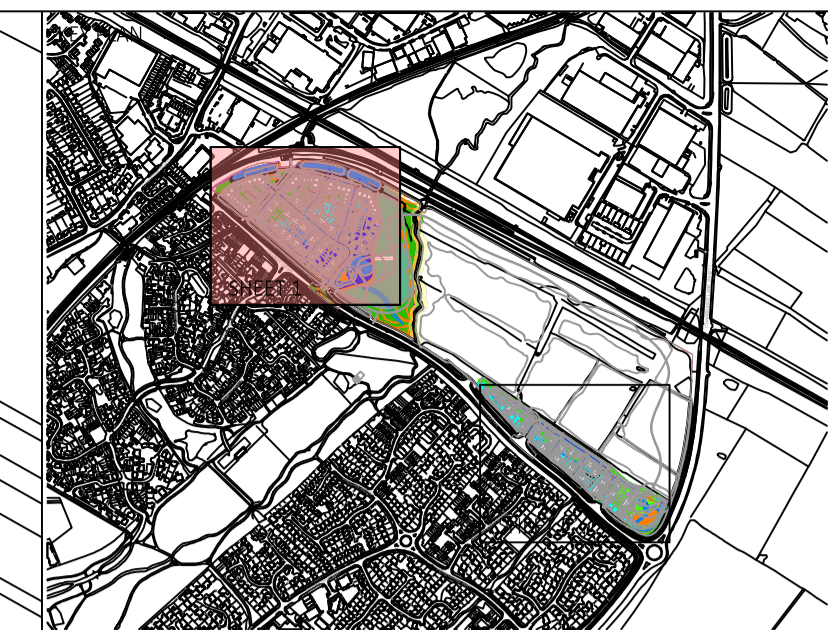


APPENDIX B COVER SHEET



Project name	Gavray Drive, Bicester		
Report title	Drainage Strategy (West)		
Document reference	15114-HYD-XX-XX-RP-D-5600		
Author	John Charlesworth		
Revision	P03		
Date	27 September 2021	Approved	✓

Reference	Title	Type	Originator
15114-HYD-XX-XX-DR-D-2050	Cut and Fill	Drawing	Hydrock
15114-HYD-XX-XX-DR-D-2200	Drainage Strategy	Drawing	Hydrock
15114-HYD-XX-XX-DR-D-2300	Overland Flow	Drawing	Hydrock
15114-HYD-XX-XX-DR-D-2400	Drainage Catchment Strategy	Drawing	Hydrock
FEH Qmed	Qmed MicroDrainage Calculation	Calculation	Hydrock
SW Drainage Model	Surface Water Drainage Model	Calculation	Hydrock
Sewer Records	Thames Water Sewer Asset plans	Correspondence	Thames Water



SURFACE LEVEL DATA			
NUMBER	MINIMUM LEVEL	MAXIMUM LEVEL	COLOUR
1	-3.00	-2.00	Red
2	-2.00	-1.00	Orange
3	-1.00	-0.50	Yellow
4	-0.50	0.00	Light Green
5	0.00	0.25	Green
6	0.25	0.50	Cyan
7	0.50	0.75	Blue
8	0.75	1.25	Dark Blue

DRAINAGE LEGEND

- PROPOSED SURFACE WATER SEWER NETWORK
- PROPOSED FOUL WATER SEWER NETWORK
- EXISTING THAMES WATER FOUL SEWER
- PROPOSED ATTENUATION BASIN
- PROPOSED EARTHWORKS EMBANKMENT
- RETAINING STRUCTURE
- BASIN MAINTENANCE EASEMENT
- PROPOSED ATTENUATION TANK
- PROPOSED TANKED PERMEABLE PAVING

- NOTES:**
- The volumes provided are an approximation only and are based on current design levels. The volumes given below should be used with caution.
 - A top soil strip has not been included within this assessment. However, assuming a 300mm strip is required over the 4.62ha development site, at 60% hard standing, approximately 8,316m³ is required to be taken off site or used in landscaping with 5,544m³ remaining. Please note, the depth of topsoil strip will need to be confirmed through ground investigations. Top soil may not be used in replacement for engineering 'fill' material however may be used in not structural and aphetic circumstance subject to design.
 - The values provided are based on a 3D generated ground model of the design levels against the topographical survey. It is recommended these volumes are reviewed after the actual CBR testing results for the highway are provided.
- Development:**
- Gross Cut = 10240m³
 - Gross Fill = 17046m³
 - Topsoil offset = 5,544m³
 - Attenuation Tank = 460m³
- Therefore, 802m³ of engineering material will be required. It is assumed this will be obtained in the form of construction materials (i.e. foundations, highways, etc.)
- No bulking factors have been applied to the above calculations.
 - Other factors such as trenches for utilities, landscaping, etc. have not been taken into account in the calculations above.
 - This volume does not account for any material produced during the demolition of the existing site.
 - A proportion of this topsoil can be assumed to be replaced within areas of POS and property gardens
 - No allowances have been made for arising from construction.**

REVISIONS

Rev	Date	Description	By	Ckd	App
P05	27/09/21	Updated to Architectural Layout issued 24/08/21	JAC	JAC	SM
P04	24/06/21	Volumetric calculations updated, error amended, further details added.	JAC	RJH	RJH
P03	21/06/21	Volumetric calculations updated.	JAC	RJH	RJH
P02	22/03/21	Updated to latest drainage strategy.	JAC	RJH	RJH
P01	19/02/21	First Issue.	JAC	RJH	RJH

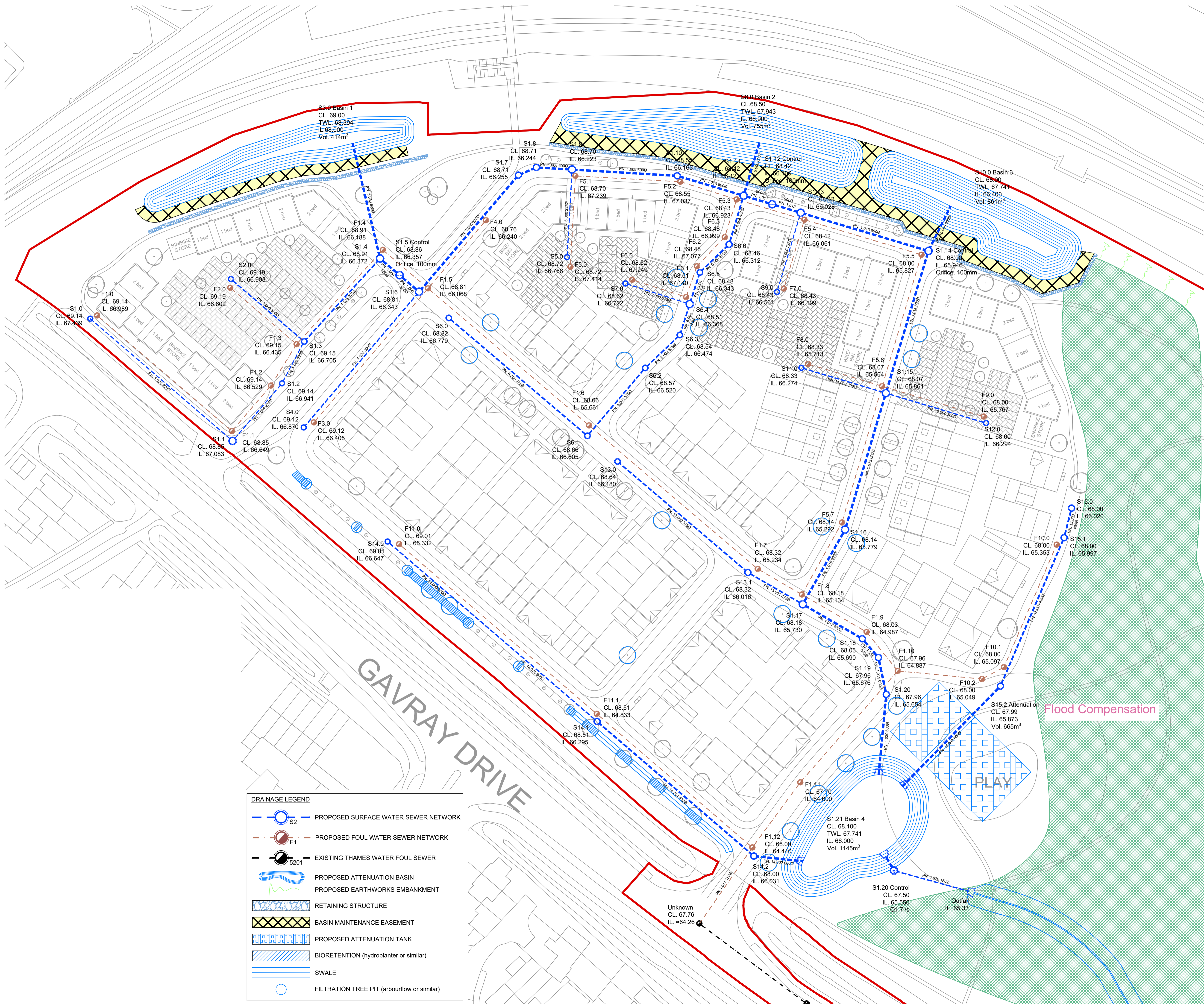
Hydrock OVER COURT BARNES OVER LAINE ALMONDSBURY BRISTOL BS32 4DF
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 e: bristol@hydrock.com

CLIENT
L&Q ESTATES LTD.

PROJECT
GAVRAY DRIVE BICESTER

TITLE
CUT AND FILL STRATEGY SHEET 1 (WESTERN DEVELOPMENT)

HYDROCK PROJECT NO. C-15114	SCALE @ A1 1 : 500	STATUS S2
STATUS DESCRIPTION INFORMATION	DRAWING NO. (PROJECT CODE-ORIGINATOR ZONE-LEVEL-TYPE-ROLE-NUMBER) 15114-HYD-XX-XX-DR-D-2050	REVISION P05



DRAINAGE LEGEND	
	PROPOSED SURFACE WATER SEWER NETWORK
	PROPOSED FOUL WATER SEWER NETWORK
	EXISTING THAMES WATER FOUL SEWER
	PROPOSED ATTENUATION BASIN
	PROPOSED EARTHWORKS EMBANKMENT
	RETAINING STRUCTURE
	BASIN MAINTENANCE EASEMENT
	PROPOSED ATTENUATION TANK
	BIORETENTION (hydroplanter or similar)
	SWALE
	FILTRATION TREE PIT (arbourflow or similar)

