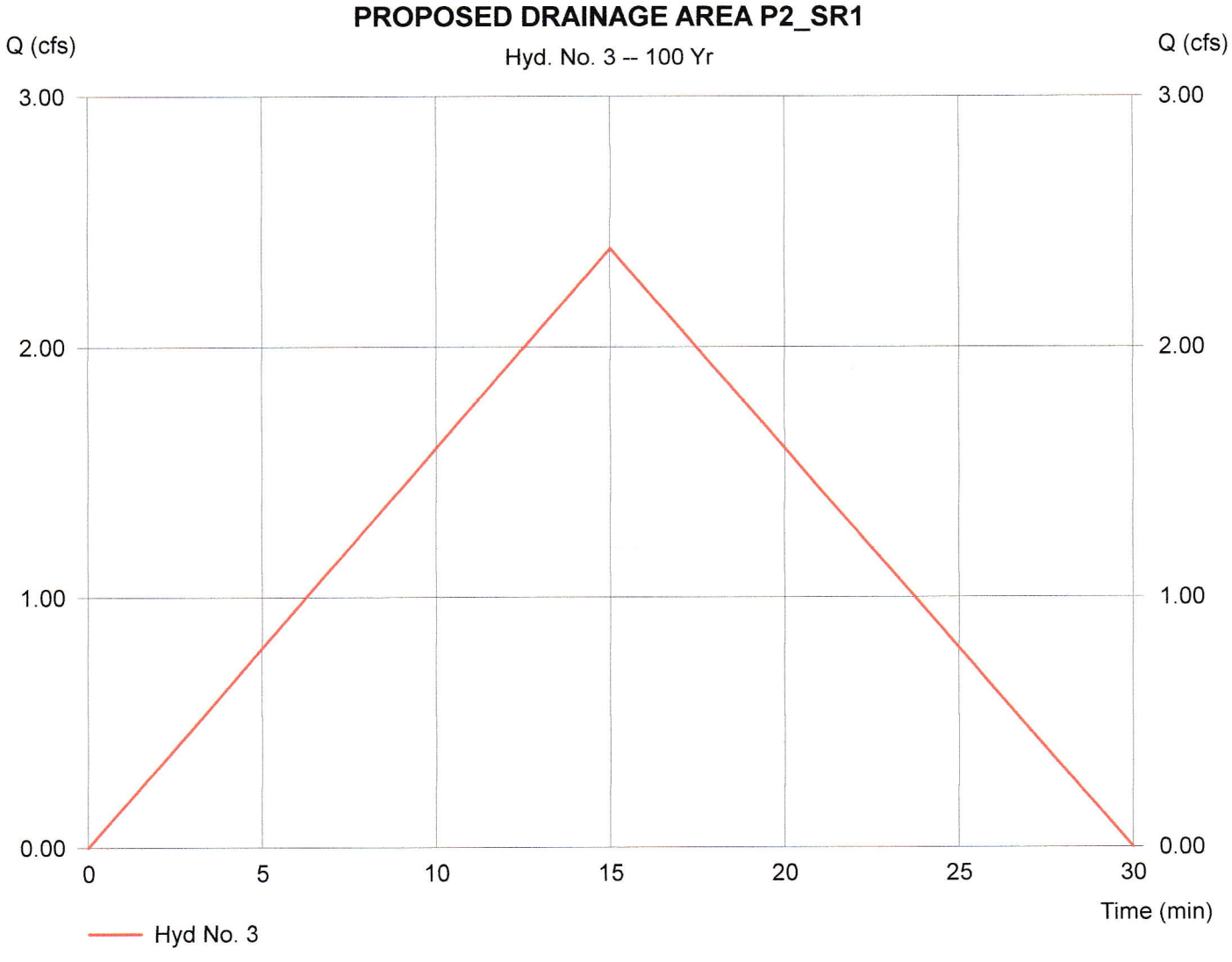
Thursday, Apr 30 2020, 7:55 PM

Hyd. No. 3

PROPOSED DRAINAGE AREA P2_SR1

Hydrograph type	= Rational	Peak discharge	= 2.39 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 0.6 ac	Runoff coeff.	= 0.76
Intensity	= 5.723 in/hr	Tc by User	= 15 min
IDF Curve	= HARTFORD COUNTY.IDF	Asc/Rec limb fact	= 1/1

