Rushmoor Surface Water Management Plan
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Executive Summary

This is one of a suite of Surface Water Management Plans being prepared for districts in Hampshire. By 2015 it is anticipated that there will be full coverage of all Hampshire districts with SWMPs.

The document has been prepared by Hampshire County Council in conjunction with stakeholder and partner organisations through a stakeholder officer group comprising representatives from the relevant district council and adjoining authorities, the Environment Agency and the water companies.

The document focuses on surface water flood risk in Rushmoor borough. It should be read alongside the Strategic Overview and Background Information SWMP document which provides a context for this report and the others to be prepared in future.

The document describes the topography, geology and hydrology of Rushmoor borough and describes other significant features which can impact on surface water flood risk. It collates and assesses historic data on surface water flood events in Rushmoor and uses Defra / Environment Agency mapping data and projections to determine likely future flood risk taking into account the impacts of climate change.

This data is described and assessed by Ward looking at each area’s susceptibility to flooding based on information from past flood events and the likelihood of future flooding based on national modelling data.

This allows a hierarchy of flood risk in the borough to be identified along with surface water flooding ‘hotspots’ where further, more detailed work may be required into the causes of, and possible responses to, flood risk. It highlights what solutions may be required to address and/or mitigate flood risk in those ‘hotspot’ areas and where further investigation is recommended.

Flood risk management responses are proposed which cover a range of areas including effective communication, policy responses and physical works. Ultimately the aim of identifying hotspots is to bring these areas to the attention of all parties who may be able to influence and reduce flood risk.

This SWMP report will continue to evolve as flood risk is better understood and as additional flood risk areas are identified, ultimately leading to a reduction in the risk of flooding as well as an increase in the understanding of flood risk across the borough.
Appendix D
Appendix C
Appendix B
Appendix A

Table 3: Example of Short-Listing Criteria (taken from Defra Technical Guidance)
1. Introduction
This document is one of a suite of intermediate level Surface Water Management Plans (SWMPs) being prepared for individual districts in Hampshire. It should be read alongside the Surface Water Management Plan Strategic Assessment and Background Information document which provides generic background and supporting information relevant to each of the district SWMPs.

The overall aim of this SWMP study is to ensure that all flood risk partners work together to understand the locations, causes and effects of flooding within the borough of Rushmoor and to identify measures to mitigate against flooding in the form of an Action Plan (see Appendix E). Once in place, this Action Plan should be reviewed and updated on a regular basis, in accordance with Defra guidance.

The scope of this report is to expand on the strategic assessment carried out under the Flood Risk Regulations, in the form of the Preliminary Flood Risk Assessment, and to carry out an intermediate assessment, within Rushmoor.

2. Background
In 2009, Defra produced a National Rank Order of Settlements Susceptible to Surface Water Flooding, ranked by the estimated number of properties susceptible to surface water flooding resulting from severe rainfall. This rank order was populated using a new national methodology indicating the relative effect between settlements if each was subjected to a similar severe rainfall event.

This ranked list of settlements was developed using the Environment Agency’s Areas Susceptible to Surface Water Flooding maps. These maps indicate areas considered to be susceptible to flooding from surface water, categorised within three bandings; less, intermediate and more susceptible.

The Areas Susceptible to Surface Water Flooding map was produced using a simplified modelling technique that assumes underground sewerage and drainage systems, and smaller over ground drainage systems are full to capacity, preventing surface water draining from the surface. The impacts of buildings are not considered. This method uses a single rainfall event with a 1 in 200 chance of occurring in any year.

Priority locations within Hampshire were identified by Defra where evidence indicating the risk and potential impact of surface water flooding could be highest, and where SWMPs would be most effective to understand and manage flooding. Using this assessment as well as historic flooding information, Defra identified a need for SWMPs to be produced for three
areas: - Rushmoor, Basingstoke and the central Hampshire chalk catchment (groundwater flooding).

The first stage of any SWMP is data collection, involving consultation with key partners and stakeholders to obtain all relevant data and information relating to historic and current flooding, alongside information on flood receptors and flood consequences.

Following completion of the data collection phase, the surface water flooding information is assessed in order to identify ‘hotspot’ areas that have a history of flooding incidents. These are prioritised for further investigation initially. However sites considered being at a potential future risk of flooding will also be considered and the information used to inform the planning process and the future location of new development.

It should be borne in mind, however, that this is one of a series of intermediate SWMPs planned across the county. Areas identified as a priority in Rushmoor will, in due course, need to be considered alongside priority areas identified in future SWMPs covering other districts. Similarly, the order in which potential flood alleviation / mitigation schemes are identified and progressed will be considered in this broader context rather than on a district by district basis. Another determinant of which, how and when schemes are progressed will be the availability of funding to implement such works.

Flooding arising from a combination of sources, and flooding incidents involving interaction between different flood types, will fall under the responsibility of the Lead Local Flood Authority (Hampshire County Council), and therefore these types of flood incident will be considered within the scope of this SWMP.

This report aims to consider all hydraulic flooding incidents in Rushmoor but does not address sewer flooding where it occurs as a result of operational issues as this is the responsibility of the water companies.

It should be noted that the compilation of flooding events within the borough does include some flooding solely due to main rivers, responsibility for which falls to the riparian landowner and is under the supervision of the Environment Agency. Therefore, further investigation of these occurrences is considered to be outside the remit of this report. Coastal flooding is also beyond the scope of this report and falls within the remit of the Environment Agency and, by agreement, District, Borough and City councils.

3. Aims & Objectives
Within the overarching Strategic Assessment and Background Information SWMP document, a number of generic objectives have been developed which should be considered as part of any district SWMP.

The objectives are as follows:
- Engage with partners and stakeholders;
Map historic flood incident data;
- Map flooding locations influenced by surface water;
- Identify surface water flooding ‘hotspot’ areas;
- Assess, compare and prioritise ‘hotspot’ areas for detailed assessment;
- Identify measures where appropriate, assess options and confirm preferred mitigation options for identified ‘hotspots’; and
- Make recommendations for the next stages of assessment.

In addition to these, specific objectives for the Rushmoor SWMP are as follows:

- Identify and record known drainage assets in high risk areas, including information on condition, ownership and maintenance requirements; and
- Ensure the results of the SWMP link into both development planning and emergency planning policies and procedures.

This report will also refer to, and take into account, information and recommendations made within the following documents:

- Rushmoor Borough Council Strategic Flood Risk Assessment produced by Halcrow;
- Thames Catchment Flood Management Plan;
- River Basin Management Plan: Thames River Basin District;
- Aldershot Area Flooding Investigation Report by Halcrow
- Rushmoor Borough Core Strategy

4. The Study Area

4.1. General
Rushmoor is a relatively small but highly urbanised borough comprising an area of over 3,905 hectares within north east Hampshire. The two largest settlements are the towns of Aldershot and Farnborough, supporting a combined population of approximately 92,000 and comprising largely urban land-use including just under 40,000 dwellings alongside large areas of office space, commercial and industrial units, an airport facility and military installations. A location plan is included in Figure 1 below.

The remainder of the borough consists of large areas of mixed deciduous woodland and heathland totalling approximately 930 hectares and largely located within areas designated as military training grounds. There are also substantial areas designated as green space, largely consisting of the boroughs parks and recreational areas.

There are a significant number of brownfield sites earmarked for redevelopment within the borough, the largest of which is the Aldershot Urban Extension located to the north of Aldershot town centre. It covers around 150
hectares and is one of the largest brownfield regeneration sites in the south east of England.

A number of contextual maps are provided in Appendix B to illustrate the environmental and historical areas of importance within the borough as well as other related information.

![Figure 1: Rushmoor Location Plan](image_url)

### 4.2. Geology and Soils

The borough of Rushmoor lies within the southern part of the London and Thames Valley geological region to the north of the Hampshire Basin and Wealden geological regions. The vast majority of the borough lies within the valley of the River Blackwater and its tributaries. This is delineated by a tract of superficial Alluvium, Head and River Terrace Deposits running along the southern and eastern margins of the borough and centrally across the north with occasional Head deposits elsewhere. The bedrock geology underlying the region consists of the Tertiary Bracklesham Group Camberley Sand, Windlesham and Bagshot Formations lying above the Thames Group London Clay Formation which is exposed in the south of the borough. These formations are generally comprised of permeable sands and impermeable clays. The sandy bedrock formations are considered to be secondary aquifers (previously referred to as minor aquifers) capable of supporting water supplies at a local scale and forming an important source of baseflow to rivers. The clay bedrock formations are unproductive strata in terms of aquifers with low
permeability and having negligible significance for water supply or river base flow. The superficial deposits are also considered to be secondary aquifers.

The River Blackwater rises in the south from springs where the permeable Bagshot Formation sands overlie impermeable London Clay, to the north of the Hogsback chalk ridge.

The river flood plain comprises alluvium with the towns adjacent to the River Blackwater partly or wholly underlain by the Lower Terrace River Gravels. The flood plain coincides with the Environment Agency flood zones. The terrace gravels associated with the Blackwater Valley have been extracted for use as aggregate, and the resulting pits either filled in with waste or restored as lakes, particularly in the Ash and Yately areas.

There are a number of licensed water company abstractions in the southernmost part of the borough with very localised Environment Agency Groundwater Source Protection Zones (SPZ) associated with them, but there are no major SPZs within the borough.

Mapping indicating the superficial and bedrock geology for the borough is indicated in Figure 2 below.
4.3. **Hydrology**

The borough of Rushmoor is dominated by the Loddon river catchment which also covers a substantial part of Hart District as well as parts of Surrey, Wokingham and parts of Bracknell Forest.

The borough contains two main watercourses, the River Blackwater and its primary tributary, Cove Brook. The River Blackwater, designated as a Main River, forms the southern and eastern boundary of the borough and is the principle river draining the entire borough.

There are no major watercourses to the south and east of Farnborough airfield apart from the River Blackwater. Drainage of the area, a large part of
which is rural heathland, is achieved by infiltration, a mixture of small open and culverted watercourses, surface water sewerage and highway drains. Part of the land drains to the Basingstoke Canal, which has an overflow to the River Blackwater, but discharges normal flow into the Wey Navigation near Byfleet.

