MICRO STORM WATER DRAINAGE STUDY

For:
Lots 9A, 11A, 13A
A Replat of Lots 9-14, Block 5
Lowe's Addition
Lee's Summit, Jackson County, Missouri

Water Sheds:
Little Blue River Watershed

3-9-2021

PREPARED BY:

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Robert Walquist, PE

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BIBLIOGRAPHY

Division V - Section 5600 – Storm Drainage Systems and Facilities" of the Kansas City Metropolitan Chapter of the American Public Works Association's "Standard Specifications and Design Criteria" dated February 15th, 2006.

APWA 5600 SPECIFICATIONS
http://kcmetro.apwa.net/chapters/kcmetro/specs/APWA5600.pdf

GOOGLE MAP
https://maps.google.com/maps?hl=en

FEMA MAP SERVICE CENTER -
https://msc.fema.gov/portal/home

UNITED STATES OF AGRICULTURE – NATURAL RESOURCES CONSERVATION SERVICE
http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

General Information

This study is to evaluate the proposed development of 3 lots in Lee's Summit Jackson County Missouri.

This study will evaluate the pre development (or use the APWA guidelines for release rates) and post development runoff from this site.

The land currently is an undeveloped property with relief of over 5 feet in places within the site. The site is an infill project with one large lot being rezoned and divided into 3 lots for duplexes. This report will look at detention for each lot within the development. The areas are defined by the area within the lots. Specific lots will be outlined in the report and tables showing the proposed rates included for each section.

None of the lots are shown to be in the flood plain for the City of Lee's Summit, Missouri Flood Insurance Study and Mapping.

Methodology

The analytical and design criteria used in the study conform to those of "Division V - Section 5600 – Storm Drainage Systems and Facilities" of the Kansas City Metropolitan Chapter of the American Public Works Association's "Standard Specifications and Design Criteria" dated February 2006. Based on these criteria, allowable discharge from the development is based on limiting 100-year (1%) and 10 year (10%) and 2-year storm post peak development discharge rates to no more than existing discharge from the site for each respective storm. The following approved methods were used in this report.

- Hydra Flow
- Rational Method
- 2, 10, and 100-Year Return Frequency
- Rational Method Coefficients per APWA 5600

Table 1. Rainfall Depths

Storm	Percent	Rainfall Depth (in)
2 Year	50%	2.20
10 Year	10%	5.34
100 Year	1%	7.95

On Site	Rational Method "C"
Pre Development	0.30
Post Development	0.66

Required Pre-Development Flow Rates

Required maximum runoff rate for the different storm event will be shown with each basin. Below is the multiplier for max rates :

Storm Event	max rates
2yr	0.5
10yr	2.0
100yr	3.0

A. Identification of Downstream Drainage Issues

To date we are not aware of any drainage issues with the downstream storm sewer system. A visual inspection confirms that the existing area does not have erosion. There are no current downstream flooding issues. The proposed project will increase impervious area. No adverse impact is anticipated in the downstream drainage system, we are proposing to provide detention basins.

B. Preliminary Onsite Drainage System

The storm water from the roofs will be collected in a gutter system with downspouts directed to the small basin on each lot. A summary of existing and proposed discharge rates is included in a table following the detention basin information.

C. Drainage Computations

Drainage computations for the 2-, 10- and 100-year design flows for the proposed site and for the downstream outfall for each sub basin are below. A summary of maximum release rates, detention basin and proposed discharge rates is included.
In the Appendix there is pre and post drainage maps with basin area designations and output from structure details and volume and stage elevations for each basin.

Flood Control Detention

The proposed project does increase the runoff from the site. Therefore, it is our recommendation that detention should be provided on the site.
A summary of the proposed detention can be found outlined in the design for each basin.

LOT 13A

Required Pre-Development Flow Rates
The following are the required maximum runoff rate for the different storm events:

Each lot is 7139 square feet or 0.16 acres

Storm Event	max rates	Runoff (cfs)
2yr	0.5 x (0.16)	0.08
10yr	2.0 x (0.16)	0.32
100yr	3.0 x (0.16)	0.48

Summary of LOT 13A

LOT 13A		2 Year	10 Year	100 Year
Drainage Area	0.16			
"C" Value	0.66			
Detained Discharge		0.03 cfs	0.04 cfs	0.05 cfs
Storage Volume		174 Cu Ft	222 Cu Ft	303 Cu Ft
Storage Elevation		1010.28	1010.35	1010.48
Basin Flow Line Outflow	1010.00			
Outlet Structure	2 inch PVC pipe			
100-Year Emergency Weir	1011.5			
Basin Top Elevation	1012			

Lots 13 and 14, Lowe's Addition – Existing and Proposed Discharge Rates

LOT 13A		2 Year, cfs	10 Year, cfs	100 Year, cfs
Existing (allowed rate)		0.28	0.36	0.48
Proposed*		0.03	0.04	0.05

*Includes runoff that is un-detained.

LOT 11A

Required Pre-Development Flow Rates

The following are the required maximum runoff rate for the different storm events:

Storm Event	max rates	Runoff (cfs)
2yr	0.5 x (0.16)	0.08
10yr	2.0 x (0.16)	0.32
100yr	3.0 x (0.16)	0.48

Summary of Detention Basin Design LOT 11A

LOT 11A		2 Year	10 Year	100 Year
Drainage Area	0.16			
"C" Value	0.66			
Detained Discharge		0.02 cfs	0.02 cfs	0.03 cfs
Storage Volume		179 Cu Ft	228 Cu Ft	311 Cu Ft
Storage Elevation		10010.14	1010.18	1010.25
Basin Flow Line Outflow	1010			
Outlet Structure	2 inch PVC pipe			
100-Year Emergency Weir	1010.5			
Basin Top Elevation	1011			

Lots 11 and 12, Lowe's Addition – Existing and Proposed Discharge Rates

LOT 11A		2 Year, cfs	10 Year, cfs	100 Year, cfs
Existing		0.28	0.36	0.48
Proposed		0.02	0.02	0.03

LOT 9A

Required Pre-Development Flow Rates

The following are the required maximum runoff rate for the different storm events:

Storm Event	max rates	Runoff (cfs)
2yr	0.5 x (0.16)	0.08
10yr	2.0 x (0.16)	0.32
100yr	3.0 x (0.16)	0.48

Lots 9 and 10, Lowe's Addition – Existing and Proposed Discharge Rates

LOT 9A		2 Year, cfs	10 Year, cfs	100 Year, cfs
Existing		0.28	0.36	0.48
Proposed		0.62	0.78	1.06

SUMMARY OF RESULTS

Total project results to the area to the south in 100 year storm

	Allowed	Released
Lot 13A	0.48	0.05
Lot 11A	0.48	0.03
Lot 9A	0.48	1.06
Total	1.44	1.14

Net reduction 0.30 cfs

Based on the City's requirements the owners of Lot 11A and 9A will need to give point discharge agreements for the discharge of the basin on their lots. Lot 9A will not have a release as the upstream detention results in a flow that keeps the total allowed flow below the maximum release rates.

The proposed detention systems for each lot does reduce the overall flow.

D. FEMA/DWR CORP of Engineers Requirements

The drainageways are not located within the 100-year flood plain Zone X per the Flood Insurance Rate Map, The FEMA map is attached.

Conclusions and Recommendations

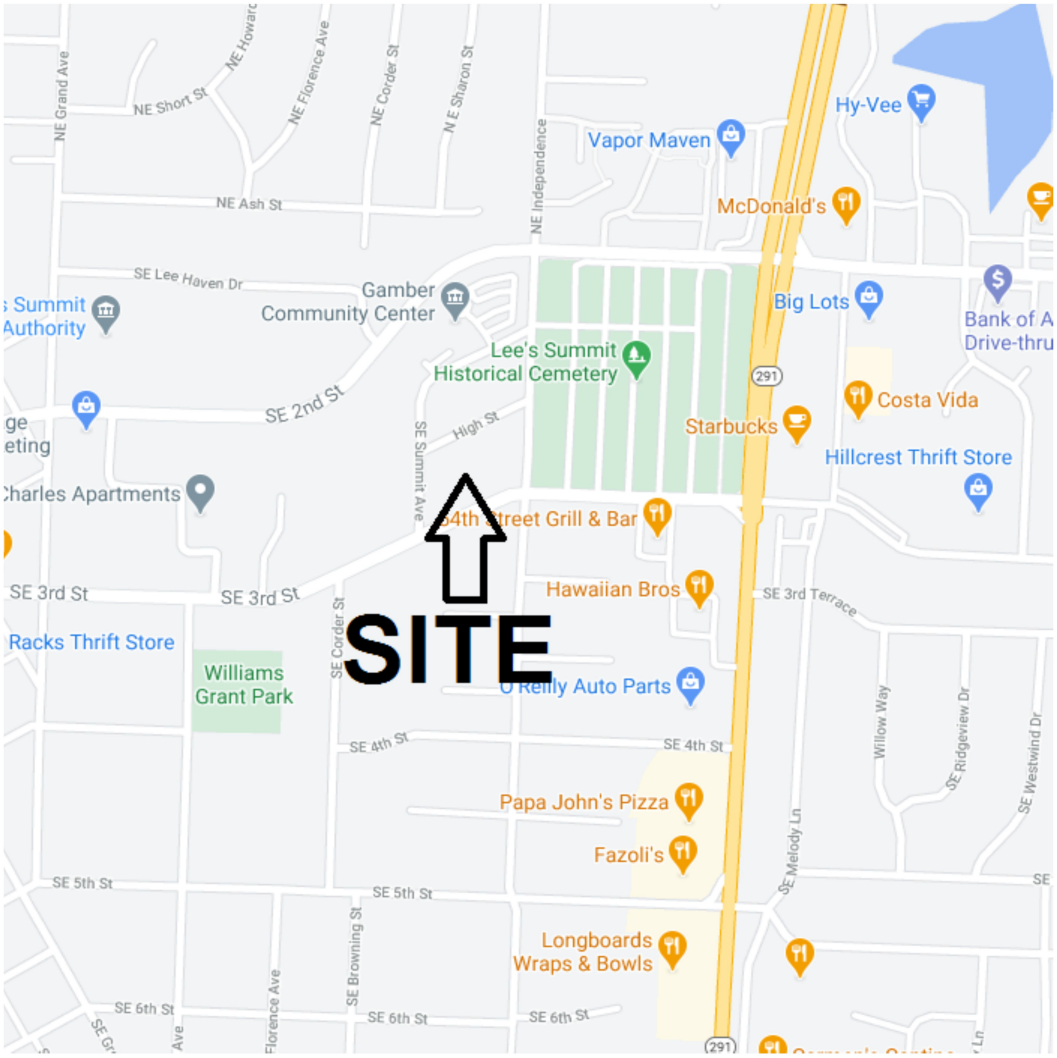
The proposed project will cause an increase of peak discharge after the improvements are made to the site. We are proposing to reduce the 2-year, 10-year, and 100-year events discharge rates to below the maximum release rates conditions for each storm event.

The proposed development project meets or exceeds all the required stormwater management criteria set forth by the City of Lee's Summit, Missouri. Based on this information, we request your approval of the storm drainage study for the replat of Lowe's Addition. If you have any questions, please do not hesitate to contact us.

