

Partnership for South Hampshire Strategic Flood Risk Assessment

Level 2 Strategic Flood Risk Assessment for Gosport Borough Council

Gosport Borough Council

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1. Introduction

1.1 Level 1 Strategic Flood Risk Assessment

- 1.1.1 The National Planning Policy Framework¹ (NPPF) and associated Planning Practice Guidance (PPG) for Flood Risk and Coastal Change² set out the active role Local Planning Authorities (LPAs) should take to ensure that flood risk is understood and managed effectively and sustainably throughout all stages of the planning process.
- 1.1.2 The NPPF outlines that Local Plans should be supported by a Strategic Flood Risk Assessment (SFRA) and LPAs should use the findings to inform strategic land use planning.
- 1.1.3 The overall approach of the NPPF to flood risk is broadly summarised in Paragraph 159, which states:

"Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere".

- 1.1.4 AECOM has been commissioned by Portsmouth City Council (CC) on behalf of ten planning authorities in South Hampshire (the 'Partnership for South Hampshire' (PfSH)) to prepare an updated Strategic Flood Risk Assessment (SFRA). The PfSH SFRA covers the administrative areas of Portsmouth City, Havant Borough, Gosport Borough, Fareham Borough, Eastleigh Borough, Southampton City, Winchester City, Test Valley Borough, New Forest District and New Forest National Park Authority.
- 1.1.5 Part 1 (Main Report) and Part 6 (Gosport BC) form the Level 1 SFRA for Gosport BC.

1.2 Level 2 Strategic Flood Risk Assessment

- 1.2.1 The PPG states that where a Level 1 SFRA shows that land outside areas at risk of flooding now or in the future cannot appropriately accommodate all the necessary development, it may be necessary to increase the scope of the SFRA to a Level 2 to provide the information necessary for application of the Exception Test where appropriate.
- 1.2.2 The Level 2 SFRA provides more detailed information about the nature of flood risk in specific areas. This will enable users to:
 - apply the sequential test by identifying the severity and variation in risk within medium and high flood risk areas,
 - begin to identify whether proposed allocations on which the emerging Local Plan will rely, are capable of being made safe throughout their lifetime without increasing flood risk elsewhere, and
 - begin to apply the Exception Test, where relevant.
- 1.2.3 This Level 2 SFRA also identifies further work that may be required by the LPA or developers before the planning application stage, to determine satisfaction of the Exception Test. This Level 2 SFRA on its own does not provide justification for the allocation of specific sites, however it provides recommendations for what would need to be undertaken to satisfy part 2 of the Exception Test.

1.3 Exception Test

1.3.1 The purpose of the Exception Test is to ensure that, where it may be necessary to locate development in areas at risk of flooding, new development is only permitted in Flood Zone 2 and Flood Zone 3 where the flood risk is clearly outweighed by other sustainability factors and where the development will be safe during its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, considering climate change. Table 1-1 identifies when the Exception Test is required. It is

¹ Department for Levelling Up, Housing and Communities. September 2023. National Planning Policy Framework.

https://www.gov.uk/government/publications/national-planning-policy-framework--2 ² Department for Levelling Up, Housing and Communities, Ministry of Housing, Communities and Local Government. August 2022. *Planning* Practice Guidance: Flood Risk and Coastal Change. http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/

noted that some types of development are not permitted, regardless of the application of the Exception Test.

1.3.2 Full details of the vulnerability classifications for different types of development can be found in the Level 1 SFRA and in Table 2 of the PPG (Flood Risk and Coastal Change).

Table 1-1	Flood risk	vulnerability and	d Flood Zone	'incompatibility'	(PPG	Table 2, 2022)
					`	, , ,

Vulnerability Classification		Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
Flood Zone	1	✓	✓	\checkmark	✓	~
	2	✓	Exception Test Required	✓	~	~
	За	Exception Test Required ^a	×	Exception Test Required	~	~
	3b	Exception Test Required ^b	×	×	×	✓ b

✓ - Exception Test is not required × - Development should not be permitted

"a" In Flood Zone 3a essential infrastructure should be designed and constructed to remain operational and safe in times of flood.

"b" In Flood Zone 3b (functional floodplain) essential infrastructure that has passed the Exception Test, and watercompatible uses, should be designed and constructed to:

- remain operational and safe for users in times of flood.
- result in no net loss of floodplain storage.
- not impede water flows and not increase flood risk elsewhere.
- 1.3.3 The NPPF states that for the Exception Test to be passed it must be demonstrated that:
 - a) the development would provide wider sustainability benefits to the community that outweigh the flood risk; and
 - b) 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.
- 1.3.4 Both elements of the test will have to be satisfied for development to be allocated or permitted.
- 1.3.5 To determine Part A of the Exception Test, applicants should assess their scheme against the objectives set out in the Council's Sustainability Appraisal. To demonstrate satisfaction of Part B of the Exception Test, relevant flood risk management and mitigation measures should be applied and demonstrated within a site-specific flood risk assessment (FRA).

1.4 Gosport BC Allocations

- 1.4.1 Gosport BC is developing the Gosport Borough Local Plan 2038³, which will identify sites for housing, employment and other land uses as well as protecting the Borough's important open space, nature conservation and heritage features. It also considers ways in which we adapt and deal with the impacts of climate change.
- 1.4.2 Gosport BC have used the Level 1 SFRA (Part 1 and Part 6) to apply the sequential test and identify strategic development sites. Due to the risk of flooding posed to the following sites, a Level 2 SFRA is required to provide more information regarding the risk of flooding to these areas:
 - Gosport Waterfront Strategic Development Site
 - Blockhouse Strategic Development Site
 - Haslar Strategic Development Site
 - The Piggeries Strategic Development Site

³ Gosport Borough Council, Gosport Borough Local Plan 2038 Webpage <u>https://www.gosport.gov.uk/article/2110/Gosport-Borough-Local-Plan-2038</u>

- Stokesmead, Little Anglesey Road, Alverstoke
- Browndown Camp.
- 1.4.3 This document forms a Level 2 SFRA for Gosport BC. This Level 2 SFRA should be read in conjunction with the Level 1 SFRA Part 1 (Main Report) and Part 6 (Report for Gosport BC).

1.5 Datasets

1.5.1 The following datasets have been used to inform the Level 2 SFRA. Full details of these datasets are included in the Level 1 SFRA (Part 1 and Part 6).

Table 1-2 Datasets

Dataset	Format	Description	Source
Strategic Development Sites	GIS shapefile	Site boundaries provided by Gosport BC.	Gosport BC
LiDAR Topographic Survey	ASCII	Ground level information obtained from Light Detection and Ranging (LIDAR), an airborne mapping technique, which uses a laser to measure the distance between the aircraft and the ground.	Defra Data Services Platform
Flood Map for Planning (Rivers and Sea) Flood Zone 2 and 3	GIS shapefile	Shapefile of Flood Zones 2 and 3, defined as area with medium and high probability of flooding from rivers and the sea, ignoring the presence of defences.	Defra Data Services Platform
3.3% AEP Tidal Defended Flood Extent	GIS shapefile	Flood extent for the 3.3% AEP tidal flood event. Used to identify areas at risk of more frequent flooding from the sea.	Level 1 SFRA
Main River Centreline	GIS shapefile	GIS shapefile of the main rivers in the area.	Defra Data Services Platform
Future Flood Zone 2 and 3	GIS shapefile	Maximum flood extents for the following modelled events, to provide an indication of future flood zones 2 and 3. Future Flood Zone 3: generated from the combined maximum flood extent of the defended and undefended 0.5% AEP for the year 2122 (Upper End). Future Flood Zone 2: generated from the combined maximum flood extent of the defended and undefended 0.1% AEP for the year 2122 (Upper End).	Level 1 SFRA
Tidal Modelling Outputs	ASCII	Maximum hazard rating, maximum depth, and maximum water levels for the design event (undefended, 0.5% AEP including climate change (Upper End allowance) to 2122). Maximum hazard rating for the extreme event (undefended 0.1% AEP including climate change (Upper End allowance) to 2122). As detailed in Level 1 SFRA Part 1 (Main Report) Appendix B1, the tidal modelling includes an allowance for wave overtopping.	Level 1 SFRA

- 1.5.2 In agreement with the Environment Agency, the tidal model scenarios used in this Level 2 are the undefended scenarios. This approach has been adopted as the existing flood and coastal erosion risk management infrastructure relevant to these sites will not generally have a useful life that will meet or exceed the lifetime of the proposed developments, and it cannot be guaranteed that the funding will be available for maintenance or upgrade.
- 1.5.3 The Level 2 SFRA assessments have been written using the best information available at the time of writing. Some of these strategic sites may take some time to progress through the planning process. As data, evidence and technology improves, there may be changes to water level predictions and climate change allowances. Detailed assessments must always be developed using the most up to date data and information.

1.5.4 Once the specific details are known for proposed developments, including details of proposed land raising and/or new or upgraded flood defences, it may be necessary to undertake further assessment of the residual risk from breach and overtopping. Wave overtopping should be calculated for proposed development and applied in addition to an appropriate freeboard that accounts for remaining uncertainty. Appropriate mitigation measures to manage this risk should then be detailed. This should include any measures needed to contain and discharge water that may have overtopped any flood defences whilst keeping people safe, in addition to surface water which may be subject to tide locking during high tides.

1.6 Site Assessments

- 1.6.1 Sections 2 7 of this report provide a Level 2 SFRA for the 6 potential strategic site allocations. For each strategic site the assessment includes:
 - a description of the existing site,
 - a description of the allocation proposals and vulnerability classification,
 - an assessment of the risk of flooding from all sources,
 - recommendations for development on the site, following the approach set out in the PPG to avoid, control, mitigate and manage residual risks.

2. Gosport Waterfront

2.1 Site Description

- 2.1.1 Gosport Waterfront is the coastal area on the western side of Portsmouth Harbour located between Priddy's Hard to the north and Haslar Marina to the south. It includes areas characterised by marine employment and leisure uses and established residential neighbourhoods at Royal Clarence Yard and Priddy's Hard.
- 2.1.2 LiDAR data (Figure 2-1, Table 2-1) shows that ground levels across the site are largely below 5mAOD. Along the frontage, ground levels are approximately 2.6mAOD. On the western edge of the site and further inland, ground levels increase to >6mAOD.



Figure 2-1 LiDAR Topography

2.2 Allocation Proposals

- 2.2.1 It is proposed that Gosport Waterfront will be enhanced, intensified, and made more accessible to enable Gosport to grow and diversify its existing offer to become a better recognised global hub for marine and maritime business and leisure activities.
- 2.2.2 The Council's preferred planning approach is for development to be based on a clear distinction between safeguarded marine employment and leisure zones that retain boat yards (Water Compatible), deep water accesses and associated infrastructure (Marine Employment is protected by a separate Local Plan policy), and mixed-use zones comprised of town centre uses (Less and More Vulnerable) and medium to high density residential development (More Vulnerable). There are also opportunities within the Waterfront to intensify uses through the reorganisation of existing spaces and buildings, including the rationalisation of vehicular parking and storage facilities and an increased vertical mix of uses.
- 2.2.3 Historically, the waterfront was contiguous with Gosport town centre's dense residential streets, many of which were rebuilt for industrial purposes or subject to modern planning in the post-war period. However, the fabric of the industrial building stock is aging, and some are no longer fit for purpose. This provides an opportunity for a return to higher density housing, albeit using different residential typologies, and commercial uses including marine employment.

2.2.4 The vulnerability classification for this strategic site include a mix of Water Compatible, Less Vulnerable and More Vulnerable.

2.3 Level 2 SFRA Maps

Figure 2-2 Flood Map for Planning (Rivers and Sea)



Figure 2-3 Future Coastal Flood Zones (2122)





Figure 2-4 Maximum Flood Depth: Undefended 0.5% AEP 2122 (Upper End)







Figure 2-6 Maximum Flood Hazard: Undefended 0.5% AEP 2122 (Upper End)





2.4 Risk of flooding from the sea

- 2.4.1 Figure 2-2 shows that the eastern frontage of the Waterfront is within Flood Zone 3, high probability of flooding from the sea including Royal Clarence Waterside, Victoria Quay, Harbour Road, Gosport Marina and Boatyard and The Esplanade.
- 2.4.2 Appendix A Figure 2 highlights that parts of this frontage are at risk of flooding during the 3.3% AEP tidal event including Victoria Quay and the Gosport Boatyard.
- 2.4.3 Routes away from the Gosport Waterfront strategic site include Heritage Way in the north, Forton Road/Mumby Road (A32) and South Street (B3333) to the east, and Haslar Road to the south. These

routes all have a hazard rating of Significant (Danger to Most) during the design event (0.5% AEP event, upper end allowance for climate change for the year 2122), as shown in Appendix A Figure 1.

