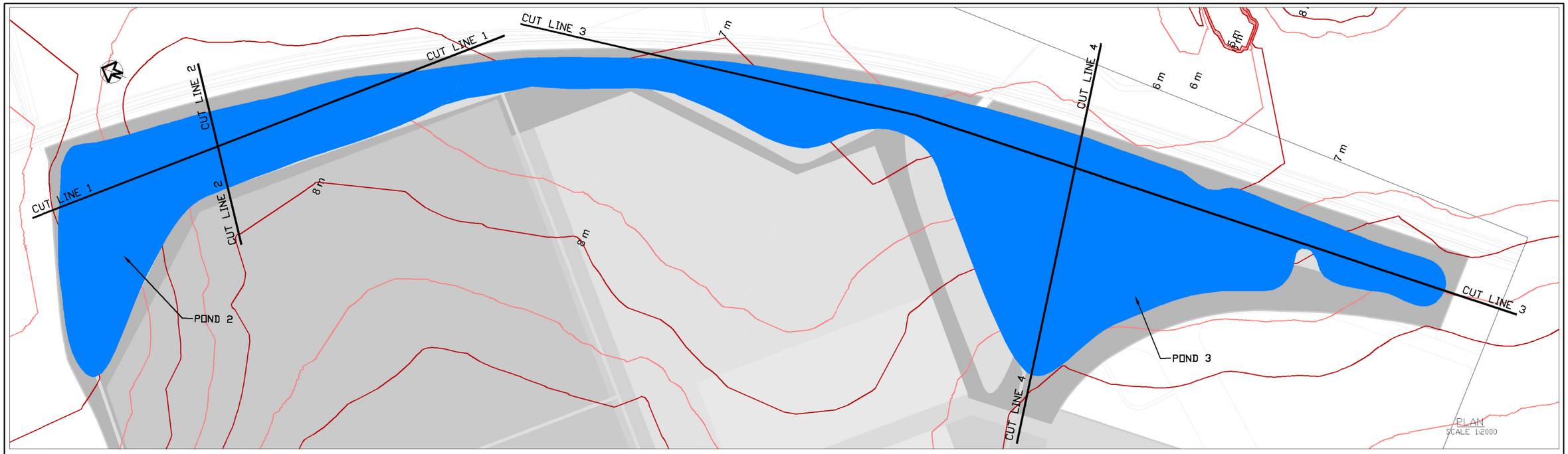
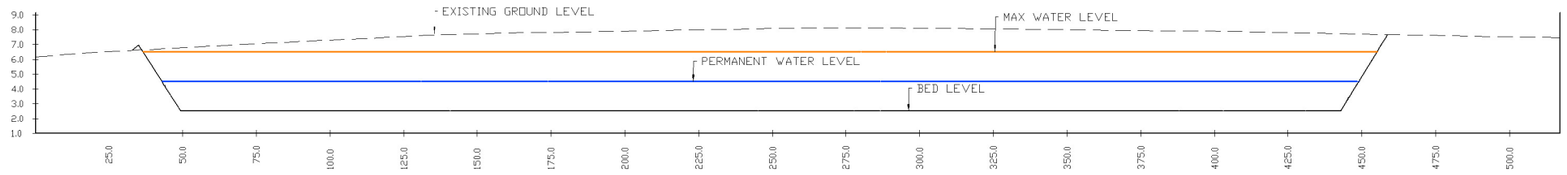
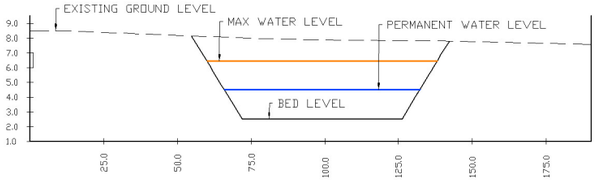




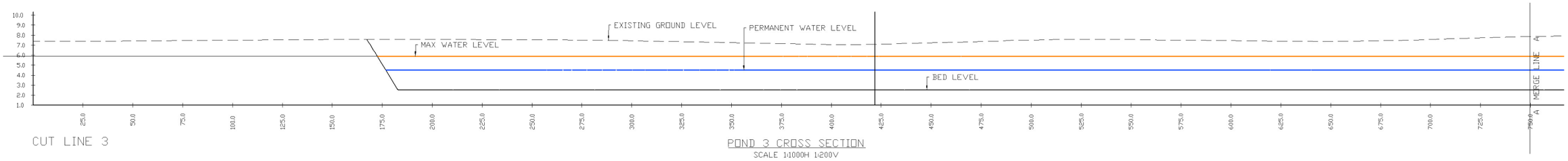
CUT LINE 1

POND 2 CROSS SECTION
SCALE 1:1000H 1:200V



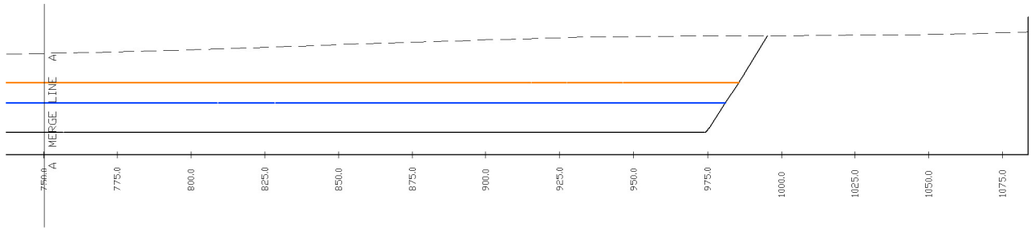
CUT LINE 2

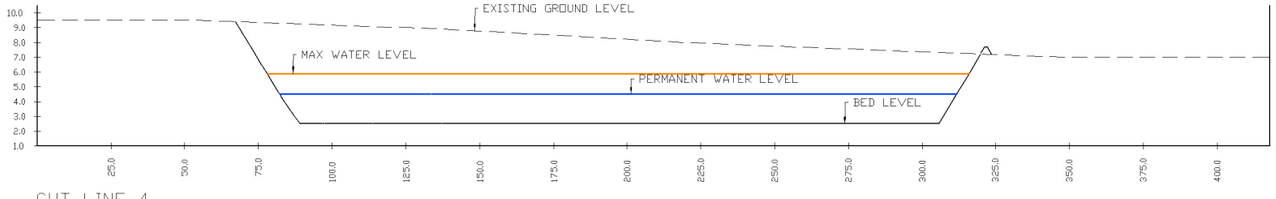
POND 2 CROSS SECTION
SCALE 1:1000H 1:200V



