

Havant Phase II

Langstone Road,
Havant, PO9 1SA

Flood Risk Assessment & Drainage Strategy Report

Project Ref: **13508**

Report Ref: **R100**

Revision 1.0

December 2023

Client

XLB Property Ltd

REPORT STATUS

Client	XLB Property Ltd
Project Title	Havant Phase II
Report Type	Flood Risk Assessment & Drainage Strategy Report
Report Number	R100



Revision	Revised by	Approved by	Date
Draft	Ricardo Blake – Graduate Civil Engineer	Alla Bolton – Civil Engineer	20/11/2023
1.0	Alla Bolton	Gavin Lord	05/12/2023

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Table of Contents

Table of Contents	3
Table Figures	4
1 Introduction	5
2 Existing Site	6
2.1 Site Location.....	6
2.2 Topography.....	6
2.3 Existing Ground Conditions	6
2.4 Aquifer Designation	8
2.5 Site Specific Flood Risks	9
2.6 Source Protection Zone	16
2.7 Future Flood Risk	17
3 Proposed Site.....	18
3.1 Description of development	18
4 Drainage Policy & Consultation	19
4.1 Drainage Authority	19
4.2 Lead Local Flood Authority	19
4.3 Application of Flood Risk Policy	20
5 Drainage Strategy	23
5.1 Hierarchy of Disposal.....	23
5.2 Sustainable Drainage	24
5.3 Sustainable Drainage Maintenance.....	25
6 Drainage Strategy – Surface Water	26
6.1 Proposed Surface Water Runoff Rate	26
6.2 Proposed Attenuation Storage	26
6.3 Proposed Surface Water Drainage Strategy	27
7 Drainage Strategy – Foul Sewerage.....	27
7.1 Proposed foul drainage strategy.....	27
8 Summary	28
Appendix A – Existing Information.....	29
Appendix B – EA & SFRA Information	30
Appendix C – Proposed Information.....	31
Appendix D - Calculations	32
Appendix E – Other Supporting Information.....	33

Table Figures

Table 1. Extreme Sea Levels	11
Table 2. Flood Risk Vulnerability and Flood Zone Compatibility	20
Table 3. Flood Risk Vulnerability Classification	21
Table 4. Summary of Flood Risks	22
Table 5. SuDS Operation and maintenance requirements	25
Figure 1. BGS Map	7
Figure 2. Aquifer Superficial Drift designation map	8
Figure 3. Aquifer Bedrock designation map	8
Figure 4. EA's Flood map for planning	9
Figure 5. Extract from Flood Risk Assessments: Climate Change Allowances, EA	10
Figure 6. EA Flood risk map from Rivers and Sea	12
Figure 7. EA Flood risk map from Surface water	13
Figure 8. EA Flood risk map from Reservoirs	14
Figure 9. Groundwater Vulnerability Map	15
Figure 10. EA Source protection zones	16

1 Introduction

Baynham Meikle Partnership Limited has been commissioned on behalf of XLB Property Ltd to prepare a Flood Risk Assessment and Drainage Strategy for the planning application for the development of 3 new industrial units with associated service yard and car parking areas. The Flood Risk Assessment will be part of a Planning Application to be made to Havant Borough Council.

The development was part of an outline planning application, ref: App/21/00405; this report should therefore be read in line with the previously approved Baynham Meikle Flood Risk Assessment (FRA) & Outline Drainage Strategy Report Rev 5.0, dated 06/01/2022, report reference 13023-R102.

The site is located in Havant and is accessed off Langstone Road (to the east of the site) and Brookside Road (to the west of the site). The development area is approximately 2.142 hectares in total and the Ordnance Survey Grid reference is E471330, N105540. A Site location plan is included in Appendix A.

It is a requirement for planning applications to consider the potential risk of flooding to the proposed development over its expected lifetime and any possible impacts on flood risk elsewhere in terms of its effects on flood flows and runoff.

This Flood Risk Assessment has been prepared following guidance set out in the National Planning Policy Framework (NPPF) and is undertaken in consultation with other relevant bodies.

The following aspects of flood risk that have been addressed within this report are:

- The area liable to flooding.
- The probability of flooding occurring now and over time.
- The extent and standard of existing flood defences and their effectiveness over time.
- The rates of flow likely to be involved.
- The likelihood of impacts on other areas, properties, and habitats.
- The effects of climate change which currently requires designs to include 1 in 100-year rainfall events with a climate change allowance as per the latest Environment Agency's guidance.
- The nature and current expected lifetime of the development proposed and the extent to which it is designed to deal with flood risk.

Further guidance has been obtained from:

- The SuDs Manual V6 (CIRIA c753).
- "Interim Code of Practice for Sustainable Drainage Systems 2004" (ICOP SUDS).
- "Interim National Procedures" point 3, 10.2 & 10.3.
- The council's in subject Strategic Flood Risk Assessment for this area.

2 Existing Site

2.1 Site Location

The development site is situated in Havant and is accessed off Langstone Road and Brookside Road, with the nearest postcode being PO9 1SA. The Ordnance Survey National Grid reference to the centre of the site is E471330, N105540. A site location plan can be found in Appendix A. The site is generally rectangular in shape and occupies an approximate area of 2.142 ha. The neighbouring land use is as follows:

North	The site is bound to the north by the B6000 development.
East	The site is bound to the east by a private road with an EA main river; The Mill Stream and soft landscaping further beyond.
South	The site is bound to the south by Endeavour Business Park comprising commercial, office and distribution units.
West	The site is bound to the west by commercial offices and distribution units.

2.2 Topography

The existing site is relatively flat, falling from north to south with levels in the north Circa 5.00m AOD and levels to the south of circa 4.00m AOD.

The existing site consists of hard landscaping from an existing car park, with an area of soft landscaping to the north.

A Topographical survey can be found in Appendix A.

2.3 Existing Ground Conditions

A Phase I and II site investigation is currently being undertaken for the site. Borehole logs from the intrusive investigations carried out by Applied Geology have been made available at the time of writing this report and will be used alongside a previous Phase I Environmental Assessment Report carried out by Delta Simons, issued November 2020, ref: 15-075.07 and British Geological Survey (BGS) published data to understand the nature of the existing ground.

A copy of the Borehole logs is included within Appendix E of this report.

From the Delta Simons Phase I Environmental Assessment Report and BGS data, the site is indicated as being predominantly underlain by superficial deposits of Alluvium comprising clay, silt, sand and gravel. The underlying bedrock is stated to comprise Lewes Nodular, Seaford, Newhaven, Culver and Portsdown Chalk Formations. An extract from the BGS Map can be seen in Figure 1. BGS Map.

An area of Made Ground is shown adjacent to the north-east of the Site. While no Made Ground is shown on site from available BGS mapping, given the development history, Made Ground would be anticipated to be present above the superficial deposits.

The boreholes from the intrusive investigation carried out by Applied Geology indicate that the site is consists of made ground to depths between 1.2m and 2.20m bgl.

Made ground is overlaying a River terrace deposit were indicated at depths between 1.0m and 3.5m bgl comprising silty, sandy, clayey gravel.

Undifferentiated Chalk underlays the River Terrace Deposit with depths varying between 3.60m and 5.1m bgl to 5.45m and 17.29m bgl, the chalk consists of silty gravel and cobbles, firm cream sandy gravelly SILT/CLAY.

Groundwater was encountered across the site as indicated in the borehole logs at depths varying from 0.6m to 2.05m bgl within the made ground and River Terrace Deposits. Trial pits SA01, SA01A and SA01B were terminated due to the presence of groundwater and was deemed as unsuitable for soakaway testing. Soakaway tests were however carried out within SA01C and SA02, once the results are received this report will be updated to suit the findings. Due to presence of chalk within the underlain strata and a relatively high groundwater table recorded within the development area this could result in disregarding infiltration techniques as a method of discharging surface water flows. Therefore, it is currently assumed, until proven otherwise, that infiltration is not viable.

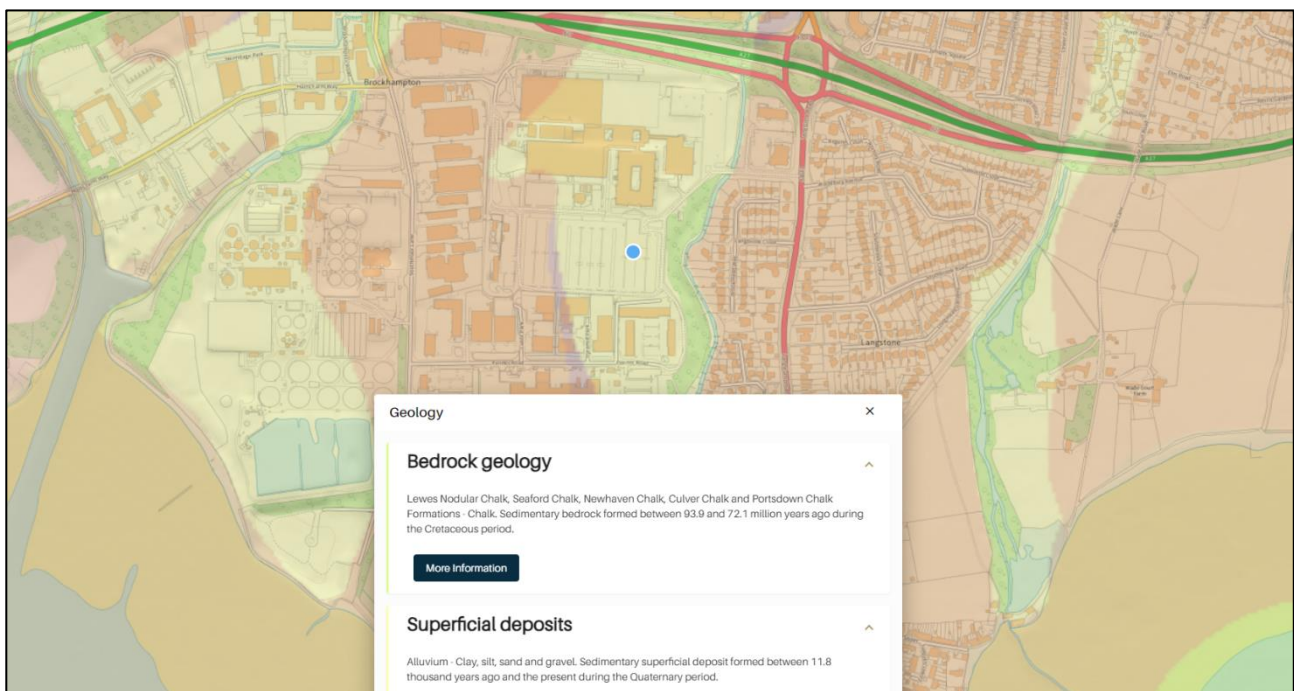


Figure 1. BGS Map

2.4 Aquifer Designation

An extract from the geographic information map (Figure 2. Aquifer Superficial Drift designation map & Figure 3. Aquifer Bedrock designation map) provided by Natural England indicates that the site is located on a Superficial Drift aquifer classified as Secondary A. These aquifers are described as having permeable layers capable of supporting water supplies at local scales, and in some cases, provide an important source of base flow to rivers. Figure 3. Aquifer Bedrock designation map indicates that the site is located above a bedrock aquifer which has been classified as a principal aquifer. Principal aquifers provide a strategically important contribution to water supplies and/or river flows due to owning high permeability and storage properties, as described by the EA. Typically, it is only the upper part of principal aquifers which are used for water supply and river flow contribution.

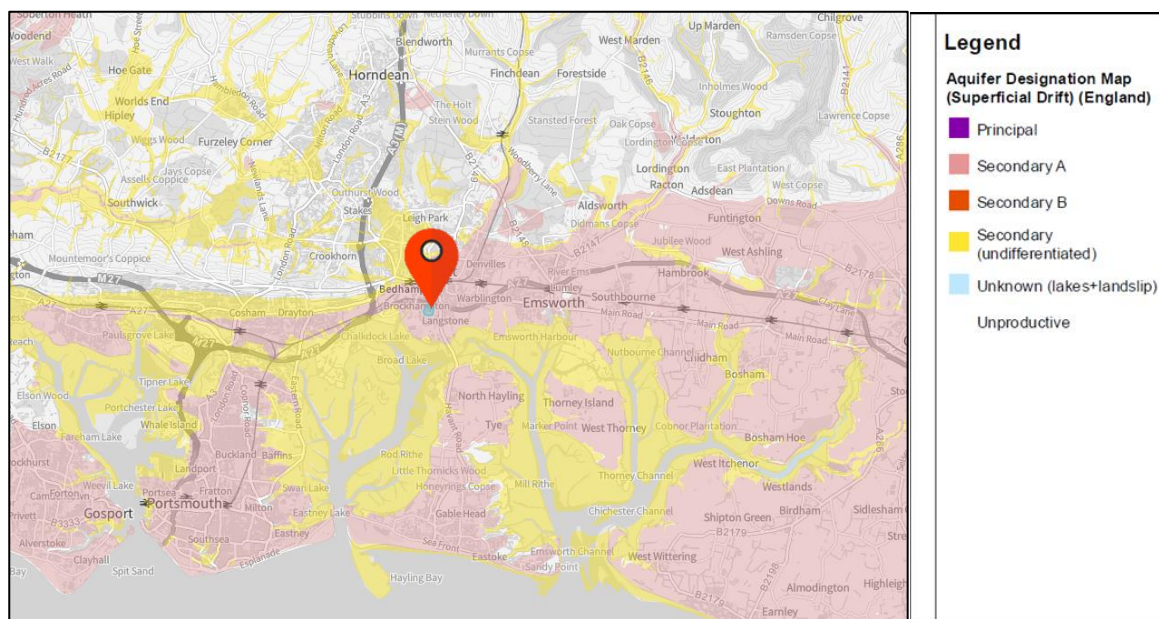


Figure 2. Aquifer Superficial Drift designation map

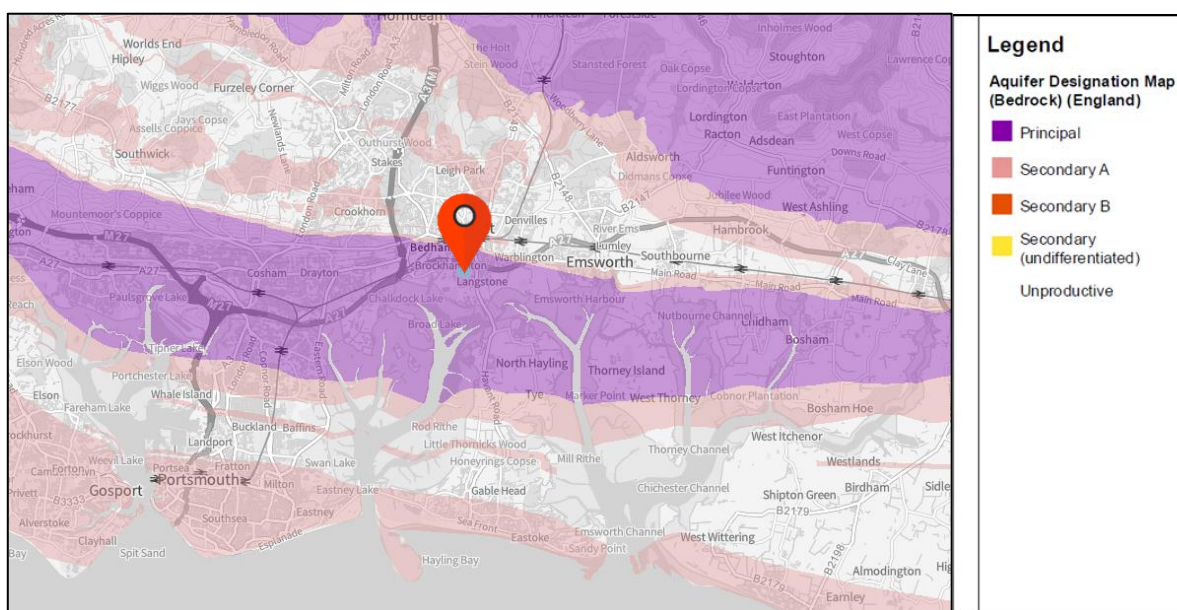


Figure 3. Aquifer Bedrock designation map

2.5 Site Specific Flood Risks

This section reviews the possible sources of flooding relevant for the site and assesses the impacts both on the development itself and on other areas as a result of the proposed development.

The Environment Agency is responsible for the provision of information pertaining to flood risk from tidal and main watercourses throughout England and Wales. The EA provides an online information service through its flood map data. An extract from the flood map is given in Figure 4. EA's Flood map for planning which indicates that the site is in Flood Zone 1. The EA identifies the land as having a less than 1 in 1,000 annual probability of river or sea flooding. The extract also highlights the EA watercourse, The Mill Stream, located directly east of the proposed plot. The Mill Stream has been identified as land being potentially prone to flooding as the EA flood maps have indicated the area as Flood Zone 3. However, it is known that there are raised earthworks at locations between The Mill Stream and the existing land West which is understood to have been built to offer protection from flooding.

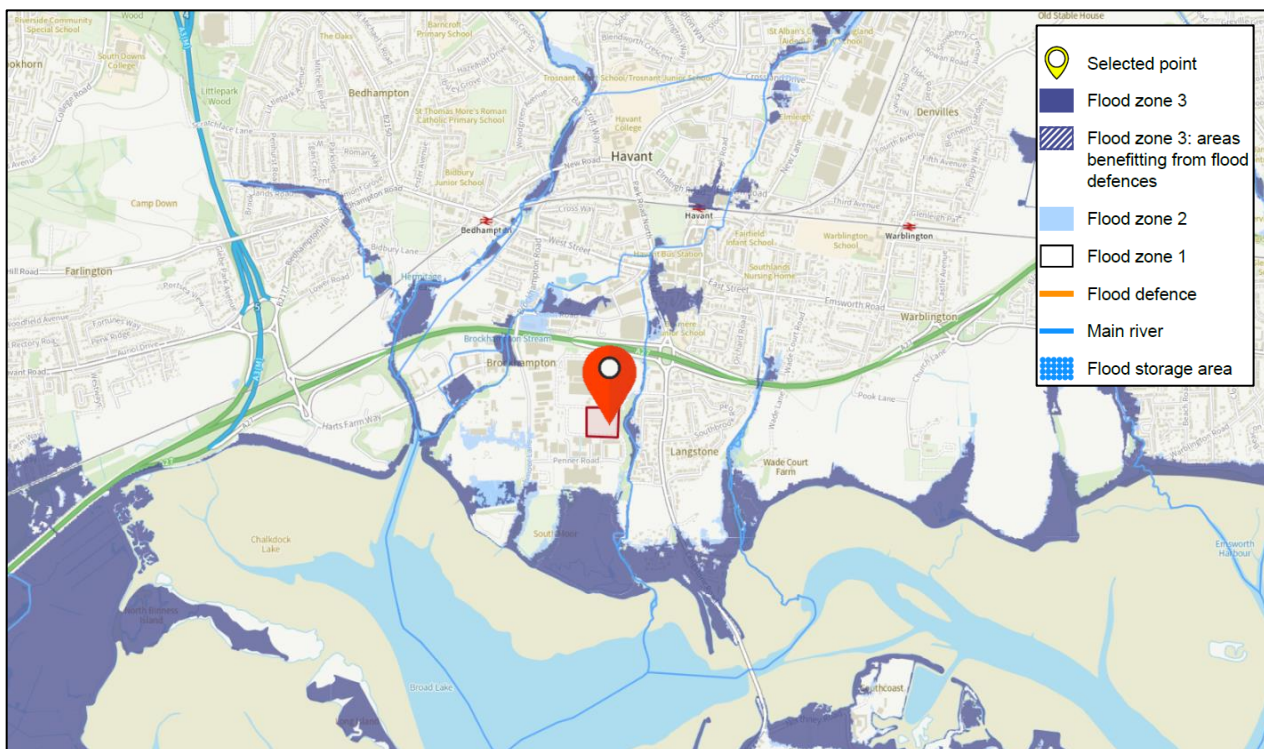


Figure 4. EA's Flood map for planning

2.5.1 Tidal/Fluvial Flooding

Tidal/Fluvial flooding occurs when sea levels rise and flow into a water course causing the water table levels to rise or water levels rise as a result of high or intense rainfall flowing into a watercourse, resulting in water courses overflowing their banks.

Sea (Tidal) Flooding – The proposed site is located approximately 750m north of the coast. Guidance from the EA's 2016 'Flood Risk Assessment: Climate Change Allowances' document has been used to calculate the total rise in sea level across the development lifespan. Figure 5. Extract from Flood Risk Assessments: Climate Change Allowances, EA shows an extract of the sea level allowances by river district for each epoch in mm for each year (total sea level rise for each epoch is in brackets). The applicable river basin district is South East. Using the Higher Central and Upper End allowances from the table below, the total sea level rise for the lifespan of the development (60 years), is calculated as 197.2mm for central allowances and 268.6mm for upper allowances. An extract of the EA's FRA: Climate Change Allowances document can be seen in Appendix B.

<u>Area of England</u>	<u>Allowance</u>	<u>2000 to 2035 (mm)</u>	<u>2036 to 2065 (mm)</u>	<u>2066 to 2095 (mm)</u>	<u>2096 to 2125 (mm)</u>	<u>Cumulative rise 2000 to 2125 (metres)</u>
Anglian	Higher central	5.8 (203)	8.7 (261)	11.6 (348)	13 (390)	1.20
Anglian	Upper end	7 (245)	11.3 (339)	15.8 (474)	18.1 (543)	1.60
South east	Higher central	5.7 (200)	8.7 (261)	11.6 (348)	13.1 (393)	1.20
South east	Upper end	6.9 (242)	11.3 (339)	15.8 (474)	18.2 (546)	1.60

Figure 5. Extract from Flood Risk Assessments: Climate Change Allowances, EA

Extreme seas levels have also been considered within the approved Baynham Meikle outline application (13023-R102) in accordance with the Coastal Flood Boundary Conditions, 2018 Update. An extract from Baynham Meikle FRA & Outline Drainage Strategy report showing the Coastal Design Sea Levels with extreme levels and chainages can be found in Appendix E.

Table 1. Extreme Sea Levels

	Extreme Sea Level			
Year	Chainage	1:1	1:200	1:1000
Based on Year 2017	4600	2.75	3.28	3.45
	4602	2.72	3.25	3.42
	4604	2.7	3.23	3.4
	4606	2.67	3.21	3.37
	4608	2.65	3.19	3.35
	461	2.63	3.17	3.33
	4612	2.6	3.15	3.3

Using the Higher central allowance for the South East river basin, as seen in Figure 5. Extract from Flood Risk Assessments: Climate Change Allowances, EA, the total rise in sea levels for the lifespan of the development – 60 years, equated to 543.5mm. Using the chainage 4600 from Table 1. Extreme Sea Levels, the 1:1, 1:200 and 1:1000-year extreme sea level changes to 3.29m, 3.82m and 3.99m respectively.

River (Fluvial) Flooding – The main river, The Mill Stream, is situated east of the plot and flows in a north to south direction, draining into the Langstone Harbour situated approximately 900m from the development. The existing watercourse has been culverted under the A27 and is understood to be confined by a 2 to 3m high embankment. Although being located within proximity of medium to high risk areas, it is indicated in Figure 6, that the EA depicts the site is in a very low risk area. Meaning, each year this area has a chance of flooding less than 1 in 1,000 (0.1%) from tidal and fluvial flows. Guidance from the EA's Climate Change Allowances document indicates a central allowance of 37% should be considered for peak river flow.