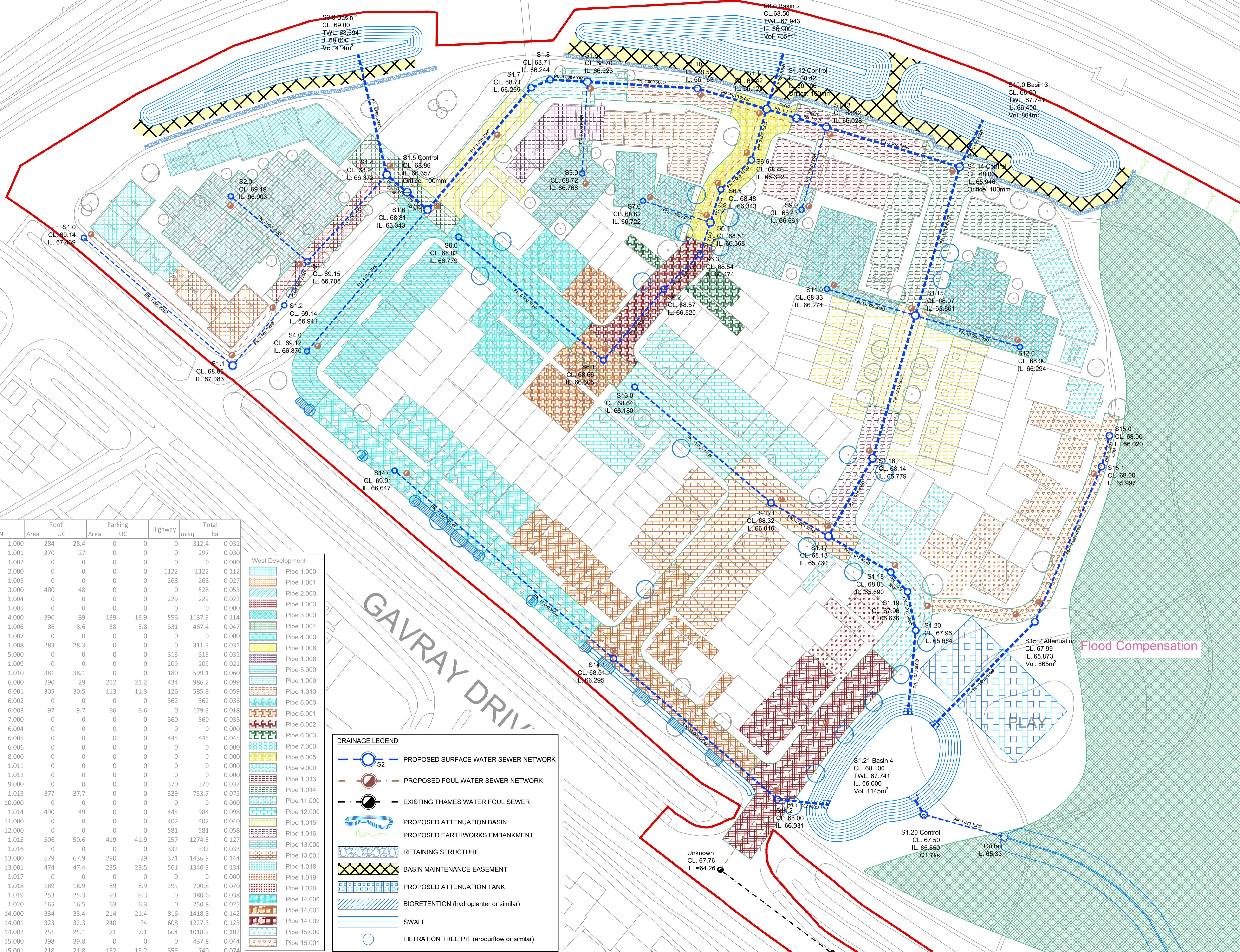


GAVRAY DRIVE

Flood Compensation

PLAY

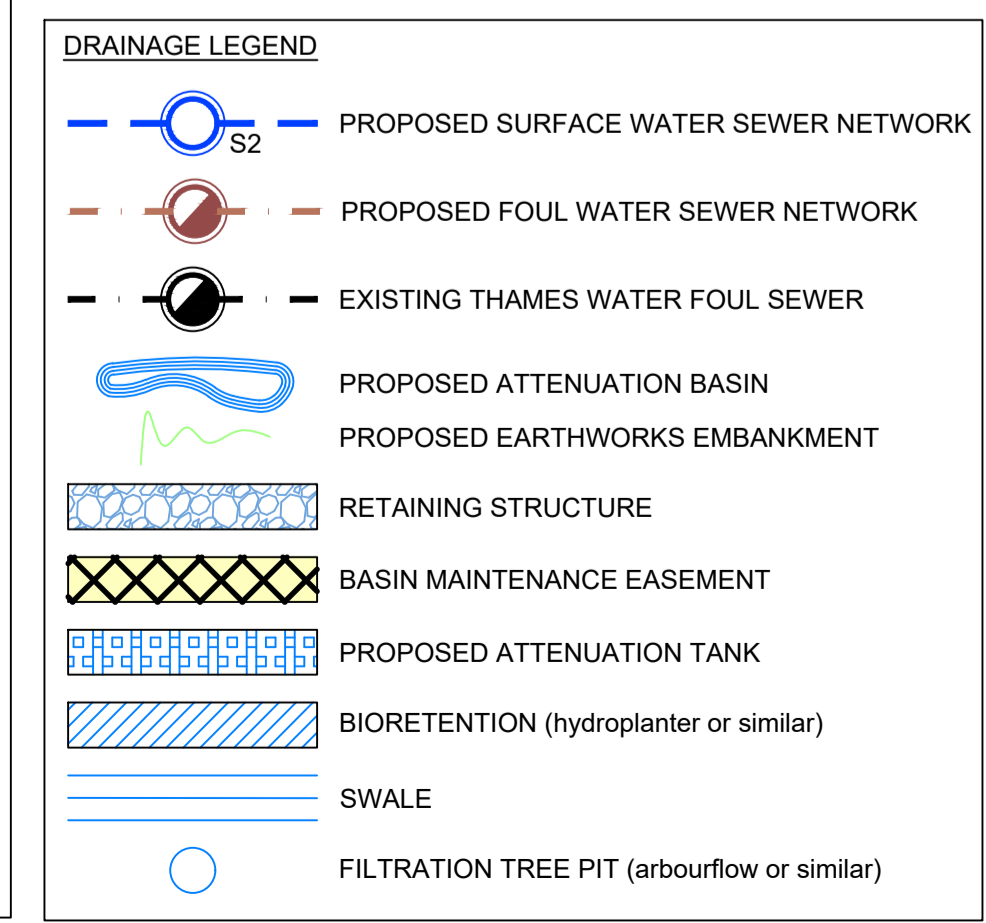
Unknown
CL. 67.76
IL. =64.26



PN	Roof Area	Roof UC	Parking Area	Parking UC	Highway	Total m.sq	Total ha
1.000	284	28.4	0	0	0	312.4	0.031
1.001	270	27	0	0	0	297	0.030
1.002	0	0	0	0	0	0	0.000
2.000	0	0	0	0	1122	1122	0.112
1.003	0	0	0	0	268	268	0.027
3.000	480	48	0	0	528	528	0.053
1.004	0	0	0	0	229	229	0.023
1.005	0	0	0	0	0	0	0.000
4.000	390	39	139	13.9	556	1137.9	0.114
1.006	86	8.6	38	3.8	331	467.4	0.047
1.007	0	0	0	0	0	0	0.000
1.008	283	28.3	0	0	0	311.3	0.031
5.000	0	0	0	0	313	313	0.031
1.009	0	0	0	0	209	209	0.021
1.010	381	38.1	0	0	180	599.1	0.060
6.000	290	29	212	21.2	434	986.2	0.099
6.001	305	30.5	113	11.3	126	585.8	0.059
6.002	0	0	0	0	362	362	0.036
6.003	97	9.7	66	6.6	0	179.3	0.018
7.000	0	0	0	0	360	360	0.036
6.004	0	0	0	0	0	0	0.000
6.005	0	0	0	0	445	445	0.045
6.006	0	0	0	0	0	0	0.000
8.000	0	0	0	0	0	0	0.000
1.011	0	0	0	0	0	0	0.000
1.012	0	0	0	0	0	0	0.000
9.000	0	0	0	0	370	370	0.037
1.013	377	37.7	0	0	339	753.7	0.075
1.014	490	49	0	0	445	984	0.098
11.000	0	0	0	0	402	402	0.040
12.000	0	0	0	0	581	581	0.058
1.015	506	50.6	419	41.9	257	1274.5	0.127
1.016	0	0	0	0	332	332	0.033
13.000	679	67.9	290	29	371	1436.9	0.144
13.001	474	47.4	235	23.5	561	1340.9	0.134
1.017	0	0	0	0	0	0	0.000
1.018	189	18.9	89	8.9	395	700.8	0.070
1.019	253	25.3	93	9.3	0	380.6	0.038
1.020	165	16.5	63	6.3	0	250.8	0.025
14.000	334	33.4	214	21.4	816	1418.8	0.142
14.001	323	32.3	240	24	608	1227.3	0.123
14.002	251	25.1	71	7.1	664	1018.2	0.102
15.000	398	39.8	0	0	0	437.8	0.044
15.001	218	21.8	132	13.2	355	740	0.074

West Development

	Pipe 1.000
	Pipe 1.001
	Pipe 2.000
	Pipe 1.003
	Pipe 3.000
	Pipe 1.004
	Pipe 4.000
	Pipe 1.006
	Pipe 1.008
	Pipe 5.000
	Pipe 1.009
	Pipe 1.010
	Pipe 6.000
	Pipe 6.001
	Pipe 6.002
	Pipe 6.003
	Pipe 7.000
	Pipe 6.005
	Pipe 9.000
	Pipe 1.013
	Pipe 1.014
	Pipe 11.000
	Pipe 12.000
	Pipe 1.015
	Pipe 13.000
	Pipe 13.001
	Pipe 1.018
	Pipe 1.019
	Pipe 14.000
	Pipe 14.001
	Pipe 14.002
	Pipe 15.000
	Pipe 15.001



REVISIONS

Rev	Date	Description	By	Ckd	App
P01	14/03/22	First Issue.	JAC	RJH	SM

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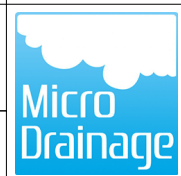
CLIENT
L&Q ESTATES LTD.

PROJECT
GAVRAY DRIVE
BICESTER

TITLE
DRAINAGE CATCHMENT STRATEGY
SHEET 1 (WESTERN DEVELOPMENT)

HYDROCK PROJECT NO. C-15114	SCALE @ A1 1 : 500	STATUS S2
STATUS DESCRIPTION INFORMATION	DRAWING NO. (PROJECT CODE-ORIGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER) 15114-HYD-XX-XX-DR-D-2400	REVISION P01

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Date 22/03/2021 14:29
File

Designed by JohnCharlesworth
Checked by

Innovyze

Source Control 2018.1.1


FEH Mean Annual Flood

Input

Site Location	GB 459350 222000 SP 59350 22000
Area (ha)	1.000
SAAR (mm)	633
URBEXT (1990)	0.0543
SPRHOST	25.220
BFIHOST	0.654
FARL	0.965

Results

QMED Rural (1/s) 0.8 QMED Urban (1/s) 0.8

Hydrock Consultants Ltd		Page 1
.	West (100, 30, 1)	
.	C-15114	
.	Gavray Drive, Bicester	
Date 14/03/2022	Designed by JAC	
File WEST.MDX	Checked by	
Innovyze	Network 2020.1.3	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for West





Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model	
Return Period (years)	100
FEH Rainfall Version	1999
Site Location GB 459350 222000 SP 59350 22000	
C (1km)	-0.022
D1 (1km)	0.323
D2 (1km)	0.315
D3 (1km)	0.249
E (1km)	0.289
F (1km)	2.478
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.950
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for West

« - 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)	Section Type	Auto Design
1.000	53.472	0.356	150.2	0.031	4.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	21.371	0.142	150.5	0.030	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.002	12.828	0.086	149.2	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.000	27.654	0.123	224.8	0.112	4.00	0.0	0.600	o	300	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	50.00	4.84	67.439	0.031	0.0	0.0	0.0	1.06	42.3	5.3
1.001	50.00	5.17	67.083	0.061	0.0	0.0	0.0	1.06	42.3	10.5
1.002	50.00	5.37	66.941	0.061	0.0	0.0	0.0	1.07	42.5	10.5
2.000	50.00	4.44	66.903	0.112	0.0	0.0	0.0	1.04	73.8	19.2

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West (100, 30, 1)
C-15114
Gavray Drive, Bicester



Date 14/03/2022

Designed by JAC

File WEST.MDX

Checked by

Innovyze

Network 2020.1.3

Network Design Table for West

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
1.003	32.270	0.108	298.8	0.027	0.00	0.0	0.600	o	375	Pipe/Conduit	
3.000	33.964	0.068	499.5	0.053	4.00	0.0	0.600	o	600	Pipe/Conduit	
1.004	7.358	0.015	507.4	0.023	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.005	7.358	0.015	490.5	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
4.000	51.117	0.227	225.2	0.114	4.00	0.0	0.600	o	300	Pipe/Conduit	
1.006	43.963	0.088	499.6	0.047	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.007	5.633	0.011	512.1	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.008	10.271	0.021	489.1	0.031	0.00	0.0	0.600	o	600	Pipe/Conduit	
5.000	25.215	0.168	150.1	0.031	4.00	0.0	0.600	o	225	Pipe/Conduit	
1.009	30.227	0.060	503.8	0.021	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.010	19.893	0.040	497.3	0.060	0.00	0.0	0.600	o	600	Pipe/Conduit	
6.000	52.245	0.174	300.3	0.099	4.00	0.0	0.600	o	375	Pipe/Conduit	
6.001	25.603	0.085	301.2	0.059	0.00	0.0	0.600	o	375	Pipe/Conduit	
6.002	13.722	0.046	298.3	0.036	0.00	0.0	0.600	o	375	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)
1.003	50.00	5.89	66.705	0.200	0.0	0.0	0.0	1.04	115.2	34.3
3.000	50.00	4.52	66.440	0.053	0.0	0.0	0.0	1.08	306.2	9.1
1.004	50.00	6.00	66.372	0.276	0.0	0.0	0.0	1.07	303.7	47.3
1.005	50.00	6.11	66.357	0.276	0.0	0.0	0.0	1.09	309.0	47.3
4.000	50.00	4.82	66.870	0.114	0.0	0.0	0.0	1.04	73.8	19.6
1.006	50.00	6.79	66.343	0.437	0.0	0.0	0.0	1.08	306.1	75.0
1.007	50.00	6.88	66.255	0.437	0.0	0.0	0.0	1.07	302.3	75.0
1.008	50.00	7.04	66.244	0.468	0.0	0.0	0.0	1.09	309.4	80.3
5.000	50.00	4.39	66.766	0.031	0.0	0.0	0.0	1.06	42.3	5.3
1.009	50.00	7.50	66.223	0.520	0.0	0.0	0.0	1.08	304.8	89.2
1.010	50.00	7.81	66.163	0.580	0.0	0.0	0.0	1.09	306.8	99.5
6.000	50.00	4.84	66.779	0.099	0.0	0.0	0.0	1.04	114.9	17.0
6.001	50.00	5.25	66.605	0.158	0.0	0.0	0.0	1.04	114.7	27.1
6.002	50.00	5.47	66.520	0.194	0.0	0.0	0.0	1.04	115.3	33.3

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West (100, 30, 1)
C-15114
Gavray Drive, Bicester



Date 14/03/2022
File WEST.MDX

Designed by JAC
Checked by

Innovyze

Network 2020.1.3

Network Design Table for West

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
6.003	9.321	0.031	300.7	0.018	0.00	0.0	0.600	o	375	Pipe/Conduit	
7.000	19.386	0.129	150.3	0.036	4.00	0.0	0.600	o	225	Pipe/Conduit	
6.004	9.522	0.025	380.9	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
6.005	11.637	0.031	375.4	0.045	0.00	0.0	0.600	o	450	Pipe/Conduit	
6.006	14.579	0.039	373.8	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
8.000	15.857	0.032	495.5	0.000	4.00	0.0	0.600	o	600	Pipe/Conduit	
1.011	8.555	0.017	503.2	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.012	8.555	0.017	503.2	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
9.000	23.720	0.158	150.1	0.037	4.00	0.0	0.600	o	225	Pipe/Conduit	
1.013	38.265	0.077	496.9	0.075	0.00	0.0	0.600	o	600	Pipe/Conduit	
10.000	14.327	0.029	494.0	0.000	4.00	0.0	0.600	o	600	Pipe/Conduit	
1.014	42.593	0.085	501.1	0.098	0.00	0.0	0.600	o	600	Pipe/Conduit	
11.000	25.320	0.113	224.1	0.040	4.00	0.0	0.600	o	300	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)
6.003	50.00	5.62	66.474	0.212	0.0	0.0	0.0	1.04	114.8	36.4
7.000	50.00	4.30	66.722	0.036	0.0	0.0	0.0	1.06	42.3	6.2
6.004	50.00	5.77	66.368	0.248	0.0	0.0	0.0	1.04	164.7	42.5
6.005	50.00	5.96	66.343	0.293	0.0	0.0	0.0	1.04	165.9	50.3
6.006	50.00	6.19	66.312	0.293	0.0	0.0	0.0	1.05	166.3	50.3
8.000	50.00	4.24	66.155	0.000	0.0	0.0	0.0	1.09	307.4	0.0
1.011	50.00	7.94	66.123	0.873	0.0	0.0	0.0	1.08	305.0	149.7
1.012	50.00	8.07	66.106	0.873	0.0	0.0	0.0	1.08	305.0	149.7
9.000	50.00	4.37	66.561	0.037	0.0	0.0	0.0	1.06	42.3	6.3
1.013	50.00	8.66	66.028	0.985	0.0	0.0	0.0	1.09	306.9	168.9
10.000	50.00	4.22	65.975	0.000	0.0	0.0	0.0	1.09	307.8	0.0
1.014	50.00	9.32	65.946	1.083	0.0	0.0	0.0	1.08	305.6	185.8
11.000	50.00	4.40	66.274	0.040	0.0	0.0	0.0	1.05	74.0	6.9

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West (100, 30, 1)
C-15114
Gavray Drive, Bicester



Date 14/03/2022
File WEST.MDX

Designed by JAC
Checked by

Innovyze

Network 2020.1.3

Network Design Table for West

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
12.000	30.020	0.133	225.7	0.058	4.00	0.0	0.600	o	300	Pipe/Conduit	
1.015	40.890	0.082	498.7	0.127	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.016	24.630	0.049	502.7	0.033	0.00	0.0	0.600	o	600	Pipe/Conduit	
13.000	49.148	0.164	299.7	0.144	4.00	0.0	0.600	o	375	Pipe/Conduit	
13.001	18.209	0.061	298.5	0.134	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.017	19.751	0.040	493.8	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.018	7.112	0.014	508.0	0.070	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.019	10.811	0.022	491.4	0.038	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.020	39.564	0.079	500.8	0.025	0.00	0.0	0.600	o	600	Pipe/Conduit	
14.000	79.264	0.352	225.2	0.142	4.00	0.0	0.600	o	300	Pipe/Conduit	
14.001	59.312	0.264	224.7	0.123	0.00	0.0	0.600	o	450	Pipe/Conduit	
14.002	35.112	0.156	225.1	0.102	0.00	0.0	0.600	o	600	Pipe/Conduit	
15.000	8.763	0.023	381.0	0.044	4.00	0.0	0.600	o	450	Pipe/Conduit	
15.001	46.357	0.124	373.8	0.074	0.00	0.0	0.600	o	450	Pipe/Conduit	
15.002	55.385	0.148	374.2	0.000	0.00	0.0	0.600	o	600	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)
12.000	50.00	4.48	66.294	0.058	0.0	0.0	0.0	1.04	73.7	9.9
1.015	50.00	9.95	65.861	1.308	0.0	0.0	0.0	1.08	306.4	224.4
1.016	50.00	10.33	65.779	1.341	0.0	0.0	0.0	1.08	305.2	230.0
13.000	50.00	4.79	66.180	0.144	0.0	0.0	0.0	1.04	115.0	24.7
13.001	50.00	5.08	66.016	0.278	0.0	0.0	0.0	1.04	115.2	47.7
1.017	50.00	10.63	65.730	1.619	0.0	0.0	0.0	1.09	307.9	277.7
1.018	50.00	10.74	65.690	1.689	0.0	0.0	0.0	1.07	303.5	289.7
1.019	50.00	10.90	65.676	1.727	0.0	0.0	0.0	1.09	308.7	296.2
1.020	50.00	11.51	65.654	1.752	0.0	0.0	0.0	1.08	305.7	300.5
14.000	50.00	5.27	66.647	0.142	0.0	0.0	0.0	1.04	73.8	24.4
14.001	50.00	6.00	66.295	0.265	0.0	0.0	0.0	1.35	215.1	45.5
14.002	50.00	6.36	66.031	0.367	0.0	0.0	0.0	1.62	457.8	62.9
15.000	50.00	4.14	66.020	0.044	0.0	0.0	0.0	1.04	164.7	7.5
15.001	50.00	4.88	65.997	0.118	0.0	0.0	0.0	1.05	166.3	20.2
15.002	50.00	5.62	65.873	0.118	0.0	0.0	0.0	1.25	354.2	20.2