Cove Brook, also designated as a Main River, receives water from the eastern extents of the Hart District via Hawley Lake, located on the north-eastern boundary of the borough and Hawley Lake Stream. Cove Brook discharges into the River Blackwater at the northern extent of the borough.

Although Rushmoor is within the Loddon Catchment, there are three sub-catchments within this which affect the borough. The Blackwater catchment runs along the eastern edge of the borough and includes the majority of the urban area of Aldershot, excluding the military land, and the eastern most parts of Farnborough.

The Cove Brook catchment covers the majority of the borough starting just to the south of the borough and encompassing the majority of the urban area of Aldershot, Farnborough Airport and the urban area of Farnborough.

Fleet Brook catchment also covers parts of Rushmoor including parts of the urban area of Cove and some of the rural area to the south west.

These catchment areas illustrate the level of water entering the different main rivers and can assist in looking at areas where attenuation may benefit different areas of the borough.

A plan indicating these river catchments and the river network is included in Appendix B.

**4.4. Ecology & Environmental Designations**

A significant proportion of the borough falls within local, national or international ecological or landscape designations, largely within the south-western extents of Rushmoor.

Part of the borough’s natural environment lies within the Thames Basin Heaths Special Protection Area, predominantly incorporating areas to the south west, and to a smaller degree, the north-western boundary of the borough. There are also five Sites of Special Scientific Interest (SSSI) and 36 Sites of Importance for Nature Conservation (SINC) designated within or partly within the borough boundary. Rushmoor Borough Council has produced a Biodiversity Action Plan for 2009 to 2014 to manage, protect and improve areas within the local environment.

These designated sites are illustrated in Appendix B.
5. Establishing Partnerships

The Flood and Water Management Act 2010 requires that unitary and county authorities take the lead on local flood risk management activities and defines them as a Lead Local Flood Authority (LLFA). The County Council, in its role as LLFA, has a responsibility to lead and convene production of the SWMP ensuring it is maintained and updated as required.

In view of this, Hampshire County Council has taken the lead on this SWMP bringing together those stakeholders that are critical for its production as well as providing information relating to its role as a Planning Authority, Highway Authority, Emergency Planning Authority and LLFA.

As with all SWMPs, there are a number of key partners in addition to Hampshire County Council each with an important role to play in managing surface water. In this case they are:

- Rushmoor Borough Council
- Environment Agency
- Thames Water

Rushmoor Borough Council has a number of permissive powers under the Land Drainage Act 1991 for the prevention and mitigation of flood damage from ordinary watercourses and also responsibilities for managing flood risk encompassed in planning legislation.

The Council adopted its Core Strategy (www.rushmoor.gov.uk/corestrategy) in October 2011, which recognises the Borough’s susceptibility to surface water flooding. Policy CP4 of the Core Strategy requires all new development to incorporate Sustainable Drainage Systems (SUDS) with the aim of returning runoff rates and volumes back to the original greenfield discharge levels. It is anticipated that some of the recommendations of the Surface Water Management Plan could be delivered through the Council’s forthcoming Delivering Development Plan Document (DPD) (http://rushmoor.gov.uk/article/4125/Delivering-Development-document).

Rushmoor falls within the Environment Agency’s Thames region. The Environment Agency has a supervisory role over all aspects relating to flood defence with a more specific role to the maintenance of main rivers.

The borough is served by Thames Water, supplying foul and surface water sewerage systems. Thames Water is also responsible for the maintenance of these networks.

A Data Sharing Protocol has been agreed and signed up to by these partners in order to agree the terms by which data is shared throughout the process of undertaking the Rushmoor SWMP and to ensure data is used correctly.
Any decisions made by these partners could also have implications on how bodies and organisations carry out their roles with respect to drainage and flood risk management. This includes those listed below:

- Network Rail;
- Highways Agency;
- Navigation and Canal Authorities - Basingstoke Canal Authority;
- TAG Aviation – owners of Farnborough Airport;
- MOD whose roles and responsibilities are covered by Defence Estates, Anningtons,

Flood risk is not contained within administrative boundaries. Therefore it is vital in considering the management of surface water to involve neighbouring authorities. In this case this includes the following.

- Hart District Council;
- Surrey County Council;
- Waverley Borough Council;
- Guilford Borough Council and;
- Surrey Heath Borough Council

All of the bodies and organisations highlighted above have been invited to comment on this SWMP.

6. Locally Agreed Surface Water Flooding Information

Given the high volume of available data it is essential to establish the most appropriate datasets, both in terms of quality and coverage, to enable a suitable assessment of local flood risk.

As part of the preparation phase of this SWMP all available flood related data was collected from each partner and assessed in terms of quality and coverage across the borough. This data contained a range of information on historic flooding incidents as well as theoretical information relating to the potential for flood risk.

Each piece of data was assessed in accordance with the data quality and confidence criteria agreed between the partners. There criteria are:

1. Best Possible – No better available; nor possible to improve in the near future
2. Data with known deficiencies – Best replaced as soon as new data available
3. Gross assumptions – Based on experience and judgement
4. Heroic assumptions – An educated guess

Each dataset obtained for the use of this SWMP is listed within Appendix A together with its data quality score.
Information must only be used in ways appropriate to the quality of data, scale of mapping etc and each partner has specific conditions of use for data outside each individual organisation. These conditions must be complied with and no third party information will be distributed or reproduced without either the express consent of that data owner or confirmation that the conditions for use of the data is adhered to. When considering Freedom of Information (FoI) or Environmental Information Regulations (EIR) requests, Hampshire County Council is unable to release information which is owned by a third party. Data licensing requirements are identified within Appendix A alongside the data quality scoring.

6.1. Existing and Historic Flooding Incidents

Data relating to historic flooding information was available from all key stakeholders and was generally assessed as being of good quality in terms of flood location although the extent and consequences of these incidents were not as well recorded.

Information on known flooding has been incorporated into a flood database including as much information as is known about each flood site. This database has been ratified by the SWMP partners and it has been agreed that the localised flooding incidents database constitutes the best available information on existing and historic flooding incidents. However this data must not be used to identify individual properties at risk of flooding or with base mapping of more than 1:25,000.

This database includes sites which have experienced flooding as a result of extreme weather conditions or rainfall which has exceeded the design capacity of the existing drainage system as well as sites where blockages or failures in the system has led to flooding.

Historic flooding data can be subjective as often few formal records exist and much of the information comes from local knowledge gathered over a period of time. The Borough Council, Environment Agency and Thames Water were asked to comment on all historic flood data, corroborating the details as well as providing information on additional local flood risk sites, to ensure that the data is as accurate and up to date as possible allowing a high level of confidence to be given to these records. It is a living dataset and will be expanded and updated as new data is obtained.

6.2. Future / Potential Surface Water Flood Risk

There are two key datasets available from the Environment Agency which assess the potential for surface water flooding, namely the Areas Susceptible to Surface Water Flooding and the Flood map for Surface Water.
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 in any 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 on other areas. However, the Environment Agency has stated that local information on flooding should be used to identify the most suitable mapping for specific locations.

Upon analysis of the available flood risk data, the SWMP partners have agreed that the dataset providing the best representation of potential flood risk in Rushmoor is the 2010 Flood Map for Surface Water.

The 1 in 30 year annual probability surface water flood mapping has been chosen to assess flood risk as the majority of drainage infrastructure and property resilience measures are currently designed to accommodate this scale of rainfall event. Sites at risk of flooding from a 1 in 30 year rainfall event or less will therefore be prioritised for investigatory work so that those areas at the highest risk can be considered for future works.

Surface water flooding arising from 1 in 200 year rainfall event is considered very extreme rainfall which exceeds that which is generally designed to be contained within drainage systems. However, it should be modelled in terms of exceedance so that overland flows do not cause property flooding and are routed away from properties where feasible. This dataset is therefore of most use for land-use planning purposes.

In addition to these datasets, there is also information available relating to coastal and fluvial (river) flood risk. This data takes the form of the ‘Flood Zones’ mapping and identifies areas at high, medium and low risk of these types of flooding. This mapping is essential in order to identify where there could be issues with the interaction of surface water and other types of flooding.
Rushmoor Borough Council has completed a Strategic Flood Risk Assessment for the Borough as part of the evidence base for its Core Strategy and Delivering Development DPD. This aims to assess the risk of flooding across Rushmoor using information on known and potential flood risk and assesses vulnerability, land use as well as topographical information. Where appropriate, this information will be used as part of the assessment of potential flooding risk for Rushmoor as well as being used to substantiate the findings of this SWMP.

7. Risk Assessment

7.1. Intermediate Level Assessment

Identification of ‘Hotspots’

Following the strategic assessment undertaken as part of the PFRA, sites known to have flooded previously have been identified and assessed. From the information provided in flood incident reports, it is clear that the extent, frequency and depth of flooding ranges widely from very minimal surface water ponding to flooding at a depth that poses a high risk to people and property. There was a need to rank the individual sites and reduce the number to focus on those that posed the highest risk. Once these sites, known as ‘hotspots’, were identified, a more thorough risk assessment could be undertaken and the sites reviewed in order of their assessed risk.

In order to rank the sites in terms of flood risk, a matrix scoring system was developed. This assesses probability and consequence of flooding at each identified site within the flood risk database. The matrix scoring apportions a score to the flood risk criteria described in the Strategic Assessment and Background Information report. The sites assessed within Rushmoor Borough are listed in Appendix C.

For the highest ranked sites or those where the cause or potential mitigation is complex, a more detailed assessment may be carried out with site investigations to determine existing drainage, works carried out, potential risk and a more thorough assessment of the available data. This will allow potential mitigation options to be reviewed and a cost benefit analysis to be carried out to determine the likelihood of securing funding for any potential schemes. This assessment is more detailed than this intermediate SWMP and will be carried out separately.

However, for those sites where the existing flooding problems could be remedied through maintenance works or relatively straightforward schemes, mitigation options will be identified and these are discussed below.
7.2. Ward Risk assessment

The following information provides an overview of flood risk in each ward, identifying areas where floods have occurred and potential works and recommendations to alleviate flood risk where appropriate. It also highlights where further investigation may be required over forthcoming years and how this information will be used in terms of each relevant authority’s maintenance and capital works programmes. These recommendations will be listed within the Action Plan in Appendix E.

