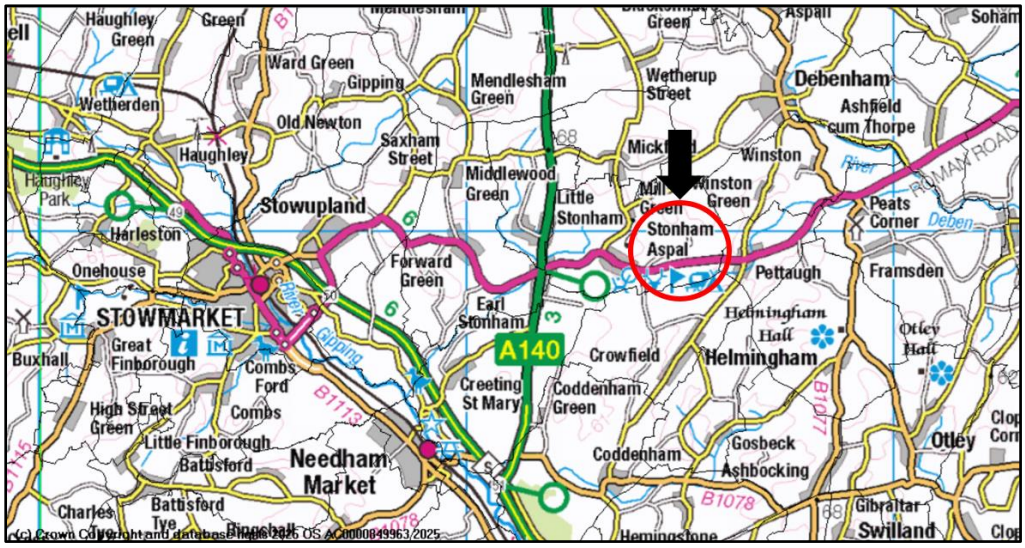
Section 19 Flood and Water Management Act 2010

Stonham Aspal Flood Investigation

Storm Babet 2023



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Executive Summary

Storm Babet caused significant disruption to communities across Suffolk between 18th - 21st October 2023. Stonham Aspal was a community that was significantly impacted, with approximately six properties suffering internal flooding as well as disruption to infrastructure and services. Suffolk County Council, as Lead Local Flood Authority, have therefore undertaken a Section 19 Flood Investigation. The resulting report will:

- highlight the probable causes of flooding
- identify options to reduce future flood risk and increase property resilience
- make recommendations for actions by relevant responsible organisations, landowners or homeowners.

Stonham Aspal is located in an area at significant risk of pluvial flooding and the nature of the surrounding topography and geology contributes to the susceptibility of the community to flooding. Areas of Stonham Aspal are relatively flat and low-lying, where surface water (pluvial) collects. The local geology and soils are susceptible to high run off, making some properties in the parish vulnerable to flooding due to intense rainfall events. Storm Babet delivered significant rainfall to the catchment, following an extended period of above average rainfall. For the purposes of the report, impacts within Stonham Aspal have been categorised into two zones: Pettaugh Road and East End Road. The description of the flood events detailed in the report have been compiled using data submitted to Suffolk County Council, as well as information from Risk Management Authorities and the community.

A comprehensive summary for each zone is provided within the report, outlining the context of the event and the impact. Key findings are that Stonham Aspal was severely impacted by flooding due to the intensity and duration of rainfall which overwhelmed the natural flow routes and the capacity of watercourses and drainage infrastructure. This situation was compounded when overland flow paths converged and saw the resultant internal flooding of property.

Short, medium and longer term recommendations have been published and each have a potential role to improve resilience and reduce the risk of flooding to Stonham Aspal. For short term measures, key highlights include the implementation of a community flood plan, maximising Property Flood Resilience measures and the creation of an integrated water management plan for the affected location south of Pettaugh Road. For medium to longer term recommendations, there is an emphasis on the management of water from rural land though new natural flood management features to reduce the flood risk within the catchment and also to enact the implementation of the integrated water management plan for the affected location south of Pettaugh Road.

Justification for Investigation

Suffolk County Council, Lead Local Flood Authority (LLFA) has determined that in accordance with our criteria, it is considered necessary and appropriate to carry out an investigation into this flood event.

This is in accordance with Section 19 (1) of the Flood and Water Management Act 2010, and in accordance with Section 19 (2) of the Flood and Water Management Act 2010, to publish the results and notify the relevant risk management authorities (RMAs).

Section 19 Local authorities: investigations

(1) On becoming aware of a flood in its area, a lead local flood authority must, to the extent that it considers it necessary or appropriate, investigate—

> *(a) which risk management authorities have relevant flood risk management functions, and*
>
> *(b) whether each of those risk management authorities has exercised, or is proposing to exercise, those functions in response to the flood.*

(2) Where an authority carries out an investigation under subsection (1) it must—

> *(a) publish the results of its investigation, and*
>
> *(b) notify any relevant risk management authorities*

Criteria for an investigation (as per Appendix D of the Suffolk Flood Risk Management Strategy):	
There was a risk to life because of flooding?	
Internal flooding of one property (domestic or business) has been experienced on more than one occasion?	
Internal flooding of five properties has been experienced during one single flood incident	✓
Where a major transport route was closed for more than 10 hours because of flooding	
Critical infrastructure was affected by flooding	
There is ambiguity surrounding the source or responsibility of a flood incident	

Understanding the flood context

1. What happened during Storm Babet

A succession of weather fronts between the 11th and 13th of October 2023 brought significant rainfall to the region. Readings indicate that between 30mm and 50mm of rain fell across Suffolk compared with an average of just less than 65mm across the whole month of October according to Meteorological Office weather data (Met Office, 1991- 2020). This significant rainfall in a short space of time resulted in saturated land and rivers reaching their capacity. Shortly after this, Storm Babet followed on the 18th to 21st of October 2023. The storm brought between 50 mm and 80 mm of rain to much of central and northern East Anglia, with some Suffolk weather stations recording the wettest October day on record.

