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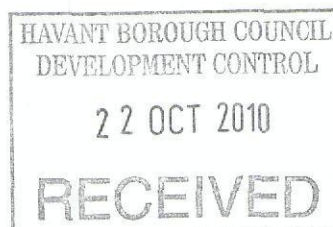
**No 34, The Kench
Ferry Road
Hayling Island
Hampshire**

Flood Risk Assessment

Prepared: October 2010



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1. Executive Summary

1.1 Scope & Background

This Flood Risk Assessment (“FRA”) has been prepared to support a planning application for the construction of a new single bungalow located at No 34, The Kench, Hayling Island Hampshire to replace an existing bungalow on the site.

The report has been prepared in accordance with the guidance set out in Planning Policy Statement 25, Development and Flood Risk (PPS25), Annex E and summarises the methodology and the conclusions of the FRA.

The key principles have been used when considering the proposals are as follows:

- protection of residents of the new proposed development
- identification of potential flood risks
- the impact or change of potential flood risks to third parties as a result of the development

This report has reviewed information contained in the Partnership for Urban South Hampshire (“PUSH”) Strategic Flood Risk Assessment and also information provided by the Environment Agency.

1.2 Flood Risk Categorisation

The Environmental Agency have indicated that they consider the site of the proposed re-development to be in a Flood Zone 3 “high probability” where the annual risk of tidal flooding is estimated 1 in 200 (0.5%) or greater. However, analysis of the available flood level and topographical data indicated that the site of No 34, The Kench is actually located within Flood Zone 1 “low probability” where the annual risk of tidal flooding is 1 in 1000 (0.1%) or less, (when the presence of defences is ignored). Full details of this Flood Zone from PPS25 Annex D Table D.1 are provided in Section 4.3.1.

1.3 Design

No 34 The Kench is located at the highest topographical point within the overall Kench site, and is as a consequence approximately 1.5m higher than the average AOD for The Kench. It is proposed that the floor level be set at a level which is the highest natural topographical height on the plot at approximately 5.5m AOD and will provide a margin of mitigation against the possible flood risk from localised flooding, and includes an adequate allowance for potential impacts of climate change.

This level is in excess of the 1 in 1000 (0.1%) annual probability 2115 tidal level for the site of No 34.



The impermeable area of the re-development will be increased as a result of the proposal due to the increased foot- print; whilst this will lead to an increase in the surface water run-off from the site, the impact would be anticipated to be negligible as the site is understood to drain to the tidal waters of Langstone harbour and environs.

1.4 Access

The floor levels of the proposed re-development bungalow at No 34 are above the 1 in 200 flood level with allowance for climate change in year 2115 however the access via the Ferry Road is at a lower level and is considered to be at significant risk of flooding. This potential risk can be mitigated by the flood warning procedures described in Section 4.6.

Tidal flood events can be accurately estimated and the site is located within an EA “flood warning area” (see Section 4.6), therefore it is considered that safe access/egress can be provided to the site, as the site can be evacuated in advance of the peak of any such event.

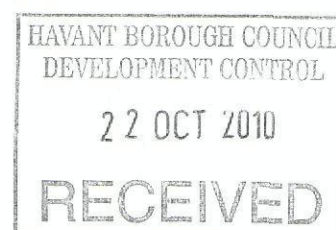
1.5 Residual Risk

No 34 has a materially lower risk to flooding due to the natural topography when compared to the surrounding area, and in addition the design mitigates the risk of flooding by raising the floor levels above those of the existing bungalow to take account of the natural benefits afforded by the topography. There always remains a possibility of a flood greater than the design case.

The site is in an area that is not protected by flood defences. Whilst there are some flood defences in the vicinity of the site identified within the PUSH SFRA the defences would not prevent the site from flooding should levels in Langstone Harbour exceed ground levels at the site.

1.6 Conclusion

The use of suitable construction techniques combined with the proposed mitigation arrangements in addition to the natural topographical advantages of the site itself demonstrate a suitable solution that will minimise the risk of flooding to the proposed re-development of the bungalow at No 34 and its residents, and ensure the proposals do not cause an increase of flood risk to the surrounding area.



