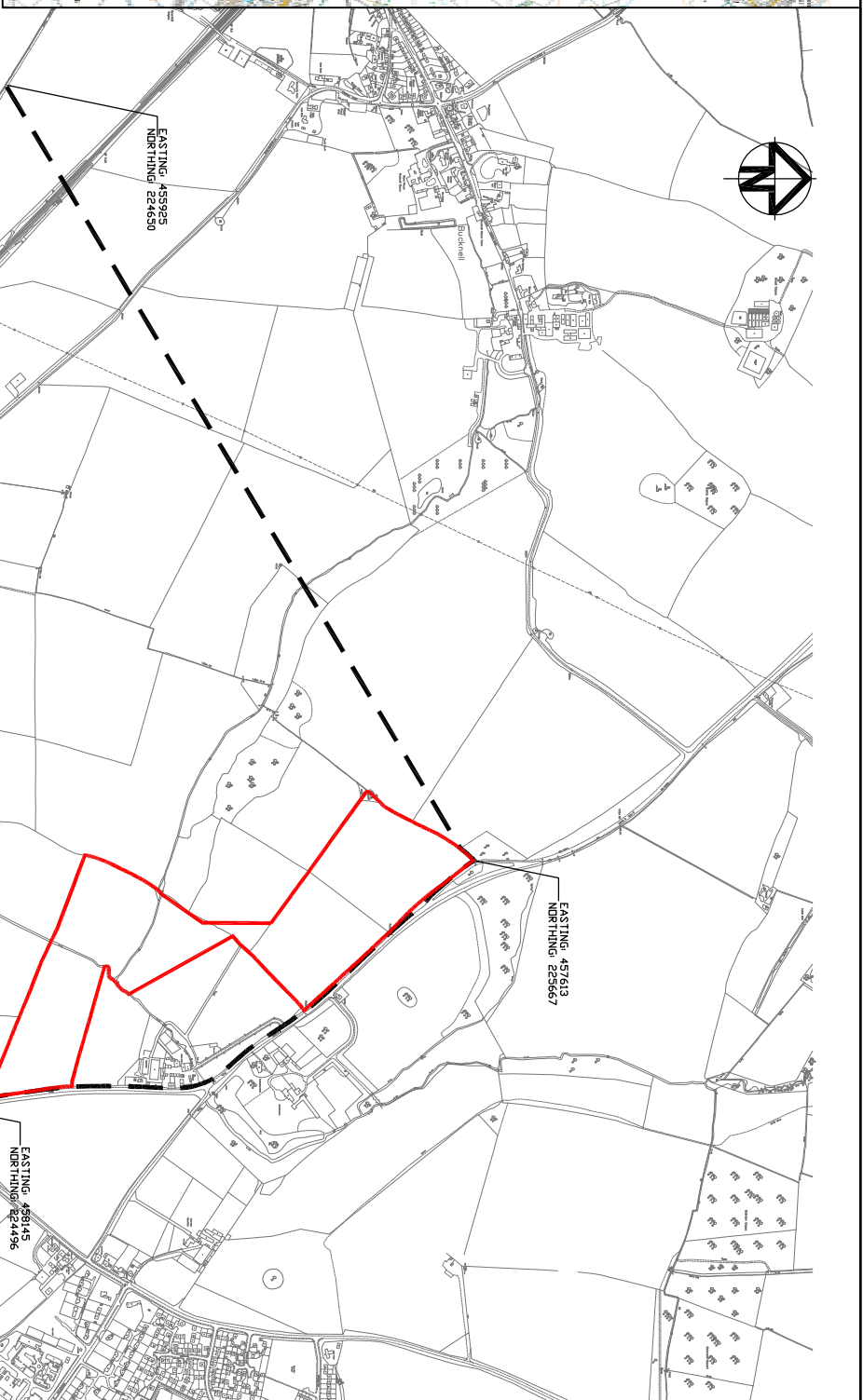




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KEY ECO DEVELOPMENT BOUNDARY EXEMPLAR SITE BOUNDARY		



KEY
■■■■■■■■■■ EXEMPLAR SITE BOUNDARY
NOTE:
HOUSING LAYOUT IS ILLUSTRATIVE ONLY

06	MINOR REVISIONS	24/11/10
Issue	Description	Date

Status

Scales	1:2000	Author	MULLEWELIN
Original Scale	A1	Designer	MPEARSON
Height Datum	-	Approver	S.A. DAVIES
Grid	0.5	©	Copyright reserved

Filename: 7013-UA001881-UP210-06-EXEMPLAR PLAN AREA.DWG
Client

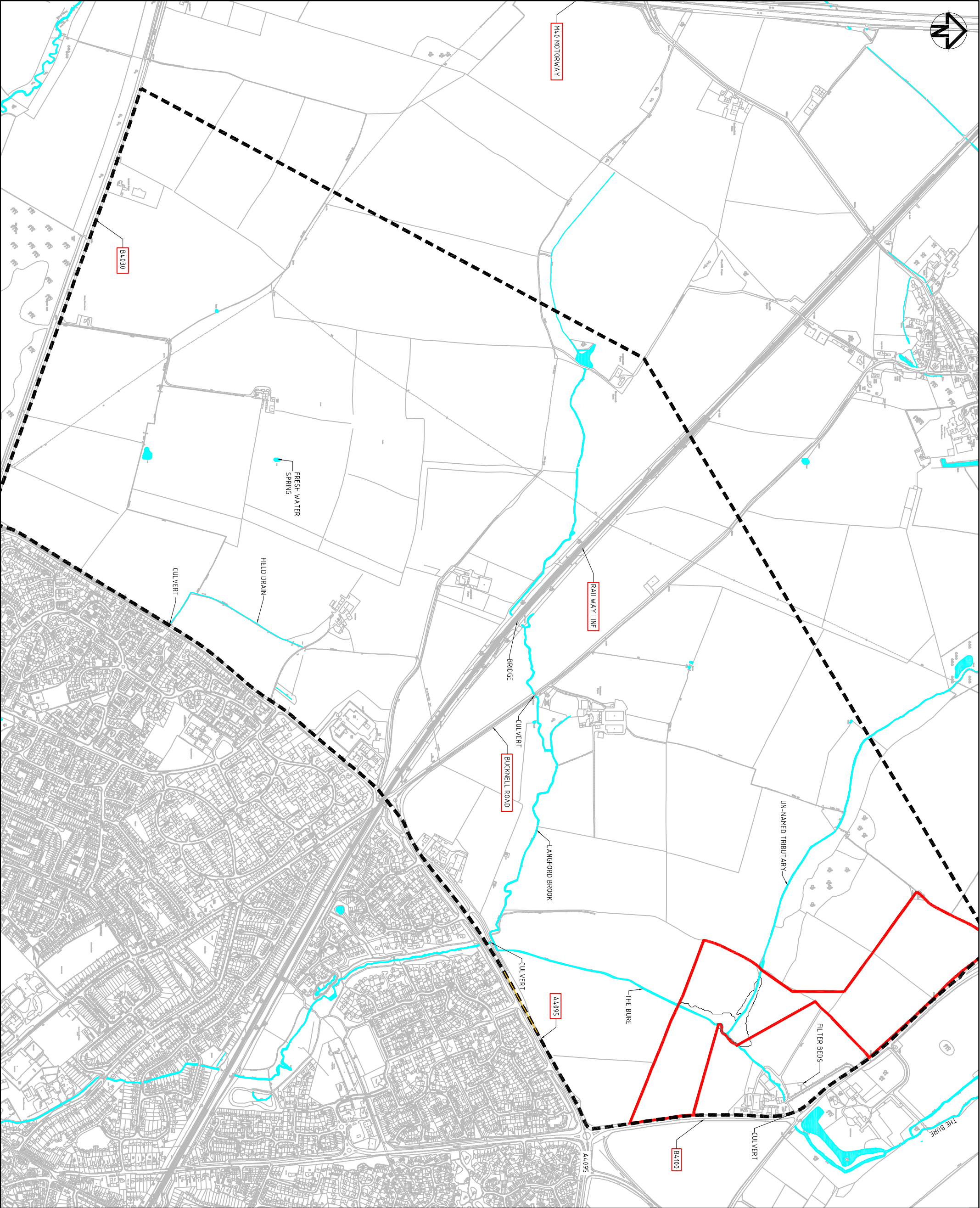


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Project
BICESTER
ECO DEVELOPMENT

Title
EXEMPLAR AREA

Drawing No.	Project No.	Issue
7013	UA001881	06



KEY

- ECO DEVELOPMENT BOUNDARY
- EXEMPLAR SITE BOUNDARY

MINOR REVISIONS		24/11/10
Issue	Description	Date
Status		

Scales		Author
Original	A1	MILFELIN
Size	-	MIFERSON
Height	-	Approver
Date/Time	-	S.A. DAVES
Grid	0.5	Copyright reserved

Client: PricewaterhouseCoopers
Project: UA001881-UP21D-02-EXISTING WATER FEATURES.DWG

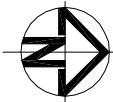


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Project: BICESTER
ECO DEVELOPMENT