The Environment Agency River level gauging stations indicated many flows close to or exceeding their highest on record, and the weather remained wetter than average for the rest of the month. October 2023 was the joint wettest on record in the east of England since 1871. During Storm Babet, Suffolk saw the heaviest rainfall across East Anglia causing significant flooding of roads and properties. The river systems rose rapidly across whole catchments due to the existing conditions, which was unusual as storms will often impact a small area and result in a steady progression of flood water downstream. A major incident was declared by Suffolk Resilience Forum (SRF) in the afternoon of the 20th of October due to significant impacts on communities and disruption to the road and rail networks.

The following maps illustrate the extent to which the rainfall in the months preceding Storm Babet exceeded the average monthly rainfall for July to October in recent years in Suffolk.

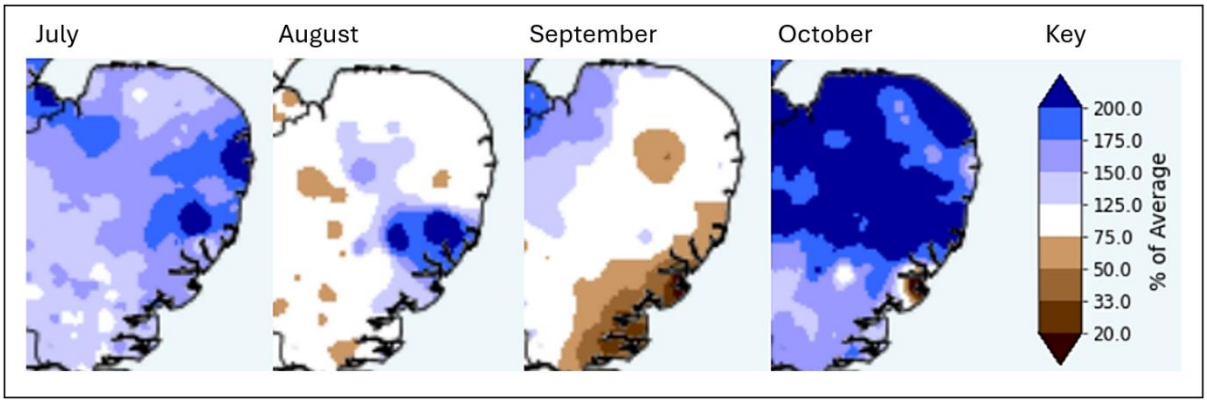

Fig. 1. Average monthly rainfall (July – October 2023) as a percentage of the historic average monthly rainfall

The following report acknowledges that October 2023 and particularly Storm Babet, was an extreme event and will assess the probable causes and impacts. The report will recommend measures to reduce the risk of flooding within the location, in line with best practice, ranging from large to small scale interventions and be targeted at a range of stakeholders. It should be noted that Storm Babet was a significant event,

with a low probability of recurrence. The recommendations will provide advice about reducing flood risk. However, they should not be relied upon as a guaranteed failsafe to mitigate against all future flooding.

2. Location of flooding

The village of Stonham Aspal is located in the district of Babergh & Mid-Suffolk District Council, approximately 3 miles southwest of Debenham and 5½ miles east of Stowmarket (Fig. 2).

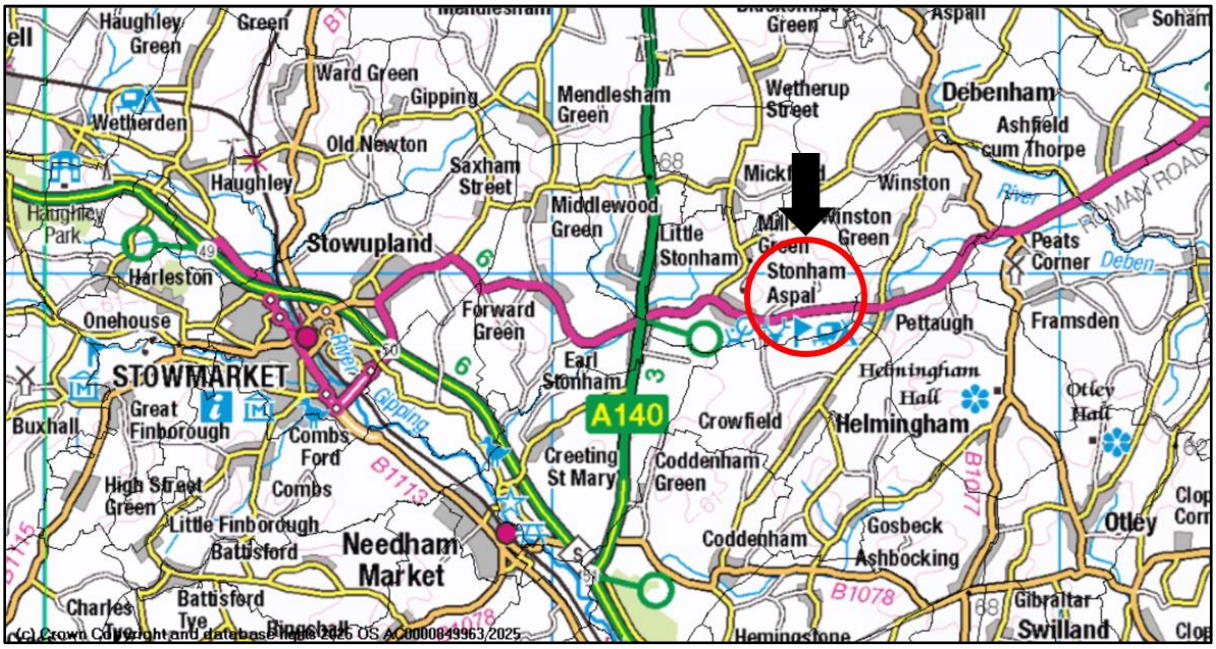

Fig. 2. Investigation area map

Fig. 3 shows the location of the nearest statutory main rivers and significant ordinary watercourses to Stonham Aspal. However, in this case, main rivers did not contribute to projected flood risk for affected property.

