



Site Specific Flood Risk Assessment

**51 & 51A Old Fort Road,
Shoreham by Sea,
BN43 5RL**

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1. Introduction

This document presents a Flood Risk Assessment (FRA) prepared by Eco 360. It provides a detailed overview of the proposed site, including its vulnerability classification, potential flood risk linkages, and an evaluation of associated flood risks.

This assessment has been prepared in accordance with relevant planning policy and guidance and was completed on 30th March 2026 by Dr. Aswin Kokkat, Flood Risk Consultant at Eco 360 and was subsequently updated on 12 June 2026.

1.1 Project Overview

The development comprises a pair of semi-detached residential dwellings at 51 & 51A Old Fort Road, Shoreham-by-Sea, West Sussex, BN43 5RL, which have been constructed in accordance with planning permission Ref. AWDM/2007/21, supported by a previously submitted Flood Risk Assessment Ref. 11726, GTA Civils & Transport Ltd, December 2021.

Eco 360 has prepared this updated site specific Flood Risk Assessment to support the application and to reassess the potential risk of flooding to the site and the completed development. The assessment has been informed by available Environment Agency flood risk data, including strategic hydraulic modelling outputs, together with a review of relevant planning and technical documentation.

This updated FRA considers the as built ground and finished floor levels and evaluates flood risk from all relevant sources, including tidal flooding, surface water flooding, groundwater, sewer flooding and reservoir flooding. The report outlines appropriate flood mitigation, resilience and emergency management measures to demonstrate that the development can remain safe for its lifetime without increasing flood risk elsewhere.

This revised FRA has been prepared to respond directly to the Environment Agency objection dated 26 May 2026, the Planning Inspectorate appeal decision APP/Y3805/W/25/3359461, and subsequent consultation comments. The principal matter addressed in this assessment is whether the lower ground floor can be safely used as flexible habitable accommodation, including sleeping accommodation, having regard to tidal flood risk, climate change, residual flood risk and the defences removed scenario.

Although surface water flood risk has been considered, the key residual flood risk issue for this application is tidal flooding, including the potential consequences of defence exceedance, overtopping or failure. The assessment therefore considers the defended present day scenario, defended climate change scenario and defences removed climate change scenario.

1.2 Purpose of Investigation

The objectives of the Flood Risk Assessment (FRA) were to:

- Develop a detailed assessment of the site.
- Determine whether the Sequential Test and, if required, the Exception Test apply to the proposed development.
- Identify potential flood sources, receptors and pathways at the site.
- Assess the level of potential flood risk.
- Determine the requirement or scope of further investigations or mitigation measures.
- Assess the specific risk to life associated with the proposed use of the lower ground floor for sleeping accommodation.
- Evaluate flood risk from tidal sources, taking account of climate change over the lifetime of the development, and specifically assessing the defences-removed scenario.
- Consider the role of mitigation, internal refuge, flood warning and emergency planning in managing residual flood risk.

1.3 Scope of Work

- Brief introductory information has been noted to provide context to the report and include an Introduction, Project Overview, Scope of Work and Limitations.

- To develop a detailed assessment of the site and determine whether the Sequential Test and, if required, the Exception Test apply to the proposed development, desk studies have been carried out to collate information obtained from sources including the Environment Agency, Local & National Authorities, Strategic Flood Risk Assessments and Digital Terrain Model (DTM) LiDAR topographical surveys.
- This information has been used to identify potential flood sources, receptors and pathways at the site, as part of an initial Conceptual Site Model.
- To assess the level of potential flood risk, a Conceptual Site Model has been produced to categorise the potential severity of the impact of the flood linkage on the receptor and the probability of the flood linkage being present.
- Following the assessment of flood linkages, an evaluation of flood risk, mitigation measures, surface water management and safe access and egress has been conducted to determine the requirement or scope of further investigations.
- Supporting appendices include photographs, maps and plans of the site.

1.4 Limitations

Eco 360 has exercised such professional skill, care and diligence as may reasonably be expected of a properly qualified and competent consultant when undertaking works of this nature. This report is only valid when used in its entirety and any information or advice contained within the report should not be relied upon until considered in the context of the whole report. Eco 360 disclaims any responsibility to the client, as named on the front of this report ("the client"), and others in respect of any matters outside the scope of this work. Any comments made on the basis of information obtained from the client or other third parties are given in good faith on the assumption that the information is accurate. This report has been prepared solely for the benefit of the client and any other party using or placing reliance upon any information contained in this report does so at their own risk. Eco 360 accepts no responsibility or liability for the contents of this report being used for any purpose or project for which it was not commissioned. Eco 360 accepts no liability whatsoever for any loss or damage arising from the interpretation or use of this report and in no event shall the company be liable for any punitive, exemplary or other special damages, or for any indirect, incidental or consequential damages, including with respect to the performance or non-performance of any services, whether arising under breach of contract, tort or any other legal theory, and regardless of whether the company has been advised of, knew of, or should have known of the possibility of such damages. Furthermore, Eco 360 does not accept any liability for the consequences of any legislative changes or the release of subsequent guidance documentation and following delivery of the report has no obligation to advise the client or any other party of such changes or their repercussions.

This report excludes consideration of potential hazards arising from any activities at the site other than normal use and occupancy for the intended land uses. Hazards associated with any other activities have not been assessed and must be subject to a specific risk assessment by the parties responsible for those activities. Eco 360 does not warrant or guarantee that the site is free of hazardous or potentially hazardous materials or conditions. It should be noted that this report has been produced for environmental purposes only.

1.5 Response to Environment Agency Objection dated 26 May 2026

The Environment Agency objected to the application on the basis that the submitted information did not demonstrate that the proposal would not pose an unacceptable risk to life from flooding. The objection specifically identifies concern regarding the proposed use of the lower ground floor for sleeping accommodation, the need to demonstrate that occupants can remain safe for the lifetime of the development, the consideration of climate change allowances, and the need to assess flood risk on the basis of the undefended or defences-removed scenario.

This revised FRA has therefore been prepared to directly address those matters. Particular attention has been given to the potential for tidal floodwater to reach the lower ground floor access and the safety of occupants who may be sleeping within the lower ground floor accommodation.

The proposed flood barrier is a fixed and passive measure with a crest level of approximately 6.16 m AOD. It is not dependent on temporary manual installation by occupants prior to a flood event. However, the assessment does not rely on this measure in isolation. It is considered as part of a wider flood safety strategy, including internal access to upper floors, safe refuge within the dwellings, flood warning registration, a Flood Risk Emergency Plan and ongoing inspection and maintenance.

2. Site

The following section provides a description of the site, location, proposed development and vulnerability classification, utilising information obtained from the client and publicly available sources.

2.1 Site Description and Location

The application site is located at 51 & 51A, Old Fort Road, Shoreham-by-Sea, West Sussex, BN43 5RL, within the administrative area of Adur District Council.

The surrounding area is characterised by predominantly residential land use, comprising a mix of detached and semi-detached dwellings with associated private gardens, access drives, and local highway infrastructure typical of a coastal urban setting.

The site forms part of the curtilage of the approved and constructed residential development and is accessed directly from Old Fort Road. The development occupies a previously residential plot, with the built form now established on site.

Topographical survey data indicates that ground levels across the site range between approximately 5.2 m and 5.5 m AOD, with levels surrounding the building footprint generally in the order of 5.3 m AOD.

