CLIMATE ADAPTATION AND RESILIENCE PLAN

Brent

London Borough of Brent

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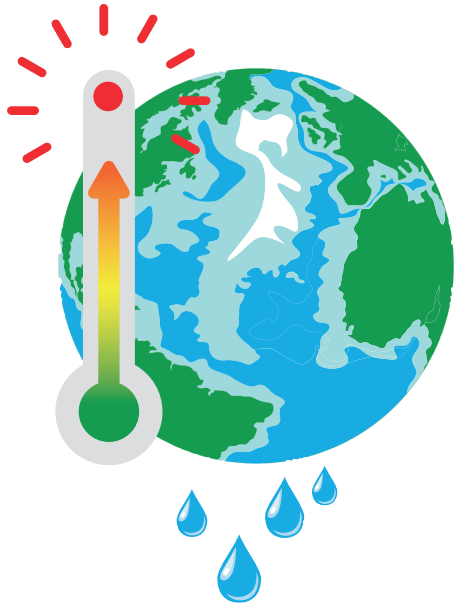
1 WHY DO WE NEED AN ADAPTATION AND RESILIENCE PLAN?

In July 2019, Brent Council declared a climate and ecological emergency and committed to 'do all reasonable in the council's gift to aim for carbon neutrality by 2030 and in 2021, the Brent Climate & Ecological Emergency Strategy was published. As part of this strategy, the need for the climate resilience and adaptation plan was identified.

Since the industrial revolution, global average temperatures have increased by over 1°C, largely due to human activity. As a result, we are already seeing significant changes to our climate and ecosystems. In the UK, the top 10 warmest years since 1884 have all occurred since 2002. Summers are becoming hotter and drier, with dense urban areas such as London increasingly vulnerable to heatwaves and water shortages. Five of the 10 wettest years on record have happened since 2000, with intense rainfall events increasingly common. The flash flooding experienced across London in July 2021 illustrates the type of event we should expect to see more frequently in future.

This plan includes an assessment of the key climate-related risks facing Brent and sets out a framework of actions for climate adaptation and resilience. The four main risks that have been identified for Brent are: Flooding, Extreme Heat, Drought and Water Shortages and Extreme Cold. The plan includes a range of actions to address each area of risk, some of which are already underway.



Adaptation and Resilience

Climate change adaptation means preparing for and adjusting to the current and future effects of climate change, many of which experts say are now inevitable. Adaptation seeks to reduce our exposure and vulnerability to harmful climate change impacts, such as the increased severity and frequency of floods, heatwaves and drought.

Climate resilience is closely related to adaptation, and refers to the ability of society and systems to recover from harmful climate-related events.

Climate adaptation and resilience differs from climate change mitigation, which focuses on reducing greenhouse gas emissions in order to limit global heating. Climate change mitigation is also being addressed in Brent's Climate & Ecological Emergency Strategy but is not the focus of this plan.

LONDON CONTEXT

London's dense population, urban built environment and lack of green space puts it at increased exposure to flooding, extreme heat and drought in particular. Many homes in London are not resilient to extreme weather, with poorly ventilated buildings and flats at greater risk of overheating. London is also already water stressed, and population growth will put further pressures on public water supply. These impacts will increase existing pressures on public health and wellbeing, infrastructure, the economy, local services and the natural environment.

The London Environment Strategy 2018 sets out a vision for improving London's environment, including adapting to climate change. This strategy highlighted the three main risks facing London as flood risk, drought, and heat risk. This helped inform the basis of this Climate Adaptation and Resilience Plan for Brent. Although the national and regional priorities for climate adaptation also apply to Brent, there is local variation and therefore the council needs to consider the unique risks and opportunities facing the borough.

Images courtesy of the Solar Centre.