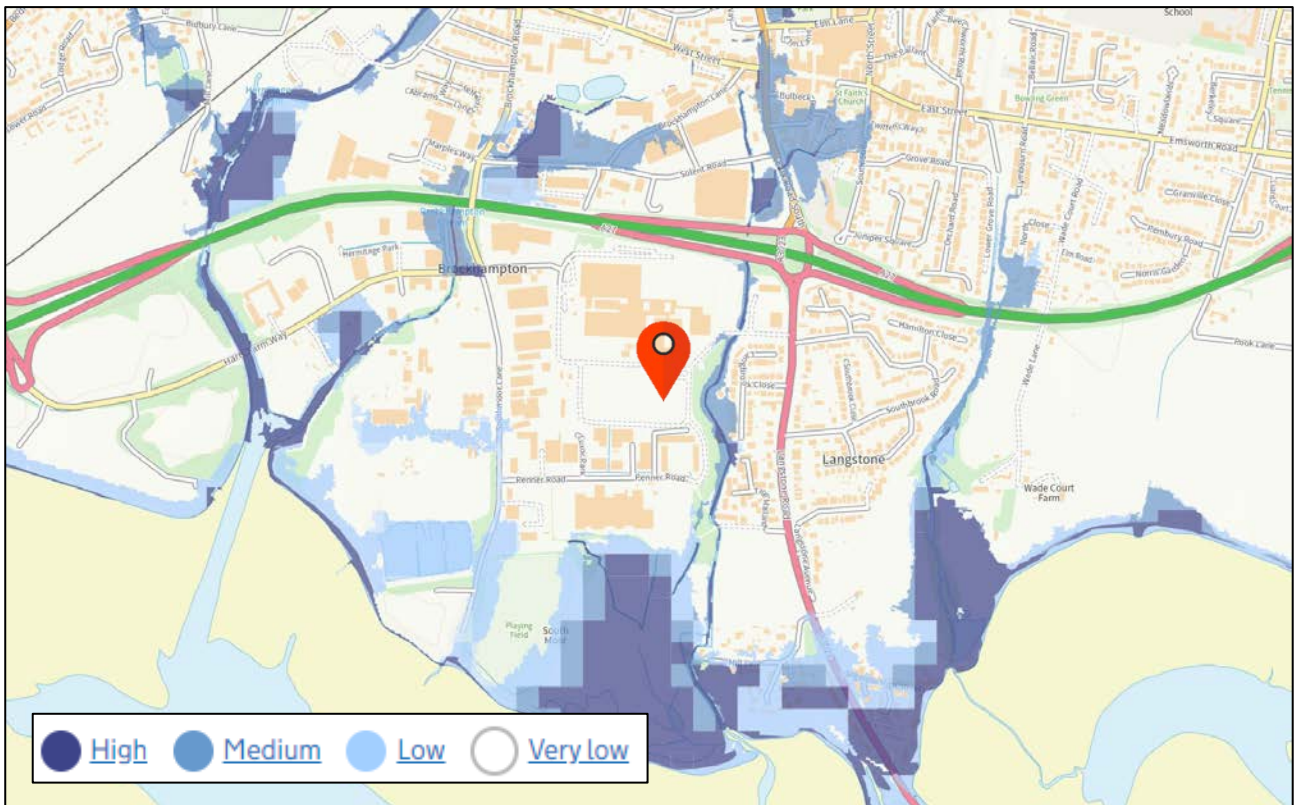


Figure 6. EA Flood risk map form Rivers and Sea

2.5.2 Surface Water Flooding (Pluvial Flooding)

Surface water flooding can occur when heavy rainfall overwhelms the local drainage network and also depends on existing ground levels, rainfall and the local drainage network. The EA website contains mapping of areas believed vulnerable to surface water flooding. An extract from the flood map is given in Figure 7. The EA flood maps indicate that the site is located within a very low risk area, meaning that the area has a chance of flooding of less than 0.1% each year. However, it must be noted that the site is predominantly surrounded by areas of low risk with small sections of medium risk. Low risk means that each year, the area has a chance of pluvial flooding of between 0.1% and 1%; medium risk areas have a chance of flooding of between 1% and 3.3% each year. The proposed development will include a drainage system capable of attenuating and discharging large storms which will reduce the risks and/or limit surface water flooding during extreme events to designated areas.

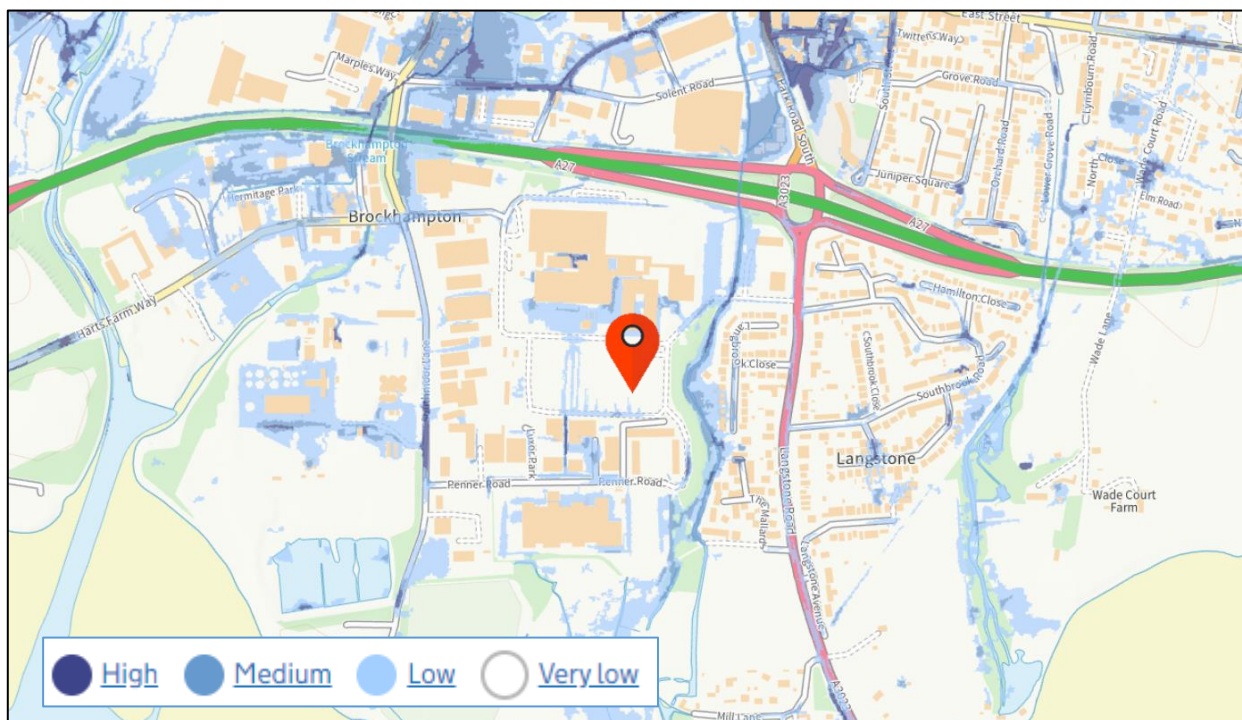


Figure 7. EA Flood risk map from Surface water

2.5.3 Artificial Sources of Flooding

Artificial sources include any water bodies not covered under other categories and typically include canals, lakes and reservoirs.

It is important to note that reservoir flooding is an extremely unlikely event to occur. All large reservoirs are inspected and supervised by reservoir panel engineers and, as the enforcement authority for the Reservoirs Act 1975 in England, the EA ensure that reservoirs are inspected regularly, and essential safety works are carried out.

Figure 8. EA Flood risk map from Reservoirs shows that the risk of flooding from reservoirs is extremely low in this area.

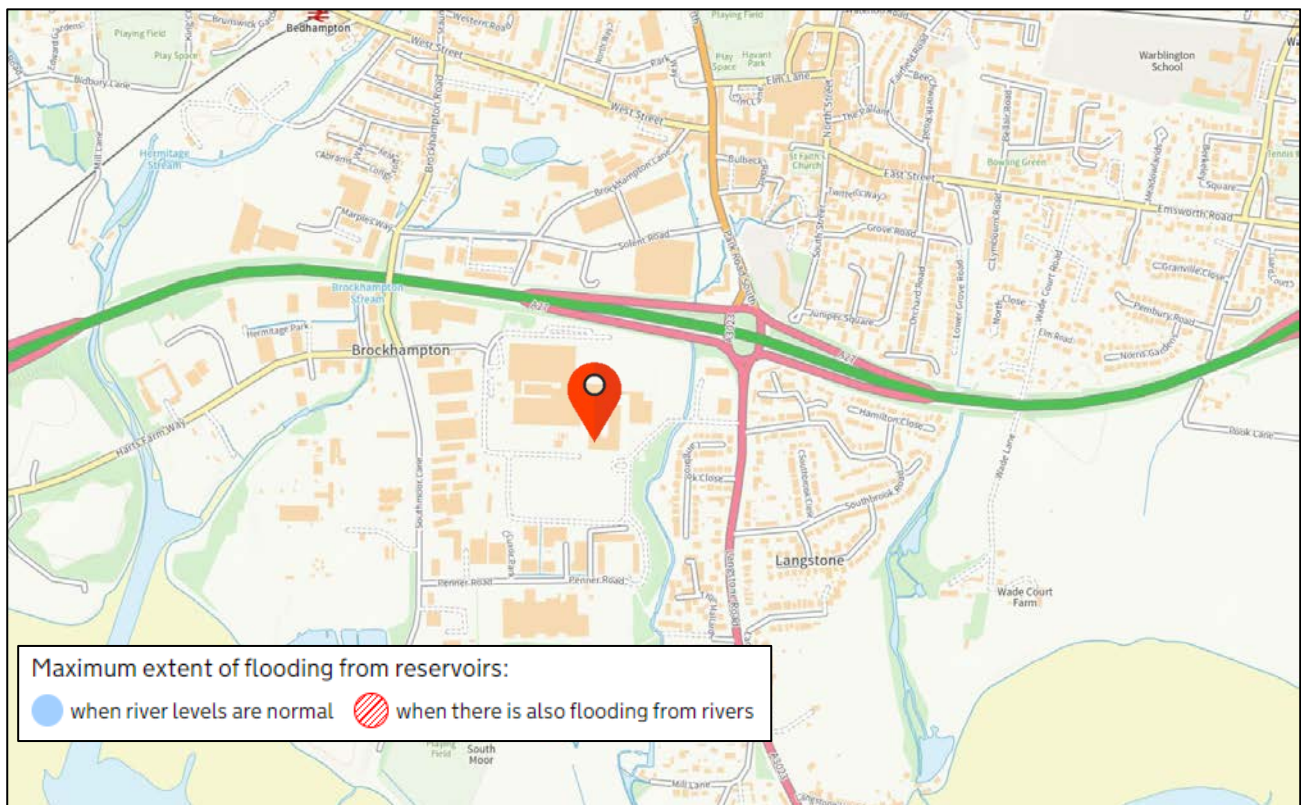


Figure 8. EA Flood risk map from Reservoirs

2.5.4 Historic Flooding

An extract from the Hampshire Councils Preliminary Flood Risk Assessment is included in Appendix B. The reports states that the county of Hampshire has historically been susceptible to pluvial flooding due to extreme rainfall events consisting of return periods ranging from 1:50 to 1:200 during occurred in 2000 – 2001. Resultantly, flooding occurred within 76 parishes across the district. It is understood the cause of the flooding was primarily due to high groundwater levels and the springflow in the Upper and Middle Test, Itchen, Meon, Wallington and Lavant Valleys. The report indicated that since this event, there have been a number of other substantial flood events in varying locations across the county, typically attributable to surface water or the interaction of surface water and river flooding. It is also stated that there are some areas across Hampshire's coastline which are susceptible to coastal flooding due to a low-lying nature. The FRA and SuDS strategy report by Clancy has been used additionally and states that there are no records of historical flooding surrounding the site within the Havant Borough Councils SFRA. This is indicated within the approved masterplan FRA and Outline Drainage Strategy by Baynham Meikle dated January 2023.

2.5.5 Sewer Flooding

Sewer flooding coincides with heavy rainfall, where rainfall levels exceed the capacity of the existing sewer systems. In these scenarios, the system can become blocked, overwhelmed and result in surcharges within the system.

The proposed development will include a drainage system capable of reducing the risk and/or limiting the surface water during extreme storm events.

2.5.6 Groundwater Flooding

In accordance with the approved FRA & Outline Drainage Strategy and the Clancy FRA and Suds Strategy, testing across the proposed and wider site encountered groundwater at depths ranging from 2.10m to 2.80m bgl rising to between 2.00m and 2.50m bgl within the superficial deposits. An extract from the EA's groundwater vulnerability map can be seen in Figure 9. Groundwater Vulnerability Map and indicates that the site is of Medium to High risk.

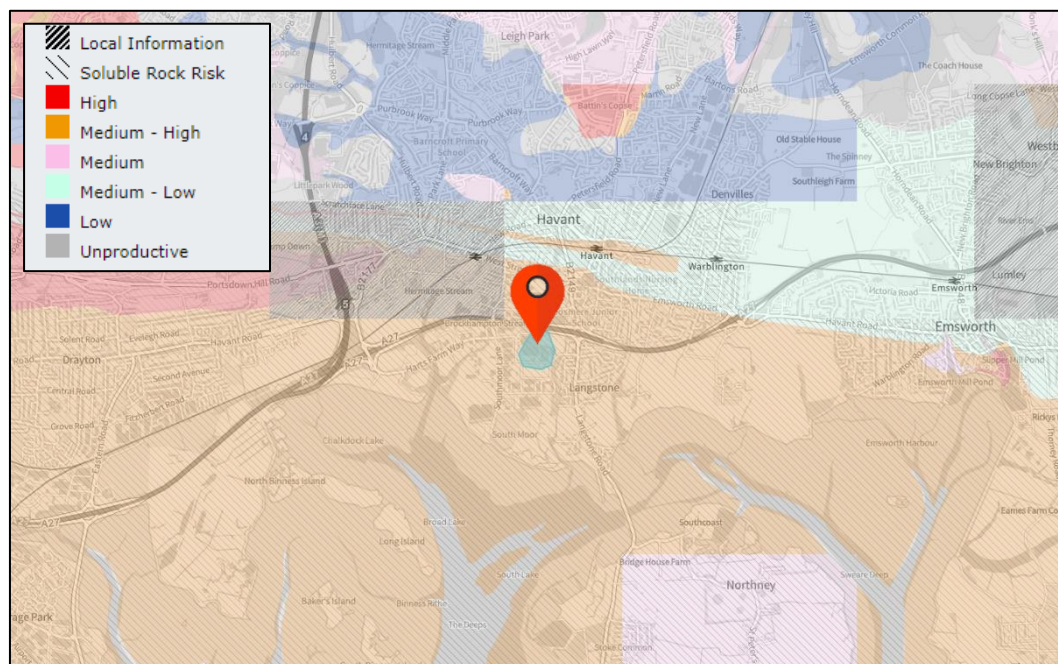


Figure 9. Groundwater Vulnerability Map

2.6 Source Protection Zone

The EA have defined Source Protection Zones (SPZs) for 2000 groundwater sources such as wells, boreholes and springs used for public drinking water supply. These zones show the risk of contamination from any activities that might cause pollution in the area. The closer the activity, the greater the risk. The maps show three main zones (inner which is buffered around the abstraction point, outer and total catchment) and a fourth zone of special interest.

The zones are used in conjunction with the EA's Groundwater Protection Policy to set up pollution prevention measures in areas which are at a higher risk, and to monitor the activities of potential polluters nearby.

As shown in Figure 10. EA Source protection zones, the proposed development is not located within any source protection zones but is situated within the vicinity of a Zone I – Inner Protection Zone.

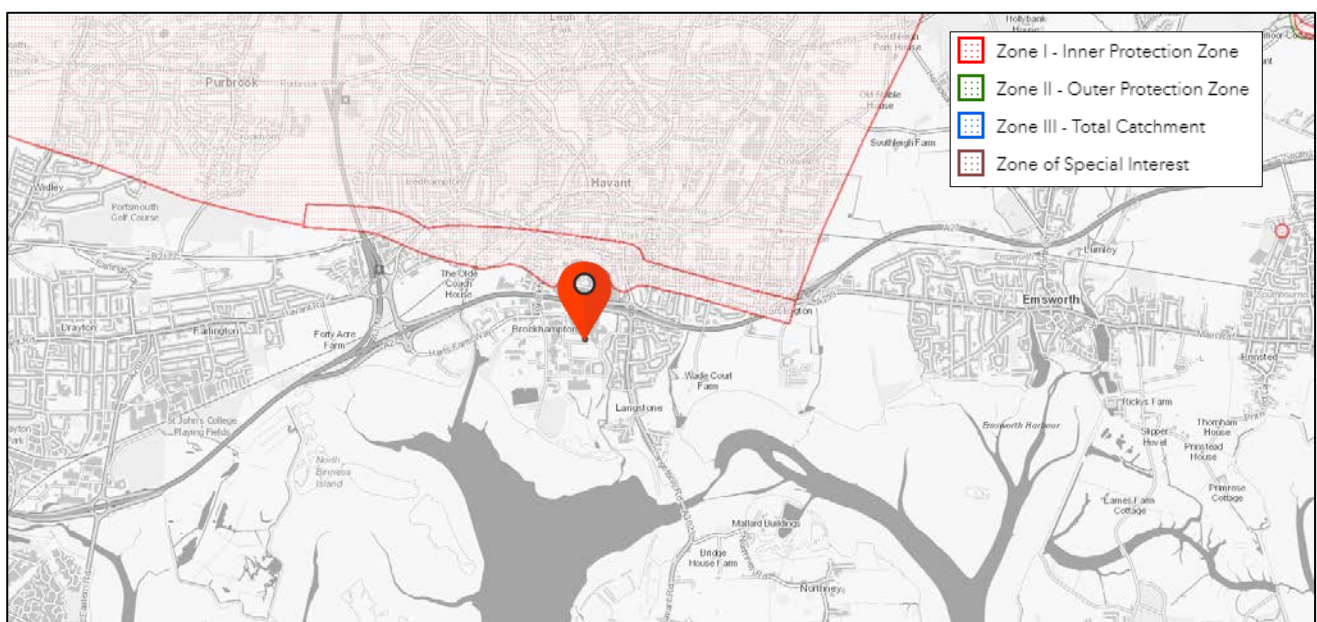


Figure 10. EA Source protection zones

2.7 Future Flood Risk

As mentioned in Section 2.5 above, the EA identifies the site to be within Flood Zone 1, with a less than 0.1% chance of annual flooding.

As discussed in the approved outline application, the Strategic Flood Risk Assessment (SFRA) for the Partnership for Urban South Hampshire has identified that by 2055, significant portions of the site may be located within Flood Zone 3. EA extreme sea levels data, levels taken from 2019 have shown tidal levels from the 1 in 200-year event to be 3.2mAOD (dated 2015), increasing to 3.7mAOD for the 2070 epoch and to 4.4mAOD for the 2115 epoch.

The topographical survey shows the site levels largely staying between 5.2mAOD in the north and falling to approximately 4.3mAOD at the southern extent of the site. The proposed Finished Floor Levels (FFL) for the buildings will therefore be set above the updated river levels. It is proposed that the minimum FFL for the buildings located within phase 2 is set at 5.50mAOD, 300mm above the 1 in 1000-year river levels, and as such, no further flood resistance and resilience measures will be required.

It is proposed to provide a safe refuge on the 1st floor of buildings in the event there is a breach. It is also recommended to raise internal services,

The site is covered by the EA's Flood Warning Direct Service and is recommended that occupants sign up to receive flood warnings to allow evacuation of the site well in advance of any actual onset flooding.

3 Proposed Site

3.1 Description of development

The current site is classed as brownfield. The current proposed application is to develop 3 new industrial units with associated service yard and car parking areas.

A copy of the site's layout plan can be found in Appendix C. Allowance will also be made for access, landscaping and services infrastructure.

The proposed development will have an impermeable area of 1.841 ha and a permeable area of 0.155 ha.

Proposed development levels will also be set such that they try to minimise any surface water flooding from the new development drainage network and ensure that should any flooding occur it is controlled and kept within the new development boundaries and does not affect neighbouring properties or highway land.

4 Drainage Policy & Consultation

4.1 Drainage Authority

Southern Water have provided information regarding the private storm and foul water sewers. A copy of the sewer records and drainage survey can be found in Appendix B.

There is an existing foul connection point situated north of the site, outside of the proposed site boundary, which is the recommended point of connection for the foul water drainage.

There is an existing storm manhole situated south-west within the site boundary, which will be the point of connection for the storm water drainage.

4.2 Lead Local Flood Authority

The Lead Local Flood Authority (LLFA) is Hampshire Council. Hampshire Council has a Strategic Flood Risk Assessment (SFRA) and Local Plan which define flooding and drainage requirements.

Key items within the SFRA are:

- An allowance needs to be made for the climate change over the life of the development for the 1 in 100-year event with an allowance for climate change as per the latest EA's guidance.
- Use of SuDS (where possible use of strategic SuDS should be made)
- Discharge rates should be restricted to Greenfield rates as a maximum.
- Brownfield sites should seek to discharge surface water from the redeveloped site at Greenfield rates wherever possible. As a minimum, betterment should be offered (in terms of reduced runoff) for all redeveloped sites.
- 1 in 100-year attenuation of surface water, taking into account climate change.

4.3 Application of Flood Risk Policy

Based on the EA's flood maps it is possible to undertake an initial site flood risk compatibility assessment to ascertain whether the proposed development site is presently suitable for development by referring to the flood zone compatibility matrix (Table 2).

As mentioned in section 2.5, the proposed site boundary lies within Flood Zone 1, with The Mill Stream – located easterly of the site boundary – categorised as flood zone 3. As there is the underlying risk in that the site could lay within Flood Zone 3 by 2055, as identified by the Partnership for Urban South Hampshire, the suitability for the proposed development has been assessed for both the current and future floodplains.

Table 2.Flood Risk Vulnerability and Flood Zone Compatibility

		Essential infrastructure	Water compatible	Highly vulnerable	More vulnerable	Less vulnerable
Flood Zones	Zone 1	√	√	√	√	√
	Zone 2	√	√	Exception Test required	√	√
	Zone 3a	Exception Test required	√	x	Exception Test required	√
	Zone 3b Functional Floodplain	Exception Test required	√	x	x	x

Key: √ - Development is appropriate
x - Development should not be permitted

Notes to table:

This table does not show:

- The application of the Sequential Test which guides development to Flood Zone 1 first, then Zone 2 and then Zone 3.
- Flood Risk Assessment requirements, or
- The Policy aims for each flood zone.

