

Lancing Surface Water Management Plan (SWMP)

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, and;
- water contained within rocks 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 Lancing SWMP

The SWMP for the Lancing has been prepared by CH2M HILL on behalf of West Sussex County Council. Work began in July 2014 and the final report was issued in October 2015.

The study area is shown in Figure 1 below. The study area covers the entire catchment from the west which drains towards the Lancing Brooks. The most northerly location of the study area is the open space to the north of Firle Road (in North Lancing). To the east the River Adur forms a natural catchment boundary and the Lancing Brooks discharge into the Adur. To the south the sea forms the natural catchment boundary.

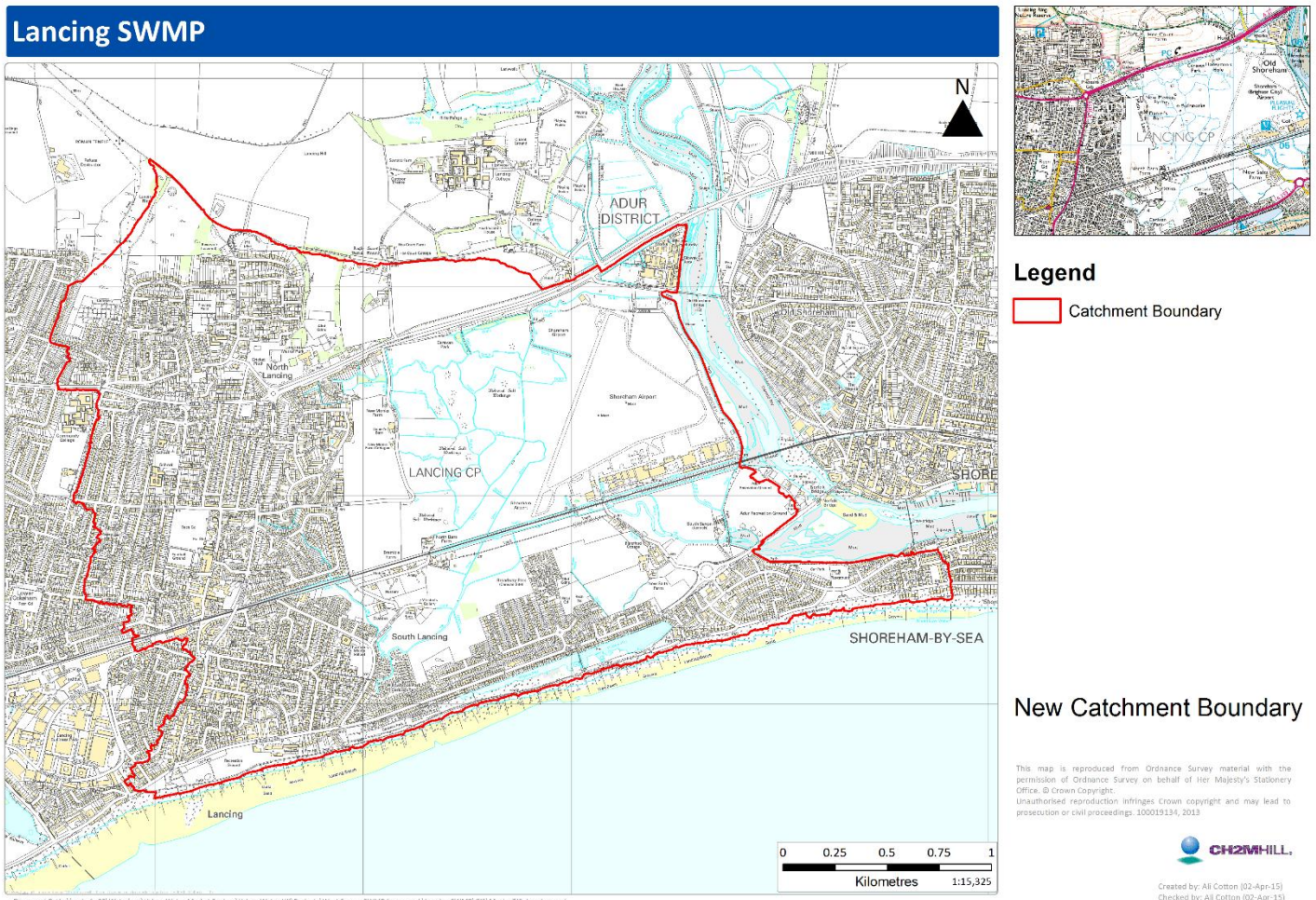


Figure 1 – Lancing SWMP Catchment Boundary

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During the development of the SMWP there has been engagement with key stakeholders, including West Sussex County Council (WSCC), Adur and Worthing Councils, the Environment Agency, Southern Water, local flood action groups, and Shoreham Airport.