CUT LINE 3

POND 3 CROSS SECTION
SCALE 1:1000H 1:200V





CUT LINE 4

POND 3 CROSS SECTION
SCALE 1:1000H 1:200V

Issue	Description	Date
02	MASTERPLAN AND POND LEVELS AMENDED	05-02-14
01	FIRST ISSUE	05-02-14

100mm on Original

Client: Homes & Communities Agency

Status: PRELIMINARY

Scales	AS SHOWN	Current Issue Signatures
Original Size	A1	Author D.HUGHES
Height Datum	A.O.D.	Checker P.JOHNSON
Grid	O.S. GRID	Approver S.A.DAVIES
Filename	UA006156-UP3D-02-PONDS 2 & 3 CROSS SECTIONS.DWG	© Copyright reserved

Project: NORTHSTOWE

Title: PONDS 2 & 3 INDICATIVE CROSS SECTIONS

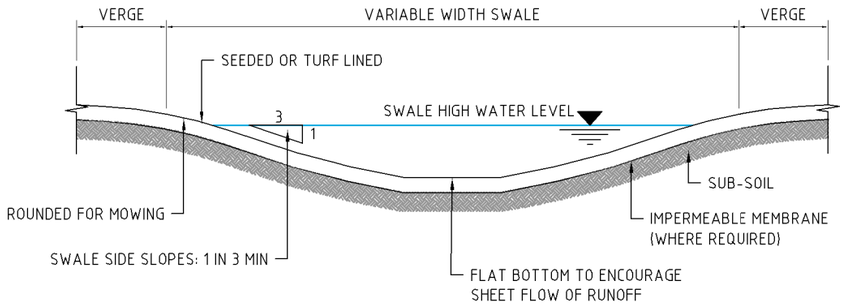
Hyder Consulting (UK) Limited
HCL House
St Mellons Business Park
Fortran Road, St Mellons
Cardiff
CF3 0EY
Tel: +44 (0)292 092 5000
Fax: +44 (0)292 092 5222

Drawing No.	Project No.	Issue
C018	UA006156	02

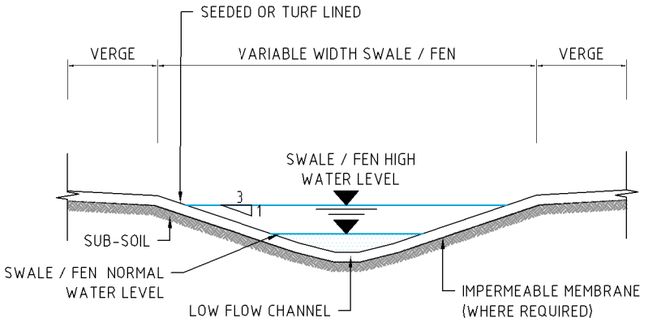
V2

8/Jul/2014 K:\UA006156 Northstowe\E-Drawings\Current Drgs\C018-UA006156-UP3D-02-PONDS 2 & 3 CROSS SECTIONS.dwg

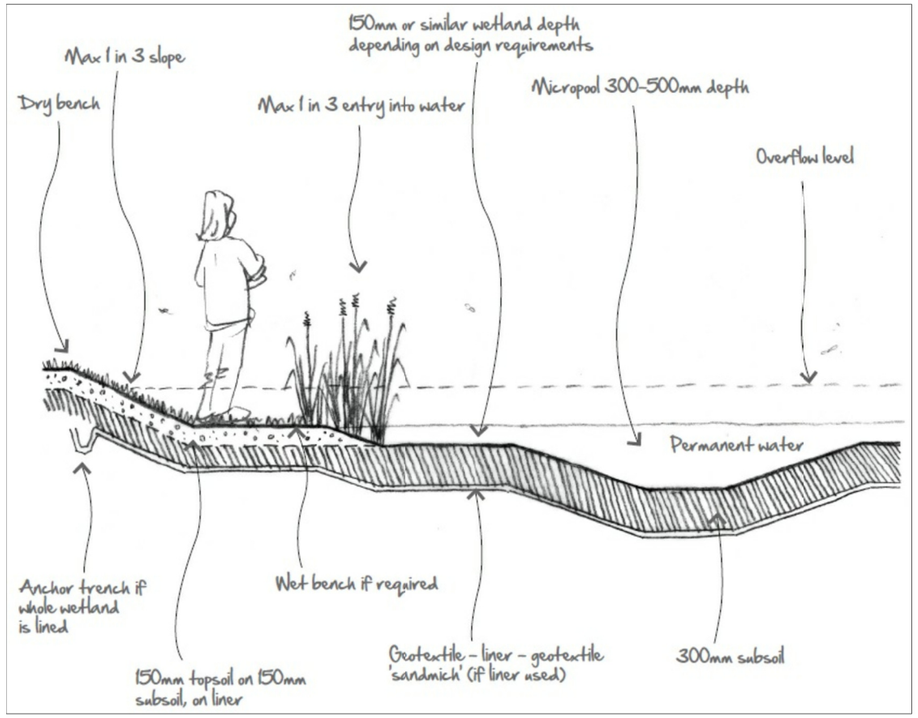
CAD FILE K:\UA006156 Northstowe\E-Drawings\Current Drgs\C018-UA006156-UP3D-02-PONDS 2 & 3 CROSS SECTIONS.dwg
PRINTED BY DHA76298 - JULY/08/2014 - 4:19PM
UPDATED BY DHA76298 - JULY/08/2014 - 4:19PM



TYPICAL SUB SWALE
SCALE N.T.S.



MAIN SWALE / FEN
SCALE N.T.S.



