AMBIENTAL

ENVIRONMENTAL ASSESSMENT

Flood Risk Assessment
6681

56 The Meadway, Shoreham by Sea, East Sussex, BN43 5RP

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Proposed Development: It is understood that proposed development is for the demolition of a bungalow and construction of a replacement dwelling.

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1. Summary

1.1 Ambiental Environmental Assessment has been appointed by ABIR Architects to undertake a National Planning Policy Framework (NPPF) compliant Flood Risk Assessment (FRA) for the proposed development at 56 The Meadway, Shoreham by Sea, East Sussex, BN43 5RP.

1.2 The site is currently a residential dwelling. It is understood that proposed development is for the demolition of a bungalow and construction of a replacement dwelling.

1.3 With reference to the Environment Agency (EA) Flood Map for Planning, the proposed development is located within Flood Zone 2 and 1. The existing dwelling and proposed development are considered as "More vulnerable" under the NPPF.

1.4 The site is approximately 300m north of the English Channel and 300m south of the River Adur and benefits from tidal defences.

1.5 The site is located within Policy Unit 4d15 (Shoreham Harbour to Worthing) of the Beachy Head to Selsey Bill Shoreline Management Plan. The short, medium and long-term policy for policy unit 4d15 is to hold the line. Details from the EA have shown that the site benefits from flood defences in the form of a shingle beach and timber wall. The site is as such defended, however the maintenance of defences is dependent on third party funding. As long as the site benefits from these defences, the primary mechanism of flooding is likely to be overtopping of coastal defences. This would likely be a result of a combination of high tide and/or storm surge, both of which are well understood mechanisms of flooding and can be predicted hours in advance.

1.6 Site-specific modelled flood levels and extents were not available specifically for this site. However, data available from the Arun to Adur Coastal Modelling Study (JBA Consulting, 2012) provided by the EA for FRA works at a nearby site. This was considered as potentially suitable due to its close vicinity to the site and similar range of elevation levels to 56 The Meadway.

1.7 56 The Meadway is shown to be affected in the 1:1,000 year and 1:200-year 2115 tidal flood events. These events are shown to have flood levels of 5.49mAOD and 5.77mAOD respectively at 43 Old Fort Road. Comparison with topographic levels from EA 1m LiDAR at 56 The Meadway shows should the same flood levels occur; it would result in flood depths of up to 0.64m onsite.

1.8 The EA does not hold any records indicating that the site has been previously affected by flooding from groundwater, sewer, fluvial/tidal or surface water sources. Adur and Worthing District SFRA (2020) show no cases of tidal flooding to be recorded within 400m of the proposed development.

1.9 With consideration of flood mitigation measures outlined in Section 7, the risk of flooding from surface water and groundwater sources could be considered as **relatively low**, and **low** from sewer sources.

1.10 Analysis of client plans on QGIS shows, that while the built extent area of the replacement dwelling is the same as the existing dwelling to the nearest $1m^2$, and impermeable surface areas on site will increase by approximately $62m^2$ as a result of the proposed development. The HR Wallingford UKSuDS Surface water storage volume estimation tool indicates that the proposed increase in impermeable surface area of $62m^2$ is associated with a greenfield runoff rate of approximately <0.01 l/s (Appendix II). However, it is generally considered that 1 l/s is an acceptable minimum flow rate as anything less than this could increase the risk of blockage within the system and subsequent flooding. As such, the calculations have been modelled to restrict runoff from the proposed extension area to 1 l/s (as close to greenfield as practical.

1.11 These calculations indicate that there would be a storage requirement of 2m^3 in the 1:100 year +CC (40%) event when restricting runoff rates from the proposed extension to 1 l/s (as close to greenfield as practical).

1.12 This could be provided through incorporation of small-scale SuDS such as rainwater planters and water butts. The details of the drainage strategy should be confirmed prior to detailed design.

1.13 It is understood that the internal ground floor Finished Floor Level (FFL) can be raised no higher than 200mm above the existing level (5.54mAOD) and as such should be set at 5.74mAOD. This is 0.03m below the 1:200-year 2115 design flood level (5.77mAOD), at 6.07mAOD. Given that this is higher than the existing internal ground floor FFL, and that all sleeping quarters are to be located on the upper floor, betterment is provided as a result of the replacement dwelling proposed development. The proposed development is to be constructed in line with current best practice for construction within an area at risk of flooding in line with CLG 2007 'Improving the Flood Performance of New Buildings.

1.14 It is important to note that, given the site benefits from the presence of defences, the highest risk of flooding to the site would occur in combination with large winter storms and storm surge coinciding with a high tide. This mechanism is well understood, and it is unlikely the site will flood without several hours of warning.

1.15 The EA operate a Flood Information service which identifies whether any flood warnings or alerts have been issued for a specific postcode or place in England or Wales: https://flood-warning-information.service.gov.uk/

1.16 In summary:

- The area of the site has been shown to be affected by 1:200-year 2115 design flood levels of 5.77mAOD
- All sleeping accommodation is to be located on the first floor and above
- The site lies within an area where the long-term policy for the coastline is 'Hold the Line'
- Significant betterment can be achieved in flood vulnerability, through the implementation of flood warning procedures and the maintenance of a safe refuge area on the upper floor.

Following the guidelines contained within the NPPF, the proposed development **is considered to be suitable** assuming appropriate mitigation (including adequate warning procedures) can be maintained for the lifetime of the development.

Table 1 Summary of flood risks, impacts and proposed flood mitigation measures.
N/A[1] not required for this assessment; N/A[2] data not available.

Development Description	Existing	Proposed
Development Type:	Residential dwelling	Residential dwelling
Number of Bedrooms:	Two	Two
EA Vulnerability Classification:	More vulnerable	More vulnerable
Ground Floor Level:	Elevations on site vary between approximately 5.13mAOD and 5.56mAOD (2m LiDAR data).	Internal ground floor FFL to be set at no lower than 6.07mAOD
Level of Sleeping Accommodation:	Ground floor	First floor (2 bedrooms)
Impermeable Surface Area:	239m^2	301m^2
Surface Water Drainage:	N/A[1]	Initial calculations indicate storage requirement of 12m^3 in the 1:100 year +CC (40%) event when restricting runoff rates from the proposed extension to 1 l/s (as close to greenfield as practical). Could be provided in below ground geocellular tank connected to existing system.
Site Size:	340m^2	No change
Risk to Development	**Summary**	**Comment**
EA Flood Zone:	2 and 1	Between 0.5% (1 in 200) and 0.1% (1 in 1,000) chance of flooding from tidal sources in any given year, and less than 0.1% (1:1,000) chance of flooding from tidal sources in any given year.
Flood Source:	Tidal	The English Channel
1:200 Year Flood Level	Defended: - Undefended: -	All levels taken from: Arun to Adur Coastal Modelling (JBA, 2012).
1:200 Year Flood Level & Climate Change 2115	Defended: 5.77mAOD Undefended: -*	
1:1000 Year Flood Level	Defended: 5.49mAOD Undefended: -	
Recorded Flood Events in Area:	Yes	Adur and Worthing SFRA (2020) and EA Historic Flood map show records of tidal flooding 400m and 1.3km to the north west respectively.
Recorded Flood Events at Site:	None	
SFRA Available:	Yes	Adur and Worthing District SFRA (2020)
Management Measures	**Summary**	**Comment**
Ground floor level above extreme flood levels:	Yes	It is recommended that ground floor internal Finished Floor Levels (FFLs) are raised no less than 300mm above the 1:200-year 2115 flood level if possible.
Safe Access/Egress Route:	Yes	See Section 7
Flood Resilient Design:	Yes	See Section 7
Site Drainage Plan:	N/A[1]	
Flood Warning & Evacuation Plan:	Yes	Refuge on upper floor of site recommended
Offsite Impacts	**Summary**	**Comment**
Displacement of floodwater:	N/A[1]	Proposed development is considered as like for like, and
Increase in surface run-off generation:	Negligible	Initial calculations indicate storage requirement of 2m^3 in the 1:100 year +CC (40%) event when restricting runoff rates from the proposed extension to 1 l/s (as close to greenfield as practical). Could be provided in below ground geocellular tank connected to existing system.
Impact on hydraulic performance of channels:	N/A[1]	Development is minor, considered as like for like

2. Development Description and Site Area

Proposed Development and Location

2.1 The proposed development is located at 56 The Meadway, Shoreham by Sea, East Sussex, BN43 5RP (see Figure 1 and Figure 2).

2.2 The site is currently a residential dwelling. It is understood that proposed development is for the demolition of a bungalow and construction of a replacement dwelling.

2.3 Elevations on site vary between approximately 5.13mAOD and 5.56mAOD (1m LiDAR data) (see Figure 3) (Source: EA). Analysis of topographic levels indicates that the site generally slopes to the north and south, away from the centre of the site.

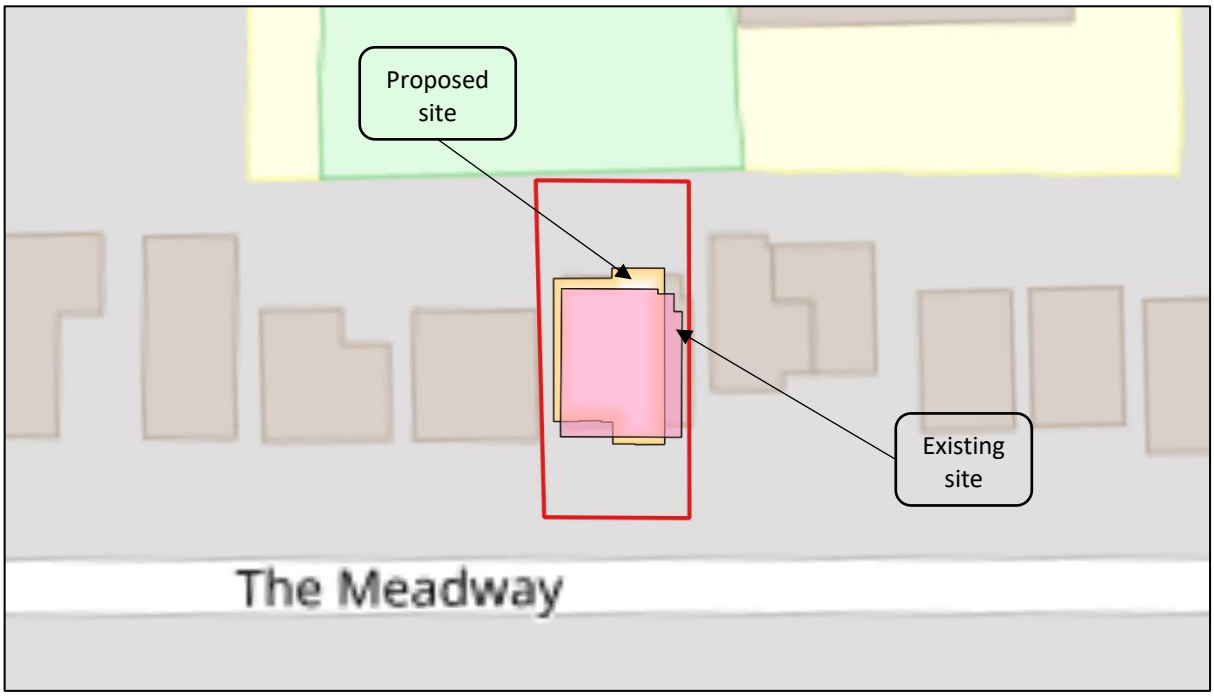


Figure 1 Location Map, identifying the location of the proposed development (Source: OS)



Figure 2 Location Map, identifying the location of the proposed development (Source: Google)

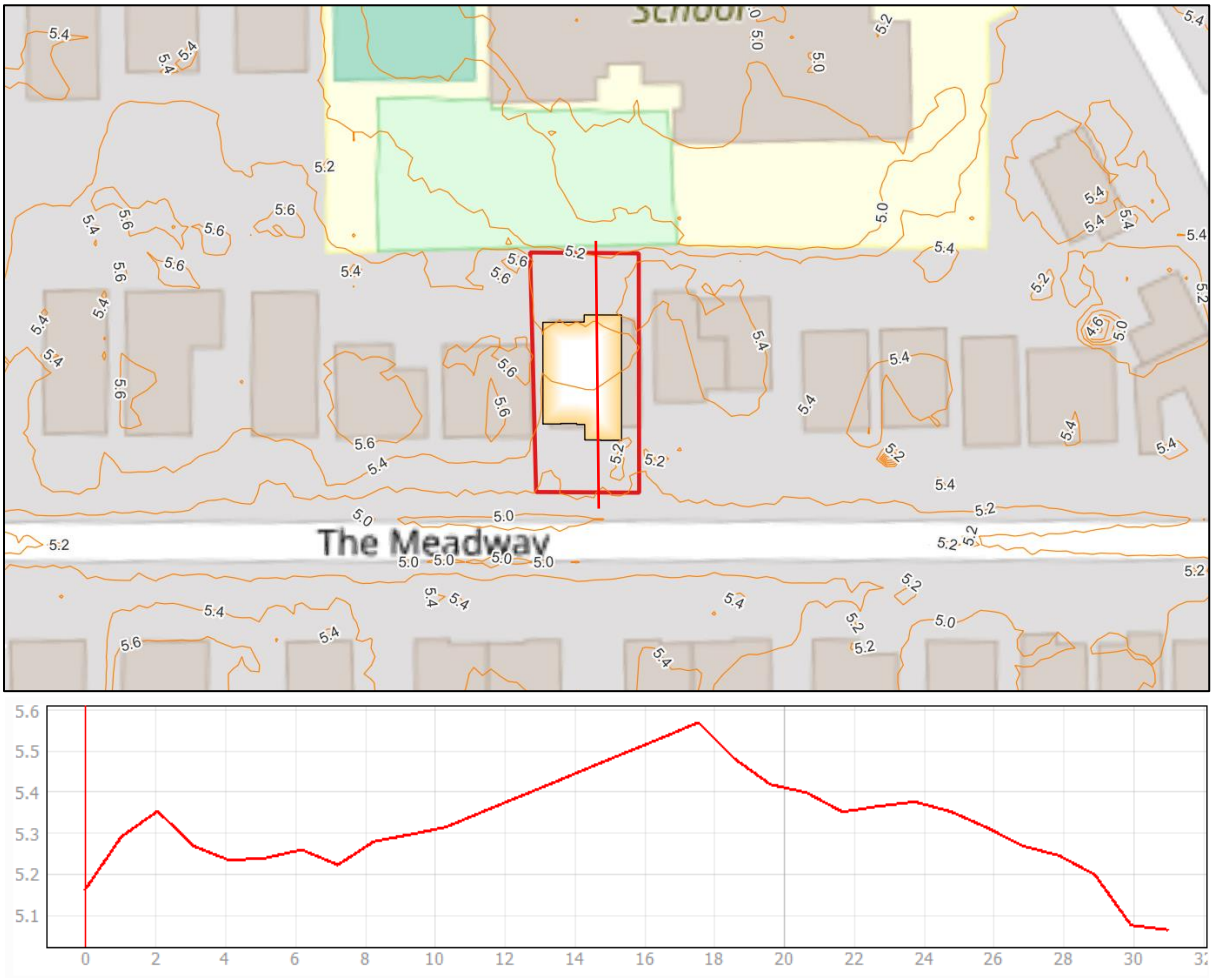


Figure 3 Site topography (upper) and cross-section (lower) (Source: EA 1m LiDAR data). Please note: cross-section is taken from south to north.

Vulnerability Classification

2.4 The EA Flood Map for Planning demonstrates that the proposed development lies within Tidal Flood Zone 2 and 1 with a medium probability of between a 1 in 200 (0.5%) and 1 in 1,000 (0.1%), and Low probability of less than a 1 in 1,000 (0.1%) of flooding from seas or tidal estuaries in any year (see Figure 4).

2.5 The southeast of the site and proposed dwelling are shown to be situated in Flood Zone 2 (see Figure 5).

2.6 According to NPPF guidelines, the existing site is classified as 'More Vulnerable'. Post-development, the NPPF vulnerability is unchanged compared to the existing situation.