The site lies within a coastal flood risk area influenced by tidal processes associated with the English Channel. Surface water runoff is expected to follow local overland flow routes and existing drainage infrastructure typical of residential development, with discharge ultimately to the wider coastal and tidal system.

National Grid Reference: TQ 22109 04597

Easting, Northing: 522109 , 104597

2.2 Development

The development comprises a pair of semi-detached residential dwellings, which have been constructed in accordance with the approved planning permission.

Each dwelling is arranged over multiple levels, including a lower ground floor, ground floor, and upper floor, providing residential accommodation consistent with the approved scheme.

The development includes internal access between levels and external access arrangements consistent with the approved layout. This assessment has been prepared to support the current application and to reassess flood risk in relation to the proposed use of the lower ground floor.

2.3 Vulnerability Classification

The National Planning Policy Framework (NPPF) classifies development according to its vulnerability to flood risk, as set out in Annex 3.

The development comprises residential dwellings and is therefore classified as 'More Vulnerable' for the purposes of flood risk planning.

The Environment Agency Flood Map for Planning indicates that the site lies within Flood Zone 3, defined as land having a high probability of flooding from tidal or fluvial sources.

The site is not identified as being located within Flood Zone 3b (functional floodplain) based on currently available strategic flood risk information.

In accordance with national planning policy, a site-specific Flood Risk Assessment is required to demonstrate that:

- the development will be safe for its lifetime, taking account of climate change;
- the development will not increase flood risk elsewhere; and
- where possible, opportunities to reduce overall flood risk are identified.

It is recognised that the Environment Agency Flood Map for Planning represents a strategic-scale assessment and does not account for detailed local topography, site-specific ground levels, or

mitigation measures. These factors are considered further within this assessment.

Table 1: Flood Risk Vulnerability Classification table from National Planning Policy Framework Technical Guidance

Flood Risk Vulnerability Classification					
Flood Zones	Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
Zone 1	•	•	•	•	•
Zone 2	•	Exception Test required	•	•	•
Zone 3a	Exception Test required	×	Exception Test required	•	•
Zone 3b	Exception Test required	×	×	×	•

Key: • Development is appropriate
 × Development should not be permitted

2.4 Lifetime of Development

In accordance with Planning Practice Guidance (Flood Risk and Coastal Change), residential development is assumed to have a design lifetime of 100 years.

This assessment has therefore been undertaken on the basis that the existing development, including the proposed use of the lower ground floor, must remain safe from flooding over this period, taking account of the potential effects of climate change.

In response to the Environment Agency objection, this FRA has also considered residual flood risk, including the defences removed climate change scenario, to assess whether occupants would remain safe during an extreme event or potential defence exceedance, overtopping or failure.

2.5 Planning Policy Context

The application site lies within the administrative boundary of Adur District Council, which is the Local Planning Authority.

Flood risk policy and development management decisions relevant to the site are informed by the following guidance and policy framework:

- National Planning Policy Framework (NPPF);
- Planning Practice Guidance (Flood Risk and Coastal Change); and
- The Strategic Flood Risk Assessment (SFRA) prepared for Adur District Council.

3. Sequential Test

3.1 Introduction

The Environment Agency Flood Map for Planning indicates that the application site is located within Flood Zone 3, defined as land having a high probability of flooding from tidal sources.

In accordance with the National Planning Policy Framework (NPPF) and associated Planning Practice Guidance (PPG), development should be directed to areas with the lowest probability of flooding where reasonably available sites exist.

The development comprises an existing pair of semi-detached residential dwellings. Residential development is classified as 'More Vulnerable' in accordance with NPPF Annex 3.

3.2 Proportionate Application of the Sequential Test

Planning Practice Guidance confirms that the Sequential Test should be applied in a proportionate manner, taking account of the scale, nature and location of the proposal.

In this instance, the proposal does not relate to a new site allocation or a new building footprint. The dwellings have already been constructed in accordance with planning permission ref. AWDM/2007/21, and the current application relates to the proposed use of the lower ground floor.

Given the nature of the proposal, the scope for identifying reasonably available alternative sites at materially lower flood risk is limited. This assessment provides site-specific evidence to inform the Local Planning Authority's consideration.

3.3 Sequential Test Conclusion

The site is located within Flood Zone 3 and forms part of an existing residential setting.

Having regard to:

- the site-specific nature of the proposal;
- the absence of changes to the built form; and
- the ability to manage flood risk through design and mitigation measures,

the Sequential Test is considered to be satisfied on a proportionate basis.

3.4 Exception Test

In accordance with the NPPF, residential development classified as 'More Vulnerable' within Flood Zone 3a requires application of the Exception Test.

In this instance, the proposal relates to an existing residential development with no increase in footprint or scale.

This Flood Risk Assessment demonstrates that the development can be safe for its lifetime, taking account of climate change, without increasing flood risk elsewhere.

4.Initial Conceptual Site Model

The following section outlines potential flood sources, pathways and receptors, utilising information gathered in the previous sections, to develop an initial conceptual site model.

4.1 Potential Flood Sources

Tidal & Seas

The Environment Agency Flood Map for Planning indicates that the application site lies within Flood Zone 3, with parts of the site also falling within Flood Zone 2.

The northern part of the site is located within Flood Zone 3, while the southern part lies within Flood Zone 2, reflecting the site's proximity to the coastline and the influence of tidal flooding within the wider area.

Flood Zone 3 represents land with a high probability of flooding in the absence of defences. However, it is recognised that the site benefits from existing tidal flood defences, which reduce the actual likelihood of flooding.

The mapping is based on strategic-scale modelling and does not take account of site-specific ground levels, local topography or the presence and standard of protection offered by flood defences.

The development is located within an established residential area and does not encroach into functional floodplain or areas identified for flood storage. The proposal does not alter floodplain capacity or flow routes.

Accordingly, while the site is located within Flood Zone 3, the actual flood risk is managed through existing defences, with residual risk limited to extreme events or potential defence exceedance. This is considered further within this assessment.

Surface Water

Surface water flooding occurs where rainfall intensity exceeds the capacity of local drainage infrastructure or where runoff accumulates along topographic flow pathways.

The Environment Agency Risk of Flooding from Surface Water mapping has been reviewed for the 1 in 30 year, 1 in 100 year and 1 in 1000 year rainfall events.

Mapping confirms that the application site, including the development footprint, is not affected by surface water flooding during the 1 in 30 year and 1 in 100 year events.

During the 1 in 1000 year event, limited areas of shallow surface water flooding are shown within the wider locality, however these do not encroach upon the building footprint and are typically associated with localised depressions and highway drainage features.

On this basis, the risk of surface water flooding to the development is considered to be low.

Groundwater

Groundwater flooding occurs where the water table rises to or above ground level following prolonged rainfall, tidal influence or seasonal recharge. This process is typically characterised by gradual emergence or prolonged soil saturation rather than rapid inundation.

Superficial deposits are mapped as storm beach deposits (gravel), which are permeable and may support localised shallow groundwater movement. However, the variability in underlying strata and presence of finer materials is likely to restrict rapid groundwater flow across the site.

Available mapping indicates that groundwater levels in the area are typically between approximately 0.5 m and 5.0 m below ground level, suggesting potential for shallow groundwater conditions during periods of elevated recharge.