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West (100, 30, 1)
C-15114
Gavray Drive, Bicester



Date 14/03/2022

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Network Design Table for West


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
1.021	12.617	0.025	504.7	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	🔴
1.022	21.975	0.220	99.9	0.000	0.00	0.0	0.600	o	150	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)
1.021	50.00	11.71	65.575	2.237	0.0	0.0	0.0	1.08	304.5«	383.7
1.022	50.00	12.07	65.550	2.237	0.0	0.0	0.0	1.01	17.8«	383.7

Free Flowing Outfall Details for West

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.022	Outfall	67.500	65.330	0.000	0	0

Hydrock Consultants Ltd		Page 6
.	West (100, 30, 1)	
.	C-15114	
.	Gavray Drive, Bicester	
Date 14/03/2022	Designed by JAC	
File WEST.MDX	Checked by	
Innovyze	Network 2020.1.3	

Online Controls for West

Orifice Manhole: 1.5 Control, DS/PN: 1.005, Volume (m³): 6.1

Diameter (m) 0.080 Discharge Coefficient 0.600 Invert Level (m) 66.357

Orifice Manhole: 1.12 Control, DS/PN: 1.012, Volume (m³): 7.8

Diameter (m) 0.080 Discharge Coefficient 0.600 Invert Level (m) 66.106

Orifice Manhole: 1.14 Control, DS/PN: 1.014, Volume (m³): 19.2

Diameter (m) 0.080 Discharge Coefficient 0.600 Invert Level (m) 65.946

Hydro-Brake® Optimum Manhole: 1.22 Control, DS/PN: 1.022, Volume (m³): 7.4

Unit Reference	MD-SHE-0050-1700-2400-1700
Design Head (m)	2.400
Design Flow (l/s)	1.7
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	50
Invert Level (m)	65.550
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.400	1.7
Flush-Flo™	0.219	1.0
Kick-Flo®	0.448	0.8
Mean Flow over Head Range	-	1.2

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	0.9	1.200	1.2	3.000	1.9	7.000	2.8
0.200	1.0	1.400	1.3	3.500	2.0	7.500	2.9
0.300	1.0	1.600	1.4	4.000	2.1	8.000	3.0
0.400	0.9	1.800	1.5	4.500	2.3	8.500	3.0
0.500	0.8	2.000	1.6	5.000	2.4	9.000	3.1
0.600	0.9	2.200	1.6	5.500	2.5	9.500	3.2
0.800	1.0	2.400	1.7	6.000	2.6		
1.000	1.1	2.600	1.8	6.500	2.7		

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West (100, 30, 1)
C-15114
Gavray Drive, Bicester



Date 14/03/2022
File WEST.MDX

Designed by JAC
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Innovyze

Network 2020.1.3

Storage Structures for West

Tank or Pond Manhole: 3.0 Basin 1, DS/PN: 3.000

Invert Level (m) 68.000

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	119.8	0.400	346.4	0.800	603.8	1.001	0.0
0.200	224.3	0.600	473.1	1.000	738.5		

Tank or Pond Manhole: 8.0 Basin 2, DS/PN: 8.000

Invert Level (m) 66.900

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	64.0	0.600	321.2	1.200	710.4	1.601	0.0
0.200	137.2	0.800	437.9	1.400	854.9		
0.400	221.6	1.000	570.0	1.600	1003.4		

Tank or Pond Manhole: 10.0 Basin 3, DS/PN: 10.000

Invert Level (m) 66.400

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	141.1	0.600	424.5	1.200	745.5	1.601	0.0
0.200	231.2	0.800	527.3	1.400	860.6		
0.400	325.8	1.000	634.4	1.600	979.7		

Cellular Storage Manhole: 15.2 Tank, DS/PN: 15.002


Invert Level (m) 65.873 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 ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	700.0	0.0	1.001	0.0	0.0
1.000	700.0	0.0			

Tank or Pond Manhole: 1.21 Basin 4, DS/PN: 1.021

Invert Level (m) 66.300

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	525.9	0.600	766.2	1.200	1042.9
0.200	601.9	0.800	854.4	1.400	1143.2
0.400	682.0	1.000	946.7	1.401	0.0

. . . Date 14/03/2022 File WEST.MDX	West (100, 30, 1) C-15114 Gavray Drive, Bicester Designed by JAC Checked by	
Innovyze	Network 2020.1.3	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for West

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m ³ /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	5
Number of Online Controls	4	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details


Rainfall Model	FEH
FEH Rainfall Version	1999
Site Location	GB 459350 222000 SP 59350 22000
C (1km)	-0.022
D1 (1km)	0.323
D2 (1km)	0.315
D3 (1km)	0.249
E (1km)	0.289
F (1km)	2.478
Cv (Summer)	0.750
Cv (Winter)	0.950

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	ON
Inertia 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, 0

WARNING: Half Drain Time has not been calculated as the structure is too full.

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	1.0	15 Winter	1	+0%	30/15 Summer			
1.001	1.1	15 Winter	1	+0%	30/15 Summer			
1.002	1.2	15 Winter	1	+0%	30/15 Summer			
2.000	2.0	15 Winter	1	+0%	30/15 Summer			
1.003	1.3	180 Winter	1	+0%	30/15 Summer			
3.000	3.0 Basin 1	180 Winter	1	+0%	30/15 Summer			

. . .	West (100, 30, 1) C-15114 Gavray Drive, Bicester	
Date 14/03/2022 File WEST.MDX	Designed by JAC Checked by	
Innovyze	Network 2020.1.3	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for West

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	1.0	67.492	-0.172	0.000	0.12		4.9	OK
1.001	1.1	67.156	-0.152	0.000	0.23		8.8	OK
1.002	1.2	67.015	-0.151	0.000	0.24		8.8	OK
2.000	2.0	67.010	-0.193	0.000	0.28		18.4	OK
1.003	1.3	67.006	-0.074	0.000	0.07		7.4	OK
3.000	3.0 Basin 1	67.005	-0.035	0.000	0.01		1.7	OK

PN	US/MH Name	Level Exceeded
1.000	1.0	
1.001	1.1	
1.002	1.2	
2.000	2.0	
1.003	1.3	
3.000	3.0 Basin 1	

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West (100, 30, 1)
C-15114
Gavray Drive, Bicester



Date 14/03/2022
File WEST.MDX

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Innovyze

Network 2020.1.3

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for West

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
1.004	1.4	180	Winter	1	+0%	1/60	Winter
1.005	1.5 Control	120	Winter	1	+0%	1/60	Winter
4.000	4.0	15	Winter	1	+0%	30/15	Summer
1.006	1.6	180	Winter	1	+0%	30/15	Summer
1.007	1.7	240	Winter	1	+0%	1/120	Winter
1.008	1.8	240	Winter	1	+0%	1/120	Winter
5.000	5.0	180	Winter	1	+0%	30/15	Summer
1.009	1.9	180	Winter	1	+0%	1/60	Winter
1.010	1.10	180	Winter	1	+0%	1/30	Winter
6.000	6.0	240	Winter	1	+0%	30/15	Winter
6.001	6.1	240	Winter	1	+0%	30/15	Summer
6.002	6.2	240	Winter	1	+0%	1/120	Winter
6.003	6.3	240	Winter	1	+0%	1/120	Winter
7.000	7.0	180	Winter	1	+0%	30/15	Summer
6.004	6.4	180	Winter	1	+0%	1/60	Winter
6.005	6.5	240	Winter	1	+0%	1/60	Winter
6.006	6.6	180	Winter	1	+0%	1/30	Winter
8.000	8.0 Basin 2	240	Winter	1	+0%	1/30	Winter
1.011	1.11	180	Winter	1	+0%	1/30	Winter
1.012	1.12 Control	240	Winter	1	+0%	1/30	Winter
9.000	9.0	15	Winter	1	+0%	30/120	Winter
1.013	1.13	1440	Winter	1	+0%	30/30	Winter
10.000	10.0 Basin 3	1440	Winter	1	+0%	30/15	Winter
1.014	1.14 Control	1440	Winter	1	+0%	30/15	Winter
11.000	11.0	4320	Winter	1	+0%	30/360	Winter
12.000	12.0	4320	Winter	1	+0%	30/360	Winter
1.015	1.15	4320	Winter	1	+0%	1/2160	Winter
1.016	1.16	4320	Winter	1	+0%	1/960	Winter
13.000	13.0	4320	Winter	1	+0%	30/15	Summer
13.001	13.1	4320	Winter	1	+0%	1/960	Winter
1.017	1.17	4320	Winter	1	+0%	1/480	Winter
1.018	1.18	4320	Winter	1	+0%	1/360	Winter
1.019	1.19	4320	Winter	1	+0%	1/360	Winter
1.020	1.20	4320	Winter	1	+0%	1/240	Winter
14.000	14.0	15	Winter	1	+0%	30/2880	Winter
14.001	14.1	4320	Winter	1	+0%	30/960	Winter
14.002	14.2	4320	Winter	1	+0%	30/480	Winter
15.000	15.0	4320	Winter	1	+0%	1/2160	Winter
15.001	15.1	4320	Winter	1	+0%	1/2160	Winter
15.002	15.2 Tank	4320	Winter	1	+0%	1/2160	Winter
1.021	1.21 Basin 4	4320	Winter	1	+0%	1/180	Winter
1.022	1.22 Control	4320	Winter	1	+0%	1/15	Summer

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West (100, 30, 1)
C-15114
Gavray Drive, Bicester



Date 14/03/2022
File WEST.MDX

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Network 2020.1.3

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for West

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)
1.004	1.4		67.005	0.033	0.000	0.03		5.2
1.005	1.5 Control		67.005	0.048	0.000	0.02		4.6
4.000	4.0		66.976	-0.194	0.000	0.27		18.9
1.006	1.6		66.927	-0.016	0.000	0.03		9.1
1.007	1.7		66.943	0.088	0.000	0.03		7.2
1.008	1.8		66.945	0.101	0.000	0.05		7.2
5.000	5.0		66.921	-0.070	0.000	0.03		1.2
1.009	1.9		66.963	0.140	0.000	0.02		5.8
1.010	1.10		66.967	0.204	0.000	0.03		5.9
6.000	6.0		66.907	-0.247	0.000	0.03		3.1
6.001	6.1		66.907	-0.073	0.000	0.05		4.7
6.002	6.2		66.928	0.033	0.000	0.06		5.2
6.003	6.3		66.935	0.086	0.000	0.06		5.2
7.000	7.0		66.920	-0.027	0.000	0.04		1.4
6.004	6.4		66.946	0.128	0.000	0.07		7.1
6.005	6.5		66.953	0.160	0.000	0.06		6.3
6.006	6.6		66.960	0.198	0.000	0.06		6.7
8.000	8.0 Basin 2		66.928	0.173	0.000	0.03		5.4
1.011	1.11		66.967	0.244	0.000	0.06		10.2
1.012	1.12 Control		66.981	0.275	0.000	0.04		6.9
9.000	9.0		66.620	-0.166	0.000	0.16		6.1
1.013	1.13		66.533	-0.095	0.000	0.02		6.2
10.000	10.0 Basin 3		66.530	-0.045	0.000	0.00		0.5
1.014	1.14 Control		66.530	-0.016	0.000	0.02		5.5
11.000	11.0		66.508	-0.066	0.000	0.00		0.2
12.000	12.0		66.508	-0.086	0.000	0.00		0.2
1.015	1.15		66.508	0.047	0.000	0.02		4.3
1.016	1.16		66.508	0.129	0.000	0.02		4.4
13.000	13.0		66.508	-0.047	0.000	0.01		0.6
13.001	13.1		66.508	0.117	0.000	0.01		1.2
1.017	1.17		66.508	0.178	0.000	0.03		5.5
1.018	1.18		66.508	0.218	0.000	0.03		5.8
1.019	1.19		66.508	0.232	0.000	0.04		5.9
1.020	1.20		66.508	0.254	0.000	0.02		6.0
14.000	14.0		66.766	-0.181	0.000	0.30		21.5
14.001	14.1		66.508	-0.237	0.000	0.01		1.1
14.002	14.2		66.508	-0.123	0.000	0.00		1.6
15.000	15.0		66.508	0.038	0.000	0.00		0.2
15.001	15.1		66.508	0.061	0.000	0.00		0.5
15.002	15.2 Tank		66.508	0.035	0.000	0.00		0.5
1.021	1.21 Basin 4		66.508	0.333	0.000	0.03		4.7
1.022	1.22 Control		66.541	0.841	0.000	0.07		1.1

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West (100, 30, 1)
C-15114
Gavray Drive, Bicester



Date 14/03/2022
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Network 2020.1.3

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for West

PN	US/MH Name	Status	Level Exceeded
1.004	1.4	SURCHARGED	
1.005	1.5 Control	SURCHARGED	
4.000	4.0	OK	
1.006	1.6	OK	
1.007	1.7	SURCHARGED	
1.008	1.8	SURCHARGED	
5.000	5.0	OK	
1.009	1.9	SURCHARGED	
1.010	1.10	SURCHARGED	
6.000	6.0	OK	
6.001	6.1	OK	
6.002	6.2	SURCHARGED	
6.003	6.3	SURCHARGED	
7.000	7.0	OK	
6.004	6.4	SURCHARGED	
6.005	6.5	SURCHARGED	
6.006	6.6	SURCHARGED	
8.000	8.0 Basin 2	SURCHARGED	
1.011	1.11	SURCHARGED	
1.012	1.12 Control	SURCHARGED	
9.000	9.0	OK	
1.013	1.13	OK	
10.000	10.0 Basin 3	OK	
1.014	1.14 Control	OK	
11.000	11.0	OK	
12.000	12.0	OK	
1.015	1.15	SURCHARGED	
1.016	1.16	SURCHARGED	
13.000	13.0	OK	
13.001	13.1	SURCHARGED	
1.017	1.17	SURCHARGED	
1.018	1.18	SURCHARGED	
1.019	1.19	SURCHARGED	
1.020	1.20	SURCHARGED	
14.000	14.0	OK	
14.001	14.1	OK	
14.002	14.2	OK	
15.000	15.0	SURCHARGED	
15.001	15.1	SURCHARGED	
15.002	15.2 Tank	SURCHARGED	
1.021	1.21 Basin 4	SURCHARGED	
1.022	1.22 Control	SURCHARGED	

. West (100, 30, 1)
 . C-15114
 . Gavray Drive, Bicester



Date 14/03/2022

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Innovyze

Network 2020.1.3

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for West

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/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 5
 Number of Online Controls 4 Number of Time/Area Diagrams 0
 Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details


Rainfall Model FEH
 FEH Rainfall Version 1999
 Site Location GB 459350 222000 SP 59350 22000
 C (1km) -0.022
 D1 (1km) 0.323
 D2 (1km) 0.315
 D3 (1km) 0.249
 E (1km) 0.289
 F (1km) 2.478
 Cv (Summer) 0.750
 Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status ON
 Inertia 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, 0

WARNING: Half Drain Time has not been calculated as the structure is too full.

