

Design

The purpose of this section is to set out our requirements for mooring schemes on our network. This includes technical and design considerations. We also give other guidance from a broader perspective to help you develop your scheme such as some best practice, references to other main statutory requirements for mooring schemes and certain other useful references. There are links to case studies, useful documents and other websites.

The subjects covered in this section are typical to mooring and marina development but this is not an exhaustive list and there may be other critical issues relating specifically to your site.

This section is not a detailed 'instruction manual' but more of a performance specification. You will need to propose design solutions based on your assessment of the site characteristics and our requirements. We encourage you to liaise with us as you develop your design during this stage so that we can agree solutions with you as you progress the scheme. For more information on working with us, the information we require to make our appraisals and our contractual requirements, you should refer to the page [our application process](#) of this website.

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Professional Advisors

Marina development is a complex process that requires a broad range of professional disciplines depending on the attributes of the site and the stage of the scheme, for example: project manager, planner, consulting engineer, ecologist, surveyor, solicitor and others.

We have included links to the most relevant professional bodies / institutions throughout this site and our team can advise on professional institutes and trade associations.

It can sometimes be beneficial to engage a firm of multi-discipline consultants who can provide continuity through the different stages, or an experienced project manager.

Requirements for Site Investigation

In line with industry practice, the site investigation should be under the overall supervision of a Ground Specialist (ICE 1993), who should have experience of development on the waterways. The investigation should be carried out to BS 5930 (1999) standards. More information can be found from the Institution of Civil Engineers www.ice.org.uk Soil testing must be carried out to BS 1377 (1990), by a UKAS accredited laboratory United Kingdom Accreditation Service www.ukas.com

Site investigation is considered to be a construction activity and should therefore comply with the Construction, Design and Management Regulations (CDM) 2007

Please note that under the Construction Design and Management Regulations (CDM) 2007 specific legal duties are placed on organisations or individuals for whom a construction project is carried out. Please contact the Health and Safety Executive for further information:

Phone: 0845 345 0055

Website: www.hse.gov.uk

The Ground Model

The overriding objective of the investigation is to produce a ground model, against which predictions may be made regarding the ground response to the proposed works. The ground model requires interpretation of the geology, ground conditions including groundwater and other factors (including existing structures), by a suitably qualified person, normally a geotechnical engineer or engineering geologist.

The ground model should be described clearly using plans, cross-sections, block diagrams and other sketches as appropriate. Areas of assumption or interpolation should be clearly identified.

Ground Investigation

A detailed geotechnical survey and appraisal will be required.

Ground investigations should include the following information where the proposal connects to or interferes with the impermeable lining of an artificial cut or canalised navigation:-

- location and depth of all boreholes and trial pits
- full log of boreholes and pits including description and classification of soils and ground water levels
- location and depth of samples
- an interpreted ground model with quantitative information on characteristics such as plasticity index, permeability (horizontal and vertical), classification by particle size distribution, angle of friction, cohesion, dry density and bulk density and dispersivity index.
- ground levels not only to Ordnance Datum but also relative to normal water level in the canal and, where appropriate, levels of flood defences, maximum flood, mean low water of spring and neap tides and mean high water of spring and neap tides
- quantitative information on contaminated land and ground water, where applicable. We may require water quality monitoring during construction and subsequently during operation.

It is important that the level and the quality of information provided is consistent with the complexity of the proposed works and that any subsequent design assumptions used in the temporary and permanent works are supported by the findings of such an investigation. Where insufficient Ground Investigation data is available, designers will have to use conservative soil parameters in the design of the works that may result in substantial additional costs.

The Ground Investigation should be sufficient to reduce the risks associated with unforeseen ground conditions to a tolerable level.

It should be noted that the connection to the waterway, unless agreed otherwise with the Trust, will need to be undertaken in dry conditions. This will require the use of temporary works and / or a pre-agreed canal stoppage / partial stoppage to create a dry working area. Consideration should be given to this in the Ground investigation and in the programming and pricing of the works.

Care should be taken not to disturb wildlife when carrying out any intrusive investigations (boreholes, trial pits, etc.) Of the wildlife most likely to be encountered, badgers (and their setts), nesting birds, bats, water voles and all reptiles require special attention as they are all legally protected.

No borehole shall be drilled or trial pit excavated within six metres of the water's edge or within the water channel without our written permission.

Normally, this will be necessary as it is a requirement to determine the composition and properties of the bed/lining material, to assess whether the lining extends behind the bank protection, or to locate services or other buried structures, to provide the level of detail for the Trust to fully assess your proposals for construction of the marina entrance.

Waterway walls can be up to two hundred years old and are generally not capable of bearing loads. Plant should be lightweight only and must not load the wall or edge of the canal. A condition survey and risk assessment will be required.

Whilst undertaking site investigation works within or adjacent to the canal, appropriate measures must be taken to avoid disturbing the existing canal lining. However, if it will be necessary to affect the navigation channel, within the existing waterway width, for temporary or permanent works, then bed profiling for a sufficient distance either side of the works should be carried out. In such cases, any investigations must be agreed in detail with us in order to minimise the risk of damage to the canal.

Other conditions which must be observed are:

- Unless pre-agreed with the Trust, and required for safety reasons, at no time shall the waterway or towpath be blocked. Signage and suitable fencing or other barriers must be used to segregate the public from the working area. Some towpaths are public rights of way and will require Local Authority consents for closure/ diversion.
- No trial pits are to be excavated on embankment slopes below the level of the waterway or within five metres of the toe of such embankments.
- No water is to be pumped into or out of the waterway.
- No borehole or trial pit spoil or grout shall be allowed to enter the waterway and all such arisings shall be removed in compliance with waste management legislation.
- Boreholes are to be sealed and backfilled with cement-bentonite grout of an agreed specification except for any borehole within the existing waterway width. Where alternative backfilling is required (for example for a particular installation), this must be agreed with us.
- Trial pits are to be carefully backfilled and adequately compacted in layers.
- Any variations from these conditions require our agreement.

Reinstatement

All access roads used, and fences and hedges disturbed during the investigation should be fully reinstated to our satisfaction.

Where it is necessary to leave apparatus such as piezometers or survey stations on our land, the design of the installations, including details of covers etc. must be acceptable to us and a commercial agreement may also be required.

Provision of information

Relevant logs, test data and other field information must be submitted. The preferred format is paper, backed up by electronic (e.g. pdf format) copies, as

well as AGS data (current version). Interpretative reports should be provided as a paper copy, together with electronic (e.g. Word or .pdf) version.

All exploratory holes must be accompanied by a 12-figure national grid reference, as well as a level to Ordnance Datum. Where it is not practical to provide levels to OD (for example where no benchmarks are present locally), then it may be acceptable to provide a relative level to an agreed datum (not water level), with a suitable witness drawing of any temporary benchmark used.

