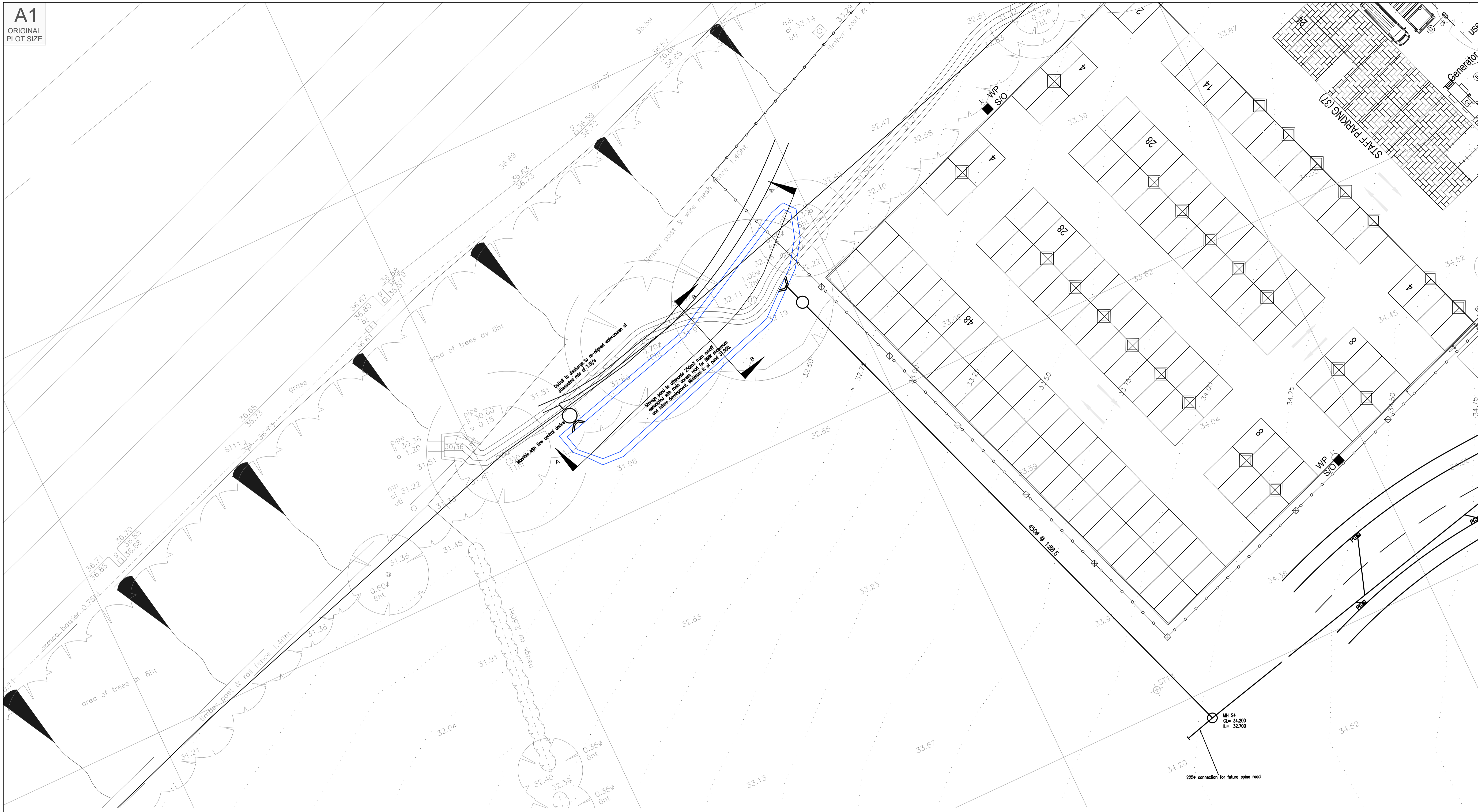
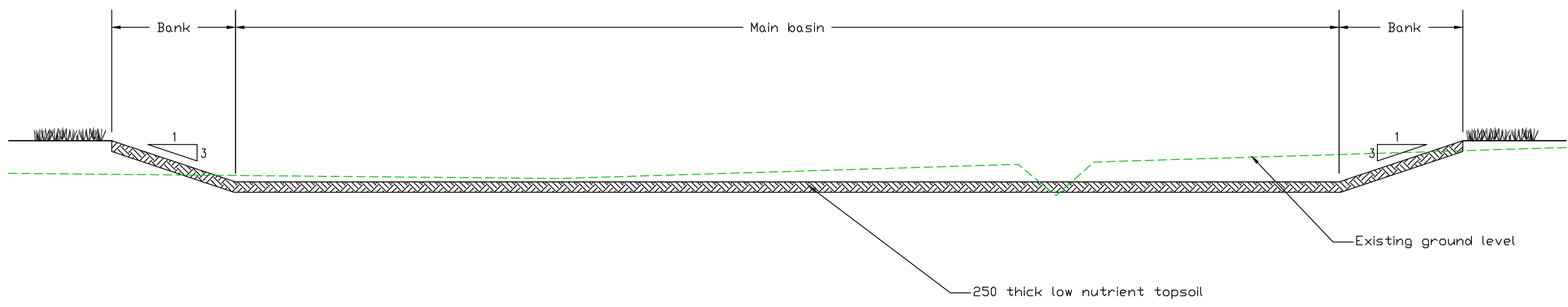


A1  
ORIGINAL  
PLOT SIZE

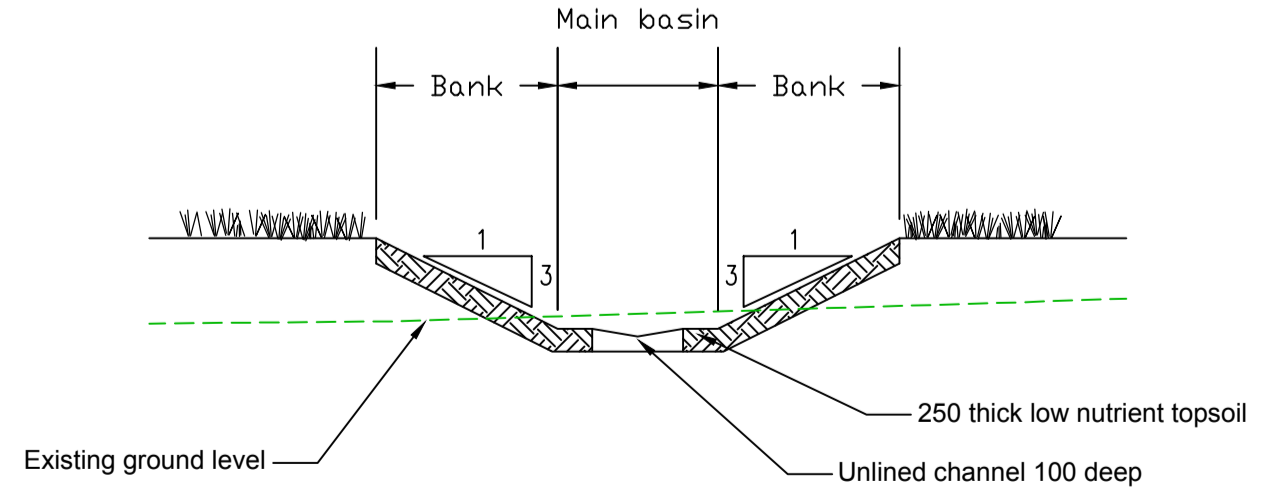
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NOTES:



