

# Upper Lavant Flood Risk Management Study

## Non Technical Summary

### What is a SWMP?

Surface Water Management Plans, or SWMPs for short, look at flooding that occurs in response rainfall when:

- Sewers and drains become inundated
- Waterlogged ground leads to runoff from land
- Small rivers and/or ditches overflow
- Water contained under the ground rises up above the surface (this is called groundwater flooding).

A SWMP sets out a long-term action plan for dealing with types of flooding.

### The Upper Lavant Study

The SWMP for Upper Lavant has been prepared by CH2M HILL on behalf of West Sussex County Council. Work began in Spring 2014 and the draft final report was issued in December 2014

The study area is shown in Figure 1 below. This included all flows into the River Lavant and the main settlements of Charlton, Chilgrove, East Dean, East and Mid Lavant, Singleton and West Dean. The downstream boundary of the study area was considered to be the River Lavant at Westhampnett Mill, which is approximately the location of the diversion channel of the Lavant constructed by the Environment Agency to reduce flood risk to Chichester.

Throughout the development of the SMWP there has been close engagement with key stakeholders. This has included engagement with the Environment Agency, Southern Water, Parish Councils and the Lavant Valley Partnership

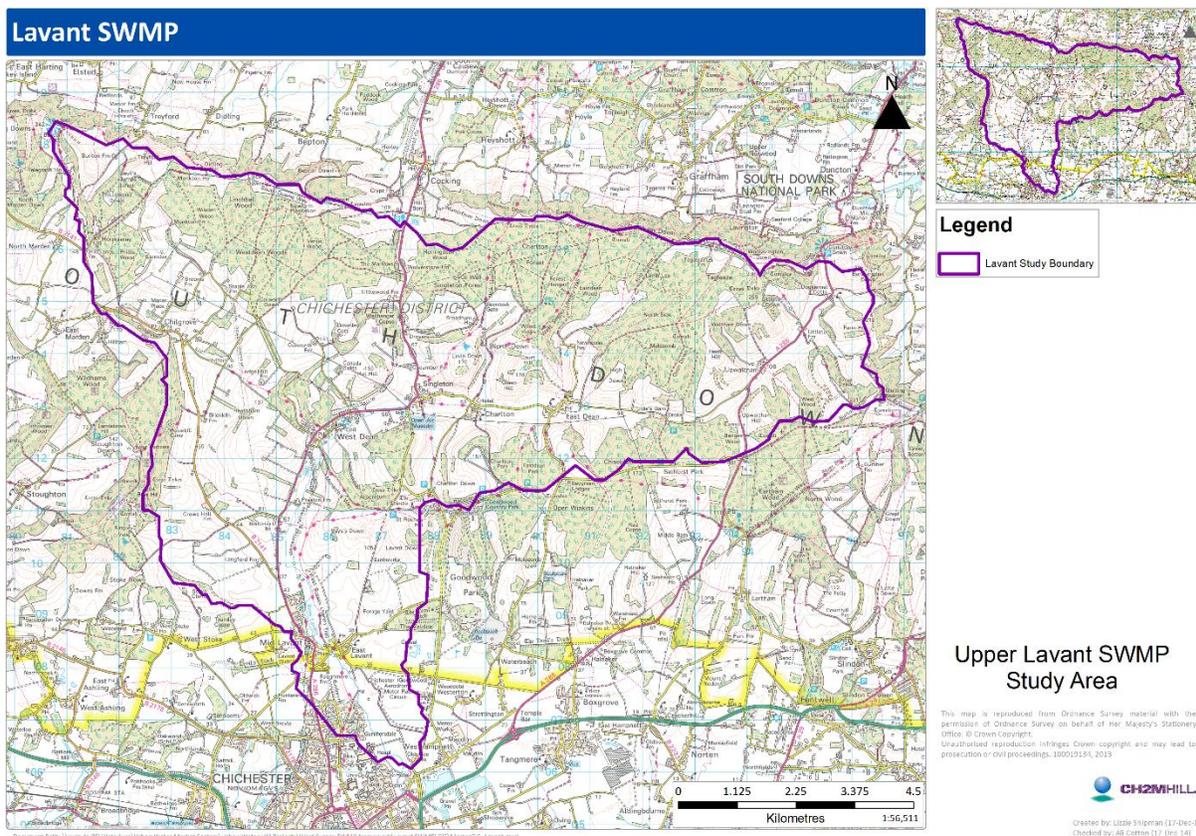


Figure 1 – Upper Lavant SWMP Study Area

# Upper Lavant Valley Flood Risk Management Study

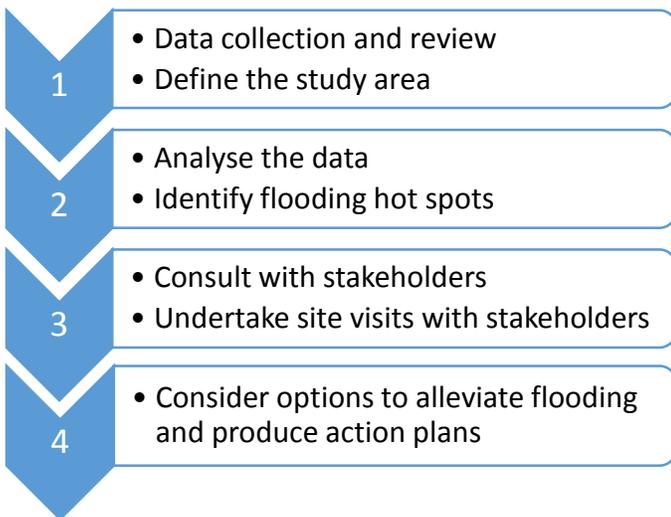
## Objectives

The primary objectives of this study are to:

- understand the flooding issues within the catchment, including flooding from the River Lavant, the foul sewer network, and high groundwater levels;
- consider current flood risk management practices within the Upper Lavant Valley, including how actions are taken in response to groundwater levels at Chilgrove;
