policy connect

Westminster sustainablebusiness Forum

BRICKS & WATER:

MANAGING FLOOD RISK AND ACCELERATING ADAPTATION IN A CLIMATE EMERGENCY

Our world needs climate action on all fronts: everything, everywhere, all at once!

António Guterres, UN secretary general

CONTACT

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Foreword

A lot has changed since publication of our first Bricks and Water inquiry in 2018: the world has suffered a global pandemic, war has returned to European soil and the UK has had four different Prime Ministers. One thing that has not changed however, is the risk that vulnerable communities face from flooding.

This year marks the 70th anniversary of the 1953 North Sea Flood, the worst natural disaster to affect the UK in the 20th century, which left 307 people dead and 400,000 homeless. Sadly, because of climate change, these kinds of events that were once isolated incidents are now becoming a challenge that communities are having to deal with on an annual basis.

This inquiry by the Westminster Sustainable Business Forum comes at a critical time for the housebuilding industry, particularly given the Government's continued target for delivery of 300,000 new homes per-year by the middle of the decade. It is essential therefore, that these homes are not constructed on land at risk of flooding if they are to weather the impacts of climate change and remain habitable throughout the 21st century.

It is more than a decade since Sir Michael Pitt's review into flooding that affected the UK in summer 2007. Since then, few of Sir Michael's recommendations have been adopted, especially with regard to reviewing and strengthening planning policy. However, this inquiry has heard repeated accounts of continued development on the floodplain, often against the advice of the Environment Agency. There appears to be a variety of reasons for this, but an overly complex planning framework and under-resourced local planning authorities play a key role. It does not have to be this way, which is why we have made recommendations for simpler, more robust planning guidance – that should be prioritised within the forthcoming Levelling Up and Regeneration Bill.

Changes to the planning system will provide scant hope to the many existing communities who face regular impacts to their homes and businesses from flooding. As Parliamentarians, we have seen first-hand the devastating effects flooding can have on lives and livelihoods. It is therefore vital that existing properties are adapted to be resilient to flooding, especially from surface water. There has been welcome progress on these issues recently, from introduction of Flood Re's Build Back Better scheme to the Government's commitment to implement Schedule 3 of the Flood and Water Management Act 2010. However, there is much more to be done and we must continue to use all the tools available to us to help make communities resilient to flooding from all sources.

Flooding not only carries significant economic costs, it also has lasting physical and mental health impacts on individuals. There is also a social justice element to this debate, given that the impacts of flooding have a disproportionate effect on disadvantaged communities. As we approach a general election, it is vital that Parliamentarians from all sides come together to prioritise flood risk management. Only by doing this can we reduce inequality and spare vulnerable communities the loss of life and livelihood that is experienced when flooding occurs.

This work has been informed by a range of expert opinions, including those from the water, construction, insurance, and academic sectors. We would particularly like to thank our generous sponsors, Yorkshire Water and Queen Mary University of London for their support.

Inquiry Chair

Baroness McIntosh of Pickering
(Conservative)

Inquiry vice-Chairs

Rt Hon Philip Dunne MP
(Conservative)

Rachael Maskell MP
(Labour)

Luke Pollard MP
(Labour)

Executive summary

Our first Bricks and Water inquiry (2018) focussed on the water and construction sectors as a whole and made high-level recommendations for better regulation and more sustainable housebuilding. Our second inquiry (2020) followed up with a specific focus on how homes can be made more water efficient and resilient to climate change. This third inquiry in the series tackles the challenges associated with flood risk management in more detail and considers how these risks can be mitigated in both new and existing communities.

Earlier this year, the Intergovernmental Panel on Climate Change (IPCC) published the final part of its sixth assessment report, delivering a 'final warning' to humanity on the climate crisis. Sadly, for many communities across the UK that are vulnerable to flooding, the IPCC's repeated calls to action are too late: the impacts of climate change are here to stay.

Following a succession of winter storms over the last three years, with Dudley, Eunice, and Franklin racking up damages of close to £500 million in 2022 alone, the challenges associated with managing the risks from flooding are now impossible to ignore. The Government has invested a record £5.2billion into Flood and Coastal Erosion Risk Management (FCERM) and has more recently committed to implement Schedule 3 of the Flood and Water Management Act 2010. The wider policy landscape relating to flood risk management is discussed in **Chapter 1** of this report, along with an introduction to the roles and responsibilities of the key stakeholders.

The principle that prevention is better than cure is acutely relevant to flood risk management. At face value, current planning policy is clear that new development should be directed away from areas of high flood risk. However, thousands of new homes are still being constructed in these areas every year, often against the advice of the Environment Agency. **Chapter 2** explores the reasons for this and sets out recommendations for better planning guidance and procedures to help ensure that new development is located appropriately.

Surface water flooding associated with extreme rainfall brought London to a standstill in July 2021 and was a stark reminder that flood risk is not limited to riparian or coastal communities. Surface water has been described as "the biggest flood risk of all" and there are now thought to be more properties at risk from surface water flooding than from rivers and the sea combined.[1] **Chapter 3** explores how the use of Sustainable Drainage Systems (SuDS) can help to mitigate the risks from surface water flooding and calls for better modelling and mapping to help in decision making.

Even with the introduction of more robust planning policy, a well-funded FCERM strategy, and effective mitigation measures, it will not be possible to protect all communities from all sources of flooding. The Environment Agency has recently warned that the UK must *'Adapt or Die'* and the use of property flood resilience measures will be key in helping vulnerable communities adapt to a warmer, wetter climate.[2] The benefits of property flood resilience are discussed in **Chapter 4**, along with the tools available to the insurance industry and property owners to help accelerate uptake.

[1] Surface water: the biggest flood risk of all, speech by Sir James Bevan to the Chartered Institute of Water and Environmental Management, October 2018
[2] Adaptation and net-zero: beating the climate emergency and building a better world, speech by Sir James Bevan to The Briefing Circle, November 2022

Recommendations

Planning for flood risk

Recommendation 1: page 14

The Government should provide clearer guidance on how and when to undertake the Sequential Test so that it can be applied by developers and Local Planning Authorities more robustly.

Recommendation 2: page 14

The Environment Agency 'Flood Map for Planning' should be expanded to include all current and future sources of flood risk and to assist with application of the Sequential Test and site-specific flood risk assessment.

Recommendation 3: page 14

The Department for Levelling Up, Housing and Communities should undertake a review of the Town and Country Planning (Consultation) (England) Direction 2021 to ensure that it is followed in cases where the Environment Agency has sustained an objection to a planning application on the grounds of flood risk from rivers or the sea.

Surface water and sustainable drainage

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The Environment Agency flood alert system should be expanded to cover the risks from surface water flooding as soon as more accurate forecasting and mapping information is available.

Recommendation 5: page 19

The Department for Environment, Food and Rural Affairs should start the public consultation on implementation of Schedule 3 of the Flood and Water Management Act in June 2023, with the aim of implementing Schedule 3 by the end of the year.

Recommendation 6: page 19

SuDS approving bodies should receive ringfenced funds (sourced from developer contributions) to enable them to adopt orphan SuDS where necessary and take enforcement action where SuDS have not been installed and maintained appropriately. This should be considered as part of the forthcoming consultation on implementation of Schedule 3 of the Flood and Water Management Act.

Flood resilience

Recommendation 7: page 24

Part C of Building Regulations should be strengthened to require all properties at high risk of flooding to include property flood resilience measures. These measures should be specified and installed in accordance with the CIRIA Code of Practice for property flood resilience.

Recommendation 8: page 25

Products and materials used to make homes more resilient to flooding (in accordance with the CIRIA Code of Practice for property flood resilience) should be exempt from VAT to incentivise use by homeowners.

Recommendation 9: page 26

All insurers should offer discounted premiums to customers who install property flood resilience measures, in accordance with the CIRIA Code of Practice.

Recommendation 10: page 26

It should be mandatory for all insurers to offer Build Back Better, funding reimbursement costs of up to £10,000, over and above work to repair damage and loss caused by a flood.

1. Introduction

> *In my constituency, I have properties that have flooded three times in the last three years. Only in February, the River Severn was within 10cm of its all-time high level as it flowed through the town of Bridgnorth. I regret to say that a number of houses flooded three years in a row. These one in one-hundred-year events are now becoming annual events.*
>
> **Rt Hon Philip Dunne MP, evidence session 1**

The Westminster Sustainable Business Forum (WSBF) has highlighted the risks to people and property from flooding in its previous two Bricks and Water inquiries.[3] These reports made several recommendations to government and industry with the aim of reducing the risk of flooding to new homes and making existing properties more resilient. Recommendations included:

"Introducing a fairer, tougher and simpler planning framework supported by Building Regulations, to deliver higher standards of flood resilience."

"Updating Building Regulations to require all properties at risk of flooding to include property flood resilience measures."

"Making the use of Sustainable Drainage Systems (SuDS) mandatory for all new developments in England."

"Including performance targets for property flood resilience and sustainable surface water disposal in the forthcoming Future Homes Standard."

Although not all these recommendations have been adopted, there have been some major developments in the policy landscape relating to flood risk management since publication of the WSBF's most recent inquiry.

In Autumn 2020, the Government adopted the Environment Agency's Flood and Coastal Erosion Risk Management strategy for England. This committed a record £5.2 billion investment from the Treasury to better protect 336,000 homes and properties and avoid £32 billion of wider economic damages between 2021 and 2027.[4] The Strategy aims to create climate resilient places, calls for the avoidance of inappropriate development within the floodplain, and promotes the use of nature-based solutions to slow or store floodwater as it moves through the catchment – three central themes from the WSBF's previous inquiries.