Pond 1 - Section A-A  
Scale 1 : 100



Pond 1 - Section B-B  
Scale 1 : 100

Rev	Date	Notes	Drawn By	Checked By	Approved By



32 Windsor Place  
Cardiff  
CF10 3BZ  
029 2023 0303  
www.tpa.uk.com

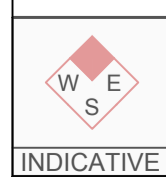
CLIENT:  
**COTSWOLD BMW**

PROJECT:  
**GROVEFIELD WAY  
CHELTENHAM**

TITLE:  
**PROPOSED POND  
LOCATION AND SECTIONS**

STATUS:  
**PLANNING**


SCALE:	DATE:	DRAWN:	CHECKED:	APPROVED:
1:250	21.08.15	NLT	MP	MP
JOB NO:	DRAWING NO:	REVISION:		
1402-01	PL01	-		



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## **Appendix C: Storage Volume Calculations (Windex)**

Complete Design Partnership Ltd		Page 1
Charford Lodge Bromsgrove Worcestershire B61 7LH		
Date 29/11/2016 13:11 File Highway as TPA design -...	Designed by markb Checked by	
Causeway		Network 2016.1

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)	1	Add Flow / Climate Change (%)	0
M5-60 (mm)	18.000	Minimum Backdrop Height (m)	0.200
Ratio R	0.350	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	100	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 Soffits

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)	Section Type	Auto Design
1.000	47.250	1.520	31.1	0.070	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	54.300	1.740	31.2	0.070	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.002	77.300	0.940	82.2	0.084	0.00	4.2	0.600	o	225	Pipe/Conduit	
2.000	76.000	0.502	151.4	0.148	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.003	81.850	0.925	88.5	0.000	0.00	4.2	0.600	o	450	Pipe/Conduit	
1.004	5.000	0.040	125.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	

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	44.90	5.33	36.900	0.070	0.0	0.0	0.0	2.36	93.6	8.5
1.001	43.57	5.72	35.380	0.140	0.0	0.0	0.0	2.35	93.5	16.5
1.002	40.80	6.61	33.640	0.224	4.2	0.0	0.0	1.44	57.4	29.0
2.000	42.04	6.19	33.127	0.148	0.0	0.0	0.0	1.06	42.2	16.9
1.003	39.08	7.24	32.625	0.372	8.4	0.0	0.0	2.16	343.9	47.8
1.004	38.96	7.29	31.550	0.372	8.4	0.0	0.0	1.82	289.0	47.8

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.070	0.070	0.070
1.001	-	-	100	0.070	0.070	0.070
1.002	-	-	100	0.084	0.084	0.084
2.000	-	-	100	0.148	0.148	0.148
1.003	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.372	0.372	0.372

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)
1.004	ditch	32.600	31.510	31.510	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 * 10m <sup>3</sup> /ha Storage	0.000
Hot Start (mins)	0	Inlet Coefficient	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)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	30
Ratio R	0.350		

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Charford Lodge Bromsgrove Worcestershire B61 7LH		
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Online Controls for Storm


Hydro-Brake Optimum® Manhole: 8, DS/PN: 1.004, Volume (m³): 14.7

Unit Reference	MD-SHE-0147-1040-1100-1040
Design Head (m)	1.100
Design Flow (l/s)	10.4
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	147
Invert Level (m)	31.550
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.100	10.4
Flush-Flo™	0.330	10.4
Kick-Flo®	0.728	8.6
Mean Flow over Head Range	-	9.0

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	5.3	1.200	10.8	3.000	16.7	7.000	25.1
0.200	10.0	1.400	11.7	3.500	18.0	7.500	26.0
0.300	10.4	1.600	12.4	4.000	19.2	8.000	26.8
0.400	10.3	1.800	13.1	4.500	20.3	8.500	27.6
0.500	10.1	2.000	13.8	5.000	21.4	9.000	28.3
0.600	9.8	2.200	14.4	5.500	22.4	9.500	29.1
0.800	9.0	2.400	15.0	6.000	23.3		
1.000	9.9	2.600	15.6	6.500	24.2		

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Charford Lodge Bromsgrove Worcestershire B61 7LH		
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Storage Structures for Storm

Tank or Pond Manhole: 8, DS/PN: 1.004

Invert Level (m) 31.550

Depth (m)	Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )
0.000	155.0	1.400	330.0

1 year Return Period Summary of Critical Results by Maximum Flood Volume  
(Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000      Additional Flow - % of Total Flow 0.000  
Hot Start (mins)                      0                      MADD Factor \* 10m<sup>3</sup>/ha Storage 0.000  
Hot Start Level (mm)                      0                      Inlet Coefficient 0.800  
Manhole Headloss Coeff (Global) 0.500      Flow per Person per Day (l/per/day) 0.000  
Foul Sewage per hectare (l/s) 0.000

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                      Ratio R 0.350  
Region England and Wales Cv (Summer) 0.750  
M5-60 (mm)                      18.000 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0                      DVD Status OFF  
Analysis Timestep      Fine Inertia Status OFF  
DTS Status                      ON

Profile(s)                      Summer and Winter  
Duration(s) (mins)                      15, 30, 60, 120, 180, 240, 360, 480, 600,  
720, 960, 1440, 2160, 2880, 4320, 5760,  
7200, 8640, 10080  
Return Period(s) (years)                      1, 30, 100  
Climate Change (%)                      0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	1	360 Winter	1	+0%				
1.001	2	360 Winter	1	+0%	100/15 Summer			
1.002	3	360 Winter	1	+0%	30/15 Summer	100/15 Summer		
2.000	4	360 Winter	1	+0%	30/15 Winter			
1.003	5	360 Winter	1	+0%				
1.004	8	360 Winter	1	+0%	30/60 Winter			

PN	US/MH Name	Water Surcharged			Flooded		Pipe		Level Exceeded
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (l/s)	Flow (l/s)	Status	
1.000	1	36.917	-0.208	0.000	0.02		1.4	OK	
1.001	2	35.406	-0.199	0.000	0.03		2.9	OK	
1.002	3	33.699	-0.166	0.000	0.16		8.8	OK	4
2.000	4	33.167	-0.185	0.000	0.07		3.0	OK	
1.003	5	32.689	-0.386	0.000	0.05		16.0	OK	
1.004	8	31.906	-0.094	0.000	0.06		10.3	OK	

30 year Return Period Summary of Critical Results by Maximum Flood Volume  
(Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000      Additional Flow - % of Total Flow 0.000  
Hot Start (mins)                      0                      MADD Factor \* 10m<sup>3</sup>/ha Storage 0.000  
Hot Start Level (mm)                      0                      Inlet Coefficient 0.800  
Manhole Headloss Coeff (Global) 0.500      Flow per Person per Day (l/per/day) 0.000  
Foul Sewage per hectare (l/s) 0.000

