

Basic Water Awareness for SOCO

Appreciation of the risks surrounding water-side working, so you can make a dynamic risk-assessment before commencing a job

Prepared by West Mercia Search & Rescue



What you will learn from this presentation

1. Facts surrounding drowning and risk
2. Identify basic water hazards
3. Identify basic safety measures needed
4. An awareness of cold water physiology and drowning
5. Appreciate difficulties with work on unstable banks
6. Have a knowledge of Hydrology
7. Appreciate appropriate PPE
8. Risk-assess before starting water-side work



Facts surrounding drowning and risk

- 650 drowning fatalities a year in the UK
- Most drownings were of people who did NOT intend to get wet
- 63% occur in inland waterways, of those:
 - 65% in Rivers and Streams
 - 19% in Lakes and Reservoirs
 - 16% in Canals
- Most drowning deaths occur within only 3m of a safe point
- 70% of those who die were considered good swimmers
- 32% of flood-related deaths are by drowning in a vehicle



Facts surrounding drowning and risk

- In water 1m deep (waist high), flows of 1m/s become challenging and by 1.8m/s (4mph) **everyone** will be washed off their feet.
- Just 15cm (6 inches) of fast flowing water can knock you off your feet and be enough for you to be unable to regain your footing.
- 60cm (2 ft) of standing water will float your car!



Facts surrounding drowning and risk

- The human body is slightly heavier than fresh water.
- When unconsciousness takes place, the body sinks.
- Fat bodies are slightly more buoyant than thin bodies, but still all bodies will sink in fresh water.
- The average drowned person will sink 8ft in 5 seconds and stay on the bottom
- Usually only a life-preserver or lifejacket will keep you afloat when unconscious



Water zoning terminology

Cold - Not close enough to the water to possibly slip or fall in is called the Cold zone.

Warm - 3 meters from the waters edge is generally acknowledged to be the warm zone. This is context sensitive, so use common-sense. A slippery bank or steep slope will be a warm-zone regardless of distance. PPE must be considered.

Hot - The water itself is called the hot zone. SOCO must wear PPE to work in the hot zone.



Basic water hazards

- Temperature – cold water shock will kill
- Flow – you can't win a fight against a river
- Contamination – it's not just water!
- Moral pressure/public/bystanders
- Lack of training/equipment
- Locks – unseen, very strong currents
- Weirs – death traps... literally
- Ice, mud and unstable surface



Hazards continued...

- Egress - how can you get out if you fall in
- Entrapment – has killed flood responders
- Debris – sharps, traps, all hidden
- Noise/Comms – a river can be loud enough to hide cries for help
- Tide or waves
- Weather – slippery banks
- Changeability of water conditions
- Other river users/Propellers



Temperature - Cold Water Shock

- Water conducts heat from the body 4 times as fast as air
- Wearing warm clothing is irrelevant
- Entering cold water has staged effects on the human body...



Cold water - Stage 1 (0-3mins)

- Immediate gasp response

What happens when you accidentally step in to a cold shower

If your head's underwater, you'll inhale water

- Ability to hold your breath becomes severely limited and you begin to hyperventilate

- Short gasps which tire you out quickly

- Panic; everyone does

- You will panic and try to doggy-paddle, and likely sink if not in PPE

- You can only relax with intense training

- Vasoconstriction.

- Skin cooling causes the vessels in the blood to restrict. This causes the heart rate and blood pressure to rise. If you have a pre-existing heart condition, the rapid increase in blood pressure could cause a heart attack.



Stage 2 (3-30mins)

- After the cold shock response, your extremities (hands, feet, arms, and legs) start to cool
- As the muscles in the arms and legs cool, flexibility, strength, and stamina are significantly reduced affecting physical performance
- Even a strong swimmer will struggle after a short while



Stage 3 (30 mins +)

- Moderate to Severe Hypothermia
- As heat is lost from the body, you will start to become confused and disorientated until you eventually become unconscious
- You don't have to be fully submerged to suffer; you could just be laying in shallow water
- You may even give up trying to survive
- Either way, death then follows very rapidly



Basic safety measures

- NEVER work near water alone
- Avoid working on slippery banks
- Consider poles or ropes to hold on to
- Self-inflating lifejacket
 - Activated by water
 - Always consider as part of your risk-assessment



