

Drainage Technical Note 18005-RW-DTN-01

- In addition to the above, the E.A. Data also indicates that the site is at a very low risk of flooding due to surface water or reservoir flooding.

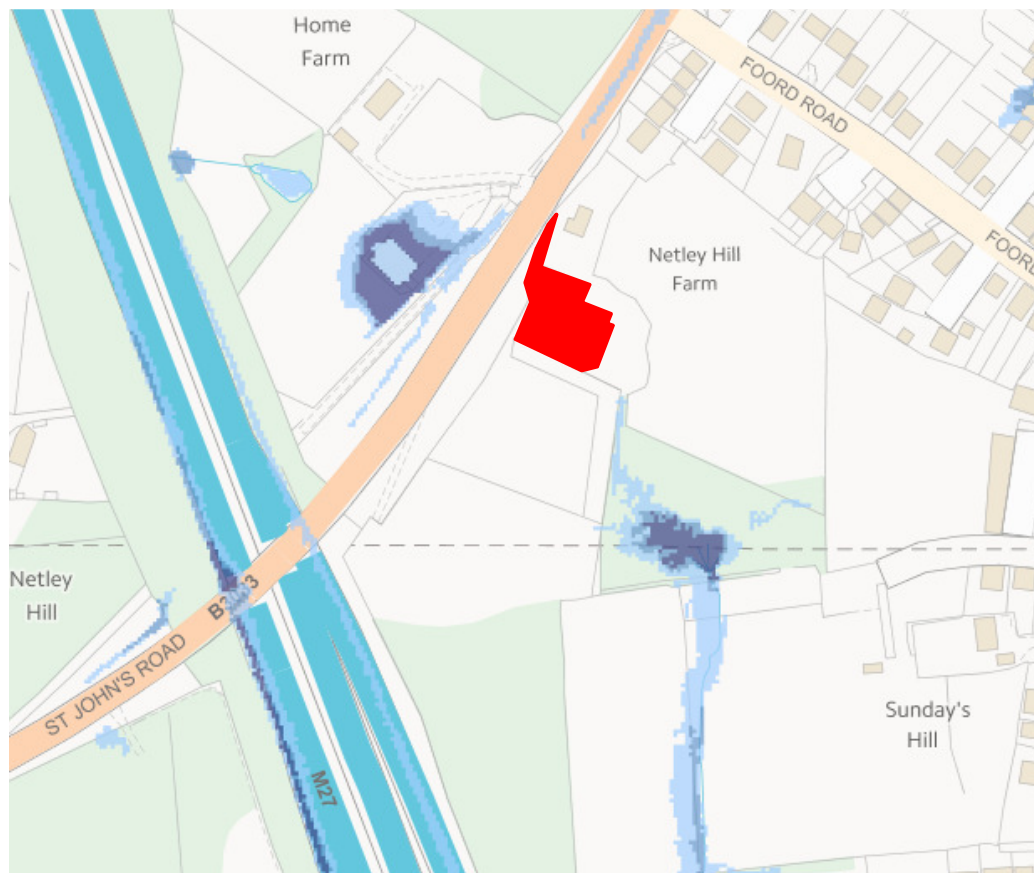


Figure 2 E.A. Surface Water Flood Map.

2. Surveys.

- The existing site and the road frontage of St Johns Road was surveyed, and a copy of the drawings are included as **Appendix A**.
- The site is currently greenfield and therefore does not generate any foul water flows, utilising the UK SuDS online tool, the greenfield run off (Qbar) has been estimated at 5.6 l/s/ha.
- The current site has an area of 2069 sqm (0.21 Ha.), all of which is considered to be permeable.
- We have also obtained the design plans for the adjacent development site, which show the new houses, roads and drainage.

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3. Foul Sewage

- The proposed new building will generate a peak foul flow of 0.4 l/s based on sewers for adoption 7th edition, whilst this is greater than the current flow from the site, it is within the normal daily variance expected on the network and hence southern Water do not accept capacity checks for such small variations.
- From the plans for the adjacent site, it can be seen that there is a new foul water sewer laid under the new road.
- The proposed foul water drainage connection is shown on drawing 18005.401 included in **Appendix B**.

