


SITE ENGINEERING DESIGN REPORT

**Proposed Warehouse Facility
East Campus
Stratford, Connecticut
Job No. 2107**

**Prepared For:
Stratford Development Company**

Prepared By:

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**August 29, 2014
Revised: November 21, 2014
Revised: August 17 2016**



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INTRODUCTION:

East Campus, L.P. is proposing the construction of a Warehouse facility, located on 975 Lordship Boulevard, in Stratford. The proposed building will have a total footprint area of approximately 137,700 square feet.

Historically the property was comprised of a single 42.56 acres parcel, which has been subdivided into 3 lots. The proposed development is on lot 2 which has an area of 12.01 acres. The existing soil condition on site is most near a fallow or bare soil with little vegetation. The East and West Campus developments were issued D.E.E.P. and U.S. Army Corps of Engineers permits in association with a tidal wetland restoration project that has been completed.

Overall, the site slopes from the center outward. The maximum elevation is approximately elevation 20 feet. The minimum perimeter elevation is approximately 5 feet.

This site has access via an existing driveway to Lordship Boulevard. The existing driveway is 42-feet wide to accommodate truck traffic for this proposed project and the existing FedEx ground on lot1. Upon project completion parking will be provided for 175 cars. The total site disturbance for the lot 2 project will be 7.25 acres.

The drainage analysis and design was constructed during the development of the FedEx site Lot1, therefore the drainage infrastructure (retention ponds, level spreader, and infiltration swales) for lot 2 and 3 are in place, with the exception of some additional conveyance piping and swales to collect water from the new warehouse and parking areas. Therefore the following design refers to the entire East Campus and assumed an impervious area of 29.0 arecas, the existing lot and the proposed lot2 will have an impervious are of 24.9 acres, making the following design and calculations very conservative.

EXISTING STORM WATER RUNOFF

For analysis purposes the site has been examined as a single drainage area (See Attached Sheet C-1). This single drainage area will be referred to as DA-EX for the balance of this report.

DA-EX drains storm water to existing wetland areas (Long Island Sound) to the south of the site.

Based on the above, it is apparent that there is one point of interest associated with the existing drainage pattern, the point immediately prior to the southern wetland area, where the site drains currently. Peak rates of storm water runoff, for 2, 25, 50 and 100 year storm events, have been calculated for these points of interest. The rates are depicted on Table 1. The supporting calculations are included as Appendix A.

These existing flows will later be compared to post development flow as a means of assessing the impact of the proposed project on surrounding infrastructures.

TABLE 1

Existing Flows (CFS)			
Runoff to surrounding wetland areas (DA-EX)			
2year	25 year	50 year	100 year
99.25	208.24	240.28	276.8

PROPOSED STORM WATER DRAINAGE

A primary concern was addressed during the design of the storm water control system. The impact on the surrounding infrastructure was to be absolutely minimized.

To achieve this objective the site drainage was diverted into one storm sewer system that will accommodate the 2 drainage areas (Front and Rear) that is depicted on Sheet C-2 (attached).

Design details for these systems are presented on Sheet SP-2 thru SP-8 (part of the overall Project Documents). The system will drain all roofs on the site, all paved areas, sidewalks, and grassy areas that contribute runoff to the system. The roofs and parking will be the major elements of the total impervious area on the site. The proposed warehouse and parking will create an impervious area of approximately 17.50 acres. For the purpose of anticipated total development of the entire tract, the proposed site will be analyzed with an impervious area of approx. 29.0 acres. Calculations are included as Appendix B. The roof, grassy areas, sidewalks, parking and driveways will contribute to the runoff totals seen in table 2. This runoff will flow to various catch basins, and infiltration swales then to a series of retention ponds. The front (north) drainage area will flow to an 114,000-cubic foot retention pond, where storm water will be contained and infiltrated. The water in this pond is controlled by a catch basin with a 24-inch pipe to allow some water to leave the pond at a much slower rate than it is entering the pond. This pipe then conveys the water to the rear (south) pond where the balance of the site also drains to. The rear pond is a 143,100-cubic foot retention pond that is controlled by a level spreader or a large spillover weir. For phase 1 of the project, the rear pond will also act as a temporary sediment basin. See Appendix B for calculations. This level spreader ensures that the pond retains the volume of water it is designed to, while also protecting the land to the south of the pond from scour and erosion. In addition, the level spreader will minimize salinity decreases in the adjacent wetlands. The level spreader is approximately 1,160 feet long and will ease the water discharging from the pond to be slower and evenly distributed. See Appendix B for calculations. This system will allow a maximum flow of 163.97 CFS at the 100 year storm event. This system is also designed to divert approximately 2 CFS to a downstream defender treatment chambers upstream from the retention ponds.

In addition water quality swales have been provided throughout the site. These swales will capture and infiltrate storm water originating from the site. The storage benefit of these water quality swales are not included in the analysis of this report. Therefore this report's findings will err conservatively.

Table 2, (below) presents the combined effect of these flow patterns on the existing infrastructures. It can be safely stated that flows from the proposed systems will produce peak flows of less than the existing peak flows to the wetlands south of the site.

TABLE 2

Existing Flows (CFS)			
Runoff to surrounding wetland areas (DA-EX)			
2year	25 year	50 year	100 year
99.25	208.24	240.28	276.8
Discharge from control/storage structure (level spreader at rear pond)			
2year	25 year	50 year	100 year
2.45	89.33	136.35	164.34
Percent Reduction of discharge from existing discharges			
2year	25 year	50 year	100 year
97.5%	57.1%	43.3%	40.7%

SANITARY SEWER

Sanitary Sewer discharge will be through a proposed 6-inch PVC sanitary sewer line to an existing sanitary sewer in the campus driveway connected to Lordship Boulevard.

Using the technical standards of the Connecticut Public Health Code, the estimated sewage flow is 0.1 gallons per square foot of gross area per day. This Development has a proposed 225,100 square feet:

$$0.1 \times 137,700 = 13,770 \text{ gallons per day average flow}$$
$$\text{Average Flow} = 9.563 \text{ g.p.m.}$$

$$\text{Peak flow estimate} = 9.563 \times 3 \text{ (peaking factor)}$$
$$= 28.689 \text{ g.p.m. Peak}$$

Other Utilities

All proposed utilities to the site will be through underground utility connections. Electrical service will be from existing aboveground electric in the campus driveway, water service will be from existing water main in campus driveway.

KEEPING PLANS CURRENT

The permittee is responsible for keeping their plan in compliance with this general permit at all times. This may involve any or all of the following:

- (A) The permittee shall amend the Plan if the actions required by the Plan fail to prevent pollution or fail to otherwise comply with any other provision of this general permit. The plan shall be amended whenever there is a change in contractors or subcontractors at the site, or a change in design, construction, operation, or maintenance at the site which has the potential for the discharge of pollutants to the waters of the state and which has not otherwise been addressed in the plan.
- (B) The commissioner may notify the permittee at any time that the plan and/or the site do not meet one or more of the minimum requirements of this general permit. Within 7 days of such notice, or such other time as the commissioner may allow, the permittee shall make the required changes to the plan and perform all actions required by such revised plan. Within 15 days of such notice, or such time as the commissioner may allow, the permittee shall submit to the commissioner a written certification that the requested changes have been made and implemented and such other information as the commissioner requires, in accordance with the “Duty to Provide Information” and “Certification of Documents” sections (subsections 5(h) and 5(i) of this general permit.
- (C) For any stormwater discharges authorized under any previous version of this general permit, the existing plan shall be updated as applicable, in accordance with the “Development and Contents of the Plan” (subsection 5(b)(1)), “Stormwater Control Measures” (subsection 5(b)(2)), “Routine Inspections” (subsection 5(b)(4)(B)), and “Monitoring” (subsection 5(c)) sections of this general permit, except for the post-construction measures in subsection 5(b)(2)(C)(i)(a) & (b) and 5(b)(2)(C)(ii)(a). The permittee shall maintain compliance with such Plan thereafter. For previously authorized sites discharging to impaired waters or other sensitive areas, the commissioner may require additional control measures or provide authorization under an individual permit pursuant to Sections 4(h) and 3(i).

Contractor Certification Statement

The following certification must be signed by each contractor and subcontractor where appropriate.

"I hereby certify that I am a contractor licensed in the State of Connecticut. I am making this certification in connection with a registration under such general permit, submitted by:

Name of Contractor / Subcontractor

for an activity located at:

Address of Project or Activity

"I certify under penalty of the law that I have read and understand the terms and conditions of the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities. I understand that as a contractor or subcontractor at the site, I am authorized by this general permit, and must comply with the terms and conditions of this general permit, including, but not limited to, the requirements of the Stormwater Pollution Control Plan prepared for the site."

Signature of Contractor / Subcontractor

Date

Name of Contractor / Subcontractor

Title

Name of Contracting Firm		
Mailing Address		City/Town
State	Zip Code	Business Phone

APPENDIX A
DRAINAGE CALCULATIONS

APPENDIX B

WATER QUALITY VOLUME CALCULATION

SITE AREA = 1,804,691 OR 42.5 ac

IMPERVIOUS = 1,263,240 SF OR 70.0%

WQV= (P*RV*A); RV=0.05+0.009*I

RV= 0.05+0.009*I= 0.68 WATERSHED INCHES

WQV= (1"*0.68"*42.5ac)/12=2.41 ac.ft. REQUIRED OR 104,907 cuft

257,100 CUBIC FEET OF STORAGE PROPOSED

LEVEL SPREADER CALCULATION

$L=Q/(V*X)$

L=LENGTH OF LEVEL SPREADER

Q=FLOW

V=DESIGN VELOCITY=1.33 ft./s (downstream grass cover)

X=EQUIVALENT HEIGHT=0.58 ft. (downstream grass cover)

$L=89.35\text{cfs}/(1.33*.058)$

= 1158 L.F.

1160 L.F. LEVEL SPREADER PROPOSED

TEMPORARY SEDIMENT BASIN DESIGN

Sediment Volume Required:

$$V = \frac{(DA)(A)(DR)(TE)(2,000\text{lbs./ton})}{(Y)(43,560\text{sq.ft./ac.})}$$

1 year of construction

Fallow:

$$(DA)(A) = (6.15\text{ ac})(1\text{ ton/ac/yr})(1\text{ yr}) = 6.15\text{ ton}$$

Construction Area:

$$(DA)(A) = (36.4\text{ ac.})(50\text{ ton/ac/yr})(1\text{ yr}) = 1,820\text{ tons} \\ = 1,826\text{ tons}$$

DR=25% (for sandy soils)

TE=0.8

Y=90 lbs./cu.ft (sandy soils)

$$V = \frac{1826 * 0.25 * 0.8 * 2000}{90 * 43,560}$$

V= 0.186 ac.ft. of sediment storage volume required over the year of construction
= 8,116 cu.ft.

Wet storage volume=8,116 cu.ft. X 2= 16,231 cu.ft.

Total = 24,346 cu.ft.

Rear pond was analyzed with storage volume of 143,100 cu.ft.-24,346 cu.ft. = 118,754 cu.ft.
For a 10 year storm event, the discharge is 166.59 cfs, a 5.4 % reduction from the existing.

APPENDIX C

Existing CN=86:

The 'Composite CN' dialog box displays the following data for existing conditions:

Area	Area (ac)	Curve No. CN
Area 1	42.55	86
Area 2	0.00	0
Area 3	0.00	0
Area 4	0.00	0
Area 5	0.00	0
Area 6	0.00	0
Composite CN		86

Buttons: Ok, Clear, Exit

Proposed CN=86:

The 'Composite CN' dialog box displays the following data for proposed conditions:

Area	Area (ac)	Curve No. CN
Area 1	28.73	98
Area 2	13.83	61
Area 3	0.00	0
Area 4	0.00	0
Area 5	0.00	0
Area 6	0.00	0
Composite CN		86

Buttons: Ok, Clear, Exit



C-1

EXISTING DRAINAGE PLAN	
TOPOGRAPHIC SURVEY, EAST CAMPUS	
PROPERTY LOCATED ON	
LORDSHIP BOULEVARD	
STAFFORD, CONNECTICUT	
STRATFORD LAND DEVELOPMENT COMPANY	
LIMITED PARTNERSHIP	
DATE	NOV 15, 2000
SCALE	1" = 50'
PROJECT NO.	00-001
DATE	NOV 15, 2000
SCALE	1" = 50'
PROJECT NO.	00-001
DATE	NOV 15, 2000
SCALE	1" = 50'
PROJECT NO.	00-001
DATE	NOV 15, 2000
SCALE	1" = 50'

GROSS AREA = 1,683,817 S.F. or 48,2000 Acres

- 1. LOT AREA
- 2. TOTAL EXCLUDED AREAS
- 3. TOTAL EXCLUDED AREAS
- 4. TOTAL EXCLUDED AREAS
- 5. TOTAL EXCLUDED AREAS
- 6. TOTAL EXCLUDED AREAS
- 7. TOTAL EXCLUDED AREAS
- 8. TOTAL EXCLUDED AREAS
- 9. TOTAL EXCLUDED AREAS
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- 16. TOTAL EXCLUDED AREAS
- 17. TOTAL EXCLUDED AREAS
- 18. TOTAL EXCLUDED AREAS
- 19. TOTAL EXCLUDED AREAS
- 20. TOTAL EXCLUDED AREAS

MAP REFERENCES:
 1. LOT AREA
 2. TOTAL EXCLUDED AREAS
 3. TOTAL EXCLUDED AREAS
 4. TOTAL EXCLUDED AREAS
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 19. TOTAL EXCLUDED AREAS
 20. TOTAL EXCLUDED AREAS

LOT AREA TABLE:
 INLAND WETLAND 1
 INLAND WETLAND AREA 1 = 30,846 S.F.
 INLAND WETLAND AREA 2 = 10,605 S.F.
 TOTAL INLAND WETLAND AREA = 41,451 S.F.
 INLAND WETLAND 2
 INLAND WETLAND AREA 3 = 4,108 S.F.
 TOTAL INLAND WETLAND AREA = 45,559 S.F.
 TIDAL AREA A
 TIDAL AREA B
 TIDAL AREA C
 TOTAL TIDAL AREA = 8,023 S.F.
 TOTAL EXCLUDED AREAS:
 TOTAL EXCLUDED AREAS = 41,451 S.F.
 TOTAL EXCLUDED AREAS = 8,023 S.F.
 TOTAL EXCLUDED AREAS = 49,474 S.F.
 GROSS AREA = 1,683,817 S.F.
 TOTAL EXCLUDED AREAS = 49,474 S.F.
 LOT AREA = 1,634,343 S.F.
 50% LOT AREA = 817,171 S.F.
 70% LOT AREA = 1,144,040 S.F.

NOTE:
 1. THIS DRAINAGE PLAN IS BASED ON THE TOPOGRAPHIC SURVEY DATED NOVEMBER 15, 2000.
 2. THE DRAINAGE PLAN IS SUBJECT TO THE APPROVAL OF THE STATE OF CONNECTICUT.
 3. THE DRAINAGE PLAN IS SUBJECT TO THE APPROVAL OF THE LOCAL GOVERNMENT.
 4. THE DRAINAGE PLAN IS SUBJECT TO THE APPROVAL OF THE ADJACENT PROPERTY OWNERS.
 5. THE DRAINAGE PLAN IS SUBJECT TO THE APPROVAL OF THE ADJACENT PROPERTY OWNERS.
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 20. THE DRAINAGE PLAN IS SUBJECT TO THE APPROVAL OF THE ADJACENT PROPERTY OWNERS.