2. Introduction

UK Government policy with respect to development in flood risk areas is contained within the Department of Communities and Local Government Planning Statement 25 (“PPS25”) ‘Development and Flood Risk’ which was issued on 7th December 2006.

PPS25 further develops on the previous guidance contained in the Planning Guidance Note 25 (PPG25) ‘Development and Flood Risk’ which was issued on 17th July 2001, it self based on the DoE Circular 30/92.

The accompanying ‘Development and Flood Risk: A Practical Guide’ was issued in June 2008 and the EA’s updated National Standing Advice to Local Planning Authorities for Planning Applications – Development and Flood Risk – England, was issued in March 2007.

This FRA has been prepared to support a planning application for the replacement and construction of a single bungalow at No 34, The Kench, Hayling Island.

The Local Planning Authority (“LPA”), Havant Borough Council will make the final decision with regard to any planning application. PPS25, paragraph 26, confirms the “Following the coming into force on 1st October 2006 of the amendment to Article 10 of The Town and Country Planning, General Development Procedure Order 1995 (the “GDPO”), the LPA is required to consult the Environmental Agency on all applications for development in flood risk areas (except minor development), including those in areas with critical drainage problems and for any development on land exceeding 1 hectare outside flood risk areas.

Statutory Instrument 2006 No. 2375: The Town and Country Planning, General Development Procedure Amendment No.2 (England) Order dated 1st October 2006, proscribed that the Environmental Agency should be consulted for planning applications where flood risk is a key issue.



3. Proposed Development Site

3.1 Site Location and Plan

The Kench forms part of a peninsula towards the southwest of Hayling Island and is accessible from the Ferry Road from the east. To the south of The Kench is Sinah Common, and to the north is Langstone Harbour, with the entrance to the harbour to the west. Copies of the site location plans are included in Appendix 1.

OS grid reference for the site is 468918m E, 99961m N

3.2 Survey Data

The topographical data referenced in this report dates from November 2008. The Kench undulates; the site of No 34 is located on/near the highest point within The Kench with existing ground levels on the site ranging between 4.0m AOD and 5.5m AOD. The plot is surrounded by grass and small shrubs and with access into The Kench from the Ferry Road adjacent to the plot on the eastern side.

3.3 Development Proposals

The proposal consists of the removal of the existing bungalow and the construction of a new residential bungalow that will be designed to achieve both a high level of energy efficiency and use environmentally friendly construction technologies.

3.4 Flood Defences

Existing Flood Defences

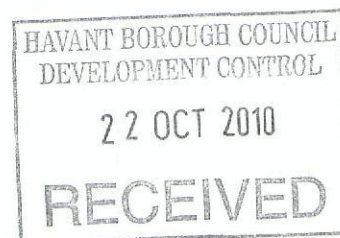
Langstone Harbour is tidal and the water levels are not controlled in the harbour. If the water levels in Langstone Harbour were to rise above the level of the ground adjacent to the site, there remains a margin of safety from flooding due a combination of the natural topography of the site of No 34 and the proposed bungalow design.

Proposed Flood Defences

There are no known currently proposed flood defences that will benefit the area or the site.

3.5 Vulnerability

PPS25 Table D.2 confirms the Flood Risk Vulnerability Classification of a site depending upon the proposed usage. This classification is subsequently applied to PPS25 Table D.3 to determine the following:



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

In this case, the proposals call for the replacement of an existing residential bungalow with a new more energy efficient and environmentally friendly bungalow. Reference to Table D.2 confirms that the proposed development falls under the 'More Vulnerable'.

The suitability of the proposed development at the site is discussed further in Section 4.

4. Assessment of Risk

The level of detail entered into in any FRA is dependent upon the scale and potential impact of the proposed development. In this case the FRA is to support the planning application for a single storey residential bungalow, which will replace the existing bungalow on the site.

4.1 Strategic Flood Risk Assessment

PPS25 sets out the process whereby regional planning bodies or local planning bodies should prepare Strategic Flood Risk Assessments in consultation with the Environmental Agency. These assessments will then be used to refine information on areas that may flood, taking into account other sources of flooding and the impact of climate change.

Havant Borough Council as part of the PUSH has commissioned such an assessment.

4.2 Local Plan

The site of No 34, The Kench is not mentioned within the Havant Council Local Plan however the proposals for No 34 are in keeping with the existing developments on the adjacent plots at The Kench.