4. Surface Water

- From the plans for the adjacent site, it can be seen that there is a new surface water sewer laid under the new road.
- From the site survey, there is an existing watercourse running along the south western boundary of the site
- The new property will have an impermeable area (roof + patio +driveway) of 281 m².
- In line with best practice, we have allowed an additional 10% on the impermeable area, to allow for Urban creep giving a total impermeable area of 310 m².
- From the BGS website it can be seen that the 1:50 000 scale bedrock geology description: Wittering Formation - Sand, Silt and Clay. Sedimentary Bedrock formed approximately 41 to 56 million years ago in the Palaeogene Period. Local environment previously dominated by shallow seas. A copy of the BGS map is included in **Appendix C**

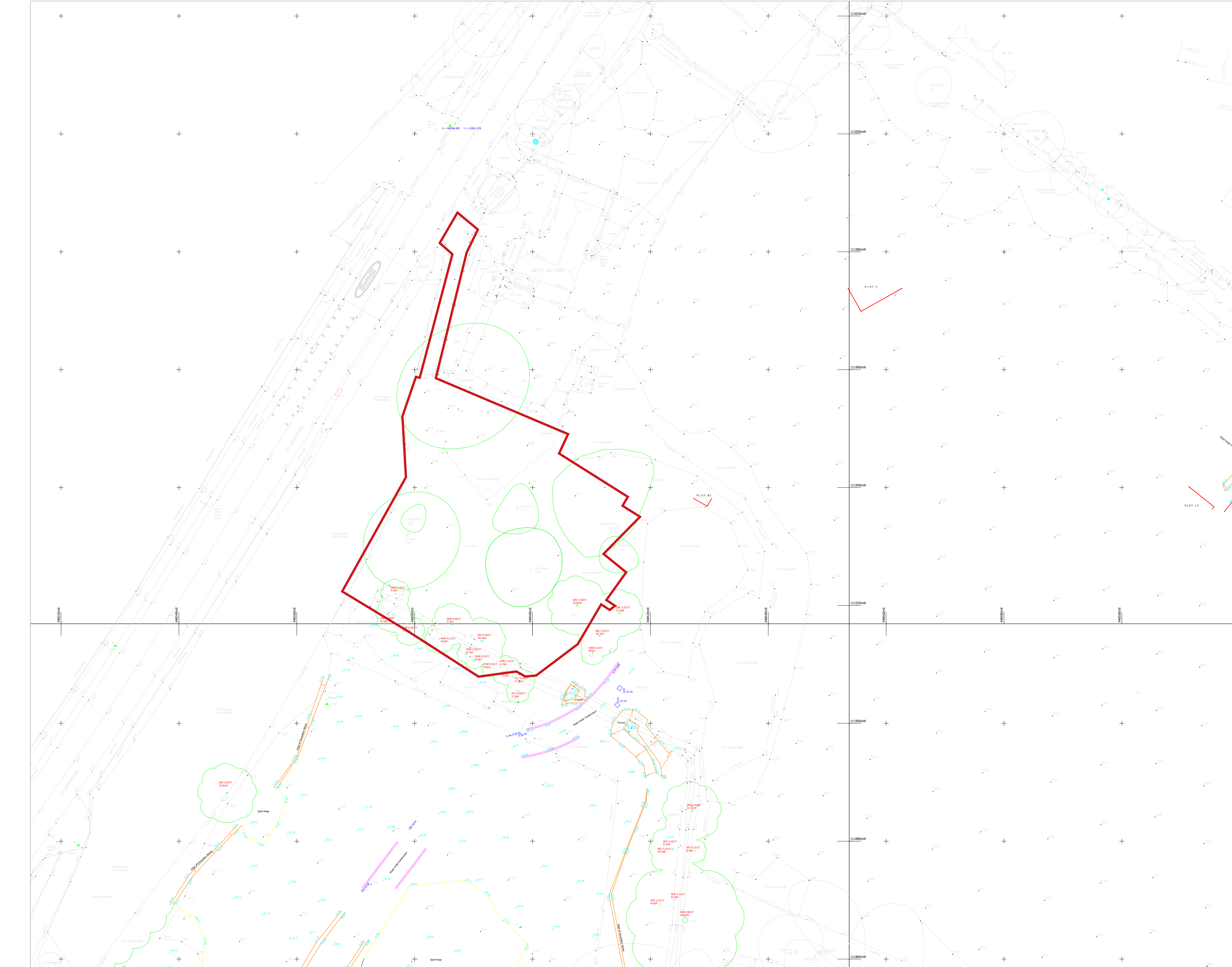
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- Given that the subsoil is predominantly Clay, it is not considered viable to utilise infiltration to dispose of the surface water, therefore, following the hierarchy within the building regulations we propose to discharge the surface water from the roof areas and patios to the surface water sewer. Based on the requirements of the SuDS manual, no further treatment is required.
- In line with good practice, the rainwater from the roofs and patios will be attenuated to a maximum discharge of 1.0 l/s. a copy of the greenfield run off calculation and the proposed attenuation calculations are included in **Appendix D**.
- The proposed driveway will be finished in a permeable paved surface, however, given that the underlying soil is clay, it is proposed that an outflow be constructed to discharge into the attenuation tank prior to discharge into the watercourse. The filtration provided by the gravel and permeable sub base will provide an additional level of treatment, thus improving the water quality in the receiving watercourse.

