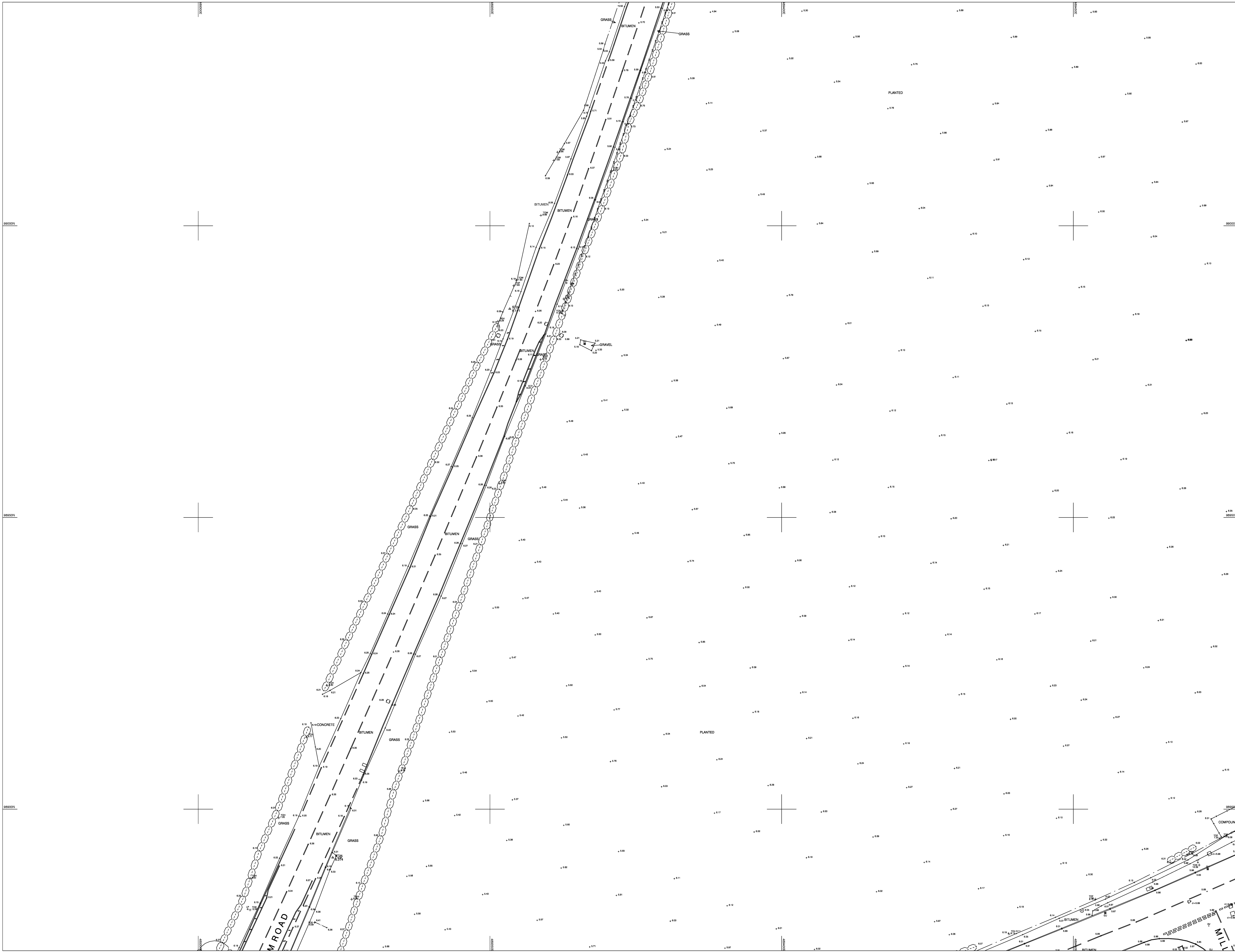
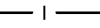
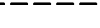
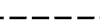




Symbol & Abbreviation Key			
	BARBED WIRE FENCE		
	POST & RAIL FENCE		
	CLOSE BOARD FENCE		
	RAILINGS		
	CHAIN LINK FENCE		
	OTHER FENCE		
	KERB		
	DROPPED KERB		
	GULLY CHANNEL		
	TOP / BOTTOM OF BANK		
	FOLIAGE		
	DITCH		
	VERGE		
	OVERHEAD CABLES		
	GATE		
	HEDGE		
	TREE - BROAD LEAVED		
	TREE - CONIFEROUS		
	BUSH		
	BUILDING		
	BENCH POLE		
	SURVEY STATION		
	ORDNANCE SURVEY BENCH MARK		
A/C	AIR CONDITIONING UNIT	KO	KERB OFFSET
AV	AIR VALVE	LC	LIGHTING COLUMN
BOL	BOLLARD	LP	LAMP POST
BN	BORERHOLE	NP	NAME PLATE
BL	BED LEVEL	NB	NOTICE BOARD
BM	BENCH MARK	PR	PIPE RISER
BT	BRITISH TELECOM	RP	RODDING POINT
CTV	CABLE TV	RS	ROAD SIGN
CL	COVER LEVEL	SP	SIGN POST
CR	CABLE RISER	SV	STOP VALVE
DP	DOWN PIPE	TL	TRAFFIC LIGHT
EN	EARTH ROD	TP	TELEGRAPH POLE
EP	ELECTRICITY POLE	TOP	TOP OF FENCE
EM	ELECTRICITY MARKER	TOD	TOP OF DITCH
FB	FUSE BOX	TOR	TOP OF RAILINGS
FR	FIRE RISER	TOS	SERVICE LEVEL
EP	FRIDGE POST	TOW	TOP OF WALL
FL	FLOOR LEVEL	UTL	UNABLE TO LIFT
GV	GAS VALVE	VM	VALVE MARKER
GM	GAS MARKER	VP	VENT PIPE
GU	GULLY	WL	WATER LEVEL
HM	HYDRANT MARKER	WM	WATER MARKER
L	INVERT LEVEL	WO	WASH OUT

General.
This survey has been prepared with a scaling accuracy for a plot at a scale of 1:200.
All tree heights and spreads are approximate. We have tried to identify tree types, however if tree species are critical specialist advice should be gained.
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Some detail may have been omitted due to parked vehicles.

Notes.
Coordinates related to OS National Grid from ST03 by GPS (No scale factor added).
Levels related to GPS.



Rev	Details of Revision	Drawn	Date

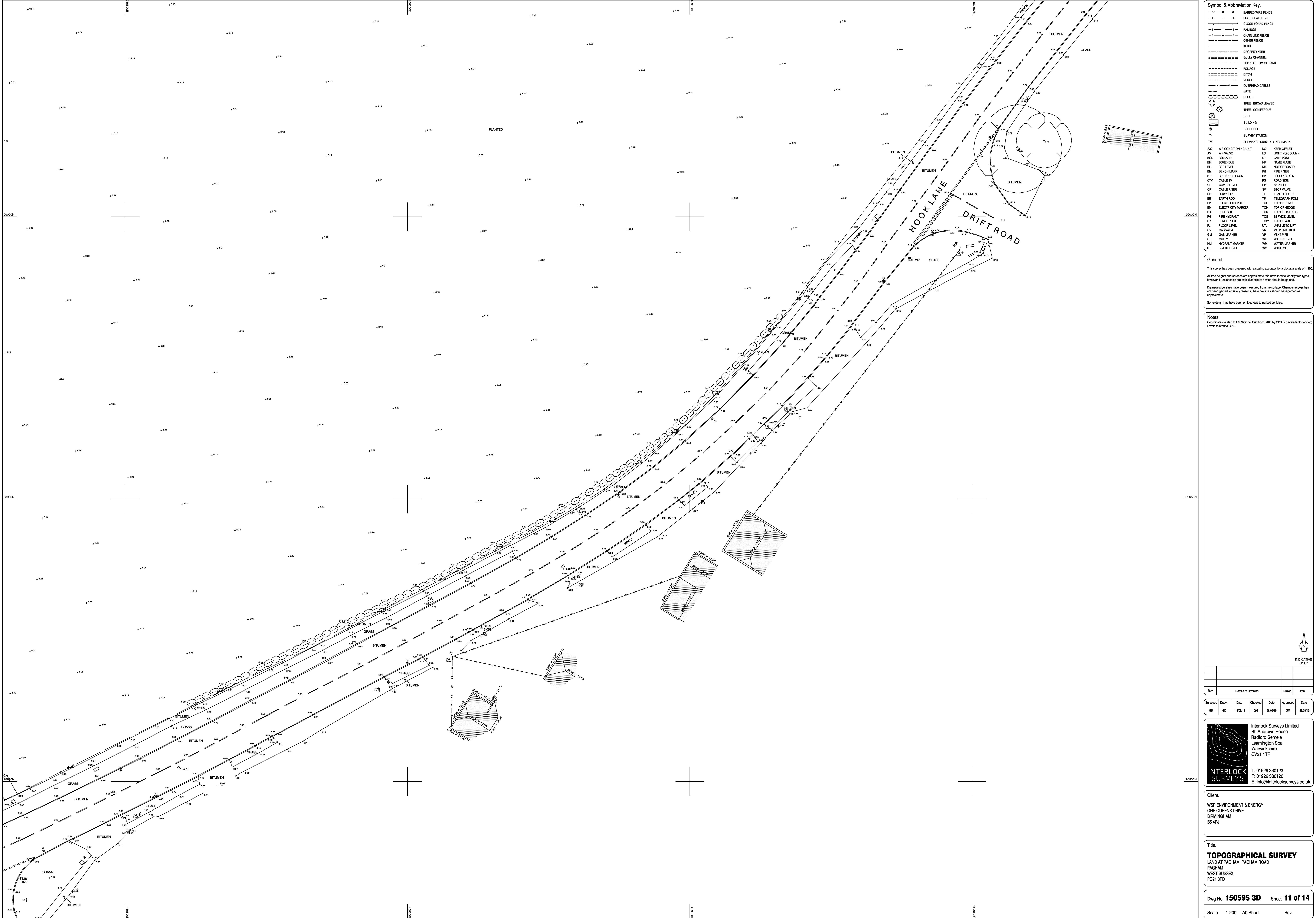
Surveyed	Drawn	Date	Checked	Date	Approved	Date
GD	GD	18/08/15	GM	28/08/15	GM	28/08/15

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Client:
WSP ENVIRONMENT & ENERGY
ONE QUEENS DRIVE
BIRMINGHAM
B5 4PJ

Title:
TOPOGRAPHICAL SURVEY
LAND AT PAGHAM, PAGHAM ROAD
PAGHAM
WEST SUSSEX
PO21 3PD



Symbol & Abbreviation Key	
	BARBED WIRE FENCE
	PORT & RAIL FENCE
	CLOSE BOARD FENCE
	RAILINGS
	CHAIN LINK FENCE
	OTHER FENCE
	KERB
	DROPPED KERB
	GULLY CHANNEL
	TOP / BOTTOM OF BANK
	FOLIAGE
	DITCH
	VERGE
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	TREE - BROAD LEAVED
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	A/C AIR CONDITIONING UNIT
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	LP LAMP POST
	BOL BOLLARD
	BH BOREHOLE
	BL BED LEVEL
	BM BENCH MARK
	BT BRITISH TELECOM
	CTV CABLE TV
	CL COVER LEVEL
	CR CABLE RISER
	DP DOWN PIPE
	ER EARTH ROD
	EP ELECTRICITY POLE
	EM ELECTRICITY MARKER
	FB FUSE BOX
	FH FIRE HYDRANT
	FP FENCE POST
	FL FLOOR LEVEL
	GV GAS VALVE
	GM GAS MARKER
	GU GULLY
	HM HYDRANT MARKER
	IL INVERT LEVEL
	KO KERB OFFSET
	LC LIGHTING COLUMN
	LP LAMP POST
	NP NAME PLATE
	NB NOTICE BOARD
	PR PIPE RISER
	RS ROAD SIGN
	SP SIGN POST
	SV STOP VALVE
	TL TRAFFIC LIGHT
	TP TELEGRAPH POLE
	TOF TOP OF FENCE
	TOH TOP OF HEDGE
	TOR TOP OF RAILINGS
	TDS SERVICE LEVEL
	TOW TOP OF WALL
	UTL UNABLE TO LIFT
	VM VALVE MARKER
	VP VENT PIPE
	WL WATER LEVEL
	WM WATER MARKER
	WO WASH OUT

General.

This survey has been prepared with a scaling accuracy for a plot at a scale of 1:200.

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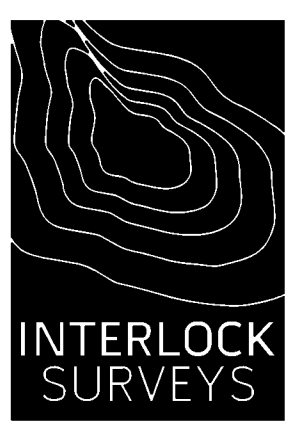
Notes.

Coordinates related to OS National Grid from ST03 by GPS (No scale factor added). Levels related to GPS.



Rev	Details of Revision	Drawn	Date

Surveyed	Drawn	Date	Checked	Date	Approved	Date
GD	GD	16/08/15	GM	26/08/15	GM	26/08/15



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Client.

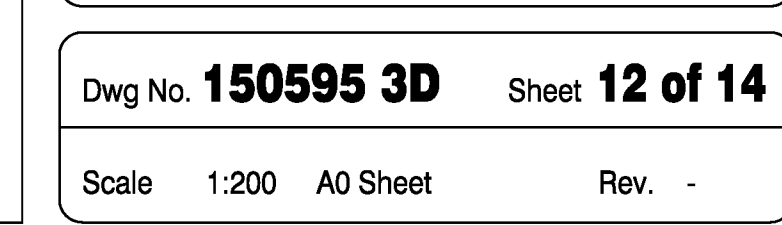
WSP ENVIRONMENT & ENERGY
ONE QUEENS DRIVE
BIRMINGHAM
B5 4PJ

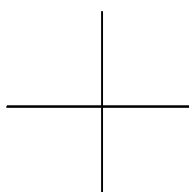
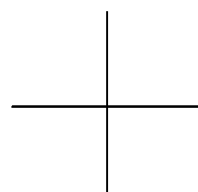
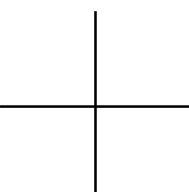
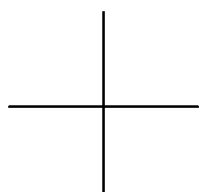
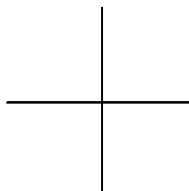
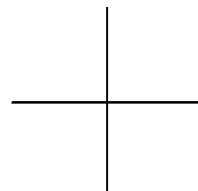
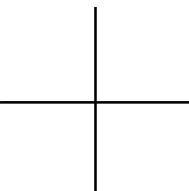
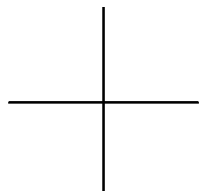
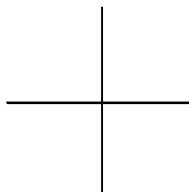
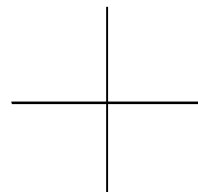
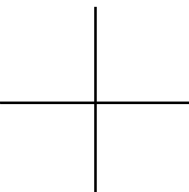
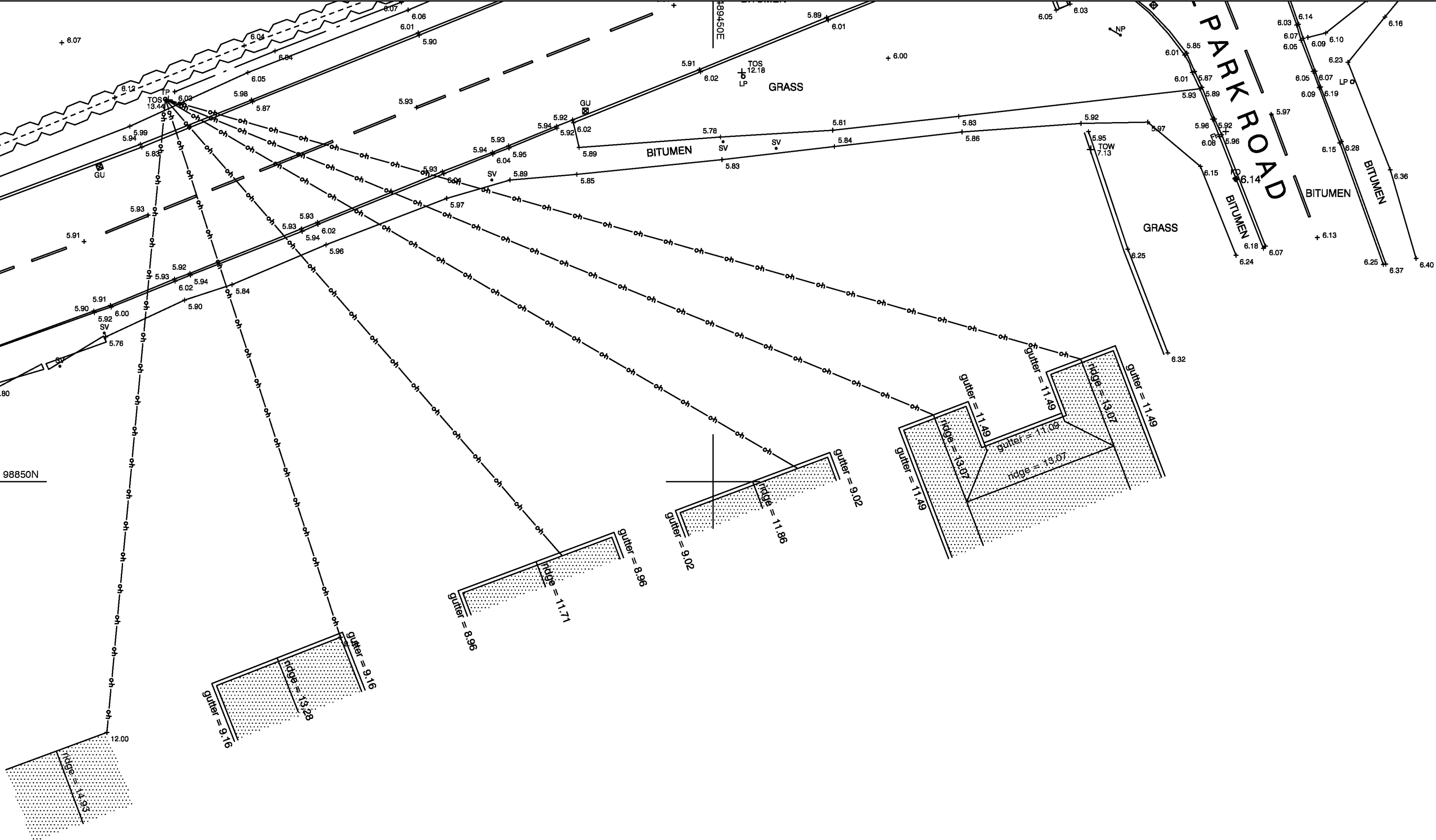
Title.

