

Building Future Communities

Creating resilient homes and businesses in a changing climate



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Introduction

We are in the midst of a climate emergency

"Over the past year, as the world has battled the **Covid-19 pandemic**, another growing crisis has continued to threaten the planet and the way we live: climate change. Globally, the number of extreme climate-related disasters, including **floods, storms** and **heatwaves**, has doubled since the early 1990s.¹

Here in the UK, we are experiencing the impact of these more extreme and frequent weather events. The top ten warmest years on record in the UK have all happened since 2002 and it is predicted that, by 2050, average summers will be hotter than the record-equalling heat of summer 2018.² At the same time, February 2020 was England's wettest ever, with some regions being hit by more than **400% of their normal rainfall**.³ The Environment Agency has warned UK communities to brace themselves for "more frequent periods of extreme weather" due to the climate crisis.⁴

Floods and storms provide acute reminders that the weather around us is changing, whilst extreme temperatures and rising sea-levels are slow-onset chronic issues that will increasingly affect coastal flooding and subsidence.

The pandemic has not only shown us the importance of preparation, resilience and careful management in the face of a crisis; it has also demonstrated the benefits of living in a 'greener world' through lower levels of air pollution. Now is the time to

address the most catastrophic impacts that climate change threatens. The upcoming **COP26 conference** in Glasgow will be a pivotal moment for global and national action on the climate crisis.

At Aviva, we know we need to act

At Aviva, our ambition to become a Net Zero carbon emissions company by 2040 is the most demanding target of any major insurance company in the world today. However, even in a best-case emissions reduction scenario, the UK is too late to avoid feeling any impact from climate change.

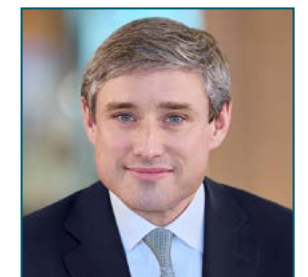
As a leading insurer for homes and businesses, we have seen first-hand the devastation that extreme weather can cause to people, properties and livelihoods. Just last February, we received almost a year's worth of storm claims in one month whilst in 2018 the lack of rainfall exposed properties to a higher incidence of subsidence claims, highlighting the vulnerability of many communities.⁵ But we have also seen examples of huge courage and creativity as communities take steps to adapt to the changing climate. Our vision is to use our expertise in risk management and resilience to help prepare homes and businesses for climate change.

We know that collective action is needed to create meaningful change. Over the coming months and years, as we work towards

our own climate commitments, we will be collaborating with partners including WWF, Cambridge Grand Challenges at the University of Cambridge and the University of Hull to better understand the challenges ahead for our customers and communities, and what we can do to help take the necessary action.

This report begins with seven calls for change: areas where Aviva believes urgent action is necessary to protect properties – homes and businesses – in our UK communities. These areas are then further explored and explained throughout the report, drawing on the wider context of the threats facing the natural, built and social environments here in the UK, and the solutions already emerging to guard against them.

Aviva's Building Future Communities report is an invitation, and a challenge. As an industry, we have expertise and knowledge to share about building resilient communities for the future, but our contribution alone is not enough. We need different sectors to come together, today, and collaborate on solutions that will help protect people and UK properties in the decades to come."



Adam Winslow
Chief Executive Officer of Aviva UK
& Ireland General Insurance*
*Subject to regulatory approval

¹ United Nations Framework Convention on Climate Change, 2018, <https://unfccc.int/news/un-warns-climate-change-is-driving-global-hunger>

² 'State of the UK Climate', 2019, pp. 18; Climate Change Committee, 'Independent Assessment of UK Climate Risk 2021', pp.5

³ Environment Agency, 2020, <https://environmentagency.blog.gov.uk/2020/03/05/the-wettest-february-between-hills-and-sea/>

⁴ Caroline Douglass, Director of Incident Management at the Environment Agency, 2020, <https://www.theguardian.com/uk-news/2020/feb/24/uk-weather-snow-threatens-travel-disruption-as-flood-alerts-continue>

⁵ Aviva property claims data analysis 2016-2021

Summary of Aviva's Call for Change

Building Future Communities sets out some of the **biggest threats, opportunities** and questions facing the UK, now and in the coming decades, and explores the innovative solutions being trialled across different sectors to mitigate the impacts of climate change on the communities in which we live and work. It takes the perspective of the UK's **natural, built** and **social environment**.

Today, nobody has all the answers. But as a leading property insurer, there are **seven areas** that we at Aviva believe require urgent action and attention if we are going to protect properties and communities, today and in the future.

Aviva is calling for:

1 Greater use of innovative nature-based solutions that are adapted to the UK landscape

Innovative, site-specific nature-based solutions that help to guard against multiple climate risks.

2 Ensure small and medium-sized enterprises (SMEs) are sufficiently protected against extreme weather

New commercial properties built today to be fit for purpose, and for the government to better support SMEs in preparing for climate events.

3 Strengthen planning regulation to protect UK properties

Strengthen planning and building regulation to prevent new properties from being built on floodplains, and to ensure that all existing and future properties have adequate resilience and safety measures in place.

4 More collaboration and research across all stages of the building process to combine sustainability with safety

From design to build, ensure that all current and future materials have both sustainability and safety in mind.

5 Improve access to home insurance and narrow the insurance gap to protect those most at risk

Increased research into the affordability and availability of insurance, and targeted measures to close the insurance gap – particularly among renters – and protect those most threatened by climate change.

6 Encourage and incentivise property resilience to aid recovery

Greater understanding, insight and collaboration on effective campaigns and incentives that drive preventative action against extreme weather impacts. These should include government grants to help return businesses and households to a greener and more resilient state after extreme weather events.

7 Collaboration across recovery organisations to strengthen crisis response and resilience at community level

Increased collaboration and support for communities through a more streamlined, quicker and joined-up crisis response to climate events, using insights from Covid 19 and existing community-level partnerships.

These **seven calls** for change will be **explored** in more detail throughout the report

Today's Reality

The UK is already feeling the effects of climate change

Climate change is not only a danger for future generations; its impact is being felt in the UK today – especially flooding, extreme heat, and subsidence.

More than 80,000 properties in the UK have flooded since 2007, and the UK flooding in 2019-20 was estimated to have cost the **UK economy £78 million**.⁶ Flooding has a financial cost, but also a human one. People who have been flooded in the UK are nine times more likely to experience long-term mental health problems than the general population.⁷

Other climate events can be equally devastating. In the UK, it is sometimes tempting to greet heatwaves with excitement, but they can also prove fatal. There were more than **2,500 heat-related deaths** during three 2020 heatwaves: more than the number of deaths from road accidents.⁸ And without adaptation measures, this could rise to 7,000 heat-related deaths every year by 2050 – with the elderly and vulnerable being the hardest hit.⁹



⁶ UK government, 'Counting the Cost of Flooding', 2021

⁷ 'Effect of Extreme Weather Events on Mental Health', 2020, pp.8, <https://www.mdpi.com/1660-4601/17/22/8581>

⁸ Climate Change Committee, 'Independent Assessment of UK Climate Risk 2021', pp. 21; Department for Transport, 'Reported Road Casualties in Great Britain: Provisional Estimates Year Ending June 2020', pp.1

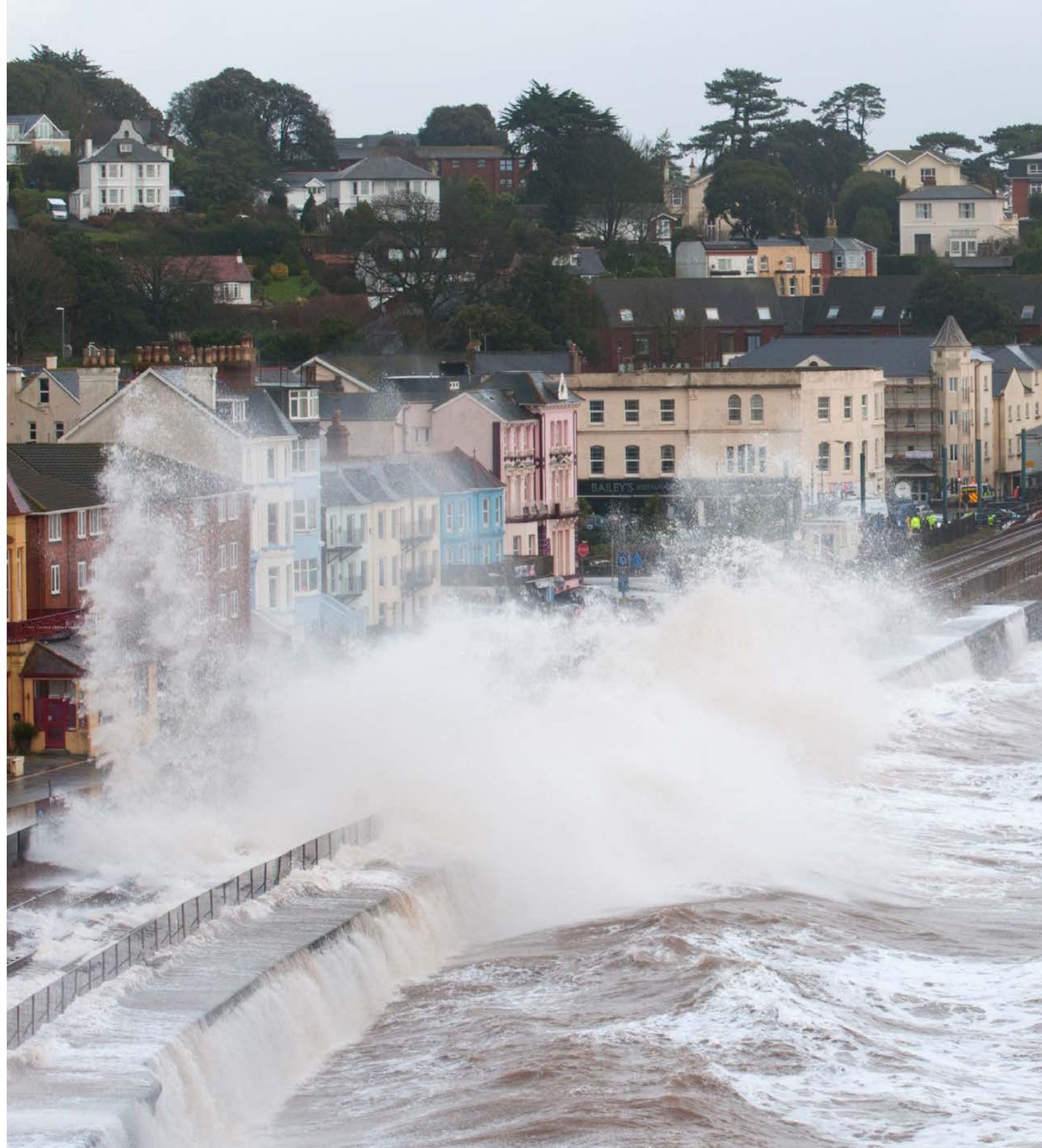
⁹ Environmental Audit Committee, 'Heatwaves: Adapting to Climate Change', 2018, pp.3