Useful references and links

Institution of Civil Engineers www.ice.org.uk

UKAS United Kingdom Accreditation Service www.ukas.com

Construction, Design and Management Regulations (CDM) 2007
www.hse.gov.uk

AGS (2004) A Client's Guide to Site Investigation, AGS Information Sheet, AGS, Beckenham, Kent

BS 5930 (1999) - Code of Practice for Site Investigations

BS 10175 (2001) - Code of Practice for the Investigation of Potentially Contaminated Sites

Excavation of the Mooring Area

The construction of the mooring area can take many forms dependent on the site conditions. Normally, a basin is separated from the waterway by a narrow mouth which has grooves for stop planks, thus allowing the basin to be isolated from the canal. To protect the integrity of our waterway, the width of the separating bank between the waterway and the mooring void must be adequate assuming that either the waterway is full and the void is dewatered or vice versa.

Refer also to the page [Feasibility - ground conditions](#) of this website and Requirements for site investigations in this section.

Site conditions can vary from entirely impermeable clays through bands of materials such as sands and gravels overlying clays to disturbed, highly variable and contaminated ground as a result of previous land use.

It is essential that you can prove the structural integrity of the proposed mooring area. To do this you will need geotechnical information on ground strength and water retention - at and below the level to be excavated to. (This is not the same as information on the material to be excavated.)

Should the basin be over excavated to allow for the construction of the liner or for the removal of any materials contained underneath it, the geotechnical

investigation and supporting calculations should be based on the differential head of water in the canal as measured above the excavated floor level of the basin.

Re-using or disposing of the excavations and dealing with Contamination

At most mooring schemes which require excavation, it may be possible to landscape some of the excavated material on site to avoid the costs of disposal. The condition and cleanliness of the excavated material will determine whether it can be re-used on site or must be removed. Our local team can advise on the potential for transporting the spoil by water.

Procedures for assessing and handling contaminated soil are strictly regulated. Procedures which are laid down by DEFRA and the Environment Agency follow a risk assessment basis. The principles of investigation and remediation of contamination are the same as for any development site but potential contaminants from the soil must be prevented from leaching into the waters which are a sensitive receptor. Contaminating materials, including excavated contaminated soils, should not be stored or placed in areas subject to flooding.

Some contaminated soil may be 'cleaned' and re-used on site. The re-use or removal of excavated material is regulated by the Environment Agency and you are advised to consult with them at an early stage. It may also be subject to approvals of the local authority (planning and/or environmental health) dependant on the nature of the re-use and is an integral component of the planning application.

The potential impacts of opening up old basins and arms as part of any development must be considered since materials originally used to fill them may be contaminated. The creation of new pathways, landscaping etc on contaminated soil will also need careful design.

Refer to the references and links at the end of this page for more information on contamination.

Useful references and links

"Site Investigation in Construction Series 1 to 4" (1993) ICE Site Investigation Steering Group, Thomas Telford, London Institution of Civil Engineering
www.ice.org.uk

Environment Agency Model Procedures for the Management of Land Contamination (CLR 11) www.environment-agency.gov.uk

Defra (Department for Environment, Food and Rural Affairs) Assessment of risks to human health from land contamination (CLR7) www.defra.gov.uk and www.environment-agency.gov.uk

Government Planning Portal; www.planningportal.gov.uk
www.communities.gov.uk

"Brownfields - managing the development of previously developed land. A

client's guide (C578)" by DW Laidler, AJ Bryce, P Wilbourn published by CIRIA (The Construction Industry Research and Information Association) www.ciria.org.uk.

"Breaking old ground; BURA Guide to Contaminated Land Assessment & Development" (British Urban Regeneration Association) www.bura.org.uk

"Land Contamination - Management of financial risk (C545)" by Finnamore J, Denton B and Nathanail, P. Published by CIRIA (The Construction Industry Research and Information Association) www.ciria.org.uk

Canal & River Trusts' principal criteria in the design of a mooring basin or marina are:

- water tightness
- the ability to isolate the marina from the main waterway
- integrity and durability of construction including any lining system
- the safe access and egress from the marina (marina entrance design / layout)

Secondary criteria are:

- accommodating the towpath, any necessary bridges and service diversions (if the site requires access from the towpath side)
- drainage of water from the development into the mooring basin / marina and our Waterway

The site assessment and design needs a structured approach, including a formal geotechnical desk study (with associated report), followed by detailed investigation, and an engineering design stage. Normally, the desk study is required at site evaluation/ feasibility stage, followed by detailed investigation and design.

You should assume a 100 year design life.

Making the void water-tight

We need the void that you create to be water-tight in order to retain the water within our network; essentially we require that water losses from the marina/ basin are below a specified rate, 5mm in depth over the surface area a day.

Clearly the design solution will depend on the ground conditions at your site. Water-tightness may be achieved in highly permeable soils provided the water level is below the local ground water table throughout the year. This can be hard to demonstrate, but may be realistic for example in a marina excavated alongside a river navigation, or close to another watercourse which will dominate the water table. A ground model is required (this should have been produced during the desk study), which considers the natural materials present, their permeability characteristics, and also the pre- and post-development hydro-geological (ground water) regimes present. This should then be used to predict water losses.

The soil characteristics will determine the need for, and type of, lining. If the basin is in impermeable ground, lining will not be needed. Sometimes the bed

is in watertight ground and only the sides need to be made watertight. The choice of lining system is determined by a very wide range of technical issues and specialist advice is essential. Examples include Puddle Clay Specification (refer to useful downloads/design documents) and modern materials such as reinforced concrete, butyl and geotextile/bentonite membranes which may be only suitable in certain conditions. Uplift should be considered for lined basins in areas of high or fluctuating groundwater level. You must also take account of the durability of a liner since boat manoeuvring can cause scour and boat propellers, boatshafts and dredgers can cause damage. Jointing details are a challenge and careful detailing of pontoon support systems need to be undertaken so as to not compromise the chosen lining system. If the adjacent or underlying land is contaminated, the seal must also prevent contamination entering the waterway.

On completion of the basin, but before connection to the navigation, a stilling test will be required to test its water-tightness. Where contamination is considered to be a risk, the stilling test should be used as an opportunity to test for leaching into the basin. Refer to the **bottom of the page** for further information.

Constructing the edges of the void

The principal functions of the basin edges/bank protection include:

- water retention
- prevention of erosion
- carrying loads
- providing the connection to pontoons

Design of retaining structures is complex, requires an understanding of the ground conditions, structural loads and proposed use, and should only be undertaken by suitably qualified specialists. Many forms of edge creation and bank protection are available. Piling is the most common form but concrete and masonry walls are also a possibility.

A structural system of bank protection, such as interlocking sheet steel piling, is likely to be needed for areas where the retained height is significant, or there will be surcharge loads from other sources such as craneage, car parking, vehicle deliveries, tankers etc. The design must be appropriate for the foreseeable end-use of the structure.

