

**Land adjacent to 132
Havant Road, Hayling
Island**

Flood Risk Assessment

Project Ref: 27859/001

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Land adjacent to 132 Havant Road, Hayling Island
Flood Risk Assessment

Executive Summary

This Flood Risk Assessment (FRA) has been prepared by Peter Brett Associates LLP (PBA) to support a planning application for a proposal to build 4 new dwellings on land adjacent to 132 Havant Road on Hayling Island. The FRA has been prepared in accordance with the National Planning Policy Framework (NPPF) and associated Technical Guidance 2012. The Eastern Solent Coastal Partnership and the Environment Agency (EA) have also provided comments on a previous FRA and we have also tried to address these, within this FRA.

The site is shown on the Environment Agency (EA) Flood Zones map as lying within Flood Zone 3 of the tidal flood extent with water arising from Langstone Harbour.

Flood Zone 3a 'High Probability' (greater than 1 in 200 (0.5%) annual probability of Tidal flooding)

The proposed development consists of residential development which, as a 'More Vulnerable' use is considered appropriate within Flood Zone 3a subject to the Exception Test (ref: Technical Guidance to NPPF Table 3).

In considering the proposals, the following key aspects have been addressed:-

- Vulnerability to flooding from all sources.
- Protection of occupants of the new development.
- Not increasing flood risk to third parties as a result of the development.

Flood risk will be appropriately mitigated through measures including:

- Flood resistance and resilience measure;
- Provision of safe refuge; and
- Appropriate management of surface water to ensure there is no increase in surface water runoff from the site.

In conclusion, the FRA confirms that the future residents would be safe within their properties, that the duration of flooding would be short and that the proposed development does not increase flood risk and it does not detrimentally affect third parties, in accordance with the objectives of the NPPF.

1 Introduction

1.1 Scope of FRA

This Flood Risk Assessment (FRA) has been prepared by Peter Brett Associates LLP, on behalf of our client, Mr Ruffell, to support a planning application for the erection of 4 detached dwellings on land adjacent to 132 Havant Road, Hayling Island.

The FRA focuses on assessing the practical flood risk issues at the site as follows:

- Identification of all the potential sources of flooding at the site (i.e. tidal, fluvial, pluvial, groundwater, surface water);
- Assessment of the existing flood risk at the site and the potential impact of the proposals;
- Consideration of the flood risk implications, taking into account the potential allowance for climate change over the lifetime of the development, and the identification of the measures to mitigate flood risk.

PBA has undertaken this FRA using experienced flood risk management staff chartered with the Institution of Civil Engineers (ICE) and the Chartered Institution of Water and Environmental Management (CIWEM). PBA has many years of experience in, amongst other areas, the assessment of flood risk, hydrology, flood defence and river engineering.

1.2 Policy Context

This FRA has been prepared in accordance with the relevant national, regional and local planning policy and statutory authority guidance as follows:

- National policy regarding flood risk as contained within **National Planning Policy Framework (NPPF)** dated March 2012, issued by Communities and Local Government and the accompanying **'Technical Guidance to the National Planning Policy Framework'** also dated March 2012;
- Local Planning Policy contained within the Havant Borough Council Local Development Framework **Core Strategy** (adopted 2011), with particular reference to **Policy CS15 'Flood Risk and Erosion'**, which states

'Development in areas at risk of flooding now and in the future as identified on the latest Environment Agency flood risk maps and Strategic Flood Risk Assessment climate change maps will only be permitted where:

1. It meets the sequential and exception test (where required) in relation to PPS25.
2. The site is located in a low hazard area as defined in the Strategic Flood Risk Assessment.
3. A site-specific flood risk assessment demonstrates that the development will be safe, including the access, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.
4. The scheme incorporates flood protection, flood resilience and resistance measures appropriate to the character and biodiversity of the area and the specific requirements of the site.
5. Appropriate flood warning and evacuation plans are in place.
6. New site drainage systems are designed taking account of events which exceed the normal design standard.
7. All development will be required to ensure that there is no net increase in surface water runoff. Priority should be given to incorporating Sustainable Drainage Systems (SuDS) to

manage surface water drainage, unless it is proven that SuDS are not appropriate. Where SuDS are provided arrangements must be put in place for their whole life management and maintenance.

8. The council will work with partners to implement the Coastal Policy Zones in the North Solent Shoreline Management Plan to ensure that development avoids areas at risk from coastal erosion and coastal flooding and that areas required to offset coastal squeeze and prevent habitat fragmentation, to allow species to adapt to climate change, are identified and protected from development.

