



PROPOSED REDEVELOPMENT

**26-28 SURREY STREET
LITTLEHAMPTON
WEST SUSSEX
BN17 5BG**

SITE SPECIFIC FLOOD RISK ASSESSMENT

ISSUE 1

NOVEMBER 2017



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Issue	Copies	Distribution	Format	Date	Status
1	1	Chris Purdy MH Architects	By email: cjp@mharchitects.co.uk	1 November 2017	Draft for comment
1	1	Chris Purdy MH Architects	By email: cjp@mharchitects.co.uk	10 November 2017	Issue 1

1.0 EXECUTIVE SUMMARY

- 1.1.1 This document reports upon the flood risk associated with the proposed three storey property at 26-28 Surrey Street Littlehampton, following demolition of the existing building.
- 1.1.2 The development includes removal of a continuous boundary wall to the rear of the property. This will reduce flood water displacement by decreasing the footprint of the proposed building from 175m² to 115m² approximately. The total site area is approximately 330m².
- 1.1.3 The Environment Agency's flood mapping indicates that the site lies within flood zone 3, with tidal flooding from the River Arun the primary flood risk. The property has a 1 in 200 [0.5% AEP] chance of flooding in any one year for both defended and undefended flood scenarios.
- 1.1.4 This desktop study concludes that the flood risk to future occupants of the proposed flat would be very low in the context of flood risk within the conurbation of Littlehampton, West Sussex.

2.0 INTRODUCTION

2.1 Property Description

2.1.1 This Flood Risk Assessment [FRA] supports the proposed development of a three storey property at 26-28 Surrey Street Littlehampton, following demolition of the existing building at the site shown in Figure 1. The proposed new three storey building comprises a retail space and carpark at ground floor level, and three flats within the upper two storeys.

2.1.2 The property lies close to the town centre of Littlehampton. The local postcode is BN17 5BG.

2.2 Limitations

2.2.1 Nothing in this report confers or purports to confer on any third party, any benefit or any right to enforce any term of this report pursuant to the Contract [Rights of Third Parties Act] 1999.

2.3 Terms of Reference

2.3.1 This report comprises a Level 1 (Screening Study) FRA in accordance with the requirements and guidance of:

- The National Planning Policy Framework
- Technical Guidance to the National Planning Policy Framework
- Flooding – Engineering Resilience, ICE
- Flood Risks to People – FD2321/TR2 DEFRA

2.4 Flood Risk in Summary

2.4.1 According to the Environment Agency's flood mapping 26-28 Surrey Street lies within Flood Zone 3, a tidal flood plain. Statistically the likelihood of flooding from the sea is 0.5% or a 1 in 200 chance of flooding each year.

2.5 Summary of Brief

2.5.1 In accordance with the Client's specific objectives, the purpose of this report is primarily:

- (i) To provide a record of all current and future sources of flood risk affecting the site.
- (ii) Identify whether any flooding or surface water management issues exist that may warrant further consideration or may affect the feasibility of the development.
- (iii) To advise on exceptional flooding events that may have an influence on developing the site.



Figure 1: Aerial view of site.

3.0 SOURCES OF INFORMATION

3.1 Desk Top and Site Based Research

3.1.1 The flood risk assessment research comprised:

Site Information	YES	NO
Review of Information supplied by Client	✓	
Site walkover		✓
Preliminary discussion with owner/occupier		✓

Public Domain Information	YES	NO
Geological Mapping		✓
Statutory Services Information		✓
Local Authority enquiry		✓
Strategic Flood Risk Assessment	✓	
Topographic site survey		✓
Internet data	✓	
Anecdotal flooding information		✓
Aerial photographs	✓	
LIDAR Survey		✓
Historic mapping		✓

Key: NA = Not applicable
NR = No records available
AR = Awaiting response

3.2 Environment Agency Flood Mapping

3.2.1 The Environment Agency's flood mapping indicates the site lies within flood zone 3, with tidal flooding from the River Arun the primary flood risk. The site has a 1 in 200 annual probability of tidal flooding with and without defences.

3.2.1 Modelled flood depths local to 26-28 Surrey Street lie in the order of 1.0m to 1.3m for defended and undefended flood scenarios. These estimates account for the increase in flood water depth due to climate change until the year 2115.

4.0 SITE DETAILS

4.1 Proposed Development

4.1.1 The site is situated close to the town centre of Littlehampton. The site is approximately 100m east of the river Arun and 600m north of the sea.

4.1.2 The existing building is not currently occupied. The ground floor of the building was used for commercial purposes and it is likely that the top floor and converted loft space were used for residence.

4.1.3 The proposed development comprises a retail space and car park at ground floor level and three flats within the upper two storeys.

4.1.4 The development includes removal of a continuous boundary wall to the rear of the property, as can be seen in Figure 1. This will reduce flood water displacement by decreasing the impermeable flood area of the proposed building from 175m² to 115m² approximately. The total site area is approximately 330m².

