

Kent County Council

Flood Risk to Communities Sevenoaks



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In partnership with:



Environment
Agency



This document has been prepared by Kent County Council, with the assistance of:

- **The Environment Agency**
- **Sevenoaks District Council**
- **The Upper Medway Internal Drainage Board**
- **Southern Water**

For further information or to provide comments, please contact us at flood@kent.gov.uk

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Introduction to Flood Risk to Communities

This document has been prepared for the residents and businesses of the Sevenoaks District Council area. It provides information on the nature and magnitude of the flood risk across the district, and outlines the existing and proposed approaches to manage the risk identified.

It has been developed with the help and support of the other Risk Management Authorities (RMAs) that operate in Sevenoaks. These include the Environment Agency, Kent County Council, Sevenoaks District Council, Southern Water, Thames Water, and the Upper Medway Internal Drainage Board.

This document aims to provide a summary of:

- the main flood risks to the area,
- the key flood risk management assets/structures,
- any flood risk management plans or strategies that are in place and,
- where to find further information.

All links to plans, strategies and other pertinent information have been shortened to facilitate the use of non-electronic versions of this document.

This is a living document and will be periodically reviewed and revised as any relevant new information or plans become available.

Sevenoaks overview

The district of Sevenoaks is situated in West Kent, bordered by Dartford, Gravesham, Tonbridge and Malling, Tunbridge Wells, Wealden, Mid Sussex, Tandridge and Bromley.

The District covers an area of approximately 363sq km, is predominantly rural, and is interspersed with small towns and villages. The main urban areas are Sevenoaks, Swanley, and Edenbridge.

The district has a diverse countryside comprising chalk downs, large arable fields, woodland, river valleys, historic parks and clay lowland pastures.

The northern part of the District is predominantly underlain by chalk, with the North Downs running east-west to the north of Sevenoaks. The Downs separate the upper and lower reaches of the River Darent and feature prominent escarpments, distinctive dry valleys, historic hedgerows and ancient woodland.

The northern and southern areas are separated by a Greensand Ridge, located immediately to the south of Sevenoaks. This elevated landscape is characterised by rolling farming fields interspersed with woodland and parkland, including the extensive Knole Park. Wooded areas and heath land typically cover the outcrop of the Hythe Beds around Sevenoaks, reflecting the generally poor underlying soils.

To the south of the District, the landscape is dominated by the Vale of Kent, a broad flat landscape predominantly underlain by heavy and impermeable Weald Clay. The River Medway and its tributary, the River Eden, flow from the west to the east, providing drainage to the vale. The broadly agricultural landscape is characterised by pasture fields separated by strips of woodland and scattered small settlements, of which Edenbridge is the largest.

The most significant flood risk to the area arises from the district's two main river systems.

- The River Darent, which flows east from Westerham to Sevenoaks and then north to South Darent where it flows out of the district through to Dartford and on to the River Thames. The River Darent has been historically heavily modified by the mills that used to operate along its course, with its channel often diverted along the valley side, and in places enlarged upstream of the mills to meet their need for water. In some reaches this has resulted in the current river channel not being at the lowest point of the valley; together with some abrupt changes of direction, flooding can be exacerbated during periods of high-flow.
- The River Eden, which enters the district at Edenbridge and flows east, joining the River Medway at Penshurst. The River Medway then leaves Sevenoaks, flowing towards Tonbridge on to Maidstone and the Medway Estuary.

The district's most notable recent flood events are:

- **September 1968** – The extreme flood event in 1968 followed a warm summer that left the soils hard and dry; during the ensuing period of prolonged and extreme rainfall, these initial conditions exacerbated the run-off from the catchment. There was extensive flooding of agricultural land and damage to properties between Westerham and Farningham. Several old bridges were washed away and Dartford was flooded. The 1968 event produced the

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greatest damage in recent times and was the trigger for channel and floodplain conveyance improvements in the Darent.

- **October 2000** – Three successive extreme rainfall events in one month caused severe flooding in many parts of Kent, including from the River Eden around Edenbridge and Penshurst and around the upper sections of the Darent, particularly in Eynsford where there was flooding of some properties and roads. The high rainfall during 2000 made it the wettest year for over 200 years.
- **Winter 2002/03** – The 24th December 2002 signalled the start of a serious flood event in Kent, which lasted until the 3rd January 2003. Over this period three weather fronts moved in from the west each bringing between 20 and 25mm of rain across the area. The most severe weather lingered over the North Downs giving rainfall accumulations of over 100mm. The River Darent catchment was most severely affected in the area, with the worst flooding recorded since 1968. Approximately 50 properties were flooded in Westerham, Brasted, Sundridge, Chipstead, Farningham and South Darenth. In most of these locations flooding was caused by a combination of high river flow with specific local factors such as surface run-off or blocked culverts.
- **Winter 2013/2014** - The period from October 2013 to March 2014 was the second wettest winter for Kent since 1910 (second only to 2000/01). In many areas the flooding was worse than that experienced in 2000/01, with record water levels being experienced on the River Darent and extensive flooding being recorded throughout the Medway Valley and through Westerham, South Chipstead and Sundridge and the surrounding villages.

Flooding from the district's main rivers is overseen and managed by the Environment Agency. The Environment Agency is also responsible for defining the extent of the tidal/fluvial flood zones, which are usually derived from detailed computer models.

Flooding from ordinary watercourses, surface water and groundwater across the borough is recorded and overseen by Kent County Council in their role as Lead Local Flood Authority.

The Upper Medway Internal Drainage Board have a general supervisory duty over all drainage matters within their district, 10% of which lies within the southern, lower lying area of the borough. Within their district they have consenting and enforcement powers for works carried out by others in or adjacent to ordinary watercourses.

The administrative boundaries of Sevenoaks are shown in Figure 1 below.

Figure 1. Sevenoaks District Council

Roles and functions in the management of flood risk

This section sets out the roles, responsibilities and functions of the main bodies that have a part to play in managing flood risk. Further information on the nature of these Risk Management Authorities is set out in Section 3.1 and Annex A of Kent County Council's Local Flood Risk Management Strategy.

Kent's Local Flood Risk Management Strategy can be found at <http://goo.gl/hpw021>

The Environment Agency

The Environment Agency (<https://goo.gl/ohv7Jv>) is a non-departmental public body, responsible to the Secretary of State for Environment, Food and Rural Affairs.

They are responsible for taking a strategic overview of the management of all sources of flooding and coastal erosion. This role includes:

- setting the direction for managing the risks through strategic plans,
- providing evidence and advice to inform Government policy and to support other RMAs,
- working collaboratively to support the development of risk management skills,
- providing a framework and capacity to support local delivery.

The Environment Agency also have operational responsibility for managing the risk of flooding from main rivers, reservoirs, estuaries and the sea (as well as being a coastal erosion risk management authority).

As part of its strategic overview role, the Environment Agency is producing Flood Risk Management Plans with partner Risk Management Authorities (RMAs). Flood Risk Management Plans will highlight the hazards and risks associated with flooding from rivers, the sea, surface water, groundwater and reservoirs; they will set out how RMAs work together with communities to manage flood risk.

The Environment Agency have also prepared the National Strategy for Flood and Coastal Erosion Risk Management to clarify their role and to outline the principles that guide flood risk management in the UK (please see the following [Plans and Strategies](#) section for further information).

Their legal powers relating to FCRM are *permissive* and are largely set out in the Water Resources Act 1991 and the Flood and Water Management Act 2010. The term *permissive* means that they have the power to undertake flood and coastal risk management works but are not legally obliged to undertake such activity. The maintenance of a main river channel and its banks is ultimately the responsibility of the riparian landowner. The Environment Agency has powers of enforcement to ensure that riparian landowners keep any main rivers flowing through their land clear of obstruction.

As with any Risk Management Authority, when they use their permissive powers they must comply with European legislation (particularly the Habitats and Birds Directives, the Floods Directive and the Water Framework Directive) and any other legal requirements.

They prioritise their investment in flood and coastal risk management works according to Government policy (and in line with Treasury guidance on economic appraisal). They implement Government policy such that public money is:

- spent on the works that provide the greatest benefits to society,

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- is spent efficiently and effectively, and
- reflects a partnership approach.

They assess the costs, economic benefits, environmental impact and flood risk to set their spending priorities.

The Environment Agency also have a regulatory role to consent works carried out by others in, under, over or within eight metres of a main river or any associated flood defence (unless a watercourse is tidally influenced, in which case their permission must be sought for all works within 15 metres). The Environment Agency has statutory byelaws specifying the range of operations that are either precluded from occurring, or that require the Environment Agency's formal consent, within this area.

Their formal permission is required to ensure that those works do not adversely affect the operation of the drainage system or cause unnecessary environmental damage.

The local Environment Agency office should be contacted in advance of any planned works taking place. For further information on any of the above, please contact KSLE@environment-agency.gov.uk

Maintenance Protocol (2013)

Maintaining some assets that have been maintained in the past may no longer be economically justifiable or the work may not have a high enough priority for central government FCRM funding over the longer term. In these circumstances, they might decide not to maintain them in the future.

The River Medway and its tributaries are split by communities according to the risk of flooding and its economic impact, these are known as asset systems. Each system has a System Asset Management Plan (SAMP); this is a long-term plan covering a collection of assets. The SAMP includes information on the costs for maintaining and replacing assets over their life as well as details of the economic benefits within the system. The available maintenance budget is then directed to areas with the greatest need

Kent County Council

Kent County Council has two main functions that affect flood risk management. They are both the **Lead Local Flood Authority** and the County's **Highway Authority**.

Additionally, and as with any riparian land owner, they are responsible for any land they own, and should maintain all ordinary watercourses and assets in their ownership.

The functions and associated responsibilities of the Lead Local Flood Authority and the Highway Authority are explained below:

Lead Local Flood Authority

Kent County Council (KCC) was made the Lead Local Flood Authority for Kent by the Flood & Water Management Act 2010; this means Kent County Council has a strategic overview role for **local** flooding (which is defined as flooding from surface water, groundwater and ordinary watercourses). As part of their role as Lead Local

Flood Authority, KCC has produced a Local Flood Risk Management Strategy (please see the following [Plans and strategies](#) Section).

Kent County Council also has a duty to:

- Maintain a register and record of structures and features,
- Undertake flood investigations,
- Regulate proposals which affect ordinary watercourses,
- Provide advice and guidance on the provision of Sustainable Drainage within new development as a statutory consultee within the planning process.

As Lead Local Flood Authority, Kent County Council are required to oversee the management of local flood risk; this includes the management of risk of flooding from ordinary watercourses. As such, Kent County Council’s formal written Consent is required prior to undertaking any works which may obstruct the passage of water within an ordinary watercourse. Such works can include culverting, diversion and the construction of new dams/weirs, etc. They have powers of enforcement over any works which have been undertaken without consent and should be contacted in advance of the commencement of any proposed works. They can be contacted at flood@kent.gov.uk.

Highways Authority

Under the Highways Act 1980, Kent County Council has a duty to maintain the highways in Kent (apart from those managed by Highways England). One of their responsibilities is to ensure that the highways are appropriately drained.

The Kent County Council Highways and Transportation department maintains the roadside surface water drains (also known as gullies) which allow rain water to run away freely from roads, pavements and cycleways. Table 1 shows the frequency of gully cleansing, according to the type of road.

Table 1. Highways drainage maintenance schedule.

Type of road	Description	Frequency
Flood routes	Roads known to flood frequently	Every 6 months
High speed roads	Roads with a speed limit of 70mph	Every 12 months
Strategic routes	Roads that are the main connection between towns and villages	Every 12 months
Urban and rural routes	All other roads	Targeted maintenance

The map in [Appendix 1](#) shows the major and strategic routes across the Sevenoaks District Council area, along with the highways which receive more frequent maintenance owing to known drainage problems. Any road not depicted in red or green should be assumed to be a normal road that receives targeted maintenance, as required (as outlined in Table 1).

Other forms of drainage (catchpits, soakaways, pipes, highway ditches etc.) are checked and cleaned or repaired when required, or when a problem is reported to us.

Highways drainage problems should be reported at <http://goo.gl/9qgjEe> or by phone on **03000 41 81 81**.

Sevenoaks District Council

Sevenoaks District Council have a general responsibility to oversee all matters relating to drainage within the district and to provide information and advice to the public, including specific advice on land drainage. They should be contacted about watercourse alterations, disputes and maintenance of land drainage within council-owned land, and about emergency works elsewhere.

They also work with Kent County Council and the other Risk management Authorities to ensure that the risks to/from any new development are effectively managed through making decisions on planning applications. They are ultimately responsible for ensuring that any new development does not exacerbate the flood risk to the area in which it is proposed.

The Upper Medway Internal Drainage Board

The Upper Medway Internal Drainage Board is the operating drainage authority within their designated drainage district. They manage and maintain approximately 162km of watercourses across their district, 15km of which are within Sevenoaks district. Approximately 4% of the borough lies within the Upper Medway Internal Drainage Board's district (14.2sqkm)

Internal Drainage Boards use their powers to maintain watercourses within their district for land drainage, flood risk management, environmental protection/enhancement and water level management purposes.

In-channel weed cutting is currently carried out annually on all River Stour (Kent) Internal Drainage Board designated watercourses, where necessary, in order to maintain conveyance capacities to allow drainage, manage local flood risk and to control water levels.

Approximately 10% of the Upper Medway Internal Drainage Board watercourses are de-silted each year (carried out on a 10 year rolling programme). Tree and shrub maintenance is carried out to allow free-flow and to maintain adequate access for routine channel maintenance. In-channel obstructions are cleared prior to and during periods of heavy rainfall (mainly from bridges, culverts and other in-channel structures). Routine activities also include the operation and maintenance of water level control structures (feeds and stopboard weirs).

Whilst they undertake routine maintenance of adopted ordinary watercourses, pumping stations, and other critical water control infrastructure under permissive powers, the overall responsibility for maintenance still lies with the riparian owner.

They also have a general supervisory duty over all drainage matters within their districts and have consenting and enforcement powers for works carried out by others in or adjacent to ordinary watercourses within their operational district.

This is done by reasonable application of the board's byelaws and the Land Drainage Act 1991, to ensure that any development has regard to secure the

efficient working of the drainage system (now and in the future) and does not cause unnecessary adverse environmental impact as a consequence, including increased risk of flooding.

If you are planning to undertake works on an ordinary watercourse within their district, please phone **01622 758345** or email enquiries@medwayidb.co.uk.

The map at [Appendix 2](#) shows the extent of the IDB areas within Sevenoaks District and shows the watercourses for which they are responsible.

Southern Water

Southern Water are responsible for the maintenance of foul and surface water public sewers. These are usually in roads or public open spaces, but may run through private gardens. They have a right of access to these sewers for maintenance. If they wish to carry out work on sewers on your land they must follow a code of practice; this is available from them upon request.

To report a problem or for general enquiries, please contact them here:

<http://goo.gl/FrP68N>

Southern Water is a risk management authority and has the following flood risk management functions:

- To respond to flooding incidents involving their assets;
- To maintain a register of properties at risk of flooding due to a hydraulic overload in the sewerage network;
- To undertake capacity improvements to alleviate sewer flooding problems;
- To provide, maintain and operate systems of public sewers and works for the purpose of effectually draining their operative area;
- To co-operate with other relevant authorities in the exercise of their flood and coastal erosion risk management functions;
- To have a regard to national and local flood and coastal erosion risk management strategies.

Parish councils

Parish councils are involved in managing local issues, and the management of local flooding may be one of the problems they help coordinate. They can also be a source of local information about flood risk and are likely to know which areas are prone to flooding (particularly from local flooding incidents). They may have records of flooding, which may not be recorded by other authorities.

Parish Councils are involved in responding to emergencies and have a consultation role in local planning applications, and can influence how local developments are delivered.

They have also been working with the Risk Management Authorities to prepare Parish Emergency Plans and train Community Flood Wardens. These wardens will act as a link between the Environment Agency and the communities at risk; they will disseminate information to local residents, and will assist with the preparation for flooding and management of incidents when they occur.

Land owners

If you own land or property that is crossed by (or next to) a river, stream or ditch, you are a riparian owner. Under common law, riparian owners possess rights and responsibilities pertaining to any stretch of watercourse which falls within or follows the boundaries of their property. It is normally presumed that a riparian owner owns land up to the centre line of a non-tidal watercourse where the watercourse itself forms a boundary, even if this is not denoted on the Land Registry plan for the property.

Riparian owners have a duty of care towards their neighbours upstream and downstream. This means they must avoid any action likely to cause flooding of their neighbour's land or property; they are therefore responsible for accepting water from the section of watercourse owned by their upstream neighbour and then transferring this, together with drainage from their own property, to their neighbour immediately downstream.