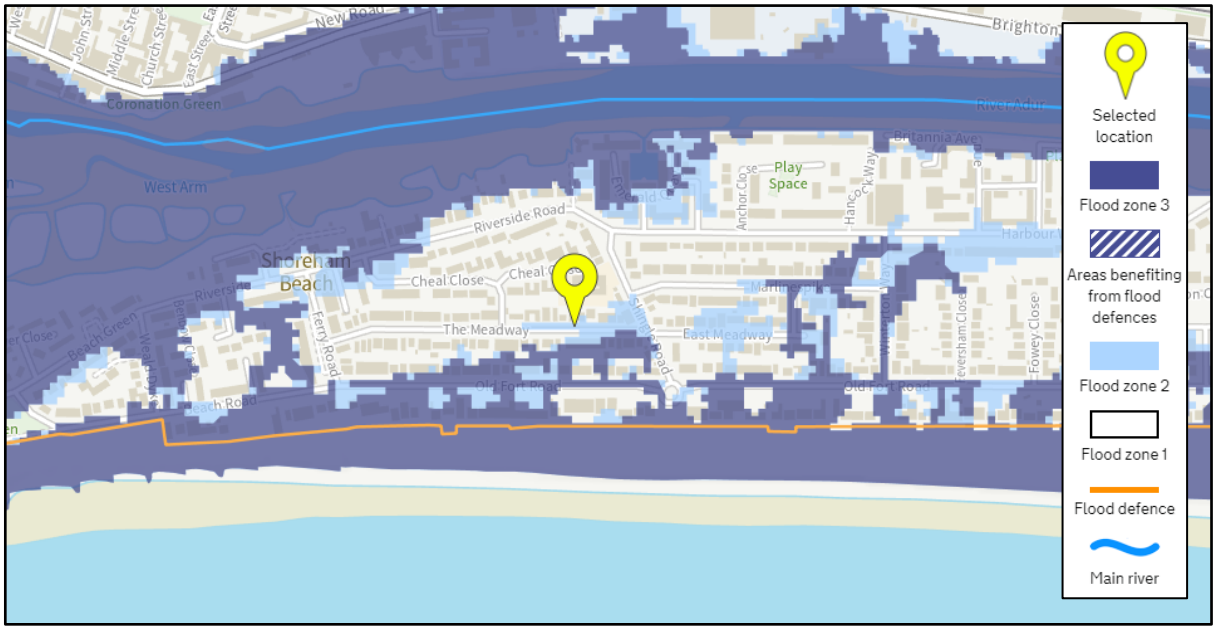


Figure 4 EA Flood Map for Planning

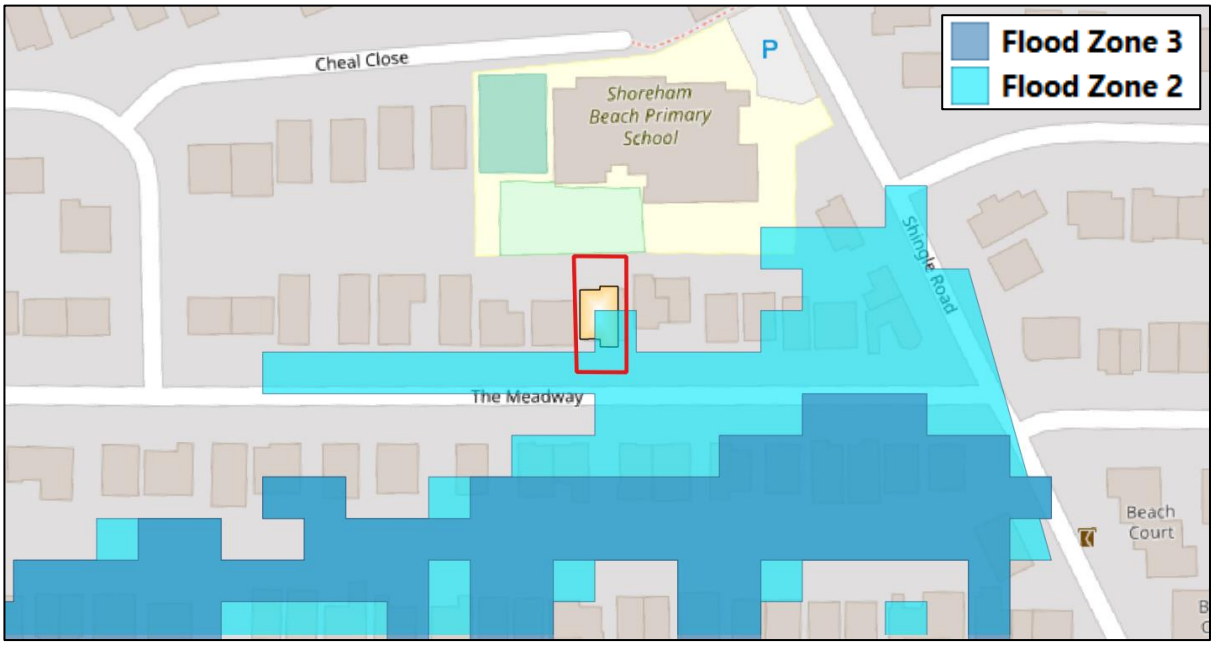


Figure 5 Site Flood Zone map (Source: EA)

Geology

2.7 The British Geological Survey (BGS) Geology of Britain Viewer indicates that the bedrock underlying the site is Tarrant Chalk Member comprising Chalk.

2.8 The BGS Geology of Britain Viewer indicates that the superficial deposits underlying the site are Storm Beach comprising gravel.

3. Sequential Test/Exception Test

3.1 Under the NPPF, all new planning applications should undergo a *Sequential Test*. This test should be implemented by local planning authorities with a view to locating particularly vulnerable new developments (e.g., residential, hospitals, mobile homes etc.) outside of the floodplain.

3.2 The NPPF *Sequential Test: Flood Risk Vulnerability and Flood Zone 'Compatibility' Table* is reproduced below in Table 2;

Table 2 The Sequential Test: Flood Risk Vulnerability and Flood Zone 'Compatibility' Table as specified by NPPF. Please note: ✓ means development is appropriate; ✗ means the development should not be permitted.

Flood Risk Vulnerability Classification		Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	**Zone 1**	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test Required	✓	✓
	Zone 3a	Exception Test Required	✓	✗	Exception Test Required	✓
	Zone 3b ***Functional Floodplain***	Exception Test Required	✓	✗	✗	✗

3.3 Using the principles of the Sequential Test outlined above, the proposed development is 'More Vulnerable'. The site is located within Flood Zones 2 and 1 (as defined by the EA) and therefore, under the NPPF, does not require the application of the Exception Test.

4. Site Flood Hazards

Sources of Flooding

4.1 The proposed development is located within Flood Zone 2 (medium risk of flooding) and is considered to be 'More vulnerable' according to NPPF guidelines. Table 3 summarises the potential sources of flooding to the site:

Table 3 Summary of flood sources

Source	Description
Fluvial/Tidal	EA Main River—River Adur 300m north Sea English Channel 300m south; **Relatively low risk**
Surface	**Relatively low risk**
Groundwater	**Relatively low risk**
Sewer	**Low risk**

Mechanisms and History of Flooding

4.2 The EA Flood Map for Planning demonstrates the site to be located within Flood Zone 2 (medium risk of flooding). It is important to note that the EA Flood Map for Planning shows only the potential floodplain; the mitigating effects of any flood defences currently in place are not considered.

Tidal

4.3 A main river, the River Adur, is located approximately 300m to the north of the development site. The site is approximately 300m north of the English Channel Mean High Tide Level.

4.4 With reference to the EA Flood Map for Planning (see Figure 4 and Figure 5), the site is in Flood Zone 2 and Flood Zone 1, so is considered to be in an area at medium risk and low risk of flooding. The site boundary is approximately 300m north of the Mean High-Water Level of The English Channel, at its closest proximity. Furthermore, the River Adur, which is classified as a Main River by the EA, is located approximately 300m north of the site at its closest proximity, with the mouth of the river 1,300m to the east. The main flood risk to the site is thus considered to be tidal.

4.5 The site is located within Policy Unit 4d15 (Shoreham Harbour to Worthing) of the Beachy Head to Selsey Bill Shoreline Management Plan.

4.6 The Beachy Head to Selsey Bill Shoreline Management Plan (2006) states:

The long-term plan for Shoreham Harbour (River Adur) to Worthing is to continue to protect assets along the frontage through holding the line, defending the present position. The urban areas of Shoreham-by-Sea, Lancing and Sompting are key tourist resorts and service centres for the sub region, providing a range of amenities and recreational facilities that support the surrounding communities. The area also supports a high number of environmental and historical assets. This policy is sustainable in the long-term as it protects an area of high economic and environmental value. It is recognised that in order to achieve this, there would

be minimal change to current management practices, but there may be an alteration to the existing sediment transport links.

4.7 The EA have stated that there are coastal flood defences to the south, designed to offer an estimated standard of protection of 1 in 100 (1%). There are flood defences in the form of a shingle beach and a timber wall. The Asset ID is 149940. The effective crest level is 7.10mAOD. The estimated standard of protection is 1 in 100 (1% AEP). The estimated condition grade is 3 (fair).

4.8 The Shoreham Adur tidal walls scheme was completed in March 2019, the site is located within reach 'W3 – Riverside Road'. At this reach, a new steel sheet-pile wall was built riverward of the existing defences. The sheet piles were capped with reinforced concrete and brick cladding. The defences to the rear of the site consist of brick and blockwork walls.

4.9 The scheme has been designed to provide better protection against surge tides with a 0.33% probability of occurring in any one year (1 in 300). The height of the defences has been set to take into account 50 years of predicted sea level rise

4.10 At time of writing, the EA have not provided a Product 4 dataset containing tidal flood levels specific to this site. In the absence of flood depth data relevant to site flood levels data from a nearby development, approximately 140m to the southwest at 43 Old Fort Road have been used as an indicator (see Figure 6). This Product 4 Dataset derives from the Adur Coastal Modelling Study (2012).

4.11 The EA have provided 3 floodplain nodes across the 43 Old Fort Road site in relation to the undefended and defended flood levels for the 1:20 year, 1:75 year, 1:200 year, 1:200 (2115) year 1:1000-year flood events

4.12 There is no record of historic flooding affecting the site at 56 The Meadway, according to EA Product 4 data for 143 Old Fort Road, which included showed historical flooding in the local area.

Undefended Scenario

4.13 The site is shown to remain unaffected by flooding in all undefended modelled events (see Figure 7), except for in the 1:200-year event for 2115, which is demonstrated to affect the southeast of the proposed dwelling.

4.14 No flood level or depth data were available for the undefended 1:200-year 2115 event, since the 43 Old Fort Road site was shown to be outside of the flood extent for this scenario. No other FRA works undertaken by Ambiental and provided with Product 4 datasets have been shown to experience flooding in the Undefended 1:200-year 2115 event. As such, no flood level or depth can be given for this modelled scenario, without a site-specific Product 4 dataset at this time.

Defended Scenario

4.15 The site is demonstrated to be partially, and inclusively affected by flooding in the defended 1:1,000 year (5.49mAOD) and 1:200-year 2115 (5.77mAOD) modelled flood events, as shown in Figure 8, with only the south and east of the site affected by the 1:1,000-year event.

4.16 Comparison of topographic site levels (between 5.13mAOD and 5.56mAOD) with flood levels at 43 Old Fort Road show the site could experience flood depths of up to 0.36m in the 1:1,000-year event, and 0.64m in the 1:200-year 2115 event. Flood levels for the defended scenario at 43 Old Fort Road can be found in Table 4.

4.17 It must be noted however, that these flood levels are not specific to the 56 Meadway site, but to 43 Old Fort Road, approximately 140m to the southwest. As such, flood levels and extents may be different.

4.18 The EA has provided the additional information with regards to the defended and undefended flood events in the Shoreham area:

4.19 *The levels and depths for the defended and undefended scenarios appear as such due to the relatively high level of the road and land along the beach, therefore the risk of inundation is little until wave overtopping is factored in. When we estimate the volume of water overtopping the beach, the model needs specific details about the beach profile and any defence geometry. This means that while we are able to model the impact of overtopping in the defended scenario, we can't do this for the undefended scenario.*

4.20 To summarise, the reason why the site and local area is affected more by flooding in the 'Defended' scenario than in the 'Undefended' is due to the potential impact of overtopping. The EA can only model the potential impact of overtopping during the defended scenario, and not in the undefended scenario.

4.21 Given that the site is defended, and will remain so for the long-term future, thus the primary mechanism of flooding is likely to be overtopping of coastal defences. This would likely be a result of a combination of high tide and/or storm surge, both of which are well understood mechanisms of flooding and can be predicted hours in advance. Furthermore, all sleeping accommodation is to be located on the upper floors of the development.

4.22 As such, with consideration of flood mitigation measure outlined in Section 7, and that it is understood that all sleeping quarters will be confined to the upper floor, the risk of flooding to the proposed development from tidal sources could be considered as **relatively low**.

Table 4 Modelled Flood Plain Flood Levels at 43 Old Fort Road (Source: EA).

Modelled Flood Level for Annual Exceedance Probability (mAOD) Defended				
5% AEP (1:20yr)	*1.3% AEP (1:75yr)*	*0.5% AEP (1:200yr)*	*0.5% AEP (2115)*	*0.1% AEP (1:1000yr)*
5.46	*5.47*	*5.47*	*5.77*	*5.49*

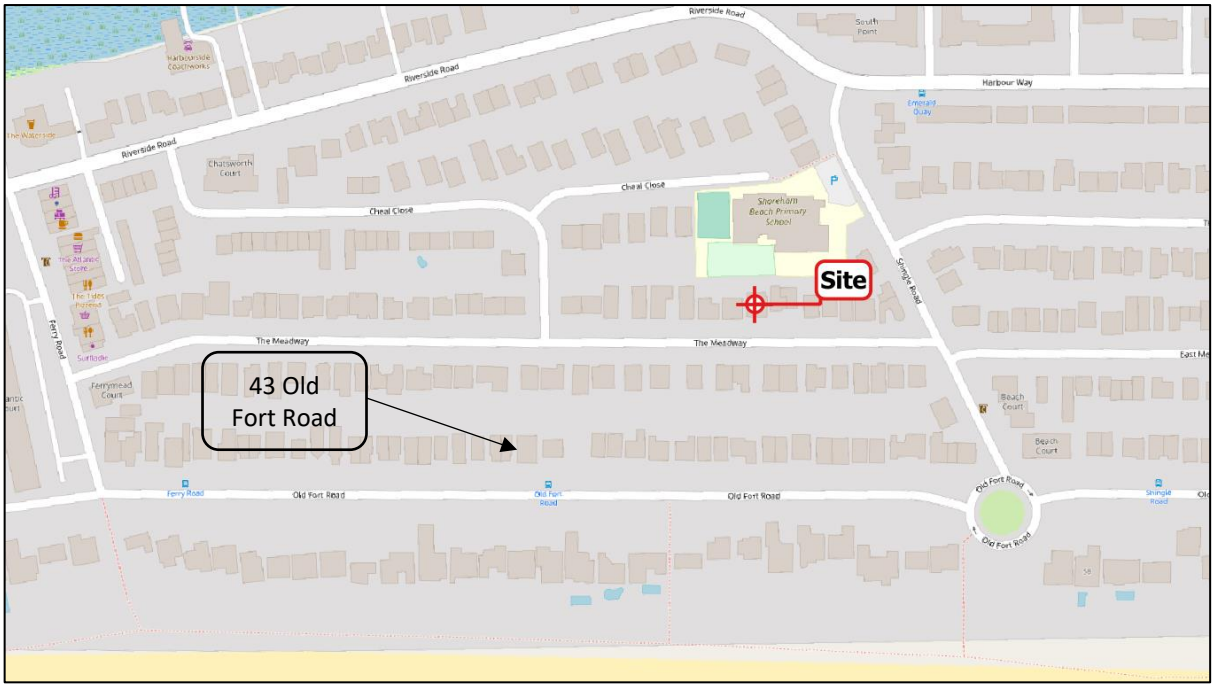


Figure 6 Site location map showing 56 Medway and 43 Old Fort road (left), for which the EA provided Product 4 dataset (Source: OS)

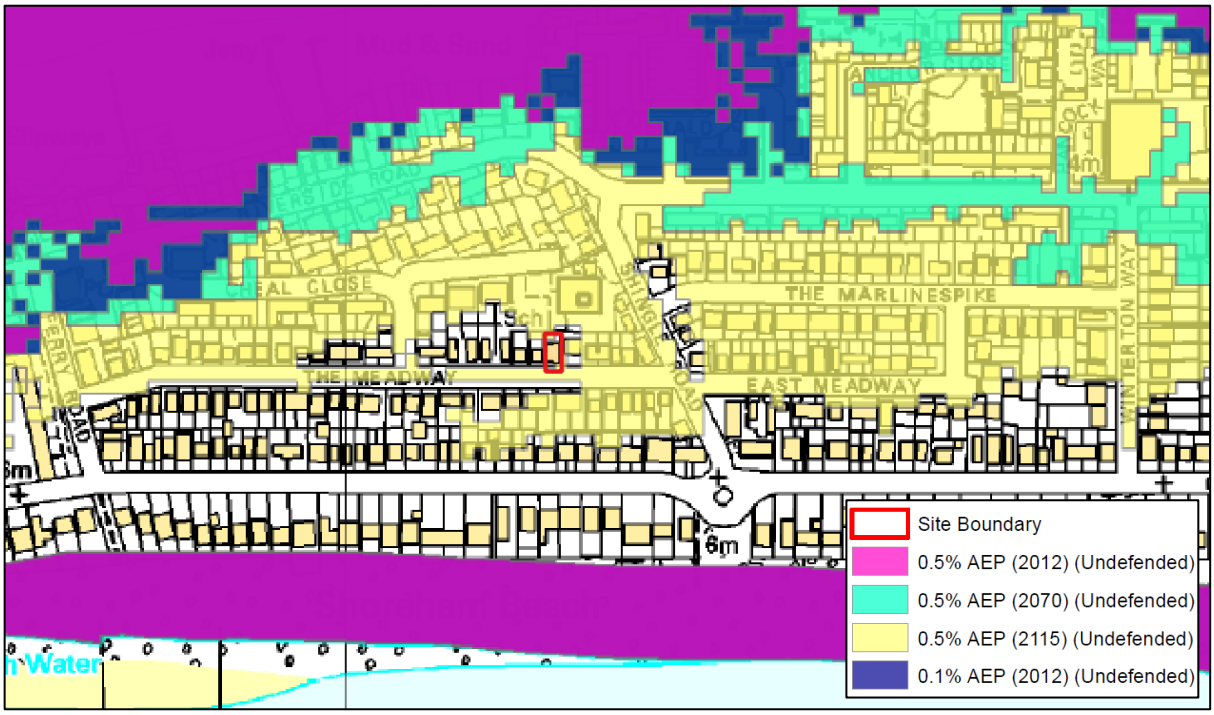


Figure 7 Undefended Flood Extents (Source: Adur Coastal Model, JBA, 2012)