The development has been constructed and does not include deep below-ground structures that would significantly interact with groundwater. The proposal does not materially alter groundwater flow pathways or recharge characteristics.

On this basis, the risk of groundwater flooding to the development is considered to be low, with any

potential impacts limited to periods of prolonged saturation rather than rapid flooding.

Historical Flooding

Adur District Council's Strategic Flood Risk Assessment (SFRA) recorded flood outlines and available local authority data indicate that there are no recorded historical flooding incidents at the application site.

West Sussex County Council records also do not identify any known local flooding incidents affecting the site.

It should be noted that the absence of recorded events does not necessarily confirm that flooding has never occurred; however, there is no evidence of significant historic flooding affecting the site.

Sewers

Sewer flooding can occur where drainage systems become surcharged during periods of intense rainfall, restricted outfall conditions, or localised network capacity constraints.

Review of available Strategic Flood Risk Assessment information and publicly available data does not identify any site-specific sewer flooding incidents in the vicinity of the site.

The site is located within an established residential area and is served by existing drainage infrastructure within the Southern Water operational area.

The development has been completed and represents a residential scheme of limited scale. It is not expected to materially increase foul or surface water discharge beyond that previously assessed and approved.

Accordingly, the risk of sewer flooding to the development is considered to be low.

Reservoirs

Reservoir flooding may occur in the unlikely event of failure or overtopping of an upstream impounding structure.

Review of the Environment Agency Reservoir Flood Map indicates that the application site is not located within any modelled reservoir flood extent, including both Wet Day and Dry Day breach scenarios.

Accordingly, the site is not considered to be at risk from reservoir flooding.

Given the absence of mapped risk, no specific mitigation measures are required in relation to reservoir flooding. Residual risk is considered to be negligible.

4.2 Potential Flood Receptors

Given the proposed development comprises a pair of semi-detached residential dwellings within an established residential setting, the following potential flood risk receptors have been identified:

- Occupants of the dwellings
- Visitors to the site
- The residential buildings and associated amenity areas
- Site access and egress routes
- Vehicles within the site boundary
- Adjacent residential properties
- Local infrastructure, including highways and utilities
- The surrounding water environment and downstream receptors
- Occupants within the lower ground floor accommodation

4.3 Potential Flood Pathways

Potential pathways by which flooding could affect the identified receptors have been considered with reference to site-specific flood mapping and local topography.

Potential flood pathways relevant to the site include:

- Overland surface water runoff during periods of intense or prolonged rainfall, which may follow localised topographic flow routes
- Temporary ponding within low lying areas of the wider locality during extreme rainfall events
- Residual flood risk associated with exceedance of local drainage systems
- Tidal flooding from the sea during extreme events, including potential overtopping or exceedance of flood defences
- Localised groundwater emergence during prolonged wet periods

This assessment therefore focuses on potential pathways that could connect off-site flood sources to on-site receptors, including residual risk associated with extreme events and defence exceedance.

4.4 Climate Change

In accordance with the National Planning Policy Framework and Environment Agency climate change allowance guidance, future increases in sea level rise and peak rainfall intensity may influence flood risk over the lifetime of the development.

The development comprises a pair of semi-detached residential dwellings and does not encroach into functional floodplain or materially alter existing flood flow pathways or surface water runoff characteristics.

Subject to appropriate mitigation and resilience measures, the development is considered capable of remaining safe over its assumed lifetime, taking account of climate change, without increasing flood risk elsewhere.

4.5 Risk Assessment Methodology

The level of risk posed by a particular flood source is determined by assessing the potential severity of the impact of the flood linkage on the receptor, assuming it is present, together with the probability of the flood linkage occurring.

Severities are categorised from Minor to Severe and probabilities from Unlikely to High Likelihood, producing an overall qualitative level of flood risk. This approach is proportionate to the scale and nature of the proposed development and is consistent with Environment Agency guidance.

Table 4: Risk Matrix

Probability	Severity of Consequence			
	Severe	Medium	Mild	Minor
High Likelihood	Very High Risk	High Risk	Moderate Risk	Low / Moderate Risk
Likely	High Risk	Moderate Risk	Low / Moderate Risk	Low Risk
Low Likelihood	Moderate Risk	Low / Moderate Risk	Low Risk	Very Low Risk
Unlikely	Low / Moderate Risk	Low Risk	Very Low Risk	Very Low Risk

Very High Risk

There is a high probability that severe harm could arise to a designated receptor from an identified source; or there is evidence that severe harm to a designated receptor is currently occurring.

High Risk

Harm is likely to arise to a designated receptor from an identified source.

Moderate Risk

It is possible that harm could arise to a designated receptor from an identified source. It is relatively unlikely that any such harm would be severe or if any harm were to occur it is more likely that the harm would be relatively mild.

Low Risk

It is possible that harm could arise to a designated receptor from an identified source, however, it is likely that this harm, if realised, would normally be mild.

Very Low Risk

There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is not likely to be severe.

4.6 Conceptual Site Model

The information presented in the preceding sections has been used to develop an initial conceptual site model outlining the potential flood sources, pathways and receptors at the site. The level of risk has been categorised by considering both the potential severity of flood impacts and the probability of occurrence, in accordance with the risk assessment methodology described above.

Table 5: Conceptual site model

Sources	Pathways	Receptors	Severity	Probability	Potential Level of Risk
Tidal Flooding	Floodplain inundation associated with coastal/tidal flooding from the English Channel	Proposed dwellings, occupants, access routes, adjacent properties	Moderate	Low Likelihood	Low to Moderate Site lies within Flood Zone 3 but benefits from tidal defences. Residual risk limited to extreme events (defence exceedance/breach)
Surface Water Flooding	Topographical flow path		Minor	Low Likelihood	Very Low No flooding during 1 in 30 or 1 in 100 events; limited shallow ponding in wider area in 1 in 1000 event.
Groundwater Flooding	Localised emergence through superficial deposits		Minor	Low Likelihood	Low Variable permeability deposits; shallow groundwater possible but no significant risk.
Sewer Flooding	Local sewers		Minor	Unlikely	Very Low No recorded incidents; limited impact from development.
Reservoir Flooding	Upstream reservoirs		Minor	Unlikely	Very Low Review of the Environment Agency Reservoir Flood Map confirms that the application site is not located within any modelled reservoir flood extent, including both Wet Day and Dry Day breach scenarios.
Climate Change	Increased rainfall intensity		Moderate	Likely	Low to Moderate Climate change is expected to increase tidal water levels and rainfall intensity over the lifetime of the development. Hydraulic modelling incorporating climate change allowances indicates increased flood extents
Tidal flooding / residual defence failure	Floodwater reaching lower ground floor access during extreme tidal event or defences removed scenario		Severe	Low likelihood	Moderate Risk reduced by fixed passive barrier at 6.16 m AOD, internal access to upper floors, flood warning registration and Flood Risk Emergency Plan.

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5. Hydraulic Modelling Data review

Hydraulic modelling outputs have been obtained from the Environment Agency, derived from the Adur Coastal Model (2012). The dataset provides modelled tidal flood extents and peak water levels (mAOD) across a high-resolution 2D grid.

The following scenarios have been reviewed:

- Defended scenario (present-day conditions)
- Defended scenario including climate change allowances
- Defences removed scenario including climate change allowances (residual risk scenario)

These datasets are considered appropriate for assessing baseline flood risk, climate change impacts and residual risk associated with defence exceedance or failure.