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                      Ratio R 0.350  
Region England and Wales Cv (Summer) 0.750  
M5-60 (mm)                      18.000 Cv (Winter) 0.840


Margin for Flood Risk Warning (mm) 300.0                      DVD Status OFF  
Analysis Timestep                      Fine Inertia Status OFF  
DTS Status                      ON

Profile(s)                      Summer and Winter  
Duration(s) (mins)                      15, 30, 60, 120, 180, 240, 360, 480, 600,  
720, 960, 1440, 2160, 2880, 4320, 5760,  
7200, 8640, 10080  
Return Period(s) (years)                      1, 30, 100  
Climate Change (%)                      0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	1	360 Winter	30	+0%				
1.001	2	360 Winter	30	+0%	100/15 Summer			
1.002	3	360 Winter	30	+0%	30/15 Summer	100/15 Summer		
2.000	4	360 Winter	30	+0%	30/15 Winter			
1.003	5	360 Winter	30	+0%				
1.004	8	360 Winter	30	+0%	30/60 Winter			

PN	US/MH Name	Water			Surcharged		Flooded		Pipe Flow (l/s)	Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (l/s)					
1.000	1	36.927	-0.198	0.000	0.04			3.2	OK		
1.001	2	35.419	-0.186	0.000	0.07			6.3	OK		
1.002	3	33.717	-0.148	0.000	0.26			14.3	OK	4	
2.000	4	33.188	-0.164	0.000	0.16			6.7	OK		
1.003	5	32.708	-0.367	0.000	0.08			25.2	OK		
1.004	8	32.232	0.232	0.000	0.06			10.4	SURCHARGED		



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Charford Lodge Bromsgrove Worcestershire B61 7LH		
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100 year Return Period Summary of Critical Results by Maximum Flood Volume  
(Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000      Additional Flow - % of Total Flow 0.000  
Hot Start (mins)                      0                      MADD Factor \* 10m<sup>3</sup>/ha Storage 0.000  
Hot Start Level (mm)                      0                      Inlet Coefficient 0.800  
Manhole Headloss Coeff (Global) 0.500      Flow per Person per Day (l/per/day) 0.000  
Foul Sewage per hectare (l/s) 0.000

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                      Ratio R 0.350  
Region England and Wales Cv (Summer) 0.750  
M5-60 (mm)                      18.000 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0                      DVD Status OFF  
Analysis Timestep      Fine Inertia Status OFF  
DTS Status                      ON

Profile(s)                      Summer and Winter  
Duration(s) (mins)                      15, 30, 60, 120, 180, 240, 360, 480, 600,  
720, 960, 1440, 2160, 2880, 4320, 5760,  
7200, 8640, 10080  
Return Period(s) (years)                      1, 30, 100  
Climate Change (%)                      0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	1	360 Winter	100	+40%				
1.001	2	360 Winter	100	+40%	100/15 Summer			
1.002	3	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
2.000	4	360 Winter	100	+40%	30/15 Winter			
1.003	5	360 Winter	100	+40%				
1.004	8	360 Winter	100	+40%	30/60 Winter			

PN	US/MH Name	Water Surcharged			Flooded		Pipe Flow (l/s)	Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (l/s)			
1.000	1	36.937	-0.188	0.000	0.06	5.8	OK		
1.001	2	35.433	-0.172	0.000	0.13	11.5	OK		
1.002	3	35.135	1.270	4.730	1.54	85.7	FLOOD	4	
2.000	4	33.211	-0.141	0.000	0.30	12.2	OK		
1.003	5	32.728	-0.347	0.000	0.12	39.0	OK		
1.004	8	32.634	0.634	0.000	0.06	10.5	FLOOD RISK		

Charford Lodge  
Bromsgrove  
Worcestershire B61 7LH



Date 29/11/2016 09:04  
File

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Checked by

Causeway Source Control 2016.1

ICP SUDS Mean Annual Flood

Input


Return Period (years)	2	Soil	0.400
Area (ha)	2.460	Urban	0.000
SAAR (mm)	700	Region Number	Region 6

**Results 1/s**

QBAR Rural	8.4
QBAR Urban	8.4

Q2 years 7.4

Q1 year	7.1
Q30 years	19.0
Q100 years	26.7

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Charford Lodge Bromsgrove Worcestershire B61 7LH	16-6953 Corinthian Park Phase 2 Storage Calculations	
Date 29-11-16 File phase -2.srcx	Designed by MB Checked by CK	
Causeway		Source Control 2016.1

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 1122 minutes.


Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max E Outflow (l/s)	Max Volume (m <sup>3</sup> )	Status
15 min Summer	98.171	0.171	0.0	7.7	7.7	162.3	O K
30 min Summer	98.052	0.052	0.0	1.6	1.6	49.6	O K
60 min Summer	98.180	0.180	0.0	7.8	7.8	171.4	O K
120 min Summer	98.341	0.341	0.0	8.4	8.4	323.5	O K
180 min Summer	98.451	0.451	0.0	8.4	8.4	428.7	O K
240 min Summer	98.501	0.501	0.0	8.4	8.4	476.0	O K
360 min Summer	98.589	0.589	0.0	8.4	8.4	559.9	O K
480 min Summer	98.650	0.650	0.0	8.4	8.4	617.4	O K
600 min Summer	98.679	0.679	0.0	8.4	8.4	645.4	O K
720 min Summer	98.702	0.702	0.0	8.4	8.4	666.6	O K
960 min Summer	98.722	0.722	0.0	8.4	8.4	685.9	O K
1440 min Summer	98.709	0.709	0.0	8.4	8.4	673.9	O K
2160 min Summer	98.668	0.668	0.0	8.4	8.4	634.5	O K
2880 min Summer	98.959	0.959	0.0	8.4	8.4	911.4	O K
4320 min Summer	98.864	0.864	0.0	8.4	8.4	821.2	O K
5760 min Summer	98.757	0.757	0.0	8.4	8.4	719.3	O K
7200 min Summer	98.644	0.644	0.0	8.4	8.4	612.0	O K
8640 min Summer	98.550	0.550	0.0	8.4	8.4	522.8	O K
10080 min Summer	98.470	0.470	0.0	8.4	8.4	446.6	O K
15 min Winter	98.201	0.201	0.0	7.9	7.9	191.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m <sup>3</sup> )	Discharge Volume (m <sup>3</sup> )	Time-Peak (mins)
15 min Summer	117.448	0.0	350.4	290
30 min Summer	79.010	0.0	37.7	46
60 min Summer	50.812	0.0	173.7	74
120 min Summer	31.621	0.0	342.3	134
180 min Summer	23.637	0.0	463.0	192
240 min Summer	19.105	0.0	525.3	252
360 min Summer	14.037	0.0	640.9	370
480 min Summer	11.286	0.0	730.9	490
600 min Summer	9.522	0.0	793.0	608
720 min Summer	8.282	0.0	848.5	728
960 min Summer	6.640	0.0	937.0	966
1440 min Summer	4.854	0.0	1050.7	1238
2160 min Summer	3.541	0.0	1247.9	1588
2880 min Summer	2.828	0.0	1833.2	2324
4320 min Summer	2.055	0.0	1961.6	3124
5760 min Summer	1.637	0.0	2143.3	3928
7200 min Summer	1.371	0.0	2241.8	4616
8640 min Summer	1.186	0.0	2321.9	5328
10080 min Summer	1.049	0.0	2384.7	6032
15 min Winter	117.448	0.0	396.3	307