5. SUMMARY

- It can be seen from the submitted plans and details, that the proposed new dwellings can be adequately drained, for both foul and surface water.

Appendix A
Topographic Survey

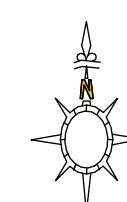


NOTES:

Drainage:
All drainage invert information has been obtained through visual inspection only, with no entry into manholes. Therefore the complete accuracy cannot be guaranteed. Where drainage is of critical importance we suggest the services of a specialist drainage expert be used.

Trees:
Every effort has been made to identify and detail all trees on site but where trees are of critical importance we suggest the use of a specialist such as an arborist. Tree spread and heights are indicative.

GPS:
Gridlines and grid are obtained using industry standard guidelines and can vary according to the quality of the GPS network at the time of survey. Therefore all GPS detail is relative to the time and date of the survey.



LEGEND

TREE SPECIES INFORMATION

ALDER	ALD	LOCUST	LOC
ASH	ASH	LOUNGE PLANE	LPN
ASPEN	ASP	MAGNOLIA	MAG
BEECH	BCH	MAPLE	MAP
CEDAR	CED	OAK	OAK
CHERRY	CHY	PINE	PNE
CYPRESS	CYP	POPLAR	POP
ELM	ELM	PRUNUS	PRU
FRUIT	FRF	RHODOCANDORUS	RDN
FRUIT	FRF	ROMAN	RWN
HAWTHORN	HAW	SILVER BIRCH	SIB
HAZEL	HAZ	SORREL	SOR
HOLLY	HOL	SWEET CHESTNUT	SCN
HORSKOE CHESTNUT	HCH	SHAMROCK	SYC
HORNBEAM	HBN	WALNUT	WNT
LABRUM	LBN	WILLOW	WLW
LARCH	LAR	YEW	YEW
LIME	LIM	SPECIES UNKNOWN	SPU
		COPPED	COP

TREE ANNOTATIONS: Tree Species / Tree Boll Size / No of Bolls
Tree Height / Tree Canopy Spread

