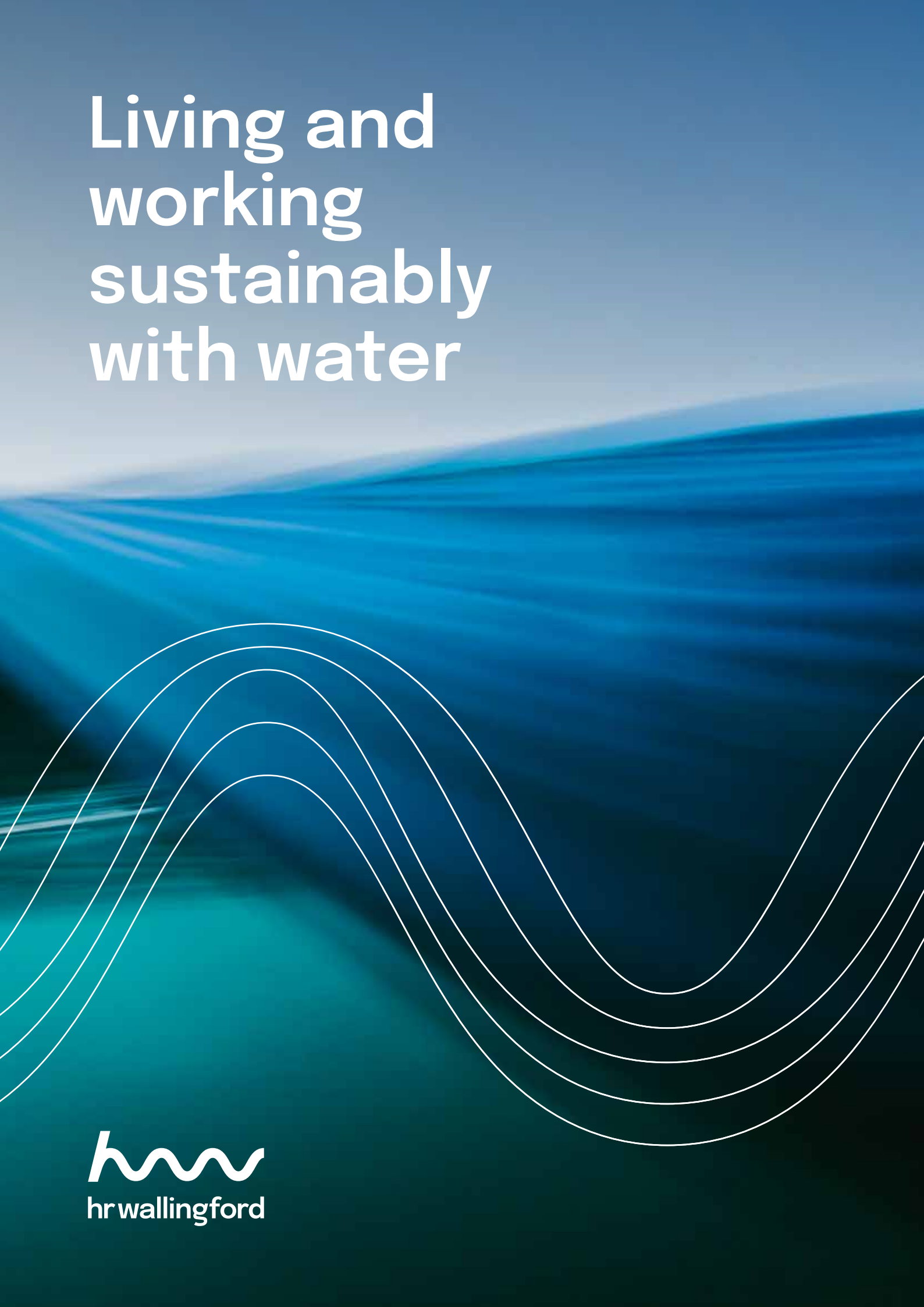
Living and working sustainably with water



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We are experts in how water moves, behaves and influences communities and industries.

Change is constant. The world is becoming ever more interconnected and climate change is having profound impacts on our planet.

Water is becoming scarcer in many places and increasingly volatile in others and building sustainable communities, industries and infrastructure is becoming more challenging.

We design smarter, more resilient solutions to help everyone live and work more sustainably with water.

Creating a future where people live and work sustainably, balancing today's needs with tomorrow's challenges and opportunities can't be achieved without a proper understanding of water in both the natural and built environments.

Our work supports infrastructure developers and operators, research bodies, governing authorities and decision makers at all levels with the innovative solutions they need, built on our experience, data insights and research.