There have been some significant flood events across the Borough in recent years, namely the storms of 2006 and 2007. These events have shown a number of areas to be particularly susceptible to flooding, primarily as a result of the interaction between fluvial and surface water flooding. Given these two events, there is a high degree of confidence in the flood risk data and that it is a good representation on where further works or investigation is required.

The Cove Brook and Blackwater main rivers both run in close proximity to urban areas and it is within the flood plain of these rivers, within the urban areas that the highest likelihood of flooding exists. In addition to these rivers, there are a number of tributaries which are also classed as main rivers and these will be highlighted as part of the relevant ward overview.

Fluvial flooding incidents fall outside the scope of this study and are the responsibility of the Environment Agency. Flooding of this nature will however be considered within the scope of interaction between surface water, drainage and ordinary watercourses.

Sites under the remit of the Environment Agency (main river and coastal issues) and Thames Water (sewerage systems) will be highlighted and put forwards to the respective authority for consideration.

The Basingstoke canal runs between Greywell (approx. 4 miles east of Basingstoke) and the River Wey Navigation (approx. 4 miles east of Woking). A section of approximately 4 miles in length runs through the centre of Rushmoor splitting the wards of St Mark’s and Wellington as shown in figure 4 below. Responsibility for the maintenance of the canal falls to the Basingstoke Canal Authority, a joint enterprise between Hampshire County Council and Surrey County Council.
Figure 3: Route of the Basingstoke Canal

The canal by its very nature contains a significant amount of water and much of it is built above the level of the surrounding area on one or both sides with substantial embankments retaining the water. As such, there is the potential for the canal to contribute to flood risk in the event of extreme rainfall conditions or damage to the canal structure. To control the risk of these events occurring, plans are in place to monitor and control the level of water in the canal as well as emergency response. A series of locks and weirs can be used to control water flow and to reduce the impact of potential flooding on the properties in the vicinity of the canal. In addition to this, there is a comprehensive inspection and maintenance regime to ensure the canal is kept in good working order.
7.2.1. **Aldershot Park**

Aldershot Park Ward is located at the southern most point of Rushmoor bordering Surrey and bounded by the River Blackwater. It contains densely populated residential areas as well as the Blackwater Industrial area and Aldershot Cricket Club.
Historically, this area has suffered with significant flooding particularly to the east of Lower Farnham Road, adjacent to Ash Road, Tongham Road and adjacent to the River Blackwater. Works have been undertaken to ensure the river and drainage systems are functioning correctly but given the catchment area and the volume of water converging in this area, the capacity of the river and drainage systems are not sufficient under severe rainfall events. It is recommended that further work is carried out in these areas to determine where there is potential to carry out flood mitigation works.

The River Blackwater has a number of areas designated as Flood Zone 3 which could impact on existing residential areas and it is essential that any future development does not increase runoff and where possible provides a reduction in flood risk. The EA has designated a flood warning area of the ‘River Blackwater at Aldershot and Farnborough’ which highlights the potential for river flooding in this location.

There are very few areas thought to be potentially at a high risk of surface water flooding under a 1:30 event however, under the 1:200 event there are far larger areas at potential risk. These areas are concentrated to the east of Lower Farnham Road in an area that is known to have flooded previously. This suggests that the interaction of drainage and rivers is a critical aspect of flood risk in this area and will need to be carefully considered in any future works to ensure the flood risk is kept to a minimum. It is also essential to ensure that suitable maintenance is carried out on these watercourses and the drainage systems in the higher risk areas to ensure their capacity is maintained.

It is recommended that all developments particularly those in or upstream of the areas identified as being at risk, should undergo detailed surface water assessments for new buildings, car parking or hard standing. This should demonstrate how the run-off rates and volumes would be minimised, with the aim of meeting or bettering greenfield discharge levels. In those areas identified as being most at risk from surface water flooding, development proposals will be required to include mitigation measures to limit the amount of property damage caused.

The recommendations for Aldershot Park are:

- Hampshire County Council as LLFA should lead the investigation into the causes of flooding in Lower Farnham Road (site 3011), Tongham Road (site 3049) and Ash Road (site 3049) and identify potential mitigation options
- The Environment Agency should promote their Flood Warning Service to the occupiers of properties within the River Blackwater at Aldershot and Farnborough flood warning area
- The Planning Authority should aim to ensure future development takes into account those areas highlighted as being at risk both through potential surface water flooding and where drainage has been identified as being at full capacity.
7.2.2. Cherrywood

Cherrywood ward, located in the north east of the borough, contains a mix of residential, commercial and educational properties. To the east it is bounded by the River Blackwater and to the west, the main river of Cove Brook.

Historically, there have been a number of flooding incidents which can be attributed to the Blackwater bursting its banks. These affected the industrial and residential premises on the eastern edge of the borough. The other area known to be affected by flooding is Mayfield Road where investigation and monitoring is underway to determine the cause of the flooding and to identify potential solutions.

There are two main rivers running through the ward. The River Blackwater on the eastern edge and Cove Brook towards the west. Both of these have areas of Flood Zone 3 designated adjacent to the rivers illustrating the potential for river flooding. In addition, these areas are included in two of the Environment Agency’s Flood Warning areas, namely the ‘River Blackwater at Camberley and Sandhurst’ and the ‘Cove Brook at Farnborough’. Whilst it is acknowledged that the majority of people in this area are signed up to this service, it is recommended that the remaining residents are advised to sign up in order to be made aware of potential river flooding.

The potential for surface water flooding is relatively minimal under a 1:30 storm scenario with small areas concentrated in the Mayfield Road area. Under the 1:200 event there is an substantial increase in potential flood risk with areas of particular note being within the estate to the west of Cherrywood Road.

This highlights the importance of maintaining the existing surface water and river systems to provide the maximum amount of drainage and ensuring suitable maintenance.

It also highlights the need for developments to take into account surface water flood risk. Therefore, it is recommended that all developments particularly those in or upstream of the areas identified as being at risk, should undergo detailed surface water assessments for new buildings, car parking or hard standing. This should demonstrate how the run-off rates and volumes would be minimised, with the aim of meeting or bettering greenfield discharge levels. In those areas identified as being most at risk from surface water flooding, development proposals will be required to include mitigation measures to limit the amount of property damage caused.

The recommendations for Cherrywood are:

- The Environment Agency should promote their Flood Warning Service to those properties not already signed up to the River Blackwater at Aldershot and Farnborough flood warning service
- The Planning Authority should aim to ensure future development takes into account those areas highlighted as being at risk both through potential surface water flooding and where drainage has been identified as being at full capacity.
7.2.3. Cove and Southwood Ward

The ward of Cove and Southwood is located to the south west edge of Farnborough, just to the north of Farnborough Airport. It is bounded to the north by the railway lines and to the south by Ively and Elles Roads. It contains areas of dense residential development backed by the Southwood woods and Cove Valley SINCs with other recreational areas in the vicinity including the Southwood golf course.

Historically, there has been minimal flooding in this area although there have been some recorded incidents that have occurred on the edge of the ward including at Kennels Lane, Elles Road, Welbeck and Cove Road.

Works have already been carried out to reduce flood risk on Kennels Lane and this is currently being monitored to assess the effectiveness of the works.

Works have also been carried out on Cove Road to alleviate the flood risk although given the proximity of the river, there is still the potential for flooding under severe rainfall conditions if the river level is already high. However, properties are not thought to be at risk in this location.

Elles Road is thought to suffer from flooding due to the cumulative impact from the level of impermeable surface in the area, all of which drains into Cove Brook. Work has been carried out within Farnborough Airport providing underground attenuation and clearance of existing systems, however, there may be potential in future to provide additional capacity within this area and to regulate the flows into Cove Brook. This may also reduce the flood risk further down stream due to the reduction in flash flows. It is recommended that the capacity of the existing attenuation is assessed and additional attenuation provided within the catchment as part of any additional development.

The main rivers of Cove Brook, Marrow Brook and Iveley Brook run through the ward and mostly fall within Flood Zone 3. At present there are no properties within these areas and this flood plain area should be maintained in future given the existing flood risk and known issues surrounding the capacity of these rivers.

When looking at the potential for surface water flooding, the Flood Map for Surface Water is used and under the 1:30 rainfall event, there is relatively minimal flooding thought to be likely although parts of Southwood, Southwood lane and Ullswater Avenue are shown to be potentially at risk.

Using the 1:200 storm event, the rural area of Southwood shows a dramatically increased risk of flooding and is thought to impact on the estate to the north although there is thought to be a minimal risk to properties in this area. The Ullswater Avenue area is also thought to have a slightly increased risk of flooding as well as the rural area alongside Cove Brook. However, there are thought to be a minimal numbers of properties at risk and this ward is considered to have a relatively low risk overall.
Given the potential surface water flood risk in currently unpopulated areas, it is recommended that all developments particularly those in or upstream of the areas identified as being at risk, should undergo detailed surface water assessments for new buildings, car parking or hard standing. This should demonstrate how the run-off rates and volumes would be minimised, with the aim of meeting or bettering greenfield discharge levels. In those areas identified as being most at risk from surface water flooding, development proposals will be required to include mitigation measures to limit the amount of property damage caused.

The recommendations for Cove and Southwood are:
- Hampshire County Council to assess the existing drainage provision at Farnborough Airport
- The Planning Authority should aim to ensure future development takes into account those areas highlighted as being at risk both through potential surface water flooding and where drainage has been identified as being at full capacity.

7.2.4. Empress Ward
Located at the east of the borough, Empress ward contains a significant amount of commercial development with a number of large industrial estates to the south of the ward. There are also a number of residential properties as well as some recreational areas towards the north.

There have been few historic flooding incidents in this ward and those that have occurred have affected Elles Road and Eelmoor Road. The flood incident in Elles Road has been discussed under section 7.2.3.

Eelmoor Road is known to flood under heavy rainfall although this largely affects the industrial estate as opposed to residential properties and will not be investigated further at this time given the minimal impact of the flooding. However, it is recommended that the occupiers of industrial estate properties are made aware of the potential for flooding.

A small section of Marrow Brook runs to the south west of the ward although this is not included in the Environment Agency Flood Zone 3 which illustrates the low flood risk of the watercourse in this area. However, the River Blackwater is located at the north eastern-most point of the ward and a small section of this is designated as within Flood Zone 3 although there are no properties thought to be affected within this area.