In 2021, the Government consulted on proposed changes to the Flood Re reinsurance scheme, including the introduction of Build Back Better, which allows flood victims access to reimbursement costs of up to £10,000, over and above work to repair damage caused by a flood.[5] This was something that the WSBF called for in its second Bricks and Water inquiry. Build Back Better was approved by the Government and introduced as part of changes to the Flood Re scheme from April 2022.

More recently, the Government has committed to implement Schedule 3 of the Flood and Water Management Act 2010, another recommendation from the WSBF's second inquiry. This would make the use of SuDS mandatory in England and remove the automatic right for developers to connect surface water drainage to public sewers. A consultation is due on the implementation of Schedule 3 later this year, which will also consider the creation of new SuDS approving bodies.

[3] Bricks and Water: a plan of action for building homes and managing water in England, Policy Connect, 2018; Bricks and Water: building resilience for England's homes, Policy Connect, 2020
[4] National flood risk and coastal erosion risk management strategy for England, Environment Agency, July 2020
[5] Consultation on amendments to the Flood Re scheme: summary of responses, Department for Environment, Food and Rural Affairs, July 2021

1.1. ROLES AND RESPONSIBILITIES

Responsibility for managing flood risk is a devolved issue and this inquiry considers policy in England only. However, on many issues, the devolved administrations have shown that they are ahead of policymakers in Westminster. For example, the Welsh Government decided to implement Schedule 3 of the Flood and Water Management Act 2010 back in 2019.

The Department for Environment, Food and Rural Affairs (Defra) has overall responsibility for managing flood risk and coastal erosion in England. The Environment Agency is the non-departmental public body that takes strategic overview of these risks through its strategic, operational, and advisory roles. However, there are several other Risk Management Authorities (RMAs) that operate alongside the Environment Agency, as below:

Table 1 - Flood Risk Management Authorities: Roles and Responsibilities[6]

Stakeholder	Roles and Responsibilities
Environment Agency	The Environment Agency has strategic overview in management of all sources of flooding. It is responsible for managing the risk of flooding from main rivers, reservoirs, estuaries, and the sea. It issues flood warnings in partnership with the Met Office, and it provides information on areas at risk of river coastal, surface water, and reservoir flooding through its 'check your long term flood risk' service, and on river and coastal flooding through its 'flood map for planning' service.
Lead Local Flood Authorities	Lead Local Flood Authorities (LLFAs) are Unitary Authorities, County Councils, London Borough Councils, and Metropolitan Borough Councils that are responsible for coordinating flood risk management in their area. They are responsible for managing the risk of flooding from surface water, groundwater, and ordinary watercourses. They should also maintain a register of flood risk assets and surface water risk areas and have plans in place to respond to emergencies.
Local Planning Authorities	Local Planning Authorities (LPAs) are usually borough or district councils. They are responsible for developing local plans and setting out how areas will develop in the future. They grant planning applications for new development in accordance with national planning policy. National Park authorities and the Broads Authority are also planning authorities.
Internal Drainage Boards	Internal Drainage Boards are independent public bodies, responsible for water level management in low lying areas (approximately 10% of England).
Water and Sewerage Companies	Water and sewerage companies are responsible for managing the risk of flooding from water supply pipes and foul/combined sewer systems that provide drainage from buildings.
Highway Authorities	Highway Authorities are responsible for managing highway drainage and roadside ditches and ensuring that new road infrastructure projects do not increase flood risk.
Riparian Owners	Owners of land or property next to a river, stream, or ditch are responsible for maintaining these waterways.
Property Owners	Owners are responsible for their own property and the drainage and pipework within the ownership boundary.

Although Defra is the policy lead for this topic, there are several other government departments that influence how the risks from flooding are managed in England. These include; the Department for Levelling Up, Housing and Communities, which sets planning policy and Building Regulations; the Department for Energy Security and Net Zero, which sets objectives surrounding greenhouse gas emissions that contribute to climate change (and ultimately exacerbated flood risk); the Cabinet Office, which is responsible for emergency response planning; and HM Treasury, which works with the Financial Conduct Authority that regulates the insurance industry.

[6] Adapted from: Who's responsible for what?, National Flood Forum, online www.nationalfloodforum.org.uk/about-flooding/flood-facts/whos-responsible-for-what/

1.2. LEGISLATIVE CONTEXT

The 2020 Government White Paper: Planning for the Future, proposed a significant overhaul of the planning system in England, including a simplified, zonal approach to planning policy (protected, renewal, and growth areas) with provisions to avoid development in areas of flood risk.[7] Following opposition from backbench Conservative and opposition MPs on certain aspects of the subsequent Planning Bill, which was anticipated to be the legislative vehicle for these reforms, the Bill was scrapped in 2022. However, several of the proposals from the Planning White Paper, including standardisation and reform to the planning system, reappeared in the Levelling Up White Paper, which is currently making its way through Parliament as the Levelling Up and Regeneration Bill.[8]

1.3. HOW FLOOD RISK IS DEFINED

Flooding can occur for a variety of reasons. Most of the annual damage from flooding in England is either from rivers (fluvial), the sea, surface water (pluvial), or groundwater.

Flood risk is a combination of the probability of a flood occurring and the potential consequences if it did occur. Flood events are often discussed in terms of a return period, for example, a 1 in 100-year flood. However, this can be misleading to the public as it can suggest that a 1 in 100-year flood will only occur once every hundred years and those affected by one will not experience another for 99 years. Of course, the chance of being affected by a 1 in 100-year flood is the same in any given year – 1%. It is therefore more helpful to use annual probability, expressed as a percentage, to discuss likelihood (see Table 2). The impact of climate change should also be taken into account when considering the future likelihood of flooding. For example, a tidal flood event with a present day 1% annual probability of occurring, is likely to become commonplace by 2100, under a high emissions scenario.

Maps showing areas at risk of flooding are published by the Environment Agency. The 'Check the Long Term Flood Risk' mapping service details areas at risk from rivers and the sea (accounting for both the height and condition of existing flood defences), surface water, reservoirs, and groundwater (where available).[9] The 'Flood Map for Planning' service, which is based on both local and national scale modelling, divides areas up into three flood zones that can be used to inform decisions on new development.[10] However, the Flood Map for Planning considers the risk of flooding from rivers and the sea only and does not account for the presence of flood defences, or the likely impacts of climate change. The Flood Map for Planning does not map Flood Zone 3b (functional floodplain), which is mapped by local planning authorities in their Strategic Flood Risk Assessments.

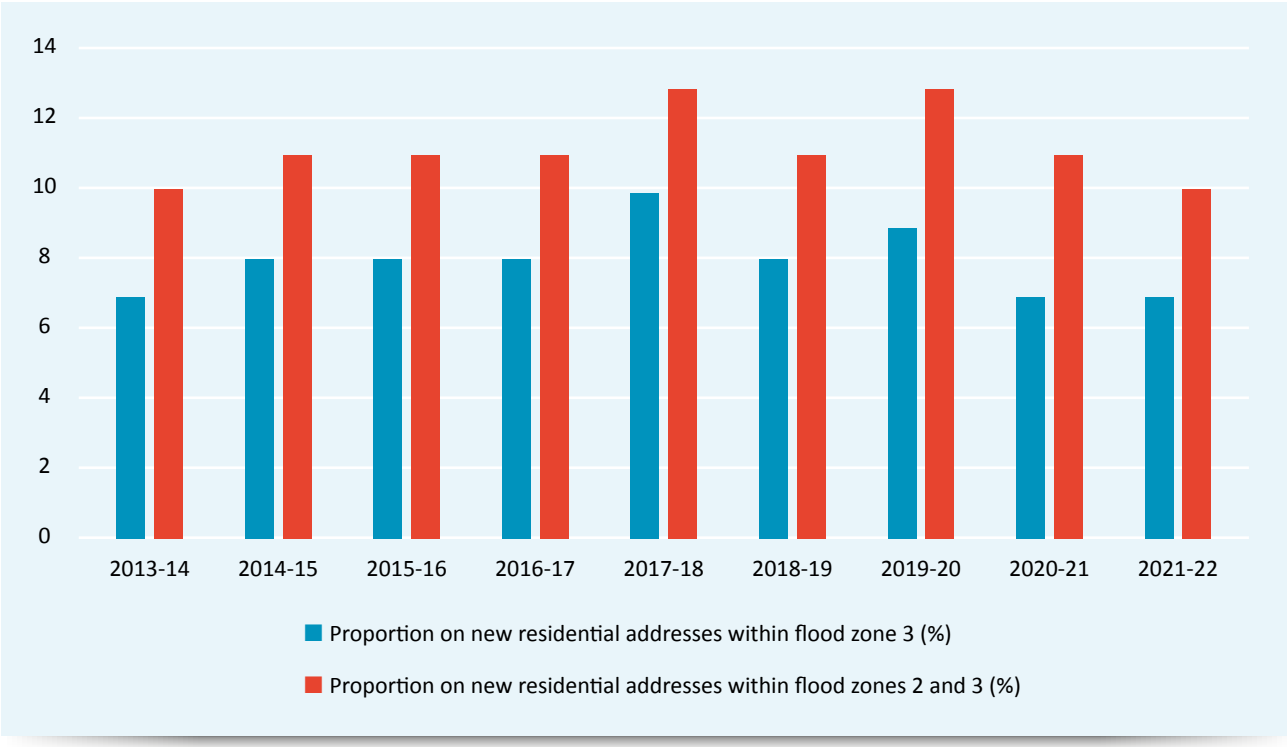
[9] Check the long-term flood risk for an area in England, Environment Agency, online www.gov.uk/check-long-term-flood-risk
[10] Get flood risk information for planning in England, Environment Agency, online www.flood-map-for-planning.service.gov.uk/

Table 2 – Flood Zone Definitions[11]

Zone	Probability	Detail
1	Low	Land having a less than 0.1% annual probability of river or sea flooding.
2	Medium	Land having between a 1% and 0.1% annual probability of river flooding; or land having between a 0.5% and 0.1% annual probability of sea flooding.
3a	High	Land having a 1% or greater annual probability of river flooding; or Land having a 0.5% or greater annual probability of sea.
3b	Functional Floodplain	Land where water from rivers or the sea has to flow or be stored in times of flood. Functional floodplain will normally comprise land having a 3.3% or greater annual probability of flooding (with any existing flood risk management infrastructure operating effectively) or land that is designed to flood, such as a flood attenuation scheme.