The site falls within the boundary of an area designated as a Coastal Zone and should therefore comply with Policy C3 of the Havant Borough District Local Plan. Policy C3 states that any development should contribute positively to the landscape and has regard to the best practice on design of new buildings in coastal locations.

4.3 Flood Zones

4.3.1 Existing Information on Flood Risk

The main risk of flooding to the area is from tidal sources, as the site is located inland (but not immediately bordering) the water within

Langstone Harbour. Information from the Environmental Agency ("EA") relating to the area is as follows:

I. Flood Zone Maps

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 website. However these are (sometimes) based on rough scale modelling and are only indicative of the flood risk to a site.

The Flood Zones divide the floodplain into four categories of flood risk and do not take account of flood defences; PPS25 defines the Flood Zones as:

- **Zone 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%)
- **Zone 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
- **Zone 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.
- **Zone 3b: The Functional Floodplain** – This zone comprises land where water has to flow or be stored in times of flood. This flood zone has 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.

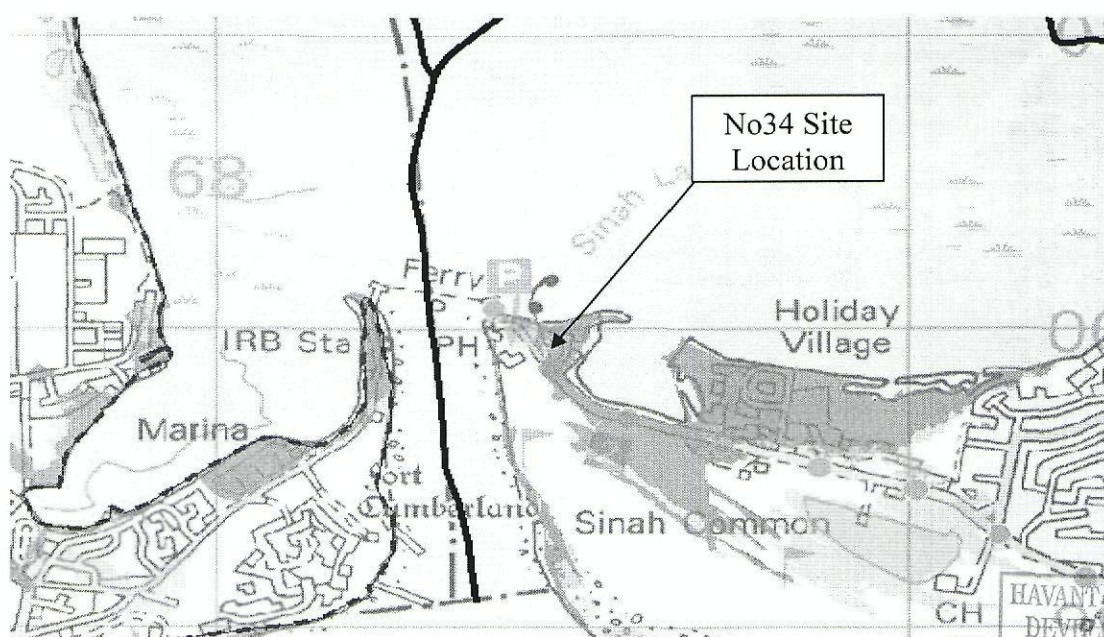


Fig: Environmental Agency Flood Zone Map showing The Kench and surrounding area.



The Environmental Agencies current flood zone map for The Kench area is shown above. This indicated that the site lies within Flood Zone 3 (marked in blue). Flood Zone 3 is defined as having a 1 in 200 (0.5%) or greater annual probability of tidal flooding in any year. Further analysis of the zone is detailed in Section 4.3.2. There is no indication on the map that there is evidence of flood defences.

The EA flood zone map extent does not take into account any reduction in flood levels or extent due to the presence of existing flood defences in the area and only shows the full breach scenario. In addition, it takes no account of the volumes of water that would enter the area but simply projects the flood level until it reaches ground of the same level.

II. EA Tidal Flood Level

The EA have provided both the 1 in 200 (0.5%) annual probabilities and the 1 in 1000 (0.1%) annual probability flood levels that they expect for the site, as shown in Table 4.1 below.

