

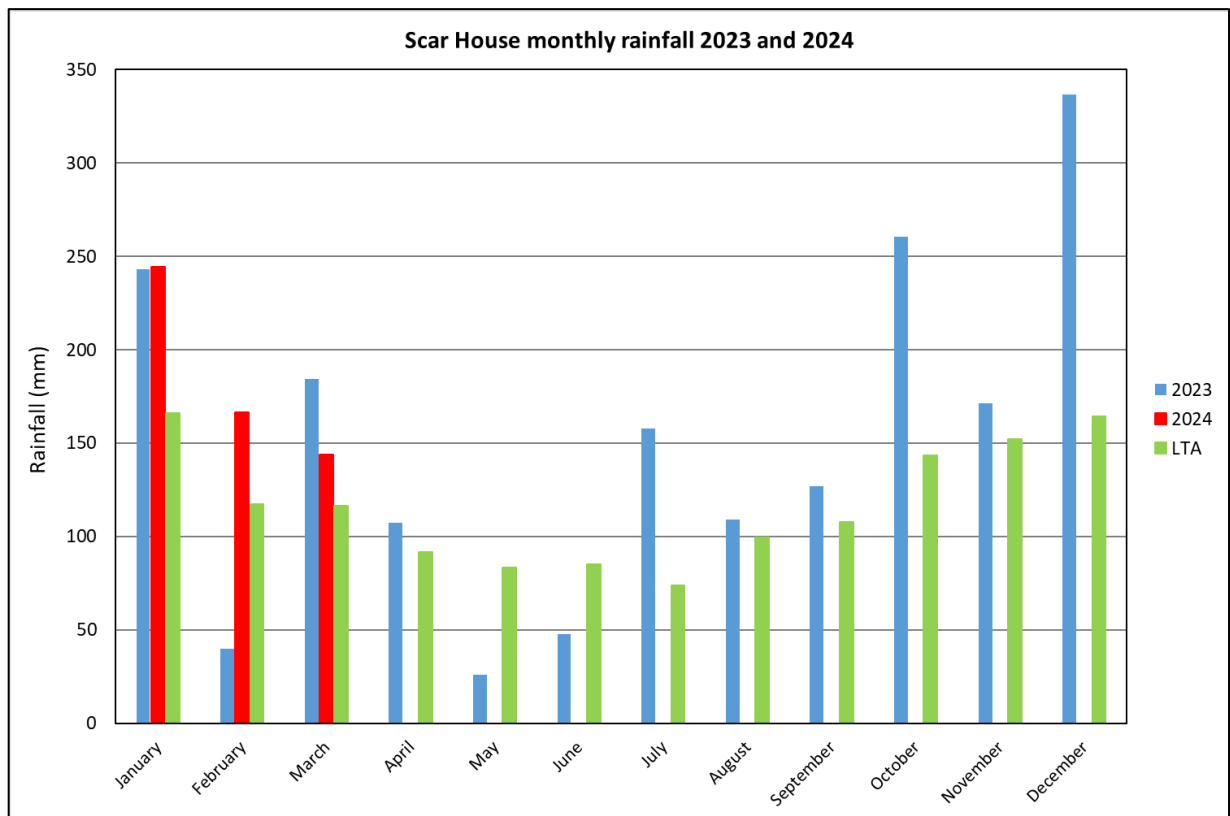
Report to Gouthwaite Board of Management