TOPOGRAPHICAL SURVEY
LAND AT PAGHAM, PAGHAM ROAD
PAGHAM
WEST SUSSEX
PO21 3PD

Dwg No. **150595 3D** Sheet **11 of 14**

Scale 1:200 A0 Sheet Rev. -





Symbol & Abbreviation Key.	
	BARBED WIRE FENCE
	POST & RAIL FENCE
	CLOSE BOARD FENCE
	RAILINGS
	CHAIN LINK FENCE
	OTHER FENCE
	KERB
	DROPPED KERB
	GULLY CHANNEL
	TOP / BOTTOM OF BANK
	FOLIAGE
	DITCH
	VERGE
	OVERHEAD CABLES
	GATE
	HEDGE
	TREE - BROAD LEAVED
	TREE - CONIFEROUS
	BUSH
	BUILDING
	BOUNDARY LINE
	SURVEY STATION
	ORDNANCE SURVEY BENCH MARK
A/C	AIR CONDITIONING UNIT
AV	AIR VALVE
BOL	BOLLARD
BS	BORERHOLE
BL	BED LEVEL
BM	BENCH MARK
BT	BRITISH TELECOM
CTV	CABLE TV
CL	COVER LEVEL
CR	CABLE RISER
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KO	KERB OFFLET
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PR	PIPE RISER
RP	RODGING POINT
RS	ROAD SIGN
SP	SIGN POST
SV	STOP VALVE
TL	TRAFFIC LIGHT
TP	TELEGRAPH POLE
TOF	TOP OF FENCE
TOD	TOP OF DITCH
TOR	TOP OF RAILINGS
TOS	SERVICE LEVEL
TOW	TOP OF WALL
UTL	UNABLE TO LIFT
VM	VALVE MARKER
VP	VENT PIPE
WL	WATER LEVEL
WM	WATER MARKER
WO	WASH OUT

General.

This survey has been prepared with a scaling accuracy for a plot at a scale of 1:200.

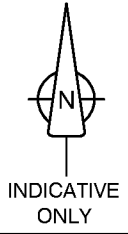
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Surveyed	Drawn	Date	Checked	Date	Approved	Date
GD	GD	18/08/15	GM	28/08/15	GM	28/08/15

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Title.

TOPOGRAPHICAL SURVEY
LAND AT PAGHAM, PAGHAM ROAD
PAGHAM
WEST SUSSEX
PO21 3PD

Dwg No. **150595 3D** Sheet **13 of 14**

Scale 1:200 A0 Sheet Rev. -

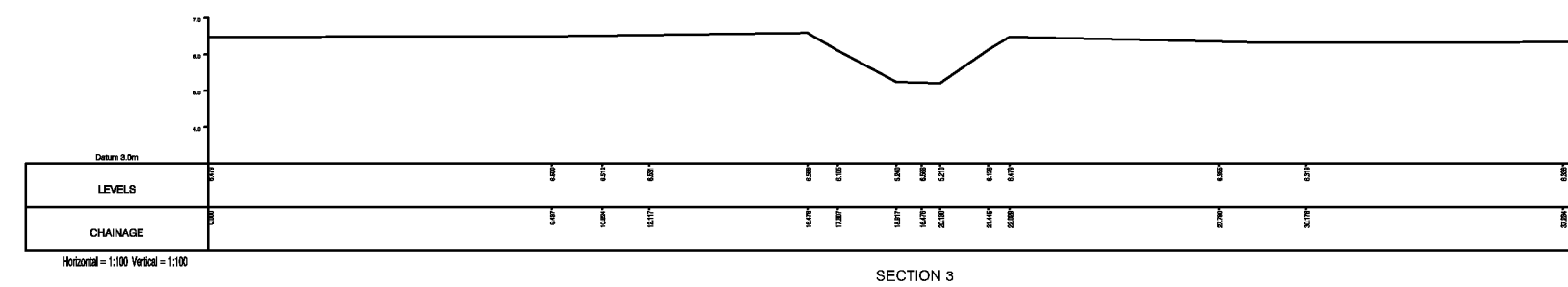
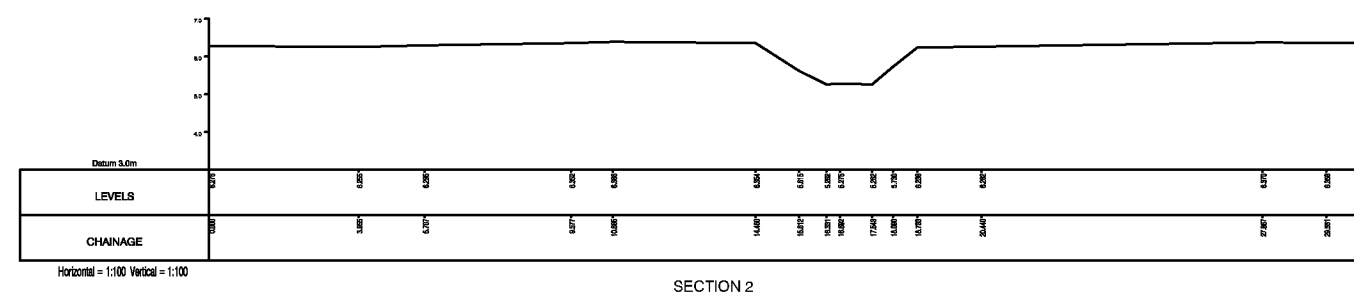
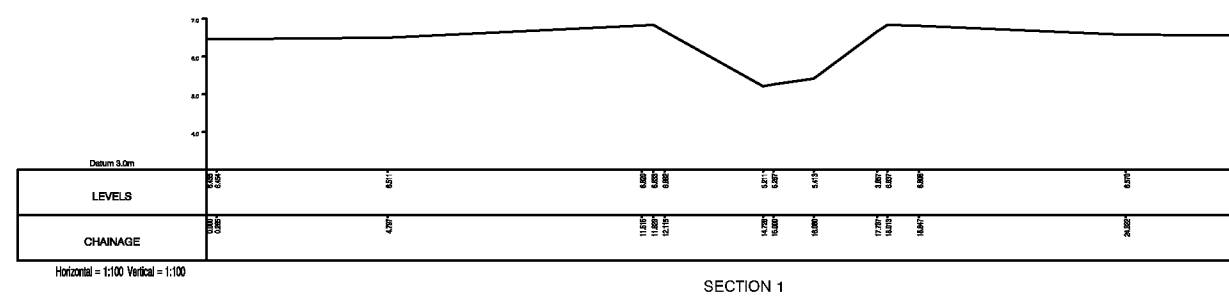
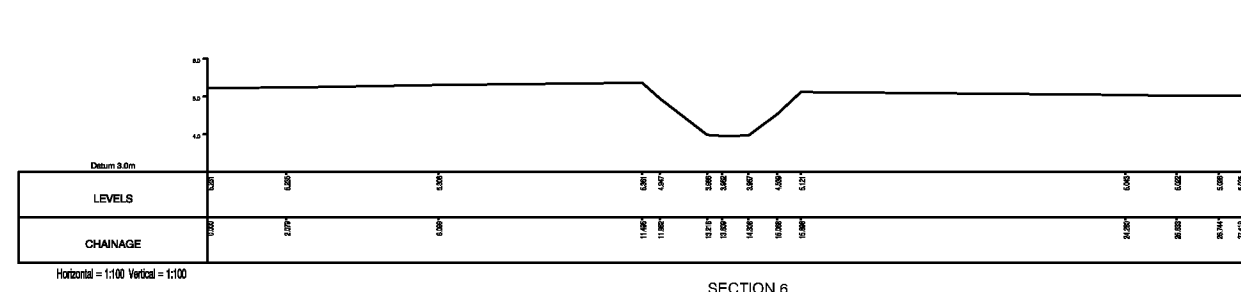
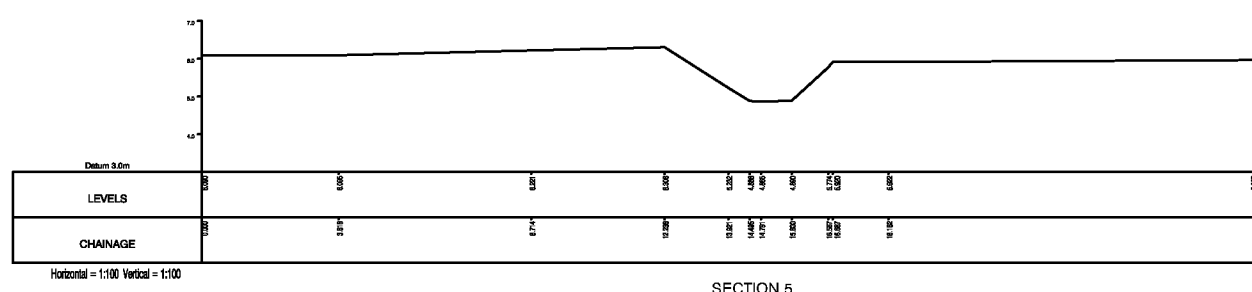
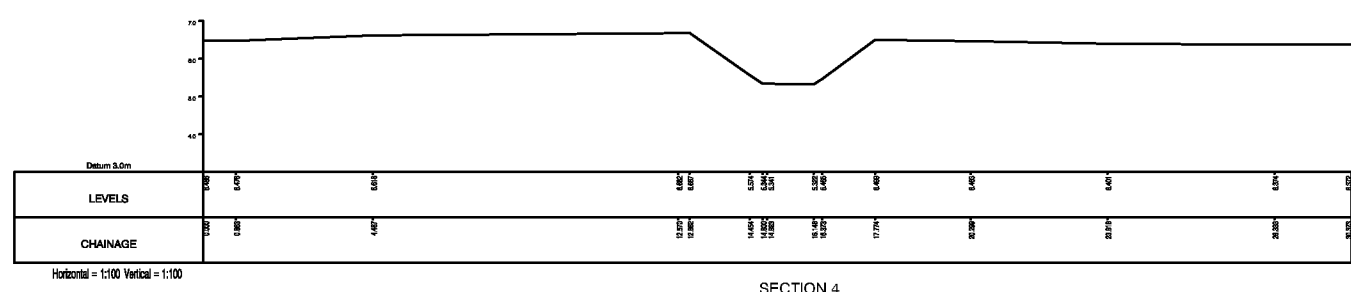
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Chart Grades		Fasting		Nonfasting		Notes	
Chart Grade	Level	Chart Grade	Level	Chart Grade	Level	Chart Grade	Level
3.818	0.000	0088-18-00	0088-18-00	0088-18-00	0088-18-00	Ground	End
8.714	0.027	0088-18-00	0088-18-00	0088-18-00	0088-18-00	Ground	End
12.871	0.054	0088-18-00	0088-18-00	0088-18-00	0088-18-00	Ground	End
17.028	0.081	0088-18-00	0088-18-00	0088-18-00	0088-18-00	Ground	End
21.185	0.108	0088-18-00	0088-18-00	0088-18-00	0088-18-00	Ground	End
25.342	0.135	0088-18-00	0088-18-00	0088-18-00	0088-18-00	Ground	End
29.499	0.162	0088-18-00	0088-18-00	0088-18-00	0088-18-00	Ground	End
33.656	0.189	0088-18-00	0088-18-00	0088-18-00	0088-18-00	Ground	End
37.813	0.216	0088-18-00	0088-18-00	0088-18-00	0088-18-00	Ground	End
41.970	0.243	0088-18-00	0088-18-00	0088-18-00	0088-18-00	Ground	End
46.127	0.270	0088-18-00	0088-18-00	0088-18-00	0088-18-00	Ground	End
50.284	0.297	0088-18-00	0088-18-00	0088-18-00	0088-18-00	Ground	End
54.441	0.324	0088-18-00	0088-18-00	0088-18-00	0088-18-00	Ground	End
58.598	0.351	0088-18-00	0088-18-00	0088-18-00	0088-18-00	Ground	End
62.755	0.378	0088-18-00	0088-18-00	0088-18-00	0088-18-00	Ground	End
66.912	0.405	0088-18-00	0088-18-00	0088-18-00	0088-18-00	Ground	End
71.069	0.432	0088-18-00	0088-18-00	0088-18-00	0088-18-00	Ground	End
75.226	0.459	0088-18-00	0088-18-00	0088-18-00	0088-18-00	Ground	End
79.383	0.486	0088-18-00	0088-18-00	0088-18-00	0088-18-00	Ground	End
83.540	0.513	0088-18-00	0088-18-00	0088-18-00	0088-18-00	Ground	End
87.697	0.540	0088-18-00	0088-18-00	0088-18-00	0088-18-00	Ground	End
91.854	0.567	0088-18-00	0088-18-00	0088-18-00	0088-18-00	Ground	End
96.011	0.594	0088-18-00	0088-18-00	0088-18-00	0088-18-00	Ground	End
100.168	0.621	0088-18-00	0088-18-00	0088-18-00	0088-18-00	Ground	End
104.325	0.648	0088-18-00	0088-18-00	0088-18-00	0088-18-00	Ground	End
108.482	0.675	0088-18-00	0088-18-00	0088-18-00	0088-18-00	Ground	End
112.639	0.702	0088-18-00	0088-18-00	0088-18-00	0088-18-00	Ground	End
116.796	0.729	0088-18-00	0088-18-00	0088-18-00	0088-18-00	Ground	End
120.953	0.756	0088-18-00	0088-18-00	0088-18-00	0088-18-00	Ground	End
125.110	0.783	0088-18-00	0088-18-00	0088-18-00	0088-18-00	Ground	End
129.267	0.810	0088-18-00	0088-18-00	0088-18-00	0088-18-00	Ground	End
133.424	0.837	0088-18-00	0088-18-00	0088-18-00	0088-18-00	Ground	End
137.581	0.864	0088-18-00	0088-18-00	0088-18-00	0088-18-00	Ground	End
141.738	0.891	0088-18-00	0088-18-00	0088-18-00	0088-18-00	Ground	End
145.895	0.918	0088-18-00	0088-18-00	0088-18-00	0088-18-00	Ground	End
150.052	0.945	0088-18-00	0088-18-00	0088-18-00	0088-18-00	Ground	End
154.209	0.972	0088-18-00	0088-18-00	0088-18-00	0088-18-00	Ground	End

Chart Grades C		Fasting		Nonfasting		Notes	
Chart Grade	Level	Chart Grade	Level	Chart Grade	Level	Chart Grade	Level
6.000	0.737	0088-11-00	0088-11-00	0088-11-00	0088-11-00	Ground	End
8.179	0.598	0088-12-00	0088-12-00	0088-12-00	0088-12-00	Ground	End
10.358	0.459	0088-13-00	0088-13-00	0088-13-00	0088-13-00	Ground	End
11.465	0.531	0088-14-00	0088-14-00	0088-14-00	0088-14-00	Ground	End
12.572	0.603	0088-15-00	0088-15-00	0088-15-00	0088-15-00	Ground	End
13.679	0.675	0088-16-00	0088-16-00	0088-16-00	0088-16-00	Ground	End
14.786	0.747	0088-17-00	0088-17-00	0088-17-00	0088-17-00	Ground	End
15.893	0.819	0088-18-00	0088-18-00	0088-18-00	0088-18-00	Ground	End
16.999	0.891	0088-19-00	0088-19-00	0088-19-00	0088-19-00	Ground	End
18.106	0.963	0088-20-00	0088-20-00	0088-20-00	0088-20-00	Ground	End
19.213	1.035	0088-21-00	0088-21-00	0088-21-00	0088-21-00	Ground	End
20.320	1.107	0088-22-00	0088-22-00	0088-22-00	0088-22-00	Ground	End
21.427	1.179	0088-23-00	0088-23-00	0088-23-00	0088-23-00	Ground	End
22.534	1.251	0088-24-00	0088-24-00	0088-24-00	0088-24-00	Ground	End
23.641	1.323	0088-25-00	0088-25-00	0088-25-00	0088-25-00	Ground	End
24.748	1.395	0088-26-00	0088-26-00	0088-26-00	0088-26-00	Ground	End
25.855	1.467	0088-27-00	0088-27-00	0088-27-00	0088-27-00	Ground	End
26.962	1.539	0088-28-00	0088-28-00	0088-28-00	0088-28-00	Ground	End
28.069	1.611	0088-29-00	0088-29-00	0088-29-00	0088-29-00	Ground	End
29.176	1.683	0088-30-00	0088-30-00	0088-30-00	0088-30-00	Ground	End
30.283	1.755	0088-31-00	0088-31-00	0088-31-00	0088-31-00	Ground	End
31.390	1.827	0088-32-00	0088-32-00	0088-32-00	0088-32-00	Ground	End
32.497	1.899	0088-33-00	0088-33-00	0088-33-00	0088-33-00	Ground	End
33.604	1.971	0088-34-00	0088-34-00	0088-34-00	0088-34-00	Ground	End
34.711	2.043	0088-35-00	0088-35-00	0088-35-00	0088-35-00	Ground	End
35.818	2.115	0088-36-00	0088-36-00	0088-36-00	0088-36-00	Ground	End
36.925	2.187	0088-37-00	0088-37-00	0088-37-00	0088-37-00	Ground	End
38.032	2.259	0088-38-00	0088-38-00	0088-38-00	0088-38-00	Ground	End
39.139	2.331	0088-39-00	0088-39-00	0088-39-00	0088-39-00	Ground	End
40.246	2.403	0088-40-00	0088-40-00	0088-40-00	0088-40-00	Ground	End
41.353	2.475	0088-41-00	0088-41-00	0088-41-00	0088-41-00	Ground	End
42.460	2.547	0088-42-00	0088-42-00	0088-42-00	0088-42-00	Ground	End
43.567	2.619	0088-43-00	0088-43-00	0088-43-00	0088-43-00	Ground	End
44.674	2.691	0088-44-00	0088-44-00	0088-44-00	0088-44-00	Ground	End
45.781	2.763	0088-45-00	0088-45-00	0088-45-00	0088-45-00	Ground	End
46.888	2.835	0088-46-00	0088-46-00	0088-46-00	0088-46-00	Ground	End
47.995	2.907	0088-47-00	0088-47-00	0088-47-00	0088-47-00	Ground	End
49.102	2.979	0088-48-00	0088-48-00	0088-48-00	0088-48-00	Ground	End
50.209	3.051	0088-49-00	0088-49-00	0088-49-00	0088-49-00	Ground	End
51.316	3.123	0088-50-00	0088-50-00	0088-50-00	0088-50-00	Ground	End
52.423	3.195	0088-51-00	0088-51-00	0088-51-00	0088-51-00	Ground	End
53.530	3.267	0088-52-00	0088-52-00	0088-52-00	0088-52-00	Ground	End
54.637	3.339	0088-53-00	0088-53-00	0088-53-00	0088-53-00	Ground	End
55.744	3.411	0088-54-00	0088-54-00	0088-54-00	0088-54-00	Ground	End
56.851	3.483	0088-55-00	0088-55-00	0088-55-00	0088-55-00	Ground	End
57.958	3.555	0088-56-00	0088-56-00	0088-56-00	0088-56-00	Ground	End
59.065	3.627	0088-57-00	0088-57-00	0088-57-00	0088-57-00	Ground	End
60.172	3.699	0088-58-00	0088-58-00	0088-58-00	0088-58-00	Ground	End
61.279	3.771	0088-59-00	0088-59-00	0088-59-00	0088-59-00	Ground	End
62.386	3.843	0088-60-00	0088-60-00	0088-60-00	0088-60-00	Ground	End
63.493	3.915	0088-61-00	0088-61-00	0088-61-00	0088-61-00	Ground	End
64.600	3.987	0088-62-00	0088-62-00	0088-62-00	0088-62-00	Ground	End
65.707	4.059	0088-63-00	0088-63-00	0088-63-00	0088-63-00	Ground	End
66.814	4.131	0088-64-00	0088-64-00	0088-64-00	0088-64-00	Ground	End
67.921	4.203	0088-65-00	0088-65-00	0088-65-00	0088-65-00	Ground	End
69.028	4.275	0088-66-00	0088-66-00	0088-66-00	0088-66-00	Ground	End
70.135	4.347	0088-67-00	0088-67-00	0088-67-00	0088-67-00	Ground	End
71.242	4.419	0088-68-00	0088-68-00	0088-68-00	0088-68-00	Ground	End
72.349	4.491	0088-69-00	0088-69-00	0088-69-00	0088-69-00	Ground	End
73.456	4.563	0088-70-00	0088-70-00	0088-70-00	0088-70-00	Ground	End
74.563	4.635	0088-71-00	0088-71-00	0088-71-00	0088-71-00	Ground	End
75.670	4.707	0088-72-00	0088-72-00	0088-72-00	0088-72-00	Ground	End
76.777	4.779	0088-73-00	0088-73-00	0088-73-00	0088-73-00	Ground	End
77.884	4.851	0088-74-00	0088-74-00	0088-74-00	0088-74-00	Ground	End
78.991	4.923	0088-75-00	0088-75-00	0088-75-00	0088-75-00	Ground	End
80.098	4.995	0088-76-00	0088-76-00	0088-76-00	0088-76-00	Ground	End
81.205	5.067	0088-77-00	0088-77-00	0088-77-00	0088-77-00	Ground	End
82.312	5.139	0088-78-00	0088-78-00	0088-78-00	0088-78-00	Ground	End
83.419	5.211	0088-79-00	0088-79-00	0088-79-00	0088-79-00	Ground	End
84.526	5.283	0088-80-00	0088-80-00	0088-80-00	0088-80-00	Ground	End
85.633	5.355	0088-81-00	0088-81-00	0088-81-00	0088-81-00	Ground	End
86.740	5.427	0088-82-00	0088-82-00	0088-82-00	0088-82-00	Ground	End
87.847	5.499	0088-83-00	0088-83-00	0088-83-00	0088-83-00	Ground	End
88.954	5.571	0088-84-00	0088-84-00	0088-84-00	0088-84-00	Ground	End
90.061	5.643	0088-85-00	0088-85-00	0088-85-00	0088-85-00	Ground	End
91.168	5.715	0088-86-00	0088-86-00	0088-86-00	0088-86-00	Ground	End
92.275	5.787	0088-87-00	0088-87-00	0088-87-00	0088-87-00	Ground	End
93.382	5.859	0088-88-00	0088-88-00	0088-88-00	0088-88-00	Ground	End
94.489	5.931	0088-89-00	0088-89-00	0088-89-00	0088-89-00	Ground	End
95.596	6.003	0088-90-00	0088-90-00	0088-90-00	0088-90-00	Ground	End
96.703	6.075	0088-91-00	0088-91-00	0088-91-00	0088-91-00	Ground	End
97.810	6.147	0088-92-00	0088-92-00	0088-92-00	0088-92-00	Ground	End
98.917	6.219	0088-93-00	0088-93-00	0088-93-00	0088-93-00	Ground	End
100.024	6.291	0088-94-00	0088-94-00	0088-94-00	0088-94-00	Ground	End
101.131	6.363	0088-95-00	0088-95-00	0088-95-00	0088-95-00	Ground	End
102.238	6.435	0088-96-00	0088-96-00	0088-96-00	0088-96-00	Ground	End
103.345	6.507	0088-97-00	0088-97-00	0088-97-00	0088-97-00	Ground	End
104.452	6.579	0088-98-00	0088-98-00	0088-98-00	0088-98-00	Ground	End
105.559	6.651	0088-99-00</					