2 WHO IN BRENT WILL BE MOST AFFECTED BY THE CLIMATE CRISIS?

The impacts of the climate crisis will not be felt equally across the borough. People who are less able to prepare for, respond to, and recover from extreme weather will be most vulnerable to climate change impacts. Residents living in more deprived areas are more likely to live in poorly ventilated homes with limited access to green space, and lack the financial capacity to prepare for floods and heatwaves. Very young children, elderly people, people with disabilities or existing health conditions are also more vulnerable from a public health perspective. The table to the right outlines the profile of the groups of residents felt to be most vulnerable to impacts of climate change in Brent:

Group	Description
Population size - 75+	According to ONS population estimates, in 2020, around 18,800 Brent residents were aged 75 and over: 5.7% of the population.
Population projections	The population is ageing: the latest projections suggest the number of residents aged 75 is likely to double in the next twenty years. By 2041, 1 in 10 Brent residents are expected to be aged 75 and over.
Limiting long term illness	The 2011 Census found that around one in seven Brent residents (14%) had a long-term health problem or disability that limited their day-to-day-activities – either a little (7%) or a lot (7%). The prevalence of disability and poor health rises sharply with age: two thirds of residents aged 75 and over had a long-term health problem or disability compared with 3% of children.
Babies and young children	In 2020, there were around 23,800 young children aged 0-4 in Brent (7.3% of the population). Of these, around 4,900 were babies aged under 1.

3 UK CLIMATE CHANGE RISK ASSESSMENT MODEL

Each risk area – flooding, extreme heat, drought and water shortages, and extreme cold – has a risk matrix which provides an indication of the potential impact on public health, infrastructure and the natural environment alongside the likelihood of these risks occurring by 2040. Whilst it is impossible to predict these risks with complete certainty, these matrices are based on the latest analysis and research available.

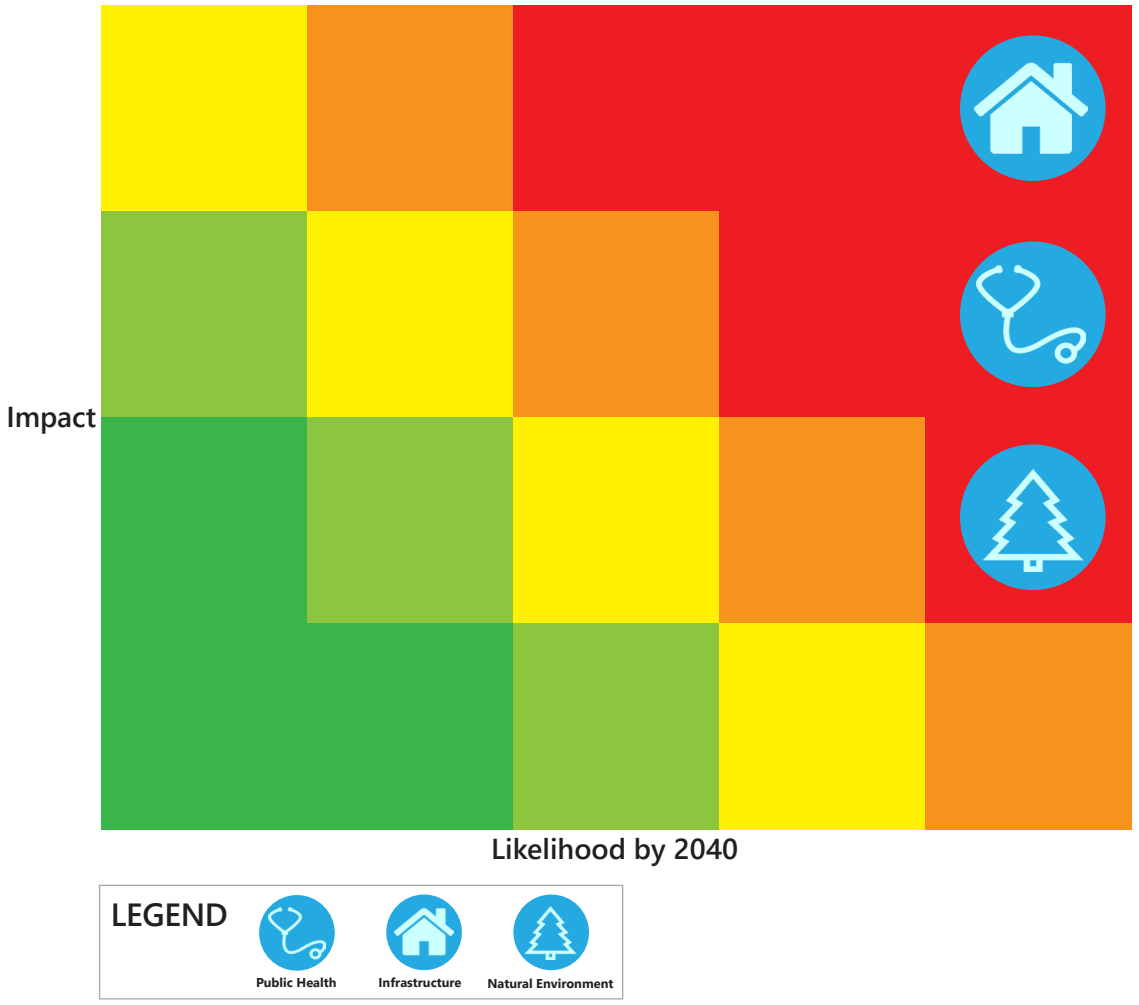
Within each risk area, there are specific areas where Brent should focus action, and some areas that the council is already well prepared for. Each action is categorised by an 'urgency score' using the UK Climate Change Risk Assessment model. This is outlined in the table to the right:

