

Appendix B

115/1
STAKEHOLDERS CORRESPONDENCE

Appendix B.1

ENVIRONMENT AGENCY



WSP

Mountbatten House

Basing View

Basingstoke

Hampshire

RG21 4HJ

Our ref: SSD90563

Date: 10/07/2018

Dear [REDACTED],

Enquiry Regarding Product 4 for Flood Risk Assessment for 94-100 Hook Lane, Bognor Regis, PO22 8AT.

Thank you for your enquiry which was received on 19 June 2018.

We respond to requests under the Freedom of Information Act 2000 and Environmental Information Regulations 2004. The information is attached.

The information on Flood Zones in the area relating to this address is as follows:

The site is in an area located within Flood Zone 3 as shown on our Flood Map for Planning (Rivers and Sea).

Note - This information relates to the area that the above named property is in and is not specific to the property itself as it is influenced by factors such as the height of door steps, air bricks or the height of surrounding walls. We do not have access to this information and is not currently used in our flood modelling.

Flood Zone definitions can be found at www.gov.uk/guidance/flood-risk-and-coastal-change#Table-1-Flood-Zones

Flood Defences

There are flood defences in the form of an embankment. The Asset ID is 149096. The upstream effective crest level is 5.64. The estimated standard of protection is 1 in 200 years (0.5% AEP). The estimated condition grade is good.

Model Information

The model used for tidal flood risk was the Ems to Littlehampton Modelling (Arun to East Head Model), which was completed in 2016 by JBA Consulting. The model used for fluvial flood risk was the Aldingbourne which was completed in 2015 by JBA Consulting.

Flood History

We hold no record of previous flooding events affecting this site.

Please note our records are not comprehensive and may not include all events. I recommend contacting the Lead Local Flood Authority, **West Sussex County**

Council or the Local Authority, **Arun District Council** for a more comprehensive flood history check.

FRA advisory text

Name	Product 4
Description	Detailed Flood Risk Assessment Map for 94 – 100 Hook Lane, Bognor Regis, PO22 8AT.
Licence	<u>Open Government Licence</u>
Information Warnings	The current climate change allowances should be checked here: https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances .
Information Warning - OS background mapping	<i>The mapping of features provided as a background in this product is © Ordnance Survey. It is provided to give context to this product. The Open Government Licence does not apply to this background mapping. You are granted a non-exclusive, royalty free, revocable licence solely to view the Licensed Data for non-commercial purposes for the period during which the Environment Agency makes it available. You are not permitted to copy, sub-license, distribute, sell or otherwise make available the Licensed Data to third parties in any form. Third party rights to enforce the terms of this licence shall be reserved to OS.</i>
Attribution	Contains Environment Agency information © Environment Agency and/or database rights. Contains Ordnance Survey data © Crown copyright 2017 Ordnance Survey 100024198.

Data Available Online

Many of our flood datasets are available online:

- Flood Map For Planning ([Flood Zone 2](#), [Flood Zone 3](#), [Flood Storage Areas](#), [Flood Defences](#), [Areas Benefiting from Defences](#))
- [Risk of Flooding from Rivers and Sea](#)
- [Historic Flood Map](#)
- [Current Flood Warnings](#)

Please get in touch if you have any further queries or contact us within two months if you'd like us to review the information we have sent.

Yours sincerely,

Leanne Prentice

FCRM Officer - PSO West Sussex

Risk of flooding from Surface Water. Centred on PO22 8AT. Created 10/7/18.



Scale 1:10,000



Likelihood of flooding from Surface Water

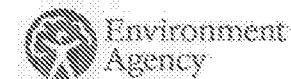
-  High ($\geq 3.3\%$)
-  Medium (3.3% - 1%)
-  Low (1% - 0.1%)
- Very Low

Likelihood of flooding from Surface Water

- High: Greater than or equal to 3.3% (1 in 30) chance in any given year
- Medium: Less than 3.3% (1 in 30) but greater than or equal to 1% (1 in 100) chance in any given year
- Low: Less than 1% (1 in 100) but greater than or equal to 0.1% (1 in 1,000) chance in any given year
- Very Low: Less than 0.1% (1 in 1,000) chance in any given year

This information is shown on the Risk of Flooding from Surface Water map on our website.

Flood Map for Planning (Rivers and Sea). Centred on PO22 8AT. Created 10/7/18.



Scale 1: 10,000



Flood Map for Planning (Rivers & Sea)

- Sealed Main Rivers
- Defences
- Flood Storage Areas
- Areas benefiting from flood defences
- Flood Zone 3
- Flood Zone 2

Flood Map Areas (assuming no defences)

Flood Zone 3 shows the area that could be affected by flooding:

- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

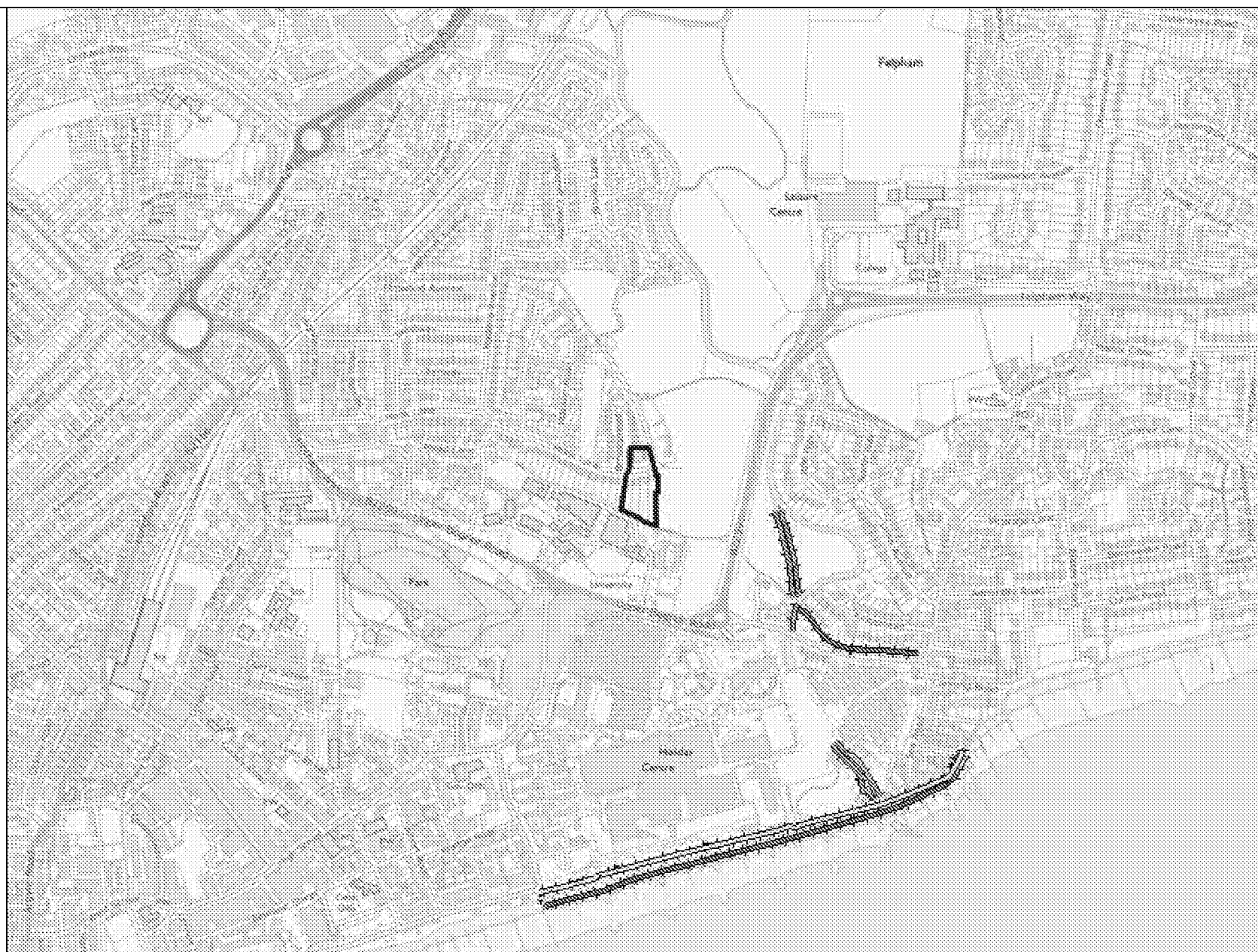
Flood Zone 2 shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

AIMS Flood Defence Map (EA Maintained). Centred on PO22 8AT. Created

Legend

Defences (EA maintained)

- Asset type not defined
- Embankment
- Wall
- Flood Gate
- Demountable Defence
- Bridge Abutment
- High Ground
- Beach
- Barrier Beach
- Promenade
- Quay
- Cliff
- Dunes



0 100 200 300
Metres

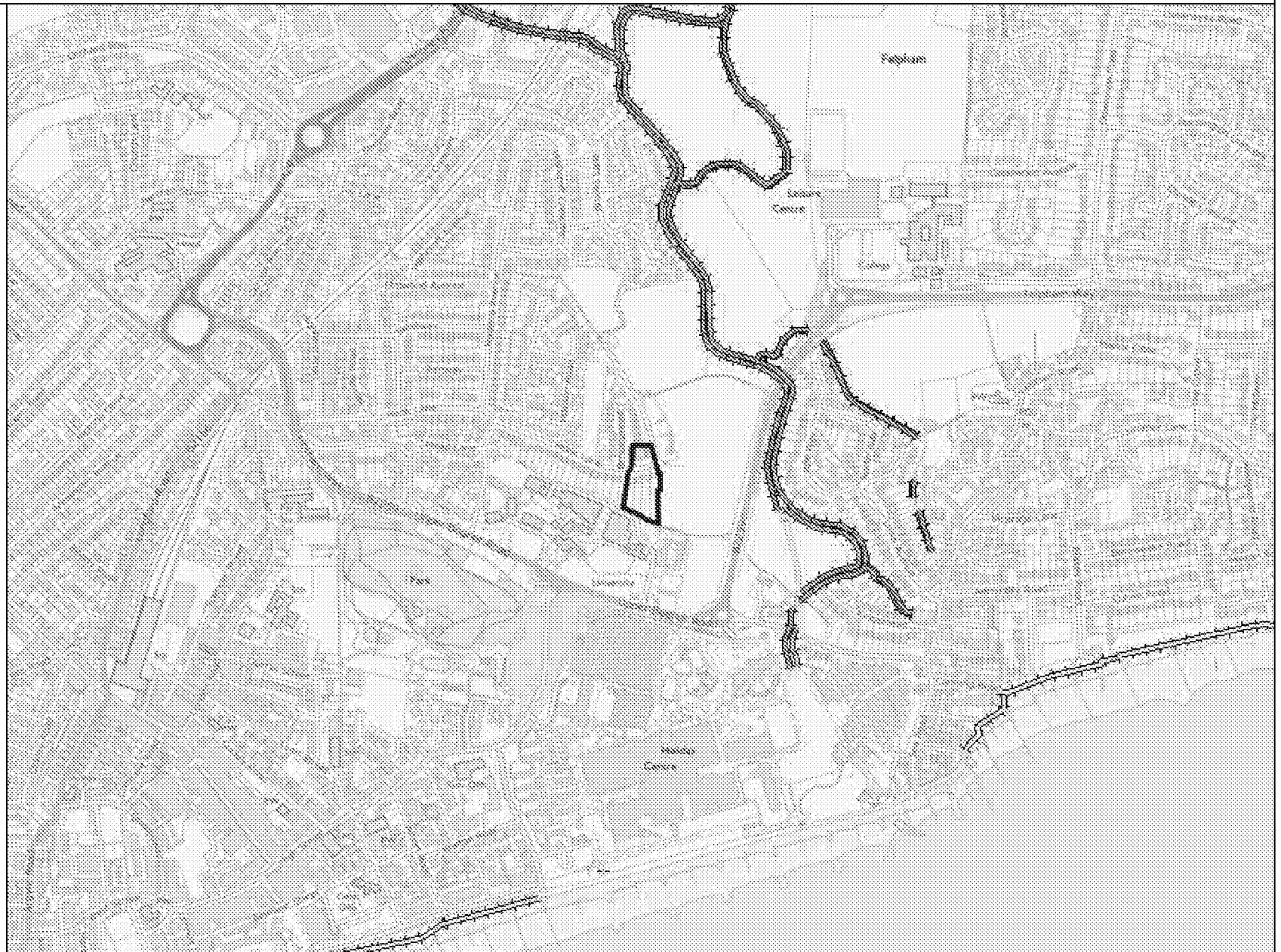


AIMS Flood Defence Map (3rd Party Maintained). Centred on PO22 8AT. Created

Legend

Defences (3rd party maintained)

