

SUBMISSION ADUR LOCAL PLAN 2016

FLOOD RISK TOPIC PAPER

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1. Introduction

1.1 This position statement aims to provide a clear overview of the following:

- 1) Why the Council has allocated for development a number of key sites within Part Two of the Adur Local Plan in areas at risk of flooding
- 2) How the approach to site selection and flood risk is consistent with national policy and guidance
- 3) The respective roles and responsibilities of Adur District Council, West Sussex County Council and the Environment Agency in assessing the impact of development on flood risk and the current position of these bodies in respect of flood risk in relation to the allocations in the Local Plan.
- 4) The flood risk issues involved with the allocations in the Adur Local Plan
- 5) The work that has currently been undertaken in respect of flood risk at these sites as well as ongoing and outstanding work.

1.2 The Council considers that its approach to development and flood risk in the Adur Local Plan meets the soundness tests set out in the National Planning Policy Framework (para 182) for local plan preparation in that:

- The Plan has been **positively prepared** and has sought to meet objectively assessed development and infrastructure requirements as far as it is reasonable to do so and is consistent with achieving sustainable development in Adur.
- The Plan is **justified** in its approach to allocating sites and is the most appropriate strategy for Adur when considered against the reasonable alternatives, based on proportionate evidence.
- The strategy is **effective** and deliverable over the Local Plan period to 2031.
- The Plan is **consistent with national policy** and will enable the delivery of sustainable development in accordance with the policies in the National Planning Policy Framework.

1.3 In developing the Plan, the Council has followed national guidance set out in the National Planning Policy Framework for “sustainable development” and produced appropriate technical studies including a Strategic Flood Risk Assessment which meets the requirements for Level 1 and 2.

1.4 This position statement should be considered as background evidence to help support the approach to development and flood risk in the Adur Local Plan. It builds upon correspondence and dialogue with the Environment Agency, West Sussex County Council as the Lead Local Flood Authority and the Council’s own drainage engineers. This document should be read in conjunction with:

- the Amendments to the Proposed Submission Adur Local Plan (2016) document
- the Sequential and Exception Test 2016.
- the Sustainability Appraisal of the Adur Local Plan (2016)

1.5 The Council seeks to avoid and address flood risk through the following vision and objectives in the Plan:

V9: Flood risk will have been minimised and/or mitigated through investment in flood defences, flood risk management initiatives and careful consideration of the location of new development.

O11: To ensure that the risks associated with flooding are avoided and mitigated through directing development to appropriate locations and, where this is not possible, through appropriate flood mitigation measures. Where feasible, new flood defences and other measures to reduce flood risk should take the form of ecologically sustainable solutions. Water quality will be protected and where possible, enhanced.

The Council also seeks to go as far as possible to address flood risk in the Adur Local Plan through Policy 37: Flood Risk and Sustainable Drainage:

Policy 37: Flood Risk and Sustainable Drainage

The Council will work with relevant bodies to ensure that flood risk in Adur is reduced.

A site specific flood risk assessment must be submitted with planning applications for:

- **Proposals of 1 hectare or greater in Flood Zone 1**
- **All development or changes of use to a more vulnerable use in Flood Zones 2 and 3**
- **All development¹ or changes of use to a more vulnerable use, regardless of flood zone or size, where flood risk from other sources (surface water, sewer, groundwater) is identified by the Strategic Flood Risk Assessment.**

The flood risk assessment will need to demonstrate that development:

- **is appropriately flood resilient and resistant, includes safe access and escape routes where required, and that any residual risk can be safely managed;**
- **will be safe for its lifetime taking account of the vulnerability of its users;**
- **will not increase flood risk (including sewer flooding, surface water and groundwater flood risk) elsewhere;**
- **will, where possible, reduce flood risk overall; and**
- **will give priority to the use of sustainable drainage systems.**

The flood risk assessment will also need to demonstrate that, where possible, higher vulnerability uses have been located on parts of the site at the lowest probability of flooding.

New development within Adur must include some form of Sustainable Drainage System (SuDS) or other appropriate design measures in order to reduce the risks of surface water flooding and to mitigate the risk of

¹ Excluding 'minor development' as defined in paragraph 046 of the National Planning Policy Framework Planning Practice Guidance.

pollution to groundwater sources. SuDS should be considered before other forms of disposal.

Substantial storage through SuDS will be required to achieve a reduction in runoff to levels below that experienced prior to development. On relevant sites, storage of runoff during the high part of the tidal cycle should be addressed. SuDS must be designed sensitively and must seek to enhance landscapes, increase biodiversity gains, and provide quality spaces.

For all developments, applicants will be required to demonstrate that acceptable management arrangements are in place and funded to ensure the ongoing maintenance of SuDS into the future. Where it is not practical to provide SuDS on site, the development of strategic level SuDS may be considered appropriate. In these circumstances, contributions may be required through s106 undertakings/ CIL.

Policies 5 (New Monks Farm, Lancing), 6 (Land at West Sompting), 7 (Shoreham Airport) and 8 (Shoreham Harbour) (see Appendix 2) also aim to minimise and mitigate flood risk.

2. The Adur Local Plan Area

- 2.1 Adur District is located on the coast between Brighton & Hove City to the east and Worthing Borough to the west. The northern part of the district is located within the South Downs National Park and to the south is the English Channel, with the low lying land of the Adur Valley separating the settlements of Lancing and Sompting to the west from Shoreham-By-Sea, Southwick and Fishersgate to the east.
- 2.2 It should be noted that this Local Plan does not address that part of Adur which lies within the National Park – this area will be covered by the emerging South Downs Local Plan.

3. National Policy

- 3.1 Paragraph 100 of The National Planning Policy Framework (NPPF) states that *'Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing flood risk elsewhere.'*
- 3.2 The NPPF requires Local Plans to develop policies to manage flood risk from all sources and apply a sequential, risk-based approach (the Sequential Test) to the location of development to avoid where possible flood risk to people and property and manage any residual risk, taking account of the impacts of climate change.