- identify localised capital and maintenance measures which can be taken to reduce flood risk to people, property and infrastructure, and;
- provide evidence to support WSCC, the Environment Agency, Southern Water and local residents to prepare for, and respond to, flooding incidents.

## Methodology

The methodology for the project broadly follows the SWMP Technical Guidance published by DEFRA in 2010. The key project stages were as follows:



## Data

A wide range of data was analysed to help understand the local flooding issues.

This included data on climate, rainfall, soils and drainage.

This was provided by a range of organisations including:

- West Sussex County Council
- Parish Councils
- The Environment Agency
- Southern Water

All this information was compiled and mapped using computer based Geographic Information Systems.



*The River Lavant at Singleton*

## Recent flooding issues and impacts

The association between high groundwater levels and flooding in the Lavant valley has been recognised at least since 1994 when there was extensive flooding in the valley (and serious fluvial flooding in Chichester itself) prompted by exceptional winter rainfall. Further incidents of flooding associated with high groundwater in the Lavant were recorded, in 2000/2001 (when this type of flooding was widespread in the south of England), to a lesser extent in 2003 and 2012/2013 and then again with widespread flooding in the winter of 2013/14.

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Specific attention has been paid to the floods that occurred during the winter of 2013/14 where we have the most data on timing of flood events. During these floods a number of properties suffered repeated internal flooding and there was significant disruption to residents. A summary of key areas affected are shown below

