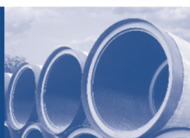
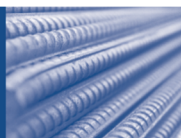


**PROPOSED RESIDENTIAL DEVELOPMENT
LAND OFF SUMMER LANE,
PAGHAM
WEST SUSSEX**

FLOOD RISK ASSESSMENT

HANBURY PROPERTIES LIMITED

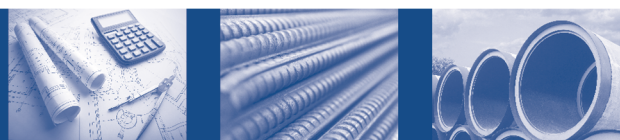
Date: March 2015
Ref: 15/0215/**4868**
Rev: C



DOCUMENT CONTROL RECORD

Document Issue:

Rev	Issue Status	Prepared by	Checked by
-	First Issue for comment	A. McShane	P. Berrill
A	Site plans updated	A. McShane	P. Berrill
B	Client comments	A. McShane	P. Berrill
C	Client comments	A. McShane	P. Berrill



	CONTENTS	Page
1	Introduction.....	4
2	Existing Site.....	5
3	Topographical and Geological Information.....	7
4	Flood Risk Assessment.....	8
5	Impact of Development on Flood Risk.....	15
6	Existing and Proposed Site Runoff.....	17
7	Surface Water Drainage Strategy.....	19
8	Foul Water Drainage Strategy.....	21
9	Summary & Conclusions.....	22

APPENDICES:

Appendix A – Preliminary Site Layout

Appendix B – Topographical Survey

Appendix C - Runoff calculations

Appendix D – Surface Water Attenuation Calculations

FIGURES:

Figure 1&2 - Site Location

Figure 3 - Development Site Boundary

Figure 4 - Extract from Environment Agency Flood Zone Map

Figure 5 – Tidal flood map. Extract from Pagham Neighbourhood Plan

REFERENCES:

Environment Agency Flood Map Information © and database right www.environment_agency.gov.uk

Contains British Geological Survey materials © NERC (2014)

West Sussex County Council SFRA – JBA Consulting (June 2009)

Pagham Neighbourhood Plan (June 2013)

1 Introduction

1.1 Scope

MJA Consulting has been commissioned by Hanbury Properties Ltd to undertake a Flood Risk Assessment and Drainage Strategy to accompany an outline planning application for a proposed residential development at land off Summer Lane, Pagham, West Sussex.

1.2

Hanbury Properties are promoting the 5.62Ha of existing agricultural land for a residential development. The residential area consists of circa 90 units with associated roads, parking areas, gardens and covers approximately 4.00Ha while the main open space located to the south covers the remaining 1.62Ha.

The preliminary site is shown in Appendix A.

1.3 Report Structure

The National Planning Policy Framework - *Department for Communities and Local Government (2012)* and the Planning Practice Guidance: Flood Risk & Coastal Change (2014) is the current guidance on development and flood risk in England.

The Flood Risk technical guidance for the National Planning Policy Framework requires a Flood Risk Assessment to be carried out to consider all potential forms of flooding including that from river, sea, estuarial, land drainage, groundwater, overland flow, surface water run-off, sewer systems, and artificial water bodies (lakes, reservoirs, canals etc).

A Flood Risk Assessment is required to consider the impact of all these potential forms flooding on both the development site and off site parties and land.

1.4

This report will take the structure of a 'Flood Risk Assessment' in accordance with the Environment Agency's Flood Risk Assessment Guidance, the National Planning Policy Framework and CIRIA Report 624 'Development and Flood Risk – Guidance for the Construction Industry.

1.5

The purposes of this report are:

- To confirm that the proposed development has a suitable strategy for dealing with potential flood risks.
- To confirm that a satisfactory strategy for the disposal of surface and foul water from the proposed development is achievable.
- This development will not increase the risk of flooding to any offsite parties and land.

