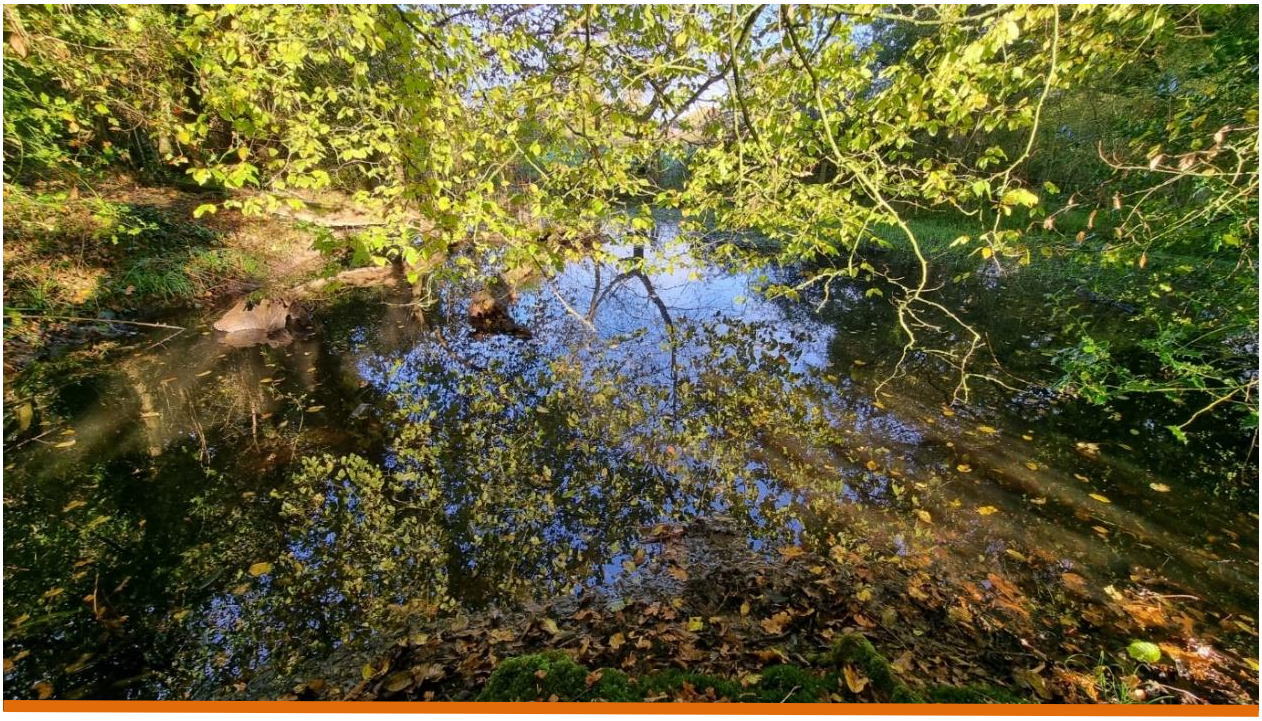

Flood Risk Assessment

The Barn Caravan Park, Old Salts Farm Road

Lancing BN15 8JG

Client

Mr/Ms J Pannell
The Barn Caravan Park
Old Salts Farm Road
Lancing BN15 8JG
Ref: 12051
Date: August 2022

Consulting Engineers

GTA Civils & Transport Limited
Gloucester House
66a Church Walk
Burgess Hill
RH15 9AS
Tel: 01444 871444

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1	Introduction	2
2	Existing Site and Current Flood Conditions	3
3	Proposed Development & SuDS Drainage Strategy	5

Schedule of Appendices

A	Site Location Map & Aerial Photo
B	Environment Agency Flood & Groundwater Maps
C	SFRA Flood Map
D	Architect's Scheme Drawings
E	Micro Drainage Calculation Sheets
F	Flood Warning and Evacuation Plan

Issue	Issue date	Compiled	Checked
Preliminary/First Issue	09 August 2022	JP	MR
Second Issue	14 August 2022	JP	MR
Third Issue	02 December 2022	JP	MR

1 Introduction

1.1 This report has been prepared for Mr/Ms J Pannell in relation to the proposed works at The Barn Caravan Park, Old Salts Farm Road, Lancing BN15 8JG. No responsibility is accepted to any third party for all or part of this study in connection with this or any other development.

1.2 GTA Civils and transport was appointed by its client to provide a Flood Risk Assessment (FRA) to support the planning application for proposed works at the above site.

1.3 This report will take the form of a formal Flood Risk Assessment in accordance with the 2021 National Planning Policy Framework (NPPF) and the current Planning Practice Guidance (PPG). Reference has been made of the 2020 Strategic Flood Risk Assessment (SFRA) and the 2008 SFRA – both published by Adur and Worthing Council.

1.4 The second version of this report has been prepared following an objection from the EA. Flood mitigation measures have been included – needed due to the possibility of the site flooding in the undefended scenario. Appendix F contains a Flood Warning and Evacuation Plan, which is deemed to be necessary, should the site flood in the undefended scenario.

1.5 The third version of this report has been prepared following the maintained objection by the EA. The house has been redesigned with a first floor that will act as a place of refuge.

1.6 The EA officer has agreed to the same approach for setting the first floor level as at a nearby development. This email exchange is contained in Appendix G. The first floor level can and will be set at 5.71m AOD (minimum).

2 Existing Site and Current Flood Conditions

2.1 The application site lies in Lancing, an area administered by Adur District Council (ADC). The site (measuring approximately 1.35ha) comprises a predominantly landscaped grass area for caravan pitches. There are a number of hardstanding tarmac areas including the administration office/dwelling next to the NW corner with parking plus an amenity (WCs/shower) block near the north boundary. The site includes an access road along the north boundary serving the fields to the northeast. A site location map and aerial view are shown in Appendix A.

2.2 This application refers solely to the admin/dwelling block, which comprises 2 mobile homes (static caravans) that have been bolted together to form a double width unit.

2.3 Hydrology: the site is located approximately 380m north of the English Channel coastline. Approximately 330m to the southeast is Widewater lagoon. To the southwest of the site an unnamed watercourse diverges with one branch passing the site approximately 8m to the south and the other branch passing the site approximately 35m to the west. A ditch a few metres to the west of the site flows into the western branch of this unnamed watercourse. The River Adur (tidally influenced to Pallingham) passes the site approximately 1.8km to the northeast before depositing into the English channel at Littlehampton.

2.4 Topography: some levels around the site are shown on the existing site layout in Appendix C. The ambient level around the unit is 2.47m AOD and the levels fall away slightly to the east; the lowest recorded level is 2.31m AOD

2.5 Geology: The BGS's online map shows the solid bedrock across the site is Newhaven Chalk Formation with Raised Beach Deposits (sand and gravel) superficially overlying this solid bedrock. It is most likely that this soil type will make infiltration features such as soakaways viable.

2.6 Public Sewers: Southern Water's sewer records show a sewage pumping station 50m to the west of the site. A rising main serves the properties to the south. There are no surface water pipes in the vicinity of the site.

2.7 Fluvial Flooding: According to the Environment Agency's Rivers and Seas Flood Map (see Appendix B), the site lies in Flood Zone 3 (High Risk). Tidally influenced coastal sites in FZ3 are defined in Table 1 of the 2021 National Planning Policy Framework (NPPF) as being susceptible to flooding with an annual exceedance probability (AEP) of greater than 1 in 200 years (0.5%>).

2.8 The EA's modelled data-pack (in Appendix B) shows the site being fully defended in all storm scenarios – refer to the 2nd and 4th tables showing the defended scenarios. Node 4 is the closest to the proposed

dwelling unit. The site is liable to flood in the undefended scenarios, however. The flood level in the 2115 0.5% event is **5.41m AOD**. The flood depth around the unit is 5.41 – 2.47 = **2.94m**.

2.9 Adur and Worthing's July 2020 Level 1 and Level 2 SFRA was consulted. This includes no breach modelling of the coastline. The 2008 SFRA includes breach modelling includes coastal breach modelling - but shows no breach locations along this vicinity (just 2 breaches well to the west of Lancing). The EA's covering lettering (for the Product 4 data) states that the defences comprise "groynes, and a sand and shingle beach… maintained by the Environment Agency." It can be inferred that there are no inherent weak points in such raised beaches, as otherwise the breach modelling would include at least one flood pattern – refer to "Map B" in Appendix C of this report. It can be concluded that – in effect – the site is clear of flooding from this source.

2.10 Surface Water flooding: this can occur when excess rainwater does not infiltrate into the ground or is not intercepted by urban drainage systems and instead flows across the surface. Appendix B includes the EA's online flood depths and velocity maps in a low risk scenario. Although there is an overland flow route that affects the central area of this site, the 2 buildings, including the location of the proposed dwelling, are removed from flooding in the extreme storm.

2.11 Artificial sources: flooding from reservoirs, canals and docks. The EA's Reservoirs Flood Map in Appendix B shows the site is removed from this source of flooding. There are no docks or canals in this area.

2.12 Historical flooding: the EA's online map in Appendix B shows the site has not been affected by flooding in the past.

2.13 Groundwater: According to the EA's Groundwater Vulnerability and Source Protection Zones Maps (both in Appendix B) this site overlies a Medium-High Aquifer and is not located within a Groundwater Source Protection Zone.

2.14 In conclusion – the flood risk profile of this site is **Low** – with the proviso that there is a residual risk of flooding in the event of the coastal defences failing. The undefended flood level is **5.41m AOD**.

3 Proposed Development & SuDS

3.1 The proposed development is to replace the proprietor's double width mobile home with a dwelling house built of traditional masonry. The current use is for 8 months of the year while the proposed dwelling would be used all year round. The roofed / footprint area of this unit is 156m^3.

3.2 As concluded in Section 2 above, the flood risk profile is low – but that some reference should be paid to the residual risk in the undefended scenario. As set out in section 2.8 above the undefended flood level is 5.41m AOD.

3.3 Vulnerability: Table 2 of the NPPF's technical guidance indicates dwelling houses are classed as 'More Vulnerable' while caravans and mobile homes are 'Highly Vulnerable'. This proposal represents a significant *reduction* in vulnerability, therefore.

3.4 For full compliance, new buildings' floor levels have to be set + 0.3m above the critical flood level. The predicted flood depth in the undefended scenario available is 2.94m. It is not a practical proposition for the ground floor to be lifted over a storey height. It is proposed to set the ground floor level at **3.07m AOD** (this was agreed with the EA officer – as set out in Appendix G). Flood resilience measures will be incorporated from ground floor up to the flood level of **5.41m AOD**. The first floor level will be set at a minimum of **5.7m AOD** – as agreed with the EA – refer to Appendix G.

3.5 Flood Mitigation: It is proposed to incorporate flood resilience materials and techniques throughout the ground floor up to **5.41m AOD**. This level is referred to as the 'critical level' below. Such construction shall include (but not necessarily limited to):

- Ground floor to be of concrete beam/block construction;
- Floor covering to be durable, eg stone flags / quarry tiles / Altro type;
- Skirtings to be durable, eg plastic (no timber or MDF) - to be tied in to the ground floor slab as appropriate;
- Waterproof plaster installed up to eaves level);
- No wood fixings below eaves level;
- Insulation at low level to the external walls (if any) will be specified as rigid board which has impermeable foil facings that are resistant to the passage of water vapour and double the thermal resistance of the cavity;
- AS Heat pump / meters to be placed at as high a level as is practicable;

3.6 The document "Improving the Flood Performance of New Buildings - Flood Resilient Construction" published by DEFRA/Environment Agency is a good source of information on flood resilient techniques.

3.7 Resistance: all manhole covers will be sealed to help prevent the flow of foul water into the building.

Waterproof (resilient) render shall coat the external masonry over the lowest 0.6m up to the floor level.

3.8 Safe access to dry land: in the unlikely event of the site flooding in the event of all of the coastal defences failing nearby, the occupants of the dwelling will be able to reside safely at 1st floor level. A Flood Warning and Evacuation Plan has been prepared – see the Appendix F of this report. Occupants will be aware of the flood risk and what actions they should take to prepare well in advance of such a situation occurring.

3.9 All external areas will be of permeable surfacing. The only impermeable surface will the dwelling's roof.

3.10 Surface Water Drainage strategy: The SuDS hierarchy was applied: as stated in section 2.5 above the soil type is Chalk with gravels overlying, so infiltration is most likely to be feasible here.