EXISTING WATER FEATURES

Drawing No. 7019 — Project No. UA001881 — Issue 02



- KEY**
- SURFACE WATER PIPE RUN
 - VILLAGE STREET SUDS FEATURE
 - ROADSIDE SUDS FEATURE
 - CATCHMENT BOUNDARIES
 - PERMEABLE PAVING
 - IMPERMEABLE PAVING
 - PLOT SOAKAWAYS
 - POND
 - BASIN
 - SWALE
 - EXCEEDED FLOW PATHS
 - MAINTENANCE ACCESS

02	LAYOUT REVISED	04/04/11
01	FIRST ISSUE	24/11/10
Issue	Description	Date
Status		

Scales	1:1000 @ A1 1:2000 @ A3	Author P. WILLIAMS
Original Size	A1	Checker M. PEARSON
Height Datum	-	Approver S. DAVIES
Grid	0.5.	Copyright reserved

Drawings: UA001881-UP21D-02-EXEMPLAR SITE HIGHWAYS DRAINAGE

Client

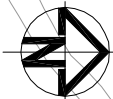
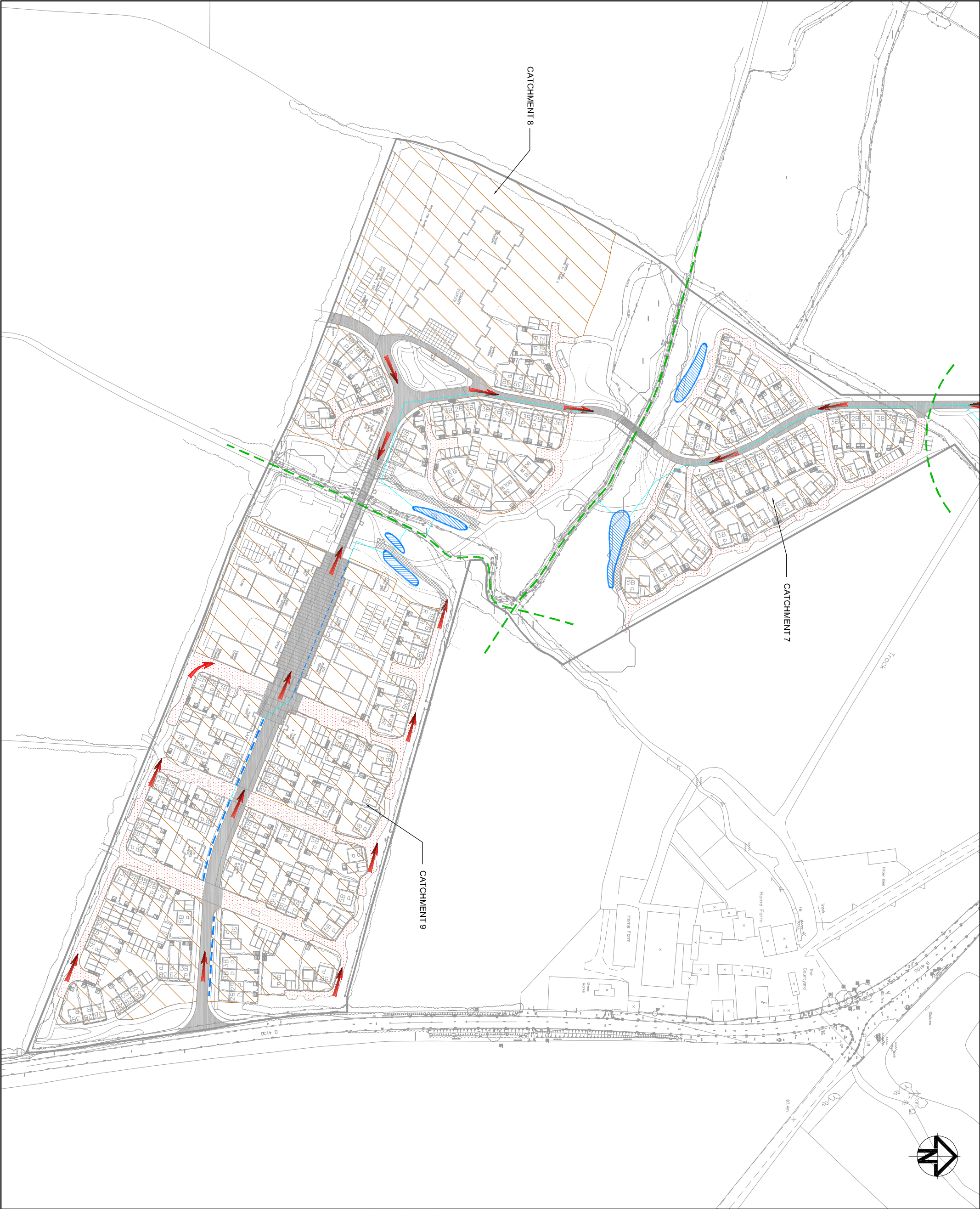


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Project
BICESTER
ECO DEVELOPMENT

Title
EXEMPLAR SITE
PROPOSED DEVELOPMENT
SURFACE WATER
DRAINAGE LAYOUT SHT 1 OF 2

Drawing No. 7160 — Project No. UA001881 — Issue 02



- KEY**
- SURFACE WATER PIPE RUN
 - VILLAGE STREET LIGHTS FEATURE
 - ROADSIDE SUDS FEATURE
 - CATCHMENT BOUNDARIES
 - PERMEABLE PAVING
 - IMPERMEABLE PAVING
 - PLOT SOAKAWAYS
 - POND
 - BASIN
 - SWALE
 - EXCEEDED FLOW PATHS
 - MAINTENANCE ACCESS

02	LAYOUT REVISED	04/04/11
01	FIRST ISSUE	24/11/10
Issue	Description	Date

Scales	1:1000 @ A1 1:2000 @ A3	Author P. WILLIAMS
Original Size	A1	Checker M. PEARSON
Height	-	Approver S. DAVIES
Grid	0.5	Copyright reserved

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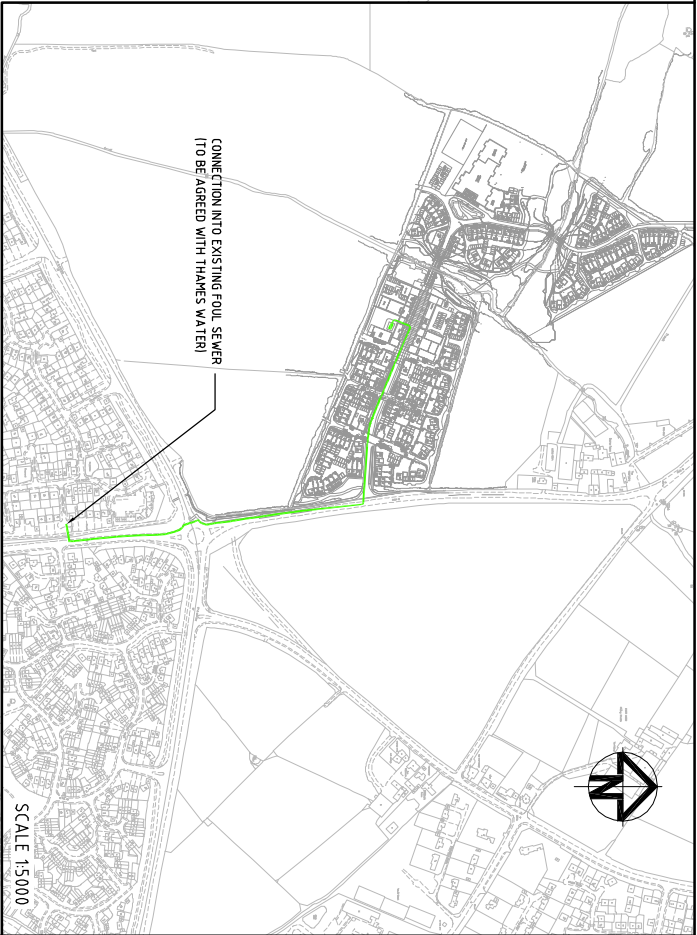


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**BICESTER
ECO DEVELOPMENT**

**EXEMPLAR SITE
PROPOSED DEVELOPMENT
SURFACE WATER
DRAINAGE LAYOUT SH1 2 OF 2**

Drawing No. 7161 — Project No. UA001881 — Issue 02



- KEY**
- SITE BOUNDARY
 - INDICATIVE ON-SITE FOUL WATER GRAVITY MAIN NETWORK
 - INDICATIVE RISING MAIN TO CONNECT TO EXISTING FOUL SEWER NETWORK
 - INDICATIVE LOCATION OF ON-SITE PUMPING STATION (LOCATION TO BE AGREED)

02	LAYOUT REVISED	04/04/11
01	FIRST ISSUE	25/11/10
Issue	Description	Date
Status		

Scales	AS SHOWN	Author P. WILLIAMS
Original Size	A1	Checker M. PEARSON
Height Datum	-	Approver SA DAVIES
Grid	0.5	© Copyright reserved

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**BICESTER
ECO DEVELOPMENT**

