



Mawgan Porth - Flooding Report

Flood Event Date: 25 March 2024

Report Date: June 2024

Version: 01

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We help people and wildlife adapt to climate change and reduce its impacts, including flooding, drought, sea level rise and coastal erosion.

We improve the quality of our water, land and air by tackling pollution. We work with businesses to help them comply with environmental regulations. A healthy and diverse environment enhances people's lives and contributes to economic growth.

We can't do this alone. We work as part of the Defra group (Department for Environment, Food & Rural Affairs), with the rest of government, local councils, businesses, civil society groups and local communities to create a better place for people and wildlife.

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1. Weather

A stalled weather front resulted in heavy rain falling over mid Cornwall during the afternoon and evening of Monday 25 March 2024. An approximate 8-hour total rainfall of ~45mm was recorded at St Dennis rain gauge under the most intense area of the weather front. It is theorised that more intense rainfall may have occurred close to the coastline in the area of North Cornwall around Mawgan Porth. It should be noted that the nearest rain gauge operated by the Environment Agency is located in the St Dennis catchment, and therefore accurate rainfall data for Mawgan Porth during this event was unavailable. However, at the St Dennis Rain Gauge, on Monday 25 March, between 11:30 BST and 22:20 BST, 38.6mm of rainfall was recorded.

2. Flooding Mechanism

Flooding was likely to have commenced in Mawgan Porth from around 10pm on the 25 March.

Information provided by residents and topographic levels taken, indicate that peak flood water levels were generally around 300mm higher than the crest levels of the low wall to the rear of the tennis courts by the Village Hall. This suggests that the floodwaters overtopped the flood defence embankment at the zone of confluence of the Gluvian Stream and River Menalhyl, and then overtopped the low wall by the tennis courts, before flowing down into the built-up area causing the flooding. Level surveys conducted by the Environment Agency after the flood event appear to suggest this mechanism of the flooding.

The River Menalhyl reportedly stayed within its banks by the lower highway bridge adjacent to the beach front properties. Video confirmation of the River Menalhyl remaining within its channel by the beach was shown to the Environment Agency by a resident, and confirmed verbally by another local resident who witnessed the flooding.

It was reported that initially there was a large accumulation of sand/shingle immediately downstream of the highway bridge on the beach, which may have raised river levels upstream. However, as flows increased, this bank of sand/shingle reportedly washed away, and an efficient discharge of water was observed under the two bridges by the beach road. There were unconfirmed reports of a tree becoming jammed against the smaller footbridge structure during the flooding.

It was reported by residents that prior to the flood event occurring, the fields to the south of the River Menalhyl had contained significant volumes of water for approximately 3 years. However, it has been reported that a few days after the flood event on the 25 March, these fields were drained of nearly all water, indicating that the bed level of the River Menalhyl had lowered, allowing substantial land drainage to occur via existing drainage ditches.

The tide was observed by witnesses as being low at the time of the flooding and was considered to have had no influence on river levels etc.

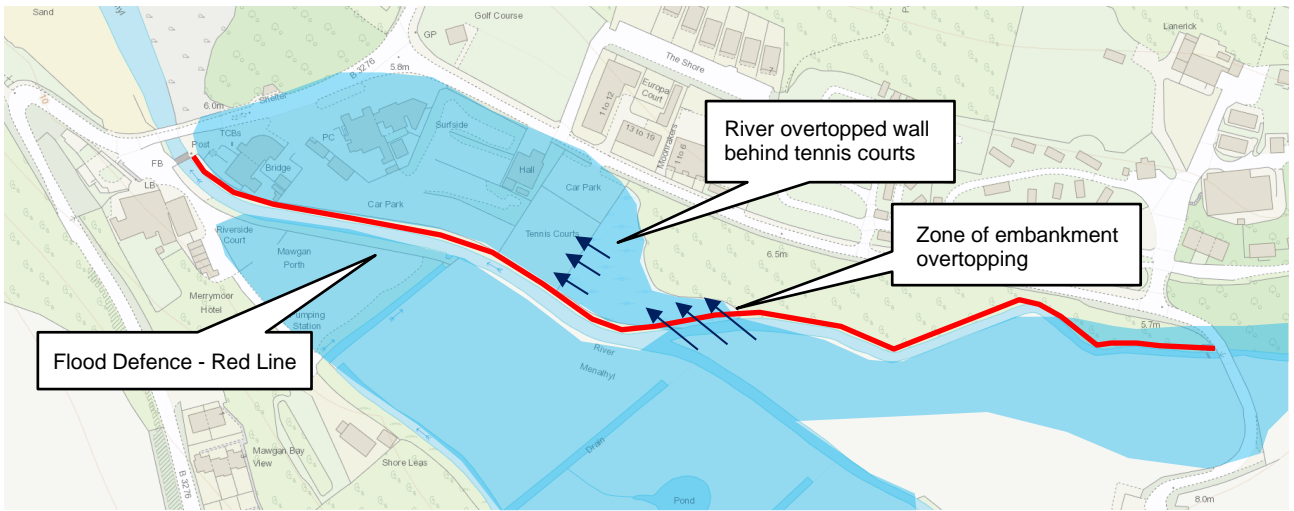


Figure 1 - Perceived extent and mechanism of flooding based on witness observations and site evidence / surveys

