



AquaServe Management Ltd

Appendix 5

Update on report following the Site Visit on 3rd October 2024

Following the completion of works in September 2023, the funding party required a follow-up site visit to be conducted one year later to assess:

- The success of the works
- Improvements to the pond's condition as a result of the works
- Increases in biodiversity within the pond ecosystem

Additionally, it was agreed that any other observations related to the pond could be noted during this visit and included as an appendix in the main report. The relevant information collected is detailed below in the same order as in the original report.



Hampden Pond, October 2024

Water Reception

Water levels were noted to be above the datum point, with water freely discharging from the outlet. No water was entering from the culvert, nor was there evidence of recent recharge from this source. This suggests that water reception is primarily from the aquifer, which appears to be supplying excess water that will assist in flushing excess nutrients from the system.

Residence Time

Based on the rate of discharge observed during the visit, the estimated residence time of water in the pond is approximately 112 days.

Water Levels

The pond was filled to the extent that water was actively discharging through the outlet culvert. Site staff confirmed that water levels have remained stable throughout the year, and the pond has maintained a full level since late 2023.

Water Quality

Although no formal testing was conducted, water quality appeared to be good. Clarity was particularly high, with visibility exceeding 600mm in the marginal areas and likely greater in deeper sections of the pond.



Water clarity was excellent

Algae

While the water exhibited a slight green tinge due to algae, the clarity remained excellent, surpassing that of comparable ponds. Reports of blue-green algae earlier in the season (September) were noted; however, photographs indicated the presence of Duckweed (*Lemna* spp.) and a filamentous 'Blanketweed' alga, likely *Cladophora* spp. Although *Cladophora* can be unsightly, it is a harmless species. Both species have since diminished, likely in response to seasonal changes in water nutrient levels and temperature.



Cladophora is a common and harmless algae species

Aquatic Plants

The pond exhibited the most notable changes in plant diversity and coverage since the completion of works in September 2023. Extensive efforts were undertaken to reduce the dominance of water lilies, which had previously contributed to a monoculture. This intervention allowed a range of new plant species to establish and flourish, enhancing biodiversity and ecosystem function. Upon returning to the site, it was encouraging to observe a variety of aquatic plants thriving in the now largely lily-free pond environment.

Submerged Plants

Rigid Hornwort (*Ceratophyllum demersum*): Rigid hornwort, a free-floating aquatic plant, is highly beneficial for pond ecosystems. Growing quickly, it acts as a natural filter by absorbing excess nutrients like nitrates and phosphates, which helps prevent unwanted algae growth and maintains water clarity. This plant also releases allelopathic chemicals that inhibit algae, fostering a balanced aquatic environment. Its dense, feathery foliage serves as a habitat and breeding ground for fish and invertebrates, promoting biodiversity. Since it does not anchor to the pond's sediment, hornwort can thrive at various depths without disturbing the pond's layers. This species was observed forming several healthy, moderate-sized clumps in the northeast quadrant of the pond, establishing distinct patches in excellent condition.



Rigid Hornwort (*Ceratophyllum demersum*)

Ivy-Leaf Duckweed (*Lemna trisulca*): Ivy-leaf duckweed, a small floating plant, offers numerous benefits to pond ecosystems. Its ivy-shaped leaves form a dense surface mat, providing shade that limits algae growth by reducing sunlight penetration, maintaining cooler water temperatures, and promoting better water quality. This plant absorbs nitrogen and phosphorus, preventing nutrient overload and the risk of algal blooms. Additionally, ivy-leaf duckweed creates sheltered habitats for fish and small amphibians, and serves as a food source for wildlife, contributing to a balanced ecosystem. One small patch of ivy-leaf duckweed was identified in the northeast quarter of the pond, helping diversify the plant community.



Ivy-Leaf Duckweed (*Lemna trisulca*)

Water Starwort (*Callitriche spp.*): Known for its delicate, star-shaped floating leaves, water starwort provides essential habitat for invertebrates and supports pond oxygenation, benefiting fish and other aquatic life. This plant absorbs excess nutrients, helping control algae and enhance water clarity. Its spreading habit and subtle visual appeal make it ideal for naturalistic ponds. A small patch of water starwort was observed in the southwest corner of the pond, thriving in an area that had previously been dominated by lilies and now benefits from increased sunlight due to nearby tree crown lifting.



