

Appendix D

Groundwater Map



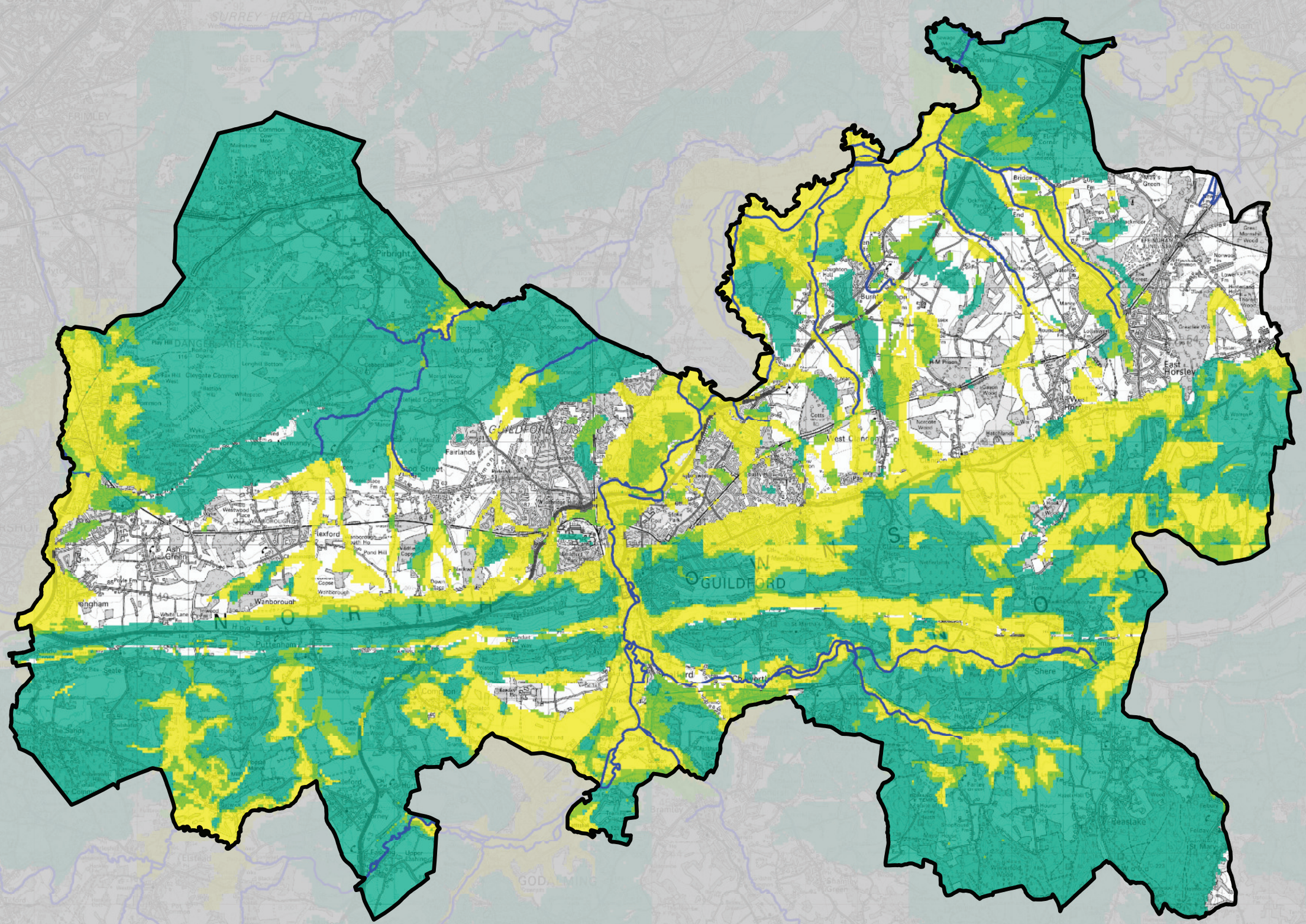
Legend

- Borough Administrative Boundary
- Main River

Susceptibility to GroundWater Flooding*

- Limited potential for groundwater flooding to occur
- Potential for groundwater flooding of property situated below ground level
- Potential for groundwater flooding to occur at surface

*British Geological Survey data



Notes

NOTE THE PROPERTY OF THIS DRAWING AND DESIGN IS VESTED IN CAPITA LIMITED AND MUST NOT BE COPIED OR REPRODUCED IN ANYWAY WITHOUT THEIR WRITTEN CONSENT.

