



Flood Risk Assessment

Seafarers Walk Change of Use Application

2-4 Seafarers Walk, Hayling Island, PO11 9TA.

May 2024

Document Control Sheet

Document Title: Flood Risk Assessment

Document Reference: S4593-C-01-B

Project Name: Seafarers Walk Change of Use Application

Project Number: S4593

Client: RDHL SPV4 Ltd

Author: Robbie Lash

Approved: Andrew Webb

Issue Record

Revision	Date	Status	Comment
A	21/05/24	Planning	Issued for Planning
B	23/08/24	Planning	Revised to include Product 4 information.

Contents

1.0	Background.....	5
1.1	Brief.....	5
1.2	Report Scope	6
2.0	Relevant Policy, Legislation and Guidance.....	7
2.1	Potential Flood Mechanisms.....	7
2.2	National Planning Policy Framework.....	7
2.3	The Flood and Water Management Act 2010.....	7
2.4	Hampshire County Council Preliminary Flood Risk Assessment	8
2.5	Hampshire County Council Local Flood Risk Management Strategy.....	8
2.6	North Solent Shoreline Management Plan.....	8
3.0	Site and Surroundings	9
3.1	Site Location and Description	9
3.2	Topography	9
3.3	Hydrology.....	9
3.4	Drainage.....	9
3.5	Water Mains	9
3.6	Flood Defence	9
3.7	Reservoir	9
3.8	Geology and Hydrology.....	10
4.0	Current Site Flood Classification.....	11
4.1	Flood Risk and Probability	11
4.2	Flood Risk Vulnerability and Flood Zone Compatibility	12
4.3	Sequential Test	12
4.4	Flood Assessment.....	12
4.5	Tidal Flooding.....	13
4.6	River (Fluvial) Flooding.....	14
4.7	Groundwater Flooding	15
4.8	Overland/Surface Water (Pluvial) Flooding	15
4.9	Sewer Flooding	16
4.10	Canals and Artificial Waterways	16
4.11	Reservoirs and Lakes.....	16



4.12	Water Mains	16
4.13	Climate Change.....	17
5.0	Flood Protection and Alleviation.....	19
5.1	Flood Mitigation Measures.....	19
5.2	Flood Resilience Measures.....	19
6.0	Site Evacuation	20
6.1	Flood Warnings.....	20
7.1	Site Reoccupation	21
7.2	Review	21
7.3	Briefing, Training & Exercising.....	21
8.0	Conclusion and Recommendations.....	22
8.1	Conclusion	22
8.2	Recommendations	23
Appendix A – Environment Agency Flood Map for Planning.....		24
Appendix B – Existing Site Survey		25

1.0 Background

1.1 Brief

BDN Ltd. has been commissioned by RDHL SPV4 Ltd to undertake a Level 1 Flood Risk Assessment (FRA) for the change of use application of the existing property. The site is centred around Ordnance Survey Grid Ref: SZ 74634 98385 with the nearest post code of PO11 9TA. This site-specific FRA has been completed to support the planning application. The site location plan is presented in Figure 1.1.

Developments have the potential to be at risk of a range of flooding mechanisms and increase the potential flood risk to the development and the surrounding area. As such flood risk is assessed with respect to risk to human life, damage to properties and the effect the development may have on surrounding watercourses, bodies of water and drainage systems. This Level 1 FRA has been prepared to examine the possible sources of flooding, within the context of the National Planning Policy Framework (NPPF) and Technical Guidance.

Consultation will be undertaken with the Environment Agency (EA), Southern Water (SW) and Hampshire County Council (HCC) as part of the planning application. Data has also been gathered from a number of other sources including National Soil Research Institute (NSRI), local ground investigations, aerial photographs, Ordnance Survey (OS), evidence obtained from the EA online tools and anecdotal evidence.

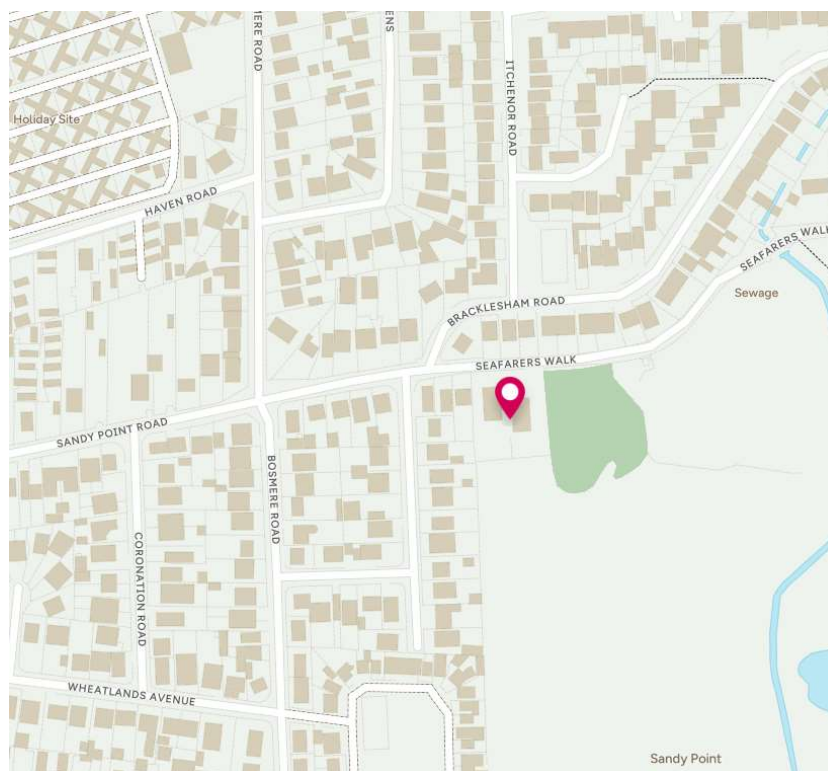


Figure 1.1 Ordnance Survey Map – Site Location

1.2 Report Scope

The Objectives of this report are as follows: The Level 1 FRA is based on readily available existing information, including reference to the Hampshire County Council Strategic Flood Risk Assessment (SFRA) to confirm the extent of flood risk at the site. The report includes the review of site information and likely extent of any flood risk on the site; identification of whether there are any flooding or surface water management issues related to the development that may warrant further consideration; identification and scoping of other flood risks as required i.e. groundwater flooding; and determining whether further assessment is required i.e. a Level 2 FRA.

An FRA should consider a range of flooding mechanisms to satisfy the following three key objectives:

- To assess flood risk to the proposed development and to demonstrate whether any residual risk to the development and its user would be acceptable.
- To assess the potential impact of the proposed development on flood risk elsewhere and to demonstrate that the development would not increase flood risk elsewhere; and
- To satisfy the requirements of national planning policy.

Flood risk should be considered alongside other spatial planning matters such as transport, housing, economic growth, natural resources, regeneration, biodiversity, the historic environment, and the management of other hazards. Policies should recognize the positive contribution that avoidance and management of flood risk can make to the development of sustainable communities, including improving local amenities and better overall quality of life.

An FRA should be carried out to an appropriate degree at all levels of the planning process. It should assess the risks of all forms of flooding to and from the development, considering climate change, and should inform the application of the sequential approach if applicable.

CIRIA C624 “Development and Flood Risk – Guidance for the Construction Industry” recommend a phase approach with three levels of assessment as define below:

- Level 1: Screening Study to identify whether there are any flooding or surface water management issues related to a development site that may warrant further consideration. The screening study will ascertain whether a Level 2 or 3 FRA is required.
- Level 2: Scoping Study to be undertaken if the Level 1 FRA indicates that the site may lie within an area that is at risk of flooding, or that the site may increase flood risk due to increase run-off. This study should confirm the sources of flooding which may affect the site.
- Level 3: Detailed Study to be undertaken if the Level 2 study concludes that the quantitative analysis is required to assess the flood risk related to the development site.

2.0 Relevant Policy, Legislation and Guidance

2.1 Potential Flood Mechanisms

The Level 1 FRA has been undertaken using the following legislation and guidance:

- National Planning Policy Framework
- Flood and Water Management Act
- Hampshire County Council Preliminary Flood Risk Assessment
- Hampshire County Council Local Flood Risk Management Strategy
- North Solent Shoreline Management Plan

2.2 National Planning Policy Framework

The NPPF published in December 2023, is a key part of the government's reform to make the planning system less complex and more accessible; to protect the environment and to promote sustainable growth.

In addition, the Technical Guidance to the NPPF published by the Department for Communities and Local Government has also been reviewed in relation to flood risk. This document provides additional guidance to ensure the effective implementation of the planning policy set out in the NPPF on development in areas at risk of flooding.

The NPPF aims to prevent inappropriate development in areas at risk of flooding and to ensure that, where development is necessary in areas at risk of flooding, it is safe without increasing flood risk elsewhere. Local Authorities should only consider development in flood risk areas appropriate where informed by a site-specific FRA, based upon the EA's Standing Advice on flood risk.