Table 3. Flood Risk Vulnerability Classification

Essential Infrastructure	• Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk. • Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including electricity generating power stations and grid and primary substations and water treatment works that need to remain operational in times of flood. • Wind turbines.
Highly Vulnerable	• Police stations, ambulance stations and fire stations and command centres and telecommunications installations required to be operational during flooding. • Emergency dispersal points. • Basement dwellings. • Caravans, mobile homes and park homes intended for permanent residential use. • Installations requiring hazardous substances consent (where there is a demonstrable need to locate such installations for bulk storage of materials with port or other similar facilities or such installations with energy infrastructure or carbon capture and storage installations, that require coastal or water-side locations or need to be located in other high flood risk areas, in these instances the facilities should be classified as “essential infrastructure”).
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 and hazardous waste. • Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan.
Less Vulnerable	• Police, ambulance and fire stations which are not required to be operational during flooding. • Buildings used for shops, financial, professional and other services, restaurants and cafes, hot food takeaways, offices, general industry, storage and distribution, non-residential institutions not included in “more vulnerable” and assembly and leisure. • Land and buildings used for agriculture and forestry. • Waste treatment (except landfill and hazardous waste facilities). • Minerals working and processing (except for sand and gravel working). • Navigations facilities. • Ministry of Defence installations. • Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location. • Water-based recreation (excluding sleeping accommodation). • Lifeguard and coastguard stations. • Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms. • Essential ancillary sleeping or residential accommodation for staff required by uses in this category, subject to a specific warning and evacuation plan.
Water Compatible Development	• Water treatment works which do not need to remain operational during times of flood. • Sewerage treatment works (if adequate measures to control pollution and manage sewage during flooding events are in place). • Flood control infrastructure. • Water transmission infrastructure and pumping stations. • Sewerage transmission infrastructure and pumping stations. • Sand and gravel working. • Docks, marinas and wharves.

4.3.1 Sequential Test

The Sequential Test is intended to direct new development to an area of lowest probability of flood risk and ensure development is in the most appropriate flood zone.

The development's extents of the site are currently within Flood Zone 1, with the potential to increase to Flood Zone 3 in future. As the proposed land use is for industrial development, it can be classified as Less Vulnerable as seen in Table 3. Flood Risk Vulnerability Classification. Therefore, the development can be considered appropriate for the proposed use and thus passes the sequential test.

4.3.2 Exception Test

The Exception Test is not required as the site is categorised as Less Vulnerable, as seen in Table 2. Flood Risk Vulnerability and Flood Zone Compatibility).

4.3.3 Flood Risk Assessment Summary & Mitigation Measures

Table 2 contains a summary of the flood risks to the proposed site. Mitigation measures to address the identified risks are discussed below.

Table 4. Summary of Flood Risks

Flood Risk	Risk Level	Action Required
Tidal/Fluvial	Low Risk Area – Risk Increase in Future	FFL'S to be a minimum of 300mm above the 1 in 1000yr river levels.
Surface Water	Very Low. Low – Medium Areas Nearby	Drainage System to accommodate 1:100-year events plus climate change allowance.
Sewers	Low	None
Groundwater	Medium - High	None
Artificial	Extremely Low	None
Run-off	Low	Mitigation Required

It can be concluded that there is no risk to flooding on the development itself. Mitigation measures are required to ensure that run-off from the proposed development will not adversely impact areas downstream.

5 Drainage Strategy

5.1 Hierarchy of Disposal

Generally, the aim should be to discharge surface water run-off as high up the following hierarchy of drainage options as reasonably practicable.

- Into the ground (infiltration)
- To a surface water body
- To a surface water sewer, highway drain, or other drainage systems
- To a combined sewer

5.1.1 Infiltration

As mentioned in section 2.4 of this report, the suitability of infiltration via SuDS techniques may not be viable due to the presence of chalk within the underlying bedrock strata and a high groundwater table indicated within the development area. Soakaway systems are not suitable for surface water discharge under high water tables conditions as groundwater fluctuates throughout the year and greatly reduces their efficiency if the soakaways are not at least 1m above the highest groundwater level. It has therefore been assumed at this stage that infiltration is not viable, however, this is to be confirmed upon completion of further site investigations.

An extract of the site investigation report can be found in Appendix E.

5.1.2 Water Body

The nearest watercourse in The Mill Stream, situated east of the proposed site. As surface water at the current land usage does not discharge into the main river, it has been disregarded as a means of outfall for the proposed plot in place.

The location of the water body can be found in the topographical survey in Appendix A.

5.1.3 Surface Water Sewer/Combined Sewer

There is an existing private surface water sewer located south-west within the development boundary. The existing drainage exits the site via 375mm diameter pipes heading south towards penner road. It is therefore proposed to retain and utilise the existing private surface water connection points as a means of discharge, as suggested within the approved FRA and SUDS Strategy report.

The location of the sewer can be found in Appendix C.

5.2 Sustainable Drainage

Potential SuDS techniques considered for the proposed site.

5.2.1 Rainwater harvesting

Rainwater harvesting (RWH) is the collection of rainwater runoff for use. Runoff can be collected from roofs and other impermeable areas, stored, treated (where required) and then used as a supply water for domestic, commercial and/or institutional properties.

Rainwater harvesting will be disproportionate in terms of cost and function in regard to the proposed development features (toilet, sinks etc.) Therefore, rainwater harvesting has been disregarded.

5.2.2 Green Roofs

Green roofs comprise a multi-layered system that covers the roof of a building or podium structure with vegetation cover, over a drainage layer. They are designed to intercept and retain precipitation, reducing the volume of run-off and attenuating peak flows.

A green roof area has been proposed for each unit within the proposed plot. This is to be finalised by others at design stage.

5.2.3 Soakaways

Soakaways are square or circular excavations either filled with rubble or lined with brickwork, precast concrete or polyethylene rings/perforated storage structures surrounded by granular backfill. They can be grouped and linked together to drain large areas including highways. The supporting structure and backfill can be substituted by modular geo-cellular units. Soakaways provide storm water attenuation, storm water treatment and groundwater recharge.

Due to the combination of a high water table and clays within the strata, it was concluded that infiltration as a means of dealing with surface water is unfeasible at this stage.

5.2.4 Swales

Swales are linear vegetated drainage features in which surface water can be stored or conveyed. They can be designed to allow infiltration, where appropriate. They should promote low flow velocities to allow much of the suspended particulate load in the storm water runoff to settle out, thus providing effective pollutant removal. Roadside swales can replace conventional gullies and drainage pipes.

Swales cannot be incorporated into the landscape design due to space restrictions.

5.2.5 Pervious Pavements

Pervious pavements provide a pavement suitable for pedestrian and/or vehicular traffic while allowing rainwater to infiltrate through the surface and into the underlying layers. The water is temporarily stored between infiltration to the ground, reuse or discharge to a watercourse or other drainage system. Pavements with aggregate sub-bases can provide good water quality treatment.

When permeable paving for car parking bays is used, the stone sub-base not only stores and slows down the rate of discharge, but also raises the water quality. It should not be used in the loading yard areas, due to the impact of the heavily loaded HGVs on the long-term durability of the pavement finish.

Pervious pavements have been adopted on the proposed development.

5.2.6 Geo-cellular/Modular Systems

Modular plastic geo-cellular systems with a high void ratio can be used to create a below ground storage structure. Modular tanks can be used for runoff attenuation but require silt trap protection and a suitable means of access for cleaning and inspection.

A Geo-cellular system has been adopted on the proposed development.

5.2.7 Ponds/Infiltration Basin

Ponds can provide both storm water attenuation and treatment. They are designed to support emergent and submerged aquatic vegetation along their shoreline. Runoff from each rain event is detained and treated in the pool. The retention time promotes removal of silt through sedimentation and the opportunity for biological uptake mechanisms to reduce nutrient concentrations.

Due to the nature of the development, there is not sufficient space to incorporate ponds.

5.3 Sustainable Drainage Maintenance

The various SuDS features will remain privately owned and be maintained by the client. The exact details of this arrangement will be defined when future tenants are confirmed.

The SuDS operation and maintenance strategy will be in accordance with CIRIA C753 best practice, as tabled below:

Table 5. SuDS Operation and maintenance requirements

Monthly	Inspect upstream catchpits for silt and vortex control manhole for debris. Clean out if necessary, using vacuum tanker.
Every Six Months	Remove sediment from the inlet catchpit with a vacuum tanker twice a year as necessary, ideally at the start of Spring when general landscaping tidying up is carried out after winter damage and autumn leaf fall.
Annually	Annually inspect/check all sumps, inlets, outlets, vents to tanks to ensure that they are in good condition and operating as designed. Inspect distribution pipe by CCTV. If necessary, clean out.
Remediation Inspection & tasks following significant storm events	Inspect upstream and downstream catchpits for silt and vortex control manhole for debris. Clean out as necessary using vacuum tanker.
Contingency plan details	Exceedance flows as defined in the Drainage Strategy Drawing.

6 Drainage Strategy – Surface Water

6.1 Proposed Surface Water Runoff Rate

As the existing site currently consists primarily of hard landscaping area, it is proposed that the changes brought about by the new development will have little effect to the impermeable area currently. It has been previously approved within the Baynham Meikle FRA & Outline Strategy Report that an impermeable area of 1.421 ha and a permeable area of 0.340 ha should be used within the drainage design. Due to design progression of the development, the latest proposed areas have been taken as an impermeable area of 1.841 ha and a permeable area of 0.155 ha. An extract of the proposed impermeable areas plan can be seen in Appendix C. The design life for the development is 60 years. Based on the Environment Agency Guidance for climate change published in February 2016, a climate change allowance of 25% should be considered for the 30 year and 25% for the 100-year storm events. The hydraulic calculations will also include 45% climate change allowance for the 100-year as a sensitivity check.

It had been previously approved in the FRA and SUDS Strategy produced by Baynham Meikle to support the outline planning application, that the proposed surface water discharge rates should follow the existing 1 in 1 year runoff rate. In accordance with the report, the maximum flow the existing 375mm diameter discharge pipes can take is 132.0 l/s. This is expected to serve all areas south of the link road for the wider site, Phases 1 and 2.

The proposed discharge rate for Phase 2 is **19.1 l/s**.

A copy of the drainage report can be found in Appendix C.

6.2 Proposed Attenuation Storage

Attenuation storage is provided to enable the runoff rate from the site into the receiving sewer to be limited to an acceptable rate to protect against flooding downstream. The estimate storage volume has been calculated using FSR hydrological zones and factor for FEH, climate change and hydrological region. Using a hydraulic modelling software, the total required attenuation for the proposed development is approximately 750m³ in a 1 in 100 year plus 45% climate change event.

The attenuation storage is provided via:

- Cellular storage crates
- Permeable paving

6.3 Proposed Surface Water Drainage Strategy

Surface water from the proposed site will be serviced by a combination of surface water pipes, permeable paving, and cellular storage tanks. Current levels fall from north to south, therefore, it is proposed for the new surface water system to discharge via a system of gravity pipework, following the fall of the existing land.

The building roofs are to discharge directly into the main drainage system. A green roof area has been proposed for each unit within the site - this is to be finalised by others. A permeable surface that will allow flows to be attenuated within the porous subbase beneath will be constructed in the new car park bays and is to be directed into the main system via land drains. Geo-cellular storage tanks have been proposed within the service yard areas and will aid in attenuation of surface water flows. Surface water from these areas will drain into the channel drains and road gullies which then connects to the main system.

There is an existing surface water connection point situated southwest within the site boundary. The proposed surface water will discharge from the site by out-falling into the existing surface water connection at a discharge rate of 19.1 l/s.

Levels within car parking areas should be designed at the appropriate detailed design stage such that critical 100 year plus climate change storm events are contained above ground, but safely within the site boundaries without risk to surrounding properties, the building or that restricts access / egress.

For the 1 in 100 years plus climate change event should any flooding occur at the surface level this would be of no more than 100mm in depth and be contained safely on site, in parking areas, without risk to proposed or existing buildings.

A copy of the proposed drainage strategy can be found in Appendix C.

7 Drainage Strategy – Foul Sewerage

7.1 Proposed foul drainage strategy.

The proposed foul drainage strategy should provide infrastructure to support the industrial wastewater. There is an existing foul water connection point situated north of the site, outside of the proposed boundary. Details including cover levels and invert levels are to be confirmed. The proposed foul flows will be serviced by a system of gravity pipework, with flows from south to north, towards the outfall connection.

A copy of the proposed foul drainage strategy network can be found in Appendix C.

8 Summary

This report follows with the previously approved FRA & Outline Strategy (ref: 13023-R102) master-planning document for Langstone Park. The development proposes 3 new industrial units with associated access roads, car parking and service yard areas in Havant.

The EA Flood maps for planning depicts the site as lying within Flood Zone 1, with very low risk of flooding from rivers and sea, with significant portions of the site lying within flood zone 3 by 2055 – as advised by sFRA for the Partnership for Urban South Hampshire. Climate change factors have been considered within Site Specific Flood Risks resulting in a raise of Finished Floor Levels by a minimum of 300mm to account for future sea level changes. The development is classified as Less Vulnerable usage and meets the Sequential Test; therefore, the Exception test is not required.

The surface water drainage system is designed to cater for storm events up to the 1 in 100-year plus 45% climate change. The site will drain at the existing brownfield rate of 55.44 l/s, as discussed in Proposed Surface Water Runoff Rate, and outfall into the existing sewer system via the connection point situated southwest within the boundary. Foul water flows will discharge into the existing sewer system via the connection point situation north of the site, outside of the boundary.

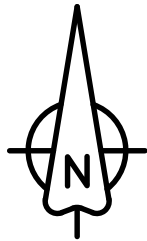
The use of SuDS features has been considered and can be incorporated within the design. Surface water discharge will be attenuated via a combination of permeable car park bays and cellular storage, with a combined attenuation volume of approximately 750m³. Green roof areas have also been proposed upon each unit and are to be finalised by others during design stages.

It has been concluded at the time of writing, that infiltration is not a suitable option of surface water discharge due to a high groundwater table and the presence of chalk within the underlying strata. This is to be confirmed post further ground investigation works.

The site does not pose any increased flood risk to the site itself or adjacent developments and is not susceptible to flooding by other means.

Appendix A – Existing Information

- A.1 Site Location Plan
- A.2 Topographical Survey

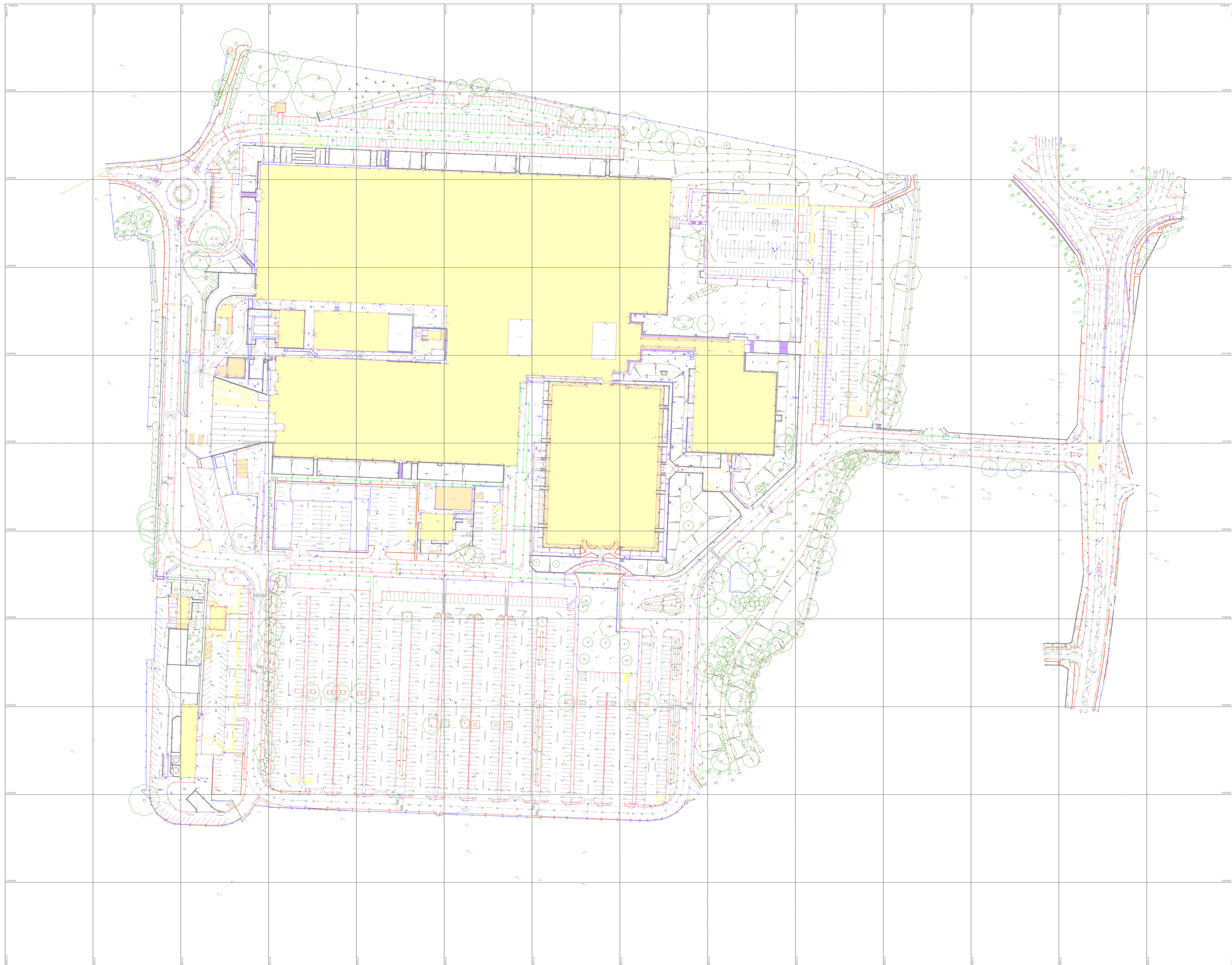


 PHASE 2 (Units 5+6)
DEVELOPMENT

 LANGSTONE TECHNOLOGY PARK
SITE-WIDE

GRID COORDINATES:
E: 471330
N: 105540
POSTCODE: PO9 1SA

Project Title Langstone Technology Park					Drawing Title Phase 2 Site Location Plan		Drawing Status For Information						
BM Ref 13508	Scale @ A3 1 : NTS	Drawn by O.C.	Checked by A.B.	Project Eng G.L.	Drawing Number 13508-114	Revision P02	 BAYNHAM MEIKLE Consulting Civil & Structural Engineers  0121 434 4100  admin@baynhammeikle.co.uk  www.baynhammeikle.co.uk		P02	17/11/2023	Grid Reference Updated	R.B.	A.B.
							P01	21/07/2023	First Issue.	O.C.	A.B.		
							Rev	Date	Description	By	Chkd		
							Revision Schedule						



Station Information:

Station	Easting (m)	Northing (m)	Level (m)
GH1	471467.951	105703.881	5.210
GH2	471356.573	105669.076	4.947
GH3	471263.579	105556.151	4.427
GH4	471172.818	105589.916	4.778
GH5	471093.648	105635.462	5.240
GH5A	471098.913	105824.054	5.142
GH6	471110.514	105871.341	5.093
GH7	471218.661	105879.712	5.375
GH8	471349.629	105874.259	5.570
GH9	471482.805	105845.720	7.682
GH10	471623.802	105886.766	7.216
D1	471156.786	105790.862	7.451
D2	471658.923	105828.440	7.807

OS Note.

This survey has been orientated to the Ordnance Survey (O.S.) National Grid OSGB36(15) via Global Navigation Satellite Systems (GNSS) and the O.S. Active Network (OS Net).

A true OSGB36 coordinate has been established near to the site centre via a transformation using the OSTN15GB & OSGM15GB transformation models.

The survey has been correlated to this point and a further one or more OSGB36 (15) points established to create a true O.S. bearing for angle orientation.

No scale factor has been applied to the survey therefore the coordinates shown are arbitrary & not true O.S. Coordinates which have a scale factor applied.

Please refer to Survey Station Table to enable establishment of the on-site grid and datum.

Some services may have been omitted due to parked vehicle

Legend:

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1	7.12.2021	Additional Road Survey	DR	GH12
Rev	Date	Description	Drawn	Q. R



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St Albans Unit B, The Courtyard The Quadrant, St Albans, Herts	Newcastle 24 Riverside Studios Ardwell Road, Newcastle, Co. Down	London 27, Cornwall Terrace London, W1
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t. (01727) 854481	t. (01912) 736391	t. (02072) 24180

CLIENT

XLB Property

PROJECT

Langstone Technology Park
Havant
PO9 1SA

TITLE	Topograph Survey
-------	---------------------

SCALE	DATE
A1@ 1: 1000	Jan 2021

DRAWN PS/JK2	QUALITY RE GH9528
------------------------	-----------------------------

Level datum	OS (see note)
Grid orientation	OS (see note)

Job number	38869
Drawing No.	

38869_T

Comments
This plan should only be used for its original purpose. Greenhatch Group accepts no responsibility for this plan if supplied to any party other than the original client.
All dimensions should be checked on site prior to design and construction.

Drainage information (where applicable) has been visually inspected from the surface and therefore should be treated as approximate only.

Notes

Appendix B – EA & SFRA Information

- B.1 EA Flood Risk Assessment: Climate Change Allowances
- B.2 Hampshire County Council PRFA
- B.3 Southern Water Sewer Records

- [National Planning Policy Framework](https://www.gov.uk/government/publications/national-planning-policy-framework--2) (<https://www.gov.uk/government/publications/national-planning-policy-framework--2>)
- [planning practice guidance on flood risk and coastal change](https://www.gov.uk/guidance/flood-risk-and-coastal-change) (<https://www.gov.uk/guidance/flood-risk-and-coastal-change>)

Local planning authorities should refer to these when they prepare local plans and consider planning applications.

What climate change allowances are

Climate change allowances are predictions of anticipated change for:

- peak river flow
- peak rainfall intensity
- sea level rise
- offshore wind speed and extreme wave height

To increase resilience to flooding and coastal change, you should make allowances for climate change in your flood risk assessment.

There are allowances for different climate scenarios over different epochs, or periods of time, over the coming century. They include figures for extreme climate change scenarios.

When to use climate change allowances

The Environment Agency uses climate change allowances when they provide advice on flood risk assessments and strategic flood risk assessments.

Exceptions – when it might be appropriate to use other data or allowances

There may be circumstances where local evidence supports using other data or allowances. For example the impact of climate change on peak

[↑ Contents](https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#contents) (<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#contents>)

The Environment Agency may want to check how and why you used other data in your plans and proposals.

Peak river flow allowances

Peak river flow allowances show the anticipated changes to peak flow by management catchment. Management catchments are sub-catchments of river basin districts.

The range of allowances is based on percentiles. A percentile describes the proportion of possible scenarios that fall below an allowance level. The 50th percentile is the point at which half of the possible scenarios for peak flow fall below it, and half fall above it.

The:

- central allowance is based on the 50th percentile
- higher central allowance is based on the 70th percentile
- upper end allowance is based on the 95th percentile

An allowance based on the 50th percentile is exceeded by 50% of the projections in the range. At the 70th percentile it is exceeded by 30%. At the 95th percentile it is exceeded by 5%.

Select the peak river flow allowances to use for your assessment

For flood risk assessments and strategic flood risk assessments, the Environment Agency, as a statutory consultee, uses the management catchment climate change allowances from the [peak river flow map](https://environment.data.gov.uk/hydrology/climate-change-allowances) (<https://environment.data.gov.uk/hydrology/climate-change-allowances>) as benchmarks.