5.0 POTENTIAL FLOOD HAZARDS

5.1 Flooding from River Arun and Sea

5.1.1 The primary flood risk is tidal flooding from the River Arun. The site lies within the flood plain of the River Arun and has a 1 in 200 [0.5% AEP] chance of flooding in any one year both with and without flood defences.

5.1.2 The Arun to Adur Flood Model produced in 2012 and updated in 2015 indicates that flood depths local to 26–28 Surrey Street would in the year 2115 lie in the region of 1.0m to 1.3m, with flood levels in the order of 4.9m AOD.

5.1.3 Given the proximity of the flood plain to 26-28 Surrey Street the most likely course of action to be taken by residential tenants would be to sit out the flood event, which would be expected to last no longer than 12 hours for one full tidal cycle.

5.2 Flooding from Land

5.2.1 Land flooding results from intense rainfall that is unable to soak into the ground or enter drainage systems.

5.2.2 The Environment Agency's flood mapping indicates the site is at very low risk of surface flooding, indicating that each year this area has a chance of land flooding of less than 0.1%.

5.3 Flooding from Groundwater

5.3.1 The Arun District Council SFRA indicates that the risk of groundwater flooding is high local to the proposed development.

5.3.2 No on-site geotechnical investigation has been undertaken for the property.

5.3.3 The risk of flooding posed to the inhabited upper two stories of the development is deemed low.

5.4 Flooding from Sewers

5.4.1 Flooding can result when a sewer is overwhelmed by heavy rainfall, groundwater, becomes blocked or is of inadequate capacity. Historic records show that multiple sewer floods have occurred in the region.

5.4.2 The effectiveness of local sewers would be adversely affected by river flooding.

5.4.3 The risk of sewer flooding posed to the inhabited upper two stories of the development is deemed low.

5.5 Flooding from Reservoirs, Canals and other Manmade Sources

5.5.1 The site is located well away from any manmade water sources. The probability of this type of flooding occurring is therefore considered to be remote.

6.0 FLOOD MITIGATION MEASURES

6.1.1 The proposed development comprises a retail space and car park at ground floor level. As the ground floor will be at risk of flooding, the following resilient construction measures should be considered to reduce flood risk:

- (i) Installing flood barriers over doors. Discreet systems can be employed which would not detract from the aesthetics of the development.
- (ii) Providing ground floor electrical sockets at levels as high as practicable above ground floor level, would reduce the risk of electrical damage during a flood event.
- (iii) Gas and electricity meters should be sited relatively high to prevent water damage during a flood event.
- (iv) Avoid use of laminate covered, medium density fibreboard or chipboard as part of any ground floor works, as these materials damage easily when wet.
- (v) Avoid use of plasterboard in the lower ground floor areas. This would reduce time consuming remedial works during a flood event.
- (vi) Ensure possible water entry points are sealed. Such routes include openings for electricity, gas and water. Telescopic air bricks venting to the outer leaf should be set at an elevated height.
- (vii) All foul and surface water inspection covers within the property should be replaced with lockable gas and water tight units. Additionally, open rainwater pipe inlet gullies should be replaced with sealed units.
- (viii) The owner/occupier should sign up to the Environment Agency's Flood Line Warnings Direct Scheme.

6.1.2 Proposed ground floor levels should be set as high as practicable.

- 6.1.3 Emergency access can be sought towards the north of Surrey Street, noting that the North end of the road (100m away) is within flood zone 1 and at less probability of flooding. At the estimated peak water depth of 1.3m, access by boat would be required. As the site of 26-28 Surrey Street lies to the northern extent of the tidal flood plain it is most likely that the local speed of flood waters will be low and therefore safe to traverse.

7.0 DISCUSSIONS AND CONCLUSIONS

7.1.1 Predicted tidal flood levels local to 26–28 Surrey Street in the year 2115 lie in the region of 4.9m AOD. Highway levels fronting the property are approximately 3.6m AOD, resulting in a predicted ground floor flood depth of approximately 1.3m. The ground floor is therefore at risk of flooding.

7.1.1 Assuming that the first floor level is 2.5m above ground floor level, the first floor flat level will lie approximately 1.2m above the estimated flood level of 4.9m AOD.

7.2 Conclusion

7.2.1 The property at 26-28 Surrey Street is located within flood zone 3. Its primary flood risk is tidal flooding from the River Arun. The property has a 1 in 200 [0.5% AEP] chance of flooding in any one year both with and without flood defences.

7.2.2 The proposed new three storey building comprises a retail space and car park at ground floor level, and three flats within the upper two storeys. The development decreases the footprint of the proposed building from approximately 175m² to 115m².

7.2.3 The uninhabited ground floor is at risk of flooding. Any flood damage incurred at this level will be reduced if the recommended flood resilient construction measures are implemented.

7.2.4 The proposed first floor flats will lie above the tidal flood levels predicted for the year 2115. Therefore the flats can be considered reasonably safe from flooding.