3. Property Flooding

A total of 8 built properties were reported as flooded to the following approximate depths:

- 'Catch Bar' - Café by bridge had its basement flooded >1m deep (the north-easterly adjacent property is raised and is not reported to have flooded)
- 'Beach Box' - café flooded 100mm
- 'Cornish Fresh' - Shop/café flooded to 600mm
- 'Scoops' - Ice cream shop flooded to 600mm
- 'Married to the Sea' - Surf hire shop flooded to 600mm
- 'Muddle and Press' - Café flooded to 300mm
- Residential bungalow flooded to 300mm
- Community Hall flooded to 400mm
- Some containers and a temporary food stand were flooded to approximately 100mm

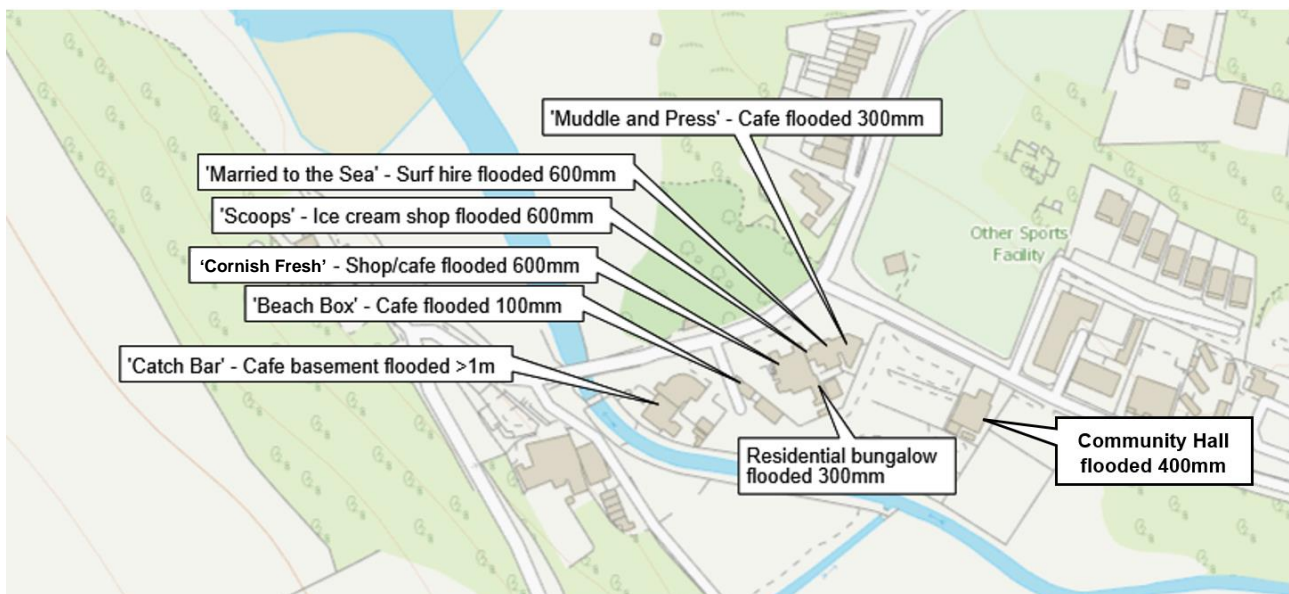


Figure 2 - Map showing reported flooded properties

4. Surveying Reports (Ground Levels Recorded)

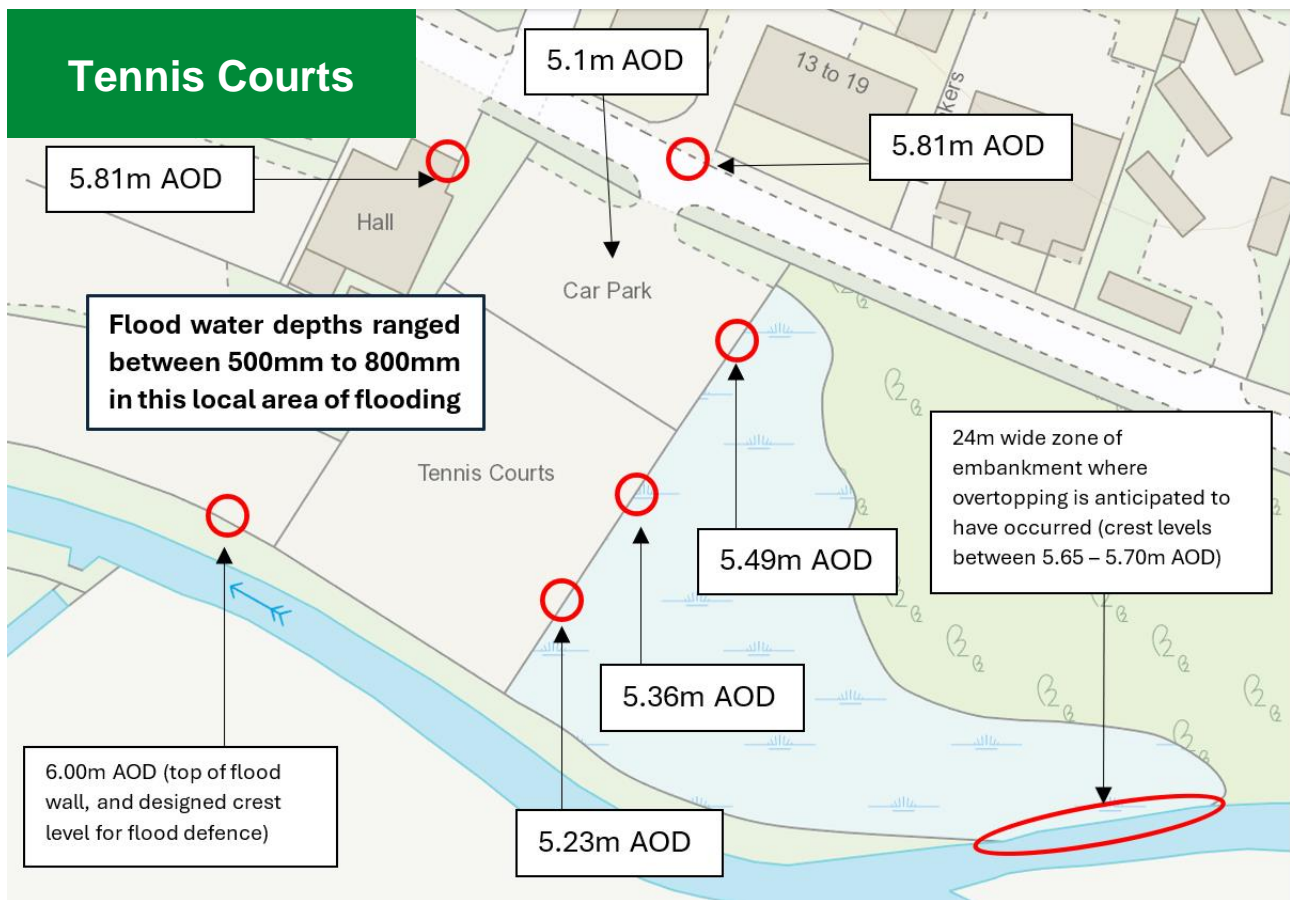


Figure 3 - Recorded ground levels with estimated flood depths in vicinity of Tennis Courts.

All ground levels detailed within Figure 3 were calculated through a Level Survey, using an optical level and levelling staff. However, it should be noted that the recorded elevations (5.65 – 5.70m AOD) for the referenced '24m wide zone of embankment where overtopping is anticipated to have occurred' was recorded via a Lidar Survey (Digital Terrain Modelling).

This type of remote digital terrain data has the potential for a greater margin of error. However, the day after the flooding occurred, an Environment Agency Asset Management team undertook a reconnaissance of Mawgan Porth and photographed this section of the embankment. Evidence of substantial 'rack marks' (toppled and tilted vegetation caused by the recent flood event) was identified both atop and on the landward side of the embankment. We consider that this site-based evidence has further verified the zone of embankment overtopping and has also validated the accuracy of the lidar data in this case.