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Guildford SFRA



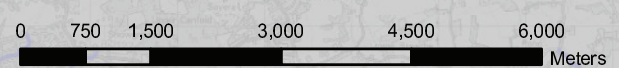
Scale at A3 1:87,000	Date July 2015	Drawn by GA	Approved by LM
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Figure 8
Susceptibility to GroundWater Flooding Overview

Consultant
CAPITA
Flood Risk Management

Capita
Level Four,
65 Gresham Street,
London
EC2V 7NQ

DRAWING NUMBER CS074594/Fig8	REV -
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Appendix E

Sequential and Exception Test Tables

Flood Risk Vulnerability Classification see table D2	Essential Infrastructure	Water compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Zone 1	√	√	√	√	√
Zone 2	√	√	Exception test required	√	√
Zone 3a	Exception test required	√	X	Exception test required	√
Zone 3b 'Functional Flood plain'	Exception test required	√	X	X	X

Key:

√ Development is appropriate

X Development should not be permitted**Table D.2: Flood Risk Vulnerability Classification**

Essential Infrastructure	<ul style="list-style-type: none"> • Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk. • Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including electricity generating power stations and grid and primary substations; and water treatment works that need to remain operational in times of flood. • Wind turbines.
Highly Vulnerable	<ul style="list-style-type: none"> • Police stations, Ambulance stations and Fire stations and Command Centres and telecommunications installations required to be operational during flooding. • Emergency dispersal points. • Basement dwellings. • Caravans, mobile homes and park homes intended for permanent residential use. • Installations requiring hazardous substances consent.¹⁹ (Where there is a demonstrable need to locate such installations for bulk storage of materials with port or other similar facilities, or such installations with energy infrastructure or carbon capture and storage installations, that require coastal or water-side locations, or need to be located in other high flood risk areas, in these instances the facilities should be classified as 'Essential Infrastructure'²⁰).
More Vulnerable	<ul style="list-style-type: none"> • Hospitals. • Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels. • Buildings used for: dwelling houses; student halls of residence; drinking establishments; nightclubs; and hotels. • Non-residential uses for health services, nurseries and educational establishments. • Landfill and sites used for waste management facilities for hazardous waste.²¹ • Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan.
Less Vulnerable	<ul style="list-style-type: none"> • Police, ambulance and fire stations which are not required to be operational during flooding. • Buildings used for: shops; financial, professional and other services; restaurants and cafes; hot food takeaways; offices; general industry; storage and distribution; non-residential institutions not included in 'more vulnerable'; and assembly and leisure. • Land and buildings used for agriculture and forestry. • Waste treatment (except landfill and hazardous waste facilities). • Minerals working and processing (except for sand and gravel working). • Water treatment works which do not need to remain operational during times of flood. • Sewage treatment works (if adequate measures to control pollution and manage sewage during flooding events are in place).
Water-compatible development	<ul style="list-style-type: none"> • Flood control infrastructure. • Water transmission infrastructure and pumping stations. • Sewage transmission infrastructure and pumping stations. • Sand and gravel workings. • Docks, marinas and wharves. • Navigation facilities. • MOD defence installations.

