Crowhurst Neighbourhood Development Plan

Watercourses and Flooding Description

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Introduction

Crowhurst is located within the heart of the Sussex Weald. History tells us that the sea came up to the village and the recreation ground in medieval times and some of the houses nearby are below sea level. The village has had a long standing flooding problems. There are two main areas of flood risk in Crowhurst. The Springfield area and the Sampsons Lane area.

Seven of the most severe floods have been documented in *The History of Flooding in Crowhurst 2010* (Tracy Hoad)

1. Facts about the Watercourses in Crowhurst

All the watercourses have been modified over several hundred years

1.1 **The Powdermill Stream**

- The Powdermill sub catchment above Crowhurst is around 1,770 ha, comprising around 6.3 km of main river, 4.2 km of secondary stream and 26.5km of tertiary (head) stream.
- The Powdermill sub – catchment has woodland covering approximately 25% (442 ha) of the total sub catchment – around twice the national average.
- The Powdermill Stream is the head stream of the Combe Haven catchment.
- The water levels of the Powdermill is largely governed by the Watermill Stream.
- The Combe Haven discharges to the sea by gravity at low tide via a short outfall onto the foreshore.
- Around 68% of the catchment is in arable land use or improved grassland.

The Hastings culvert on a flood event

1.2 **Rackwell Stream**

- The Rackwell is fed by three streams, Telham Place – Brakes Coppice, Crowhurst Park and Long Plantation – New Wood Park.
- The downstream part of the Rackwell has a southwards flow and over tops the banks on a regular basis.
- The upstream part of the Rackwell has a south eastward flow.
- The ‘Sinks’ at the eastern edge of Rackwell Wood, stream goes under the old railway
- There is a substantial structure – the culvert is big and runs underground for more than 200m.
- Rackwell emerges from under old railway into Rackwell Wood which identifies the size of the stream.

This brick culvert construction can be found in Rackwell Wood.

1.3 **Brokes Gill (Tributary Stream)**

- The stream 'Brokes Gill runs behind/parallel to the houses on Station Road. The stream sinks before one of the properties at the bottom of the road and crosses under the road and emerges into a ditch on Court Lodge Farm.

- From Court Lodge Farm it runs through an underground culvert which emerges into a ditch beside the footpath in Forewood Lane.

- An underground culvert runs from Forewood Lane which surfaces at the Old Post Office bridge. This is where it merges with the Powdermill Stream.

2. Types of Flooding

2.1 **Fluvial Flooding**

Fluvial, flooding, occurs when excessive rainfall over an extended period of time causes a river to exceed its capacity. The damage from a river flood can be widespread as the overflow affects smaller rivers downstream, often causing dams and dikes to break and swamp nearby areas.

There are two main types of riverine flooding:

- Overbank flooding occurs when water rises overflows over the edges of a river or stream. This is the most common and can occur in any size channel — from small streams to huge rivers.
- Flash flooding is characterized by an intense, high velocity torrent of water that occurs in an existing river channel with little to no notice.

The severity of the flood is determined by the amount of precipitation in an area, how long it takes for precipitation to accumulate, previous saturation of local soils, and the terrain surrounding the river system. In flatter areas, floodwater tends to rise more slowly and be more shallow, and it often remains for days. In hilly areas, floods can occur within minutes after a heavy rain.

2.2 **Pluvial Water Flooding**

A pluvial, or surface water flood, is caused when heavy rainfall creates a flood event independent of an overflowing water body. One of the most common misconceptions about flood risk is that one must be located near a body of water to be at risk. Pluvial flooding can happen in any urban area — even higher elevation areas that lie above coastal and river floodplains.

There are two common types of pluvial flooding:

- Intense rain saturates an urban drainage system. The system becomes overwhelmed and water flows out into streets and nearby structures.
- Run-off or flowing water from rain falling on hillsides that are unable to absorb the water.

Pluvial flooding often occurs in combination with coastal and fluvial flooding, and although typically only a few centimetres deep, a pluvial flood can cause significant property damage.

Many issues of localised flooding are caused by storm run – off from the road network and urban surfaces. This occurs either as sheer volume of water sheeting off hard surfaces and or its intersection with culverts and bridges which have inadequate capacity to accommodate flood flows.