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	1.0	30 Winter	30	+0%	30/15 Summer			
1.001	1.1	30 Winter	30	+0%	30/15 Summer			
1.002	1.2	15 Winter	30	+0%	30/15 Summer			
2.000	2.0	30 Winter	30	+0%	30/15 Summer			
1.003	1.3	30 Winter	30	+0%	30/15 Summer			
3.000	3.0 Basin 1	60 Winter	30	+0%	30/15 Summer			

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for West

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	1.0	68.341	0.677	0.000	0.24		9.6	SURCHARGED
1.001	1.1	68.317	1.009	0.000	0.49		18.7	SURCHARGED
1.002	1.2	68.299	1.133	0.000	0.56		20.6	SURCHARGED
2.000	2.0	68.370	1.167	0.000	0.46		30.6	SURCHARGED
1.003	1.3	68.322	1.242	0.000	0.51		52.1	SURCHARGED
3.000	3.0 Basin 1	68.138	1.098	0.000	0.07		17.8	SURCHARGED

PN	US/MH Name	Level Exceeded
1.000	1.0	
1.001	1.1	
1.002	1.2	
2.000	2.0	
1.003	1.3	
3.000	3.0 Basin 1	

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West (100, 30, 1)
C-15114
Gavray Drive, Bicester



Date 14/03/2022
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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for West

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
1.004	1.4	30 Winter	30	+0%	1/60 Winter		
1.005	1.5 Control	30 Winter	30	+0%	1/60 Winter		
4.000	4.0	240 Winter	30	+0%	30/15 Summer		
1.006	1.6	240 Winter	30	+0%	30/15 Summer		
1.007	1.7	240 Winter	30	+0%	1/120 Winter		
1.008	1.8	240 Winter	30	+0%	1/120 Winter		
5.000	5.0	240 Winter	30	+0%	30/15 Summer		
1.009	1.9	240 Winter	30	+0%	1/60 Winter		
1.010	1.10	240 Winter	30	+0%	1/30 Winter		
6.000	6.0	240 Winter	30	+0%	30/15 Winter		
6.001	6.1	240 Winter	30	+0%	30/15 Summer		
6.002	6.2	240 Winter	30	+0%	1/120 Winter		
6.003	6.3	240 Winter	30	+0%	1/120 Winter		
7.000	7.0	240 Winter	30	+0%	30/15 Summer		
6.004	6.4	240 Winter	30	+0%	1/60 Winter		
6.005	6.5	240 Winter	30	+0%	1/60 Winter		
6.006	6.6	240 Winter	30	+0%	1/30 Winter		
8.000	8.0 Basin 2	240 Winter	30	+0%	1/30 Winter		
1.011	1.11	240 Winter	30	+0%	1/30 Winter		
1.012	1.12 Control	240 Winter	30	+0%	1/30 Winter		
9.000	9.0	4320 Winter	30	+0%	30/120 Winter		
1.013	1.13	4320 Winter	30	+0%	30/30 Winter		
10.000	10.0 Basin 3	4320 Winter	30	+0%	30/15 Winter		
1.014	1.14 Control	4320 Winter	30	+0%	30/15 Winter		
11.000	11.0	5760 Winter	30	+0%	30/360 Winter		
12.000	12.0	5760 Winter	30	+0%	30/360 Winter		
1.015	1.15	5760 Winter	30	+0%	1/2160 Winter		
1.016	1.16	5760 Winter	30	+0%	1/960 Winter		
13.000	13.0	5760 Winter	30	+0%	30/15 Summer		
13.001	13.1	5760 Winter	30	+0%	1/960 Winter		
1.017	1.17	5760 Winter	30	+0%	1/480 Winter		
1.018	1.18	5760 Winter	30	+0%	1/360 Winter		
1.019	1.19	5760 Winter	30	+0%	1/360 Winter		
1.020	1.20	5760 Winter	30	+0%	1/240 Winter		
14.000	14.0	5760 Winter	30	+0%	30/2880 Winter		
14.001	14.1	5760 Winter	30	+0%	30/960 Winter		
14.002	14.2	5760 Winter	30	+0%	30/480 Winter		
15.000	15.0	5760 Winter	30	+0%	1/2160 Winter		
15.001	15.1	5760 Winter	30	+0%	1/2160 Winter		
15.002	15.2 Tank	5760 Winter	30	+0%	1/2160 Winter		
1.021	1.21 Basin 4	5760 Winter	30	+0%	1/180 Winter		
1.022	1.22 Control	5760 Winter	30	+0%	1/15 Summer		

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West (100, 30, 1)
C-15114
Gavray Drive, Bicester



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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for West

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)
1.004	1.4		68.296	1.324	0.000	0.18		33.1
1.005	1.5 Control		68.327	1.370	0.000	0.07		12.8
4.000	4.0		67.653	0.483	0.000	0.12		8.4
1.006	1.6		67.652	0.709	0.000	0.08		22.1
1.007	1.7		67.647	0.792	0.000	0.11		23.8
1.008	1.8		67.644	0.800	0.000	0.18		26.9
5.000	5.0		67.633	0.642	0.000	0.07		2.7
1.009	1.9		67.643	0.820	0.000	0.11		27.2
1.010	1.10		67.647	0.884	0.000	0.15		31.5
6.000	6.0		67.601	0.447	0.000	0.07		7.1
6.001	6.1		67.595	0.615	0.000	0.12		11.5
6.002	6.2		67.597	0.702	0.000	0.15		13.7
6.003	6.3		67.600	0.751	0.000	0.19		15.4
7.000	7.0		67.607	0.660	0.000	0.08		3.1
6.004	6.4		67.612	0.794	0.000	0.17		17.3
6.005	6.5		67.629	0.836	0.000	0.20		21.0
6.006	6.6		67.634	0.872	0.000	0.17		19.4
8.000	8.0 Basin 2		67.568	0.813	0.000	0.10		16.7
1.011	1.11		67.643	0.920	0.000	0.17		27.8
1.012	1.12 Control		67.664	0.958	0.000	0.07		11.2
9.000	9.0		67.077	0.291	0.000	0.03		1.1
1.013	1.13		67.085	0.457	0.000	0.03		8.0
10.000	10.0 Basin 3		67.037	0.462	0.000	0.03		4.5
1.014	1.14 Control		67.082	0.536	0.000	0.02		4.2
11.000	11.0		66.993	0.419	0.000	0.00		0.3
12.000	12.0		66.993	0.399	0.000	0.01		0.4
1.015	1.15		66.993	0.532	0.000	0.02		5.0
1.016	1.16		66.993	0.614	0.000	0.02		5.2
13.000	13.0		66.993	0.438	0.000	0.01		0.9
13.001	13.1		66.993	0.602	0.000	0.02		1.8
1.017	1.17		66.993	0.663	0.000	0.03		6.8
1.018	1.18		66.993	0.703	0.000	0.04		7.2
1.019	1.19		66.993	0.717	0.000	0.05		7.4
1.020	1.20		66.993	0.739	0.000	0.03		7.6
14.000	14.0		66.993	0.046	0.000	0.01		0.9
14.001	14.1		66.993	0.248	0.000	0.01		1.7
14.002	14.2		66.994	0.363	0.000	0.01		2.3
15.000	15.0		66.993	0.523	0.000	0.00		0.3
15.001	15.1		66.993	0.546	0.000	0.00		0.7
15.002	15.2 Tank		66.993	0.520	0.000	0.00		0.7
1.021	1.21 Basin 4		66.994	0.819	0.000	0.03		4.2
1.022	1.22 Control		67.026	1.326	0.000	0.08		1.3

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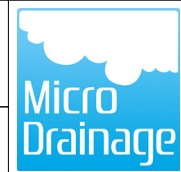
30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for West

PN	US/MH Name	Status	Level Exceeded
1.004	1.4	SURCHARGED	
1.005	1.5 Control	SURCHARGED	
4.000	4.0	SURCHARGED	
1.006	1.6	SURCHARGED	
1.007	1.7	SURCHARGED	
1.008	1.8	SURCHARGED	
5.000	5.0	SURCHARGED	
1.009	1.9	SURCHARGED	
1.010	1.10	SURCHARGED	
6.000	6.0	SURCHARGED	
6.001	6.1	SURCHARGED	
6.002	6.2	SURCHARGED	
6.003	6.3	SURCHARGED	
7.000	7.0	SURCHARGED	
6.004	6.4	SURCHARGED	
6.005	6.5	SURCHARGED	
6.006	6.6	SURCHARGED	
8.000	8.0 Basin 2	SURCHARGED	
1.011	1.11	SURCHARGED	
1.012	1.12 Control	SURCHARGED	
9.000	9.0	SURCHARGED	
1.013	1.13	SURCHARGED	
10.000	10.0 Basin 3	SURCHARGED	
1.014	1.14 Control	SURCHARGED	
11.000	11.0	SURCHARGED	
12.000	12.0	SURCHARGED	
1.015	1.15	SURCHARGED	
1.016	1.16	SURCHARGED	
13.000	13.0	SURCHARGED	
13.001	13.1	SURCHARGED	
1.017	1.17	SURCHARGED	
1.018	1.18	SURCHARGED	
1.019	1.19	SURCHARGED	
1.020	1.20	SURCHARGED	
14.000	14.0	SURCHARGED	
14.001	14.1	SURCHARGED	
14.002	14.2	SURCHARGED	
15.000	15.0	SURCHARGED	
15.001	15.1	SURCHARGED	
15.002	15.2 Tank	SURCHARGED	
1.021	1.21 Basin 4	SURCHARGED	
1.022	1.22 Control	SURCHARGED	

. West (100, 30, 1)
 . C-15114
 . Gavray Drive, Bicester

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for West

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/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 5
 Number of Online Controls 4 Number of Time/Area Diagrams 0
 Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details


Rainfall Model FEH
 FEH Rainfall Version 1999
 Site Location GB 459350 222000 SP 59350 22000
 C (1km) -0.022
 D1 (1km) 0.323
 D2 (1km) 0.315
 D3 (1km) 0.249
 E (1km) 0.289
 F (1km) 2.478
 Cv (Summer) 0.750
 Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status ON
 Inertia 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, 0

WARNING: Half Drain Time has not been calculated as the structure is too full.

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	1.0	15 Winter	100	+0%	30/15 Summer			
1.001	1.1	15 Winter	100	+0%	30/15 Summer			
1.002	1.2	15 Winter	100	+0%	30/15 Summer			
2.000	2.0	15 Winter	100	+0%	30/15 Summer			
1.003	1.3	15 Winter	100	+0%	30/15 Summer			
3.000	3.0 Basin 1	180 Winter	100	+0%	30/15 Summer			

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for West

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	1.0	68.813	1.149	0.000	0.43		17.4	SURCHARGED
1.001	1.1	68.742	1.434	0.000	0.88		33.8	FLOOD RISK
1.002	1.2	68.722	1.556	0.000	0.87		32.0	SURCHARGED
2.000	2.0	68.848	1.645	0.000	1.11		73.7	SURCHARGED
1.003	1.3	68.689	1.609	0.000	1.01		104.1	SURCHARGED
3.000	3.0 Basin 1	68.292	1.252	0.000	0.07		17.1	SURCHARGED

PN	US/MH Name	Level Exceeded
1.000	1.0	
1.001	1.1	
1.002	1.2	
2.000	2.0	
1.003	1.3	
3.000	3.0 Basin 1	

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West (100, 30, 1)
C-15114
Gavray Drive, Bicester



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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for West

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
1.004	1.4	30	Winter	100	+0%	1/60	Winter
1.005	1.5 Control	15	Winter	100	+0%	1/60	Winter
4.000	4.0	15	Winter	100	+0%	30/15	Summer
1.006	1.6	15	Winter	100	+0%	30/15	Summer
1.007	1.7	15	Winter	100	+0%	1/120	Winter
1.008	1.8	180	Winter	100	+0%	1/120	Winter
5.000	5.0	180	Winter	100	+0%	30/15	Summer
1.009	1.9	180	Winter	100	+0%	1/60	Winter
1.010	1.10	180	Winter	100	+0%	1/30	Winter
6.000	6.0	15	Winter	100	+0%	30/15	Winter
6.001	6.1	15	Winter	100	+0%	30/15	Summer
6.002	6.2	15	Winter	100	+0%	1/120	Winter
6.003	6.3	15	Winter	100	+0%	1/120	Winter
7.000	7.0	15	Winter	100	+0%	30/15	Summer
6.004	6.4	180	Winter	100	+0%	1/60	Winter
6.005	6.5	180	Winter	100	+0%	1/60	Winter
6.006	6.6	180	Winter	100	+0%	1/30	Winter
8.000	8.0 Basin 2	360	Winter	100	+0%	1/30	Winter
1.011	1.11	180	Winter	100	+0%	1/30	Winter
1.012	1.12 Control	180	Winter	100	+0%	1/30	Winter
9.000	9.0	5760	Winter	100	+0%	30/120	Winter
1.013	1.13	5760	Winter	100	+0%	30/30	Winter
10.000	10.0 Basin 3	5760	Winter	100	+0%	30/15	Winter
1.014	1.14 Control	5760	Winter	100	+0%	30/15	Winter
11.000	11.0	5760	Winter	100	+0%	30/360	Winter
12.000	12.0	5760	Winter	100	+0%	30/360	Winter
1.015	1.15	5760	Winter	100	+0%	1/2160	Winter
1.016	1.16	5760	Winter	100	+0%	1/960	Winter
13.000	13.0	5760	Winter	100	+0%	30/15	Summer
13.001	13.1	5760	Winter	100	+0%	1/960	Winter
1.017	1.17	5760	Winter	100	+0%	1/480	Winter
1.018	1.18	5760	Winter	100	+0%	1/360	Winter
1.019	1.19	5760	Winter	100	+0%	1/360	Winter
1.020	1.20	5760	Winter	100	+0%	1/240	Winter
14.000	14.0	15	Winter	100	+0%	30/2880	Winter
14.001	14.1	5760	Winter	100	+0%	30/960	Winter
14.002	14.2	5760	Winter	100	+0%	30/480	Winter
15.000	15.0	5760	Winter	100	+0%	1/2160	Winter
15.001	15.1	5760	Winter	100	+0%	1/2160	Winter
15.002	15.2 Tank	5760	Winter	100	+0%	1/2160	Winter
1.021	1.21 Basin 4	5760	Winter	100	+0%	1/180	Winter
1.022	1.22 Control	5760	Winter	100	+0%	1/15	Summer

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West (100, 30, 1)
C-15114
Gavray Drive, Bicester



Date 14/03/2022
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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for West

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)
1.004	1.4		68.544	1.572	0.000	0.21		38.0
1.005	1.5 Control		68.613	1.656	0.000	0.06		11.9
4.000	4.0		68.098	0.928	0.000	1.08		74.9
1.006	1.6		68.075	1.132	0.000	0.39		101.9
1.007	1.7		68.066	1.211	0.000	0.46		96.8
1.008	1.8		68.031	1.187	0.000	0.21		32.7
5.000	5.0		68.017	1.026	0.000	0.13		5.3
1.009	1.9		68.031	1.208	0.000	0.14		35.4
1.010	1.10		68.029	1.266	0.000	0.21		43.4
6.000	6.0		68.163	1.009	0.000	0.56		59.6
6.001	6.1		68.149	1.169	0.000	0.88		88.1
6.002	6.2		68.110	1.215	0.000	1.11		100.5
6.003	6.3		68.040	1.191	0.000	1.24		102.8
7.000	7.0		68.016	1.069	0.000	0.55		21.1
6.004	6.4		67.993	1.175	0.000	0.29		29.3
6.005	6.5		67.992	1.199	0.000	0.36		38.9
6.006	6.6		67.996	1.234	0.000	0.30		34.6
8.000	8.0 Basin 2		67.779	1.024	0.000	0.10		17.5
1.011	1.11		67.998	1.275	0.000	0.31		51.4
1.012	1.12 Control		68.070	1.364	0.000	0.07		12.0
9.000	9.0		67.375	0.589	0.000	0.03		1.2
1.013	1.13		67.379	0.751	0.000	0.03		7.5
10.000	10.0 Basin 3		67.333	0.758	0.000	0.03		4.6
1.014	1.14 Control		67.380	0.834	0.000	0.01		3.8
11.000	11.0		67.285	0.711	0.000	0.00		0.3
12.000	12.0		67.285	0.691	0.000	0.01		0.5
1.015	1.15		67.285	0.824	0.000	0.02		5.6
1.016	1.16		67.286	0.907	0.000	0.02		5.8
13.000	13.0		67.286	0.731	0.000	0.01		1.2
13.001	13.1		67.286	0.895	0.000	0.02		2.2
1.017	1.17		67.286	0.956	0.000	0.04		8.0
1.018	1.18		67.286	0.996	0.000	0.05		8.6
1.019	1.19		67.286	1.010	0.000	0.06		8.9
1.020	1.20		67.286	1.032	0.000	0.03		9.0
14.000	14.0		67.355	0.408	0.000	1.32		93.9
14.001	14.1		67.286	0.541	0.000	0.01		2.1
14.002	14.2		67.286	0.655	0.000	0.01		3.0
15.000	15.0		67.286	0.816	0.000	0.00		0.3
15.001	15.1		67.286	0.839	0.000	0.01		0.9
15.002	15.2 Tank		67.286	0.813	0.000	0.01		2.1
1.021	1.21 Basin 4		67.286	1.111	0.000	0.04		6.0
1.022	1.22 Control		67.319	1.619	0.000	0.09		1.5