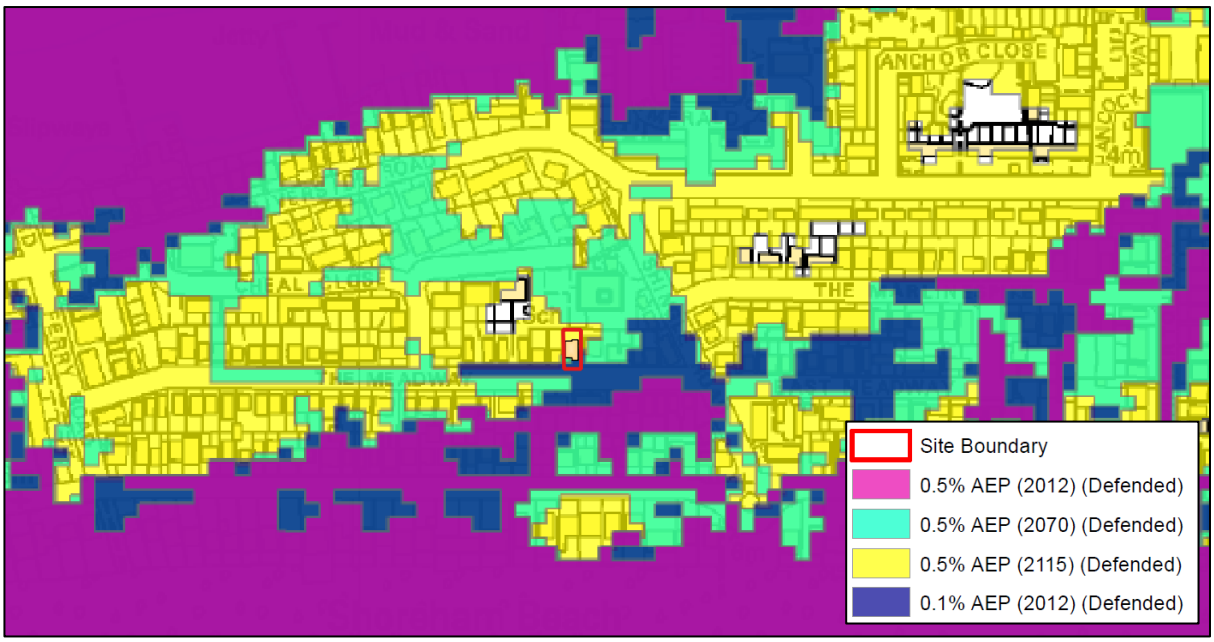


Figure 8 Defended Flood Extents (Source: Adur Coastal Model, JBA, 2012)

Surface Water (Pluvial)

4.23 The EA Flood Risk from Surface Water website shows the proposed development to be within an area of 'Medium' risk of flooding from surface water (see Figure 9). Areas identified to be at 'Medium' risk have a 1% to 3.3% annual risk of flooding from this source.

4.24 The EA Surface Water Flood Depth Map for the High Risk (1:30 year), Medium Risk (1:100 year) and Low Risk (1:1,000) events (see Figure 10) indicate that the proposed development is not affected in these modelled events.

4.25 The Adur and Worthing SFRA Historic Flood map (see Figure 13) shows no cases of surface water flooding have been recorded within 1.3km of the site.

4.26 As such, and with consideration of flood mitigation measures outlined in Section 7, the risk of surface water flooding to the proposed development could be considered as **relatively low**.

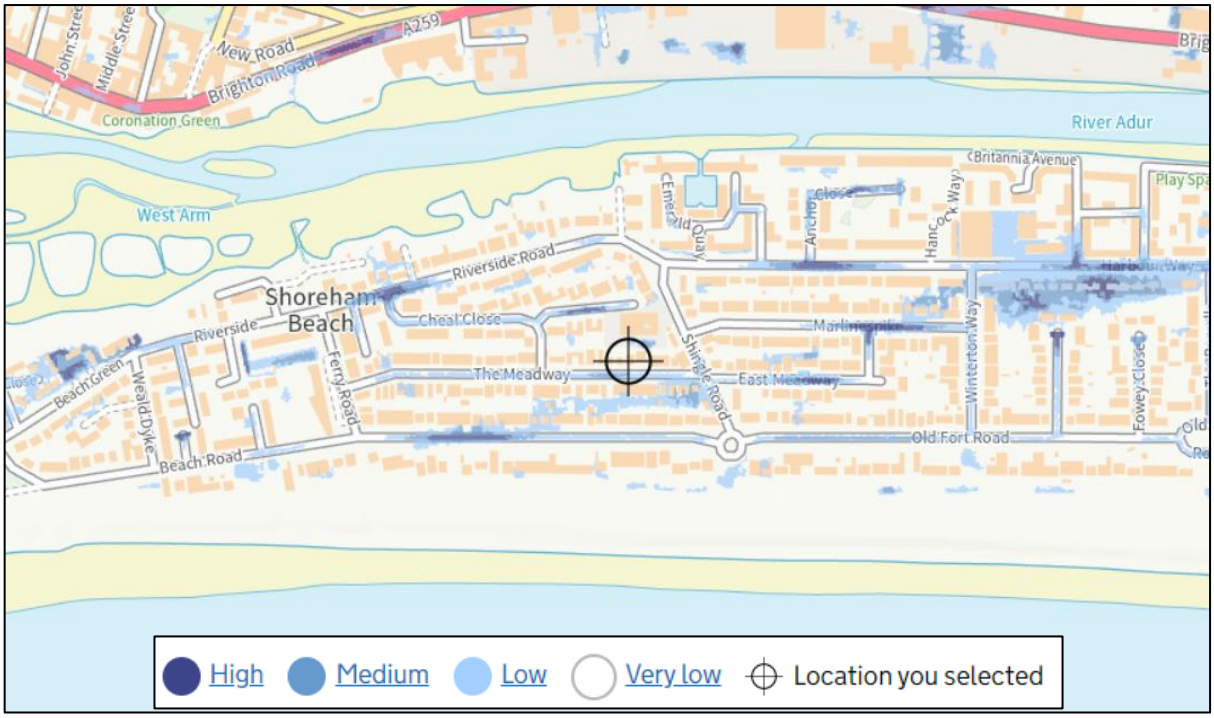


Figure 9 EA Surface Water Flood Risk Map. (Source: EA)

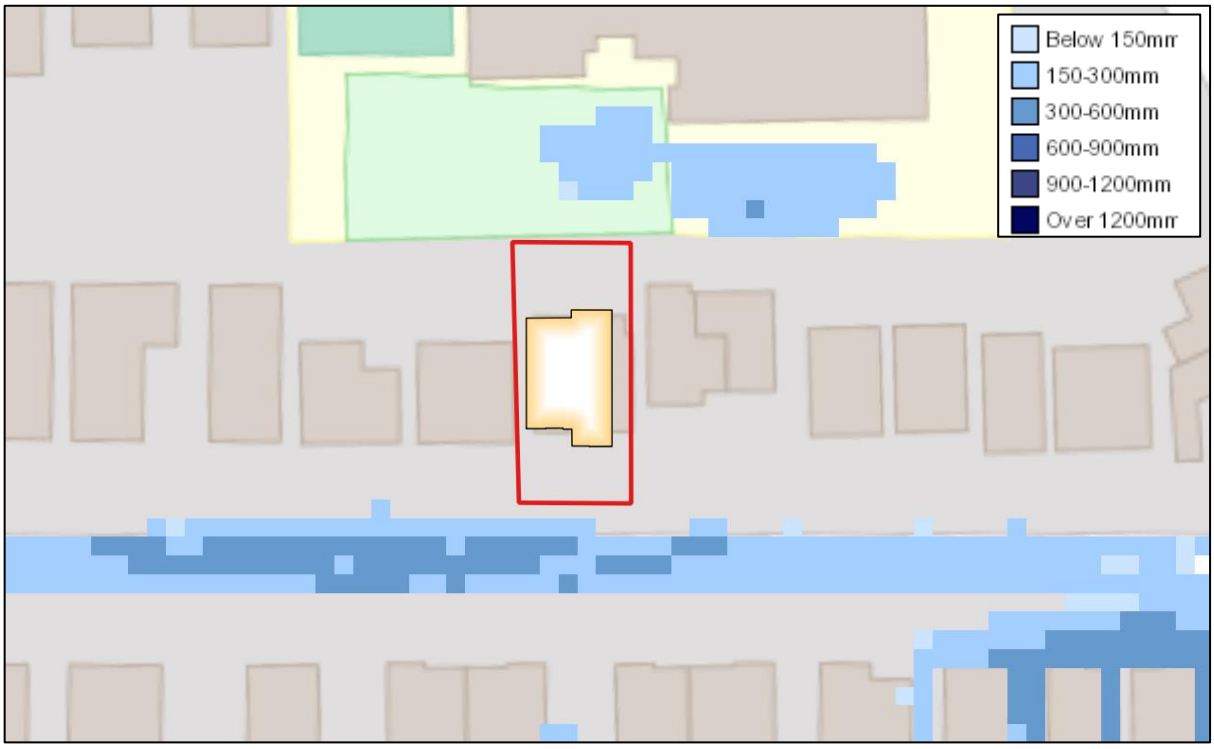


Figure 10 EA RoFSW Low Risk (1:1,000 year) surface water flood depth map (Source: EA)

Groundwater

4.27 The BGS Geology of Britain Viewer indicates that the bedrock underlying the site is Tarrant Chalk Member (Source: BGS). This formation is considered to be a Principal aquifer (Source: EA; Magic Map online resource). A Principal aquifer is highly permeable, supporting water supply and/or river base flow on a strategic scale.

4.28 The BGS Geology of Britain Viewer indicates that the superficial deposits underlying the site are Storm Beach comprising gravel. This formation is a Secondary 'A' aquifer (Source: EA; Magic Map online resource). A Secondary 'A' aquifer is permeable, supporting water supplies at a local scale and may contribute to base flow of rivers.

4.29 This aquifer is considered to be an intermediate vulnerability principal aquifer. Soils have moderate ability to attenuate pollutants and therefore pollutants may reach groundwater.

4.30 The site is not within an EA groundwater Source Protection Zone.

4.31 The BGS Susceptibility to Groundwater Flooding map (see Figure 11), shows the site to be situated in an area considered to have "*Potential for groundwater flooding of property situated below ground level*" (EA; BGS).

4.32 The Groundwater Depth map from the Adur and Worthing SFRA (2020) shows the site to be situated in an area where groundwater levels are at depths of 0.5m-5.0m below the ground surface (see Figure 12).

4.33 Given the proposed development includes no rooms below ground level, and the flood mitigation measures outlined in Section 7, the risk of flooding from groundwater sources could be considered as **relatively low**.

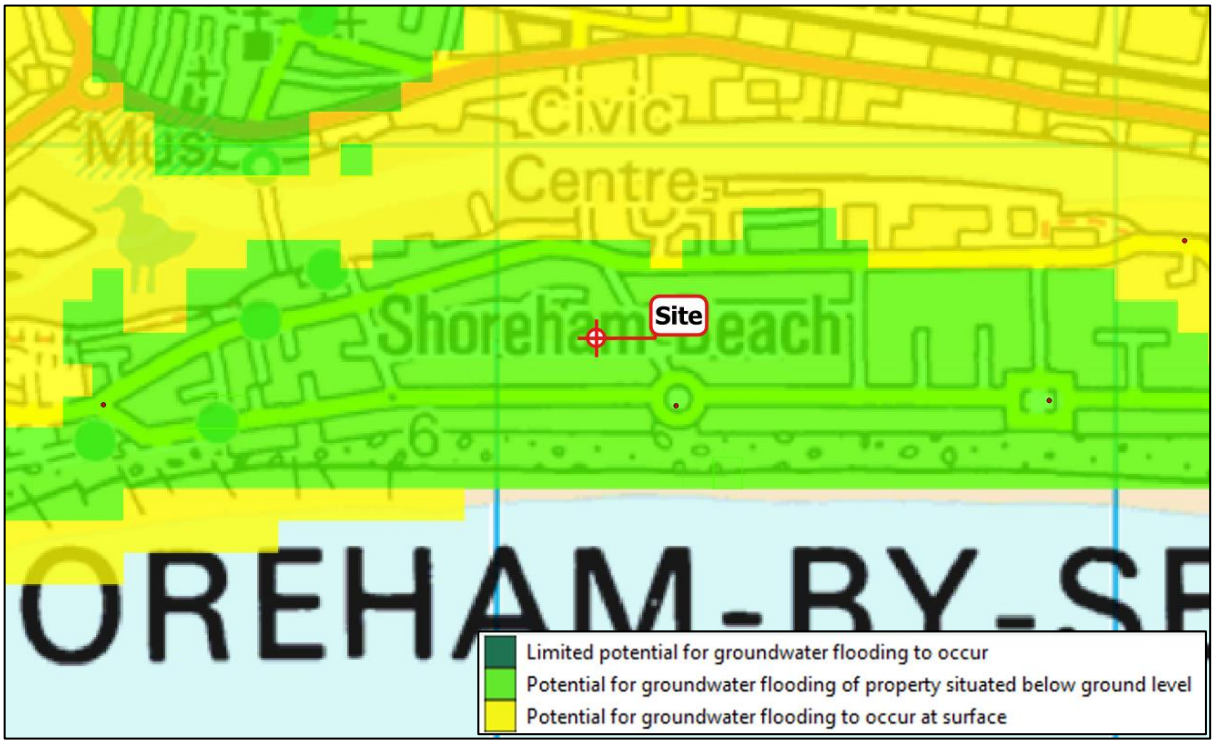


Figure 11 BGS Susceptibility to Groundwater Flooding map (Source: EA; BGS)

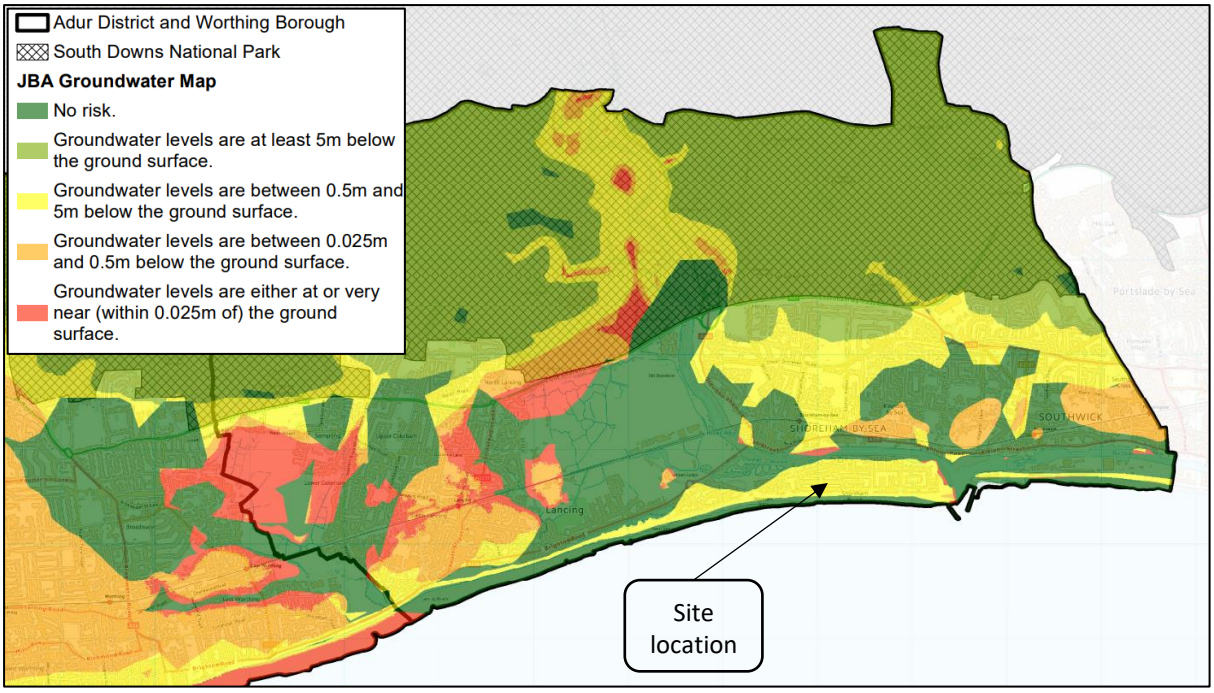


Figure 12 Groundwater depth map (Source: Adur and Worthing District SFRA, 2017; JBA Consulting)

Sewer

4.34 Sewer flooding is usually associated with a failure (blockage or collapse) or a lack of sewer capacity to convey the surface water flood event. A sewer failure could occur at any point on the network and is considered to be a residual risk.

