Sustainable school pools study

In this document you will find a number of reviews of methods by which a primary school could consider installing a small outdoor ‘owned’ school pool. The purpose of which would be to enable lesson delivery on school site, thus making lesson delivery simpler and quicker.

There are further recommendations for solutions for secondary schools.

The suggested solutions, findings and costs outlined in this document are subject to change from external economic factors – and were correct at the time of the study (March 2018).

Summary

In the 1960’s there was a huge surge of interest in providing primary schools in England with a small swimming pool so that pupils could learn to swim. These swimming pools were mainly outdoor pools that could conveniently be placed in a small primary school grounds. These pools were invariably sponsored by the school's Parent Teacher Association who campaigned and fundraised to make the vision happen.

To enable such small utility pools to be built required design, imagination and so it was no surprise that Trevor Bayliss, one of the country's most prolific inventors (clockwork radio, clockwork computer etc.) came up with the solution. In his workshop he created the “Shotline Pool”. This was a simple metal frame construction that sat above ground with plywood panel infills. The pool was then lined with a PVC liner and fitted with basic water filtration through one or two inlets, one bottom outlet and one or two surface skimmer weirs. A small hi-rate filtration system could be fitted into a nearby housing, even a shed. The pools were typically hand-dosed with disinfection chemicals and unheated.

The pools were usually quite small, 18-metres x 6 metres and no more than 1 metre deep; ideal for primary school pupils’ swimming lessons.
These pools were if nothing else “cheap” and literally thousands were built. Originally they were designed to last approximately 10-years but there are still some functioning today over 50-years since they were first installed. Many have been covered over and have had heating added.

Similarly designed small pools were produced as a result of Trevor Bayliss’ initiative and other concrete framed school pools were designed that were also inexpensive.

However, because of the move to more conventional swimming pools and particularly because they were indoor and heated the old primary school outdoor pool lost its popularity. Parent Teacher Associations are fantastic at raising money and achieving initial provision, but they were rarely geared to manage facilities - and after a school swimming pool was built it was given to the school administration to operate. This precipitated a long period of decline and neglect.

By the 1970’s, the concept of dual provision sports centres was conceived. More accomplished provision was built on school sites with a view to being education facilities in the daytime and community facilities in the evenings and weekends. They were jointly funded by the local authority and education authority. These facilities were designed to regulation standards and often represented a local authorities “flagship” public provision. Their capital costs reflected this. They were usually sited on larger senior school campuses, often on sites where there was no primary school nearby. These pools were larger and more standard, with a pool length of 25 metres. Although these dual provision facilities were a significant improvement on the small primary school pool and serviced a wider customer base, there was nevertheless conflict between the education and community usage that caused them to be not entirely effective and sustainable. The locations also created the most significant barrier to school pupils learning to swim - and that is the cost of transport from the outlying primary schools to the nearest dual-provision pool.

Dual-provision sports and leisure centres are rarely built today, with local authorities preferring to build completely community orientated centres, but still offer time for school swimming. This did not resolve the cost barrier of transport issues for schools.

For this reason some primary schools fought fiercely to maintain their small outdoor swimming pools so that a local ‘Learn to Swim’ programme could be operated throughout the summer term and they still operate in this manner.

There are challenges to this methodology. The main challenge is the cost of heating an outdoor swimming pool, even for a relatively short period each year, because heating an outdoor pool in the British climate is inefficient and expensive.

However these constraints shouldn’t mean that a more modern approach to providing a small outdoor swimming pool on primary school sites shouldn’t be considered.

Addressing the issues

The Trevor Bayliss concept still has merit - as long as the perceived issues can be addressed:

Pool Frame
The main cost of a pool of this kind is the pool frame and PVC liner. Metal supports are still valid and long lasting, but nowadays high density resin panels are more suitable as the infill of the frame. These frames are virtually indestructible so a long lasting shell is now easily achievable.
PVC liners are still used extensively in all types of swimming pools and usually have a ‘life’ of between 10 and 15 years before replacement is necessary.

**Water Circulation**
Previous pools of this type have consistently had poor water circulation and turnover. However, because of their short operational summer operation and small bather loads this hasn’t always been a problem. Nevertheless, current health and safety standards require two bottom return sumps to prevent vacuum entrapment - and modern panel pools have the option for surface water draw-off, so water circulation is improved anyway.

**Pool Water Heating**
Heating an outdoor pool by conventional methods, for example, from a gas/electric or oil fired boiler is wasteful and will always place an insurmountable burden on the operational budget of this type of pool.

To operate a pool of this type, two principles must be adopted:
1. The pool will operate as an un-heated pool (certainly not favoured by most parents);
2. Low cost heating alternatives should be used.