Prepared by: James Teuten CEng, MIMechE, MEng, ACGI

Checked by: Jon Lord BEng (Hons)

Date: 10 November 2017

APPENDIX A
Environment Agency Flood Mapping Data

James Teuten
Archibald Shaw
One Little London
Chichester
West Sussex
PO19 1PP

Our ref: SSD62530

Date: 31/10/17

Dear James Teuten,

Enquiry regarding Product 4 for 26-28 Surrey Street, Littlehampton, BN17 5BG

Thank you for your enquiry which was received on 9/10/17.

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 property is in an area located within Flood Zone 2 & 3 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 steel sheet piling with a concrete cap. The Asset ID is 463061. The actual downstream crest level is 3.39, and the actual upstream is 3.94. The estimated standard of protection is 1 in 75 (1.3% AEP). The estimated condition grade is 3. This is maintained privately.

Model Information

The model used was the Arun to Adur Coastal Model which was completed in 2012 by JBA Consulting.

Flood History

We hold no record of flooding within the site, but a nearby area approximately 100m South West of the site was previously flooded in 1983 (Flood Event Code: 2068), and the cause was over topping of the defences from the main river.

Please note our records are not comprehensive and may not include all events. I recommend contacting the Lead Local Flooding 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 26-28 Surrey Street, Littlehampton, BN17 5BG
Licence	<u>Open Government Licence</u>
Information Warnings	No information warnings.
Information Waring - 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](#)

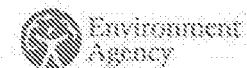
Please get in touch if you have any further queries or contact us within two months if you'd like us to review the information we have sent.

Yours sincerely,

Leanne Prentice

FCRM Officer – PSO West Sussex

Flood Map for Planning (Rivers and Sea). Centred on BN17 5BG. Created 17/10/17.



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:

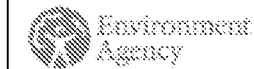
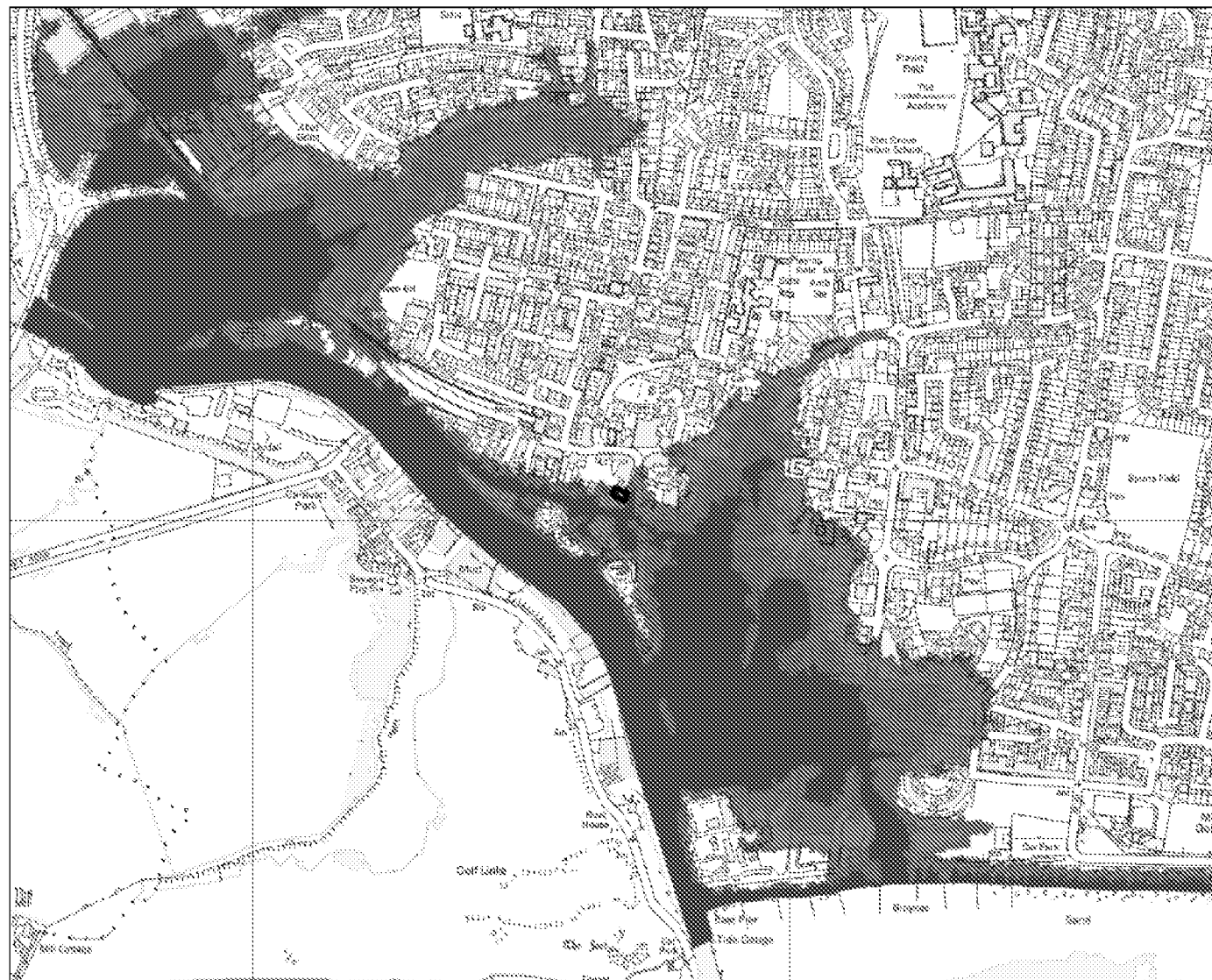
- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year

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.