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	98.119	0.119	0.0	5.9	5.9	112.8	O K
60 min Winter	98.273	0.273	0.0	8.3	8.3	259.1	O K
120 min Winter	98.456	0.456	0.0	8.4	8.4	433.4	O K
180 min Winter	98.564	0.564	0.0	8.4	8.4	536.2	O K
240 min Winter	98.638	0.638	0.0	8.4	8.4	606.1	O K
360 min Winter	98.736	0.736	0.0	8.4	8.4	699.6	O K
480 min Winter	98.807	0.807	0.0	8.4	8.4	766.5	O K
600 min Winter	98.849	0.849	0.0	8.4	8.4	806.4	O K
720 min Winter	98.874	0.874	0.0	8.4	8.4	830.6	O K
960 min Winter	98.907	0.907	0.0	8.4	8.4	861.9	O K
1440 min Winter	98.904	0.904	0.0	8.4	8.4	859.0	O K
2160 min Winter	99.158	1.158	0.0	8.4	8.4	1099.8	O K
2880 min Winter	99.097	1.097	0.0	8.4	8.4	1042.1	O K
4320 min Winter	98.962	0.962	0.0	8.4	8.4	914.3	O K
5760 min Winter	98.812	0.812	0.0	8.4	8.4	771.2	O K
7200 min Winter	98.627	0.627	0.0	8.4	8.4	595.5	O K
8640 min Winter	98.485	0.485	0.0	8.4	8.4	460.3	O K
10080 min Winter	98.373	0.373	0.0	8.4	8.4	354.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	79.010	0.0	101.0	45
60 min Winter	50.812	0.0	263.2	74
120 min Winter	31.621	0.0	451.8	132
180 min Winter	23.637	0.0	568.8	190
240 min Winter	19.105	0.0	653.2	248
360 min Winter	14.037	0.0	775.8	364
480 min Winter	11.286	0.0	871.4	482
600 min Winter	9.522	0.0	942.8	598
720 min Winter	8.282	0.0	999.5	712
960 min Winter	6.640	0.0	1090.4	938
1440 min Winter	4.854	0.0	1124.8	1374
2160 min Winter	3.541	0.0	1933.0	2044
2880 min Winter	2.828	0.0	2049.5	2428
4320 min Winter	2.055	0.0	2122.7	3312
5760 min Winter	1.637	0.0	2401.2	4216
7200 min Winter	1.371	0.0	2512.1	4904
8640 min Winter	1.186	0.0	2602.6	5568
10080 min Winter	1.049	0.0	2675.8	6216

Charford Lodge Bromsgrove Worcestershire B61 7LH	16-6953 Corinthian Park Phase 2 Storage Calculations	
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Date 29-11-16 File phase -2.srcx	Designed by MB Checked by CK	
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Causeway	Source Control 2016.1
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Rainfall Details

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)	18.000	Shortest Storm (mins)	15
Ratio R	0.350	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40


Pipe Network

Volume in Pipe Network (m³)	487	Dia of Outfall Pipe (m)	0.2
Slope of Outfall Pipe (1:X)	150	Roughness of Outfall Pipe (mm)	0.600

Time Area Diagram

Total Area (ha) 1.824

Time (mins)	Area	Time (mins)	Area	Time (mins)	Area	Time (mins)	Area
From:	To:	From:	To:	From:	To:	From:	To:
0	4 0.000	4	8 0.608	8	12 0.608	12	16 0.608

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Charford Lodge Bromsgrove Worcestershire B61 7LH	16-6953 Corinthian Park Phase 2 Storage Calculations	
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Causeway		Source Control 2016.1

Model Details

Storage is Online Cover Level (m) 100.000

Cellular Storage Structure

Invert Level (m) 98.000 Safety Factor 2.0  
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95  
 Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m <sup>2</sup> )	Inf. Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )	Inf. Area (m <sup>2</sup> )
0.000	1000.0	1000.0	1.300	0.0	1165.5
0.100	1000.0	1013.0	1.400	0.0	1165.5
0.200	1000.0	1026.2	1.500	0.0	1165.5
0.300	1000.0	1039.5	1.600	0.0	1165.5
0.400	1000.0	1052.8	1.700	0.0	1165.5
0.500	1000.0	1066.0	1.800	0.0	1165.5
0.600	1000.0	1079.3	1.900	0.0	1165.5
0.700	1000.0	1092.6	2.000	0.0	1165.5
0.800	1000.0	1105.8	2.100	0.0	1165.5
0.900	1000.0	1119.1	2.200	0.0	1165.5
1.000	1000.0	1132.4	2.300	0.0	1165.5
1.100	1000.0	1145.6	2.400	0.0	1165.5
1.200	1000.0	1158.9	2.500	0.0	1165.5

Hydro-Brake Optimum® Outflow Control

Unit Reference MD-SHE-0132-8400-1200-8400  
 Design Head (m) 1.200  
 Design Flow (l/s) 8.4  
 Flush-Flo™ Calculated  
 Objective Minimise upstream storage  
 Application Surface  
 Sump Available Yes  
 Diameter (mm) 132  
 Invert Level (m) 98.000  
 Minimum Outlet Pipe Diameter (mm) 150  
 Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	8.4
Flush-Flo™	0.357	8.4
Kick-Flo®	0.768	6.8
Mean Flow over Head Range	-	7.3

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

Charford Lodge  
 Bromsgrove  
 Worcestershire B61 7LH

16-6953 Corinthian Park  
 Phase 2  
 Storage Calculations



Date 29-11-16  
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Source Control 2016.1

Hydro-Brake Optimum® Outflow Control

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.7	1.200	8.4	3.000	12.9	7.000	19.4
0.200	7.9	1.400	9.0	3.500	13.9	7.500	20.1
0.300	8.3	1.600	9.6	4.000	14.8	8.000	20.7
0.400	8.4	1.800	10.2	4.500	15.7	8.500	21.3
0.500	8.2	2.000	10.7	5.000	16.5	9.000	21.9
0.600	8.0	2.200	11.2	5.500	17.3	9.500	22.5
0.800	6.9	2.400	11.6	6.000	18.0		
1.000	7.7	2.600	12.1	6.500	18.7		

Charford Lodge  
Bromsgrove  
Worcestershire B61 7LH



Date 29/11/2016 09:06  
File

Designed by markb  
Checked by

Causeway Source Control 2016.1

ICP SUDS Mean Annual Flood

Input

Return Period (years)	2	Soil	0.400
Area (ha)	1.680	Urban	0.000
SAAR (mm)	700	Region Number	Region 6


**Results 1/s**

QBAR Rural	5.7
QBAR Urban	5.7

Q2 years 5.0

Q1 year	4.9
Q30 years	13.0
Q100 years	18.2




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Causeway		Source Control 2016.1

