

Appendix J Attenuation Modelling Output Summary

[illegible]

Easy Flood Risk		Page 3																																	
55 Shepherds Lane Dartford DA1 2NL																																			
Date 07/05/2024 06:28 File 9 Chatsworth Ave.SRCX	Designed by sheph Checked by																																		
Innovyze		Source Control 2020.1																																	
<u>Rainfall Details</u> <table> <tr> <td>Rainfall Model</td> <td>FSR</td> <td>Winter Storms</td> <td>Yes</td> </tr> <tr> <td>Return Period (years)</td> <td>100</td> <td>Cv (Summer)</td> <td>0.750</td> </tr> <tr> <td>Region</td> <td>England and Wales</td> <td>Cv (Winter)</td> <td>0.840</td> </tr> <tr> <td>M5-60 (mm)</td> <td>18.100</td> <td>Shortest Storm (mins)</td> <td>15</td> </tr> <tr> <td>Ratio R</td> <td>0.360</td> <td>Longest Storm (mins)</td> <td>10080</td> </tr> <tr> <td>Summer Storms</td> <td>Yes</td> <td>Climate Change %</td> <td>+40</td> </tr> </table> <u>Time Area Diagram</u> Total Area (ha) 0.023 <table> <thead> <tr> <th colspan="2">Time (mins)</th> <th>Area</th> </tr> <tr> <th>From:</th> <th>To:</th> <th>(ha)</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>4</td> <td>0.023</td> </tr> </tbody> </table>			Rainfall Model	FSR	Winter Storms	Yes	Return Period (years)	100	Cv (Summer)	0.750	Region	England and Wales	Cv (Winter)	0.840	M5-60 (mm)	18.100	Shortest Storm (mins)	15	Ratio R	0.360	Longest Storm (mins)	10080	Summer Storms	Yes	Climate Change %	+40	Time (mins)		Area	From:	To:	(ha)	0	4	0.023
Rainfall Model	FSR	Winter Storms	Yes																																
Return Period (years)	100	Cv (Summer)	0.750																																
Region	England and Wales	Cv (Winter)	0.840																																
M5-60 (mm)	18.100	Shortest Storm (mins)	15																																
Ratio R	0.360	Longest Storm (mins)	10080																																
Summer Storms	Yes	Climate Change %	+40																																
Time (mins)		Area																																	
From:	To:	(ha)																																	
0	4	0.023																																	
©1982-2020 Innovyze																																			

Easy Flood Risk		Page 4
55 Shepherds Lane Dartford DA1 2NL		
Date 07/05/2024 06:28 File 9 Chatsworth Ave.SRCX	Designed by sheph Checked by	
Innovyze Source Control 2020.1		

Model Details

Storage is Online Cover Level (m) 88.100

Tank or Pond Structure

Invert Level (m) 87.300

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	8.0	0.400	8.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SCL-0077-2500-0400-2500
Design Head (m)	0.400
Design Flow (l/s)	2.5
Flush-Flo™	Calculated
Objective	Minimise blockage risk
Application	Surface
Sump Available	Yes
Diameter (mm)	77
Invert Level (m)	87.300
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.400	2.5	Kick-Flo®	0.262	2.1
Flush-Flo™	0.104	2.5	Mean Flow over Head Range	-	2.0

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

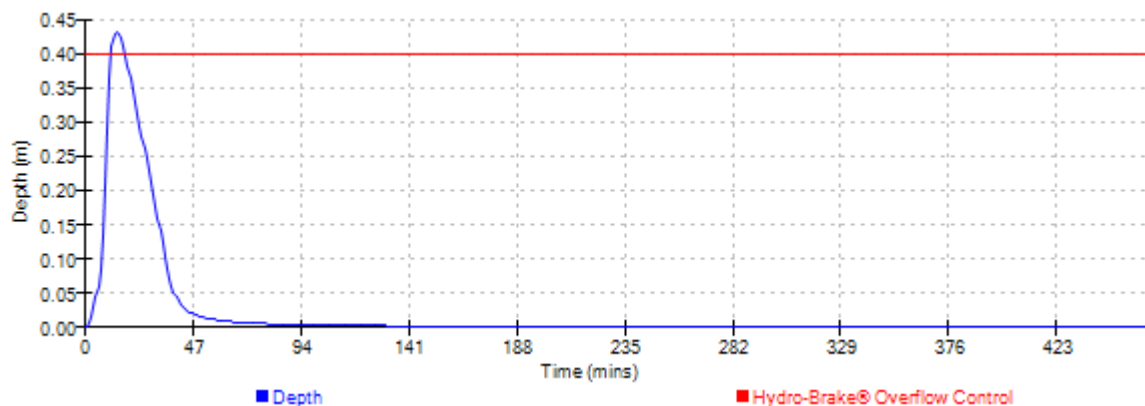
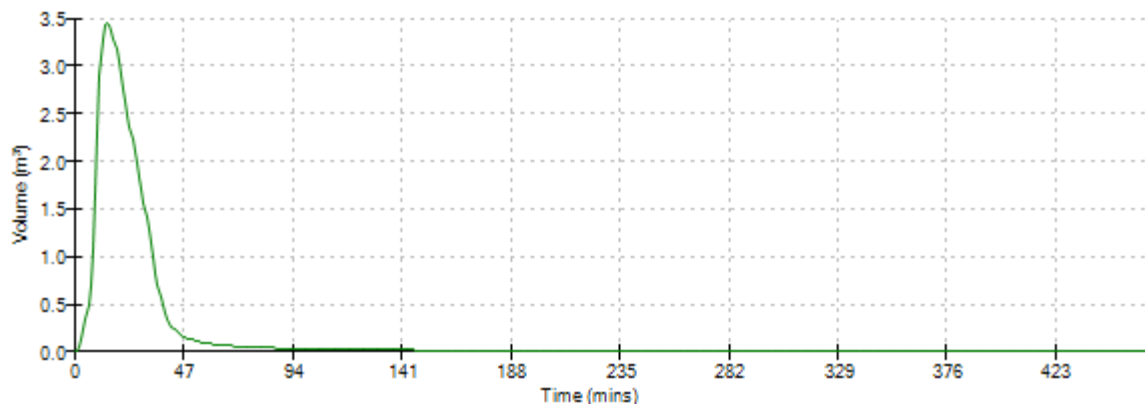
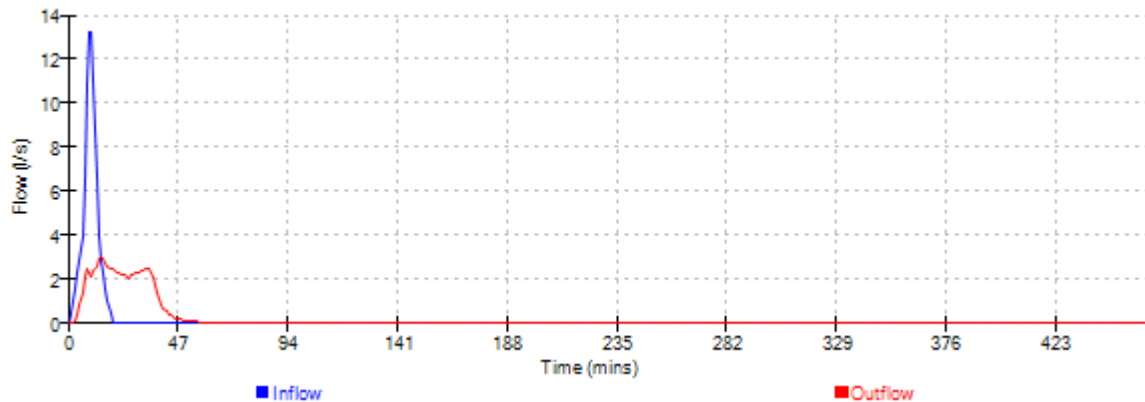
Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.4	1.200	4.1	3.000	6.3	7.000	9.5
0.200	2.3	1.400	4.4	3.500	6.8	7.500	9.9
0.300	2.2	1.600	4.7	4.000	7.2	8.000	10.2
0.400	2.5	1.800	5.0	4.500	7.6	8.500	10.5
0.500	2.8	2.000	5.2	5.000	8.1	9.000	10.8
0.600	3.0	2.200	5.5	5.500	8.5	9.500	11.1
0.800	3.4	2.400	5.7	6.000	8.8		
1.000	3.8	2.600	5.9	6.500	9.2		

©1982-2020 Innovyze

Easy Flood Risk		Page 5																																																																																										
55 Shepherds Lane Dartford DA1 2NL																																																																																												
Date 07/05/2024 06:28 File 9 Chatsworth Ave.SRCX	Designed by sheph Checked by																																																																																											
Innovyze																																																																																												
Source Control 2020.1																																																																																												
Hydro-Brake® Optimum Overflow Control Unit Reference MD-SCL-0077-2500-0400-2500 Design Head (m)0.400 Design Flow (l/s)2.5 Flush-Flo™Calculated ObjectiveMinimise blockage risk ApplicationSurface Sump AvailableYes Diameter (mm)77 Invert Level (m)87.700 Minimum Outlet Pipe Diameter (mm)100 Suggested Manhole Diameter (mm)1200 <table><tr><td>Control Points</td><td>Head (m)</td><td>Flow (l/s)</td><td>Control Points</td><td>Head (m)</td><td>Flow (l/s)</td></tr><tr><td>Design Point (Calculated)</td><td>0.400</td><td>2.5</td><td>Kick-Flo®</td><td>0.262</td><td>2.1</td></tr><tr><td>Flush-Flo™</td><td>0.104</td><td>2.5</td><td>Mean Flow over Head Range</td><td>-</td><td>2.0</td></tr></table> The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated <table><tr><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td><td>Depth (m)</td><td>Flow (l/s)</td></tr><tr><td>0.100</td><td>2.4</td><td>1.200</td><td>4.1</td><td>3.000</td><td>6.3</td><td>7.000</td><td>9.5</td></tr><tr><td>0.200</td><td>2.3</td><td>1.400</td><td>4.4</td><td>3.500</td><td>6.8</td><td>7.500</td><td>9.9</td></tr><tr><td>0.300</td><td>2.2</td><td>1.600</td><td>4.7</td><td>4.000</td><td>7.2</td><td>8.000</td><td>10.2</td></tr><tr><td>0.400</td><td>2.5</td><td>1.800</td><td>5.0</td><td>4.500</td><td>7.6</td><td>8.500</td><td>10.5</td></tr><tr><td>0.500</td><td>2.8</td><td>2.000</td><td>5.2</td><td>5.000</td><td>8.1</td><td>9.000</td><td>10.8</td></tr><tr><td>0.600</td><td>3.0</td><td>2.200</td><td>5.5</td><td>5.500</td><td>8.5</td><td>9.500</td><td>11.1</td></tr><tr><td>0.800</td><td>3.4</td><td>2.400</td><td>5.7</td><td>6.000</td><td>8.8</td><td></td><td></td></tr><tr><td>1.000</td><td>3.8</td><td>2.600</td><td>5.9</td><td>6.500</td><td>9.2</td><td></td><td></td></tr></table>			Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)	Design Point (Calculated)	0.400	2.5	Kick-Flo®	0.262	2.1	Flush-Flo™	0.104	2.5	Mean Flow over Head Range	-	2.0	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	0.100	2.4	1.200	4.1	3.000	6.3	7.000	9.5	0.200	2.3	1.400	4.4	3.500	6.8	7.500	9.9	0.300	2.2	1.600	4.7	4.000	7.2	8.000	10.2	0.400	2.5	1.800	5.0	4.500	7.6	8.500	10.5	0.500	2.8	2.000	5.2	5.000	8.1	9.000	10.8	0.600	3.0	2.200	5.5	5.500	8.5	9.500	11.1	0.800	3.4	2.400	5.7	6.000	8.8			1.000	3.8	2.600	5.9	6.500	9.2		
Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)																																																																																							
Design Point (Calculated)	0.400	2.5	Kick-Flo®	0.262	2.1																																																																																							
Flush-Flo™	0.104	2.5	Mean Flow over Head Range	-	2.0																																																																																							
Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)																																																																																					
0.100	2.4	1.200	4.1	3.000	6.3	7.000	9.5																																																																																					
0.200	2.3	1.400	4.4	3.500	6.8	7.500	9.9																																																																																					
0.300	2.2	1.600	4.7	4.000	7.2	8.000	10.2																																																																																					
0.400	2.5	1.800	5.0	4.500	7.6	8.500	10.5																																																																																					
0.500	2.8	2.000	5.2	5.000	8.1	9.000	10.8																																																																																					
0.600	3.0	2.200	5.5	5.500	8.5	9.500	11.1																																																																																					
0.800	3.4	2.400	5.7	6.000	8.8																																																																																							
1.000	3.8	2.600	5.9	6.500	9.2																																																																																							
©1982-2020 Innovyze																																																																																												

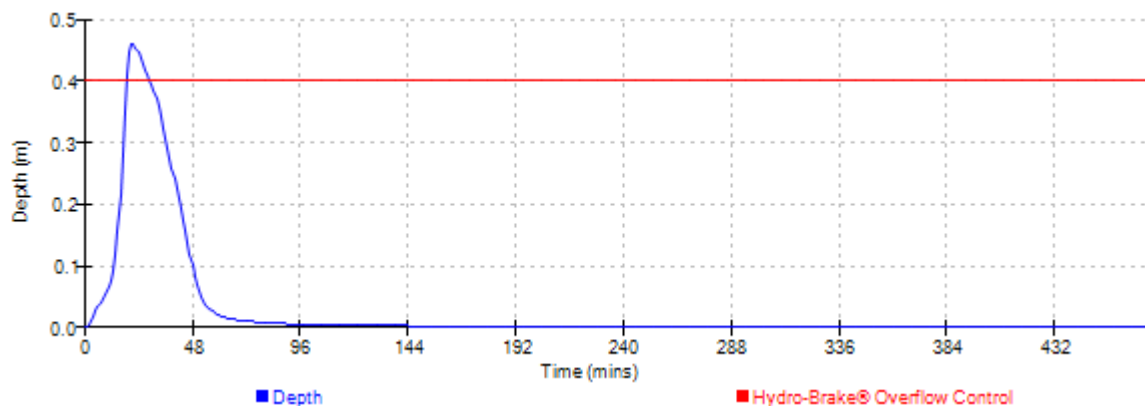
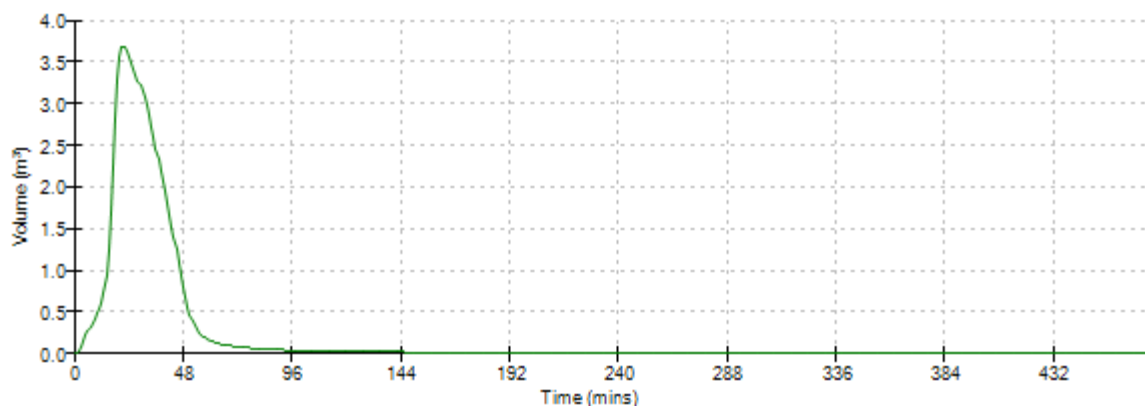
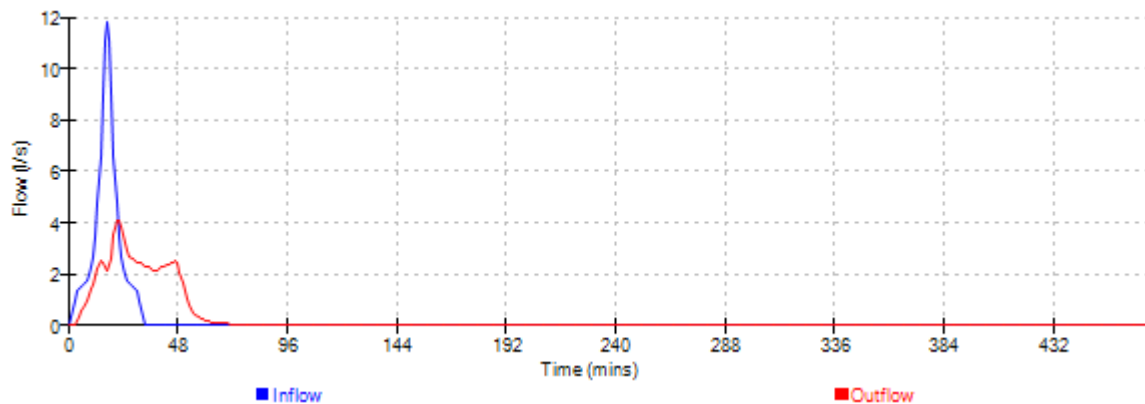
Easy Flood Risk		Page 6
55 Shepherds Lane Dartford DA1 2NL		
Date 07/05/2024 06:28 File 9 Chatsworth Ave.SRCX	Designed by sheph Checked by	
Innovyze	Source Control 2020.1	

Event: 15 min Summer



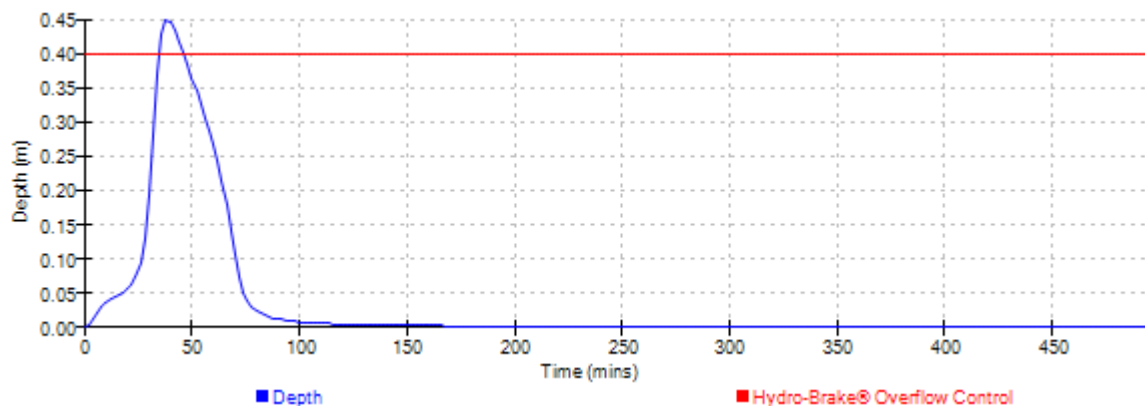
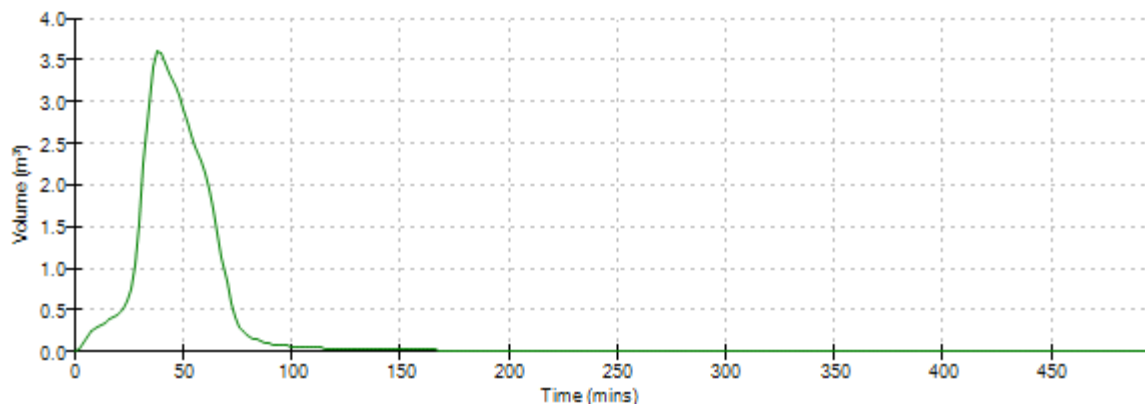
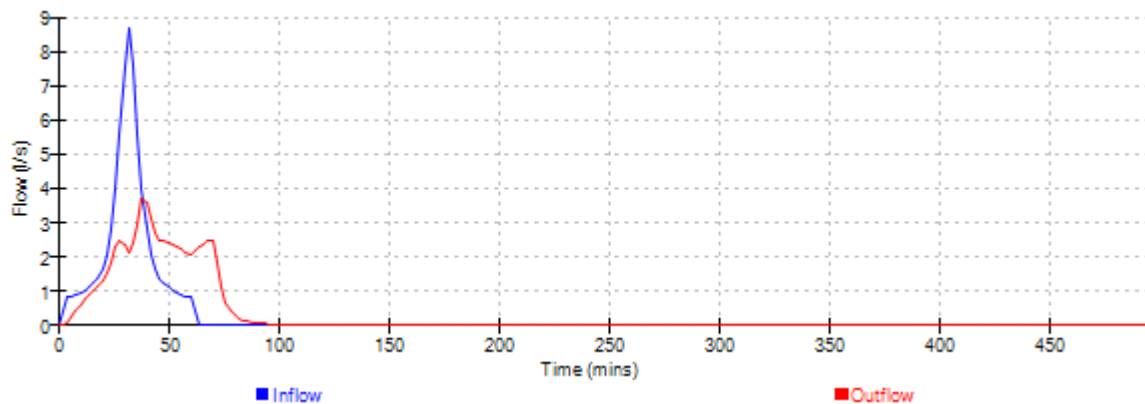
Easy Flood Risk		Page 7
55 Shepherds Lane Dartford DA1 2NL		
Date 07/05/2024 06:28 File 9 Chatsworth Ave.SRCX	Designed by sheph Checked by	
Innovyze	Source Control 2020.1	