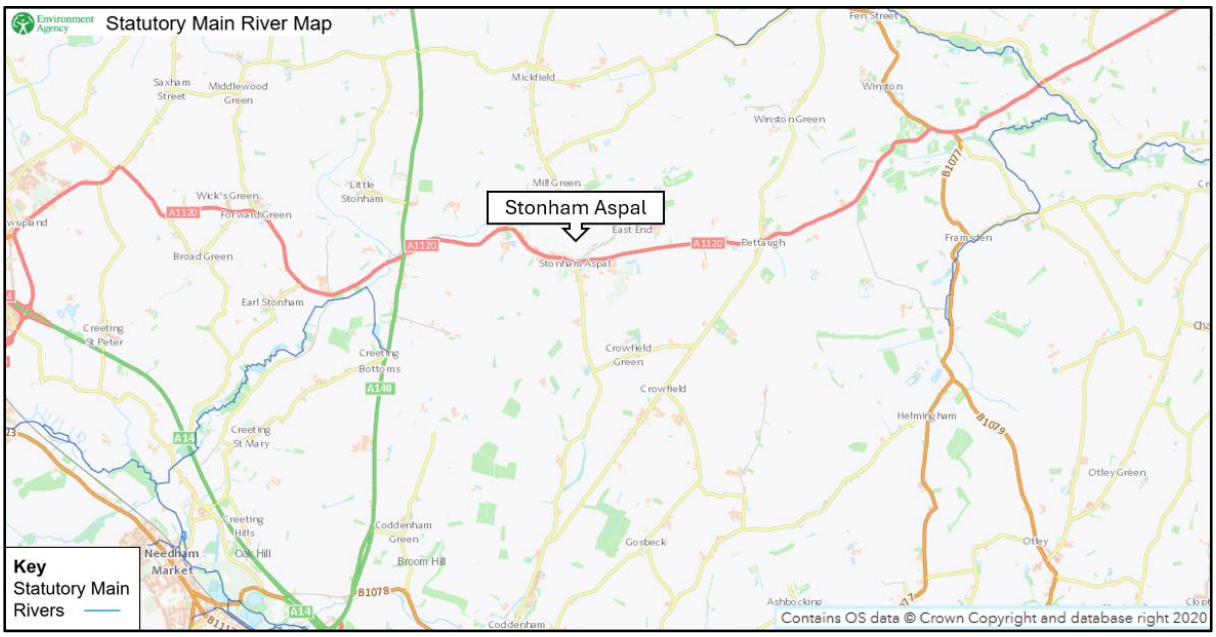

Fig. 3. Location of statutory main rivers and significant ordinary watercourses (Environment Agency)

The Environment Agency has permissive powers to carry out maintenance, improvement or construction work on statutory main rivers to manage flood risk. Lead Local Flood Authorities (LLFAs) and Internal Drainage Boards (IDBs) manage the flood risk from ordinary watercourses but responsibility for maintaining watercourses rests with the Riparian Landowner, defined as those who have a river, stream or ditch which runs next to or through their land or property.

On the 20th October 2023, Storm Babet resulted in significant rainfall across Suffolk on already saturated ground due to above average rainfall in the preceding weeks. Stonham Aspal was significantly impacted with six properties reporting internal flooding. Flood water was described as coming from several sources including surface water runoff from surrounding fields (pluvial), the overtopping of local watercourses (fluvial) and overwhelmed drainage systems. Within this report, the term 'flood water' may be used to describe all types of flooding.

For the purposes of this investigation the various areas affected by flooding have been separated into two distinct zones:

1. Pettaugh Road
2. East End Road

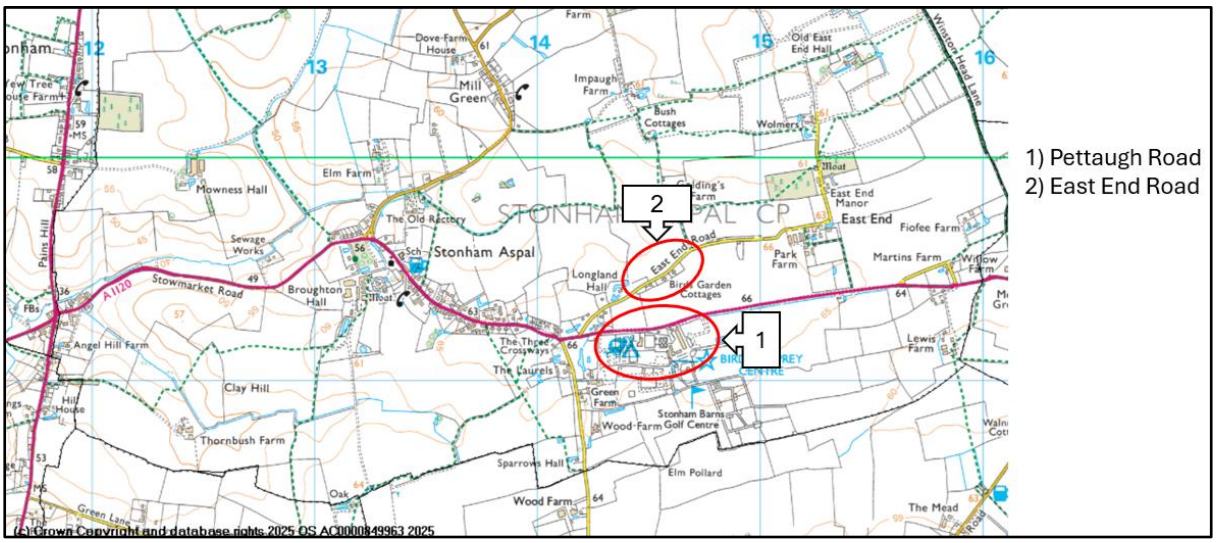

Fig. 4. Distinct flood zones

3. Records of any historical flooding

A review of Suffolk County Council's Highways reporting tool, local and social media reports indicated that there had been previous localised flooding in Zone 1 (above).