- *It is requirement of the National Planning Policy Framework that developments must not increase the risk of flooding elsewhere. This means that the rate of surface water run off during storms must not be increased by new developments. This includes a requirement that if new or replacement driveways are proposed in front gardens and if the surfaces to be covered are more than 5 square metres, planning permission will be needed for laying traditional, impermeable driveways that do not provide for the water to run to a permeable area.*
- *The use of Sustainable Drainage Systems (SuDS) should be encouraged. These are designed to store rainfall run off during heavy rain and slowly released it at a rate not exceeding the 'green-field' run off rate. SuDS include a number of different practices or*

mechanisms designed to drain or soak up surface water in a more sustainable approach to the conventional practice of draining water run off through a pipe into a sewer. The effectiveness of SuDS schemes is subject to the approval of a national approval board. The SuDS Approval Board (SAB) came into existence in October 2014. This effects new developments that are 10+ dwelling in size.

2.3 **Groundwater Flooding**

Groundwater flooding occurs when the water table in permeable rocks rises to enter basements/cellars or comes up above the ground surface. Groundwater flooding is not necessarily linked directly to a specific rainfall event and is generally of longer duration than other causes of flooding (possibly lasting for weeks or even months).

Groundwater levels are generally highest in early spring and lowest in early autumn. Therefore flooding that occurs in June to September is not normally caused by groundwater. Flooding that responds rapidly to rainfall events is also unlikely to be caused by high groundwater levels; exceptions do occur if the water table is normally very shallow and it has been very wet.

3. Flood Areas in Crowhurst

3.1

Areas	***Type of Flooding***
Lower Wilting	Pluvial
Sampsons Lane	Pluvial
Sandrock Hill	Pluvial & fluvial
Sandrock Crescent	Pluvial & fluvial
Recreation Ground	Groundwater and pluvial
Forewood Lane (lower)	Pluvial & fluvial
Station Road	Fluvial and Pluvial
Forewood Lane (higher)	Pluvial

(The technical guidance to the National Planning Policy Framework states 'Flood Risk' means risk of flooding from all sources – including from rivers and the sea, directly from rainfall on the ground surface and rising groundwater, overwhelmed sewers and drainage systems and from reservoirs, canals and lakes and other artificial sources)

4. Flood Zones

4.1 The Government's Planning Practice Guidance (PPG) sets out what is meant by a flood risk area for planning purposes.

It states: For the purposes of applying the National Planning Policy Framework, "flood risk" is a combination of the probability and the potential consequences of flooding from all sources – including from rivers and the sea, directly from rainfall on the ground surface and rising groundwater, overwhelmed sewers and drainage systems, and from reservoirs, canals and lakes and other artificial sources.

4.2 **Flood Zone One:** which is low probability. This is land having less than 1 in 1000 of annual probability of river or sea flooding.

4.3 **Flood Zone Two** : which is medium probability. This is land having between 1 in 100 and 1 in 1000 annual probability of river flooding or land having between a 1 in 200 and 1 in 1000 annual probability of sea flooding.

4.4 **Flood Zone Three:**

(a) which is high probability. This is land having a 1 in 100 or greater annual probability of river flooding or land having a 1 in 200 or greater annual probability of sea flooding.

(b) the Functional Floodplain. This zone comprises land where water has to flow or be stored in times of flood.

4.5 **Strategic Flood Risk Assessments Areas**

Local planning authorities should identify in the Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency.

5. Flood Management[i]

5.1 **Slowing the Flow and increasing 'Out of Bank Storage'**

An important way to reduce flooding downstream is to hold water back in and on the land; this effectively slows the flow of water and reduces the size of the peak flow in the river. The capacity of a landscape to store water is a function of its underlying geological and climatic characteristics, its land use and how those uses are managed. The factors that relate to how water moves across the land to a stream are the soil infiltration, storage and tillage regimes and the level of flow connectivity. A number of management options are also available to reduce the potential risk of flooding from farmland.

5.2 **Flood Management in Crowhurst**

There are areas of woodland patches within the upper Crowhurst area connected to the river network. Implying that there is a possibility for flow disruption within the stream woodland network.