- 2.4.4 Figure 2-3 shows that by 2122, almost all the site is predicted to be within Flood Zone 3 'high probability of flooding from the sea'. The western edge, to the west of Weevil Lane is shown to remain in Flood Zone 1, low probability of flooding from the sea.
- 2.4.5 Modelled outputs for the 0.5% AEP event including the upper end climate change allowance for the year 2122, without the existing defences in place, indicate flood depths of 1-1.5m in the eastern areas of the site, with areas to the north and south reaching around 1m (Figure 2-4). The maximum water level is approximately 4.6m across the site (Figure 2-5). The hazard rating is Significant (Danger for Most) across most of the site. The hazard rating reduces further inland to Moderate (Danger for Some) and Low (Caution) where the ground levels increase.
- 2.4.6 Table 2-1 provides a summary of maximum water levels across the site for a range of modelled events. Maps have been provided for the 0.5% AEP event including upper end climate change allowance for the year 2122 (highlighted in grey in the table) as this is the design event for More Vulnerable development.

		Maximum water levels (mAOD) for a range of Undefended modelled scenarios						
Point	Topography (mAOD)	200YR 2055 HC	200YR 2055 UE	200YR 2122 HC	200YR 2122 UE	1000YR 2055 UE	1000YR 2122 UE	
1	2.48	-	-	4.22	4.59	3.14	4.74	
2	3.44	-	3.49	4.22	4.59	3.64	4.74	
3	3.77	-	-	4.22	4.59	-	4.74	
4	2.66	3.42	3.49	4.22	4.59	3.64	4.74	
5	5.86	-	-	-	-	-	-	
6	2.99	3.42	3.49	4.22	4.59	3.64	4.74	
7	2.88	3.42	3.49	4.22	4.59	3.64	4.74	
8	3.38	3.46	3.51	4.22	4.59	3.64	4.74	
9	3.44	-	3.46	4.22	4.59	3.65	4.74	
10	3.79	-	-	4.22	4.59	-	4.74	
11	5.41	-	-	-	-	-		
12	4.33	-	-	4.51	4.59	-	4.74	
13	3.88	-	-	4.22	4.59	-	4.74	
14	4.43	-	-	-	-	-	4.74	
15	4.25	-	-	-	4.59	-	4.74	
Notes: HC 200YR is	Notes: HC = Higher Central allowance; UE = Upper end allowance. 200YR is the 0.5% AEP event. 1000YR is the 0.1% AEP event.							

Table 2-1 Maximum water levels (mAOD), undefended modelled scenarios

2.4.7 The hazard rating for the extreme tidal flood event (0.1% AEP event including the upper end climate change allowance for the year 2122) is mostly Significant (Danger for Most). Further inland, the hazard rating is Moderate (Danger for Some) to Low (Caution) (Figure 2-7).

2.5 Risk of flooding from other sources

Surface water and sewers

- 2.5.1 The Risk of Flooding from Surface Water (RoFSW) mapping identifies the risk to the local area to be predominately very low (Level 1 SFRA, Part 6 Appendix A Figure 3C). Some areas of the site are at low to high risk of flooding from surface water, however there are no large flow paths shown. There are incidents of highway flooding recorded in this area.
- 2.5.2 Gosport Waterfront is covered by Hampshire County Council's Catchment Management Plan (CMP) 3 for the River Meon and River Wallington⁴. Gosport Waterfront is in East Gosport which is a Priority Area within the CMP. The CMP notes that principal flood risk sources are coastal, groundwater and surface water, with temporary overland flow routes that occur following heavy rainfall events. Flooding is exacerbated by the low lying, densely urbanised nature of the area. Surface water flooding occurs throughout the entire priority group, with concentrated areas of flooding along the B3333, Forton Road and around Priddy's Hard and Amberley Road in the north.
- 2.5.3 Rainfall on what is predominantly Bracklesham Group, Lambeth Group and London Clay produces relatively rapid runoff. This shortening of the response time in this part of the catchment leads to higher risks of both surface water and fluvial flooding in several areas. As a result of climate change, the risk of surface water flooding is predicted to increase.
- 2.5.4 The Recorded Flood Outline mapping identifies a record of flooding from an unknown source around the centre of the site at Harbour Road (Level 1 SFRA, Part 6 Appendix A Figure 2C). No sewer flooding records have been indicated across this strategic development site.

Groundwater

2.5.5 The BGS Susceptibility to Groundwater Flooding map identifies most of the site as having 'Potential for groundwater flooding of property situated below ground level' and 'Potential for groundwater flooding to occur at surface' (Level 1 SFRA, Part 6 Appendix A Figure 6C). An area to the north of the site is classified as having 'Limited potential for groundwater flooding to occur'. The CMP confirms that groundwater flooding is prominent across the entire area of East Gosport, although less severe in the northeast.

Reservoirs

2.5.6 The Risk of Flooding from Reservoirs mapping shows that reservoir flooding is not predicted inland.

2.6 Recommendations for development

Avoid flood risk

- 2.6.1 A sequential approach to land use planning should be applied across Gosport Waterfront.
- 2.6.2 Areas along the immediate waterfront may be at risk of frequent flooding (e.g., during the 3.3% AEP flood event). Marine employment, leisure and boatyard uses may be appropriate throughout these areas. Development in these areas should be designed and constructed to remain operational and safe for users in times of flood and not impede water flows and not increase flood risk elsewhere.
- 2.6.3 The most vulnerable aspects (residential development) should be in the areas of lowest risk towards the west of the site unless there are overriding reasons to prefer a different location. In addition, measures to avoid flood risk vertically can then be taken, by locating the most vulnerable uses on upper storeys, and by raising finished floor and/or ground levels, where appropriate and that such techniques are suitably designed.

⁴ River Meon and River Wallington Draft Catchment Management Plan (CMP) <u>https://documents.hants.gov.uk/flood-water-management/3-HCC-CMP-MeonandWallington.pdf</u>

Control flood risk

- 2.6.4 Future Coastal Flood Zones (Figure 2-3) indicate that Gosport Waterfront will be almost entirely within Flood Zone 3 in 2122 and therefore flood defences and ground raising will be needed to enable residential development in the area. Further work will be required to determine the technical and economic feasibility of these measures being delivered.
- 2.6.5 Gosport Waterfront is covered by the **North Solent Shoreline Management Plan**⁵ (SMP), section 5a25 (Quay Lane (MoD boundary) to Portsmouth Harbour Entrance (west)). The SMP recommends a policy of 'Hold the Line' (HTL maintain or upgrade the standard of protection offered by the existing coastal defences) for this policy unit for at least the next 100 years.
- 2.6.6 The **River Hamble to Portchester Coastal Flood and Erosion Risk Management Strategy**⁶ was developed to build on policies set out in the North Solent SMP and to identify appropriate management options to manage risk to the existing community. The preferred options set out what is technically, environmentally and economically sustainable. This may be a lower standard of protection than that required of new development, which must comply with the requirements of the NPPF. Gosport Waterfront is included within Strategy Management Zone 2 within which the preferred option is to sustain a minimum 1 in 100 year standard of protection against flooding.
- 2.6.7 The Strategy identifies the options for sections of coastline (Option Development Units, ODUs) along the Gosport Waterfront strategic development site (and either side) as summarised in Table 2-2. It is vital that redevelopment of the Gosport Waterfront enables the implementation of these measures over the coming years. GBC should also seek financial contribution from development in the area that will benefit from such schemes.



Table 2-2 Land to be safeguarded for flood defences or land raising

 ⁵ North Solent Shoreline Management Plan, 2010 <u>https://www.northsolentsmp.co.uk/</u>
⁶ Coastal Partners, March 2016, River Hamble to Portchester Coastal Flood and Erosion Risk Management Strategy. <u>https://coastalpartners.org.uk/project/river-hamble-to-portchester-strategy/</u>

- Option Development Unit (ODU)10: Monks Walk to Lichfield Drive: Land must be safeguarded for maintenance of existing defences, and further capital works (a seawall), which will be required from 2060.
- **ODU11: Lichfield Drive to Parnham Road:** Forton Lake was identified as a priority area for capital works. The Forton scheme will cover approximately 400m of coastal frontage in St Vincent's College at the western end of Forton Lake. The scheme includes a new L shaped reinforced concrete wall which will be set back from the existing flood protection, sections of road raising and removable flood equipment as well as repairs to some of the existing flood defences. The flood defence level will be 3.7m AOD, providing a 1 in 100 year standard of protection.

Whilst this scheme does not afford protection to the Gosport Waterfront site itself, it does reduce the risk of flooding to the A32 Forton Road which is the primary access route to and from the Gosport Waterfront. (It also provides protection to the residential area of Forton and other critical infrastructure including electricity substations, surface water pumping stations and sewers, pressure gas mains and telecoms and cable networks). Ongoing defence maintenance will be required with further upgrade from 2060. Land must be safeguarded adjacent to the defences to enable maintenance and future upgrade.

- ODU12: Parnham Road to Rolling Bridge: Maintenance of existing defences by MoD.
- **ODU13: Rolling Bridge to Jamaica Drive:** Land must be safeguarded for maintenance of existing defences, and further capital works (a seawall), which will be required from 2060.
- **ODU14: Jamaica Drive to Rope Quays:** Opportunities to deliver passive defences, for example land raising, should be explored.
- ODU15: Rope Quays to Haslar Bridge: Opportunities should be sought to deliver flood defence schemes with new development.
- **ODU16: Haslar Bridge to Willis Road**: Land must be safeguarded for maintenance of existing defences, and further capital works (a seawall), which will be required from 2060.



2.6.8 In line with the Strategy, measures should be considered for the Waterfront strategic site including:

- Raising land levels above the design flood level (approximately 4.6m AOD plus an appropriate freeboard), for the More Vulnerable land uses and key infrastructure, e.g., residential zones and main roads within the developed area.
- Providing raised (multi-functional) flood defences around the coastal perimeter, particularly between Rolling Bridge and Jamaica Drive.
- Providing set-back/secondary defences around sheltered water basins for Less Vulnerable land uses, e.g., commercial, marine employment or leisure related uses.
- Raising building floor levels above the design flood level (approximately 4.6m AOD plus an appropriate freeboard) and incorporating flood resilient structural measures.

- Providing safe access to the site and for evacuation of people during extreme flood events.
- Future-proofing the coastal flood and erosion defences and drainage to allow for climate change impacts including sea-level rise, increased surge and wave severity and rainfall intensity.

Mitigate and manage residual risk

Wave Overtopping

2.6.9 Once the proposed development design is known, including proposed land raising and/or flood defences, detailed site specific wave overtopping calculations will need to be undertaken along with a suitable calculation for appropriate freeboard that accounts for uncertainty. Measures will need to be identified to contain and discharge water from overtopping whilst keeping people safe, in addition to surface water which may be subject to tide locking during high tides.

Finished floor levels

2.6.10 Finished floor levels should be set above the design flood level (0.5% AEP including an appropriate allowance for climate change) plus freeboard. More Vulnerable and Highly Vulnerable development should apply the upper end climate change allowance (on this site this is approximately 4.6m AOD). Less Vulnerable development should apply the higher central climate change allowance.

Access and escape

- 2.6.11 New development must have safe access / escape during the design flood (0.5% AEP) including an appropriate allowance for climate change. More Vulnerable and Highly Vulnerable development should apply the upper end climate change allowance. Less Vulnerable development should apply the higher central climate change allowance. The order of preference is as follows:
 - Safe dry route for people and vehicles.
 - Safe dry routes for people.
 - Route for people where flood hazard is low.
 - Route for emergency vehicles where flood hazard is low.
- 2.6.12 Access routes for people and vehicles that are dry during the design event are not available from this strategic allocation. From Priddy's Hard, the access route to the north via Heritage Way is shown to be at Significant hazard during the design event, therefore a dry access route is not achievable. Routes away from the Waterfront area to the west via Forton Road/Mumby Road (A32) are shown to be at Significant and Extreme hazard and routes to the southwest via the B3333/South Street are shown to be at Significant hazard. Access routes to the south via Haslar Bridge and Haslar Road are shown to be at Significant hazard. To provide safe access to the Gosport Waterfront site, measures to land raise or improve the flood defences protecting these access routes will be required. If improvements are not provided, Gosport BC will need to consider, in conjunction their Emergency Planning team and with the emergency services, if reliance on prior evacuation and safe refuge is appropriate.