It is usual to install a reinforced concrete capping beam to structural piles to prevent damage to boats. Galvanised trench sheets are non-structural but are sometimes used where craft must lie alongside the bank. Capping beams should ideally be made to accord visually with vernacular building materials for instance by laying brick or stone masonry to the upper face and fendering the vertical face.

The method of future maintenance of bank protection systems should also be considered at the design stage.

Soft edge details can look more pleasing in many settings, offer an opportunity for wildlife and can be significantly cheaper than hard bank protection. If they are to provide access to boats, the soft banks will require a 'bridge' detail between the edge and pontoons as there is usually insufficient

depth to moor within about 3m of the soft edge because it slopes. Services will also need to be located within any bridging structure.

Fixing the pontoons in place

The solution depends on the site conditions, form of construction and whether water levels fluctuate.

If the bed is natural clay, the pontoons may be located by piles driven into the bed. A lined marina presents more difficulty. Puddle clay may need to be repuddled around piles. Modern liners have specific solutions such as gaiters.

Pontoons can be fixed or static i.e. supported off the bed or alternatively floating, tethered at suitable locations. Most floating pontoons are supplied on a design and build basis and manufacturers will normally produce a layout as part of their quotation for supply and installation. It is advisable to use a good quality pontoon and fittings such as cleats, service bollards and fenders.

These are likely to be the safest, easiest to maintain, have the longest life, meet customer demands and ensure a standard of quality.

Pontoons and the access to them will need specialist design in fluctuating water levels. Canal water levels vary little and no particular precautions are necessary. Some canals, which are constructed near rivers are subject to occasional inundation with rising levels. River levels fluctuate with rainfall and drought. Lock cuts (artificial canal sections on river navigations) are also affected. Moorings or marinas on river navigations will need to have mooring pontoons capable of operating in a range of water levels with flexible connections to dry land. Floating pontoons accessed by link bridges are normally used. They rise and fall with river levels, removing the need to adjust mooring ropes. There may be some restrictions imposed on boat movement during flood conditions or exceptionally low water levels.

Tidal rivers and waters fluctuate daily and represent a further dimension which may require special consideration in terms of 'rise and fall' access. Boat movement may be restricted at low water levels. Moored vessels may need to 'bottom out' and rest on the river bed at low tide. This may require the creation of flat beds on which they can rest. To maintain a marina in water at all states of the tide, an entrance lock or tide gates may be needed.

Refer to the page [water levels-flood risk-discharges](#) of this website for more information on water levels and flood risk.

Locating the entrance of the mooring basin/marina

The entrance to a basin/marina should be located and designed to minimise the effect on other canal users. Existing structures such as bridges, locks, weirs, sluices, feeders, existing moorings and established reed beds can affect the ability of crafts to manoeuvre safely when accessing / egressing a marina. Sight lines should also be considered when locating a marina entrance. As a general rule, oncoming boats approaching the entrance should have a minimum line of sight of 60m to each direction from the centre line of the marina entrance. Please see diagram below

Typical Marina Entrance

Typical Layby Marina Entrance

Signage requirements to warn approaching boaters may be required (at your expense). Passing boats may use the entrance to turn around and this should be considered in its design and siting. Particular attention must therefore be paid to the manoeuvring facilities depending on the attributes of the site, prevailing wind, waterway constraints and level of traffic.

The basin should be separated from the main navigation by an undisturbed berm that is lined and armoured as appropriate so that the entrance cannot be by-passed by water.

The entrance to the basin should generally be no wider than the standard lock gauge of the navigation unless manoeuvring of boats requires it.

Hard bank protection around the entrance to the basin/marina and on the opposite bank of the waterway is likely to be needed (at your expense) in order to prevent erosion and scour. You will also need to consider any dredging requirements in the waterway around the entrance. In some cases works may be required to widen the waterway locally, for example to create better turning circles or a lay-bye to accommodate a full length boat accessing the basin/marina safely. These areas will need to be constructed to full depth, typically 1.5m. Soft bank protection may be required within the vicinity of the site to reduce erosion from increased boat movement. We may not own the bank and in these circumstances permission to install the protection measures will need to be obtained from the relevant land owner.

Marina connections 'through' our towpath

Marinas which require a connection to be made 'through' our towpath will need to provide a towpath over-bridge and associated infrastructure, including access ramps on either side. This can add a significant cost to your scheme as a whole. The minimum headroom required for boats to pass underneath will vary according to the waterway in question, but it will be a minimum of 2.6m from the control weir level (which we will advise you of). There may be utilities apparatus in the towpath/adjacent land which will need to be diverted. You would need to liaise with the utility owner directly in terms of the logistics and costs of diversion work.

The 'cut-off arrangements' to isolate the mooring void from our network must be clear of the bridge structure to permit safe handling of the stop logs. You will need to take account of the [Disability Discrimination Act](#) when designing the access ramps either side of the towpath over-bridge. We may require access for operational vehicles along the towpath and hence over the bridge which may therefore need to accommodate vehicular and pedestrian traffic. The bridge design should be appropriate to its waterway setting and any conservation or heritage requirements.

You will need to consider temporary arrangements for the construction of the bridge and ramps on our property (the towpath) which may include diversion of the public and our staff around your site whilst the towpath is interrupted to make the connection.

In most cases the towpath bridge will be located on your property and we will need to have an easement allowing us, members of the public and utility services to have use of it. The ownership and maintenance of the bridge will be your responsibility.

Connecting to our waterway and maintaining its structural integrity

Preserving the integrity of the waterway as well as any mooring / marina construction is of fundamental importance to us. As described above, the proposed construction must be structurally sound and capable of being maintained in a watertight condition.

The site should ideally be at the waterway level, thus avoiding the need for a lock to access the waterway for cruising.

Our waterway network has a great range of channel geometry and detail, including various bank protection systems and linings. This will influence the design and method for connecting your site to our network. You will need to 'tie in' to the deep channel section of the waterway. The design of this junction with the main canal bed must be profiled to provide sufficient depth for navigation and continuity of the lining. Refer to the following diagram which demonstrates this issue on a typical [Canal Section](#) with sloping sides. The method of connection will depend on local conditions.

It may not be achieved by dredging because of disruption to the lining of the canal and the inability to achieve a satisfactory interface under water. It may be possible to connect without draining the canal in certain conditions but a cofferdam or even a stoppage may be needed to temporarily drain the canal of water (which must be done during our stoppage programme). Refer to the [Construction - timing and canal closures](#) page of this website for more information.

Isolating the site from our waterway

We require a basin or marina to be capable of isolation from the waterway so that both you and we can protect our respective water-spaces. (We accept that this is not practical on lay-bye mooring schemes.) We will conduct a risk assessment, in consultation with you, to determine the range of options for isolating your waterspace.