Today's Reality

The natural environment is becoming more volatile

In 2019 and 2020, Aviva claims data showed a major spike in claims for flood-related damage to homes.¹⁰ Claims from commercial properties also grew steadily between 2017 and 2019, with a large increase in 2020. Even more worryingly, there appears to be a rise in the number of flood events outside of winter months, due to increased surface water flooding following heavy downpours. Sadly, this suggests that flood events are becoming more common – and will continue to do so.

It's not just floods. Between 2016 and 2021, the data also shows a sharp increase in claims for subsidence: when the ground beneath a property sinks, pulling the foundations down with it. A major reason for this could be hotter and drier summers causing soil shrinkage.



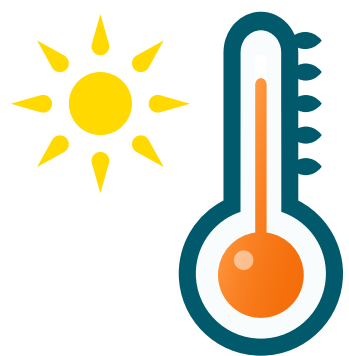
Tomorrow's Forecast

Heatwaves, floods and drought: the future of the UK

The impacts of climate change are likely to become drastically worse over the next thirty years. Hotter, wetter conditions not only increase the likelihood of extreme weather; they also bring greater risk from new pests, diseases and invasive species which can threaten both human health, and the health of the UK's natural environment.¹¹ And the latest report from the UK Climate Change Committee predicts that major climate events, including flooding and heatwaves, will rise dramatically by mid-century.¹²

Mapping the changes

Climate events affect different regions in different ways. Higher temperatures and subsidence claims are more frequent around London and the South-East, whilst the data suggests higher storm claims in Southern England than in Northern Regions.¹³ In the future, North-West England is likely to become wetter as South-East England becomes drier, placing the North-West at even higher risk of flooding than it is today. And worryingly, some of the most agriculturally-productive regions in the UK, such as Kent and East Anglia, are also likely to be some of the worst affected by soil dryness and water shortages.¹⁴



7.4°C rise in UK
summer temperatures¹⁵



59% increase in
rainfall by 2050¹⁵



¹¹ Climate Change Committee, 'Independent Assessment of UK Climate Risk 2021', pp.102

¹² Climate Change Committee, 'Independent Assessment of UK Climate Risk 2021', pp.40

¹³ Aviva property claims data analysis 2016-2021; Met Office, 'Hot Weather and Its Impacts', <https://www.metoffice.gov.uk/weather/warnings-and-advice/seasonal-advice/health-wellbeing/hot-weather-and-its-impacts>

¹⁴ Climate Change Committee, 'UK Climate Change Risk Assessment 2017', pp.36

¹⁵ Environment Agency, 'Blueprint to Protect and Prepare Nation from Flooding', 2020

Tomorrow's Forecast

A vicious cycle

Both climate change and its impacts could be worsened by human activity. In 2021, the UK was ranked twelfth worst out of 240 countries and territories for biodiversity loss.¹⁶ Destruction of natural habitats such as forests does not just further damage the UK's dwindling biodiversity: cutting down trees releases carbon dioxide into the atmosphere and reduces the cooling effect provided by woodland, thereby increasing the risk of heatwaves.¹⁷ What's more, climate impacts do not happen in a vacuum: one can worsen another. Soil erosion, for example, increases the risk of landslides and floods, whilst severe flooding in turn further accelerates soil erosion. Floods can also cause hazardous chemicals to leak into rivers and farmland, with potentially toxic effects for human health and the environment. After the 2012 floods in the UK, levels of lead were sufficient to kill animals grazing on flooded fields.¹⁸ These compounding impacts could lead to a vicious cycle of environmental damage, whose full effects it is almost impossible to predict today.

“The UK, and the world, is facing a **triple challenge**: mitigating **climate change**; **feeding ourselves sustainably** and **restoring nature**. We need solutions that can address each issue – such as **reducing greenhouse gas emissions** – while also finding ways of managing trade-offs between the issues, such as how we use water resources.”

Dave Tickner
Chief Freshwater Adviser, WWF

¹⁶ RSPB, 'Biodiversity Intactness Index Summary Report', 2021, <https://www.rspb.org.uk/globalassets/downloads/projects/48398rspb-biodiversity-intactness-index-summary-report-v5-1-1.pdf>

¹⁷ UN Environment Programme, <https://www.unep.org/news-and-stories/story/how-cities-are-using-nature-keep-heatwaves-bay>

¹⁸ 'Flood-Related Contamination in Catchments Affected by Historical Metal Mining', 2014, <https://www.sciencedirect.com/science/article/abs/S004896971301560X>

Evolving Solutions

Solutions should work with the unique features of the UK landscape – rather than against them

Going with the flow

There are already effective ways to reduce the risk of extreme weather, including flooding, on people and communities. Many of these solutions draw on the unique features of the UK landscape, rather than working against them. For example, researchers studying the River Caldew in Cumbria found that letting rivers behave more naturally, rather than straightening them into rigid channels, could help to reduce future flooding.¹⁹ This nature-based approach also creates a much wider variety of habitats, helping natural wildlife to thrive.

A triple win

Solutions that work with the natural environment can protect against multiple climate risks at once. For example, a DEFRA-funded project in South Tyneside is designed to guard against coastal erosion and flooding through restoring underwater habitats.²⁰ At the same time, these habitats also help to boost marine biodiversity and store carbon, reducing the amount of CO2 in the atmosphere.



¹⁹ Impacts of River Engineering on River Channel Behaviour, 2020, <https://www.mdpi.com/2073-4441/12/5/1355>

²⁰ Department for Environment, Food & Rural Affairs, 'Innovative Projects to Protect Against Flooding Selected', 2021, <https://www.gov.uk/government/news/innovative-projects-to-protect-against-flooding-selected>

Evolving Solutions

“ We want this **pilot project** to provide a model for how business can invest in **nature-based solutions** to help guard against **extreme weather**, the **climate crisis** and **biodiversity loss**, whilst meeting the needs of a host of different stakeholder groups ”

Kerrina Thorogood,
Head of Partnerships, WWF-UK

Case Study: WWF and Aviva Soar Catchment Pilot

Through Aviva's new partnership with WWF, a pilot project in the River Soar catchment in Leicestershire has been launched to explore nature-based solutions that will increase the UK's resilience to a range of climate risks.

Using nature-based solutions to mitigate risks such as flooding is not a new concept. However, finding solutions that meet the needs of all the different groups within a given area has long been a challenge for policymakers. For example, how do farmers balance increasing crop yields with planting trees to reduce flood risk? Too often, priorities end up competing.

This project aims to help solve this problem. Aviva and WWF will bring together different groups, from farmers and landowners to insurers and local government, to explore nature-based solutions and provide a best practice model that addresses the 'triple challenge' of feeding a growing population, combatting the climate crisis and reversing nature loss.

Evolving Solutions

A natural alliance

Nature-based solutions don't need to happen in isolation – or only in rural areas. They can also be built into urban design and used to strengthen existing defences.