DATE: NOV 15, 2000
 SCALE: 1" = 50'
 PROJECT NO.: 00-001

STRATFORD LAND DEVELOPMENT COMPANY
 LIMITED PARTNERSHIP

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Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2010 by Autodesk, Inc. v9.24

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	SCS Runoff	-----	-----	99.25	-----	-----	-----	208.24	240.28	276.80	EXISTING RUNOFF
2	SCS Runoff	-----	-----	102.42	-----	-----	-----	214.85	247.74	285.22	PROPOSED RUNOFF
3	Diversion1	2	-----	51.21	-----	-----	-----	107.42	123.87	142.61	FRONT
4	Diversion2	2	-----	51.21	-----	-----	-----	107.42	123.87	142.61	REAR
5	Reservoir	3	-----	5.821	-----	-----	-----	23.46	35.22	51.40	FRONT POND OUTLET
6	Combine	4, 5	-----	54.36	-----	-----	-----	119.45	138.36	164.53	REAR POND
7	Reservoir	6	-----	2.448	-----	-----	-----	89.33	136.35	164.34	<no description>

Hydrograph Report

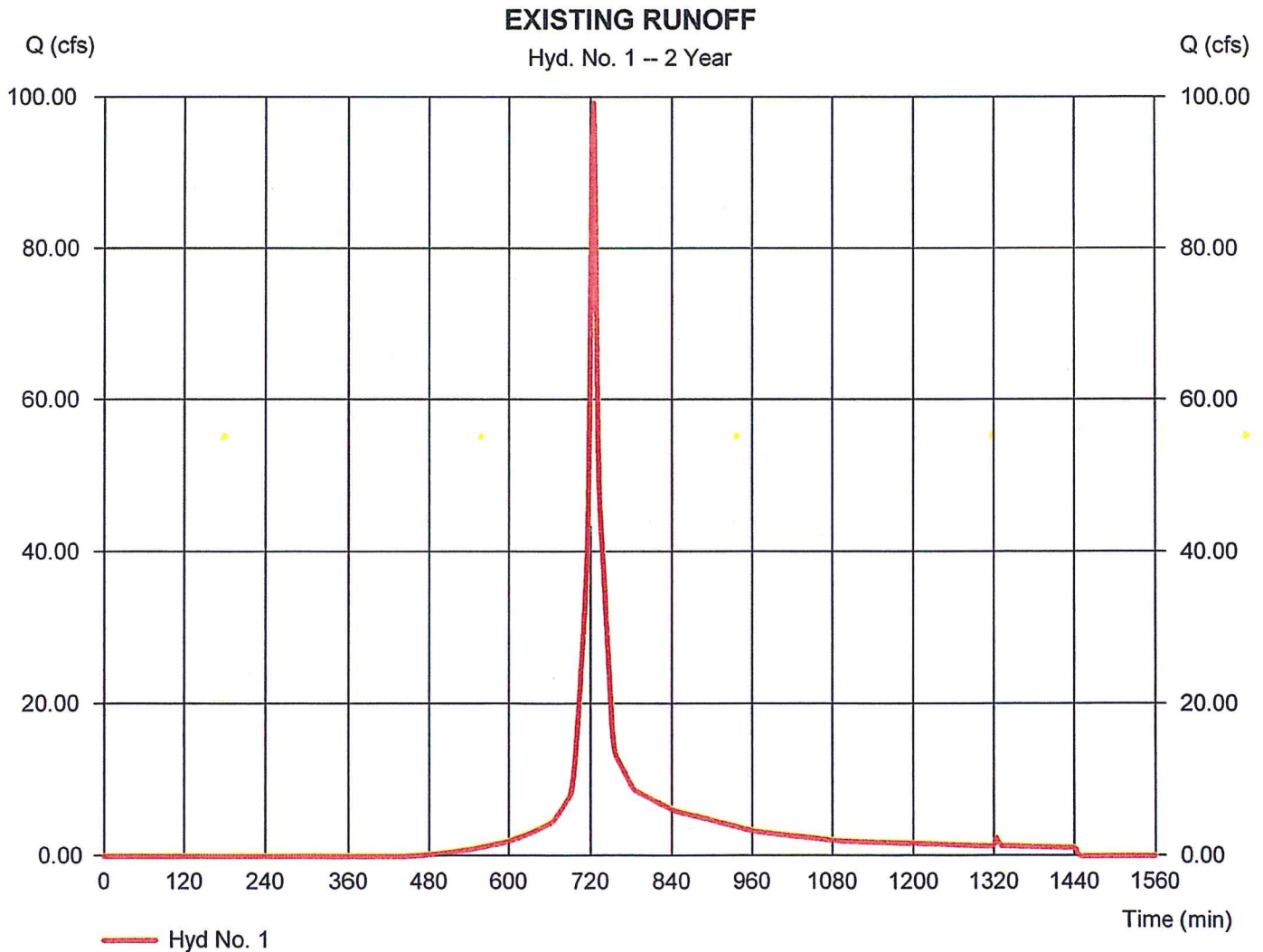
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2010 by Autodesk, Inc. v9.24

Wednesday, Nov 19, 2014

Hyd. No. 1

EXISTING RUNOFF

Hydrograph type	= SCS Runoff	Peak discharge	= 99.25 cfs
Storm frequency	= 2 yrs	Time to peak	= 725 min
Time interval	= 1 min	Hyd. volume	= 306,266 cuft
Drainage area	= 42.560 ac	Curve number	= 86
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 5.50 min
Total precip.	= 3.30 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2010 by Autodesk, Inc. v9.24

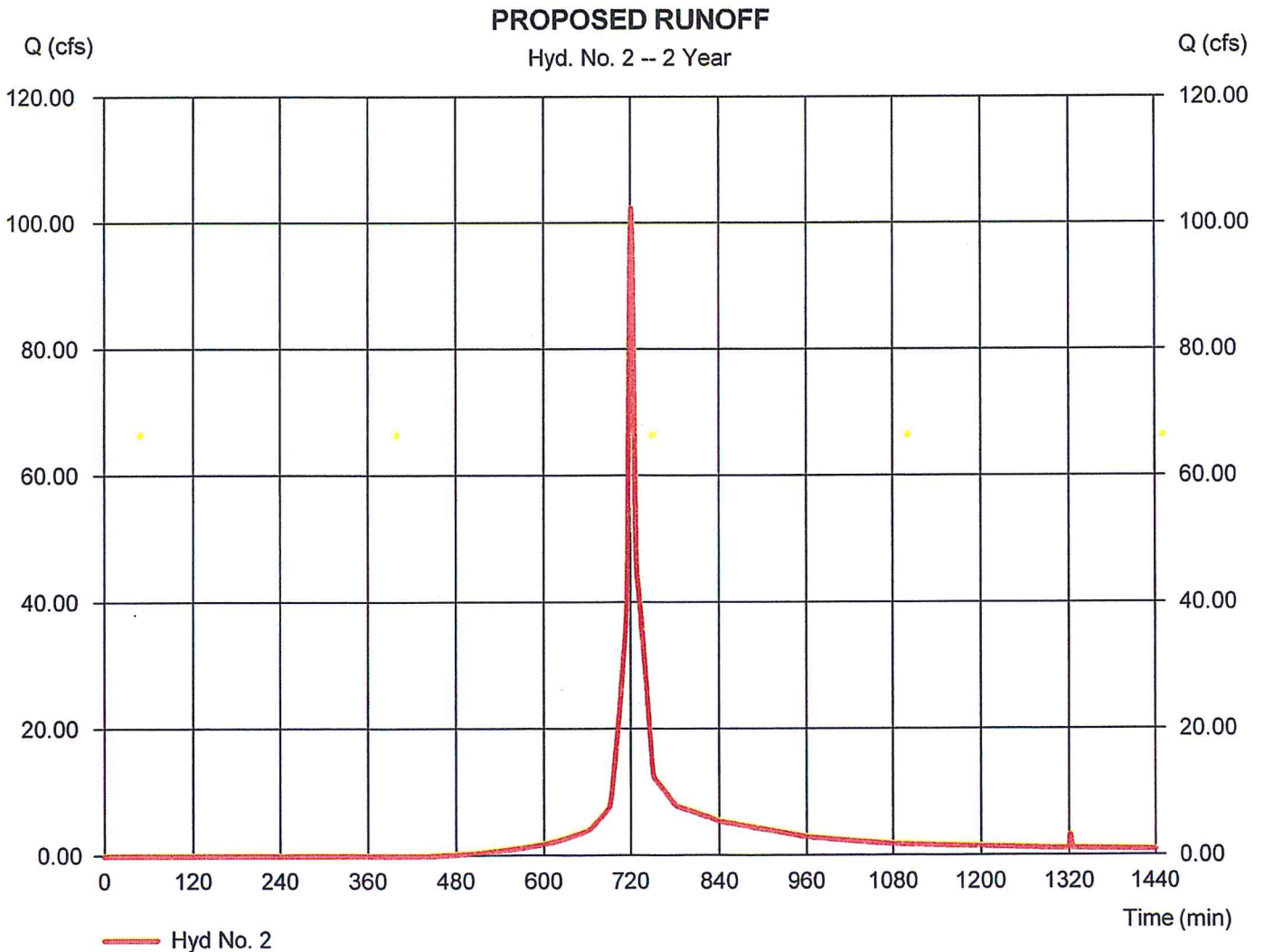
Wednesday, Nov 19, 2014

Hyd. No. 2

PROPOSED RUNOFF

Hydrograph type	= SCS Runoff	Peak discharge	= 102.42 cfs
Storm frequency	= 2 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 278,424 cuft
Drainage area	= 42.560 ac	Curve number	= 86*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 2.90 min
Total precip.	= 3.30 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(28.730 \times 98) + (13.830 \times 61)] / 42.560$



Hydrograph Report

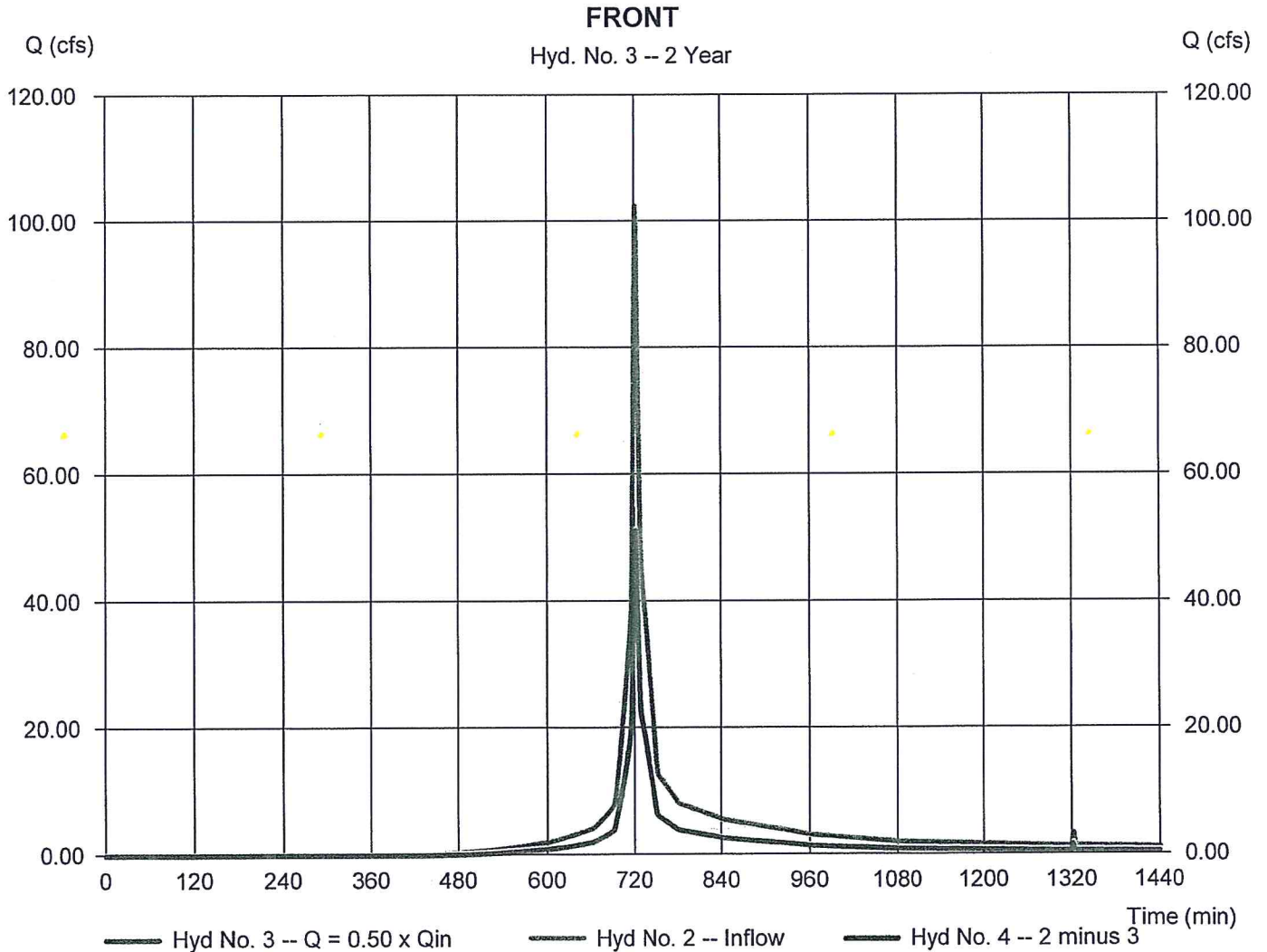
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2010 by Autodesk, Inc. v9.24

Wednesday, Nov 19, 2014

Hyd. No. 3

FRONT

Hydrograph type	= Diversion1	Peak discharge	= 51.21 cfs
Storm frequency	= 2 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 139,212 cuft
Inflow hydrograph	= 2 - PROPOSED RUNOFF	2nd diverted hyd.	= 4
Diversion method	= Flow Ratio	Flow ratio	= 0.50



Hydrograph Report

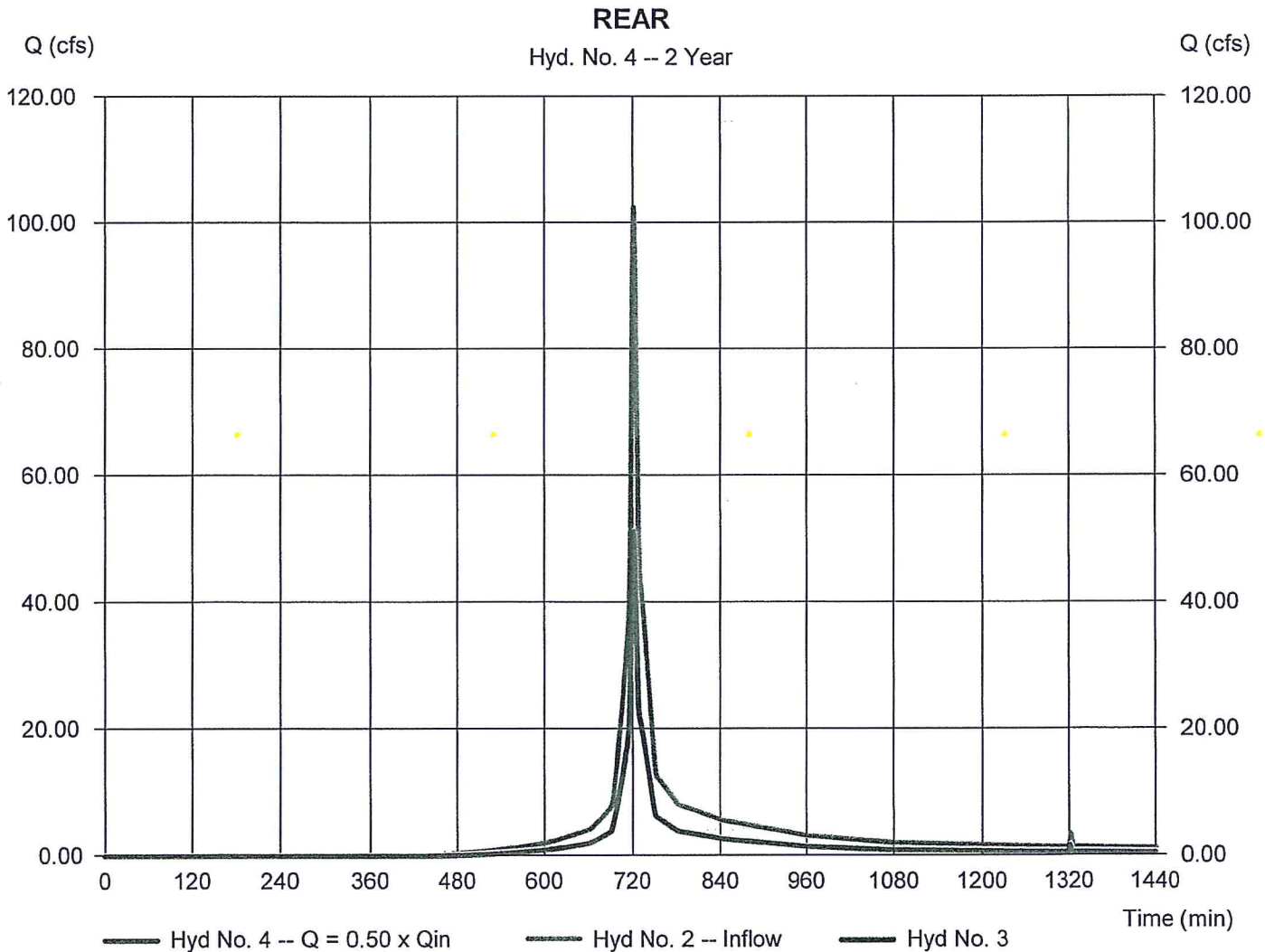
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2010 by Autodesk, Inc. v9.24

Wednesday, Nov 19, 2014

Hyd. No. 4

REAR

Hydrograph type	= Diversion2	Peak discharge	= 51.21 cfs
Storm frequency	= 2 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 139,212 cuft
Inflow hydrograph	= 2 - PROPOSED RUNOFF	2nd diverted hyd.	= 3
Diversion method	= Flow Ratio	Flow ratio	= 0.50



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2010 by Autodesk, Inc. v9.24