2 Existing Site

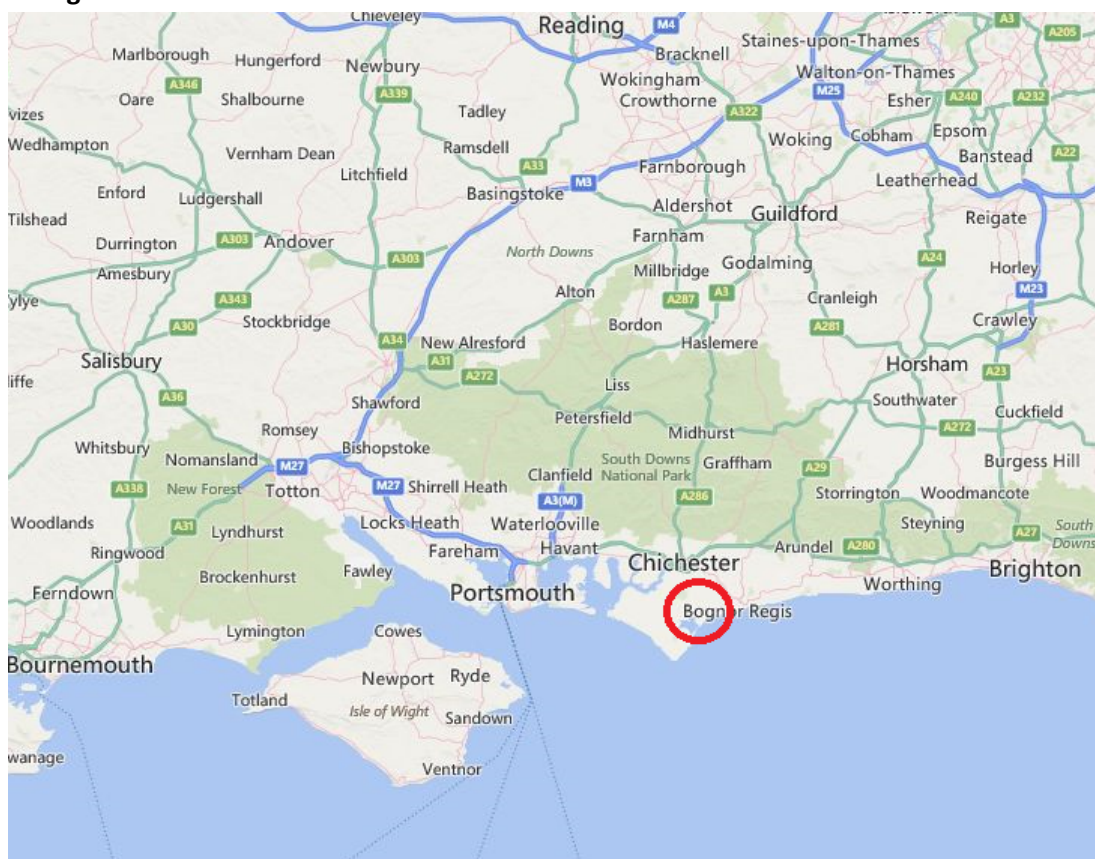
2.1 Site Location and Description

2.2 The proposed development is located to the west of the existing development which bounds Pagham Road and is accessed off Summer Lane.

The approximate National Grid Reference of the site is SZ 88955 98387.

2.3 The site is bordered by existing linear residential development to the east, Mill Farm Park Homes to the north and open agricultural land to the south & west.

Figure 1: Site Location



© 2011 Microsoft – Bing Maps

Land off Summer Lane, Pagham
Flood Risk Assessment

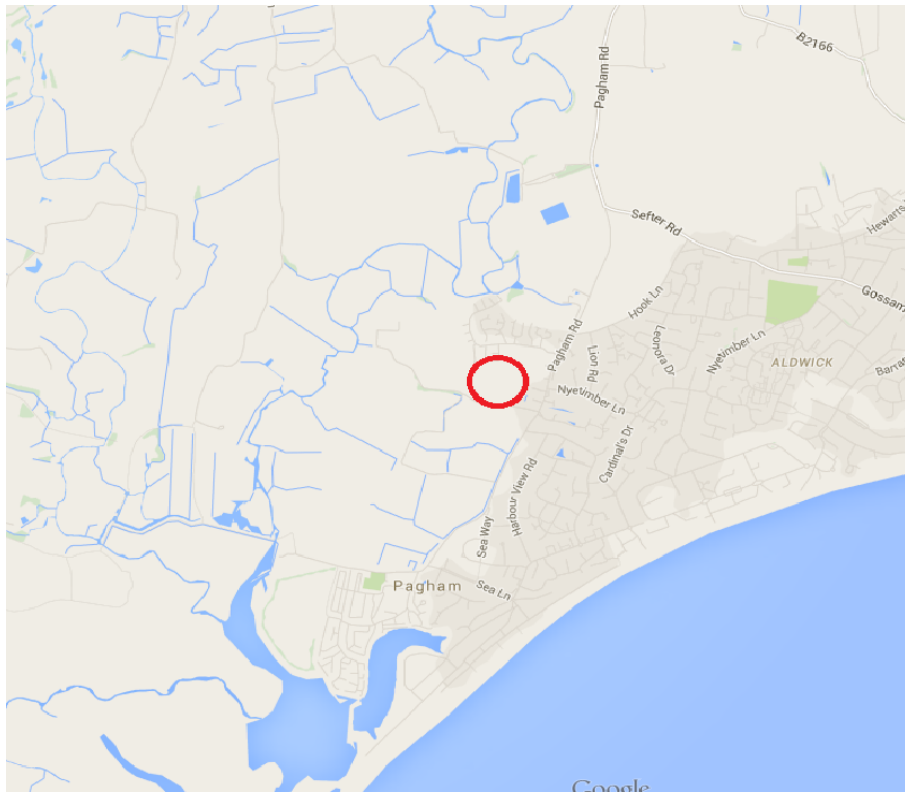


Figure 2: Site Location (Approximate)