For example, cities like Copenhagen are designing parks to store rainwater in periods of heavy rainfall.²¹ As well as helping to relieve pressure on drainage systems, this also provides recreational spaces for communities, and helps to increase urban wildlife. Elsewhere, in the Netherlands, natural flood defences are being used to strengthen artificial ones on the coast, without the need to build much higher walls.²²

To be effective, innovative solutions need to be tailored to the unique features of the landscape in the region of the UK where they are being used and for the particular risks in that region. For example, tree-planting can be an effective defence against some climate risks, but planting trees on heathland or wetland can damage existing biodiverse and carbon-rich habitats, doing more harm than good.²³ When it comes to nature-based climate solutions, one size does not fit all.

²¹ 'Copenhagen Climate Adaptation Plan', 2011, pp.13

²² Environment Agency, 2017, <https://environmentagency.blog.gov.uk/2017/08/07/the-netherlands-and-why-partnership-matters-in-flood-risk-management/>

²³ RSPB, WWF UK and the Nature-Based Solutions Initiative, 'The Role of Nature-based Solutions for Climate Change Adaptation in UK Policy', 2021, pp. 5

Aviva's call for change

Greater use of innovative nature-based solutions that are adapted to the UK landscape

Aviva is calling for the UK to further develop and explore innovative nature-based solutions that deliver a host of social, economic and wellbeing advantages for people and communities, as well as protecting against multiple climate risks including flooding and extreme heat. The UK should learn from nature-based solutions that are effective elsewhere, but these must be adapted to the unique qualities of the UK landscape, rather than 'copy and pasted' from elsewhere.



Today's Reality

Current building practices put people and properties at risk from extreme weather

Aviva's latest risk-mapping data shows that one in five properties (**21%**) are currently at risk of at least one type of flooding: **19%** from surface water flooding, and **6%** from river or coastal flooding.²⁴ Concerningly, **4%** are at risk from all three types of flooding.

70,000 new homes in flood zones

A joint industry and government scheme – Flood Re – was introduced in 2016 to improve the accessibility and affordability of insurance for properties at risk from flooding, thereby helping people to recover faster after a flood event.²⁵ Flood Re does not cover homes built after 2009, because it was intended that these new homes would be resilient to flood events. Yet worryingly, since January 2009, over 70,000 homes have been built in flood zones, 20,000 of these in areas without flood defences, in the full knowledge that their inhabitants will not be covered by Flood Re.²⁶

Building practices that do not consider other climate impacts may also put people in danger. In England alone, over 570,000 new homes have been built since 2016 that will not be resilient to future high temperatures.²⁷ And the Climate Change Committee has called for UK planning strategies to address the urban heat island effect, in which heat is trapped within cities – causing them to be much warmer than surrounding areas.²⁸

“ My home has been **flooded several times over the years** and it's upsetting each time it happens. It makes me feel **helpless and bewildered**. Although the water is only a few inches deep it causes so much damage.

When the last flood happened, in November 2020, I felt more prepared and I'd already taken steps to make my home more resilient to flooding by **putting furniture on blocks, raising sockets** and **installing flood gates**. Moving out of your home after a flood can feel isolating and lonely, but taking these steps meant I could stay at home and move upstairs, and many items didn't need to be replaced. ”

Aviva home insurance customer
North Yorkshire



²⁴ Aviva Flood Mapping Data, 2021

²⁵ <https://www.floodre.co.uk/>

²⁶ Bright Blue Think Tank, 2020, <https://www.brightblue.org.uk/70000-english-homes-in-areas-prone-to-flooding/>

²⁷ Climate Change Committee, 'Independent Assessment of UK Climate Risk 2021', pp.28

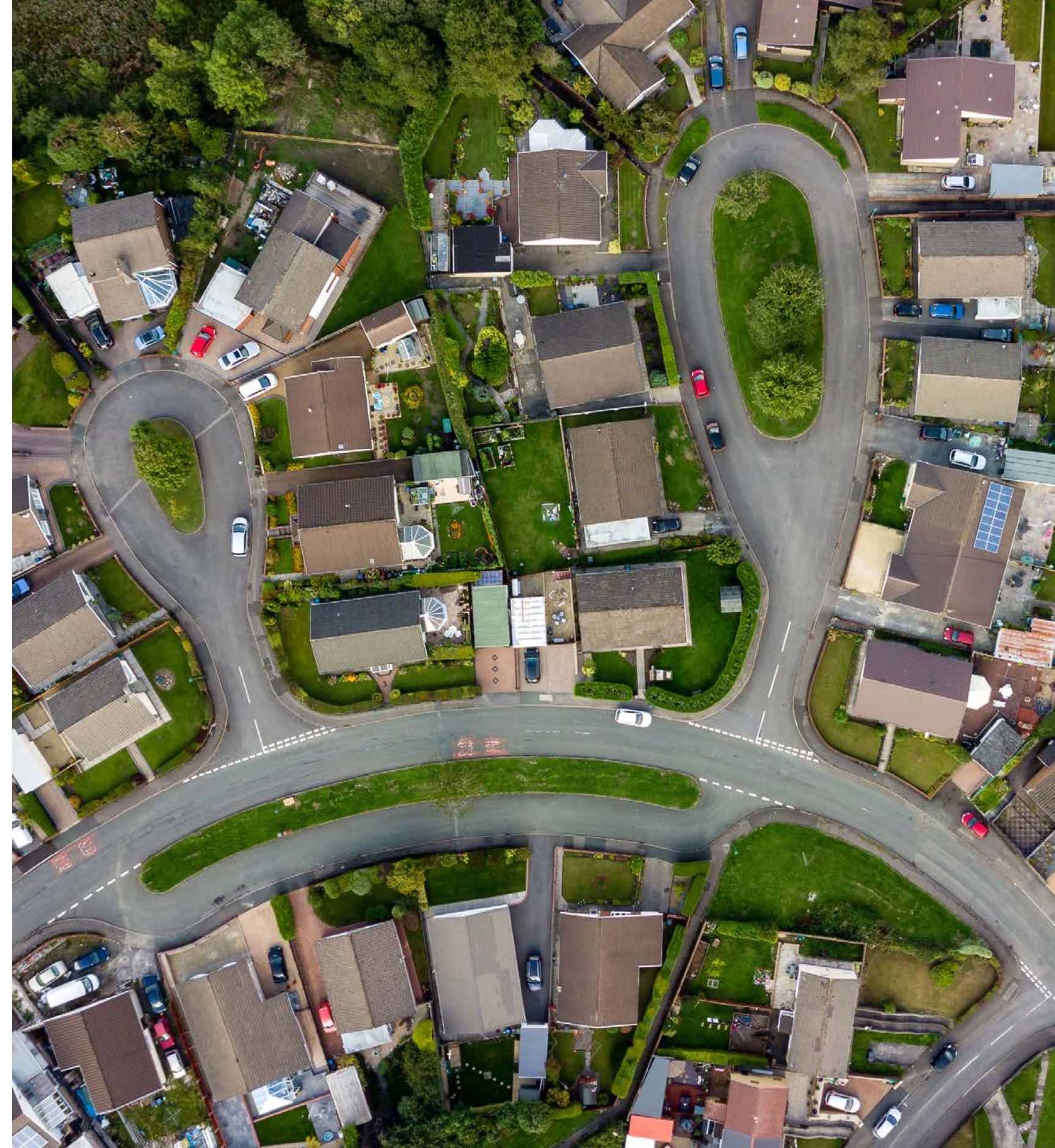
²⁸ Climate Change Committee, 'Independent Assessment of UK Climate Risk 2021', pp. 134

Today's Reality

Vulnerable homes

Not only where but how buildings are constructed can put people and properties at risk. Features such as paved driveways and low airbricks make buildings more likely to suffer major damage in the event of a flood, particularly in urban areas.²⁹ Certain species of tree planted close to properties on clay soils can increase their risk of subsidence, whilst large windows facing the south or west (especially without shutters or awnings) make buildings more likely to overheat during the warmest parts of the day.³⁰

Materials, too, make a difference. As well as having a high carbon footprint, buildings built from concrete absorb more of the sun's heat, making residents more likely to suffer from overheating.³¹ Other materials, such as timber, are slow to recover from flooding – meaning residents can be delayed in returning home after a traumatic weather event.



²⁹ Edward Barsley, *Retrofitting for Flood Resilience*, 2020, pp. 192-95

³⁰ 'Energy Poverty and Indoor Cooling: An overlooked issue in Europe', 2019, pp.26 https://www.sciencedirect.com/science/article/abs/pii/S0378778818324307?casa_token=rErQcYiPym0AAAAA:n43yr2IFm7OeYhYCPqx1eg9QLc5c43BC9atuA_X8rA3Bz00EolxErrMfezd_SosMmn9tGbbL3n8

³¹ 'Energy Poverty and Indoor Cooling: An overlooked issue in Europe', 2019, pp.26 https://www.sciencedirect.com/science/article/abs/pii/S0378778818324307?casa_token=rErQcYiPym0AAAAA:n43yr2IFm7OeYhYCPqx1eg9QLc5c43BC9atuA_X8rA3Bz00EolxErrMfezd_SosMmn9tGbbL3n8

Today's Reality

Taking care of business?

Small and medium-sized enterprises (SMEs) are vital to short and long-term community recovery after a flood event, providing jobs and essential services to local people. Despite this, UK planning regulations prioritise protecting homes over protecting businesses, which can place SMEs in significant danger from extreme weather.

