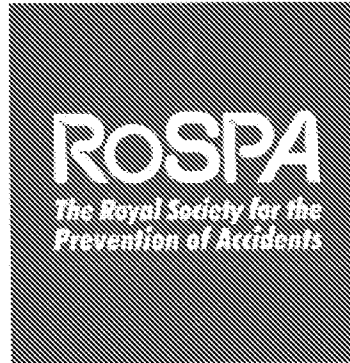


The Royal Society for the Prevention of Accidents



Water and Leisure Report

MJA Consulting for their clients Barratt-David Wilson Homes:

**A water safety assessment of the design and operation of the balancing
ponds at the proposed residential development at Site Six Felpham
Bognor Regis.**

April 2008

RoSPA Risk Management Consultant

**Peter S. G. MacGregor
F.I.Fire.E .CMIOSH. DMS**

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1. Introduction and Terms of Reference

This review has been commissioned by MJA Consulting for their clients Barratt - David Wilson Homes to review the water safety arrangements for the balancing ponds at the residential development at Site Six Felpham Bognor Regis.

The ponds are designed to control the water discharge from the site before it runs into the main drainage scheme and has been designed to Environmental Agency's parameters of a 100 year flood plus 20%.

The report reviews design arrangements for water safety and how this impacts on public safety. In making the following appraisal of your design, RoSPA emphasises the developers 'Duty of Care' to residents and others that may visit the site.

Particular note has been taken of the demographic occupancy mix on this development and that there are likely to be a high percentage of young children in residence.

In making this assessment particular emphasis has been placed upon the RoSPA publication '*Safety at Inland Water sites - Operational Guidelines*'.

Consideration is also given to the implications of recent court judgements and accident investigations where these have a bearing on water safety and provision of rescue equipment and edge protection measures.

In the recommendations that follow RoSPA has endeavoured to identify all the risks; however it is essential that equipment(where applicable), signage(where applicable), risk assessments and operating procedures are continually developed and reviewed in response to changing legislation, best practice documents, *active monitoring* and the *investigation and outcomes of accidents and near misses*.

This review is based an examination of the Design statement submitted in April 2008 and:-

- Drawing No 4180.709 Maintenance areas.
- Drawing number 4180.701 Surface water outfalls and attenuation proposals Ponds A-D.
- Drawing number 4180.702 Surface water outfalls and attenuation proposals Ponds A-D.
- Drawing number 4180.703 Surface water outfalls and attenuation proposals Ponds A-D.
- Drawing number 4180.704 Surface water outfalls and attenuation proposals- pond 1.
- Drawing number 4180.705 Pond water levels.
- Drawing number 4180.706 Pond water levels.

2. Summary of Hazard and Risk

Areas of open water, particularly in areas where the public are either encouraged to visit and or can be present in large numbers, can create a danger to any person walking or playing alongside them - **deep drops** often exacerbate this.

The main risks associated with the hazard are:

- Drowning through immersion.

- Physical injury.
- Health problems associated with untreated or polluted water.

Drowning

This can occur from either accidentally falling or deliberately accessing the water and usually arises from one or more of the following factors:

- *Uninformed or unrestricted access to the water hazard.*
- *Ignorance, disregard or misjudgement of the danger.*
- *A lack of suitable life saving equipment.*
- *Lack of supervision.*
- *Inability of the victim to cope (or be rescued) once in danger.*

Although each of these above may be a contributory factor, the major cause of potential danger on any site will be *ignorance or misjudgement of the danger.*

Physical injury

Injuries are generally caused by falls; slips, trips and are likely to be exacerbated by wet and slippery conditions and potentially entrapment in sand or silt.

Potential poor water quality associated health issues

Water can both contain contaminants (such as pollutants) and toxins that cause ill health, and can be the medium to promote the spreading of bacteria that cause disease and infections. Blue green algae toxins, leptospirosis, cryptosporidium and e-coli are some examples.

The hazards of the ponds and drainage culverts have the potential to promote a risk to persons using the adjacent fields and pathways. In addition, water fascinates young children in particular whose natural curiosity can lead them into danger. Furthermore, employees can also be at risk carrying out maintenance work and using machinery near the waterside, as can adults and older children accessing the site during the hours of darkness.

Child Drowning Research based upon RoSPA annual drowning statistics 1993 - 2003.

Between 1st January 1993 and 31st December 2003, 342 children under the age of 15 drowned in small bodies of water, canals, lakes and rivers and swimming pools in the UK. This figure does not include those that have drowned in the bath at home and at coastal locations such the beach.

A 'small body of water' such as a village pond, garden pond, water container, paddling pool, ditch etc accounted for 131 fatalities.

The highest number of fatalities occurs among those aged two years old. At this age, toddlers have increased mobility, but stability and co-ordination are still undeveloped, therefore, they cannot help themselves if they get into difficulty.

