
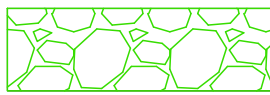


KEY:

	PROPOSED SITE AREA = 2.720Ha
	EXISTING PERMEABLE AREA = 2.720Ha

FOR INFORMATION

Rev	Date	Description	By	Chkd
—	30/06/2022	FIRST ISSUE	J.T.	J.M.


Project Title
BICESTER GATEWAY

Drawing Title
EXISTING PERMEABLE AND IMPERMEABLE AREA PLAN

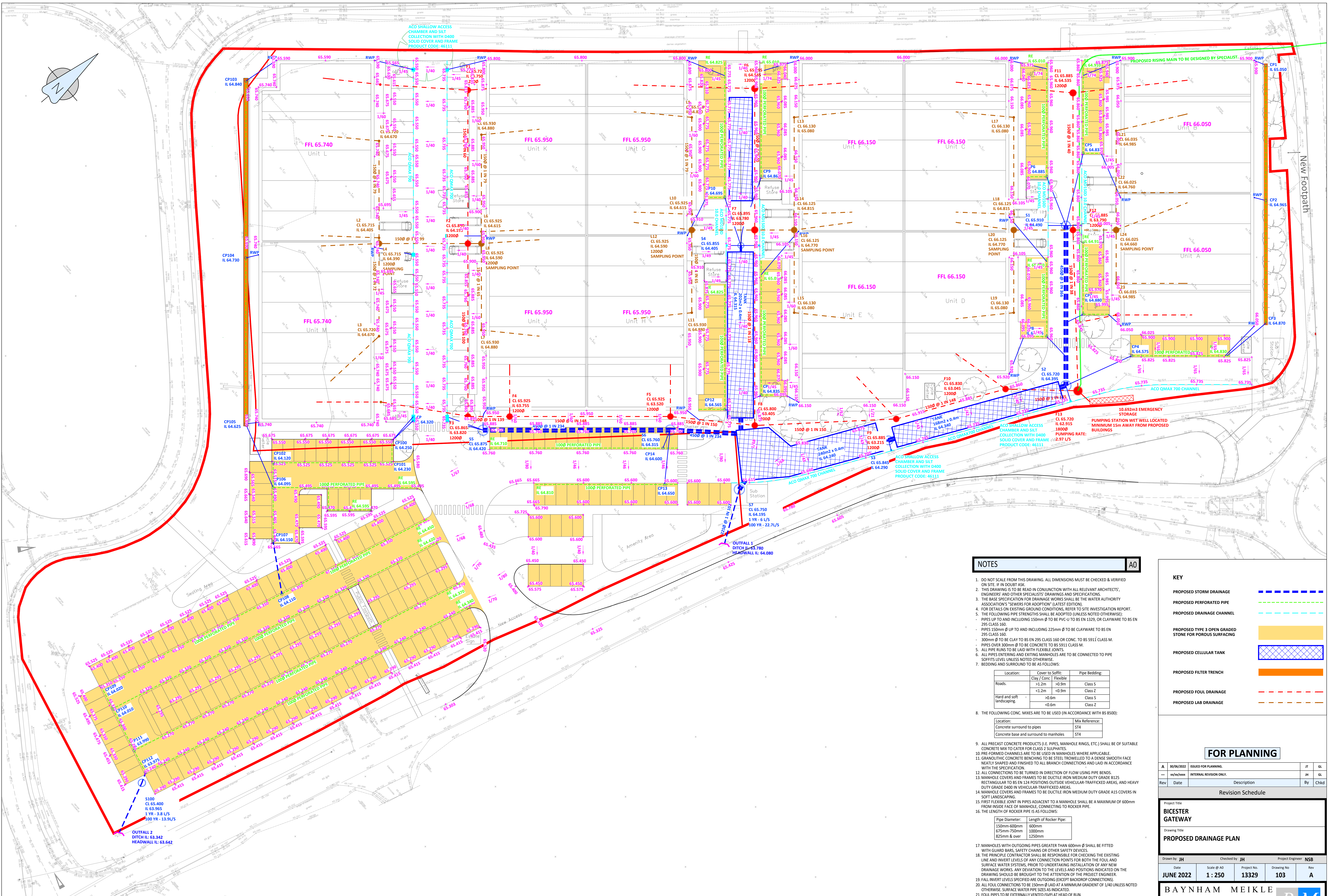
Drawn by J.T.	Checked by J.H.	Project Engineer N.S.B.
Date JUNE 2022	Scale @ A0 1 : 500	Project No. 13329
		Drawing No. SK103

BAYNHAM MEIKLE
Consulting Structural & Civil Engineers

8 Meadow Road, Edgbaston, Birmingham B11 8BU
Tel: 0121 434 4100 Fax: 0121 434 4073 Email: admin@bemp.co.uk



1: 0m 5m 10m 15m 20m 25m 30m 35m 40m 45m 50m
500 0mm 10mm 20mm 30mm 40mm 50mm 60mm 70mm 80mm 90mm 100mm



NOTES

- DO NOT SCALE FROM THIS DRAWING. ALL DIMENSIONS MUST BE CHECKED & VERIFIED ON SITE. IF IN DOUBT ASK.
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS', ENGINEERS' AND OTHER SPECIALISTS' DRAWINGS AND SPECIFICATIONS.
- THE BASE SPECIFICATION FOR DRAINAGE WORKS SHALL BE THE WATER AUTHORITY ASSOCIATION'S 'NEWERS FOR ADOPTION' (LATEST EDITION).
- FOR DETAILS ON EXISTING GROUND CONDITIONS, REFER TO SITE INVESTIGATION REPORT.
- THE FOLLOWING PIPE STRENGTHS SHALL BE ADOPTED (UNLESS NOTED OTHERWISE):
 - PIPES UP TO AND INCLUDING 150mm Ø TO BE PVC-U TO BS EN 1329, OR CLAYWARE TO BS EN 295 CLASS 160.
 - PIPES 150mm Ø UP TO AND INCLUDING 225mm Ø TO BE CLAYWARE TO BS EN 295 CLASS 160.
 - 300mm Ø TO BE CLAY TO BS EN 295 CLASS 160 OR CONC. TO BS 5911 CLASS M.
 - PIPES OVER 300mm Ø TO BE CONCRETE TO BS 5911 CLASS M.
 - ALL PIPE RUNS TO BE LAID WITH FLEXIBLE JOINTS.
 - ALL PIPES ENTERING AND EXITING MANHOLES ARE TO BE CONNECTED TO PIPE SOFFITS LEVEL UNLESS NOTED OTHERWISE.
 - BEDDING AND SURROUND TO BE AS FOLLOWS:

Location:	Cover to Soffit:	Pipe Bedding:
Roads:	>1.2m	>0.9m Class 5
	<1.2m	<0.9m Class 2
Hard and soft landscaping:	>0.6m	Class 5
	<0.6m	Class 2
- THE FOLLOWING CONC. MIXES ARE TO BE USED IN ACCORDANCE WITH BS 8500:

Location:	Mix Reference:
Concrete surround to pipes	ST4
Concrete base and surround to manholes	ST4
- ALL PRECAST CONCRETE PRODUCTS (I.E. PIPES, MANHOLE RINGS, ETC.) SHALL BE OF SUITABLE CONCRETE MIX TO CATER FOR CLASS 2 SULPHATES.
- PRE-FORMED CHANNELS ARE TO BE USED IN MANHOLES WHERE APPLICABLE.
- GRANULITIC CONCRETE BEDDING TO BE STEEL TROWELLED TO A DENSE SMOOTH FACE NEATLY SHAPED AND FINISHED TO ALL BRANCH CONNECTIONS AND LAID IN ACCORDANCE WITH THE SPECIFICATION.
- ALL CONNECTIONS TO BE TURNED IN DIRECTION OF FLOW USING PIPE BENDS.
- MANHOLE COVERS AND FRAMES TO BE DUCTILE IRON MEDIUM DUTY GRADE B125 RECTANGULAR TO BS EN 124 POSITIONS OUTSIDE VEHICULAR-TRAFFICED AREAS, AND HEAVY DUTY GRADE D200 IN VEHICULAR-TRAFFICED AREAS.
- MANHOLE COVERS AND FRAMES TO BE DUCTILE IRON MEDIUM DUTY GRADE A15 COVERS IN SOFT LANDSCAPING.
- FIRST FLEXIBLE JOINT IN PIPES ADJACENT TO A MANHOLE SHALL BE A MAXIMUM OF 600mm FROM INSIDE FACE OF MANHOLE, CONNECTING TO ROCKER PIPE.
- THE LENGTH OF ROCKER PIPE IS AS FOLLOWS:

Pipe Diameter:	Length of Rocker Pipe:
150mm-300mm	600mm
375mm-500mm	1000mm
625mm & over	1250mm
- MANHOLES WITH OUTGOING PIPES GREATER THAN 600mm Ø SHALL BE FITTED WITH GUARD BARS, SAFETY CHAINS OR OTHER SAFETY DEVICES.
- THE PRINCIPLE CONTRACTOR SHALL BE RESPONSIBLE FOR CHECKING THE EXISTING LINE AND INVERT LEVELS OF ANY CONNECTION POINTS FOR BOTH THE FOUL AND SURFACE WATER SYSTEMS, PRIOR TO UNDERTAKING INSTALLATION OF ANY NEW DRAINAGE WORKS. ANY DEVIATION TO THE LEVELS AND POSITIONS INDICATED ON THE DRAWING SHOULD BE BROUGHT TO THE ATTENTION OF THE PROJECT ENGINEER.
- FALL INVERT LEVELS SPECIFIED ARE OUTGOING (EXCEPT BACKDROP CONNECTIONS).
- ALL FOUL CONNECTIONS TO BE 150mm Ø LAID AT A MINIMUM GRADIENT OF 1/40 UNLESS NOTED OTHERWISE. SURFACE WATER PIPES AS INDICATED.
- FOUL PIPES TO BE EXTERNALLY VENTED (SVP) AT HEAD OF RUN.
- FOR LOCATION OF INTERNAL SVP, SS, ETC. REFER TO ARCHITECT'S LATEST LAYOUTS.
- THE DRAINAGE INSTALLATION IS TO BE COMPLIANT WITH BUILDING REGS. (PART H).
- INTERNAL FOUL DRAINAGE CONNECTIONS / POSITIONS AND SETTING-OUT INFORMATION TO BE CONFIRMED BY THE M&E CONSULTANT / ARCHITECT.

KEY

- PROPOSED STORM DRAINAGE
- PROPOSED PERFORATED PIPE
- PROPOSED DRAINAGE CHANNEL
- PROPOSED TYPE 3 OPEN GRADED STONE FOR POROUS SURFACING
- PROPOSED CELLULAR TANK
- PROPOSED FILTER TRENCH
- PROPOSED FOUL DRAINAGE
- PROPOSED LAB DRAINAGE

FOR PLANNING

Rev	Date	Description	By	Chkd
A	30/06/2022	ISSUED FOR PLANNING.	JH	GL
	xx/xx/xxxx	INTERNAL REVISION ONLY.	JH	GL

Project Title: **BICESTER GATEWAY**

Drawing Title: **PROPOSED DRAINAGE PLAN**

Revision Schedule

Date	Scale @ A0	Project No.	Drawing No.	Rev
JUNE 2022	1: 250	13329	103	A

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Consulting Structural & Civil Engineers

8 Meadow Road, Edgbaston, Birmingham B11 8BU
Tel: 0121 414 4100 Fax: 0121 414 4073 Email: admin@bme.co.uk



1: 0m 2.5m 5m 7.5m 10m 12.5m 15m 17.5m 20m 22.5m 25m
250
0m 10mm 20mm 30mm 40mm 50mm 60mm 70mm 80mm 90mm 100mm

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KEY

PROPOSED LEVELS	+ 65.630
EXISTING LEVELS AT SITE BOUNDARY	+ 65.059
EXISTING TOPOGRAPHICAL LEVELS	+ 65.207

FOR PLANNING

Rev	Date	Description	By	Chkd
A	30/06/2022	ISSUED FOR PLANNING	JH	NSB
-	xx/xx/xx	INTERNAL REVISION	JH	NSB

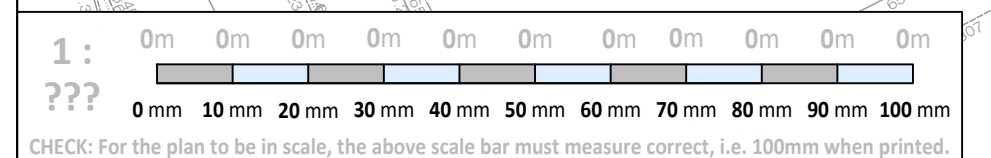
Revision Schedule

Project Title	BICESTER GATEWAY
Drawing Title	PROPOSED LEVELS PLAN

Drawn by	JH	Checked by	JH	Project Engineer	NSB
Date	MAY 2022	Scale @ AO	1 : 250	Project No.	13329
				Drawing No.	102

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Consulting Structural & Civil Engineers

8 Maslow Road, Edgbaston, Birmingham B11 4BU
Tel: 0121 434 4100 Fax: 0121 434 4073 Email: admin@bme.co.uk

1 : 0m 20m 40m 60m 80m 100m
0m 20mm 40mm 60mm 80mm 100mm
CHECK: For the plan to be in scale, the above scale bar must measure correct, i.e. 100mm when printed.
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Appendix C - Calculations

- C.1 Greenfield Run Off Calcs
- C.2 Quick Storage Estimate
- C.3 Network Calculations

8 Meadow Road
Edgbaston, Birmingham
B 17 8BU

Bicester
Gateway
Rural Run Off



Date 17/05/2022 14:52
File

Designed by JH
Checked by JH

Micro Drainage Source Control 2020.1

ICP SUDS Mean Annual Flood

Input

Return Period (years)	1	Soil	0.450
Area (ha)	2.720	Urban	0.000
SAAR (mm)	676	Region Number	Region 6

Results 1/s

QBAR Rural 11.5
QBAR Urban 11.5

Q1 year 9.8

Q1 year 9.8
Q30 years 26.0
Q100 years 36.6

Quick Storage Estimate

Micro Drainage

Variables

FSR Rainfall		Cv (Summer)	0.750
Return Period (years)	1	Cv (Winter)	0.840
Region	England and Wales	Impemeable Area (ha)	2.290
Map	M5-60 (mm)	Maximum Allowable Discharge (l/s)	36.6
	Ratio R	Infiltration Coefficient (m/hr)	0.00000
		Safety Factor	1.0
		Climate Change (%)	40

Analyse OK Cancel Help

Enter Safety Factor between 1.0 and 50.0

Quick Storage Estimate

Micro Drainage


Results

Global Variables require approximate storage of between 217 m³ and 370 m³.