	<ul style="list-style-type: none">• Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location.• Water-based recreation (excluding sleeping accommodation).• Lifeguard and coastguard stations.• Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms.• Essential ancillary sleeping or residential accommodation for staff required by uses in this category, subject to a specific warning and evacuation plan.
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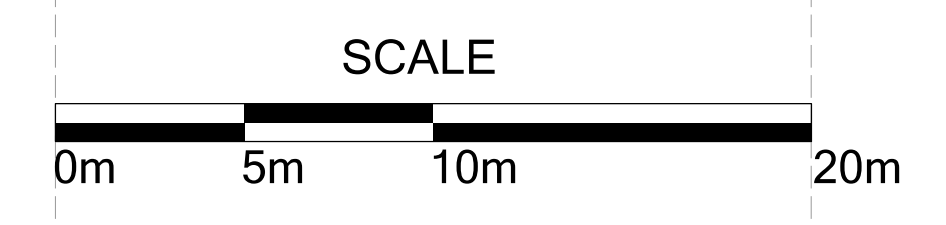
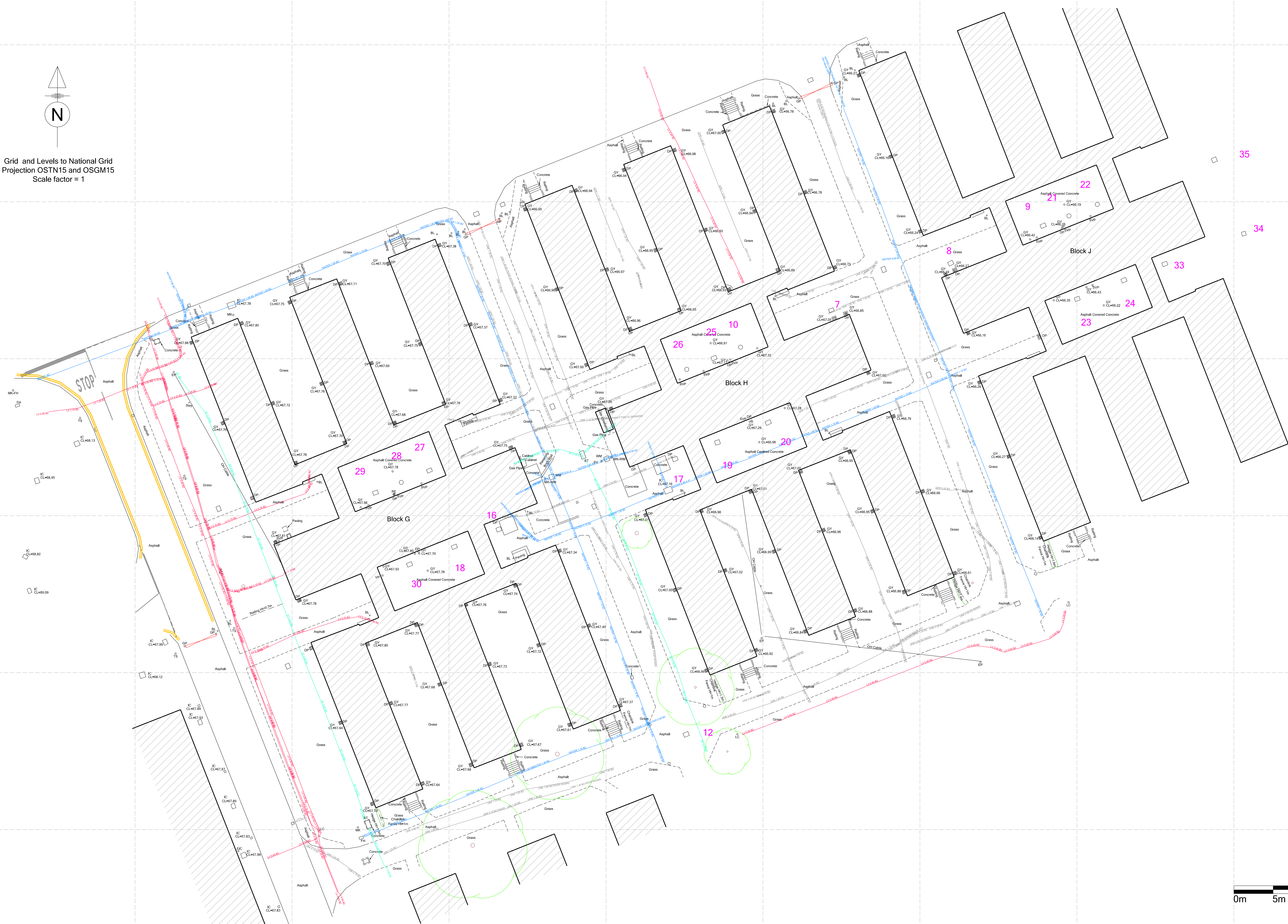
Flood Risk Vulnerability and Flood Zone ‘Compatibility’



