



May 16th, 2022

City of Lansing, KS
Community & Economic Development Department
800 First Terrace
Lansing, KS 66043

Re: Stormwater Letter – Primus Dental

To Whom It May Concern:

We are submitting this letter on behalf of Primus Companies for the proposed development of a parcel of land located on 1st st Terrace in Lansing, KS. The purpose of this letter is to provide compliance with the city's storm water discharge criteria, and compliance with the previously approved stormwater Management Studies performed by GBA and EBH for the regional detention. This report follows the design requirements of the Lansing Design Criteria for Storm Drainage Facilities.

The following exhibits are attached for your reference:

- Exhibit A – Existing Conditions
- Exhibit B – Proposed Conditions
- Exhibit C – Storm Water Calculations

Existing Drainage Conditions:

The existing site is approximately 1.26 acres of a temporarily undeveloped lot (*See Exhibit A*). The existing site topography generally slopes to the east, and runoff is directed into first terrace where it eventually is routed into the existing storm sewer along the street. An existing 36" RCP directs flow into our site from the west side of Hwy 7. There is no information for the flows from this existing pipe however there are no proposed modifications to the pipe, and it shall remain as is in the proposed conditions. The pre-developed site was assigned a "C" value of 0.65. The existing site drainage conditions are summarized in the table below. (*See Exhibit C*).

Table 1 – Existing Conditions Hydrologic Parameters

Drainage Area	Area (acres)	C	Tc (min)
On site	1.26	0.65	5
Offsite	0.16	0.30	5

Table 2 – Summary of Existing Onsite Flows

Drainage Area	Q ₁₀ (cfs)	Q ₂₅ (cfs)	Q ₁₀₀ (cfs)
Outfall A	6.28	7.15	8.52

Proposed Conditions:

The proposed overall development of the site will be medical office use and contain a new building and associated parking and utilities. Future improvements include an additional building and parking. The proposed impervious area of the overall development, including future improvements, will be 0.72 acres, which is a 57% increase. This is in conformance with the previous report prepared by GBA, with an assumed increase area of 80% ($C=0.80$) for Heavy Industrial Areas. The proposed improvements will increase the impervious area on site, and therefore increase the runoff volumes as shown in Table 4 (See *Exhibit B*). The proposed site topography will mimic the existing site and direct water to the east where a portion of the site will flow into First Terrace, and another portion to be captured by storm inlet and routed to the existing storm sewer along First Terrace. The existing 36" RCP discharge will be routed overland by swale along the north property line and into a proposed area inlet and into the existing storm sewer. During larger storm events the area inlet will overflow into First Terrace. The proposed development was assigned a "C" value of 0.80 for Heavy Industrial, which is in conformance with the previously approved drainage reports prepared by GBA and EBH. The proposed site drainage conditions are summarized in the table below. (See *Exhibit C*).

Table 3 – Proposed Overall Conditions Hydrologic Parameters

Drainage Area	Area (acres)	C	T _c (min)
On site	1.26	0.80	5
Offsite	0.16	0.16	5

Table 4 – Summary of Proposed Onsite Flows

Drainage Area	Q ₁₀ (cfs)	Q ₂₅ (cfs)	Q ₁₀₀ (cfs)
Outfall A	7.65	8.71	10.38

Stormwater Detention:

The proposed development detention is provided by an existing pond to the southeast of the development. The pond was designed to accommodate these proposed improvements. Per the conditions noted above for the assumed increase of impervious area, there are no recommendations to modify the existing detention pond.

Conclusions:

The proposed improvements shall be constructed in accordance with the City of Lansing's Engineering Design Criteria. The stormwater discharge from the proposed development will not exceed the design capacities of the adjacent public storm sewer systems or regional detention.

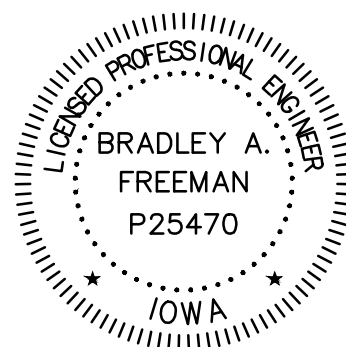
Based on the information provided herein, we request your approval of this storm drainage Letter. If you have any questions or comments or need additional information, please do not hesitate to call me at (515) 867-2755 or via e-mail at bfreeman@olsson.com.

Sincerely,

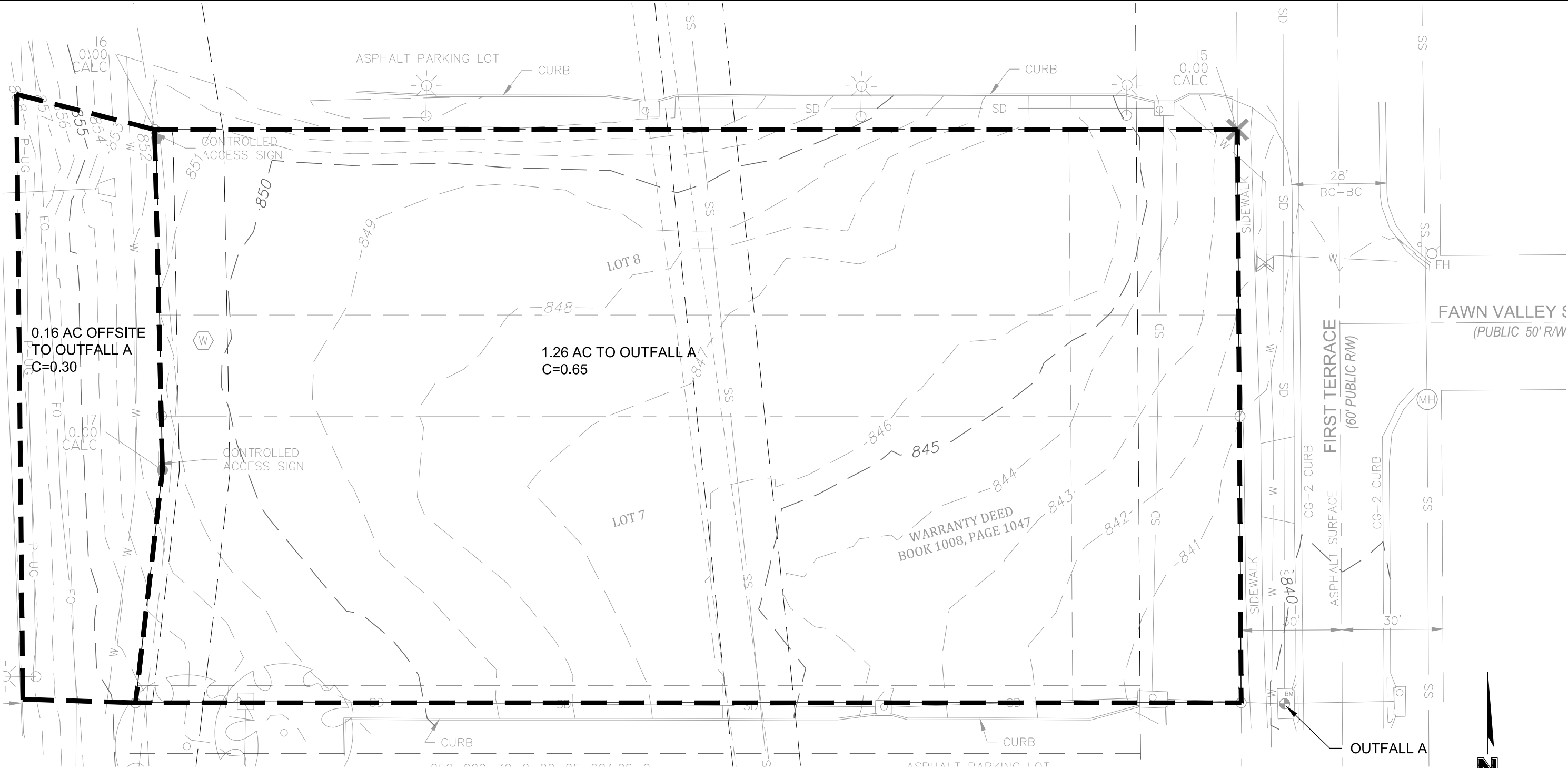
OLSSON



Bradley Freeman, PE
Project Engineer



DWG: F:\2022\02001-02500\022-02457\40-Design\Reports\GNCV\EXHA.dwg
DATE: May 12, 2022 10:19am
XREFS: C_XBASE_02202457 C_PBASE_02202457
USER: bfreeman