The ultimate responsibility for the maintenance of a watercourse and its banks always lies with the riparian owner, regardless of whether such works have been carried out by any other Authority at its own expense in the past. Such maintenance works can include clearing obstructions, repairing the banks, and the management of vegetation or trees.

It is important that riparian owners preserve access to the banks of rivers and streams for maintenance and safety purposes. Access to the watercourse should therefore be considered when erecting any fencing, and undergrowth and vegetation on and around the banks should be appropriately controlled.

Further information on riparian rights and responsibilities can be found in the Environment Agency's document 'Living on the Edge'.

If you are a riparian owner and planning works on a watercourse (or in the vicinity of flood defences) you must contact the relevant authority to discuss whether you need formal consent for your works. This is to ensure that you do not increase flood risk or damage watercourses and flood defences. The relevant consenting authority has powers to remove works that are not consented.

If you are not sure whose consent you may require, please contact the Kent County Council Flood Risk team at flood@kent.gov.uk, or phone 03000 414141.

It should be noted that the abstraction of water from (and the discharge of water to) any watercourse is also regulated by the Environment Agency. They should be contacted prior to the commencement of any such activity.

Flood and Coastal Risk Management investment

The government provides an annual grant to invest in flood defence works; this is known as Flood Defence Grant in Aid. The government offers funding to projects based on the outcomes they will deliver. Whilst the number of homes protected from flooding is the primary consideration, the amount of habitat created and other economic benefits are also taken into account. Any risk management authority can apply for funds from this source.

Flood defence schemes which provide a significant reduction in risk to a large number of properties may occasionally be funded in their entirety by FDGIA; however, smaller schemes which provide a smaller benefit will usually require additional contributions from elsewhere to proceed.

Any other body, organisation or person may make a contribution to meet the shortfall. This process has been established by the government to encourage the communities that benefit from these schemes to invest directly in them. This is known as partnership funding.

Each year risk management authorities from each region are invited to submit details of any proposed flood or coastal erosion management works which will require funding over the next six years. The proposals are captured in a report known as the Medium Term Plan (MTP) by the Environment Agency. Each regional MTP is combined into one national plan to give an indication of investment needs across the entire country.

Projects on the MTP are ranked according to the benefits provided divided by the remaining cost (once partnership funding contribution have been taken into account). The highest ranked schemes receive the greatest proportion of government allocation. The lower ranked schemes typically require a greater contribution from other concerned parties.

Figure 2. shows how this mechanism of flood defence funding differs from how flood defence investment was allocated in the past.

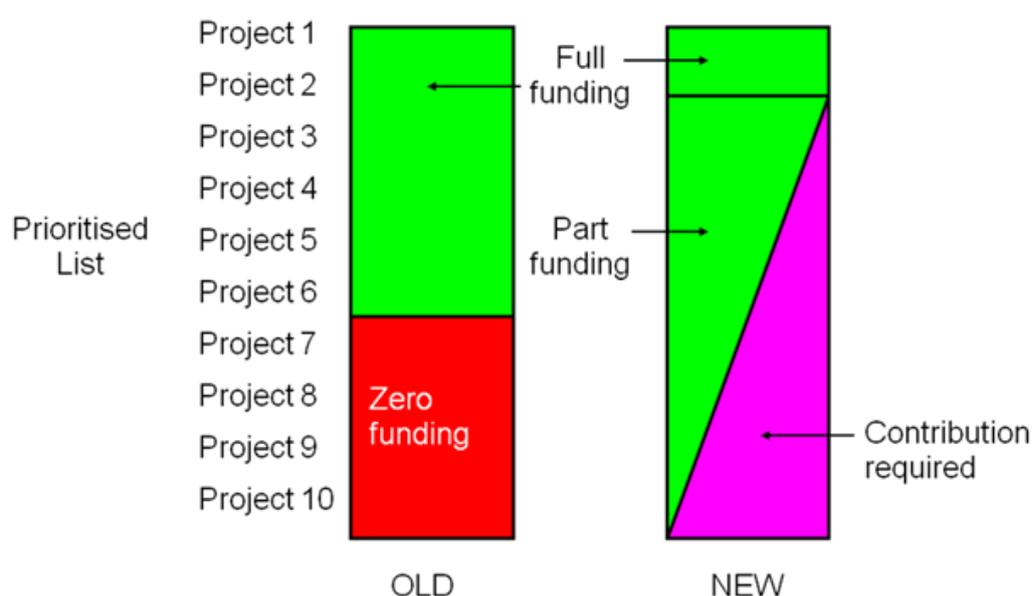


Figure 2. Flood defence investment.

Flood risk management plans and strategies

There are a number of flood risk management plans and strategies that affect how flood risk in Sevenoaks is managed. More detailed information about flood risk management in Sevenoaks can be found in these documents.

This section aims to give you an overview of the most important of these documents and lets you know where to find them.

National Flood and Coastal Erosion Risk Management Strategy

The National Flood and Coastal Erosion Risk Management Strategy (the National Strategy) provides a national framework for managing the risk of flooding and coastal erosion in England.

It has been prepared by the Environment Agency with input from Defra, and sets out the objectives and six guiding principles on how flood risk management should be delivered by all risk management authorities in England

The National Strategy can be found here:

<http://goo.gl/27nZp0>

Flood Risk Management Plans

By law, the Environment Agency and Natural Resources Wales must produce flood risk management plans (FRMPs) for each River Basin District. These FRMPs must cover flooding from main rivers, the sea and reservoirs.

Lead Local Flood Authorities must also produce FRMPs for all Flood Risk Areas covering flooding from local sources (surface water, ordinary watercourses and groundwater). LLFAs may either prepare a separate FRMP or contribute to a joint partnership FRMP for the River Basin District.

Kent County Council do not have any designated Flood Risk Areas under their jurisdiction, but they may contribute to a joint partnership FRMP. Other RMAs can also contribute to developing the joint partnership FRMP for the River Basin District. Such contributions are carried out on a voluntary basis and will result in better co-ordinated flood management.

The preferred approach to completing a FRMP

The preferred approach to FRMPs is for Environment Agency and Natural Resources Wales to prepare joint FRMPs in partnership with others, in particular LLFAs and other RMAs. Information about all sources of flood risk is combined to form a single FRMP. This approach co-ordinates flood risk management planning with river basin management planning under the Water Framework Directive, in particular the statutory consultation on proposed updates of River Basin Management Plans (RBMPs) and draft FRMPs.

LLFAs preparing separate FRMPs must co-ordinate the activities of interested parties with those developing RBMPs in England and Wales.

What FRMPs contain

Flood Risk Management Plans must include:

- a map showing the boundaries of the Flood Risk Area
- the conclusions drawn from the flood hazard and risk maps
- objectives for the purpose of managing the flood risk
- proposed measures for achieving those objectives
- a description of the proposed timing and manner of implementing the measures including details of who is responsible for implementation
- a description of the way implementation of the measures will be monitored
- a report of the consultation
- where appropriate, information about how the implementation of measures under the FRMP and RBMP area will be co-ordinated

'Flood Risk Management Plans (FRMPs): how to prepare them' provides more guidance for Risk Management Authorities.

<https://goo.gl/Lz kfUM>

Local Flood Risk Management Strategy

Kent County Council's Local Flood Risk Management Strategy (the Local Strategy) sets out a countywide strategy for managing the risks of local flooding; this is defined as flooding from surface water, groundwater and ordinary watercourses. The Local Strategy is prepared by Kent County Council as part of its role as Lead Local Flood Authority. The aims of the local strategy are:

- To coordinate the work of the management authorities to improve the understanding of these risks
- To ensure that Risk Management Authorities work together to aim to provide effective solutions to problems
- To improve the public's understanding of the risks in Kent and how everyone can play a part in reducing them.

Part of the Local Strategy sets out how KCC prioritises the management of local flooding in the county. The county is divided into areas with similar local flooding issues. These areas are given a policy for the management of this risk according to its complexity. The local flood risk management policies are shown on the map in [Appendix 3](#).

The Local Strategy can be found here:

<http://goo.gl/hpw021>

Catchment Flood Management Plans

Catchment Flood Management Plans (CFMPs) are produced by the Environment Agency; they set policies for how inland flood risk should be managed within the catchment (coastal flooding is considered in Shoreline Management Plans, see below). Catchment Flood Management Plans pre-date the Flood and Water Management Act and were not prepared with the input of the Lead Local Flood Authorities (or with the additional data that is now available about local flooding).

Catchment Flood Management Plans consider all types of inland flooding, from rivers, groundwater, surface water and tidal flooding. Shoreline management plans consider flooding from the sea.

CFMPs also include:

- the likely impacts of climate change
- the effects of how we use and manage the land
- how areas could be developed to meet our present day needs without compromising the ability of future generations to meet their own needs

CFMPs help the Environment Agency and their partners to plan and agree the most effective way to manage flood risk in the future.

Sevenoaks is in both the North Kent Rivers and Medway Catchment Flood Management Plans. The policies, along with an explanation of what each of the 6 policies mean, are shown on the map in [Appendix 4](#).

The North Kent Rivers Catchment Flood Management Plan can be found here:

<https://goo.gl/Za60b7>

The River Medway Catchment Flood Management Plan can be found here:

<http://goo.gl/S6KHXF>

Surface Water Management Plans

Surface Water Management Plans (SWMPs) are prepared by Kent County Council in partnership with the other Risk Management Authorities. They provide an overview of local flood risk for the study area (despite their name) and may cover the risks from other sources of flooding, including where there are combined risks of flooding.

Surface water management plans can vary in scope and detail. Some provide an overview of historic flooding and a general review of existing information. Other surface water management plans use complex rainfall modelling to determine the flood risk from a range of storm durations and intensities to quantify the risks (usually in high risk areas). These plans identify the areas of significant local flood risk and seek to identify options to address the identified risks.

The Sevenoaks Surface Water Management Plan can be found at:

[Surface water management plan](#)

Strategic Flood Risk Assessment (SFRA)

Strategic Flood Risk Assessments (SFRAs) are prepared by Local Authorities and are primarily used to influence local planning policy decisions to ensure future development in the borough are appropriately located and sustainably constructed. They provide a general assessment of the flood risk from all sources across a borough (tidal, fluvial, surface water, groundwater, impounded water bodies and sewers) and should take full account of the likely impact of predicted climate change.

Sevenoaks District Council's SFRA can be read here:

[Strategic flood risk assessment](#)

River Basin Management Plan

River Basin Management Plans are a requirement of the Water Framework Directive; they provide an overview of how water framework directive objectives (achieving the protection, improvement and sustainable use of the water environment) will be met for the water bodies in the river basin that the plan covers. They are not flood risk management documents, but they can influence how rivers and other water bodies are managed.

Sevenoaks falls within the area covered by the Thames River Basin Management Plan; this can be found here:

<http://goo.gl/6aUiTb>

Sources of flooding

Flooding sources

Groundwater

Occurs when water stored in the ground rises to the surface. This is most likely in areas with porous underlying rocks (like chalk).

Risk Management Authority
 • KCC As the Lead
 Local Flood Authority.



Reservoirs

Reservoir flooding is extremely unlikely to occur. When the amount of water entering the reservoir is greater than the amount the reservoir is designed to discharge, floodwaters may overtop the crest of the reservoir and flow downstream (some reservoirs are designed to manage excess flows in this way). Occasionally, where a reservoir has been poorly designed, the structure can fail, releasing water.

Risk Management Authority
 • EA - regulator.
 • Reservoir owner - managing on-site risks.
 • KCC/KRT - off-site emergency plan.



Surface water

Occurs when the rate of rainfall is higher than the rate at which water can drain into the ground or enter a drainage system, creating runoff, running down hill and pooling in low points.

Risk Management Authority
 • KCC as the Lead Local Flood Authority and Highway Authority.

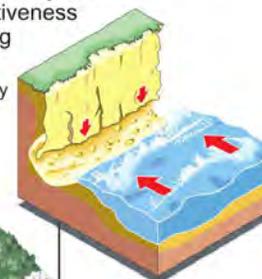


- Authorities responsible
- KCC: Kent County Council
 - EA: Environment Agency
 - SW: Southern Water
 - TW: Thames Water
 - IDB: Internal Drainage Boards
 - o Lower Medway Internal Drainage Board
 - o Upper Medway Internal Drainage Board
 - o Romney Marshes Area Internal Drainage Board
 - o River Stour (Kent) Internal Drainage Board
 - o North Kent Marshes Internal Drainage Board
 - DB: District and Borough Councils
 - KRT: Kent Resilience Team
 - RO: Reservoir Operators

Coastal Erosion

Occurs when the coastline is eroded by the action of the sea, leading to loss of land. Whilst coast protection works are not the same as coastal flood defences, they can contribute to the effectiveness of flood defences along a shoreline.

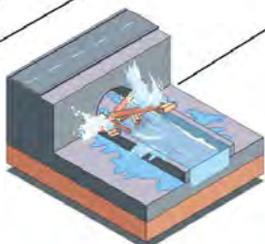
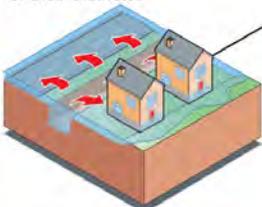
Risk Management Authority
 • DB



Main river and ordinary watercourses

Occurs when the water flowing in a watercourse (which may be in a culvert), exceeds the capacity of the channel and goes over its banks. The capacity of the watercourse maybe reduced by blockages and debris in the channel. There are two categories of watercourse: main rivers (those which present the greatest risk to life and property), and ordinary watercourses, which cover all other watercourses, including streams, drains and ditches.

Risk Management Authority
 • EA - main rivers.
 • KCC - ordinary watercourses, outside the boundaries of Internal Drainage Districts.
 • Internal Drainage Boards – ordinary watercourses within the boundary of their districts.



Sewer flooding (including foul sewers)

May occur when the sewerage system fails due to blockages or it is overwhelmed by surface water.

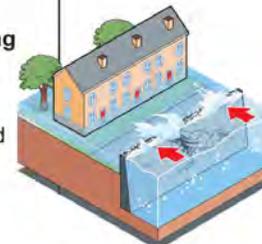
Risk Management Authority
 • SW and TW for public sewers
 • Sewer owner for a private system.



Coastal Flooding

Occurs when the coastline and/or coastal flood defences are either overwhelmed or breached by high tides or a storm surge.

Risk Management Authority
 • EA



Understanding flood risk

There are a number of maps available that show the risk of flooding to areas from various sources. This section explains what the easily available maps are and what form of flooding they show.

Flood risk mapping

Not all flood risk is nationally modelled and mapped. For instance, the flood risk arising from ordinary watercourses has not been specifically investigated and depicted on a national scale. It is also important to note that many types of flood map only include one type of flood risk. For example, a flood map of Eynsford would not include the potential for any groundwater or surface water flooding that might occur at the same time as tidal flooding.

Combining the different types of flooding into one model (and one map) is very difficult. The mechanisms involved in combining the different types of flooding are extremely complex and the scales are different, consequently it is not easily computable in one model. However, in some areas where a significant risk from combined sources of flooding has been identified, KCC has investigated flooding collectively and produced mapping to depict this within their Surface Water Management Plans. Unfortunately it is not yet possible to produce a map to show this risk for the whole county.

How flood risk is expressed

The terms Annual Exceedance Probability (AEP) and Return Period are common ways to describe the likelihood of a flood of a certain magnitude happening in any given year.

An AEP is the *probability* of a certain size of flood occurring in any one year. A 1% AEP flood event has a 1% (or 1 in 100) chance of occurring in any one year.

A Return Period is a way of expressing how often a flood of a given magnitude might reoccur over a long period of time. For example, a flood described as having a 1 in 100 year return period is likely to occur, on average, ten times every 1000 years (or once every 100 years).

A 1 in 100 year Return Period flood and 1% AEP flood event are different terms to describe the same event.

It is important to note that while a 1% AEP flood may occur once every 100 years on average, the probability of a flood of that size occurring in any particular year does not change. If a 1% AEP flood was recorded this year, the probability of another flood of that magnitude being recorded in the following year (or any other subsequent year) would still be 1%. Accordingly, it is statistically possible to have several 1% AEP floods over a period of 100 years. Similarly, it is equally statistically possible have a period of 100 years without a single 1% AEP flood being recorded.

Table 2. Annual Exceedance Probabilities and their equivalent Return Periods.

AEP (%)	Equivalent return period (yrs)	Magnitude	
0.1	1000	Less frequent/more extreme events.	
1	100		
1.33	75		
2	50		
3.33	30		
5	20		
10	10		
20	5		
50	2		
100	1		More frequent/less extreme events.

Flood Map for Planning

The Flood Map for Planning is the Environment Agency’s original format for flood mapping and depicts the three flood zones used to define areas of risk of flooding from rivers and the sea. It is important to note that these maps show the predicted extent of flooding **if there were no defences or buildings present** to affect the flow of water into and through the natural floodplain.