- 3.3 The aim of the Sequential Test is to steer new development to areas with the lowest probability of flooding.
- 3.4 If, following application of the Sequential Test, it is not possible, for the development to be located in zones with a lower probability of flooding, the Exception Test can be applied if appropriate. The Exception Test is made up of two elements:
- it must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk; and
 - a site-specific flood risk assessment must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.
- 3.5 Paragraph 102 of the NPPF makes clear that both elements have to be passed for development to be allocated.
- 3.6 Paragraph 103 states:

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

- *within the site, the most vulnerable development is located in areas of lowest flood risk unless there are overriding reasons to prefer a different location; and*
- *development is appropriately flood resilient and resistant, including safe access and escape routes where required, and that any residual risk can be safely managed, including by emergency planning; and it gives priority to the use of sustainable drainage systems.’*

4. National Guidance

- 4.1 Flood risk is defined by the Planning Practice Guidance (PPG) as a combination of the probability and the potential consequences of flooding from all sources. The Flood Zones refer to the probability of river and sea flooding at current day, ignoring the presence of defences.
- 4.2 Table 1: Flood Zones (paragraph 065 ref: 7-065-20140306) defines the Flood Zones. It separates Flood Zone 3 into zones 3a and 3b. Flood Zone 3b: the functional floodplain is defined as land where water has to flow or be stored in times of flood.
- 4.3 Paragraph 018 (Ref: 7-018-20140306) sets out the approach of the sequential test:

This general approach is designed to ensure that areas at little or no risk of flooding from any source are developed in preference to areas at higher risk. The aim should be to keep development out of medium and high flood risk areas (Flood Zones 2 and 3) and other areas affected by other sources of flooding where possible.

4.4 Table 3: Flood risk vulnerability and flood zone ‘compatibility’ (paragraph 067 ref: 7-067-20140306) sets the requirement for more vulnerable development in Flood Zone 3a to pass the Exception Test. It also shows that all types of development other than water compatible uses and essential infrastructure (subject to the Exception test) should not be permitted in Flood Zone 3b.

4.5 Paragraph 023 (ref: 7-023-20140306):

The Exception Test, as set out in paragraph 102 of the Framework, is a method to demonstrate and help ensure that flood risk to people and property will be managed satisfactorily, while allowing necessary development to go ahead in situations where suitable sites at lower risk of flooding are not available. Essentially, the two parts to the Test require proposed development to show that it will provide wider sustainability benefits to the community that outweigh flood risk, and that it will be safe for its lifetime, without increasing flood risk elsewhere and where possible reduce flood risk overall.

4.6 Paragraph 026 (ref: 7-026-20140306) defines the lifetime of development:

Residential development should be considered for a minimum of 100 years, unless there is specific justification for considering a shorter period. The lifetime of a non-residential development depends on the characteristics of that development. Planners should use their experience within their locality to assess how long they anticipate the development being present for.

4.7 Local Plans should also be supported by a Strategic Flood Risk Assessment (SFRA). Paragraph 009 (ref: 7-009-20140306) explains:

A Strategic Flood Risk Assessment is a study carried out by one or more local planning authorities to assess the risk to an area from flooding from all sources, now and in the future, taking account of the impacts of climate change, and to assess the impact that land use changes and development in the area will have on flood risk.

Paragraph 025 (ref: 7-025-20140306) states that:

In considering an allocation in a Local Plan a level 2 Strategic Flood Risk Assessment should inform consideration of the second part of the Exception Test.

5. Roles and Responsibilities

- 5.1 No single agency is responsible for managing flood risk. It is therefore important that the key organisations involved work closely together. The following bodies play a key role in dealing with flood risk. However, each body has a slightly different role as explained below:

The Environment Agency

- 5.2 The Environment Agency is a specific consultation body (defined by the Town and Country Planning (Local Planning) (England) Regulations 2012) in the preparation of Local Plans and Strategic Environmental Assessment (SEA). They provide technical advice to Local Planning Authorities (LPAs) on issues relating to flood risk, biodiversity and water quality.
- 5.3 The Environment Agency is responsible for taking a strategic overview of the management of all sources of flooding and coastal erosion. This includes, for example, setting the direction for managing the risks through strategic plans and providing evidence and advice to inform Government policy and support others. The Environment Agency has permissive powers to undertake operational roles for managing the risk of flooding from main rivers, reservoirs, estuaries and the sea, as well as being a coastal erosion risk management authority. The Environment Agency publishes flood maps. The Flood Map for Planning is the most up to date map for the current day undefended risk of flooding from rivers or the sea. This shows the areas of Flood Zones 2 and 3 and is updated quarterly. The Environment Agency has also published the Risk of Flooding from Surface Water map.
- 5.4 With regard to the flood risk issues relating to the emerging Adur Local Plan, the Environment Agency's advice is focused on tidal and fluvial flood risk to main river.

Lead Local Flood Authorities

- 5.5 The Flood and Water Management Act (2010) has given responsibility for the management of local flood risk to Unitary/ County Councils as Lead Local Flood Authorities. The Lead Local Flood Authority, in this case West Sussex County Council, are responsible for developing, maintaining and applying a strategy for local flood risk management in their areas and for maintaining a register of flood risk assets. They also have lead responsibility for managing the risk of flooding from surface water, groundwater and ordinary watercourses.

Adur District Council

- 5.6 Adur District Council is a key partner in planning local flood risk management and can carry out flood risk management works on minor watercourses, working with Lead Local Flood Authorities and others, including through taking decisions on development in their area which ensure that risks are effectively

managed. Adur District Council also acts as a coastal erosion risk management authority.