Some of the streams in the headwaters are steep sandstone ghyll woodlands. These could have potential for the inclusion of natural woody material to slow down flows.

There are a number of opportunities for washland restoration across the catchment. Historic maps show that historic stream courses South of Peppering Eye Farm and West of Fore Wood have be straightened and re-aligned.

The EA are currently looking to see if work could be carried out here, and downstream of Fore Wood to re-engage the river with its floodplain and to slow down flood flows.

6. Soil Infiltration, Storage and Tillage Regimes

6.1 **Natural influences** on soil storage capacity of water relate to factors like the soil depth, aspect and slope of fields. A surface that allows the water to flow quickly is not desirable and causes flooding, whereas a higher surface roughness and higher infiltration into the ground can slow down the flood response and is desirable. Steeper slopes and shallow soils are more susceptible to surface run off. The vegetation cover of soils, whether that is permanent grassland or the cover of other crops, during the wettest times of the year in the winter and spring, has an important impact on the ability of the soil to act as a water store. Run off of rainwater is much more likely on bare fields than those with a good crop cover. Different types of crops and the way they are cultivated can also increase the risk of run off, for example crops like maize or potatoes result in much more bare soil being exposed than grass or forestry and the traditional ridges and furrows approach to tillage can generate more run off than direct drilling of seeds into the soil.

6.2 **The structure and infiltration capacity of soils** will also have an important impact on the efficiency of the soil to act as a sponge and soak up water. Different types of soils have differing capacities but they can also become degraded through poor management practices. Some fine soils can be prone to capping where the surface forms a hard crust, preventing water from infiltrating resulting in water running off the surface. Compaction caused by heavy machinery or high stocking densities can also lead to degraded soils.

6.3 **Adopting best management practices** for soils can significantly improve the structure and functioning of the soil as a store for water during wet weather, it is also very cost effective and reduces nutrient and soil erosion.

7. Flow connectivity

7.1 **Flow connectivity** relates to how easy it is for rainwater falling on the land to reach the stream. High connectivity can be bad from a flood risk perspective as larger volumes of water will reach the streams and rivers in a catchment quickly, resulting in high levels of discharge increasing the risk of a flood. Natural connectivity is associated with the shape of the hill slope in relation to the stream; steep slopes with no flat area next to the stream have a higher level of connectivity than gentle slopes or flat land. In the agricultural landscape, connectivity can be enhanced by the use of land drains and ditches and the location of tyre tracks and roads. Where these features are oriented down a slope, results in their as a conduit for water speeding up its travel over land.

7.2 **The density of livestock on land**, particularly during the wet winter months can impact on flow connectivity through the compaction of land leading to a reduction in water infiltrating into the soil. Compacted ground leads to higher surface run off so water reaches the stream more quickly.

- This is evident where the Rackwell runs through the Cinderbrook Field and the adjoining field**.**

8. Management Measures

8.1 In order to address the **issues of soil structure and flow connectivity** and effectively slow down the flow of water from land to streams and rivers, a number of management approaches can be adopted to trap water and sediment before it can reach the stream.

8.2 Sometimes **measures to reduce flooding** can also be similar to those that reduce diffuse pollution, so there is a dual benefit here. This has the dual benefit of reducing the potential flood risk and also preventing fine sediments, nutrients and other diffuse polluting substances from being lost from the land. The use of field boundaries, such as hedges, trees and stone walls and buffer strips can act as potential traps for water, increasing the time for infiltration into the soil and reducing the flow connectivity.

8.3 **Hedges as Barriers**:

- *Strong evidence exists that individual hedges can reduce the volume and rate of water moving down slope so potentially help to reduce the risk of flooding. Hedges act as physical barriers, especially if they contain earth barks, and typical British hedge shrubs and trees can greatly increase water penetration into the ground. Some evidence exists to show that hedge works can reduce peak flows of nearby water courses following heavy rainfall by upto 50% but more work is required at catchment scale. (From report of Defra project LM0106)*

8.4 **Slowing down water delivery** with wetlands, ponds, waterlogged zones and storage ponds can also help to store more water on the land before it reaches the river. This may be through a slowing of run off as it passes through a wetland or as a temporary storage area during a high flow event.