These values are estimates only and should not be used for design purposes.

Analyse OK Cancel Help

Enter Safety Factor between 1.0 and 50.0

Baynham Meikle Partnership		Page 1
8 Meadow Road Edgbaston, Birmingham B 17 8BU	BICESTER GATEWAY 13329 / 103 REVA	
Date 30/06/2022 16:48 File NETWORK 1.MDX	Designed by JH Checked by JH	
Micro Drainage	Network 2020.1	

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	PIMP (%)	100
M5-60 (mm)	20.000	Add Flow / Climate Change (%)	0
Ratio R	0.403	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm





Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.703	4-8	0.800	8-12	0.035

Total Area Contributing (ha) = 1.538

Total Pipe Volume (m³) = 140.824


Network Design Table for Storm

« - Indicates pipe capacity < flow













PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	29.331	0.085	345.1	0.035	6.00	0.0	0.600	o	300	Pipe/Conduit	
1.001	26.605	0.095	280.1	0.031	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.002	29.939	0.295	101.5	0.031	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.003	15.670	0.180	87.1	0.023	0.00	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	48.35	6.58	65.050	0.035	0.0	0.0	0.0	0.84	59.4	4.6
1.001	46.71	7.06	64.965	0.066	0.0	0.0	0.0	0.93	66.1	8.3
1.002	45.67	7.38	64.870	0.097	0.0	0.0	0.0	1.56	110.3	12.0
1.003	45.19	7.53	64.575	0.120	0.0	0.0	0.0	1.69	119.2	14.7


Baynham Meikle Partnership		Page 2
8 Meadow Road Edgbaston, Birmingham B 17 8BU	BICESTER GATEWAY 13329 / 103 REVA	
Date 30/06/2022 16:48 File NETWORK 1.MDX	Designed by JH Checked by JH	
Micro Drainage	Network 2020.1	

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
2.000	16.087	0.100	160.9	0.092	6.00	0.0	0.600	o	225	Pipe/Conduit	
3.000	11.361	0.100	113.6	0.079	6.00	0.0	0.600	o	225	Pipe/Conduit	
2.001	34.723	0.095	365.5	0.043	0.00	0.0	0.600	oo	43	Pipe/Conduit	
4.000	18.045	0.185	97.5	0.052	6.00	0.0	0.600	o	225	Pipe/Conduit	
5.000	11.466	0.260	44.1	0.119	6.00	0.0	0.600	o	225	Pipe/Conduit	
1.004	20.097	0.055	365.4	0.000	0.00	0.0	0.600	oo	43	Pipe/Conduit	
1.005	20.170	0.050	403.4	0.000	0.00	0.0	0.600	oo	43	Pipe/Conduit	
6.000	79.487	0.160	496.8	0.046	6.00	0.0	0.600	Q70	-6	Pipe/Conduit	
6.001	2.362	0.215	11.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.006	19.130	0.050	382.6	0.054	0.00	0.0	0.600	oo	43	Pipe/Conduit	
7.000	13.257	0.230	57.6	0.086	6.00	0.0	0.600	o	225	Pipe/Conduit	
8.000	10.993	0.065	169.1	0.164	6.00	0.0	0.600	o	225	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)
2.000	49.53	6.26	64.835	0.092	0.0	0.0	0.0	1.03	40.9	12.3
3.000	49.94	6.15	64.885	0.079	0.0	0.0	0.0	1.23	48.7	10.7
2.001	47.55	6.81	64.490	0.214	0.0	0.0	0.0	1.06	336.3	27.6
4.000	49.66	6.23	64.880	0.052	0.0	0.0	0.0	1.32	52.6	7.0
5.000	50.00	6.10	64.955	0.119	0.0	0.0	0.0	1.98	78.5	16.1
1.004	44.24	7.85	64.395	0.505	0.0	0.0	0.0	1.06	336.3	60.5
1.005	43.28	8.18	64.340	0.505	0.0	0.0	0.0	1.01	319.9	60.5
6.000	45.90	7.30	64.665	0.046	0.0	0.0	0.0	1.02	254.2	5.7
6.001	45.88	7.31	64.505	0.046	0.0	0.0	0.0	6.16	979.7	5.7
1.006	42.44	8.49	64.290	0.605	0.0	0.0	0.0	1.03	328.6	69.5
7.000	50.00	6.13	64.860	0.086	0.0	0.0	0.0	1.73	68.6	11.6
8.000	49.83	6.18	64.695	0.164	0.0	0.0	0.0	1.00	39.9	22.1


Baynham Meikle Partnership		Page 3
8 Meadow Road Edgbaston, Birmingham B 17 8BU	BICESTER GATEWAY 13329 / 103 REVA	
Date 30/06/2022 16:48 File NETWORK 1.MDX	Designed by JH Checked by JH	
Micro Drainage		Network 2020.1

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
9.000	20.905	0.060	348.4	0.030	6.00	0.0	0.600	oo	43	Pipe/Conduit		
7.001	19.392	0.090	215.5	0.038	0.00	0.0	0.600	oo	43	Pipe/Conduit		
7.002	28.544	0.075	380.6	0.000	0.00	0.0	0.600	oo	43	Pipe/Conduit		
10.000	78.400	0.160	490.0	0.183	6.00	0.0	0.600	Q70	-6	Pipe/Conduit		
10.001	8.071	0.085	95.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit		
10.002	40.552	0.105	386.2	0.055	0.00	0.0	0.600	oo	43	Pipe/Conduit		
11.000	11.850	0.100	118.5	0.015	6.00	0.0	0.600	o	225	Pipe/Conduit		
12.000	4.188	0.100	41.9	0.078	6.00	0.0	0.600	o	225	Pipe/Conduit		
10.003	28.743	0.075	383.2	0.000	0.00	0.0	0.600	oo	43	Pipe/Conduit		
13.000	14.871	0.100	148.7	0.141	6.00	0.0	0.600	o	225	Pipe/Conduit		
14.000	17.835	0.100	178.4	0.106	6.00	0.0	0.600	o	225	Pipe/Conduit		
15.000	27.099	0.055	492.7	0.000	6.00	0.0	0.600	Q70	-6	Pipe/Conduit		
15.001	9.193	0.355	25.9	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)
9.000	49.30	6.32	64.465	0.030	0.0	0.0	0.0	1.08	344.5	4.0
7.001	48.44	6.56	64.405	0.318	0.0	0.0	0.0	1.38	439.1	41.7
7.002	46.84	7.01	64.315	0.318	0.0	0.0	0.0	1.04	329.4	41.7
10.000	45.99	7.28	64.665	0.183	0.0	0.0	0.0	1.02	255.9	22.8
10.001	45.78	7.34	64.505	0.183	0.0	0.0	0.0	2.09	331.9	22.8
10.002	43.80	8.00	64.420	0.238	0.0	0.0	0.0	1.03	327.0	28.2
11.000	49.90	6.16	64.650	0.015	0.0	0.0	0.0	1.20	47.7	2.0
12.000	50.00	6.03	64.600	0.078	0.0	0.0	0.0	2.03	80.6	10.6
10.003	42.51	8.46	64.315	0.331	0.0	0.0	0.0	1.03	328.3	38.1
13.000	49.64	6.23	64.835	0.141	0.0	0.0	0.0	1.07	42.5	19.0
14.000	49.37	6.30	64.565	0.106	0.0	0.0	0.0	0.98	38.8	14.2
15.000	48.85	6.44	64.650	0.000	0.0	0.0	0.0	1.02	255.2	0.0
15.001	48.71	6.48	64.595	0.000	0.0	0.0	0.0	4.01	637.4	0.0

Baynham Meikle Partnership		Page 4
8 Meadow Road Edgbaston, Birmingham B 17 8BU	BICESTER GATEWAY 13329 / 103 REVA	
Date 30/06/2022 16:48 File NETWORK 1.MDX	Designed by JH Checked by JH	
Micro Drainage	Network 2020.1	

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
1.007	14.918	0.045	331.5	0.000	0.00	0.0	0.600	oo	43	Pipe/Conduit	
1.008	12.814	0.115	111.4	0.037	0.00	0.0	0.600	o	225	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)
1.007	41.85	8.71	64.240	1.501	0.0	0.0	0.0	1.11	353.3	170.1
1.008	41.43	8.89	64.195	1.538	0.0	0.0	0.0	1.24	49.2«	172.5

Conduit Sections for Storm

NOTE: Diameters less than 66 refer to section numbers of hydraulic conduits. These conduits are marked by the symbols:- [] box culvert, \ / open channel, oo dual pipe, ooo triple pipe, O egg.

Section numbers < 0 are taken from user conduit table

Section Number	Conduit Type	Major Dimn. (mm)	Minor Dimn. (mm)	Side Slope (Deg)	Corner Splay (mm)	4*Hyd Radius (m)	Xsect Area (m ²)
43	oo	900	450			0.450	0.318
-6	Q70	467	700			0.541	0.250

Baynham Meikle Partnership		Page 5
8 Meadow Road Edgbaston, Birmingham B 17 8BU		BICESTER GATEWAY 13329 / 103 REVA
Date 30/06/2022 16:48 File NETWORK 1.MDX		Designed by JH Checked by JH
Micro Drainage		Network 2020.1



Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Back (m)
CP1	65.850	0.800	Open Manhole	600	1.000	65.050	300				
CP2	66.000	1.035	Open Manhole	600	1.001	64.965	300	1.000	64.965	300	
CP3	66.000	1.130	Open Manhole	600	1.002	64.870	300	1.001	64.870	300	
CP4	65.780	1.205	Open Manhole	600	1.003	64.575	300	1.002	64.575	300	
CP5	65.860	1.025	Open Manhole	600	2.000	64.835	225				
CP6	65.960	1.075	Open Manhole	600	3.000	64.885	225				
S1	65.910	1.420	Open Manhole	1800	2.001	64.490	43	2.000	64.735	225	
								3.000	64.785	225	
CP7	65.860	0.980	Open Manhole	600	4.000	64.880	225				
CP8	65.960	1.005	Open Manhole	600	5.000	64.955	225				
S2	65.720	1.325	Open Manhole	2100	1.004	64.395	43	1.003	64.395	300	
								2.001	64.395	43	
								4.000	64.695	225	
								5.000	64.695	225	
TANK	65.710	1.370	Open Manhole	100	1.005	64.340	43	1.004	64.340	43	
ACO QMAX	65.735	1.070	Junction		6.000	64.665	-6				
ACO OUTFALL	65.720	1.215	Open Manhole	500	6.001	64.505	450	6.000	64.505	-6	
S3	65.845	1.555	Open Manhole	2100	1.006	64.290	43	1.005	64.290	43	
								6.001	64.290	450	
CP9	65.960	1.100	Open Manhole	600	7.000	64.860	225				
CP10	65.775	1.080	Open Manhole	600	8.000	64.695	225				
TANK	65.865	1.400	Open Manhole	100	9.000	64.465	43				
S4	65.855	1.450	Open Manhole	1800	7.001	64.405	43	7.000	64.630	225	
								8.000	64.630	225	
								9.000	64.405	43	
TANK	65.775	1.460	Open Manhole	100	7.002	64.315	43	7.001	64.315	43	
ACO QMAX	65.735	1.070	Junction		10.000	64.665	-6				
ACO OUTFALL	65.735	1.230	Open Manhole	500	10.001	64.505	450	10.000	64.505	-6	
S5	65.875	1.455	Open Manhole	2100	10.002	64.420	43	10.001	64.420	450	
CP13	65.760	1.110	Open Manhole	600	11.000	64.650	225				
CP14	65.660	1.060	Open Manhole	600	12.000	64.600	225				
S6	65.760	1.445	Open Manhole	2100	10.003	64.315	43	10.002	64.315	43	
								11.000	64.550	225	
								12.000	64.500	225	
CP11	65.960	1.125	Open Manhole	600	13.000	64.835	225				
CP12	65.775	1.210	Open Manhole	600	14.000	64.565	225				
ACO QMAX	65.720	1.070	Junction		15.000	64.650	-6				
ACO OUTFALL	65.660	1.065	Junction		15.001	64.595	450	15.000	64.595	-6	

Baynham Meikle Partnership		Page 6
8 Meadow Road Edgbaston, Birmingham B 17 8BU		BICESTER GATEWAY 13329 / 103 REVA
Date 30/06/2022 16:48 File NETWORK 1.MDX		Designed by JH Checked by JH
Micro Drainage		Network 2020.1



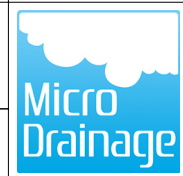
Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	Pipe Out			Pipes In			Backdrop (mm)
					PN	Invert Level (m)	Diameter (mm)	PN	Invert Level (m)	Diameter (mm)	
TANK	65.550	1.310	Open Manhole	1050	1.007	64.240	43	1.006	64.240	43	270
								7.002	64.240	43	
								10.003	64.240	43	
								13.000	64.735	225	
								14.000	64.465	225	
S7	65.750 65.000	1.555 0.920	Open Manhole Open Manhole	2100 1000	1.008	64.195	225	1.007	64.195	43	
								1.008	64.080	225	
								OUTFALL			

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
CP1	457289.652	221148.597	457289.652	221148.597	Required	
CP2	457311.943	221129.534	457311.943	221129.534	Required	
CP3	457332.163	221112.242	457332.163	221112.242	Required	
CP4	457318.635	221085.556	457318.635	221085.556	Required	
CP5	457278.430	221106.088	457278.430	221106.088	Required	
CP6	457277.157	221096.781	457277.157	221096.781	Required	
S1	457287.900	221093.083	457287.900	221093.083	Required	
CP7	457303.297	221084.822	457303.297	221084.822	Required	
CP8	457303.457	221074.291	457303.457	221074.291	Required	
S2	457314.279	221070.504	457314.279	221070.504	Required	

8 Meadow Road
Edgbaston, Birmingham
B 17 8BU

BICESTER GATEWAY
13329 / 103 REVA



Date 30/06/2022 16:48
File NETWORK 1.MDX

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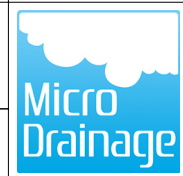
Network 2020.1

Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
TANK	457306.558	221051.950	457306.558	221051.950	Required	
ACO QMAX	457340.331	221101.310			No Entry	
ACO OUTFALL	457300.449	221032.552	457300.449	221032.552	Required	
S3	457298.306	221033.545	457298.306	221033.545	Required	
CP9	457238.866	221048.079	457238.866	221048.079	Required	
CP10	457235.202	221040.818	457235.202	221040.818	Required	
S4	457245.395	221036.701	457245.395	221036.701	Required	
TANK	457260.071	221024.025	457260.071	221024.025	Required	
ACO QMAX	457173.529	221014.348			No Entry	
ACO OUTFALL	457233.122	220963.404	457233.122	220963.404	Required	
S5	457239.504	220968.203	457239.504	220968.203	Required	
CP13	457274.028	220990.437	457274.028	220990.437	Required	
CP14	457267.795	220995.308	457267.795	220995.308	Required	
S6	457265.860	220999.022	457265.860	220999.022	Required	
CP11	457272.924	221018.968	457272.924	221018.968	Required	

8 Meadow Road
Edgbaston, Birmingham
B 17 8BU

BICESTER GATEWAY
13329 / 103 REVA



Date 30/06/2022 16:48
File NETWORK 1.MDX

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Network 2020.1

Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
CP12	457272.001	221009.363	457272.001	221009.363	Required	
ACO QMAX	457300.449	221032.552			No Entry	
ACO OUTFALL	457288.338	221008.337			No Entry	
TANK	457287.863	221017.517	457287.863	221017.517	Required	
S7	457285.377	221002.808	457285.377	221002.808	Required	
	457292.230	220991.981			No Entry	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	300	CP1	65.850	65.050	0.500	Open Manhole	600
1.001	o	300	CP2	66.000	64.965	0.735	Open Manhole	600
1.002	o	300	CP3	66.000	64.870	0.830	Open Manhole	600
1.003	o	300	CP4	65.780	64.575	0.905	Open Manhole	600
2.000	o	225	CP5	65.860	64.835	0.800	Open Manhole	600
3.000	o	225	CP6	65.960	64.885	0.850	Open Manhole	600
2.001	oo	43	S1	65.910	64.490	0.970	Open Manhole	1800
4.000	o	225	CP7	65.860	64.880	0.755	Open Manhole	600
5.000	o	225	CP8	65.960	64.955	0.780	Open Manhole	600
1.004	oo	43	S2	65.720	64.395	0.875	Open Manhole	2100
1.005	oo	43	TANK	65.710	64.340	0.920	Open Manhole	100
6.000	Q70	-6	ACO QMAX	65.735	64.665	0.370	Junction	
6.001	o	450	ACO OUTFALL	65.720	64.505	0.765	Open Manhole	500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	29.331	345.1	CP2	66.000	64.965	0.735	Open Manhole	600
1.001	26.605	280.1	CP3	66.000	64.870	0.830	Open Manhole	600
1.002	29.939	101.5	CP4	65.780	64.575	0.905	Open Manhole	600
1.003	15.670	87.1	S2	65.720	64.395	1.025	Open Manhole	2100
2.000	16.087	160.9	S1	65.910	64.735	0.950	Open Manhole	1800
3.000	11.361	113.6	S1	65.910	64.785	0.900	Open Manhole	1800
2.001	34.723	365.5	S2	65.720	64.395	0.875	Open Manhole	2100
4.000	18.045	97.5	S2	65.720	64.695	0.800	Open Manhole	2100
5.000	11.466	44.1	S2	65.720	64.695	0.800	Open Manhole	2100
1.004	20.097	365.4	TANK	65.710	64.340	0.920	Open Manhole	100
1.005	20.170	403.4	S3	65.845	64.290	1.105	Open Manhole	2100
6.000	79.487	496.8	ACO OUTFALL	65.720	64.505	0.515	Open Manhole	500
6.001	2.362	11.0	S3	65.845	64.290	1.105	Open Manhole	2100


PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.006	oo	43	S3	65.845	64.290	1.105	Open Manhole	2100
7.000	o	225	CP9	65.960	64.860	0.875	Open Manhole	600
8.000	o	225	CP10	65.775	64.695	0.855	Open Manhole	600
9.000	oo	43	TANK	65.865	64.465	0.950	Open Manhole	100
7.001	oo	43	S4	65.855	64.405	1.000	Open Manhole	1800
7.002	oo	43	TANK	65.775	64.315	1.010	Open Manhole	100
10.000	Q70	-6	ACO QMAX	65.735	64.665	0.370	Junction	
10.001	o	450	ACO OUTFALL	65.735	64.505	0.780	Open Manhole	500
10.002	oo	43	S5	65.875	64.420	1.005	Open Manhole	2100
11.000	o	225	CP13	65.760	64.650	0.885	Open Manhole	600
12.000	o	225	CP14	65.660	64.600	0.835	Open Manhole	600
10.003	oo	43	S6	65.760	64.315	0.995	Open Manhole	2100

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.006	19.130	382.6	TANK	65.550	64.240	0.860	Open Manhole	1050
7.000	13.257	57.6	S4	65.855	64.630	1.000	Open Manhole	1800
8.000	10.993	169.1	S4	65.855	64.630	1.000	Open Manhole	1800
9.000	20.905	348.4	S4	65.855	64.405	1.000	Open Manhole	1800
7.001	19.392	215.5	TANK	65.775	64.315	1.010	Open Manhole	100
7.002	28.544	380.6	TANK	65.550	64.240	0.860	Open Manhole	1050
10.000	78.400	490.0	ACO OUTFALL	65.735	64.505	0.530	Open Manhole	500
10.001	8.071	95.0	S5	65.875	64.420	1.005	Open Manhole	2100
10.002	40.552	386.2	S6	65.760	64.315	0.995	Open Manhole	2100
11.000	11.850	118.5	S6	65.760	64.550	0.985	Open Manhole	2100
12.000	4.188	41.9	S6	65.760	64.500	1.035	Open Manhole	2100
10.003	28.743	383.2	TANK	65.550	64.240	0.860	Open Manhole	1050

Baynham Meikle Partnership		Page 11
8 Meadow Road Edgbaston, Birmingham B 17 8BU	BICESTER GATEWAY 13329 / 103 REVA	
Date 30/06/2022 16:48 File NETWORK 1.MDX	Designed by JH Checked by JH	
Micro Drainage	Network 2020.1	


PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
13.000	o	225	CP11	65.960	64.835	0.900	Open Manhole	600
14.000	o	225	CP12	65.775	64.565	0.985	Open Manhole	600
15.000	Q70	-6	ACO QMAX	65.720	64.650	0.370	Junction	
15.001	o	450	ACO OUTFALL	65.660	64.595	0.615	Junction	
1.007	oo	43	TANK	65.550	64.240	0.860	Open Manhole	1050
1.008	o	225	S7	65.750	64.195	1.330	Open Manhole	2100

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
13.000	14.871	148.7	TANK	65.550	64.735	0.590	Open Manhole	1050
14.000	17.835	178.4	TANK	65.550	64.465	0.860	Open Manhole	1050
15.000	27.099	492.7	ACO OUTFALL	65.660	64.595	0.365	Junction	
15.001	9.193	25.9	TANK	65.550	64.240	0.860	Open Manhole	1050
1.007	14.918	331.5	S7	65.750	64.195	1.105	Open Manhole	2100
1.008	12.814	111.4		65.000	64.080	0.695	Open Manhole	1000


Baynham Meikle Partnership		Page 12
8 Meadow Road Edgbaston, Birmingham B 17 8BU	BICESTER GATEWAY 13329 / 103 REVA	
Date 30/06/2022 16:48 File NETWORK 1.MDX	Designed by JH Checked by JH	
Micro Drainage		Network 2020.1

Network Classifications for Storm

PN	USMH Name	Pipe Dia (mm)	Min Cover Depth (m)	Max Cover Depth (m)	Pipe Type	MH Dia (mm)	MH Width (mm)	MH Ring Depth (m)	MH Type
1.000	CP1	300	0.500	0.735	Unclassified	600	0	0.500	Unclassified
1.001	CP2	300	0.735	0.830	Unclassified	600	0	0.735	Unclassified
1.002	CP3	300	0.830	0.905	Unclassified	600	0	0.830	Unclassified
1.003	CP4	300	0.905	1.025	Unclassified	600	0	0.905	Unclassified
2.000	CP5	225	0.800	0.950	Unclassified	600	0	0.800	Unclassified
3.000	CP6	225	0.850	0.900	Unclassified	600	0	0.850	Unclassified
2.001	S1	43	0.875	0.970	Unclassified	1800	0	0.970	Unclassified
4.000	CP7	225	0.755	0.800	Unclassified	600	0	0.755	Unclassified
5.000	CP8	225	0.780	0.800	Unclassified	600	0	0.780	Unclassified
1.004	S2	43	0.875	0.920	Unclassified	2100	0	0.875	Unclassified
1.005	TANK	43	0.920	1.105	Unclassified	100	0	0.920	Unclassified
6.000	ACO QMAX	-6	0.370	0.515	Unclassified				Junction
6.001	ACO OUTFALL	450	0.765	1.105	Unclassified	500	0	0.765	Unclassified
1.006	S3	43	0.860	1.105	Unclassified	2100	0	1.105	Unclassified
7.000	CP9	225	0.875	1.000	Unclassified	600	0	0.875	Unclassified
8.000	CP10	225	0.855	1.000	Unclassified	600	0	0.855	Unclassified
9.000	TANK	43	0.950	1.000	Unclassified	100	0	0.950	Unclassified
7.001	S4	43	1.000	1.010	Unclassified	1800	0	1.000	Unclassified
7.002	TANK	43	0.860	1.010	Unclassified	100	0	1.010	Unclassified
10.000	ACO QMAX	-6	0.370	0.530	Unclassified				Junction
10.001	ACO OUTFALL	450	0.780	1.005	Unclassified	500	0	0.780	Unclassified
10.002	S5	43	0.995	1.005	Unclassified	2100	0	1.005	Unclassified
11.000	CP13	225	0.885	0.985	Unclassified	600	0	0.885	Unclassified
12.000	CP14	225	0.835	1.035	Unclassified	600	0	0.835	Unclassified
10.003	S6	43	0.860	0.995	Unclassified	2100	0	0.995	Unclassified
13.000	CP11	225	0.590	0.900	Unclassified	600	0	0.900	Unclassified
14.000	CP12	225	0.860	0.985	Unclassified	600	0	0.985	Unclassified
15.000	ACO QMAX	-6	0.365	0.370	Unclassified				Junction
15.001	ACO OUTFALL	450	0.615	0.860	Unclassified				Junction
1.007	TANK	43	0.860	1.105	Unclassified	1050	0	0.860	Unclassified
1.008	S7	225	0.695	1.330	Unclassified	2100	0	1.330	Unclassified

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)
1.008		65.000	64.080	0.000	1000	0

8 Meadow Road Edgbaston, Birmingham B 17 8BU	BICESTER GATEWAY 13329 / 103 REVA	
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Date 30/06/2022 16:48 File NETWORK 1.MDX	Designed by JH Checked by JH	
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Micro Drainage	Network 2020.1
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Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
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	17
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)	1	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Storm Duration (mins)	30
Ratio R	0.403		

Baynham Meikle Partnership		Page 14
8 Meadow Road Edgbaston, Birmingham B 17 8BU	BICESTER GATEWAY 13329 / 103 REVA	
Date 30/06/2022 16:48 File NETWORK 1.MDX	Designed by JH Checked by JH	
Micro Drainage	Network 2020.1	

Online Controls for Storm

Complex Manhole: S7, DS/PN: 1.008, Volume (m³): 9.6

Hydro-Brake® Optimum

Unit Reference MD-SHE-0122-6000-0500-6000
 Design Head (m) 0.500
 Design Flow (l/s) 6.0
 Flush-Flo™ Calculated
 Objective Minimise upstream storage
 Application Surface
 Sump Available Yes
 Diameter (mm) 122
 Invert Level (m) 64.195
 Minimum Outlet Pipe Diameter (mm) 150
 Suggested Manhole Diameter (mm) 1200


Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.500	6.0
Flush-Flo™	0.189	6.0
Kick-Flo®	0.378	5.3
Mean Flow over Head Range	-	4.9

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	4.3	1.200	9.0	3.000	14.0	7.000	21.0
0.200	6.0	1.400	9.7	3.500	15.0	7.500	21.7
0.300	5.8	1.600	10.4	4.000	16.0	8.000	22.5
0.400	5.4	1.800	10.9	4.500	16.9	8.500	23.2
0.500	6.0	2.000	11.5	5.000	17.8	9.000	23.8
0.600	6.5	2.200	12.0	5.500	18.6	9.500	24.5
0.800	7.5	2.400	12.5	6.000	19.4		
1.000	8.3	2.600	13.0	6.500	20.2		

Orifice

Diameter (m) 0.100 Discharge Coefficient 0.600 Invert Level (m) 65.050

Baynham Meikle Partnership		Page 15
8 Meadow Road Edgbaston, Birmingham B 17 8BU	BICESTER GATEWAY 13329 / 103 REVA	
Date 30/06/2022 16:48 File NETWORK 1.MDX	Designed by JH Checked by JH	
Micro Drainage	Network 2020.1	

Storage Structures for Storm

Porous Car Park Manhole: CP2, DS/PN: 1.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	0.8
Membrane Percolation (mm/hr)	1000	Length (m)	29.3
Max Percolation (l/s)	6.5	Slope (1:X)	345.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	64.965	Membrane Depth (mm)	0

Porous Car Park Manhole: CP3, DS/PN: 1.002

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	0.8
Membrane Percolation (mm/hr)	1000	Length (m)	26.6
Max Percolation (l/s)	5.9	Slope (1:X)	280.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	64.870	Membrane Depth (mm)	0

Porous Car Park Manhole: CP4, DS/PN: 1.003

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.8
Membrane Percolation (mm/hr)	1000	Length (m)	26.4
Max Percolation (l/s)	35.2	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	64.980	Membrane Depth (mm)	0

Porous Car Park Manhole: CP5, DS/PN: 2.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.8
Membrane Percolation (mm/hr)	1000	Length (m)	20.4
Max Percolation (l/s)	27.2	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	64.910	Membrane Depth (mm)	0

Porous Car Park Manhole: CP6, DS/PN: 3.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.8
Membrane Percolation (mm/hr)	1000	Length (m)	25.2
Max Percolation (l/s)	33.6	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	65.010	Membrane Depth (mm)	0

Porous Car Park Manhole: CP7, DS/PN: 4.000

Infiltration Coefficient Base (m/hr)	0.00000	Max Percolation (l/s)	20.8
Membrane Percolation (mm/hr)	1000	Safety Factor	2.0

8 Meadow Road
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B 17 8BU

BICESTER GATEWAY
13329 / 103 REVA



Date 30/06/2022 16:48
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Porous Car Park Manhole: CP7, DS/PN: 4.000