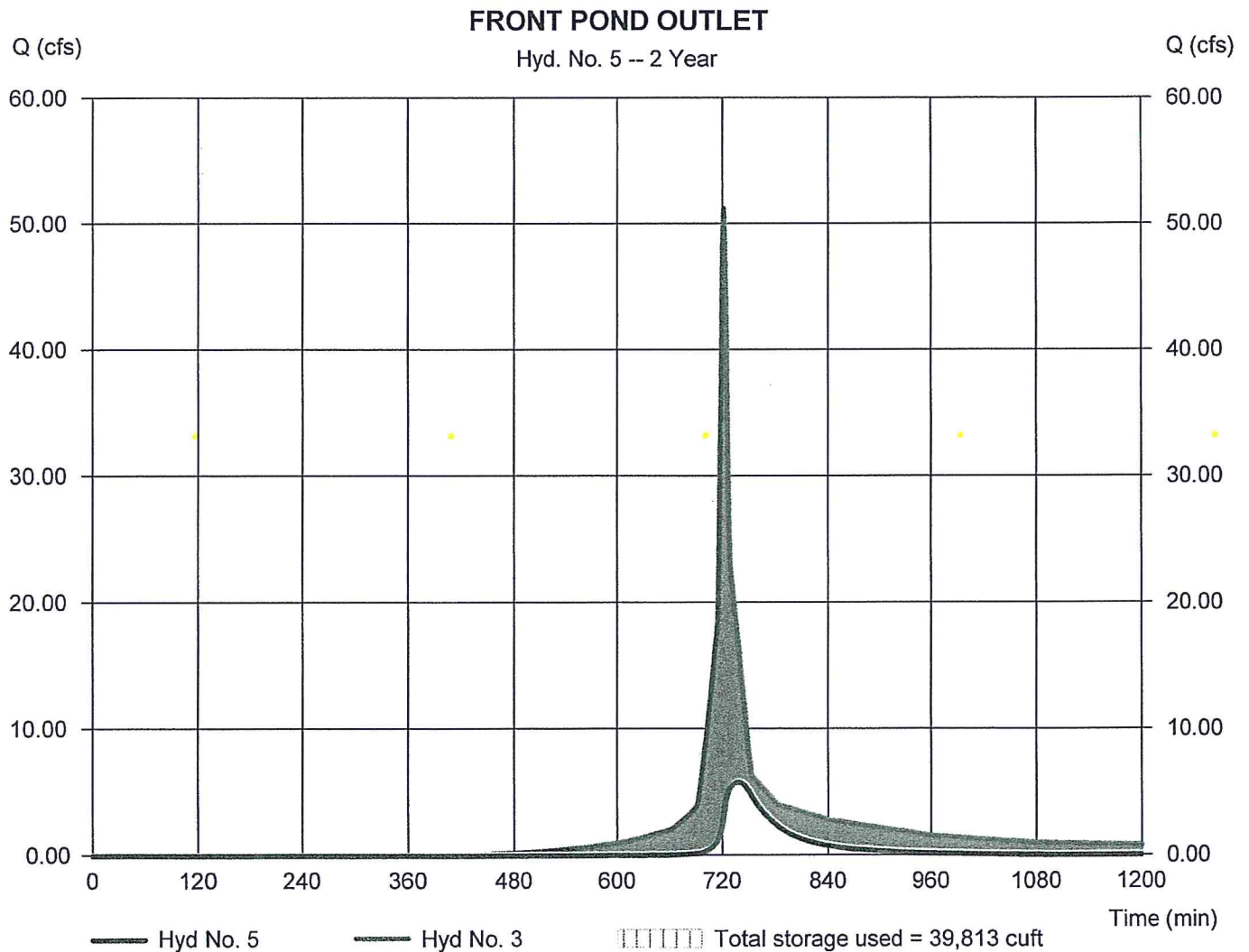
Wednesday, Nov 19, 2014

Hyd. No. 5

FRONT POND OUTLET

Hydrograph type	= Reservoir	Peak discharge	= 5.821 cfs
Storm frequency	= 2 yrs	Time to peak	= 738 min
Time interval	= 1 min	Hyd. volume	= 27,613 cuft
Inflow hyd. No.	= 3 - FRONT	Max. Elevation	= 7.05 ft
Reservoir name	= FRONT	Max. Storage	= 39,813 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond Report

Pond No. 2 - FRONT

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 6.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	6.00	38,000	0	0
1.00	7.00	38,000	37,996	37,996
2.00	8.00	38,000	37,996	75,992
3.00	9.00	38,000	37,996	113,989

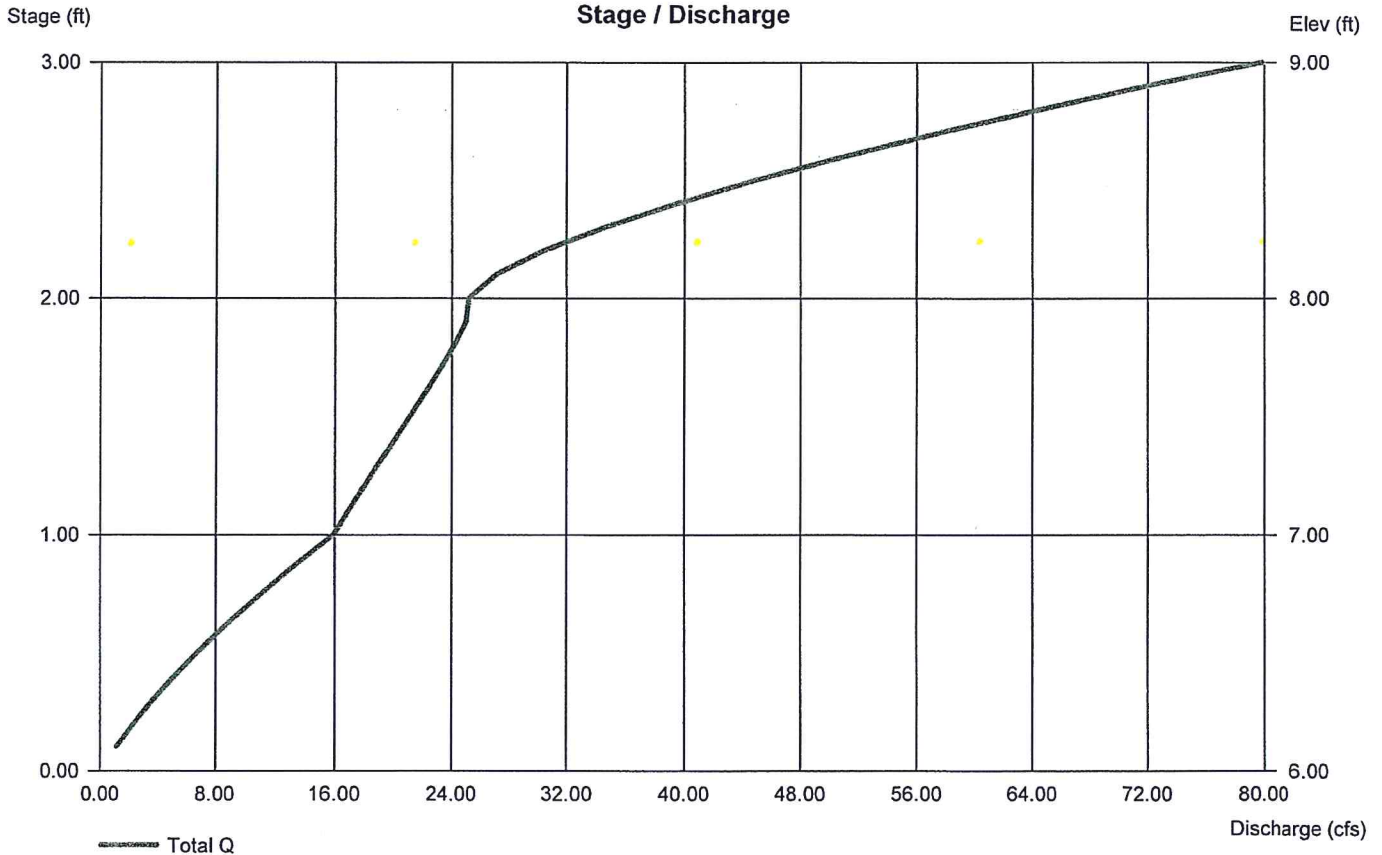
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	24.00	0.00	0.00
Span (in)	= 0.00	24.00	0.00	0.00
No. Barrels	= 0	10	0	0
Invert El. (ft)	= 0.00	6.00	0.00	0.00
Length (ft)	= 0.00	1000.00	0.00	0.00
Slope (%)	= 0.00	0.25	0.00	n/a
N-Value	= .013	.009	.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)	= 20.00	0.00	0.00	0.00
Crest El. (ft)	= 8.00	0.00	0.00	0.00
Weir Coeff.	= 2.60.00	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No
Exfil.(in/hr)	= 120 (by Contour)			
TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Hydrograph Report

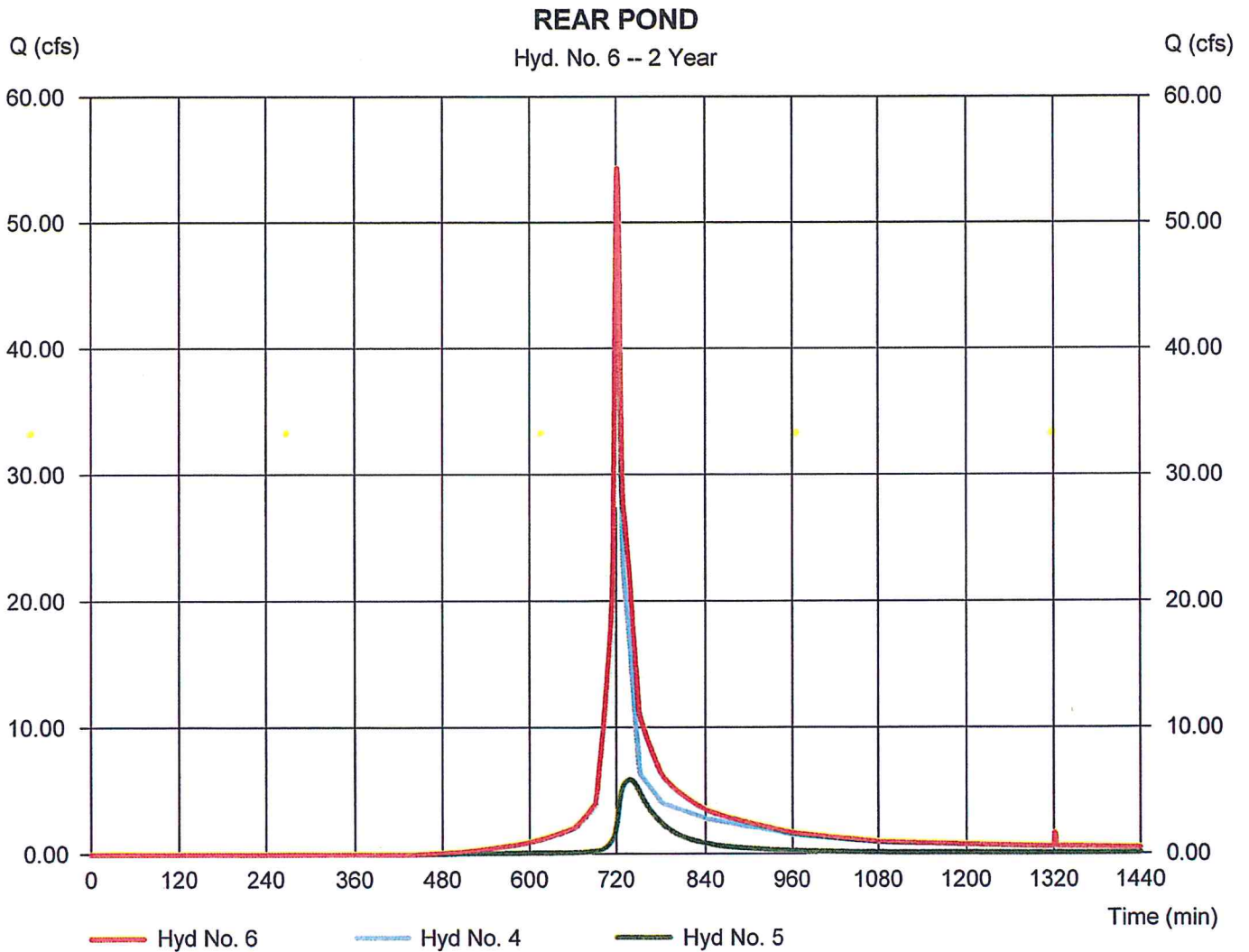
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2010 by Autodesk, Inc. v9.24

Wednesday, Nov 19, 2014

Hyd. No. 6

REAR POND

Hydrograph type	= Combine	Peak discharge	= 54.36 cfs
Storm frequency	= 2 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 166,825 cuft
Inflow hyds.	= 4, 5	Contrib. drain. area	= 0.000 ac



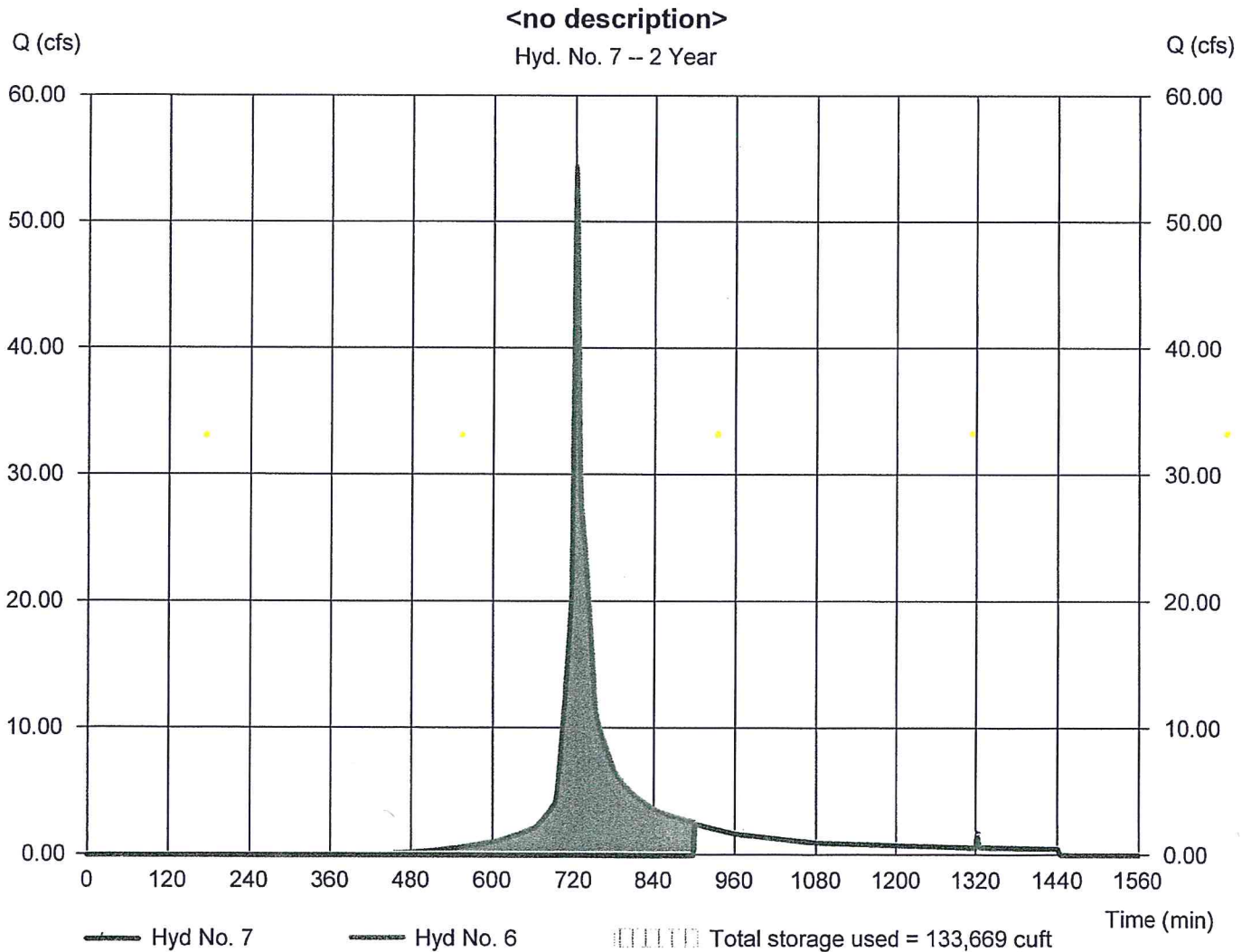
Hydrograph Report

Hyd. No. 7

<no description>

Hydrograph type	= Reservoir	Peak discharge	= 2.448 cfs
Storm frequency	= 2 yrs	Time to peak	= 904 min
Time interval	= 1 min	Hyd. volume	= 33,279 cuft
Inflow hyd. No.	= 6 - REAR POND	Max. Elevation	= 5.80 ft
Reservoir name	= rear	Max. Storage	= 133,669 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - rear

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 3.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	3.00	47,700	0	0
1.00	4.00	47,700	47,695	47,695
2.00	5.00	47,700	47,695	95,390
3.00	6.00	47,700	47,695	143,086