To work out which management catchment allowances to use, you need to:

↑ [Contents \(https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#contents\)](https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#contents)

<https://environment.data.gov.uk/hydrology/climate-change-allowances>

- search for your location by postcode, national grid reference or town in the 'find address or place' search box
- select the management catchment for your location – the allowances appear in a pop-up box

In some locations the dominant source of flooding will be from a neighbouring management catchment. If so, use the allowances from the neighbouring management catchment to assess the risk for your development or site allocation. [Contact the Environment Agency](https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#contact) (<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#contact>) if you are unsure which allowance to use.

The Environment Agency also provide these allowances in the [peak river flow climate change allowances by management catchment](https://www.gov.uk/government/publications/peak-river-flow-climate-change-allowances-by-management-catchment) (<https://www.gov.uk/government/publications/peak-river-flow-climate-change-allowances-by-management-catchment>) table – you have to know your management catchment to get the information you need.

You also need to know the flood zone your development is located in.

Using peak river flow allowances for flood risk assessments

Use the [flood risk vulnerability classification](https://www.gov.uk/guidance/flood-risk-and-coastal-change#Table-2-Flood-Risk-Vulnerability-Classification) (<https://www.gov.uk/guidance/flood-risk-and-coastal-change#Table-2-Flood-Risk-Vulnerability-Classification>) to classify the vulnerability of your development.

Assess both the central and higher central allowances for strategic flood risk assessments.

In flood zones 2 or 3a for:

- essential infrastructure – use the higher central allowance

[↑ Contents](https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#contents) (<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#contents>)

zone 3a)

- more vulnerable – use the central allowance
- less vulnerable – use the central allowance
- water compatible – use the central allowance

In flood zone 3b for:

- essential infrastructure – use the higher central allowance
- highly vulnerable – development should not be permitted
- more vulnerable – development should not be permitted
- less vulnerable – development should not be permitted
- water compatible – use the central allowance

Apply the peak river flow allowances to developments and allocations where the strategic flood risk assessment shows an increased risk of flooding in the future. This includes locations that are currently in flood zone 1, but might be in flood zone 2 or 3 in the future.

To ensure the safety of people using the development when designing [safe access, escape routes and places of refuge](https://www.gov.uk/guidance/flood-risk-and-coastal-change#flood-warning-and-evacuation-plan) (<https://www.gov.uk/guidance/flood-risk-and-coastal-change#flood-warning-and-evacuation-plan>), use the central allowance for all development types except for essential infrastructure. Use the higher central allowance for this.

If the local planning authority consider the development is appropriate, even though it will not follow the [flood zone compatibility categories](https://www.gov.uk/guidance/flood-risk-and-coastal-change#Table-3-Flood-risk-vulnerability) (<https://www.gov.uk/guidance/flood-risk-and-coastal-change#Table-3-Flood-risk-vulnerability>) for flood zones 2, 3a or 3b, use the higher central allowance.

Where it is appropriate to apply a [credible maximum scenario](https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#credible-maximum-scenarios) (<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#credible-maximum-scenarios>), use the upper end allowance.

[↑ Contents](https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#contents) (<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#contents>)

Assess off-site impacts and calculate floodplain storage compensation

The appropriate allowance to assess off-site impacts and calculate floodplain storage compensation depends on land uses in affected areas. Use the:

- central allowance for most cases
- higher central allowance when the affected area contains essential infrastructure

You should also consider likely future land uses shown by local plan allocations or unimplemented extant planning permissions. The Environment Agency will want to see evidence from the developer to prove they have done this.

[Contact the Environment Agency](https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#contact)

(<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#contact>) if you are unsure which allowance to use for flood storage compensation.

Peak rainfall intensity allowance

Increased rainfall affects surface water flood risk and how you need to design drainage systems.

How to use the peak rainfall intensity allowances

The [peak rainfall allowances map](https://environment.data.gov.uk/hydrology/climate-change-allowances/rainfall)

(<https://environment.data.gov.uk/hydrology/climate-change-allowances/rainfall>) shows anticipated changes in peak rainfall intensity. Use these for site-scale applications (for example, drainage design), and for surface water flood mapping in small catchments (less than 5 square kilometres) and urbanised drainage catchments. A drainage catchment is urban if the land use is a town or city. If you are unsure if your catchment is urban or rural, please contact the [lead local flood authority](https://www.gov.uk/find-your-local-council) (<https://www.gov.uk/find-your-local-council>).

modelling is unlikely to be appropriate and fluvial flood risk should be assessed using the [peak river flow allowances](https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#peak-river-flow-allowances) (<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#peak-river-flow-allowances>). Do not use the peak river flow allowances to adjust rainfall totals as they are not compatible.

To work out which management catchment allowances to use, you need to:

- access the climate change allowances for [peak rainfall allowances map](https://environment.data.gov.uk/hydrology/climate-change-allowances/rainfall) (<https://environment.data.gov.uk/hydrology/climate-change-allowances/rainfall>)
- search for your location by postcode, national grid reference or town in the 'find address or place' search box
- select the management catchment for your location – the allowances appear in a pop-up box

The Environment Agency also provides the peak rainfall allowances in the table [Peak rainfall climate change allowances by management catchment](https://www.gov.uk/government/publications/peak-rainfall-climate-change-allowances-by-management-catchment) (<https://www.gov.uk/government/publications/peak-rainfall-climate-change-allowances-by-management-catchment>). You have to know your management catchment to find the information you need.

Using peak rainfall intensity allowances to assess surface water flood risk

Use the development lifetime guidance to work out the lifetime of your development. You should consider residential development to have a minimum lifetime of a 100 years.

Development with a lifetime beyond 2100

This includes development proposed in applications or local plan allocations.

For flood risk assessments and strategic flood risk

[↑ Contents](https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#contents) (<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#contents>)

exceedance probability events for the 2070s epoch (2061 to 2125).

Design your development so that for the upper end allowance in the 1% annual exceedance probability event:

- there is no increase in flood risk elsewhere
- your development will be safe from surface water flooding

Follow this guidance to help you do this:

- [Planning practice guidance on flood risk](https://www.gov.uk/guidance/flood-risk-and-coastal-change#planning-and-flood-risk)
(<https://www.gov.uk/guidance/flood-risk-and-coastal-change#planning-and-flood-risk>)
- [Preparing a flood risk assessment: standing advice – Surface water management section](https://www.gov.uk/guidance/flood-risk-assessment-standing-advice#standing-advice-for-vulnerable-developments)
(<https://www.gov.uk/guidance/flood-risk-assessment-standing-advice#standing-advice-for-vulnerable-developments>)
- [Sustainable drainage systems: non-statutory technical standards](https://www.gov.uk/government/publications/sustainable-drainage-systems-non-statutory-technical-standards)
(<https://www.gov.uk/government/publications/sustainable-drainage-systems-non-statutory-technical-standards>)
- [CIRIA SuDS manual](https://www.gov.uk/flood-and-coastal-erosion-risk-management-research-reports/update-to-the-suds-manual) (<https://www.gov.uk/flood-and-coastal-erosion-risk-management-research-reports/update-to-the-suds-manual>)
- [Water UK sewerage sector guidance – Design and construction standards](https://www.water.org.uk/wp-content/uploads/2021/07/SSG-App-C-Des-Con-Guide.pdf)
(<https://www.water.org.uk/wp-content/uploads/2021/07/SSG-App-C-Des-Con-Guide.pdf>)
- [ICE SuDS route maps](https://myice.ice.org.uk/knowledge-and-resources/best-practice/sustainable-drainage-systems)
(<https://myice.ice.org.uk/knowledge-and-resources/best-practice/sustainable-drainage-systems>)

Development with a lifetime of between 2061 and 2100

For development with a lifetime between 2061 and 2100 take the same approach but use the central allowance for the 2070s epoch (2061 to 2125)

↑ [Contents](https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#contents) (<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#contents>)

For development with a lifetime up to 2060, take the same approach but use the central allowance for the 2050s epoch (2022 to 2060).

Contact the [lead local flood authority](https://www.gov.uk/find-local-council) (<https://www.gov.uk/find-local-council>) if you are unsure which allowance to use.

Exceptions

In some locations the allowance for the 2050s epoch is higher than that for the 2070s epoch. If so, and development has a lifetime beyond 2061, use the higher of the two allowances.

Sea level allowances

There are a range of allowances for each [river basin district](https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#river-basin-district) (<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#river-basin-district>) and epoch for sea level rise. They are set out in [table 1](https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#table-1) (<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#table-1>) and are based on percentiles. A percentile describes the proportion of possible scenarios that fall below an allowance level.

The:

- higher central allowance is based on the 70th percentile
- upper end allowance is based on the 95th percentile

An allowance based on the 70th percentile is exceeded by 30% of the projections in the range. At the 95th percentile it is exceeded by 5% of the projections in the range.

For flood risk assessments and strategic flood risk assessments, assess both the higher central and upper end allowances.

The Environment Agency will want to see if you

[↑ Contents](https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#contents) (<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#contents>)

[climate-change-allowances#H-plus-plus](#)) for your flood risk assessment or strategic flood risk assessment. Where applicable you should do H++ allowance assessments as well as assessing the sea level rise allowances in table 1.

Table 1: sea level allowances by river basin district for each epoch in mm for each year (based on a 1981 to 2000 baseline) – the total sea level rise for each epoch is in brackets

[Area of England](#)
 [\(https://www.gov.uk/government/publications/flood-risk-assessments-river-basin-district-maps\)](https://www.gov.uk/government/publications/flood-risk-assessments-river-basin-district-maps)

Anglian
Anglian
South east
South east
South west
South west
Northumbria
Northumbria
Humber
Humber

Area of England

<https://www.gov.uk/government/publications/flood-risk-assessments-river-basin-district-maps>)

North west

North west

The following maps will help you find out which river basin district you are in:

- [River basin district map](https://www.gov.uk/government/publications/river-basin-district-map)
(<https://www.gov.uk/government/publications/river-basin-district-map>)
- [River basin district map that zooms in](https://environment.data.gov.uk/DefraDataDownload/?mapService=EA/WFDRiverBasinDistrictsCycle2&Mode=spatial)
(<https://environment.data.gov.uk/DefraDataDownload/?mapService=EA/WFDRiverBasinDistrictsCycle2&Mode=spatial>) so you can find places close to river basin district boundaries

For places in:

- Thames river basin district use 'south east' sea level rise allowances
- Severn river basin district use 'south west' sea level rise allowances
- parts of Solway Tweed river basin district on the west coast and Dee river basin district that are in England, use 'north west' sea level rise allowances
- parts of Solway Tweed river basin district on the east coast that are in England, use 'Northumbria' sea level rise allowances

The allowances in [table 1](#)

(<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#table-1>) account for slow land movement. This is due to 'glacial isostatic adjustment' from the release of pressure at the end of the last ice age. The northern part of the UK is

[↑ Contents](#) (<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#contents>)

To calculate sea level using table 1, add the allowances for the appropriate one of the 6 geographical areas:

- up to 2035, use the mm for each year rates for the appropriate geographical area, starting from the present day extreme sea levels from [Coastal design sea levels – coastal flood boundary extreme sea levels \(2018\)](https://data.gov.uk/dataset/73834283-7dc4-488a-9583-a920072d9a9d/coastal-design-sea-levels-coastal-flood-boundary-extreme-sea-levels-2018) (<https://data.gov.uk/dataset/73834283-7dc4-488a-9583-a920072d9a9d/coastal-design-sea-levels-coastal-flood-boundary-extreme-sea-levels-2018>)
- from 2036 to 2065, get the increase in sea level by adding the number of years on from 2035 (to 2065), multiplied by the respective rate shown in [table 1](https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#table-1) (<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#table-1>) for the appropriate geographical area – if the whole time period applies use the cumulative total
- treat time periods 2066 to 2095 and 2096 to 2125 as you would 2036 to 2065

Where it is appropriate to apply a [credible maximum scenario](https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#credible-maximum-scenarios) (<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#credible-maximum-scenarios>), use the H++ allowance. There is no H++ value for sea level rise beyond 2100.

H++ sea level rise allowance

For the change to relative mean sea level use the H++ scenario of 1.9m for the total sea level rise to 2100.

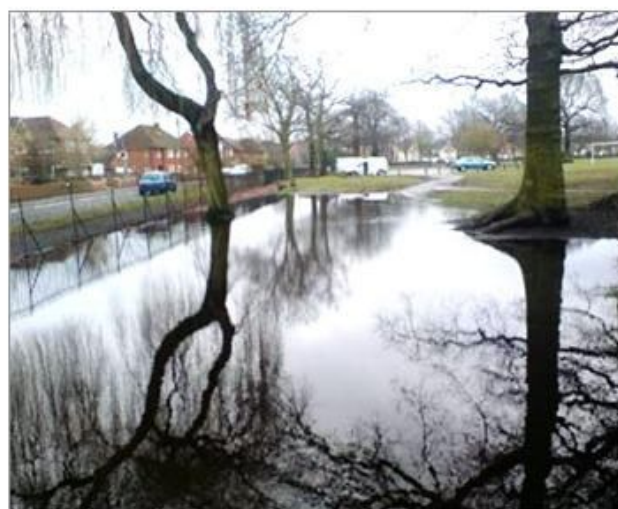
How to use a range of allowances to assess flood risk

To help you decide which allowances to use to address flood risk for a development or development plan allocation, consider the:

- likely depth, extent, speed of onset, velocity and duration of flooding for each allowance of climate change over time

[↑ Contents](https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#contents) (<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#contents>)

Hampshire County Council Preliminary Flood Risk Assessment



April 2011



Hampshire
County Council

www.hants.gov.uk

Preliminary Assessment Report

Executive Summary

This report has been prepared by Hampshire County Council as Lead Local Flood Authority (LLFA) to assist in meeting its duties to manage local flood risk and to deliver the requirements of the Flood Risk Regulations 2009.

The initial stage of the Flood Risk Regulations requires the completion of a Preliminary Flood Risk Assessment which comprises this document (Preliminary Assessment Report) and the associated annexes.

The Preliminary Flood Risk Assessment provides a high level overview of flood risk from a variety and combination of flood sources including surface water, ground water and ordinary watercourses as well as the interaction with main rivers, the sea and reservoir flooding. Some work has already been carried out on surface water management plans in Eastleigh, Basingstoke, Rushmoor and the chalk catchment (ground water flooding risk area), which was funded by specific grants from Defra. These areas were selected on the basis of relative priority as advised by Defra at the time.

The Environment Agency has set out a national methodology and supporting mapping for the identification of areas of 'significant risk' which require further works. This work will consist of flood and hazard mapping and a flood risk assessment to standards set by European Union requirements. None of the areas identified in the high-level national assessment carried out by the Environment Agency as at 'significant risk' are within Hampshire. Therefore this report fulfils the requirements of the regulations at present.

Although there are no nationally significant flood risk areas within Hampshire, this report and the data collected will be used to identify local flood risk areas, and areas where further information is required to better determine and understand local flood risk across Hampshire. In turn, this will be used to inform the Local Flood Risk Management Strategy required under the Flood and Water Management Act 2010 and to identify additional areas where surface water management plans may be required.

Contents

1	Introduction	1
1.1	Aims and Objectives	1
1.2	Sources of Flood Risk	1
1.2.1	Fluvial	2
1.2.2	Pluvial	2
1.2.3	Sewer	2
1.2.4	Groundwater	2
1.2.5	Coastal	3
1.2.6	Reservoir	3
2	The Study Area	3
2.1	Hydrology	4
2.1.1	Thames River Basin District	4
2.1.2	Southern River Basin District	5
2.1.3	South West River Basin District	6
2.2	Geology	8
2.3	Environmental and Heritage	10
3	Flood Risk Management Authorities and their Responsibilities	14
3.1	Hampshire County Council (and other LLFAs)	14
3.2	Second Tier Authorities	14
3.3	Environment Agency	15
3.4	Water Companies	16
3.5	Riparian Owners	17
3.6	Other	17
3.7	Governance	17
3.8	Scrutiny and Approval Process	19
3.9	Communication	19
4	Methodology and Data Review	20
4.1	Information Availability	20
4.1.1	Local Authority Data	20
4.1.2	Water Company Data	20
4.1.3	Environment Agency Data	21
4.2	Data Limitations	21
4.2.1	Inconsistent Recording Systems	21
4.2.2	Incomplete Datasets	21
4.3	Quality Assurance, Security and Data Restrictions	21
5	Past Flood Risk	22
5.1	Introduction	22
5.2	Historic Flooding	22
5.3	Consequences of Past Floods	23
6	Future Flood Risk	24
6.1	Introduction	24
6.2	Locally Agreed Surface Water Information	24
6.3	Potential Consequences of Future Flooding	27
6.4	Climate change and long term developments	29
6.4.1	The Evidence	29
6.4.2	Key Projections for South East River Basin District	29
6.4.3	Implications for Flood Risk	29
6.4.4	Adapting to Change	30
6.4.5	Long Term Developments	30
6.4.6	Major Developments and Flood Risk	30
7	Identification of Flood Risk Areas	31
8	Conclusion	31
9	Next Steps	32
10	References	32

Figure 1 - Hampshire County Council Location Plan.....	4
Figure 2 – River Catchments	7
Figure 3 – Geology of Hampshire.....	9
Figure 4 – Areas of Environmental Significance – International Designations.....	11
Figure 5 – Areas of Environmental Significance – National Designations.	12
Figure 6 – Areas of Environmental Significance – Local Designations.	13
Figure 7 – District and Borough Boundaries.....	15
Figure 8 – Environment Agency River Basin Areas.....	16
Figure 9 – Water Company Boundaries.....	17
Figure 10 - Hampshire County Council Governance Arrangements	18
Figure 11 – Flooding Incidents within Hampshire.....	23
Figure 12 – Areas Susceptible to Surface Water Flooding Map	25
Figure 13 – Flood Map for Surface Water and Localised Flooding Incidents.....	26
Figure 14 – Clusters of Places above the Flood Risk Thresholds in Hampshire.....	28
Annex 1	Past Floods
Annex 2	Future Floods
Annex 3	Review Checklist

1 Introduction

The Flood Risk Regulations came into force in December 2009, transposing the EU Floods Directive into law. These regulations place duties on Lead Local Flood Authorities (LLFAs), defined as County and Unitary authorities, to assess flood risk from surface water, groundwater and ordinary watercourses within their respective boundaries and to publish the result of that assessment in the form of this Preliminary Flood Risk Assessment. The Environment Agency also has duties under these regulations relating to their existing responsibility for main rivers and the sea and also relating to their overview role for flood risk in general.

Flood risk is defined by Regulation 3 of the Flood Risk Regulations as *"a combination of the probability of the occurrence with its potential consequences"*.

The main duty for LLFAs under the regulations is the preparation of a Preliminary Flood Risk Assessment. This is an initial screening exercise to review historic and future local flood risk from all sources of flooding. If this assessment highlights areas of significant risk, known as Flood Risk Areas which are defined using national criteria set by the Environment Agency, further investigation is required including the preparation of flood hazard and risk maps, and also flood risk management plans. It is also used to identify locations where the national criteria is not met but local flood risk highlight the need for further investigation to be carried out in the form of surface water management plans.

Defra have defined a surface water management plan (SWMP) as "a framework through which key local partners with responsibility for surface water and drainage in their areas work together to understand the causes of surface water flooding and agree the most cost effective way of managing surface water flood risk."

1.1 Aims and Objectives

The Preliminary Flood Risk Assessment consists of a Preliminary Assessment Report and Annexes identifying areas of significant historic and future flood risk. This report assesses local flood risk from all sources of flooding in order to identify Flood Risk Areas which will require further investigation. This report will also support the Local Flood Risk Management Strategy, which LLFAs are required to prepare to meet the requirements of the Flood & Water Management Act. This strategy assesses local flood risk and identifies areas for which further investigation is recommended at a local level.

The key stages in undertaking a Preliminary Flood Risk Assessment are as follows:

- Identification of relevant partner organisations and the relevant flood risk data held with each body;
- Development of suitable partnership working, collaboration and governance
- Identification and assessment of historic flood risk information including information on likelihood and consequences;
- Identification and assessment of future flood risk data including information on potential harmful consequences;
- Assessment of all information to inform on the requirement for significant flood risk areas in accordance with the National guidance.

1.2 Sources of Flood Risk

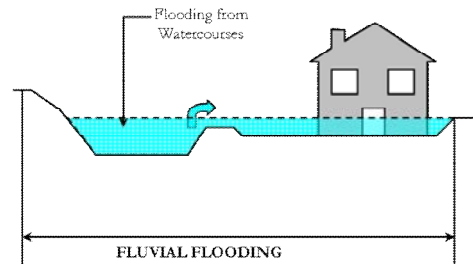
Floods can originate from a variety of sources. The most severe flooding often occurs when sources combine and although flood risk from main rivers and the sea falls under the responsibility of the Environment Agency, it must still be considered if it is a contributing factor

to surface water flooding. The different sources of flooding to be considered under this assessment are as follows.

1.2.1 Fluvial

Fluvial flooding (also known as river flooding) occurs when a watercourse cannot accommodate the volume of water draining into it from the surrounding land. It is generally infrequent and can be predicted to some extent.

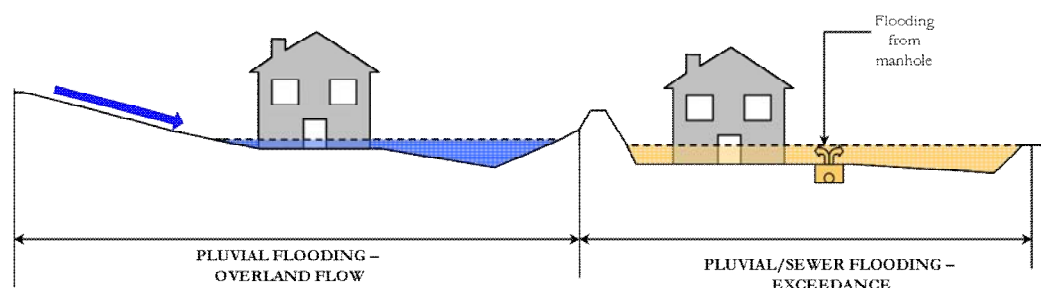
Watercourses are more likely to be overwhelmed when rainwater cannot be absorbed into the land onto which it falls. It might be very steep, water logged, or built over. Rapid melting of snow also leads to river flooding in some cases.



1.2.2 Pluvial

Pluvial flooding (also known as surface water flooding) occurs when heavy rainfall overwhelms the capacity of local drainage (both natural and man-made) and water flows across the ground. The route the water takes and the depth of flooding will depend on local features and can be difficult to predict.

Surface water flooding may also be the result of blockages in the drainage system or high river levels backing up along drainage pipes.

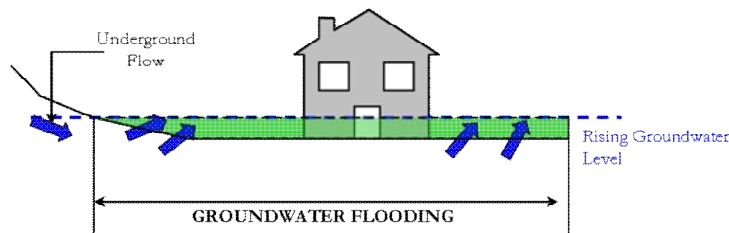


1.2.3 Sewer

Sewer flooding occurs when sewers are overwhelmed by heavy rainfall or when pipes become blocked. In urban areas, surface water flooding and sewer flooding often combine, polluting the floodwater.