Place of safety

- 2.6.13 New development must be designed to include a place of safety during extreme flood conditions (0.1% AEP) including an allowance for climate change (on this site this is approximately 4.74m AOD).
- 2.6.14 Tidal flooding occurs during exceptionally high tides or storm surges. As a result, there is advance warning of such events. The Environment Agency aim to provide a minimum 6 hours warning time for tidal flooding. As a result, it would be possible to evacuate properties prior to any significant tidal flooding taking place.
- 2.6.15 However, places of safety play an important role where, for whatever reason, evacuation in advance of flooding is not achieved, or in cases where flooding occurs because of a failure (e.g., breach) in the flood defences. Places of safety should be designed to facilitate rescue in case emergency care is needed or if it's unlikely to be safe for occupants/users to wait until flood waters have receded sufficiently.

Flood Warning and Emergency Plans

2.6.16 Gosport Waterfront is covered by the Gosport Flood Warning Area (Level 1 SFRA Part 6, Appendix A Figure 9).

- 2.6.17 Developers must prepare Emergency Plans for occupants of the site to set out the response in the event of a flooding warning with respect to safe access routes and places of safety. Emergency Plans should be agreed with Gosport BC and key emergency services. Refer to Level 1 SFRA, Part 6 (Gosport), Section 7.8 for further details.
- 2.6.18 Gosport BC should review the flood risk information within the SFRA with their emergency planning team and use this to update their Multi Agency Flood Response Plan. Proposals for development that are likely to increase the number of people living or working in areas of flood risk require particularly careful consideration, as they could increase the scale of any evacuation required.

Surface water management

- 2.6.19 Development proposals for the site should consider the natural patterns of surface water flow across the site early in the planning process⁷. New development should discharge runoff to the sea following suitable treatment. Proposals for surface water management should make provision for storage during high tide events, when the surface water drainage may be subject to tide locking. Proposals should demonstrate sustainable approaches to the management of surface water making use of SuDS; and incorporate soft landscaping, planting, and permeable surfacing. Potential overland flow paths from surface water should be determined and appropriate solutions proposed to minimise the impact of the development, whilst ensuring that flows are not diverted towards other properties elsewhere. Flow paths should be assessed to inform the strategic location of SuDS and techniques to route flows around the edge of buildings.
- 2.6.20 Redevelopment of the Gosport Waterfront will entail major brownfield development. In line with the policies in CMP3, HCC will make it best practice that a 50% betterment for surface water runoff rates is demonstrated for the surface water management features of any proposed development. HCC may also make it best practice for Gosport BC to request hydraulic modelling of surface water exceedance flows movement and management on new development.

Groundwater flooding

2.6.21 New development should not result in an increased risk of groundwater flooding elsewhere. A Ground Investigation should be undertaken to determine specific site conditions and groundwater levels. Where development is proposed that involves works below ground and/or changes to drainage, further assessment may be required to determine the potential impact on groundwater and identify proposed mitigation measures.

2.7 Summary

- 2.7.1 The Gosport Waterfront potential allocation site is currently shown to be at risk of flooding from the sea and this is predicted to increase in the future. The access routes to and from the strategic site are also shown to be at risk of flooding from the sea.
- 2.7.2 Flood defence improvement works planned at Forton Lake are expected to reduce the risk of flooding to the A32 access route to the Waterfront area.
- 2.7.3 For residential development to be possible, ground raising will be required, and access routes may need to be either raised or protected by flood defence improvement works to reduce the level of flood risk. Further work is required to determine the technical and economic feasibility of these measures being delivered before this site can be allocated.
- 2.7.4 Redevelopment of the Gosport Waterfront provides an opportunity to reduce the risk of flooding to the existing community west of the waterfront site. Provision of land raising and/or flood defences as part of future development could contribute to the delivery of the FCERM Strategy.
- 2.7.5 To provide safe access to the Gosport Waterfront site, measures to raise access routes or improve the flood defences protecting these access routes will be required. If improvements are not provided, Gosport BC will need to consider, in conjunction their Emergency Planning team and with the emergency services, if reliance on prior evacuation and safe refuge is appropriate.

⁷ Water. People. Places. A guide for master planning sustainable drainage into developments. <u>https://www.midsussex.gov.uk/media/2909/water-people-places-a-guide-for-master-planning-sustainable-drainage-into-developments.pdf</u>

3. Blockhouse

3.1 Site Description

- 3.1.1 The Blockhouse site is located on the Haslar Peninsula. The site is approximately 32.8 hectares and has approximately 2.5km of water frontage on Haslar Creek, Portsmouth Harbour and the Solent. Set at the mouth of Portsmouth Harbour is Fort Blockhouse itself, located just over 200 metres from Old Portsmouth. Parts of the Blockhouse site are planned for release by the Ministry of Defence and have potential for redevelopment with a mix of marine employment uses and residential development.
- 3.1.2 For the purposes of the SFRA, the Blockhouse site not only includes the former HMS Dolphin and Fort Blockhouse Scheduled Ancient Monument located to the south of Haslar Road, but also Haslar Gunboat Sheds and Traverser Area located to the north of Haslar Road adjacent to the Haslar Marine Technology Park.
- 3.1.3 Ground levels across the site vary from 3 4.5mAOD (Figure 3-1, Table 3-1).



Figure 3-1 LiDAR Topography

3.2 Allocation Proposals

- 3.2.1 The Blockhouse site is due to be released by the Ministry of Defence. The site (including Fort Blockhouse and the Haslar Gunboat Sheds and Traverser area) is being considered for a mix of uses comprising a heritage-led regeneration scheme with marine employment, new homes and open space. The uses being considered include a range of development types include Less Vulnerable uses and More Vulnerable (i.e. residential). The site is subject to a masterplanning approach between the Defence Infrastructure Organisation and Gosport Borough Council as Local Planning Authority.
- 3.2.2 Regeneration of the Blockhouse, and the Haslar Gunboat Sheds and Traverser area, should protect and enhance its unique heritage assets and waterfront location, and make the best possible use of its land resources to provide a set of accessible mixed-use neighbourhoods.

3.3 Level 2 SFRA Maps

Figure 3-2 Flood Map for Planning (Rivers and Sea)



Figure 3-3 Future Coastal Flood Zones (2122)





Figure 3-4 Maximum Flood Depth: Undefended 0.5% AEP 2122 (Upper End)







Figure 3-6 Maximum Flood Hazard: Undefended 0.5% AEP 2122 (Upper End)





3.4 Risk of flooding from the sea

3.4.1 The site is bounded by the Solent to the south, Portsmouth Harbour to the east and Haslar Lake and Stoke Lake to the north. Figure 3-2 shows that a large part of the site is within Flood Zone 3, high probability of flooding from the sea. A small area to the east and a large area towards the west have slightly elevated ground levels and are therefore within Flood Zone 1, low probability of flooding from the sea. A small area to the northeast of the site covering 33 Field Hospital benefits from a reduction in risk of flooding from rivers and sea due to defences.

- 3.4.2 Figure 3-3 shows that by 2122, most of the site is predicted to be located almost entirely within Flood Zone 3 'high probability of flooding from the sea'. The western edge where ground levels are slightly higher is predicted to remain within Flood Zone 1. However large parts of the Haslar Peninsula including access routes to the site are shown to be within Flood Zone 3.
- 3.4.3 Modelled outputs for the 0.5% AEP event including the upper end climate change allowance for the year 2122, without the existing defences in place, indicate flood depths of 1.5-2m in the west of the site, with flood depths of up to 1.5m elsewhere (Figure 3-4). The maximum water level is predominately 4.6m across the site. The water level along the southern edge of the site (where ground levels are higher) is 5m AOD (Figure 3-5). The hazard rating is mostly Significant (Danger for Most) with small areas to the west reaching Extreme (Danger to All). Areas towards the south and southwest are Moderate (Danger for Some) to Low (Caution) (Figure 3-6).
- 3.4.4 Table 3-1 provides a summary of maximum water levels across the site for a range of modelled events. Maps have been provided for the 0.5% AEP event including upper end climate change allowance for the year 2122 (highlighted in grey in the table) as this is the design event for More Vulnerable development.

Point		Maximum water levels (mAOD) for a range of Undefended modelled scenarios						
	(maod)	200YR 2055 HC	200YR 2055 UE	200YR 2122 HC	200YR 2122 UE	1000YR 2055 UE	1000YR 2122 UE	
А	3.93	-	-	4.22	4.59	-	4.74	
в	3.04	3.43	3.50	4.22	4.59	3.65	4.74	
С	4.12	-	-	4.22	4.59	-	4.74	
D	4.45	-	-	-	4.59	-	4.74	
E	4.09	-	-	4.22	4.59	-	4.74	
F	5.48	5.02	5.01	5.09	5.09	5.05	5.11	
G	3.78	-	-	4.22	4.59	-	4.74	
н	5.00	-	-	-	-	-	-	
1	3.43	3.90	4.06	4.51	4.66	4.21	4.75	
Notes: HC = Higher Central allowance; UE = Upper end allowance. 200YR is the 0.5% AEP event. 1000YR is the 0.1% AEP event.								

Table 3-1 Maximum water levels (mAOD), undefended modelled scenarios

3.4.5 The hazard rating for the 0.1% AEP event including the upper end climate change allowance for the year 2122 is mostly Significant (Danger for Most) with small areas to the west reaching Extreme (Danger to All). Areas towards the south and southwest are Moderate (Danger for Some) to Low (Caution) (Figure 3-7).

3.5 Risk of flooding from other sources

Surface water and sewers

- 3.5.1 The Risk of Flooding from Surface Water (RoFSW) mapping identifies the risk to the local area to be predominately very low (Level 1 SFRA, Part 6 Appendix A Figure 3C). Some areas of the site are at low to high risk of flooding from surface water, however there are no large flow paths. The Recorded Flood Outline mapping does not identify any flood records within the site (Level 1 SFRA, Part 6 Appendix A Figure 2C).
- 3.5.2 Blockhouse is covered by Hampshire County Council's Catchment Management Plan (CMP) 3 for the River Meon and River Wallington⁸, within the East Gosport priority area. The CMP notes that principal flood risk sources are coastal, groundwater and surface water, with temporary overland flow routes that occur following heavy rainfall events. Flooding is exacerbated by the low lying, densely urbanised nature of the area. Surface water flooding occurs throughout the entire priority group.

⁸ River Meon and River Wallington Draft Catchment Management Plan (CMP) <u>https://documents.hants.gov.uk/flood-water-management/3-HCC-CMP-MeonandWallington.pdf</u>

3.5.3 Rainfall on what is predominantly Bracklesham Group, Lambeth Group and London Clay produces relatively rapid runoff. This shortening of the response time in this part of the catchment leads to higher risk of surface water flooding. As a result of climate change, the risk of surface water flooding is predicted to increase.

Groundwater

3.5.4 The BGS Susceptibility to Groundwater Flooding map identifies most of the site as having 'Potential for groundwater flooding of property situated below ground level' (Level 1 SFRA, Part 6 Appendix A Figure 6C). Areas to the north are classified as having 'Potential for groundwater flooding to occur at surface'. The CMP confirms that groundwater flooding is prominent across the entire area of East Gosport.

Reservoirs

3.5.5 The site is not at risk of flooding from reservoirs (Level 1 SFRA, Part 6 Appendix A Figure 6C).

3.6 Recommendations for development

Avoid flood risk

- 3.6.1 A sequential approach to land use planning should be applied *within* the site. The most vulnerable aspects of the development (residential development) should be in the areas of lowest risk towards the west of the site unless there are overriding reasons to prefer a different location. In addition, measures to avoid flood risk vertically can then be taken, by locating the most vulnerable uses on upper storeys, and by raising finished floor and/or ground levels, where appropriate and that such techniques are suitably designed.
- 3.6.2 Areas along the immediate coastal frontage may be at risk of the effects of wave overtopping. Development in these areas should be designed and constructed to remain operational and safe for users in times of flood and not impede water flows and not increase flood risk elsewhere.