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 642 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max E Outflow (l/s)	Max Volume (m <sup>3</sup> )	Status
15 min Summer	98.120	0.120	0.0	4.5	4.5	68.6	O K
30 min Summer	98.179	0.179	0.0	5.3	5.3	102.3	O K
60 min Summer	98.263	0.263	0.0	5.6	5.6	149.8	O K
120 min Summer	98.365	0.365	0.0	5.7	5.7	208.1	O K
180 min Summer	98.430	0.430	0.0	5.7	5.7	245.3	O K
240 min Summer	98.477	0.477	0.0	5.7	5.7	271.7	O K
360 min Summer	98.538	0.538	0.0	5.7	5.7	306.6	O K
480 min Summer	98.580	0.580	0.0	5.7	5.7	330.4	O K
600 min Summer	98.608	0.608	0.0	5.7	5.7	346.3	O K
720 min Summer	98.625	0.625	0.0	5.7	5.7	356.4	O K
960 min Summer	98.639	0.639	0.0	5.7	5.7	364.3	O K
1440 min Summer	98.621	0.621	0.0	5.7	5.7	353.8	O K
2160 min Summer	98.573	0.573	0.0	5.7	5.7	326.7	O K
2880 min Summer	98.522	0.522	0.0	5.7	5.7	297.4	O K
4320 min Summer	98.424	0.424	0.0	5.7	5.7	241.7	O K
5760 min Summer	98.341	0.341	0.0	5.7	5.7	194.2	O K
7200 min Summer	98.274	0.274	0.0	5.6	5.6	156.3	O K
8640 min Summer	98.224	0.224	0.0	5.5	5.5	127.6	O K
10080 min Summer	98.186	0.186	0.0	5.3	5.3	106.2	O K
15 min Winter	98.138	0.138	0.0	5.0	5.0	78.6	O K


Storm Event	Rain (mm/hr)	Flooded Volume (m <sup>3</sup> )	Discharge Volume (m <sup>3</sup> )	Time-Peak (mins)
15 min Summer	117.448	0.0	159.7	222
30 min Summer	79.010	0.0	219.7	255
60 min Summer	50.812	0.0	301.0	302
120 min Summer	31.621	0.0	376.1	368
180 min Summer	23.637	0.0	422.3	420
240 min Summer	19.105	0.0	455.3	468
360 min Summer	14.037	0.0	501.9	556
480 min Summer	11.286	0.0	537.9	644
600 min Summer	9.522	0.0	566.8	732
720 min Summer	8.282	0.0	591.0	822
960 min Summer	6.640	0.0	629.9	1006
1440 min Summer	4.854	0.0	683.1	1284
2160 min Summer	3.541	0.0	769.6	1648
2880 min Summer	2.828	0.0	818.5	2024
4320 min Summer	2.055	0.0	886.8	2776
5760 min Summer	1.637	0.0	952.2	3496
7200 min Summer	1.371	0.0	996.1	4200
8640 min Summer	1.186	0.0	1031.9	4880
10080 min Summer	1.049	0.0	1060.4	5568
15 min Winter	117.448	0.0	180.6	226

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Charford Lodge Bromsgrove Worcestershire B61 7LH	16-6953 Corinthian Park Phase 3 Storage Calculations	
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Causeway		Source Control 2016.1

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	98.213	0.213	0.0	5.5	5.5	121.3	O K
60 min Winter	98.312	0.312	0.0	5.7	5.7	178.1	O K
120 min Winter	98.433	0.433	0.0	5.7	5.7	246.6	O K
180 min Winter	98.508	0.508	0.0	5.7	5.7	289.7	O K
240 min Winter	98.562	0.562	0.0	5.7	5.7	320.3	O K
360 min Winter	98.633	0.633	0.0	5.7	5.7	361.1	O K
480 min Winter	98.683	0.683	0.0	5.7	5.7	389.5	O K
600 min Winter	98.718	0.718	0.0	5.7	5.7	409.3	O K
720 min Winter	98.741	0.741	0.0	5.7	5.7	422.6	O K
960 min Winter	98.763	0.763	0.0	5.7	5.7	434.9	O K
1440 min Winter	98.744	0.744	0.0	5.7	5.7	424.2	O K
2160 min Winter	98.660	0.660	0.0	5.7	5.7	376.3	O K
2880 min Winter	98.575	0.575	0.0	5.7	5.7	327.9	O K
4320 min Winter	98.417	0.417	0.0	5.7	5.7	237.7	O K
5760 min Winter	98.294	0.294	0.0	5.7	5.7	167.7	O K
7200 min Winter	98.211	0.211	0.0	5.4	5.4	120.1	O K
8640 min Winter	98.158	0.158	0.0	5.1	5.1	89.8	O K
10080 min Winter	98.129	0.129	0.0	4.8	4.8	73.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	79.010	0.0	247.8	268
60 min Winter	50.812	0.0	337.9	318
120 min Winter	31.621	0.0	421.9	386
180 min Winter	23.637	0.0	473.6	442
240 min Winter	19.105	0.0	510.5	490
360 min Winter	14.037	0.0	562.5	582
480 min Winter	11.286	0.0	602.4	674
600 min Winter	9.522	0.0	634.2	768
720 min Winter	8.282	0.0	660.6	862
960 min Winter	6.640	0.0	701.6	1044
1440 min Winter	4.854	0.0	745.9	1426
2160 min Winter	3.541	0.0	862.4	1772
2880 min Winter	2.828	0.0	917.3	2168
4320 min Winter	2.055	0.0	994.9	2928
5760 min Winter	1.637	0.0	1066.7	3632
7200 min Winter	1.371	0.0	1116.1	4280
8640 min Winter	1.186	0.0	1156.5	4896
10080 min Winter	1.049	0.0	1189.7	5480

Charford Lodge Bromsgrove Worcestershire B61 7LH	16-6953 Corinthian Park Phase 3 Storage Calculations	
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Date 29-11-16 File phase -3.srcx	Designed by MB Checked by CK	
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Causeway	Source Control 2016.1
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Rainfall Details

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)	18.000	Shortest Storm (mins)	15
Ratio R	0.350	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40


Pipe Network

Volume in Pipe Network (m³)	350	Dia of Outfall Pipe (m)	0.2
Slope of Outfall Pipe (1:X)	150	Roughness of Outfall Pipe (mm)	0.600

Time Area Diagram

Total Area (ha) 0.810

Time (mins)	Area	Time (mins)	Area	Time (mins)	Area	Time (mins)	Area
From:	To:	From:	To:	From:	To:	From:	To:
0	4 0.000	4	8 0.270	8	12 0.270	12	16 0.270

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Charford Lodge Bromsgrove Worcestershire B61 7LH	16-6953 Corinthian Park Phase 3 Storage Calculations	
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Causeway		Source Control 2016.1

Model Details

Storage is Online Cover Level (m) 100.000

Cellular Storage Structure

Invert Level (m) 98.000 Safety Factor 2.0  
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95  
 Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m <sup>2</sup> )	Inf. Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )	Inf. Area (m <sup>2</sup> )
0.000	600.0	600.0	1.300	0.0	727.3
0.100	600.0	610.0	1.400	0.0	727.3
0.200	600.0	620.2	1.500	0.0	727.3
0.300	600.0	630.4	1.600	0.0	727.3
0.400	600.0	640.6	1.700	0.0	727.3
0.500	600.0	650.8	1.800	0.0	727.3
0.600	600.0	661.0	1.900	0.0	727.3
0.700	600.0	671.2	2.000	0.0	727.3
0.800	600.0	681.4	2.100	0.0	727.3
0.900	600.0	691.6	2.200	0.0	727.3
1.000	600.0	701.8	2.300	0.0	727.3
1.100	600.0	712.0	2.400	0.0	727.3
1.200	600.0	722.2	2.500	0.0	727.3