Working on slippery or unstable banks

- NEVER work near water alone (this is worth saying again)
- Consider asking for on-water support (FRS, SAR)
- Saturated earth can collapse with no warning
- Consider the warm zone to be extended
- Consider PPE as part of your risk assessment



River Hydrology

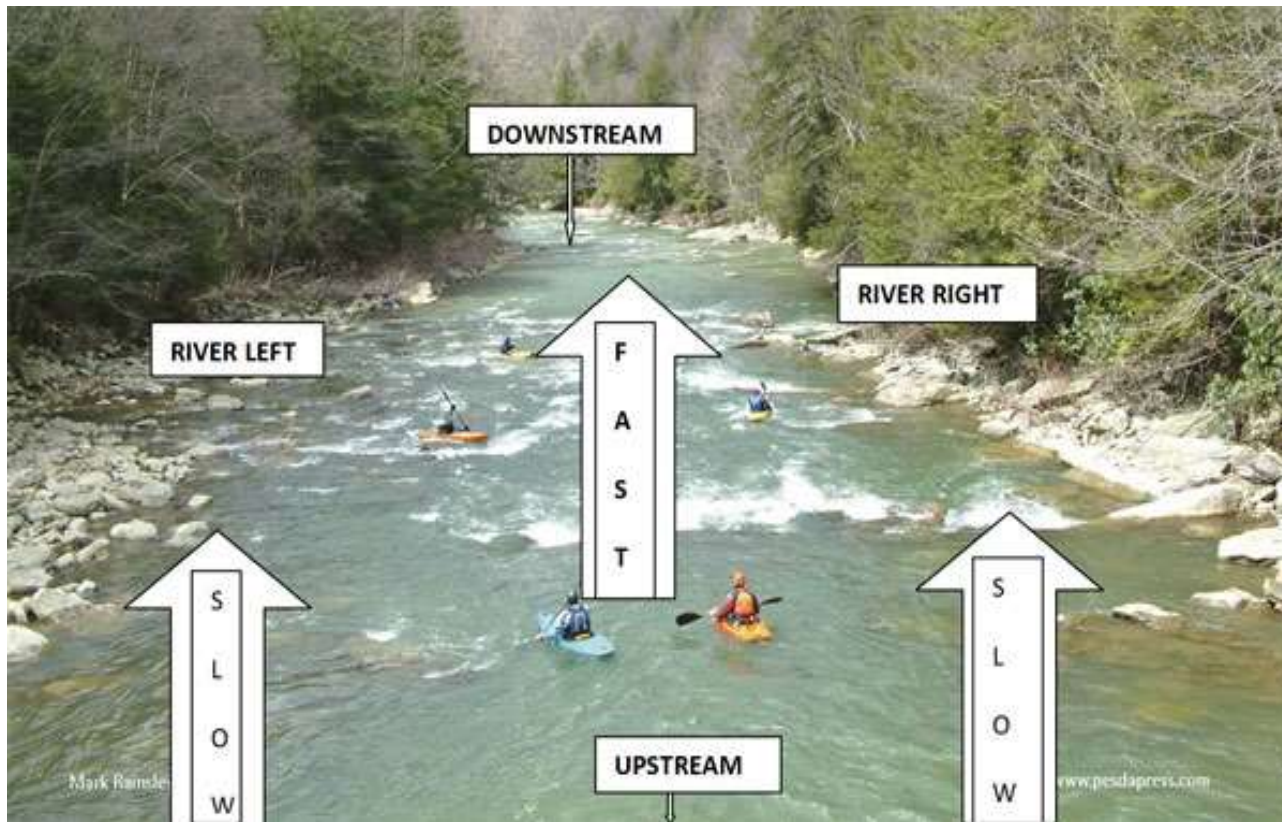
Knowing what a river is doing and how water is flowing in different areas will affect your risk assessment

The following slides are an introduction to the way water moves - hydrology



River Hydrology

Water moves at different speeds depending on depths, riverbed shapes, bends, and features. It is generally much faster in the middle.