Exhibits

- **SITE LOCATION MAP**
- **USGS MAP**
- **AERIAL VIEW**
- **FIRMETTE MAP**
- **STORM DRAINAGE MAP & BASIN LOCATION PLANS**
- **HYDROLOGIC MODEL**
    - **2yr MODEL**
    - **10yr MODEL**
    - **100yr MODEL**

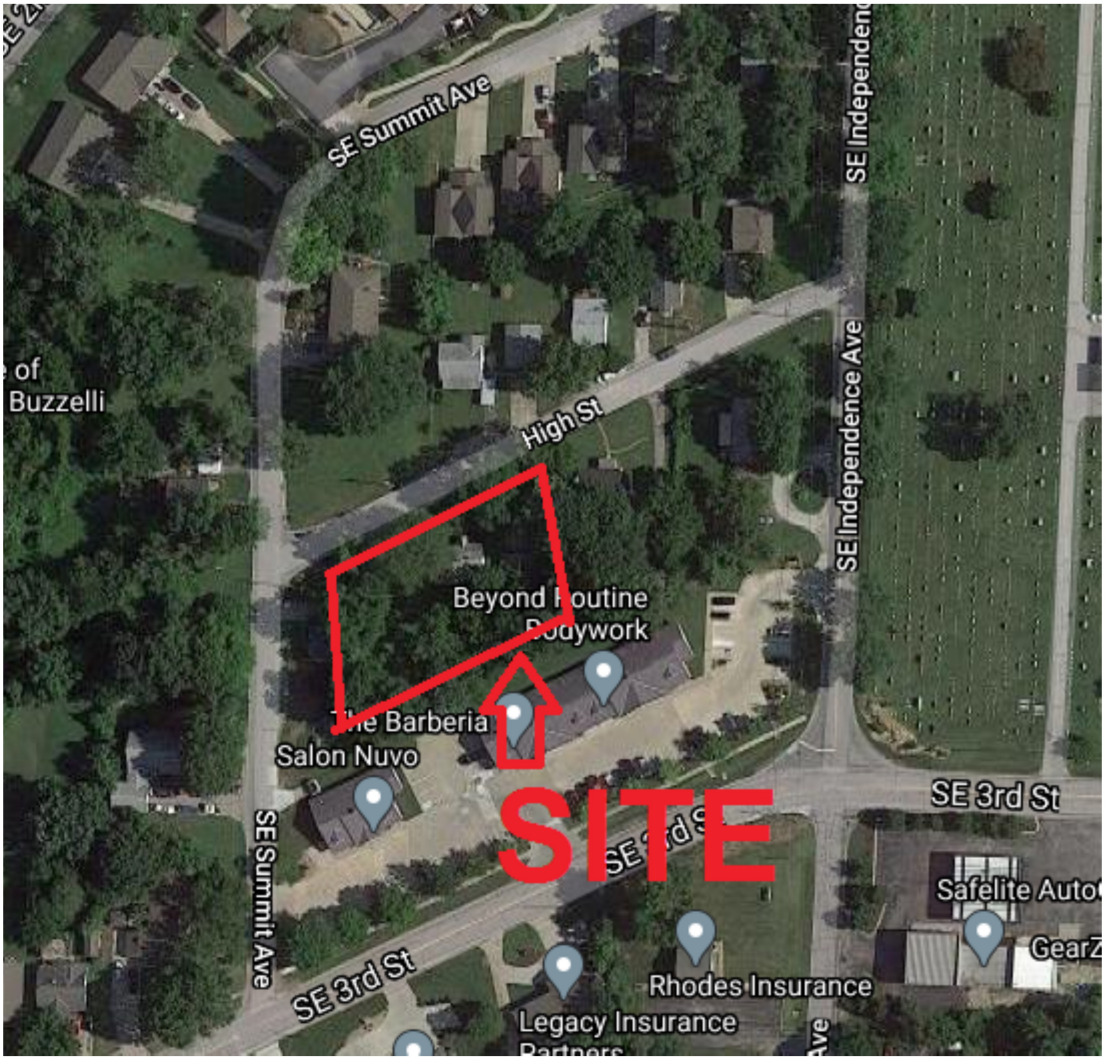
SITE LOCATION MAP




SE DOUGLAS ST
SE GRAND AVE
1050
SE GREEN
SE HOWARD ST
Lees Summit
NE ASH ST
5
ING ST
SE 6TH ST
SE 3
SITE
SE INDEPENDENCE AVE
SE 5 ST
1000
Summit Cem
Lee's
291

USGS MAP

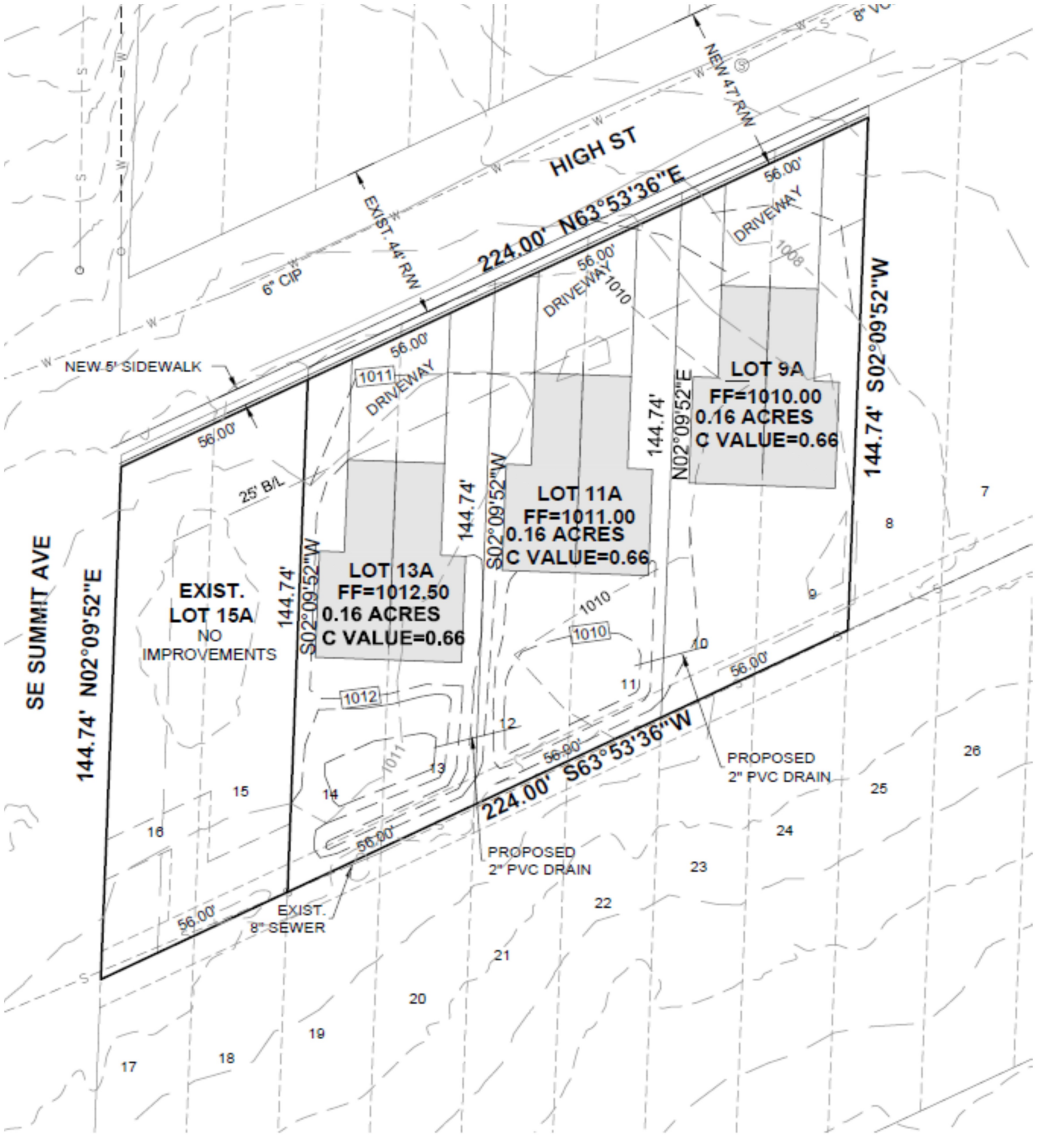
AERIAL VIEW


SE Summit Ave
SE Independence Ave
High St
Beyond Routine
Bodywork
Salon Nuvo
SITE
SE 3rd St
SE Summit Ave
SE 3rd St
Rhodes Insurance
Legacy Insurance

FIRM MAP & PANEL NUMBER

Taken from Map Number 29095C0436G, with an effective date of January 20, 2017

STORM DRAINAGE MAP & BASIN DESIGN



POST-DEVELOPMENT

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v2018.3

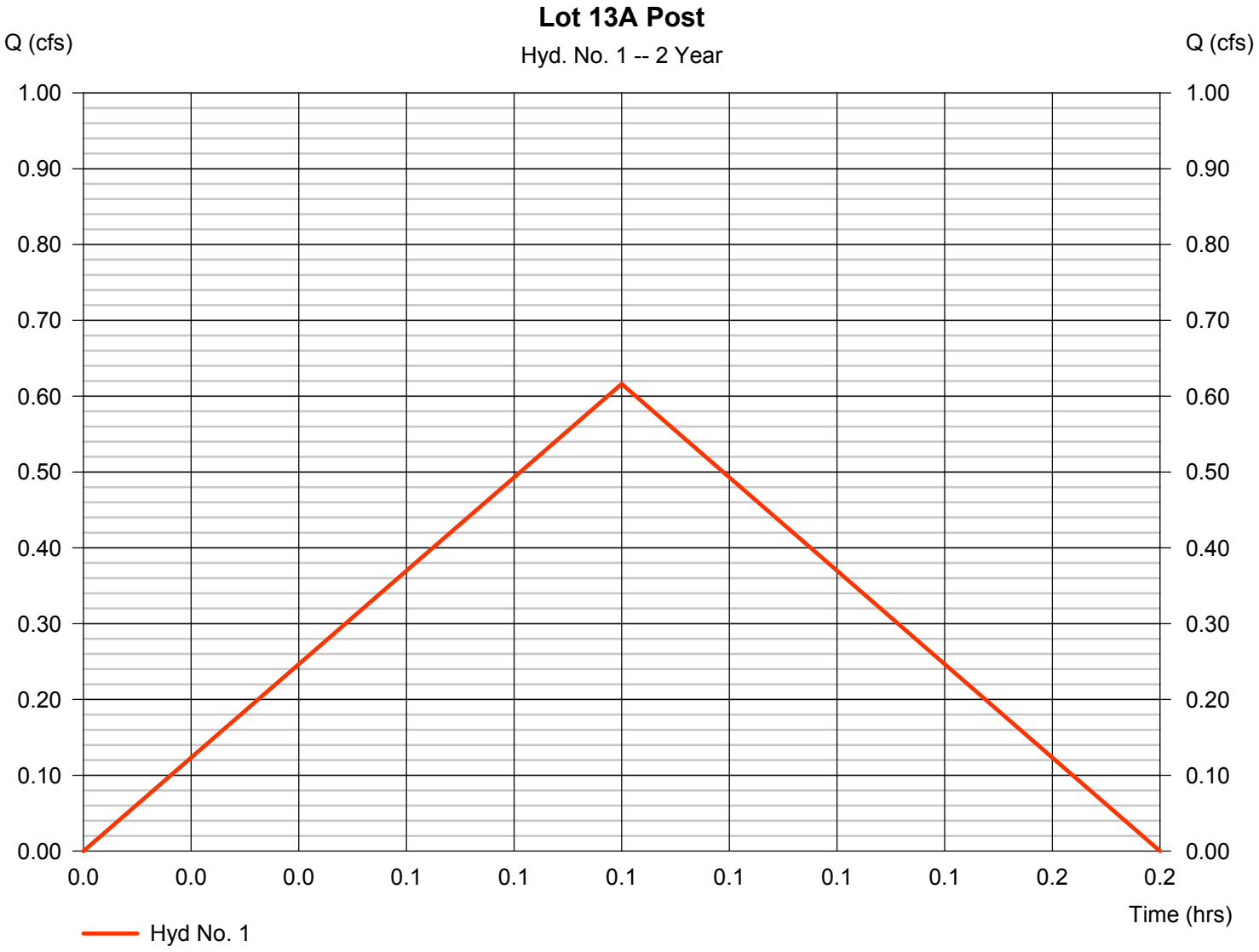
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	0.616	1	5	185	------	------	------	Lot 13A Post
2	Rational	0.280	1	5	84	------	------	------	Lot 13A Pre
4	Reservoir	0.032	1	10	180	1	1010.28	174	Lot 13A Route
6	Rational	0.616	1	5	185	------	------	------	Lot 11A Post
7	Rational	0.280	1	5	84	------	------	------	Lot 11A Pre
9	Reservoir	0.017	1	10	175	6	1010.14	179	Lot 11A Route