1.2.4 Groundwater

Groundwater flooding occurs when water levels in the ground rise above the land surface. This type of flooding is most likely to occur in areas above an aquifer. Groundwater levels within an aquifer generally rise and fall according to an annual cycle, but periods of prolonged rainfall may cause water levels to rise above the land surface. This type of flooding can last substantially longer than surface water flooding with water remaining above ground for weeks or even months.



1.2.5 Coastal

Coastal flooding results from high tides, waves driven by strong winds and surges of seawater caused by storms. The most severe coastal flooding often occurs when storm surges and high waves coincide with high tides.

1.2.6 Reservoir

Reservoir flooding occurs after the failure of the reservoir's walls or earth embankments. This may be caused by erosion due to seepage, overtopping of the dam or by accidental damage to the structure. Reservoir failure is extremely rare in the UK.

2 The Study Area

The study area for the Preliminary Flood Risk Assessment is the area within the administrative boundary of Hampshire County Council. Hampshire is made up of 11 District and Borough authorities; Rushmoor, Hart, Basingstoke and Deane, Test Valley, Winchester City, East Hampshire, New Forest, Eastleigh, Fareham, Havant and Gosport.

In addition to these 11 authorities, the two unitary authorities of Southampton and Portsmouth are also situated within the geographic county of Hampshire (though not within the County Council area). Hampshire is also in close proximity to the Isle of Wight unitary authority which is separated from the Hampshire coast by the Solent. Bordered to the south by the Solent, Hampshire is also bordered to the west by Dorset and Wiltshire, Berkshire to the north, and Surrey and West Sussex to the east. Figure 1 shows the geographical location of Hampshire and Figure 7 highlights the locations of each of the District and Borough Councils.

Hampshire is one of the largest counties in England, covering 3,769 square kilometres. Including the two cities of Portsmouth and Southampton, Hampshire has a population of just over 1.7 million (HCC Small area population forecasts 2009).

Over eighty percent of Hampshire's total population live in urban areas, although only fifteen per cent of the county is classified as urban. Eighty five percent of Hampshire is classified as rural, with significant areas subject to international and national environmental designations including two national parks (Urban Rural Classification, Office of National Statistics 2004). Within Hampshire's administrative area there are 251 Parish Councils.

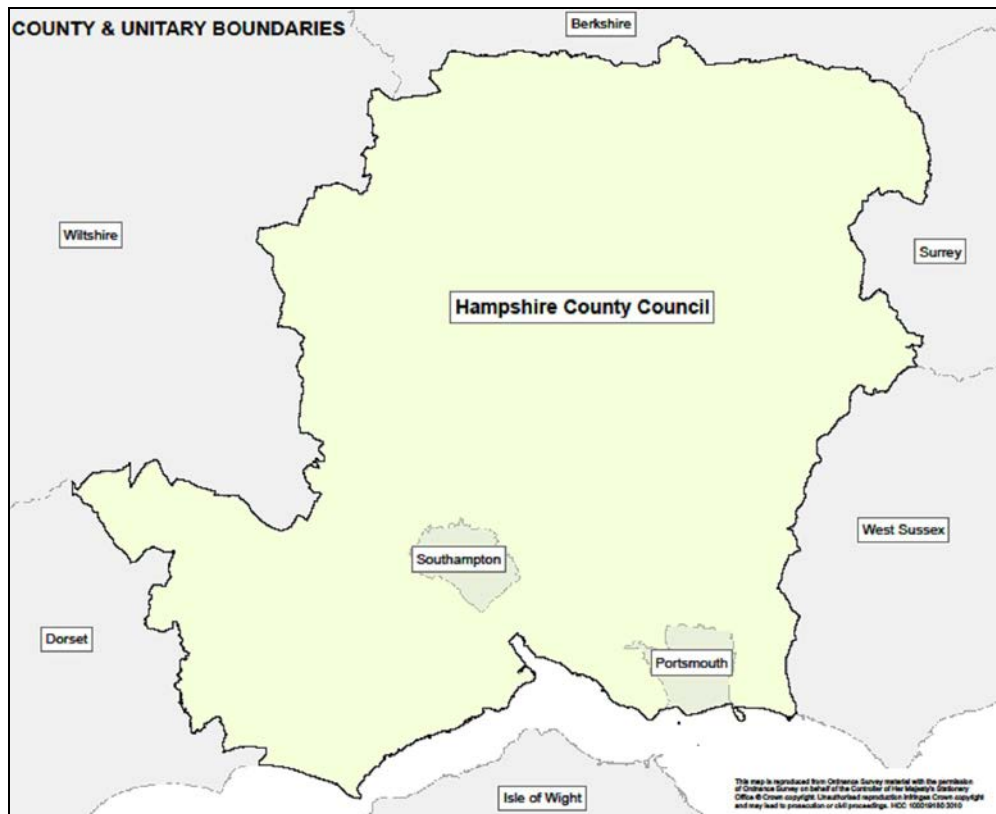


Figure 1 - Hampshire County Council Location Plan

2.1 Hydrology

Hampshire is covered by 17 separate river catchments all with slightly different characteristics according to the topology and geology of the area. For administrative purposes, these catchments are grouped into three River Basin Districts as defined by the Environment Agency under the Water Framework Directive. Hydrology is an important aspect in flood risk management as different catchments respond in different ways with speed and likelihood of flooding varying considerably in different areas. Figure 2 illustrates the different river catchments with the River Basin Districts shown in Figure 8.

2.1.1 Thames River Basin District

Loddon

The Loddon catchment covers the administrative areas of Basingstoke & Deane Borough, Rushmoor Borough and Hart District and tends to respond quickly to rainfall due to the clay beneath it. There are some relatively large urbanised areas which mean flash flooding can occur with a risk to property and people. The Loddon river has undergone many alterations over time and in places is heavily engineered, particularly within urban areas.

Kennet

This catchment only affects Basingstoke & Deane Borough and is generally underlain by a mixture of clay, limestone and sand making it prone to rapid surface water run-off and flash flooding. However due to this being a rural area there are fewer properties at risk than in the urban areas of the Loddon catchment.

Wey Addlestone Bourne

This catchment covers the northern part of East Hampshire District and is underlain with chalk and sands, reducing the likelihood of flashy flood conditions. This means that the rivers respond slower to rainfall giving more time between the time of rainfall to potential flood conditions. Much of this area is rural with Alton being the main town along the line of the river. Due to the rural nature of the catchment there are substantial floodplains and storage areas, which help to reduce the impacts of flooding.

2.1.2 Southern River Basin District

Itchen

This river catchment is largely dominated by groundwater flow due the bedrock geology that underlies the area. It covers Basingstoke & Deane Borough, Winchester City and Eastleigh Borough. The River Itchen is considered one of the best chalk streams in the world with excellent diversity and water quality, meaning it is covered by several protective designations; Special Area of Conservation (SAC) and Site of Special Scientific Interest (SSSI). The groundwater flowing through the chalk provides a stable flow through the catchment, making the response of river levels to rainfall in the upper section slower than the lower section of the catchment. Winchester is heavily affected by this river due to canals, mills and sluices being placed along the course of the river. Due to substantial modifications made between Winchester and the mouth of the river the flood defences already in place will be put under further strain in the future as a result of climate change and sea level rise.

Test

Test Valley is the main borough affected by the Test catchment, and is another that is highly controlled by the groundwater in the chalk.. It also affects the northern part of the New Forest where several smaller tributaries join the River Test. The Test is a protected SSSI area for the same reasons as the River Itchen, making this an important area for conservation. The upper and middle sections of the catchment can be prone to groundwater flooding when levels are high after prolonged rainfall. The main areas of concern are all within Test Valley Borough, such as Andover in the north and towns which straddle the river such as Stockbridge. The lower part of the Test is predominantly clay and tends to be more heavily urbanised which leads to fast surface run-off from heavy rainfall. This in turn may lead to the flood risk increasing over time due to more frequent and intense storms.

Hamble

The upper half of the catchment within Winchester City is relatively rural and is underlain by chalk so there are few properties at risk of flooding in this area. However the lower half, in Eastleigh Borough, is highly urbanised meaning that surface water flooding often occurs due to the drainage network and watercourse being overwhelmed. There are concerns that the capacity of the existing surface water drainage system will be exceeded if further major developments take place.

Meon

This is a very small, narrow catchment which runs from East Hampshire District through the rural section of Winchester City and finally enters the Solent in Fareham Borough. The lower section is protected from tidal inflow by a tidal sluice, whilst the upper half of the river flows over chalk meaning very little fluvial flooding occurs as most rainfall is directly absorbed into the ground.

Wallington

This catchment covers a large area and also includes several smaller streams, such as the Lavant Stream. East Hampshire District, Winchester City, Fareham Borough, Gosport Borough and Havant Borough are all affected by this catchment. It is typically prone to surface water flooding

rather than fluvial flooding due to its large built up areas along the coast, though increased groundwater from the upstream chalk aquifers during the winter and spring months can also have an effect, as can tidal influences along the coastline.

Rother

This catchment is part of the Arun catchment and flows through the gentle hills of the South Downs in East Hampshire District to low lying land in West Sussex. Petersfield is the only main town in this catchment that has suffered from groundwater flooding in the past due to the underlying chalk bedrock. However the majority of this catchment is rural so few properties are at risk.

New Forest

Only New Forest District is affected by this catchment and it either drains into the Solent or Southampton Water. This catchment is largely rural with very little development, meaning few properties are at risk. The two main rivers are the Lymington River and Beaulieu River, both of which flow over relatively impermeable ground meaning there is a higher risk of surface water flooding compared to fluvial flooding. Typically this catchment has many smaller braided rivers because of the underlying geology. The coastline watercourses can be affected by high tide levels, which is predicted to become a more prominent problem in the future due to sea level rise. Climate change may also have a high impact on the number of flash floods that occur in this catchment with a predicted increase in stormy conditions.

2.1.3 South West River Basin District

Avon

This catchment covers the west side of the New Forest District and receives significant flows from the chalk aquifers underlying Salisbury Plain. It is mainly groundwater flooding that affects this area, with flood events often being prolonged. The lower section of this catchment runs over relatively impermeable rocks and this can lead to a high surface run-off rate during the winter months. Fordingbridge and the villages that line the River Avon in the lower section of the catchment are at the highest risk of fluvial flooding. However, due to most of this catchment's being within the New Forest Park and relatively sparsely populated, not many properties are affected.

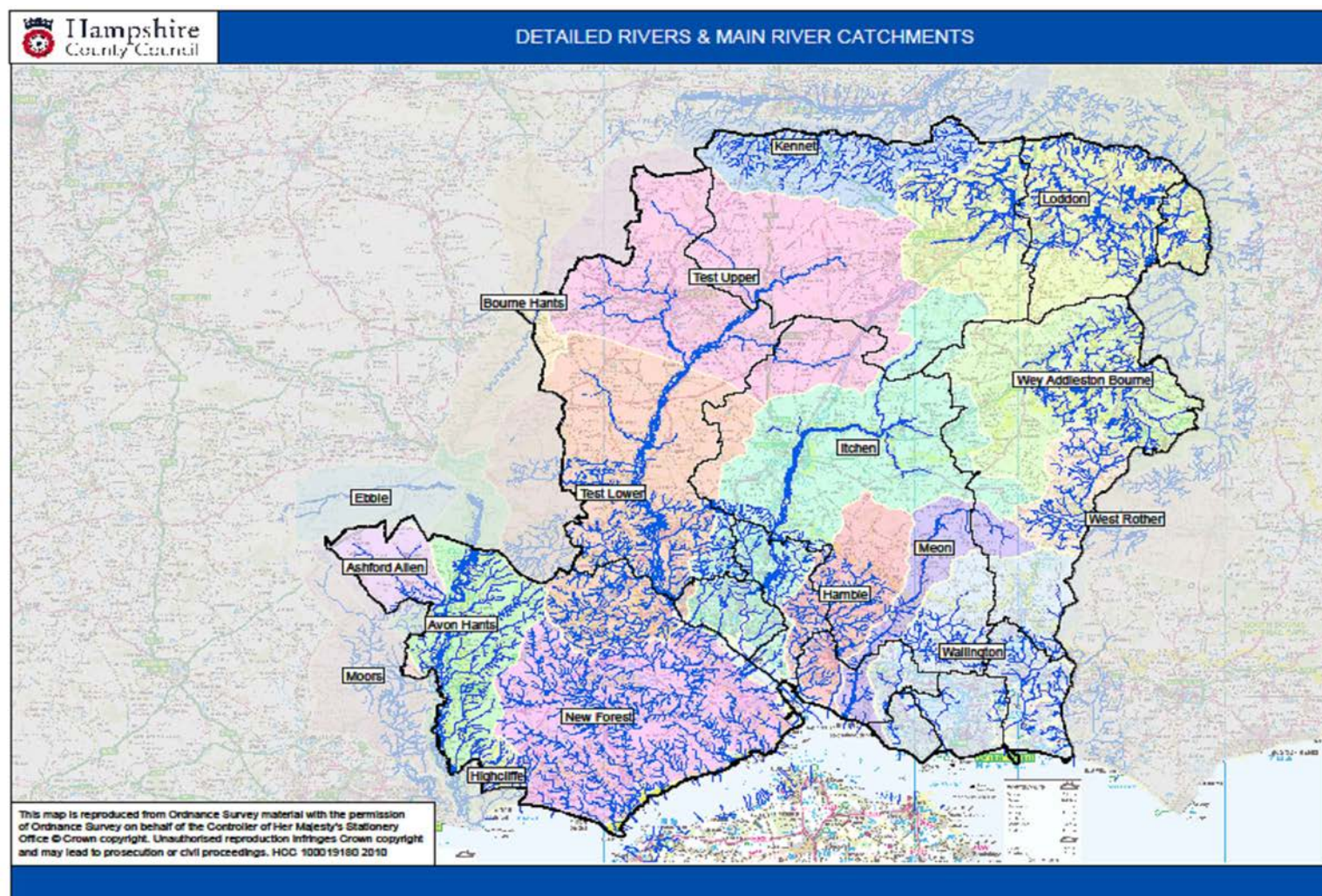


Figure 2 – River Catchments

2.2 Geology

Figure 3 illustrates the varying bedrock geology across Hampshire. When considering flooding, permeability is the critical factor affecting the rate at which water can soak into the ground and is therefore essential to consider the bedrock geology.

Permeable - Strata through which water can pass either via a network of spaces between particles or along bedding planes, cracks, and fissures. The main permeable strata in Hampshire is chalk.

Impermeable - Strata without significant pore spaces, such that fluid will not flow through. The main impermeable strata in Hampshire are clays and mudstones.

Most of the groundwater flow through the aquifers is directed to the Rivers Test, Itchen and Meon. During prolonged periods of wet weather the aquifers tend to become saturated and this is what causes groundwater flooding. This is a serious problem in Hampshire because a large proportion of the county is underlain by chalk.

The New Forest, north Basingstoke, Rushmoor, Hart and the southern coastline have a more complex geology where clays, gravels and mudstones are interbedded with each other, creating much thinner layers that alternate between permeable and impermeable. This leads to water running along the permeable layers but unable to pass through the impermeable ones. These areas tend to be less affected by groundwater flooding due to the impermeable layers inhibiting the water from rising back to the surface. However it can increase the likelihood of high surface water run-off because of a lower absorption rate.

There is a close relationship between the bedrock geology and the locations of watercourses as can be seen in Figure 2. Where land is underlain by the more permeable chalk there tends to be major rivers such as the Itchen and Test as most of the water runs through the aquifers to reach these watercourses. Within areas such as north Basingstoke, Hart, Rushmoor, the south coastline and the New Forest there are smaller watercourses as less of the rainfall goes into groundwater and more travels across the surface.

It is essential that the bedrock geology is assessed and understood as the way flooding occurs and the possible mitigation options will vary dramatically depending on the area's underlying bedrock geology.

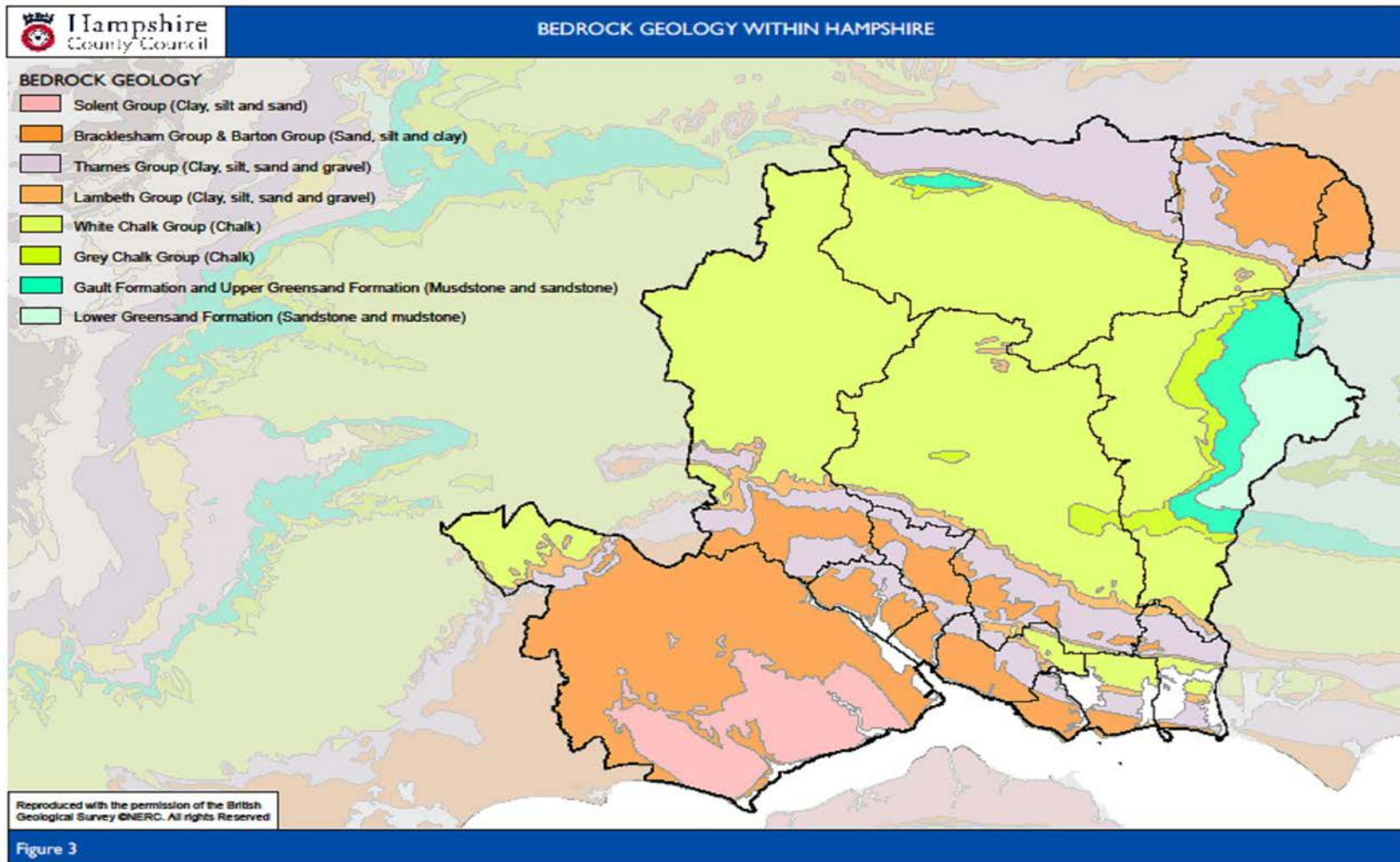


Figure 3 – Geology of Hampshire

2.3 *Environmental and Heritage*

Approximately 83% of the county is classed as Rural under the 2004 Rural/Urban Classification (Communities and Local Government 2004). There is a clearly defined difference between the urbanised southern part of Hampshire and the central rural areas as only 17% of Hampshire's population live within these rural areas.

This area includes two National Parks namely the New Forest National Park and newly designated South Downs National Park. It also includes three Areas of Outstanding Natural Beauty which cumulatively cover a total area of 1,445 sq km, which is about 38% of the total county area (Hampshire County Council Integrated Character Assessment 2010)

Hampshire has a remarkably rich and varied landscape and a great diversity of habitats from ancient woodlands and wildflower meadows, to heathlands and chalk streams, river valleys and coastal habitats. Hampshire also includes the New Forest – the greatest area of semi wilderness left in lowland England. Whilst Hampshire's lowland heaths account for almost 30% of the total UK resource it is also one of the most wooded counties in England and holds 5% of the UK's ancient semi-natural woodland. The chalk fed rivers of the Itchen, Test and Meon are internationally recognised for their rich and diverse habitats. (Hampshire Biodiversity Information Centre)

All these habitats support an impressive array of wild plants and animals. Hampshire has the greatest diversity of species of any county in England.

Britain's most valuable wildlife habitats – designated as Sites of Special Scientific Interest (SSSIs) and protected by law – cover 14.5% of the county, about twice the national average. A further 8.7% of Hampshire is covered by county Sites of Importance for Nature Conservation (SINCs). Outside these specially recognised areas much of Hampshire's rural landscape, and many urban areas, are also rich in biodiversity (Hampshire Biodiversity Information Centre). The designated areas are as shown in Figures 4 – 6.

Hampshire's historic environment has been formed by the physical impact of human activity from earliest prehistory to the late twentieth century. It includes archaeological sites, historic buildings, historic landscape and townscape, historic parks and gardens, and battlefield sites. It is a defining part of Hampshire's identity. The historic environment is valued in its own right, and also supports recreation, education and tourism.

Hampshire has a rich archaeological heritage with nearly 800 Scheduled Monuments, 372 of which are located within areas identified by the Environment Agency as susceptible to surface water flooding. Scheduled Monuments are nationally significant sites that are protected by law and any work affecting them and their setting may require Scheduled Monument Consent so the advice of English Heritage must be sought. In addition, there are a further 1000 archaeological sites countywide that although not Scheduled are of national significance, nearly 400 of these are located within the identified pluvial flood risk areas.

As well as these nationally significant sites there are many thousands of other known archaeological sites county wide, at least 1200 of which are located in the pluvial flood risk areas.

As well as the large number of archaeological sites, Hampshire also has over 14,000 listed buildings and 58 registered parks and gardens. There are also a large number of buildings and designed landscapes that are not designated.

All of the above sites are logged on the Historic Environment Record and this should be checked prior to any works being undertaken as well as seeking advice from Hampshire County Council Archaeological advisors.