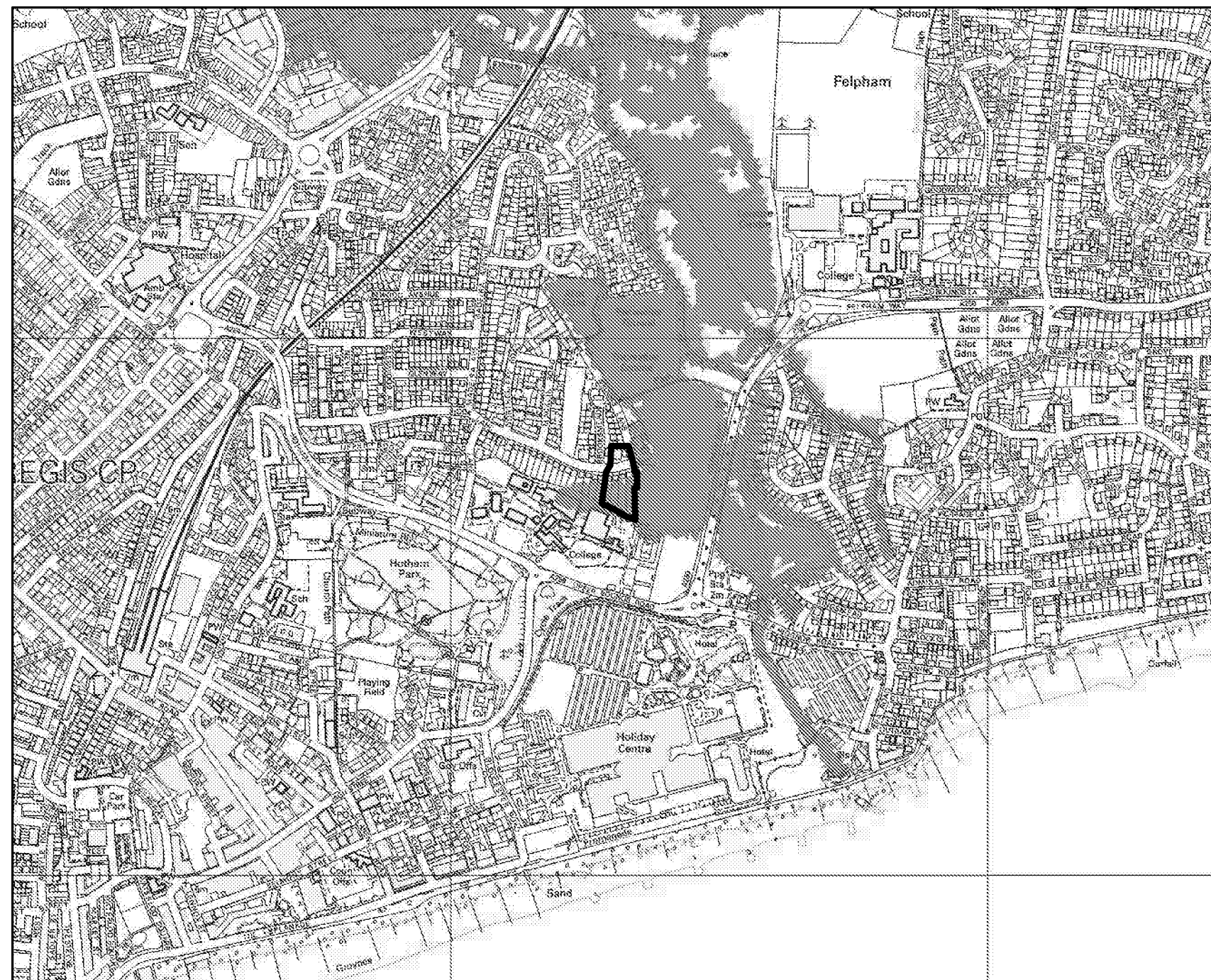
-  Asset type not defined
-  Embankment
-  Wall
-  Flood Gate
-  Demountable Defence
-  Bridge Abutment
-  High Ground
-  Beach
-  Barrier Beach
-  Promenade
-  Quay
-  Cliff
-  Dunes



0 100 200 300
Metres



Modelled Flood Outlines (Fluvial) Map. Centred PO22 8AT. Created 10/7/18.

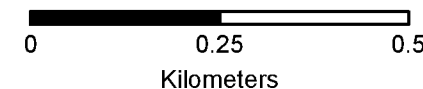


Legend

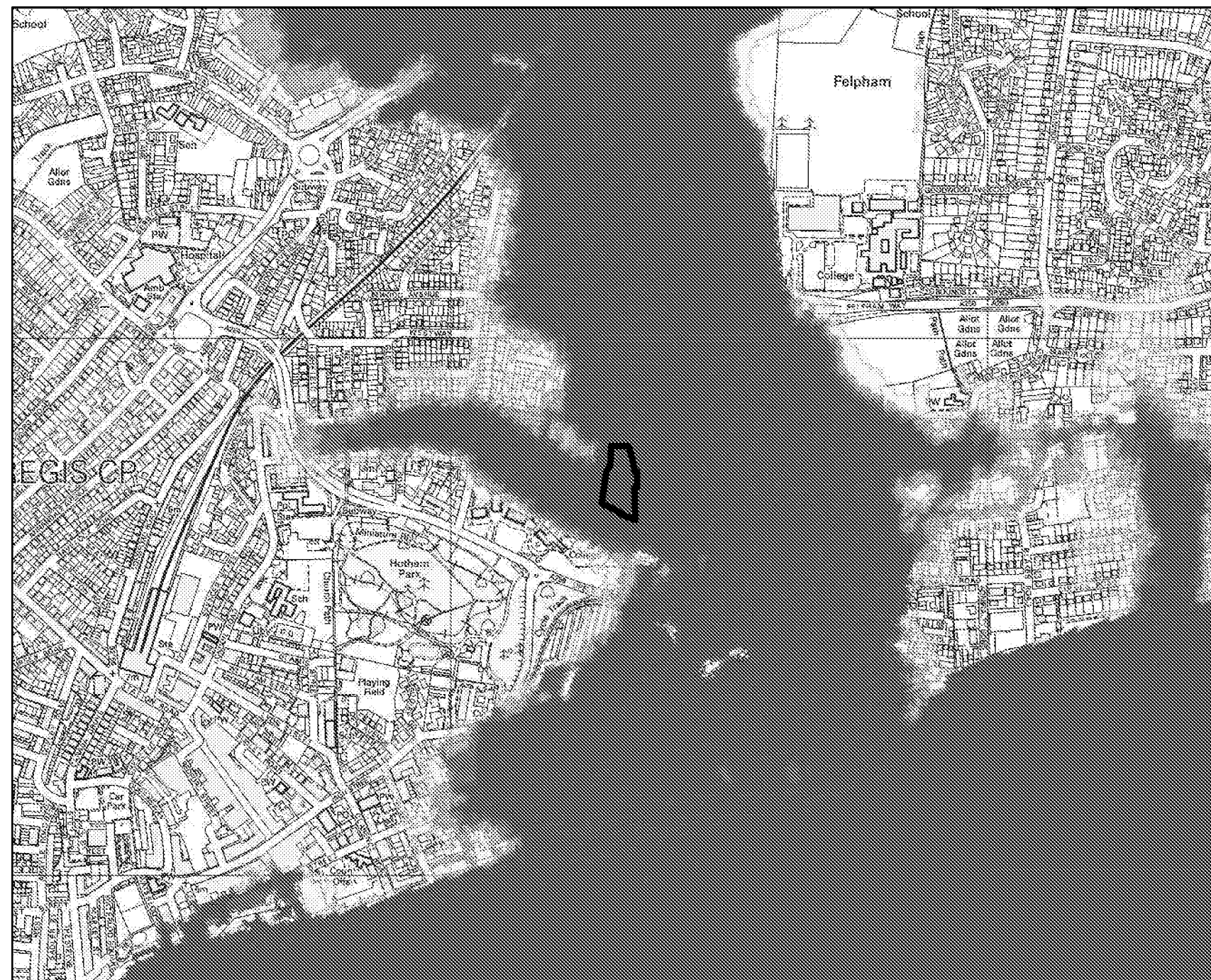
-  Site Boundary
-  0.1% AEP (Defended Fluvial)
-  0.1% AEP (Undefended Fluvial)

Annual Exceedance Probability (AEP) The probability of a flood of a particular magnitude, or greater occurring in any given year.

Scale: 1:10,000



Modelled Flood Outlines (Tidal) Map. Centred PO22 8AT. Created 10/7/18.



Environment
Agency



Legend



Site Boundary

0.5% AEP (Un defended Tidal)

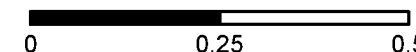
0.1% AEP (Un defended Tidal)

0.5% AEP (2070) (Un defended Tidal)

0.5% AEP (2115) (Un defended Tidal)

Annual Exceedance Probability (AEP) The probability of a flood of a particular magnitude, or greater occurring in any given year.