TYPICAL POND EDGE PROFILE
TAKEN FROM CAMBRIDGESHIRE SUDS MANUAL

Issue	Description	Date
02	SWALES AMENDED	07-07-14
01	FIRST ISSUE	05-02-14

100mm on Original

Client: Homes & Communities Agency

Status: PRELIMINARY

Scales	N.T.S.	Current Issue Signatures
		Author D.HUGHES
Original Size	A1	Checker P.JOHNSON
Height Datum	A.O.D.	Approver S. A. DAVIES
Grid	N/A	© Copyright reserved

Filename: C019-UA006156-UP3D-02-INDICATIVE SWALE DESIGNS.DWG

Project: NORTHSTOWE

Title: INDICATIVE SWALE DESIGNS AND POND EDGE PROFILE

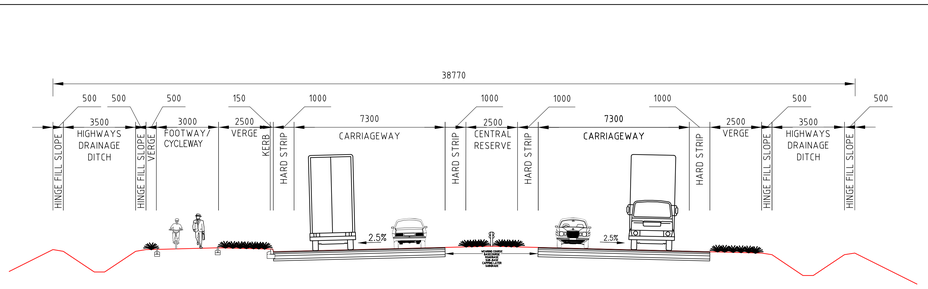
Hyder Consulting (UK) Limited
HCL House
St Mellons Business Park
Fortran Road, St Mellons
Cardiff
CF3 0EY
Tel: +44 (0)292 092 5000
Fax: +44 (0)292 092 5222

Drawing No.	Project No.	Issue
C019	UA006156	02

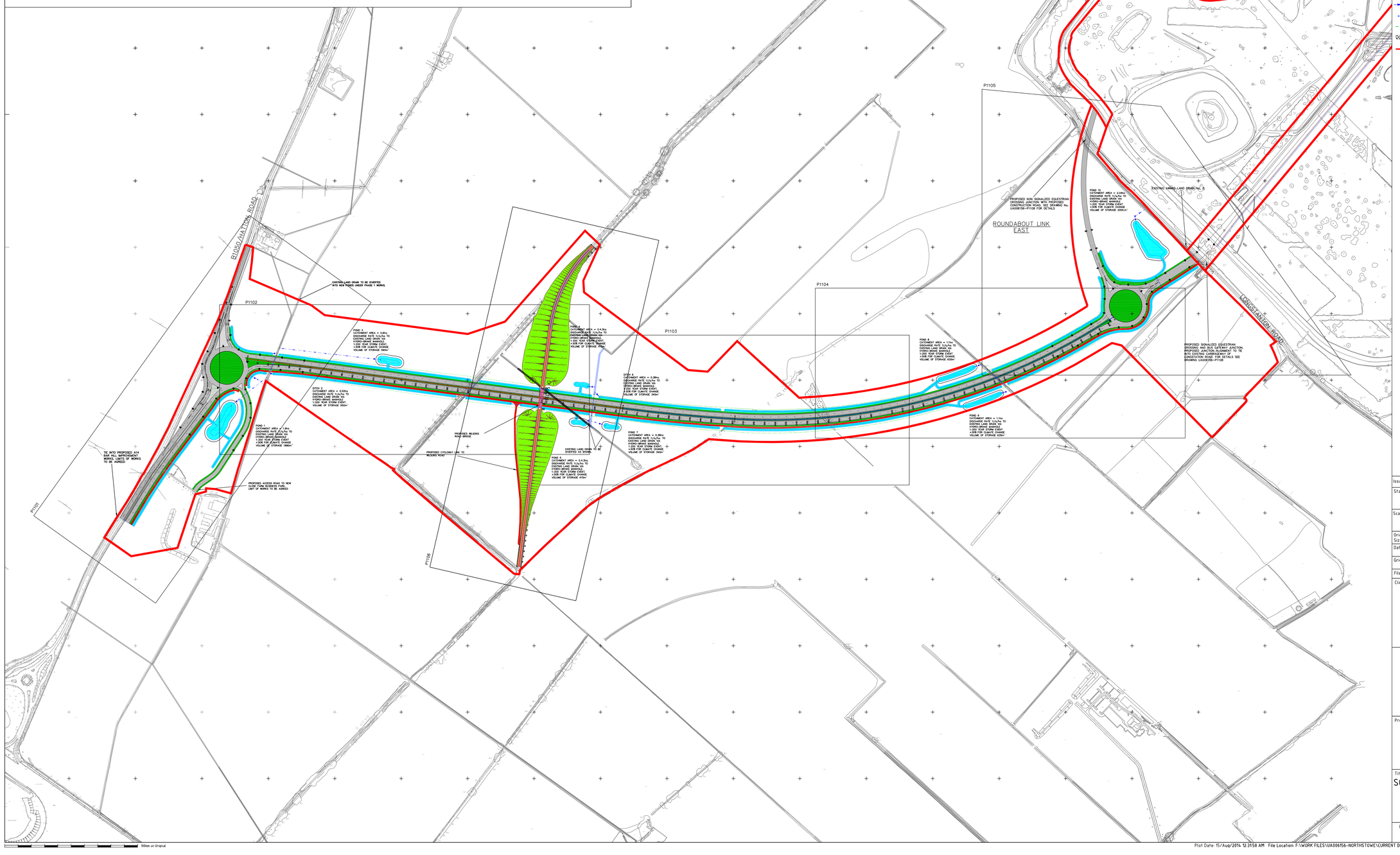
V1

CAD FILE: K:\UA006156 Northstowe\E-Drawings\Current Drgs\C019-UA006156-UP3D-02-INDICATIVE SWALE DESIGNS.dwg
UPDATED BY: OH476298 - JUL/11/2014 - 8:28AM
PRINTED BY: OH476298 - JUL/11/2014 - 8:28AM

11/Jul/2014 K:\UA006156 Northstowe\E-Drawings\Current Drgs\C019-UA006156-UP3D-02-INDICATIVE SWALE DESIGNS.dwg



Proposed Typical Dual Carriageway
(Scale 1:100 @ A3)



NOTES

1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
2. All WORKS TO BE CARRIED OUT IN ACCORDANCE WITH THE DEPARTMENT OF TRANSPORT SPECIFICATION FOR HIGHWAY WORKS & SUPPLEMENTARY SPECIFICATION DOCUMENTS.