Event: 30 min Summer



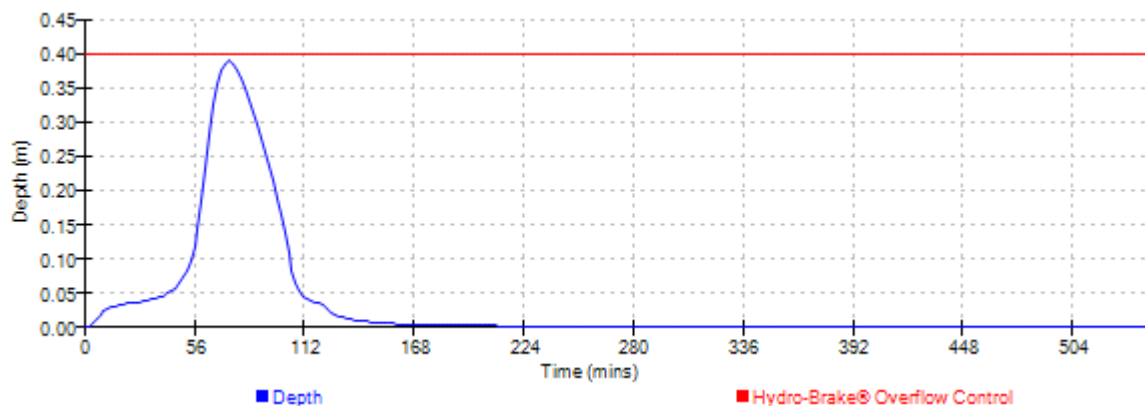
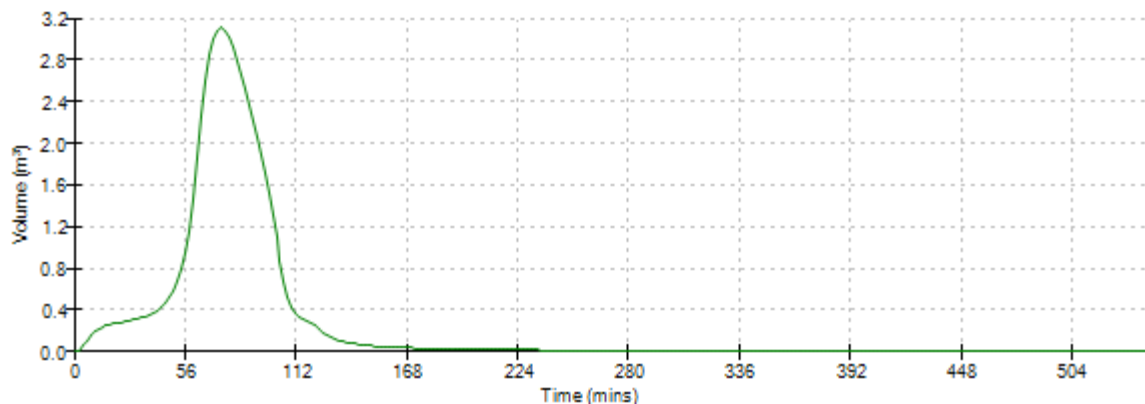
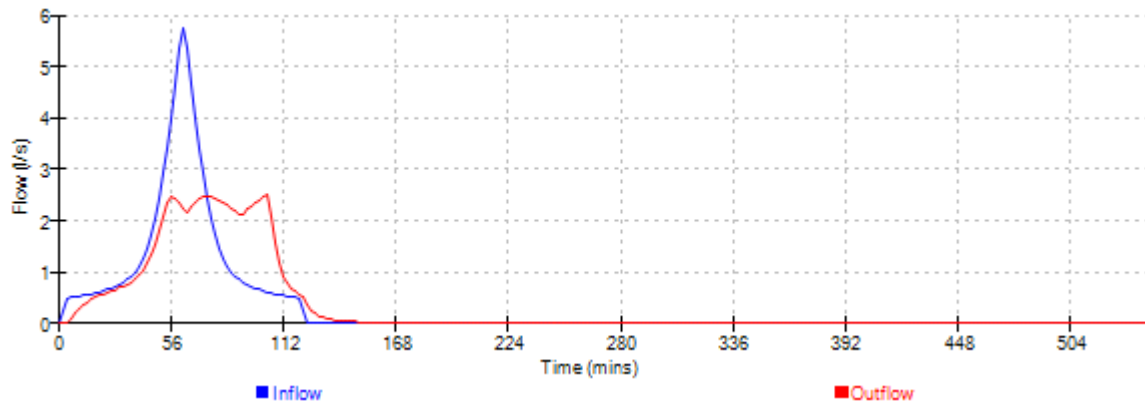
Easy Flood Risk		Page 8
55 Shepherds Lane Dartford DA1 2NL		
Date 07/05/2024 06:28 File 9 Chatsworth Ave.SRCX	Designed by sheph Checked by	
Innovyze	Source Control 2020.1	

Event: 60 min Summer



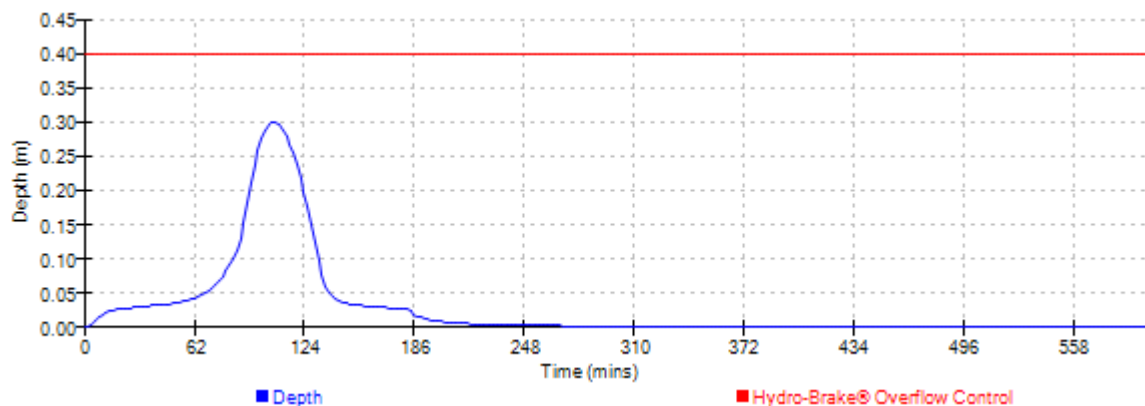
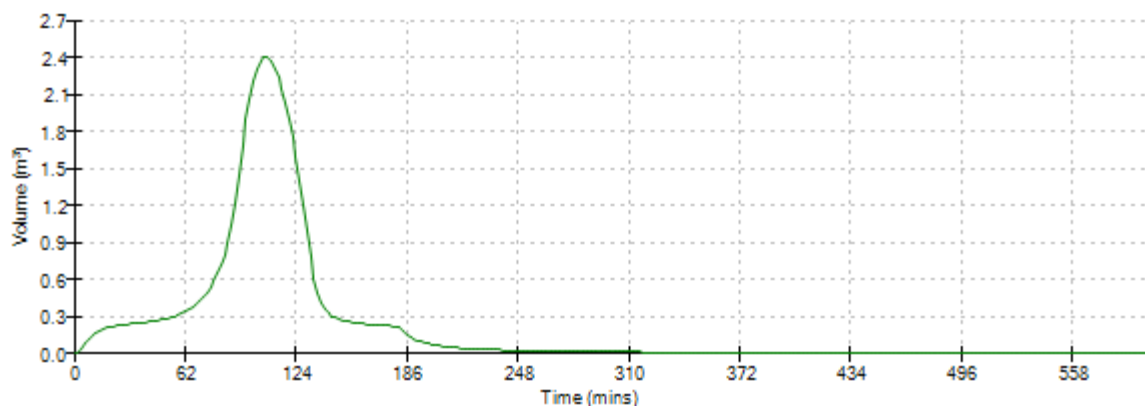
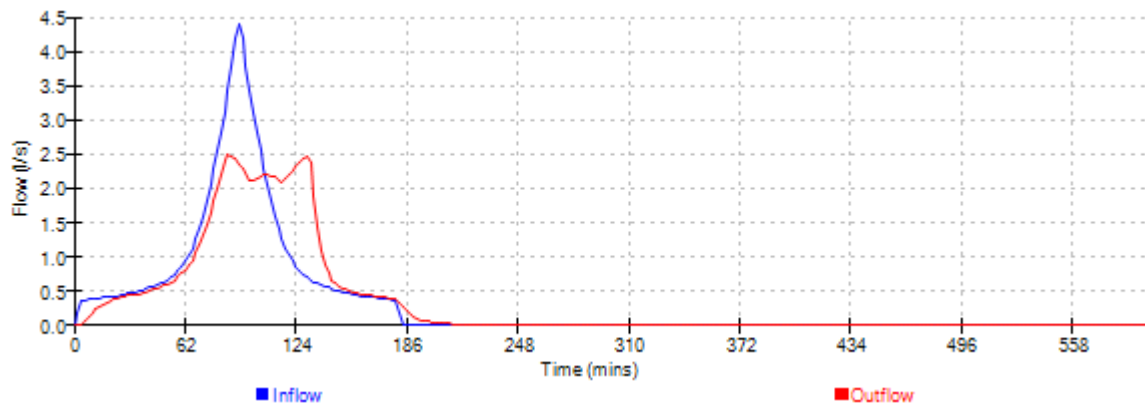
Easy Flood Risk		Page 9
55 Shepherds Lane Dartford DA1 2NL		
Date 07/05/2024 06:28 File 9 Chatsworth Ave.SRCX	Designed by sheph Checked by	
Innovyze	Source Control 2020.1	

Event: 120 min Summer



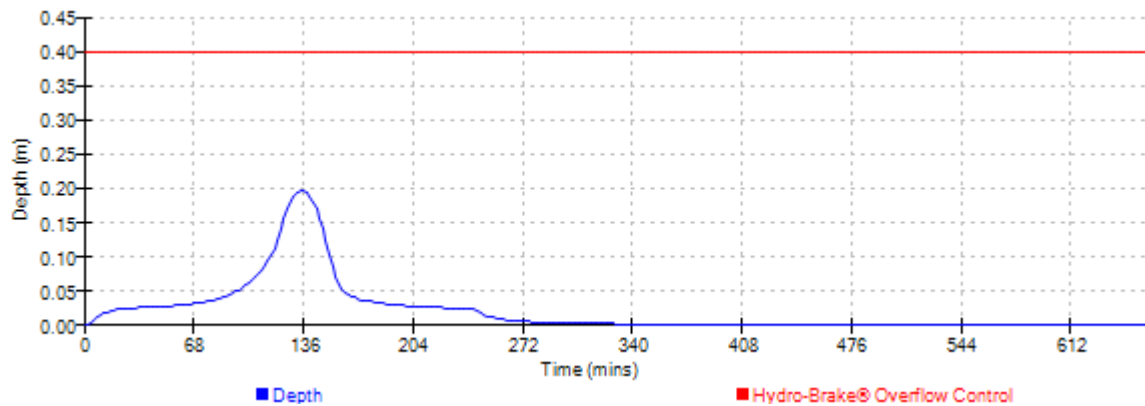
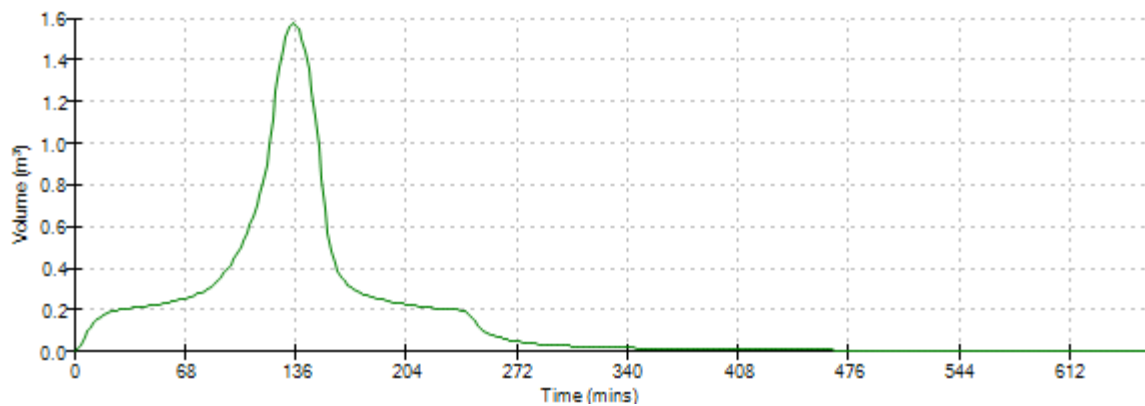
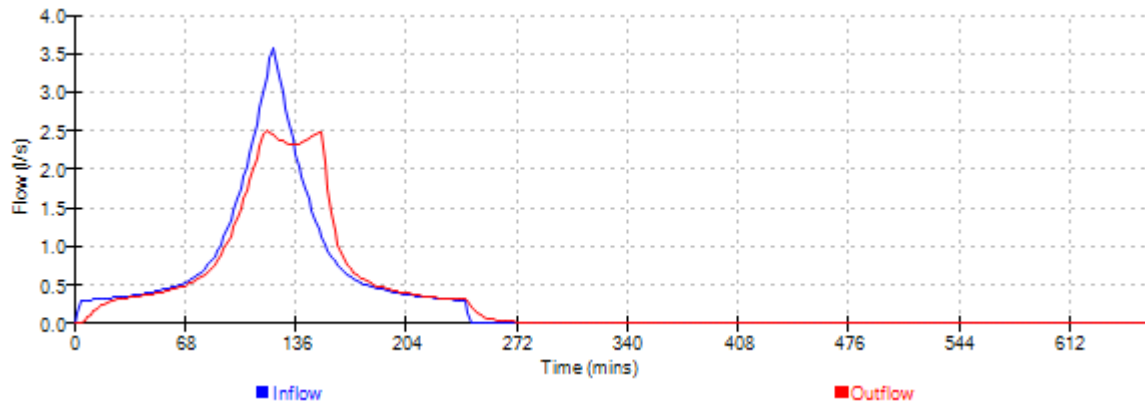
Easy Flood Risk		Page 10
55 Shepherds Lane Dartford DA1 2NL		
Date 07/05/2024 06:28 File 9 Chatsworth Ave.SRCX	Designed by sheph Checked by	
Innovyze	Source Control 2020.1	

Event: 180 min Summer



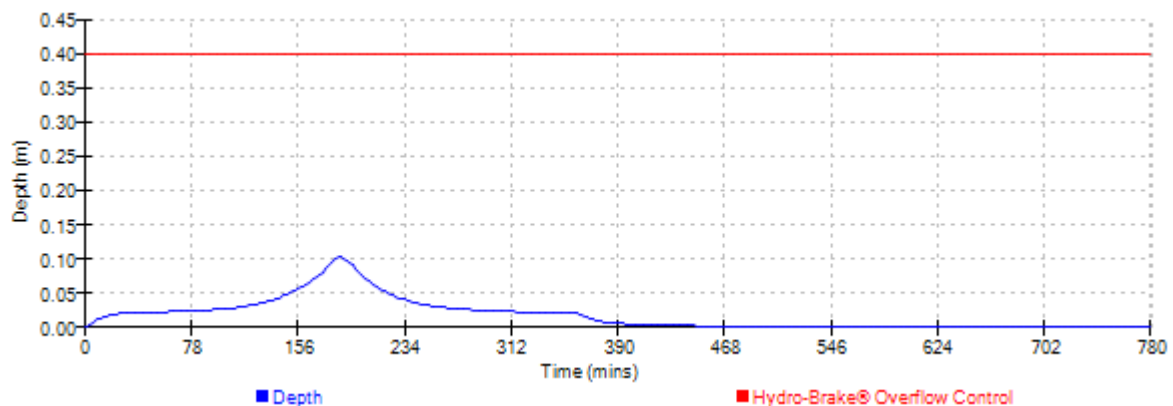
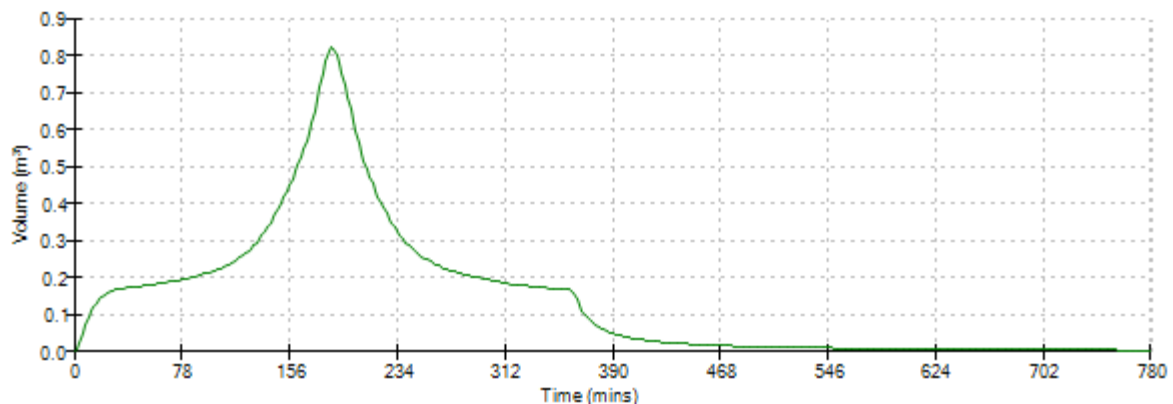
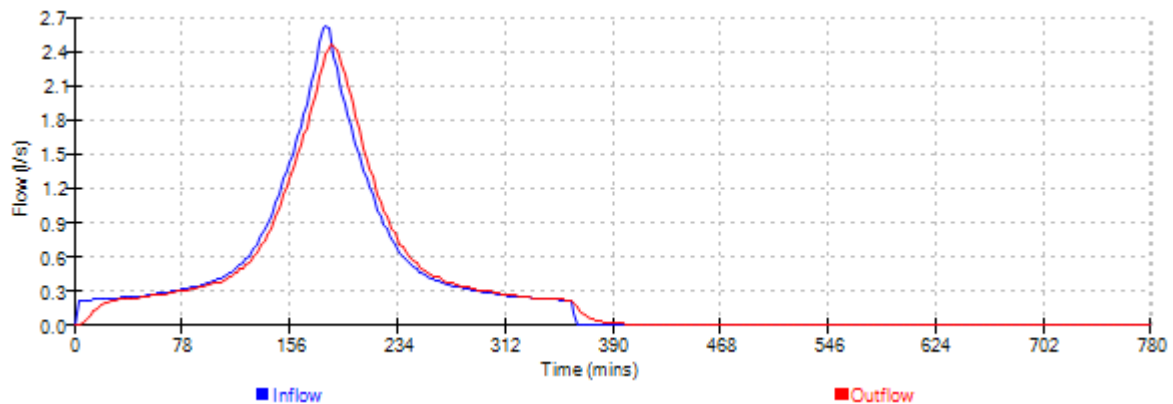
Easy Flood Risk		Page 11
55 Shepherds Lane		
Dartford		
DA1 2NL		
Date 07/05/2024 06:28	Designed by sheph	
File 9 Chatsworth Ave.SRCX	Checked by	
Innovyze	Source Control 2020.1	

Event: 240 min Summer



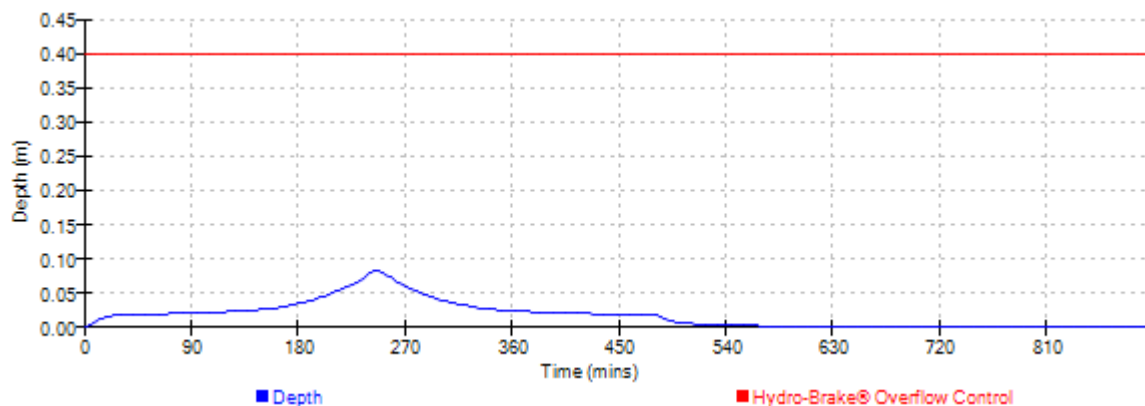
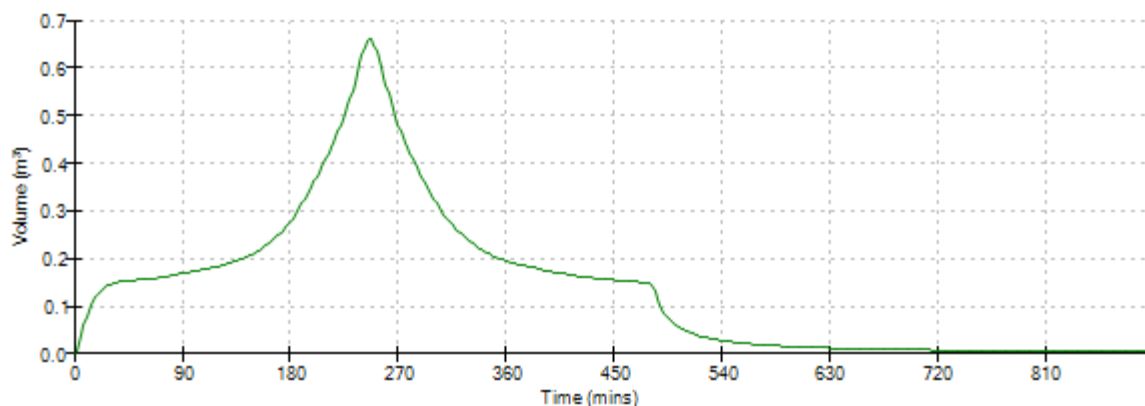
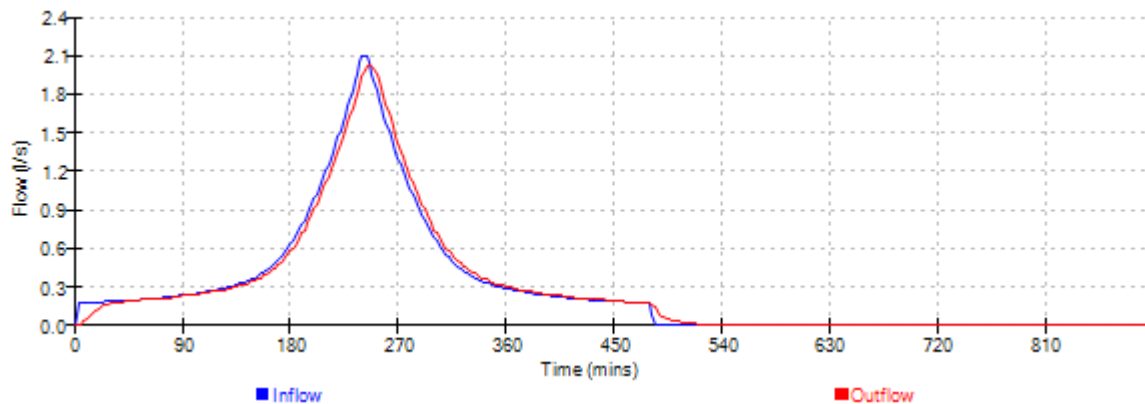
Easy Flood Risk		Page 12
55 Shepherds Lane Dartford DA1 2NL		
Date 07/05/2024 06:28 File 9 Chatsworth Ave.SRCX	Designed by sheph Checked by	
Innovyze	Source Control 2020.1	