Scale: 1:10,000



Kilometers



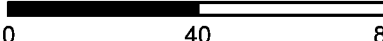
Environment
Agency

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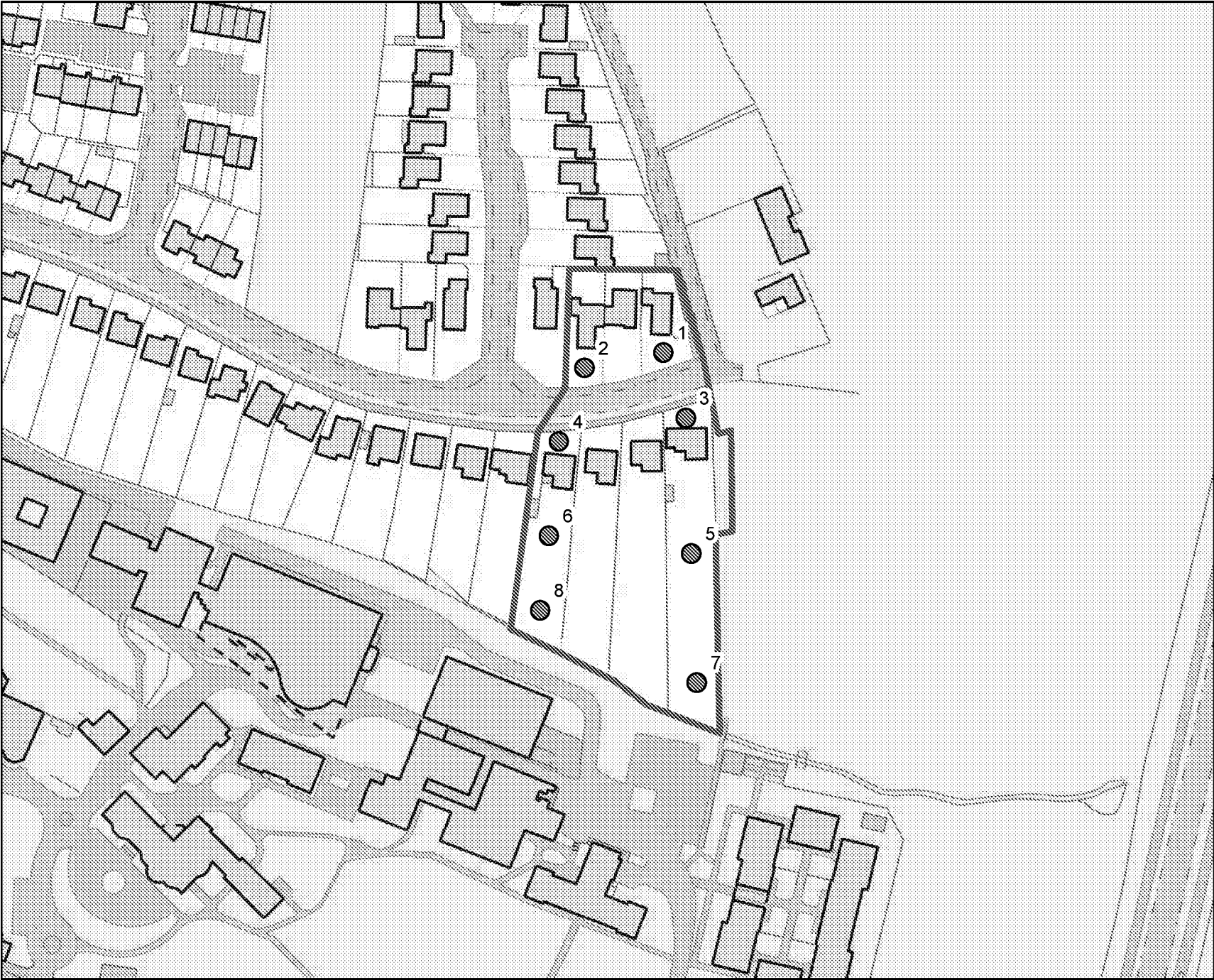

Legend

-  Site Nodes
-  Site Boundary

Scale: 1:1,600



04080
Meters



Product 4 Flood Risk Data Requested by: WSP

Site: 94 – 100 Hook Lane, Bognor Regis, PO22 8AT

Table 1: Water Levels: Fluvial Defended

Node Ref	NGR		Modelled Flood Levels in Metres
	Eastings	Northings	Defended Annual Exceedance Probability
			0.1%
1	494326	99775	N/A
2	494303	99770	N/A
3	494333	99755	N/A
4	494295	99748	N/A
5	494334	99715	1.93
6	494292	99720	1.93
7	494336	99676	N/A
8	494289	99698	1.93

Table 2: Water Levels: Tidal Undefended

Node Ref	NGR		Modelled Flood Levels in Metres			
	Eastings	Northings	Undefended Annual Exceedance Probability			
			0.5%	0.5% (2070)	0.5% (2115)	0.1%
1	494326	99775	3.02	3.62	4.26	3.28
2	494303	99770	3.03	3.63	4.27	3.29
3	494333	99755	3.02	3.63	4.27	3.29
4	494295	99748	3.03	3.63	4.27	3.30
5	494334	99715	3.03	3.64	4.28	3.30
6	494292	99720	3.03	3.64	4.28	3.30
7	494336	99676	3.03	3.64	4.28	3.30
8	494289	99698	3.03	3.64	4.28	3.30

Table 3: Water Depth: Fluvial Defended

Node Ref	NGR		Modelled Flood Depths in Metres
			Defended Annual Exceedance Probability
	Eastings	Northings	0.1%
1	494326	99775	N/A
2	494303	99770	N/A
3	494333	99755	N/A
4	494295	99748	N/A
5	494334	99715	0.53
6	494292	99720	0.45
7	494336	99676	N/A
8	494289	99698	0.49

Table 4: Water Depth: Tidal Undefended

Node Ref	NGR		Modelled Flood Depths in Metres			
			Undefended Annual Exceedance Probability			
	Eastings	Northings	0.5%	0.5% (2070)	0.5% (2115)	0.1%
1	494326	99775	0.68	1.28	1.92	0.94
2	494303	99770	0.34	0.94	1.58	0.60
3	494333	99755	1.09	1.69	2.33	1.35
4	494295	99748	0.91	1.52	2.15	1.18
5	494334	99715	1.66	2.27	2.91	1.93
6	494292	99720	1.65	2.25	2.89	1.91
7	494336	99676	1.36	1.97	2.61	1.63
8	494289	99698	1.64	2.25	2.89	1.91

All levels taken from: Ems to Littlehampton Modelling (Arun to East Head Model) (tidal) & Aldingbourne (fluvial)

Produced on: 10/07/2018

There are only defended levels and depths available from the Aldingbourne Model

There is no additional information or health warnings for these levels/depths or the model from which they have been produced.

Station name **SHRIPNEY**
 Station number 2.45E+08
 External number ---
 River ---
 Operator ---
 NGR **SU9290701615**
 Easting **492907**
 Northing **101615**
 Parameter-name WL [Water Level]
 Parameter Type Groundwater Level
 Time series name SSD/245420001/WL/Cmd.RelAbs.P
 Time series unit m
 Time level High-resolution
 Time series type Other -1.8
 Equidistant time s no 1.81
 Time series value --- -0.3508
 Time series quality Production
 Time series measi ---
 Period of record in file: 24/04/1980 12:00:00 to 08/05/2018 13:29:00

G = good; E = estimated; S = suspect; U = unchecked; M = missing; C = complete; I = incomplete; Ed = edited; WR = within rating; NR = no rating; EX> = extrapolated upper part; EX< = extrapolated lower part; BL> = beyond upper limit; BL< = beyond lower limit; MH = weir modular (head); NH = weir non modular (head); EH = weir extremely non modular (head); MT = weir modular (tail); NT = weir non modular (tail); ET = weir extremely non modular (tail); MC = weir modular (crest); NC = weir non modular (crest); EC = weir extremely non modular (crest); -H = weir head only; RAS = rastered time stamp; A = apportioned/interpolated; D = dry; SN = snow; T = trace

Quality code	Dip[m]	State of va	Interpolatic	Groundwai	State of ab	Interpolatic	Tags	Comments
description								
Time stamp								
24/04/1980 12:00	3.28 G	101	-0.17 G	101				
27/05/1980 12:00	3.63 G	101	-0.52 G	101				
04/07/1980 12:00	3.56 G	101	-0.45 G	101				
07/08/1980 12:00	3.64 G	101	-0.53 G	101				
12/09/1980 12:00	3.68 G	101	-0.57 G	101				
17/10/1980 12:00	2.86 G	101	0.25 G	101				
17/10/1980 12:01 ---	M	101 ---	M	101				
09/04/1981 12:00	2.8 G	101	0.31 G	101				
13/05/1981 12:00	3.3 G	101	-0.19 G	101				
19/06/1981 12:00	3.46 G	101	-0.35 G	101				
16/07/1981 12:00	3.71 G	101	-0.6 G	101				
16/09/1981 12:00	3.75 G	101	-0.64 G	101				
16/10/1981 12:00	3.22 G	101	-0.11 G	101				
11/11/1981 12:00	3.09 G	101	0.02 G	101				
19/02/1982 12:00	3.16 G	101	-0.05 G	101				
15/04/1982 12:00	3.33 G	101	-0.22 G	101				
09/06/1982 12:00	3.64 G	101	-0.53 G	101				
07/07/1982 12:00	2.75 G	101	0.36 G	101				
22/09/1982 12:00	4.91 G	101	-1.8 G	101				
03/11/1982 12:00	2.95 G	101	0.16 G	101				
12/01/1983 12:00	2.66 G	101	0.45 G	101				
17/02/1983 12:00	3.4 G	101	-0.29 G	101				
29/04/1983 12:00	3.07 G	101	0.04 G	101				
10/06/1983 12:00	3.28 G	101	-0.17 G	101				
14/07/1983 12:00	3.62 G	101	-0.51 G	101				
17/09/1983 12:00	3.59 G	101	-0.48 G	101				
09/01/1984 12:00	3.32 G	101	-0.21 G	101				
09/05/1984 12:00	3.65 G	101	-0.54 G	101				

Time stamp	Dip[m]	State of va Interpolatic	Groundwai	State of ab Interpolatic	Tags	Comments
10/07/1984 12:00	3.86 G	101	-0.75 G	101		
11/09/1984 12:00	4 G	101	-0.89 G	101		
15/10/1984 12:00	3.62 G	101	-0.51 G	101		
15/10/1984 12:01 ---	M	101 ---	M	101		
01/05/1985 12:00	3.42 G	101	-0.31 G	101		
26/09/1985 12:00	3.75 G	101	-0.64 G	101		
27/11/1985 12:00	3.27 G	101	-0.16 G	101		
21/02/1986 12:00	3.43 G	101	-0.32 G	101		
09/04/1986 12:00	3.2 G	101	-0.09 G	101		
18/06/1986 12:00	3.6 G	101	-0.49 G	101		
10/09/1986 12:00	3.64 G	101	-0.53 G	101		
05/11/1986 12:00	3.56 G	101	-0.45 G	101		
28/01/1987 12:00	3.51 G	101	-0.4 G	101		
13/05/1987 12:00	3.54 G	101	-0.43 G	101		
22/07/1987 12:00	3.65 G	101	-0.54 G	101		
11/08/1987 12:00	3.85 G	101	-0.74 G	101		
15/10/1987 12:00	3.44 G	101	-0.33 G	101		
31/12/1987 12:00	3.53 G	101	-0.42 G	101		
31/12/1987 12:01 ---	M	101 ---	M	101		
11/08/1988 12:00	4.01 G	101	-0.9 G	101		
25/01/1989 12:00	3.77 G	101	-0.66 G	101		
15/06/1989 12:00	4 G	101	-0.89 G	101		
11/10/1989 12:00	4.26 G	101	-1.15 G	101		
16/11/1989 12:00	3.78 G	101	-0.67 G	101		
12/12/1989 12:00	2.73 G	101	0.38 G	101		
23/01/1990 12:00	3.18 G	101	-0.07 G	101		
23/01/1990 12:01 ---	M	101 ---	M	101		
27/09/1990 12:00	4.14 G	101	-1.03 G	101		
20/12/1990 12:00	3.86 G	101	-0.75 G	101		
24/01/1991 12:00	3.33 G	101	-0.22 G	101		
27/02/1991 12:00	3.61 G	101	-0.5 G	101		
22/03/1991 12:00	3.96 G	101	-0.85 G	101		
25/04/1991 12:00	3.55 G	101	-0.44 G	101		
29/05/1991 12:00	3.79 G	101	-0.68 G	101		
28/06/1991 12:00	3.66 G	101	-0.55 G	101		
26/07/1991 12:00	3.6 G	101	-0.49 G	101		
26/07/1991 12:01 ---	M	101 ---	M	101		
13/12/1991 12:00	3.59 G	101	-0.48 G	101		
24/01/1992 12:00	3.89 G	101	-0.78 G	101		
27/02/1992 12:00	3.78 G	101	-0.67 G	101		
30/03/1992 12:00	3.73 G	101	-0.62 G	101		
23/04/1992 12:00	3.7 G	101	-0.59 G	101		
20/05/1992 12:00	3.66 G	101	-0.55 G	101		
08/06/1992 12:00	2.45 S	101	0.66 S	101		
15/06/1992 12:00	2.6 S	101	0.51 S	101		
22/06/1992 12:00	3.95 S	101	-0.84 S	101		
30/06/1992 12:00	2.72 S	101	0.39 S	101		
06/07/1992 12:00	2.53 S	101	0.58 S	101		
13/07/1992 12:00	2.54 S	101	0.57 S	101		
27/07/1992 12:00	2.55 S	101	0.56 S	101		
30/07/1992 12:00	3.8 S	101	-0.69 S	101		
21/08/1992 12:00	3.85 S	101	-0.74 S	101		
07/09/1992 12:00	2.48 S	101	0.63 S	101		
23/09/1992 12:00	3.79 S	101	-0.68 S	101		
27/10/1992 12:00	3.44 S	101	-0.33 S	101		
24/11/1992 12:00	1.87 S	101	1.24 S	101		