Appendix F

Utilities Search

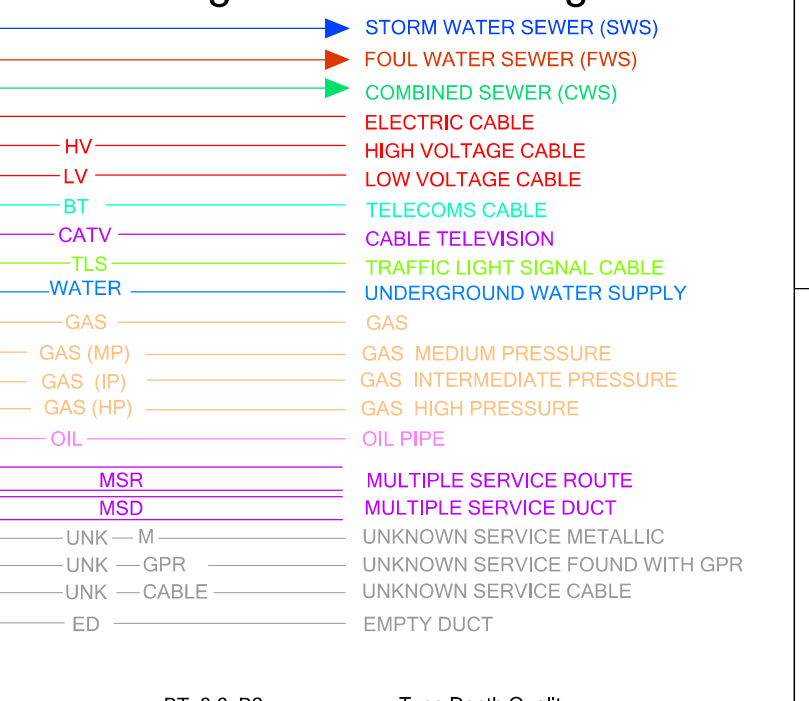
Grid and Levels to National Grid Projection OSTN15 and OSGM15 Scale factor = 1



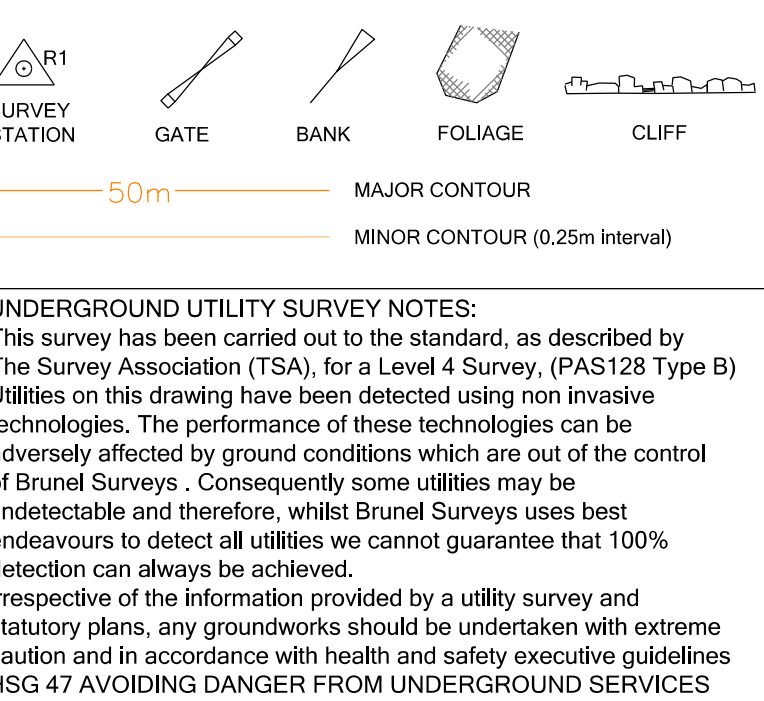
Underground Utility Surveys - PAS 128 - Quality Levels