Today, almost a third of commercial properties are also at risk of flooding – and certain features put businesses at even greater risk.³² Those that have IT systems in the basement, for example, could be left unable to function following a flood event, whilst large glass frontages on office buildings can lead to uncomfortably hot internal temperatures. As well as impacting workers' health and wellbeing, this also damages productivity: the 2003 European heatwave is estimated to have caused UK manufacturing output to reduce by £400-500 million.³³

Not a thing of the past

These features are not only a problem for old buildings. In fact, evidence suggests that newer properties are more likely to overheat than older designs, particularly those designed to be thermally efficient in cold weather.³⁴ Worryingly, as heatwaves drastically rise, buildings are becoming even worse equipped to deal with them.

Aviva's call for change

Ensure small and medium-sized enterprises are sufficiently protected against climate change

Aviva is calling for everyone involved in building and protecting properties to work together to ensure that every new commercial property built today and in future is fit for purpose and adequately protected from the changing impacts of extreme weather. The government should ensure that SMEs in communities do not suffer collateral damage due to attempts to protect homes from extreme weather. The government should also promote proactive measures to help businesses in high-risk areas take preventative action before being hit by a climate event, and work with the insurance industry and with businesses to ensure adequacy of cover among SMEs – especially those in high-risk areas.



³² Aviva Flood Mapping Data, 2021

³³ Climate Change Committee, 'UK Climate Change Risk Assessment 2017', pp.34

³⁴ Climate Change Committee, 'UK Climate Change Risk Assessment 2017', pp.64

Tomorrow's Forecast

On shaky ground

As extreme weather increases so too will the risk to the built environment. According to research commissioned for Aviva, 38% of people believe climate change will impact their home within the next year, with 50% believing it will affect their home in five years and 57% in ten years. And over half of small or medium-sized business owners (57%) also believe that climate change will affect their business within the next ten years, with extreme heat and flooding being the biggest concerns.³⁵

These impacts could be catastrophic. According to WWF, if the UK follows a 'business-as-usual' scenario, a repeat of the 2013/14 winter floods in 2050 would affect 2.5 million homes and 770,000 non-residential properties, as well as over a thousand schools.³⁶ And although 'hard defences' such as sea walls can help to mitigate the damage done by some extreme weather, it will never be practical or possible to install these everywhere – or to protect properties against every kind of climate event.

According to the Climate Change Committee, a heatwave event in 2050 could result in 92% of flats and 61% of detached homes exceeding overheating thresholds in London alone.³⁷ And new research from the British Geological Survey predicts that the number of properties in the UK at high risk of clay-related subsidence will triple between 2030 and 2070 – with London feeling the worst effects.³⁸

“ Subsidence ‘**surge**’ events are caused by **hot, dry summers**. As the UK climate changes, prolonged periods of drought could lead to more subsidence – particularly in densely populated areas in the south of England where clay soil is prevalent ”

Richard Rollitt
Technical Director, the Innovation Group
(which manages Aviva subsidence claims)

³⁵ Research commissioned by Censuswide and YouGov for Aviva in May 2021

³⁶ WWF, 'Developing and piloting a UK Natural Capital Stress Test, 2017, pp.64

³⁷ Climate Change Committee, 'UK Climate Change Risk Assessment 2017: Chapter 5: People and the Built Environment', pp. 71

³⁸ British Geological Society, 2021, <https://www.bgs.ac.uk/news/maps-show-the-real-threat-of-climate-related-subsidence-to-british-homes-and-properties/>



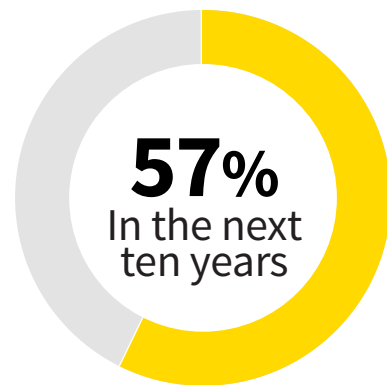
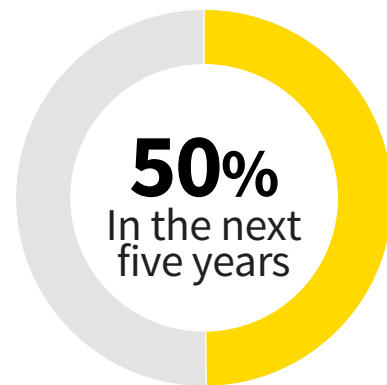
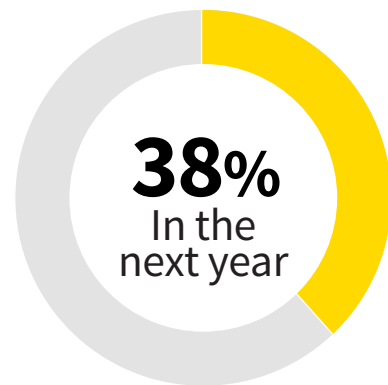
Tomorrow's Forecast

The domino effect

These climate impacts will compound and accelerate each other, leading to threats that cannot be predicted today. In extreme weather events there is potential for 'cascading collapse': when damage to one part of a system has knock-on effects that makes the situation even worse. For example, the collapse of communications systems during a climate event could cut-off vital communication channels for coordinating rescue efforts, leaving people trapped in dangerous situations.

Decisions made to protect against one risk could also have unintended consequences. Choosing to adopt more flood-resistant building materials, such as concrete, could leave UK properties poorly adapted for heatwaves and other climate risks further reducing urban biodiversity and increasing city temperatures.

Do you think climate change will impact on your home?
All Respondents (UK householders)



Evolving Solutions

New regulation on building practices and materials is urgently needed

The Environment Agency has identified that the number of properties built on floodplains is likely to reach 4.6 million over the next 50 years: almost double the figure today.³⁹

The government has an ambition to build 300,000 new homes a year by the mid-2020s, but this must be balanced with measures to ensure that new properties are safe and resilient across the lifetime of the building.⁴⁰ Developers should recognise that land at high risk of flooding may not be suitable for certain uses, such as occupation by vulnerable people or businesses that use heavy machinery. The effect properties can have on the wider environment should also be considered in the context of climate change. For example, a large supermarket car park increases the likelihood of floodwater surface run-off in a high-risk area.

It is crucial that these considerations are made right from the planning stage of development, as many climate adaptations, particularly those increasing resilience to storms and subsidence, can only be implemented before and during a build.

It is not enough to build properties that are adapted to the current level of risk. New properties built today must be resilient to the enormous changes the UK will face over the next thirty years as a result of the climate crisis. If builders and developers wait for these changes to take place before adapting the built environment, it will be too late.

“ Properties designed and built today must be **future-proofed**, within a **robust planning** and **design regime** that takes into account the UK’s unique features and risks. ”

Nick Major
MD, Commercial Lines, Aviva

Aviva’s call for change

Strengthen planning regulation to protect UK properties

3

To prevent catastrophic damage to people, homes and businesses, Aviva is calling for the government to strengthen planning policies to direct new development away from areas at risk and ensure that developers can be held to account when new properties flood – as is already the case in Scotland. The government should ensure that houses and other residential and commercial properties already built have access to adequate insurance cover and resilience measures in place.

Building regulations, standards and testing of new materials need to be stringent enough to protect inhabitants and businesses against major climate events, and be supported by more effective oversight and enforcement than is currently in place. As well as ensuring people are safe, building standards should also cover resilience measures to help residents, businesses and communities recover faster after a major climate event.



³⁹ Environment Agency, ‘National Flood and Coastal Erosion Risk Management Strategy for England’, 2020, pp.35

⁴⁰ Ministry of Housing, Communities & Local Government, ‘Government announces new housing measures’, 2018, <https://www.gov.uk/government/news/government-announces-new-housing-measures>

Evolving Solutions

Solutions exist to help the built environment respond to, and reduce, climate threats

There are a host of actions everyone can take to help protect themselves, their businesses and their communities from climate risks.

Aviva has produced a [short video](#) with tips to help people prepare for and minimise flood damage and a [commercial flood guide for businesses](#). Simple measures like installing flood gates on doors and windows, implementing temporary barriers around commercial properties or fitting non-return valves on toilets can make a real difference in helping people get back into their properties sooner after a flood event.

Building solutions can also help to guard against other climate risks, including overheating. Installing external shading to shield windows from the sun and improving insulation to stop heat from outside entering a property can both help to reduce indoor temperatures.⁴¹ However, as with nature-based solutions, it's important to consider the local context when adapting properties for extreme weather.



This short film helps to explain flood-resistant measures



Evolving Solutions

Slowing the flow

Property owners can also take steps to protect their neighbours and their wider community, for example by adapting their properties to ‘slow the flow’ of stormwater during a climate event. This helps take the pressure off drainage systems and protect downstream properties from flooding. Residents can also plant green roofs or introduce a rain garden to store excess rainwater during flood events.⁴² However, our research suggests that uptake of such measures is low. For example, only 14% of people had installed a rainwater harvesting system, such as a water butt, since moving into their home.⁴³

Resilience measures should go hand-in-hand with efforts to reduce emissions from properties. Features such as solar panels and sustainable building materials can help to reduce the carbon footprint of building and maintaining properties but need to be rigorously tested.

