

PRE-DEVELOPMENT
OVERALL DEVELOPMENT
SCALE: 1" = 100'

*FOR DETAILED INFORMATION OF EACH PHASE OF DEVELOPMENT, PLEASE SEE SHEETS 38 AND 39.

Pre-ReDevelopment Land Cover (acres)					
	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed forest/open space		0.73		0.09	0.82
Managed Turf (acres) -- disturbed, graded for yards or other turf to be		0.06	0.01	0.33	0.40
Impervious Cover (acres)		0.01	0.00	0.91	0.92
					2.14

POST-DEVELOPMENT
OVERALL DEVELOPMENT
SCALE: 1" = 100'

Post-Development Land Cover (acres)					
	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested					0.00
Managed Turf (acres) -- disturbed, graded for yards or other turf to be		0.43	0.01	0.40	0.84
Impervious Cover (acres)		0.37	0.00	0.93	1.30
Area Check	OK.	OK.	OK.	OK.	2.14

6. Bioretention [RR]													
6.b. Bioretention #2 or Micro-Bioretention #2 (Spec #9)	80	0.31	0.63	0	1,941	485	2,426	50	0.00	1.52	1.37	0.15	

14. Manufactured Treatment Devices (no RR)													
14.a. Manufactured Treatment Device-Hydrodynamic	0	0.07	0.33	0	0	1,194	1,194	20	0.00	0.75	0.15	0.60	10. ISOLATOR ROW
10.b. (40% PHOS. REMOVAL)	0			1,194	0	1,194	1,194	40	0.60	0.00	0.24	0.36	14.b. MTD - Filtering
14.b. Manufactured Treatment Device-Filtering	0			1,194	0	1,194	1,194	50	0.36	0.00	0.18	0.18	

OVERALL STORMWATER/OUTFALL NARRATIVE

THE OUTFALL POINT OF THIS PROJECT IS AT ACCOTING CREEK, ABOUT 340' DOWNSTREAM OF THE EXISTING CULVERTS UNDER PRESBYTERIAN WAY, PER 9VAC25-870-66-B-4. AT THIS POINT, ONSITE RUNOFF DISCHARGES INTO A NATURAL CHANNEL, THROUGH AN EXISTING MAN-MADE STORM SEWER, A LEVEL 2 BIORETENTION AREA AND MULTIPLE MANUFACTURED TREATMENT FACILITIES ARE PROPOSED TO MITIGATE THE IMPACTS OF THE PROPOSED DEVELOPMENT ON THE EXISTING PARKING LOT AND FORESTED AREAS WITHIN THE LIMITS OF CLEARING AND GRADING.

CHANNEL PROTECTION:
POST DEVELOPMENT RUNOFF DURING THE 1-YEAR STORM EVENT HAS BEEN
REDUCED IN ACCORDANCE WITH 9VAC25-870-66-B-3-A, AND AS SUCH,
CHANNEL PROTECTION REQUIREMENTS HAVE BEEN MET FOR THIS PORTION OF THE
SITE.

FLOOD PROTECTION:
THE POST DEVELOPMENT 2-YEAR STORM AND 10-YEAR 24-HOUR STORMS WILL
HAVE PEAK RUNOFF RATES WHICH ARE LESS THAN THE PRE DEVELOPMENT
CONDITION, PER 9VAC25-870-66-C-1. THE LIMIT OF ANALYSIS FOR FLOOD
PROTECTION IS WITHIN ACCOTING CREEK, 340' DOWNSTREAM OF THE EXISTING
CULVERTS UNDER PRESBYTERIAN WAY, PER 9VAC25-870-66-C-3-C.

SEE RUNOFF SUMMARY TABLE ON THIS SHEET.

WATER QUALITY: BIOTRENTION, A LOW IMPACT DEVELOPMENT (LID) TECHNIQUE, IS BEING PROPOSED ON THE TOWN HOME PORTION OF THE PROJECT TO MEET WATER QUALITY REQUIREMENTS. A SERIES OF MANUFACTURED FILTERING DEVICES AND A HYDRODYNAMIC SEPARATOR IS PROPOSED ON THE ADDITIONAL PARKING PORTION OF THE PROJECT TO ADDRESS WATER QUALITY REQUIREMENTS. THE BIOTRENTION FACILITY AND THE MANUFACTURED TREATMENT DEVICES WILL BE PRIVATELY OWNED AND MAINTAINED.

SEE VRRM SUMMARY ON THIS SHEET.

THE BMP AND SWM DESIGN SHOWN ARE PRELIMINARY AND MAY CHANGE AT THE TIME OF FINAL ENGINEERING. THE PROJECT MAY USE NUTRIENT CREDITS OR ALTERNATE BMP/SWM FACILITIES TO MEET THE WATER QUALITY AND WATER QUANTITY REQUIREMENTS FOR THIS PROJECT AS NECESSARY.

OVERALL DEVELOPMENT	
1-Year Storm Channel Protection	
Pre Dev. Q. Onsite	2.63 cfs
Pre Dev Rv	7.361 cf
Post Dev Rv	11.312 cf
Pre/post vol. ratio	0.65
Improvement Factor	0.8
Post Dev Q. allowable	1.37 cfs
Offsite Controlled (UGS 1) (pre dev bypass)	0.55 cfs
Offsite Controlled (UGS 2) (pre dev bypass)	0.26 cfs
Total Allowable release	2.18 cfs
Post Dev Onsite Uncontrolled	0.95 cfs
Post Dev UGS 1 Release	0.95 cfs
Post Dev UGS 2 Release	0.25 cfs
Total Post Dev Release	2.15 cfs

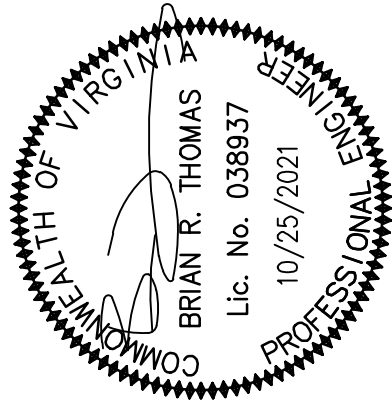
Stormwater Quantity Summary - Overall Development			
	1-Year Storm Channel Protection	2-Year Storm (cfs)	10-Year Storm Flood Protection (cfs)
Pre Development	3.44	4.99	10.25
Post Development allowable release	2.18	4.99	10.25
Post Development Release	2.15	4.31	9.61

Total Phosphorus	
FINAL POST-DEVELOPMENT TP LOAD (lb/yr)	3.25
TP LOAD REDUCTION REQUIRED (lb/yr)	1.29
TP LOAD REDUCTION ACHIEVED (lb/yr)	1.94
TP LOAD REMAINING (lb/yr):	1.31
REMAINING TP LOAD REDUCTION REQUIRED (lb/yr):	0.00

**** TARGET TP REDUCTION EXCEEDED BY 100%**

**FAIRFAX
PRESBYTERIAN
CHURCH**

CITY OF FAIRFAX, VIRGINIA

[illegible]

DESIGN GMP	DRAFT GMP	APPROVED BRT	DATE JAN. 2021	SCALE 1" = 100'	HORIZ. VERT.
SHEET 37			OF 46		
PRJ NO: 2017-257					
TYPE: MDP					

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Pre-ReDevelopment Land Cover (acres)					
	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed forest/open space		0.50			0.50
Managed Turf (acres) -- disturbed, graded for yards or other turf to be		0.01	0.01	0.05	0.07
Impervious Cover (acres)		0.01	0.00	0.90	0.91
					1.48



Post-Development Land Cover (acres)					
	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested					0.00
Managed Turf (acres) -- to be disturbed, graded for yards or other turf to be		0.29	0.01	0.29	0.59
Impervious Cover (acres)		0.23	0.00	0.66	0.89
Area Check	OK.	OK.	OK.	OK.	1.48

6. Bioretention (RR)													
6.b. Bioretention #2 or Micro-Bioretention #2 (Spec #9)	80	0.31	0.63	0	1,941	485	2,426	50	0.00	1.52	1.37	0.15	

PHASE ONE – TOWNHOUSE DEVELOPMENT STORMWATER/OUTFALL NARRATIVE

THE OUTFALL POINT OF THIS PORTION OF THE PROJECT IS AT ACOTCINK CREEK, ABOUT 340' DOWNSTREAM OF THE EXISTING CULVERTS UNDER PRESBYTERIAN WAY, PER 9VAC25-870-66-B-4. AT THIS POINT, ONSITE RUNOFF DISCHARGES INTO A NATURAL CHANNEL, THROUGH AN EXISTING MAN-MADE STORM SEWER. A LEVEL 2 BIOTORETENTION AREA IS PROPOSED TO MITIGATE THE IMPACTS OF THE PROPOSED DEVELOPMENT ON THE EXISTING PARKING LOT AND FORESTED AREAS WITHIN THE LIMITS OF CLEARING AND GRADING.

CHANNEL PROTECTION:
POST DEVELOPMENT RUNOFF DURING THE 1-YEAR STORM EVENT HAS BEEN
REDUCED IN ACCORDANCE WITH 9VAC25-870-66-B-3-A, AND AS SUCH,
CHANNEL PROTECTION REQUIREMENTS HAVE BEEN MET FOR THIS PORTION OF THE
SITE.