The three flood zones are:

Flood Zone 3

Flood Zone 3 is the area deemed to be at the highest risk from flooding; it is subdivided into two categories:

Flood Zone 3a - In the absence of defences, this is an area that would be considered to be at risk from:

- the sea during a flood event that has an AEP of 0.5% (i.e. a Return Period of 200 years)
- a river during a flood event that has an AEP of 1% (i.e. a Return Period of 100 years)

Flood Zone 3b – This zone is also known as the functional floodplain. The functional floodplain is defined as the area that would be susceptible to flooding from rivers or the sea during any event up to and including the 5% AEP event (i.e. the 1 in 20 year event, or more frequently). Unlike the other Flood Zones, Zone 3b takes full account of any defences which may offer protection to the area. **The functional floodplain is the area that would flood despite the presence of defences.**

Flood Zone 2 - This shows the additional extent of an extreme flood from rivers or the sea. In the absence of defences, these outlying areas would be affected by a major flood, with an AEP of up to 0.1% (i.e. an area at risk from flooding from an event with a 1000 year Return Period). This is also known as the Extreme Flood Outline.

Flood Zone 1 – This shows all areas not covered by the other two flood zones, it is an area considered to be a negligible risk of flooding from rivers or the sea. However, areas in this flood zone may still be at risk from other forms of flooding.

The primary use of this map is for planning purposes to ensure that new developments can take account of the risk of flooding as they are being planned. It is important to understand that there remains a flood risk, even if there are defences that protect the area from flooding. Flood defences can only reduce the risk from flooding. No matter how well constructed a flood defence may be, there will always be a risk of its overtopping or failure. This residual risk must be taken into account when considering new development to ensure it is appropriately constructed, and to ensure the users, inhabitants or emergency services are not placed in unnecessary danger in the unlikely event of flooding.

The Flood Map for Planning is available on the Environment Agency's website:

<http://goo.gl/8YyW8k>

The Environment Agency are statutory consultees for all development at risk of flooding from rivers and the sea, defined as Flood Zones 2 and 3. They should be consulted as early in the development planning process as possible.

National Flood Risk Assessment

The Environment Agency's National Flood Risk Assessment (NaFRA) mapping provides an assessment of the likelihood of flooding from rivers and the sea during an extreme 0.1% AEP event. Unlike the Flood Map for Planning (as described above), the NaFRA mapping **takes full account of the flood defences protecting an area**. It considers the likelihood of the defences being breached or overtopped during a flood event. This likelihood depends on the type of defence, its location, its condition and the designed standard of protection.

The mapped flood risk is presented as a grid of 50m² squares. The likelihood of flooding is determined for each 50m² within the entire area of the Extreme Flood Outline (i.e. Flood Zone 2).

Each 50m² area within the Extreme Flood Outline is then assigned one of four categories:

- High – At risk from an event with an AEP of 3.3% or greater (i.e. at risk from floods with a Return Period of 30 years, or more frequently)
- Medium – At risk from an event with an AEP of less than 3.33% AEP but greater than or equal to 1% (i.e. at risk from flooding events with a Return Period of between 30 years and 100 years)
- Low - At risk from an event with an AEP of less than 1% AEP but greater than or equal to 0.1% (i.e. at risk from flooding events with a Return Period of between 100 years and 1000 years)
- Very Low – At risk from events with an AEP of less than 0.1% (i.e. at risk from floods with a Return Period of 1000 years or greater).

The NaFRA mapping is generally considered to present a more accurate representation of the flood risk to an area than the Flood Map for Planning provides owing to its incorporation of existing flood defences.

Properties at risk

In the Sevenoaks district, there are a total of 2102 dwellings in areas considered to be at risk from tidal or fluvial flooding (this figure is taken from the Environment Agency’s NaFRA mapping, which takes the presence of flood defences into account); 740 of these are at a medium-high risk of flooding.

Table 3 (below) outlines the level of this risk within each parish.

Table 3. Dwellings at fluvial flood risk in Sevenoaks.

Parish	Number of dwellings at medium-high risk (up to 1% AEP)	Number of dwellings at overall risk (up to 0.1% AEP)
Ash-cum-Ridley	0	0
Brasted	17	65
Chevening	36	73
Chiddingstone	4	6
Cowden	6	10
Crockenhill	0	0
Dunton Green	2	10
Edenbridge	171	739
Eynsford	47	121
Farningham	9	33
Fawkham	0	0
Halstead	17	17
Hartley	0	0
Hever	27	52
Hextable	0	0
Horton Kirby and South Darenth	39	207
Kemsing	2	2
Knockholt	0	0
Leigh	13	31
Otford	10	11
Penshurst	6	20
Riverhead	0	0

Seal	2	66
Sevenoaks	204	293
Sevenoaks Weald	0	0
Shoreham	72	83
Speldhurst	0	0
Sundridge with Ide Hill	28	41
Swanley	0	0
West Kingsdown	0	0
Westerham	32	221

Surface Water Mapping

The Environment Agency’s surface water flood mapping gives a broad indication of the areas likely to be at risk from surface water flooding. These are areas where surface water would be expected to flow or pond if the capacity of the drainage networks and ground were exceeded.

The Flood and Water Management Act 2010 defines surface runoff, and the type of flooding shown by the updated Flood Map for Surface Water fits with the definition given within the Act. It shows the extent of flooding that could occur from any form of precipitation (including melted snow), which:

- is on the surface of the ground (whether or not it is moving), and
- has not yet entered a watercourse, drainage system or public sewer.

In 2013, the Environment Agency produced the updated Flood Map for Surface Water (uFMfSW). The aim of the uFMfSW is to provide the best single source of information on surface water flooding for England and Wales which includes local information and knowledge. It is a separate, single, mapping product that draws together:

- The Environment Agency's national scale surface water flood mapping, and
- appropriate locally produced mapping from LLFAs.

The uFMfSW should not be used to identify the flood risk to individual properties, and should only serve to give a more general indication of an area’s susceptibility to surface water flooding.

Planning and Flood Risk

The National Planning Policy Framework sets strict tests to protect people and property from flooding which all local planning authorities are expected to follow. Where these tests are not met, national policy is clear that new development should not be allowed. The main steps to be followed are set out below; these are designed to ensure that the most vulnerable forms of development are located in the areas least susceptible to flooding. Where, exceptionally, development in flood risk areas is considered unavoidable, it must be demonstrated that the proposals are 'safe'.

Assess flood risk

Local planning authorities should undertake a Strategic Flood Risk Assessment to fully understand the flood risk in the area to inform Local Plan preparation.

In areas at risk of flooding (FZs 2 or 3) or for sites of 1 hectare or more, developers should undertake a site-specific flood risk assessment to accompany applications for planning permission (or prior approval for certain types of permitted development).

Avoid flood risk

In plan-making, local planning authorities apply a sequential approach to site selection so that development is, as far as reasonably possible, located where the risk of flooding (from all sources) is lowest, taking account of climate change and the vulnerability of future uses to flood risk. In plan-making this involves applying the 'Sequential Test' to Local Plans and, if needed, the 'Exception Test' to Local Plans.

In decision-taking, local planning authorities also apply the 'sequential approach'. In decision-taking this involves applying the Sequential Test for specific development proposals and, if needed, the Exception Test for specific development proposals, to steer development to areas with the lowest probability of flooding.

Further information on the Sequential Test is available here:

<http://goo.gl/KMj5lo>

Further information on the Exception Test is available here:

<http://goo.gl/HEcd9F>

Manage and Mitigate flood risk

Where alternative sites are not available and development needs to be in locations where there is a risk of flooding, local planning authorities and developers should ensure development is appropriately flood resilient and resistant, safe for its users for the development's lifetime, and will not increase flood risk overall.

Local planning authorities and developers should seek flood risk management opportunities (e.g. safeguarding land), and reduce the causes and impacts of flooding (e.g. through the use of sustainable drainage systems in developments).

The requirements to consult the Environment Agency on applications where there is a risk of flooding are available here:

<http://goo.gl/YNGxPs>

Planning and Sustainable Drainage (SuDS)

Planning authorities must take flood risk from all sources into consideration when they are preparing their local development plans or during their determination of planning applications. This requirement is clearly laid out in Section 10 of the National Planning Policy Framework (NPPF) and within its associated Technical Guidance.

Permission for new development or redevelopment of sites in areas at risk from flooding will not necessarily be withheld, but the planning authorities have a duty to ensure flooding is materially taken into account within any development proposal. Applications are likely to be refused if it cannot be demonstrated that the identified risks can be appropriately managed.

Sustainable drainage systems (SuDS) are an important flood risk management measure to consider when advancing development plans; they aim to manage surface water runoff from developments in a natural way by replicating natural processes and should be considered from the outset and included wherever possible.

Since 15 April 2015, the provision of sustainable drainage within new development has been a material consideration in the planning process. There is an associated requirement for Kent County Council to be consulted by each of the county's twelve Local Planning Authorities whenever they receive an application for major development within their districts.

They will also be consulted on applications for minor development in areas where there are known drainage problems.

Kent County Council's Statutory Consultee Role

Kent County Council are required to provide technical advice and guidance on the surface water drainage strategies, designs and maintenance arrangements put forward by developers for any new **major development** (as per the definition provided below). Existing planning policies, National Planning Practice Guidance, and the recently published national '*non-statutory technical standards for the design, maintenance, and operation of SUDS*' will provide the guidance upon which their consultation responses will be based.

As statutory consultees, KCC will be seeking to assist the delivery of requirements of the Government's National Planning Policy Framework (NPPF). This framework promotes sustainable development and makes specific recommendations for the incorporation of SuDS into new development.

This role fits with their existing role of Lead Local Flood Authority (LLFA) for the county, in which they develop strategies to manage local flooding (flooding from surface water, groundwater and ordinary watercourses).

Major development

Major development is defined in planning as any development involving any one or more of the following:

- a) the winning and working of minerals or the use of land for mineral-working deposits;

- b) waste development;
- c) the provision of dwellinghouses where -
 - i. the number of dwellinghouses to be provided is ten or more; or
 - ii. the development is to be carried out on a site having an area of 0.5 hectares or more and it is not known whether the development falls within sub-paragraph (c)(i);
- d) the provision of a building or buildings where the floor space to be created by the development is 1,000 square metres or more; or
- e) development carried out on a site having an area of one hectare or more.

(The Town and Country Planning (Development Management Procedure) (England) Order 2010).

Sustainable Drainage Systems

Kent County Council encourages the use of Sustainable Drainage Systems (SuDS) to manage surface water in a sustainable way in all development. For all new major development it should be demonstrated that:

- an appropriate SuDS system will be incorporated (unless it is clearly demonstrated and agreed that they would be inappropriate),
- the minimum standards of operation proposed by the applicant are appropriate,
- that there are clear arrangements in place for the ongoing maintenance of any SuDS scheme over the lifetime of the associated development (through the use of planning conditions or planning obligations, where appropriate).

Further information:

The National Planning Policy Framework can be found at:

<http://goo.gl/KIbX9p>

The Government's Planning Practice Guidance can be found at:

<http://goo.gl/K5i5gz>

The associated NPPF guidance related to surface water management can be found at:

<http://goo.gl/W4ePfy>

The non-statutory technical standards for the design, maintenance, and operation of SuDS can be found at:

<http://goo.gl/5pcA7f>

Emergency Planning

Planning for and managing flooding emergencies

Severe weather and any associated flooding can lead to an emergency being declared. It is important that plans are maintained to outline the actions that should be taken to both reduce the likelihood of an emergency occurring, and to reduce its impact far as possible if an emergency does occur. Regular training and exercising supports this planning. The Civil Contingencies Act 2004 designates response agencies as either Category 1 or 2 responders, and sets out their roles and responsibilities.

Category 1 responders are known as 'core responders', and they include the emergency services and local authorities. Category 2 responders are 'key co-operating responders' acting in support of Category 1 responders; they include utility companies and transport organisations.

There are a number of bodies responsible for planning for and responding to a flood emergency, their roles and responsibilities are summarised below:

Category 1 Responders

Kent County Council

- Coordinate emergency support within their own functions.
- Establish multi-agency command and control systems (County Emergency Centre).
- Coordinate emergency support from the voluntary sector.
- Mobilise and chair Severe Weather Advisory Group.
- Mobilise military aid to the civil community.
- Liaise with central and regional government departments.
- Liaise with essential service providers.
- Open and support survivor reception and rest centres.
- Manage the local transport and traffic networks.
- Mobilise social care interventions.
- Provide emergency assistance.
- Coordinate the recovery process.
- Provide advice and management of public health.
- Assist with business continuity.

Sevenoaks Borough Council

- Deal with emergencies on 'non main rivers'.
- Establish multi-agency command and control systems (District Emergency Centre).
- Liaise with central and regional government departments.
- Co-ordinate the response to any homelessness issues which may arise.
- Deal with environmental health issues, such as contamination and pollution.
- Coordinate emergency support within their own functions.

Kent Police

- Save life.

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- Establish multi-agency command and control systems.
- Coordination and communication between emergency services and organisations providing support.
- Coordinate the preparation and dissemination of public warning and informing.
- Establish and maintain a Casualty Bureau.

Kent Fire and Rescue Service

- Save life, rescuing people and animals.
- Carry out other specialist work, including flood rescue services.
- Where appropriate, assist people where the use of fire service personnel and equipment is relevant.

South East Coast Ambulance Service

- Save life.
- Provide treatment, stabilisation and care at the scene.

Environment Agency

- Issue Flood Alerts and Warnings and ensure systems display current flooding information.
- Provide information to the public on what they can do before, during and after a flood event.
- Work with professional partners and stakeholders and respond to requests for flooding information and updates.
- Mobilise and chair Severe Weather Advisory Group.
- Receive and record details of flooding and related information.
- Operate water level control structures within its jurisdiction and in line with permissive powers.
- Flood event data collection.
- Arrange and take part in flood event exercises.
- Respond to pollution incidents and advise on disposal.
- Assist with the recovery process, for example, by advising on the disposal of silt, attending flood surgeries.

Category 2 Responders

Utility providers

- Attend emergencies relating to their services putting life at risk.
- Assess and manage risk of service failure.
- Assist with the recovery process, including the management of public health considerations.

Kent Resilience Forum

The Kent Resilience Forum (KRF) is one of a number of Local Resilience Forums (LRFs) that have been set up across England. The overall aim of a LRF is to ensure that the various agencies and organisations plan and subsequently work together to

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ensure a co-ordinated response to any emergency that could have a significant impact on any community.

LRFs are partnerships made up of a number of different organisations and agencies (although they are not legal organisations in themselves). The areas covered by a LRF align with the local police area boundaries.

The various agencies that form the KRF work together in a range of areas including:

- Assessing risks across the county and developing the Kent Community Risk Register
- Planning for emergencies
- Planning for Business Continuity Management
- Producing multi-agency plans
- Carrying out training and exercising
- Warning and informing the public - before, during and after emergencies.

Member organisations of the LRFs are the Category 1 and 2 responders (as outlined [above](#)). The KRF is required to meet at least every six months.

Further information:

The National Flood Emergency Framework for England can be found at:

<http://goo.gl/vkeV3O>

Kent County Council's Flood Response Plan can be found at:

[KCC flood response plan](#)

Sevenoaks District Council's Major Emergency Plan can be found at:

[Major emergency plan](#)

Sandbags

If the Sevenoaks District Council Emergency Planning Officer has declared a flooding emergency, they will supply and deliver a limited number of sandbags, free of charge, to homes in the affected area. **For details call 01732 227000.**

Empty sandbags are also available to buy from Sevenoaks District Council - please call before you travel to arrange payment and collection. You can also buy sandbags from most builders' merchants and larger DIY stores.

After a flood you should dispose of sandbags that have been contaminated with petrol, oil, diesel or sewage. Those that have not been contaminated can be kept.

The sandbags **will not** be collected after the flooding has subsided so, please make your own disposal arrangements.

Further information:

[Emergencies - Flooding](#)

Personal flood planning and assistance

The Government has produced a guide on what to do before, during and after a flood. It features advice such as how to check whether you are at risk of flooding, checklists to help you prepare and practical advice should flooding occur.

According to this advice, you should initially:

- Find out if you're at risk,
- Make a Flood Plan,
- Improve your property's protection,
- Get insurance,
- Get help during a flood,
- Get help after a flood.

Further guidance on each of these steps is available at:

<http://goo.gl/qPRnP1>

Flood advice for businesses

The Government has also produced advice and guidance specifically aimed at businesses at risk from flooding. This guidance can be found at:

<http://goo.gl/oyrbfA>

Flood Warnings

The Environment Agency provides a free Flood Alert and Warning service in many areas at risk of flooding from rivers or the sea.

Flood warnings give advanced notice of potential flooding by phone, text, email, pager or fax.