- The **PUSH Strategic Flood Risk Assessment (SFRA)**, released in December 2007;
- The **EA's Flood Risk Standing Advice (FRSA)**, the latest revision of which (version 3.0) was issued in January 2011.

1.3 Vulnerability and the NPPF Sequential Test

The NPPF follows a sequential risk-based approach in determining the suitability of land for development in flood risk areas, with the intention of steering all new development to the lowest flood risk areas.

NPPF Technical Guidance Table 2 confirms the '*Flood risk vulnerability classification*' of a site, depending upon the proposed usage. This classification is subsequently applied to Table 3 to determine whether:

- The proposed development is suitable for the flood zone in which it is located, and;
- Whether an Exception Test is required for the proposed development.

The proposal is for residential development, which Table 2 considers as 'More vulnerable' development. 'More vulnerable' development is considered acceptable in Flood Zones 1, 2 and 3a (subject to the Exception Test).

A rigid application of the Sequential Test is unlikely to be passed since, for relatively small developments, it is almost certain that a lower risk site would be available elsewhere in the Borough. However, development within Hayling Island needs more careful consideration. There is a need for additional housing on the Island to meet local requirements and this can only be provided on the Island itself.

In terms of applying the sequential test it is inappropriate to look for alternative sites borough wide when there is evidently a need for housing on Hayling Island. For this reason the Sequential Test should be limited to Hayling Island.

Hayling Island is low lying and much of the Island is at risk of flooding. It is relevant to note that the whole island is served by the A3023. This road forms the link from the south of the Island to the mainland and Havant Town Centre. Although three other roads run parallel to it, in part, the island is entirely dependent upon this artery which crosses the bridge at Langstone Harbour to the mainland.

There are large areas of residential development situated within Flood Zone 3 which predate current concerns about flood risk. Development which is proposed today must consider the flood risk issues and take a measured approach to the risks.

Within the Island the opportunities for development are also constrained by proximity to the road network and other planning considerations. Therefore there are relatively few potential sites for this type of residential development.

Hayling Island is one of 5 distinct areas identified in the Havant Borough Draft Local Plan (Allocations). The total housing requirement for the period 2006 to 2026 is 660-727 units of which some are built, some permitted and some covered by potential windfalls, leaving 213-280 to be allocated between 2012 and 2026.

It is noted that the Havant Borough Draft Local Plan (Allocations) has identified 3 sites exclusively for residential development and a further two sites for mixed uses including residential. All 5 of these sites are located at the southern end of the Island. This necessitates the maximum travel northwards to be able to leave the Island. There is no choice of sites towards the middle or north of Hayling Island for residents who wish to commute a lesser distance to reach the mainland.

Although the proposed allocations have largely avoided areas at risk of flood it is noted that 75 housing units are proposed at Beachlands (site HY45). This site is located on the shore side and is potentially affected by flooding. The plan states:

The area adjacent to the site is at risk of coastal flooding, in Flood Zone 3 and likely to be affected by wave action. Much of the site is also within PUSH SFRA 2115 tidal Flood Zones 2 and 3. A FRA is therefore required to demonstrate that the development is safe in flood risk terms over its full lifetime.

Thus in allocating this site the Council has concluded that it must be satisfactory in respect of the Sequential Test.

In respect of the other sites identified in the Draft Local Plan it is noted that Land North of Rook Farm (UE35) which provides 119 units is "uncertain for waders use in the Solent Waders and Brent Goose Strategy". The site of UE21 is a mixed use site providing for 56 dwellings. The plan states "The greenfield part of the site is identified as an 'uncertain' site for Brent Geese and waders and is within Havant Biodiversity Action Plan (BAP) action area".

Thus in terms of alternative sites Hayling Island has a limited choice of development sites. If one of the sites identified by the Council is subject to flooding and two others are "uncertain" because of wading birds it is evident that alternative sites are not readily identifiable.

If these sites, which are proposed for allocation, do not come forward then the Island will suffer a serious shortfall in its housing provision. It will be necessary to find alternative land. The site the subject to this application would make only a very small contribution, but it is land which is available for development now, without significant encumbrances.

1.4 NPPF Exception Test

The site is shown on the EA Flood Zone maps as falling within Flood Zone 3 'high probability'. The Exception Test has been carried out in accordance with the NPPF. The NPPF paragraph 102 states:

"...For the Exception Test to be passed:

- it must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk, informed by a Strategic Flood Risk Assessment where one has been prepared; and*
- a site-specific flood risk assessment must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall."*

In relation to part 1 of the Exception Test the vast majority of existing housing on Hayling Island is to the south of the Island. The Draft Local Plan promotes housing only in the south of the Island. There is no allocation of new housing to the north of the Island.