Survey Type	Quality Level	Post Processing	Location Accuracy		Supporting Data
			Horizontal	Vertical	
D Desktop Utility Records Search	D	-	Undefined	Undefined	-
C Site Reconnaissance	C	-	Undefined	Undefined	Location demonstrated by Topographical Features or Reinstatement Scar
B Detection	B4	No	Undefined	Undefined	Suspected to exist, but undetected. Shown as "ASSUMED"
	B3	No	+/-500mm	Undefined	Horizontal Position Only One location method only used
	B3P	Yes	+/-500mm	Undefined	Horizontal Position Only One location method only used
	B2	No	+/-250mm or +/-40% of Detected Depth Whichever is Greater	+/-40% of Detected Depth	Horizontal and Vertical Detection One Detection Method Used
	B2P	Yes	+/-250mm or +/-40% of Detected Depth Whichever is Greater	+/-40% of Detected Depth	Horizontal and Vertical Detection Multiple Detection Methods Used
	B1	No	+/-150mm or +/-15% of Detected Depth Whichever is Greater	+/-15% of Detected Depth	Horizontal and Vertical Detection Multiple Detection Methods Used
B1P	Yes	+/-150mm or +/-15% of Detected Depth Whichever is Greater	+/-15% of Detected Depth	Horizontal and Vertical Detection Multiple Detection Methods Used	
A Verification	A	-	+/-50mm	+/-25mm	Horizontal and Vertical Location of the top, and/or bottom of the utility

Underground Utilities Legend



Legend



UNDERGROUND UTILITY SURVEY NOTES:

This survey has been carried out to the standard, as described by The Survey Association (TSA), for a Level 4 Survey, (PAS128 Type B) Utilities on this drawing have been detected using non-invasive technologies. The performance of these technologies can be adversely affected by ground conditions which are out of the control of Brunel Surveys. Consequently some utilities may be undetectable and therefore, while Brunel Surveys uses best endeavours to detect all utilities we cannot guarantee that 100% detection can always be achieved. In respect of the information provided by a utility survey and statutory plans, any groundworks should be undertaken with extreme caution and in accordance with health and safety executive guidelines HSG 47 AVOIDING DANGER FROM UNDERGROUND SERVICES

Brunel Surveys Ltd

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WATCHFIELD, SWINDON, WILTSHIRE, SN6 8TY
TEL: (01793) 784700
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CLIENT

Fairhurst
Clifton Heights
Triangle West
Clifton
Bristol
BS8 1EJ

JOB TITLE

Utilities Survey
Accommodation Blocks G, H & J
Brunswick Camp

REVISIONS

SCALE	A0 Sheet @ 1 to 200
DATE	Nov 2020
DRAWN BY	AW/LB
CHECKED BY	PAH
DRAWING No.	22392-200-01 Utilities

SURVEY STATIONS

Name	Easting	Northing	Height	Remark
T1	492361.705	156962.433	66.452	Nat
T2	492395.260	156986.342	69.442	Nat
T3	492347.788	156989.652	67.965	Nat
T4	492325.317	156988.294	67.728	Nat
T5	492281.325	156921.398	68.038	Nat
T6	492321.464	156947.478	67.182	Nat

Appendix G

Tweedie Evans Consulting report

Trial Pit Log

Project Name: Brunswick Camp, Pirbright		Client: Fairhurst		Date: 04/10/2019	
Location: Pirbright		Contractor:			
Project No. : 1909007.001		Crew Name:		Equipment: JCB 3CX	
Location Number TP01	Location Type TP	Level	Logged By HK	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	ES		0.20		Dark brown gravelly sandy SILT with frequent roots and rootlets. Gravel is fine to coarse angular to rounded of brick, flint and coal.		
		0.60 - 0.70	WAC		0.90				Brown tending to light brown gravelly silty fine to coarse SAND with rare rootlets. Gravel is fine to coarse angular to rounded of flint, brick and wood.
		1.10	D		2.00		Orange mottled greenish grey very silty fine to medium SAND.		
		2.00	B		2.30				End of Borehole at 2.300m

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks
2.00	0.50	Stable	None				

Remarks
SA1 completed within this pit.