Control flood risk

- 3.6.3 Blockhouse is covered by the **North Solent Shoreline Management Plan**⁵ (SMP), section 5a25 (Quay Lane (MoD boundary) to Portsmouth Harbour Entrance (west)) and 5b01 (Portsmouth Harbour entrance to Gilkicker Point). The SMP recommends a policy of 'Hold the Line' (HTL maintain or upgrade the standard of protection offered by the existing coastal defences) for this policy unit for at least the next 100 years.
- 3.6.4 The **River Hamble to Portchester Coastal Flood and Erosion Risk Management Strategy**⁶ was developed to build on policies set out in the North Solent SMP and to identify appropriate management options to manage risk to the existing community. The preferred options set out what is technically, environmentally and economically sustainable. This may be a lower standard of protection than that required of new development, which must comply with the requirements of the NPPF. Blockhouse is included within Strategy Management Zone 2 within which the preferred option is to sustain a minimum 1 in 100 year standard of protection against flooding.
- 3.6.5 The Blockhouse strategic site is covered by ODU20 (Figure 3-8), from Haslar Royal Navy Cemetery to Fort Monckton. The option in this unit is continued maintenance of the existing defences by the MoD. Redevelopment of Blockhouse must include future flood defence maintenance and upgrade by the MoD over the coming years.



Figure 3-8 River Hamble to Portchester FCERM Strategy Option Development Units

3.6.6

- 3.6.7 Future Coastal Flood Zones (Figure 3-3) indicate that Blockhouse will be almost entirely within Flood Zone 3 in 2122 and therefore flood defences and ground raising will be needed to enable residential development of the area. Further work will be required to determine the technical and economic feasibility of these measures being delivered.
- 3.6.8 Various measures could be considered for the site including:
 - Raising land levels above the design flood level (approximately 4.6m AOD) for the More Vulnerable land uses and key infrastructure, e.g., residential zones and main roads within the developed area.
 - Providing raised (multi-functional) flood defences around the coastal perimeter.
 - Providing set-back/secondary defences for Less Vulnerable land uses, e.g., commercial, marine employment or leisure related uses.
 - Raising building floor levels above the design flood level and incorporating flood resilient structural measures.
 - Providing safe access to the site and for evacuation of people during extreme flood events.
 - Future-proofing the coastal flood and erosion defences and drainage to allow for climate change impacts including sea-level rise, increased surge and wave severity and rainfall intensity.

Mitigate and manage residual risk

Wave Overtopping

3.6.9 As the proposed development design is developed, including proposed land raising and/or flood defences, detailed site specific wave overtopping calculations will need to be undertaken along with a suitable calculation for appropriate freeboard that accounts for uncertainty. Measures will need to be identified to contain and discharge water from overtopping whilst keeping people safe, in addition to surface water which may be subject to tide locking during high tides.

Finished floor levels

3.6.10 Finished floor levels should be set above the design flood level (0.5% AEP including an appropriate allowance for climate change) plus freeboard. More Vulnerable and Highly Vulnerable development should apply the upper end climate change allowance (on most of this site this is approximately 4.6m AOD). Less Vulnerable development should apply the higher central climate change allowance.

Access and escape

- 3.6.11 New development must have safe access / escape during the design flood (0.5% AEP) including an appropriate allowance for climate change. More Vulnerable and Highly Vulnerable development should apply the upper end climate change allowance. Less Vulnerable development should apply the higher central climate change allowance. The order of preference is as follows:
 - Safe dry route for people and vehicles.
 - Safe dry routes for people.
 - Route for people where flood hazard is low.
 - Route for emergency vehicles where flood hazard is low.
- 3.6.12 For this strategic allocation, access routes off Haslar Peninsular to the northeast via Haslar Bridge are shown to be at Significant and Extreme hazard. Routes to the southwest via Haslar Road and then onto either Clayhill Road or Dolphin Way/Fort Road are also shown to be at Significant and Extreme hazard and are therefore not suitable access routes. To provide safe access to the Blockhouse site, measures to land raise or improve the flood defences protecting these access routes will be required. If improvements are not provided, Gosport BC will need to consider, in conjunction their Emergency Planning team and with the emergency services, if reliance on prior evacuation and safe refuge is appropriate.

Place of safety

- 3.6.13 New development must be designed to include a place of safety during extreme flood conditions (0.1% AEP) including an allowance for climate change (on this site this is approximately 4.74m AOD).
- 3.6.14 Tidal flooding occurs during exceptionally high tides or storm surges. As a result, there is advance warning of such events. The Environment Agency aim to provide a minimum 6 hours warning time for tidal flooding. As a result, it would be possible to evacuate properties prior to any significant tidal flooding taking place.
- 3.6.15 However, places of safety play an important role where, for whatever reason, evacuation in advance of flooding is not achieved, or in cases where flooding occurs because of a failure (e.g., breach) in the flood defences. Places of safety should be designed to facilitate rescue in case emergency care is needed or if it's unlikely to be safe for occupants/users to wait until flood waters have receded sufficiently.

Flood Warning and Emergency Plans

- 3.6.16 Areas of Blockhouse at risk of flooding are covered by the Gosport Flood Warning Area (Level 1 SFRA Part 6, Appendix A Figure 9).
- 3.6.17 Emergency Plans must be prepared for occupants of the site to set out the response in the event of a flooding warning with respect to safe access routes and places of safety. Emergency Plans should be agreed with Gosport BC and key emergency services. Refer to Level 1 SFRA, Part 6 (Gosport), Section 7.8 for further details.
- 3.6.18 It is noted that areas of the Fort Blockhouse that are, and will remain, in Flood Zone 1 over the lifetime of the development may not be eligible for flood warnings, despite the potential to be significantly affected by flooding to the access routes on and off Haslar Peninsula if they cannot be raised or defended. Consideration should therefore be given to how warnings will be issued and managed for the site as a whole and not just for those who reside in areas directly at risk.

Surface water management

3.6.19 Development proposals for the site should consider the natural patterns of surface water flow across the site early in the planning process⁷. New development should discharge runoff to the sea following suitable treatment. Proposals for surface water management should make provision for storage during high tide events, when the surface water drainage may be subject to tide locking. Proposals should demonstrate sustainable approaches to the management of surface water making use of SuDS; and incorporate soft landscaping, planting, and permeable surfacing. Potential overland flow paths from

surface water should be determined and appropriate solutions proposed to minimise the impact of the development, whilst ensuring that flows are not diverted towards other properties elsewhere. Flow paths should be assessed to inform the strategic location of SuDS and techniques to route flows around the edge of buildings.

3.6.20 Redevelopment of Blockhouse will entail major brownfield development. In line with the policies in CMP3, HCC will make it best practice that a 50% betterment for surface water runoff rates is demonstrated for the surface water management features of any proposed development. HCC may also make it best practice for Gosport BC to request hydraulic modelling of surface water exceedance flows movement and management on new development.

Groundwater flooding

3.6.21 New development should not result in an increased risk of groundwater flooding elsewhere. A Ground Investigation should be undertaken to determine specific site conditions and groundwater levels. Where development is proposed that involves works below ground and/or changes to drainage, further assessment may be required to determine the potential impact on groundwater and identify proposed mitigation measures.

3.7 Summary

- 3.7.1 The Blockhouse allocation is currently shown to be at risk of flooding from the sea and this is predicted to increase in the future. The access routes to and from the strategic site are also shown to be at risk of flooding.
- 3.7.2 For development to be possible on this site, ground raising will be required, and access routes may need to be either raised or protected by flood defence improvement works to reduce the level of flood risk. Land raising may prove particularly challenging for this site, as there are several listed buildings and buildings of historic interest which may significantly limit the degree to which ground levels can be raised. Given the location of Fort Blockhouse, any defences will need to be capable to managing the increased risk of coastal erosion as well as flooding. Further work is required to determine the technical and economic feasibility of these measures being delivered before this site can be allocated.
- 3.7.3 To provide safe access to the Blockhouse site, measures to raise access routes or improve the flood defences protecting these access routes will be required. If improvements are not provided, Gosport BC will need to consider, in conjunction their Emergency Planning team and with the emergency services, if reliance on prior evacuation and safe refuge is appropriate.

4. Haslar

4.1 Site Description

- 4.1.1 The Haslar site covers both the Royal Haslar Hospital (to the northeast) and the Haslar Barracks (to the southwest). The Royal Haslar Hospital closed as a military hospital in 2007 and the NHS ceased operating from the site in July 2009. The Haslar Barracks is designated as a Conservation Area and is a site of national historic significance due to its rarity by type and strategic role in the defence of the wider military establishments in the Gosport and Portsmouth area. In 1864 the site was converted and possibly partly re-developed as an army hospital. In the early 1950s the site was occupied by the Royal Army Ordnance Corps, then became a Youth Offenders' Centre, before its final use as an Immigration Holding Centre which closed in 2017.
- 4.1.2 LiDAR data (Figure 4-1, Table 4-1) indicates that ground levels across the site range from 3.9mAOD to 6.5mAOD.



Figure 4-1 LiDAR Topography

4.2 Allocation Proposals

- 4.2.1 A planning application for the former hospital was approved in 2014, which comprises the demolition and part demolition of a Listed Building and buildings within a Conservation Area and conversion of existing buildings and erection of new buildings. This is now being reviewed and land at Haslar Hospital is allocated for the following mixed-use development:
 - Either up to 300 residential dwellings and a hotel; or up to 260 residential dwellings (Class C3 use) (More Vulnerable).
 - Up to 305 residential care units (Class C2 use) (More Vulnerable).
 - Medical, health and care facilities including residential care will be the prime uses on this site including the re-use of existing facilities and buildings (More Vulnerable).
 - Other employment uses will be encouraged including the re-use of buildings for small offices and workshops (Less Vulnerable).
 - Appropriate leisure and tourism uses (More/Less Vulnerable).

- Small-scale retail facilities and services to serve the site and the local community (Less Vulnerable).
- 4.2.2 Gosport BC have stated that proposals should ensure the Listed Buildings and the Historic Park and Garden are conserved and where appropriate enhanced. Public access to the Historic Park and Garden and the Solent frontage should be secured. The Haslar Hospital Site of Importance to Nature Conservation (SINC) should be appropriately protected and opportunities should be taken to enhance it.
- 4.2.3 Haslar Barracks is allocated for heritage-led, mixed-use regeneration consisting of approximately 225 residential dwellings (either Class C2 and/or C3), defined as More Vulnerable. Ancillary small-scale commercial uses should be considered, which may be More or Less Vulnerable. Development proposals could in lieu of on-site open space provision provide a commuted sum towards the improvement of the adjacent Fort Road site into a new public park.

4.3 Level 2 SFRA Maps

Figure 4-2 Flood Map for Planning (Rivers and Sea)



Figure 4-3 Future Coastal Flood Zones (2122)





Figure 4-4 Maximum Flood Depth: Undefended 0.5% AEP 2122 (Upper End)







Figure 4-6 Maximum Flood Hazard: Undefended 0.5% AEP 2122 (Upper End)





4.4 Risk of flooding from the sea

- 4.4.1 Figure 4-2 shows the south, southeast and southwest of the site to lie within Flood Zone 3, high probability of flooding from the sea. The north of the site is classified as Flood Zone 1 'low probability of flooding from the sea'.
- 4.4.2 Figure 4-3 shows that by 2122, the extent of Flood Zone 3 'high probability of flooding' is predicted to increase further inland, with some areas in the west predicted to lie within Flood Zone 2 'medium probability of flooding'. The north of the site is still predicted to be located within Flood Zone 1 'low probability of flooding from the sea'. Access routes for the site along Clayhall Road, Fort Road and Anglesey Road are shown to be in Flood Zone 3, high probability of flooding.
- 4.4.3 Modelled outputs for the 0.5% AEP event including the upper end climate change allowance for the year 2122, without the existing defences in place, indicate flood depths of 1-1.5m in the west of the site (Figure 4-4). Southern areas of the site are indicated to have flood depths of up to 1m. The maximum water level along the tidal frontage is 5.6m towards the south of the site. (Figure 4-5). Water levels to the west are indicated to be between 4.5-4.6m. The hazard rating is Significant (Danger for Most) and Extreme (Danger to All) in the west, with areas along the south and southeast being Moderate (Danger for Some) to Low (Caution) (Figure 4-6). Hazard ratings along the access routes (Clayhall Road, Fort Road and Anglesey Road) are Significant (Danger for Most) and Extreme (Danger for All).
- 4.4.4 Table 4-1 provides a summary of maximum water levels across the site for a range of modelled events. Maps have been provided for the 0.5% AEP event including upper end climate change allowance for the year 2122 (highlighted in grey in the table) as this is the design event for More Vulnerable development.