Hydrological Conditions of the Nidd Catchment – 2023 to March 2024

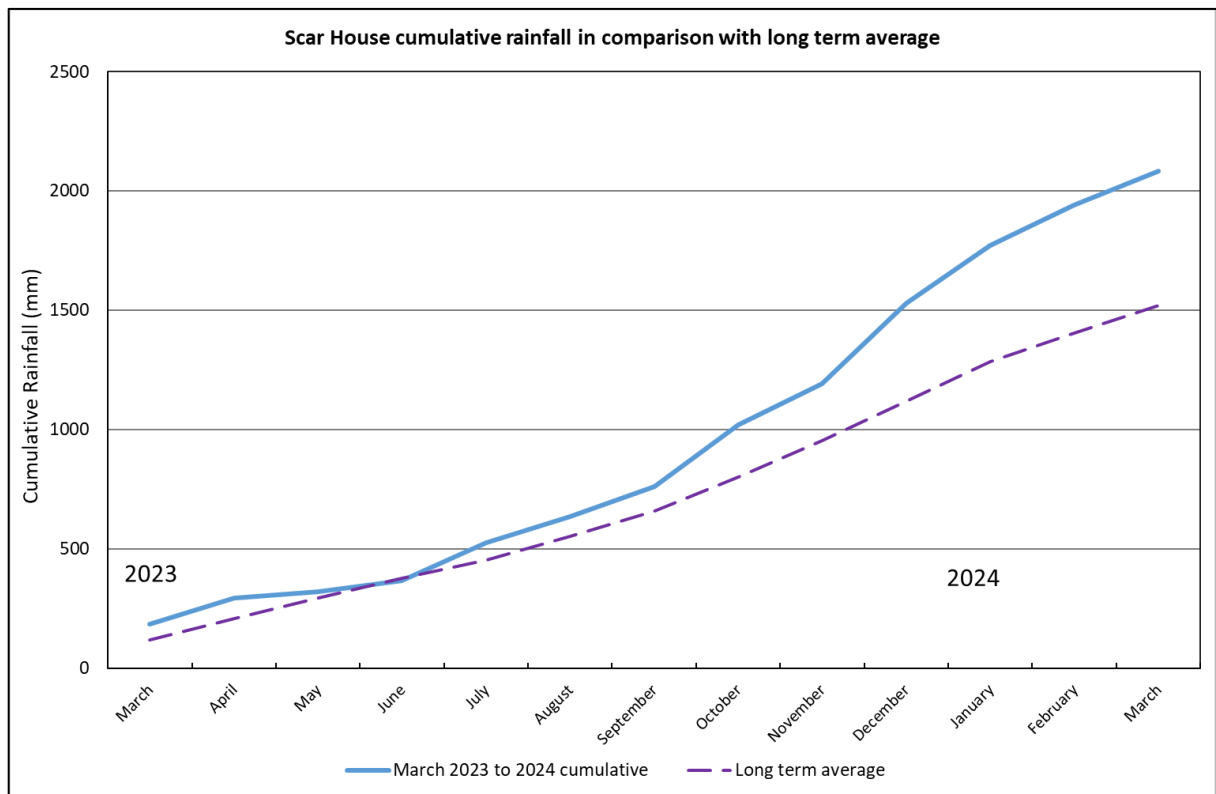
Rainfall

Graph 1 shows monthly rainfall totals at Scar House rain gauge in comparison with the 1981-2010 long term average (LTA). Monthly rainfall has been above the LTA for 12 out of the last 15 months. The driest months were February, May and June 2023, reaching only 30% to 56% of LTA rainfall. These were balanced by a wet March and typical conditions in April. The change to persistently wet conditions came from July onwards, with July, October and December being notably wet. The autumn and winter featured a succession of low pressure weather systems contributing to high monthly rainfall totals. Graph 2 shows the cumulative surplus of rainfall relative to the LTA during the latter part of 2023 and early 2024, reaching over 550mm by March.

For the Nidd catchment as a whole it was the second wettest October to February winter period in a record length of over 150 years, derived from the Met Office Had-UK data set.



