5 January 2026

Shamley Green Duck Pond

Reflections and Recommendations from monitoring the water levels 2022-2025

Summary

The Duck Pond is an important part of the Shamley Green landscape. It is a shallow pond liable to drying out in extremely dry summers. Our research shows the main causes are lack of water inflow during extended dry periods and evapotranspiration which accelerates as temperatures rise and water levels decrease. Seepage from the bed of the pond does not appear to be a major contributing factor. The current combination of regular ditch maintenance to preserve inflows from the catchment area and raising the spillway will reduce the number of days that the pond dries out in extremely dry years, such as 2022 and 2025. Raising the spillway slightly more, stopping any leaks from around the spillway structure and periodic silt removal will further reduce the likelihood of drying out, but the risk cannot be completely ruled out due to the shallow nature of the pond and increased frequency of extremely dry, hot summers. It is envisaged that silt removal needs to be done on a 5-10 year cycle. Silt should only be removed from one third of the pond at a time to protect wildlife habitats. The most cost-effective time to remove silt is in the summer by volunteers when the pond is partially or fully dry. Permission to do this should be sought well in advance. Excavated silt can be used to marginally raise the pond banks. The following actions are recommended for 2026-27:

- continue regular seasonal maintenance of the drainage system and plug the small leak near the spillway.
- organize a working party to remove the deposited silt layer on one-third to one-half of the pond area when water levels drop sufficiently to do this manually, preferably in mid- to late-summer rather than spring; complete desilting in the remaining pond area in subsequent years. Leave a minimum gap of 5 years between desilting cycles to minimize ecosystem disturbance.
- continue the monitoring program of pond water level, groundwater level and rainfall for the period spring to autumn to assess the effect the temporary raising of the spillway (done in autumn last year) will have on pond water levels during the 2026 summer.
- if the findings of the 2026 monitoring program show that the temporary raised spillway is beneficial, then reconstruct the spillway permanently to the new height of 5-10cm above the original height. Raising the spillway permanently will incur additional costs that need to be estimated.
- undertake basic water quality testing to cover the period when pond levels are low.

What is being measured?

Since the drought of 2022, monitoring of the following parameters has taken place on a regular basis from spring to early autumn:

- Pond water levels using a staff gauge mounted on the duck house (from mid-June 2022)
- Daily rainfall in Shamley Green (from mid-July 2022, records from Guildford used before)
- Groundwater level on the west side of the pond (since early-June 2023)

- Mid-day air temperature – online data available for Guildford
- Basic water quality parameters were measured in November 2025 and will be repeated in 2026

Some general points about the pond

- The Duck Pond is on Common Land owned by Waverley Borough Council and managed by Wonersh Parish Council. The main objective is to manage the pond as a village amenity to be enjoyed by the community as a place of relaxation. Part of that enjoyment comes from the range of vegetation and wildlife in and around the pond and the Parish Council is obliged to consult Waverley and Natural England over any significant changes to the pond.
  The Parish Council budget is small with lots of demands on it, so cost is an important factor in all decisions about the pond.

- The pond is about 30m long by 15m wide. When full, the maximum depth of water is about 42cm. There is about 5-10 cm of silt that has settled above the bed of the pond and if this is removed, the maximum water depth would be about 50cm.

- According to the Freshwater Habitats Trust (FHT), this is categorized as a “shallow” pond. Note, their threshold depth for categorizing a “deep” pond is 1 metre minimum depth, which is twice the depth of the Duck Pond.

- There is a significant amount of well-established vegetation along the banks of the pond including large willow trees whose root systems inevitably infiltrate into the bed of the pond and extract water from it. Transpiration from this vegetation contributes significantly to the loss of water from the pond particularly in the peak growing season. This vegetative transpiration is in addition to the open water evaporation from the pond surface (which varies with temperature, sunlight hours and wind speed), as well as any seepage into the ground. As a general rule, the FHT note that water levels in natural ponds typically drop 50cm in a summer and the drawdown zone can be biologically rich.

Works carried out in recent years

Work done in the past few years to improve water inflows into the pond and reduce silt deposition includes:

- Annual ditch clearance efficient flow of water into the pond.

- Repairs to the drainage system along the public footpath that routes water from the land drainage system in the catchment area into the pond.