Figure 3: Site Boundary (Approximate)

3 Topographical and Geological Information

3.1 Topography

- 3.1.1 The topographical survey of the site shows the existing ground generally falling typically from east to west direction towards the local watercourses and the Pagham Rife. The lowest point being adjacent to the existing Mill Farm Park Homes.
- 3.1.2 The site levels range from 5.65m AOD to approximately 3.13m AOD within the north-west corner. The limit of the residential area however has a level of 4.70m AOD. Refer to Appendix B for the existing Topographical Survey.

3.2 Geology & Hydrogeology

- 3.2.1 The British Geological Survey map 317/332 1:50,000 of the area indicates that the site is predominantly underlain by sands & silts from the Bracklesham Group formation over sands, silts and clays within the London Clay Formation. This then overlays Seaford chalk Member (Upper Chalk).
A detailed ground investigation will confirm exact make-up of sub strata.
- 3.2.2 Due to the nature of the sub strata it is unlikely that infiltration type drainage would be suitable within this site.
- 3.2.3 As the existing site has been agriculturally farmed over a number of years the natural drainage regime is for surface water to run directly off the surface impermeable clay soils and directly to the surrounding local field ditches.

3.3 Hydrogeology

The Environment Agency's mapping website confirms that the site is not located within a Groundwater Source Protection Zone for groundwater abstractions.

3.4 Groundwater

No recorded incidents of groundwater flooding within the vicinity of the site have been found during the investigations.

During prolonged periods of heavy rain or typically during the winter months the site and surrounding fields can become waterlogged due to the clay becoming saturated which can create areas of surface ponding (standing water).

3.5 Local Catchment Information

The development area currently drains to adjacent field ditches to the southern & western boundaries these in turn then feed to the Pagham Rife which is designated as Main River and located approximately 550m to the west.

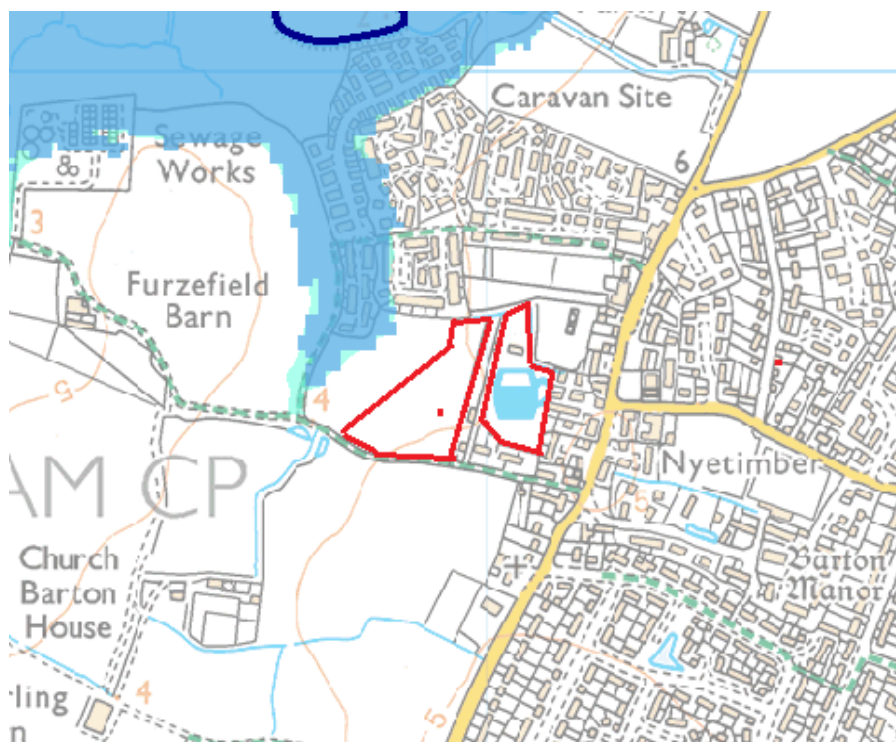
4 Flood Risk Assessment

4.1 Flood Zone Map

Figure 4: Extract from Environment Agency Flood Zone Map



© Environment Agency 2011





Main Rivers



Dark blue shows the area that could be affected by flooding, either from rivers or the sea, if there were no flood defences. This area could be flooded:

- From the sea by a flood that has a 0.5 per cent (1 in 200) or greater chance of happening each year.
- From a river by a flood that has a 1 per cent (1 in 100) or greater chance of happening each year.