Time stamp	Dip[m]	State of va Interpolatic Groundwai	State of ab Interpolatic Tags	Comments
26/11/1992 12:00	2.74 S	101	0.37 S	101
01/12/1992 12:00	1.3 S	101	1.81 S	101
10/12/1992 12:00	1.58 S	101	1.53 S	101
17/12/1992 12:00	3.18 S	101	-0.07 S	101
07/01/1993 12:00	1.93 S	101	1.18 S	101
21/01/1993 12:00	3.03 S	101	0.08 S	101
04/02/1993 12:00	1.89 S	101	1.22 S	101
18/02/1993 12:00	2.2 S	101	0.91 S	101
19/02/1993 12:00	3.44 S	101	-0.33 S	101
05/03/1993 12:00	3.63 S	101	-0.52 S	101
18/03/1993 12:00	2.51 S	101	0.6 S	101
01/04/1993 12:00	2.36 S	101	0.75 S	101
15/04/1993 12:00	2.17 S	101	0.94 S	101
27/04/1993 12:00	2.19 S	101	0.92 S	101
04/05/1993 12:00	2.34 S	101	0.77 S	101
11/05/1993 12:00	2.42 S	101	0.69 S	101
14/05/1993 12:00	3.67 S	101	-0.56 S	101
18/05/1993 12:00	2.49 S	101	0.62 S	101
01/06/1993 12:00	2.43 S	101	0.68 S	101
07/06/1993 12:00	2.52 S	101	0.59 S	101
15/06/1993 12:00	2.41 S	101	0.7 S	101
18/06/1993 12:00	2.2 S	101	0.91 S	101
22/06/1993 12:00	2.39 S	101	0.72 S	101
24/06/1993 12:00	3.75 S	101	-0.64 S	101
05/07/1993 12:00	2.64 S	101	0.47 S	101
14/07/1993 12:00	2.59 S	101	0.52 S	101
22/07/1993 12:00	2.59 S	101	0.52 S	101
29/07/1993 12:00	2.44 S	101	0.67 S	101
05/08/1993 12:00	2.58 S	101	0.53 S	101
09/08/1993 12:00	2.62 S	101	0.49 S	101
16/08/1993 12:00	2.59 S	101	0.52 S	101
23/08/1993 12:00	2.57 S	101	0.54 S	101
31/08/1993 12:00	2.69 S	101	0.42 S	101
09/09/1993 12:00	3.81 S	101	-0.7 S	101
15/09/1993 12:00	2.6 S	101	0.51 S	101
16/09/1993 12:00	3.33 S	101	-0.22 S	101
18/09/1993 12:00	2.67 S	101	0.44 S	101
20/09/1993 12:00	2.21 S	101	0.9 S	101
22/09/1993 12:00	2.68 S	101	0.43 S	101
29/09/1993 12:00	2.34 S	101	0.77 S	101
04/10/1993 12:00	1.67 S	101	1.44 S	101
11/10/1993 12:00	1.61 S	101	1.5 S	101
18/10/1993 12:00	1.74 S	101	1.37 S	101
20/10/1993 12:00	2.43 S	101	0.68 S	101
25/10/1993 12:00	2 S	101	1.11 S	101
12/11/1993 12:00	1.99 S	101	1.12 S	101
14/12/1993 12:00	1.69 S	101	1.42 S	101
14/12/1993 12:01 ---	M	101 ---	M	101
22/06/1994 12:00	3.63 G	101	-0.52 G	101
19/07/1994 12:00	3.81 G	101	-0.7 G	101
16/08/1994 12:00	4.02 G	101	-0.91 G	101
14/09/1994 12:00	3.56 G	101	-0.45 G	101
19/10/1994 12:00	3.84 G	101	-0.73 G	101
10/01/1995 12:00	2.97 G	101	0.14 G	101
17/03/1995 12:00	2.84 G	101	0.27 G	101
02/05/1995 12:00	3.59 G	101	-0.48 G	101

Time stamp	Dip[m]	State of va	Interpolatic	Groundwai	State of ab	Interpolatic	Tags	Comments
02/05/1995 12:01	---	M	101	---	M	101		
05/12/1995 12:00	3.92	G	101	-0.81	G	101		
04/01/1996 12:00	3.51	G	101	-0.4	G	101		
08/03/1996 12:00	3.48	G	101	-0.37	G	101		
02/04/1996 12:00	3.69	G	101	-0.58	G	101		
02/05/1996 12:00	3.81	G	101	-0.7	G	101		
04/06/1996 12:00	3.89	G	101	-0.78	G	101		
05/07/1996 12:00	3.97	G	101	-0.86	G	101		
02/08/1996 12:00	4.35	G	101	-1.24	G	101		
06/09/1996 12:00	4.42	G	101	-1.31	G	101		
04/10/1996 12:00	4.34	G	101	-1.23	G	101		
08/11/1996 12:00	4.06	G	101	-0.95	G	101		
05/12/1996 12:00	3.53	G	101	-0.42	G	101		
03/01/1997 12:00	3.9	G	101	-0.79	G	101		
06/02/1997 12:00	3.83	G	101	-0.72	G	101		
07/03/1997 12:00	3.37	G	101	-0.26	G	101		
04/04/1997 12:00	3.87	G	101	-0.76	G	101		
07/05/1997 12:00	4.41	G	101	-1.3	G	101		
03/06/1997 12:00	4.51	G	101	-1.4	G	101		
01/07/1997 12:00	3.53	G	101	-0.42	G	101		
01/08/1997 00:00	4.12	G	101	-1.01	G	101		
01/09/1997 00:00	3.89	G	101	-0.78	G	101		
01/10/1997 00:00	4.28	G	101	-1.17	G	101		
03/11/1997 00:00	3.94	G	101	-0.83	G	101		
02/12/1997 12:00	3.04	G	101	0.07	G	101		
02/01/1998 00:00	2.68	G	101	0.43	G	101		
03/02/1998 12:00	3.45	G	101	-0.34	G	101		
03/03/1998 12:00	3.71	G	101	-0.6	G	101		
02/04/1998 12:00	3.6	G	101	-0.49	G	101		
05/05/1998 12:00	3.45	G	101	-0.34	G	101		
01/07/1998 12:00	3.69	G	101	-0.58	G	101		
03/08/1998 12:00	4.01	G	101	-0.9	G	101		
01/10/1998 12:00	3.95	G	101	-0.84	G	101		
02/11/1998 12:00	3.18	G	101	-0.07	G	101		
04/12/1998 12:00	3.58	G	101	-0.47	G	101		
04/01/1999 12:00	3.03	G	101	0.08	G	101		
11/02/1999 12:00	3.49	G	101	-0.38	G	101		
08/03/1999 12:00	3.48	G	101	-0.37	G	101		
06/04/1999 12:00	3.78	G	101	-0.67	G	101		
05/05/1999 12:00	3.84	G	101	-0.73	G	101		
04/06/1999 12:00	3.75	G	101	-0.64	G	101		
05/07/1999 12:00	4.04	G	101	-0.93	G	101		
05/08/1999 12:00	4.25	G	101	-1.14	G	101		
03/09/1999 12:00	4.18	G	101	-1.07	G	101		
01/10/1999 12:00	3.77	G	101	-0.66	G	101		
01/11/1999 12:00	3.77	G	101	-0.66	G	101		
01/12/1999 12:00	3.97	G	101	-0.86	G	101		
30/12/1999 12:00	3.07	G	101	0.04	G	101		
28/01/2000 12:00	3.59	G	101	-0.48	G	101		
24/02/2000 12:00	3.61	G	101	-0.5	G	101		
03/04/2000 12:00	3.66	G	101	-0.55	G	101		
03/05/2000 12:00	3.31	G	101	-0.2	G	101		
02/06/2000 12:00	3.24	G	101	-0.13	G	101		
03/07/2000 12:00	3.8	G	101	-0.69	G	101		
02/08/2000 12:00	4	G	101	-0.89	G	101		
31/08/2000 12:00	4.16	G	101	-1.05	G	101		

Time stamp	Dip[m]	State of va Interpolatic Groundwai	State of at Interpolatic Tags	Comments
02/10/2000 12:00	3.56 G	101	-0.45 G	101
09/11/2000 12:00	2.55 G	101	0.56 G	101
14/11/2000 12:00	2.57 G	101	0.54 G	101
01/12/2000 12:00	2.66 G	101	0.45 G	101
03/01/2001 12:00	2.95 G	101	0.16 G	101
01/02/2001 12:00	3.01 G	101	0.1 G	101
01/03/2001 12:00	3.34 G	101	-0.23 G	101
03/04/2001 12:00	3.09 G	101	0.02 G	101
01/05/2001 12:00	3.11 G	101	0 G	101
04/06/2001 12:00	3.85 G	101	-0.74 G	101
02/07/2001 12:00	4.01 G	101	-0.9 G	101
01/08/2001 12:00	4.16 G	101	-1.05 G	101
03/09/2001 12:00	4.2 G	101	-1.09 G	101
04/10/2001 12:00	3.7 G	101	-0.59 G	101
05/11/2001 12:00	3.65 G	101	-0.54 G	101
03/12/2001 12:00	3.6 G	101	-0.49 G	101
02/01/2002 12:00	3.81 G	101	-0.7 G	101
31/01/2002 12:00	3.11 G	101	0 G	101
28/02/2002 12:00	2.95 G	101	0.16 G	101
02/04/2002 12:00	3.42 G	101	-0.31 G	101
29/04/2002 12:00	3.64 G	101	-0.53 G	101
31/05/2002 12:00	3.6 G	101	-0.49 G	101
24/06/2002 12:00	3.66 G	101	-0.55 G	101
31/07/2002 12:00	3.82 G	101	-0.71 G	101
30/08/2002 12:00	3.81 G	101	-0.7 G	101
30/09/2002 12:00	3.85 G	101	-0.74 G	101
25/10/2002 12:00	3.72 G	101	-0.61 G	101
27/11/2002 12:00	3.02 G	101	0.09 G	101
30/12/2002 12:00	2.65 G	101	0.46 G	101
04/02/2003 12:00	3.16 G	101	-0.05 G	101
28/02/2003 12:00	3.51 G	101	-0.4 G	101
31/03/2003 12:00	3.67 G	101	-0.56 G	101
01/05/2003 12:00	3.69 G	101	-0.58 G	101
30/05/2003 11:12	3.85 G	101	-0.74 G	101
13/07/2003 12:02	4 G	101	-0.89 G	101
31/07/2003 14:20	3.97 G	101	-0.86 G	101
01/09/2003 10:06	4.04 G	101	-0.93 G	101
30/09/2003 10:55	4.36 G	101	-1.25 G	101
28/10/2003 11:35	4.17 G	101	-1.06 G	101
27/11/2003 11:44	3.41 G	101	-0.3 G	101
31/12/2003 13:20	2.96 G	101	0.15 G	101
28/01/2004 13:01	3.29 G	101	-0.18 G	101
26/02/2004 11:58	3.62 G	101	-0.51 G	101
31/03/2004 11:18	3.73 G	101	-0.62 G	101
30/04/2004 10:57	3.65 G	101	-0.54 G	101
28/05/2004 11:12	3.89 G	101	-0.78 G	101
24/06/2004 12:13	3.94 G	101	-0.83 G	101
27/07/2004 11:20	4.2 G	101	-1.09 G	101
18/08/2004 10:52	4.21 G	101	-1.1 G	101
23/09/2004 10:18	4.12 G	101	-1.01 G	101
28/10/2004 11:44	3.43 G	101	-0.32 G	101
29/11/2004 12:41	3.78 G	101	-0.67 G	101
29/12/2004 12:24	3.27 G	101	-0.16 G	101
27/01/2005 11:44	3.37 G	101	-0.26 G	101
28/02/2005 12:00	3.78 G	101	-0.67 G	101
23/03/2005 16:15	3.86 G	101	-0.75 G	101