The Environment Agency estimates that 5.2 million homes and businesses in England are at risk of flooding (around one in six properties) and this number is set to rise as a result of future development and climate change.[12] Respondents to this inquiry's call for evidence frequently raised concerns about the amount of new homes being constructed within the floodplain and information obtained from the Department for Levelling Up, Housing and Communities shows that, since 2013, more than 10% of all new homes in England have consistently been built on land within flood zones 2 and 3 (see Figure 1).

Figure 1 – proportion of new homes constructed in areas of flood risk[13]



[11] Guidance: flood risk and coastal change, Department for Levelling Up, Housing and Communities, online www.gov.uk/guidance/flood-risk-and-coastal-change#para77-
[12] Flooding in England: a national assessment of flood risk, Environment Agency, June 2009
[13] Department for Levelling Up, Housing and Communities, via Parliamentary Question HL6937

1.4. CLIMATE CHANGE

Climate change is exacerbating the risks associated with flooding across both the country and the world. The Met Office predicts that by 2070, UK winters will be 30% wetter, rainfall will be 25% more intense, and downpours exceeding 30mm/hour will be twice as likely, compared with a 1990 baseline.[14] Alongside increased rainfall, the Environment Agency anticipates that sea levels will rise by between 1.01m and 1.62m by 2125, depending on geographical location and compared with a 1981-2000 baseline.[15] These changes in climate, combined with the Government's continued ambition to deliver 300,000 new homes per year by the middle of the decade will make managing the risks from flooding increasingly challenging. This is a particular problem for communities where the risks from flooding are already extensive (such as South Holland in Lincolnshire, where 34% of the district's land is at high risk of flooding), but where demand for housing is also high and LPAs are under pressure to meet development targets.[16]

1.5. COUNTING THE COST

Ignoring the risks that flooding poses will carry an increasing cost to individuals, businesses, and the public purse. Research from the University of Bristol indicates that flooding in the UK caused £730 million of damages in 2020 and this cost could rise by 23%, even under a best-case scenario, where climate pledges made at COP26 are met.[17] Other estimates are much higher – in 2015 the Committee on Climate Change (CCC) estimated that the combined average annual cost of flooding from rivers, the sea, surface water, and groundwater was £1.35 billion.[18]

Regardless of the actual figure, the cost to victims of flooding stretches far beyond an impact on their finances. Health impacts range from the direct effect of contact with floodwater including drowning and injury, to longer term effects such as respiratory disease from damp, carbon monoxide poisoning from generators, rodent-borne disease, and mental health impacts. Since publication of the WSBF's last Bricks and Water inquiry, there has been more research into the impacts of flooding on mental health, including a systematic review by the Environment Agency.[19] This work estimated the mental health cost (in monetary value) per adult household to be between £1,878 and £4,136. Guidance is now also available for public health and local authorities on how to support the victims of flooding affected by mental health issues, however, prevention is undoubtedly better than cure.[20] In 2021, the Environment, Food and Rural Affairs Committee recommended that "the Government should supplement its July 2020 policy statement with an additional action plan, developed with local partners, for the long-term physical, economic, and psychological recovery of communities impacted by flooding".[21] Although no such plan has been produced to date, in the Government's response it committed to "reviewing the role of the voluntary sector to improve their capacity and capability to help local communities in the event of a flood".[22]

[14] Climate change in the UK, Met Office, online https://www.metoffice.gov.uk/weather/climate-change/climate-change-in-the-uk
[15] Flood risk assessments: climate change allowances, Environment Agency, online, May 2022
[16] Plain dealing: building for flood resilience, Localis, November 2021
[17] A climate-conditioned catastrophe risk model for UK flooding, Bates et al, Natural Hazards and Earth System Sciences, March 2023
[18] Climate change risk assessment 2017: projections of future flood risk in the UK, Sayers et al, Committee on Climate Change, October 2015
[19] A method for monetising the mental health costs of flooding, Environment Agency, June 2020
[20] Flooding and health: assessment and management of public mental health, UK Health Security Agency, July 2022
[21] Flooding, Environment, Food and Rural Affairs Committee: fourth report of session 2019-21, February 2021
[22] Flooding: Government's response to the Committee's fourth report of session 2019-21, April 2021

1.6. SOCIAL JUSTICE

The impacts of flooding do not affect everyone equally. Research by the Environment Agency has found that residents from areas classed as more deprived face greater risks from all sources of flooding, compared to those living in less deprived areas.[23] Analysis from the Grantham Institute also found that a disproportionately higher number of homes that were built in struggling or declining neighbourhoods between 2008 and 2018 are expected to be vulnerable to flooding over their lifetime.[24] Research from Europe has arrived at similar conclusions, where populations within Belgium's Liège province with weaker socio-economic status were found to be more likely to be exposed to hazards from fluvial flooding than wealthier populations.[25]

1.7. INQUIRY AIMS

This inquiry aims to appraise current policy on flood risk management and seeks to explore how vulnerable communities can become more resilient to the impacts of flooding. Most of the evidence collected has focussed on planning policy, surface water flooding, and property-level flood resilience, which form the themes for the following three chapters.

[23] Social deprivation and the likelihood of flooding, Environment Agency, April 2022
[24] New build homes, flood resilience and environmental justice – current and future trends under climate change across England and Wales, Rözer and Surminski, Grantham Institute, November 2020
[25] Environmental inequalities in flood exposure: a matter of scale, Poussard et al, Frontiers in Water, March 2021

2. Planning for flood risk

> *We have got a real demand to build housing for the future and therefore we need to ensure that our planning policies are right. The need for ensuring that we build not just resilient homes, but also infrastructure, is going to be absolutely crucial as the climate challenges ever encroaches.*
>
> Rachael Maskell MP, evidence session 1

TOP LINES

- **Planning policy is clear that new development should be directed away from areas of high flood risk.**
- **Despite this, thousands of new homes are being constructed on the floodplain each year and in many instances, against the advice of the Environment Agency.**
- **There are many reasons for this, including overly complex planning guidance, pressure on Local Planning Authorities to deliver a supply of housing, and a lack of funding and skills.**

2.1. PLANNING

Planning policy relating to flood risk in England is set out in the National Planning Policy Framework (NPPF) and associated Planning Practice Guidance. The NPPF states that "Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere."[26]

The NPPF requires a 'sequential' approach to be taken, which means avoiding areas at risk of flooding so as to place as little reliance as possible on flood defences, warning systems, and property-level flood resilience. Planning Practice Guidance for Flood Risk and Coastal Change states that "The Sequential Test ensures that a sequential, risk-based approach is followed to steer new development to areas with the lowest risk of flooding, taking all sources of flood risk and climate change into account."[27]

In response to the Government's review of policy for development in areas at flood risk, the Department for Levelling Up, Housing and Communities published an update to Planning Practice Guidance, which sought to provide clarity on how and when to undertake the Sequential Test. However, evidence submitted to this inquiry has indicated that both developers and LPAs continue to struggle in applying the Sequential Test to both individual planning applications and in local plan development respectively, citing its complexity. Indeed, a recent government survey of local planning authorities showed that 63% of respondents felt that there was uncertainty about the intent or application of the Sequential Test.[28] In many cases, the Test is not being applied at all, with a survey by the Town and Country Planning Association finding that only half of LPA respondents would insist on completion of the Sequential Test for a development of fewer than ten homes in an area of high flood risk.[29] Even where the Test is applied, there have been concerns around its ability to ensure safety and resilience, as cited within the Chartered Institution for Water and Environmental Management's submission to a recent Environment, Food and Rural Affairs Committee inquiry.[30]

[26] National Planning Policy Framework, Ministry of Housing, Communities, and Local Government, July 2021
[27] Planning Practice Guidance: Flood Risk and Coastal Change, Ministry of Housing, Communities, and Local Government, August 2022
[28] Review of policy development in areas of flood risk, Department for Environment, Food and Rural Affairs, Ministry of Housing, Communities and Local Government, Environment Agency, July 2021
[29] Ibid.
[30] Flooding, Environment, Food and Rural Affairs Committee: fourth report of session 2019-21, February 2021

These failings in the application of planning policy are being exacerbated by an unprecedented demand from central government for delivery of a five-year housing supply. Evidence submitted to this inquiry has cited that the demand for housing has now outweighed the requirement for flood risk management. As a result, guidance is being ignored and development is being allowed to proceed within areas of medium and high flood risk. Many of these issues were summed up in an Adjournment Debate secured by Greg Smith MP in the House of Commons in November 2021. In this debate, Smith described the shortcomings of the planning system that led to flooding of a new development within the village of Ickford, Buckinghamshire and called for a "stronger and direct presumption against developments in floodplains".[31]

Recommendation 1: the Government should provide clearer guidance on how and when to undertake the Sequential Test so that it can be applied by developers and Local Planning Authorities more robustly.