Light blue shows the additional extent of an extreme flood from rivers or the sea. These outlying areas are likely to be affected by a major flood, with up to a 0.1 per cent (1 in 1000) chance of occurring each year.

- 4.2 The Environment Agency's indicative Flood Map shows the majority of the site to be currently located within Flood Zone 1.

Zone 1 is land assessed as having a less than 1 in 1000 (<0.1%) annual probability of flooding, Zone 2 is land assessed as having between a 1 in 100 year and 1 in 1000 annual probability of flooding, while Zone 3 is land assessed as having between a 1 in 200 year or greater annual probability of flooding from the sea or a 1 in 100 year or greater annual probability of flooding from a river or stream in any year by the Environment Agency.

- 4.3 The Environment Agency Flood Map is indicative only and takes no account of actual ground levels or features. These flood maps tend to be derived from coarse scale JFLOW modelling which bases part of the results on assumptions of hydrology and topography. This does lead to inaccuracies in the plans and therefore cannot be used as an accurate guide to flooding. However, they are intended to be an indicative measure to flood risk.
- 4.4 The Environment Agency has confirmed that the flood zone adjacent to the site is based on an undefended tidal flood level and not the Pagham Rife fluvial flood level.
- 4.5 Pagham is currently protected by a number of sea defences including the Inland Banks & Pagham Harbour which currently offer 1:200 year storm protection. These flood defences provide a protection to 3.90m AOD which includes some freeboard to allow for wave action but doesn't currently include for climate change.

4.6 West Sussex CC Strategic Flood Risk Assessment

4.6.1 The current sea defences for the coastline of Pagham to East Head is mainly protected by timber, concrete and shingle defences which include large shingle banks which dominate Pagham Beach, Pagham Harbour and Church Norton. From Pagham to the River Arun, there is a mixture of defences, with the land behind consistently low lying.

4.6.2 Flood defences are as follows:

Pagham Harbour:	Embankment, wharf, quaysides
Pagham – Aldingbourne Rife:	Shingle ridge to east of harbour entrance. Section of sea wall (secondary defence)

4.6.3 Flooding from the sea occurs when water levels in the sea rise above ground levels of coastal land. This can occur:

- during normal high tides - where land floods on a regular basis;
- when there are extreme atmospheric effects such as storm surges;
- when wind action causes water levels of the sea to rise.

4.6.4 Where sea defences have been constructed and maintained a residual risks remains which result from a:

- flood of greater magnitude that flood defences were designed; and/or
- breach or failure of flood defence and other assets.

It is known that the dominant waves that approach the River Arun and Pagham coastline are from the southwest and south. Protection from waves is provided by reefs and banks, however these features have less influence on easterly waves. Waves in Pagham Harbour are generated locally and are only significant at higher water levels.

Extreme water levels have been determined along the West Sussex coastline:
Extreme water levels reported in the Arun to Pagham.

AEP (%)	Littlehampton (mAOD)	Bognor Regis (mAOD)	Pagham (mAOD)
10	3.72	3.52	3.42
2	3.94	3.74	3.64
1	4.04	3.84	3.74
0.5	4.13	3.93	3.83

The extreme water levels for the 5, 0.5 and 0.1 per cent AEP flood events were extracted from previous study (JBA, 2004) which showed the following for Pagham Harbour:

Location	Extreme Water Level (JBA 2004)		
	5% AEP	0.5% AEP	0.1% AEP
Pagham Harbour	3.40m	3.70m	3.90m

The predicted impact on sea levels when climate change is taken into account are considered in the table below. Using the baseline of 2006, the climate change for 2056 and 2106 are as follows;

Location	5% AEP			
	2000	2006	2056	2106
Selsey Bill	3.40m	3.42m	3.77m	4.43m
Bognor Regis	3.60m	3.62m	3.97m	4.63m

Location	0.5% AEP			
	2000	2006	2056	2106
Selsey Bill	3.70m	3.72m	4.07m	4.73m
Bognor Regis	3.90m	3.92m	4.27m	4.93m