.	West (100, 30, 1)	
.	C-15114	
.	Gavray Drive, Bicester	

Date 14/03/2022	Designed by JAC
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Innovyze	Network 2020.1.3
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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for West

PN	US/MH Name	Status	Level Exceeded
1.004	1.4	SURCHARGED	
1.005	1.5 Control	FLOOD RISK	
4.000	4.0	SURCHARGED	
1.006	1.6	SURCHARGED	
1.007	1.7	SURCHARGED	
1.008	1.8	SURCHARGED	
5.000	5.0	SURCHARGED	
1.009	1.9	SURCHARGED	
1.010	1.10	SURCHARGED	
6.000	6.0	SURCHARGED	
6.001	6.1	SURCHARGED	
6.002	6.2	SURCHARGED	
6.003	6.3	SURCHARGED	
7.000	7.0	SURCHARGED	
6.004	6.4	SURCHARGED	
6.005	6.5	SURCHARGED	
6.006	6.6	SURCHARGED	
8.000	8.0 Basin 2	SURCHARGED	
1.011	1.11	SURCHARGED	
1.012	1.12 Control	SURCHARGED	
9.000	9.0	SURCHARGED	
1.013	1.13	SURCHARGED	
10.000	10.0 Basin 3	SURCHARGED	
1.014	1.14 Control	SURCHARGED	
11.000	11.0	SURCHARGED	
12.000	12.0	SURCHARGED	
1.015	1.15	SURCHARGED	
1.016	1.16	SURCHARGED	
13.000	13.0	SURCHARGED	
13.001	13.1	SURCHARGED	
1.017	1.17	SURCHARGED	
1.018	1.18	SURCHARGED	
1.019	1.19	SURCHARGED	
1.020	1.20	SURCHARGED	
14.000	14.0	SURCHARGED	
14.001	14.1	SURCHARGED	
14.002	14.2	SURCHARGED	
15.000	15.0	SURCHARGED	
15.001	15.1	SURCHARGED	
15.002	15.2 Tank	SURCHARGED	
1.021	1.21 Basin 4	SURCHARGED	
1.022	1.22 Control	SURCHARGED	

Hydrock Consultants Ltd		Page 1
.	West (100+CC)	
.	C-15114	
.	Gavray Drive, Bicester	
Date 14/03/2022	Designed by JAC	
File WEST.MDX	Checked by	
Innovyze	Network 2020.1.3	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for West

Pipe Sizes STANDARD Manhole Sizes STANDARD





FEH Rainfall Model

Return Period (years)	100
FEH Rainfall Version	1999
Site Location GB 459350 222000 SP 59350 22000	
C (1km)	-0.022
D1 (1km)	0.323
D2 (1km)	0.315
D3 (1km)	0.249
E (1km)	0.289
F (1km)	2.478
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.950
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits


Network Design Table for West

« - 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)	Section Type	Auto Design
1.000	53.472	0.356	150.2	0.031	4.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	21.371	0.142	150.5	0.030	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.002	12.828	0.086	149.2	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.000	27.654	0.123	224.8	0.112	4.00	0.0	0.600	o	300	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	50.00	4.84	67.439	0.031	0.0	0.0	0.0	1.06	42.3	5.3
1.001	50.00	5.17	67.083	0.061	0.0	0.0	0.0	1.06	42.3	10.5
1.002	50.00	5.37	66.941	0.061	0.0	0.0	0.0	1.07	42.5	10.5
2.000	50.00	4.44	66.903	0.112	0.0	0.0	0.0	1.04	73.8	19.2


.	West (100+CC)	
.	C-15114	
.	Gavray Drive, Bicester	
Date 14/03/2022	Designed by JAC	
File WEST.MDX	Checked by	
Innovyze	Network 2020.1.3	

Network Design Table for West

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
1.003	32.270	0.108	298.8	0.027	0.00	0.0	0.600	o	375	Pipe/Conduit	
3.000	33.964	0.068	499.5	0.053	4.00	0.0	0.600	o	600	Pipe/Conduit	
1.004	7.358	0.015	507.4	0.023	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.005	7.358	0.015	490.5	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
4.000	51.117	0.227	225.2	0.114	4.00	0.0	0.600	o	300	Pipe/Conduit	
1.006	43.963	0.088	499.6	0.047	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.007	5.633	0.011	512.1	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.008	10.271	0.021	489.1	0.031	0.00	0.0	0.600	o	600	Pipe/Conduit	
5.000	25.215	0.168	150.1	0.031	4.00	0.0	0.600	o	225	Pipe/Conduit	
1.009	30.227	0.060	503.8	0.021	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.010	19.893	0.040	497.3	0.060	0.00	0.0	0.600	o	600	Pipe/Conduit	
6.000	52.245	0.174	300.3	0.099	4.00	0.0	0.600	o	375	Pipe/Conduit	
6.001	25.603	0.085	301.2	0.059	0.00	0.0	0.600	o	375	Pipe/Conduit	
6.002	13.722	0.046	298.3	0.036	0.00	0.0	0.600	o	375	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)
1.003	50.00	5.89	66.705	0.200	0.0	0.0	0.0	1.04	115.2	34.3
3.000	50.00	4.52	66.440	0.053	0.0	0.0	0.0	1.08	306.2	9.1
1.004	50.00	6.00	66.372	0.276	0.0	0.0	0.0	1.07	303.7	47.3
1.005	50.00	6.11	66.357	0.276	0.0	0.0	0.0	1.09	309.0	47.3
4.000	50.00	4.82	66.870	0.114	0.0	0.0	0.0	1.04	73.8	19.6
1.006	50.00	6.79	66.343	0.437	0.0	0.0	0.0	1.08	306.1	75.0
1.007	50.00	6.88	66.255	0.437	0.0	0.0	0.0	1.07	302.3	75.0
1.008	50.00	7.04	66.244	0.468	0.0	0.0	0.0	1.09	309.4	80.3
5.000	50.00	4.39	66.766	0.031	0.0	0.0	0.0	1.06	42.3	5.3
1.009	50.00	7.50	66.223	0.520	0.0	0.0	0.0	1.08	304.8	89.2
1.010	50.00	7.81	66.163	0.580	0.0	0.0	0.0	1.09	306.8	99.5
6.000	50.00	4.84	66.779	0.099	0.0	0.0	0.0	1.04	114.9	17.0
6.001	50.00	5.25	66.605	0.158	0.0	0.0	0.0	1.04	114.7	27.1
6.002	50.00	5.47	66.520	0.194	0.0	0.0	0.0	1.04	115.3	33.3

. . . Date 14/03/2022 File WEST.MDX	West (100+CC) C-15114 Gavray Drive, Bicester Designed by JAC Checked by	
Innovyze	Network 2020.1.3	

Network Design Table for West

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
6.003	9.321	0.031	300.7	0.018	0.00	0.0	0.600	o	375	Pipe/Conduit	
7.000	19.386	0.129	150.3	0.036	4.00	0.0	0.600	o	225	Pipe/Conduit	
6.004	9.522	0.025	380.9	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
6.005	11.637	0.031	375.4	0.045	0.00	0.0	0.600	o	450	Pipe/Conduit	
6.006	14.579	0.039	373.8	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
8.000	15.857	0.032	495.5	0.000	4.00	0.0	0.600	o	600	Pipe/Conduit	
1.011	8.555	0.017	503.2	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.012	8.555	0.017	503.2	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
9.000	23.720	0.158	150.1	0.037	4.00	0.0	0.600	o	225	Pipe/Conduit	
1.013	38.265	0.077	496.9	0.075	0.00	0.0	0.600	o	600	Pipe/Conduit	
10.000	14.327	0.029	494.0	0.000	4.00	0.0	0.600	o	600	Pipe/Conduit	
1.014	42.593	0.085	501.1	0.098	0.00	0.0	0.600	o	600	Pipe/Conduit	
11.000	25.320	0.113	224.1	0.040	4.00	0.0	0.600	o	300	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)
6.003	50.00	5.62	66.474	0.212	0.0	0.0	0.0	1.04	114.8	36.4
7.000	50.00	4.30	66.722	0.036	0.0	0.0	0.0	1.06	42.3	6.2
6.004	50.00	5.77	66.368	0.248	0.0	0.0	0.0	1.04	164.7	42.5
6.005	50.00	5.96	66.343	0.293	0.0	0.0	0.0	1.04	165.9	50.3
6.006	50.00	6.19	66.312	0.293	0.0	0.0	0.0	1.05	166.3	50.3
8.000	50.00	4.24	66.155	0.000	0.0	0.0	0.0	1.09	307.4	0.0
1.011	50.00	7.94	66.123	0.873	0.0	0.0	0.0	1.08	305.0	149.7
1.012	50.00	8.07	66.106	0.873	0.0	0.0	0.0	1.08	305.0	149.7
9.000	50.00	4.37	66.561	0.037	0.0	0.0	0.0	1.06	42.3	6.3
1.013	50.00	8.66	66.028	0.985	0.0	0.0	0.0	1.09	306.9	168.9
10.000	50.00	4.22	65.975	0.000	0.0	0.0	0.0	1.09	307.8	0.0
1.014	50.00	9.32	65.946	1.083	0.0	0.0	0.0	1.08	305.6	185.8
11.000	50.00	4.40	66.274	0.040	0.0	0.0	0.0	1.05	74.0	6.9

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West (100+CC)
C-15114
Gavray Drive, Bicester



Date 14/03/2022
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Network Design Table for West

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
12.000	30.020	0.133	225.7	0.058	4.00	0.0	0.600	o	300	Pipe/Conduit	
1.015	40.890	0.082	498.7	0.127	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.016	24.630	0.049	502.7	0.033	0.00	0.0	0.600	o	600	Pipe/Conduit	
13.000	49.148	0.164	299.7	0.144	4.00	0.0	0.600	o	375	Pipe/Conduit	
13.001	18.209	0.061	298.5	0.134	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.017	19.751	0.040	493.8	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.018	7.112	0.014	508.0	0.070	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.019	10.811	0.022	491.4	0.038	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.020	39.564	0.079	500.8	0.025	0.00	0.0	0.600	o	600	Pipe/Conduit	
14.000	79.264	0.352	225.2	0.142	4.00	0.0	0.600	o	300	Pipe/Conduit	
14.001	59.312	0.264	224.7	0.123	0.00	0.0	0.600	o	450	Pipe/Conduit	
14.002	35.112	0.156	225.1	0.102	0.00	0.0	0.600	o	600	Pipe/Conduit	
15.000	8.763	0.023	381.0	0.044	4.00	0.0	0.600	o	450	Pipe/Conduit	
15.001	46.357	0.124	373.8	0.074	0.00	0.0	0.600	o	450	Pipe/Conduit	
15.002	55.385	0.148	374.2	0.000	0.00	0.0	0.600	o	600	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)
12.000	50.00	4.48	66.294	0.058	0.0	0.0	0.0	1.04	73.7	9.9
1.015	50.00	9.95	65.861	1.308	0.0	0.0	0.0	1.08	306.4	224.4
1.016	50.00	10.33	65.779	1.341	0.0	0.0	0.0	1.08	305.2	230.0
13.000	50.00	4.79	66.180	0.144	0.0	0.0	0.0	1.04	115.0	24.7
13.001	50.00	5.08	66.016	0.278	0.0	0.0	0.0	1.04	115.2	47.7
1.017	50.00	10.63	65.730	1.619	0.0	0.0	0.0	1.09	307.9	277.7
1.018	50.00	10.74	65.690	1.689	0.0	0.0	0.0	1.07	303.5	289.7
1.019	50.00	10.90	65.676	1.727	0.0	0.0	0.0	1.09	308.7	296.2
1.020	50.00	11.51	65.654	1.752	0.0	0.0	0.0	1.08	305.7	300.5
14.000	50.00	5.27	66.647	0.142	0.0	0.0	0.0	1.04	73.8	24.4
14.001	50.00	6.00	66.295	0.265	0.0	0.0	0.0	1.35	215.1	45.5
14.002	50.00	6.36	66.031	0.367	0.0	0.0	0.0	1.62	457.8	62.9
15.000	50.00	4.14	66.020	0.044	0.0	0.0	0.0	1.04	164.7	7.5
15.001	50.00	4.88	65.997	0.118	0.0	0.0	0.0	1.05	166.3	20.2
15.002	50.00	5.62	65.873	0.118	0.0	0.0	0.0	1.25	354.2	20.2

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West (100+CC)
C-15114
Gavray Drive, Bicester



Date 14/03/2022

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Network Design Table for West


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
1.021	12.617	0.025	504.7	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	🔴
1.022	21.975	0.220	99.9	0.000	0.00	0.0	0.600	o	150	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)
1.021	50.00	11.71	65.575	2.237	0.0	0.0	0.0	1.08	304.5«	383.7
1.022	50.00	12.07	65.550	2.237	0.0	0.0	0.0	1.01	17.8«	383.7

Free Flowing Outfall Details for West

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.022	Outfall	67.500	65.330	0.000	0	0

Hydrock Consultants Ltd		Page 6
.	West (100+CC)	
.	C-15114	
.	Gavray Drive, Bicester	
Date 14/03/2022	Designed by JAC	
File WEST.MDX	Checked by	
Innovyze	Network 2020.1.3	

Online Controls for West

Orifice Manhole: 1.5 Control, DS/PN: 1.005, Volume (m³): 6.1

Diameter (m) 0.080 Discharge Coefficient 0.600 Invert Level (m) 66.357

Orifice Manhole: 1.12 Control, DS/PN: 1.012, Volume (m³): 7.8

Diameter (m) 0.080 Discharge Coefficient 0.600 Invert Level (m) 66.106

Orifice Manhole: 1.14 Control, DS/PN: 1.014, Volume (m³): 19.2

Diameter (m) 0.080 Discharge Coefficient 0.600 Invert Level (m) 65.946

Hydro-Brake® Optimum Manhole: 1.22 Control, DS/PN: 1.022, Volume (m³): 7.4

Unit Reference	MD-SHE-0050-1700-2400-1700
Design Head (m)	2.400
Design Flow (l/s)	1.7
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	50
Invert Level (m)	65.550
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.400	1.7
Flush-Flo™	0.219	1.0
Kick-Flo®	0.448	0.8
Mean Flow over Head Range	-	1.2

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	0.9	1.200	1.2	3.000	1.9	7.000	2.8
0.200	1.0	1.400	1.3	3.500	2.0	7.500	2.9
0.300	1.0	1.600	1.4	4.000	2.1	8.000	3.0
0.400	0.9	1.800	1.5	4.500	2.3	8.500	3.0
0.500	0.8	2.000	1.6	5.000	2.4	9.000	3.1
0.600	0.9	2.200	1.6	5.500	2.5	9.500	3.2
0.800	1.0	2.400	1.7	6.000	2.6		
1.000	1.1	2.600	1.8	6.500	2.7		

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Storage Structures for West

Tank or Pond Manhole: 3.0 Basin 1, DS/PN: 3.000

Invert Level (m) 68.000

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	119.8	0.400	346.4	0.800	603.8	1.001	0.0
0.200	224.3	0.600	473.1	1.000	738.5		

Tank or Pond Manhole: 8.0 Basin 2, DS/PN: 8.000

Invert Level (m) 66.900

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	64.0	0.600	321.2	1.200	710.4	1.601	0.0
0.200	137.2	0.800	437.9	1.400	854.9		
0.400	221.6	1.000	570.0	1.600	1003.4		

Tank or Pond Manhole: 10.0 Basin 3, DS/PN: 10.000

Invert Level (m) 66.400

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	141.1	0.600	424.5	1.200	745.5	1.601	0.0
0.200	231.2	0.800	527.3	1.400	860.6		
0.400	325.8	1.000	634.4	1.600	979.7		

Cellular Storage Manhole: 15.2 Tank, DS/PN: 15.002

Invert Level (m) 65.873 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 ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	700.0	0.0	1.001	0.0	0.0
1.000	700.0	0.0			

Tank or Pond Manhole: 1.21 Basin 4, DS/PN: 1.021

Invert Level (m) 66.300

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	525.9	0.600	766.2	1.200	1042.9
0.200	601.9	0.800	854.4	1.400	1143.2
0.400	682.0	1.000	946.7	1.401	0.0

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West (100+CC)
C-15114
Gavray Drive, Bicester



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Innovyze Network 2020.1.3

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for West

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/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 5
Number of Online Controls 4 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 1999
Site Location GB 459350 222000 SP 59350 22000
C (1km) -0.022
D1 (1km) 0.323
D2 (1km) 0.315
D3 (1km) 0.249
E (1km) 0.289
F (1km) 2.478
Cv (Summer) 0.750
Cv (Winter) 0.950

Margin for Flood Risk Warning (mm) 300.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status ON
DVD Status ON
Inertia 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) 100
Climate Change (%) 40

WARNING: Half Drain Time has not been calculated as the structure is too full.

