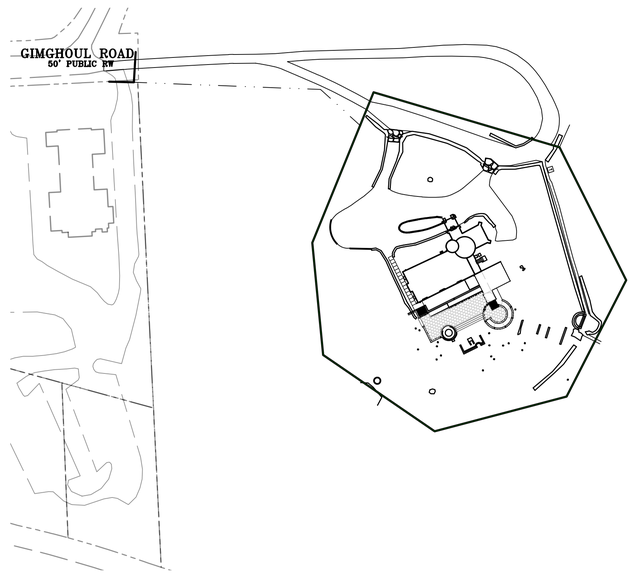

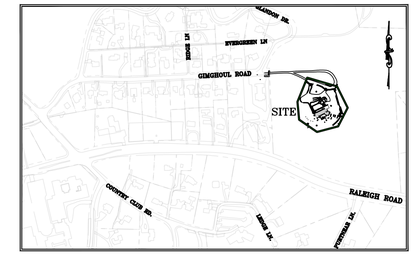

VICINITY MAP
NTS

BUILDING RENOVATION & PATIO ADDITION TO GIMGHOUL CASTLE

742 GIMGHOUL RD

CHAPEL HILL, NORTH CAROLINA

DRAWING INDEX:

SITE DATA:

OWNER:	GIMGHOUL CORPORATION PO BOX 3670 CHAPEL HILL, NC 27515R
APPLICANT:	GIMGHOUL CORPORATION PO BOX 3670 CHAPEL HILL, NC 27515R
PROJECT DESCRIPTION:	BUILDING RENOVATION AND PATIO ADDITION
EXISTING USE:	PRIVATE CLUB
PROPOSED USE:	PRIVATE CLUB
PIN:	9788-96-2765
DEED REFERENCE:	DB 851 PG 418
PARCEL ACREAGE:	2.15 ACRES
CURRENT ZONING:	R-1
PROPOSED ZONING:	OI-1 CZD
OVERLAY ZONING:	GIMGHOUL HISTORIC DISTRICT (HD-3) JORDAN LAKE WATERSHED PROTECTION DISTRICT
RESOURCE CONSERVATION DISTRICT SUMMARY (RCD)	
STREAM SIDE ZONE:	0 SF
MANAGED USE ZONE:	0 SF
UPLAND ZONE:	0 SF
TOTAL RCD:	0 SF
RIVER BASIN:	CAPE FEAR RIVER BASIN (JORDAN LAKE)
FLOODPLAIN:	NO FLOOD ZONE PER MAP #3701809788 K
SOILS:	APPLING (AuC), WEDOWEE (WmE)
ENVIRONMENTAL:	NO STREAMS, WETLANDS, NOR RCD
NO. OF LOTS:	1 LOT
BUILDING SETBACKS REQUIRED:	
STREET:	24'
INTERIOR:	8'
SOLAR:	11'
BUILDING SETBACKS PROVIDED:	
STREET:	365'
INTERIOR:	97'
SOLAR:	108'

MAXIMUM BUILDING HEIGHT:	PRIMARY	29'
	SECONDARY	60'
MINIMUM LOT SIZE REQUIRED:	10,000 SF	
MINIMUM LOT SIZE PROPOSED:	2.15 ACRES	
NET LAND AREA (NLA):	93,849 SF	
GROSS LAND AREA (GLA):	103,234 SF	
IMPERVIOUS AREA		
EXISTING:	24,602 SF	23.81%
DEMOLITION:	596 SF	0.57%
PROPOSED:	4,298 SF	4.16%
TOTAL:	28,304 SF	27.41%
LAND DISTURBANCE AREA:	18,500 SF	
PARKING SUMMARY		
NONE REQUIRED		
BUILDING SUMMARY		
EXISTING FLOOR AREA:	5,055 SF	
NEW FLOOR AREA:	1,200 SF	
TOTAL FLOOR AREA:	6,255 SF	

LEGEND

	NEW	EXISTING	REMOVE
DRAINAGE STRUCTURE			
SANITARY SEWER MANHOLE	S	S	S
SANITARY SEWER CLEANOUT	C.O.	C.O.	C.O.
WATER VALVE			
FIRE HYDRANT			
OVERHEAD UTILITY LINE	OH	XOH	DXOH
UNDERGROUND ELECTRIC LINE	E	XE	DXE
UNDERGROUND TELECOM/DATA LINE	TD	XTD	DXTD
FIBER OPTIC CABLE	FO	XFO	DXFO
GAS LINE	G	XG	DXG
STORM DRAINAGE PIPE	SD	XSD	DXSD
SANITARY SEWER LINE	SS	XSS	DXSS
WATER LINE	W	XW	DXW
SURFACE ELEVATION CONTOUR	400	400	
SURFACE SPOT ELEVATION	+ 356.44	x 356.44	
TREE LINE			
LIMIT OF DISTURBANCE/CLEARING	LOD		
ROOF DRAIN	RD	XRD	DXRD
ELECTRICAL TRANSFORMER PAD	T	T	T
TYPICAL KEYED NOTE LABEL	1		

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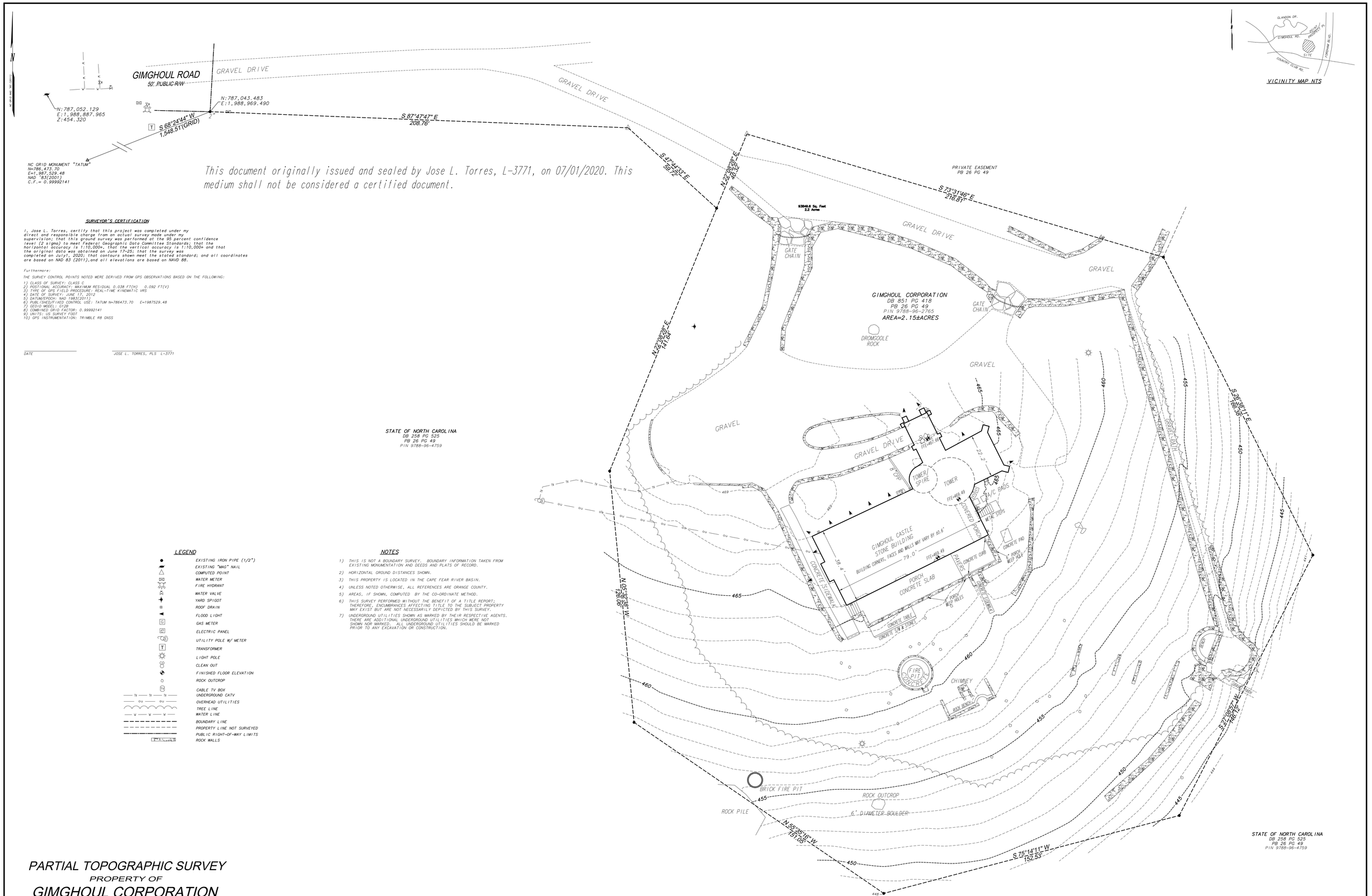
Lic. #C-1030

GIMGHOUL CASTLE
CHAPEL HILL, NORTH CAROLINA
COVER SHEET

REV.	DATE	DESCRIPTION
1	09/17/2021	TRT REVIEW COMMENTS
2	12/07/2021	TRT REVIEW COMMENTS
3	02/15/2022	TRT REVIEW COMMENTS
4	03/04/2022	BUFFER OPTION 1 (NO DISTURBANCE)
5	03/08/2022	LAND DISTURBANCE AREA

DATE: FEBRUARY 4 2021

SHEET NO.
C1.1



VICINITY MAP NTS

This document originally issued and sealed by Jose L. Torres, L-3771, on 07/01/2020. This medium shall not be considered a certified document.

SURVEYOR'S CERTIFICATION

I, Jose L. Torres, certify that this project was completed under my direct and responsible charge from an actual survey made under my supervision; that this ground survey was performed at the 95 percent confidence level (2 sigma) to meet Federal Geographic Data Committee Standards; that the horizontal accuracy is 1:10,000+, that the vertical accuracy is 1:10,000+ and that the original data was obtained on June 17-25; that the survey was completed on July1, 2020; that contours shown meet the stated standard; and all coordinates are based on NAD 83 (2011),and all elevations are based on NAVD 88.

Furthermore:

THE SURVEY CONTROL POINTS NOTED WERE DERIVED FROM GPS OBSERVATIONS BASED ON THE FOLLOWING:

1) CLASS OF SURVEY: CLASS C
2) POSITIONAL ACCURACY: MAXIMUM RESIDUAL 0.038 FT(H) 0.092 FT(V)
3) TYPE OF GPS FIELD PROCEDURE: REAL-TIME KINEMATIC VRS
4) DATE OF SURVEY: JUNE 17, 2012
5) DATUM/EPOCH: NAD 1983(2011)
6) PUBLISHED/FIXED CONTROL USE: TATUM N=786473.70 E=1987529.48
7) GEOID MODEL: G12B
8) COMBINED GRID FACTOR: 0.99992141
9) UNITS: US SURVEY FOOT
10) GPS INSTRUMENTATION: TRIMBLE R8 GNSS

DATE

JOSE L. TORRES, PLS L-3771

LEGEND

- EXISTING IRON PIPE (1/2")
- EXISTING "MAG" NAIL
- COMPUTED POINT
- WATER METER
- FIRE HYDRANT
- WATER VALVE
- YARD SPIGOT
- ROOF DRAIN
- FLOOD LIGHT
- GAS METER
- ELECTRIC PANEL
- UTILITY POLE W/ METER
- TRANSFORMER
- LIGHT POLE
- CLEAN OUT
- FINISHED FLOOR ELEVATION
- ROCK OUTCROP
- CABLE TV BOX
- UNDERGROUND CATV
- OVERHEAD UTILITIES
- TREE LINE
- WATER LINE
- BOUNDARY LINE
- PROPERTY LINE NOT SURVEYED
- PUBLIC RIGHT-OF-WAY LIMITS
- ROCK WALLS

NOTES

1) THIS IS NOT A BOUNDARY SURVEY. BOUNDARY INFORMATION TAKEN FROM EXISTING MONUMENTATION AND DEEDS AND PLATS OF RECORD.
2) HORIZONTAL GROUND DISTANCES SHOWN.
3) THIS PROPERTY IS LOCATED IN THE CAPE FEAR RIVER BASIN.
4) UNLESS NOTED OTHERWISE, ALL REFERENCES ARE ORANGE COUNTY.
5) AREAS, IF SHOWN, COMPUTED BY THE CO-ORDINATE METHOD.
6) THIS SURVEY PERFORMED WITHOUT THE BENEFIT OF A TITLE REPORT; THEREFORE, ENCUMBRANCES AFFECTING TITLE TO THE SUBJECT PROPERTY MAY EXIST BUT ARE NOT NECESSARILY DEPICTED BY THIS SURVEY.
7) UNDERGROUND UTILITIES SHOWN AS MARKED BY THEIR RESPECTIVE AGENTS. THERE ARE ADDITIONAL UNDERGROUND UTILITIES WHICH WERE NOT SHOWN NOR MARKED. ALL UNDERGROUND UTILITIES SHOULD BE MARKED PRIOR TO ANY EXCAVATION OR CONSTRUCTION.

PARTIAL TOPOGRAPHIC SURVEY

PROPERTY OF

GIMGHOUL CORPORATION

CHAPEL HILL TOWNSHIP
ORANGE COUNTY, NORTH CAROLINA

1"=20'

JULY 1, 2020

RILEY SURVEYING, P.A.
3326 DURHAM CHAPEL HILL BLVD. STE B-100
DURHAM, N.C. 27707
919-667-0742 C-1281 jtorres@rileysurveyingpa.com

NOTES

1. ALL EXISTING STRUCTURES 500 SQUARE FEET AND LARGER SHALL BE ASSESSED PRIOR TO THE ISSUANCE OF A DEMOLITION PERMIT TO ENSURE COMPLIANCE WITH THE COUNTY'S REGULATED RECYCLABLE MATERIALS ORDINANCE (RRMO) AND TO ASSESS THE POTENTIAL FOR DECONSTRUCTION AND/OR THE REUSE OF SALVAGEABLE MATERIALS.
2. PURSUANT TO THE COUNTY'S RRMO, CLEAN WOOD WASTE, SCRAP METAL, AND CORRUGATED CARDBOARD PRESENT IN CONSTRUCTION OR DEMOLITION WASTE MUST BE RECYCLED.
3. PURSUANT TO THE COUNTY'S RRMO, ALL HAULERS OF MIXED CONSTRUCTION AND DEMOLITION WASTE WHICH INCLUDES ANY REGULATED RECYCLABLE MATERIALS SHALL BE LICENSED BY ORANGE COUNTY.
4. PRIOR TO ANY DEMOLITION OR CONSTRUCTION ACTIVITY ON THE SITE, THE APPLICANT SHALL HOLD A PRE-DEMOLITION/PRE-CONSTRUCTION CONFERENCE WITH SOLID WASTE STAFF. THIS MAY BE THE SAME PRE-CONSTRUCTION MEETING HELD WITH OTHER DEVELOPMENT/ENFORCEMENT OFFICIALS.
5. THE PRESENCE IF ANY ASBESTOS CONTAINING MATERIALS ('ACM') AND/OR OTHER HAZARDOUS MATERIALS SHALL BE HANDLED IN ACCORDANCE WITH ANY AND ALL LOCAL, STATE, AND FEDERAL REGULATIONS AND GUIDELINES.

GIMGHOUL ROAD
50' PUBLIC RW

N= 787,043.483
E=1,988,969.490

S68°24'44"W
1,548.51' TO GRID

NC GRID
MONUMENT "TATUM"
N= 786,473.70
E=1,987,529.48
NAD '83(2001)
C.F.=0.99992141

PRIVATE EASEMENT
PB 26 PG 49

S87°47'47"E 208.76'

BATTLE PARK
STATE OF NORTH CAROLINA
DB 258 PG 525
PB 26 PG 49
PIN: 9788-96-4759

S47°44'33"E 59.72'

N22°08'28"E 40.32'

S73°31'46"E 216.81'

10' TYPE "B" BUFFER
11' SOLAR SETBACK

GIMGHOUL CORPORATION
DB 851 PG 418
PB 26 PG 49
PIN: 9788-96-2765
AREA=2.15± ACRES

N22°08'28"E 141.64'

8' INTERIOR SETBACK
10' TYPE "B" BUFFER

S28°38'11"E 166.38'

N55°32'38"W 126.06'

S27°08'57"W 146.12'

N55°35'16"W 151.05'

S75°14'11"W 152.53'

BATTLE PARK
STATE OF NORTH CAROLINA
DB 258 PG 525
PB 26 PG 49
PIN: 9788-96-4759

EXISTING UNDERGROUND CABLE TV
EXISTING ELECTRIC METER

REMOVE EXISTING CONCRETE SIDEWALK FOR NEW CONCRETE SIDEWALK IN ITS PLACE

EXISTING CONCRETE SIDEWALK

REMOVE EXISTING CONCRETE SLAB AND REPLACE WITH NEW PAVERS

6" PORCH WEEP HOLES

REMOVE EXISTING STAIRS

EXISTING FIRE PIT

EXISTING CONCRETE

EXISTING ROCK OUTCROP (TYPICAL)

TREE CLEARING

EXISTING ROCK OUTCROP (TYPICAL)

REMOVE EXISTING CONCRETE SIDEWALK & WALLS

REMOVE EX. 28" WHITE OAK

REMOVE EX. 28" WHITE OAK

REMOVE EX. 20" PINE FOR NEW ELECTRICAL SERVICE

EXISTING ROOF DRAIN GROUND

REMOVE EXISTING CONCRETE PAD

REMOVE EXISTING ROOF DRAIN

REMOVE EXISTING WALLS AND PORTION OF PATIO FOR NEW BUILDING EXPANSION.

PAVERS

CONCRETE CURB

EXISTING GAS METERS

EXISTING A/C CONCRETE PADS

EXISTING METAL STEPS

EXISTING ROCK WALL (TYPICAL)

EXISTING BENCH

EXISTING CHIMNEY

EXISTING ROCK BENCH

EXISTING ROCK PILE

EXISTING ROCK BOULDER

EX. GRAVEL DRIVE

EX. GRAVEL

EX. CHAIN GATE

EX. BROMGOOLE ROCK

EXISTING ROCK WALL (TYPICAL)

EXISTING STONE BUILDING

EXISTING BUILDING CORNER FACES AND WALLS MAY VARY BY ±0.6'

EXISTING ROOF DRAIN

EX. TOWER SPIRE

EX. TOWER

EXISTING ELECTRIC PANEL

EXISTING TRANSFORMER

EX. PORCH

EX. PORCH TABLE

EXISTING BRICK PIT

PRIVATE EASEMENT
PB 26 PG 49

BATTLE PARK
STATE OF NORTH CAROLINA
DB 258 PG 525
PB 26 PG 49
PIN: 9788-96-4759

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20 0 10 20 40
(IN FEET)
1 inch = 20 ft.

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GIMGHOUL CASTLE

CHAPEL HILL, NORTH CAROLINA

EXISTING CONDITIONS & DEMOLITION PLAN

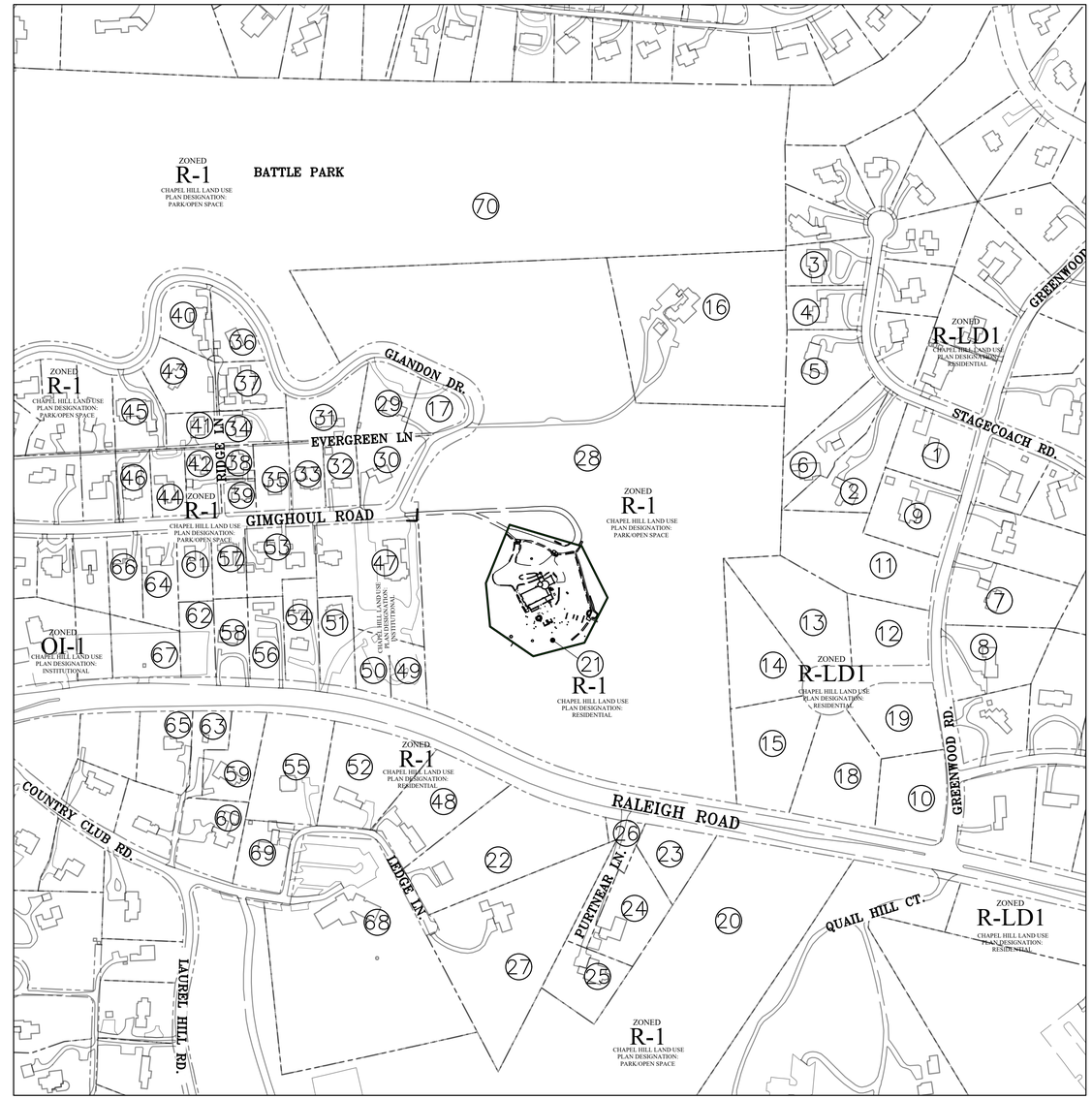
REV.	DATE	DESCRIPTION
1	09/17/2021	TRT REVIEW COMMENTS
2	12/07/2021	TRT REVIEW COMMENTS
3	02/15/2022	TRT REVIEW COMMENTS

DATE: FEBRUARY 4 2021

SHEET NO.
C2.3

Z:\Shared Folders\Projects\Corona\26011\DWG\26011.dwg, C2.3 DEMO, 2/15/2022 10:05:16 AM