Recommendation 2: the Environment Agency 'Flood Map for Planning' should be expanded to include all current and future sources of flood risk and to assist with application of the Sequential Test and site-specific flood risk assessment.

The Environment Agency is a statutory consultee to the planning process for development within areas at current risk of flooding from rivers and the sea. Between 2016 and 2021, 95.8% of planning applications were determined in line with its advice.[32] Even so, over 2000 homes were granted planning permission against Environment Agency advice during this period and as a result, there have been calls for mandatory reporting of planning decisions where these have been made against expert advice.

In instances where the Environment Agency has maintained an objection to major development on the grounds of flood risk, LPAs should refer these cases to the Secretary of State for Levelling Up, Housing and Communities to give them the opportunity to 'call-in' these applications for their own determination.[33] However, awareness and uptake of this call-in Direction varies significantly between LPAs and is often not properly followed. The Direction also currently only applies to 'major' development and to proposals in areas at existing risk of flooding from rivers or the sea. It does not apply in areas that currently have low flood risk, but are expected to be at medium or high risk of flooding in future, as a result of climate change.

Recommendation 3: the Department for Levelling Up, Housing and Communities should undertake a review of the Town and Country Planning (Consultation) (England) Direction 2021 to ensure that it is followed in cases where the Environment Agency has sustained an objection to a planning application on the grounds of flood risk from rivers or the sea.

In addition, called-in applications must be heard by Public Inquiry, which are expensive and time-consuming for all involved. In accordance with the conclusions of the Rosewell Review of Planning Appeal Inquiries, having more choice about how appeals are heard could help to streamline this process.[34] For example, there could be a choice of written representations, informal hearings, or public inquiries.

There is currently not an equivalent call-in Direction for LLFA advice. This is because, in areas covered by unitary councils, such an approach would pit the council (as LLFA) against itself (as LPA) in a public inquiry situation. It would therefore be challenging to introduce a call-in process for instances where LLFA advice is not followed. However, as an alternative, LLFAs could be required to collect and report on whether their planning advice is being followed by LPAs.

[31] Ickford: flood risk, Hansard volume 704, November 2021
[32] Environment Agency objections to planning applications based on flood risk and water quality, Environment Agency, August 2022
[33] The Town and Country Planning (Consultation) (England) Direction, Ministry of Housing, Communities and Local Government, April 2021
[34] Independent review of planning appeal inquiries, Bridget Rosewell OBE, December 2018

2.2. MITIGATION

Where the Sequential Test demonstrates that there are no alternative sites with lower flood risk, then the Exception Test may be required. This test requires a developer to demonstrate how the risks from flooding will be managed, which may include detailed mitigation measures set out within a site-specific flood risk assessment. Such measures can include raising of floor levels to prevent water entry or floodplain compensation (where flood storage is provided to offset any loss of storage resulting from the development).

Mitigation measures are usually conditional upon planning approval and an inspection may be necessary to ensure that these measures had been incorporated into the development. However, only 3% of LPA respondents to the survey cited previously said that they always inspected new developments for compliance with planning conditions relating to flood risk, with around a third saying that they relied on complaints to ensure that developers were building in accordance with approved plans.[35] One respondent to this inquiry's written call for evidence described enforcement within the planning system to be "non-existent".

In summary, LPAs have a significant influence over the location of new development in areas of flood risk and the measures that are required to mitigate these risks. However, many authorities fall short in both of these areas due to a lack of funding and skills. A survey of LPAs by the Town and Country Planning Association found that over a third of respondents felt their authority lacked the resources to tackle planning decisions relating to flood risk and one in four respondents felt that they did not have the relevant skills and expertise to account for flood risk in the planning process.[36] The Environment, Food and Rural Affairs Committee also recently concluded that they were "very concerned" that LPAs lack the skills and resources to factor the impacts of climate change into development decisions.[37] The eventual creation of the Building Safety Regulator several years after the appalling Grenfell Tower disaster is a reminder that capacity for strong oversight and enforcement needs to be built in at the start.

2.3. DEFENCES

The use of flood defences should always be a last resort, particularly if the principles of avoid, control, and mitigate are applied in accordance with planning guidance. However, there are many communities at current or future risk of flooding, where the use of flood defences is a necessity.

This inquiry has not collected evidence on the effectiveness or value for money of the current flood and coastal erosion risk management investment programme, which runs between 2021 and 2027 and seeks to better protect 336,000 homes and properties from flooding. The programme, including its partnership funding model and 'better protected' metric, has recently been scrutinised by both the Environment, Food and Rural Affairs Committee[38] and the National Audit Office.[39]

[35] Review of policy development in areas of flood risk, Department for Environment, Food and Rural Affairs, Ministry of Housing, Communities and Local Government, Environment Agency, July 2021
[36] Planning for climate change and flood risk – training and skills survey for local planning authorities, Town and Country Planning Association, March 2023
[37] Flooding, Environment, Food and Rural Affairs Committee: fourth report of session 2019-21, February 2021
[38] Ibid.
[39] Managing flood risk, National Audit Office, November 2020

3. Surface water and sustainable drainage

> *We are in the middle of a climate and nature crisis, and we have already seen an increase in the frequency and severity of extreme weather events. This will result in increased flood risks, particularly for the most vulnerable communities. This means that more mitigation, alleviation, and prevention is required.*
>
> Luke Pollard MP, evidence session 2

TOP LINES

- **Increased rainfall intensity as a result of climate change, and hard surfaces associated with new development means that surface water flooding is a growing problem. There are now more properties at risk from surface water flooding than from rivers and the sea combined.**
- **Current maps, detailing areas at risk of surface water flooding vary significantly in quality – these should be standardised and improved to allow integration into the Environment Agency's mapping service.**
- **The use of Sustainable Drainage Systems (SuDS) plays an important role in reducing surface water flood risk, along with a host of wider benefits. The Government's decision to implement Schedule 3 of the Flood and Water Management Act 2010 is welcome and should be consulted on at pace.**

3.1. SURFACE WATER FLOODING

In July 2021, London was hit by two extreme storms, resulting in parts of the Capital receiving close to twice the monthly average amount of rainfall in just two hours. The rain resulted in widespread surface water flooding inundating thousands of homes, leading to the partial closure of thirty underground stations, and forcing the evacuation of several hospitals and schools.[40] Similar flood events in mainland Europe resulted in more than 200 fatalities.[41]

Sadly, events such as these are becoming more frequent and widespread, and the London floods simply drew attention to what has been happening outside the capital for many years. As set out in Section 1, climate change is resulting in wetter winters and more intense rainfall events, with winter rainfall predicted to be as much as a third higher by 2070.[42] These risks are exacerbated when green space is converted to artificial hardstanding, which speeds up the rate at which rainwater enters the drainage system. Surface water flooding is a significant and growing threat to life, property, and the economy, so much so that former Environment Agency Chief Executive, Sir James Bevan, recently described it as "the biggest flood risk of all".[43]

Surface water flooding occurs when rainfall cannot drain away quickly enough and as a result, accumulates at ground-level. This can either be because the drainage system exceeds its capacity, or because pipes and gullies become blocked and cannot function effectively. In more rural areas, water from waterlogged fields rushes down roads and into properties. Around 325,000 properties (1.1%) are at high risk of surface water flooding in England, with a further 500,000 properties in areas of medium risk, meaning that a far greater number of homes are at risk from this source of flooding than from rivers and the sea combined.[44] The number of properties at high risk of surface water flooding is set to rise by up to 230,000 by 2055, depending on the impact of climate change and additional pressure from new development.[45]

LLFAs are responsible for managing the risks from surface water. However, the division of responsibilities is complex and there are several other Risk Management Authorities with interests in this area including highway authorities, water and sewerage companies, internal drainage boards, and the Environment Agency (see Table 1).

[40] Surface water flooding in London: roundtable progress report, Mayor of London, March 2022
[41] Flooding in Europe, Copernicus Climate Change Service, July 2021, online https://climate.copernicus.eu/esotc/2021/flooding-july
[42] Surface tensions: working together against flash flooding, Localis, November 2022
[43] Surface water: the biggest flood risk of all, speech to the Chartered Institute of Water and Environmental Management, October 2018
[44] Reducing the risk of surface water flooding, National Infrastructure Commission, November 2022
[45] Ibid.

3.1.1. SURFACE WATER MANAGEMENT STRATEGIES

Given the highly localised nature of surface water flooding, individual LLFAs typically seek to appraise these risks via Local Surface Water Management Strategies. However, the quality of these documents varies between the 152 LLFAs. For example, many of these Strategies lack a consistent approach to monitoring and evaluation of the risks from flooding and the impacts from climate change are not always considered. Challenges also exist given that surface water flooding is not confined to LLFA administrative boundaries and although a partnership approach has been adopted in some areas, this is far from the norm across the country. To address these issues, the National Infrastructure Commission has recently recommended that LLFAs partner with water and sewerage companies, and internal drainage boards (where relevant) to produce joint, long-term, costed, plans that set out targets for reduction of surface water flood risk. These should be completed by 2026 and renewed every five years, with approval from the Environment Agency. The WSBF strongly supports this recommendation.