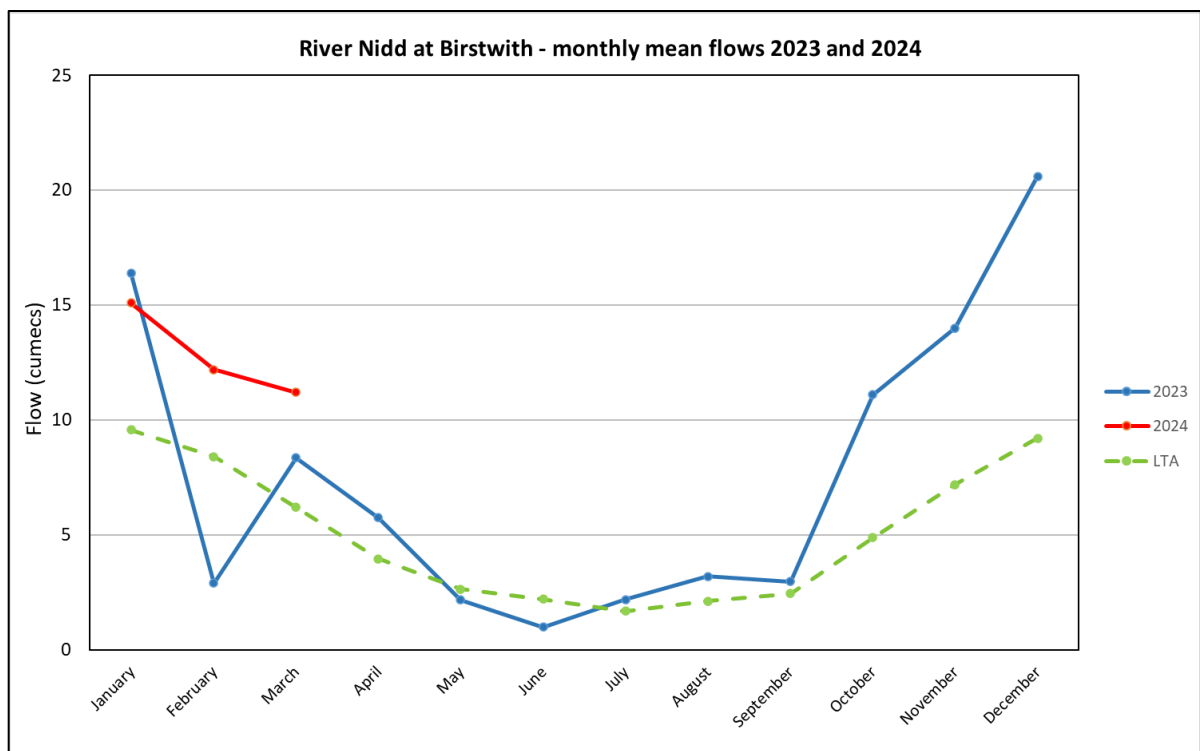
Graph 1: Monthly rainfall totals at Scar House Reservoir compared with the LTA for 2023 to March 2024



Graph 2. Cumulative rainfall to show excess above long term average during autumn and winter 2023/24

River Flow

Graph 3 shows the monthly mean flows recorded at Birstwith gauging station on the River Nidd for 2023 and early 2024. They are compared with the LTA from the preceding record of 1975-2022.

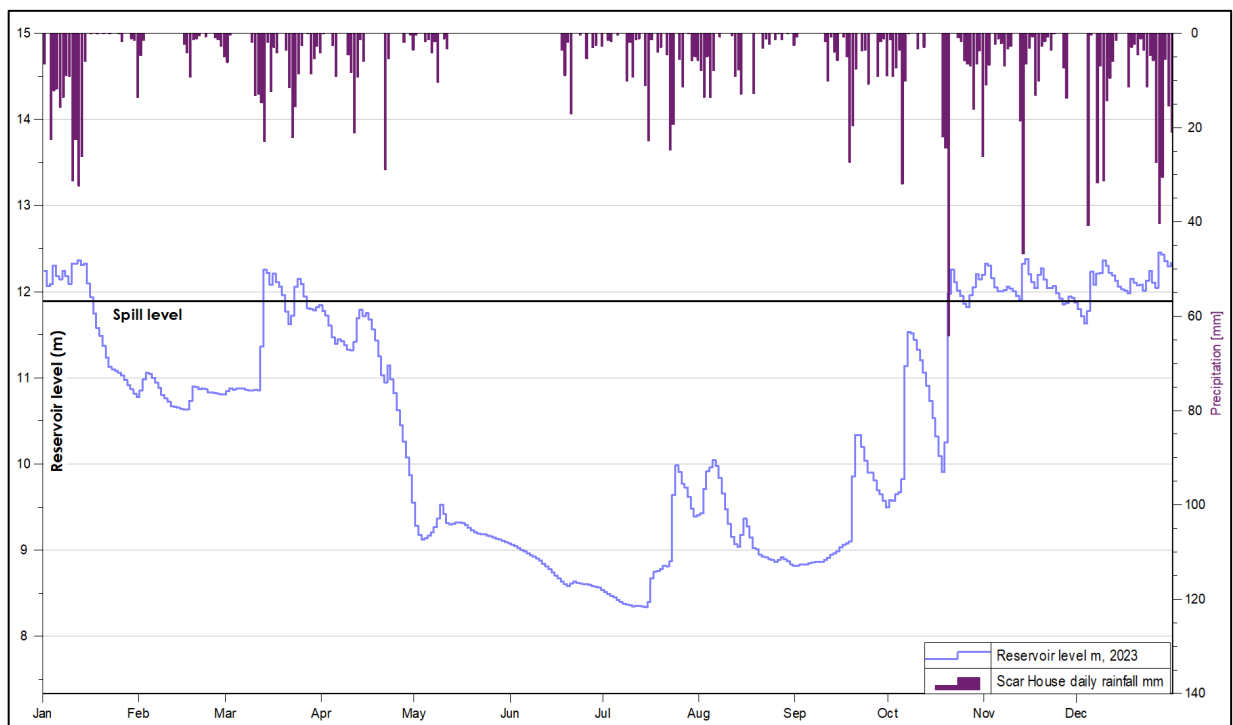


Graph 3: River Nidd monthly mean flow at Birstwith for 2023 to March 2024, compared with the LTA