6. Local Flood Risk

- 6.1 The Adur District is affected to varying degrees by all sources of flooding, including surface water, fluvial, tidal, sewer and groundwater.
- 6.2 **Tidal** flooding is a particularly significant issue due to Adur's coastal location and the presence of the River Adur which is tidally influenced. Much of the area at risk from tidal flooding is protected by flood defences. However, there remains a residual risk that the defences could fail or be overtopped during a flood event.
- 6.3 **Fluvial** flooding is caused by high flows in rivers or streams exceeding the capacity of the river channel and spilling onto the floodplain, usually after a period of heavy rainfall. The largest areas of Flood Zones 2 and 3 are along the River Adur.
- 6.4 Flooding from **surface water** occurs when the local drainage system cannot cope with the rainfall and/or the rainfall cannot be infiltrated to the ground. It is extremely difficult to predict precisely where surface water flooding will happen as it is dependent on ground levels, rainfall, groundwater levels, blockages and the local drainage network. In Adur surface water flooding often originates from run-off from the steep slopes of the South Downs.
- 6.5 The position of Adur at the base of the South Downs has resulted in **groundwater** flooding in the past. The majority of Adur District is susceptible to groundwater flooding due to the geology of the area. Ground water flooding is defined as a rise in the water table in permeable rocks during higher than normal rainfall.
- 6.6 **Sewer** flooding can be caused when rainfall is so heavy that it overwhelms the system, when groundwater flows into underground drainage networks, or when the sewerage system becomes blocked.
- 6.7 The following table sets out the varying flood risk issues for each of the Local Plan allocations/broad locations contained in Part Two of the Adur Local Plan:

Flood Risk Issues for Strategic Sites in the Adur Local Plan

Site allocation / broad location	Flood Zone (Present Day) (Undefended)	Flood Zone (Future 2115) (Defended)	Surface Water Flood Risk	Ground Water Flood Risk
New Monks Farm	Predominantly within tidal flood zone 3a (high probability) with parts in flood zone 1 (low probability) and 2 (medium probability).	Some of the areas currently within tidal flood zones 1 and 2 will become flood zone 3.	There are pockets of flooding associated with the ditches to the south east and northern perimeter of the site as well as flooding associated with the 1 in 30 year and 1 in 200 year event across the site. There is a potentially significant flow path parallel to Old Shoreham Road in the north limiting access along Mash Barn Lane.	The majority of the site has a susceptibility of greater than 75%. The site is underlain by the Newhaven Chalk Formation and is within the Environment Agency's major aquifer high vulnerability zone.
Shoreham Airport	Predominantly within tidal flood zone 3b (functional floodplain). However, following the construction of the Shoreham Adur Tidal Walls Scheme, the flood zone of the site will become 3a (high probability).	No worsening of flood risk compared to present day undefended tidal flood zone.	There are small pockets of surface water flooding, some deep, across the site.	The majority of the site has a susceptibility of greater than 75%. The site is underlain by the Newhaven Chalk Formation and is within the Environment Agency's major aquifer high vulnerability zone.

Shoreham Harbour	The site is within tidal flood zones 1 (low probability), 2 (medium probability) and 3a (high probability).	No worsening of flood risk compared to present day undefended tidal flood zone.	There are pockets of surface water flooding across the site.	The majority of the western harbour arm has a susceptibility of greater than 75%. The site is mostly underlain by the Tarrant Member and Lambeth Group chalk.
West Sompting	Fluvial flood zone 1 (low probability), 2 (medium probability), 3a (high probability) and 3b (functional floodplain). However, it should be noted that the development area is entirely within flood zone 1.	No worsening of flood risk compared to present day undefended fluvial flood zone	The majority of the site appears to be at low risk from surface water flooding. However there appears to be a drainage channel along the south east edge of the northern section of the site.	The larger southern section of the site has a susceptibility of greater than 75% whereas the northern section has a susceptibility of less than 25%. The site is underlain by the Tarrant Member chalk formation.

Strategic Flood Risk Assessment:

- 6.8 The Council's Strategic Flood Risk Assessment (SFRA) builds upon the Environment Agency's flood map.
- 6.9 The SFRA was updated in 2012 to help inform the location of new development within the Local Plan area and satisfy the requirements of a Level 1 and Level 2 SFRA. The SFRA considers flooding from all sources, now and in the future, taking account of the impacts of climate change (as assessed at that time). The SFRA also distinguishes between Flood Zones 3a and 3b.

Shoreham Adur Tidal Walls

- 6.10 Due to the risk of flooding to the towns of Shoreham-by-Sea and Lancing from the River Adur, the Environment Agency is developing a flood risk management scheme to improve the tidal defences in Shoreham-by-Sea, called the Shoreham Adur Tidal Walls Scheme. The scheme is being delivered in partnership with West Sussex County Council, Adur District Council and the Coast to Capital Local Enterprise Partnership and will improve or replace the existing defences from Shoreham Fort to Ricardo on the west bank and Coronation Green to the A27 on the east bank. The tidal walls scheme was granted planning permission in June 2016 and construction is planned to start in October 2016. It is anticipated that the scheme will be completed in 2018.
- 6.11 Although the aim of the scheme is to protect existing properties and businesses, the tidal walls will change the flood zone of the Shoreham Airport area from flood zone 3b (functional floodplain) to 3a (high probability). This will allow the proposed allocation at Shoreham Airport to proceed once the Adur Tidal Walls are in place. (Please see Policy 7 of the Adur Local Plan and the Sequential and Exception Test for more information).

Historic Flooding

- 6.12 Significant widespread flooding occurred across West Sussex in the summer of 2012 and winter of 2013/2014 as a result of heavy rainfall. In December 2013 a tidal surge up the River Adur caused the western flood defence along the river to be breached, resulting in flooding of the airport.
- 6.13 The SFRA documents a number of flooding events concerning groundwater, surface water and sewer flooding within the northern section of New Monks Farm. In addition, in 1974 sewer and surface water flooding affected Shoreham Airport.