Hydrograph Report

Hyd. No. 1

Lot 13A Post

Hydrograph type	= Rational	Peak discharge	= 0.616 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.08 hrs
Time interval	= 1 min	Hyd. volume	= 185 cuft
Drainage area	= 0.164 ac	Runoff coeff.	= 0.66
Intensity	= 5.693 in/hr	Tc by User	= 5.00 min
IDF Curve	= SampleFHA.idf	Asc/Rec limb fact	= 1/1

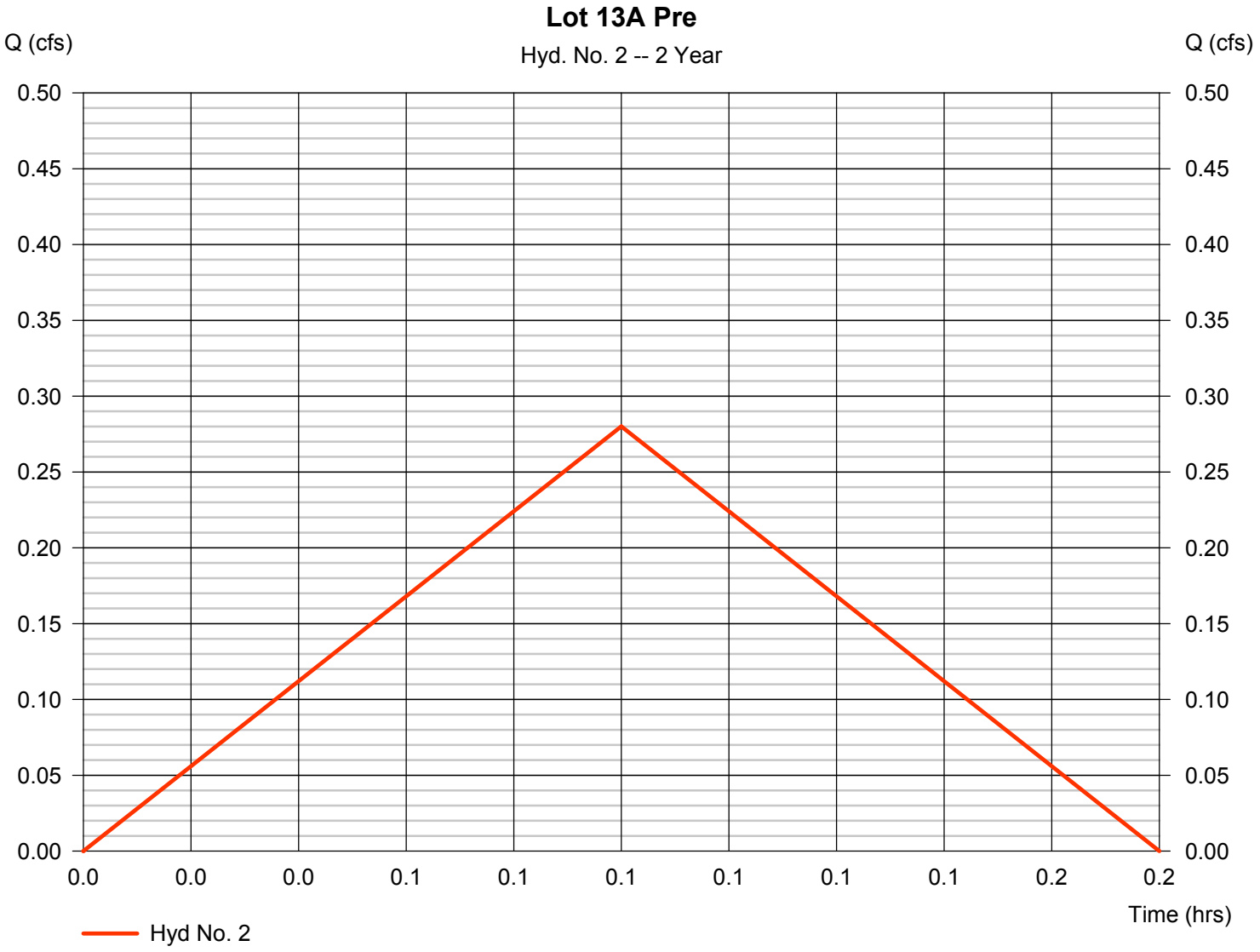


Hydrograph Report

Hyd. No. 2

Lot 13A Pre

Hydrograph type	= Rational	Peak discharge	= 0.280 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.08 hrs
Time interval	= 1 min	Hyd. volume	= 84 cuft
Drainage area	= 0.164 ac	Runoff coeff.	= 0.3
Intensity	= 5.693 in/hr	Tc by User	= 5.00 min
IDF Curve	= SampleFHA.idf	Asc/Rec limb fact	= 1/1



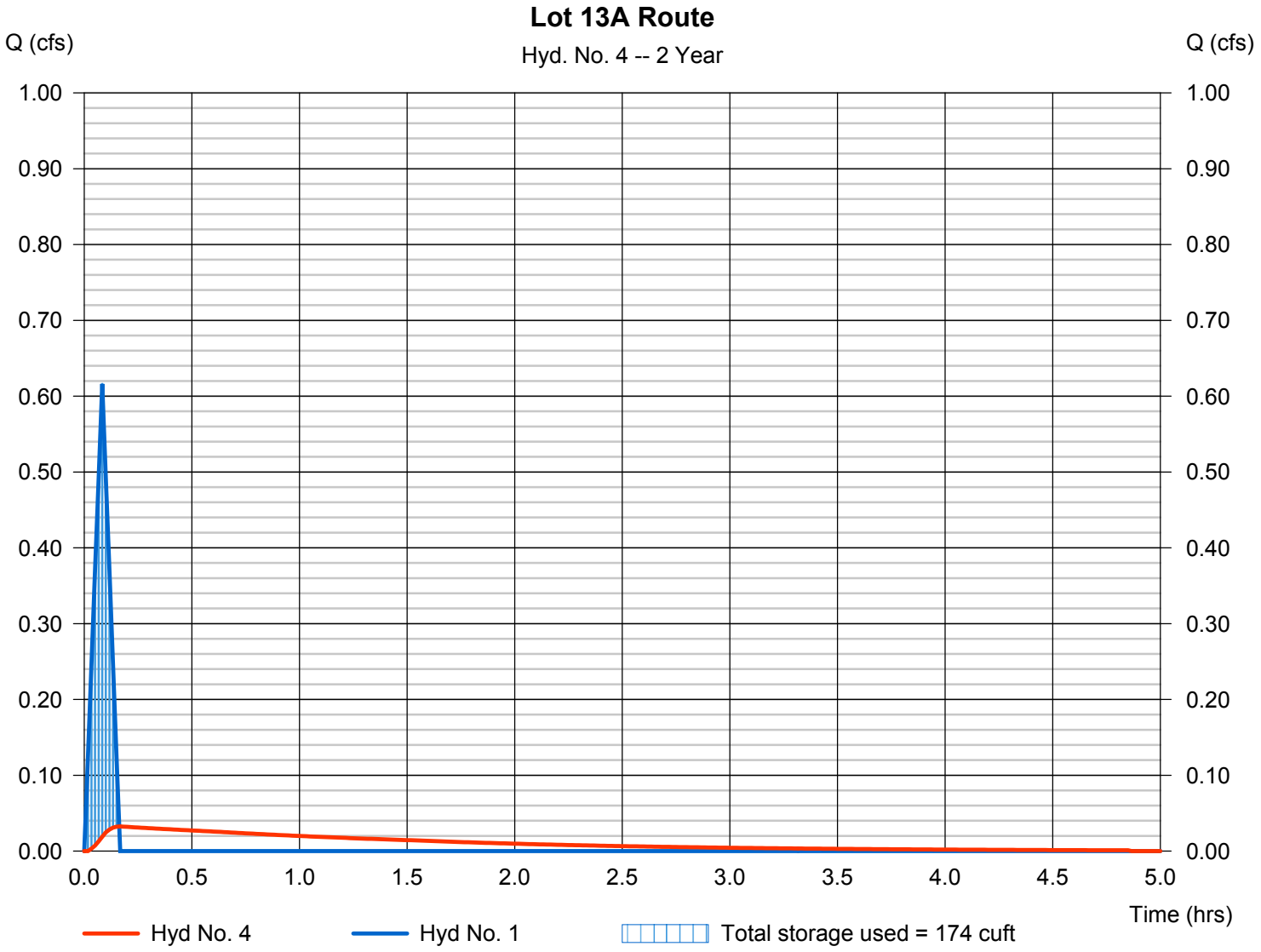
Hydrograph Report

Hyd. No. 4

Lot 13A Route

Hydrograph type	= Reservoir	Peak discharge	= 0.032 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 180 cuft
Inflow hyd. No.	= 1 - Lot 13A Post	Max. Elevation	= 1010.28 ft
Reservoir name	= Lot 13A	Max. Storage	= 174 cuft

Storage Indication method used.



Pond Report

Pond No. 3 - Lot 13A

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 1010.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	1010.00	372	0	0
1.00	1011.00	945	637	637
2.00	1012.00	1,405	1,167	1,804

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 2.00	0.00	0.00	0.00
Span (in)	= 2.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 1010.00	0.00	0.00	0.00
Length (ft)	= 16.00	0.00	0.00	0.00
Slope (%)	= 0.50	0.00	0.00	n/a
N-Value	= .011	.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

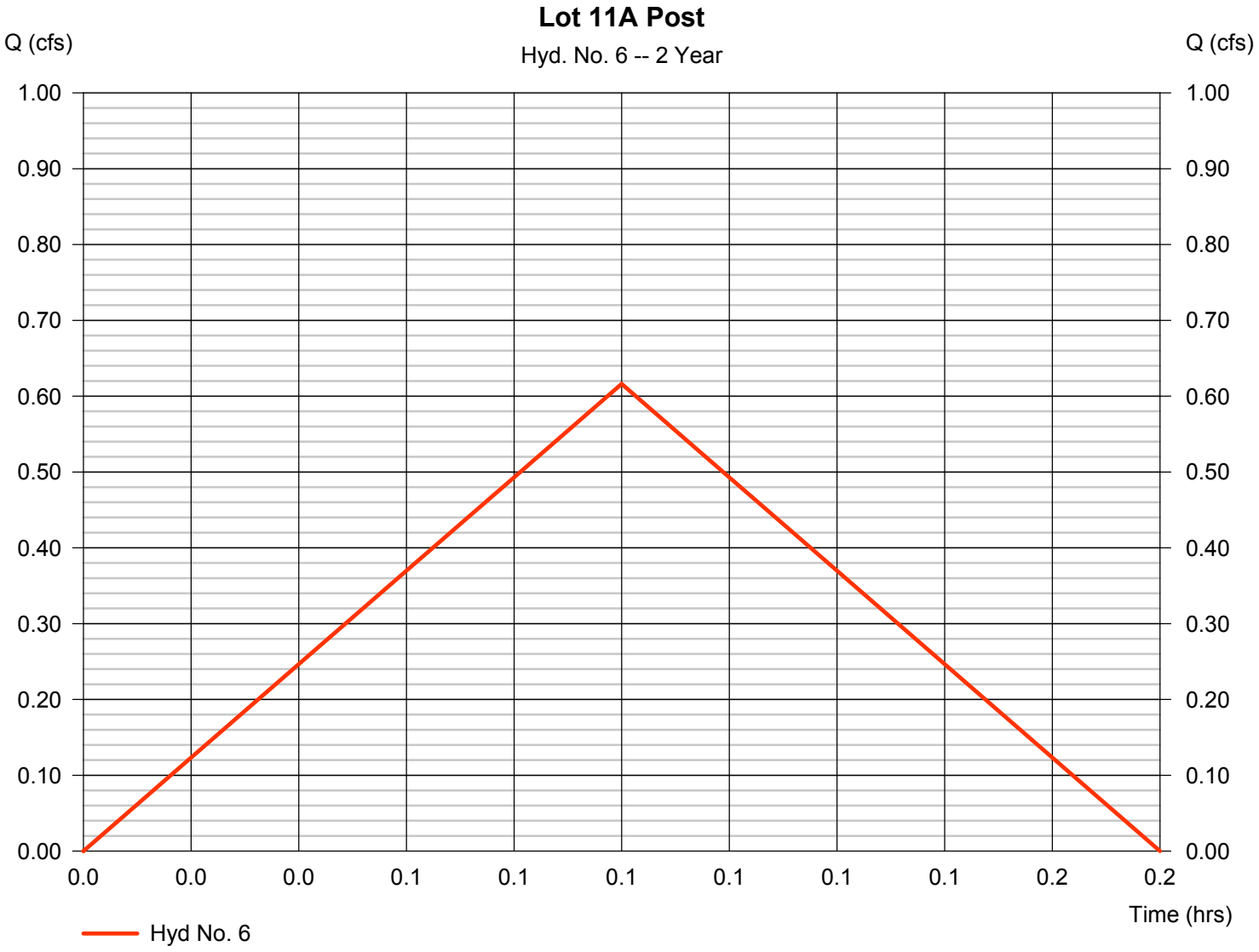
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	1010.00	0.00	---	---	---	---	---	---	---	---	---	0.000
1.00	637	1011.00	0.07 oc	---	---	---	---	---	---	---	---	---	0.072
2.00	1,804	1012.00	0.10 oc	---	---	---	---	---	---	---	---	---	0.105