FLOOD PROTECTION:
THE POST DEVELOPMENT 2-YEAR STORM AND 10-YEAR 24-HOUR STORMS WILL HAVE PEAK RUNOFF RATES WHICH ARE LESS THAN THE PRE DEVELOPMENT CONDITION, PER 9VAC25-870-66-C-1. THE LIMIT OF ANALYSIS FOR FLOOD PROTECTION IS WITHIN ACCOTINK CREEK, 340' DOWNSTREAM OF THE EXISTING CULVERTS UNDER PRESBYTERIAN WAY, PER 9VAC25-870-66-C-3-C.

SEE RUNOFF SUMMARY TABLE ON THIS SHEET.

WATER QUALITY:
BIORETENTION, A LOW IMPACT DEVELOPMENT (LID) TECHNIQUE, IS BEING PROPOSED ON THIS PORTION OF THE PROJECT TO MEET WATER QUALITY REQUIREMENTS. THE BIORETENTION FACILITY WILL BE PRIVATELY OWNED AND MAINTAINED.

SEE VRRM SUMMARY ON THIS SHEET.

THE BMP AND SWM DESIGN IS PRELIMINARY AND MAY CHANGE AT THE TIME OF FINAL ENGINEERING. THE PROJECT MAY USE NUTRIENT CREDITS OR ALTERNATE BMP/SWM FACILITIES TO MEET THE WATER QUALITY AND WATER QUANTITY REQUIREMENTS FOR THIS PROJECT AS NECESSARY.

PHASE 1 - TOWNHOMES 1-Year Storm Channel Protection	
Pre Dev Q. Onsite	2.18 cfs
Pre Dev Rv	6,022 cf
Post Dev Rv	7,823 cf
Pre/post vol. ratio	0.77
Improvement Factor	0.8
Post Dev Q allowable	1.34 cfs
Offsite Controlled (UGS 1) (pre dev bypass)	0.55 cfs
Total Allowable release	1.89 cfs
Post Dev Onsite Uncontrolled	0.63 cfs
Post Dev UGS 1 Release	0.95 cfs
Total Post Dev Release	1.58 cfs

Stormwater Quantity Summary - Phase 1 - Townhomes			
	1-Year Channel Protection	2-Year Storm (cfs)	10-Year Storm Flood Protection (cfs)
Pre Development	2.73	3.86	7.58
Post Development allowable release	1.89	3.86	7.58
Post Development Release	1.58	3.54	7.29

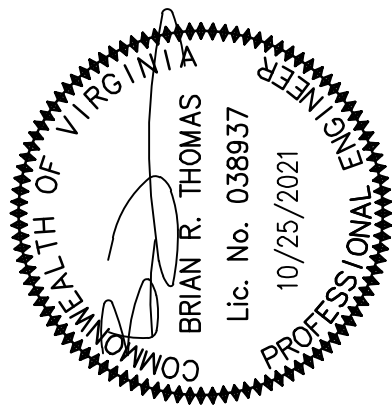
Total Phosphorus	
FINAL POST-DEVELOPMENT TP LOAD (lb/yr)	2.23
TP LOAD REDUCTION REQUIRED (lb/yr)	0.60
TP LOAD REDUCTION ACHIEVED (lb/yr)	1.37
TP LOAD REMAINING (lb/yr):	0.86
REMAINING TP LOAD REDUCTION REQUIRED (lb/yr):	0.00