This is particularly important with regard to parental / carer supervision. In 76% of the cases studied children were reported to be unsupervised at the time of drowning. 50% of the children whom drown in small bodies of water were reported as playing, the other 50% were reported to have wandered off and escaped supervision. In the cases where it was possible to analyse, the reasons cited for a lack of supervision were:

- Momentarily distracted (e.g. by answering telephone) 63%
- Being supervised by other children 13%
- Left unattended for more than a few minutes 11%

- * Assumed child to be playing inside 6%
- * Doing another activity at the time (e.g. working) 4%
- * Adult socialising (too many people around) 2%

Along with supervision, unrestricted access to water is another significant contributory factor. Safety grills on garden ponds or fencing around swimming pools have been demonstrated in Australia to reduce the rate of drowning.

Generic assessment of risk

As already stated the ponds present 3 specific water related hazards.

2.1 Drowning

This ponds due to the shallowness of the water at the margins currently present a higher risk of drowning to only very young children (4 years of age and below) who on entering the water are unable to get upright again and out of the water and to older children and adults who fall face down and then are unable to get themselves out of the water.

The circumstances for both occurrences is very rare and would be mitigated by the fact that young children of the age quoted should be closely supervised by parents, teachers or carers and it is highly unlikely that any children would be at the site without supervisors being present. Any drowning that occurred with this age group would be primarily a result of a breakdown in supervision such a child being allowed to wander off. As already stated a small number of children drown each year in shallow bodies of water or the shallow margins of water in public areas, where a breakdown in supervision has occurred.

In these instances signage or public rescue equipment would not have prevented the fatality, only fencing off the water could have stopped the children but it is not practical to fence off all water bodies or pavements on roadsides or for that matter to stop children wandering into danger.

The shallowness of the water does not present a significant risk of drowning to adults and older children either deliberately or accidentally entering the water unless they remained face down in the water for several minutes and where incapable of getting themselves out. Such as those who become unconscious as a result of a fall, those with a disability that could make it difficult for them to get out of the water or severely drunk people are likely to be only those at risk in this eventuality. This is more likely during nighttimes, when it is dark more people could accidentally walk into the ponds if they are difficult to see.

2.2 Physical Injury

Wet and watery conditions are likely to exacerbate the risk of slip and trip injuries, however these will usually be a result of people deliberately accessing the water to play in it or people accidentally wandering into unprotected water whilst not looking where they are going. It is unrealistic to introduce control measures to preclude accidental access to all obvious areas of hazard, if just looking to see where you are going is all that is required to avoid the hazard.

2.3 Potential ill health as a result of contact with un-treated water

As the water features are not intended to be designed to encourage water access, only those whom deliberately come into contact with the water are likely to be exposed to the hazard and any risk associated is likely to be increased with poor personal hygiene, i.e. not washing hands before eating food, blowing nose, rubbing eyes etc. after getting hands wet in the water or through ingestion of water.

3. Existing management of the risk

Water hazards when risk assessed are usually controlled by:

- Physical features to deny or control access, such as barriers or gates.
- Education to raise awareness of the dangers by providing information through signage, leaflets and the use of the local media, etc.
- Documented risk assessments.
- Documented maintenance arrangements.
- Supervision by having a physical presence on site.
- By having in place agreed operational procedures such as formal written Normal Operational Procedures (NOP's) and having an Emergency Action Plan (EAP) and, *when appropriate*, rescue equipment deemed suitable for the risk.

A risk assessment review can be used to determine what should be done, but in itself it can be only part of a total assessment strategy. The conducting of risk assessments by the developer only ensures that you have a full understanding of the hazards and risks, which are the basic premis of why a risk assessment should be carried out. The risk assessment strategy should highlight the need for documentation such as Normal Operating Procedures (NOP) or and Emergency Action Plans (EAP), formal supervision or information dissemination arrangements.

The starting point in establishing a safe site is to develop a **Safety Policy and Safety Management System**, which clearly identifies responsibilities and resources to support this approach. This is based upon acknowledged good practice and design principals as contained in, for example, HSE publication (HSG 65) '*Successful Health and Safety Management*, and

BSI (BS 8800, 1996) '*Guide to Occupational Health and Safety Management Systems*'. Both these documents stress that the key to adopting a planned approach to safety management lies in developing an effective approach to risk assessment. At present, there is a requirement under legislation to carry out risk assessments but there is no statutory requirement to put in place specific controls such as fences and rescue equipment *although this is implicit in the management regulations*.

4. Legal Responsibilities

Various pieces of legislation place statutory duties on the site owners/managers of water sites, or the person responsible for the sites, to provide for the safety and the well being of visitors, which **includes employees and members of the public**. The **consultant has highlighted those issues, which directly relate to the recommendations, which follow in this report.**

Both statute and common law have a relevance to the operation of inland and coastal waters.