Symbol & Abbreviation Key.

	BARBED WIRE FENCE
	POST & RAIL FENCE
	CLOSE BOARD FENCE
	RAILINGS
	CHAIN LINK FENCE
	OTHER FENCE
	KERB
	DROPPED KERB
	GULLY CHANNEL
	TOP / BOTTOM OF BANK
	FOLIAGE
	DITCH
	VERGE
	OVERHEAD CABLES
	GATE
	HEDGE
	TREE - BROAD LEAVED
	TREE - CONIFEROUS
	BUSH
	BUILDING
	BOREHOLE
	SURVEY STATION
	ORDNANCE SURVEY BENCH MARK

General.

This survey has been prepared with a scaling accuracy for a plot at a scale of 1:200.

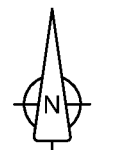
All tree heights and spreads are approximate. We have tried to identify tree types, however if tree species are critical specialist advice should be gained.

Drainage pipe sizes have been measured from the surface. Chamber access has not been gained for safety reasons, therefore sizes should be regarded as approximate.

Some detail may have been omitted due to parked vehicles.

Notes.

Coordinates related to OS National Grid from S105 by GPS (No scale factor added).
Levels related to GPS.



Rev	Details of Revision	Drawn	Date

Surveyed	Drawn	Date	Checked	Date	Approved	Date
GD	SE	18/09/15	GM	28/09/15	GM	28/09/15



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Client.

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ONE QUEENS DRIVE
BIRMINGHAM
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Title.

SECTIONS
LAND AT PAGHAM, PAGHAM ROAD
PAGHAM
WEST SUSSEX
PO21 3PD

Dwg No. **150595 3D** Sheet **14 of 14**

Scale 1:200 A1 Sheet Rev. -

Figure 12-1: Sites screened as part of the Level 1 SFRA

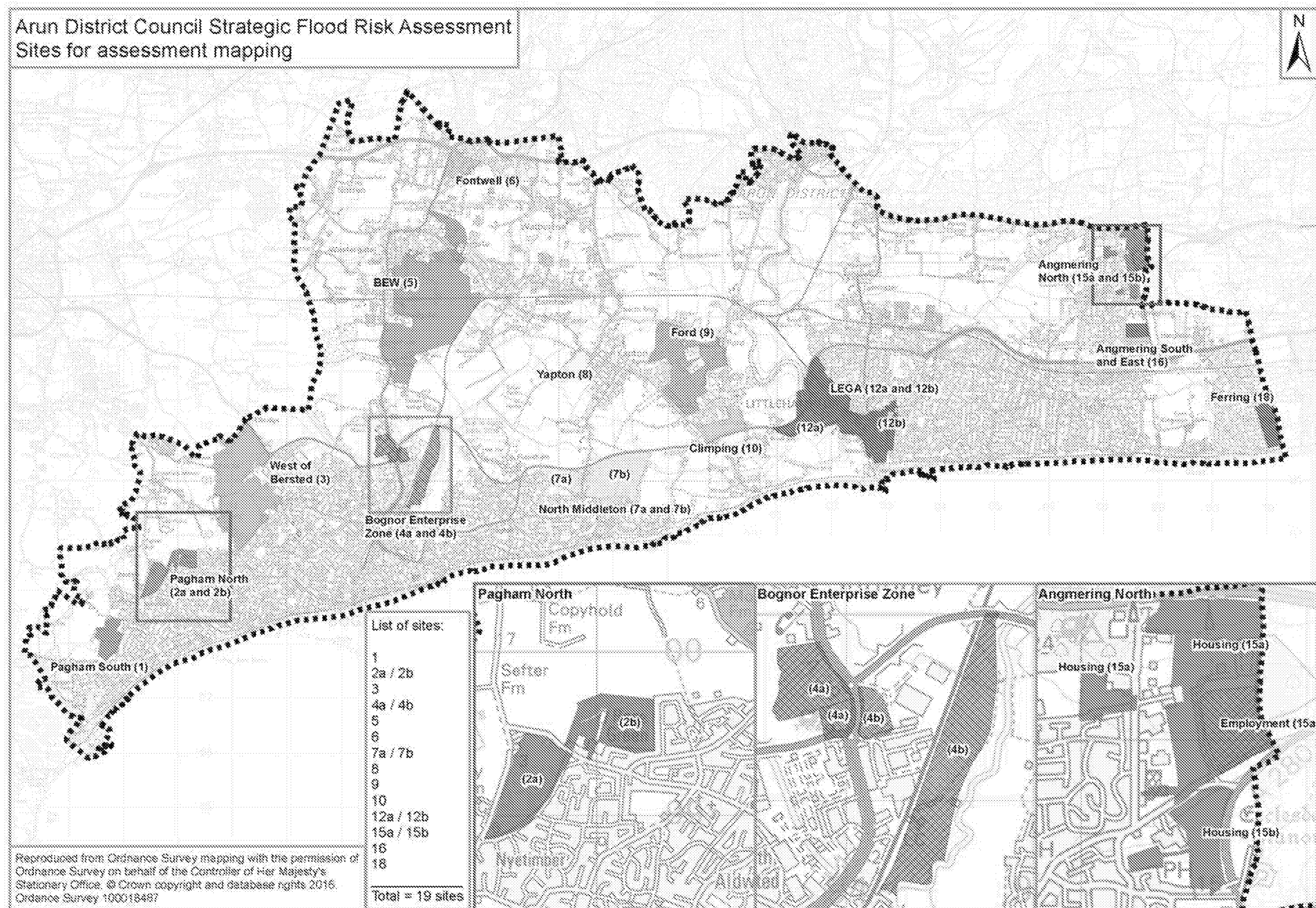


Table 12-1: Site summary assessment – flood risk and spatial datasets

Site no.	Site area (ha)	Proportion of site within Flood Zone 3b	Proportion of site within Flood Zone 3a	Proportion of site within Flood Zone 2	Proportion of site within Flood Zone 1	Proportion of site within EA Historic Flood Map	Proportion of site within u/MISW 30-year extent	Proportion of site within u/MISW 100-year extent	Proportion of site within u/MISW 1000-year extent	Proportion of site outside u/MISW extent	Intersected by Risk of Flooding from Reservoir's extent (Yes/No)	Highest ASGW class in site	Watercourse present within or adjacent to the site boundary? (Main River / Ordinary Watercourse / Both / No)	Site located within Flood Alert Area or Flood Warning Area (FAA / FWA / Both / No)
1	24.5	0%	0% > 25%	0% > 25%	75% > 100%	0%	0% > 25%	0% > 25%	0% > 25%	75% > 100%	0%	>=75%	Both	Both
2a	17.0	0%	0%	0% > 25%	75% > 100%	0%	0% > 25%	0% > 25%	0% > 25%	75% > 100%	0%	>=75%	Ordinary Watercourse	No
2b	15.3	0%	0%	0%	100%	0%	0% > 25%	0% > 25%	0% > 25%	75% > 100%	0%	>=75%	Ordinary Watercourse	No
3	1.6	0%	0%	0%	100%	0%	0% > 25%	0% > 25%	0% > 25%	75% > 100%	0%	>=75%	Ordinary Watercourse	Both
4a	14.9	0% > 25%	0% > 25%	0% > 25%	75% > 100%	0%	0% > 25%	0% > 25%	0% > 25%	75% > 100%	0%	>= 25% <50%	Both	Both
4b	33.0	0% > 25%	75% > 100%	0% > 25%	0% > 25%	0%	0% > 25%	0% > 25%	0% > 25%	75% > 100%	0%	>= 25% <50%	Both	Both
5	2.8	0% > 25%	0% > 25%	0% > 25%	75% > 100%	0% > 25%	0% > 25%	0% > 25%	0% > 25%	75% > 100%	0%	>=75%	Both	Both
6	18.1	0%	0%	0%	100%	0%	0% > 25%	0% > 25%	0% > 25%	75% > 100%	0%	>=75%	No	No
7a	10.3	0%	0%	0%	100%	0%	0% > 25%	0% > 25%	0% > 25%	75% > 100%	0%	>=75%	Ordinary Watercourse	No
7b	85.5	0% > 25%	0% > 25%	0% > 25%	50% > 75%	0%	0% > 25%	0% > 25%	0% > 25%	75% > 100%	0%	>=75%	Ordinary Watercourse	Both
8	21.2	0% > 25%	0% > 25%	0% > 25%	75% > 100%	0%	0% > 25%	0% > 25%	0% > 25%	75% > 100%	0%	>= 50% <75%	Both	No
9	1.2	0%	0%	0%	100%	0%	0% > 25%	0% > 25%	0% > 25%	75% > 100%	0%	>=75%	Ordinary Watercourse	No
10	26.4	0%	0%	0% > 25%	75% > 100%	0%	0%	0% > 25%	0% > 25%	75% > 100%	0%	>=75%	No	FAA
12a	46.3	0% > 25%	50% > 75%	0% > 25%	0% > 25%	0% > 25%	0% > 25%	0% > 25%	0% > 25%	75% > 100%	0%	>=75%	Both	Both
12b	98.7	0% > 25%	50% > 75%	0% > 25%	25% > 50%	0% > 25%	0% > 25%	0% > 25%	0% > 25%	75% > 100%	0%	>=75%	Both	Both
15a	36.4	0%	0%	0%	100%	0%	0% > 25%	0% > 25%	0% > 25%	75% > 100%	0%	>= 50% <75%	Both	FAA
15b	9.0	0% > 25%	0% > 25%	0% > 25%	75% > 100%	0%	0% > 25%	0% > 25%	0% > 25%	75% > 100%	0%	>= 25% <50%	Both	FAA
16	9.4	0%	0%	0%	100%	0%	0% > 25%	0% > 25%	0% > 25%	75% > 100%	0%	>= 25% <50%	Ordinary Watercourse	No
18	27.9	0% > 25%	0% > 25%	0% > 25%	75% > 100%	0%	0% > 25%	0% > 25%	0% > 25%	75% > 100%	0%	>= 50% <75%	No	No

Table 12-2: Site summary assessment – change in area of site intersected by Flood Zone 3a at 2031, 2061 and 2111 epochs (Higher Central flow allowance +15%, +30% and +45%, respectively)

Site no.	Site area (ha)	Proportion of site in Flood Zone 3a (including Flood Zone 3b) – Rivers and Sea			
		Present day	2031 (+15%)	2061 (+30%)	2111 (+45%)
1	24.5	0%	0%	3%	18%
2a	17.0	0%	0%	0%	1%
2b	15.3	0%	0%	0%	0%
3	1.6	0%	0%	0%	0%
4a	14.9	17%	17%	51%	96%
4b	33.0	81%	82%	84%	97%
5	2.8	10%	10%	10%	10%
6	18.1	0%	0%	0%	0%
7a	10.3	0%	0%	0%	11%
7b	85.5	23%	27%	47%	71%
8	21.2	2%	2%	2%	2%
9	1.2	0%	0%	0%	0%
10	26.4	0%	0%	0%	0%
12a	46.3	81%	82%	83%	89%
12b	98.7	64%	67%	74%	81%
15a	36.4	0%	0%	0%	0%
15b	9.0	7%	7%	7%	7%
16	9.4	0%	0%	0%	0%
18	27.9	11%	11%	11%	11%



Notes

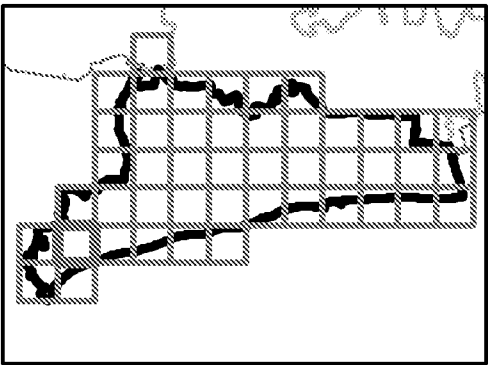
Zone 1: Comprised of land having a less than 1 in 1,000 annual probability of river or sea flooding in any year.

Zone 2: Comprised of land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding or 1 in 200 and 1 in 1,000 annual probability of sea flooding in any year.

Zone 3a: This zone comprises land assessed as having a greater than 1in 100 annual probability of river flooding or a greater than 1 in 200 annual probability of flooding from sea in any year.

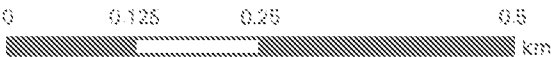
Zone 3b: This zone comprises land where water has to flow or be stored in times of flood (the functional floodplain). The SFRA identified this Flood Zone as land which would flood with an annual probability of 1 in 20 years, where detailed modelling exists. In the absence of detailed hydraulic model information, a precautionary approach has been adopted with the assumption that the extent of Flood Zone 3b would be equal to Flood Zone 3a. If development is shown to be in Flood Zone 3a, further work should be undertaken as part of a detailed site specific:

Key Plan



Legend

- Arun District SFRA boundary
- Flood Zone 3b
- Flood Zone 3a
- Flood Zone 2



REF	Date	Comments
A	June 2014	-
B		
C		

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ARUN DISTRICT COUNCIL

LEVEL 1 SFRA: APPENDIX C FLOOD ZONES

Sheet No: 4 of 46 Index Number: ADC_04

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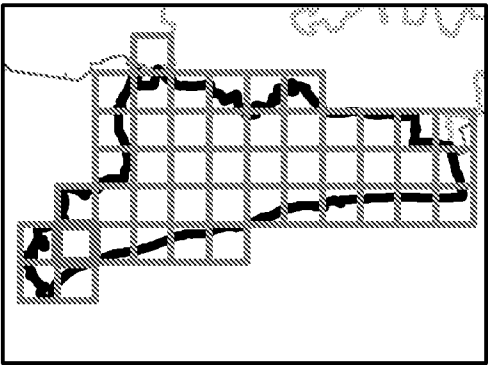
Notes

Hydraulic modelling has been undertaken as part of this SFRA to provide updated climate change flood mapping in the Arun District for Flood Zone 3a. This modelling followed the latest guidance for climate change in FRAs/SFRAs released by the Environment Agency in February 2016 (and updated in April 2016). Climate change for fluvial events has been based on the Higher Central estimates for the years 2031, 2061 and 2111. Present day flood risk information is available for comparison. Arun District is within the South East River Basin District and therefore allowance are:

- 2031 = +15% flows
- 2061 = +30% flows
- 2111 = +45% flows

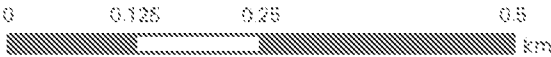
For tidal/coastal models, undefended case still water level and defended case still water level with wave overtopping simulations have been completed to inform future flood risk within the Arun District. Again, climate change allowance predictions are for the years 2031, 2061 and 2111, with present day outputs for comparison.

Key Plan



Legend

- Arun District SFPA boundary
- Present Flood Zone 3a
- Future Flood Zone 3a (2031)
- Future Flood Zone 3a (2061)
- Future Flood Zone 3a (2111)



REF	Date	Comments
A	August 2016	
B		
C		

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LEVEL 1 SFRA: APPENDIX D CLIMATE CHANGE MAPPING

Sheet No: 4 of 46 Index Number: ADC_04

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Notes

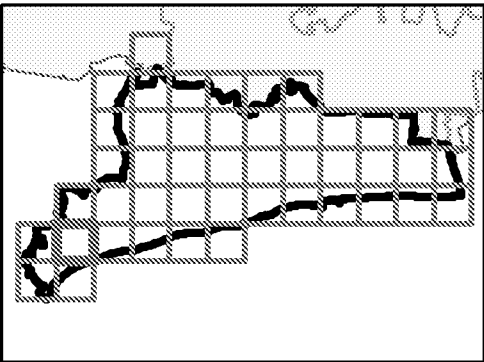
The updated Flood Map for Surface Water (uFMISW) shows the flooding that takes place from the 'surface runoff' generated by rainwater (including snow and other precipitation) which:

- (a) is on the surface of the ground (whether or not it is moving), and
- (b) has not yet entered a watercourse, drainage system or public sewer.

The uFMISW will pick out natural drainage channels, rivers, low areas in the floodplain and flow paths between buildings but it will only indicate flooding caused by local rainfall.

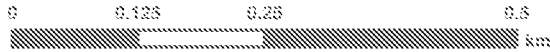
Note: The uFMISW shows predictions of flooded areas but does not show whether individual properties will be affected by surface water flooding or have been affected in the past. The uFMISW should not be used to predict if individual properties will flood.

