

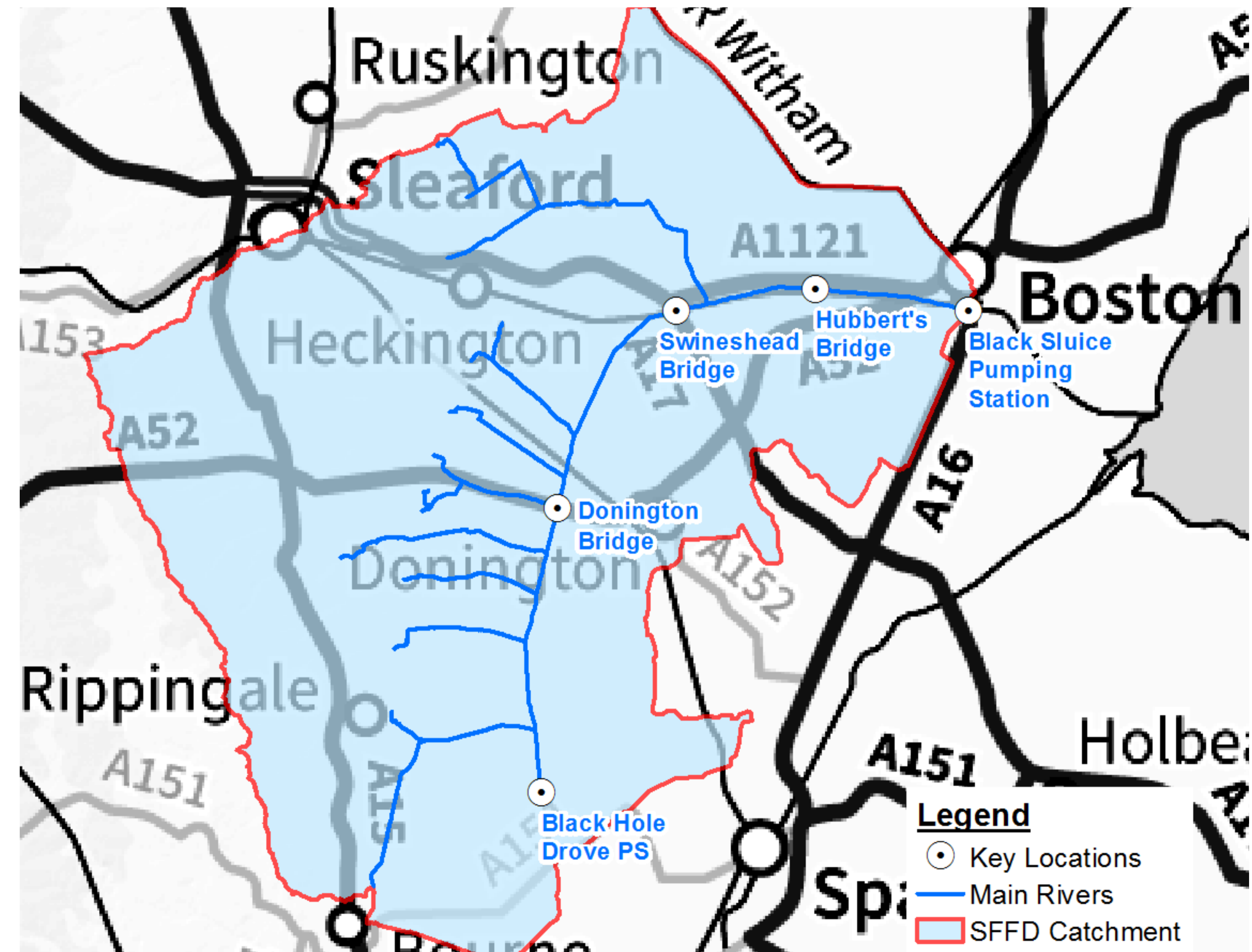
# FLOODING IN THE BLACK SLUICE CATCHMENT

The South Forty Foot Drain drains the Black Sluice catchment, which extends from Boston across the South Lincolnshire fens.