There are relatively few areas thought to be at risk of surface water flooding under a 1:30 storm scenario however, those that are include Westmead and the area adjacent to the railway line at Farnborough Green.
Under the more severe 1:200 storm scenario, the level of flood risk is increased in the Westmead and Kingsmead area as well as the Invincible Road area of Invincible Road Industrial Estate. It is recommended that the occupiers of property in the Invincible Road Industrial Estate are contacted to advise of the potential flood risk in order for them to make any suitable alterations to their surface water drainage or property resilience.

It is also recommended that all developments particularly those in or upstream of the areas identified as being at risk, should undergo detailed surface water assessments for new buildings, car parking or hard standing. This should demonstrate how the run-off rates and volumes would be minimised, with the aim of meeting or bettering greenfield discharge levels. In those areas identified as being most at risk from surface water flooding, development proposals will be required to include mitigation measures to limit the amount of property damage caused.

The recommendations for Empress are:
- Hampshire County Council to promote the information within this SWaMP to those areas thought to be at a potential risk of surface water flooding
- The Planning Authority should aim to ensure future development takes into account those areas highlighted as being at risk both through potential surface water flooding and where drainage has been identified as being at full capacity.

7.2.5. Fernhill Ward
The Ward of Fernhill is located at the northern-most point of Rushmoor bounded to the south by the M3. It is a densely populated residential area and contains part of Hawley Common, designated as a SSSI.

Historically there have been flooding incidents in a number of locations across the ward as identified in the Rushmoor Strategic Flood Risk Assessment although the majority of these have not been known to flood in recent years.

There are several areas where flooding has been known to occur more recently as identified within Hampshire County Council’s flood risk database and illustrated within the mapping in Appendix D. The majority of these areas have had works carried out to ensure the existing highway drainage is functioning correctly and to provide additional capacity. However, these sites will be monitored and if further flooding occurs, will be reassessed to identify if additional works are required.

There are a number of small watercourses running through this ward with the main river of Hawley Lake Stream towards the west and a small section of the River Blackwater at the eastern edge of the ward. The River Blackwater is known to have flooded historically and, for this reason, this area is designated
as Flood Zone 3 and is also within the Environment Agency Flood Warning area known as ‘Cove Brook at Farnborough’. Hawley Lake Stream, despite the proximity of the river to residential properties, is not thought to pose a significant flood risk from river flooding. None of this area is classified as being within a Flood Warning Area although there is a small area which is classified as Flood Zone 3 between Hawley Lake and Sandy Lane. This area is not known to have flooded historically but care will need to be taken if any works are carried out that could impact on flood risk.

When looking at the potential for surface water flooding, the flood map for surface water is considered to give the best representation for this area. Using this information under a 1:30 year storm scenario there are few areas thought to be at high risk of flooding with small areas concentrated adjacent to the M3.

When looking at the 1:200 storm which is considered to be an extreme rainfall event, a larger area is affected. The most significant of these areas include Fernhill Road, a large extent of land to the north of the M3 and parts of the residential area to the north of Sandy Lane.

It is recommended that all developments particularly those in or upstream of the areas identified as being at risk, should undergo detailed surface water assessments for new buildings, car parking or hard standing. This should demonstrate how the run-off rates and volumes would be minimised, with the aim of meeting or bettering greenfield discharge levels. In those areas identified as being most at risk from surface water flooding, development proposals will be required to include mitigation measures to limit the amount of property damage caused.

<table>
<thead>
<tr>
<th>The recommendations for Fernhill are:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Hampshire County Council to monitor historic flooding sites to ensure that flood mitigation works are effective.</td>
</tr>
<tr>
<td>• The Environment Agency should promote their Flood Warning Service to those properties not already signed up to the ‘Cove Brook at Farnborough’ flood warning service.</td>
</tr>
<tr>
<td>• The Planning Authority should aim to ensure future development takes into account those areas highlighted as being at risk both through potential surface water flooding and where drainage has been identified as being at full capacity.</td>
</tr>
</tbody>
</table>

### 7.2.6. Knellwood Ward

Knellwood ward is located towards the central, eastern edge of Rushmoor bounded to the east by the River Blackwater and to the west, Farnborough Road and is primarily residential.
There have been a number of flooding incidents in this area both historic and current, particularly in relation to the River Blackwater which runs along the eastern edge.

There are a number of other areas which have been affected by flooding including Sycamore Road which is thought to be due to a combination of sewer overflow and land drainage issues. It is recommended that this site is investigated to determine if flood alleviation works are required.

Flooding is also known to occur at Rectory Road and is believed to have impacted on a number of properties. Although the frequency of flooding has been reduced, it is recommended that further investigation is carried out to determine the cause of flooding and any potential mitigation options.

There are a number of other areas where it is known to flood and these are thought to be due to inadequate surface water drainage. It is recommended that these areas are assessed to determine the existing drainage capacity and if there is scope to provide improvements or to increase the maintenance of these systems to reduce the impact of blockages.

Areas alongside the River Blackwater are designated as Flood Zone 3 and are also covered by the Environment Agency’s Flood Warning area of ‘River Blackwater at Aldershot and Farnborough’. This highlights the potential risk from river flooding and residents in this area are advised to sign up to the Environment Agency flood warning service.

The potential for surface water flooding is thought to be minimal under the 1:30 scenario although there are areas highlighted around the Sycamore Road and Rectory Road areas. This highlights the importance of carrying out investigatory work in these areas where there is known to be a flooding issue. When looking at the more extreme events, namely the 1:200 scenario, there is a large increase in potential flood risk in those areas highlighted under a 1:30 scenario as well as alongside the River Blackwater. This highlights the importance of the interaction between surface water and river flooding. The rest of the ward is thought to have a low risk of potential surface water flooding.

It is recommended that all developments particularly those in or upstream of the areas identified as being at risk, should undergo detailed surface water assessments for new buildings, car parking or hard standing. This should demonstrate how the run-off rates and volumes would be minimised, with the aim of meeting or bettering greenfield discharge levels. In those areas identified as being most at risk from surface water flooding, development proposals will be required to include mitigation measures to limit the amount of property damage caused.
The recommendations for Knellwood are:

- Hampshire County Council to lead on the investigation of the cause of flooding in Sycamore Road (site 3007) and identify potential mitigation options
- Hampshire County Council to lead on the investigation of the cause of flooding in Rectory Road (site 3052) and identify potential mitigation options
- The Environment Agency should promote their Flood Warning Service for those within the River Blackwater at Aldershot and Farnborough flood warning area
- The Planning Authority should aim to ensure future development takes into account those areas highlighted as being at risk both through potential surface water flooding and where drainage has been identified as being at full capacity.

7.2.7. Manor Park Ward
This ward is located at the south of the borough bounded to the west by the railway line and contains a large proportion of residential dwellings as well as small recreational areas.

Historically there have been a number of flooding incidents although the majority of these have had works carried out to alleviate the flood risk. Of the areas that have not been mitigated the most significant include the residential area to the north east of the High Street and the area at the southern edge of Lower Farnham Road which are recommended for further investigation. Other areas include Boxalls Lane which is at a relatively low risk as there is no known property flooding and Church Road where mitigation works have been carried out. Church Road will be monitored to determine the success of the works and put forward for further investigation if appropriate.

One additional area that still has the potential for flood risk is Grosvenor Road. Although some works have been carried out on the highway drainage system, it is possible that the capacity of the main carrier drain is insufficient or that attenuation areas are required. However, there are no properties thought to be at risk of flooding so this is considered to be a relatively low risk issue.

The River Blackwater follows the southern boundary of the borough and is known to have caused flooding historically. However, there is a relatively small section that is classed as Flood Zone 3 though none of it is identified as a flood warning area. Despite this, it is recommended that any future development in this area facilitates a reduction in run off rates to ensure flood risk is not increased.

There is thought to be a potential for surface water flooding to the south of Boxalls Lane where the interaction with the River Blackwater is critical. In addition, the area to the east of Lower Farnham Road is also shown at risk.
under the 1:30 storm scenario. When looking at the 1:200 storm scenario, there is not a significant increase in the area thought to be at risk but the potential depth of water does increase highlighting the need to assess these areas for potential attenuation or ensure the existing capacity is sufficient.

It is recommended that all developments particularly those in or upstream of the areas identified as being at risk, should undergo detailed surface water assessments for new buildings, car parking or hard standing. This should demonstrate how the run-off rates and volumes would be minimised, with the aim of meeting or bettering greenfield discharge levels. In those areas identified as being most at risk from surface water flooding, development proposals will be required to include mitigation measures to limit the amount of property damage caused.

The recommendations for Manor Park are:
- Hampshire County Council to lead on the investigation of the cause of flooding in the Lower Farnham Road area (site 3011) and identify potential mitigation options – as detailed in the recommendations for Aldershot Park.
- The Planning Authority should aim to ensure future development takes into account those areas highlighted as being at risk both through potential surface water flooding and where drainage has been identified as being at full capacity.

7.2.8. North Town Ward

Located in the south east of Rushmoor, bounded by the railway line and A331, this ward contains a significant proportion of industrial and commercial properties as well as large areas of residential property.

There has been a number of flooding incidents historically which are thought to be attributable to the River Blackwater. Eastern Road and Ivy Road are both known to suffer from flooding which is thought to be due to the inability of the surface water drainage being able to discharge into the River Blackwater under high flow conditions. Both of these areas are recommended for further investigation.

There have been other flooding incidents in the ward but works have been carried out in these areas to reduce the flood risk. These works will be monitored and re-assessed if necessary.

To emphasise the flood risk in this area, a large proportion of the eastern edge of the ward is located within the Environment Agency’s Flood Warning area known as the ‘River Blackwater at Aldershot and Farnborough’. Whilst it is acknowledged that the majority of people in this area are signed up to this service, it is recommended that the remaining residents are advised to sign up in order to be made aware of potential river flooding.
The potential for future surface water flooding is illustrated in the 1:30 and 1:200 mapping and these show the potential risk areas to be concentrated to the east of North Lane. However, there are a number of other small areas that have the potential for surface water flooding which highlights the need to give careful consideration to any future development and where possible, provide an increase in the storage capacity of surface water run off.