Although it was not unusual in the 1960’s for swimmers to use unheated outdoor pools, the prevalence has moved to heated pools with most modern swimmers finding the idea of swimming in cooler water abhorrent.

To many swimmers today the thought of swimming in a pool with a water temperature of less than 28°C (degrees Celsius) is inconceivable, whereas swimming in temperatures of around 18°C was considered quite normal in the 1960’s. This reluctance to swim in cooler temperatures can be overcome by having swimmers wear wetsuits that provide substantial protection successfully for swimming lesson periods of say 30 minutes.

Additionally methods to raise the water temperature can be pursued without using gas, oil or conventional electricity.
Heating the pool
Two alternative methods can be adopted to raise the temperature of outdoor swimming pools:

1. Solar Panels
   The use of solar panels, either for solar gain, or as photo-voltaic cells to produce electricity is now widely adopted and utilised. Most outdoor pools have an area nearby where panels can be placed; depending on the amount this area will accommodate the water temperature can be raised from its base line to some extent.

2. Polycarbonate Housings
   Many current outdoor pools have been adapted into a semi-indoor swimming pool with the use of a polycarbonate housing. This rarely allows the pool to operate more than in the summer months, as the heat loss through the polycarbonate housing at night is substantial - and when combined with pool water heating, extremely expensive. Other draw backs of using a polycarbonate housing is the high condensation problem on the interior of the polycarbonate. This is caused by the significant variations of temperature between the internal atmosphere and the external atmosphere. This high level of condensation rapidly corrodes the fabric of the housing.

The main benefit of a polycarbonate housing is the solar gain it provides in daylight hours, even on cooler days. This primarily heats the interior air and marginally the surface water.

To off-set the condensation and humid atmosphere problem, but still achieve the solar gain and maintain an open air ‘feel’ to the pool it’s suggested that instead of a fully enclosed polycarbonate housing, a polycarbonate tunnel is adopted with openings at one or both ends. In this case care has to be taken not to create an unpleasant wind tunnel effect.
The above methodology using solar panels and an open tunnel polycarbonate cover will provide an outdoor swimming pool with moderate water heating that can be used over an extended summer period.

**Water purification and circulation**
Modern health and safety requirements require swimming pools to be chemically disinfected either automatically or semi-automatically. Fortunately for small pools of this type semi-automatic dosing systems are now economical, simple and efficient.

There is also a wider range of filters on the market and rather than have a small high-rate filter, taller more effective high-rate filters are available.

So a small housing, such as a large shed, adjacent to the pool can house a filter, strainer basket/pump/motor and a reasonable sized plastic filter suitable to circulate a pool of this size; together with a small economical disinfectant dosing system.

An outdoor swimming pool should always be dosed with a chloro-isocyanurate compound designed to retain the active chlorine for as long as possible in the pool water, rather than the conventional calcium or sodium hypochlorite.

**The way forward**

It is Swim England’s view that there is still a role for the small outdoor swimming pool on primary school sites. The key is to construct and operate them as economically as possible. These are not ‘full-blown’ community use pools with all the conventional structures and building regulations that need compliance.

Learning to swim has been part of the school national curriculum for many years but sadly and too often this objective has been embraced with little enthusiasm in some educational quarters.

There are many reasons for this but perhaps the most salient reasons are:

**Where there is no swimming pool on site**
- Other higher priority curriculum targets;
- The time, cost and logistics involved in conveying school pupils to often distant swimming facilities;
- Lack of training/competency of school personnel in delivering swimming lessons.
Where there is a swimming pool on site:

- Other higher priority curriculum targets;
- The lack of competencies of the school’s personnel in delivering swimming lessons;
- The lack of skills and competencies in managing and operating a swimming pool, even a small one;
- The cost of maintaining the swimming pool.

To overcome these barriers it is clear that a strategy has to be adopted that addresses and resolves these issues and this has been outlined above.

By having the swimming pool on site the excessive time transporting children to an off-site pool is eradicated.

The simplified structure and operation of the pool, as described, reduces the skills and competencies required to run it and Swim England provide training to up-skill staff. The removal of the conventional heating element from the pool operation simplifies the management of the pool, leaving only the purification system for the site management to master.
How large does the pool need to be?

Simply to achieve the national curriculum objectives a quite small pool can be envisaged and it is suggested that most primary school could comfortably achieve its swimming lesson obligation with a pool as small as 15-metres x 6-metres with a constant depth of 1-metre. However if a primary school entered into a partnership with a local swimming club to share the costs and share the pool it would also need to accommodate some club training and have a length commensurate with their needs. This would mean a preferable pool length of 25-metres, with a possible minimum acceptable length of 16.6 metres i.e. Third of 50 metres.