The Environment Agency manages flood risk within the South Forty Foot Drain and through the Black Sluice Gravity Sluices and Pumping Station in Boston, where the water discharges into The Haven. The South Forty Foot Drain is mainly fed by embanked channels managed by the Environment Agency and by a network of drains and pumping stations operated by the Black Sluice Internal Drainage Board. The embanked channels (also known as highland water carriers) channel water from the high ground of the catchment, across the fenland. Other watercourses in the catchment feeding the South Forty Foot Drain are managed by landowners ('riparian owners').

There is a history of flooding within the catchment, mostly from rivers and also from surface water and ground water. The Environment Agency, in partnership with the Black Sluice Internal Drainage Board, has reduced the risk of flooding by maintaining its drains, operating the gravity sluices in Boston, and during high flows by operating the Black Sluice Pumping Station, which is now in need

of major investment. We are looking at the whole catchment to identify how we can achieve best value for money in terms of flood risk management.





# BLACK SLUICE PUMPING STATION OPTIONS

The Black Sluice Pumping Station was built in 1946. It pumps out the South Forty Foot Drain into The Haven when high flows in the drain occur at the same time as high tide. This happens about twice each year. At other times water flows from the drain into Boston Haven under gravity, via sluices that close at high tide.

In December 2013, the East Coast tidal surge inundated the pumping station, damaging some of the pumps. The pumping station now has only two operational pumps, which provide half of the original pumping capacity. The remaining pumps are 50 years old – at the end of their operational life.

Our study has shown that even before the tidal surge, the pumping station offered very little protection from flooding for residential properties (we believe that no more than 16 properties, in the whole catchment, could see a small increase in flood levels if the pumps did not operate). The pumping station operates principally as a land drainage pumping station, but only during very extreme flooding. This has implications for the amount of funding that the Environment Agency can attract for the pumping station.

Options considered for the Black Sluice Pumping Station are:

- PUMPS OFF

The Black Sluice Pumping Station would be decommissioned. Water would be discharged from the South Forty Foot Drain by gravity alone and the sluices would continue to operate to prevent water entering the drain from The Haven at high tide. The Environment Agency would continue to maintain the drain and its main tributaries. The pumping station building and the main pumps would be retained and could be transferred to some other use.