The NPPF requires that a site-specific FRA is required for proposals of 1 hectare or greater in Flood Zone 1; all proposals for new development (including minor development and change of use) in Flood Zones 2 and 3, or in an area within Flood Zone 1 which has critical drainage problems (as notified to the local planning authority by the EA); and where proposed development or a change of use to a more vulnerable class may be subject to other sources of flooding.

This means that the FRA should identify and assess the risks of all forms of flooding to and from the development and demonstrate how flood risks will be managed so that the development remains safe throughout its lifetime, taking climate change into account.

Development should be directed as far as practicable towards Flood Zone 1 areas (Low Probability (<0.1% Annual Exceedance Probability (AEP) of fluvial/ sea flooding)) to avoid fluvial flood risks wherever this is possible. For development proposed in Flood Zone 1, if the development area is greater than 1 hectare an FRA will still be required to address design issues related to the control of surface water runoff and climate change, as well as considering any other potential sources of flood risk for the development site.

2.3 The Flood and Water Management Act 2010

The Flood and Water Management Act 2010 determined the need for flood risk to be managed within the framework of National Strategies for England and Wales and within Local Strategies for each Local Flood Authority Area. The national strategy for England sets out the principles for flood risk Management and which organisations are responsible for implementation.

In accordance with the national strategy for England, Lead Local Flood Authorities (LLFAs) have been allocated responsibility for developing independent Local Flood Risk Management Strategy's (LFRMS's) to address sources of local flooding. Each LFRMS identifies which local organisation is accountable for managing flood risk and establishes partnership agreements, as well as undertaking an assessment of flood risk and developing plans / actions, for tackling these risks.

2.4 Hampshire County Council Preliminary Flood Risk Assessment

This document provides an overview of flood risk with our boundaries. It aims to provide general guidance to planning officers, developers, and other interested parties about areas where potential flood risk is an issue.

2.5 Hampshire County Council Local Flood Risk Management Strategy

The high-level strategic document outlines the responsibilities of the Risk Management Authorities in Hampshire and how they are working in partnership to coordinate local flood risk management. This covers everything from engaging with communities and preparing for floods, responding to flood events, collaborating on flood risk studies, and investing in flood improvements.

2.6 North Solent Shoreline Management Plan

The Catchment Flood Management Plan (CFMP) is a plan produced by the EA to aid the understanding of the scale and extent of flooding now and in the future and set policies for managing flood risk within the catchment. The CFMP's aim is to promote more sustainable approaches to managing flood risk.

The CFMP summarises the need to manage future flood risk with four main messages:

- Flood defences cannot be built to protect everything.
- Climate change will be the major cause of increased flood risk in the future.
- The floodplain is our most important asset in managing flood risk; and
- Development and urban regeneration provide a crucial opportunity to manage the risk.

3.0 Site and Surroundings

3.1 Site Location and Description

The site comprises of 2 No. existing dwellings with residential properties located to the north and west of the site. To the eastern and southern boundaries scrubland separates the site from the River Solent.

3.2 Topography

A topographical survey has been completed for the site, refer to appendix B.

Finished Floor Levels are constructed approximately 400mm above the ground levels with ramped access provided to each dwelling.

3.3 Hydrology

The Ordnance Survey and EA maps show that the site is situated within the catchment of the Solent, which is located approximately 350m to the southern boundary.

An un-named watercourses/drainage ditch is located within the vicinity of the site assumed to drain to the River Solent.

3.4 Drainage

At the time of writing the adopted sewer plans are unavailable, the site is served by a private drainage system. This system is assumed to discharge into an existing Southern Water (SW) system.

3.5 Water Mains

At the time of writing the adopted supply plans are unavailable, the site is assumed to be served by SW with a private supply into the site.

3.6 Flood Defence

The site is not understood to benefit directly from any flood defences.

Chichester Harbour uses hard defences to protect the coastline within the Harbour including concrete walls, gabions, rock armour, revetments, timber planks and groynes. All of these have been constructed to reduce erosion and the risk of the land behind flooding. The nearest flood defence structures are circa 500m to the north of the site boundary.

3.7 Reservoir

There are no reservoirs or bodies of water within 1km of the site boundary.

3.8 Geology and Hydrology

A site investigation has not been completed for the site; the following sources have therefore been reviewed to provide the anticipated ground conditions:

- BGS 1:50,000 scale map
- BGS GeoIndex.

Summary of Anticipated Geology Features/Sources	Description/Remarks
Bedrock Geology	Firm to very stiff sometimes sandy CLAY or SILT. Effectively impermeable to low permeability flow dominantly through fissures. Includes calcareous types. Considered to be over consolidated.
Superficial (drift) Geology	Loose to dense fine to coarse-grained SAND or SAND and GRAVEL with some cobbles. Sandy clay and silt, sometimes laminated, occur locally, especially within terrace deposits which may also contain peat. High to very high permeability flow is through matrix. Includes glaciofluvial sand and gravel, river terrace deposits, blown sand, coarse marine, coarse alluvium, head, and talus deposits.

4.0 Current Site Flood Classification

4.1 Flood Risk and Probability

The risk framework outlined in the SFRA defines the flood risk using the categories in Table 4.1. The EA flood map defines the geographical extent of fluvial flooding for Flood Zones 1, 2, 3a and 3b.

Flood Zone	Definition	Probability
Flood Zone 1	At risk from flood event greater than the 1 in 1000-year event (greater than 0.1% annual probability).	Low Probability
Flood Zone 2	At risk from flood event between the 1 in 100 and 1 in 1000-year event (between 1% and 0.1% annual probability)	Medium Probability
Flood Zone 3a	At risk from a flood event less than or equal to the 1 in 100-year event.	High Probability
Flood Zone 3b	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 otherwise defined by the Local Planning Authority. This zone also comprises land where water must flow or be stored in times of a flood.	Functional Floodplain

Table 4.1 Fluvial Flood Zone Definition

Flooding is a natural process that can present a range of different risks depending on its form. Flood practitioners and professionals define the risks presented by flooding according to an Annual Exceedance Probability (AEP), or as having a 'return period.'

Flood Risk includes the statistical probability of an event occurring and the scale of the potential consequences. Flood risk is estimated from historical data and expressed in terms of the expected frequency of a flood of a given magnitude. The 10-year, 50 year and the 100-year floods have a 10%, 2%, and 1% chance of occurring in any given year, respectively. However, over a longer period the probability of flooding is greater.

For example, for the 100-year return period flood:

- There is a 1% chance of the 100-year flood occurring or being exceeded in any single year.
- A 26% chance of it occurring or being exceeded in a 30-year period; and
- A 51% chance of it occurring or being exceeded in a 70-year period.

Table 4.2 below provides a summary of the relevant AEP and corresponding return period events of a particular severity.

AEP	Definition
100%	1 in 1 Year
10%	1 in 10 Years
2%	1 in 50 Years
1%	1 in 100 Years
0.5%	1 in 200 Years
0.1%	1 in 1000 Years

Table 4.2 Definition of AEP and Return Period Flood Events

4.2 Flood Risk Vulnerability and Flood Zone Compatibility

In terms of flood risk vulnerability, the proposed redevelopment is classified as “More Vulnerable” in the NPPF and SFRA which includes residential dwellings.

The SFRA states that the suitability of all sites in flood risk terms will be subject to ratification by the EA, a detailed site-specific FRA being prepared to support any planning application and demonstration that surface water runoff from the development will pose no detrimental impact to off-site areas.

The proposed site is considered as More Vulnerable Infrastructure and as such is suitable for Flood Zones 1 and 2 with an exception test required for developments in Flood Zone 3. The EA mapping service has been used to confirm that the site is located within Flood Zone 3.

Flood Zone 3 is split into two categories; 3a is a high flood risk with a chance of flooding between once every 30 and 100 years (1 – 3.3%), 3b is a functional floodplain where water must flow or be stored in times of flood. The site is not considered be part of the flood plain by the HCC PFRA and therefore the site is within Flood Zone 3a.

4.3 Sequential Test

The Sequential test is the process that Local Authorities use to give priority in allocating and permitting sites for development, when drawing up or revising policies or in considering planning applications. In the case of flooding, the risk based Sequential test is meant to steer new development towards those sites with little or no risk of flooding (i.e. the lowest probability of flooding, Flood Zone 1) in preference to areas of higher risk.

As the application is for a change of use the development is deemed as appropriate in Flood Zone 3a.

4.4 Flood Assessment

Potential sources of flooding and associated mechanisms for review are as follows:

- Tidal Sources - Potential flooding resulting from tidal sources.
- River (Fluvial and Tidal) Sources - Potential flooding resulting from watercourses near to the site or from the sea.
- Groundwater Flooding- Potential flooding because of rising groundwater levels.
- Overland/Surface water (Pluvial) Flooding - Potential flooding because of surface water flows from adjacent land.
- Sewers and Drains - Potential flooding resulting from sewers or drains.
- Canals and Artificial Waterways - Potential flooding resulting from failure or overtopping canal networks.
- Reservoir/Lake Flooding - Potential flooding resulting from overtopping or bursting of reservoirs or lakes.
- Infrastructure - Potential flooding because of failed or burst water mains; and
- Climate Change – Potential rise in sea levels and estimated peak flows of watercourse.