Hydro-Brake Optimum® Outflow Control

Unit Reference MD-SHE-0109-5700-1200-5700  
 Design Head (m) 1.200  
 Design Flow (l/s) 5.7  
 Flush-Flo™ Calculated  
 Objective Minimise upstream storage  
 Application Surface  
 Sump Available Yes  
 Diameter (mm) 109  
 Invert Level (m) 98.000  
 Minimum Outlet Pipe Diameter (mm) 150  
 Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	5.7
Flush-Flo™	0.353	5.7
Kick-Flo®	0.750	4.6
Mean Flow over Head Range	-	5.0

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

Charford Lodge  
 Bromsgrove  
 Worcestershire B61 7LH

16-6953 Corinthian Park  
 Phase 3  
 Storage Calculations



Date 29-11-16  
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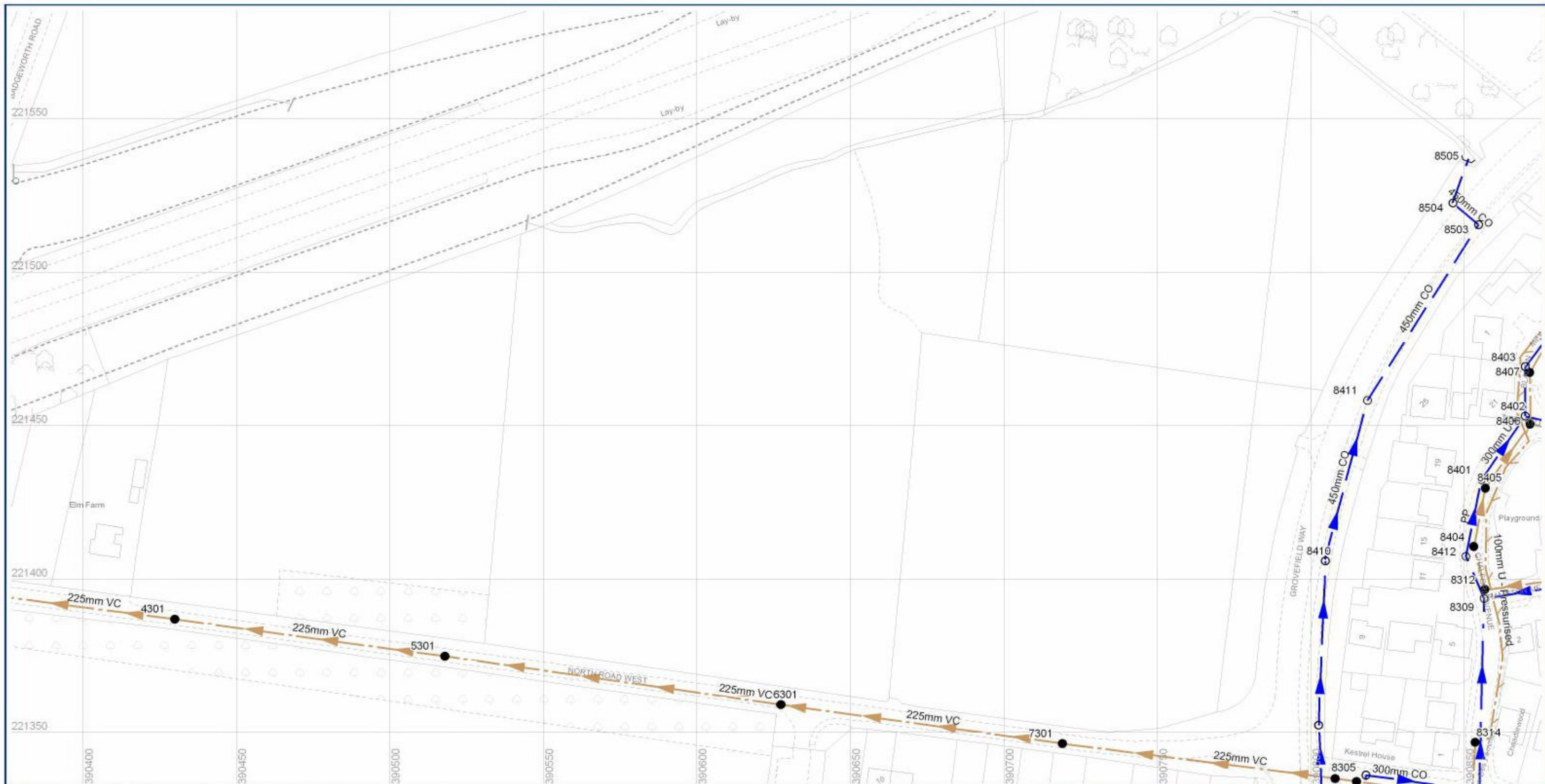
Designed by MB  
 Checked by CK

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Hydro-Brake Optimum® Outflow Control

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.8	1.200	5.7	3.000	8.8	7.000	13.1
0.200	5.4	1.400	6.1	3.500	9.4	7.500	13.5
0.300	5.7	1.600	6.5	4.000	10.0	8.000	14.0
0.400	5.7	1.800	6.9	4.500	10.6	8.500	14.4
0.500	5.6	2.000	7.2	5.000	11.2	9.000	14.8
0.600	5.4	2.200	7.6	5.500	11.7	9.500	15.2
0.800	4.7	2.400	7.9	6.000	12.2		
1.000	5.2	2.600	8.2	6.500	12.6		