Porosity 0.30 Slope (1:X) 0.0
 Invert Level (m) 64.910 Depression Storage (mm) 5
 Width (m) 4.8 Evaporation (mm/day) 3
 Length (m) 15.6 Membrane Depth (mm) 0

Porous Car Park Manhole: CP8, DS/PN: 5.000

Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 4.8
 Membrane Percolation (mm/hr) 1000 Length (m) 17.6
 Max Percolation (l/s) 23.5 Slope (1:X) 0.0
 Safety Factor 2.0 Depression Storage (mm) 5
 Porosity 0.30 Evaporation (mm/day) 3
 Invert Level (m) 65.010 Membrane Depth (mm) 0

Cellular Storage Manhole: TANK, DS/PN: 1.005

Invert Level (m) 64.340 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	168.0	168.0	0.500	0.0	189.4
0.400	168.0	189.4			

Porous Car Park Manhole: CP9, DS/PN: 7.000


Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 4.8
 Membrane Percolation (mm/hr) 1000 Length (m) 27.6
 Max Percolation (l/s) 36.8 Slope (1:X) 0.0
 Safety Factor 2.0 Depression Storage (mm) 5
 Porosity 0.30 Evaporation (mm/day) 3
 Invert Level (m) 65.010 Membrane Depth (mm) 0

Porous Car Park Manhole: CP10, DS/PN: 8.000

Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 4.8
 Membrane Percolation (mm/hr) 1000 Length (m) 30.0
 Max Percolation (l/s) 40.0 Slope (1:X) 0.0
 Safety Factor 2.0 Depression Storage (mm) 5
 Porosity 0.30 Evaporation (mm/day) 3
 Invert Level (m) 64.825 Membrane Depth (mm) 0

Cellular Storage Manhole: TANK, DS/PN: 9.000

Invert Level (m) 64.465 Safety Factor 2.0
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
 Infiltration Coefficient Side (m/hr) 0.00000

Baynham Meikle Partnership		Page 17
8 Meadow Road Edgbaston, Birmingham B 17 8BU	BICESTER GATEWAY 13329 / 103 REVA	
Date 30/06/2022 16:48 File NETWORK 1.MDX	Designed by JH Checked by JH	
Micro Drainage	Network 2020.1	

Cellular Storage Manhole: TANK, DS/PN: 9.000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	112.0	112.0	0.500	0.0	131.1
0.400	112.0	131.1			

Cellular Storage Manhole: TANK, DS/PN: 7.002

Invert Level (m) 64.350 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	202.0	202.0	0.500	0.0	245.6
0.400	202.0	245.6			

Porous Car Park Manhole: CP13, DS/PN: 11.000

Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 4.8
 Membrane Percolation (mm/hr) 1000 Length (m) 31.2
 Max Percolation (l/s) 41.6 Slope (1:X) 0.0
 Safety Factor 2.0 Depression Storage (mm) 5
 Porosity 0.30 Evaporation (mm/day) 3
 Invert Level (m) 64.650 Membrane Depth (mm) 0

Porous Car Park Manhole: CP14, DS/PN: 12.000

Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 4.8
 Membrane Percolation (mm/hr) 1000 Length (m) 40.8
 Max Percolation (l/s) 54.4 Slope (1:X) 0.0
 Safety Factor 2.0 Depression Storage (mm) 5
 Porosity 0.30 Evaporation (mm/day) 3
 Invert Level (m) 64.810 Membrane Depth (mm) 0

Porous Car Park Manhole: CP11, DS/PN: 13.000

Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 4.8
 Membrane Percolation (mm/hr) 1000 Length (m) 29.6
 Max Percolation (l/s) 39.5 Slope (1:X) 0.0
 Safety Factor 2.0 Depression Storage (mm) 5
 Porosity 0.30 Evaporation (mm/day) 3
 Invert Level (m) 65.010 Membrane Depth (mm) 0

Porous Car Park Manhole: CP12, DS/PN: 14.000

Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 4.8
 Membrane Percolation (mm/hr) 1000 Length (m) 32.4
 Max Percolation (l/s) 43.2 Slope (1:X) 0.0
 Safety Factor 2.0 Depression Storage (mm) 5
 Porosity 0.30 Evaporation (mm/day) 3
 Invert Level (m) 64.825 Membrane Depth (mm) 0

8 Meadow Road
 Edgbaston, Birmingham
 B 17 8BU

BICESTER GATEWAY
 13329 / 103 REVA



Date 30/06/2022 16:48
 File NETWORK 1.MDX


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Micro Drainage Network 2020.1

Cellular Storage Manhole: TANK, DS/PN: 1.007

Invert Level (m) 64.240 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	240.0	240.0	0.500	0.0	270.4
0.400	240.0	270.4			

Baynham Meikle Partnership		Page 20
8 Meadow Road Edgbaston, Birmingham B 17 8BU	BICESTER GATEWAY 13329 / 103 REVA	
Date 30/06/2022 16:48 File NETWORK 1.MDX	Designed by JH Checked by JH	
Micro Drainage	Network 2020.1	

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

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap. (l/s)	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)
1.000	CP1		65.108	-0.242	0.000	0.08			4.5
1.001	CP2		65.037	-0.228	0.000	0.13		7	7.8
1.002	CP3		64.936	-0.234	0.000	0.11		7	11.0
1.003	CP4		64.648	-0.227	0.000	0.13		8	13.4
2.000	CP5		64.919	-0.141	0.000	0.30		4	10.9
3.000	CP6		64.960	-0.150	0.000	0.25		7	10.2
2.001	S1		64.582	-0.358	0.000	0.09			25.2
4.000	CP7		64.933	-0.172	0.000	0.13		5	6.0
5.000	CP8		65.027	-0.153	0.000	0.22		4	14.7
1.004	S2		64.543	-0.302	0.000	0.04			10.6
1.005	TANK		64.542	-0.248	0.000	0.02		272	5.8
6.000	ACO QMAX		64.739	-0.626	0.000	0.02			5.9
6.001	ACO OUTFALL		64.551	-0.404	0.000	0.02			5.9
1.006	S3		64.542	-0.198	0.000	0.03			7.2
7.000	CP9		64.925	-0.160	0.000	0.19		7	11.1
8.000	CP10		64.825	-0.095	0.000	0.63		7	21.2
9.000	TANK		64.542	-0.373	0.000	0.00		120	0.9
7.001	S4		64.543	-0.312	0.000	0.02			6.5

PN	US/MH Name	Level Status Exceeded
1.000	CP1	OK
1.001	CP2	OK
1.002	CP3	OK
1.003	CP4	OK
2.000	CP5	OK
3.000	CP6	OK
2.001	S1	OK
4.000	CP7	OK
5.000	CP8	OK
1.004	S2	OK
1.005	TANK	OK
6.000	ACO QMAX	OK
6.001	ACO OUTFALL	OK
1.006	S3	OK
7.000	CP9	OK
8.000	CP10	OK
9.000	TANK	OK
7.001	S4	OK

8 Meadow Road
Edgbaston, Birmingham
B 17 8BU

BICESTER GATEWAY
13329 / 103 REVA



Date 30/06/2022 16:48
File NETWORK 1.MDX

Designed by JH
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Micro Drainage Network 2020.1

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow
7.002	TANK	360 Winter	1	+0%	30/120 Summer	100/30 Winter	
10.000	ACO QMAX	15 Winter	1	+0%	100/60 Winter		
10.001	ACO OUTFALL	15 Winter	1	+0%	30/180 Winter		
10.002	S5	360 Winter	1	+0%	30/120 Winter		
11.000	CP13	120 Winter	1	+0%	30/120 Winter		
12.000	CP14	15 Winter	1	+0%	30/120 Winter		
10.003	S6	360 Winter	1	+0%	30/60 Winter		
13.000	CP11	15 Winter	1	+0%	100/15 Summer		
14.000	CP12	15 Winter	1	+0%	30/120 Summer		
15.000	ACO QMAX	15 Summer	1	+0%	100/30 Winter		
15.001	ACO OUTFALL	15 Summer	1	+0%	30/180 Winter		
1.007	TANK	360 Winter	1	+0%	30/60 Summer	100/120 Summer	
1.008	S7	360 Winter	1	+0%	1/15 Winter		

PN	US/MH Name	Water Overflow Act.	Surcharged Level (m)	Flooded Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)
7.002	TANK		64.542	-0.223	0.000	0.01		264	3.0
10.000	ACO QMAX		64.810	-0.555	0.000	0.09			22.4
10.001	ACO OUTFALL		64.613	-0.342	0.000	0.13			22.1
10.002	S5		64.542	-0.328	0.000	0.02			5.0
11.000	CP13		64.660	-0.215	0.000	0.01		35	0.4
12.000	CP14		64.672	-0.153	0.000	0.23		7	10.1
10.003	S6		64.542	-0.223	0.000	0.02			6.0
13.000	CP11		64.946	-0.114	0.000	0.49		7	18.2
14.000	CP12		64.663	-0.127	0.000	0.39		6	13.7
15.000	ACO QMAX		64.650	-0.700	0.000	0.00			0.0
15.001	ACO OUTFALL		64.595	-0.450	0.000	0.00			0.0
1.007	TANK		64.542	-0.148	0.000	0.03		380	8.9
1.008	S7		64.542	0.122	0.000	0.14			5.9

PN	US/MH Name	Status	Level Exceeded
7.002	TANK	OK	
10.000	ACO QMAX	OK	
10.001	ACO OUTFALL	OK	
10.002	S5	OK	
11.000	CP13	OK	
12.000	CP14	OK	
10.003	S6	OK	
13.000	CP11	OK	
14.000	CP12	OK	
15.000	ACO QMAX	OK	

8 Meadow Road Edgbaston, Birmingham B 17 8BU	BICESTER GATEWAY 13329 / 103 REVA	
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Date 30/06/2022 16:48 File NETWORK 1.MDX	Designed by JH Checked by JH	
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Micro Drainage	Network 2020.1
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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Storm

PN	US/MH Name	Status	Level Exceeded
15.001	ACO OUTFALL	OK*	
1.007	TANK	OK	15
1.008	S7 SURCHARGED		

8 Meadow Road Edgbaston, Birmingham B 17 8BU	BICESTER GATEWAY 13329 / 103 REVA
Date 30/06/2022 16:48 File NETWORK 1.MDX	Designed by JH Checked by JH



Micro Drainage Network 2020.1

30 year Return Period Summary of Critical Results by Maximum Level (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 ³ /ha Storage 2.000	
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 17
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 0.404
Region England and Wales	Cv (Summer) 0.750	
M5-60 (mm)	20.000	Cv (Winter) 0.840
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	
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
1.000	CP1	15 Winter	30	+0%	100/60 Winter		
1.001	CP2	15 Winter	30	+0%	100/60 Summer		
1.002	CP3	360 Winter	30	+0%	100/30 Winter		
1.003	CP4	360 Winter	30	+0%	30/120 Winter		
2.000	CP5	360 Winter	30	+0%	100/15 Summer		
3.000	CP6	360 Winter	30	+0%	100/30 Winter		
2.001	S1	360 Winter	30	+0%	30/180 Winter		
4.000	CP7	360 Winter	30	+0%	100/30 Winter		
5.000	CP8	15 Winter	30	+0%	100/30 Winter		
1.004	S2	360 Winter	30	+0%	30/120 Winter		
1.005	TANK	360 Winter	30	+0%	30/120 Summer	100/15 Winter	
6.000	ACO QMAX	360 Winter	30	+0%	100/30 Winter		
6.001	ACO OUTFALL	360 Winter	30	+0%	30/180 Winter		
1.006	S3	360 Winter	30	+0%	30/60 Winter	100/15 Winter	
7.000	CP9	360 Winter	30	+0%	100/30 Winter		
8.000	CP10	360 Winter	30	+0%	30/15 Summer		
9.000	TANK	360 Winter	30	+0%	30/120 Winter		
7.001	S4	360 Winter	30	+0%	30/120 Winter		

Baynham Meikle Partnership		Page 24
8 Meadow Road Edgbaston, Birmingham B 17 8BU	BICESTER GATEWAY 13329 / 103 REVA	
Date 30/06/2022 16:48 File NETWORK 1.MDX	Designed by JH Checked by JH	
Micro Drainage	Network 2020.1	

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

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)
1.000	CP1		65.144	-0.206	0.000	0.20		10.9
1.001	CP2		65.087	-0.178	0.000	0.34	6	20.3
1.002	CP3		65.039	-0.131	0.000	0.05	64	4.6
1.003	CP4		65.046	0.171	0.000	0.12	74	12.4
2.000	CP5		64.999	-0.061	0.000	0.25	68	9.1
3.000	CP6		65.014	-0.096	0.000	0.11	17	4.4
2.001	S1		65.148	0.208	0.000	0.03		9.8
4.000	CP7		64.987	-0.118	0.000	0.09	53	4.3
5.000	CP8		65.075	-0.105	0.000	0.55	5	36.4
1.004	S2		65.153	0.308	0.000	0.08		20.7
1.005	TANK		65.167	0.377	0.000	0.07	863	17.0
6.000	ACO QMAX		65.135	-0.230	0.000	0.01		2.1
6.001	ACO OUTFALL		65.135	0.180	0.000	0.12		32.0
1.006	S3		65.175	0.435	0.000	0.06		15.9
7.000	CP9		65.016	-0.069	0.000	0.10	20	6.2
8.000	CP10		65.038	0.118	0.000	0.32	104	10.9
9.000	TANK		65.185	0.270	0.000	0.03	467	8.6
7.001	S4		65.181	0.326	0.000	0.05		16.7

PN	US/MH Name	Status	Level Exceeded
1.000	CP1	OK	
1.001	CP2	OK	
1.002	CP3	OK	
1.003	CP4	SURCHARGED	
2.000	CP5	OK	
3.000	CP6	OK	
2.001	S1	SURCHARGED	
4.000	CP7	OK	
5.000	CP8	OK	
1.004	S2	SURCHARGED	
1.005	TANK	SURCHARGED	
6.000	ACO QMAX	OK	
6.001	ACO OUTFALL	SURCHARGED	
1.006	S3	SURCHARGED	
7.000	CP9	OK	
8.000	CP10	SURCHARGED	
9.000	TANK	SURCHARGED	
7.001	S4	SURCHARGED	


Baynham Meikle Partnership		Page 25
8 Meadow Road Edgbaston, Birmingham B 17 8BU	BICESTER GATEWAY 13329 / 103 REVA	
Date 30/06/2022 16:48 File NETWORK 1.MDX	Designed by JH Checked by JH	
Micro Drainage		Network 2020.1