- Digging of a small sediment trap that reduces the volume of any coarser sediments entering the pond. There is no room to build a larger sediment trap and so finer particles of silt that are in suspension in the drainage water continue to flow into the pond and settle there, which over time reduces the depth of pond water and needs removing.

What has been learnt from the monitoring program?

- In the past four years, the pond has dried out twice. This is more frequently than historic weather patterns would suggest and occurred during extended periods of very low rainfall coupled with high temperatures. The pond was dry for about 6 weeks from early July 2022 to the end of August 2022 and effectively dry for about 9 weeks from the end of June 2025 to the end of August 2025.[1] The summer of 2022 was classified as a 'drought' by the Environment Agency whereas 2025 was classified as 'prolonged dry weather'. In both cases, Thames Water announced a hosepipe ban, although in 2025 it did not include the Guildford area. Rainfall recorded in Shamley Green in 2025 was significantly lower than average from May through to August, ranging from 57% to 69% of long-term monthly averages.

- To put this high occurrence of dry years during the monitoring period in perspective (1 in 2 years), research by the Centre for Ecology and Hydrology noted that there were 10 periods of drought in the UK in the 70 years between 1945 and 2015, or 1 in 7 years on average.

- As the Shamley Green pond is shallow, it has limited storage and is very dependent on a steady flow of drainage water entering from the upstream catchment. The graphs of pond water level for the 2022 to 2025 summer seasons show this clearly (see annex). The drawdown of the pond in 2022 and 2025, (when there was little rainfall over extended periods), contrasts with the situation in 2023 and 2024 when the distribution of rainfall was more favourable and the pond remained at least half full.

- The degree of **evaporation** from an open water surface like the Duck Pond is very dependent on a number of climatic factors including:

    - **air temperature** – average weekly noon-time temperatures for the period when the pond dried out in 2022 were consistently around 25°C and in 2025 were 23°C .
    - **water temperature** – analysis of the daily reductions in pond water level during the four summers shows a considerable increase in the 'rate' of water loss when the water depth is shallower and air temperatures are high. For example, average daily rates of water loss were in the order of 3 to 5 mm/day when the pond level was more than half full, compared to more than 8mm/day when the pond was less than half full. The increase in water loss at low water levels can be explained by significantly higher water temperatures in the pond which drives higher evaporation rates. This increased rate of depletion can be seen by the steepening slope of the drawdown curve, e.g. in the early part of the 2025 season (see annex).
    - **wind speed** is not measured at Shamley Green and unlikely to be a major factor as high winds are relatively short-lived in the summer months and the pond surface is quite sheltered by vegetation.

- **Transpiration** from the trees and other vegetation around the pond increases with their stage of growth, with highest rates of transpiration in the spring and early summer months. When soil moisture around the pond is depleted due to lengthy dry periods, the roots will extract more water from the pond, contributing to more rapid lowering of water levels in extended dry periods.

[1] For some of this period there was small ponding of water, but only a few centimetres

- **Rainfall.** The table below compares monthly total rainfall in Shamley Green[2] with the historic average recorded at Wisley for the thirty years, 1991 to 2020 (right hand side of table). Yellow shading shows months where the monthly rainfall is less than 75% of monthly average, and those in blue, the months that are at least 25% more than average. The prolonged periods of lower than average rainfall is clearly seen from May to August 2025. The left side of the table shows the number of dry periods of at least 7 days duration in each year and the length of the longest dry period. Even though the longest dry period was in 2023 (37 days), this did not result in drying of the pond as it was a year when average noon-time air temperatures over the dry period mid-May to mid-June were lower, around 20°C. This was then followed by a relatively wet second half of the summer. In 2024, the rainfall was more evenly distributed across the summer keeping the pond more than half full.