Lancing Surface Water Management Plan (SWMP)

- 6.14 The Lancing SWMP was completed in 2015 and the area it covers includes the eastern edge of Lancing across to the River Adur in the east and extends as far as the northern tip of Lancing Ring in the north. This covers the New

Monks Farm area, Shoreham Airport and the West Beach (Hasler) residential area. The area is characterised by low-lying land and low gradients. The SWMP was undertaken because the water table is generally high and the drainage system becomes filled with groundwater draining from the chalk, and at times of heavy rainfall, surface water, leading to flooding. Groundwater and surface water also infiltrate the foul drainage system leading to sewer flooding. In the West Beach estate, flooding problems are complicated because the estate is situated below sea level and is further impacted by saline water at high tide. It should be noted that the SWMP was produced to help deal with existing problems in the area and not a result of allocations within the emerging Adur Local Plan.

- 6.15 The SWMP considers a number of policy, construction and maintenance measures to alleviate the impacts of flooding in Lancing. Nevertheless, it concludes that even with all of these measures in place, Lancing will still be at risk of flooding during more extreme weather events. This is because the drainage systems (both natural and man-made) and any other flood risk infrastructure will become overwhelmed during extreme weather events. In addition, Lancing is highly vulnerable to groundwater flooding (or drainage is affected by groundwater levels), which is significantly more challenging, both technically and economically, to manage.

7. Approach to Site Selection and Flood Risk

- 7.1 The purpose of the Sequential Test, as set out in the NPPF and the PPG, is to steer new development towards areas with the lowest probability of flooding. Only where there are no reasonably available sites in Flood Zones 1 or 2 should decision-makers consider the suitability of sites in Flood Zone 3, taking into account the flood risk vulnerability of land uses and applying the Exception Test if required.
- 7.2 A Sequential Test has been undertaken for the emerging Adur Local Plan. This shows that due to the limited number of available sites in the Local Plan area and high proportion of land within Flood Zones 2 and 3, it is not possible to meet Adur's housing and employment needs entirely within Flood Zone 1. Therefore sites located in Flood Zone 2 and Flood Zone 3 have also been considered. These include strategic allocations at New Monks Farm, Shoreham Harbour and Shoreham Airport.
- 7.3 Shoreham Airport is currently located within Flood Zone 3b (functional floodplain). Employment uses are not appropriate in this flood zone. However, the Shoreham Adur Tidal Walls scheme, once constructed, will result in the land at Shoreham Airport being reclassified as Flood Zone 3a (high probability). The Tidal walls scheme has received planning permission and construction is planned to start August 2016. Due to Shoreham Airport's current location within Flood Zone 3b, no development can take place until the site has been reclassified as Flood Zone 3a. Policy 7 (Shoreham Airport) of the Adur Local Plan makes this clear. Therefore, following consultation with

the EA, the approach taken has been to consider Shoreham Airport as Flood Zone 3a for the purposes of the Sequential Test.

- 7.4 Further detail regarding flood risk and mitigation for New Monks Farm, Shoreham Harbour and Shoreham Airport are set out below.

8. The Exception Test and Flood Mitigation for the Strategic Allocations

New Monks Farm

- 8.1 The New Monks Farm site, as defined by the allocation within the Adur Local Plan 2016, is approximately 61 hectares and comprises predominantly undeveloped greenfield land in the west and a golf course (under construction) located on the eastern portion. The site is bounded by the A27 dual carriageway to the north, residential development to the west, Shoreham Airport to the east, and the Brighton & Hove Football Club Training Ground forms part of the southern boundary.
- 8.2 Numerous drainage ditches are located throughout the site and these ditches drain into the River Adur, mainly via an outfall, south of the railway line adjacent to the A259.
- 8.3 The SFRA and Environment Agency's Flood Map for Planning classifies the site as being located predominantly in Flood Zone 3a, defined as having a high probability of flooding, in this instance from the sea. The SFRA also identifies that the site is at risk from groundwater and surface water flooding.
- 8.4 As residential development is proposed at New Monks Farm, due to its location within Flood Zone 3a, an Exception Test must be undertaken. Under Part 1 of the Exception Test it must be demonstrated that new development will provide wider sustainability benefits to the community that outweigh flood risk.
- 8.5 By assessing the New Monks Farm allocation against the Sustainability Objectives in the Council's Sustainability Appraisal of the Adur Local Plan, the Exception Test for the Adur Local Plan demonstrates that the wider sustainability benefits that New Monks Farm would bring outweigh flood risk issues.
- 8.6 In order to undertake Part 2 of the Exception Test, as set out in paragraph 102 of the NPPF (see above), the Level 2 SFRA for New Monks Farm was used. Due to the range of sources of flooding, the ongoing advice of West Sussex County Council as the lead local flood authority has been sought in relation to groundwater and surface water flooding, in addition to ongoing advice from the Council's own drainage engineer, and the Environment Agency regarding tidal flood risk.
- 8.7 Given some concerns surrounding the deliverability of the site because of the complex nature and interrelationship of the various forms of flooding, the

previous landowner of New Monks Farm commissioned work to understand groundwater issues on the site in more detail. This resulted in the New Monks Farm Interpretative Hydrogeological Report on Groundwater Levels and Influencing Factors (April 2014). The conclusions of the study can be summarised as follows:

- The site has two layers of groundwater; the deeper groundwater layer associated with the chalk geology and a shallower water table associated with a clay layer just below the land surface. It is the groundwater confined above this clay layer that standing water is associated with.
- The clay layer acts to confine the groundwater within the chalk layer beneath and prevents significant groundwater emergence south of the springline along the A27.
- Groundwater associated with the chalk outcrop and the Downs does affect the site but indirectly due to the emergence at or around the A27 via springs and then this water is carried by the surface water systems and watercourses through the site above the clay layer.
- There is little evidence that groundwater levels in the chalk or tidal influence affects the higher water table above the clay. The only evidence of tidal influence is in the most southerly borehole at the deeper groundwater level.
- The development will have little effect on the groundwater levels in the area and chalk groundwater will have little effect on the development itself so long as the sub surface clay layer remains intact. The surface water system is the key feature in dealing with groundwater emergence to the north of the site and its conveyance through the onsite watercourses.