**EXEMPLAR SITE
FOUL WATER
DRAINAGE**

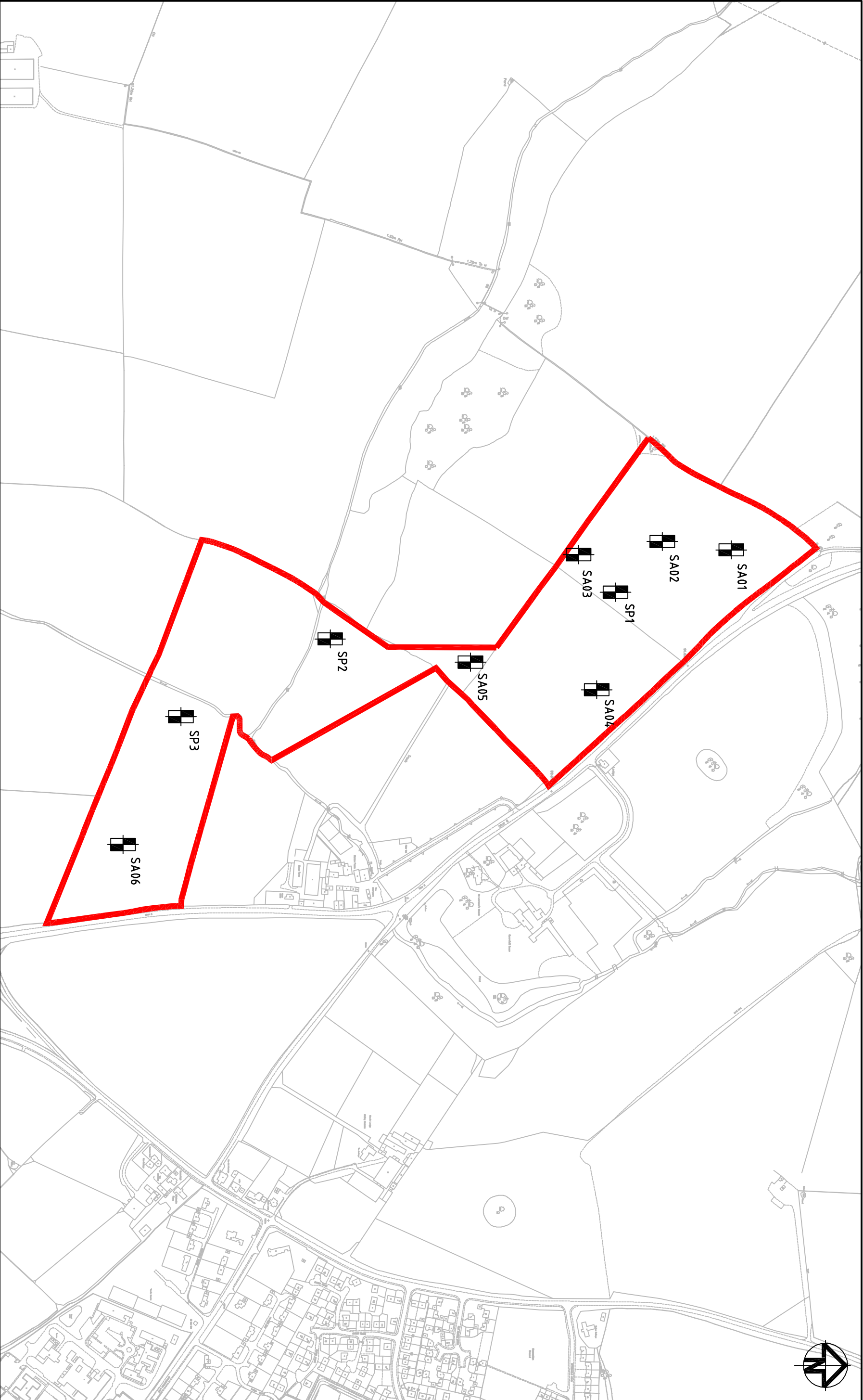
Drawing No. 7162 — Project No. UA001881 — Issue 02

Appendix B

GROUND INFILTRATION RATES

2005-UA001881 – Soakaway Test Locations

Soil Infiltration Rate Test Data



		Date
01	FIRST ISSUE	
Issue	Description	

KEY

SITE BOUNDARY

SP1 / SA01

SOAKAWAY

Client

azdominion

P3Eco Ltd

Status		
Scales		Current Issue Signatures
1:12,500	Author P. WILLIAMS	
Original	A3	Chekker M. PEARSON
Height	-	Approver S.A. DAVIES
Datum	OS	© Copyright reserved
Grid	Filename: 2005-UA001881-UP33D-01DWG	

Project

BICESTER
ECO DEVELOPMENT

EXEMPLAR SITE
SOAKAWAY TEST
LOCATIONS

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Drawing No.

2005 — UA001881 — 01

Project No.

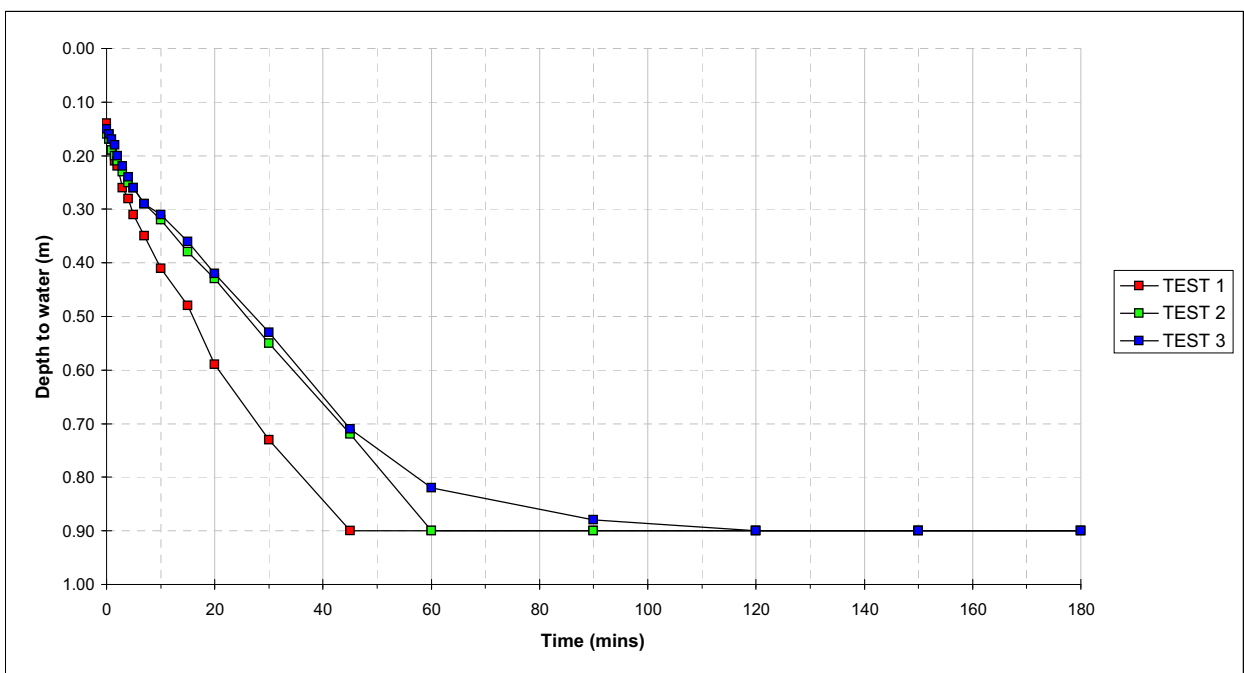
Issue

01

5/Apr/2011 4:16 PM K:\UA001881_BicesterEcoV-OurDrawings\2005-UA001881-UP33D-01.dwg V1