This will enable you to protect your basin/marina and the boats moored within it in events such as a pollution or low flow on the waterway (e.g. a breach, drought, or planned stoppage requiring de-watering). This will also allow you to de-water the basin for dredging or other forms of maintenance. We also require the marina to be isolated from the waterway network in order to conduct the stilling test (see below) and to protect our network in the event of a leakage from your site or other potential impact extending through to our system such as pollution etc.

A suitable structure must be built at the basin/marina entrance to form an impermeable seal when connecting to the channel and allow isolation. This can be undertaken using a variety of methods such as piled coffer dams, flexi dams or the usual option of stop logs. Cut off piling may be needed beneath

and around the structure. The requirements of any coffer dam are that it will be structurally secure, watertight and will be able to be inspected by a competent person who will sign the coffer dam register.

In the event of the traditional stop log method being chosen, it can be cost effective for a double set of stop log grooves to be installed approximately 1m apart, 1.5m high and usually having a clear span of 5m equivalent to the width of a broad beam lock. It is essential that the stop log grooves are themselves rebated to prevent damage from boat collision and are thus available to be used at any time. All structures must be protected where necessary by fendering designed and installed to resist the impact of moving craft, vertical movements of water level due to flooding or tides and to protect the hulls and superstructures of craft from damage. A drainage sump between the two coffer dams assists with the stilling test (see below).

Refer to this diagram which demonstrates a [typical connection design](#)

The stilling test

We will need to test your mooring site for potential water loss which will be drawn from our network.

The test involves isolating the basin from the waterway by a double coffer dam, the space between the coffer dams being pumped out, the basin being filled with water and maintained over a minimum period of 14 days to monitor the loss of water level in the basin for all reasons including evaporation. If this is found to be within reasonable limits of less than 5mm in depth over the surface area per day, we will permit the basin to be connected to the waterway.

Whilst we will need to approve the removal of water from our waterway for this test, there is currently no need to apply for an abstraction license to use water from our network for this first filling of the marina.

Useful references and links

Disability Discrimination Act www.disability.gov.uk

Puddle Clay Specification

CRT Diagram to illustrate a typical [Canal Section with sloping sides](#)

CRT Diagram to illustrate a [typical Connection design](#)

Water Levels, Flood Risk, Discharges and Water Quality

Water levels

Canal water levels vary little and no particular precautions are necessary.

Although some canals which are constructed near rivers are subject to occasional inundation with rising levels.

The Environment Agency and we can advise on whether your site is in one of these locations. Any development in Flood Plains will need consent [Environment Agency](#).

Flood risk

There are two main impacts of a mooring development on flood risk. The first impact is the increased risk to the waterway from the development associated with the mooring site. For example the construction of hard standings, new buildings and infrastructure may increase the rate of run-off to the waterway. Refer to our guidance below on accepting surface water discharges.

The second impact is the risk to the mooring site and its infrastructure from the waterway. A Flood Risk Assessment (FRA) is required with your planning application and it should be consistent with this guidance and it is important that you include us early in the scoping of the FRA.

Basins or marinas retaining more than 25,000m³ of water above natural ground level are likely to come under the provisions of the Reservoirs Act 1975. The approximate dimensions of a marina of this magnitude are 15,000m² in area and 1.5 m deep which would accommodate approximately 150 boats. The marina will require specialist input from Reservoir Panel Engineers and a rigorous maintenance and inspection regime under the auspices of the [Environment Agency](#)

Surface water discharges

Discharge of water from your site, other than by way of natural run-off, either into the proposed basin or into our waterway requires our consent. Any discharges, including surface water drainage of impermeable surfaces, will only be agreed to if they will not cause the water quality of the waterway to deteriorate, either in the long term, or as a result of increased emergency discharges. We will only accept clean surface water. We will not accept foul, polluted or contaminated water. Discharges of trade or sewage effluent are not normally accepted on water quality grounds due to the relatively static nature of our waters.

We expect you to use best available technology to treat and regulate any discharge. We may require oil interceptors and silt traps to be fitted. We support and encourage sustainable methods such as reed beds filtration. You will need to provide calculations showing the relevant catchment areas, run off quantities and the sizing of oil and silt traps that will be required.

If you wish to discharge surface water you will require a separate licence with us which includes standard clauses to ensure that issues of water quantity and quality as well as any construction issues are properly addressed. There is no charge for surface water discharges made from property and structures directly connected to the provision of mooring. Payment is however likely to

be required in respect of discharges for all other purposes. Refer to the page [Our Application Process - legal agreements](#) of this website for more information on the Surface Water Discharge Licence.

Surface water discharges may also require consent from the Environment Agency (EA), this includes roof and car parking drainage and will depend on the size of the area drained and the risk to the waterway. Drainage from areas with commercial activities e.g. working boatyards can be subject to Trade Effluent Agreements with the EA. They also issue Pollution Prevention Guidance. www.environment-agency.gov.uk

CIRIA (The Construction Industry Research and Information Association) www.ciria.org.uk have information and good practice relating to sustainable drainage in the built environment.

Storage of fuel and other substances

Diesel tanks, hazardous substances and other commodities will need to be stored in bunded areas that are capable of holding at least 110% of the volume of material stored. Storage tanks and dispensing equipment will need to be installed in accordance with current legislation. <http://www.environment-agency.gov.uk> and should be located so that the use avoids spillages into the mooring area and entering our waterway.

Oil emergency facilities should be kept on site including spillage clean up and, if appropriate, the means to isolate the marina described in [Design: performance criteria](#). Measures may include oil absorbent materials being available and attention to any refuelling facilities that might be provided at the marina. Fuel storage facilities may require a fire officer's approval which may influence their siting. An emergency plan for dealing with a pollution incident should be written in line with Environment Agency guidance.

Discharges from boats

Sewage from boats must not be discharged into the water. Facilities such as pump-outs and Elsan disposal units should be provided on site for the emptying of boat holding tanks. The location of these facilities must be carefully planned to minimise effects from spillage. Residential boats can be directly hooked up to mains sewage disposal via their service bollard when they are at their mooring. This can remove both sewage and grey water (see below) for this 'high use' group of customers. Because this facility avoids the customer handling any waste, it is greatly valued by them.

Consideration should be given to 'grey water' from boats, which includes waste water from sinks, showers and washing machines. We encourage recycling processes and collection of waste water to prevent overboard discharge into the mooring site.

Whilst clean rain water may be pumped from bilges, engine compartments must not be emptied into the water.

Water quality and stagnation

Basins, marinas, or areas within them may become stagnant when there is little boat movement. This in turn can lead to formation of scums, possibly blue-green algae blooms and gassing sediments. Formal monitoring is not usually necessary but problems will become self-evident. Failure to address this issue at the design stage may lead to customer complaints as the perception of poor water quality is heavily influenced by surface water appearance.