Hydrograph Volume = 2,153 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

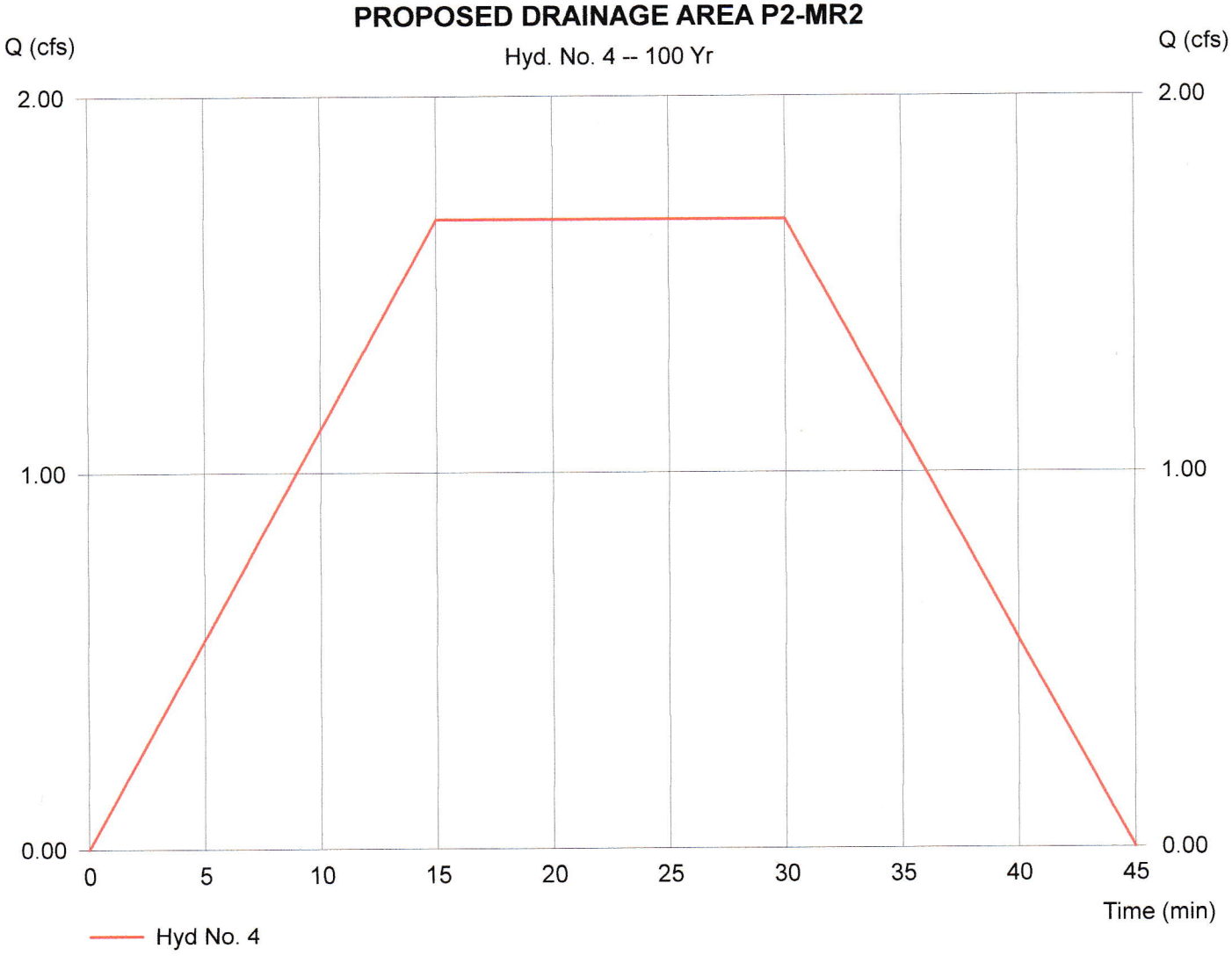
Thursday, Apr 30 2020, 8:5 PM

Hyd. No. 4

PROPOSED DRAINAGE AREA P2-MR2

Hydrograph type	= Mod. Rational	Peak discharge	= 1.67 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 0.6 ac	Runoff coeff.	= 0.76
Intensity	= 4.000 in/hr	Tc by User	= 15 min
IDF Curve	= HARTFORD COUNTY.IDF	Storm duration	= 2 x Tc