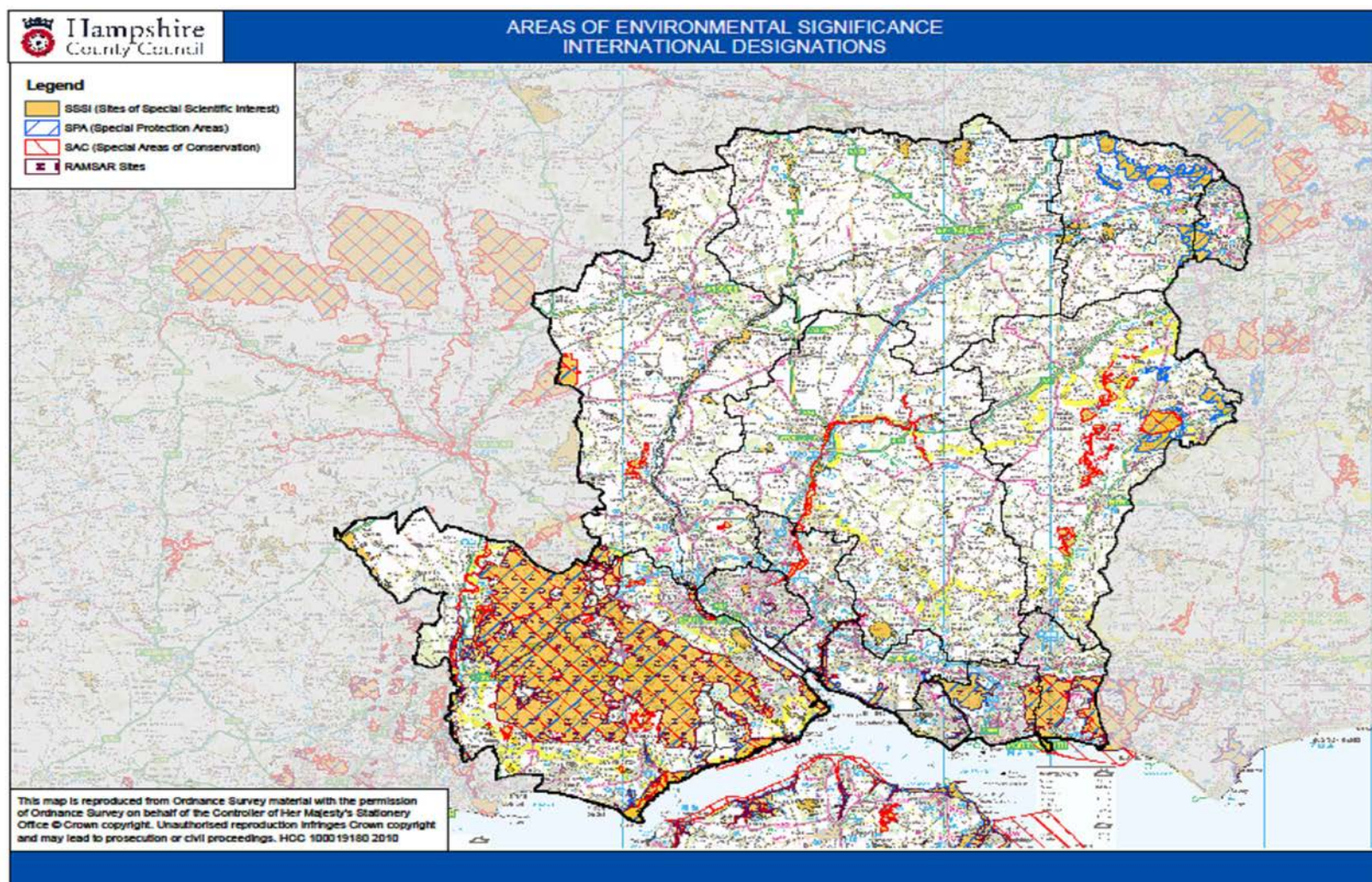


Figure 4 – Areas of Environmental Significance – International Designations.

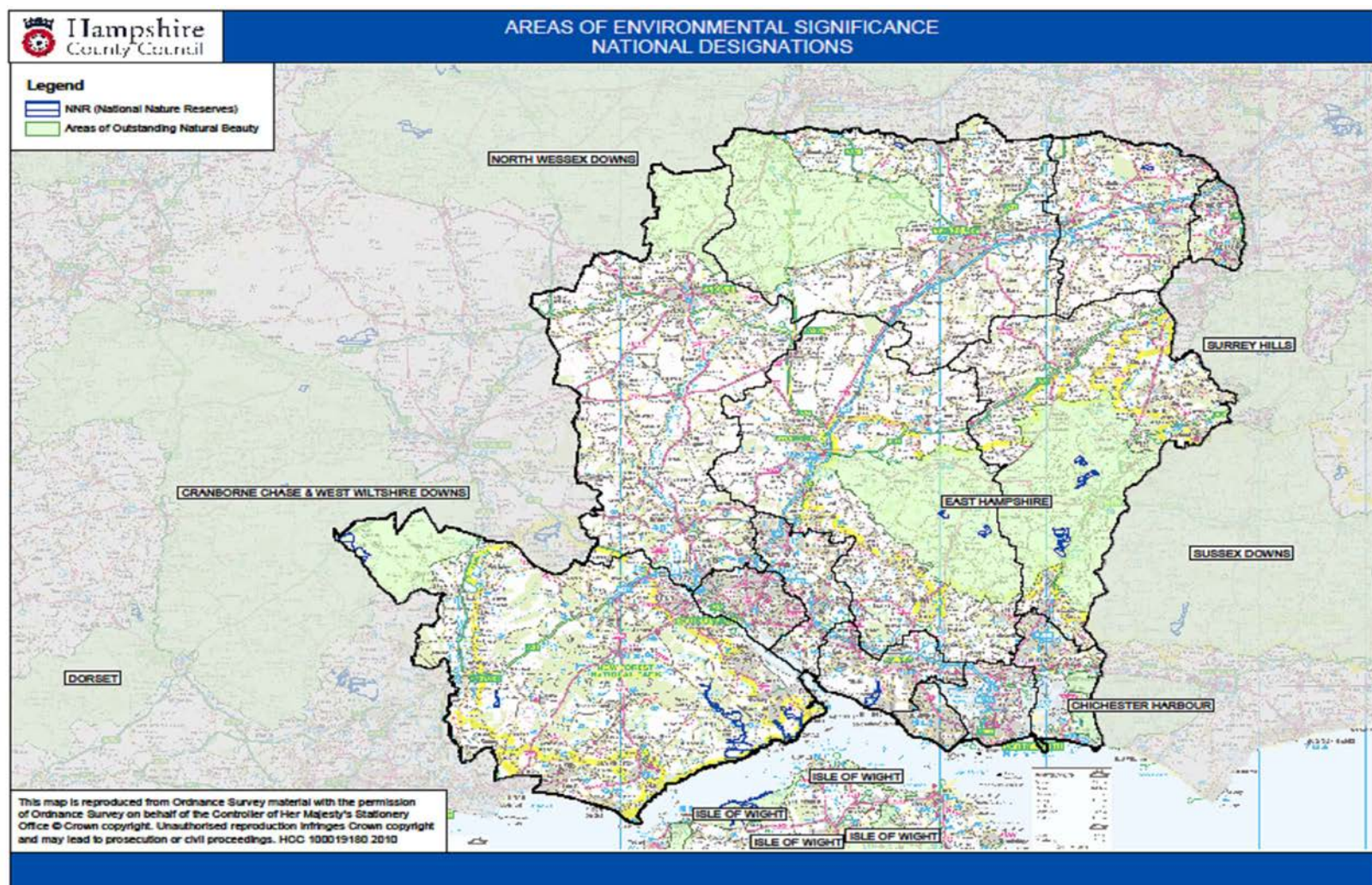


Figure 5 – Areas of Environmental Significance – National Designations.

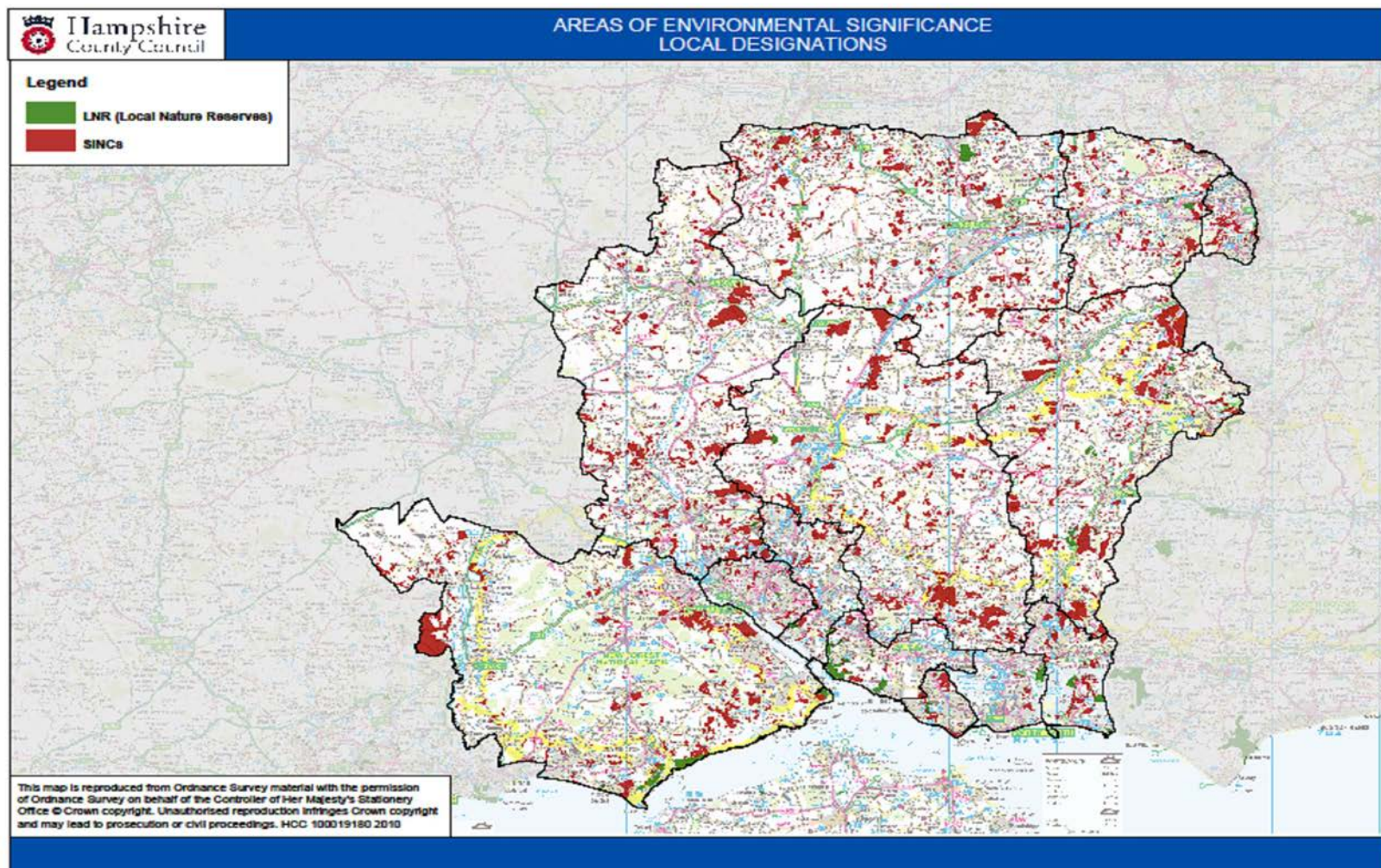


Figure 6 – Areas of Environmental Significance – Local Designations.

3 Flood Risk Management Authorities and their Responsibilities

The key organisations are listed below with a brief description of some of their responsibilities and areas of expertise in relation to Flood Risk Management.

3.1 *Hampshire County Council (and other LLFAs)*

Traditionally, county councils take responsibility for Highway drainage although their remit with respect to flooding and flood risk management is changing rapidly.

Sir Michael Pitt stated in his report on the 2007 floods that “the role of local authorities should be enhanced so that they take on responsibility for leading the coordination of flood risk management in their areas”. This intention was developed in the Flood Risk Regulations and the Flood and Water Management Act, both of which designated upper tier authorities, including Hampshire County Council, as ‘Lead Local Flood Authorities’.

In addition to the ‘lead’ role, there are a number of other responsibilities for LLFAs which include the preparation of a local strategy for flood risk management, investigating flood incidents, maintaining a register of assets and features, and other roles which will develop as the Act becomes fully enabled.

3.2 *Second Tier Authorities*

Hampshire contains 11 second tier Authorities, as shown on Figure 7. These are designated as ‘local drainage authorities’ under the Land Drainage Act 1991 and as Risk Management Authorities under the Flood and Water Management Act.

District and Borough Councils have a number of permissive powers under the Land Drainage Act for prevention and mitigation of flood damage from ordinary watercourses as well as responsibilities for managing flood risk enshrined in planning legislation.

To enable them to deliver this function they have powers to:

- Implement works to prevent, mitigate or remedy flood damage subject to consent by the Environment Agency;
- Serve notice on owners requiring them to remove obstructions from ‘ordinary watercourses’ in order to secure a proper flow.

They also now have a duty to co-operate with LLFAs to develop local flood risk strategies and to share flood risk information.

As well as these permissive powers and duties, some councils have kept records of flood events and carried out both maintenance and new works within their area although the extent of these activities varies considerably between councils due to variations in the technical resource and capacity available.

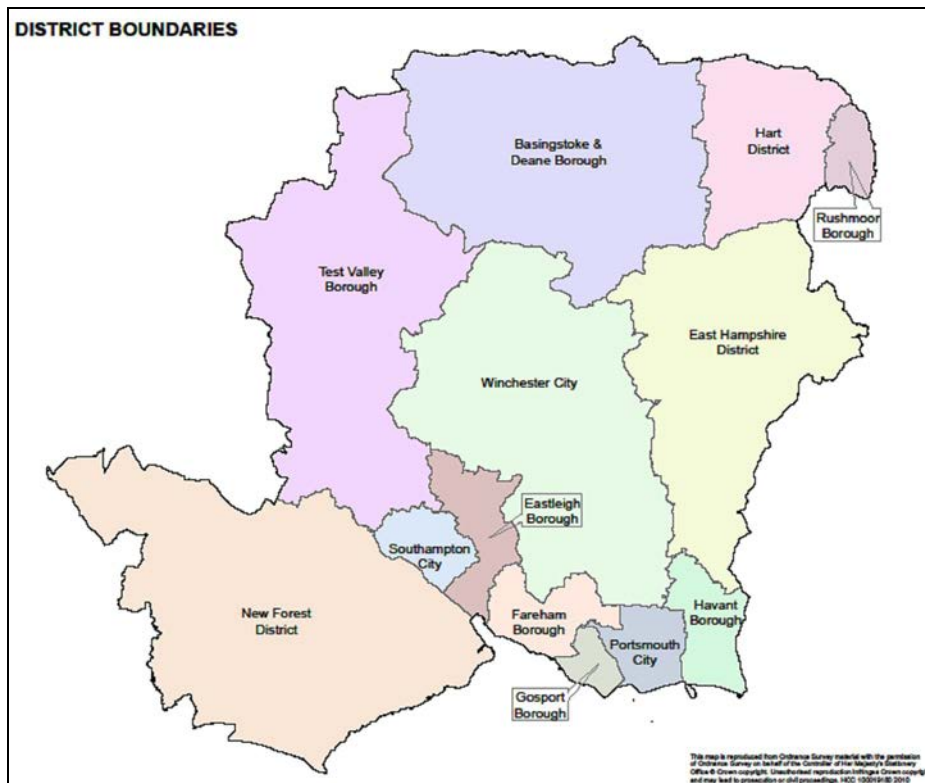


Figure 7 – District and Borough Boundaries

3.3 *Environment Agency*

Generally the Environment Agency has a supervisory role over all aspects relating to flood defence with a more specific role to:

- Exercise powers to carry out improvements or maintenance to designated 'main rivers'.
- Act as a regulating authority for works and activities in and alongside main rivers
- Influence, through the planning process, land use and development particularly within flood plains.
- Produce flood risk mapping and manage historical flood records and data.
- Install and operate flood warning systems
- Protect and conserve of the natural environment whilst carrying out flood risk management activities.

Hampshire County is included within three of the Environment Agency's published Catchment Flood Management Plans (CFMPs) which consist of the Thames, Southern and South West regions as shown in Figure 8. CFMPs give an overview of the flood risk across each river catchment. They recommend ways of managing those risks now and over the next 50-100 years.

The Environment Agency also produce River Basin Management Plans (RBMPs) for each river basin district within the UK in accordance with the European Framework Directive. For Hampshire, these River Basin Districts consist of Thames, South East and South West. The RBMPs aim to protect and improve the water environment in the river basin. They describe the main issues and set out the actions needed to meet the objectives for each river basin district. RBMPs are produced on a six yearly cycle with the current plans due to be reviewed in 2015.

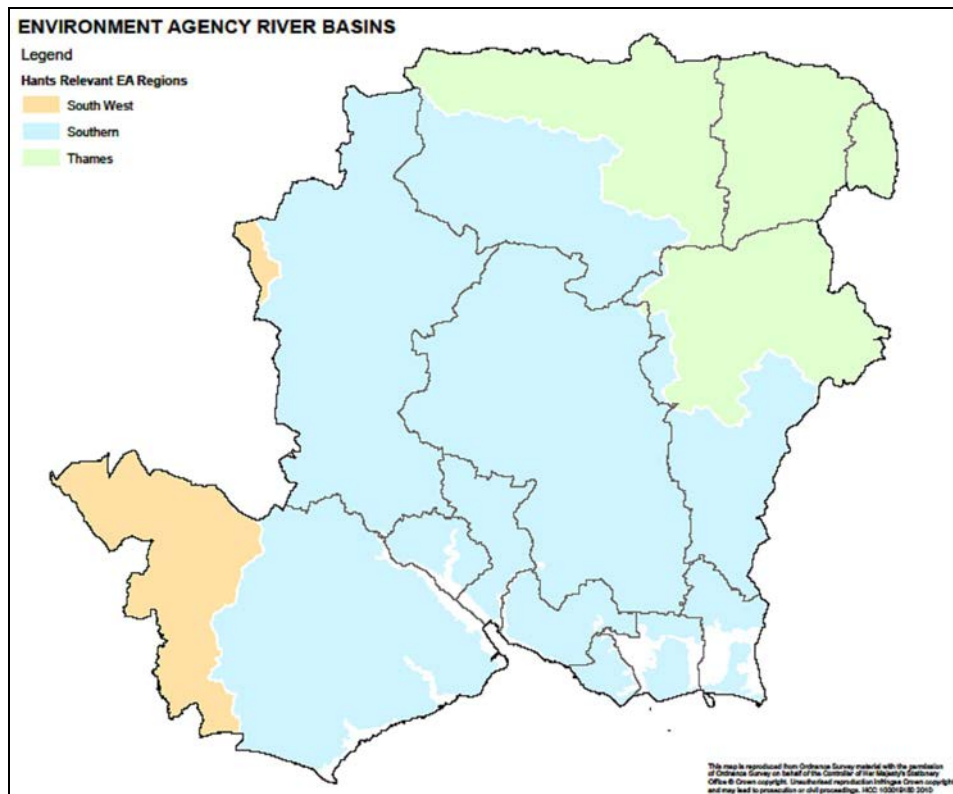


Figure 8 – Environment Agency River Basin Areas

3.4 Water Companies

There are a several water companies in Hampshire with responsibility for public water supply and sewerage. Every five years, water companies in England and Wales are required to produce a Water Resources Management Plan that sets out how they aim to meet predicted demand for water over a 25-year period.

Water Companies have a more formal role in the management of surface water as they are a statutory consultee for Sustainable Drainage Approvals. They are also required to co-operate and share flood risk information with the LLFA. Within Hampshire there are three water companies with a responsibility for sewerage and six companies with water supply responsibilities as shown in Figure 9.

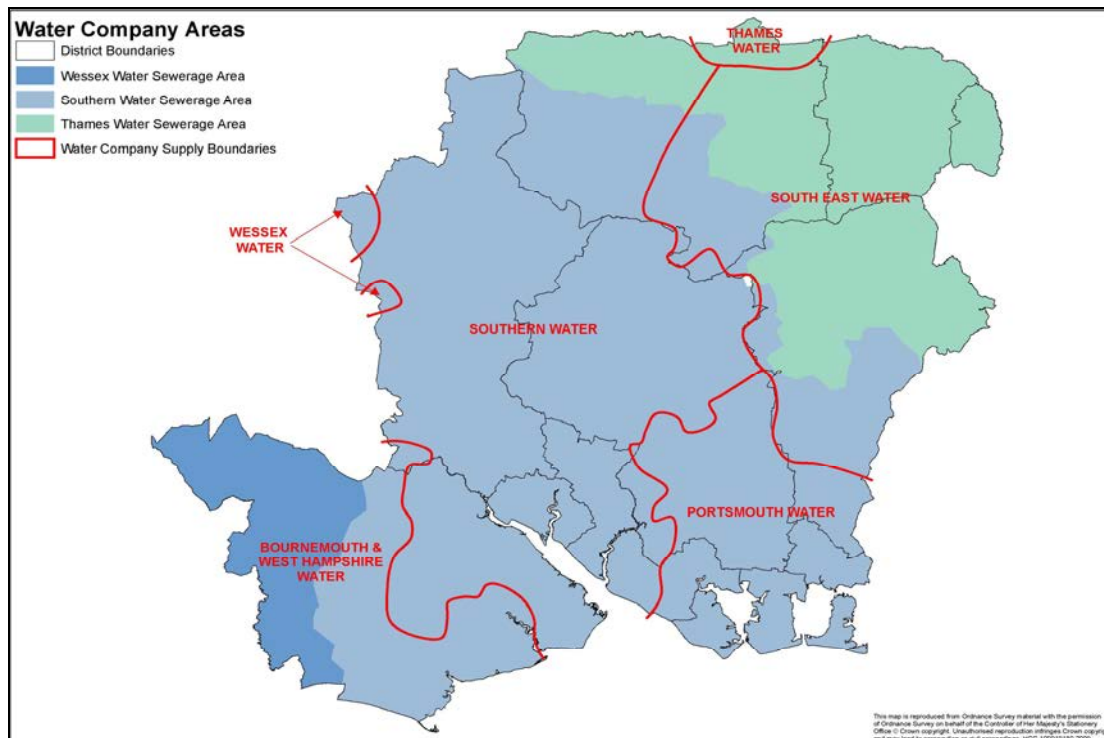


Figure 9 – Water Company Boundaries

3.5 *Riparian Owners*

Landowners with a watercourse passing through or adjacent to their land (riparian owners) retain the duties and responsibilities for these watercourses set out in the Land Drainage Act 1991.

3.6 *Other*

There are other organisations with a very limited responsibility for flood risk on their private property. These groups will be identified as part of the Flood Risk Assessment process where their landholdings are shown to be at risk.

3.7 *Governance*

As the LLFA the County Council must work alongside a number of partner and stakeholder organisations in fulfilling its responsibilities, to ensure effective and consistent management of local flood risk and to contribute to the provision of a coordinated and holistic approach to flood risk management across the county

The County Council has sought to engage stakeholders and partners from the following organisations in the preparation of the Preliminary Flood Risk Assessment:

- the eleven district and borough councils in Hampshire
- the Environment Agency
- water companies covering Hampshire
- the Hampshire Association of Local Councils (HALC)
- the Hampshire and Isle of Wight Planning Officers' Group
- Hampshire Fire and Rescue Service
- Hampshire Constabulary

A diagram illustrating the working arrangements and structure in Hampshire is provided in Figure 10 and a brief description of the role of each group or partnership is provided below.