It is recommended that all developments particularly those in or upstream of the areas identified as being at risk, should undergo detailed surface water assessments for new buildings, car parking or hard standing. This should demonstrate how the run-off rates and volumes would be minimised, with the aim of meeting or bettering greenfield discharge levels. In those areas identified as being most at risk from surface water flooding, development proposals will be required to include mitigation measures to limit the amount of property damage caused.

The recommendations for North Town are:

- Hampshire County Council to lead on the investigation of the cause of flooding in Ivy Road (site 3040) and identify potential mitigation options
- Hampshire County Council to lead on the investigation of the cause of flooding in Eastern Road (site 3041) and identify potential mitigation options
- The Environment Agency should promote their Flood Warning Service to those properties not already signed up to the River Blackwater at Aldershot and Farnborough flood warning service.
- The Planning Authority should aim to ensure future development takes into account those areas highlighted as being at risk both through potential surface water flooding and where drainage has been identified as being at full capacity.

7.2.9. Rowhill Ward

Rowhill ward is a densely populated residential area to the south of the borough bounded to the west by the A325 Farnborough Road.

Historically there have been relatively few flooding incidents in this ward and there is only one area where flooding is still thought to be an issue. This is at Rock Gardens. There are no properties thought to be affected at this location and is not considered to be at high risk.

Although the River Blackwater runs along the southern edge of the ward, there are no flood warning areas and only small sections of Flood Zone 3 highlighting the minimal flood risk of this area.
When looking at the potential for surface water flooding, there are relatively few areas highlighted and those that are follow the route of the River Blackwater and ordinary watercourses as shown on the maps in Appendix D. This highlights the importance of continued maintenance on these watercourses and the need to ensure any additional runoff entering the watercourses is controlled.

However, although the current level of flood risk is low, it is recommended that all developments particularly those in or upstream of areas identified as being potentially at surface water flood risk, should undergo detailed surface water assessments for new buildings, car parking or hard standing. This should demonstrate how the run-off rates and volumes would be minimised, with the aim of meeting or bettering greenfield discharge levels. In those areas identified as being most at risk from surface water flooding, development proposals will be required to include mitigation measures to limit the amount of property damage caused.

The recommendations for Rowhill are:
- The Environment Agency to ensure continued maintenance is carried out on the River Blackwater.
- Hampshire County Council to ensure the riparian landowners are aware of their maintenance responsibilities for ordinary watercourses.
- The Planning Authority should aim to ensure future development takes into account those areas highlighted as being at risk both through potential surface water flooding and where drainage has been identified as being at full capacity.

7.2.10. **St John Ward**

The ward of St John is located in the west of the borough, bounded to the south by the railway line and to the north by the ward of Fernhill and the M3 motorway. It is a densely populated residential area with nearly 3,000 properties.

There is minimal historical flooding within this ward and the three locations known to have flooded previously have all had works carried out which is believed to have alleviated the flood risk. These sites will be monitored to ensure the effectiveness of these works.

As there are no main rivers within this ward, there are no flood warning or flood zone areas. However, there is an ordinary watercourse, named Melrose Ditch which has the potential to influence the level of flood risk within its catchment if not properly maintained. It is recommended that the riparian landowners are informed of the importance of carrying out regular maintenance of this water course in order to minimise flood risk and that local
residents are made aware of the potential risks and the measures they can take to protect their property from it.

When looking at the potential for surface water flooding, there are some areas shown under a 1:200 storm scenario which generally follow the line of the ordinary watercourse. Given the lack of historic incidents under severe rainfall, it is not proposed to carry out works in this area, however, this will be monitored and any future development in these areas should not be allowed to increase the levels of surface water runoff.

It is recommended that all developments particularly those in or upstream of the areas identified as being at risk, should undergo detailed surface water assessments for new buildings, car parking or hard standing. This should demonstrate how the run-off rates and volumes would be minimised, with the aim of meeting or bettering greenfield discharge levels. In those areas identified as being most at risk from surface water flooding, development proposals will be required to include mitigation measures to limit the amount of property damage caused.

The recommendations for St John are:
- Hampshire County Council should ensure riparian landowners are aware of their duties in relation to the maintenance and management of watercourses.
- The Planning Authority should aim to ensure future development takes into account those areas highlighted as being at risk both through potential surface water flooding and where drainage has been identified as being at full capacity.

7.2.11. St Mark’s Ward

St Mark’s ward is one of the largest wards in Rushmoor covering the central area of the borough, bounded to the south by the Basingstoke canal. It includes Farnborough Airport as well as some large industrial estates and a number of areas of environmental importance. The eastern part of the ward contains a mix of residential property and Ministry of Defence estates.

There have been a number of recorded flooding incidents in the north part section of the ward the majority of which require further investigation to determine the cause of flooding or regular maintenance to reduce the risk of flooding. The most critical of these areas is thought to be Netley Street where there is a lack of capacity in the existing surface water system and is recommended for further investigation.

The River Blackwater runs along the eastern edge of the ward however only a small section of the river is designated as Flood Zone 3 and in this location there is a small section of flood warning area known as the ‘River Blackwater at Aldershot and Farnborough’.
The potential risk from surface water is thought to be relatively low. Under a 1:30 scenario there are very few areas shown at being at potential risk. Under the 1:200 event, there is an increase in flood risk, the majority of which is within the Farnborough Airport site, Watts Common and the Queen’s Parade area. These areas are all controlled by third parties and it is recommended that this information is communicated to those parties to allow for works to be carried out in these areas where required.

It is also recommended that all developments particularly those in or upstream of the areas identified as being at risk, should undergo detailed surface water assessments for new buildings, car parking or hard standing. This should demonstrate how the run-off rates and volumes would be minimised, with the aim of meeting or bettering greenfield discharge levels. In those areas identified as being most at risk from surface water flooding, development proposals will be required to include mitigation measures to limit the amount of property damage caused.

<table>
<thead>
<tr>
<th>The recommendations for St Mark’s are:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Hampshire County Council to lead on the investigation of the cause of flooding in Netley Street (site 3008) and identify potential mitigation options</td>
</tr>
<tr>
<td>• Hampshire County Council to ensure Farnborough Airport and the MOD are aware of the potential flood risk in their areas.</td>
</tr>
<tr>
<td>• The Environment Agency to promote their Flood Warning Service for those within the River Blackwater at Aldershot and Farnborough flood zone warning area</td>
</tr>
<tr>
<td>• The Planning Authority should aim to ensure future development takes into account those areas highlighted as being at risk both through potential surface water flooding and where drainage has been identified as being at full capacity.</td>
</tr>
</tbody>
</table>

7.2.12. **Wellington Ward**

This is a very large ward towards the south of Rushmoor and bounded to the north by the Basingstoke canal. To the west is a large rural area which is designated as being of environmental importance. Part of this area is controlled by the Ministry of Defence as is the residential area to the central and eastern area of the ward.

South of Wellington Avenue there is a mix of commercial and residential properties including the main Aldershot railway line and station.

There are very few areas of the ward known to have suffered from significant surface water flooding incidents in the past.

Within the ward there is a small section of the River Blackwater at the eastern edge which is classed as Flood Zone 3 and the ‘River Blackwater at Aldershot and Farnborough’ flood warning area. However, there are no residential
properties in this area so the flood risk is minimal. There are no other main rivers and only a couple of small watercourses within the ward which run through the rural area of Ravine Head to the west of the ward.

Given the rural nature of the ward there is thought to be a relatively low risk of surface water flooding. The potential flood risk mapping does highlight some areas that could be at risk under severe rainfall conditions in the High Street and Cole Avenue but these are not thought to pose a significant risk.

Although the current level of flood risk is low, it is recommended that all developments particularly those in or upstream of areas identified as being potentially at surface water flood risk, should undergo detailed surface water assessments for new buildings, car parking or hard standing. This should demonstrate how the run-off rates and volumes would be minimised, with the aim of meeting or bettering greenfield discharge levels. In those areas identified as being most at risk from surface water flooding, development proposals will be required to include mitigation measures to limit the amount of property damage caused.

The recommendations for Wellington are to:

- The Environment Agency to ensure continued maintenance is carried out on the River Blackwater.
- Hampshire County Council to ensure the riparian landowners are aware of their maintenance responsibilities for ordinary watercourses.
- The Planning Authority should aim to ensure future development takes into account those areas highlighted as being at risk both through potential surface water flooding and where drainage has been identified as being at full capacity.

7.2.13. **West Heath Ward**

West Heath ward is located in north central Rushmoor to the south of the M3. It is a dense residential area with the main river of Cove Brook running south to north through the centre of the ward and Hawley Lake Stream towards the west.

Historically, there have been a number of flooding incidents including the Cheyne Way area where Cove Brook burst its banks and also due to the inability of surface water being able to discharge into the river. It is recommended that further work is carried out in this area to alleviate the flood risk.

Flooding is also known to occur on Sunnybank Road, Fernhill Road, Medway Drive, Giffard Drive, Houseman Road and Kingsley Road all of which are thought to be attributable to surface water being unable to discharge into the Cove Brook or the Cove Brook exceeding its banks. It is recommended that
the relevant parties ensure that suitable maintenance is carried out in these areas to ensure the existing capacity is maximised. They should also assess whether there is the potential for additional attenuation to alleviate flood risk. It is also recommended that the flooding on Sunnybank Road be investigated further to determine if any mitigation works are feasible.

Given the known flooding history in the Cove Brook area, there is a substantial section of this watercourse and the surrounding flood plain that is designated as Flood Zone 3 and part of this is also in the ‘Cove Brook to Farnborough’ flood warning area although this is located towards the north of the ward.

Given the level of flood risk in this area, it is recommended that residents within this area sign up to the Environment Agency’s flood warning service which will give an indication of the likelihood of flooding.

Looking at the potential for surface water flooding under a 1:30 event, there are very few areas thought to be at risk.

Under a 1:200 event there is a large increase in areas potentially at risk concentrated within the estate bounded by Giffard Drive and Beta Road. Other areas highlighted include smaller areas alongside Fernhill Road and the route of Hawley Lake Stream.

Given the potential risk in these areas it is recommended that all developments particularly those in or upstream of the areas identified as being at risk, should undergo detailed surface water assessments for new buildings, car parking or hard standing. This should demonstrate how the run-off rates and volumes would be minimised, with the aim of meeting or bettering greenfield discharge levels. In those areas identified as being most at risk from surface water flooding, development proposals will be required to include mitigation measures to limit the amount of property damage caused.