Event: 360 min Summer



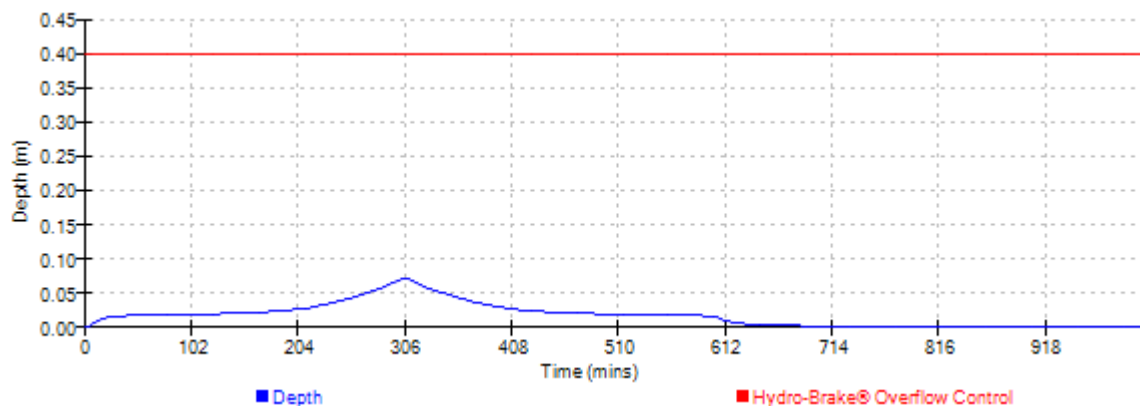
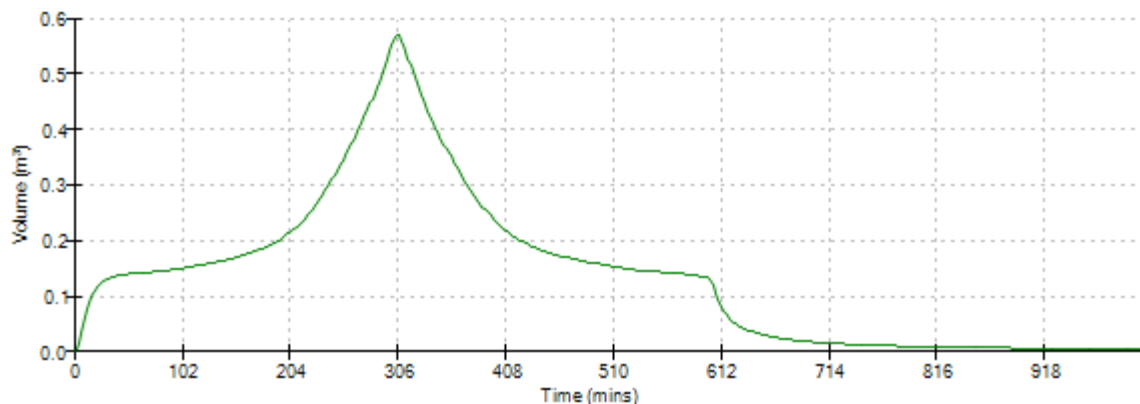
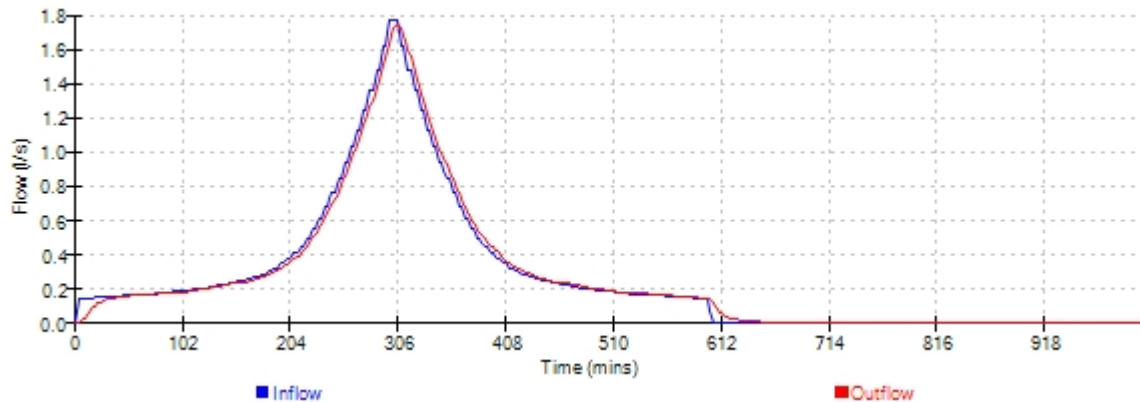
Easy Flood Risk		Page 13
55 Shepherds Lane Dartford DA1 2NL		
Date 07/05/2024 06:28	Designed by sheph	
File 9 Chatsworth Ave.SRCX	Checked by	
Innovyze	Source Control 2020.1	

Event: 480 min Summer



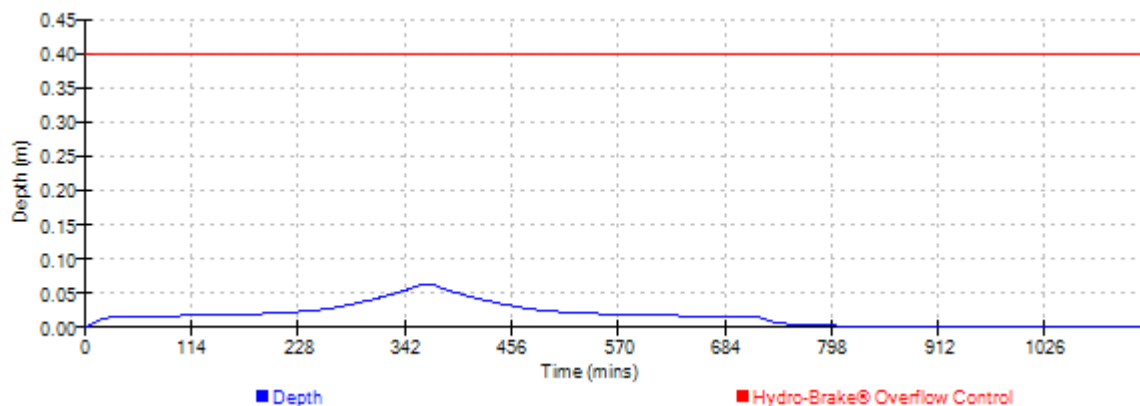
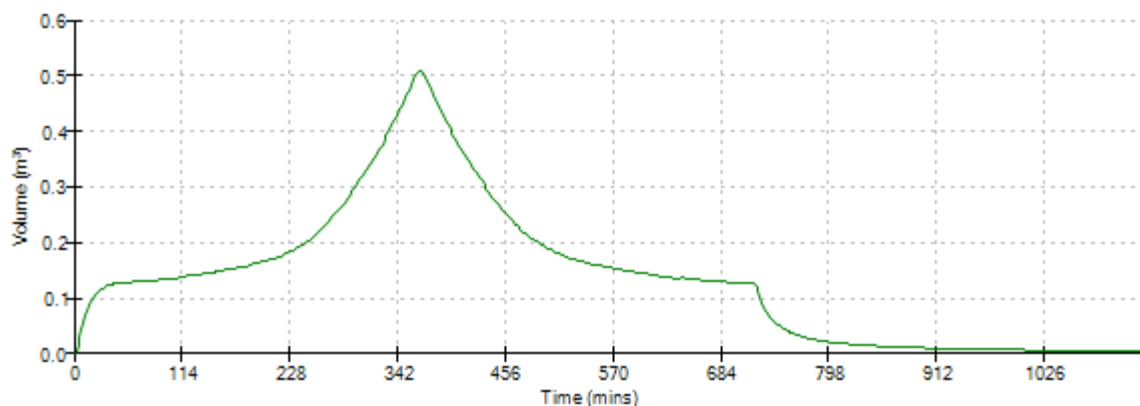
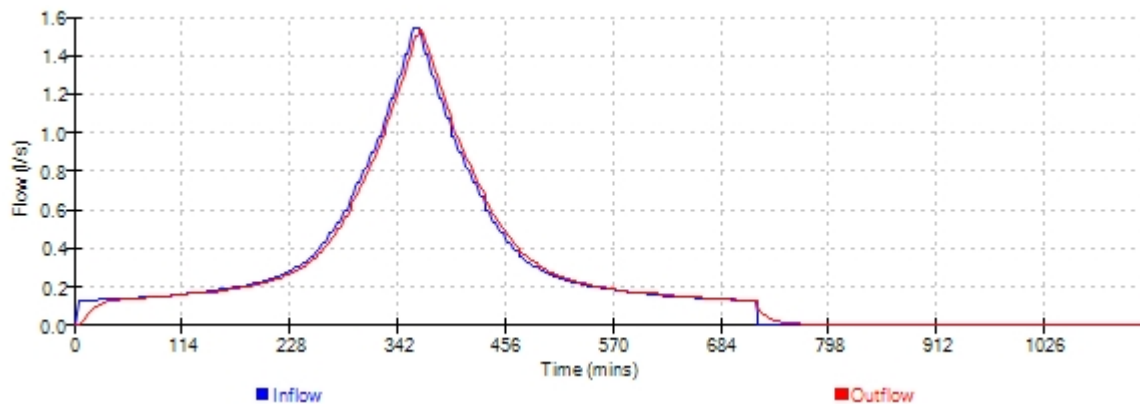
Easy Flood Risk		Page 14
55 Shepherds Lane Dartford DA1 2NL		
Date 07/05/2024 06:28 File 9 Chatsworth Ave.SRCX	Designed by sheph Checked by	
Innovyze	Source Control 2020.1	

Event: 600 min Summer



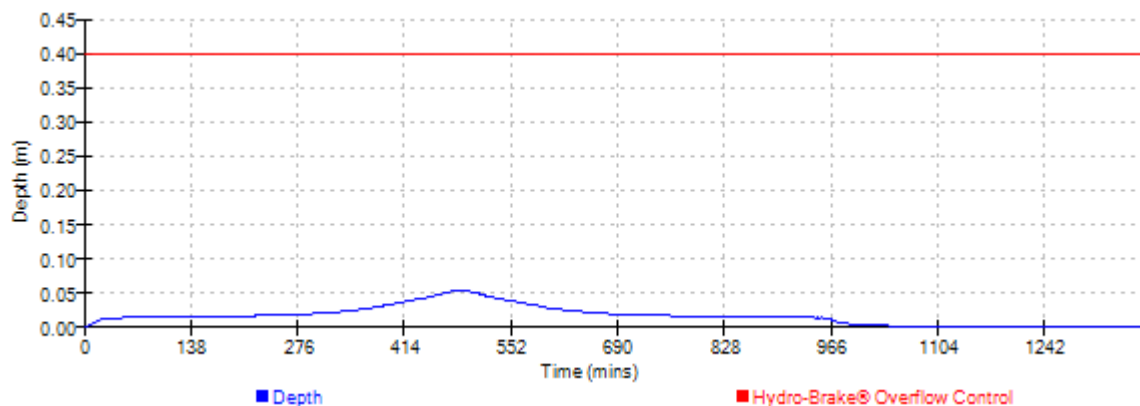
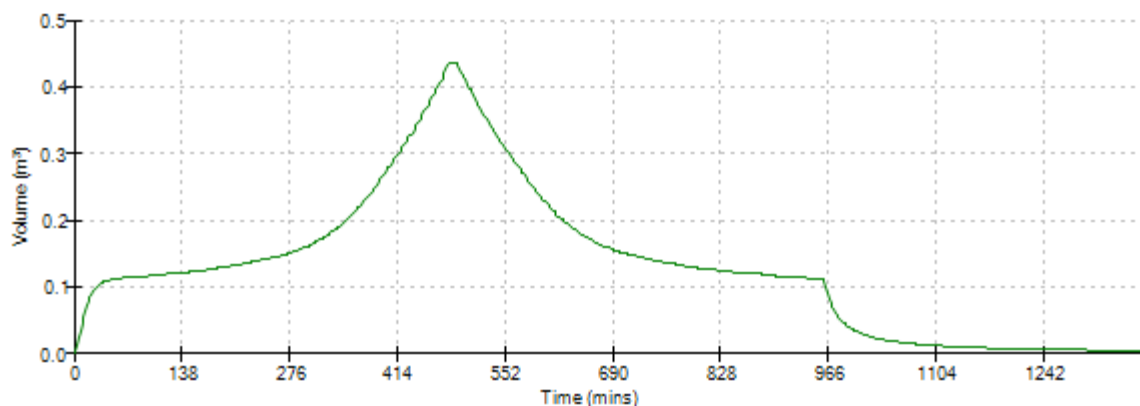
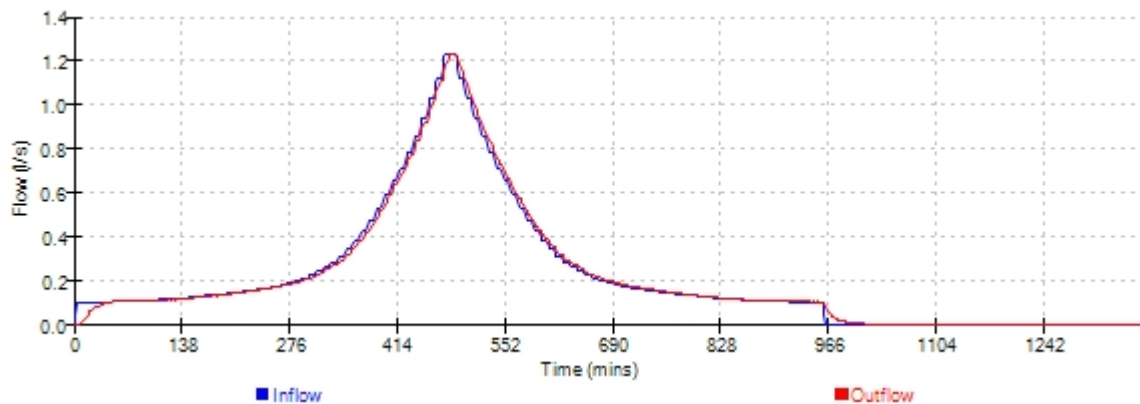
Easy Flood Risk		Page 15
55 Shepherds Lane Dartford DA1 2NL		
Date 07/05/2024 06:28 File 9 Chatsworth Ave.SRCX	Designed by sheph Checked by	
Innovyze	Source Control 2020.1	

Event: 720 min Summer



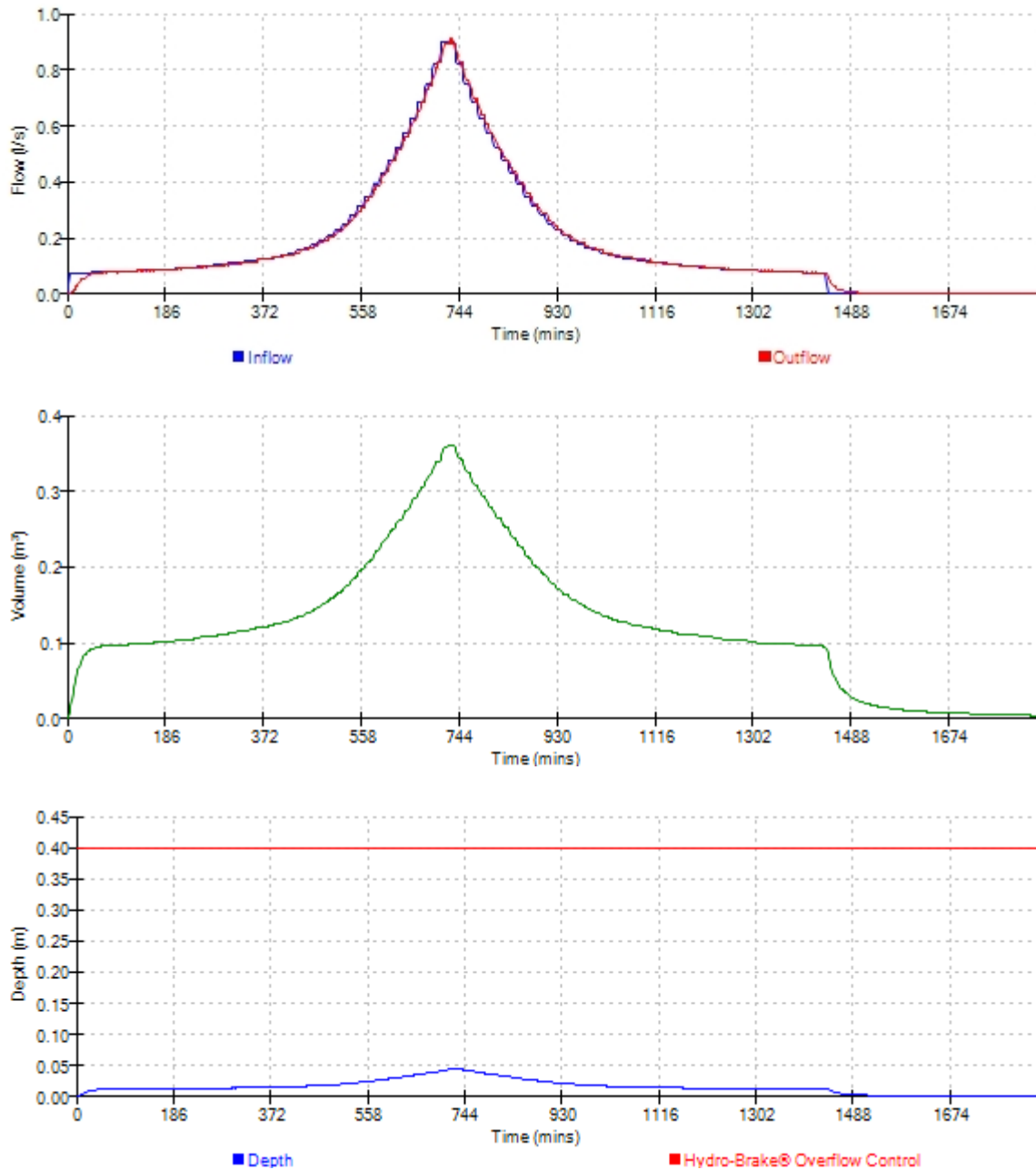
Easy Flood Risk		Page 16
55 Shepherds Lane Dartford DA1 2NL		
Date 07/05/2024 06:28 File 9 Chatsworth Ave.SRCX	Designed by sheph Checked by	
Innovyze	Source Control 2020.1	

Event: 960 min Summer



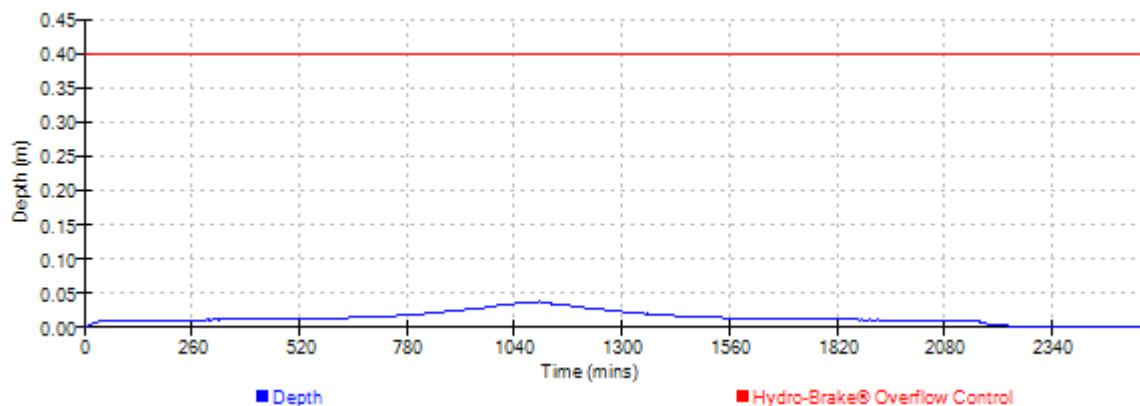
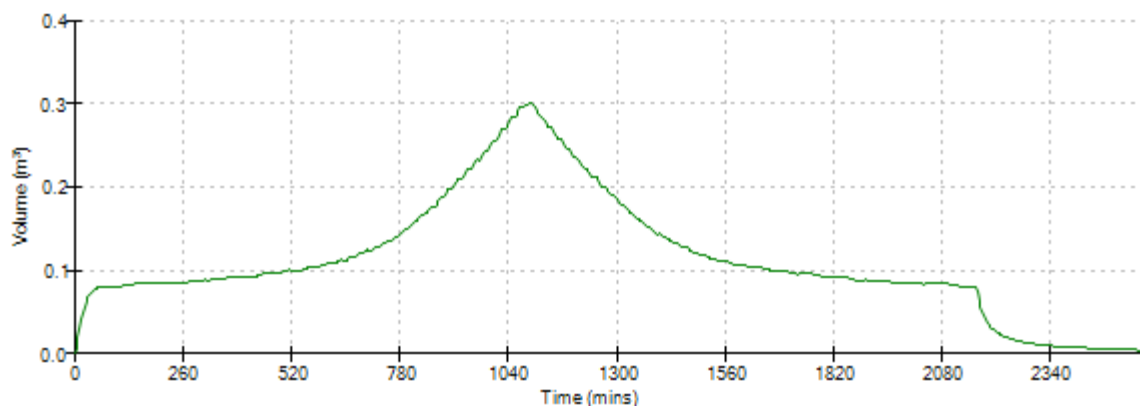
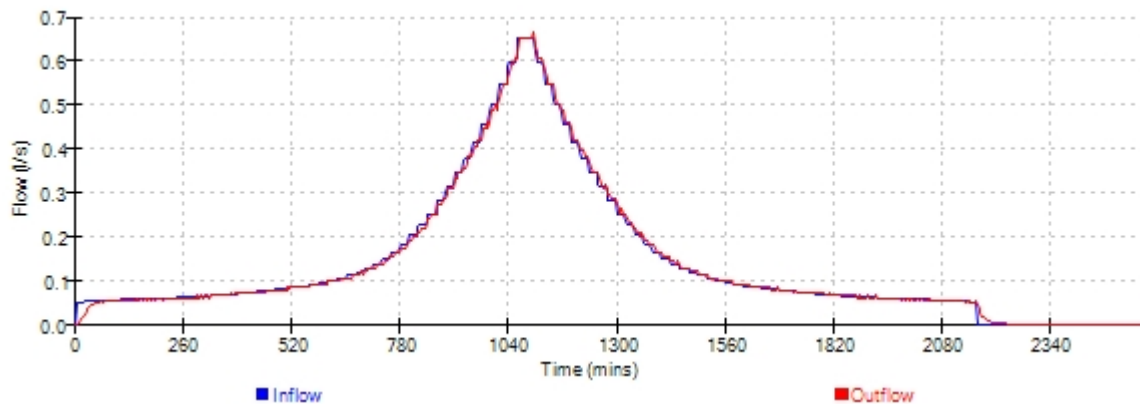
Easy Flood Risk		Page 17
55 Shepherds Lane Dartford DA1 2NL		
Date 07/05/2024 06:28 File 9 Chatsworth Ave.SRCX	Designed by sheph Checked by	
Innovyze	Source Control 2020.1	