Building a climate resilient world

Understanding water is critical to managing the impacts of climate change. Rising sea levels and more extreme weather are affecting people, nature, infrastructure and economies across the globe.

We assess risks, identify and optimise steps to create additional resilience in a changing world. It's a core element of everything that we do, delivering wide ranging social, economic and environmental benefits.

Resilient communities, supported by resilient infrastructure can mitigate the impacts of climate change and bounce back from climate shocks like floods, droughts and rising sea levels. They actively prepare for economic, social and environmental change enabling them to endure climate stresses and recover to deliver the long term sustainable benefits for everyone who lives and works on, near or with water.

Securing our water future

A secure and safe water supply is essential for the well-being and growth of communities, economies and ecosystems. Yet climate change threatens our access to reliable supplies of fresh water at a time when demand is already rising.

Governments, agencies and water companies need help to effectively respond to their challenges in this ever changing landscape.

From single water supply schemes to modelling complex supply systems, from ground-breaking regional scale models to analysis of supply risks at a national level we help clients manage their assets and their water resources risks, whether to guide policy development, or evaluate the potential of specific sources and systems.

In the UK, our work on drought resilience, climate change and abstraction reform has made us an industry leader. Internationally, we've worked in Europe, Africa, the Middle East and the Caribbean to monitor ground water levels through pioneering Earth observation technologies as well as identify and assess adaptation options.

Our work with local partners, to build expertise through training and building capacity creates long term in-country capability.

In regions where water is scarce, our expertise in water intake and outfall systems is helping to deliver the next generation of reverse osmosis desalination facilities.

By understanding the impact of natural change and change caused by human behaviour we create robust solutions which help manage the environmental risks associated with water.

These solutions deliver a sustainable, resilient freshwater environment. And our expertise in green infrastructure helps conserve and restore the water environment by improving water quality, morphology and natural habitats.

Dam and reservoir inspections (carried out by qualified Panel Engineers), sediment management strategies, risk assessments, remote monitoring and early warning of potential dam failures enable robust and reliable water infrastructure. We also have a range of tools which identify leaks in the water supply network to support proactive management of assets.

Creating a healthier world through water

Our award-winning technology has provided early warning of mosquito-borne disease outbreaks to protect community health and our support for water supply infrastructure has helped build resilience into water, sanitation and hygiene services. In Small Island States we've been instrumental in embedding a 'build back better' approach in the aftermath of devastating hurricanes.

Building flood resilient communities

World-class expertise in flood and coastal management

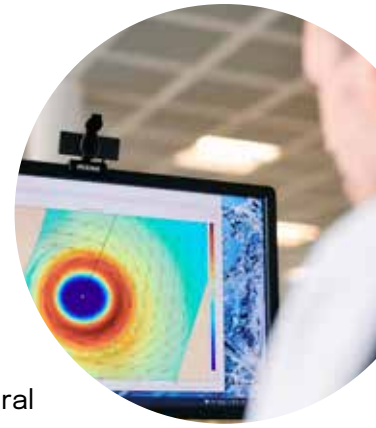
Due to climate change millions of people around the world are facing an increased risk of flooding whether from surface water, groundwater, rivers or the sea.

Our expertise supports policy, emergency planning, decision-making and asset management through expert risk assessments at regional and national level. This means that the most vulnerable communities and infrastructure are protected through property level flood protection, modelling and mapping.

Bespoke decision support systems, including the use of satellite data, empower our clients to make evidence-based decisions with confidence. Our tools include:

- **river and coastal flood forecasting systems**
- **flood defence maintenance and emergency planning**
- **predictive modelling of flood impacts in both the natural and built environments.**

As climate change and urbanisation lead to bigger, more frequent floods, effective early-warning systems are critical. By carrying out real-time flood forecasting, early warning and alert systems at regional and national levels we support targeted responses that keep people and infrastructure safe.



Using predictive tools we can forecast the impact of extreme events and natural disasters such as hurricanes, cyclones and tsunami, ensuring flood protection infrastructure is sustainable in the long term. Our hurricane and cyclone forecasts are used to inform planning decisions, warn vulnerable communities in developing countries, and help international agencies target their emergency response.

New infrastructure developments can change the way flood water behaves, so our risk assessments include potential impacts on surrounding areas.

We use our expertise in surface water management, urban drainage and sustainable drainage systems to manage runoff, mitigate flood risk and deliver environmental and social benefits. And by building an understanding of how proposals can be evolved we help to positively benefit the site, the environment and other areas. Our findings are summarised in a site-specific flood risk assessment that can be submitted with a planning application.

