Basic Details

Publish Date

14 July 2026

Case ID#

3367

Title

Burst pipe upstream of dam caused external erosion to dam face

Nation

England

Regulator Reference No.

545

Legal Status

Statutory

Reservoir Type

Impounding

Reservoir Capacity

1M - 10M m3

Year of Construction

1950 - 1969

Main Construction Type

Earth fill embankment

Dam Height

15 - 29.99 metres

Dam Flood Category

A

Hazard Class

High-risk reservoir

Reservoir Use

- Water supply

Owner Type

Limited company

Incident Details

Date & Time of Incident

19 June 2025 - 12:00

Date Incident Closed

27 June 2025

Observations that Caused the Incident to be Declared

- Dam or embankment overflowing or overtopping
- Slope or face deformation (slippage, cracking, slumps, mounds, depressions)
- Water flowing outside of engineered channels

Describe the Incident

A major pipe burst at the water treatment works above the reservoir resulting in water from the burst pipe flowing along the road from the treatment works onto the crest of the dam, down the right side of the downstream face, right mitre and toe until it discharged into the watercourse.

The SE was called at about 3.30am and arrived on site at about 5.00am. By this time, the flow issuing from the burst had reduced from approximately 1500 l/s to about 350 l/s. Water was flowing strongly down the mitre but debris lines indicated that a greater flow had occurred previously.

An erosion hole had developed in the area where water had been flowing (approx at top water level (TWL) and the reservoir was about 0.75m below TWL at the time of the incident). The operator called several ARPEs and one answered at approximately 5.45am and agreed to visit site.

Water was not seeping through the dam at the erosion hole, it had been flowing over the surface and through the sub-surface drainage system.

The operational team were working to stop the water from discharging from the burst main and installed a pump to discharge a proportion of the water downstream of the dam.

Sampling of the water was undertaken as it was chlorinated water and it was found to have a very low level of chlorine in the water to not adversely affect aquatic life by the time it reached the watercourse.

By 8.00am, the discharge from the burst pipe ceased and the flow down the dam stopped. The SE cleared the blocked road gullies (stone had been washed down in the flow) and the crest drained quickly through the installed drainage system.

The dam performed well under strong flows on the downstream face and mitre. The grass has been very well maintained this year and accommodated the flow with very limited damage.

The erosion hole was infilled with sandbags and covered with visqueen/tarpaulin until the permanent reinstatement was complete. Reinstatement of the drainage blanket was subsequently completed and topsoil added to downstream face and seeded. Repairs were done to the damaged sections of toe drainage where there were collapsed pipes.

Supporting Photos

No images provided.

Causes and Impacts

Natural Processes which Initiated or Contributed to the Incident

- None

Main Contributing Factors to the Incident Occurring

Dam Factors

- Not provided

External Factors

- Other external factors (describe below)

Shortcomings

- Design shortcoming
- Human error

Root Cause of the Incident

The root cause was the inappropriate selection of flange adaptor fittings supported by unclear or incomplete fitting literature from the supplier.

Impacts on the Reservoir

- External erosion

Supporting Photos

No images provided.

Supporting Contributions and Studies

Human Factors which Influenced the Incident

Inappropriate selection of flange adaptor fitting.

Instrumentation at the Reservoir

The piezometers (a line of 5 approximately down the centre of the dam) were read and found to be within their normal range.

Dam drainage is monitored electronically. The drainage flows were observed on the day of the incident and the following day and found to be flowing more strongly than normal. This is to be expected given the amount of water that flowed over the dam. The electronic flow measurement will continue to be read and plotted to determine when flows revery to normal levels.

Was Instrumentation Effective?

Yes

Assistance by External Parties and Impacts on Downstream Population

Minor impacts downstream - flooding of farmland

Summary of Studies or Investigations Undertaken

Investigations to determine root cause of the pipe burst were not related to the reservoir.

Operational surveillance increased to daily initially following the incident. The ARPE determined when surveillance could return to normal operation procedures.

The piezometers (a line of 5 approximately down the centre of the dam) were read and found to be within their normal range.

The internal survey team undertook a crest levelling survey and found the results to be in the normal range. They also installed a grid of prisms over the right third of the dam that had been affected by the overflow and a tighter grid around the erosion hole. The area was initially monitored every weekday.

Dam drainage is monitored electronically. The drainage flows were observed on the day of the incident and the following day and found to be flowing more strongly than normal. This was to be expected given the amount of water that flowed over the dam. The electronic flow measurement continued to be read and plotted to determine when flows reverted to normal levels.

Investigations of the damage to the dam included a topographical survey of the flow path and damaged area, deformation monitoring survey of the embankment crest and area around the damaged part of the downstream face and ground investigation to determine the particle size distribution of the drainage blanket.

Supporting Photos

No images provided.

Lessons Learnt

Lesson 1

- Appurtenant structures
- Other
- Records and studies

External threats to the reservoir should be considered in risk assessment. In this case, the water treatment works and high pressure pipe upstream of the dam was not considered in the risk assessment therefore was not recognised as a potential threat. the team has now reviewed the risk assessment and will consider upstream risks more carefully for their risk assessment portfolio.

Lesson 2

- Emergency response

This was a good example of incident response. The correct people were onsite within a few hours of the incident being observed. The onsite flood plan was used and proved to be effective, which highlights the importance of having a comprehensive onsite flood plan. Communication was key, and using a Whatsapp group proved helpful while co-ordinating the response

Lesson 3

- Operation and maintenance

The importance of well maintained embankments. Good grounds maintenance here meant that the erosion impacts were minimised.

Lesson 4

- Surveillance and Monitoring

The importance of regular surveillance and well-understood, comprehensive baseline operation data. The team here increased surveillance after the incident, and could monitor to identify drainage, poor water pressure and crest level - this meant they could recognise when the operation had returned to normal. It is key that surveillance tools are operational and in good working order to be able to achieve this.

Closing Comments

Supporting Photos

No images provided.

Information provided has been sent from reservoir owners and engineers, and cleansed of personal information by the enforcement authority. We cannot guarantee the accuracy of the data, but if you find an error please contact the relevant enforcement authority.