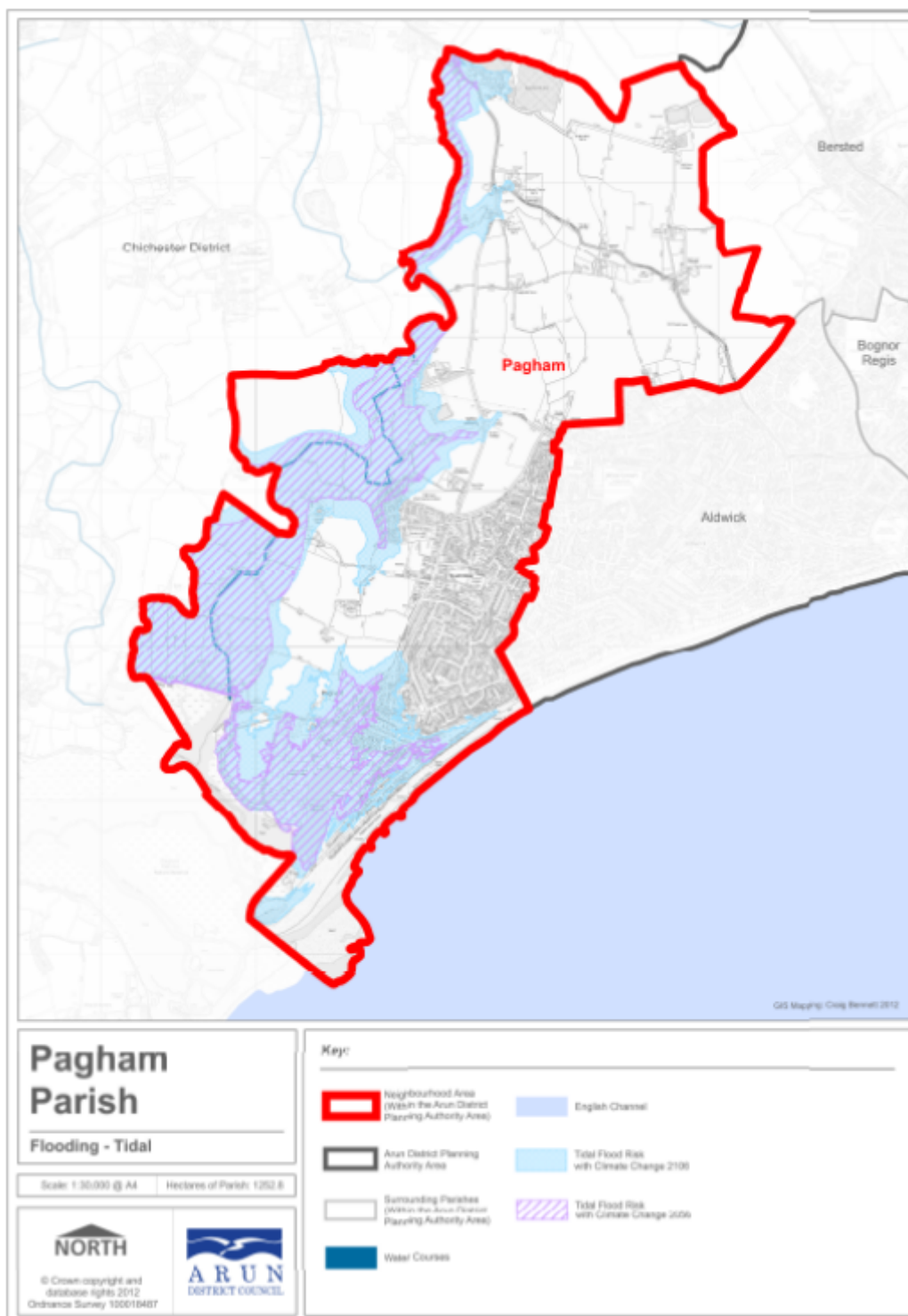
Location	0.1% AEP			
	2000	2006	2056	2106
Selsey Bill	3.90m	3.92m	4.27m	4.93m
Bognor Regis	4.10m	4.12m	4.47m	5.13m

- 4.6.5 The Environment Agency flood maps show the extent of flooding to be without tidal defences. Based on the existing sea flood defences a potential for a large breach scenario is low, minor overtopping may occur which could cause localised flooding.

The site lies approximately 1.6km from Pagham Harbour and has minimal risk of being affected by minor breaches of sea defences.

4.7 Future Tidal Flood Zone Map

Figure 5: Extract from Pagham Neighbourhood Plan Report



- 4.8 Based on the Environment Agency's Flood Zone Map the proposed residential area indicates that all habitable areas are to be located within the lowest risk category - Flood Zone 1.

This is land assessed as having a less than 1 in 1000 (<0.1%) annual probability of flooding from a river or stream in any year by the Environment Agency and is not within an area subject to either flooding or extreme flooding events.

- 4.9 The flood risk technical Guidance to the National Planning Policy Framework Table 2: Flood Risk Vulnerability classification, classifies residential developments as 'More Vulnerable'.

