

RM008 Mrs Menard’s objection to the Environment Agency’s Application to vary the Scheme within the River Medway (Flood Relief) Act 1976

Environment Agency technical response, September 2020

1. I have lived at Longford since June 2007 and have seen how my neighbours’ properties have been affected by the flooding and understand that there is now a risk that my garage could be flooded. My household usually has at least two cars parked at the bottom of our garden next to our garage. If we were away from our house for a number of days (perhaps on holiday or visiting family members) and there was a flood there could be damage to cars left on our driveway.

Environment Agency response to point 1:

Longford is on the very edge of the land that might be flooded. The plan below (Figure 1) shows the extent of your property shaded. In the southern part of your property is a small area shaded blue. This is the land that might currently be flooded by a 1% AEP + 20% flood event. You will note that your garage, which is situated on raised land, is not affected.

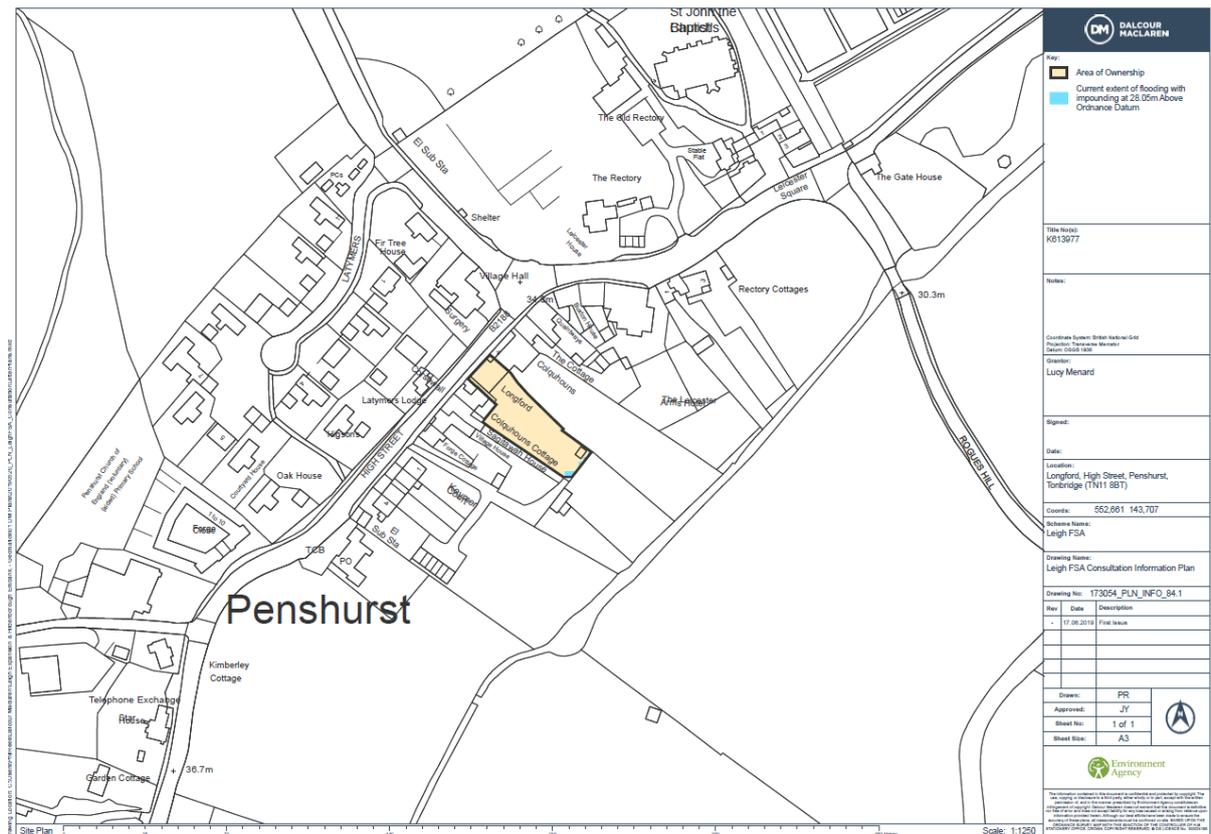


Figure 1: Extent of your property (Longford) that might be affected in a 1% AEP + 20% flood event.

2. I object to this application to vary the Scheme for the operation of the Leigh Flood Storage Area. The Environment Agency (EA) has failed to properly understand the effect that the operation of the Flood Storage Area (FSA) has on Penshurst. Because of this lack of understanding it has developed a theoretical model of flood events that is fundamentally flawed. This has a knock on effect through the whole project.