1	9798073185	BROCK RICHARD J	900 GREENWOOD RD	CHAPEL HILL	NC	275143910
2	9798071069	BRACHMAN LISA	201 STAGECOACH RD	CHAPEL HILL	NC	27514
3	9798070679	MORRIS CATHERINE CARTER	219 STAGECOACH RD	CHAPEL HILL	NC	27514
4	9798070576	TAYLOR NICHOLAS	215 STAGECOACH RD	CHAPEL HILL	NC	275143922
5	9798070358	BRUNO ELIZABETH	211 STAGECOACH RD	CHAPEL HILL	NC	27514
6	9798070178	SPITLER ERIC J TRUSTEE	207 STAGECOACH RD	CHAPEL HILL	NC	27514
7	9798065784	SEEGER FRIEDERIKE	905 GREENWOOD RD	Chapel Hill	NC	27514
8	9798065565	SODE KOJI	907 GREENWOOD RD	CHAPEL HILL	NC	27514
9	9798063947	BUCKLAD MATTHEW A	908 GREENWOOD RD	CHAPEL HILL	NC	27514
10	9798063116	UNIVERSITY OF N C	UNKNOWN ADDRESS	CHAPEL HILL	NC	27514
11	9798061863	STATE OF NORTH CAROLINA	UNKNOWN ADDRESS	RALEIGH	NC	27603
12	9798062663	STATE OF NORTH CAROLINA	UNKNOWN ADDRESS	RALEIGH	NC	27603
13	9798060639	STATE OF NORTH CAROLINA	UNKNOWN ADDRESS	RALEIGH	NC	27603
14	9788968588	STATE OF NORTH CAROLINA	UNKNOWN ADDRESS	RALEIGH	NC	27603
15	9788969331	STATE OF NORTH CAROLINA	UNKNOWN ADDRESS	RALEIGH	NC	27603
16	9788977537	LORELLI CHARLES A	1 POINT PROSPECT PLACE	CHAPEL HILL	NC	275143932
17	9788970325	DAVIS ROBERTO A	408 PATTERSON PL W	CHAPEL HILL	NC	27516
18	9798060273	STATE OF NORTH CAROLINA	UNKNOWN ADDRESS	RALEIGH	NC	27603
19	9798062368	STATE OF NORTH CAROLINA	UNKNOWN ADDRESS	RALEIGH	NC	27600
20	9788941696	STATE OF NORTH CAROLINA	UNKNOWN ADDRESS	UNKNOWN	XX	0
21	9788962765	GIMGHOUL CORPORATION	PO BOX 3670	CHAPEL HILL	NC	27515
22	9788961064	FRELIER ALEXANDER	107 LEDGE LN	CHAPEL HILL	NC	27514
23	9788956909	FERGUSON JAMES GATES JR	P O BOX 869	CHAPEL HILL	NC	27514
24	9788954881	FERGUSON JAMES GATES JR	P O BOX 869	CHAPEL HILL	NC	27514
25	9788953684	FERGUSON JAMES GATES JR	P O BOX 869	CHAPEL HILL	NC	27514
26	9788954920	FERGUSON JAMES GATES JR	PO BOX 869	CHAPEL HILL	NC	275140869
27	9788951794	ECCLE TRUST	109 LEDGE LN	CHAPEL HILL	NC	27514
28	9788964759	STATE OF NORTH CAROLINA	UNKNOWN ADDRESS	RALEIGH	NC	27603
29	9788878389	DOELL SANDRA D	360 GLANDON DR	CHAPEL HILL	NC	27514
30	9788877172	NEWTON ADRIAN J III	741 GIMGHOUL RD	CHAPEL HILL	NC	275143815
31	9788876216	TOLEDO COURTNEY E	300 GLANDON DR	CHAPEL HILL	NC	275143818
32	9788876150	PARROTT VICKI LYNN	739 GIMGHOUL RD	CHAPEL HILL	NC	275143815
33	9788875140	WHITTINGTON DALE	737 GIMGHOUL RD	CHAPEL HILL	NC	275143815
34	9788874215	WHARTON ELISABETH D	110 RIDGE LN	Chapel Hill	NC	27514
35	9788874059	ABBEY JEFFREY DAVID	735 GIMGHOUL RD	CHAPEL HILL	NC	27514
36	9788873459	SCHOULTZ LARS	250 GLANDON DR	CHAPEL HILL	NC	275143816
37	9788873375	JENSEN BRIAN COLWELL	260 GLANDON DR	CHAPEL HILL	NC	27514
38	9788873151	RABKIN MIRIAM	106 RIDGE LN	CHAPEL HILL	NC	27514
39	9788873064	DEMOSTHENIAN HOLDINGS LLC	4525 PROVINCE LINE RD	PRINCETON	NJ	8540
40	9788872523	GUILKEY DAVID K	246 GLANDON DR	CHAPEL HILL	NC	275143816
41	9788872202	MURPHY EDWARD JAMES III	111 RIDGE LN	CHAPEL HILL	NC	27514
42	9788872048	WHITE JAMES W	105 RIDGE LN	CHAPEL HILL	NC	275143830
43	9788871387	MILES MIKE E	240 GLANDON DR	CHAPEL HILL	NC	27514
44	9788871057	BRITT MARGURETE R	1412 VILLAGE CROSSING DR	CHAPEL HILL	NC	27517
45	9788870269	NOELL PAULA DAVIS TRUSTEE	232 GLANDON DR	CHAPEL HILL	NC	27514
46	9788870056	MCBRIDE PAUL M II TRUSTEE	719 GIMGHOUL RD	CHAPEL HILL	NC	27514
47	9788868855	CAVALIER ASSETS LLC	1289 FORDHAM BLVD #123	CHAPEL HILL	NC	27514
48	9788869165	MODLIN D MICHAEL	105 LEDGE LN	CHAPEL HILL	NC	27514
49	9788869640	CAVALIER ASSETS LLC	1289 FORDHAM BLVD #123	CHAPEL HILL	NC	27514
50	9788868643	CAVALIER ASSETS LLC	1289 FORDHAM BLVD #123	CHAPEL HILL	NC	27514
51	9788867639	CAVALIER ASSETS LLC	1289 FORDHAM BLVD #123	CHAPEL HILL	NC	27514
52	9788867266	JCAC LLC	9104 GLENWOOD AVE	RALEIGH	NC	27617
53	9788865972	M AND T CH PROP INC ETAL & KEVIN BIESE	738 GIMGHOUL RD	CHAPEL HILL	NC	27514
54	9788865635	CHEEVER CHRISTOPHER R	805 MEADOW LN	HENDERSON	NC	27536
55	9788865233	101 LEDGE LANE LLC	100 CRESCENT CT	DALLAS	TX	75201
56	9788864631	HUSE HENRY	24 SABLE CT	NORWALK	CT	6854
57	9788863824	ANDERSON ALLEN L	728 GIMGHOUL RD	CHAPEL HILL	NC	275143811
58	9788863634	EAGLE HOLDINGS LLC	P O BOX 834	TRUSSVILLE	AL	35173
59	9788863264	MARTIN DAVID GRIER JR	313 COUNTRY CLUB RD	CHAPEL HILL	NC	275143904
60	9788863005	SEARING DONALD TRUSTEE	307 COUNTRY CLUB RD	CHAPEL HILL	NC	27514
61	9788862824	DILL MATTHEW L	724 GIMGHOUL RD	CHAPEL HILL	NC	27514
62	9788862634	STATE OF NORTH CAROLINA	UNKNOWN ADDRESS	UNKNOWN	XX	0
63	9788862351	MARTIN DAVID G JR	313 COUNTRY CLUB RD	CHAPEL HILL	NC	275143904
64	9788861729	DAWE DAVID	720 GIMGHOUL RD	CHAPEL HILL	NC	27514
65	9788861259	MARY LOU QUINTO LIVING TRUST	150 CHAPMAN	SAN FRANCISCO	CA	94110
66	9788860821	BRODEY BENJAMIN B	716 GIMGHOUL RD	CHAPEL HILL	NC	27514
67	9788860599	STATE OF NORTH CAROLINA	UNKNOWN ADDRESS	UNKNOWN	XX	0
68	9788858707	CORP PRES BISHOP CH JESUS CHRIST-LDS	LDS CHURCH TAX DIVISION	SALT LAKE CITY	UT	84150
69	9788854949	ROSEMAN MARK J	321 COUNTRY CLUB RD	CHAPEL HILL	NC	275143904
70	9788543697	UNIVERSITY OF N C	PROPERTY OFFICE UNC	CHAPEL HILL	NC	27599



OWNER

GIMGHOUL CORPORATION
PO BOX 3670
CHAPEL HILL, NC 27515

ZONING LEGEND

R-1	RESIDENTIAL 1, 3 UNITS /ACRE
R-LD1	RESIDENTIAL-LOW DENSITY, 1 UNIT/ACRE
OI-1	OFFICE & INSTITUTIONAL 1

LEGEND

SUBJECT PROPERTY

1,000 FOOT NOTIFICATION BOUNDARY

ZONING DISTRICTS

OVERLAY DISTRICTS

CHAPEL HILL LAND USE PLAN DESIGNATION: INSTITUTIONAL

NOTES:
1. THERE IS AN UNPAVED GREENWAY ON THE PROPERTY THAT SURROUNDS THE SUBJECT PROPERTY. BATTLE PARK IS LOCATED WITHIN THE 1,000 FOOT NOTIFICATION OF THE SUBJECT PROPERTY.
2. THERE ARE NO BICYCLE LANES WITHIN 1,000 FEET OF THE SUBJECT PROPERTY.
3. THIS PROPERTY AND ALL PROPERTY WITHIN 1,000 FEET OF THE PROPERTY ARE WITHIN THE TOWN OF CHAPEL HILL, NC CORPORATE LIMITS.

OVERLAY DISTRICTS

HD-3 (HISTORIC DISTRICT)	GRIMGOUHL
CD-2 (NEGHBORHOOD CONSERVATION)	GREENWOOD

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PRELIMINARY
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GRAPHIC SCALE
200 0 100 200 400
(IN FEET)
1 inch = 200 ft.

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Lic. #C-1030

GIMGHOUL CASTLE
CHAPEL HILL, NORTH CAROLINA
AREA MAP

REV.	DATE	DESCRIPTION
1	11/18/2020	PROGRESS MODIFICATIONS

DATE: FEBRUARY 4 2021

SHEET NO.
C2.4

GIMGHOUL ROAD
50' PUBLIC RW

GRAVEL DRIVE

PRIVATE EASEMENT
PB 26 PG 49

N= 787,043.483
E=1,988,969.490

S87°47'47"E 208.76'

S68°24'44"W
1,548.51' TO GRID

NC GRID
MONUMENT "TATUM"
N= 786,473.70
E=1,987,529.48
NAD '83(2001)
C.F.=0.99992141

BATTLE PARK
STATE OF NORTH CAROLINA
DB 258 PG 525
PB 26 PG 49
PIN: 9788-96-4759

S47°44'33"E 59.72'

N22°08'28"E 40.30'

S73°31'46"E 216.81'

10' TYPE "B" BUFFER
11' SOLAR SETBACK

PRIVATE EASEMENT
PB 26 PG 49

LANDSCAPE PERIMETER BUFFER NOTE:

1. THE LANDSCAPING WITHIN THE EXISTING PERIMETER BUFFERS SHALL NOT BE DISTURBED.

GIMGHOUL CORPORATION
DB 851 PG 418
PB 26 PG 49
PIN: 9788-96-2765
AREA=2.15± ACRES

8' INTERIOR SETBACK
10' TYPE "B" BUFFER

141.64'

N22°08'28"E

10' STORMWATER MANAGEMENT ACCESS AND MAINTENANCE EASEMENT TO GIMGHOULD ROAD R/W.

BATTLE PARK
STATE OF NORTH CAROLINA
DB 258 PG 525
PB 26 PG 49
PIN: 9788-96-4759

EX. TOWER/ SPIRE

EX. TOWER

BUILDING CORNERS, FACES AND WALLS MAY VARY BY ±0.6'

EXISTING GIMGHOUL CASTLE STONE BUILDING

EX. COVERED PORCH

EXISTING GAS METERS

EXISTING A/C CONCRETE PADS

EXISTING METAL STEPS

REBUILD PORTION OF EX. PATIO

NEW BLDG ADDITION WITH BASEMENT

NEW CONCRETE SIDEWALK

REPLACE EXISTING CONCRETE SIDEWALK

EX. PORCH CONCRETE SLAB RESURFACE EXISTING PATIO

6" PORCH WEEP HOLES

EX. CONC. TABLE

NEW LOWER TERRACE

NEW STAIRS TO LOWER TERRACE

NEW STAIRS TO GRADE

RAMP TO BASEMENT LEVEL

NEW STAIRS TO LOWER TERRACE

STORMWATER MANAGEMENT

STORMWATER MANAGEMENT ACCESS AND MAINTENANCE EASEMENT AROUND SCM AND TO GIMGHOULD ROAD R/W.

EXISTING ROCK PILE

EXISTING ROCK BOULDER

EXISTING CHIMNEY

EXISTING ROCK BENCH

EXISTING BENCH

EXISTING ROCK WALL (TYPICAL)

EXISTING BRICK WALL

EX. GRAVEL

EX. GRAVEL DRIVE

EX. CHAIN GATE

EX. DROMGOOLE ROCK

EXISTING ROCK WALL (TYPICAL)

REMOVE EX. 20" PINE FOR NEW ELECTRICAL SERVICE

REMOVE EX. 28" WHITE OAK

REMOVE EX. 28" WHITE OAK

16" HICKORY
18" CEDAR
20" PINE
20" HICKORY
24" WHITE OAK
24" DBL. HEMLOCK
30" WHITE OAK
36" WHITE OAK
32" WHITE OAK
24" PINE
38" WHITE OAK
30" PINE
20" OAK
34" WHITE OAK
22" WHITE OAK
18" HICKORY
12" HICKORY
28"

S26°58'11"E 166.38'

10' TYPE "B" BUFFER
8' INTERIOR SETBACK

S2°08'57"W 146.12'

10' TYPE "B" BUFFER
8' INTERIOR SETBACK

S75°14'11"W 152.53'

10' TYPE "B" BUFFER
8' INTERIOR SETBACK

N55°35'16"W 151.05'

10' TYPE "B" BUFFER
8' INTERIOR SETBACK

N05°32'36"W 128.06'

BATTLE PARK
STATE OF NORTH CAROLINA
DB 258 PG 525
PB 26 PG 49
PIN: 9788-96-4759

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GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 inch = 20 ft.

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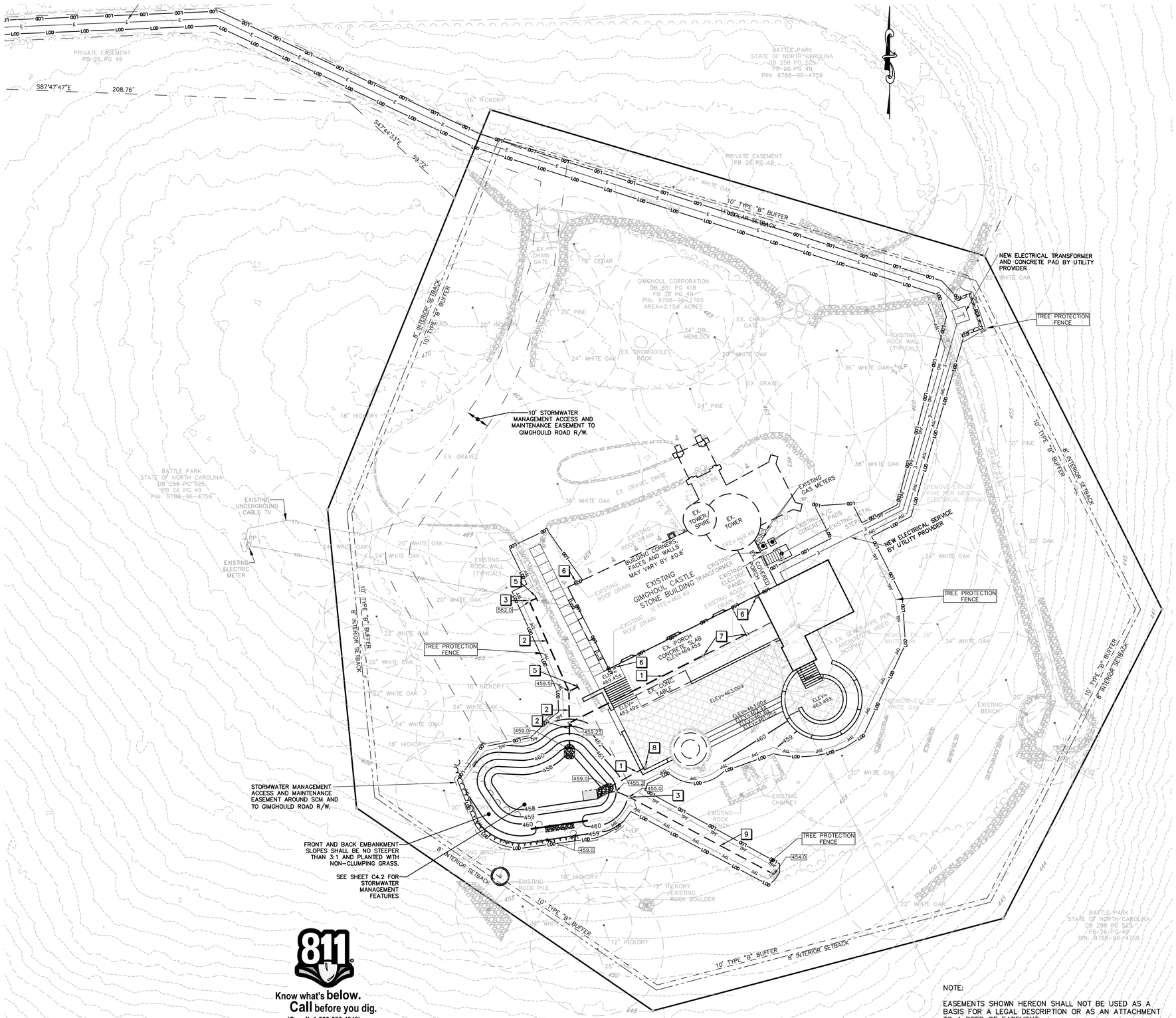
GIMGHOUL CASTLE
CHAPEL HILL, NORTH CAROLINA
SITE LAYOUT PLAN

REV.	DATE	DESCRIPTION
1	09/17/2021	TRT REVIEW COMMENTS
2	12/07/2021	TRT REVIEW COMMENTS

DATE: FEBRUARY 4 2021

SHEET NO.
C3.1



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NOTE:

EASEMENTS SHOWN HEREON SHALL NOT BE USED AS A BASIS FOR A LEGAL DESCRIPTION OR AS AN ATTACHMENT TO A DEED OF EASEMENT.

KEY KEYED NOTES – GRADING & STORM DRAINAGE PLAN

1. NEW 4" DIAMETER ROOF DRAINAGE PIPE AT 1% MINIMUM SLOPE.
2. NEW 6" DIAMETER ROOF DRAINAGE PIPE AT 1% MINIMUM SLOPE.
3. ADD CLEANOUT ASSEMBLY TO ROOF DRAIN, SIMILAR TO SANITARY SEWER CLEANOUT DETAIL.
4. SEE ARCHITECTURAL DRAWINGS FOR FINISHED ELEVATIONS FOR TERRACE, STEPS, AND SIDEWALK.
5. MAKE WATERTIGHT CONNECTIONS TO ROOF DRAIN STUBOUTS FROM ARCHITECTURAL DRAWINGS.
6. EXISTING DOWNSPOUT TO DRAIN TO FILTERRA DEVICE. SEE ARCHITECTURAL DRAWINGS. FOR ANY EXISTING ROOF DRAIN PIPING INDICATED TO REMAIN IN SERVICE, CONDUCT VISUAL EXAMINATION OF PIPE WITH FLOWING WATER TO VERIFY FUNCTIONALITY; RESOLVE ANY DEFICIENCIES FOUND TO THE ARCHITECT'S SATISFACTION.
7. INSTALL NEW CATCH BASINS AT LOW POINTS IN EXISTING PORCH. BASINS SHALL BE 9" X 9" THERMOPLASTIC UNITS WITH SQUARE "ATRIUM" GRATE BY NDS, OR EQUIVALENT. INSTALL UNIT TO PROVIDE POSITIVE DRAINAGE FROM THE PORCH.
8. MILDLY SLOPE THE WESTERN PORTION OF THE NEW LOWER TERRACE SURFACE TO DRAIN TO A NEW CATCH BASIN AT THE LOW POINT IN THE CORNER. BASINS SHALL BE 9" X 9" THERMOPLASTIC UNITS WITH SQUARE "ATRIUM" GRATE BY NDS, OR EQUIVALENT. INSTALL UNIT TO PROVIDE POSITIVE DRAINAGE FROM THE NEW LOWER TERRACE. SEE ARCHITECTURAL DRAWINGS OF TERRACE AND CANOPY FOR DETAIL.
9. NEW 8" DIAMETER DRAINAGE PIPE AT 1% MINIMUM SLOPE.

IMPERVIOUS SURFACE:

EXISTING:	24,602 SF
DEMOLITION:	596 SF
PROPOSED:	4,298 SF
TOTAL:	28,304 SF

NOTES

1. NO STEEP SLOPE AREAS ARE PRESENT ON THIS PROPERTY.
2. SEE SHEET C2.2 FOR MORE DETAIL ABOUT EXISTING TOPOGRAPHIC CONDITIONS.
3. SEE SHEET C4.2 FOR STORMWATER MANAGEMENT PLAN AND DETAILS.
4. SOILS ON THE SITE ARE AuC AND WmE.

PRELIMINARY
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20 0 10 20 40
(IN FEET)
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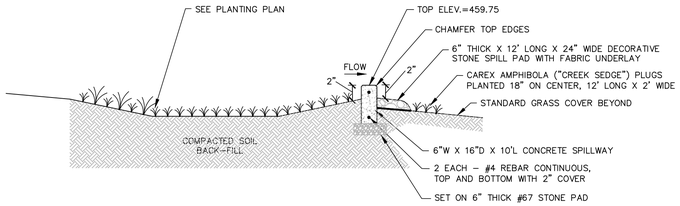
GIMGHOUL CASTLE
CHAPEL HILL, NORTH CAROLINA

GRADING & STORM DRAINAGE PLAN

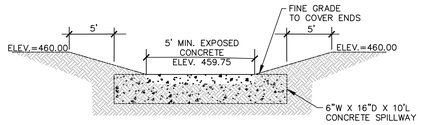
REV.	DATE	DESCRIPTION
1	09/17/2021	TRT REVIEW COMMENTS
2	12/07/2021	TRT REVIEW COMMENTS
4	03/04/2022	BUFFER OPTION 1 (NO DISTURBANCE)

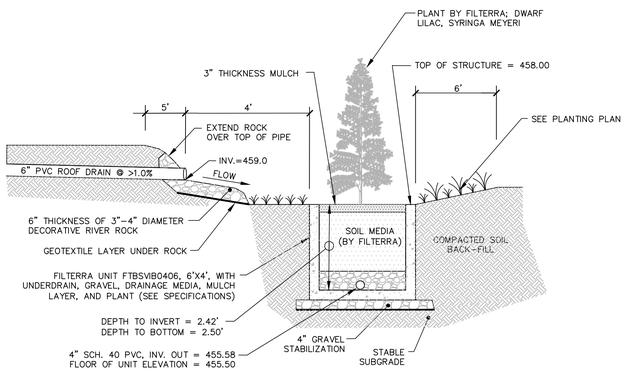
DATE: FEBRUARY 4 2021

SHEET NO.
C4.1

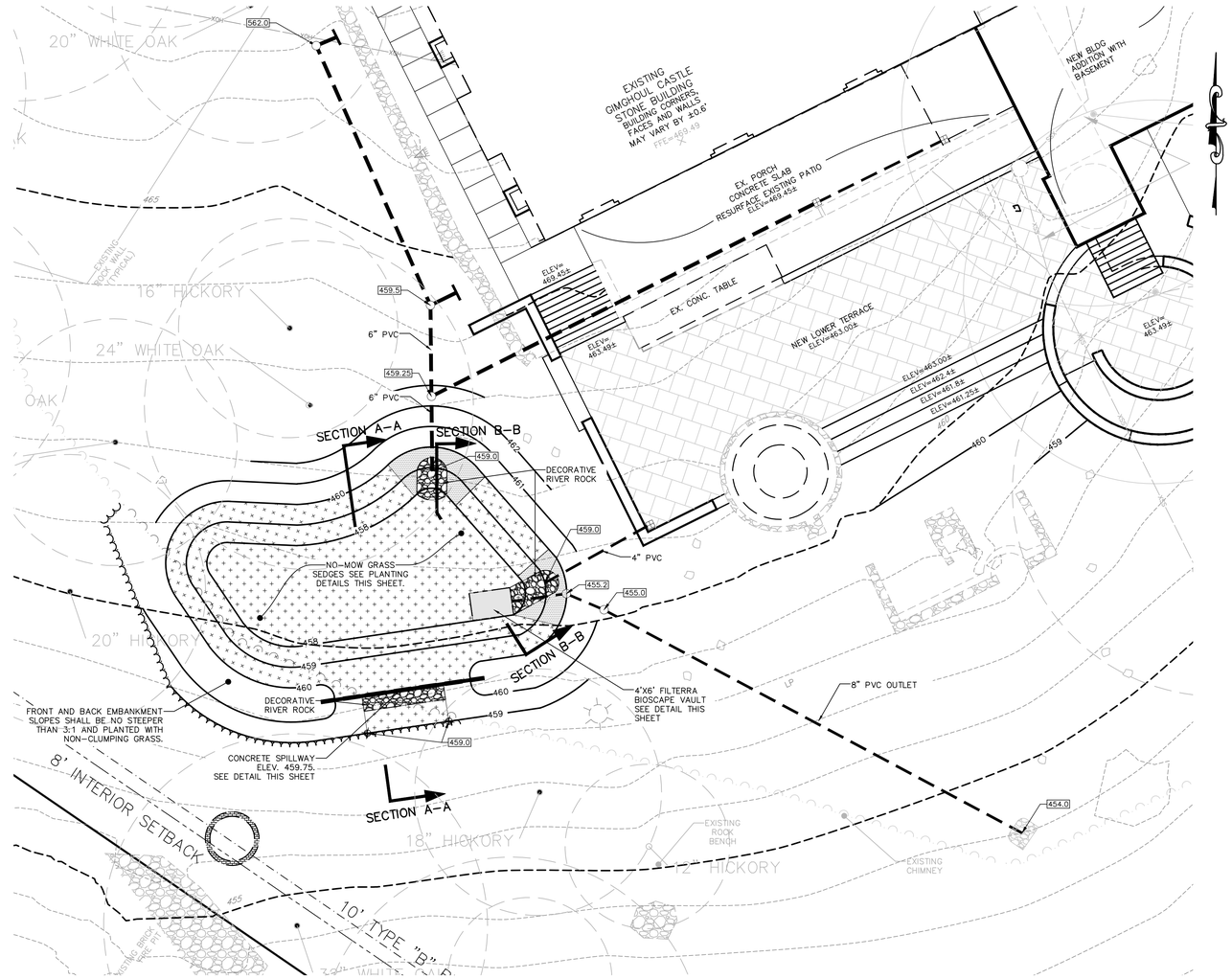


STORMWATER MANAGEMENT
SECTION A–A





STORMWATER MANAGEMENT
SECTION B–B



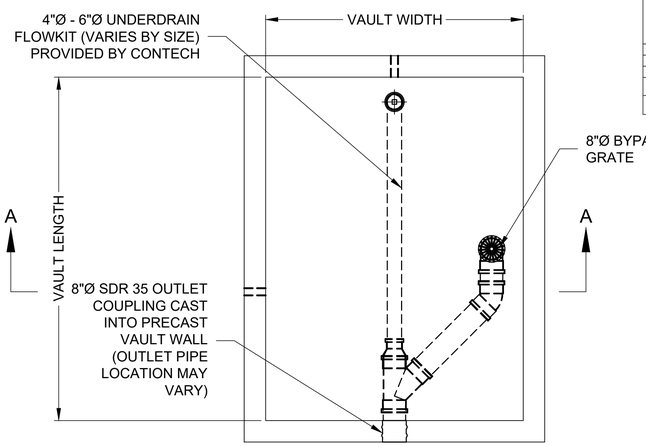
SYMBOL	BOTANICAL NAME	COMMON NAME	SIZE	SPACING	AREA (SF)	EST. QUANTITY
+ + + + + + + + + + + +	CAREX AMPHIBOLA	CREEK SEDGE	PLUG	18" O.C.	1,320	680
	PHLOX DIVARICATE	WOODLAND PHLOX	QUART	18" O.C.	90	46

PLANTING NOTES:
1. ALL PLANT SUBSTITUTIONS MUST BE APPROVED BY ENGINEER.
2. PLACE PLANTINGS IN A STAGGERED PATTERN WITH THE INDICATED SPACINGS
3. BREAK APART ROOT MASSES PRIOR TO PLANTING QUART PLANTINGS.
4. WITHIN THE PLANTING SOIL AREA, DO NOT EXCAVATE AN OVERSIZED HOLE FOR PLANTINGS, BUT REMOVE OR DISPLACE ONLY ENOUGH SOIL FOR THE ROOT BALL OR ROOT MASS. INSERT ROOT INTO THE PLANTING MIX AND FIRMLY PRESS SURROUNDING SOIL AGAINST IT FOR SUPPORT.
5. PROVIDE A ONE-YEAR WARRANTY TO OWNER FOR ALL PLANT MATERIALS.