	No. of dry periods > 7 days duration	**Max length of dry days (<0.5mm)**
2022	7	19
2023	9	37
2024	5	17
2025	11	14

	Mean @ Wisley (mm) (1991-2020)	**Monthly totals (mm) - SG**			
		2022	**2023**	**2024**	**2025**
May	47	n/a	31	67	28
June	47	n/a	20	22	27
July	49	1	64	77	34
Aug	57	48	48	35	33
Sept	54	36	61	174	69
Oct	74	44	127	n/a	96

- **Seepage loss.** There are potentially two areas of water loss through seepage:
    - Any movement of water through the bed and sides of the pond depends on the integrity of the bed material. It is difficult to assess the extent of any seepage, but the fact that the rate of water loss from the pond is significantly higher when the pond is shallower, suggests that any seepage loss is a relatively small factor (as one would expect seepage rates to increase as water depths increase). Also, the daily summertime loss rates of 3-5mm/day when the pond is full is consistent with theoretical evapotranspiration rates, again suggesting that any seepage is relatively limited.
    - A small leak has been observed close to the spillway structure at relatively high level. The situation is being monitored and remedial works being planned. However, a leak at this elevation will not contribute to the high rates of water loss experienced when the pond is less than half full. This is because the water surface of the pond retreats away from the spillway as the water level drops. It will however be important to repair this leak for integrity of the pond and to avoid any unnecessary water loss in the early part of the spring/summer which in turn would contribute to earlier drying out of the pond in hot, dry years.
- The **groundwater** level on the Green next to the pond is relatively shallow, reaching the surface during periods of heavy rain (e.g. early November 2023 and early May 2024) and dropping to just over a metre below ground level during extended dry periods, (e.g. mid-July to mid-August 2025). Groundwater levels appear to be very responsive to local rainfall, rising rapidly during heavy rainfall and declining during dry periods when the groundwater drains towards lower elevations. During the summer period, the groundwater level is mostly below the pond surface by about 30-50cm. There may be some seepage from the pond to groundwater, but this is considered minimal (see the discussion on evapotranspiration rates

[2] For the early part of the 2022 season (before a gauge was established in Shamley Green), the rainfall data were taken from Guildford records.

above). This view is supported by measurements during dry periods, when the groundwater level appears to drop at a similar rate regardless of whether the pond is full or dried out. It infers that the groundwater levels are influenced more by direct rainfall and soil drainage capacity in the wider environs of the Green, rather than by any significant infiltration from the pond.

- Basic **water quality** parameters were measured recently by a local Water Ranger. Little was previously known about the water quality of the pond, but there are potential contaminants that could be harmful to wildlife coming from agricultural runoff, road drainage and possibly veterinary products. On 30 November 2025, the readings for basic water quality parameters were chlorine 0 µg/L, ph 7.2, alkalinity 3.5 mg/L, hardness 0 mg/L, nitrates 0 ppm, phosphates 0 ppm.[3] While this is only an isolated snapshot and does not include potential toxins from sources such as road runoff, it suggests a relatively healthy pond with indiscernible nitrates and phosphates that could lead to algal growth. Repeat tests can be scheduled for the spring, summer and autumn periods when the dilution and flushing effect of heavy rainfall is reduced and there is more static water.

Rate of siltation. During the inspection of the pond in the drought of 2022, there appeared to be 5-10 cm of accumulated silt on the pond bed. The date of the last effort to remove silt is unclear. Siltation is caused by decomposition of falling leaves from neighbouring trees, the inflow of silt carried in suspension in drainage inflows from the catchment, and duck droppings. The inflow of silt has been mitigated in recent years by excavation of a small silt trap in the ditch upstream of the pond which allows some silt to be removed manually from the trap before it enters the pond. While we do not have firm data, the marginal increase in pond bed-level observed in 2025[4] when the pond dried out, compared to that in 2022, suggests a thickness of 5-10cm of silt has built up over a period of 5-10 years or more. In absolute terms this is not a lot, but as the maximum depth of the pond is only about 50cm, it is a significant amount and needs periodic clearing, using methods to reduce any impact on ecosystem habitats.

Is it a problem for the pond to dry out?

- It depends on the objective for the Duck Pond. As a village amenity and habitat for wildlife including ducks, maintaining some water in the SG Pond throughout the summer is important. Due to its shallow depth, there will be drying out in extreme dry years due to a combination of the lack of recharge from the catchment area for extended periods and high air and water temperatures leading to high evapotranspiration rates.

- The Freshwater Habitats Trust (FHT)[5] is a useful resource for information on ponds. Their guidance emphasizes the importance of shallow ponds for aquatic ecosystems, particularly if there are variable depths to suit habitats of different species and there are shallow areas around the edges to allow access. Although drying out discourages the duck population, the FHT stress that periodic drying out of shallow ponds is not necessarily negative for other aquatic ecosystems.