Time stamp	Dip[m]	State of va Interpolatic	Groundwai	State of at Interpolatic	Tags	Comments
27/04/2005 14:09	3.73 G	101	-0.62 G	101		
26/05/2005 10:33	3.88 G	101	-0.77 G	101		
30/06/2005 13:20	4.18 G	101	-1.07 G	101		
01/08/2005 14:40	4.04 G	101	-0.93 G	101		
30/08/2005 15:09	4.04 G	101	-0.93 G	101		
26/09/2005 15:50	4.24 G	101	-1.13 G	101		
27/10/2005 16:43	3.5 G	101	-0.39 G	101		
29/11/2005 12:11	3.76 G	101	-0.65 G	101		
23/12/2005 15:08	3.61 G	101	-0.5 G	101		
27/01/2006 16:10	3.67 G	101	-0.56 G	101		
28/02/2006 12:18	3.35 G	101	-0.24 G	101		
28/03/2006 15:00	2.48 G	101	0.63 G	101		
27/04/2006 11:40	3.63 G	101	-0.52 G	101		
30/05/2006 15:45	3.58 G	101	-0.47 G	101		
29/06/2006 16:00	4.03 G	101	-0.92 G	101		
01/08/2006 15:16	4.31 G	101	-1.2 G	101		
31/08/2006 12:35	4.62 G	101	-1.51 G	101		
27/09/2006 13:10	3.92 G	101	-0.81 G	101		
02/11/2006 14:20	3.56 G	101	-0.45 G	101		
30/11/2006 13:45	3.28 G	101	-0.17 G	101		
29/12/2006 15:31	3.35 G	101	-0.24 G	101		
24/01/2007 15:00	3.16 G	101	-0.05 G	101		
26/02/2007 16:30	2.89 G	101	0.22 G	101		
13/04/2007 11:31	3.69 G	101	-0.58 G	101		
01/06/2007 10:27	3.5 G	101	-0.39 G	101		
05/07/2007 12:10	3.56 G	101	-0.45 G	101		
09/08/2007 12:50	3.88 G	101	-0.77 G	101		
19/09/2007 12:08	4.12 G	101	-1.01 G	101		
25/10/2007 12:30	4.05 G	101	-0.94 G	101		
29/11/2007 14:10	3.57 G	101	-0.46 G	101		
12/12/2007 12:35	3.22 G	101	-0.11 G	101		
11/01/2008 12:25	3.09 G	101	0.02 G	101		
04/02/2008 13:42	3.24 G	101	-0.13 G	101		
03/03/2008 13:21	3.59 G	101	-0.48 G	101		
17/04/2008 11:15	3.58 G	101	-0.47 G	101		
14/05/2008 11:45	3.69 G	101	-0.58 G	101		
03/06/2008 12:25	3.22 G	101	-0.11 G	101		
10/07/2008 12:20	3.54 G	101	-0.43 G	101		
21/08/2008 12:06	3.89 G	101	-0.78 G	101		
08/10/2008 12:37	3.71 G	101	-0.6 G	101		
05/11/2008 13:32	3.69 G	101	-0.58 G	101		
02/12/2008 13:09	3.4 G	101	-0.29 G	101		
06/01/2009 14:01	3.7 G	101	-0.59 G	101		
04/02/2009 12:23	3.18 G	101	-0.07 G	101		
04/03/2009 12:03	3.3 G	101	-0.19 G	101		
07/04/2009 10:45	3.7 G	101	-0.59 G	101		
13/05/2009 11:22	3.82 G	101	-0.71 G	101		
03/06/2009 11:18	3.9 G	101	-0.79 G	101		
01/07/2009 08:20	4.21 G	101	-1.1 G	101		
05/08/2009 13:18	4.09 G	101	-0.98 G	101		
02/09/2009 08:42	4.31 G	101	-1.2 G	101		
02/10/2009 09:58	4.44 G	101	-1.33 G	101		
02/11/2009 11:37	3.92 G	101	-0.81 G	101		
08/12/2009 10:59	2.84 G	101	0.27 G	101		
12/01/2010 15:37	3.07 G	101	0.04 G	101		
12/02/2010 15:26	3.24 G	101	-0.13 G	101		

Time stamp	Dip[m]	State of va Interpolatic	Groundwai	State of ab Interpolatic	Tags	Comments
24/03/2010 12:56	3.29 G	101	-0.18 G	101		
30/04/2010 09:10	3.64 G	101	-0.53 G	101		
26/05/2010 08:22	3.83 G	101	-0.72 G	101		
30/06/2010 09:40	4.2 G	101	-1.09 G	101		
20/07/2010 08:43	4.2 G	101	-1.09 G	101		
17/08/2010 09:13	4.42 G	101	-1.31 G	101		
17/09/2010 09:13	3.88 G	101	-0.77 G	101		
18/10/2010 14:47	3.7 G	101	-0.59 G	101		
18/11/2010 10:21	2.98 G	101	0.13 G	101		
08/12/2010 10:01	3.26 G	101	-0.15 G	101		
07/01/2011 10:23	3.02 G	101	0.09 G	101		
11/02/2011 09:54	3.26 G	101	-0.15 G	101		
22/03/2011 09:39	3.51 G	101	-0.4 G	101		
15/04/2011 08:22	3.74 G	101	-0.63 G	101		
19/05/2011 08:56	3.98 G	101	-0.87 G	101		
16/06/2011 08:45	3.94 G	101	-0.83 G	101		
21/07/2011 09:22	4 G	101	-0.89 G	101		
18/08/2011 08:40	4.03 G	101	-0.92 G	101		
15/09/2011 09:09	4.03 G	101	-0.92 G	101		
13/10/2011 13:34	4.18 G	101	-1.07 G	101		
16/11/2011 10:35	4 G	101	-0.89 G	101		
22/12/2011 09:23	3.57 G	101	-0.46 G	101		
12/01/2012 13:00	3.58 G	101	-0.47 G	101		
09/02/2012 11:21	3.67 G	101	-0.56 G	101		
08/03/2012 10:12	3.76 G	101	-0.65 G	101		
11/04/2012 09:00	3.81 G	101	-0.7 G	101		
15/05/2012 09:42	3.32 G	101	-0.21 G	101		
07/06/2012 09:54	3.52 G	101	-0.41 G	101		
17/07/2012 10:16	3.02 G	101	0.09 G	101		
08/08/2012 09:37	3.63 G	101	-0.52 G	101		
10/09/2012 09:41	3.86 G	101	-0.75 G	101		
08/10/2012 11:22	3.41 G	101	-0.3 G	101		
04/11/2012 10:51	3.2 G	101	-0.09 G	101		
13/12/2012 14:31	3.22 G	101	-0.11 G	101		
10/01/2013 10:31	3 G	101	0.11 G	101		
07/02/2013 15:00	2.99 G	101	0.12 G	101		
13/03/2013 12:01	3.3 G	101	-0.19 G	101		
16/04/2013 09:20	3.09 G	101	0.02 G	101		
14/05/2013 14:05	3.46 G	101	-0.35 G	101		
14/06/2013 10:18	3.62 G	101	-0.51 G	101		
18/07/2013 09:12	3.9 G	101	-0.79 G	101		
22/08/2013 11:10	4.04 G	101	-0.93 G	101		
25/09/2013 09:14	3.93 G	101	-0.82 G	101		
17/10/2013 13:19	3.78 G	101	-0.67 G	101		
26/11/2013 10:23	3.5 G	101	-0.39 G	101		
17/12/2013 11:10	3.44 G	101	-0.33 G	101		
13/01/2014 11:34	2.86 G	101	0.25 G	101		
26/02/2014 09:57	2.95 G	101	0.16 G	101		
19/03/2014 09:58	3.4 G	101	-0.29 G	101		
14/04/2014 09:27	3.54 G	101	-0.43 G	101		
28/05/2014 10:10	3.34 G	101	-0.23 G	101		
26/06/2014 10:54	3.78 G	101	-0.67 G	101		
28/07/2014 09:38	4.06 G	101	-0.95 G	101		
22/08/2014 11:49	4.07 G	101	-0.96 G	101		
16/09/2014 09:12	4.03 G	101	-0.92 G	101		
30/10/2014 12:03	4.25 G	101	-1.14 G	101		

Time stamp	Dip[m]	State of va Interpolatic	Groundwai	State of at Interpolatic	Tags	Comments
27/11/2014 10:38	2.76 G	101	0.35 G	101		
19/12/2014 13:45	3.11 G	101	0 G	101		
27/01/2015 10:02	3.09 G	101	0.02 G	101		
17/02/2015 12:41	3.48 G	101	-0.37 G	101		
17/03/2015 16:15	3.5 G	101	-0.39 G	101		
22/04/2015 13:31	3.77 G	101	-0.66 G	101		
15/05/2015 13:36	3.71 G	101	-0.6 G	101		
15/06/2015 12:18	3.9 G	101	-0.79 G	101		
27/07/2015 12:45	3.93 G	101	-0.82 G	101		
19/08/2015 08:30	4.02 G	101	-0.91 G	101		
18/09/2015 13:05	3.59 G	101	-0.48 G	101		
19/10/2015 13:54	3.84 G	101	-0.73 G	101		
12/11/2015 11:43	3.51 G	101	-0.4 G	101		
10/12/2015 13:49	3.51 G	101	-0.4 G	101		
18/01/2016 12:05	2.89 G	101	0.22 G	101		
18/02/2016 14:30	3.04 G	101	0.07 G	101		
29/03/2016 16:00	3.28 G	101	-0.17 G	101		null
15/04/2016 16:00	--- M;Ed	101	--- M;Ed	101		Monthly diğ
27/05/2016 11:00	3.75 G	101	-0.64 G	101		null
23/06/2016 14:00	3.4 G	101	-0.29 G	101		null
20/07/2016 11:00	3.85 G	101	-0.74 G	101		null
12/08/2016 14:00	3.94 G	101	-0.83 G	101		null
30/09/2016 10:00	4.09 G	101	-0.98 G	101		null
06/10/2016 11:00	4.05 G	101	-0.94 G	101		null
07/11/2016 13:00	3.83 G	101	-0.72 G	101		null
16/12/2016 15:00	3.78 G	101	-0.67 G	101		null
19/01/2017 16:00	3.31 G	101	-0.2 G	101		null
09/02/2017 10:00	3.08 G	101	0.03 G	101		null
27/03/2017 17:00	3.48 G	101	-0.37 G	101		null
27/04/2017 10:00	3.79 G	101	-0.68 G	101		null
19/05/2017 09:00	3.63 G	101	-0.52 G	101		null
22/06/2017 09:00	3.8 G	101	-0.69 G	101		null
07/07/2017 09:00	3.84 G	101	-0.73 G	101		null
02/08/2017 09:00	3.6 G	101	-0.49 G	101		null
28/09/2017 09:00	3.73 G	101	-0.62 G	101		null
25/10/2017 09:00	3.67 G	101	-0.56 G	101		null
06/11/2017 09:00	3.8 G	101	-0.69 G	101		null
05/12/2017 09:00	3.71 G	101	-0.6 G	101		null
25/01/2018 09:00	2.91 G	101	0.2 G	101		null
08/02/2018 12:44	3.31 G	101	-0.2 G	101		
13/03/2018 10:32	3.14 G	101	-0.03 G	101		
10/04/2018 10:39	3.05 G	101	0.06 G	101		
08/05/2018 13:29	3.45 G	101	-0.34 G	101		

From: PSO West Sussex <PSOWestSussex@environment-agency.gov.uk>
Sent: 28 April 2021 15:52
To: [REDACTED]
Cc: SSD Enquiries
Subject: SSD214635- Product 4 - West Sussex
Attachments: FRA Advisory Text.pdf; SSD Pre-app advice note September 2019.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Dear [REDACTED],

Thank you for your Product 4 request for **94 – 100 Hook Lane, Bognor Regis, PO22 8AT**.