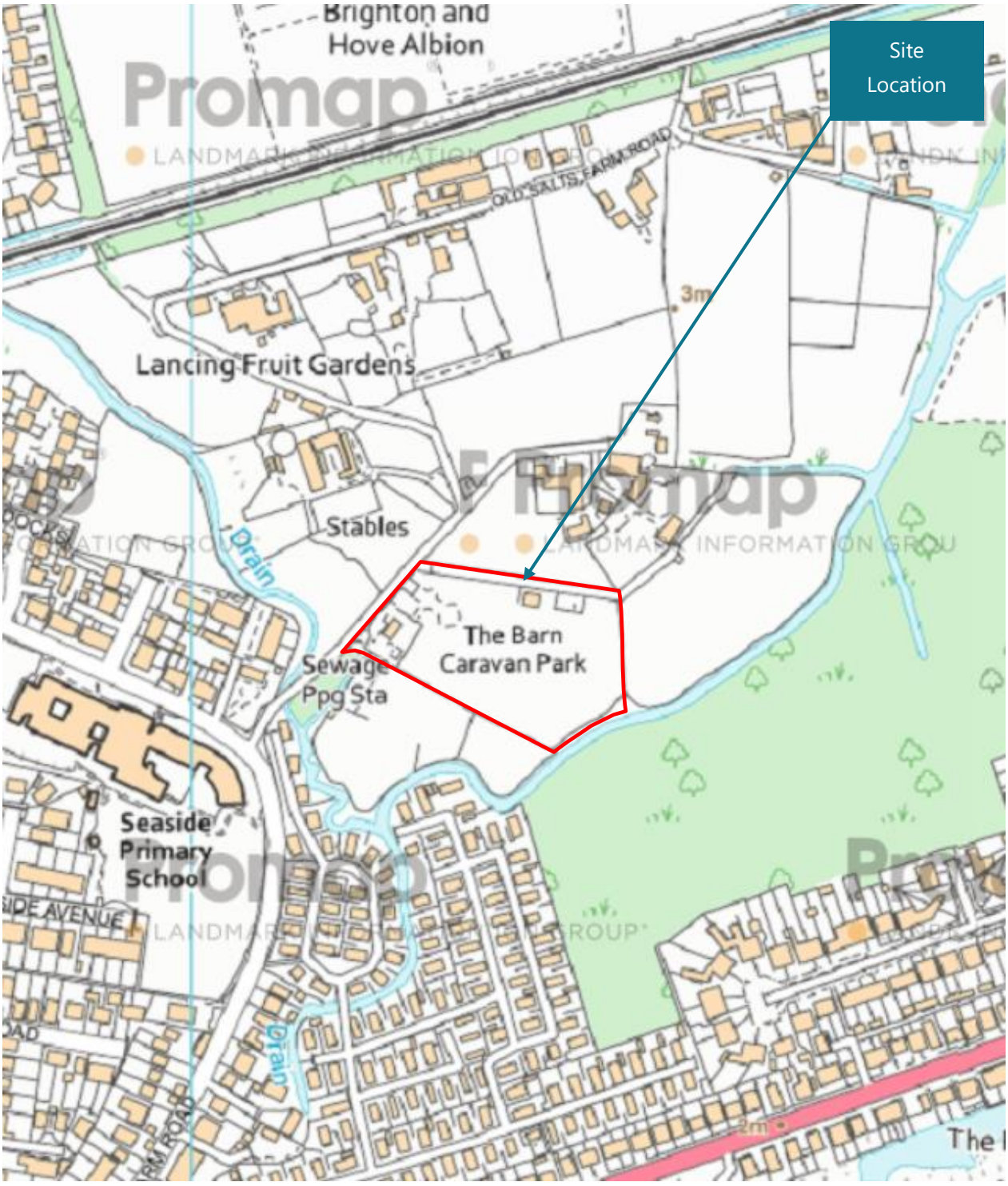
3.11 Appendix E shows a MicroDrainage Source Control calculation that uses an assumed, conservative soakage rate of 5 x 10^{-5}m/s. An infiltration blanket, whose dimensions are 20m x 3m x 0.22m deep, will store the volume in the critical 1% + 45% CC event. This calculation will be re-run once soil soakage testing (in accordance with BRE365) has been undertaken on this site. Note that this infiltration blanket may comprise the sub-base of a porous paved driveway, with a voids ratio of 0.3.

3.12 Conclusion: This development will not increase the flood risk to either this site or to neighbouring properties. It complies fully with the 2021 National Planning Policy Framework and 2022 Planning Practice Guidance (PPG).

- End of Report -

Appendix A

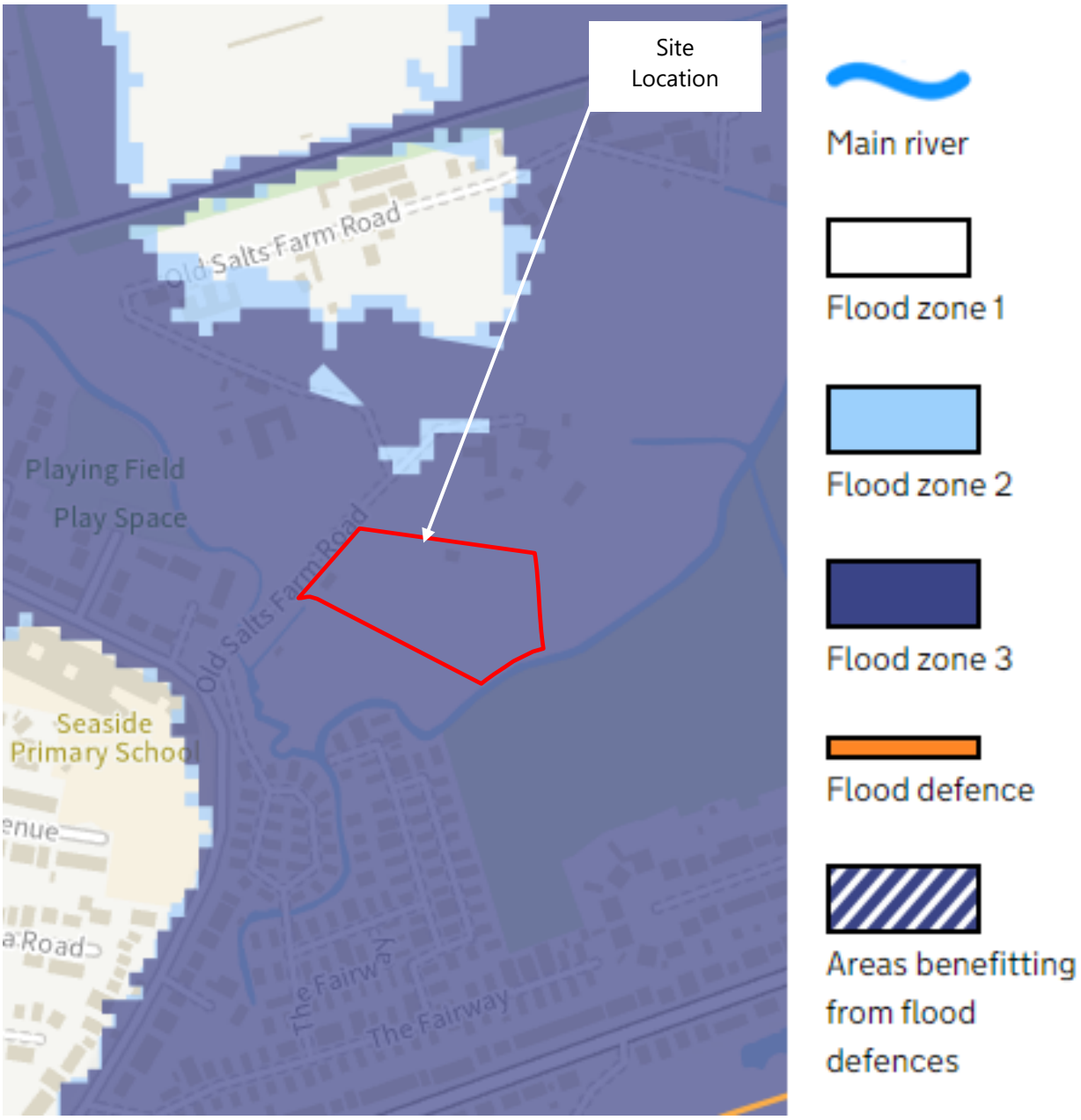
Site Location Map & Aerial Photo




Site
Location

Appendix B

Environment Agency Flood & Groundwater Maps



EA's Online Flood Map for Planning (Rivers and Seas)

The site lies in *tidal* Flood Zone 3 (FZ3)

John Pakenham
GTA Civils Ltd
66a Church Walk
Burgess Hill
West Sussex
RH15 9AS

Our ref: SSD263842
Date: 21/07/2022

Dear John Pakenham,

Enquiry Regarding Product 4 for Flood Risk Assessment for The Barn Caravan Park, Old Salts Farm Road, Lancing, BN15 8JG.

Thank you for your enquiry which was received on 23 May 2022.

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 Zones 1, 2 and 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 groynes, and a sand and shingle beach. All of these features are maintained by the Environment Agency.

Model Information
The models used were the Adur Coastal Modelling - Arun to Adur Flood Modelling, completed in 2012 by JBA Consulting for the undefended scenarios, and the Shoreham Tidal Walls update for defended scenarios.

Flood History
An area close to this site experienced flooding as a result of drainage and surface water in November 1960 (Flood ID: 1972), and again as a result of drainage in November 1986 (Flood ID: 1973).

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, **Adur District Council** for a more comprehensive flood history check.

FRA advisory text

Name	Product 4
Description	Detailed Flood Risk Assessment Map for **The Barn Caravan Park, Old Salts Farm Road, Lancing, BN15 8JG.**
Licence	Open Government Licence
Information Warnings	The flood risk data provided is based on existing EA hydraulic models with an allowance for climate change. Please note the climate change allowances provided are not up to date. These were updated on 27 July 2021. 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.
Information Warning - OS background mapping	*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.*
Attribution	Contains Environment Agency information © Environment Agency and/or database rights. Contains Ordnance Survey data © Crown copyright 2022 Ordnance Survey 100024198.

Data Available Online

Many of our flood datasets are available online:

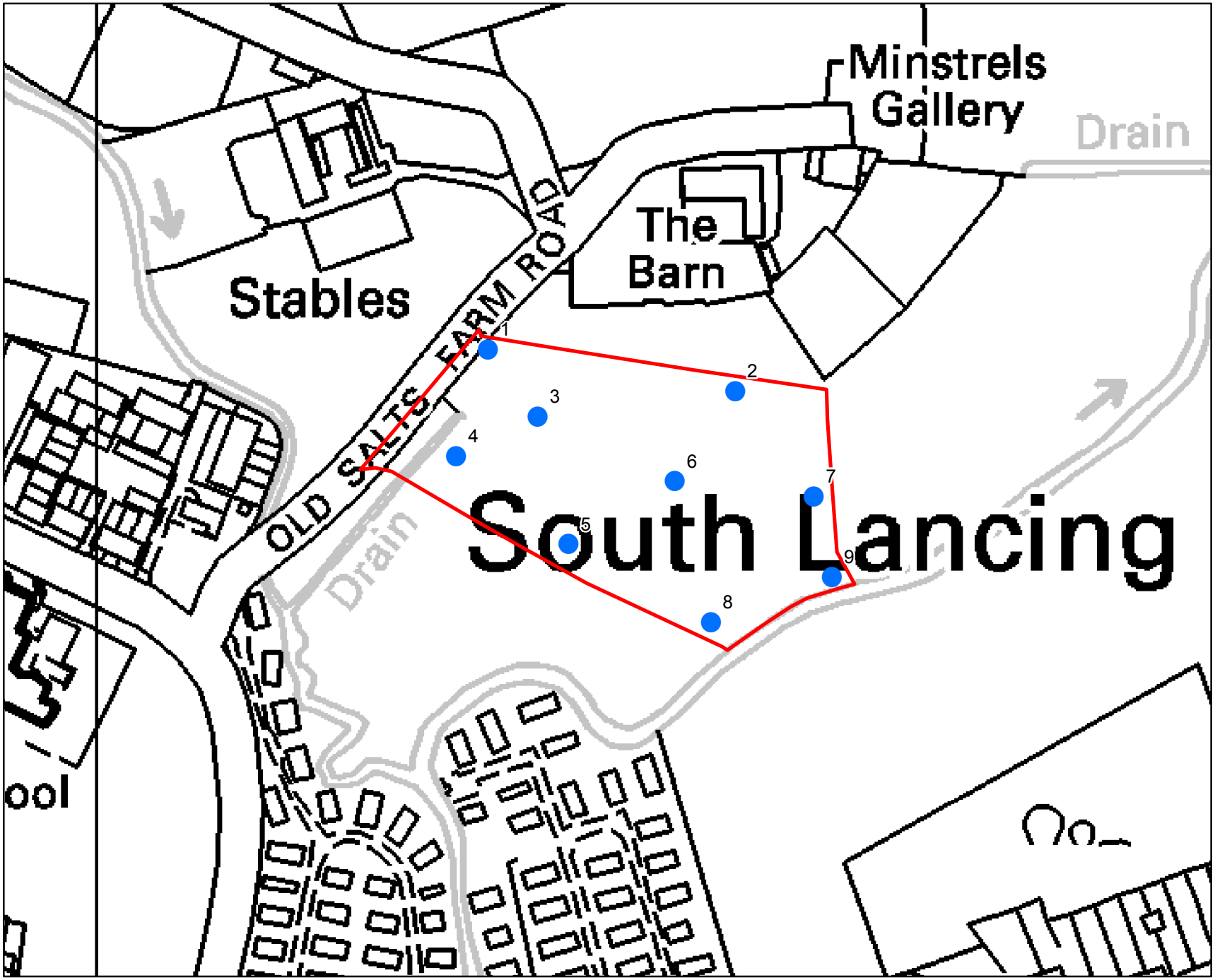
- Flood Map For Planning (Flood Zone 2, Flood Zone 3 ,Flood Storage Areas, Flood Defences, Areas Benefiting from Defences)
- Risk of Flooding from Rivers and Sea
- Historic Flood Map
- Current Flood Warnings

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,

Amy O'Donnell
MA to Kate Donlon: Area Environment Manager (Coast), Solent and South Downs Area
MA to Nick Gray: Flood and Coastal Risk Manager, Solent and South Downs Area
Environment Agency | Guildbourne House, Chatsworth Road, Worthing, West Sussex, BN11 1LD

FRA Site Boundary & Node Points. Centred BN15 8JG. Created 21/07/2022.