Year	Flood level (m AOD) 1 in 200 (0.5%) annual probability	Flood level (m AOD) 1 in 1000 (0.1%) annual probability
2010	3.3	3.5
2025	3.3	3.5
2055	3.6	3.8
2085	4.0	4.2
2115	4.4	4.6

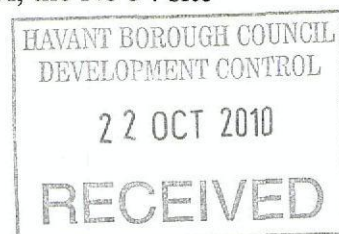
Table 4.1: EA Tidal Flood Levels

PPS25 requires that consideration is given to the impacts of climate change for the lifetime of the development. Since the proposed development in this case is a replacement residential bungalow, a 100-year design life has been conservatively assumed. Therefore, a 1 in 200 (0.5%) annual probability tidal level projected for 2115 is used for the analysis of flooding risk.

4.3.2 Impact of Flood Levels on No 34 Site

No 34, The Kench has a range of ground levels ranging from approximately 4.0m to 5.5m AOD. The present day 1 in 200 (0.5%) annual probability flood level at the site is 3.3m AOD. Therefore the existing ground is approximately between 0.7m and 2.5m above the 1 in 200 (0.5%) annual probability levels. The ground levels on the site are in excess of the present day 1 in 1000 (0.1%) annual probability flood level at 3.5m AOD.

Based on the topographic data and the flood levels provided by the EA, the No 34 site at The Kench is within Flood Zone 1 (Low probability).



4.3.3 Impact of Climate Change

Annex B of PPS25 confirms that there is an increasing body of scientific evidence that the global climate is changing as a result of human activity. It states in paragraph B5 that *'Global sea level rise will continue to rise, depending on greenhouse gas emissions and the sensitivity of the climate system. The relative sea level rise in England also depends on the local vertical movement of the land, which is generally falling in the south-east and rising in the north and west. Allowances for the regional rates of relative sea change rise shown in Table B.1 should be used as a starting point for considering flooding from the sea, along with the sensitivity ranges for wave height and wind speed in Table B.2 in preparing flood risk assessments'*.

Net Sea Level Rise (mm/yr) Relative to 1990

Administrative Region	1990-2025	2025-2055	2055-2085	2085-2115
East of England, East Midlands, London, SE England	4.0	8.5	12.0	15.0

Table 4.2 Extract from PPS25 Table B.1 – recommended contingency allowances for net sea level rise

PPS25 requires that consideration is given to the impacts of climate change for the lifetime of the development. Since the proposed development in this case is a residential bungalow, a 100-year design life has been conservatively assumed.

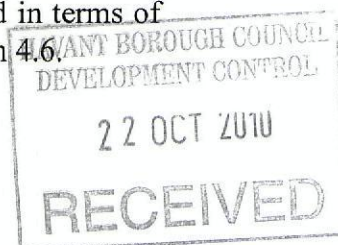
The EA have provided tidal flood levels for the lifetime of the development, see Table 4.1 above. Based on the sea level rises indicated in Table B.1 above which sum to 1.05m AOD, this indicated a 1 in 200 (0.5%) annual probability flood level including allowance for climate change to 2115 flood level of 4.4m AOD.

Annex B, paragraph B9, states that *'In making an assessment of the impacts of climate change on flooding from the land, rivers and sea as part of the flood risk assessment, the sensitivity ranges in Table B.2 may provide an appropriate precautionary response to the uncertainty about climate change impacts on rainfall intensities, river flows, wave height and wind speed.'*

Parameter	1990-2025	2025-2055	2055-2085	2085-2115
Peak rainfall intensity	+5%	+10%	+20%	+30%
Peak river flow	+10%	+20%	+20%	+20%
Offshore wind speed	+5%	+5%	+10%	+10%
Extreme wave height	+5%	+5%	+10%	+10%

Table 4.3: extract from PPS25 Table B.2. Recommended national precautionary sensitivity ranges for peak rainfall intensities, peak river flows, offshore wind speeds and wave heights.

