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Site Location: 56a Bracklesham Road, Hayling Island, PO11 9SJ

Proposed Development: Construction of a new residential dwelling

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1. Executive Summary

- 1.1 Following the guidelines contained within NPPF, the proposed development type is **considered to be suitable** assuming appropriate mitigation (including adequate warning and evacuation procedures) can be maintained for its lifetime, given that:
- a) the site lies within a developed residential area with substantial flood defence infrastructure;
 - b) site is located in area of tidal flooding;
 - c) the site lies within an area where the long-term policy for the coastline is 'Hold the Line';
 - d) the ground floor is to be used as a garage and storage area, all habitable rooms to be located on the first floor, above all modelled flood levels; and,
 - e) in terms of flood vulnerability, significant betterment can be achieved through the implementation of flood warning procedures;
- 1.2 With reference to the NPPF and the Environment Agency (EA) standing advice on development and flood risk, as well as the low detail, national-scale flood mapping created on behalf of the EA, the proposed site is located within Flood Zone 3 (High Risk; >0.5% chance of annual tidal flooding) and is considered to be a 'More Vulnerable' development.
- 1.3 The site is located within Policy Unit 5AHI05 (Chichester Harbour Entrance to Langstone Harbour Entrance) of the North Solent Shoreline Management Plan. The short, medium and long-term policy for policy unit 5AHI05 is to hold the line. Details from the EA has shown that the site benefits from defences in the form of a vegetated shingle beach with timber groynes, sand dunes and embankments and a raised masonry wall.
- 1.4 The Havant Borough Core Strategy (March 2011) Policy CS9 states that planning permission will be granted for housing proposals that will contribute to achieving a net total of 6300 new dwellings between 2006 and 2026.
- 1.5 The developer has stated that the ditch was previously in a state of disrepair and full of rubbish. As a result of constructing a dwelling on the land it will become the responsibility of the home owner to manage and maintain the ditch to ensure that rubbish doesn't create a blockage; overall providing betterment over the existing situation and reducing the risk of flooding to the properties adjacent to the ditch.
- 1.6 As such, the proposed development will be constructed to provide wider sustainability benefits to the surrounding community.
- 1.7 The ground floor of the proposed development is to be used as a garage and storage area. First floor and all habitable rooms will be located approximately 3m above external ground levels, and therefore above all modelled flood levels. Internal access is provided throughout the dwelling to provide an area of safe refuge on the upper floors of the property.
- 1.8 Surface water runoff from proposed roof will be discharged to soakaways and not the sewer system in the local area, this will ensure that flood risk is not increased as a result of the proposed development..

Development Description	Existing	Proposed
Development Type:	Residential	New Residential Dwelling
(Number of Bedrooms):	N/A ²	N/A ²
EA Vulnerability Classification:	More Vulnerable	No Change
External Ground Level:	Between 2.29mAOD and 2.57mAOD	No Change
Level of Sleeping Accommodation:	N/A ¹	First Floor (all habitable rooms located on the first floor and above)
Impermeable Surface Area:	N/A ²	Increase
Surface Water Drainage:	N/A ¹	Discharge surface water to existing drainage ditch in the rear garden of the site
Site Size:	N/A ¹	No change
Risk to Development	Summary	Comment
EA Flood Zone:	3	High Risk
Flood Source:	Tidal	English Channel/Emsworth Channel
1 in 200 year flood level	3.3mAOD	
1 in 1000 year flood level	3.5mAOD	
1 in 200 year + climate change flood level (2070)	3.8mAOD	Based on 2011 base data
1 in 200 year + climate change flood level (2115)	4.5mAOD	
SFRA Available:	Yes	Havant Borough Council SFRA 2013, PUSH SFRA 2007
Management Measures	Summary	Comment
Ground floor level above extreme flood levels:	N/A ²	All habitable development is located on the first floor and above
Safe Access/Egress Route:	N/A ²	Used in conjunction with EA Flood Warning/Alert service, safe refuge can be provided via internal stairwells.
Flood Resilient Design:	Yes	All habitable rooms located on the first floor and above
Site Drainage Plan:	N/A ¹	Discharge surface water to existing drainage ditch in the rear garden
Flood Warning & Evacuation Plan:	Yes	EA Flood Warning Service
Offsite Impacts	Summary	Comment
Displacement of floodwater:	N/A ¹	Site lies in area of tidal flood risk
Increase in surface run-off generation:	N/A ¹	Discharge surface water to the existing drainage ditch in the rear garden
Impact on hydraulic performance of channels:	None	Does not affect channel

Table 1: Summary of flood risks, impacts and proposed flood mitigation measures.

N/A¹ not required for this assessment; N/A² data not available.

2. Development Description and Site Area

Proposed Development and Location

- 2.1 The site is located at 56a Bracklesham Road, Hayling Island, PO11 9SJ (Figure 1 and 2).
- 2.2 The existing site consists of a single residential dwelling and garden. The proposed development is for the construction of a new residential dwelling on land adjacent to 56 Bracklesham Road.
- 2.3 The nearest watercourse/waterbody to the site is the Emsworth Channel, the Mean High Water line of the Emsworth Channel is located approximately 210m to the east of the proposed development site. An ordinary watercourse, in the form of an unnamed drainage ditch, intersects the middle of the site.
- 2.4 Analysis of topographic levels (source: topographic survey) show the site to be relatively flat, with topographic levels varying between 2.29mAOD and 2.57mAOD.

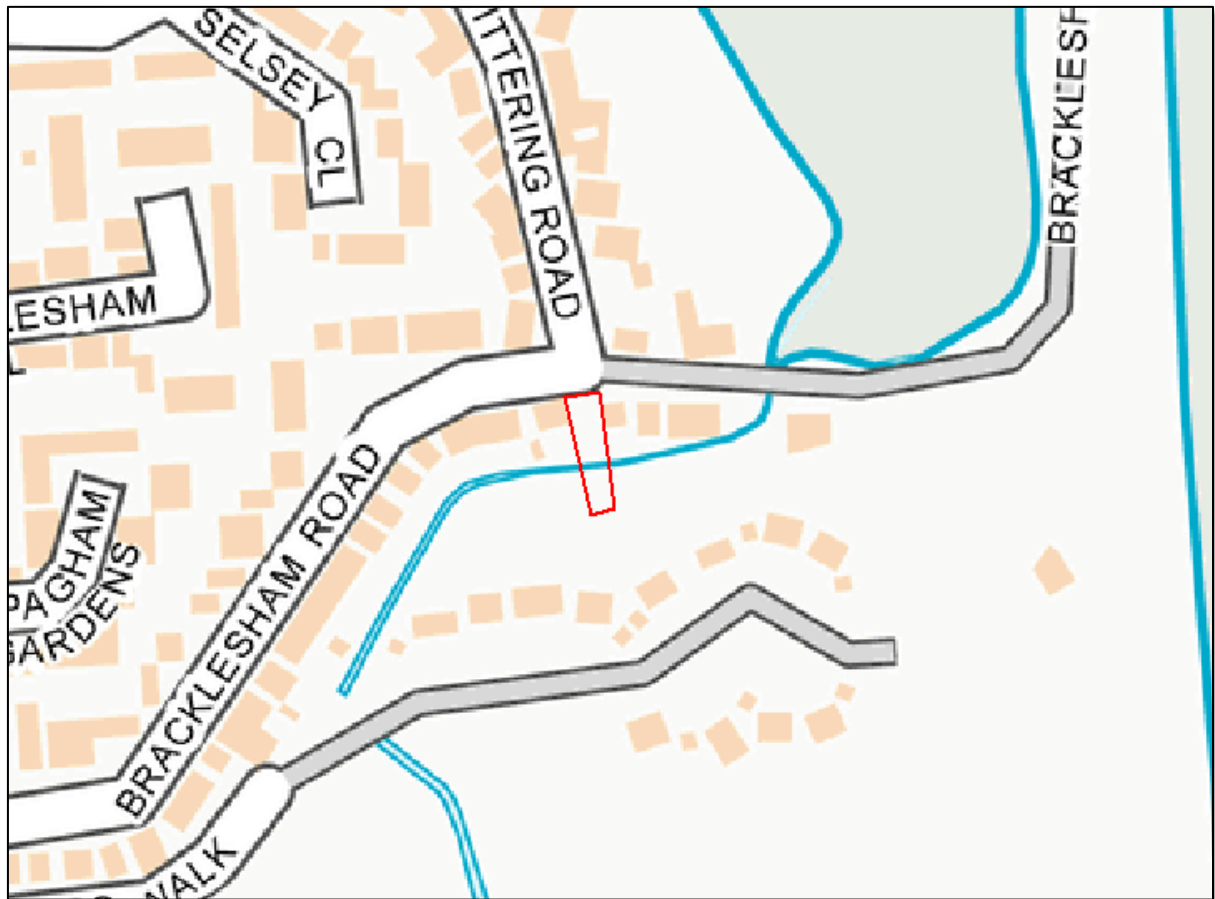


Figure 1: Wider Location Map. Approximate redline application boundary shown. (Source: OS)