Good design and management can overcome this by ensuring regular boat movement across all areas. Otherwise aeration and circulation technology may be required. There are a number of low cost solutions available based on solar and wind power that simply ensure that water is kept moving. A 'sweetening flow' could be considered using a by-pass pipe although this must be capable of being closed off when required.

Useful references and links

Environment Agency www.environment-agency.gov.uk

Government planning portal www.planningportal.gov.uk

CIRIA (The Construction Industry Research and Information Association)
www.ciria.org.uk

Planning

In order to build your scheme you will require planning permission from the Local Planning Authority (LPA). We recommend in the [Feasibility - planning](#) section of this website that you have early pre application discussions with the LPA to understand their requirements and relevant policies. This should enable you to address these in your submitted application.

As a statutory consultee, we will be asked by the LPA to comment on your application and we would like to be in a position to support it.

To allow us to do this we would ask that you and your planning advisers liaise closely with us as you prepare your planning application.

We would also request that we see the final application before it is submitted to the LPA so we can ensure as much as possible that there is nothing in it that may cause us any concerns.

You will need to judge carefully the timing of both your application to us and your planning application to avoid delays (and wasted costs in the event that either application is unsuccessful). Refer to [our application process](#) on this website for more information.

Useful references and links

Government portal www.planningportal.gov.uk and www.communities.gov.uk
"Planning Guide for Boating Facilities" produced jointly by the [British Marine Federation](#) and the [Royal Yachting Association](#)

Environmental Impact Assessment

Planning regulations, Environmental Impact Assessment (EIA) and the Environmental Statement

The planning application process requires an assessment of the scheme's environmental impacts. The Local Planning Authority (LPA) will decide what needs to be submitted, based on the scale of the proposal and the sensitivities at the location.

The regulations state that the LPA may require an Environmental Impact Assessment (EIA) where the surface area of the enclosed water-space is greater than 1000 square metres (we estimate that this area may accommodate only 10 berths) or more than 100 berths are planned. The application will then need to include an Environmental Statement. Refer to the page [Feasibility – planning](#) of this website for early considerations relating to EIA.

If the LPA have indicated that the proposal is likely to be appropriate / acceptable and an Environmental Statement is required, you are advised to seek their Scoping Opinion on the content. We are willing to review with you, in advance, the information in your approach to the LPA on this issue. The LPA will consult statutory consultees, including us, on the information to be included such as desk study and investigations.

The statutory consultees are obliged by the LPA to provide the developer (on request) with any information in their possession that is likely to be relevant to the preparation of the Environmental Statement. The onus is on the developer to make the request and identify the type of information required. Consultees may make a reasonable charge for the consideration and provision of that information. However, to demonstrate our commitment to new mooring development, in cases where we are broadly supportive of the proposal, we will not charge for the consideration and provision of such information, for our part as a statutory consultee.

We will provide a schedule of information relevant to either the Environmental Statement or the planning supporting statement (where it is ruled that an EIA is not required). The issues highlighted in the subsequent section, Wildlife and Natural Environment, are likely to feature within an Environmental Statement if an EIA is required. The majority of other environmental impacts such as noise impacts on neighbours, light pollution, etc will vary on the type of location of the site. If an EIA is required they will be addressed through the scoping exercise. Where an EIA is not required early discussions with the LPA should identify the information to be provided in the planning application on these matters.

At this stage, consultees would not be expected to express a view about the merits of the proposal. However you should note that, as part of our Application Process, we send you reports on our appraisals of your submissions which include our views (which may be positive or negative). Such views will be made on the basis that they are without prejudice to matters that we may like to raise or are required to be raised in connection with our status as statutory consultee in planning matters.

Useful references and links

Environmental Impact Assessment: guide to procedures
www.communities.gov.uk

Royal Town Planning Institute (RTPI) www.rtpi.org.uk and their journal "Planning" which can be viewed at www.PlanningResource.co.uk

"Scoping guidelines for the Environmental Impact Assessment of Projects" produced by the Environment Agency, particularly section F4, Scoping the environmental impacts of marinas www.environment-agency.gov.uk

Wildlife and the Natural Environment

General principles

The character and nature of the unique waterway environment should be protected. You should identify the key potential impacts of the scheme on the waterway corridor and how they are to be assessed and addressed. Impacts on waterway habitats should be minimised. Opportunities to enhance the quality and number of habitats on land and water should be grasped.

We will advise you whether there are any known environmental sensitivities, protected species or valuable habitats/features on the waterway at your proposed site of which we are aware. However you will need to make enquiries of regulatory or other public bodies such as English Nature, CCW, the Environment Agency, local planning authorities and local authorities.

Further survey work

Refer to the page [Feasibility](#) - Wildlife and the Natural Environment of this website to review the initial assessment work which should have been undertaken. The initial feasibility stage should have identified any statutory and/or non-statutory wildlife sites, and/or the actual or possible presence of protected species. Assuming these were no major issues requiring special consideration, the size, layout and design of the marina, and the timing and (possibly) phasing of the works will now need to take these and other wildlife issues, such as local/national biodiversity species and/or habitats, into account.

More detailed field survey work, carried out at suitable time(s) of the year by suitably qualified and insured professionals, will now be required. This should be informed by the results and interpretation of the desk study material.

Potential mooring/marina sites and adjacent aquatic habitats may be acting as a refuge for species dependant on these habitats, so surveys for reptiles, amphibians, water vole and white-clawed crayfish must be carried out in addition to those normally required and those indicated by the desk study. The assessment periods for some species can be long, up to 12 months, (dependant on the season and species abundance).

The survey work will give more information about what is present and locate the positions of features on the ground to inform design. It should confirm one way or the other the presence or likely presence of species identified as possibly present at the feasibility stage. Additionally there is always the chance that a species not found or present at the feasibility stage will turn up (especially if there is a long break between the feasibility and this stage) and could become a 'show-stopper', affect the timing of works or cause delays in construction if discovered later.

Evaluating the results

The results of this field survey work should be interpreted and evaluated by a suitably qualified professional. The data should be used to assess the impacts on biodiversity by the development, any associated infrastructure and new access roads (temporary during construction or permanent).

The data should also be used to assess the impacts on biodiversity by any increase in boat movements on adjacent stretches of channel; frequently this is as, if not more, significant than the direct impacts of the development. The adjacent towpath is likely to have a greater use associated with users of the mooring site on foot and by boat; the implications of this for biodiversity should also be evaluated. We are likely to want to consider implications of greater use of the waterway and towpath with you in more detail and can use this opportunity to provide you with examples of our practices for managing wildlife during the course of operating the waterways.

Mitigation and enhancement measures

The evaluation of the results should be used to inform issues such as the size of the mooring site, number of berths and types of craft using the site. This may alter the impacts caused by boat movements on lengths of waterway adjacent to the mooring site. Other mitigations may include the installation of soft bank protection along the edges of the waterway to prevent or reduce erosion of the banks.