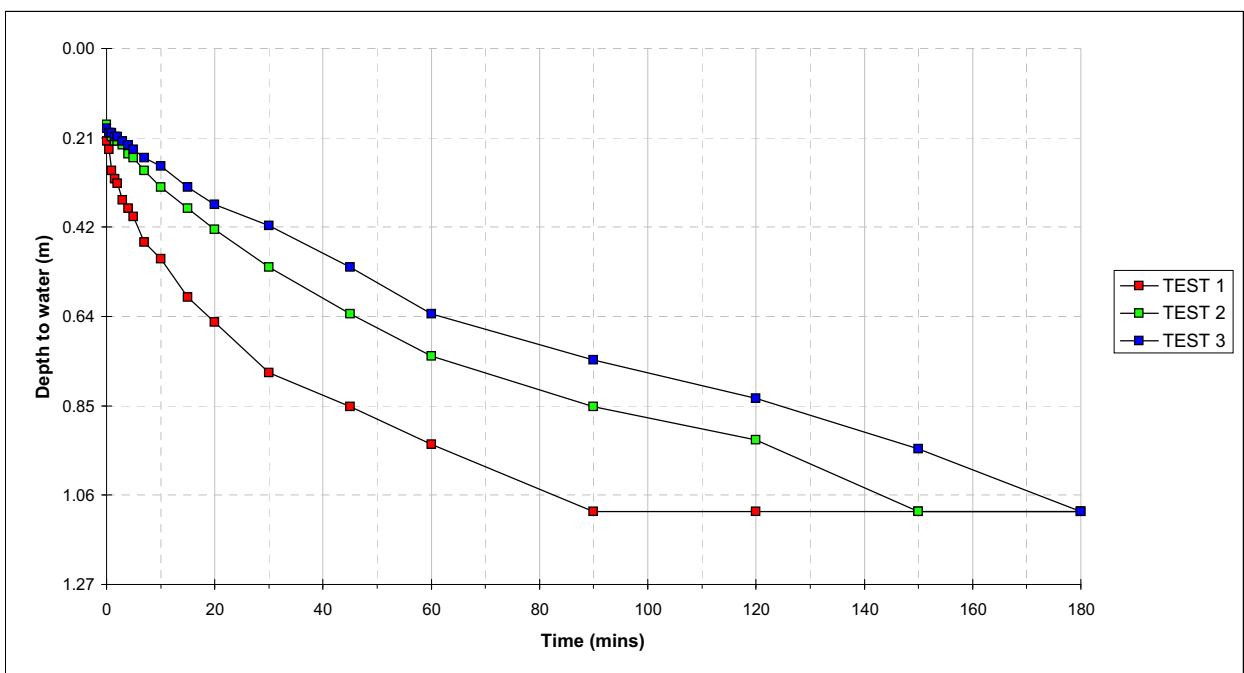
C.J. ASSOCIATES GEOTECHNICAL LTD.		Site..... Bicester		Trial Pit Number..... SP1		
SOIL INFILTRATION RATE TEST		Job Number..... Y0964		Length..... 1.95 m		
See B.R.E. Digest 365, 1991, Soakaway Design.		Date of Test..... 05.10.2010		Width..... 0.30 m		
				Depth..... 0.90 m		
				Groundwater Level..... Dry		
	TEST 1		TEST 2		TEST 3	
	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)
	0.0	0.14	0.0	0.16	0.0	0.15
	0.5	0.16	0.5	0.17	0.5	0.16
	1.0	0.19	1.0	0.19	1.0	0.17
	1.5	0.21	1.5	0.20	1.5	0.18
	2.0	0.22	2.0	0.21	2.0	0.20
	3.0	0.26	3.0	0.23	3.0	0.22
	4.0	0.28	4.0	0.25	4.0	0.24
	5.0	0.31	5.0	0.26	5.0	0.26
	7.0	0.35	7.0	0.29	7.0	0.29
	10	0.41	10	0.32	10	0.31
	15	0.48	15	0.38	15	0.36
	20	0.59	20	0.43	20	0.42
	30	0.73	30	0.55	30	0.53
	40	0.90	45	0.72	45	0.71
	60	0.90	58	0.90	60	0.82
	90	0.90	90	0.90	90	0.88
	120	0.90	110	0.90	95	0.90
	150	0.90	150	0.90	150	0.90
180	0.90	180	0.90	165	0.90	
Effective Storage Depth	m	0.76	0.74	0.75		
75% Effective Storage Depth	m	0.57	0.56	0.56		
(i.e. depth below GL)	m	0.33	0.35	0.34		
25% Effective Storage Depth	m	0.19	0.19	0.19		
(i.e. depth below GL)	m	0.71	0.72	0.71		
Effective Storage Depth 75%-25%	m	0.38	0.37	0.38		
Time to fall to 75% effective depth	mins	6.00	13.00	13.00		
Time to fall to 25% effective depth	mins	28.00	45.00	45.00		
V (75%-25%)	m3	0.22	0.22	0.22		
a (50%)	m2	2.30	2.25	2.27		
t (75%-25%)	mins	22.00	32.00	32.00		
SOIL INFILTRATION RATE	m/s	7.34E-05	5.01E-05	5.03E-05		

DESIGN SOIL INFILTRATION RATE, f	5.01E-05 m/s
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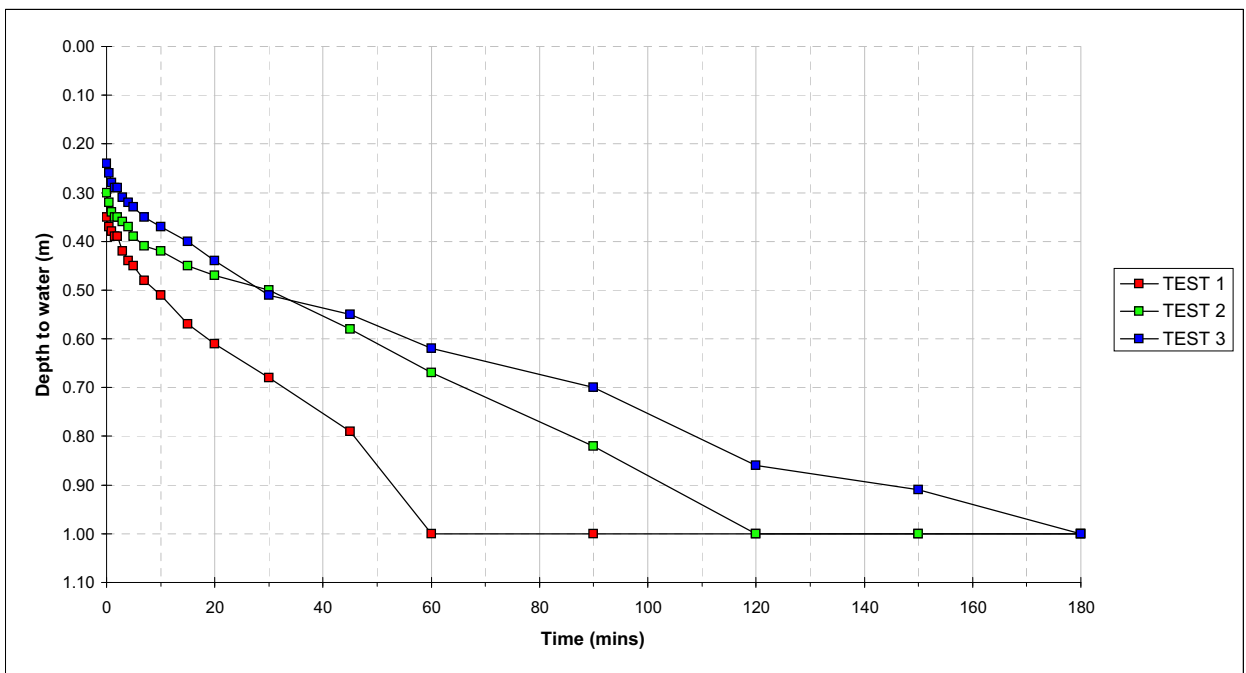
C.J. ASSOCIATES GEOTECHNICAL LTD. SOIL INFILTRATION RATE TEST See B.R.E. Digest 365, 1991, Soakaway Design.		Site.....Bicester		Trial Pit Number.....SP2		
		Job Number.....Y0964		Length.....1.50 m		
		Date of Test.....06.10.2010		Width.....0.30 m		
				Depth.....1.10 m		
				Groundwater Level.....Dry		
	TEST 1		TEST 2		TEST 3	
	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)
	0.0	0.22	0.0	0.18	0.0	0.19
	0.5	0.24	0.5	0.20	0.5	0.20
	1.0	0.29	1.0	0.21	1.0	0.20
	1.5	0.31	1.5	0.22	1.5	0.21
	2.0	0.32	2.0	0.22	2.0	0.21
	3.0	0.36	3.0	0.23	3.0	0.22
	4.0	0.38	4.0	0.25	4.0	0.23
	5.0	0.40	5.0	0.26	5.0	0.24
	7.0	0.46	7.0	0.29	7.0	0.26
	10	0.50	10	0.33	10	0.28
	15	0.59	15	0.38	15	0.33
	20	0.65	20	0.43	20	0.37
	30	0.77	30	0.52	30	0.42
	45	0.85	45	0.63	45	0.52
	60	0.94	58	0.73	60	0.63
	75	1.10	90	0.85	90	0.74
	120	1.10	120	0.93	120	0.83
	150	1.10	136	1.10	150	0.95
180	1.10	180	1.10	178	1.10	
Effective Storage Depth	m	0.88	0.92	0.91		
75% Effective Storage Depth	m	0.66	0.69	0.68		
(i.e. depth below GL)	m	0.44	0.41	0.42		
25% Effective Storage Depth	m	0.22	0.23	0.23		
(i.e. depth below GL)	m	0.88	0.87	0.87		
Effective Storage Depth 75%-25%	m	0.44	0.46	0.46		
Time to fall to 75% effective depth	mins	6.50	18.00	30.00		
Time to fall to 25% effective depth	mins	50.00	98.00	135.00		
V (75%-25%)	m3	0.20	0.21	0.20		
a (50%)	m2	2.03	2.11	2.09		
t (75%-25%)	mins	43.50	80.00	105.00		
SOIL INFILTRATION RATE	m/s	3.73E-05	2.05E-05	1.56E-05		