Figure 2: Aerial View of the site. Site outlined in red (Source: Google Earth)

Vulnerability classification

- 2.5 According to the NPPF and the Environment Agency (EA) standing advice on development and flood risk, as well as the low detail, national-scale flood mapping created on behalf of the EA the site is located in Flood Zone 3 (High Risk; 1 in 200 or greater annual probability of flooding from the sea (>0.5%)).
- 2.6 Under the NPPF guidance, the existing site is considered “More Vulnerable” due to its residential usage, post development the proposed development will remain being classified as “More Vulnerable”.

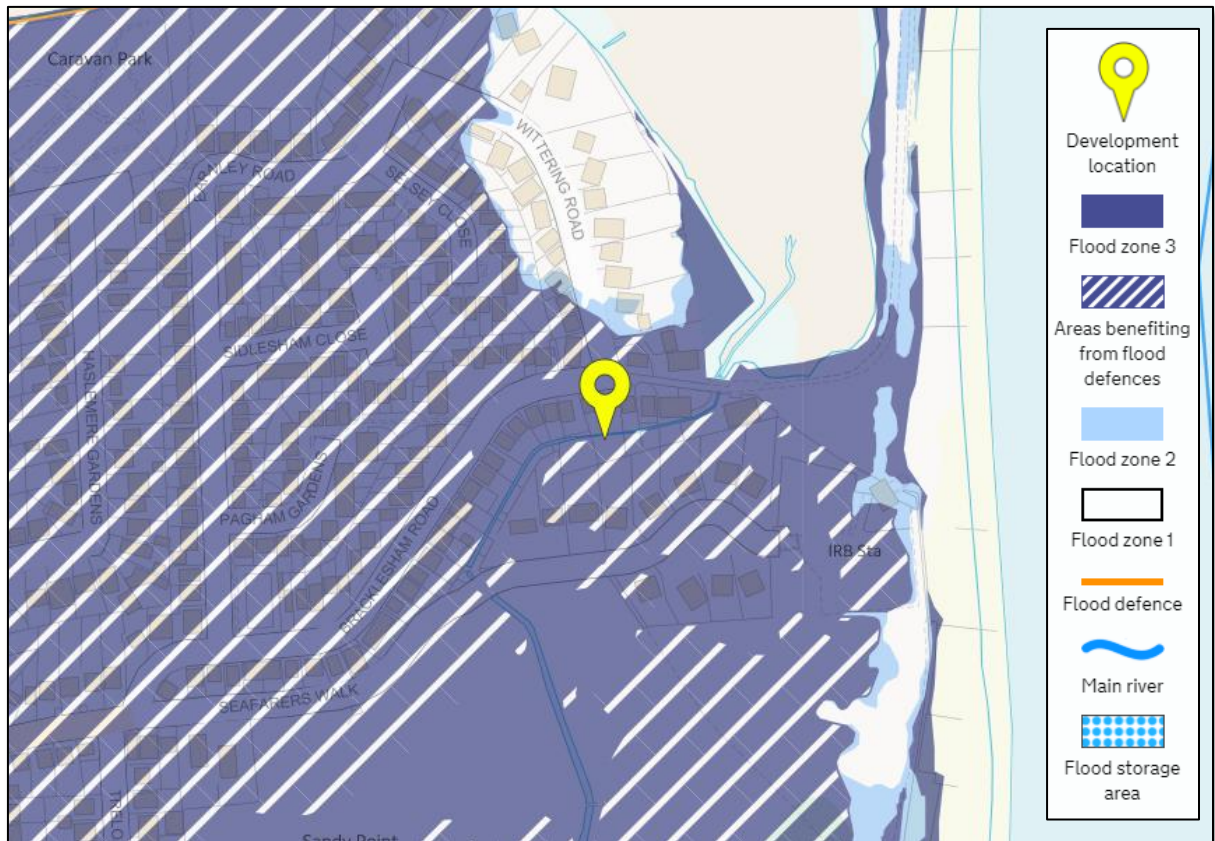


Figure 3: EA Flood Zone Map (Source: EA Online)

Geology

- 2.7 The site's bedrock geology has been identified by the British Geological Survey's public mapping model as partially London Clay Formation, formed of clay silt and sand and partially Portsmouth Sand Member and Whitecliff Member (undifferentiated) formed of sand. The superficial geology is identified as the River Terrace Deposits formed of sand, silt and clay (Source: BGS).

3. Sequential Test/Exception Test

- 3.1 Under the NPPF, all new planning applications must undergo a *Sequential Test*. This test must be implemented by local planning authorities with a view to locating particularly vulnerable new developments (e.g. residential, hospitals, mobile homes etc.) outside of the floodplain.
- 3.2 The test refers to the EA Flood Zones described in Table 6. For reference, the NPPF *Sequential Test: Flood Risk Vulnerability and Flood Zone 'Compatibility' Table* is reproduced below.

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

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

- 3.3 Using the principles of the Sequential Test outlined above, the proposed development is 'More Vulnerable' and located within Flood Zone 3 (as defined by the EA online Flood Map, Figure 3) and as such, the development is required to implement the Exception Test.

For the Exception Test to be passed, the proposed development must meet the following criteria:

- it must be demonstrated that the development provides wider sustainability benefits to the community that outweigh the flood risk, as informed by a Strategic Flood Risk Assessment;
- a Flood Risk Assessment demonstrates that the development will be safe, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

(Source: the NPPF)

- 3.4 As such, and in order to address these requirements, the planning application submitted by the applicant is required to be accompanied by a FRA which shows that the development can be achieved in a sustainable manner, with an overall reduction of flood risk to the site and surrounding area.
- 3.5 The Havant Borough Core Strategy (March 2011) Policy CS9 states that planning permission will be granted for housing proposals that will contribute to achieving a net total of 6300 new dwellings between 2006 and 2026.
- 3.6 The number of completed dwellings in Hayling Island between 1 April 2006 and 31 March 2009 was 130, the projected supply for housing in Hayling Island between 1 April 2009 and 31 March

2026 is 597. The total supply of housing on Hayling Island by 2026 is therefore approximately 727.

- 3.7 The Strategic Housing Land Availability Assessment (SHLAA) 8th Edition (July 2016) provides an assessment of whether sites are deliverable and developable. However, the assessment is conducted on a borough-wide level and only assesses sites that are likely to deliver five or more units, as these sites are likely to be required to meet housing allowances. It is not cost-effective for the council or developer to develop this land for the purpose of one residential dwelling.
- 3.8 The client has stated that prior to the purchase of the site the ditch was in a state of disrepair and blocked with rubbish. Significant investment was required to clear the ditch to ensure the rubbish was not a flood hazard. By constructing the new dwelling on the land it will become the responsibility of the home owner to manage and maintain the ditch; overall providing betterment over the existing situation and reducing the risk of flooding to the properties adjacent to the ditch.
- 3.9 As part of the proposed development the developer will plant indigenous plant species around the property, this will enhance the character of the area and provide ecological benefit over the existing situation.
- 3.10 The site is defended, the long term policy in the area is 'Hold the Line', so will remain defended for the foreseeable future, therefore the residual risk of flooding is relatively low. The mitigation measures proposed in the FRA are appropriate in scale and size for the proposed development and the developer will aim to implement measures to provide wider sustainability benefits for the community, where possible. The SHLAA does not identify any suitable available or suitably sized sites for the development, therefore, under the NPPF, the development passes the sequential test.

4. Site Flood Hazards

Sources of Flooding

- 4.1 As outlined in Figure 3, the proposed development is located within Flood Zone 3 (High risk of flooding), and is considered to be 'More Vulnerable' under the NPPF. Communication with the Environment Agency (EA) has identified the following potential sources of flooding to the site.