3.1.2. SURFACE WATER FLOOD MAPPING

LLFAs identify areas where there is a significant risk of surface water flooding (known as Flood Risk Areas) with the help of the Environment Agency, which draws on information within its National Flood Risk Assessment. These Flood Risk Areas are due to be reviewed this year, however, the National Infrastructure Commission has recommended that this review is delayed so that information within the forthcoming National Flood Risk Assessment can be incorporated, which is due to be published in 2024. Outputs from the National Flood Risk Assessment will also help the Environment Agency to produce an improved national Surface Water Flood Map, which incorporates compatible local surface water mapping where this has been produced by LLFAs and made available to the Environment Agency.

Notwithstanding these updates, LLFAs are still required to produce maps, detailing the risk of surface water flooding within Flood Risk Areas. However, many LLFAs rely on the Environment Agency's national mapping to meet this requirement. Even when these maps are based on detailed local information, they typically vary widely in quality and are often not compatible with the Environment Agency's national Surface Water Flood Map. The National Infrastructure Commission has also recommended that LLFA flood maps are standardised and improved – this recommendation is key to better management of the risks from surface water flooding and is also something the WSBF strongly supports.

3.1.3. A FLOOD ALERT AND WARNING SYSTEM FOR SURFACE WATER

The Environment Agency currently provides a free information service that informs residents and businesses of flood risk from rivers and the sea through provision of flood alerts (to be prepared when flooding is possible) and warnings (to take action when flooding is expected). The Environment Agency currently does not issue flood alerts or warnings for surface water flooding and expanding this service to cover surface water is likely to be challenging, given the sudden and sometimes localised nature of surface water flood events. There are a variety of reasons for this, including limitations associated with modelling and mapping described above, forecasting capabilities, and legal issues.

Within its Flood and Coastal Erosion Risk Management Strategy Roadmap, the Environment Agency has committed to working with the Met Office and Flood Forecasting Centre to explore opportunities to improve its forecasting capabilities for surface water flood events.[46] An updated flood alert system should draw on recent solutions in the private sector, both in terms of forecasting surface water flooding and access to alerts and warnings via smart phone technology.[47]

Recommendation 4: the Environment Agency flood alert system should be expanded to cover the risks from surface water flooding as soon as more accurate forecasting and mapping information is available.

[46] Flood and Coastal Erosion Risk Management Strategy Roadmap to 2026, Environment Agency, June 2022
[47] Flood performance certification – phase 1: proving the concept of a flood performance certificate for property flood resilience scenarios, Flood Re,

Case Study: Surface water flood forecasting technology

Following devastating flooding to the Somerset Levels in early 2014, a partnership was established between the Cabinet Office and Loughborough University to develop the next generation of flood forecasting technology. After five years of research, the Previsico forecasting service was founded by Loughborough academics Prof Yu and Dr Baruch. The Previsico platform, which includes an email warning system and a flood dashboard, helps insurers, businesses, governments, and humanitarian organisations to mitigate the impacts of flooding. The forecasting and warning system uses high-quality topographic and hydrological data to produce fast and accurate representations of flow routing across floodplains and can be supplemented by sensors to provide real-time information. Notably, the system provides alerts for surface water flood risk, something not currently included within the Environment Agency flood alert service.

Case Study: Access to flood alerts via smart phone technology

The Resilico Flood Compliance Platform has been developed in the private sector in collaboration with the Chartered Institute for Water and Environmental Management, Flood Re, Previsico and other industry stakeholders. The team behind the digital platform, designed originally to enable Property Flood Resilience measures to be mainstreamed, have recently developed Resilico Connect - a mobile app and website. Preparedness (being flood ready) is knowing what to do and when to do it and the app allows users to access bespoke flood alerts and warnings (river, coastal and surface water) in real time, 24 hours per day from their smart phone. The app also enables the user to create a bespoke flood plan that can be implemented in the event of an alert or warning.

The Resilico Connect user experience and functionality was trialled and tested as part of a pilot carried out by Flood Re and the Environment Agency in East Peckham in Kent in 2022 to prove the concept of flood performance certificates. East Peckham has both fluvial and surface water flood risk and the pilot research found 93% of participants were supportive of having access to a smart phone app that would supply flood warnings to their property.

3.2. THE ROLE OF SUSTAINABLE DRAINAGE SYSTEMS

Sustainable Drainage Systems (SuDS) help to alleviate surface water flooding by slowing, storing, and reusing rainfall close to where it falls. From swales and soakaways to green roofs and wetlands, there are a wide variety of SuDS available that can suit almost any development. The benefits and challenges associated with the use of SuDS for both new and existing properties are discussed in detail within the WSBF's previous Bricks and Water inquiry. This work called for implementation of Schedule 3 of the Flood and Water Management Act 2010 (never introduced in England), which would end the automatic right for developers to discharge surface water to public sewers and make the use of SuDS mandatory. Following a recent review,[48] the Government has now committed to the introduction of Schedule 3, subject to a consultation this year on implementation.[49] Given that it is now over ten years since introduction of the Flood and Water Management Act 2010, this should be legislated for at pace.

Recommendation 5: the Department for Environment, Food and Rural Affairs should start the public consultation on implementation of Schedule 3 of the Flood and Water Management Act in June 2023, with the aim of implementing Schedule 3 by the end of the year.

New SuDS approving bodies will be required to ensure that new SuDS are fit for purpose and designed and built in accordance with national standards. The Government's recent review suggested that upper-tier local authorities were best placed to adopt this role, however a final decision should be made following conclusion of the forthcoming consultation.

There remains a debate around who should take responsibility for adoption and maintenance of SuDS and these challenges have been explored within both previous Bricks and Water inquiries. Some progress has been made, with the publication of Sewage Sector Guidance making it clearer as to when water and sewerage companies should adopt SuDS.[50] However, some water and sewerage companies (including Thames Water) are yet to recognise SuDS as sewers, in accordance with this guidance.

Even if arrangements for adoption and maintenance of new SuDS can be managed by new approving bodies, there remains a challenge surrounding 'orphan' SuDS features where disputes remain over responsibilities for maintenance, for example, where a previous maintenance company has ceased to operate. Schedule 3 of the Flood and Water Management Act gives SuDS approving bodies a power (but not a duty) to adopt all or part of a sustainable drainage system. This could provide an adoption route for orphan SuDS or for single properties, where adoption duties will not apply.

If SuDS approving bodies are to have these powers, it is vitally important that they are adequately resourced. This should include funding for enforcement action, to avoid the problems associated with enforcement of mitigation measures for flood risk currently encountered within the planning process (detailed within section 2.2).

Recommendation 6: SuDS approving bodies should receive ringfenced funds (sourced from developer contributions) to enable them to adopt orphan SuDS where necessary and to take enforcement action where SuDS have not been installed and maintained appropriately. This should be considered as part of the forthcoming consultation on implementation of Schedule 3 of the Flood and Water Management Act.

[50] Sector guidance in relation to adoption of sewerage assets by sewerage companies in England, Water UK, June 2022

3.3. IMPROVING RIVER QUALITY & WIDER BENEFITS

In addition to reducing flood risk, the use of SuDS can improve water quality. Combined Sewer Overflows (CSOs) operate when the capacity of the combined sewerage system is exceeded during periods of heavy rainfall, and dilute effluent is discharged, untreated, to rivers and streams. This is permissible in some instances to avoid surface water flooding associated with an overwhelmed combined sewerage system.

However, in recent years it has come to light that water and sewerage companies are often not operating CSOs in accordance with the terms of their permits, resulting in pollution of rivers and coastal bathing waters. In 2021, Southern Water were handed a record £90m, fine for widespread pollution after pleading guilty for thousands of unpermitted sewage discharges.[51] This issue has become widely politicalised, with the Shadow Environment Secretary branding it the "Tory sewage scandal".[52]

In reality, it is far more nuanced and there are very few easy answers. Indeed, there are many sectors who have an equal, if not greater role to play in preventing river pollution including farming (from nutrient runoff), transport (from highway runoff), industry (from effluent discharge), and the built environment. Within the water industry, the problem of discharges from both wastewater treatment works and the combined sewer network will take a significant amount of investment to tackle, which is why the use of SuDS plays a vital role in avoiding, minimising, and attenuating any discharge of rainwater into public sewers. Aside from the use of SuDS to reduce flood risk and improve water quality, they also have several wider benefits as set out on the following page:

[51] Record £90 million fine for southern water following EA prosecution, Environment Agency press release, July 2021
[52] Open letter to Conservative MPs, Jim McMahon MP and Fergal Sharkey, April 2023

Table 3 - The wider benefits of SuDS[53]