TWEEDIE EVANS CONSULTING

Trial Pit Log

Project Name: Brunswick Camp, Pirbright		Client: Fairhurst		Date: 04/10/2019	
Location: Pirbright		Contractor:			
Project No. : 1909007.001		Crew Name:		Equipment: JCB 3CX	
Location Number TP02	Location Type TP	Level	Logged By HK	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.25	WAC		0.25		Grass over dark brown gravelly sandy SILT with frequent roots and rootlets. Gravel is fine to coarse angular to rounded of brick, flint and coal.	1	
		0.50	ES		0.70				Brown and grey gravelly silty fine to coarse SAND with rare brick cobbles.
		0.90	D			2.10			Orange mottled light grey gravelly very silty fine to medium SAND. Gravel is fine to coarse angular to rounded of flint.
		1.70	B						<i>Becoming slightly gravelly</i>
					2.10		End of Borehole at 2.100m	2	
								3	
								4	
								5	

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks
1.90	0.50	Stable	None				

Remarks
SA2 completed within this pit.





TWEEDIE EVANS CONSULTING

Trial Pit Log

Project Name: Brunswick Camp, Pirbright		Client: Fairhurst		Date: 04/10/2019	
Location: Pirbright		Contractor:			
Project No. : 1909007.001		Crew Name:		Equipment: JCB 3CX	
Location Number TP03	Location Type TP	Level	Logged By HK	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30	ES		0.30		Grass over dark brown gravelly sandy SILT with frequent roots and rootlets. Gravel is fine to coarse angular to subrounded of brick, flint and coal.	1	
		0.50	WAC				Brown and light brown gravelly silty fine to coarse SAND.		
		1.00 - 2.90	D		0.90		<u>One concrete boulder 470x500mm</u> Soft light grey slightly gravelly sandy SILT with rare pockets of orange sand.		
		1.30	D		1.10		Brownish orange slightly silty very gravelly SAND. Gravel is fine to coarse angular to sub rounded of flint.		
		1.60	B						
		2.10	B		1.90		Orangish brown slightly silty fine to coarse SAND.		
				3.80			End of Borehole at 3.800m	4	
								5	

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length 2.00	Pit Width 0.50	Pit Stability Stable	Shoring Used None	Remarks	Date	Rate	Remarks

Remarks



Trial Pit Log

Project Name: Brunswick Camp, Pirbright		Client: Fairhurst		Date: 04/10/2019	
Location: Pirbright		Contractor:			
Project No. : 1909007.001		Crew Name:		Equipment: JCB 3CX	
Location Number TP04	Location Type TP	Level	Logged By HK	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
Well		0.20			0.20		Grass over dark brown gravelly sandy SILT with frequent roots and rootlets. Gravel is fine to coarse angular to subrounded of brick, flint and coal.	1	
		0.40	ES				Orange mottled black and brown gravelly silty fine to coarse SAND with rare rootlets.		
		0.60 - 2.10	WAC		0.60		Light brown grey silty very gravelly fine to coarse SAND. Gravel is fine to coarse angular to subrounded of flint		
		1.20	D		0.90		Orange mottled grey slightly gravelly silty fine to coarse SAND.		
		1.80	B				<u>No gravels</u>		
							<u>Rare pockets of grey sand.</u>	2	
								3	
					4.00		End of Borehole at 4.000m	4	
								5	

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length 1.90	Pit Width 0.50	Pit Stability Stable	Shoring Used None	Remarks	Date	Rate	Remarks