NPPF Table 2 of technical Guidance: Flood Risk Vulnerability classification

More vulnerable	
- Hospitals. - Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels. - Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels. - Non-residential uses for health services, nurseries and educational establishments. - Landfill and sites used for waste management facilities for hazardous waste⁶. - Sites used for holiday or short-let caravans and camping, <i>subject to a specific warning and evacuation plan</i>.⁷	

- 4.10 Table 2 & 3 would indicate that 'more vulnerable' developments located within Flood Zone 1 are considered appropriate under the National Planning Policy Framework.

NPPF Table 3: Flood Risk Vulnerability and Flood Zone 'compatibility'

Flood risk vulnerability classification (see table 2)		Essential infrastructure	Water compatible	Highly vulnerable	More vulnerable	Less vulnerable
Flood zone (see table 1)	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test required	✓	✓
	Zone 3a	Exception Test required	✓	✗	Exception Test required	✓
	Zone 3b functional floodplain	Exception Test required	✓	✗	✗	✗

Key: ✓ Development is appropriate.
✗ Development should not be permitted.

4.11 Sequential Test

- 4.11.1 The National Planning Policy Framework Guidance states that Planning Authorities should complete a risk based 'Sequential Test' at all stages of the planning process, to steer new development to areas with the lowest probability of flooding.
- 4.11.2 Under the requirements of the 'sequential test' and as the proposed commercial development is to be located within an amended flood zone 1 (lowest risk), there are no more suitable, developable and deliverable alternative sites, better located from a flood risk perspective, which would accommodate the proposed development.

5 Impact of Development on Flood Risk

- 5.1 This section identifies sources of potential flood risk to the site.
A Flood Risk Assessment requires that an evaluation of all potential forms of flood risk to the site is considered.

In accordance with the Environment Agency's Flood Risk Assessment Guidance, NPPF and CIRIA Report 624, sources of flooding to be assessed include tidal, fluvial (rivers, streams and watercourses), pluvial (overland rainfall runoff), groundwater, artificial sources (canals and reservoirs) and existing / proposed sewerage and water mains infrastructure.

Source of Flooding	Potential Flood Risk To Development		Comments
	Yes	No	
Fluvial		X	
Pluvial	X		The makeup of the existing sub strata has the potential to create "ponding" or boggy areas within the site during periods of prolonged wet weather.
Groundwater	X		See above
Artificial		X	
Tidal		X	The tidal flood zone lies to the west of the site assuming no flood defences are present.

5.2 Fluvial Flooding

The site lies outside of the Pagham Rife fluvial flood zone.

5.3 Existing Watercourses

The watercourses / filed ditches located on the western & southern boundaries could at times become overloaded. Minor flooding on the adjacent site boundaries could occur however and flooding would tend to run alongside the ditch until capacity is available. No history of this type of flooding was found.

5.4 Waterbodies

There are no reservoirs or canals or other artificial sources of flooding within a 500m radius of the development area.

5.5 Groundwater

There are no reported or recorded incidents of groundwater flooding to this development site.

5.6 Existing Sewers

Southern Water has indicated that there have been no recorded incidents of flooding from public sewers within a 500m radius of the site.

5.7 Tidal Flood Risk

The Environment Agency flood maps show minor flooding to the west of the site. However, this is based on there being no sea defences. The Tidal Flood Risk to the site is low as the minimum site is 4.80m AOD. Sea defences are well maintained and provide sufficient defence against the predicted 1:200 year tidal level. If a more extreme event or a localised breach occurred the risk to the site would be minimal due to the actual distance to the sea defence.

5.8 Proposed Site Drainage

Artificial drainage systems and infrastructure within, or in close proximity to, the site may present a risk of flooding through the capacity of the systems being exceeded or the structural, hydraulic, mechanical or operational failure of the system occurring.

In the context of the proposed site there are likely to be installed as part of the development, the following systems which may present a flood risk:

- Piped gravity foul/ surface water sewers and a foul rising main.
- SUDS systems for the collection and conveyance of surface water runoff within the site boundary.

- 5.9 The surface water runoff generated on the site as a result of the development will be managed using appropriate SUDS techniques up to the 1 in 100 +30% storm event. This will ensure that the peak rate of surface water leaving the developed site will be no greater than the existing Greenfield runoff.

6 Existing and Proposed Site Runoff

- 6.1 This section aims to calculate the estimated peak runoff rate of surface water leaving the site, for the pre development conditions.
These discharge rates have then been used for the preliminary design of the surface water drainage strategy for the proposed development.
- 6.2 From the geological mapping information it is likely only minimal runoff will permeate through the sub strata with a rate unsuitable to drain runoff from a residential development.

6.3 Catchment Areas

The existing and proposed permeable and impermeable areas are listed in the table below.