4.5 Tidal Flooding

Coastal flooding occurs when sea levels rise above the normal tidal range. This can happen anywhere around the coast, including the estuaries. Tidal flooding is a result of one or a combination of high tides, storm or tidal surges, wave action and high sea levels combining with high river flows.

The site is located approximately 350m from the River Solent. Based on the EA flood map there is a low risk of tidal flooding on the site, as shown in Figure 4.6. The site currently benefits from a raised finished floor level relative to the surrounding ground levels of circa 400mm.



Figure 4.5 Environment Agency – Tidal Flood Map

Product 4 information has been acquired which gives more detailed flood data for flood zones 2 and 3. Through use of the Hayling Island 2018 – East Solent Model, a range of undefended and defended scenarios have been modelled both considering and discounting climate change allowances.

It can be seen from Appendix C page 18, the extents of the modelled flooding occurs at a 0.5% AEP (+320mm). Appendix C page 20 gives nodal flood levels for various positions within the site boundary.

Nodes 1,2,3,4,5,7,10,11,12,13 and 14 are located within the carpark and areas of soft landscaping, these areas are deemed less critical and have therefore been discounted.

Nodes 6,8,9 are situated within the hardstanding areas access areas of the two buildings. “NoData” responses were outputted at these locations, 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. This indicates that the property is not at risk of flooding for a 1 in 200-year tidal flood event plus climate change for the lifetime of the development.

4.6 River (Fluvial) Flooding

The proposed site is considered as More Vulnerable Infrastructure and as such is suitable for development within Flood Zones 1, 2 and 3a. The EA mapping service which is used to confirm the extent of a flood zone within the vicinity of a site shows that the site is located within Flood Zone 3a, as shown in Figure 4.6.



Figure 4.6 Environment Agency – Fluvial Flood Map

Whilst the extents of the site are within Flood Zone 3a the properties themselves are elevated above the anticipated flood levels.

The Flood Maps are based upon the approximate extent of floods with a Flood Zone 3 having a 0.5% annual probability boundary for flooding from the sea and tidal waters, and 1% annual probability boundary for flooding from rivers under present expectations, or where this is greater, the extent of the highest known flood. It should be noted that the flood map area assumes no defences and does not consider the likelihood that flood risk will be increased by climatic change. It is important to recognise that a 1% flood has a 26% probability of being equalled or exceeded at least once in 30 years (the duration of a typical mortgage) and a 49% probability of being equalled or exceeded at least once in 70 years (a typical human lifetime).

Figure 4.6 represents the best available current information on the extent of flood risk. However, it should be noted, that these maps are indicative only, and are to be used as a basis of consultation and not as the sole basis for decisions on where planning policies apply. Therefore, due to such local variability and uncertainties, it is difficult to be prescriptive about the levels of risk. It is to be recognised that there is a continuum from virtually no to high risk.

Based on the guidance within the NPPF and the sites current protections measures the site is suitably located with respect to fluvial flooding.

4.7 Groundwater Flooding

Groundwater flooding occurs during intense, long-duration rainfall events, when infiltration of rainwater into the ground raises the level of the water table until it exceeds ground levels. Groundwater flooding may take weeks or months to dissipate as groundwater flow is much slower than surface water flow and water levels thus take much longer to fall. Groundwater flooding is sporadic in time and location, but when it does occur, it usually lasts longer than surface water flooding and interferes with property and infrastructure (such as roads). Groundwater levels may also rise because of reactivating springs.

Based on the geological information available it is unlikely that the geological strata would be highly responsive to rainfall events and therefore the changes in groundwater level over time are unlikely to be significant resulting in groundwater flooding issues.

A review of the ground investigation will need to be carried out. The information available suggests that the site is not at risk from groundwater flooding.

4.8 Overland/Surface Water (Pluvial) Flooding

Pluvial and overland flow results from rainfall that fails to infiltrate the surface and travels over the ground surface. This is exacerbated by low permeable urban development or low permeability soils and geology (such as clayey soils). Overland flow is likely to occur at the base of an escarpment and low points in terrain. Local topography and built form can have a strong influence on the direction and depth of flow. The design of development down to a micro-level can influence or exacerbate this. Overland flow paths should be considered in spatial planning for urban developments. In addition, surface water flooding can be exacerbated if development increases the percentage of impervious area.

The EA flood map as shown in Figure 4.7 has identified that the existing site is classed as low risk (between 0.1% and 1% annually) of surface water flooding.

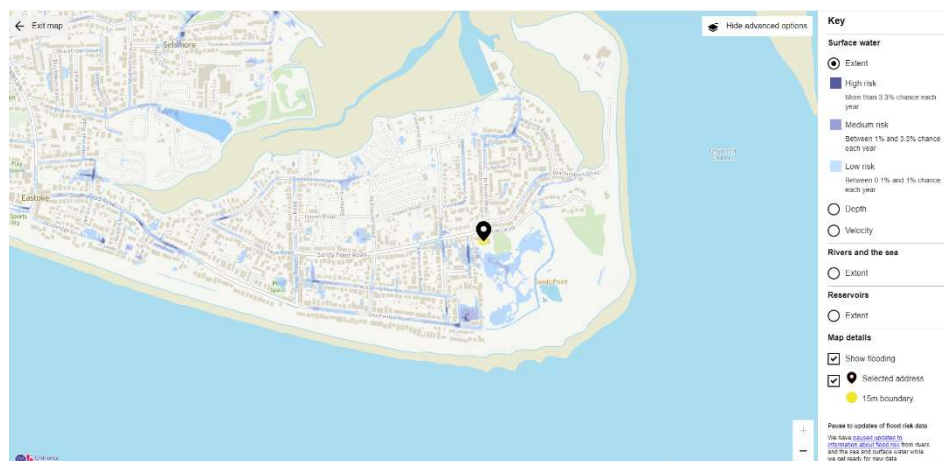


Figure 4.7 Environment Agency Pluvial Flood Map

Surface water flooding can be exacerbated if development increases the percentage of impervious area which has the potential to change the surface water flow regime for the site and the surrounding area. It is important to ensure that any surface water flows generated by the change to impermeable area are collected on site and do not pass into neighbouring land.

With the design of the surface water management of the site in line with the above principles no further consideration of this flooding mechanism is required.

4.9 Sewer Flooding

Flooding can occur when the sewerage infrastructure becomes overwhelmed by heavy rainfall (due to inadequate capacity) or blockages in drain systems (such as silt or debris accumulation). Works above or adjacent to existing sewer networks may also damage buried pipeline to the extent that it leads to flooding through damage during excavations or through damage causing blockages below ground.

There are not understood to be any flooding incidents caused by incapacity within the sewerage network affecting the site and as such no further consideration of this flooding type is required.

4.10 Canals and Artificial Waterways

Flooding from artificial sources is most likely to result from infrastructure failure an artificial watercourse or water body, i.e., canals or other water features. These systems are maintained, improved, and regularly inspected by British Waterways (canals), Southern Water (water mains) and the EA water bodies, therefore, flood risk from these sources is considered to be low.

4.11 Reservoirs and Lakes

When reservoirs and lakes flood, there can be implications beyond the immediate area of the water body. The EA has identified that there is no risk of flooding on the site on the EA's online flood map, see Figure 4.11.

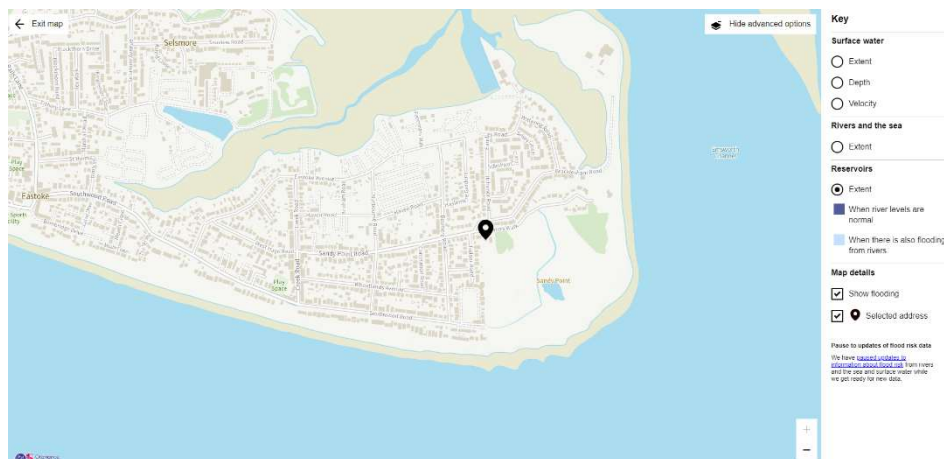


Figure 4.11 Environment Agency Reservoir Flood Map

4.12 Water Mains

Based on the site topography and pipe locations, the site is not assessed to be at risk from flooding from the existing water mains and no further assessment of flood risk, or management of flood risk from this source is required for the development.

Consideration should be given to the FFLs to ensure floor levels of buildings are raised above proposed car parks to protect properties from potential flooding caused by burst water mains as part of the development's service infrastructure.