Remarks



Trial Pit Log

Project Name: Brunswick Camp, Pirbright		Client: Fairhurst		Date: 04/10/2019	
Location: Pirbright		Contractor:			
Project No. : 1909007.001		Crew Name:		Equipment: JCB 3CX	
Location Number TP05	Location Type TP	Level	Logged By HK	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
Well		0.60	ES		0.90	Gravel	Grass over gravelly sandy SILT with frequent roots and rootlets. Gravel is fine to coarse angular to rounded of brick, wood, tile, flint, mudstone and coal.	1	
		1.70	B		3.50	Sand	Orange mottled grey silty fine to coarse SAND. <i>Paler in colour with some flint gravels.</i>	2	
								End of Borehole at 3.500m	3
								4	
								5	

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks
2.00	0.50	Stable	None				

Remarks





Key:

Trial Pit Location 


*All locations are approximate

Extract provided by Fairhurst. Project Ref: 133561 NTA. Sketch Ref: 133561-BRON-1001. Sketch Title: Survey & GIR, GPR Extents. Dated 23/10/2020

	<p>TEC The Old Chapel 35a Southover Wells, Somerset BA5 1UH</p>	<p>Tel: 01749 67760 Email: info@tecon.co.uk Web: www.tecon.co.uk</p>	<p>Site Name: Brunswick Camp, Pirbright</p>	<p>Drawing Name: Proposed Development Plan & Exploratory Hole Location Plan</p>	<p>Client Name: Fairhurst</p>	<p>Project No: 1909007.002</p>	<p>Figure No: 2</p>	<p>Date: December 2020</p>	<p>Scale: NTS</p>
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Appendix H

Drainage Calculations

W A Fairhurst & Partners		Page 1
11 Woodside Terrace Glasgow G3 7XQ	Brunswick Camp 20% CC	
Date 02/12/2020 15:13 File Brunswick Calcs.SRCX	Designed by MDF Checked by NS	
Micro Drainage		Source Control 2019.1

Summary of Results for 100 year Return Period (+20%)

Half Drain Time : 586 minutes.


Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max E Outflow (l/s)	Max Volume (m ³)	Status
15 min Summer	98.531	0.331	0.0	0.8	0.8	38.6	O K
30 min Summer	98.632	0.432	0.0	0.9	0.9	50.3	O K
60 min Summer	98.732	0.532	0.0	1.0	1.0	61.9	O K
120 min Summer	98.825	0.625	0.0	1.1	1.1	72.7	O K
180 min Summer	98.870	0.670	0.0	1.1	1.1	78.0	O K
240 min Summer	98.895	0.695	0.0	1.2	1.2	80.8	O K
360 min Summer	98.916	0.716	0.0	1.2	1.2	83.3	O K
480 min Summer	98.921	0.721	0.0	1.2	1.2	83.9	O K
600 min Summer	98.920	0.720	0.0	1.2	1.2	83.8	O K
720 min Summer	98.918	0.718	0.0	1.2	1.2	83.5	O K
960 min Summer	98.910	0.710	0.0	1.2	1.2	82.6	O K
1440 min Summer	98.887	0.687	0.0	1.2	1.2	79.9	O K
2160 min Summer	98.844	0.644	0.0	1.1	1.1	74.9	O K
2880 min Summer	98.800	0.600	0.0	1.1	1.1	69.9	O K
4320 min Summer	98.723	0.523	0.0	1.0	1.0	60.8	O K
5760 min Summer	98.658	0.458	0.0	0.9	0.9	53.3	O K
7200 min Summer	98.606	0.406	0.0	0.9	0.9	47.2	O K
8640 min Summer	98.562	0.362	0.0	0.8	0.8	42.2	O K
10080 min Summer	98.526	0.326	0.0	0.8	0.8	37.9	O K
15 min Winter	98.571	0.371	0.0	0.8	0.8	43.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m ³)	Time-Peak (mins)
15 min Summer	115.824	0.0	37.0	19
30 min Summer	76.075	0.0	47.7	34
60 min Summer	47.609	0.0	63.6	64
120 min Summer	28.793	0.0	76.9	122
180 min Summer	21.171	0.0	84.8	182
240 min Summer	16.922	0.0	90.4	242
360 min Summer	12.286	0.0	98.3	360
480 min Summer	9.792	0.0	104.4	478
600 min Summer	8.206	0.0	109.1	524
720 min Summer	7.100	0.0	113.0	586
960 min Summer	5.645	0.0	118.8	710
1440 min Summer	4.080	0.0	124.4	980
2160 min Summer	2.944	0.0	142.7	1388
2880 min Summer	2.333	0.0	150.7	1792
4320 min Summer	1.679	0.0	162.3	2596
5760 min Summer	1.328	0.0	171.9	3352
7200 min Summer	1.106	0.0	179.0	4112
8640 min Summer	0.953	0.0	184.9	4848
10080 min Summer	0.840	0.0	189.9	5552
15 min Winter	115.824	0.0	41.3	19