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
7.002	TANK	480 Winter	30	+0%	30/120 Summer	100/30 Winter	
10.000	ACO QMAX	360 Winter	30	+0%	100/60 Winter		
10.001	ACO OUTFALL	360 Winter	30	+0%	30/180 Winter		
10.002	S5	480 Winter	30	+0%	30/120 Winter		
11.000	CP13	360 Winter	30	+0%	30/120 Winter		
12.000	CP14	360 Winter	30	+0%	30/120 Winter		
10.003	S6	360 Winter	30	+0%	30/60 Winter		
13.000	CP11	15 Winter	30	+0%	100/15 Summer		
14.000	CP12	360 Winter	30	+0%	30/120 Summer		
15.000	ACO QMAX	360 Winter	30	+0%	100/30 Winter		
15.001	ACO OUTFALL	360 Winter	30	+0%	30/180 Winter		
1.007	TANK	360 Winter	30	+0%	30/60 Summer	100/120 Summer	
1.008	S7	360 Winter	30	+0%	1/15 Winter		

PN	US/MH Name	Water Overflow Act.	Surcharged Level (m)	Flooded Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)
7.002	TANK		65.206	0.441	0.000	0.03		875	8.5
10.000	ACO QMAX		65.099	-0.266	0.000	0.03			8.6
10.001	ACO OUTFALL		65.096	0.141	0.000	0.13			22.6
10.002	S5		65.144	0.274	0.000	0.03			8.1
11.000	CP13		64.998	0.123	0.000	0.34		206	13.7
12.000	CP14		65.012	0.187	0.000	0.39		123	17.3
10.003	S6		65.158	0.393	0.000	0.04			11.5
13.000	CP11		65.039	-0.021	0.000	1.00		3	37.4
14.000	CP12		65.000	0.210	0.000	0.43		114	14.8
15.000	ACO QMAX		65.169	-0.181	0.000	0.01			1.8
15.001	ACO OUTFALL		65.171	0.126	0.000	0.11			38.4
1.007	TANK		65.198	0.508	0.000	0.21		1039	52.7
1.008	S7		65.275	0.855	0.000	0.26			10.8

PN	US/MH Name	Status	Level Exceeded
7.002	TANK	SURCHARGED	
10.000	ACO QMAX	OK	
10.001	ACO OUTFALL	SURCHARGED	
10.002	S5	SURCHARGED	
11.000	CP13	SURCHARGED	
12.000	CP14	SURCHARGED	
10.003	S6	SURCHARGED	
13.000	CP11	OK	
14.000	CP12	SURCHARGED	
15.000	ACO QMAX	OK	


8 Meadow Road Edgbaston, Birmingham B 17 8BU	BICESTER GATEWAY 13329 / 103 REVA	
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Date 30/06/2022 16:48 File NETWORK 1.MDX	Designed by JH Checked by JH	
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Micro Drainage	Network 2020.1
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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Storm

PN	US/MH Name	Status	Level Exceeded
15.001	ACO OUTFALL	SURCHARGED*	
1.007	TANK	SURCHARGED	15
1.008	S7	SURCHARGED	

Baynham Meikle Partnership		Page 28
8 Meadow Road Edgbaston, Birmingham B 17 8BU	BICESTER GATEWAY 13329 / 103 REVA	
Date 30/06/2022 16:48 File NETWORK 1.MDX	Designed by JH Checked by JH	
Micro Drainage	Network 2020.1	

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

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)
1.000	CP1		65.604	0.254	0.000	0.08		4.1
1.001	CP2		65.603	0.338	0.000	0.13	209	7.5
1.002	CP3		65.602	0.432	0.000	0.10	257	10.5
1.003	CP4		65.600	0.725	0.000	0.13	229	12.8
2.000	CP5		65.602	0.542	0.000	0.36	194	13.1
3.000	CP6		65.601	0.491	0.000	0.24	213	10.1
2.001	S1		65.599	0.659	0.000	0.06		16.6
4.000	CP7		65.600	0.495	0.000	0.17	233	8.2
5.000	CP8		65.601	0.421	0.000	0.18	211	11.8
1.004	S2		65.599	0.754	0.000	0.14		39.0
1.005	TANK		65.598	0.808	0.000	0.15	1241	37.8
6.000	ACO QMAX		65.623	0.258	0.000	0.03		8.5
6.001	ACO OUTFALL		65.634	0.679	0.000	0.13		34.2
1.006	S3		65.595	0.855	0.000	0.13		34.0
7.000	CP9		65.598	0.513	0.000	0.24	207	14.4
8.000	CP10		65.599	0.679	0.000	0.48	260	16.1
9.000	TANK		65.596	0.681	0.000	0.03	913	8.6
7.001	S4		65.596	0.741	0.000	0.06		18.7

PN	US/MH Name	Status	Level Exceeded
1.000	CP1	FLOOD RISK	
1.001	CP2	SURCHARGED	
1.002	CP3	SURCHARGED	
1.003	CP4	FLOOD RISK	
2.000	CP5	FLOOD RISK	
3.000	CP6	SURCHARGED	
2.001	S1	SURCHARGED	
4.000	CP7	FLOOD RISK	
5.000	CP8	SURCHARGED	
1.004	S2	FLOOD RISK	
1.005	TANK	FLOOD RISK	
6.000	ACO QMAX	FLOOD RISK*	
6.001	ACO OUTFALL	FLOOD RISK	
1.006	S3	FLOOD RISK	
7.000	CP9	SURCHARGED	
8.000	CP10	FLOOD RISK	
9.000	TANK	FLOOD RISK	
7.001	S4	FLOOD RISK	

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Date 30/06/2022 16:48
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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
7.002	TANK	240 Summer	100	+40%	30/120 Summer	100/30 Winter	
10.000	ACO QMAX	360 Winter	100	+40%	100/60 Winter		
10.001	ACO OUTFALL	2160 Summer	100	+40%	30/180 Winter		
10.002	S5	360 Winter	100	+40%	30/120 Winter		
11.000	CP13	360 Winter	100	+40%	30/120 Winter		
12.000	CP14	360 Winter	100	+40%	30/120 Winter		
10.003	S6	360 Winter	100	+40%	30/60 Winter		
13.000	CP11	360 Winter	100	+40%	100/15 Summer		
14.000	CP12	360 Winter	100	+40%	30/120 Summer		
15.000	ACO QMAX	360 Winter	100	+40%	100/30 Winter		
15.001	ACO OUTFALL	360 Winter	100	+40%	30/180 Winter		
1.007	TANK	360 Winter	100	+40%	30/60 Summer	100/120 Summer	
1.008	S7	960 Winter	100	+40%	1/15 Winter		


PN	US/MH Name	Water Overflow Act.	Surcharged Level (m)	Flooded Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)
7.002	TANK		65.631	0.866	0.000	0.05		813	12.8
10.000	ACO QMAX		65.596	0.231	0.000	0.06			15.3
10.001	ACO OUTFALL		65.672	0.717	0.000	0.14			23.6
10.002	S5		65.596	0.726	0.000	0.07			21.2
11.000	CP13		65.595	0.720	0.000	0.33		328	13.5
12.000	CP14		65.596	0.771	0.000	0.39		262	17.4
10.003	S6		65.595	0.830	0.000	0.05			15.4
13.000	CP11		65.598	0.538	0.000	0.43		208	16.1
14.000	CP12		65.597	0.807	0.000	0.47		255	16.4
15.000	ACO QMAX		65.654	0.304	0.000	0.01			2.6
15.001	ACO OUTFALL		65.644	0.599	0.000	0.11			38.1
1.007	TANK		65.594	0.904	43.809	0.25		1274	64.6
1.008	S7		65.619	1.199	0.000	0.55			23.5

PN	US/MH Name	Status	Level Exceeded
7.002	TANK	FLOOD RISK	
10.000	ACO QMAX	FLOOD RISK*	
10.001	ACO OUTFALL	FLOOD RISK	
10.002	S5	FLOOD RISK	
11.000	CP13	FLOOD RISK	
12.000	CP14	FLOOD RISK	
10.003	S6	FLOOD RISK	
13.000	CP11	SURCHARGED	
14.000	CP12	FLOOD RISK	
15.000	ACO QMAX	FLOOD RISK*	

Baynham Meikle Partnership		Page 30
8 Meadow Road Edgbaston, Birmingham B 17 8BU	BICESTER GATEWAY 13329 / 103 REVA	
Date 30/06/2022 16:48 File NETWORK 1.MDX	Designed by JH Checked by JH	
Micro Drainage	Network 2020.1	

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

PN	US/MH Name	Status	Level Exceeded
15.001	ACO OUTFALL	FLOOD RISK*	
1.007	TANK	FLOOD	15
1.008	S7	FLOOD RISK	

Baynham Meikle Partnership		Page 1
8 Meadow Road Edgbaston, Birmingham B 17 8BU	BICESTER GATEWAY 13329 / 103 REVA NETWORK 2	
Date 30/06/2022 16:56 File NETWORK 2.MDX	Designed by JH Checked by JH	
Micro Drainage	Network 2020.1	

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	PIMP (%)	100
M5-60 (mm)	20.000	Add Flow / Climate Change (%)	0
Ratio R	0.404	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm





Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.434	4-8	0.279	8-12	0.038

Total Area Contributing (ha) = 0.751

Total Pipe Volume (m³) = 39.477


Network Design Table for Storm

« - Indicates pipe capacity < flow









PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
20.000	78.400	0.160	490.0	0.198	6.00	0.0	0.600	Q70	-6	Pipe/Conduit	
20.001	6.161	0.070	88.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
20.002	16.910	0.050	338.2	0.033	0.00	0.0	0.600	o	450	Pipe/Conduit	
21.000	38.397	0.110	349.1	0.035	6.00	0.0	0.600	o	225	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)
20.000	46.04	7.28	64.480	0.198	0.0	0.0	0.0	1.02	255.9	24.7
20.001	45.84	7.34	64.320	0.198	0.0	0.0	0.0	1.68	118.5	24.7
20.002	45.04	7.59	64.250	0.231	0.0	0.0	0.0	1.10	174.9	28.2
21.000	47.21	6.92	64.840	0.035	0.0	0.0	0.0	0.69	27.6	4.5

Baynham Meikle Partnership		Page 2
8 Meadow Road Edgbaston, Birmingham B 17 8BU	BICESTER GATEWAY 13329 / 103 REVA NETWORK 2	
Date 30/06/2022 16:56 File NETWORK 2.MDX	Designed by JH Checked by JH	
Micro Drainage	Network 2020.1	

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
21.001	35.983	0.105	342.7	0.038	0.00	0.0	0.600	o	225	Pipe/Conduit	
21.002	23.840	0.425	56.1	0.038	0.00	0.0	0.600	o	225	Pipe/Conduit	
20.003	16.910	0.050	338.2	0.096	0.00	0.0	0.600	o	450	Pipe/Conduit	
20.004	11.451	0.040	286.3	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
20.005	24.379	0.065	375.1	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
20.006	24.379	0.070	348.3	0.313	0.00	0.0	0.600	o	450	Pipe/Conduit	
20.007	2.334	0.010	233.4	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
20.008	11.880	0.323	36.8	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)
21.001	44.49	7.78	64.730	0.073	0.0	0.0	0.0	0.70	27.9	8.8
21.002	43.83	8.00	64.625	0.111	0.0	0.0	0.0	1.75	69.6	13.2
20.003	43.10	8.26	64.200	0.438	0.0	0.0	0.0	1.10	174.9	51.1
20.004	42.67	8.42	64.150	0.438	0.0	0.0	0.0	1.20	190.3	51.1
20.005	41.65	8.81	64.110	0.438	0.0	0.0	0.0	1.04	166.0	51.1
20.006	40.77	9.18	64.045	0.751	0.0	0.0	0.0	1.08	172.3	82.9
20.007	40.71	9.21	63.975	0.751	0.0	0.0	0.0	1.33	211.0	82.9
20.008	40.44	9.33	63.965	0.751	0.0	0.0	0.0	1.66	29.4«	82.9




Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diam (mm)
ACO	65.550	1.070	Junction		20.000	64.480	-6			
ACO OUTLET	65.550	1.230	Open Manhole	1050	20.001	64.320	300	20.000	64.320	
CP100	65.550	1.300	Open Manhole	1050	20.002	64.250	450	20.001	64.250	
FILTER TRENCH	65.640	0.800	Open Manhole	600	21.000	64.840	225			
FILTER TRENCH	65.640	0.910	Open Manhole	600	21.001	64.730	225	21.000	64.730	
FILTER TRENCH OUTLET	65.640	1.015	Open Manhole	600	21.002	64.625	225	21.001	64.625	
PERMEABLE PAVING	65.495	1.295	Open Manhole	100	20.003	64.200	450	20.002	64.200	
								21.002	64.200	
CP107	65.465	1.315	Open Manhole	1050	20.004	64.150	450	20.003	64.150	
CP108	65.350	1.240	Open Manhole	1050	20.005	64.110	450	20.004	64.110	
PERMEABLE PAVING	65.295	1.250	Open Manhole	100	20.006	64.045	450	20.005	64.045	
CP112	65.240	1.265	Open Manhole	1050	20.007	63.975	450	20.006	63.975	
S100	65.400	1.435	Open Manhole	1350	20.008	63.965	150	20.007	63.965	
	64.700	1.058	Open Manhole	100		OUTFALL		20.008	63.642	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
ACO	457168.785	221008.800			No Entry	
ACO OUTLET	457228.368	220957.845	457228.368	220957.845	Required	
CP100	457228.433	220951.684	457228.433	220951.684	Required	
FILTER TRENCH	457148.529	220978.372	457148.529	220978.372	Required	
FILTER TRENCH	457177.701	220953.426	457177.701	220953.426	Required	
FILTER TRENCH OUTLET	457205.018	220929.994	457205.018	220929.994	Required	
PERMEABLE PAVING	457228.371	220934.790	457228.371	220934.790	Required	

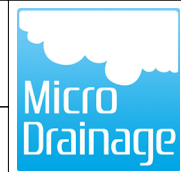
Baynham Meikle Partnership		Page 4
8 Meadow Road Edgbaston, Birmingham B 17 8BU	BICESTER GATEWAY 13329 / 103 REVA NETWORK 2	
Date 30/06/2022 16:56 File NETWORK 2.MDX	Designed by JH Checked by JH	
Micro Drainage	Network 2020.1	

Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
CP107	457228.327	220917.880	457228.327	220917.880	Required	
CP108	457238.139	220911.977	457238.139	220911.977	Required	
PERMEABLE PAVING	457243.270	220888.144	457243.270	220888.144	Required	
CP112	457248.402	220864.310	457248.402	220864.310	Required	
S100	457249.557	220862.282	457249.557	220862.282	Required	
	457254.595	220851.523			No Entry	