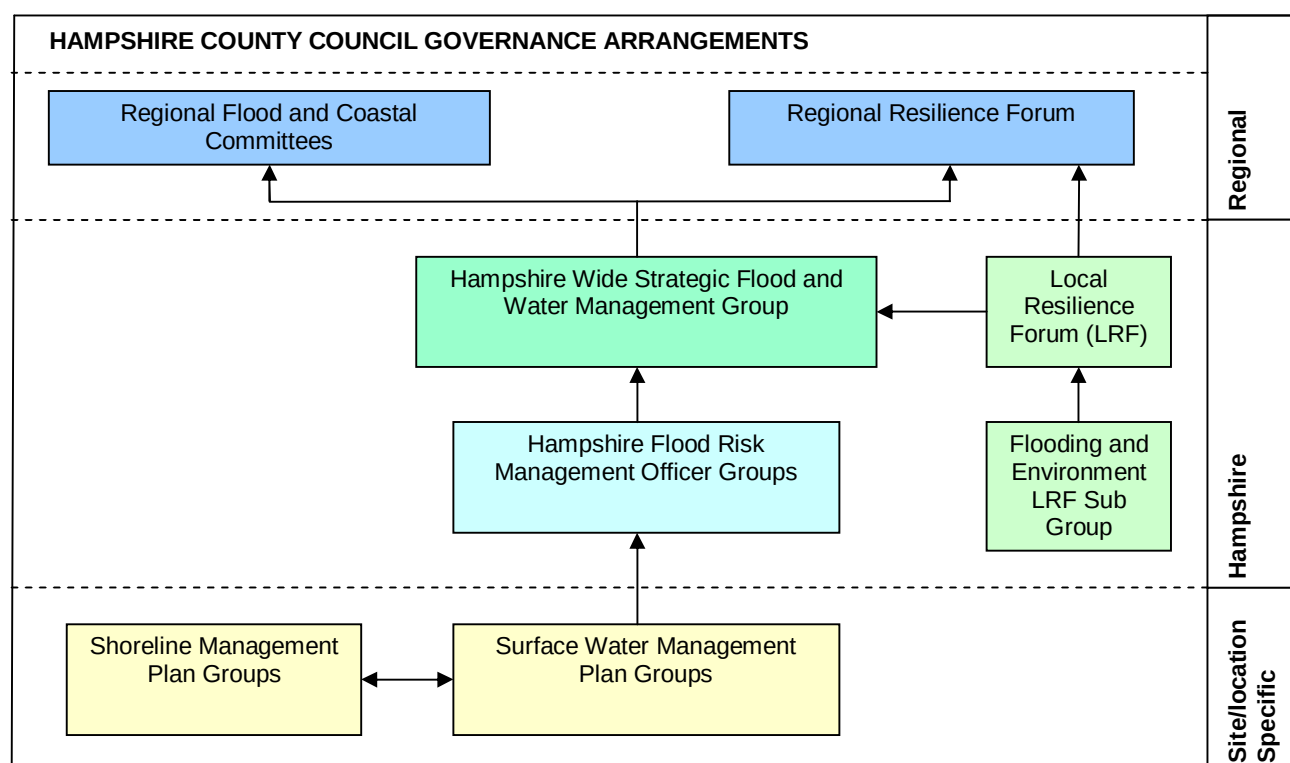


Figure 10 - Hampshire County Council Governance Arrangements

Regional Flood and Coastal Committees

The Regional Flood and Coastal Committees guide the Environment Agency's flood and coastal erosion risk management activities in their region including raising the local levy and scrutiny of the Local Flood and Coastal Erosion Risk Management Strategy and Preliminary Flood Risk Assessments prepared by LLFAs. Hampshire is covered by three Committees; Southern, Thames and Wessex.

Local Resilience Forum and Sub Group

The LRF is responsible for the development, maintenance and testing of plans and procedures for major emergencies and incidents in Hampshire, including flooding. Flooding and Environment LRF Sub-Group is an umbrella role for all related issues such as Pitt, review flood plans and reservoir inundation.

Hampshire Strategic Flood and Water Management Group

The Hampshire Strategic Flood and Water Management Group is chaired by Hampshire County Council as the Lead Local Flood Authority and comprised by partners and stakeholders in order to ensure a holistic and joint approach in discharging responsibilities under the Flood and Water Management Act and Flood Risk Regulations.

Hampshire Flood Risk Management Officer Group

This group is a multi agency technical group which oversees the development of surface water management plans, the Preliminary Flood Risk Assessment and other technical aspects of the Flood and Water Management Act. It enables all stakeholders to meet and discuss any issues within the relative organisations and to support the Strategic Flood and Water Management group.

Surface Water Management Plans Groups

The surface water management plan groups are multi-agency groups set up for each area in which surface water management plans are being undertaken so that the relevant organisations can meet to discuss and develop the plan for their areas and to ensure that they are fit for purpose. They report back to the Flood Risk Management Officer Group ensuring consistency across all SWMPs carried out within the Hampshire County Council area.

Shoreline Management Plans Groups

Shoreline Management Plans (SMPs) cover discrete areas of coast across Hampshire. SMPs develop policies outlining how the shoreline should be managed in the future. The SMPs and SWMPs are mutually informative.

3.8 Scrutiny and Approval Process

The Preliminary Flood Risk Assessment is critical in the initial assessment of flood risk and will be used to identify areas where further investigation should be undertaken which in turn will inform the Local Flood Risk Management Strategy. As such, it is essential to ensure this process is undertaken with the appropriate level of detail and that all members of the partnership are signed up to the recommendations.

The first internal review of the Preliminary Assessment Report is undertaken in accordance with the County Councils internal review procedures. The Preliminary Assessment Report will undergo scrutiny at a dedicated meeting of the Environment and Transport Select Committee where there is an opportunity for our partners to contribute. Following this, the document will be signed-off by the relevant Executive Member of Hampshire County Council before being submitted to the Environment Agency during June 2011.

Under the Flood Risk Regulations, the Environment Agency have been given the responsibility to collate, assess and publish all of the Preliminary Flood Risk Assessments before submission to Europe. They are required to undertake a technical review, analysing the significant flood risk areas and collating them on a river basin level. When satisfied the Environment Agency will recommend submission of the Preliminary Flood Risk Assessment to the relevant Regional Flood and Coastal Defence Committee for endorsement. Once the RFCC has endorsed the Preliminary Flood Risk Assessment the Environment Agency will finally sign it off before its submission to the European Commission on or by the 22nd December 2011.

3.9 Communication

Hampshire County Council has put in place a communications plan to ensure that Hampshire's residents are informed and made aware of the roles and responsibilities of the Lead Local Flood Authority and its partners. The aims of this are to build up a picture of flood risk areas in the county, to foster two-way communication between residents and the local authorities, to ensure communities know what precautions they can take and how to act responsibly to reduce risks, and to increase understanding of the effects and limitations of flood risk management.

The County Council aims to target all relevant audiences including residents, businesses, landowners, parish and town councils, district and county councillors, partner organisations and local MPs in Hampshire to inform them and raise awareness of flood risk issues. This will be done through a number of channels including the following:

- press
- online
- social media
- council publications
- direct liaison with town and parish councils, MPs and county councillors

4 Methodology and Data Review

4.1 Information Availability

In order to complete an appropriate Preliminary Flood Risk Assessment, it is essential to ensure that all relevant flood risk information has been located, collated and assessed.

There is a considerable amount of information related to flooding held by different organisations, both within the county and also at a national level. This takes various forms, including formal records, reports, mapping and local knowledge.

In order to determine what information is available and identify the data owner a questionnaire was sent to all the relevant stakeholders including local authorities, the Environment Agency and the water companies. In addition, engagement with the public was undertaken to capture information on known local flooding problems.

A review of all information available in the public domain was also carried out. The main source of information for members of the public is the Environment Agency 'what's in your backyard' service which does provide some detail on flood risk.

The public can sign up to the Environment Agency flood warning system although this is not yet sufficiently developed to consider pluvial flood risk and is heavily geared towards fluvial risk.

A summary of the key datasets used as part of this assessment is described below:

4.1.1 Local Authority Data

Within Hampshire, data has been collected on localised flooding incidents. This includes both sites that flood as a result of extreme weather conditions and those where areas have limited drainage or flood protection measures. Flooding from all sources is accounted for.

This data is largely subjective as few records exist and much of the information comes from local knowledge gathered over a period of time. The District Councils were asked to comment on this data, corroborating the details as well as providing additional localised flood risk sites. District Councils hold data collected for the Strategic Flood Risk Assessments, used for planning purposes, and this information was also collected and assessed.

The data is mapped on the County Council's computerised Geographic Information System (GIS). The GIS data itself contains only minimal details on the cause and effect of the flooding but it is linked to a database in which more detail is recorded on each site where known. Recording and storing this in a consistent format enables us to assess and compare the risk of all sites across the county.

4.1.2 Water Company Data

The water companies hold a variety of information relating to their apparatus and function. This includes apparatus location plans, the DG5 register (which records flood incidents relating to capacity overload) and sometimes modelling information where detailed investigation or schemes are undertaken.

The DG5 register is the most useful indication of flooding incidents even though the data can only be provided at a high level either by street or postcode. This information is provided as either an excel file or GIS shape file. A data sharing agreement is required to ensure the information is used correctly.

4.1.3 Environment Agency Data

The Environment Agency has made a number of datasets available for the purposes of flood risk management.

The Areas Susceptible to Surface Water Flooding Map was produced in July 2009. It was produced using a simplistic modelling technique based on a single rainfall event, namely a storm with a 1 in 200 chance of occurring each year, highlighting areas that could be affected by surface water flooding within three different bandings; less, intermediate and more. It does not take into account buildings, drainage or ground permeability. This map should not be used with base mapping of more than 1:50,000 and is not designed to be a detailed representation of areas that could flood.

The Agency produced a more detailed Flood Map for Surface Water issued in November 2010. This uses a more sophisticated modelling technique based on a number of different assumptions for ground permeability, drainage capacity and flow routing around structures. It was created using both a 1:30 and 1:200 annual probability and separates the level of flood risk into areas that could experience flooding in excess of 100mm and 300mm. It should not be used with base mapping of more than 1:25,000 and is not designed to identify individual properties at risk.

Environment Agency guidance suggests that the Areas Susceptible To Surface Water Flooding (2009) map would be more representative of flooding in areas where there is minimal drainage capacity and flat areas with a longer storm duration with the Flood Map for Surface Water (2010) being more suitable in other areas. However, the Environment Agency have stated that local information on flooding should be used to identify the most suitable mapping for specific locations.

Although this data is extremely useful in identifying areas perceived to be at a high risk of future flooding, it requires verification using historic and localised flooding as a base point. This verification process has been carried out within Hampshire, and the Flood Map for Surface Water (2010), particularly within rural areas, is considered to be most suitable and accurate for identifying areas that could be at risk of flooding and that require further investigation.

4.2 Data Limitations

There are a number of limitations with all of the above datasets and these are summarised below.

4.2.1 Inconsistent Recording Systems

Each of the above datasets has used a different methodology to collect and record flood data which has led to difficulties in the analysis and comparison of data. It is intended that for future flooding incidents, a standard template will be used by the LLFA to record incidents to enable the same data to be provided from all parties and to the same standard wherever possible.

4.2.2 Incomplete Datasets

Much of the flooding data has been collected from individuals or as a result of public reports so there will be discrepancies in the amount of data collected from each area and the trigger point for which flooding is recorded.

4.3 Quality Assurance, Security and Data Restrictions

All data collected is subject to quality assurance measures to monitor and record its quality and accuracy. Where feasible, this information is collected or converted into GIS data, which allows the different datasets to be compared. This also allows them to be stored on the corporate GIS system (providing it would not be in breach of data licensing agreements) which is managed to

ensure information is as up to date as possible and allows the relevant people access to the information.

Data security is essential given the range of data confidentiality requirements. As part of the quality assurance records all data classed as sensitive or restricted is highlighted and stored on secure local servers. The quality assurance record also includes information on update requirements and any specific requirements on data usage.

Hampshire County Council as a local authority, is subject to the Freedom of Information Act meaning that if a request is made for this data, it has to be provided within a certain timeframe. The only data that can be withheld is that containing personal or financial information. If data is requested that is held by a third party, the person requesting it is directed to that data owner and the County Council does not release it. This is particularly pertinent to data provided by the water companies.

5 Past Flood Risk

5.1 Introduction

Flooding within Hampshire can occur for a number of reasons. With an extensive coastline, Hampshire is susceptible to coastal flooding. There are a number of communities extremely close to sea level which are most susceptible to tidal influence and potential sea level rise.

Hampshire also has numerous river networks which ultimately discharge into the sea. With a combination of high tides and high river levels, there is a high potential for river or surface water flooding where rivers in flood are unable to discharge into the sea due to high tides.

There is also a large area of chalk bedrock within central Hampshire and this is particularly susceptible to groundwater flooding caused when water held within aquifers under the ground reaches ground level following periods of heavy rainfall.

One particular issue linked with groundwater flooding is the emergence of 'winterbournes'. These are channels that run dry through the summer but become watercourses from the groundwater stored in the aquifer that is forced to the surface during winter. Because they are dry in summer, and sometimes over a longer period dependant on rainfall levels throughout the year, they can be forgotten and poorly maintained giving rise to a potential flooding problem when the water returns. They only occur in areas of chalk bedrock and as such are a key cause of groundwater flooding in Hampshire.

Surface water flooding is also a problem in Hampshire both within urban areas, where there is a high concentration of properties that could be at risk, and in rural areas where there is minimal drainage. In both cases, critical transport routes can be affected. Surface water flooding is not as well understood or managed when compared to other forms of flooding, especially as it is not confined to flood plains and is very dependant on the location of rain storms. One of the key purposes of the Floods Directive and the Flood and Water Management Act is to improve the understanding and management of surface water flooding thereby reducing the risk of this type of flooding in the future.

5.2 Historic Flooding

In 2000 – 2001, there was exceptional rainfall within Hampshire with return periods ranging from 1:50 to 1:200. Following this exceptional rainfall flooding occurred in 76 parishes with flooding at 713 properties to varying extents. Flooding was primarily caused by high groundwater levels and springflows in the Upper and Middle Test, Itchen, Meon, Wallington and Lavant valleys. Flooding incidents in the lower reaches of these valleys were more commonly associated with rainfall runoff from saturated ground. This was also the main trigger in the New Forest and Hamble catchments although springflows from local minor aquifers also contributed to flooding in some locations.

Since this flood event, there have been a number of other substantial flood events in varying locations across the County. These tend to be attributable to surface water flooding or the interaction of surface water and river flooding. There are also some areas along Hampshire's coastline which are susceptible to coastal flooding given their low lying nature and whilst these are identified and logged as part of this report, they will undergo a more detailed assessment through the shoreline management plans.

Figure 11 shows the distribution of known flooding incidents across Hampshire. It should be noted, however, that this only shows known incidents of flooding and gives no indication of the severity of flooding. Nor does it identify incidents of flooding not captured through the above data collection process.

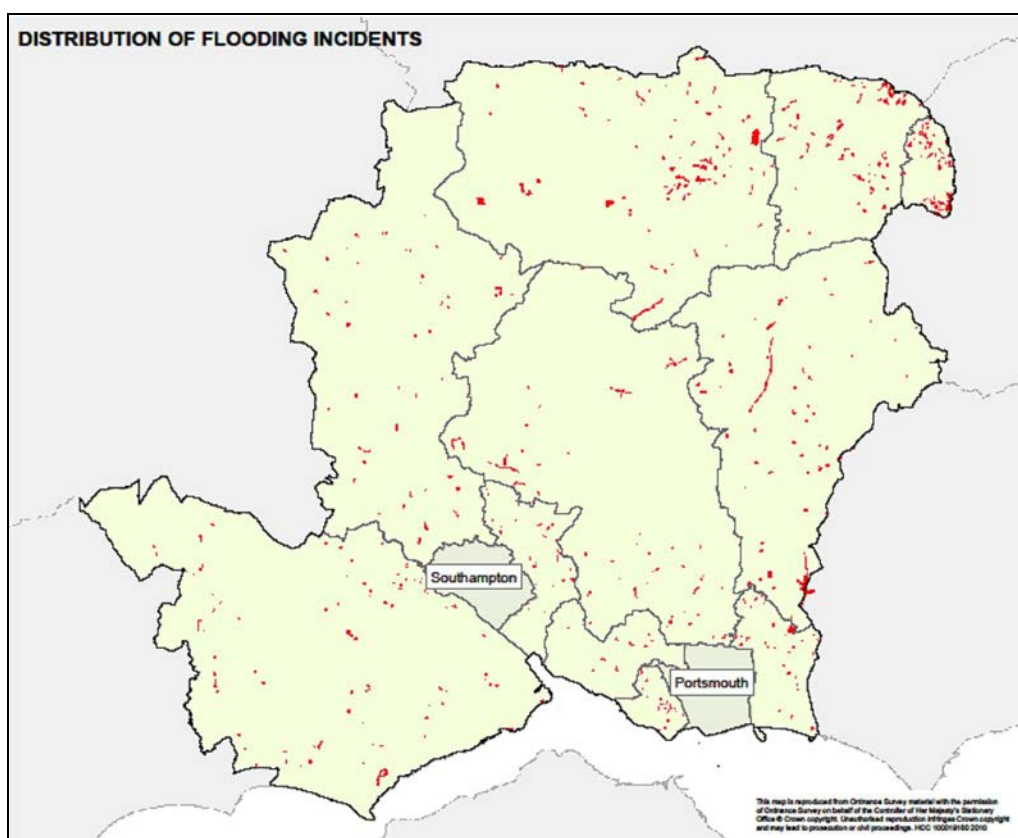


Figure 11 – Flooding Incidents within Hampshire

5.3 Consequences of Past Floods

In order to assess the risk of flooding, probability and consequence must be assessed. Probability should be assessed as an annual probability of that flood re-occurring, i.e. the return period, and is relatively straightforward to determine providing the date the flooding occurred is known.

Consequence is far more complex and needs to include a wide range of information although this can be considered under three general areas as identified below;

- human health - this includes property flooding and critical services such as hospitals, nursing homes etc
- the economy – this includes non-residential or commercial properties, infrastructure and agricultural land.
- the environment and heritage – consequences of pollution and the impact on designated environmental and heritage sites.

Although the consequences can be identified for floods that have occurred relatively recently through an assessment of the flood extent, it is not as straightforward to assess the overall priority each consequence would have. For its own purposes Hampshire County Council has developed a risk matrix to utilise the information consistently available from flood events using a methodology consistent with PPS25, planning policy statement for flood risk and including criteria relating to human health and the economy. This allows an initial assessment of flood risk which can then be looked at in more detail to include consequences to the environment and heritage.

The Preliminary Flood Risk Assessment requires details of past flooding incidents with significant adverse consequences to be recorded in Annex 1 for submission to Europe. The specification for sites that are entered into this annex are informed from guidance issued by the Environment Agency and from the requirements set out by Europe. Only sites that were of a scale that registered nationally should be entered into this annex and then only if sufficient information on the consequences of the event are recorded.

Historic flood events within Hampshire have been relatively poorly recorded in the past and there is only minimal data on the consequences of each event. The level of information required for reporting to the European Commission is extensive and the only flood event in Hampshire with sufficient recorded information is the 2000-01 groundwater flood. This event will be reported as a significant flood event within Annex 1 of this Preliminary Flood Risk Assessment. Although other flood incidents will not be reported to Europe, they will still be recorded, assessed and used to influence the Local Flood Risk Management Strategy.

6 Future Flood Risk

6.1 Introduction

The Environment Agency has historically provided a substantial amount of information about the potential risk from river and coastal flooding. This has been primarily for use in flood risk assessments required under PPS25. Following the Pitt review, a substantial amount of work has been undertaken to translate this information and experience into producing potential flood risk maps relating to surface water flooding. Two different surface water flood risk datasets are available for use at present as defined in section 4.1.3, each with their own advantages and limitations.

6.2 Locally Agreed Surface Water Information

Upon analysis of the available flood risk data, Hampshire County Council, the District Councils, the Environment Agency and the water companies have agreed that three datasets are considered to best represent flood risk in Hampshire. These datasets are illustrated on Figures 12 and 13 and consist of:

- Area susceptible to surface water flooding (figure 12)
- Flood Map for Surface Water 1:200 (figure 13)
- Localised Flooding Incidents (figure 13)

The Environment Agency has produced a 'Susceptibility to Groundwater Flooding' map. However, due to the extreme groundwater flooding that occurred in Hampshire in 2000-01, partners agreed that the existing records are likely to be more accurate than the modelling information. Groundwater is also extremely complex to model so it is unlikely to provide sufficient accuracy at this time.

Although these datasets have been agreed as the most suitable at this time, it is recognised that this list will require review as new information emerges.