KEY

- BLACK ASPHALT CARRIAGEWAY
- RED ASPHALT FOOTWAY/CYCLEWAY
- BLACK ASPHALT TRAFFIC ISLAND
- HIGHWAY DRAINAGE DITCH
- VERGE
- BRIDGE STRUCTURE
- BRIDGE EARTHWORKS EMBANKMENT
- BRIDLEWAY TRACK
- PROPOSED HEADWALL
- PROPOSED HYDRO-BRAKE MANHOLE
- PROPOSED SW SEWER (300mmø)
- PROPOSED CULVERT
- EXTENT OF EARTHWORKS
- EXISTING DITCH TO BE ABANDONED
- RED LINE BOUNDARY
- EXISTING LEVEL
- PROPOSED 12M COLUMN WITH POST TOP MOUNTED PHILIPS IRIDIUM (254) LANTERN WITH 150w SON-T PLUS LAMP.
- PROPOSED 10M COLUMN WITH POST TOP MOUNTED PHILIPS IRIDIUM (254) LANTERN WITH 150w SON-T PLUS LAMP.
- PROPOSED 8M COLUMN WITH POST TOP MOUNTED PHILIPS IRIDIUM (253) LANTERN WITH 100w SON-T PLUS LAMP.
- PROPOSED LOCATION OF ADVANCE DIRECTIONAL SIGNAGE

Issue	Description	Date

Status: FOR PLANNING

Scales	1 : 2500 @ A0	Current Issue Signatures	
		Author AK	
Original Size	A0	Checker JP	
Datum	OS	Approver PH	
Grid	OS	© Copyright reserved	

Filename: P1100-UA006156 GA AND TYPICAL SECTION.DWG

Client: Homes & Communities Agency

HYDER CONSULTING (UK) LTD
Manning House
22 Carlisle Place
London
SW1P 1JA
Tel: +44 (0)20 3014 9000
Fax: +44 (0)20 7828 8428

Project: NORTHSTOWE PHASE 2

Title: SOUTHERN ACCESS ROAD (WEST) GENERAL ARRANGEMENT AND TYPICAL SECTION

Drawing No.	Project No.	Issue
P1100 —	UA006156 —	03

100mm on Original

Plot Date: 15/Aug/2014 12:31:58 AM File Location: F:\WORK FILES\UA006156-NORTHSTOWE\CURRENT DRAWINGS\P1100-UA006156 GA AND TYPICAL SECTION.DWG

Summary of Results for 200 year Return Period (+30%)

Outflow is too low. Design is unsatisfactory.

Storm Event	Max Level (m)	Max Depth (m)	Max Volume (m³)	Status
15 min Summer	4.972	0.472	50218.0	O K
30 min Summer	5.106	0.606	64912.9	O K
60 min Summer	5.239	0.739	79666.6	O K
120 min Summer	5.370	0.870	94340.8	O K
180 min Summer	5.445	0.945	102777.2	O K
240 min Summer	5.496	0.996	108607.6	O K
360 min Summer	5.566	1.066	116616.9	O K
480 min Summer	5.619	1.119	122795.3	O K
600 min Summer	5.662	1.162	127722.0	O K
720 min Summer	5.697	1.197	131838.5	O K
960 min Summer	5.755	1.255	138506.3	O K
1440 min Summer	5.838	1.338	148274.3	O K
2160 min Summer	5.924	1.424	158487.3	O K
2880 min Summer	5.988	1.488	166007.6	O K
4320 min Summer	6.079	1.579	176995.0	O K
5760 min Summer	6.146	1.646	185065.5	O K
7200 min Summer	6.199	1.699	191481.5	O K
8640 min Summer	6.243	1.743	196824.1	Flood Risk
10080 min Summer	6.281	1.781	201411.1	Flood Risk
15 min Winter	5.027	0.527	56244.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Summer	155.442	0.0	51
30 min Summer	100.464	0.0	66
60 min Summer	61.649	0.0	96
120 min Summer	36.502	0.0	156
180 min Summer	26.511	0.0	216
240 min Summer	21.011	0.0	276
360 min Summer	15.040	0.0	396
480 min Summer	11.878	0.0	516
600 min Summer	9.884	0.0	636
720 min Summer	8.502	0.0	756
960 min Summer	6.699	0.0	996
1440 min Summer	4.781	0.0	1476
2160 min Summer	3.407	0.0	2196
2880 min Summer	2.676	0.0	2916
4320 min Summer	1.902	0.0	4356
5760 min Summer	1.492	0.0	5800
7200 min Summer	1.235	0.0	7240
8640 min Summer	1.058	0.0	8680
10080 min Summer	0.928	0.0	10120
15 min Winter	155.442	0.0	51

Summary of Results for 200 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Volume (m³)	Status
30 min Winter	5.177	0.677	72702.4	O K
60 min Winter	5.325	0.825	89226.6	O K
120 min Winter	5.470	0.970	105661.7	O K
180 min Winter	5.553	1.053	115110.5	O K
240 min Winter	5.609	1.109	121640.5	O K
360 min Winter	5.687	1.187	130611.0	O K
480 min Winter	5.746	1.246	137530.7	O K
600 min Winter	5.794	1.294	143048.6	O K
720 min Winter	5.833	1.333	147659.1	O K
960 min Winter	5.896	1.396	155127.1	O K
1440 min Winter	5.988	1.488	166067.2	O K
2160 min Winter	6.084	1.584	177505.7	O K
2880 min Winter	6.154	1.654	185928.5	O K
4320 min Winter	6.255	1.755	198234.4	Flood Risk
5760 min Winter	6.329	1.829	207273.4	Flood Risk
7200 min Winter	6.387	1.887	214459.2	Flood Risk
8640 min Winter	6.435	1.935	220443.0	Flood Risk
10080 min Winter	6.477	1.977	225580.5	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
30 min Winter	100.464	0.0	66
60 min Winter	61.649	0.0	96
120 min Winter	36.502	0.0	156
180 min Winter	26.511	0.0	216
240 min Winter	21.011	0.0	276
360 min Winter	15.040	0.0	396
480 min Winter	11.878	0.0	516
600 min Winter	9.884	0.0	636
720 min Winter	8.502	0.0	756
960 min Winter	6.699	0.0	996
1440 min Winter	4.781	0.0	1476
2160 min Winter	3.407	0.0	2196
2880 min Winter	2.676	0.0	2916
4320 min Winter	1.902	0.0	4356
5760 min Winter	1.492	0.0	5800
7200 min Winter	1.235	0.0	7240
8640 min Winter	1.058	0.0	8680
10080 min Winter	0.928	0.0	10120

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	200	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.450	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 172.302

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	19.145	12	16	19.145	24	28	19.144
4	8	19.145	16	20	19.145	28	32	19.144
8	12	19.145	20	24	19.145	32	36	19.144