Source	Description
Fluvial	N/A
Tidal	English Channel/Emsworth Channel
Surface	N/A
Groundwater	N/A
Sewer	N/A

Table 3: Summary of flood sources.

Mechanisms and History of Flooding

- 4.2 According to the low detail, national-scale flood mapping created on behalf of the EA the probability of tidal flooding at the site is 1:200 or greater annual probability (>0.5%). Figure 3 outlines only the potential floodplain; and the mitigating effects of flood defences currently in place are not considered.

Tidal

- 4.3 The EA Flood Map for Planning (Figure 3) confirms that the site lies within Flood Zone 3 (High Risk), and benefits from the presence of defences.
- 4.4 The nearest watercourse/waterbody to the site is the Emsworth Channel, the Mean High Water line of the Emsworth Channel is located approximately 210m to the east of the proposed development site. An ordinary watercourse, in the form of an unnamed drainage ditch, intersects the middle of the site.
- 4.5 The EA have provided sea levels (still water design estimates) for the 0.5% (1:200) and the 0.1% (1:1000) annual exceedance probabilities relevant to the site. The chainage point relevant to the site is 162.
- 4.6 The values provided by the EA are based on 2011 base data, and take into account:
- Revised epochs as per 'Flood risk assessments: climate change allowances - guidance for Sustainable Places and Partnerships and Strategic Overview teams' 08/02/2016

- Revised data from 'Extreme Sea Levels for Estuaries and Harbours, April 2015 Please refer to 'Adapting to Climate Change: Advice for Flood and Coastal Erosion Risk Management Authorities' for the latest advice on applying sea level rise allowances to flood defence schemes

- 4.7 The still water design estimates are detailed in Table 4, below.
- 4.8 Analysis of the 1:200 year tidal flood event shows a modelled still water level of 3.3mAOD for the present day (2015) scenario. Comparison of topographic site levels (between 2.29mAOD to 2.57mAOD) shows the site could be affected by possible flood depths of 1.01mAOD.
- 4.9 Analysis of the 2070 and 2115 1:200 year still water design water level shows a flood level for 3.8mAOD and 4.5mAOD, respectively. Comparison of topographic site levels (between 2.29mAOD to 2.57mAOD) shows the site could be affected by possible flood depths of 1.51m, and 2.21m for the 2070 and 2115 flood events, respectively.

Chainage Point: 162	Easting: 474660	Northing: 099039
Year	Tide Level (mAOD)	
	0.5% annual exceedance probability 1 in 200yr (Flood Zone 3)	0.1% annual exceedance probability 1 in 1000yr (Flood Zone 2)
1 (2015)	3.3	3.5
2 (2070)	3.8	4.0
3 (2115)	4.5	4.6

Table 4: Modelled Tidal Still Water Estimates (Source: EA)

- 4.10 The EA have provided details on the defences in the area; the initial line of defences (Asset ID 470260) consist of a vegetated shingle beach wither timber groynes, the estimated standard of protection is unknown. The defences behind the shingle beach consist of sand dunes and embankments (Asset ID 470270 and 470271), the standard of protection is also unknown. The defences behind this consist of a raised masonry wall (Asset ID 180386) with an estimated standard of protection of 1:100 (Figure 4 and Table 5).

Asset ID	Description	Estimated Standard of Protection
180386	Raised masonry wall	1:100
470270	Sand dunes and embankments	Unknown
470271	Low embankment	Unknown
470260	Vegetated single beach with timber groynes	Unknown

Table 5: Asset ID Data (Source: EA)

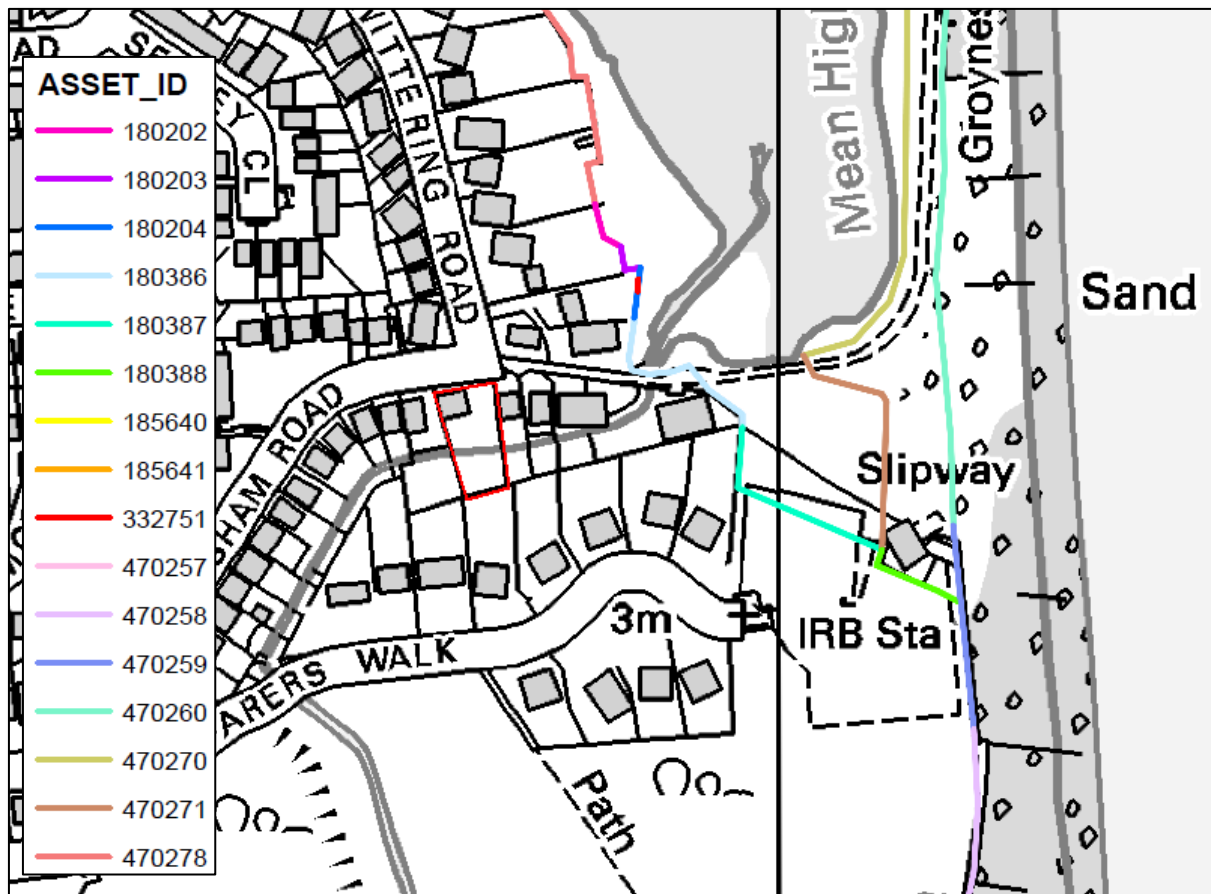


Figure 4: Defence Location Map (Source: EA)

- 4.11 The SFRA, Channel Coast Observatory and Shoreline Management Plan have identified that the sub-region of which the site is located, is protected from flooding from the sea by defences along the majority of its coastal frontages. The level of protection afforded by the defences along each frontage varies considerably, with areas such as Portsea Island, parts of Gosport and Southampton, and Hayling Island generally defended to a higher level than other frontages in the sub-region. There are no significant flood defences on rivers in the sub-region, although localised flood protection measures such as bank protection and maintenance of structures provide benefits in terms of flood risk in a number of locations.
- 4.12 The site is located within Policy Unit 5AHI05 (Chichester Harbour Entrance to Langstone Harbour Entrance) of the North Solent Shoreline Management Plan.
- 4.13 An extensive tidal floodplain covers the western and eastern ends of this frontage of Hayling Island's open coast. Significant numbers of residential properties at Eastoke, commercial assets and facilities and transport networks are within the extensive tidal floodplain. The defences to the east on Hayling Island are maintained by the Local Authority with short sections maintained by a private sailing club.
- 4.14 The short, medium and long-term policy for policy unit 5AHI05 is to 'hold the line'. The intention is to manage the open coast of Hayling Island as a single frontage through maintenance and improvements to the defence structures and integrated beach management activities, with beach recycling from areas of accretion (e.g. currently at the western end) and replenishment to areas of beach volume depletion (e.g. Eastoke). The approved Eastoke Strategy and the existing

Beach Management Plan for Hayling Island frontage details the beach recycling and replenishment requirements that will provide a level of flood protection to coastal communities, commercial assets and local transport networks, amenity open space and facilities, including a golf course.