“ Context is key for **flood resilience**. You **can’t copy and paste**: what works for one community and site may not work for another ”

Edward Barsley
Author of *Retrofitting for Flood Resilience* and
Founder of The Environmental Design Studio

Aviva’s call for change

More collaboration and research across all stages of the building process to combine sustainability with safety

Aviva is calling for UK builders, developers, architects, planners, government, the insurance industry and the public to come together to ensure that we build responsibly for the UK landscape now and in the future, as well as working with industry to improve the levels of training and skills. This should build on the work of the industry-led Property Flood Resilience Code of Practice, sponsored by Aviva, which was launched in 2020.

We are calling for more research into all stages of the building process, from design to build, to ensure that all current and future materials have both sustainability and safety in mind. Design and building codes must support adoption of new technologies with rigorous testing, and certification should be granted to support and guide on the usage of these materials. The sustainable materials code should also be linked to industry agreement and to carbon emissions target dates and legislation.



Evolving Solutions



“ Following the **second flood in six years**, we felt we had to do what was right for our business and take action to prevent the most catastrophic impacts if another flood did occur, by **installing flood mitigation measures**. But many surrounding businesses have not yet implemented these measures – whether that’s because of cost, lack of information or feeling overwhelmed by the situation. It’s an ongoing challenge. ”

Sarah Gibbs
Managing Director, The Swan Hotel, Cumbria

Case Study: The Swan Hotel, Cumbria

Sarah Gibbs has been managing director of the Swan Hotel in Cumbria for thirteen years. Sadly, during that time, the hotel has flooded twice. Both times it was a hugely stressful experience – for employees and managers, who worry about losing their jobs and livelihoods, and for guests, particularly those who have booked the hotel for a special occasion.

After the second flood in 2015, the hotel management team decided to install resilience measures that would help the hotel to recover faster after a flood event. They undertook a range of repairs including waterproofing floors and walls, replacing

underground airbricks (as water often enters the property through the floors) and putting non-return valves on all drainage. They also worked with Aviva, their insurer, to develop a flood mitigation strategy, which included door guards on all ground floor doors and a temporary barrier around the hotel which can be quickly installed if floods are predicted. Although Sarah hopes that these barriers are never put to the test, this ‘belt and braces’ approach has helped to reassure her that if another flood were to happen, the hotel would now avoid the worst effects.

Evolving Solutions

Beyond barriers

The UK must do everything possible to halt the climate crisis. However, it is already too late to avoid all the impacts of climate change. Even if the UK stopped burning all fossil fuels today, the earth would continue heating for several decades.⁴⁴ The UK needs a built environment that is ready for more extreme weather.

Flood-resilient homes

New materials, designs and engineering principles are already emerging that could help properties adapt. In the Netherlands, where more than half the population lives below sea level, architects are experimenting with 'floating homes' that can rise or fall with changing water levels.⁴⁵

In the UK, new build homes and businesses could be designed to be moveable during extreme weather, to be 'amphibious' in wet conditions, or to allow floodwater to pass through areas where it will have less impact, such as a multi-use basement area.⁴⁶

Innovations such as these help to lay the foundations for buildings of the future, where people and businesses can live safely and securely in a world of extreme weather.



⁴⁴ IPCC, 'Global Warming of 1.5°C. An IPCC Special Report on the Impacts of Global Warming of 1.5°C Above Pre-Industrial Levels and Related Global Greenhouse Gas Emission Pathways, in the Context of Strengthening the Global Response to the Threat of Climate Change, Sustainable Development, and Efforts to Eradicate Poverty', 2018, pp.5

⁴⁵ World Economic Forum, 2021, <https://www.weforum.org/agenda/2021/02/netherlands-floating-village-schoonschip-density/>

⁴⁶ Edward Barsley, Retrofitting for Flood Resilience, 2020, p. 197

Evolving Solutions



⁴⁷ <https://www.t-e-d-s.com/the-home-for-all-seasons>

© The Environmental Design Studio & JTP

Case Study: The Home for All Seasons

Created by The Environmental Design Studio and JTP, the Home for All Seasons is designed to take extreme weather in its stride.⁴⁷ Made from long-lasting and easily repairable materials, the future-proofed design is resilient to flooding, heatwaves, extreme cold, energy shortages and even societal change. The ground floor is a multi-use 'garden room' that can be quickly adapted and

recovered after a flood event. Water and utilities raised to first-floor level mean that power continues even if the basement is flooded, whilst natural ventilation protects against extreme heat without the need for air conditioning. Green spaces provide shade and cooling, help to absorb excess rainwater and support resident wellbeing.

Today's Reality

The burden of climate change is not being felt equally

The people hit hardest by extreme weather events are often those least able to cope with them. According to the Grantham Institute, new homes built in economically deprived parts of England and Wales between 2008 and 2018 are more likely to become exposed to high flood risk over their lifetime than houses built in more affluent areas.⁴⁸ Dense urban areas, often inhabited by more deprived communities, are more likely to trap heat during a heatwave, and simple cooling strategies such as opening windows at night may not be feasible because of higher crime rates.⁴⁹ The Environment Agency also found that people in deprived communities may be less able to cope with the impact of extreme weather.⁵⁰

As well as being more vulnerable to the impacts of climate events, deprived groups may also be less likely to be covered by insurance. The Blanc Report, commissioned in the aftermath of the 2019 Doncaster floods, found that the vulnerable, elderly, deprived and at-risk may be less likely to have buildings or contents insurance – in part due to affordability concerns.⁵¹

Without action, this inequality could worsen drastically over time. Deprived groups could be trapped in a vicious cycle of extreme weather events followed by slow, incomplete recovery that further hampers their resilience to future climate risks.



⁴⁸ Grantham Research Institute on Climate Change and the Environment, 'New Build Homes, Flood Resilience and Environmental Justice – Current and Future Trends under Climate Change across England and Wales', 2020

⁴⁹ Environmental Audit Committee, 'Heatwaves: Adapting to Climate Change', 2018

⁵⁰ Environment Agency, 'Addressing Environmental Inequalities: Flood Risk', 2006

⁵¹ Amanda Blanc, 'Independent Review of Flood Insurance in Doncaster', 2020

Today's Reality

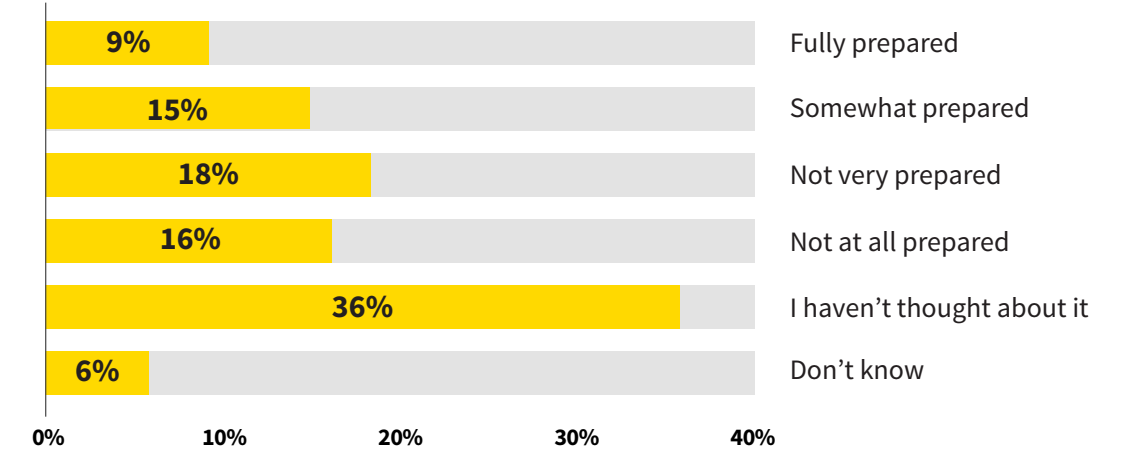
Across the UK, people underestimate the threat of extreme weather.

Research commissioned for Aviva in 2021 shows that people tend to misunderstand their level of risk to climate events. 56% of people living in high-risk flood areas believe their property faces no risk at all from flooding.⁵²

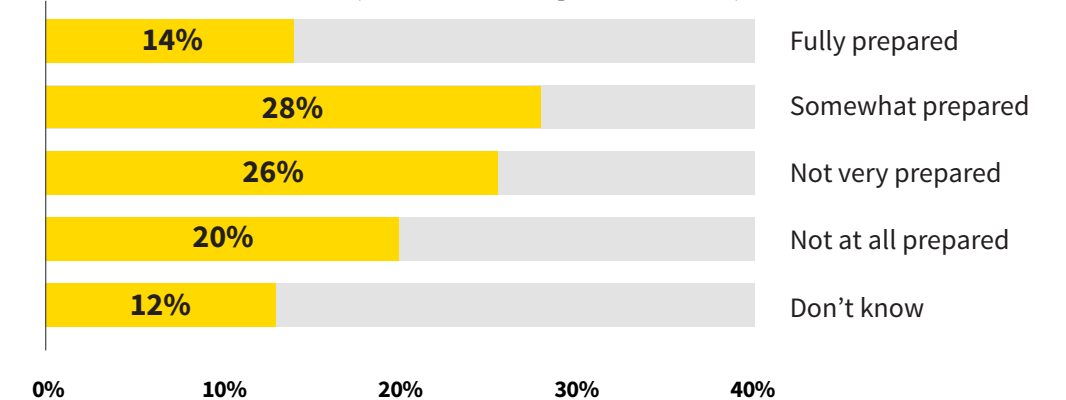
However, even those who believe they are at risk may not necessarily take any preventative action. Our research found that although 34% of people believe their home is at risk of flooding, only 9% feel fully prepared for a flood. Similarly, although over half (57%) of SME owners believe that climate change will have an impact on their business in the next ten years, only 12% have a business continuity plan that includes climate change risks.