DESIGN SOIL INFILTRATION RATE, f	1.56E-05 m/s
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C.J. ASSOCIATES GEOTECHNICAL LTD.		Site..... Bicester		Trial Pit Number..... SP3		
SOIL INFILTRATION RATE TEST		Job Number..... Y0964		Length..... 2.10 m		
See B.R.E. Digest 365, 1991, Soakaway Design.		Date of Test..... 05.10.2010		Width..... 0.30 m		
				Depth..... 1.00 m		
				Groundwater Level..... Dry		
	TEST 1		TEST 2		TEST 3	
	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)
	0.0	0.35	0.0	0.30	0.0	0.24
	0.5	0.37	0.5	0.32	0.5	0.26
	1.0	0.38	1.0	0.34	1.0	0.28
	1.5	0.39	1.5	0.35	1.5	0.29
	2.0	0.39	2.0	0.35	2.0	0.29
	3.0	0.42	3.0	0.36	3.0	0.31
	4.0	0.44	4.0	0.37	4.0	0.32
	5.0	0.45	5.0	0.39	5.0	0.33
	7.0	0.48	7.0	0.41	7.0	0.35
	10	0.51	10	0.42	10	0.37
	15	0.57	15	0.45	15	0.40
	20	0.61	20	0.47	20	0.44
	30	0.68	30	0.50	30	0.51
	45	0.79	45	0.58	45	0.55
	55	1.00	60	0.67	60	0.62
	90	1.00	90	0.82	90	0.70
	120	1.00	110	1.00	120	0.86
	150	1.00	150	1.00	150	0.91
180	1.00	180	1.00	165	1.00	
Effective Storage Depth	m	0.65	0.70	0.76		
75% Effective Storage Depth	m	0.49	0.53	0.57		
(i.e. depth below GL)	m	0.51	0.48	0.43		
25% Effective Storage Depth	m	0.16	0.18	0.19		
(i.e. depth below GL)	m	0.84	0.83	0.81		
Effective Storage Depth 75%-25%	m	0.33	0.35	0.38		
Time to fall to 75% effective depth	mins	10.00	22.00	18.00		
Time to fall to 25% effective depth	mins	50.00	92.00	110.00		
V (75%-25%)	m3	0.20	0.22	0.24		
a (50%)	m2	2.19	2.31	2.45		
t (75%-25%)	mins	40.00	70.00	92.00		
SOIL INFILTRATION RATE	m/s	3.90E-05	2.27E-05	1.77E-05		

DESIGN SOIL INFILTRATION RATE, f	1.77E-05 m/s
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Appendix C

TREATMENT TRAIN ASSESSMENT

Water Source	Description	Train Description	SUDS Group	Technique	Treatment characteristics					Potential additional pretreatment
					Total Suspended Solids	Heavy metals	Nutrients	Bacteria	Fines and dissolved	
Building rooftops	Relatively clean, likely to contain some sediment, metals and organic matter	Roof to rainwater harvesting with overflow to soakaway discharging to ground	Source Control Infiltration	Rainwater harvesting Soakway	M H	L H	L H	L M	- H	Leaf guards in guttering system
		Roof to rainwater harvesting with overflow to pipe network to swale discharging to ground	Source Control Swale	Rainwater harvesting Enhanced wet swale	M H	L H	L M	L H	- H	Leaf guards in guttering system
Residential Roads and	Likely to contain grits,	Percolates surface, filters through substructure and infiltrates ground	Source Control	Permeable Pavement	H	H	H	H	H	
Main Roads	Likely to contain grits, hydrocarbons and metals	Conveyed by channels to swale and discharging to ground	Swale	Enhanced wet swale	H	H	M	H	H	
		Runs over edge of road and percolates through vegetated strip to ground below. In large rainfall events, runs through vegetation to infiltration trench beyond for storage and discharge to ground	Filtration	Bioretention/filter strips	H	H	H	M	H	

Appendix D

HYDRAULIC CALCULATIONS

7009-UA001881 – Domestic Soakaway

7010-UA001881 – Permeable Block Paving

7011-UA001881 – SuDS Storage Structures

7015-UA001881 – Surface Water Catchment Areas

7016-UA001881 – Greenfield Runoff Volumetric Calculation

		CALCULATIONS		DOCUMENT No 7009-UA001881-UP21B-02				
OFFICE CARDIFF			PROJECT TITLE NW Bicester Eco Development					
SUBJECT Domestic Soakaway Sizing Calculation					SHEET No 1 OF 11			
ISSUE	TOTAL SHEETS	AUTHOR	DATE	CHECKED BY	DATE	APPROVED BY	DATE	COMMENTS
1	4	MP	27/09/10	DCB	27/09/10	SAD	27/09/10	
2	11	DCB	25/11/10	MP	25/11/10	SAD	25/11/10	
3								
4								
5								
SUPERSEDES DOC No								DATE

DESIGN BASIS STATEMENT (Inc. sources of info/data, assumptions made, standards, etc.) Introduction This calculation is intended to establish the size of a typical soakaway draining a residential property in order to establish the viability of providing domestic soakaways. Typical data for residential properties on the site has been used to establish indicative dimensions. Design of the soakaway has been undertaken to suit Building Regulations Part H. The soakaway has been assessed as a trench soakaway (2.4m x 2.4m in plan to a depth of 0.75m) using WinDES (an industry standard drainage design package produced by Microdrainage). Assumptions 1) Contributing area from roof areas only (including garages) 2) Typical roof area = 90m² 3) Ground infiltration rates are assumed to be 180mm/hr for the north western area of the site and 64mm/hr for the south eastern area of the site 4) Design to accommodate 10 yr rainfall events with a variety of durations (required by Building Regs Part H) 5) Trench soakaway used, as defined by WinDES (void formed by a trench filled with gravel or similar porous material - for the purpose of this model porosity assumed as 60%) 6) Infiltration through all sides and base of trench 7) Factor of Safety of 2 applied to soakage rate 8) Inflow to soakaway is from rainwater harvesting tank overflow 9) Rainwater harvesting tank is full at start of rainfall event 10) Climate change factor of 30% applied to rainfall Results • North western area - 180 mm/hr infiltration ◦ Maximum water depth - 493 mm (60 minute winter storm) ◦ Half drain time - 66 minutes • South eastern area - 64 mm/hr infiltration ◦ Maximum water level - 682 mm (180 minute winter storm) ◦ Half drain time - 212 minutes Assessment of the domestic soakaway indicates that under both potential infiltration scenarios the maximum water level for the 1 in 10 year rainfall event would be contained within the soakaway. The results also indicate that the half drain time of the system for both rates of infiltration is less than the maximum recommended 1440 minutes (24 hours). Notes A trench soakaway with 60% porosity is assumed to be representative of the soakaway proposals discussed within the drainage strategy report. Approximate depth of impermeable stratum between 2.0 and 1.0m below ground level. Therefore soakaways should be kept less than 1m deep, and may not be suitable in areas where such stratum are shallowest. The domestic trench soakaway has been initially sized such that a standard design may be used throughout the development, however soakaways could be designed to suit specific conditions for each location at detailed design stage.