Model Details

Storage is Online Cover Level (m) 6.500

Tank or Pond Structure

Invert Level (m) 4.500

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	104089.0	2.000	124718.0

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	Add Flow / Climate Change (%)	0
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio R	0.450	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

Designed with Level Inverts

Network Design Table for Storm

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
1.000	50.000	0.078	641.0	0.074	4.00	0.0	0.600	\/	-1	
1.001	50.000	0.078	641.0	0.074	0.00	0.0	0.600	\/	-1	
1.002	50.000	0.078	641.0	0.074	0.00	0.0	0.600	\/	-1	
1.003	50.000	0.078	641.0	0.074	0.00	0.0	0.600	\/	-1	
1.004	50.000	0.078	641.0	0.074	0.00	0.0	0.600	\/	-1	
1.005	50.000	0.078	641.0	0.074	0.00	0.0	0.600	\/	-1	
1.006	50.000	0.078	641.0	0.074	0.00	0.0	0.600	\/	-1	
1.007	50.000	0.078	641.0	0.074	0.00	0.0	0.600	\/	-1	
1.008	50.000	0.078	641.0	0.074	0.00	0.0	0.600	\/	-1	
1.009	50.000	0.078	641.0	0.074	0.00	0.0	0.600	\/	-1	
1.010	50.000	0.078	641.0	0.074	0.00	0.0	0.600	\/	-1	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	4.44	15.300	0.074	0.0	0.0	0.0	1.90	4431.2	10.0
1.001	50.00	4.88	15.222	0.148	0.0	0.0	0.0	1.90	4431.2	20.0
1.002	50.00	5.32	15.144	0.222	0.0	0.0	0.0	1.90	4431.2	30.1
1.003	50.00	5.75	15.066	0.296	0.0	0.0	0.0	1.90	4431.2	40.1
1.004	50.00	6.19	14.988	0.370	0.0	0.0	0.0	1.90	4431.2	50.1
1.005	50.00	6.63	14.910	0.444	0.0	0.0	0.0	1.90	4431.2	60.1
1.006	50.00	7.07	14.832	0.518	0.0	0.0	0.0	1.90	4431.2	70.1
1.007	50.00	7.51	14.754	0.592	0.0	0.0	0.0	1.90	4431.2	80.2
1.008	50.00	7.95	14.676	0.666	0.0	0.0	0.0	1.90	4431.2	90.2
1.009	50.00	8.39	14.598	0.740	0.0	0.0	0.0	1.90	4431.2	100.2
1.010	50.00	8.82	14.520	0.814	0.0	0.0	0.0	1.90	4431.2	110.2

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
1.011	50.000	0.078	641.0	0.074	0.00	0.0	0.600	\/	-1	
1.012	50.000	0.078	641.0	0.074	0.00	0.0	0.600	\/	-1	
1.013	50.000	0.078	641.0	0.074	0.00	0.0	0.600	\/	-1	
1.014	50.000	0.078	641.0	0.074	0.00	0.0	0.600	\/	-1	
1.015	5.000	0.033	151.5	0.000	0.00	0.0	0.600	o	300	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.011	50.00	9.26	14.442	0.888	0.0	0.0	0.0	1.90	4431.2	120.2
1.012	50.00	9.70	14.364	0.962	0.0	0.0	0.0	1.90	4431.2	130.3
1.013	50.00	10.14	14.286	1.036	0.0	0.0	0.0	1.90	4431.2	140.3
1.014	50.00	10.58	14.208	1.110	0.0	0.0	0.0	1.90	4431.2	150.3
1.015	50.00	10.64	14.052	1.110	0.0	0.0	0.0	1.27	90.1«	150.3

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.074	0.074	0.074
1.001	-	-	100	0.074	0.074	0.074
1.002	-	-	100	0.074	0.074	0.074
1.003	-	-	100	0.074	0.074	0.074
1.004	-	-	100	0.074	0.074	0.074
1.005	-	-	100	0.074	0.074	0.074
1.006	-	-	100	0.074	0.074	0.074
1.007	-	-	100	0.074	0.074	0.074
1.008	-	-	100	0.074	0.074	0.074
1.009	-	-	100	0.074	0.074	0.074
1.010	-	-	100	0.074	0.074	0.074
1.011	-	-	100	0.074	0.074	0.074
1.012	-	-	100	0.074	0.074	0.074
1.013	-	-	100	0.074	0.074	0.074
1.014	-	-	100	0.074	0.074	0.074
1.015	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				1.110	1.110	1.110

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.015	Swale D	15.000	14.019	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Storm Duration (mins)	30
Ratio R	0.450		

Online Controls for Storm

Orifice Manhole: 17, DS/PN: 1.015, Volume (m³): 116.6

Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 14.052

Storage Structures for Storm

Tank or Pond Manhole: 17, DS/PN: 1.015

Invert Level (m) 14.052

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	470.5	1.000	729.4

Summary of Results for 200 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	15.812	0.748	0.3	123.8	O K
30 min Summer	15.945	0.881	0.3	159.8	O K
60 min Summer	16.067	1.003	0.4	195.8	O K
120 min Summer	16.182	1.118	0.4	231.0	O K
180 min Summer	16.247	1.183	0.4	250.7	O K
240 min Summer	16.290	1.226	0.4	264.0	O K
360 min Summer	16.347	1.283	0.4	281.5	O K
480 min Summer	16.390	1.326	0.4	294.5	O K
600 min Summer	16.422	1.358	0.4	304.3	O K
720 min Summer	16.447	1.383	0.4	312.1	O K
960 min Summer	16.486	1.422	0.4	323.8	O K
1440 min Summer	16.533	1.469	0.4	338.3	Flood Risk
2160 min Summer	16.568	1.504	0.4	349.1	Flood Risk
2880 min Summer	16.582	1.518	0.4	353.2	Flood Risk
4320 min Summer	16.577	1.513	0.4	351.6	Flood Risk
5760 min Summer	16.550	1.486	0.4	343.6	Flood Risk
7200 min Summer	16.522	1.458	0.4	334.9	Flood Risk
8640 min Summer	16.495	1.431	0.4	326.8	Flood Risk
10080 min Summer	16.470	1.406	0.4	319.0	O K
15 min Winter	15.869	0.805	0.3	138.7	O K
30 min Winter	16.011	0.947	0.4	179.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	155.442	0.0	27.0	27
30 min Summer	100.464	0.0	29.1	42
60 min Summer	61.649	0.0	60.4	72
120 min Summer	36.502	0.0	63.5	132
180 min Summer	26.511	0.0	65.0	192
240 min Summer	21.011	0.0	65.9	252
360 min Summer	15.040	0.0	66.8	370
480 min Summer	11.878	0.0	67.3	490
600 min Summer	9.884	0.0	67.5	610
720 min Summer	8.502	0.0	67.5	730
960 min Summer	6.699	0.0	67.1	970
1440 min Summer	4.781	0.0	65.4	1448
2160 min Summer	3.407	0.0	134.2	2168
2880 min Summer	2.676	0.0	131.5	2884
4320 min Summer	1.902	0.0	123.7	4324
5760 min Summer	1.492	0.0	255.1	5592
7200 min Summer	1.235	0.0	248.2	6136
8640 min Summer	1.058	0.0	239.7	6840
10080 min Summer	0.928	0.0	230.0	7568
15 min Winter	155.442	0.0	27.9	27
30 min Winter	100.464	0.0	30.1	42