[3] For comparison, readings for the River Wey near the Birtley Road were chlorine 0, pH 7.3, alkalinity 4.0 mg/L Hardness 50mg/L, Nitrates 1.5 ppm and Phosphates 0 ppm, (Latitude 51.182N; Longitude 0.543E).
[4] As observed at the measuring gauge near the duck hose
[5] Advice and Resources - Freshwater Habitats Trust

- Inspection of the pond bed in the summer of 2022 showed a mosaic of cracks in the silt layer at the bottom of the pond. The cracks were 5-10 centimetres deep, and even after several weeks of dry weather, the silt was still moist at the bottom of the cracks with evidence of life (invertebrates and small toads).

What are the options to reduce the frequency and duration of drying out?

Regular maintenance of the land drainage system that brings water from the small catchment area as well as repairing any visible leaks from the spillway or banks of the pond are fundamental activities for the integrity of duck pond. Beyond that, there are several interventions to consider:

a) **Periodic dredging/ silt clearance**.[6] Removing the 5-10cm of silt currently covering the base of the pond would partially delay the onset of drying out by effectively increasing the depth of water in the pond. A significant amount of material would need to be disposed of. There are other concerns about removing sediment related to timing:

   - in winter months it would be a difficult task without some form of sludge dredger which would be relatively expensive and disruptive. A portion of the common land adjacent to the pond would need to be used as a settling basin for the dredged material. Removal by hand or mechanical digging while there is water in the pond is less feasible as disturbance of the silt will put it in suspension making it difficult to remove. The FHT raises the prospect of some species over-wintering in the sediment layer and any dredging would disturb their habitat. For that reason, FHT recommend only one third of the pond bed should be cleared of sediment each year, suggesting it would require a program over at least three years.

   - In summer months the process of removal by hand or mechanical digger would be more feasible but only in areas that dry out. In some years this may be the whole pond, in others, it may just be the fringes. Similar concerns exist about the potential for the sediment providing a habitat for locally important species and a phased removal of just a part of the sediment each year would be prudent. It can be done manually at minimal cost by a team of volunteers. The excavated silt can be used to build up the banks provided it doesn't create an obstacle for wildlife access.

b) **Raising the height of the spillway.** Raising the spillway by 5-10cm would deepen the pond with minimal disruption to ecosystems. This small increase would mean the pond is still categorized as a 'shallow' pond. The additional depth of water would delay the onset of any drying out in extreme years. For example, raising the spillway by 10cm could delay drying out by about 20 days (i.e. 20 days at 5mm/day evapotranspiration). A pilot experiment to raise the spillway by 5 cm was introduced at the end of the 2025 season by inserting a wooden block on the top of the spillway. The water level has now risen to this new maximum level, but it will not be until the 2026 spring/summer season (when water levels start dropping) that the effect on pond drawdown will be seen. Raising the spillway level is a relatively low cost and low impact approach. If the height of the spillway is increased a further 3-5cm to a total of 8-10cm, then there may be a few places around the edges of the pond that would

[6] Also see https://freshwaterhabitats.b-cdn.net/app/uploads/2023/06/Silted-up-ponds-and-dredging.pdf

need to be slightly raised to prevent overtopping. As noted above, this could be done using some of the sediment removed from the bed of the pond when it is cleared. Note that in any case the existing spillway needs to be reconstructed in the near future to fix the leak mentioned earlier and to reduce any potential for erosion around the structure.

c) **Lining the pond to prevent seepage**. Making the bed and sides of the pond more impermeable could be attempted by the traditional method of constructing a new clay layer or adopting modern technology and laying a waterproof membrane (e.g. butyl lining). Both approaches would require considerable excavation and be very disruptive. The barrier (either puddled clay or membrane) would need to be covered by a layer of soil to protect it from damage during pond maintenance and, in the case of a membrane, from birds such as herons that can puncture a lining.