8 Meadow Road
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B 17 8BU

BICESTER GATEWAY
13329 / 103 REVA
NETWORK 2



Date 30/06/2022 16:56
File NETWORK 2.MDX

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Network 2020.1

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
20.000	Q70	-6	ACO	65.550	64.480	0.370	Junction	
20.001	o	300	ACO OUTLET	65.550	64.320	0.930	Open Manhole	1050
20.002	o	450	CP100	65.550	64.250	0.850	Open Manhole	1050
21.000	o	225	FILTER TRENCH	65.640	64.840	0.575	Open Manhole	600
21.001	o	225	FILTER TRENCH	65.640	64.730	0.685	Open Manhole	600
21.002	o	225	FILTER TRENCH OUTLET	65.640	64.625	0.790	Open Manhole	600
20.003	o	450	PERMEABLE PAVING	65.495	64.200	0.845	Open Manhole	100
20.004	o	450	CP107	65.465	64.150	0.865	Open Manhole	1050
20.005	o	450	CP108	65.350	64.110	0.790	Open Manhole	1050
20.006	o	450	PERMEABLE PAVING	65.295	64.045	0.800	Open Manhole	100
20.007	o	450	CP112	65.240	63.975	0.815	Open Manhole	1050
20.008	o	150	S100	65.400	63.965	1.285	Open Manhole	1350

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
20.000	78.400	490.0	ACO OUTLET	65.550	64.320	0.530	Open Manhole	1050
20.001	6.161	88.0	CP100	65.550	64.250	1.000	Open Manhole	1050
20.002	16.910	338.2	PERMEABLE PAVING	65.495	64.200	0.845	Open Manhole	100
21.000	38.397	349.1	FILTER TRENCH	65.640	64.730	0.685	Open Manhole	600
21.001	35.983	342.7	FILTER TRENCH OUTLET	65.640	64.625	0.790	Open Manhole	600
21.002	23.840	56.1	PERMEABLE PAVING	65.495	64.200	1.070	Open Manhole	100
20.003	16.910	338.2	CP107	65.465	64.150	0.865	Open Manhole	1050
20.004	11.451	286.3	CP108	65.350	64.110	0.790	Open Manhole	1050
20.005	24.379	375.1	PERMEABLE PAVING	65.295	64.045	0.800	Open Manhole	100
20.006	24.379	348.3	CP112	65.240	63.975	0.815	Open Manhole	1050
20.007	2.334	233.4	S100	65.400	63.965	0.985	Open Manhole	1350
20.008	11.880	36.8		64.700	63.642	0.908	Open Manhole	100

8 Meadow Road
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B 17 8BU

BICESTER GATEWAY
13329 / 103 REVA
NETWORK 2



Date 30/06/2022 16:56
File NETWORK 2.MDX

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Network Classifications for Storm

PN	USMH Name	Pipe Dia (mm)	Min Cover Depth (m)	Max Cover Depth (m)	Pipe Type	MH Dia (mm)	MH Width (mm)	MH Ring Depth (m)	MH Type
20.000	ACO	-6	0.370	0.530	Unclassified				Junction
20.001	ACO OUTLET	300	0.930	1.000	Unclassified	1050	0	0.930	Unclassified
20.002	CP100	450	0.845	0.850	Unclassified	1050	0	0.850	Unclassified
21.000	FILTER TRENCH	225	0.575	0.685	Unclassified	600	0	0.575	Unclassified
21.001	FILTER TRENCH	225	0.685	0.790	Unclassified	600	0	0.685	Unclassified
21.002	FILTER TRENCH OUTLET	225	0.790	1.070	Unclassified	600	0	0.790	Unclassified
20.003	PERMEABLE PAVING	450	0.845	0.865	Unclassified	100	0	0.845	Unclassified
20.004	CP107	450	0.790	0.865	Unclassified	1050	0	0.865	Unclassified
20.005	CP108	450	0.790	0.800	Unclassified	1050	0	0.790	Unclassified
20.006	PERMEABLE PAVING	450	0.800	0.815	Unclassified	100	0	0.800	Unclassified
20.007	CP112	450	0.815	0.985	Unclassified	1050	0	0.815	Unclassified
20.008	S100	150	0.908	1.285	Unclassified	1350	0	1.285	Unclassified

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)
20.008		64.700	63.642	0.000	100	0


Simulation Criteria for Storm

Volumetric Runoff Coeff 0.750 Additional Flow - % of Total Flow 0.000
 Areal Reduction Factor 1.000 MADD Factor * 10m³/ha Storage 2.000
 Hot Start (mins) 0 Inlet 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 4
 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) 1 Cv (Summer) 0.750
 Region England and Wales Cv (Winter) 0.840
 M5-60 (mm) 20.000 Storm Duration (mins) 30
 Ratio R 0.404

Baynham Meikle Partnership		Page 7
8 Meadow Road Edgbaston, Birmingham B 17 8BU	BICESTER GATEWAY 13329 / 103 REVA NETWORK 2	
Date 30/06/2022 16:56 File NETWORK 2.MDX	Designed by JH Checked by JH	
Micro Drainage	Network 2020.1	

Online Controls for Storm

Complex Manhole: S100, DS/PN: 20.008, Volume (m³): 2.2

Hydro-Brake® Optimum

Unit Reference MD-SHE-0097-3600-0500-3600
 Design Head (m) 0.500
 Design Flow (l/s) 3.6
 Flush-Flo™ Calculated
 Objective Minimise upstream storage
 Application Surface
 Sump Available Yes
 Diameter (mm) 97
 Invert Level (m) 63.965
 Minimum Outlet Pipe Diameter (mm) 150
 Suggested Manhole Diameter (mm) 1200


Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.500	3.6
Flush-Flo™	0.164	3.6
Kick-Flo®	0.361	3.1
Mean Flow over Head Range	-	3.0

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	3.2	1.200	5.4	3.000	8.3	7.000	12.5
0.200	3.6	1.400	5.8	3.500	8.9	7.500	12.9
0.300	3.4	1.600	6.2	4.000	9.5	8.000	13.3
0.400	3.3	1.800	6.5	4.500	10.1	8.500	13.8
0.500	3.6	2.000	6.9	5.000	10.6	9.000	14.2
0.600	3.9	2.200	7.2	5.500	11.0	9.500	14.5
0.800	4.5	2.400	7.5	6.000	11.5		
1.000	5.0	2.600	7.8	6.500	12.0		

Orifice

Diameter (m) 0.136 Discharge Coefficient 0.600 Invert Level (m) 64.765

Baynham Meikle Partnership		Page 8
8 Meadow Road Edgbaston, Birmingham B 17 8BU	BICESTER GATEWAY 13329 / 103 REVA NETWORK 2	
Date 30/06/2022 16:56 File NETWORK 2.MDX	Designed by JH Checked by JH	
Micro Drainage	Network 2020.1	

Storage Structures for Storm

Porous Car Park Manhole: FILTER TRENCH , DS/PN: 21.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	1.0
Membrane Percolation (mm/hr)	1000	Length (m)	38.4
Max Percolation (l/s)	10.7	Slope (1:X)	350.0
Safety Factor	1.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	64.730	Membrane Depth (mm)	0

Porous Car Park Manhole: FILTER TRENCH OUTLET , DS/PN: 21.002


Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	1.0
Membrane Percolation (mm/hr)	1000	Length (m)	36.0
Max Percolation (l/s)	10.0	Slope (1:X)	350.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	64.625	Membrane Depth (mm)	0

Porous Car Park Manhole: PERMEABLE PAVING, DS/PN: 20.003

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	15.0
Membrane Percolation (mm/hr)	1000	Length (m)	36.6
Max Percolation (l/s)	152.5	Slope (1:X)	350.0
Safety Factor	1.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	64.595	Membrane Depth (mm)	0

Porous Car Park Manhole: PERMEABLE PAVING, DS/PN: 20.006

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	51.7
Membrane Percolation (mm/hr)	1000	Length (m)	50.0
Max Percolation (l/s)	718.1	Slope (1:X)	350.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	64.395	Membrane Depth (mm)	0

Baynham Meikle Partnership		Page 9
8 Meadow Road Edgbaston, Birmingham B 17 8BU	BICESTER GATEWAY 13329 / 103 REVA NETWORK 2	
Date 30/06/2022 16:56 File NETWORK 2.MDX	Designed by JH Checked by JH	
Micro Drainage	Network 2020.1	

1 year Return Period Summary of Critical Results by Maximum Level (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 ³ /ha Storage	2.000
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	4
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	0.403
Region England and Wales	Cv (Summer)		0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840
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		
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
20.000	ACO	15 Winter	1	+0%		
20.001	ACO OUTLET	60 Winter	1	+0%	30/15 Summer	
20.002	CP100	60 Winter	1	+0%	30/15 Summer	
21.000	FILTER TRENCH	15 Winter	1	+0%	100/15 Winter	
21.001	FILTER TRENCH	15 Winter	1	+0%	100/15 Summer	
21.002	FILTER TRENCH OUTLET	15 Winter	1	+0%	100/15 Summer	
20.003	PERMEABLE PAVING	60 Winter	1	+0%	30/15 Summer	
20.004	CP107	60 Winter	1	+0%	30/15 Summer	
20.005	CP108	120 Winter	1	+0%	30/15 Summer	
20.006	PERMEABLE PAVING	240 Winter	1	+0%	1/60 Winter	
20.007	CP112	240 Winter	1	+0%	1/15 Summer	100/60 Winter
20.008	S100	180 Winter	1	+0%	1/15 Summer	100/60 Winter

Baynham Meikle Partnership		Page 10
8 Meadow Road Edgbaston, Birmingham B 17 8BU	BICESTER GATEWAY 13329 / 103 REVA NETWORK 2	
Date 30/06/2022 16:56 File NETWORK 2.MDX	Designed by JH Checked by JH	
Micro Drainage	Network 2020.1	

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

PN	US/MH Name	First (Z) Overflow	Overflow Act.	Water Surcharged			Flooded Volume (m³)	Flow / Overflow Cap. (l/s)
				Level (m)	Depth (m)	Flow		
20.000	ACO			64.632	-0.548	0.000	0.09	
20.001	ACO OUTLET			64.574	-0.046	0.000	0.19	
20.002	CP100			64.571	-0.129	0.000	0.10	
21.000	FILTER TRENCH			64.902	-0.163	0.000	0.17	
21.001	FILTER TRENCH			64.816	-0.139	0.000	0.31	
21.002	FILTER TRENCH OUTLET			64.690	-0.160	0.000	0.19	
20.003	PERMEABLE PAVING			64.566	-0.084	0.000	0.17	
20.004	CP107			64.545	-0.055	0.000	0.16	
20.005	CP108			64.528	-0.032	0.000	0.10	
20.006	PERMEABLE PAVING			64.525	0.030	0.000	0.13	
20.007	CP112			64.607	0.182	0.000	0.07	
20.008	S100			64.615	0.500	0.000	0.14	


PN	US/MH Name	Half Drain Pipe		Status	Level Exceeded
		Time (mins)	Flow (l/s)		
20.000	ACO		24.2	OK	
20.001	ACO OUTLET		12.4	OK	
20.002	CP100		13.8	OK	
21.000	FILTER TRENCH		4.4	OK	
21.001	FILTER TRENCH	6	8.1	OK	
21.002	FILTER TRENCH OUTLET	7	11.8	OK	
20.003	PERMEABLE PAVING	184	24.0	OK	
20.004	CP107		21.5	OK	
20.005	CP108		14.4	OK	
20.006	PERMEABLE PAVING	134	19.2	SURCHARGED	
20.007	CP112		9.0	SURCHARGED	1
20.008	S100		3.8	SURCHARGED	

Baynham Meikle Partnership		Page 12
8 Meadow Road Edgbaston, Birmingham B 17 8BU	BICESTER GATEWAY 13329 / 103 REVA NETWORK 2	
Date 30/06/2022 16:56 File NETWORK 2.MDX	Designed by JH Checked by JH	
Micro Drainage	Network 2020.1	

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

PN	US/MH Name	First (Z) Overflow	Overflow Act.	Water Surcharged Flooded			Flow / Cap. (l/s)
				Level (m)	Depth (m)	Volume (m ³)	
20.000	ACO			64.834	-0.346	0.000	0.19
20.001	ACO OUTLET			64.791	0.171	0.000	0.61
20.002	CP100			64.719	0.019	0.000	0.30
21.000	FILTER TRENCH			64.942	-0.123	0.000	0.41
21.001	FILTER TRENCH			64.885	-0.070	0.000	0.78
21.002	FILTER TRENCH OUTLET			64.745	-0.105	0.000	0.40
20.003	PERMEABLE PAVING			64.694	0.044	0.000	0.15
20.004	CP107			64.694	0.094	0.000	0.15
20.005	CP108			64.694	0.134	0.000	0.15
20.006	PERMEABLE PAVING			64.693	0.198	0.000	0.22
20.007	CP112			64.906	0.481	0.000	0.20
20.008	S100			64.952	0.837	0.000	0.24

PN	US/MH Name	Half Drain Pipe		Status	Level Exceeded
		Time (mins)	Flow (l/s)		
20.000	ACO		47.4	OK	
20.001	ACO OUTLET		40.6	SURCHARGED	
20.002	CP100		40.7	SURCHARGED	
21.000	FILTER TRENCH		10.8	OK	
21.001	FILTER TRENCH	6	20.6	OK	
21.002	FILTER TRENCH OUTLET	7	25.3	OK	
20.003	PERMEABLE PAVING	183	20.5	SURCHARGED	
20.004	CP107		20.5	SURCHARGED	
20.005	CP108		20.3	SURCHARGED	
20.006	PERMEABLE PAVING	458	31.1	SURCHARGED	
20.007	CP112		25.0	SURCHARGED	1
20.008	S100		6.5	SURCHARGED	

Baynham Meikle Partnership		Page 13
8 Meadow Road Edgbaston, Birmingham B 17 8BU	BICESTER GATEWAY 13329 / 103 REVA NETWORK 2	
Date 30/06/2022 16:56 File NETWORK 2.MDX	Designed by JH Checked by JH	
Micro Drainage	Network 2020.1	