	Permeable	Impermeable	Total
Existing Site Area (Development Area only, excluding southern open space)	4.00 Ha (40,000 m ²)	0 m ²	4.00 Ha (40,000 m ²)
Proposed Site Area	1.98Ha (19,800m ²)	2.02Ha (13,300m ²)	4.00 Ha (40,000 m ²)

* Total site area equates to approximately 5.62 Hectares but not included within Greenfield runoff assessment

- 6.4 This development represents an overall increase of 1.98Ha (19,800m²) in impermeable area post development.
- 6.5 **Existing Surface Water Runoff Peak Runoff Rate & Volume (Greenfield)**
Greenfield runoff rates and volumes are calculated to determine the acceptable rate of discharge from the site post development and are used by the environmental regulator to set site-specific drainage constraints.
- 6.6 An assessment of the estimated current Greenfield runoff rate has been carried out using the Institute of Hydrology Report 124 methodology using Micro Drainage software, interpolated for sites under 50ha.
- 6.7 IH124 mean annual flood flow rate equation:

$$QBAR_{<50ha} = 0.00108 \times AREA^{0.89} \times SAAR^{1.17} \times SOIL^{2.17}$$

Greenfield Catchment: 4.00ha

1 in 1 year	11.6 l/s
1 in 30 year	30.8 l/s
1 in 100 year	43.4 l/s
QBar	13.6 l/s

Refer to Appendix C for the Micro Drainage Runoff estimate.

Based on the above all discharge from the site will be restricted to a maximum discharge of 13 l/sec (QBar) for all storm events.

6.4 Proposed Development Surface Water Runoff Rate

6.4.1 The estimated peak runoff rate from the proposed site is based on 100% runoff from impermeable areas and 0% runoff from permeable areas, in accordance with CIRIA C697 The SUDS Manual & Preliminary rainfall runoff management for Developments (EA/DEFRA W5-074/A).

6.4.2 A suitable method for the estimation of peak flow is the *Rational method*,
 $Q = 2.78 CIA$.

Where:

Q = flow (l/s)

I = rainfall intensity (mm/hr), return period equal to time of concentration
(to include a 30% increase for predicted climate change)

A = Impermeable area drained (ha)

C = runoff coefficient, assumed to be 1.0

Catchment: 1.98ha

1 in 1 year	88.9 l/sec
1 in 30 year	215.2 l/sec
1 in 100 year	285.4 l/sec
1 in 100 year + 30%	371.0 l/sec

6.4.3 It can be seen that as a result of this development and the increase in impermeable areas, the peak rate and volume at which surface water could potentially runoff the site if not effectively managed, will be greater than in its Greenfield state.

To mitigate this increase in potential additional runoff due to development the discharge will be constrained to QBar (mean annual peak rate of runoff for the Greenfield site), calculated for this site at 13 l/s.

7 Surface Water Drainage Strategy

- 7.1 The National Planning Policy Framework requires that new developments do not exacerbate flood risks elsewhere, which means there is a need to control drainage and runoff to ensure there are no increases in overland flow as a result of the development.

A variety of Sustainable Drainage Systems (SuDS) should be incorporated into the surface water drainage strategy to mitigate the additional runoff and reduce flood risk to downstream areas.

The philosophy of the SuDS will be to replicate as closely as possible the natural drainage regime from a site before development, reducing the impact on receiving watercourses.

- 7.2 The Building Regulations Document H (2002) details a hierarchy of potential methods of disposing of surface water from a site:
- An adequate soakaway or some other adequate infiltration system, or where that is not practicable,
 - A watercourse, or where that is not practicable,
 - A sewer
- 7.3 Following a review of the potential site geology, soil permeability and potential groundwater levels, infiltration as a method of surface water disposal will not be practicable. Therefore it is proposed that all surface water runoff from the developed site utilises an outfall into the exiting watercourse / field ditch to the western boundary.
- 7.4 The following SUDs techniques are considered suitable for the development site subject to further ground investigations and engineering design. The following storm drainage strategy outlines how they could be utilised.
- Permeable paving / permeable sub base:
 - Road side swales
 - Attenuation / Bio-retention basin
- 7.5 The final surface water runoff from the site will be strictly controlled via Sustainable Drainage Systems (SuDS) in the form of a series of attenuation basins. All main SuDS features will be designed to manage the 1 in 100 year return storm plus an extra allowance of 30% for the potential predicted increase in peak rainfall up to 2115.

Runoff from the site will discharge into the existing watercourse at the western boundary of the site at a maximum of the existing QBar (1:2 year rainfall event), equating to a QMax of 13 l/s.

7.6 **Drainage Strategy**

The surface water drainage strategy for the proposed development will utilise the following options:

7.6.1 **Roof Runoff**

- Roof runoff will be collected by a conventional system of guttering and downpipes where it will be discharged to a main storm sewer or to a permeable paving stone sub base within the drive or parking courts, which would then connect to the main storm drain.
- Water Butts are to be provided per plot where feasible on a rainwater downpipe to collect roof runoff for re-use.