    - **Membrane**: If left exposed, the life of a liner would be 20 years or less. Any exposed liner around the edges of the pond would also look unsightly. To retain the natural look of the pond and lengthen the life of membrane, it would need to be buried by about 15 cm of soil on the bed and the sides would need to be covered by a similar thickness of soil or other protection like the timber sleepers. Digging out the bed and sides of the pond by 15-20cm would impact any wildlife habitats, disrupt the vegetation around the pond and impact the tree roots. If the liner is alternatively placed on top of the roots, a further covering of soil would be needed to protect it, further reducing the effective depth of the pond and increasing he frequency of drying out. In existing shallow areas near the trees, this would result in shifting the banks inwards thereby reducing the pond's surface area. It would take several years for the pond to re-establish its current natural look and functionality.

    - **Clay-lining.** Disruption would be even greater than that of a membrane liner as the excavation would need to go deeper to accommodate the thickness of impermeable clay as well as its protective soil covering. The impact on tree roots would be extensive and the clay would need to be imported. Further guidance would be needed to estimate those costs and practicality. Excavation for a new clay layer would need to extend up the banks to the high water level. A difficulty will be ensuring a waterproof layer along any of the steeper edges, i.e. along the roadside and the banks here may need to be shelved. Over time, the roots from the trees may puncture the clay lining.

Other issues - roadside embankment. The pond borders Woodhill Lane with the embankment protected by timber sleepers, though the earth embankment is the main protection against water seepage under the road. The sleepers are rotting and will probably need replacement within the next five years. This task would need to be done in the period late-spring to late-summer when water levels are below the bottom of the sleepers. It could probably be done by the pond's current maintenance team.

Proposal

As the primary objective for the Duck Pond is as a village amenity, then it follows that the periods of drying out should be minimized. A combination of high air temperature and shallow pond levels leading to high water temperature appears to be the main causes of water loss rather than

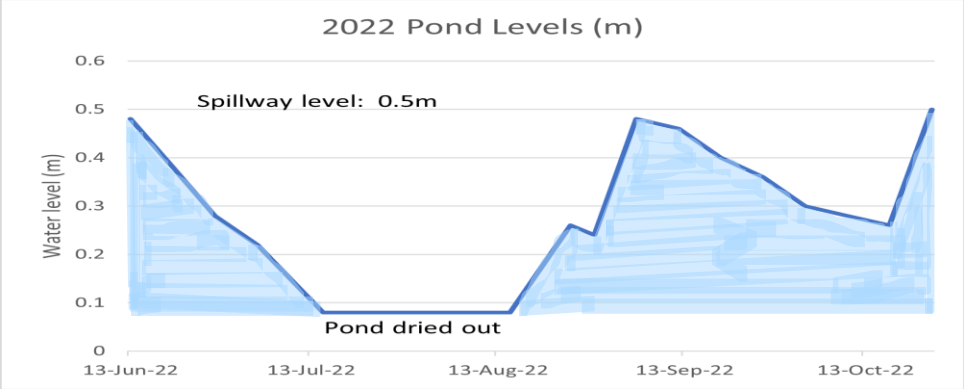
seepage. Raising the pond spillway level and removing some of the sediment will increase the depth of the pond and hence attenuate the drawdown. Keeping the pond deeper for longer at the beginning of the spring and summer should have a considerable influence on reducing the frequency of years that the pond dries out, and in extreme years, reducing number of days when it is dry. Based on the analysis above, the extent of sub-surface seepage from the pond is considered low in comparison with the high evaporation and transpiration rates in dry, hot summers. Hence the expense and disruption of excavating and re-lining the pond with a new clay layer or membrane is considered questionable.