Point	Point LiDAR (mAOD)	Maximum water levels (mAOD) for a range of Undefended modelled scenarios							
		200YR 2055 HC	200YR 2055 UE	200YR 2122 HC	200YR 2122 UE	1000YR 2055 UE	1000YR 2122 UE		
1	6.52	-	-	-	-	-	-		
2	6.53	-	-	-	-	-	-		
3	6.00	-	-	-	-	-	-		
4	3.94	4.11	4.25	4.79	4.86	4.44	4.90		
5	5.78	-	-	-	-	-	-		
6	5.57	5.58	5.59	5.61	5.61	5.59	5.61		
7	6.08	6.08	6.08	6.11	6.11	6.09	6.11		
8	2.84	3.92	4.09	4.59	4.71	4.27	4.78		
9	3.86	-	-	4.23	4.59	-	4.74		
10	5.33	-	-	-	-	-	-		
11	4.06	-	-	-	4.54	-	4.69		
Notes: HC = Higher Central allowance; UE = Upper end allowance. 200YR is the 0.5% AEP event. 1000YR is the 0.1% AEP event.									

Table 4-1 Maximum water levels (mAOD), undefended modelled scenarios

4.4.5 The hazard rating for the 0.1% AEP event including the upper end climate change allowance for the year 2122 is Significant (Danger for Most) and Extreme (Danger to All) in the west, with areas along the south and southeast being Moderate (Danger for Some) to Low (Caution) (Figure 4-7).

4.5 Risk of flooding from other sources

Surface water and sewers

4.5.1 The Risk of Flooding from Surface Water (RoFSW) mapping identifies the risk to the local area to be predominately very low (Level 1 SFRA, Part 6 Appendix A Figure 3C). Some areas of the site are at low to high risk of flooding from surface water, however there are no large flow paths. The Recorded Flood Outline mapping does not identify any flood records within the site (Level 1 SFRA, Part 6 Appendix A Figure 2C).

4.5.2 As a result of climate change, the risk of surface water flooding is predicted to increase.

Groundwater

4.5.3 The BGS Susceptibility to Groundwater Flooding map identifies most of the site as having 'Potential for groundwater flooding of property situated below ground level' (Level 1 SFRA, Part 6 Appendix A Figure 6C). An area to the centre of the site is classified as having 'Limited potential for groundwater flooding to occur'.

Reservoirs

4.5.4 The site is not at risk of flooding from reservoirs (Level 1 SFRA, Part 6 Appendix A Figure 6C).

4.6 Recommendations for development

Avoid flood risk

- 4.6.1 A sequential approach to land use planning should be applied *within* the site. All development should be set back from the coastal frontage, where there is risk of overtopping and greater water depths. Development should be steered away from areas at Significant hazard.
- 4.6.2 The most vulnerable aspects of the development including residential dwellings, residential care units, medical, health and care facilities should be in the areas of lowest risk towards the centre/north of the site, unless there are overriding reasons to prefer a different location. In addition, measures to avoid flood risk vertically can then be taken, by locating the most vulnerable uses on upper storeys, and by raising finished floor and/or ground levels, where appropriate and that such techniques are suitably designed.

Control flood risk

- 4.6.3 Haslar is covered by the **North Solent Shoreline Management Plan**⁵ (SMP), section 5b01 (Portsmouth Harbour entrance to Gilkicker Point). The SMP recommends a policy of 'Hold the Line' (HTL maintain or upgrade the standard of protection offered by the existing coastal defences) for this policy unit for at least the next 100 years.
- 4.6.4 The **River Hamble to Portchester Coastal Flood and Erosion Risk Management Strategy**⁶ was developed to build on policies set out in the North Solent SMP and to identify appropriate management options to manage risk to the existing community. The preferred options set out what is technically, environmentally and economically sustainable. This may be a lower standard of protection than that required of new development, which must comply with the requirements of the NPPF. Haslar is included within Strategy Management Zone 2 within which the preferred option is to sustain a minimum 1 in 100 year standard of protection against flooding.
- 4.6.5 The Haslar strategic site is covered by ODU20, from Haslar Royal Navy Cemetery to Fort Monckton (Figure 4-8). The option in this unit is continued maintenance of the existing defences by the MoD. Redevelopment of Haslar must include future flood defence maintenance and upgrade by the MoD over the coming years.
- 4.6.6 Figure 4-3 (Future Coastal Flood Zones) indicates that more of the site and surrounding area, including access routes, will be within Flood Zone 3 in 2122 and therefore flood defences and ground raising will be needed to enable residential development of the area towards the east, south and west. Further work is required to determine the technical and economic feasibility of these measures being delivered.
- 4.6.7 Various measures could be considered for the site including:
 - Raising land levels above the design flood level for the More Vulnerable land uses and key infrastructure, e.g., residential zones and main roads within the developed area.
 - Providing raised (multi-functional) flood defences around the coastal perimeter.
 - Providing set-back/secondary defences for Less Vulnerable land uses, e.g., commercial, retail or leisure related uses.

- Raising building floor levels above the design flood level and incorporating flood resilient structural measures.
- Providing safe access to the site and for evacuation of people during extreme flood events.
- Future-proofing the coastal flood and erosion defences and drainage to allow for climate change impacts including sea-level rise, increased surge and wave severity and rainfall intensity.



Figure 4-8 River Hamble to Portchester FCERM Strategy Option Development Units

Mitigate and manage residual risk

Wave Overtopping

4.6.8 As the proposed development design is developed, including proposed land raising and/or flood defences, detailed site specific wave overtopping calculations will need to be undertaken along with a suitable calculation for appropriate freeboard that accounts for uncertainty. Measures will need to be identified to contain and discharge water from overtopping whilst keeping people safe, in addition to surface water which may be subject to tide locking during high tides.

Finished floor levels

4.6.9 Finished floor levels should be set above the design flood level (0.5% AEP including an appropriate allowance for climate change) plus freeboard, as detailed in Table 4-1. More Vulnerable and Highly Vulnerable development should apply the upper end climate change. Less Vulnerable development should apply the higher central climate change allowance.

Access and escape

- 4.6.10 New development must have safe access / escape during the design flood (0.5% AEP) including an appropriate allowance for climate change. More Vulnerable and Highly Vulnerable development should apply the upper end climate change allowance. Less Vulnerable development should apply the higher central climate change allowance. The order of preference is as follows:
 - Safe dry route for people and vehicles.
 - Safe dry routes for people.
 - Route for people where flood hazard is low.

- Route for emergency vehicles where flood hazard is low.
- 4.6.11 For this strategic allocation, access routes off Haslar Peninsular to the northeast via Haslar Bridge are shown to be at Significant and Extreme hazard. Routes to the west via Clayhill Road and Dolphin Way/Fort Road are also shown to be at Significant and Extreme hazard and are therefore not suitable access routes. To provide safe access to the Haslar site, measures to land raise or improve the flood defences protecting these access routes will be required. If improvements are not provided, Gosport BC will need to consider, in conjunction their Emergency Planning team and with the emergency services, if reliance on prior evacuation and safe refuge is appropriate.

Place of safety

- 4.6.12 New development must be designed to include a place of safety during extreme flood conditions (0.1% AEP) including an allowance for climate change (as detailed in Table 4-1).
- 4.6.13 Tidal flooding occurs during exceptionally high tides or storm surges. As a result, there is advance warning of such events. The Environment Agency aim to provide a minimum 6 hours warning time for tidal flooding. As a result, it would be possible to evacuate properties prior to any significant tidal flooding taking place.
- 4.6.14 However, places of safety play an important role where, for whatever reason, evacuation in advance of flooding is not achieved, or in cases where flooding occurs because of a failure (e.g., breach) in the flood defences. Places of safety should be designed to facilitate rescue in case emergency care is needed or if it's unlikely to be safe for occupants/users to wait until flood waters have receded sufficiently.

Flood Warning and Emergency Plans

- 4.6.15 Areas of Haslar at risk of flooding are covered by the Gosport Flood Warning Area (Level 1 SFRA Part 6, Appendix A Figure 9).
- 4.6.16 Emergency Plans must be prepared for occupants of the site to set out the response in the event of a flooding warning with respect to safe access routes and places of safety. Emergency Plans should be agreed with Gosport BC and key emergency services. Refer to Level 1 SFRA, Part 6 (Gosport), Section 7.8 for further details.

Surface water management

4.6.17 Development proposals for the site should consider the natural patterns of surface water flow across the site early in the planning process⁷. New development should discharge runoff to the sea following suitable treatment. Proposals for surface water management should make provision for storage during high tide events, when the surface water drainage may be subject to tide locking. Proposals should demonstrate sustainable approaches to the management of surface water making use of SuDS; and incorporate soft landscaping, planting, and permeable surfacing. Potential overland flow paths from surface water should be determined and appropriate solutions proposed to minimise the impact of the development, whilst ensuring that flows are not diverted towards other properties elsewhere. Flow paths should be assessed to inform the strategic location of SuDS and techniques to route flows around the edge of buildings.

Groundwater flooding

4.6.18 New development should not result in an increased risk of groundwater flooding elsewhere. A Ground Investigation should be undertaken to determine specific site conditions and groundwater levels. Where development is proposed that involves works below ground and/or changes to drainage, further assessment may be required to determine the potential impact on groundwater and identify proposed mitigation measures.

4.7 Summary

- 4.7.1 The Haslar allocation is currently shown to be at risk of flooding from the sea towards the east, south and west, and flood risk in these areas is predicted to increase in the future. The access routes to and from the strategic site are also shown to be at risk of flooding during the design event with hazard ratings of Significant (Danger for Most) and Extreme (Danger for All).
- 4.7.2 For any development to be possible, (including residential dwellings, residential care units, medical, health and care facilities which are defined as More Vulnerable), land and access routes will either need to be raised or protected by flood defence improvement works to reduce the level of flood risk. **Further**

work is required to determine the technical and economic feasibility of these measures being delivered before this site can be allocated.

To provide safe access to the Haslar site, measures to raise access routes or improve the flood defences protecting these access routes will be required. If improvements are not provided, Gosport BC will need to consider, in conjunction their Emergency Planning team and with the emergency services, if reliance on prior evacuation and safe refuge is appropriate.

5. The Piggeries

5.1 Site Description

- 5.1.1 The Piggeries is a currently undeveloped area at the western end of the Haslar Peninsula. It has capacity for up to 60 dwellings and public open space which should primarily provide public access to the Stoke Lake shoreline. The north of the site is bordered by Stoke Lake.
- 5.1.2 Ground levels across the site range from 3.3mAOD in the north and west to 4.5mAOD in the south east (Figure 5-1, Table 5-1).



Figure 5-1 LiDAR Topography

5.2 Allocation Proposals

- 5.2.1 Land at The Piggeries is allocated for residential development to provide the following:
 - Up to 60 residential dwellings (Class C3 use) in a suitable mix of tenures and sizes (More Vulnerable).
 - Residential typologies which address through their design, current and forecasted flood risk from all relevant sources.
 - Provision of safe vehicular and pedestrian access and egress from the site taking flood risk into account.
 - Publicly accessible open space providing suitably landscaped access to the Stoke Lake shoreline from Clayhall Road (Water Compatible).

5.3 Level 2 SFRA Maps

Figure 5-2 Flood Map for Planning (Rivers and Sea)



Figure 5-3 Future Coastal Flood Zones (2122)





Figure 5-4 Maximum Flood Depth: Undefended 0.5% AEP 2122 (Upper End)







Figure 5-6 Maximum Flood Hazard: Undefended 0.5% AEP 2122 (Upper End)





5.4 Risk of flooding from the sea

- 5.4.1 Figure 5-2 shows the south of the site to be within Flood Zone 3 'high probability of flooding from the sea' and the centre to be within Flood Zone 2 'medium probability of flooding'. The north and north-eastern areas of the site are within Flood Zone 1 'low probability of flooding'. The site is not within the defended 3.33% AEP tidal flood extent (Appendix A Figure 2).
- 5.4.2 Figure 5-3 shows that by 2122, the extent of Flood Zone 3 'high probability of flooding' is predicted to increase across most of the site. A small area to the east remains within Flood Zone 1 'low probability of

flooding'. Access routes for the site along Clayhall Road and Anglesey Road are shown to be in Flood Zone 3, high probability of flooding.