4.13 Climate Change

Climate change will be the major cause of increased flood risk in the future. The CFMP suggests that for climate change the EA tested the following changes up to 2110:

- Further to review of paragraphs 30 to 32 of the Flood Risk and Coastal Change section of the planning guidance, it is understood that to adequately take climate change into account for the site, it should be considered to be within the upper end allowance category for Table 1 peak river flow allowances by river basin district (use 1961 to 1990 baseline). As such a 40% allowance for climate change should be allowed.
- A total sea level rise of 1050 mm by the year 2110. This will increase the probability of tidal flooding and increase the length of time that watercourses will not be able to flow freely to the sea at high tide (tide-locked).
- Therefore, climate change was shown to have a significant impact on flood risk.

The Analysis of UK Climate Projections 2018 (UKCP18) found that:

- There has been an increase in annual average rainfall over the UK, especially over Scotland where the most recent decade (2008–2017) has been on average 11% wetter than 1961–1990 and 4% wetter than 1981–2010.
- In recent decades there has been an increase in annual average rainfall over the UK, the most recent decade (2008–2017) has been on average 11% wetter than 1961–1990 and 4% wetter than 1981–2010.

It has been predicted that the UK's coastal flood risk will increase under all the emission scenarios used in UKCP18, because of mean sea level rise. This will result in an increase in the frequency and magnitude of extreme water levels around the UK coastline. This increase in coastal flood risk combined with an increase in precipitation in winter is likely to result in more frequent flooding in various parts of the UK.

The impact of climate change will increase the risk of flooding from several of the mechanisms considered, therefore it is recommended that the resident of the property sign up to the EA flood warning service and consider appropriate protection measures. It is not anticipated that an evacuation plan for the site is required as the normal access locations will be available.

Technical Guidance to the NPPF and the PPG include for an increase in the peak rainfall intensity of up to 30%, as well as increase in peak flows in watercourses of up to 20% within 100 years. This will significantly affect smaller urban catchments, leading to rapid runoff into and subsequent increased flows within watercourses, surface water flooding, surcharging of gullies, drains and sewer flooding.

CFMPs have also considered flood risk for the next 50-100 years and have considered the flood risk drivers of climate change, urban development, and changes in land use.

Catchment models and the Modelling and Decision Support Framework (MDSF) software were used in the CFMP to test sensitivity to the flood risk drivers across the catchments in the study area.

The location of future urban developments and flood defences within a catchment can heavily influence flood risk in the area and has the potential to further increase flood risk at areas downstream of such developments. Impacts include the lowering of the SoP offered by flood defences and the carrying capacity of culverts, drains, sewers and watercourse channels. This potentially leads to areas being at risk of flooding that were previously not at risk and highlights the increasing conflicts and pressures that are emerging between climate change scenarios and future development aspirations.

The NPPF sets out important objectives to tackle climate change, sea level rise and avoid flood risk. The purpose of design policies should be to ensure that developments are sustainable, durable, and adaptable to natural hazards such as flooding. Following this guidance, it should be possible to mitigate against increased flood risk through incorporating 'flood proofing' measures such as raised finished

floor levels into the development design, and/or development of compensatory storage and flood storage basins. The Adaptation Strategies for Climate Change in the Urban Environment (ASCCUE) project is a study undertaken collaboratively by the University of Manchester, The University of Cardiff, University of Southampton, and Oxford Brooks University. One of the aspects examined was surface water runoff during extreme rainfall events. With an increase in development, there comes an increase in the number of impermeable areas thus leading to increased runoff during storm events.

5.0 Flood Protection and Alleviation

5.1 Flood Mitigation Measures

It is proposed to place the developed building on the Environment Agency's emergency flood line which would advise occupants of potential flood events. The site occupiers will draft a flood procedure plan to ensure that all visitors are aware of the evacuation plan / safe egress and refuge routes should flooding occur.

The proposed scheme will not change the operational function of the Solent.

5.2 Flood Resilience Measures

The EA recommends that all new buildings offer some sort of flood resilience measures into the ground floor construction. As the application only relates to a change of use there is limited opportunity to provide flood resilience measures to the properties. Therefore, it is considered that the existing FFL is set to a suitable elevation.

6.0 Site Evacuation

6.1 Flood Warnings

The residents of the property will sign up to the Environment Agency Flood Warning Scheme (<https://www.gov.uk/sign-up-for-flood-warnings>).

The following action will be taken for each flood warning:

Warning	Message	Timing	Action
 FLOOD ALERT	Flooding is possible. Be prepared.	2 hours to 2 days in advance of flooding.	Be prepared for flooding.
 FLOOD WARNING	Flooding is expected. Immediate action required.	Half an hour to 1 day in advance of flooding.	- Block doors with flood boards or sandbags and cover airbricks and other ventilation holes. - Keep a flood kit ready. - Move any critical equipment and information to a safe location
 SEVERE FLOOD WARNING	Severe flooding. Danger to life	When flooding poses a significant threat to life and different actions are required.	- Be ready should you need to evacuate. - Co-operate with the emergency services and call 999 if you are in immediate danger.
Warning Removed	No further flooding is currently expected for your area.	Issued when a flood warning is no longer in force.	- Flood water may still be around and could be contaminated. - If you have been flooded, ring your buildings and contents insurance company as soon as possible.

7.0 Post Flooding

7.1 Site Reoccupation

The site will be reoccupied once deemed safe to do so by emergency services or other agencies.

7.2 Review

This plan will be reviewed every three years and updated in accordance with alterations to flood risk assessment for the site or experience of flooding in that duration.

7.3 Briefing, Training & Exercising

All personnel who work or are residents on site should be made aware of this plan and briefed / trained accordingly. Exercising of the plan and personnel is essential.

Health & Safety records will keep listings of which personnel have been trained and exercised.

8.0 Conclusion and Recommendations

8.1 Conclusion

This Level 1 FRA concludes that:

- Tidal Flooding – there is a low residual risk of tidal flooding to the property based on the EA flood map.
- River Flooding (Fluvial) – The development is in Flood Zone 3 meaning it is at risk from a flood event less than or equal to the 1 in 100-year event. The application relates to a change of use application and will not significantly increase the number of people present within the area at risk of flooding.
- Groundwater Flooding - There is a negligible risk of groundwater flooding occurring at the site, therefore no further assessment is required with respect to groundwater flooding.
- Surface Water (Pluvial) Flooding - The Environment Agency mapping shows that the site is at negligible risk of flooding. The proposed development will change the surface water flow regime for the site and proposals will need to be developed in line with local and national guidelines.
- Sewer Flooding - There are no known previous flooding incidents from the sewers located surrounding the site and as such there is negligible risk of sewer flooding affecting the site.
- Canals and Artificial Waterways Flooding – The location of canals and artificial waterways are sufficiently far from the site and therefore unlikely to result in flood risk and as such will not require further assessment.
- Reservoirs and Lakes - The Environment Agency mapping shows that the site is at risk of flooding from reservoirs. Given the chance of reservoir failure and the significant distance of the reservoirs to the site, it is not considered that the site will be at significant risk and require further assessment.
- Water Mains – The location of water mains suggest that any flooding would be directed away from the site and does not require further assessment.
- Climate Change - The potential impacts of climate change will increase the risk of flooding and suitable protection measures should be considered.
- Mitigation Measures – The proposed measures demonstrate how flood risk will be appropriately managed now and over the development's lifetime.

8.2 Recommendations

The Level 1 FRA shows that the site is not at risk from the flooding mechanisms assessed in this document except for Tidal flooding. The proposed development is suitably located based on the proposed land use and flood zone classification subject to the resilience measures detailed within this report.

Appendix A – Environment Agency Flood Map for Planning

Flood map for planning

Your reference
S4593

Location (easting/northing)
474634/98388

Created
17 May 2024 14:41

**Your selected location is in flood zone 3
– an area with a high probability of flooding.**

This means:

- you may need to complete a flood risk assessment for development in this area
- you should ask the Environment Agency about the level of flood protection at your location and request a Flood Defence Breach Hazard Map (You can email the Environment Agency at: enquiries@environment-agency.gov.uk)
- you should follow the Environment Agency's standing advice for carrying out a flood risk assessment (find out more at www.gov.uk/guidance/flood-risk-assessment-standing-advice)

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Flood risk data is covered by the Open Government Licence which sets out the terms and conditions for using government data. <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

Use of the address and mapping data is subject to Ordnance Survey public viewing terms under Crown copyright and database rights 2022 OS 100024198. <https://flood-map-for-planning.service.gov.uk/os-terms>

Appendix B – Existing Site Survey



copyright

Copyright of this drawing is retained by HB Surveys Ltd. Any discrepancies between this drawing and any other information should be reported to HB Surveys Ltd.