(There are a number of Pond Bays that are dried up within the Crowhurst parish. If some of these were reinstated they could be used to hold some of the surface water.)

8.5 **Crowhurst is mentioned in**:

The East Sussex Local Flood Risk Management Strategy (2013 – 2016):

The Cuckmere and Sussex Havens Catchment Flood Management Plan

'The main source of risk in this plan area is from intense localised flooding from surface water sources largely focussed in the towns of Eastbourne, Polgate and Pevensey.

The plan notes that further action is needed in Eastbourne, Polgate, Hailsham, Bexhill, Hastings and Crowhurst to tackle future anticipated rises in flood risk (policy unit four).

Within the plan area, road and rail infastructure are prone to flooding at a number of locations (notably Combe Haven), from the 1% AEP event, with 2.63 km of the road and 2.11 of rail network currently affected.

9. Responsibilities

Managing Flood risks: who is responsible:

9.1 **Defra**

Defra has overall national responsibility for policy on flood and coastal erosion risk management, and provides funding for flood risk management authorities through grants to the Environment Agency and local authorities.

9.2 **The Environment Agency**

The Environment Agency is responsible for taking a strategic overview of the management of all sources of flooding and coastal erosion. This includes, for example, setting the direction for managing the risks through strategic plans; providing evidence and advice to inform Government policy and support others; working collaboratively to support the development of risk management skills and capacity; and providing a framework to support local delivery.

The Agency also has 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 has published a

National Flood and Coastal Risk Management Strategy for England. The strategy provides a lot more information designed to ensure that the roles of all those involved in managing risk are clearly defined and understood.

9.3 **Rother District Council**

RDC are key partners in planning local flood risk management and can carry out flood risk management works on minor watercourses, working with Lead Local Flood Authorities and others, including through taking decisions on development in their area which ensure that risks are effectively managed. District and unitary councils in coastal areas also act as coastal erosion risk management authorities.

9.4 **Internal Drainage Boards**

These are independent public bodies responsible for water level management in low lying areas, also play an important role in the areas they cover (approximately 10% of England at present), working in partnership with other authorities to actively manage and reduce the risk of flooding.

9.5 **Sandbags as a Means of managing Flood Risk**

These can be obtained via Rother's Emergency Planning Officer in a flooding event.

9.6 **The Role of the Local Planning Authority**

The National Planning Policy Framework directs that when determining planning applications, local planning authorities (Local Planning Authorities) should ensure flood risk is not increased elsewhere and only consider development appropriate in areas at risk of flooding where, (informed by a site-specific flood risk assessment following the Sequential Test, and if required the Exception Test), it can be demonstrated that within the site, the most vulnerable development is located in areas of lowest flood risk unless there are overriding reasons to prefer a different location; and • development is appropriately flood resilient and resistant, including safe access and escape routes where required, and that any residual risk can be safely managed, including by emergency planning; and it gives priority to the use of sustainable drainage systems.

Where development needs to be in locations where there is a risk of flooding (i.e. because alternative sites are not available), LPAs 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. These terms are further defined in the Government's online PPG.

9.6 **East Sussex County Council (ESCC) - The Lead Local Flood Authority**

The Flood and Water Management Act 2010 gives ESCC the role of Lead Local Flood Authority (LLFA) for the county. They have a strategic overview role for local flooding and work closely with other organisations to manage local flood risk in East Sussex. Local flooding is defined as flooding from surface water, groundwater and ordinary watercourses

(an ordinary watercourse is any river, stream or channel which is not identified on the Environment Agency Flood Map as a Main River). Flooding from Main Rivers, the sea and large reservoirs is managed by the Environment Agency

ESCC look after and clean 98,000 roadside gullies in East Sussex.

The gullies are cleaned every 3, 6, 12 or 24 months depending on how quickly they fill up.

They also maintain over 500km of ditches and 10,000 road side grips (shallow ditches connecting the road edge to the roadside ditch).