4.35 The Adur and Worthing Council SFRA (2020) includes mapping of historic flood records, including records of sewer flooding. An extract of this map is shown in Figure 13 and demonstrates that the approximate location of the site is not near any previous records of sewer flooding.

4.36 As such, and with consideration of flood mitigation measures outlined in Section 7, the risk of sewer flooding could be considered as **low**.

Surface Water Drainage Strategy

4.37 It is understood that proposed development is for the demolition of a bungalow and construction of a replacement dwelling. The exact built extent figures and impermeable surface area were not provided in architect's plans, however from analysis on QGIS, it can be said that the increase in dwelling footprint will be no more than approximately 1m^2.

4.38 It can be seen from comparison of proposed and existing site plans, that the proposed development will result in a growth in impermeable surface area of approximately 62m^2. This growth however comes from ground surfaces as opposed to roofed areas.

4.39 The Adur Local Plan (2017) Policy 36: Flood Risk and Sustainable Drainage states:

Flood Risk Assessment will need to demonstrate that development:

- *Will not increase flood risk (including sewer flooding, surface water and groundwater flood risk) elsewhere.*
- *Will, where possible, reduce flood risk overall.*

- *Will give priority to the use of sustainable drainage systems.*

4.40 Calculations using HR Wallingford's Surface Water Storage demonstrates that an additional storage volume of 2m^3 will be necessary in the design pluvial event, in order to reduce pluvial flood risk to surrounding areas, as a result of the approximately 62m^2 increase in impermeable surface area onsite.

4.41 It should be noted that any runoff generated from existing, or from further additional impermeable, areas of the site are be restricted to greenfield runoff rates if practicable. It is recommended that small-scale SuDS features (water butt, permeable paving, rain planters/gardens) are incorporated into the proposed development, where possible.

4.42 As a result, this FRA contains initial surface water runoff calculations to estimate approximate attenuation volumes when restricting runoff rates from the proposed extension to greenfield rates. The HR Wallingford UKSuDS Surface water storage volume estimation tool indicates that the proposed increase in impermeable surface area of 62m^2 is associated with a greenfield runoff rate of approximately <0.01 l/s (Appendix II). However, it is generally considered that 1 l/s is an acceptable minimum flow rate as anything less than this could increase the risk of blockage within the system and subsequent flooding. As such, the calculations have been modelled to restrict runoff from the proposed extension area to 1 l/s (as close to greenfield as practical).

4.43 These calculations indicate that there would be a storage requirement of 2m^3 in the 1:100 year +CC (40%) event when restricting runoff rates from the proposed extension to 1 l/s (as close to greenfield as practical). This could be provided through incorporation of small-scale SuDS such as rainwater planters and water butts. The details of the drainage strategy should be confirmed prior to detailed design.

Records of Historical Flooding

4.44 The Adur to Worthing SFRA (2020) Historic Flood Map (see Figure 13) shows the site to be approximately 400m from the closest recorded case of tidal flooding.

4.45 The EA Historic Flooding Map, however, shows the site to be situated approximately 160m to the north of the closest area to be affected by historic flooding (see Figure 14). This area is however on Shoreham beach. The next closest area to be affected by fluvial and/or flooding is approximately 1.2km west of site.

4.46 As such, there is no recorded history of flooding onsite, however there is a history of flooding in the area.

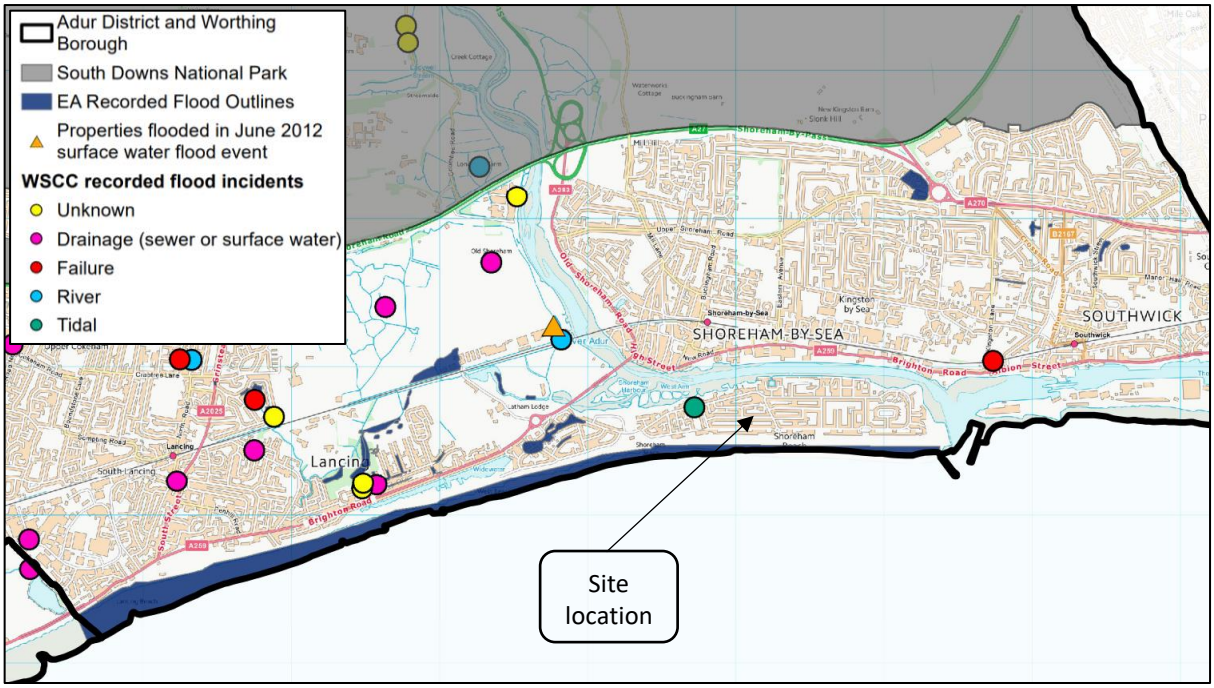


Figure 13 Adur and Worthing SFRA Historic Flood Map (Source: Adur and Worthing SFRA; EA)



Figure 14 EA Historic Flooding map from Tidal and Fluvial sources (Source: EA)

5. Probability of Flooding

Flood Zones

5.1 According to the EA Flood Map for Planning, the site is located within Flood Zone 2 and 1 (medium risk and low risk of flooding).

5.2 The EA Flood Map for Planning has been produced in part using a relatively coarse, national scale flood modelling strategy, and in part by detailed modelling. It is important to note that only the potential floodplain is modelled; **the mitigating effects of any flood defences currently in place are not considered**. For reference, the definition of the NPPF flood risk zones is included below in Table 5.

Table 5 Definition of the NPPF Flood Zones. (Source: EA)

Zone	Description
1	**Low Probability.** This zone comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any year (<0.1%).
2	**Medium Probability.** This zone comprises land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% – 0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% – 0.1%) in any year.
3a	**High Probability.** This zone comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.
3b	**The Functional Floodplain.** This zone comprises land where water has to flow or be stored in times of flood. SFRA's should identify this Flood Zone (land which would flood with an annual probability of 1 in 20 (5%) or greater in any year or is designed to flood in an extreme (0.1%) flood, or at another probability to be agreed between the LPA and the EA, including water conveyance routes).

Climate Change on Site

5.3 Climate change is likely to increase the flow in rivers and raise sea levels and storm intensity.

5.4 The EA have recently updated climate change guidance for sea level allowances. Tidal allowances are detailed in Table 3 of the new changes (https://www.gov.uk/guidance/flood-risk- assessments-climate-change-allowances).

5.5 Ambiental have been provided with flood data for the site, extracted from the Adur Coastal Modelling Study, which was completed in 2012 by JBA Consulting. This includes modelled flood levels in the climate change scenarios.

5.6 The EA provided flood data for both the 'Defended' and 'Undefended' scenarios. As discussed in Section 4 of this report, the worst-case scenario of flooding occurred in the 'Defended' scenarios. Thus, the modelled flood levels in the 'Defended' scenarios have been analysed here.

5.7 The flood data provided by the EA demonstrates that the site could be affected by flooding in the modelled 1 in 200-year tidal events in both the 2070 and 2115 epochs.

5.8 Environment Agency climate change allowances were updated in December 2019 for tidal and coastal flooding. Given that the model used here was completed in 2012, it does not take account of the updated allowances. The EA's latest climate change allowances for tidal and coastal flooding have been applied to

the maximum present-day flood level experienced at the 43 Old Fort Road site in the 1 in 200-year defended event, which is 5.47mAOD. This flood level has been highlighted in Table 4.

5.9 After applying the climate change allowances, which are dependent on the year the model was completed (2012) and the region of the UK (South-East), it has been demonstrated that the cumulative sea-level rise could be approximately 1.13m in the 'Higher Central' scenario and 1.52m in the 'Upper End' scenario. Because the site isn't sensitive, 'Higher Central' allowance has been deemed appropriate.

5.10 When the 'Higher Central' cumulative sea-level rise of 1.13m is added to the present-day flood level extracted for 43 Old Fort Road in the 1 in 200-year defended event (5.47mAOD), the total sea level is calculated to be 6.60mAOD in the 'Upper End' scenario (2125 epoch). The latter level is considerably above all topographic levels at the 56 The Meadway site. The calculations for this are shown in Table 6 below.

5.11 Ambiental have then used the existing ground levels of the site according to the EA's 1m LiDAR dataset to assess the potential flood depths at the site as a result of sea level rise due to climate change. The existing ground levels range from 5.13mAOD in the front of the site in the south, to 5.56mAOD in the mid part of the site. In the 'Higher Central' scenario (2125 epoch), the site could be affected by flood depths of approximately 1.47m, due to sea waters overtopping the southern-most part of the site (calculated by 6.60mAOD-5.13mAOD).

5.12 This analysis represents the worst-case scenario of flooding, when taking account of climate change up to 2125.

5.13 The site is located within Policy Unit 4d15 (Shoreham Harbour to Worthing) of the Beachy Head to Selsey Bill Shoreline Management Plan. The short, medium and long-term policy for this area is to Hold the Line. Details provided by the EA have shown that there is a sand and shingle beach just south of the site, which is maintained by the EA.

5.14 Flood resilience measures for the proposed replacement dwelling have been discussed in Section 7 of this report.

Table 6 Modelled flood levels on site, from EA flood data; and calculated Upper End scenario

	Topographic level (mAOD)	**1 in 200-year (mAOD)**	**1 in 200-year (2115) (mAOD)**	**1 in 1,000-year (mAOD)**	**1 in 200-year (2125; Upper End) (mAOD)**
Site low point	5.13	- (5.47 at nearby 43 Old Fort Road)	5.77	5.49	6.60

5.15 The EA have also stated that climate change will increase the peak rainfall intensity allowance in small and urban catchments (see Table 7).

5.16 Given that the proposed development is residential, surface water runoff calculations have therefore been calculated using the EA's guidance of a 40% increase for climate change.

Table 7 peak rainfall intensity allowance in small catchments (less than 5km2) or urban drainage catchments (based on a 1961 to 1990 baseline)

Applies across all of England	**Total potential change anticipated for the '2020s' (2015 to 2039)**	**Total potential change anticipated for the '2050s' (2040 to 2069)**	**Total potential change anticipated for the '2080s' (2070 to 2115)**
Upper end	10%	20%	40%
Central	5%	10%	20%

6. Residual Risks

Identification of Residual Risks

6.1 Residual risks are those remaining after applying the sequential approach to the location of development and taking mitigating actions. Examples of residual flood risk include:

- the failure of flood management infrastructure such as a breach of a raised flood defence, blockage of a surface water conveyance system, overtopping of an upstream storage area, or failure of a pumped drainage system.
- failure of a reservoir, or
- a severe flood event that exceeds a flood management design standard, such as a flood that overtops a raised flood defence, or an intense rainfall event which the drainage system cannot cope with.

Defence Breach

6.2 The EA Flood Map for Planning does not indicate that the site is in an area which benefits from flood defences; however, there is a flood defence located just south of the site, in the form of a sand and shingle beach. As such, there is a residual risk of flooding from overtopping of the existing beach.

6.3 Ambiental have been provided with site-specific flood levels for a nearby site at 43 Old Fort Road, where FRA works were previously carried out by Ambiental, extracted from the Adur Coastal Modelling Study (2012). It is understood that the defended flood levels provided take account of wave overtopping during an extreme flood event and result in a greater flood risk to the site than during the undefended flood scenario.

6.4 As such, the defended flood levels have been used here, to assess the residual risk of flooding as a result of overtopping.

6.5 Ambiental have assessed the 1:200-year 2115 flood levels (defended) for 43 Old Fort Road nearby, alongside the topographic levels on site, ranging from 5.13mAOD to 5.56mAOD and found that the flood. Using this flood level from this modelled scenario at 43 Old Fort Road, for 56 The Meadway, suggests that flood depths of up to 0.64m may be experienced in such an event if the flood levels were to be the same. This demonstrates that flooding on site would be considerable in a potential overtopping tidal flood event.

Reservoir Failure

6.6 The EA Risk from Reservoir Map demonstrates that the site is outside flood extents in the event of reservoir flooding. As such, the residual risk of flooding from this source could be considered as negligible.

Drainage Exceedance

6.7 In the event of drainage failure/exceedance, overland flows would be dictated by site topography. External levels should be designed to fall away from ground floor thresholds to direct overland flow away from the property and provide some mitigation against drainage exceedance.

7. Flood Risk Management Measures

Flood Risks

7.1 It is understood that proposed development is for the demolition of a bungalow and construction of a replacement dwelling.

7.2 According to the topographic survey provided by the client, topographic levels within the existing site boundary vary between approximately 5.12mAOD in the south and north the property, and 5.54mAOD in the middle of the site. The topographic survey is included in Appendix I.

7.3 The NPPF and Adur and Worthing SFRA (2020) requires all sleeping quarters to be situated now lower than 600mm above the 1:200 year 2115 design flood level on site (5.77mAOD), at 6.37mAOD. It is understood however that ground floor internal FFLs can be raised no higher than 200mm above the existing level, from 5.54mAOD to 5.74mAOD. As such, the design flood level is demonstrated to be 0.03m below the design flood level.

7.4 It is recommended that all sleeping quarters be located on the upper floor, and the room that was planned to be used for sleeping quarters on the ground floor be used as a study/living quarters.

7.5 It can be argued, that while the Adur and Worthing SFRA (2020) requires the internal FFLs for living quarters to be no lower than 300mm above the design flood level, and the internal ground floor FFL is to be set 0.03m below this design flood level, betterment is provided as a result of the proposed development. This is since, unlike in the existing dwelling, all sleeping quarters will be located on the first floor and not the ground floor. Further to this, the ground floor FFL will be set 200mm higher than the existing, hence providing betterment.

7.6 The proposed development is also to be constructed in line with current best practice for construction within an area at risk of flooding in line with CLG 2007 'Improving the Flood Performance of New Buildings. These are detailed below.

7.7 Damp Proof Membranes (d.p.m.) should be included in any design to minimise the passage of water through ground floors. Impermeable polythene membranes should be at least 1200 gauge to minimise ripping. Effective methods of joining membrane sections are overlaps of 300mm, and also taping (mastic tape with an overlap of 50mm minimum). Care should be taken not to stretch the membrane in order to retain a waterproof layer.

7.8 Windows and patio doors are vulnerable to flood water and similar measures to those used for doors should be taken. Special care should be taken to ensure adequate sealing of any PVC window/door sills to the fabric of the house. Of particular concern would be excessive water pressure on the glazing of patio doors. Double glazing conforming to the relevant standards would in principle adequately resist the pressures generated by flood waters.

7.9 Doors: sealed PVC external framed doors should be used and, where the use of wooden doors is a preferred option, all effort should be made to ensure a good fit and seal to their frames. Hollow core timber internal doors should not be used.

7.10 Drainage services: Non-return valves are recommended in the drainage system to prevent back-flow of diluted sewage in situations where there is an identified risk of the foul sewer surcharging. Maintenance of these valves is important to ensure their continued effectiveness

7.11 The following flood resilience measures are recommended for the proposed replacement dwelling:

- Finished Floor Levels of the ground floor should be set at 5.75mAOD, 0.03m below the design modelled 1:200-year 2115 flood level (5.77mAOD) on site. A topographic survey of the existing house provided by the client demonstrates that the lowest external ground level of the proposed dwelling area is at 5.20mAOD, 0.54m lower than the recommended internal ground floor FFL. As such, this recommendation should be achievable for the proposed replacement dwelling.
- All sleeping quarters to be located on the first floor level.
- Waterproof materials and damp-proof membrane to be utilised in the construction of the dwellings.
- Non-return valves on any new sewer connections to prevent back flow.
- Exterior ventilation outlets, utility points and air bricks to be fitted with removeable waterproof covers.
- All new plumbing insulation to be of closed-cell design.
- Internal access to the upper storey of the property is to be maintained for the lifespan of the development, all sleeping is to be located on the upper floors.
- Windows and patio doors are vulnerable to flood water and similar measures to those used for doors should be taken. Special care should be taken to ensure adequate sealing of any PVC window/door sills to the fabric of the house. Of concern would be excessive water pressure on the glazing of patio doors. Double glazing conforming to the relevant standards would, in principle, adequately resist the pressures generated by flood waters.
- Any new sewer connection created as part of the development proposals should be first agreed with the local sewer provider and fitted with non-return valves to mitigate the risk of sewer flooding.
- The site owner, residents and staff should sign up to the EA Flood Alert/Warning Service and have an evacuation plan.