To find out if you live within a Flood Warning area and to sign up, please visit [flood warnings](#) or call **0345 988 1188**.

The Environment Agency's live Flood Warning map identifies areas where Flood Alerts, Flood Warnings or Severe Flood Warnings are in force. The map is updated

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with information from the Flood Warning service every 15 minutes; it can be found here: [Live flood map](#).

It should be noted that the Environment Agency's Floodline Warnings Direct service only pertains to flooding from rivers and the sea.

Table 4. Flood Alert and Warnings

Symbol	Status	Action
	A Flood Alert means that flooding is possible and that you need to be prepared	Residents should make some low impact preparations (e.g. move small / valuable items upstairs) check travel plans and remain vigilant.
	A Flood Warning means that flooding is expected. You should take immediate action and not wait for a severe flood warning.	Put in place home flood defences. Move valuables and people upstairs. Turn off utilities.
	A Severe Weather Warning means that there is severe flooding and danger to life.	These are issued when flooding is posing significant risk to life or disruption to communities.
There is no symbol for this stage.	Warnings no longer in force	This message will be issued when no further flooding is currently expected in your area.

Key contacts

Southern Water:

0330 303 0368,
customerservices@southernwater.co.uk

Thames Water:

0800 316 9800,
0845 920 0800 (24-hour service)
[Website](#)

**Private connections to the main sewer
Householders responsibility.**

Domestic drainage in social housing properties

West Kent Housing

0173 274 9400,
[Website](#)

Main rivers

Environment Agency

0345 988 1188 (Floodline 24-hour service),
0800 80 70 60 (24-hour emergency hotline),
[Website](#),
E-mail: enquiries@environment-agency.gov.uk

Ditches, watercourses and land drainage

Kent County Council

03000 41 81 81 (9am - 5pm),
03000 41 91 91 (out of office hours),
[Website](#),
E-mail: flood@kent.gov.uk

Upper and Lower Medway Internal Drainage Board

0162 269 3665,
[Website](#),
E-mail: enquiries@medwayidb.co.uk

Highway flooding, including blocked gullies (kerbside gratings)

Kent County Council Highways

03000 41 81 81,
[Website](#)

Environmental Services

Sevenoaks District Council

01732 227 000
E-mail: eh.support@dartford.gov.uk

Environment Agency

0800 80 70 60 (24-hour emergency hotline)

Swanley

In the Swanley area there are 0 properties at risk from flooding from rivers.

Table 5. Number of dwellings at risk from fluvial flooding in Swanley

Ward	Number of dwellings at medium-high risk (up to 1% AEP)	Number of dwellings at overall risk (up to 0.1% AEP)
Hextable	0	0
Swanley St. Mary's	0	0
Swanley White Oak	0	0

The Swanley ward is generally at a low risk from flooding, with all of the properties and businesses considered to be at negligible risk from fluvial flooding.

There remains a risk of surface water flooding in the event of prolonged or extreme rainfall throughout the area, particularly where the sewers become overloaded, or where gullies or drains become blocked and are unable to drain freely. Such issues can arise from the drainage systems in residential areas, or as a result of runoff from areas of agricultural land or from the infrastructure associated with the Highways England maintained A20 that forms the western boundary of the area.

The Environment Agency's updated Flood map for Surface Water depicts a potential surface water flow-route that follows an ordinarily dry-valley in a generally north easterly direction towards Hextable and the lower lying land beyond. This indicates that during periods of prolonged and/or extreme rainfall, there is an increased likelihood of runoff causing potential problems.

The underlying geology of this area predominantly comprises relatively permeable and freely drainage chalk and sand formations; for new development in this area, there would therefore be a presumption in favour of drainage systems that are designed to dispose of surface water through infiltration.

The NaFRA mapping for Swanley (which shows the areas at risk from flooding with the defences in place) is shown in Appendix 6.

Further information:

Sevenoaks Surface Water Management Plan: [Surface water management plan](#)

Sevenoaks District Council's SFRA: [Strategic flood risk assessment](#)

Planned flood defence works in the Swanley area

Darent Valley

In the Darent Valley area there are a total of 444 properties at risk from fluvial flooding (taking any existing defences into account), 163 of which are at a medium to high risk.

Table 6. Number of dwellings at risk from fluvial flooding in the Darent Valley

Ward	Number of dwellings at medium-high risk (up to 1% AEP)	Number of dwellings at overall risk (up to 0.1% AEP)
Crockenhill and Well Hill	0	0
Eynsford	47	121
Farningham, Horton Kirby and South Darent	44	240
Halstead, Knockholt and Badgers Mount	0	0
Otford and Shoreham	72	83
Swanley Christchurch and Swanley Village	0	0

As it flows north through the Darent Valley towards Dartford, the River Darent presents the source of the most significant flood risk to this ward.

Flooding throughout the valley is generally caused by high river flows in combination with other factors such as blocked culverts and bridges or by problems with the operation of sluices.

The River Darent has been historically heavily modified by the mills that used to operate along its course, with its channel often diverted along the valley side, and in places enlarged upstream of the mills to meet their need for water. In some reaches this has resulted in the current river channel not being at the lowest point of the valley; together with some abrupt changes of direction, flooding can be exacerbated during periods of high-flow.

During periods of prolonged or extreme rainfall, raised groundwater levels can cause groundwater flooding. This has been noted in South Darent, Bradbourne Lakes and parts of Sevenoaks. ...

The most significant recorded flooding in recent years followed a period of extreme rainfall from December 2002 to January 2003. The River Darent catchment was severely affected, with the worst flooding recorded since the County-wide flooding of 1968. Approximately 50 properties were flooded in Westerham, Brasted, Sundridge, Chipstead, Farningham and South Darent. In most of these locations it is thought that flooding was caused by a combination of high river flow with specific local factors such as surface run-off or blocked culverts.

The NaFRA mapping for Darent Valley (which shows the areas at risk from flooding with the defences in place) is shown in Appendix 7.

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Further information:

Sevenoaks Surface Water Management Plan: [Surface water management plan](#)

Sevenoaks District Council's SFRA: [Strategic flood risk assessment](#)

Planned flood defence works in the Darent Valley area

Sevenoaks North East

In the Sevenoaks North East area there are 0 properties at risk from fluvial flooding.

Table 7. Number of dwellings at risk from fluvial flooding in Sevenoaks North East

Ward	Number of dwellings at medium-high risk (up to 1% AEP)	Number of dwellings at overall risk (up to 0.1% AEP)
Ash and New Ash Green	0	0
Fawkham and West Kingsdown	0	0
Hartley and Hodsoll Street	0	0

There is an extremely low risk of fluvial flooding in the Sevenoaks North East area, with no properties considered to be at risk. However, there remains a risk of surface water flooding in the event of prolonged or extreme rainfall throughout the area, particularly where the sewers become overloaded, or where gullies or drains become blocked and are unable to drain freely. Such issues can arise from the drainage systems in residential areas, or as a result of runoff from areas of agricultural land.

The NaFRA mapping for Sevenoaks North East (which shows the areas at risk from flooding with the defences in place) is shown in Appendix 8.

Further information:

Sevenoaks Surface Water Management Plan: [Surface water management plan](#)

Sevenoaks District Council's SFRA: [Strategic flood risk assessment](#)

Planned flood defence works in the Sevenoaks North East area

Sevenoaks East & Sevenoaks Central

In the main Sevenoaks urban area there are a total of 373 properties at risk from fluvial flooding (taking the existing defences into account), 218 of which are at medium to high risk.

Table 8. Number of dwellings at risk from fluvial flooding in Sevenoaks East

Ward	Number of dwellings at medium-high risk (up to 1% AEP)	Number of dwellings at overall risk (up to 0.1% AEP)
Kemsing	2	2
Otford and Shoreham	10	11
Seal and Weald	2	79
Sevenoaks Northern	148	176

Table 9. Number of dwellings at risk from fluvial flooding in Sevenoaks Central

Ward	Number of dwellings at medium-high risk (up to 1% AEP)	Number of dwellings at overall risk (up to 0.1% AEP)
Dunton Green and Riverhead	0	1
Sevenoaks Eastern	0	48
Sevenoaks Kippington	56	56
Sevenoaks Town and St. Johns	0	0

The River Darent and its tributaries (the Honeypot Stream and Watercress Stream) present the source of the greatest flood risk to the main urban area of Sevenoaks district.

The River Darent flows east through this area, meeting its two tributaries to the south of the M26, north of the town. The River Darent flows into and through the Chipstead Lakes, passing through numerous weir and sluice structures which serve to divert the flow through several channels.

During and after prolonged periods of wet weather these lakes can receive elevated quantities of springwater. In combination with the coincidence of raised water levels in the Darent and the risk associated with the blockage of the online feed and control structures, these lakes are potentially susceptible to overflowing, placing adjacent properties at risk from flooding.

There is also a risk of flooding arising from blockage of the culverts carrying the various main rivers and ordinary watercourses beneath the M25 and M26 around Chipstead, Chevening and Dunton Green.

Flood Risk to Communities – Sevenoaks

Towards the south of the area the risk of fluvial flooding reduces; however, there are recorded instances of highways flooding caused by blockages or lack of capacity within the sewerage network that serves the area. There have also been reported problems with unconfined surface water runoff having affected parts of southern Sevenoaks and Underriver.

The NaFRA mapping for Sevenoaks East and Sevenoaks Central (which shows the areas at risk from flooding with the defences in place) are shown in Appendix 9.

Further information:

Sevenoaks Surface Water Management Plan: [Surface water management plan](#)

Sevenoaks District Council's SFRA: [Strategic flood risk assessment](#)

Planned flood defence works in the main Sevenoaks urban area

Sevenoaks West

In the Sevenoaks West area there are a total of 427 properties at risk from fluvial flooding (taking the existing defences into account), 132 of which are at medium to high risk.

Table 10. Number of dwellings at risk from fluvial flooding in Sevenoaks West

Ward	Number of dwellings at medium-high risk (up to 1% AEP)	Number of dwellings at overall risk (up to 0.1% AEP)
Brasted, Chevening and Sundridge	81	179
Dunton Green and Riverhead	2	10
Halstead, Knockholt and Badgers Mount	17	17
Westerham and Crockham Hill	32	221

The River Darent is fed by a series of springs emerging from the chalk and Lower Greensand formation along the valley between Westerham and Sevenoaks. This designated main river is the source of the greatest flood risk to the Sevenoaks West area as it flows east from Westerham, through Brasted and Sundridge.

The main risk from flooding arises from restrictions to the flow of the river brought about by culverting within the urban areas as it passes beneath roads, bridges and through various weir and sluice structures. Properties and highways are at risk from flooding in the event of blockage of any of these structures.

Additionally, the A25 is known to have flooded during prolonged or extreme rainfall events as a result of blockages in the sewer and highways drainage network, in combination with excessive surface water runoff and groundwater emergence.

The NaFRA mapping for Sevenoaks West (which shows the areas at risk from flooding with the defences in place) is shown in Appendix 9.

Further information:

Sevenoaks Surface Water Management Plan: [Surface water management plan](#)

Sevenoaks District Council's SFRA: [Strategic flood risk assessment](#)

Planned flood defence works in the Sevenoaks West area

Sevenoaks South

In the Sevenoaks South area there are a total of 858 properties at risk from flooding from fluvial flooding (taking the existing defences into account), 227 of which are at medium to high risk.

Table 11. Number of dwellings at risk from fluvial flooding in Sevenoaks South

Ward	Number of dwellings at medium-high risk (up to 1% AEP)	Number of dwellings at overall risk (up to 0.1% AEP)
Cowden and Hever	33	62
Edenbridge North and East	53	292
Edenbridge South and West	118	447
Leigh and Chiddingstone Causeway	15	35
Penshurst, Fordcombe and Chiddingstone	8	22

In the Sevenoaks South area there is significant fluvial flood risk associated with the River Eden and its tributaries, the St. Brelades Stream and Skinner’s Stream. The main channel of the river enters the district to the south west of Edenbridge and flows in an easterly direction, meeting its tributaries to the east of the town before joining the River Medway at Penshurst.

Flooding from the River Eden in Edenbridge is thought to be primarily as a result of a lack of capacity of the watercourse as it flows through culverts and bridges as it passes through the town.

In 2012 and 2013/14 flooding was reported in the gardens of numerous houses in and around the housing estate located at Fircroft Way, to the north east of the main town. This was most likely caused by the surcharging of the St. Brelades Stream which passes beneath this area in a culvert.

There are also records of historical flooding from Skinners Stream on Main Road owing to a blocked or inadequately sized culvert. There is a potential flood risk to the Spitals Cross estate and former school site on Four Elms Road from this source.

Records also suggest that Edenbridge High Street is vulnerable to flooding from surface water surcharging from full/ blocked drains.

Marsh Green Road, Hilders Lane, Lingfield Road and Main Road are reported to have also flooded as a result of excess surface water during extreme rainfall events.

Throughout the rural area in the remainder of the ward, there remains a risk of surface water flooding in the event of prolonged or extreme rainfall, particularly where the sewers become overloaded, or where gullies or drains become blocked and are unable to drain freely. Such issues can arise from the drainage systems in

Flood Risk to Communities – Sevenoaks

residential areas, or as a result of runoff from areas of agricultural land, particularly throughout the low-lying and impermeable land in the weald.

The NaFRA mapping for Sevenoaks South (which shows the areas at risk from flooding with the defences in place) is shown in Appendix 10.

Further information:

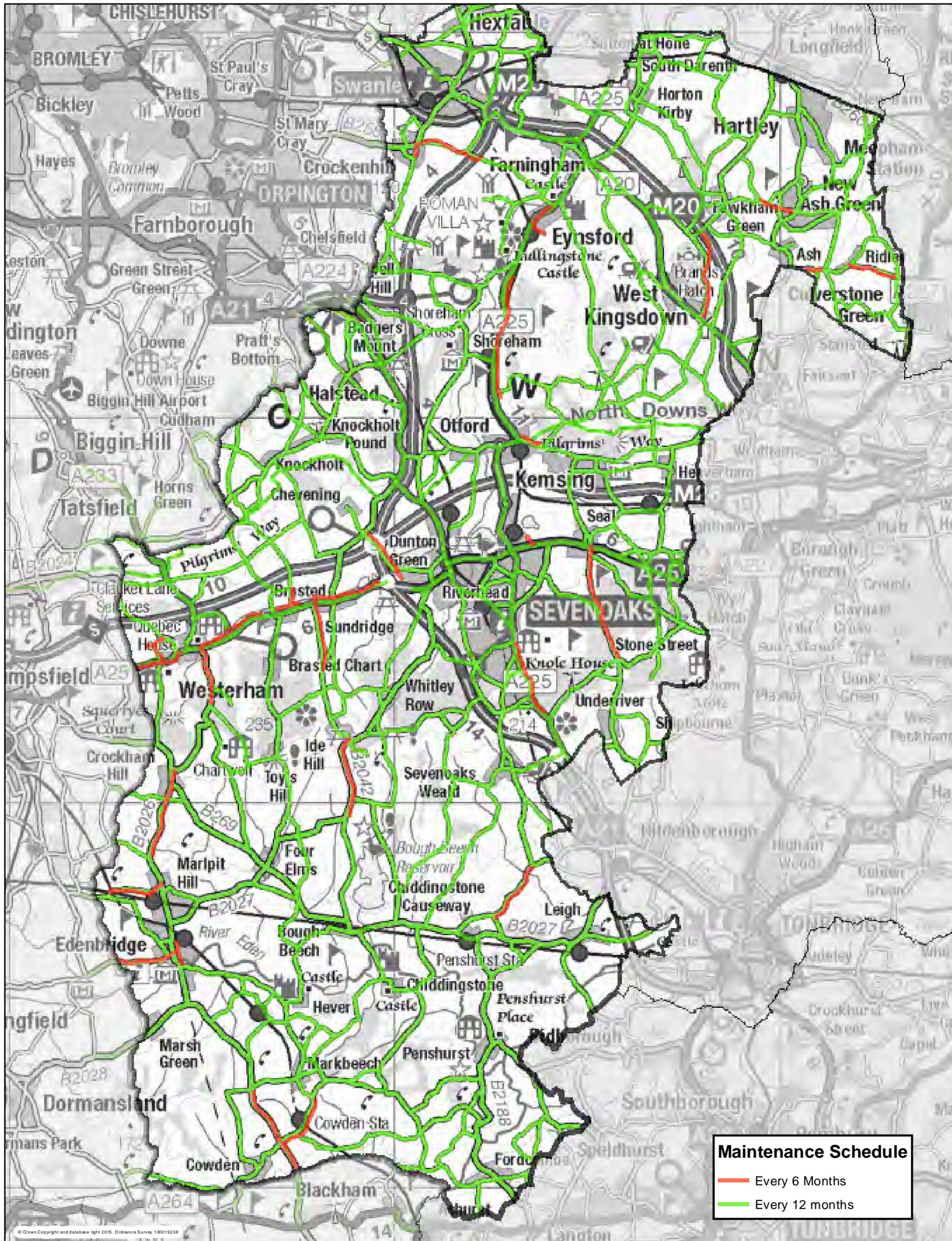
Sevenoaks Surface Water Management Plan: [Surface water management plan](#)

Sevenoaks District Council's SFRA: [Strategic flood risk assessment](#)

Planned flood defence works in the Sevenoaks South area

Appendix 1

Highways drainage maintenance schedules



KCC Highways are responsible for keeping water off the Roads known to flood frequently - Every 6 months highway making it safe for drivers and other road users.