Summary of Results for 200 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	16.144	1.080	0.4	219.4	O K
120 min Winter	16.273	1.209	0.4	258.9	O K
180 min Winter	16.346	1.282	0.4	281.1	O K
240 min Winter	16.395	1.331	0.4	296.1	O K
360 min Winter	16.460	1.396	0.4	316.0	O K
480 min Winter	16.508	1.444	0.4	330.7	Flood Risk
600 min Winter	16.545	1.481	0.4	341.9	Flood Risk
720 min Winter	16.574	1.510	0.4	350.9	Flood Risk
960 min Winter	16.619	1.555	0.5	364.4	Flood Risk
1440 min Winter	16.675	1.611	0.5	381.6	Flood Risk
2160 min Winter	16.719	1.655	0.5	395.0	Flood Risk
2880 min Winter	16.739	1.675	0.5	401.1	Flood Risk
4320 min Winter	16.743	1.679	0.5	402.5	Flood Risk
5760 min Winter	16.724	1.660	0.5	396.7	Flood Risk
7200 min Winter	16.694	1.630	0.5	387.4	Flood Risk
8640 min Winter	16.658	1.594	0.5	376.4	Flood Risk
10080 min Winter	16.628	1.564	0.5	367.2	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	61.649	0.0	62.7	72
120 min Winter	36.502	0.0	66.0	130
180 min Winter	26.511	0.0	67.6	190
240 min Winter	21.011	0.0	68.6	248
360 min Winter	15.040	0.0	69.6	366
480 min Winter	11.878	0.0	70.1	484
600 min Winter	9.884	0.0	70.3	604
720 min Winter	8.502	0.0	70.3	722
960 min Winter	6.699	0.0	69.9	958
1440 min Winter	4.781	0.0	68.1	1430
2160 min Winter	3.407	0.0	140.2	2128
2880 min Winter	2.676	0.0	137.3	2828
4320 min Winter	1.902	0.0	129.1	4196
5760 min Winter	1.492	0.0	267.7	5528
7200 min Winter	1.235	0.0	260.3	6776
8640 min Winter	1.058	0.0	251.5	7864
10080 min Winter	0.928	0.0	241.4	7976

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	200	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.450	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.426

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.142	4	8	0.142	8	12	0.142

Model Details

Storage is Online Cover Level (m) 16.789

Tank or Pond Structure

Invert Level (m) 15.064

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	56.0	0.500	219.1	1.000	305.7

Orifice Outflow Control

Diameter (m) 0.013 Discharge Coefficient 0.600 Invert Level (m) 14.964

Summary of Results for 200 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	15.812	0.748	0.3	123.8	O K
30 min Summer	15.945	0.881	0.3	159.8	O K
60 min Summer	16.067	1.003	0.4	195.8	O K
120 min Summer	16.182	1.118	0.4	231.0	O K
180 min Summer	16.247	1.183	0.4	250.7	O K
240 min Summer	16.290	1.226	0.4	264.0	O K
360 min Summer	16.347	1.283	0.4	281.5	O K
480 min Summer	16.390	1.326	0.4	294.5	O K
600 min Summer	16.422	1.358	0.4	304.3	O K
720 min Summer	16.447	1.383	0.4	312.1	O K
960 min Summer	16.486	1.422	0.4	323.8	O K
1440 min Summer	16.533	1.469	0.4	338.3	Flood Risk
2160 min Summer	16.568	1.504	0.4	349.1	Flood Risk
2880 min Summer	16.582	1.518	0.4	353.2	Flood Risk
4320 min Summer	16.577	1.513	0.4	351.6	Flood Risk
5760 min Summer	16.550	1.486	0.4	343.6	Flood Risk
7200 min Summer	16.522	1.458	0.4	334.9	Flood Risk
8640 min Summer	16.495	1.431	0.4	326.8	Flood Risk
10080 min Summer	16.470	1.406	0.4	319.0	O K
15 min Winter	15.869	0.805	0.3	138.7	O K
30 min Winter	16.011	0.947	0.4	179.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	155.442	0.0	27.0	27
30 min Summer	100.464	0.0	29.1	42
60 min Summer	61.649	0.0	60.4	72
120 min Summer	36.502	0.0	63.5	132
180 min Summer	26.511	0.0	65.0	192
240 min Summer	21.011	0.0	65.9	252
360 min Summer	15.040	0.0	66.8	370
480 min Summer	11.878	0.0	67.3	490
600 min Summer	9.884	0.0	67.5	610
720 min Summer	8.502	0.0	67.5	730
960 min Summer	6.699	0.0	67.1	970
1440 min Summer	4.781	0.0	65.4	1448
2160 min Summer	3.407	0.0	134.2	2168
2880 min Summer	2.676	0.0	131.5	2884
4320 min Summer	1.902	0.0	123.7	4324
5760 min Summer	1.492	0.0	255.1	5592
7200 min Summer	1.235	0.0	248.2	6136
8640 min Summer	1.058	0.0	239.7	6840
10080 min Summer	0.928	0.0	230.0	7568
15 min Winter	155.442	0.0	27.9	27
30 min Winter	100.464	0.0	30.1	42