Statutory Health and Safety Requirements

Health and Safety at Work Act 1974: This is an enabling act with the aim of securing health and safety in the work place. Regulations made under the Act place more specific duties on employers than employees. **Section Three of the 1974 Act** specifically requires every employer to ensure, so far as is reasonably practicable, that he/she takes the necessary steps to ensure the **safety of non-employees affected by his/her activities.**

The Management of Health and Safety at Work Regulations 1999 (previously 1992): These were made under the 1974 Act. They require that health and safety is suitably managed so as to control risks effectively and present no harm to people. **The regulations require that adequate and suitable assessments of work related hazards should be carried out to determine the preventative and protective steps that must be taken.**

They also require employers to have access to competent advice, to monitor and review their systems, to have emergency procedures and to provide information and training. **They have major implications for the many areas of inland open water, whose activities have a bearing on the public as well as employee safety.**

The Health and Safety (First Aid) Regulations 1981: These were also made under the 1974 Act, and are mainly concerned with the provision of first aid for employees. The regulations set out the range of numbers and training of first-aiders, and the type of equipment that should be provided.

Public Health Act 1936: This is an enabling law offering local authorities the power to regulate water users by by-laws (for example, to prohibit swimming, jumping, wave jumping, etc).

Occupiers Liability Act 1957: This states that the occupier must **take reasonable steps** to ensure the **safety of visitors** to his/her land or premises. **This duty is particularly onerous where children are concerned.** The occupier also owes this duty to visitors and trespassers as well.

The Health and Safety (Safety Signs and Signals) Regulations 1996: This implements European Directive 92/58/EEC, which came into force in April 1996. This standardises safety signs throughout member states of the European Union. The regulations require employers to use safety signs where there is a significant risk to health and safety of their employees that has not been avoided or controlled by the methods required under other relevant law, provided use of a sign can help reduce the risk.

You should be aware that a new BSI standard has been developed specific to water safety signs. The standard BS 5499-11: 2002 was published on 20/07/2002 and RoSPA recommends that any new signage should conform to this standard in the future and that a regular review of existing signage is carried out. Those signs that are in need of repair or have poor legibility/clarity of image should be replaced straight away and all others should be subject to programmed replacement. The period of time for such replacement should be 'reasonable' in terms of overall cost against the safety gain or imperative. Overall, it should not be unreasonable to expect that all signs should also comply with this new standard within a three-year period. (This estimation could be modified by future court actions arising from signage issues).

Other Occupational Health and Safety Duties

Operators to whom the 1974 Act applies also have various duties, including the recording, notification and investigation of accidents to the enforcing authority (e.g. HSE or local authority Environmental Health departments). The appropriate enforcing authority must be notified, where a member of the public has drowned or has been taken to hospital for medical treatment, i.e. following a near drowning incident.

Common Law Duty of Care

Although there is a lack of legislation in this area, responsible bodies do have powers to effect preventative measures and the site owner must ensure that all facilities and equipment are suitable and safe to use. Under common law, liability to negligence may arise from the breach of fundamental duty, known as a 'duty of care'. The duty is described as follows, and applies to members of the public as well as operators:

'To take reasonable care to avoid acts or omissions which you can reasonably foresee would be likely to cause injury to your neighbour'.

The duty specified to take reasonable care. This can be defined as 'what the reasonable man/woman would have foreseen as being necessary'. A certain level of risk is acceptable and it is expected that safety measures will be applied 'as far as is reasonably practicable'. In other words, practicable measures have to be technically feasible, and costs in time, money and effort are reasonable.

In the case of safe management of inland water sites, **the duty of care means that the burden of taking adequate precautions falls on the site operator. A risk assessment of the facility and equipment should be undertaken and appropriate safety measure adopted.** A normal operating procedure document, together with an emergency action plan, should be completed and then monitored and reviewed at regular intervals. Before devising a water safety strategy hazards must be identified, risk determined and findings recorded. This is a legal requirement under the Management of Health and Safety Regulations 1999. **The duty of care is extended to protect people even from their own ill-judgement or wilful abuse of facility or equipment.**

5. Site specific observations and recommendations

The proposed ponds are particularly attractive features and will become a magnet for people (particularly children) to play around them

With this in mind and with the particular requirements of the *Occupiers Liability Act* as far as children are concerned, ***it is pleasing to note that your design has incorporated the following features.***

Edge gradient

Where an open aspect to the water is required it is preferable to maintain a gentle underwater gradient from the edge (normally 1:3). This should be as such as to allow a person to stand with their head above water, at a distance of two-body lengths from the

water's edge. This section of shallow water will provide the necessary protection from the deep water without the recourse to edge protective railings.