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HCL House Fortran Rd St Mellons B'nness Park Cardiff CF3 0EY		7009-UA001881-UP21B-02 NW Exemplar Site Domestic Soakaway																																																																																																																																																																													
Date 24/11/2010 14:04 File NW Domestic Soaka...		Designed By dcbw06491 Checked By																																																																																																																																																																													
Elstree Computing Ltd		Source Control W.12.4																																																																																																																																																																													
Summary of Results for 10 year Return Period (+30%) Half Drain Time : 66 minutes. <table><tr><th>Storm Event</th><th>Max Level (m)</th><th>Max Depth (m)</th><th>Max Infiltration (l/s)</th><th>Max Volume (m³)</th><th>Status</th></tr><tr><td>15 min Summer</td><td>9.584</td><td>0.334</td><td>0.2</td><td>1.2</td><td>O K</td></tr><tr><td>30 min Summer</td><td>9.650</td><td>0.400</td><td>0.2</td><td>1.4</td><td>O K</td></tr><tr><td>60 min Summer</td><td>9.679</td><td>0.429</td><td>0.2</td><td>1.5</td><td>O K</td></tr><tr><td>120 min Summer</td><td>9.674</td><td>0.424</td><td>0.2</td><td>1.5</td><td>O K</td></tr><tr><td>180 min Summer</td><td>9.654</td><td>0.404</td><td>0.2</td><td>1.4</td><td>O K</td></tr><tr><td>240 min Summer</td><td>9.630</td><td>0.380</td><td>0.2</td><td>1.3</td><td>O K</td></tr><tr><td>360 min Summer</td><td>9.584</td><td>0.334</td><td>0.2</td><td>1.2</td><td>O K</td></tr><tr><td>480 min Summer</td><td>9.542</td><td>0.292</td><td>0.2</td><td>1.0</td><td>O K</td></tr><tr><td>600 min Summer</td><td>9.505</td><td>0.255</td><td>0.2</td><td>0.9</td><td>O K</td></tr><tr><td>720 min Summer</td><td>9.472</td><td>0.222</td><td>0.2</td><td>0.8</td><td>O K</td></tr><tr><td>960 min Summer</td><td>9.418</td><td>0.168</td><td>0.2</td><td>0.6</td><td>O K</td></tr><tr><td>1440 min Summer</td><td>9.344</td><td>0.094</td><td>0.2</td><td>0.3</td><td>O K</td></tr><tr><td>2160 min Summer</td><td>9.298</td><td>0.048</td><td>0.2</td><td>0.2</td><td>O K</td></tr><tr><td>2880 min Summer</td><td>9.289</td><td>0.039</td><td>0.1</td><td>0.1</td><td>O K</td></tr><tr><td>4320 min Summer</td><td>9.279</td><td>0.029</td><td>0.1</td><td>0.1</td><td>O K</td></tr><tr><td>5760 min Summer</td><td>9.273</td><td>0.023</td><td>0.1</td><td>0.1</td><td>O K</td></tr><tr><td>7200 min Summer</td><td>9.270</td><td>0.020</td><td>0.1</td><td>0.1</td><td>O K</td></tr><tr><td>8640 min Summer</td><td>9.267</td><td>0.017</td><td>0.1</td><td>0.1</td><td>O K</td></tr></table> <table><tr><th>Storm Event</th><th>Rain (mm/hr)</th><th>Time-Peak (mins)</th></tr><tr><td>15 min Summer</td><td>77.919</td><td>17</td></tr><tr><td>30 min Summer</td><td>50.334</td><td>31</td></tr><tr><td>60 min Summer</td><td>31.203</td><td>52</td></tr><tr><td>120 min Summer</td><td>18.861</td><td>86</td></tr><tr><td>180 min Summer</td><td>13.939</td><td>120</td></tr><tr><td>240 min Summer</td><td>11.215</td><td>154</td></tr><tr><td>360 min Summer</td><td>8.240</td><td>222</td></tr><tr><td>480 min Summer</td><td>6.617</td><td>288</td></tr><tr><td>600 min Summer</td><td>5.579</td><td>350</td></tr><tr><td>720 min Summer</td><td>4.852</td><td>412</td></tr><tr><td>960 min Summer</td><td>3.890</td><td>532</td></tr><tr><td>1440 min Summer</td><td>2.848</td><td>766</td></tr><tr><td>2160 min Summer</td><td>2.083</td><td>1100</td></tr><tr><td>2880 min Summer</td><td>1.668</td><td>1468</td></tr><tr><td>4320 min Summer</td><td>1.219</td><td>2164</td></tr><tr><td>5760 min Summer</td><td>0.976</td><td>2888</td></tr><tr><td>7200 min Summer</td><td>0.821</td><td>3664</td></tr><tr><td>8640 min Summer</td><td>0.712</td><td>4400</td></tr></table>					Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status	15 min Summer	9.584	0.334	0.2	1.2	O K	30 min Summer	9.650	0.400	0.2	1.4	O K	60 min Summer	9.679	0.429	0.2	1.5	O K	120 min Summer	9.674	0.424	0.2	1.5	O K	180 min Summer	9.654	0.404	0.2	1.4	O K	240 min Summer	9.630	0.380	0.2	1.3	O K	360 min Summer	9.584	0.334	0.2	1.2	O K	480 min Summer	9.542	0.292	0.2	1.0	O K	600 min Summer	9.505	0.255	0.2	0.9	O K	720 min Summer	9.472	0.222	0.2	0.8	O K	960 min Summer	9.418	0.168	0.2	0.6	O K	1440 min Summer	9.344	0.094	0.2	0.3	O K	2160 min Summer	9.298	0.048	0.2	0.2	O K	2880 min Summer	9.289	0.039	0.1	0.1	O K	4320 min Summer	9.279	0.029	0.1	0.1	O K	5760 min Summer	9.273	0.023	0.1	0.1	O K	7200 min Summer	9.270	0.020	0.1	0.1	O K	8640 min Summer	9.267	0.017	0.1	0.1	O K	Storm Event	Rain (mm/hr)	Time-Peak (mins)	15 min Summer	77.919	17	30 min Summer	50.334	31	60 min Summer	31.203	52	120 min Summer	18.861	86	180 min Summer	13.939	120	240 min Summer	11.215	154	360 min Summer	8.240	222	480 min Summer	6.617	288	600 min Summer	5.579	350	720 min Summer	4.852	412	960 min Summer	3.890	532	1440 min Summer	2.848	766	2160 min Summer	2.083	1100	2880 min Summer	1.668	1468	4320 min Summer	1.219	2164	5760 min Summer	0.976	2888	7200 min Summer	0.821	3664	8640 min Summer	0.712	4400
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HCL House Fortran Rd St Mellons B'ness Park Cardiff CF3 0EY		7009-UA001881-UP21B-02 NW Exemplar Site Domestic Soakaway				
Date 24/11/2010 14:04 File NW Domestic Soaka...		Designed By dcbw06491 Checked By				
Elstree Computing Ltd		Source Control W.12.4				
<u>Summary of Results for 10 year Return Period (+30%)</u>						
	Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
	10080 min Summer	9.265	0.015	0.0	0.1	O K
	15 min Winter	9.628	0.378	0.2	1.3	O K
	30 min Winter	9.706	0.456	0.3	1.6	O K
	60 min Winter	9.743	0.493	0.3	1.7	O K
	120 min Winter	9.734	0.484	0.3	1.7	O K
	180 min Winter	9.702	0.452	0.3	1.6	O K
	240 min Winter	9.666	0.416	0.2	1.4	O K
	360 min Winter	9.596	0.346	0.2	1.2	O K
	480 min Winter	9.535	0.285	0.2	1.0	O K
	600 min Winter	9.483	0.233	0.2	0.8	O K
	720 min Winter	9.438	0.188	0.2	0.6	O K
	960 min Winter	9.367	0.117	0.2	0.4	O K
	1440 min Winter	9.298	0.048	0.2	0.2	O K
	2160 min Winter	9.285	0.035	0.1	0.1	O K
	2880 min Winter	9.278	0.028	0.1	0.1	O K
	4320 min Winter	9.271	0.021	0.1	0.1	O K
	5760 min Winter	9.267	0.017	0.1	0.1	O K
	7200 min Winter	9.264	0.014	0.0	0.0	O K
	8640 min Winter	9.262	0.012	0.0	0.0	O K
	Storm Event			Rain (mm/hr)	Time-Peak (mins)	
	10080 min Summer			0.632	5120	
	15 min Winter			77.919	17	
	30 min Winter			50.334	31	
	60 min Winter			31.203	58	
	120 min Winter			18.861	92	
	180 min Winter			13.939	130	
	240 min Winter			11.215	166	
	360 min Winter			8.240	236	
	480 min Winter			6.617	304	
	600 min Winter			5.579	368	
	720 min Winter			4.852	432	
	960 min Winter			3.890	550	
	1440 min Winter			2.848	736	
	2160 min Winter			2.083	1104	
	2880 min Winter			1.668	1472	
	4320 min Winter			1.219	2200	
	5760 min Winter			0.976	2864	
	7200 min Winter			0.821	3592	
	8640 min Winter			0.712	4264	
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HCL House Fortran Rd St Mellons B'ness Park Cardiff CF3 0EY		7009-UA001881-UP21B-02 NW Exemplar Site Domestic Soakaway																					
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<u>Summary of Results for 10 year Return Period (+30%)</u> <table><tr><td>Storm Event</td><td>Max Level (m)</td><td>Max Depth (m)</td><td>Max Infiltration (l/s)</td><td>Max Volume (m³)</td><td>Status</td></tr><tr><td>10080 min Winter</td><td>9.261</td><td>0.011</td><td>0.0</td><td>0.0</td><td>O K</td></tr></table> <table><tr><td>Storm Event</td><td>Rain (mm/hr)</td><td>Time-Peak (mins)</td></tr><tr><td>10080 min Winter</td><td>0.632</td><td>5136</td></tr></table>						Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status	10080 min Winter	9.261	0.011	0.0	0.0	O K	Storm Event	Rain (mm/hr)	Time-Peak (mins)	10080 min Winter	0.632	5136
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HCL House Fortran Rd St Mellons B'ness Park Cardiff CF3 0EY	7009-UA001881-UP21B-02 NW Exemplar Site Domestic Soakaway	
Date 24/11/2010 14:04 File NW Domestic Soaka...	Designed By dcbw06491 Checked By	
Elstree Computing Ltd	Source Control W.12.4	

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	10	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time / Area Diagram

Total Area (ha) 0.009

Time	Area
(mins)	(ha)

0-4	0.009
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HCL House Fortran Rd St Mellons B'ness Park Cardiff CF3 0EY	7009-UA001881-UP21B-02 NW Exemplar Site Domestic Soakaway	
Date 24/11/2010 14:04 File NW Domestic Soaka...	Designed By dcbw06491 Checked By	
Elstree Computing Ltd	Source Control W.12.4	

Model Details

Storage is Online Cover Level (m) 10.000

Trench Soakaway Structure

Infiltration Coefficient Base (m/hr)	0.18000	Trench Width (m)	2.4
Infiltration Coefficient Side (m/hr)	0.18000	Trench Length (m)	2.4
Safety Factor	2.0	Slope (1:X)	10000.0
Porosity	0.60	Cap Volume Depth (m)	0.000
Invert Level (m)	9.250	Cap Infiltration Depth (m)	0.000