LEGEND

--- DRAINAGE BOUNDARY

PROJECT NO:	022-02457
DRAWN BY:	BF
DATE:	5/11/2022

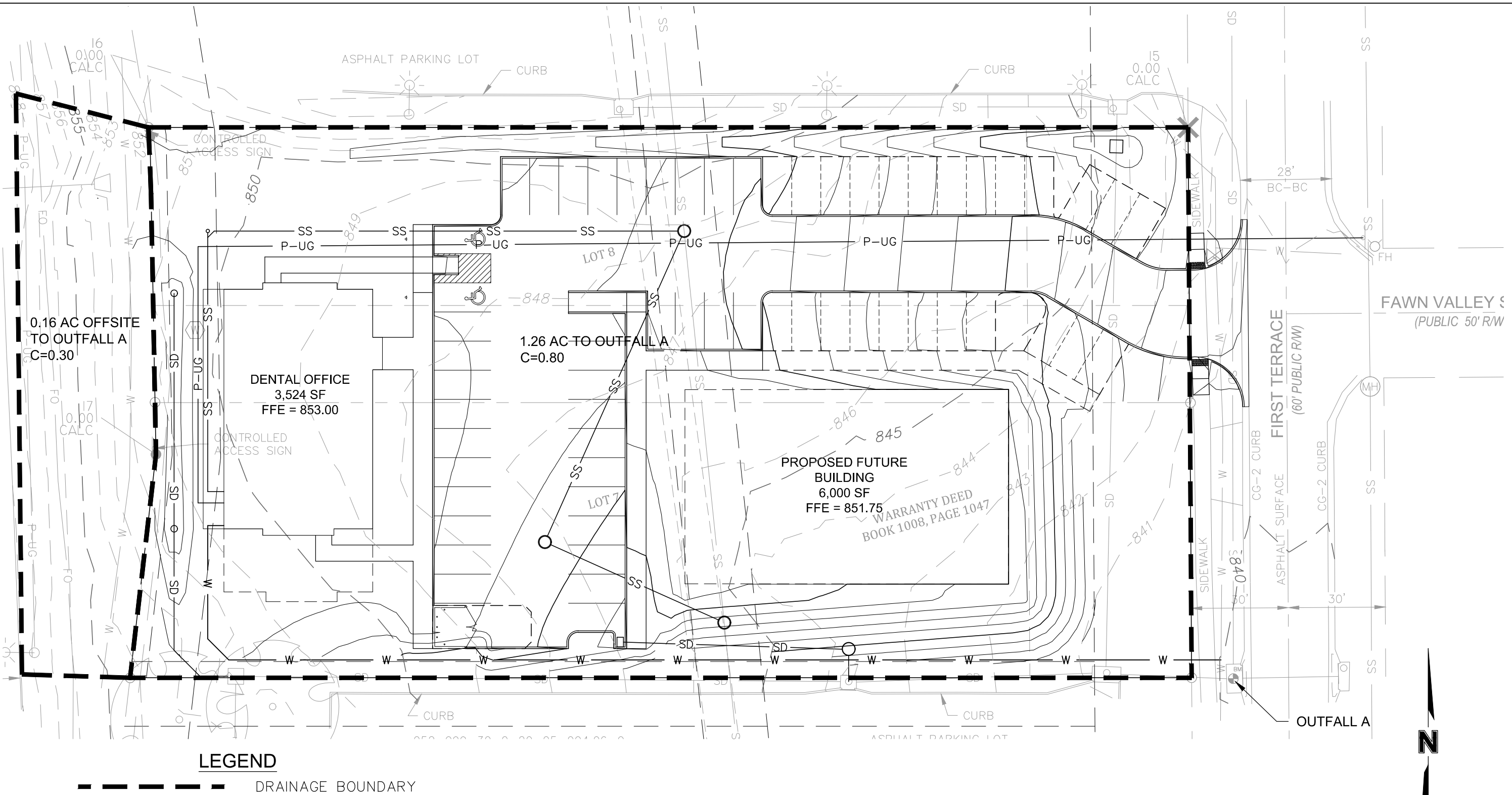
EXISTING CONDITIONS



7157 Vista Drive
West Des Moines, IA 50266
TEL 515.331.6517

EXHIBIT
A

DWG: F:\2022\02001-02500\022-02457\40-Design\Reports\GNCV\EXHB.dwg USER: bfreeman
DATE: May 12, 2022 10:21am XREFS: C_XBASE_02202457 C_PBASE_02202457



PROJECT NO:	022-02457
-------------	-----------

DRAWN BY: BF

DATE: 5/11/2022

PROPOSED CONDITIONS

olsson

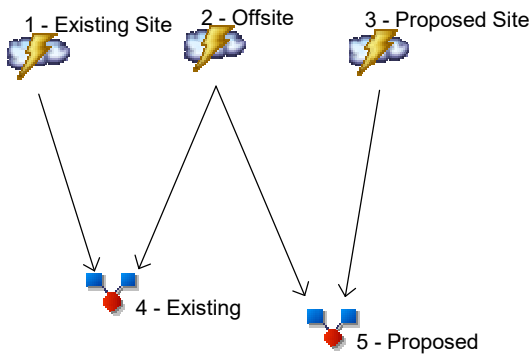
7157 Vista Drive
West Des Moines, IA 50266
TEL 515.331.6517

EXHIBIT

B

EXHIBIT C

Watershed Model Schematic



Legend

<u>Hyd.</u>	<u>Origin</u>	<u>Description</u>
1	Rational	Existing Site
2	Rational	Offsite
3	Rational	Proposed Site
4	Combine	Existing
5	Combine	Proposed

Watershed Model Schematic.....	1
Hydrograph Return Period Recap.....	2
10 - Year	
Summary Report.....	3
Hydrograph Reports.....	4
Hydrograph No. 1, Rational, Existing Site.....	4
Hydrograph No. 2, Rational, Offsite.....	5
Hydrograph No. 3, Rational, Proposed Site.....	6
Hydrograph No. 4, Combine, Existing.....	7
Hydrograph No. 5, Combine, Proposed.....	8
25 - Year	
Summary Report.....	9
Hydrograph Reports.....	10
Hydrograph No. 1, Rational, Existing Site.....	10
Hydrograph No. 2, Rational, Offsite.....	11
Hydrograph No. 3, Rational, Proposed Site.....	12
Hydrograph No. 4, Combine, Existing.....	13
Hydrograph No. 5, Combine, Proposed.....	14
100 - Year	
Summary Report.....	15
Hydrograph Reports.....	16
Hydrograph No. 1, Rational, Existing Site.....	16
Hydrograph No. 2, Rational, Offsite.....	17
Hydrograph No. 3, Rational, Proposed Site.....	18
Hydrograph No. 4, Combine, Existing.....	19
Hydrograph No. 5, Combine, Proposed.....	20
IDF Report.....	21

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022

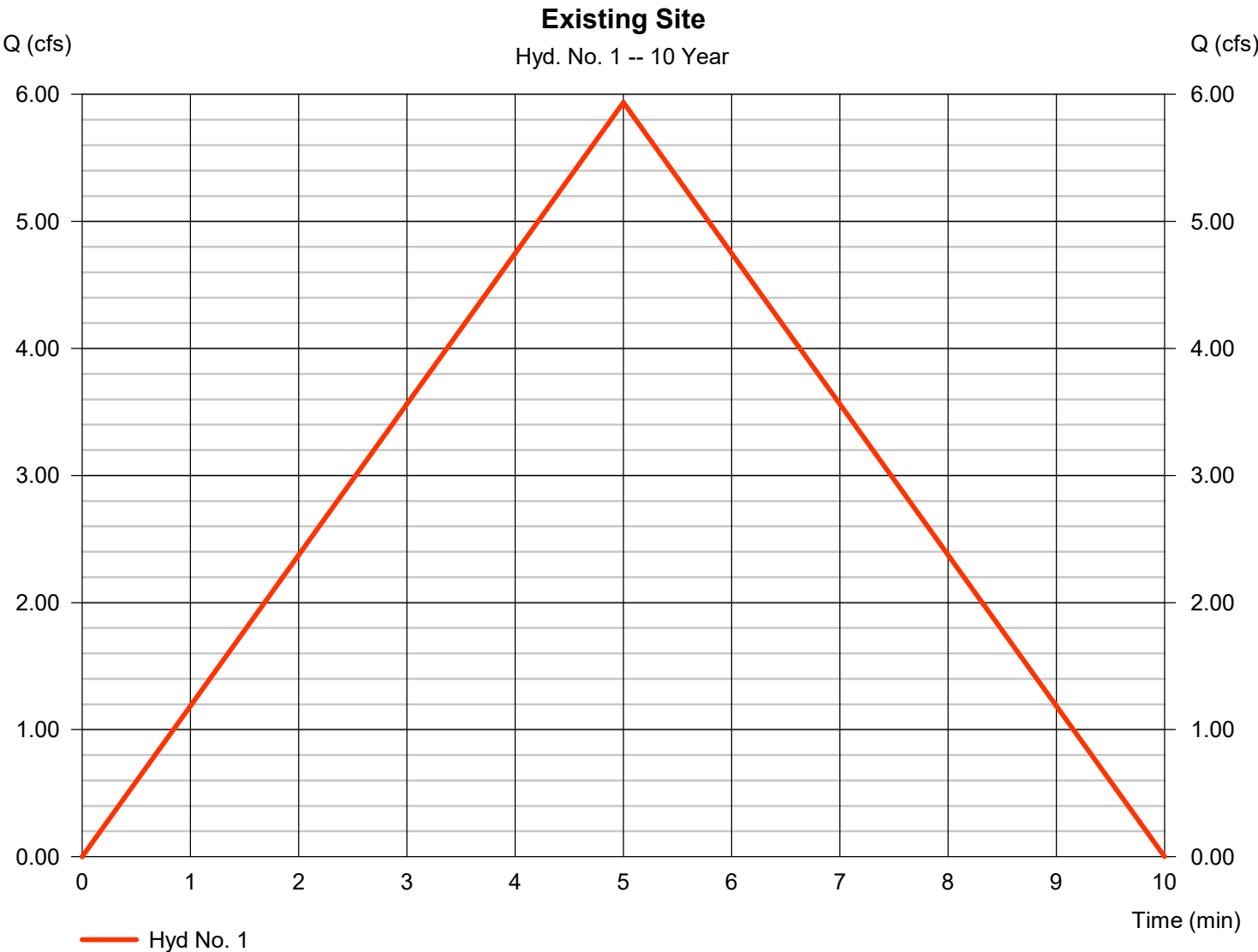
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	5.937	1	5	1,781	-----	-----	-----	Existing Site
2	Rational	0.348	1	5	104	-----	-----	-----	Offsite
3	Rational	7.307	1	5	2,192	-----	-----	-----	Proposed Site
4	Combine	6.284	1	5	1,885	1, 2,	-----	-----	Existing
5	Combine	7.654	1	5	2,296	2, 3,	-----	-----	Proposed
Hydro.gpw					Return Period: 10 Year			Thursday, 05 / 12 / 2022	