## **Appendix D: Severn Trent Sewer Record Mapping**



<ul style="list-style-type: none"> <li>✕ ✕ ✕ ✕ Abandoned Gravity Sewer</li> <li>— Private Combined Gravity Sewer</li> <li>— Private Foul Gravity Sewer</li> <li>— Private Surface Water Gravity Sewer</li> <li>— Public Combined Gravity Sewer</li> <li>— Public Foul Gravity Sewer</li> <li>— Public Surface Water Gravity Sewer</li> <li>— Trunk Combined Gravity Sewer</li> <li>— Trunk Foul Use Gravity Sewer</li> <li>— Trunk Surface Water Gravity Sewer</li> <li>— Combined Use Pressurised Sewer</li> <li>— Foul Use Pressurised Sewer</li> <li>— Surface Water Pressurised Sewer</li> <li>— Highway Drain</li> <li>— Combined Lateral Drain (SS)</li> <li>— Foul Lateral Drain (SS)</li> <li>— Surface Water Lateral Drain (SS)</li> </ul>	<ul style="list-style-type: none"> <li>— Cuverted Watercourse</li> <li>— Cable, Earthing</li> <li>— Cable Junction</li> <li>— Cable, Optical Fibre/Instrumentation</li> <li>— Cable, Low Voltage</li> <li>— Cable, High Voltage</li> <li>— Cable, Other</li> <li>[H] Housing, Building</li> <li>[K] Housing, Kiosk</li> <li>[EG] Disposal Site</li> <li>[STW] Sewage Treatment Works</li> <li>[●] Housing, Other</li> <li>— Pipe Support Structure</li> <li>▲ Sewage Pumping Facility</li> <li>☒ Sewer Facility Connection Inlet / Outlet</li> </ul>	<ul style="list-style-type: none"> <li>● Blind Shaft</li> <li>● Combined Use Manhole</li> <li>□ Flushing Chamber</li> <li>● Foul Use Manhole</li> <li>● Grease Trap</li> <li>⊕ Head Node</li> <li>— Hydrobrake</li> <li>□ Lamphole</li> <li>— Outfall</li> <li>□ Overflow</li> <li>— Penstock</li> <li>⊕ Petrol Interceptor</li> </ul>	<ul style="list-style-type: none"> <li>— Sewer Chemical Injection Point</li> <li>● Sewer Junction</li> <li>— Sewerage Air Valve</li> <li>— Sewerage Hatch Box Point</li> <li>— Sewerage Isolation Valve</li> <li>— Soakaway</li> <li>○ Surface Water Manhole</li> <li>— Vent Column</li> <li>— Waste Water Storage</li> <li>— Pre-1937 Properties</li> </ul>
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MATERIALS	CATEGORIES
<ul style="list-style-type: none"> <li>- - NONE</li> <li>AC - ASBESTOS CEMENT</li> <li>BR - BRICK</li> <li>CD - CONCRETE BOX CULVERT</li> <li>CI - CAST IRON</li> <li>CO - CONCRETE</li> <li>CSB - CONCRETE SEGMENTS (BOLTED)</li> <li>CSU - CONCRETE SEGMENTS (UNBOLTED)</li> <li>DI - DUCTILE IRON</li> <li>ORC - GLASS REINFORCED CONCRETE</li> <li>GRP - GLASS REINFORCED PLASTIC</li> <li>MAC - MASONRY IN REGULAR COURSES</li> <li>MAR - MASONRY RANDOMLY COURSED</li> <li>PE - POLYETHYLENE</li> <li>PF - PITCH</li> <li>PP - POLYPROPYLENE</li> <li>PSG - PLASTIC STEEL COMPOSITE</li> <li>PVC - POLYVINYL CHLORIDE</li> <li>RPM - REINFORCED PLASTIC MATRIX</li> <li>SI - SPUN (GREY) IRON</li> <li>ST - STEEL</li> <li>U - UNKNOWN</li> <li>VC - VITRIFIED CLAY</li> <li>XXX - OTHER</li> </ul>	<ul style="list-style-type: none"> <li>W - WEIR</li> <li>C - CASCADE</li> <li>DB - DAMBOARD</li> <li>BE - SIDE ENTRY</li> <li>FV - FLAP VALVE</li> <li>BD - BACK DROP</li> <li>S - SIPHON</li> <li>HD - HIGHWAY DRAIN</li> <li>S104 - SECTION 104</li> </ul>
SHAPE	PURPOSE
<ul style="list-style-type: none"> <li>C - CIRCULAR</li> <li>E - EGG SHAPED</li> <li>O - OTHER</li> <li>R - RECTANGLE</li> <li>S - SQUARE</li> <li>T - TRAPEZOIDAL</li> <li>U - UNKNOWN</li> </ul>	<ul style="list-style-type: none"> <li>C - COMBINED</li> <li>E - FINAL EFFLUENT</li> <li>F - FOLL</li> <li>L - SLUDGE</li> <li>S - SURFACE WATER</li> </ul>

Sewer Trent Water Limited  
Asset Data Management  
PO Box 5344  
Coventry  
CV3 9FT  
Telephone: 0545 601 6616