Environment Agency response to point 2:

The Environment Agency, and the wider hydrological industry, uses modelling software, mapping techniques and topographical and rainfall data to understand a wide range of catchment processes, how river catchments respond to different rainfall events, and to identify the impacts of these events.

The Environment Agency has flow gauges upstream of Rogues Hill, at Chafford Bridge and Colliers Land Bridge on the River Medway and at Penshurst and Vexour Bridge on the River Eden. This represents a significant investment in flow monitoring and allows us to understand the water levels on both rivers. Information from these gauging stations was used to calibrate the 2015 Medway flood model and is used to inform the operation of the Leigh Flood Storage Area (FSA).

In addition to the 2015 Medway flood model, the Environment Agency has photographs and data showing the extent of land flooded during previous events, and staff observed the flooding at Rogues Hill in February 2020 to understand the extent of flooding at this location. The timing and extent of the flooding in February 2020 was as predicted by the model.

3. The main issue seems to be that there is no measuring of water levels at the confluence of the River Eden and the River Medway a few hundred metres upstream of Bridge House and so the EA rely on theoretical modelling.

4. Measurement of actual flood levels should have been taken at the confluence of two major Kent rivers to understand the effect that the operation of the FSA causes during times of flooding. Instead the EA relies on measuring actual flood levels at Colliers Land Bridge for the River Medway and Vexour Bridge for the River Eden and then estimating the effect after the confluence. This is a fundamental flaw. Modelling is only ever as good as the inputs into it, if the inputs are flawed, the outputs will also be flawed.

Environment Agency response to points 3 & 4:

As stated above, the Environment Agency has flow gauges upstream of Rogues Hill at Chafford Bridge and Colliers Land Bridge on the River Medway, and Penshurst and Vexour Bridge on the River Eden. This allows us to understand the flow in both rivers, including after the confluence.

Whilst it is always possible to further refine the calibration of any flood model by considering more baseline data, the Environment Agency is confident that the modelled flood data is sufficient to understand the flood risk at Penshurst, and additional flow gauging data from points downstream of the confluence will align with the outputs of the 2015 Medway flood model.

We appreciate, however, that we need to address the concerns of the community in Penshurst on this issue, and are looking to provide additional depth gauging in Penshurst downstream of Rogues Hill. This will provide definitive data on this issue, and will hopefully provide the reassurance sought by the community.

5. The EA assumes that “Natural Flooding” occurs rather than being the effect of impounding the FSA. In my experience of living in Penshurst (in Longford since 2007 and previously at The Village House, High Street, Penshurst 1999-2007) this is not true. There is evidence from neighbours that all floods from 2000 to 2020 in the Village have occurred after the impounding of the FSA takes place. This flooding is greater than, and lasts for a longer duration than, any natural flooding.

Environment Agency response to point 5:

We acknowledge that areas of Penshurst can be affected by the operation of the existing Leigh FSA, depending on the size of the flood event. However, the area is within the floodplain of the River Medway so can also be affected by naturally-occurring flooding.

Please see the photographs below showing that natural flooding occurred at Penshurst prior to the operation of the FSA. The first (Figure 3) was taken in the garden of Colquhouns Cottage at 14:12 on 20 December 2019. Impoundment didn't commence until 15:30 on the same day.



Figure 3: Flooding of the garden of Colquhouns Cottage, 14:12 on 20 December 2019

The next two photographs below (Figures 4 and 5), were taken from Rogues Hill on 16 February 2020. Figure 4 shows the fields immediately upstream of Rogues Hill and was taken at 12:51. Figure 5 was taken from the bridge on Rogues Hill over the River Medway and shows Bridge House. It was taken at 13:13. Impoundment didn't commence until 17:15 the same day.



Figure 4: Flooding of the fields immediately upstream of Rogues Hill, 12:51 on 16 February 2020



Figure 5: River Medway and Bridge House, 13:13 on 16 February 2020

The final photograph (Figure 6), below, was taken 14 minutes earlier than Figure 4 (at 12:37 on 16 February 2020). It shows the bridge on Ensfield Road over the River Medway, 3.9km downstream of Penshurst. It is clear that the river was within bank at this location whilst at the same time there was significant flooding in Penshurst driven by upstream flows. The Leigh FSA was not in operation and all the flooding at this time in Penshurst was driven by flows from upstream.



Figure 6: The bridge on Ensfield Road over the River Medway, 12:37 on 16 February 2020

The above photographs confirm that the land around Penshurst floods before operation of the FSA. The FSA only operates during high flows, and so therefore the same conditions that drive flooding in Penshurst will also determine the operation of the FSA. This does not mean that the FSA causes the flooding in Penshurst.