Urgency score	Definition of urgency score
More Action Needed	New, stronger, or different action will be beneficial to reduce climate risks or take advantage of opportunities. This may include policies, implementation activities, capacity building or enabling environment for adaptation.
Further Investigation	On the basis of available information, it is not known if more action is needed or not. More evidence is urgently needed to fill significant gaps or reduce the uncertainty in the current level of understanding in order to assess the need for additional action.
Sustain Current Action	Current or planned levels of activity are appropriate, but continued implementation of these policies or plans is needed to ensure that the risk or opportunity continues to be managed in the future.
Watching Brief	The evidence in these areas should be kept under review, with continuous monitoring of risk levels and adaptation activity (or the potential for opportunities and adaptation) so that further adaptation can be taken if necessary.

4 FLOODING

Climate change is predicted to cause more frequent and intense rainfall, particularly in winter. The risk of flooding is therefore expected to increase over the next century.

BRENT FLOODING RISK MATRIX



RISKS OF FLOODING IN BRENT

Type of flooding	Surface Water Flooding	Fluvial Flooding	Groundwater Flooding
Description	When rainfall is unable to drain through drainage systems or soak into land, and instead flows over land. Brent's limited amount of green space, amount of paved surfaces, ageing drainage infrastructure and population growth could increase this risk.	When the capacity of a river channel is exceeded because of intense, sustained rainfall. There have been no reports of flooding received in recent years, but the areas near River Brent and Wealdstone Brook are at most risk.	When the underground water rises to the surface during a wet period. The main risk is due to Brent's "London Clay" formation: pockets of groundwater pop up resulting in the occasional saturated garden and internal leaks.
Risk level in Brent	**High**	**Low**	**Low**

Infrastructure

Flooding of any kind can cause disruption to critical infrastructure including energy supplies, communications networks, water supply, roads and railways.

Around 1,400 properties in Brent are potentially at risk of surface water flooding at least once every 100 years, and 2,000 properties once every 1,000 years. Basement properties have a higher risk, especially of groundwater flooding. However, the council currently has limited knowledge about basement properties. There is also limited government funding for retrofitting existing properties to adapt them to more volatile weather.