8.8 In an email dated 6 June 2014, West Sussex County Council, as the Lead Local Flood Authority, confirmed that they support the study's conclusions based on the data submitted in the report and stated the following:

- Raising of ground levels and widening/deepening of surface water channels is highly unlikely to affect groundwater levels offsite.
- The proposed system of attenuation/storage ponds for rainwater which then flow slowly into the surface water system is likely to work and is unlikely to be affected by or affect chalk strata and associated groundwater beneath.
- It is vital that the development does not breach the clay layer acting as an aquaclude/ aquatard across the site, or that, if development intends to go below this layer, some suitable engineering option is used to prevent interaction between the surface water or perched groundwater layer and the deeper groundwater associated with the chalk strata. Failure to do this may result in groundwater emergence from the deeper groundwater and increased flood risk through surface water or groundwater pathways. It may also affect flood risk offsite by changing or increasing groundwater emergence areas. A suitable strategy should be developed to ensure that development remains above the bottom of this clay layer with an associated conservative factor of safety.

8.9 Through discussions with the Environment Agency, West Sussex County Council and the Council's own drainage engineers the following mitigation has been identified to ensure that the site can be made safe for its lifetime, without

increasing flood risk elsewhere and, where possible, reduce flood risk overall to meet the requirements of part two of the Exception Test. This mitigation is being progressed and considered further as part of a site specific Flood Risk Assessment (FRA) which will be used to inform discussions at the Adur Local Plan Examination in Public as well as inform the planning application.

New Monks Farm

Flood Risk	Issue	Recommended Mitigation (how can this be managed)	Outcome
Tidal (from the River Adur)	Most of the site is located within Flood Zone 3	<ul style="list-style-type: none"> • The Adur Tidal Walls scheme will provide improved protection to the local area. • The sequential approach should inform the site layout considering all sources of flooding to locate the most vulnerable uses in the areas of lowest risk. 	Ensure development is safe across its lifetime
	Residual risk should flood defences fail or be overtopped.	<ul style="list-style-type: none"> • Design buildings to avoid flooding by raising finished floor levels for residential development above the 1:200 year flood level for 2115 to ensure internal flooding does not occur; and/or • Localised land raising above the 1:200 year flood level for 2115 where required, secondary flood defences or appropriate evacuation and flood response procedures should be put in place to fully manage and mitigate flood risk. • Provide flood resilient measures and resistant construction below the 1:200 year flood level for 2115. 	Ensure development is safe across its lifetime
Surface Water	The site and local area suffer from surface water flooding.	<ul style="list-style-type: none"> • A surface water drainage strategy incorporating Sustainable Drainage Systems (SuDS) should be developed. • Overland flow routes should be maintained. • Ensure total runoff rates from new development are below that experienced prior to development by providing additional storage and attenuation. • The drainage strategy should ensure that adequate 	Ensure flood risk is not increased elsewhere

		capacity is available in the on-site system for existing and future volumes.	
		<ul style="list-style-type: none"> • The development should take account of and where possible seek to facilitate recommendations from the Lancing SWMP. • Opportunities should be explored to increase on site storage capacity in the ditch network through widening or deepening channels and providing on site storage or other measures to reduce upstream impacts of tide locking. • The site should be designed to safely manage rainfall events in excess of 1 in 100 year plus climate change 	Where possible reduce flood risk overall
Groundwater	There is shallow perched groundwater in the clay just below the ground surface. The clay also confines a deeper groundwater aquifer in the chalk	<ul style="list-style-type: none"> • Development must provide suitable engineering options to prevent interaction between the surface water or perched groundwater layer and the deeper groundwater associated with the chalk strata. 	Ensure development is safe across its lifetime
		<ul style="list-style-type: none"> • The proposed surface water drainage strategy will need to discharge to watercourses and ultimately the River Adur rather than relying on infiltration. 	Ensure flood risk is not increased elsewhere
		<ul style="list-style-type: none"> • Adequate/additional capacity in the surface water system should be allowed for additional flows from groundwater which may have previously pooled on site. 	Ensure flood risk is not increased elsewhere.
	Water from springs and groundwater levels rising above ground is currently conveyed across the site through watercourses.	<ul style="list-style-type: none"> • Development must maintain the existing capacity and conveyance between springs/groundwater and the ditch network. 	Ensure flood risk is not increased elsewhere

Shoreham Harbour

- 8.10 Shoreham Harbour benefits from a natural coastal setting and accessible water environment. It has a rich and diverse landscape including the River Adur Estuary SSSI, Kingston Beach lighthouse and Shoreham Port as a highly engineered, operational environment. There is an opportunity to bring underused sites back into active use for employment and housing developments, raise the quality of community spaces and improve waterfront access. The regeneration of Shoreham Harbour has been an objective of the local authority and the Port Authority for a number of years.
- 8.11 Residential development is proposed at Shoreham Harbour and, due to its location in Flood Zone 3, an Exception Test must be undertaken. Under Part 1 of the Exception Test it must be demonstrated that new development will provide wider sustainability benefits to the community that outweigh flood risk. By assessing the Shoreham Harbour broad location against the Sustainability Objectives in the Council's Sustainability Appraisal of the Adur Local Plan, the Exception Test demonstrates that the wider sustainability benefits that Shoreham Harbour would bring outweigh flood risk issues.
- 8.12 In order to undertake Part 2 of the Exception Test, as set out in paragraph 102 of the NPPF (see above), the Level 2 SFRA for Shoreham Harbour was used.
- 8.13 This shows that the most significant risk of flooding at Shoreham Harbour is tidal flooding. The existing flood defences do not offer a sufficient standard of protection. The site lies outside of the area which will benefit from the Shoreham Adur Tidal Walls Scheme. Through consultation with the Environment Agency, it has been identified that flood defences and or land raising will be required along the Western Harbour Arm to ensure that development is safe for its lifetime. The details and form of these flood defences were explored through the Shoreham Harbour Flood Risk Management Guide Supplementary Planning Document published in September 2015.
- 8.14 Through discussions with the Environment Agency, West Sussex County Council and the Council's own drainage engineers, the following mitigation has been identified to ensure that the site can be made safe for its lifetime, without increasing flood risk elsewhere and, where possible, reduce flood risk overall to meet the requirements of part two of the Exception Test. This mitigation will be progressed and considered further as part of a site specific Flood Risk Assessment (FRA) at the detailed design stage to support a planning application.