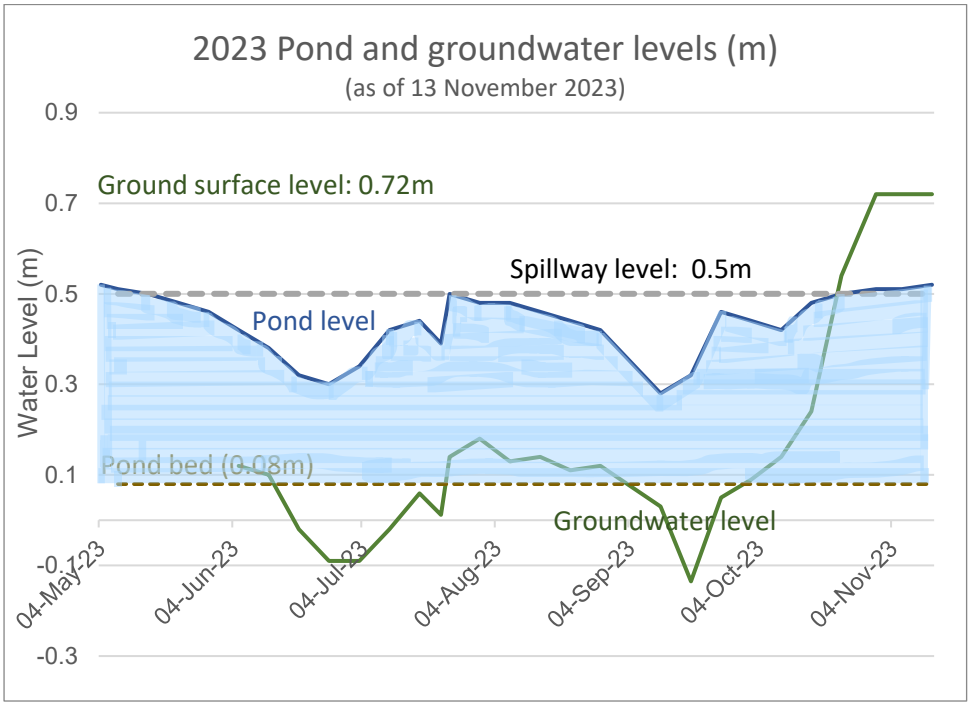
The following combination of measures is proposed: continued maintenance of the drainage system, raising the spillway level slightly, and removing some sediment;

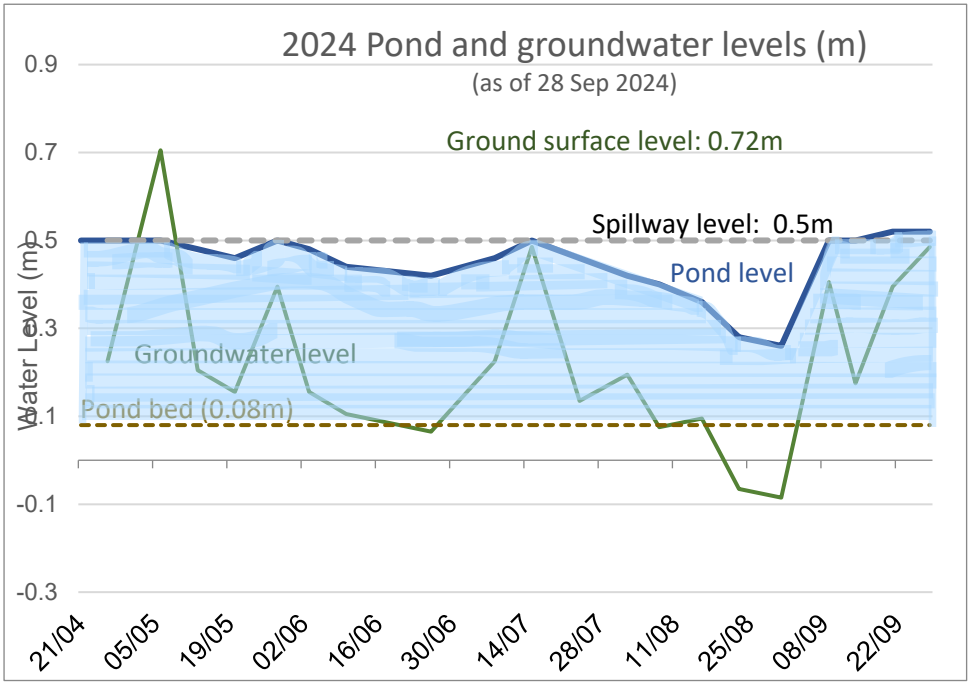
- continued **monitoring and regular clearing of the upstream drainage system** to maximize inflows to the pond from the catchment area.
- monitor the ongoing trial of the **increased spillway height** (5cm) for the 2026 summer season and, if positive, consider adopting this new arrangement permanently or preferably increasing it by a further 3-5cm (making a total of 8-10cm higher than its original height). This will require rebuilding of the existing spillway structure which is needed anyway to fix the leak near its crest.
- **carefully removing the silt layer** that builds up on the bed on a regular basis with a limit of one third to one half of the area being cleared in any one year to minimize potential loss of habitats. The most pragmatic and certainly cheapest way is careful manual removal of silt by a volunteer working party during summer periods when the pond dries. Alternatively, the feasibility of hiring a small sludge pump during the winter could be considered.
- **continue monitoring** of pond water levels, rainfall and groundwater levels in the period 1st April to 31st October after any changes have been made.
- further periodic **water quality monitoring** of basic parameters at quarterly intervals, including times when the pond is partially depleted, with additional consideration of a one-off monitoring of toxin levels in the summer period – as this is an expensive exercise, it would need to be done if the opportunity arises to link with testing regimes of other groups.