Event: 1440 min Summer



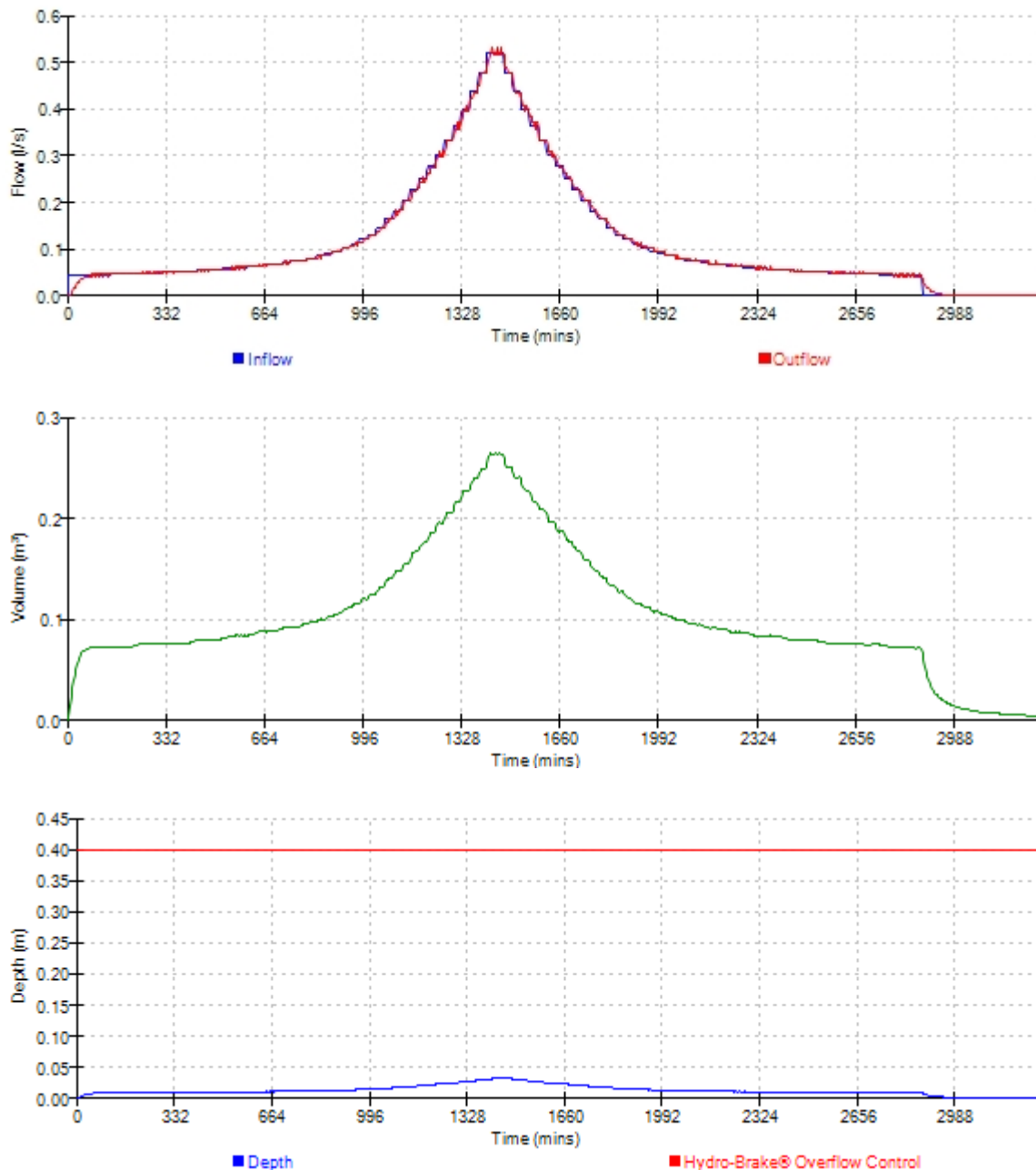
Easy Flood Risk		Page 18
55 Shepherds Lane Dartford DA1 2NL		
Date 07/05/2024 06:28	Designed by sheph	
File 9 Chatsworth Ave.SRCX	Checked by	
Innovyze	Source Control 2020.1	

Event: 2160 min Summer



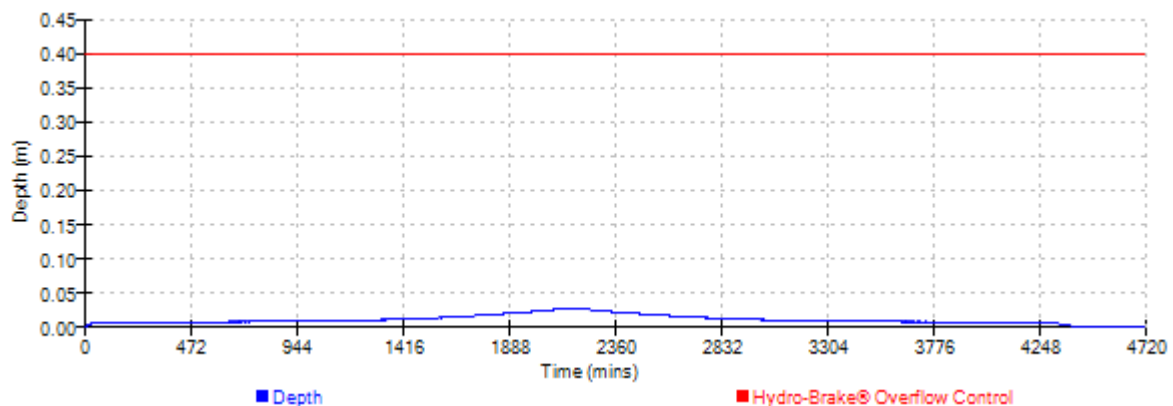
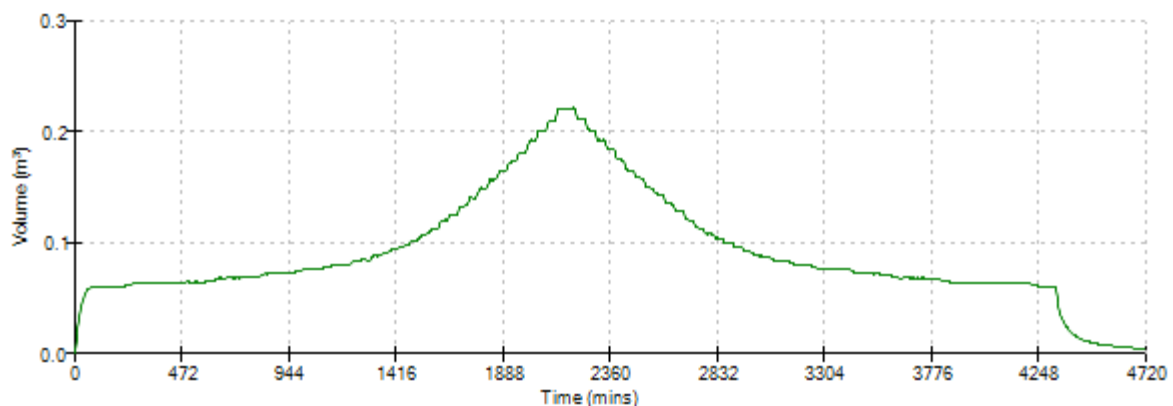
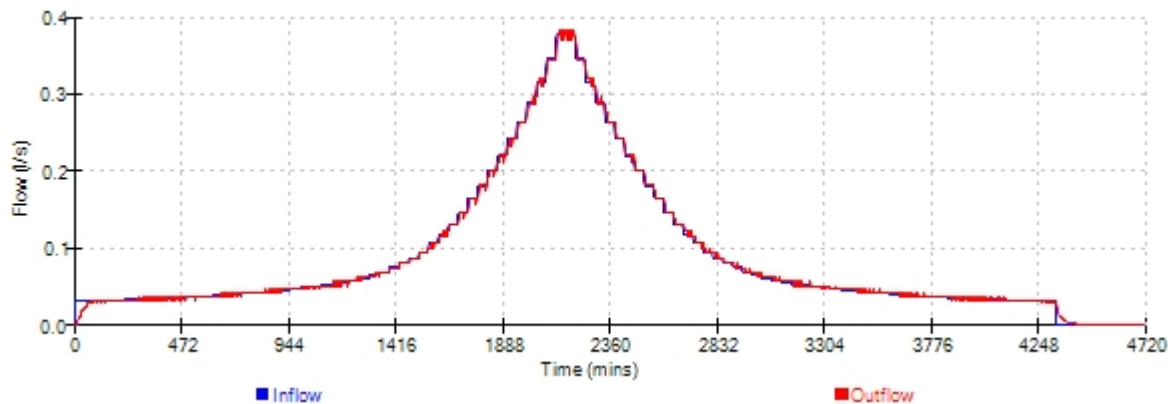
Easy Flood Risk		Page 19
55 Shepherds Lane Dartford DA1 2NL		
Date 07/05/2024 06:28	Designed by sheph	
File 9 Chatsworth Ave.SRCX	Checked by	
Innovyze	Source Control 2020.1	

Event: 2880 min Summer



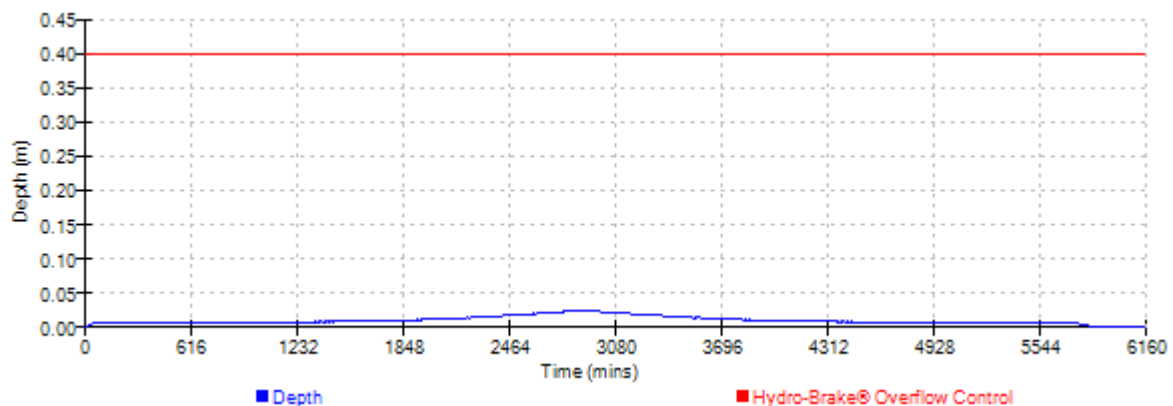
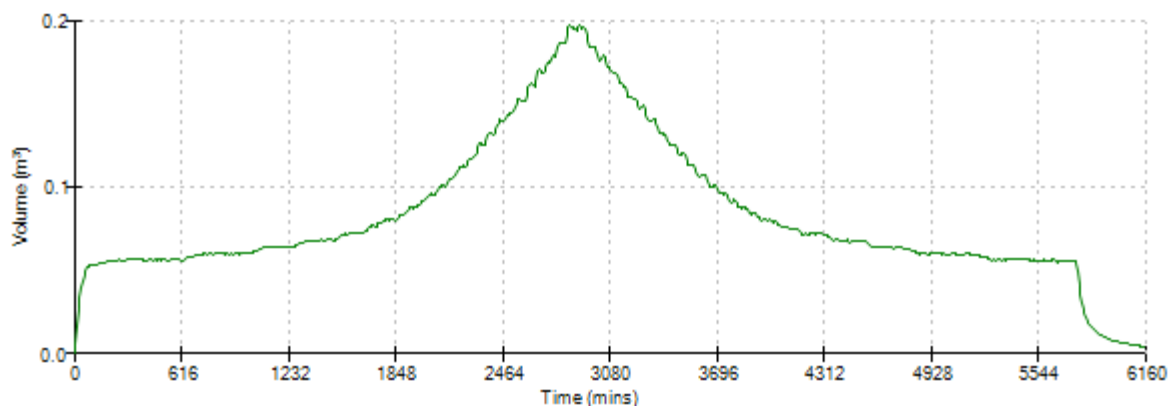
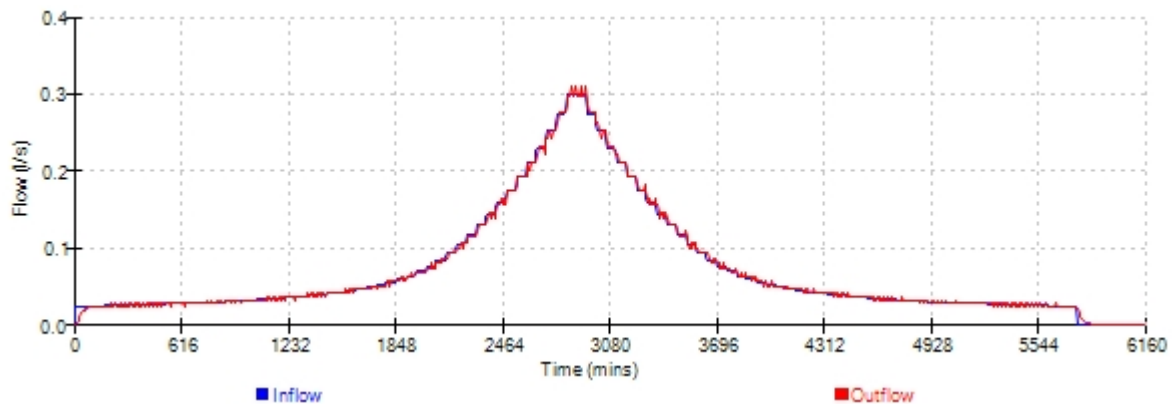
Easy Flood Risk		Page 20
55 Shepherds Lane Dartford DA1 2NL		
Date 07/05/2024 06:28 File 9 Chatsworth Ave.SRCX	Designed by sheph Checked by	
Innovyze	Source Control 2020.1	

Event: 4320 min Summer



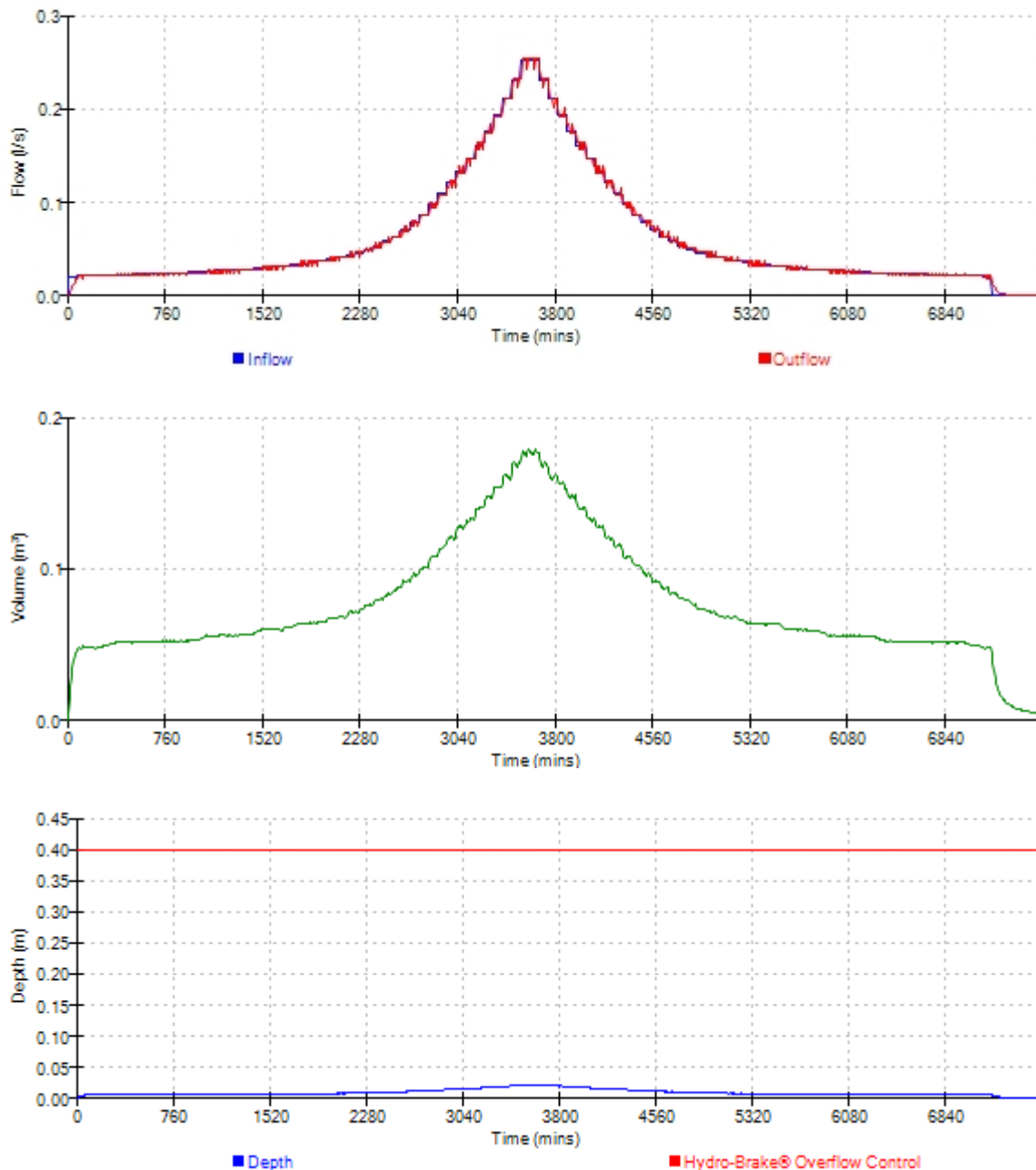
Easy Flood Risk		Page 21
55 Shepherds Lane Dartford DA1 2NL		
Date 07/05/2024 06:28 File 9 Chatsworth Ave.SRCX	Designed by sheph Checked by	
Innovyze	Source Control 2020.1	

Event: 5760 min Summer



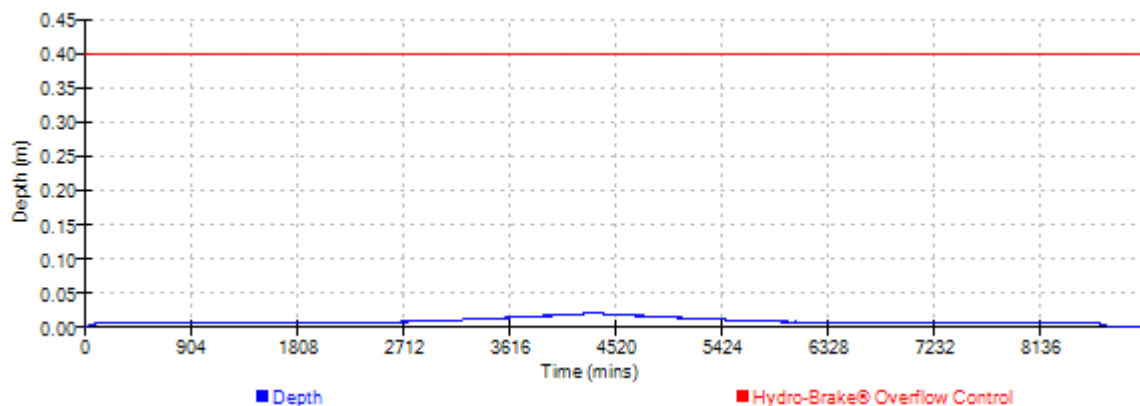
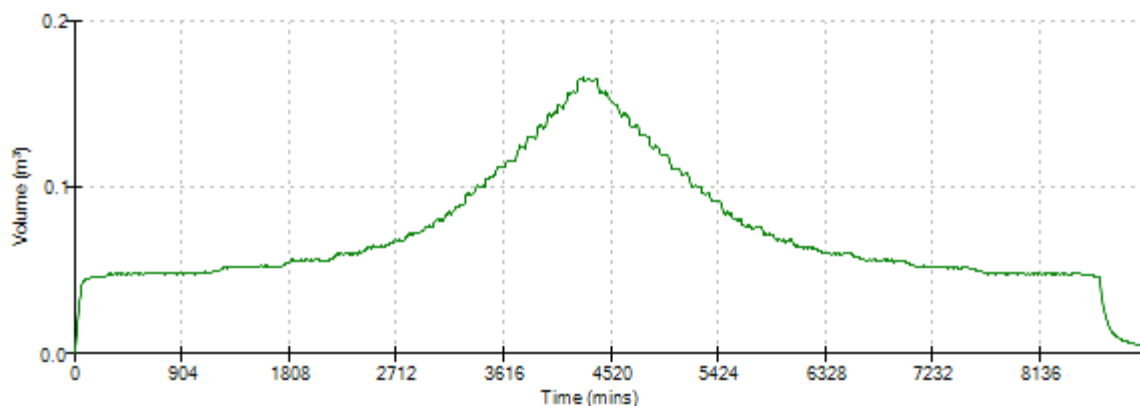
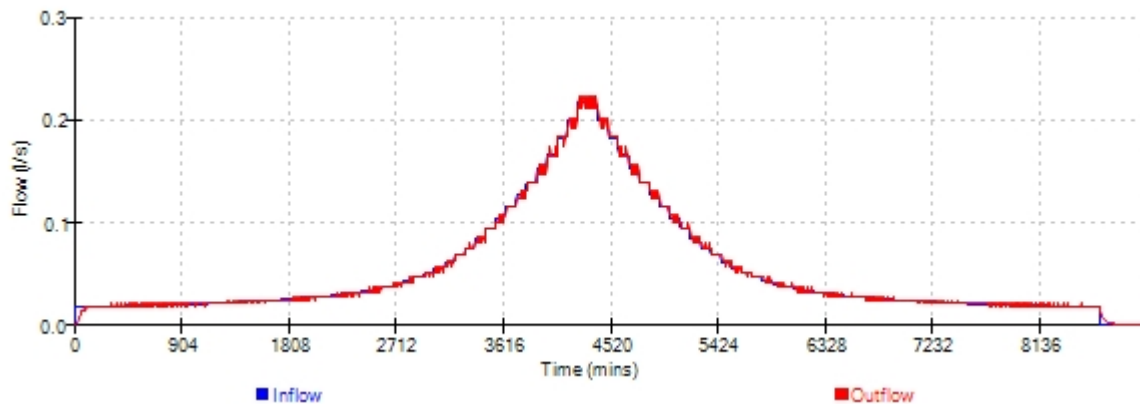
Easy Flood Risk		Page 22
55 Shepherds Lane Dartford DA1 2NL		
Date 07/05/2024 06:28	Designed by sheph	
File 9 Chatsworth Ave.SRCX	Checked by	
Innovyze	Source Control 2020.1	