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Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03705 505 505 (Mon-Fri 9-5). Email: enquiries@environment.agency.gov.uk

Modelled Flood Outlines (Un defended Tidal) Map. Centred BN17 5BG. Created 25/10/2017.

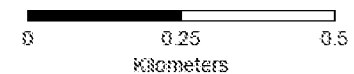


Legend

-  Site Boundary
-  5% AEP (2012) (Un defended)
-  1.3% AEP (2012) (Un defended)
-  0.5% AEP (2012) (Un defended)
-  0.1% AEP (2012) (Un defended)

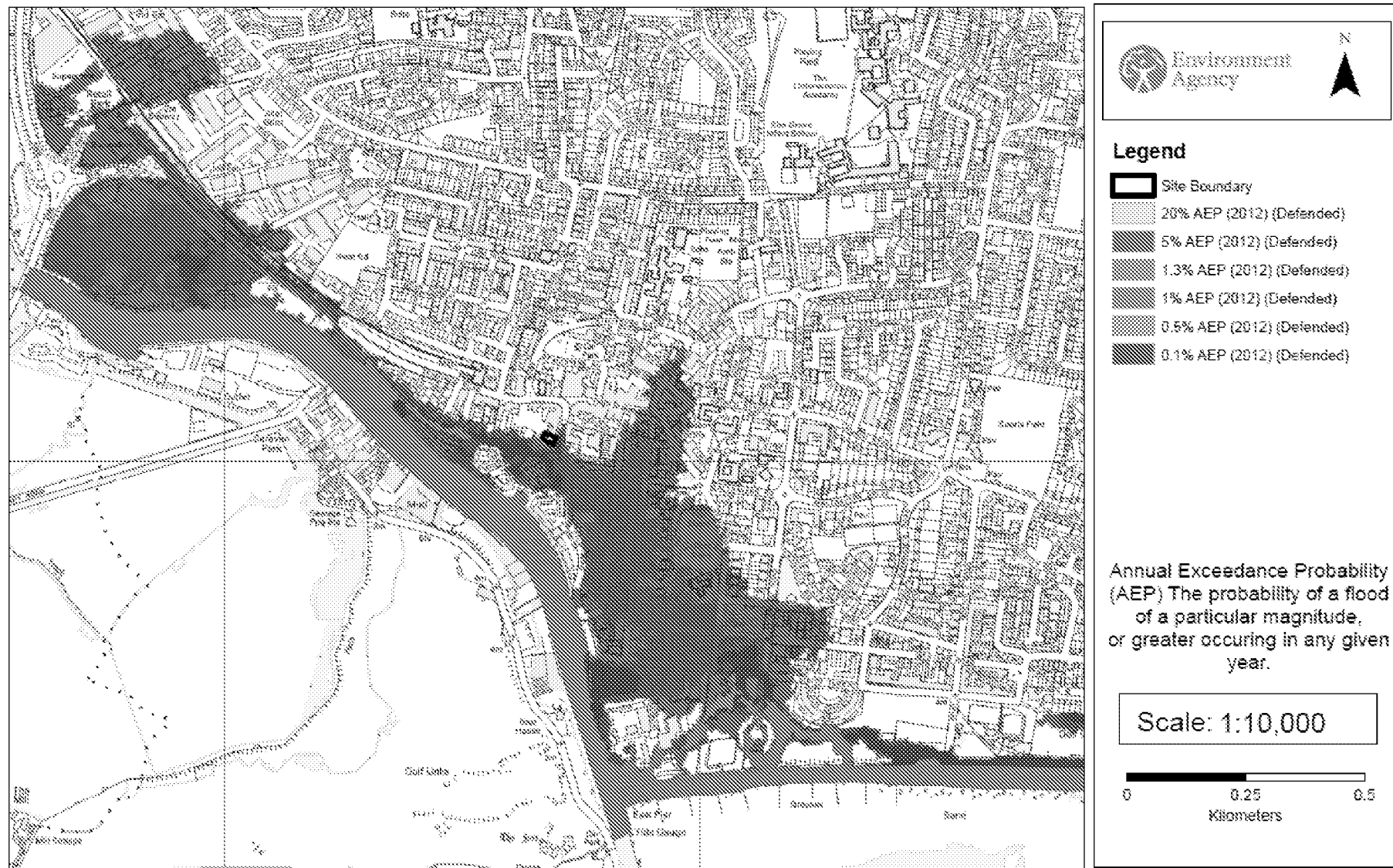
Annual Exceedance Probability (AEP) The probability of a flood of a particular magnitude, or greater occurring in any given year.