Hydrograph Report

Hyd. No. 6

Lot 11A Post

Hydrograph type	= Rational	Peak discharge	= 0.616 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.08 hrs
Time interval	= 1 min	Hyd. volume	= 185 cuft
Drainage area	= 0.164 ac	Runoff coeff.	= 0.66
Intensity	= 5.693 in/hr	Tc by User	= 5.00 min
IDF Curve	= SampleFHA.idf	Asc/Rec limb fact	= 1/1

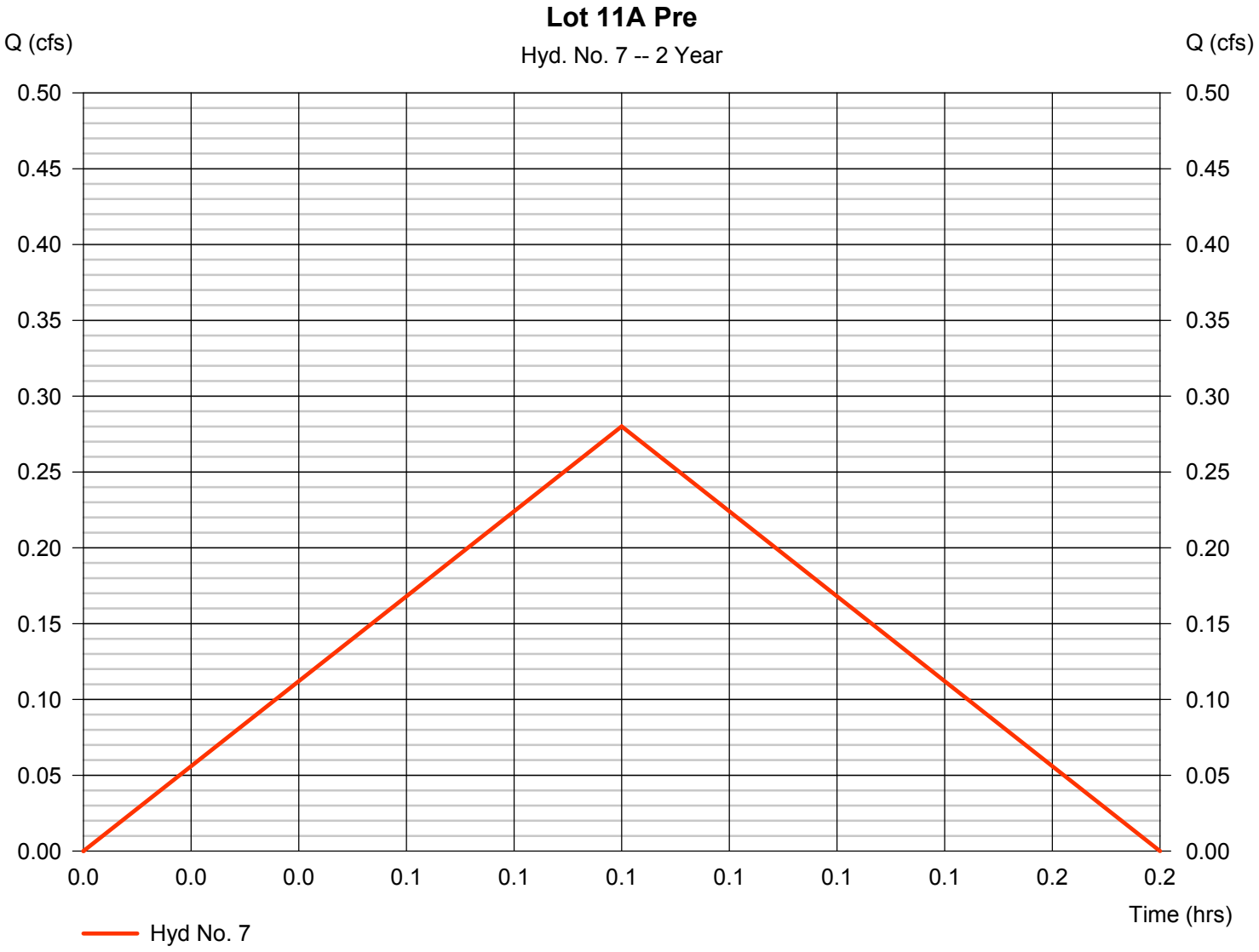


Hydrograph Report

Hyd. No. 7

Lot 11A Pre

Hydrograph type	= Rational	Peak discharge	= 0.280 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.08 hrs
Time interval	= 1 min	Hyd. volume	= 84 cuft
Drainage area	= 0.164 ac	Runoff coeff.	= 0.3
Intensity	= 5.693 in/hr	Tc by User	= 5.00 min
IDF Curve	= SampleFHA.idf	Asc/Rec limb fact	= 1/1



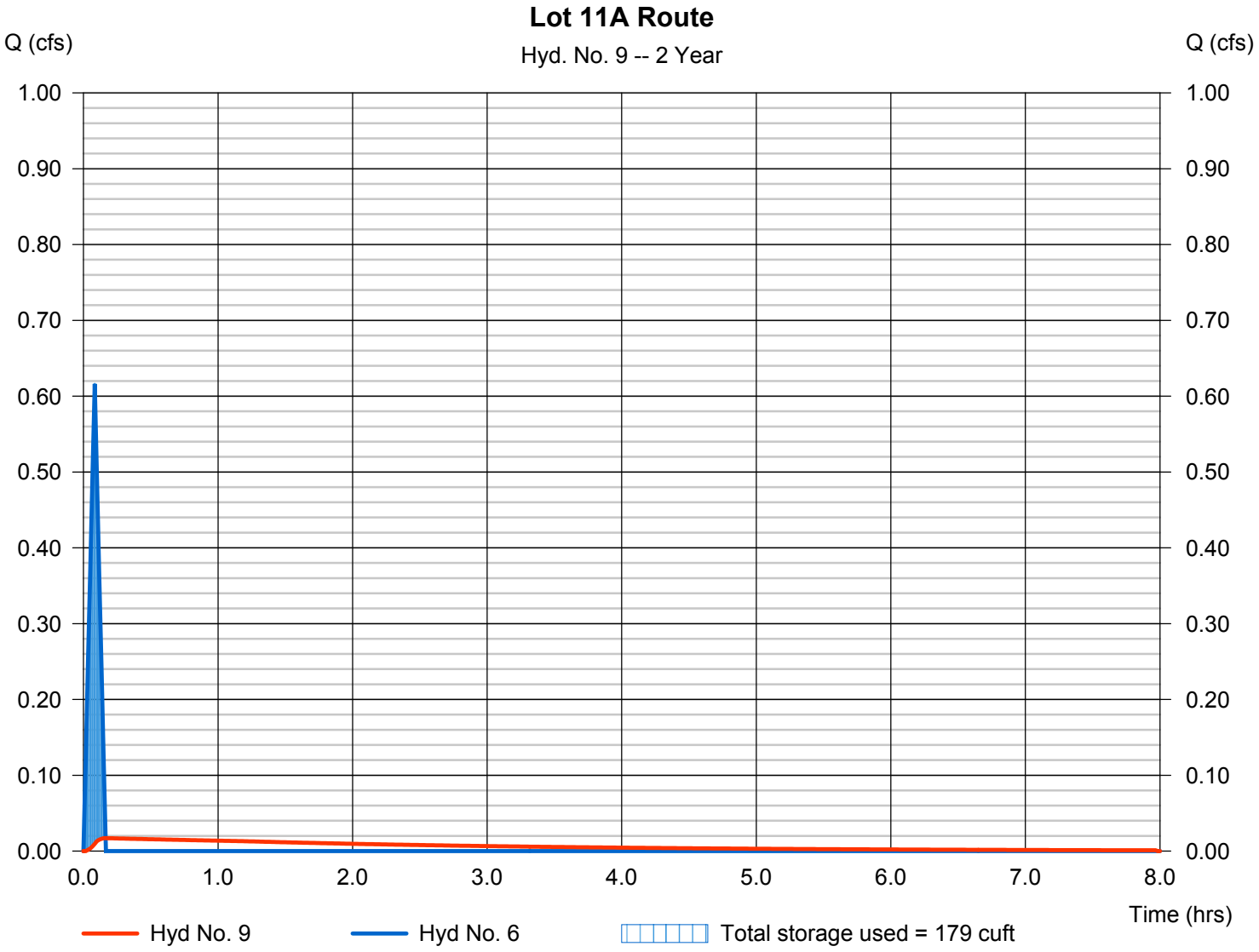
Hydrograph Report

Hyd. No. 9

Lot 11A Route

Hydrograph type	= Reservoir	Peak discharge	= 0.017 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 175 cuft
Inflow hyd. No.	= 6 - Lot 11A Post	Max. Elevation	= 1010.14 ft
Reservoir name	= Lot 11A	Max. Storage	= 179 cuft

Storage Indication method used.