The key modelled levels relevant to flood risk assessment are summarised below:

Scenario	Level
Defended present day 0.1% AEP tidal level	Up to 5.29 m AOD
Defended 0.1% AEP + climate change tidal level	Up to 5.82 m AOD
Defences removed 0.1% AEP + climate change tidal level	Up to 5.58 m AOD
Defences removed flood depth	About 0.03 m to 0.65 m
Proposed fixed passive barrier crest level	6.16 m AOD
Planning Inspectorate referenced level	6.13 m AOD

The proposed fixed flood barrier crest level of approximately 6.16 m AOD is above the modelled peak water levels identified for the defended, defended climate change and defences removed climate change scenarios. The barrier therefore provides a passive physical measure to reduce the potential for floodwater ingress to the lower ground floor. However, the safety strategy does not rely on the barrier in isolation and also includes internal access to upper floors, safe refuge, flood warning registration, emergency procedures and maintenance.

5.1 Defended Scenario

The defended scenario modelling indicates that tidal water levels in the vicinity of the site are generally within the range of approximately 5.1 m AOD to 5.3 m AOD, based on Environment Agency hydraulic model outputs.

Peak water levels within the application site are shown to be up to approximately 5.29 m AOD under the 0.1% Annual Exceedance Probability (AEP) event.

Modelled flood depths at the site are generally shallow, typically less than 0.15 m, indicating limited and low-hazard inundation under defended conditions.

5.2 Defended Climate Change Scenario

The defended climate change model indicates that tidal water levels within the site are generally in the order of 5.4 m AOD to 5.8 m AOD, with peak levels up to approximately 5.82 m AOD under the 0.1% Annual Exceedance Probability (AEP) plus climate change scenario. Modelled flood depths within the selected site area are shown to be up to approximately 0.64 m.

This indicates that the site may be affected by shallow to moderate tidal inundation under defended climate change conditions. Flood behaviour is influenced by the presence and standard of protection of the existing tidal defence system, which continues to provide a degree of attenuation to flood risk.

5.3 Defences Removed

The defences removed climate change scenario represents a residual risk scenario, assuming failure, removal, overtopping or exceedance of the existing tidal defences. This scenario has been specifically considered in response to the Environment Agency's comment that flood risk should be assessed on the basis of the undefended scenario and that the proposed flood defence should not be relied upon in isolation when

determining flood risk to the site.

Model outputs indicate peak tidal water levels within the site of approximately 5.58 m AOD during the 0.1% AEP event including climate change allowances. Modelled flood depths across the site are generally in the range of approximately 0.03 m to 0.65 m, with a maximum recorded depth of approximately 0.65 m within the selected area.

The modelled peak water level of approximately 5.58 m AOD remains below the proposed fixed passive flood barrier crest level of approximately 6.16 m AOD. On this basis, the barrier provides a passive physical measure to reduce the likelihood of floodwater ingress to the lower ground floor during the defences removed climate change scenario.

The assessment does not rely solely on the barrier. The dwellings include internal access from the lower ground floor to upper floors, allowing occupants to move to a place of safety within the building if external evacuation is not appropriate or if flooding occurs during night-time hours. Residual risk is further managed through flood warning registration, a Flood Risk Emergency Plan and maintenance of the fixed passive barrier for the lifetime of the development.

Flow velocities are expected to be low and the modelled flood hazard is therefore limited.

6 Conclusion

6.1 Risk Evaluation

The initial conceptual site model identified the following potential flood linkages present at the site and the following conclusions have been drawn:

- Low residual risk from fluvial flooding associated with the wider coastal/tidal flood risk associated with the English Channel
- Low risk from surface water flooding during extreme rainfall events
- Low residual risk from groundwater flooding associated with superficial deposits
- Very low residual risk from reservoir flooding
- Low to moderate residual risk when climate change is considered

Site specific flood mapping confirms that the development is located within an area influenced by tidal flood risk, with parts of the site falling within Flood Zones 2 and 3. The site is not identified as functional floodplain.

The principal residual risk requiring consideration is the potential risk to occupants sleeping within the lower ground floor during an extreme tidal event, including a defences removed climate change scenario. This risk has been specifically assessed in this FRA and is managed through a combined strategy of passive flood protection, internal safe refuge, flood warning registration, emergency procedures and maintenance.

On this basis, flood risk to the proposed development is considered to be low and manageable in planning terms.

6.2 Existing Flood Mitigation Measures

The site is located within an established residential setting where existing ground levels, built form and surrounding drainage infrastructure influence local flood behaviour.

Site-specific flood mapping indicates that the development is located within an area benefiting from tidal flood defences, which provide a significant standard of protection.

Surface water runoff is conveyed via existing drainage pathways and local drainage infrastructure serving the surrounding residential area.

Accordingly, existing topography, drainage arrangements and wider flood defence infrastructure are considered to provide an element of inherent flood risk mitigation at the site.

6.3 Proposed Flood Mitigation Measures

In addition to existing site conditions, a range of mitigation measures have been incorporated into the development to manage flood risk.

A site-specific mitigation measure has been provided at the access to the lower ground floor in the form of a fixed flood barrier located at the half-landing, as shown on the submitted drawings.

The barrier comprises:

- A galvanised steel plate, approximately 12 mm thick and 100 mm high
- Fixed securely to the adjacent blockwork using mechanical fixings
- Sealed at the base to prevent water ingress
- Extending across the full width of the access (approximately 1500 mm)

The barrier provides a crest level of approximately 6.16 m AOD, which exceeds:

- Modelled tidal flood levels under defended conditions
- Modelled levels under climate change scenarios
- The minimum level of 6.13 m AOD identified by the Planning Inspectorate

This provides a physical barrier to reduce the potential for floodwater ingress to the lower ground floor during extreme events, including residual risk scenarios associated with defence exceedance or failure.

The development also benefits from:

- Appropriate finished floor levels relative to surrounding ground levels
- Management of lower ground floor use in accordance with planning constraints

The proposed mitigation measures are considered sufficient to manage residual flood risk when considered as a combined safety strategy. The assessment does not rely solely on the flood barrier; rather, the barrier forms part of a wider approach including internal safe refuge, flood warning registration, emergency procedures and maintenance. Subject to correct installation, retention and ongoing maintenance, the development is considered capable of remaining safe for its lifetime, taking account of climate change.

6.4 Surface Water Management

The application site forms part of an existing residential plot comprising predominantly permeable surfaces. The development introduces limited additional hardstanding associated with residential use.

Surface water runoff will be managed in accordance with the sustainable drainage hierarchy, with priority given to infiltration where feasible. Where infiltration is not suitable, discharge will be directed to the existing drainage network at a controlled rate.

Detailed drainage design will be confirmed at the detailed design stage in consultation with the Local Planning Authority and Lead Local Flood Authority.

On this basis, the development will not increase surface water flood risk on site or elsewhere.

6.5 Safe Access, Egress and Internal Refuge

Safe access and egress to the site is provided via the existing highway network under normal conditions. The site benefits from tidal flood defences and is not subject to significant flood hazard under defended present-day conditions. Residual risk is limited to extreme events, including defence exceedance, overtopping or failure.

Given that the application also seeks to allow sleeping accommodation within the lower ground floor, the assessment has not relied solely on external evacuation. Each dwelling includes internal access from the lower ground floor to upper floors, allowing occupants to move to a place of safety within the building.