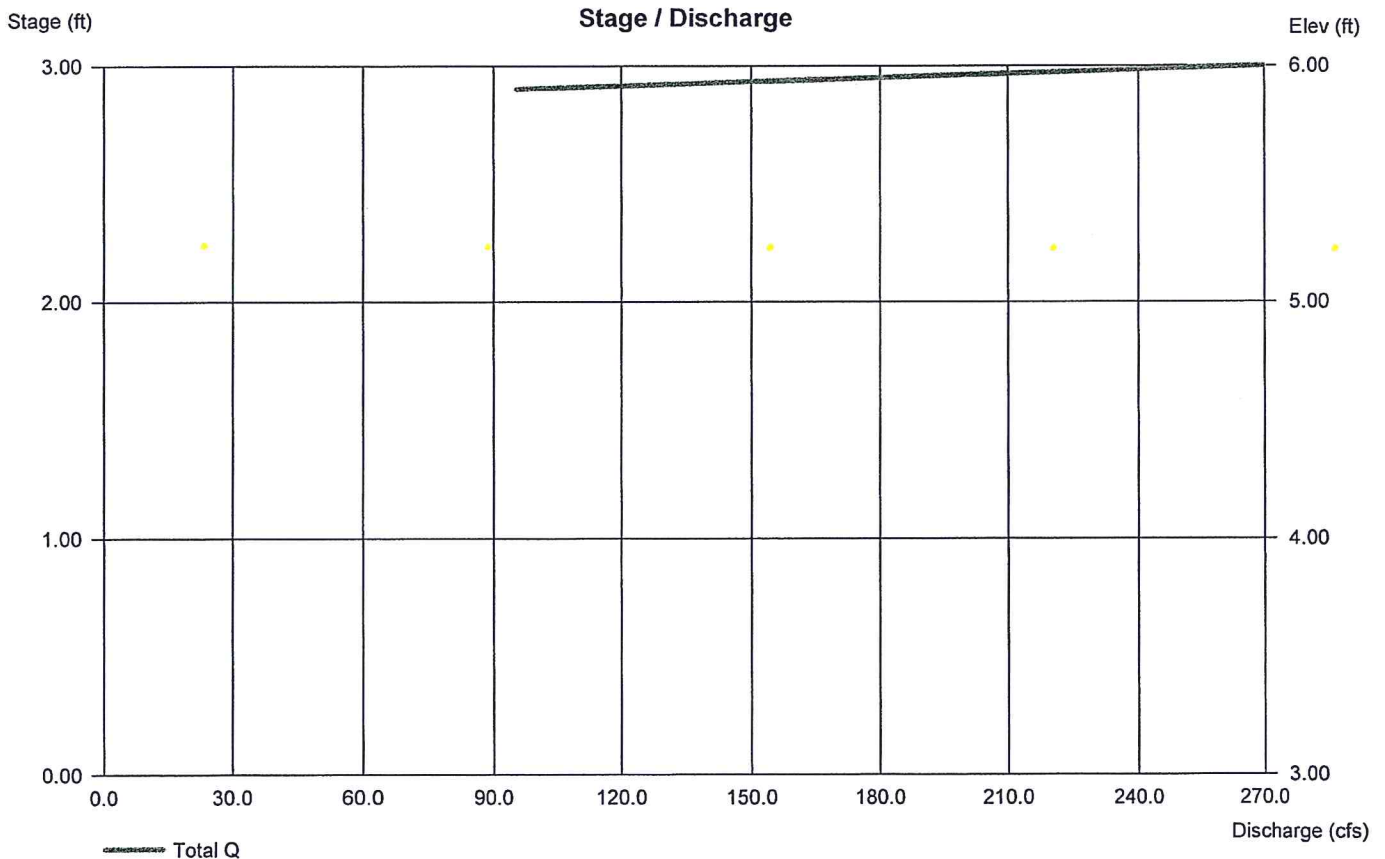
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 1160.00	0.00	0.00	0.00
Crest El. (ft)	= 5.80	0.00	0.00	0.00
Weir Coeff.	= 2.60.00	3.33	3.33	3.33
Weir Type	= Broad	---	---	---
Multi-Stage	= No	No	No	No
Exfil.(in/hr)	= 0 (by Contour)			
TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Hydrograph Report

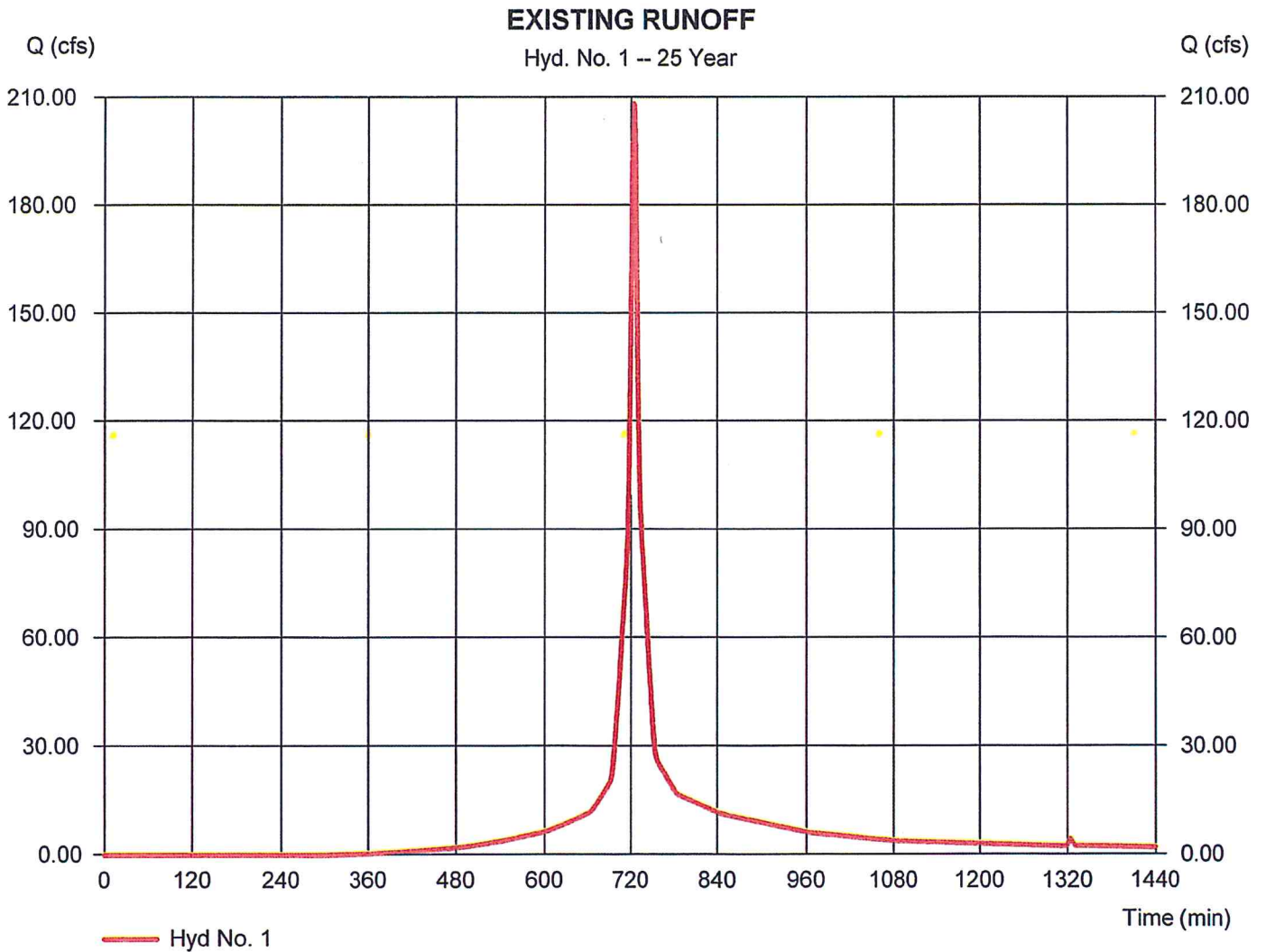
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Wednesday, Nov 19, 2014

Hyd. No. 1

EXISTING RUNOFF

Hydrograph type	= SCS Runoff	Peak discharge	= 208.24 cfs
Storm frequency	= 25 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 657,193 cuft
Drainage area	= 42.560 ac	Curve number	= 86
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 5.50 min
Total precip.	= 5.70 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

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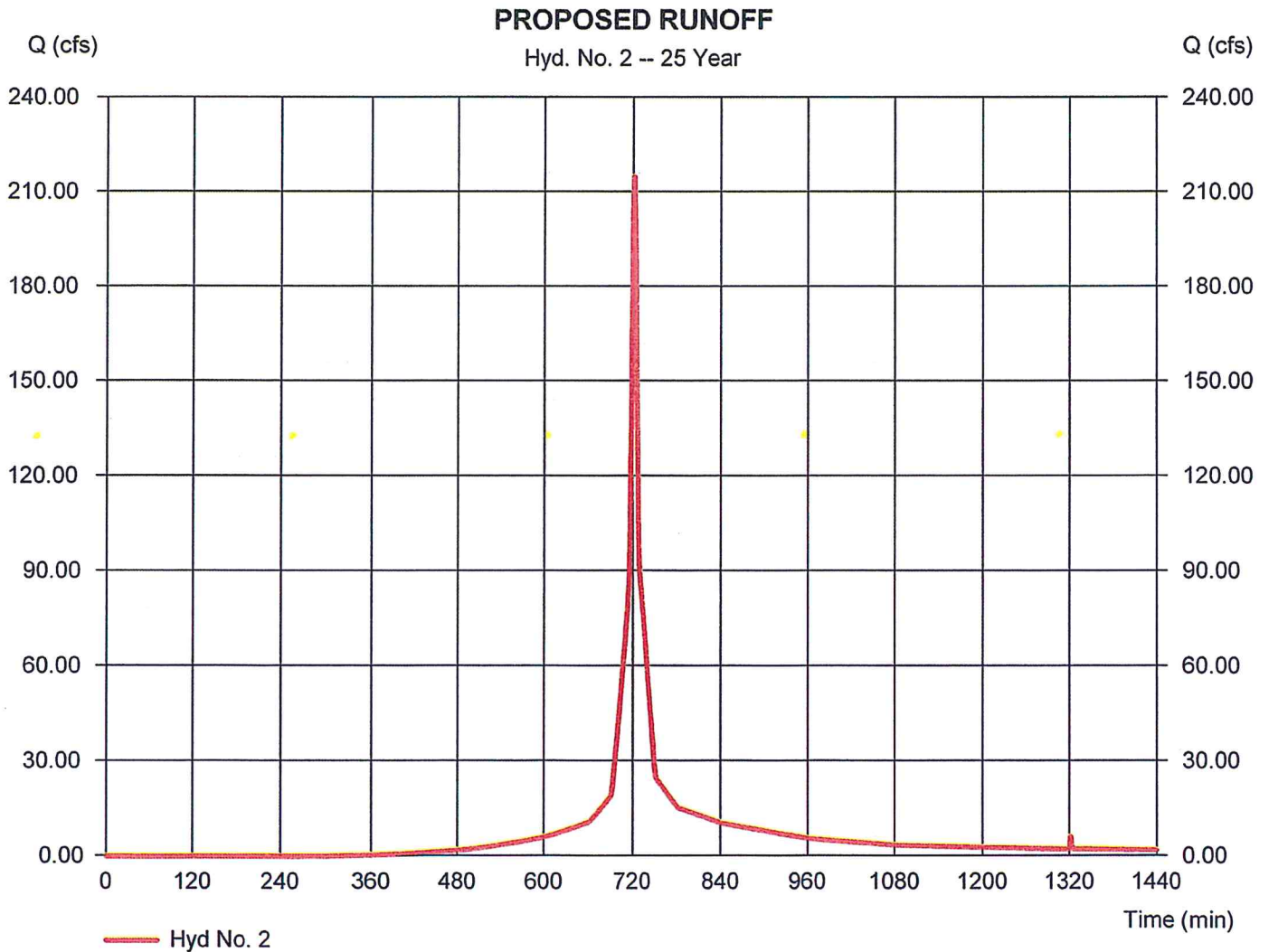
Wednesday, Nov 19, 2014

Hyd. No. 2

PROPOSED RUNOFF

Hydrograph type	= SCS Runoff	Peak discharge	= 214.85 cfs
Storm frequency	= 25 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 597,448 cuft
Drainage area	= 42.560 ac	Curve number	= 86*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 2.90 min
Total precip.	= 5.70 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(28.730 x 98) + (13.830 x 61)] / 42.560



Hydrograph Report

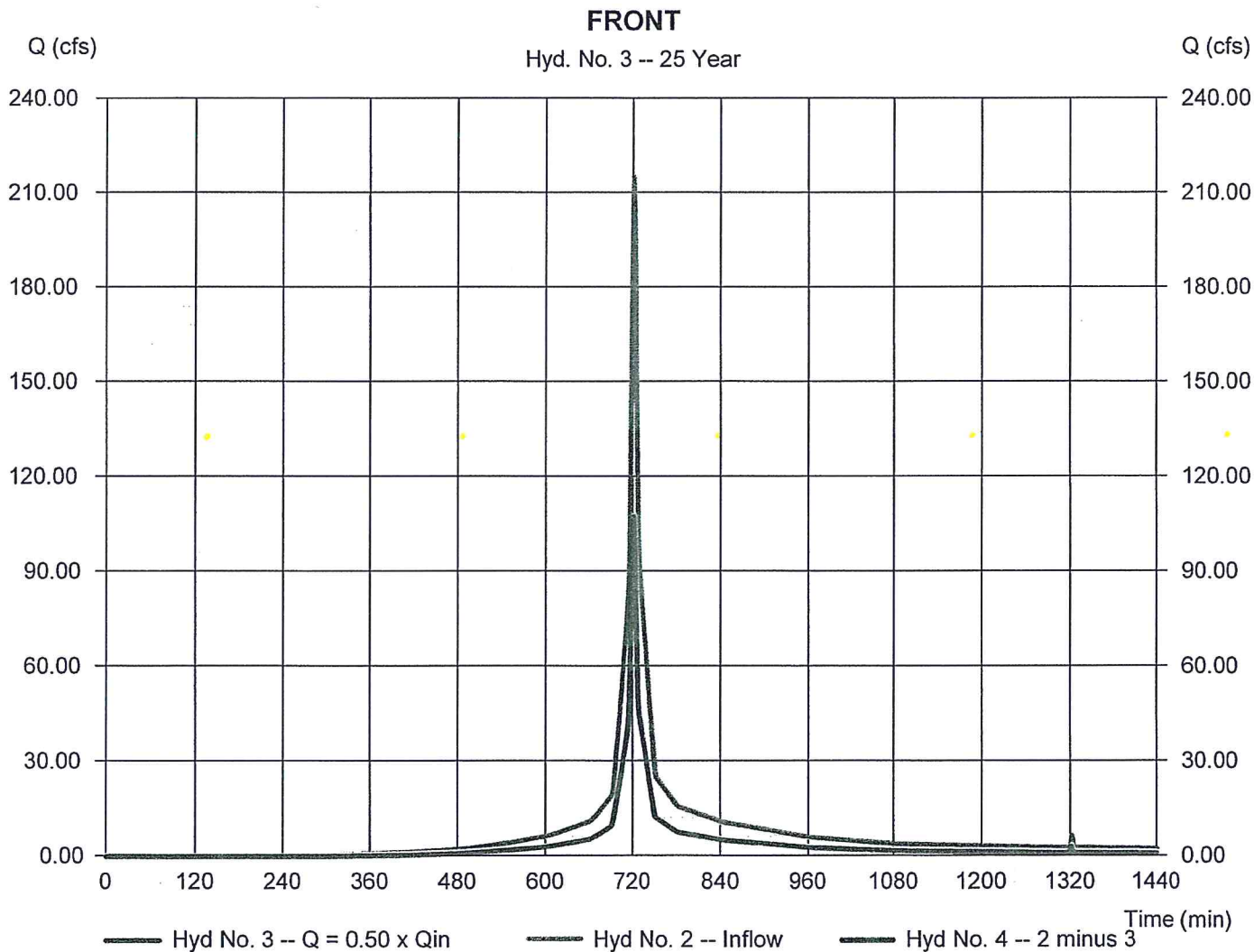
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Wednesday, Nov 19, 2014

Hyd. No. 3

FRONT

Hydrograph type	= Diversion1	Peak discharge	= 107.42 cfs
Storm frequency	= 25 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 298,724 cuft
Inflow hydrograph	= 2 - PROPOSED RUNOFF	2nd diverted hyd.	= 4
Diversion method	= Flow Ratio	Flow ratio	= 0.50



Hydrograph Report

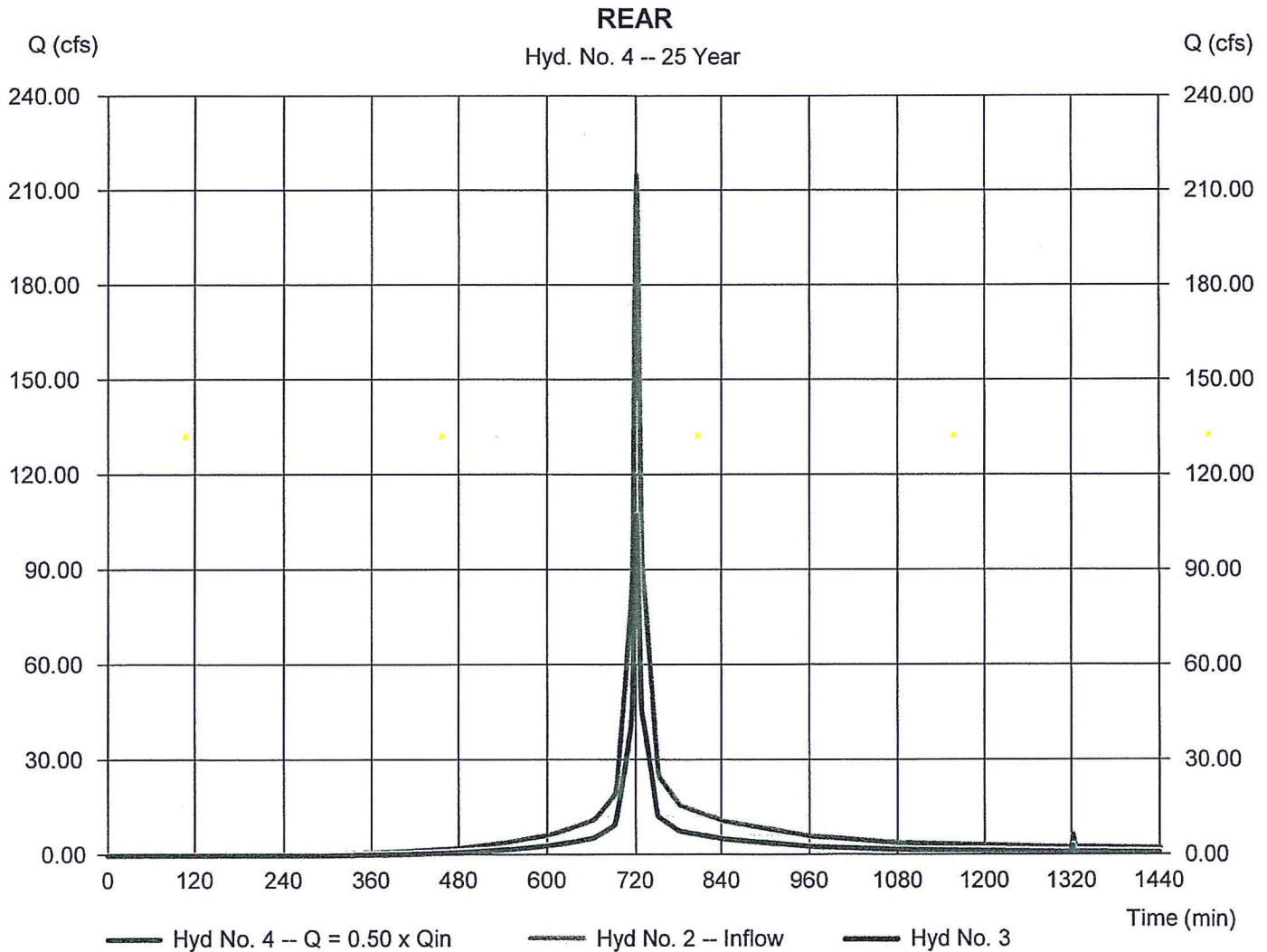
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Wednesday, Nov 19, 2014