4. Predicted Flood Risk

The parish of Stonham Aspal is projected to be at significant risk of pluvial flooding (Fig. 5). All affected property in East End Road and on land south of Pettaugh Road is projected to be at high pluvial flood risk. Both areas are at slightly lower levels relative to surrounding land, where surface water collects.

Fig. 5. Predicted flood risk from surface water (Environment Agency)

There is no projected fluvial flood risk for the affected areas in Stonham Aspal.

5. Catchment characteristics

The parish of Stonham Aspal consists of a relatively flat plateau in the eastern part which slopes down towards the west. Affected property was located in the eastern part, where surface water collects in lower lying areas, either ponding or draining slowly through small watercourses. The parish is located in a relatively rural area with farmland used for arable agriculture and grassland.

During high rainfall events, considerable flows of water converge towards low-lying areas (see Fig. 6). Overwhelmed infrastructure and watercourses may be observed during these intense rainfall events.

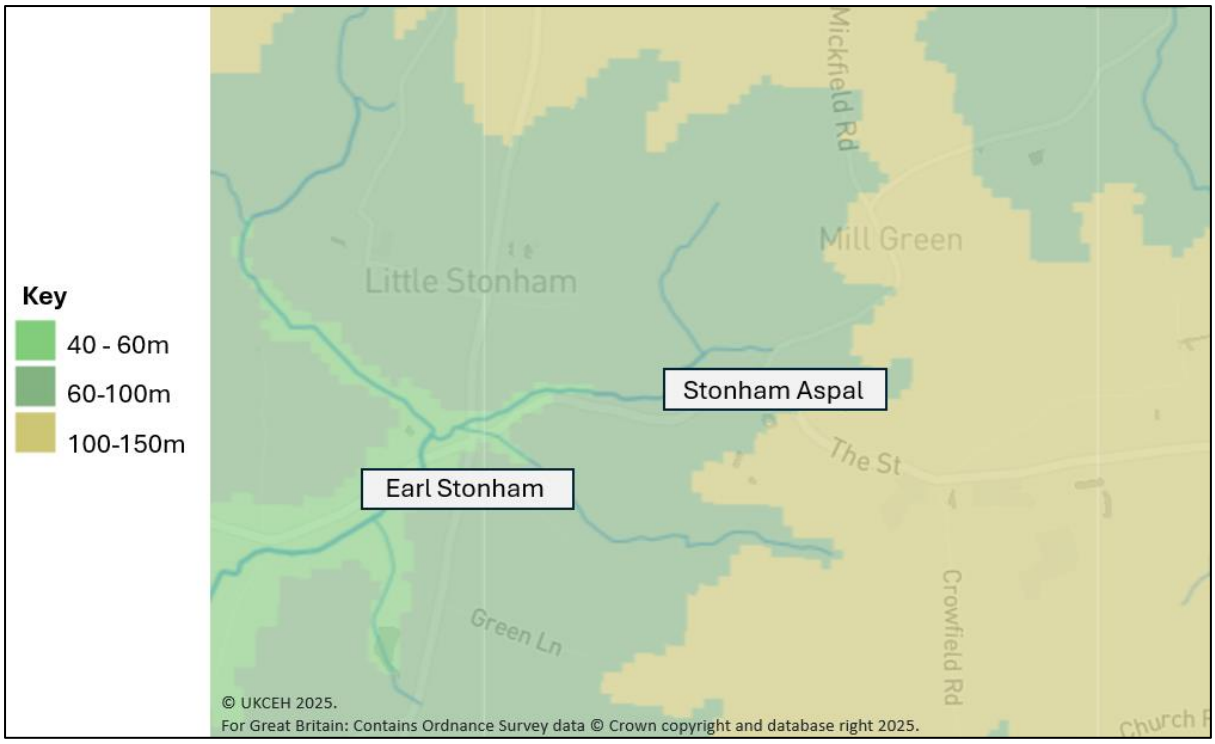

Fig. 6. Elevation map (National River Flow Archive)

The soils surrounding Stonham Aspal are loamy and clayey with impeded drainage, or slowly permeable, meaning that water penetrates the ground more slowly, and surface water runoff is greater, particularly during intense rainfall (Fig. 7). However, the saturated nature of the soils leading up to the event would also have prevented some infiltration.