Scale: 1:10,000



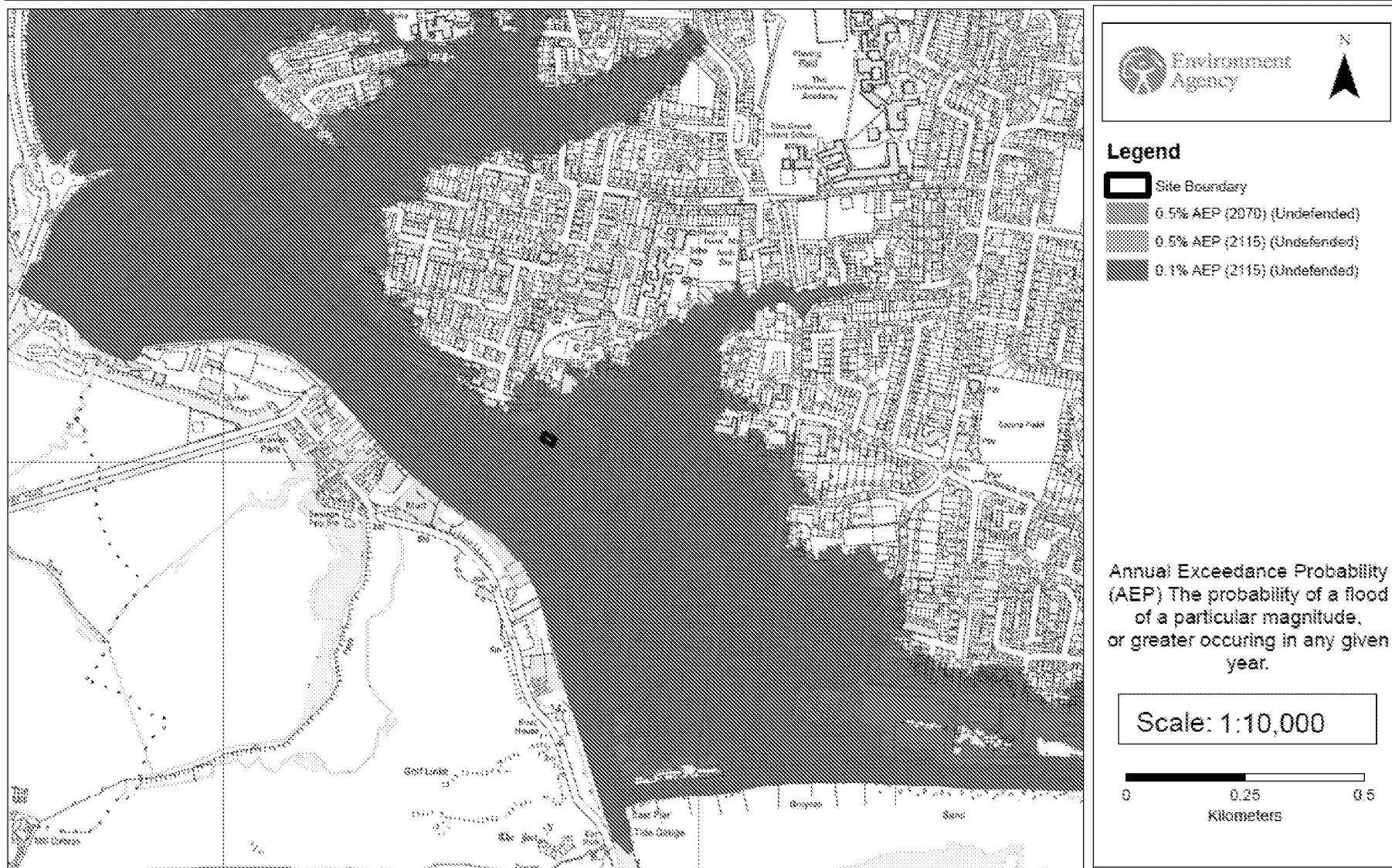
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Modelled Flood Outlines (Defended Tidal) Map. Centred BN17 5BG. Created 25/10/2017.