Drawing Naming Convention:

Job No/Code/Dwg type/Location/Ref

Codes

G2 = Existing

Dwg Type:

B = Building
S = Section

E = Elevation
T = Topographical

Locations:

B = Basement
E = External
G = Ground
M = First
R = Roof
1 = Mezzanine

C = Ceiling Plan
F = Floor
S = Site
R = Riser
AA = Section A/A

Ref

Ref to individual dwg LD. (e.g., Revision)

Standard Abbreviations (where applicable):

Building Survey

Land Survey

ACU

AIR BRICK

BB

BOLLARD

AGU

AIR CONDITIONING UNIT

BT

BELIEBA BEACON

AP

ACCESS HATCH

CM

C.B.T COVER

AV

ACCESS PANEL

CAM

CAMERA

AV

AIR VALVE

CATV

CABLE TV COVER

BR

BEAM HT

CL

COVER LEVEL

BSL

BEAM SOFFIT LEVEL

ELEC

ELECTRIC COVER

CB

CURBROAD

EP

ELECTRIC POLE

CC

CEILING CHANGE

ER

EARTH ROAD

CH

CLEAR INTERNAL HT

FP

FLOOR FOLE

C-A

CALL TO APEX HT

PW

POOL WATER

CH

CALL TO HEAD HT

GV

GULLY

C-S

CALL TO SPRING HT

HC

HIRE HYDRANT

DB

DOOR BASE HT

ICN

INSPECTION COVER

DH

DOOR HEAD HT

IL

INVERT LEVEL

DR

DRAIN

LP

LAMP POST

DSF

DOWNSTAIR FAN

MH

MANHOLE

FA

FIRE ALARM

OHT

OVERHEAD TELECOM

F-A

FLOOR TO APEX HT

P

POST

F-C

FLOOR TO CALL HT

PM

PARKING METER

F-H

FLOOR TO HEAD HT

PI

PIPE

F-S

FLOOR TO SPRING HT

RD

RODDING EYE

GEA

GROSS EXTERNAL AREA

RS

ROAD SIGN

GIA

GROSS INTERNAL AREA

RTW

RETAINING WALL

GJ

GULLY

RWP

RUN WATER PIPE

H

HEATER

SA

SITE AREA

HW

HOT WATER TANK

SGN

SEWER

NA

NET INTERNAL AREA

SL

SOFFIT LEVEL

NTS

NOT TO SCALE

SV

SOFT VENT PIPE

RAD

RADIATOR

SWP

SOFT VENT PIPE

RE

RECESS HEAD HEIGHT

TOW

TOWER

REV

RAISED FLOOR VOID

TP

TOP OF FENCE

RFL

ROOF LIGHT

TP

TELEGRAPHY POLE

RSB

ROLLER SHUTTER

UTL

UNABLE TO LIFT

RWP

RAN WATER PIPE

VP

VENT PIPE

SV

SOFT VENT PIPE

WM

WATER METER

V

VENT

WT

WATER TAP

WA

WARDROBE

Symbols (where applicable):

Direction of sloping ceiling

2.8%

FLOOR TO STRUCTURAL CEILING HT

2.6%

FLOOR TO SUSPENDED CEILING HT

10.0%

FLOOR LEVEL RELATIVE TO DATUM

Notes:

The Survey has been completed on an arbitrary grid.
All Levels are in meters and relate to an arbitrary site datum.
Station X1 Value 10.000m

All direction arrows indicate UP unless otherwise stated.

Drainage pipe sizes (where shown) have been gauged from the surface (for safety reasons) and should be regarded as approximate only.

Visible features in the vicinity of any boundaries, as shown on this survey, may not represent the extent of legally conveyed ownership.

Whilst every effort has been made to determine wall materials, no guarantee is given. Materials should be regarded as assumed unless verified by a qualified third party.

Tree spread and height are approximate. Species should be regarded as assumed unless verified by a qualified third party.

Appendix C – Product 4: Hayling Island 2018 – East Solent Model

Flood risk assessment data

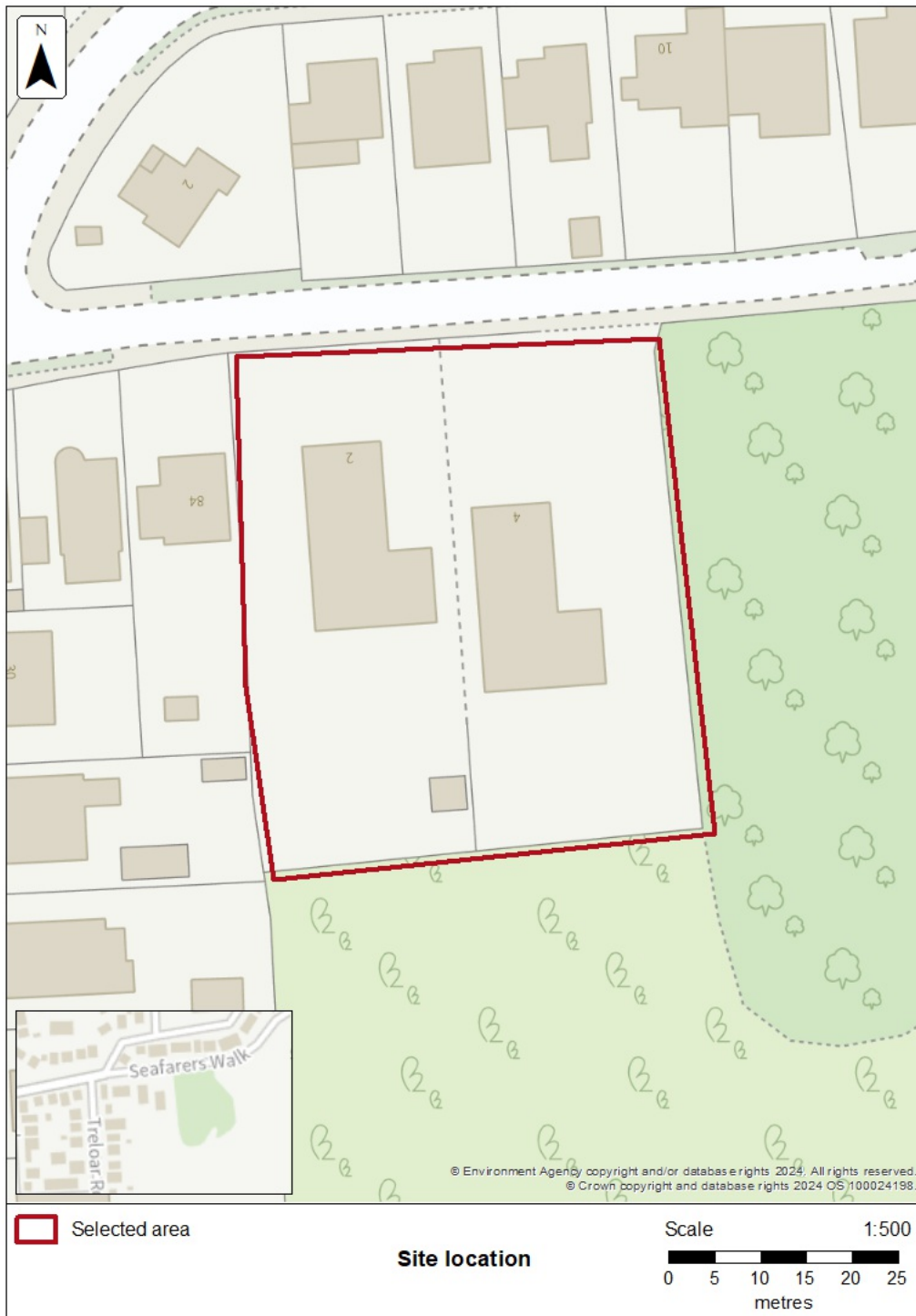
Location of site: 474633 / 98386 (shown as easting and northing coordinates)

Document created on: 12 August 2024

This information was previously known as a product 4.

Customer reference number: X7KEACDXVEU / SSD371860DP

Map showing the location that flood risk assessment data has been requested for.



How to use this information

You can use this information as part of a flood risk assessment for a planning application. To do this, you should include it in the appendix of your flood risk assessment.

We recommend that you work with a flood risk consultant to get your flood risk assessment.

Included in this document

In this document you'll find:

- how to find information about surface water and other sources of flooding
- information on the models used
- definitions for the terminology used throughout
- flood map for planning (rivers and the sea)
- historic flooding
- flood defences and attributes
- information to help you assess if there is a reduced flood risk from rivers and the sea because of defences
- modelled data
- climate change modelled data
- information about strategic flood risk assessments
- information about this data
- information about flood risk activity permits
- help and advice

Surface water and other sources of flooding

Use the [long term flood risk service](#) to find out about the risk of flooding from:

- surface water
- ordinary watercourses
- reservoirs

Or you can contact your Lead Local Flood Authority for further information.

Your Lead Local Flood Authority is Hampshire County Council.

For information about sewer flooding, contact the relevant water company for the area.

About the models used

Model name: Hayling Island 2018 - East Solent Model

Scenario(s): Defended tidal, defences removed tidal, defended climate change tidal, defences removed climate change tidal

Date: 1 July 2018

This model contains the most relevant data for your area of interest.

Terminology used

Annual exceedance probability (AEP)

This refers to the probability of a flood event occurring in any year. The probability is expressed as a percentage. For example, a large flood which is calculated to have a 1% chance of occurring in any one year, is described as 1% AEP.

Metres above ordnance datum (mAOD)

All flood levels are given in metres above ordnance datum which is defined as the mean sea level at Newlyn, Cornwall.

