Asset or liability?

DAVID HEMSTOCK considers the merits, or otherwise, of water features on golf courses and looks at planning, design, construction and maintenance

As with many other aspects of the golf course,the pros and cons of water features are an emotive subject, more often than not producing an emphatic for or against, with rarely a display of indifference.

We all seem to have an almost instinctive affinity for water: ponds, lakes, streams are an attraction in being mysterious, changeable and always drawing attention. Any Club with water on its course (formal rather than casual) should view it as a valuable asset. Those without would do well to consider the value of establishing a water feature to add interest and variability to play, to improve the views, to encourage wildlife diversity, to serve a purpose, say irrigation, drainage or even fire fighting to name but a few – or indeed all of these.

Historically, water features are important. Our island once had many more areas of exposed water than it does now, particularly in England, but innumerable ponds have been in-filled, with streams, running ditches and springs piped for convenience. There is an element of maintenance involved with any open water, arguably less than that of an equivalent turf area perhaps, but still representing a commitment which if not carried out may result in an eyesore rather than an asset.

Time casts the cloud of doom over many such areas, slowly and often unnoticeably, as siltation, shading by trees that have increased in size and changing water inputs have their effects. A greenkeeper needs to have another string in his bow – that of water area management – if he is to keep the whole of the course in thriving condition.

The arguments against? Well, as a number of greenkeepers have put it to me in the past, they have enough on their plate without the regular donning of waders to cope with black sludge, blocked outlets, midges and water weeds. Fair comment, but many such problems can be avoided with good planning at the construction stage. One bad experience with an ill-conceived water feature should not condemn water features forever and if you are unfortunate enough to have a very demanding area of open water, perhaps there is a way of reducing the maintenance requirement, for instance, in a pond which requires regular cleaning, one that may be suffering from leaf-fall and a build up of organic matter which cannot break down quickly enough, because conditions are not right for biological decomposition eg. trees are blocking out light and aeration is not sufficient.

These problems suggest that presenting a good water circulation is essential to provide oxygen for healthy water. If flows have reduced for some reason (many spring supplies are not what they used to be due to the recent low rainfalls), then perhaps rainwater harvesting can help supplement water inputs. By this I mean directing more surface run-off or drain flow by actively diverting these flows in

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Pond under construction: clay seals are not necessarily easy to form. Vertical faces require special treatment

'What to do with that strip of mud when water levels drop...'

29 ➡ some way. Alternatively an aeration pump helps to keep water healthy and conditions stable whilst also providing the interest of bubbling water. Of course, there is bound to be a maintenance element involved in the upkeep of an aerator and a potentially expensive power supply necessary to install, but they are worthwhile.

Sedimentation of water areas may actually indicate bank instability and erosion upstream, particularly if increased peak flows are occurring due to, say, a new intensive drainage scheme or hard surfaced area (car-park, housing estate, etc). Off-site problems affecting the course are often tricky to negotiate solutions, and so perhaps controlled collection of sediment in advance of the pond/lake/brook may be the answer, by means of a small lagoon which slows down flow velocity and causes deposition. High nutrient levels caused by applying too much fertiliser and its subsequent leaching also causes excessive weed growth and other problems, such as algae blooms (which, in the worst cases can be toxic). This, coupled with water which is too shallow, can lead to serious weed problems. Again, water circulation and aeration, aided by deeper water, helps control the problem.

Moving now to new water features, there are those who object not just to maintenance needs, but to the very concept of water on the course. We are all aware of how unnatural and excessively formal and penal water can be, particularly in the hands of some American-style designers. Timber-edged and amoeba-shaped, they may be simple to maintain with a clean break between water level and mown edge, but are they British?

Formally-edged ditches and brooks are easier to maintain and positively discourage the socks-off brigade, who may indulge in a spot of impromptu, aeration of water whilst holding up play. A definite edge and deep water leaves no one in any doubts what to do.

Concerning banks, a particular problem is what to do about that unsightly strip of mud which appears as water levels drop, either through evaporation losses or drawdown by irrigation. A large surface area will give less drawdown for a given amount of water abstraction than a small area, but evaporation losses will be greater. Typical evaporation losses can amount to 0.3 metres over the summer and when coupled with irrigation use can make a pond look fairly sad by the end of summer.

The National Rivers Authority, when considering an application for abstraction of water for irrigation, may stipulate that the summer base flow from the supplying source must be maintained, meaning that all water must be collected in winter with potentially very little reliable summer replenishment. This has implications on cost of construction with expensive regulatory structures being required, but also heightens the drawdown problem. Edging the water with crushed stone (rip-rap), slabs, blocks and textiles etc., is effective as a disguise but is again expensive, given the generally large area and circumference involved.

Why not place a 'tank' or steep-sided reservoir, purely for the purposes of irrigation, away in a corner where unsightliness does not bother anyone? The design will have to be carefully executed, but this now applies to most water areas. The NRA should consulted on all work to main watercourses, including drain outfalls, foot-bridges etc, and you may also require an impounding licence for a proposed pond or lake. Planning permission will also be required, thus levels will have to be calculated; along with drawings of the pond, cross- sections, inflow/outflow etc. and an assessment of cost produced, including the method of sealing. Of course, the obvious but occasionally un-addressed question of where the initial filling water will come from must also be decided.