**** TARGET TP REDUCTION EXCEEDED BY 100%**

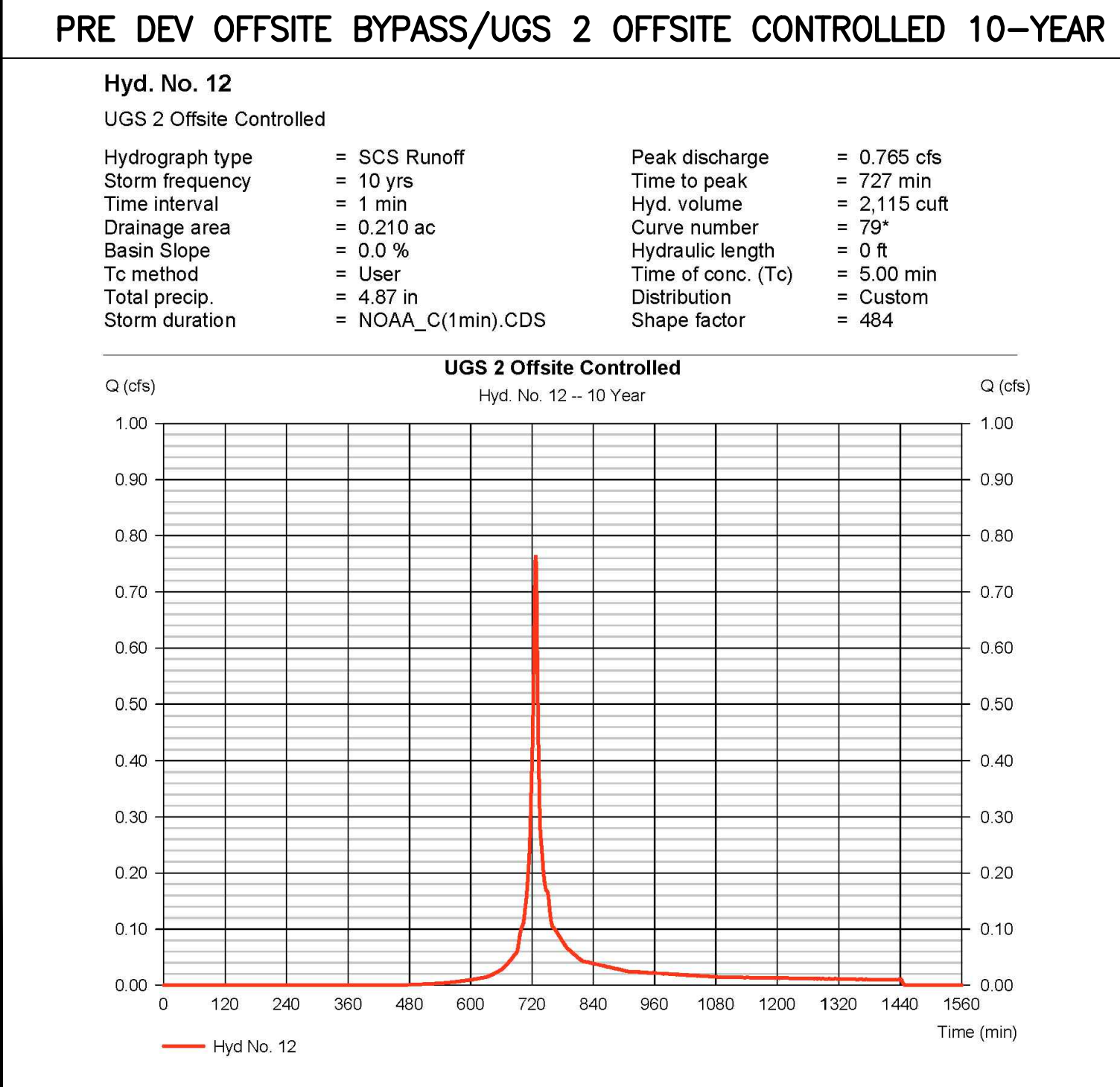
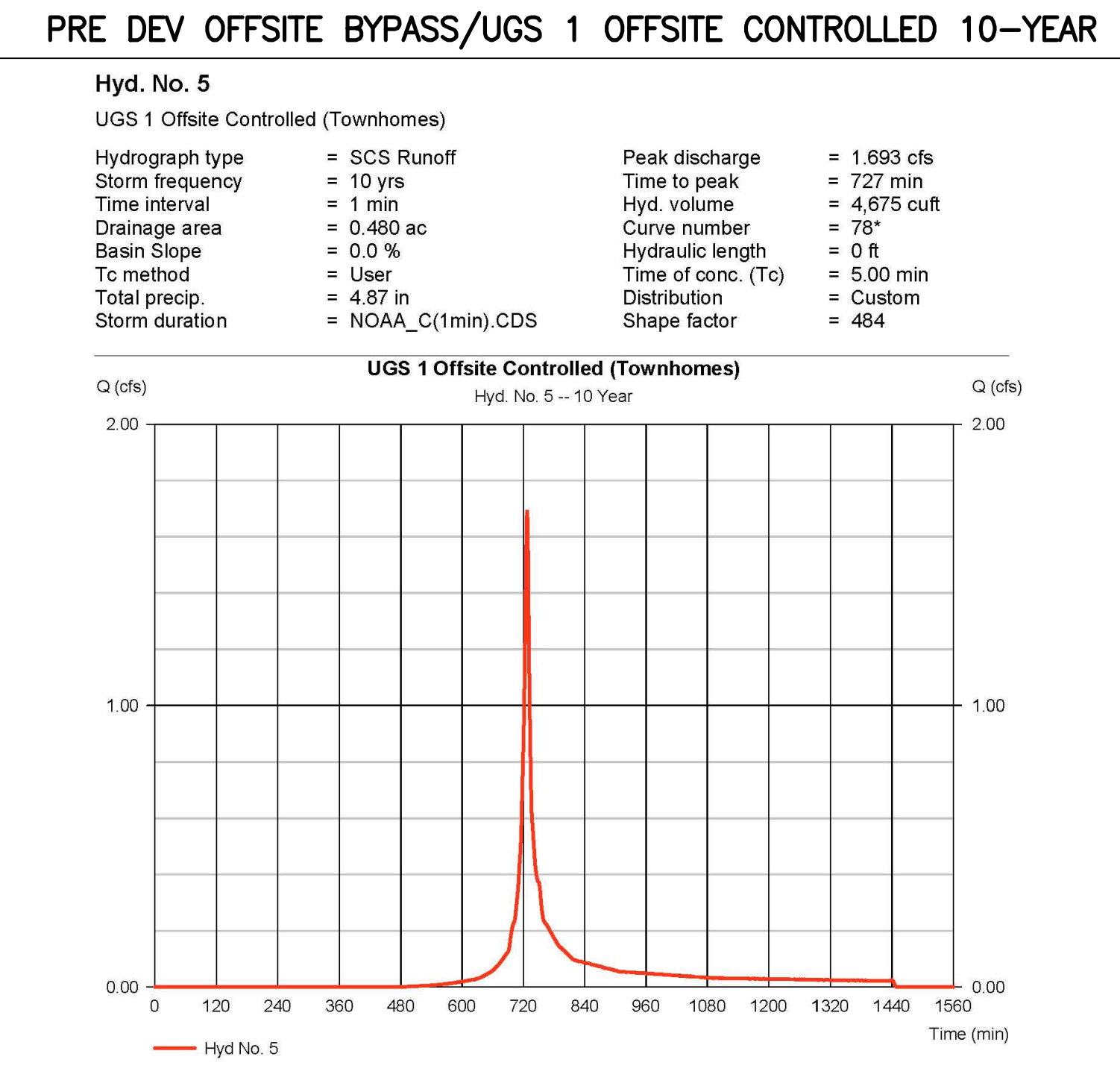
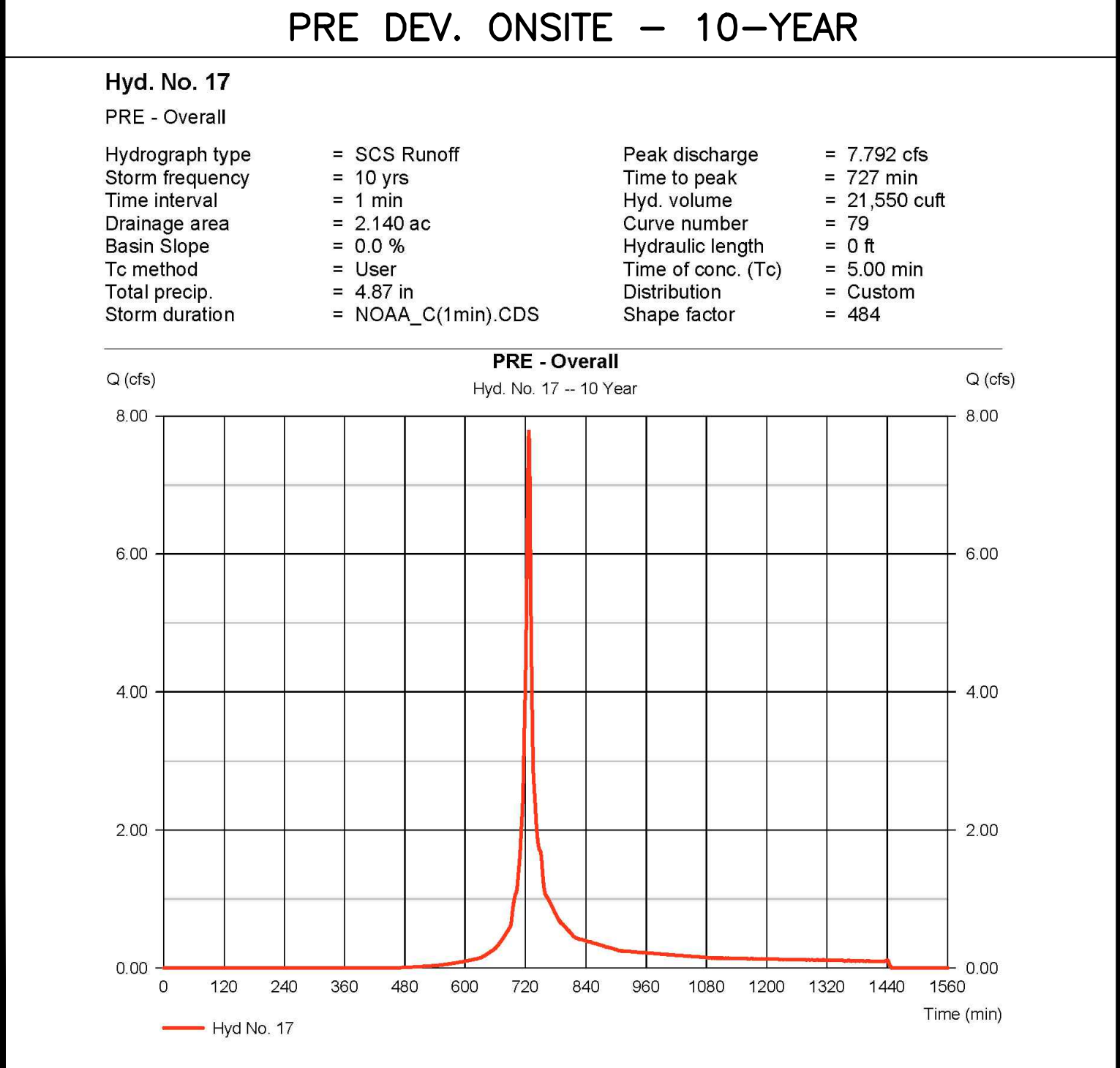