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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
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 4
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 0.403
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 20.000 Cv (Winter) 0.840
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
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
20.000	ACO 120	Winter	100	+40%		
20.001	ACO OUTLET 120	Winter	100	+40%	30/15 Summer	
20.002	CP100 360	Winter	100	+40%	30/15 Summer	
21.000	FILTER TRENCH 15	Winter	100	+40%	100/15 Winter	
21.001	FILTER TRENCH 15	Winter	100	+40%	100/15 Summer	
21.002	FILTER TRENCH OUTLET 30	Winter	100	+40%	100/15 Summer	
20.003	PERMEABLE PAVING 360	Winter	100	+40%	30/15 Summer	
20.004	CP107 360	Winter	100	+40%	30/15 Summer	
20.005	CP108 360	Winter	100	+40%	30/15 Summer	
20.006	PERMEABLE PAVING 360	Winter	100	+40%	1/60 Winter	
20.007	CP112 60	Winter	100	+40%	1/15 Summer	100/60 Winter
20.008	S100 60	Winter	100	+40%	1/15 Summer	100/60 Winter

Baynham Meikle Partnership		Page 14
8 Meadow Road Edgbaston, Birmingham B 17 8BU	BICESTER GATEWAY 13329 / 103 REVA NETWORK 2	
Date 30/06/2022 16:56 File NETWORK 2.MDX	Designed by JH Checked by JH	
Micro Drainage	Network 2020.1	

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

PN	US/MH Name	First (Z) Overflow	Overflow Act.	Water Surcharged Flooded			Flow / Overflow Cap. (l/s)
				Level (m)	Depth (m)	Volume (m³)	
20.000	ACO			65.025	-0.155	0.000	0.15
20.001	ACO OUTLET			64.958	0.338	0.000	0.56
20.002	CP100			64.893	0.193	0.000	0.14
21.000	FILTER TRENCH			65.094	0.029	0.000	0.72
21.001	FILTER TRENCH			65.042	0.087	0.000	1.14
21.002	FILTER TRENCH OUTLET			64.926	0.076	0.000	0.56
20.003	PERMEABLE PAVING			64.892	0.242	0.000	0.23
20.004	CP107			64.891	0.291	0.000	0.23
20.005	CP108			64.889	0.329	0.000	0.23
20.006	PERMEABLE PAVING			64.887	0.392	0.000	0.34
20.007	CP112			65.240	0.815	0.496	0.28
20.008	S100			65.348	1.233	0.056	0.52

PN	US/MH Name	Half Drain Pipe		Status	Level Exceeded
		Time (mins)	Flow (l/s)		
20.000	ACO		38.7	OK	
20.001	ACO OUTLET		37.0	SURCHARGED	
20.002	CP100		18.7	SURCHARGED	
21.000	FILTER TRENCH		18.8	SURCHARGED	
21.001	FILTER TRENCH		7	30.0	SURCHARGED
21.002	FILTER TRENCH OUTLET		19	36.0	SURCHARGED
20.003	PERMEABLE PAVING	358	31.3	SURCHARGED	
20.004	CP107		31.0	SURCHARGED	
20.005	CP108		31.2	SURCHARGED	
20.006	PERMEABLE PAVING	672	48.4	SURCHARGED	
20.007	CP112		35.3	FLOOD	1
20.008	S100		13.8	FLOOD	



Appendix D – Other Supporting Information

D.1 Available Ground Investigation



Contract Name: Bicester Gateway, Phase 1B, Wendlebury Road, Chesterton		Client: Baynham Meikle Partnership Limited			Hole ID: BH01
Contract Number: 20249	Start and End Date:	Logged By:	Checked By:	Status: DRAFT	Hole Type: CP
Easting:	Northing:	Ground Level:	Plant Used:	Print Date: 17/06/2022	Scale: 1:50

Termination: SPT Hammer: N/R, Energy Ratio: N/R Sheet 1 of 1

Samples & In Situ Testing			Strata Details					Groundwater	
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike	Backfill/Installation	
0.20	D	N=28 (3,7/8,7,9,4)		(0.70)		Brown clayey soil.			
0.60	D			0.70		Brown grey silty CLAY			
0.90	D			0.90		Soft firm rows grey sandy silty CLAY.	1		
1.20	SPT			(0.40)		Loose brown silty SAND and GRAVEL			
1.20 - 1.70	D B			1.30	(0.35)		Dark grey CLAY		
1.80	D	50 (50 for 75mm/50 for 75mm)		(0.40)		Brown SAND and GRAVEL with mudstone fragments.	2		
2.00	U			2.05	(0.35)		Dense brown sandstone		
2.00 - 2.40	B			2.40					
2.40 - 2.50	SPT			2.50			End of Borehole at 2.50m		
							3		
							4		
							5		
							6		
							7		
							8		
							9		
							10		

Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:				
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)					
Chiselling					Installation				Water Strikes				
From (m)	To (m)	Duration	Remarks	Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks

Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.



Contract Name: Bicester Gateway, Phase 1B, Wendlebury Road, Chesterton		Client: Baynham Meikle Partnership Limited			Hole ID: BH02
Contract Number: 20249	Start and End Date:	Logged By:	Checked By:	Status: DRAFT	Hole Type: CP
Easting:	Northing:	Ground Level:	Plant Used:	Print Date: 17/06/2022	Scale: 1:50

Termination: SPT Hammer: N/R, Energy Ratio: N/R Sheet 1 of 1

Samples & In Situ Testing				Strata Details				Groundwater	
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike	Backfill/Installation	
0.30	D			(0.50)		Brown clayey soil			
0.60	D			0.50 (0.30)		Brown sandy clay silty CLAY			
1.20	SPT B	N=28 (3,7/8,7,9,4)		0.80 (0.90)		Brown SAND and GRAVEL	1		
1.80	D			1.70 (1.80)		Brown grey silty CLAY			
2.00	SPT	N=7 (1,1/1,2,2,2)		(1.20)		Dark grey CLAY	2		
3.00	SPT B	50 (50 for 75mm/50 for 75mm)		3.00 (3.10)		Dense brown sandstone	3		
						End of Borehole at 3.10m			
							4		
							5		
							6		
							7		
							8		
							9		
							10		

Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	

Chiselling				Installation				Water Strikes					
From (m)	To (m)	Duration	Remarks	Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks

Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.



Contract Name: Bicester Gateway, Phase 1B, Wendlebury Road, Chesterton		Client: Baynham Meikle Partnership Limited			Hole ID: BH03	
Contract Number: 20249		Start and End Date:	Logged By:	Checked By:	Status: DRAFT	Hole Type: CP
Easting:		Northing:	Ground Level:	Plant Used:	Print Date: 17/06/2022	Scale: 1:50

Termination:				SPT Hammer: N/R, Energy Ratio: N/R		Sheet 1 of 1
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Samples & In Situ Testing				Strata Details				Groundwater	
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike	Backfill/Installation	
0.20	D					Dense clayey soil			
0.40	D			(1.20)					
0.80	D					Brown grey silty CLAY			
1.20	U			1.20 (0.40)					
1.55	D					Firm grey silty CLAY			
1.55 - 2.00	B			1.60					
2.00	SPT	49 (2,3/49 for 225mm)		(0.70)		Dense brown sandstone			
2.00 - 2.50	B			2.30					
2.50	SPT	50 (50 for 75mm/50 for 75mm)		2.50		End of Borehole at 2.50m			

Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	

Chiselling					Installation				Water Strikes				
From (m)	To (m)	Duration	Remarks	Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks

Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.



Contract Name: Bicester Gateway, Phase 1B, Wendlebury Road, Chesterton		Client: Baynham Meikle Partnership Limited			Hole ID: BH04
Contract Number: 20249	Start and End Date:	Logged By:	Checked By:	Status: DRAFT	Hole Type: CP
Easting:	Northing:	Ground Level:	Plant Used:	Print Date: 17/06/2022	Scale: 1:50

Termination: SPT Hammer: N/R, Energy Ratio: N/R Sheet 1 of 1

Samples & In Situ Testing				Strata Details				Groundwater	
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description		Water Strike	Backfill/Installation
0.10	D			(0.30)		Brown clayey soil			
0.40	D			0.30		Brown grey silty CLAY			
1.00	D			(1.25)		Dark grey CLAY		1	
1.20	U								
1.65	D			1.55		Dark grey CLAY			
1.90	D	N=46 (4,5/6,5,6,29)		(0.95)				2	
2.00	SPT								
2.00 - 2.50	B								
2.50 - 2.60	B	50 (50 for 75mm/50 for 75mm)		2.50		Dense brown sandstone			
2.60	SPT		2.60			End of Borehole at 2.60m		3	
								4	
								5	
								6	
								7	
								8	
								9	
								10	

Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:	
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)		
					Water Strikes					
					Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
					Installation					
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)		

Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.



Contract Name: Bicester Gateway, Phase 1B, Wendlebury Road, Chesterton		Client: Baynham Meikle Partnership Limited			Hole ID: BH05
Contract Number: 20249	Start and End Date:	Logged By:	Checked By:	Status: DRAFT	Hole Type: CP
Easting:	Northing:	Ground Level:	Plant Used:	Print Date: 17/06/2022	Scale: 1:50

Termination: SPT Hammer: N/R, Energy Ratio: N/R Sheet 1 of 1

Samples & In Situ Testing				Strata Details				Groundwater	
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description		Water Strike	Backfill/Installation
0.10	D			0.10		TOPSOIL			
0.40	D			(0.40)		Brown clayey soil			
0.50				0.50		Brown grey silty CLAY			
1.00	D	N=6 (1,1/2,1,1,2)		(1.20)				1	
1.20	SPT								
1.20 - 1.70	U B								
1.65	D			1.70		Brown sandy CLAY with gravel			
1.90	D	N=10 (1,1/2,2,2,4)		(0.30)		Dark grey CLAY		2	
2.00	SPT								
2.00 - 2.40	B				(0.40)				
2.40 - 2.50	B	50 (50 for 75mm/50 for 75mm)		2.40		Dense brown sandstone			
2.50	SPT			2.50		End of Borehole at 2.50m		3	
								4	
								5	
								6	
								7	
								8	
								9	
								10	

Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)						
Chiselling					Installation				Water Strikes					
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks

Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.



Contract Name: Bicester Gateway, Phase 1B, Wendlebury Road, Chesterton		Client: Baynham Meikle Partnership Limited			Hole ID: BH06
Contract Number: 20249	Start and End Date:	Logged By:	Checked By:	Status: DRAFT	Hole Type: CP
Easting:	Northing:	Ground Level:	Plant Used:	Print Date: 17/06/2022	Scale: 1:50

Termination: SPT Hammer: N/R, Energy Ratio: N/R Sheet 1 of 1

Samples & In Situ Testing				Strata Details				Groundwater	
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike	Backfill/Installation	
0.00	D	N=8 (1,1/2,2,2,2)		0.10		TOPSOIL	1		
0.40	D			(0.50)		Brown clayey soil			
0.60						Brown silty CLAY			
1.00	D	N=8 (1,1/2,2,2,2)		(0.70)		Brown grey silty CLAY	2		
1.20	SPT			1.30					
1.20 - 1.70	B			(0.50)					
1.80	D	50 (50 for 75mm/50 for 75mm)		1.80		Dark grey CLAY	3		
2.00	U			(0.60)					
2.40	SPT	50 (50 for 75mm/50 for 75mm)		2.40		Dense brown sandstone	4		
2.40 - 2.50	D			2.50		End of Borehole at 2.50m			
	B						5		
							6		
							7		
							8		
							9		
							10		

Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	

Chiselling					Installation				Water Strikes				
From (m)	To (m)	Duration	Remarks	Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks

Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.



Contract Name: Bicester Gateway, Phase 1B, Wendlebury Road, Chesterton		Client: Baynham Meikle Partnership Limited			Hole ID: BH07
Contract Number: 20249	Start and End Date:	Logged By:	Checked By:	Status: DRAFT	Hole Type: CP
Easting:	Northing:	Ground Level:	Plant Used:	Print Date: 17/06/2022	Scale: 1:50

Termination: SPT Hammer: N/R, Energy Ratio: N/R Sheet 1 of 1

Samples & In Situ Testing			Strata Details					Groundwater	
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description	Water Strike	Backfill/Installation	
0.20	D	N=6 (1,1/1,1,2,2)		(0.45)		TOPSOIL			
0.50	D			0.45		Orange brown CLAY			
0.90	D			0.90		Brown silty CLAY very sandy	1		
1.20 1.20 - 1.70	SPT B	50 (50 for 75mm/50 for 75mm)		(0.80)		Grey silty CLAY			
1.70	D			1.70		Dense brown sandstone	2		
2.00 2.20	SPT B			2.00 2.20		End of Borehole at 2.20m			
							3		
							4		
							5		
							6		
							7		
							8		
							9		
							10		

Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	
Chiselling					Installation				Water Strikes
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)	Strike (m) Casing (m) Sealed (m) Time (mins) Rose to (m) Remarks

Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.



Contract Name: Bicester Gateway, Phase 1B, Wendlebury Road, Chesterton		Client: Baynham Meikle Partnership Limited			Hole ID: WS01
Contract Number: 20249	Start and End Date: 30/05/22	Logged By: CF	Checked By:	Status: DRAFT	Hole Type: WS
Easting:	Northing:	Ground Level:	Plant Used:	Print Date: 17/06/2022	Scale: 1:50

Weather: Termination: Sheet 1 of 1

Samples & In Situ Testing			Strata Details					Groundwater	
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description		Water Strike	Backfill/Installation
1.20	D			(0.40)		Firm dark brown, slightly gravelly sandy CLAY. Gravel is sub-angular to sub-rounded fine to coarse flint, igneous and fine clinker. Occasional black speckling. Frequent rootlets. MADE GROUND.	1		
				0.40		Firm brown mottled greyish brown, slightly sandy slightly gravelly CLAY. Gravel is sub-angular to sub-rounded fine to coarse flint, concrete, fine red brick and clinker. Occasional orangish brown mottling. Occasional black speckling. Occasional rootlets. MADE GROUND.			
1.80	D			0.55		Firm yellowish brown, brownish grey and light brown mottled, slightly gravelly, slightly sandy becoming very sandy CLAY. Gravel is sub-angular fine to medium flint. Occasional rootlets.	1		
				(0.30)		Brownish grey, light brown and yellowish brown mottled, clayey silty very gravelly SAND. Gravel is sub-angular to sub-rounded fine to medium flint.			
				(0.45)		<i>No recovery and drop down material.</i>			
				1.30		Firm becoming stiff dark grey, slightly sandy silty CLAY. Sand is predominantly fine. Occasional fine to coarse sand-sized calcareous thin laminations. Occasional desiccated rootlets and woody fragments. Rare grey sub-angular fine-gravel sized calcareous fragments.	2		
				(1.70)					
				3.00		End of Borehole at 3.00m	3		
							4		
							5		
							6		
							7		
							8		
							9		
							10		

Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:				
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Rootlets observed to 1.90m bgl.				
Chiselling					Installation				Water Strikes				
From (m)	To (m)	Duration	Remarks	Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
											0	0.00	No groundwater encountered.
Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.													