- REFURBISHMENT

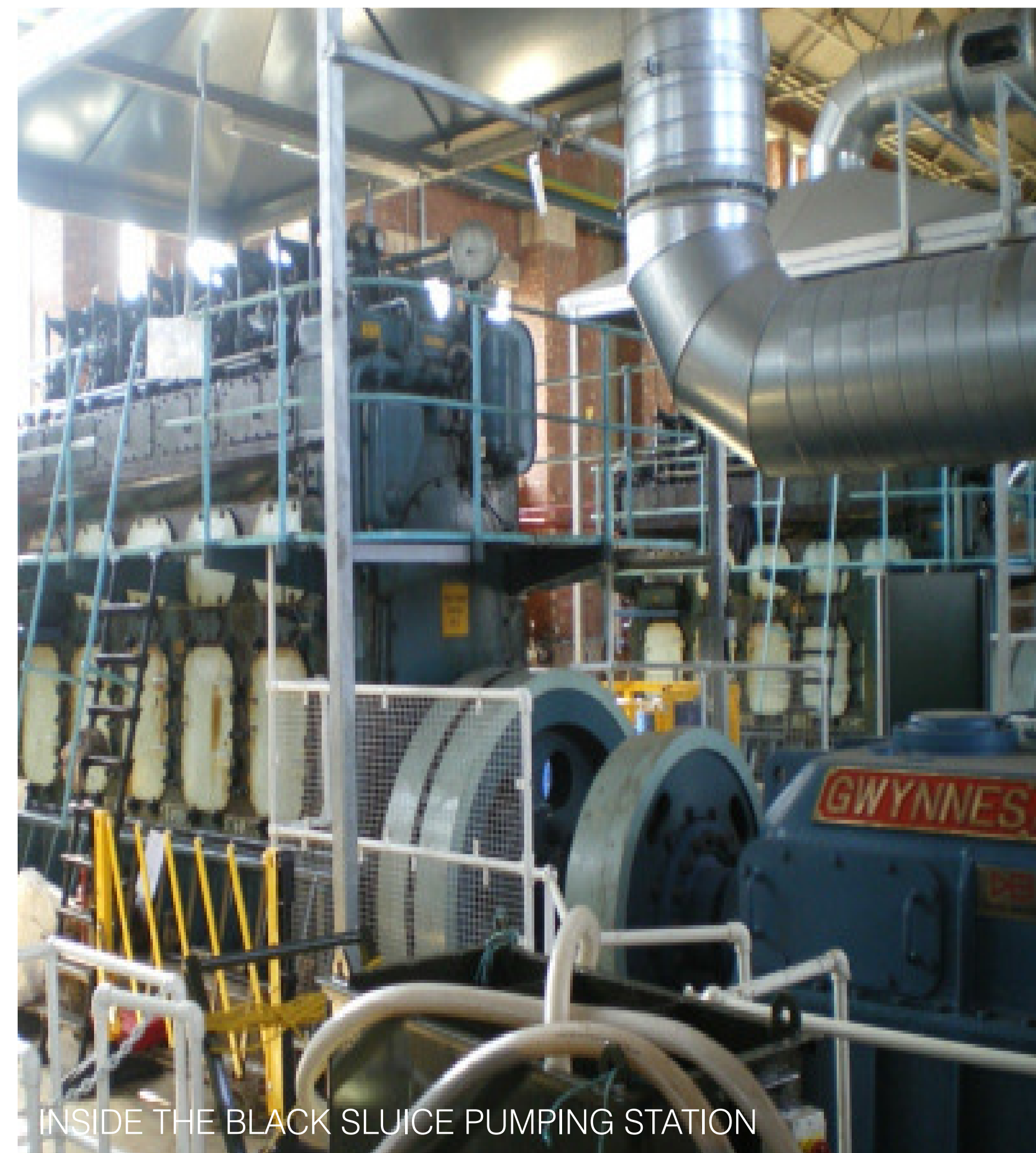
The Black Sluice Pumping Station would remain operational and the two pumps that still work would be replaced. Expensive modifications to the pumping station would be needed to accommodate the replacement pumps.

- TRANSFER OF ASSETS

The Black Sluice Pumping Station and possibly also the operation and maintenance of channels in the Black Sluice catchment could be transferred to the Black Sluice Internal Drainage Board. This option is complicated due to issues such as navigation rights and funding sources.



BLACK SLUICE PUMPING STATION



INSIDE THE BLACK SLUICE PUMPING STATION

# LOWER CATCHMENT OPTIONS

Outside Boston, the lower catchment is mainly high grade agricultural land with isolated properties. The South Forty Foot Drain is 31km long, and runs from Guthram Gowt, on the A151 Spalding Road to the Black Sluice Pumping Station. Although the drain is an artificial channel it is a Local Wildlife Site, selected for its diversity of aquatic plants.

The South Forty Foot Drain is used for recreational boating. The narrow section upstream of Donington Bridge is for small craft only while downstream of the bridge the channel is navigable by larger boats. A new lock has been installed at Black Sluice Pumping Station to allow boats to enter the South Forty Foot Drain from The Haven.

Options considered for the lower catchment are:

- AN ADDITIONAL GRAVITY SLUICE

An additional gravity sluice would be installed at the Black Sluice Pumping Station. Modelling has shown that this would only slightly reduce flood risk in the catchment. An alternative is to allow water to pass under gravity through the existing pump tunnels in the pumping station. While less costly than installing a new sluice, the reduction in flood risk would also be even less.

