Ousemere Lode, Billingborough Flooding 6th January 2025 – Evidence Based Review by BFG Members

Text in Blue is our comments and feedback to the various sections in the Billingborough report.

Text in Red is the responses from EA and other agencies to our queries from the Billingborough report.

Page 3 Introduction.

"It has been undertaken by staff in the Witham Partnerships and Strategic Overview (PSO) team, Environment Agency (EA) and based on available and relevant dinformation at the time."

Who are the parties involved in the "Witham Partnerships and Strategic Overview (PSO) team "?

Chris Walker is the Flood & Coastal Risk Management Advisor & Ian Cappitt is the Team Leader for the Partnerships & Strategic Overview Team.

Page 4 & 5 Section 1: Billingborough

With climate change the risk of flooding has increased this does not mean that previous flooding events over 200 years should be considered acceptable for the future particularly with climate changes.

This part of the report was to highlight the history regarding the area and it being subject to flooding across its floodplain for many years.

"The Ousemere Lode (Figures 2 and 3) (waterbody ID: GB105030056490) is a designated main river under the regulation of the Environment Agency (red line) east of Folkingham with the upper reaches being classed as an ordinary watercourse and under the regulation of South Kesteven District Council.

The Ousemere Lode sources from the west in the fenland uplands at an elevation of around 73mAOD meandering through fields west of the A15 near Pickworth, flowing easterly to Walcot, then in a southernly direction to Folkingham before heading east crossing under Folkingham Road (known as the Piperdam Bridge) and flowing around the north edge of Billingborough (at around 9 to 10m AOD) and through the fens discharging into the South Forty Foot Drain (SFFD) – see figure 2 below. The Ousemere Lode is approximately 17km in length. It has an open and unrestricted confluence flowing via gravity into the SFFD, which then flows north, then east to Boston discharging via gravity through the Black Sluice Complex, into the Boston Tidal Haven and out to sea"

The OML is restricted in several places from Folkingham to Billingborough, it is not dredged, and banks are falling into the riverbed.

EA & SKDC need to work together as Folkingham was flooded before Billingborough

EA and SKD need to work together as EA are responsible for the OML up to Mareham Lane, river length 8 Kilometres and SKD upstream to Folkingham and beyond which is an additional 9 K.

Our priority is to continue working closely with all our partners to deliver a cohesive response for the community. In terms of responsibility, the watercourse in Folkingham is a non-main river, and falls within the remit of South Kesteven District Council to coordinate flood management efforts.

We understand that dredging has been a recurring point of discussion, and we want to address this directly. Based on our expert analysis, dredging this particular channel would not have prevented the recent flooding, and we have determined it would offer minimal benefit for reducing future flood risk. There are more effective ways to manage flood risk than dredging/desilting the channel.

"The designed Standard of Protection (SoP) for the embankment was 1 in 25 meaning a 4% chance of flooding in any year. This is based on the embankment either failing or overtopping. However, over time this has been reviewed against newer modelling outputs and techniques which has meant the SoP has been reassessed. Based on the new modelling assessment parameters, the embankment is now classed as providing a minimum SoP of 1 in 100 meaning a 1% chance of flooding in any year.

Why reduce SOP risk when increased flooding has occurred in 2024 & 2025 - SOP must remain as a min 1 in 25. When was new modelling carried out??

We would like to clarify that the flood protection from the embankment has increased, not reduced. The embankment was reassessed by the current modelling and confirms the actual design now protects against a much larger flood event.

Previously, it was recorded as offering a "1-in-25" annual exceedance probability [AEP] however has since been reassessed and now offers a "1-in-1000" annual exceedance probability meaning the chance of it being overwhelmed is far lower than before. Although we rarely build schemes to a 1in1000 design level, this does now offer that level of protection.

During the floods in January, the embankment through Billingborough performed as designed and were not breached. The flooding experienced was caused by the river exceeding the channel upstream, in areas that do not have the same formal flood defences.

Bank condition of OML.

We can provide a copy of the latest asset inspection reports if these would be deemed helpful.