Hyd. No. 4

REAR

Hydrograph type	= Diversion2	Peak discharge	= 107.42 cfs
Storm frequency	= 25 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 298,724 cuft
Inflow hydrograph	= 2 - PROPOSED RUNOFF	2nd diverted hyd.	= 3
Diversion method	= Flow Ratio	Flow ratio	= 0.50



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2010 by Autodesk, Inc. v9.24

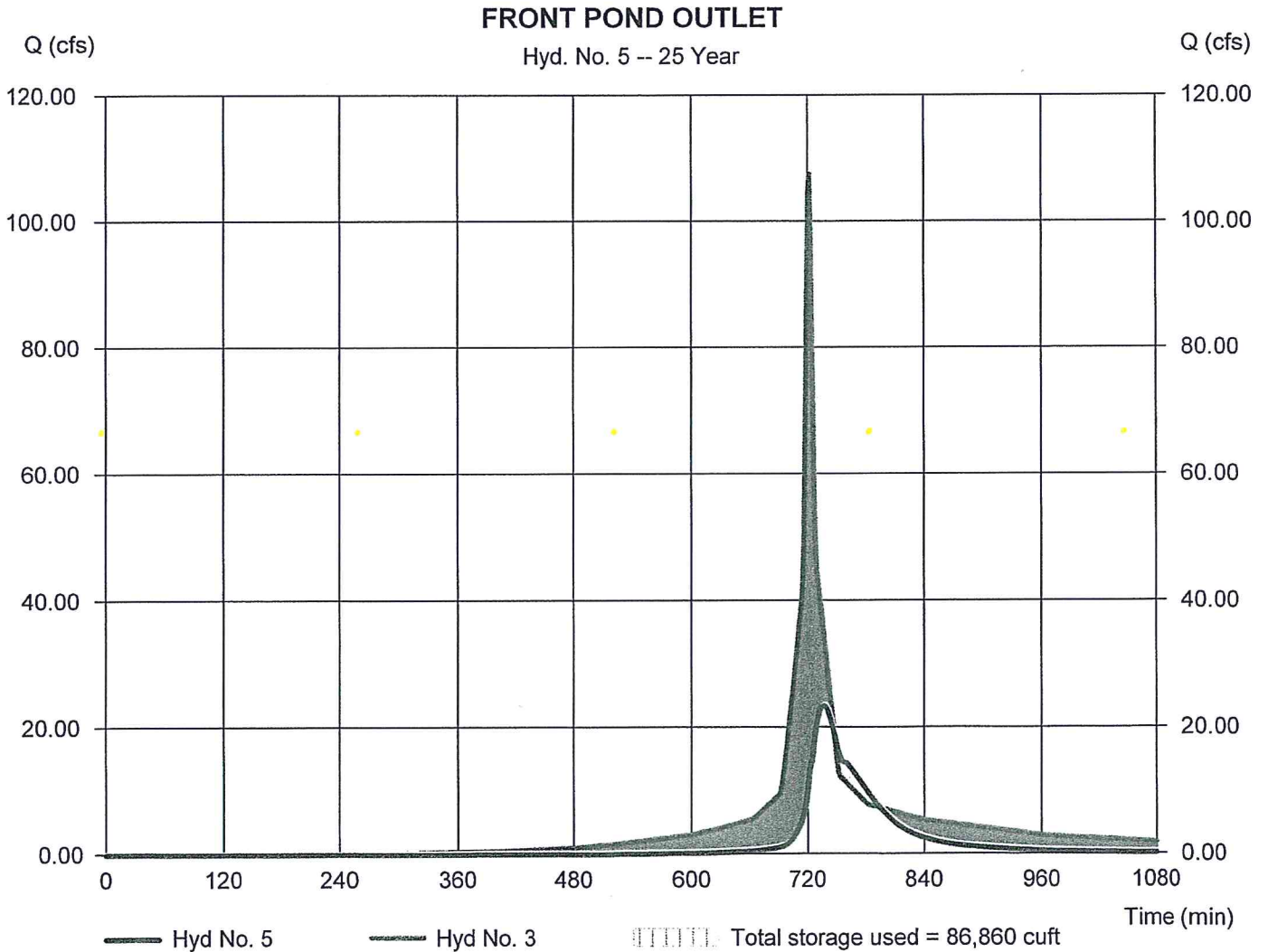
Wednesday, Nov 19, 2014

Hyd. No. 5

FRONT POND OUTLET

Hydrograph type	= Reservoir	Peak discharge	= 23.46 cfs
Storm frequency	= 25 yrs	Time to peak	= 737 min
Time interval	= 1 min	Hyd. volume	= 103,374 cuft
Inflow hyd. No.	= 3 - FRONT	Max. Elevation	= 8.29 ft
Reservoir name	= FRONT	Max. Storage	= 86,860 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

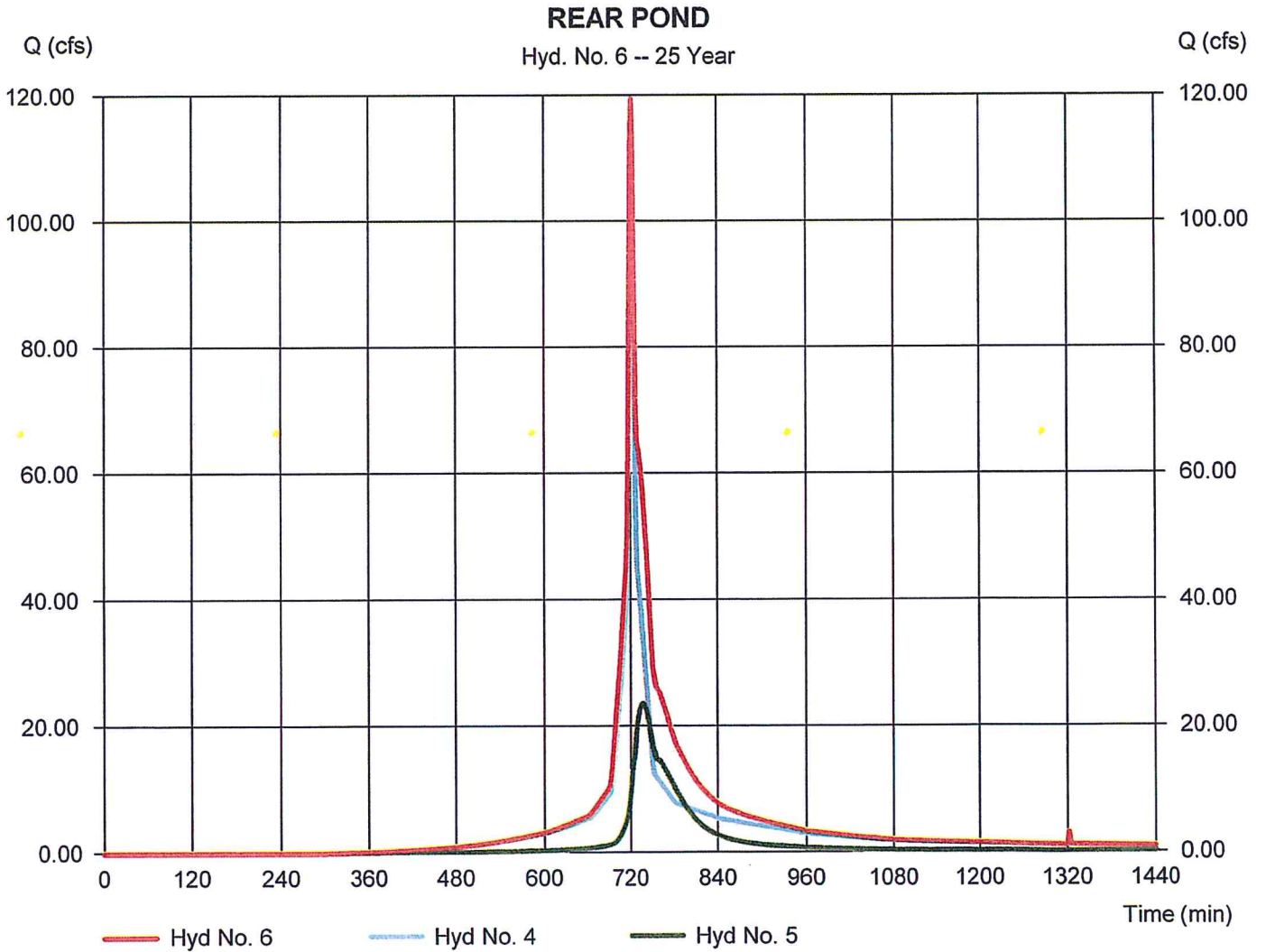
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Wednesday, Nov 19, 2014

Hyd. No. 6

REAR POND

Hydrograph type	= Combine	Peak discharge	= 119.45 cfs
Storm frequency	= 25 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 402,098 cuft
Inflow hyds.	= 4, 5	Contrib. drain. area	= 0.000 ac



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2010 by Autodesk, Inc. v9.24

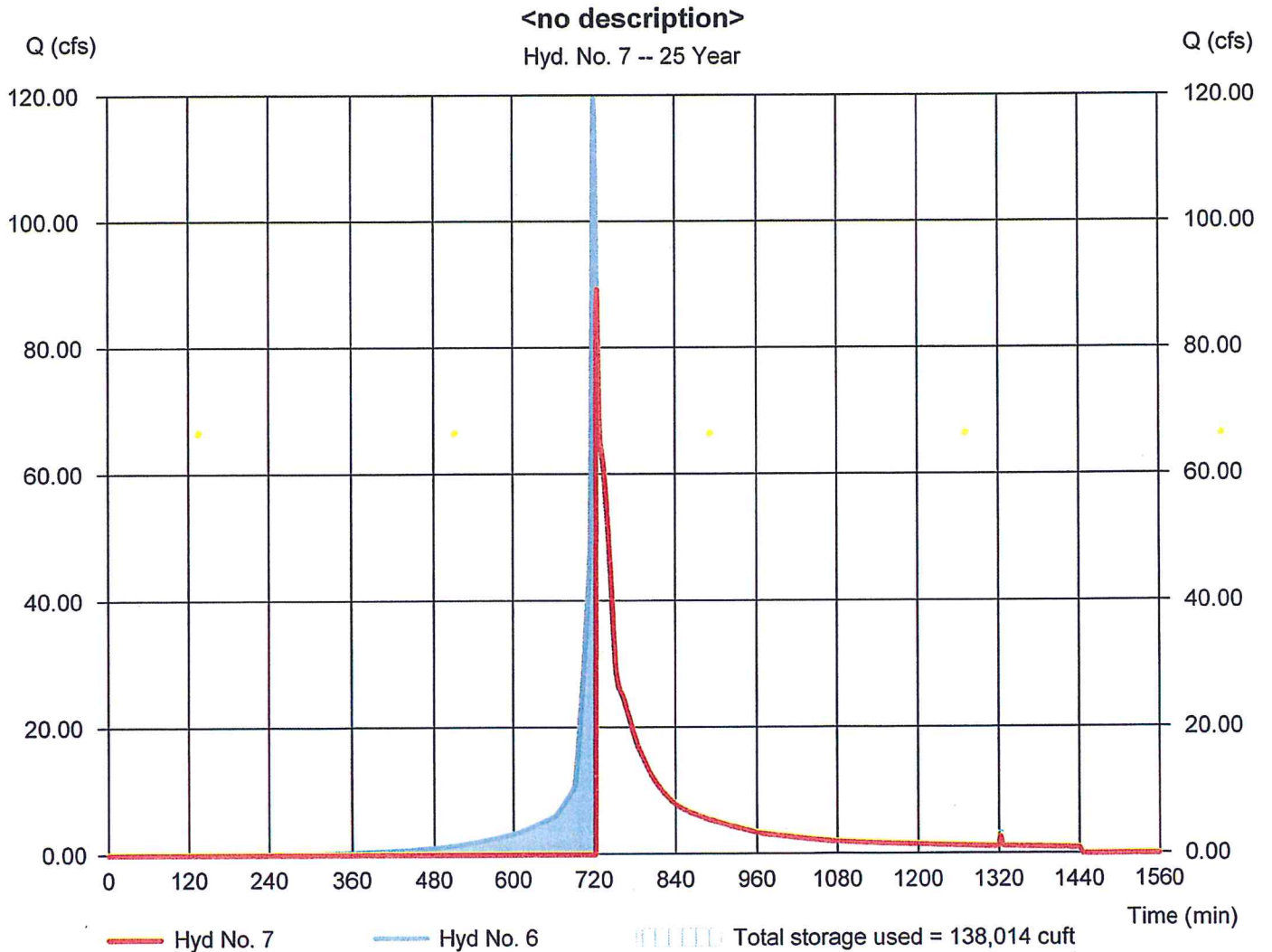
Wednesday, Nov 19, 2014

Hyd. No. 7

<no description>

Hydrograph type	= Reservoir	Peak discharge	= 89.33 cfs
Storm frequency	= 25 yrs	Time to peak	= 726 min
Time interval	= 1 min	Hyd. volume	= 268,553 cuft
Inflow hyd. No.	= 6 - REAR POND	Max. Elevation	= 5.90 ft
Reservoir name	= rear	Max. Storage	= 138,014 cuft

Storage Indication method used.



Hydrograph Report

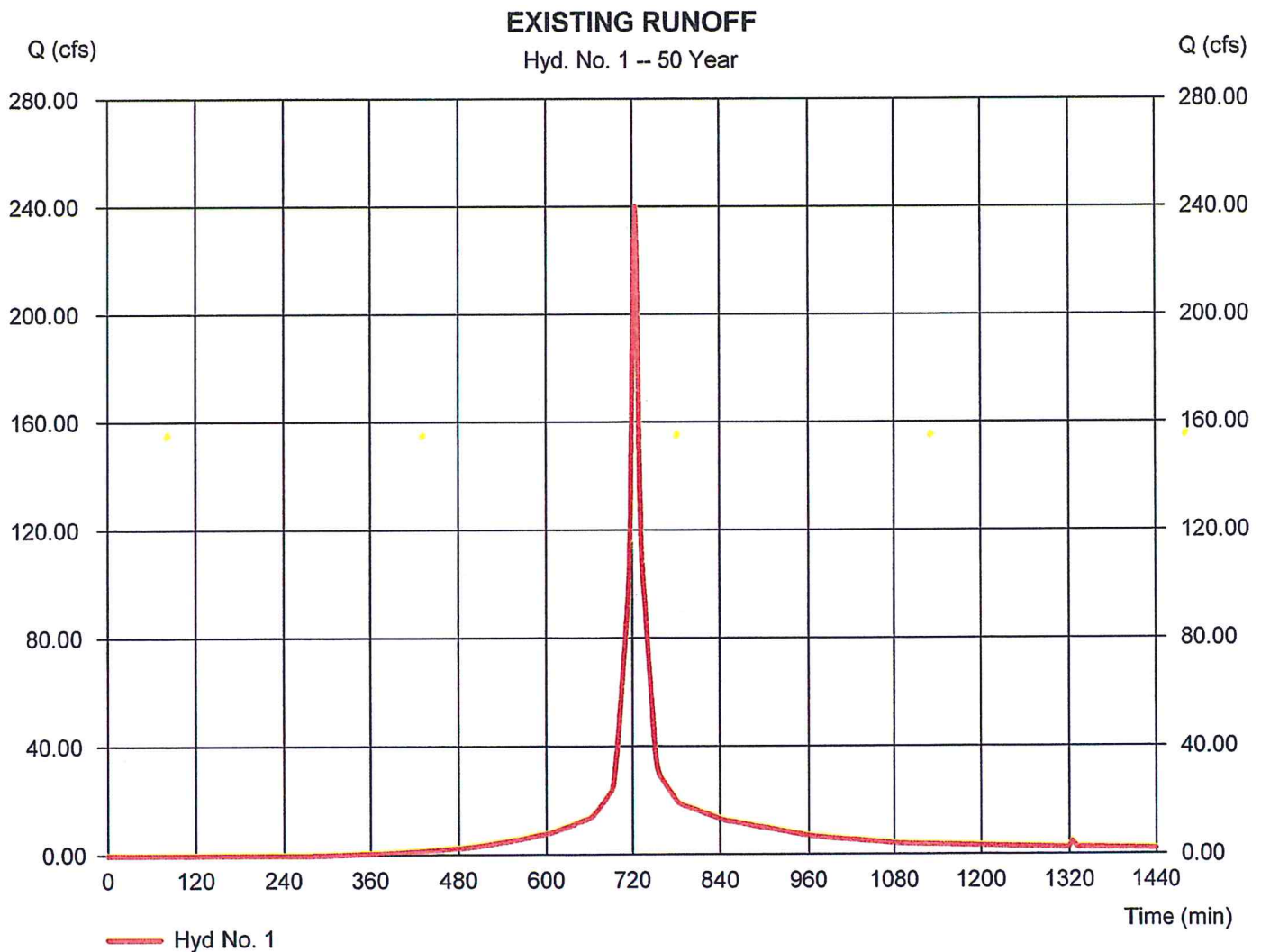
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Wednesday, Nov 19, 2014