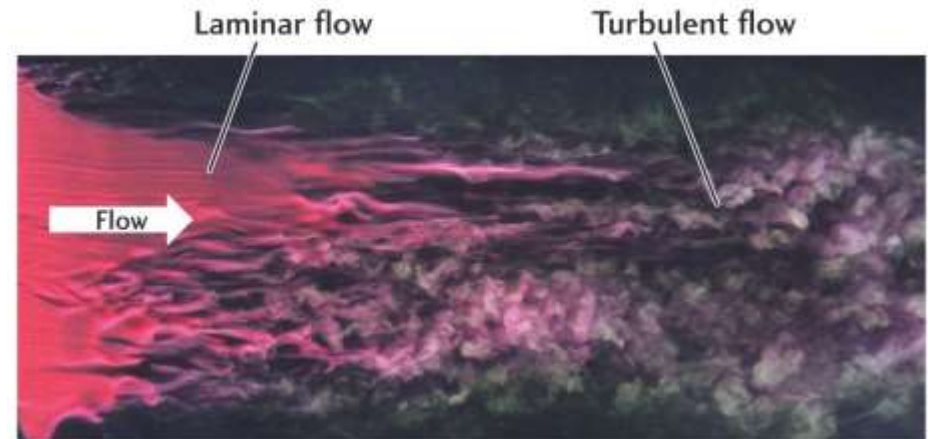
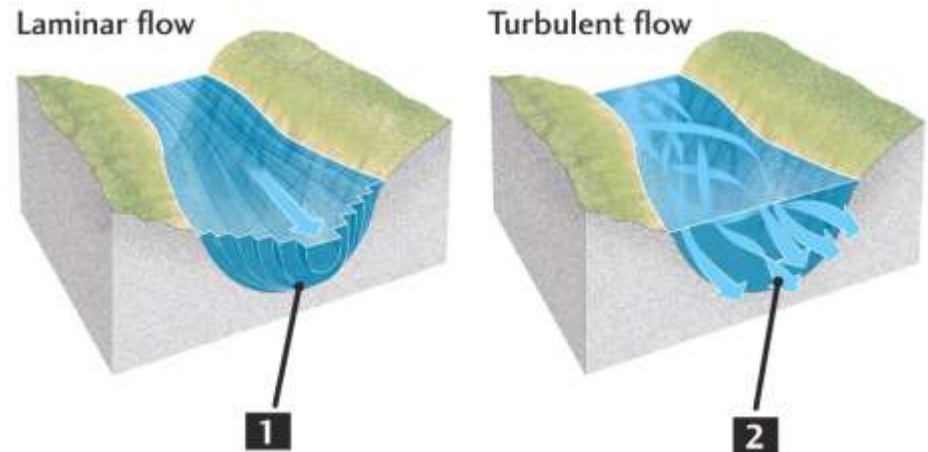


Laminar and Turbulent flow

Laminar flow is quicker than turbulent flow as smooth running water flows faster than rough, turbulent water.

Smooth rivers will pull you away deceptively quickly.

Water moves much quicker under the surface. A deep river can be very fast without looking like it is.