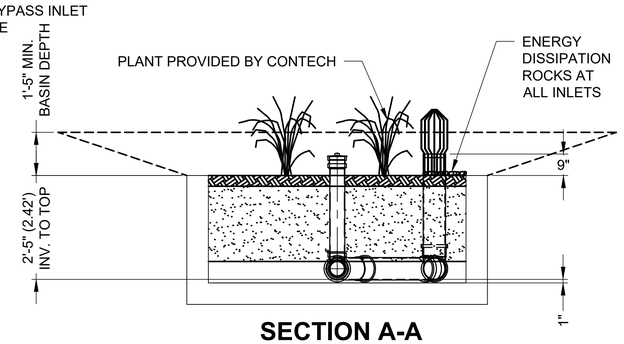
FTBSVIB CONFIGURATION
(OPTIONS: BASIN "-B", GREEN INFRASTRUCTURE INLET "-I", PIPE INLET "-P", SLOTTED THROAT INLET "-T")

MEDIA BAY SIZE	VAULT SIZE (L x W)	LONG SIDE INLET DESIGNATION	SHORT SIDE INLET DESIGNATION	AVAILABILITY	MAX. OUTLET / BYPASS PIPE DIA.	MAX. BYPASS FLOW (CFS)	UNDERDRAIN PIPE DIA. (PERF)	MIN. NO. OF INLET PIPES (-P ONLY)
4 x 4	4 x 4	FTBSVIB0404	FTBSVIB0404	ALL	6" SDR 35	1.42	4" SDR 35	1
6 x 4	6 x 4	FTBSVIB0604	FTBSVIB0406	N/A CA	8" SDR 35	1.89	4" SDR 35	1
6.5 x 4	6.5 x 4	FTBSVIB06504	FTBSVIB04065	CA ONLY	8" SDR 35	1.89	4" SDR 35	1
7.83 x 4.5	7.83 x 4.5	FTBSVIB078045	FTBSVIB045078	DE,MD,NJ,PA,VA,WV ONLY	8" SDR 35	1.89	4" SDR 35	1
8 x 4	8 x 4	FTBSVIB0804	FTBSVIB0408	N/A DE,MD,NJ,PA,VA,WV	8" SDR 35	1.89	4" SDR 35	1

*UTILIZES (2) CURB OPENINGS WITH MIN 1' SPACING
N/A = NOT AVAILABLE



PLAN VIEW



SECTION A-A

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10 0 5 10 20
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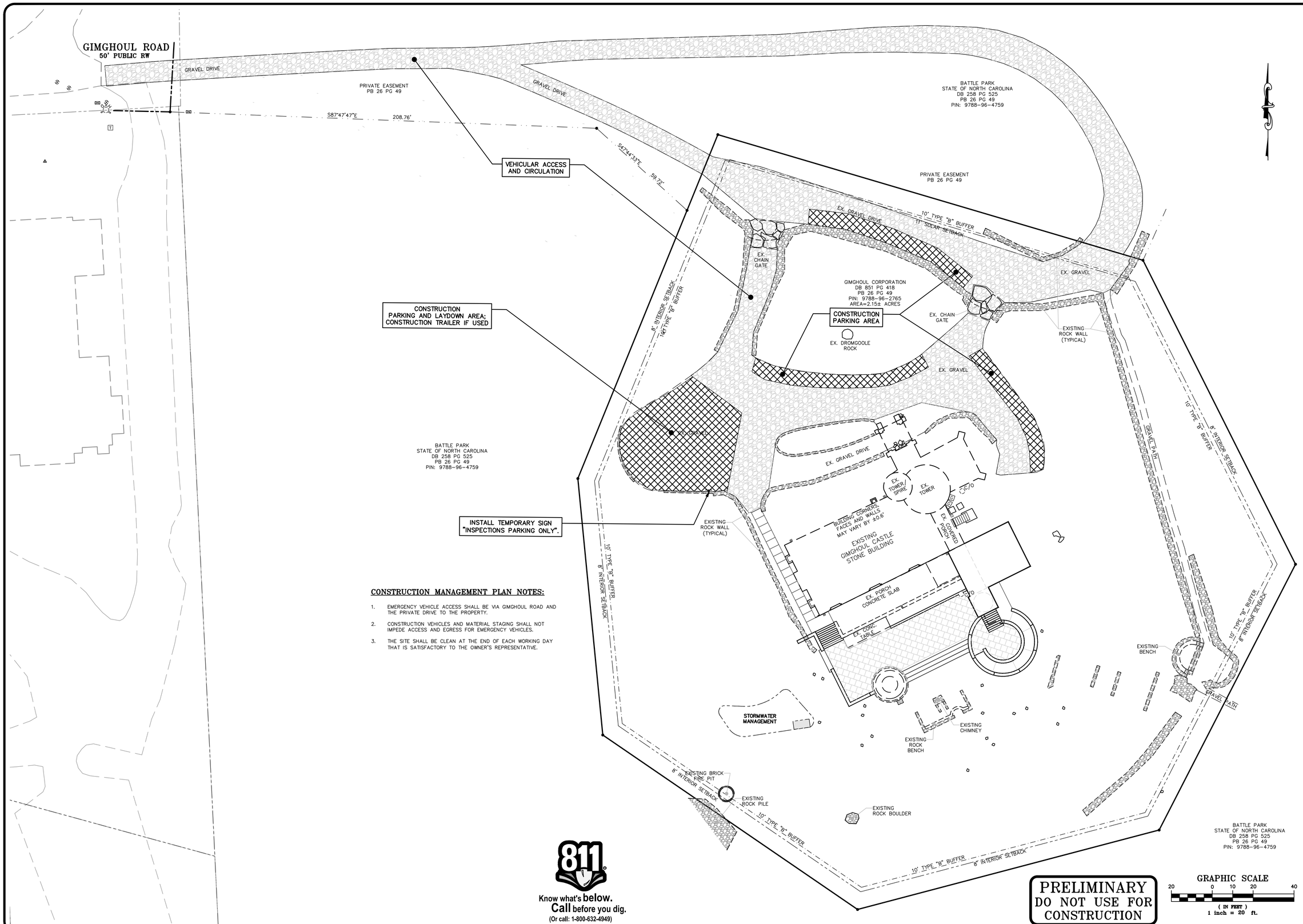
GIMGHOUL CASTLE
CHAPEL HILL, NORTH CAROLINA
STORMWATER MANAGEMENT PLAN AND DETAILS

REV.	DATE	DESCRIPTION
1	09/17/2021	TRT REVIEW COMMENTS
2	12/07/2021	TRT REVIEW COMMENTS

DATE: FEBRUARY 4 2021

SHEET NO.
C4.2



CONSTRUCTION MANAGEMENT PLAN NOTES:

1. EMERGENCY VEHICLE ACCESS SHALL BE VIA GIMGHOUL ROAD AND THE PRIVATE DRIVE TO THE PROPERTY.
2. CONSTRUCTION VEHICLES AND MATERIAL STAGING SHALL NOT IMPEDE ACCESS AND EGRESS FOR EMERGENCY VEHICLES.
3. THE SITE SHALL BE CLEAN AT THE END OF EACH WORKING DAY THAT IS SATISFACTORY TO THE OWNER'S REPRESENTATIVE.

811
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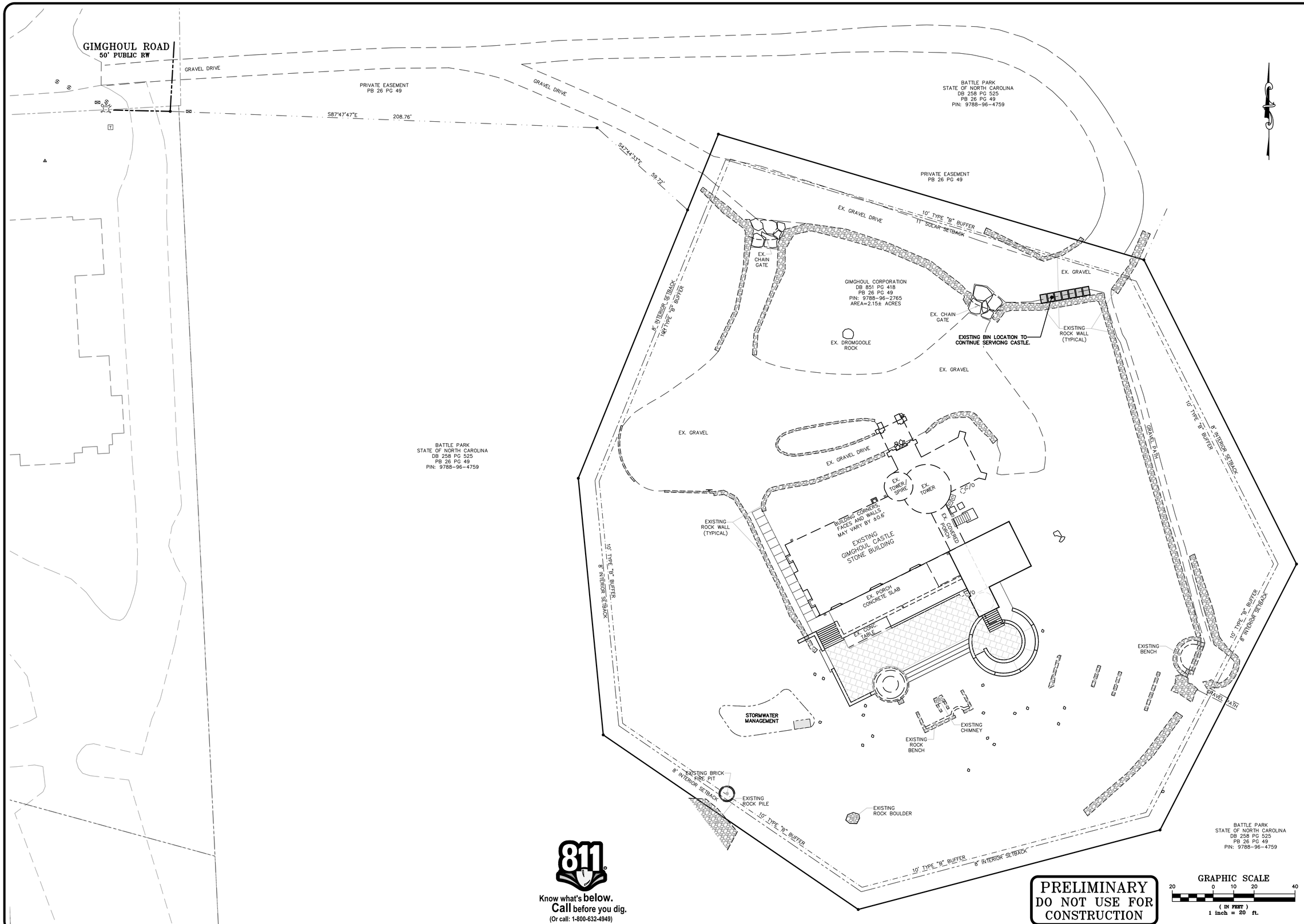
GIMGHOUL CASTLE
CHAPEL HILL, NORTH CAROLINA
CONSTRUCTION MANAGEMENT PLAN

REV.	DATE	DESCRIPTION
2	12/07/2021	TRT REVIEW COMMENTS

DATE: FEBRUARY 4 2021

SHEET NO.
C5.1



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GIMGHOUL CASTLE
CHAPEL HILL, NORTH CAROLINA

SOLID WASTE PLAN

REV.	DATE	DESCRIPTION
2	12/07/2021	TRT REVIEW COMMENTS

DATE: FEBRUARY 4 2021

SHEET NO.
C5.2

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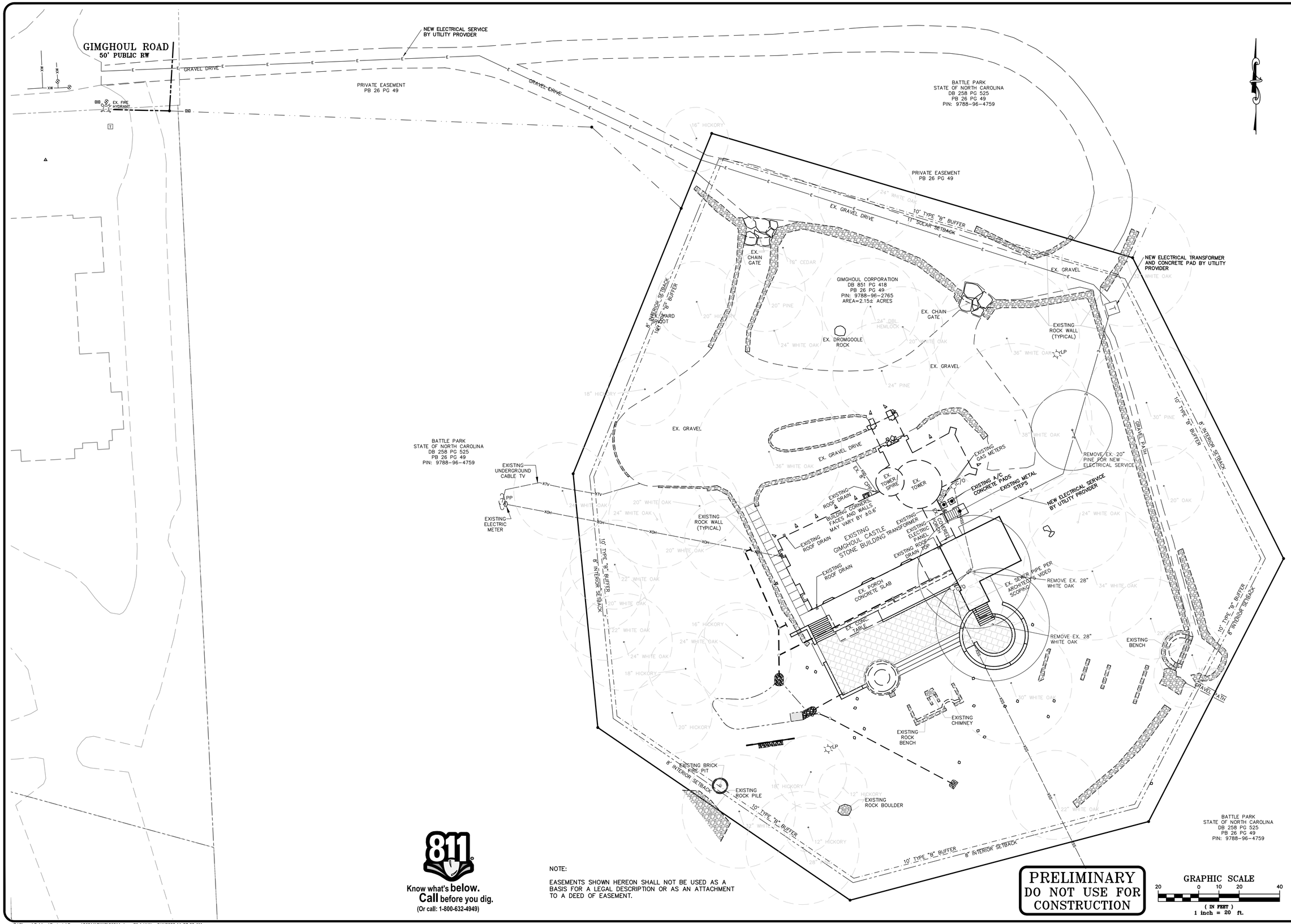

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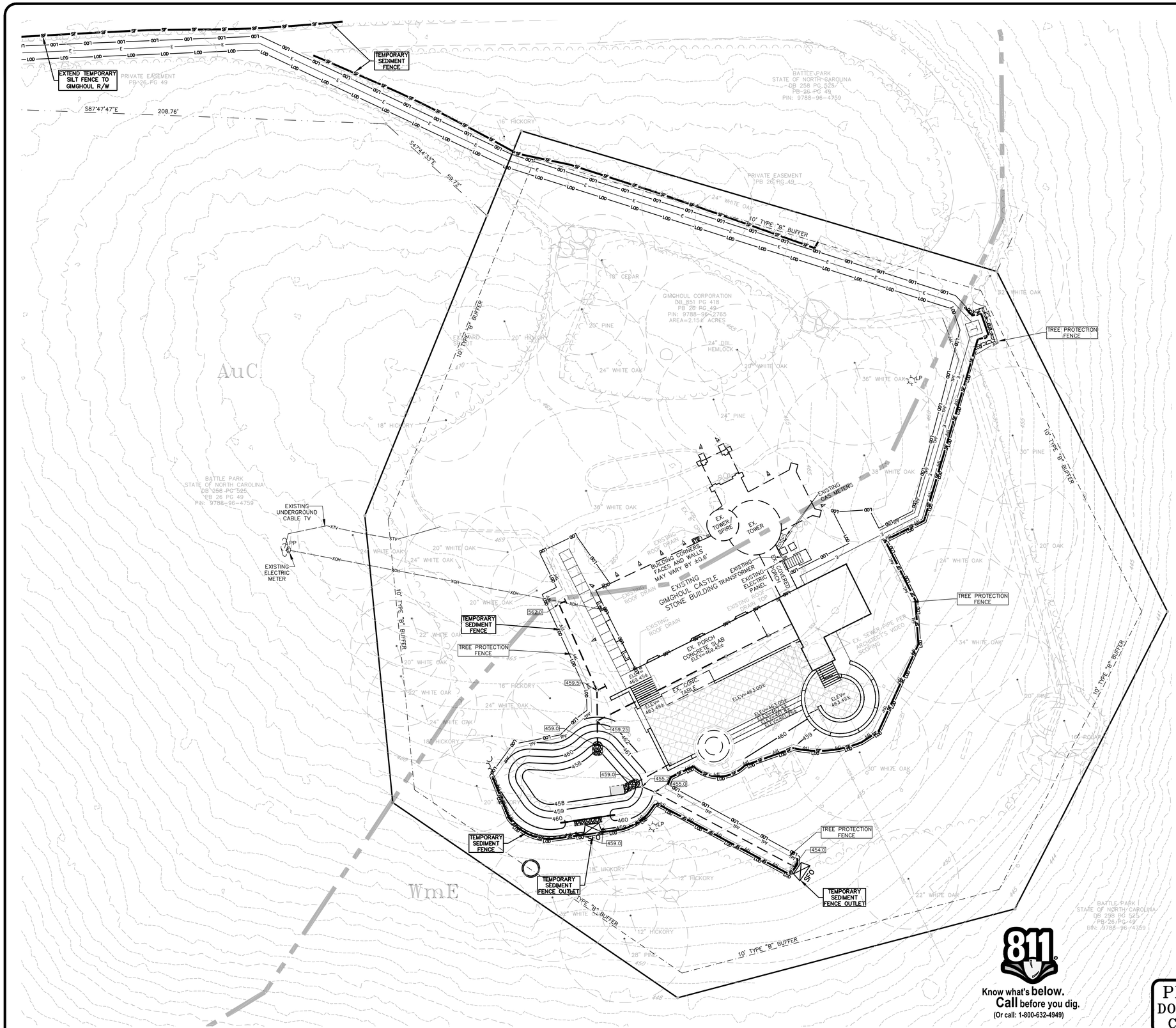
GIMGHOUL CASTLE
CHAPEL HILL, NORTH CAROLINA

UTILITY PLAN

REV.	DATE	DESCRIPTION
2	12/07/2021	TRT REVIEW COMMENTS
4	03/04/2022	BUFFER OPTION 1 (NO DISTURBANCE)

DATE: FEBRUARY 4 2021

SHEET NO.
C6.1



EROSION CONTROL LEGEND

	NEW
STANDARD SILT FENCE	SF SF
LIMIT OF DISTURBANCE	LOD LOD
STANDARD SILT FENCE OUTLET	SFO

EROSION CONTROL NOTES:

1. WHERE TEMP SILT FENCE AND TREE PROTECTION FENCE ARE SHOWN TOGETHER INSTALL ONLY THE TEMPORASRY SILT FENCE.

MAINTENANCE PLAN

1. CHECK ALL EROSION AND SEDIMENT CONTROL PRACTICES FOR STABILITY AND OPERATION FOLLOWING EVERY RAINFALL PRODUCING RUNOFF BUT IN NO CASE LESS THAN ONCE EVERY WEEK. MAKE ANY NEEDED REPAIRS IMMEDIATELY TO MAINTAIN ALL PRACTICES AS DESIGNED.
2. REMOVE SEDIMENT FROM BEHIND CHECK DAMS AND STONE FILTERS WHEN STORAGE CAPACITY HAS BEEN APPROXIMATELY 50% FILLED. CLEAN OR REPLACE GRAVEL ON OUTLETS WHEN WATER POOLS AND IS NO LONGER DRAINING PROPERLY.
3. FERTILIZE ALL SEEDED AREAS, RESEED AS NECESSARY, AND MULCH ACCORDING TO THE SEEDING SCHEDULE TO MAINTAIN A VIGOROUS, DENSE VEGETATIVE COVER.
4. RE-WORK DEVICES AND MEASURES, INCLUDING REMOVAL, RE-CONSTRUCTION, AND/OR RELOCATION AS NEEDED DURING THE PROGRESS OF WORK TO ACCOMMODATE CHANGING TOPOGRAPHIC CONDITIONS, SURFACE RUNOFF PATTERNS, INSTALLATIONS OF OTHER WORK, ETC.

Know what's **below.**
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GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 inch = 20 ft.

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CHAPEL HILL, NORTH CAROLINA
EROSION CONTROL PLAN

REV.	DATE	DESCRIPTION
1	09/17/2021	TRT REVIEW COMMENTS
4	03/04/2022	BUFFER OPTION 1 (NO DISTURBANCE)

DATE: FEBRUARY 4 2021

SHEET NO.
C7.1

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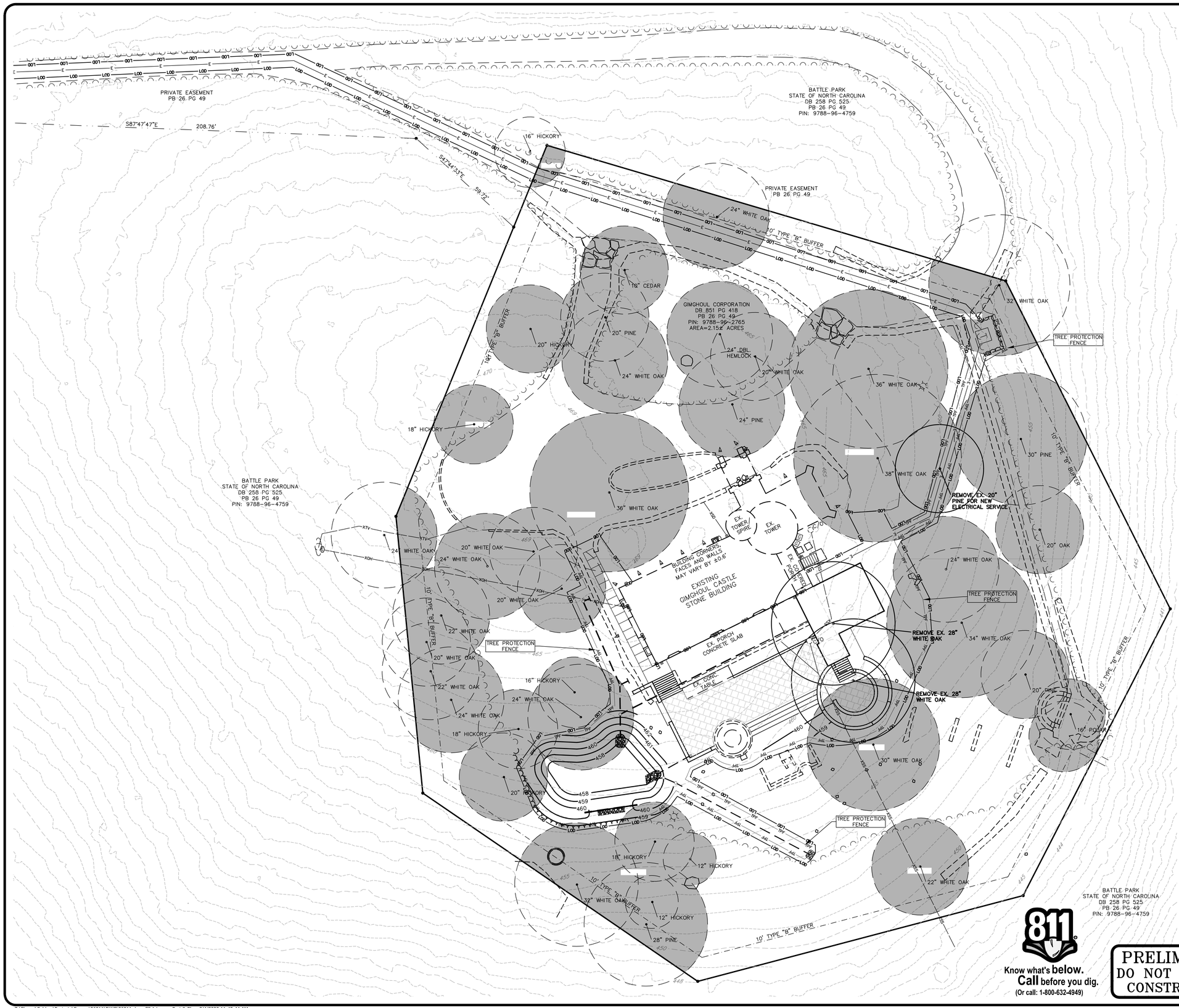

EXISTING TREE COVERAGE

EXISTING PROPERTY AREA = 93,850 SF

EXISTING TREE COVERAGE AREA = 49,173 SF

PERCENT OF PROPERTY = 52.4%

LANDSCAPE PROTECTION PLAN NOTES:

1. ALL TREE PROTECTION FENCE AND TEMP SILT FENCE SHALL BE INSTALLED BEFORE CLEARING AND GRADING.
2. THE CONTRACTOR SHALL TAKE EVERY PRECAUTION TO PROTECT EXISTING TREES.
3. THE LANDSCAPING WITHIN THE EXISTING PERIMETER BUFFERS SHALL NOT BE DISTURBED.