Hydrograph Volume = 3,010 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

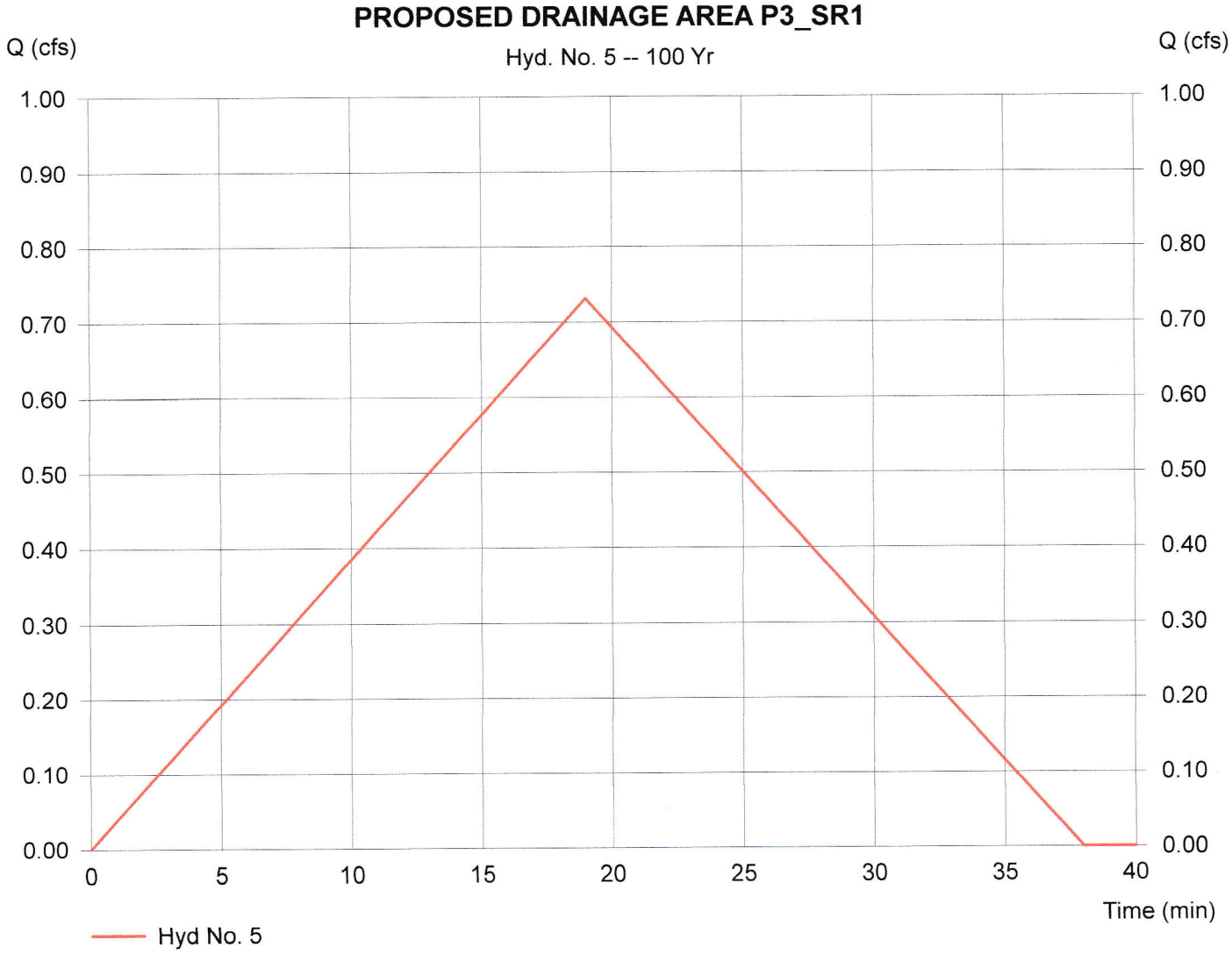
Thursday, Apr 30 2020, 7:57 PM

Hyd. No. 5

PROPOSED DRAINAGE AREA P3_SR1

Hydrograph type	= Rational	Peak discharge	= 0.73 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 0.3 ac	Runoff coeff.	= 0.5
Intensity	= 5.113 in/hr	Tc by User	= 19 min
IDF Curve	= HARTFORD COUNTY.IDF	Asc/Rec limb fact	= 1/1