FENCE INFORMATION

BARRED WIRE FENCE	BWF	BASEMENT LEVEL	BTL
CORRUGATED IRON FENCE	CIF	RED LEVEL	BL
CLOSE BOARD FENCE	CBF	COVER LEVEL	CL
CHAIN LINK FENCE	CLF	DAMP PROOF COURSE	DPC
CHESTNUT PALING	CFP	FLOOR LINE	FL
CRASH BARRIER	CB	INVERT LEVEL	IL
HANDRAIL	HDL	OUTCALL LEVEL	OL
IRON RAILING	IRF	THRESHOLD LEVEL	THL
LARCH PAL FENCE	LPF	POLE WATER	PW
MISCELLANEOUS FENCE	MSF	SURFACE WATER	SW
PALEADE FENCE	PAF	UNABLE TO LIFT	UL
POST FENCE	POF	WATER LEVEL	WL

SURFACE INFORMATION

STOCK WIRE FENCE	SWF	CONCRETE	Conc
TRELLIS FENCING	TUF	BRICK PAVERS	BP
		FLOWERBED	FB
		PAVING SLABS	PS
		RETAINING WALL	RWall
		TACTILE PAVING	Tac

FEATURE INFORMATION

BOLLARD	BO	NOTICE BOARD	NB
BRITISH TELECOM BOX	BTB	POST	P
BRITISH TELECOM IC	BTIC	RAIN WATER PIPE	RWP
BUS STOP	BS	RAISED FLOWERBED	RFB
CABLE TELEVISION BOX	CATB	ROAD SIGN	RS
CABLE TELEVISION IC	CATIC	ROOFCING EYE	RE
EARTHING BOX	EB	SERVICE MARKER POST	SMP
ELECTRICITY CABLE PIT	ELCP	SOIL VENT PIPE	SWP
ELECTRICITY CONTROL BOX	ELCB	STOP COOK	SC
ELECTRICITY POLE	EP	STOP VALVE	SV
FEET IMBOMBANT	FI	TELEGRAPH POLE	TP
INSPECTION COVER	IC	TELEPHONE CALL BOX	TB
LAMP POST	LP	TRAFFIC SIGNALS	TS
LETTER BOX	LB	TRAFFIC SIGNALS IC	TSIC
LETTER BOX	LB	WATER METER	WM
KERO OUTLET	KO	WATER TAP	Tap
NAME PLATE	NP		

Level Datum:
Levels are related to a previous survey as supplied by Foreman
Homes.

Grid:
Grid is related to a previous survey as supplied by Foreman Homes.

Northpoint:



Encompass Surveys Ltd
Unit 28
Deer Park Farm Industrial Estate
Knowle Lane
Fair Oak, Eastleigh
Hampshire SO50 7PZ

Tel: 023 80692062 Email: info@encompass-surveys.co.uk
Fax: 023 80697125 Website: encompass-surveys.co.uk

Client:	Foreman Homes
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Survey Location:	Land at St Johns Road Hedge End
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Bridge and Southampton		Cost: £ 250
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Survey type:	Topographical	Scale:	1:200
Drawing ref:	ENC/200014_201	Date:	November 20

Drawing Tel:	ENC/250914-3R1	Date:	November 20
Drawn/DA:	ATB	Revision:	-

Appendix B
Drainage strategy

NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS, SERVICES AND SPECIALIST DRAWINGS AND SPECIFICATION.
2. THE LEVEL OF THE EXISTING FOUL AND STORM SEWERS ON SITE HAS BEEN EXTAPOLATED FROM THE LEVELS OF ADJACENT MANHOLES THE EXACT LEVEL AT THE POINT OF CONNECTION SHALL BE CHECKED PRIOR TO THE COMMENCEMENT OF THE WORKS AND ANY VARIANCE REPORTED TO THE ENGINEER IMMEDIATELY
3. ALL DRAINAGE TO BE IN ACCORDANCE WITH BUILDING REGULATIONS PART H. SEWERS NOTED AS ADOPTABLE SHALL BE TO SEWERS FOR ADOPTION 7th EDITION.,
4. THE LOCATION OF EXISTING UNDERGROUND UTILITY SERVICES IS AS PROVIDED BY THE RELEVANT STATUTORY UNDERTAKERS THE CONTRACTOR IS TO ASCERTAIN THE EXACT LOCATION PRIOR TO COMMENCEMENT OF WORKS.
5. UNLESS NOTED OTHERWISE ALL DRAINAGE PIPES ARE TO BE 100mm Ø ALL GULLY LEADS ARE TO BE 150mm Ø. MINIMUM ADOPTABLE SEWER 150mmØ