Public Health

The worst health impacts of flooding are likely to affect those with existing health problems, and people in the most vulnerable age groups, typically older people and young children. These groups are most likely to feel the impacts of health and social care service disruptions. Surface water flooding is also a risk that falls disproportionately on communities that can least afford it. Poor urban areas are most susceptible as they are often densely populated with residents from deprived socio-economic backgrounds who are the least able to adapt and recover from the effects of flooding. Those living in poor quality housing with little flood protection are also at higher risk.

Natural Environment

Flooding can have negative effects on the natural environment and ecosystems, destroying habitats, causing wildlife to drown and increasing the likelihood of disease. However, some ecosystems such as wetlands (like the Welsh Harp) thrive in very wet conditions.

FLOODING RESILIENCE ACTIONS

Action	Urgency Score
Provide information to people living in high risk areas. a. Flood risk information and emergency procedures b. Encouraging the incorporation of sustainable drainage systems (SuDs)	More action needed
Consider a retrofitting scheme to incorporate green infrastructure and SuDS on council owned properties to reduce the risk of flooding.	More action needed
Improve advice and support to businesses, particularly small and medium enterprises, to understand how flood risk may affect their operations and how to adapt.	More action needed
Ensure all public and private basement properties are included in asset management databases during stock condition surveys with an aim to have completed this by 2026.	Further Investigation
Consider the cost/benefit ratio of increasing Brent's flood defences to mitigate future fluvial flooding risk.	Further Investigation
Undertake further research on groundwater flooding in Brent in order to more accurately assess the level of risk and establish whether more action is needed.	Further Investigation
Continue to review and revise Brent's Flood Risk Management Strategy as required under the Flood Risk Regulations 2009 and Flood and Water Management Act 2010.	Sustain current action

4 EXTREME HEAT

The frequency and intensity of heatwaves is expected to increase in the future, therefore so is the risk to Brent residents.

BRENT EXTREME HEAT RISK MATRIX

RISKS OF EXTREME HEAT IN BRENT

Infrastructure

High temperatures can affect the energy sector by reducing electricity generation and transmission and affect transport infrastructure by causing railway tracks to buckle, overhead cables to sag, signals to fail and prevent maintenance from being performed. Brent is home to 21 tube stations and 12 rail stations and public transport accounts for 36% of trips in the borough.

The Urban Heat Island (UHI) effect

London faces a higher risk of extreme heat than the rest of the UK due to the UHI effect. The infrastructure found in urban areas like buildings and roads absorb and re-emit the sun's heat more than natural landscapes such as forests and water bodies. The increase in development associated with building new homes represents a real threat to the city's temperature. The UHI effect can cause London to be up to 10°C warmer than neighbouring rural areas, with pavements and roads at risk of softening or melting.