The evaluation should also inform layout and design so that features such as designated wildlife sites and protected/national or local Biodiversity Action Plan (BAP) species/habitats can be retained in situ. If all or part of a designated wildlife site or BAP habitat is affected and habitat recreation is required, then this should be on a like-for-like basis (i.e. if the interest is currently a wetland, then create wetland, don't plant trees instead). If protected or BAP species are affected, these may need to be relocated to suitable habitat. In many cases, permission for this will have to be sought and

granted by the relevant statutory authority. It should also be borne in mind that habitat creation or species relocation, even if permitted, is not easy and requires space, time and money. There are timing implications, such as restrictions on time of year when relocations can be carried out; this varies with the species involved. There may be conditions on the permission allowing relocation which stipulates that the species must be established in its new location before its old habitat can be destroyed. If space, topography etc. allows, it is frequently easier and cheaper to retain features in situ.

The design should take the opportunity to use more environmentally friendly features such as soft edges, landscaping with native species of local provenance and bat or bird roosting/nesting opportunities in or associated with new or existing buildings. Timing of the works will need to take into account the species present. This should include any clearance from the site of woody vegetation, which should take place in the winter to avoid disturbance to nesting birds.

The opening up of an offline mooring scheme will also impact on the movement of local fish populations. This will impact on local angling clubs if they have rights to fish the waterway and we recommend early discussions with our fishery officer and local angling clubs.

Ongoing management

A management plan for the site should be drawn up and implemented to ensure long-term survival of the biodiversity features, both existing and new, of the site.

Useful references and links

Local Wildlife Trusts www.wildlifetrusts.org

English Nature www.english-nature.org.uk

Countryside Council for Wales www.ccw.gov.uk

Environment Agency www.environment-agency.gov.uk

National Biological Records Centre www.brc.ac.uk

National Biodiversity Network www.nbn.org.uk

Multi-agency Geographic Information for the Countryside www.magic.gov.uk

Heritage

General principles

The term 'heritage' encapsulates a broad and rich diversity on our waterways encompassing their histories, buildings, historic landscapes and assets such as the historic route and associated landscape of a waterway, locks, slipways

and minor items such as mileposts and bollards. Our network is home to Listed Buildings, Scheduled Monuments, Conservation Areas and many thousands of potential archaeological sites. All of these designated assets are controlled by legislation but we treat our heritage seriously, whether designated or not.

We take a pragmatic view of the importance of heritage and recognise that a balance must be struck between development and conservation. Adaptive reuse, alteration and occasional demolition may be necessary to deliver successful development. Good contemporary design may well become the heritage of the future.

Heritage and development

Planning for heritage conservation in any development scheme is controlled by legislation. It is therefore important that the process for determining the relevance of heritage and archaeology to mooring development proposals is clearly understood and consistently applied. The notes below outline the process and you should also refer to the page [Feasibility - Archaeology and historic structures](#) of this website to review the initial assessment work which should have been undertaken.

In addition to normal development controls, specific protection is provided for Scheduled Monuments, Listed Buildings, Conservation Areas and archaeological sites.

At the outset of any development proposals it is essential that a suitably qualified professional performs a rapid assessment that identifies the following:

- Heritage designations - e.g. Listed Buildings etc.
- Archaeological designations - e.g. Local Authority based Historic Environment Record (HER) registered sites, which may be non-statutory but can still require investigation.
- Non-statutory heritage - e.g. local listings, or items recorded in the Canal & River Trust Architectural Heritage Survey.

Where heritage assets are identified, a nominated heritage adviser should prepare a short heritage impact assessment. This will identify the effect of development proposals upon existing heritage. Complex sites or buildings with high heritage value are likely to require a conservation statement or conservation management plan.

Development sites where potential archaeological deposits have been identified (although this is not common) will require an archaeological deskbased assessment. This should be performed by an archaeologist who is a member of the Institute of Field Archaeologists (IFA) www.archaeologists.net and may point to the need for further archaeological investigations and recording (e.g., evaluation by trial trenching, watching brief, full excavation). For complex sites this work may be in addition to a conservation statement or conservation management plan.

It is important that a development project manager and their suitably qualified professional engage with Local Authority conservation and archaeology staff and/or with the relevant statutory agency (e.g., English Heritage in England english-heritage.org.uk , Cadw in Wales www.cadw.wales.gov.uk) at the earliest opportunity. To begin with, this may involve no more than informal discussion, but establishing a dialogue is essential; the heritage designation regime is complex and can be problematic if managed poorly.

Where Listed Building , Scheduled Monument , or Conservation Area Consent applications need to be made to a Local Authority or Government department/statutory agency, these should be prepared with advice from a heritage adviser.

Successful development in the historic environment may require on-going input from a heritage adviser and should demonstrate clear adherence to heritage processes and sustainable re-use, adaptation, or conservation of heritage assets where appropriate. Interpretation of a historic environment where development has taken place can greatly enhance the visitor's experience and attract additional customers to a site. Refer to the page [Design – landscaping and marina layout](#) of this website for more information on visitor interpretation.

Useful references and links

Institute of Field Archaeologists (IFA) www.archaeologists.net

The Waterways Trust www.thewaterwaystrust.co.uk

Government Portal www.communities.gov.uk ; www.planningportal.gov.uk

Welsh Office Circulars 60/96, 61/96, 1/98 www.wales.gov.uk

Council for British Archaeology www.britarch.ac.uk

Archaeology Data Service www.ads.ahds.ac.uk

English Heritage www.english-heritage.org.uk

Cadw www.cadw.wales.gov.uk

Society for the Protection of Ancient Buildings www.spab.org.uk

Landscaping and Marina Layout

General Principles

The landscape quality and setting of a new marina or mooring facility will contribute to its success and is an important consideration during the planning application. Schemes should be designed to suit their landscape and waterside setting and visual impact should be considered as part of the design and planning process. We place significant importance on this issue

and will comment on the quality of the design during the planning application.

We can advise on the landscape and related design issues which should be taken into account in order to help steer the scheme in the right direction. Issues such as topography, existing trees and vegetation, and adjacent land uses and boundaries should all be considered at an early stage so that they can inform and guide site planning and design, including access and security arrangements.

We encourage you to create not just a 'boat park' but a visitor destination on the network which will attract a broad range of visitors wishing to use your site's facilities and explore the local waterway.

A range of specific guidance is available from professional bodies and consultants. Refer to the end of this section for useful references and links.

Mooring and facility layout

Moorings layouts and associated facilities inevitably vary from site to site and there is no standard design which caters for all circumstances. For instance, site topography, exposure, and views into and across the site are likely to influence and affect lay-outs, and options usually need to be developed to make best use of the anticipated waterspace. As a rough rule of thumb, minimum approximate provision is around 94 boats per hectare of water, with approximately a similar area for parking, landscaping, access works and, potentially, disposal of on-site excavations. The shape of the basin and the need to control access by non-boaters, as well as any security requirements, will help determine whether individual pontoons or a system of walkways with finger jetties will be most appropriate.