Village	Properties / Infrastructure affected by flooding
East Dean	Several properties suffer basement flooding  Butchers Lane and Main Road are flooded (not impassable)
Charlton	Charlton Road flooded along various sections from East Dean to Charlton  Flooding also occurs at both bridges through Charlton
Singleton	2-5 properties flooded due to direct groundwater flooding, overtopping of the River Lavant and sewer flooding  Charlton Road flooded along various sections from Charlton through to Singleton  Flooding also occurs on the A286 and Cobbler's Row
Chilgrove & Chilgrove Road	Extensive flooding on Chilgrove Road which causes dangerous driving conditions
West Dean	2-3 properties at risk of flooding from overtopping of River Lavant and direct groundwater flooding (only one property suffered basement flooding in 2013/14 event)
Mid & East Lavant	3 properties on Pook Lane and memorial hall at risk of flooding from overtopping of River Lavant (no property flooding in 2013/14)  Sheepwash Lane and Pook Lane flooded

network causing sewer surcharge and flooding. There are few recorded incidents of direct groundwater emergence through property floors (and these were limited to a few properties in West Dean, East Dean and Singleton), on or around the 8<sup>th</sup> January 2014.

Flooding also occurred as a result of heavy rainfall on saturated catchments which caused river levels to rise rapidly and flow out of bank. This occurred when already high river levels (caused by high groundwater levels) were exacerbated by a series of intense rainfall events, causing problems in Singleton and Mid/East Lavant particularly.

The elevated levels through the upper catchment led to the inundation and infiltration of the Southern Water sewer network throughout much of the Upper Lavant Valley. This resulted in tankering and over-pumping operations at 8 locations across the Valley.



*Village Pond at East Dean (July 2014)*

## Potential measures and action plan

A detailed evaluation process was undertaken to consider the most appropriate future actions to help better manage flood risk and erosion and a "short list" of feasible, practical, deliverable measures was developed.

For the Upper Lavant Valley study we have identified capital works, maintenance measures and emergency management approaches to reduce the impacts of flooding to people, property and infrastructure. In the Lavant valley, the capital works and maintenance measures are designed to deal with identified and known flooding hotspots wherein such measures will either increase conveyance or reduce the potential for out of bank flow. The emergency management approaches seek to reduce the impact where such measures are impractical or are less likely to be effective, and will also manage the impact where the flood event reflects the 'extreme' combination of rainfall and groundwater level, such as those seen during the winter of 2013/14.

## Causes of flooding

Flooding in this catchment is caused by groundwater emerging through basements and inundating and infiltrating sewers, overtopping of the River Lavant.

During 2013/2014 the most dominant of these mechanisms were the significantly enhanced flows in the River Lavant due to high groundwater levels (leading to fluvial flooding) and infiltration into the foul sewer

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An action plan was developed for each settlement affected by flooding was developed, based on the short-listed options.

In each settlement the key flooding issues affecting people, property and infrastructure have been described, with accompanying actions. Actions have been broken down into:

- capital measures, where investment in infrastructure is required to improve conveyance of flows or protect properties;
- enhanced maintenance measures to ensure that the conveyance of drainage and watercourses is effective during times of flooding incidents, and;
- emergency management approaches, which consider what local authorities, parish councils, Southern Water and homeowners need to do to reduce the impacts of flooding when certain threshold levels are reached in the catchment.

These measures are discussed in full in Section 4.3 of the main SWMP report.



*Grille at The Leys, Singleton (July 2014)*

Many of the actions that the SWMP identifies fall to West Sussex County Council. However, a wide range of others have a key role to play in helping to better manage flooding, including:

- The Environment Agency
- Parish Councils
- Riparian Owners
- Local residents

It is important that everyone plays a role in helping to better manage flooding in the Upper Lavant Valley area.

## What next?

WSSCC has drafted a Lavant Valley Groundwater Multi-Agency Flood Plan (MAFP) to outline the actions and

responsibilities for each identified organisation in response to high groundwater levels. This SWMP has provided a further, more detailed analysis of groundwater levels and their impacts on flooding within the catchment. The purpose has been to provide additional evidence to inform the MAFP. The findings of this study will be used to update the MAFP, and provide locally specific capital, maintenance and emergency management approaches to minimise the impact of flooding to people, properties and infrastructure within the Upper Lavant Valley.