- 5.4.3 Modelled outputs for the 0.5% AEP event including the upper end climate change allowance for the year 2122, without the existing defences in place, indicate flood depths of 1-1.5m in the south and centre of the site (Figure 5-4). Areas to the north, east and west indicate flood depths of up to 1m. The maximum water level across the site is 4.6mAOD (Figure 5-5). The hazard rating is predominately Significant (Danger for Most), with areas to the north and east Moderate to Low (Caution) (Figure 5-6). Hazard ratings along the access routes (Clayhall Road and Anglesey Road) are Significant (Danger for Most) and Extreme (Danger for All).
- 5.4.4 Table 5-1 provides a summary of maximum water levels across the site and access routes for a range of modelled events. Maps have been provided for the 0.5% AEP event including upper end climate change allowance for the year 2122 (highlighted in grey in the table) as this is the design event for More Vulnerable development.

Point	LiDAR Topography (mAOD)	Maximum water levels (mAOD) for a range of Undefended modelled scenarios						
		200YR 2055 HC	200YR 2055 UE	200YR 2122 HC	200YR 2122 UE	1000YR 2055 UE	1000YR 2122 UE	
1	3.89	-	-	4.23	4.59	-	4.74	
2	3.38	3.43	3.51	4.23	4.59	3.65	4.74	
3	4.57	-	-	-	-	-	4.74	
4	4.36	-	-	-	4.59	-	4.74	
5	3.57	-	-	4.17	4.54	-	4.69	
6	3.66	3.93	4.11	4.64	4.75	4.30	4.81	
Notes: HC = Higher Central allowance; UE = Upper end allowance. 200YR is the 0.5% AEP event. 1000YR is the 0.1% AEP event.								

Table 5-1 Maximum water levels (mAOD), undefended modelled scenarios

5.4.5 The hazard rating for the 0.1% AEP event including the upper end climate change allowance for the year 2122 is mostly Significant (Danger for Most) with a small area to the south and southeast reaching Extreme (Danger to All). Areas towards the north and east are Moderate (Danger for Some) to Low (Caution) (Figure 5-7).

5.5 Risk of flooding from other sources

Surface water and sewers

5.5.1 The Risk of Flooding from Surface Water (RoFSW) mapping identifies the risk to the local area to predominately very low (Level 1 SFRA, Part 6 Appendix A Figure 3C). Some areas to the south and west of the site are at low to high risk of flooding from surface water. The Recorded Flood Outline mapping identifies a Southern Water Observed Flooding incident just south of the site (Level 1 SFRA, Part 6 Appendix A Figure 2C). There are also records of highway flooding in this area.

Groundwater

5.5.2 The BGS Susceptibility to Groundwater Flooding map identifies the entire site as having 'Potential for groundwater flooding of property situated below ground level' (Level 1 SFRA, Part 6 Appendix A Figure 6C).

Reservoirs

5.5.3 The site is not at risk of flooding from reservoirs (Level 1 SFRA, Part 6 Appendix A Figure 6C).

5.6 Recommendations for development

Avoid flood risk

5.6.1 A sequential approach to land use planning should be applied *within* the site. Measures to avoid flood risk vertically can then be taken, by locating the most vulnerable uses on upper storeys, and by raising finished floor and/or ground levels, where appropriate and that such techniques are suitably designed.

Control flood risk

- 5.6.2 The Piggeries is covered by the **North Solent Shoreline Management Plan**⁵ (SMP), section 5a25 (Quay Lane (MoD boundary) to Portsmouth Harbour Entrance (west)). The SMP recommends a policy of 'Hold the Line' (HTL maintain or upgrade the standard of protection offered by the existing coastal defences) for this policy unit for at least the next 100 years.
- 5.6.3 The **River Hamble to Portchester Coastal Flood and Erosion Risk Management Strategy**⁶ was developed to build on policies set out in the North Solent SMP and to identify appropriate management options to manage risk to the existing community. The preferred options set out what is technically, environmentally and economically sustainable. This may be a lower standard of protection than that required of new development, which must comply with the requirements of the NPPF. The Piggeries is included within Strategy Management Zone 2 within which the preferred option is to sustain a minimum 1 in 100 year standard of protection against flooding.
- 5.6.4 As shown in Figure 4-8, The Piggeries strategic site is covered by ODU20, from Haslar Royal Navy Cemetery to Fort Monckton. The option in this unit is continued maintenance of the existing defences by the MoD. Redevelopment of The Piggeries must enable and facilitate future flood defence maintenance and upgrade by the MoD over the coming years.
- 5.6.5 In the adjacent ODU19 to the west, (from Park Road to Haslar Royal Navy Cemetery), the Strategy identifies that priority capital works are required at Alverstoke as the current defences only provide a standard of protection of 1 in 20 years⁹. The scheme aims to increase this to 1 in 100 years to better defend around 130 houses from flooding and sea level rise. The works include a new reinforced wall on top of the existing defences and a flood gate across Little Anglesey Road. The design life of the scheme is until 2060. At the time of writing the scheme has been paused due to funding constraints. Once implemented this will reduce the level of risk along Anglesey Road, which forms an access route for The Piggeries site.
- 5.6.6 Future Coastal Flood Zones (Figure 5-3) indicate that The Piggeries will be almost entirely within Flood Zone 3 in 2122 and therefore flood defences and ground raising will be needed if there is a need for residential development of the area. Further work is required to determine the technical and economic feasibility of these measures being delivered before this site can be allocated.

⁹ Coastal Partners Alverstoke Coastal Defence Scheme. <u>https://coastalpartners.org.uk/project/alverstoke-coastal-defence-scheme-152</u>



Figure 5-8 River Hamble to Portchester FCERM Strategy Option Development Units

Mitigate and manage residual risk

Finished floor levels

5.6.7 Finished floor levels should be set above the design flood level (0.5% AEP including an appropriate allowance for climate change) plus freeboard. More Vulnerable and Highly Vulnerable development should apply the upper end climate change allowance (on this site this is approximately 4.6m AOD). Less Vulnerable development should apply the higher central climate change allowance.

Access and escape

- 5.6.8 New development must have safe access / escape during the design flood (0.5% AEP) including an appropriate allowance for climate change. More Vulnerable and Highly Vulnerable development should apply the upper end climate change allowance. Less Vulnerable development should apply the higher central climate change allowance. The order of preference is as follows:
 - Safe dry route for people and vehicles.
 - Safe dry routes for people.
 - Route for people where flood hazard is low.
 - Route for emergency vehicles where flood hazard is low.
- 5.6.9 There are currently no routes away from flooding for people or vehicles across the site. The road to the south of the site (Clayhall Road) is at risk of flooding. Access routes off Haslar Peninsular to the northeast via Haslar Road and Haslar Bridge are shown to be at Significant and Extreme hazard. Routes to the west via Clayhill Road and routes to the south via Fort Road are also shown to be at Significant hazard and are therefore not suitable access routes. To provide safe access to the Piggeries site, measures to raise access routes or improve the flood defences protecting these access routes will be required. If improvements are not provided, Gosport BC will need to consider, in conjunction their Emergency Planning team and with the emergency services, if reliance on prior evacuation and safe refuge is appropriate.

Place of safety

- 5.6.10 New development must be designed to include a place of safety during extreme flood conditions (0.1% AEP) including an allowance for climate change (on this site this is approximately 4.74m AOD).
- 5.6.11 Tidal flooding occurs during exceptionally high tides or storm surges. As a result, there is advance warning of such events. The Environment Agency aim to provide a minimum 6 hours warning time for tidal flooding. As a result, it would be possible to evacuate properties prior to any significant tidal flooding taking place.
- 5.6.12 However, places of safety play an important role where, for whatever reason, evacuation in advance of flooding is not achieved, or in cases where flooding occurs because of a failure (e.g., breach) in the flood defences. Places of safety should be designed to facilitate rescue in case emergency care is needed or if it's unlikely to be safe for occupants/users to wait until flood waters have receded sufficiently.

Flood Warning and Emergency Plans

- 5.6.13 The Piggeries is covered by the Gosport Flood Warning Area (Level 1 SFRA Part 6, Appendix A Figure 9).
- 5.6.14 Emergency Plans must be prepared for occupants of the site to set out the response in the event of a flooding warning with respect to safe access routes and places of safety. Emergency Plans should be agreed with Gosport BC and key emergency services. Refer to Level 1 SFRA, Part 6 (Gosport), Section 7.8 for further details.

Surface water management

5.6.15 Development proposals for the site should consider the natural patterns of surface water flow across the site early in the planning process⁷. New development should discharge runoff to the sea following suitable treatment. Proposals for surface water management should make provision for storage during high tide events, when the surface water drainage may be subject to tide locking. Proposals should demonstrate sustainable approaches to the management of surface water making use of SuDS; and incorporate soft landscaping, planting, and permeable surfacing. Potential overland flow paths from surface water should be determined and appropriate solutions proposed to minimise the impact of the development, whilst ensuring that flows are not diverted towards other properties elsewhere. Flow paths should be assessed to inform the strategic location of SuDS and techniques to route flows around the edge of buildings.

Groundwater flooding

5.6.16 New development should not result in an increased risk of groundwater flooding elsewhere. A Ground Investigation should be undertaken to determine specific site conditions and groundwater levels. Where development is proposed that involves works below ground and/or changes to drainage, further assessment may be required to determine the potential impact on groundwater and identify proposed mitigation measures.

5.7 Summary

- 5.7.1 The Piggeries allocation is currently shown to be at risk of flooding from the sea and this is predicted to increase in the future. The access routes to and from the strategic site are also shown to be at risk of flooding.
- 5.7.2 For residential development to be possible, proposed development will need to be raised above the design flood level and access routes may need to be either raised or protected by flood defence improvement works to reduce the level of flood risk. Further work is required to determine the technical and economic feasibility of these measures being delivered before this site can be allocated.
- 5.7.3 To provide safe access to the Piggeries site, measures to raise access routes or improve the flood defences protecting these access routes will be required. If improvements are not provided, Gosport BC will need to consider, in conjunction their Emergency Planning team and with the emergency services, if reliance on prior evacuation and safe refuge is appropriate.

6. Stokesmead, Little Anglesey Road, Alverstoke

6.1 Site Description

- 6.1.1 The field occupies a very prominent location in the Anglesey Conservation Area and adjoins a site currently used for community facilities. It is well placed to serve the local area and provides a green area which can be utilised for recreation and biodiversity improvement purposes.
- 6.1.2 Stokesmead is bordered to the north by Little Anglesey Road, to the south by Clayhall Road and to the west by Anglesey Road. A sewage pumping station and Stoke Lake borders the eastern site boundary.
- 6.1.3 LiDAR data (Figure 6-1, Table 6-1) shows that ground levels across the site are approximately 1.8mAOD to 3mAOD. To the north along Anglesey Road ground levels increase to >5mAOD.



Figure 6-1 LiDAR Topography

6.2 Allocation Proposals

- 6.2.1 There is currently a deficiency of local play facilities within this part of Gosport. The Borough Council will seek to acquire Stokesmead Field for public open space uses through negotiations with the landowners. Built development, including residential, is not suitable at this location for several reasons which are outlined in the Gosport Borough Local Plan. The site should be retained as open space outside the urban area boundary.
- 6.2.2 As defined by PPG Table 2, public open space uses are largely defined as Water Compatible development.

6.3 Level 2 SFRA Maps

Figure 6-2 Flood Map for Planning (Rivers and Sea)



Figure 6-3 Future Coastal Flood Zones (2122)





Figure 6-4 Maximum Flood Depth: Undefended 0.5% AEP 2122 (Upper End)

Figure 6-5 Maximum Flood Level: Undefended 0.5% AEP 2122 (Upper End)





Figure 6-6 Maximum Flood Hazard: Undefended 0.5% AEP 2122 (Upper End)





6.4 Risk of flooding from the sea

- 6.4.1 Figure 6-2 shows most of the site to be within both Flood Zone 3 'high probability of flooding from the sea'. The site is also within the defended 3.33% AEP tidal flood extent (Appendix A Figure 2). The south-eastern tip of the site is within Flood Zone 1 'low probability of flooding' from the sea.
- 6.4.2 Figure 6-3 shows that by 2122, the entire site will be within Flood Zone 3 'high probability of flooding'.
- 6.4.3 Modelled outputs for the 0.5% AEP event including the upper end climate change allowance for the year 2122, without the existing defences in place, indicate flood depths of 2-2.5m in the north of the site, decreasing to 1.5-2m further south, and 0.5-1m in the south-eastern tip (Figure 6-4). The maximum

water level across the site is 4.6m (Figure 6-5). The hazard rating is predominately Extreme (Danger for All), with the southern area Significant (Danger for Most) (Figure 6-6).