Flooding from tidal sources is generally forecastable, and occupants should register with the Environment Agency Flood Warning Service and follow local flood warning advice. During a flood alert or flood warning affecting the area, occupants should avoid using the lower ground floor for sleeping and should move to the upper floors or evacuate in accordance with official advice.

On this basis, safe access, egress and internal refuge are considered achievable in flood risk planning terms, subject to implementation of the Flood Risk Emergency Plan.

6.6 Flood Risk Emergency Plan

A Flood Risk Emergency Plan will be implemented for the dwellings and retained for the lifetime of the development. The plan will be provided to future occupants and should consider all sources of flooding, including tidal flooding, surface water flooding, groundwater, sewer flooding and residual risk associated with defence exceedance, overtopping or failure.

The plan should include the following measures:

- occupants should register with the Environment Agency Flood Warning Service and any relevant local flood warning service;
- occupants should monitor flood alerts and flood warnings during periods of severe weather or coastal/tidal flood risk;
- the lower ground floor should not be used for sleeping during a flood warning affecting the site;
- occupants should move to the upper floors if a flood warning is issued or if flooding is observed in the local area;
- emergency contact details and evacuation advice should be retained within the property;
- the fixed passive flood barrier should remain installed and should not be removed without prior written approval from the Local Planning Authority;
- the fixed passive flood barrier should be inspected periodically and maintained in good working condition for the lifetime of the development;

- future owners and occupiers should be made aware of the residual flood risk and the requirement to follow the Flood Risk Emergency Plan.

These measures provide an additional layer of risk management and ensure that residual risk to occupants, including those using the lower ground floor, is appropriately managed for the lifetime of the development.

6.7 Overall Conclusion

This site specific Flood Risk Assessment demonstrates that:

- the development is located within an area influenced by tidal flood risk, with parts of the site falling within Flood Zones 2 and 3;
- the site is not identified as functional floodplain;
- all relevant sources of flood risk have been identified and assessed
- the defended, defended climate change and defences removed climate change scenarios have been considered;
- the modelled peak water levels remain below the proposed fixed passive flood barrier crest level of approximately 6.16 m AOD;
- the lower ground floor is protected by a fixed passive flood barrier which is not dependent on manual deployment;
- the safety strategy does not rely solely on the barrier and also includes internal access to upper floors, safe refuge, flood warning registration, emergency procedures and ongoing maintenance;
- residual flood risk to occupants, including occupants sleeping within the lower ground floor, can be managed for the lifetime of the development, taking account of climate change; and
- the proposal will not increase flood risk on-site or elsewhere.

Accordingly, in line with the National Planning Policy Framework, Planning Practice Guidance and Environment Agency guidance, the proposed use of the lower ground floor, including sleeping accommodation, is considered acceptable in flood risk terms, subject to the implementation, retention and maintenance of the mitigation measures and Flood Risk Emergency Plan set out within this assessment.

6. References

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Appendix A - Site Maps & Plans	
Description	
Site location plan	
Sources	
James Breckell Architect	
Key	
▲	North
	Site boundary

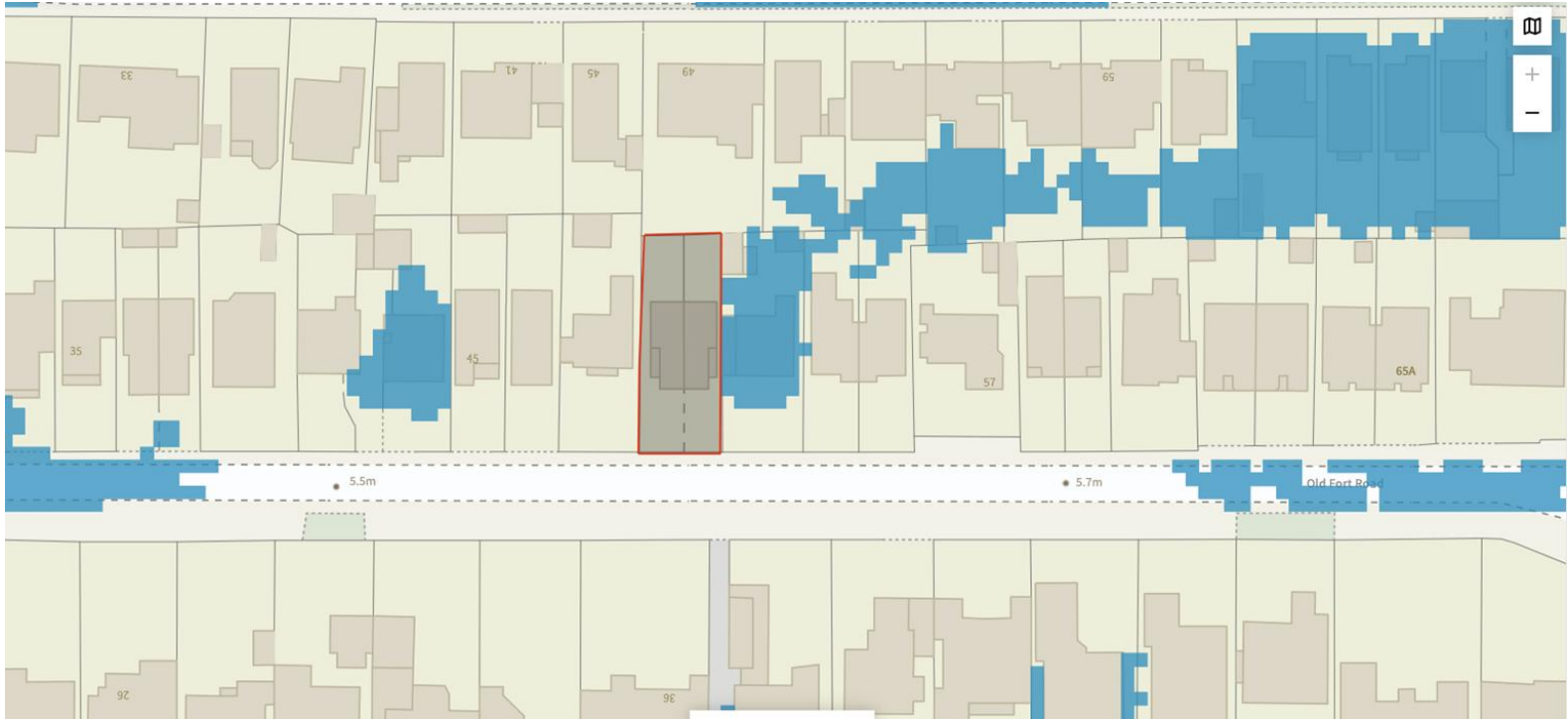


Appendix B –EA Flood Risk Maps

Description	
Flood zone map for planning	
Sources	
Environment Agency OS data © Crown copyright and database rights	
Key	
	Site boundary
	Flood Zone 1
	Flood Zone 2
	Flood Zone 3
	Main river
	Flood defence
	North



Appendix C – Surface water (1 in 100)	
Description	
Environment Agency map showing the predicted extent of surface water flooding for a 1 in 100 year (1% Annual Exceedance Probability) rainfall event. The mapping indicates areas susceptible to surface water ponding and overland flow during intense rainfall events.	
Sources	
Environment Agency OS data © Crown copyright and database rights	
Key	
	Site boundary
	North



Appendix D – Surface water (1 in 1000)

Description

Environment Agency mapping showing the predicted extent of surface water flooding for a 1 in 1000 year (0.1% Annual Exceedance Probability) rainfall event. The mapping identifies areas susceptible to surface water ponding and overland flow during extreme rainfall events.