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The benefit of the proposed site is that it offers housing close to the north of the Island. This would provide the community with greater choice of residential location. Residents of this site would avoid the need to travel the length of the A3023 and would not suffer the regular congestion on the road.

The site is more sustainably located in respect of access to the mainland, to Havant Town Centre, to the rail and motorway networks.

In the event of a flood warning occupants of these dwellings would be able to leave the Island more quickly and easily than those located in dwellings to the south. Occupants would have the choice of leaving in advance of an inundation or waiting until the waters subsided. This choice may not be available to residents to the south.

Given that the A3023 itself passes through areas within Flood Zone 3 once an inundation occurs the whole of the Island would be isolated from the mainland until waters subsided. However as the flooding is tidal it can be predicted and its duration calculated.

The development of this site offers a more sustainable location and greater convenience than land south of the Island which is being allocated by the Council.

The details provided within this FRA address the second part of the Exception Test and demonstrate that the site is safe for its lifetime.

2 Existing Site & Proposals

2.1 Site Description

The site is located on land adjacent to 132 Havant Road, Hayling Island, Hampshire (OS grid reference 517,940m E, 168,830m N; see location plan provided in Appendix 1).

The 0.37ha site is currently used as a paddock and is accessed from the lane adjacent to 132 Havant Road.

The western boundary is bordered by Havant Road and there are residential properties to the north and south. The eastern end of the site is bordered by a commercial property and open fields.

2.2 Proposed Development

The proposal is for the construction of 4 new detached dwellings, details of the proposal are provided on the drawing by Chris Flint Associates in Appendix 3.

2.3 The Sea, Watercourses & Flood Defences

The site is not protected by formal flood defences and is exposed to tidal flood risk from Langstone Harbour and also from a ditch to the north which is designated as Main River and understood to be called Pound Croft. The ditch is thought to suffer from periodic flooding due to flows backing up during high tides, however the anecdotal evidence from the current owners of the site is that this does not cause extensive flooding.

In the EAs response letter to the original application they confirm that the site is protected by a sea wall and is currently protected to the current 1 in 200 (0.5%) annual probability flood event. However when taking into account the impact of climate change from the year 2048 the wall will be overtopped and the site will be impacted by flooding.

2.4 Topography

A topographic survey of the site, to OS Newlyn datum determined has been carried out by J. Brothers & Partners Land Surveyors and Engineers and is provided in Appendix 2.

The survey indicates that ground levels over the site are relatively flat and vary between 1.99m AOD on the north west boundary of the site to 2.47m AOD located in the south east corner of the site.

3 Flood Risk

3.1 EA Flood Zone

The initial phase in identifying whether a site is potentially at risk of flooding is to consult the EA's Flood Zone maps, available on the EA's website and reproduced in Figure 3.1 below.

Figure 3.1: EA Flood Zone Map



This indicates that the site lies in the following zone:

Flood Zone 3 'high probability' - land assessed as having a greater than 1 in 200 and annual probability of tidal flooding (>0.5%).

The Flood Zone map indicates that Flood Zone 3 extends in all directions from the site and also affects the road.

3.2 The PUSH SFRA

As noted in Section 1.2, the PUSH SFRA was released as a 'final version' in December 2007. Copies of the maps are included in Appendix 5 and the information of relevance to the site is provided below:

- Historical Flooding;
- Flood Hazard

The EA issues warnings of anticipated tidal flooding within this area and, due to the relatively long lead times, substantial forewarning of an impending flood event can generally be provided. This enables the Council, emergency services, residents and businesses to prepare in an endeavour to minimise property damage and risk to life.

3.3 EA Modelled Flood Level Data

The data provided for the previous FRA has been used as a basis for this assessment and is summarised as follows.

Table 3.1: EA Modelled Flood Levels

Flood Event (Annual Probability)	Flood Level (m AOD)
1 in 200 (0.5%)	3.3
1 in 200 plus allowance for climate change	4.4

A comparison of the topographic survey with the above flood levels confirm that the site would be impacted to a maximum depth of about 2.4 metres at the 1 in 200 annual probability plus climate change flood event.