Pond Report

Pond No. 4 - Lot 11A

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 1010.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	1010.00	836	0	0
1.00	1011.00	1,711	1,248	1,248

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 2.00	0.00	0.00	0.00
Span (in)	= 2.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 1010.00	0.00	0.00	0.00
Length (ft)	= 26.00	0.00	0.00	0.00
Slope (%)	= 0.50	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	1010.00	0.00	---	---	---	---	---	---	---	---	---	0.000
1.00	1,248	1011.00	0.05 oc	---	---	---	---	---	---	---	---	---	0.054

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v2018.3

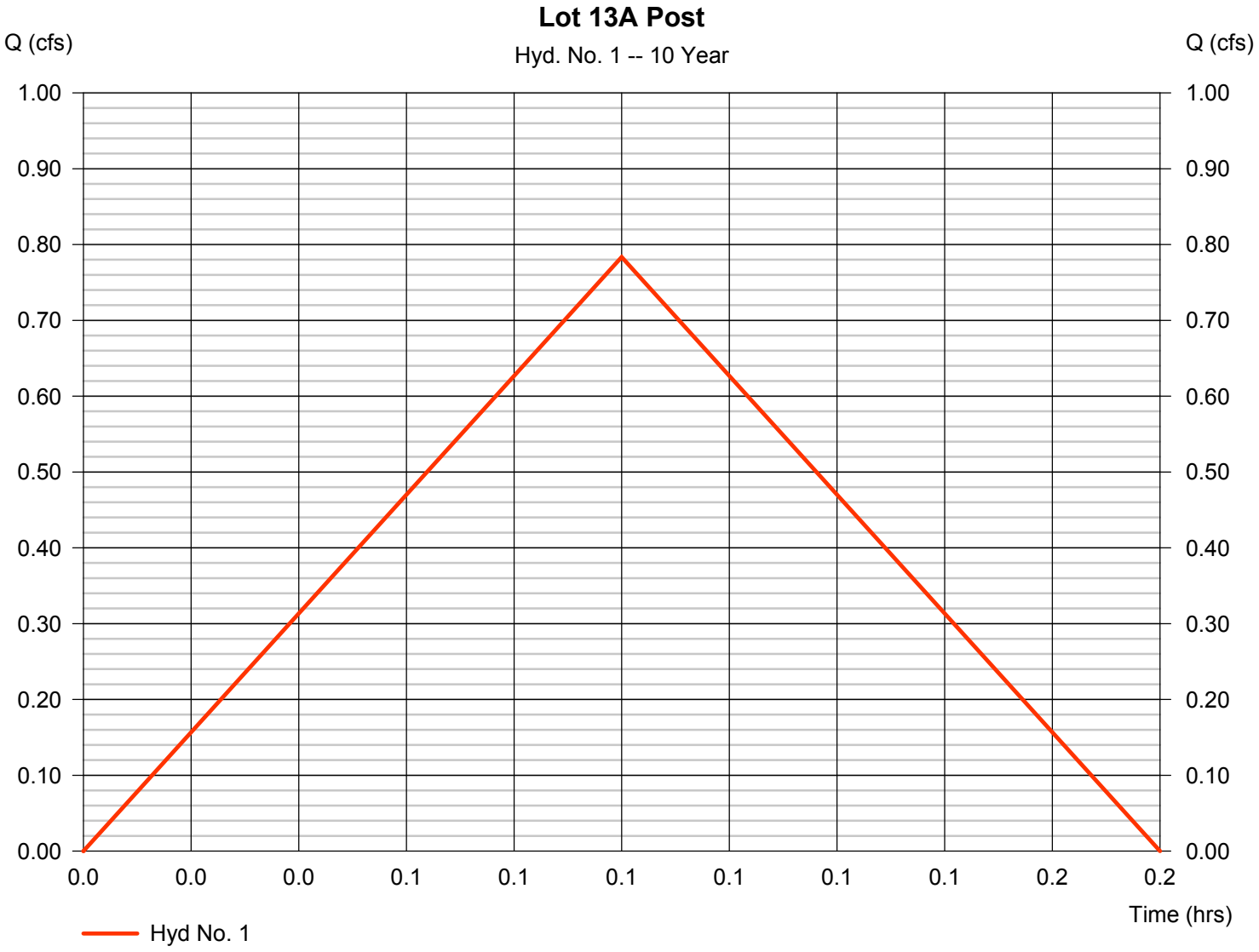
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	0.783	1	5	235	------	------	------	Lot 13A Post
2	Rational	0.356	1	5	107	------	------	------	Lot 13A Pre
4	Reservoir	0.039	1	10	230	1	1010.35	222	Lot 13A Route
6	Rational	0.783	1	5	235	------	------	------	Lot 11A Post
7	Rational	0.356	1	5	107	------	------	------	Lot 11A Pre
9	Reservoir	0.021	1	10	226	6	1010.18	228	Lot 11A Route

Hydrograph Report

Hyd. No. 1

Lot 13A Post

Hydrograph type	= Rational	Peak discharge	= 0.783 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.08 hrs
Time interval	= 1 min	Hyd. volume	= 235 cuft
Drainage area	= 0.164 ac	Runoff coeff.	= 0.66
Intensity	= 7.238 in/hr	Tc by User	= 5.00 min
IDF Curve	= SampleFHA.idf	Asc/Rec limb fact	= 1/1

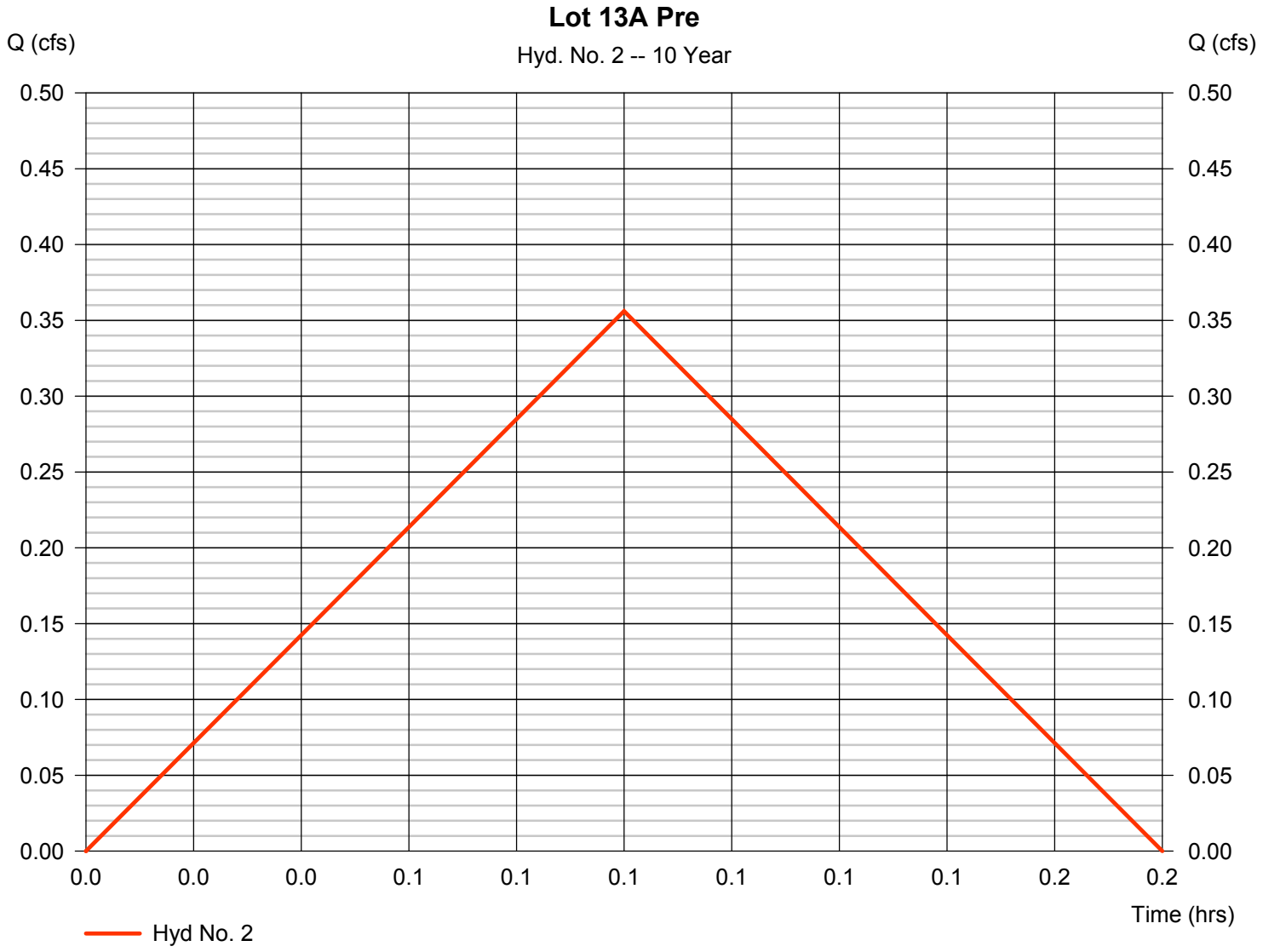


Hydrograph Report

Hyd. No. 2

Lot 13A Pre

Hydrograph type	= Rational	Peak discharge	= 0.356 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.08 hrs
Time interval	= 1 min	Hyd. volume	= 107 cuft
Drainage area	= 0.164 ac	Runoff coeff.	= 0.3
Intensity	= 7.238 in/hr	Tc by User	= 5.00 min
IDF Curve	= SampleFHA.idf	Asc/Rec limb fact	= 1/1



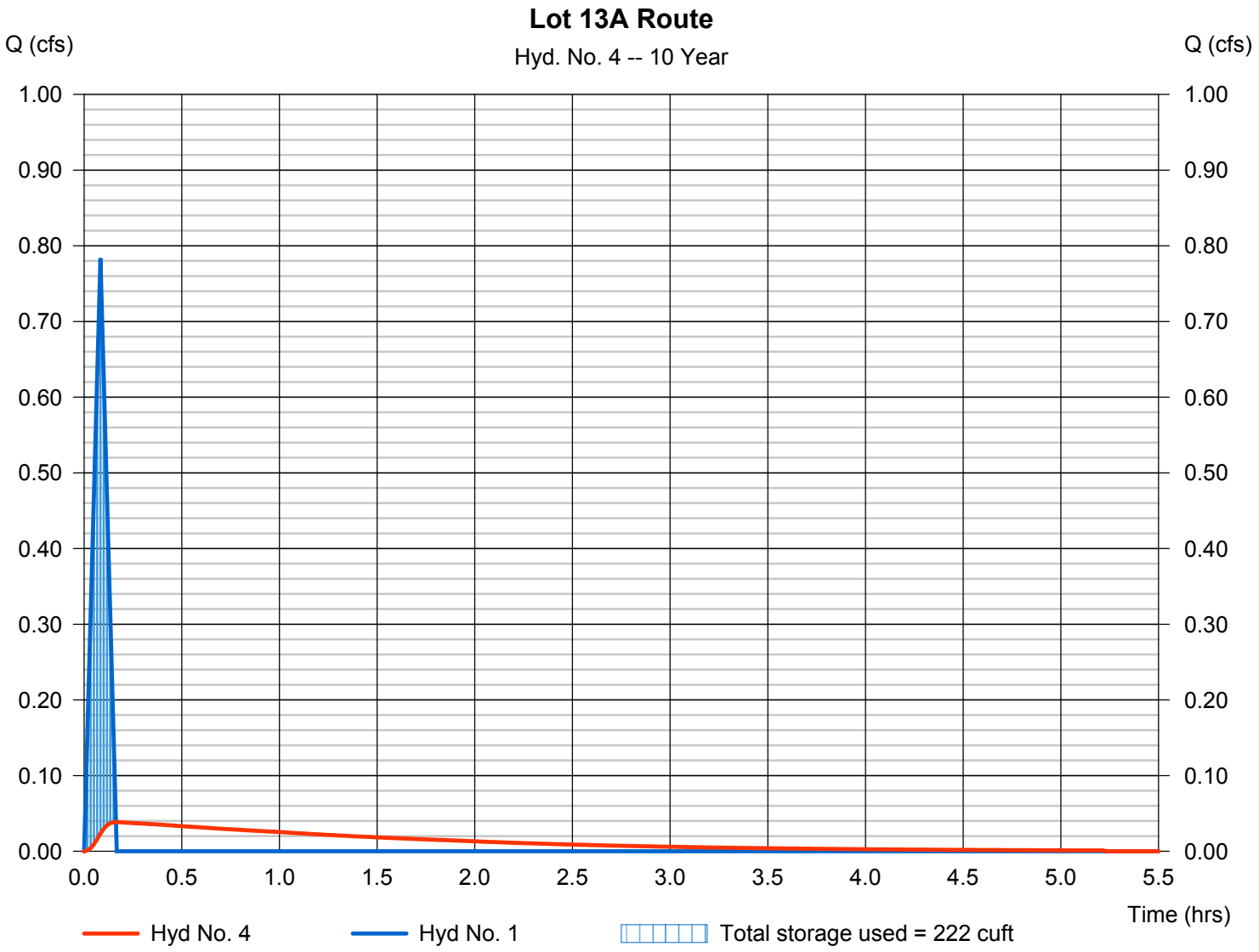
Hydrograph Report

Hyd. No. 4

Lot 13A Route

Hydrograph type	= Reservoir	Peak discharge	= 0.039 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 230 cuft
Inflow hyd. No.	= 1 - Lot 13A Post	Max. Elevation	= 1010.35 ft
Reservoir name	= Lot 13A	Max. Storage	= 222 cuft

Storage Indication method used.