Surface Water (Pluvial)

- 4.15 The EA Risk from Surface Water Flooding map has identified the site to be located in an area that is of “Very Low” risk of surface water flooding (Figure 6). With a less than 0.1% chance of flooding annually from this source. There are small areas of “Low” and “Medium” risk of surface water flooding along Bracklesham Road and in the drainage ditch to the rear of the existing dwelling. Areas identified to be a “Low” risk have between 0.1% and 1% chance of flooding annually and areas at “Medium” risk have between 1% and 3.3% chance of flooding annually.
- 4.16 The EA Surface Water Depth Map shows the site would be unaffected by any flood depths during an event with a high, medium and low chance of occurring. The Low Chance of occurring map shows that the areas identified to be “Low” and “Medium” risk, along Bracklesham Road could be affected by flood depths no greater than 300mm with small areas between 300-900mm. There are flood depths in the rear garden of between 300-900mm, however these are primarily confined to the drainage ditch (Figure 8 shows Low Chance of Occurring map).
- 4.17 The EA have not provided any information relating to specific pluvial flood events on site or in the surrounding area.
- 4.18 As such the risk from surface water flooding to the site can be considered **relatively low**.

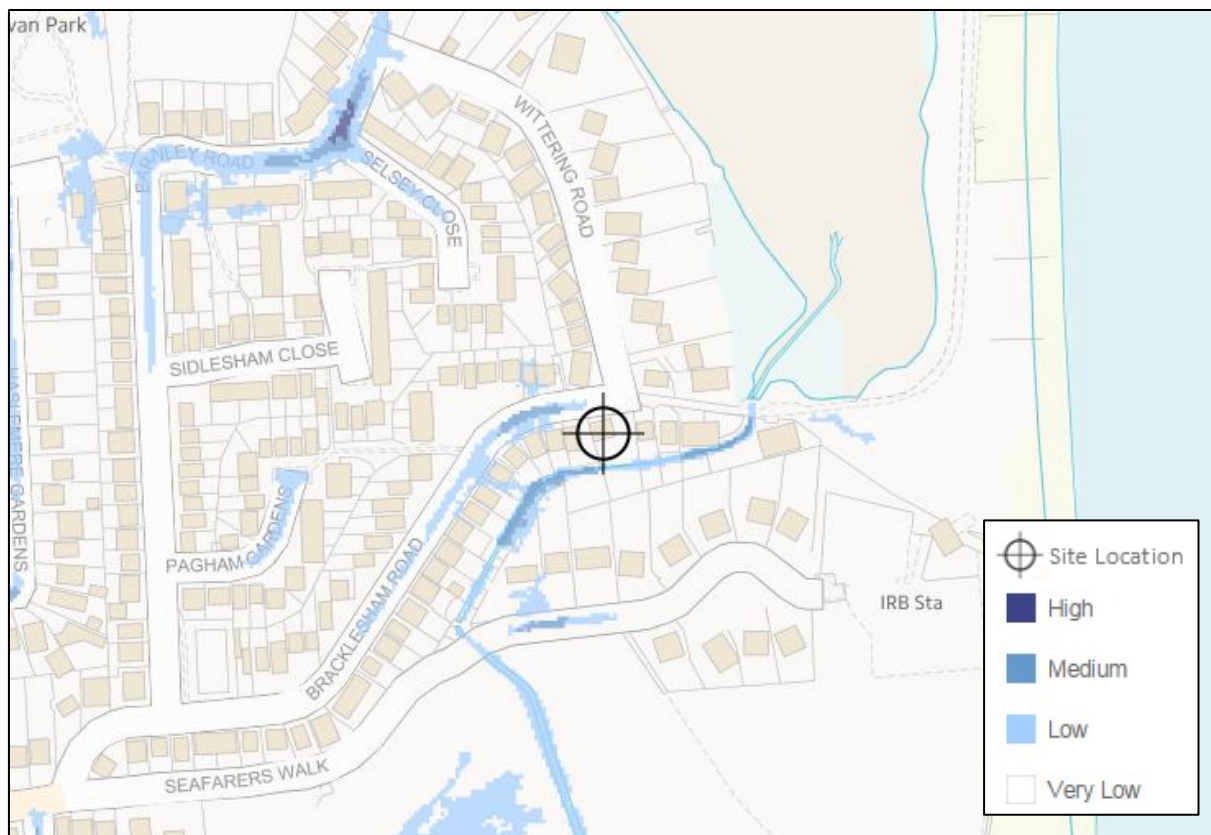


Figure 5: EA Surface Flood Risk Map. (Source: EA Online)



Figure 6: The EA Surface Water Depth Map – High Chance of Occurring Event (Source: EA Online)

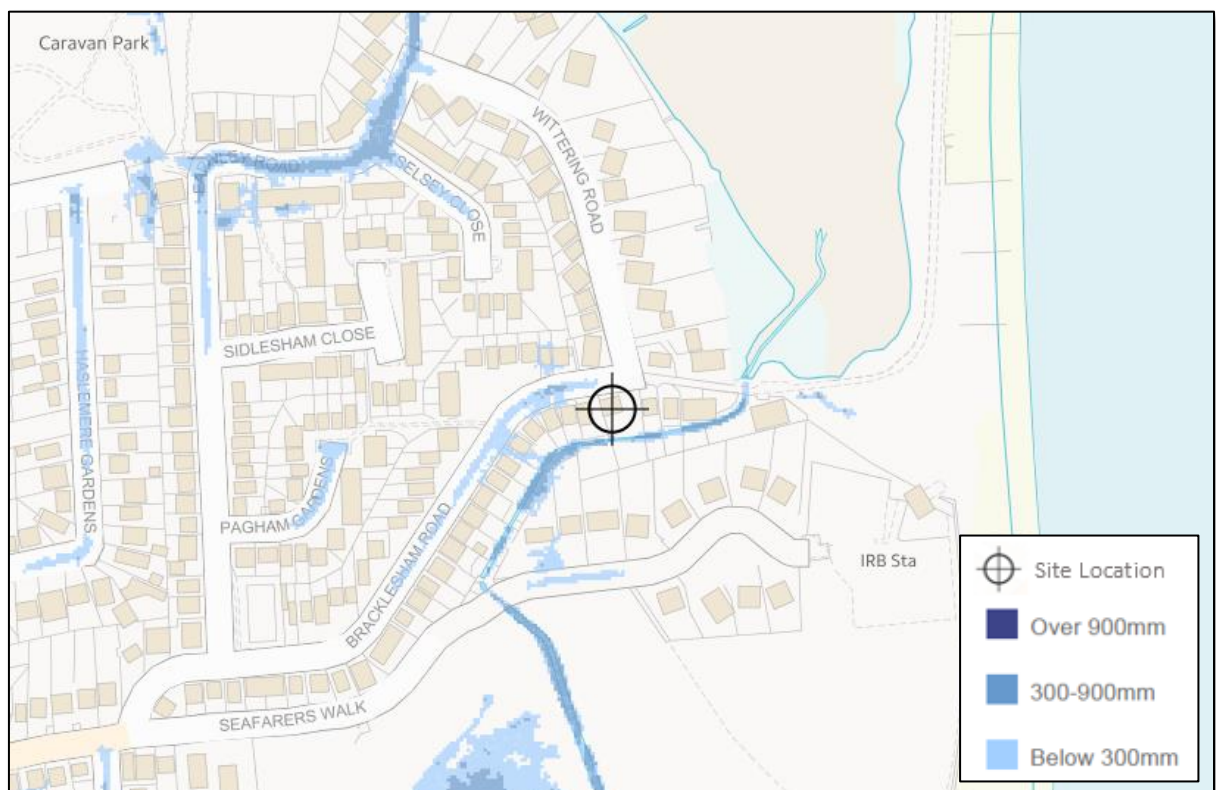


Figure 7: The EA Surface Water Depth Map – Low Chance of Occurring Event (Source: EA Online)

Groundwater

- 4.19 At the time of writing, no records of groundwater flooding at the site have been provided. The EA has not classified the site to be located within a groundwater source protection zone.
- 4.20 The site is located within a groundwater vulnerability zone classified as a Minor Aquifer with high vulnerability. However the EA are currently updating their groundwater vulnerability maps to reflect improvements in data mapping and understanding of the factors that affect this vulnerability.
- 4.21 No further information has been provided by the PUSH SFRA in regards to groundwater susceptibility areas.
- 4.22 However, online BGS Borehole record for a nearby site, indicate groundwater levels are quite high, in the region of 760mm below ground level (Figure 9). Given the close proximity to the seafront, it is likely that these levels may be tidally influenced.