3.4 Flow Routes and Flood Storage

It is important to consider the potential for development to impact on flow routes and/or flood storage. In this case the dominant flood risk is tidal and as such the issues of flood storage are not significant. The rate of rise of flood waters would be relatively slow and due to the generally flat nature of the topography flows will be relatively uniform and as such the proposals would not affect flow routes. The ditch to the north has a very small catchment and so flows will be small. Flooding is most likely the result of tidal waters flowing back up the ditch or due to the inability of the water to escape during high tides. In either case there is unlikely to be significant risk to the site from this watercourse and this is supported by local information.

In any case the design of the proposed building would be such that the ground floor would be floodable and as such there would be negligible impact on flood storage.

Figure 3.3: Aerial view of site and surrounding area



4 Mitigation Measures

The proposed dwellings would be located in the 'High Probability' Flood Zone 3a. Mitigation measures have been incorporated into the development as detailed in the following sections to ensure the building is safe and the risks from flooding are minimised.

4.1 Proposed Development Ground Floor Levels

Due to the depths of flooding it is not practical to raise the ground floor levels above the 1 in 200 year plus climate change level as recommended by the Environment Agency. Current EA guidance recommends that the minimum ground floor levels of residential developments are set at:

- 300mm above the 1 in 200 (0.5%) annual probability plus allowance for climate change flood level (if it is available)

It is therefore proposed that the ground floor be devoted to garaging and less vulnerable uses such as utility rooms, storage, swimming pool and personal gym which will be resilient to flooding. The first floor will contain the habitable rooms and the minimum floor level would be 4.7m AODN thus achieving the EA guidance for the residential component.

The EA also mentioned in their letter to Havant Borough Councils planners that they would recommend that safe refuge is provided above the 1 in 1000 (0.1%) annual probability flood level of 4.6m AOD. The proposed development has all habitable rooms located on the first floor at a level of 4.7m AOD, and therefore is compliant with this recommendation.

4.2 Flood Resistance and Resilience Measures

As the ground floor of the building is to be constructed to a level lower than the 1 in 200 (0.5%) annual probability flood level, the building will need to incorporate materials that will not be damaged by occasional flooding.

Due to the predicted flood depths at the site it is not viable to exclude all water entering the property therefore in line with '*improving the flood performance of new dwellings*' document produced by the Department of Communities and Local Government (CLG), a water entry strategy has been deemed most appropriate as the external pressure that would be acting upon the external structure due to depths exceeding 600mm would be too high.

5 Safe Access

It is recommended that new development is provided with safe access arrangements to land lying outside the floodplain.

5.1 Safe Access Route & Flood Hazard

The main access to the Island is along Havant Road. Based on the flood levels during a 1 in 200 year plus climate change event it is highly unlikely that safe access could be provided in accordance with FD2320. Due to the relatively short duration of tidal flooding it would therefore be preferable to adopt a stay put approach within the properties, which would themselves be safe.

5.2 Flood Risk Management Plan

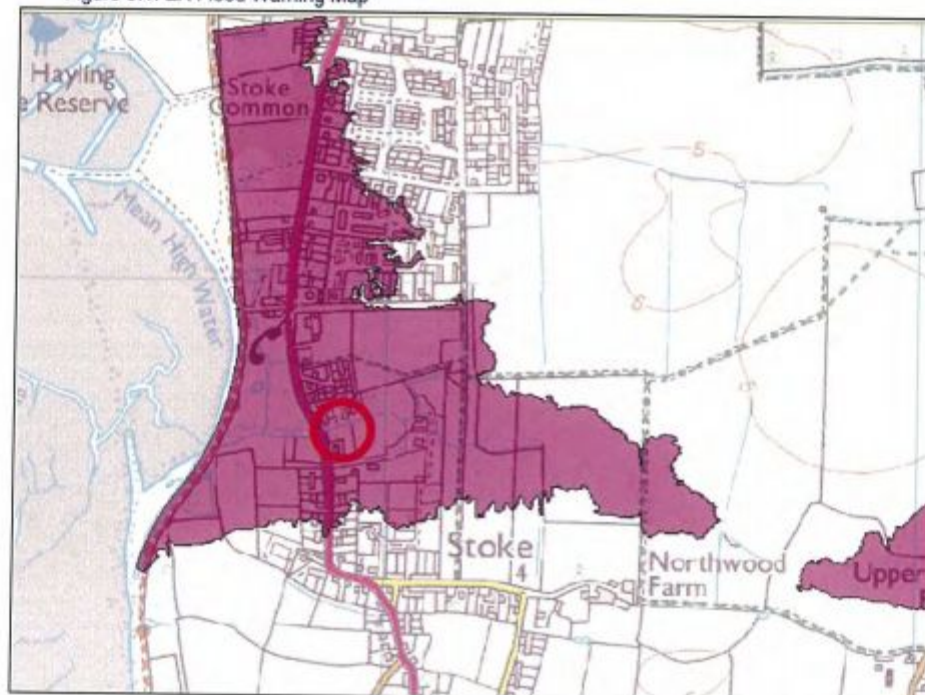
A draft Flood Risk Management Plan (FRMP) has been prepared for the proposed development, and is included in Appendix 7. This document ensures the occupants are made aware of the flood risk at the site and of the appropriate measures if the area was to be flooded. It should be noted that there is a significant advance notice of tidal flooding.