Hydrograph Volume = 834 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

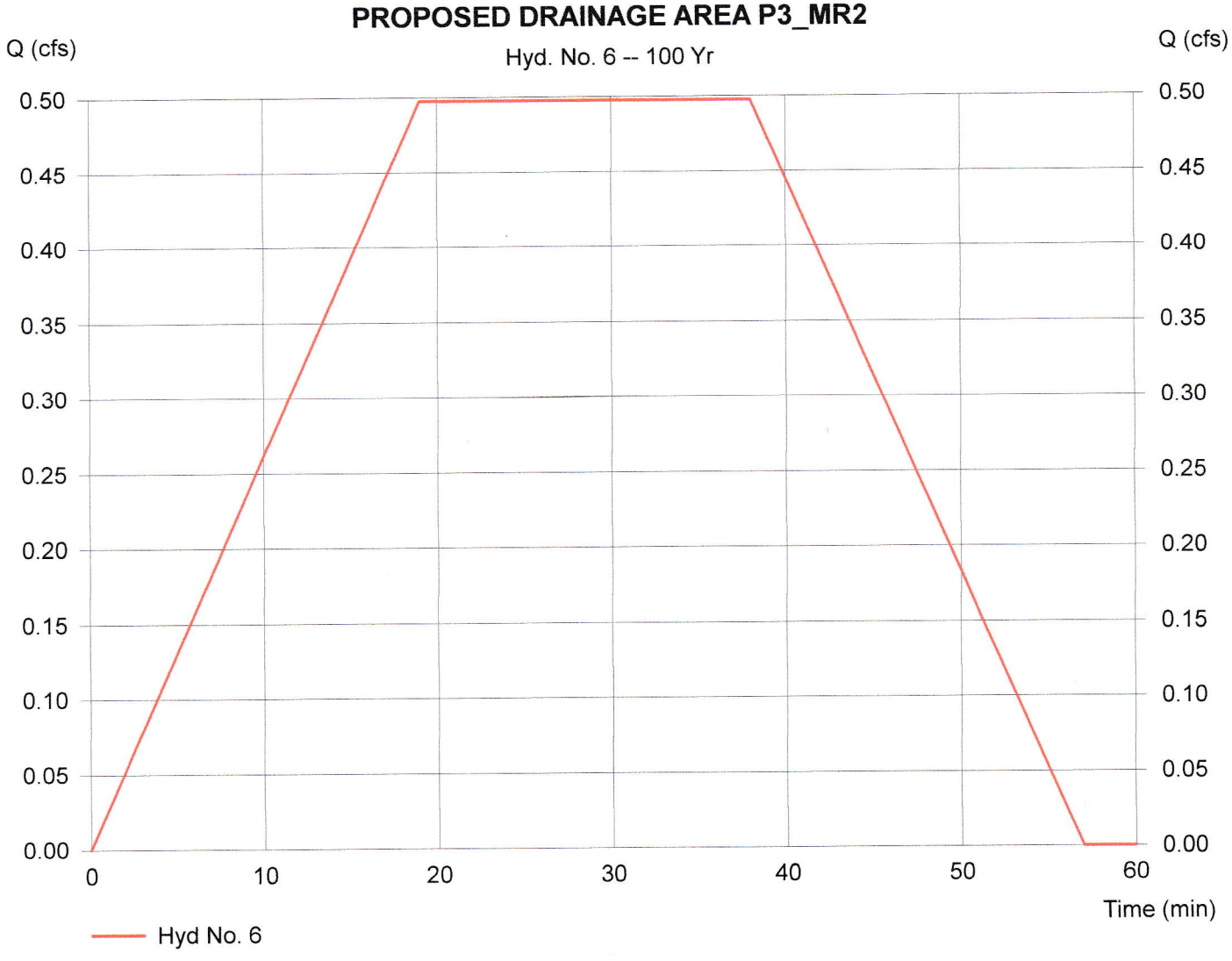
Thursday, Apr 30 2020, 8:7 PM

Hyd. No. 6

PROPOSED DRAINAGE AREA P3_MR2

Hydrograph type	= Mod. Rational	Peak discharge	= 0.50 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 0.3 ac	Runoff coeff.	= 0.5
Intensity	= 3.478 in/hr	Tc by User	= 19 min
IDF Curve	= HARTFORD COUNTY.IDF	Storm duration	= 2 x Tc