Public Health

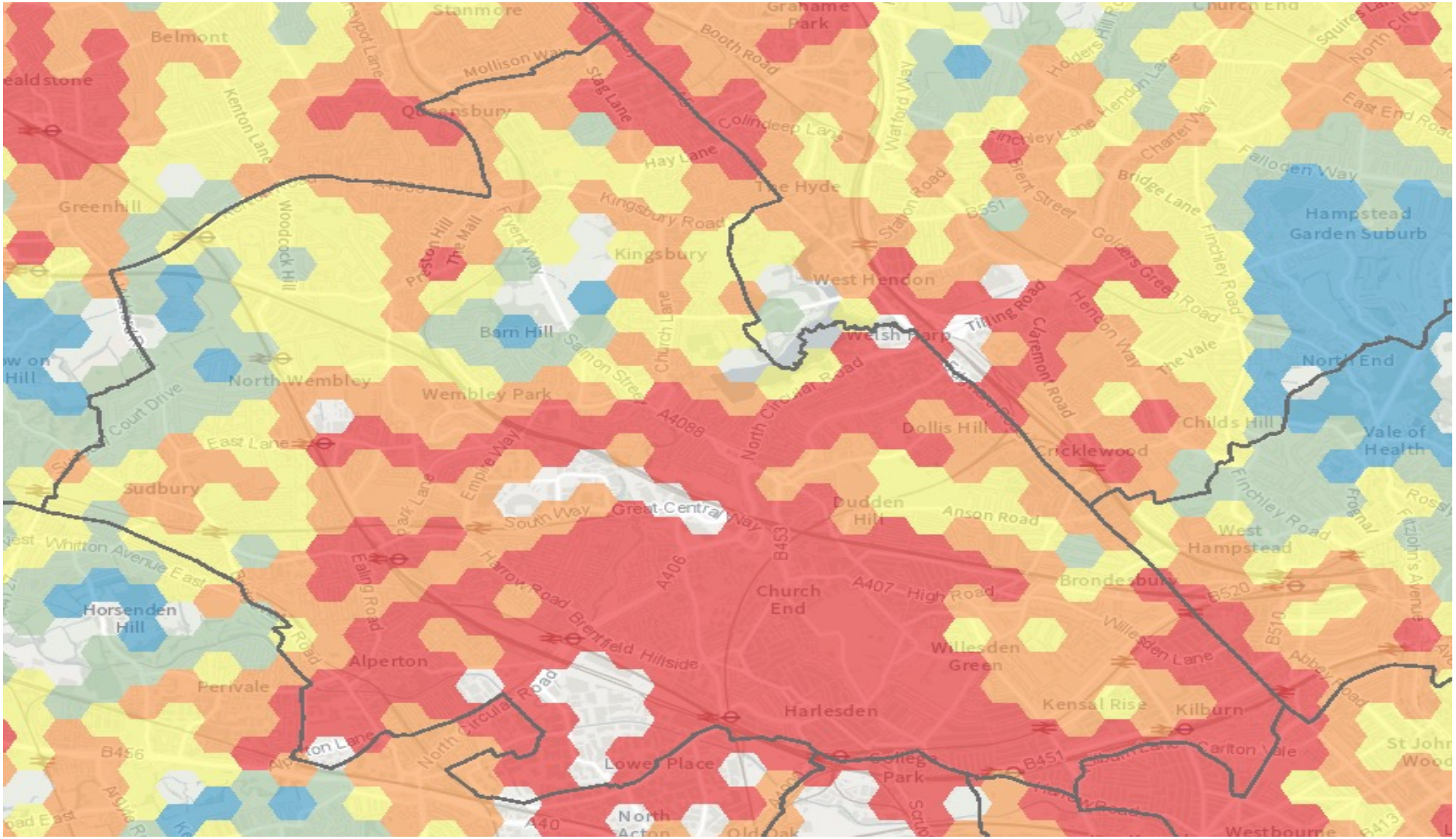
Extreme heat and heatwaves present a very significant risk to human health, causing overheating, heat exhaustion and heatstroke, and increased mortality. A large proportion of UK heat-related deaths are thought to be caused by overheating of homes and other buildings. Brent Council does not currently hold data on the number and location of properties susceptible to overheating. Top floor flats and poorly ventilated buildings are thought to be most at risk.

The health impacts of a heatwave will be felt worse in areas of Brent with poor air quality, which is a major risk to health in the borough, particularly for young children, older adults and those with existing respiratory health problems. Brent's Air Quality Action Plan identifies hotspots with poorest air quality in the borough and sets out what Brent Council plans to do in future to improve air quality.

Natural Environment

The droughts and in some parts of the world, wildfires, associated with heatwaves reduce the amount of vegetation capable of absorbing the carbon from the atmosphere, further contributing to atmospheric warming. Those without access to green spaces at home will find it more difficult to keep cool in hot weather. Access to public urban green space is therefore crucial, however many areas of London are green space deprived. Those living in areas of high deprivation and people from Global Majority backgrounds are more likely to experience the lowest levels of access to and highest levels of congestion in proximal green space. Areas lacking in greenspace (mainly in central Brent) also tend to have the lowest tree canopy levels, further increasing the risk of heat to local residents.