Flood Warning Service and Evacuation Plan

7.12 The EA operate a 5 day county-wide forecast in relation to flood risk. It is recommended that this service is regularly checked to ensure occupants/residents are aware of any possible risks: https://flood-warning-information.service.gov.uk/5-day-flood-risk.

7.13 The EA operate a Flood Information service which identifies whether any flood warnings or alerts have been issued for a specific postcode or place in England or Wales: https://flood-warning-information.service.gov.uk/.

7.14 The Met Office issues weather warnings up to 5 days in advance, through the National Severe Weather Warning Service, when severe weather has the potential to bring impacts to the UK. It is also possible to stay up to date with weather warnings through the Met Office app (available on both android and apple), social media (twitter, Facebook) or email alerts. More information can be found at https://www.metoffice.gov.uk/weather/guides/warnings.

7.15 During periods of bad weather, site users should monitor local weather reports and sign up for the Met Office UK weather warnings. Warnings can be monitored through an Apple/Android app, Twitter or directly via emails. Further information can be found at https://www.metoffice.gov.uk/.

7.16 The proposed development site is located within an EA Flood Warning Service Area; Shoreham Beach (see Figure 15). As such, it is recommended that site users sign up to this service.

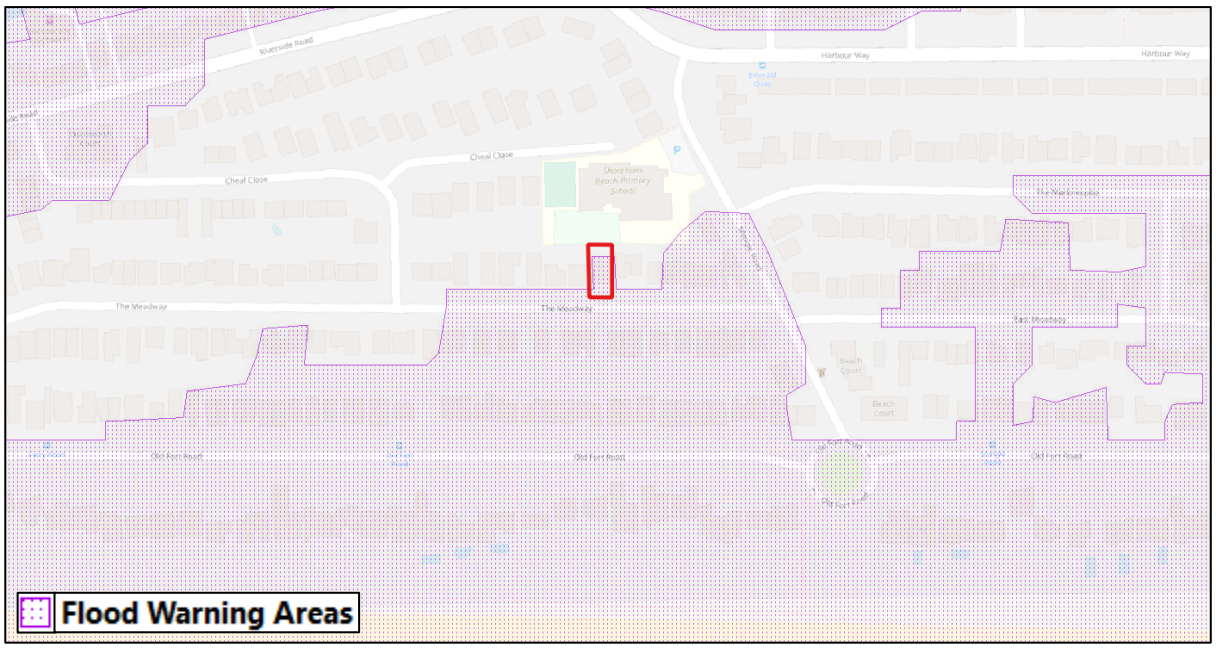


Figure 15 Flood Warning Area Map (Source: EA)

What to do if you receive a **Flood Alert**



A flood alert means you need to prepare, flooding is possible. You should:

- check your flood risk - https://flood-warning-information.service.gov.uk/long-term-flood-risk
- sign up for flood warnings - https://www.gov.uk/sign-up-for-flood-warnings
- keep up to date with the latest situation - call Floodline on 0345 988 1188 or follow @EnvAgency and #floodaware on Twitter for the latest flood updates
- have a bag ready with vital items like insurance documents and medications in case you need to leave your home
- check you know how to turn off your gas, electricity and water mains supplies
- plan how you'll move family and pets to safety

What to do if you receive a **Flood Warning**



A flood warning means you need to act, flooding is expected. You should do all the actions for a flood alert but also:

- move vehicles to higher ground if it's safe to do so
- move family and pets to safety
- move important items upstairs or to a safe place in your property, starting with cherished items and valuables, then furniture and furnishings
- turn off gas, electricity and water supplies if it's safe to do so; never touch an electrical switch if you're standing in water
- if you have property protection products such as flood barriers, or air brick covers, use them now

- keep track of the latest situation - https://flood-warning-information.service.gov.uk/warnings

What to do if you receive a **Severe Flood Warning**



A severe flood warning means there is danger to life: you must act now:

- call 999 if you're in immediate danger
- follow advice from the emergency services and evacuate if you're told to do so
- make sure you have an emergency kit including a torch, spare batteries, mobile phone and charger, warm clothes, important numbers like your home insurance, water, food, first aid kit and any medicines and baby care items you may need
- alert neighbours and offer help if it's safe to do so
- avoid driving or walking through flood water: just 30cm (1 foot) of fast flowing water could move your car and even shallow moving water can knock you off your feet
- keep your family and pets away from floodwater – it may contain heavy debris, sharp objects, open manhole covers, sewage and chemicals
- wash your hands if you've been in contact with flood water which may contain toxic substances

7.17 It is recommended that occupants move to the upper floors of the building for safe refuge during an unexpected flood event, this internal access to upper floors will be maintained for the lifetime of the development.

7.18 Tidal flooding is generally caused by a low-pressure weather system creating storm-surges (or storm tides), chiefly via high-speed winds. These winds (and to a certain extent, the low pressure) create a 'bulge' or water which, if it coincides with high tide, can generate very high, stormy water levels. However, because this mechanism is well understood, it is very likely that early warning will be issued several hours before such an event occurs.

7.19 It is the responsibility of the site owners(s) to keep the evacuation routes and procedures known to site users and visitors.

7.20 Safe Access/egress may be maintained to the proposed dwelling in the Medium Risk (1:100 year) pluvial event, with low or very low Hazard levels on the footways and carriageways on the Meadway and other surrounding roads (see Figure 16).



Figure 16 Access/ egress from the proposed relpacement dwelling with Hazard levels in the Medium Risk (1:100 year) Pluvial event (Source: EA RoFSW dataset)

8. Off Site Impacts

Impact to Flood Risk Elsewhere

8.1 It is understood that proposed development is for the demolition of a bungalow and construction of a replacement dwelling.

8.2 The site is located within tidal Flood Zone 2 and 1 and under the NPPF:

"*Unless the development is located in an area which is subject to tidal flooding and which serves no conveyance function, land raising must be accompanied by compensatory provision of flood storage either on- or off-site.*"

8.3 Given that the dominant source of flooding to the site is tidal, there is no requirement to provide compensatory flood storage.

Generation of Runoff

8.4 This FRA contains initial surface water runoff calculations to estimate approximate attenuation volumes when restricting runoff rates from the proposed extension to greenfield rates. The HR Wallingford UKSuDS Surface water storage volume estimation tool indicates that the proposed increase in impermeable surface areas of approximately 62m^2 is associated with a greenfield runoff rate of approximately <0.01 l/s. However, it is generally considered that 1 l/s is an acceptable minimum flow rate as anything less than this could increase the risk of blockage within the system and subsequent flooding. As such, the calculations have been modelled to restrict runoff from the proposed extension area to 1 l/s (as close to greenfield as practical).

8.5 These calculations indicate that there would be a storage requirement of 2m^3 in the 1:100 year +CC (40%) event when restricting runoff rates from the proposed extension to 1 l/s (as close to greenfield as practical). This could be provided provided through incorporation of small-scale SuDS such as rainwater planters and water butts. The details of the drainage strategy should be confirmed prior to detailed design.

9. Conclusion

9.1 Ambiental Environmental Assessment has been appointed by ABIR Architects to undertake a National Planning Policy Framework (NPPF) compliant Flood Risk Assessment (FRA) for the proposed development at 56 The Meadway, Shoreham by Sea, East Sussex, BN43 5RP.

9.2 The site is currently a residential dwelling. It is understood that proposed development is for the demolition of a bungalow and construction of a replacement dwelling.

9.3 With reference to the Environment Agency (EA) Flood Map for Planning, the proposed development is located within Flood Zone 2 and 1. The existing dwelling and proposed development are considered as "More vulnerable" under the NPPF.

9.4 The site is approximately 300m north of the English Channel and 300m south of the River Adur and benefits from tidal defences.

9.5 The site is located within Policy Unit 4d15 (Shoreham Harbour to Worthing) of the Beachy Head to Selsey Bill Shoreline Management Plan. The short, medium and long-term policy for policy unit 4d15 is to hold the line. Details from the EA have shown that the site benefits from flood defences in the form of a shingle beach and timber wall. The site is as such defended, however the maintenance of defences is dependent on third party funding. As long as the site benefits from these defences, the primary mechanism of flooding is likely to be overtopping of coastal defences. This would likely be a result of a combination of high tide and/or storm surge, both of which are well understood mechanisms of flooding and can be predicted hours in advance.

9.6 Site-specific modelled flood levels and extents were not available specifically for this site. However, data available from the Arun to Adur Coastal Modelling Study (JBA Consulting, 2012) provided by the EA for FRA works at a nearby site. This was considered as potentially suitable due to its close vicinity to the site and similar range of elevation levels to 56 The Meadway.

9.7 54 The Meadway is shown to be affected in the 1:1,000 year and 1:200-year 2115 tidal flood events. These events are shown to have flood levels of 5.49mAOD and 5.77mAOD respectively at 43 Old Fort Road. Comparison with topographic levels from EA 1m LiDAR at 56 The Meadway shows should the same flood levels occur; it would result in flood depths of up to 0.64m onsite.

9.8 The EA does not hold any records indicating that the site has been previously affected by flooding from groundwater, sewer, fluvial/tidal or surface water sources. Adur and Worthing District SFRA (2020) show no cases of tidal flooding to be recorded within 400m of the proposed development.

9.9 With consideration of flood mitigation measures outlined in Section 7, the risk of flooding from surface water and groundwater sources could be considered as **relatively low**, and **low** from sewer sources.

9.10 Analysis of client plans on QGIS shows, that while the built extent area of the replacement dwelling is the same as the existing dwelling to the nearest $1m^2$, and impermeable surface areas on site will increase by approximately $62m^2$ as a result of the proposed development. The HR Wallingford UKSuDS Surface water storage volume estimation tool indicates that the proposed increase in impermeable surface area of $62m^2$ is associated with a greenfield runoff rate of approximately <0.01 l/s (Appendix II). However, it is generally considered that 1 l/s is an acceptable minimum flow rate as anything less than this could increase the risk of blockage within the system and subsequent flooding. As such, the calculations have been modelled to restrict runoff from the proposed extension area to 1 l/s (as close to greenfield as practical.

9.11 These calculations indicate that there would be a storage requirement of 2m^3 in the 1:100 year +CC (40%) event when restricting runoff rates from the proposed extension to 1 l/s (as close to greenfield as practical).

9.12 This could be provided through incorporation of small-scale SuDS such as rainwater planters and water butts. The details of the drainage strategy should be confirmed prior to detailed design.

9.13 It is understood that the internal ground floor Finished Floor Level (FFL) can be raised no higher than 200mm above the existing level (5.54mAOD) and as such should be set at 5.74mAOD. This is 0.03m below the 1:200-year 2115 design flood level (5.77mAOD), at 6.07mAOD. Given that this is higher than the existing internal ground floor FFL, and that all sleeping quarters are to be located on the upper floor, betterment is provided as a result of the replacement dwelling proposed development. The proposed development is to be constructed in line with current best practice for construction within an area at risk of flooding in line with CLG 2007 'Improving the Flood Performance of New Buildings.

9.14 It is important to note that, given the site benefits from the presence of defences, the highest risk of flooding to the site would occur in combination with large winter storms and storm surge coinciding with a high tide. This mechanism is well understood, and it is unlikely the site will flood without several hours of warning.

9.15 The EA operate a Flood Information service which identifies whether any flood warnings or alerts have been issued for a specific postcode or place in England or Wales: https://flood-warning-information.service.gov.uk/

9.16 In summary:

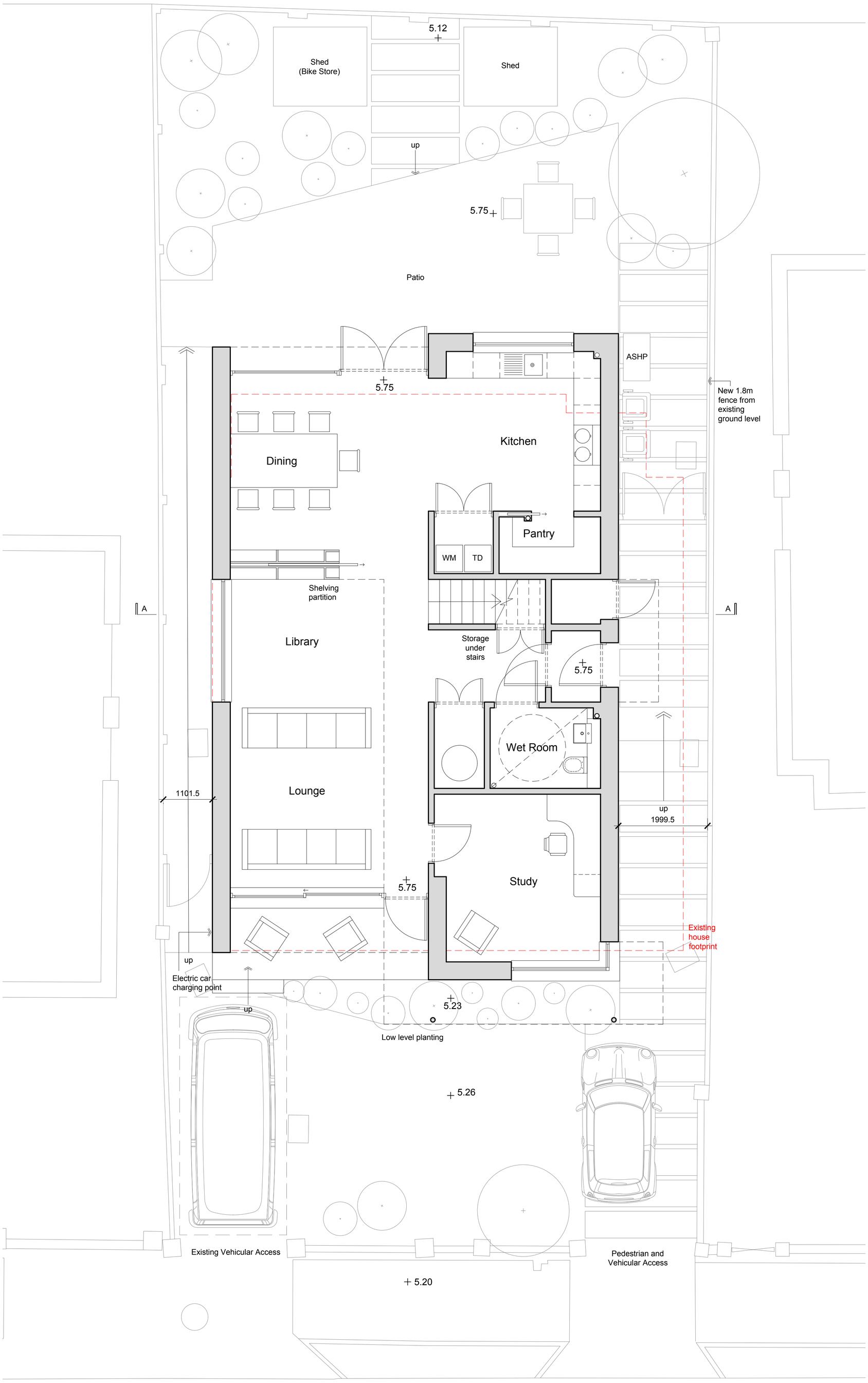
- The area of the site has been shown to be affected by 1:200-year 2115 design flood levels of 5.77mAOD
- All sleeping accommodation is to be located on the first floor and above
- The site lies within an area where the long-term policy for the coastline is 'Hold the Line'
- Significant betterment can be achieved in flood vulnerability, through the implementation of flood warning procedures and the maintenance of a safe refuge area on the upper floor.