Environment Agency

N

Legend

- Site Nodes
- Site Boundary

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

Scale: 1:2,000

0 0.045 0.09
Kilometers

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Contact us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506. Email:enquiries@environment-agency.gov.uk

Product 4 Flood Risk Data Requested by: GTA Civils Ltd

Site: The Barn Caravan Park, Old Salts Farm Road, Lancing, BN15 8JG

Table 1: Water Levels: Tidal Undefended

	NGR		Modelled Flood Levels in Metres AOD Undefended Annual Exceedance Probability			
Node Ref	Eastings	Northings	0.5%	0.5% (2070)	0.5% (2115)	0.1%
1	519145	104390	4.25	4.79	5.41	4.48
2	519238	104374	4.25	4.79	5.41	4.48
3	519164	104366	4.25	4.79	5.41	4.48
4	519136	104352	4.25	4.79	5.41	4.48
5	519174	104316	4.25	4.79	5.41	4.48
6	519218	104339	4.25	4.79	5.41	4.48
7	519267	104336	4.25	4.79	5.41	4.48
8	519229	104286	4.25	4.79	5.41	4.48
9	519275	104305	4.25	4.79	5.41	4.48

Table 2: Water Levels: Tidal Defended

	NGR		Modelled Flood Levels in Metres AOD Defended Annual Exceedance Probability		
Node Ref	Eastings	Northings	0.5%	0.5% (2070)	0.5% (2115)
1	519145	104390	-	-	-
2	519238	104374	-	-	-
3	519164	104366	-	-	-
4	519136	104352	-	-	-
5	519174	104316	-	-	-
6	519218	104339	-	-	-
7	519267	104336	-	-	-
8	519229	104286	-	-	-
9	519275	104305	-	-	-

Table 3: Water Depths: Tidal Undefended

	NGR		Modelled Flood Depths in Metres Undefended Annual Exceedance Probability			
Node Ref	Eastings	Northings	0.5%	0.5% (2070)	0.5% (2115)	0.1%
1	519145	104390	1.92	2.46	3.08	2.15
2	519238	104374	2.56	3.10	3.72	2.79
3	519164	104366	2.09	2.62	3.24	2.31
4	519136	104352	2.15	2.68	3.30	2.37
5	519174	104316	2.75	3.29	3.91	2.98
6	519218	104339	2.88	3.42	4.04	3.11
7	519267	104336	2.66	3.19	3.81	2.88
8	519229	104286	2.53	3.07	3.69	2.76
9	519275	104305	3.10	2.95	3.57	3.32

Table 4: Water Depths: Tidal Defended

	NGR		Modelled Flood Depths in Metres Defended Annual Exceedance Probability		
Node Ref	Eastings	Northings	0.5%	0.5% (2070)	0.5% (2115)
1	519145	104390	-	-	-
2	519238	104374	-	-	-
3	519164	104366	-	-	-
4	519136	104352	-	-	-
5	519174	104316	-	-	-
6	519218	104339	-	-	-
7	519267	104336	-	-	-
8	519229	104286	-	-	-
9	519275	104305	-	-	-

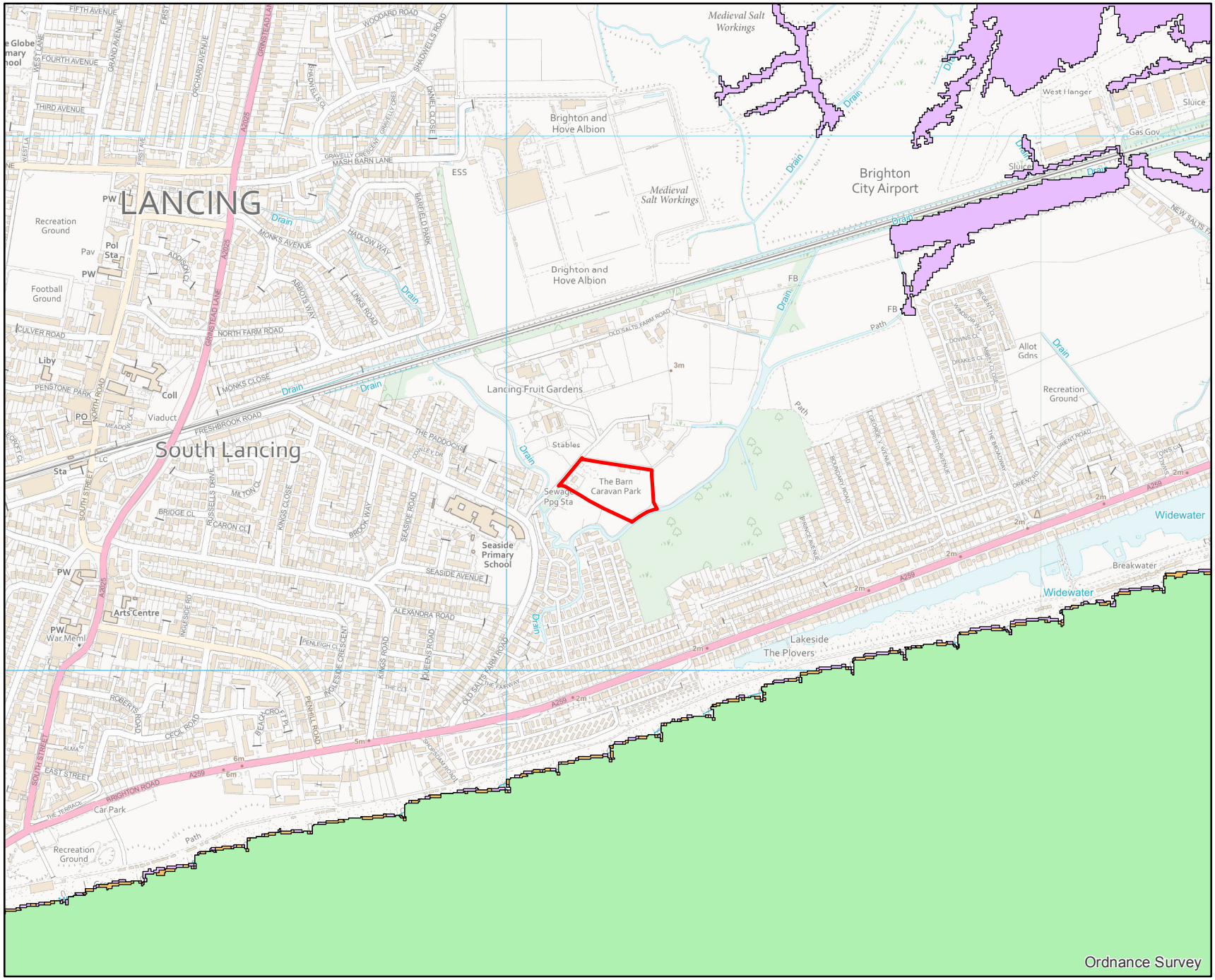
All levels taken from: Arun to Adur Coastal Tuflow Model (2012) with updated Adur Tidal Wall Scheme Modelling (2018) for the defended scenarios.

Produced on: 21/07/2022

*** Climate Change allowances for this model only show the superseded 20% increase in flows. The current allowances should be checked here: https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances.**

**** The flood risk data provided is based on existing EA hydraulic models with an allowance for climate change. Please note the climate change allowances provided are not up to date. These were updated on 27 July 2021.**
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.

Modelled Flood Outlines (Defended Tidal). Centred BN15 8JG. Created 21/07/2022.



Environment Agency

N

Legend

- 0.5% AEP (2018) (Defended)
- 0.5% AEP (2067) (Defended)
- 0.5% AEP (2117) (Defended)
- Site Boundary

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

Scale: 1:10,000

0 0.225 0.45
Kilometers

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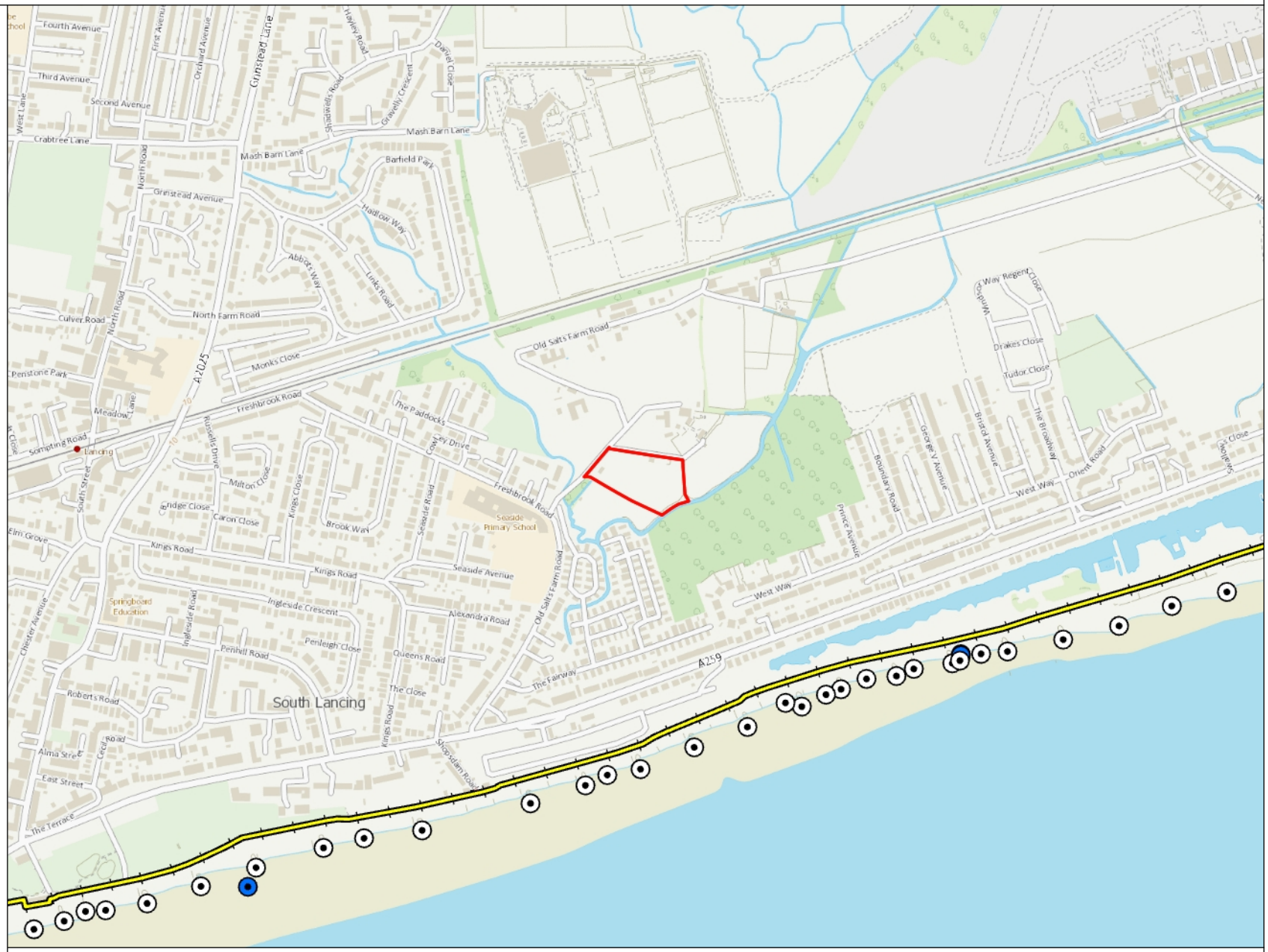
AIMS Flood Defences. Centred BN15 8JG. Created **21**/07/2022.