Hydrograph Volume = 1,134 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

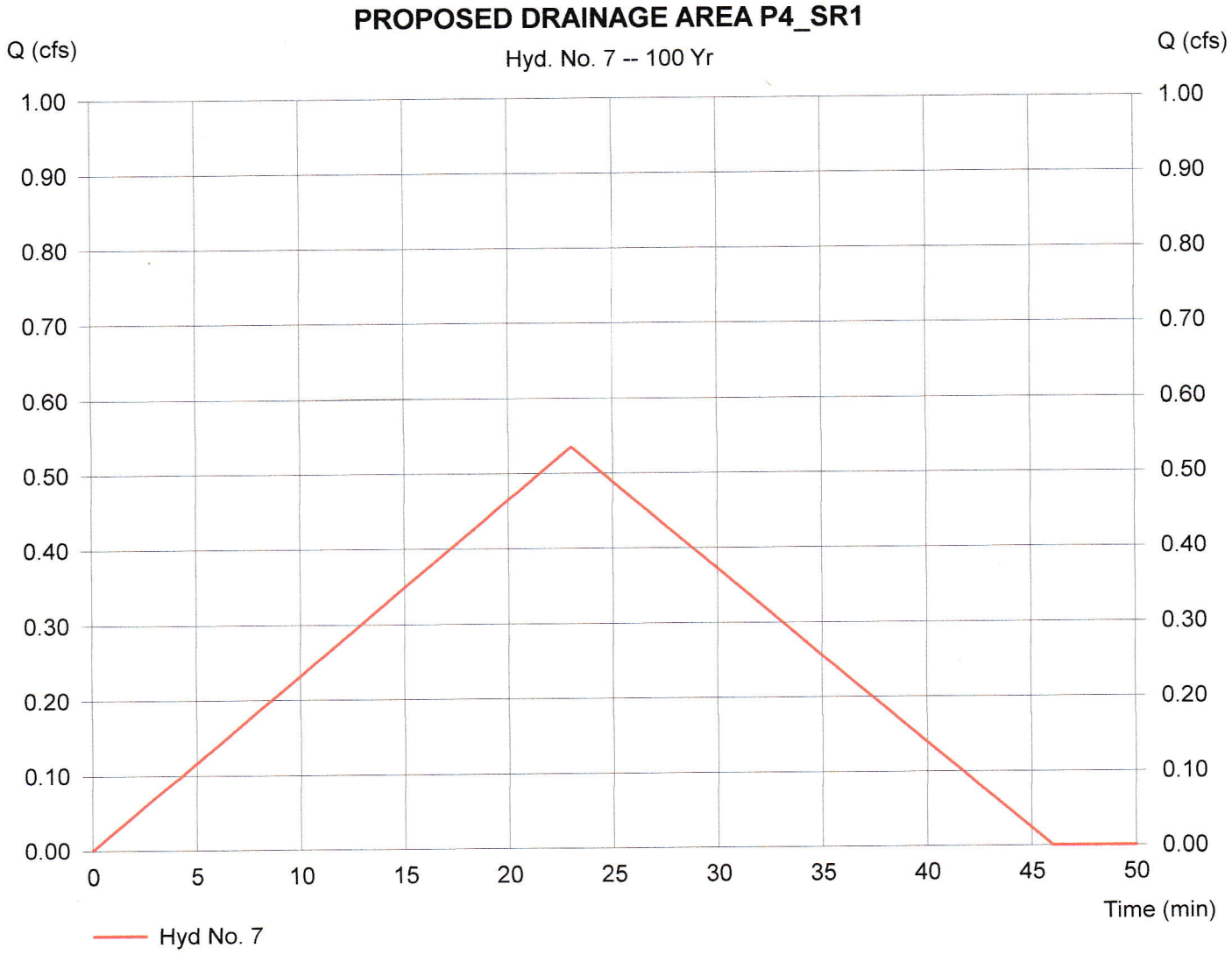
Thursday, Apr 30 2020, 8:0 PM

Hyd. No. 7

PROPOSED DRAINAGE AREA P4_SR1

Hydrograph type	= Rational	Peak discharge	= 0.53 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 0.2 ac	Runoff coeff.	= 0.56
Intensity	= 4.634 in/hr	Tc by User	= 23 min
IDF Curve	= HARTFORD COUNTY.IDF	Asc/Rec limb fact	= 1/1