Benefit	Description
Biodiversity	Increasing the amount of green or blue space within a development provides habitat for wildlife and can contribute to targets for biodiversity net gain.
Amenity	The use of green space and vegetation can increase the aesthetic value of an area and provides residents with access to nature.
Air quality	Green SuDS can have a positive effect on local air quality by absorbing pollutants such as nitrogen dioxide, sulphur dioxide, and particulate matter.
Overheating	SuDS can reduce the 'urban heat island effect' via evapotranspiration and shading.[54] Options such as green roofs and trees can also regulate the temperature inside buildings, by offering cooling in summer and insulation in winter.
Carbon reduction	SuDS can sequester carbon via absorption of carbon dioxide. They can also reduce carbon emissions by avoiding the need to pump and treat wastewater and reducing the requirement for heating or cooling within buildings.
Crime	Studies have shown that access to vegetation and green space can reduce crime and anti-social behaviour.[55]
Education	Where SuDS have been used in school settings, they can provide educational opportunities and enhanced access to nature.
Groundwater recharge	The use of infiltration SuDS allows rainwater to soak into the ground where it falls, contributing to the recharge of local aquifers.
Health and wellbeing	There is an increasing body of evidence to demonstrate that access to green space can improve people's physical and mental health. A recent review by Natural England found that people who live in neighbourhoods with greater amounts of green infrastructure tend to be happier, healthier, and live longer lives than those who live in less green places.[56] The use of SuDS will also be key in delivery of the commitment within the Government's Environmental Improvement Plan for every household in England to be within a 15-minute walk of green space or water.[57]
Recreation	Some SuDS can have dual uses for recreation, such as sports pitches or for activities such as angling or birdwatching.
Traffic calming	Some SuDS, such as bioretention cells, can be incorporated into traffic calming schemes.
Developer benefits	It has been demonstrated that the use of SuDS can often be more cost-effective than traditional surface water drainage systems.[58] Research has also shown that SuDS can increase property values by up to 15%[59] and are a benefit that buyers are willing to pay a premium for.[60] Contrary to popular belief, SuDS can also be cheaper to maintain than traditional drainage systems, as has been demonstrated within a recent scheme in Cambridge.[61]

[53] Adapted from: Benefits of SuDS, Susdrain, online https://www.susdrain.org/delivering-suds/using-suds/benefits-of-suds/SuDS-benefits.html
[54] The effect of sustainable urban drainage systems on outdoor comfort and runoff, Rosso et al, Journal of Physics Conference Series, November 2019
[55] Environment and crime in the inner city: does vegetation reduce crime? Kuo and Sullivan, Environment and Behaviour, May 2001
[56] A rapid scoping review of health and wellbeing evidence for the framework of green infrastructure standards, Natural England, September 2020.
[57] Environmental improvement plan 2023, HM Government, January 2023
[58] Water availability and quality programme: comparative costings for surface water sewers and SuDS, DEFRA, February 2011
[59] Water, people, places: a guide for master planning sustainable drainage into developments, AECOM, September 2013
[60] The value of SuDS to new home buyers, Wavin, January 2023
[61] Lamb Drove, Residential SuDS Scheme, Cambourne, Cambridge, Susdrain & Ciria

4. Flood resilience

> *The sooner we can make properties more resilient and recoverable to flooding, the better it is for both individual homeowners and communities as a whole. I welcome the investment of £5.2 billion by the Government in flood and coastal erosion risk management.*
>
> Baroness McIntosh of Pickering, evidence session 3

TOP LINES

- **Given the impacts of climate change, it will not be possible to protect all properties from flooding and therefore the use of Property Flood Resilience (PFR) measures are vitally important in ensuring that damage to homes can be reduced.**
- **The Flood Re reinsurance scheme allows access to affordable home insurance for communities at high risk of flooding. However, this scheme will be withdrawn in 2039 whereby home insurance will be priced according to the individual level of risk.**
- **PFR offers a solution by demonstrating to insurers that the cost of restoring a property after a flood is not prohibitive. However, PFR measures are currently only being installed at a fraction of the pace required to make vulnerable communities insurable once Flood Re is withdrawn.**

4.1. THE NEED FOR RESILIENCE

Chapters 1 and 2 of this report discuss the risks from flooding and how these risks can be mitigated through informed planning decisions and via the use of green infrastructure. However, it will not be possible to protect all homes and businesses from all sources of flooding and recent surface water flooding incidents are a reminder that these challenges are not restricted to riparian or coastal communities. Even where flood defences are present or are planned, residual risks will always exist, such as failure or overtopping.

It is for these reasons that the use of Property Flood Resilience (PFR) is so important. PFR describes the measures that can be taken at the individual property-level to either keep water out (known as flood resistance) or make a building more easily recoverable (i.e., to minimise the effects of flooding, should water enter the property and to aid faster recovery). However, the CCC's recent progress report on adapting to climate change cited that there had been 'mixed progress' on ensuring that buildings are prepared for flooding and that there were 'limited' plans and policies in place to address this issue.[62]

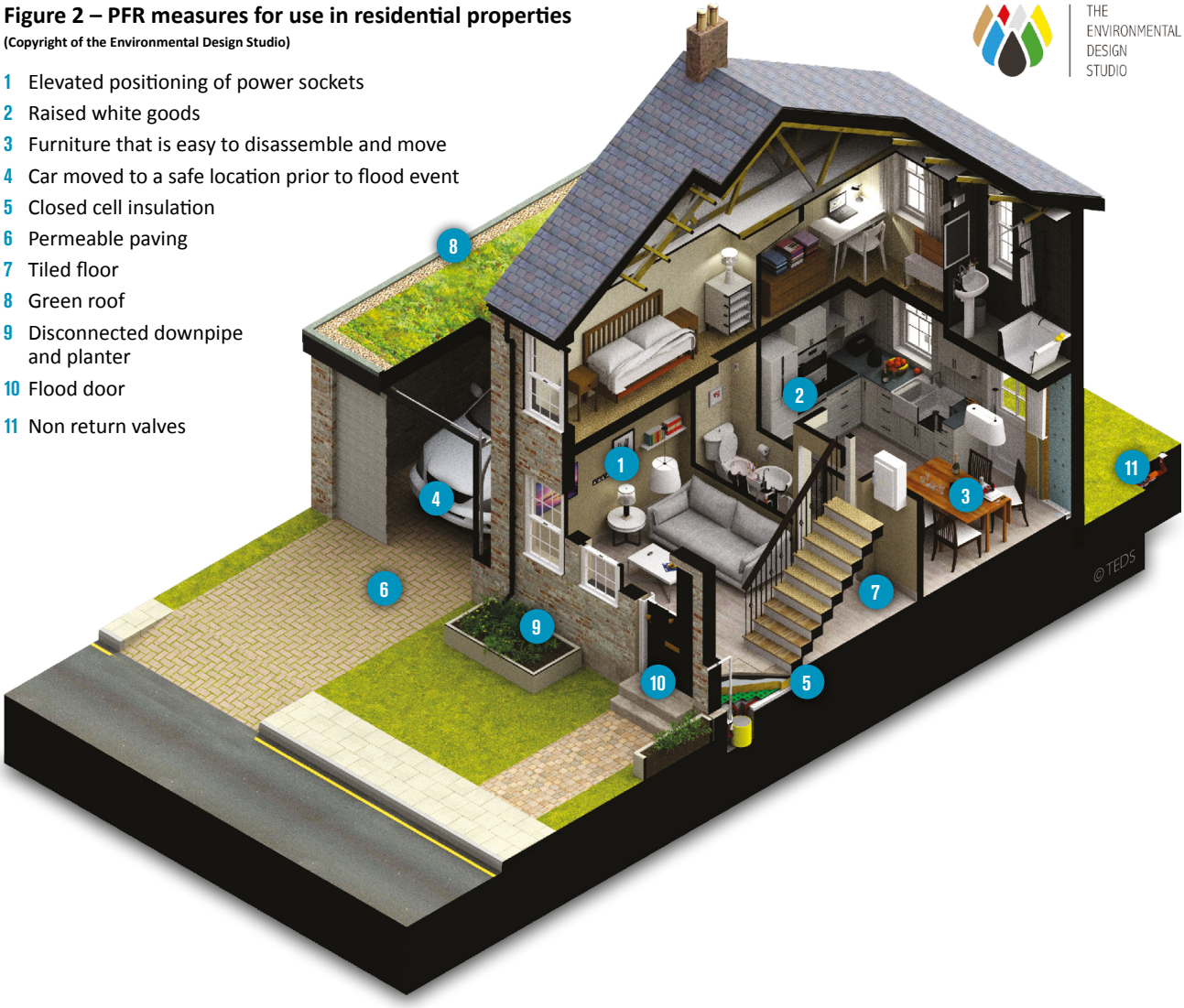
4.2. WHAT IS PROPERTY FLOOD RESILIENCE?

PFR measures come in a wide range of forms, including flood doors and non-return valves to keep water out, intentionally positioned power sockets and appliances to avoid damage by floodwater, and flood resilient wall and flooring materials that can be easily cleaned or replaced following a flood (see Figure 2). These measures work best when they are installed as a package and are most cost-effective when completed alongside home improvement work or during restoration following a flood.

[62] Progress in adapting to climate change: 2023 report to Parliament, Committee on Climate Change, March 2023

Figure 2 – PFR measures for use in residential properties
(Copyright of the Environmental Design Studio)

1 Elevated positioning of power sockets
2 Raised white goods
3 Furniture that is easy to disassemble and move
4 Car moved to a safe location prior to flood event
5 Closed cell insulation
6 Permeable paving
7 Tiled floor
8 Green roof
9 Disconnected downpipe and planter
10 Flood door
11 Non return valves



Responsibility for retrofitting a property with PFR measures typically lies with the owner. Following storms such as Desmond, Frank, and Eva in 2015/16, the reputation of PFR was blighted by the entry of rogue traders to the market, looking to capitalise on the provision of government grants that were offered to affected communities. In response to this, the Construction Industry Research and Information Association (CIRIA) published a Code of Practice and accompanying guidance for PFR, which aimed to restore confidence for those wanting to protect their homes and businesses.[63] There is now also an updated British Standard (BS 851188) for flood resistance products, that aligns with the Code of Practice.