Where possible, it is beneficial to separate different mooring types and to locate boaters' facilities where they can be accessed by both the main mooring customers and by passing boats on the waterway without this group needing to enter the mooring. A degree of flexibility should be allowed for to cater for growth or changing demand, and it is advisable to grade mooring lengths with smaller boats at the furthest point from the entrance, and larger and visiting boats nearer to the entrance.

Proposals for moorings and marinas also need to take account of a range of associated factors, such as spacing between boats, length of pontoons, turning circles, prevailing wind, location of mooring points, pedestrian access, safety and security, berthing and access to facilities. Facilities could include water supply, refuse disposal, electrical points, fuel supplies and car parking/hard standings. All need to be considered as an integral part of the scheme, and a high quality and well-designed marina should help develop both custom and income.

A growing part of the waterway business is trail boats and thus the provision of an adequate slipway to meet this demand could be useful. It may also contribute to supporting any boat repair business at the site.

Refer also to the page [Feasibility - Local market assessment](#) of this website for more information on facilities and services.

Hard and soft landscaping

A landscape architect should be engaged to design external and landscape work, but should also be used to contribute to the initial site planning process. The hard and soft landscaping of the site should be a fundamental part of its design and may well contribute to a successful planning application. The character of the waterway corridor and the relationship of the proposed marina with the wider environment must be considered. Your submission should therefore identify how the proposal has responded to, for example, any site designations or prominent or important visual features. Landscape proposals should include boundary/fencing treatments, car parking arrangements and screening, design and layout of footpaths and routes, and the quality and specification of appropriate materials.

A useful reference is the "Guidelines for Landscape and Visual Assessment" published and promoted by The Landscape Institute www.li.org.uk

"The External Works Compendium" published by www.endat.com is a useful annual publication which lists products and specialist services for the external environment, including contractors and suppliers for water based work.

"A Code of Practice for the Design, Construction and Operation of Coastal and Inland Marinas and Yacht Harbours " produced by The Yacht Harbour Association www.yachtharbourassociation.com and the "Environmental Code of Practice" produced by the British Marine Federation www.britishmarine.co.uk are also useful references.

The following issues should also be addressed:

Views to and from the waterway

Creation of a new mooring scheme, with a new entrance to our network, often involves opening up views to and from the waterway which may be visually intrusive. This may need to be mitigated through landscape and screening work, which would also provide some privacy and security to boat owners.

Trees

Trees are valuable visual features and form important canal side wildlife habitats. Developments should take account of all existing trees on our land or adjacent land. Trees should only be removed where there is no other practical option. Any trees lost in developing the site should be replaced as part of the overall plan for the site.

Planting schemes

Planting schemes should only include species of British seed source (native provenance) and should match that occurring naturally in the area.

Where the planting scheme will affect the boundary of the canal/river corridor the scheme should be agreed by us. The planned locations of planting schemes should also take account of existing valuable habitats, such as grasslands. The BTCV (British Trust for Conservation Volunteers) online

handbook [BTCV - Volunteer](#) for conservation led works.

Treatment of invasive plant species

Any invasive plant species such as Giant Hogweed, Himalayan Balsam, and Japanese Knotweed must be removed prior to development to prevent spread onto and along the waterway corridor. Eradication of these plants requires specialist knowledge and any material generated will be classified as special waste and will require specialist disposal facilities which should be provided by the Local Authority.

Soft waterside edges

Wherever possible, soft vegetated waterside edges should be considered. These help create visual interest and can break up the impact of any hard engineering works. They also help to establish aquatic marginal habitats. A range of bio-engineering techniques is available, and we can advise accordingly. A number of well, established marinas now incorporate soft edges.

Lighting

Sensitive use of lighting should be applied, particularly in rural or remote areas, and light 'spillage' from the marina should be avoided in order to maintain local character, prevent stress on nocturnal wildlife and to allow watchers of the night sky. However in other locations, improved lighting may be seen as a benefit, aiding security and access. Lighting schemes should consider guidance from, for example, the Institute of Lighting Engineers www.ile.org.uk and the Campaign to Protect Rural England www.cpre.org.uk

Signs

Signs should not be visually intrusive from the waterway. You should liaise with our local office regarding the size, design and siting of any signage adjacent to our navigation prior to its installation.

Access and parking

Access for your customers and the public around your site and facilities should provide equal services for people with a disability and provide clear signage and orientation. The Fieldfare Trust / BT Countryside for All guidelines www.fieldfare.org.uk are a useful reference for public access provision. Information on the Disability Discrimination Act can be found on Directgov website, click [here](#)

Also refer to the sections below relating to creating a welcoming site and interpretation. Our briefing note [Road Traffic Generation & Car Parking Requirements of Marinas](#) will help you plan your parking requirements and to estimate the likely arrivals and departure rates.

Useful references and links

"Guidelines for Landscape and Visual Assessment" published by The Landscape Institute www.l-i.org.uk

The BTCV (British Trust for Conservation Volunteers) online handbook:
<http://www2.btcv.org.uk/>

"The External Works Compendium" published by www.endat.com
"A Code of Practice for the Design, Construction and Operation of Coastal and Inland Marinas and Yacht Harbours " produced by The Yacht Harbour Association www.yachtharbourassociation.com

"Environmental Code of Practice" produced by the British Marine Federation
www.britishmarine.co.uk

The Institute of Lighting Engineers www.ile.org.uk

The Campaign to Protect Rural England www.cpre.org.uk

The Fieldfare Trust / BT Countryside for All guidelines www.fieldfare.org.uk

Disability Discrimination Act www.disability.gov.uk

CRT briefing note: [Road Traffic Generation & Car Parking Requirements of Marinas](#)

Designing a welcoming site

The creation of a welcoming site will contribute greatly to the success of the business, particularly in a competitive mooring and leisure market. By catering for a broad range of visitors - your core boating customers, visiting boaters and the general public - you should be able to generate greater revenue streams and satisfy the needs of each group with careful design and on-site management.

Visits to a range of other mooring sites and marinas will give you an insight into the issues to consider for your core mooring customers. Useful references include the British Marine Federation www.britishmarine.co.uk and there are courses in marina management and customer management.

To attract the wider public to your site it is important to firstly consider what type of visit you can offer (e.g. quiet or active recreation, watching the boating activity, a family meal, a stop-off for walkers) and to which groups (e.g. families, young couples, coach outings, passing boaters and walkers). You will then need to identify what facilities to provide such as a restaurant, café, ice cream/coffee kiosk, boat hire, walking trails, bicycle hire, play equipment, toilets, parking or visitor moorings.