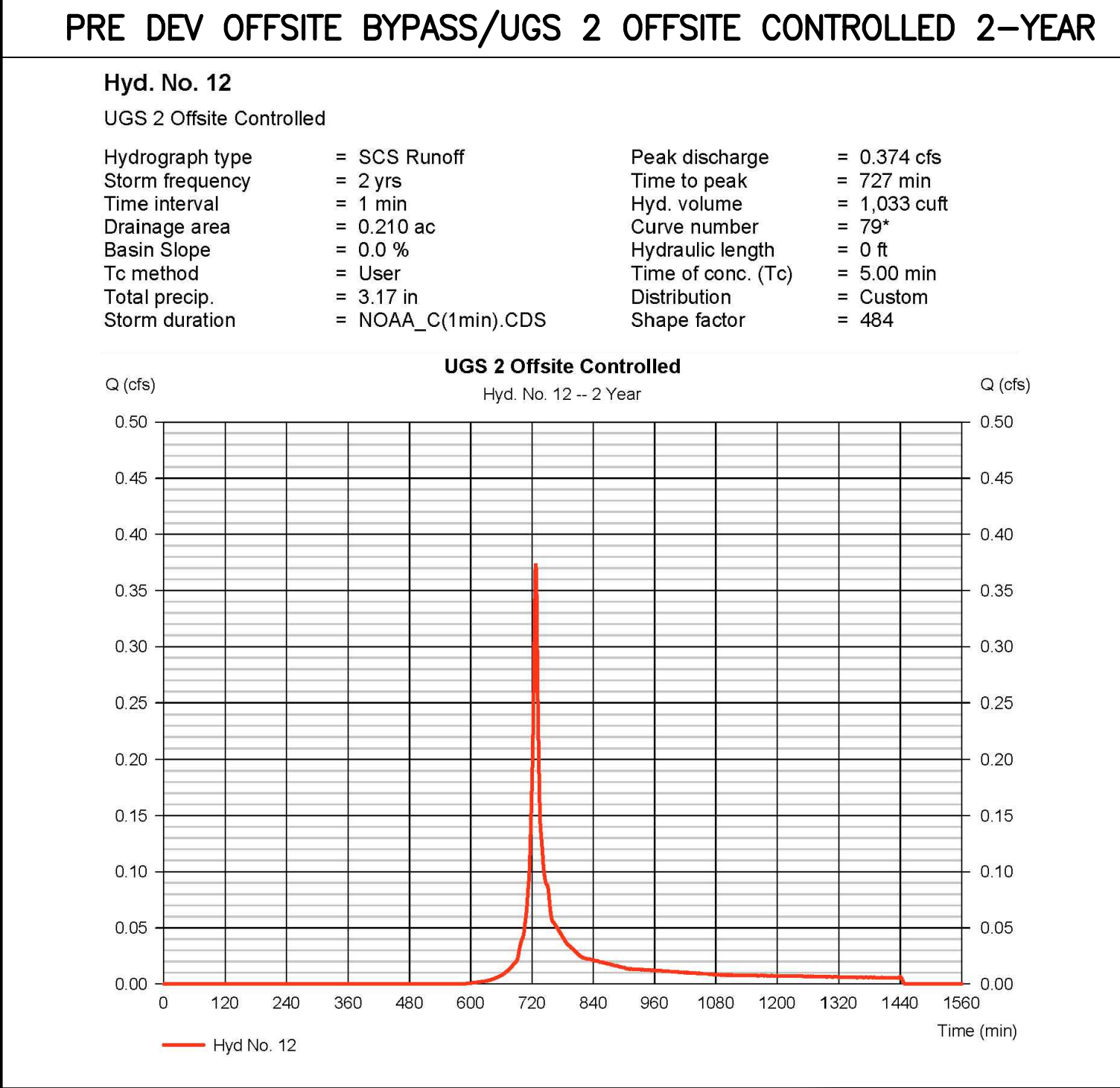
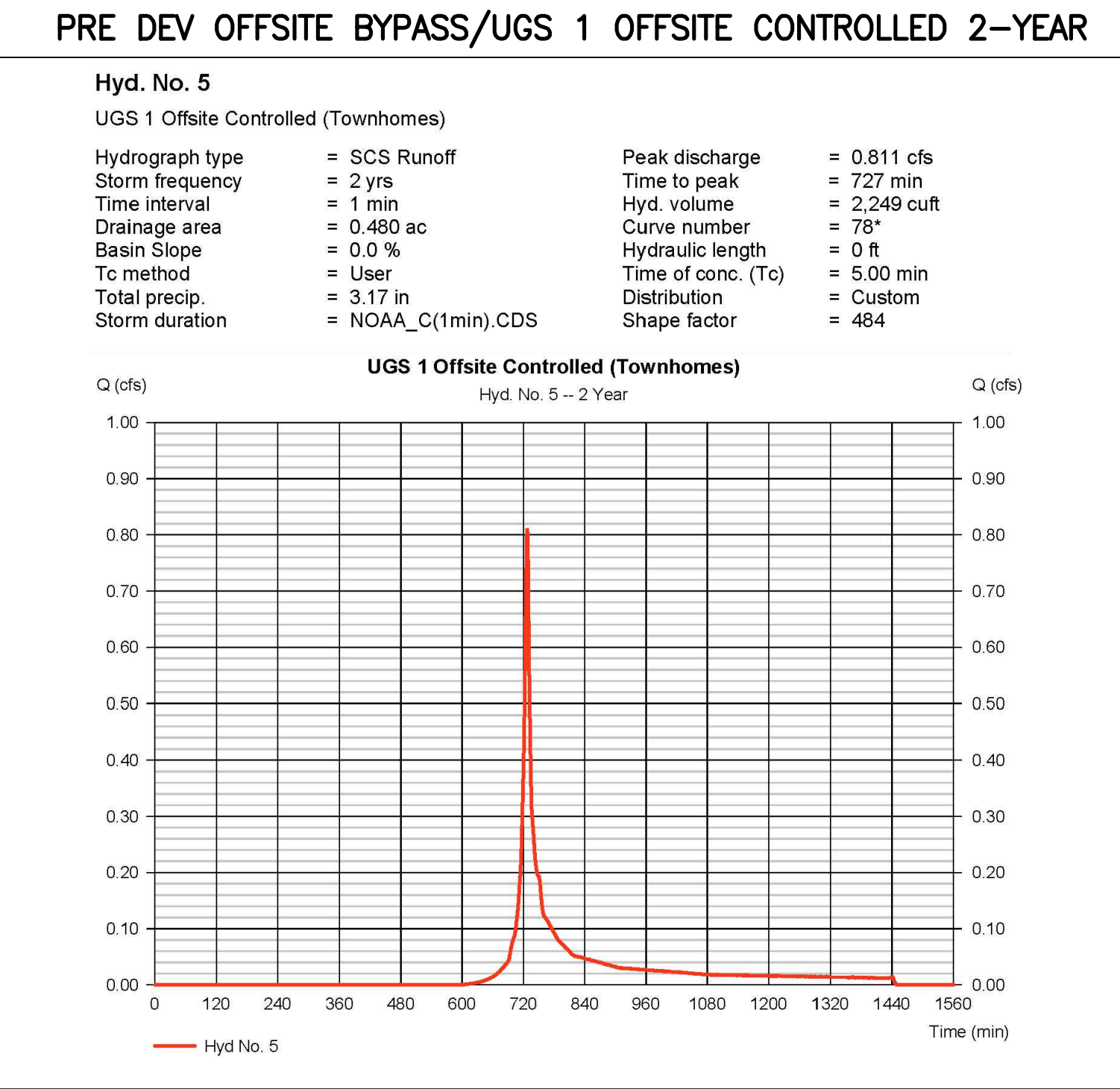
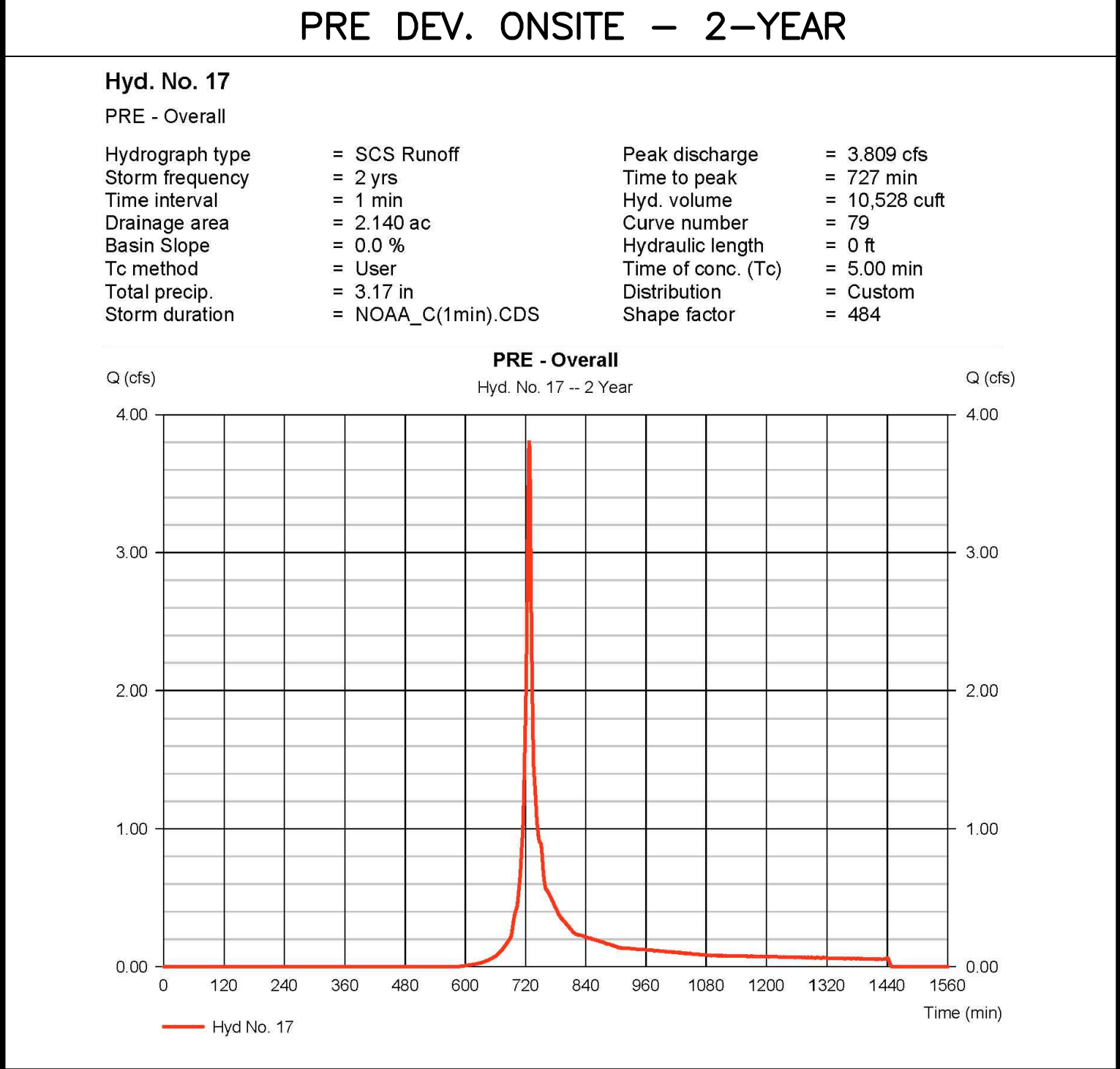
