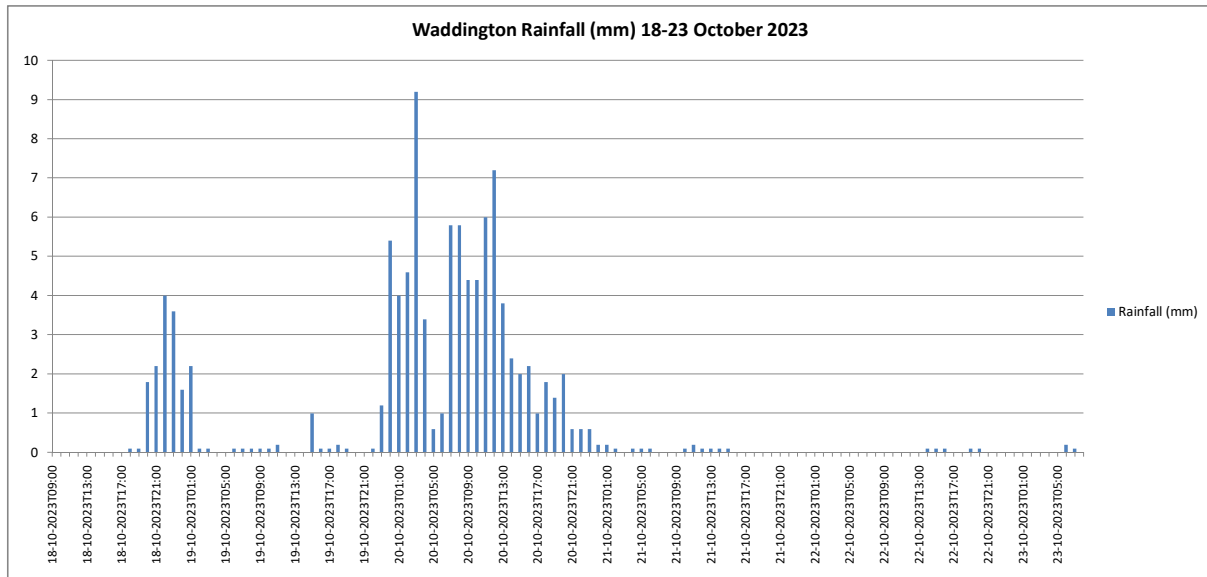
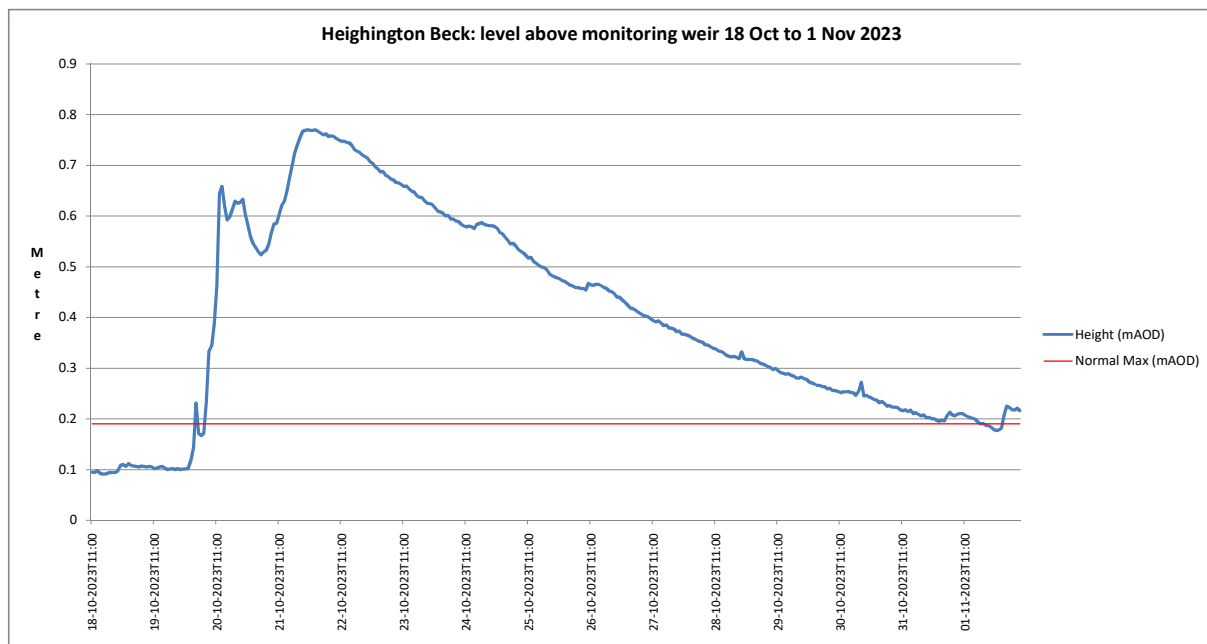


Storm Babet October 2023

This brief report is intended to provide a snapshot of the localised flooding event in Heighington in October 2023. It is based upon analysis of publicly available data sources.