Tentative Costs for a 17 metres x 6 metres panel pool

Assuming a pool size of 17 metres x 6 metres and that the school does not need additional changing areas, toilets and showers and that there is a spacious flat, solid area the pool can be sat upon:

<table>
<thead>
<tr>
<th>Item</th>
<th>Swimming Pool</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pool size</td>
<td>17m x 6m, 1.0m</td>
<td></td>
</tr>
<tr>
<td>Water treatment</td>
<td>70m³/hr; PAC, filtration, chemical control</td>
<td></td>
</tr>
<tr>
<td>Groundworks</td>
<td>Ground works:</td>
<td>Minimum £10,000, maximum £50,000</td>
</tr>
<tr>
<td></td>
<td>• Pool tank excavation; requires a suitable flat area to support the pool and anchor the polycarbonate frame to; together with excavation to accommodate the under pool return pipework to the plant room area.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Pool surrounds excavation; the surrounding pool deck area will need to be either paved or concreted with a gradient away from the pool to a waste drain.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Backfilling as required for pool surrounds.</td>
<td></td>
</tr>
<tr>
<td>Water treatment plantroom</td>
<td>Small cost required here, at the most a substantial wooden shed</td>
<td>£5,000</td>
</tr>
<tr>
<td>Panel pool tank – frame system</td>
<td>The client is prepared to consider a low cost panel type system or similar:</td>
<td>£75,000</td>
</tr>
<tr>
<td></td>
<td>• Ground slab upon which to form the pool tank</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• There are a wide range of panel pools on the market at varying costs so the costs of the structure can vary significantly from a little as £75,000 to £120,000. The use of metal stanchions and high density plastic panelling is an option recommended with the deck-level option.</td>
<td></td>
</tr>
<tr>
<td>Traditional pool tanks, options</td>
<td>Skimmer type – concrete, finished with render and tile</td>
<td>£105,000</td>
</tr>
<tr>
<td></td>
<td>Skimmer type – blockwork, with a liner</td>
<td>£85,000</td>
</tr>
<tr>
<td></td>
<td>Deck level – concrete with render and tile; balance tank</td>
<td>£150,000</td>
</tr>
<tr>
<td>Circulating System, Filtration System</td>
<td>The cost of the strainer basket/pump/motor</td>
<td>£50,000</td>
</tr>
<tr>
<td>Chemical dosing system</td>
<td>The additional cost of automatic dosing system will be approximately</td>
<td>£7,000</td>
</tr>
<tr>
<td>Pool cover</td>
<td>Deck mounted system</td>
<td>£5,000</td>
</tr>
<tr>
<td>Pool surrounds</td>
<td>Allow for ground preparation and paving stones for pool surround typically 2.0mm wide</td>
<td>£10,000</td>
</tr>
</tbody>
</table>
The preferred polycarbonate tunnel is a convex structure capable of sustaining heavy snow loading and wind speeds. The cost of a polycarbonate housing to cover a pool of this size. Certikin supplied system from Endless Summer Enclosures, supplied and installed. £45,000

The cost of solar panels to enhance the water temperature per panel or unit and as many units should be acquired as possible and the area of land permits. There is no limit on photo-voltaic cell numbers that can be used and again this depends on the area available to accommodate them and how many can be afforded. Not Included

£210,000 minimum

It can be seen from this simplified list of costs that a pool of this type can be introduced into a primary school site for around £210,000 providing a facility that could be used for approximately four months of the year.

**Funding**

A pool of this type will never meet the design requirements expected from conventional planning and building regulations that apply to indoor pools and for this reason attracting grant funding from the traditional sources is usually difficult.

Increased participation in swimming is usually a cardinal objective of any grant funding and an outdoor pool that is only likely to operate for four months of each year will usually lose out against a grant bid relating to an indoor pool that will operate all year.

However a good case can be made for primary schools that are in remote areas where there is little chance of children being able to regularly attend a conventional indoor pool - and in this situation Sport England may be interested in some form of support – see [https://www.sportengland.org/funding/](https://www.sportengland.org/funding/).

Without a doubt though, funding for this sort of project remains firmly with the local support network the primary school requires, there are anyone of a number of small local funding agencies that wish to enhance children’s welfare - [https://www.princes-trust.org.uk/help-for-young-people/who-else/employment/grants-funding/community-projects](https://www.princes-trust.org.uk/help-for-young-people/who-else/employment/grants-funding/community-projects)

Swim England can assist with staff training for pool plant operation and pool management skills.

**Temporary Pools**

An alternative to providing a small economically permanent pool is to hire a temporary pool for a short summer season. These types of pools can be erected in the playground and covered with a substantial temporary housing. The scheme enables the school to deliver on its national curriculum obligations within a short hire period.