- PROTECT INDIVIDUAL PROPERTIES

No more than sixteen properties could be slightly more at risk of flooding if the Black Sluice Pumping Station did not operate. Measures such as flood-resilient doors and non-return valves for drains could be installed in these properties to provide cost effective flood resilience.

- SPILLWAYS

A spillway is a short, lowered and reinforced section of bank next to a watercourse. It allows water to drain from the watercourse into surrounding land when it reaches a particular level. A number of spillways would be created at eight different locations on the tributaries that feed into the South Forty Foot Drain. Modelling shows that spillways would only reduce the water level in the drain slightly. This option also has the drawback of flooding farmland downstream of the spillways, but has the advantage of reducing the risk of a breach (bank failure) on the main SFFD embankments.



SOUTH FORTY FOOT DRAIN



A FLOOD DEFENCE DOOR

# LOWER CATCHMENT OPTIONS

- WIDENING

The South Forty Foot Drain could be widened to increase the rate of flow. Up to 10 road crossings and bridges would have to be modified if the channel was widened along its entire length. Alternatively, widening only particular sections of the drain can avoid these crossings. This option would remove the existing habitat in the drain although it does offer opportunities for creating new habitat.

- DIVERSION

While constructing a diversion channel is an option in theory, it would likely increase the flood risk in towns, such as Risegate or Frampton, and other properties close by. This option would be very costly, and so would be unlikely to proceed unless there were another significant economic reason for choosing to construct a diversion.

- CONTAINMENT

The banks of the South Forty Foot Drain and its tributaries would be raised to reduce the likelihood of them being over-topped during high flow. To construct raised embankments to current engineering standards, would be a costly option for the entire length of the drain and highland carriers.