Some basic principles to make visitors feel welcome and want to return include:

- clear signing to your site from the highway and local routes
- obvious entrances (by boat, car and on foot) which are named and welcoming
- car parks which are easy to find and where visitors feel safe to leave their cars
- a pleasant, relaxing and safe site ambience
- easy orientation around the site with clear signs and accessible paths
- appropriate facilities for your visitors, with clean toilets and friendly staff
- information on the activities around the site and beyond so visitors can plan their day

and make the most of your site, including leaflets, maps, menus etc.

Most Regional Tourist Boards run one day accredited training courses in customer service for leisure and tourism operators

www.welcometoexcellence.co.uk

Interpretation is a very useful tool for engaging visitors to your site. Visitors to any destination expect information and signing but also wish to engage with, and have a deeper understanding of, the place they are visiting. For more information, refer to the Canal & River Trust Interpretation Briefing Note .

Useful references and links

Regional Tourist Boards training courses www.welcometoexcellence.co.uk

Wildlife Trusts www.wildlifetrusts.org

[Canal & River Trust Interpretation briefing note](#)

Sustainability

Sustainability is one of our core values which should be clearly considered and built into any scheme at an early stage. We encourage and expect interested parties to show commitment towards sustainable development.

Sustainable development seeks to create a balance between economic, social and environmental pressures, and in a waterway context development will be expected to show that it has made efforts to meet best practice in this field. Indeed, long term economic sustainability can be encouraged by ensuring that environmental and social issues have been catered for, and increasingly planning authorities are requiring some form of sustainability statement as part of an application.

We would expect a sustainable approach to be taken given the historic and sometimes sensitive nature of our waterway network. However, sustainability need not hamper innovation or contemporary work and, by the very nature of their business, moorings / marinas lend themselves to 'green' solutions. Most boaters are environmentally conscious and will welcome and anticipate measures which support our sustainability values.

Measures to support and help facilitate sustainability may include efforts to lower energy consumption including ideas to generate renewable energy (e.g. small scale wind power), waste minimisation and on-site recycling, construction materials obtained from sustainable sources with the use of recycled aggregates, management of water resources, including sustainable urban drainage systems, and, if feasible, encouragement of waterborne transport during construction.

The social aspects of sustainability include the need to consider impacts upon the local community, opportunities for local job creation, and benefits in terms of, for example, publicly accessible green space, and interpretation or

educational opportunities possibly linked to a nearby school.

A wide range of guidance is available on sustainable development and construction. Local authorities will be able to provide advice on the standards expected from developers. The Government's Sustainable Development Unit's website provides information, background and links about sustainability (please find link below)

Specific information about sustainable drainage is available from CIRIA (The Construction Industry Research and Information Association) www.ciria.org.uk.

Useful references and links

The Government's Sustainable Development Unit
<http://www.environ.ie/en/Environment/SustainableDevelopment/>

CIRIA (The Construction Industry Research and Information Association)
www.ciria.org.uk

Safety

Safety is an essential consideration throughout all stages of your scheme. There are diverse and detailed safety regulations which should be incorporated into the design, construction and operation of mooring sites.

Regulation

Mooring sites and marinas are often considered and treated as 'car parks' for boats in relation to safety. The authority regulating safety for mooring sites will usually be the local authority, however the Maritime & Coastguard Agency www.mca.gov.uk and the Health & Safety Executive www.hse.gov.uk also have a role to play. The primary legislation covering safety for businesses is the Health & Safety at Work Act 1974 (Section 3 relates specifically to visitors & contractors) and the Occupiers Liability Acts 1957 and 1988. Information can be found at the HSE website www.hse.gov.uk

There is a range of organisations specialising in public safety consultancy and some specialise in water safety.

Designing for Safety

Under the Construction Design and Management (CDM) Regulations 2007 specific legal duties are placed on designers of construction projects. These include designing with consideration to constructing, maintaining and dismantling safely. Please contact the Health and Safety Executive for further information:

Phone: 0845 345 0055

Website: www.hse.gov.uk

Consideration should be given to the navigational safety of boats leaving and entering the marina, as well as those on the mainline canal, when deciding upon the location of the marina entrance and designing its layout. CRT will assess the navigational safety of the proposals as part of our appraisal.

Operating Safely

Operators' responsibilities extend to everyone on the site including boating customers, casual visitors, general public and staff in the workplace. The safety of those with disabilities and people by water are equally important considerations.

Risk Assessment is a key element to providing a safe environment. The safety of people at a mooring site is a fundamental aspect of the design process. A risk assessment, at the design stage, of the proposed activities at the site will highlight features to be designed into the scheme. These could extend to, for example, pontoon lay-out and sizes, lighting, access to facilities, service provision to boats, segregation of car parking, provision of life saving equipment, storage of hazardous substances etc.

Once the site is built and operational, there should be a clear safety policy and appropriate operating procedures (including inspection and maintenance) informed by regular risk assessment.

The Yacht Harbour Association (TYHA) publishes a comprehensive guide which includes safety advice: "A Code of Practice for the Design, Construction and Operation of Coastal and Inland Marinas and Yacht Harbours".

www.yachtharbourassociation.com

Water Safety

Serious consideration must be given to water safety. The provision of life saving equipment alone may not necessarily discharge your legal duties. Issues such as slip resistant surfaces on pontoons and walkways adjacent to the water, demarcation of edges (e.g. contrasting colours & tactile surfaces), height of freeboard, the provision of a means of escape and a method of preserving life whilst waiting to be rescued must all be considered.

RoSPA (Royal Society for the Prevention of Accidents) www.rospa.com have a dedicated water safety section and you can engage their consultants to carry out water safety audits which include reports with advice on risk assessments and operating procedures.

The National Water Safety Forum (NWSF) www.nationalwatersafety.org.uk is a useful source of information for operators and includes resources and good practice.

Security

Security is particularly important to customers. Good design can limit the potential for crime, vandalism and enhance personal safety. The Trust publish a document with the Metropolitan Police "Under Lock and Quay" which contains good practice for designing out crime from waterside environments. You could also contact the local Crime Prevention Officer at an early stage in the design

process.

Useful references and links

HSE (Health & Safety Executive) www.hse.gov.uk

"A Code of Practice for the Design, Construction and Operation of Coastal and Inland Marinas and Yacht Harbours " produced by The Yacht Harbour Association (TYHA) www.yachtharbourassociation.com

RoSPA (Royal Society for the Prevention of Accidents) www.rosipa.com

Visitor Safety in the Countryside Group Guidance: Managing Visitor Safety in the Countryside principles & practice www.vscg.co.uk

National Water Safety Forum (NWSF) www.nationalwatersafety.org.uk

British Marine Federation (BMF): Health and Safety Handbook for Boat Builders and Boat Repair www.britishmarine.co.uk

Maritime and Coastguard Agency (MCA) www.mca.gov.uk

Under Lock and Quay published jointly by CRT (formerly British Waterways) and the Metropolitan Police