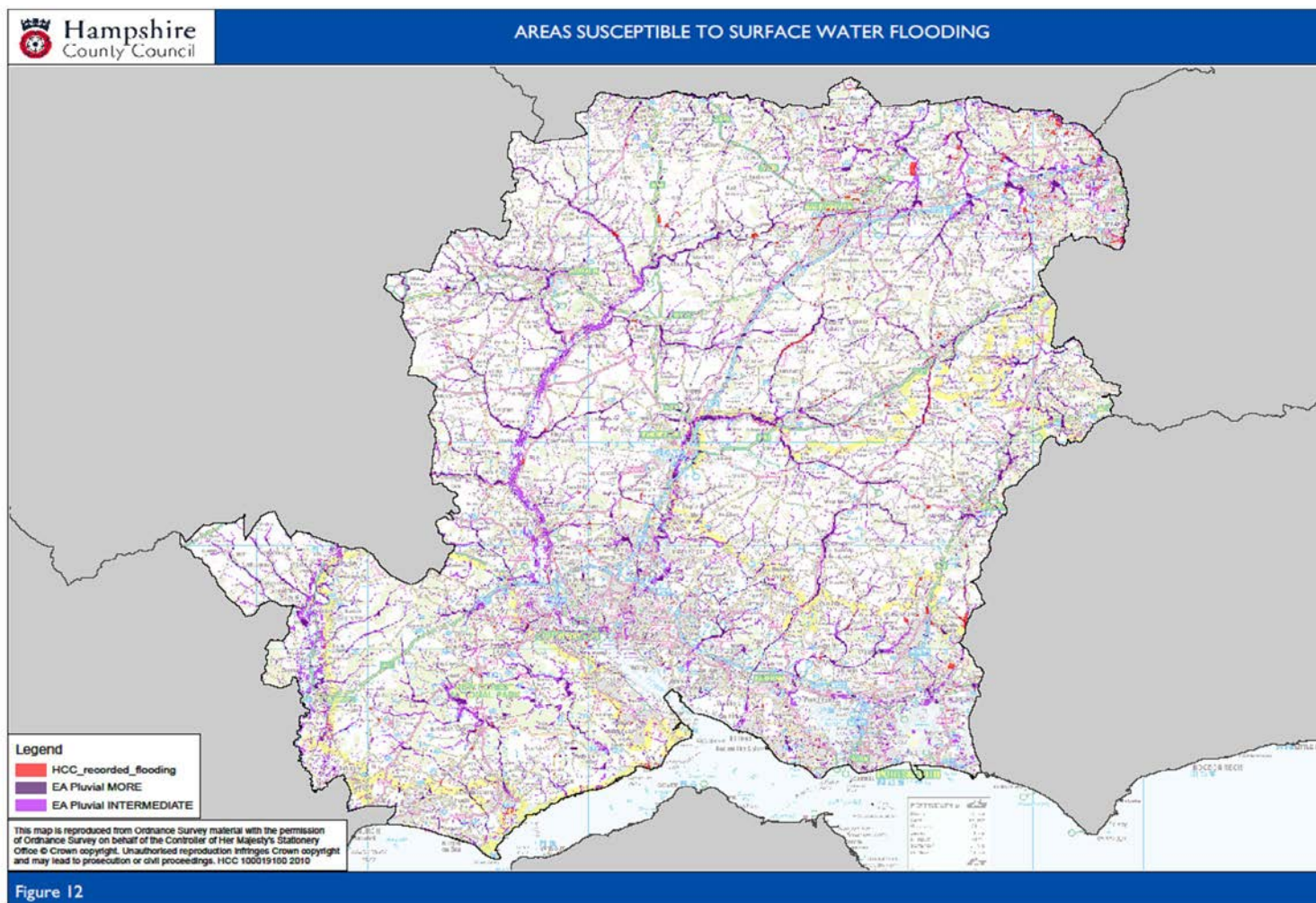


Figure 12 – Areas Susceptible to Surface Water Flooding Map

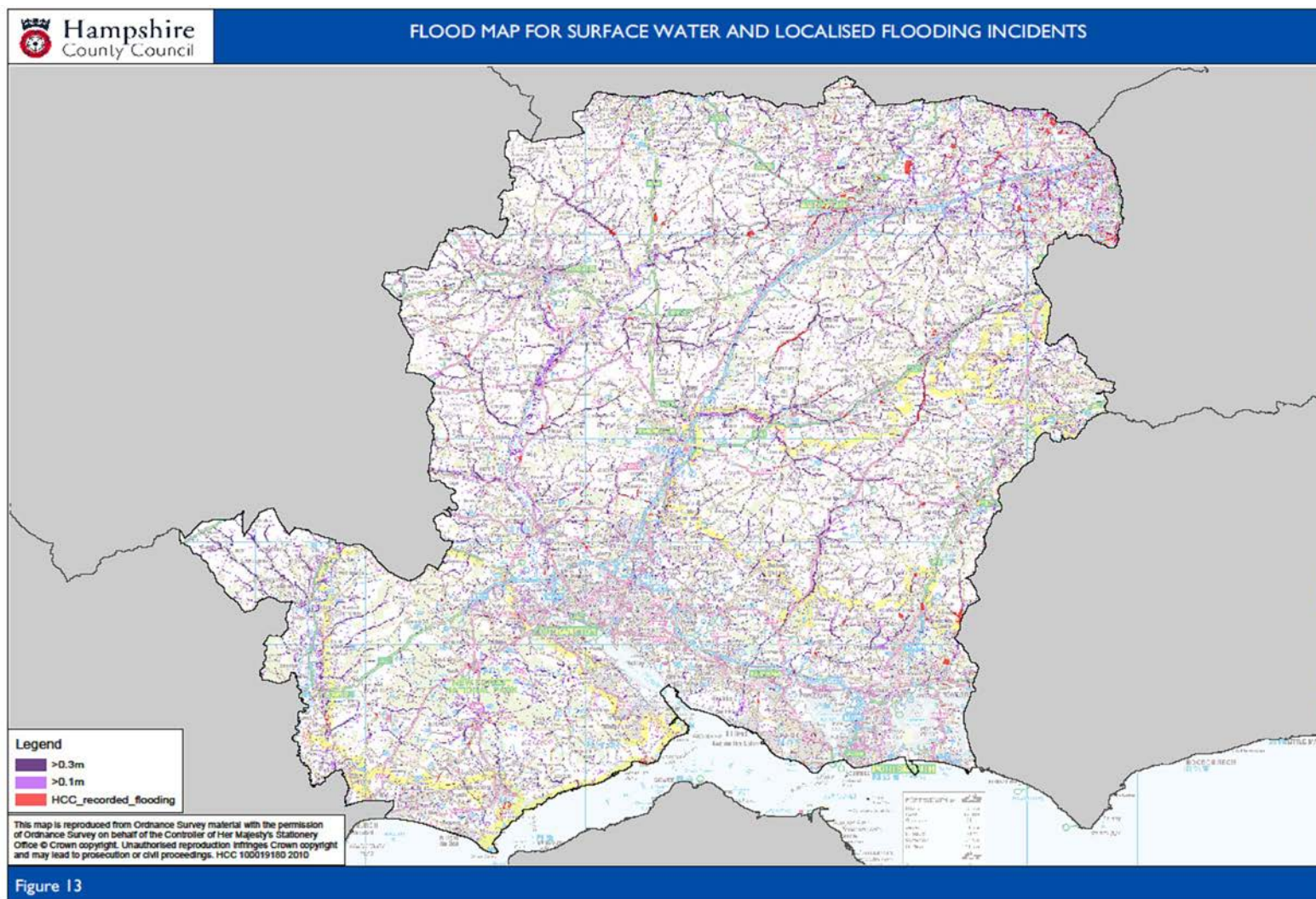


Figure 13 – Flood Map for Surface Water and Localised Flooding Incidents

This modelled information should be cross-referenced to datasets / network maps showing existing drainage capacity in order to validate the modelling and identify where additional capacity could be required. However, given the variety of drainage systems across the County and the number of organisations with drainage assets within the Hampshire County Council area, it is extremely difficult to assess the drainage capacity at the present time. Despite this, it is recognised that for extreme flooding events such as the 1:200 annual probability, drainage capacity would have a minimal impact on flooding and as such would not significantly affect this assessment. Drainage capacity information is being collected on a risk prioritised basis and will be included within the next Preliminary Flood Risk Assessment submission in 2017.

6.3 *Potential Consequences of Future Flooding*

When looking at the potential consequences of future floods, the same general categories are used as for past floods. The difference in the assessment is that they are potential consequences determined through modelling and more investigation is required in assessing the validity of the modelling information and the potential impact.

The Environment Agency have carried out an initial assessment of the consequences of future flooding to inform the identification of national flood risk areas that require submission to Europe. This was done using the Flood Map for Surface Water (1:200) to identify the areas that could be at risk of flooding to a depth in excess of 300mm. The UK was then covered with 1km grid squares and a property count of all properties at risk along with identification of any critical infrastructure within each square was carried out.

The Environment Agency then identified each square considered to have significant harmful consequences, based on the criteria below, and combined squares in close proximity (five touching squares within a 3x3 grid) to create the clusters shown in Figure 14. The potential consequences to environment and heritage were not considered as part of this assessment and has been left for the LLFA to assess and to determine if these impacts should highlight additional areas of future flood risk with potential harmful consequences.

'Significant Harmful Consequences' is considered by the Environment Agency to be;

- ≥ 200 people or,
- ≥ 20 businesses or,
- ≥ 1 critical service

This methodology should be considered as an initial assessment and local knowledge is required to validate this information.

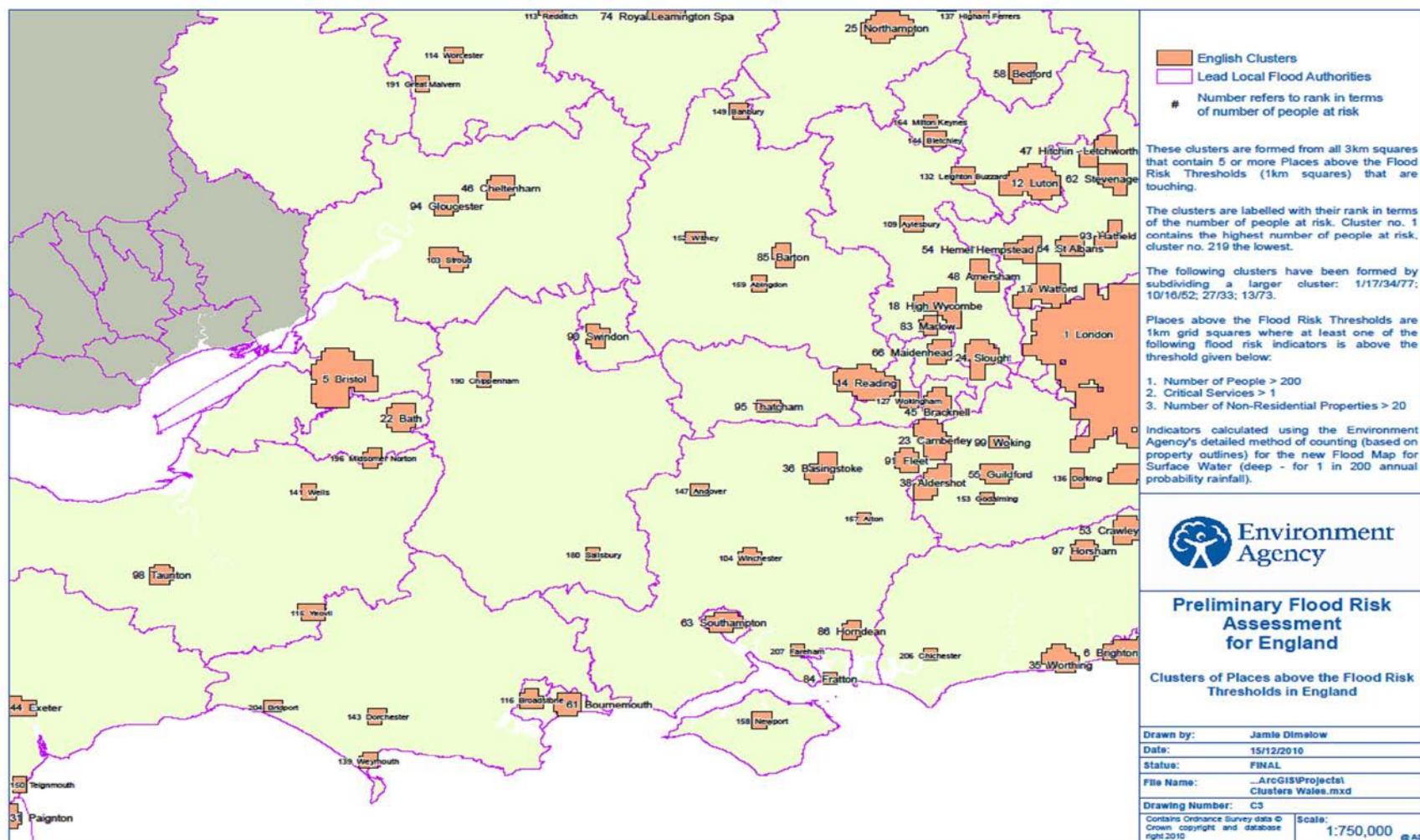


Figure14 – Clusters of Places above the Flood Risk Thresholds in Hampshire

6.4 *Climate change and long term developments*

The following text on climate change (6.4.1 – 6.4.5) has been provided by the Environment Agency to ensure consistency between Preliminary Flood Risk Assessments produced by different LLFAs and to simplify the European reporting process.

6.4.1 *The Evidence*

There is clear scientific evidence that global climate change is happening now. It cannot be ignored.

Over the past century around the UK we have seen sea level rise and more of our winter rain falling in intense wet spells. Seasonal rainfall is highly variable. It seems to have decreased in summer and increased in winter, although winter amounts changed little in the last 50 years. Some of the changes might reflect natural variation, however the broad trends are in line with projections from climate models.

Greenhouse gas (GHG) levels in the atmosphere are likely to cause higher winter rainfall in future. Past GHG emissions mean some climate change is inevitable in the next 20-30 years. Lower emissions could reduce the amount of climate change further into the future, but changes are still projected at least as far ahead as the 2080s.

We have enough confidence in large scale climate models to say that we must plan for change. There is more uncertainty at a local scale but model results can still help us plan to adapt. For example we understand rain storms may become more intense, even if we can't be sure about exactly where or when. By the 2080s, the latest UK climate projections (UKCP09) are that there could be around three times as many days in winter with heavy rainfall (defined as more than 25mm in a day). It is plausible that the amount of rain in extreme storms (with a 1 in 5 annual chance, or rarer) could increase locally by 40%.

6.4.2 *Key Projections for South East River Basin District*

Environment Agency guidance requests text for a single River Basin District be included in the Preliminary Flood Risk Assessment. Since the South East Basin represents 68.9% of Hampshire (by geographical area), this is the text that has been used. The other River Basin Districts within Hampshire are Thames (23.5%) and South West (7.6%) as identified in figure 8.

For the South East River Basin if emissions follow a medium future scenario, UKCP09 projected changes by the 2050s relative to the recent past are

- Winter precipitation increases of around 18% (very likely to be between 2 and 39%)
- Precipitation on the wettest day in winter up by around 16% (very unlikely to be more than 34%)
- Relative sea level at Portsmouth very likely to be up between 10 and 40cm from 1990 levels (not including extra potential rises from polar ice sheet loss)
- Peak river flows in a typical catchment likely to increase between 11 and 24%
- Increases in rain are projected to be greater at the coast and in the west of the district.

6.4.3 *Implications for Flood Risk*

Climate changes can affect local flood risk in several ways. Impacts will depend on local conditions and vulnerability.

Wetter winters and more of this rain falling in wet spells may increase river flooding, especially in the rapidly responding catchments draining the South Downs and Weald. More intense rainfall causes more surface runoff, increasing localised flooding and erosion. In turn, this may increase

pressure on drains, sewers and water quality. Storm intensity in summer could increase even in drier summers, so we need to be prepared for the unexpected.

Rising sea or river levels may increase local flood risk inland or away from major rivers because of interactions with drains, sewers and smaller watercourses.

There is a risk of flooding from groundwater in the district. Recharge may increase in wetter winters, or decrease in drier summers.

Where appropriate, we need local studies to understand climate impacts in detail, including effects from other factors like land use. Sustainable development and drainage will help us adapt to climate change and manage the risk of damaging floods in future.

6.4.4 Adapting to Change

Past emission means some climate change is inevitable. It is essential we respond by planning ahead. We can prepare by understanding our current and future vulnerability to flooding, developing plans for increased resilience and building the capacity to adapt. Regular review and adherence to these plans is key to achieving long-term, sustainable benefits.

Although the broad climate change picture is clear, we have to make local decisions against deeper uncertainty. We will therefore consider a range of measures and retain flexibility to adapt. This approach, embodied within flood risk appraisal guidance, will help to ensure that we do not increase our vulnerability to flooding.

6.4.5 Long Term Developments

It is possible that long term developments might affect the occurrence and significance of flooding. However current planning policy aims to prevent new development from increasing flood risk.

In England, Planning Policy Statement 25 (PPS25) on development and flood risk aims to "ensure that flood risk is taken into account at all stages in the planning process to avoid inappropriate development in areas at risk of flooding, and to direct development away from areas at highest risk. Where new development is, exceptionally, necessary in such areas, policy aims to make it safe without increasing flood risk elsewhere and where possible, reducing flood risk overall."

Adherence to Government policy ensures that new development does not increase local flood risk. However, in exceptional circumstances the Local Planning Authority may accept that flood risk can be increased contrary to Government policy, usually because of the wider benefits of a new or proposed major development. Any exceptions would not be expected to increase risk to levels which are "significant" (in terms of the Government's criteria).

6.4.6 Major Developments and Flood Risk

Managing flood risk is an important issue for any development. The location, layout and design of developments - in that order - are vital factors determining both the likelihood and consequences of flooding.

PPS25 requires Strategic flood risk assessments (SFRAs) to be carried out by local planning authorities as part of a local development framework (LDF). New development must be considered in the light of these assessments. SFRAs should consider the risk of flooding from all sources, taking into account climate change.

It is also a requirement of PPS25 that site-specific flood risk assessments (FRAs) are undertaken by applicants when a planning application is submitted in a flood risk area.

Given both of these requirements, every effort is made to ensure that new or proposed developments within Hampshire County Council's area will not increase local flood risk and where practicable, actually reduce local flood risk.

7 Identification of Flood Risk Areas

As discussed in section 6.3, the Environment Agency has carried out a national assessment of potential flood risk to determine areas which should be submitted to Europe as 'Flood Risk Areas'.

Although Figure 14 identifies flood risk clusters considered to be of significant risk, the Environment Agency have specified that only those with populations in excess of 30,000 people at risk should be submitted to Europe at this stage and the areas below this threshold should be assessed by each LLFA and used to identify areas for which Surface Water Management Plans are required which would then inform the local strategy.

Within Hampshire there are eight areas considered to have a substantial potential flood risk and these are detailed together with the Environment Agency estimation of the number of people potentially at risk and also where they rank on a national scale.

National Rank	Cluster Location	No. of People potentially at risk
23	Camberley (also covering Farnborough)	11955
36	Basingstoke	9021
38	Aldershot (including parts of Surrey)	8429
86	Horndean	4296
91	Fleet	3980
104	Winchester	3477
147	Andover	2279
157	Alton	2104

The ranking of these areas are determined through a basic national assessment carried out by the Environment Agency. The next stage will be for a more detailed assessment to be carried out incorporating local knowledge and information on areas that have experienced flooding previously. This information will inform the developing Flood Risk Management Strategy, and will in turn be used to help determine which, if any, further Surface Water Management Plans are required. This process may also lead to other areas, not been identified by the Environment Agency but for which substantial local information is available to justify the level of local flood risk, being included in these investigations.

The table above includes Farnborough, Aldershot and Basingstoke. These areas are already under investigation as part of existing surface water management plans funded by Defra. The remaining areas shown in the table will be investigated as resources permit, to inform the Flood Risk Management Strategy and are likely to be fully investigated and action plans prepared as appropriate, prior to the next Preliminary Flood Risk Assessment submission.

8 Conclusion

Flooding is a natural process that cannot be prevented entirely but there are many things that can be done to reduce both the risk of flooding and also to reduce the impact flooding has on the wider community. The Preliminary Flood Risk Assessment is a first step in flood risk management and by identifying the different partner and stakeholder organisations and the information held within each organisation, it has been possible to develop a strategic view of both past, current and future flood risk across the county. The different groups that have been

set up as part of this work have enabled all parties to come together to discuss the flood risk in Hampshire and to identify where future investigation and works should be prioritised in order to reduce flood risk and improve the quality of life for the most number of people.

The initial areas defined through this report, namely Farnborough, Basingstoke, Aldershot, Horndean, Fleet, Winchester, Andover and Alton, will undergo further investigation to identify the specific surface water problems and potential mitigation and adaptation measures, which may be developed into the form of formal Surface Water Management Plans, but all the information will feed into the Local Flood Risk Strategy that will co-ordinate the policy and local decisions to assist in reducing flood risk in these areas and eventually across the whole county.

9 Next Steps

It is important that the Preliminary Flood Risk Assessment is viewed as an initial, interim and strategic assessment of flood risk. It is a starting point for the preparation of a more detailed local flood risk management strategy which assesses flood risk at a local level and identifies where additional investigations and/or surface water management plans are required.

This Preliminary Flood Risk Assessment will be updated as floods are identified and their flooding mechanisms and consequences are understood. Also, as the understanding of surface water flooding grows, additional information may become available to assess future flood risk especially in relation to climate change. Any new information of this type will require the Preliminary Flood Risk Assessment and risk sites to be re-assessed and the priorities for Hampshire reviewed on a risk basis.

Section 17 of the Flood Risk Regulations states that LLFAs must prepare a revised Preliminary Assessment Report by the 22nd June 2017, and carry out subsequent reviews every 6 years. Notwithstanding this Statutory requirement for formal review, the information within this document will continue to be updated, collected and assessed as resources permit, prior to the preparation and submission of a formal review in 2017.

10 References

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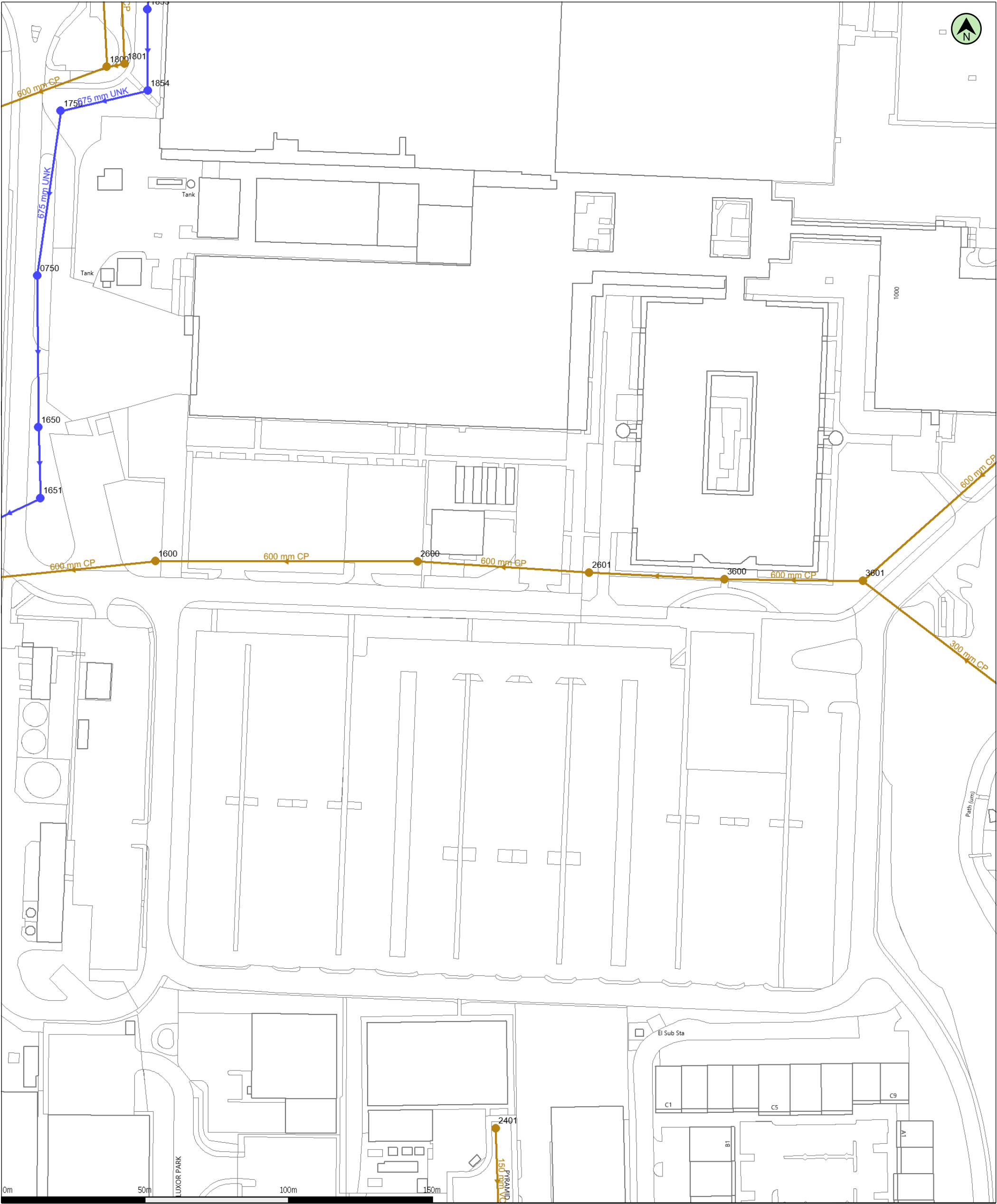
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Annex 1 – Past Floods

Annex 2 – Future Floods

Annex 3 – Review Checklist



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Data updated: 21/08/23

Scale: 1:1250
Map Centre: 471260,105628

Date: 08/09/23
Our Ref: 1268061 - 1

Wastewater Plan A3
Powered by digdat

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WARNING: BAC pipes are constructed of Bonded Asbestos Cement.

WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement.