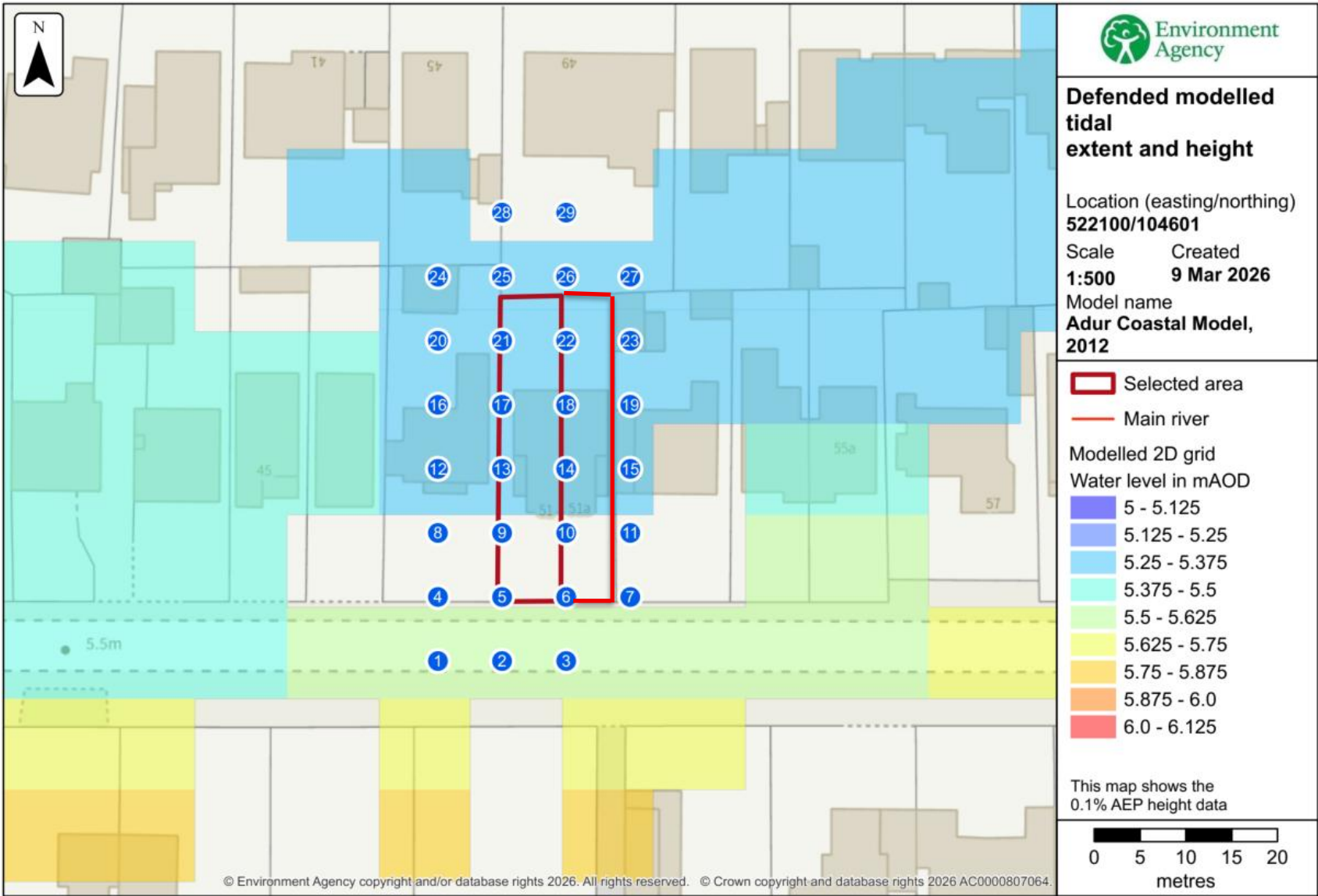
Sources

Environment Agency
OS data © Crown copyright and database rights

Key

	Site boundary
	North

Appendix E Defended tidal flood extent and water levels (0.1% AEP) – Environment Agency hydraulic modelling (Adur Coastal Model, 2012) showing present-day tidal flood extent and standard of protection.



Sample point data

Defended

Label	Easting	Northing	1.33% AEP	0.5% AEP	0.1% AEP	1.33% AEP	0.5% AEP	0.1% AEP
			Height	Height	Height	Depth	Depth	Depth
1	522090	104578	5.49	5.50	5.53	0.00	0.00	0.02
2	522097	104578	5.56	5.56	5.58	0.06	0.06	0.07
3	522104	104578	5.58	5.58	5.59	0.05	0.05	0.06
4	522090	104585	NoData	NoData	NoData	NoData	NoData	NoData
5	522097	104585	NoData	NoData	NoData	NoData	NoData	NoData
6	522104	104585	NoData	NoData	NoData	NoData	NoData	NoData
7	522111	104585	NoData	NoData	NoData	NoData	NoData	NoData
8	522090	104592	NoData	NoData	NoData	NoData	NoData	NoData
9	522097	104592	NoData	NoData	NoData	NoData	NoData	NoData
10	522104	104592	NoData	NoData	NoData	NoData	NoData	NoData
11	522111	104592	NoData	NoData	NoData	NoData	NoData	NoData
12	522090	104599	NoData	NoData	5.33	NoData	NoData	0.04

Label	Easting	Northing	1.33% AEP	0.5% AEP	0.1% AEP	1.33% AEP	0.5% AEP	0.1% AEP
			Height	Height	Height	Depth	Depth	Depth
13	522097	104599	NoData	NoData	5.29	NoData	NoData	0.02
14	522104	104599	5.19	5.21	5.29	0.01	0.02	0.10
15	522111	104599	5.19	5.21	5.29	0.01	0.02	0.10
16	522090	104606	5.14	5.21	5.31	0.04	0.07	0.15
17	522097	104606	5.12	5.15	5.29	0.01	0.03	0.14
18	522104	104606	5.12	5.15	5.29	0.08	0.11	0.25
19	522111	104606	5.12	5.15	5.29	0.08	0.11	0.25
20	522090	104613	5.14	5.21	5.31	0.04	0.07	0.15
21	522097	104613	5.12	5.15	5.29	0.01	0.03	0.14
22	522104	104613	5.12	5.15	5.29	0.08	0.11	0.25
23	522111	104613	5.12	5.15	5.29	0.08	0.11	0.25
24	522090	104620	5.14	5.17	5.29	0.15	0.18	0.30

Label	Easting	Northing	1.33% AEP	0.5% AEP	0.1% AEP	1.33% AEP	0.5% AEP	0.1% AEP
			Height	Height	Height	Depth	Depth	Depth
25	522097	104620	5.12	5.15	5.29	0.18	0.21	0.35
26	522104	104620	5.12	5.15	5.29	0.10	0.14	0.27
27	522111	104620	5.12	5.15	5.29	0.10	0.14	0.27
28	522097	104627	NoData	NoData	NoData	NoData	NoData	NoData
29	522104	104627	NoData	NoData	NoData	NoData	NoData	NoData
Max value in selected area:			5.12	5.15	5.29	0.01	0.03	0.14