Key Plan



Legend

- Arun District SFRA boundary
- uFMISW 30-year extent
- uFMISW 100-year extent
- uFMISW 1,000-year extent



REF	Date	Comments
A	June 2016	-
B		
C		

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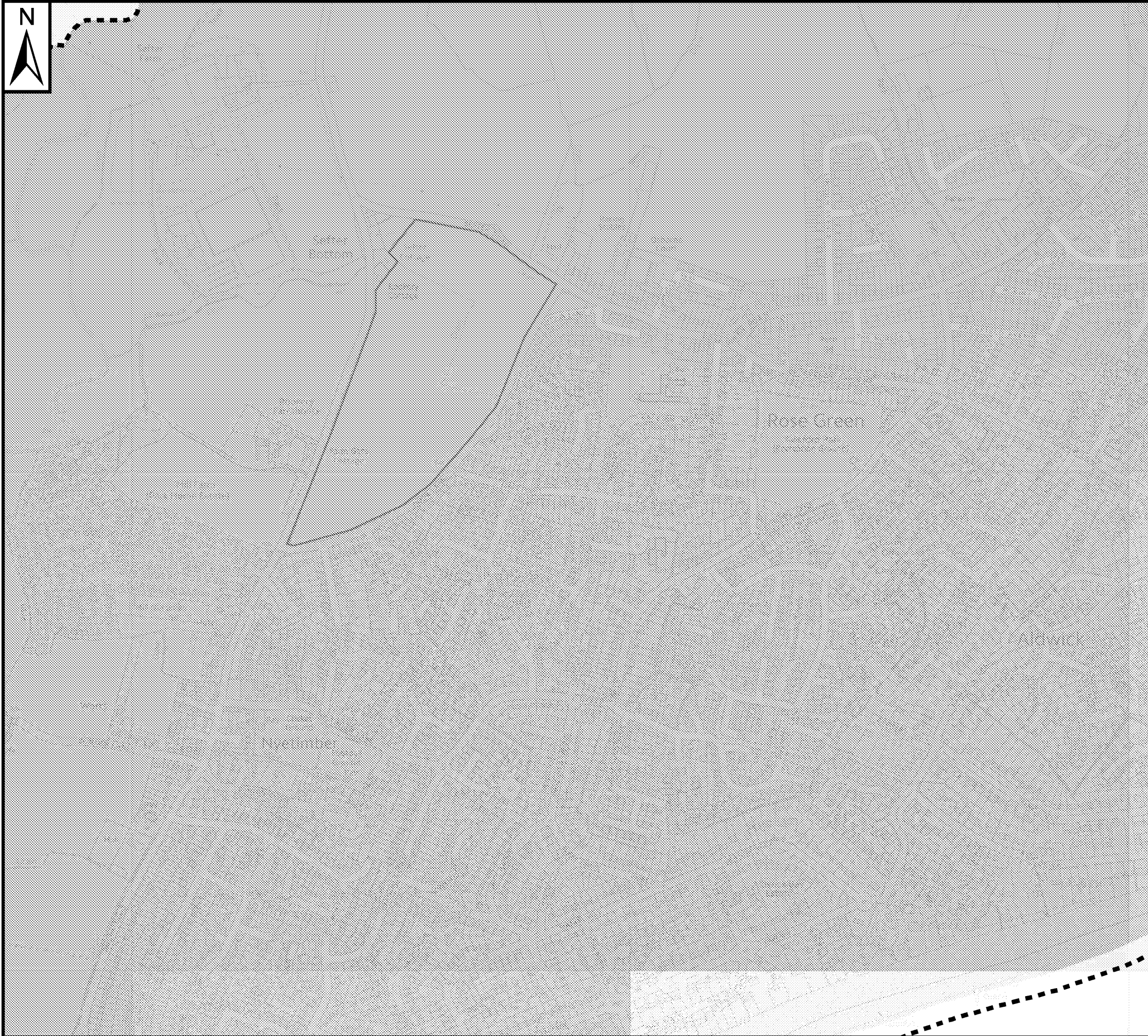
ARUN DISTRICT COUNCIL

**LEVEL 1 SFRA: APPENDIX E
SURFACE WATER FLOOD RISK**

Sheet No: 4 of 46 Index Number: AGC_04

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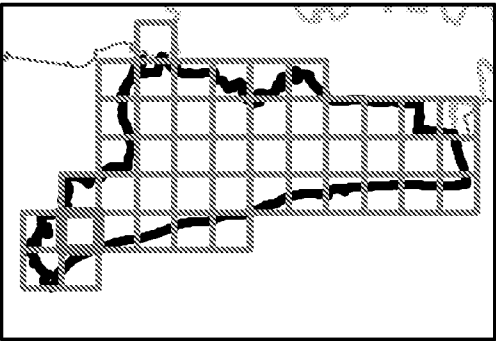
Notes

The Areas Susceptible to Groundwater Flooding (ASiGWF) is a strategic scale map showing groundwater flood areas on a 1km square grid. The data was produced to annotate Indicative Flood Risk Areas for Preliminary Flood Risk Assessment (PFRA) studies and allow the Lead Local Flood Authorities (LLFAs) to determine whether there may be a risk of flooding from groundwater.

This data shows the proportion of each 1km grid square where geological and hydrogeological condition show that groundwater might emerge. It does not show the likelihood of groundwater flooding occurring. It does not take account of the chance of flooding from groundwater rebound. This dataset covers a large area of land, and only isolated locations within the overall susceptible area are actually likely to suffer the consequences of groundwater flooding.

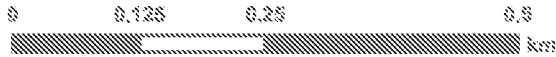
The ASiGWF data should be used only in combination with other information, for example local data or historic data. It should not be used as sole evidence for any specific flood risk management, land use planning or other decisions at any scale. However, the data can help to identify areas for assessment at a local scale where finer resolution datasets exist.

Key Plan



Legend

-  Arun District SFRA boundary
-  < 25%
-  >= 25% <50%
-  >= 50% <75%
-  >= 75%



REF	Date	Comments
A	June 2016	-
B		
C		

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ARUN DISTRICT COUNCIL LEVEL 1 SFRA: APPENDIX F AREAS SUSCEPTIBLE TO GROUNDWATER

Sheet No: 4 of 46 Index Number: ADC_04

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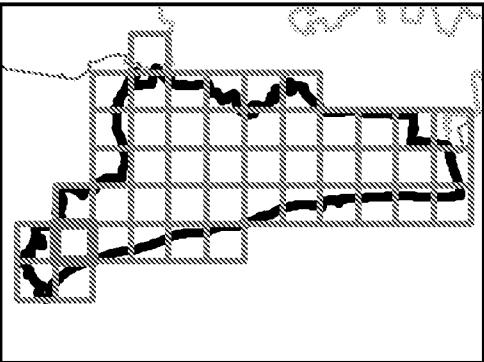
Notes

The Historic Flooding Map shows the recorded incidents and flood outlines provided by Arun District Council, West Sussex County Council, Southern Water and Environment Agency. Historical flood extent was obtained from the Environment Agency.

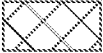
Flooding incidents provided have been categorised based upon the details provided in the records. Unknown flood points could not be determined from the information provided, and therefore could be from a number of sources.

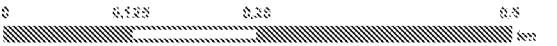
Please note that not all historical records may be shown on this map, and that it is therefore advised you contact Arun District Council for updated information post 2016.

Key Plan



Legend

-  Arun District SFRA boundary
-  Historic flood outline
- Source of flooding**
-  Fluvial
-  Coastal
-  Tidal
-  Surface Water
-  Failure
-  Unknown



REF	Date	Comments
A	June 2016	-
B		
C		

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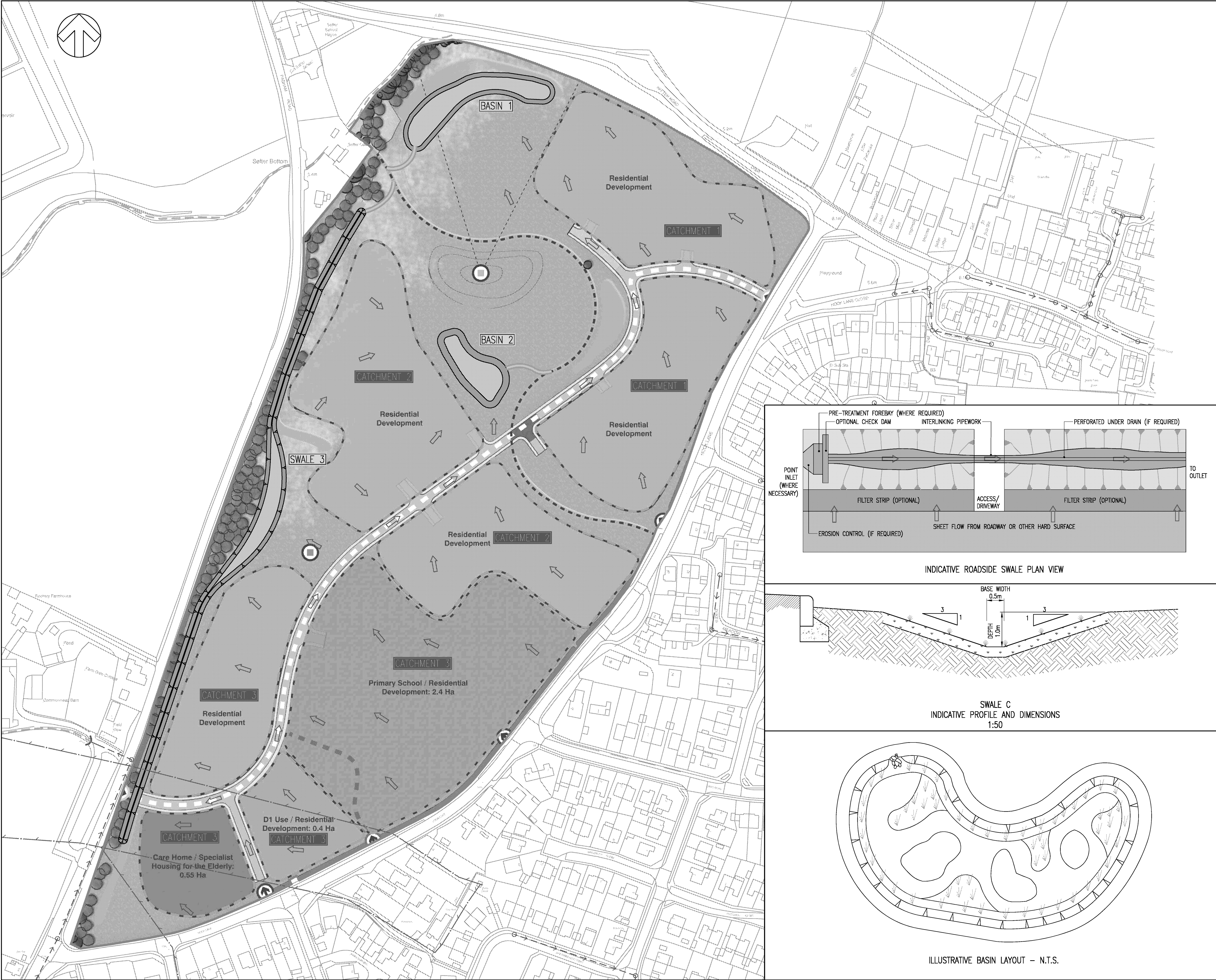
ARUN DISTRICT COUNCIL LEVEL 1 SFRA: APPENDIX H HISTORIC FLOODING RECORDS

Sheet No: 4 of 46 Index Number: ADC_04

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\\SERO1HER1UK\PROJECTS\70014147 - ROSE GREEN, PAGHAM\E MODELS AND DRAWINGS\AUTOCAD\14147-D-02.DWG 06/01/2017 14:45:52 Brammeier, Chris



- NOTES
1.

ALL LEVELS ARE IN METRES ABOVE ORDNANCE DATUM
2.

ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED
3.

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT SCHEME DRAWINGS AND SPECIFICATIONS
4.

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5.

REPRODUCED FROM THE ORDNANCE SURVEY MAP WITH PERMISSION OF THE CONTROLLER OF HER MAJESTY'S STATIONARY OFFICE. LICENCE NO. 100048755. CROWN COPYRIGHT RESERVED
6.

ILLUSTRATIVE DRAINAGE STRATEGY BASED ON:
- 6.1.

TOPOGRAPHICAL SURVEY PRODUCED BY INTERLOCK SURVEYS DATED 18TH SEPTEMBER 2015
- 6.2.

MASTERPLAN 167-P-006-RevB PRODUCED BY URBAN WILDERNESS DATED 19TH DECEMBER 2016
7.

ALL STORAGE HYDRAULIC MODELLING CONDUCTED USING WINDES SIMULATION SOFTWARE. STORAGE VOLUMES ARE APPROXIMATE AND WILL BE SUBJECT TO REFINEMENT FOLLOWING DETAILED ANALYSIS OF THE DEVELOPMENT DRAINAGE NETWORK.

KEY

SITE RED LINE BOUNDARY

PROPOSED ATTENUATION BASIN

PROPOSED SURFACE WATER CONNECTION SWALE

CATCHMENT BOUNDARY

EXISTING WATERCOURSE

PROPOSED WATERCOURSE

EXISTING SURFACE WATER SEWERS

EXISTING FOUL RISING MAINS

DRAINAGE CATCHMENT DETAILS				
CATCHMENT	CONTRIBUTING AREA [ha]	PROPOSED DISCHARGE RATE (1 in 100 Yr Event) [l/s]	STORAGE VOLUME [m³]	STORAGE AREA [m²]
1	1.62	5.7	657	2316
2	1.61	5.7	631	1557
3	2.71	9.5	1390	4137
TOTAL	5.94	20.9	3078	8010

REV	DATE	BY	DESCRIPTION	CHK	APD
E	06/01/17	CSB	UPDATED RED LINE BOUNDARY ALONG SEFTER ROAD	DW	CS
D	04/01/17	CSB	BASINS UPDATED FOR LATEST MASTERPLAN	DW	CS
C	05/10/16	CSB	BASINS UPDATED TO AVOID RISING MAIN	A	CS
B	25/01/16	CSB	ADDED INDICATIVE SWALE PROFILE AND BASIN LAYOUT	DW	DW
A	15/12/15	CSB	FIRST ISSUE	DW	DW

DRAWING STATUS:

FOR INFORMATION ONLY

WSP

PARSONS
BRINCKERHOFF

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www.wspgroup.com www.pbworld.com

CLIENT:

HALLAM LAND MANAGEMENT

ARCHITECT:

URBAN WILDERNESS

PROJECT:

HOOKE LANE,
PAGHAM

TITLE:

ILLUSTRATIVE SURFACE WATER
DRAINAGE STRATEGY

SCALE @ A1:

1 : 1250 m

CHECKED:

DW

APPROVED:

DW

CAD FILE:

4147-D-02

DESIGN-DRAWN:

CSB

DATE:

November 2015

PROJECT No:

70014147

DRAWING No:

4147-D-02

REV:

E

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Appendix B

CALCULATIONS

WSP Management Services Ltd		Page 1
One Queens Drive Birmingham B5 4PJ	Greefield Runoff Rate Rose Green, Pagham	
Date January 2016 File loH124.srcx	Designed by CSB Checked by DW	
XP Solutions		Source Control 2015.1

IH 124 Mean Annual Flood

Input

Return Period (years)	100	Soil	0.400
Area (ha)	50.000	Urban	0.000
SAAR (mm)	721	Region Number	Region 7

Results 1/s

QBAR Rural 176.1

QBAR Urban 176.1

Q100 years 561.8

Q1 year 149.7

Q2 years 155.1

Q5 years 225.4

Q10 years 285.3

Q20 years 352.8

Q25 years 378.3

Q30 years 399.1

Q50 years 461.4

Q100 years 561.8

Q200 years 660.4

Q250 years 692.1

Q1000 years 908.7

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WSP Group Ltd		Basin 1 Hook Lane, Pagham		Page 1	
Date January 2017 File Basin 1.srcx		Designed by CSB Checked by DW			
XP Solutions		Source Control 2015.1			
<u>Summary of Results for 100 year Return Period</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	3.971	0.171	5.5	266.3	O K
30 min Summer	4.026	0.226	5.5	356.5	O K
60 min Summer	4.082	0.282	5.5	453.3	O K
120 min Summer	4.138	0.338	5.5	552.8	O K
180 min Summer	4.168	0.368	5.5	608.2	O K
240 min Summer	4.188	0.388	5.5	643.7	O K
360 min Summer	4.212	0.412	5.5	688.9	O K
480 min Summer	4.226	0.426	5.5	716.6	O K
600 min Summer	4.235	0.435	5.5	733.5	O K
720 min Summer	4.240	0.440	5.5	743.4	O K
960 min Summer	4.244	0.444	5.5	749.8	O K
1440 min Summer	4.240	0.440	5.5	742.4	O K
2160 min Summer	4.229	0.429	5.5	721.2	O K
2880 min Summer	4.214	0.414	5.5	693.7	O K
4320 min Summer	4.180	0.380	5.5	629.4	O K
5760 min Summer	4.141	0.341	5.5	557.9	O K
7200 min Summer	4.104	0.304	5.5	492.8	O K
8640 min Summer	4.072	0.272	5.5	435.5	O K
10080 min Summer	4.042	0.242	5.5	384.4	O K
15 min Winter	3.991	0.191	5.5	298.7	O K
30 min Winter	4.051	0.251	5.5	400.0	O K
60 min Winter	4.114	0.314	5.5	509.1	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
15 min Summer	89.024	0.0	223.6	23	
30 min Summer	59.849	0.0	304.3	37	
60 min Summer	38.413	0.0	437.8	66	
120 min Summer	23.812	0.0	543.5	126	
180 min Summer	17.737	0.0	605.7	186	
240 min Summer	14.290	0.0	648.2	246	
360 min Summer	10.505	0.0	708.3	364	
480 min Summer	8.441	0.0	750.2	484	
600 min Summer	7.118	0.0	779.4	602	
720 min Summer	6.190	0.0	798.5	722	
960 min Summer	4.959	0.0	810.0	960	
1440 min Summer	3.622	0.0	770.2	1202	
2160 min Summer	2.640	0.0	1126.7	1580	
2880 min Summer	2.107	0.0	1192.9	1992	
4320 min Summer	1.530	0.0	1274.7	2812	
5760 min Summer	1.218	0.0	1410.2	3584	
7200 min Summer	1.019	0.0	1474.1	4328	
8640 min Summer	0.882	0.0	1527.4	5104	
10080 min Summer	0.781	0.0	1568.8	5848	
15 min Winter	89.024	0.0	252.4	22	
30 min Winter	59.849	0.0	339.9	37	
60 min Winter	38.413	0.0	491.2	66	
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WSP Group Ltd		Page 2																																																																																																																																																																																												
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WSP Group Ltd		Page 3
.	Basin 1	
.	Hook Lane, Pagham	
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Date January 2017	Designed by CSB	
File Basin 1.srcx	Checked by DW	
XP Solutions	Source Control 2015.1	

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)	19.000	Shortest Storm (mins)	15
Ratio R	0.350	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

Time Area Diagram

Total Area (ha) 1.620

Time (mins)	Area		Time (mins)	Area
From:	To:	(ha)	From:	To:
		(ha)		
0	4	0.820	4	8
		0.800		

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WSP Group Ltd		Page 4
.	Basin 1	
.	Hook Lane, Pagham	
.		
Date January 2017	Designed by CSB	
File Basin 1.srcx	Checked by DW	
XP Solutions	Source Control 2015.1	