Shoreham Harbour (western arm)

Flood Risk	Issue	Recommended Mitigation (how can this be managed)	Outcome
Tidal (including from the River Adur)	Parts of the site are located within Flood Zone 3. Some areas would flood in an event with an annual probability of 1 in 20 or greater in any year but are not considered to be within the functional floodplain.	<ul style="list-style-type: none"> • New flood defences will need to be provided along the western arm of the Harbour to enable new development. • The sequential approach should inform the site layout considering all sources of flooding to locate the most vulnerable uses in the areas of lowest risk. 	Ensure development is safe across its lifetime
	Residual risk should the new flood defences fail or be overtopped.	<ul style="list-style-type: none"> • Finished Floor Levels for residential development should be raised above the 1:200 year flood level for 2115 to ensure internal flooding does not occur. The Shoreham Harbour Flood Risk Management Guide Supplementary Planning Document (SPD, 2015) sets finished floor levels at 5.77m. • For non-residential uses, the SPD advises that development should be designed to be safe for the lifetime of the building, assumed to be at least 60 years from the date of gaining planning permission. • Raise land levels locally to above the 1:200 year flood level for 2115. This will ensure that safe access and egress is provided and the development is protected from flood events. • Flood resilient and resistant construction below the 1:200 year flood level for 2115. 	Ensure development is safe across its lifetime

Surface Water	The SFRA identifies a relatively small area of potential surface water flooding within the western arm of the Harbour.	<ul style="list-style-type: none"> Surface water can drain directly to the River Adur without attenuation due to its close proximity assuming pollution mitigation measures are also included. The Flood Risk Management Guide SPD identifies suitable SuDS for the Western Harbour Arm. 	Ensure flood risk is not increased elsewhere
		<ul style="list-style-type: none"> The surface water drainage strategy should be designed to manage exceedance events. 	Where possible reduce flood risk overall
Groundwater	The SFRA identifies potential susceptibility to groundwater flooding within the western arm of Shoreham Harbour.	<ul style="list-style-type: none"> Any new development should ensure prevention of emergence of groundwater at sub-level. This may include tanking of any basements. 	Ensure development is safe across its lifetime

Shoreham Airport

- 8.15 Shoreham Airport is the oldest licensed airfield in Britain and is home to a wide range of general and commercial aviation, related engineering operations and training. The airport generally constitutes a flat, open and ordered landscape and sits within the Lancing-Shoreham gap adjacent to the River Adur. This riverside location results in the airport being at risk of tidal flooding.
- 8.16 As set out in the Sequential Test, following the implementation of the Shoreham Adur Tidal Walls scheme, the flood zone on the site will change from 3b to 3a. As the proposed use on this site is employment, classified as '*less vulnerable*', in accordance with Table 3 in the Planning Practice Guidance the Exception Test is not required.
- 8.17 However although the Shoreham Adur Tidal Walls scheme will reduce the risk of tidal flooding to the site, the SFRA also highlighted similar risks from groundwater and surface water flooding as at New Monks Farm. These issues will be assessed and considered as part of a site specific Flood Risk Assessment (FRA) at the planning application stage. The FRA should be informed by the Lancing Surface Water Management Plan.

9. Climate Change Allowances

- 9.1 New guidance on climate change allowances was published in 2016 by the Government. The purpose of this guidance is to ensure an allowance for climate change is made in flood risk assessments to help minimise vulnerability and provide resilience to flooding and coastal change in the future. The allowances are based on climate change projections and different scenarios of carbon dioxide emissions into the atmosphere. There are different allowances for different epochs or periods of time over the next century.
- 9.2 The new guidance affects fluvial flow and surface water allowances. While the existing Adur SFRA will have to be amended to take account of these new allowances, this update can take place next year as it is not considered that the new allowances will have a significant effect on the allocations in the Local Plan. The reasons for this are set out below.

New Monks Farm:

- 9.3 Groundwater is a key feature of the drainage system. Springs occur along Old Shoreham Road on the line of the interface between chalk and clay and this groundwater drains into the Lancing ditches. In addition to the deeper groundwater associated with the chalk geology, there is a shallower water table associated with a clay layer just below the land surface. Some of this groundwater also runs into the ditches. These ditches also carry surface water runoff from residential areas to the west of the catchment boundary as well as surface water runoff from the A27 drains.

- 9.4 As the flows in the ditches are comprised predominantly of groundwater along with some additional surface water, the majority of the flows are not considered to be fluvial and are unlikely to result in fluvial flooding. The low level of fluvial flood risk in this area is reflected in the flood zone maps within the SFRA.
- 9.5 Nevertheless, the new fluvial and surface water climate change allowances should be applied at the detailed design stage .

Shoreham Airport:

- 9.6 Despite the close proximity of the Airport to the River Adur, the main risk from the river in this location relates to tidal flooding and not fluvial. While the airport is in Flood Zone 3a with regard to fluvial flooding, this Flood Zone does not take account of the existing flood defences. With existing flood defences in place, the actual fluvial flood risk to the Airport is minimal and any residual risk would be reduced further once the new Shoreham Adur Tidal Walls are constructed. There are culverts beneath the airfield which, like the ditches at New Monks Farm, convey predominantly groundwater along with some surface water. Similarly to New Monks Farm (see above), it is therefore not considered that the new climate change allowances will have a significant impact on the proposed employment allocation at the Airport.
- 9.7 Nevertheless, the new fluvial and surface water climate change allowances should be applied at the detailed design stage.

