



Norfolk County Council

Flood Investigation Report

Report Title:

South Norfolk

Brooke

Church of England V.C Primary School

Report Reference: 000162

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Report Status: Approved Report

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Flood Investigation Report

Church of England V.C Primary School, Brooke, South Norfolk

1. Location of flooding incident

- 1.1 Brooke is located approximately 12km miles South-East of Norwich. The Church of England V.C Primary School is situated on High Green Road, Brooke village. The area of reported flooding is at the school premises.

2 Flood Incident as reported

- 2.1 Two successive reports of internal flooding have been reported at the school. Both events were reported by the School to Norfolk Property Services (NPS).
- 2.2 The first event occurred on 28 January 2013. Further flooding was experienced over the weekend of the 9 and 10 March 2013. Both events caused the school to close to students until the flood water was removed and the property dried out.
- 2.3 Norfolk County Council's Flood and Water Management Team were first alerted to the flooding issues at Brooke Primary School by NPS on the 13 March 2013. The contact in NPS requested assistance in understanding the land drainage issues and identifying possible causes of the flooding.

3 Desk Study

- 3.1 The location of the flooding:
- Lies within the upper reaches of the River Chet Catchment.
 - Is sited within an area of geology likely to have low rates of infiltration.
 - Is located within South Norfolk District Council's administrative boundary.
 - Is located within the Environment Agency Eastern Admin and Water Management areas.
 - Does not lie within any predicted significant surface water overland flow paths.
 - Does not lie within Flood Zone 2 or Flood Zone 3.
 - Is approx. 1.8 km from an Environment Agency raingauge.
 - Has not been mentioned within existing flood risk management publications (i.e. Strategic Flood Risk Assessments).

- 3.2 From the desk study it is indicated that the management of local drainage is primarily the responsibility of riparian owners and where appropriate, Anglian Water and Norfolk County Council Highways. .

4 Summary of site investigation and information received

- 4.1 A site visit was carried out by NCC officers on Friday 5th April 2013. When officers arrived on site, it was evident building contractors contracted through NPS were carrying out remedial works caused from the effects of flooding.
- 4.2 Norfolk County Council received a copy of a drainage report undertaken by contractors Dyna-Rod Ltd and dated 19/03/2013 as instructed by NPS Property Consultants Ltd. This drainage report has informed the annotated map attached to this report which summarises the information received by third parties and through on site investigations.

5 Summary of impacts

- 5.1 Information relating to the impacts experienced at the flood location are detailed below; *(Please see Annex 6 within the PFRA Annexes to the final guidance for the classification of property types to be used in filling in the section below).*

Risk to life: None

Internal Flooding: Yes

External Flooding: School grounds only

Critical services: Main School building internally flooded

Priority Gritting Routes: None

Obstruction of Access: None

- 5.2 No other flooding was reported in the locality.

6 Investigation findings

6.1 What caused the flooding?

- 6.1.1 The flooding at the school was experienced due to a number of factors. These are set out below. The order that these are listed does not reflect the significance of the issue and a number of factors require more detailed analysis or surveying to ascertain their level of influence over the two incidents experience at this location.

- An extreme rainfall event was experienced at the flooding location on 8 January when rain fell over a period 5.5. hours and on 9/10 March when rainfall fell over period of 23.5 hours.
- The drainage system which serves the topography falling towards the school has been segmented through changes in the settlement over the last 100 years. This has caused a loss of conectivity between drainage features.
- The drainage system falling towards the school is in a poor state of repair.
- The drainage system serving the school is inadequate for the rainfall events which were experienced. It is likely to only mitigate small return periods.
- The extent of the drainage system associated with the highway imediately adjacent to the school is unknown.

6.2 Who has responsibilities to manage the cause(s) of the flood?

6.2.1 With reference to the above factors, responsibility to manage the causes of the flood are listed below;

- The maintenance of the drainage system falling towards the school is a riparian owner responsibility.
- The adequacy of the on-site drainage system is the responsibility of the property owner.
- The responsibility of highways drainage is the relevant highways authority, in this case Norfolk County Council.

6.3 What was their response in relation to the cause of the flood?

6.3.1 The response of the organisations to the cause of the flooding is listed below;

- No responsive maintenance from riparian owners of the drainage system falling towards the school has been evident following the two flood events experienced.
- Through NPS the school investigated the on-site drainage of the school. This has not yet established the full extent or connectivity of the drainage to wider systems or infiltration devices.
- Norfolk County Council highways have provided Norfolk County Council's Flood and Water Management Team (who act as Lead Local Flood Authority) with drainage plans known to serve the road south of the school site and identify features where by the connectivity to wider systems in some instances are inconclusive.