Hydrograph Report

Hyd. No. 1

Existing Site

Hydrograph type	= Rational	Peak discharge	= 5.937 cfs
Storm frequency	= 10 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 1,781 cuft
Drainage area	= 1.260 ac	Runoff coeff.	= 0.65
Intensity	= 7.249 in/hr	Tc by User	= 5.00 min
IDF Curve	= KCMO.IDF	Asc/Rec limb fact	= 1/1

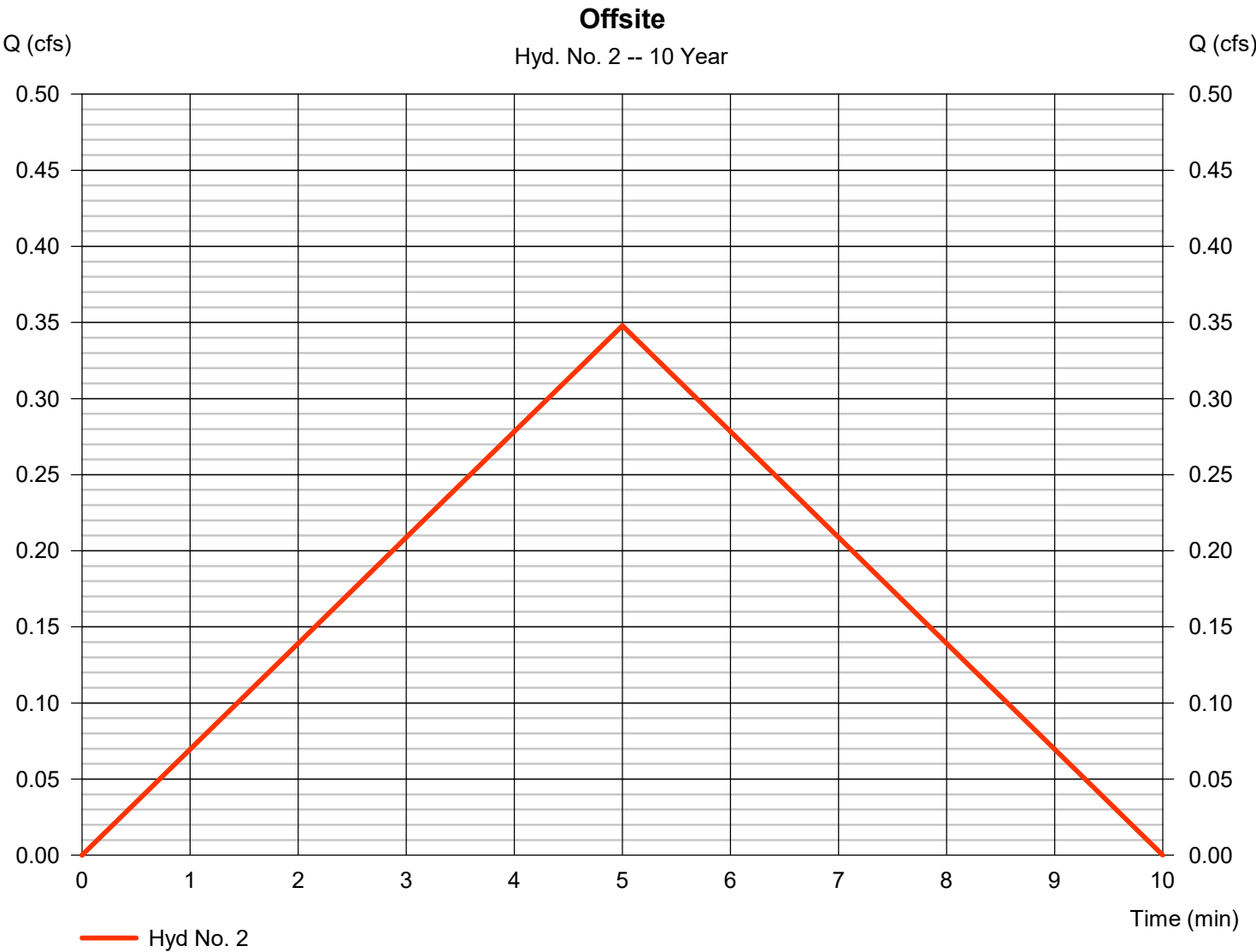


Hydrograph Report

Hyd. No. 2

Offsite

Hydrograph type	= Rational	Peak discharge	= 0.348 cfs
Storm frequency	= 10 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 104 cuft
Drainage area	= 0.160 ac	Runoff coeff.	= 0.3
Intensity	= 7.249 in/hr	Tc by User	= 5.00 min
IDF Curve	= KCMO.IDF	Asc/Rec limb fact	= 1/1



Hydrograph Report

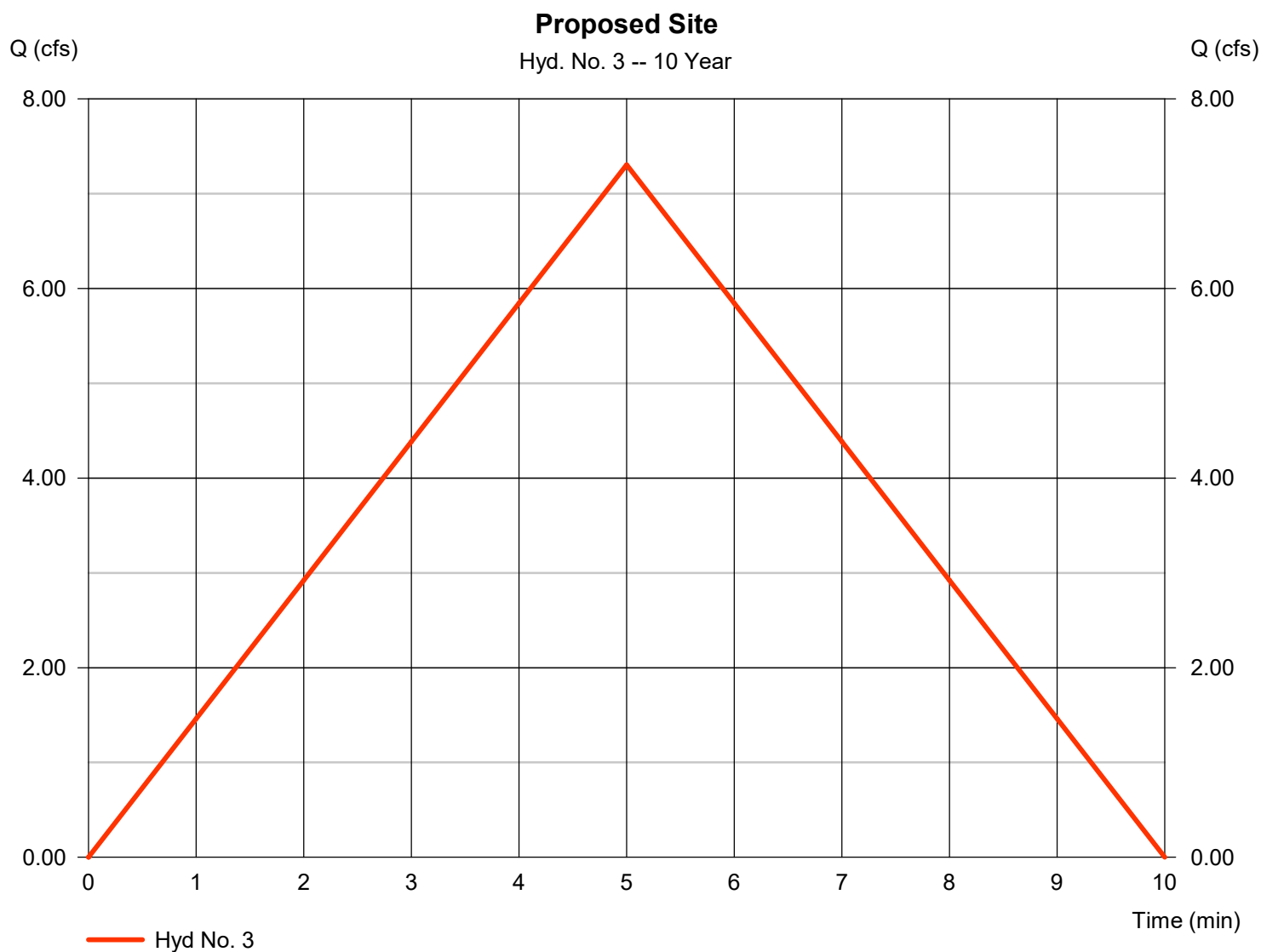
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022