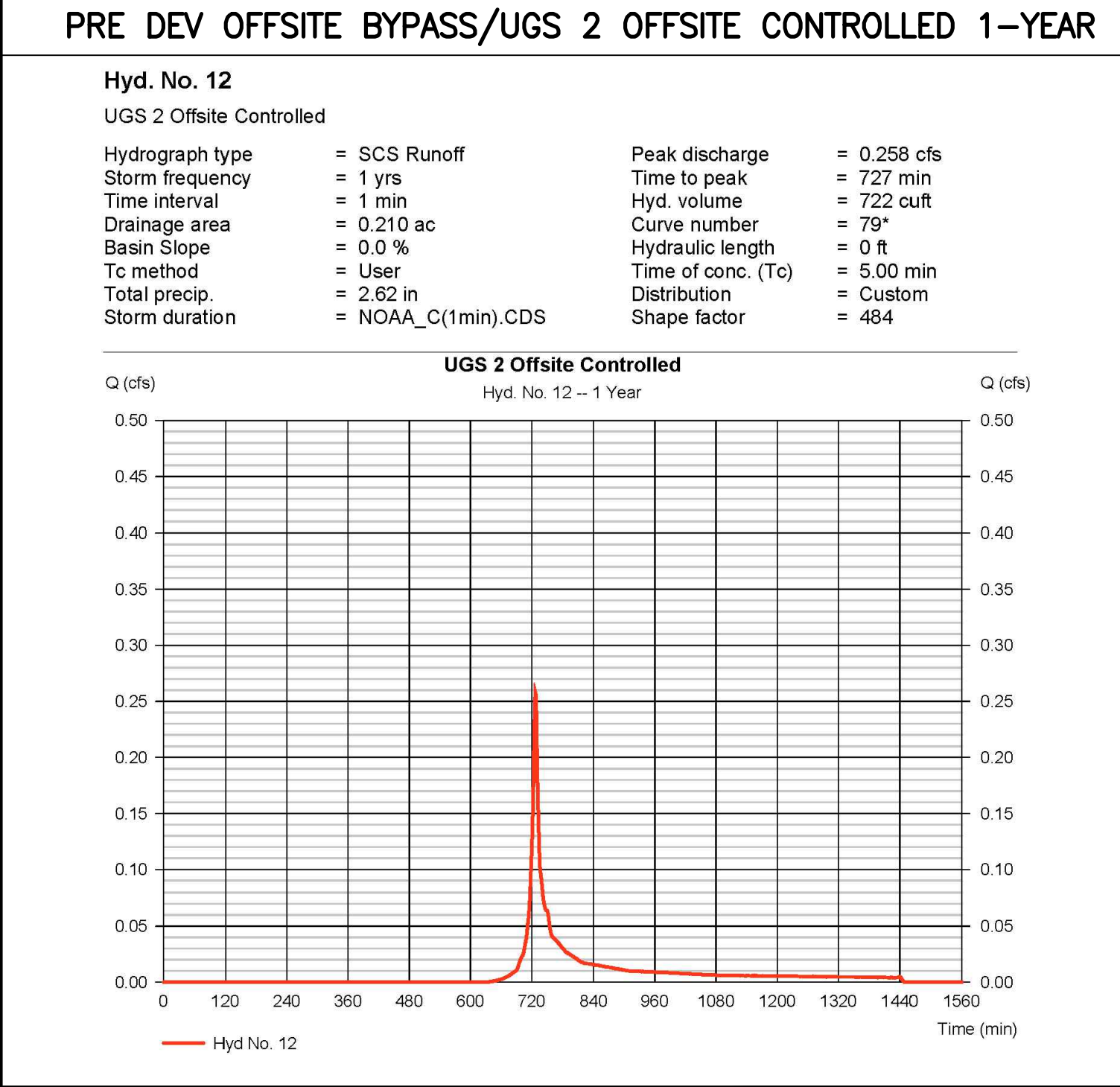
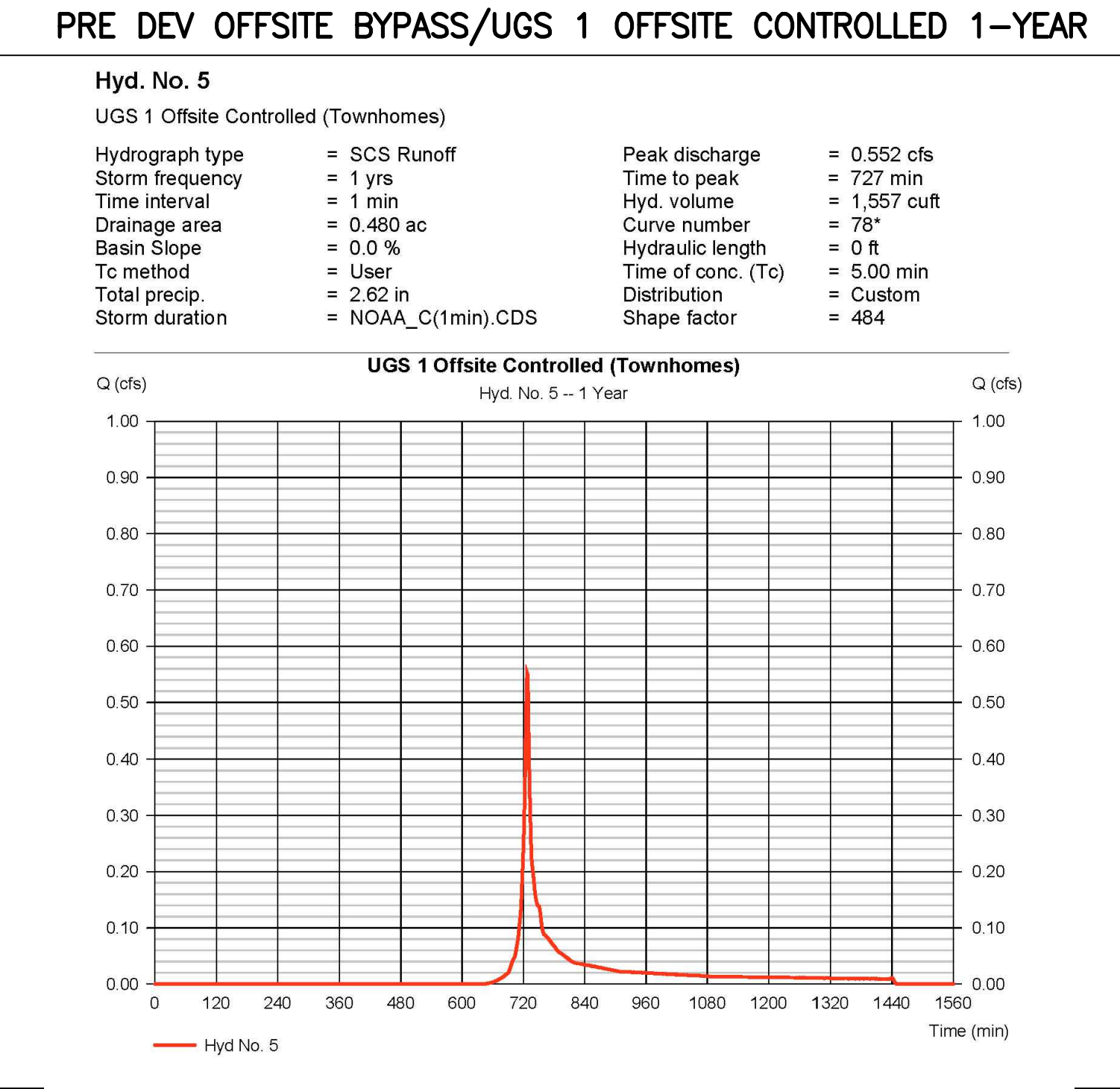
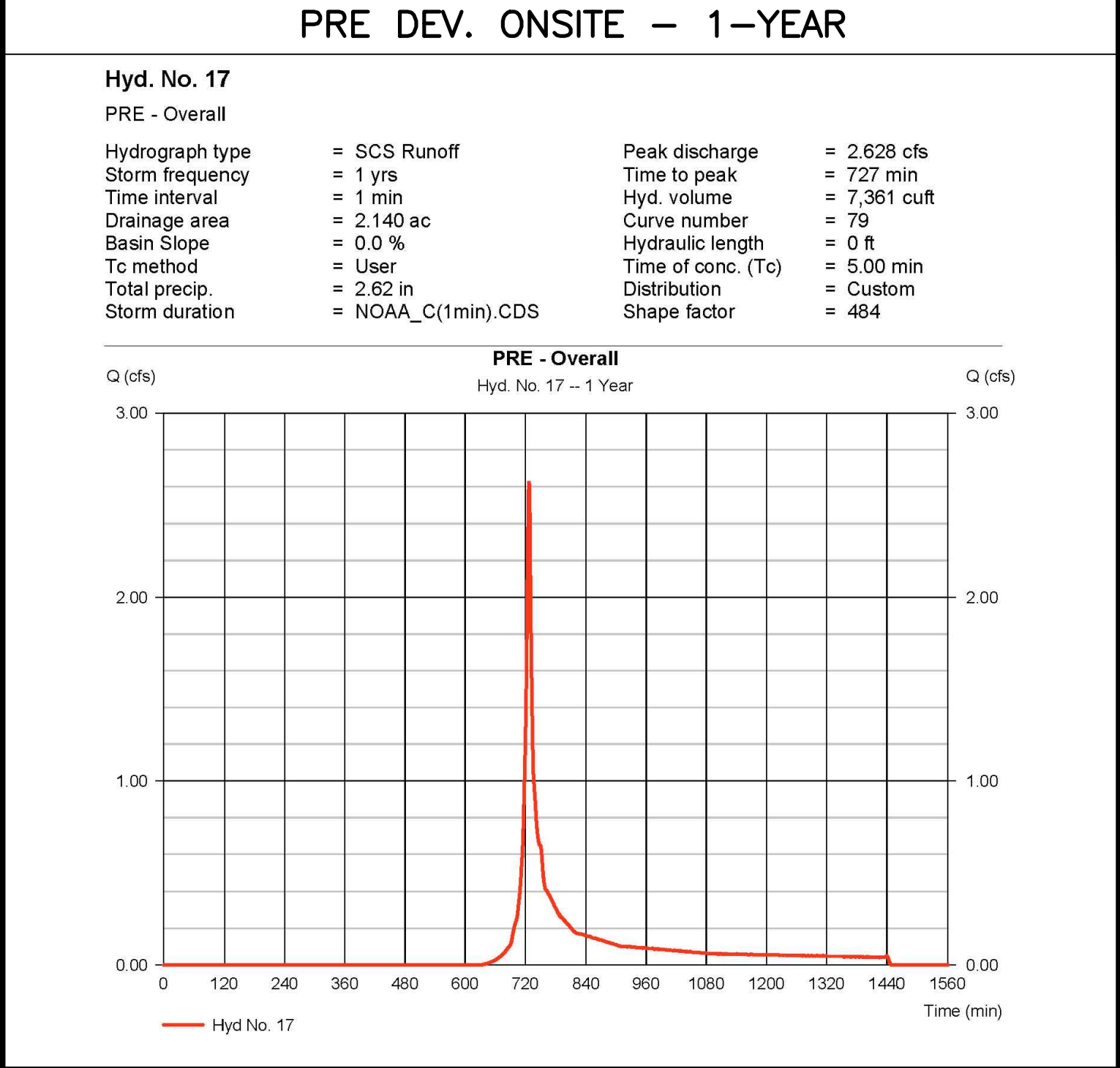
PHASE ONE STORMWATER MANAGEMENT/BMP DESIGN