7 Recommendations

- 7.1 Whilst Norfolk County Council are aware that some remedial works have been carried out on site there are a number of further options available to mitigate the risk experienced on site. These include, but are not limited to, the following.
 - 7.1.1 The property owner should work with the Lead Local Flood Authority and Norfolk County Council's Highways services to help identify where the pre-existing drainage network conveyed flows to. Identified beneficiaries should determine the wider systems integrity or capacity issues.
 - 7.1.2 Norfolk County Council as the Lead Local Flood Authority may notify all riparian owners of their responsibility to maintain the ditch system found north of the school.
 - 7.1.3 The property owner should determine the adequacy of the on-site drainage and where appropriate increase on-site storage capacity.
 - 7.1.4 The property owner should instigate a regular regime of maintenance to ensure the gullies are free from obstruction (i.e. tree leaves) at all times.
 - 7.1.5 The property owners should aim to protect the buildings through flood protection measures where appropriate.
 - 7.1.6 An extension to Brooke School is at the planning stage and as such provides a useful opportunity to determine the potential for drainage improvements to be facilitated by the new development. As such the evidence and lessons learnt from past flooding and drainage surveys need to be incorporated into any possible drainage strategy identified for the proposed extension.

8 Disclaimer

Although every effort as been taken to ensure the accuracy of the information contained within the pages of the report, we cannot guarantee that the contents will always be current, accurate or complete.

This report has been prepared as part of Norfolk County Council's responsibilities under 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 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.

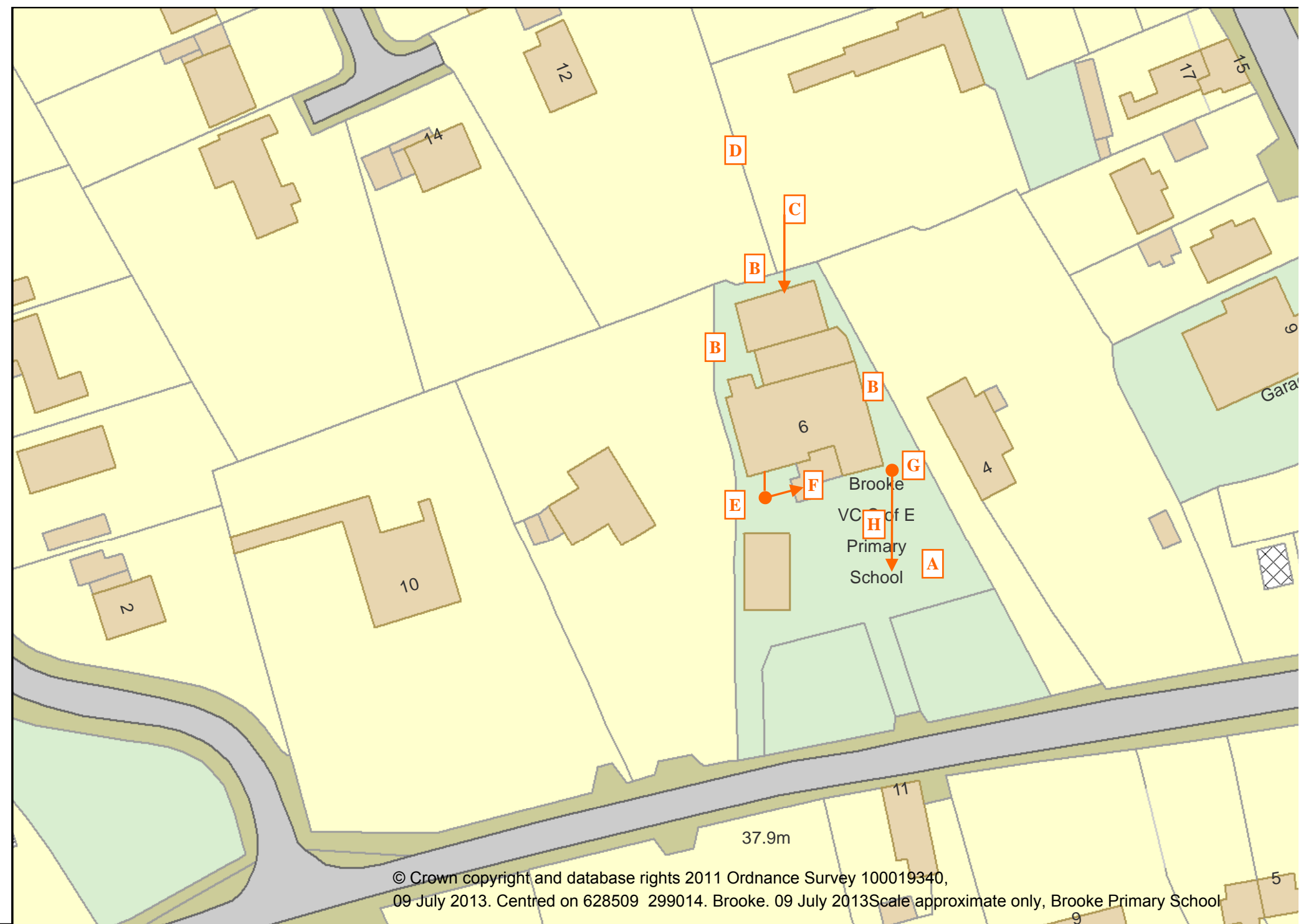
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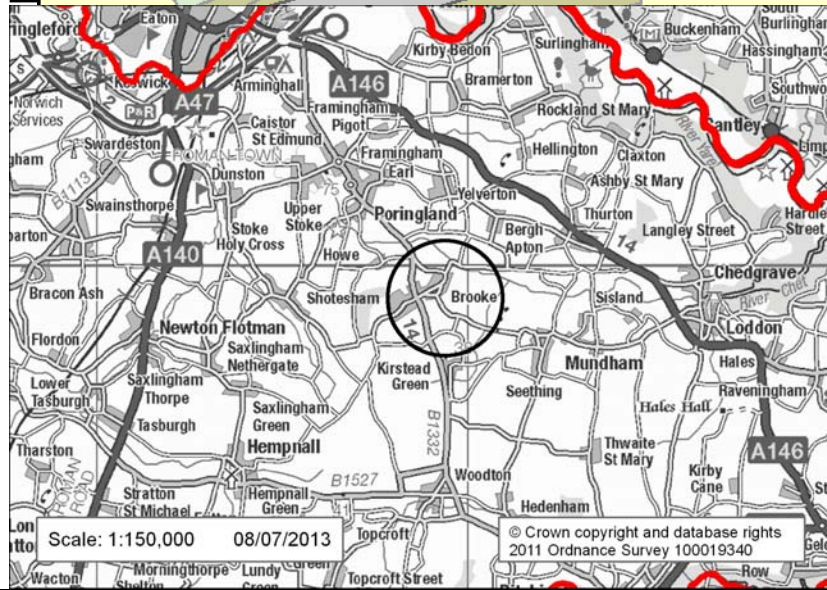