- *Your design has incorporated a minimum underwater gradient of 1:3 with a maximum sump depth of 1.3mt.*
- *The position of the sump complies with RoSPA's guidance as it is situated away from the edge together which together with the reduced edge gradient significantly reduces the risk of some one dropping into deep water at the waters edge.*
- *It should be noted that, where experience has shown that where permanent water is in place in a retention pond, the risk is considerably reduced as young persons in particular get used to water being in the ponds and do not use them as play areas; your design incorporates this feature.*

Culverts and drains

Recommendation

- *It is noted that culverts and drains incorporated into the design can present a potential risk to children. These have been protected by grids across the drainage pipes and that fencing is positioned on the culverts to prevent potential falls by children.*

Signage

Recommendations

As part of the overall water safety strategy it is recommended that the following pictogram signage be positioned: -

- *Either side of the detention ponds stating: - 'Likely to flood after heavy rain - Caution - Keep out'. You should be aware that a new BSI standard has been developed specific to water safety signs. The standard BS 5499-11: 2002 was published on 20/07/2002 and RoSPA recommends that any signage should conform to this standard.*

Life Saving Equipment

The decision to place rescue equipment on site, should only be undertaken on a risk assessment basis. The key factors to be considered are: *How effective the equipment will be in preventing a drowning incident when compared to or in relation the other control measures proposed on this site? And importantly – Can the equipment be monitored and maintained on a regular basis?*

Observation

Providing the proposed design and edge profile together with the signage recommended, are incorporated into the design no rescue equipment is required. Rescue equipment can lead to a false of security and in many cases is subject to

vandalism compromising its effectiveness. It is for this reason that such emphasis is placed on physical edge protection measures (i.e. gradient and marginal planting) and signage in this report.

Maintenance and checking of signage

Recommendation

It is recommended that you regularly inspect these safety features and that the results of these inspections are documented as part of your risk assessments.

Ice

Recommendation

It is recommended that you have a procedure that precludes the breaking of the ice in winter and that suitable temporary signage be positioned adjacent to the waters edge 'Danger! Ice'. (if the ponds are full of water)

Similar arrangements should include the positioning of temporary signage when severe weather conditions cause the water levels to rise above the normal operating height.

Management and control measures

Recommendation.

The control measures will be required to maintain the management and effectiveness of the :-

- *Design criteria for achieving sustainable edge profiling and operating procedures.*
- *Means of control for children's access and interaction with the pond.*

Peter. S.G MacGregor CMIOSH RSP

*Risk Management Consultant for 'The Royal Society for the Prevention of Accidents'
April 2008*

Appendix 1 Signage

February 2007

Signage Information

The provision of signage information is a key tool for any landowner in ensuring that they fully discharge their duty of care to the public. Warnings and safety information are an important part of any risk management strategy, whether reinforcing other control measures or standing alone as the key means of protection.

Great care must be given to the extent and type of messages given to visitors. There is a fine balance to be struck between ensuring that visitors are informed about the hazards on a site and the need to preserve the essential nature of that environment.

The following document looks at the general principles behind safety signs in an inland context.

Information in Context

The first consideration of a strategy for accident prevention should always be to try to remove the hazard completely. If this is not practicable, reasonable steps should be taken to reduce the level of risk. The provision of information is extremely important where it is difficult to control risk adequately by other means.

In the open water environment it is totally impractical and unreasonable to deny access or provide supervision along every water's edge. A balanced approach is required using a package of preventive measures, underpinned by a comprehensive information-giving strategy.

Safety Signs and Notices

Specifications

The Health and Safety (Safety Signs and Signals) Regulations 1996 apply to employers and their employees. They do not place any duty on the employer to provide signs to warn other people (e.g. visitors) of risks to their health and safety. However under Section 3 of the Health and Safety at Work etc. Act 1974 many operators do have duties regarding the health and safety of non-employees. The Regulations and accompanying guidance can be helpful in meeting these general duties.

The Regulations specify the colourings and marking needed for safety signs, and are consistent with British Standard 5378: 1980. Wherever possible, pictograms should be incorporated to provide clear, sharp messages people of all nationalities.

In 1988 RoSPA's National Water Safety Committee approved a range of pictogram signs for water safety which comply with BS 5378 and these are now commonly seen at all types of water venues across the country. These signs have formed the basis of the new Standard BS5499: 2002 *Part 11 Water Safety Signs*. Images or signs that are not covered by the standard can be designed but should conform to BS 5499-6:2002 *Design of graphical symbols for use in safety signs – Requirements*.

RoSPA recommends that any new signage should conform British Standard 5499-11: 2002 in the future and that a regular review of existing signage is carried out.

Prohibition

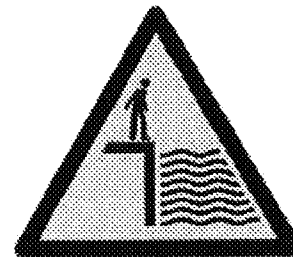
Red background, white text

Prohibition information. The most common will be 'No Swimming' and 'No Diving'.