DANGER - Weirs

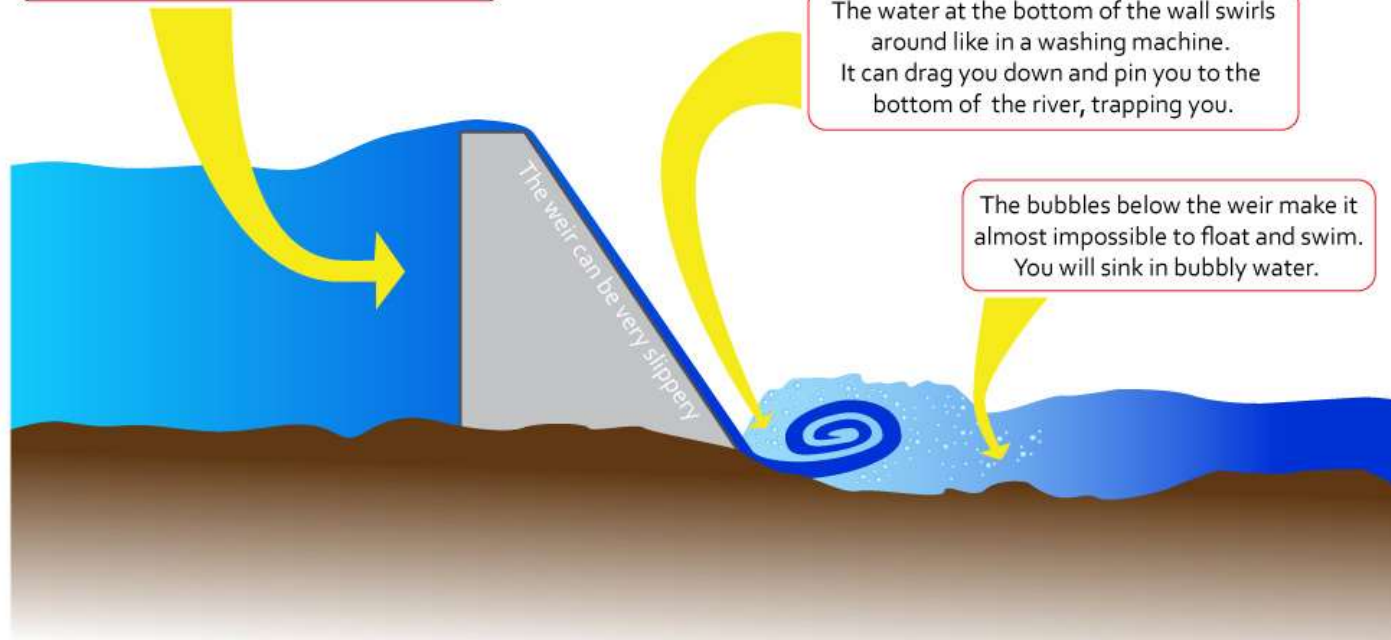
Danger - River Weirs Kill



Water is being pushed against the wall with enough force to pin you to that wall and make it very difficult to drag yourself out.

The water at the bottom of the wall swirls around like in a washing machine. It can drag you down and pin you to the bottom of the river, trapping you.

The bubbles below the weir make it almost impossible to float and swim. You will sink in bubbly water.



For more water safety advice see www.westmerciasar.org.uk



DANGER - Weirs

Specialist access required

- Get FRS or SAR if working on/in a weir

Consider:

FRS or SAR support if working upstream of a strainer in warm or hot zone



DANGER - Strainers

A strainer can be anything that lets water pass through, but prevents the passage of a person. If you float in to one, you will get stuck and likely drown – even in PPE.

Beware:

Gates, Cars, Ropes, Fences

Downed trees

Logs in river channels

Consider:

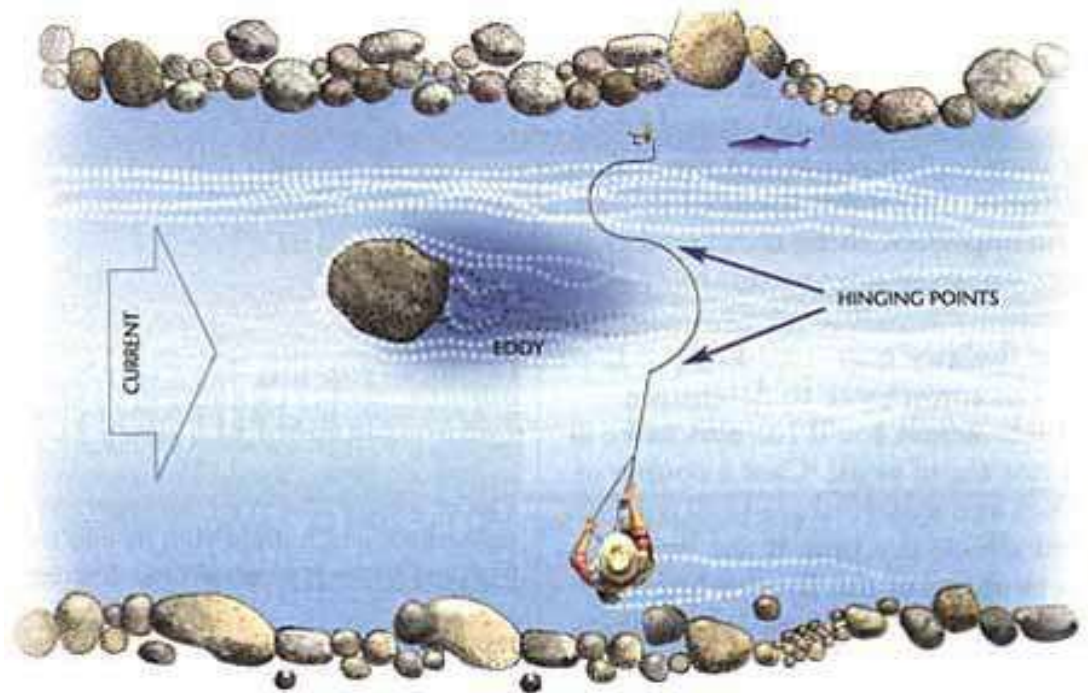
FRS or SAR support if working upstream of a strainer in warm or hot zone