Contract <u>HAYLING ISLAND</u>	Date started <u>9/3</u> Finished <u>9/3/11</u>
Borehole No <u>B</u>	Operator <u>ES</u>
Ordinance Datum Level <u></u>	Type of Penetration Test <u>SPT</u>
Type of Boring <u>S/A</u>	Weight <u>63.5kg</u> Drop <u>762</u>
Diameter of Boring <u>153mm</u>	Standing Water Level <u>762m</u>

Figure 8: Borehole records (Source: BGS)

- 4.23 It is recommended that that groundwater monitoring be undertaken at the site to determine the sensitivity (if any) of the site to groundwater flooding.
- 4.24 Based on anecdotal evidence provided at the time of writing, the risk of flooding from this source to the site is considered to be **relatively low**.

Sewer

- 4.25 At the time of writing, no records were sourced to indicate that sewer flooding had been documented at the property via the EA or SFRA.
- 4.26 As such the risk of sewer flooding to the development is deemed to be **relatively low**.

Surface Water Drainage Strategy

- 4.27 The existing site consists of a garden area associated with the existing residential dwelling. The proposed development is to construct a new residential dwelling.
- 4.28 The developer has stated that the surface water runoff from the proposed development roof will be discharged via a soakaway in the rear garden of the development site.
- 4.29 In order to not increase flood risk to adjacent properties as a result of the development, surface water discharge rates to the ditch should be controlled/limited in accordance with recommendations within the local SFRA. Details of these systems are considered outside the scope of this report.

- 4.30 It should be noted that any additional runoff generated from the increase in hardstanding area of the site are restricted to greenfield runoff rates if practicable. However, if deemed impractical, any additional flows discharged to the ditch will need to be agreed with the LLFA.

Records of Historical Flooding

- 4.31 The EA have one record of previous flooding from around the area from November 2005, but have no specific details, it should be noted that the EA records are not comprehensive.
- 4.32 Incidents of flooding on the Island have been recorded in particularly the open coast facing the English Channel which is exposed to medium wave energy as per the PUSH SFRA as demonstrated on Figure 10 below. However this does not directly affect the site.

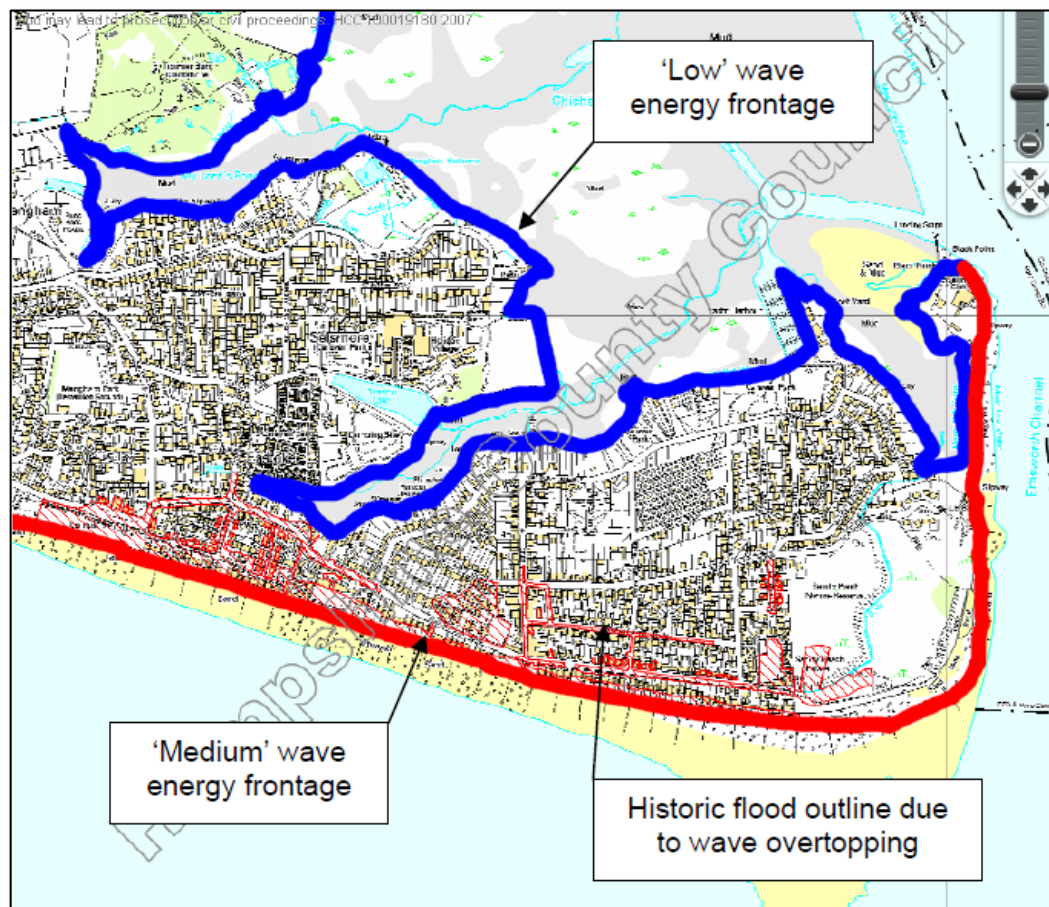


Figure 9: Wave Energy and Historic Flood Map (Source: PUSH SFRA)

5. Probability of Flooding

- 5.1 According to the low detail, national-scale flood mapping created on behalf of the EA the probability of tidal flooding at the site is 0.5% or greater (or 1:200 years or greater annual probability of tidal flooding).
- 5.2 This information is supported by the EA Flood Map for Planning (Figure 3) which has been produced in part using JFLOW/HYDRO-F – a relatively coarse, national scale flood modelling strategy and in part using detailed modelling. These maps indicate the potential spatial extent of a tidal flood event which has a magnitude that is, on average, likely to occur once in every two hundred years (i.e. the 1:200 year tidal floodplain). It is important to note that only the *potential* floodplain is shown; ***the mitigating effects of any flood defences currently in place are not considered***. For reference, the definition of the NPPF flood risk zones is included in Table 6.
- 5.3 Tidal flooding is generally caused by low pressure weather systems creating storm-surges (or storm tides), chiefly via high speed winds. These winds (and to a certain extent, the low pressure) create a ‘bulge’ of water which, if it coincides with high tide, can generate very high, stormy, water levels. However, because this mechanism is well understood, it is very likely that an early warning will be issued before such an event strikes. As such, it is very unlikely, even should the site become undefended, that the site would be subject to tidal flooding without several hours of early warning.

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

Table 6: Definition of the NPPF Flood Zones. Shaded cells denote the proposed development. (Source: EA)

Climate Change on Site

- 5.4 Climate change is likely to increase the flow in rivers, and raise sea levels and storm intensity.
- 5.5 The EA have recently updated the peak river flow allowances to use for different types of development. Communication with the EA has confirmed that the changes are only focused to river flow and rainfall allowances. Tidal allowances are detailed in Table 3 of the new changes (<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>). As a result

of this dialogue it has been confirmed that the EA detailed data sets provided are relevant for the purposes of this assessment given that the dominant source of flooding is tidal.

- 5.6 The EA have also stated that the climate change will increase the peak rainfall intensity allowance in small and urban catchments.

Applies across all of England	Total potential change anticipated for 2010 to 2039	Total potential change anticipated for 2040 to 2059	Total potential change anticipated for 2060 to 2115
Upper end	10%	20%	40%
Central	5%	10%	20%

Table 7: Peak Rainfall Intensity Climate Change Allowances

- 5.7 The risk of tidal flooding to the site would therefore be expected to increase following the effects of climate change. The likely increases in peak rainfall intensity would also lead to an increased risk of surface water flooding.
- 5.8 The EA have provided climate change flood levels for the 1:200 year, 2070 and 2115 year flood event and the 1:1000 year, 2070 and 2115 flood event. Analysis of these flood levels can be found in Section 4.