West Sompting:

- 9.8 The development area of the West Sompting allocation is located entirely within Flood Zone 1 and therefore hasn't been assessed in any detail in this paper as the Exception Test is not required. The drainage ditches running north to south on the eastern boundary (outside of the development area) of the West Sompting allocation are fluvial and could be affected by the new climate change allowances. However, the development area has been located away from the area of fluvial flood risk with a significant buffer between the proposed development and the ditches. Therefore the new climate change allowances are unlikely to have any significant impact on this allocation.
- 9.9 Nevertheless, the new fluvial and surface water climate change allowances should be applied at the detailed design stage.

Shoreham Harbour:

- 9.10 Although the Harbour is adjacent to the River Adur, the Adur is tidally influenced and therefore the only risk to the Harbour is tidal flooding. The new Climate Change Allowances therefore do not apply.

9.11 The assumptions regarding fluvial flows and the new climate change allowances set out above for each of the allocations have been agreed by the Environment Agency.

10. Summary

10.1 The allocation of sites within the Adur Local Plan in areas of flood risk is considered to be justified and the Sequential Test and Exception Test (where required), as set out in the NPPF, have been passed at this stage.

10.2 The flood risks associated with these sites, particularly New Monks Farm and Shoreham Airport, are complex due to the different sources of flooding and the interactions between them. Any future planning applications for these sites must be accompanied by detailed FRAs that will need to demonstrate that the final SuDS strategy and flood risk mitigation meet the requirements of the relevant policies in the Adur Local Plan and the relevant paragraphs of the NPPF.

Appendix 1

Other relevant policies in the Adur Local Plan relating to flood risk

Policy 5: New Monks Farm, Lancing:

Land at New Monks Farm (within the area shown on Map 2) will be allocated for mixed use development comprising:

- **600 homes, 30% of which are to be affordable, providing a mix of types and tenures in accordance with identified needs.**
- **A community hub.**
- **1 hectare of land to accommodate a 1-form entry primary school, with additional land for expansion to 2-form entry in the future.**
- **Approximately 10,000sqm of appropriate employment-generating floorspace.**
- **Suitable access onto the A27 in agreement with Highways England.**
- **Provision or funding of mitigation for off-site traffic impacts on the Strategic Road Network and local roads through a package of measures including improvements to the A27/Grinstead Lane (North Lancing roundabout) junction.**
- **Provision of sustainable transport infrastructure including improved public transport and cycle, pedestrian and equestrian links to Lancing, Shoreham-by-Sea and the South Downs National Park.**
- **Site-specific travel behaviour initiatives which encourage sustainable modes of transport. (This should include a package of travel behaviour initiatives such as residential and workplace travel plans).**

The Withy Patch Gypsy and Travellers site should be relocated and increased in size. The new site should be built at a higher level to reduce flood risk and to take the site out of Flood Zone 3. This will enable the provision of additional pitches in the future to meet identified needs.

Improved access across the A27 to the South Downs National Park for pedestrians, cyclists and equestrians must be provided.

Developers will need to work with Adur District Council, West Sussex County Council and the Environment Agency to ensure that tidal and fluvial flooding as well as surface water and groundwater flooding are adequately mitigated without worsening flood risk elsewhere. A Flood Risk Assessment (FRA) will be required at the planning application stage. The FRA must take account of and seek to facilitate relevant recommendations of the Lancing Surface Water Management Plan.

As part of a Landscape Strategy/Green Infrastructure Strategy for the site, the following are to be delivered:

- **Ecological enhancements in the north-west corner of the site in order to address the safeguarding and enhancement of biodiversity assets.**
- **Retention and enhancement of the existing network of water bodies on site for drainage and ecological benefits.**
- **Open space and recreation areas (to include children's play areas) located within the development, and provision for formal sports, in accordance with Council standards.**
- **A Country Park and informal recreation (approx. 28 hectares).**
- **Strategically sited areas of woodland to the north and east of the development area to provide a distinctive 'green edge', screening views of the new development.**

A number of assessments will also be required at the planning application stage. These will include:

- **A desk-based assessment and, where necessary, a field evaluation of archaeological assets which should be undertaken before determination of any application. Reference should be made to the West Sussex Historic Environment Records.**
- **A site wide landscape and ecological management plan to be produced and implemented to the satisfaction of the local planning authority to ensure the long-term maintenance of retained and newly created on-site habitats.**

Appropriate mitigation of any issues raised through these assessments is to be delivered.

The development of this site, the location and layout of built development, green infrastructure and other landscaping is to be based on the following principles and site-specific requirements:

- **Development must respect the landscape of the surrounding countryside and the South Downs National Park.**
- **Affordable housing is to be distributed throughout the development.**
- **The development is to be connected to sewerage and water distribution networks at the nearest points of adequate capacity, as agreed with Southern Water.**

Development will be phased in order to:

- **Ensure the Withy Patch Gypsy and Travellers site is relocated prior to the construction of the new roundabout access onto the A27**
- **Ensure delivery of a new A27 access at an appropriate stage of development.**

- Facilitate use of the community hub and primary school at a stage to be agreed with West Sussex County Council and Adur District Council.

Infrastructure requirements are to be secured through CIL/s106/planning conditions as appropriate.

Policy 7: Shoreham Airport

Approximately 15,000sqm of new employment generating floorspace (both aviation and non-aviation related), including a mix of B1 (business), B2 (general industry) and B8 (storage) / hangar uses, will be provided on the north-eastern side of the Airport.