Environment Agency

Legend

Please see page 2 for asset symbology

- Stilling Well
- Water Baffles
- Water Distribution Pipeline
- Well
- Stilling Well
- Water Baffles
- Water Distribution Pipeline
- Well



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0 250

Metres

N W E S

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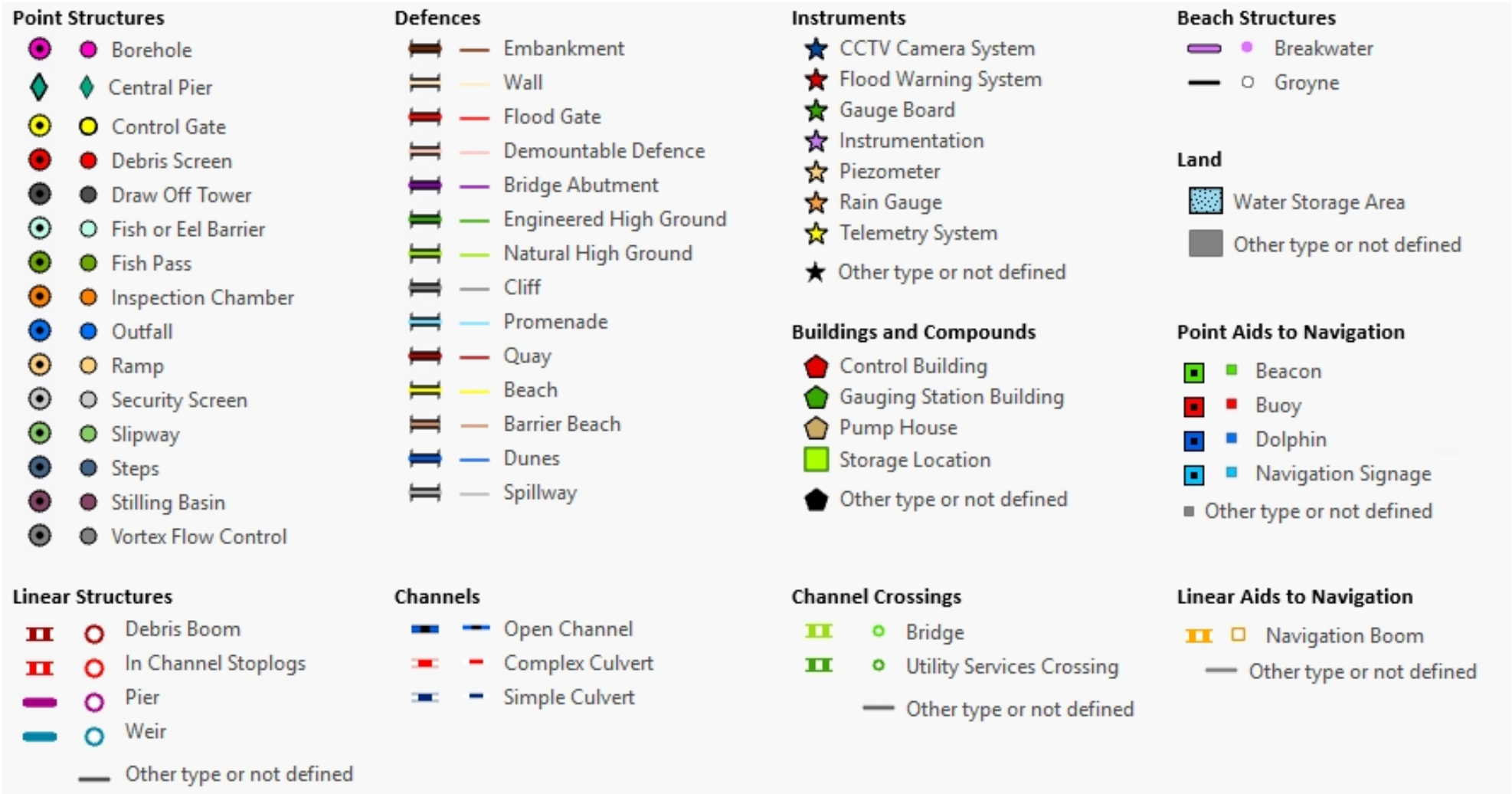
Point Structures
Borehole
Central Pier
Control Gate
Debris Screen
Draw Off Tower
Fish or Eel Barrier
Fish Pass
Inspection Chamber
Outfall
Ramp
Security Screen
Slipway
Steps
Stilling Basin
Vortex Flow Control
Defences
Embankment
Wall
Flood Gate
Demountable Defence
Bridge Abutment
Engineered High Ground
Natural High Ground
Cliff
Promenade
Quay
Beach
Barrier Beach
Dunes
Spillway
Instruments
CCTV Camera System
Flood Warning System
Gauge Board
Instrumentation
Piezometer
Rain Gauge
Telemetry System
Other type or not defined
Buildings and Compounds
Control Building
Gauging Station Building
Pump House
Storage Location
Other type or not defined
Beach Structures
Breakwater
Groyne
Land
Water Storage Area
Other type or not defined
Point Aids to Navigation
Beacon
Buoy
Dolphin
Navigation Signage
Other type or not defined
Linear Structures
Debris Boom
In Channel Stoplogs
Pier
Weir
Other type or not defined
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Simple Culvert
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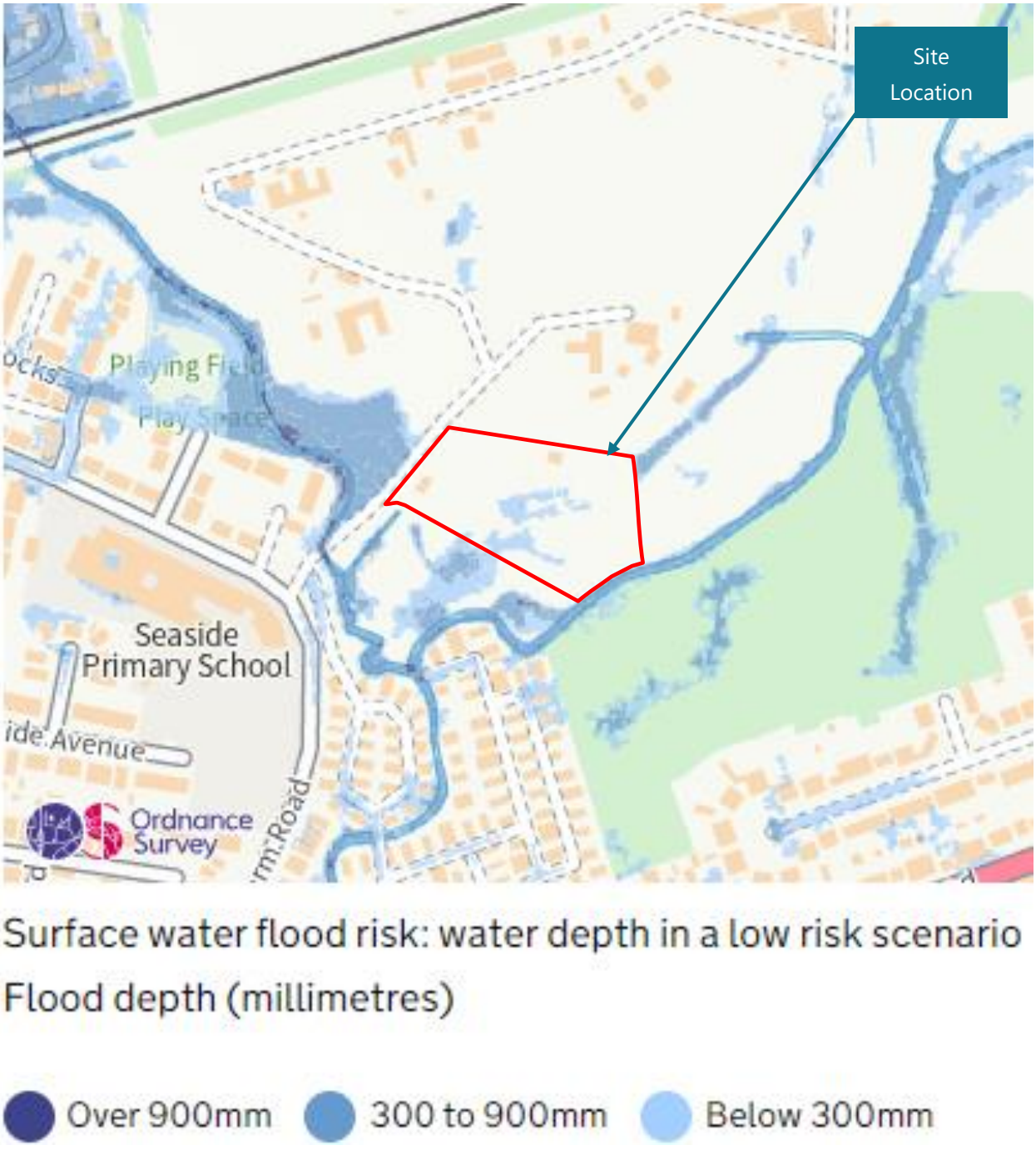
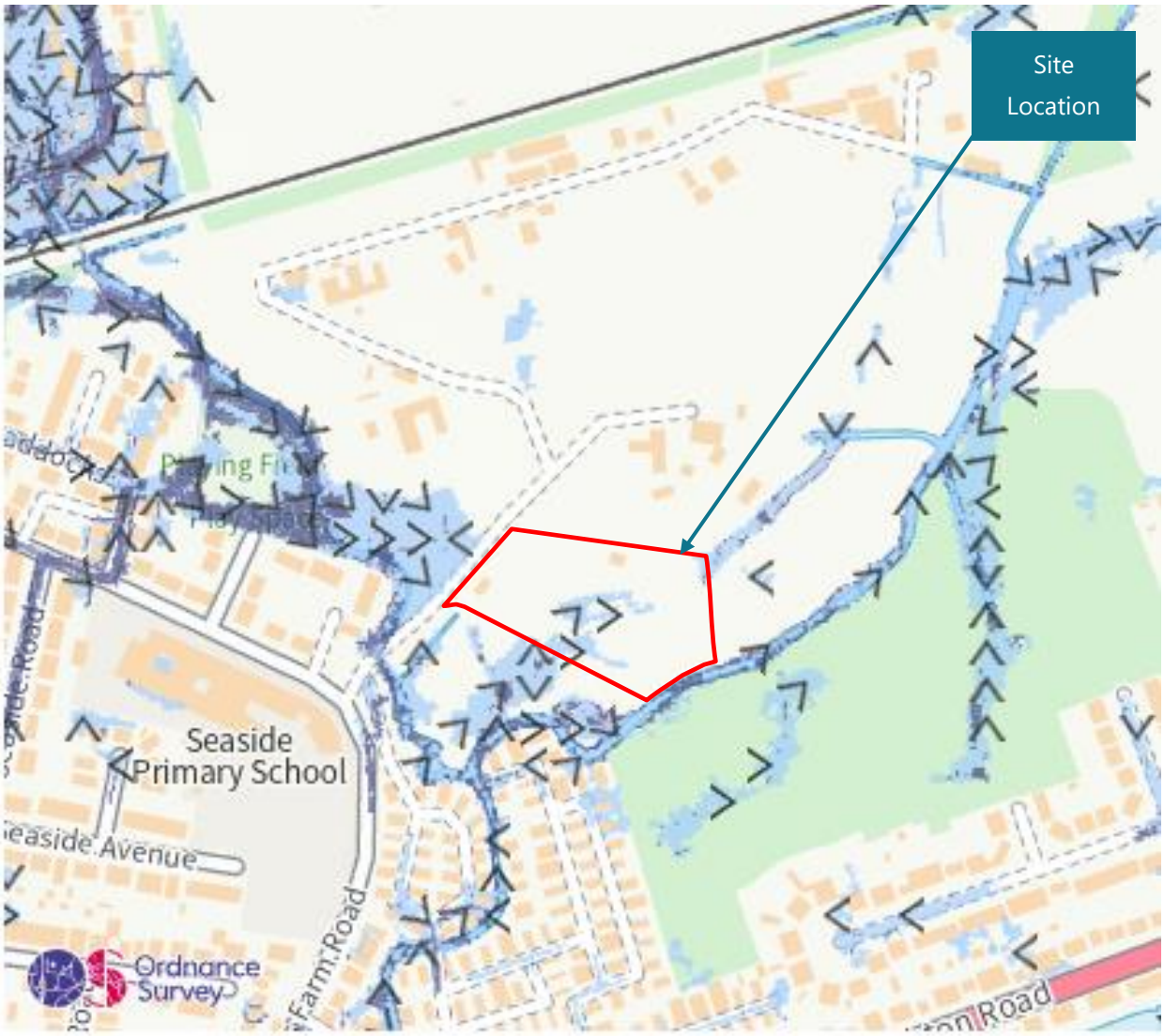
Linear Aids to Navigation
Navigation Boom
Other type or not defined



EA's Online Surface Water Flood Depth Map in a 'Low Risk Scenario'
(1 in 1000 years storm event)

While the majority of the site is free from this risk, an overland flow route makes central areas susceptible to flooding below 300mm



EA's Online Surface Water Flood Velocity Map in a 'Low Risk Scenario'
(1 in 1000 years storm event)

While the majority of the site is clear from surface water flooding, an overland flow route flows SW-NE across the centre of the site at a velocity of less than 0.25m/s