The main factor is to ensure that any building floor levels are set at a height to give adequate protection should the flood risk alter as a result of climate change. The potential for increased flood risk as a result of such factors are addressed in terms of the recommended mitigation measures that are reviewed further in Section 4.6



Climate change over the lifetime of the proposed re-development is taken into account. Since the proposed re-development in this case is a residential bungalow, a 100 year design life has been conservatively assumed. The 1 in 200 (0.5%) annual probability flood levels projected for 2115 are provided in Table 4.4 below. It should be noted that these are conservative flood levels as they assume that any flood defences will remain at their existing levels, irrespective of sea levels.

4.3.4 Extreme Flood Level – Impact on Development Site

The EA provided an extreme (1 in 1000 year or (0.1%) annual probability) flood level for The Kench site. Flood levels for both the 1 in 200 year (0.5% annual probability) flood level and 1 in 1000 (0.1% annual probability) are summarised in the table below.

	1 in 200 (0.5%) annual probability (m AOD)	1 in 1000 (0.1%) annual probability (m AOD)
2010	3.3	3.5
2115	4.4	4.6

Table 4.4: Extreme flood levels

4.3.5 Hydraulic Modelling

Flood levels provided by the EA have been used in the preparation of this flood risk assessment.

4.3.6 Impact of Development on Site Permeability

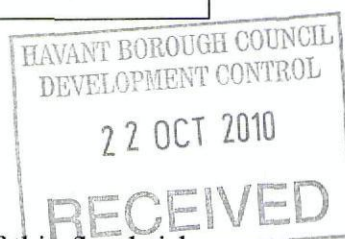
Any increase in the impermeable surfacing over the area would represent an increase risk of flooding due to the increase in runoff potential and the rate at which surface water rainfall enters water courses or other water bodies.

The existing site currently has a residential dwelling in-situ with a footprint of approximately 30m²; the proposed re-development will have a footprint of approximately 70m². This would be an increase in the surface water run-off by 40m². The surface water for the site drains into Langstone Harbour and environs, which is a tidal water body. Therefore, whilst the proposed re-development would increase the impermeable area of the site, the impact on surface runoff from the site is anticipated as being minimal.

Surface water drainage is discussed further in Section 4.5.

4.4 The Sequential Test & Exception Test

PPS25 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 developments to the lowest flood risk areas.



PPS25 Annex D confirms *'The risk-based Sequential Test should be applied at all stages of planning. Its aim is to steer new development to areas at the lowest probability of flooding.....within each flood zone, new development should be directed first to sites at the lowest probability of flooding and the flood vulnerability of the intended use matched to the flood risk of the site, e.g. higher vulnerability uses located on parts of the site at lowest probability of flooding.'*

As discussed in Section 3.3, the proposals for the site consist of re-placing an existing residential bungalow with a new residential bungalow; reference to Table D.2 confirms that this re-development falls under the 'More Vulnerable' classification. As identified in Section 4.3.2, the EA flood levels confirm that the site is within the Flood Zone 1 "Low Probability".

PPS25 table D.3 explains Flood Risk Vulnerability and Flood Risk 'Compatibility' indicating what level of vulnerability classification is appropriate for each Flood Zone. Developments that are classified as "More Vulnerable" are considered to be appropriate in Flood Zones 1 and 2. "More Vulnerable" developments may be considered to be appropriate in Flood Zone 3 if they pass the "Exception Test".

As this re-development is in Flood Zone 1 the proposals can be considered to be appropriate development.

4.5 Managing Surface Water & SUDS

PPS25 Annex F paragraph 5 states that *'The effective disposal of surface water from development is a material planning consideration in determining proposals for development and use of land'.*

PPS25 Annex F paragraph 6 states that *'Surface water arising from a developed area should as far as practicable, be managed in a sustainable manner to mimic the surface water flows arising from the site prior to the proposed development, whilst reducing the flood risk to the site itself and elsewhere, taking climate change into account. This should be demonstrated as part of the flood risk assessment.'*

PPS25 recognises that flood risk and other environmental damage can be managed by minimizing changes in the volume and rate of surface runoff from development sites though the use of sustainable drainage systems ("SUDS"), this being complementary to the control of development within the flood plain.