New development at the Airport must be designed to minimise its impact on the landscape as well as on the open nature of the Shoreham-Lancing Local Green Gap. Key views must be retained, and any impacts on the historic character of the Airport and the historic assets within it must be minimised. A Development Brief will be required to address these issues.

New development at the Airport will result in a need for improved access from the A27. Access across the A27 to the South Downs National Park for pedestrians, cyclists and equestrians must be retained, and where possible, enhanced. New development will also be required to contribute to the provision or funding of mitigation for offsite traffic impacts on the strategic road network and local roads through a package of measures including improvements to the A27/A2025 Grinstead Lane junction.

A package of site-specific travel behaviour initiatives to maximise opportunities to encourage sustainable modes of transport will be required. (This should include travel behaviour initiatives such as workplace travel plans). These initiatives will include improvements to adjacent footpaths, cycle ways and bus transport, linking the Airport to the A259 coast road and Shoreham town centre. A travel plan will need to accompany any future planning application at the site, detailing sustainable transport measures to reduce the impact of development on the highway network.

Due to the current Flood Zone 3b (functional floodplain) designation at the Airport, no development shall take place within the allocated area until the relevant section of the Shoreham Adur Tidal Walls on the west bank has been completed. In addition, flood mitigation measures will need to be incorporated into the development in order to further reduce flood risk. A Flood Risk Assessment (FRA) will be required at the planning application stage. The FRA must take account of and seek to

facilitate relevant recommendations of the Lancing Surface Water Management Plan.

Mitigation measures will be required to ensure that new development at the Airport does not impact on the ecological value of the airport itself or the adjacent Adur Estuary SSSI. Ecological enhancements should be incorporated as an integral part of the development.

A number of assessments will also be required at the planning application stage. These will include:

- A desk-based assessment and, where necessary, a field evaluation of archaeological assets which should be undertaken before determination of any application. Reference should be made to the West Sussex Historic Environment Records; and**
- A site wide landscape and ecological management plan to be drawn up and implemented to ensure the long-term maintenance of retained and newly created on-site habitats.**

Any new development at the airport must not jeopardise the runway use or airport operations.

Within the existing developed area located at the southern end of the Airport, airside locations will be protected and supported for aviation-related B1, B2 and B8/hangar uses. Non-airside locations will be protected and supported for aviation-related B1, B2 and B8/hangar uses and for non-aviation related B1, B2 and B8 uses where it can be demonstrated that the use will not impact the operational viability of the Airport. Appropriate aviation-related training uses will also be supported. However, training which does not require access to operational facilities will not be supported in airside locations.

Infrastructure requirements are to be addressed through s106/ planning conditions as appropriate.

Appendix 2

Sites not allocated in the Plan due to flood risk and deliverability concerns

Two sites have not been allocated in the Adur Local Plan due to concerns regarding flood risk and, as a result, deliverability. These sites are Land North West of the Hasler Estate and Land North East of the Hasler Estate (New Salts Farm). They are located adjacent to each other and were excluded from the Local Plan for the same reasons, namely concerns regarding tidal, groundwater and surface water flooding and the interactions between these different flood risks.

Land North West of the Hasler Estate and the western section of Land East of the Hasler Estate were included as potential housing options in the Draft Adur Local Plan 2012. This was at an early stage of consultation when there was less of an understanding regarding the flooding issues on the site. While tidal, surface water and ground water issues on the site were made clear within a Level 2 Strategic Flood Risk Assessment, these issues were brought into sharp focus during the heavy rainfall in the winter periods of 2012/13 and 2013/14 when significant flooding occurred. This then resulted in the production of the Lancing Surface Water Management Plan (2015).

During the consultation on the Draft 2012 Plan, the Environment Agency submitted a representation noting particular concerns about surface water and ground water related constraints at Land North of the Hasler Estate. The Environment Agency stated *'given the flood risk from all sources, development of this site is likely to be problematic. As a minimum at least one year of groundwater monitoring on site will be necessary.'*

Shortly after consultation on the Draft Plan, a meeting was held with Landstone (the owners of the majority of Land North West of Hasler) primarily regarding flood risk issues on site. A separate meeting with Taylor Wimpey (owners of the New Salts Farm site at the time) again focussing on the issue of flood risk. Shortly after these meetings, letters were sent to Landstone and Taylor Wimpey, requesting more information to support the allocations, with a particular emphasis on flood risk. However, more information regarding mitigation of flood risk on site was not received and as a result, the site was not included in the Revised Draft Local Plan 2013.

During consultation on the 2013 Plan, the Environment Agency submitted representations stating *'without additional information that flood risk can be adequately mitigated we support the removal of Hasler as a proposed allocation.'* West Sussex County Council as Local Lead Flood Authority also stated that *'given there is insufficient information to demonstrate that flood risk can be adequately mitigated, the removal of Hasler as a proposed allocation is supported.'*

Representations were also received from Landstone and Taylor Wimpey regarding the Hasler sites but neither representation contained any substantive information regarding flood mitigation.

Following the 2013 consultation, further letters were sent to Landstone and Taylor Wimpey requesting further information including flood risk mitigation. Again, no information was forthcoming and as a result the sites were not included as allocations in the Proposed Submission Adur Local Plan 2014.

The Lancing Surface Water Management Plan, completed at the end of 2015, found that within the West Beach area, groundwater levels in the chalk aquifer are significantly influenced by the tide and high tides may cause groundwater to back up and maintain high groundwater levels. It also states that the Old Salts Farm area is associated with widespread waterlogged ground which is further evidence of emerging groundwater and that there is strong circumstantial evidence that there are more permeable windows in the superficial deposits in the West Beach area that may allow Chalk groundwater to impact groundwater levels in the area. High groundwater levels mean that water cannot drain away after heavy rainfall events.

The New Salts Farm site, previously owned by Taylor Wimpey, is now owned by Hyde Housing who purchased it in 2015. They have produced a Flood Risk Assessment to support the proposed development of 445 homes. This FRA is currently being amended following comments from the Environment Agency.