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
1.000	1.0	15 Winter	100	+40%	100/15 Summer		
1.001	1.1	15 Winter	100	+40%	100/15 Summer	100/15 Summer	
1.002	1.2	15 Winter	100	+40%	100/15 Summer		
2.000	2.0	15 Winter	100	+40%	100/15 Summer	100/15 Winter	
1.003	1.3	15 Winter	100	+40%	100/15 Summer		
3.000	3.0 Basin 1	180 Winter	100	+40%	100/15 Summer		

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for West

PN	US/MH Name	Overflow Act.	Water Surcharged Flooded			Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)
			Level (m)	Depth (m)	Volume (m³)			
1.000	1.0		69.061	1.397	0.000	0.61		24.7
1.001	1.1		68.856	1.548	3.066	1.20		46.0
1.002	1.2		69.047	1.881	0.000	1.12		41.0
2.000	2.0		69.193	1.990	0.273	1.56		103.6
1.003	1.3		68.863	1.783	0.000	1.47		151.1
3.000	3.0 Basin 1		68.485	1.445	0.000	0.07		17.7

PN	US/MH Name	Status	Level Exceeded
1.000	1.0	FLOOD RISK	
1.001	1.1	FLOOD	3
1.002	1.2	FLOOD RISK	
2.000	2.0	FLOOD	1
1.003	1.3	FLOOD RISK	
3.000	3.0 Basin 1	SURCHARGED	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for West

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
1.004	1.4	30	Winter	100	+40%	100/15 Summer	
1.005	1.5 Control	15	Winter	100	+40%	100/15 Summer	100/15 Winter
4.000	4.0	180	Winter	100	+40%	100/15 Summer	
1.006	1.6	180	Winter	100	+40%	100/15 Summer	
1.007	1.7	180	Winter	100	+40%	100/15 Summer	
1.008	1.8	180	Winter	100	+40%	100/15 Summer	
5.000	5.0	180	Winter	100	+40%	100/15 Summer	
1.009	1.9	180	Winter	100	+40%	100/15 Summer	
1.010	1.10	180	Winter	100	+40%	100/15 Summer	
6.000	6.0	180	Winter	100	+40%	100/15 Summer	
6.001	6.1	180	Winter	100	+40%	100/15 Summer	
6.002	6.2	180	Winter	100	+40%	100/15 Summer	
6.003	6.3	180	Winter	100	+40%	100/15 Summer	
7.000	7.0	180	Winter	100	+40%	100/15 Summer	
6.004	6.4	180	Winter	100	+40%	100/15 Summer	
6.005	6.5	180	Winter	100	+40%	100/15 Summer	
6.006	6.6	180	Winter	100	+40%	100/15 Summer	
8.000	8.0 Basin 2	600	Winter	100	+40%	100/15 Summer	
1.011	1.11	180	Winter	100	+40%	100/15 Summer	
1.012	1.12 Control	180	Winter	100	+40%	100/15 Summer	100/180 Winter
9.000	9.0	7200	Winter	100	+40%	100/15 Summer	
1.013	1.13	7200	Winter	100	+40%	100/15 Summer	
10.000	10.0 Basin 3	7200	Winter	100	+40%	100/15 Summer	
1.014	1.14 Control	7200	Winter	100	+40%	100/15 Summer	
11.000	11.0	5760	Winter	100	+40%	100/15 Summer	
12.000	12.0	5760	Winter	100	+40%	100/15 Summer	
1.015	1.15	5760	Winter	100	+40%	100/15 Summer	
1.016	1.16	5760	Winter	100	+40%	100/15 Summer	
13.000	13.0	15	Winter	100	+40%	100/15 Summer	
13.001	13.1	15	Winter	100	+40%	100/15 Summer	
1.017	1.17	5760	Winter	100	+40%	100/15 Summer	
1.018	1.18	5760	Winter	100	+40%	100/15 Summer	
1.019	1.19	5760	Winter	100	+40%	100/15 Summer	
1.020	1.20	5760	Winter	100	+40%	100/15 Summer	
14.000	14.0	15	Winter	100	+40%	100/15 Summer	
14.001	14.1	5760	Winter	100	+40%	100/15 Summer	
14.002	14.2	5760	Winter	100	+40%	100/15 Summer	
15.000	15.0	5760	Winter	100	+40%	100/60 Winter	
15.001	15.1	5760	Winter	100	+40%	100/30 Winter	
15.002	15.2 Tank	5760	Winter	100	+40%	100/60 Winter	
1.021	1.21 Basin 4	5760	Winter	100	+40%	100/15 Summer	
1.022	1.22 Control	5760	Winter	100	+40%	100/15 Summer	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for West

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)
1.004		1.4	68.779	1.807	0.000	0.22		39.6
1.005	1.5 Control		68.859	1.902	0.436	0.06		11.1
4.000		4.0	68.499	1.329	0.000	0.29		20.3
1.006		1.6	68.455	1.512	0.000	0.11		29.2
1.007		1.7	68.436	1.581	0.000	0.15		31.4
1.008		1.8	68.386	1.542	0.000	0.28		43.3
5.000		5.0	68.368	1.377	0.000	0.22		8.6
1.009		1.9	68.398	1.575	0.000	0.18		44.4
1.010		1.10	68.393	1.630	0.000	0.26		53.8
6.000		6.0	68.558	1.404	0.000	0.16		17.1
6.001		6.1	68.543	1.563	0.000	0.28		27.9
6.002		6.2	68.505	1.610	0.000	0.39		35.1
6.003		6.3	68.427	1.578	0.000	0.49		41.0
7.000		7.0	68.401	1.454	0.000	0.26		9.8
6.004		6.4	68.367	1.549	0.000	0.50		50.6
6.005		6.5	68.377	1.584	0.000	0.55		58.7
6.006		6.6	68.347	1.585	0.000	0.45		51.2
8.000	8.0 Basin 2		68.022	1.267	0.000	0.09		16.3
1.011		1.11	68.346	1.623	0.000	0.46		76.7
1.012	1.12 Control		68.417	1.711	0.351	0.08		12.5
9.000		9.0	67.814	1.028	0.000	0.03		1.3
1.013		1.13	67.822	1.194	0.000	0.03		7.5
10.000	10.0 Basin 3		67.774	1.199	0.000	0.03		4.8
1.014	1.14 Control		67.820	1.274	0.000	0.01		3.7
11.000		11.0	67.741	1.167	0.000	0.01		0.4
12.000		12.0	67.741	1.147	0.000	0.01		0.6
1.015		1.15	67.741	1.280	0.000	0.03		6.6
1.016		1.16	67.741	1.362	0.000	0.03		6.9
13.000		13.0	68.115	1.560	0.000	1.20		127.7
13.001		13.1	67.900	1.509	0.000	2.57		245.0
1.017		1.17	67.741	1.411	0.000	0.05		10.0
1.018		1.18	67.741	1.451	0.000	0.06		10.8
1.019		1.19	67.741	1.465	0.000	0.07		11.2
1.020		1.20	67.741	1.487	0.000	0.04		11.5
14.000		14.0	68.259	1.312	0.000	1.82		129.3
14.001		14.1	67.741	0.996	0.000	0.01		3.0
14.002		14.2	67.741	1.110	0.000	0.01		4.1
15.000		15.0	67.741	1.271	0.000	0.00		0.5
15.001		15.1	67.741	1.294	0.000	0.01		1.3
15.002	15.2 Tank		67.741	1.268	0.000	0.00		1.2
1.021	1.21 Basin 4		67.741	1.566	0.000	0.03		4.2
1.022	1.22 Control		67.741	2.041	0.000	0.10		1.6

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for West

PN	US/MH Name	Status	Level Exceeded
1.004	1.4	FLOOD RISK	
1.005	1.5 Control	FLOOD	1
4.000	4.0	SURCHARGED	
1.006	1.6	SURCHARGED	
1.007	1.7	FLOOD RISK	
1.008	1.8	SURCHARGED	
5.000	5.0	SURCHARGED	
1.009	1.9	SURCHARGED	
1.010	1.10	FLOOD RISK	
6.000	6.0	FLOOD RISK	
6.001	6.1	FLOOD RISK	
6.002	6.2	FLOOD RISK	
6.003	6.3	FLOOD RISK	
7.000	7.0	FLOOD RISK	
6.004	6.4	FLOOD RISK	
6.005	6.5	FLOOD RISK	
6.006	6.6	FLOOD RISK	
8.000	8.0 Basin 2	SURCHARGED	
1.011	1.11	FLOOD RISK	
1.012	1.12 Control	FLOOD	2
9.000	9.0	SURCHARGED	
1.013	1.13	SURCHARGED	
10.000	10.0 Basin 3	FLOOD RISK	
1.014	1.14 Control	FLOOD RISK	
11.000	11.0	SURCHARGED	
12.000	12.0	FLOOD RISK	
1.015	1.15	SURCHARGED	
1.016	1.16	SURCHARGED	
13.000	13.0	SURCHARGED	
13.001	13.1	SURCHARGED	
1.017	1.17	SURCHARGED	
1.018	1.18	FLOOD RISK	
1.019	1.19	FLOOD RISK	
1.020	1.20	FLOOD RISK	
14.000	14.0	SURCHARGED	
14.001	14.1	SURCHARGED	
14.002	14.2	FLOOD RISK	
15.000	15.0	FLOOD RISK	
15.001	15.1	FLOOD RISK	
15.002	15.2 Tank	FLOOD RISK	
1.021	1.21 Basin 4	SURCHARGED	
1.022	1.22 Control	FLOOD RISK	

Asset location search



Property Searches

Hydrock Consultants
Over Court Barns Almondsbury, Over Court Barns

BRISTOL
BS32 4DF

Search address supplied 1
Heron Court
Bicester
OX26 6XU

Your reference 15114 Gavray Drive

Our reference ALS/ALS Standard/2020_4238759

Search date 20 August 2020

Knowledge of features below the surface is essential for every development

The benefits of this knowledge not only include ensuring due diligence and avoiding risk, but also being able to ascertain the feasibility of any development.

Did you know that Thames Water Property Searches can also provide a variety of utility searches including a more comprehensive view of utility providers' assets (across up to 35-45 different providers), as well as more focused searches relating to specific major utility companies such as National Grid (gas and electric).

Contact us to find out more.



Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW
DX 151280 Slough 13



searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk



0845 070 9148

Search address supplied: 1, Heron Court, Bicester, OX26 6XU

Dear Sir / Madam

An Asset Location Search is recommended when undertaking a site development. It is essential to obtain information on the size and location of clean water and sewerage assets to safeguard against expensive damage and allow cost-effective service design.

The following records were searched in compiling this report: - the map of public sewers & the map of waterworks. Thames Water Utilities Ltd (TWUL) holds all of these.

This search provides maps showing the position, size of Thames Water assets close to the proposed development and also manhole cover and invert levels, where available.

Please note that none of the charges made for this report relate to the provision of Ordnance Survey mapping information. The replies contained in this letter are given following inspection of the public service records available to this company. No responsibility can be accepted for any error or omission in the replies.

You should be aware that the information contained on these plans is current only on the day that the plans are issued. The plans should only be used for the duration of the work that is being carried out at the present time. Under no circumstances should this data be copied or transmitted to parties other than those for whom the current work is being carried out.

Thames Water do update these service plans on a regular basis and failure to observe the above conditions could lead to damage arising to new or diverted services at a later date.

Contact Us

If you have any further queries regarding this enquiry please feel free to contact a member of the team on 0845 070 9148, or use the address below:

Thames Water Utilities Ltd
Property Searches
PO Box 3189
Slough
SL1 4WW

Email: searches@thameswater.co.uk

Web: www.thameswater-propertysearches.co.uk

Waste Water Services

Please provide a copy extract from the public sewer map.

The following quartiles have been printed as they fall within Thames' sewerage area:

SP6021NW
SP5922SE
SP5921NE
SP6022SW

Enclosed is a map showing the approximate lines of our sewers. Our plans do not show sewer connections from individual properties or any sewers not owned by Thames Water unless specifically annotated otherwise. Records such as "private" pipework are in some cases available from the Building Control Department of the relevant Local Authority.

Where the Local Authority does not hold such plans it might be advisable to consult the property deeds for the site or contact neighbouring landowners.

This report relates only to sewerage apparatus of Thames Water Utilities Ltd, it does not disclose details of cables and or communications equipment that may be running through or around such apparatus.

The sewer level information contained in this response represents all of the level data available in our existing records. Should you require any further Information, please refer to the relevant section within the 'Further Contacts' page found later in this document.

For your guidance:

- The Company is not generally responsible for rivers, watercourses, ponds, culverts or highway drains. If any of these are shown on the copy extract they are shown for information only.
- Any private sewers or lateral drains which are indicated on the extract of the public sewer map as being subject to an agreement under Section 104 of the Water Industry Act 1991 are not an 'as constructed' record. It is recommended these details be checked with the developer.

Clean Water Services

Please provide a copy extract from the public water main map.

The following quartiles have been printed as they fall within Thames' water area:

SP5922SE
SP5921NE

SP6022SW

Enclosed is a map showing the approximate positions of our water mains and associated apparatus. Please note that records are not kept of the positions of individual domestic supplies.

For your information, there will be a pressure of at least 10m head at the outside stop valve. If you would like to know the static pressure, please contact our Customer Centre on 0800 316 9800. The Customer Centre can also arrange for a full flow and pressure test to be carried out for a fee.

The following quartiles have not been printed as they contain no assets:

SP6021NW

For your guidance:

- Assets other than vested water mains may be shown on the plan, for information only.
- If an extract of the public water main record is enclosed, this will show known public water mains in the vicinity of the property. It should be possible to estimate the likely length and route of any private water supply pipe connecting the property to the public water network.

Payment for this Search

A charge will be added to your suppliers account.

Further contacts:

Waste Water queries

Should you require verification of the invert levels of public sewers, by site measurement, you will need to approach the relevant Thames Water Area Network Office for permission to lift the appropriate covers. This permission will usually involve you completing a TWOSA form. For further information please contact our Customer Centre on Tel: 0845 920 0800. Alternatively, a survey can be arranged, for a fee, through our Customer Centre on the above number.