They look after drains, ponds and lagoons, pumping stations and soakaways.

They DO NOT look after sewers, water leaks or ditches on private land.

High speed roads (roads with a speed limit of 70mph) - Every 6 months

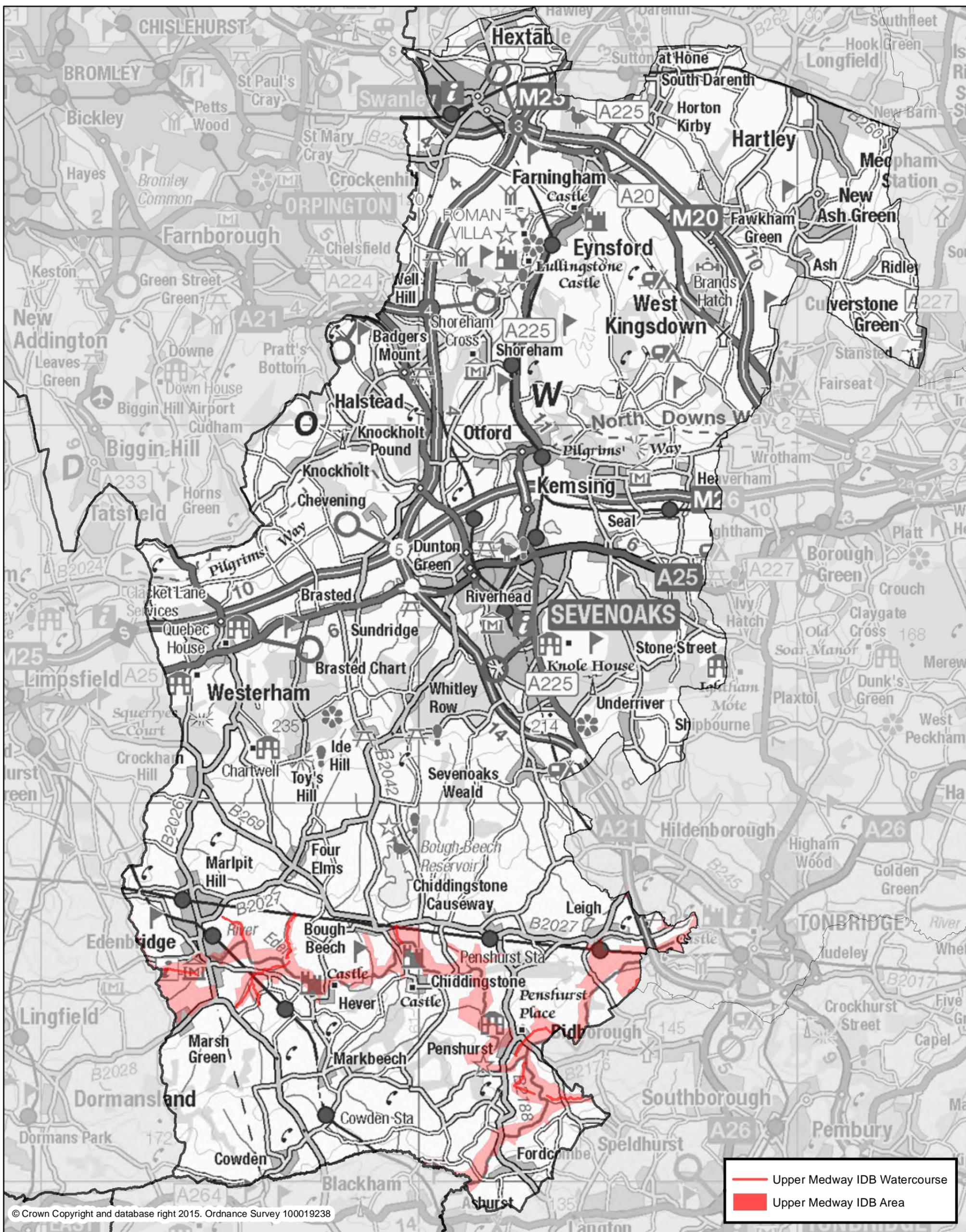
Strategic routes (roads that are the main connection between towns and villages) - Every 12 months

Urban and rural routes (all other roads) - Every 18 to 24 months



Appendix 2

Internal Drainage Board Areas and Watercourses



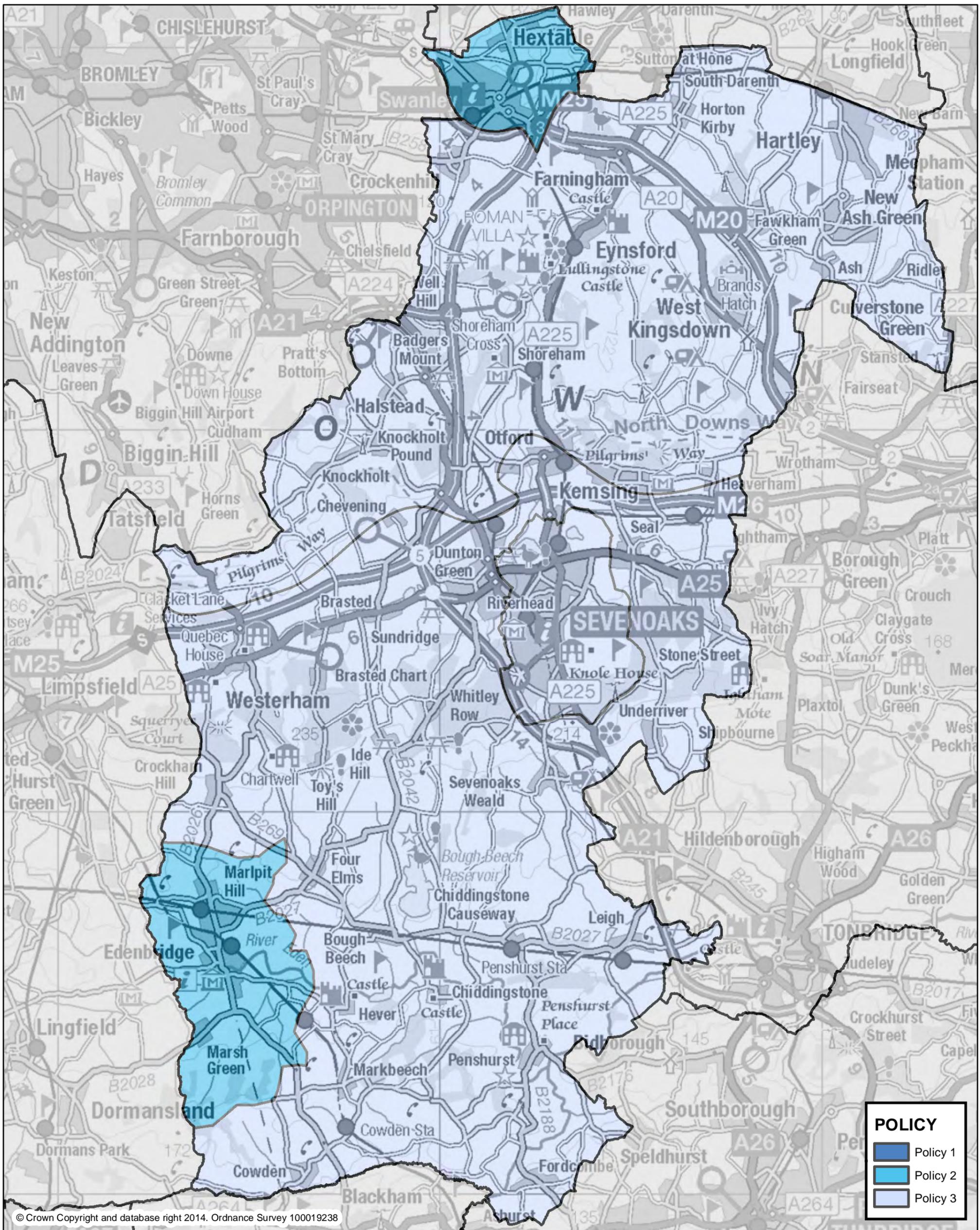
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Each IDB has permissive powers to undertake work to provide water level management within their Internal Drainage District (IDD), undertaking works to reduce flood risk to people and property and manage water levels for local needs. Much of their work involves the maintenance of rivers, drainage channels, outfalls and pumping stations, facilitating drainage of new developments and advising on planning applications. They also have statutory duties with regard to the environment and recreation when exercising their permissive powers.



Appendix 3

Sevenoaks Local Flood Risk Management Policy areas



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Local Flood Risk Management Policies:

Policy 1
 Areas with complex local flood problems.
 This policy will be applied to areas where we are aware of flood risk issues that are complex. These are the problems which are technically challenging to understand or where a number of different risk management authorities may be involved in their resolution. These areas will typically have local flood risks that affect large areas, for instance a town centre or suburb. An action plan of feasible options to manage the identified risks will be developed and delivered by the relevant risk management authorities.

Policy 2
 Areas with moderate local flood problems.
 This policy will be applied to areas where there are known local flood problems

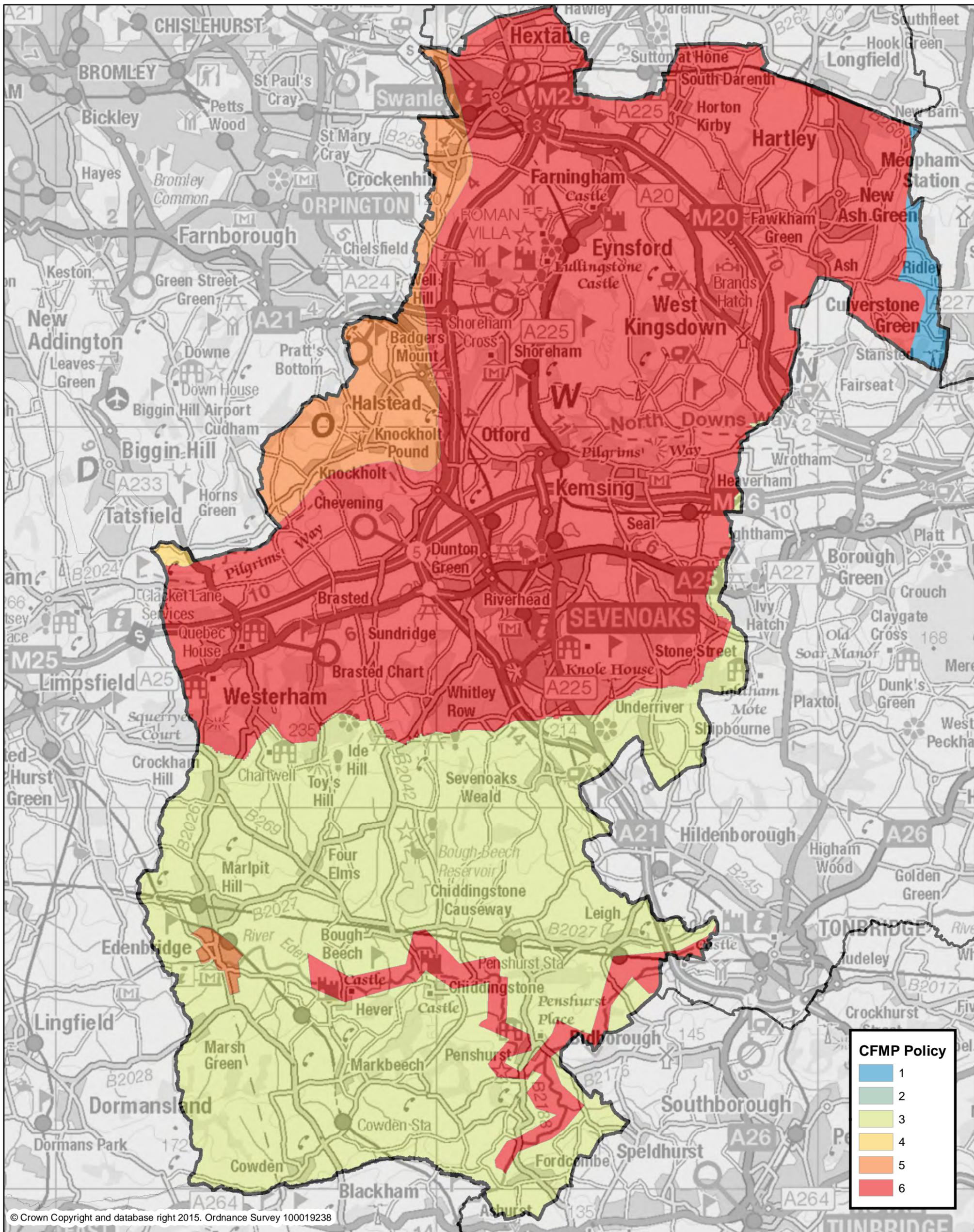
which need to be investigated but are relatively straight-forward. These areas will typically have local flood risks that affect localised areas, for instance one or two roads, that require more indepth assessment and interventions than have been used in the past. These areas may not need an in depth assessment of the risks and may be dealt with by ensuring the relevant risk management authorities work together effectively to investigate the problems although in some instances these may be necessary.

Areas with low local flood risk which are being managed effectively
 This policy will be applied to areas where local flooding risks are currently not significant. That does not mean that these areas are not at risk of local flooding, but the risks can be managed by each risk management authority undertaking its duties effectively.



Appendix 4.

Catchment Flood Management Plan and Shoreline Management Plan policy areas



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Environment Agency Catchment Flood Management Plans

Policy 1
Areas of little or no flood risk. The situation will continue to be monitored.

Policy 2
Areas of low to moderate flood risk where the existing flood risk management actions can be generally reduced.

Policy 3
Areas of low to moderate flood risk where the existing flood risk is generally being managed effectively.

Policy 4
Areas of low, moderate or high flood risk where the existing flood risk is already being effectively managed, but where further actions may be needed to keep pace with climate change.

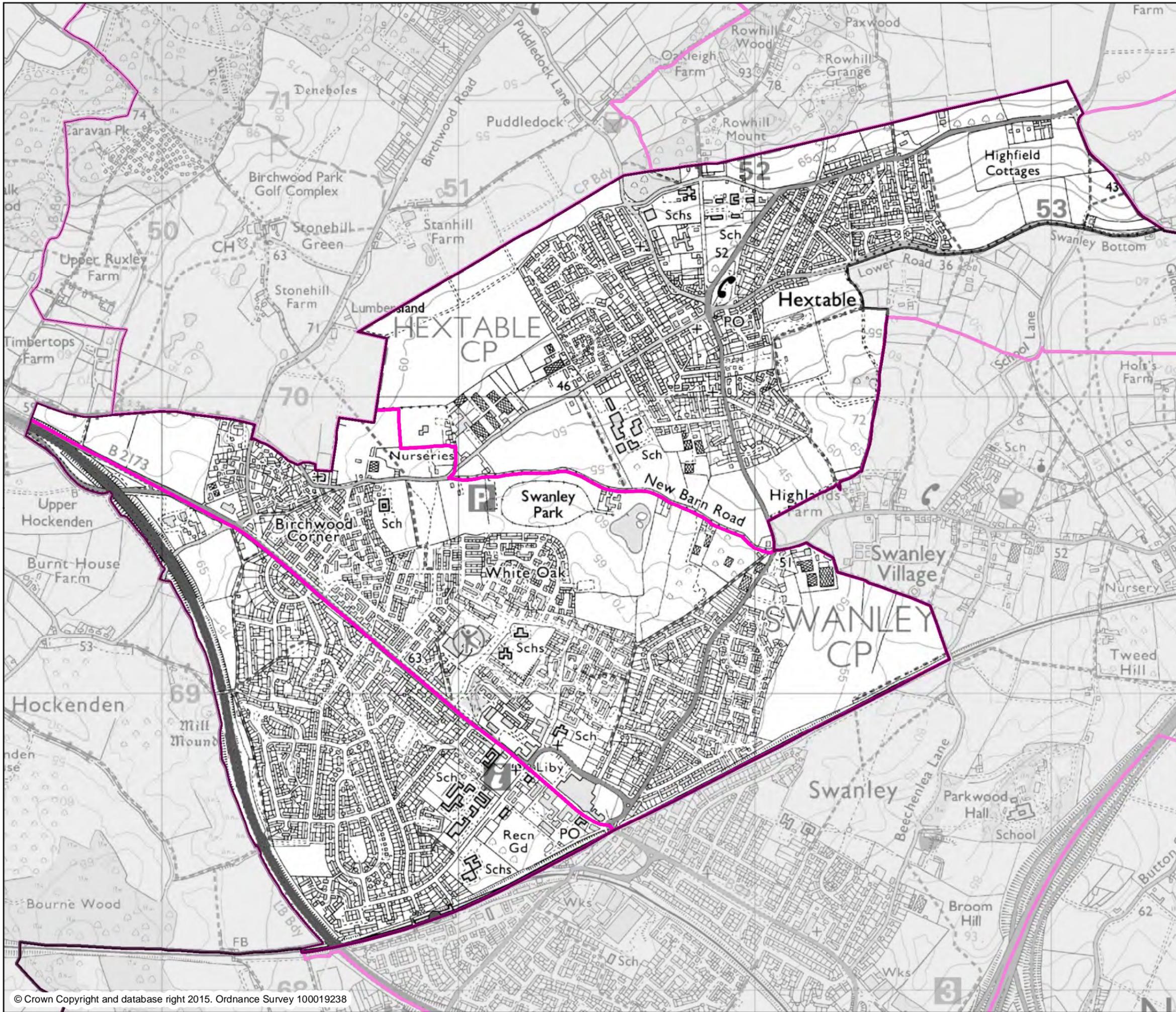
Policy 5
Areas of moderate to high flood risk where further action can be taken to reduce flood risk.