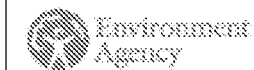
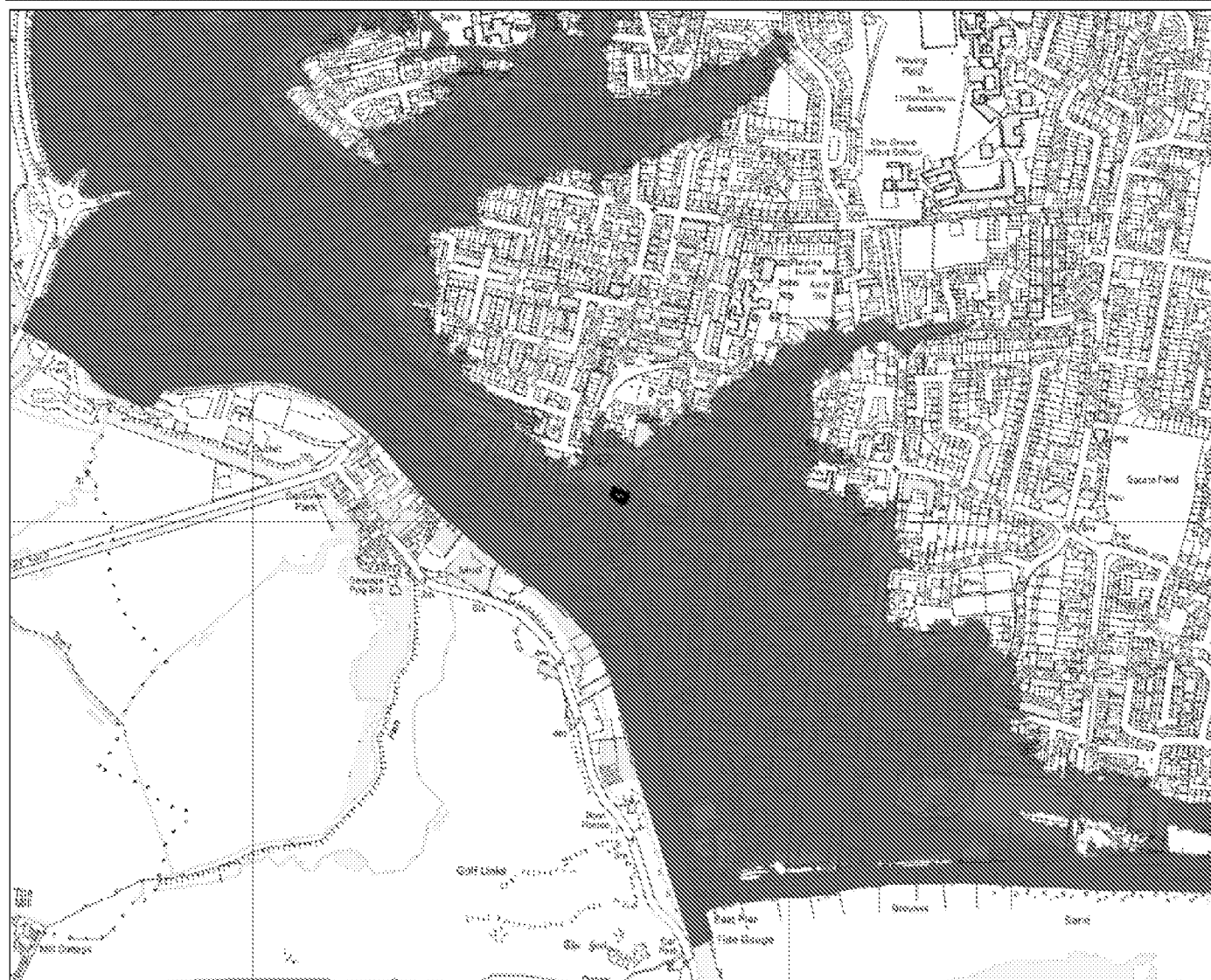
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Modelled Flood Outlines (Undefended Tidal, 2115, 2070) Map. Centred BN17 5BG. Created 25/10/2017.



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Modelled Flood Outlines (Defended Tidal, 2115, 2070) Map. Centred BN17 5BG. Created 25/10/2017.

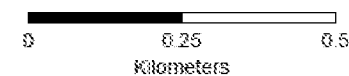


Legend

-  Site Boundary
-  0.5% AEP (2070) (Defended)
-  0.5% AEP (2115) (Defended)
-  0.1% AEP (2115) (Defended)