Flood map for planning (rivers and the sea)

Your selected location is in flood zone 3.

Flood zone 3 shows the area at risk of flooding for an undefended flood event with a:

- 0.5% or greater probability of occurring in any year for flooding from the sea
- 1% or greater probability of occurring in any year for fluvial (river) flooding

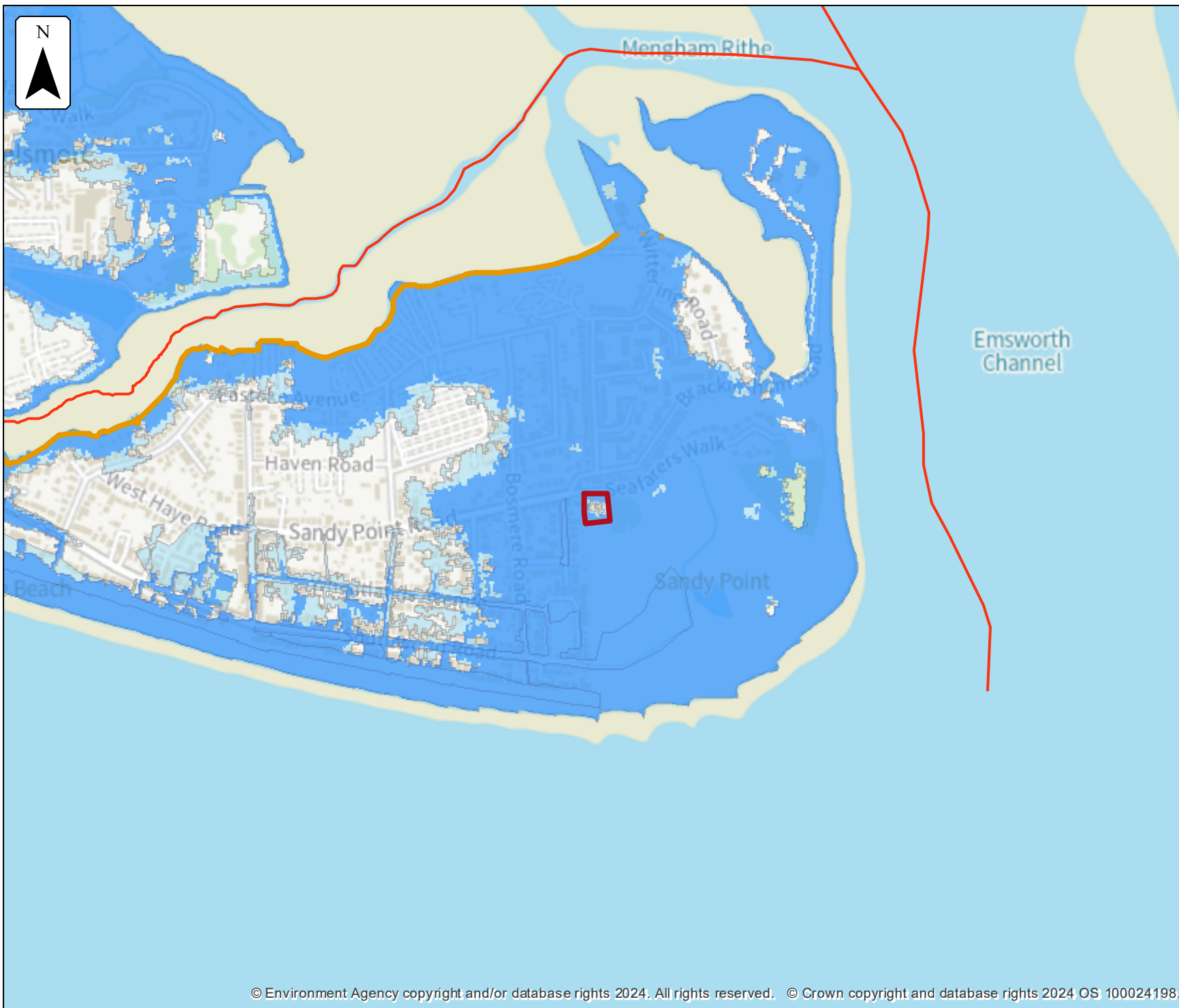
Flood zone 2 shows the area at risk of flooding for an undefended flood event with:

- between a 0.1% and 0.5% probability of occurring in any year for flooding from the sea
- between a 0.1% and 1% probability of occurring in any year for fluvial (river) flooding

It's important to remember that the flood zones on this map:

- refer to the land at risk of flooding and do not refer to individual properties
- refer to the probability of river and sea flooding, ignoring the presence of defences
- do not take into account potential impacts of climate change

The flood zones are not currently being updated. The last update was in November 2023. Some of the flood zones may have changed, however all source data is included in the models below.



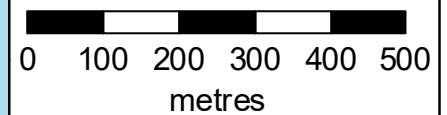
Flood map for planning

Location (easting/northing)
474633/98386

Scale
1:10,000

Created
12 Aug 2024

-  Selected area
-  Main river
-  Flood defence
-  Flood zone 3
-  Flood zone 2



Historic flooding

This map is an indicative outline of areas that have previously flooded. Remember that:

- our records are incomplete, so the information here is based on the best available data
- it is possible not all properties within this area will have flooded
- other flooding may have occurred that we do not have records for
- flooding can come from a range of different sources - we can only supply flood risk data relating to flooding from rivers or the sea

You can also contact your Lead Local Flood Authority or Internal Drainage Board to see if they have other relevant local flood information. Please note that some areas do not have an Internal Drainage Board.

Your Lead Local Flood Authority is Hampshire County Council.

[Download recorded flood outlines in GIS format](#)



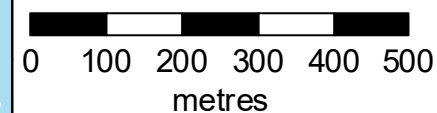
Historic flood map

Location (easting/northing)
474633/98386

Scale
1:10,000

Created
12 Aug 2024

-  Selected area
-  Main river
- Date of flood event
 -  March, 2008
 -  November, 2005
 -  December, 1981



Historic flood event data

Start date	End date	Source of flood	Cause of flood	Affects location
10 March 2008	10 March 2008	sea	other	No
3 November 2005	3 November 2005	sea	overtopping of defences	No
14 December 1981	14 December 1981	other	unknown	No

Flood defences and attributes

The flood defences map shows the location of the flood defences present.

The flood defences data table shows the type of defences, their condition and the standard of protection. It shows the height above sea level of the top of the flood defence (crest level). The height is in mAOD which is the metres above the mean sea level at Newlyn, Cornwall.

It's important to remember that flood defence data may not be updated on a regular basis. The information here is based on the best available data.

Use this information:

- to help you assess if there is a reduced flood risk for this location because of defences
- with any information in the modelled data section to find out the impact of defences on flood risk



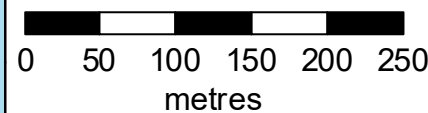
Flood defences

Location (easting/northing)
474633/98386

Scale
1:5,000

Created
12 Aug 2024

- Selected area
- Main river
- Flood defence



Flood defences data

Label	Asset ID	Asset Type	Standard of protection (years)	Current condition	Downstream actual crest level (mAOD)	Upstream actual crest level (mAOD)	Effective crest level (mAOD)
1	44203	Flood Gate					3.61
2	97750	Wall	200				3.61
3	186411	Wall	200				3.61
4	44202	Flood Gate					3.61
5	147339	Flood Gate					3.61
6	186412	Wall	200				3.61
7	186413	Wall	200				3.61
8	184349	Wall	200				3.61
9	184350	Wall	200				3.75
10	184351	Wall	200				3.61
11	769375	Wall					
12	147334	Flood Gate					3.61
13	430935	Demountable Defence			2.80	2.80	3.61
14	769366	Wall					
15	184538	Wall	200				3.75
16	769365	Wall					
17	147333	Flood Gate					3.61
18	769363	Wall					

Label	Asset ID	Asset Type	Standard of protection (years)	Current condition	Downstream actual crest level (mAOD)	Upstream actual crest level (mAOD)	Effective crest level (mAOD)
19	147332	Flood Gate					3.61
20	184539	Wall	200				3.61
21	767723	Wall					
22	147338	Flood Gate					3.61
23	184540	Wall	200				3.75
24	184541	Wall	200				3.61
25	184542	Wall	200				3.61
26	767722	Wall					
27	147337	Flood Gate					3.61
28	184543	Wall	200				3.61
29	767721	Wall					
30	147336	Flood Gate					3.61
31	767717	Wall					
32	147335	Flood Gate					3.61
33	184544	Wall	200				3.61
34	470251	Embankment					5.60
35	184545	Wall	200				3.61
36	180202	Embankment	100				3.75
37	180203	Wall	100		1.86	3.15	3.75

Label	Asset ID	Asset Type	Standard of protection (years)	Current condition	Downstream actual crest level (mAOD)	Upstream actual crest level (mAOD)	Effective crest level (mAOD)
38	180204	Wall	100				3.75
39	332751	Flood Gate					3.75
40	180386	Wall	100		3.0	3.0	3.75
41	470252	Embankment					4.60
42	180387	Embankment	100		3.93	3.44	3.75
43	470271	Embankment					3.80
44	470270	Embankment					4.50
45	180388	Wall	100		3.49	3.49	3.75
46	470260	Beach					3.80
47	470257	Beach					3.60
48	470259	Embankment					4.80
49	470258	Embankment					3.70

Any blank cells show where a particular value has not been recorded for an asset.