LEGEND:

-  ROAD GULLY
-  YARD GULLY
-  DOMESTIC S.W. DRAIN 100mm DIA. (U.N.O.)
-  THRESHOLD DRAIN AT FRONT DOORS
-  HIGHWAY DRAIN / SURFACE WATER SEWER
-  DOMESTIC FOUL DRAIN 100mm DIA. (U.N.O.)
-  ADOPTABLE FOUL SEWER.
-  RWP
-  RAINWATER PIPE.
-  RE
-  RODDING EYE (LEVEL SHOWN IS INVERT)
-  ADOPTABLE MANHOLE
-  DOMESTIC MANHOLE (LEVEL SHOWN IS INVERT)
-  UIC
-  INSPECTION CHAMBER depth > 0.6m - 450 DIA.
-  SIC
-  ACCESS CHAMBER depth < 0.6m - 250 DIA.
-  SVP
-  SOIL AND VENT PIPE
-  GS
-  GROUND SOCKET CONNECTED TO IC OR AC.
-  WC
-  WC CONNECTED DIRECT TO IC OR AC
-  SS
-  SOIL PIPE WITH 'DURGO' VALVE.
-  BIG(R)
-  BACK INLET GULLY (RODDABLE)
-  BD
-  BACKDROP
-  D.C.
-  DROPPER KERBS
-  P.R.
-  PRAM RAMP
-  103.75
-  EXISTING LEVELS
-  105.20
-  PROPOSED LEVELS
-  CARRIAGEWAY CAMBER/CROSSFALL
-  DIRECTION ARROWS
-  84.050
-  FINISHED FLOOR LEVEL
-  DENOTES AREA OF UNDERBUILD BELOW DPC LEVEL (IN ADDITION TO STD REQUIREMENTS)
-  DENOTES AREA OF TANKING
-  CELLULAR ATTENUATION TANK
-  PERMEABLE PAVING

All dimensions and levels are to be checked on site prior to the commencement of construction and any discrepancies should be reported to the Construction Manager immediately.

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All dimensions are in millimetres unless otherwise stated.

All contractors / Sub-Contractors MUST ensure they have the latest drawing issue before they commence work on site.

This drawing is to be read in conjunction with all other relevant working drawings, engineers details, specialist subcontractors drawings and the specifications.

This drawing is for the purpose of obtaining Local Authority consents only. The builder must check all dimensions on site prior to ordering any factory made units, trusses or staircases.

			BY	CHECKED	DATE
			DESIGN	BGA	R/W
			DRAWN	BGA	R/W
			APPROVED		
			This drawing and its contents are the property of Baker Gilbey Associates Limited. Any unauthorised employment or reproduction, in full or in part, is forbidden.		
AMENDMENT	APP'D	DATE			