LANDSCAPE PLANTING NOTES:

1. EXISTING FOLIAGE, WITH THE EXCEPTION OF ONE TREE TO BE REMOVED FOR NEW ELECTRICAL SERVICE, WILL BE PRESERVED AND CONTINUE TO SATISFY BUFFER REQUIREMENTS

PRELIMINARY
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GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 inch = 20 ft.

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GIMGHOUL CASTLE
CHAPEL HILL, NORTH CAROLINA

LANDSCAPE PROTECTION AND PLANTING PLAN

REV.	DATE	DESCRIPTION
1	09/17/2021	TRT REVIEW COMMENTS
2	12/07/2021	TRT REVIEW COMMENTS
4	03/04/2022	BUFFER OPTION 1 (NO DISTURBANCE)

DATE: FEBRUARY 4 2021

SHEET NO.
C8.1

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GIMGHOUL CASTLE

CHAPEL HILL, NORTH CAROLINA

SITE LAYOUT EXHIBIT

REV.	DATE	DESCRIPTION
2	12/07/2021	TRT REVIEW COMMENTS

DATE: FEBRUARY 4 2021

SHEET NO.

EX-1

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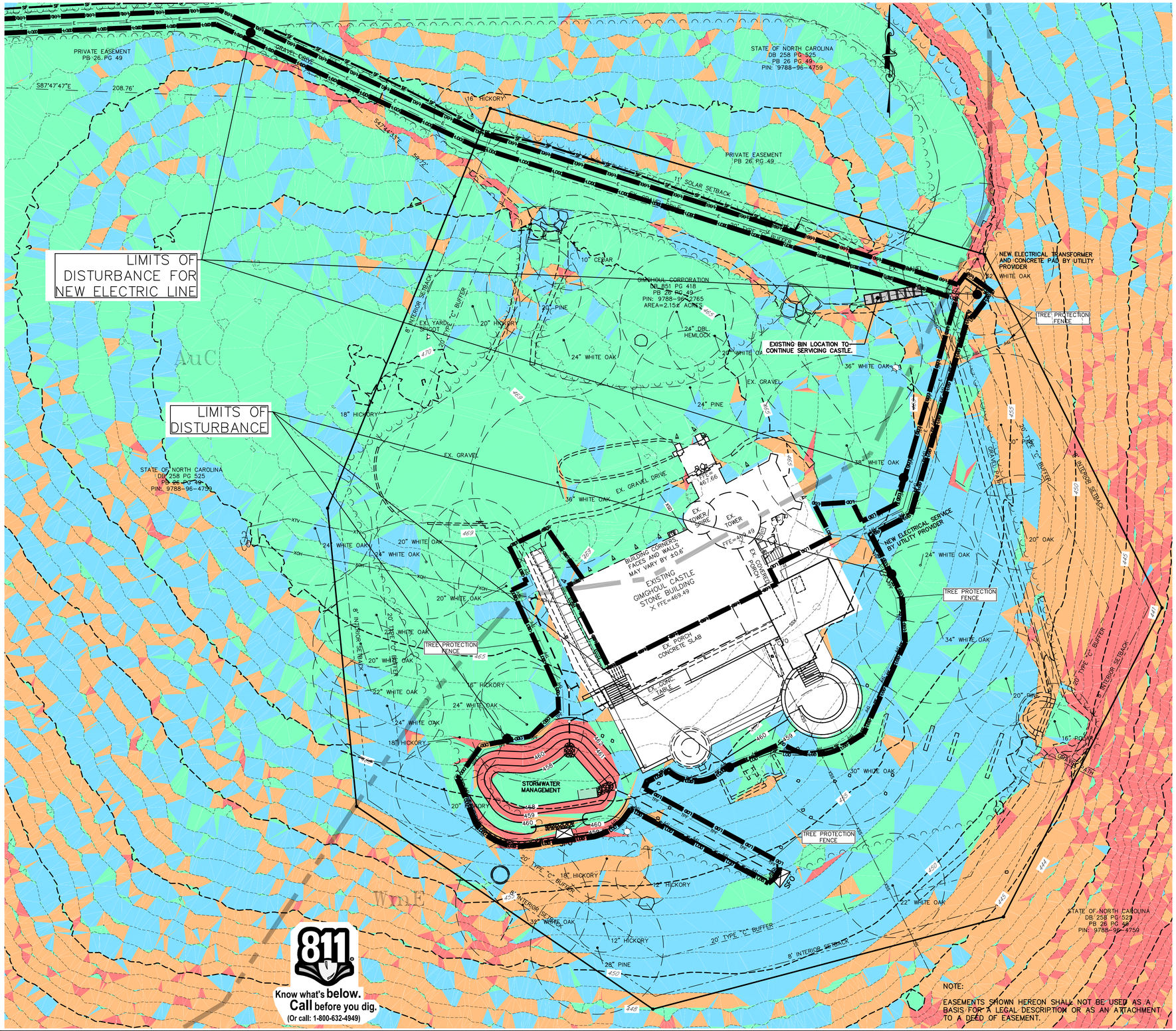

NOTE:

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SLOPE LEGEND:

- 0% TO 10%
- 10% TO 15%
- 15% TO 25%
- 25% AND GREATER

NOTE:

1. THERE WILL BE NO CONSTRUCTION IN ANY STEEP SLOPE AREAS AS DEFINED BY THE CHAPEL HILL LUMO SECTION 5.3.2-C(1).

GRAPHIC SCALE

20 0 10 20 40

(IN FEET)
1 inch = 20 ft.

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GIMGHOUL CASTLE

CHAPEL HILL, NORTH CAROLINA

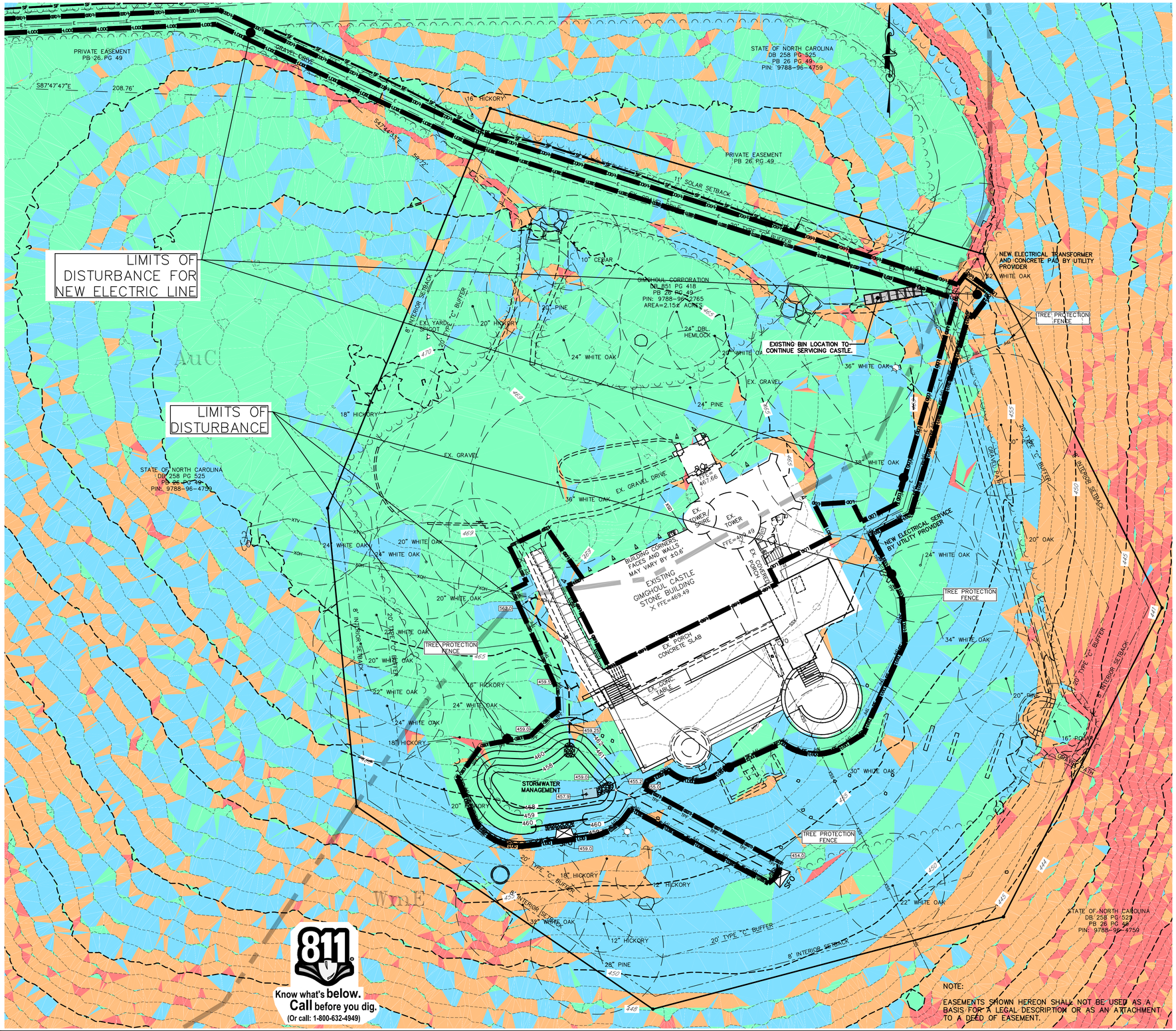
PROPOSED SLOPE ANALYSIS

REV.	DATE	DESCRIPTION

DATE: FEBRUARY 4 2021

SHEET NO.

SA-2



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GIMGHOUL CASTLE

CHAPEL HILL, NORTH CAROLINA

EXISTING SLOPE ANALYSIS

REV.	DATE	DESCRIPTION

DATE: FEBRUARY 4 2021

SHEET NO.

SA-1

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Existing Vehicle Parking (21 total spaces)....

including proposed Handicapped Spaces w/ Access Isle +

Bicycle Racks to accommodate four Bicycles.

CONSTRUCTION COLOR KEY

- PROPOSED NEW CONSTRUCTION
- PROPOESD NEW HARDSCAPE CONSTRUCTION

1 / S1.01 **SITE PLAN**

SCALE: 1"=20'-0"

GRAPHIC SCALE 0 5' 10' 15' 20' 40' (1" 2")

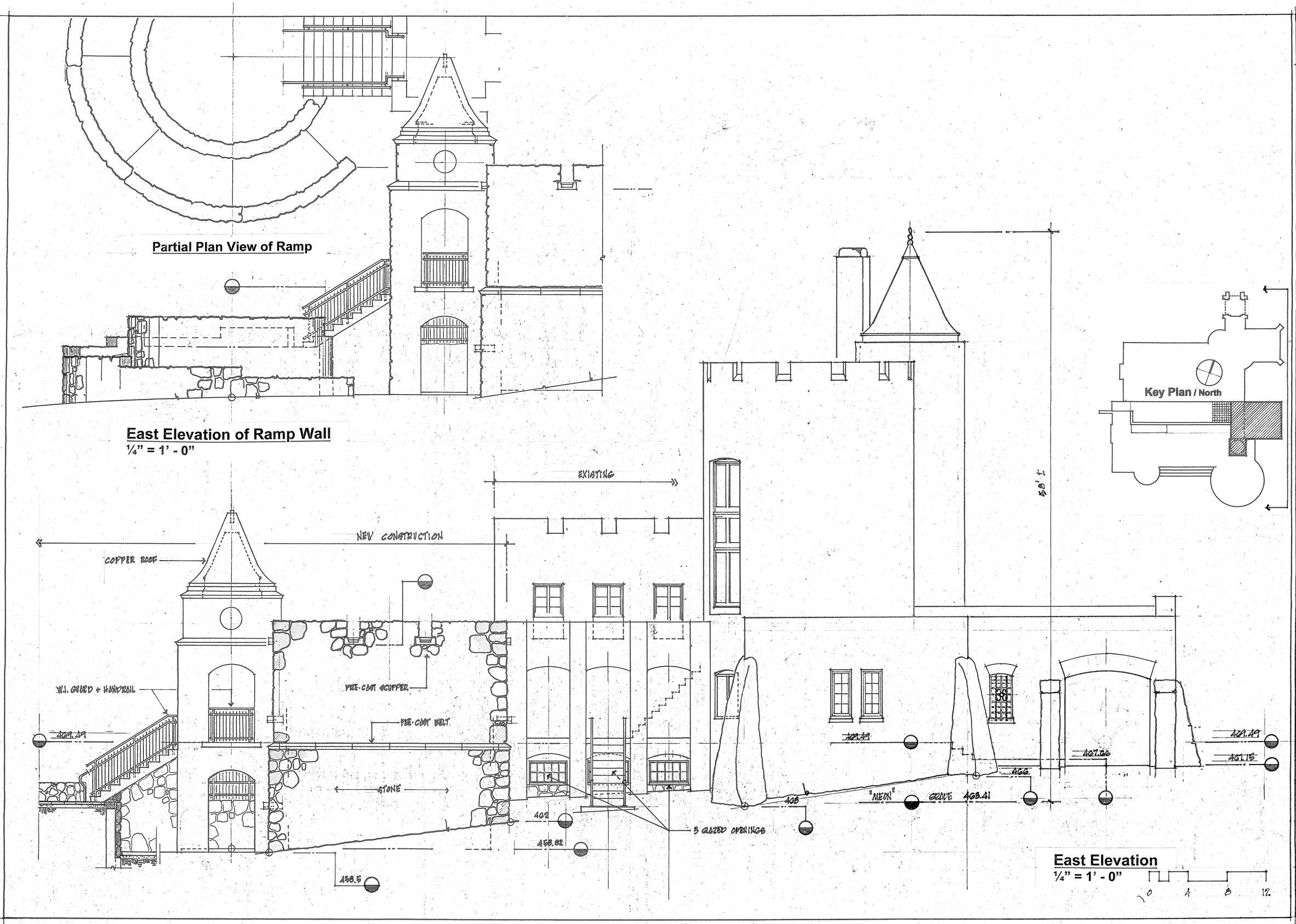
Edgar Toms Carr, AIA, NCARB
c/o Robert Winston Carr, Inc./ Associated Architects
PO Box 1692
Durham, North Carolina 27702
rwc.architects@frontier.com 919-688-6308 o. / 919-906-2496 c.

Addition & Renovation to...

Gimghoul Castle

742 Gimghoul Road

Chapel Hill, North Carolina 27514



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PO Box 1692
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rwc.architects@frontier.com 919/688-6308 o. / 919-906-2486 c.

Addition & Renovations to...
Gimghoul Castle
Gimghoul Road
Chapel Hill, North Carolina 27514

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STORMWATER IMPACT STATEMENT

Gimghoul Castle

705 Gimghoul Rd
Chapel Hill, NC 27514
February 3, 2021
Revised September 17, 2021
Revised December 7, 2021
Project # 26011

NORTH CAROLINA PROFESSIONAL SEAL 045307 ENGINEER ANDREW JONES
12/07/2021

Prepared For:
Gimghoul Corporation
PO Box 3670
Chapel Hill, NC 27515R

Gimghoul Castle

Stormwater Impact Statement

Purpose

The purpose of this report is to assess stormwater impacts associated with proposed renovations of an existing historic site and building located in the Town of Chapel Hill. This analysis addresses requirements prescribed in the Town's regulations related to stormwater runoff control. Improvements to the site include interior building renovations, small building additions, a new terrace, and pedestrian improvements to the site.

Existing Site Conditions and Drainage Characteristics

The subject property is located at 742 Gimghoul Rd in Chapel Hill, and consists of approximately 2.15 acres of lightly developed property. A single structure sits on the property, with a gravel-surfaced driveway. The predominant land cover is grass lawn and forest with numerous mature trees. No stormwater runoff from offsite areas flows onto the property which is located on the crest of a hill. Runoff leaves the property in a distributed nature largely across the southern border of the site boundary. The property is not located in any floodplain area or Resource Conservation District (RCD). The subject property is located in the Jordan Lake drainage basin, and within the Town's Watershed Protection Overlay District.

Impervious Surface Area

The current site contains 24,602 ft^2 of existing impervious area comprised of one existing building, onsite parking, and several stone walls and walking paths. The project will remove 596 ft^2 of impervious and add 4,298 ft^2 of new impervious for a net increase of 3,702 ft^2.

$$24{,}602\ ft^2 - 596\ ft^2 + 4{,}298\ ft^2 = 28{,}304\ ft^2 \text{ Total proposed impervious area.}$$

Sedimentation and Erosion Control

The relatively small amount of disturbed area for the subject project is less than the threshold for plan review and permitting by the Orange County Sedimentation Control Office. The applicable disturbed area threshold is 20,000 sf, and the proposed disturbed area for this project is 17,750 sf. Despite having no requirement for sedimentation control plan review, the project work includes conventional measures for temporary sediment and erosion control during construction activities.

Applicability of Local Stormwater Regulations

Two areas of stormwater-related regulations appear in the Town of Chapel Hill LUMO; specifically Section 3.6.4 – Watershed Protection District and Section 5.4 – Stormwater Management. Paragraph 3.6.4 (d) (2) provides exemption from the entire 3.6.4 section for projects that do not trigger the threshold for Erosion and Sedimentation Control Review. Based on the foregoing discussion regarding this topic, the applicant claims exemption from LUMO Section 3.6.4 for this project.

Section 5.4 exemptions do not appear to apply to this project since it is not residential in nature. The relevant performance requirements for this site are:

1. Achieve 85% TSS removal from the runoff generated by the first 1" of precipitation on the new impervious added to the site.
2. Limit the 2-year 24-hour runoff volume leaving the site to the corresponding pre-development (existing conditions) level.
3. Limit the peak runoff rate leaving the site resulting from the 1-year, 2-year, and 25-year, 24-hour rainfall events to the pre-development (existing conditions) levels.

TSS Removal

An additional 3,702 sf of impervious area is proposed on the site. One inch of precipitation on the new impervious would generate 293 cubic feet of runoff required to be treated to 85% TSS. A Filterra Bioscape device is proposed to remove 85% TSS from 5,529 sf (0.13 ac.) of existing and proposed impervious area; an area greater than the amount of net new impervious area. One inch of precipitation on the actual area draining to the proposed device would generate 574 cubic feet of runoff that will be treated to 85% TSS.

The NCDEQ Manual recommends a 4'x6' Filterra Bioscape unit for drainage areas up to 0.14 acres based on a Media area / Drainage Area ratio of 0.39%. Due to some concerns raised by the Town regarding the pervious area draining to the device, a more conservative ratio of 0.33% will be used.

$$5{,}529\ ft^2\ drainage\ area \times 0.33\% \ = 18.2\ ft^2\ media\ area$$

The proposed 4'x6' Filterra Bioscape will provide 24 ft^2 of media area which exceeds the media area required.

2-Year Volume Management

The estimated volume increases between 2-year pre-development and post-development conditions is 906 cubic feet as calculated by the SCS Runoff Curve Number Method provided in Exhibit 3. This volume will be entirely treated by the Filterra Bioscape device.

The Filterra device was modeled in Autodesk's Hydrographs model as a stormwater control measure "pond" with an overflow spillway and a constant outflow equivalent. A 50% factor of safety has been applied to the published infiltration rate of the Filterra media of 140 inches per hour to account for potential decrease in performance over time. An infiltration rate of 70 inches per hour has been used in all calculations.

$$\frac{70\ inches}{hour} \times \frac{1\ hour}{3600\ seconds} \times \frac{1\ foot}{12\ inches} \times [4' \times 6' Filterra\ Surface\ Area] = 0.039 \frac{ft^3}{s}$$

The Filterra device is equipped with an “internal bypass” overflow standpipe riser set at 9” above the media surface. The Hydrographs model demonstrates that this design will allow the entire 1-year, post development storm event (1,420 cubic feet of runoff) to pass through the Filterra media without staging up over the internal bypass overflow. The model output for this scenario is included in Exhibit 4.

Peak Runoff Rate

The Filterra device and surrounding depression area in the lawn will provide sufficient detention so that the project does not increase the peak runoff rates for all regulated return intervals. The peak runoff rate calculations are provided in Exhibit 4 for the required 1-year, 2-year and 25-year; 24-hour events. These are summarized below:

	Q1 (cfs)		Q2 (cfs)		Q25 (cfs)	
	Pre	**Post**	**Pre**	**Post**	**Pre**	**Post**
Drainage Area:	0.70	0.43	1.28	1.01	4.54	4.28

These results demonstrate that the project does not increase the peak runoff rates for all regulated return intervals.

Conclusion

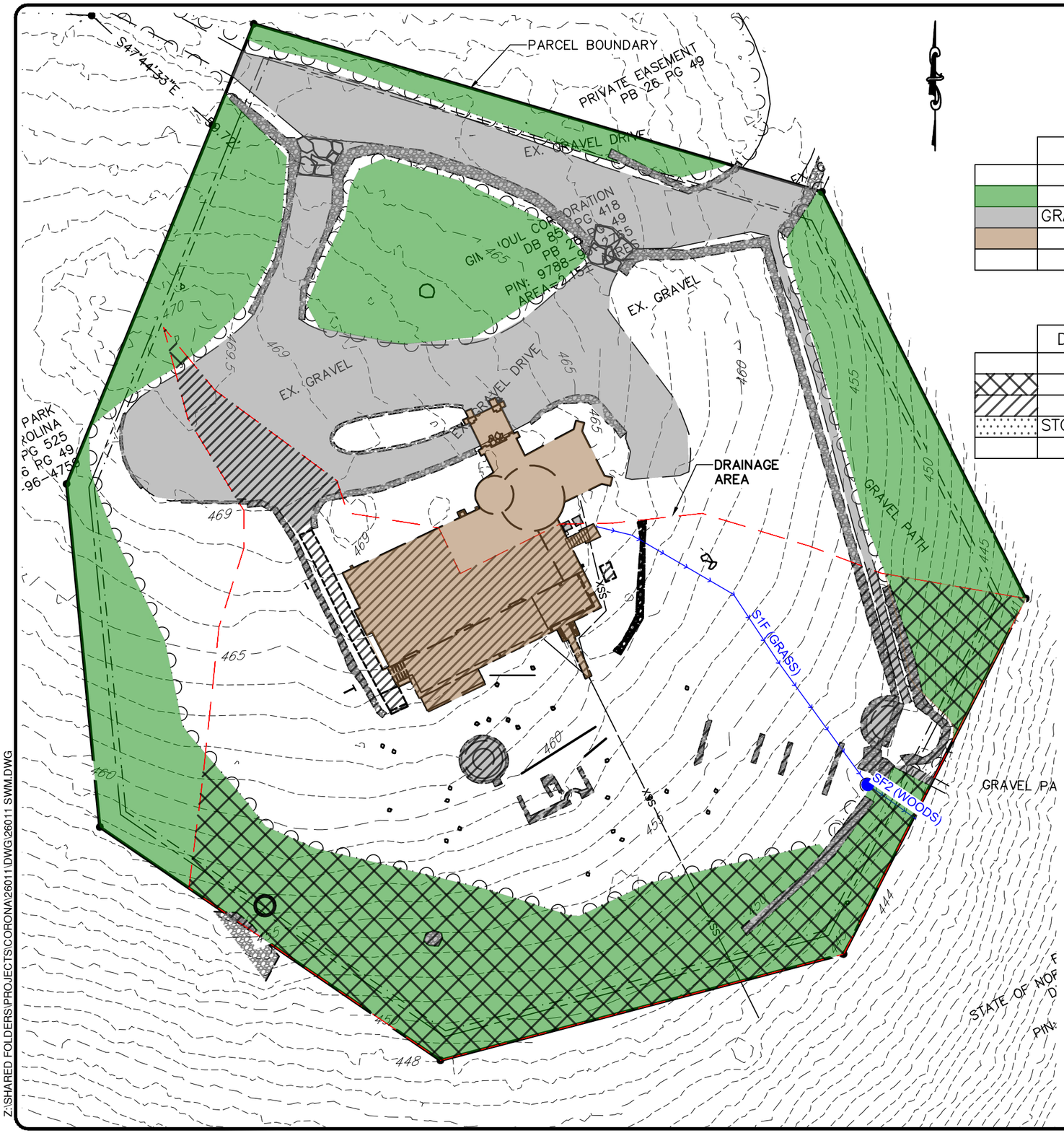
The proposed stormwater management strategy will meet Town of Chapel Hill stormwater management requirements.