West of the railway embankment to the north of Piper Hold Farm is the EA outfall (EA asset number 264502) Source of data is DEFRA. National Flood Map.

This is not an Environment Agency outfall. Although assets are listed on our mapping system, this outfall is maintained by a third party.

Please clarify who is responsible for the maintenance and operation of this?

The riparian owner as there is no listed owner on our system.

The OML embankment in this area (EA asset number 154270 is the OML south embankment)

It is recorded as last inspected 18/03/25 and the bank condition is stated as “very poor” which means “Severe defects resulting in complete performance failure”

Next planned inspection is 28 02 2027 2 years’ time.

The same applies to the outfall (EA Asset ID 188752) located near to Piper Dam. Asset maintainer and operator EA. OML south bank (EA Asset 154270) is also recorded as very poor “Severe defects resulting in complete performance failure”

This demonstrates that the EA have failed to maintain the south bank to an acceptable level. This is a key area where overtopping will flood properties.

Please advise who is responsible for the drains / culverts which enter the OML via these culverts.

EA to bring level of embankments to and acceptable condition as a matter of priority. See Summary at end of report.

While our recent bid for funding to address the visible erosion was unsuccessful, the embankment continues to provide a high standard of flood protection. The current erosion is a predictable consequence of the river's natural desire to meander within its artificially straightened channel and did not contribute to the recent flooding. Although we can confirm the embankments performed effectively during the last flood event and their integrity pose no immediate threat, we will continue to pursue funding for these repairs.

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“The embankment begins after the watercourse passes under Piperdam Road Bridge and is continuous all the way to the flood wall just before Victoria Street meets the B1177. The raised embankments are cut twice a year

with a weed cut in channel performed once a year. The channel itself is rich with gravels creating small riffles. There is a small section of engineered high ground and a flood wall past Victoria Street. The left-hand embankment from where the watercourse passes under Piperdam Bridge is classified as natural high ground. In extreme events, it is expected that the channel along this stretch of the river overtops the left-hand bank onto the floodplain. In addition to Ousemere Lode, the catchment is also drained via a local drainage network that includes field and roadside ditches as well as culverted drains in Billingborough itself. Following this network down Folkingham Road towards the old railway embankment, some of the ditches are open with access bridges to properties. Some have been filled in over the years. The access bridges to properties have a small pipe running underneath to allow water to pass between the ditches either side. At the time of our initial investigations, in some cases, it appeared flows may be impeded within ditches and/or through culverts due to debris accumulation."

EA do not cut all vegetation on banks in the OML. There is evidence of little works to the east of the village (East of Victoria Road bridge) BFG have provided detailed information (date?) on the condition of the OML to the east of Victoria Road bridge.

Please confirm EA have reviewed what was sent.

We have reviewed and passed the details to our maintenance team. We can provide maintenance schedules to assist in what work is being carried out year on year.

Page 7 Summary of prevailing weather and catchment conditions

"On 5th January, several weather stations recorded their wettest January day on record including Cranwell, (30.8mm, 111 years of recorded data) and Coningsby (33.2mm, 60 years of recorded data)."

These areas are to the North of Billingborough - not a true account.

These areas are the gauging stations the Met Office use to measure rainfall for this catchment.

Catchment conditions

There was very little snow fall laying at Billingborough.

To provide the full picture in our report, we explained how the flooding in Billingborough was caused by conditions across the surrounding catchment.

Due to the freezing and close to freezing temperatures throughout the catchment combined with already saturated wet ground from an already wet winter meant the ground everywhere was severely saturated and the temperatures created a hard, non-absorbent surface.

Because the ground couldn't soak up any more water, the subsequent rainfall had nowhere to go. It immediately ran off the land and funnelled directly into the rivers, causing them to rise much more quickly and severely than they would normally.

Page 8 & 9 Soil Moisture Deficit SMD

SMD is extremely important in assessing the risk of fluvial flooding from the Ousemere to the west of Billingborough.

The fig 5 Please explain how this is measured & results obtained?

Where is the soil moisture deficit (SMD) measured in the Ousemere Lode catchment area ?

How often is it measured, continuously?