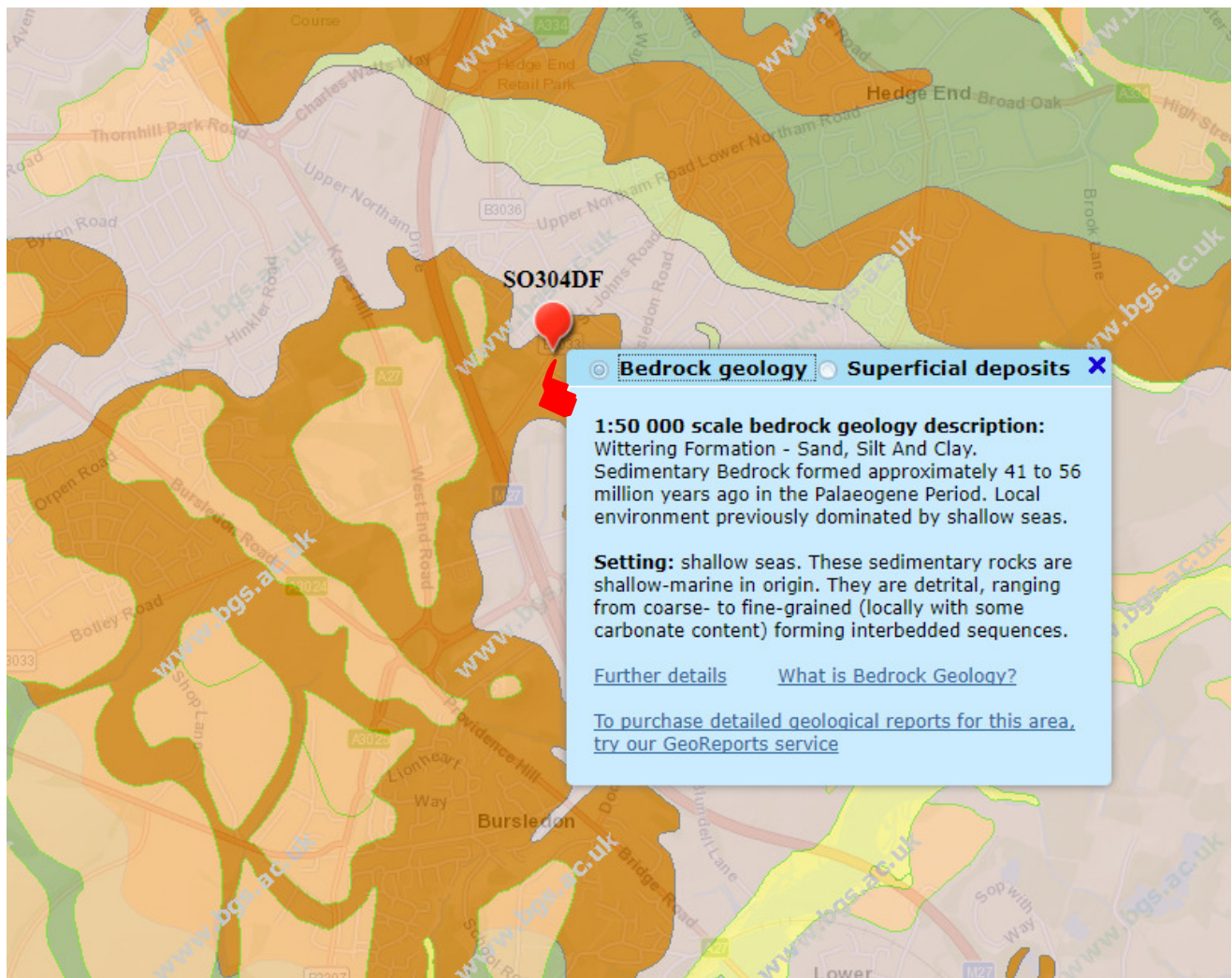
CLIENT

Baker Gilbey Associates
CONSULTING CIVIL AND STRUCTURAL ENGINEERS BROXMOOR, 105 OAKLEY LANE, OAKLEY, HAMPSHIRE RG23 7BX

TITLE PROPOSED NEW BUNGALOW ST JOHNS ROAD HEDGE END				
SITE LAYOUT DRAINAGE STRATEGY				
STATUS	FOR PLANNING	FILE		
SCALE	1:250 @ A3	PLOT DATE	FEB 2018	Project Number 18005
		Drawing Number	401	REVISION -

ORIGINAL SHEET SIZE A1 [840x594]

Appendix C
BGS Mapping



Appendix D
Calculations

Calculated by: rob wilson

Site name: the bungalow

Site location: st Johns Road

Site coordinates

Latitude: 50.90516° N

Longitude: 1.31285° W

This is an estimation of the greenfield runoff rate limits that are needed to meet normal best practice criteria in line with Environment Agency guidance "Preliminary rainfall runoff management for developments", W5-074/A/TR1/1 rev. E (2012) and the SuDS Manual, C753 (Ciria, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Reference: 6237433