Eddys

An **eddy** is the swirling of water and a reverse current created when the fluid flows past an obstacle. The moving fluid creates a space devoid of downstream-flow on the downstream side of the object.

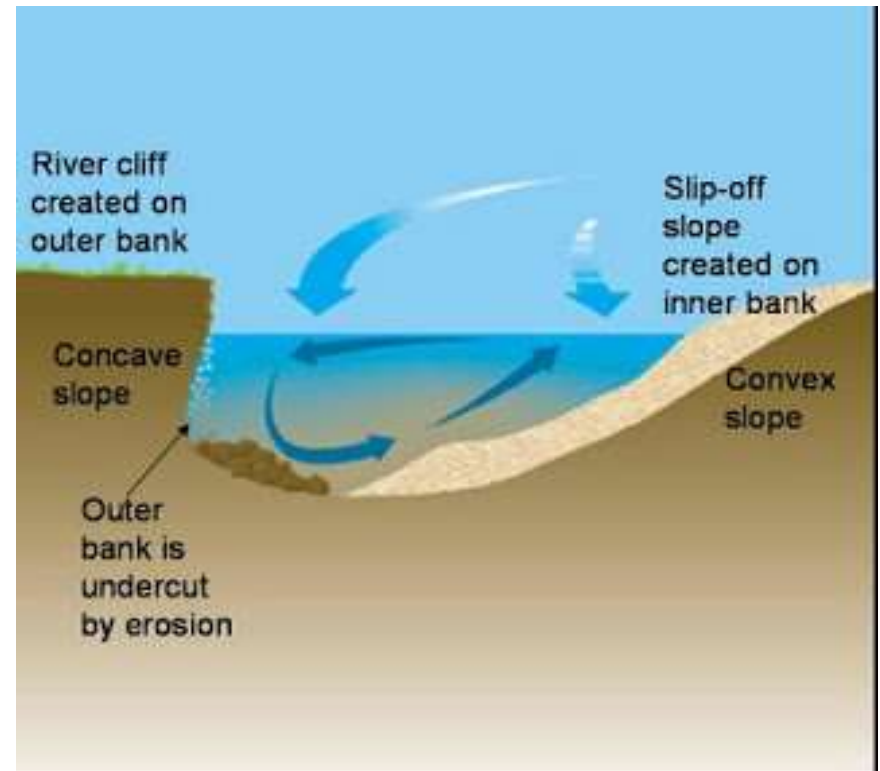
If you fall in the water, an eddy is a place where you can stop being swept away.