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CHURCH**

CITY OF FAIRFAX, VIRGINIA

[illegible]

Attached Xrefs:



OVERALL DEVELOPMENT HYDROGRAPHS 1

FAIRFAX PRESBYTERIAN CHURCH

CITY OF FAIRFAX, VIRGINIA

NO. DATE REVISION PRIOR TO APPROVAL

DESIGN DRAFT GMP GMP APPROVED GMP DATE JAN. 2021 SCALE HORIZ. 1" = 100' VERT. ---

SHEET 40 OF 46

PRJ NO: 2017-2570

TYPE: MDP

COMMONWEALTH OF VIRGINIA

BRIAN R. THOMAS

Lic. No. 038937

10/25/2021

PROFESSIONAL ENGINEER

00-G0700/00-G0500/XREF-R0401/XREF-R0301/SEAL/SIGNATURE/SIGNATURE DATE

Attached Xrefs:

UGS 1 ROUTING - 1-YEAR

BMP/SWM UGS 1 Routings

Hyd. No. 8 -- 1 Year

Q (cfs)

Q (cfs)

Time (min)

Hyd. No. 8

Hyd. No. 7

Total storage used = 1,690 cuft

UGS 2 ROUTING - 1-YEAR

Routing UGS 2

Hyd. No. 14 -- 1 Year

Q (cfs)

2.00

1.00

0.00

0 120 240 360 480 600 720 840 960 1080 1200 1320 1440 1560

Time (min)

Hyd. No. 14

Hyd. No. 13

Total storage used = 1,140 cuft

POST DEV. UNCONTROLLED - 1-YEAR

POST - Overall UNCONTROLLED

Hyd. No. 19 -- 1 Year

Q (cfs)

Time (min)

Hyd No. 19

UGS 1 ROUTING - 2-YEAR

BMP/SWM UGS 1 Routings

Hyd. No. 8 -- 2 Year

Q (cfs)

4.00

3.00

2.00

1.00

0.00

0 120 240 360 480 600 720 840 960 1080 1200 1320 1440 1560

Time (min)

Hyd No. 8

Hyd No. 7

Total storage used = 2,004 cuft

UGS 2 ROUTING - 2-YEAR

Routing UGS 2
Hyd. No. 14 -- 2 Year

Q (cfs)

2.00

1.00

0.00

0 120 240 360 480 600 720 840 960 1080 1200 1320 1440 1560

Time (min)

Hyd. No. 14

Hyd. No. 13

Total storage used = 1,558 cu ft

POST DEV. UNCONTROLLED - 2-YEAR

POST - Overall UNCONTROLLED

Hyd. No. 19 -- 2 Year

Q (cfs)

Time (min)

Hyd No. 19

UGS 1 ROUTING - 10-YEAR

UGS 2 ROUTING - 10-YEAR

Routing UGS 2

Hydr. No. 14 -- 10 Year

Q (cfs)

3.00

2.00

1.00

0.00

0 120 240 360 480 600 720 840 960 1080 1200 1320 1440 1560

Time (min)

Hydr. No. 14

Hydr. No. 13

Total storage used = 2,262 cu ft.

POST DEV. UNCONTROLLED - 10-YEAR

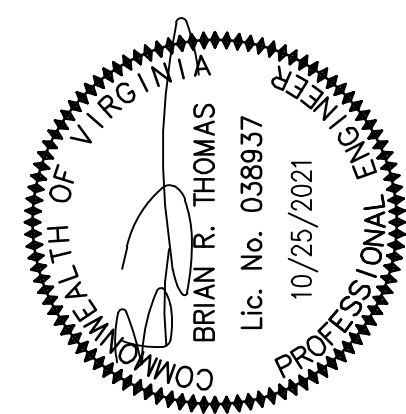
POST - Overall UNCONTROLLED
Hyd. No. 19 -- 10 Year

The graph displays the flow rate Q (cfs) on the y-axis (0.00 to 3.00) against Time (min) on the x-axis (0 to 1560). A single red line represents the hydrograph for Hyd No. 19. The flow remains near zero until about 600 minutes, then rises sharply to a peak of approximately 2.8 cfs at 720 minutes, before gradually returning to near zero by 1440 minutes.

OVERALL DEVELOPMENT HYDROGRAPHS 2

**FAIRFAX
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CHURCH**

CITY OF FAIRFAX, VIRGINIA

[illegible]

DESIGN GMP	DRAFT GMP
APPROVED	BRT
DATE JAN. 2021	
SCALE 1" = 100'	
HORIZ: 1" = 100'	
VERT: 1" = 100'	

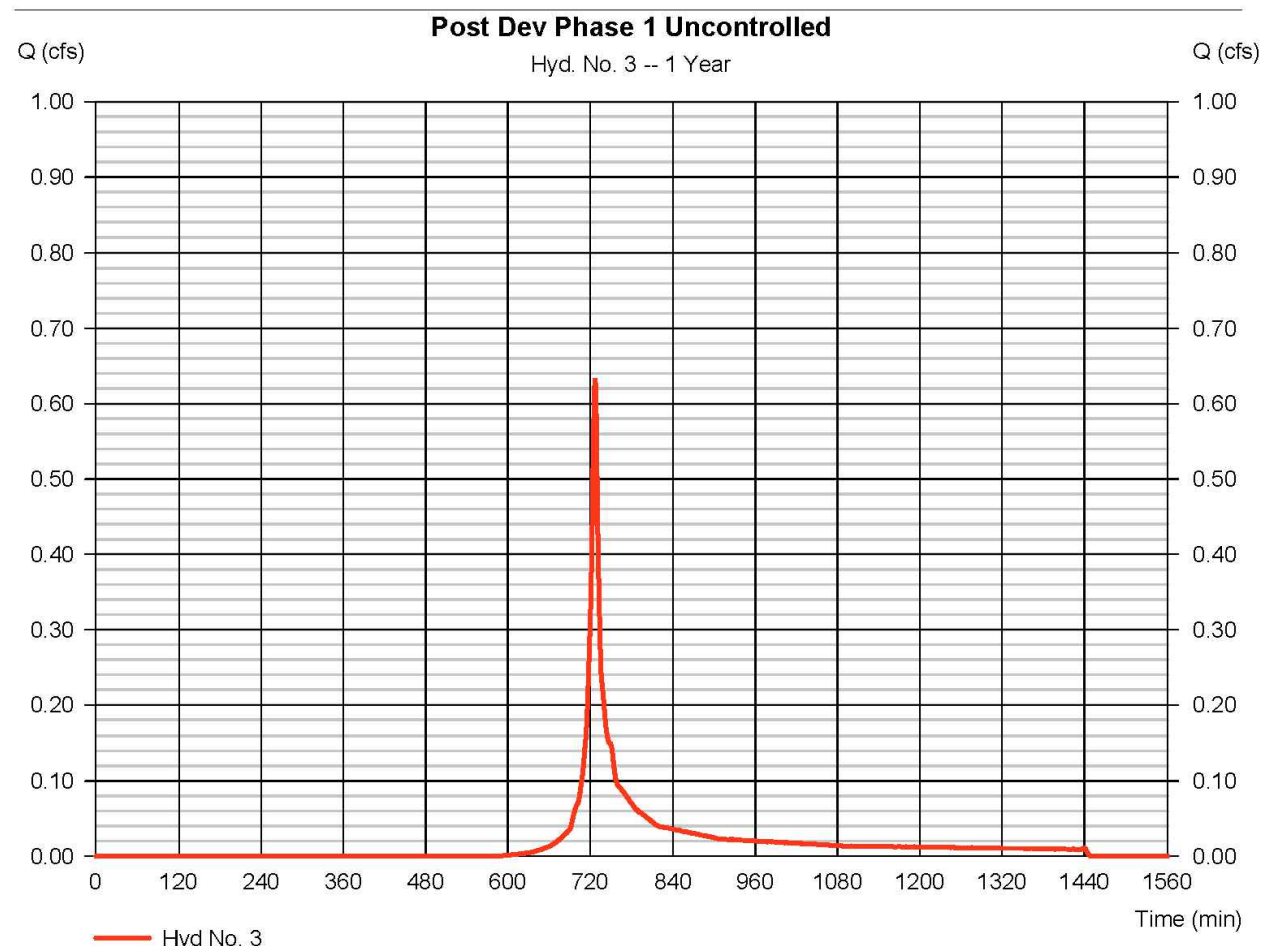
SHEET 41	OF 46
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PRJ NO: 2017-2571