The pattern of river flow was of course closely related to rainfall. The February 2023 mean flow was well below average for the time of year. Following dry conditions in late spring, what we would term typical low summer flows were recorded by late June. Since July, persistent wet weather produced above average monthly mean flows, especially in October through to December which ranged from 195% to 227% of the LTA. The River Nidd produced a series of flow peaks from mid-October to late January 2023, but none of them were exceptional in the historic record.

Reservoir Level and Compensation Releases

Graphs 4 and 6 show Gouthwaite Reservoir levels during 2023 and early 2024 relative to the spill level of 11.89m. Daily data from Scar House rain gauge has been added to illustrate the influence of rainfall episodes. Graphs 5 and 7 show reservoir releases including any spill, measured downstream of the dam, together with required compensation releases if the usual control rules were being followed.



Graph 4: Reservoir levels 2023

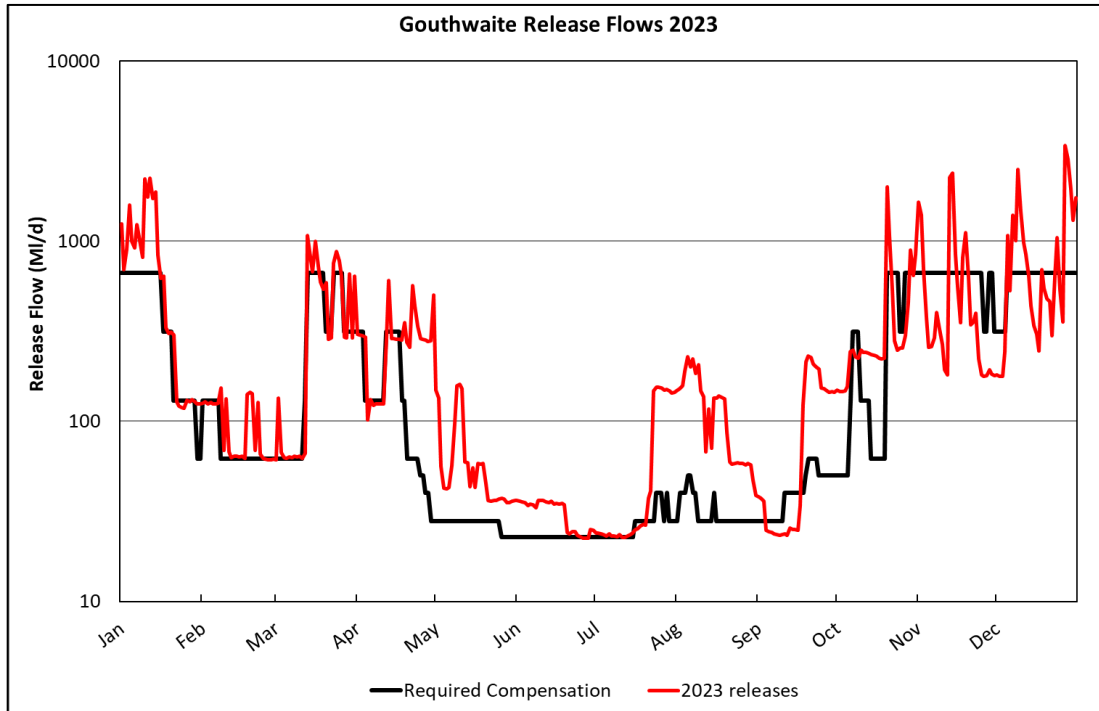
From January to mid-April 2023 reservoir releases followed the required compensation rates closely. The reservoir started 2023 above the spill level. The decline in level in late January and the fairly steady level until mid-March corresponded to a period of low rainfall. The reservoir was briefly above the spill level again after rainfall in mid-March.

From mid-April onwards reservoir levels were drawn down to below 9m for syphon installation works. Graph 5 shows releases exceeding the usual compensation requirement during this period.