Event: 7200 min Summer



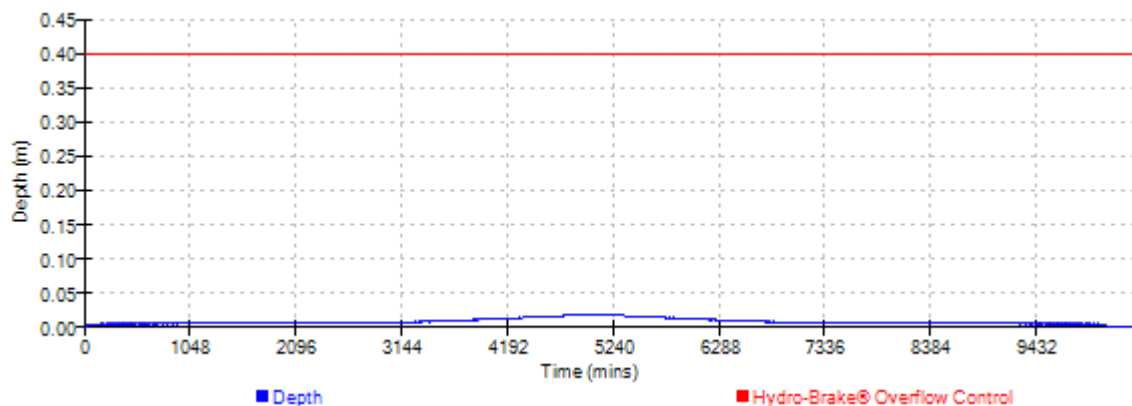
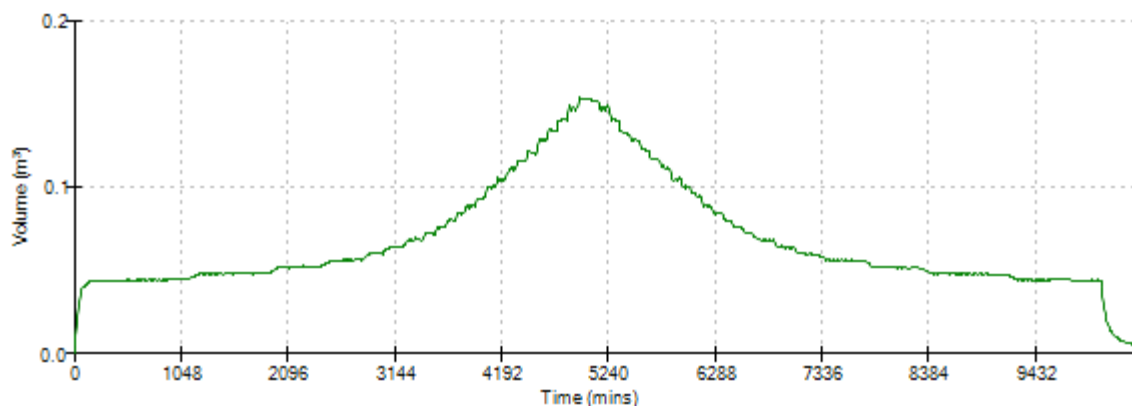
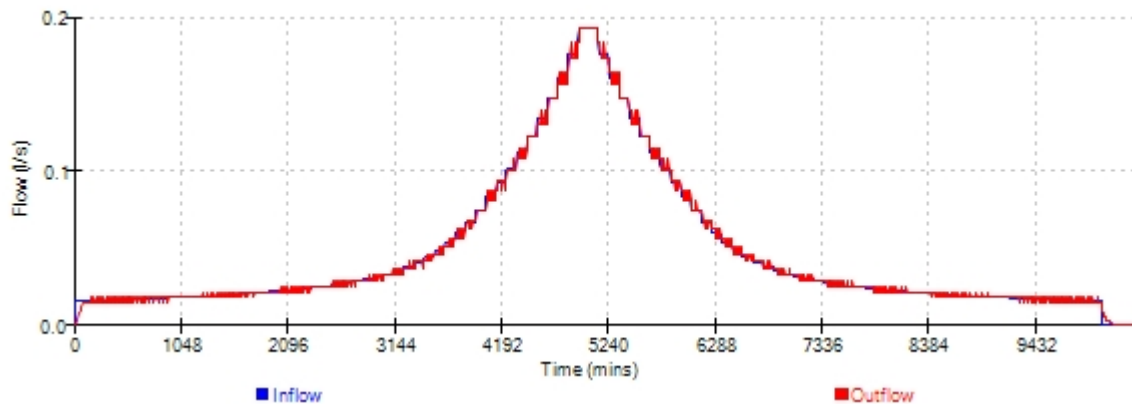
Easy Flood Risk		Page 23
55 Shepherds Lane Dartford DA1 2NL		
Date 07/05/2024 06:28 File 9 Chatsworth Ave.SRCX	Designed by sheph Checked by	
Innovyze	Source Control 2020.1	

Event: 8640 min Summer



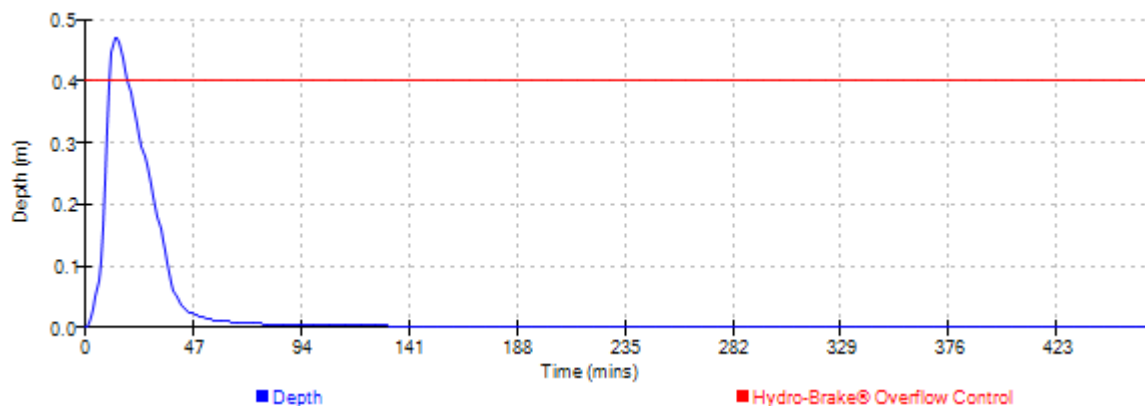
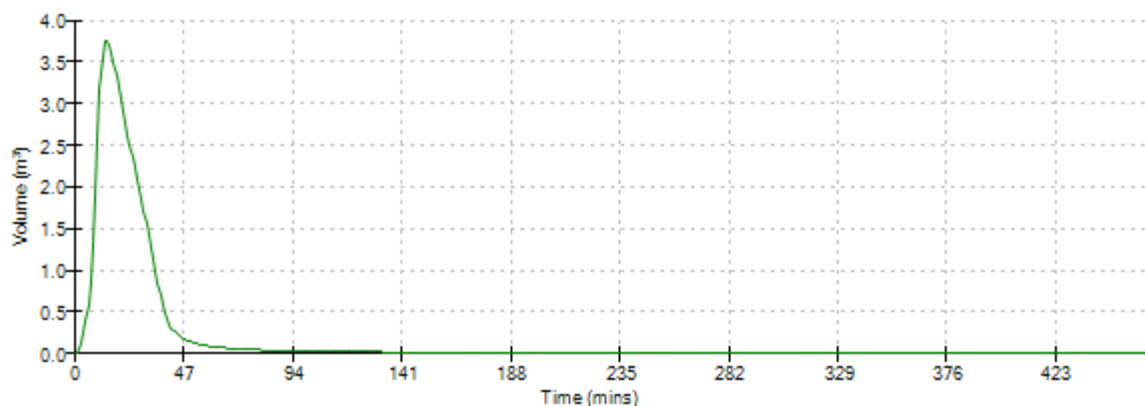
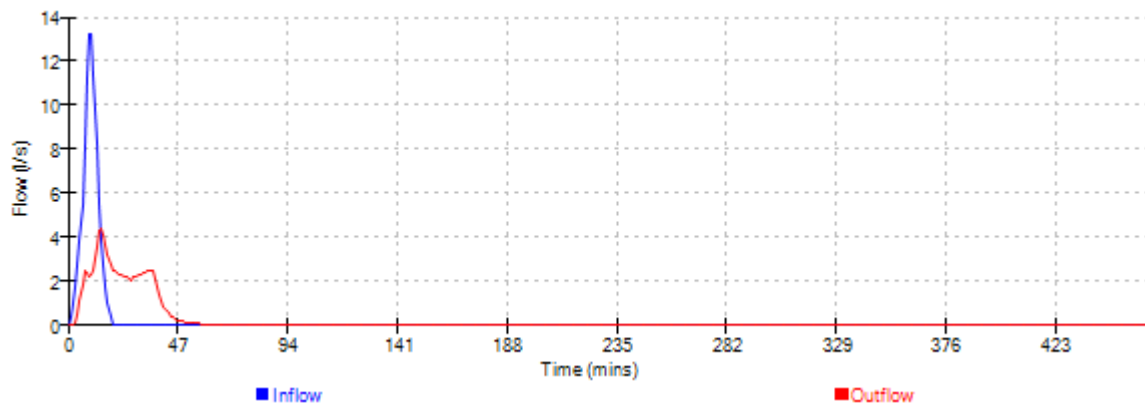
Easy Flood Risk		Page 24
55 Shepherds Lane Dartford DA1 2NL		
Date 07/05/2024 06:28	Designed by sheph	
File 9 Chatsworth Ave.SRCX	Checked by	
Innovyze	Source Control 2020.1	

Event: 10080 min Summer



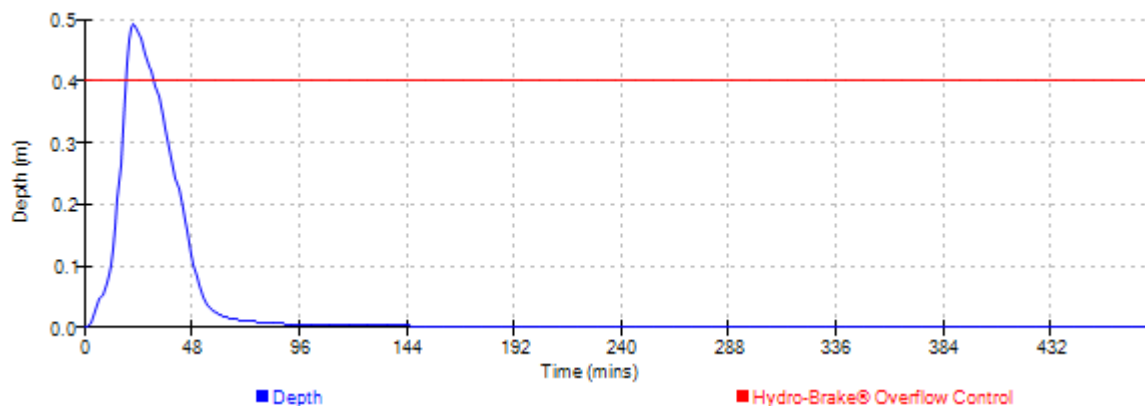
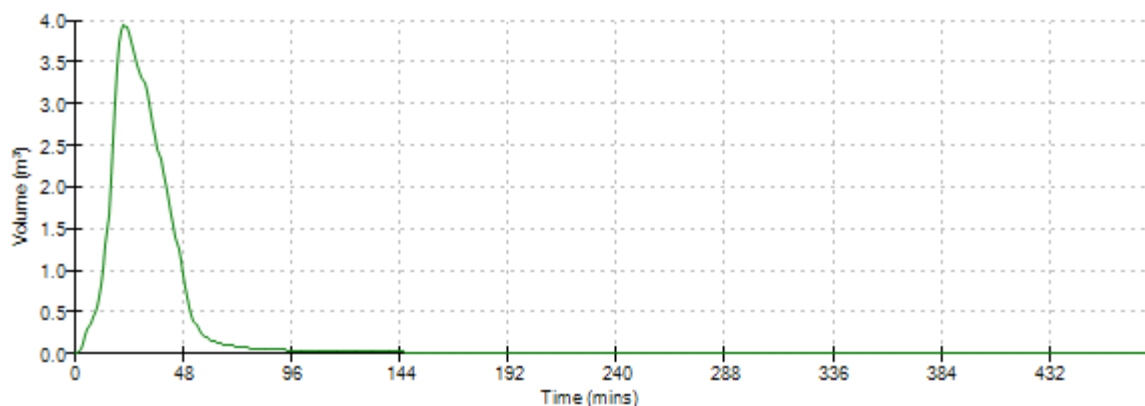
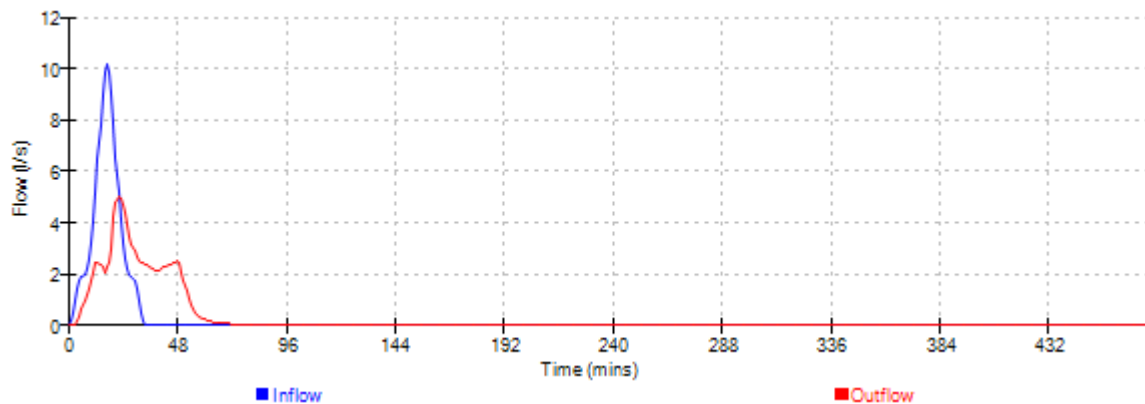
Easy Flood Risk		Page 25
55 Shepherds Lane Dartford DA1 2NL		
Date 07/05/2024 06:28 File 9 Chatsworth Ave.SRCX	Designed by sheph Checked by	
Innovyze	Source Control 2020.1	

Event: 15 min Winter



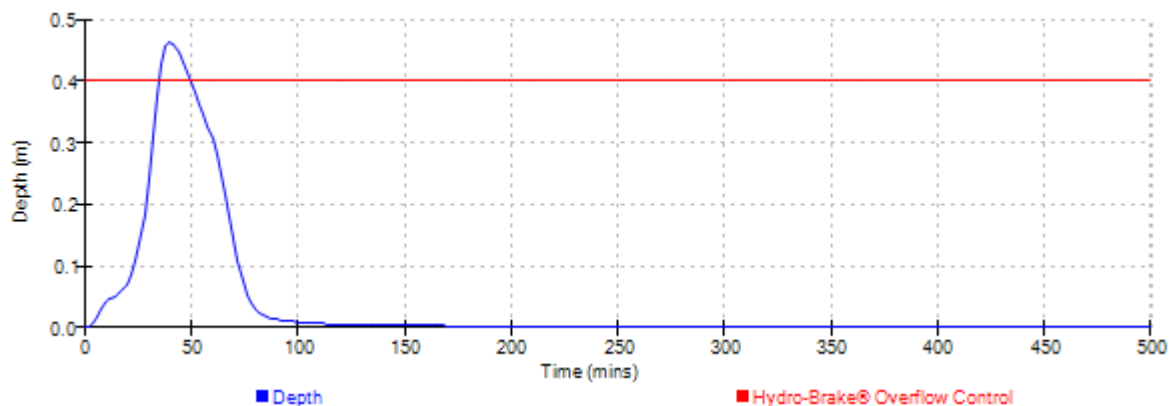
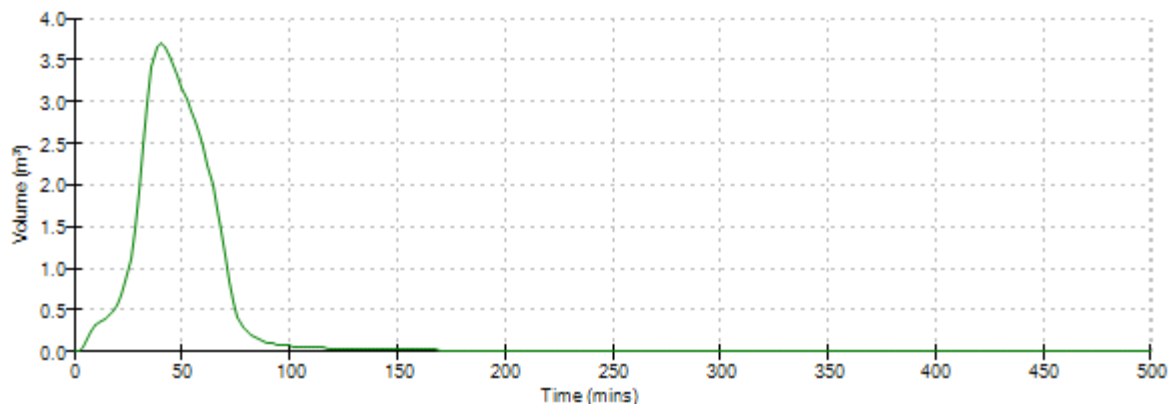
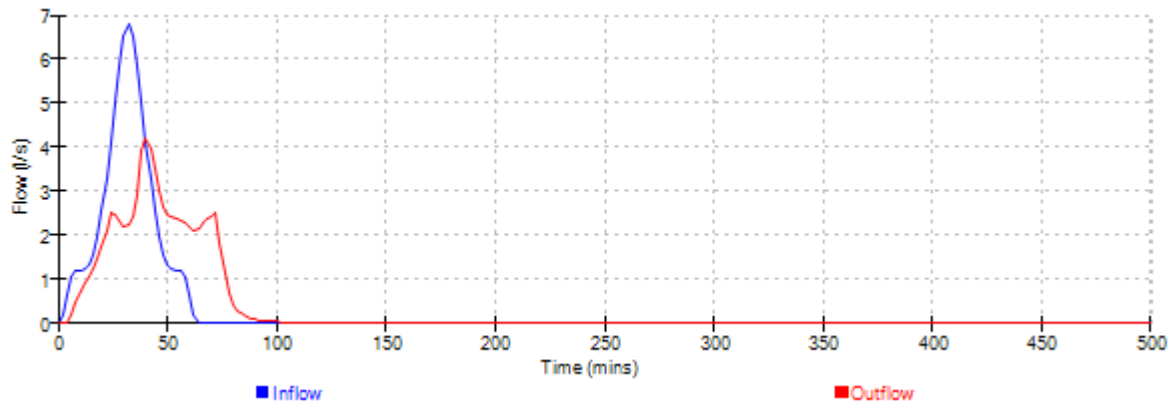
Easy Flood Risk		Page 26
55 Shepherds Lane Dartford DA1 2NL		
Date 07/05/2024 06:28 File 9 Chatsworth Ave.SRCX	Designed by sheph Checked by	
Innovyze	Source Control 2020.1	