Thursday, 05 / 12 / 2022

Hyd. No. 3

Proposed Site

Hydrograph type	= Rational	Peak discharge	= 7.307 cfs
Storm frequency	= 10 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 2,192 cuft
Drainage area	= 1.260 ac	Runoff coeff.	= 0.8
Intensity	= 7.249 in/hr	Tc by User	= 5.00 min
IDF Curve	= KCMO.IDF	Asc/Rec limb fact	= 1/1



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022

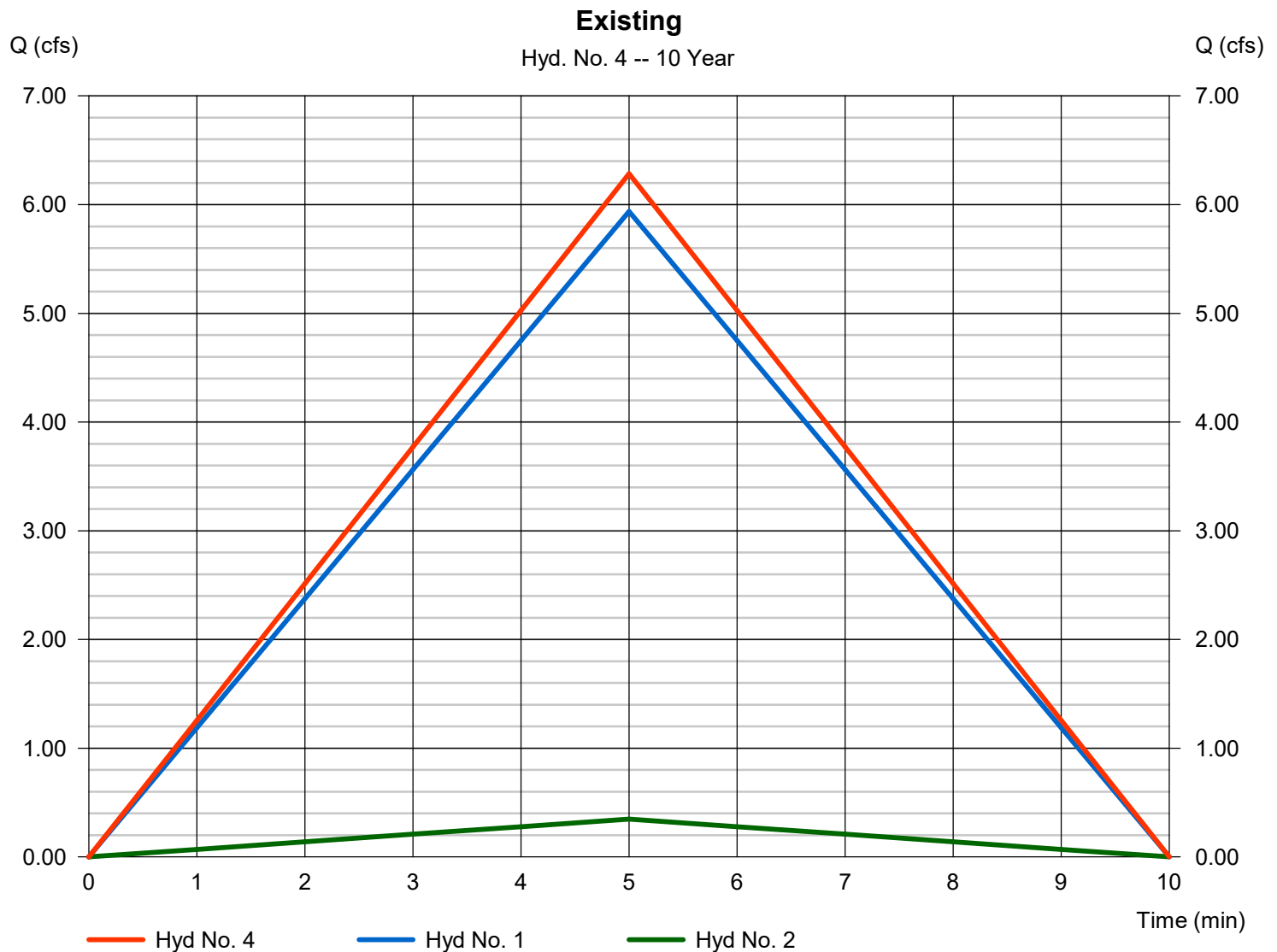
Thursday, 05 / 12 / 2022

Hyd. No. 4

Existing

Hydrograph type = Combine
 Storm frequency = 10 yrs
 Time interval = 1 min
 Inflow hyds. = 1, 2

Peak discharge = 6.284 cfs
 Time to peak = 5 min
 Hyd. volume = 1,885 cuft
 Contrib. drain. area = 1.420 ac

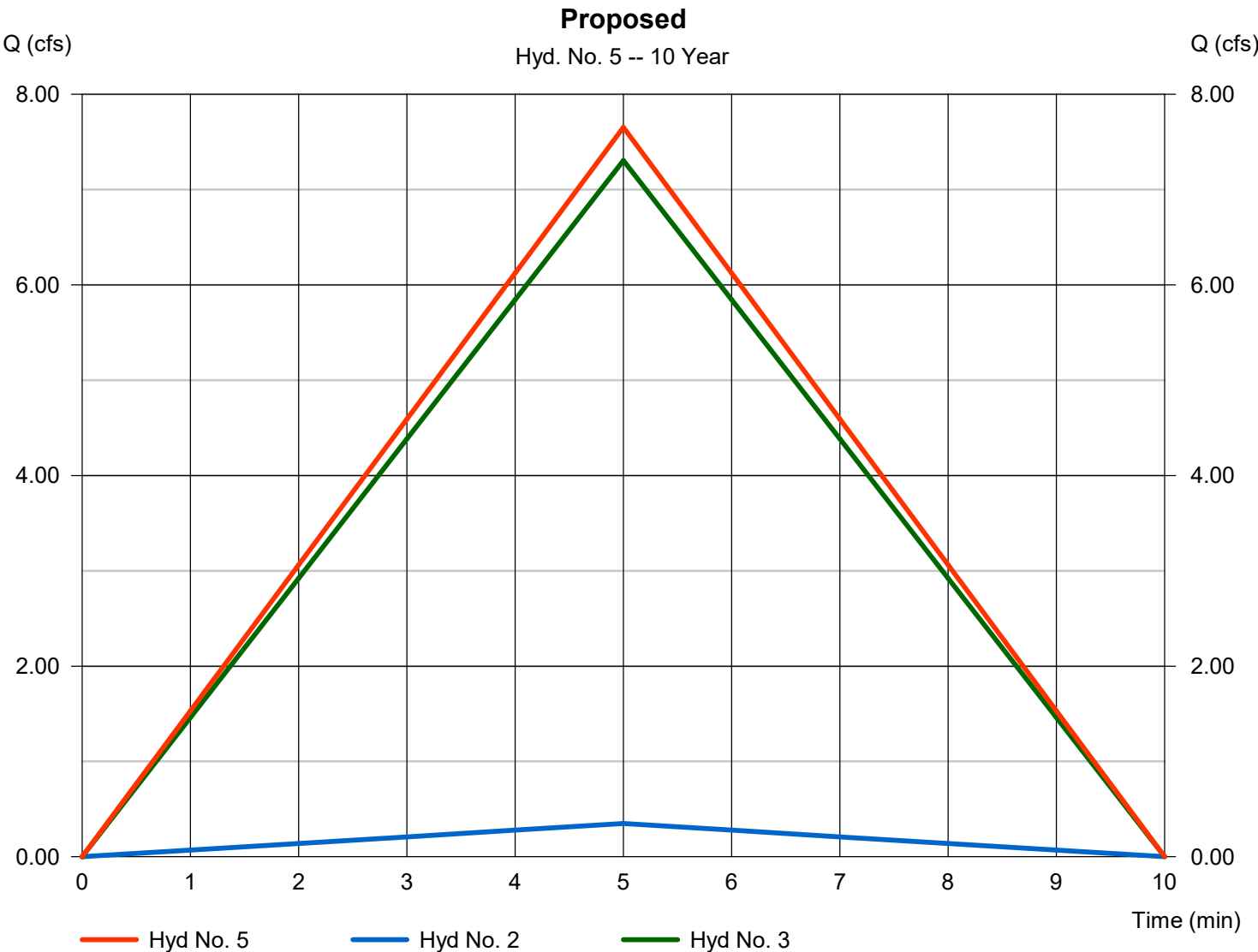


Hydrograph Report

Hyd. No. 5

Proposed

Hydrograph type	= Combine	Peak discharge	= 7.654 cfs
Storm frequency	= 10 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 2,296 cuft
Inflow hyds.	= 2, 3	Contrib. drain. area	= 1.420 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022