End

Exhibits

1. Drainage Area Map for Pre-Development Conditions
2. Drainage Area Map for Post-Development Conditions
3. SCS Curve Number for 2-Year Volume Analysis
4. Porch catch basin calculation
5. Peak Flow Analysis and Model Report

Exhibit 1 – Drainage Area Map for Pre-Development Conditions



	EXISTING LAND COVER	AREA (FT2)	AREA (AC.)
	GRASS	37,506	0.86
	FOREST	31,742	0.73
	GRAVEL DRIVE AND STONE PATHS	19,133	0.44
	BUILDING FOOTPRINT	5,469	0.13
	TOTAL AREA	93,850	2.15

	DRAINAGE AREA LAND COVER	AREA (FT2)	AREA (AC.)
	GRASS	24,829	0.57
	FOREST	13,676	0.31
	IMPERVIOUS	7,468	0.17
	STORMWATER CONTROL MEASURE	0	0
	TOTAL AREA	45,973	1.06

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Lic. #C-1080

REV.	DATE	DESCRIPTION	BY

PRE DEVELOPMENT DRAINAGE MAP

DATE: NOV 30, 2021
HORIZ. SCALE: 1" = 40'
VERT. SCALE: N/A
PROJ. MANAGER: MAF
DRAWN BY: ADJ
PROJECT NO: 26011
DRAWING NAME: 26011 SWM.DWG
SHEET NO. 1

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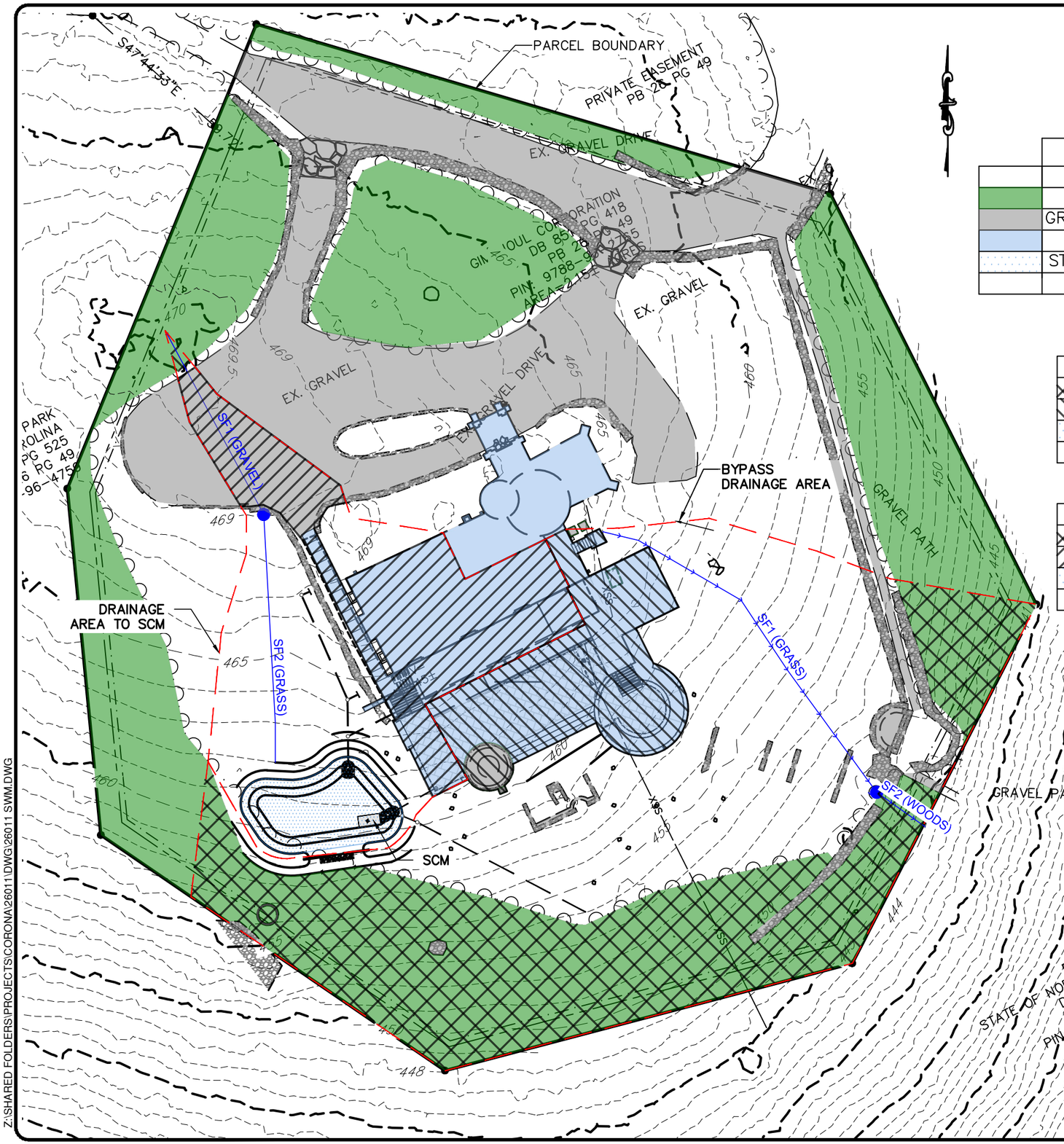
Exhibit 2 – Drainage Area Map for Post-Development Conditions



	PROPOSED LAND COVER	AREA (FT2)	AREA (AC.)
	GRASS	32,871	0.75
	FOREST	31,239	0.72
	GRAVEL DRIVE AND STONE PATHS	18,576	0.43
	BUILDING FOOTPRINT	9,730	0.22
	STORMWATER CONTROL MEASURE	1,434	0.03
	TOTAL AREA	93,850	2.15

	BYPASS DRAINAGE AREA	AREA (FT2)	AREA (AC.)
	GRASS	16,165	0.37
	FOREST	13,123	0.30
	IMPERVIOUS	4,200	0.10
	SCM	0	0
	TOTAL AREA	33,488	0.77

	DRAINAGE AREA TO SCM	AREA (FT2)	AREA (AC.)
	GRASS	5,529	0.13
	FOREST	48	0.00
	IMPERVIOUS	5,468	0.13
	SCM	1,434	0.03
	TOTAL AREA	12,479	0.29

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REV.	DATE	DESCRIPTION	BY

POST DEVELOPMENT DRAINAGE MAP

DATE: NOV 30, 2021	
HORIZ. SCALE: 1" = 40'	
VERT. SCALE: N/A	
PROJ. MANAGER: MAF	
DRAWN BY: ADJ	
PROJECT NO: 26011	
DRAWING NAME: 26011 SWM.DWG	
SHEET NO. 2	

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Exhibit 3 – SCS Curve Number for 2-Year Volume Analysis

Pre Development Curve Number					
Catchment	**Area (ac.)**	**LandCover**	**HSG**	**Curve Number**	**Composite CN**
Site	0.86	Grass (Good)	B	61	52.5
Site	0.73	Forest (Good)	B	55	40.1
Site	0.56	Impervious	B	98	55.3
Site	0.00	SCM	B	98	0.0
TOTAL Site	**2.15**				**68.7**

Post Development Curve Number					
Catchment	**Area (ac.)**	**LandCover**	**HSG**	**Curve Number**	**Composite CN**
Site	0.75	Grass (Good)	B	61	46.0
Site	0.72	Forest (Good)	B	55	39.4
Site	0.65	Impervious	B	98	63.7
Site	0.03	SCM	B	98	3.2
TOTAL Site	**2.15**				**70.7**

Pre Development 2-yr Runoff Volume	
3.60	Rainfall (in)
68.7	Curve Number
4.56	S
0.91	Initial Abstraction (Ia)
1.00	Runoff (Q) inches
7,792	Runoff Volume (ft^3)

Post Development 2-yr Runoff Volume	
3.60	Rainfall (in)
70.7	Curve Number
4.14	S
0.83	Initial Abstraction (Ia)
1.11	Runoff (Q) inches
8,697	Runoff Volume (ft^3)

Required 2-year Detention Volume:	**906**

Runoff Generated by 1" of precipitation on new impervious (simple method)

Ia (Impervious Fraction)	1.00	
Rd (Rainfall Depth)	1.0	inches
Rv (Runoff Volume)	0.95	
A (Area)	3,702.00	ft^2
DV (Design Volume)	**293**	ft^3

Drainage Area to SCM

Land Cover	Area (ft^2)	Area (ac.)
Impervious	5,529	0.13
Forest	48	0.00
Grass	5,468	0.13
SCM	1,434	0.03
TOTAL	**12,479**	**0.29**

Runoff Generated by 1" of precipitation on actual SCM Drainage Area (simple method)

Ia (Impervious Fraction)	0.56	
Rd (Rainfall Depth)	1.0	inches
Rv (Runoff Volume)	0.55	
A (Area)	0.29	ft^2
DV (Design Volume)	**574**	ft^3

Exhibit 4 – Porch catch basin calculation

Roof Drain Sizing

STRUCTURE	ZONE	LAND COVER	AREA (Ac)	C-VALUE	% OF TOTAL	$C_{increment}$
SCM	1	Impervious	0.013	0.96	100.0%	0.960
	2	Grass	0.000	0.50	0.0%	0.000
	3	Woods	0.000	0.40	0.0%	0.000
		Area =	**0.013**		**100.0%**	
		$C_{composite}$ =	**0.96**			

	1yr Q	2yr Q	10yr Q
I (intensity)	4.5	5.76	7.22
Q (Flow)	0.05	0.07	0.09

Inlet Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Sep 17 2021

<Name>

Drop Grate Inlet

Location	=	Sag
Curb Length (ft)	=	-0-
Throat Height (in)	=	-0-
Grate Area (sqft)	=	0.56
Grate Width (ft)	=	0.75
Grate Length (ft)	=	0.75

Gutter

Slope, Sw (ft/ft)	=	0.020
Slope, Sx (ft/ft)	=	0.020
Local Depr (in)	=	-0-
Gutter Width (ft)	=	1.00
Gutter Slope (%)	=	-0-
Gutter n-value	=	-0-

Calculations

Compute by:		Known Q
Q (cfs)	=	0.10

Highlighted

Q Total (cfs)	=	0.10
Q Capt (cfs)	=	0.10
Q Bypass (cfs)	=	-0-
Depth at Inlet (in)	=	0.60
Efficiency (%)	=	100
Gutter Spread (ft)	=	5.97
Gutter Vel (ft/s)	=	-0-
Bypass Spread (ft)	=	-0-
Bypass Depth (in)	=	-0-

All dimensions in feet

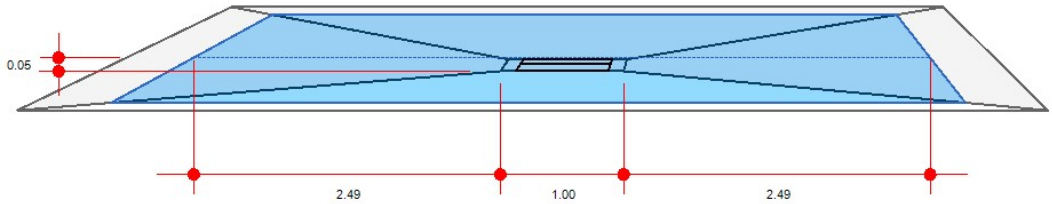


Exhibit 5 – Peak Flow Analysis and Model Report

Pre Development Drainage Area Curve Number					
Catchment	**Area (ac.)**	**LandCover**	**HSG**	**Curve Number**	**Composite CN**
Site	0.57	Grass (Good)	B	61	34.8
Site	0.31	Forest (Good)	B	55	17.3
Site	0.17	Impervious	B	98	16.8
Site	0.00	SCM	B	98	0.0
TOTAL Site	**1.06**				**65.2**

Post Development Drainage Area To SCM Curve Number					
Catchment	**Area (ac.)**	**LandCover**	**HSG**	**Curve Number**	**Composite CN**
Site	0.13	Grass (Good)	B	61	7.7
Site	0.00	Forest (Good)	B	55	0.1
Site	0.13	Impervious	B	98	12.3
Site	0.03	SCM	B	98	3.2
TOTAL Site	**0.29**				**81.4**

Post Development Bypass Drainage Area Curve Number					
Catchment	**Area (ac.)**	**LandCover**	**HSG**	**Curve Number**	**Composite CN**
Site	0.37	Grass (Good)	B	61	22.6
Site	0.30	Forest (Good)	B	55	16.6
Site	0.10	Impervious	B	98	9.4
Site	0.00	SCM	B	98	0.0
TOTAL Site	**0.77**				**63.3**

Time of Concentration Calculations

2-year, 24-hour rainfall depth (in.) 3.6

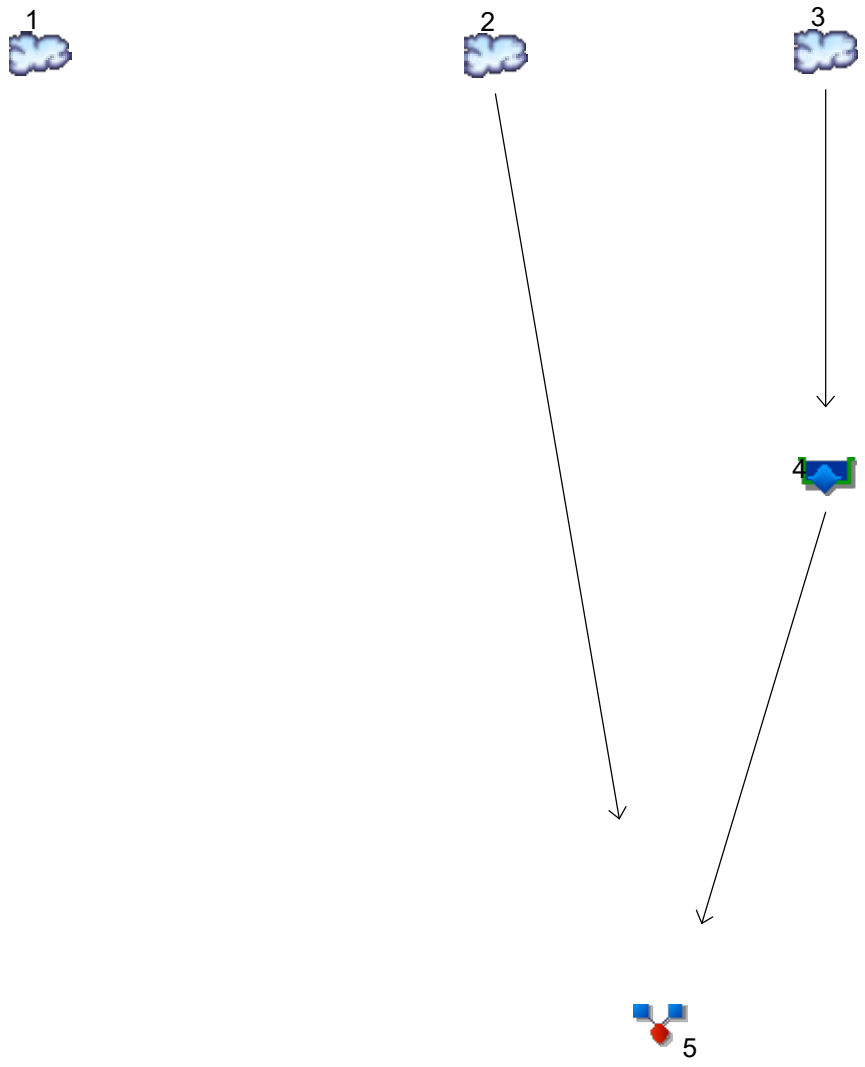
Pre Development Time of Concentration								
Label	**Flow Regime**	**Length**	**Land Cover**	**Roughness**	**Start Elev.**	**End Elev.**	**Average Slope**	**Time (min)**
SF1	Sheet Flow	141	Grass	0.15	464.0	450.0	0.10	6.41
SF2	Sheet Flow	21	Woods (Light)	0.4	450.0	445.0	0.24	2.16
Pre-Dev								8.56

Post Development Time of Concentration								
Catchment	**Flow Regime**	**Length**	**Land Cover**	**Roughness**	**Start Elev.**	**End Elev.**	**Average Slope**	**Time (min)**
SF1	Sheet Flow	75	Gravel	0.011	470.0	469.0	0.01	1.07
SF2	Sheet Flow	90	Grass	0.15	469.0	462.0	0.08	4.93
Post								6.00

Catchment	**Flow Regime**	**Length**	**Land Cover**	**Roughness**	**Start Elev.**	**End Elev.**	**Average Slope**	**Time (min)**
SF1	Sheet Flow	141	Grass	0.15	464.0	450.0	0.10	6.41
SF2	Sheet Flow	21	Woods (Light)	0.4	450.0	445.0	0.24	2.16
Post Bypass								8.56

Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020



Legend

Hyd.	Origin	Description
1	SCS Runoff	Pre-A
2	SCS Runoff	Post-A bypass
3	SCS Runoff	Site
4	Reservoir	FILTERRA
5	Combine	Post-A

Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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	------	0.696	1.279	-------	-------	-------	4.543	-------	6.663	Pre-A
2	SCS Runoff	------	0.404	0.795	-------	-------	-------	3.075	-------	4.574	Post-A bypass
3	SCS Runoff	------	0.707	0.977	-------	-------	-------	2.233	-------	2.957	Site
4	Reservoir	3	0.057	0.328	-------	-------	-------	1.247	-------	1.513	FILTERRA
5	Combine	2, 4	0.443	1.005	-------	-------	-------	4.283	-------	6.040	Post-A

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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	SCS Runoff	0.696	1	721	1,906	------	------	------	Pre-A
2	SCS Runoff	0.404	1	721	1,192	------	------	------	Post-A bypass
3	SCS Runoff	0.707	1	718	1,420	------	------	------	Site
4	Reservoir	0.057	1	752	1,420	3	458.73	593	FILTERRA
5	Combine	0.443	1	721	2,613	2, 4	------	------	Post-A

Total Volume passing through Filterra in 1 yr. storm.

The maximum ponding elevation gets to 458.73 and the internal bypass overflow device is set at 458.75'.

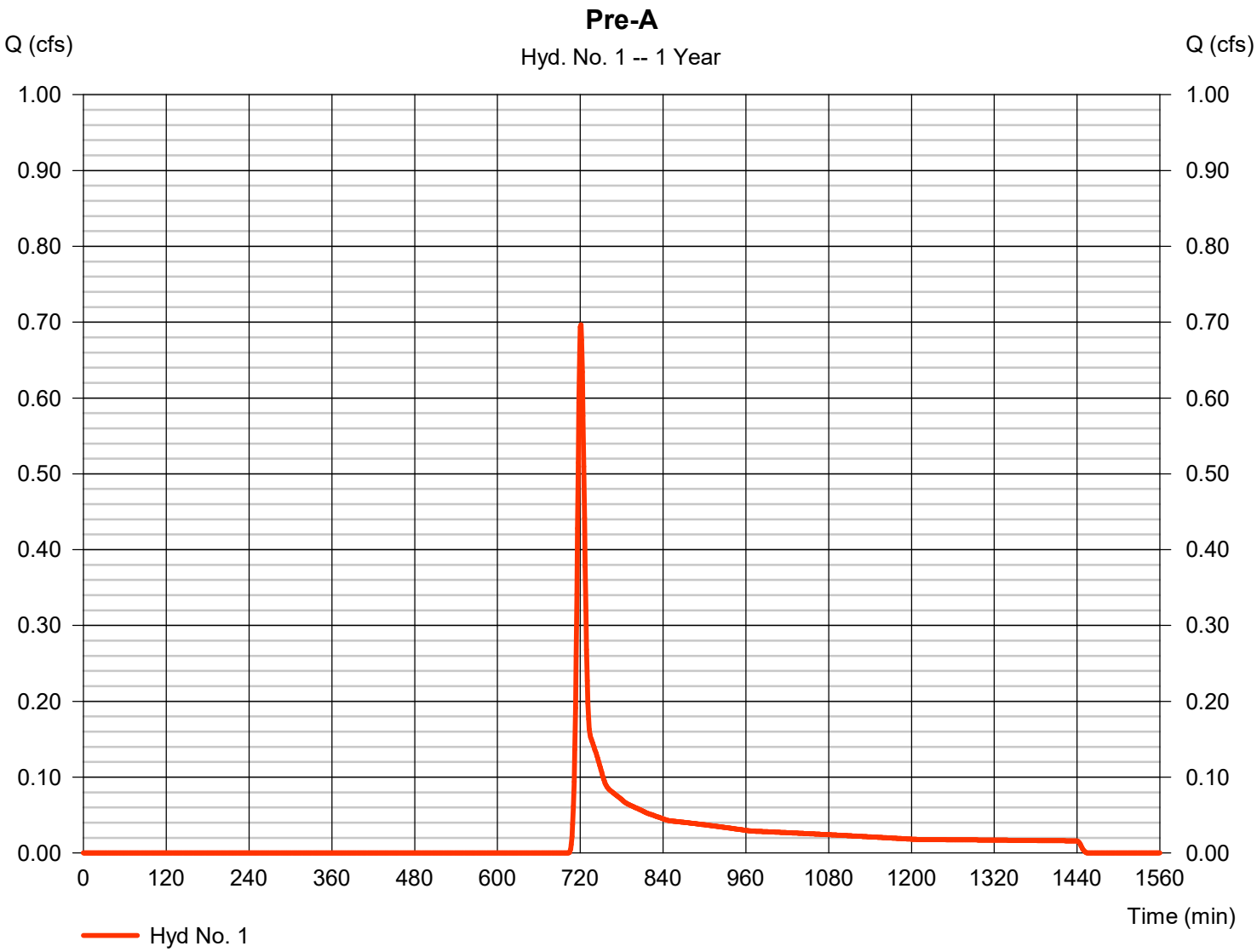
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Tuesday, 12 / 7 / 2021

Hyd. No. 1

Pre-A

Hydrograph type	= SCS Runoff	Peak discharge	= 0.696 cfs
Storm frequency	= 1 yrs	Time to peak	= 721 min
Time interval	= 1 min	Hyd. volume	= 1,906 cuft
Drainage area	= 1.060 ac	Curve number	= 65.2
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.60 min
Total precip.	= 2.96 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



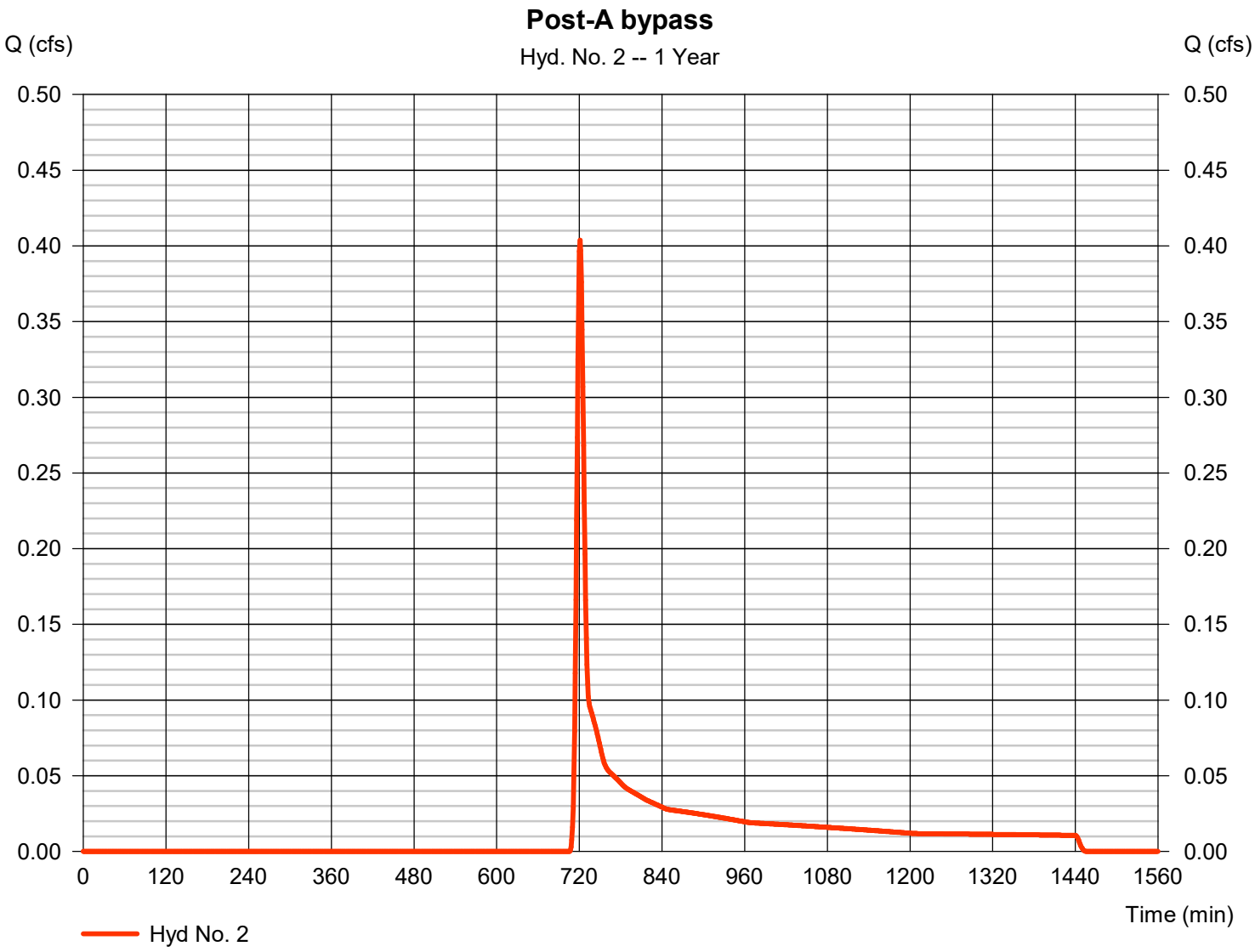
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Tuesday, 12 / 7 / 2021