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Date 24/11/2010 14:07 File SE Domestic Soaka...		Designed By dcbw06491 Checked By																																																																																																																																																																													
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Summary of Results for 10 year Return Period (+30%) Half Drain Time : 212 minutes. <table><tr><th>Storm Event</th><th>Max Level (m)</th><th>Max Depth (m)</th><th>Max Infiltration (l/s)</th><th>Max Volume (m³)</th><th>Status</th></tr><tr><td>15 min Summer</td><td>9.613</td><td>0.363</td><td>0.1</td><td>1.3</td><td>O K</td></tr><tr><td>30 min Summer</td><td>9.706</td><td>0.456</td><td>0.1</td><td>1.6</td><td>O K</td></tr><tr><td>60 min Summer</td><td>9.786</td><td>0.536</td><td>0.1</td><td>1.9</td><td>O K</td></tr><tr><td>120 min Summer</td><td>9.836</td><td>0.586</td><td>0.1</td><td>2.0</td><td>O K</td></tr><tr><td>180 min Summer</td><td>9.843</td><td>0.593</td><td>0.1</td><td>2.0</td><td>O K</td></tr><tr><td>240 min Summer</td><td>9.841</td><td>0.591</td><td>0.1</td><td>2.0</td><td>O K</td></tr><tr><td>360 min Summer</td><td>9.828</td><td>0.578</td><td>0.1</td><td>2.0</td><td>O K</td></tr><tr><td>480 min Summer</td><td>9.809</td><td>0.559</td><td>0.1</td><td>1.9</td><td>O K</td></tr><tr><td>600 min Summer</td><td>9.790</td><td>0.540</td><td>0.1</td><td>1.9</td><td>O K</td></tr><tr><td>720 min Summer</td><td>9.770</td><td>0.520</td><td>0.1</td><td>1.8</td><td>O K</td></tr><tr><td>960 min Summer</td><td>9.732</td><td>0.482</td><td>0.1</td><td>1.7</td><td>O K</td></tr><tr><td>1440 min Summer</td><td>9.664</td><td>0.414</td><td>0.1</td><td>1.4</td><td>O K</td></tr><tr><td>2160 min Summer</td><td>9.579</td><td>0.329</td><td>0.1</td><td>1.1</td><td>O K</td></tr><tr><td>2880 min Summer</td><td>9.510</td><td>0.260</td><td>0.1</td><td>0.9</td><td>O K</td></tr><tr><td>4320 min Summer</td><td>9.411</td><td>0.161</td><td>0.1</td><td>0.6</td><td>O K</td></tr><tr><td>5760 min Summer</td><td>9.347</td><td>0.097</td><td>0.1</td><td>0.3</td><td>O K</td></tr><tr><td>7200 min Summer</td><td>9.310</td><td>0.060</td><td>0.1</td><td>0.2</td><td>O K</td></tr><tr><td>8640 min Summer</td><td>9.297</td><td>0.047</td><td>0.1</td><td>0.2</td><td>O K</td></tr></table> <table><tr><th>Storm Event</th><th>Rain (mm/hr)</th><th>Time-Peak (mins)</th></tr><tr><td>15 min Summer</td><td>77.919</td><td>18</td></tr><tr><td>30 min Summer</td><td>50.334</td><td>33</td></tr><tr><td>60 min Summer</td><td>31.203</td><td>62</td></tr><tr><td>120 min Summer</td><td>18.861</td><td>120</td></tr><tr><td>180 min Summer</td><td>13.939</td><td>158</td></tr><tr><td>240 min Summer</td><td>11.215</td><td>190</td></tr><tr><td>360 min Summer</td><td>8.240</td><td>254</td></tr><tr><td>480 min Summer</td><td>6.617</td><td>324</td></tr><tr><td>600 min Summer</td><td>5.579</td><td>394</td></tr><tr><td>720 min Summer</td><td>4.852</td><td>462</td></tr><tr><td>960 min Summer</td><td>3.890</td><td>598</td></tr><tr><td>1440 min Summer</td><td>2.848</td><td>866</td></tr><tr><td>2160 min Summer</td><td>2.083</td><td>1252</td></tr><tr><td>2880 min Summer</td><td>1.668</td><td>1616</td></tr><tr><td>4320 min Summer</td><td>1.219</td><td>2336</td></tr><tr><td>5760 min Summer</td><td>0.976</td><td>3048</td></tr><tr><td>7200 min Summer</td><td>0.821</td><td>3680</td></tr><tr><td>8640 min Summer</td><td>0.712</td><td>4400</td></tr></table>					Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status	15 min Summer	9.613	0.363	0.1	1.3	O K	30 min Summer	9.706	0.456	0.1	1.6	O K	60 min Summer	9.786	0.536	0.1	1.9	O K	120 min Summer	9.836	0.586	0.1	2.0	O K	180 min Summer	9.843	0.593	0.1	2.0	O K	240 min Summer	9.841	0.591	0.1	2.0	O K	360 min Summer	9.828	0.578	0.1	2.0	O K	480 min Summer	9.809	0.559	0.1	1.9	O K	600 min Summer	9.790	0.540	0.1	1.9	O K	720 min Summer	9.770	0.520	0.1	1.8	O K	960 min Summer	9.732	0.482	0.1	1.7	O K	1440 min Summer	9.664	0.414	0.1	1.4	O K	2160 min Summer	9.579	0.329	0.1	1.1	O K	2880 min Summer	9.510	0.260	0.1	0.9	O K	4320 min Summer	9.411	0.161	0.1	0.6	O K	5760 min Summer	9.347	0.097	0.1	0.3	O K	7200 min Summer	9.310	0.060	0.1	0.2	O K	8640 min Summer	9.297	0.047	0.1	0.2	O K	Storm Event	Rain (mm/hr)	Time-Peak (mins)	15 min Summer	77.919	18	30 min Summer	50.334	33	60 min Summer	31.203	62	120 min Summer	18.861	120	180 min Summer	13.939	158	240 min Summer	11.215	190	360 min Summer	8.240	254	480 min Summer	6.617	324	600 min Summer	5.579	394	720 min Summer	4.852	462	960 min Summer	3.890	598	1440 min Summer	2.848	866	2160 min Summer	2.083	1252	2880 min Summer	1.668	1616	4320 min Summer	1.219	2336	5760 min Summer	0.976	3048	7200 min Summer	0.821	3680	8640 min Summer	0.712	4400
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HCL House Fortran Rd St Mellons B'ness Park Cardiff CF3 0EY		7009-UA001881-UP21B-02 SE Exemplar Site Domestic Soakaway				
Date 24/11/2010 14:07 File SE Domestic Soaka...		Designed By dcbw06491 Checked By				
Elstree Computing Ltd		Source Control W.12.4				
Summary of Results for 10 year Return Period (+30%)						
Storm Event		Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
10080 min Summer		9.292	0.042	0.0	0.1	O K
15 min Winter		9.658	0.408	0.1	1.4	O K
30 min Winter		9.764	0.514	0.1	1.8	O K
60 min Winter		9.857	0.607	0.1	2.1	O K
120 min Winter		9.921	0.671	0.1	2.3	O K
180 min Winter		9.932	0.682	0.1	2.4	O K
240 min Winter		9.927	0.677	0.1	2.3	O K
360 min Winter		9.910	0.660	0.1	2.3	O K
480 min Winter		9.884	0.634	0.1	2.2	O K
600 min Winter		9.855	0.605	0.1	2.1	O K
720 min Winter		9.825	0.575	0.1	2.0	O K
960 min Winter		9.768	0.518	0.1	1.8	O K
1440 min Winter		9.668	0.418	0.1	1.4	O K
2160 min Winter		9.549	0.299	0.1	1.0	O K
2880 min Winter		9.458	0.208	0.1	0.7	O K
4320 min Winter		9.338	0.088	0.1	0.3	O K
5760 min Winter		9.297	0.047	0.1	0.2	O K
7200 min Winter		9.289	0.039	0.0	0.1	O K
8640 min Winter		9.284	0.034	0.0	0.1	O K
Storm Event		Rain (mm/hr)		Time-Peak (mins)		
10080 min Summer		0.632		5136		
15 min Winter		77.919		18		
30 min Winter		50.334		32		
60 min Winter		31.203		60		
120 min Winter		18.861		118		
180 min Winter		13.939		172		
240 min Winter		11.215		198		
360 min Winter		8.240		272		
480 min Winter		6.617		350		
600 min Winter		5.579		426		
720 min Winter		4.852		500		
960 min Winter		3.890		644		
1440 min Winter		2.848		922		
2160 min Winter		2.083		1316		
2880 min Winter		1.668		1696		
4320 min Winter		1.219		2376		
5760 min Winter		0.976		2904		
7200 min Winter		0.821		3672		
8640 min Winter		0.712		4408		
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HCL House Fortran Rd St Mellons B'nness Park Cardiff CF3 0EY	7009-UA001881-UP21B-02 SE Exemplar Site Domestic Soakaway	
Date 24/11/2010 14:07 File SE Domestic Soaka...	Designed By dcbw06491 Checked By	
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Summary of Results for 10 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
10080 min Winter	9.280	0.030	0.0	0.1	O K

Storm Event	Rain (mm/hr)	Time-Peak (mins)
10080 min Winter	0.632	5136

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Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	10	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time / Area Diagram

Total Area (ha) 0.009

Time	Area
(mins)	(ha)

0-4	0.009
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Model Details

Storage is Online Cover Level (m) 10.000

Trench Soakaway Structure

Infiltration Coefficient Base (m/hr)	0.06400	Trench Width (m)	2.4
Infiltration Coefficient Side (m/hr)	0.06400	Trench Length (m)	2.4
Safety Factor	2.0	Slope (1:X)	10000.0
Porosity	0.60	Cap Volume Depth (m)	0.000
Invert Level (m)	9.250	Cap Infiltration Depth (m)	0.000