[63] Code of practice for property flood resilience, CIRIA, November 2019

Following publication of the Code of Practice, Defra commissioned three PFR 'Pathfinder' projects, charged with raising awareness and increasing the uptake of PFR. These projects, undertaken in Yorkshire, Devon and Cornwall, and the Oxford to Cambridge arc have recently concluded. Highlights included the touring 'floodmobile' vehicle, which visited communities between Oxfordshire and Cambridgeshire demonstrating the practical steps that homeowners can take to reduce the risk of flooding to their property.[64] A prototype database was also developed, which enabled local authorities and third parties to collect and map household-level data on PFR installation. However, the CCC recently cited the absence of funding to upscale this project as a 'missed opportunity'.[65]

Despite these interventions, uptake of PFR remains stubbornly low. The CCC's 2021 progress report in adapting to climate change estimates that the rate of PFR installation is between 500 and 2000 homes per year.[66] This falls far short of the deployment of PFR within 200,000 homes over the next 50 years, set out by the Environment Agency as a level that would 'significantly reduce' the risk to individual property owners.[67] The WSBF's previous Bricks and Water inquiry recommended that Building Regulations should be updated to require the installation of PFR, where necessary. This was also endorsed by several stakeholders in responses to this inquiry's call for evidence. Sadly, this recommendation has not yet been adopted, despite it being specifically cited by the CCC in 2021[68], and followed up by the statement that "there are a lack of enforceable resilience standards to ensure buildings are built or fitted with appropriate property-level flood measures" in the CCC's most recent progress report to Parliament.[69] It is therefore appropriate to include it again here:

Recommendation 7: part C of Building Regulations should be updated to require all properties at high risk of flooding to include property flood resilience measures. These measures should be specified and installed in accordance with the CIRIA Code of Practice for property flood resilience.

It is acknowledged that there is unlikely to be a one-size-fits-all solution to flood resilient design through Building Regulations and there remains a risk of duplicating the role of the planning system if a more bespoke approach was taken. The most appropriate role of Building Regulations should be to be to raise minimum standards in flood resilient design to limit the impacts of localised flooding. For example, requirements for raising floor levels a minimum of 300mm above surrounding ground levels (rather than the existing 150mm), raising sockets and sensitive electrical equipment, and fitting non-return valves on soil pipes. However, these interventions should not negate the requirement for site-specific flood risk assessment and bespoke mitigation approaches under the planning system.

In anticipation that changes to Building Regulations can be slow and would have to follow the proper consultation process, making the use of PFR measures more cost-effective effective could be a good solution in the interim. Products and materials used to improve energy efficiency are currently exempt from VAT[70] and their installation has also recently been made VAT-free.[71] A similar exemption could be applied to products and materials for PFR – something that Aviva has called for in its recent report on future communities.[72] This inquiry has concluded that this would be a useful step in incentivising the uptake of PFR, provided that the savings are passed on to the consumer. This exemption should apply to products and materials specifically designed with flood resilience in mind and not to all-purpose products, that happen to be flood resilient (for example, granite work surfaces).

[64] The Ox-Cam pathfinder project: introducing the floodmobile, Environment Agency blog, May 2021
[65] Progress in adapting to climate change: 2023 report to Parliament, Committee on Climate Change, March 2023
[66] Progress report in adapting to climate change, Committee on Climate Change, June 2021
[67] National flood and coastal erosion flood management strategy for England, Environment Agency, July 2020
[68] Progress in adapting to climate change: 2021 report to Parliament, Committee on Climate Change, June 2021
[69] Progress in adapting to climate change: 2023 report to Parliament, Committee on Climate Change, March 2023
[70] VAT rates on different goods and services, HM Revenue and Customs, July 2022, online VAT rates on different goods and services - GOV.UK (www.gov.uk)
[71] Energy saving materials and heating equipment, HM Revenue and Customs, March 2023, online, Energy-saving materials and heating equipment (VAT Notice 708/6) - GOV.UK (www.gov.uk)
[72] Building future communities report: homes for a changing climate, Aviva, February 2023

Recommendation 8: products and materials used to make homes more resilient to flooding (in accordance with the CIRIA Code of Practice for property flood resilience) should be exempt from VAT to incentivise use by homeowners.

4.3. FLOOD RE

Historically, the cost of obtaining home insurance has been significantly higher for those living within areas at risk of flooding, with many not able to secure insurance at all. Research by Defra has consistently shown that affordability is the main reason that 'at-risk' groups to not take out insurance[73] and an independent review of flood insurance concluded that a "worrying" proportion of policies did not cover flood damage.[74]

The Flood Re reinsurance scheme is a joint initiative between the insurance industry and the Government that was launched in 2014 to improve the availability and affordability of household insurance for people living at the highest risk of flooding. Insurers pass the flood risk element of the insurance policy to Flood Re, which reimburses the insurer if a claim is made. The scheme is funded through an insurance industry levy, which insurers sometimes pass on to consumers through higher general premiums. Following the introduction of the Flood Re scheme, all eligible households who had made previous claims were soon able to get home insurance quotes from two or more providers and four out of five eligible households saw a reduction in their premiums of more than 50%.[75]

In addition to its underwriting obligations, Flood Re is also responsible for managing the transition of the insurance market to 'affordable and risk-reflective' pricing by 2039, at which point it will be withdrawn.[76] To get to this point (i.e., a market in which premiums and excesses are affordable for those in areas of flood risk, without the support of an industry levy) Flood Re has committed to establishing an evidence base that can demonstrate, including to householders and insurers, the effectiveness of PFR measures in homes.[77] The most effective way of doing this is by demonstrating to insurers that the cost of restoring a property after a flood is not prohibitive, through installation of PFR.

However, PFR measures are only being installed at a fraction of the pace required to make vulnerable communities insurable once Flood Re is withdrawn. The CCC has found that to coincide with the withdrawal of Flood Re, resilience measures should be installed at a rate of around 9,000 properties per year.[78] Current rates of installation, as detailed in the previous section, are falling far short of this.

4.3.1. INCENTIVISING UPTAKE

In 2021, the Government ran a consultation on amendments to the Flood Re scheme, which included proposals for discounted insurance premiums and the introduction of Build Back Better.[79]

Discounted premiums are a tool that could be used to incentivise the uptake of PFR. As Flood Re does not offer insurance policies directly, this discount could be offered to insurers who cede policies to them, and insurers could pass those discounted premiums on to customers. It was anticipated that this would result in a saving of around 25% on the total cost of insurance for a typical benefitting household.[80] Proposals for Flood Re to offer discounted premiums to insurers were not adopted following the consultation. However, offering discounted premiums to customers directly remains a useful alternative to incentivise homeowners to install PFR measures, especially at a time when household budgets are squeezed.

[73] Availability and affordability of insurance, Department for Environment, Food and Rural Affairs, July 2018
[74] Independent review of flood insurance in Doncaster, Amanda Blanc, April 2020
[75] Our vision: securing a future of affordable flood insurance, Flood Re, July 2018
[76] Ibid.
[77] Regulation 27: the quinquennial review, Flood Re, July 2019
[78] Progress in preparing for climate change: 2019 report to Parliament, Committee on Climate Change, July 2019
[79] Consultation on amendments to the Flood Re scheme: summary of responses, Department for Environment, Food and Rural Affairs, July 2021
[80] Regulation 27: the quinquennial review, Flood Re, July 2019

Recommendation 9: all insurers should offer discounted premiums to customers who install property flood resilience measures, in accordance with the CIRIA Code of Practice.

Once this has become commonplace, discounts could be extended where the customer can demonstrate they are maintaining the PFR measures in place and are also prepared for flooding in other ways, for example, by signing up for flood alerts or putting a flood plan in place.

Secondly, the Government has now endorsed Flood Re's Build Back Better scheme. Prior to introduction of Build Back Better, insurers would offer 'like-for-like' refurbishment, restoring the property to the same condition as it was before a flood. Flood Re is now able to reimburse insurers up to £10,000, in addition to standard repair costs, to incorporate PFR into the property refurbishment. This benefits both insurers and residents, as the cost of repairs will be reduced if the property floods again and residents will also be able to return to their homes quicker. Although Build Back Better has been available since April 2022, not all insurance companies have signed up to include it in their policies.[81] Mandating the use of Build Back Better will be a useful lever in accelerating the installation of PFR where it is needed most. This may need to be phased in, to give insurers that currently do not offer Build Back Better time to incorporate it into their business plans.

Recommendation 10: it should be mandatory for all insurers to offer Build Back Better, funding reimbursement costs of up to £10,000, over and above work to repair damage and loss caused by a flood.

The above recommendations for incentivising the uptake of PFR are likely to be most effective if tools are available to the both the insurance industry and the homeowner that demonstrate the value of PFR installation. In the long-term, this should include a comprehensive evidence base of the type of PFR measures, in which properties they have been installed, and the level of protection that they are likely to afford to a home. In the short-term, the benefits of PFR could be detailed within a Flood Performance Certificate. The WSBF made the case for introduction of Flood Performance Certificates (as part of a wider Water Performance Certificate) within its previous Bricks and Water inquiry and the CCC has also cited their use in incentivising PFR uptake.[82] The use of Flood Performance Certificates has recently been piloted in East Peckham as part of the Environment Agency's FCERM Strategy Roadmap to 2026.[83] This pilot has proved a success with both homeowners and residents and scoping has begun for a second phase of the project.