At the 2023 AGM the Board accepted Yorkshire Water (YW)'s intention to maintain releases at 40 MI/d for as long as possible once the reservoir level dropped below 50% (about 9.14m). This level was reached in late May. Releases of 40 MI/d were maintained until 20 June, with the objective of supporting fish farm operations downstream, then stepped down to 28 MI/d after this. In early July YW's proposal to reduce releases to the statutory 22.8 MI/d from 17 July to conserve water stocks was discussed with the Environment Agency. In the event wetter conditions soon returned and the releases remained at 28 MI/d or higher.

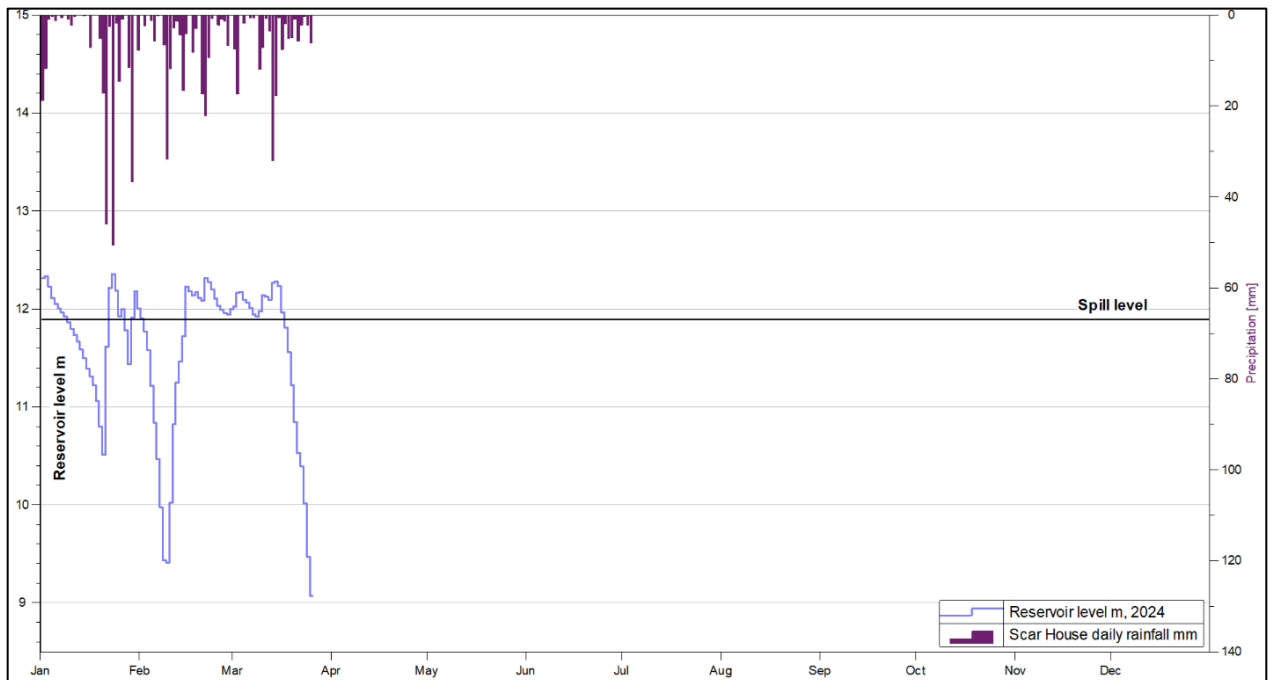
The rainfall and consequent inflows from the upper Nidd caused reservoir levels to rise in late July, early August, mid-September and early October. Releases usually in excess of compensation requirements were made to keep levels down for safety works as shown in Graph 5. There was a week during low flow conditions in mid-September when releases were around 15 MI/d less than the

usual target 40 MI/d. When contacted, YW advised that releases were being managed for the purpose of reservoir safety works drawdown.