TYPE: MDP

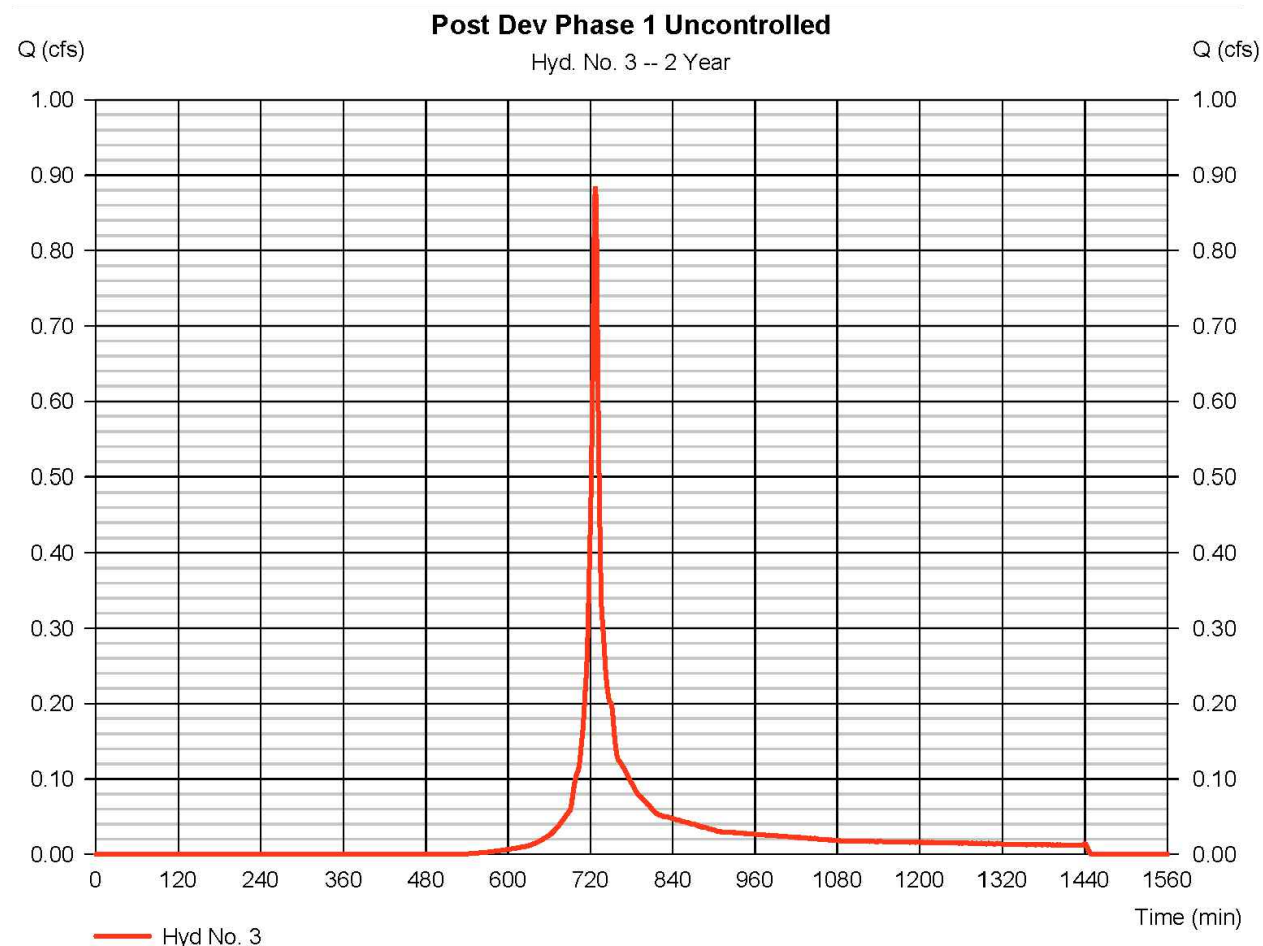
PHASE 1 POST DEV. UNCONTROLLED – 1-YEAR

Hydrograph type	= SCS Runoff	Peak discharge	= 0.633 cfs
Storm frequency	= 1 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 1,750 cuf
Drainage area	= 0.430 ac	Curve number	= 82"
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.62 in	Distribution	= Custom
Storm duration	= NOAA_C(1min).CDS	Shape factor	= 484



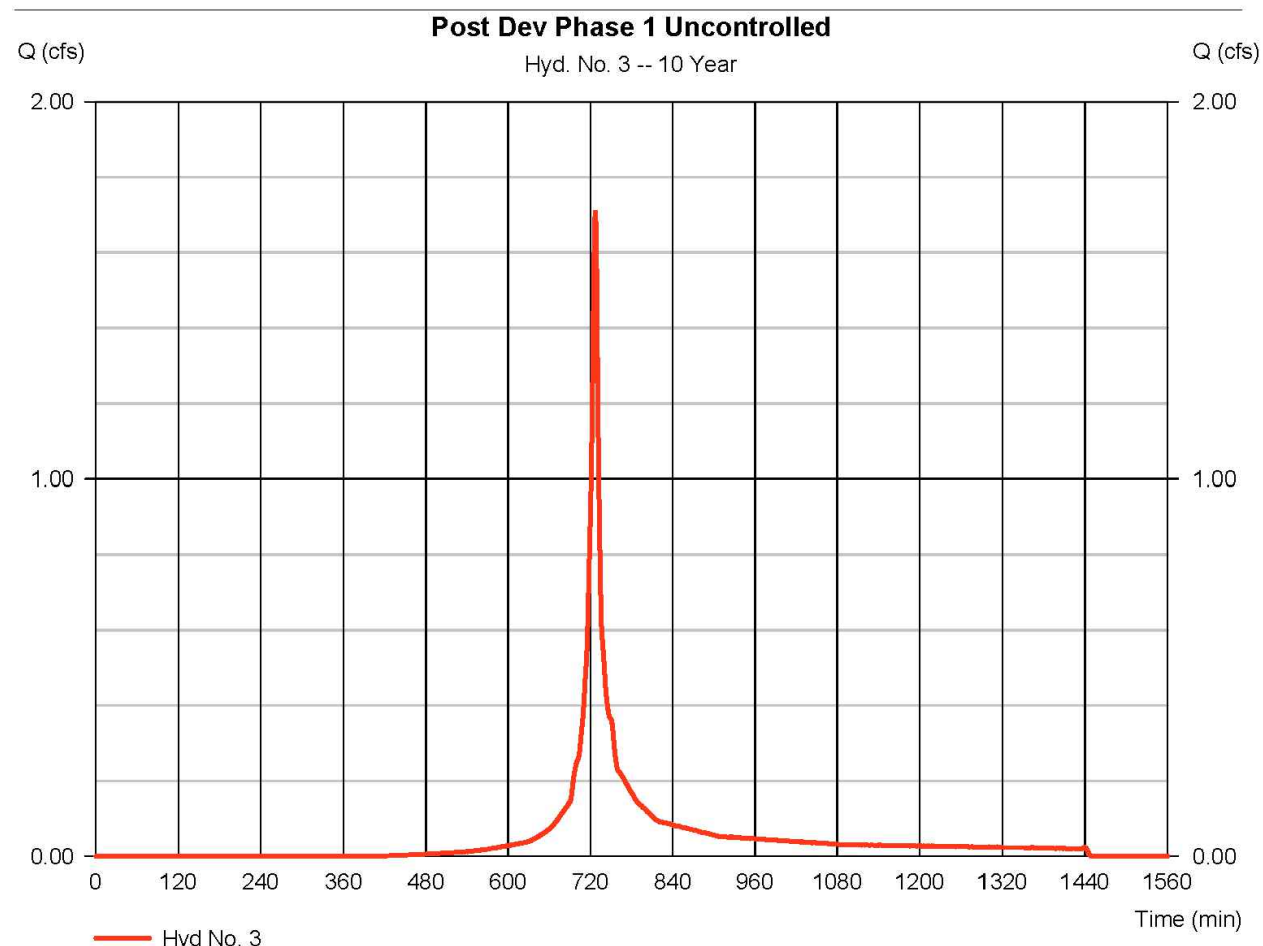
PHASE 1 POST DEV. UNCONTROLLED – 2-YEAR

Hydrograph type	= SCS Runoff	Peak discharge	= 0.895 cfs
Storm frequency	= 2 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 2,437 cuf
Drainage area	= 0.430 ac	Curve number	= 82"
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.17 in	Distribution	= Custom
Storm duration	= NOAA_C(1min)CDS	Shape factor	= 484