**Hazard**

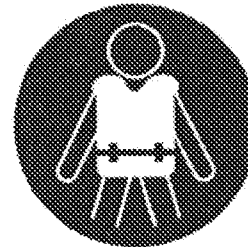
Yellow background, black text

Warning information, particularly regarding hazards such as strong currents, shallow or deep water.

**Mandatory**

Blue background, white text

Mandatory information, for instance, 'lifejackets must be worn'.

**Information**

White background, black text

All other information that relates to safety messages given.

**Safe Condition**

Green background, white text

Includes information regarding the location of first aid and emergency telephones.



Placement & use of signage

Appropriate placement and use of signage is key to conveying the right message to the right people. Too much information and signage can prove counter productive, and in many cases will undermine the benefits of visiting open spaces. The correct application of signage will be achieved only by undertaking a site risk assessment exercise, with due consideration to the following factors:

- Activities occurring on site
- Ease of site access
- Extent of the hazard(s) on the site
- Extent visitors are invited / encouraged onto the site
- Formal control / management on the site
- Heritage and other considerations (AONB, SSSI)
- Hinterland activity and local populations (schools, young families)
- Nature of the site (duck pond v. local park v. country park v. national park)
- Number of visitors
- Site incident history
- Size of site

When choosing and installing signs, the needs of disabled people will need to be considered, and attention given to height/angle, text size, colour contrast and, possibly, tactile properties.

Access Signs and Multiboards

Types of signs

There are several different levels of safety signs available to the operator - primary access, secondary access, and nag signs. These three levels of signage should be adequate to meet the needs of all UK sites. The individual signs will be explored in further detail later.

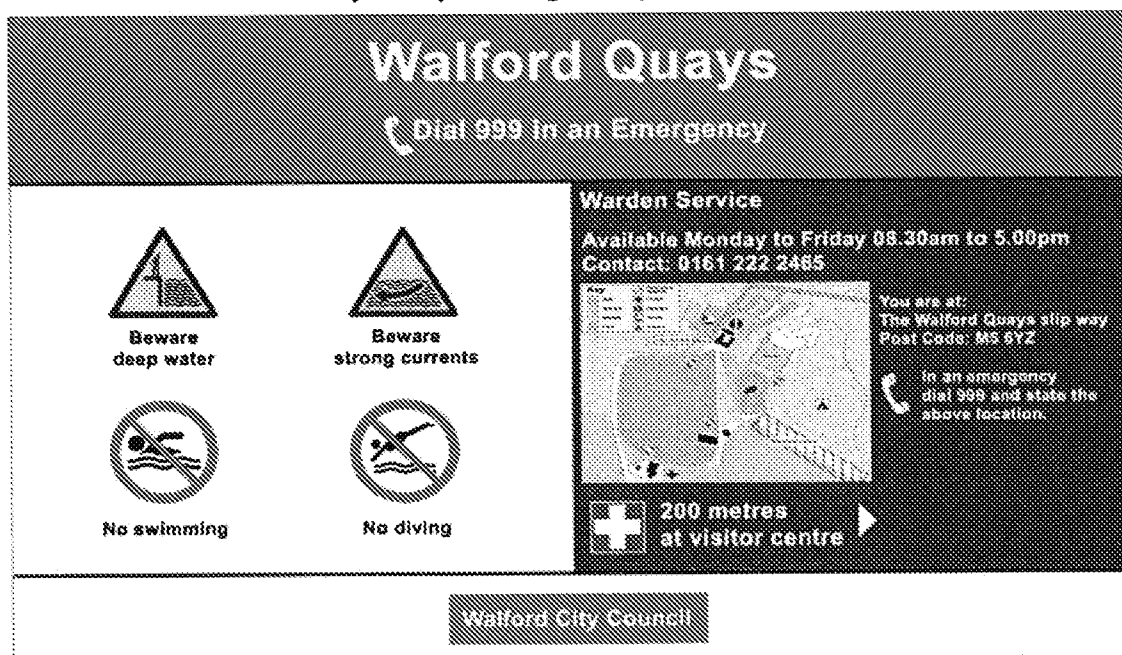
Location

The location and type of signage will ultimately depend upon the outcome of the risk assessment and the factors listed above, but there should be a reasonable amount of consistency in the placement of signs and type of signage used. The table below provides example locations of appropriate placement for each of the signage types.

Primary access signs	Secondary access signs	Nag signs
Main site access points	Main entrance point to the water	Pinch points on site
Car Parks	Major site junctions	Key hazard determined on site
Main collection points	Congregation points	

Primary access signs

A primary access sign is the main sign that will be viewed by the majority of visitors on site. It can have several key safety messages as part of the safety information board.