10. Drainage issues within Crowhurst

- Areas such as lower Wilting, Sandrock Hill, Sandrock Crescent, Forewood Lane and Station Road need to be checked and cleared on a regular basis
- A number of gullies and drains regularly block in Crowhurst. ESCC clear the drains annually. Individual blocked drains are reported via the ESCC website.
- The drains in Lower Wilting are constantly clogged with silt. This area floods on a regular basis due to the road being in a low lying area.
- Some of the drains in Forewood Lane and Sandrock Hill are linked to the Powdermill stream. When the stream is at capacity these drains are unable to take any of the surface run off.

11. Strategic Flood Risk Assessment

11.1 **A Strategic Flood Risk Assessment** (SFRA) has been prepared by the Council, together with its consultants, Scott Wilson and in consultation with the Environment Agency.

The SFRA refines information on the areas within Rother District Council that may flood, taking into account other sources of flooding and the impacts of climate change, in addition to the information on the Flood Map.

11.2 **The purpose of the SFRA** is to inform decision makers, knowledge of flooding, refine the information on the Flood Map and determine the variations in flood risk from all sources of flooding across and from the area. These will form the basis for preparing appropriate policies for flood risk management.

11.3 **The SFRA informs the Sustainability Appraisal** (incorporating the SEA Directive) of the Core Strategy and other Local Development Documents and will provide the basis from which to apply the Sequential Test and Exception Test in the development allocation and development control process.

11.4 **The Level 2 SFRA flood mapping shows flood outlines for different probabilities**, impact, speed of onset, depth and velocity variance of flooding taking account of the presence and likely performance of flood risk management infrastructure.

12. Southern Water

12.1 Southern Water's priority is to keep the sewers flowing and manage the flows they are built to carry. They work alongside ESCC, EA and others to help alleviate the effects of flooding on the community.

12.2 **Southern water has a pumping station in the field behind Sampson's Lane. On two flooding occasions the pumping station was overwhelmed by the surface water and has stopped working.**

13. Riparian Ownership

13.1 If there is **a watercourse on, under or next to a property**, the property owner is known as a riparian owner. A riparian owner has a role to playing managing flood risk and is responsible for maintaining the watercourse. A watercourse is any natural or artificial channel above or below ground through which water flows such as a river, brook, beck, ditch, mill stream or culvert. A riparian must ensure that water can flow freely within the watercourse and without obstruction that may increase the risk of flooding.

13.2 **Some of the responsibilities include**:-

- Clearing any silt and debris, including rubbish.
- Managing vegetation within the channel.
- Ensuring the flow of water is not obstructed.

13.3 **A riparian has the right to:**

- Protect their property from flooding.
- Protect their land from erosion.

14. Summary and Recommendations

14.1 **New developments** within Crowhurst should not increase the flood risk in locations beyond the development site by increasing the amount surface run off especially in the Springfield area and Sampson's Lane areas. Many of the drains in Crowhurst would struggle if a new housing development were connected to it.

14.2 **Adding surface water run off** into the tributaries and streams would have a detrimental effect to homes already at risk.

14.3 **Risks could be avoided** if developments include Sustainable Drainage Systems, Attenuation storage, ponds, green roofs, permeable paving and vegetative drainage.

15. Glossary

Defra	Department for Environment Food and Rural Affairs
EA	Environment Agency
ENFM	Environmental National Flood Management Team
ESCC	East Sussex County Council
LLFA	Lead Local Flood Authority
LPA	Local Planning Authority
PPG	Planning Practical Guidance
RDC	Rother District Council
SAB	Sustainable Drainage Systems Approval Board
SEA	Strategic Environmental Assessment
SFRA	Strategic Flood Risk Assessment
SuDS	Sustainable Drainage Systems
SW:	Southern Water

References

History of Flooding in Crowhurst 2010 – Tracy Hoad, Crowhurst Flood Warden

www.gov.uk/guidance/national-planning-policy-framework

www.gov.uk/guidance/flood-risk-assessment-in-flood-zones-2-and-3

www.gov.uk/.../flood-risk-management-plans-what-they-are-and-who-is-responsible

www.gov.uk/guidance/local-planning-authorities-strategic-flood-risk-assessment

www.gov.uk/.../flood-risk-management-information-for-flood-risk-management

www.southernwater.co.uk/flooding

www.eastsussex.gov.uk › Environment and planning › Flooding

www.rother.gov.uk/

www.gov.uk/government/.../riverside-ownership-rights-and-responsibilities