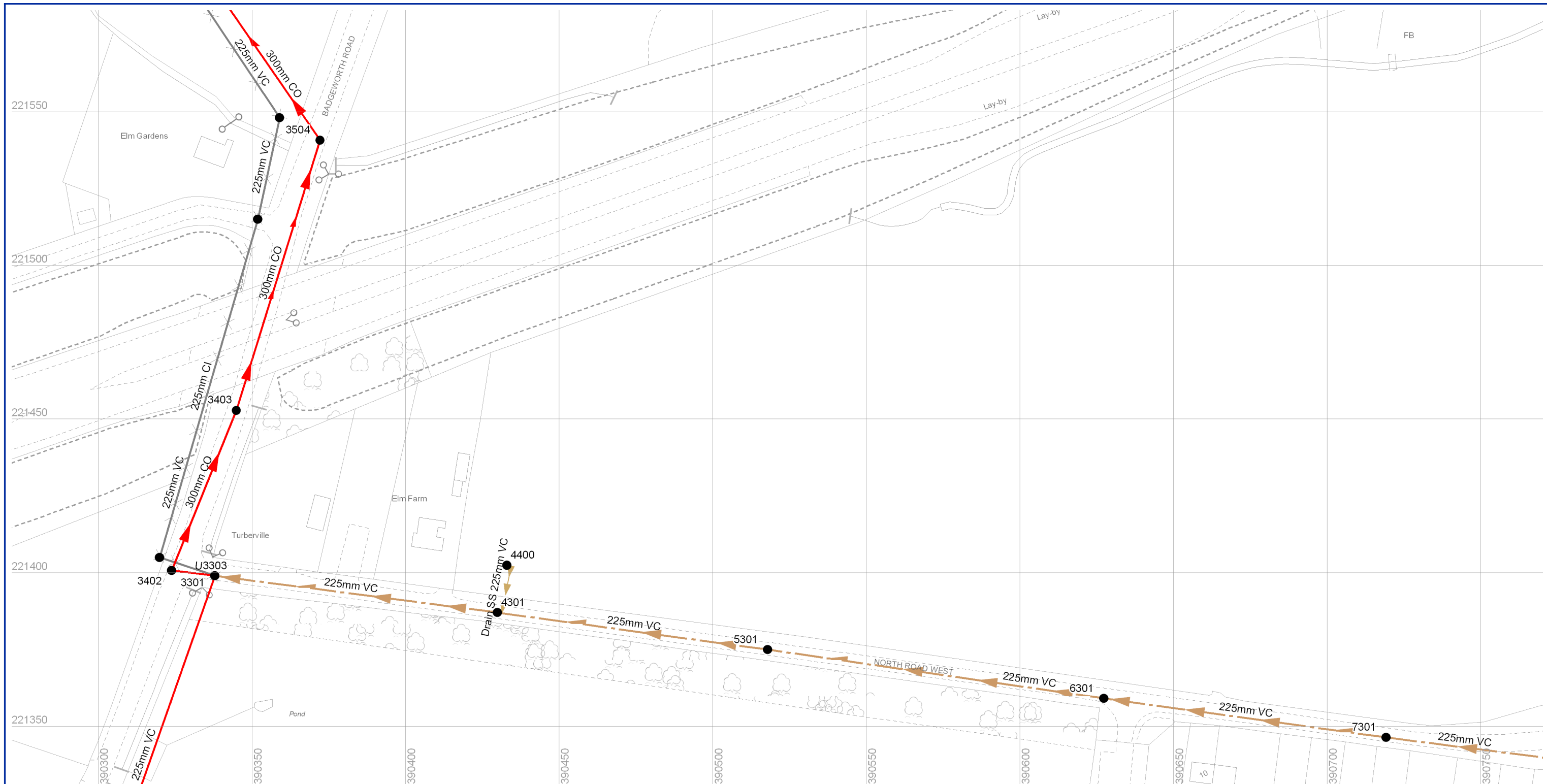
### SEWER RECORD

**O/S Map scale:** 1:1250  
**Date of issue:** 21.05.13

**This map is centred upon:**  
**O / S Grid reference:**  
x : 390626  
y : 221459

**Disclaimer Statement:**  
1. Do not scale off this Map.  
2. This map and any information supplied with it is furnished as a genuine guide, at only valid at the date of issue and no warranty as to its correctness is given or implied. In particular this Map and any information shown on it must not be relied upon in the event of any development or works (including but not limited to excavations) in the vicinity of Severn Trent Water's assets or for the purpose of determining the suitability of a point of connection to the sewerage or distribution systems.  
3. On 1 October 2011 most private sewers and private lateral drains in Severn Trent Water's sewerage area, which were connected to a public sewer as at 1 July 2011, transferred to the ownership of Severn Trent Water and became public sewers and public lateral drains. A further transfer takes place on 1 October 2012 (date to be confirmed). Private pumping stations, which form part of these sewers or lateral drains, will transfer to the ownership of Severn Trent Water on or before 1 October 2016. Severn Trent Water does not possess complete records of these assets. These assets may not be displayed on this Map.  
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All Private Sewers are shown in magenta  
All section 104 sewers are shown in green  
All Sewers that have been transferred to Severn Trent Water after the 1<sup>st</sup> October 2011, but have not been surveyed and confirmed by Severn Trent Water are shown in orange



<ul style="list-style-type: none"> <li>Abandoned Gravity Sewer</li> <li>Private Combined Gravity Sewer</li> <li>Private Foul Gravity Sewer</li> <li>Private Surface Water Gravity Sewer</li> <li>Public Combined Gravity Sewer</li> <li>Public Foul Gravity Sewer</li> <li>Public Surface Water Gravity Sewer</li> <li>Trunk Combined Gravity Sewer</li> <li>Trunk Foul Use Gravity Sewer</li> <li>Trunk Surface Water Gravity Sewer</li> <li>Combined Use Pressurised Sewer</li> <li>Foul Use Pressurised Sewer</li> <li>Surface Water Pressurised Sewer</li> <li>Highway Drain</li> <li>Combined Lateral Drain (SS)</li> <li>Foul Lateral Drain (SS)</li> <li>Surface Water Lateral Drain (SS)</li> </ul>	<ul style="list-style-type: none"> <li>Culverted Watercourse</li> <li>Cable, Earthing</li> <li>Cable Junction</li> <li>Cable, Optical Fibre/Instrumentation</li> <li>Cable, Low Voltage</li> <li>Cable, High Voltage</li> <li>Cable, Other</li> <li>Housing, Building</li> <li>Housing, Kiosk</li> <li>Disposal Site</li> <li>Sewage Treatment Works</li> <li>Highway Drain</li> <li>Combined Lateral Drain (SS)</li> <li>Foul Lateral Drain (SS)</li> <li>Surface Water Lateral Drain (SS)</li> </ul>	<ul style="list-style-type: none"> <li>Blind Shaft</li> <li>Combined Use Manhole</li> <li>Flushing Chamber</li> <li>Foul Use Manhole</li> <li>Grease Trap</li> <li>Head Node</li> <li>Hydrobrake</li> <li>Lampole</li> <li>Outfall</li> <li>Overflow</li> <li>Penstock</li> <li>Petrol Interceptor</li> </ul>	<ul style="list-style-type: none"> <li>Sewer Chemical Injection Point</li> <li>Sewer Junction</li> <li>Sewerage Air Valve</li> <li>Sewerage Hatch Box Point</li> <li>Sewerage Isolation Valve</li> <li>Soakaway</li> <li>Surface Water Manhole</li> <li>Vent Column</li> <li>Waste Water Storage</li> <li>Pre-1937 Properties</li> </ul>
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All Private Sewers are shown in magenta  
 All section 104 sewers are shown in green  
 All sewers that have been transferred to Severn Trent Water after the 1<sup>st</sup> October 2011, but have not been surveyed and confirmed by Severn Trent Water are shown in orange

<b>MATERIALS</b> - NONE AC - ASBESTOS CEMENT BR - BRICK CC - CONCRETE BOX CULVERT CI - CAST IRON CO - CONCRETE CSB - CONCRETE SEGMENTS (BOLTED) CSU - CONCRETE SEGMENTS (UNBOLTED) DI - DUCTILE IRON GRC - GLASS REINFORCED CONCRETE GRP - GLASS REINFORCED PLASTIC MAC - MASONRY IN REGULAR COURSES MAR - MASONRY RANDOMLY COURSED PE - POLYETHYLENE PF - PITCH PP - POLYPROPYLENE PSC - PLASTIC STEEL COMPOSITE PVC - POLYVINYL CHLORIDE RPM - REINFORCED PLASTIC MATRIX SI - SPUN (GREY) IRON ST - STEEL U - UNKNOWN VC - VITRIFIED CLAY XXX - OTHER	<b>CATEGORIES</b> W - WEIR C - CASCADE DB - DAMBOARD SE - SIDE ENTRY FV - FLAP VALVE BD - BACK DROP S - SIPHON HD - HIGHWAY DRAIN S104 - SECTION 104
<b>SHAPE</b> C - CIRCULAR E - EGG SHAPED O - OTHER R - RECTANGLE S - SQUARE T - TRAPEZOIDAL U - UNKNOWN	<b>PURPOSE</b> C - COMBINED E - FINAL EFFLUENT F - FOUL L - SLUDGE S - SURFACE WATER




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<b>SEWER RECORD</b>	
<b>O/S Map scale:</b>	1:1250
<b>Date of issue:</b>	07.12.16
<b>This map is centred upon:</b>	
<b>O / S Grid reference:</b>	
<b>x :</b>	390521
<b>y :</b>	221457

**Disclaimer Statement:**  
 1. Do not scale off this Map.  
 2. This map and any information supplied with it is furnished as a general guide, is only valid at the date of issue and no warranty as to its correctness is given or implied. In particular this Map and any information shown on it must not be relied upon in the event of any development or works (including but not limited to excavations) in the vicinity of Severn Trent Water's assets or for the purposes of determining the suitability of a point of connection to the sewerage or distribution systems.  
 3. On 1 October 2011 most private sewers and private lateral drains in Severn Trent Water's sewerage area, which were connected to a public sewer as at 1 July 2011, transferred to the ownership of Severn Trent Water and became public sewers and public lateral drains. A further transfer takes place on 1 October 2012 (date to be confirmed). Private pumping stations, which form part of these sewers or lateral drains, will transfer to the ownership of Severn Trent Water on or before 1 October 2016. Severn Trent Water does not possess complete records of these assets.  
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