The recommendations for West Heath are to:

- Hampshire County Council to lead on the investigation of the cause of flooding in Cheyne Way (site 3065) and identify potential mitigation options.
- Hampshire County Council to lead on the investigation of the cause of flooding in Sunnybank Road (site 3066) and identify potential mitigation options.
- Hampshire County Council and the Environment Agency to ensure suitable maintenance is continued on the Cove Brook and that riparian owners are aware of their responsibilities.
- The Environment Agency to promote their Flood Warning Service for those within the Cove Brook to Farnborough flood warning area.
- The Planning Authority should aim to ensure future development takes into account those areas highlighted as being at risk both through potential surface water flooding and where drainage has been identified as being at full capacity.
7.3. Flooding Hotspots Requiring Further Assessment

The assessment of flood risk within each ward in section 7.2 above makes a number of recommendations for action to address that risk. These recommendations are captured and elaborated in the Action Plan attached at appendix E.

There are a number of sites where the causes of flooding are complex and will require additional investigation to understand the mechanisms of flooding and potential mitigation options. These sites are listed below.

It must be noted that this is a preliminary list and other sites may be investigated prior to those identified if further information identifies an increased flood risk.

The sites identified are as follows:

<table>
<thead>
<tr>
<th>Rank</th>
<th>GIS Reference</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3010</td>
<td>Ash Road / High Street, Aldershot</td>
</tr>
<tr>
<td>2</td>
<td>3011</td>
<td>Lower Farnham Road, Aldershot</td>
</tr>
<tr>
<td>3</td>
<td>3065</td>
<td>Cheyne Way, Farnborough</td>
</tr>
<tr>
<td>4</td>
<td>3052</td>
<td>Rectory Road, Farnborough</td>
</tr>
<tr>
<td>5</td>
<td>3040</td>
<td>Ivy Road, Aldershot</td>
</tr>
<tr>
<td>6</td>
<td>3041</td>
<td>Eastern Road, Aldershot</td>
</tr>
<tr>
<td>7</td>
<td>3007</td>
<td>Sycamore Road, Farnborough</td>
</tr>
<tr>
<td>8</td>
<td>3008</td>
<td>Netley Street / Osborne Road, Farnborough</td>
</tr>
<tr>
<td>9</td>
<td>3066</td>
<td>Sunnybank Road, Farnborough</td>
</tr>
<tr>
<td>10</td>
<td>3049</td>
<td>Tongham Road, Aldershot</td>
</tr>
<tr>
<td>11</td>
<td>3053</td>
<td>A325 Farnborough Road, Farnborough</td>
</tr>
</tbody>
</table>

Table 1: Flooding Hotspots Requiring Further Assessment
Figure 5: Location of Sites Recommended for Further Assessment
7.4. Managing the Potential for Flood Risk

The following table summarises the number of properties thought to be located within areas at risk of surface water under both a 1:30 and 1:200 storm events. This information was extracted from the Environment Agency’s Flood Map for Surface Water and must be used with caution as it is not designed to identify individual properties at risk. However, it can be used to provide an indication of which areas may have a higher relative risk than others.

<table>
<thead>
<tr>
<th>Ward</th>
<th>Total number of properties per Ward.</th>
<th>Number of properties at risk</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1:30 deep</td>
</tr>
<tr>
<td>Cove and Southwood</td>
<td>3104</td>
<td>7</td>
</tr>
<tr>
<td>Empress</td>
<td>3098</td>
<td>12</td>
</tr>
<tr>
<td>Fernhill</td>
<td>2924</td>
<td>20</td>
</tr>
<tr>
<td>Cherrywood</td>
<td>3165</td>
<td>1</td>
</tr>
<tr>
<td>Aldershot Park</td>
<td>3146</td>
<td>67</td>
</tr>
<tr>
<td>Knollwood</td>
<td>3100</td>
<td>39</td>
</tr>
<tr>
<td>Manor Park</td>
<td>3611</td>
<td>36</td>
</tr>
<tr>
<td>North Town</td>
<td>3051</td>
<td>11</td>
</tr>
<tr>
<td>Rowhill</td>
<td>3185</td>
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</tr>
<tr>
<td>St John</td>
<td>2840</td>
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</tr>
<tr>
<td>St Mark</td>
<td>3481</td>
<td>21</td>
</tr>
<tr>
<td>West Heath</td>
<td>2721</td>
<td>0</td>
</tr>
<tr>
<td>Wellington</td>
<td>2820</td>
<td>38</td>
</tr>
<tr>
<td>Rushmoor Borough Totals</td>
<td>40246</td>
<td>292</td>
</tr>
</tbody>
</table>

Table 2: Properties potentially at risk from surface water flooding
Shallow = 100mm depth, Deep = 300mm depth (see section 6.2)

7.5. Managing Flood Risk

The assessment of flood risk within each area in section 7.2 above makes a number of recommendations which are common for the borough as a whole and there are also additional actions that can be taken to reduce the potential for flooding. These recommendations are summarised below and are also elaborated on in the Action Plan attached at appendix E.

Proactive measures can be undertaken to reduce the level of risk such as reviewing drainage maintenance programmes. It is recommended that when drainage maintenance works are being carried out in areas where flooding is shown to be a potential risk (from the potential flood risk maps), an assessment is carried out on the existing drainage capacity. If it is shown that there is already more capacity in the drainage than assumed in the modelling...
then it could be shown that the areas are at less risk. The potential effects of climate change also need to be considered and it is recommended that where feasible, additional capacity is provided in the order of 30%. This is not always feasible and a whole catchment analysis should be carried out to ensure that flood risk is not increased downstream. The retro-fitting of SuDS and upstream attenuation can be an effective method of increasing capacity without adversely impacting the downstream catchment.

Given the size of the borough, this is a significant task and is unlikely to be carried out in a short period of time. However, as those areas currently affected by flooding are assessed and the flood risk reduced, attention can be centred on those areas potentially at future risk.

The issues around riparian ownership are also essential and these roles and responsibilities need to be publicised more fully. This should be undertaken through the publication and promotion of this document and others which explain the roles and responsibilities in more detail. Targeted publicity should also be carried out in areas where the lack of maintenance is known to be an issue.

In all cases, the homeowners should be made aware of methods of protecting their home. This has the added benefit of demonstrating a lower risk to insurance companies which could have a financial benefit for those living in these areas.

The Environment Agency has a large amount of information relating to this already on its website and, through means such as parish flood plans and multi-agency flood plans, information can be provided to each community.

In addition to this, home owners can subscribe to the Environment Agency’s Flood Warning Service where it is available, which can help to provide advance warning of flooding and assist in the preparation for flooding.

It is recommended that the information in this SWMP is publicised so as to raise awareness of the information available to assist the public in identifying the potential level of risk in their area and to assist in the provision of property level protection information.

All new buildings and the development of car parking and hard standing should incorporate sustainable drainage systems with the aim of returning runoff rates and volumes back to the original greenfield discharge to prevent flooding and to ensure the quality of local water. Where this document identifies a risk of surface water flooding, detailed surface water assessments should be submitted for all applications for new buildings, car parking and hard standing areas.

This is in line with Rushmoor Borough Council’s Core Strategy and requirements for new development.
8. Evaluation of Options and Considerations

In order to determine the suitability of mitigation options for these locations a preliminary assessment of each identified flood location will be required in order to determine the cause of flooding, factors contributing to flooding and whether any works can be undertaken in order to remove or reduce the risk of flooding.

At this phase of evaluation, options should not be constrained by availability of funding or delivery mechanisms and should identify all feasible measures available for managing surface water flood risk. Consideration should also be given to other sources of flooding and their interaction with surface water flooding and opportunities for measures that deliver multiple benefits.

In some cases it may not be possible or cost-effective to undertake mitigation works at present but the consideration of other investment projects such as those of the water companies, developers or other partners may make the mitigation of surface water flood risk more viable.

In these instances, the SWMP should identify a suitable strategy to ensure the investment reduces surface water flood risk.

It is recommended that the borough council takes into account areas identified as having the potential for surface water flooding as identified within this Surface Water Management Plan and identifies the need for flood risk mitigation infrastructure when setting its Community Infrastructure Levy.

It is vital that key partners and stakeholders, including the local community, are engaged in this process. This can help determine the level of public interest and support for risk management as well as the appetite for local fund-raising to assist in the delivery of flood mitigation and alleviation measures.

It is recommended that short-listing of these measures is undertaken using a two stage process, as defined in the Defra Technical Guidance. Stage 1 of this process requires further site inspections to consider firstly the technical feasibility and relevance of each measure at each of the detailed sites. This adopted the following scoring system:

3 - Feasible with significant benefit;
2 - Feasible with some benefit;
1 - Feasible but marginal benefit; and
0 - Not Feasible or Not Relevant.

Only measures which score 2 or more will be considered further under Stage 2. Stage 2 considers individual measures scored against various criteria, with scores summed to generate a short-list. These short-listing criteria are outlined in Table 3 below. The purpose of the scoring is to rank individual measures to identify those to take forward for more detailed appraisal.
key criterion is whether the measures will assist in meeting the objectives established at the outset of the SWMP.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical</td>
<td>Is it technically possible and buildable? Will it be robust and reliable?</td>
<td>U (Unacceptable) – measures eliminated from further consideration.</td>
</tr>
<tr>
<td>Economic</td>
<td>Will benefits exceed costs?</td>
<td>-2 Severe negative outcome</td>
</tr>
<tr>
<td>Social</td>
<td>Will the community benefit or suffer from implementation of the measure?</td>
<td>-1 Moderate negative outcome</td>
</tr>
<tr>
<td>Environmental</td>
<td>Will the environment benefit or suffer from implementation of the measure?</td>
<td>0 Neutral</td>
</tr>
<tr>
<td>Objectives</td>
<td>Will it help to achieve the objectives of the SWMP partnership?</td>
<td>+1 Moderate positive outcome</td>
</tr>
<tr>
<td></td>
<td></td>
<td>+2 High positive outcome</td>
</tr>
</tbody>
</table>

Table 3: Example of Short-Listing Criteria (taken from Defra Technical Guidance)

Sites considered for mitigation against flood risk arising from surface water will be assessed against these criteria to identify suitable measures for reducing or removing the risk. Those options scoring 5 or more will be considered in more detail, either individually or in combination, in order to determine the preferred option of greatest overall benefit.