Policy 6
Areas of low to moderate flood risk where further action will be taken to store water or manage run-off in locations that provide overall flood risk reduction or environmental benefits.



Appendix 5

Swanley NaFRA mapping



Swanley

-  District Wards
-  Main Rivers
-  High
-  Medium
-  Low
-  Very Low

NaFRA:

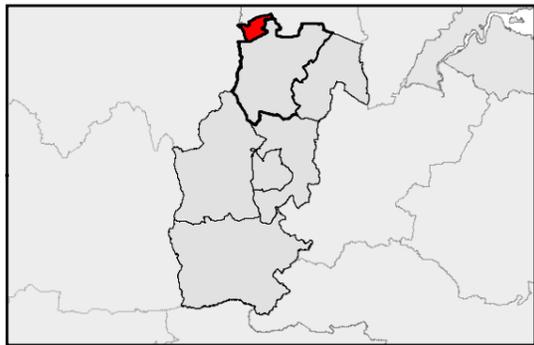
National Flood Risk Assessment (NaFRA) is a national assessment of flood risk across England and Wales which shows the likelihood of flooding in any year from rivers and the sea. It considers the location, type and condition of defences, mapped on a 50m x 50m grid in four probability bandings:

High – At risk from an event with an AEP of 3.3% or greater

Medium – At risk from an event with an AEP of less than 3.33% AEP but greater than or equal to 1%

Low - At risk from an event with an AEP of less than 1% AEP but greater than or equal to 0.1%

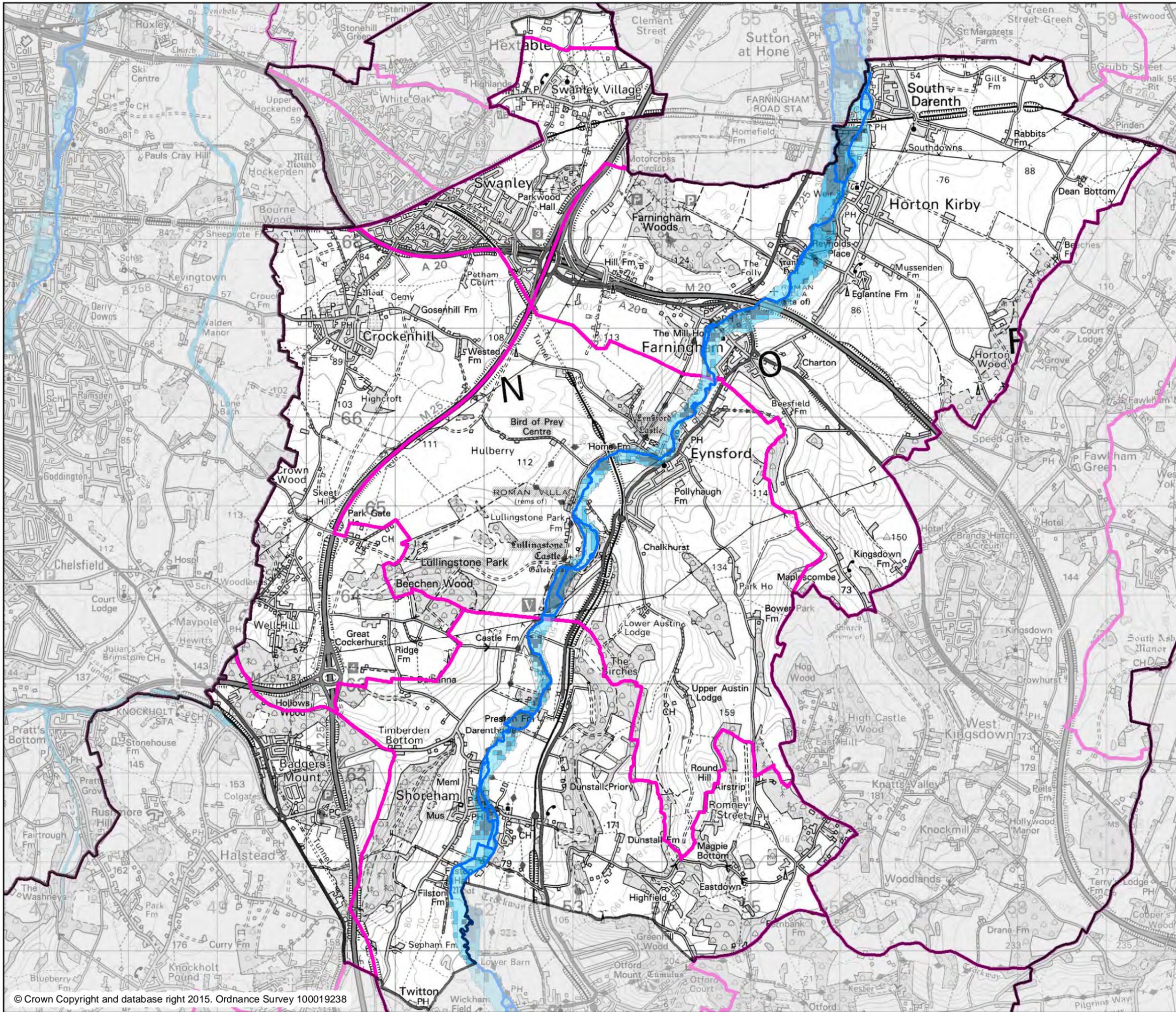
Very Low – At risk from events with an AEP of less than 0.1%



Caveats:
Properties at risk have been defined using the National Flood Risk Assessment data (NaFRA), which calculates the likelihood of flooding from rivers or the sea. The assessment takes into account the type, location and condition of flood defences, and the chance of these defences overtopping or failing during a flood event. This data is DRAFT, and subject to further checks to verify the information. This should be used as a guide only.

Appendix 6

Darent Valley NaFRA mapping



Darent Valley

-  District Wards
-  Main Rivers
-  High
-  Medium
-  Low
-  Very Low

NaFRA:

National Flood Risk Assessment (NaFRA) is a national assessment of flood risk across England and Wales which shows the likelihood of flooding in any year from rivers and the sea. It considers the location, type and condition of defences, mapped on a 50m x 50m grid in four probability bandings:

High – At risk from an event with an AEP of 3.3% or greater

Medium – At risk from an event with an AEP of less than 3.3% AEP but greater than or equal to 1%

Low - At risk from an event with an AEP of less than 1% AEP but greater than or equal to 0.1%

Very Low – At risk from events with an AEP of less than 0.1%

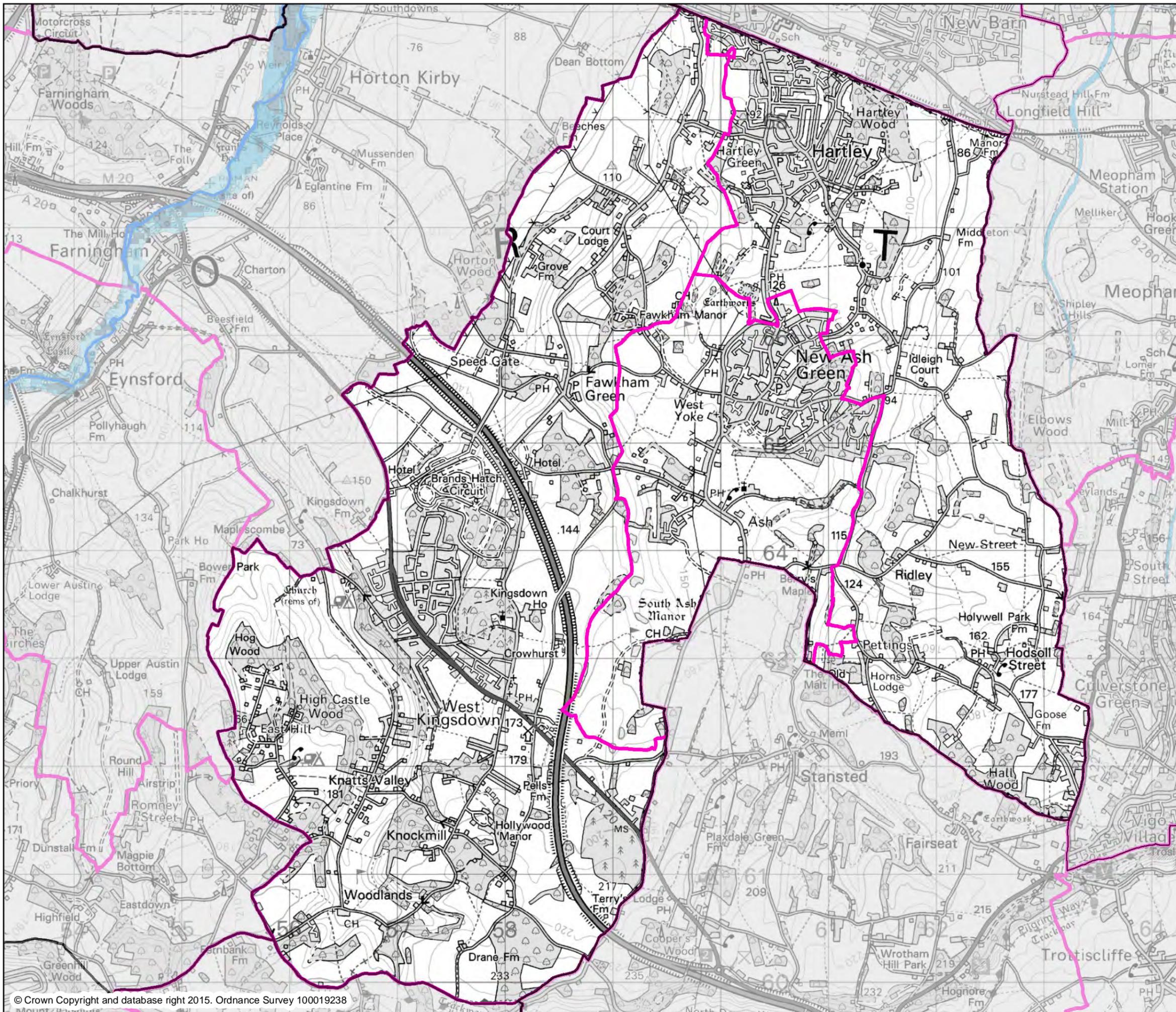


Caveats:
Properties at risk have been defined using the National Flood Risk Assessment data (NaFRA), which calculates the likelihood of flooding from rivers or the sea. The assessment takes into account the type, location and condition of flood defences, and the chance of these defences overtopping or failing during a flood event. This data is DRAFT, and subject to further checks to verify the information. This should be used as a guide only.

Appendix 7

Sevenoaks North East NaFRA mapping

Sevenoaks North East



-  District Wards
-  Main Rivers
-  High
-  Medium
-  Low
-  Very Low

NaFRA:

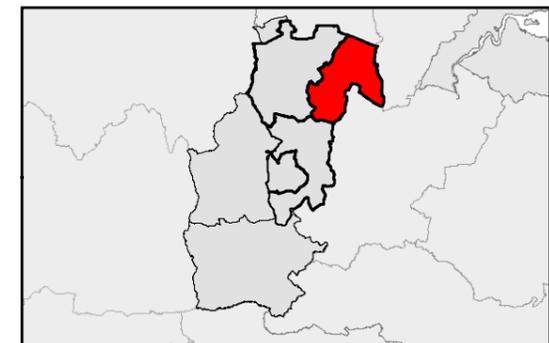
National Flood Risk Assessment (NaFRA) is a national assessment of flood risk across England and Wales which shows the likelihood of flooding in any year from rivers and the sea. It considers the location, type and condition of defences, mapped on a 50m x 50m grid in four probability bandings:

High – At risk from an event with an AEP of 3.3% or greater

Medium – At risk from an event with an AEP of less than 3.3% AEP but greater than or equal to 1%

Low – At risk from an event with an AEP of less than 1% AEP but greater than or equal to 0.1%

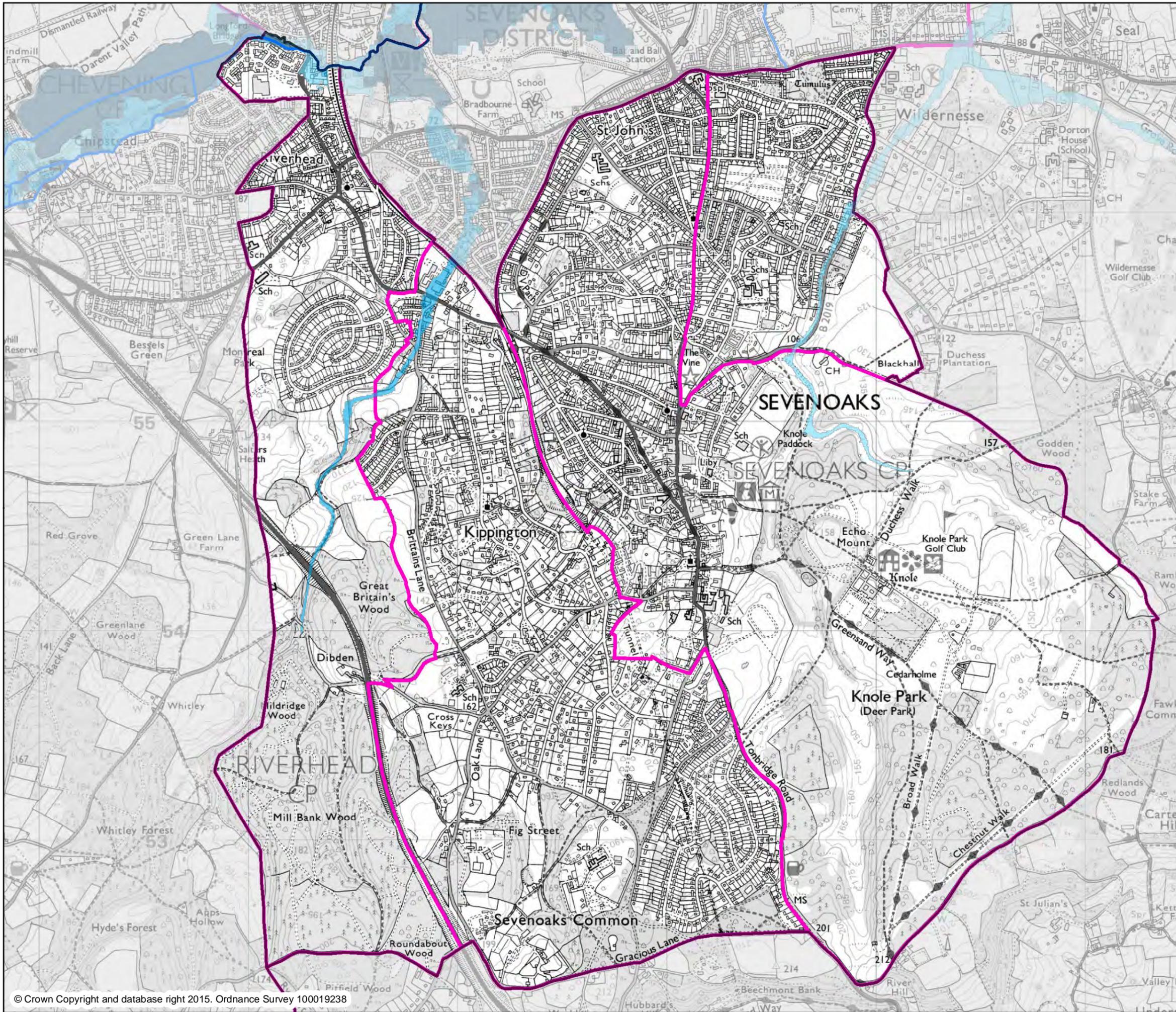
Very Low – At risk from events with an AEP of less than 0.1%



Caveats:
Properties at risk have been defined using the National Flood Risk Assessment data (NaFRA), which calculates the likelihood of flooding from rivers or the sea. The assessment takes into account the type, location and condition of flood defences, and the chance of these defences overtopping or failing during a flood event. This data is DRAFT, and subject to further checks to verify the information. This should be used as a guide only.