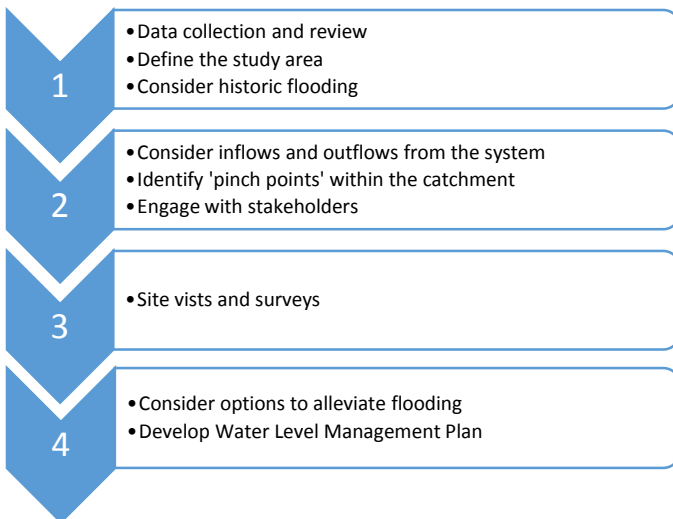
Objectives

The objectives of the Lancing SWMP were to:

- confirm the catchment boundaries and comment on any differences with previous studies;
- gain a better understanding of the existing drainage network, connectivity, and ownership;
- understand the causes of flooding across Lancing from a range of sources including surface water, foul water, groundwater, watercourses, and tidal influence;
- understand the performance of the Lancing Brooks ditch network and identify how and when future maintenance of the ditches needs to be undertaken, and;
- identify any construction works required to mitigate flooding in Lancing.

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 were collated and analysed to help understand the local flooding issues. This included data from previous studies in Lancing (e.g. Royal Haskoning Watercourse Study, Monson Engineering Study), historic flooding data, and information on historic rainfall, topography and drainage. All this information was

compiled and mapped using computer based Geographic Information Systems.



Flooding in West Beach Estate

Recent flooding issues

There is good anecdotal evidence of flooding within Lancing from the wet winters of 2012/13 and 2013/14, and ongoing reporting from local residents throughout 2014 and 2015. Flooding in Lancing has been a long-standing problem, but the best anecdotal evidence of flooding is from the last two to three years. Given that 2013/14 was the wettest winter on record it is reasonable to assume that the available anecdotal evidence from the past two to three years provides a good basis to assess the flooding impacts. The table below provides an overview of the key locations affected by flooding in Lancing.

Location	No. properties flooded internally	Other impacts
Grinstead Lane, Manor Way, Manor Close	Garages flooded on Manor Way	Extensive flooding on Grinstead Lane (impassable), restricted toilet use, garden flooding, and overpumping of foul network into ditch network
Old Shoreham Road (cul-de-sacs south of A27)	None	Flooding on Old Shoreham Road Garden flooding
Barfield Park and Monks Avenue	1 home affected on Barfield Park 1 property flooded near Monks Avenue/Hadlow Way	Garden flooding in other locations
The Paddocks	Garages flooded	Highway flooding
West Beach Estate	None	Flooding across most of The Broadway, and parts of Westway and Prince Avenue

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Location	No. properties flooded internally	Other impacts
A27	None	Northern carriageway of A27 flooded
Shoreham Airport	None	Airport flooded, although main runway was still operational

Causes of flooding

The causes of flooding have been identified through site visits, stakeholder engagement, cross-section and limited manhole surveys, and hydraulic modelling. Lancing is vulnerable to flooding from multiple causes including surface water, groundwater, sewer flooding, and due to capacity constraints in the Lancing Brooks. The table below summarises the key causes of flooding to the locations which are most vulnerable to flooding in Lancing

Location	Causes of flooding
Grinstead Lane, Manor Way, Manor Close & Old Shoreham Road	<ul style="list-style-type: none"> High sensitivity to groundwater emergence Influence of high groundwater on the performance of foul and surface water network Culverts on Manor Close and Mash Barn Lane Maintenance of the Lancing Brooks Under-sized drainage around Manor Way which can exacerbate flooding along Grinstead Lane
Barfield Park and Monks Avenue	<ul style="list-style-type: none"> High sensitivity to groundwater emergence Highway drainage at junction of Monks Avenue / Hadlow Way Culverts on Monks Avenue and North Farm Road, and the railway culvert have some impact on water levels, but do not cause out of bank flows. Maintenance of the Lancing Brooks
The Paddocks	<ul style="list-style-type: none"> Siltation in the storage tanks, root infestation, and siltation in the ditch network. This has been cleared by WSCC during the past 18 months
West Beach Estate	<ul style="list-style-type: none"> Gullies which are cracked/broken, or full of sediment, siltation in the surface water pipes along The Westway, and potential siltation of soakaways. Blocked surface water drainage outfalls High groundwater levels and tidal influence which affects discharge of runoff via soakaways
A27	<ul style="list-style-type: none"> Condition of the piped drainage, which has since been addressed through remedial works undertaken by Highways England in 2013
Shoreham Airport	<ul style="list-style-type: none"> Failure of the River Adur tidal wall during a tidal surge in December 2013. The Environment Agency is developing the business case for long term improvements to the tidal wall, and this is not considered further in this report.