Financial barriers and “friction costs” (the hassle and disruption of selecting and installing defences) can stop people taking steps to protect themselves even if they know they are at risk.⁵³ This is particularly true for small businesses: firms with under 50 employees are more likely to be put off by friction costs when applying for government schemes.⁵⁴ These cognitive and behavioural barriers to action might help to explain the worrying statistic that 60% of people living in high-risk flood areas have implemented no flood protection measures at all.⁵⁵

How prepared (if at all) do you feel for the event of your **home** being flooded?
(All householder respondents)



How prepared (if at all) do you feel for the event of your **business** being flooded?
(All SME respondents)



⁵² Research commissioned by Censuswide and YouGov for Aviva in May 2021

⁵³ Department for Environment, Food & Rural Affairs, 'Applying Behavioural Insights to Property Flood Resilience', 2020, pp.51

⁵⁴ Department for Environment, Food & Rural Affairs, 'Applying Behavioural Insights to Property Flood Resilience', 2020, pp.51

⁵⁵ Research commissioned by Censuswide for Aviva in May 2021

Today's Reality

Particular attention is needed to protect renters

Aviva research shows that renters are less likely than homeowners to have insurance. Over a third (37%) of tenants in private rentals and over half (53%) of those in social housing don't have any insurance.⁵⁶ Currently, landlords are responsible for buildings insurance in rented accommodation, but there is no obligation to provide cover. This leaves thousands of tenants at risk of becoming homeless if a property is made uninhabitable by an extreme weather event.

Most contents insurance policies provide tenants with temporary accommodation in a crisis event, but Aviva research showed that uptake of contents insurance among tenants is also low – particularly among those in social housing.

Aviva's call for change

Improve access to home insurance and narrow the insurance gap to protect those most at risk

5

Aviva is calling for the government to seek greater understanding of which people and communities are most at risk of the impacts of climate change, who is least likely to have resilience measures in place, including insurance coverage, and how best to improve their levels of protection. Aviva supports the targeted measures set out in the Blanc Report to help close the insurance gap, including its call for the Department for Environment, Food & Rural Affairs to repeat its 2018 survey into the affordability and availability of insurance by 2022.

The government should consider the case for requiring landlords to have buildings insurance that protects tenants if they cannot live in their home for a long period. Landlords should provide tenants with details of flood cover and how they will support them in a flood event, particularly in high-risk zones. And local authorities should ensure that tenants in high flood risk areas are given guidance on the range of risks they face and how they can protect themselves with adequate insurance cover. There is also a need for innovation and collaboration on schemes that encourage or incentivise greater access to contents insurance for renters. These measures should be considered as part of the Renters Reforms package announced in the Queen's Speech.



Tomorrow's Forecast

Population changes over the coming decades will affect who is most at risk from extreme weather.

Changing populations

The number of people living in the UK is rising. According to the Office of National Statistics, the UK population is projected to pass 70 million by mid-2031.⁵⁷ This will place more people at risk of extreme weather events, including flooding and heatwaves.⁵⁸

At the same time, the UK population is ageing.⁵⁹ Older people are more vulnerable to extreme weather, particularly heatwaves, and they might also find it more difficult to leave or adapt their properties during a climate event.⁶⁰ Worryingly, this could mean that as climate risks increase, so too will the UK population's vulnerability to those risks.

The young are more concerned

Perhaps unsurprisingly, our research found that young people are more concerned than older people about the impacts of climate change. Two thirds (69%) of 25–34-year-olds believe that climate change will have an impact on their home in the next ten years,

compared with 41% of over 75s.⁶¹ As the younger generation grows up over the coming decades, and the impacts of climate change are felt more strongly in the UK, overall concern may well continue to increase – and hopefully, so too will the number of people putting in place resilience or sustainability measures. However, it may not be that simple. Some evidence suggests that negative emotions such as fear cause people to avoid information about a threat in order to shield themselves from further worry.⁶² Whilst this is an understandable response, it could lead to serious problems if rising concern about extreme weather paralyses people rather than empowering them to act.



⁵⁷ Office of National Statistics, 'National Population Projections: 2018-Based', <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/bulletins/nationalpopulationprojections/2018based>

⁵⁸ Climate Change Committee, 'UK Climate Change Risk Assessment 2017', pp.32

⁵⁹ Office of National Statistics, 'National Population Projections: 2018-Based', <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/bulletins/nationalpopulationprojections/2018based>

⁶⁰ Climate Change Committee, 'UK Climate Change Risk Assessment 2017', pp.34

⁶¹ Research commissioned by Censuwide for Aviva in May 2021

⁶² Department for Environment, Food & Rural Affairs, 'Applying Behavioural Insights to Property Flood Resilience', 2020, pp.13

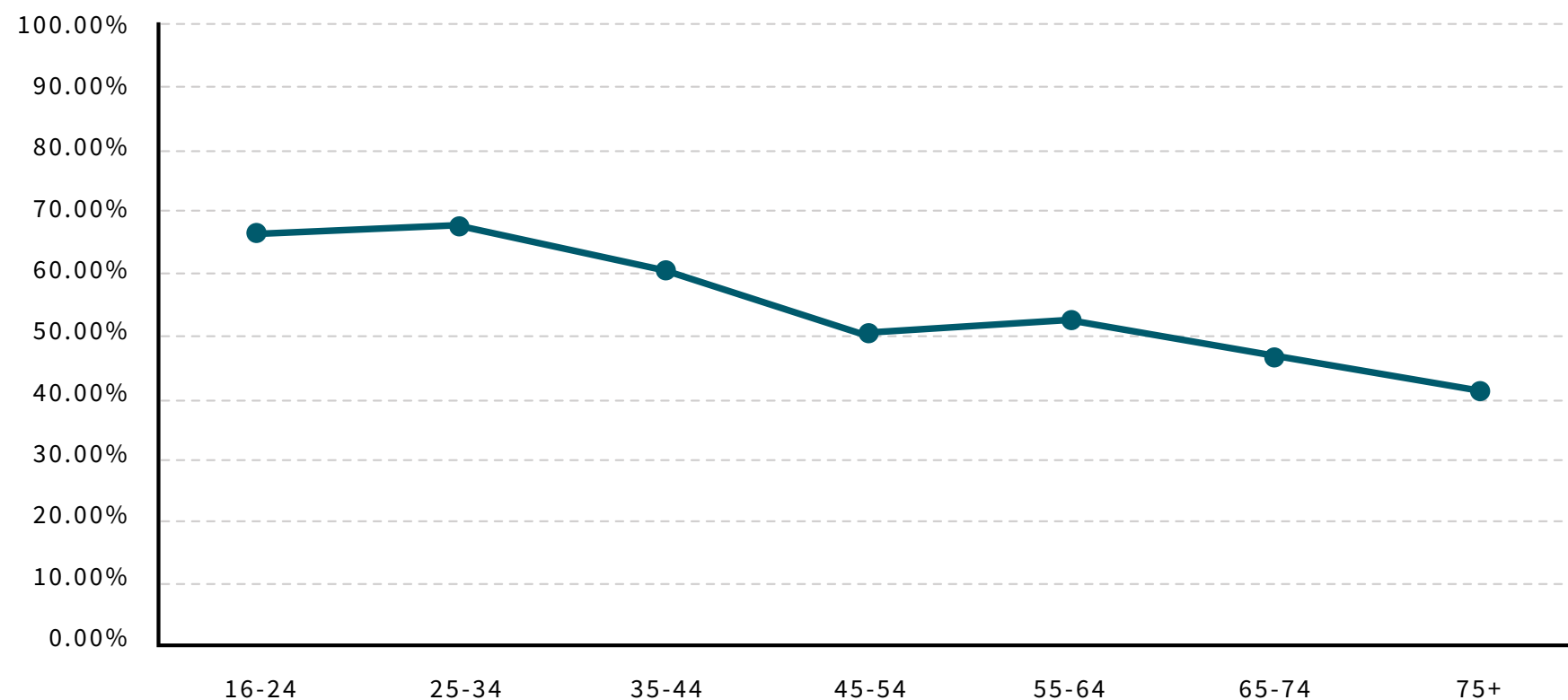
Tomorrow's Forecast

Populations on the move

Population movement is hard to predict, but could have a major impact on who is most at risk. According to the UK Climate Change Committee, trends for people to move to urban areas or the coast could place more people at risk from certain types of climate events, such as coastal erosion or heatwaves.

However, a recent PwC report suggested that these trends have been interrupted by the Covid-19 pandemic.⁶³ In 2021, London's population is predicted to decline for the first time in the 21st Century. This could reflect a wider shift away from city living, in part due to more opportunities to work from home or remotely. Monitoring these trends over the coming years is essential for understanding who will be affected by extreme weather in the future.