Date: 2018-02-05T15:00:36

Methodology

IH124

Site characteristics

Total site area (ha)	0.21
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Methodology

Qbar estimation method	Calculate from SPR and SAAR
SPR estimation method	Calculate from SOIL type

	Default	Edited
SOIL type	4	4
HOST class	---	---
SPR/SPRHOST	0.47	0.47

Hydrological characteristics

	Default	Edited
SAAR (mm)	791	791
Hydrological region	7	7
Growth curve factor: 1 year	0.85	0.85
Growth curve factor: 30 year	2.3	2.3
Growth curve factor: 100 year	3.19	3.19

Notes:

(1) Is $Q_{BAR} < 2.0$ l/s/ha?

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consents are usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set in which case blockage work must be addressed by using appropriate drainage elements

(3) Is $SPR/SPRHOST \leq 0.3$?

Greenfield runoff rates

	Default	Edited
Qbar (l/s)	1.17	1.17
1 in 1 year (l/s)	0.99	0.99
1 in 30 years (l/s)	2.69	2.69
1 in 100 years (l/s)	3.73	3.73

LAND AT ST JOHNS ROAD
HEDGE END
ATTENUATION STORAGE



Date 05.02.18
File tank.SRCX

Designed by BGA
Checked by RJW

XP Solutions

Source Control 2014.1

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m ³)	Status
15 min Summer	55.901	0.201	0.9	7.0	O K
30 min Summer	55.960	0.260	0.9	9.1	O K
60 min Summer	56.008	0.308	0.9	10.8	O K
120 min Summer	56.030	0.330	0.9	11.6	O K
180 min Summer	56.029	0.329	0.9	11.5	O K
240 min Summer	56.020	0.320	0.9	11.2	O K
360 min Summer	55.999	0.299	0.9	10.4	O K
480 min Summer	55.975	0.275	0.9	9.6	O K
600 min Summer	55.952	0.252	0.9	8.8	O K
720 min Summer	55.930	0.230	0.9	8.1	O K
960 min Summer	55.891	0.191	0.9	6.7	O K
1440 min Summer	55.834	0.134	0.9	4.7	O K
2160 min Summer	55.786	0.086	0.8	3.0	O K
2880 min Summer	55.766	0.066	0.7	2.3	O K
4320 min Summer	55.749	0.049	0.6	1.7	O K
5760 min Summer	55.741	0.041	0.4	1.4	O K
7200 min Summer	55.736	0.036	0.4	1.3	O K
8640 min Summer	55.733	0.033	0.3	1.1	O K
10080 min Summer	55.731	0.031	0.3	1.1	O K
15 min Winter	55.927	0.227	0.9	7.9	O K
30 min Winter	55.994	0.294	0.9	10.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m ³)	Time-Peak (mins)
15 min Summer	131.851	0.0	7.6	18
30 min Summer	88.566	0.0	10.3	32
60 min Summer	56.713	0.0	13.2	62
120 min Summer	35.004	0.0	16.3	106
180 min Summer	25.973	0.0	18.1	136
240 min Summer	20.877	0.0	19.4	170
360 min Summer	15.365	0.0	21.4	238
480 min Summer	12.341	0.0	22.9	304
600 min Summer	10.402	0.0	24.2	370
720 min Summer	9.042	0.0	25.2	434
960 min Summer	7.241	0.0	26.9	558
1440 min Summer	5.284	0.0	29.5	794
2160 min Summer	3.848	0.0	32.2	1144
2880 min Summer	3.068	0.0	34.2	1472
4320 min Summer	2.226	0.0	37.2	2204
5760 min Summer	1.771	0.0	39.5	2936
7200 min Summer	1.483	0.0	41.4	3656
8640 min Summer	1.284	0.0	43.0	4400
10080 min Summer	1.137	0.0	44.4	5096
15 min Winter	131.851	0.0	8.5	18
30 min Winter	88.566	0.0	11.5	32