Hydrograph Volume = 738 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

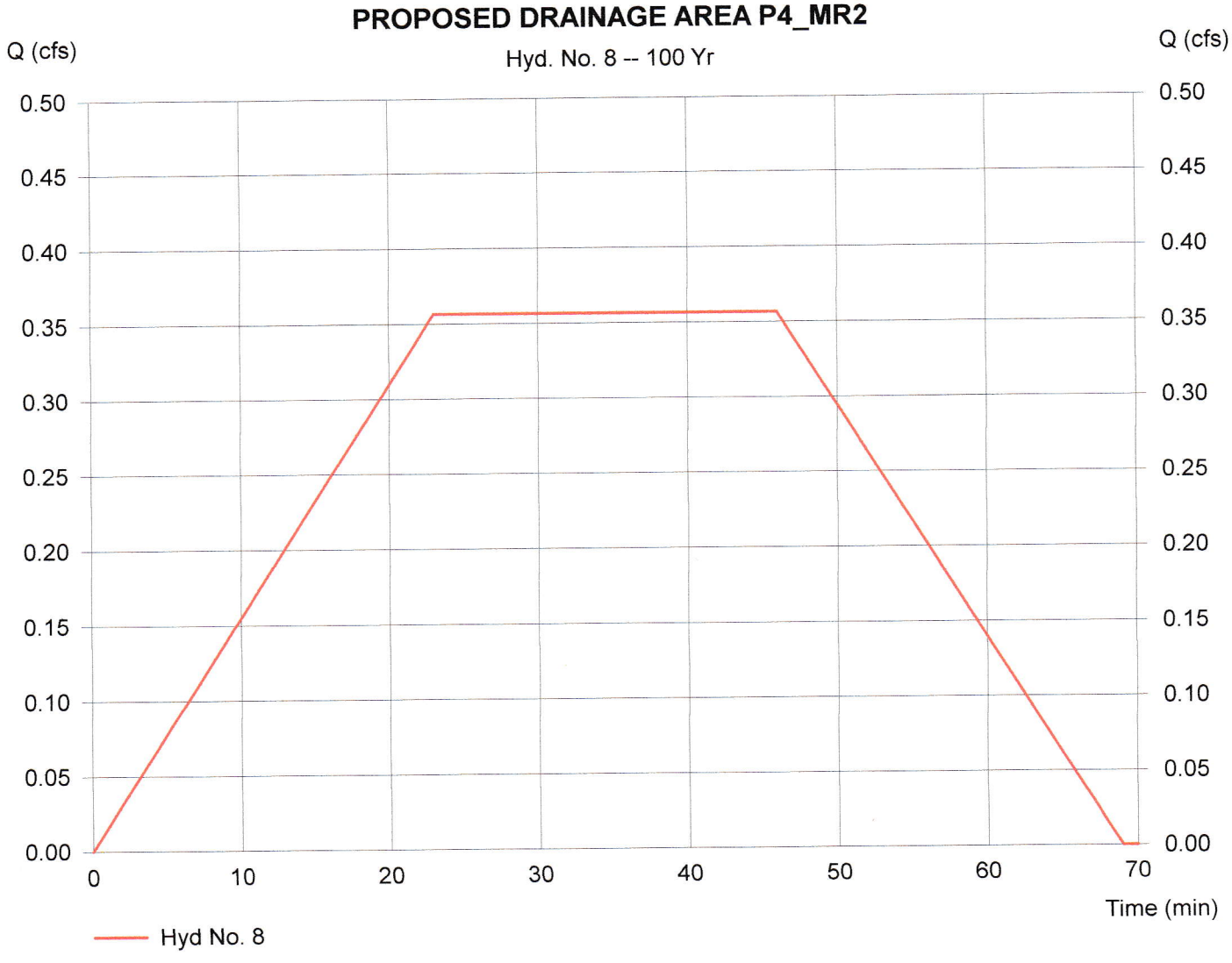
Thursday, Apr 30 2020, 8:21 PM

Hyd. No. 8

PROPOSED DRAINAGE AREA P4_MR2

Hydrograph type	= Mod. Rational	Peak discharge	= 0.36 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 0.2 ac	Runoff coeff.	= 0.56
Intensity	= 3.089 in/hr	Tc by User	= 23 min
IDF Curve	= HARTFORD COUNTY.IDF	Storm duration	= 2 x Tc

Hydrograph Volume = 983 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): $Q=[WQV\ (acre\text{-}feet)]\ x\ [12\ (inches/foot)]\ /\ Drainage\ Area\ (acres)$

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 EACH OF FOUR PROPOSED RETENTION/INFILTRATION BASINS TO BE CONSTRUCTED ON THE SUBECT PROPERTY):

BASIN NO. 1 [DRAINAGE AREA P1]

Drainage Area (A) = 0.421 acres; Impervious Cover (I) = 0.293 ac. [69.6% of total area]; Tc = 0.33 hr.