"I believe that climate change will have an impact on my current home within the next ten years"
(All respondents)



Evolving Solutions

Among both individuals and SMEs, Aviva research found a range of reasons for not implementing flood resilience measures. These included a belief that nobody else was taking such measures, the financial cost of taking action, not knowing how to install protective measures and being unsure which measure to choose.⁶⁴

Nudging for good

Simple behavioural ‘nudges’, such as setting artificial deadlines for taking action or making it easier to choose between different resilience measures, can help people and businesses overcome these barriers.⁶⁵ Given that people are influenced by the actions of those around them, it could also be effective to inform residents when others in their area have had defences installed. Perceptions of risk are ‘contagious’ – and this is an effective lever for behaviour change.

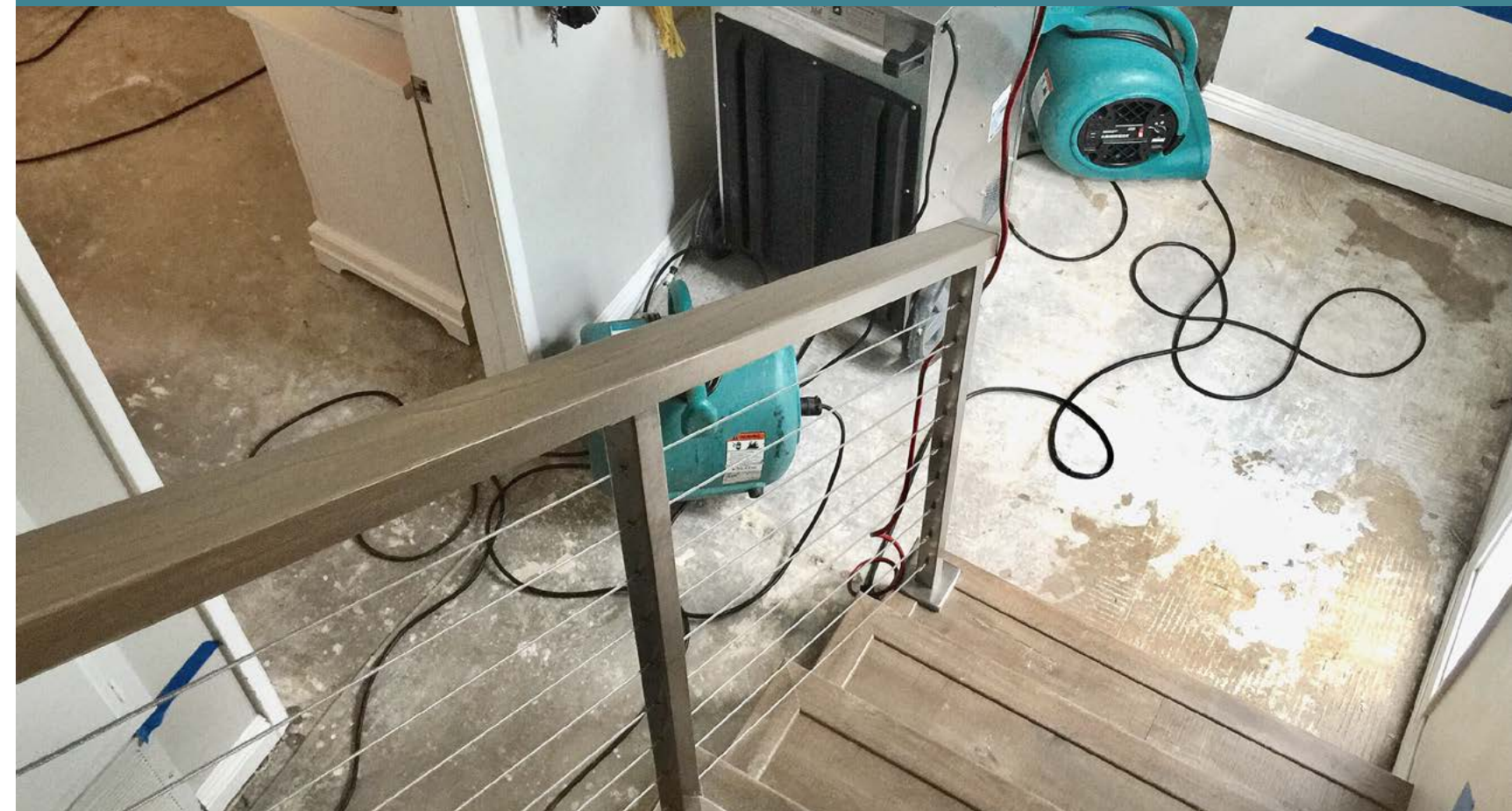
Installing protective measures can feel like a hassle for people with busy lives. Encouraging people to install resilience measures when renovation is already taking place – for example, immediately after a flood event – reduces disruption to their routines, can help residents return to their homes quicker and enable businesses to get back to trading.

Aviva’s call for change

Encourage and incentivise property resilience to aid recovery

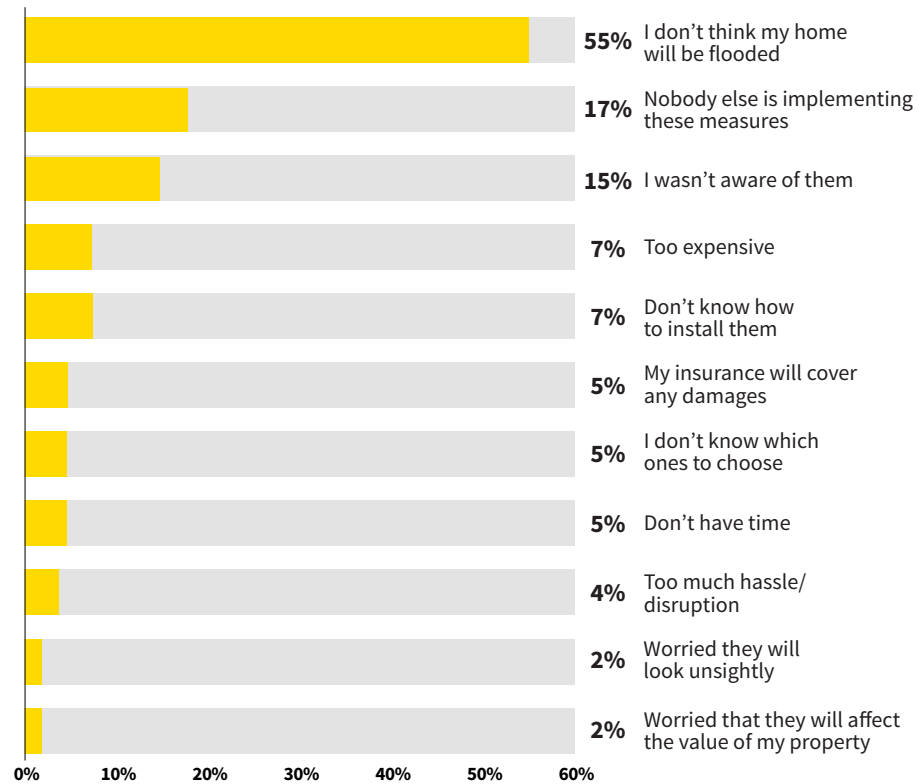
Aviva is calling for more research into the incentives and barriers to taking early, preventative action against extreme weather risks. We believe greater collaboration is needed on campaigns and incentives that will equip people and businesses to act, drawing on behavioural insights and people’s desire to protect each other as well as themselves. In particular, to help overcome the financial barriers to action, the government should reinstate a scheme similar to the Green Home Grants, to help return businesses and households to a greener and more resilient state after extreme weather events, particularly in high-risk areas. This support should be provided promptly to enable these measures to be installed early in the re-building process and should extend to cover cost-effective resilience measures for households in high-risk areas.

6

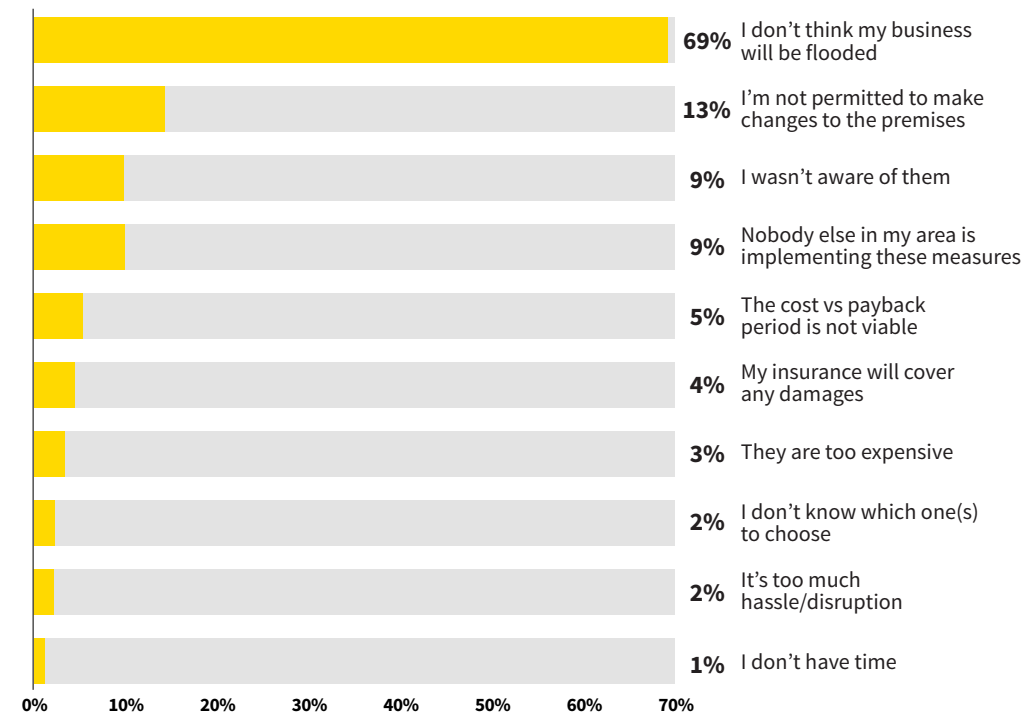


Evolving Solutions

If flood mitigation measures have not been implemented in your home, why not?
(Householder respondents who said no measures had been implemented)⁶⁴