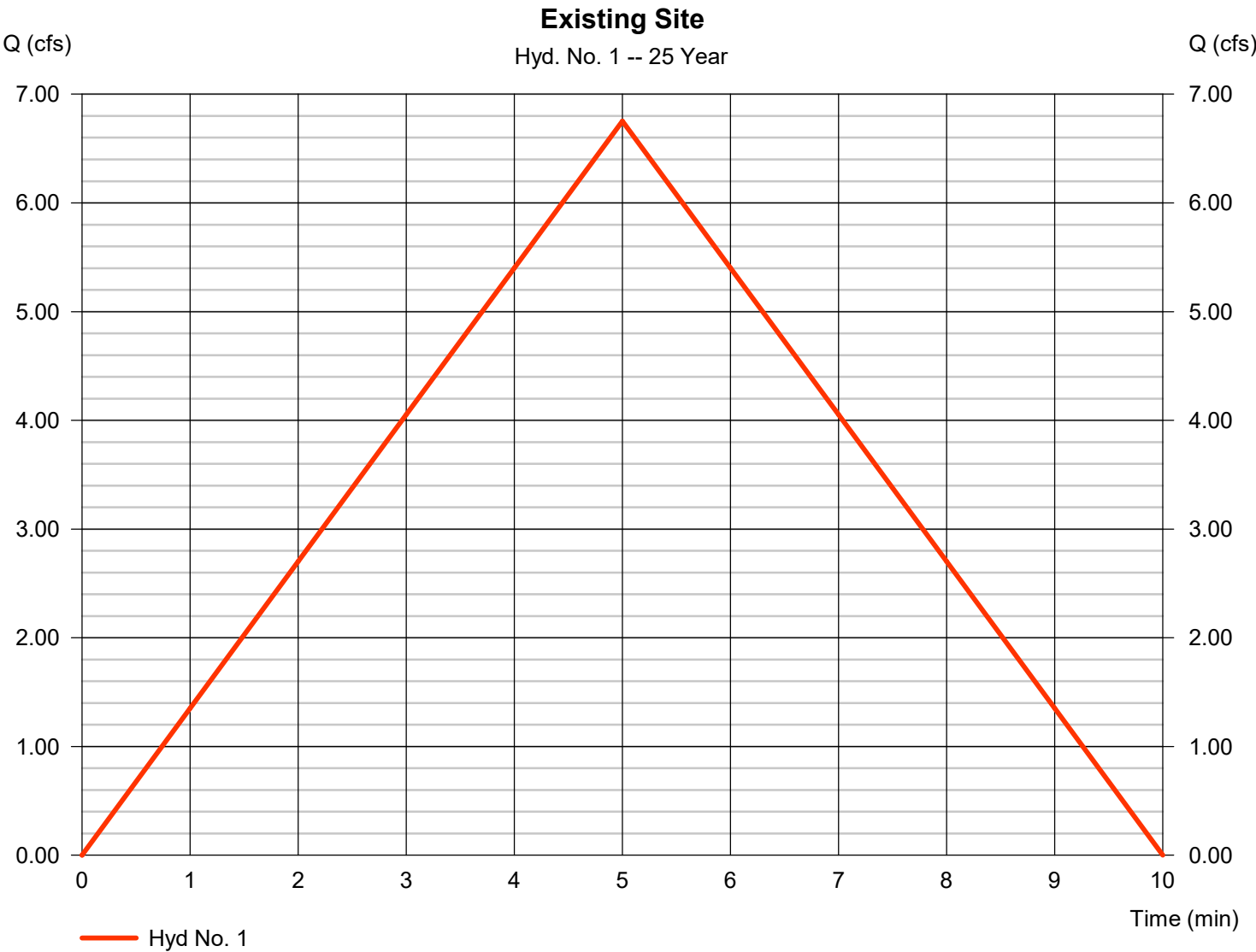
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	6.753	1	5	2,026	-----	-----	-----	Existing Site
2	Rational	0.396	1	5	119	-----	-----	-----	Offsite
3	Rational	8.311	1	5	2,493	-----	-----	-----	Proposed Site
4	Combine	7.149	1	5	2,145	1, 2,	-----	-----	Existing
5	Combine	8.707	1	5	2,612	2, 3,	-----	-----	Proposed
Hydro.gpw					Return Period: 25 Year			Thursday, 05 / 12 / 2022	

Hydrograph Report

Hyd. No. 1

Existing Site

Hydrograph type	= Rational	Peak discharge	= 6.753 cfs
Storm frequency	= 25 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 2,026 cuft
Drainage area	= 1.260 ac	Runoff coeff.	= 0.65
Intensity	= 8.245 in/hr	Tc by User	= 5.00 min
IDF Curve	= KCMO.IDF	Asc/Rec limb fact	= 1/1

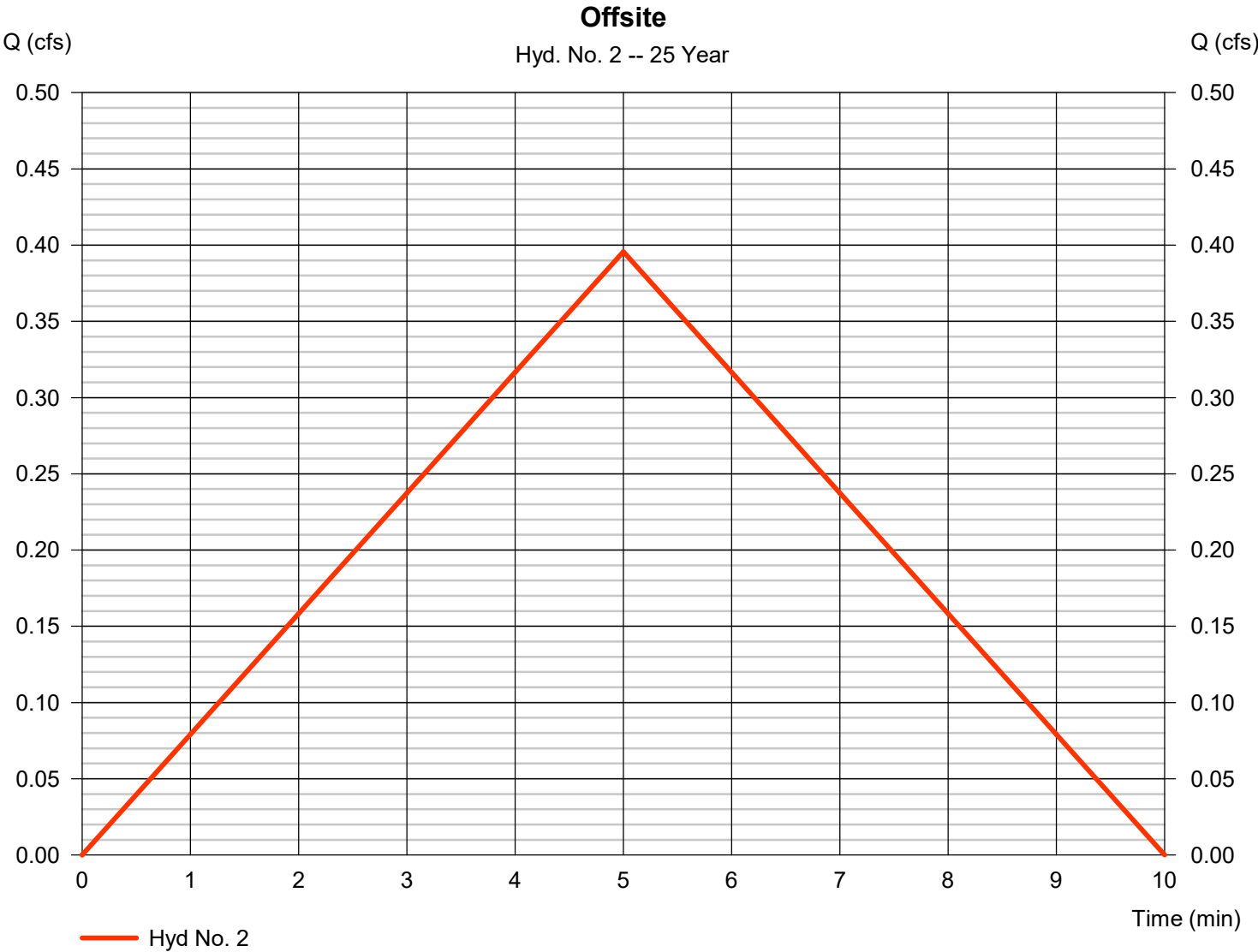


Hydrograph Report

Hyd. No. 2

Offsite

Hydrograph type	= Rational	Peak discharge	= 0.396 cfs
Storm frequency	= 25 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 119 cuft
Drainage area	= 0.160 ac	Runoff coeff.	= 0.3
Intensity	= 8.245 in/hr	Tc by User	= 5.00 min
IDF Curve	= KCMO.IDF	Asc/Rec limb fact	= 1/1