Hyd. No. 1

EXISTING RUNOFF

Hydrograph type	= SCS Runoff	Peak discharge	= 240.28 cfs
Storm frequency	= 50 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 763,237 cuft
Drainage area	= 42.560 ac	Curve number	= 86
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 5.50 min
Total precip.	= 6.40 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

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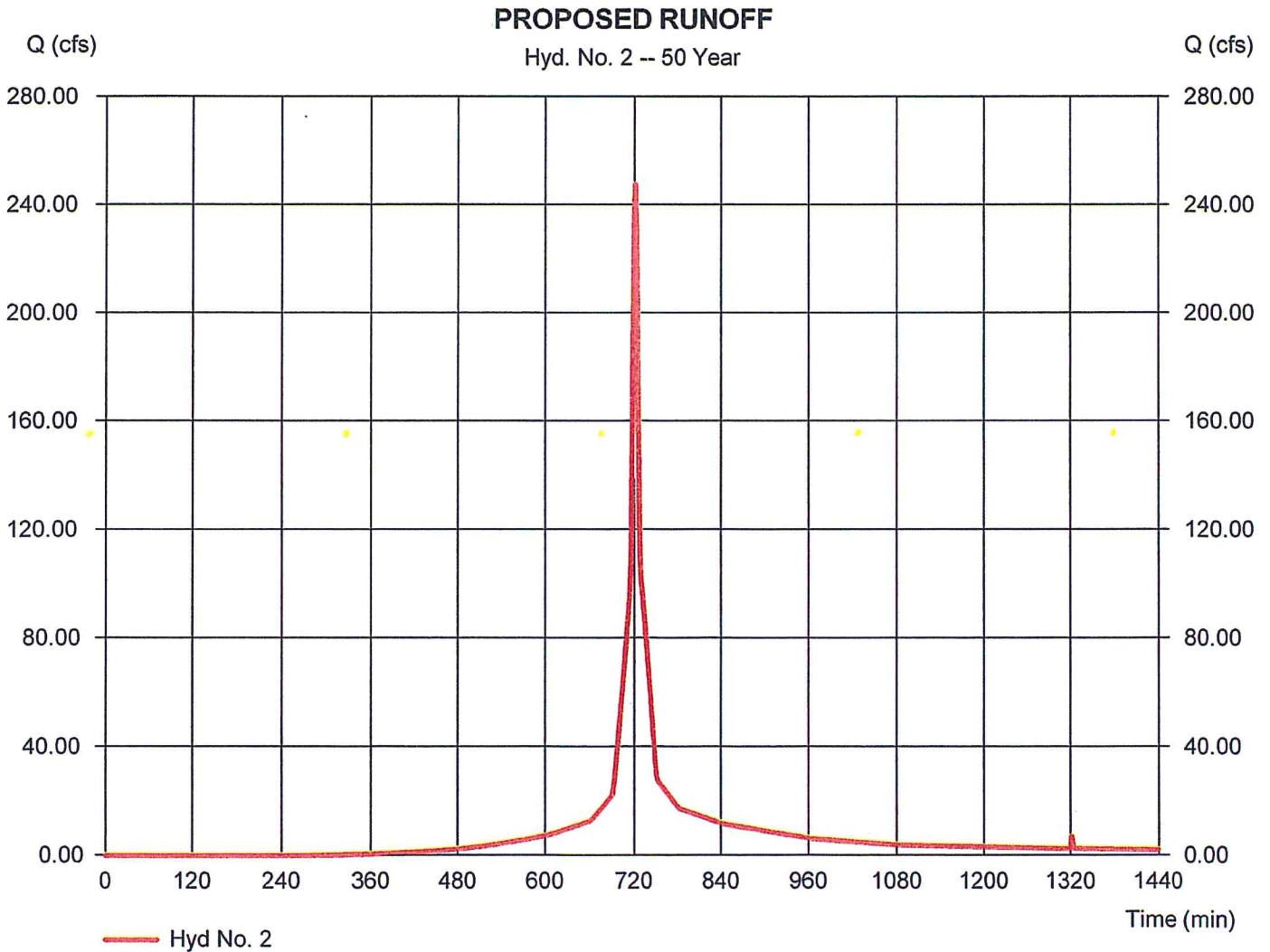
Wednesday, Nov 19, 2014

Hyd. No. 2

PROPOSED RUNOFF

Hydrograph type	= SCS Runoff	Peak discharge	= 247.74 cfs
Storm frequency	= 50 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 693,853 cuft
Drainage area	= 42.560 ac	Curve number	= 86*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 2.90 min
Total precip.	= 6.40 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(28.730 x 98) + (13.830 x 61)] / 42.560



Hydrograph Report

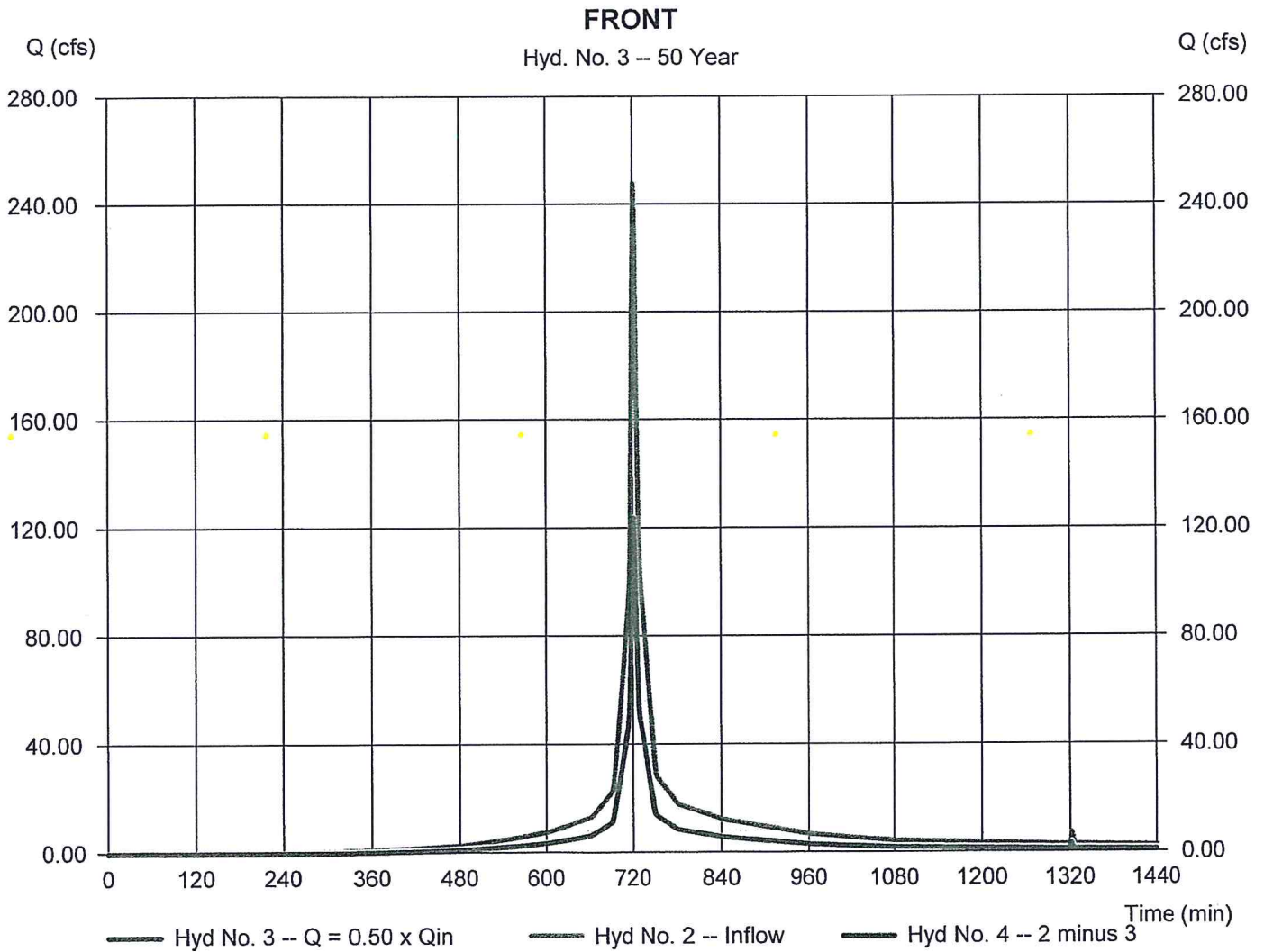
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Wednesday, Nov 19, 2014

Hyd. No. 3

FRONT

Hydrograph type	= Diversion1	Peak discharge	= 123.87 cfs
Storm frequency	= 50 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 346,927 cuft
Inflow hydrograph	= 2 - PROPOSED RUNOFF	2nd diverted hyd.	= 4
Diversion method	= Flow Ratio	Flow ratio	= 0.50



Hydrograph Report

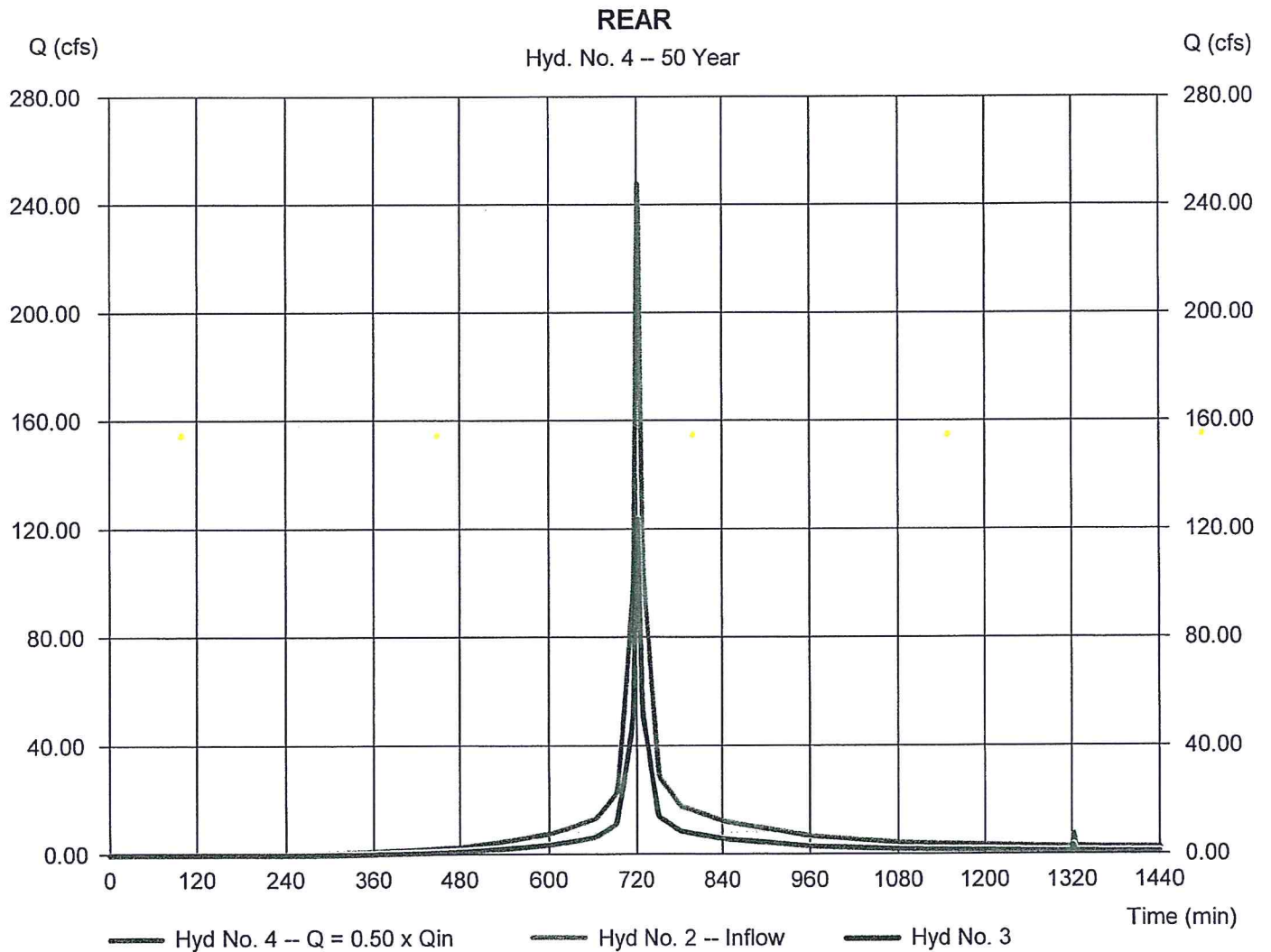
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Wednesday, Nov 19, 2014

Hyd. No. 4

REAR

Hydrograph type	= Diversion2	Peak discharge	= 123.87 cfs
Storm frequency	= 50 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 346,927 cuft
Inflow hydrograph	= 2 - PROPOSED RUNOFF	2nd diverted hyd.	= 3
Diversion method	= Flow Ratio	Flow ratio	= 0.50



Hydrograph Report

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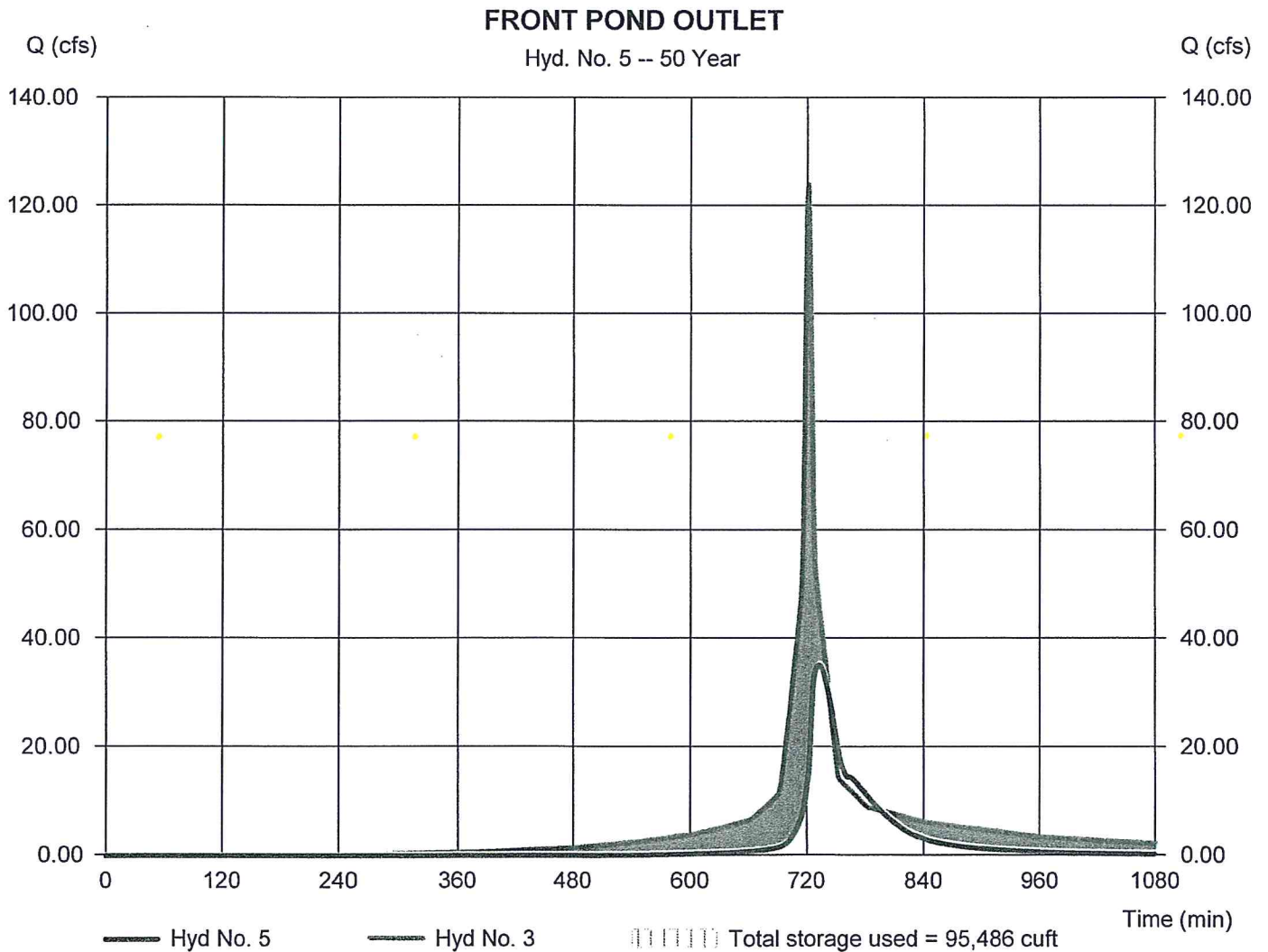
Wednesday, Nov 19, 2014