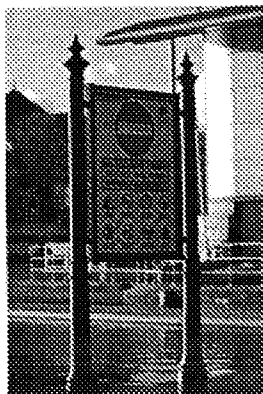


The logical place for the display of safety primary access boards and signs is at principal access points to sites such as main entrances and visitors' car parks, where the maximum number of visitors will view the information.

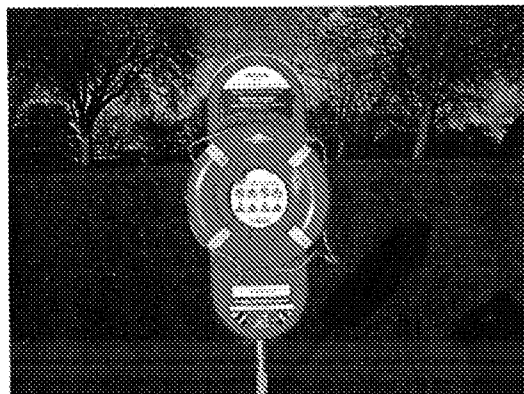
The following information should be on the board:

1. Site name
2. Emergency instruction: "Dial 999 in an emergency"
3. Main hazard and prohibition symbols and supplementary text
4. Details of site supervision services and contact details
5. Location and Postcode (needs to be understood by local emergency services)
6. Site map showing, rescue equipment, first aid and supervisory help, telephones
7. Organisational logos.

Most sites will only have one or two primary access signs (in line with the number of 'main' entrances). The information on these boards can also be combined with rescue equipment to create 'safety points' if appropriate to the site. The images below outline the main information required on a primary access sign.



Primary access sign
(Prohibition based)



Safety point
(Combined safety information & rescue equipment)

Where a lot of information is to be displayed on a multi-board it should be divided up into categories and each section should use the appropriate colour scheme detailed above. Plans of the site should show the location of first aid facilities and emergency telephones if present, and identify unsafe, inaccessible or prohibited access etc.

General safety advice should be displayed at these points, e.g. *'Parents are reminded to supervise their children at all times'*, and *'Lifejackets must be worn during all on-water activities'*.

The extent of any supervision/ranger patrol should also be outlined here.

The information given should be short and to the point, and where possible in pictorial fashion, otherwise it can easily be overlooked. Safety information should always be displayed separately from that relating to environmental or site interpretation signs, such as the location of toilets, refreshments etc.

Secondary Access Signs

Specific signs should be considered at particular hazard spots. These are usually placed closer to the main body of water or congregation point on site, normally these locations will be:

- Main entrance point to the water body
- Major site junctions
- Congregation points

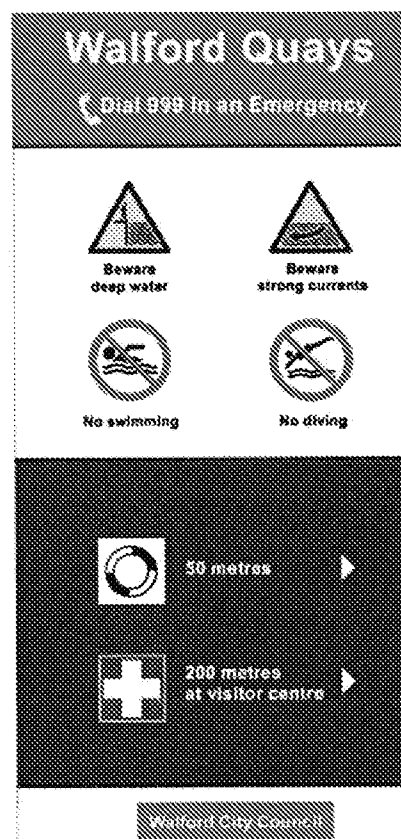
A 'beach' area traditionally popular for swimming, a point where a path passes close to deep water, an area that attracts a concentration of people, such as a picnic spot or viewing platform, are all examples of locations that will need special consideration.

On site many of these characteristics will be found at the same place, which could mean that only one secondary access sign needs placing. Again this sign can be combined with rescue equipment to form a safety point (as above).

The board should hold the following information:

1. Site name
2. Emergency instruction: "Dial 999 in an emergency"
3. Main hazard and prohibition symbols and supplementary text
4. Location and Postcode (needs to be understood by local emergency services)
5. Symbol direction and distance of rescue equipment
6. Symbol direction and distance of first aid provision
7. Details of site supervision services and contact details
8. Organisational logos.

These signs will help reinforce the safety messages already disseminated at access points.



Example – Secondary access sign

'Nag' Signs

In addition to the information provided at principal access points, provision should be made to repeat the message along routes adjacent to the water's edge.