WQV: $R = 0.05 + 0.009(69.6) = 0.676$
$WQV = (1in.)(0.676)(0.421\ ac.)/12 =$ 0.024 ac.-ft. [1,033cu. ft.]

WQF: $Q = (0.024\ ac.\text{-}ft.)(12\ in./ft.)/0.421\ ac. = 0.68\ in.$
$CN = 1000 / \{10 + (5)(1) + 10(0.68) - 10[(0.68)^2 + 1.25(0.68)(1)]^{½}\} = 97$
$I_a = 0.062$ [Table 4-I, TR-55]
$I_a/P = 0.062 / 1 = 0.083$
$q_u = 500$ [Exhibit 4-III, TR-55]
$WQF = (500)(0.421/640)(0.68) =$ 0.22 cfs

BASIN NO. 2 [DRAINAGE AREA P2]

Drainage Area (A) = 0.550 acres; Impervious Cover (I) = 0.424 ac. [77.1% of total area]; Tc = 0.25 hr.

WQV: $R = 0.05 + 0.009(77.1) = 0.744$
$WQV = (1in.)(0.744)(0.550\ ac.)/12 =$ 0.034 ac.-ft. [1,481 cu. ft.]

WQF: $Q = (0.034\ ac.\text{-}ft.)(12\ in./ft.)/0.550\ ac. = 0.74\ in.$
$CN = 1000 / \{10 + (5)(1) + 10(0.74) - 10[(0.74)^2 + 1.25(0.74)(1)]^{½}\} = 97$
$I_a = 0.062$ [Table 4-I, TR-55]
$I_a/P = 0.062 / 1 = 0.062$
$q_u = 550$ [Exhibit 4-III, TR-55]
$WQF = (550)(0.550/640)(0.74) =$ 0.35 cfs

BASIN NO. 3 [DRAINAGE AREA P3]

Drainage Area (A) = 0.286 acres; Impervious Cover (I) = 0.093 ac. [32.5% of total area]; Tc = 0.32 hr.

WQV: $R = 0.05 + 0.009(32.5) = 0.343$
$WQV = (1in.)(0.343)(0.286\ ac.)/12 = \underline{0.008\ ac.\text{-}ft.}$ [348 cu. ft.]

WQF: $Q = (0.008\ ac.\text{-}ft.)(12\ in./ft.)/0.286\ ac. = 0.34\ in.$
$CN = 1000 / \{10 + (5)(1) + 10(0.34) - 10[(0.34)^2 + 1.25(0.34)(1)]^{½}\} = 91$
$I_a = 0.198$ [Table 4-I, TR-55]
$I_a/P = 0.198/ 1 = 0.198$
$q_u = 440$ [Exhibit 4-III, TR-55]
$WQF = (440)(0.286/640)(0.34) = \underline{0.07\ cfs}$

BASIN NO. 4 [DRAINAGE AREA P4]

Drainage Area (A) = 0.206 acres; Impervious Cover (I) = 0.088 ac. [42.7 % of total area]; Tc = 0.38 hr.

WQV: $R = 0.05 + 0.009(42.7) = 0.434$
$WQV = (1in.)(0.434)(0.206\ ac.)/12 = \underline{0.007\ ac.\text{-}ft.}$ [305 cu. ft.]

WQF: $Q = (0.007\ ac.\text{-}ft.)(12\ in./ft.)/0.206\ ac. = 0.41\ in.$
$CN = 1000 / \{10 + (5)(1) + 10(0.41) - 10[(0.41)^2 + 1.25(0.41)(1)]^{½}\} = 92$
$I_a = 0.174$ [Table 4-I, TR-55]
$I_a/P = 0.174/ 1 = 0.198$
$q_u = 430$ [Exhibit 4-III, TR-55]
$WQF = (430)(0.206/640)(041) = \underline{0.06\ cfs}$