LEVELS OF RISK OF EXTREME HEAT ACROSS THE BOROUGH



Climate Risk Metrics heat risk map, Greater London Authority:

Areas in central and southern Brent, such as Wembley, Stonebridge Park, Church End and Kilburn are most at risk of excessive heat.

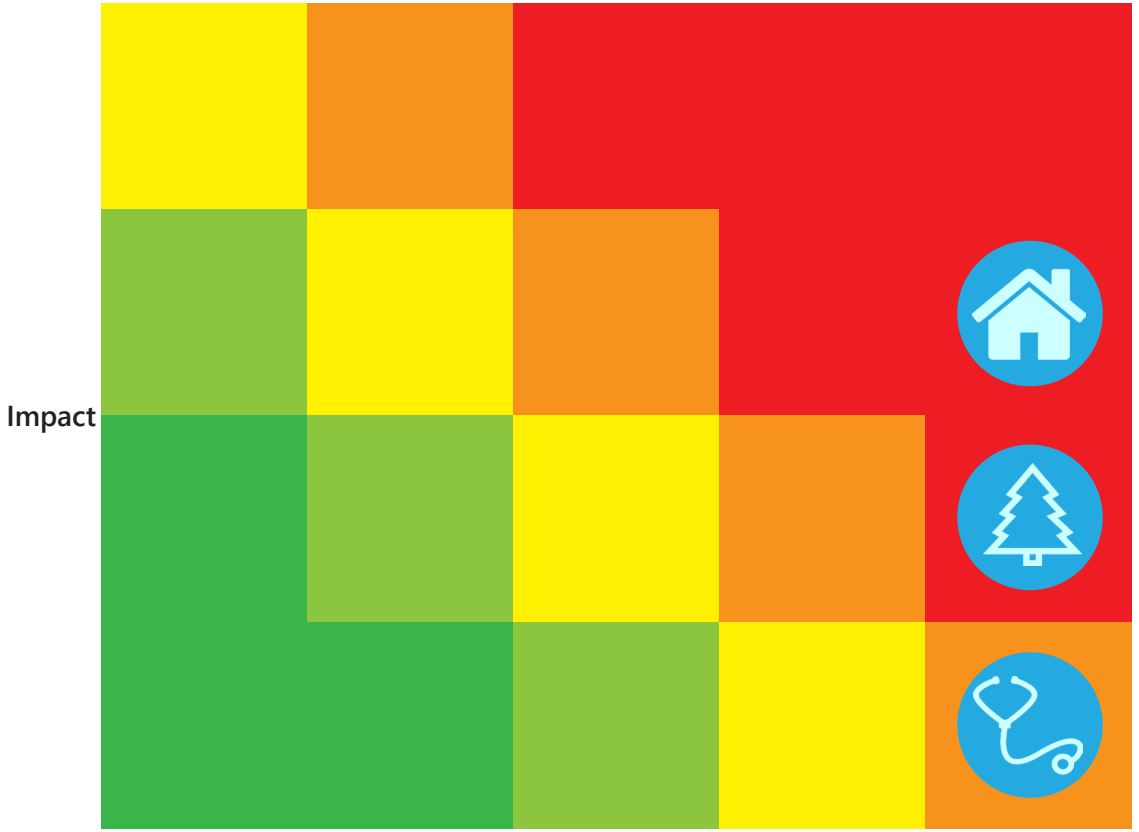
EXTREME HEAT PROPOSED RISK-MITIGATION ACTIONS

Action	Urgency Score
Consider a community awareness campaign targeting those most vulnerable to heatwaves in the borough.	More action needed
Seek to increase the number of 'cool spaces' in Brent and submit to the GLA Cool Spaces map.	More action needed
Consider improving access to facilities such as toilets and water fountains at cool places of refuge around the borough.	More action needed
Seek to build understanding of the effects of extreme heat and heatwaves on Brent's population, including identification of the most vulnerable areas and groups.	More action needed
Consider undertaking a data collection exercise to establish the proportion of council housing stock with estimated overheating risk.	Further Investigation
Improve our understanding of the impacts of extreme heat on nature and biodiversity in Brent, including both risks and opportunities for new species.	Further Investigation
Continue to explore ways to increase green (natural) infrastructure, vegetation and tree canopy to reduce the UHI effectfor instance exploring transforming neglected or derelict spaces into new green spaces such as pocket parks.	Further investigation
Continue to incorporate heat-specific advice on the Council's website and ensure this is prominent during hot spells.	Sustain current action

6 DROUGHT AND WATER SHORTAGES

The risk of drought and water shortages in London as a whole and in Brent is very high. One of the most significant recent droughts affecting Brent occurred following a long dry spell in 2010-2012.

BRENT DROUGHT AND WATER SHORTAGES RISK MATRIX



RISKS OF DROUGHT AND WATER SHORTAGES IN BRENT

Climate change is expected to lead to hotter, drier summers, which may increase the risk of water shortages. By the 2050s, summer rainfall in England is expected to decrease by approximately 15%, and by up to 22% in the 2080s. London in particular is more likely to experience drought than the rest of the UK.

Infrastructure

The main risk of drought and water shortages is the inability of water companies to meet public water demand, which would lead to restrictions on customers. Water supply in Brent is managed by two water companies, roughly split by the North Circular Road: Affinity Water manage water supply in the north of the borough, whilst Thames Water manage water supply in the south of the borough, as well as sewerage across the borough. Both companies have already reported water supply-demand deficits. The gap is expected to grow in the future due to predicted reductions in water available and increasing demand for water.