If you have any questions regarding sewer connections, budget estimates, diversions, building over issues or any other questions regarding operational issues please direct them to our service desk. Which can be contacted by writing to:

Developer Services (Waste Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

Clean Water queries

Should you require any advice concerning clean water operational issues or clean water connections, please contact:

Developer Services (Clean Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk



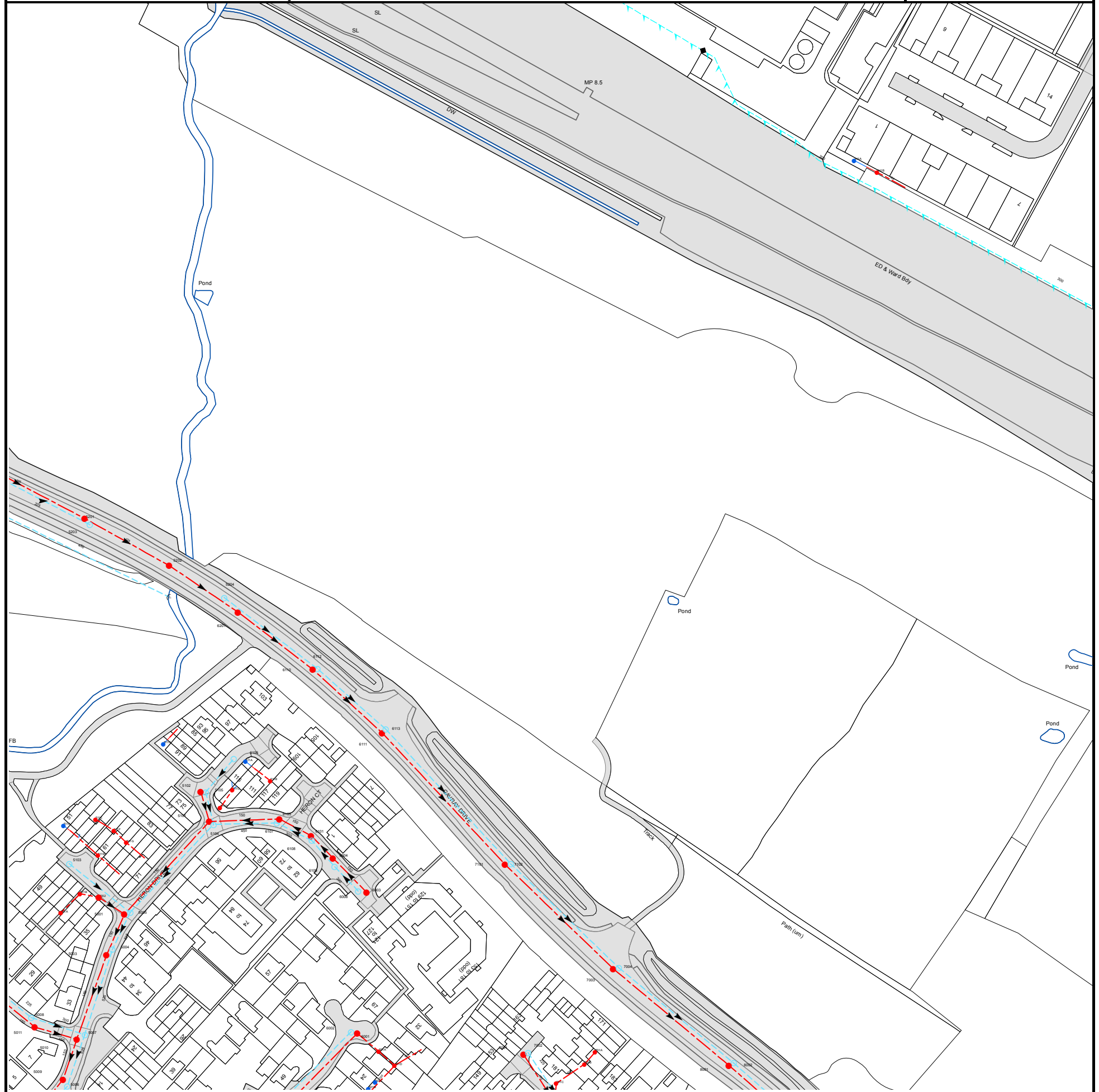
The width of the displayed area is 500m and the centre of the map is located at OS coordinates 460250,221750
The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Based on the Ordnance Survey Map with the Sanction of the controller of H.M. Stationery Office, License no. 100019345 Crown Copyright Reserved.

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
0801	65.31	60.61
0802	65.5	62.58
0902	n/a	n/a
0906	n/a	n/a
0901	n/a	n/a
0905	n/a	n/a
0903	n/a	n/a
0904	n/a	n/a

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.



The width of the displayed area is 500m and the centre of the map is located at OS coordinates 459750,222250
The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Based on the Ordnance Survey Map with the Sanction of the controller of H.M. Stationery Office, License no. 100019345 Crown Copyright Reserved.

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
841B	n/a	n/a
841A	n/a	n/a
6004	67.55	64.97
6109	67.55	65.62
6002	67.29	65.57
6001	67.29	65.3
6008	67.46	65.73
6003	67.5	65.13
601A	n/a	n/a
6111	n/a	n/a
6113	n/a	n/a
7101	n/a	n/a
7102	n/a	n/a
7002	66.89	65.41
701A	n/a	n/a
7003	n/a	n/a
7004	n/a	n/a
501A	n/a	n/a
511A	n/a	n/a
5103	66.94	65.33
501B	n/a	n/a
511E	n/a	n/a
511B	n/a	n/a
5002	67.24	64.48
5003	67.29	63.99
5004	67.3	64.88
511F	n/a	n/a
5001	67.36	64.13
511G	n/a	n/a
5005	67.41	64.95
511H	n/a	n/a
5102	67.02	64.94
5105	67.07	65.37
5101	67.26	64.54
5104	67.33	65.13
611D	n/a	n/a
611C	n/a	n/a
6106	67.25	65.79
611A	n/a	n/a
611B	n/a	n/a
6107	67.5	65.25
6105	67.39	64.7
6101	67.59	64.87
6108	67.61	65.46
5201	67.92	63.15
5203	68.14	66.51
5202	n/a	n/a
5204	n/a	n/a
6201	n/a	n/a
6110	67.53	62.56
6112	n/a	n/a
701C	n/a	n/a
701B	n/a	n/a
8001	66.7	61.5
8002	n/a	n/a
601B	n/a	n/a
601C	n/a	n/a
601D	n/a	n/a
7001	66.9	64.96
5006	67.29	64.71
5009	67.25	63.35
5010	67.2	63.56
5007	67.21	64.78
5011	67.33	64.39
5008	67.34	65.08

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The width of the displayed area is 500m and the centre of the map is located at OS coordinates 459750,221750

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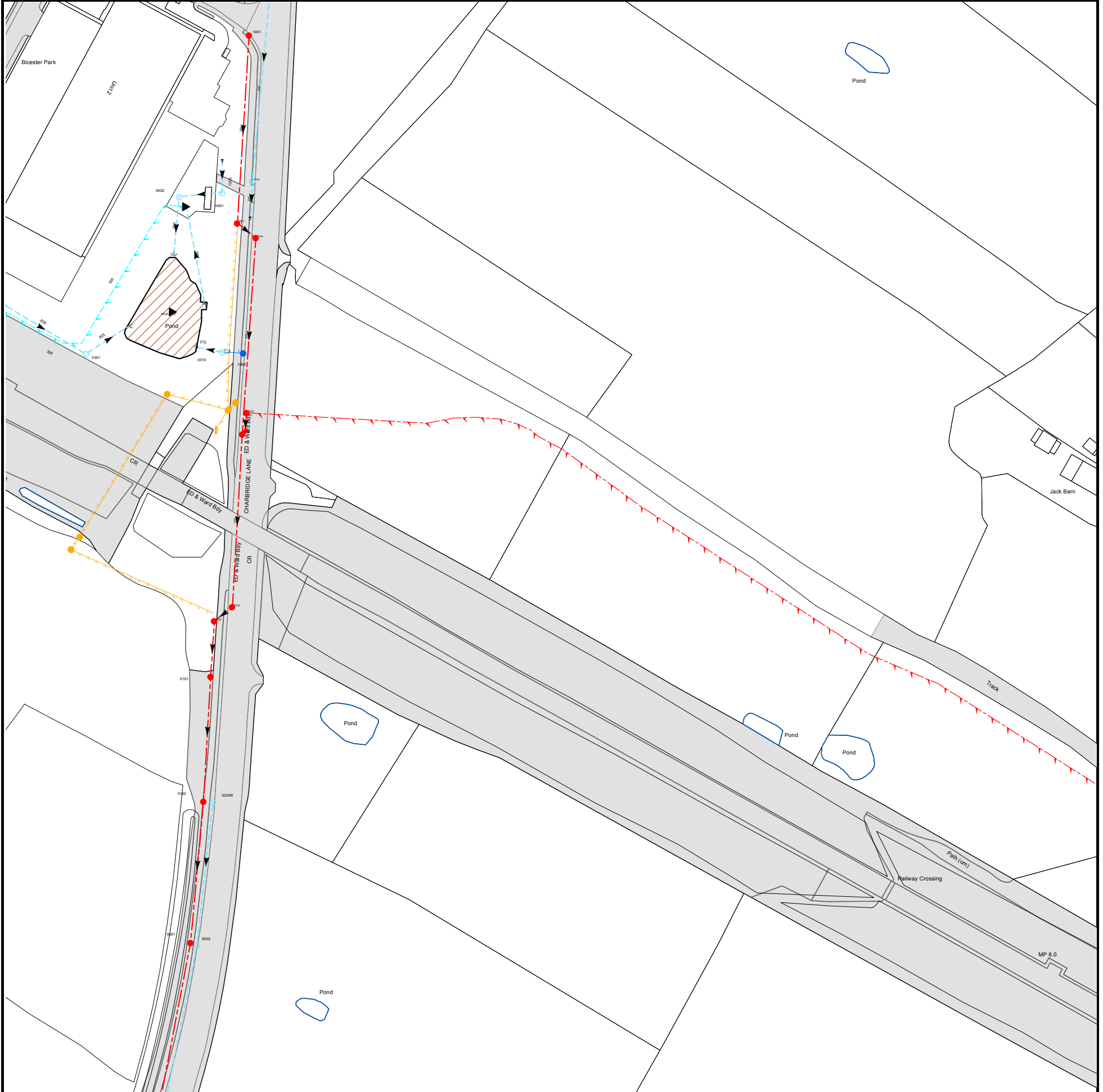
NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
8802	65.17	62.6
8905	66.19	64.23
8807	65.18	63.68
8804	65.01	61.93
8803	65.07	62.41
8808	65.05	63.64
8809	64.96	63.43
9804	64.86	62.16
9808	64.87	63.56
9809	64.91	63.36
9805	64.84	61.63
9902	n/a	n/a
9903	65.5	63.9
9806	64.58	61.23
9810	64.59	63.27
9801	n/a	n/a
9802	65.34	52.69
9807	64.9	60.42
9803	n/a	n/a
7715	n/a	n/a
8710	64.85	63.22
8704	64.92	61.59
871A	n/a	n/a
871C	n/a	n/a
871B	n/a	n/a
871I	n/a	n/a
8711	64.9	63.13
8705	64.91	61.25
871H	n/a	n/a
8603	n/a	n/a
871G	n/a	n/a
8706	64.79	62.39
8806	64.8	63.43
8707	64.62	60.75
8712	64.62	63.01
871K	n/a	n/a
871D	n/a	n/a
871J	n/a	n/a
871E	n/a	n/a
871F	n/a	n/a
8709	64.47	59.95
8713	64.71	63.34
8708	64.69	62.04
8999	64.3	62.19
9799	64.34	62.21
9702	64.42	62.27
9703	64.54	60.22
9701	64.48	62.31
7905	66.74	65.22
781A	n/a	n/a
7812	65.85	63.95
7811	65.86	61.71
7903	66.51	63.97
7907	66.39	64.87
7902	66.45	64.1
7906	66.48	64.97
7908	66.26	64.71
7904	66.31	63.66
791A	n/a	n/a
87810	65.25	62.81
87809	65.26	63.69
891A	n/a	n/a
8901	66	63.4
8903	66.01	64.57
8904	66.12	64.39
8902	66.07	62.97
8906	65.35	62.86
8907	65.35	63.82
8810	65.14	63.65
8805	65.12	62.68
9901	n/a	n/a
6613	64.95	61.16
6616	64.95	62.05
6617	64.92	62.29
6614	64.92	62.75
7711	65.11	63.49
7714	65.04	63.14
7708	65.49	63.4
7706	65.51	60.66
7705	65.65	60.78
7707	65.64	63.45
7712	64.81	62.59
7709	64.78	62.91
7713	64.81	62.87
7710	64.84	63.28
7604	64.72	63.25
7605	64.79	62.88
771A	n/a	n/a
771B	n/a	n/a
781C	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
761A	n/a	n/a
781B	n/a	n/a
7703	65.02	63.46
7716	n/a	n/a
7701	65.05	62.25
7609	64.95	58.34
7704	65.06	63.4
7702	65.07	61.99
6806	65.87	64.29
6802	65.86	63.9
6801	65.46	63.14
6805	65.45	64.1
6807	65.55	63.99
6803	65.54	62.82
6908	66.39	64.47
6906	66.38	63.87
691A	n/a	n/a
6804	65.75	62.49
6905	66.12	63.79
6907	66.12	64.34
6808	65.73	63.86
7909	65.93	63.42
7801	65.29	62.03
7803	65.33	63.75
7911	65.95	64.16
7813	65.63	61.34
7804	65.67	63.63
7802	65.64	61.09
7910	66.28	64.1
7912	66.33	64.39
7901	66.7	64.52
551B	n/a	n/a
5604	64.79	63.33
561J	n/a	n/a
561I	n/a	n/a
6618	n/a	n/a
6619	n/a	n/a
661A	n/a	n/a
6610	64.89	63.65
6608	64.87	63.36
5709	n/a	n/a
671C	n/a	n/a
6702	n/a	n/a
671B	n/a	n/a
6701	n/a	n/a
5706	65.4	63.56
571D	n/a	n/a
6704	65.49	63.93
6707	65.55	64.35
571C	n/a	n/a
571B	n/a	n/a
6703	65.74	63.34
6706	65.71	64.18
6705	65.78	64.06
671A	n/a	n/a
571A	n/a	n/a
6812	n/a	n/a
681A	n/a	n/a
6811	n/a	n/a
6809	n/a	n/a
6810	n/a	n/a
581A	n/a	n/a
5801	67.43	61
5802	67.43	63.92
5901	66.8	61.3
691D	n/a	n/a
5904	66.8	63.48
691B	n/a	n/a
691C	n/a	n/a
5916	n/a	n/a
5914	n/a	n/a
591B	n/a	n/a
5902	66.88	64.04
5903	66.88	64.66
591C	n/a	n/a
5906	n/a	n/a
5912	n/a	n/a
5905	67.01	65.58
5911	n/a	n/a
591A	n/a	n/a
5907	67.46	64.66
5915	n/a	n/a
5917	n/a	n/a
6901	67.05	64.45
6904	67.05	64.93
5918	67.36	64.63
5920	67.31	62.98
6902	67.25	64.76
6903	67.25	65.2
561G	n/a	n/a
561H	n/a	n/a
561E	n/a	n/a
561C	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
5607	n/a	n/a
561D	n/a	n/a
561B	n/a	n/a
5710	n/a	n/a
5708	65.58	64.15
5711	65.55	63.45
571E	n/a	n/a
5707	65.39	64.28
5702	65.68	64.72
5705	65.84	63.8
5704	65.84	64.47
5703	66.01	64.61
5701	66.1	64.02
5803	65.62	64.78
5504	65.34	62.3
5508	65.12	62.97
5503	64.93	62.71
5506	64.88	62.63
5502	65.01	62.87
551A	n/a	n/a
5505	65	62.77
561A	n/a	n/a
5501	65.24	63.16
5606	65.23	63.03
5605	65.09	63.33
561F	n/a	n/a
5507	64.83	62.57
505	64.71	62.36
6501	64.51	63
6503	64.49	63.19
6502	64.68	62.74
6504	64.66	63.19
6603	64.65	62.16
6606	64.66	63.03
5602	n/a	n/a
5601	n/a	n/a
6611	64.15	60.71
7606	64.76	61.07
7610	n/a	n/a
6601	64.92	62.61
7607	64.73	61.38
6612	64.6	60.92
6604	64.94	63.07
6602	64.74	61.81
6615	64.65	61.84
6605	64.72	62.72
761B	n/a	n/a
6609	64.91	61.44
5603	64.82	62.84
6607	64.9	62.35