If flood mitigation measures have not been implemented in your business premises, why not?
(SME respondents who said no measures had been implemented)⁶⁴



Evolving Solutions

Covid-19 and communities

The past year has revealed countless examples of communities stepping up to support each other in the face of crisis. Across the UK, an incredible nine million people (15% of the population) came forward to offer help during the Covid-19 pandemic.⁶⁶ Of these, 70% plan to continue doing the same amount or more once the pandemic is over.⁶⁷

Even before the pandemic, research completed by the British Red Cross and Aviva showed that nine in ten people would want to help if crisis hit their community, but more than half of people would not know what to do.⁶⁸ Initiatives such as the British Red Cross' community reserve volunteer programme, supported by Aviva, help to bridge this gap by mobilising local people to help their communities get back on track after major emergencies.⁶⁹ Over the past four years, we have seen over 88,000 volunteers sign up.

“Thousands of mutual aid groups spontaneously emerged early on in the pandemic. It was so encouraging to see this swell of **neighbourliness** on such a **mass scale**”

Dr Matt Thomas
Head of Strategic Insight & Foresight, British Red Cross

⁶⁶ Relationships Project, <https://relationshipsproject.org/active-neighbours/>

⁶⁷ Relationships Project, <https://relationshipsproject.org/active-neighbours/>

⁶⁸ British Red Cross & Aviva, 'When Crisis Hits: Mobilising Kindness in Our Communities', 2018, pp.7-9

⁶⁹ <https://reserves.redcross.org.uk/>

Aviva's call for change

Collaboration across recovery organisations to strengthen crisis response and resilience at community level

7

Aviva is calling for recovery organisations, including insurers, to collaborate on initiatives that will lead to a more streamlined, quicker and joined-up post-crisis response. We echo the Blanc Report's call for local authorities to review the demographics and tenancy rates of an affected area immediately after a flood event, to ensure a response mechanism is put in place that is appropriate for the community and its needs.

Lessons from initiatives such as the Aviva Foundation's partnership with the University of Hull's Flood Innovation Centre, and the British Red Cross' insights into community crisis response should be harnessed to speed up and streamline recovery from a wide range of climate events, not just flooding. Solutions should also draw on the strengthened community links developed during the pandemic to ensure that, whatever the nature of the next threat faced, people have the tools and knowledge they need to help each other.



Evolving Solutions

Prevention rather than cure

However, to protect people from the worst effects of the climate emergency, communities must act before a crisis hits.

Tools such as the British Red Cross' Covid-19 Vulnerability Index – a colour-coded map of the UK showing where people might be hit hardest by the impacts of Covid-19 – could be adapted to identify which communities are the most vulnerable to climate events.⁷⁰ Emergency response organisations can then work together with people, communities and local organisations to help local people better prepare for climate events, for example, by considering who in their community is likely to need extra help to evacuate their home.

Early warning systems can also make a big difference to communities' ability to act. The Met Office is part of a global partnership to give millions of people more warning of major climate events, including heatwaves.⁷¹ Just a few extra hours can make a huge difference when preparing for an emergency, whether that's to check-in on vulnerable neighbours during a heatwave or to move precious possessions out of the way of a flood.



© David Severn/British Red Cross

⁷⁰ <https://britishredcrossociety.github.io/covid-19-vulnerability/>

⁷¹ Met Office, <https://www.metoffice.gov.uk/about-us/press-office/news/weather-and-climate/2019/new-global-partnership-will-make-1-billion-people-safer-from-weather-and-climate-related-disasters>

Evolving Solutions

“ Through this partnership with the **Aviva Foundation**, we will identify practical actions to drive more efficient, joined-up and sustainable post-flood recovery. This will have major benefits in **helping communities** to get back on their feet faster after a traumatic flood event. ”

Dr Steven Forrest
Flood Resilience Lecturer at The University of Hull

⁷² <https://www.hull.ac.uk/work-with-us/research/institutes/energy-and-environment-institute/our-work/mapping-the-gaps-a-research-partnership-for-delivering-effective-post-flood-support>

The Aviva Foundation, set up in 2018, supports organisations to make a positive impact for Aviva's customers, communities and climate. It is funded by Aviva's dormant assets from the shareholder registry and donations from the Aviva business.

Case Study: 'Mapping the Gaps'

Joining the dots between support services can help to make post-flood recovery faster and more efficient.

Today, a patchwork of national agencies and government departments is involved in responding to flood incidents, along with insurers, regional water companies, Local Authorities and a host of others. Navigating this complex web of organisations can be hard at the best of times – but even more so in the aftermath of a traumatic event such as a flood. This can lead to slow and fragmented recovery. More affordable, community-level actions (such as implementing defences that protect multiple properties at once) can also be missed because of a lack of communication between different organisations.

To address this problem, the Aviva Foundation has partnered with the University of Hull's Flood Innovation Centre to 'map the gaps' in post-flood recovery processes.⁷² The partnership focuses on the immediate aftermath of flood events in the Humber: one of the UK's most flood-vulnerable regions. Together, we will identify areas where better knowledge and communication between organisations could help communities get back on their feet more quickly after a crisis.

Building Future Communities:

Creating resilient homes and businesses in a changing climate

The Way Forward

Building future communities in a changing climate

Throughout this report, we have seen that the climate emergency is one of the greatest challenges facing the UK today. Sadly, it's too late to stop its impacts, but we can reduce the effect it will have on our lives if action is taken – now. This will help to ensure that the UK's communities, built environment and natural environment are more resilient to the effects of climate change, both today and in the decades to come.

At Aviva, we are taking immediate and widespread action across all parts of our business in response to this crisis. Alongside our environmental commitments in carbon reduction, investment and underwriting, and our customer propositions, we are taking significant steps to help build stronger communities that are better prepared for flooding and other climate risks. This includes our partnership with WWF to identify nature-based solutions to improve flood resilience, and with the University of Hull's Flood Innovation Centre to help UK communities build back better after a climate event. We are also working with the Cambridge Grand Challenges at the University of Cambridge to further develop our collective understanding of the climate risks facing UK properties and communities, and how different groups should respond.

In addition, the next round of our Aviva Community Fund will back projects and initiatives that help communities to prevent, prepare for and protect against the impacts of climate change. The Fund supports forward-thinking charities to test new ideas that can have an enormous impact on the lives of people across the UK.

Aviva has made its own net zero carbon commitments, but this is not something that any one organisation can do alone. A cultural shift is needed to better understand the risks that climate change and its impacts pose to UK communities, homes, businesses and the natural environment – and how the UK can better prepare and adapt. To bring about real, tangible change, we need collective engagement and action from government, local authorities, industry, home and business owners and the communities they serve. In the coming weeks and months, we invite you to join us in being part of that shift, and helping to build stronger, more prepared communities, now and in the future.

Adam Winslow
Chief Executive Officer of Aviva UK
& Ireland General Insurance*
*Subject to regulatory approval



Research methodology:

Censuswide consumer research May 2021

Research commissioned by Censuswide for Aviva in May 2021. 2000 nationally representative respondents which were split into groups according to flood risk. A high-risk flood area is defined as having a 1 in 75 year risk, which means that a property in this area has a 75/1 chance of flooding every year. A low risk area is defined as 1 in every 200 years, which means a property has a 200/1 chance of flooding each year.

YouGov SME research May 2021

Research commissioned by YouGov for Aviva in May 2021. 201 nationally representative small and medium-sized businesses across a range of industries and sectors.

Aviva's flood mapping data

The risk of each area was defined by Aviva's flood mapping data which assesses river, coastal and surface water flood risk.

Our view of risk is derived from models we licence through third-party hydrologist consultancy firms, which is updated and refreshed annually. The most accurate elevation data available is used for a nationwide, comprehensive flood model. The annual updates ensure that the best available data is being used to shape our view of risk, with improvements in elevation data and modelling techniques being incorporated into the final models. We take into account all known flood defence and mitigation measures that prevent flood water reaching UK property and this is reflected in the risk assessment we make.

With thanks to:

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British Red Cross
Edward Barsley, Author of Retrofitting for Flood Resilience and Founder of The Environmental Design Studio
Andrew Curry, Director at School of International Futures
The University of Hull
The Swan Hotel, Cumbria
Richard Rollitt, Technical Director, the Innovation Group

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