I can confirm that the Product 4 previously supplied is still the most up to date modelled data.

For FRA and pre-planning advice please see attached 'FRA Advisory Text' and 'SSD Pre-app advice note September 2019'.

For information on flooding from other sources such as surface water please contact the Lead Local Flood Authority, West Sussex County Council.

The flood risk data provided is based on existing EA hydraulic models for existing 0.5% annual probability events with an allowance for climate change. Please note the climate change allowances provided are not up to date. These were updated on 17 December 2019.

You should refer to 'Flood risk assessments: climate change allowances' for the most up to date allowances. You will need to undertake further assessment of future flood risk using different allowances to ensure your assessment of future flood risk is based on best available evidence.

Guidance on climate change allowances and how to use them in Flood Risk Assessments can be found [here](#).

For future reference, detailed flood information and maps can be viewed using the [Long Term Flood Risk Information service](#) and [Flood Map for Planning service](#). Flood and Coastal Risk Management asset information, and details of all planned maintenance activities can be viewed using the [Asset Management Service](#).

If you have any further queries about this request, please do not hesitate to contact us at psowestsussex@environment-agency.gov.uk.

Kind regards,

[REDACTED]

FCRM Officer, Partnership & Strategic Overview West Sussex, Solent and South Downs
Environment Agency, Guildbourne House, Chatsworth Road, Worthing, West Sussex, BN11 1LD

From: [REDACTED] [mailto:[REDACTED]@wsp.com]
Sent: 25 March 2021 14:56
To: Enquiries, Unit <enquiries@environment-agency.gov.uk>
Subject: Product 4 - West Sussex

Hello

We've previously carried out a FRA for a site in Bognor Regis, West Sussex (located at approximately 494296, 099738) in 2018. The proposed site covers the addresses of 94 – 100 Hook Lane, PO22 8AT
The Product 4 at the time was based on the following models;
Tidal - Ems to Littlehampton Modelling 9Arun to East Head Model), JBA Consulting 2016
Fluvial – Aldingbourne, JBA consulting 2015

Can you confirm whether these models have since been updated? If so please can I request a new product 4 for the site?

Best regards

[REDACTED]

[REDACTED] **BSc (Hons), MSc, MCIWEM C.WEM**
Principal Water and Flood Risk Consultant
Water Risk Management & Engineering, WE&I



T+ 44 [REDACTED]
Please note I do not work on Mondays

Mountbatten House, Basing View
Basingstoke, Hampshire
RG21 4HJ

wsp.com

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Eleonora Pilla
Environment Agency
Canal Walk
Romsey
SO51 7LP

70047808-IT1-LTR-001

24 August 2018

Dear Eleonora Pilla,

94 - 100 Hook Lane, Bognor Regis

Thank you for your time on the call, it was very useful to be able to discuss your concerns and agree a way forward with you. We also appreciate you providing the updated flood modelling information for consideration as part of the Flood Risk Assessment.

With respect to your letter dated 7 August 2018 we have provided a summary of our discussions and the proposed resolution for each point.

Objection 1: The submitted FRA fails to assess the surface water back up from the drainage ditch at the south of the development and fluvial interaction, which it is understood had caused some flooding issue in the past.

Response: As we discussed on the call, following an inspection of the Combined Defended Modelled Flood Outlines indicates that the flood extent is similar to the fluvial extent as the topography is lower at the rear of the properties at Hook Lane, effectively creating a bowl. It was agreed that it would be suitable to use the flood levels from the Aldingbourne undefended model scenario, in order to define the requirements for the flood mitigation of the Proposed Development.

We agreed that the flood level to be used was 2.19 mAOD (fluvial undefended water level at the Site) for the combined surface water and fluvial mitigation of the Proposed Development. This will also provide mitigation against potential failure of the Felpham pumping station. This design level has been used in the calculations for the floodplain compensation.

Objection 2: Different climate change allowances have been used to assess future flood risk than those advised in 'Flood risk assessment: climate change allowances', without adequate justification. We would expect you assess the climate change for this development using the new climate change allowances higher central allowances (45%) and upper allowance (105%). We can now provide information to you. Please contact SSD Enquiries under SSDEnquireis@environment-agency.gov.uk to request an update to the Product 4 information.

Response: Following receipt of the new climate change flood levels from you, it was agreed during our phone conversation, that the flood level of 2.19m AOD (1 in 100-year event plus 105% upper climate change allowance), shall be used.

Mountbatten House
Basing View
Basingstoke, Hampshire
RG21 4HJ
Tel +44 1256 318600
Tel +44 1256 318700
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The proposed new buildings will be designed to allow for 2.19m AOD flood water level consider plus additional 300mm freeboard beneath the ground floor slab.

Objection 3: More information about the proposed flood compensation is needed. Basic requirements for compensatory floodplain storage are as follows

- ③ A volume of floodplain equal to or larger than that lost to the proposed development must be created.
- ③ The volume must apply at all levels between the lowest point on the site and the design flood level. Normally this is calculated by comparing volumes taken by the development and the volume offered by the compensatory storage for a number of horizontal 'slices' through the range defined above.
- ③ The thickness of a vertical slice should typically be 0.2 metres. In the case of large flat sites or very steep sites this may be varied, for example for flat sites to 0.1 or even 0.05 metres. The slice thickness should be set to provide between ten and fifteen slices for such unusual sites

Response: As discussed, the current calculations have been based on assumptions regarding the number of piers and the size of the piers per property. It was agreed that following detailed design the floodplain compensation calculations would need to be revisited, and these would need to be informed by suitable geo-technical investigations.

The estimated total area of the piers equals 5.76m² (450mm diameter piers, 6 No. piers per building; 6 No. buildings at the Application Site)

For each 200mm vertical increase, the piers will displace a volume of water which equals 5.76*0.2=1.15m³

To achieve an increase in floodplain storage, a 20% allowance has been accounted for in the floodplain compensation indicative area. The FRA demonstrates that the northern part of the site, near Hook Lane access, can be used as flood compensation (refer to attached Drawing 47808-FCA-001).

Level	Volume lost (m ³)	Flood compensation area required (m ²)	Flood compensation area identified (m ²)	Flood compensation volume identified (m ³)
1.3 m AOD to 1.5 m AOD	1.15	5.76	7.06	1.41
1.5m AOD to 1.7 m AOD	1.15	5.76	7.06	1.41
1.7 m AOD to 1.9 m AOD	1.15	5.76	7.02	1.41
1.9 m AOD to 2.1m AOD	1.15	5.76	7.07	1.41
2.1 m AOD to 2.19m AOD	0.52	2.6	9.60	1.92

The volume required to achieve the flood plain compensation vertical strip between 1.3 and 1.5m AOD will be achieved in the area specified. It is anticipated that localised reprofiling of the Site will be required to facilitate hydraulic connectivity between the floodplain compensation and the source of flooding.

Objection 4: Due to lack of information, it is not clear if it is proposed to use stilts or voids. This is not floodplain compensation, but rather mitigation of risk by design. The use of stilts reduces the impact on the development but does not guarantee that the floodplain will be retained in the same way as a compensation scheme (which is a form of risk substitution).

Response: It is proposed that the ground floor slab for the buildings will be raised 300 mm above the flood level, with the buildings supported on piers to create a void beneath the buildings. The impact of the piers on the floodplain, and the requirements for floodplain compensation are discussed above.

I hope the responses above have answered the queries and objections raised. If you have any further queries, or would like to discuss the matter further, please do not hesitate to contact Emiliya Stoykova or Steven Brown.



Yours faithfully

Emiliya Stoykova
Assistant Engineer

Cc: Counterpoint Properties Ltd
Encl.: Drawing 47808-FCA-001
Environment Agency's flood risk data and correspondence



KEY:

Site Boundary

Contour 0.1m

Flood Compensation Area footprint

Flood Compensation Area

1.3 mAOD - 1.5 mAOD - Lowered to 1.3 mAOD

1.5 mAOD - 1.7 mAOD - Lowered to 1.3 mAOD

1.7 mAOD - 1.9 mAOD - Lowered to 1.7 mAOD

1.9 mAOD - 2.1 mAOD - Lowered to 1.9 mAOD

2.1 mAOD - 2.19 mAOD - Lowered to 2.1 mAOD

Pier assumed dia 0.45 m
Pier area 0.16 m.sq. (each pier)
Assumed No. piers per building 6
No. buildings 6
Flood water level = 2.19 mAOD (100year +
105%CC undefended fluvial model)
Flood compensation indicative area 5.76 m.sq.

To achieve an increase in floodplain storage a
20% allowance has been accounted for in the
floodplain compensation indicative area, i.e. 7
m.sq.

Localised reprofiling of the Site will be required to
facilitate hydraulic connectivity between the
floodplain compensation and the source of
flooding.

REV	DATE	DRW	DESCRIPTION	CHK	APP
	24/08/18	ES	FIRST ISSUE		

STATUS:
FOR INFORMATION ONLY

WSP

Mountbatten House, Basing View,
Basingstoke, HANTS, RG21 4HJ
Tel: +44 (0) 1256 318 800
Fax: +44 (0) 1256 318 70
www.wsp.com

CLIENT:
COUNTERPOINT PROPERTIES LTD

ARCHITECT:
CROSSLEY DESIGN
ARCHITECTURE

PROJECT:
94 - 100 HOOK LANE
BOGNOR REGIS

TITLE:
PROPOSED FLOOD
COMPENSATION AREA

DRAWN:	CHECKED:	APPROVED:
QGIS FILE: 70047808.qgs	SCALE @A3: 1:400	DATE: 24/08/18
PROJECT No: 70047808	DRAWING No: 47808-FCA-001	REV:

Stoykova, Emiliya

From: SSD Enquiries <SSDEnquiries@environment-agency.gov.uk>
Sent: 23 August 2018 15:09
To: Stoykova, Emiliya
Subject: 180823 GE3603 Re SSD90563 94 – 100 Hook Lane, Bognor Regis - FRA Enquiry

Hi Emiliya,

Further to the email below which you received from our PSO team earlier today, please be advised that this information is supplied subject to the notice which can be viewed via the following link:

<http://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

Please get in touch if you have any further queries or contact us within two months if you would like us to review the information we have sent.