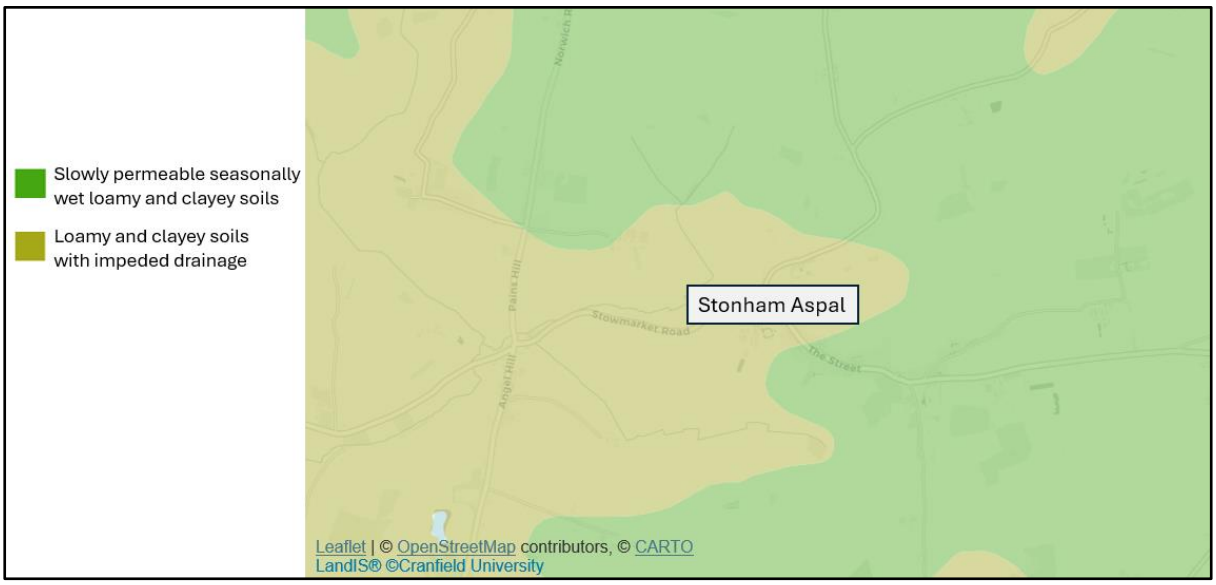

Fig. 7. Soil map of catchment area (LandIS® Soilscapes)

Fig. 8 shows that much of the superficial geology surrounding Stonham Aspal is made up of 'Lowestoft Formation – Diamicton' which is described by the British Geological Survey as a diverse mixture of clay, sand, gravel, and boulders varying widely in size and shape. This is sometimes known as boulder clay. This generally has a low permeability meaning water will tend to flow off it before it can infiltrate, which also reflects the reports collected during Storm Babet.

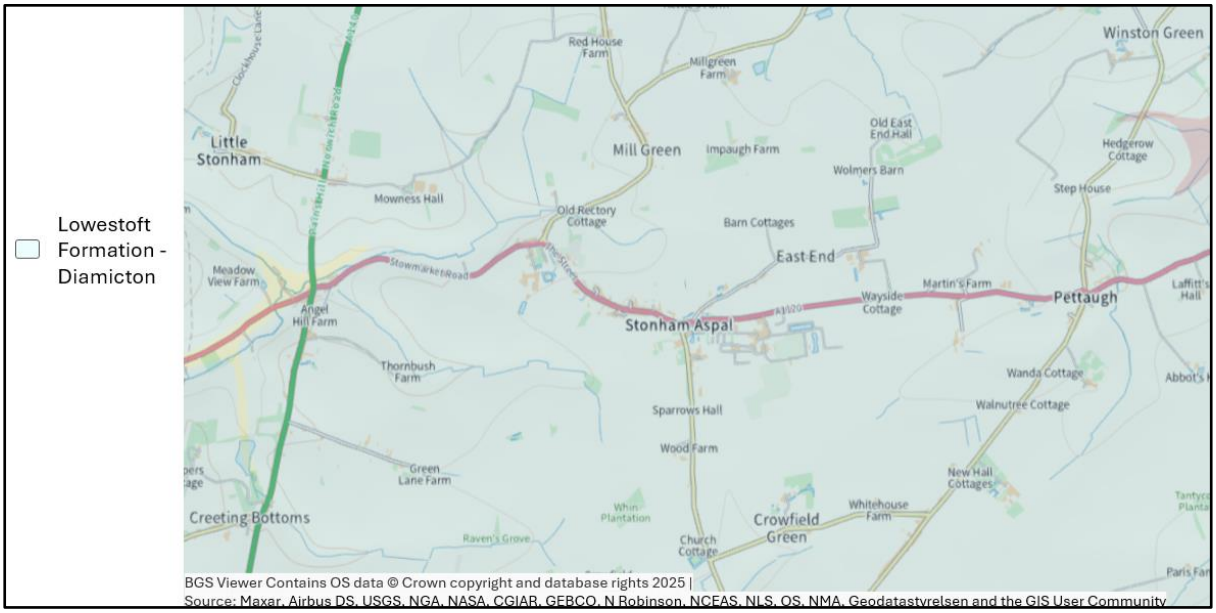

Fig. 8 Superficial geology (British Geological Society)

The bedrock in Stonham Aspal and the surrounding area consists of Lewes Nodular Chalk Formation and Crag Group - sand which are generally relatively porous or permeable.

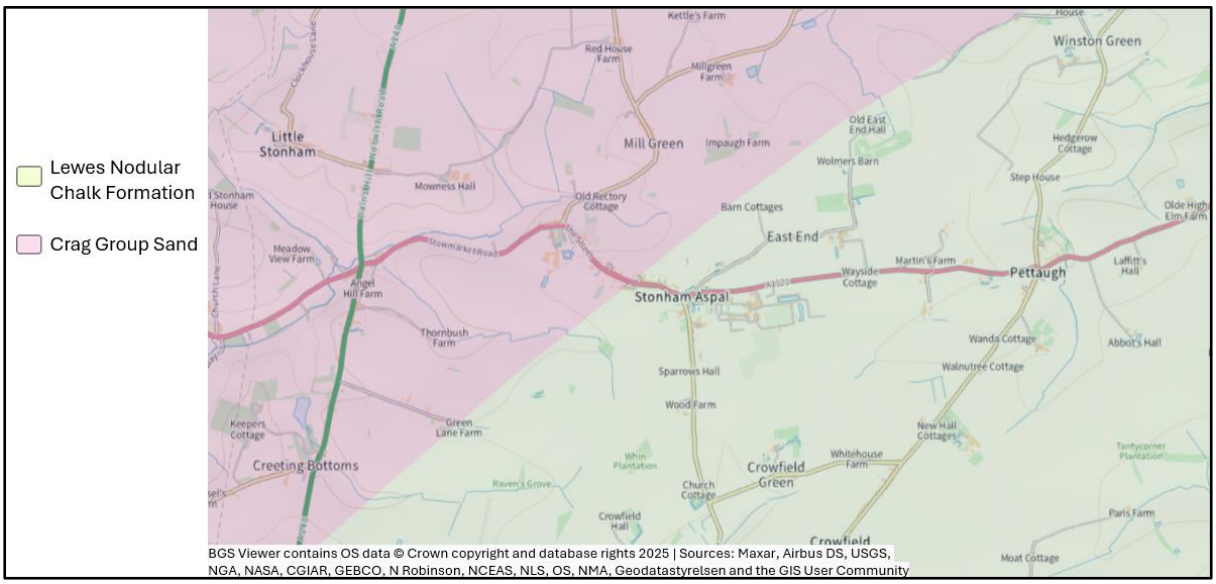

Fig. 9 Bedrock (British Geological Society)