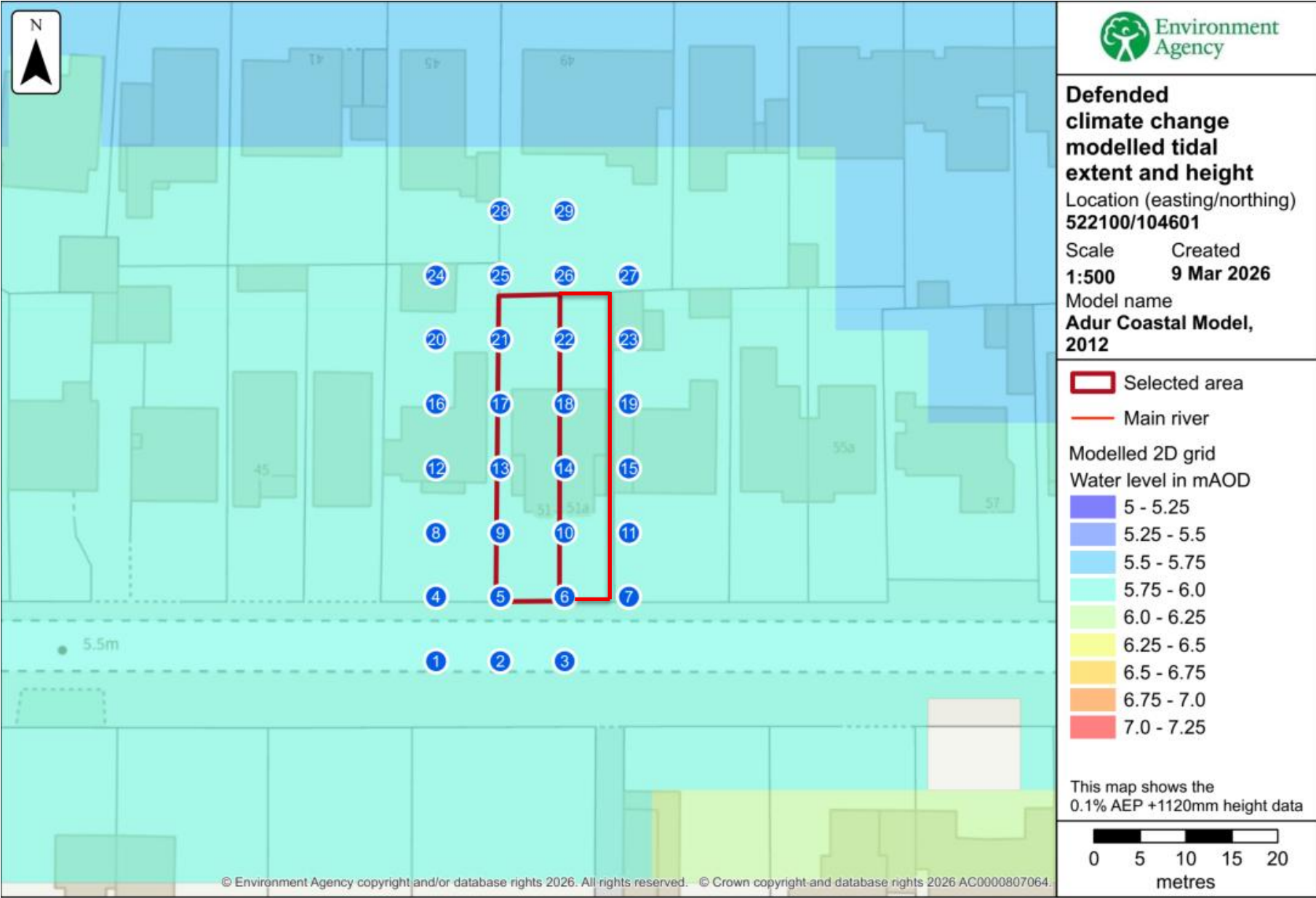
Data in this table comes from the Adur Coastal Model, 2012 model. Height values are shown in mAOD, and depth values are shown in metres.

Any blank cells show where a particular scenario has not been modelled for this location.

Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.

'Max value in selected area' is the deepest depth or highest height at any location within your drawn boundary.

Appendix F: Defended tidal flood extent and water levels (0.1% AEP + climate change) – Environment Agency hydraulic modelling (Adur Coastal Model, 2012) showing tidal flood extent under defended conditions including climate change allowances.



Sample point data

Defended climate change

Label	Easting	Northing	0.5% AEP (+490mm)	0.5% AEP (+1120mm)	0.1% AEP (+1120mm)	0.5% AEP (+490mm)	0.5% AEP (+1120mm)	0.1% AEP (+1120mm)
			Height	Height	Height	Depth	Depth	Depth
1	522090	104578	5.59	5.76	5.85	0.07	0.25	0.33
2	522097	104578	5.61	5.76	5.84	0.10	0.25	0.34
3	522104	104578	5.61	5.74	5.83	0.08	0.21	0.30
4	522090	104585	5.52	5.73	5.83	0.04	0.23	0.32
5	522097	104585	NoData	NoData	5.82	NoData	NoData	0.13
6	522104	104585	NoData	5.71	5.81	NoData	0.27	0.37
7	522111	104585	NoData	5.71	5.81	NoData	0.27	0.37
8	522090	104592	5.52	5.73	5.83	0.04	0.23	0.32
9	522097	104592	NoData	NoData	5.82	NoData	NoData	0.13
10	522104	104592	NoData	5.71	5.81	NoData	0.27	0.37
11	522111	104592	NoData	5.71	5.81	NoData	0.27	0.37
12	522090	104599	5.43	5.70	5.80	0.12	0.40	0.50

Label	Easting	Northing	0.5% AEP (+490mm)	0.5% AEP (+1120mm)	0.1% AEP (+1120mm)	0.5% AEP (+490mm)	0.5% AEP (+1120mm)	0.1% AEP (+1120mm)
			Height	Height	Height	Depth	Depth	Depth
13	522097	104599	5.41	5.70	5.79	0.14	0.42	0.52
14	522104	104599	5.41	5.69	5.79	0.22	0.50	0.60
15	522111	104599	5.41	5.69	5.79	0.22	0.50	0.60
16	522090	104606	5.41	5.69	5.78	0.26	0.54	0.63
17	522097	104606	5.41	5.69	5.78	0.27	0.54	0.64
18	522104	104606	5.41	5.68	5.78	0.37	0.64	0.74
19	522111	104606	5.41	5.68	5.78	0.37	0.64	0.74
20	522090	104613	5.41	5.69	5.78	0.26	0.54	0.63
21	522097	104613	5.41	5.69	5.78	0.27	0.54	0.64
22	522104	104613	5.41	5.68	5.78	0.37	0.64	0.74
23	522111	104613	5.41	5.68	5.78	0.37	0.64	0.74
24	522090	104620	5.41	5.69	5.78	0.42	0.70	0.79