Kind regards

Nick

Customers & Engagement Team | Environmental Planning and Engagement | Solent and South Downs Area |
Environment Agency | Romsey District Office, Canal Walk, Romsey, SO51 7LP

SSDEnquiries@environment-agency.gov.uk
National Contact Call Centre 03708 506506



From: PSO West Sussex
Sent: 23 August 2018 11:35
To: [REDACTED]
Cc: SSD Enquiries <SSDEnquiries@environment-agency.gov.uk>
Subject: RE: GE3603 Re SSD90563 94 – 100 Hook Lane, Bognor Regis - FRA Enquiry

Hi Emiliya,

Thanks for your email. Please find attached updated Levels and Depths Table and Fluvial Modelled Flood Outlines with the new climate change allowances, and some extract from the 2015 Aldingbourne Flood Risk Mapping Study modelling report. I've also attached a combined (fluvial and surface water) modelled flood outline map.

Do not hesitate to contact us if you have further enquiries.

Kind regards,
Ee

Eleonora Pilla

Flood and Coastal Risk Management Officer | Partnership & Strategic Overview | West Sussex
Environment Agency | Guildbourne House, Chatsworth Road, Worthing, West Sussex, BN11 1LD

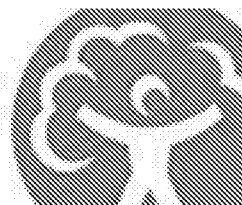
eleonora.pilla@environment-agency.gov.uk

External: 020 847 48395 | Mobile: 07810 050246



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From: [REDACTED]
Sent: 13 August 2018 14:04
To: PSO West Sussex <PSOWestSussex@environment-agency.gov.uk>
Cc: SSD Enquiries <SSDEnquiries@environment-agency.gov.uk>
Subject: RE: GE3603 Re SSD90563 94 – 100 Hook Lane, Bognor Regis - FRA Enquiry

Hi Leanne,

The provided Product 4 includes only flood water levels from the Aldingbourne model for the 1 in 1000-year event. Please can you confirm if the flood levels are available for the upper climate change allowance (105%) as well as the higher central allowance (45%) at the Site?

Many thanks

Kind regards,

Emiliya Stoykova MEng (Hons) MSc GradCIWEM

Assistant Engineer - Water



[REDACTED]
Mountbatten House, Basing View
Basingstoke, Hampshire
RG21 4HJ

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From: PSO West Sussex [<mailto:PSOWestSussex@environment-agency.gov.uk>]
Sent: 13 July 2018 10:19
To: [REDACTED]
Cc: SSD Enquiries <SSDEnquiries@environment-agency.gov.uk>
Subject: RE: GE3603 Re SSD90563 94 – 100 Hook Lane, Bognor Regis - FRA Enquiry

Dear Emiliya,

Thank you for your email. I can confirm that the embankment (Asset ID 149096) mentioned in the Product 4 is a coastal defence.

Kind regards,

Leanne Prentice

FCRM Officer, Partnerships & Strategic Overview Team West Sussex

Environment Agency | Guildbourne House, Chatsworth Road, Worthing, West Sussex, BN11 1LD



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ARE YOU AT RISK FROM FLOODING?

Check your flood risk today



From: Stoykova, Emiliya [REDACTED]

Sent: 12 July 2018 07:32

To: SSD Enquiries <SSDEnquiries@environment-agency.gov.uk>

Subject: 180712: GE3603 - Ini - SSD90563 94 – 100 Hook Lane, Bognor Regis - FRA Enquiry

Dear Matthew,

Thank you for the data provided.

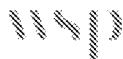
Please can you confirm that the existing flood defences (Asset ID 149096) are for tidal flooding?

Many thanks

Kind regards,

Emiliya Stoykova MEng (Hons) MSc GradCIWEM

Assistant Engineer - Water



Mountbatten House, Basing View
Basingstoke, Hampshire
RG21 4HJ

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From: SSD Enquiries [<mailto:SSDEnquiries@environment-agency.gov.uk>]
Sent: 11 July 2018 10:47
To: Stoykova, Emiliya
Subject: 180711: SSD90563 94 – 100 Hook Lane, Bognor Regis - FRA Enquiry

Dear Ms Stoykova

Thank you for your email of July 19. Please find attached a Product 4, which also has most of the answers to your questions.

For FRA and pre-planning advice please see attached FRA Advisory Text and Planning Advice from the Environment Agency.

For information on flooding from other sources such as surface water please contact the Lead Local Flood Authority, West Sussex County Council.

Please be aware that in February 2016 the Environment Agency updated its guidance on climate change allowances. Guidance on climate change allowances and how to use them in Flood Risk Assessments can be found [here](#).

For future reference, detailed flood information and maps can be viewed using the [Long Term Flood Risk Information](#) service and [Flood Map for Planning](#) service. Flood and Coastal Risk Management asset information, and details of all planned maintenance activities can be viewed using the [Asset Management Service](#).

There is no groundwater monitoring site within 500m of this location. The nearest one is about 1.3km to the north; I have attached the data from this site for information. This information is not available with the Open Government Licence but we may be able to license you under the Environment Agency Conditional licence as in the link below.

<https://www.gov.uk/government/publications/environment-agency-conditional-licence/environment-agency-conditional-licence>

Groundwater level measurements – AfA 075, detailed information about this dataset including all the conditions applicable to this dataset, can be found on the [Register Licence Abstract](#) (you will need to download this spreadsheet to access the information about AfA 075). However, you must first check the supporting information and the above link to determine if the conditions on use are suitable for your purposes. If they are not, this information is not provided with a licence for use, and the data is provided for read right only.

With regards to Source Protection Zones and Aquifer classifications please use the link below:

<http://magic.defra.gov.uk/MagicMap.aspx>

Finally, the site is located in the South East River Basin Management Plan.

Please get in touch if you have any further queries or contact us within two months if you would like us to review the information we have sent.

For information on what you can expect from us and our full service commitment to you, please click on this link;

<https://www.gov.uk/government/publications/environment-agency-customer-service-commitment--2/environment-agency-customer-service-commitment>

Yours sincerely

Matthew Murphy
Customers and Engagement
Environment Agency | Chichester Office, Oving Road, Chichester, West Sussex, PO20 2AG

Matthew.Murphy@environment-agency.gov.uk

Working days: Monday to Friday



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From: Stoykova, Emiliya [REDACTED]
Sent: 19 June 2018 13:24
To: Enquiries, Unit <enquiries@environment-agency.gov.uk>
Subject: 94 – 100 Hook Lane, Bognor Regis - FRA Enquiry

Dear Sirs,

94 – 100 Hook Lane, Bognor Regis Flood Risk Assessment – Enquiry

We have been instructed by our client to undertake a Flood Risk Assessment and drainage strategy for a proposed development comprising 6 residential dwellings at the above site. The Ordnance Survey grid reference for the site is 494296, 099738 and the nearest postcode is PO22 8AT. Attached is a location plan for your information.

With regards to completing a Flood Risk Assessment in compliance with the National Planning Policy Framework (NPPF), please could the Environment Agency provide the following information, where available.

Information required for the FRA:

- 1 Predicted flood levels for the site. If predicted flood levels are available, please could the Environment Agency confirm that these levels are suitable for use in a formal Flood Risk Assessment.
- 2 Please can you confirm the status of any hydraulic modelling undertaken on the watercourse in the vicinity of the site (Aldingbourne Rife). Can you also confirm that the output from this modelling is fit for purpose in terms of undertaking a flood risk assessment.
- 3 A detailed fluvial flood map for the area. We already have access to the Agency's Flood Maps provided on the Government's website.
- 4 A detailed surface water flood map for the area. Please could the Environment Agency confirm the level of risk to the site from surface water flooding. We already have access to the Risk of Flooding from Surface Water Maps on the Government's website.
- 5 Historical records of flooding at or within the vicinity of the site, including groundwater flooding. If the Environment Agency does not hold any records, please can you confirm that the site has no record of flooding in the past.
- 6 Significant hydraulic structures in the area that might control the flow.
- 7 Recent channel and hydraulic structure survey data for the watercourses and hydraulic structures in the site's vicinity. If this information is available, please can the Environment Agency provide the cost of acquiring this data.
- 8 The Aquifer classification for the area.
- 9 Protection Zones at or within 500m of the site.
- 10 Groundwater levels on or within 500m of the site.
- 11 Any additional flood data or policy the Environment Agency considers useful for the above site, including any previous historical agreements associated with this specific development site.

Please can the Environment Agency also confirm the following in order to inform the Flood Risk Assessment:

- 1 The River Basin Management Plan the site is located within.
- 2 The Flood Catchment Management Plan the site is located within.
- 3 The site is shown to be located within Flood Zone 3 associated with the Aldingbourne Rife.
- 4 The specific freeboard requirement above the 1 in 100 year climate change flood level for all structures constructed on site (typically residential dwellings).

Kind regards,

Emiliya Stoykova MEng (Hons) MSc GradCIWEM

Assistant Engineer - Water



Mountbatten House, Basing View
Basingstoke, Hampshire
RG21 4HJ

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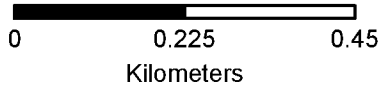


Legend

- Main River
- 5% AEP (Defended Fluvial)
- 1% AEP (Defended Fluvial)
- 0.1% AEP (Defended Fluvial)

Annual Exceedance Probability (AEP) The probability of a flood of a particular magnitude, or greater occurring in any given year.

Scale: 1:10,000



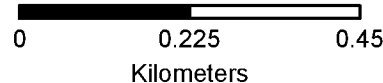


Legend

- Main River
- 1% AEP (Undefended Fluvial)
- 0.1% AEP (Undefended Fluvial)

Annual Exceedance Probability (AEP) The probability of a flood of a particular magnitude, or greater occurring in any given year.

Scale: 1:10,000







Environment
Agency



Legend

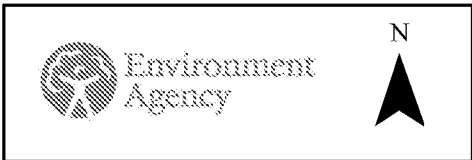
- Main River
- Defended 1% AEP plus Climate Change (45%)
- Defended 1% AEP plus Climate Change (105%)

Annual Exceedance Probability (AEP) The probability of a flood of a particular magnitude, or greater occurring in any given year.

Scale: 1:10,000



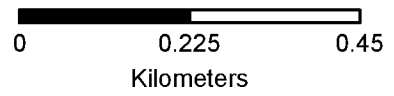
00.2250.45
Kilometers



- Legend**
- Main River
 - Undefended 1% AEP plus Climate Change (45%)
 - Undefended 1% AEP plus Climate Change (105%)

Annual Exceedance Probability (AEP) The probability of a flood of a particular magnitude, or greater occurring in any given year.