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The width of the displayed area is 500m and the centre of the map is located at OS coordinates 460250,222250

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Manhole Reference	Manhole Cover Level	Manhole Invert Level
1306	n/a	n/a
0310	n/a	64.2
131A	66.38	62.44
1301	66.48	62.48
0402	n/a	62.93
0401	n/a	64
141A	n/a	n/a
1401	n/a	n/a
0301	n/a	64
0001	n/a	n/a
0002	n/a	n/a
0102	n/a	61.59
0101	n/a	61.71
0204B	n/a	n/a
0203	65.98	61.71
121A	65.88	61.8
131B	66.05	62.11
131C	66.18	64

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ALS Sewer Map Key

Public Sewer Types (Operated & Maintained by Thames Water)

-  **Foul:** A sewer designed to convey waste water from domestic and industrial sources to a treatment works.
-  **Surface Water:** A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.
-  **Combined:** A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.
-  **Trunk Surface Water**
-  **Trunk Foul**
-  **Storm Relief**
-  **Trunk Combined**
-  **Vent Pipe**
-  **Bio-solids (Sludge)**
-  **Proposed Thames Surface Water Sewer**
-  **Proposed Thames Water Foul Sewer**
-  **Gallery**
-  **Foul Rising Main**
-  **Surface Water Rising Main**
-  **Combined Rising Main**
-  **Sludge Rising Main**
-  **Proposed Thames Water Rising Main**
-  **Vacuum**





Sewer Fittings

A feature in a sewer that does not affect the flow in the pipe. Example: a vent is a fitting as the function of a vent is to release excess gas.

-  Air Valve
-  Dam Chase
-  Fitting
-  Meter
-  Vent Column




Operational Controls

A feature in a sewer that changes or diverts the flow in the sewer. Example: A hydrobrake limits the flow passing downstream.

-  Control Valve
-  Drop Pipe
-  Ancillary
-  Weir






End Items

End symbols appear at the start or end of a sewer pipe. Examples: an Undefined End at the start of a sewer indicates that Thames Water has no knowledge of the position of the sewer upstream of that symbol, Outfall on a surface water sewer indicates that the pipe discharges into a stream or river.

-  Outfall
-  Undefined End
-  Inlet






Other Symbols

Symbols used on maps which do not fall under other general categories








-  /  Public/Private Pumping Station
-  Change of characteristic indicator (C.O.C.I.)
-  Invert Level
-  Summit

Areas

Lines denoting areas of underground surveys, etc.

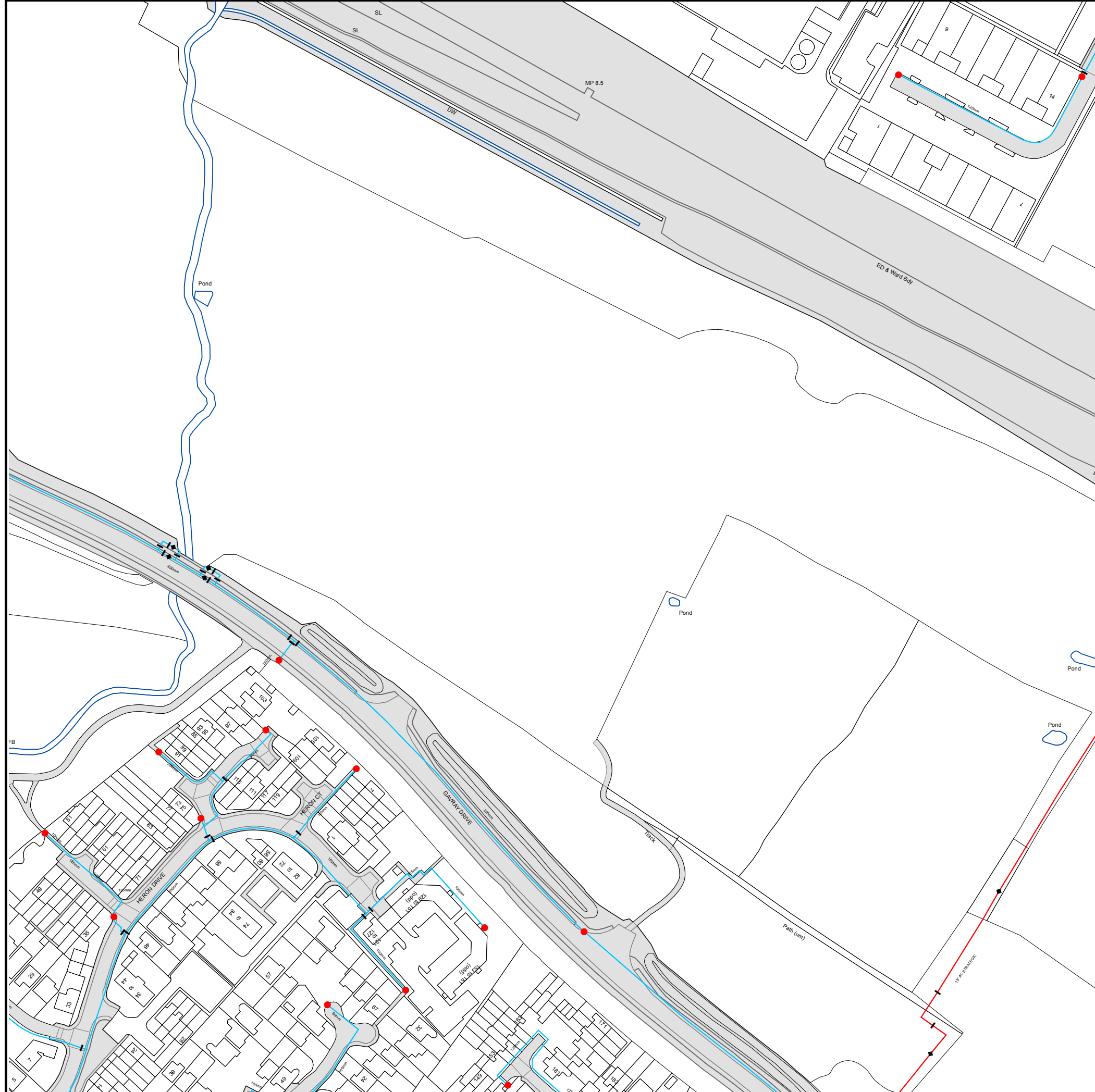
-  Agreement
-  Operational Site
-  Chamber
-  Tunnel
-  Conduit Bridge

Other Sewer Types (Not Operated or Maintained by Thames Water)

-  Foul Sewer
-  Surface Water Sewer
-  Combined Sewer
-  Gully
-  Culverted Watercourse
-  Proposed
-  Abandoned Sewer

Notes:

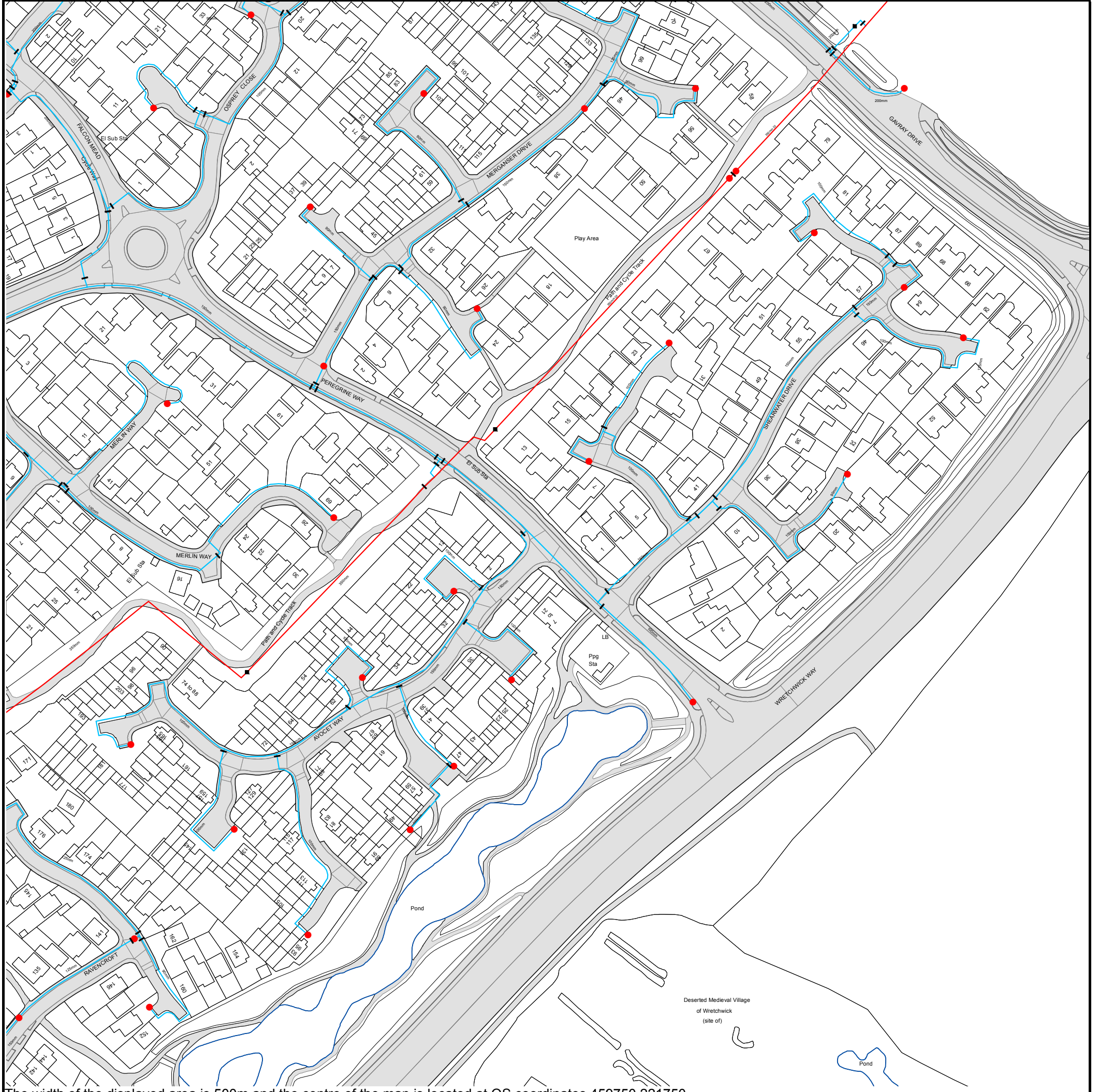
- 1) All levels associated with the plans are to Ordnance Datum Newlyn.
- 2) All measurements on the plans are metric.
- 3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow.
- 4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.
- 5) 'na' or '0' on a manhole level indicates that data is unavailable.
- 6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in millimetres. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. If you are unsure about any text or symbology present on the plan, please contact a member of Property Insight on 0845 070 9148.



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ALS Water Map Key

Water Pipes (Operated & Maintained by Thames Water)


- 
Distribution Main: The most common pipe shown on water maps. With few exceptions, domestic connections are only made to distribution mains.
- 
Trunk Main: A main carrying water from a source of supply to a treatment plant or reservoir, or from one treatment plant or reservoir to another. Also a main transferring water in bulk to smaller water mains used for supplying individual customers.
- 
Supply Main: A supply main indicates that the water main is used as a supply for a single property or group of properties.
- 
Fire Main: Where a pipe is used as a fire supply, the word FIRE will be displayed along the pipe.
- 
Metered Pipe: A metered main indicates that the pipe in question supplies water for a single property or group of properties and that quantity of water passing through the pipe is metered even though there may be no meter symbol shown.
- 
Transmission Tunnel: A very large diameter water pipe. Most tunnels are buried very deep underground. These pipes are not expected to affect the structural integrity of buildings shown on the map provided.
- 
Proposed Main: A main that is still in the planning stages or in the process of being laid. More details of the proposed main and its reference number are generally included near the main.

PIPE DIAMETER	DEPTH BELOW GROUND
Up to 300mm (12")	900mm (3')
300mm - 600mm (12" - 24")	1100mm (3' 8")
600mm and bigger (24" plus)	1200mm (4')

Valves

-  General Purpose Valve
-  Air Valve
-  Pressure Control Valve
-  Customer Valve

Hydrants








-  Single Hydrant

Meters










-  Meter

End Items

Symbol indicating what happens at the end of a water main.

-  Blank Flange
-  Capped End
-  Emptying Pit
-  Undefined End
-  Manifold
-  Customer Supply
-  Fire Supply



Operational Sites

-  Booster Station
-  Other
-  Other (Proposed)
-  Pumping Station
-  Service Reservoir
-  Shaft Inspection
-  Treatment Works
-  Unknown
-  Water Tower

Other Symbols

-  Data Logger

Other Water Pipes (Not Operated or Maintained by Thames Water)

-  **Other Water Company Main:** Occasionally other water company water pipes may overlap the border of our clean water coverage area. These mains are denoted in purple and in most cases have the owner of the pipe displayed along them.
-  **Private Main:** Indicates that the water main in question is not owned by Thames Water. These mains normally have text associated with them indicating the diameter and owner of the pipe.

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1. All goods remain in the property of Thames Water Utilities Ltd until full payment is received.
2. Provision of service will be in accordance with all legal requirements and published TWUL policies.
3. All invoices are strictly due for payment 14 days from due date of the invoice. Any other terms must be accepted/agreed in writing prior to provision of goods or service, or will be held to be invalid.
4. Thames Water does not accept post-dated cheques-any cheques received will be processed for payment on date of receipt.
5. In case of dispute TWUL's terms and conditions shall apply.
6. Penalty interest may be invoked by TWUL in the event of unjustifiable payment delay. Interest charges will be in line with UK Statute Law 'The Late Payment of Commercial Debts (Interest) Act 1998'.
7. Interest will be charged in line with current Court Interest Charges, if legal action is taken.
8. A charge may be made at the discretion of the company for increased administration costs.

A copy of Thames Water's standard terms and conditions are available from the Commercial Billing Team (cashoperations@thameswater.co.uk).

We publish several Codes of Practice including a guaranteed standards scheme. You can obtain copies of these leaflets by calling us on 0800 316 9800

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If the Goods or Services covered by this invoice falls under the regulation of the 1991 Water Industry Act, and you remain dissatisfied you can refer your complaint to Consumer Council for Water on 0121 345 1000 or write to them at Consumer Council for Water, 1st Floor, Victoria Square House, Victoria Square, Birmingham, B2 4AJ.

Ways to pay your bill

Credit Card	BACS Payment	Telephone Banking	Cheque
<p>Call 0845 070 9148 quoting your invoice number starting CBA or ADS / OSS</p>	<p>Account number 90478703 Sort code 60-00-01 A remittance advice must be sent to: Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW. or email ps.billing@thameswater.co.uk</p>	<p>By calling your bank and quoting: Account number 90478703 Sort code 60-00-01 and your invoice number</p>	<p>Made payable to 'Thames Water Utilities Ltd' Write your Thames Water account number on the back. Send to: Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW or by DX to 151280 Slough 13</p>

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