Summary of Results for 200 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	16.144	1.080	0.4	219.4	O K
120 min Winter	16.273	1.209	0.4	258.9	O K
180 min Winter	16.346	1.282	0.4	281.1	O K
240 min Winter	16.395	1.331	0.4	296.1	O K
360 min Winter	16.460	1.396	0.4	316.0	O K
480 min Winter	16.508	1.444	0.4	330.7	Flood Risk
600 min Winter	16.545	1.481	0.4	341.9	Flood Risk
720 min Winter	16.574	1.510	0.4	350.9	Flood Risk
960 min Winter	16.619	1.555	0.5	364.4	Flood Risk
1440 min Winter	16.675	1.611	0.5	381.6	Flood Risk
2160 min Winter	16.719	1.655	0.5	395.0	Flood Risk
2880 min Winter	16.739	1.675	0.5	401.1	Flood Risk
4320 min Winter	16.743	1.679	0.5	402.5	Flood Risk
5760 min Winter	16.724	1.660	0.5	396.7	Flood Risk
7200 min Winter	16.694	1.630	0.5	387.4	Flood Risk
8640 min Winter	16.658	1.594	0.5	376.4	Flood Risk
10080 min Winter	16.628	1.564	0.5	367.2	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	61.649	0.0	62.7	72
120 min Winter	36.502	0.0	66.0	130
180 min Winter	26.511	0.0	67.6	190
240 min Winter	21.011	0.0	68.6	248
360 min Winter	15.040	0.0	69.6	366
480 min Winter	11.878	0.0	70.1	484
600 min Winter	9.884	0.0	70.3	604
720 min Winter	8.502	0.0	70.3	722
960 min Winter	6.699	0.0	69.9	958
1440 min Winter	4.781	0.0	68.1	1430
2160 min Winter	3.407	0.0	140.2	2128
2880 min Winter	2.676	0.0	137.3	2828
4320 min Winter	1.902	0.0	129.1	4196
5760 min Winter	1.492	0.0	267.7	5528
7200 min Winter	1.235	0.0	260.3	6776
8640 min Winter	1.058	0.0	251.5	7864
10080 min Winter	0.928	0.0	241.4	7976

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	200	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.450	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.426

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.142	4	8	0.142	8	12	0.142

Model Details

Storage is Online Cover Level (m) 16.789

Tank or Pond Structure

Invert Level (m) 15.064

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	56.0	0.500	219.1	1.000	305.7

Orifice Outflow Control

Diameter (m) 0.013 Discharge Coefficient 0.600 Invert Level (m) 14.964

Summary of Results for 200 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	14.846	0.407	0.4	174.5	O K
30 min Summer	14.942	0.503	0.4	225.3	O K
60 min Summer	15.031	0.592	0.4	276.1	O K
120 min Summer	15.114	0.675	0.5	326.0	O K
180 min Summer	15.159	0.720	0.5	354.1	O K
240 min Summer	15.188	0.749	0.5	373.1	O K
360 min Summer	15.227	0.788	0.5	398.4	Flood Risk
480 min Summer	15.255	0.816	0.5	417.3	Flood Risk
600 min Summer	15.276	0.837	0.5	431.7	Flood Risk
720 min Summer	15.293	0.854	0.5	443.4	Flood Risk
960 min Summer	15.318	0.879	0.5	461.1	Flood Risk
1440 min Summer	15.350	0.911	0.5	484.1	Flood Risk
2160 min Summer	15.376	0.937	0.5	502.9	Flood Risk
2880 min Summer	15.389	0.950	0.5	512.3	Flood Risk
4320 min Summer	15.396	0.957	0.5	517.2	Flood Risk
5760 min Summer	15.389	0.950	0.5	512.2	Flood Risk
7200 min Summer	15.376	0.937	0.5	502.5	Flood Risk
8640 min Summer	15.363	0.924	0.5	493.0	Flood Risk
10080 min Summer	15.350	0.911	0.5	484.1	Flood Risk
15 min Winter	14.887	0.448	0.4	195.4	O K
30 min Winter	14.990	0.551	0.4	252.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	155.442	0.0	30.3	27
30 min Summer	100.464	0.0	33.4	42
60 min Summer	61.649	0.0	70.4	72
120 min Summer	36.502	0.0	74.8	132
180 min Summer	26.511	0.0	76.8	192
240 min Summer	21.011	0.0	78.0	252
360 min Summer	15.040	0.0	79.2	372
480 min Summer	11.878	0.0	79.7	490
600 min Summer	9.884	0.0	79.9	610
720 min Summer	8.502	0.0	79.8	730
960 min Summer	6.699	0.0	79.1	970
1440 min Summer	4.781	0.0	76.7	1448
2160 min Summer	3.407	0.0	159.2	2168
2880 min Summer	2.676	0.0	155.3	2884
4320 min Summer	1.902	0.0	144.8	4324
5760 min Summer	1.492	0.0	305.3	5760
7200 min Summer	1.235	0.0	295.9	6848
8640 min Summer	1.058	0.0	284.8	7360
10080 min Summer	0.928	0.0	272.3	8072
15 min Winter	155.442	0.0	31.7	27
30 min Winter	100.464	0.0	34.8	42

Summary of Results for 200 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	15.087	0.648	0.4	309.4	O K
120 min Winter	15.176	0.737	0.5	365.3	O K
180 min Winter	15.224	0.785	0.5	396.9	Flood Risk
240 min Winter	15.256	0.817	0.5	418.3	Flood Risk
360 min Winter	15.298	0.859	0.5	446.9	Flood Risk
480 min Winter	15.328	0.889	0.5	468.3	Flood Risk
600 min Winter	15.351	0.912	0.5	484.7	Flood Risk
720 min Winter	15.369	0.930	0.5	498.0	Flood Risk
960 min Winter	15.397	0.958	0.5	518.3	Flood Risk
1440 min Winter	15.433	0.994	0.5	545.0	Flood Risk
2160 min Winter	15.463	1.024	0.6	567.7	Flood Risk
2880 min Winter	15.479	1.040	0.6	579.8	Flood Risk
4320 min Winter	15.490	1.051	0.6	588.6	Flood Risk
5760 min Winter	15.488	1.049	0.6	586.7	Flood Risk
7200 min Winter	15.478	1.039	0.6	579.2	Flood Risk
8640 min Winter	15.464	1.025	0.6	568.5	Flood Risk
10080 min Winter	15.447	1.008	0.6	556.1	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	61.649	0.0	73.6	72
120 min Winter	36.502	0.0	78.1	130
180 min Winter	26.511	0.0	80.3	190
240 min Winter	21.011	0.0	81.5	248
360 min Winter	15.040	0.0	82.7	368
480 min Winter	11.878	0.0	83.2	486
600 min Winter	9.884	0.0	83.4	604
720 min Winter	8.502	0.0	83.3	722
960 min Winter	6.699	0.0	82.5	960
1440 min Winter	4.781	0.0	79.9	1432
2160 min Winter	3.407	0.0	166.4	2140
2880 min Winter	2.676	0.0	162.3	2832
4320 min Winter	1.902	0.0	151.3	4204
5760 min Winter	1.492	0.0	320.5	5584
7200 min Winter	1.235	0.0	310.6	6856
8640 min Winter	1.058	0.0	298.9	8128
10080 min Winter	0.928	0.0	285.9	9280