It should be emphasised that any generic guidance provided in the FRMP would be superseded by the information provided by Havant Borough Council and/or the Emergency Services at the time. The applicant will also register to receive Flood Warnings Direct from the EA for the site.

Flood warnings are broadcast on TV and radio weather and travel bulletins and, in designated flood warning areas, direct to the local community by siren, loudhailer or flood wardens, and in high risk areas by phone or fax.

The flood warning information on the EA website is updated every 15 minutes. All warnings are also available through the EA's 24 hour Floodline service 0845 988 1188. Furthermore, people may sign up to Flood Warnings Direct (FWD) to receive a pre-recorded flood warning message sent to their home, work or mobile phone number.

Figure 5.1: EA Flood Warning Map



The importance of flood warning in the management of safe access arrangements for new development is highlighted in paragraph 103 of the NPPF, which states the following with regard to the Exception Test:

"When determining planning applications, local planning authorities should ensure flood risk is not increased elsewhere and only consider development appropriate in areas at risk of flooding where, informed by a site-specific flood risk assessment following the Sequential Test, and if required the Exception Test, it can be demonstrated that:...

- development is appropriately flood resilient and resistant, including safe access and escape routes where required, and that any residual risk can be safely managed, including by emergency planning..."*

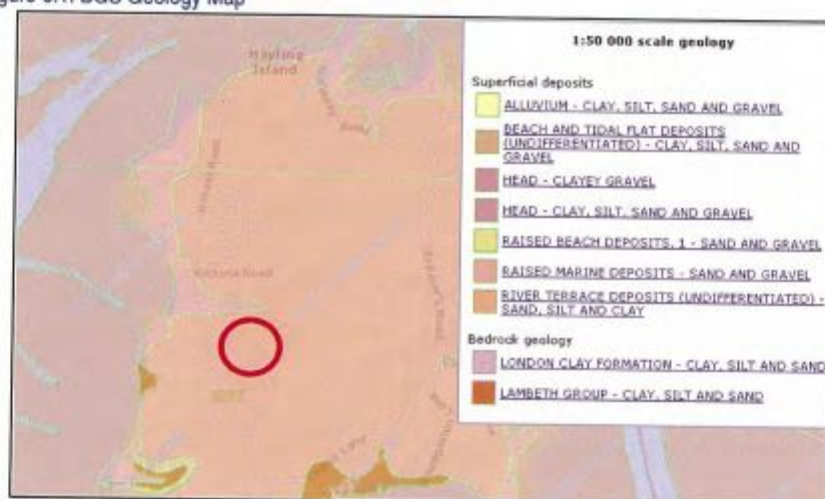
Havant Borough Council, as the Local Planning Authority, is responsible via planning condition or agreement to ensure that such plans are suitable. This should be done in consultation with Local Authority emergency planning staff. It should be emphasised that any generic guidance provided in the FRMP will be superseded by the information provided by the Local Authority and/or the Emergency Services at the time.

6 Surface Water & SuDS

The NPPF recognises that flood risk and other environmental damage can be managed by minimising changes in the volume and rate of surface runoff from development sites, and recommends that priority is given to the use of Sustainable Drainage Systems (SuDS) in new development, this being complementary to the control of development within the floodplain.

The primary sustainable drainage (SuDS) technique is infiltration drainage, based on the available information on the geology of the site it is thought that the ground conditions south of the watercourse running along the northern boundary of the site, are likely to be River Terrace Deposits (Undifferentiated) - Sand, Silt And Clay and therefore may be suitable for infiltration, however this will also depend on the ground water level in the area and would need to be confirmed through a ground investigation and infiltration testing. Due to the sites location and its proximity to the sea, we expect the ground water level to be too high to allow infiltration.