Appendix 8

Sevenoaks East & Sevenoaks Central NaFRA mapping



Sevenoaks Central

-  District Wards
-  Main Rivers
-  High
-  Medium
-  Low
-  Very Low

NaFRA:

National Flood Risk Assessment (NaFRA) is a national assessment of flood risk across England and Wales which shows the likelihood of flooding in any year from rivers and the sea. It considers the location, type and condition of defences, mapped on a 50m x 50m grid in four probability bandings:

High – At risk from an event with an AEP of 3.3% or greater

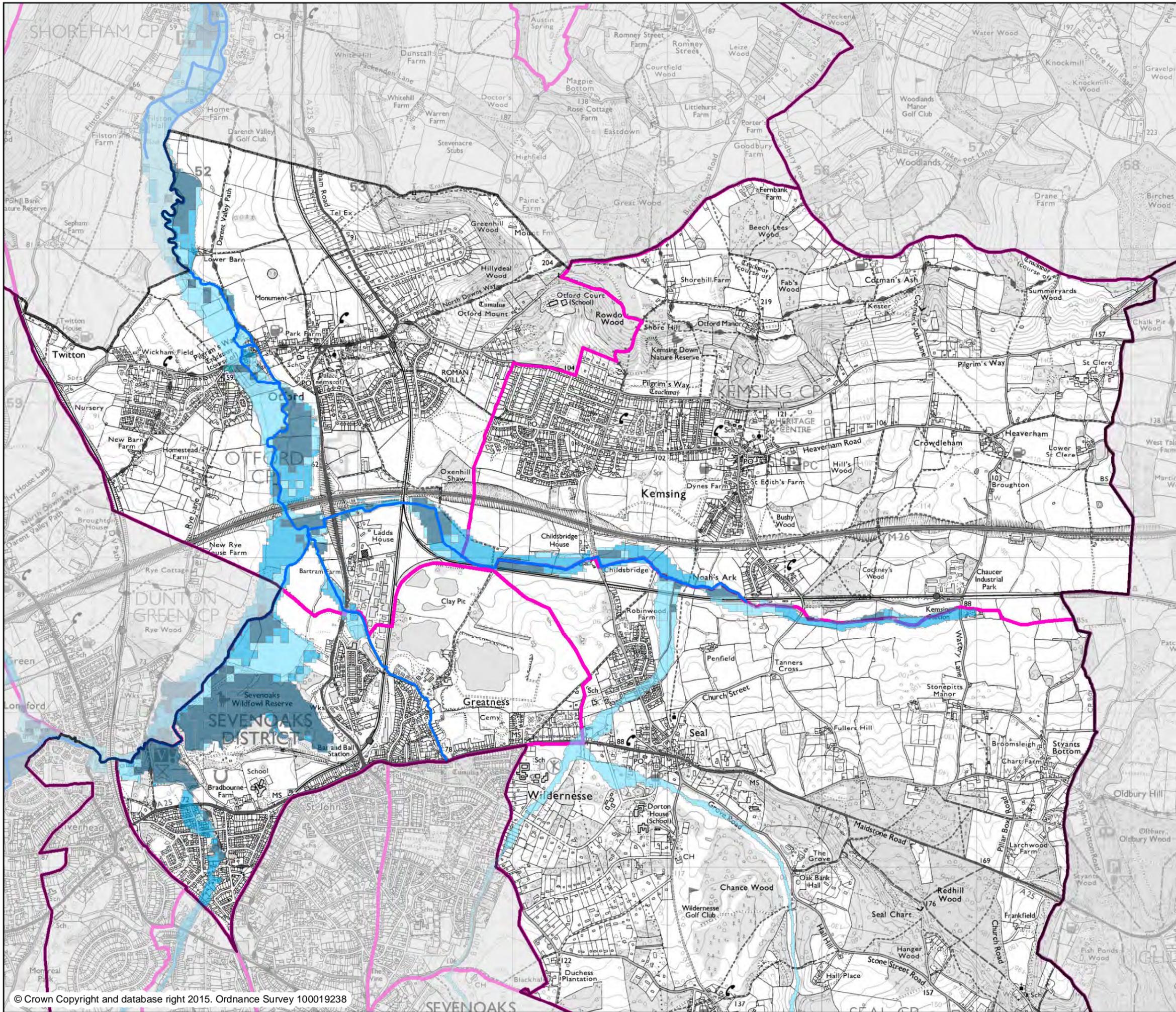
Medium – At risk from an event with an AEP of less than 3.33% AEP but greater than or equal to 1%

Low - At risk from an event with an AEP of less than 1% AEP but greater than or equal to 0.1%

Very Low – At risk from events with an AEP of less than 0.1%



Caveats:
 Properties at risk have been defined using the National Flood Risk Assessment data (NaFRA), which calculates the likelihood of flooding from rivers or the sea. The assessment takes into account the type, location and condition of flood defences, and the chance of these defences overtopping or failing during a flood event. This data is DRAFT, and subject to further checks to verify the information. This should be used as a guide only.



Sevenoaks East (North)

-  District Wards
-  Main Rivers
-  High
-  Medium
-  Low
-  Very Low

NaFRA:

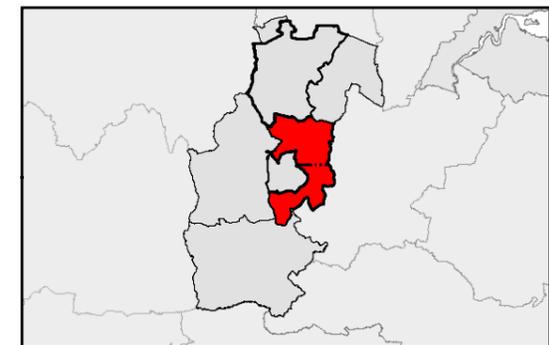
National Flood Risk Assessment (NaFRA) is a national assessment of flood risk across England and Wales which shows the likelihood of flooding in any year from rivers and the sea. It considers the location, type and condition of defences, mapped on a 50m x 50m grid in four probability bandings:

High – At risk from an event with an AEP of 3.3% or greater

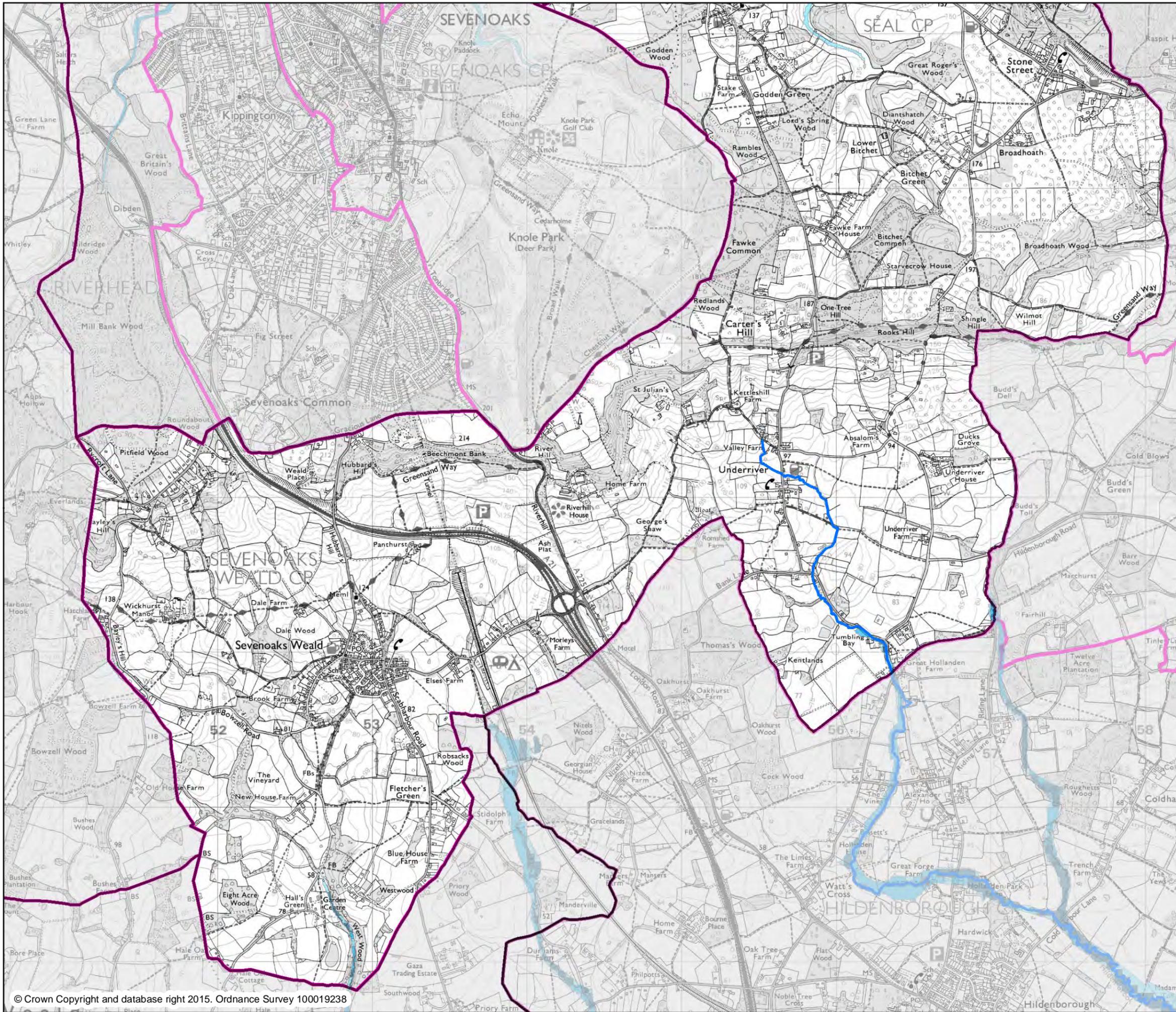
Medium – At risk from an event with an AEP of less than 3.33% AEP but greater than or equal to 1%

Low – At risk from an event with an AEP of less than 1% AEP but greater than or equal to 0.1%

Very Low – At risk from events with an AEP of less than 0.1%



Caveats:
Properties at risk have been defined using the National Flood Risk Assessment data (NaFRA), which calculates the likelihood of flooding from rivers or the sea. The assessment takes into account the type, location and condition of flood defences, and the chance of these defences overtopping of failing during a flood event. This data is DRAFT, and subject to further checks to verify the information. This should be used as a guide only.



Sevenoaks East (South)

-  District Wards
-  Main Rivers
-  High
-  Medium
-  Low
-  Very Low

NaFRA:

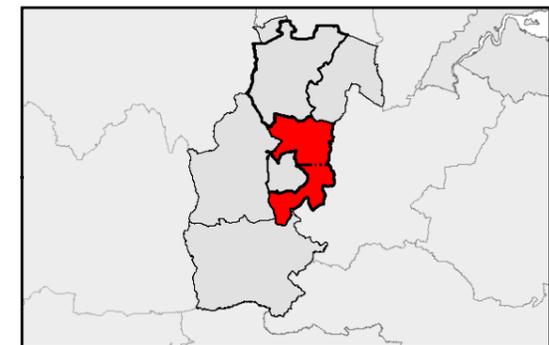
National Flood Risk Assessment (NaFRA) is a national assessment of flood risk across England and Wales which shows the likelihood of flooding in any year from rivers and the sea. It considers the location, type and condition of defences, mapped on a 50m x 50m grid in four probability bandings:

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Medium – At risk from an event with an AEP of less than 3.3% AEP but greater than or equal to 1%

Low – At risk from an event with an AEP of less than 1% AEP but greater than or equal to 0.1%

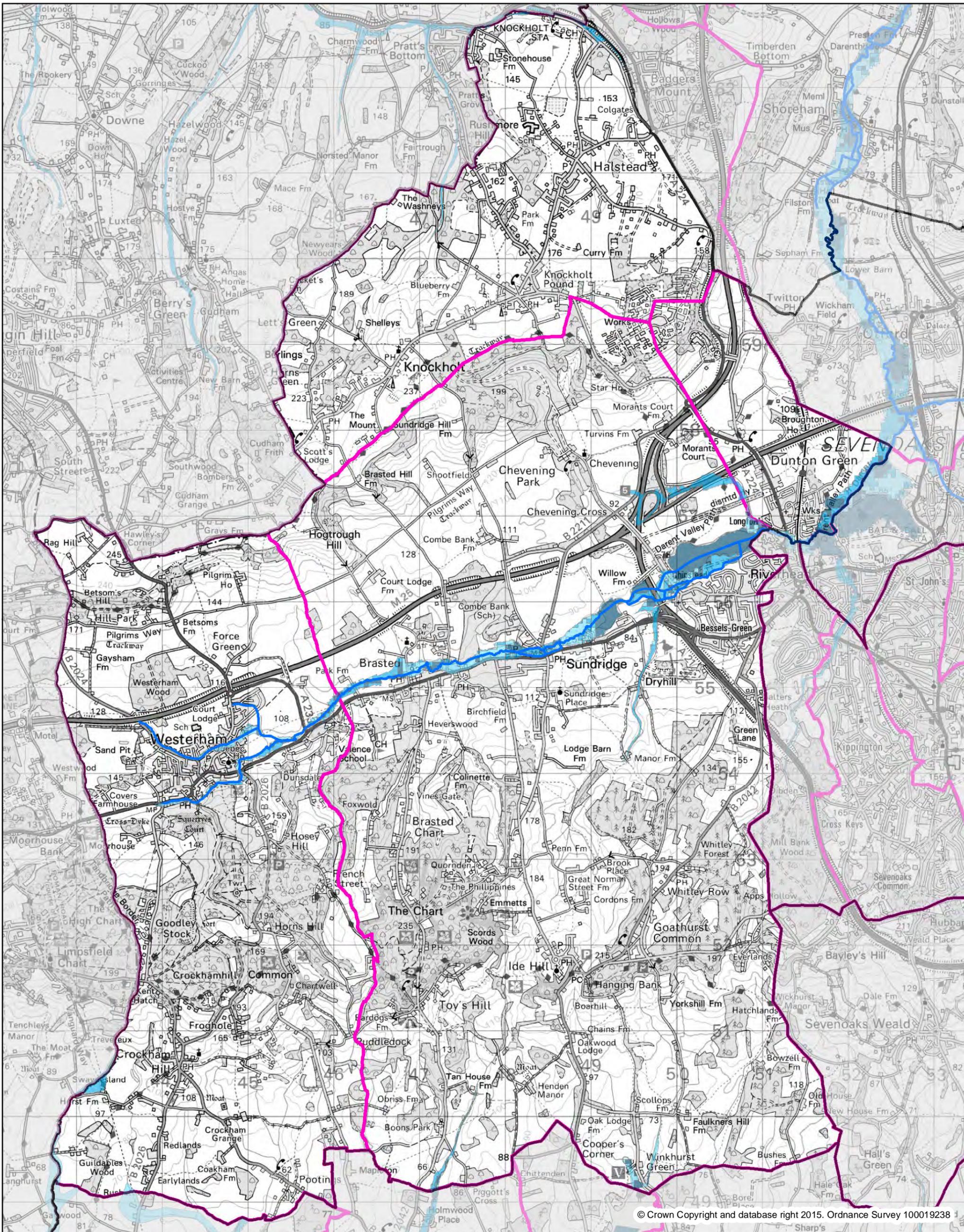
Very Low – At risk from events with an AEP of less than 0.1%



Caveats:
Properties at risk have been defined using the National Flood Risk Assessment data (NaFRA), which calculates the likelihood of flooding from rivers or the sea. The assessment takes into account the type, location and condition of flood defences, and the chance of these defences overtopping or failing during a flood event. This data is DRAFT, and subject to further checks to verify the information. This should be used as a guide only.