6. In the EA's Strategic Flood Policy it states that 1 in 100 years plus climate change is the scenario that should be defended against. Throughout this project the EA have always quoted 1 in 100 years plus climate change as the scenario used. In the application the EA have quoted a 1 in 75 years scenario. This conflicts with their own National Guidance.

Environment Agency response to point 6:

Figure 2 in response 1 above shows a plan of the additional depth of water during a modelled 1.33% (1 in 75 year) flood event as a result of changing the maximum stored water level from 28.05m AOD to 28.6m AOD.

We chose this scenario to demonstrate the impact of expanding the FSA because it shows the greatest change in flood depths as a result of the proposed change. The depth increase for the majority of the storage area will be greatest for the 1.33% event.

During more extreme flood events, such as a 1% (1 in 100 year) plus climate change event, the increase in depth as a result of the proposed change reduces. This is because the natural flood level, which is greater, dominates.

Please see Section 5.1 (pages 24 to 26) and Appendices A and B of the Flood Risk Assessment for further details. For clarity and to address your concern, figures B1, B2 and B3 in Appendix B of the flood risk assessment show the change in flood depth for the following flood events: 1.33% AEP, 1% AEP and 1%+20% flow AEP.

7. The current Scheme allows the FSA to be used when the rate of flow in the River Medway exceeds 35 cubic metres per second. Since 2011 the EA have only used the FSA when the flow exceeds 75 cubic metres per second, as to "go too early" would leave them with no spare capacity. Yet they ask to retain the lower figure. This places a great risk on Penshurst. With an increased capacity they could start impounding of the FSA too early and this would increase flood levels.

Environment Agency response to point 7:

The flow rate at which impounding begins needs to be flexible to enable optimum use of the storage volume in the FSA. This will vary for every flood event. It is important not store flood water too soon to ensure we have capacity to store the peak and the most damaging flood flows for any given event.

For the majority of floods impounding starts around 75 cubic metres per second. However that is not always the case and it may be necessary to impound water at different flows, both higher and lower, to provide the maximum flood risk reduction in Tonbridge.

Altering the Scheme's minimum operating flow rate in law would fundamentally diminish the ability to operate the FSA, as designed, to reduce flood risk to downstream communities.

8. Tom Tugendhat MP has been supportive of our vulnerable position within this proposal.

Environment Agency response to point 8:

Noted.

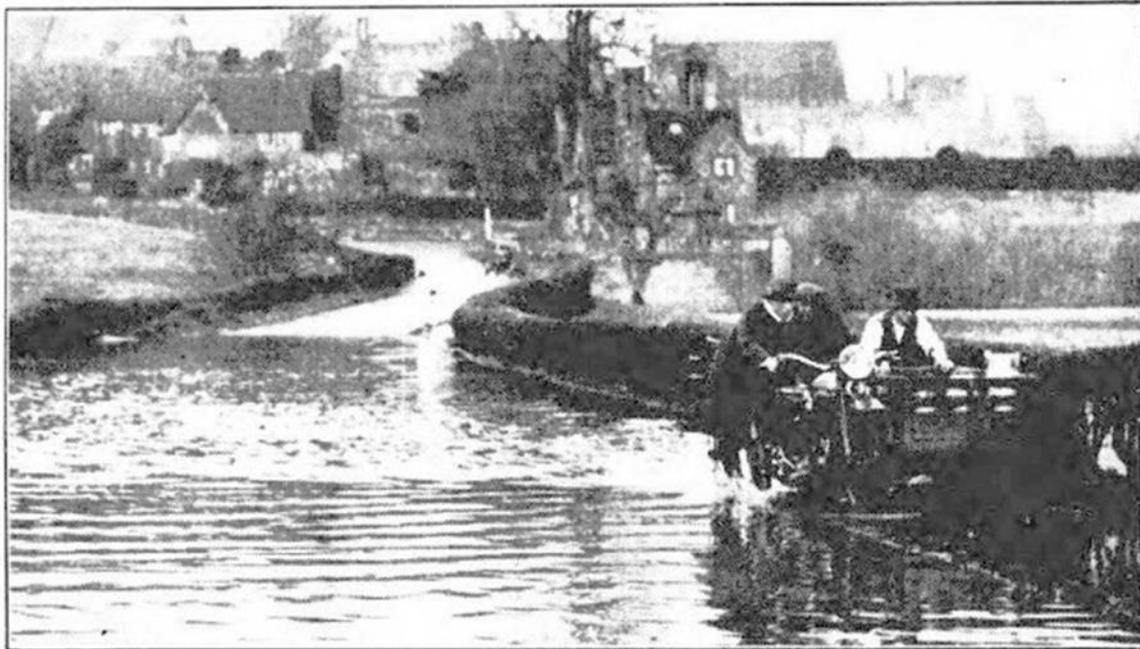
9. Rogues Hill is a major route into and through the Village. It is the route used by the Fire Brigade, Police and Ambulance Service responding to emergency calls. It is also used by school buses and village traffic. When the EA impound the FSA this road floods to a depth of up to 1 metre, making it impassable, yet vehicles still attempt to pass. Raising the level of the FSA can only increase this flooding. This would create a Moral Hazard, with the potential for death. The water flow is known to be in excess of 70 cubic metres per second and should a school bus attempt to go through the flood, it could easily be carried away downstream. This risk of multiple death is high. The EA have merely said that it is the responsibility of the Highways Agency.