Hyd. No. 2

Post-A bypass

Hydrograph type	= SCS Runoff	Peak discharge	= 0.404 cfs
Storm frequency	= 1 yrs	Time to peak	= 721 min
Time interval	= 1 min	Hyd. volume	= 1,192 cuft
Drainage area	= 0.770 ac	Curve number	= 63.3
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.60 min
Total precip.	= 2.96 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



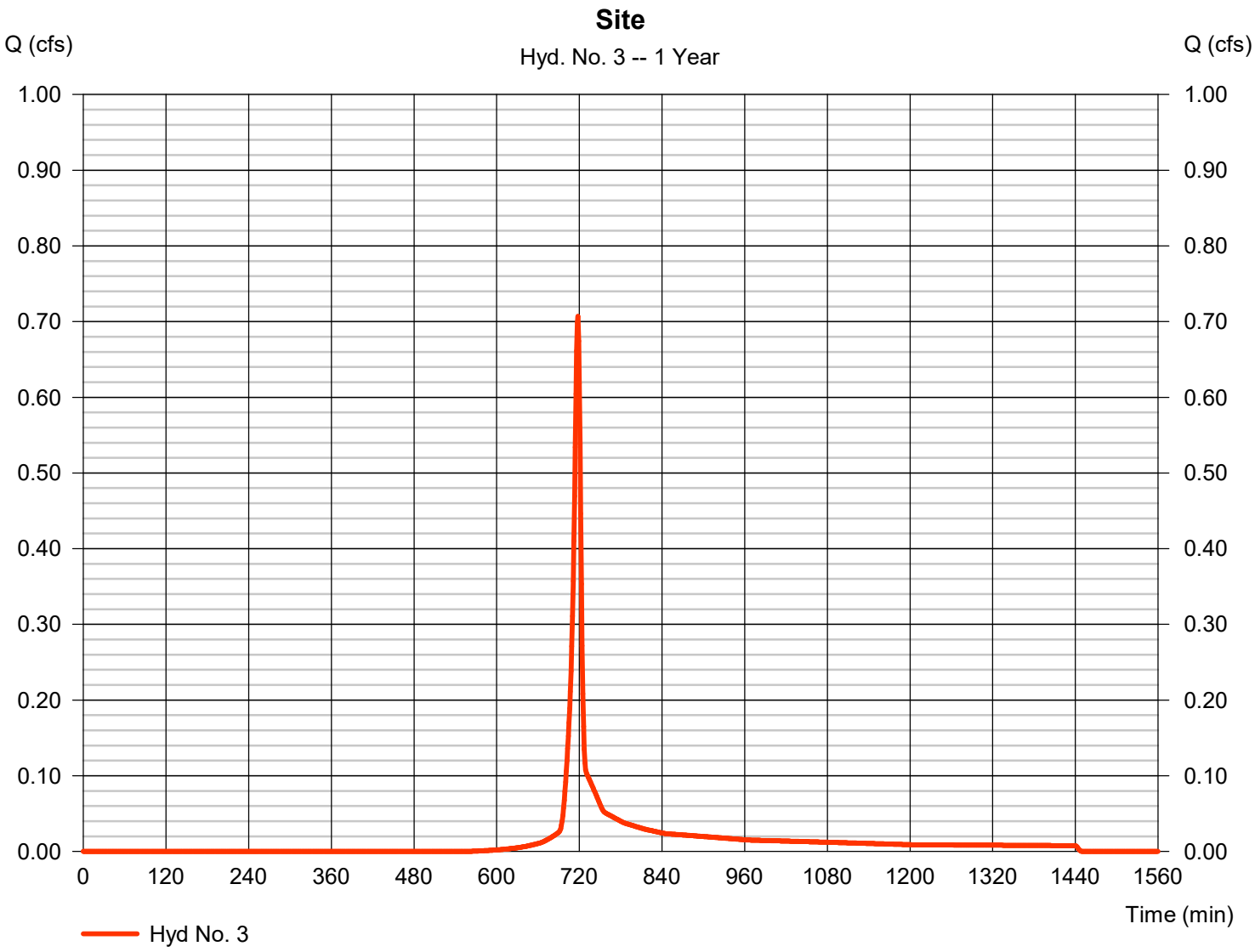
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Tuesday, 12 / 7 / 2021

Hyd. No. 3

Site

Hydrograph type	= SCS Runoff	Peak discharge	= 0.707 cfs
Storm frequency	= 1 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 1,420 cuft
Drainage area	= 0.290 ac	Curve number	= 81.4
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 2.96 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

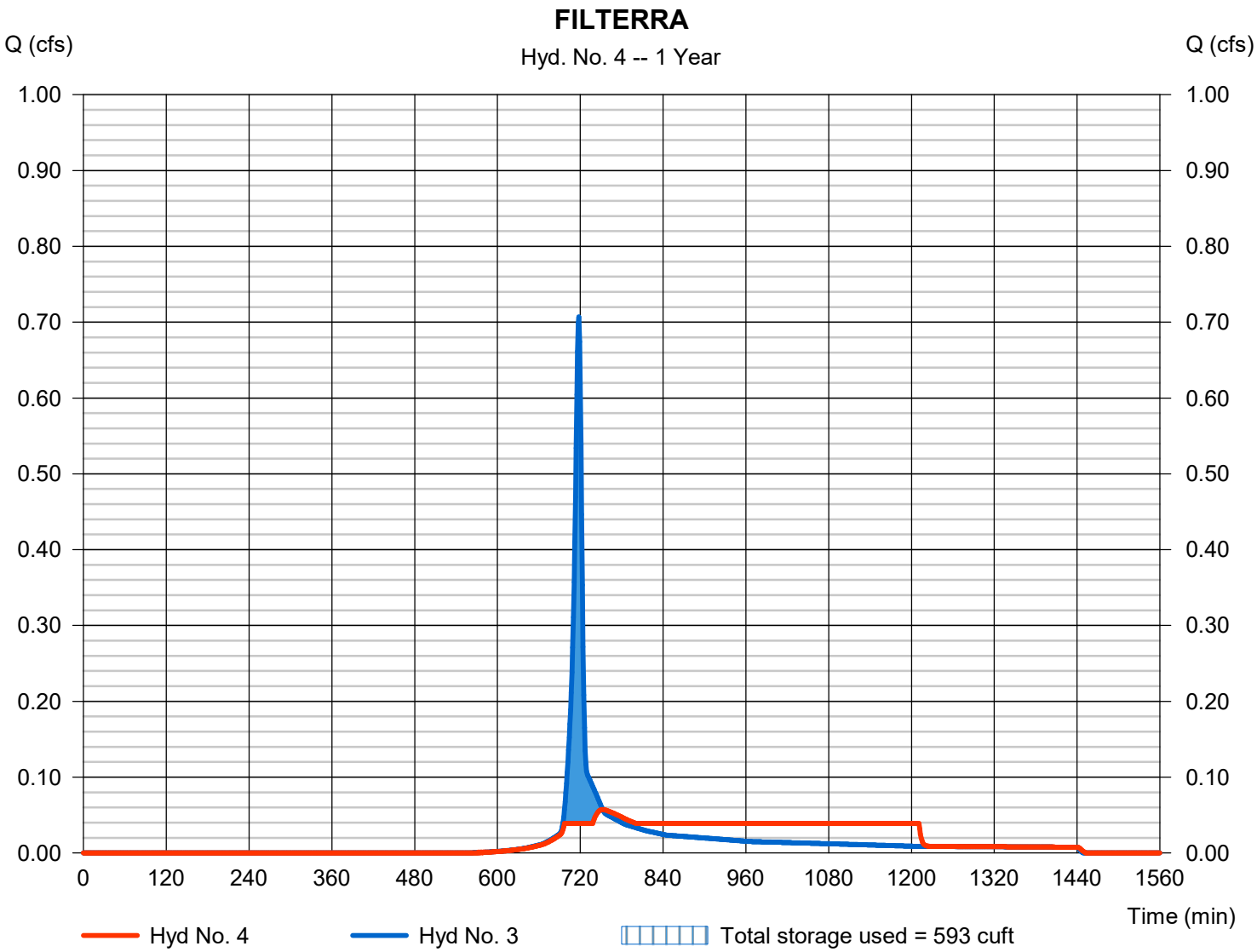
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Tuesday, 12 / 7 / 2021

Hyd. No. 4

FILTERRA

Hydrograph type	= Reservoir	Peak discharge	= 0.057 cfs
Storm frequency	= 1 yrs	Time to peak	= 752 min
Time interval	= 1 min	Hyd. volume	= 1,420 cuft
Inflow hyd. No.	= 3 - Site	Max. Elevation	= 458.73 ft
Reservoir name	= FILTERRA	Max. Storage	= 593 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Tuesday, 12 / 7 / 2021

Pond No. 1 - FILTERRA

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 458.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	458.00	644	0	0
0.01	458.01	645	6	6
1.00	459.00	1,010	812	819
1.50	459.50	1,215	555	1,374
2.00	460.00	1,430	660	2,035

Internal bypass standpipe riser.

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 6.00	Inactive	Inactive	Inactive
Span (in)	= 6.00	2.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 96.00	100.00	0.00	0.00
Length (ft)	= 70.00	4.00	0.00	0.00
Slope (%)	= 0.09	1.00	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	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 2.09	Inactive	Inactive	Inactive
Crest El. (ft)	= 458.75	450.00	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= 1	Broad	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)
TW Elev. (ft) = 0.00

Constant outflow for Filterra unit media infiltration rate.

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	458.00	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
0.00	1	458.00	12.89 oc	0.00	---	---	0.00	0.00	---	---	---	0.004	0.004
0.00	1	458.00	12.89 oc	0.00	---	---	0.00	0.00	---	---	---	0.008	0.008
0.00	2	458.00	12.89 oc	0.00	---	---	0.00	0.00	---	---	---	0.012	0.012
0.00	3	458.00	12.89 oc	0.00	---	---	0.00	0.00	---	---	---	0.016	0.016
0.01	3	458.01	12.89 oc	0.00	---	---	0.00	0.00	---	---	---	0.019	0.019
0.01	4	458.01	12.89 oc	0.00	---	---	0.00	0.00	---	---	---	0.023	0.023
0.01	5	458.01	12.89 oc	0.00	---	---	0.00	0.00	---	---	---	0.027	0.027
0.01	5	458.01	12.89 oc	0.00	---	---	0.00	0.00	---	---	---	0.031	0.031
0.01	6	458.01	12.89 oc	0.00	---	---	0.00	0.00	---	---	---	0.035	0.035
0.01	6	458.01	12.89 oc	0.00	---	---	0.00	0.00	---	---	---	0.039	0.039
0.11	88	458.11	12.89 oc	0.00	---	---	0.00	0.00	---	---	---	0.039	0.039
0.21	169	458.21	12.89 oc	0.00	---	---	0.00	0.00	---	---	---	0.039	0.039
0.31	250	458.31	12.89 oc	0.00	---	---	0.00	0.00	---	---	---	0.039	0.039
0.41	331	458.41	12.89 oc	0.00	---	---	0.00	0.00	---	---	---	0.039	0.039
0.51	413	458.51	12.89 oc	0.00	---	---	0.00	0.00	---	---	---	0.039	0.039
0.60	494	458.60	12.89 oc	0.00	---	---	0.00	0.00	---	---	---	0.039	0.039
0.70	575	458.70	12.89 oc	0.00	---	---	0.00	0.00	---	---	---	0.039	0.039
0.80	656	458.80	12.89 oc	0.00	---	---	0.08	0.00	---	---	---	0.039	0.121
0.90	738	458.90	12.89 oc	0.00	---	---	0.41	0.00	---	---	---	0.039	0.447
1.00	819	459.00	12.89 oc	0.00	---	---	0.87	0.00	---	---	---	0.039	0.909
1.05	874	459.05	12.89 oc	0.00	---	---	0.80 ic	0.00	---	---	---	0.039	0.843
1.10	930	459.10	12.89 oc	0.00	---	---	0.87 ic	0.00	---	---	---	0.039	0.907
1.15	985	459.15	12.89 oc	0.00	---	---	0.93 ic	0.00	---	---	---	0.039	0.967
1.20	1,041	459.20	12.89 oc	0.00	---	---	0.98 ic	0.00	---	---	---	0.039	1.024
1.25	1,097	459.25	12.89 oc	0.00	---	---	1.04 ic	0.00	---	---	---	0.039	1.077
1.30	1,152	459.30	12.89 oc	0.00	---	---	1.09 ic	0.00	---	---	---	0.039	1.127
1.35	1,208	459.35	12.89 oc	0.00	---	---	1.14 ic	0.00	---	---	---	0.039	1.176
1.40	1,263	459.40	12.89 oc	0.00	---	---	1.18 ic	0.00	---	---	---	0.039	1.222
1.45	1,319	459.45	12.89 oc	0.00	---	---	1.23 ic	0.00	---	---	---	0.039	1.267
1.50	1,374	459.50	12.89 oc	0.00	---	---	1.27 ic	0.00	---	---	---	0.039	1.310
1.55	1,440	459.55	12.89 oc	0.00	---	---	1.31 ic	0.00	---	---	---	0.039	1.352
1.60	1,506	459.60	12.89 oc	0.00	---	---	1.35 ic	0.00	---	---	---	0.039	1.392
1.65	1,572	459.65	12.89 oc	0.00	---	---	1.39 ic	0.00	---	---	---	0.039	1.431
1.70	1,638	459.70	12.89 oc	0.00	---	---	1.43 ic	0.00	---	---	---	0.039	1.470
1.75	1,704	459.75	12.89 oc	0.00	---	---	1.47 ic	0.00	---	---	---	0.039	1.507
1.80	1,771	459.80	12.89 oc	0.00	---	---	1.50 ic	0.00	---	---	---	0.039	1.543
1.85	1,837	459.85	12.89 oc	0.00	---	---	1.54 ic	0.00	---	---	---	0.039	1.578

Continues on next page...

FILTERRA

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
1.90	1,903	459.90	12.89 oc	0.00	---	---	1.57 ic	0.00	---	---	---	0.039	1.613
1.95	1,969	459.95	12.89 oc	0.00	---	---	1.61 ic	0.00	---	---	---	0.039	1.647
2.00	2,035	460.00	12.89 oc	0.00	---	---	1.64 ic	0.00	---	---	---	0.039	1.680

...End

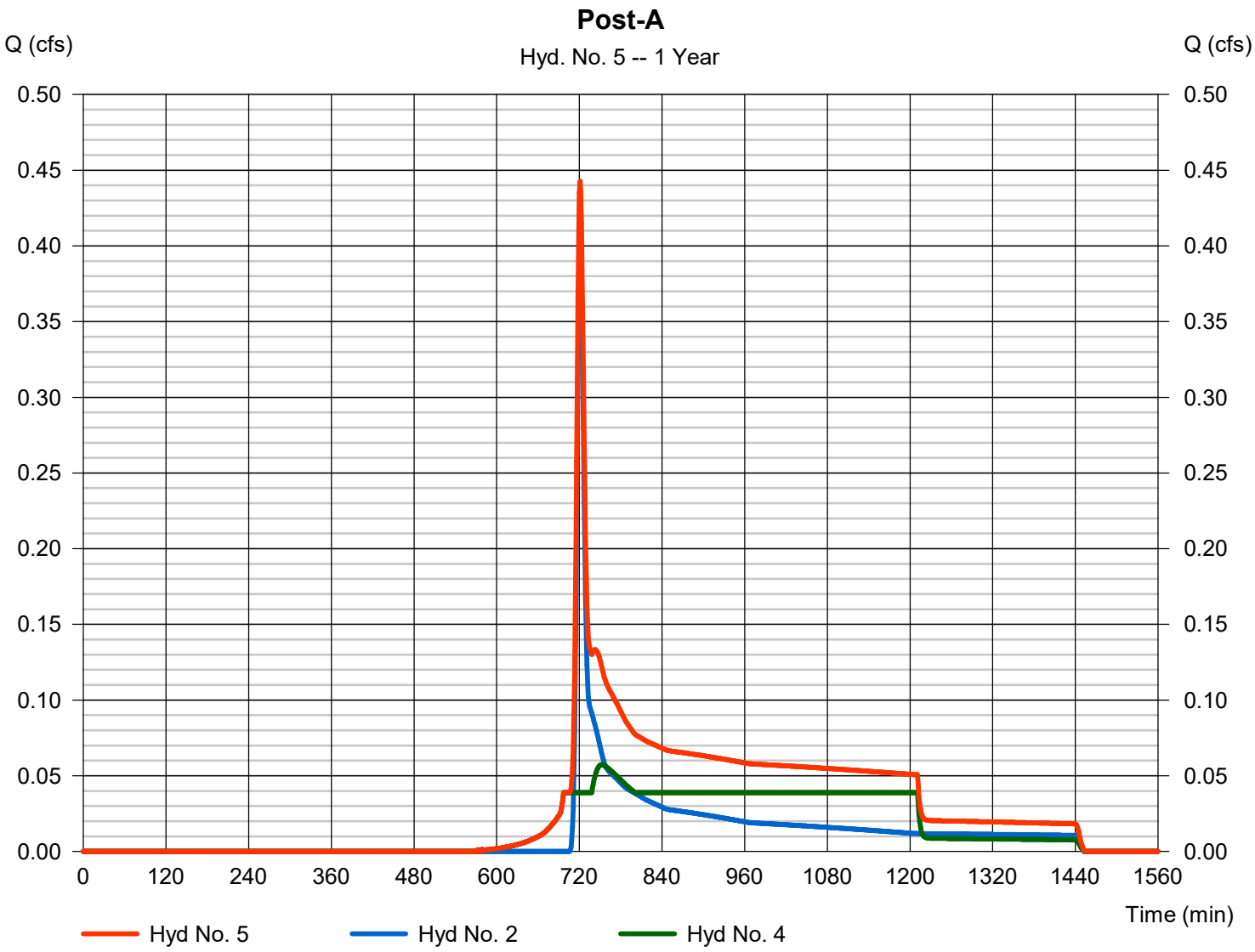
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Tuesday, 12 / 7 / 2021

Hyd. No. 5

Post-A

Hydrograph type	= Combine	Peak discharge	= 0.443 cfs
Storm frequency	= 1 yrs	Time to peak	= 721 min
Time interval	= 1 min	Hyd. volume	= 2,613 cuft
Inflow hyds.	= 2, 4	Contrib. drain. area	= 0.770 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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	SCS Runoff	1.279	1	720	3,136	------	------	------	Pre-A
2	SCS Runoff	0.795	1	720	2,021	------	------	------	Post-A bypass
3	SCS Runoff	0.977	1	718	1,976	------	------	------	Site
4	Reservoir	0.328	1	724	1,975	3	458.87	708	FILTERRA
5	Combine	1.005	1	723	3,996	2, 4	------	------	Post-A

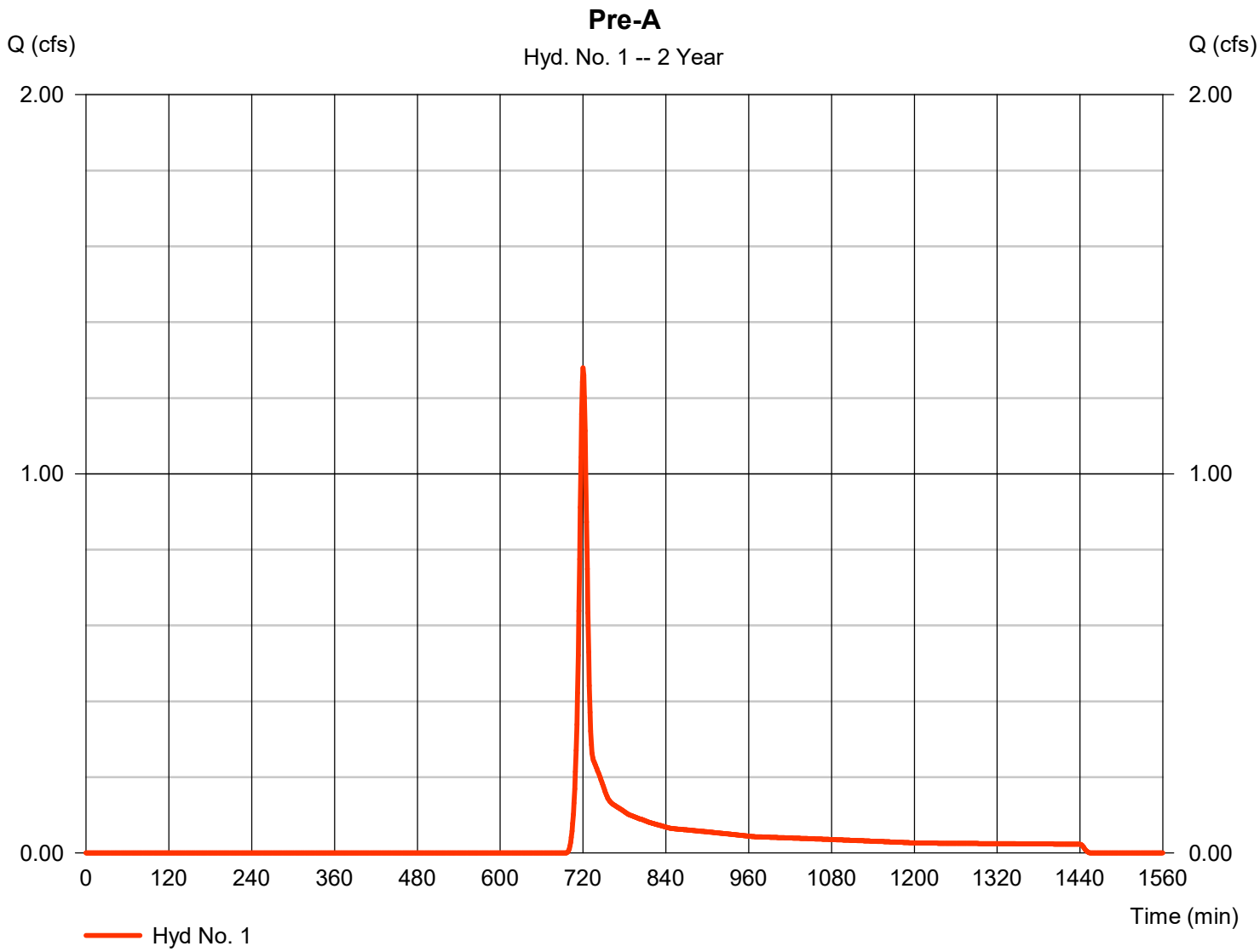
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Tuesday, 12 / 7 / 2021

Hyd. No. 1

Pre-A

Hydrograph type	= SCS Runoff	Peak discharge	= 1.279 cfs
Storm frequency	= 2 yrs	Time to peak	= 720 min
Time interval	= 1 min	Hyd. volume	= 3,136 cuft
Drainage area	= 1.060 ac	Curve number	= 65.2
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.60 min
Total precip.	= 3.60 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



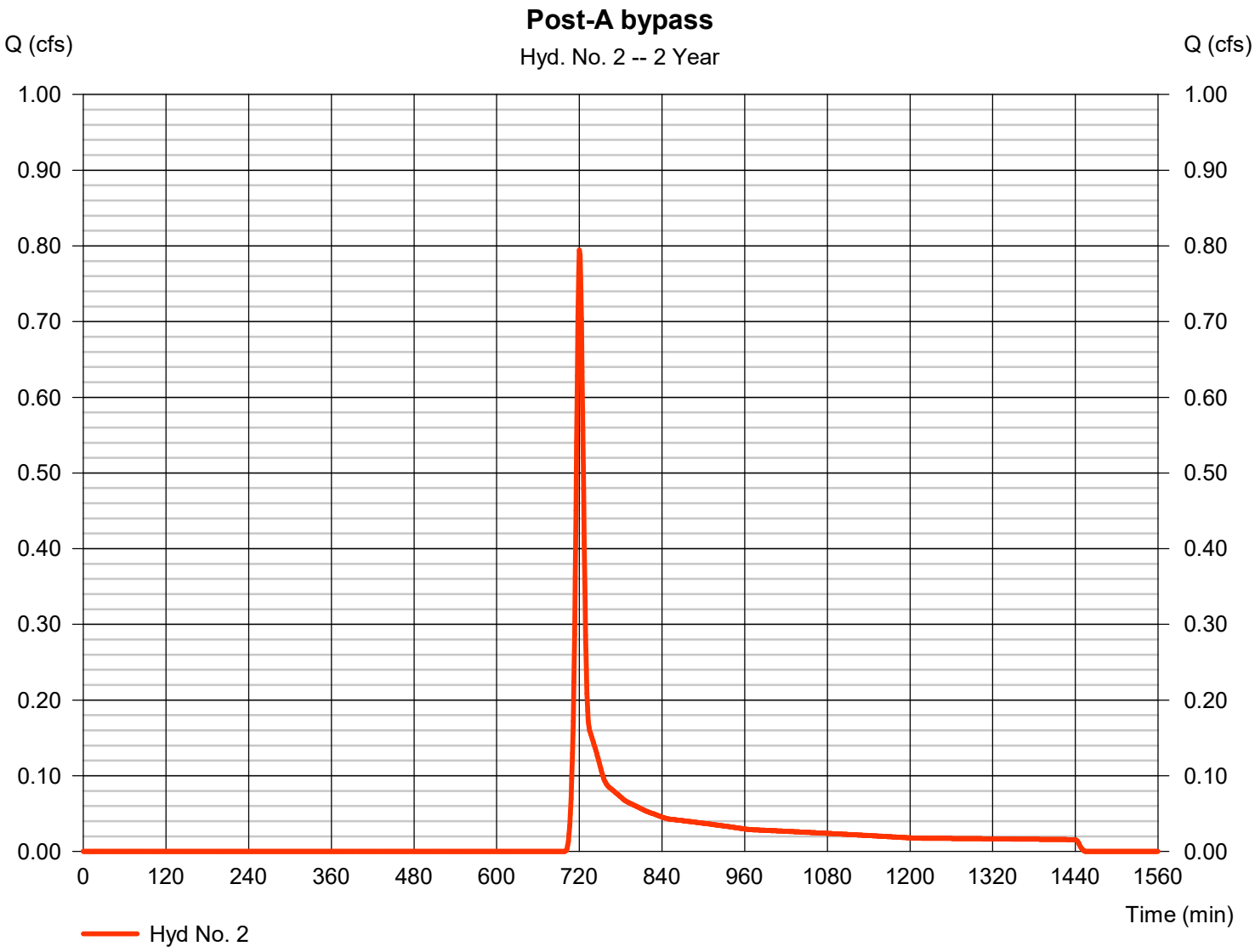
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Tuesday, 12 / 7 / 2021