Scale: 1:10,000



Product 4 Flood Risk Data Requested by: WSP

Site: 94 - 100 Hook Lane, Bognor Regis, PO22 8AT

Table 1: Water Levels: Fluvial Defended

Node Ref	NGR		Modelled Flood Levels in Metres AOD Defended Annual Exceedance Probability			
	Eastings	Northings	1%	0.1%	1% + CC (45%)	1% + CC (105%)
1	494326	99775	-	-	-	-
2	494303	99770	-	-	-	-
3	494333	99755	-	-	-	-
4	494295	99748	-	-	-	-
5	494334	99715	-	1.93	1.72	1.93
6	494292	99720	-	1.93	1.74	1.93
7	494336	99676	-	-	-	-
8	494289	99698	-	1.93	1.73	1.93

Table 2: Water Levels: Fluvial Undefended

Node Ref	NGR		Modelled Flood Levels in Metres AOD Undefended Annual Exceedance Probability			
	Eastings	Northings	1%	0.1%	1% + CC (45%)	1% + CC (105%)
1	494326	99775	-	-	-	-
2	494303	99770	-	-	-	-
3	494333	99755	-	-	-	2.19
4	494295	99748	-	-	-	-
5	494334	99715	-	2.19	1.75	2.19
6	494292	99720	-	2.22	1.77	2.19
7	494336	99676	-	-	-	2.19
8	494289	99698	-	2.22	1.77	2.19

Table 3: Water Depth: Fluvial Defended

Node Ref	NGR		Modelled Flood Depths in Metres			
	Eastings	Northings	Defended Annual Exceedance Probability			
			1%	0.1%	1% + CC (45%)	1% + CC (105%)
1	494326	99775	-	-	-	-
2	494303	99770	-	-	-	-
3	494333	99755	-	-	-	-
4	494295	99748	-	-	-	-
5	494334	99715	-	0.53	0.32	0.53
6	494292	99720	-	0.45	0.26	0.45
7	494336	99676	-	-	-	-
8	494289	99698	-	0.49	0.29	0.49

Table 4: Water Depth: Fluvial Undefended

Node Ref	NGR		Modelled Flood Depths in Metres			
	Eastings	Northings	Undefended Annual Exceedance Probability			
			1%	0.1%	1% + CC (45%)	1% + CC (105%)
1	494326	99775	-	-	-	-
2	494303	99770	-	-	-	-
3	494333	99755	-	-	-	0.19
4	494295	99748	-	-	-	-
5	494334	99715	-	0.58	0.35	0.79
6	494292	99720	-	0.50	0.29	0.71
7	494336	99676	-	-	-	0.16
8	494289	99698	-	0.54	0.32	0.75

All levels taken from: 2015 Aldingbourne Flood Risk Mapping Study by JBA Consulting. New climate change allowances taken from 2017 Aldingbourne Climate Change Modelling by JBA Consulting.

Produced on: 23/08/2018

There is no additional information or health warnings for these levels/depths or the model from which they have been produced.

Under normal conditions flow from the Aldingbourne Rife is conveyed under the sea wall via two gravity outfall structures which have tidal flaps. When tidal conditions and river flows dictate, flow is pumped over the sea wall by Felpham pumping station to discharge into a stilling bay on the upper foreshore. [From section 1.2]

There are no other raised defences identified in the Aldingbourne catchment. However, Felpham pumping station has been identified as a defence as an inland pumping station. Therefore, both defended (pumps running) and undefended (Felpham pumping station removed) design modelling was completed as part of the study. [From section 1.2.1]

The main flood risks along the study reach are considered to be a result of flood water exceeding bankfull levels and spilling onto the floodplain and urban area, or from rainfall exceeding sewer capacity leading to surface water runoff. [From section 3.1.2]

There are no formal defences in the Aldingbourne catchment, but as noted in section 1.2.1, Felpham pumping station is considered to be a defence and was therefore removed from the undefended model. As a result, the only outfall in operation at Felpham was the gravity outfall which is susceptible to tide locking. [From section 7.1.6]

Arun District Council
Development Control
1, Arun Civic Centre Maltravers Road
Littlehampton
West Sussex
BN17 5LF

Our ref: HA/2018/120569/02-L01
Your ref: BR/139/18/OUT
Date: 18 September 2018

Dear Sir/Madam

Additional information outline application with some matters reserved for the demolition of 1 no. Existing dwelling to form access for 6 no. Residential dwellings

Rear of 94-100 Hook Lane, Bognor Regis, PO22 8AT

Thank you for consulting the Environment Agency on the above application.

Environment Agency Position

Following the submission of a suitable flood risk assessment we are happy to **remove our objection subject to the inclusion of the following 3 conditions**, in any permission granted.

We consider that planning permission could be granted to the proposed development, as submitted, if the following planning conditions are included as set out below. Without these conditions, the proposed development on this site poses an unacceptable risk to the environment and we would object to the application.

Condition 1 – Floodplain compensation

No development approved by this planning permission shall take place until such time as a floodplain compensation scheme has been submitted to, and approved in writing by, the local planning authority.

The scheme shall be fully implemented and subsequently maintained, in accordance with the timing / phasing arrangements embodied within the scheme, or within any other period as may subsequently be agreed, in writing, by the local planning authority.

Condition 2 – Design and maintenance regime for proposed voids

No development approved by this planning permission shall take place until such time as information on detailed design and maintenance regime for the proposed voids beneath the buildings (including size, location and appearance) has been submitted to, and approved in writing by, the local planning authority.

Environment Agency
Canal Walk, ROMSEY, Hampshire, SO51 7LP.

[Redacted signature block]

Cont/d..

Reason for condition 1 and 2

To reduce the risk of flooding to the proposed development and future users and to prevent flooding elsewhere by ensuring that compensatory storage of flood water is provided in line with section 9 of the Planning Practice Guidance of the National Planning Policy Framework (NPPF) for Flood Risk and Coastal Change.

Condition 3 – Implementation of Flood Risk Assessment

The development permitted by this planning permission shall be carried out in accordance with the approved Flood Risk Assessment (FRA) (WSP, July 2018) and letter dated 28/08/2018, and the following mitigation measures detailed within the FRA:

- Finished floor levels are set no lower than 300mm above 2.19m AOD (above Ordnance Datum).

The mitigation measures shall be fully implemented prior to occupation and subsequently in accordance with the timing / phasing arrangements embodied within the scheme, or within any other period as may subsequently be agreed, in writing, by the local planning authority.

Reason for condition 3

To reduce the risk of flooding to the proposed development and future occupants in line with section 9 of the Planning Practice Guidance of the National Planning Policy Framework (NPPF) for Flood Risk and Coastal Change.

Advice to Local Planning Authority/Applicant

Flood proofing measures

We recommend that consideration be given to use of flood proofing measures to reduce the impact of flooding when it occurs. Flood proofing measures include barriers on ground floor doors, windows and access points and bringing in electrical services into the building at a high level so that plugs are located above possible flood levels.

Consultation with your building control department is recommending when determining if flood proofing measures are effective.

Reference should also be made to the Department for communities and local Government publication 'Preparing for Floods' go to: <http://www.planningportal.gov.uk/uploads/odpm/4000000009282.pdf> as well as the communities and local Government publication 'Improving the flood performance of new buildings' which can be viewed at: <http://www.communities.gov.uk/publications/planningandbuilding/improvingflood>.

Void/stilt design

Voids or stilts should be designed to allow the free flow of water up to and including the 1 in 100 flood event, with an allowance for climate change. Openings should be designed to be as large as feasible within the proposed development. This is to reduce the risk of the void openings becoming blocked by debris during a flood which could subsequently increase risk to third parties.

It is imperative that the void space beneath the dwelling is kept free from debris throughout the lifetime of the development. This enables the voids to fulfil their flood storage role. The local planning authority should be satisfied that this is achievable and may wish to consider including a condition on any decision notice where permission is granted or requiring the applicant to enter into a legal agreement.

It should be demonstrated to the satisfaction of the local planning authority that the stilts/voids are a suitable form of mitigation.

The FRA should explain why other forms of floodplain compensation are not possible and

Cont/d..

provide the detailed design and maintenance regime for the proposed voids.

Safe access and egress

The Environment Agency does not normally comment on or approve the adequacy of flood emergency response procedures accompanying development proposals, as we do not carry out these roles during a flood. Our involvement with this development during an emergency will be limited to delivering flood warnings to occupants/users covered by our flood warning network.

The Technical Guide to the National Planning Policy Framework (paragraph 9) states that those proposing developments should take advice from the emergency services when producing an evacuation plan for the development as part of the flood risk assessment.

In all circumstances where warning and emergency response is fundamental to managing flood risk, we advise local planning authorities to formally consider the emergency planning and rescue implications of new development in making their decisions.

Should you have any further queries please do not hesitate to contact me.

Yours faithfully

Miss Suz Greenwood
Planning Advisor, Environment Agency

[REDACTED]

[REDACTED]

cc Counterpoint Properties Ltd

Appendix B.2

ARUN DISTRICT COUNCIL



From: [REDACTED] <[REDACTED]@arun.gov.uk>
Sent: 29 June 2018 13:02
To: [REDACTED]
Cc: [REDACTED]
Subject: RE 94 - 100 Hook Lane, Bognor Regis FRA Enquiry

[REDACTED]
Thank you for your enquiry.

As you state the site is within flood zone 3. I would therefore recommend you contact the Environment Agency with a Product 4 (or higher) data request.

Our records show there is a watercourse running to the rear of the properties, this may be culverted, the exact location and condition of this should be identified early. And discussions held with us.

We hold no historic flooding records.

The site is at risk of surface water flooding and I recommend that you look at the SFRA on our website which details the risk of surface water flooding further.

Regards,

[REDACTED], MEng, GMICE
Engineer (Drainage & Coastal)

[REDACTED] | Engineer (Drainage & Coastal), Engineering Services, [Arun District Council](#) | Location: First Floor, Arun Civic Centre, Maltravers Road, Littlehampton, BN17 5LF
Internal: [REDACTED] | External: +44 (0) [REDACTED] | Fax: +44 (0) [REDACTED] | E-mail: [REDACTED]@arun.gov.uk
Arun is Working in Partnership with Chichester District Council
Visit Arun's web site at <http://www.arun.gov.uk/> and www.chichester.gov.uk



Save the environment - think before you print

From: [REDACTED] On Behalf Of Planning
Sent: 22 June 2018 10:49
To: Land Drainage
Subject: FW: 94 – 100 Hook Lane, Bognor Regis FRA Enquiry

[REDACTED] | Technical Support Manager, Planning Department, [Arun District Council](#) | Location: First floor, Arun Civic Centre, Maltravers Road, Littlehampton, BN17 5LF
Internal: [REDACTED] | External: +44 (0) [REDACTED] | E-mail: [REDACTED]@arun.gov.uk
Visit Arun's web site at www.arun.gov.uk



Save the environment - think before you print

From: [REDACTED] [mailto:[REDACTED]@wsp.com]
Sent: 19 June 2018 12:02
To: Planning
Subject: 94 – 100 Hook Lane, Bognor Regis FRA Enquiry

Dear Sirs,

94 – 100 Hook Lane, Bognor Regis

Flood Risk Assessment – Enquiry

We have been instructed by our client to carry out an assessment of flood risk at the above site. The Proposed Development is to build 6 units at the site above.

We are writing to request the Lead Local Flood Authority provide any flood risk and flood defence data and information with respect to the above site and any other pertinent information or opinion regarding development at the application site. The Ordnance Survey grid reference for the site is 494296, 099738 and the nearest postcode is PO22 8AT.

From a review of data on the Environment Agency's Website we understand the site lies within Flood Zone 3.

Please could Arun District Council provide:

1. Flood risk and flood defence data and information with respect to the above site
2. Other pertinent information or opinion regarding development at the application site.
3. Historic records of flooding in the vicinity of the site.
4. Any assets or features which could significantly influence local flooding.

If you have any queries or require any further information from WSP please do not hesitate to get in contact

Kind regards,

 **MEng (Hons) MSc GradCIWEM**
Assistant Engineer - Water



T+ 44 (0) 

Mountbatten House, Basing View
Basingstoke, Hampshire
RG21 4HJ

wsp.com

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WSP UK Limited, a limited company registered in England & Wales with registered number 01383511. Registered office: WSP House, 70 Chancery Lane, London, WC2A 1AF.

<http://www.arun.gov.uk>

DX 57406 Littlehampton

You can view Arun District Council's Privacy Policy from <https://www.arun.gov.uk/privacy-policy>

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