BLACK SLUICE PUMPING STATION



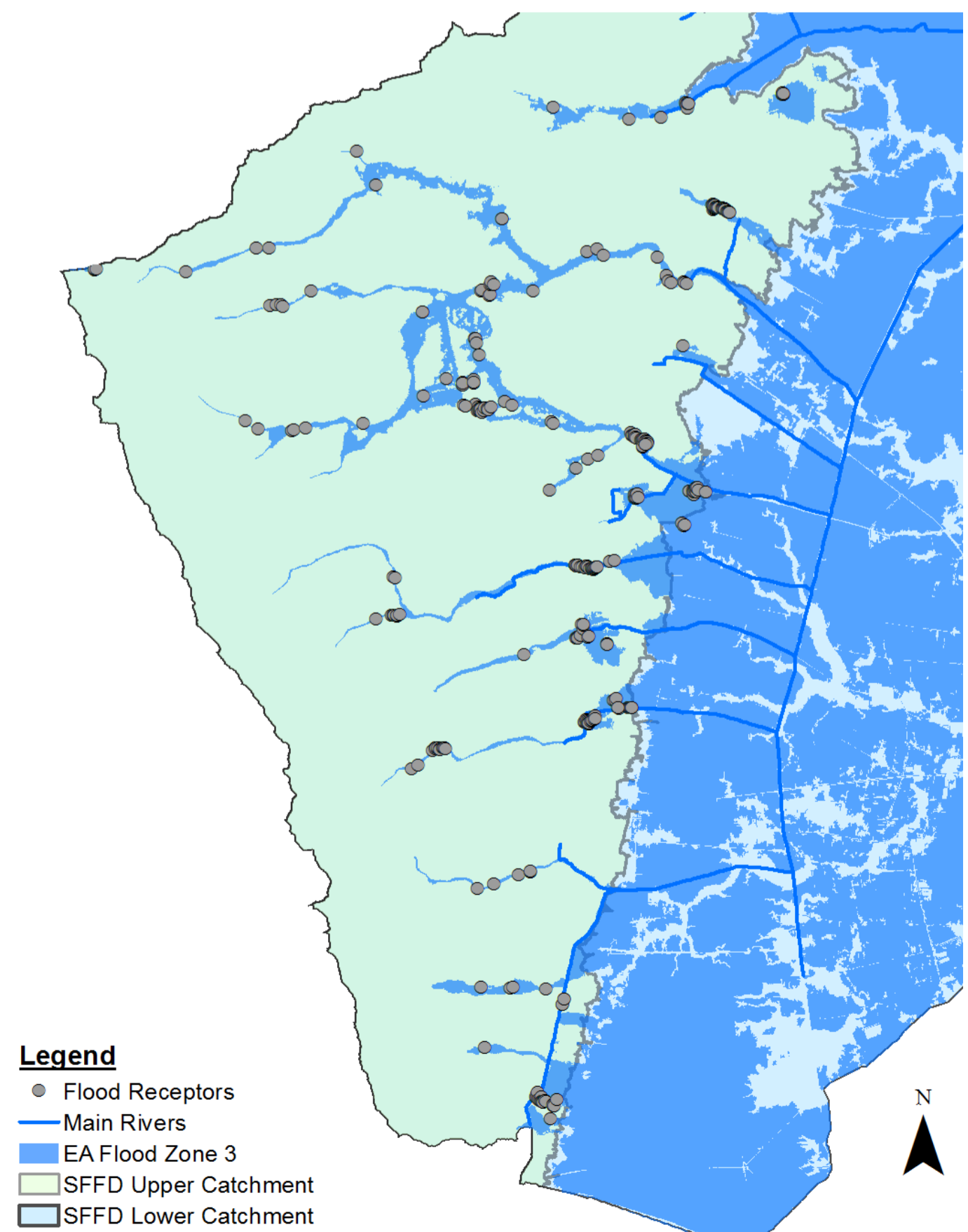
SFFD AT HUBBERTS BRIDGE

# UPPER CATCHMENT OPTIONS

The upper catchment rises to 130 meters above sea level, to the west of the South Forty Foot Drain. The area is also rural, with residential properties clustered in small villages. Tributaries of the drain flow through Swaton, Billingborough and other villages.

Options considered are:

- Increase flood water storage - 'Flood ponds' would slow the flow of water upstream of the areas at most risk of flooding.
- Increased channel maintenance - The Environment Agency could cut weeds on the bed and banks of Swaton Eau, Billingborough Ouse Mere Lode and Pointon Lode more often.
- Identify and remove local flow constrictions - Structures such as the road bridge in Swaton at the junction of West Street and High Street/Swaton Lane could be replaced to allow water to pass more easily and reduce the risk of flooding, if shown to be constricting flows.
- Provide flood relief / by-pass channel around flood risk areas - New channels could be dug to divert the flow away from flood risk areas.
- Provide Property Level Protection - Individual properties would see the impact of flooding reduced using equipment like flood-resilient doors and non-return valves for drains.



The Environment Agency is gathering views on the options presented here and you are welcome to complete a feedback form.

We believe that a combination of options, for example one option for the Black Sluice Pumping Station and another for works in the upper catchment, would offer the greatest benefit for least cost.

We will carry out more detailed assessments of the most promising of these combinations by July 2015. We then intend to apply for any consents required to progress with the preferred combination of options.

## KEEPING YOU UPDATED

We will tell you what we are doing through public exhibitions, face to face meetings and newsletters. If you want to receive our regular communications then please write your contact details on a feedback form and hand it to a member of staff.

## MORE INFORMATION

If you would like any more information then please contact:

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## ARE YOU AT RISK OF FLOODING?

To find out more about whether your home is at risk of flooding or to register for our free flood warning service call Floodline on 0345 988 1188 or visit [www.gov.uk/flood](http://www.gov.uk/flood)

You can also make a flood plan for your home so that you are more prepared if flooding is expected.