These are repeat messages, small reinforcement messages of key hazard or prohibition messages given previously on the primary or secondary signs. They should relate directly to the hazard they are in close proximity to, and be predominantly symbol-based messages, with reinforcing text.



They are normally located next to the hazard, at places where visitors are most likely to access to water. These could be (for example):

- Pinch points on walkways/paths
- Jetties / platforms
- Bridges where jumping occurs
- Viewing platforms
- Weirs
- Other key hazards determined on site

There will be many locations on site where nag signs can be placed, however it is crucial that only the key locations are signed. Too many nag signs will have a detrimental effect on the overall message. The nag sign should include the following information:

1. Site name
2. Main hazard and prohibition messages
3. Organisational logo (possibly, if not detracting from main message)



Example – warning & prohibition 'nag' signs

Time expired signs, vandalism and replacement

Signs that are in need of repair or have poor legibility/clarity of image should be replaced straight away and all others should be subject to programmed replacement.

The period of time for such replacement should be 'reasonable' in terms of overall cost against the safety gain or imperative. Overall it should not be unreasonable to expect that all signs should also comply with this new standard within a five-year period. (This estimation could be modified by future court actions arising from signage issues).

Operators should bear in mind however, that notices, particularly when they are first installed, are more likely to be susceptible to vandalism than those already in place. Newly installed notices will, therefore, require a stringent inspection regime and a ready stock of replacement notices should be available.

Literature Dissemination

At a large water-based facility or seaside resort, where different activities take place and visitors pass through a control point, it is recommended that leaflets/handouts are distributed on arrival to inform them of the facilities, activities etc. These leaflets should contain prioritised safety messages that relate directly to the location in question. At smaller non-commercial facilities this may not be a practical measure.

Educational Awareness

The most effective method of promoting water safety is through community education. It is in this way that people's perceptions of the dangers in and around open water can be challenged and their awareness of the risks raised.

This can be achieved through talks to groups and schools, information sheets and posters, leaflets, videos etc. Involving the local community and encouraging the perception of a site as a recreational asset for them will engender a healthy relationship with the operator. This may help establish an informal network for the reporting of anti-social behaviour or potential danger points/areas.

Community education is of great importance where a water site is close to dwellings. In these areas the presence of young unaccompanied children at the site increases.

Size Guidelines

Viewing Distance (m)	1.2	1.8	9	18
Height of Letters (mm)	12	16	63	100

Lettering type	Type size (mm)	
Titles (mm)	21 - 25	60 - 72 pt
Subtitles (mm)	14 - 17	40 - 48 pt
Main text (mm)	9	24 pt
Captions (mm)	6	18 pt

General Layout

- Important information should be prominent.
- Break up text, using captions, photos etc.
- Use clear titles and captions to focus attention on information categories.
- Use lower case - it's easier to read.
- Use plain type faces.
- Print text at legible sizes, using an appropriate colour.

National Water Safety Signs

Expenditure



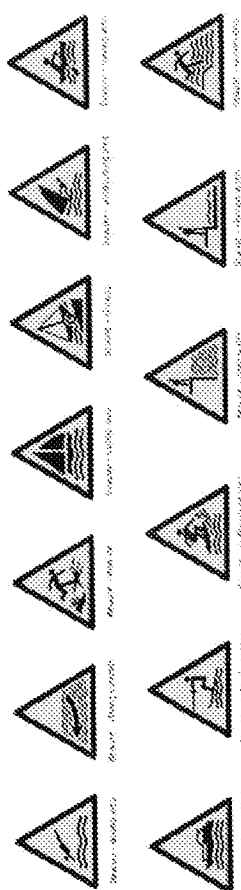
Black and Red on White



040224



Hazard Sign: warn of potential hazards.
Black on yellow.



Mandatory



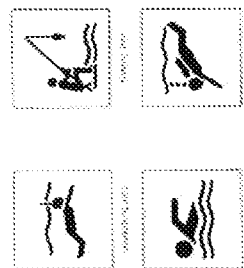
Use the instructions



Information



These are not safety signs, but give general information. Black on White.



Information



The National Water Safety Signs are based on the BS standard BS:4556:2002 Part 1 Water Safety Signs



For Royal Service for the President of Argentina,
the above mentioned, 20th of June 1966.
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Appendix 2 Risk Control for Inland Water Sites

June 2007

Risk Control for Inland Water Sites

Introduction

The first consideration in a strategy for accident prevention is always to try to remove, or separate, the public from the hazard. At sites such as water treatment plant, where only authorised visitors are permitted, complete restrictions are necessary. However, at many inland water sites, it would be neither practical, reasonable nor desirable to attempt to prevent drowning by denying access to water, or by providing supervision along every waters edge. Open water, like our road network, is an integral part of our environment with which we must learn to live safely, whilst those in positions of responsibility play their part in controlling the risk to a reasonably practicable level.