Hyd. No. 2

Post-A bypass

Hydrograph type	= SCS Runoff	Peak discharge	= 0.795 cfs
Storm frequency	= 2 yrs	Time to peak	= 720 min
Time interval	= 1 min	Hyd. volume	= 2,021 cuft
Drainage area	= 0.770 ac	Curve number	= 63.3
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.60 min
Total precip.	= 3.60 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



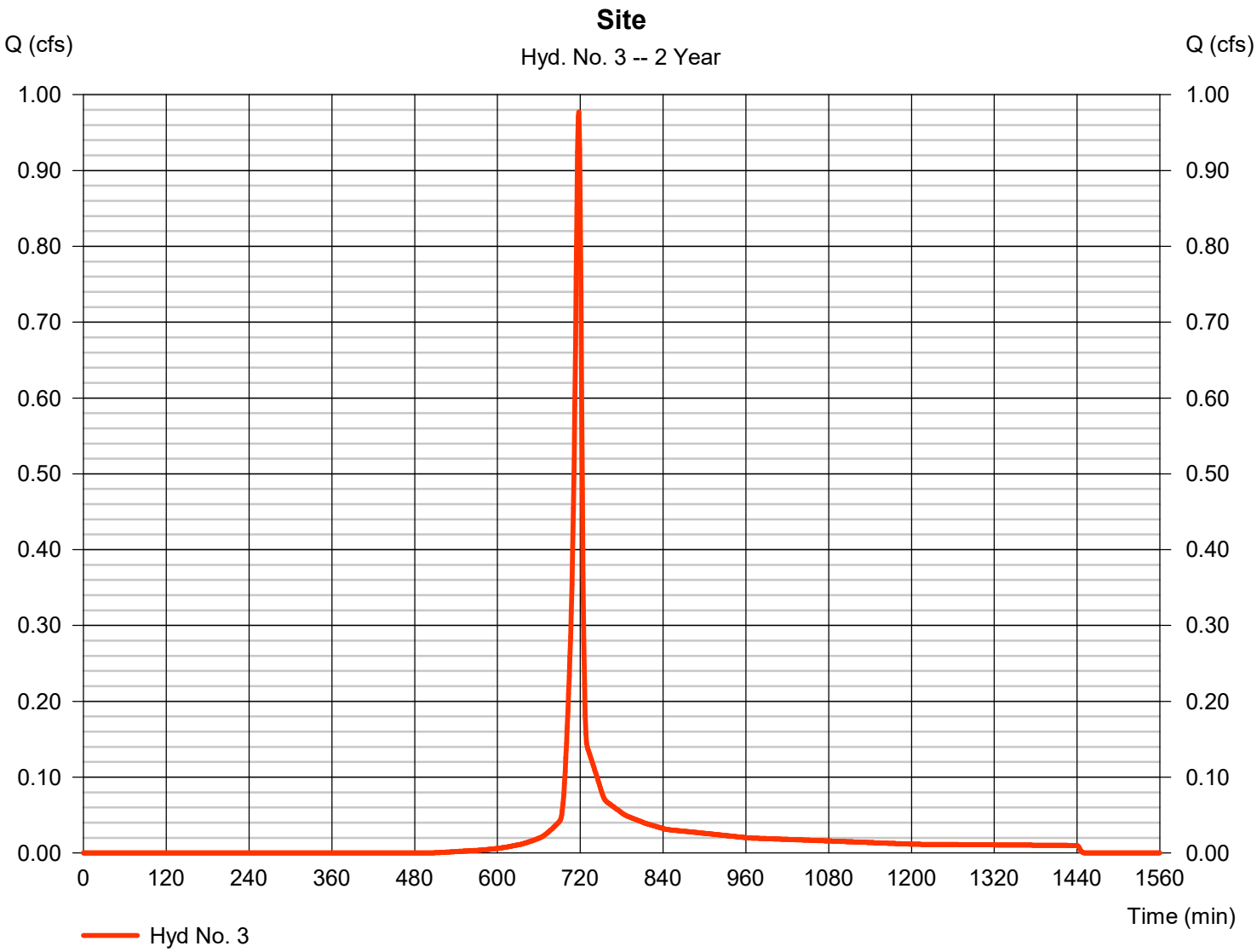
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Tuesday, 12 / 7 / 2021

Hyd. No. 3

Site

Hydrograph type	= SCS Runoff	Peak discharge	= 0.977 cfs
Storm frequency	= 2 yrs	Time to peak	= 718 min
Time interval	= 1 min	Hyd. volume	= 1,976 cuft
Drainage area	= 0.290 ac	Curve number	= 81.4
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 3.60 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

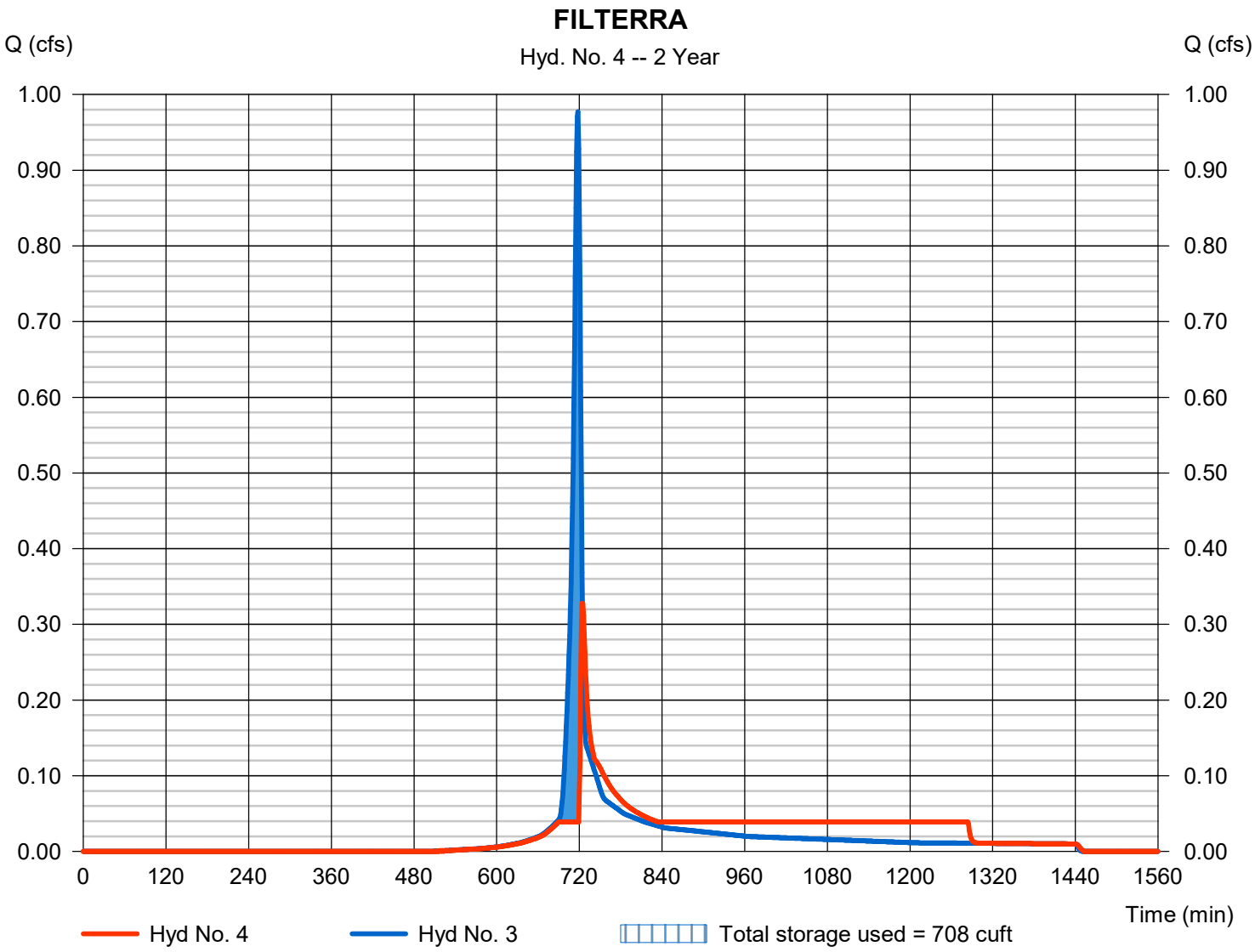
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Tuesday, 12 / 7 / 2021

Hyd. No. 4

FILTERRA

Hydrograph type	= Reservoir	Peak discharge	= 0.328 cfs
Storm frequency	= 2 yrs	Time to peak	= 724 min
Time interval	= 1 min	Hyd. volume	= 1,975 cuft
Inflow hyd. No.	= 3 - Site	Max. Elevation	= 458.87 ft
Reservoir name	= FILTERRA	Max. Storage	= 708 cuft

Storage Indication method used.



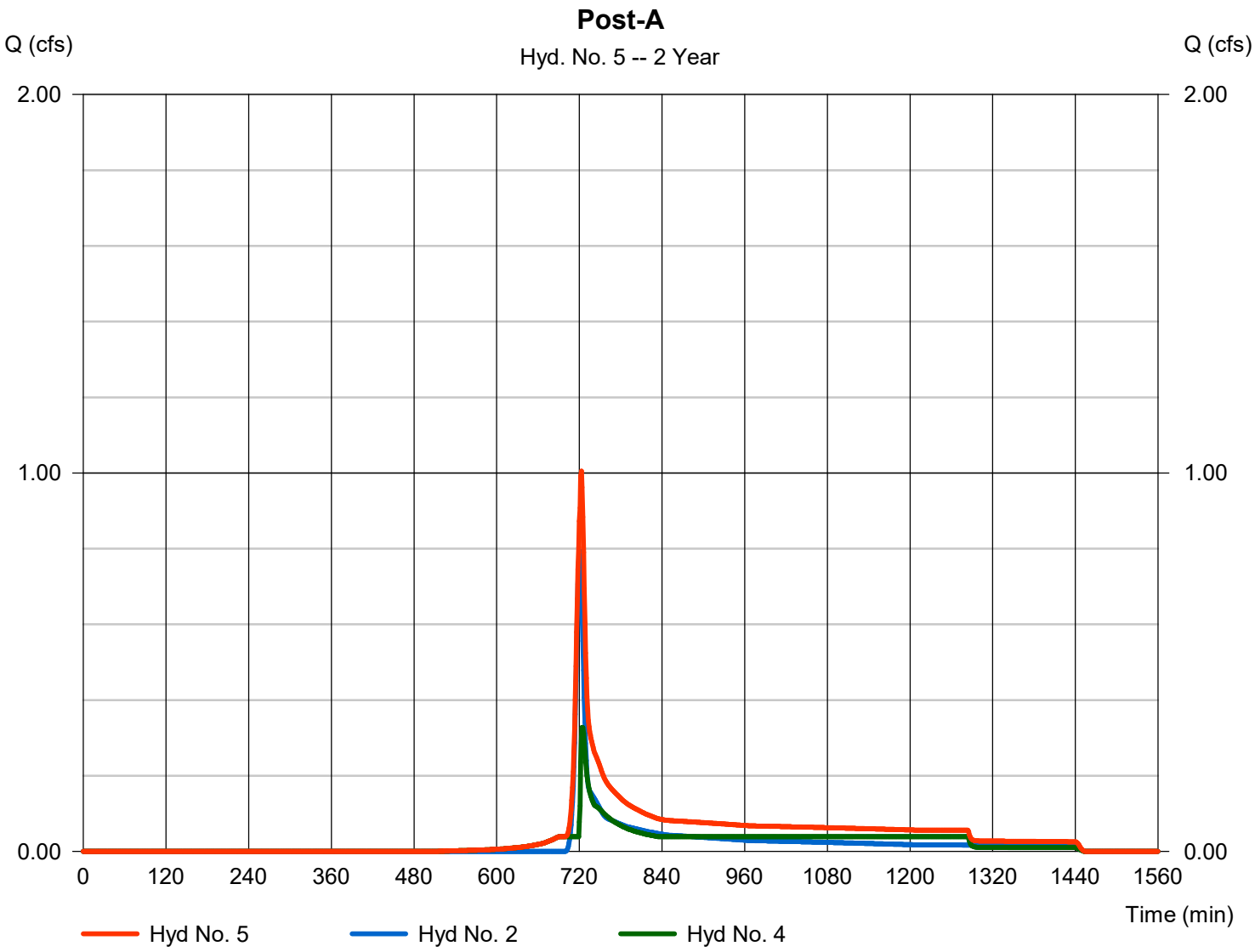
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Tuesday, 12 / 7 / 2021

Hyd. No. 5

Post-A

Hydrograph type	= Combine	Peak discharge	= 1.005 cfs
Storm frequency	= 2 yrs	Time to peak	= 723 min
Time interval	= 1 min	Hyd. volume	= 3,996 cuft
Inflow hyds.	= 2, 4	Contrib. drain. area	= 0.770 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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	SCS Runoff	4.543	1	720	10,283	------	------	------	Pre-A
2	SCS Runoff	3.075	1	720	6,974	------	------	------	Post-A bypass
3	SCS Runoff	2.233	1	717	4,670	------	------	------	Site
4	Reservoir	1.247	1	722	4,670	3	459.43	1,295	FILTERRA
5	Combine	4.283	1	720	11,644	2, 4	------	------	Post-A

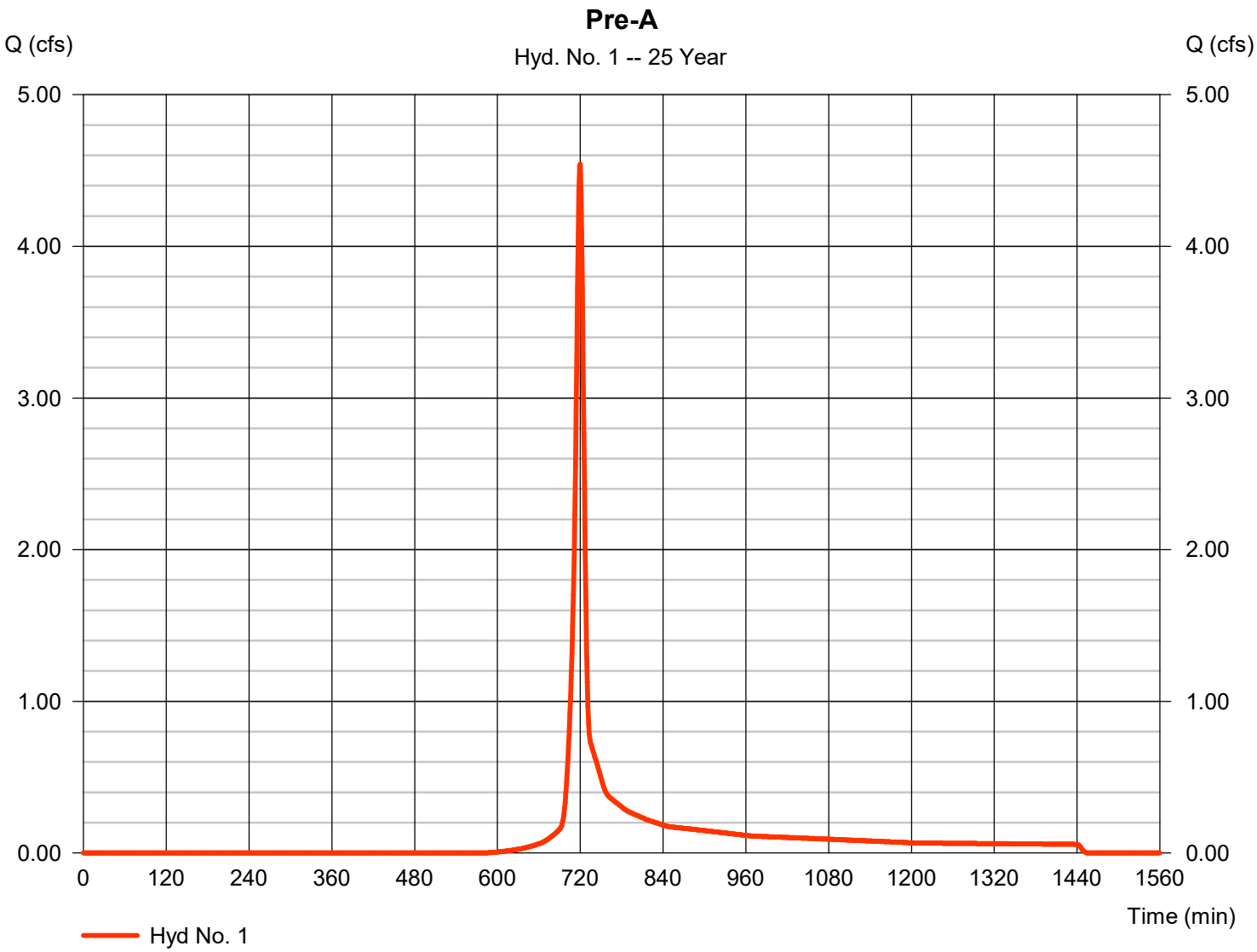
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Tuesday, 12 / 7 / 2021

Hyd. No. 1

Pre-A

Hydrograph type	= SCS Runoff	Peak discharge	= 4.543 cfs
Storm frequency	= 25 yrs	Time to peak	= 720 min
Time interval	= 1 min	Hyd. volume	= 10,283 cuft
Drainage area	= 1.060 ac	Curve number	= 65.2
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.60 min
Total precip.	= 6.41 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



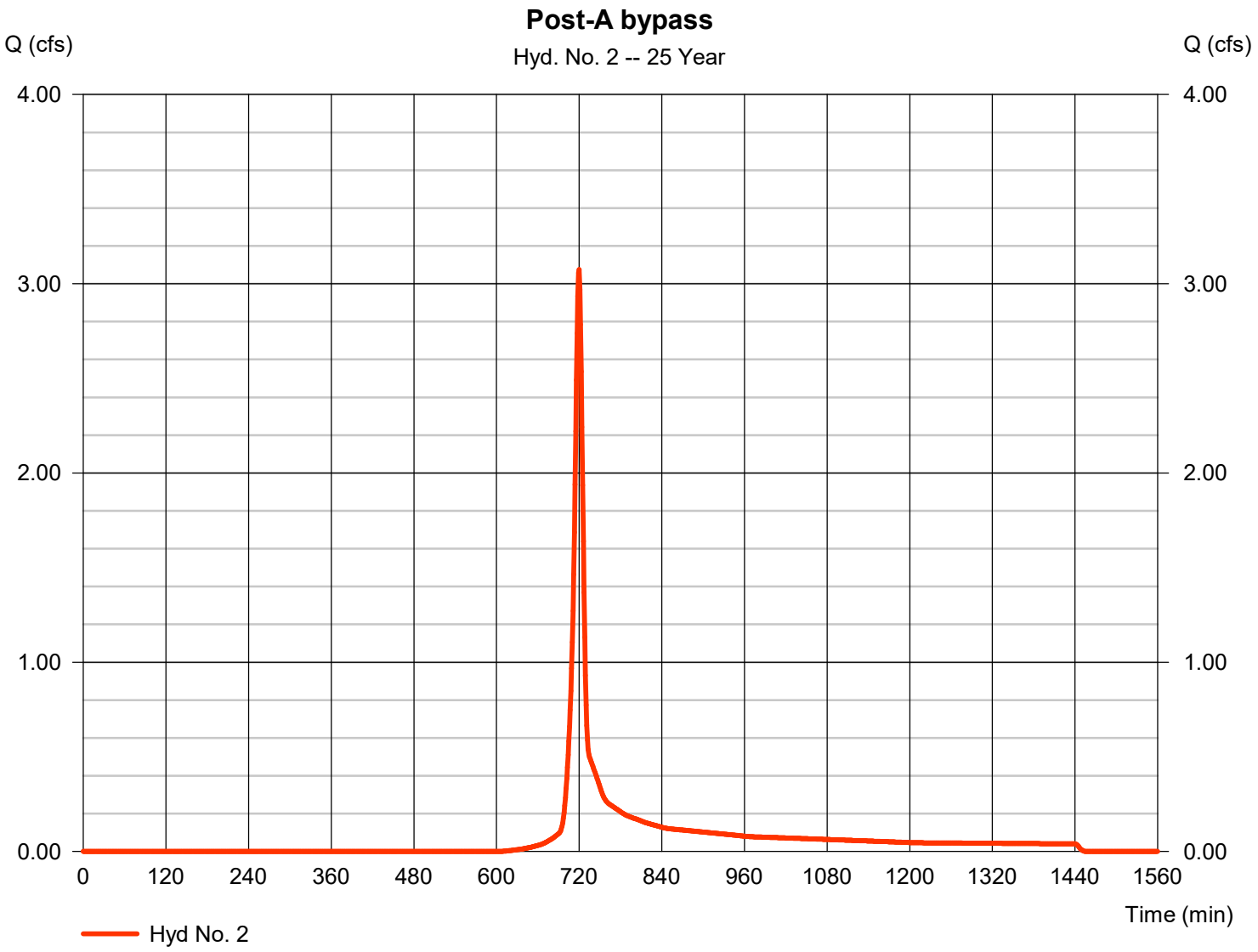
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Tuesday, 12 / 7 / 2021

Hyd. No. 2

Post-A bypass

Hydrograph type	= SCS Runoff	Peak discharge	= 3.075 cfs
Storm frequency	= 25 yrs	Time to peak	= 720 min
Time interval	= 1 min	Hyd. volume	= 6,974 cuft
Drainage area	= 0.770 ac	Curve number	= 63.3
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.60 min
Total precip.	= 6.41 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



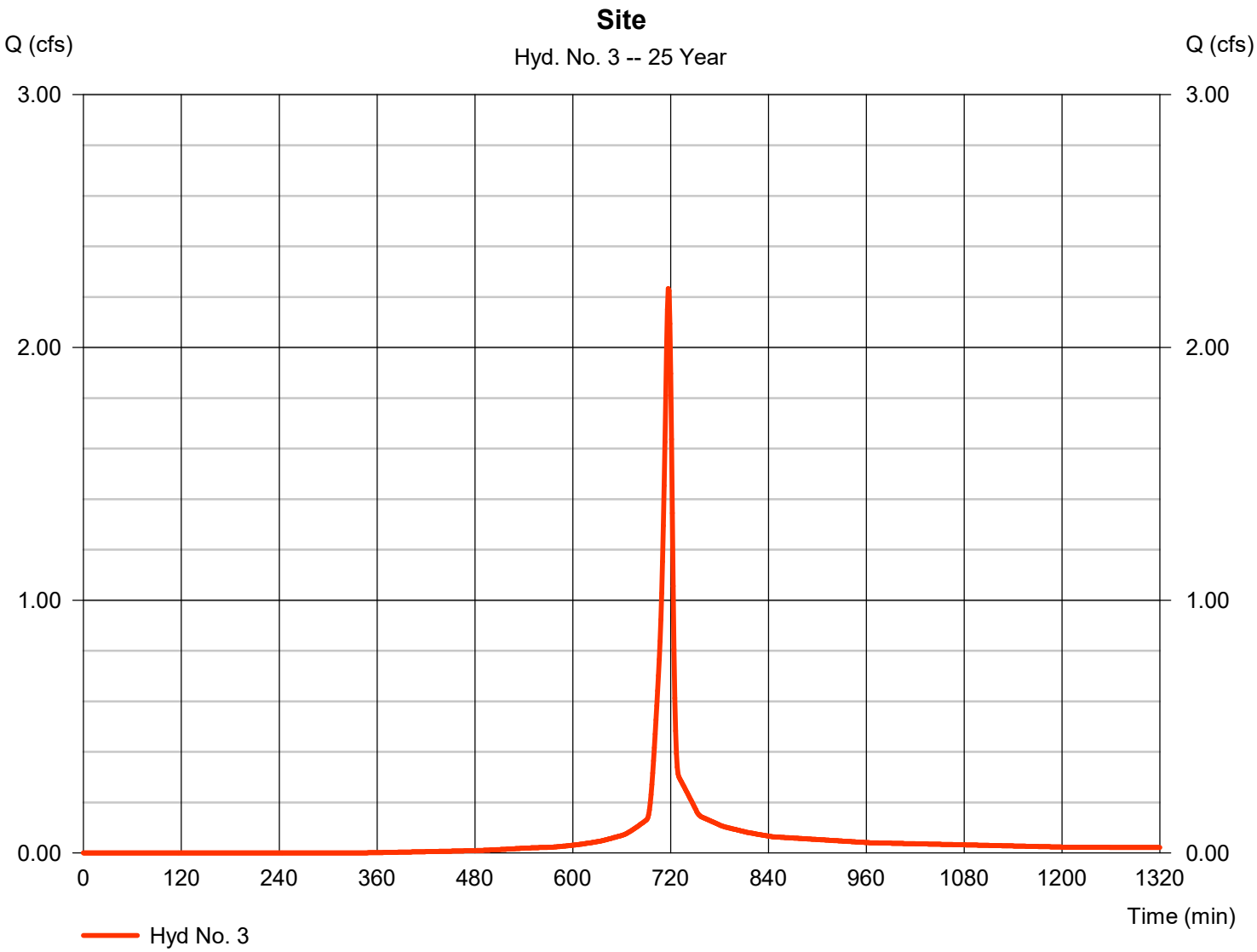
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Tuesday, 12 / 7 / 2021