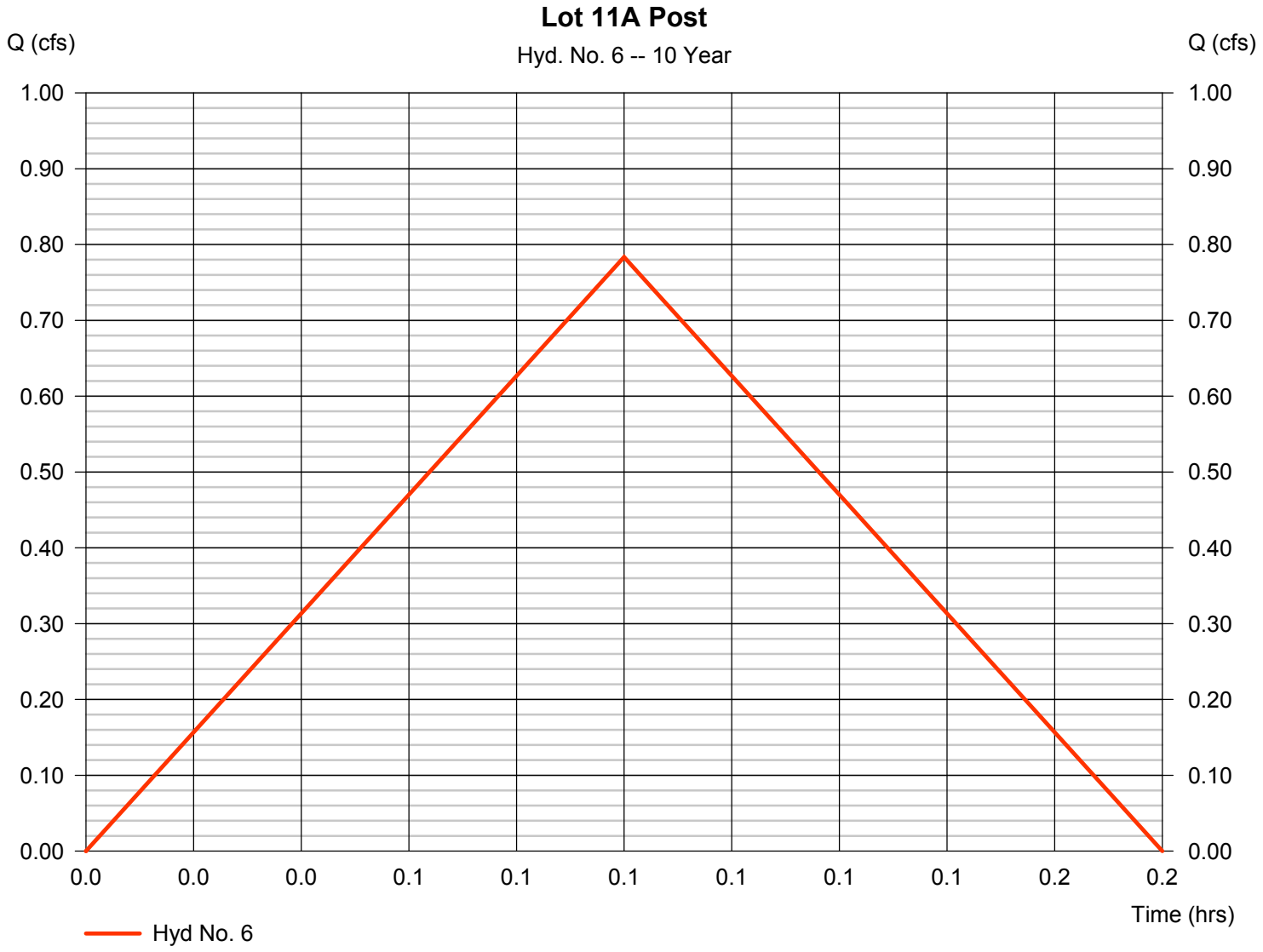


Hydrograph Report

Hyd. No. 6

Lot 11A Post

Hydrograph type	=	Rational	Peak discharge	=	0.783 cfs
Storm frequency	=	10 yrs	Time to peak	=	0.08 hrs
Time interval	=	1 min	Hyd. volume	=	235 cuft
Drainage area	=	0.164 ac	Runoff coeff.	=	0.66
Intensity	=	7.238 in/hr	Tc by User	=	5.00 min
IDF Curve	=	SampleFHA.idf	Asc/Rec limb fact	=	1/1

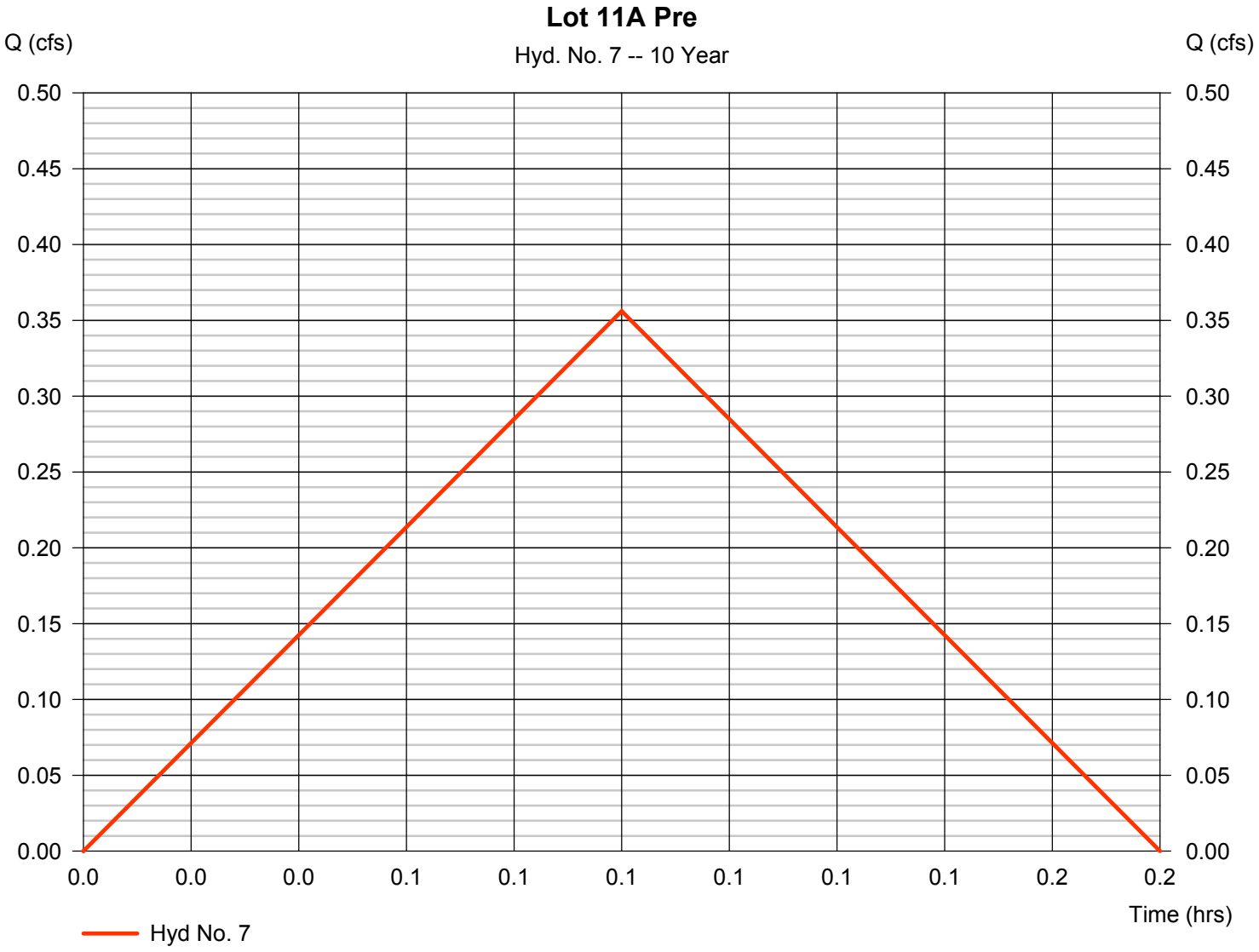


Hydrograph Report

Hyd. No. 7

Lot 11A Pre

Hydrograph type	= Rational	Peak discharge	= 0.356 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.08 hrs
Time interval	= 1 min	Hyd. volume	= 107 cuft
Drainage area	= 0.164 ac	Runoff coeff.	= 0.3
Intensity	= 7.238 in/hr	Tc by User	= 5.00 min
IDF Curve	= SampleFHA.idf	Asc/Rec limb fact	= 1/1



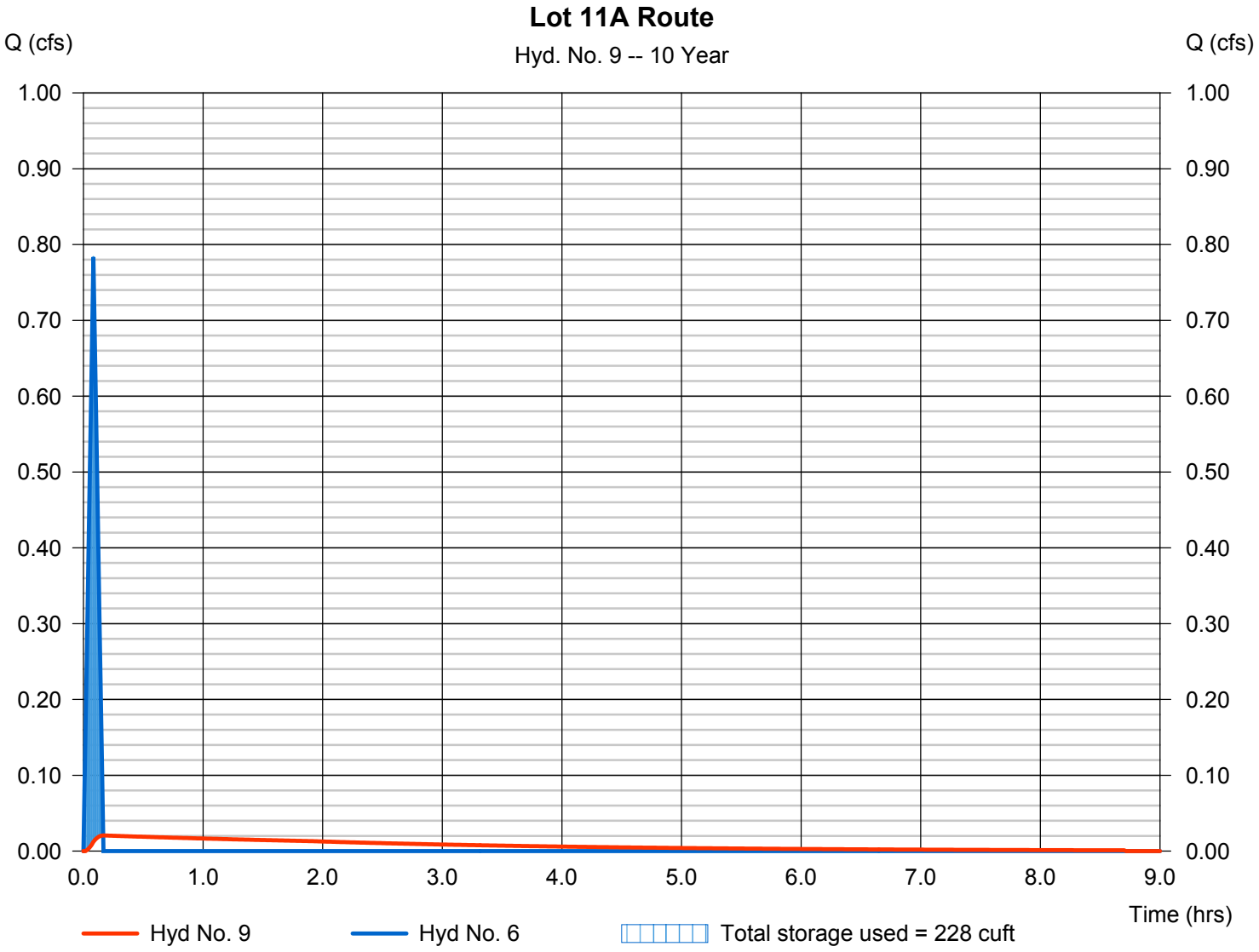
Hydrograph Report

Hyd. No. 9

Lot 11A Route

Hydrograph type	= Reservoir	Peak discharge	= 0.021 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 226 cuft
Inflow hyd. No.	= 6 - Lot 11A Post	Max. Elevation	= 1010.18 ft
Reservoir name	= Lot 11A	Max. Storage	= 228 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v2018.3