Following the guidelines contained within the NPPF, the proposed development **is considered to be suitable** assuming appropriate mitigation (including adequate warning procedures) can be maintained for the lifetime of the development.

Appendix I - Site Plans

Ambiental Environmental Assessment
Sussex Innovation Centre,
Science Park Square,
Brighton, BN1 9SB

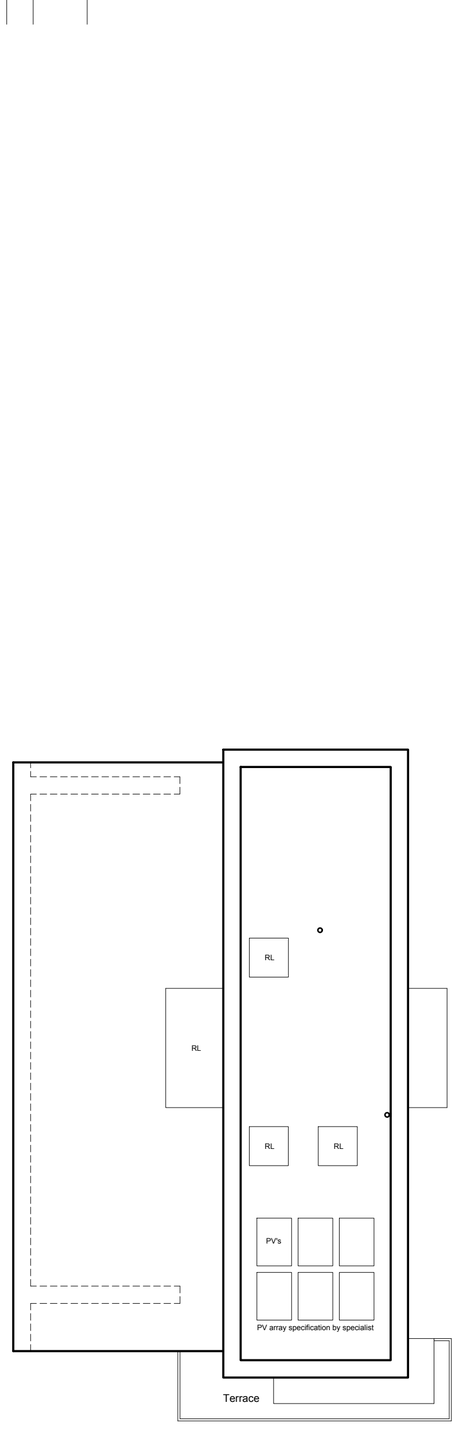
amendments				
rev.	date	comment	auth.	chkd.
A	12.01.22	Distance to adjacent boundaries added to ground floor plan.	EI	GI
B	18.03.22	Ramped and stepped access to rear garden and entrance amended to account for rise in ground floor finish level.	EI	GI



Ground Floor Plan 1:50

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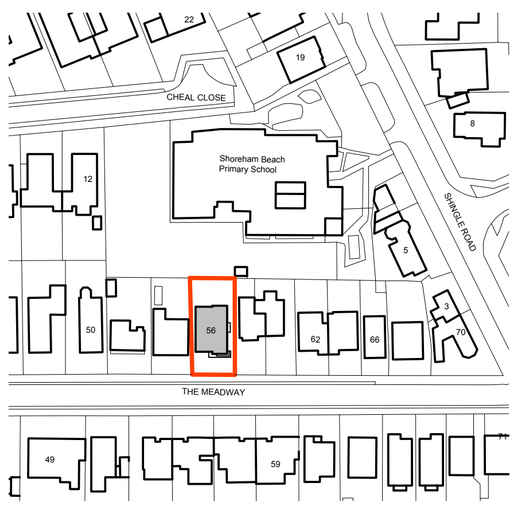
scale in metres 1:50



Roof Plan 1:100

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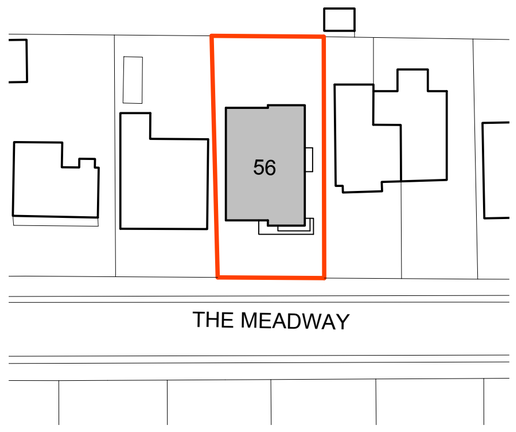
scale in metres 1:100



Location Plan 1:1250

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scale in metres 1:1250



Block Plan 1:500

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scale in metres 1:500

client	drawing number	revision
Maureen & Peter Gunzi	0655.PL.001	B
project	**drawing title**	
56 The Meadway Shoreham by Sea BN43 5RP	Site / Ground Floor Plan Block & Location Plans Planning	

drawn by	checked by	riba work stage	date	scale/original sheet size
EI	GI	3	March 2022	As shown @ A1

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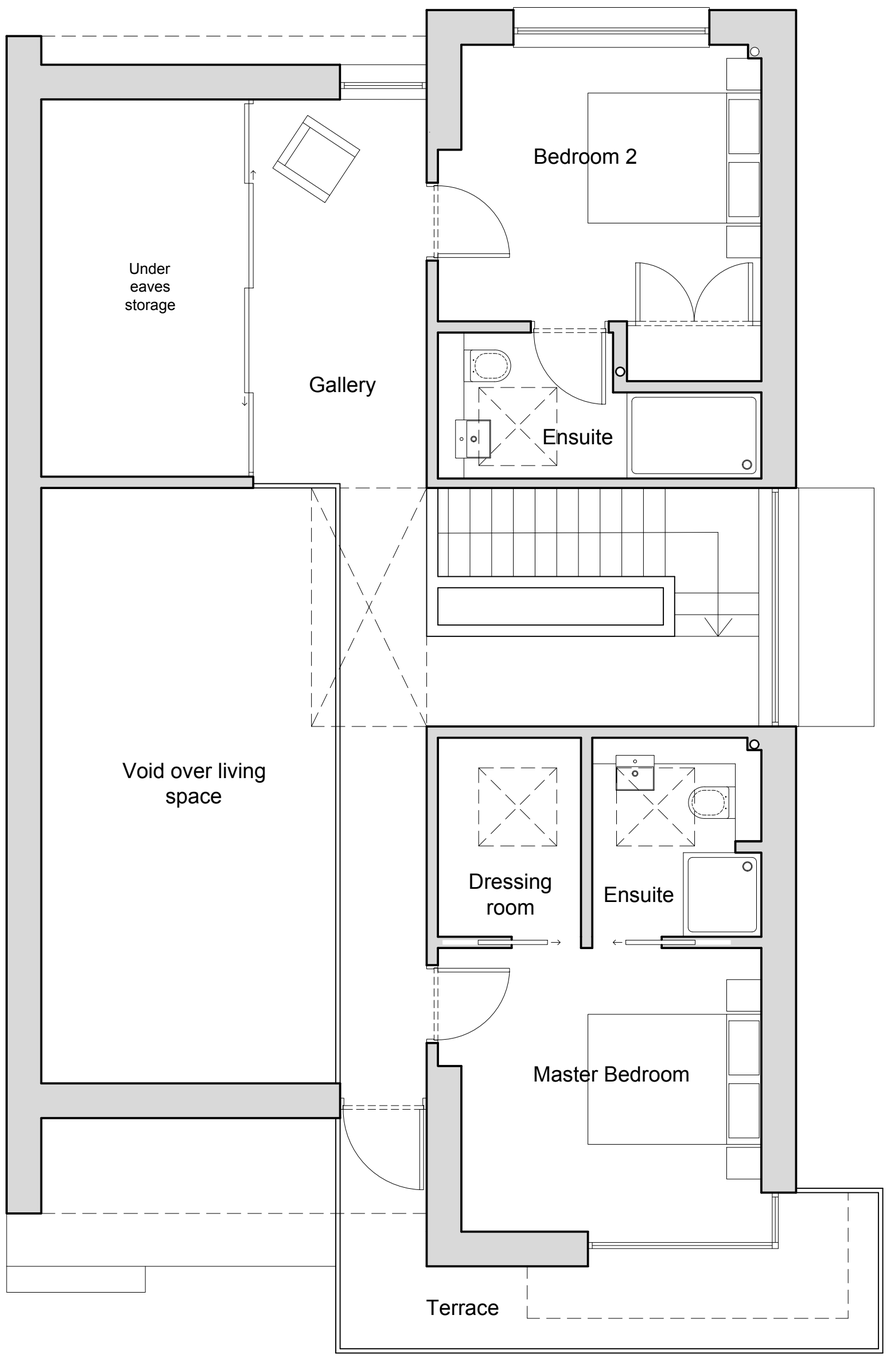
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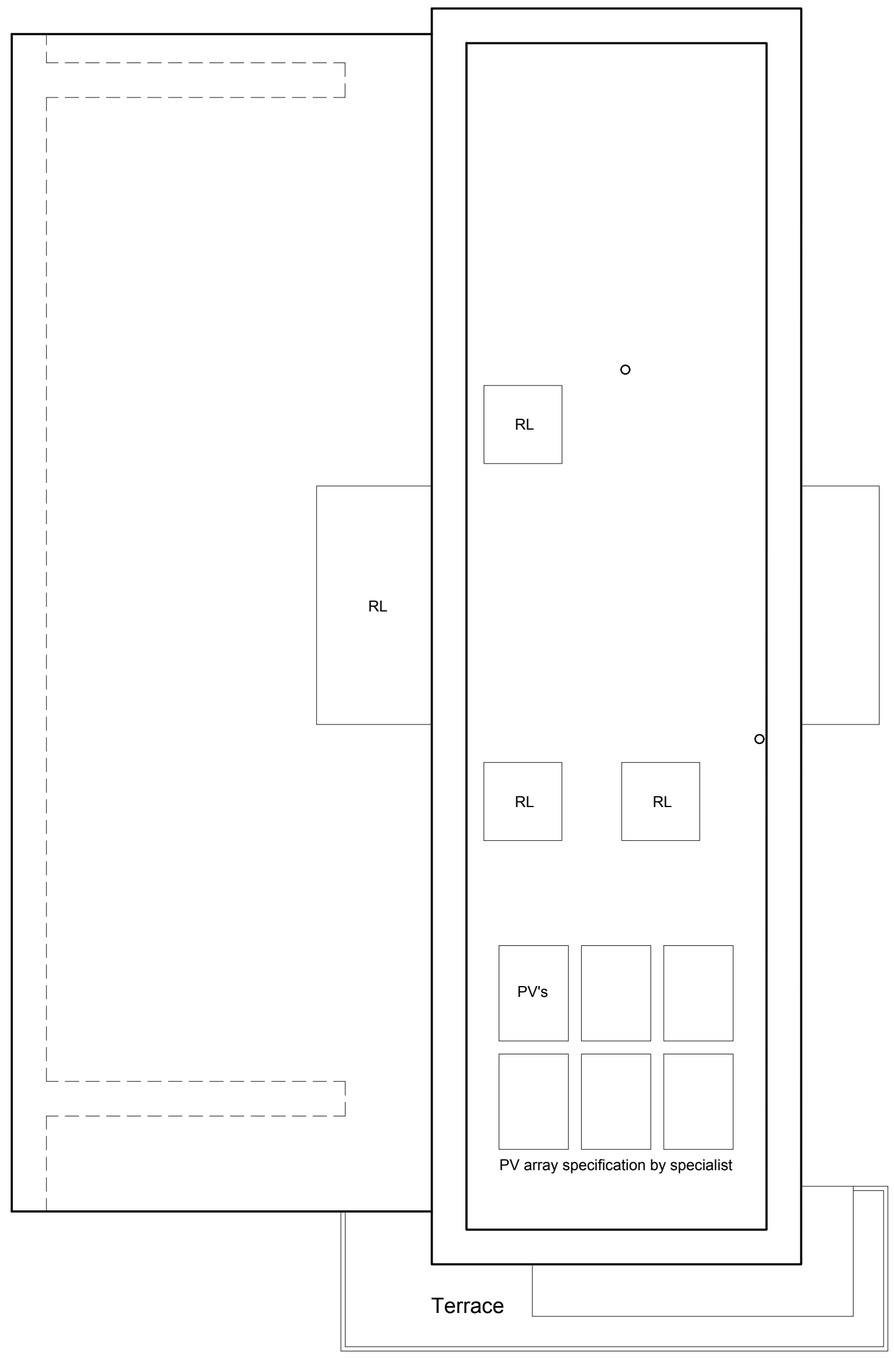
amendments				
rev.	date	comment	auth.	chkd.
A	18.03.22	Amendment to ground floor finish floor level and ramped/stepped access to rear garden and entrance on section A-A.	EI	GI

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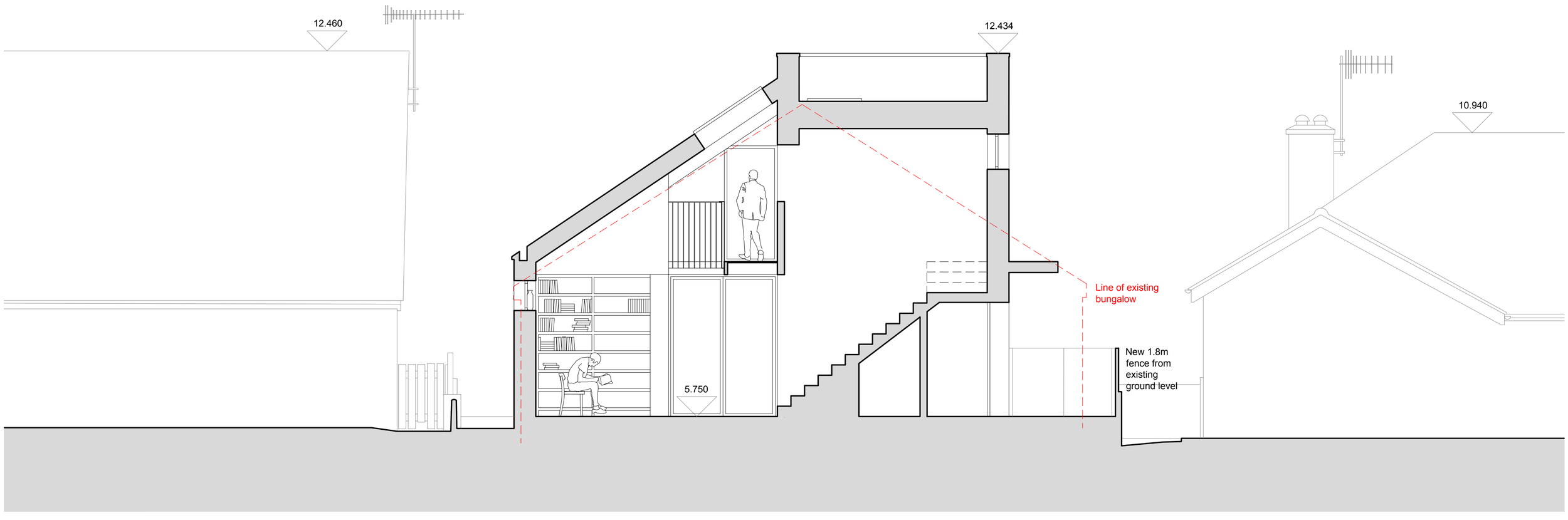
scale in metres 1:50