6.4.4 Table 6-1 provides a summary of maximum water levels across the site for a range of modelled events. Maps have been provided for the 0.5% AEP event including upper end climate change allowance for the year 2122 (highlighted in grey in the table) as this is the design event for More Vulnerable development. (It is noted that More Vulnerable development is not proposed for this particular site).

Point	LiDAR Topography (mAOD)	Maximum water levels (mAOD) for a range of Undefended modelled scenarios						
		200YR 2055 HC	200YR 2055 UE	200YR 2122 HC	200YR 2122 UE	1000YR 2055 UE	1000YR 2122 UE	
А	1.84	3.43	3.50	4.23	4.59	3.65	4.74	
В	3.00	3.43	3.50	4.23	4.59	3.65	4.74	
С	5.18	-	-	-	-	-	-	
D	1.66	3.43	3.50	4.23	4.59	3.65	4.73	
E	3.29	3.43	3.50	4.23	4.59	3.65	4.74	
Notes: HC = Higher Central allowance; UE = Upper end allowance. 200YR is the 0.5% AEP event. 1000YR is the 0.1% AEP event.								

Table 6-1 Maximum water levels (mAOD), undefended modelled scenarios

6.4.5 The hazard rating for the 0.1% AEP event including the upper end climate change allowance for the year 2122 is predominately Extreme (Danger for All), with the southern area Significant (Danger for Most) (Figure 6-7).

6.5 Risk of flooding from other sources

Surface water and sewers

- 6.5.1 The Risk of Flooding from Surface Water (RoFSW) mapping identifies the risk to the local area to predominately low, with areas to the west medium to high (Level 1 SFRA, Part 6 Appendix A Figure 3C). The site is not at risk of flooding from reservoirs (Level 1 SFRA, Part 6 Appendix A Figure 6C).
- 6.5.2 The Recorded Flood Outline mapping identifies a flood record from an unknown source to the northeast of the site (Level 1 SFRA, Part 6 Appendix A Figure 2C). The RoFSW mapping identifies recorded highway flooding in this area. No sewer flooding records have been indicated across this site.

Groundwater

- 6.5.3 The Environment Agency Areas Susceptible to Groundwater Flooding map identifies most of the site to have a susceptibility to groundwater flooding of >=75% (Level 1 SFRA, Part 6 Appendix A Figure 4C).
- 6.5.4 The BGS Susceptibility to Groundwater Flooding map identifies most of the site as having 'Potential for groundwater flooding to occur at surface' (Level 1 SFRA, Part 6 Appendix A Figure 6C). Areas to the south and west are classified as having 'Potential for groundwater flooding of property situated below ground level'.

Reservoirs

6.5.5 The site is not at risk of flooding from reservoirs (Level 1 SFRA, Part 6 Appendix A Figure 6C).

6.6 Recommendations for development

- 6.6.1 Future Coastal Flood Zones (Figure 6-3) indicate that Stokesmead will be entirely within Flood Zone 3 in 2122.
- 6.6.2 Stokesmead Field has been identified for open space which is Water Compatible development. Water Compatible development is appropriate for this area. The Exception Test is not required.

6.6.3 Should More Vulnerable development be proposed for this site (subject to the satisfaction of the Sequential Test), the Exception Test would be required.

Control flood risk

- 6.6.4 Stokesmead is covered by the **North Solent Shoreline Management Plan**⁵ (SMP), section 5a25 (Quay Lane (MoD boundary) to Portsmouth Harbour Entrance (west)). The SMP recommends a policy of 'Hold the Line' (HTL maintain or upgrade the standard of protection offered by the existing coastal defences) for this policy unit for at least the next 100 years.
- 6.6.5 The **River Hamble to Portchester Coastal Flood and Erosion Risk Management Strategy**⁶ was developed to build on policies set out in the North Solent SMP and to identify appropriate management options to manage risk to the existing community. The preferred options set out what is technically, environmentally and economically sustainable. This may be a lower standard of protection than that required of new development, which must comply with the requirements of the NPPF. Stokesmead is included within Strategy Management Zone 2 within which the preferred option is to sustain a minimum 1 in 100 year standard of protection against flooding.
- 6.6.6 As shown in Figure 6-8, the Strategy identifies that within ODU19, priority capital works are required at Alverstoke.
- 6.6.7 The Alverstoke Coastal Defence Scheme¹⁰, construction of which is currently on hold¹¹, will cover approximately 100m of coastal frontage and protect against the current flood route located at the western end of Stoke Lake (between Little Anglesey Road and Clayhill Road). The new defences have been designed to protect 130 properties against a 1 in 100 year (1% AEP) event until 2060.
- 6.6.8 It is vital that Gosport BC safeguard land on this site in accordance with the Strategy for implementation of these measures over the coming years.
- 6.6.9 Future Coastal Flood Zones (Figure 5-3) indicate that Stokesmead will be entirely within Flood Zone 3 in 2122 and therefore land raising or flood defences will be needed if there is a need for residential development in the area. Further work would be required to determine the technical and economic feasibility of these measures being delivered before this site can be allocated for residential development.

 ¹⁰ Description of Alverstoke Coastal Defence Scheme, Coastal Partners Website, <u>https://coastalpartners.org.uk/project/alverstoke-coastal-defence-scheme-152</u>
¹¹ Status of Alverstoke Coastal Defence Scheme, Coastal Partners Website, August 2022 <u>https://coastalpartners.org.uk/news/alverstoke-coastal-defence-scheme-august-2022-update/</u>



Figure 6-8 River Hamble to Portchester FCERM Strategy Option Development Units

Mitigate and manage residual risk

Finished floor levels

6.6.10 Finished floor levels should be set above the design flood level (0.5% AEP including an appropriate allowance for climate change) plus freeboard. More Vulnerable and Highly Vulnerable development should apply the upper end climate change allowance (on this site this is approximately 4.6m AOD). Less Vulnerable development should apply the higher central climate change allowance.

Access and escape

- 6.6.11 New development must have safe access / escape during the design flood (0.5% AEP) including an appropriate allowance for climate change. More Vulnerable and Highly Vulnerable development should apply the upper end climate change allowance. Less Vulnerable development should apply the higher central climate change allowance. The order of preference is as follows:
 - Safe dry route for people and vehicles.
 - Safe dry routes for people.
 - Route for people where flood hazard is low.
 - Route for emergency vehicles where flood hazard is low.
- 6.6.12 There are currently no routes away from flooding for people or vehicles across the site. Anglesey Road is also at risk of flooding with hazard rating of Significant (Danger for Most). To provide safe access to the Stokesmead site, measures to raise access routes or improve the flood defences protecting these access routes will be required. If improvements are not provided, Gosport BC will need to consider, in conjunction their Emergency Planning team and with the emergency services, whether reliance on prior evacuation and safe refuge is appropriate.

Place of safety

- 6.6.13 New development must be designed to include a place of safety during extreme flood conditions (0.1% AEP) including an allowance for climate change (on this site this is approximately 4.74m AOD).
- 6.6.14 Tidal flooding occurs during exceptionally high tides or storm surges. As a result, there is advance warning of such events. The Environment Agency aim to provide a minimum 6 hours warning time for

tidal flooding. As a result, it would be possible to evacuate properties prior to any significant tidal flooding taking place.

6.6.15 However, places of safety play an important role where, for whatever reason, evacuation in advance of flooding is not achieved, or in cases where flooding occurs because of a failure (e.g., breach) in the flood defences. Places of safety should be designed to facilitate rescue in case emergency care is needed or if it's unlikely to be safe for occupants/users to wait until flood waters have receded sufficiently.

Flood Warning and Emergency Plans

- 6.6.16 Stokesmead is covered by the Gosport Flood Warning Area (Level 1 SFRA Part 6, Appendix A Figure 9).
- 6.6.17 This site is proposed for public use. Emergency planning procedures for potential occupants of the site should be covered as part of the overall flood response plan for the Borough. Refer to Level 1 SFRA, Part 6 (Gosport), Section 6.3 for further details.
- 6.6.18 Should built development be proposed for the site, Emergency Plans must be prepared for occupants of the site to set out the response in the event of a flooding warning with respect to safe access routes and places of safety. Emergency Plans should be agreed with Gosport BC and key emergency services. Refer to Level 1 SFRA, Part 6 (Gosport), Section 7.8 for further details.

Surface water management

6.6.19 Development proposals for the site should consider the natural patterns of surface water flow across the site early in the planning process⁷. New development should discharge runoff to the sea following suitable treatment. Proposals for surface water management should make provision for storage during high tide events, when the surface water drainage may be subject to tide locking. Proposals should demonstrate sustainable approaches to the management of surface water making use of SuDS; and incorporate soft landscaping, planting, and permeable surfacing. Potential overland flow paths from surface water should be determined and appropriate solutions proposed to minimise the impact of the development, whilst ensuring that flows are not diverted towards other properties elsewhere. Flow paths should be assessed to inform the strategic location of SuDS and techniques to route flows around the edge of buildings.

6.7 Summary

- 6.7.1 The Stokesmead allocation and local area is currently shown to be at risk of flooding from the sea and this is predicted to increase in the future. The access routes to and from the strategic site are also shown to be at risk of flooding with Significant hazard rating.
- 6.7.2 Stokesmead Field is being considered for open space which is Water Compatible development.
- 6.7.3 Residual risk of tidal flooding will need to be managed through effective emergency planning measures at the wider Borough level.
- 6.7.4 Should More Vulnerable development be considered for this site (e.g. residential development), further work would be required to determine the technical and economic feasibility of land raising or flood defence improvement measures being delivered before this site can be allocated. To provide safe access to the Stokesmead site, measures to raise access routes or improve the flood defences protecting these access routes will be required. If improvements are not provided, Gosport BC will need to consider, in conjunction their Emergency Planning team and with the emergency services, if reliance on prior evacuation and safe refuge is appropriate.

7. Browndown Camp

7.1 Site Description

- 7.1.1 Browndown Camp is a former MoD site immediately south of the Alver Valley, 2.1 hectares in size.
- 7.1.2 Browndown Camp is bordered to the north by Privett Road and to the east by Browndown Road.
- 7.1.3 LiDAR data (Figure 7-1, Table 7-1) shows that ground levels to the south of site are between 2.5mAOD and 4mAOD. Ground levels across the land in the centre of the site are approximately 4.7mAOD, while land to the east is between 1.8mAOD and 3mAOD and land in the north is between 4.5mAOD and 5.2mAOD.

Figure 7-1 LiDAR Topography



7.2 Allocation Proposals

7.2.1 Browndown Camp is being considered for several development options. This may include a range of development types including Less Vulnerable uses and More Vulnerable (i.e., residential).

7.3 Level 2 SFRA Maps

Figure 7-2 Flood Map for Planning (Rivers and Sea)



Figure 7-3 Future Coastal Flood Zones (2122)





Figure 7-4 Maximum Flood Depth: Undefended 0.5% AEP 2122 (Upper End)







Figure 7-6 Maximum Flood Hazard: Undefended 0.5% AEP 2122 (Upper End)





7.4 Risk of flooding from rivers and the sea

- 7.4.1 The River Alver is located approximately 200m east of the site and flows south to the sea at Stokes Bay. A tributary of the Alver flows east, to the north of Privett Road.
- 7.4.2 Figure 7-2 shows most of the site is within Flood Zone 1 'low probability of flooding' from rivers and the sea. A small area to the east of the site benefits from a reduction in risk of flooding from rivers and sea due to defences. The site is not within the defended 3.33% AEP flood extent from the sea or the River Alver (Appendix A Figure 2).
- 7.4.3 Figure 7-3 shows that by 2122, the east and south of the site is predicted to be located within Flood Zone 2 'medium probability of flooding' and Flood Zone 3 'high probability of flooding' associated with the sea. This includes the access routes of Privett Road and Browndown Road. The west of the site remains within Flood Zone 1 'low probability of flooding'.
- 7.4.4 Modelled outputs for the 0.5% AEP event including the upper end climate change allowance for the year 2122, without the existing defences in place, indicate flood depths up to 2m in the east and south of the site with a maximum flood depth of 3m extending from Browndown Road (Figure 7-4). A small area to the north of the site along Privett Road indicated flood depths of up to 1m. The maximum water level across the site is 4.4m (Figure 7-5). The hazard rating in the east and south of the site ranges from Low (Caution) to Extreme (Danger for All) (Figure 7-6). Hazard ratings along the access routes are Extreme (Danger for All).
- 7.4.5 Table 6-1 provides a summary of maximum water levels across the site and access route for a range of modelled events. Maps have been provided for the 0.5% AEP event including upper end climate change allowance for the year 2122 (highlighted in grey in the table) as this is the design event for More Vulnerable development.