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	200	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.450	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.600

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.200	4	8	0.200	8	12	0.200

Model Details

Storage is Online Cover Level (m) 15.500

Tank or Pond Structure

Invert Level (m) 14.439

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	352.0	0.500	550.0	1.000	760.0

Orifice Outflow Control

Diameter (m) 0.016 Discharge Coefficient 0.600 Invert Level (m) 14.373

Summary of Results for 200 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	15.405	0.415	1.0	552.5	O K
30 min Summer	15.518	0.528	1.2	713.7	O K
60 min Summer	15.627	0.637	1.3	874.6	O K
120 min Summer	15.731	0.741	1.4	1032.9	O K
180 min Summer	15.788	0.798	1.5	1122.3	O K
240 min Summer	15.827	0.837	1.5	1182.9	O K
360 min Summer	15.877	0.887	1.5	1263.8	O K
480 min Summer	15.915	0.925	1.6	1324.2	O K
600 min Summer	15.943	0.953	1.6	1370.8	O K
720 min Summer	15.966	0.976	1.6	1408.3	Flood Risk
960 min Summer	16.001	1.011	1.6	1465.8	Flood Risk
1440 min Summer	16.046	1.056	1.7	1541.0	Flood Risk
2160 min Summer	16.084	1.094	1.7	1604.1	Flood Risk
2880 min Summer	16.103	1.113	1.7	1637.1	Flood Risk
4320 min Summer	16.115	1.125	1.7	1658.2	Flood Risk
5760 min Summer	16.109	1.119	1.7	1647.9	Flood Risk
7200 min Summer	16.094	1.104	1.7	1622.6	Flood Risk
8640 min Summer	16.080	1.090	1.7	1598.7	Flood Risk
10080 min Summer	16.067	1.077	1.7	1575.8	Flood Risk
15 min Winter	15.452	0.462	1.1	618.8	O K
30 min Winter	15.576	0.586	1.2	799.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	155.442	0.0	86.1	27
30 min Summer	100.464	0.0	97.4	42
60 min Summer	61.649	0.0	209.1	72
120 min Summer	36.502	0.0	225.8	132
180 min Summer	26.511	0.0	233.7	192
240 min Summer	21.011	0.0	238.3	252
360 min Summer	15.040	0.0	242.8	372
480 min Summer	11.878	0.0	245.1	490
600 min Summer	9.884	0.0	245.8	610
720 min Summer	8.502	0.0	245.5	730
960 min Summer	6.699	0.0	243.1	970
1440 min Summer	4.781	0.0	233.9	1448
2160 min Summer	3.407	0.0	491.3	2168
2880 min Summer	2.676	0.0	477.1	2884
4320 min Summer	1.902	0.0	438.4	4324
5760 min Summer	1.492	0.0	939.1	5760
7200 min Summer	1.235	0.0	906.2	6712
8640 min Summer	1.058	0.0	866.8	7352
10080 min Summer	0.928	0.0	822.2	7984
15 min Winter	155.442	0.0	91.1	27
30 min Winter	100.464	0.0	103.0	42

Summary of Results for 200 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	15.696	0.706	1.4	979.8	O K
120 min Winter	15.810	0.820	1.5	1157.4	O K
180 min Winter	15.874	0.884	1.5	1257.8	O K
240 min Winter	15.916	0.926	1.6	1326.0	O K
360 min Winter	15.972	0.982	1.6	1417.1	Flood Risk
480 min Winter	16.013	1.023	1.6	1485.4	Flood Risk
600 min Winter	16.044	1.054	1.7	1538.1	Flood Risk
720 min Winter	16.070	1.080	1.7	1580.7	Flood Risk
960 min Winter	16.108	1.118	1.7	1646.4	Flood Risk
1440 min Winter	16.159	1.169	1.8	1733.1	Flood Risk
2160 min Winter	16.202	1.212	1.8	1807.7	Flood Risk
2880 min Winter	16.225	1.235	1.8	1848.9	Flood Risk
4320 min Winter	16.244	1.254	1.8	1881.8	Flood Risk
5760 min Winter	16.243	1.253	1.8	1880.3	Flood Risk
7200 min Winter	16.232	1.242	1.8	1860.9	Flood Risk
8640 min Winter	16.215	1.225	1.8	1831.3	Flood Risk
10080 min Winter	16.195	1.205	1.8	1796.4	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	61.649	0.0	221.3	72
120 min Winter	36.502	0.0	238.7	130
180 min Winter	26.511	0.0	246.9	190
240 min Winter	21.011	0.0	251.6	248
360 min Winter	15.040	0.0	256.3	368
480 min Winter	11.878	0.0	258.6	486
600 min Winter	9.884	0.0	259.3	604
720 min Winter	8.502	0.0	259.0	722
960 min Winter	6.699	0.0	256.4	960
1440 min Winter	4.781	0.0	246.7	1432
2160 min Winter	3.407	0.0	519.2	2140
2880 min Winter	2.676	0.0	504.1	2832
4320 min Winter	1.902	0.0	463.4	4200
5760 min Winter	1.492	0.0	997.0	5544
7200 min Winter	1.235	0.0	961.9	6848
8640 min Winter	1.058	0.0	920.3	8120
10080 min Winter	0.928	0.0	873.5	9176

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	200	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.450	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 1.899

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.633	4	8	0.633	8	12	0.633

Model Details

Storage is Online Cover Level (m) 16.250

Tank or Pond Structure

Invert Level (m) 14.990

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1250.0	0.400	1404.9	0.800	1568.9	1.260	1768.6
0.200	1326.3	0.600	1485.8	1.000	1654.3		

Orifice Outflow Control

Diameter (m) 0.028 Discharge Coefficient 0.600 Invert Level (m) 14.985