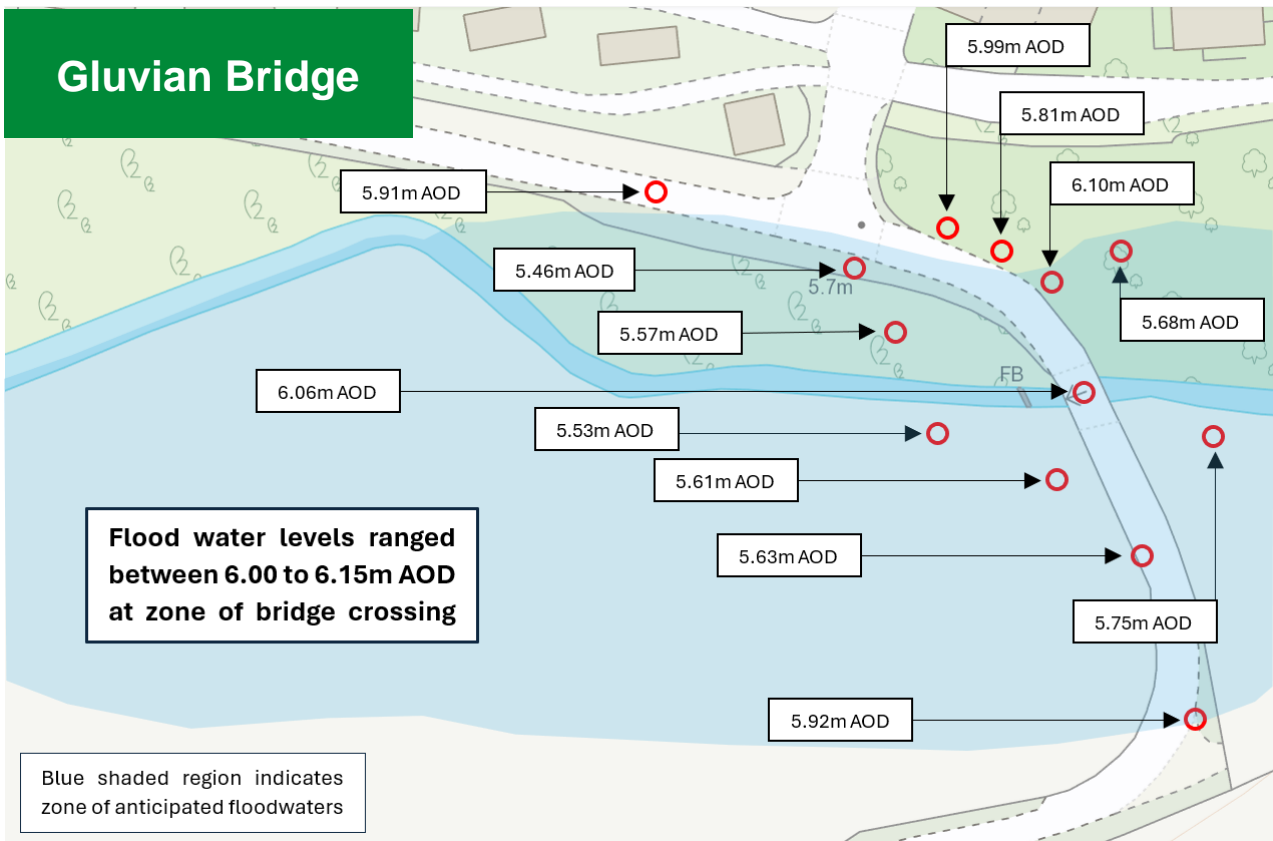


Figure 4 - Recorded ground levels with estimated flood extent in vicinity of Gluvian Bridge

Spot-point elevations taken during our level survey along the northerly adjacent road do appear to indicate that it would be possible for high river flows (between 6.00 to 6.15m AOD) to overtop the Gluvian Bridge and pass down this northerly adjacent road. However, we believe that the large volume of flood-water storage available on the southern side of the river, and the comparably lower elevation terrain, means that the vast proportion of the out-of-bank flows would have preferentially entered the southerly adjacent fields, instead of this road. This was further evidenced on-site by tall 'rack marks' and piled vegetation, indicating a significant depth of flooding occurred in the southern fields. Such evidence was not found along the road, reducing the likelihood that the road would have acted as a substantial flow-route pathway. The photographic evidence available also appears to support this theory.

5. Estimated Annual Exceedance Probability

Based on conversations with residents of Mawgan Porth, it has been estimated that the resultant area of flooding was the most extensive to have occurred in approximately 70 years. However, this would not necessarily indicate an Annual Exceedance Probability of 1 in 70 years, as there are other influencing factors. These include the accumulation of riverbed material across the extent of the lower watercourse, and the southerly floodplains already containing significant volumes of water prior to the flooding occurring. Finally, it has been identified that the river flood defence embankment has a zone of reduced crest level at the point of confluence between the two rivers, which appeared to be a mechanism behind the inundation to the area behind our zone of defences.

6. Caveats and Acknowledgements

Determining the mechanism of flooding that caused this flood event has proven to be a challenging process, requiring several reconnaissance site visits by the Environment Agency to Mawgan Porth. While the proposed flooding mechanism cannot be proven with certainty, the evidence that was available aligns most directly with the provided hypothesis.

We owe our thanks to the residents of Mawgan Porth for providing invaluable evidence that has supported our investigative work.

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