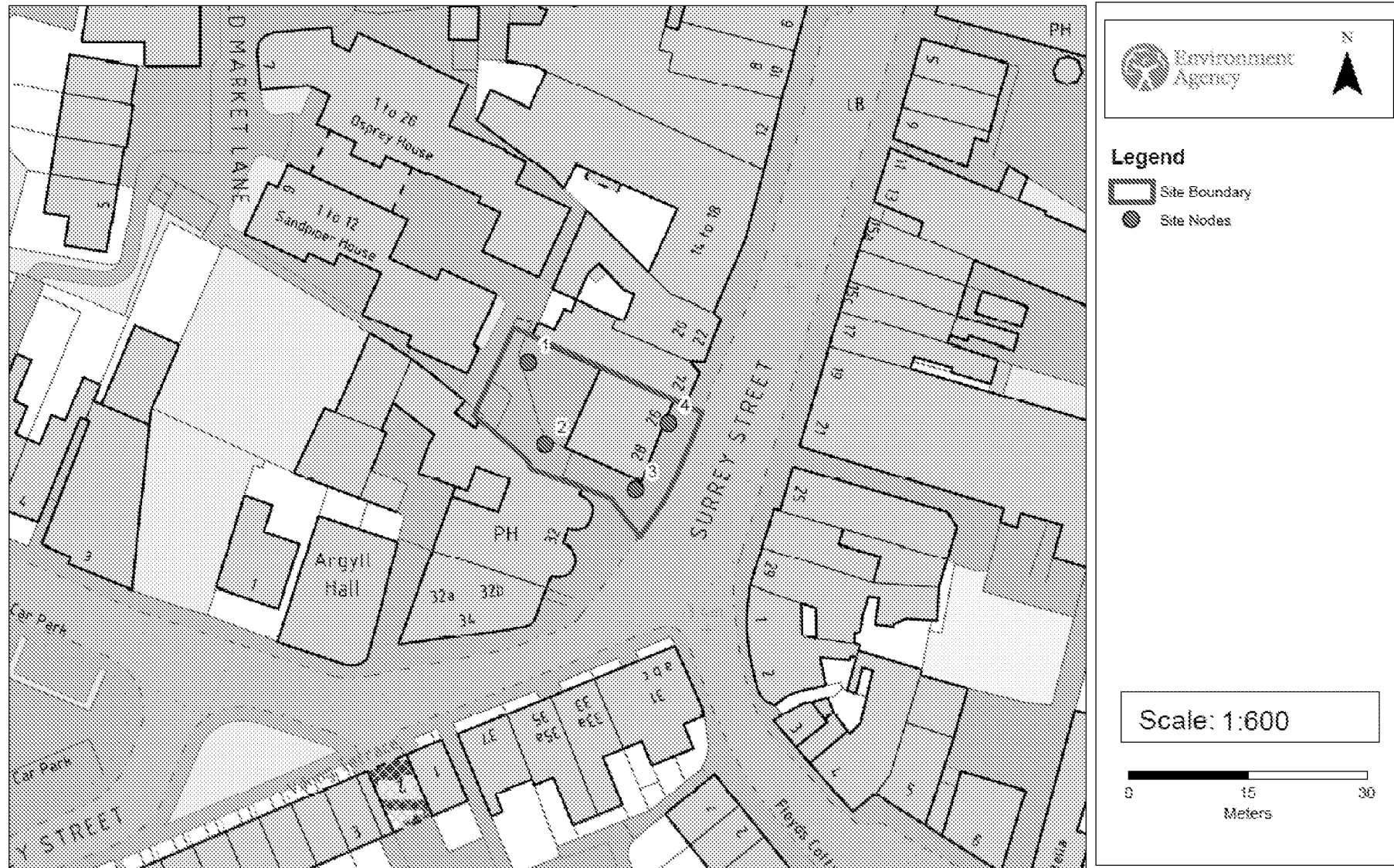
Annual Exceedance Probability (AEP) The probability of a flood of a particular magnitude, or greater occurring in any given year.

Scale: 1:10,000



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FRA Site Boundary & Node Points Map. Centred BN17 5BG. Created 25/10/2017.



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Product 4 Flood Risk Data Requested by: Archibald Shaw

Site: 26-28 Surrey Street, Littlehampton, BN17 5BG

Table 1: Water Levels: Tidal Undefended

Node Reference	NGR		Modelled Flood Levels in Metres				
	Eastings	Northings	Undefended Annual Exceedance Probability				
			5%	1.3%	0.5%	0.5% (2115)	0.1%
1	502674	102056	N/A	N/A	N/A	4.92	4.05
2	502677	102045	N/A	N/A	N/A	4.92	4.05
3	502688	102039	N/A	N/A	N/A	4.92	4.05
4	502692	102048	N/A	N/A	N/A	4.92	4.05

Table 2: Water Levels: Tidal Defended

Node Reference	NGR		Modelled Flood Levels in Metres				
	Eastings	Northings	Defended Annual Exceedance Probability				
			5%	0.5%	0.5% (2115)	0.1%	0.1% (2115)
1	502674	102056	N/A	N/A	4.88	N/A	5.08
2	502677	102045	N/A	N/A	4.88	N/A	5.08
3	502688	102039	N/A	N/A	4.88	N/A	5.08
4	502692	102048	N/A	N/A	4.88	3.57	5.08

Table 3: Water Depth: Tidal Undefended

Node Reference	NGR		Modelled Flood Depth in Metres				
	Eastings	Northings	Undefended Annual Exceedance Probability				
			5%	1.3%	0.5%	0.5% (2115)	0.1%
1	502674	102056	N/A	N/A	N/A	1.00	0.13
2	502677	102045	N/A	N/A	N/A	1.14	0.26
3	502688	102039	N/A	N/A	0.15	0.46	1.34
4	502692	102048	N/A	N/A	N/A	1.11	0.23

Office Address: Guildbourne House, Chatsworth Road, Worthing BN11 1LD.
 Customer services line: 03708 506 506. Email: enquiries@environment-agency.gov.uk
www.gov.uk/government/organisations/environment-agency

Table 4: Water Depth: Tidal Defended

Node Reference	NGR		Modelled Flood Depth in Metres				
	Eastings	Northings	Defended Annual Exceedance Probability				
			5%	0.5%	0.5% (2115)	0.1%	0.1% (2115)
1	502674	102056	N/A	N/A	0.96	N/A	1.16
2	502677	102045	N/A	N/A	1.09	N/A	1.30
3	502688	102039	N/A	N/A	1.29	N/A	1.50
4	502692	102048	N/A	N/A	1.06	N/A	1.27

All levels taken from: Arun to Adur Coastal Model

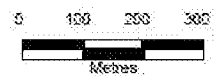
There is no additional information or health warnings for these levels/depths or the model from which they have been produced.