Hyd. No. 5

FRONT POND OUTLET

Hydrograph type	= Reservoir	Peak discharge	= 35.22 cfs
Storm frequency	= 50 yrs	Time to peak	= 733 min
Time interval	= 1 min	Hyd. volume	= 132,482 cuft
Inflow hyd. No.	= 3 - FRONT	Max. Elevation	= 8.51 ft
Reservoir name	= FRONT	Max. Storage	= 95,486 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



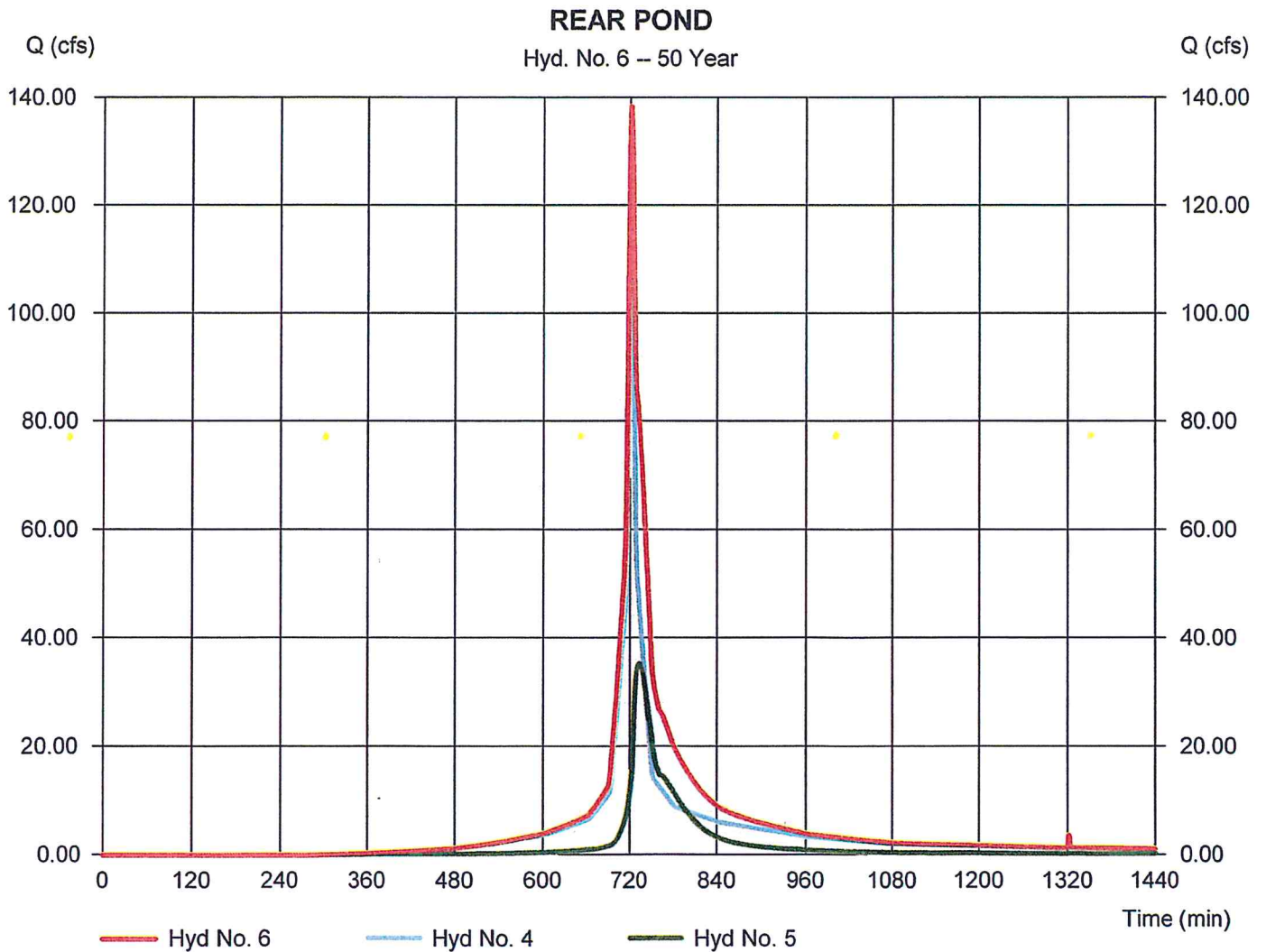
Hydrograph Report

Hyd. No. 6

REAR POND

Hydrograph type = Combine
Storm frequency = 50 yrs
Time interval = 1 min
Inflow hyds. = 4, 5

Peak discharge = 138.36 cfs
Time to peak = 722 min
Hyd. volume = 479,408 cuft
Contrib. drain. area = 0.000 ac



Hydrograph Report

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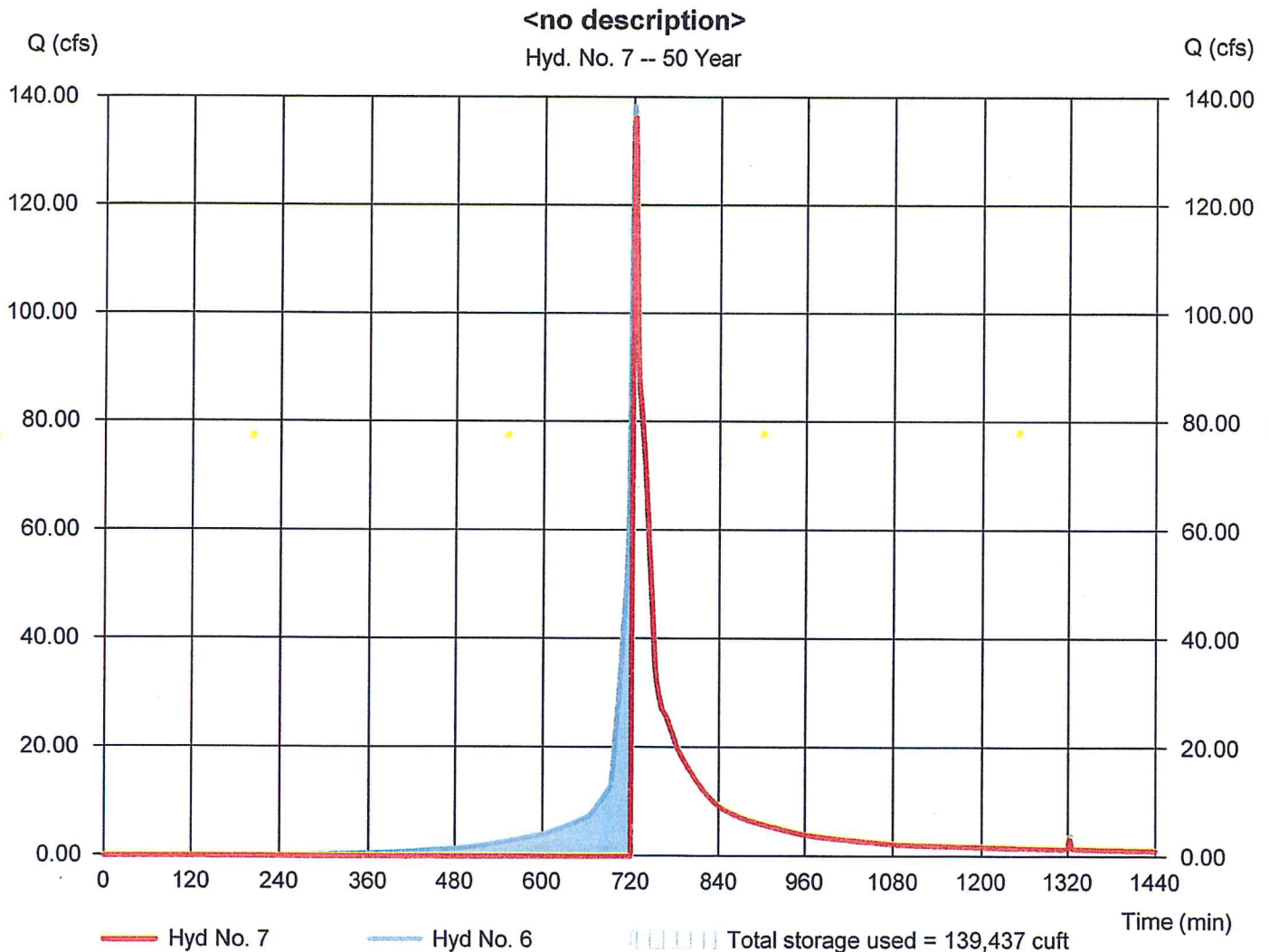
Wednesday, Nov 19, 2014

Hyd. No. 7

<no description>

Hydrograph type	= Reservoir	Peak discharge	= 136.35 cfs
Storm frequency	= 50 yrs	Time to peak	= 723 min
Time interval	= 1 min	Hyd. volume	= 345,862 cuft
Inflow hyd. No.	= 6 - REAR POND	Max. Elevation	= 5.92 ft
Reservoir name	= rear	Max. Storage	= 139,437 cuft

Storage Indication method used.



Hydrograph Report

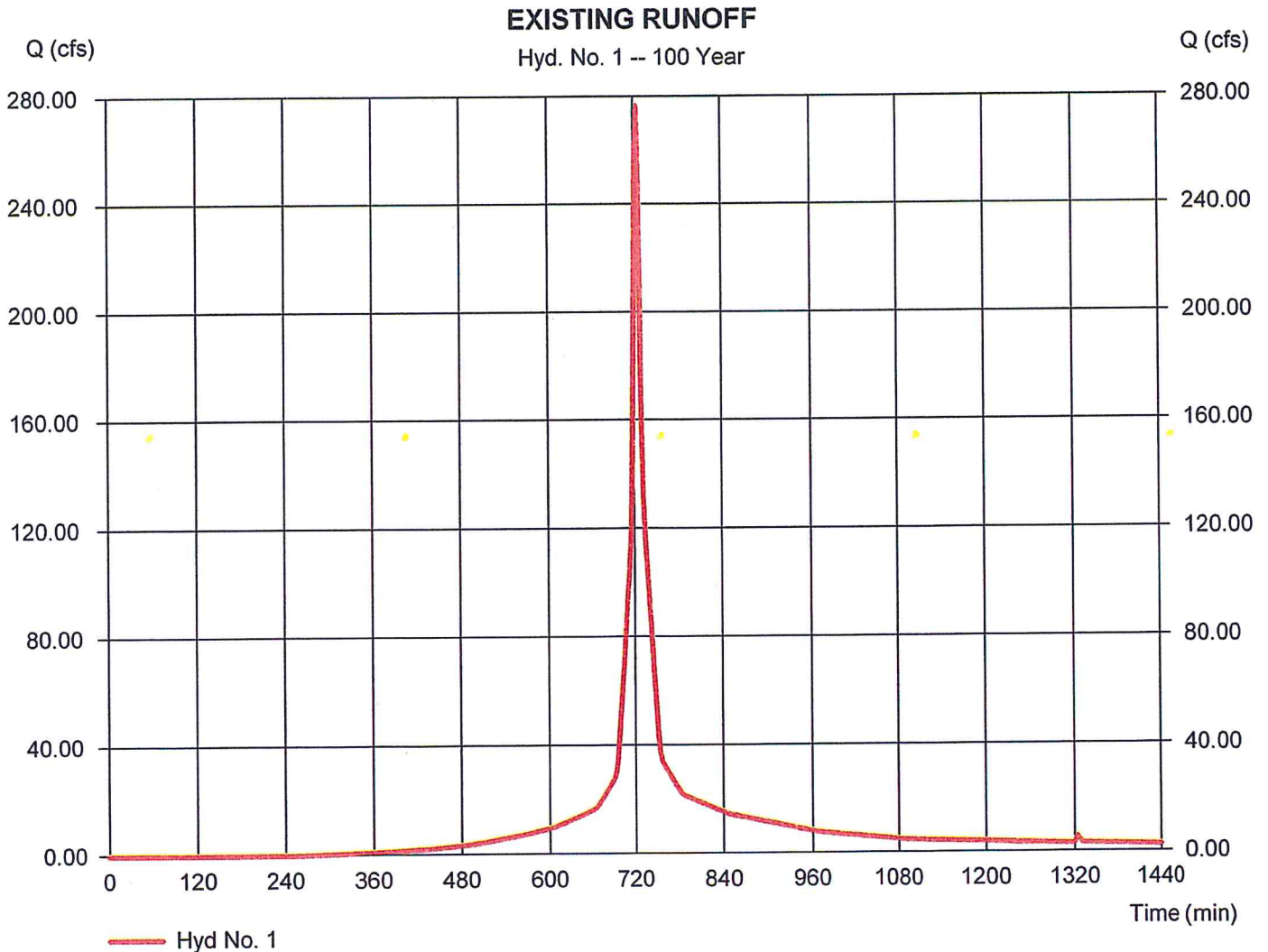
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Wednesday, Nov 19, 2014

Hyd. No. 1

EXISTING RUNOFF

Hydrograph type	= SCS Runoff	Peak discharge	= 276.80 cfs
Storm frequency	= 100 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 885,537 cuft
Drainage area	= 42.560 ac	Curve number	= 86
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 5.50 min
Total precip.	= 7.20 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

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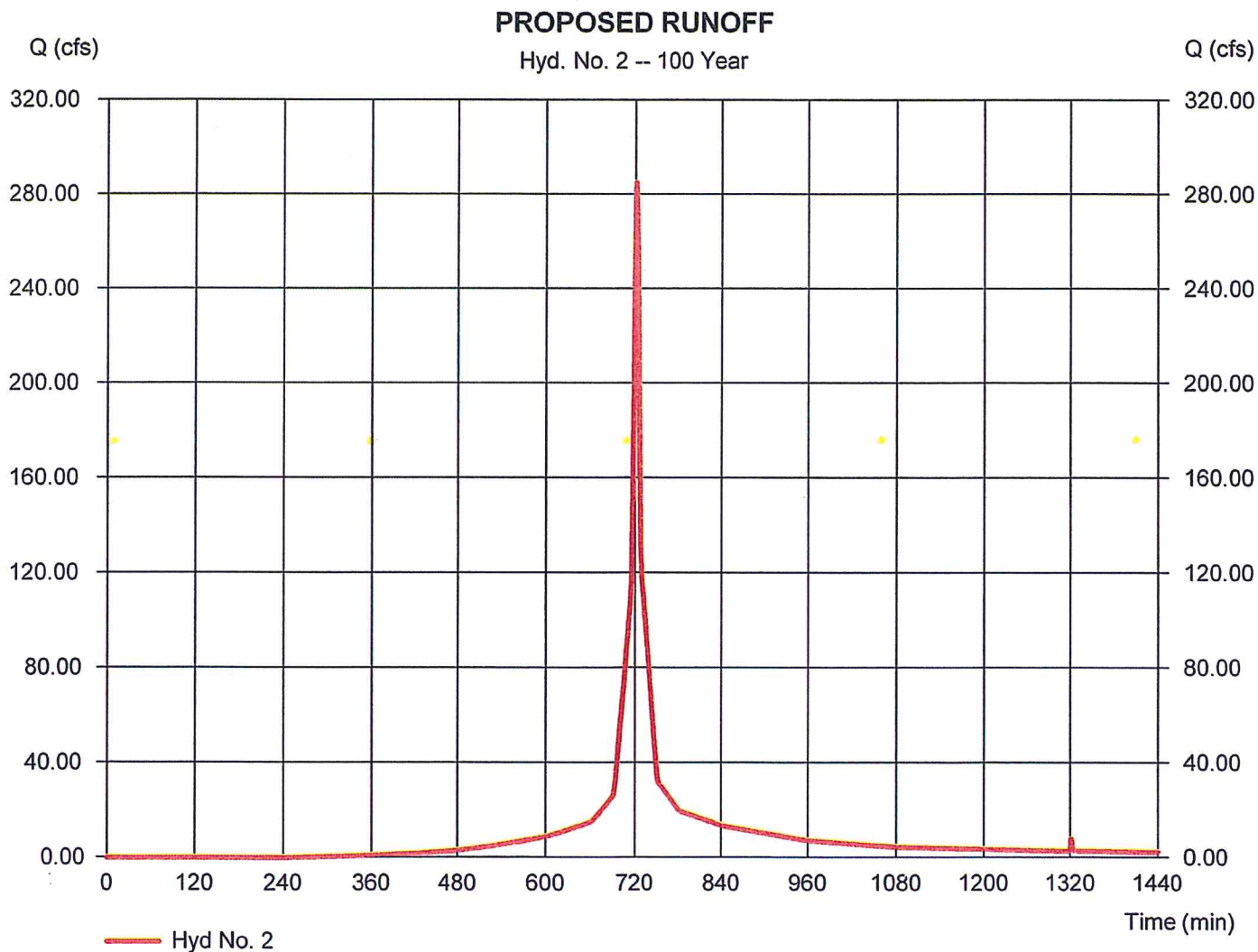
Wednesday, Nov 19, 2014

Hyd. No. 2

PROPOSED RUNOFF

Hydrograph type	= SCS Runoff	Peak discharge	= 285.22 cfs
Storm frequency	= 100 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 805,033 cuft
Drainage area	= 42.560 ac	Curve number	= 86*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 2.90 min
Total precip.	= 7.20 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(28.730 x 98) + (13.830 x 61)] / 42.560