: Water Starwort (*Callitriche* spp.)

Emergent Plants

Brooklime (*Veronica beccabunga*): Brooklime, with its bright green leaves and small blue flowers, naturally thrives along pond edges, providing essential cover for aquatic insects, larvae, and tadpoles. This hardy native plant absorbs excess nutrients, preventing algal blooms and enhancing water quality. Its fibrous roots help stabilise pond edges, reducing erosion. The plant's spread on the pond's northern bank extends approximately 12 meters from the east edge, covering about 3 meters into the pond. This area was intentionally designated as a heavily vegetated zone, with brooklime establishing successfully, likely aided by additional sunlight from tree removal.



Brooklime (*Veronica beccabunga*)

Mare's Tail (*Hippuris vulgaris*): Recognisable by its whorls of fine, conifer-like leaves, mare's tail thrives in wet conditions, stabilising pond edges with its dense roots. This plant provides shelter for small aquatic creatures and absorbs excess nutrients, reducing algae and supporting a balanced ecosystem. Two distinct patches of mare's tail were observed on the north bank, west of the peninsula, both located in areas formerly dominated by lilies. This successful establishment contributes structural diversity and adds visual interest to the pond.



Mare's Tail (*Hippuris vulgaris*)

Water Mint (*Mentha aquatica*): Water mint, a fragrant plant with lilac flowers, attracts pollinators like bees and butterflies, increasing biodiversity around the pond. It provides habitat for small fish, frogs, and beneficial insects, while its dense root system helps stabilise pond edges and reduce sedimentation. By absorbing excess nutrients, water mint contributes to water clarity and limits algae growth. Patches of water mint were observed along the eastern and southeastern banks and around the peninsula, mostly in areas previously dominated by lilies. Its spread brings aesthetic and ecological benefits to the pond.



Water Mint (*Mentha aquatica*) surrounded by *Lemna* SP

Marginal Plants

Pendulous Sedge (*Carex pendula*): This robust, arching sedge is well-suited for damp, shaded pond edges. Its extensive root system stabilises banks, minimising erosion, while it absorbs excess nutrients that help prevent algae growth and improve water clarity. Pendulous sedge provides shelter for pond wildlife and adds visual appeal with its tall, flowing form. This plant was observed in large patches along the northern bank, similar in location to the brooklime, with smaller clusters spread throughout the pond's edges, including the southeast corner where bank restoration was completed.



Pendulous Sedge (*Carex pendula*)

The presence of these aquatic and marginal plants underscores the pond's enhanced biodiversity and improved ecological health, meeting project goals by establishing a variety of species in areas previously dominated by a single plant type. The new diversity in plant life benefits water quality, stability, and wildlife habitat, contributing to the pond's long-term resilience.

Lilies

There are still some isolated areas of lily growth, although this accounts for less than 5% of the coverage observed in 2024. The reduction in lily coverage has made a significant difference to the pond and is largely responsible for the sudden increase in other plant species. It is further believed that water retention may have improved due to the reduction in transpiration from lilies, although increased groundwater is likely the primary contributing factor.

Fish

A small number of carp were observed in the pond. The small shoal, estimated at approximately five fish, appeared to range between 30–40 cm in length. Movement from additional, smaller fish was also noted, though they could not be identified.

Invertebrates

There was a noticeable increase in dragonflies and damselflies observed while walking around the pond, suggesting an increase in the pond's invertebrate population.

Paths

The path created to the south of the pond now appears to be well-used, while the previous path, which runs closer to the water's edge, shows little evidence of regular use. This shift improves the safety and accessibility for people using the area. Given the new path's popularity, there is an opportunity to move the bench to make it more accessible from this route.

Pond Use

During the visit, it was further noted that an area around the bench on the south bank could be opened up and utilised as a communal gathering space, similar to the proposed improvements planned for the peninsula.

Summary

The extensive work completed on the pond has already shown a positive impact, transforming the pond into a more diverse habitat that supports a variety of plant species. The reduction in lily dominance has allowed new species to establish, increasing both plant diversity and ecosystem health. It is encouraging to see that these changes are taking effect so quickly, and it is hoped that further efforts to enhance the pond will continue to build on this promising foundation. The increase in plant diversity should lead to a broader range of invertebrates and more advanced species, contributing to the pond's overall biodiversity.