Model Details

Storage is Online Cover Level (m) 4.600

Tank or Pond Structure

Invert Level (m) 3.800

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	1472.0	0.800	2316.0

Hydro-Brake Optimum® Outflow Control

Unit Reference	MD-SHE-0117-5700-0500-5700
Design Head (m)	0.500
Design Flow (l/s)	5.7
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Diameter (mm)	117
Invert Level (m)	3.800
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.500	5.5
Flush-Flo™	0.185	5.5
Kick-Flo®	0.376	4.8
Mean Flow over Head Range	-	4.5

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	4.1	1.200	8.2	3.000	12.7	7.000	19.1
0.200	5.5	1.400	8.8	3.500	13.7	7.500	19.8
0.300	5.3	1.600	9.4	4.000	14.6	8.000	20.4
0.400	4.9	1.800	10.0	4.500	15.4	8.500	21.0
0.500	5.5	2.000	10.5	5.000	16.2	9.000	21.7
0.600	5.9	2.200	10.9	5.500	16.9	9.500	22.3
0.800	6.8	2.400	11.4	6.000	17.7		
1.000	7.5	2.600	11.9	6.500	18.4		

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WSP Group Ltd		Page 1			
		Basin 2 Hook Lane, Pagham			
Date January 2017 File Basin 2.srcx		Designed by CSB Checked by DW			
XP Solutions		Source Control 2015.1			
Summary of Results for 100 year Return Period					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	5.288	0.288	5.7	264.0	O K
30 min Summer	5.376	0.376	5.7	353.2	O K
60 min Summer	5.466	0.466	5.7	448.6	O K
120 min Summer	5.553	0.553	5.7	545.9	O K
180 min Summer	5.599	0.599	5.7	599.6	O K
240 min Summer	5.628	0.628	5.7	633.2	O K
360 min Summer	5.662	0.662	5.7	674.8	O K
480 min Summer	5.682	0.682	5.7	699.4	O K
600 min Summer	5.694	0.694	5.7	713.4	O K
720 min Summer	5.700	0.700	5.7	720.7	O K
960 min Summer	5.701	0.701	5.7	722.4	O K
1440 min Summer	5.688	0.688	5.7	706.0	O K
2160 min Summer	5.662	0.662	5.7	674.6	O K
2880 min Summer	5.633	0.633	5.7	640.1	O K
4320 min Summer	5.567	0.567	5.7	562.9	O K
5760 min Summer	5.500	0.500	5.7	486.7	O K
7200 min Summer	5.438	0.438	5.7	419.2	O K
8640 min Summer	5.382	0.382	5.7	359.8	O K
10080 min Summer	5.333	0.333	5.7	308.6	O K
15 min Winter	5.320	0.320	5.7	296.1	O K
30 min Winter	5.417	0.417	5.7	396.5	O K
60 min Winter	5.516	0.516	5.7	504.2	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
15 min Summer	89.024	0.0	248.7	23	
30 min Summer	59.849	0.0	333.8	37	
60 min Summer	38.413	0.0	453.0	66	
120 min Summer	23.812	0.0	561.4	126	
180 min Summer	17.737	0.0	626.1	186	
240 min Summer	14.290	0.0	671.0	246	
360 min Summer	10.505	0.0	735.6	364	
480 min Summer	8.441	0.0	782.0	484	
600 min Summer	7.118	0.0	815.0	602	
720 min Summer	6.190	0.0	836.3	722	
960 min Summer	4.959	0.0	842.1	960	
1440 min Summer	3.622	0.0	801.6	1216	
2160 min Summer	2.640	0.0	1137.7	1600	
2880 min Summer	2.107	0.0	1208.3	1996	
4320 min Summer	1.530	0.0	1307.5	2812	
5760 min Summer	1.218	0.0	1408.1	3576	
7200 min Summer	1.019	0.0	1472.7	4328	
8640 min Summer	0.882	0.0	1528.1	5096	
10080 min Summer	0.781	0.0	1574.3	5752	
15 min Winter	89.024	0.0	278.9	22	
30 min Winter	59.849	0.0	371.7	37	
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<u>Summary of Results for 100 year Return Period</u> <table><tr><th>Storm Event</th><th>Max Level (m)</th><th>Max Depth (m)</th><th>Max Control (l/s)</th><th>Max Volume (m³)</th><th>Status</th></tr><tr><td>120 min Winter</td><td>5.612</td><td>0.612</td><td>5.7</td><td>615.1</td><td>O K</td></tr><tr><td>180 min Winter</td><td>5.663</td><td>0.663</td><td>5.7</td><td>676.1</td><td>O K</td></tr><tr><td>240 min Winter</td><td>5.695</td><td>0.695</td><td>5.7</td><td>714.6</td><td>O K</td></tr><tr><td>360 min Winter</td><td>5.734</td><td>0.734</td><td>5.7</td><td>763.5</td><td>O K</td></tr><tr><td>480 min Winter</td><td>5.758</td><td>0.758</td><td>5.7</td><td>793.6</td><td>O K</td></tr><tr><td>600 min Winter</td><td>5.773</td><td>0.773</td><td>5.7</td><td>812.1</td><td>O K</td></tr><tr><td>720 min Winter</td><td>5.781</td><td>0.781</td><td>5.7</td><td>823.1</td><td>O K</td></tr><tr><td>860 min Winter</td><td>5.787</td><td>0.787</td><td>5.7</td><td>830.3</td><td>O K</td></tr><tr><td>1440 min Winter</td><td>5.776</td><td>0.776</td><td>5.7</td><td>815.8</td><td>O K</td></tr><tr><td>2160 min Winter</td><td>5.742</td><td>0.742</td><td>5.7</td><td>773.4</td><td>O K</td></tr><tr><td>2880 min Winter</td><td>5.705</td><td>0.705</td><td>5.7</td><td>727.3</td><td>O K</td></tr><tr><td>4320 min Winter</td><td>5.619</td><td>0.619</td><td>5.7</td><td>622.6</td><td>O K</td></tr><tr><td>5760 min Winter</td><td>5.512</td><td>0.512</td><td>5.7</td><td>499.6</td><td>O K</td></tr><tr><td>7200 min Winter</td><td>5.415</td><td>0.415</td><td>5.7</td><td>394.6</td><td>O K</td></tr><tr><td>8640 min Winter</td><td>5.332</td><td>0.332</td><td>5.7</td><td>307.4</td><td>O K</td></tr><tr><td>10080 min Winter</td><td>5.262</td><td>0.262</td><td>5.7</td><td>237.9</td><td>O K</td></tr></table> <table><tr><th>Storm Event</th><th>Rain (mm/hr)</th><th>Flooded Volume (m³)</th><th>Discharge Volume (m³)</th><th>Time-Peak (mins)</th></tr><tr><td>120 min Winter</td><td>23.812</td><td>0.0</td><td>627.7</td><td>124</td></tr><tr><td>180 min Winter</td><td>17.737</td><td>0.0</td><td>698.7</td><td>184</td></tr><tr><td>240 min Winter</td><td>14.290</td><td>0.0</td><td>747.3</td><td>242</td></tr><tr><td>360 min Winter</td><td>10.505</td><td>0.0</td><td>813.9</td><td>358</td></tr><tr><td>480 min Winter</td><td>8.441</td><td>0.0</td><td>854.0</td><td>474</td></tr><tr><td>600 min Winter</td><td>7.118</td><td>0.0</td><td>868.9</td><td>590</td></tr><tr><td>720 min Winter</td><td>6.190</td><td>0.0</td><td>864.7</td><td>704</td></tr><tr><td>860 min Winter</td><td>4.958</td><td>0.0</td><td>847.8</td><td>828</td></tr><tr><td>1440 min Winter</td><td>3.622</td><td>0.0</td><td>811.0</td><td>1354</td></tr><tr><td>2160 min Winter</td><td>2.640</td><td>0.0</td><td>1273.3</td><td>1688</td></tr><tr><td>2880 min Winter</td><td>2.107</td><td>0.0</td><td>1351.1</td><td>2160</td></tr><tr><td>4320 min Winter</td><td>1.530</td><td>0.0</td><td>1449.3</td><td>3072</td></tr><tr><td>5760 min Winter</td><td>1.218</td><td>0.0</td><td>1577.3</td><td>3864</td></tr><tr><td>7200 min Winter</td><td>1.019</td><td>0.0</td><td>1650.0</td><td>4608</td></tr><tr><td>8640 min Winter</td><td>0.882</td><td>0.0</td><td>1712.4</td><td>5280</td></tr><tr><td>10080 min Winter</td><td>0.781</td><td>0.0</td><td>1765.0</td><td>5952</td></tr></table>					Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status	120 min Winter	5.612	0.612	5.7	615.1	O K	180 min Winter	5.663	0.663	5.7	676.1	O K	240 min Winter	5.695	0.695	5.7	714.6	O K	360 min Winter	5.734	0.734	5.7	763.5	O K	480 min Winter	5.758	0.758	5.7	793.6	O K	600 min Winter	5.773	0.773	5.7	812.1	O K	720 min Winter	5.781	0.781	5.7	823.1	O K	860 min Winter	5.787	0.787	5.7	830.3	O K	1440 min Winter	5.776	0.776	5.7	815.8	O K	2160 min Winter	5.742	0.742	5.7	773.4	O K	2880 min Winter	5.705	0.705	5.7	727.3	O K	4320 min Winter	5.619	0.619	5.7	622.6	O K	5760 min Winter	5.512	0.512	5.7	499.6	O K	7200 min Winter	5.415	0.415	5.7	394.6	O K	8640 min Winter	5.332	0.332	5.7	307.4	O K	10080 min Winter	5.262	0.262	5.7	237.9	O K	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	120 min Winter	23.812	0.0	627.7	124	180 min Winter	17.737	0.0	698.7	184	240 min Winter	14.290	0.0	747.3	242	360 min Winter	10.505	0.0	813.9	358	480 min Winter	8.441	0.0	854.0	474	600 min Winter	7.118	0.0	868.9	590	720 min Winter	6.190	0.0	864.7	704	860 min Winter	4.958	0.0	847.8	828	1440 min Winter	3.622	0.0	811.0	1354	2160 min Winter	2.640	0.0	1273.3	1688	2880 min Winter	2.107	0.0	1351.1	2160	4320 min Winter	1.530	0.0	1449.3	3072	5760 min Winter	1.218	0.0	1577.3	3864	7200 min Winter	1.019	0.0	1650.0	4608	8640 min Winter	0.882	0.0	1712.4	5280	10080 min Winter	0.781	0.0	1765.0	5952
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Model Details

Storage is Online Cover Level (m) 6.200

Tank or Pond Structure

Invert Level (m) 5.000

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	840.5	1.200	1556.5

Hydro-Brake Optimum® Outflow Control

Unit Reference	MD-SHE-0113-5700-0900-5700
Design Head (m)	0.900
Design Flow (l/s)	5.7
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Diameter (mm)	113
Invert Level (m)	5.000
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.900	5.7
Flush-Flo™	0.266	5.7
Kick-Flo®	0.590	4.7
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	4.0	1.200	6.5	3.000	10.0	7.000	14.9
0.200	5.6	1.400	7.0	3.500	10.7	7.500	15.4
0.300	5.6	1.600	7.4	4.000	11.4	8.000	15.9
0.400	5.5	1.800	7.8	4.500	12.1	8.500	16.4
0.500	5.3	2.000	8.2	5.000	12.7	9.000	16.8
0.600	4.7	2.200	8.6	5.500	13.3	9.500	17.3
0.800	5.4	2.400	9.0	6.000	13.9		
1.000	6.0	2.600	9.3	6.500	14.4		

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<u>Summary of Results for 100 year Return Period</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	4.199	0.299	9.4	444.4	O K
30 min Summer	4.276	0.376	9.4	594.8	O K
60 min Summer	4.350	0.450	9.4	755.6	O K
120 min Summer	4.420	0.520	9.4	920.0	O K
180 min Summer	4.455	0.555	9.4	1009.4	O K
240 min Summer	4.476	0.576	9.4	1064.7	O K
360 min Summer	4.502	0.602	9.4	1132.9	O K
480 min Summer	4.516	0.616	9.4	1172.7	O K
600 min Summer	4.524	0.624	9.4	1195.0	O K
720 min Summer	4.528	0.628	9.4	1206.0	O K
960 min Summer	4.528	0.628	9.4	1206.2	O K
1440 min Summer	4.519	0.619	9.4	1180.1	O K
2160 min Summer	4.500	0.600	9.4	1129.5	O K
2880 min Summer	4.480	0.580	9.4	1073.6	O K
4320 min Summer	4.435	0.535	9.4	957.4	O K
5760 min Summer	4.383	0.483	9.4	832.5	O K
7200 min Summer	4.333	0.433	9.4	716.3	O K
8640 min Summer	4.286	0.386	9.4	615.1	O K
10080 min Summer	4.242	0.342	9.4	526.1	O K
15 min Winter	4.228	0.328	9.4	498.5	O K
30 min Winter	4.310	0.410	9.4	667.6	O K
60 min Winter	4.391	0.491	9.4	849.2	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
15 min Summer	89.024	0.0	417.6	23	
30 min Summer	59.849	0.0	560.2	37	
60 min Summer	38.413	0.0	762.0	68	
120 min Summer	23.812	0.0	944.1	126	
180 min Summer	17.737	0.0	1052.8	186	
240 min Summer	14.290	0.0	1128.4	246	
360 min Summer	10.505	0.0	1237.3	364	
480 min Summer	8.441	0.0	1315.7	484	
600 min Summer	7.118	0.0	1372.5	602	
720 min Summer	6.190	0.0	1410.9	722	
960 min Summer	4.959	0.0	1432.0	958	
1440 min Summer	3.622	0.0	1367.9	1184	
2160 min Summer	2.640	0.0	1915.1	1560	
2880 min Summer	2.107	0.0	2033.8	1968	
4320 min Summer	1.530	0.0	2197.0	2812	
5760 min Summer	1.218	0.0	2370.1	3584	
7200 min Summer	1.019	0.0	2479.0	4328	
8640 min Summer	0.882	0.0	2572.2	5096	
10080 min Summer	0.781	0.0	2649.8	5752	
15 min Winter	89.024	0.0	468.3	22	
30 min Winter	59.849	0.0	623.2	37	
60 min Winter	38.413	0.0	853.6	66	
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<u>Summary of Results for 100 year Return Period</u> <table><tr><th>Storm Event</th><th>Max Level (m)</th><th>Max Depth (m)</th><th>Max Control (l/s)</th><th>Max Volume (m³)</th><th>Status</th></tr><tr><td>120 min Winter</td><td>4.465</td><td>0.565</td><td>9.4</td><td>1035.1</td><td>O K</td></tr><tr><td>180 min Winter</td><td>4.503</td><td>0.603</td><td>9.4</td><td>1137.0</td><td>O K</td></tr><tr><td>240 min Winter</td><td>4.526</td><td>0.626</td><td>9.4</td><td>1201.1</td><td>O K</td></tr><tr><td>360 min Winter</td><td>4.555</td><td>0.655</td><td>9.4</td><td>1282.2</td><td>O K</td></tr><tr><td>480 min Winter</td><td>4.572</td><td>0.672</td><td>9.4</td><td>1331.8</td><td>O K</td></tr><tr><td>600 min Winter</td><td>4.582</td><td>0.682</td><td>9.4</td><td>1361.9</td><td>O K</td></tr><tr><td>720 min Winter</td><td>4.588</td><td>0.688</td><td>9.4</td><td>1379.4</td><td>O K</td></tr><tr><td>860 min Winter</td><td>4.591</td><td>0.691</td><td>9.4</td><td>1390.4</td><td>O K</td></tr><tr><td>1440 min Winter</td><td>4.582</td><td>0.682</td><td>9.4</td><td>1361.8</td><td>O K</td></tr><tr><td>2160 min Winter</td><td>4.559</td><td>0.659</td><td>9.4</td><td>1293.6</td><td>O K</td></tr><tr><td>2880 min Winter</td><td>4.532</td><td>0.632</td><td>9.4</td><td>1216.1</td><td>O K</td></tr><tr><td>4320 min Winter</td><td>4.469</td><td>0.569</td><td>9.4</td><td>1046.1</td><td>O K</td></tr><tr><td>5760 min Winter</td><td>4.395</td><td>0.495</td><td>9.4</td><td>860.4</td><td>O K</td></tr><tr><td>7200 min Winter</td><td>4.315</td><td>0.415</td><td>9.4</td><td>676.8</td><td>O K</td></tr><tr><td>8640 min Winter</td><td>4.241</td><td>0.341</td><td>9.4</td><td>525.3</td><td>O K</td></tr><tr><td>10080 min Winter</td><td>4.175</td><td>0.275</td><td>9.4</td><td>401.7</td><td>O K</td></tr></table> <table><tr><th>Storm Event</th><th>Rain (mm/hr)</th><th>Flooded Volume (m³)</th><th>Discharge Volume (m³)</th><th>Time-Peak (mins)</th></tr><tr><td>120 min Winter</td><td>23.812</td><td>0.0</td><td>1055.6</td><td>124</td></tr><tr><td>180 min Winter</td><td>17.737</td><td>0.0</td><td>1175.3</td><td>182</td></tr><tr><td>240 min Winter</td><td>14.290</td><td>0.0</td><td>1257.2</td><td>242</td></tr><tr><td>360 min Winter</td><td>10.505</td><td>0.0</td><td>1370.4</td><td>358</td></tr><tr><td>480 min Winter</td><td>8.441</td><td>0.0</td><td>1441.9</td><td>474</td></tr><tr><td>600 min Winter</td><td>7.118</td><td>0.0</td><td>1476.2</td><td>588</td></tr><tr><td>720 min Winter</td><td>6.190</td><td>0.0</td><td>1476.2</td><td>702</td></tr><tr><td>860 min Winter</td><td>4.958</td><td>0.0</td><td>1449.9</td><td>826</td></tr><tr><td>1440 min Winter</td><td>3.622</td><td>0.0</td><td>1394.8</td><td>1342</td></tr><tr><td>2160 min Winter</td><td>2.640</td><td>0.0</td><td>2143.5</td><td>1668</td></tr><tr><td>2880 min Winter</td><td>2.107</td><td>0.0</td><td>2274.7</td><td>2136</td></tr><tr><td>4320 min Winter</td><td>1.530</td><td>0.0</td><td>2439.0</td><td>3032</td></tr><tr><td>5760 min Winter</td><td>1.218</td><td>0.0</td><td>2654.9</td><td>3920</td></tr><tr><td>7200 min Winter</td><td>1.019</td><td>0.0</td><td>2777.3</td><td>4616</td></tr><tr><td>8640 min Winter</td><td>0.882</td><td>0.0</td><td>2882.3</td><td>5352</td></tr><tr><td>10080 min Winter</td><td>0.781</td><td>0.0</td><td>2970.8</td><td>5952</td></tr></table>				Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status	120 min Winter	4.465	0.565	9.4	1035.1	O K	180 min Winter	4.503	0.603	9.4	1137.0	O K	240 min Winter	4.526	0.626	9.4	1201.1	O K	360 min Winter	4.555	0.655	9.4	1282.2	O K	480 min Winter	4.572	0.672	9.4	1331.8	O K	600 min Winter	4.582	0.682	9.4	1361.9	O K	720 min Winter	4.588	0.688	9.4	1379.4	O K	860 min Winter	4.591	0.691	9.4	1390.4	O K	1440 min Winter	4.582	0.682	9.4	1361.8	O K	2160 min Winter	4.559	0.659	9.4	1293.6	O K	2880 min Winter	4.532	0.632	9.4	1216.1	O K	4320 min Winter	4.469	0.569	9.4	1046.1	O K	5760 min Winter	4.395	0.495	9.4	860.4	O K	7200 min Winter	4.315	0.415	9.4	676.8	O K	8640 min Winter	4.241	0.341	9.4	525.3	O K	10080 min Winter	4.175	0.275	9.4	401.7	O K	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	120 min Winter	23.812	0.0	1055.6	124	180 min Winter	17.737	0.0	1175.3	182	240 min Winter	14.290	0.0	1257.2	242	360 min Winter	10.505	0.0	1370.4	358	480 min Winter	8.441	0.0	1441.9	474	600 min Winter	7.118	0.0	1476.2	588	720 min Winter	6.190	0.0	1476.2	702	860 min Winter	4.958	0.0	1449.9	826	1440 min Winter	3.622	0.0	1394.8	1342	2160 min Winter	2.640	0.0	2143.5	1668	2880 min Winter	2.107	0.0	2274.7	2136	4320 min Winter	1.530	0.0	2439.0	3032	5760 min Winter	1.218	0.0	2654.9	3920	7200 min Winter	1.019	0.0	2777.3	4616	8640 min Winter	0.882	0.0	2882.3	5352	10080 min Winter	0.781	0.0	2970.8	5952
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XP Solutions		Source Control 2015.1