Event: 30 min Winter



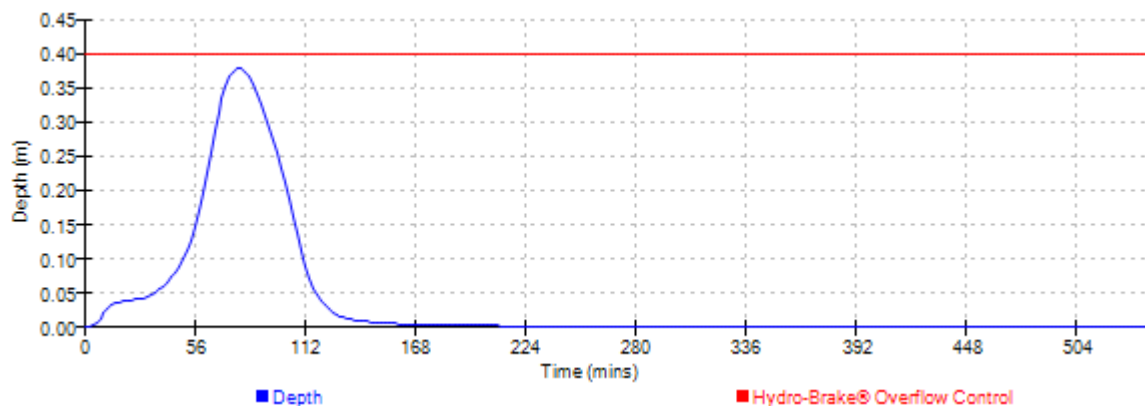
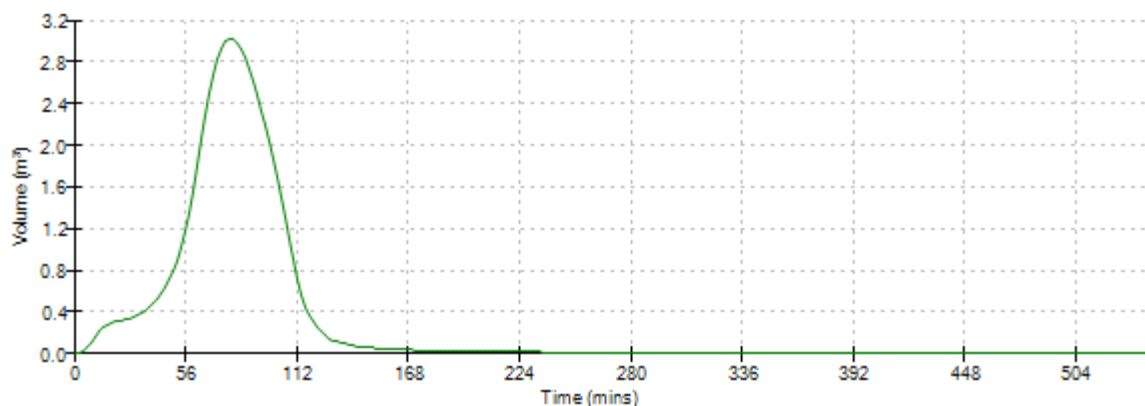
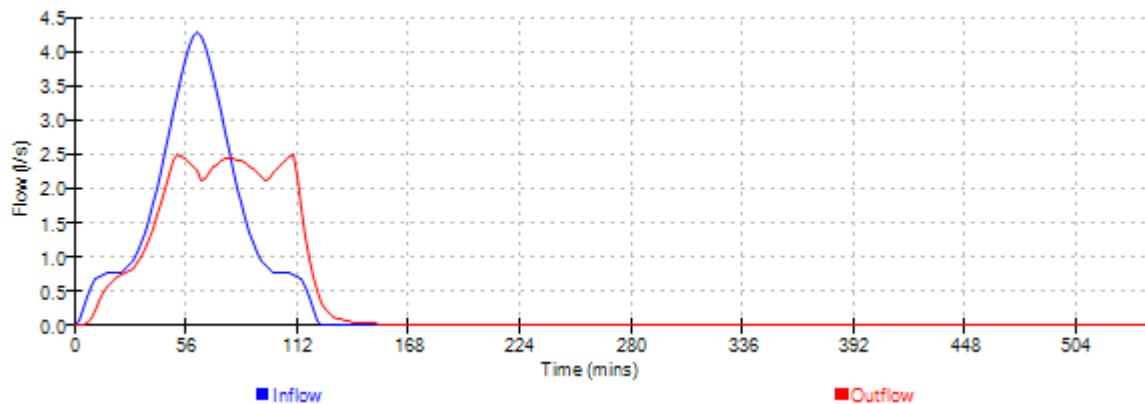
Easy Flood Risk		Page 27
55 Shepherds Lane Dartford DA1 2NL		
Date 07/05/2024 06:28 File 9 Chatsworth Ave.SRCX	Designed by sheph Checked by	
Innovyze	Source Control 2020.1	

Event: 60 min Winter



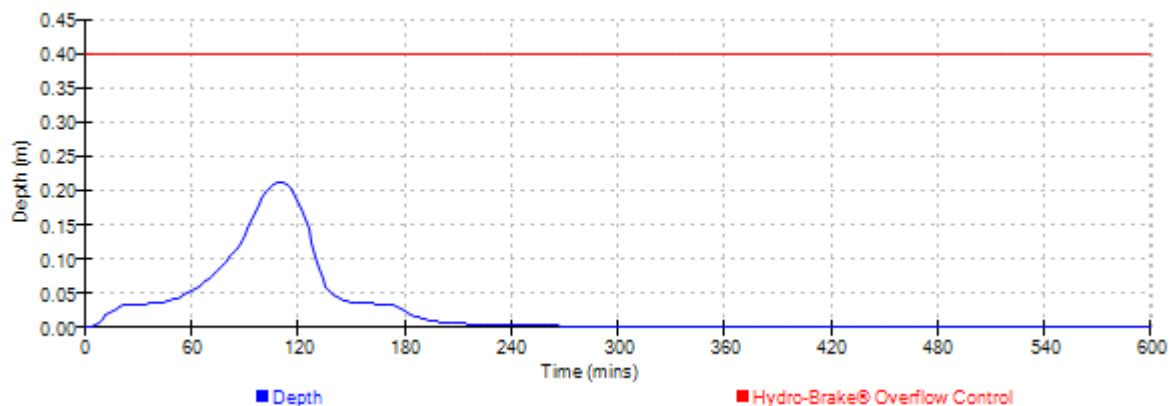
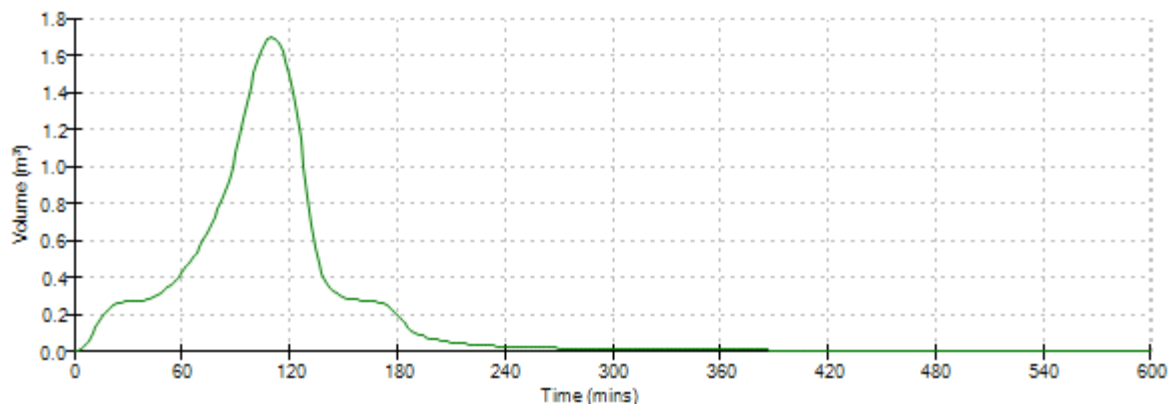
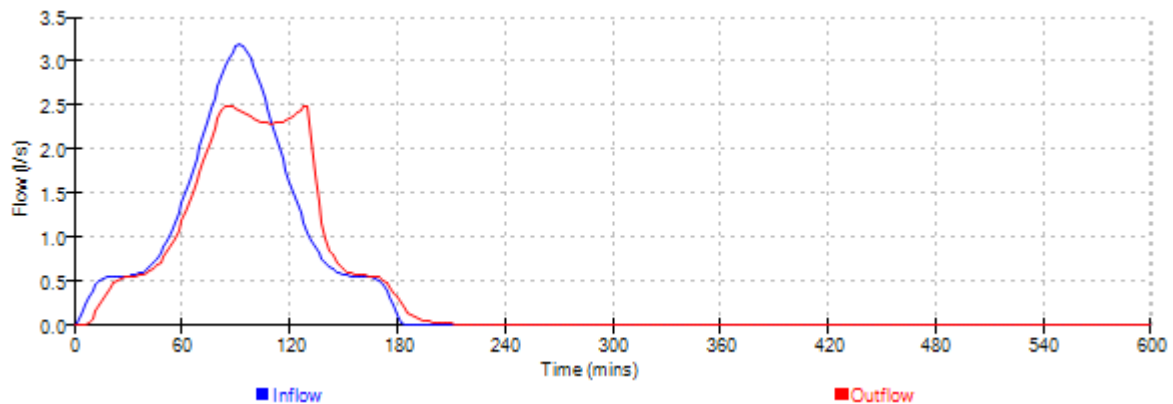
Easy Flood Risk		Page 28
55 Shepherds Lane Dartford DA1 2NL		
Date 07/05/2024 06:28 File 9 Chatsworth Ave.SRCX	Designed by sheph Checked by	
Innovyze	Source Control 2020.1	

Event: 120 min Winter



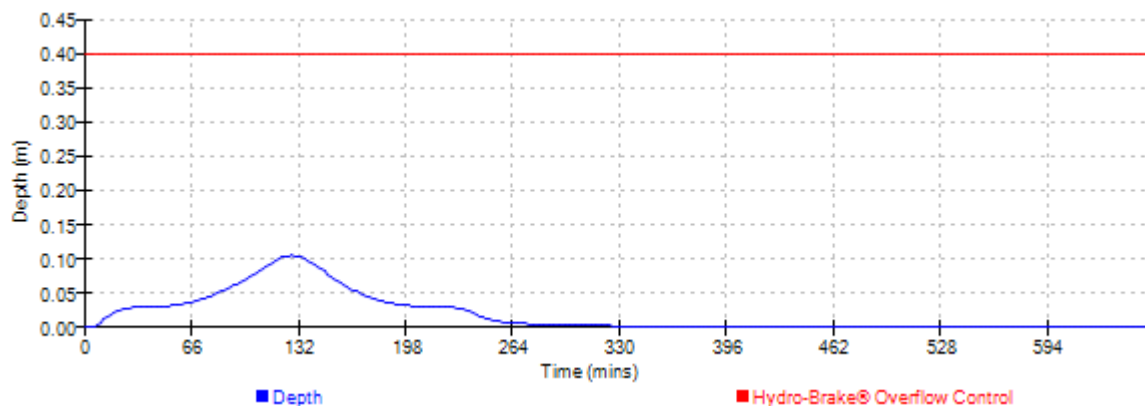
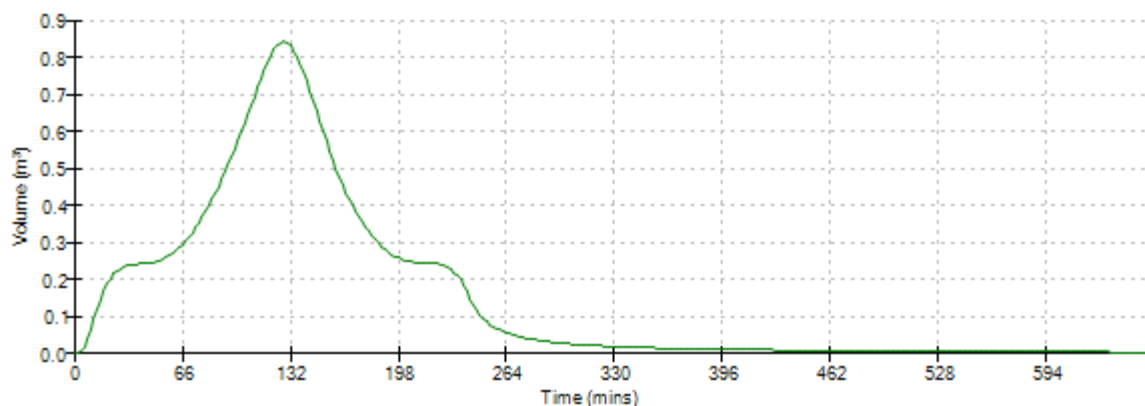
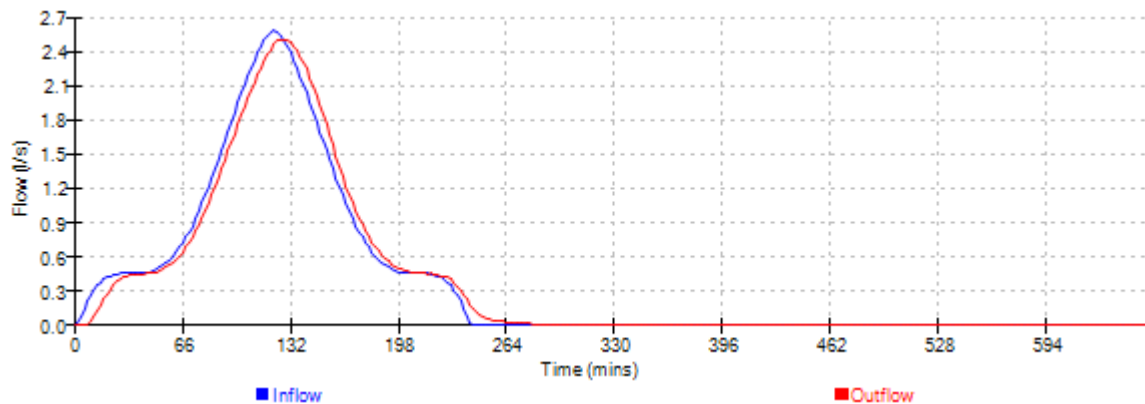
Easy Flood Risk		Page 29
55 Shepherds Lane Dartford DA1 2NL		
Date 07/05/2024 06:28	Designed by sheph	
File 9 Chatsworth Ave.SRCX	Checked by	
Innovyze	Source Control 2020.1	

Event: 180 min Winter



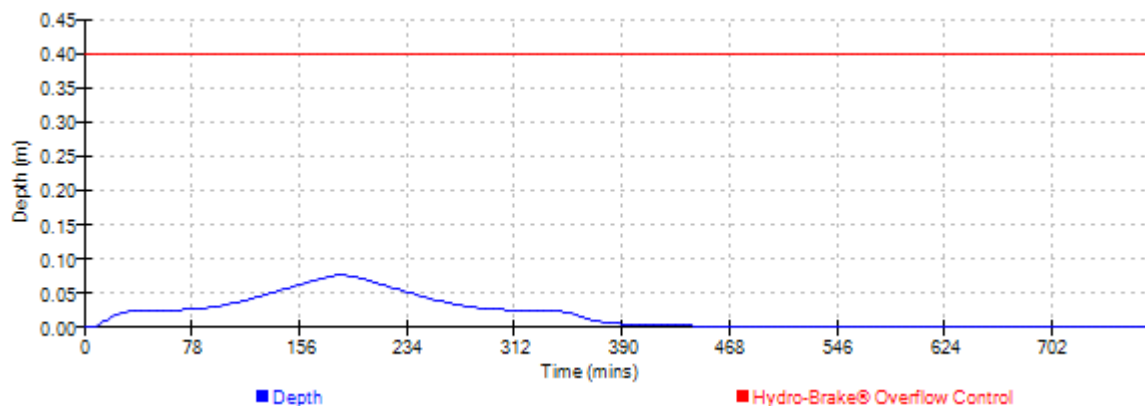
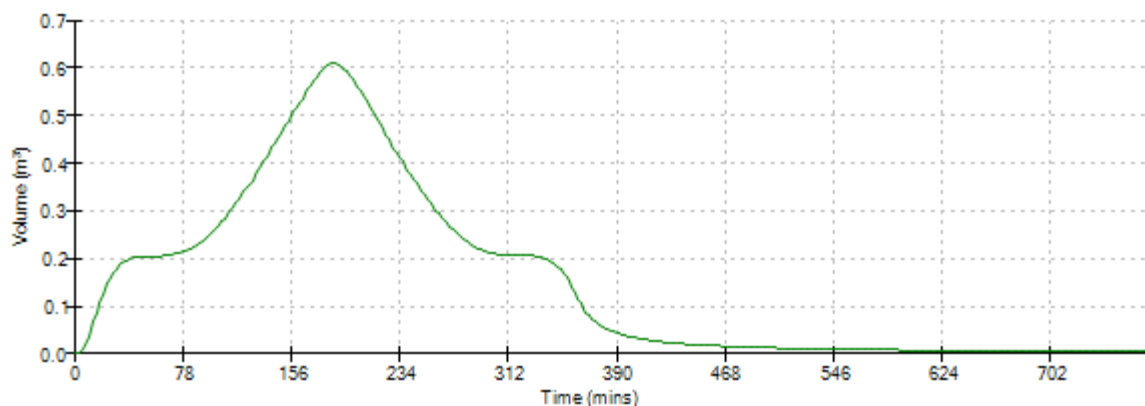
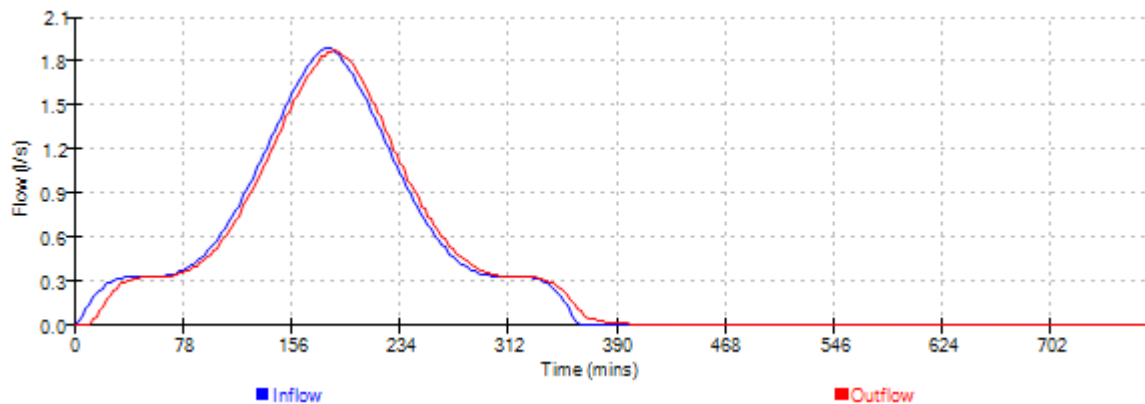
Easy Flood Risk		Page 30
55 Shepherds Lane Dartford DA1 2NL		
Date 07/05/2024 06:28 File 9 Chatsworth Ave.SRCX	Designed by sheph Checked by	
Innovyze	Source Control 2020.1	

Event: 240 min Winter



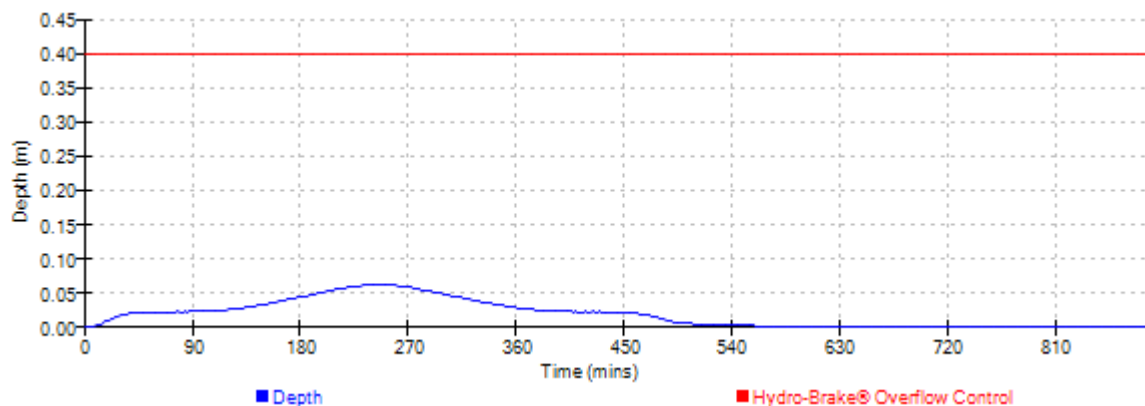
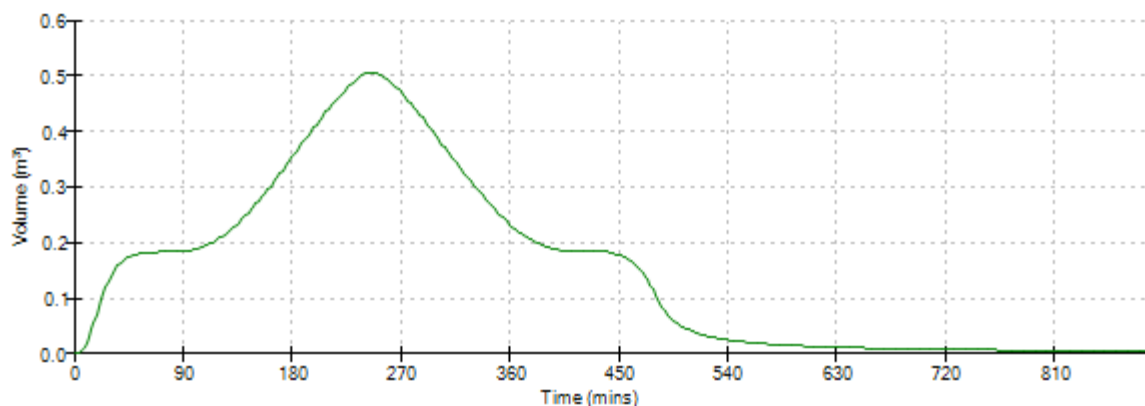
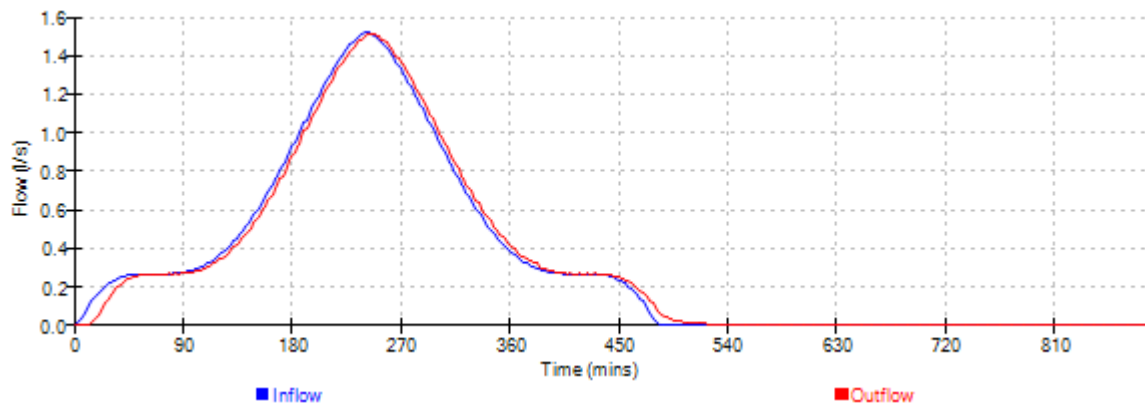
Easy Flood Risk		Page 31
55 Shepherds Lane Dartford DA1 2NL		
Date 07/05/2024 06:28	Designed by sheph	
File 9 Chatsworth Ave.SRCX	Checked by	
Innovyze	Source Control 2020.1	