9. Implementation and Recommendations

The Action Plan is an essential part of a SWMP. It summarises the actions and recommendations made within this SWMP as well as those areas requiring more detailed investigation. In order for the Action Plan to be effective, it will require agreement from each stakeholder and a commitment that the actions will be undertaken within agreed timescales.

These recommendations can be summarised in four general categories:

- Communication
- Maintenance and Capital Schemes (implementation)
- Policy and Procedures
- Emergency Planning

In addition to this, there is an action plan for each ward providing more details on individual sites, schemes and other measures to assist in the reduction of flood risk.

The Action Plans can be found in Appendix E.
Although the actions are identified within the Action Plans, a brief summary of actions for each authority or responsible body is identified below:

**Hampshire County Council (as LLFA and Highway Authority)**
- To publicise this SWMP and the information within it so as to raise awareness of the information available to assist the public in identifying the potential level of risk in their area and to assist in the provision of property level protection information.
- To take the lead in ensuring that there is a suitable level of communication with the public and other stakeholders as well as appropriate links made with other work/strategies.
- To ensure suitable maintenance is carried out on highway drainage and ensure others are aware of their maintenance responsibility particularly riparian landowners in relation to ordinary watercourses.
- To take the lead on the additional investigations and assessments identified with section 7.2 and within the Action Plan.
- To work with stakeholders to develop proposals for capital works which should be fed through the Local Flood Risk Management Strategy in order to bid for funding.

**Rushmoor Borough Council**
- To ensure future developments undergo detailed surface water assessments to take into account those areas highlighted as being at risk both through potential surface water flooding and where drainage has been identified as being at full capacity.
- To promote the use of sustainable and suitable drainage systems within all development.
- To work with the LLFA to reduce the impact of flooding where possible in the Borough of Rushmoor.

**Environment Agency**
- To promote the use of the flood warning and alert services where available, for both groundwater and river flood risk.
- To ensure suitable maintenance is carried out in relation to main rivers.
- To work with the LLFA to reduce the impact of flooding where possible in the Borough of Rushmoor.

**Thames Water**
- To provide, maintain and extend a system of public sewers in their area.
- To work with the LLFA to reduce the impact of flooding where possible in the Borough of Rushmoor.

**Riparian Landowners**
- To ensure the appropriate level of maintenance is carried out to watercourses and ditches on or adjacent to their properties.
10. Review and Monitoring

In order for a Surface Water Management Plan to be effective, it will require updating when new information is obtained. This could include additional sites affected by flooding or completion of schemes reducing the risk in a particular area. Changes to legislation and guidance and the availability of funding will also need to be considered at a national and/or local level.

Given the range of documentation that could be updated within different timescales, this SWMP will remain as a live document and will be updated as situations change.

The action plan will be reviewed on an annual basis to ensure that each party is progressing their relevant actions. This will also aid in the identification and preparation of schemes to be put forward onto the capital scheme programme.

Although the areas identified within this document have undergone an initial investigation and assessment, it is essential that any flood incidents that occur in the future are identified, assessed and put into future work programmes as appropriate.

This need is consistent with the requirement to investigate flooding under section 19 of the Flood and Water Management Act 2010. Section 19 states that on becoming aware of a significant flooding event the County Council, in its role as Lead Local Flood Authority must, to the extent that it considers it necessary or appropriate, investigate which risk management authorities have relevant flood risk management functions, and whether each of those risk management authorities has exercised, or is proposing to exercise, those functions in response to the flood.

In order to fulfil this requirement and to ensure an investigation is of the most benefit to the community, Hampshire County Council will also investigate the cause and effects of significant flood incidents and make recommendations on reducing the risk of the flood incident reoccurring. These reports will be linked to the relevant SWMP and any agreed recommendations added to the action plan.

To facilitate the reporting of significant flood incidents, a standard template has been developed and is available for all parties to complete and forward to the LLFA. This form will be available on Hampshire County Council’s flood risk management web pages (www.hants.gov.uk/flooding).

However, if public sewer flooding occurs, the incident must be reported by the home owner directly to Thames Water. This ensures that all incidents can be entered onto the Thames Water database and the frequency and severity of events will be used as justification for future works. Therefore, if the reports are not submitted, there is no evidence or justification for carrying out investigation or improvement works. These reports can be submitted through
the Thames Water website (www.thameswater.co.uk) or by contacting their help line on 0845 9200 800.

Any reviews or updates on this document will be carried out between the key stakeholders as identified in section 5. If there is a particular issue relating to other stakeholders, they will also be invited to assist with this procedure.

11. Conclusion

This intermediate level SWMP has set out to ensure that all flood risk partners work together to understand the locations, causes and effects of flooding within the borough of Rushmoor and to identify measures to mitigate against flooding in the form of an Action Plan.

It has done this through regular stakeholder meetings, which will be continued, using local knowledge to identify, map and assess those areas where surface water flooding has been or has the potential to be a high risk.

It has identified a number of areas where additional work is required, both in terms of assessment of flood risk and physical mitigation works in order to reduce the level of flood risk. This work will constitute a detailed SWMP and these will be undertaken on a countywide risk prioritised basis to ensure time and resources are directed to the areas at highest risk.

Recommendations have been made which cover a wide range of areas including effective communication, policy and schemes and has sought to highlight the outcomes from this report to all parties who may be able to influence and reduce risk.

This report will continue to develop as flood risk is better understood and as additional flood risk areas are identified, ultimately leading to a reduction in the risk of flooding as well as an increase in the understanding of flood risk across the borough.
## 12. Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>AONB</td>
<td>Area of Outstanding Natural Beauty</td>
</tr>
<tr>
<td>CFMP</td>
<td>Catchment Flood Management Plan</td>
</tr>
<tr>
<td>CLG</td>
<td>Communities and Local Government</td>
</tr>
<tr>
<td>DEFRA</td>
<td>Department for Environment, Food and Rural Affairs</td>
</tr>
<tr>
<td>DPD</td>
<td>Development Plan Document</td>
</tr>
<tr>
<td>EA</td>
<td>Environment Agency</td>
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<tr>
<td>FoIA</td>
<td>Freedom of Information Act</td>
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<tr>
<td>FRA</td>
<td>Flood Risk Assessment</td>
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<tr>
<td>FRM</td>
<td>Flood Risk Management</td>
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<tr>
<td>FRR</td>
<td>Flood Risk Regulations 2009</td>
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<tr>
<td>FWMA</td>
<td>Flood and Water Management Act 2010</td>
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<tr>
<td>GIS</td>
<td>Geographical Information Systems</td>
</tr>
<tr>
<td>HCC</td>
<td>Hampshire County Council</td>
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<tr>
<td>LDF</td>
<td>Local Development Framework</td>
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<tr>
<td>LLFA</td>
<td>Lead Local Flood Authority</td>
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<tr>
<td>LPA</td>
<td>Local Planning Authority</td>
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<tr>
<td>LRF</td>
<td>Local Resilience Forum</td>
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<tr>
<td>MAFP</td>
<td>Multi-Agency Flood Plans</td>
</tr>
<tr>
<td>NPPF</td>
<td>National Planning Policy Framework</td>
</tr>
<tr>
<td>PFRA</td>
<td>Preliminary Flood Risk Assessment</td>
</tr>
<tr>
<td>RBC</td>
<td>Rushmoor Borough Council</td>
</tr>
<tr>
<td>RBMP</td>
<td>River Basin Management Plan</td>
</tr>
<tr>
<td>RFCC</td>
<td>Regional Flood and Coastal Committee</td>
</tr>
<tr>
<td>SAC</td>
<td>Special Area of Conservation</td>
</tr>
<tr>
<td>SFRA</td>
<td>Strategic Flood Risk Assessment</td>
</tr>
<tr>
<td>SINC</td>
<td>Sites of Importance for Nature Conservation</td>
</tr>
<tr>
<td>SMP</td>
<td>Shoreline Management Plan</td>
</tr>
<tr>
<td>SPA</td>
<td>Special Protection Area</td>
</tr>
<tr>
<td>SSSI</td>
<td>Sites of Special Scientific Interest</td>
</tr>
<tr>
<td>SuDS</td>
<td>Sustainable Drainage Systems</td>
</tr>
<tr>
<td>SWMP</td>
<td>Surface Water Management Plan</td>
</tr>
<tr>
<td>UKCIP</td>
<td>UK Climate Impacts Programme</td>
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<tr>
<td>WFD</td>
<td>Water Framework Directive</td>
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</table>
### Glossary