First Floor Plan 1:50



Roof Plan 1:50



Section A-A 1:50

client			drawing number	revision
Maureen & Peter Gunzi			0655.PL.002	A
project			drawing title	
56 The Meadway Shoreham by Sea BN43 5RP			First Floor & Roof Plans Section Planning	
drawn by	checked by	riba work stage	date	scale/original sheet size
EI	GI	3	March 2022	1:50 @ A1

www.abir.co.uk studio@abirarchitects.co.uk
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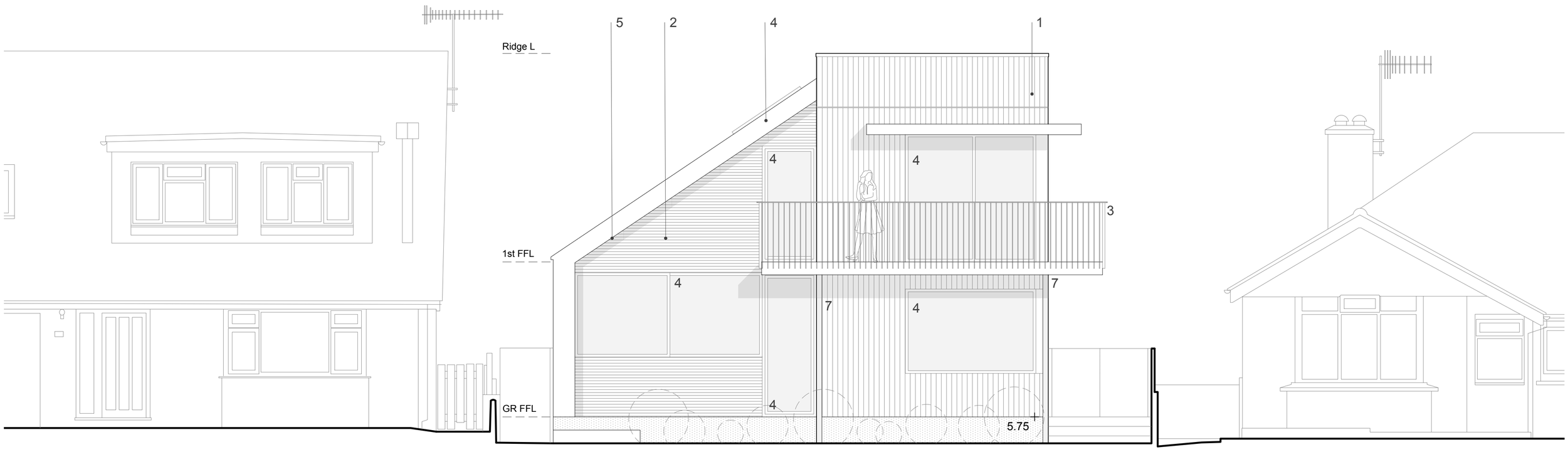
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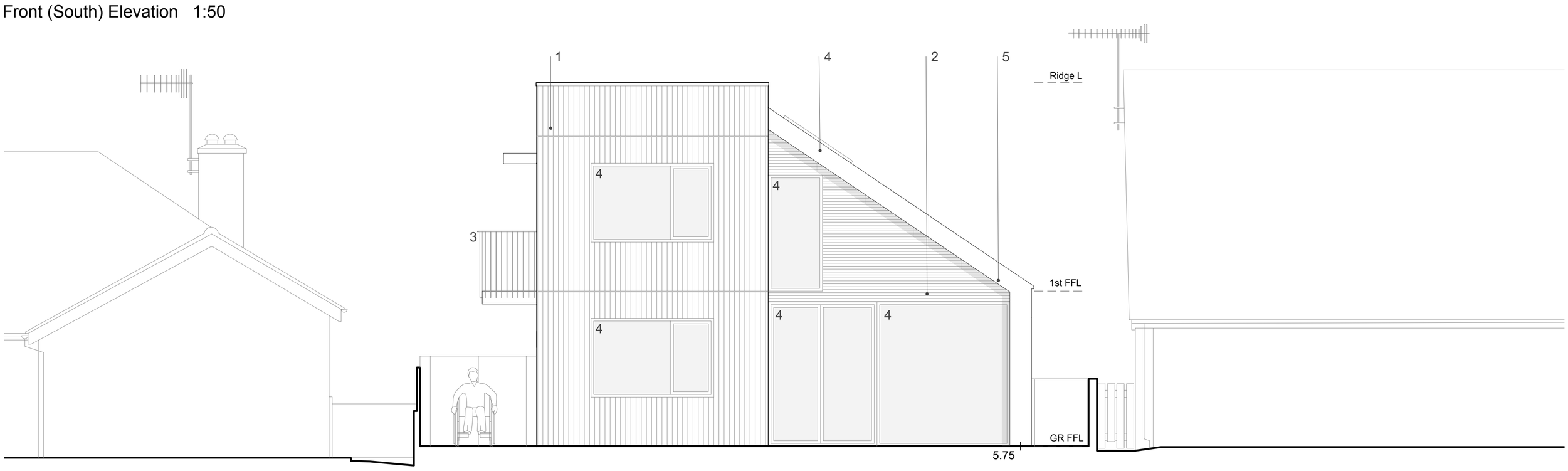
scale in metres 1:50

amendments				
rev.	date	comment	auth.	chkd.
A	12.01.22	Material key added to sheet.	EI	GI
B	18.03.22	Amendment to ground floor finish floor level and ramped/stepped access to rear garden and entrance on all elevations.	EI	GI

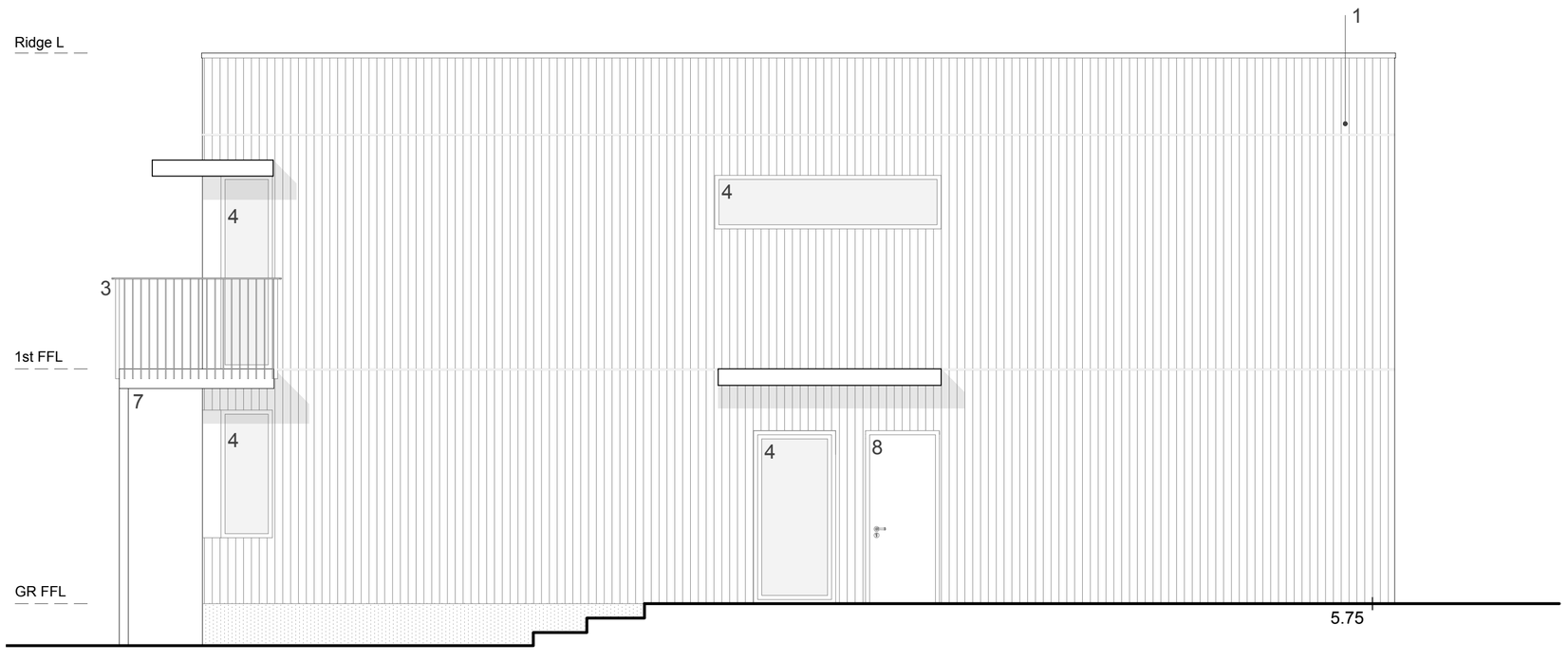


No.54 No.56 No.58

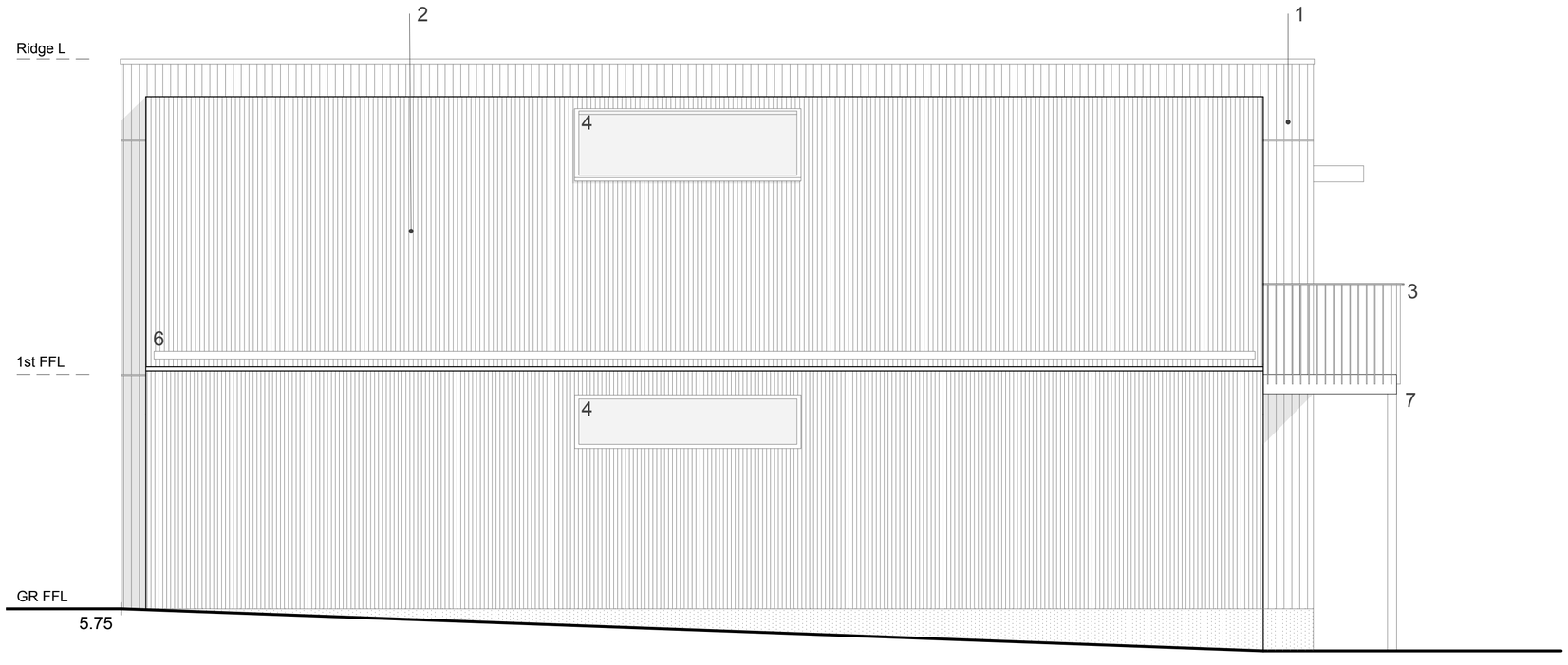
Front (South) Elevation 1:50



Rear (North) Elevation 1:50



Side (East) Elevation 1:50



Side (West) Elevation 1:50

KEY

1. Vertical timber cladding
2. Black corrugated metal cladding
3. Powder coated metal balustrade
4. Double glazed composite frame windows/doors/rooflights
5. Powder coated aluminium fascias
6. Hidden gutter detail
7. Metal support column

client	drawing number	revision
Maureen & Peter Gunzi	0655.PL.003	B
project	**drawing title**	
56 The Meadway Shoreham by Sea BN43 5RP	Elevations Planning	

drawn by	checked by	riba work stage	date	scale/original sheet size
EI	GI	3	March 2022	1:50 @ A1

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Appendix II - EA Data

Ambiental Environmental Assessment
Sussex Innovation Centre,
Science Park Square,
Brighton, BN1 9SB

Oliver Harvey

From: PSO West Sussex <PSOWestSussex@environment-agency.gov.uk>
Sent: 15 April 2020 17:46
To: Consultancy
Cc: SSD Enquiries
Subject: SSD167676- 5351 - BN43 5RL - Product 5,6,7
Attachments: P5 6 7 Covering Letter.pdf

Categories: Data in

Dear Lydia Sayers,

Thank you for your Product 5,6 & 7 request for 43 Old Fort Road, Shoreham-by-Sea, West Sussex, BN43 5RL. Please find attached cover letter.

You can download the flood risk data from this link: https://ea.sharefile.com/d-saaa4bd10eb94de3b

Please note the link will expire in 30 days.

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

Kind regards,

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

tom.lamboo@environment-agency.gov.uk
Internal 45239 | External: 02084745239 | Mobile: 07880243479



From: Consultancy [mailto:consultancy@ambiental.co.uk]
Sent: 27 March 2020 16:54
To: SSD Enquiries <SSDEnquiries@environment-agency.gov.uk>
Subject: 5351 - BN43 5RL - Product 5,6,7

Dear EA

Please can we request a product 5, 6 and 7 data set to support a FRA. We would expect the data set to include;

- Modelled flood levels and maps for a number of AEPs
- EA flood map for planning including EA main rivers
- Defence information (including crest height and standard of protection)
- Historic Flood Information
- Breach data (if required)
- Map demonstrating modelled nodes with corresponding flood levels

The product 5, 6 and 7 is to support the site below;

Address: 43 Old Fort Road, Shoreham-by-Sea, West Sussex, BN43 5RL

Grid Reference: TQ 22063 04601

In addition please find attached a mapping extract with redline application below;



Thank you

Kind Regards,

Lydia Sayers
Consultancy Coordinator

AMBIENTAL
ENVIRONMENTAL ASSESSMENT

Ambiental, Science Park Square, Brighton, BN1 9SB
Consultancy Team + 44 (0) 203 857 8540
General Enquiries + 44 (0) 203 857 8530
W www.ambiental.co.uk | **E** consultancy@ambiental.co.uk
Twitter | **LinkedIn**

Ambiental Environmental Assessment Ltd qualify to ISO 14001 (Environmental Management System), qualify to ISO 9001 (Quality Management System), are members of CIWEM and members of UK Flood Partnership. Company registered in England & Wales; Company Number 10238346; Registered Address, Sussex Innovation Centre, Science Park Square, Brighton, BN1 9SB, UK. This email and any attachments are confidential and intended exclusively for the use of the intended recipient(s). Any views or opinions presented are solely those of the author and do not necessarily represent those of Ambiental Environmental Assessment Ltd. If you are not the intended recipient(s) please note that any form of distribution, copying or use of this email or the information in it is strictly prohibited and may be unlawful. If you have received this communication in error, please notify the sender and then delete the message and any attachments from your system. Please note that no responsibility for viruses is taken and it is your responsibility to scan this message and any attachments. Please consider the environment before printing out this email.

Thea Powell
Ambiental
Science Park Square
Brighton
BN1 9SB

Our ref: SSD65487
Your ref: 3549
Date: 27-11-2017

Dear Thea Powell

Enquiry regarding Product 4 for 43 Old Fort Road, Shoreham-by-Sea, West Sussex, BN43 5RL.

Thank you for your enquiry which was received on 30 October 2017.

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 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 a shingle beach. The Asset ID is 149939. The estimated standard of protection is 1 in 100 (1% AEP). The estimated condition grade is 3.

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

Flood History
We hold no record of flooding events affecting this site, but a nearby area was previously flooded in Lancing (1992) (Flood Event Code: 2094), the source of the flooding was the sea and the cause was overtopping of defences.