It is considered that there is limited potential for use of SUD on this site due to the small scale of the project, proximity to the adjacent property and due to the marginal increase in the risk compared to the existing risk from the property in-situ.

The re-development of No 34, The Kench will increase the impermeable area on site, however the increase relates to a small single bungalow and it is anticipated that the surface run-off is likely to discharge into Langstone Harbour and environs. The increase in impermeable area and the surface water runoff is therefore not considered to cause an increase in flood risk either to the site or to others.



4.6 Risk Mitigation

As previously summarised it is advisable that the finished floor level should be able to have sufficient freeboard above the 1 in 200 year flood level. The proposed re-development plans for No 34, The Kench incorporate optimising the use of the natural topography of the site, so the new bungalow will be raised to the approximate maximum of the existing site which is approximately 5.5m AOD. Thus the floor level would be 2.2m above the 'present day' 1 in 200 (0.5%) annual probability of peak tidal flood risk; 1.1m above the 1 in 200 (0.5%) annual probability of peak tidal risk (in the sea) projected in year 2115; and, 0.9m above the 1 in 1000 (0.1%) annual probability peak tidal flood risk (in the sea) projected to year 2115. Therefore, the floor level is designed to ensure that the residents are safe in the event of potential flood risks for the lifetime of the proposed development.

In the event that a flood risk event is anticipated then the EA aims to give advanced warning of flooding to the public. The Kench is shown as being within a 'Flood Warning Area' (see EA map "blue marked area" in Section 4.3.1). Flood warnings would be broadcast on TV, radio and other suitable media sources as well as local warning for the community by siren, loudhailer/wardens, direct contact etc. Flood warning information is updated every 15 minutes on the EA website, there is a 24 hour flood-line service phone number 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.

4.7 Proposed Construction & Occupancy

Unlike many of the other bungalows at The Kench, it is proposed that the re-development of No 34 will use energy efficient, environmentally friendly construction technology that would enable the bungalow to be used at all times of the year. The response to the potential flood risks have been taken into account in the development planning. Given these considerations it is not believed that there should be any restrictions on occupancy in keeping with the majority of the existing bungalows.

4.8 Residual Risk

It is impossible to completely mitigate the risk of flooding since greater than design events than the current standards are always possible. However, No 34 is located on the highest topographical point of The Kench, and the design is based on using this topography along with suitable building technologies to ensure a material margin of comfort above the risks based on EA models allowances including for continued climate change to year 2115. It should be noted that the EA analysis projecting the tide levels to 2115 does not allow for any improvements to tidal defences from those already in existence.



5 Conclusions

Analysis of the currently available data indicates that the proposed re-development with a replacement bungalow at No 34, The Kench Hayling Island is located within Flood Zone 1 “Low Probability”. The site does not currently benefit from the presence of tidal flood defences.

The vulnerability classification of the proposed development is ‘More Vulnerable’. Subsequent reference to PPS25 Annex D Table D.: Flood Risk Vulnerability and Flood Zone Compatibility confirm that “More Vulnerable” developments in Flood Zone 1 are appropriate in flood risk terms. A summary of the key information and main mitigation measures to be incorporated into the re-development design are as follows:

- The EA have provided a current 1 in 200 (0.5%) annual probability tidal flood risk of 3.3m AOD.
- Based on the climate change sea levels rise requirements in PPS25; the 1 in 200 (0.5%) annual probability tidal flood risk projected level in year 2115 is 4.4m AOD.
- Floor level of the bungalow development will be set at approximately 5.5m AOD, this is in excess of the 1 in 1000 annual probability 2115 tidal flood level at the site. This floor level ensures residents are provided safe refuge up to the design flood event for the lifetime of the proposed development with a material additional allowance for freeboard in the event of wave action.
- The site of the proposed re-development for the bungalow and The Kench as a whole is within a designated flood warning area and therefore residents may receive advanced warning of forecast flooding.
- The replacement and redevelopment of the bungalow at No 34, The Kench will lead to a significant improvement in lowering the risk of flooding compared to the existing risk, however the redevelopment will increase the impermeable area and thus runoff but the overall impact is anticipated to be negligible.

The above analysis is based on the existing flood defences and there does not take into account any future improvements that may occur if sea levels did rise as projected in PPS25.





Appendix 1

Location Plan



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