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Aquifer</td>
<td>Layer of water-bearing permeable rock, sand of gravel which is capable of providing significant amounts of water.</td>
</tr>
<tr>
<td>Catchment Flood Management Plan (CFMP)</td>
<td>Strategic planning tool through which the Environment Agency works with other key decision-makers within a river catchment to identify and agree policies for sustainable flood risk management.</td>
</tr>
<tr>
<td>Combined Sewer System</td>
<td>Sewer system that carries both sewage and storm water.</td>
</tr>
<tr>
<td>Core Strategy</td>
<td>A Development Plan Document setting out the spatial vision and strategic objectives of the planning framework for an area, having regard to the Community Strategy.</td>
</tr>
<tr>
<td>Cost-Benefit Analysis</td>
<td>Analysis which quantifies in monetary terms the costs and benefits of a proposed scheme, including items which the market does not provide a readily available monetary value for. Sometimes referred to as Benefit-Cost Analysis.</td>
</tr>
<tr>
<td>Critical Drainage Area</td>
<td>Defined in the Town and Country Planning Act as an area within Flood Zone 1 which has critical drainage problems and which has been notified to the local planning authority by the Environment Agency. Also identified within the Strategic Flood Risk Assessment based on recorded and anecdotal historical flood events.</td>
</tr>
<tr>
<td>Department for Environment, Food and Rural Affairs (Defra)</td>
<td>Department that brings together the interests of farmers and the countryside; the environment and the rural economy, the food we eat, air we breathe and the water we drink.</td>
</tr>
<tr>
<td>DG5 Register</td>
<td>A water company held register of properties which have experienced sewer flooding (either internal or external flooding) due to hydraulic overload, or properties which are ‘at risk’ of sewer flooding more frequently than once in 10 years.</td>
</tr>
<tr>
<td>Designing for Exceedance</td>
<td>Designing for Exceedance is an engineering philosophy or approach which aims to plan for and manage flows which are larger than the designed capacity of infrastructure during rainfall events. An example of designing for exceedance would be the use of car parks to store water during flood events. Construction Industry Research and Information Association (CIRIA) have published a designing for exceedance best practice manual.</td>
</tr>
<tr>
<td>Environment Agency</td>
<td>The Environment Agency is the leading public body for protecting and improving the environment in England and Wales today and for future generations. The organisation is responsible for wide-ranging matters, including the management of flood risk from main rivers and the coast, water resources, water quality, waste regulation, pollution control, inland fisheries, recreation, conservation and navigation of inland waterways. It will also have a new strategic overview</td>
</tr>
<tr>
<td><strong>Essential Infrastructure</strong></td>
<td>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 critical operational reasons, including electricity generating power stations and grid and primary substations; water treatment plants; and sewage treatment plants if adequate measures to control pollution and manage sewage during flooding events are in place.</td>
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<tr>
<td><strong>Exceedance Flows</strong></td>
<td>Excess flow that appears on the surface once the capacity of the underground drainage system is exceeded.</td>
</tr>
<tr>
<td><strong>Floods Directive</strong></td>
<td>The EU Floods Directive came into force in November 2007 and is designed to help Member States prevent and limit the impact of floods on people, property and the environment. It was transposed into English law in December 2009 by the Flood Risk Regulations.</td>
</tr>
<tr>
<td><strong>Flood Risk Assessment (FRA)</strong></td>
<td>An assessment of the likelihood and consequences of flooding in a development area so that development needs and mitigation measures can be carefully considered.</td>
</tr>
<tr>
<td><strong>Flood and Water Management Act 2010 (FWMA)</strong></td>
<td>An Act to make provision about water, including provision about the management of risks in connection with flooding and coastal erosion.</td>
</tr>
<tr>
<td><strong>Flood Zones</strong></td>
<td>These are a national dataset held by the Environment Agency and show the predicted probability of flooding for any given area. The zones were created following Defra’s Making Space for Water pilot study. This was a Government programme that sought to take forward the developing strategy for flood and coastal erosion risk management in England.</td>
</tr>
<tr>
<td><strong>Flood Zone 1</strong></td>
<td>Low probability of flooding – Land considered as having less than 1 in 1000 annual probability of river or sea flooding in any year (&lt;0.1%).</td>
</tr>
<tr>
<td><strong>Flood Zone 2</strong></td>
<td>Medium probability of flooding – Land considered as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% to 0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding in any year (0.5% to 0.1%).</td>
</tr>
<tr>
<td><strong>Flood Zone 3a</strong></td>
<td>High probability of flooding – Land considered as having a 1 in 100 or greater annual probability of river flooding (&gt;1%) or a 1 in 200 or greater annual probability of flooding from the sea in any year (&gt;0.5%).</td>
</tr>
<tr>
<td><strong>Flood Zone 3b</strong></td>
<td>The Functional Floodplain – This zone comprises land where water has to flow or be stored in times of flood. Land within this zone is considered to flood with an annual probability of 1 in 20 (5%) or greater in any year, or has been designed to flood in an extreme event.</td>
</tr>
<tr>
<td><strong>Term</strong></td>
<td><strong>Definition</strong></td>
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</tr>
<tr>
<td>GIS</td>
<td>Software package used for spatial mapping and analysis of data.</td>
</tr>
<tr>
<td>Greenfield Run-off Rate</td>
<td>The rate of runoff which would occur from a site that was undeveloped and undisturbed.</td>
</tr>
<tr>
<td>Groundwater flooding</td>
<td>Flooding caused by raised groundwater levels, typically following prolonged rain. High groundwater levels may result in increased overland flow flooding.</td>
</tr>
<tr>
<td>Lead Local Flood Authority (LLFA)</td>
<td>Lead Local Flood Authorities are unitary authorities or County Councils, and have been established as part of the Flood and Water Management Act. LLFAs are responsible for leading the co-ordination of flood risk management in their area, but can delegate flood or coastal erosion functions to another risk management authority by agreement.</td>
</tr>
<tr>
<td>Local Development Framework (LDF)</td>
<td>A non-statutory term used to describe a folder of documents which includes all the local planning authority’s Local Development Documents (LDDs). The local development framework will also comprise the statement of community involvement, the local development scheme and the annual monitoring report.</td>
</tr>
<tr>
<td>Local Resilience Forums (LRF)</td>
<td>LRFs are multi-agency forums, bringing together all organisations who have a duty to co-operate under the Civil Contingencies Act, and those involved in responding to emergencies. They prepare emergency plans in a co-ordinated manner.</td>
</tr>
<tr>
<td>Main River</td>
<td>Main Rivers are usually larger streams and rivers, but also include smaller watercourses of strategic drainage importance. A main river is defined as a watercourse shown as such on a main river map, and can include any structure or appliance for controlling or regulating flow or water in, into or out of a main river. The Environment Agency’s powers to carry out flood defence works apply to main rivers only. Main rivers are designated by Defra.</td>
</tr>
<tr>
<td>Multi-Agency Flood Plans (MAFP)</td>
<td>Multi-Agency Flood Plans are specific emergency plans which should be developed by LRFs, to deliver a coordinated plan to respond to flood incidents.</td>
</tr>
<tr>
<td>National Planning Policy Framework</td>
<td>Sets out Government policy on development and flood risk to ensure that flood risk is taken into account at all stages in the planning process, to avoid inappropriate development in areas at high risk of flooding, and to direct development away from areas at highest risk.</td>
</tr>
<tr>
<td>Ordinary Watercourse</td>
<td>An ordinary watercourse is any other river, stream, ditch, cut, sluice, dyke or non-public sewer which is not a Main River. The Lead Local Authority has consenting and enforcement powers for these features under the Land Drainage Act.</td>
</tr>
<tr>
<td>Overland Flow/Surface Water Run-Off</td>
<td>Water flowing over the ground surface that has not reached a natural or artificial drainage channel.</td>
</tr>
<tr>
<td>Pitt Review</td>
<td>An independent review of the 2007 summer floods by Sir Michael Pitt, which provided recommendations to improve flood risk management in England.</td>
</tr>
<tr>
<td>Type</td>
<td>Description</td>
</tr>
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<td>-----------------------------------------</td>
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</tr>
<tr>
<td>Pluvial Flooding</td>
<td>‘Pluvial’ flooding (or surface runoff flooding) is caused by rainfall and is that flooding which occurs due to water ponding on or flowing over the surface before it reaches a drain or watercourse.</td>
</tr>
<tr>
<td>Preliminary Flood Risk Assessment (PFRA)</td>
<td>Requirement under the EU Floods Directive/Flood Risk Regulations. The LLFA must complete a preliminary assessment report on past and future flood risk, and identify significant flood risk areas using national datasets.</td>
</tr>
<tr>
<td>Regional Flood and Coastal Committee (RFCC)</td>
<td>RFCCs have replaced Regional Flood Defence Committees following the Flood and Water Management Act. They consult with the Environment Agency to help develop flood risk management solutions, as well as providing advice on community engagement, coastal erosion, incident management and emergency planning within their regions. They also have a responsibility for raising local levies and providing an accountable forum for testing new ideas and ways of working.</td>
</tr>
<tr>
<td>Resilience Measures</td>
<td>Resilience measures are designed to reduce the impact of water that enters property and businesses, and could include measures such as raising electrical appliances.</td>
</tr>
<tr>
<td>Resistance Measures</td>
<td>Resistance measures are designed to keep flood water out of properties and businesses, and could include flood guards for example.</td>
</tr>
<tr>
<td>Riparian Owners</td>
<td>A riparian owner is someone who owns land or property adjacent to a watercourse. A riparian owner has a duty to maintain the watercourse and allow flow to pass through freely.</td>
</tr>
<tr>
<td>Risk</td>
<td>In flood risk management risk is defined as the probability of a flood occurring x consequence of the flood.</td>
</tr>
<tr>
<td>River Basin Management Plan (RBMP)</td>
<td>A management plan for all river basins required by the Water Framework Directive. These documents will establish a strategic plan for the long-term management of the River Basin District, set out objectives for water bodies and, in broad terms, what measures are planned to meet these objectives, and act as the main reporting mechanism to the European Commission.</td>
</tr>
<tr>
<td>Shoreline Management Plan (SMP)</td>
<td>A plan providing a large-scale assessment of the risk to people and to the developed, historic and natural environment associated with coastal processes. It presents a policy framework to manage these risks in a sustainable manner.</td>
</tr>
<tr>
<td>Strategic Flood Risk Assessment (SFRA)</td>
<td>A SFRA provides information on areas at risk from all sources of flooding. The SFRA should form the basis for flood risk management decisions, and provides the basis from which to apply the Sequential Test and Exception Test (as defined in the National Planning Policy Framework and associated technical guidance, replacing PPS 25) in development allocation and development control process.</td>
</tr>
<tr>
<td><strong>Surface Water Flooding</strong></td>
<td>In the context of this report, surface water flooding describes flooding from sewers and ordinary water courses that occurs as a result of heavy rainfall.</td>
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</tr>
<tr>
<td><strong>Sustainable Drainage Systems (SuDS)</strong></td>
<td>Sustainable drainage systems are a sequence of management practices and control measures designed to mimic natural drainage processes by allowing rainfall to infiltrate and by attenuating and conveying surface water runoff slowly compared to conventional drainage. SUDS can operate at different levels; ideally in a hierarchy of source control, local control and regional control.</td>
</tr>
<tr>
<td><strong>UK Climate Impacts Programme (UKCIP)</strong></td>
<td>UKCIP publishes climate change scenarios on behalf of the Government showing how the UK’s climate might change in this century. The UKCIP02 climate change scenarios are widely used in research into the impacts of climate change.</td>
</tr>
<tr>
<td><strong>Water Framework Directive (WFD)</strong></td>
<td>EC water legislation designed to improve and integrate the way water bodies are managed throughout Europe. The WFD came into force on in December 2000. Member States must aim to reach good chemical and ecological status in inland and coastal waters by 2015.</td>
</tr>
</tbody>
</table>