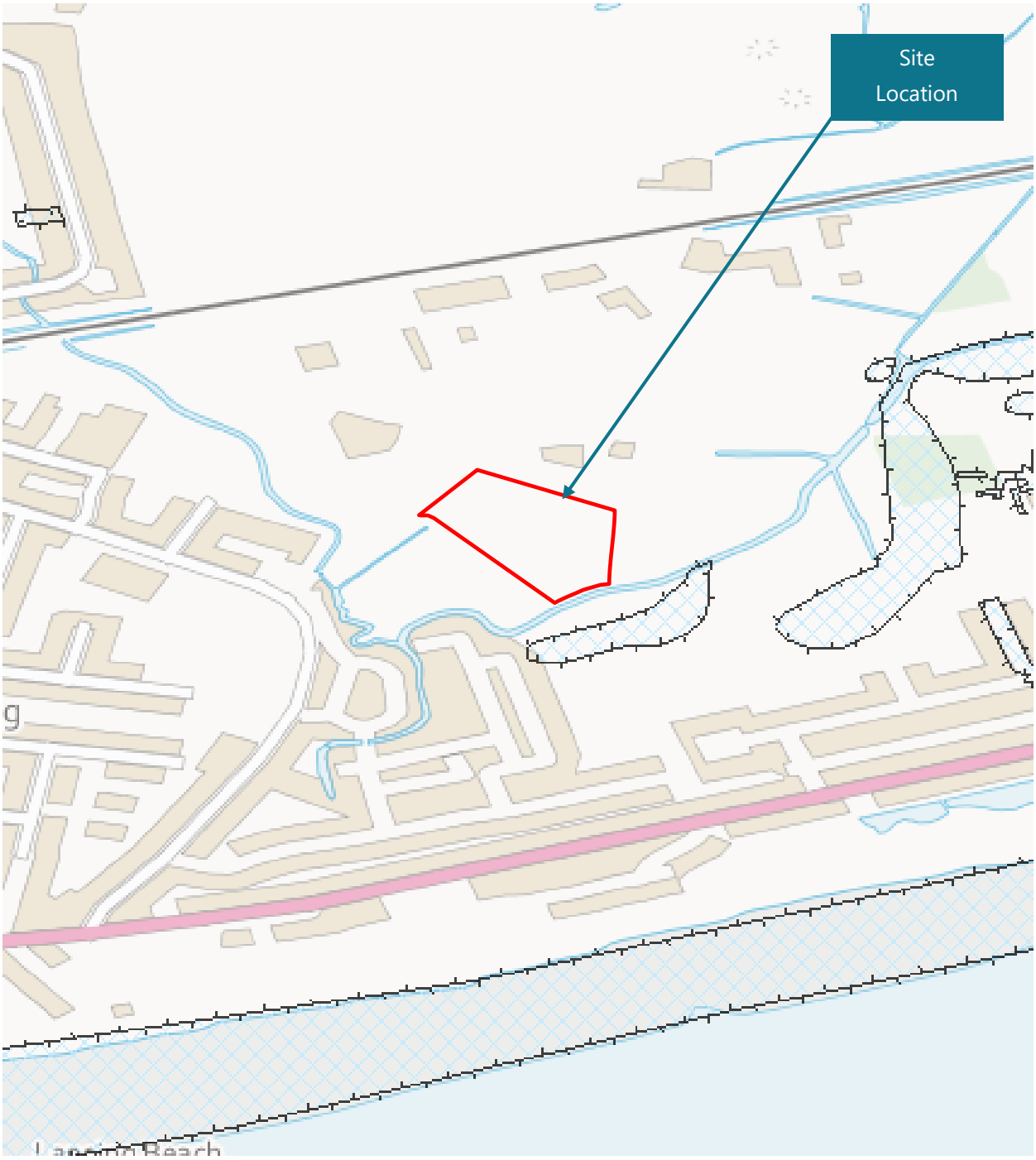
Maximum extent of flooding from reservoirs:

when river levels are normal

when there is also flooding from rivers

EA's Online 'Risk of Flooding from Reservoirs' Map

The site is removed from this source of flood risk

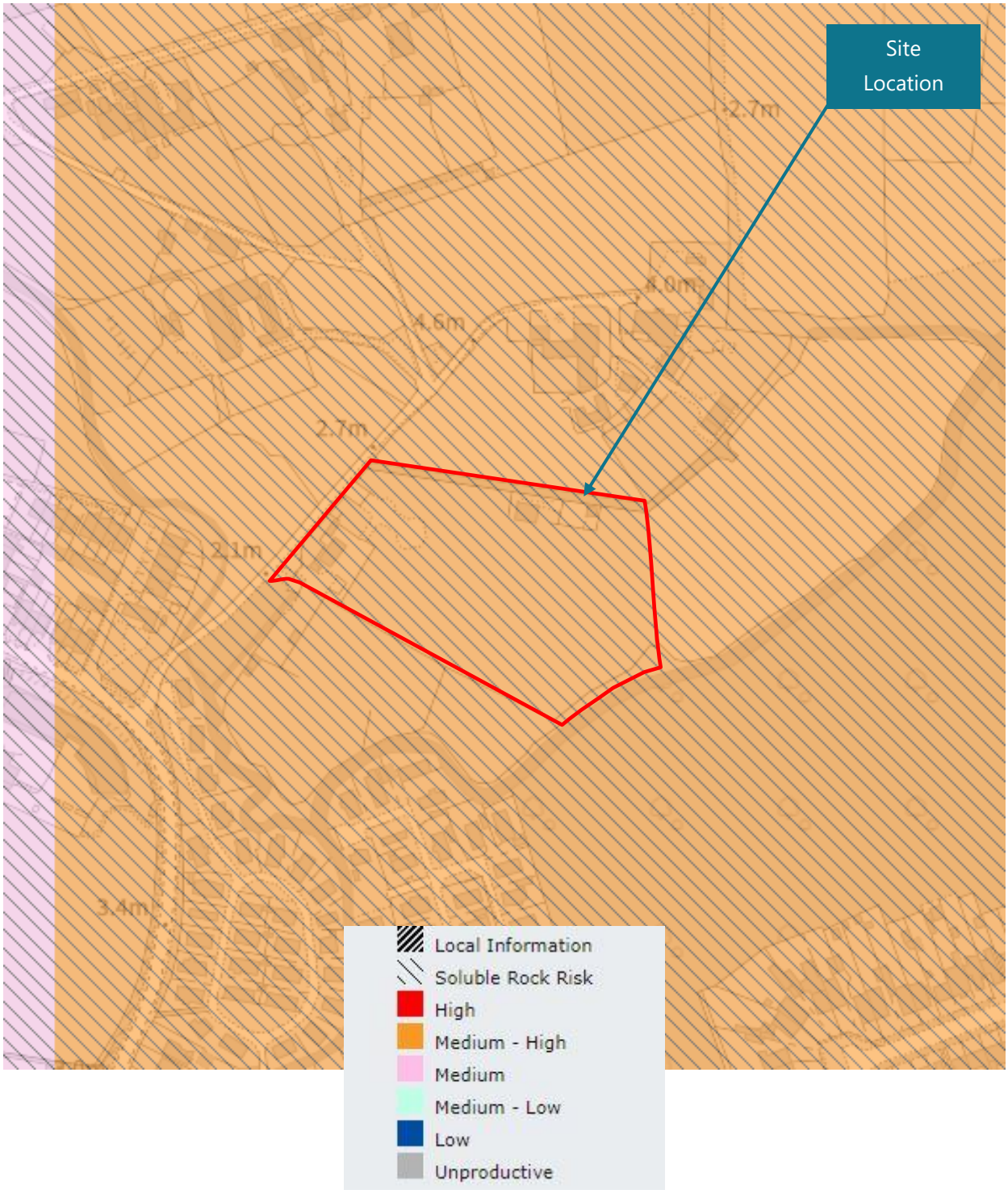


Historic Flood Map

Historic Flood Map

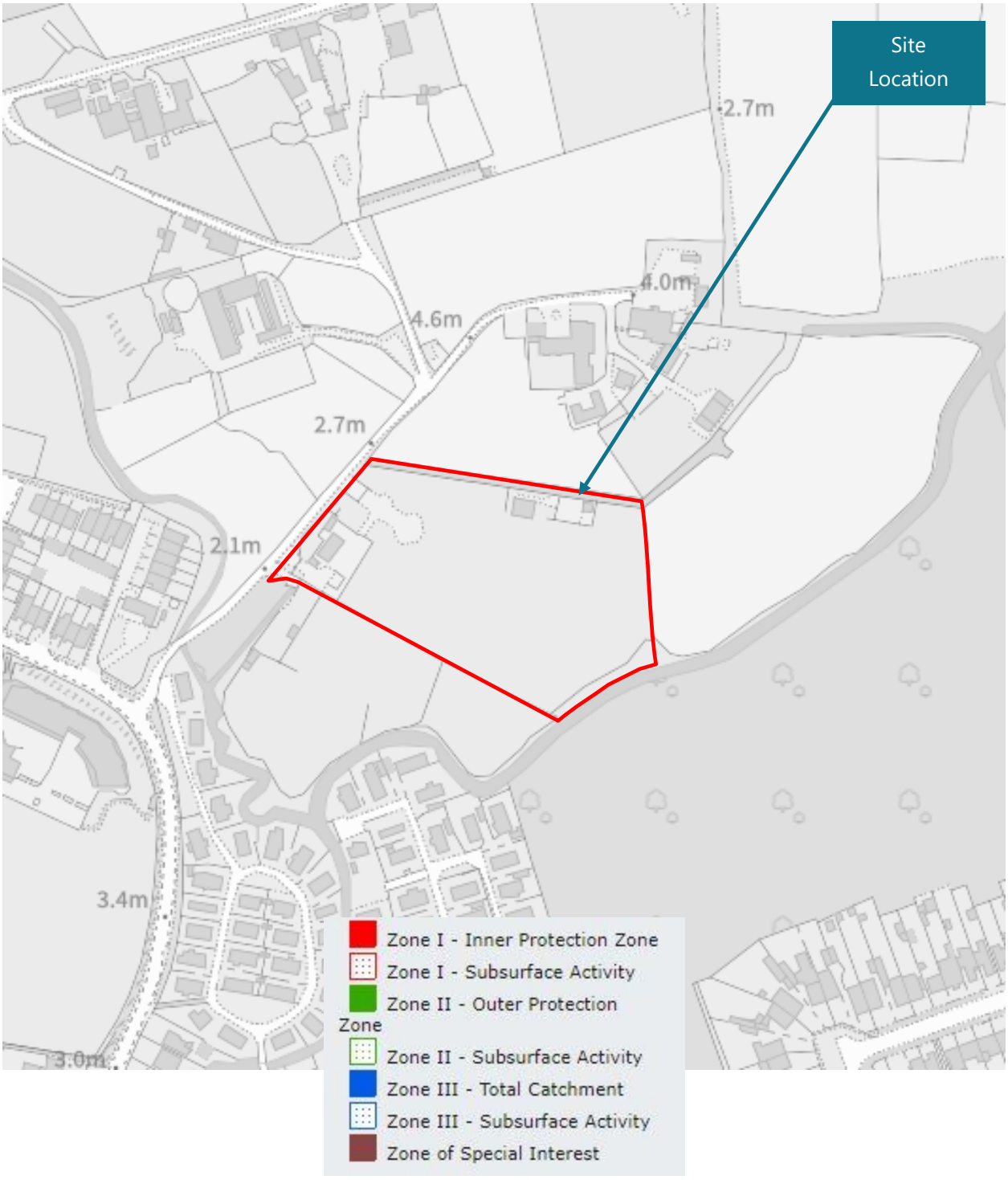
EA's Historic Flood Map

The site has not been affected by historical flooding



EA's Groundwater Vulnerability Map

This site overlies a "Medium - High" Aquifer



EA's Source Protection Zones Map

The site is not located within any Source Protection Zone

Appendix C

SFRA Flood Map

SITE LOCATION

ADUR DISTRICT

WORTHING DISTRICT

SHOREHAM-BY-SEA

PORTSLADE-BY-SEA

WORTHING

Worthing and Adur SFRA

Map B - Residual Risk from Breach

ADUR DISTRICT COUNCIL

Worthing Borough Council

CAPITA SYMONDS

Legend

- Worthing and Adur Administrative Boundaries
- Main River
- Breach Location
- Breach Flood Extent (0.5% AEP)