Hydrograph Report

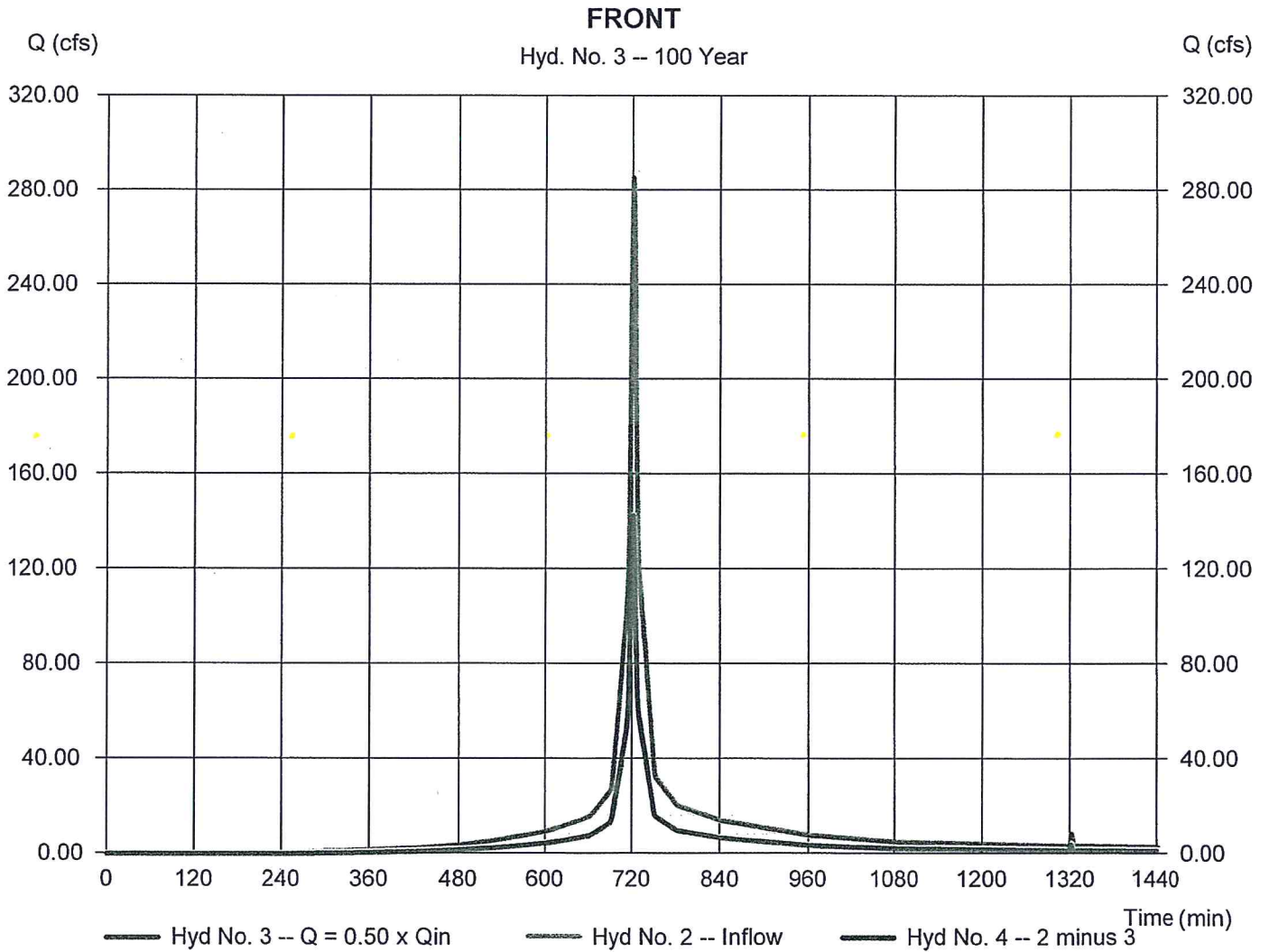
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Wednesday, Nov 19, 2014

Hyd. No. 3

FRONT

Hydrograph type	= Diversion1	Peak discharge	= 142.61 cfs
Storm frequency	= 100 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 402,516 cuft
Inflow hydrograph	= 2 - PROPOSED RUNOFF	2nd diverted hyd.	= 4
Diversion method	= Flow Ratio	Flow ratio	= 0.50



Hydrograph Report

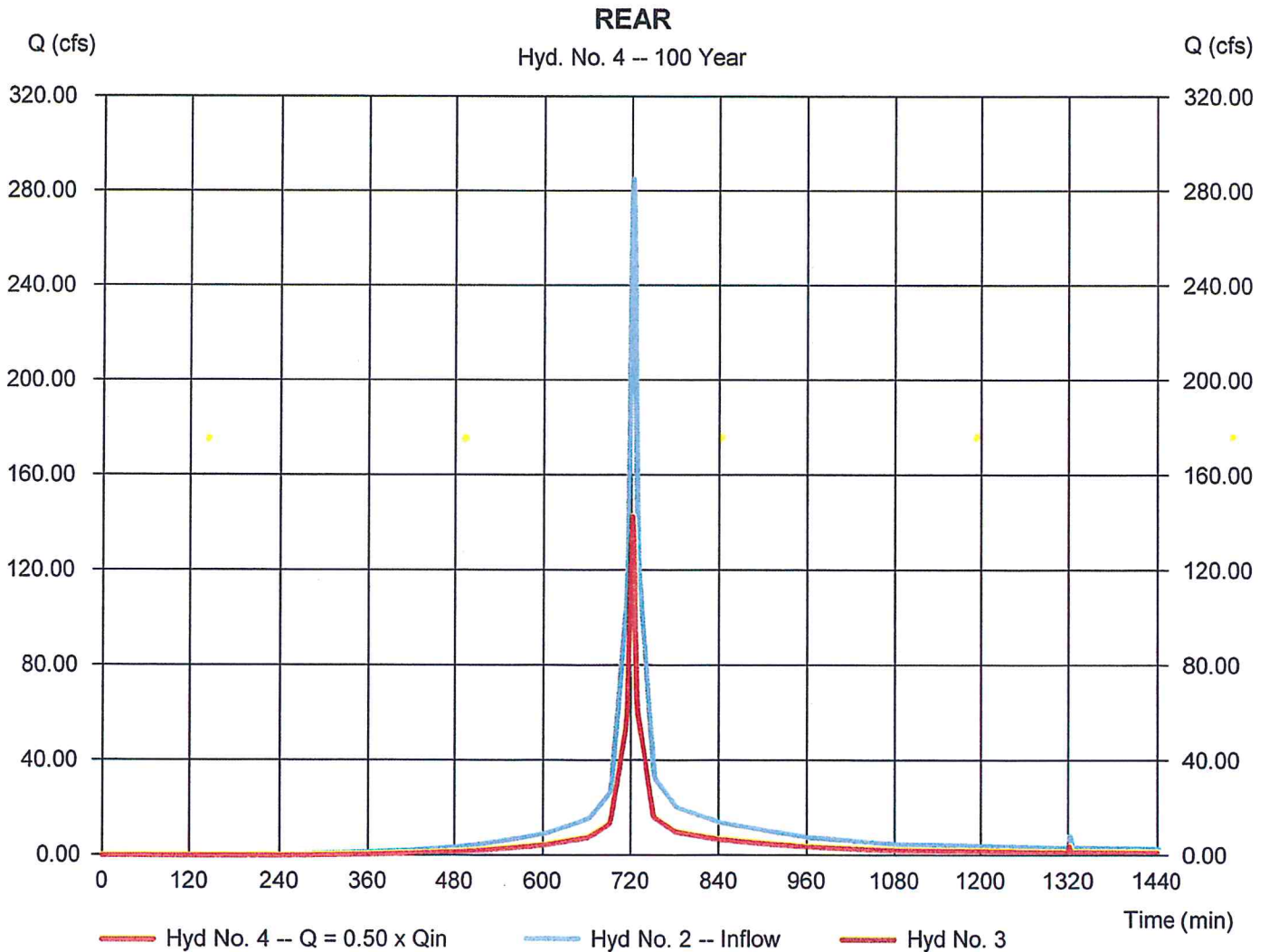
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2010 by Autodesk, Inc. v9.24

Wednesday, Nov 19, 2014

Hyd. No. 4

REAR

Hydrograph type	= Diversion2	Peak discharge	= 142.61 cfs
Storm frequency	= 100 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 402,516 cuft
Inflow hydrograph	= 2 - PROPOSED RUNOFF	2nd diverted hyd.	= 3
Diversion method	= Flow Ratio	Flow ratio	= 0.50



Hydrograph Report

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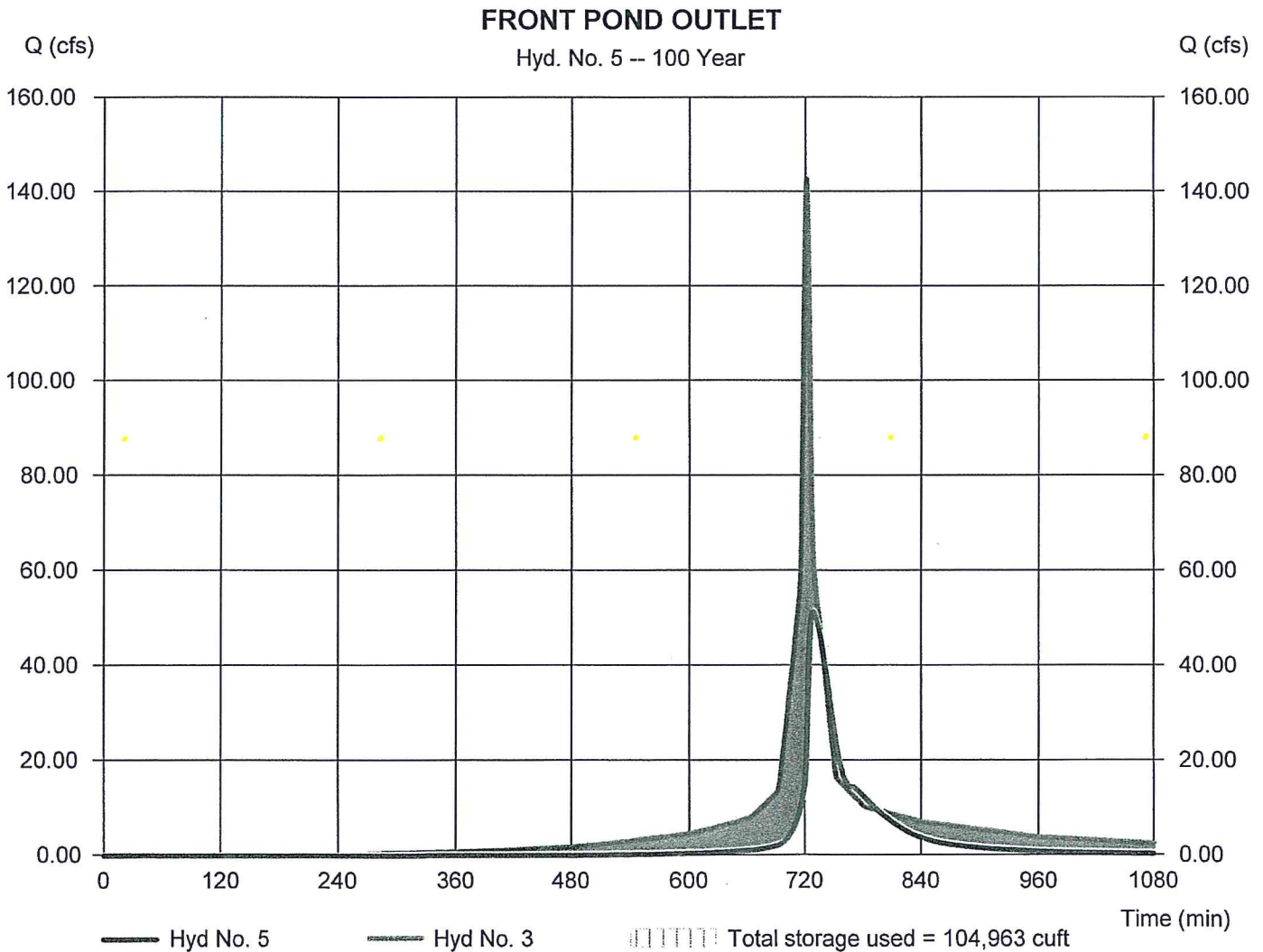
Wednesday, Nov 19, 2014

Hyd. No. 5

FRONT POND OUTLET

Hydrograph type	= Reservoir	Peak discharge	= 51.40 cfs
Storm frequency	= 100 yrs	Time to peak	= 729 min
Time interval	= 1 min	Hyd. volume	= 167,311 cuft
Inflow hyd. No.	= 3 - FRONT	Max. Elevation	= 8.76 ft
Reservoir name	= FRONT	Max. Storage	= 104,963 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

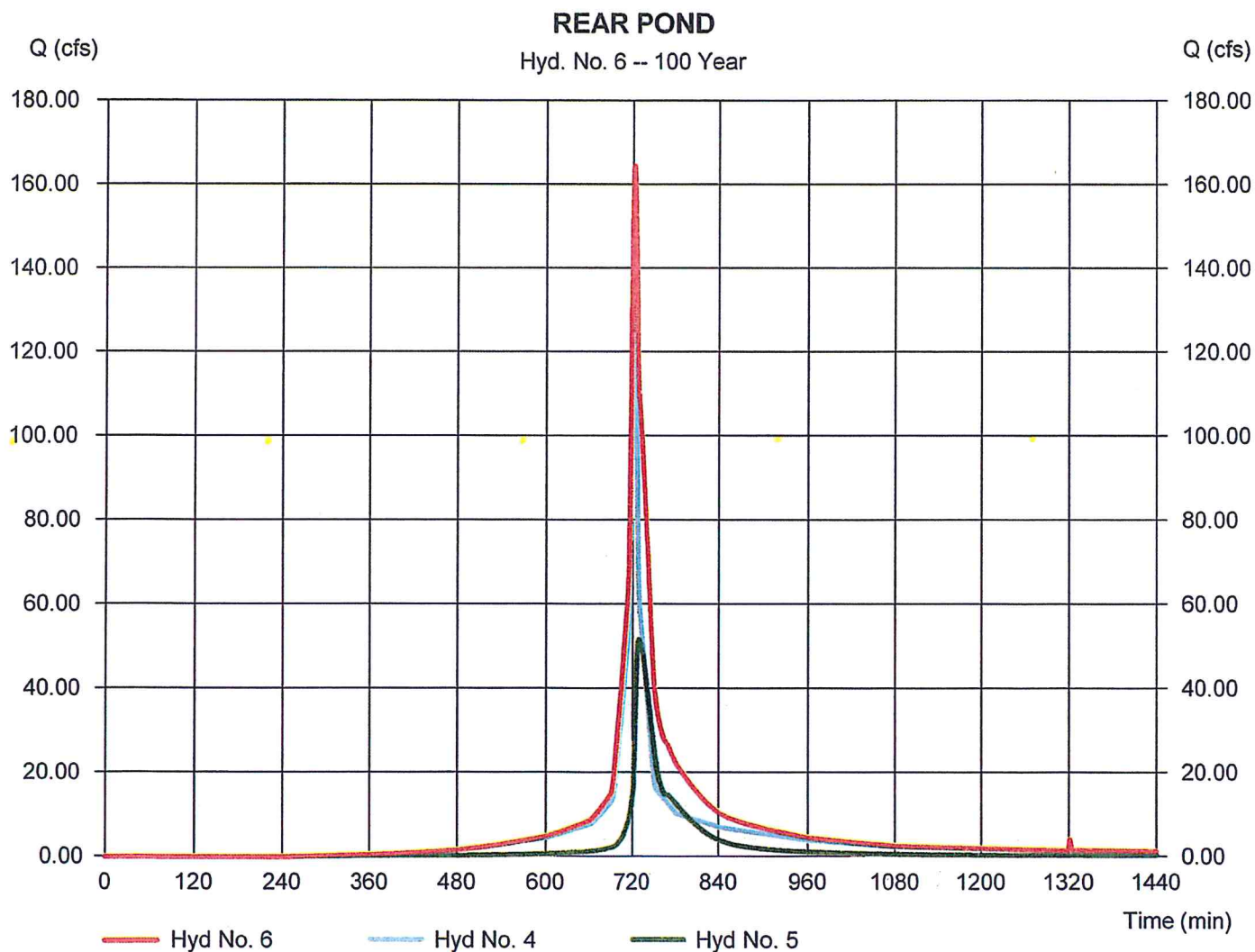
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Wednesday, Nov 19, 2014

Hyd. No. 6

REAR POND

Hydrograph type	= Combine	Peak discharge	= 164.53 cfs
Storm frequency	= 100 yrs	Time to peak	= 723 min
Time interval	= 1 min	Hyd. volume	= 569,828 cuft
Inflow hyds.	= 4, 5	Contrib. drain. area	= 0.000 ac



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2010 by Autodesk, Inc. v9.24

Wednesday, Nov 19, 2014

Hyd. No. 7

<no description>

Hydrograph type	= Reservoir	Peak discharge	= 164.34 cfs
Storm frequency	= 100 yrs	Time to peak	= 723 min
Time interval	= 1 min	Hyd. volume	= 436,283 cuft
Inflow hyd. No.	= 6 - REAR POND	Max. Elevation	= 5.94 ft
Reservoir name	= rear	Max. Storage	= 140,202 cuft

Storage Indication method used.