We work with both private and public sector clients on developing resilient and sustainable coastal protection solutions.

We design coastal defences to protect vulnerable communities and infrastructure from sea-level rise and coastal hazards. We develop coastal management plans, from national flood risk assessements and regional shoreline management plans, through to local strategy studies and schemes.

Managing floods naturally is going to be increasingly important for providing flow storage, carbon savings, water quality and habitat benefits.

We are pioneering the tools and guidance to support natural flood management measures and green engineering.

We are also enabling the transition from grey to green infrastructure, working with natural processes. Dynamic beach nourishment, managed realignment and habitat creation solutions all help clients to work with nature to develop flood resilient coasts.

Resilient coastal and maritime infrastructure

Infrastructure in the coastal zone and estuaries are especially at risk from climate change. Our cost-effective and sustainable solutions for ports, harbours, waterfront developments, artificial islands and all infrastructure built in and by the sea, successfully balances engineering and commercial needs with economic, social and environmental factors.

With 90% of the world's traded goods transported by sea, it's essential that ports can withstand the impacts of climate change.

Whether designed to handle passengers, cargo, or both, we expertly design and plan specialist ports of all types and sizes, from small marinas and fishing harbours up to mega ports and terminals. Comprehensive expertise helps port owners and operators, and their consultants, understand and optimise all aspects of a development to make sure it is sustainable.

Our experience spans the globe with projects in North and South America, Europe, Africa, the Middle East and Asia Pacific.

Alongside the port's physical infrastructure, we apply our specialist marine expertise to deliver a full technical appraisal of port development that includes harbour protection, environmental impact assessment, vessel access and dredging as well as the operational berth, equipment and storage requirements.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We assess and design marine coastal structures that protect all types of coastal infrastructure for public-sector and private clients all over the world. We are renowned for providing high value designs for challenging sites, providing resilient, safe, environmentally sensitive, low risk and cost efficient solutions.

The marine environment is complex, and new waterfront developments influence coastal processes, marine sediments and water quality. This can change the way marine ecosystems, coastal communities and sea users interact. Our experts help you explore the potential consequences of these changes to sustainably manage the environmental aspects of a development and regulatory requirements while protecting and enhancing the environment.

Specialist technology in our own world-class physical modelling facilities is essential to optimising the design of coastal infrastructure.

Our wavemakers, dynamometers and specialist instrumentation are available to other hydraulic, marine and coastal research facilities. These are now in use by more than 300 institutions worldwide to educate, investigate and innovate in the coastal and maritime sectors.

The global energy transition

How we help the world deliver net zero - understanding the role water plays in transitioning is critical if we are to be successful.

The technology and engineering involved is complex. New infrastructure has to be in the right place, resilient and safe. And it must be built responsibly, minimising impacts on the environment and local communities.

The global expansion of offshore wind is driving technical innovation in both fixed and floating infrastructure. With the seabed becoming more congested, we are building further offshore in deeper, more challenging waters, increasing the complexity of installation and creating a host of new subsea engineering challenges.

Our specialist expertise has helped to deliver over 90% of the UK's offshore wind farms, as well as developments in Europe, the US and Taiwan.

Our deep understanding of the complex, dynamic interactions between waves, tides, structures and the seabed ensures projects are optimised and risk, cost and environmental impacts are minimised. Our experts support port developments that are vital to the construction, operation and maintenance of the rapidly growing offshore wind estate.

With the expansion of tidal and wave energy, identifying sites with the right conditions to maximise energy yield is increasingly important. At the same time we build an understanding of the potential impacts on the marine environment and optimise structural designs to ensure that they can withstand the loads they'll face once deployed.

Working alongside increasing renewables capacity, nuclear technology generates a constant, reliable baseload of energy for many countries. We help designers understand the water-related challenges faced by the latest generation of nuclear power plants. Focusing on long term security and resilience, we design strategies that consider extreme and extremely unlikely conditions, as well as long term climate change and sea level rise. We also help optimise the hydraulic design and environmental impact of the critical cooling water systems.

In the short term, gas continues to play a part in the global energy mix. Our historic expertise in the area ensures the safe design, construction and operation of LNG terminals to meet this interim need, while mitigating and minimising environmental impacts. We actively facilitate the transition to renewables by working with clients to safely decommission legacy infrastructure and explore ways to refocus their operations to develop green energy solutions.

The wave and tidal power industry has the potential to meet up to 20% of the UK's current electricity demand.

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