With a steel tank that measures 12 metres by 6 metres, with a depth of 1 metre, the swimming pools delivered by Total Swimming are the ideal size to teach primary school classes how to swim.

The experts who build the pools ensure that all health and safety provisions, maintenance and standards are adhered to – providing a school with a 24 hour emergency line should it need any assistance, at any time.
Swim England seeks to support those school pools eligible for funding under the Government initiative ‘Priority Schools Business Programme’ to ensure swimming participation is maximised, and in particular the opportunities for every primary school aged child to be able to swim competently, confidently and proficiently and understand the principles of safe self-rescue in different water-based situations before they leave school. This support is implicit within the Swim England and Sport England strategies.

Where the provision of swimming pools at secondary schools are concerned, Swim England recognises that a different criteria must apply to primary schools.

The swimming requirements of the national curriculum target primary school age groups/key stages; not the secondary school age groups. Placing a swimming pool on secondary school campus implies:

- That the site is readily accessible as a hub for a cluster of nearby primary schools that can access it with a reasonable cost burden.
- That the pool will be used by the secondary school as part of an extended health and well-being process or because that secondary school has a sports and recreation remit.
- That the swimming pool has a wider community use and is in fact a dual-provision centre.

The strategy for hub schools to link with feeder schools in order to share the facilities, reduce travel time and time away from other subjects within the school day, is an effective development model. Additionally we also believe that all school swimming pools must have an appropriate management structure in place, with adequate training to ensure a safe and sustainable operation - and this model allows this over the primary school model.
We support the view that if children and young people can be given the habit of exercising from an early age - and easy ways provided of continuing to exercise out of school they are more likely to stay active into adulthood. A school pool placed strategically within a partnership of schools and effectively programmed, can have a significant effect on local attainment targets.

**Sports Academies and Sports Colleges**

Specialist Sports Colleges enhance young people’s opportunities to participate in sport. However, it’s an ongoing concern that many schools seeking this status do not have swimming pools.

Swimming is a major sporting activity which is undertaken equally by pupils and the lack of swimming facilities in ‘sports colleges’ is a cause for concern, not only in relation to the sports curriculum as a whole but in relation to providing training opportunities for future employment in a paid capacity or as a sports volunteer.

The provision of a pool in a sports college gives the opportunity for pupils not only to become competent swimmers but also to learn skills such as lifesaving and the teaching and coaching of swimming, which can enhance employment opportunities in both paid and voluntary jobs.

It’s our recommendation that in the planning and location of sports colleges, consideration should be given to a swimming pool which can be used for both education purposes and by the local community, and that where a pool can’t be provided, there should be a defined link and suitable and sufficient access to local authority provision.

**Type of pool suitable for a secondary school**

Unlike the primary school model the secondary school provision is more compatible with the standard community swimming pool model that can be found in Sport England’s/Swim England’s “Design Guidance Notes” [https://www.sportengland.org/media/4187/swimming-pools-dgn-2013.pdf](https://www.sportengland.org/media/4187/swimming-pools-dgn-2013.pdf).

Depending on the size of the school and available cluster primary schools, swimming pool configuration is likely to be a 25 metres by 4-lane swimming pool, with a depth of 1-metre at the shallow end to 1.8-metres at the deep end. A guidance design can be seen here: [https://www.sportengland.org/media/4648/4-lane-pool-pdf-set.pdf](https://www.sportengland.org/media/4648/4-lane-pool-pdf-set.pdf)

If the pool is a dual-provision facility the population of the surrounding conurbation will determine if the pool needs to be a larger 25-metres by 6-lane swimming pool with possibly an additional small learner pool for children younger than primary school age.

The most likely variance from the standard swimming pool model provided in the “Design Guidance Notes” is that a school facility can operate with smaller open plan changing areas without cubicles and the lobby can be more rudimentary with less of a catering provision.

In terms of cost the build and operational estimates provided in the Sport England “Affordable Pools” are good indicators, see: [https://www.sportengland.org/media/4653/affordable-community-swimming-pools-r003-2012.pdf](https://www.sportengland.org/media/4653/affordable-community-swimming-pools-r003-2012.pdf)
Conclusion

With determination and the support of parents, volunteers and local support groups there is no reason why remote primary schools cannot have their own rudimentary swimming pool on site. Most moderate population clusters have a municipal swimming pool that local schools can engage with.

The Swim England Facilities Team can help with the construction of economical primary school pools and the Swim England Learn to Swim team can help with the access to swimming pool challenges.

Key contacts
facilities@swimming.org
schoolswimming@swimming.org

For more information visit www.swimming.org/schools