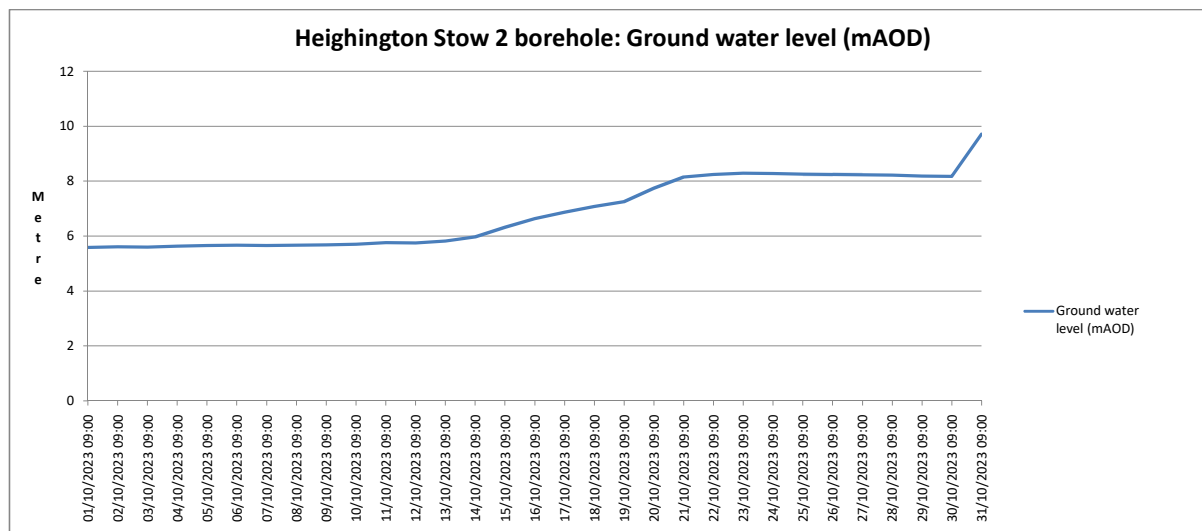


In the 24 hour period starting at 00:00 on 20th October 2023 the Waddington monitoring station recorded rainfall of 75mm. The typical monthly rainfall for October is 61.4mm. Peak rainfall occurred between 02:00 and 03:00 at 9.2mm in one hour.



Heighington Beck exceeded the typical maximum level (0.19m) at around 07:00 on 20th October 2023. The peak level reached on 20th October was 0.658m at 13:00. Despite negligible rainfall on 21st October the peak level reached for this event was 0.77m at around 22:00 on that day. The peak level was sustained for about 4 hours. It is significant to note that it took a further 11 days for the level to dip below the typical maximum level. The previous peak level for Heighington Beck was 0.74m at 07:30 on 25th June 2007.

The peak groundwater level during this flood event stabilised at around 8.29m on 24th. Previous experience has shown that localised groundwater flooding occurs in parts of Heighington when the groundwater reaches a level of about 10m. We may therefore conclude that this was a surface water flooding event arising due to heavy rainfall is a short time period, not a groundwater flood event. The groundwater level has displayed a significant lag behind the rainfall, but climbed abruptly (by 1.5m in 24 hours) to 9.71m on 31st.



Comparison with previous events

The National River Flow Archive provides a useful ranking of peak flow events, which can provide the basis for comparison with previous flooding. The mean flow rate for Heighington Beck is 0.129m³/s. Provisional data suggests the peak flow rate for this event was 5.17m³/s on 21st October.

The following table is ranked by the peak flow rate on Heighington Beck. It shows the top ten flow events from a dataset, which starts in 1976 (47 years). A significant proportion of high flow events have occurred in the last 20 years. Those events known to be linked to flood events are indicated. Information about cumulative rainfall is from the historic station data for Waddington. Information about groundwater level (where available) is based upon data supplied to Heighington Parish Council by the Environment Agency.

Rank	Date	Level above weir (m)	Flow (m ³ /s)	Approx 12 month cumulative rainfall (mm)	Approx 3 month cumulative rainfall (mm)	Approx 2 month cumulative rainfall (mm)	Groundwater level (m) where available	
1	25/06/2007	0.745	5.337	799	308.4	302.6	n/a	Flood event
2	11/11/2019	0.416	2.055	834.6	323.4	219.2	10.38	Flood event
3	18/07/2012	0.369	1.695	666.2	227.4	191.6	n/a	
4	02/06/2018	0.32	1.351	638.6	215.1	140.8	n/a	
5	24/12/2012	0.306	1.259	826.8	250.8	179	10.26	Flood event
6	13/02/1977	0.3	1.22	685.2	267.5	202.8	n/a	Flood event
7	30/07/2021	0.299	1.214	656	214.2	122.8	5.78	
8	05/01/1998	0.296	1.195	666.6	185.7	126.1	n/a	
9	01/01/2003	0.273	1.052	754.1	235.5	144.3	n/a	
10	11/11/2000	0.264	0.998	747.5	307.6	198.2	n/a	
This event	21/10/2023	0.77	5.17	746.5	271.6	235.2	8.15	Flood event (provisional figures)

Looking ahead

The groundwater level at the Stow 2 borehole on 31st October 2023 was 9.71mAOD. Experience has shown that localised flooding may occur when the groundwater level is above 10mAOD. The current level is very similar to that of 2019 (significantly above the levels in 2020, 2021 and 2022). On 31st October 2019 the groundwater level was 9.84mAOD and groundwater flooding occurred in Heighington in the period 9th to 19th November. It seems the probability of a groundwater flood event in the coming winter period is very high.

Looking at the data in the above table, it seems flood events tend to occur when the two month cumulative rainfall exceeds 200mm or where the twelve month cumulative rainfall is around 800mm (the typical rainfall average for Heighington is 614.81mm). Data about cumulative rainfall is readily available in the historic station data for Waddington, which is updated monthly.

Information sources:

Met Office Historic Station Data
<https://www.metoffice.gov.uk/research/climate/maps-and-data/historic-station-data>

The National River Flow Archive
<https://nrfa.ceh.ac.uk/data/station/peakflow/30013>