Contract Name: Bicester Gateway, Phase 1B, Wendlebury Road, Chesterton		Client: Baynham Meikle Partnership Limited			Hole ID: WS02
Contract Number: 20249	Start and End Date: 30/05/22	Logged By: CF	Checked By:	Status: DRAFT	Hole Type: WS
Easting:	Northing:	Ground Level:	Plant Used:	Print Date: 17/06/2022	Scale: 1:50

Weather: Termination: Sheet 1 of 1

Samples & In Situ Testing				Strata Details				Groundwater	
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description		Water Strike	Backfill/Installation
1.20	D			(0.60)		Firm dark brown, slightly gravelly sandy CLAY. Gravel is sub-angular to sub-rounded fine to coarse flint, igneous, fine red brick and clinker. Occasional black speckling. Frequent rootlets becoming occasional. MADE GROUND.			
1.40	D			0.60 0.70 (0.30)		Firm brown mottled greyish brown, slightly sandy slightly gravelly CLAY. Gravel is sub-angular to sub-rounded fine to coarse flint, concrete, fine red brick and clinker. Occasional orangish brown mottling. Occasional black speckling. Occasional rootlets. MADE GROUND.			
				1.00 (0.30)		Firm greyish brown mottled orangish brown, slightly gravelly sandy CLAY. Gravel is sub-angular to sub-rounded fine to coarse flint, igneous and fine clinker. Occasional black speckling. Potentially reworked material. MADE GROUND			
				1.30		Very soft becoming firm brownish grey, grey and orangish brown mottled, slightly gravelly very sandy CLAY. Gravel is sub-angular to sub-rounded fine to medium flint. Frequent rootlets. Occasional dark bluish mottling with minor odour of decomposition.			
				1.50		Yellowish brown, grey and light grey, clayey silty very gravelly SAND. Gravel is sub-angular to sub-rounded fine to medium flint.			
				(1.50)		Firm becoming stiff dark grey, slightly sandy silty CLAY. Sand is predominantly fine. Occasional fine to coarse sand-sized calcareous thin laminations. Occasional desiccated rootlets and woody fragments. Rare grey sub-angular fine-gravel sized calcareous fragments. Rare zone of pyritic sand and fine gravel.			
				3.00		End of Borehole at 3.00m			

Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:				
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)					
									Rootlets observed to 1.80m bgl.				
Chiselling					Installation				Water Strikes				
From (m)	To (m)	Duration	Remarks	Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
											0	0.00	No groundwater encountered.
Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.													



Contract Name: Bicester Gateway, Phase 1B, Wendlebury Road, Chesterton			Client: Baynham Meikle Partnership Limited			Hole ID: WS03					
Contract Number: 20249		Start and End Date: 30/05/22		Logged By: DW		Checked By:		Status: DRAFT		Hole Type: WS	
Easting:		Northing:		Ground Level:		Plant Used:		Print Date: 17/06/2022		Scale: 1:50	

Weather: Termination: Sheet 1 of 1

Samples & In Situ Testing				Strata Details						Groundwater	
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description				Water Strike	Backfill/Installation
0.80	D			0.25		Stiff dark brown mottled reddish brown, slightly sandy silty CLAY. Frequent rootlets. Rare sub-rounded fine flint gravel. TOPSOIL.				1	
				(0.45)		Firm yellowish brown mottled orange, slightly sandy silty CLAY. Sand is fine to medium and features in occasional partings. Frequent rootlets. Occasional black speckles. Rare rounded medium flint gravel.					
				(0.35)		Firm greyish brown, grey and brown mottled, slightly sandy silty CLAY. Sand is fine to medium. Occasional sub-rounded fine to medium calcic mudstone nodules and inclusions. Frequent rootlets.					
1.90	D			1.05		Firm to stiff grey mottled brownish grey and yellowish brown silty CLAY. Frequent to rare desiccated rootlets. Frequent becoming rare sand sized selenite crystals. Very rare sub-rounded medium gravel sized calcic mudstone nodules.				2	
				(1.15)		Frequent becoming rare coarse sand to fine gravel sized selenite crystals.					
				(0.60)		Firm to stiff blueish grey mottled orange silty fissured CLAY. Occasional fine to medium gravel sized pyrite inclusions. Occasional fine orange siderite lenses recovered as sub-rounded medium to coarse sand. Rare desiccated rootlets. Light grey silt lens at 0.75m bgl.					
				2.80		End of Borehole at 2.80m				3	
										4	
										5	
										6	
										7	
										8	
										9	
										10	

Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Rootlets observed to 2.60m bgl.					
									Water Strikes					
Chiselling					Installation				Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)				0	0.00	No groundwater encountered.
Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.														



Contract Name: Bicester Gateway, Phase 1B, Wendlebury Road, Chesterton		Client: Baynham Meikle Partnership Limited			Hole ID: WS04
Contract Number: 20249	Start and End Date: 30/05/22	Logged By: CF	Checked By:	Status: DRAFT	Hole Type: WS
Easting:	Northing:	Ground Level:	Plant Used:	Print Date: 17/06/2022	Scale: 1:50

Weather: Termination: Sheet 1 of 1

Samples & In Situ Testing			Strata Details					Groundwater	
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description		Water Strike	Backfill/Installation
0.70	D			(0.30)		Firm dark brown, slightly gravelly sandy CLAY. Gravel is sub-angular to sub-rounded fine to coarse flint. Occasional black speckling. Frequent rootlets. Occasional coarse sand-sized red brick and clinker (<5%). TOPSOIL.			
				0.30		Firm dark brown mottled brown, slightly gravelly sandy CLAY. Gravel is sub-angular to sub-rounded fine to coarse flint. Occasional black speckling. Occasional rootlets.			
				(0.30)		Firm greyish brown mottled orangish brown, slightly gravelly very sandy CLAY. Gravel is sub-angular to sub-rounded fine to coarse flint. Occasional black speckling. Potentially reworked material.			
				0.80		Yellowish brown mottled brownish grey, gravelly very clayey SAND. Gravel is sub-angular to rounded fine to medium flint. Occasional rootlets.			
				0.95		Yellowish brown, brownish grey and light brown, slightly silty very gravelly SAND. Gravel is sub-angular to rounded fine to medium flint.		1	
1.50	D			(0.75)		Firm becoming stiff dark grey, slightly sandy silty CLAY. Sand is predominantly fine. Occasional fine to coarse sand-sized calcareous thin laminations. Occasional desiccated rootlets and woody fragments. Rare grey sub-angular fine-gravel sized calcareous fragments. Rare pyritic sand inclusion.		2	
				1.70		Drop down material.			
				(1.30)		Drop down material.			
				3.00	End of Borehole at 3.00m			3	
								4	
								5	
								6	
								7	
								8	
								9	
								10	

Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:				
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Rootlets observed to 2.20m bgl.				
Chiselling					Installation				Water Strikes				
From (m)	To (m)	Duration	Remarks	Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
											0	0.00	No groundwater encountered.
Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.													



Contract Name: Bicester Gateway, Phase 1B, Wendlebury Road, Chesterton		Client: Baynham Meikle Partnership Limited			Hole ID: WS05
Contract Number: 20249	Start and End Date: 30/05/22	Logged By: DW	Checked By:	Status: DRAFT	Hole Type: WS
Easting:	Northing:	Ground Level:	Plant Used:	Print Date: 17/06/2022	Scale: 1:50

Weather: Termination: Sheet 1 of 1

Samples & In Situ Testing			Strata Details						Groundwater			
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description			Water Strike	Backfill/Installation		
1.00	D			(0.40)		Stiff dark brown mottled reddish brown, slightly silty very sandy CLAY. Sand is predominantly medium. Frequent rootlets and decomposing woody roots. Rare sub-angular to sub-rounded fine to medium flint, ironstone and limestone gravel. TOPSOIL.			1			
				0.40		Firm to stiff orange, orangish brown and yellowish brown mottled very sandy CLAY. Sand is predominantly composed of ooids. Frequent rootlets. Occasional sub-angular fine to medium flint gravel.						
				0.65		Firm light greyish brown mottled orangish brown and yellowish brown, slightly gravelly, sandy CLAY. Sand is predominantly composed of ooids. Gravel is sub-angular to sub-rounded, fine to coarse limestone. Frequent rootlets.						
				0.90		Yellowish brown slightly clayey becoming silty, SAND AND GRAVEL. Sand is predominantly composed of ooids. Gravel is sub-angular to sub-rounded, fine to coarse limestone.						
1.90	D			(0.50)		Yellowish brown clayey gravelly SAND interbedded with soft grey sandy CLAY. Gravel is sub-angular to sub-rounded, fine limestone. Rare desiccated rootlets.			2			
				1.40		Firm dark blueish grey silty fissured CLAY. Occasional sub angular to sub-rounded fine gravel sized pyrite nodules. Rare desiccated rootlets. Occasional pyritic fine sand laminations and inclusions.						
				1.55		No recovery in liner from 2.0 - 2.55 due to granular dropdown.						
				(1.45)		Frequent sand sized calcareous shell fragments.						
				3.00		End of Borehole at 3.00m			3			
											4	
											5	
											6	
											7	
											8	
											9	
											10	

Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:				
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)					
									Rootlets observed to 2.00m bgl.				
Chiselling					Installation				Water Strikes				
From (m)	To (m)	Duration	Remarks	Top (m)	Base (m)	Type	Dia (mm)	Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
											0	0.00	No groundwater encountered.
Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.													



Contract Name: Bicester Gateway, Phase 1B, Wendlebury Road, Chesterton		Client: Baynham Meikle Partnership Limited			Hole ID: WS06
Contract Number: 20249	Start and End Date: 30/05/22	Logged By: DW	Checked By:	Status: DRAFT	Hole Type: WS
Easting:	Northing:	Ground Level:	Plant Used:	Print Date: 17/06/2022	Scale: 1:50

Weather: Termination: Sheet 1 of 1

Samples & In Situ Testing			Strata Details					Groundwater	
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description		Water Strike	Backfill/Installation
0.90	D			(0.45)		Stiff dark brown slightly silty very sandy CLAY. Sand is predominantly medium. Frequent rootlets and decomposing woody roots. Rare sub-angular to sub-rounded fine to medium flint and limestone gravel. TOPSOIL.			
1.10	D			0.45 0.60		Grey mottled brown slightly clayey slightly sandy sub-angular fine to coarse limestone GRAVEL. Occasional rootlets.			
				(0.40)		Firm brownish grey mottled orangish brown and reddish brown, slightly gravelly, sandy CLAY. Sand is predominantly composed of ooids. Gravel is sub-angular fine to medium limestone and flint. Frequent rootlets, roots and decomposing roots. Occasional fine calcareous shells.		1	
				1.00		Yellowish brown slightly clayey very sandy GRAVEL. Gravel is sub-angular to well rounded, fine to coarse limestone and flint. Occasional clay lenses.			
				(0.60)		Firm dark blueish grey silty fissured CLAY. Occasional sub angular to sub-rounded fine gravel sized pyrite nodules. Rare desiccated roots. Occasional pyritic fine sand laminations and inclusions.			
				1.60		No recovery in liner from 2.0 - 2.55 due to granular dropdown.		2	
				(1.40)		End of Borehole at 3.00m			
				3.00				3	
								4	
								5	
								6	
								7	
								8	
								9	
								10	

Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:	
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)		
									Rootlets observed to 3.00m bgl.	
					Water Strikes					
					Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
								0	0.00	No groundwater encountered.
					Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.					



Contract Name: Bicester Gateway, Phase 1B, Wendlebury Road, Chesterton			Client: Baynham Meikle Partnership Limited			Hole ID: WS07					
Contract Number: 20249		Start and End Date: 30/05/22		Logged By: CF		Checked By:		Status: DRAFT		Hole Type: WS	
Easting:		Northing:		Ground Level:		Plant Used:		Print Date: 17/06/2022		Scale: 1:50	

Weather: Termination: Sheet 1 of 1

Samples & In Situ Testing				Strata Details						Groundwater	
Depth	Type	Results	Level (mAOD)	Depth (m) (Thickness)	Legend	Strata Description				Water Strike	Backfill/Installation
0.90	D			(0.50)		Firm becoming stiff dark brown, greyish brown and dark orangish brown, slightly gravelly sandy desiccated CLAY. Gravel is sub-angular to sub-rounded fine to coarse flint, red brick, igneous and fine clinker. Occasional black speckling. Frequent rootlets becoming occasional. Occasional woody fragments. MADE GROUND.				1	
				0.50		Firm brown mottled greyish brown, slightly sandy slightly gravelly CLAY. Gravel is sub-angular to sub-rounded fine to coarse flint, concrete, fine red brick and clinker. Occasional orangish brown mottling. Occasional black speckling. Occasional woody fragments. Occasional rootlets. MADE GROUND.					
				0.70		Firm yellowish brown, brownish grey and light brown mottled, slightly gravelly very sandy CLAY. Gravel is sub-angular fine to medium flint. Occasional rootlets.					
				(0.60)		Firm dark brown mottled brown, slightly gravelly sandy CLAY. Gravel is sub-angular to sub-rounded fine to coarse flint. Occasional rootlets. Occasional black speckling.					
				1.30		Soft becoming firm yellowish brown mottled brownish grey, slightly gravelly very sandy CLAY. Gravel is sub-angular fine to medium flint. Occasional rootlets. Minor odour of decomposition.					
2.60	D			1.50		Brownish grey mottled yellowish brown silty very gravelly SAND. Gravel is sub-angular to rounded fine to coarse flint.				2	
				1.60		Firm becoming stiff dark grey, slightly sandy silty CLAY. Sand is predominantly fine. Occasional fine to coarse sand-sized calcareous thin laminations. Rare desiccated rootlets and woody fragments. Rare grey sub-angular fine-gravel sized calcareous fragments. Rare pyritic sand inclusion.					
				(0.30)		Drop down material.					
				1.90		End of Borehole at 3.00m				3	
				(1.10)						4	
				3.00						5	
										6	
										7	
										8	
										9	
										10	

Start & End of Shift Observations					Borehole Diameter		Casing Diameter		Remarks:					
Date	Time	Depth (m)	Casing (m)	Water (m)	Depth (m)	Dia (mm)	Depth (m)	Dia (mm)						
									Rootlets observed to 2.60m bgl.					
Water Strikes														
Chiselling					Installation				Strike (m)	Casing (m)	Sealed (m)	Time (mins)	Rose to (m)	Remarks
From (m)	To (m)	Duration	Remarks		Top (m)	Base (m)	Type	Dia (mm)				0	0.00	No groundwater encountered.
Hand vane (HV), Hand penetrometer (HP) reported in kPa. PID reported in ppm.														