Point	LiDAR	Maximum water levels (mAOD) for a range of Undefended modelled scenarios						
	(mAOD)	200YR 2055 HC	200YR 2055 UE	200YR 2122 HC	200YR 2122 UE	1000YR 2055 UE	1000YR 2122 UE	
А	3.16	-	-	4.00	4.43	3.28	4.58	
В	3.50	-	-	3.97	4.43	-	4.58	
С	4.62	-	-		-	-	-	
D	5.32	-	-		-	-	-	
E	2.04	2.27	2.47	3.96	4.43	2.91	4.58	
F	2.51	-	-	3.96	4.43	2.91	4.58	
Notes: HC = Higher Central allowance; UE = Upper end allowance. 200YR is the 0.5% AEP event. 1000YR is the 0.1% AEP event.								

Table 7-1 Maximum water levels (mAOD), undefended modelled scenarios

7.4.6 The hazard rating for the 0.1% AEP event including the upper end climate change allowance for the year 2122 is Moderate (Danger for Some) and Low (Caution) in the east and south of the site with this moving into Significant (Danger for Most) and Extreme (Danger for All) towards Browndown Road (Figure 7-7).

7.5 Risk of flooding from other sources

Surface water and sewers

- 7.5.1 The Risk of Flooding from Surface Water (RoFSW) mapping identifies the risk to the local area to predominately low, with an area of high risk to the east along Browndown Road (Level 1 SFRA, Part 6 Appendix A Figure 3C).
- 7.5.2 The Recorded Flood Outline mapping identifies a flood record from an unknown source at the junction of Privett Road and Browndown Road to the northeast of the site (Level 1 SFRA, Part 6 Appendix A Figure 2C). No sewer flooding records have been indicated across this site.

- Browndown Camp is covered by Hampshire County Council's Catchment Management Plan (CMP) 3 for 7.5.3 the River Meon and River Wallington¹². Browndown Camp is in West Gosport which is a Priority Area within the CMP. The CMP notes that principal flood risk sources are groundwater, surface water, fluvial flooding (associated with the River Alver) and coastal flooding.
- 7.5.4 The majority of surface water flooding runs centrally through the West Gosport area, along the River Alver travelling north to south. This risk is generally concentrated in the Alver Valley Country Park but also poses a risk to the surrounding residential areas. As a result of climate change, the risk of surface water flooding is predicted to increase.

Groundwater

- 7.5.5 The Environment Agency Areas Susceptible to Groundwater Flooding map identifies most of the site to have a susceptibility to groundwater flooding of >=75% (Level 1 SFRA, Part 6 Appendix A Figure 4C).
- 7.5.6 The BGS Susceptibility to Groundwater Flooding map identifies most of the site as having 'Potential for groundwater flooding to occur at surface' (Level 1 SFRA, Part 6 Appendix A Figure 5C). This is confirmed by the CMP which notes that there is a high risk of groundwater flooding in West Gosport, particularly in the southeast area of the priority group.

Reservoirs

7.5.7 The site is not at risk of flooding from reservoirs (Level 1 SFRA, Part 6 Appendix A Figure 6C).

7.6 Recommendations for development

Avoid flood risk

7.6.1 A sequential approach to land use planning should be applied within the site. The most vulnerable aspects of the development (residential development) should be in the areas of lowest risk towards the west of the site unless there are overriding reasons to prefer a different location. In addition, measures to avoid flood risk vertically can then be taken, by locating the most vulnerable uses on upper storeys, and by raising finished floor and/or ground levels, where appropriate and that such techniques are suitably designed.

Control flood risk

- 7.6.2 The Browndown Camp strategic allocation and surrounding area is covered by the North Solent Shoreline Management Plan⁵ (SMP), section 5b02 (Gilkicker Point to Meon Road, Titchfield Haven). The SMP recommends a policy of 'Hold the Line' (HTL – maintain or upgrade the standard of protection offered by the existing coastal defences) for this policy unit for at least the next 100 years.
- 7.6.3 The River Hamble to Portchester Coastal Flood and Erosion Risk Management Strategy⁶ was developed to build on policies set out in the North Solent SMP and to identify appropriate management options to manage risk to the existing community. The preferred options set out what is technically, environmentally and economically sustainable. This may be a lower standard of protection than that required of new development, which must comply with the requirements of the NPPF. Browndown Camp is included within Strategy Management Zone 3 within which the preferred option is scheduled maintenance and beach recycling to maintain beaches and prevent erosion, accepting that the standard of protection against flooding will fall in the longer term. As part of this strategy, Coastal Partners¹³ are currently developing a beach management plan (BMP) extending between Hill Head Harbour in the west and Portsmouth Harbour Entrance in the east, including Stokes Bay. If approved and funded, beach management activities will be undertaken with localised works where beach levels have fallen (or are in excess), to manage coastal risk and amenity.
- 7.6.4 The Stokes Bay Seawall Replacement Project, expected to be delivered in 2024 if additional funding is secured, does not cover the extent of the proposed development area.

¹² River Meon and River Wallington Draft Catchment Management Plan (CMP) <u>https://documents.hants.gov.uk/flood-water-</u> management/3-HCC-CMP-MeonandWallington.pdf ¹³ https://coastalpartners.org.uk/authority/gosport/

- 7.6.5 Future Coastal Flood Zones (Figure 7-3) indicate that Browndown Camp and the associated access routes will be at an increased risk of flooding from the sea and the River Alver in the future. Therefore ground raising of the eastern part of the site and to provide suitable access to the site would be needed to enable residential development on the site and to enable the evacuation of people during extreme flood events.
- 7.6.6 Further work would be required to determine the technical and economic feasibility of these measures being delivered before this site can be allocated for residential development.
- 7.6.7 Whilst the dominant source of flooding to Browndown Camp is tidal flooding, consideration will also need to be made of the risk of flooding from the River Alver. Development in areas at risk of fluvial flooding should be avoided. Where development is proposed that increases ground levels, floodplain compensation storage will be required to ensure that there is no increase in fluvial flood risk elsewhere.

Mitigate and manage residual risk

Finished floor levels

7.6.8 Finished floor levels should be set above the design flood level (0.5% AEP including an appropriate allowance for climate change) plus freeboard. More Vulnerable and Highly Vulnerable development should apply the upper end climate change allowance (on this site this is approximately 4.4m AOD). Less Vulnerable development should apply the higher central climate change allowance.

Access and escape

- 7.6.9 New development must have safe access / escape during the design flood (0.5% AEP) including an appropriate allowance for climate change. More Vulnerable and Highly Vulnerable development should apply the upper end climate change allowance. Less Vulnerable development should apply the higher central climate change allowance. The order of preference is as follows:
 - Safe dry route for people and vehicles.
 - Safe dry routes for people.
 - Route for people where flood hazard is low.
 - Route for emergency vehicles where flood hazard is low.
- 7.6.10 There are currently no routes away from the site that are dry during the design flood event for people or vehicles. Privett Road provides access away from the site to both the northeast and northwest and is shown to be at Extreme hazard (Danger for All). Browndown Road provides access away from the site to the south and is also shown to be at Extreme hazard (Danger for All). To provide safe access to the Browndown Camp site, measures to raise access routes or improve the flood defences protecting these access routes will be required. If improvements are not provided, Gosport BC will need to consider, in conjunction their Emergency Planning team and with the emergency services, whether reliance on prior evacuation and safe refuge is appropriate.

Place of safety

- 7.6.11 New development must be designed to include a place of safety during extreme flood conditions (0.1% AEP) including an allowance for climate change (on this site this is approximately 4.58m AOD).
- 7.6.12 Tidal flooding occurs during exceptionally high tides or storm surges. As a result, there is advance warning of such events. The Environment Agency aim to provide a minimum 6 hours warning time for tidal flooding. As a result, it would be possible to evacuate properties prior to any significant tidal flooding taking place.
- 7.6.13 However, places of safety play an important role where, for whatever reason, evacuation in advance of flooding is not achieved, or in cases where flooding occurs because of a failure (e.g., breach) in the flood defences. Places of safety should be designed to facilitate rescue in case emergency care is needed or if it's unlikely to be safe for occupants/users to wait until flood waters have receded sufficiently.

Flood Warning and Emergency Plans

7.6.14 The eastern edge of Browndown Camp is covered by the "Browndown on the River" Flood Warning Area (Level 1 SFRA Part 6, Appendix A Figure 9C). To the south of the site, outside of the allocation, the area is covered by the Gosport Flood Warning Area.

7.6.15 Emergency Plans must be prepared for occupants of the site to set out the response in the event of a flooding warning with respect to safe access routes and places of safety. Emergency Plans should be agreed with Gosport BC and key emergency services. Refer to Level 1 SFRA, Part 6 (Gosport), Section 7.8 for further details.

Surface water management

- 7.6.16 Development proposals for the site should consider the natural patterns of surface water flow across the site early in the planning process⁷. Proposals for redevelopment of the site should restrict surface water runoff rates; demonstrate sustainable approaches to the management of surface water making use of SuDS; and incorporate soft landscaping, planting, and permeable surfacing. Potential overland flow paths from surface water should be determined and appropriate solutions proposed to minimise the impact of the development, whilst ensuring that flows are not diverted towards other properties elsewhere. Flow paths should be assessed to inform the strategic location of SuDS and techniques to route flows around the edge of buildings.
- 7.6.17 Redevelopment of Browndown Camp will entail major brownfield development. In line with the policies in CMP3, HCC will make it best practice that a 50% betterment for surface water runoff rates is demonstrated for the surface water management features of any proposed development. HCC may also make it best practice for Gosport BC to request hydraulic modelling of surface water exceedance flows movement and management on new development.

Groundwater flooding

7.6.18 New development should not result in an increased risk of groundwater flooding elsewhere. A Ground Investigation should be undertaken to determine specific site conditions and groundwater levels. Where development is proposed that involves works below ground and/or changes to drainage, further assessment may be required to determine the potential impact on groundwater and identify proposed mitigation measures.

7.7 Summary

- 7.7.1 The Browndown Camp allocation is shown to be at an increased risk of flooding from the sea in the future. The access routes to and from the strategic site are also shown to be at risk of flooding with Extreme hazard rating (Danger for All).
- 7.7.2 Proposals for development that may increase the number of people living or working in areas of flood risk require particularly careful consideration, as they could increase the scale of any evacuation required. Measures to improve the flood defences protecting these access routes or to raise the key access routes above the design flood level will be required and planned into future infrastructure delivery plans for Gosport to enable development on this site to be considered safe. Further work is required to determine the technical and economic feasibility of these measures being delivered before this site can be allocated.
- 7.7.3 If improvements are not provided, Gosport BC will need to consider, in conjunction their Emergency Planning team and with the emergency services, if reliance on prior evacuation and safe refuge is appropriate.

8. Summary

- 8.1.1 Gosport BC is developing the Gosport Borough Local Plan 2038, which will identify sites for housing, employment and other land uses as well as protecting the Borough's important open space, nature conservation and heritage features.
- 8.1.2 This Level 2 SFRA has been undertaken to assess the risk of flooding to the following potential development sites:
 - Gosport Waterfront Strategic Development Site
 - Blockhouse Strategic Development Site
 - Haslar Strategic Development Site
 - The Piggeries Strategic Development Site
 - Stokesmead, Little Anglesey Road, Alverstoke
 - Browndown Camp.
- 8.1.3 Flooding from the sea poses a significant risk to all of these sites and this is predicted to increase in the future. However, it is not only the sites that are at risk, key access routes to the sites are also at risk of flooding from the sea with hazard ratings of Significant or Extreme.
- 8.1.4 In order for these sites to be allocated, further work is required to determine the technical and economic feasibility of the land raising and/or defence improvement works required to deliver safe development in these locations. Furthermore, Gosport BC need to consider, in conjunction their Emergency Planning team and with the emergency services, appropriate emergency planning procedures to manage the residual risk, particularly if reliance on prior evacuation and safe refuge is required.

Appendix A Borough Wide Maps

Figure 1: Undefended Scenario 0.5% AEP Upper End (2122) Maximum Flood Hazard Rating

Figure 2: Defended Scenario 3.3% AEP (2022) Tidal Flood Extent