Appendix 9

Sevenoaks West NaFRA mapping

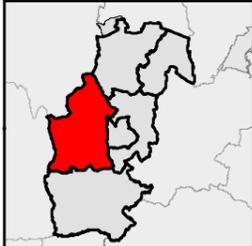


Sevenoaks West

National Flood Risk Assessment (NaFRA) is a national assessment of flood risk across England and Wales which shows the likelihood of flooding in any year from rivers and the sea. It considers the location, type and condition of defences, mapped on a 50m x 50m grid in four probability bandings:

- High - At risk from an event with an AEP of 3.3% or greater
- Medium - At risk from an event with an AEP of less than 3.33% AEP but greater than or equal to 1%
- Low - At risk from an event with an AEP of less than 1% AEP but greater than or equal to 0.1%
- Very Low - At risk from events with an AEP of less than 0.1%

- District Wards
- Main Rivers
- High
- Medium
- Low
- Very Low

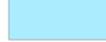


Caveats: Properties at risk have been defined using the National Flood Risk Assessment data (NaFRA), which calculates the likelihood of flooding from rivers or the sea. The assessment takes into account the type, location and condition of flood defences, and the chance of these defences overtopping or failing during a flood event. This data is DRAFT, and subject to further checks to verify the information. This should be used as a guide only.

Appendix 10

Sevenoaks South NaFRA mapping

Sevenoaks South (East)

-  District Wards
-  Main Rivers
-  High
-  Medium
-  Low
-  Very Low

NaFRA:

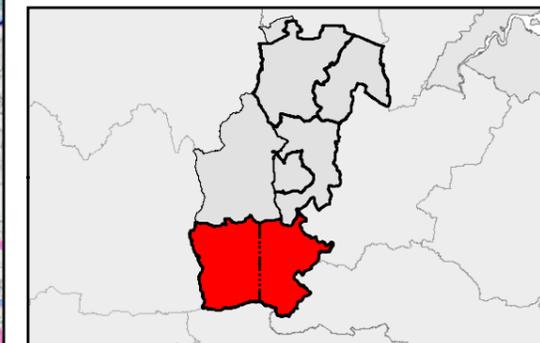
National Flood Risk Assessment (NaFRA) is a national assessment of flood risk across England and Wales which shows the likelihood of flooding in any year from rivers and the sea. It considers the location, type and condition of defences, mapped on a 50m x 50m grid in four probability bandings:

High – At risk from an event with an AEP of 3.3% or greater

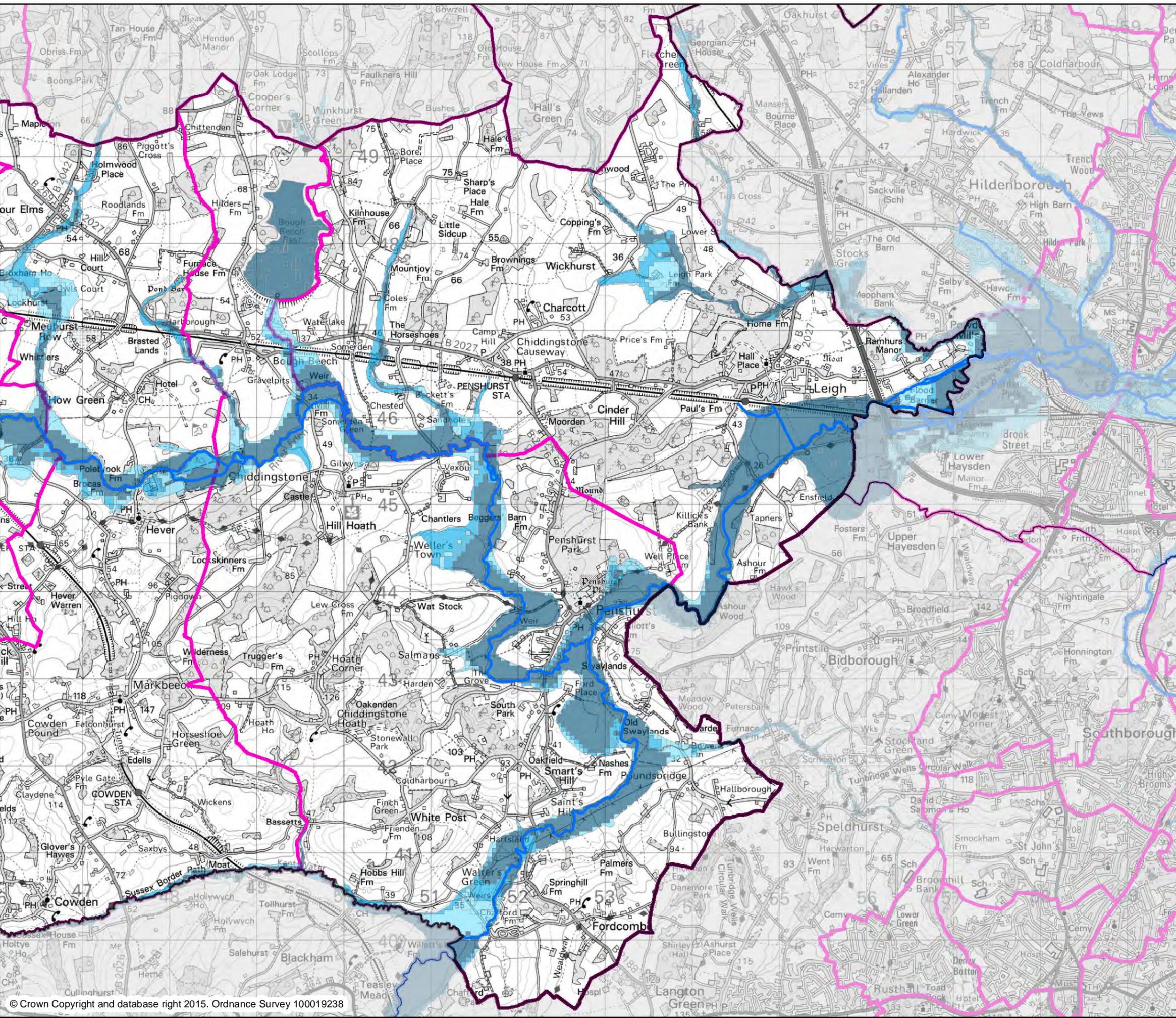
Medium – At risk from an event with an AEP of less than 3.33% AEP but greater than or equal to 1%

Low - At risk from an event with an AEP of less than 1% AEP but greater than or equal to 0.1%

Very Low – At risk from events with an AEP of less than 0.1%



Caveats:
Properties at risk have been defined using the National Flood Risk Assessment data (NaFRA), which calculates the likelihood of flooding from rivers or the sea. The assessment takes into account the type, location and condition of flood defences, and the chance of these defences overtopping or failing during a flood event. This data is DRAFT, and subject to further checks to verify the information. This should be used as a guide only.

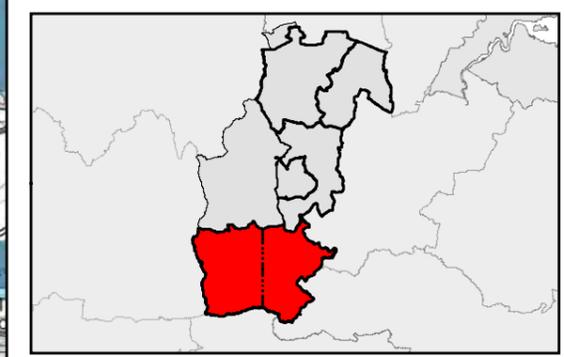


Sevenoaks South (West)

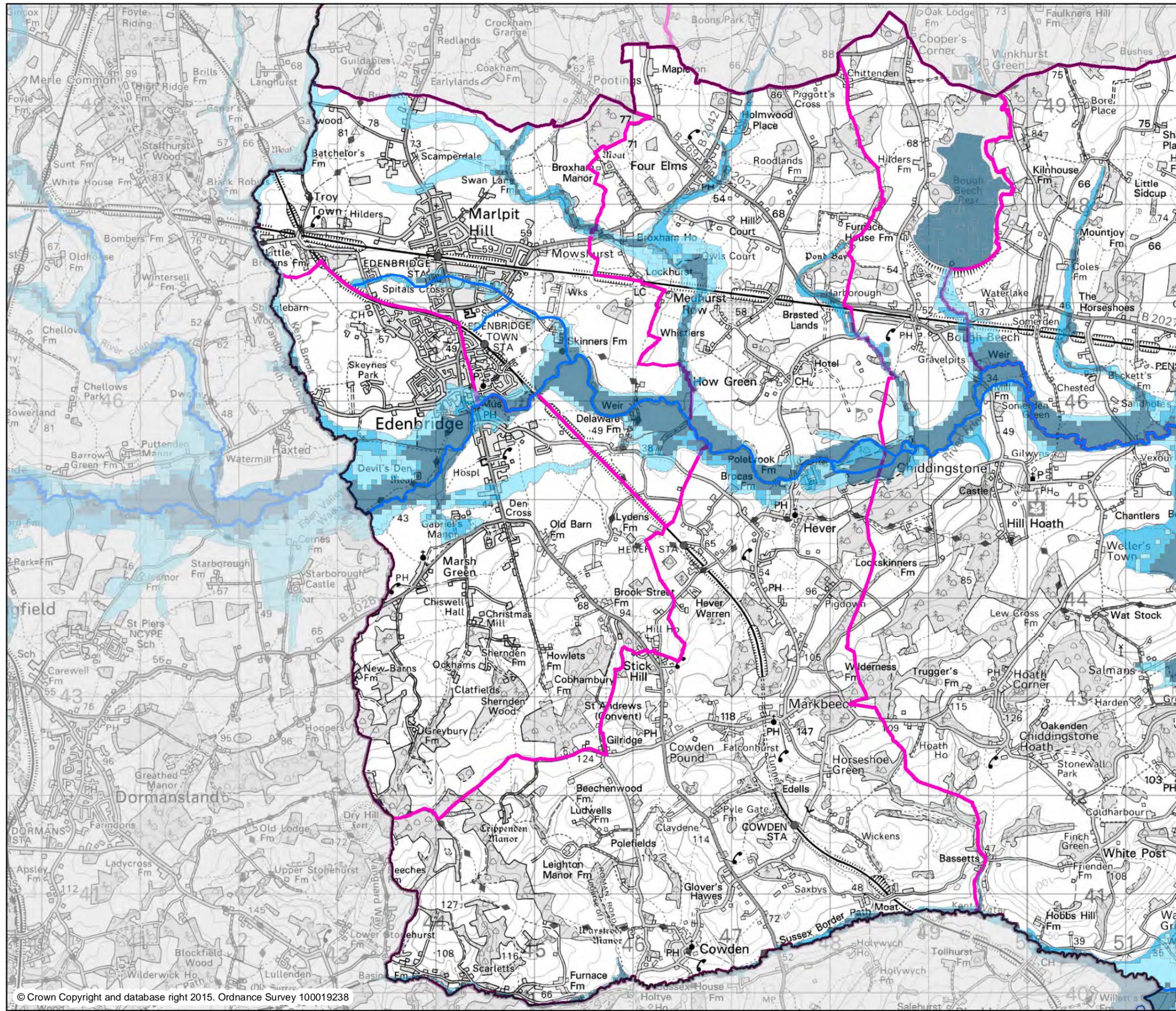
-  District Wards
-  Main Rivers
-  High
-  Medium
-  Low
-  Very Low

NaFRA:
National Flood Risk Assessment (NaFRA) is a national assessment of flood risk across England and Wales which shows the likelihood of flooding in any year from rivers and the sea. It considers the location, type and condition of defences, mapped on a 50m x 50m grid in four probability bandings:

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- Medium** – At risk from an event with an AEP of less than 3.33% AEP but greater than or equal to 1%
- Low** - At risk from an event with an AEP of less than 1% AEP but greater than or equal to 0.1%
- Very Low** – At risk from events with an AEP of less than 0.1%



Caveats:
 Properties at risk have been defined using the National Flood Risk Assessment data (NaFRA), which calculates the likelihood of flooding from rivers or the sea. The assessment takes into account the type, location and condition of flood defences, and the chance of these defences overtopping or failing during a flood event. This data is DRAFT, and subject to further checks to verify the information. This should be used as a guide only.



Glossary

Flood Risk to Communities –Sevenoaks

Aquifer	A source of groundwater comprising water-bearing rock, sand or gravel capable of yielding significant quantities of water.
Attenuation	Attenuation is the process of water retention on site and slowly releasing it in a controlled discharge to a surface water or combined drain or watercourse. The amount of discharge will vary depending whether it is a brown or greenfield site. For brownfield sites the developer must determine the likely run off and agree an acceptable discharge with the LLFA, environment agency or water authority.
Brownfield site	Any land or site that has been previously developed.
Catchment	The area contributing surface water flow to a point on a drainage or river system.
CIRIA	Construction Industry Research and Information Association. www.ciria.org
Climate change	Long-term variations in global temperature and weather patterns both natural and as a result of human activity (anthropogenic) such as greenhouse gas emissions
Culvert	A structure which fully contains a watercourse as it passes through an embankment or below ground.
Development	The undertaking of building, engineering, mining or other operations in, on, over or under land or the making of any material

	any buildings or other land.
EA	Environment Agency. Government Agency responsible for flooding issues from main river, and strategic overview of flooding.
Flood event	A flooding incident usually in response to severe weather or a combination of flood generating characteristics.
Flood risk	The combination of the flood probability and the magnitude of the potential consequences of the flood event.
Flood Risk Assessment	An appraisal of the flood risks that may affect development or increase flood risk elsewhere
Flood Zones	Flood Zones provide a general indication of flood risk, mainly used for spatial planning.
Floodplain	An area of land that would naturally flood from a watercourse, an estuary or the sea.
Freeboard	A vertical distance that allows for a margin of safety to account for uncertainties.
Flood and Water Management Act	The Flood and Water Management Act clarifies the legislative framework for managing surface water flood risk in England.
Flow control device	A device used to manage the movement of surface water into and out of an attenuation facility.

Flood Risk to Communities -Sevenoaks

Geocellular storage systems	Modular plastic systems with a high void ratio, typically placed below ground which allow for storage of storm water to infiltrate or discharge to another system.
Gravity drainage	Drainage which runs through pipework installed to a fall, and not therefore under pressure.
Greenfield	Undeveloped land.
Greenfield runoff rate	The rate of runoff which would occur from a site that was undeveloped and undisturbed.
Groundwater	Water that exists beneath the ground in underground aquifers and streams.
Groundwater flooding	Flooding caused by groundwater rising and escaping due to sustained periods of higher than average rainfall (years) or a reduction in abstraction for water supply.
Impermeable	Will not allow water to pass through it.
Impermeable surface	An artificial non-porous surface that generates a surface water runoff after rainfall.
Infiltration	Infiltration or soakaway is the temporary storage of water to allow it to naturally soak away into the ground. Because water soaks into the ground gradually, reduces the risk of flooding downstream. Infiltration may be used where

	there is no surface water sewer or where existing systems are at full capacity. Infiltration helps to recharge natural ground water levels.
Local Flood Risk Management Strategy	Strategy outlining the Lead Local Flood Authority's approach to local flood risk management as well as recording how this approach has been developed and agreed.
Main River	A watercourse designated on a statutory map of Main rivers, maintained by Department for Environment, Food and Rural Affairs (Defra).
Mitigation measure	A generic term used in this guide to refer to an element of development design which may be used to manage flood risk to the development, or to avoid an increase in flood risk elsewhere.
National Planning Policy Framework	Framework setting out the Government's planning policies for England and how these are expected to be applied. It provides a framework within which local people and their accountable councils can produce their own distinctive local and neighbourhood plans, which reflect the needs and priorities of their communities.
Overland Flow	Flooding caused by surface water runoff when rainfall intensity exceeds the infiltration capacity of the ground, or when the soil is so saturated that it cannot accept any more water.
Permeability	A measure of the ease with which a fluid can flow through a porous medium. It depends on the physical properties of the medium.

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Pitt Review	An independent review of the 2007 summer floods by Sir Michael Pitt, which provided recommendations to improve flood risk management in England.
Rainwater harvesting	Collection and Re-use or recycling of rainwater for the purpose of garden irrigation, car washing, toilet flushing etc.
Runoff	Water flow over the ground surface to the drainage system. This occurs if the ground is impermeable, is saturated or if rainfall is particularly intense.
Source Protection Zone	Defined areas showing the risk of contamination to selected groundwater sources used for public drinking water supply.
Strategic Flood Risk Assessment	A study to examine flood risk issues on a sub-regional scale, typically for a river catchment or local authority area during the preparation of a development plan.
Surface water flooding	Flooding caused by the combination of pluvial flooding, sewer flooding, flooding from open channels and culverted urban watercourses and overland flows from groundwater springs
Surface Water Management Plan	A study undertaken in consultation with key local partners to understand the causes and effects of surface water flooding and agree the most cost effective way of managing surface water flood risk for the long term.

SUDS	Sustainable (urban) drainage systems. A sequence of management practices and control structures that are designed to drain surface water in a more sustainable manner.
Watercourse	A term including all rivers, streams, ditches drains cuts culverts dykes sluices and passages through which water flows.