Model Details

Storage is Online Cover Level (m) 4.900

Tank or Pond Structure

Invert Level (m) 3.900

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	1151.6	1.000	4136.7

Hydro-Brake Optimum® Outflow Control

Unit Reference MD-SHE-0146-9500-0700-9500	
Design Head (m)	0.700
Design Flow (l/s)	9.5
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Diameter (mm)	146
Invert Level (m)	3.900
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.700	9.4
Flush-Flo™	0.241	9.4
Kick-Flo®	0.510	8.2
Mean Flow over Head Range	-	7.9

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	5.3	1.200	12.2	3.000	18.8	7.000	28.3
0.200	9.4	1.400	13.1	3.500	20.3	7.500	29.2
0.300	9.4	1.600	14.0	4.000	21.6	8.000	30.1
0.400	9.1	1.800	14.8	4.500	22.9	8.500	31.1
0.500	8.3	2.000	15.5	5.000	24.1	9.000	32.0
0.600	8.8	2.200	16.2	5.500	25.2	9.500	32.9
0.800	10.1	2.400	16.9	6.000	26.3		
1.000	11.2	2.600	17.6	6.500	27.3		

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Date January 2017 File Basin 1.srcx			Designed by CSB Checked by DW		
XP Solutions			Source Control 2015.1		
Summary of Results for 100 year Return Period (+40%)					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	4.057	0.257	5.5	410.9	O K
30 min Summer	4.137	0.337	5.5	551.5	O K
60 min Summer	4.220	0.420	5.5	704.2	O K
120 min Summer	4.301	0.501	5.5	862.0	Flood Risk
180 min Summer	4.346	0.546	5.7	951.0	Flood Risk
240 min Summer	4.374	0.574	5.8	1008.9	Flood Risk
360 min Summer	4.411	0.611	6.0	1086.0	Flood Risk
480 min Summer	4.435	0.635	6.1	1136.8	Flood Risk
600 min Summer	4.451	0.651	6.2	1171.3	Flood Risk
720 min Summer	4.462	0.662	6.2	1195.0	Flood Risk
960 min Summer	4.475	0.675	6.3	1221.5	Flood Risk
1440 min Summer	4.477	0.677	6.3	1227.4	Flood Risk
2160 min Summer	4.468	0.668	6.2	1206.5	Flood Risk
2880 min Summer	4.455	0.655	6.2	1178.0	Flood Risk
4320 min Summer	4.424	0.624	6.1	1112.1	Flood Risk
5760 min Summer	4.391	0.591	5.9	1043.6	Flood Risk
7200 min Summer	4.359	0.559	5.8	977.3	Flood Risk
8640 min Summer	4.328	0.528	5.6	915.5	Flood Risk
10080 min Summer	4.299	0.499	5.5	857.1	O K
15 min Winter	4.086	0.286	5.5	460.8	O K
30 min Winter	4.174	0.374	5.5	618.7	O K
60 min Winter	4.265	0.465	5.5	789.8	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
15 min Summer	124.633	0.0	347.6	26	
30 min Summer	83.789	0.0	437.7	40	
60 min Summer	53.779	0.0	671.6	68	
120 min Summer	33.337	0.0	812.5	128	
180 min Summer	24.832	0.0	875.4	188	
240 min Summer	20.006	0.0	896.9	246	
360 min Summer	14.706	0.0	898.9	366	
480 min Summer	11.818	0.0	898.4	484	
600 min Summer	9.966	0.0	898.0	604	
720 min Summer	8.665	0.0	897.6	724	
960 min Summer	6.943	0.0	897.2	962	
1440 min Summer	5.071	0.0	892.8	1402	
2160 min Summer	3.696	0.0	1694.2	1732	
2880 min Summer	2.949	0.0	1714.9	2108	
4320 min Summer	2.142	0.0	1586.8	2940	
5760 min Summer	1.705	0.0	2172.4	3752	
7200 min Summer	1.427	0.0	2269.9	4608	
8640 min Summer	1.235	0.0	2352.2	5440	
10080 min Summer	1.093	0.0	2418.6	6248	
15 min Winter	124.633	0.0	384.8	26	
30 min Winter	83.789	0.0	452.0	40	
60 min Winter	53.779	0.0	745.9	68	
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WSP Group Ltd		Page 4
.	Basin 1	
.	Hook Lane, Pagham	
.	+40%CC, +10% Creep	
Date January 2017	Designed by CSB	
File Basin 1.srcx	Checked by DW	
XP Solutions	Source Control 2015.1	

Model Details

Storage is Online Cover Level (m) 4.600

Tank or Pond Structure

Invert Level (m) 3.800

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	1472.0	0.800	2316.0

Hydro-Brake Optimum® Outflow Control

Unit Reference	MD-SHE-0117-5700-0500-5700
Design Head (m)	0.500
Design Flow (l/s)	5.7
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Diameter (mm)	117
Invert Level (m)	3.800
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.500	5.5
Flush-Flo™	0.185	5.5
Kick-Flo®	0.376	4.8
Mean Flow over Head Range	-	4.5

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	4.1	1.200	8.2	3.000	12.7	7.000	19.1
0.200	5.5	1.400	8.8	3.500	13.7	7.500	19.8
0.300	5.3	1.600	9.4	4.000	14.6	8.000	20.4
0.400	4.9	1.800	10.0	4.500	15.4	8.500	21.0
0.500	5.5	2.000	10.5	5.000	16.2	9.000	21.7
0.600	5.9	2.200	10.9	5.500	16.9	9.500	22.3
0.800	6.8	2.400	11.4	6.000	17.7		
1.000	7.5	2.600	11.9	6.500	18.4		

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Risk</td></tr><tr><td>600 min Summer</td><td>6.022</td><td>1.022</td><td>6.0</td><td>1150.6</td><td>Flood Risk</td></tr><tr><td>720 min Summer</td><td>6.037</td><td>1.037</td><td>6.1</td><td>1172.0</td><td>Flood Risk</td></tr><tr><td>960 min Summer</td><td>6.053</td><td>1.053</td><td>6.1</td><td>1194.4</td><td>Flood Risk</td></tr><tr><td>1440 min Summer</td><td>6.052</td><td>1.052</td><td>6.1</td><td>1193.2</td><td>Flood Risk</td></tr><tr><td>2160 min Summer</td><td>6.029</td><td>1.029</td><td>6.0</td><td>1160.8</td><td>Flood Risk</td></tr><tr><td>2880 min Summer</td><td>6.004</td><td>1.004</td><td>6.0</td><td>1124.5</td><td>Flood Risk</td></tr><tr><td>4320 min Summer</td><td>5.952</td><td>0.952</td><td>5.8</td><td>1051.7</td><td>Flood Risk</td></tr><tr><td>5760 min Summer</td><td>5.901</td><td>0.901</td><td>5.7</td><td>981.2</td><td>Flood Risk</td></tr><tr><td>7200 min Summer</td><td>5.851</td><td>0.851</td><td>5.7</td><td>914.2</td><td>O K</td></tr><tr><td>8640 min Summer</td><td>5.803</td><td>0.803</td><td>5.7</td><td>851.3</td><td>O K</td></tr><tr><td>10080 min Summer</td><td>5.756</td><td>0.756</td><td>5.7</td><td>791.0</td><td>O K</td></tr><tr><td>15 min Winter</td><td>5.474</td><td>0.474</td><td>5.7</td><td>457.4</td><td>O K</td></tr><tr><td>30 min Winter</td><td>5.611</td><td>0.611</td><td>5.7</td><td>614.2</td><td>O K</td></tr><tr><td>60 min Winter</td><td>5.750</td><td>0.750</td><td>5.7</td><td>783.5</td><td>O K</td></tr></table> <table><tr><th>Storm Event</th><th>Rain (mm/hr)</th><th>Flooded Volume (m³)</th><th>Discharge Volume (m³)</th><th>Time-Peak (mins)</th></tr><tr><td>15 min Summer</td><td>124.633</td><td>0.0</td><td>379.6</td><td>25</td></tr><tr><td>30 min Summer</td><td>83.789</td><td>0.0</td><td>464.5</td><td>40</td></tr><tr><td>60 min Summer</td><td>53.779</td><td>0.0</td><td>694.3</td><td>68</td></tr><tr><td>120 min Summer</td><td>33.337</td><td>0.0</td><td>843.4</td><td>128</td></tr><tr><td>180 min Summer</td><td>24.832</td><td>0.0</td><td>899.6</td><td>188</td></tr><tr><td>240 min Summer</td><td>20.006</td><td>0.0</td><td>903.9</td><td>246</td></tr><tr><td>360 min Summer</td><td>14.706</td><td>0.0</td><td>900.7</td><td>366</td></tr><tr><td>480 min Summer</td><td>11.818</td><td>0.0</td><td>898.6</td><td>486</td></tr><tr><td>600 min Summer</td><td>9.966</td><td>0.0</td><td>897.8</td><td>604</td></tr><tr><td>720 min Summer</td><td>8.665</td><td>0.0</td><td>897.7</td><td>724</td></tr><tr><td>960 min Summer</td><td>6.943</td><td>0.0</td><td>900.9</td><td>962</td></tr><tr><td>1440 min Summer</td><td>5.071</td><td>0.0</td><td>904.1</td><td>1430</td></tr><tr><td>2160 min Summer</td><td>3.696</td><td>0.0</td><td>1726.2</td><td>1756</td></tr><tr><td>2880 min Summer</td><td>2.949</td><td>0.0</td><td>1744.6</td><td>2136</td></tr><tr><td>4320 min Summer</td><td>2.142</td><td>0.0</td><td>1611.0</td><td>2944</td></tr><tr><td>5760 min Summer</td><td>1.705</td><td>0.0</td><td>2168.5</td><td>3800</td></tr><tr><td>7200 min Summer</td><td>1.427</td><td>0.0</td><td>2268.0</td><td>4616</td></tr><tr><td>8640 min Summer</td><td>1.235</td><td>0.0</td><td>2353.7</td><td>5448</td></tr><tr><td>10080 min Summer</td><td>1.093</td><td>0.0</td><td>2426.9</td><td>6256</td></tr><tr><td>15 min Winter</td><td>124.633</td><td>0.0</td><td>418.9</td><td>25</td></tr><tr><td>30 min Winter</td><td>83.789</td><td>0.0</td><td>459.1</td><td>40</td></tr><tr><td>60 min Winter</td><td>53.779</td><td>0.0</td><td>772.6</td><td>68</td></tr></table>							Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status	15 min Summer	5.428	0.428	5.7	407.8	O K	30 min Summer	5.554	0.554	5.7	547.3	O K	60 min Summer	5.681	0.681	5.7	698.1	O K	120 min Summer	5.805	0.805	5.7	853.3	O K	180 min Summer	5.871	0.871	5.7	940.3	O K	240 min Summer	5.912	0.912	5.7	996.5	Flood Risk	360 min Summer	5.966	0.966	5.9	1070.5	Flood Risk	480 min Summer	6.000	1.000	6.0	1118.5	Flood Risk	600 min Summer	6.022	1.022	6.0	1150.6	Flood Risk	720 min Summer	6.037	1.037	6.1	1172.0	Flood Risk	960 min Summer	6.053	1.053	6.1	1194.4	Flood Risk	1440 min Summer	6.052	1.052	6.1	1193.2	Flood Risk	2160 min Summer	6.029	1.029	6.0	1160.8	Flood Risk	2880 min Summer	6.004	1.004	6.0	1124.5	Flood Risk	4320 min Summer	5.952	0.952	5.8	1051.7	Flood Risk	5760 min Summer	5.901	0.901	5.7	981.2	Flood Risk	7200 min Summer	5.851	0.851	5.7	914.2	O K	8640 min Summer	5.803	0.803	5.7	851.3	O K	10080 min Summer	5.756	0.756	5.7	791.0	O K	15 min Winter	5.474	0.474	5.7	457.4	O K	30 min Winter	5.611	0.611	5.7	614.2	O K	60 min Winter	5.750	0.750	5.7	783.5	O K	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	15 min Summer	124.633	0.0	379.6	25	30 min Summer	83.789	0.0	464.5	40	60 min Summer	53.779	0.0	694.3	68	120 min Summer	33.337	0.0	843.4	128	180 min Summer	24.832	0.0	899.6	188	240 min Summer	20.006	0.0	903.9	246	360 min Summer	14.706	0.0	900.7	366	480 min Summer	11.818	0.0	898.6	486	600 min Summer	9.966	0.0	897.8	604	720 min Summer	8.665	0.0	897.7	724	960 min Summer	6.943	0.0	900.9	962	1440 min Summer	5.071	0.0	904.1	1430	2160 min Summer	3.696	0.0	1726.2	1756	2880 min Summer	2.949	0.0	1744.6	2136	4320 min Summer	2.142	0.0	1611.0	2944	5760 min Summer	1.705	0.0	2168.5	3800	7200 min Summer	1.427	0.0	2268.0	4616	8640 min Summer	1.235	0.0	2353.7	5448	10080 min Summer	1.093	0.0	2426.9	6256	15 min Winter	124.633	0.0	418.9	25	30 min Winter	83.789	0.0	459.1	40	60 min Winter	53.779	0.0	772.6	68
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status																																																																																																																																																																																																																																																														
15 min Summer	5.428	0.428	5.7	407.8	O K																																																																																																																																																																																																																																																														
30 min Summer	5.554	0.554	5.7	547.3	O K																																																																																																																																																																																																																																																														
60 min Summer	5.681	0.681	5.7	698.1	O K																																																																																																																																																																																																																																																														
120 min Summer	5.805	0.805	5.7	853.3	O K																																																																																																																																																																																																																																																														
180 min Summer	5.871	0.871	5.7	940.3	O K																																																																																																																																																																																																																																																														
240 min Summer	5.912	0.912	5.7	996.5	Flood Risk																																																																																																																																																																																																																																																														
360 min Summer	5.966	0.966	5.9	1070.5	Flood Risk																																																																																																																																																																																																																																																														
480 min Summer	6.000	1.000	6.0	1118.5	Flood Risk																																																																																																																																																																																																																																																														
600 min Summer	6.022	1.022	6.0	1150.6	Flood Risk																																																																																																																																																																																																																																																														
720 min Summer	6.037	1.037	6.1	1172.0	Flood Risk																																																																																																																																																																																																																																																														
960 min Summer	6.053	1.053	6.1	1194.4	Flood Risk																																																																																																																																																																																																																																																														
1440 min Summer	6.052	1.052	6.1	1193.2	Flood Risk																																																																																																																																																																																																																																																														
2160 min Summer	6.029	1.029	6.0	1160.8	Flood Risk																																																																																																																																																																																																																																																														
2880 min Summer	6.004	1.004	6.0	1124.5	Flood Risk																																																																																																																																																																																																																																																														
4320 min Summer	5.952	0.952	5.8	1051.7	Flood Risk																																																																																																																																																																																																																																																														
5760 min Summer	5.901	0.901	5.7	981.2	Flood Risk																																																																																																																																																																																																																																																														
7200 min Summer	5.851	0.851	5.7	914.2	O K																																																																																																																																																																																																																																																														
8640 min Summer	5.803	0.803	5.7	851.3	O K																																																																																																																																																																																																																																																														
10080 min Summer	5.756	0.756	5.7	791.0	O K																																																																																																																																																																																																																																																														
15 min Winter	5.474	0.474	5.7	457.4	O K																																																																																																																																																																																																																																																														
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60 min Winter	5.750	0.750	5.7	783.5	O K																																																																																																																																																																																																																																																														
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)																																																																																																																																																																																																																																																															
15 min Summer	124.633	0.0	379.6	25																																																																																																																																																																																																																																																															
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60 min Summer	53.779	0.0	694.3	68																																																																																																																																																																																																																																																															
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240 min Summer	20.006	0.0	903.9	246																																																																																																																																																																																																																																																															
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480 min Summer	11.818	0.0	898.6	486																																																																																																																																																																																																																																																															
600 min Summer	9.966	0.0	897.8	604																																																																																																																																																																																																																																																															
720 min Summer	8.665	0.0	897.7	724																																																																																																																																																																																																																																																															
960 min Summer	6.943	0.0	900.9	962																																																																																																																																																																																																																																																															
1440 min Summer	5.071	0.0	904.1	1430																																																																																																																																																																																																																																																															
2160 min Summer	3.696	0.0	1726.2	1756																																																																																																																																																																																																																																																															
2880 min Summer	2.949	0.0	1744.6	2136																																																																																																																																																																																																																																																															
4320 min Summer	2.142	0.0	1611.0	2944																																																																																																																																																																																																																																																															
5760 min Summer	1.705	0.0	2168.5	3800																																																																																																																																																																																																																																																															
7200 min Summer	1.427	0.0	2268.0	4616																																																																																																																																																																																																																																																															
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Date January 2017		Designed by CSB	
File Basin 2.srcx		Checked by DW	
XP Solutions		Source Control 2015.1	

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
120 min Winter	5.885	0.885	5.7	958.9	O K
180 min Winter	5.957	0.957	5.8	1058.1	Flood Risk
240 min Winter	6.003	1.003	6.0	1122.9	Flood Risk
360 min Winter	6.063	1.063	6.1	1209.6	Flood Risk
480 min Winter	6.102	1.102	6.2	1267.2	Flood Risk
600 min Winter	6.129	1.129	6.3	1307.0	Flood Risk
720 min Winter	6.147	1.147	6.3	1334.9	Flood Risk
960 min Winter	6.169	1.169	6.4	1368.0	Flood Risk
1440 min Winter	6.179	1.179	6.4	1383.1	Flood Risk
2160 min Winter	6.155	1.155	6.4	1347.7	Flood Risk
2880 min Winter	6.125	1.125	6.3	1301.6	Flood Risk
4320 min Winter	6.059	1.059	6.1	1203.1	Flood Risk
5760 min Winter	5.987	0.987	5.9	1100.1	Flood Risk
7200 min Winter	5.914	0.914	5.7	999.4	Flood Risk
8640 min Winter	5.844	0.844	5.7	904.4	O K
10080 min Winter	5.774	0.774	5.7	813.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
120 min Winter	33.337	0.0	903.4	126
180 min Winter	24.832	0.0	910.4	184
240 min Winter	20.006	0.0	910.5	244
360 min Winter	14.706	0.0	913.4	360
480 min Winter	11.818	0.0	918.8	478
600 min Winter	9.966	0.0	926.4	594
720 min Winter	8.665	0.0	936.1	710
960 min Winter	6.943	0.0	948.0	938
1440 min Winter	5.071	0.0	948.4	1386
2160 min Winter	3.696	0.0	1839.7	1996
2880 min Winter	2.949	0.0	1796.8	2252
4320 min Winter	2.142	0.0	1700.2	3196
5760 min Winter	1.705	0.0	2428.6	4096
7200 min Winter	1.427	0.0	2539.7	4976
8640 min Winter	1.235	0.0	2634.7	5880
10080 min Winter	1.093	0.0	2713.6	6752