Where can we see a record of current and historical values?

Since SMD figures vary significantly during the seasons, what SMD figures are used in the modelling.

We can liaise with our Hydrology and Telemetry teams to understand further how you can obtain these figures.

Page 10

." Excess water came out of the channel and flowed across the natural floodplain, remaining out of channel as it reached the Piperdam Road Bridge. The road bridge did allow water to flow beneath the soffit level but given the high river level, water was already out of channel at this point and therefore flowed east along the field adjacent to Folkingham Road."

Upstream of Piper Dam Bridge the OML breached resulting in surface water flowing across the fields and into Billingborough. The Lode needs trees & vegetation removed; channel dredged & banks widened to achieve greater capacity.

The channel capacity was exceeded rather than breached. A breach is when a raised embankment erodes away, causing a hole in the defence. There are no embankments west of Piper Dam Bridge and therefore the OML did not fail or breach.

Greater capacity is not achieved by dredging as this describes the removal and lowering of the riverbed. The space created by the lower bed would already be full of water, before a flood flow came through, providing no extra storage for this water. Setting back flood embankments, to create a two-stage channel could be beneficial to a limited extent but is very costly and it would not be possible to create enough space for all the water filling the natural flood plain in this location during a flood similar to January 2025 unless you removed the houses out of the floodplain to create a free flowing floodplain. Ideally tree and vegetation removal from this channel would take place if these were impeding flows but this is not a 'responsibility' of the Environment Agency, but the 'riparian' or land owners of the river. The Environment Agency can choose to exercise permissive powers to undertake this type of maintenance if budgets are available. Recently maintenance budgets have been reduced significantly meaning far less of this type of work has been carried out.

This also requires an alleviation scheme (dam / flood gates etc) between Piper Dam Bridge and Folkingham to hold water back.

This can be discussed but we must be clear it is unlikely that funding could be secured for an engineered flood alleviation scheme. There may be other methods for holding back overland flows, such as natural flood management techniques like those installed above the village of Swaton, which could attract some funding. This can explored over time with partners and the community.

East of Piper Dam bridge and Victoria Road Bridge OML channel needs to be dredged, and banks widened and cleared of vegetation to allow the river to keep the flow in channel past Billingborough and onto the SFFD.

As above. The OML is an artificial channel which has been straightened over the years to flow around Billingborough. Historically, there were three rivers flowing through Billingborough according to the LiDAR.

Page 11 Flood Impacts

Figure 8: Flood extent and main river overland flow paths, Ousemere Lode, Billingborough, January 6th, 2025

The map showing flooding extent should show where the OML breached its banks. This would be very helpful in understanding where essential maintenance is required to reinforce the banks and protect properties.

See reference to very poor condition of the OSL south bank on page 4 & 5.

As mentioned previously, the OML did not breach its banks through Billingborough apart from the known location east of Billingborough which did not affect property only land.

"Flooding impacted 15 properties, 13 on Folkingham Road, one on West Road and one on Vine Court/Street as well as highways, drainage networks and surrounding land (Figure 9 and 10)."

No properties on Vine Court were flooded. The property which reported flooding is in Vine Street.

The statement in the report should be changed from Vine Court / Street to Vine Street which also corresponds to the map Fig 9 Page 12. It needs to be factually correct, particularly since it will be accessible to the public domain.

We will correct this in the report.

The OML banks did overtop east of Victoria Road bridge. Bridge Farm was particularly affected with severe erosion and damage to the sewage? service pipe supports serving the property and erosion of the banks next to the fence running alongside the OML.

Also overtopping on the right-hand bank flowing downstream behind the Feather Factory, very close to adjacent properties.

We are aware of the breach east of the village however was not aware of this affecting any properties only land. Do you have any further evidence to share?

Page 12

Drone photo from BFG taken from Folkingham Road showing station Road / West Road and Vine Street has not been shown in the report.

Properties were flooded here. The picture shows the extent of flooding in this area. Farmland to the east of Billingborough is dry.

We have chosen not to include several photos due to copyright infringements and them not showing the true overall flooding. Photos have been used as a visual so readers can understand some of the magnitude.