6. Residual Risks

- 6.1 Residual risks are those remaining after applying the principles of the sequential approach to the location of development and taking mitigating actions. Examples of residual flood risk include:
- the failure of flood management infrastructure such as a breach of a raised flood defence, blockage of a surface water conveyance system, overtopping of an upstream storage area, or failure of a pumped drainage system;
 - failure of a reservoir, or;
 - a severe flood event that exceeds a flood management design standard, such as a flood that overtops a raised flood defence, or an intense rainfall event which the drainage system cannot cope with.
- 6.2 The site benefits from tidal flood defences, as such the site is at risk of breach failure of the defences. The EA have not provided modelled flood extents for breach failure of the defences, nor overtopping of defences flood levels.
- 6.3 As discussed the site is within an area of tidal flood risk. Tidal flooding is generally caused by low pressure weather systems creating storm-surges (or storm tides). However, because this mechanism is well understood, it is very likely that an early warning will be issued before a tidal flood event occurs. As such, it is very unlikely that the site would be subject to tidal flooding without several hours of early warning.
- 6.4 Given the nature of the tidal cycle, flood waters on site will likely recede as in-channel water levels fall.

Overtopping

- 6.5 No overtopping data has been provided to Ambiental at this time.

Defence Breach

- 6.6 The EA have not provided site specific flood data for the site at this time, this includes information with regards to the breach flood extents.

7. Flood Risk Management Measures

- 7.1 The site is located in Flood Zone 3 (High Risk of flooding as defined in the NPPF) according to the EA Floodmap, as such the proposed development will require flood mitigation measures.
- 7.2 Given the nature of the tidal cycle and fluvial channel setting, flood waters on site will likely recede as in-channel water levels fall.
- 7.3 The proposed development is for the construction of a new three-storey residential dwelling. As such it is recommended that the applicant implement the following measures:
- Construction:
 - Ground floor to be utilised as a garage/storage space;
 - All habitable rooms to be located on the first floor and above;
 - First floor to be set approximately 3m above external ground levels;
 - Ground floor to be constructed using a concrete floor;
 - Wall cavities to be filled with closed-cell foam throughout;
 - Ground floor internal render to be waterproof;
 - External walls to be resistant to flooding to first floor level;
 - Exterior ventilation outlets, utility points and air bricks to be fitted with removable waterproof covers.
 - Electrical connection:
 - Ground floor electrical main ring to be run from first floor level; and on separately switched circuit from first floor;
 - Electrical incomer and meter to be situated at first floor level or above.
 - Gas / water supply:
 - Boilers, control and water storage / immersion to be installed at first floor level or above;
 - Gas meter to be installed at first floor level or above;
 - All plumbing insulation to be of closed-cell design.
 - Drainage:
 - Non-return valves to be fitted to all drain and sewer outlets;
 - Manhole covers to be secured;
 - Anti-syphon fitted to all toilets.
 - Interior fittings:
 - Use of MDF carpentry (i.e. skirting, architrave, built-in storage) to be avoided at ground floor level;
 - Flood Warning System:
 - Residents required to sign up to the EA flood warning service.
- 7.4 Due to the nature of tidal flooding the applicant has agreed to maintain **internal access from the ground floor to the upper floors of the building for the lifetime of the property**; thereby providing

safe refuge. As such, all habitable rooms will be located approximately 3m above external ground levels so the development itself provides an area of safe refuge above modelled flood levels and potential breach flood levels at the site.

Flood Evacuation and Access / Egress

- 7.5 The site resides within Flood Zone 3 (tidal) and is located within an EA Flood Warning Service Area (Figure 10).
- 7.6 It is recommended the site owner, site staff and all site users' sign up to the EA flood warning service if they have not done so already in order to provide betterment to the site. It is recommended that all new site owners, new site staff, and all site users are made aware of the potential flood risk to the site and that they sign up to the EA flood warning service.

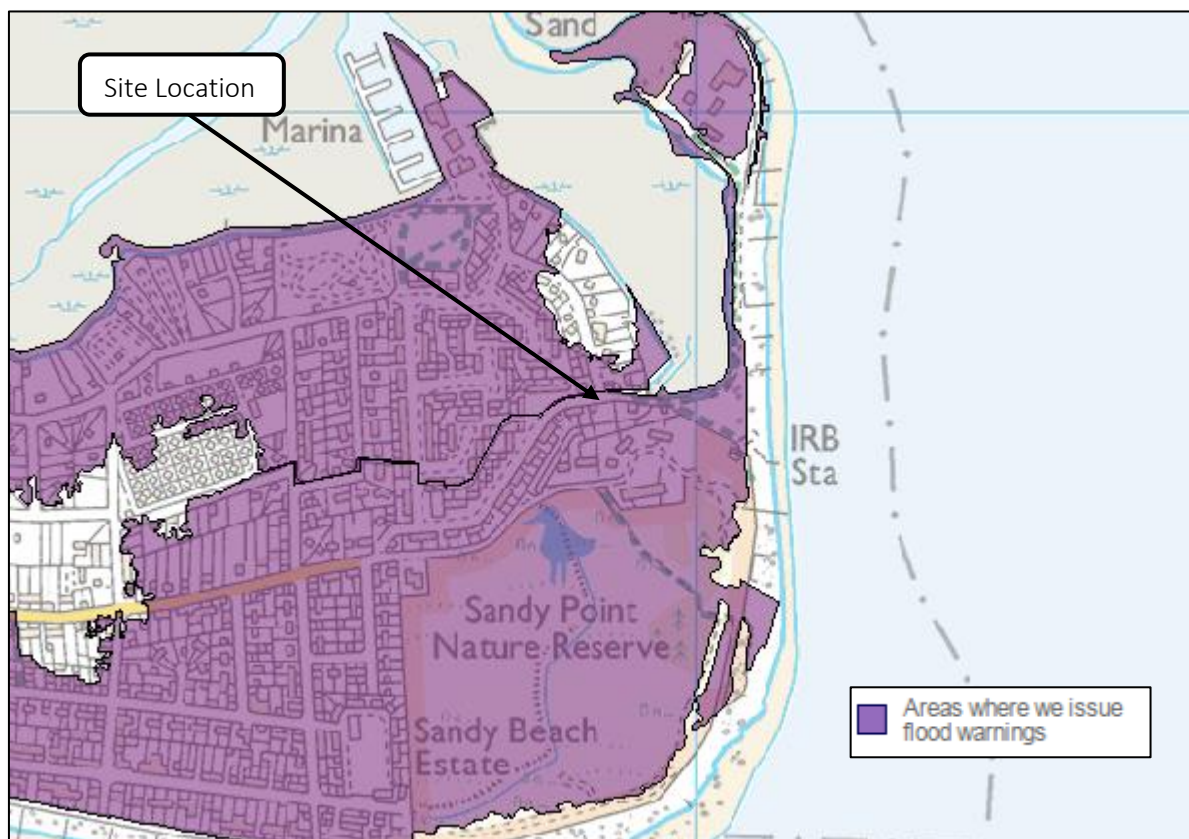


Figure 10: The EA Flood Warning and Alert Areas (Source: EA Online)

- 7.7 The EA operate a 5 day county-wide forecast in relation to flood risk. It is recommended that this service is regularly checked to ensure occupants/residents are aware of any possible risks: <https://flood-warning-information.service.gov.uk/5-day-flood-risk>.
- 7.8 The EA operate a Flood Information service which identifies whether any flood warnings or alerts have been issued for a specific postcode or place in England or Wales: <https://flood-warning-information.service.gov.uk/>.
- 7.9 The EA also operates a 24-hour telephone service on 0345 988 1188 that provides frequently updated flood warnings and associated floodplain information. It is important to note that the

EA's flood warnings are only in relation to fluvial and tidal flooding, and do not cover other sources of flooding such as surface water or groundwater flooding.