Modelled data

This section provides details of different scenarios we have modelled and includes the following (where available):

- outline maps showing the area at risk from flooding in different modelled scenarios
- map(s) showing the approximate water levels for the return period with the largest flood extent for a scenario and table(s) of sample points providing details of the flood risk for different return periods

Climate change

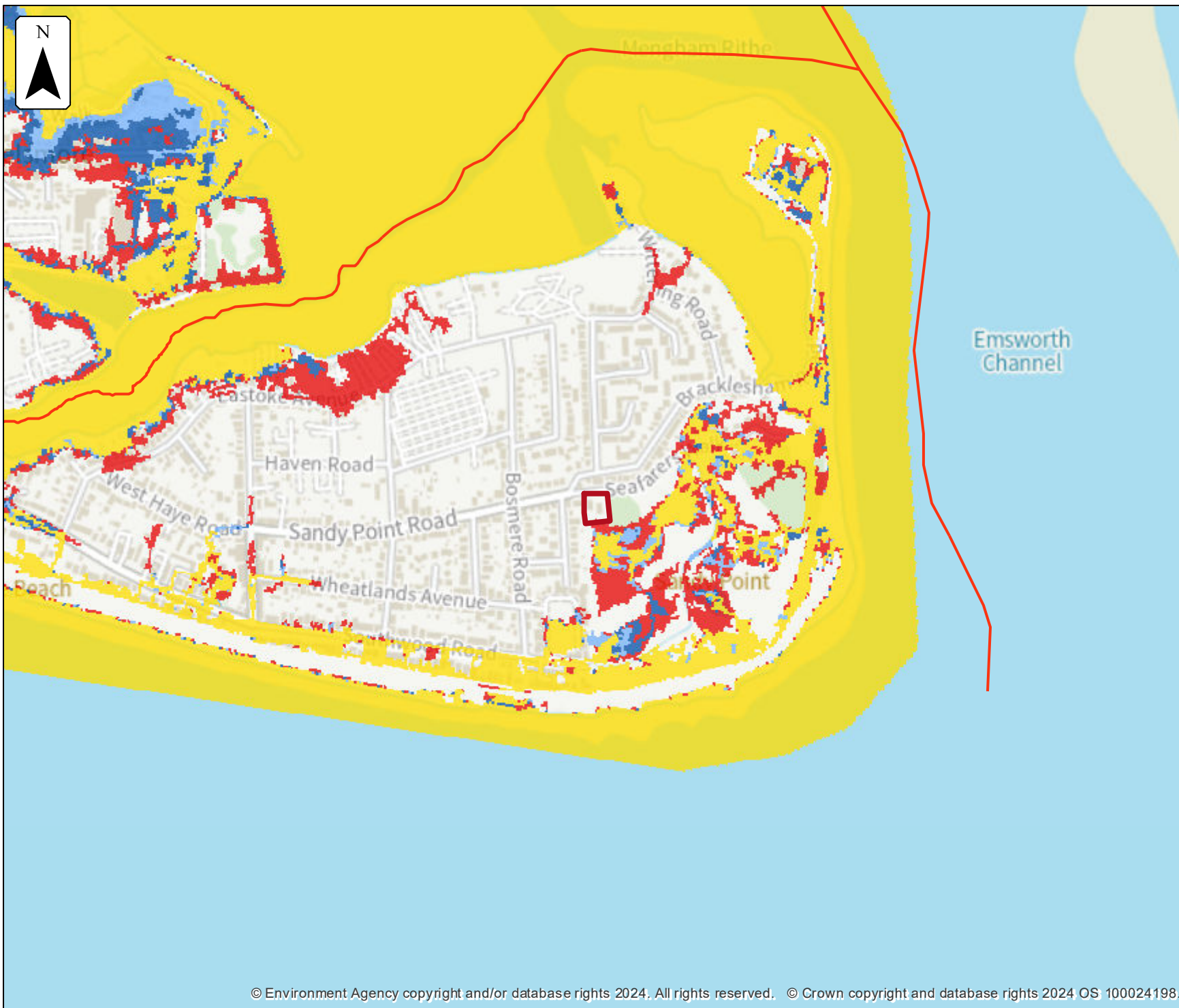
The climate change data included in the models may not include the latest [flood risk assessment climate change allowances](#). Where the new allowances are not available you will need to consider this data and factor in the new allowances to demonstrate the development will be safe from flooding.

The Environment Agency will incorporate the new allowances into future modelling studies. For now, it's your responsibility to demonstrate that new developments will be safe in flood risk terms for their lifetime.

Modelled scenarios

The following scenarios are included:

- Defended modelled tidal: risk of flooding from the sea where there are flood defences
- Defences removed modelled tidal: risk of flooding from the sea where flood defences have been removed
- Defended climate change modelled tidal: risk of flooding from the sea where there are flood defences, including estimated impact of climate change
- Defences removed climate change modelled tidal: risk of flooding from the sea where flood defences have been removed, including estimated impact of climate change



Defended modelled tidal extent

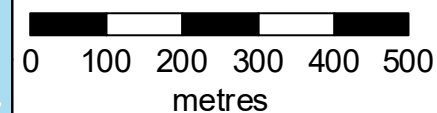
Location (easting/northing)
474633/98386

Scale Created
1:10,000 12 Aug 2024

Model name
**Hayling Island 2018
East Solent Model**

-  Selected area
-  Main river
- Modelled flood extent
 -  1.33% AEP
 -  1% AEP
 -  0.5% AEP
 -  0.1% AEP

Flood extents may not be visible where they overlap other return periods





Defences removed modelled tidal extent

Location (easting/northing)
474633/98386

Scale Created
1:10,000 12 Aug 2024

Model name
**Hayling Island 2018
East Solent Model**

 Selected area

 Main river

Modelled flood extent

 0.5% AEP

 0.1% AEP

Flood extents may not be
visible where they overlap
other return periods





Defended climate change modelled tidal extent

Location (easting/northing)
474633/98386

Scale Created
1:10,000 12 Aug 2024

Model name
**Hayling Island 2018
East Solent Model**

 Selected area

 Main river

Modelled flood extent

 0.5% AEP (+90mm)

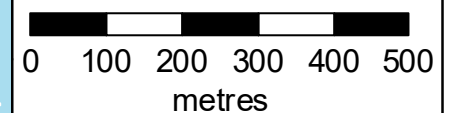
 0.5% AEP (+320mm)

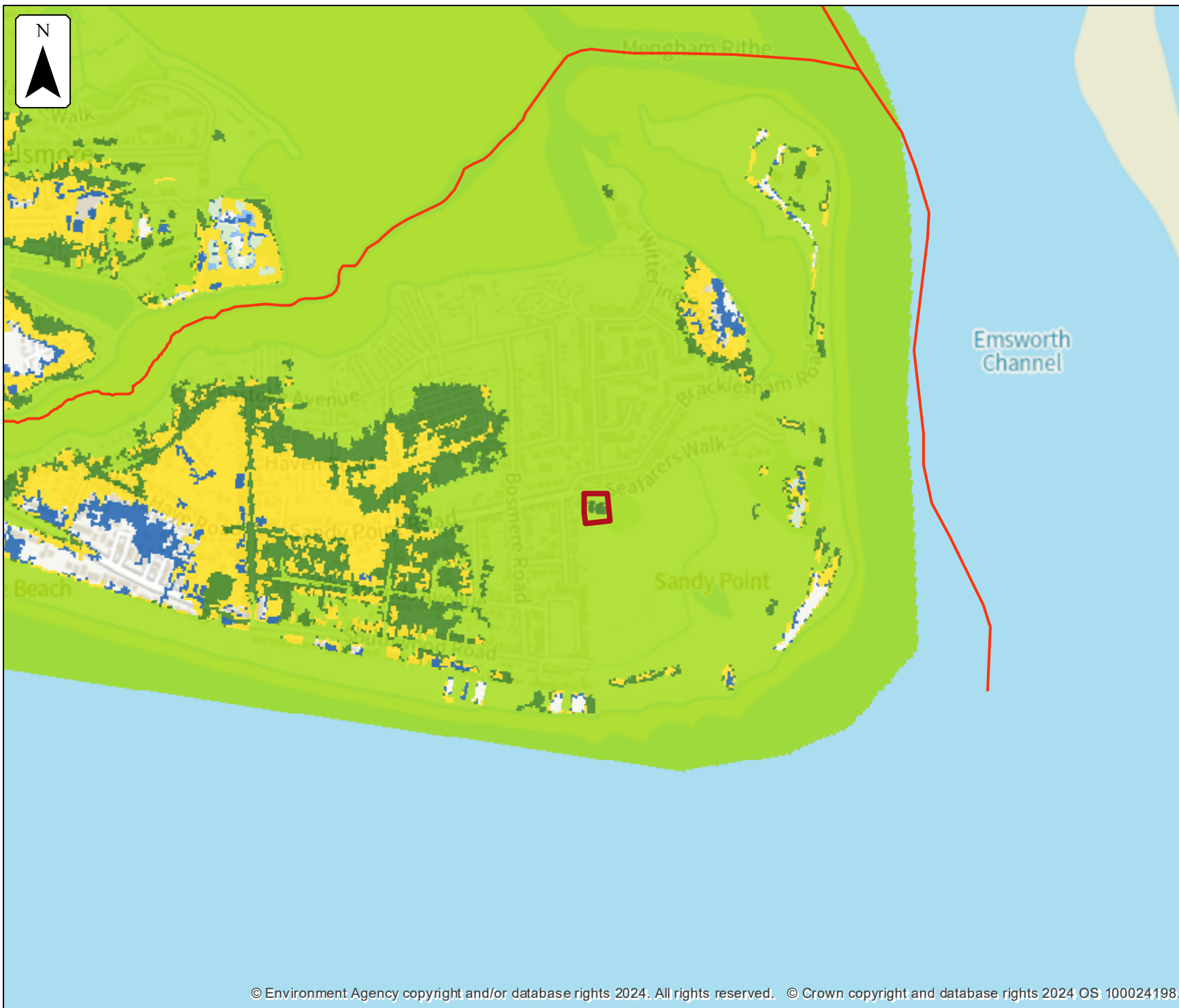
 0.5% AEP (+744mm)