Scale at A3 1: 50,000

Date 09/01/2008

0 5 10 15

kilometres

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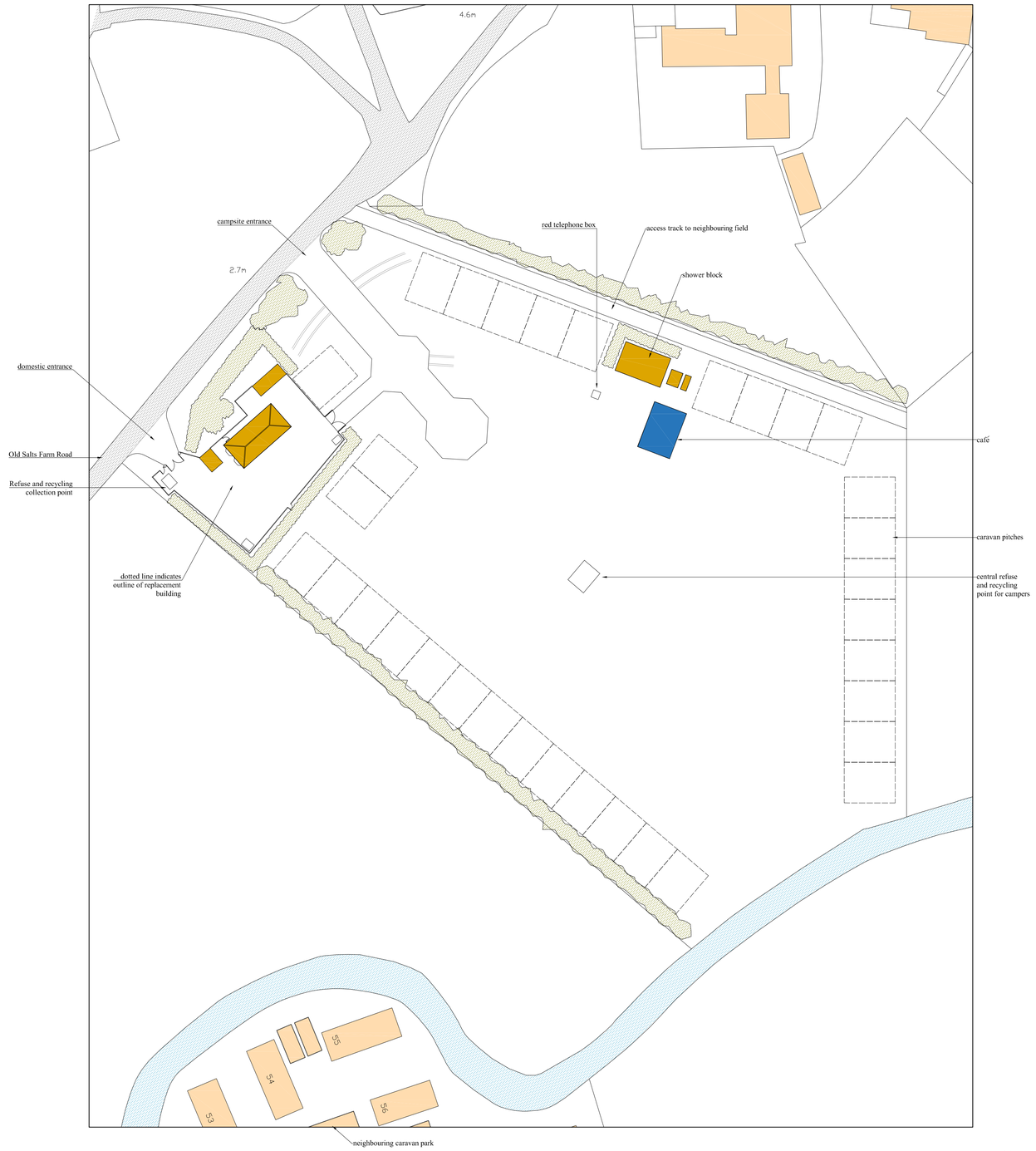
Map_B

Appendix D

Proposed Scheme Drawings

Removal of the existing permanent mobile home and construction of a tied residential bungalow at
The Barn Caravan Park, Old Salts Farm Road, Lancing, BN15 8JG

December 2022
Drawing no:JB 454/ planning application 02



EXISTING BLOCK PLAN 1:500



PROPOSED BLOCK PLAN 1:500

N
W E
S

0 10 20 30 40 50
Scale bar 1:500

JAMES BRECKELL : ARCHITECT : ARB : RIBA
89 Old Fort Road, Shoreham by Sea, BN43 5HA, Tel 07733 268 297, Email: james@breckell.co.uk

Removal of the existing permanent mobile home and construction of a tied residential bungalow at
The Barn Caravan Park, Old Salts Farm Road, Lancing, BN15 8JG

December 2022
Drawing no:JB 454/ planning application 03



EXISTING SITE PLAN 1:200

0 2 4 6 8 10m

SCALE BAR 1:200

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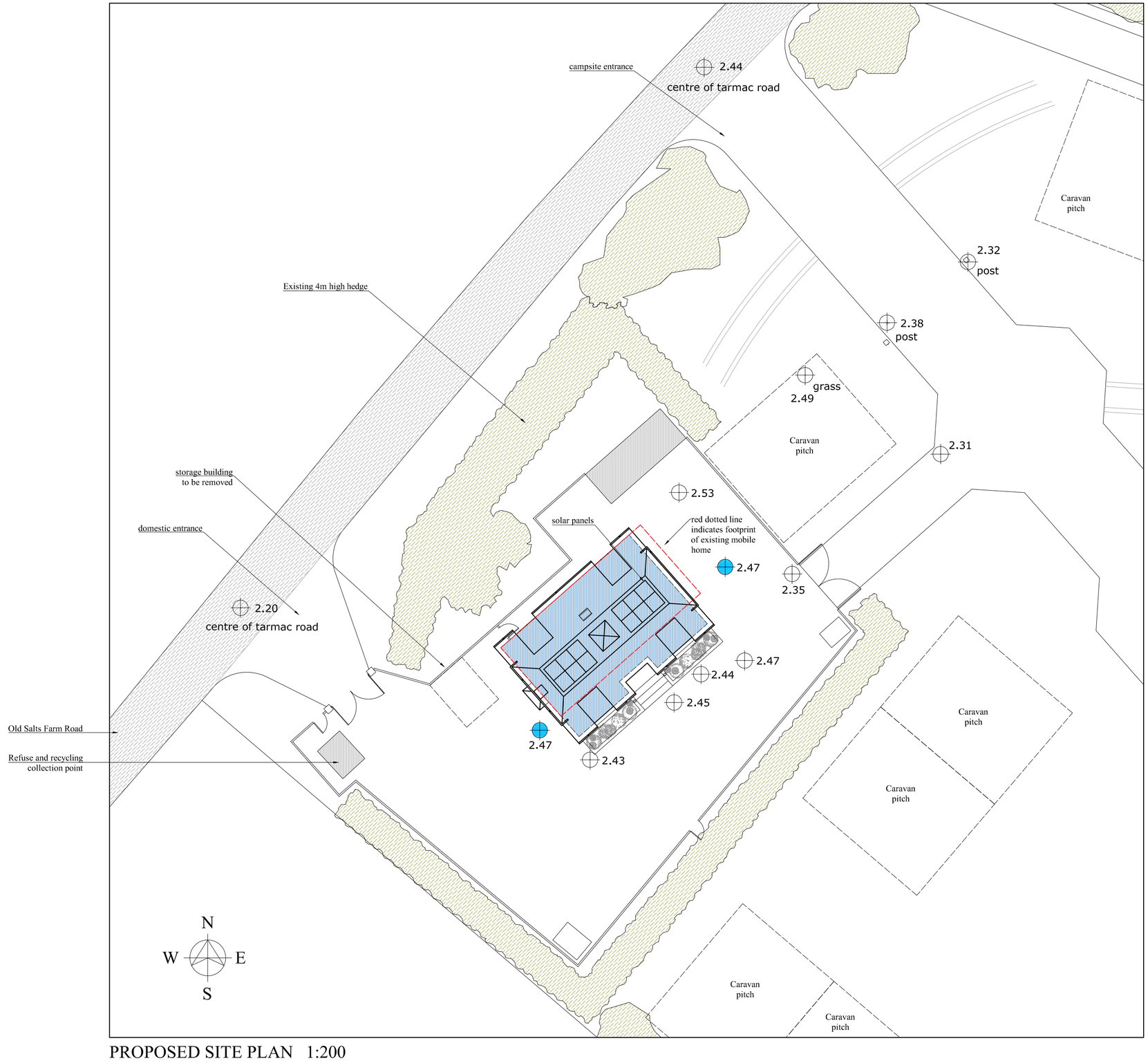
Removal of the existing permanent mobile home and construction of a tied residential bungalow at
The Barn Caravan Park, Old Salts Farm Road, Lancing, BN15 8JG

December 2022
Drawing no:JB 454/ planning application 04



PROPOSED SITE PLAN 1:200

0 2 4 6 8 10m

SCALE BAR 1:200

Flood Resilient Measures:

Ground Floor is 600mm above external ground level.
Floor is a concrete beam and block floor.
Floor covering is to be a durable surface. e.g. stone, ceramic tile or equal.
Skirting boards to be durable. e.g. plastic.
Waterproofed render 600mm high from ground level around the perimeter of the building
Waterproof plaster installed up to eaves level.
Partition walls to be built in block work.
No wooden fixings below eaves level.
Insulation within the cavity walls to be rigid board which has
impermeable foil facings that are resilient to the passage of water.
Air source heat pump to be fixed 1.5m above floor level.
All systems controls - consumer unit etc to be as high
as is practicable.

JAMES BRECKELL : ARCHITECT : ARB : RIBA
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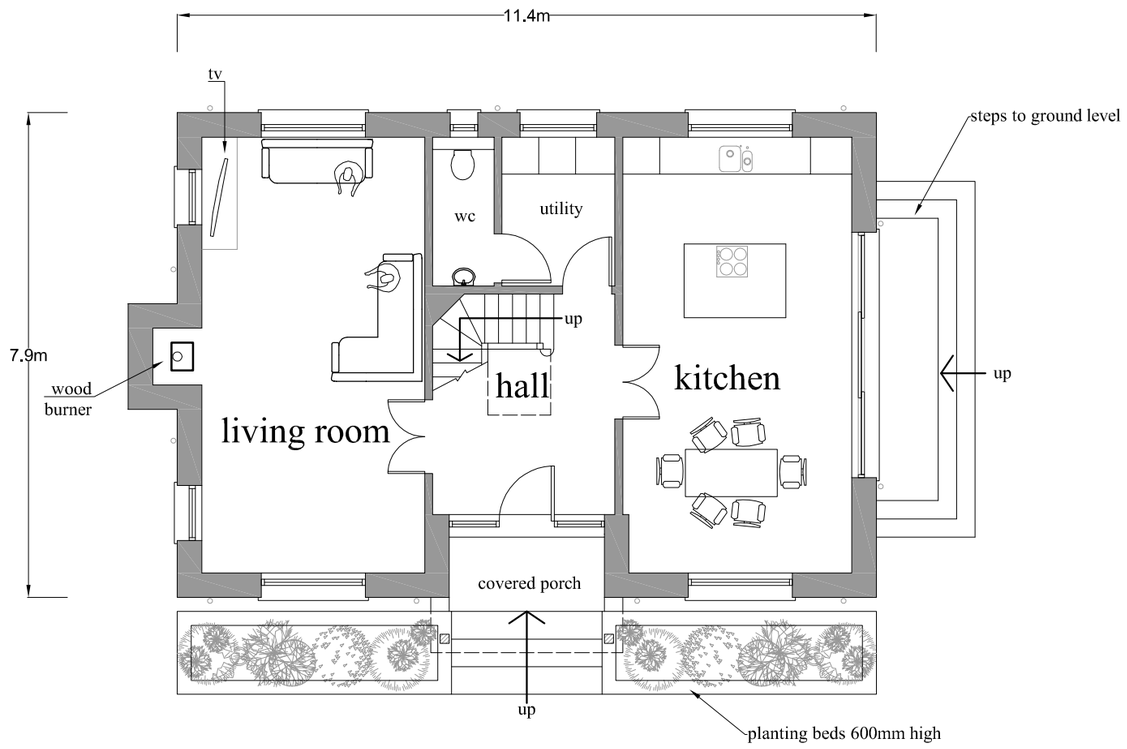
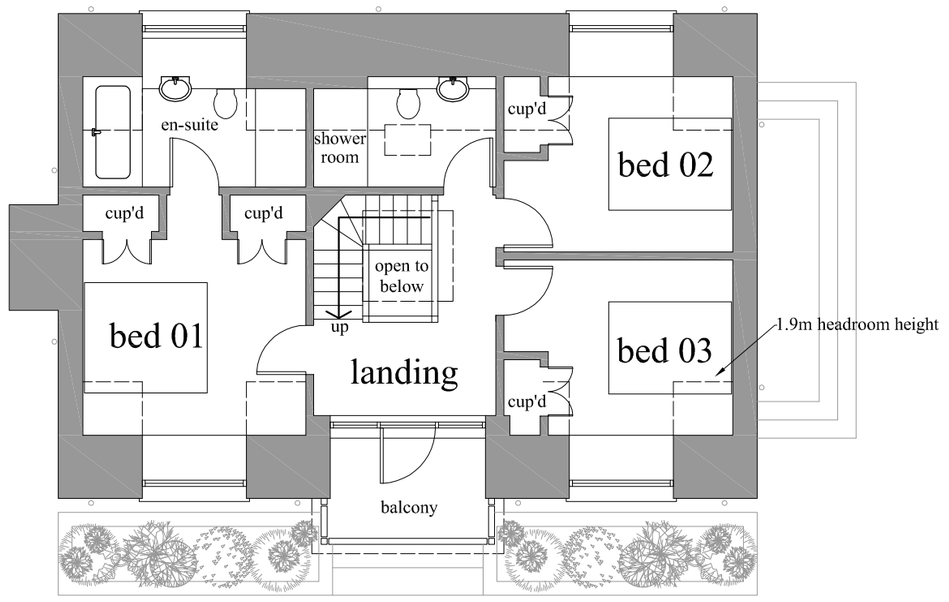
Removal of the existing permanent mobile home and construction of a tied residential bungalow at
The Barn Caravan Park, Old Salts Farm Road, Lancing, BN15 8JG