Environment Agency response to point 9:

As you state, Rogues Hill is a major route into and through the village. It is built on a causeway across the flat valley 200m downstream of the confluence of the Rivers Eden and Medway. Rogues Hill passes over the River Medway by Bridge House. The lowest part of Rogues Hill is particularly vulnerable to flooding.

The photograph below from a 1937 newspaper article (Figure 7) shows flooding on Rogues Hill. In 1968 the flooding at this location was so severe that the Rogues Hill road bridge over the River Medway was damaged to such an extent a temporary bridge had to be installed. These events show that Rogues Hill has historically experienced flooding and that it is not the operation of the Leigh FSA that causes flooding.

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The recent heavy rains have produced some of the worst floods in Penshurst for 40 years. This is a portion of the road to Bidborough.

Figure 7: Flooding of Rogues Hill in 1937

In your representation you suggest that Rogues Hill floods to up to 1m deep as a result of the operation of the FSA. Whilst in certain circumstances the FSA can, when operating, add up to 0.1m to the depth of water at Rogues Hill, the depth and timing of the flooding of Rogues Hill is dictated by upstream flows. This is shown by the photographs provided in response to 5.

To further illustrate this, the peak of the most recent flood at Penshurst Gauging Station was at 01:30 on 17 February 2020 (see Figure 8 below) and the water level was falling as the water levels in the Leigh FSA were rising (see Figure 9). Penshurst Gauging Station is situated on the River Eden about 2.8 km upstream of Rogues Hill, and so the peak of this flood will occur earlier at Penshurst Gauging Station than at Rogues Hill but it clearly demonstrates that the water level in the river is not influenced by the operation of the FSA.

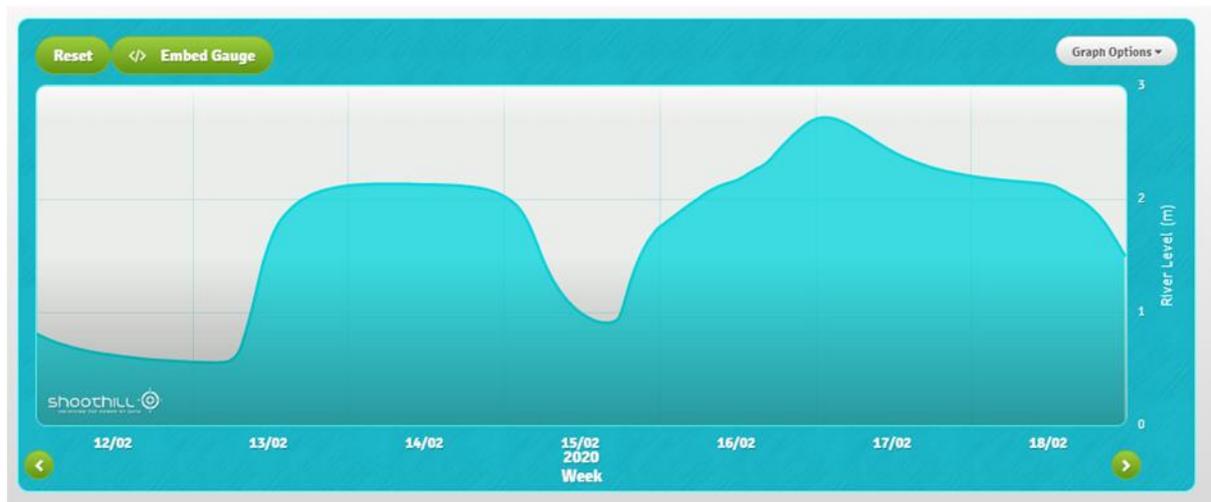


Figure 8: Water levels at Penshurst gauging station 12 to 18 February 2020. Image from Shoothill Gauge map using data from Environment Agency gauging station