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

FRA advisory text

Name	Product 4
Description	Detailed Flood Risk Assessment Map for 43 Old Fort Road, Shoreham-by-Sea, West Sussex, BN43 5RL.
Licence	Open Government Licence
Information Warnings	No information warnings.
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 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

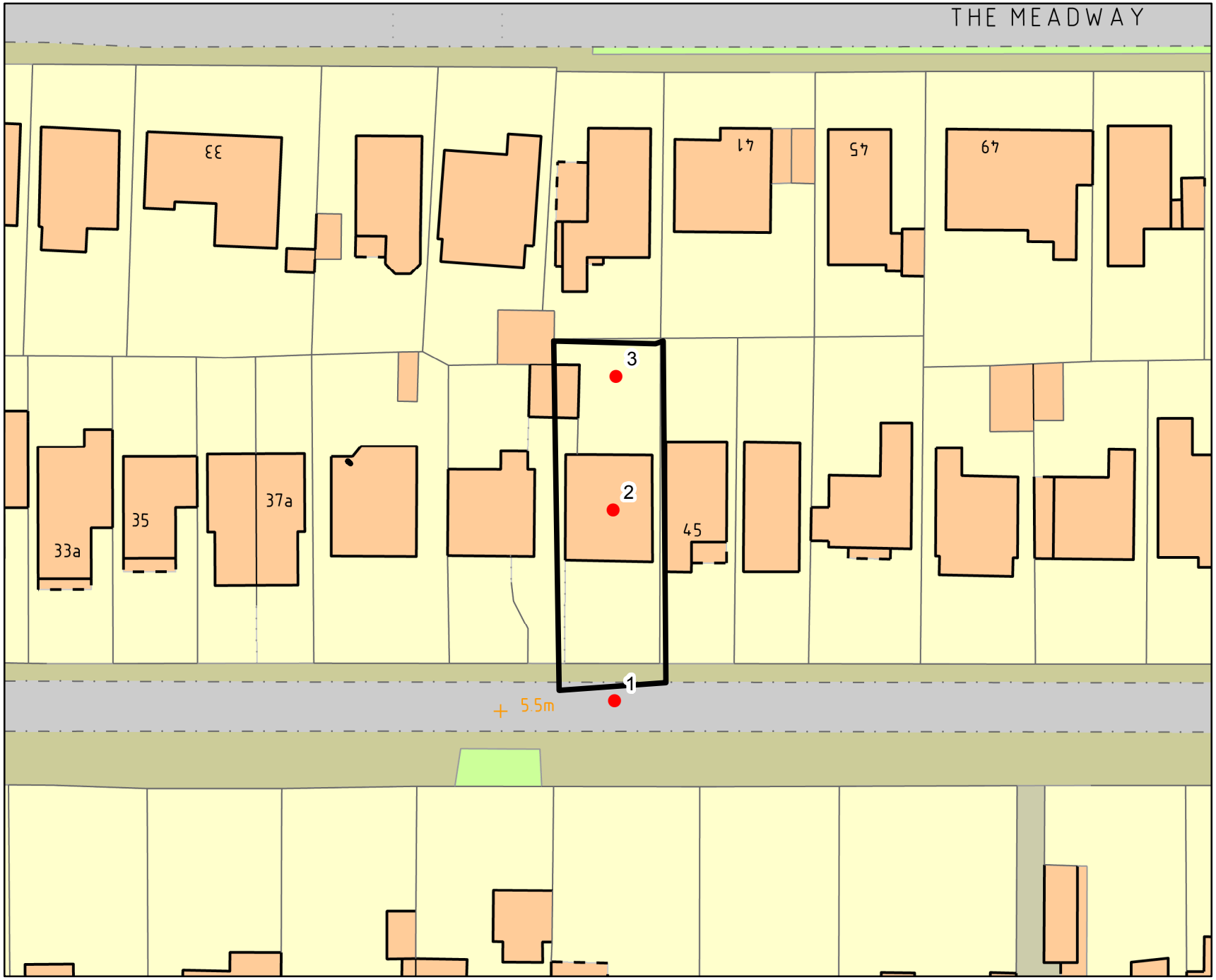
Please get in touch if you have any further queries or contact us within two months if you'd like us to review the information we have sent.

Yours sincerely,

Chris Brown

Flood and Coastal Risk Management Officer, Partnerships & Strategic Overview
West Sussex.

FRA Site Boundary & Node Points Map centred BN43 5RL. Created 27-11-2017



Environment Agency

N

Legend

- Site Boundary
- Site Nodes

Scale: 1:600

0 15 30

Meters

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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: Ambiental

Site: 43 Old Fort Road, Shoreham-by-Sea, West Sussex, BN43 5RL

Table 3: Water Levels: Tidal Undefended

	NGR		Modelled Flood Levels in Metres Undefended Annual Exceedance Probability				
Node Ref	Eastings	Northings	5%	1.3%	0.5%	0.1%	0.5% (2115)
1	522063	104581	N/A	N/A	N/A	N/A	N/A
2	522063	104603	N/A	N/A	N/A	N/A	N/A
3	522063	104618	N/A	N/A	N/A	N/A	N/A

Table 4: Water Levels: Tidal Defended

	NGR		Modelled Flood Levels in Metres Defended Annual Exceedance Probability				
Node Ref	Eastings	Northings	5%	1.3%	0.5%	0.1%	0.5% (2115)
1	522063	104581	5.46	5.47	5.47	5.49	5.77
2	522063	104603	N/A	N/A	N/A	5.47	5.76
3	522063	104618		5.38	5.41	5.46	5.73

Table 7: Water Depth: Tidal Undefended

	NGR		Modelled Flood Levels in Metres Undefended Annual Exceedance Probability				
Node Ref	Eastings	Northings	5%	1.3%	0.5%	0.1%	0.5% (2115)
1	522063	104581	N/A	N/A	N/A	N/A	N/A
2	522063	104603	N/A	N/A	N/A	N/A	N/A
3	522063	104618	N/A	N/A	N/A	N/A	N/A

Table 8: Water Depth: Tidal Defended

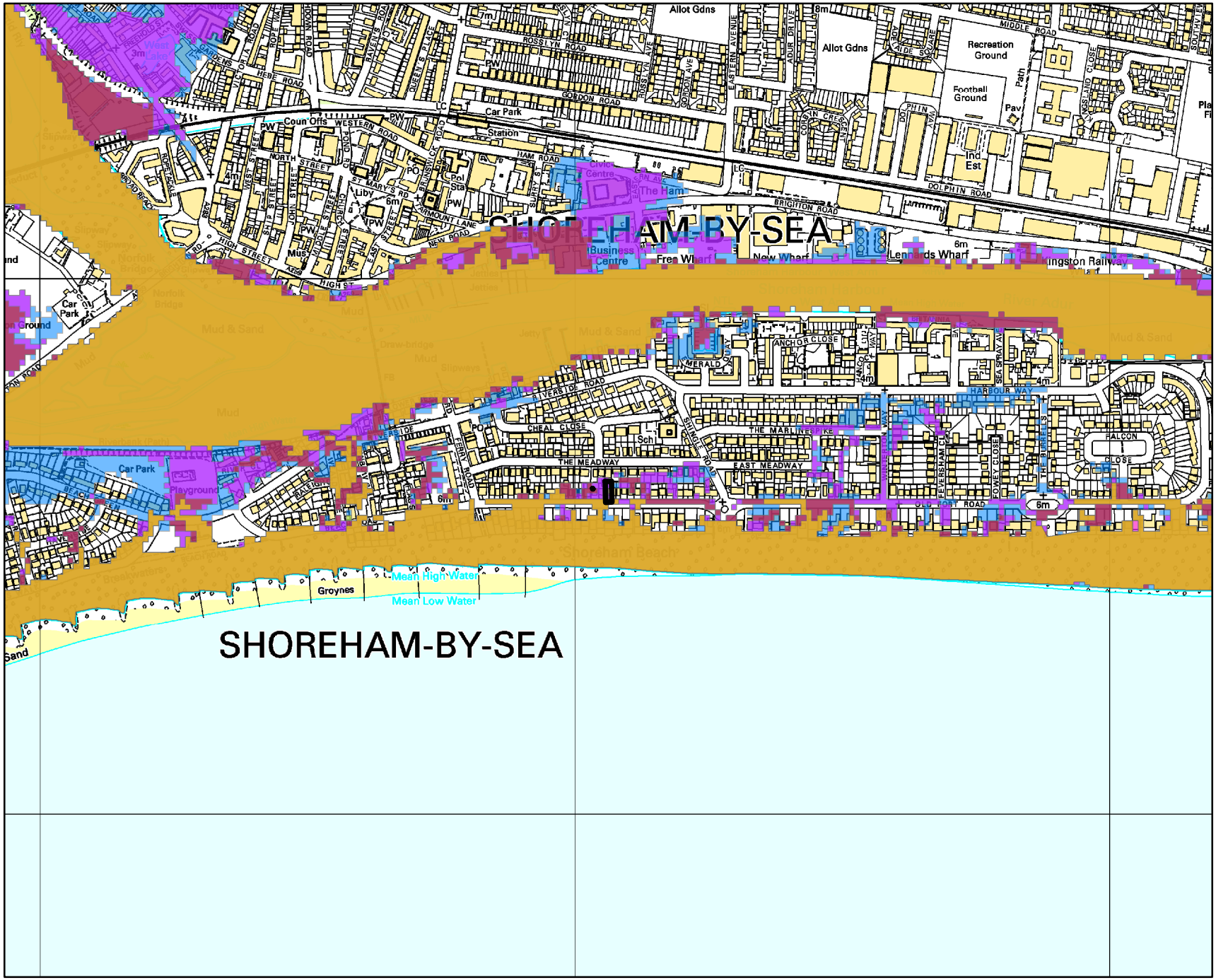
	NGR		Modelled Flood Levels in Metres				
			Defended Annual Exceedance Probability				
Node Ref	**Eastings**	**Northings**	**5%**	**1.3%**	**0.5%**	**0.1%**	**0.5% (2115)**
1	522063	104581	0.03	0.03	0.04	0.06	0.33
2	522063	104603	N/A	N/A	N/A	0.08	0.37
3	522063	104618	N/A	0.02	0.04	0.09	0.36

All levels taken from: Arun to Adur Flood Model

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

Produced on: 27-11-2017

Modelled Flood Outline Map (Tidal defended 1) centred BN43 5RL. Created 27-11-2017



Environment Agency

N

Legend

- Site Boundary
- 20% AEP (2012) (Defended)
- 5% AEP (2012) (Defended)
- 1.3% AEP (2012) (Defended)
- 0.5% AEP (2012) (Defended)

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

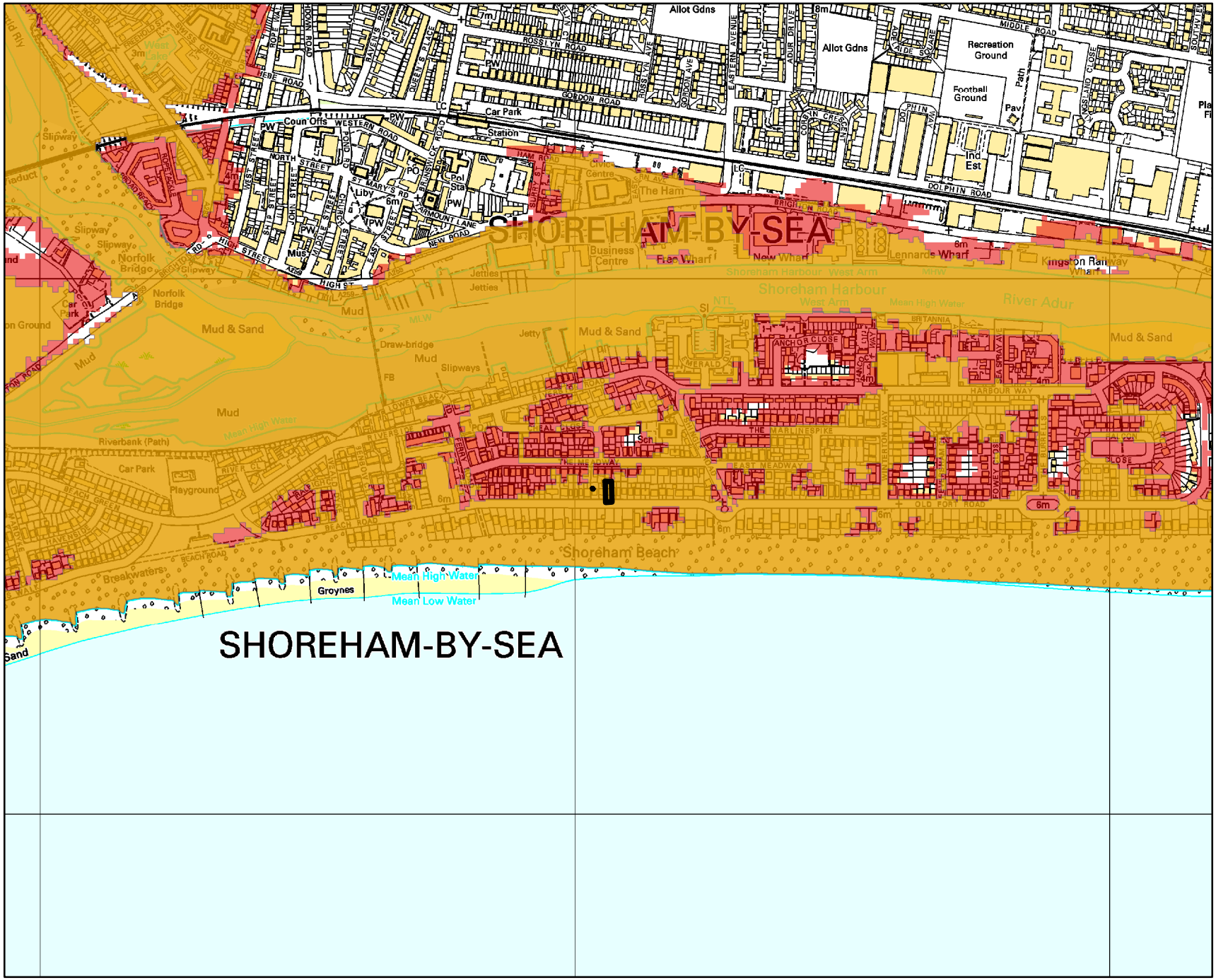
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0 0.25 0.5

Kilometers

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Modelled Flood Outline Map (Tidal defended 2) centred BN43 5RL. Created 27-11-2017



Environment Agency

N

Legend

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

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

Scale: 1:10,000

0 0.25 0.5

Kilometers

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Recorded flood event outlines. Centred on BN43 5RL. Created on 07-11-2017.

Environment Agency

Legend

All recorded flood outlines



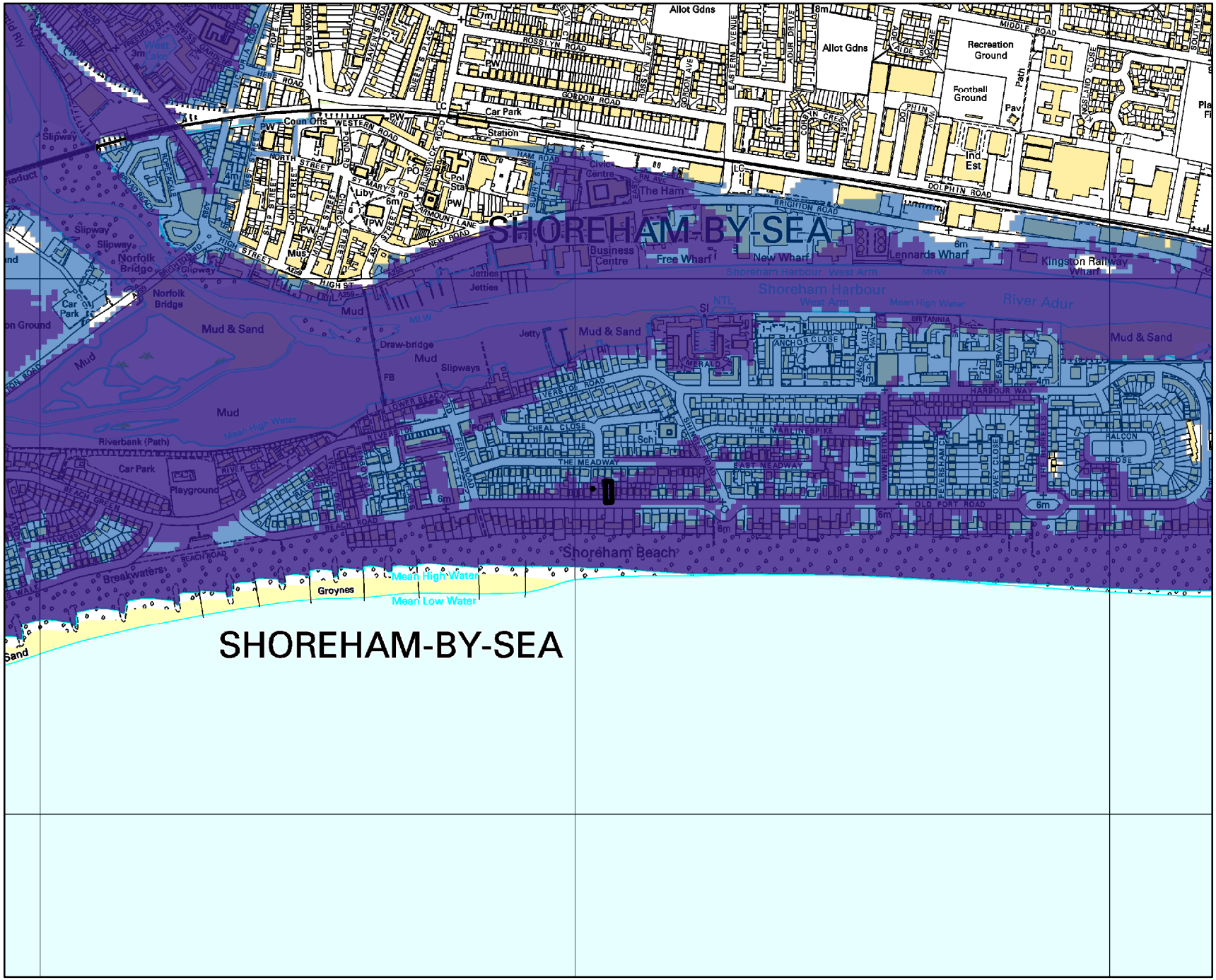
0 100 200 300

Metres

N
W E
S

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Modelled Flood Outline Map (Tidal defended 3) centred BN43 5RL. Created 27-11-2017



Legend

- Site Boundary
- 0.1% AEP (2012) (Defended)
- 0.1% AEP (2115) (Defended)

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

Scale: 1:10,000

0 0.25 0.5
Kilometers

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Appendix III - Supplementary Information

Ambiental Environmental Assessment
Sussex Innovation Centre,
Science Park Square,
Brighton, BN1 9SB