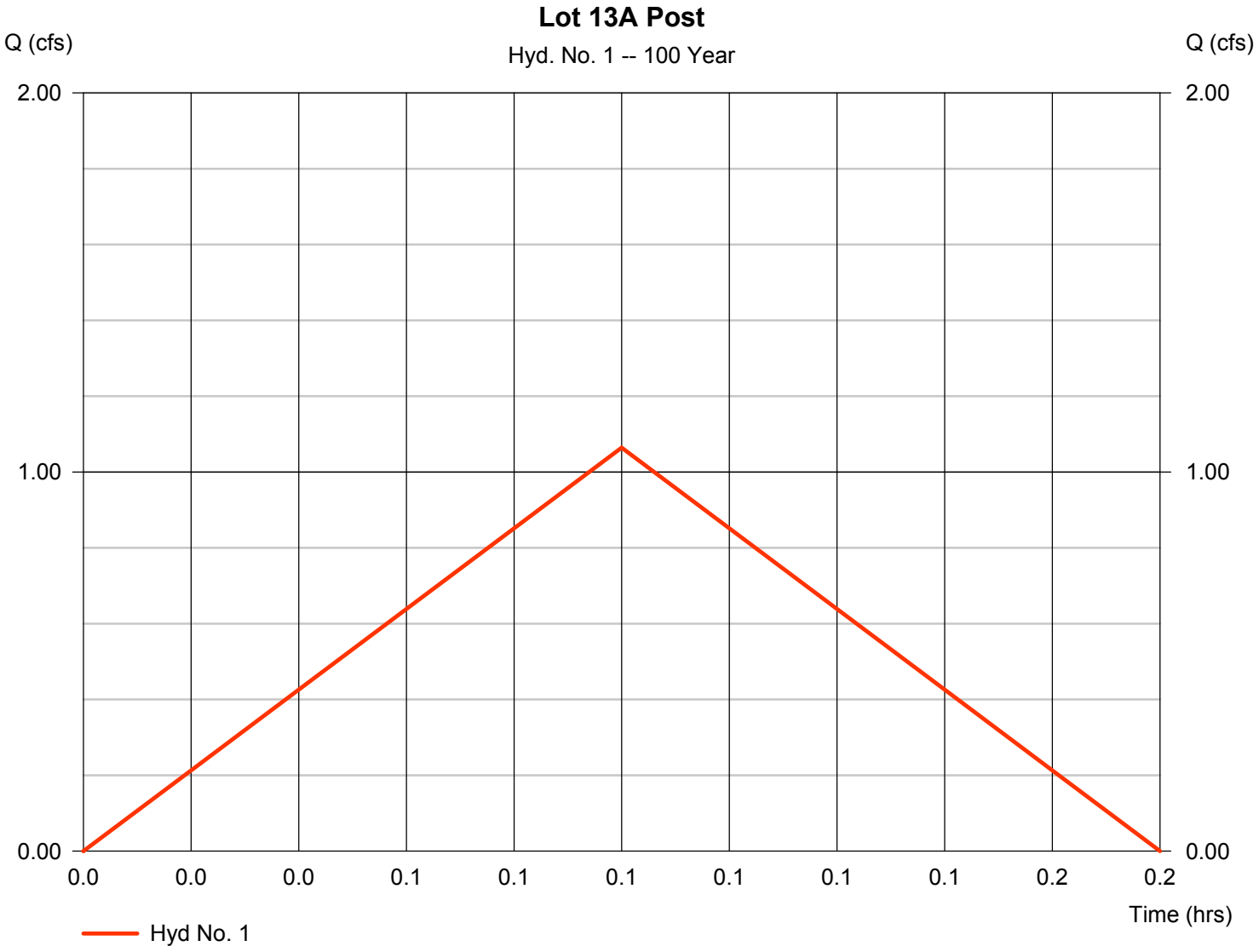
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	1.064	1	5	319	------	------	------	Lot 13A Post
2	Rational	0.484	1	5	145	------	------	------	Lot 13A Pre
4	Reservoir	0.047	1	10	315	1	1010.48	303	Lot 13A Route
6	Rational	1.064	1	5	319	------	------	------	Lot 11A Post
7	Rational	0.484	1	5	145	------	------	------	Lot 11A Pre
9	Reservoir	0.025	1	10	310	6	1010.25	311	Lot 11A Route

Hydrograph Report

Hyd. No. 1

Lot 13A Post

Hydrograph type	= Rational	Peak discharge	= 1.064 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.08 hrs
Time interval	= 1 min	Hyd. volume	= 319 cuft
Drainage area	= 0.164 ac	Runoff coeff.	= 0.66
Intensity	= 9.833 in/hr	Tc by User	= 5.00 min
IDF Curve	= SampleFHA.idf	Asc/Rec limb fact	= 1/1

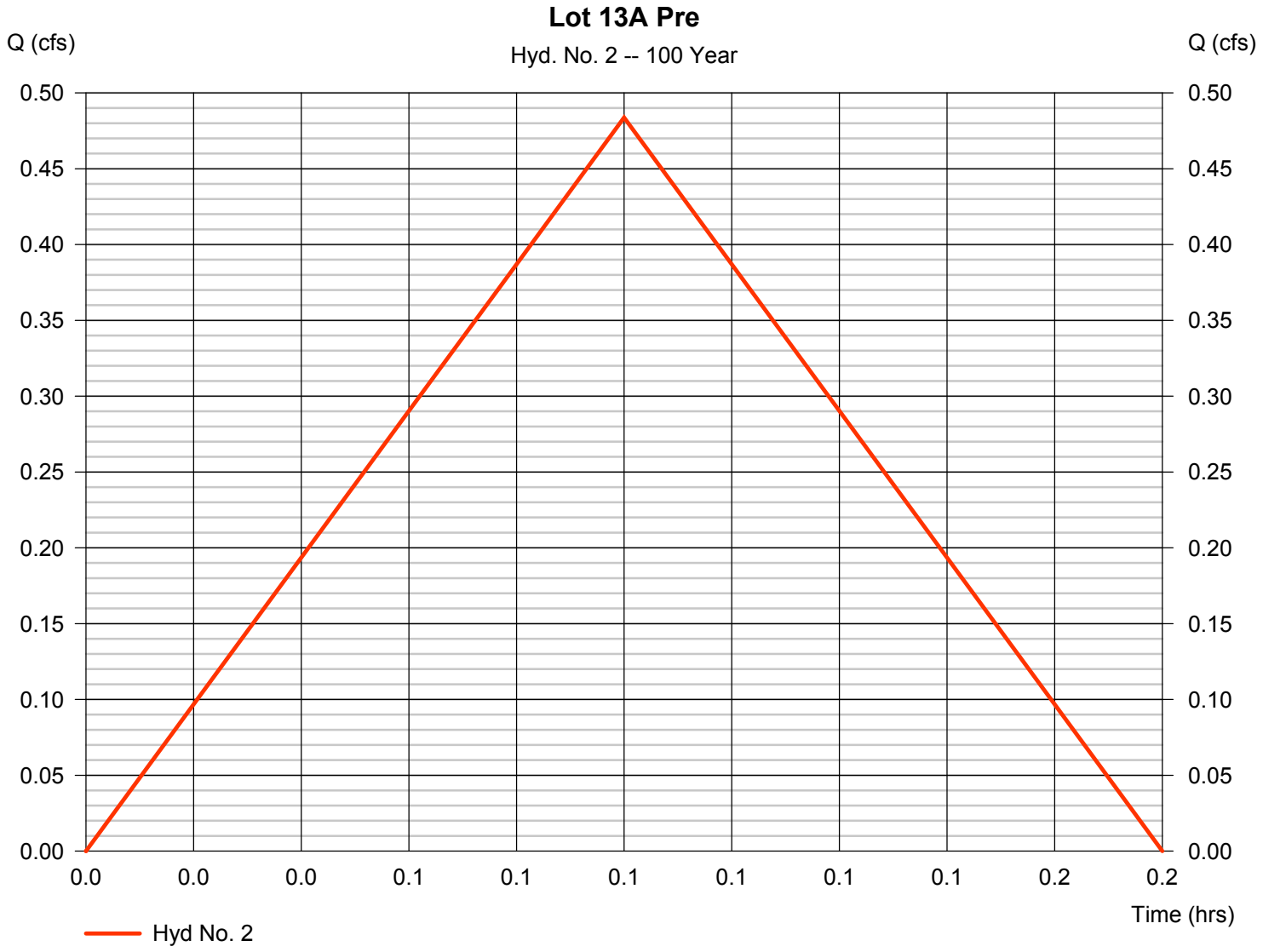


Hydrograph Report

Hyd. No. 2

Lot 13A Pre

Hydrograph type	= Rational	Peak discharge	= 0.484 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.08 hrs
Time interval	= 1 min	Hyd. volume	= 145 cuft
Drainage area	= 0.164 ac	Runoff coeff.	= 0.3
Intensity	= 9.833 in/hr	Tc by User	= 5.00 min
IDF Curve	= SampleFHA.idf	Asc/Rec limb fact	= 1/1