December 2022
Drawing no:JB 454/ 06



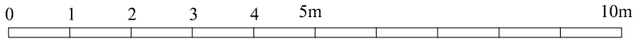
PROPOSED GROUND FLOOR PLAN 1:100

Gross Internal Area (both floors) : 130m.sq



PROPOSED FIRST FLOOR PLAN 1:100





SCALE BAR 1:100

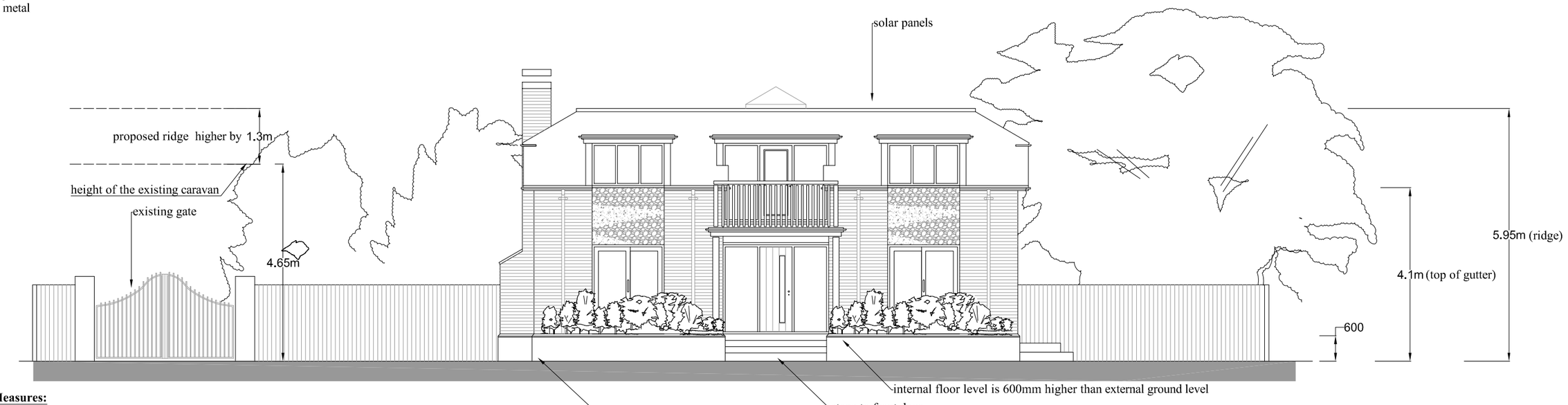
JAMES BRECKELL : ARCHITECT : ARB : RIBA
89 Old Fort Road, Shoreham by Sea, BN43 5HA, Tel 07733 268 297, Email: james@breckell.co.uk

Removal of the existing permanent mobile home and construction of a tied residential bungalow at The Barn Caravan Park, Old Salts Farm Road, Lancing, BN15 8JG

December 2022

Drawing no:JB 454/ planning application 07

Materials:
Roof: 1st quality slate
Walls: Sussex stock reclaimed bricks with flint panels
Windows: Triple glazed metal framed windows
Rainwater goods: metal



PROPOSED SOUTH-EAST FACING ELEVATION 1:100

Flood Resilient Measures:

Ground Floor is 600mm above external ground level.
Floor is a concrete beam and block floor.
Floor covering is to be a durable surface. e.g. stone, ceramic tile or equal.
Skirting boards to be durable. e.g. plastic.
Waterproofed render 600mm high from ground level around the perimeter of the building
Waterproof plaster installed up to eaves level.
Partition walls to be built in block work.
No wooden fixings below eaves level.
Insulation within the cavity walls to be rigid board which has impermeable foil facings that are resilient to the passage of water.
Air source heat pump to be fixed 1.5m above floor level.
All systems controls - consumer unit etc to be as high as is practicable.



PROPOSED SOUTH-WEST FACING ELEVATION 1:100

0 1 2 3 4 5m 10m

SCALE BAR 1:100

JAMES BRECKELL : ARCHITECT : ARB : RIBA

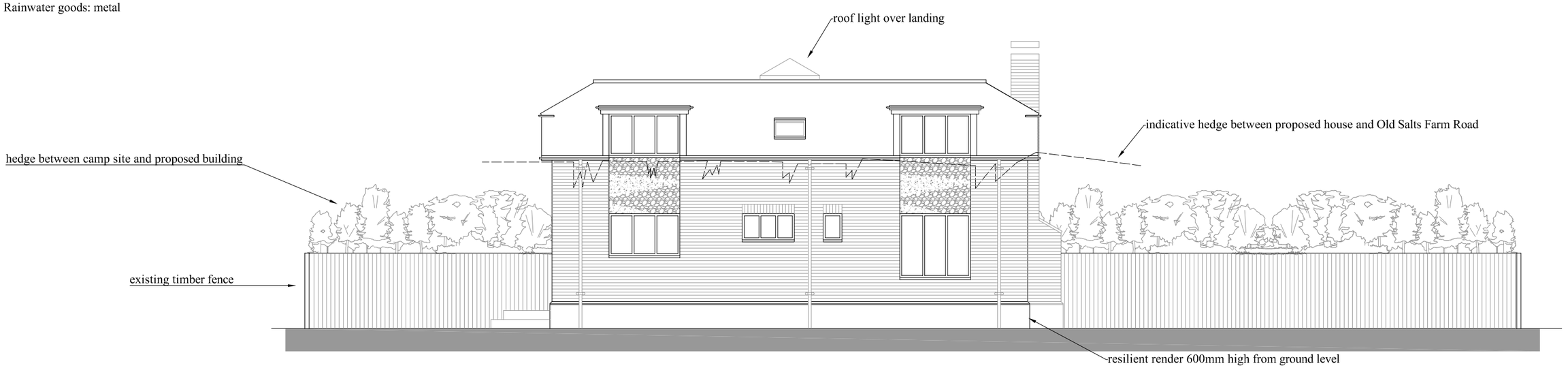
89 Old Fort Road, Shoreham by Sea, BN43 5HA, Tel 07733 268 297, Email: james@breckell.co.uk

Removal of the existing permanent mobile home and construction of a tied residential bungalow at The Barn Caravan Park, Old Salts Farm Road, Lancing, BN15 8JG

December 2022

Drawing no:JB 454/ planning application 08

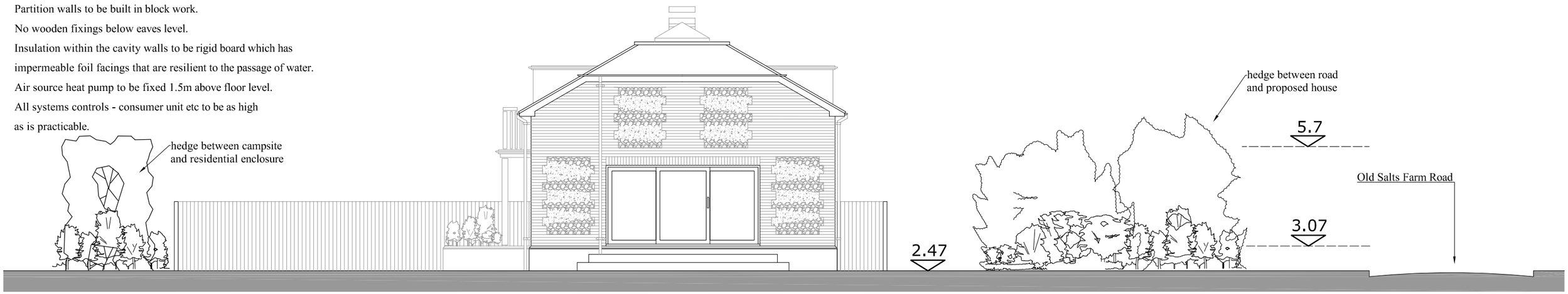
Materials:
Roof: 1st quality slate
Walls: Sussex stock reclaimed bricks with flint panels
Windows: Triple glazed metal framed windows
Rainwater goods: metal



PROPOSED NORTH-WEST FACING ELEVATION 1:100

Flood Resilient Measures:

Ground Floor is 600mm above external ground level.
Floor is a concrete beam and block floor.
Floor covering is to be a durable surface. e.g. stone, ceramic tile or equal.
Skirting boards to be durable. e.g. plastic.
Waterproofed render 600mm high from ground level around the perimeter of the building
Waterproof plaster installed up to eaves level.
Partition walls to be built in block work.
No wooden fixings below eaves level.
Insulation within the cavity walls to be rigid board which has
impermeable foil facings that are resilient to the passage of water.
Air source heat pump to be fixed 1.5m above floor level.
All systems controls - consumer unit etc to be as high
as is practicable.



PROPOSED NORTH-EAST FACING ELEVATION 1:100

0 1 2 3 4 5m 10m

SCALE BAR 1:100

JAMES BRECKELL : ARCHITECT : ARB : RIBA

89 Old Fort Road, Shoreham by Sea, BN43 5HA, Tel 07733 268 297, Email: james@breckell.co.uk

Appendix E

Micro Drainage Calculation Sheets

Summary of Results for 100 year Return Period (+45%)

Half Drain Time : 23 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	0.150	0.150	1.5	2.7	O K
30 min Summer	0.182	0.182	1.5	3.3	O K
60 min Summer	0.192	0.192	1.5	3.4	O K
120 min Summer	0.170	0.170	1.5	3.1	O K
180 min Summer	0.139	0.139	1.5	2.5	O K
240 min Summer	0.111	0.111	1.5	2.0	O K
360 min Summer	0.069	0.069	1.5	1.2	O K
480 min Summer	0.049	0.049	1.5	0.9	O K
600 min Summer	0.043	0.043	1.3	0.8	O K
720 min Summer	0.038	0.038	1.1	0.7	O K
960 min Summer	0.031	0.031	0.9	0.6	O K
1440 min Summer	0.023	0.023	0.7	0.4	O K
2160 min Summer	0.017	0.017	0.5	0.3	O K
2880 min Summer	0.013	0.013	0.4	0.2	O K
4320 min Summer	0.010	0.010	0.3	0.2	O K
5760 min Summer	0.008	0.008	0.2	0.1	O K
7200 min Summer	0.007	0.007	0.2	0.1	O K
8640 min Summer	0.006	0.006	0.2	0.1	O K
10080 min Summer	0.005	0.005	0.2	0.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Summer	130.577	0.0	16
30 min Summer	87.772	0.0	25
60 min Summer	56.310	0.0	42
120 min Summer	34.877	0.0	76
180 min Summer	25.960	0.0	108
240 min Summer	20.900	0.0	140
360 min Summer	15.369	0.0	196
480 min Summer	12.349	0.0	250
600 min Summer	10.413	0.0	308
720 min Summer	9.053	0.0	370
960 min Summer	7.253	0.0	490
1440 min Summer	5.297	0.0	734
2160 min Summer	3.860	0.0	1084
2880 min Summer	3.079	0.0	1468
4320 min Summer	2.236	0.0	2192
5760 min Summer	1.779	0.0	2888
7200 min Summer	1.489	0.0	3664
8640 min Summer	1.289	0.0	4288
10080 min Summer	1.141	0.0	5128

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Summary of Results for 100 year Return Period (+45%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Winter	0.174	0.174	1.5	3.1	O K
30 min Winter	0.209	0.209	1.5	3.8	O K
60 min Winter	0.216	0.216	1.5	3.9	O K
120 min Winter	0.177	0.177	1.5	3.2	O K
180 min Winter	0.128	0.128	1.5	2.3	O K
240 min Winter	0.086	0.086	1.5	1.5	O K
360 min Winter	0.047	0.047	1.4	0.8	O K
480 min Winter	0.038	0.038	1.1	0.7	O K
600 min Winter	0.032	0.032	1.0	0.6	O K
720 min Winter	0.028	0.028	0.8	0.5	O K
960 min Winter	0.023	0.023	0.7	0.4	O K
1440 min Winter	0.017	0.017	0.5	0.3	O K
2160 min Winter	0.012	0.012	0.4	0.2	O K
2880 min Winter	0.010	0.010	0.3	0.2	O K
4320 min Winter	0.007	0.007	0.2	0.1	O K
5760 min Winter	0.006	0.006	0.2	0.1	O K
7200 min Winter	0.005	0.005	0.1	0.1	O K
8640 min Winter	0.004	0.004	0.1	0.1	O K
10080 min Winter	0.004	0.004	0.1	0.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Winter	130.577	0.0	16
30 min Winter	87.772	0.0	27
60 min Winter	56.310	0.0	46
120 min Winter	34.877	0.0	82
180 min Winter	25.960	0.0	116
240 min Winter	20.900	0.0	144
360 min Winter	15.369	0.0	190
480 min Winter	12.349	0.0	250
600 min Winter	10.413	0.0	312
720 min Winter	9.053	0.0	368
960 min Winter	7.253	0.0	488
1440 min Winter	5.297	0.0	724
2160 min Winter	3.860	0.0	1096
2880 min Winter	3.079	0.0	1428
4320 min Winter	2.236	0.0	2116
5760 min Winter	1.779	0.0	2896
7200 min Winter	1.489	0.0	3600
8640 min Winter	1.289	0.0	4264
10080 min Winter	1.141	0.0	5080

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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)	19.200	Shortest Storm (mins)	15
Ratio R	0.350	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+45

Time Area Diagram

Total Area (ha) 0.016

Time (mins) From:	To:	Area (ha)
0	4	0.016

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Model Details

Storage is Online Cover Level (m) 4.000

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.18000	Width (m)	3.0
Membrane Percolation (mm/hr)	1000	Length (m)	20.0
Max Percolation (l/s)	16.7	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	0.000	Membrane Depth (m)	0

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Appendix F

Flood Warning and Evacuation Plan

Introduction

The main objectives of this Plan are to 1) raise the awareness of the flood risk to this site and 2) to highlight the need for occupants (residents/visitors) to plan in advance how they would evacuate this area before the peak flooding (when the water levels will make evacuation hazardous).