- 7.10 The site owner(s) and management will be required to register for this service (<https://www.gov.uk/sign-up-for-flood-warnings>). It is advised that all residents and site users also register for this service, as management may not be on site at the time of a flood event. It is the responsibility of the site owner to make this service available to all site users.
- 7.11 The site owner(s), site management and residents will be required to register for this service. It is the site owner and site management's responsibility to make this service available and known to all site users.
- On receipt of a **FLOOD ALERT**, the site users should:
 - Monitor the situation via local media;
 - Make themselves aware of forecast local weather conditions;
 - Alert others resident in the property of the situation;
 - Prepare to evacuate if necessary.
 - On receipt of a **FLOOD WARNING**, the site users should:
 - Follow advice to “go in, stay in, and tune in”;
 - Be prepared to follow instruction from the Emergency Services.
 - On receipt of a **SEVERE FLOOD WARNING**, the site users should:
 - Follow advice to “go in, stay in, and tune in”;
 - Remain attentive to local media forecasts and news bulletins;
 - Do not evacuate unless instructed to do so by the Emergency Services;
 - Only when instructed to evacuate by the Emergency Services, leave the property and follow the agreed evacuation route – detailed previously.
- 7.12 If flooding has already occurred before prior evacuation, it is advised site users return to the property and await evacuation. No evacuation should be sought if flood depths exceed 25cm, evacuation should only be sought with the assistance of the emergency services in these circumstances.
- 7.13 It is recommended that occupants egress to the upper floors of the building for safe refuge during an unexpected flood event, this internal route will be maintained for the lifetime of the development.
- 7.14 Further information can be found on www.environment-agency.gov.uk/floodline. Floodline Warnings Direct is a free service operated by the EA that provides flood warnings direct to occupants by telephone, mobile phone, fax or pager.

8. Off Site Impacts

Impact to Flood Risk Elsewhere

- 8.1 The site is located in Flood Zone 3, (tidal flood risk) and under the NPPF:

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

- 8.2 As such, there is no requirement for compensatory flood storage and the proposed development shall not increase the flood risk elsewhere.

Generation of Runoff

- 8.3 The existing site consists of a garden area associated with the existing residential dwelling. The proposed development is to construct a new residential dwelling.
- 8.4 The developer has stated that the surface water runoff from the proposed development roof will be discharged via a soakaway in the rear garden of the development site.
- 8.5 It should be noted that any additional runoff generated from the increase in hardstanding area of the site is restricted to greenfield runoff rates if practicable. However, if deemed impractical, any additional flows discharged to the ditch will need to be agreed with the LLFA.

9. Conclusion

- 9.1 Ambiantal Technical Solutions Limited has been appointed to undertake a National Planning Policy Framework (NPPF) compliant Flood Risk Assessment (FRA) at 56a Bracklesham Road, Hayling Island, PO11 9SJ.
- 9.2 The existing site consists of a single residential dwelling and garden. The proposed development is for the construction of a new residential dwelling on land adjacent to 56 Bracklesham Road.
- 9.3 With reference to the NPPF and the Environment Agency (EA) standing advice on development and flood risk, as well as the low detail, national-scale flood mapping created on behalf of the EA, the proposed site is located within Flood Zone 3 (High Risk; >0.5% chance of annual tidal flooding) and is considered to be a 'More Vulnerable' development.
- 9.4 The nearest watercourse/waterbody to the site is the Emsworth Channel, the Mean High Water line of the Emsworth Channel is located approximately 210m to the east of the proposed development site. An ordinary watercourse, in the form of an unnamed drainage ditch, intersects the middle of the site.
- 9.5 The EA have one record of previous flooding from around the area from November 2005, but have no specific details, it should be noted that the EA records are not comprehensive.
- 9.6 The site is located within Policy Unit 5AHI05 (Chichester Harbour Entrance to Langstone Harbour Entrance) of the North Solent Shoreline Management Plan. The short, medium and long-term policy for policy unit 5AHI05 is to hold the line. Details from the EA has shown that the site benefits from defences in the form of a vegetated shingle beach with timber groynes, sand dunes and embankments and a raised masonry wall.
- 9.7 Drainage proposals should limit the additional runoff generated from the increase in hardstanding area of the site to greenfield runoff rates if practicable. However, if deemed impractical, any additional flows discharged to the ditch will need to be agreed with the LLFA.
- 9.8 The ground floor of the proposed development is to be used as a garage and storage area. First floor and all habitable rooms will be located approximately 3m above external ground levels, and therefore above all modelled flood levels. Internal access is provided throughout the dwelling to provide an area of safe refuge on the upper floors of the property.
- 9.9 As such, and given that:
- a) the site lies within a developed residential area with substantial flood defence infrastructure;
 - b) site is located in area of tidal flooding;
 - c) the site lies within an area where the long-term policy for the coastline is 'Hold the Line';
 - d) the ground floor is to be used as a garage and storage area, all habitable rooms to be located on the first floor, above all modelled flood levels; and,
 - e) in terms of flood vulnerability, significant betterment can be achieved through the implementation of flood warning procedures;

following the guidelines contained within NPPF, the proposed development type is **considered to be suitable** assuming appropriate mitigation and approvals for any ditch works (including adequate warning and evacuation procedures) can be maintained for its lifetime.

Appendix A – Supporting Information



Fri 08/09/2017 11:34

Partnership and Strategic Overview team, HIOW <psohiow@environment-agency.gov.uk>

Flood Risk Information for Bracklesham Road - Ref: SSD/56598

To Consultancy

Cc SSD Enquiries

Defences Map.pdf .pdf File	Flood Map for Planning (Rivers and Sea).pdf .pdf File	Risk of Flooding from Surface Water.pdf .pdf File
Open Government Licence.pdf .pdf File	uFMFSW Fact Sheet.pdf .pdf File	

Dear Thea

Provision of Product 4 for 56A Bracklesham Road, Hayling Island, PO11 9SJ

Thank you for your request to use Environment Agency data, in the development of 56A Bracklesham Road, Hayling Island, PO11 9SJ. The information is attached.

Further details about the Environment Agency information supplied can be found on the GOV.UK website:

<https://www.gov.uk/browse/environment-countryside/flooding-extreme-weather>

If you have requested this information to help inform a development proposal, then you should note the information on GOV.UK on the use of Environment Agency Information for Flood Risk Assessments

<https://www.gov.uk/planning-applications-assessing-flood-risk>

<https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion>

The site may be affected by an extreme flood. According to our published flood map, which provides a general estimate of the likelihood of flooding across England & Wales, the property is shown to be within Flood Zone 3 - an area which may have a 0.5% chance of flooding annually (1 in 200), **ignoring** the presence and effect of any flood defences.

The Environment Agency is aware of flooding to this area during November 2005, but have no specific details. Not all flooding events are reported to us and further information may be available from Havant Borough Council.

Defences – Please see the attached map. The defences were found to be in good to fair condition when we last inspected them in June 2017.

Sea levels (still water design estimates) for the 0.5% (1:200) and the 0.1% (1:1000) annual exceedance probabilities relevant to your site are provided in the table below.

Chainage point: 162	Easting: 474660	Northing: 099039
---------------------	-----------------	------------------

Year	Tide Level (mAOD*)	
	0.5% annual exceedance probability/1 in 200 Year (Flood Zone 3)	0.1% annual exceedance probability/1 in 1000 Year (Flood Zone 2)
2015	3.3	3.5
2070	3.8	4.0
2115	4.5	4.6

* Levels in metres above Ordnance Datum Newlyn.