Potential measures

In recent years, there has been a significant amount of work undertaken by WSCC, Adur and Worthing Councils, Southern Water and local residents to reduce flooding to people, property and infrastructure in Lancing. This has included:

- clearance of the Lancing Brooks in 2010 and 2013 by Adur and Worthing Councils and landowners, and further ditch clearance in the golf course development in January 2015;
- improvements to the foul sewerage network buy Southern Water, including development of an Infiltration Reduction Plan, sealing of the sewer network, installation of a level alert system, and production of an Emergency Action Plan;
- clearance of the surface water drainage near No. 4 Old Shoreham Road;
- works by local residents in West Beach Estate, and;
- de-silting of storage tanks and clearance of root infestation at The Paddocks.



Lancing Brooks in North Lancing

The SWMP has considered potential additional measures to reduce flood risk. The level of investment to mitigate flood risk must be proportional to the damage to property and infrastructure caused by flooding. In Lancing few properties are currently affected by internal flooding, and the proposed mitigation measures are reflective of this. Policy, construction and maintenance mitigation measures to alleviate the impacts of flooding in Lancing have been considered.

Even with all of these measures in place Lancing will still be at risk of flooding during more extreme weather events. This is because drainage systems (both natural and man-made) and any other flood risk infrastructure will become overwhelmed during extreme weather events. In addition, Lancing is highly vulnerable to groundwater flooding (or drainage is affected by groundwater levels), which is significantly more technically and economically challenging to manage.

In Grinstead Lane, Manor Way, Manor Close & Old Shoreham Road the proposed measures in the SWMP to manage flooding are:

- improve the management of surface water flows arriving at Grinstead Lane;
- Adur District Council to further consider the golf course development site;

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- Southern Water to implement their Infiltration Reduction Plan (IRP) to reduce infiltration into the sewer network, and ensure measures are fully communicated with stakeholders and local residents;
- Southern Water to activate the Emergency Action Plan (EAP) when required;
- Adur Floodwatch Group and Adur District Council to work with local residents and communities to prepare individual and community flood plans, and;
- Adur District Council to discourage the use of new soakaway drainage unless site specific investigations demonstrate there is capacity with respect to groundwater levels. In certain areas soakaways will not function during periods of high groundwater levels and may also allow upward emergence of groundwater from the Chalk.

Within Barfield Park and Monks Avenue there are no significant proposed construction works related to highway or surface water drainage. For the properties which experience groundwater emergence it is recommended that roof and yard drainage is positively connected to the nearest drainage system (highway drainage or ditches), rather than to soakaways, and that soakaways are infilled to reduce the risk of groundwater emergence.

In addition there is evidence that the highway drainage at the junction of Monks Avenue and Hadlow Way results in garden flooding to one property. WSCC should investigate this further and clear any blocked gullies and/or install a new outlet into the ditch network.

On the West Beach Estate there are several quick win measures which should be taken forward by local residents with appropriate consent from the relevant landowners:

- enhanced maintenance of road gullies, several of which are cracked, broken or heavily silted;
- jetting of the pipe network and any soakaways where there is heavy siltation;
- uncover and clear the outfalls from the piped drainage on Boundary Road and Prince Avenue to enable discharge from the network, and;
- at the end of each outfall on Bristol Avenue, George V Avenue, Boundary Road and Prince Avenue it is recommended that a shallow depression be constructed to store flows from the Estate.

In addition, on The Broadway an option has been proposed to reduce flooding through additional gravity drainage. The details of this are presented in the main technical report and Appendix H.

Finally, the SWMP has developed an initial Water Level Management Plan to identify the short-term remedial measures, ongoing maintenance and monitoring which is required to improve the flows of the Lancing Brooks. This recommends improvement works at Old Salts Farm Road bridge, the Mash Barn Lane bridge and the Manor Close culvert. In addition the Water Level Management Plan outlines the need for vegetation clearance, monitoring of silt build-up, and de-silting (as required).

Implementation plan

It is recommended that within three months of publication of this report that WSCC produce an implementation plan. The implementation plan will set out who will undertake the recommended actions from the SWMP, the timetable for doing so, and the funding mechanism.