However, during short term intense rainfall events, soil composition and superficial geology become more influential in affecting the volume of surface water runoff. Combined with the topography within the catchment, these make Stonham Aspal susceptible to extreme rainfall events. Saturated ground and high rainfall, like that of Storm Babet, will further emphasise the vulnerability of the parish and localised flooding could be experienced.

Flooding Sources, Pathways & Receptors

Storm Babet was an extreme event which came at a time when Suffolk had experienced a significant amount of rainfall in the preceding weeks.

Data from surrounding Environment Agency rain gauges indicates that a significant volume of rain was experienced during Storm Babet. The nearest rainfall gauge to Stonham Aspal is at Needham Market. It recorded 54.2mm of rainfall between 22:45 on 19/10/23 and 15:30 on 20/10/23.

The Environment Agency issue two types of warning when flooding is possible from a main river. These are:

1. Flood Alert – Flooding is possible. Be prepared. - usually issued between 2 and 12 hours before flooding.

2. Flood Warning - Flooding is expected. Immediate action required – usually issued 30 minutes to 2 hours before flooding.

Stonham Aspal is not covered by the Environment Agency Flood Warning Service.

The description of the flood events described below will discuss the probable sources of flooding, the observed flow paths through the community and the receptors which have been affected. The term ‘floodwater’ may be used to describe both fluvial (water from a watercourse) and pluvial (surface water run-off) flooding. This section has been prepared using reports submitted to Suffolk County Council via the online Highways Reporting Tool, community data and site visits.

Detailed descriptions of each investigation area can be found below.

1. Pettaugh Road

Four properties are reported to have internally flooded in this area. Affected property to the south of Pettaugh Road was projected to be at high risk of surface water flooding and no risk of fluvial (river water) flooding.

On 20th October 2023, ponds and watercourses in the area of affected property on the south side of Pettaugh Road overtopped and it was also reported that blocked culverts downstream were a significant cause of flooding. However, the flat nature of the area surrounding affected property, clay soils and superficial geology and limited drainage would all have reduced the rate at which floodwater was able to drain away. Water in nearby ditches would also have been supplemented by treated effluent discharging into the ditches. (In addition to rainfall, abstracted water provides a further additional source of water on site after subsequent use and treatment). Reports suggest that some sewage may also have been present. (There is no water company foul sewer connection in this area, so any sewage would have come from leaking septic tanks and associated pipework or internal pipework and appliances in properties.).

Floodwater is also reported to have come from the drain (unclear whether highway gullies or ditches) and flowed south across Pettaugh Road, flooding property on the south side of Pettaugh Road. This flow was increased due to some surface water flowing from fields into drainage ditches on the north side of Pettaugh Road. Some of the gullies on Pettaugh Road in the vicinity of affected property were not fully functioning prior to Storm Babet. These merit further investigation, although due to the extreme rainfall conditions in Storm Babet, the capacity of the wider highways drainage system, even if fully functioning, would have been limited. Floodwater would have reached the south side of Pettaugh Road either via the culvert or over the road.

Internal floodwater levels in affected property were reported to have reached 30cm. Flooding had receded by mid-morning on the 21st October.

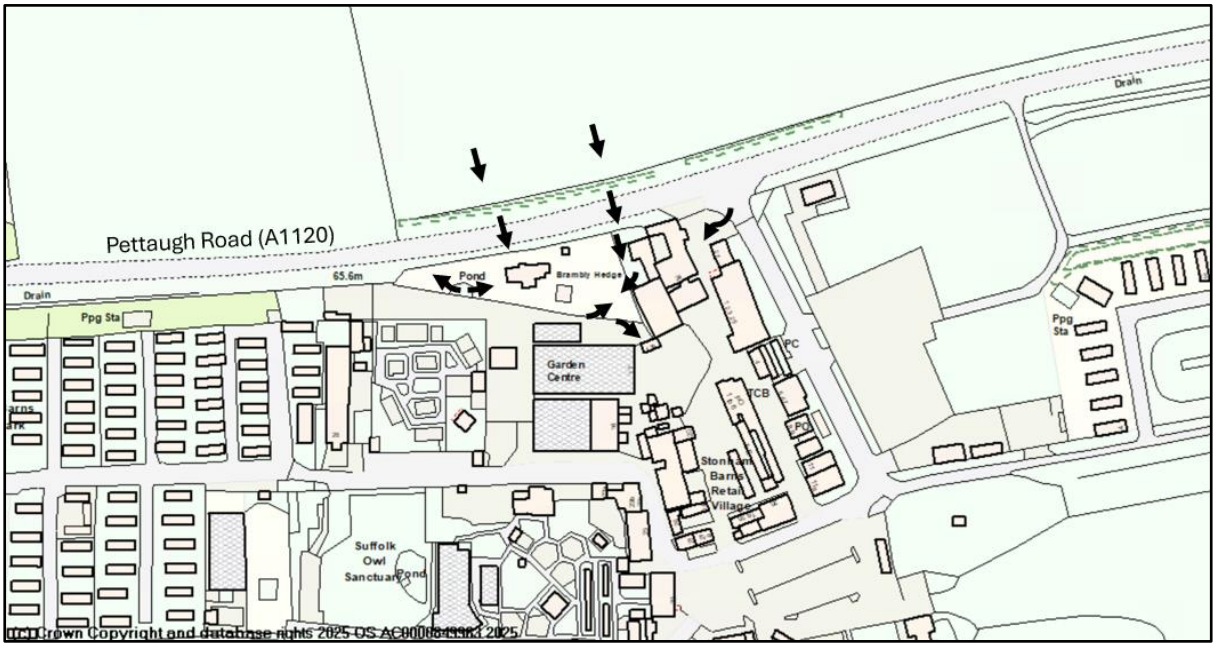

Fig. 10. Approximate floodwater flow paths, Pettaugh Road

In summary:

- Intense and prolonged rainfall caused floodwater to flow south from drains across Pettaugh Road.
- This combined with surface water and floodwater from overtopping ponds and ditches on the south side of Pettaugh Road.
- Volumes of water in nearby ditches would have been increased by discharges of treated effluent.
- Some sewage may have been present in floodwater.
- The flat nature and limited drainage of the affected area reduced the ability of flood water to drain away quickly.
- Some gullies on Pettaugh Road were not fully functioning during Storm Babet. However, floodwater would have reached the south side of Pettaugh Road regardless due to the extreme rainfall conditions.

Recommended actions:

- Residents to install Property Flood Resilience (PFR) measures.
- SCC Highways to investigate potential blockages of gullies on Pettaugh Road in the vicinity of affected property.
- Landowner to create and enact an integrated water management plan including a flood risk and drainage strategy for the site surrounding affected property.
- Ensure riparian landowner responsibilities are understood with regard to watercourse management

2. East End Road

Two properties are reported to have internally flooded in this area. Affected property to the south of East End Road was at high risk of surface water flooding and no risk of fluvial (river water) flooding.

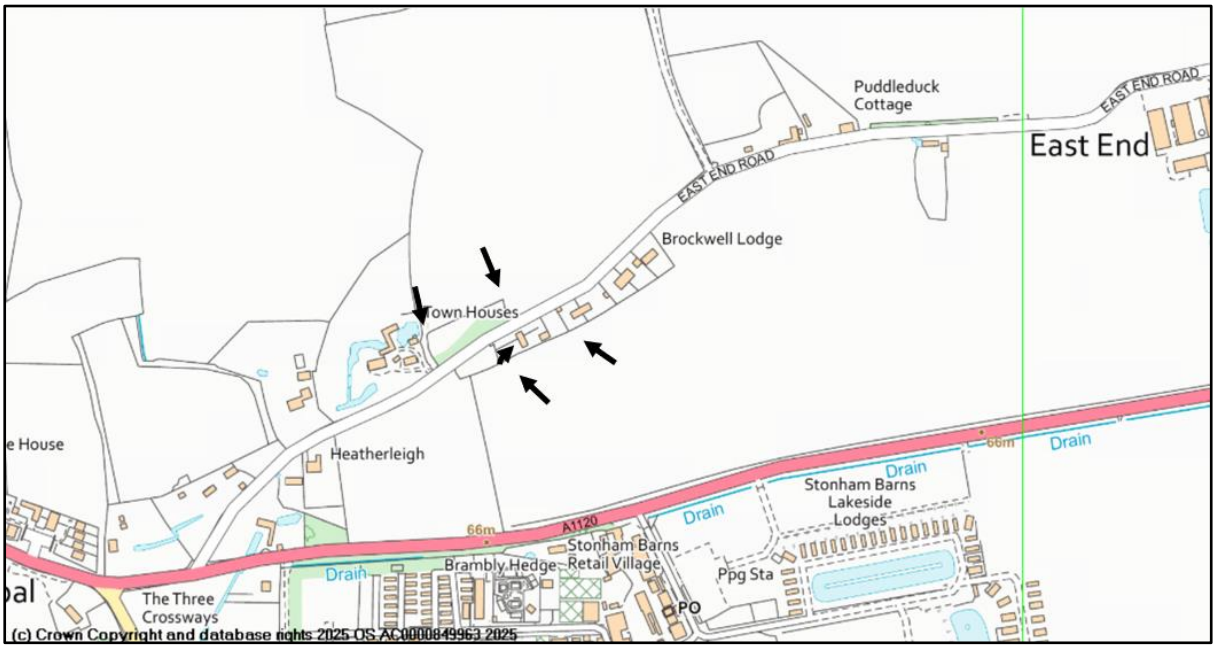

Figure 11 Approximate floodwater flow paths, East End Road

Flooding was reported to have resulted from surface water runoff from fields. Nearby field drainage was reported to have been converted from open ditches to culverted sections, leading to a reduced capacity to respond to sudden extreme rainfall such as that during Storm Babet. A ditch to the rear of affected property overtopped, contributing further flood water. Two highway gullies in the vicinity of affected property were reported not to be fully functioning during Storm Babet and merit further investigation. However, due to the extreme rainfall conditions in Storm Babet, the capacity of the wider drainage system would have been limited. Sewage was also reported to be present in floodwater due to a lid lifting on a septic tank.

In summary:

- Surface water runoff from fields was a significant source of floodwater.
- Field drainage was reported to have been converted from open ditches to culverts, decreasing capacity.
- A watercourse adjacent to affected property overtopped.
- Two highway gullies in the vicinity were not fully functioning.
- Sewage was reported to be present in the flood water.

Recommendations:

- Residents to install Property Flood Resilience (PFR) measures.
- LLFA to investigate field drainage and permissions adjacent to affected property in East End Road.
- SCC Highways to investigate potential blockages of gullies on East End Road in the vicinity of affected property.
- Explore potential natural flood management measures (eg. attenuation ponds and wetland in the fields to the rear of affected property) to “slow the flow” and provide extra storage capacity.
- Ensure riparian landowner responsibilities are understood with regard to watercourse management.