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Model Details

Storage is Online Cover Level (m) 6.200

Tank or Pond Structure

Invert Level (m) 5.000

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	840.5	1.200	1556.5

Hydro-Brake Optimum® Outflow Control

Unit Reference	MD-SHE-0113-5700-0900-5700
Design Head (m)	0.900
Design Flow (l/s)	5.7
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Diameter (mm)	113
Invert Level (m)	5.000
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.900	5.7
Flush-Flo™	0.266	5.7
Kick-Flo®	0.590	4.7
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	4.0	1.200	6.5	3.000	10.0	7.000	14.9
0.200	5.6	1.400	7.0	3.500	10.7	7.500	15.4
0.300	5.6	1.600	7.4	4.000	11.4	8.000	15.9
0.400	5.5	1.800	7.8	4.500	12.1	8.500	16.4
0.500	5.3	2.000	8.2	5.000	12.7	9.000	16.8
0.600	4.7	2.200	8.6	5.500	13.3	9.500	17.3
0.800	5.4	2.400	9.0	6.000	13.9		
1.000	6.0	2.600	9.3	6.500	14.4		

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Date January 2017 File Basin 3.srcx		Designed by CSB Checked by DW			
XP Solutions		Source Control 2015.1			
Summary of Results for 100 year Return Period (+40%)					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	4.319	0.419	9.4	686.5	O K
30 min Summer	4.420	0.520	9.4	921.5	O K
60 min Summer	4.517	0.617	9.4	1174.6	O K
120 min Summer	4.606	0.706	9.5	1435.1	Flood Risk
180 min Summer	4.652	0.752	9.8	1580.9	Flood Risk
240 min Summer	4.681	0.781	9.9	1675.1	Flood Risk
360 min Summer	4.718	0.818	10.2	1798.7	Flood Risk
480 min Summer	4.740	0.840	10.3	1878.8	Flood Risk
600 min Summer	4.755	0.855	10.4	1931.9	Flood Risk
720 min Summer	4.765	0.865	10.4	1967.2	Flood Risk
960 min Summer	4.775	0.875	10.5	2003.4	Flood Risk
1440 min Summer	4.774	0.874	10.5	1998.4	Flood Risk
2160 min Summer	4.759	0.859	10.4	1944.0	Flood Risk
2880 min Summer	4.741	0.841	10.3	1882.3	Flood Risk
4320 min Summer	4.706	0.806	10.1	1757.8	Flood Risk
5760 min Summer	4.669	0.769	9.9	1636.8	Flood Risk
7200 min Summer	4.634	0.734	9.7	1521.4	Flood Risk
8640 min Summer	4.599	0.699	9.4	1413.7	O K
10080 min Summer	4.565	0.665	9.4	1311.9	O K
15 min Winter	4.357	0.457	9.4	770.1	O K
30 min Winter	4.464	0.564	9.4	1033.6	O K
60 min Winter	4.567	0.667	9.4	1318.1	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
15 min Summer	124.633	0.0	636.4	26	
30 min Summer	83.789	0.0	771.5	40	
60 min Summer	53.779	0.0	1167.9	68	
120 min Summer	33.337	0.0	1421.7	128	
180 min Summer	24.832	0.0	1530.7	188	
240 min Summer	20.006	0.0	1549.8	246	
360 min Summer	14.706	0.0	1550.3	366	
480 min Summer	11.818	0.0	1551.6	484	
600 min Summer	9.966	0.0	1553.7	604	
720 min Summer	8.665	0.0	1556.3	724	
960 min Summer	6.943	0.0	1564.7	962	
1440 min Summer	5.071	0.0	1560.9	1402	
2160 min Summer	3.696	0.0	2913.2	1736	
2880 min Summer	2.949	0.0	2985.0	2112	
4320 min Summer	2.142	0.0	2771.7	2940	
5760 min Summer	1.705	0.0	3650.4	3752	
7200 min Summer	1.427	0.0	3817.9	4608	
8640 min Summer	1.235	0.0	3962.3	5376	
10080 min Summer	1.093	0.0	4085.7	6248	
15 min Winter	124.633	0.0	701.2	26	
30 min Winter	83.789	0.0	764.8	40	
60 min Winter	53.779	0.0	1300.4	68	
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		Basin 3 Hook Lane, Pagham +40%CC, +10% Creep																																																																																																																																																																																														
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XP Solutions		Source Control 2015.1																																																																																																																																																																																														
<u>Summary of Results for 100 year Return Period (+40%)</u> <table><tr><th>Storm Event</th><th>Max Level (m)</th><th>Max Depth (m)</th><th>Max Control (l/s)</th><th>Max Volume (m³)</th><th>Status</th></tr><tr><td>120 min Winter</td><td>4.662</td><td>0.762</td><td>9.8</td><td>1612.9</td><td>Flood Risk</td></tr><tr><td>180 min Winter</td><td>4.712</td><td>0.812</td><td>10.1</td><td>1779.6</td><td>Flood Risk</td></tr><tr><td>240 min Winter</td><td>4.743</td><td>0.843</td><td>10.3</td><td>1888.1</td><td>Flood Risk</td></tr><tr><td>360 min Winter</td><td>4.783</td><td>0.883</td><td>10.5</td><td>2033.3</td><td>Flood Risk</td></tr><tr><td>480 min Winter</td><td>4.809</td><td>0.909</td><td>10.7</td><td>2129.7</td><td>Flood Risk</td></tr><tr><td>600 min Winter</td><td>4.826</td><td>0.926</td><td>10.8</td><td>2196.0</td><td>Flood Risk</td></tr><tr><td>720 min Winter</td><td>4.838</td><td>0.938</td><td>10.8</td><td>2242.4</td><td>Flood Risk</td></tr><tr><td>960 min Winter</td><td>4.852</td><td>0.952</td><td>10.9</td><td>2297.0</td><td>Flood Risk</td></tr><tr><td>1440 min Winter</td><td>4.858</td><td>0.958</td><td>11.0</td><td>2320.3</td><td>Flood Risk</td></tr><tr><td>2160 min Winter</td><td>4.842</td><td>0.942</td><td>10.9</td><td>2257.5</td><td>Flood Risk</td></tr><tr><td>2880 min Winter</td><td>4.822</td><td>0.922</td><td>10.8</td><td>2179.7</td><td>Flood Risk</td></tr><tr><td>4320 min Winter</td><td>4.777</td><td>0.877</td><td>10.5</td><td>2009.4</td><td>Flood Risk</td></tr><tr><td>5760 min Winter</td><td>4.727</td><td>0.827</td><td>10.2</td><td>1831.8</td><td>Flood Risk</td></tr><tr><td>7200 min Winter</td><td>4.676</td><td>0.776</td><td>9.9</td><td>1658.8</td><td>Flood Risk</td></tr><tr><td>8640 min Winter</td><td>4.626</td><td>0.726</td><td>9.6</td><td>1496.7</td><td>Flood Risk</td></tr><tr><td>10080 min Winter</td><td>4.576</td><td>0.676</td><td>9.4</td><td>1343.8</td><td>O K</td></tr></table> <table><tr><th>Storm Event</th><th>Rain 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Winter	1.427	0.0	4275.5	4968	8640 min Winter	1.235	0.0	4435.9	5800	10080 min Winter	1.093	0.0	4570.1	6664
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WSP Group Ltd		Page 3
.	Basin 3	
.	Hook Lane, Pagham	
.	+40%CC, +10% Creep	
Date January 2017	Designed by CSB	
File Basin 3.srcx	Checked by DW	
XP Solutions	Source Control 2015.1	

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)	19.000	Shortest Storm (mins)	15
Ratio R	0.350	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 2.981

Time (mins)	Area	Time (mins)	Area	Time (mins)	Area
From: To:	(ha)	From: To:	(ha)	From: To:	(ha)
0 4	1.355	4 8	1.355	8 12	0.271

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WSP Group Ltd		Page 4
.	Basin 3	
.	Hook Lane, Pagham	
.	+40%CC, +10% Creep	
Date January 2017	Designed by CSB	
File Basin 3.srcx	Checked by DW	
XP Solutions	Source Control 2015.1	

Model Details

Storage is Online Cover Level (m) 4.900

Tank or Pond Structure

Invert Level (m) 3.900

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	1151.6	1.000	4136.7

Hydro-Brake Optimum® Outflow Control

Unit Reference	MD-SHE-0146-9500-0700-9500
Design Head (m)	0.700
Design Flow (l/s)	9.5
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Diameter (mm)	146
Invert Level (m)	3.900
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.700	9.4
Flush-Flo™	0.241	9.4
Kick-Flo®	0.510	8.2
Mean Flow over Head Range	-	7.9

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	5.3	1.200	12.2	3.000	18.8	7.000	28.3
0.200	9.4	1.400	13.1	3.500	20.3	7.500	29.2
0.300	9.4	1.600	14.0	4.000	21.6	8.000	30.1
0.400	9.1	1.800	14.8	4.500	22.9	8.500	31.1
0.500	8.3	2.000	15.5	5.000	24.1	9.000	32.0
0.600	8.8	2.200	16.2	5.500	25.2	9.500	32.9
0.800	10.1	2.400	16.9	6.000	26.3		
1.000	11.2	2.600	17.6	6.500	27.3		

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Appendix C

CORRESPONDENCE

Brammeier, Chris

From: [REDACTED]
Sent: 04 September 2015 12:51
To: Brammeier, Chris
Subject: FW: Land at Pagham, Bognor Regis - Flood risk consultation
Attachments: SefterRdDrainage.pdf; Drainage - Supplementary Guidance Notes.pdf

Categories: Rose Green - Pagham

Dear Mr Brammeier

Thank you for your email. Please see the response below from the Council's engineers department.

Yours sincerely

Nicola Spencer

From: Thomas Callaway
Sent: 04 September 2015 10:32
To: Nicola Spencer
Subject: RE: Land at Pagham, Bognor Regis - Flood risk consultation

Please forward on the following comments:

1. We have a record of Sefter Cottage flooding during the June 2012 flooding event, and additionally it would be prudent to check the SFRA from 2008 (<http://www.arun.gov.uk/planning-policy-flood-risk>) and the report on flooding in June 2012 (http://www2.westsussex.gov.uk/osd/flood/final_report.pdf).
2. The EA surface water flood maps suggest that surface water may pond for the 1 in 30 year event opposite Farm Gate Cottage, and a land drain has been installed in this location. Other areas close to the boundaries and ditches show up for the 1 in 100 and 1 in 1000 year events.
3. Groundwater monitoring will be required over the winter period across the site before drainage can be approved and development can commence. The levels encountered will determine whether soakaways can be utilised.
4. Any discharge of surface water to a watercourse should have passed through some form of source control, especially if the runoff is from roads and parking areas. Runoff should also be restricted to greenfield runoff rate, but discharge to a watercourse should only be investigated if soakaways are found not to be suitable.
5. The surface water drainage system should prioritise infiltration, and winter groundwater monitoring and percolation testing is necessary to inform the design. Restricted discharge to a watercourse may be investigated if this is not suitable. The system should store the 1 in 100 year storm event plus 30% without causing flooding.
6. The LPA is unlikely to adopt SuDS features.

Please find further guidance and an extract of our mapped land drainage records attached.

In addition to this, it should be noted that all ditches, land drains and watercourses require a three metre easement for access and maintenance. A SuDS maintenance manual should also be provided following SuDS Manual guidance, and it would be best to incorporate ditch maintenance within this document also.

Regards

Tom Callaway

From: Brammeier, Chris
Sent: 24 August 2015
To: Planning
Cc: Ward, Dean
Subject: Land at Pagham, Bognor Regis - Flood risk consultation

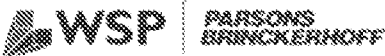
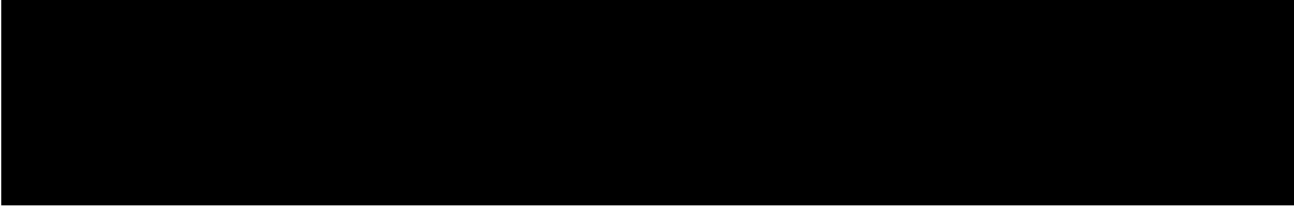
Dear Sir / Madam

We are investigating if there are any flood risk issues at a site in Pagham, with approximate NGR 489600, 099220. Please find attached a plan indicating the location of the site for clarity.

In your role as Local Planning Authority I would be very grateful for your attention to the questions below, and in addition would welcome comments on any additional issues or concerns you may have involving this site.

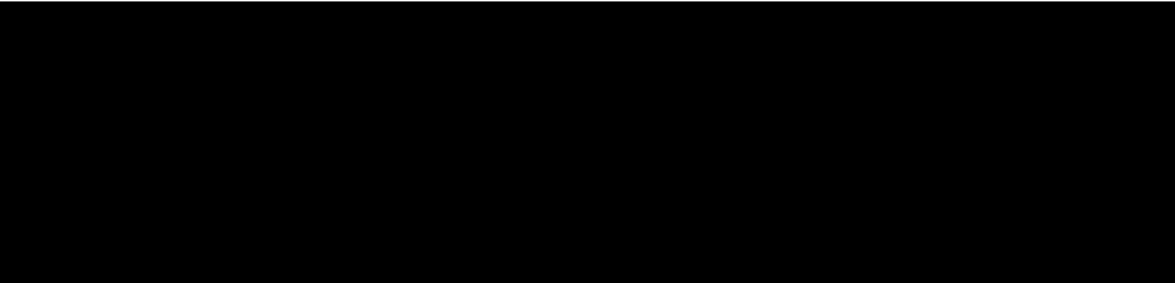
- Any known historical flooding at the site. Any known information on the mechanism of flooding (including any studies undertaken) for the area would also be appreciated;
- Any issues related to surface water flooding (including past flooding linked to drainage systems) within the area? We have also contacted the LLFA and EA for their records;
- Any information in your possession on groundwater (e.g. groundwater level) and the potential for groundwater flooding within the area, if the site is located within a source protection zone and whether infiltration would be an appropriate means of disposing of surface water. SuDS.
- Any water quality issues/requirements for the tributary on site or downstream that we need to take into account?
- Any surface water or SuDS design criteria that we need to take into consideration
- In light of the non-implementation of Schedule 3 of the Flood and Water Management Act, will SuDS be eligible for adoption by the LPA or will maintenance of such devices need to be sought elsewhere i.e. by a third party management and maintenance company?

We would appreciate an early response, therefore if you require any further information regarding the site to assist with our queries, please do not hesitate to contact me



Christopher Brammeier
Graduate Engineer

Unit 9, The Chase, John Tate Road,
Foxholes Business Park, Hertford SG13 7NN



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Brammeier, Chris

From: SSD Enquiries <[REDACTED]>
Sent: 20 October 2015 16:44
To: Brammeier, Chris
Subject: FW: 151020 4 SSD/7262 Land at Pagham, Bognor Regis - Flood risk consultation
Attachments: SK-001A.PDF

Categories: Rose Green - Pagham

Dear Chris

Please accept our apologies for the delay in updating you with the available data for the specified site.

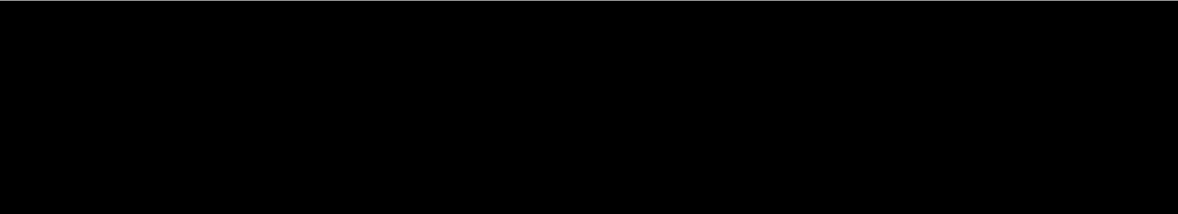
We can advise you that the majority of the site is outside the flood zone and is not covered by detailed modeling. The area nearby is covered by national generalized modeling which is only suitable for Flood Zone extent visualization not levels or depths data. **IMPORTANT** JFLOW data is not fit for Flood Risk Assessments.

We will put your request on hold unless you contact us again.

We are committed to providing a professional customer service. Please help us understand more about what is important to you by completing our [two minute survey](#)

Kind regards

Customer s & Engagement Team
Sol ent and Sout h Downs



From: SSD Enquiries
Sent: 04 September 2015 15:24
To: [REDACTED]
Subject: 150904 SSD/7262 Land at Pagham, Bognor Regis - Flood risk consultation

Dear Chris

Thank you for your enquiry. Please accept our apologies for the delay in providing you with an update. We are waiting for clarification regarding the availability of the data and will contact you again in due course to advise the relevant charges.

In the meantime we have marked your enquiry below with guidance where you are able to freely access some of the information.

For your information the ngr provided is incorrect.

If you have further queries please do not hesitate to contact this office.

Kind regards
Cherry

From: Brammeier, Chris
Sent: 24 August 2015
To: Planning Liaison, South Downs
Cc: Ward, Dean
Subject: Land at Pagham, Bognor Regis - Flood risk consultation

Dear Sir / Madam

We are investigating if there are any flood risk issues at a site in Pagham, with approximate NGR 489600, 099220. Please find attached a plan indicating the location of the site for clarity.

We would like to request the information below and in addition would welcome comments on any additional issues or concerns you may have involving this site.