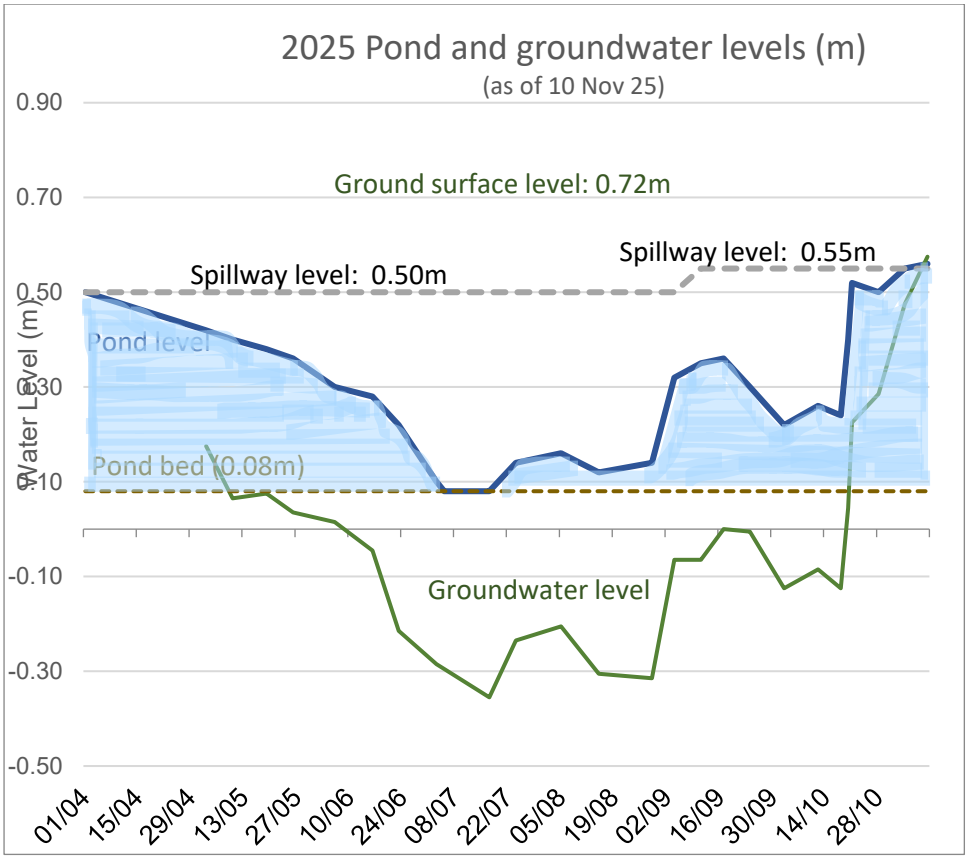
Even with raising the spillway and removing the silt layer, the pond would probably still dry out when conditions similar to those experienced in 2022 and 2025 occur. However, the proposed measures would reduce the duration of drying out by up to 4 weeks less, so 2 weeks dry rather than 6 weeks for 2022 conditions and 5 weeks dry rather than 9 weeks dry for 2025 conditions. For less extreme years, the pond should not dry at all.

Annex – Pond levels 2022-2025








2025 Pond and groundwater levels (m)
(as of 10 Nov 25)
0.90
0.70
0.50
0.30
0.10
-0.10
-0.30
-0.50
Water Level (m)
Ground surface level: 0.72m
Spillway level: 0.50m
Spillway level: 0.55m
Pond level
Pond bed (0.08m)
Groundwater level
01/04
15/04
29/04
13/05
27/05
10/06
24/06
08/07
22/07
05/08
19/08
02/09
16/09
30/09
14/10
28/10