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m ³)	Status
30 min Winter	98.684	0.484	0.0	1.0	1.0	56.4	O K
60 min Winter	98.797	0.597	0.0	1.1	1.1	69.5	O K
120 min Winter	98.903	0.703	0.0	1.2	1.2	81.8	O K
180 min Winter	98.956	0.756	0.0	1.2	1.2	87.9	O K
240 min Winter	98.985	0.785	0.0	1.2	1.2	91.3	O K
360 min Winter	99.823	1.623	0.0	1.8	1.8	94.0	Flood Risk
480 min Winter	99.804	1.604	0.0	1.8	1.8	93.9	Flood Risk
600 min Winter	99.664	1.464	0.0	1.7	1.7	93.8	O K
720 min Winter	99.624	1.424	0.0	1.7	1.7	93.8	O K
960 min Winter	99.241	1.041	0.0	1.4	1.4	93.4	O K
1440 min Winter	98.971	0.771	0.0	1.2	1.2	89.7	O K
2160 min Winter	98.908	0.708	0.0	1.2	1.2	82.4	O K
2880 min Winter	98.845	0.645	0.0	1.1	1.1	75.0	O K
4320 min Winter	98.735	0.535	0.0	1.0	1.0	62.3	O K
5760 min Winter	98.648	0.448	0.0	0.9	0.9	52.1	O K
7200 min Winter	98.580	0.380	0.0	0.9	0.9	44.2	O K
8640 min Winter	98.525	0.325	0.0	0.8	0.8	37.8	O K
10080 min Winter	98.481	0.281	0.0	0.7	0.7	32.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m ³)	Time-Peak (mins)
30 min Winter	76.075	0.0	52.4	33
60 min Winter	47.609	0.0	71.3	62
120 min Winter	28.793	0.0	86.2	120
180 min Winter	21.171	0.0	95.0	180
240 min Winter	16.922	0.0	101.2	236
360 min Winter	12.286	0.0	110.0	344
480 min Winter	9.792	0.0	116.7	440
600 min Winter	8.206	0.0	121.9	478
720 min Winter	7.100	0.0	126.1	554
960 min Winter	5.645	0.0	131.7	728
1440 min Winter	4.080	0.0	136.6	1054
2160 min Winter	2.944	0.0	159.8	1512
2880 min Winter	2.333	0.0	168.8	1932
4320 min Winter	1.679	0.0	181.7	2764
5760 min Winter	1.328	0.0	192.6	3568
7200 min Winter	1.106	0.0	200.6	4320
8640 min Winter	0.953	0.0	207.2	5096
10080 min Winter	0.840	0.0	212.8	5760

W A Fairhurst & Partners		Page 3
11 Woodside Terrace Glasgow G3 7XQ	Brunswick Camp 20% CC	
Date 02/12/2020 15:13 File Brunswick Calcs.SRCX	Designed by MDF Checked by NS	
Micro Drainage	Source Control 2019.1	

Model Details

Storage is Online Cover Level (m) 100.000

Cellular Storage Structure

Invert Level (m) 98.200 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	122.5	122.5	0.801	0.0	161.7
0.800	122.5	161.7			

Orifice Outflow Control

Diameter (m) 0.026 Discharge Coefficient 0.600 Invert Level (m) 98.200