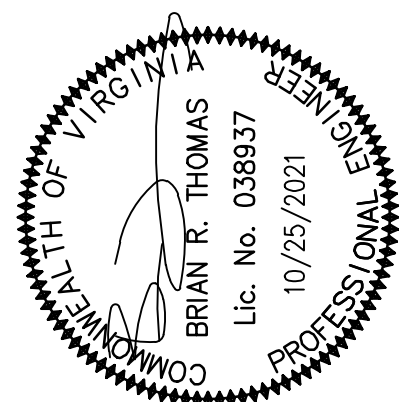


PHASE 1 POST DEV. UNCONTROLLED – 10-YEAR

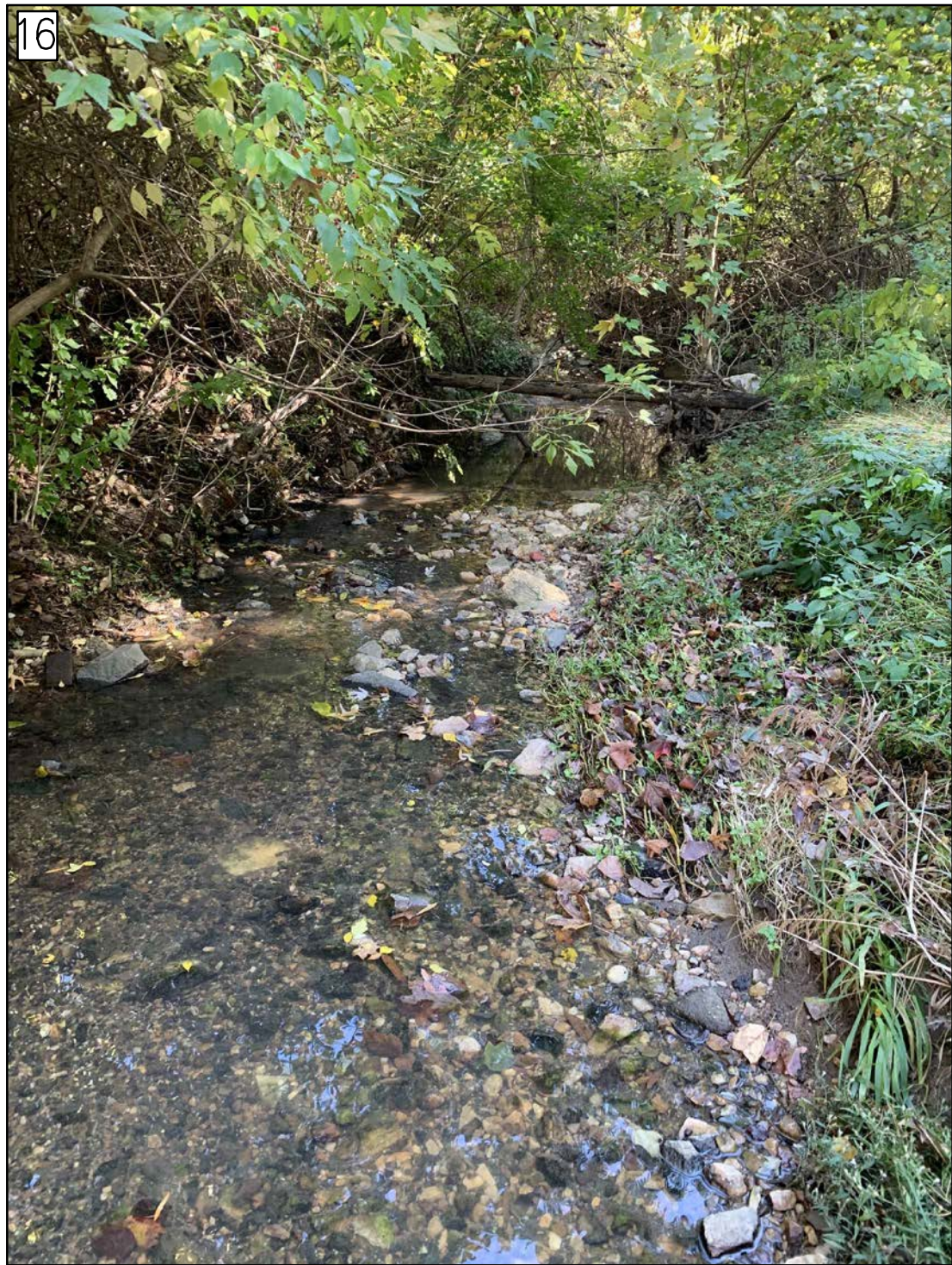
Hydrograph type	= SCS Runoff	Peak discharge	= 1,711 cfs
Storm frequency	= 102 yrs	Time to peak	= 727 min
Time interval	= 1 min	Hyd. volume	= 4,770 cuf
Drainage area	= 0.430 ac	Curve number	= 82"
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 4.87 in	Distribution	= Custom
Storm duration	= NOAA_C(1min)CDS	Shape factor	= 484



CITY OF FAIRFAX, VIRGINIA



SHEET	DESIGN	DRAFT	GMP	GMP	NO.	DESCRIPTION	REVISIONS	REVIEW	APPROV.	DATE
	42	OF								
PRJ NO: 2017-2570										
TYPE: MDP										



DESIGN		DRAFT		GMP		APPROVED		DATE		REVISION		PRIORITY		TO APPROVAL	
GMP		GMP		GMP		GMP		GMP		GMP		GMP		GMP	
SHEET		44		OF		46		PRJ NO: 2017-2570		TYPE: MDP		NO.		DATE	
PRJ NO: 2017-2570		TYPE: MDP		DATE		DATE		DATE		DATE		DATE		DATE	

OUTFALL PHOTOS

FAIRFAX PRESBYTERIAN CHURCH

CITY OF FAIRFAX, VIRGINIA

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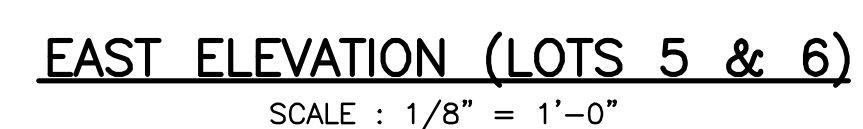
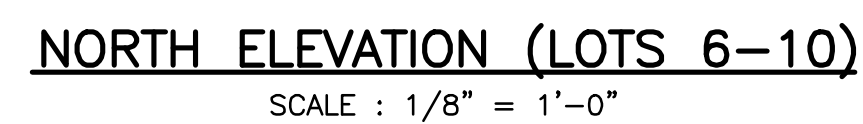
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00-G0700/00-G0500/REF-R0401/REF-R0301/57-1/57-3/SEAL/SIGNATURE

DATE



NOTE : THESE DRAWINGS ARE CONCEPTUAL AND INTENDED TO ILLUSTRATE THE GENERAL CHARACTER OF THE BUILDING, QUALITY OF CONSTRUCTION, AND QUALITY OF MATERIALS. THESE DRAWINGS ARE NOT INTENDED TO REPRESENT FINAL BUILDING DESIGN, OR TO BE INTERPRETED AS A COMMITMENT TO SPECIFIC DIMENSIONS OR BUILDING ELEMENTS. FINAL DESIGN WILL BE DETERMINED AT TIME OF SITE PLAN SUBMISSION.

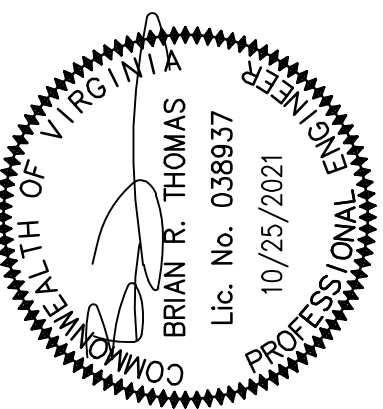
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	KcV	KcV
	APPROVED	
	HMF	
	DATE	JAN. 2021
SCALE		HORIZ/8" = 1"
		VERT: ---
SHEET		OF
45		46
PRJ NO: 2017-2570		
TYPE: MDP		

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**FAIRFAX
PRESBYTERIAN
CHURCH**

CITY OF FAIRFAX, VIRGINIA

[illegible]

DESIGN KJV	DRAFT KJV
APPROVED HMF	
DATE JAN. 2021	
SCALE	
HORIZ: ---	VERT: ---
SHEET 46	
OF 46	
PRJ NO: 2017-2570	
TYPE: MDP	