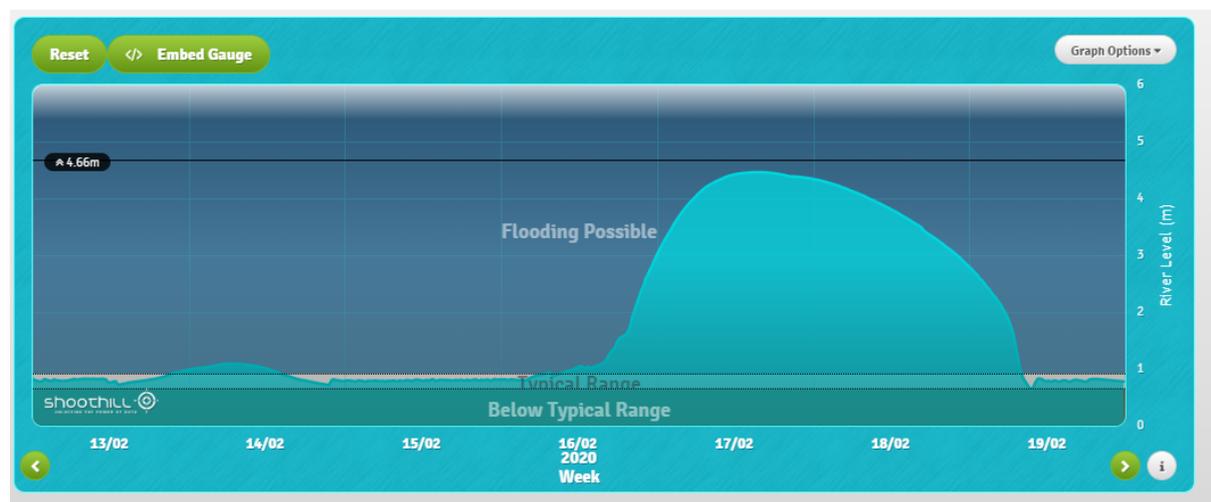


Figure 9: Water levels at Leigh Barrier upstream gauging station 13 to 19 February 2020. Image from Shoothill Gauge map using data from Environment Agency gauging station

For the reasons set out in 1 above, the proposed expansion does not increase the flood risk at Rogues Hill. Therefore, the proposed expansion does not exacerbate the present situation.

Whilst the expansion of the Leigh FSA will not increase the level of flooding experienced at Rogues Hill, we recognise the risks that arise through flooding of the roads around Penshurst. We always warn the public against driving through flood water. Flooding of these and other roads makes them dangerous, with the potential for drivers to try to pass through the floodwater at Rogues Hill and for cars to become stuck with the obvious risk to life this presents and the ongoing blockage to passage after the floodwaters have receded.

There are a number of organisations involved in managing and responding to flood risk. The Environment Agency has powers to manage flood risk from main rivers and Kent County Council provide and manage highway drainage and roadside ditches.

Other organisations and risk management authorities also have roles in managing and responding to flooding.

The risk of flooding in the natural floodplain cannot be eliminated. Warning and informing presents the only viable approach to the management of the risk to road users.

As a result, we are offering to fund the National Flood Forum to help the local community to set up a flood action group where the concerns of the community can be raised with all of the organisations involved in managing flood risk so that ways to mitigate the impact and improve the resilience of the community to flooding can be explored together.

10. When the Leigh FSA was built in 1982 the EA's predecessor identified the risk of access to properties on the Penshurst Estate, and paid for the construction of a concrete road to ensure safe access. The EA's proposal to raise the height of the FSA now places access via that same concrete road at risk. There are six residential properties and farm buildings but also a nursery school with many children in its care who could face being cut off during a flood.

Environment Agency response to point 10:

This is a matter that has been raised by the Penshurst Place Estate and we are working to address it with them.

11. Flooding will affect a number of properties on the High Street, not just Longford. There are buildings used for warehousing, hobbies and garages to the rear of these properties. Increased flooding will cause damage to property and access problems. One of these properties also claimed compensation for flooding caused by the EA's impounding of the FSA in December 2013. Early in 2020 the EA admitted liability and paid compensation to the owner of the property.

Environment Agency response to point 11:

Section 4.2 (page 24 and 25) of the Application and our response to 1 above explains the impact the proposed change to the flood water levels. This is also explained in greater detail in section 5.1 (pages 24 to 26) of the Flood Risk Assessment submitted with the planning application.

You will see that no change is expected to the extent of flooding or depth of water at the properties on the High Street, which are upstream of Rogues Hill, as a result of the proposal to increase the maximum stored water level.