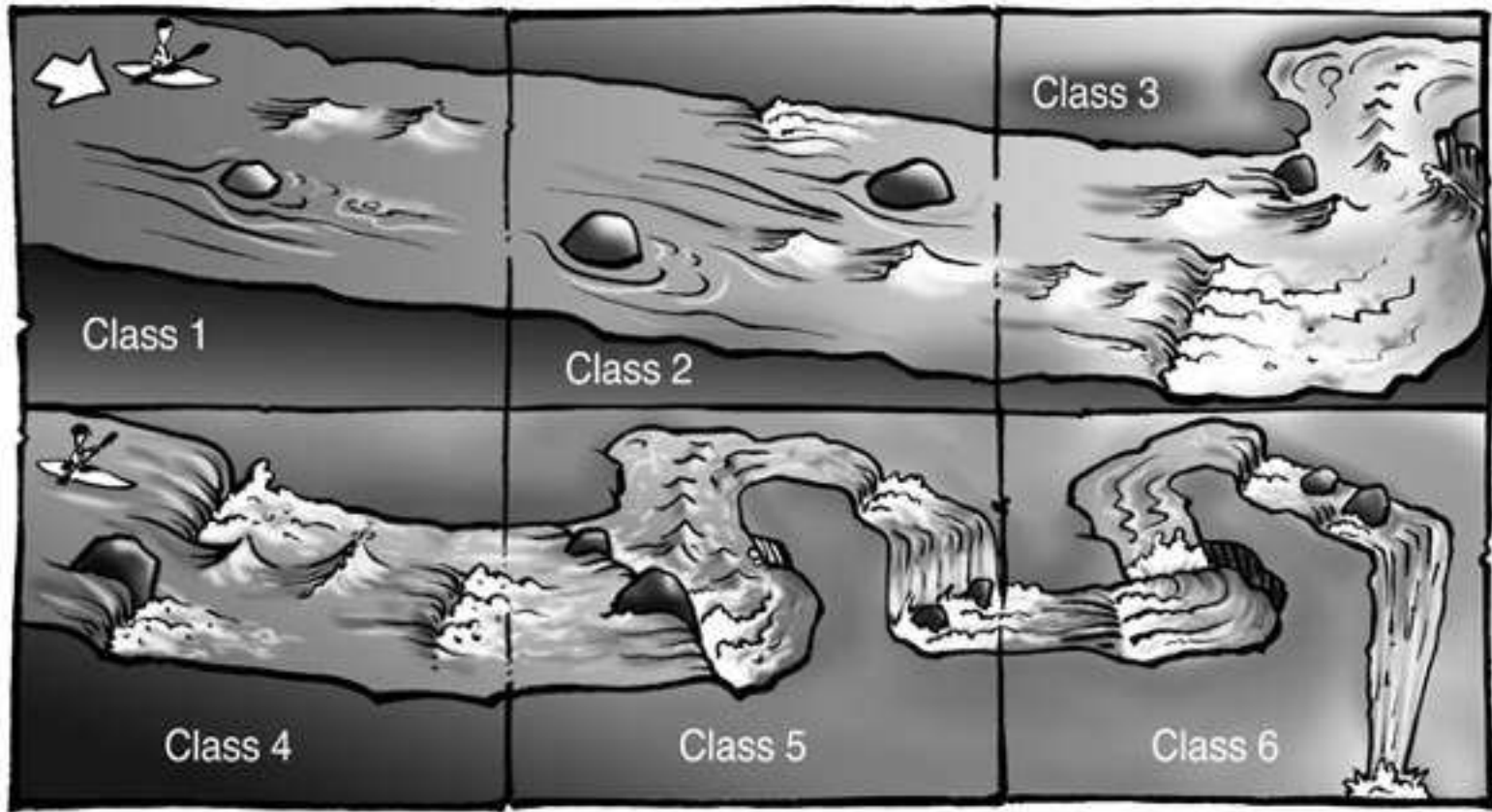
Helical Flow

Helical flow is a corkscrew (spiral) movement of water responsible for moving eroded river load from the outer bank and then depositing much of it on the next inner bank of a river.

Beware that strong helical flow can pull you under at the edge of a river.



White Water Classification



Adopt this position if you are swept away

Feet-first, on your back, with your bum down.

This will protect you from hitting rocks, and help you see where you are going so you can spot hazards and eddy spots.

Don't try to swim on your front in a lifejacket.



If someone else falls in

1. Talk – Shout “swim to me” for example
2. Reach – use a stick or pole from the bankside. Beware that they may pull you in!
3. Throw – if you have a throw-rope or nearby lifebelt
4. DO NOT enter the water to try to save someone else



Flood Water - Specific Hazards

- Slipping and tripping hazards
- Kerbstones/ drain covers/ manholes
 - Responders have died after becoming trapped in drain covers
 - Use a pole or stick to prod the ground in front of you, even in shallow floods
- Contamination
 - Sewers
 - Drainage water
 - Petrol/oil/pesticides

Moving floodwater is POWERFUL, RELENTLESS and DANGEROUS-30cm of floodwater moving at 6mph is enough to float an average family saloon.



Water Risk Assessment

- A points based risk-assessment has been provided at the link below
- Dynamic risk-assessment is vital
- Use the points system as a guide with common-sense
- Do not over-extend your risk

www.westmerciasar.org.uk/socowatercpd



CPD Questions

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