These values are based on 2011 base data, and take into account:

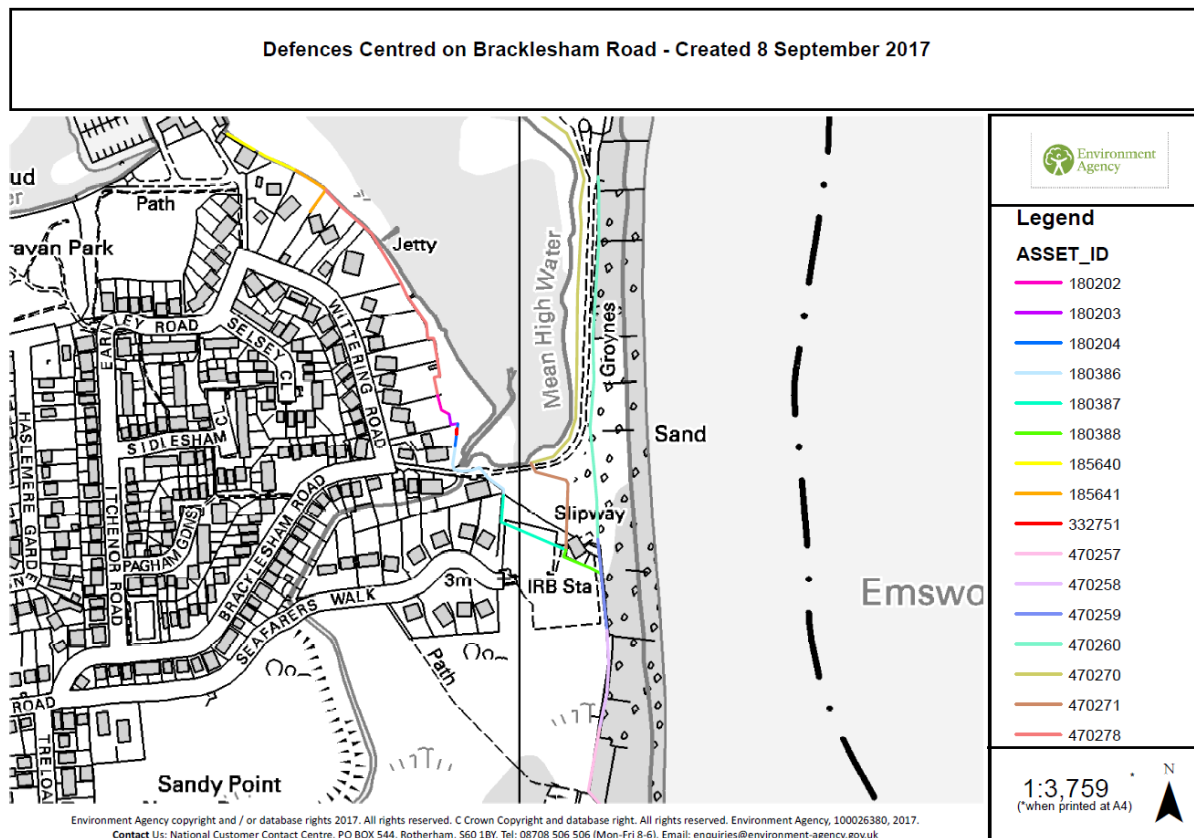
- Revised epochs as per 'Flood risk assessments: climate change allowances - guidance for Sustainable Places and Partnerships and Strategic Overview teams' 08/02/2016
- Revised data from 'Extreme Sea Levels for Estuaries and Harbours, April 2015 Please refer to 'Adapting to Climate Change: Advice for Flood and Coastal Erosion Risk Management Authorities' for the latest advice on applying sea level rise allowances to flood defence schemes

Note 1:

Extreme sea level values are for still water sea levels only. Extreme sea level values include the effect of storm surge but do not account for any local increase in sea level that may be induced by onshore wave action. Wave set-up would need to be estimated separately.

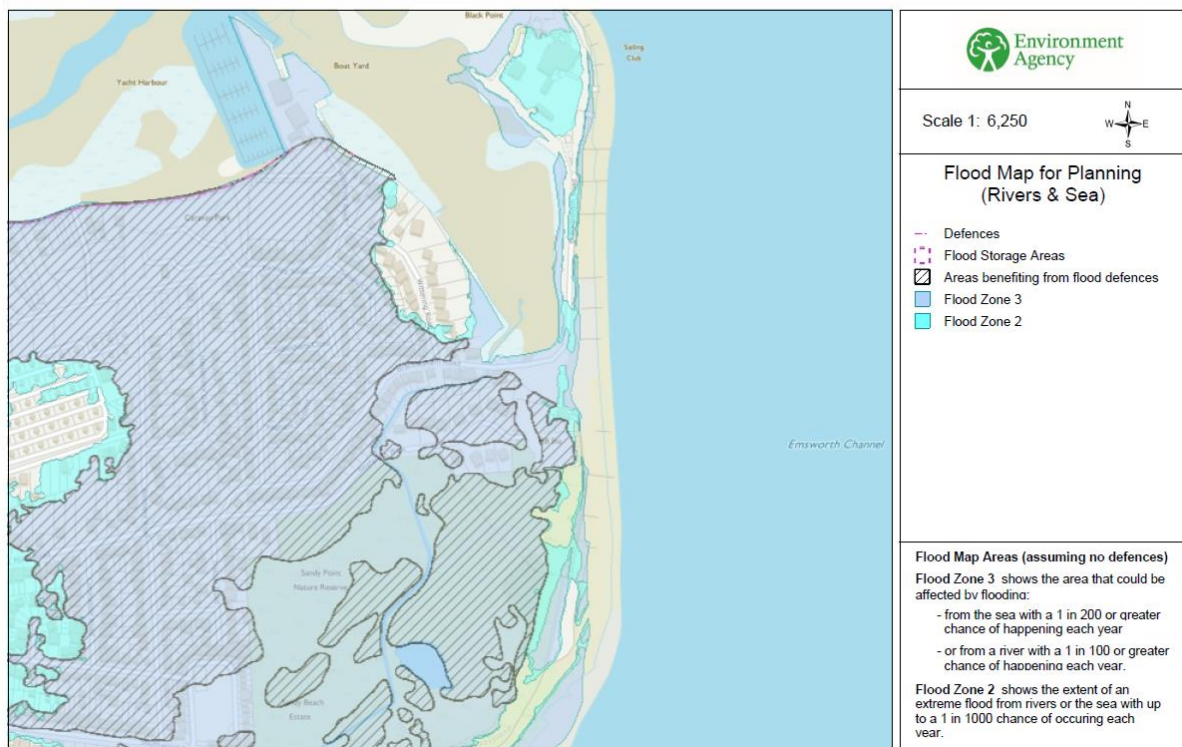
Note 2:

Annual exceedance probability describes the likelihood (chance) of being exceeded in any given year.

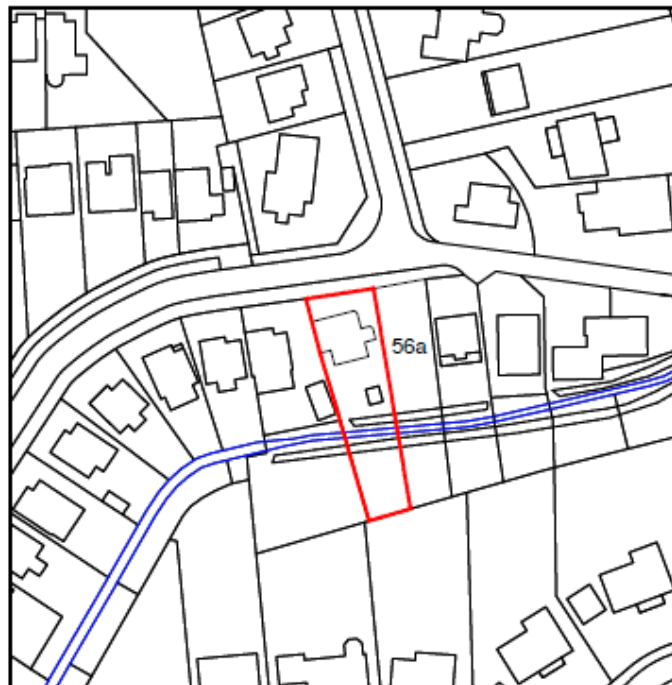


Asset ID	Description	Asset Maintainer	Estimated Standard of Protection
180202	Raised grass embankment	environment_agency	1:100
180203	Masonry wall	environment_agency	1:100
180204	Privately constructed raised wall	private	1:100
180386	Raised masonry wall	environment_agency	1:100
180387	Raised embankment	environment_agency	1:100
180388	Raised masonry wall	environment_agency	1:100
185640	Concrete Seawall	environment_agency	1:200
185641	Raised earth embankment with concrete slab revetment	environment_agency	1:200
332751	flood gate	private	
470257	Crest of shingle ridge	unknown	
470258	Timber splash wall on top of shingle beach	unknown	
470259	Earth embankment with concrete toe wall	unknown	
470260	Vegetated shingle beach with timber groynes	unknown	
470270	Sand dunes and embankments	unknown	
470271	Low embankment	unknown	
470278	Various private revetments and defences	unknown	

Flood Map for Planning (Rivers and Sea) Centred on Bracklesham Road - Created 8 September 2017



Streetwise License No. 1000047474



**56 Bracklesham Road,
Hayling Island**

1:1250