Some overtopping occurred into farmland and then dry in 24 hours.

Page 13 Flood Warnings

"We have had a report of a resident receiving no warning prior to flooding and this is most likely due to surface rather than river water being the first source of flooding."

Not acceptable. Earlier statements on Page 10 of EA report say:- "The rain resulted in the excess flows spilling onto areas of natural high ground at two location upstream of Billingborough."

The OML flow channel was compromised west of Mareham lane resulting in surface water flowing out of channel down to Piperdam and then to Folkingham Road causing flooding.

This clearly demonstrates that there is a need to consider installing flood alleviation measures to the west of Ouseby road to Mareham lane and importantly west of Mareham lane to Folkingham, which is not shown on Fig 8.

There is a need for a secondary flood warning system to be in place to warn of rising water levels.

The flood warning service provided adequate warning which has been detailed in the report. It has since transpired the warning was not received because the residents were in fact not signed up to the flood warning service. Only 15% of residents were signed up to the flood warning service. Since the engagement event this is now at 43%.

Page 14

This rainfall at Osbournby does not drain into the OML

The whole catchment drains towards the South Forty Foot Drain and therefore some rainfall north of Folkingham towards Osbournby and Threekingham may make its way towards the OML or The Beck at Osbournby.

Page 15

"The rain resulted in the excess flows spilling onto areas of natural high ground at two locations upstream of Billingborough."

No consideration of the OML capacity upstream to Folkingham.

The report focused on Main River flooding only with a wider look at catchment influences. Although the OML is not a main river upstream towards Folkingham, partner agencies can assist with reviewing this in future and can discussed across agencies. This is why we have pulled together other agencies to attend the meeting on the 7th July.

"Given the extent and depth of flooding that occurred, it is believed the primary but not the first source of flooding that reached residential properties in Billingborough was from the Ousemere Lode evidenced by both photographs and a significant accumulation of straw debris within the fields as floodwater pooled and backed up."

OML low capacity caused overtopping at Mareham Lane towards Billingborough.

SKDC and EA need together to work together to solve.

No river will contain the full range of flows that it receives from the catchment feeding it. High flows naturally spill out into the river's floodplain with or without defences. This does not mean the river has 'low capacity'. The January 2025 flows were contained within the river for longer due to the presence of the flood defence embankment, but the magnitude of the event meant that eventually water did still flow out of bank upstream and in to the floodplain unfortunately where houses sit.

Page 16

" For Billingborough, the river level gauge has simply recorded a water level higher than the 1 in 1000 modelled level. This does not mean the event was higher than a 1 in 1000."

Don't understand please clarify this statement.

The model that predicts the water level for a 1-in-1000 event makes assumptions about the river channel being in certain conditions. The real-world gauge reading can be higher for several reasons that are not related to the volume of the flood itself. So in effect you can have a high reading but the flood event itself might not represent the level across the catchment and therefore it is always difficult to predict what probability type of an event is unless detailed modelling is used to record a figure.

With more extreme weather events such as this with rain (rather than snow) falling on frozen ground this type of event is more likely to occur. This modelling appears to take a great deal of time and expense to undertake and needs to be expedited. The EA states that the OML capacity was exceeded, therefore the OML needs dredging and the embankments increasing in height as it enters Billingborough.

The above together with alleviation works to the west of village at Mareham Lane is required to hold back severe flooding. Also fit a gauge to monitor levels at the junction of OML / Walcot on the outskirts of Folkingham.

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Table 3. There is no modelled river level for 06/01/25 09.00. Does this mean the model cannot predict levels above 9.664m?

We are not sure we quite understand this statement?

EA are responsible for the flooding for 15 properties as this was water overtopped from the OML which was then out of channel.

The Environment Agency does not have a legal duty, obligation or responsibility to prevent flooding or maintain watercourses. The Environment Agency, using its permissive powers, can carry out maintenance, improvement, or construction work on main rivers to manage flood risk. The Environment Agency is required to prioritise funding to areas where we will reduce the risk to the highest numbers of people and property, where most benefit can be had from every pound spent.