LAND AT ST JOHNS ROAD
HEDGE END
ATTENUATION STORAGE



Date 05.02.18
File tank.SRCX

Designed by BGA
Checked by RJW

XP Solutions

Source Control 2014.1

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m ³)	Status
60 min Winter	56.053	0.353	0.9	12.3	O K
120 min Winter	56.085	0.385	0.9	13.5	O K
180 min Winter	56.079	0.379	0.9	13.3	O K
240 min Winter	56.066	0.366	0.9	12.8	O K
360 min Winter	56.033	0.333	0.9	11.6	O K
480 min Winter	55.996	0.296	0.9	10.3	O K
600 min Winter	55.959	0.259	0.9	9.1	O K
720 min Winter	55.926	0.226	0.9	7.9	O K
960 min Winter	55.869	0.169	0.9	5.9	O K
1440 min Winter	55.799	0.099	0.8	3.5	O K
2160 min Winter	55.762	0.062	0.7	2.2	O K
2880 min Winter	55.750	0.050	0.6	1.7	O K
4320 min Winter	55.738	0.038	0.4	1.3	O K
5760 min Winter	55.733	0.033	0.3	1.1	O K
7200 min Winter	55.729	0.029	0.3	1.0	O K
8640 min Winter	55.727	0.027	0.2	0.9	O K
10080 min Winter	55.725	0.025	0.2	0.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m ³)	Time-Peak (mins)
60 min Winter	56.713	0.0	14.8	60
120 min Winter	35.004	0.0	18.2	116
180 min Winter	25.973	0.0	20.3	150
240 min Winter	20.877	0.0	21.7	184
360 min Winter	15.365	0.0	24.0	260
480 min Winter	12.341	0.0	25.7	332
600 min Winter	10.402	0.0	27.1	398
720 min Winter	9.042	0.0	28.2	464
960 min Winter	7.241	0.0	30.1	586
1440 min Winter	5.284	0.0	33.0	808
2160 min Winter	3.848	0.0	36.1	1128
2880 min Winter	3.068	0.0	38.3	1472
4320 min Winter	2.226	0.0	41.7	2176
5760 min Winter	1.771	0.0	44.2	2936
7200 min Winter	1.483	0.0	46.3	3672
8640 min Winter	1.284	0.0	48.1	4416
10080 min Winter	1.137	0.0	49.7	5024

Date 05.02.18
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LAND AT ST JOHNS ROAD
HEDGE END
ATTENUATION STORAGE

Designed by BGA
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XP Solutions

Source Control 2014.1

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	0.350	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.031

Time (mins)	Area
From:	To: (ha)

0	4 0.031
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LAND AT ST JOHNS ROAD
HEDGE END
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Date 05.02.18
File tank.SRCX

Designed by BGA
Checked by RJW

XP Solutions

Source Control 2014.1

Model Details

Storage is Online Cover Level (m) 56.500

Tank or Pond Structure

Invert Level (m) 55.700

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	35.0	0.400	35.0	0.401	0.0

Hydro-Brake Optimum® Outflow Control

Unit Reference	MD-SHE-0049-1000-0800-1000
Design Head (m)	0.800
Design Flow (l/s)	1.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Diameter (mm)	49
Invert Level (m)	55.700
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points Head (m) Flow (l/s)

Design Point (Calculated)	0.800	1.0
Flush-Flo™	0.215	0.9
Kick-Flo®	0.437	0.8
Mean Flow over Head Range	-	0.8

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake Optimum® as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.8	1.200	1.2	3.000	1.8	7.000	2.7
0.200	0.9	1.400	1.3	3.500	1.9	7.500	2.8
0.300	0.9	1.600	1.4	4.000	2.1	8.000	2.9
0.400	0.8	1.800	1.4	4.500	2.2	8.500	2.9
0.500	0.8	2.000	1.5	5.000	2.3	9.000	3.0
0.600	0.9	2.200	1.6	5.500	2.4	9.500	3.1
0.800	1.0	2.400	1.6	6.000	2.5		
1.000	1.1	2.600	1.7	6.500	2.6		