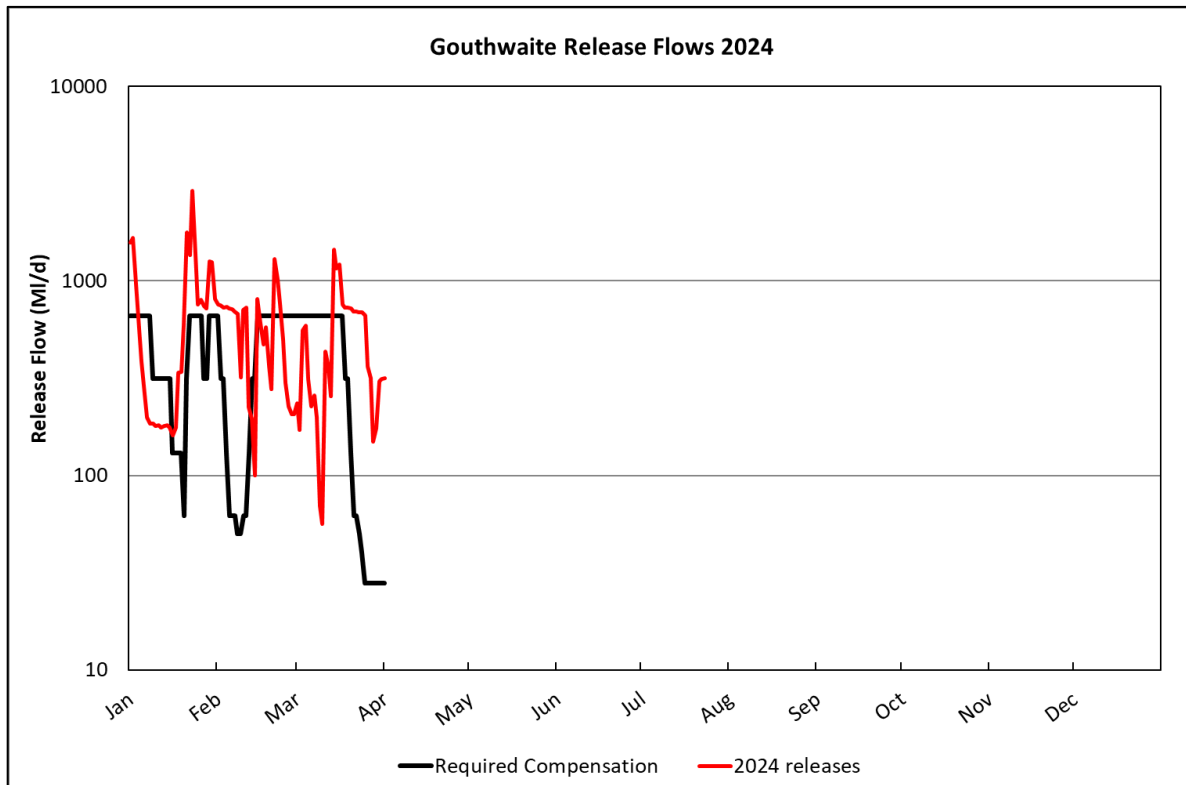


Graph 5: Reservoir releases 2023

Later, runoff during Storm Babet from 19 to 21 October refilled the reservoir. With ongoing wet weather, the reservoir was above the spill level for a total of 37 days in late October and November and for almost all of December. There were periods from late October to the end of 2023 when the reservoir was above the spill level and the expected release would have been 664 MI/d but recorded flow downstream was in the range 200 to 400 MI/d. Reasons for this are covered in the conclusions section below.



Graph 6: Reservoir levels early 2024



Graph 7: Reservoir releases 2024

Reservoir levels declined during the cold, dry spell in mid-January 2024. In February the level was drawn down by releases well above usual compensation requirements, as shown in Graphs 6 and 7. This was to facilitate safety works: YW advise they were backfilling around the siphon during this time. Wet weather from mid-February onwards brought the reservoir back above the spill level. Apart from spills following heavy rainfall episodes, releases fluctuated considerably during February and early March and were usually lower than the expected 664 MI/d band. In the second half of March the reservoir level was drawn down again with high release rates.

Conclusions

The Environment Agency is satisfied that for the majority of 2023 YW operated Gouthwaite Reservoir with regard to downstream water users and to the river environment, within the constraints of weather conditions and the necessary reservoir safety construction works. There was a brief period during September 2023 when low flow releases were lower than we would have expected. Deviation from the usual control rules had been discussed and agreed at the 2023 Board meeting.

During some periods of high reservoir levels in late autumn and winter, the full daily compensation flows in the upper two control bands were not released. YW have explained that downstream releases were limited by the capacity of the upper drawoffs plus any overspill. During particular construction activities identified as high risk works, the lower drawoffs were not being opened due to the potential for silt release. We consider this explanation to be reasonable and understand that the operations followed YW's silt mitigation plan.