Event: 360 min Winter



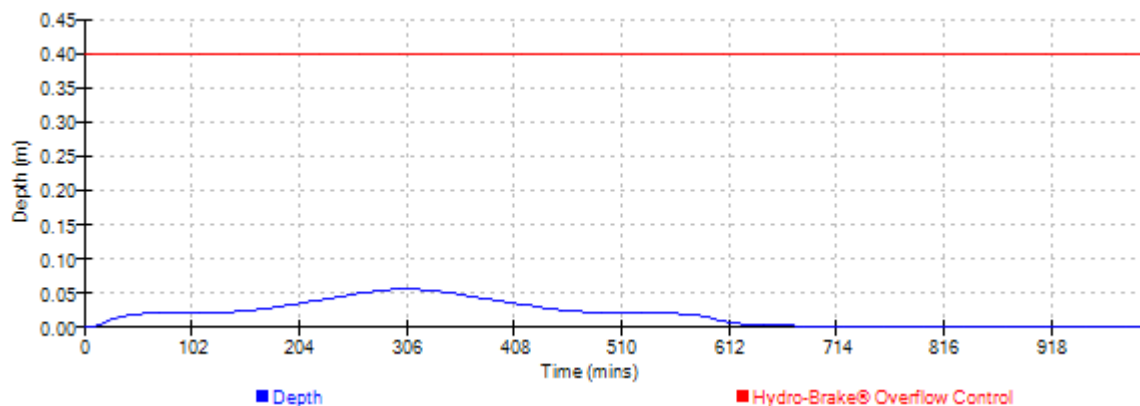
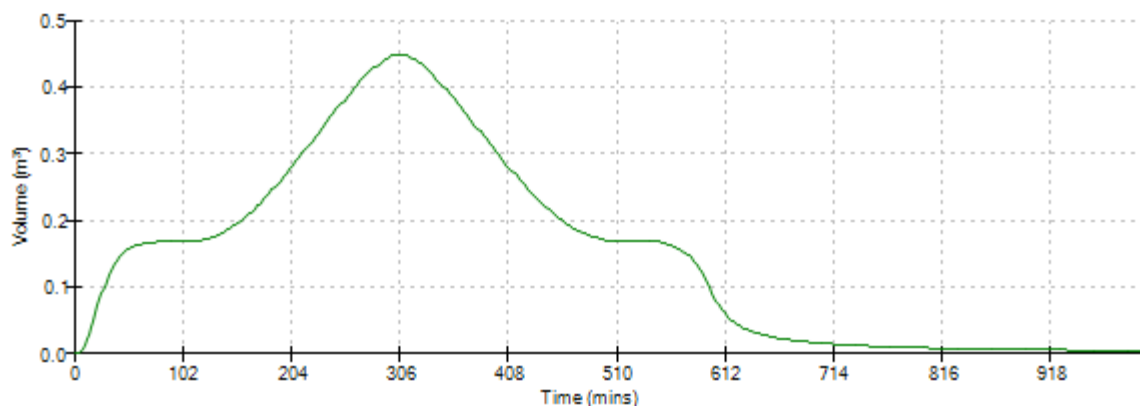
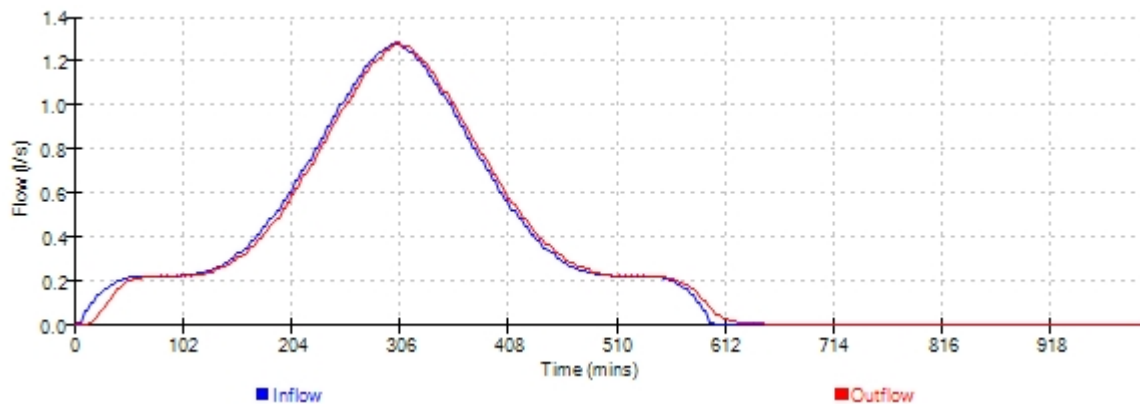
Easy Flood Risk		Page 32
55 Shepherds Lane Dartford DA1 2NL		
Date 07/05/2024 06:28	Designed by sheph	
File 9 Chatsworth Ave.SRCX	Checked by	
Innovyze	Source Control 2020.1	

Event: 480 min Winter



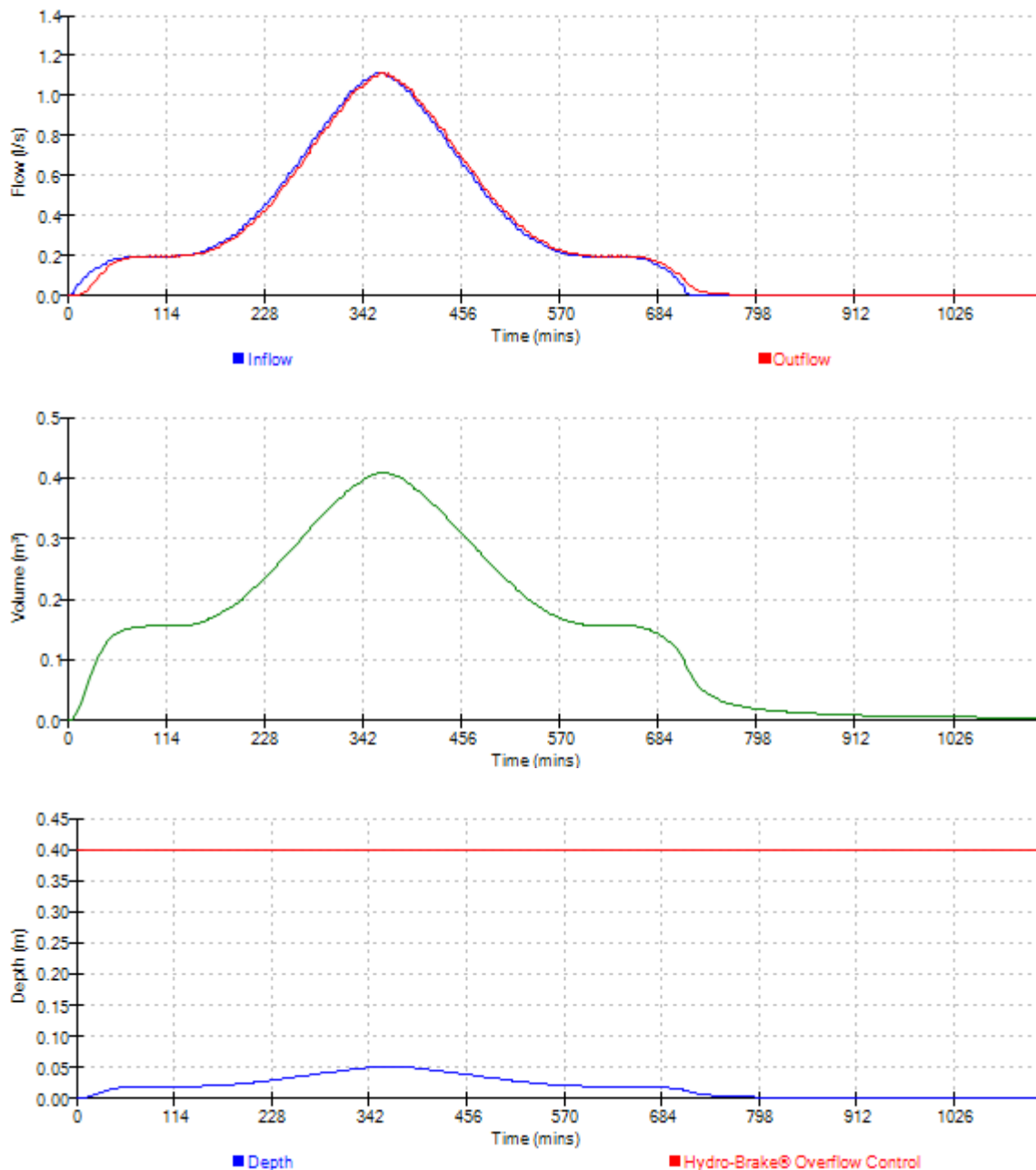
Easy Flood Risk		Page 33
55 Shepherds Lane Dartford DA1 2NL		
Date 07/05/2024 06:28	Designed by sheph	
File 9 Chatsworth Ave.SRCX	Checked by	
Innovyze	Source Control 2020.1	

Event: 600 min Winter



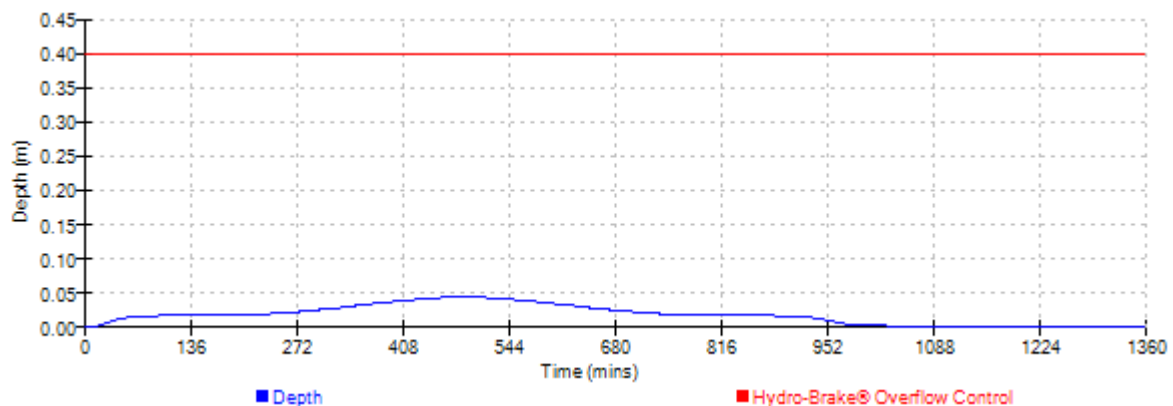
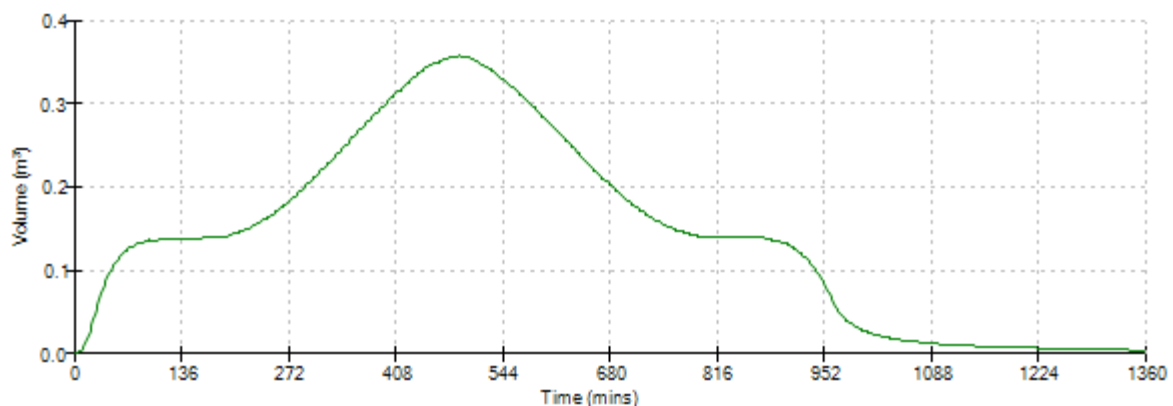
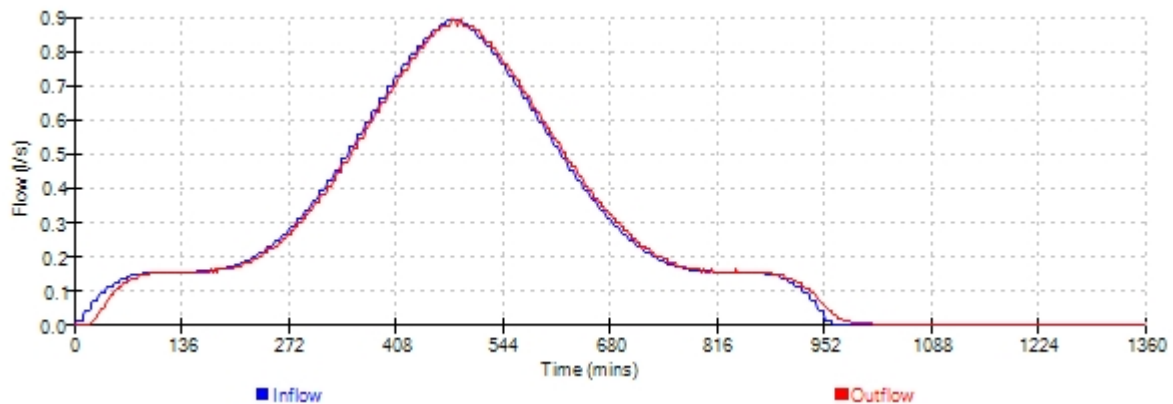
Easy Flood Risk		Page 34
55 Shepherds Lane Dartford DA1 2NL		
Date 07/05/2024 06:28	Designed by sheph	
File 9 Chatsworth Ave.SRCX	Checked by	
Innovyze	Source Control 2020.1	

Event: 720 min Winter



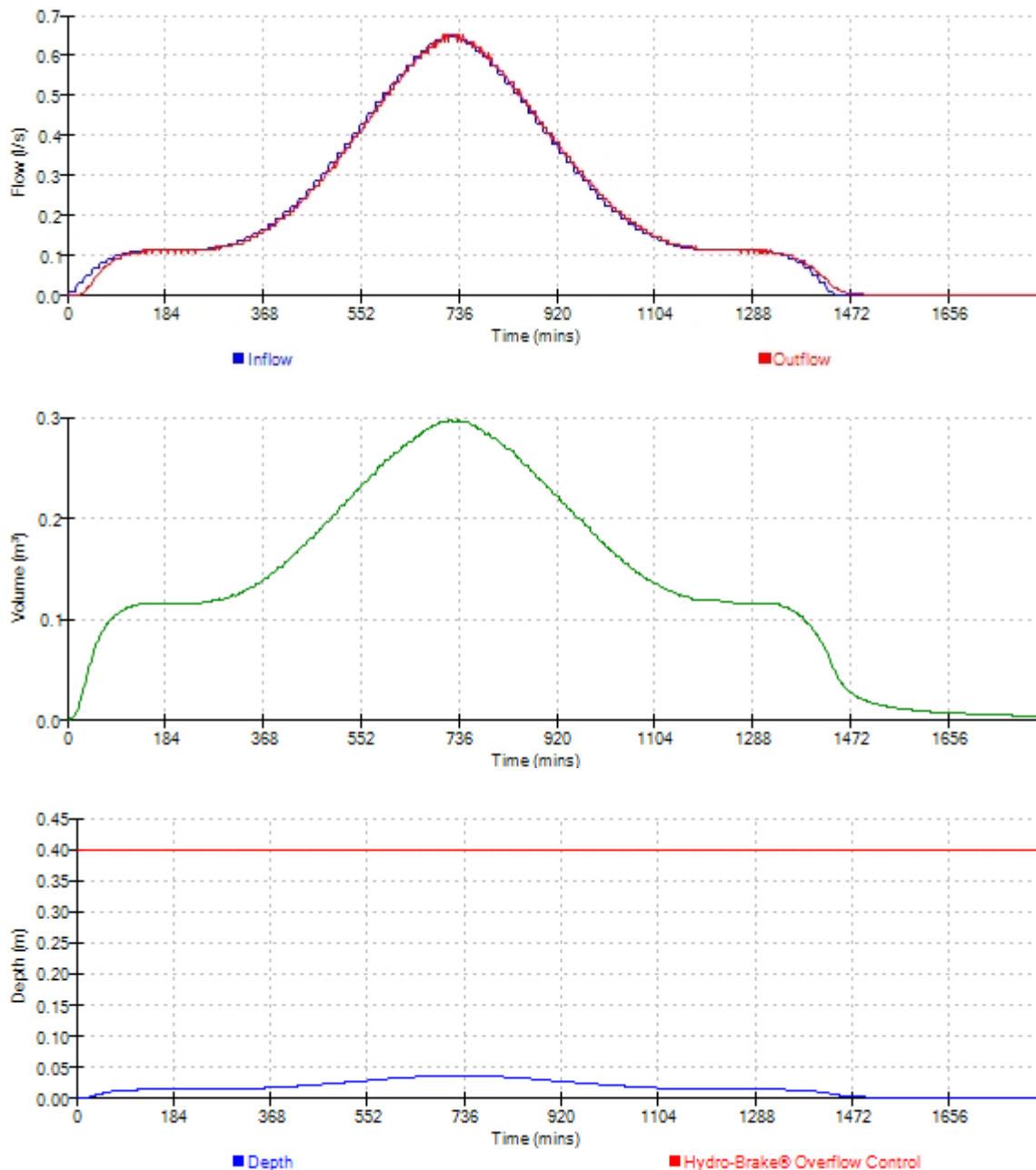
Easy Flood Risk		Page 35
55 Shepherds Lane Dartford DA1 2NL		
Date 07/05/2024 06:28 File 9 Chatsworth Ave.SRCX	Designed by sheph Checked by	
Innovyze	Source Control 2020.1	

Event: 960 min Winter



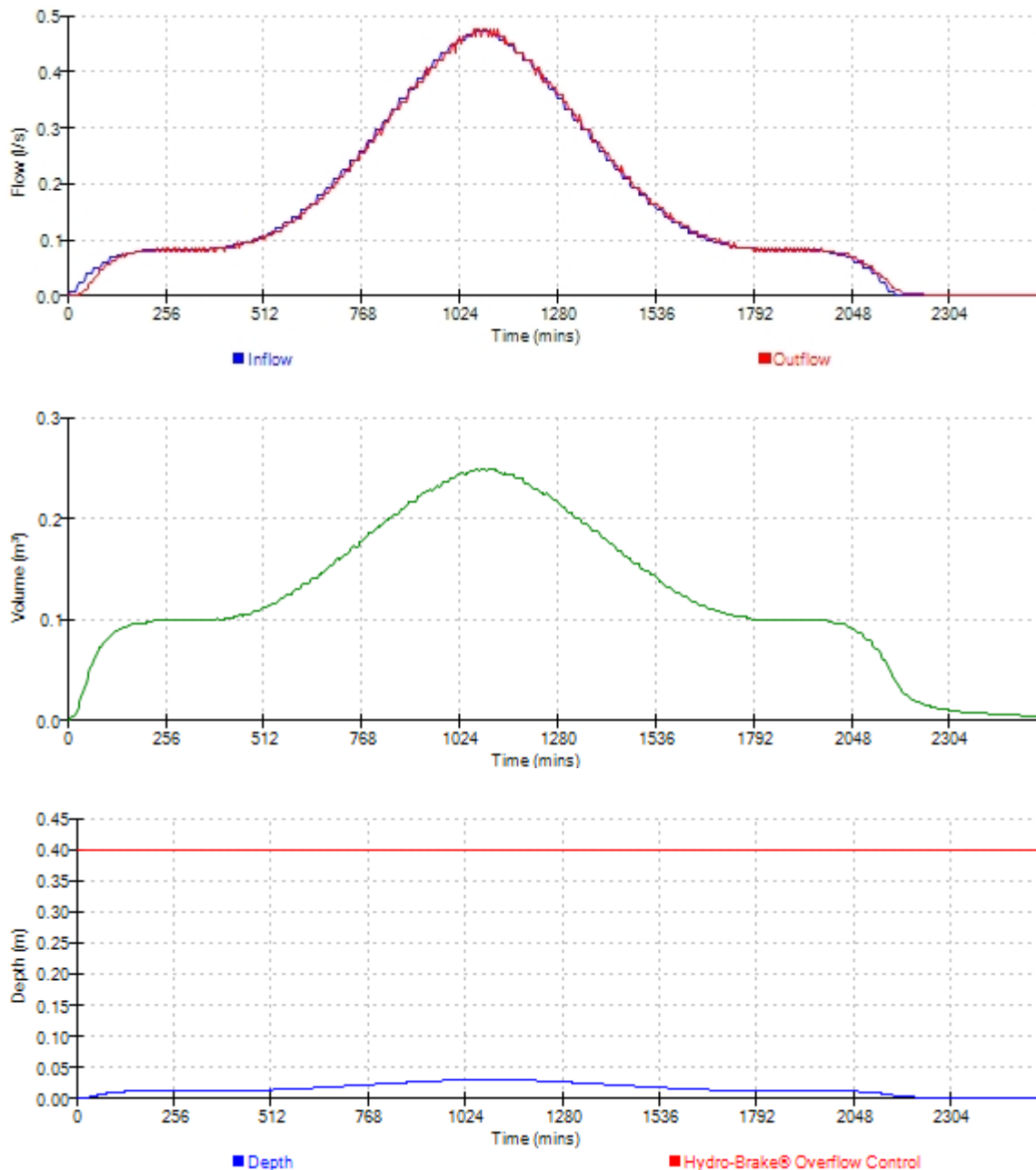
Easy Flood Risk		Page 36
55 Shepherds Lane Dartford DA1 2NL		
Date 07/05/2024 06:28 File 9 Chatsworth Ave.SRCX	Designed by sheph Checked by	
Innovyze	Source Control 2020.1	