Hydrograph Report

Hyd. No. 3

Proposed Site

Hydrograph type	= Rational	Peak discharge	= 8.311 cfs
Storm frequency	= 25 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 2,493 cuft
Drainage area	= 1.260 ac	Runoff coeff.	= 0.8
Intensity	= 8.245 in/hr	Tc by User	= 5.00 min
IDF Curve	= KCMO.IDF	Asc/Rec limb fact	= 1/1

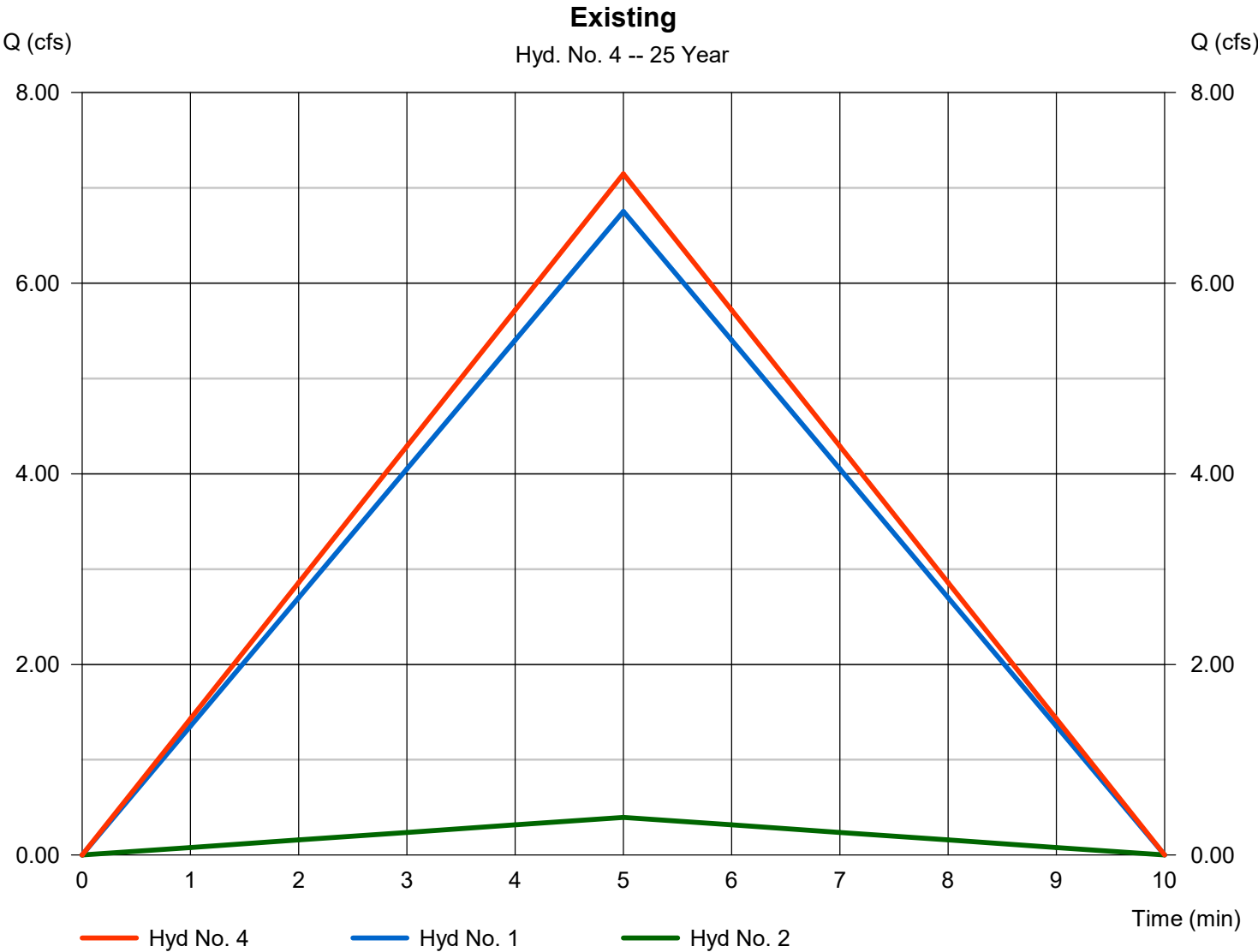


Hydrograph Report

Hyd. No. 4

Existing

Hydrograph type	= Combine	Peak discharge	= 7.149 cfs
Storm frequency	= 25 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 2,145 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 1.420 ac

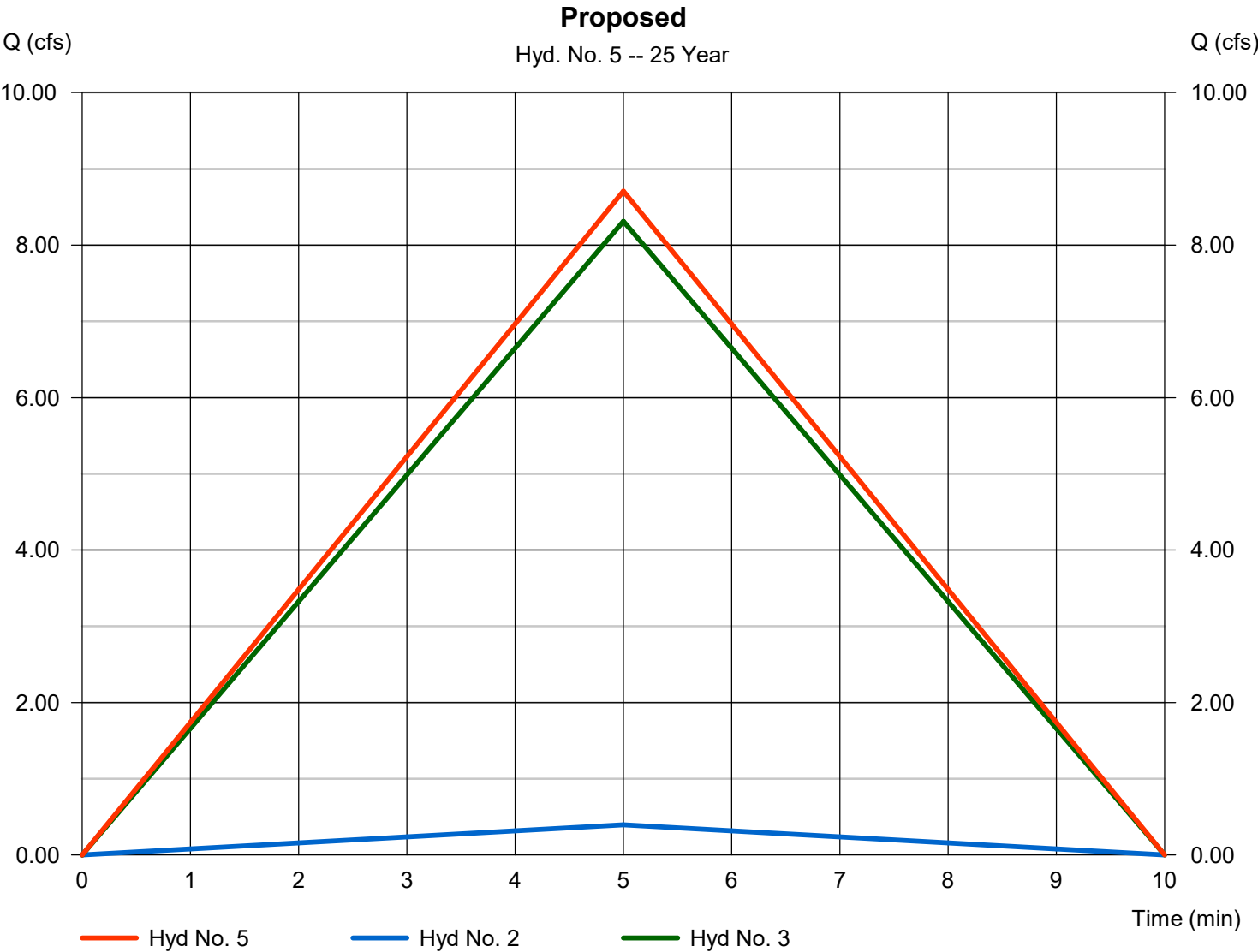


Hydrograph Report

Hyd. No. 5

Proposed

Hydrograph type	= Combine	Peak discharge	= 8.707 cfs
Storm frequency	= 25 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 2,612 cuft
Inflow hyds.	= 2, 3	Contrib. drain. area	= 1.420 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022