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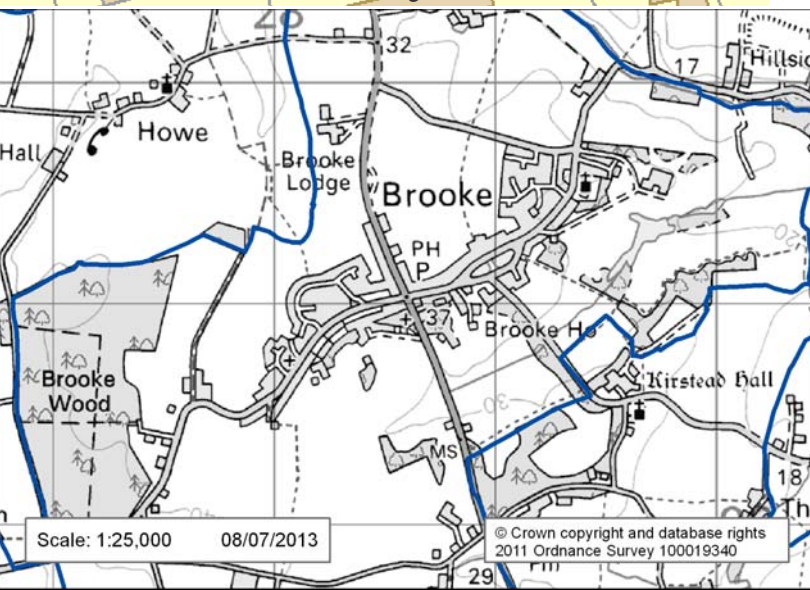
Annotated Map

Flood Investigation Report: Brooke Primary School

A	On the outside of the building the entire school grounds are asphalted. The levels of the asphalt consistently fall from the extremities of the site downwards toward the building. This raised level of asphalt is also at a level which is consistent with that of the damp-proof membrane designed to prevent both the ingress of water and protect the superstructure of the main building from rising damp from the ground. Air vents within the fabric of the walls were also found below the asphalt. At every door opening the asphalt was level with the internal floor levels.
B	There are 3 domestic sized drainage gully pots which are located one each side of the main building and one to the rear of the building. These appear to be the only form of drainage to remove surface water runoff from the immediate area surrounding the school. Other isolated drainage gullies exist within the play ground areas of the school. These have a negative gradient and were found to be approximately 50% efficient.
C	Works were ongoing to remove the northern access to the building and to infill the space to prevent flood water entering the building.
D	There is a ditch which requires maintenance but this falls toward the school which would be the natural direction of flow
E	A well has been identified which is located south of the main building, with in a few meters of the wall outside the most south-western classroom. One pipe leads northerly away from the well chamber to a buried chamber not visible on the asphalt surface
F	A second pipe from the chamber is laid in an east-west direction and would appear to terminate under the front office/entrance lobby of the school. Condition of chambers and/or pipes are not clear in the report.
G	The Surface water drainage system includes a manhole chamber at the south east corner of the building.
H	A drain runs in a southerly direction from this chamber. The condition of this drain is not known due to heavy siltation and poor access at the time of survey. The ability of flow and general integrity was not determined.



Legend
 Parish Boundaries
 District Boundaries



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