The year 2000 raising of the OML banks has not overcome the flooding risk and the banks are in very poor condition.

Again, we must make it clear, these banks did not breach and held back the water as they were designed to. The water exceeded the channel further upstream.

Page 18

"Surface water that did not flow towards the Ousemere Lode occurred as previously mentioned due to saturated and frozen/near frozen ground, and whilst it contributed in the early stages of the flooding it is not believed to be the primary contributor to flooding that occurred."

The OML could not take the volume of water from Folkingham and overtopped at Marehamm lane and Oseby Lane resulting in surface water flowing down Folkingham Road and resulting in flooding.

Your interpretation is correct as this event was classified as an exceedance event.

"It is possible improved conveyance overall including through the culverted section under the old railway embankment to the outfall on Ousemere Lode downstream could have reduced the depth of flooding and timescale of flooding impacts which continued for more than 48 hours. The reasons for floodwater pooling for so long along Folkingham Road to at least 0.5m are to be determined. It is understood surveys of the culverts under the old railway embankment have been undertaken by another Risk Management Authority."

Flooding height was min 1.1m not 0.5m (see photo of vehicles under water) this is a big difference.

We referred to the minimum flood depth being 0.5m. We understand the flood water was higher in places, but this was the minimum observed flood height rather than a range.

The EA need to be clear where they are referring to here and provide a map showing drains/culverts.

If the EA mean take the water from Folkingham Road under the railway down Station road to the bottom of Vine Street where there is a culvert the bottom of Vine Street which flows into the OML, this may reduce the levels in Folkingham Road but would be a disaster on Vine Street / Low Street/ Vine Court / High Street as the roads are already flooded due to backflow from the Ousemere Lode via the aforementioned culvert

There is no mention in the report of the serious backflow from the OML into Vine Street / Vine Court. EA to comment on this and offer a solution.

We continually work with partners such as LLFA and AWS to understand the constraints and which organisation is best place to remedy a solution. The assets listed above are not EA culverts or outfalls.

No comments on BSPS section in this report.

It was appended to the report. It has been mentioned several times already that BSPS has zero impact in Billingborough and this is backed up by the evidence.

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Elevation

'The diagram below shows the relative heights above sea level of the pumping station and Billingborough. For water backing up in the South Forty Foot Drain to affect Billingborough, it would need to rise to the level of the village. This would be around 6m higher than the highest ever recorded

levels in the South Forty Foot Drain, by which point the entire Fenland area of South Lincolnshire would be under 5-6m of flood water (Figure 15).'

If the natural direction of water flow from Billingborough is downhill to the SFFD, and the levels at Donnington Bridge would not have been impacted on by the Pumping Station whether or not it was working, then please explain why the OML could not empty into the SFFD?

It could and it did. There was no restriction observed at the confluence between OML and SFFD and the OML discharged freely by gravity into the SFFD. We can explain this further at the meeting.

Surely, that means that the SFFD could not take the volume of water exiting from the OML and if that is the case, then we have to have a way of holding excess flood water back in places that ensure flood water does not run out of control into Billingborough.

Although this can be explored, there needs to be an acceptance of the actual floodplain in Billingborough. Properties have been built in the floodplain. We cannot alter floodplains. The risk will forever remain regardless of any schemes or project created now or in the future. Schemes only mitigate against the risk, it will never eliminate the risk completely.

Page 21 Section 5 Review Conclusions and Next Steps.

"Early onset of flooding from surface water appears to have occurred first for which there is no flood warning system. The nature of surface water flooding is often characterised as being a "flash flood" and can occur quite rapidly meaning it is extremely difficult to predict when and where it will occur."

Early warning system required at Folkingham. The EA/ SKDC to work together to resolve overtopping.

The Flood Warning Service is for Main Rivers only.

"The river flooding exceedance event was exacerbated by the heavy intense rain falling on saturated and frozen or near frozen ground, providing little room for infiltration resulting in overland flows being increased significantly between Folkingham and Billingborough with the floodplain being used to its full capacity."