Event: 1440 min Winter



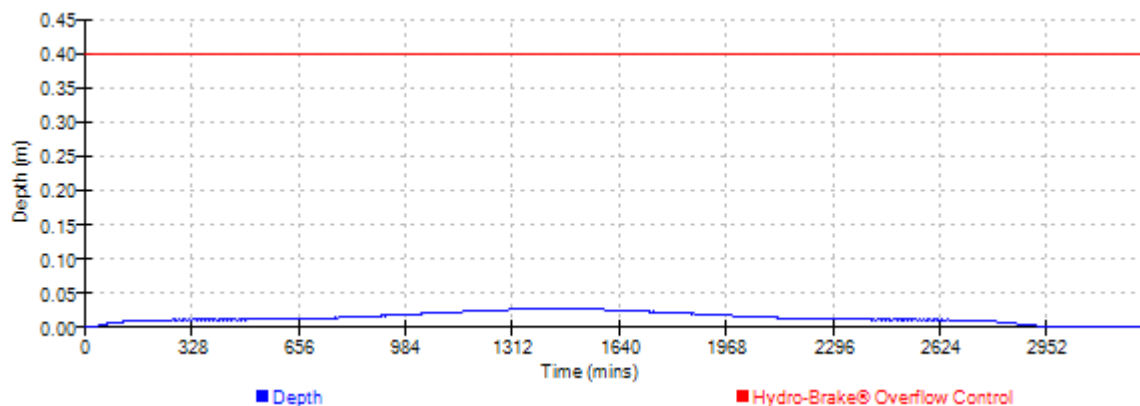
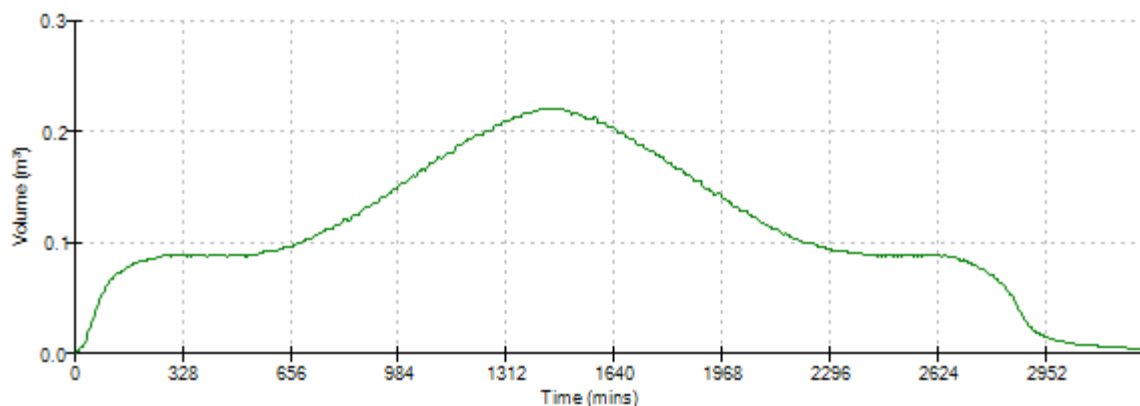
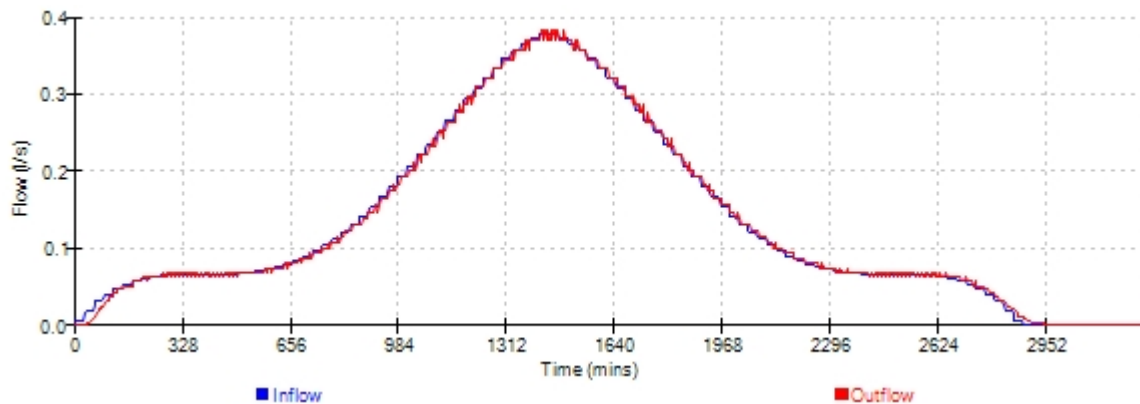
Easy Flood Risk		Page 37
55 Shepherds Lane Dartford DA1 2NL		
Date 07/05/2024 06:28	Designed by sheph	
File 9 Chatsworth Ave.SRCX	Checked by	
Innovyze	Source Control 2020.1	

Event: 2160 min Winter



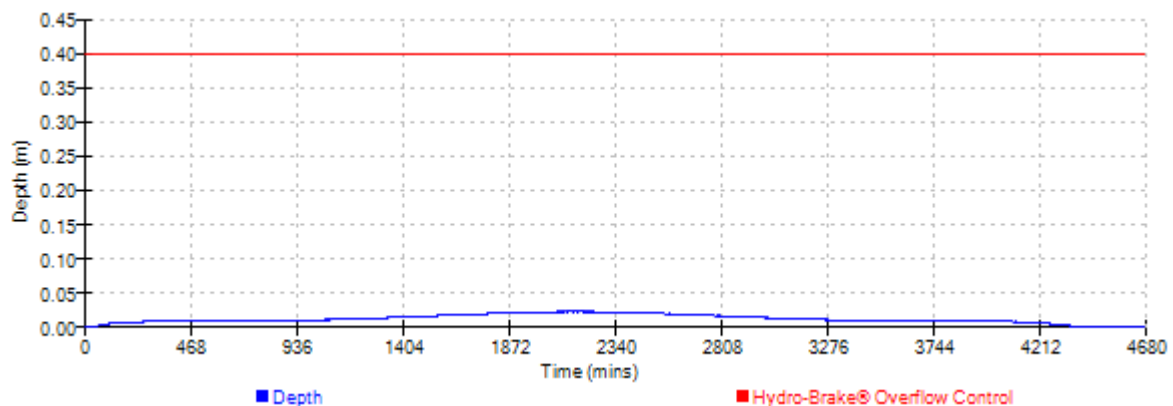
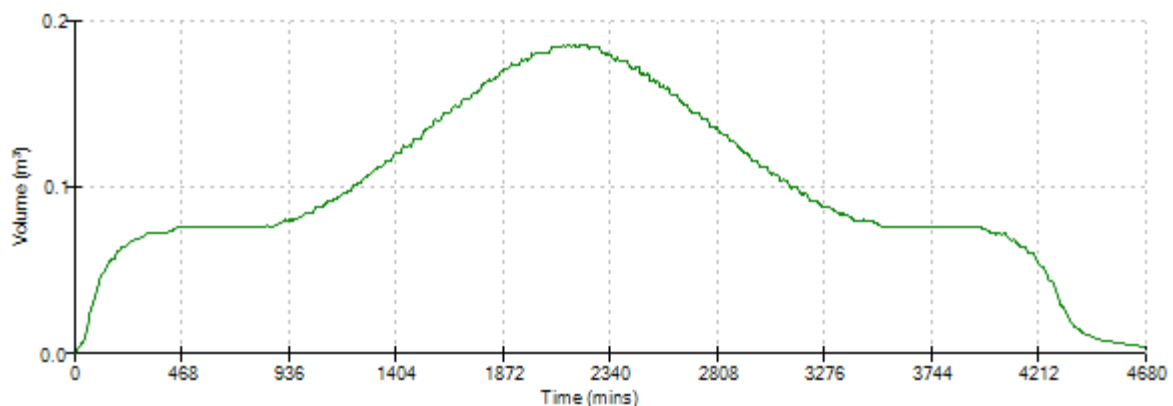
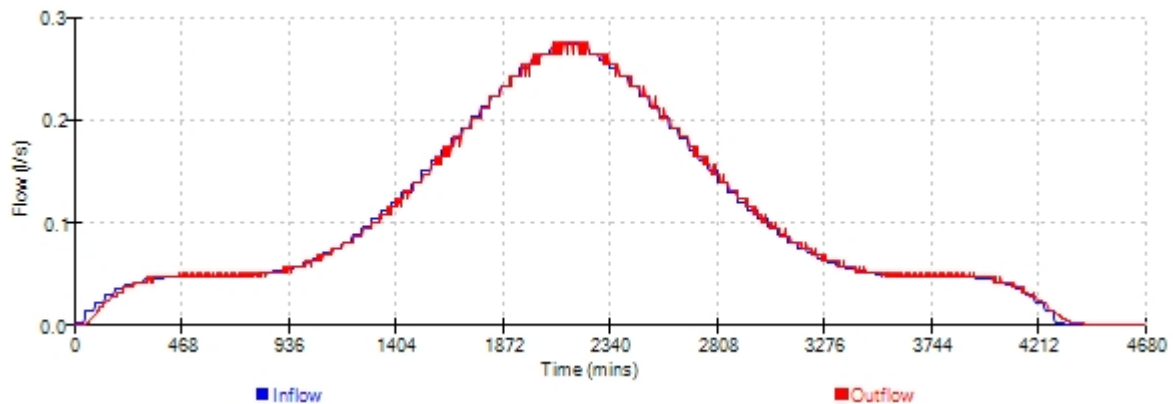
Easy Flood Risk		Page 38
55 Shepherds Lane Dartford DA1 2NL		
Date 07/05/2024 06:28 File 9 Chatsworth Ave.SRCX	Designed by sheph Checked by	
Innovyze	Source Control 2020.1	

Event: 2880 min Winter



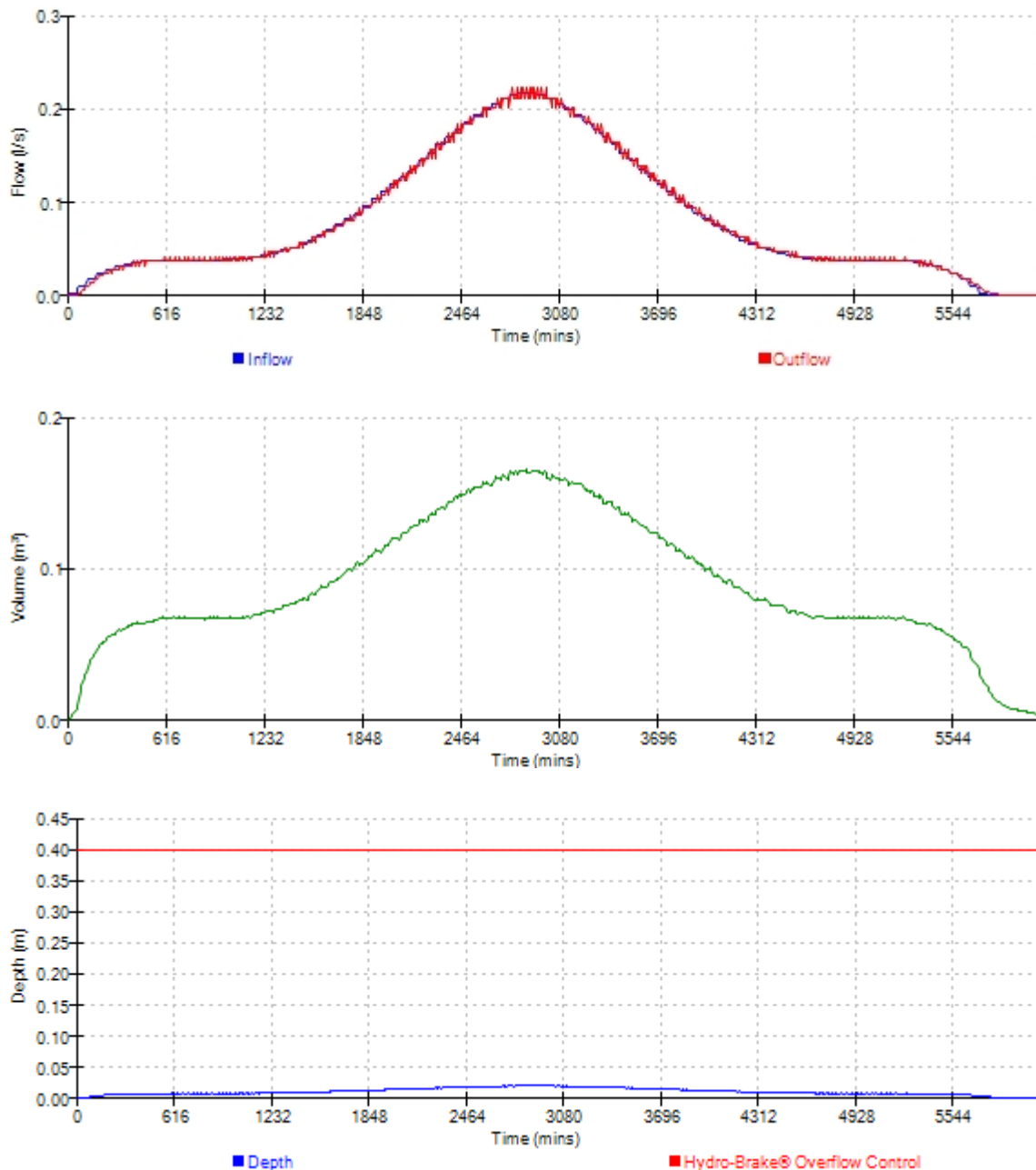
Easy Flood Risk		Page 39
55 Shepherds Lane Dartford DA1 2NL		
Date 07/05/2024 06:28	Designed by sheph	
File 9 Chatsworth Ave.SRCX	Checked by	
Innovyze	Source Control 2020.1	

Event: 4320 min Winter



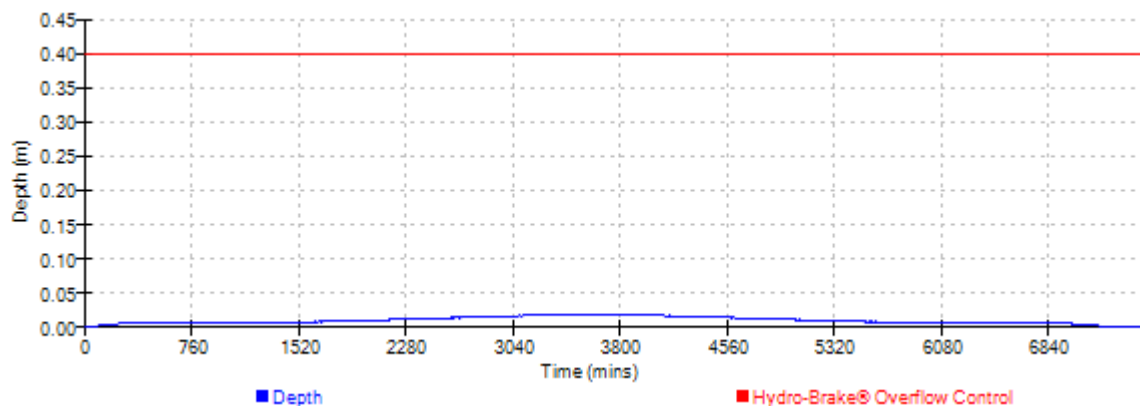
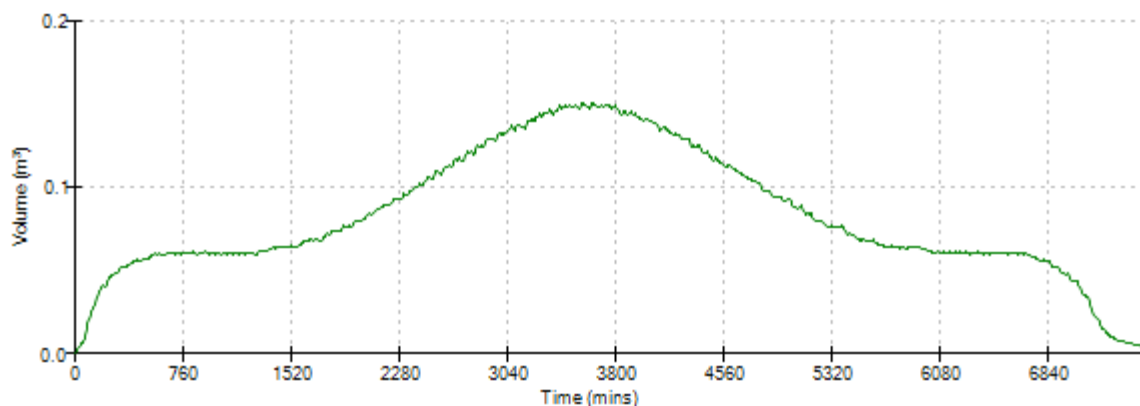
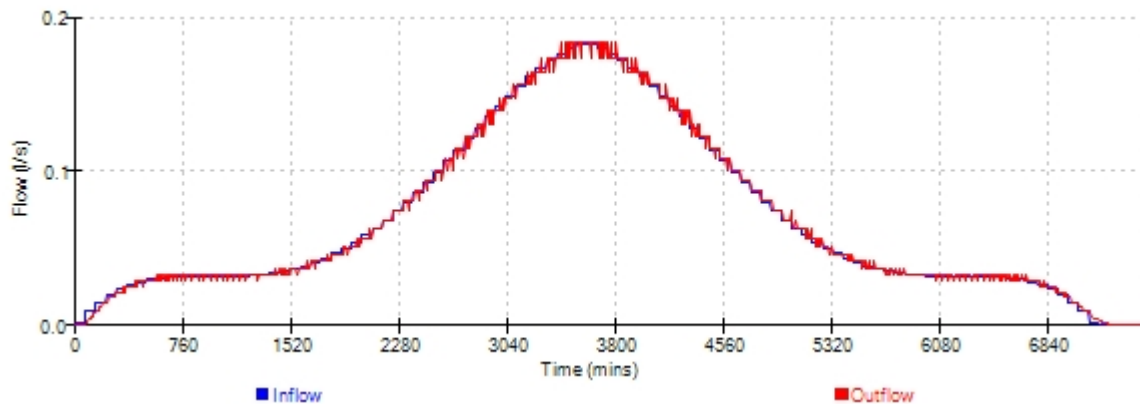
Easy Flood Risk		Page 40
55 Shepherds Lane Dartford DA1 2NL		
Date 07/05/2024 06:28 File 9 Chatsworth Ave.SRCX	Designed by sheph Checked by	
Innovyze	Source Control 2020.1	

Event: 5760 min Winter



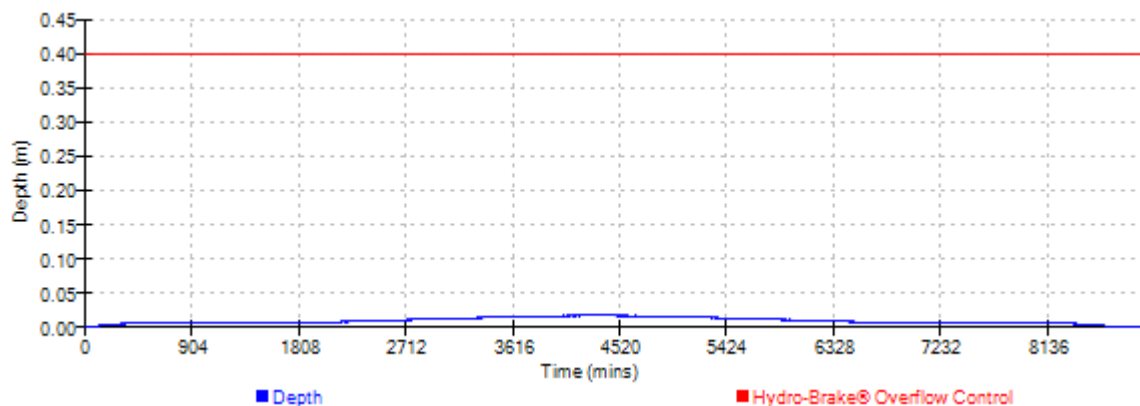
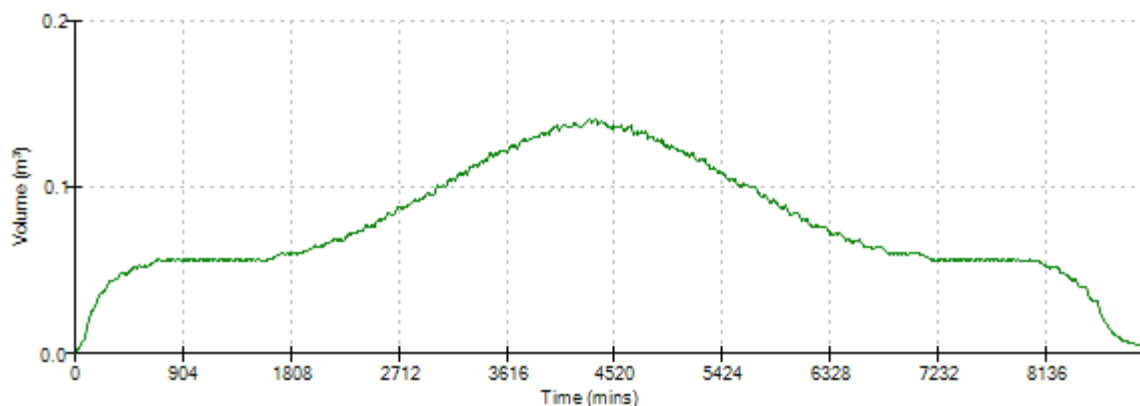
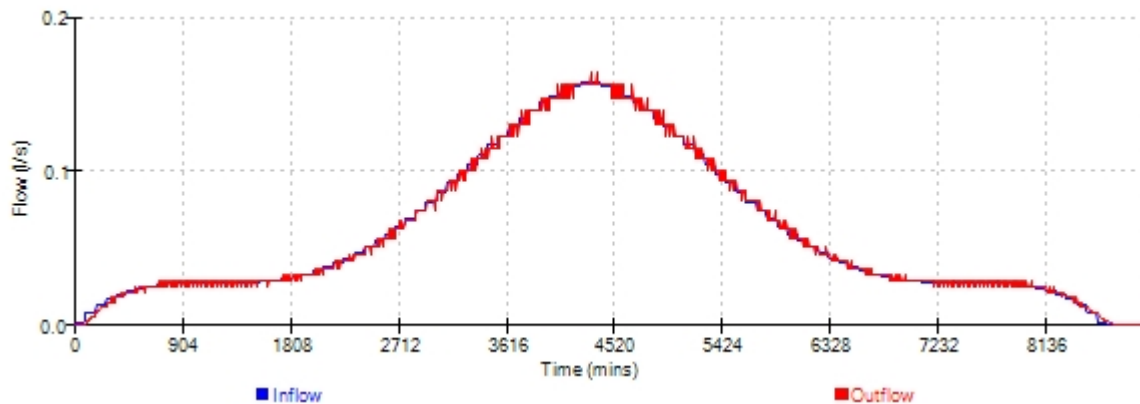
Easy Flood Risk		Page 41
55 Shepherds Lane Dartford DA1 2NL		
Date 07/05/2024 06:28 File 9 Chatsworth Ave.SRCX	Designed by sheph Checked by	
Innovyze	Source Control 2020.1	

Event: 7200 min Winter



Easy Flood Risk		Page 42
55 Shepherds Lane Dartford DA1 2NL		
Date 07/05/2024 06:28 File 9 Chatsworth Ave.SRCX	Designed by sheph Checked by	
Innovyze	Source Control 2020.1	

Event: 8640 min Winter



Easy Flood Risk		Page 43
55 Shepherds Lane Dartford DA1 2NL		
Date 07/05/2024 06:28 File 9 Chatsworth Ave.SRCX	Designed by sheph Checked by	
Innovyze	Source Control 2020.1	

Event: 10080 min Winter