[81] Flood Re launches world first 'Build Back Better' scheme to help householders after a flood, Flood Re, press release, April 2022
[82] Progress in adapting to climate change: 2021 report to Parliament, Committee on Climate Change, June 2021
[83] Flood performance certification phase 1: proving the concept of a flood performance certificate for property flood resilience scenarios, Flood Re, 2023

4.4. THE FUTURE OF PROPERTY FLOOD RESILIENCE

In 2039, Flood Re will be withdrawn and home insurance policies will be priced according to the level of flood risk. As discussed earlier in this report, the communities with higher flood risk are also often those that will find it hardest to meet the costs of increased insurance premiums. However, many homeowners remain completely unaware that their property is at risk of flooding, never mind that their access to affordable insurance is only available through a temporary reinsurance scheme.

Only around a quarter of homeowners know the flood risk of their property.[84] A study by the Environment Agency showed that even when residents were aware of the general flood risk to an area, a much smaller proportion (7%) had considered the risks to their home specifically.[85] It is therefore vital that communities work together to raise awareness of issues surrounding flood risk and promote the use of PFR, where appropriate. Evidence submitted to this inquiry suggests that both individuals and communities are willing to take action to reduce their risk of flooding, but either aren't aware of the risks or lack the tools required to adequately prepare. Community and Coastal forums can also be used to share good practice that goes beyond PFR, including advice on how to develop a flood plan and distribution of flood warnings.

Case Study: Building resilience in communities

Building Resilience in Communities (BRIC) is a two-year, Interreg Europe project, which aims to build resilience in local communities at risk of flooding across England and France. The project focusses specifically on communities experiencing deprivation, targeting vulnerable groups such as the elderly and those furthest from the labour market. Pilot projects in England are underway in Plymouth, Canvey Island, Weymouth, and Kent.

Communities in Weymouth face flood risks from a variety of sources including tidal (via the harbour), fluvial (via the River Wey), surface water, and wave overtopping. Recent studies have shown that by 2115, 1,600 properties will be at risk of tidal flooding around the harbour alone. Sea level rise also poses a significant risk to retention of the popular beach, the loss of which would pose an economic risk to the local economy.

The BRIC project aims to create a more resilient community through development of tools to assist in the assessment and communication of risk, encouraging participation in local flood risk management strategies, and creation of a community resilience plan.

[84] Six out of ten people admit to never checking their flood risk (news article), Landmark Information Group, November 2019
[88] Future flood prevention, Environment, Food and Rural Affairs Committee, Second Report of Session 2016-17, November 2016

5. Conclusion

Following publication of the final part of the Intergovernmental Panel on Climate Change's sixth assessment report, UN secretary general, António Guterres, said: "Our world needs climate action on all fronts: everything, everywhere, all at once".[86] Although these remarks were made in the context of global climate action they are just as relevant when applied to domestic flood risk management. This report has discussed the tools available to policymakers, risk management authorities, developers, and individuals to better manage the risks from flooding, including good planning policy, robust enforcement, the use of green infrastructure, capital investment in flood defences, and the use of property flood resilience measures. These tools are complimentary to one another, and so should all be considered for use across all parts of the country if communities across England are to become truly resilient to flooding.

The recommendations made within this report are intended to be ambitious but achievable. With this in mind, the WSBF has set out a timeframe for implementation below:

Figure 3 – timescale for implementation of recommendations

2023	2024	2025
Recommendation 1: Gudiance on Sequential Test (Q2)	**Recommendation 2:** Updates to the Flood Map for Planning (2024 onwards)	**Recommendation 4:** Expanded flood alert and warning system
Recommendation 3: Review of the Town and Country Planning Direction (Q2)	**Recommendation 7:** Building Regulations to mandate PFR	**Recommendation 10:** Mandating Build Back Better
Recommendation 5: Implementation of Schedule 3 (Q4)	**Recommendation 9:** Discounted premiums	
Recommendation 6: Funding for SuDS approving bodies (Q4)		
Recommendation 8: VAT exemption for PFR (Q4)		

[86] Secretary general calls on States to tackle climate change 'time bomb' through new solidarity pact acceleration agenda at launch of intergovernmental panel report, United Nations, press release, March 2023, https://press.un.org/en/2023/sgsm21730.doc.htm

Steering group

Baroness McIntosh of Pickering, life peer (Chair)

Rt Hon Philip Dunne, Member of Parliament for Ludlow (vice-chair)

Rachael Maskell, Member of Parliament for York Central (vice-chair)

Luke Pollard, Member of Parliament for Plymouth, Sutton and Devonport (vice-chair)

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Paul Cobbing MBE, Independent Advisor (former Chief Executive, National Flood Forum)

Julie Foley, Director of Flood Risk Strategy and National Adaptation, Environment Agency

Dermot Kehoe, Director of Communications and Transition, Flood Re

Oona Muirhead CBE, Policy Fellow, Policy Connect

Tim Myatt, Head of Corporate Affairs, Yorkshire Water

Dr. Andy Russell, Lecturer in Environmental Science, Queen Mary University of London

Methodology

Work on this ***Bricks and Water*** inquiry began in February 2022, when the WSBF held a scoping session entitled 'Bricks and Water 3: a dive into flood risk management'. This session was kindly chaired by Baroness McIntosh of Pickering.

This project draws on third party research from a large number of organisations, as well as primary data collected following a call for evidence and through one-to-one interviews with experts across industry, academia, Government, and NGOs. The following evidence sessions were completed, which focussed on the following topics:

Roundtable 1: Planning and Prevention – 26th April 2022 (Chaired by Rachael Maskell MP)

Roundtable 2: Mitigation – 25th May 2022 (Chaired by Luke Pollard MP)

Roundtable 3: Resilience and Recovery – 15th June 2022 (Chaired by Baroness McIntosh of Pickering)

Policy Connect would like to thank all the individuals and organisations that participated in this inquiry. Our particular thanks to our Chair, Baroness McIntosh of Pickering, and Vice Chairs, Luke Pollard MP, Rt Hon Philip Dunne MP, and Rachael Maskell MP for their leadership and dedication to project. A full list of contributors is outlined below. The views in this report are those of the authors and Policy Connect. Although these were informed by the listed contributors, they do not necessarily reflect the opinions of these organisations.

Roundtable attendance, oral and written evidence:

AECOM
APP Wholesale
Association of British Insurers
Association of Drainage Authorities
Association of SuDS Authorities
AXA Insurance
Binnies
British Insurers Brokers' Association
Chartered Institution of Water and Environmental Management
Coastal Partnership East
Cumbria Strategic Flood Partnership
Dorset Coast Forum
Department for Levelling Up, Housing and Communities
Environment Agency
Flood Protection Solutions
Flood Re
Fylde Council
Genuit
GJB Consultancy Oxford
Great Yarmouth Borough Council
Guy Carpenter
Hope for the Future
Illman Young Landscape Design
Imperial College London
JBA Consulting
Kent Developers' Group
Keswick Flood Action Group
Lancashire County Council
Lancaster University
Natural Environment Research Council
North East Kendal Flood Action Group
Open University
Lower Medway Internal Drainage Board
Queen Mary University of London
RAB Consultants
Stormwater Shepherds
The Environmental Design Studio
University of Derby
University of Edinburgh
Wakefield Council
Warrington Borough Council
Waterlevel
Watertight International
Water UK
Wilbourne and Co.
Wildfowl and Wetlands Trust
WPI Economics
Yorkshire Water
Zurich Insurance UK

About this report

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The Westminster Sustainable Business Forum (WSBF) is Policy Connect's coalition of high-level stakeholders informing better policy-making on sustainability issues for the built environment.

The WSBF's members include key UK businesses, Parliamentarians, Civil Servants, academics and third sector organisations. Providing a politically neutral environment for knowledge sharing and discussion on sustainability policy, we help to impact the agenda in government and are a trusted source of independent information and advice for policymakers.

We publish authoritative research reports; impact on Government policy through our in-depth round table policy discussions and outputs; and inform the wider sustainability debate by convening key stakeholders at our larger policy events and seminars. The WSBF works in the policy areas of construction, infrastructure, water, sustainable planning, green finance and natural capital. We are cross-party, independent and not-for-profit.

THE SUSTAINABILITY TEAM

The All-Party Parliamentary Sustainable Resource Group (APSRG), Carbon Connect, the Sustainable Resource Forum, and the Westminster Sustainable Business Forum (WSBF) make up the Sustainability team at Policy Connect.

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Policy Connect is a cross-party think tank. We specialise in supporting parliamentary groups, forums and commissions, delivering impactful policy research and event programmes and bringing together parliamentarians and government in collaboration with academia, business and civil society to help shape public policy in Westminster and Whitehall, so as to improve people's lives.

Our work focusses on five key policy areas which are: Education & Skills; Industry, Technology & Innovation; Sustainability; Health; and Assistive & Accessible Technology.

We are a social enterprise and are funded by a combination of regular annual membership subscriptions and time-limited sponsorships. We are proud to be a Disability Confident and London Living Wage employer, and a member of Social Enterprise UK.

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