Risk Management Authorities, Non-Risk Management Authorities and flood risk functions

Risk Management Authority	Relevant Flood Risk Function(s)
Suffolk County Council	Lead Local Flood Authority, Highways Authority & Asset Owner
Environment Agency	Lead organisation for providing flood risk management under its permissive powers and warning of flooding from main rivers
Babergh & Mid Suffolk District Council	Local Planning Authority & Asset Owner
Anglian Water	Asset Owner
Non-Risk Management Authority	**Relevant Flood Risk Function(s)**
Private Landowners	Riparian Responsibilities and management of water from land or/ watercourses
Private Homeowners	Improving flood resilience to property and some riparian responsibilities if adjacent to watercourses.
Parish Council	Manage flood risk at a community level, prepare and produce flood action plans and maintain watercourses where present on land they own.

Action(s) completed to date:

The following section acknowledges actions that RMA's and Non-RMAs have implemented or are currently in progress since Storm Babet and prior to publishing of this report.

Action	Responsible Party	Progress
Offer of £5k Property Flood Resilience (PFR) grant funded scheme to eligible properties that flooded during Storm Babet	Suffolk County Council Lead Local Flood Authority (LLFA)	Application window now closed. Installation of PFR measures on approved applications has been extended to December 2025.
Ensure riparian landowner responsibilities are understood with regard to watercourse management	SCC LLFA	SCC published "Flood Smart Living" handbook designed to increase flood resilience for residents, landowners and communities, December 2024

LLFA Recommended Action(s):

The following section provides a range of flood mitigation measures that could be implemented to reduce the risk of flooding in Stonham Aspal. They have been derived from data and evidence collated as part of the report and have been included having been considered realistic in their implementation. The implementation of actions falls to the responsible party. Progress on the action will be monitored by Suffolk County Council but it should be acknowledged that the council has limited powers to enforce the implementation of recommended actions.

Action	Responsible Party	Timescale for response	Latest Progress Update for Actions
Short Term Actions (e.g. standard maintenance activity and initial investigation of options that can be undertaken with limited need for forward planning)			
Establish a Community Emergency Plan that includes plans to manage future flood events –Liaison with Suffolk Joint Emergency Planning Unit	Stonham Aspal Parish Council	6 months	
Residents to consider installing Property Flood Resilience (PFR) measures to property to reduce damage caused by flooding.	Residents	N/A	DEFRA PFR Grant has now closed for new applications. Installation of PFR measures on approved applications has been extended to December 2025. Further information on PFR measures can be found within SCC published "Flood Smart Living" handbook. There is currently no active PFR schemes being managed by

			the LLFA in Suffolk.
Investigate potential blockages of gullies on Pettaugh Road in the vicinity of affected property.	SCC Highways	6 months	
Investigate potential blockages of gullies on East End Road in the vicinity of affected property.	SCC Highways	6 months	
Investigate field drainage and permissions adjacent to affected property in East End Road	SCC LLFA	6 months	
MSDC should consider relevant recommendations in planning and enforcement decisions, support the responsible party with pre-application advice and timely processing where needed and negotiate and enforce embedded designs and/or conditions as appropriate.	MSDC	6 months	
Medium Term Actions (e.g. longer planning timescales and potential need to source funding but potential for greater impact)			
Explore potential natural flood management measures (eg. attenuation ponds and wetland) in the fields to the rear of affected property on the south side of East End Road to "slow the flow" and provide extra surface water storage capacity.	Landowners, supported by relevant authority, resource dependant (SCC LLFA, EA)	12 - 24 months	
Landowner to create and enact an integrated water management plan including a flood risk and drainage strategy for the site surrounding affected property south of Pettaugh Road.	Landowners, supported by relevant authority, resource dependant (SCC LLFA, EA)	12-24 months	

Long Term actions (significantly longer timescale and budget required with potentially greater positive impact)			
Deliver any capital interventions that are economically, technically and environmentally feasible and acceptable to improve the flood resilience of the village, eg. NFM and PFR measures.	Landowners, supported by relevant authority, resource dependant (SCC LLFA, EA)	TBC	

Approval

This report will be reviewed and updated every 6 months until actions are marked as complete.

Reviewer	Date of Review

Disclaimer

This report has been prepared and published as part of Suffolk County Council's responsibilities under Section 19 of the Flood and Water Management Act 2010. It is intended to provide context and information to support the delivery of the local flood risk management strategy and should not be used for any other purpose.

The findings of the report are based on a subjective assessment of the information available by those undertaking the investigation and therefore while all reasonable efforts have been made to gather and verify such information may not include all relevant information. As such it should not be considered as a definitive assessment of all factors that may have triggered or contributed to the flood event. Should there be additional information available to develop the report, please email to floodinvestigations@suffolk.gov.uk.

The opinions, conclusions and recommendations in this Report are based on assumptions made by Suffolk County Council when preparing this report, including, but not limited to those key assumptions noted in the Report, including reliance on information provided by third parties.

Suffolk County Council expressly disclaims responsibility for any error in, or omission from, this report arising from or in connection with any of the assumptions being incorrect.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the time of preparation and Suffolk County Council expressly disclaims responsibility for any error in, or omission from this report arising from or in connection with those opinions, conclusions, and any recommendations.

The implications for producing Flood Investigation Reports and any consequences of blight have been considered. The process of gaining insurance for a property and/or purchasing/selling a property and any flooding issues identified are considered a separate and legally binding process placed upon property owners and this is independent of and does not relate to Suffolk County Council highlighting flooding to properties at a street level. Property owners and prospective purchasers or occupiers of property are advised to seek and rely on their own surveys and reports regarding any specific risk to any identified area of land.

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