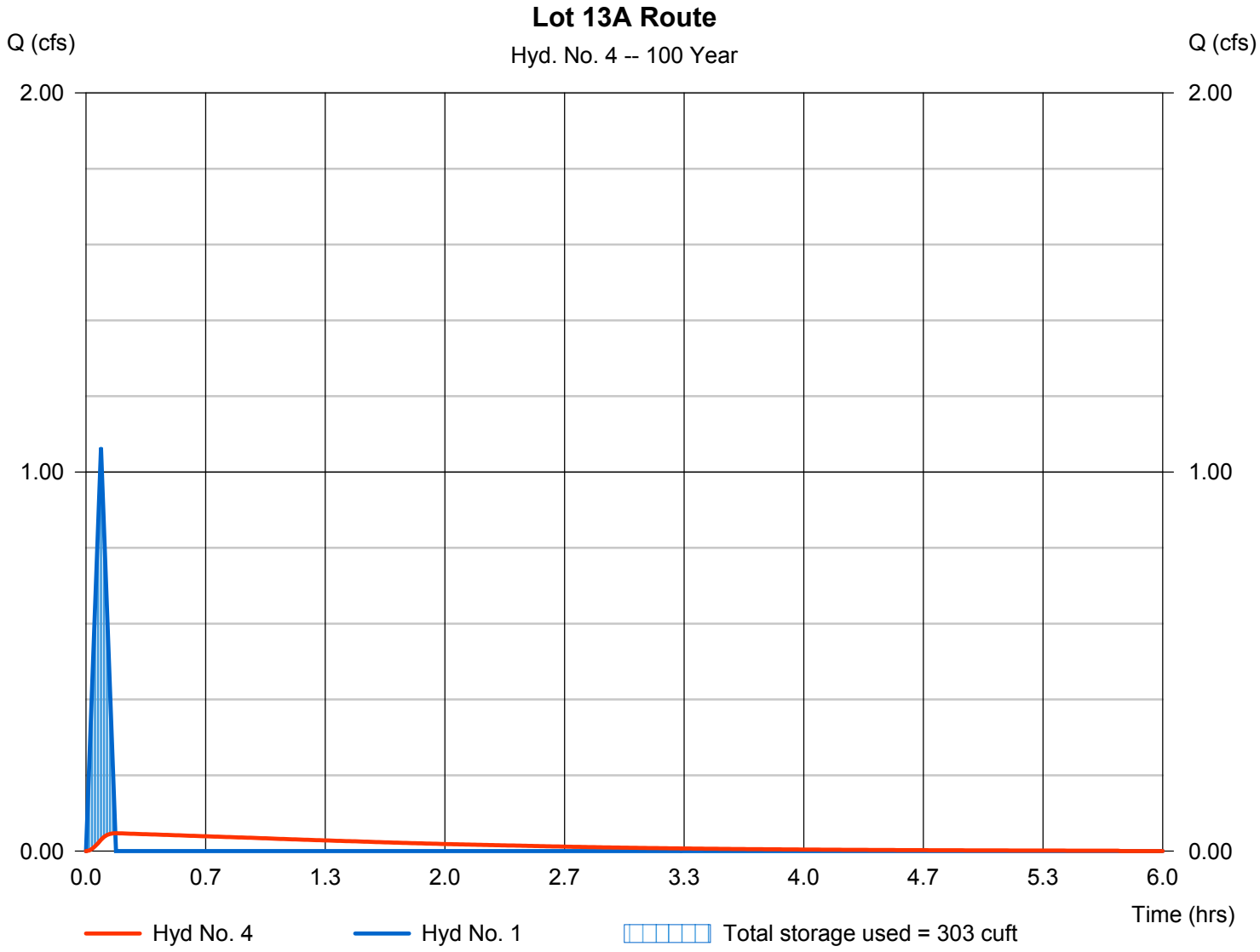
Hydrograph Report

Hyd. No. 4

Lot 13A Route

Hydrograph type	=	Reservoir	Peak discharge	=	0.047 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.17 hrs
Time interval	=	1 min	Hyd. volume	=	315 cuft
Inflow hyd. No.	=	1 - Lot 13A Post	Max. Elevation	=	1010.48 ft
Reservoir name	=	Lot 13A	Max. Storage	=	303 cuft

Storage Indication method used.

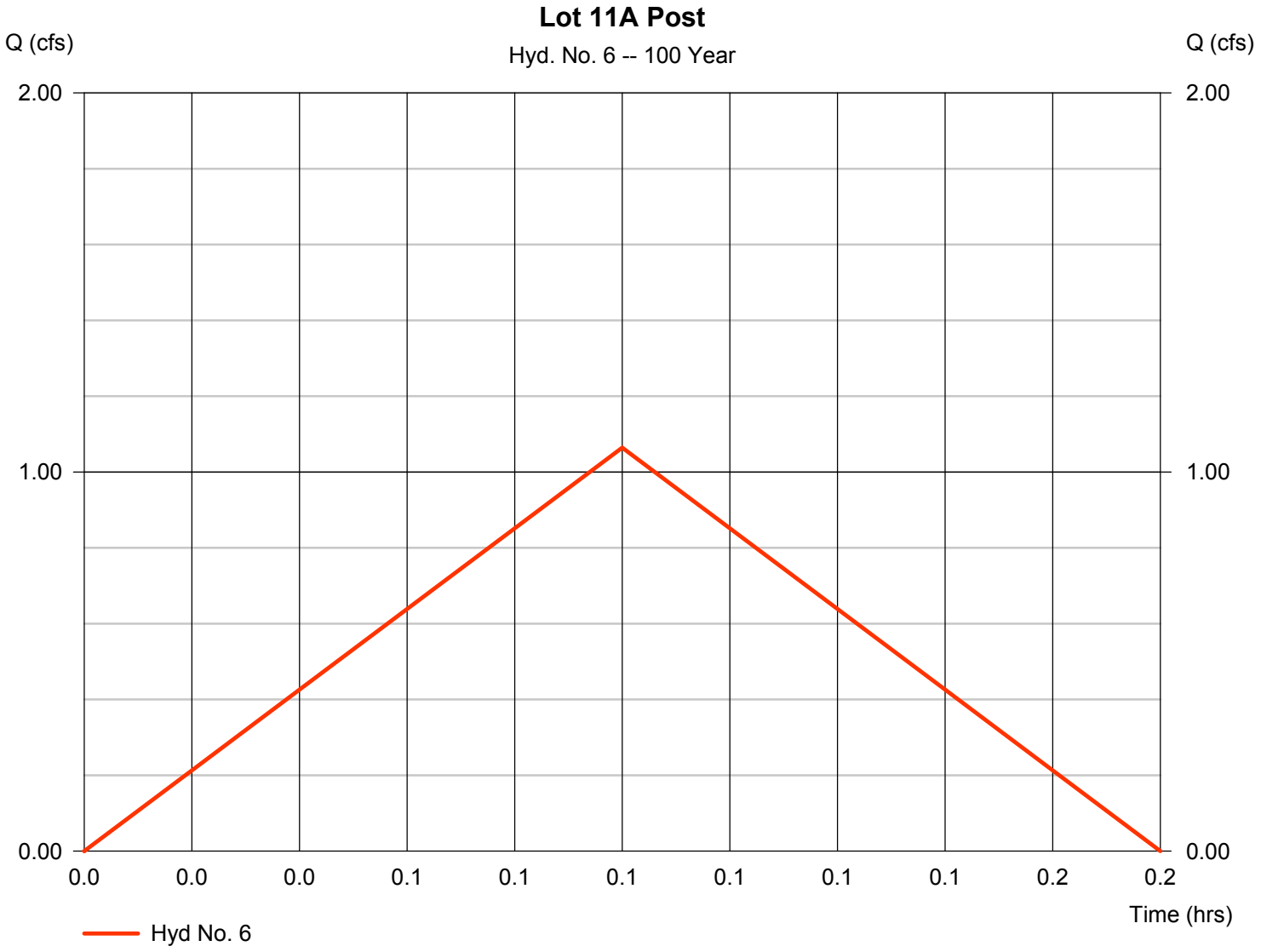


Hydrograph Report

Hyd. No. 6

Lot 11A Post

Hydrograph type	= Rational	Peak discharge	= 1.064 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.08 hrs
Time interval	= 1 min	Hyd. volume	= 319 cuft
Drainage area	= 0.164 ac	Runoff coeff.	= 0.66
Intensity	= 9.833 in/hr	Tc by User	= 5.00 min
IDF Curve	= SampleFHA.idf	Asc/Rec limb fact	= 1/1

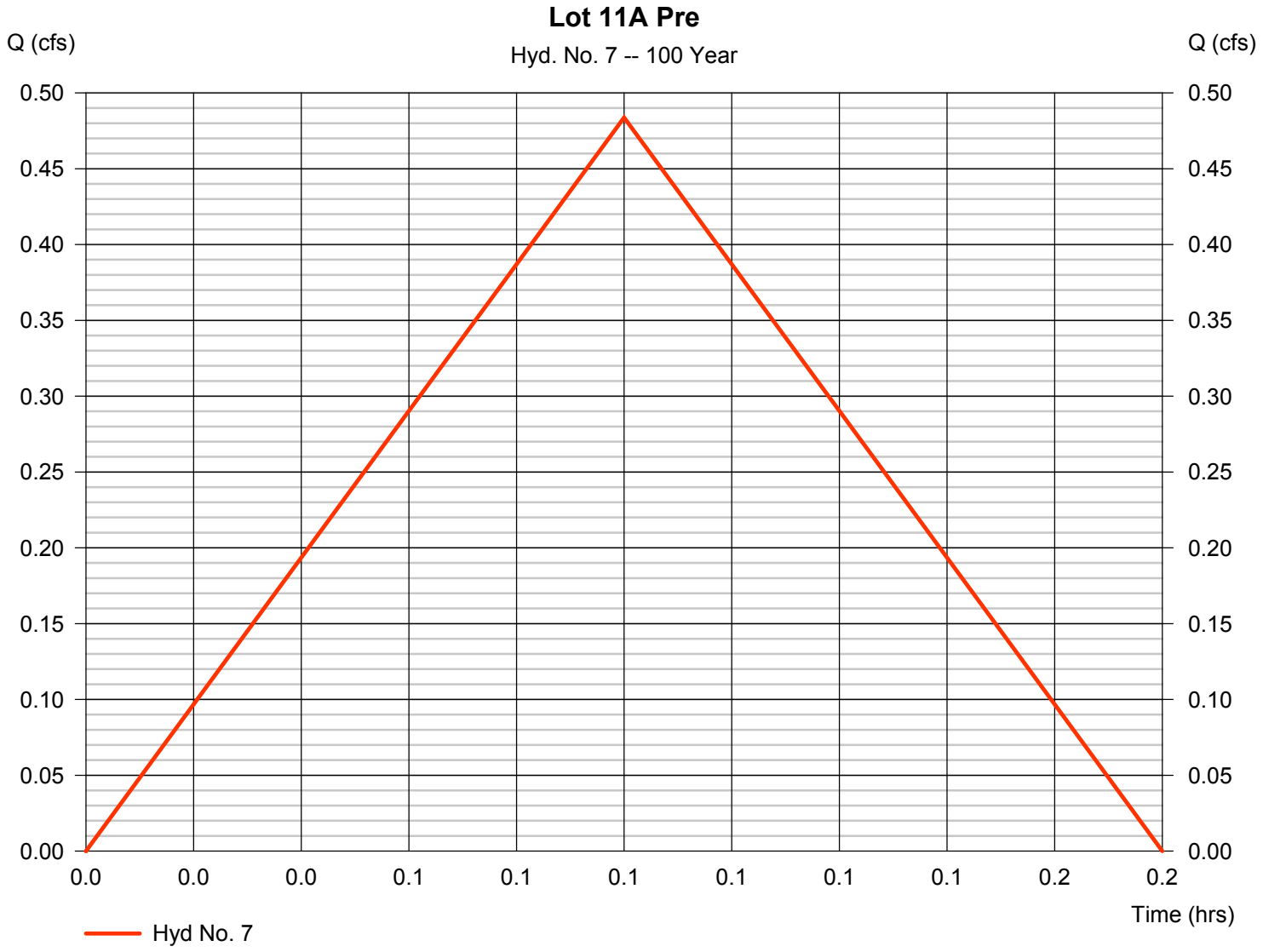


Hydrograph Report

Hyd. No. 7

Lot 11A Pre

Hydrograph type	= Rational	Peak discharge	= 0.484 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.08 hrs
Time interval	= 1 min	Hyd. volume	= 145 cuft
Drainage area	= 0.164 ac	Runoff coeff.	= 0.3
Intensity	= 9.833 in/hr	Tc by User	= 5.00 min
IDF Curve	= SampleFHA.idf	Asc/Rec limb fact	= 1/1



Hydrograph Report

Hyd. No. 9

Lot 11A Route

Hydrograph type	= Reservoir	Peak discharge	= 0.025 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.17 hrs
Time interval	= 1 min	Hyd. volume	= 310 cuft
Inflow hyd. No.	= 6 - Lot 11A Post	Max. Elevation	= 1010.25 ft
Reservoir name	= Lot 11A	Max. Storage	= 311 cuft

Storage Indication method used.