No mention of flood alleviation upstream which could slow the flow and flatten the peak of water flowing into the OML.

The report was to understand the flood mechanisms and what happened and not what could have been done to prevent it. It was a factual report, not a hypothetical review.

"Our flood warning service provided the relevant warning and information ahead of the flooding"

This was inadequate as it did not predict the potential for high surface water flows due to ground saturation and high rainfall combined.

The FWS only offers alerts and warnings based on rivers. Surface Water flooding is extremely difficult to predict and warn against as it can occur within an instant making it increasingly difficult to predict or forewarn.

Residents see water in their homes and don't care initially whether it is surface water or from a river. An early warning system is required.

This is something that can be explored with the Flood Action Group. The LLFA will be able to support on Surface Water and we can explore as a partnership what can be done as a community. Other communities have flood wardens who check certain sections of the watercourse when forecasts predict rainfall events and have a flood warning and evacuation plan to supplement the different scenarios.

"Due to the significant volumes of water conveyed across the floodplain and amount of water received via rainfall, onto saturated and frozen or near frozen ground, there is unlikely to have been anything that could have been done to prevent the flooding"

Revisit OML upstream to Folkingham not just Marham Lane and make a proposal of options.

The EA will support and continue to support other partners where it can however, as mentioned previously, due to funding rules and constraints there is little investment by means of large schemes available which is why community engagement and community led schemes will be so important now and in the future.

It is possible that the depth and period of flooding on Folkingham Road may have been reduced if the floodwater had been able to drain away via the culvert under the old railway embankment, via adequately maintained roadside ditches and into Ousemere Lode once the river levels receded.

As previously stated, this is a dangerous statement to make without being thought through.

These are facts which could have reduced some of the impact. We are not saying it would have removed the risk entirely, but it may have made some difference.

There is a culvert that enters the Lode to the north of Folkingham road and west of the railway embankment near Piper Holt Farm, this is not mentioned.

This is a surface water drain allowing surface water from the new housing development to drain into the Lode. The pipe has been over-designed to act as an attenuation feature for drainage as per the planning application submitted for the development. The LPA under the local authority approved the plans.

Wasn't the pipe which evidenced itself when the ditches which were dug out by the railway embankment and bungalow covered up ? Was this checked by AW?

We feel this would be better commented on by SKDC or AWS.

Maps of all culverts / drains and responsibility needed. SKDC (Tom Amlin-Lighhtowler) is working with us on this since March.

No mention of developing a flood risk management project to protect homes which is in the EA's remit.

As previously mentioned above, it can be explored further as a community due to the funding constraints. As our powers are permissive only, the Environment Agency is not obliged to carry out either maintenance or new works on main rivers. We are required to prioritise our funding to areas where we will most effectively reduce the risk to people and property, where most benefit can be had from every pound spent.

Other Comments

Drone flights over Ousemere Lode by EA. No reference to their footage being reviewed and what was observed.

All photos and evidence have been reviewed and logged in our incident systems. Although they haven't been shared in the report, they have been logged.

BFG provided a document to the EA showing issues east of Victoria Bridge. No mention of this and any plans to carry out remedial works.

There is no mention in this report of the culverted drain from Vine Street / Vine Court junction into the OML which flooded river water into Vine Street.

The Boston Report provided short term, 3 mths / medium term, 6 mths and long term 6 mths + action plan. The same is required for Billingborough. What is good for Boston is good for Billingborough and other villages in the SFFD catchment.

We chose not to include a 3, 6, month etc plan as we want this to be developed with the BFG and in partnership with the community.

EA Responsibility

Environment Agency (EA)	• Responsible for flood and coastal erosion risk management activities on main rivers and the coast and regulating reservoir safety. • Work with Lead Local Flood Authorities (LLFAs) and coastal groups to oversee flood and coastal erosion risk management and reduce risk to communities, coastlines, and habitat. • Deliver the Flood Warning Service to communities and areas at flood risk from rivers and the sea. • Produce and update publicly available flood risk maps and information for main rivers, surface water, reservoir and groundwater flooding. • Develop and deliver flood risk management projects to protect properties.