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	8.052	1	5	2,416	-----	-----	-----	Existing Site
2	Rational	0.472	1	5	142	-----	-----	-----	Offsite
3	Rational	9.910	1	5	2,973	-----	-----	-----	Proposed Site
4	Combine	8.524	1	5	2,557	1, 2,	-----	-----	Existing
5	Combine	10.38	1	5	3,115	2, 3,	-----	-----	Proposed
Hydro.gpw					Return Period: 100 Year			Thursday, 05 / 12 / 2022	

Hydrograph Report

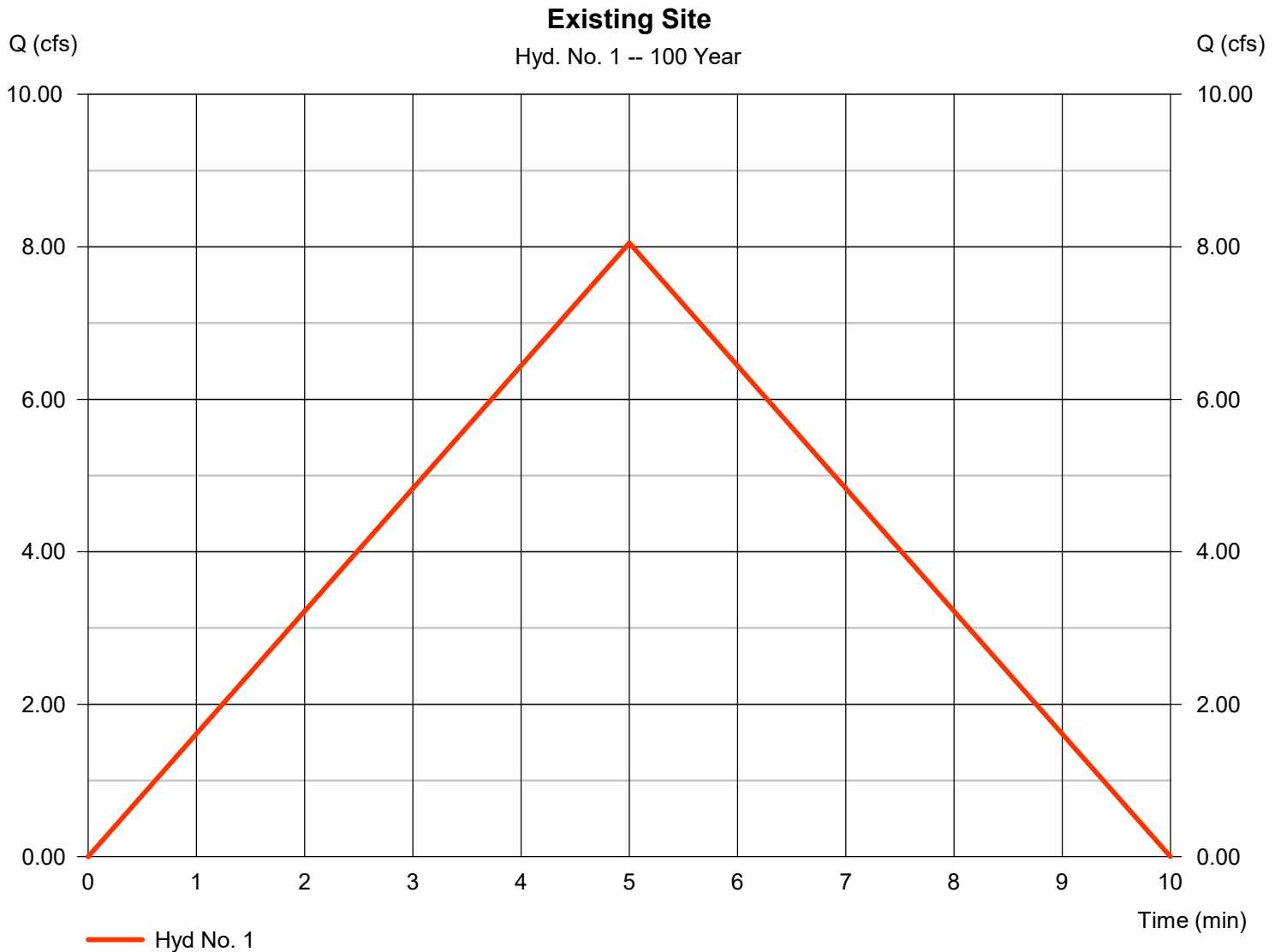
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022

Thursday, 05 / 12 / 2022

Hyd. No. 1

Existing Site

Hydrograph type	= Rational	Peak discharge	= 8.052 cfs
Storm frequency	= 100 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 2,416 cuft
Drainage area	= 1.260 ac	Runoff coeff.	= 0.65
Intensity	= 9.832 in/hr	Tc by User	= 5.00 min
IDF Curve	= KCMO.IDF	Asc/Rec limb fact	= 1/1

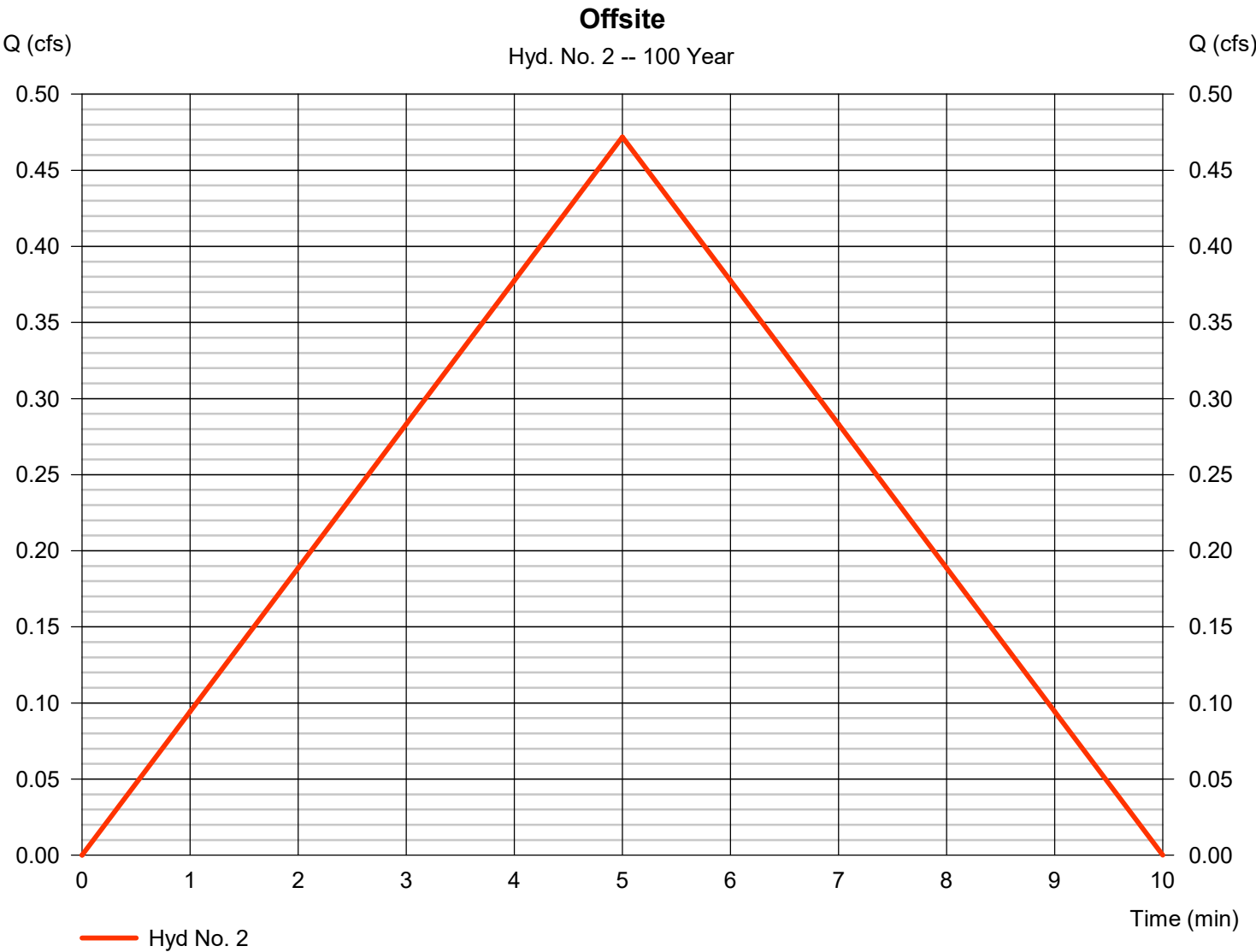


Hydrograph Report

Hyd. No. 2

Offsite

Hydrograph type	= Rational	Peak discharge	= 0.472 cfs
Storm frequency	= 100 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 142 cuft
Drainage area	= 0.160 ac	Runoff coeff.	= 0.3
Intensity	= 9.832 in/hr	Tc by User	= 5.00 min
IDF Curve	= KCMO.IDF	Asc/Rec limb fact	= 1/1