Hyd. No. 3

Site

Hydrograph type	= SCS Runoff	Peak discharge	= 2.233 cfs
Storm frequency	= 25 yrs	Time to peak	= 717 min
Time interval	= 1 min	Hyd. volume	= 4,670 cuft
Drainage area	= 0.290 ac	Curve number	= 81.4
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 6.41 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

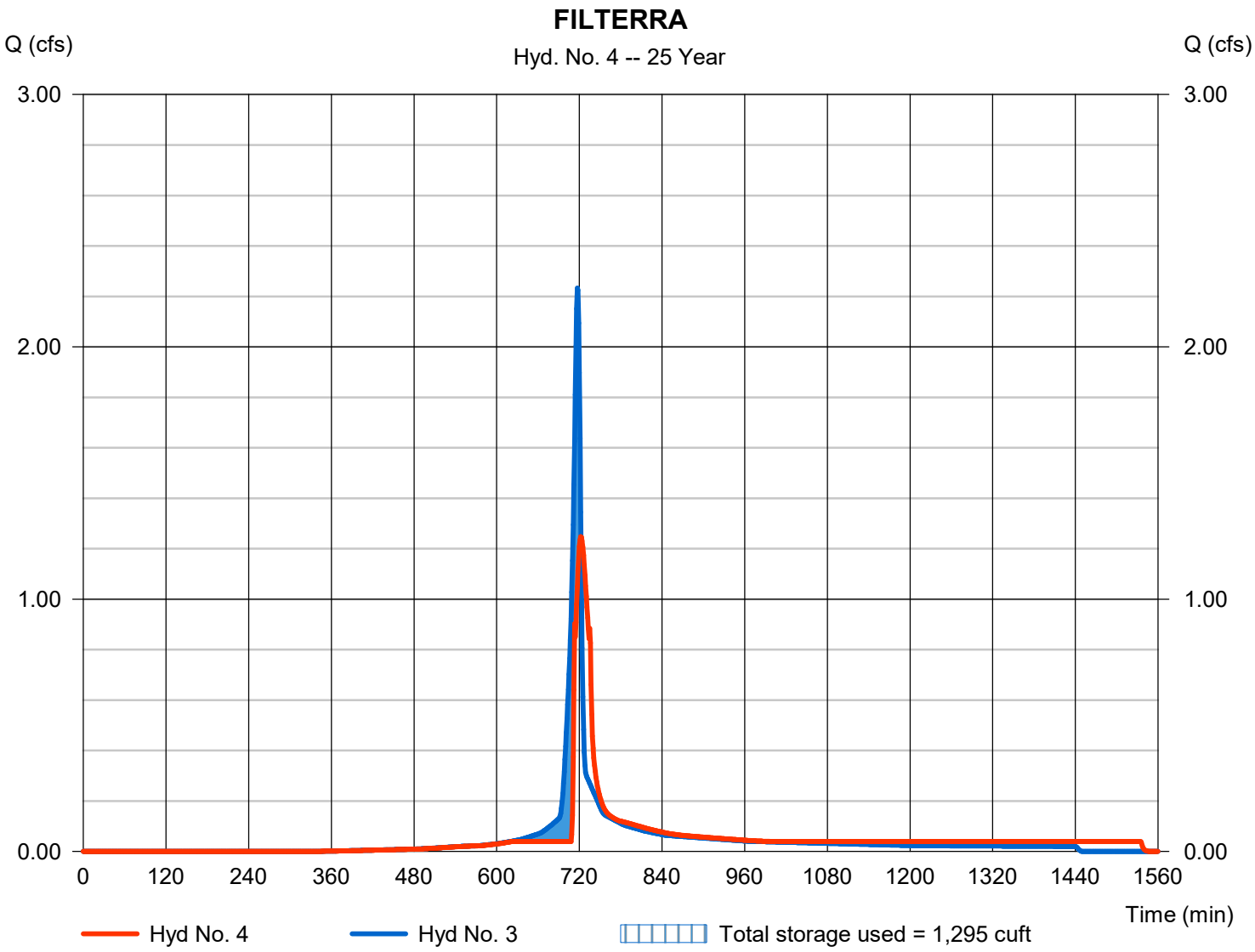
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Tuesday, 12 / 7 / 2021

Hyd. No. 4

FILTERRA

Hydrograph type	= Reservoir	Peak discharge	= 1.247 cfs
Storm frequency	= 25 yrs	Time to peak	= 722 min
Time interval	= 1 min	Hyd. volume	= 4,670 cuft
Inflow hyd. No.	= 3 - Site	Max. Elevation	= 459.43 ft
Reservoir name	= FILTERRA	Max. Storage	= 1,295 cuft

Storage Indication method used.



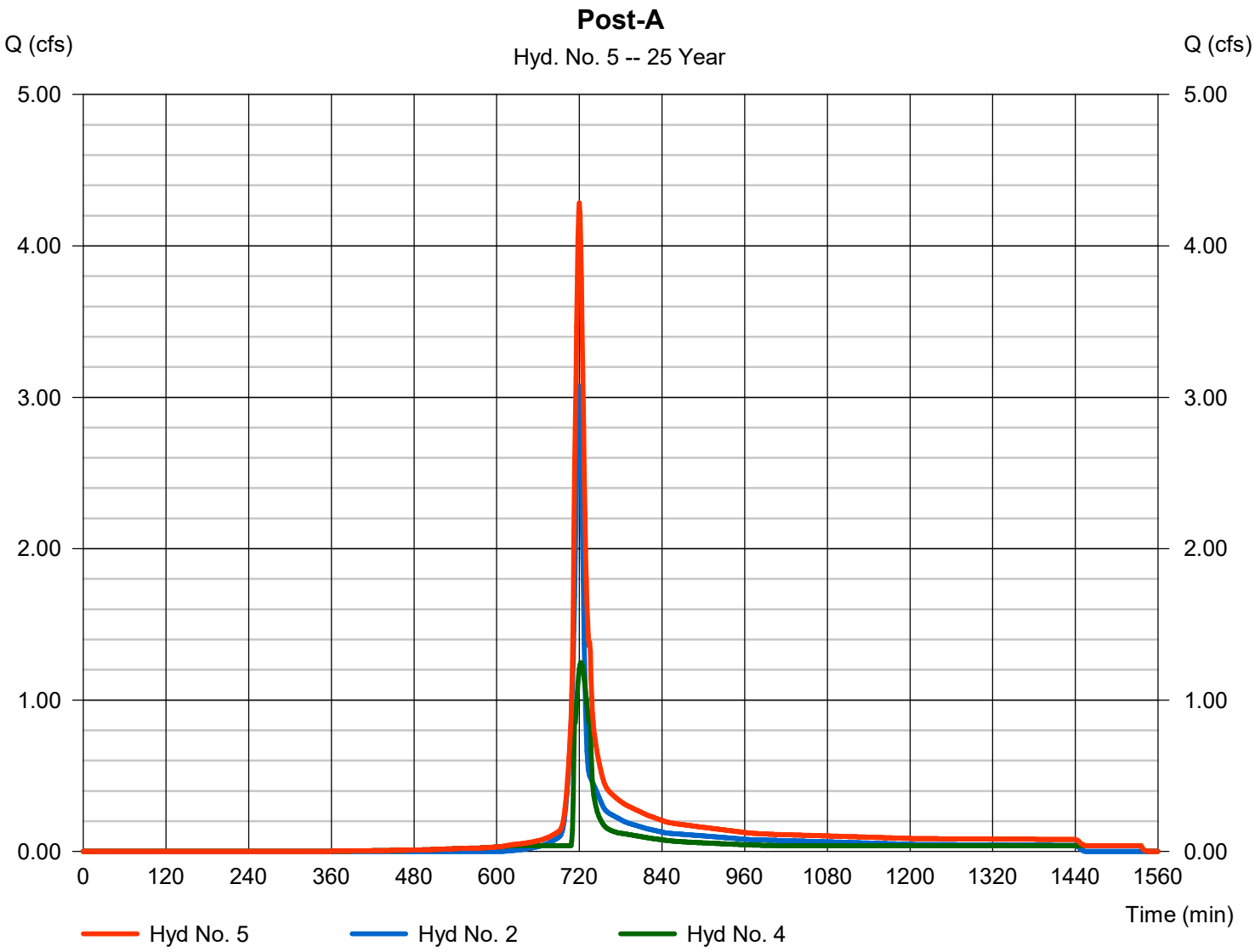
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Tuesday, 12 / 7 / 2021

Hyd. No. 5

Post-A

Hydrograph type	= Combine	Peak discharge	= 4.283 cfs
Storm frequency	= 25 yrs	Time to peak	= 720 min
Time interval	= 1 min	Hyd. volume	= 11,644 cuft
Inflow hyds.	= 2, 4	Contrib. drain. area	= 0.770 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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	SCS Runoff	6.663	1	719	15,071	------	------	------	Pre-A
2	SCS Runoff	4.574	1	719	10,349	------	------	------	Post-A bypass
3	SCS Runoff	2.957	1	717	6,285	------	------	------	Site
4	Reservoir	1.513	1	723	6,285	3	459.76	1,716	FILTERRA
5	Combine	6.040	1	720	16,633	2, 4	------	------	Post-A

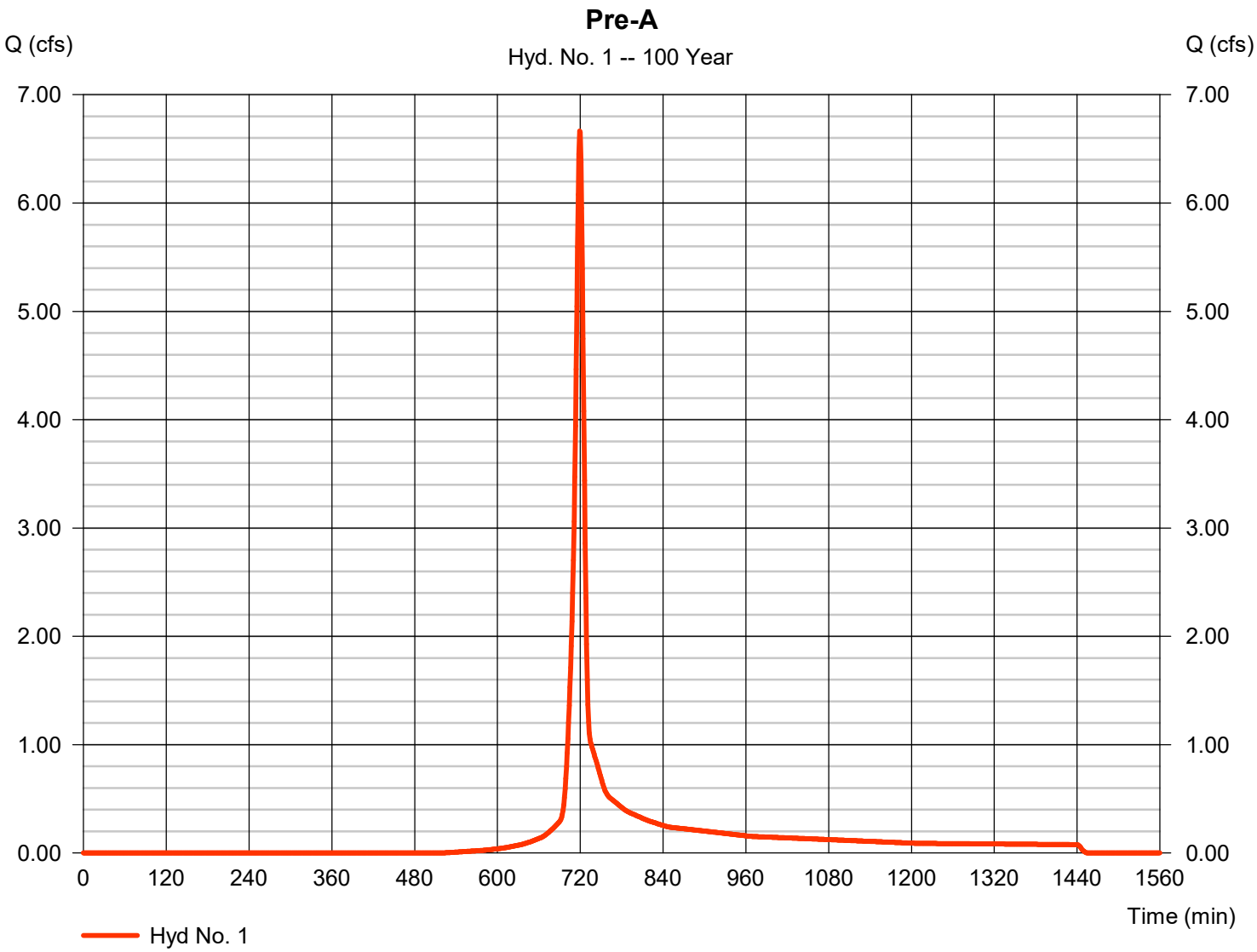
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Tuesday, 12 / 7 / 2021

Hyd. No. 1

Pre-A

Hydrograph type	= SCS Runoff	Peak discharge	= 6.663 cfs
Storm frequency	= 100 yrs	Time to peak	= 719 min
Time interval	= 1 min	Hyd. volume	= 15,071 cuft
Drainage area	= 1.060 ac	Curve number	= 65.2
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.60 min
Total precip.	= 8.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



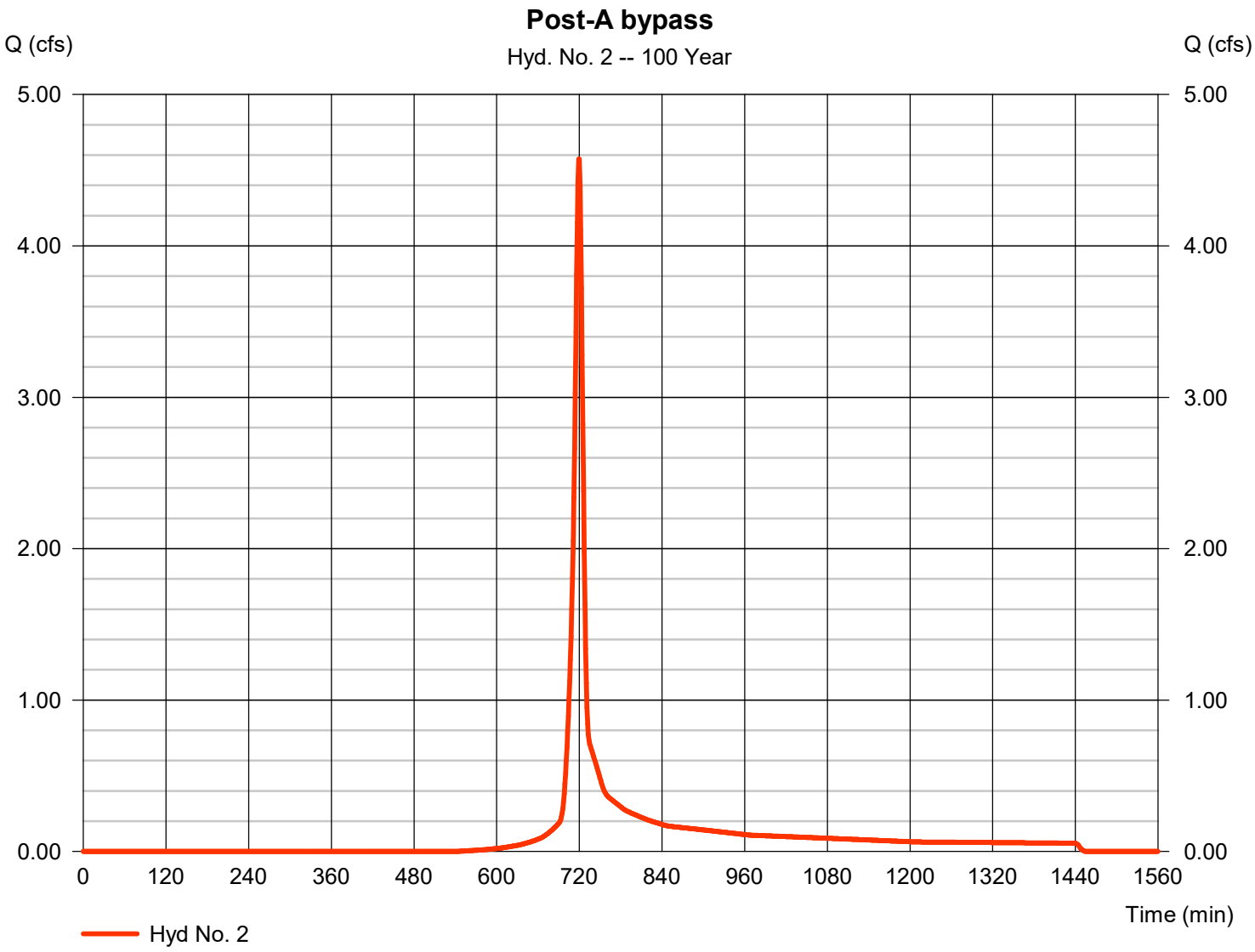
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Tuesday, 12 / 7 / 2021

Hyd. No. 2

Post-A bypass

Hydrograph type	= SCS Runoff	Peak discharge	= 4.574 cfs
Storm frequency	= 100 yrs	Time to peak	= 719 min
Time interval	= 1 min	Hyd. volume	= 10,349 cuft
Drainage area	= 0.770 ac	Curve number	= 63.3
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 8.60 min
Total precip.	= 8.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



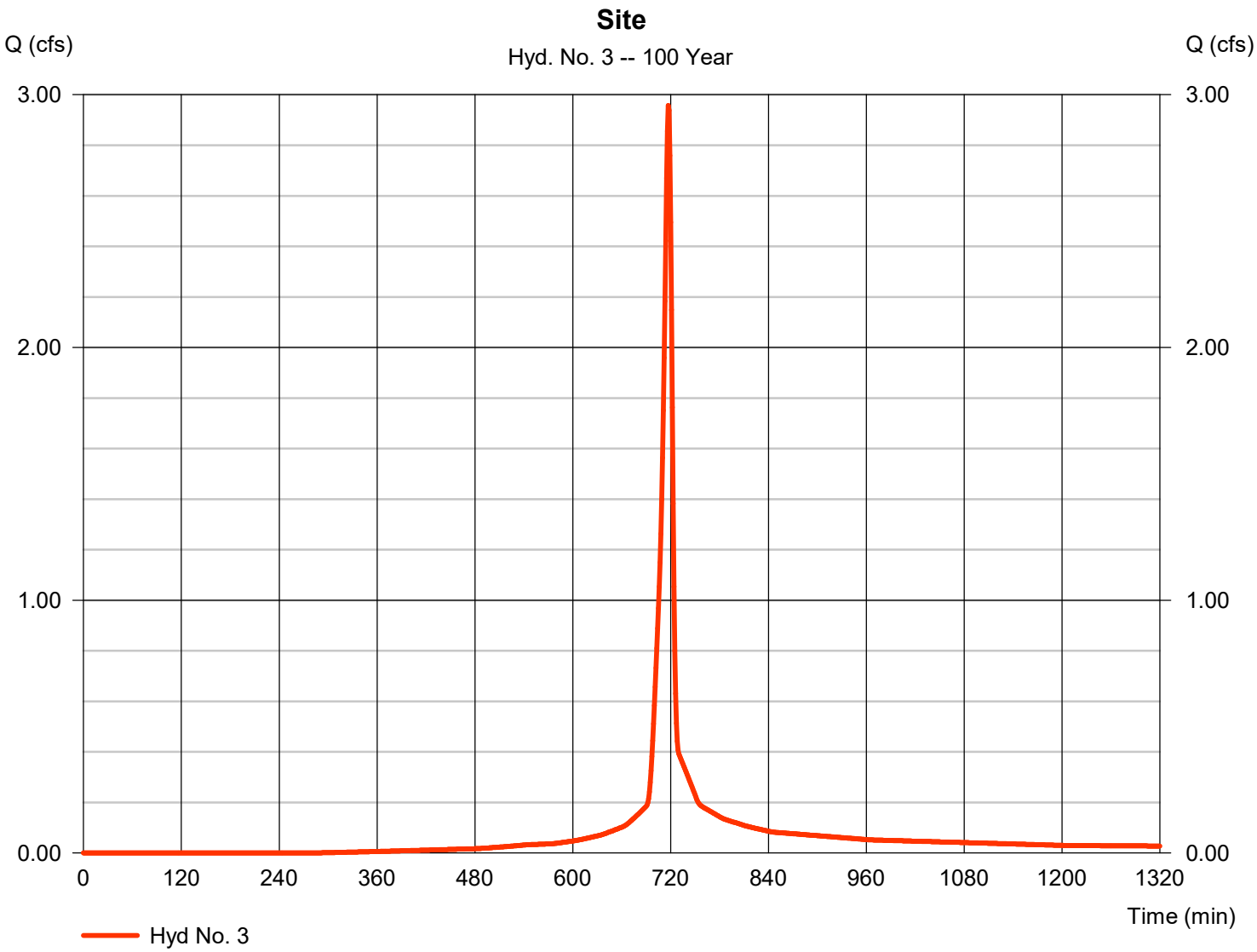
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Tuesday, 12 / 7 / 2021

Hyd. No. 3

Site

Hydrograph type	= SCS Runoff	Peak discharge	= 2.957 cfs
Storm frequency	= 100 yrs	Time to peak	= 717 min
Time interval	= 1 min	Hyd. volume	= 6,285 cuft
Drainage area	= 0.290 ac	Curve number	= 81.4
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 6.00 min
Total precip.	= 8.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

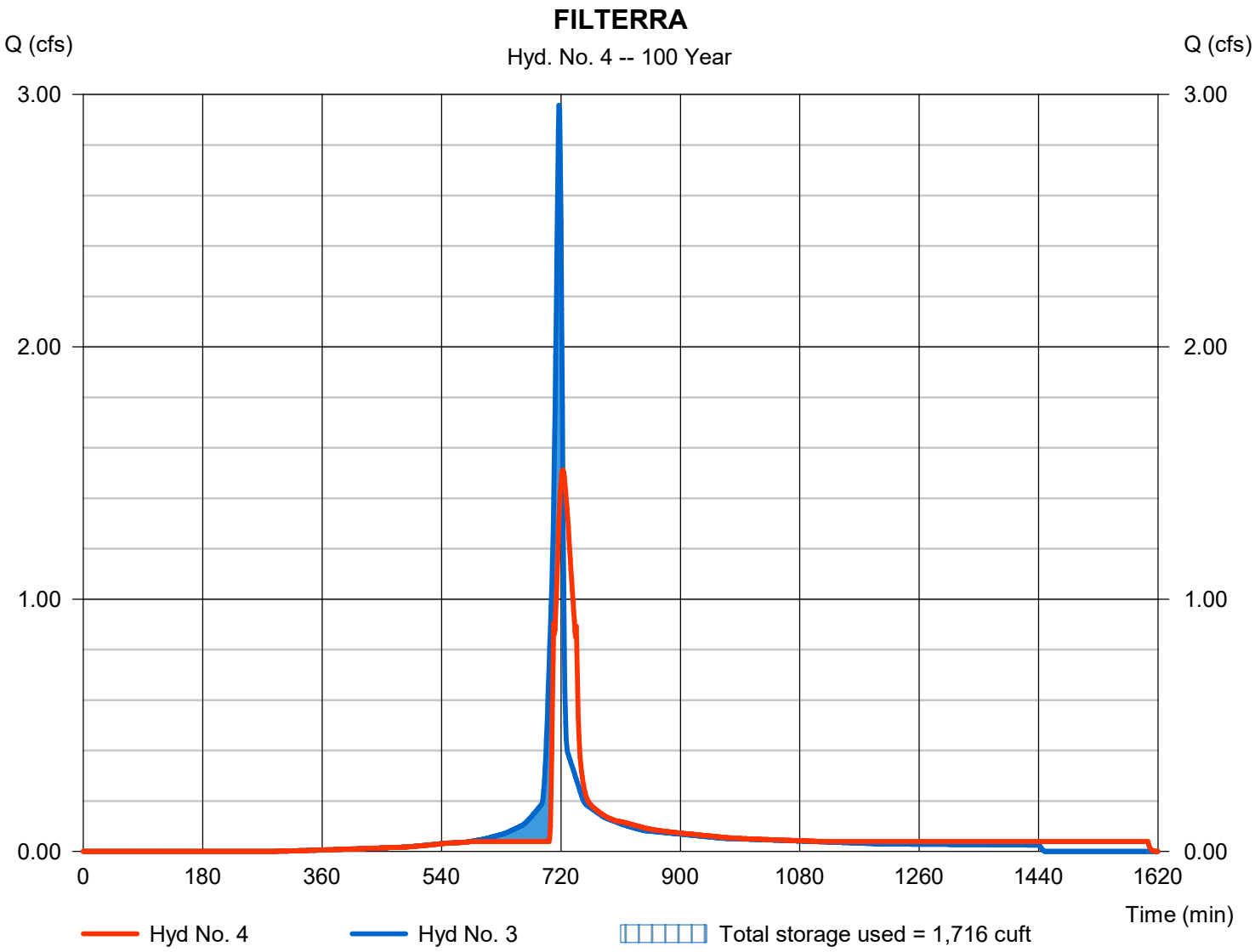
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Tuesday, 12 / 7 / 2021

Hyd. No. 4

FILTERRA

Hydrograph type	= Reservoir	Peak discharge	= 1.513 cfs
Storm frequency	= 100 yrs	Time to peak	= 723 min
Time interval	= 1 min	Hyd. volume	= 6,285 cuft
Inflow hyd. No.	= 3 - Site	Max. Elevation	= 459.76 ft
Reservoir name	= FILTERRA	Max. Storage	= 1,716 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Tuesday, 12 / 7 / 2021

Hyd. No. 5

Post-A

Hydrograph type	= Combine	Peak discharge	= 6.040 cfs
Storm frequency	= 100 yrs	Time to peak	= 720 min
Time interval	= 1 min	Hyd. volume	= 16,633 cuft
Inflow hyds.	= 2, 4	Contrib. drain. area	= 0.770 ac