 0.1% AEP (+320mm)

 0.1% AEP (+744mm)

Flood extents may not be
visible where they overlap
other return periods





Defences removed climate change modelled tidal extent

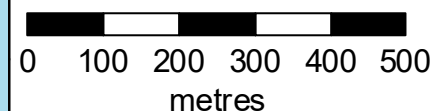
Location (easting/northing)
474633/98386

Scale Created
1:10,000 12 Aug 2024

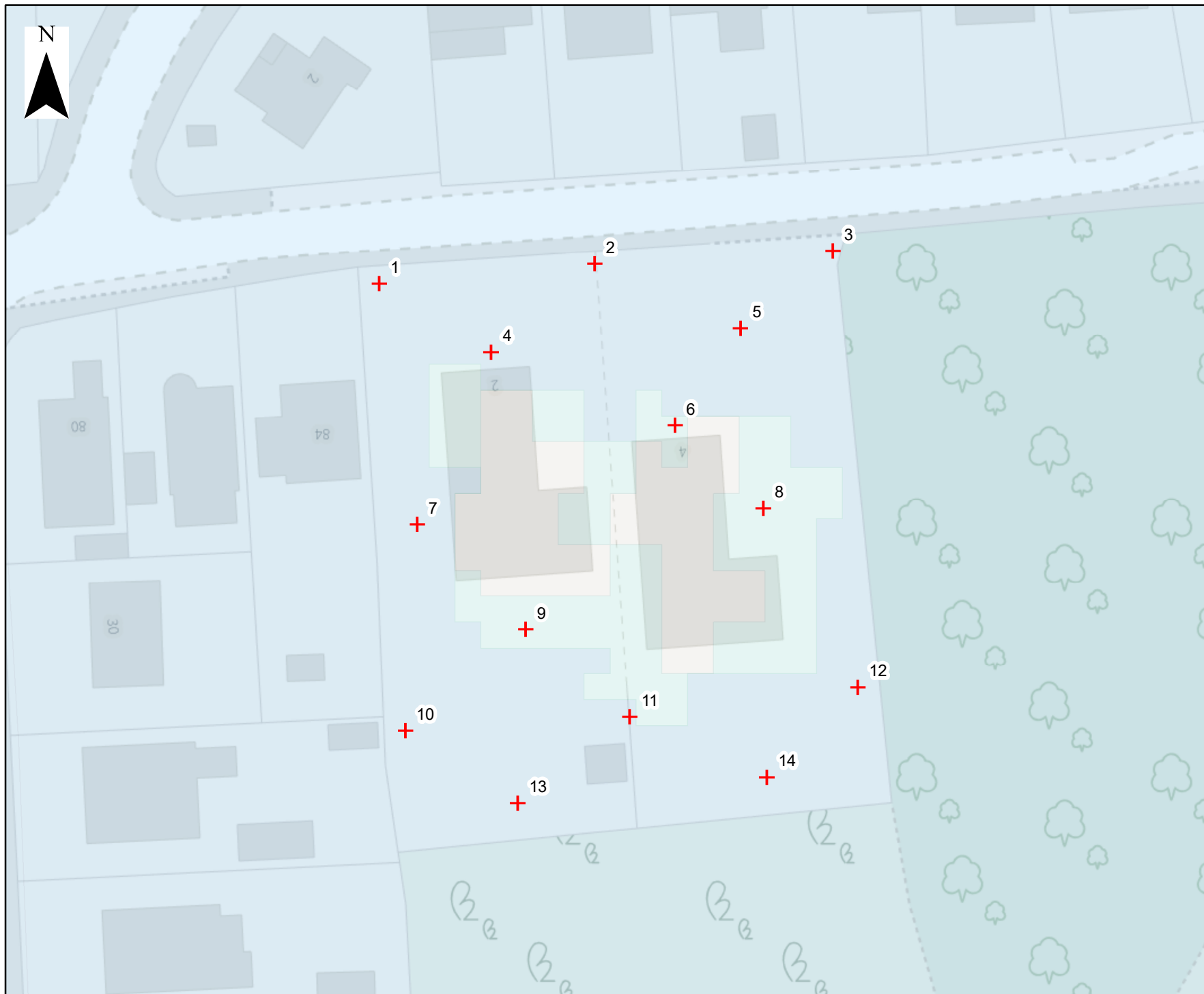
Model name
**Hayling Island 2018
East Solent Model**

- Selected area
- Main river
- Modelled flood extent
 - 0.5% AEP (+90mm)
 - 0.5% AEP (+320mm)
 - 0.5% AEP (+744mm)
 - 0.1% AEP (+320mm)
 - 0.1% AEP (+744mm)

Flood extents may not be
visible where they overlap
other return periods



2018 East Solent Coastal Model - Flood Levels Centred on: SZ7463398390



Flood Levels Map

Location (easting/northing)
474635/98386

Scale

1:500

Created

13th August 2024

Legend

Location Points

flood_zone_3

flood_zone_2

Meters
0 2 4 8 12 16

Water Depths & Levels for SZ7463398390

Point	Water Depth (Metres)		Water Surface Level (mAOD*)		Ground Level
	0.5% Annual Probability/1 in 200 Year (Flood Zone 3)	0.1% Annual Probability/1 in 1000 Year (Flood Zone 2)	0.5% Annual Probability/1 in 200 Year (Flood Zone 3)	0.1% Annual Probability/1 in 1000 Year (Flood Zone 2)	
1	0.90	1.13	3.32	3.55	2.42
2	0.75	0.99	3.32	3.56	2.57
3	0.60	0.83	3.32	3.55	2.72
4	0.40	0.63	3.32	3.55	2.92
5	0.67	0.90	3.32	3.55	2.65
6	NoData	0.20	NoData	3.61	3.41
7	0.44	0.67	3.32	3.55	2.88
8	NoData	0.09	NoData	3.61	3.52
9	NoData	0.23	NoData	3.55	3.32
10	1.36	1.60	3.32	3.56	1.96
11	0.57	0.80	3.32	3.55	2.75
12	0.88	1.11	3.32	3.55	2.44
13	1.70	1.93	3.32	3.55	1.62
14	1.60	1.83	3.32	3.55	1.72

* Levels in metres above Ordnance Datum Newlyn

Strategic flood risk assessments

We recommend that you check the relevant local authority's strategic flood risk assessment (SFRA) as part of your work to prepare a site specific flood risk assessment.

This should give you information about:

- the potential impacts of climate change in this catchment
- areas defined as functional floodplain
- flooding from other sources, such as surface water, ground water and reservoirs

Your Lead Local Flood Authority is Hampshire County Council.

About this data

This data has been generated by strategic scale flood models and is not intended for use at the individual property scale. If you're intending to use this data as part of a flood risk assessment, please include an appropriate modelling tolerance as part of your assessment. The Environment Agency regularly updates its modelling. We recommend that you check the data provided is the most recent, before submitting your flood risk assessment.

Flood risk activity permits

Under the Environmental Permitting (England and Wales) Regulations 2016 some developments may require an environmental permit for flood risk activities from the Environment Agency. This includes any permanent or temporary works that are in, over, under, or nearby a designated main river or flood defence structure.

[Find out more about flood risk activity permits](#)

Help and advice

Contact the Solent and South Downs Environment Agency team at ssdenquiries@environment-agency.gov.uk for:

- [more information about getting a product 5, 6, 7 or 8](#)
- general help and advice about the site you're requesting data for