7.6.2 **Private Drives & Parking Courts:**

All private drives and parking courts will either drain via a traditional gully & piped system or via a permeable block paving stone sub base prior to outfalling to a the main storm drain.

7.6.3 **Macadam Access Road**

Runoff from the highway areas will drain via deep trapped road gullies connecting directly to either the main piped storm drain or into an adjacent conveyance swale.

7.6.4 **Attenuation Basin**

The attenuation basins will be designed to provide final filtration/water cleansing together with the main storage to allow storm water to be temporarily stored within the basin before discharging into the existing watercourse at the western boundary of the site at a controlled rate (Greenfield QBar – 13 l/s) via a hydraulic vortex flow control device.

Using the Micro Drainage attenuation estimation tool the storage volume required for the development within the attenuation basin is approximately 1550m³.
Refer to Appendix D for the preliminary Micro Drainage attenuation design.

8 Foul water drainage strategy

- 8.1 It is proposed that the foul water discharge from each unit will drain via gravity through a piped network before discharging to a sewer system within the development road network.
- 8.2 Southern Water were consulted on capacity of the local sewage network and confirmed that the main foul sewers within Pagham suffer from surcharge and overloading during rainfall events. Additional flow from development would increase the risk of flooding unless upgrades were undertaken.
- 8.3 Southern Water has confirmed that sufficient capacity for the development exists at Pagham WWTW which is located off Summer Lane to the west of the development.
- 8.4 Foul flows from the development will be conveyed to the western side to a new pumping station which will discharge flows directly to Pagham WWTW's. An option of a new gravity sewer from the development directly to the works will be considered at the detailed design stage.

The main foul sewers, pumping station & rising main to serve the site will be offered to Southern Water for adoption.

9 Summary & Conclusions

- 9.1 Hanbury Properties are promoting the 5.62Ha of existing agricultural land for a residential development. The residential area consists of circa 90 units with associated roads, parking areas, gardens and covers approximately 4.00Ha while the main open space located to the south covers the remaining 1.62Ha.
- 9.2 The Environment Agency's indicative Flood Map shows the site to be located within Flood Zone 1.
- 9.3 The Environment Agency Flood Map is indicative only and takes no account of actual ground levels or features. This can lead to inaccuracies in the plans and therefore cannot be used as an accurate guide to flooding. However, they are intended to be an indicative measure to flood risk.
- 9.4 The Environment Agency has confirmed that the flood zone adjacent to the site is based on an undefended tidal flood level and not the Pagham Rife fluvial flood level.
- 9.5 Pagham is currently protected by a number of sea defences including the Inland Banks & Pagham Harbour which currently offer 1:200 year storm protection. These flood defences provide a protection to 3.90m AOD which includes some freeboard to allow for wave action but doesn't currently include for climate change.
- 9.6 Based on the Environment Agency's Flood Zone Map the proposed residential area indicates that all habitable areas are to be located within the lowest risk category - Flood Zone 1.
- 9.7 An assessment of the estimated current Greenfield runoff rate has been carried out using the Institute of Hydrology Report 124 methodology using Micro Drainage software, interpolated for sites under 50ha. Based on the above all discharge from the site will be restricted to a maximum discharge of 13 l/sec (QBar) for all storm events.
- 9.8 Due to the potential site geology, soil permeability and potential groundwater levels, infiltration as a method of surface water disposal will not be practicable. Therefore it is proposed that all surface water runoff from the developed site utilises an outfall into the exiting watercourse / field ditch to the western boundary.

- 9.9 The following SUDs techniques are considered suitable for the development site subject to further ground investigations and engineering design. The following storm drainage strategy outlines how they could be utilised.
- Permeable paving / permeable sub base:
 - Road side swales
 - Attenuation / Bio-retention basin
- 9.10 The final surface water runoff from the site will be strictly controlled via Sustainable Drainage Systems (SuDS) in the form of a series of attenuation basins. All main SuDS features will be designed to manage the 1 in 100 year return storm plus an extra allowance of 30% for the potential predicted increase in peak rainfall up to 2115.
- 9.11 Foul flows from the development will be conveyed to the western side to a new pumping station which will discharge flows directly to Pagham WWTW's. An option of a new gravity sewer from the development directly to the works will be considered at the detailed design stage.

The main foul sewers, pumping station & rising main to serve the site will be offered to Southern Water for adoption.

- 9.12 This report concludes to demonstrate the following:
- The development site does not lie within a fluvial or tidal flood zone.
 - That a satisfactory strategy for the disposal of surface and foul water from the proposed development is achievable.
 - This development will not increase the risk of flooding to any offsite parties and land or increase resident population within a flood plain.