It is easy to be too optimistic on the latter point, particularly with the low winter rainfalls we seem to be experiencing. Drains which flow reliably may mysteriously stop for all sorts of reasons, indeed this is happening at present. Thus reducing losses through seepage by adequate sealing is important. The cheapest method of sealing off on the right soil type is to compact and puddle clay. Done traditionally by scooping out soil, throwing a bale of hay into the middle and allowing cattle to do the poaching or puddling for you, heavy machinery is the preferred method now. Weight, high ground pressure, smearing action and good, fairly high moisture content of the correct type of soils are essential to form a good seal. Subsequent to this the clay seal must always be covered by at least 0.3m of water or protected by a layer of soil, gravel etc., where it is periodically exposed to the air. Otherwise it will shrink and crack and the seal is lost. This is a lesson which has been well learnt, often from constructors who did not pay enough attention to sealing work.

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On sandier or more free draining sites, the rule that 'you get what you pay for' applies. Polyethylene or PVC is commonly used as a waterproof lining, but needs protection from sunlight or it will harden and be easily damaged. A life-span of 10 years or more is possible if the correct gradients, jointings and laying methods are used. Heavy duty grades cost up to £10/m². Butyl rubber is tougher and potentially has a longer life costing over £5-6/m² for 80% Butyl + 20% EPDM. It does not require a soil cover, but can look ugly without. Other proprietary membranes are available, eg. reinforced and coated polyethylene or polyester reinforced bitumen, etc with costs which can be as low ➡ 32

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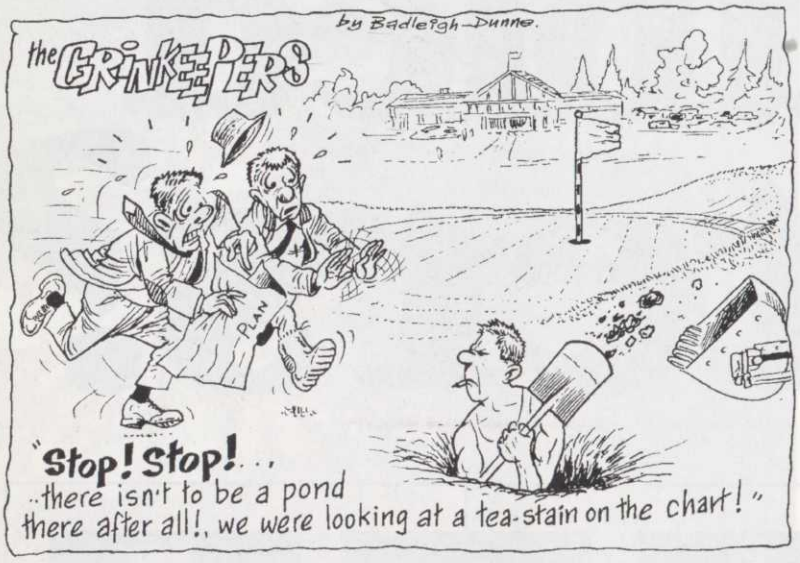

31 ➡ as £1.50-£2 per m². All require a stone free base for laying.

The edging or bank protection methods – referred to earlier as disguisers of drawdown levels – obviously serve another purpose, that of counteracting a wave action against banks, which can eat away soil at an alarming rate and undermine the structure. There are materials available which can be 'disguised' above water by grass, effectively providing a reinforced turf, whilst protecting above and below water level, eg. 'open' concrete blocks and plastic meshing. A natural appearance is really the main aim: a blending in with surroundings through careful construction, without civil engineering straights and angles, and with plenty of opportunities for unique wet area habitat species to develop.

Indenting the shore-line and varying the depth on margins and planting will increase the rate of development and maturity of a new pond or lake. It is a good idea to deposit some of the original topsoil (or better still silt) from an old pond or marshy peat into the water feature to act as a pump-primer for this development process. Marginal plants can be planted directly into mud (marsh marigold, bur-reed, watermint), emergent plants in 150mm deep water (reed-mace, common reed, water plantain). Aquatics (floating, such as water lily, or submerged, such as water milfoil) are best planted with weighted Hessian sacking to anchor them at the right point. Temporary protection from wave action can be provided by anchored floating logs or a similar 'boom' type of arrangement aimed at breaking up waves. Insects and other wildlife appears very quickly in new ponds, thanks primarily to water pond, and with a bit of luck other more interesting fauna such as frogs and newts will appear, or in the case of a renovated pond, re-appear.

From then on it is a case of monitoring over the years and watching for tell tale signs of developing problems – dead fish, abundant algae, dominant water weeds – and taking action before the pond or lake system degenerates too far. This action includes tree pruning, dredging, controlling pollution and as a last resort, chemical control (following consultation with the NRA).

The result? A healthy stretch of water which will hopefully benefit the course in a variety of ways.

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