Figure 6.1: BGS Geology Map



6.1.1 Existing Surface Water Drainage Arrangements

The site is currently undeveloped and is considered as a greenfield site, therefore no formal drainage system is located on site, as such the drainage would be via natural means; either infiltration directly into the subsoil, or surface runoff across the site into the Pound Croft.

6.1.2 Allowable Discharge Rates

The greenfield runoff rates have been calculated based on the 'Preliminary rainfall runoff management for developments – Technical report W5-074A/TR/1', Rev. E (Jan 2012) document by Defra/EA and are listed in Table 6.1.

Table 6.1: Calculated greenfield runoff rates

Rainfall Event	Greenfield Discharge Rate (l/s)
1 in 1 year	1.8
1 in 30 year	4.9
1 in 100 year	6.8

6.1.3 Building Regulations Hierarchy

The NPPF recognises that flood risk and other environmental damage can be managed by minimising changes in the volume and rate of surface runoff from development sites, and recommends that priority is given to the use of Sustainable Drainage Systems (SuDS) in new development, this being complementary to the control of development within the floodplain.

The Building Regulations Requirement H3 stipulates that rainwater from roofs and paved areas is carried away from the surface to discharge to one of the following, listed in order of priority:

- a) an adequate soakaway or some other adequate infiltration system,
- b) a watercourse, or where that is not practicable,
- c) a sewer.

6.1.4 Suitability of Drainage via Infiltration

In accordance with the aforementioned Building Regulations H3 hierarchy, the first option when assessing the disposal of surface water is for drainage via infiltration methods, if feasible.

It is expected that due to the sites close proximity to the watercourse and the tidal influence in the area that ground water levels are too high to allow infiltration to be feasible.

6.1.5 Suitability of Drainage via Watercourse

The second option when assessing the disposal of surface water, where infiltration is not feasible, is via discharge to a watercourse.

Therefore the proposed outline drainage strategy proposes to discharge to the adjacent watercourse.

6.1.6 Outline Surface Water Drainage Strategy

The outline surface water drainage strategy is shown on PBA drawing 27859/001/001 in Appendix 6. The design incorporates the following features/requirements:

- Pipe network with on site with on-site temporary storage of surface water provided within Cellular Storage;
- There is no surface flooding up to the 1 in 30 year rainfall event;
- The attenuation volumes have been designed to provide sufficient storage at the 1 in 100 annual probability plus 30% allowance for climate change rainfall event;
- An outlet control will limit peak surface water runoff to no greater than the equivalent greenfield rate;

The proposed discharge rates from the proposed development are provided in Table 6.2 below.

Table 6.2: Proposed surface water discharge rates

Rainfall Event	Peak Discharge Rate (l/s)	
	Existing (greenfield)	Proposed
1 in 30 year	4.9	3.9
1 in 100 year	6.8	4.3
1 in 100 year plus 30%	-	4.9

The above results confirm that the proposed drainage strategy limits the discharge rate at the 1 in 100 annual probability plus 30% allowance for climate change rainfall event, to the 'existing' 1 in 100 annual probability greenfield runoff rate.

Since the greatest demand for on-site storage is at the most severe (1 in 100 annual probability plus 30% allowance for climate change) rainfall event, it is clear that the design provides sufficient storage for the lower order events.

The drainage strategy has been designed to ensure no surface flooding at the 1 in 100 annual probability plus 30% allowance for climate change rainfall event (this exceeds the requirement in NPPF, that there shall be no property flooding at this event).

To ensure the volume of water discharged from the site is not increased from existing, rainwater harvesting and green roofs may be incorporated if found suitable.

7 Conclusion

This FRA has been prepared to accompany a planning application for 4 proposed new dwelling on land adjacent to 132 Havant Road, on Hayling Island.

The EA Flood Zone map indicates that the site is within Flood Zone 3 'High Probability'. The EA's detailed hydraulic modelling confirms that the site is located within the 1 in 200 annual probability plus allowance for climate change floodplain.

A water entry strategy has been adopted for the proposed development for the ground floor level. All habitable accommodation will be located on the 1st floor and above, a minimum of 300mm above the 1 in 200 (0.5%) annual probability flood level.

The ground floor level will incorporate flood resilience measures ensuring if the development is flooded, damage is kept to a minimum and the property can be used quickly once water has receded.

Safe refuge is available for each property in the development; occupants are advised to remain within their properties due to the relatively short duration of tidal flooding. The Flood Risk Management Plan will detail the necessary arrangements and key contacts which is to be prepared for the development.

In conclusion, the proposed development meets the requirements of the NPPF.

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