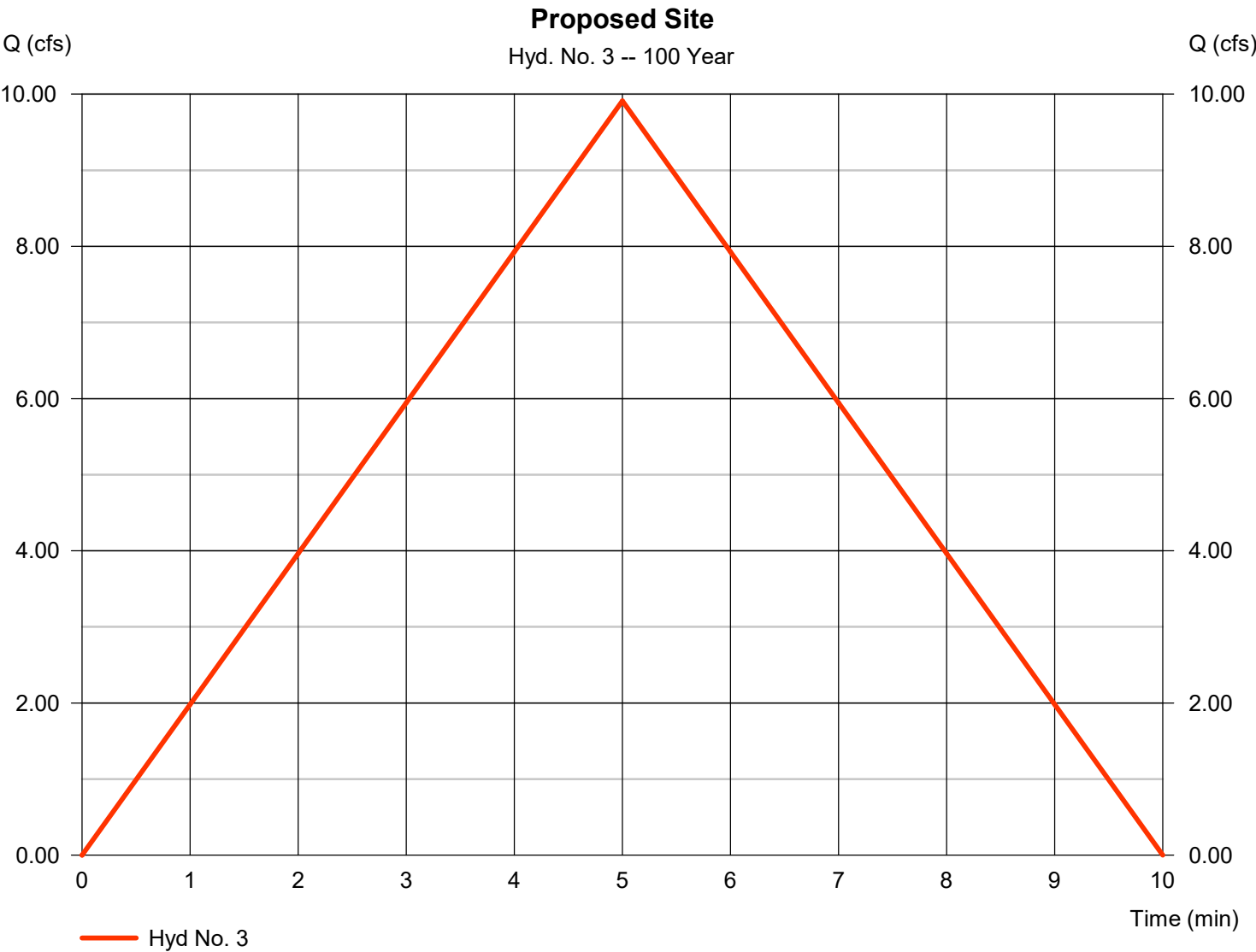


Hydrograph Report

Hyd. No. 3

Proposed Site

Hydrograph type	= Rational	Peak discharge	= 9.910 cfs
Storm frequency	= 100 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 2,973 cuft
Drainage area	= 1.260 ac	Runoff coeff.	= 0.8
Intensity	= 9.832 in/hr	Tc by User	= 5.00 min
IDF Curve	= KCMO.IDF	Asc/Rec limb fact	= 1/1

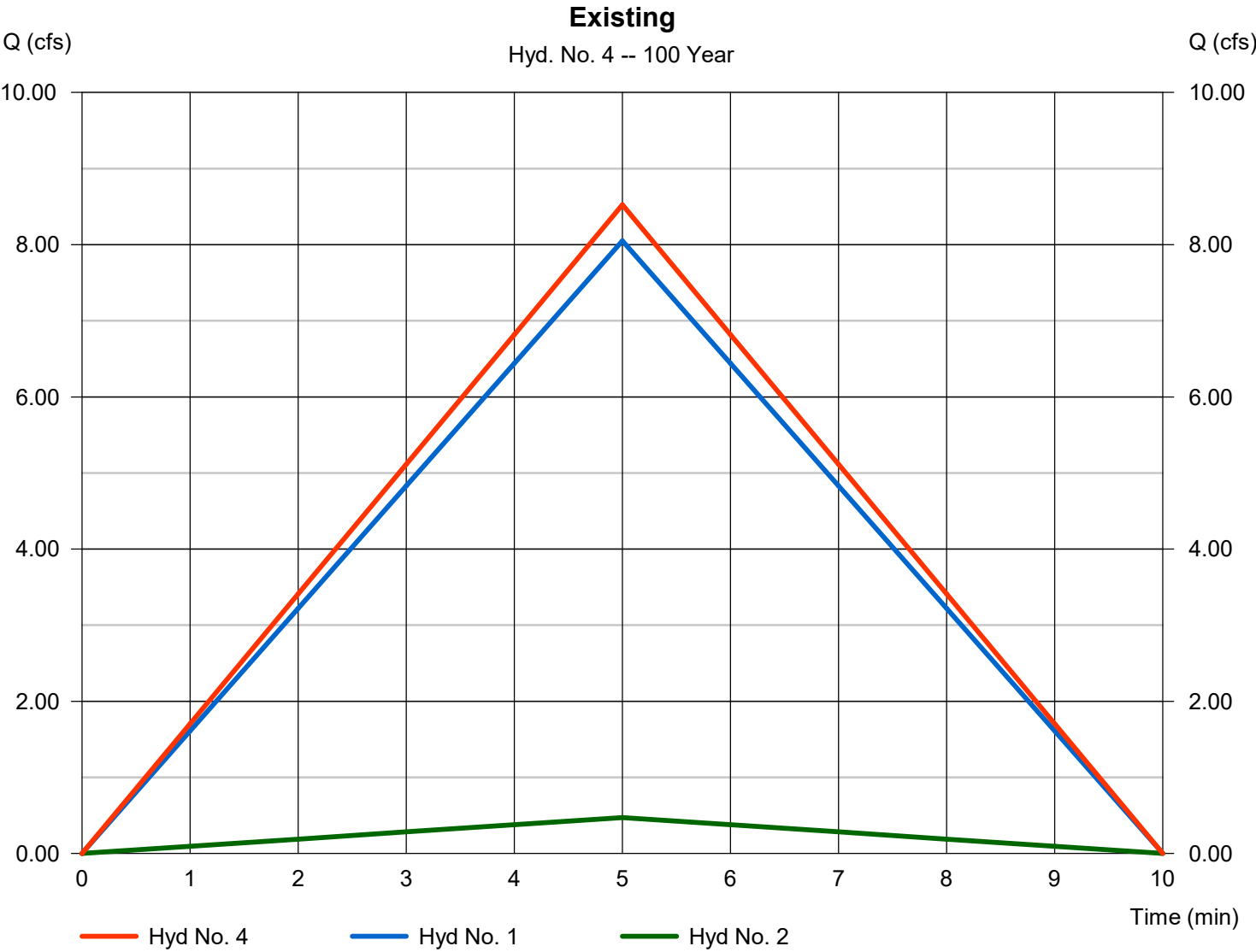


Hydrograph Report

Hyd. No. 4

Existing

Hydrograph type	= Combine	Peak discharge	= 8.524 cfs
Storm frequency	= 100 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 2,557 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 1.420 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022

Thursday, 05 / 12 / 2022

Hyd. No. 5

Proposed

Hydrograph type = Combine
 Storm frequency = 100 yrs
 Time interval = 1 min
 Inflow hyds. = 2, 3

Peak discharge = 10.38 cfs
 Time to peak = 5 min
 Hyd. volume = 3,115 cuft
 Contrib. drain. area = 1.420 ac