Where access restriction is not appropriate, steps must be taken to control risk to an acceptable level using the risk assessment process described above and identifying appropriate risk control measures, some of which are outlined below. It is important that operators responsible for adjacent sites (e.g. sections of riverside), do, where possible co-operate in the task to ensure consistency for visitors passing between sites.

Edge Protection

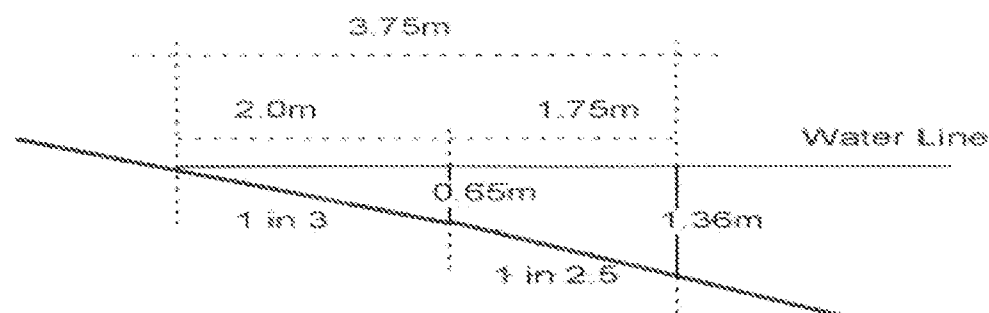
Whilst the profile and nature of the water's edge is a fundamental factor in risk, addressing the edge in isolation will not address all the safety issues. Protective measures should always be supplemented by adequate information and warnings; education of visitors; and, where appropriate, rescue equipment and supervision. Some physical measures to prevent public access are outlined below.

Grading

One critical feature of all water edges affecting the outcome of accidental entry into the water from the bank is the gradient above and below the water line. Research undertaken by the RLSS UK in the 1980s ("Drownings in the British Isles" 1982, 1983), demonstrates that many people who drown, do so in water which is near their own standing depth. Maintaining or regaining standing balance whilst 'in their depth' is very difficult for weak or non-swimmers.

Therefore, where risk is considered to be high, but an open aspect to the water is required, it is preferable to maintain a gentle underwater gradient from the edge. This should be such as to allow a person to stand with their head above water, at a distance of two body lengths from the shore. This section of shallow water will provide protection from the deep water. Grading above and below the water line, can, at some locations, successfully control the risk of falling in.

It is recommended therefore, that shallow water (less than 0.66m) should extend a minimum of 2M from the water edge, via a 1:3 gradient, and a further protective margin of 1:75m with depths from 0.65m to 1.36m via a 1:2.5 gradient.



Planting

In addition, or as an alternative to grading, and where access to the water's edge is required, but either a steep gradient (falling risk) or very shallow gradient (swimming temptation) exists, the planting of backside or emergent marginal aquatic vegetation, particularly with sharp foliage, can provide adequate yet aesthetic protection, with additional environmental benefits. Mud at the water's edge is also unappealing and acts as a deterrent.

Suitable plants which will deter access to the water include:

Emergent Planting

Phragmites australis
Typha angustifolia
Carex riparia
Scirpus lacustris
Iris pseudacorus

Inhospitable Planting

Salix spp - Willow
Prunus spinosa - Blackthorn
Crataegus monogyna - Hawthorn
Rubus fruticosus - Bramble
Rosa Canina - Dogrose

Footpaths

A further protective measure (where public rights of way permit) is to define footpaths away from the water's edge, creating a 'margin' of vegetation between the two. This option is particularly appropriate where views over the water feature are required, and the natural beauty of the site is to be retained. Where a particular section of water has been assessed as higher risk, the footpath can lead visitors away from the water altogether. Alternatively, where risk is deemed low, due perhaps to the shallow depth of the water, (as found at some duck ponds for instance), a painted yellow line can be a useful means of clearly defining the boundary between path and water.

Fencing

In some circumstances, where the risk is high due to the nature of the edge, the hinterland activity or a combination of the two, then fencing may be necessary.

The level of assessed risk will affect the choice of barrier. At low risk sites, the function of the barrier might be merely to 'deflect' the public from the water's edge; therefore a post and chain or a single rustic rail might be adequate.

Where overall risk is identified as moderate but where a particularly sensitive location is identified i.e. deep water or pinch points, a section of more substantial fencing may be required.

A high level of risk may lead to the installation of balustrade, combined with warning signs, to exclude members of the public from gaining access to the waters edge.

The balustrade or fencing will require regular maintenance and inspection, it may be subject to vandalism, and it will usually remain scaleable. The effect of barrier erection on other user groups, such as boaters, will also have to be taken into account, to ensure that landing points are provided and that there is no risk of crushing.