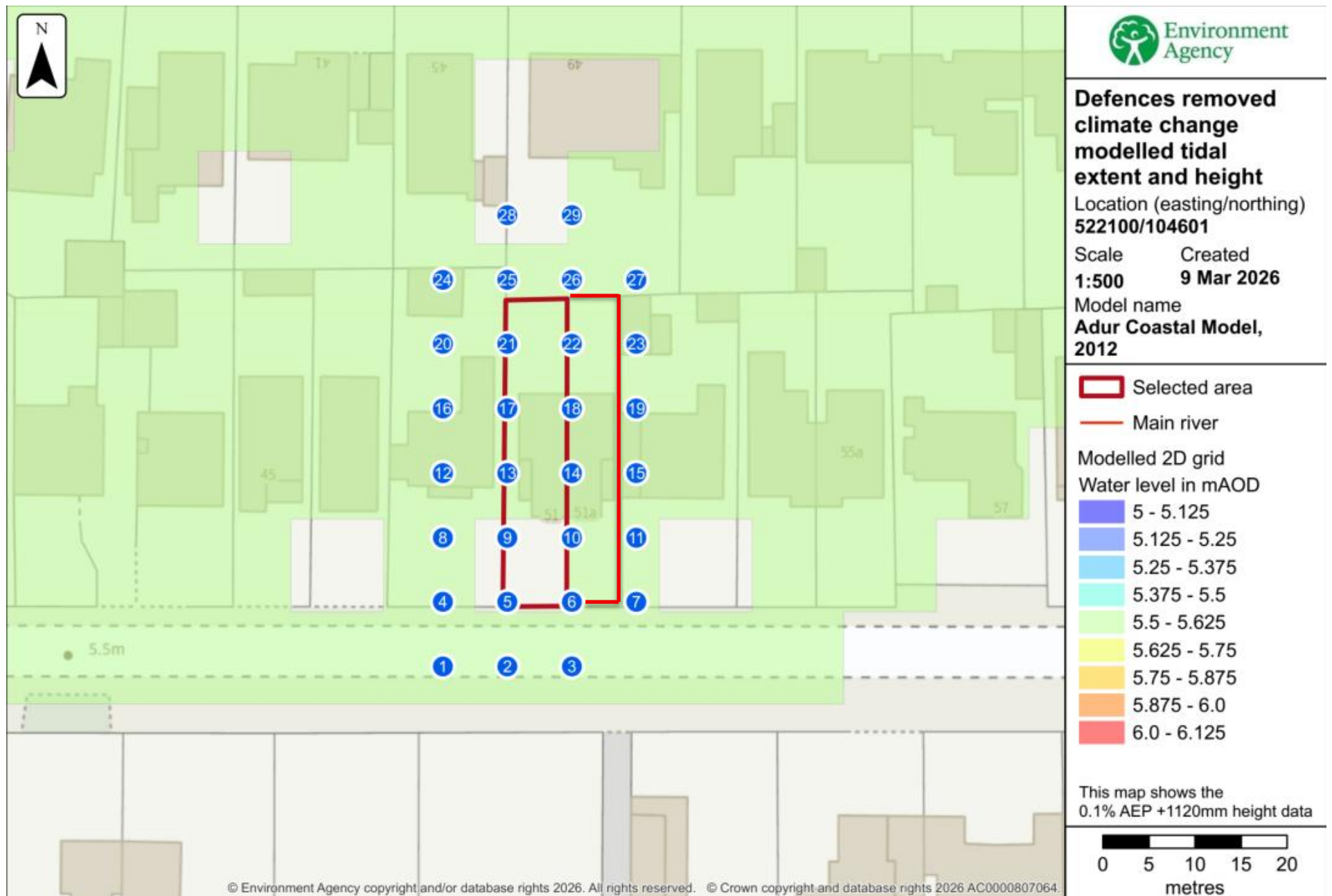
Label	Easting	Northing	0.5% AEP (+490mm)	0.5% AEP (+1120mm)	0.1% AEP (+1120mm)	0.5% AEP (+490mm)	0.5% AEP (+1120mm)	0.1% AEP (+1120mm)
			Height	Height	Height	Depth	Depth	Depth
25	522097	104620	5.41	5.69	5.78	0.48	0.75	0.85
26	522104	104620	5.41	5.68	5.77	0.40	0.67	0.76
27	522111	104620	5.41	5.68	5.77	0.40	0.67	0.76
28	522097	104627	NoData	5.68	5.77	NoData	0.30	0.39
29	522104	104627	NoData	5.68	5.77	NoData	0.46	0.55
Max value in selected area:			5.41	5.70	5.82	0.27	0.54	0.64

Data in this table comes from the Adur Coastal Model, 2012 model. Height values are shown in mAOD, and depth values are shown in metres.

Any blank cells show where a particular scenario has not been modelled for this location.

Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.

'Max value in selected area' is the deepest depth or highest height at any location within your drawn boundary.



Sample point data

Defences removed climate change

Label	Easting	Northing	0.5% AEP (+1120mm)	0.1% AEP (+1120mm)	0.5% AEP (+1120mm)	0.1% AEP (+1120mm)
			Height	Height	Depth	Depth
1	522090	104578	NoData	5.54	NoData	0.03
2	522097	104578	NoData	5.55	NoData	0.04
3	522104	104578	NoData	5.58	NoData	0.05
4	522090	104585	NoData	5.58	NoData	0.09
5	522097	104585	NoData	NoData	NoData	NoData
6	522104	104585	NoData	5.58	NoData	0.14
7	522111	104585	NoData	5.58	NoData	0.14
8	522090	104592	NoData	5.58	NoData	0.09
9	522097	104592	NoData	NoData	NoData	NoData
10	522104	104592	NoData	5.58	NoData	0.14
11	522111	104592	NoData	5.58	NoData	0.14
12	522090	104599	5.26	5.58	0.01	0.27

Label	Easting	Northing	0.5% AEP (+1120mm)	0.1% AEP (+1120mm)	0.5% AEP (+1120mm)	0.1% AEP (+1120mm)
			Height	Height	Depth	Depth
13	522097	104599	NoData	5.58	NoData	0.30
14	522104	104599	5.26	5.58	0.07	0.39
15	522111	104599	5.26	5.58	0.07	0.39
16	522090	104606	5.26	5.58	0.11	0.43
17	522097	104606	5.26	5.58	0.12	0.43
18	522104	104606	5.26	5.58	0.22	0.54
19	522111	104606	5.26	5.58	0.22	0.54
20	522090	104613	5.26	5.58	0.11	0.43
21	522097	104613	5.26	5.58	0.12	0.43
22	522104	104613	5.26	5.58	0.22	0.54
23	522111	104613	5.26	5.58	0.22	0.54
24	522090	104620	5.26	5.58	0.27	0.59

Label	Easting	Northing	0.5% AEP (+1120mm)	0.1% AEP (+1120mm)	0.5% AEP (+1120mm)	0.1% AEP (+1120mm)
			Height	Height	Depth	Depth
25	522097	104620	5.26	5.58	0.33	0.65
26	522104	104620	5.26	5.58	0.25	0.57
27	522111	104620	5.26	5.58	0.25	0.57
28	522097	104627	NoData	NoData	NoData	NoData
29	522104	104627	NoData	5.58	NoData	0.36
Max value in selected area:			5.26	5.58	0.12	0.44

Data in this table comes from the Adur Coastal Model, 2012 model. Height values are shown in mAOD, and depth values are shown in metres. Any blank cells show where a particular scenario has not been modelled for this location. Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.

'Max value in selected area' is the deepest depth or highest height at any location within your drawn boundary.