		CALCULATIONS		DOCUMENT No 7010-UA001881-UP21B-02				
OFFICE CARDIFF			PROJECT TITLE NW Bicester Eco Development					
SUBJECT Permeable Block-Paving Design Calculation					SHEET No 1 OF 11			
ISSUE	TOTAL SHEETS	AUTHOR	DATE	CHECKED BY	DATE	APPROVED BY	DATE	COMMENTS
1	2	MP	27/09/10	DCB	27/09/10	SAD	27/09/10	
2	11	DCB	25/11/10	MP	25/11/10	SAD	25/11/10	
3								
4								
5								
SUPERSEDES DOC No								DATE

DESIGN BASIS STATEMENT (Inc. sources of info/data, assumptions made, standards, etc.) Introduction This calculation is intended to establish the dimensions of a typical area of self-draining permeable pavement forming residential roads. The Interpave design guide (Guide to the Design, Construction and Maintenance of Concrete Block Permeable Pavements, Edition 6, Jan 2010, Interpave) has been used to define a suitable system which has then been tested, using WinDES (an industry standard drainage design package produced by Microdrainage) utilising the Modified Rational Method, to establish the system capacity during rainfall events. Assumptions 1) Assessed for typical area of 6x20m paving (120m²) with no additional runoff from surrounding areas 2) Base slope falling with approximate typical land profile of 1 in 200 3) Ground infiltration rates are assumed to be 180mm/hr for the north western area of the site and 64mm/hr for the south eastern area of the site 4) Tested to accommodate 100 year rainfall events with a range of durations 5) Tested as Permeable Paving as defined by WinDES (Layer of block paving above a gravel/sand layer of 30% porosity) 6) Infiltration through base of paving only 7) Factor of Safety of 2 applied to soakage rate 8) Climate change factor of 30% applied to rainfall 9) No evaporation or depression storage allowed for (conservative) Design (using Interpave design guide) Assuming discharge by infiltration only and usage Category 4 (ref Table 7, approx 10 large goods vehicles per week), Figure 23 indicates a suitable profile would be 80mm block paviors on a 50mm bedding layer, with 150mm of hydraulically bound coarse graded aggregate and a further 150mm of course graded aggregate beneath, giving a total system depth of 430mm. Testing Results (using WinDES) • North western area - 180mm/hr infiltration ◦ Maximum water depth - 87mm ◦ Half drain time - 4 minutes ◦ Approximate surplus storage depth - 213mm (25m³) • South eastern area - 64 mm/hr infiltration ◦ Maximum water depth - 125mm ◦ Half drain time - 23 minutes ◦ Approximate surplus storage depth - 175mm (20m³) Notes Assessment of the permeable paving indicates that under both potential infiltration scenarios the maximum water level would not exceed 300mm, and would be contained within the aggregate under the paving. The results also indicate that the half drain time of the system for both rates of infiltration is less than the maximum recommended 1440 minutes (24 hours). Impermeable strata are anticipated at depths between 1 and 2m below ground level, therefore impermeable paving could be viable for use on site in all areas.

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Hyder Consulting Ltd				Page 3		
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Date 24/11/2010 13:31 File NW EXEMPLAR PERME...		Designed By dcbw06491 Checked By				
Elstree Computing Ltd		Source Control W.12.4				
Summary of Results for 100 year Return Period (+30%)						
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status	
10080 min Summer	0.007	0.007	0.1	0.0	O K	
15 min Winter	0.087	0.087	3.0	1.4	O K	
30 min Winter	0.081	0.081	3.0	1.2	O K	
60 min Winter	0.057	0.057	3.0	0.6	O K	
120 min Winter	0.036	0.036	2.2	0.2	O K	
180 min Winter	0.029	0.029	1.7	0.1	O K	
240 min Winter	0.026	0.026	1.3	0.1	O K	
360 min Winter	0.022	0.022	0.9	0.1	O K	
480 min Winter	0.020	0.020	0.8	0.1	O K	
600 min Winter	0.018	0.018	0.7	0.1	O K	
720 min Winter	0.017	0.017	0.6	0.1	O K	
960 min Winter	0.015	0.015	0.5	0.0	O K	
1440 min Winter	0.013	0.013	0.3	0.0	O K	
2160 min Winter	0.011	0.011	0.2	0.0	O K	
2880 min Winter	0.010	0.010	0.2	0.0	O K	
4320 min Winter	0.008	0.008	0.1	0.0	O K	
5760 min Winter	0.008	0.008	0.1	0.0	O K	
7200 min Winter	0.007	0.007	0.1	0.0	O K	
8640 min Winter	0.006	0.006	0.1	0.0	O K	
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180 min Winter	23.353		92			
240 min Winter	18.644		126			
360 min Winter	13.543		188			
480 min Winter	10.792		242			
600 min Winter	9.043		302			
720 min Winter	7.823		358			
960 min Winter	6.219		484			
1440 min Winter	4.493		728			
2160 min Winter	3.241		1064			
2880 min Winter	2.568		1360			
4320 min Winter	1.847		2200			
5760 min Winter	1.461		2776			
7200 min Winter	1.217		3640			
8640 min Winter	1.048		4336			
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Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time / Area Diagram

Total Area (ha) 0.012

Time	Area
(mins)	(ha)

0-4	0.012
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HCL House Fortran Rd St Mellons B'ness Park Cardiff CF3 0EY	7010-UA001881-UP21B-02 NW Exemplar Site Permeable Block-Paving	
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Model Details

Storage is Online Cover Level (m) 0.430

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.18000	Width (m)	6.0
Membrane Percolation (mm/hr)	1000	Length (m)	20.0
Max Percolation (l/s)	33.3	Slope (1:X)	200.0
Safety Factor	2.0	Depression Storage (mm)	0
Porosity	0.30	Evaporation (mm/day)	0
Invert Level (m)	0.000	Cap Volume Depth (m)	0.000

Hyder Consulting Ltd			Page 7																																																																																																																			
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4320 min Summer	0.016	0.016	0.2	0.0	O K																																																																																																																	
5760 min Summer	0.014	0.014	0.1	0.0	O K																																																																																																																	
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HCL House Fortran Rd St Mellons B'nness Park Cardiff CF3 0EY		7010-UA001881-UP21B-02 SE Exemplar Site Permeable Block-Paving				
Date 24/11/2010 13:38 File SE EXEMPLAR PERME...		Designed By dcbw06491 Checked By				
Elstree Computing Ltd		Source Control W.12.4				
Summary of Results for 100 year Return Period (+30%)						
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status	
10080 min Summer	0.012	0.012	0.1	0.0	O K	
15 min Winter	0.117	0.117	1.1	2.4	O K	
30 min Winter	0.125	0.125	1.1	2.7	O K	
60 min Winter	0.121	0.121	1.1	2.6	O K	
120 min Winter	0.103	0.103	1.1	1.9	O K	
180 min Winter	0.083	0.083	1.1	1.2	O K	
240 min Winter	0.063	0.063	1.1	0.7	O K	
360 min Winter	0.043	0.043	0.9	0.3	O K	
480 min Winter	0.035	0.035	0.8	0.2	O K	
600 min Winter	0.030	0.030	0.6	0.2	O K	
720 min Winter	0.028	0.028	0.6	0.1	O K	
960 min Winter	0.025	0.025	0.5	0.1	O K	
1440 min Winter	0.021	0.021	0.3	0.1	O K	
2160 min Winter	0.018	0.018	0.2	0.1	O K	
2880 min Winter	0.016	0.016	0.2	0.0	O K	
4320 min Winter	0.014	0.014	0.1	0.0	O K	
5760 min Winter	0.012	0.012	0.1	0.0	O K	
7200 min Winter	0.011	0.011	0.1	0.0	O K	
8640 min Winter	0.010	0.010	0.1	0.0	O K	
Storm Event	Rain (mm/hr)		Time-Peak (mins)			
10080 min Summer	0.923		4992			
15 min Winter	128.285		16			
30 min Winter	84.226		28			
60 min Winter	52.662		46			
120 min Winter	31.800		82			
180 min Winter	23.353		114			
240 min Winter	18.644		140			
360 min Winter	13.543		192			
480 min Winter	10.792		250			
600 min Winter	9.043		308			
720 min Winter	7.823		368			
960 min Winter	6.219		488			
1440 min Winter	4.493		734			
2160 min Winter	3.241		1116			
2880 min Winter	2.568		1476			
4320 min Winter	1.847		2152			
5760 min Winter	1.461		2904			
7200 min Winter	1.217		3808			
8640 min Winter	1.048		4392			
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Elstree Computing Ltd	Source Control W.12.4	

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time / Area Diagram

Total Area (ha) 0.012

Time (mins)	Area (ha)
0-4	0.012

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HCL House Fortran Rd St Mellons B'ness Park Cardiff CF3 0EY	7010-UA001881-UP21B-02 SE Exemplar Site Permeable Block-Paving	
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Elstree Computing Ltd	Source Control W.12.4	

Model Details

Storage is Online Cover Level (m) 0.430

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.06400	Width (m)	6.0
Membrane Percolation (mm/hr)	1000	Length (m)	20.0
Max Percolation (l/s)	33.3	Slope (1:X)	200.0
Safety Factor	2.0	Depression Storage (mm)	0
Porosity	0.30	Evaporation (mm/day)	0
Invert Level (m)	0.000	Cap Volume Depth (m)	0.000