A copy of this Plan must be bound into the legal documentation (leases or freehold deeds), so as to alert the owners or tenants.

This plan has been prepared so that all occupants can plan ahead – and prepare to evacuate in good time.

Background

This unit is in the area administered by Adur District Council.

The main threat of flooding is from the coast (south) and River Adur (north). The dwelling's floor level has been set higher than ground levels. There is no risk of flooding when the sea defences are in place. There is only some risk if these defences were to become seriously eroded. Although unlikely, there is a possibility of **3m** flood depth in this area. This would be life threatening, needless to say.

Resilience measures have been included in the unit's design – to minimise disruption caused by flood damage.

Warning Arrangements

This area is covered by the EA's Flood Warnings service. All residents are 'strongly advised' (ie **must**) subscribe to 'Floodline', the Environment Agency's free flood warning system. Visit https://www.fws.environment-agency.gov.uk/app/olr/register, this being the best web page at the time of preparing this in 2020 – search "EA flood warnings UK" if this has changed.

The possibility of flooding to the property will trigger an automatic 24 alert message to the registered address contact. These flood warnings are intended to be given in sufficient time to allow evacuation plans to be implemented.

For tenanted dwellings: The landlord is responsible for ensuring that the details in this section are completed with the correct occupant details at the beginning of each change of tenancy. If the tenant changes their details they should communicate this to the landlord who will then update this FRMP with the correct information. The registered contact for the site is [INSERT OCCUPIER'S NAME], and his/her contact number is [INSERT OPCCUPIER'S TELEPHONE NUMBER]. His/her email address is [INSERT OCCUPIER'S EMAIL ADDRESS].

Likely depth: the flood depth outside your house may be as great as **2.94m**. Note that this is only possible if the defences protecting this area have failed.

Time to inundation: the likely warning time period for tidal flooding given by the Environment Agency (EA) may be short – if the defences were to fail at a critical place, the time to inundation may be as short as 2-4 hours.

It must be stressed that the first floor is ***not*** at direct risk of being flooded. This plan has been prepared so that occupants can prepare to evacuate the area via the best safe route. If you do not manage to evacuate in time you should reside at high level until the flood waters recede from peak level. The total time of inundation is unlikely to be long as the tide will recede quickly.

This plan has been prepared so that occupants can prepare to evacuate the area via the best safe route – see the Appendix - so as to minimise the impact on the emergency services.

In addition to the automated service, further information on the flooding can be obtained by consulting the Environment Agency website (www.environmentagencv.gov.uk/flood) and phoning Floodline on 0345 988 1188, selecting option 1. The site lies within an EA Flood Warning Area. Information on these telephone numbers is updated every 15 minutes.

For a local media outlet offering flood information, consider tuning into BBC Radio Sussex:

Frequency: 104.5, 104.8 & 95.0–95.3 FM; DAB: NOW Sussex Coast; Freeview: 720

Many other radio stations are available online and DAB – browse by name.

<u>Emergency Telephone numbers:</u>

General first responders, namely police, ambulance and fire		999
Adur District Council – Environmental Health	(business hours)	01903 221064
Gas Leaks/safety		0800 111 999
EA Floodline		0345 988 1188
RSPA		0300 1234 999

You should prepare by collecting all emergency numbers *relevant to you*, eg vehicle cover, insurer, landlord.

Flood Warning Codes

If flooding is forecast, alerts are issued by the EA using a set of four easily recognisable codes.
Each of the four codes indicates the level of danger associated with the warning/alert. The EA aims to issue flood alerts up to 12 hours in advance, although this is not always possible. The codes may not always be used in sequence; a Severe Flood Warning may be issued immediately, with no other warning code preceding it.

The Flood Warning Codes and their meanings are:



- What it means: Flooding is possible. Be prepared.
- When it's used: two hours to two days in advance of flooding.
- Impact: flooding of low lying land and roads - property flooding is not expected.

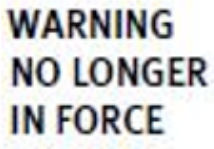


- What it means: Flooding is expected. Immediate action required.
- When it's used: Half an hour to one day in advance of flooding.
- Impact: Property flooding of homes and businesses is expected.



- What it means: Severe flooding. Danger to life.
- When it's used: When flooding poses a significant threat to life.
- Impact: Deep, fast flowing water. Debris in water. Communities cut off.

Source: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/311020/flood_warnings_LIT_5215.pdf



- No further flooding is currently expected in your area.
- When it's used: When river (and sea) conditions return to normal.

Action to be Taken on Receipt of Flood Warnings



- What it means: Be prepared to act on your flood plan. Refer to the Action Checklist – below.
- Call Floodline on 0345 988 1188, select option 1 for up to date information.
- Monitor local water levels and flood forecast on the EA website.

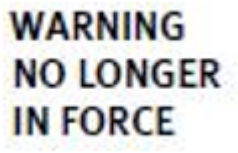


- What it means: Flooding is expected. Serious consideration needs to be given to the need to evacuate. It may be impossible for the emergency services to reach this building if events unfold differently to as anticipated.
- Move valuable items to as high a level as possible.
- Carry out the rest of the Action Checklist – as appropriate to the nature of the flooding

THE PROPERTY MUST BE EVACUATED IF SAFE TO DO SO.



- Co-operate with the emergency services. Call 999 if you are in immediate danger.
- If there has been a sudden breach or overtopping of a reservoir resulting in hazardous floodwaters surrounding the site, seek safe refuge at high level.



- Be careful. Floodwater may still be around for several days.
- If you've been flooded, ring your insurance company as soon as possible.

There is a map in the Appendix showing the *probable best* route to dry land. All adults in this dwelling should be familiar with this.

Preparation for a Flood Event

Prepare a list of all your important contacts written in a notebook - and keep it to hand.

Prepare a **grab bag** of essential items and keep it to hand – with a copy of this Plan. It can include some or all of the following items:

- List of prescription medication for the family
- Pen
- Blankets and warm clothing
- Waterproofs
- Important documents such as passport and insurance certificates
- First aid kit
- Radio (battery or wind up)
- Torch (battery or wind up)
- Spare batteries
- Spare glasses
- Mobile phone and charger
- Contact numbers in a notebook (see 6.1)
- Insurance details
- Spare keys for house and car
- Tinned and non-perishable food, and a tin opener

Prepare a list of all your important contacts written in a notebook - and keep it close to hand, eg in the grab bag.

Ensure that all adults in your household know *exactly* how to turn off electricity, gas and water.

Make arrangements with family/friends living outside a flood area to receive you in case of evacuation. If this is not feasible, ensure that you have appropriate insurance cover that provides alternative accommodation (ie guest house/hotel).

Action Checklist

An evacuation route is shown at the back of this Plan. You should consider evacuating the property via this or a similar route on receipt of a flood alert. Bear in mind that there may be short notice between warnings and this area becoming inundated.

The evacuation route guides occupants from this building to higher, dry ground. Study this so that you are familiar with this in advance of deciding to evacuate.

Evacuate! Ensure all the measures listed above are in place – and lock up.

Pets

Pets should be included in your emergency planning arrangements.

Be prepared:

- Make sure your cats and dogs are wearing proper identification e.g. up to date contact details on their collar, microchip
- Make sure pet foods and medicines are well stocked
- Arrange for a family member or friend living outside the flood risk area to take in your pets when an evacuation order comes

If there's a flood warning:

- Move food, bedding and fresh water to somewhere safe and dry
- Keep your portable pet carriers at hand
- Keep familiar toys dry, because pets under stress will welcome something that smells of home
- Consider taking pets to a family member or friend who lives outside the flood risk area
- Put documents like vaccination records, vet's details, and microchip number(s) in a sealed bag with any other important documents. Include a current photograph in case your pet(s) get lost

If disaster strikes:

- Bring your small pets inside (upstairs)
- Move food, bedding and fresh water to somewhere safe and dry
- Keep your portable pet carriers at hand

- Keep familiar toys dry: pets under stress will welcome something that smells of home
- Consider taking pets to a family member or friend who lives outside the flood risk area
- Put documents like vaccination records, your vet's details, and microchip number(s) in a sealed bag with any other important documents. Include a current photograph in case your pet(s) get lost

Upon Return & Recovery

When to go back? The responding organisations will be providing updates on the situation and notification when it is safe to return. Follow their advice.

- Do not start the clean-up until the threat of further flooding has passed
- Don't throw anything away until told to do so by your insurer
- Check with your insurance company if it is OK to start cleaning your property before starting
- Confirm what services your insurance company will pay for
- Use a permanent marker to mark on the wall the height of the flood water in each room
- Wear waterproof, gloves, boots and a face mask when clearing up
- Household products are sufficient to clean and disinfect your property
- Use mains pressure garden hose for washing down, not high pressure hose lines
- As soon as possible, ask your insurance company when a loss adjuster will visit
- Ask your insurance company if they will pay for repairs the will make your property more flood resilient for the future
- Keep records: date, time, name of person you spoke to and what was agreed
- Keep receipts
- Take photos and video of your damaged property
- Make a list/record of your damaged property

Map Showing Route to Dry Land



The shortest route to dry land is south along Old Salts Farm Road, right (west) along Freshbrook Road and left turn into Seaside Road. Provided you keep heading west and then north you remain in dry land

Appendix G

EA Correspondence

From: Rabone, Anna <Anna.Rabone@environment-agency.gov.uk>
Sent: Friday, November 25, 2022 1:29 PM
To: James Breckell <James@breckell.co.uk>
Cc: Peter Barnett <peter.barnett@adur-worthing.gov.uk>
Subject: RE: The Barn Caravan Park

Hi James,

I am so sorry for the delay in getting back to you on this – things have been busy on our incident response side of the organisation due to the rain which many of us get pulled from our day jobs to incident response.

Anyway, I have now heard back from our flood risk team and yes, the first floor level at 5.7m AOD is acceptable as an absolute minimum.

The FRA should also include information about adequate access/egress arrangements in the event of a flood.

If the above can be incorporated into the planning application submissions, then we should be able to remove our objection accordingly.

Kind regards,
Anna
Anna Rabone
Sustainable Places Technical Specialist | Solent and South Downs
Environment Agency | Oving Road, Chichester, West Sussex, PO20 2AG

From: James Breckell <James@breckell.co.uk>
Sent: 03 November 2022 09:43
To: Rabone, Anna <Anna.Rabone@environment-agency.gov.uk>
Cc: Peter Barnett <peter.barnett@adur-worthing.gov.uk>
Subject: RE: The Barn Caravan Park

Hi Anna,

We had a digital survey of the site done last Friday and the levels of the land are higher than expected. Our FRA is based on EA information where the existing ground level is understood to be 2.11m. This is based on LiDAR data and is now known to be inaccurate. The digital survey shows that the

level of the site immediately in front of the building being 2.47m. The increase in height helps us, although it is not as high as the ordnance survey information suggests as 2.7m.

Please see the attached site plan and sketch design. Please ignore the appearance of the building because our planning case officer (Peter Barnett) has discouraged us from pursuing this 'appearance' – if we can focus on the floor levels only.

A notable planning permission at Monks Farm (Lancing) for 385 houses has an EA planning condition where the 1st floor of those houses is to be **5.7m**.

If we work back from that level where our 1st floor is 5.7m and the ground floor is 8 brick courses (600mm) above external ground level at 3.07m then we have exceeded your recommendation of 3.35mm AOD because this was on the assumption that the ground level was 2.11m AOD. (2.11m + 3.35m = 5.46mAOD) i.e. at 5.7mAOD we have exceeded the High Central Allowance.

Whilst the sketch design attached is not supportable on its appearance, can you please confirm that the floor levels would be acceptable to the EA?

If you are able to confirm that this would enable you to change your comment from objection to being supportive this would be a major step forward.

Thanks again for your continued engagement on this.
With compliments,

James Breckell

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Civil Engineering - Transport Planning - Flood Risk

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