- A Product 4 request centred on the site The site is in flood zone one, therefore limited data will be available
- Any records of flooding for the site or local area We will check however it is unlikely we have any records
- Confirmation on current flood zone classification. <http://maps.environment-agency.gov.uk/wiyby/wiybyController?ep=mantopics&lang=e>
- Any known historical flooding at the site? Any known information on the mechanism of flooding for the area would also be appreciated (including corresponding return periods for flood events and studies undertaken). Limited information will be available

- Details of any flood alleviation schemes in the area and estimated standard of protection. <http://maps.environment-agency.gov.uk/wiyby/wiybyController?x=357683&y=355134&scale=1&layerGroups=default&ep=map&textonly=off&lang=en&topic=fcrmschemes>
- Any information in your possession on groundwater (e.g. groundwater levels) and the potential for groundwater flooding within the area, if the site is located within a source protection zone and weather infiltration would be an appropriate means of disposing of surface water. <https://www.gov.uk/government/statistics/sussex-groundwater-situation>; <http://maps.environment-agency.gov.uk/wiyby/wiybyController?ep=maptopics&lang=en> ;
- Any issues related to surface water flooding in the area (including past flooding linked to drainage systems) within the area? We have also contacted the LLFA for information. Contact the Local Council
- Any water quality issues/requirements for discharging surface water off-site that we need to take into account we would suggest you visit the following link for further information on Water Quality <http://environment.data.gov.uk/catchment-planning/OperationalCatchment/chichester-chalk>
- Details of any EA apparatus within the site boundary. We are not aware of any apparatus in the vicinity however we have groundwater monitoring sites to the North West of the site boundary
- Any site specific surface water plans Contact the Local Council
- Confirmation on the latest SFRA for the area or any proposed SFRA soon due for publication. Contact the Local Council
- Any surface water or SuDS design criteria that we need to take into consideration <https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion>
- In light of the non-implementation of Schedule 3 of the Flood and Water Management Act, will SuDS be eligible for adoption by the Environment Agency or will maintenance of such devices need to be sought elsewhere i.e. by a third party management and maintenance company? We would suggest you submit a pre planning application via <https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion>

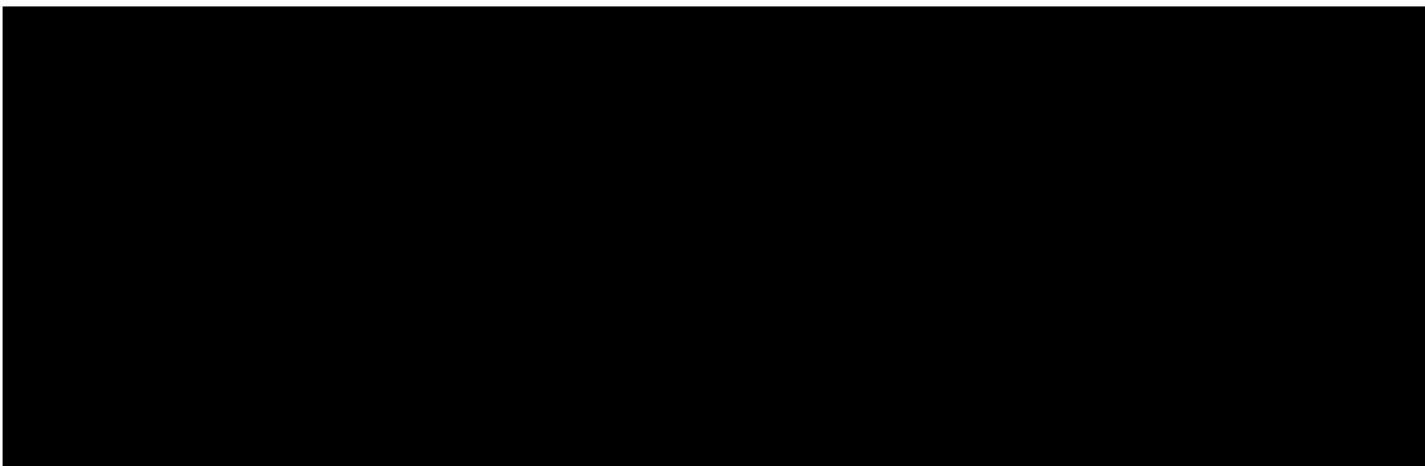
We would appreciate an early response, therefore if you require any further information regarding the site to assist with our queries, please do not hesitate to contact me on 01992 526026 or chris.brammeier@wspgroup.com.

Many Thanks,
Chris

Advanced Notice of Annual Leave: 10th – 26th October

 **WSP** | **PARSONS
BRINCKERHOFF**
Christopher Brammeier
Graduate Engineer

Unit 9, The Chase, John Tate Road,
Foxholes Business Park, Hertford SG13 7NN



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Brammeier, Chris

From: Developer Services [REDACTED]
Sent: 24 August 2015 12:27
To: Brammeier, Chris
Subject: RE: Land at Pagham, Bognor Regis - Flood risk consultation

Categories: Rose Green - Pagham

Dear Mr Brammeier,

Thank you for your email below.

In response to your queries, please see below.

1. Unfortunately, we do not hold any flood risk data for this area. You may be able to obtain further information from the Environmental Agency.
2. All surface water sewers should be designed in accordance with Sewers for Adoption and should make sure that no groundwater or land drainage is communicated with the public system.
3. Southern water will not adopt a SUDS system.

Yours sincerely,

Paul Jones, Councillor

From: Brammeier, Chris [REDACTED]
Sent: 24 August 2015 11:24
To: Developer Services
Subject: Land at Pagham, Bognor Regis - Flood risk consultation

Dear Sir / Madam

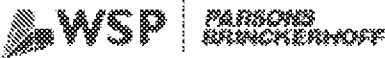
We are investigating if there are any flood risk issues at a site in Pagham, with approximate NGR 489600, 099220. Please find attached a plan indicating the location of the site for clarity.

In your role as Sewage Undertaker I would be very grateful for your attention to the questions below, and in addition would welcome comments on any additional issues or concerns you may have involving this site.

1. • Are you aware of any flooding incidents from surface water or foul water sewers that may have affected the above site in the past?
2. • Any surface water or SuDS design criteria that we need to take into consideration
3. • In light of the non-implementation of Schedule 3 of the Flood and Water Management Act, will SuDS be eligible for adoption by the Southern Water or will maintenance of such devices need to be sought elsewhere i.e. by a third party management and maintenance company?

We would appreciate an early response, therefore if you require any further information regarding the site to assist with our queries, please do not hesitate to contact me

Advanced Notice of Annual Leave: 10th – 26th October



Christopher Brammeier
Graduate Engineer

Unit 9, The Chase, John Tate Road,
Foxholes Business Park, Hertford SG13 7NN

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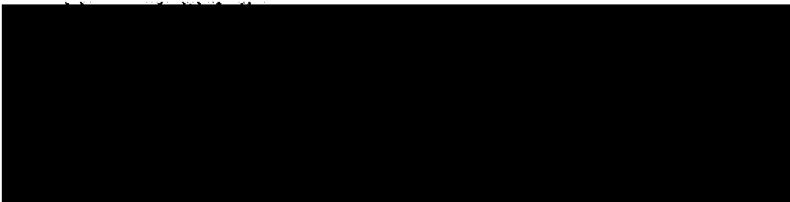
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Developer Services
Southern Water
Sparrowgrove House
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Otterbourne
Hampshire
SO21 2SW

The right of refusal is limited to these criteria alone and the undertaker cannot refuse to allow the connection on the grounds that the sewerage system is inadequate to take the extra liquid that the connection will discharge into it. This is a matter that should be dealt with at the planning stage.

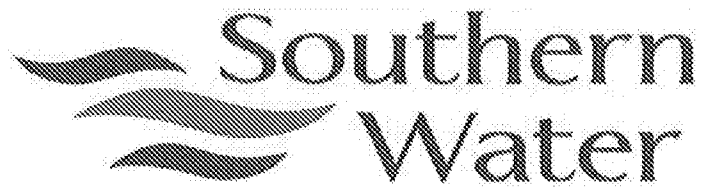


Thomas Clark

Developer Services

Please note:

The information provided above does not grant approval for any designs/drawings submitted for the capacity analysis. The results quoted above are only valid for 12 months from the date of issue of this letter.



INFRASTRUCTURE ASSESSMENT FOR
FOUL DRAINAGE AT
ROSE GREEN
HOOK LANE
PAGHAM
PO21 3PD

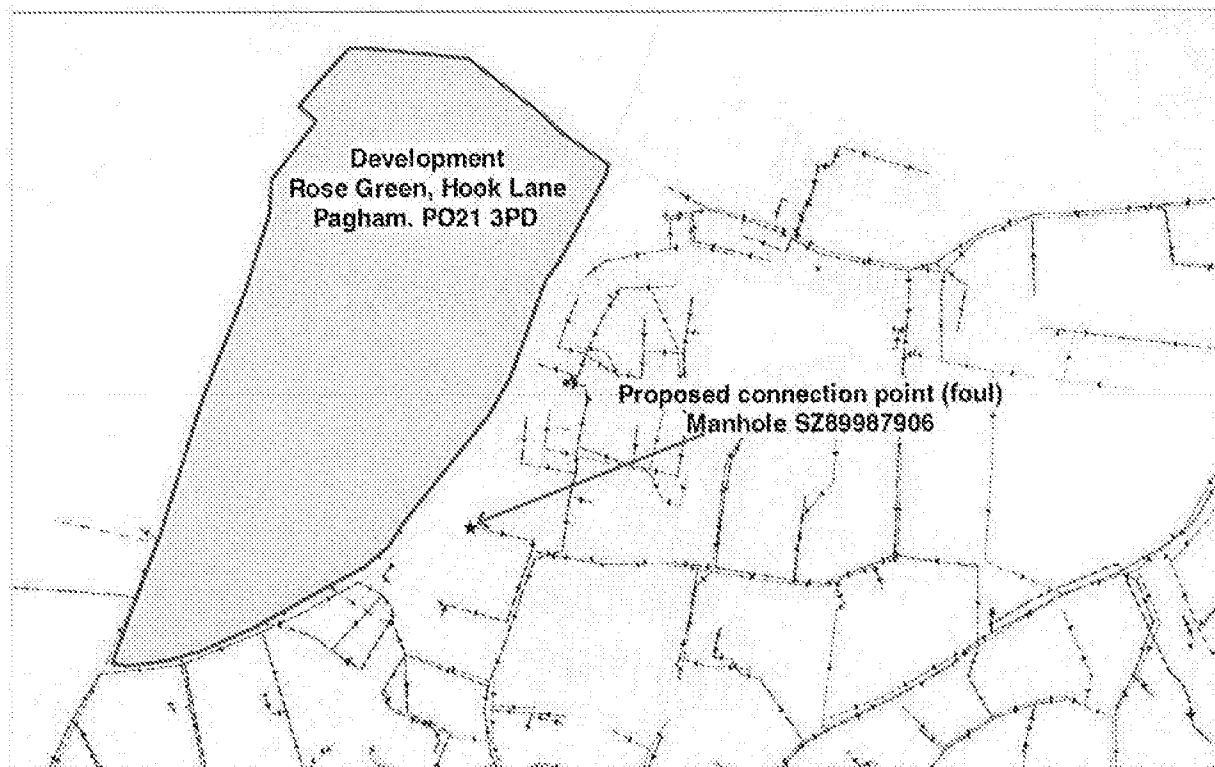
16 February 2016

REQUESTED:
WSP PARSONS BRINCKERHOFF

I. Development Details:

The proposal is to discharge foul flow from the development to the local foul sewerage systems at manhole reference SZ89987906 which is located on Drift Road.

Figure 1 - Proposed Development



II. Results and Conclusions:

Foul Water:

There is currently insufficient capacity within the local foul sewerage network to accommodate the additional flow at the proposed manhole SZ89987906. The additional flows significantly increase downstream surcharge and increase flooding so enhancements to the downstream system are required and detailed in Figure 2 and table 1.

7906 IL -A 4.53
-B 4.54 -X 4.51

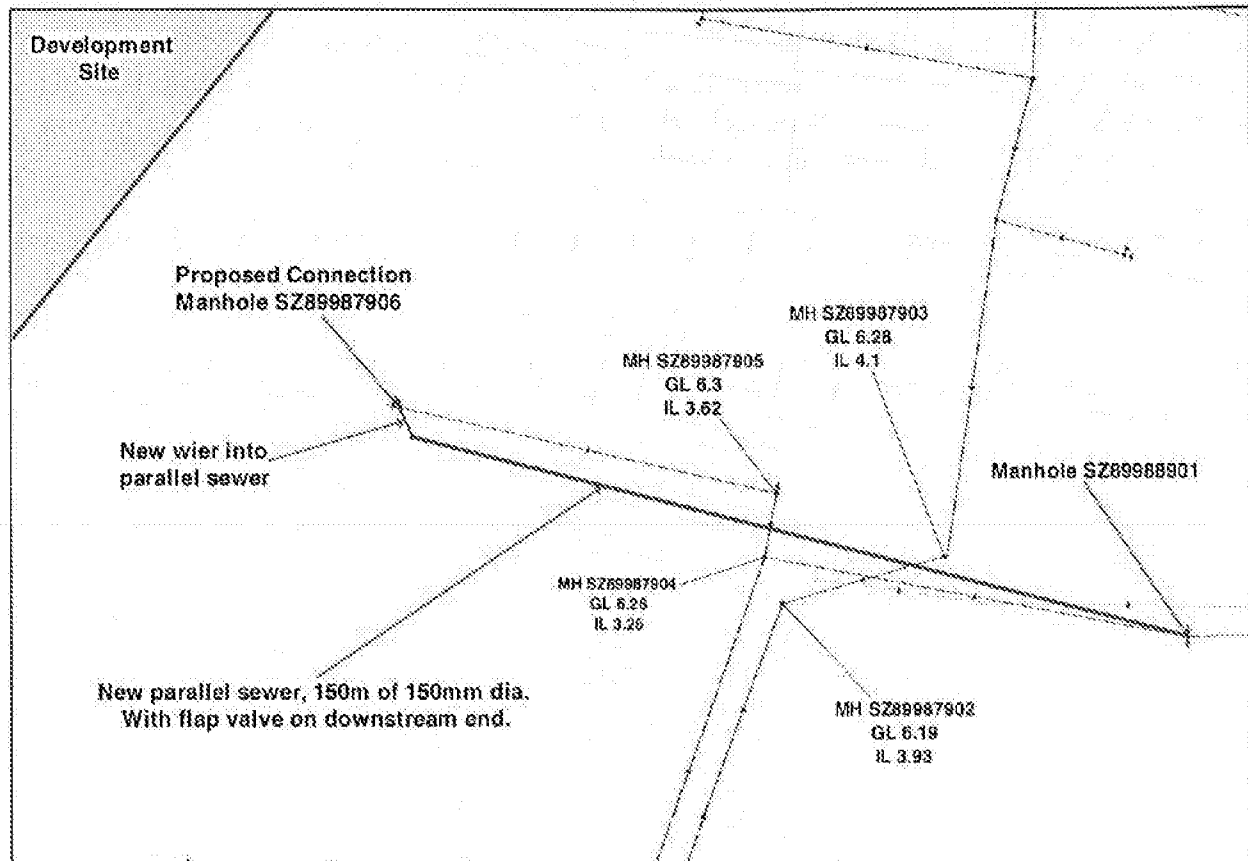


Figure 2- Proposed Improvements

Table 1 - Proposed Improvements Schedule

U/S Manhole	D/S Manhole	Sewer Diameter (mm)		Avg. Depth (m)	Length (m)
		Existing	Proposed		
SZ89987906*	SZ89988901**	-	150	~2.2	150

*Wier from SZ89987906 into the head of the proposed sewer. **Flap valve at base of the proposed sewer

The nearest point of the network where capacity is currently available for the foul water flow is at West Park Bognor Regis WPS, located approximately 2.5 km east of the proposed development site.

Section 98 of the Water Industry Act 1991 provides a legal mechanism through which the appropriate infrastructure can be requested (by the developer) and provided to drain a specific location.

Surface Water:

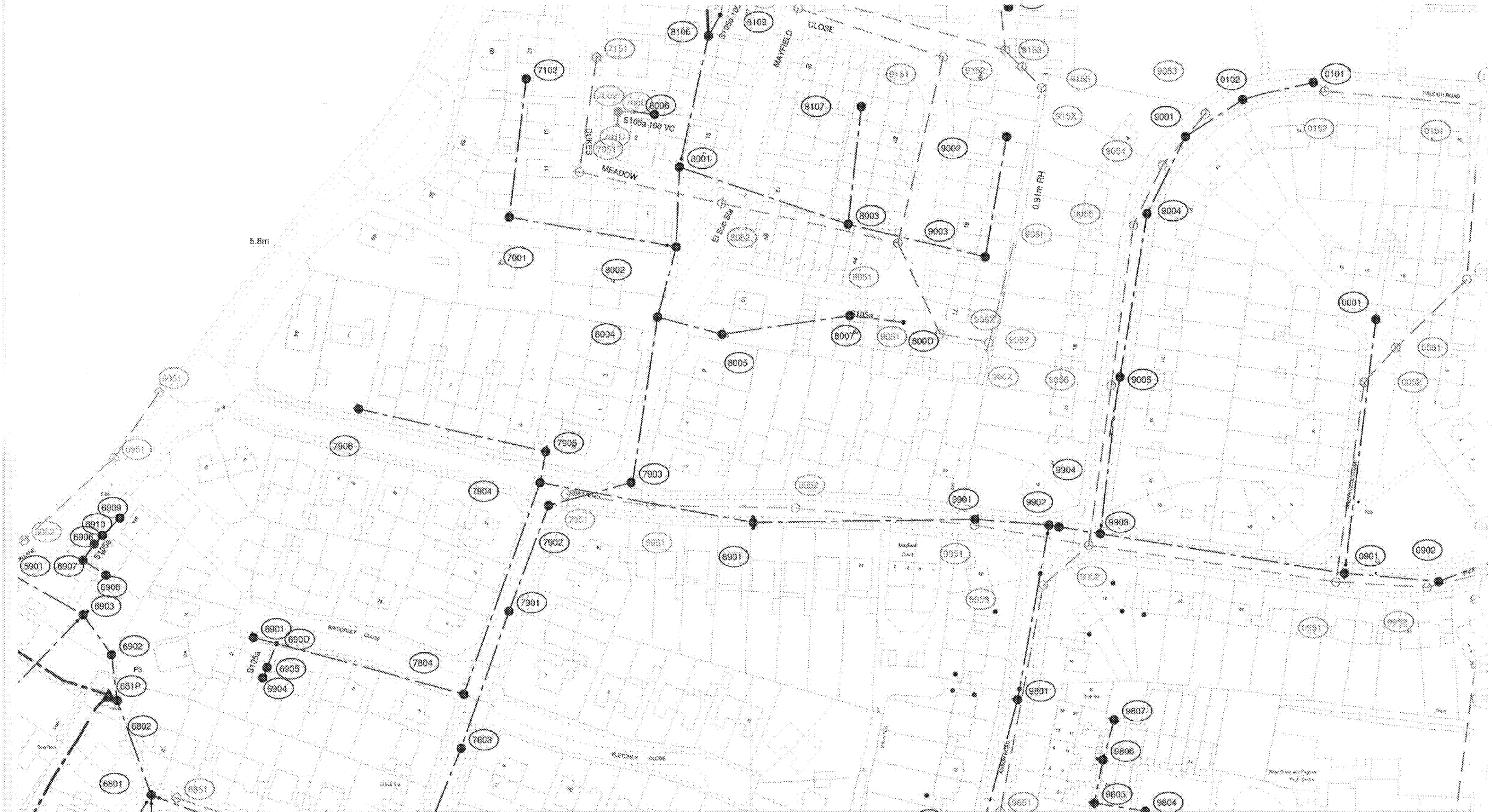
There is currently adequate capacity within the local surface water sewerage network to accommodate development surface water flows at the proposed manhole SU44158053. The proposed development does not significantly increase local flow to the proposed connection manhole, thus significant additional surcharge or flooding to the existing system is not predicted to occur. Therefore no remedial work is required to accommodate the proposed development.

Before any connections are made, an application form needs to be completed and approved by Southern Water Services.

Please note: - The information provided above does not grant approval for any designs /drawings submitted for the capacity analysis. The results are an indicative hydraulic assessment and should not be used as a basis for design. The results quoted above are only valid for 12 months from the date of issue of this letter.

PUBLIC SEWER RECORD

SOUTHERN WATER



The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site.

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O.S. REF: SZ8998NE

Scale: 1:1250

Sewer Plot

WARNING: BAC pipes are constructed of Bonded Asbestos Cement
WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement



Printed By: sierrob
Southern Water MapGuide Browser
Requested By:
Sewer Record Extract

Date: 18-1-2016

Appendix D

SOUTHERN WATER RECORDS