Produced on: 25/10/17

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 All recorded flood outlines

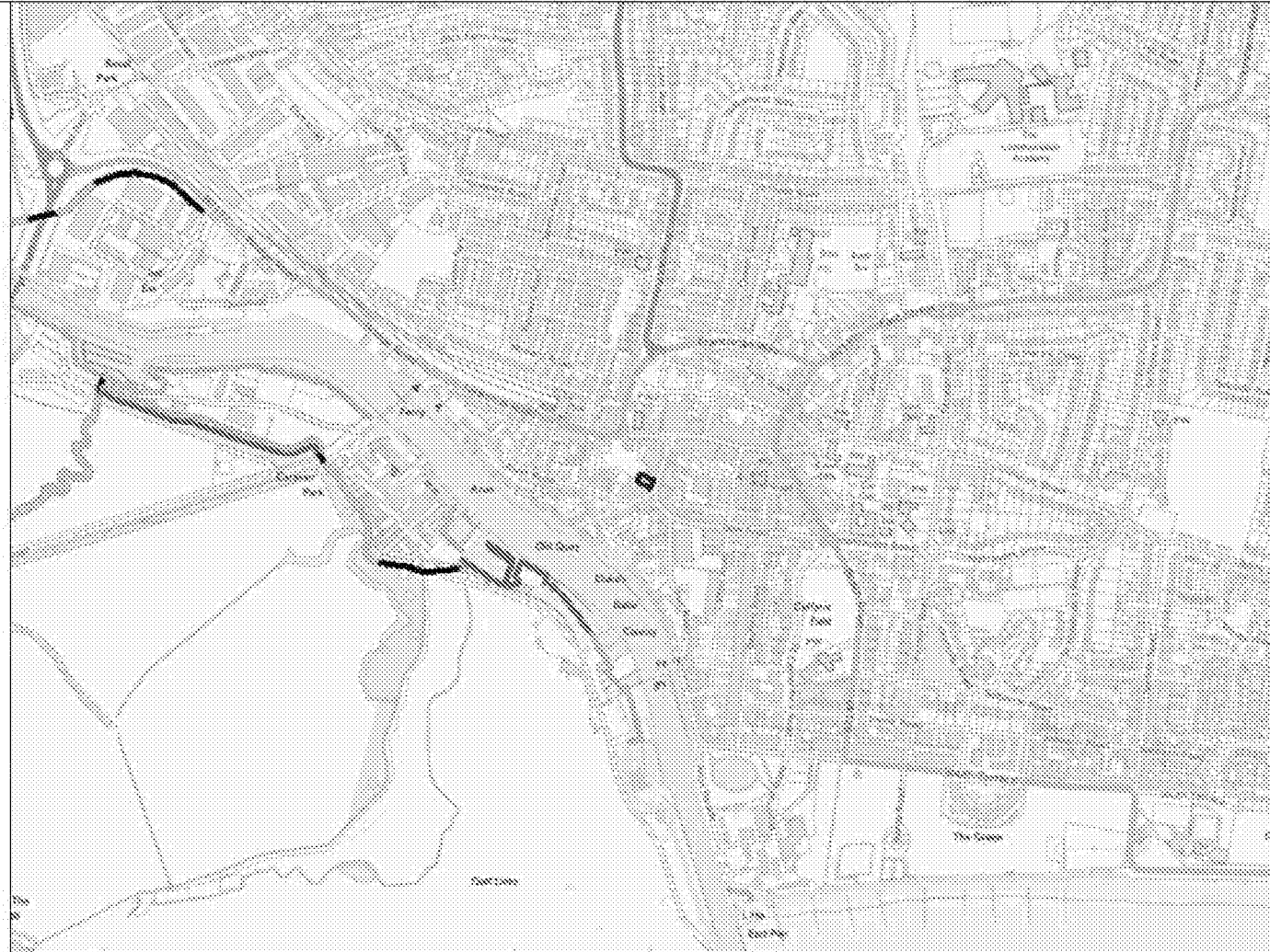


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Environment
Agency

References

-  Embankment
 Wall
 Flood Gate
 Demountable Defence
 Bridge Abutment
 High Ground
 Beach
 Barrier Beach
 Promenade
 Quay
 Cliff
 Dunes
 Culvert



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