The British Geological Survey 2021 highlighted Brent as one of the ten most at risk London boroughs of drought-induced subsidence – when the hotter and drier summers lead to clay formations under houses to shrink and crack. This can cause damage to buried infrastructure like electricity cables as well as to railways and roads.

Public Health

The main health implications of drought include: reduced water availability, water quality, and the resulting negative impact on hygiene and sanitation, food security and air quality. Imposition of such restrictions would have health and wellbeing impacts for high risk individuals and vulnerable people who need access to more water.

Natural Environment

Although many ecosystems are usually resilient to short-term drought and recover well, long-lasting, severe droughts can cause loss of habitat, species migration, spread of invasive species and overall biodiversity loss. During drought, the usual restrictions on the amount of water that can be abstracted from rivers and groundwater may be temporarily lifted. This can significantly affect the flow of rivers – like the River Brent and Wealdstone Brook - and damage wetland ecosystems – like in the Welsh Harp. It would also threaten Brent's limited amount of green space in its 90 parks and open spaces. Some habitats are more at risk than others, such as the chalk streams in the hills near London, which could dry up entirely if groundwater levels are depleted.

DROUGHT AND WATER SHORTAGES RESILIENCE ACTIONS

Action	Urgency Score
Consider installation of rainwater harvesting systems in Brent-owned buildings and estates.	More action needed
Provide information to encourage more water efficient activities among residents and businesses.	More action needed
Continue to introduce drought resistant planting in Brent's parks and green spaces.	More action needed
Continue the development of rain gardens, with the dual function of reducing flood risk and retaining soil moisture during drought.	Sustain current action
Work with Thames Water and Affinity Water where necessary to support management of public water supply in the borough.	Sustain current action

7 EXTREME COLD

Unpredictable extreme weather is likely to increase due the climate crisis. Evidence suggests that the threat posed by extreme cold within the context of climate change is less likely to occur than other risks, but when it does it can have devastating effects.

BRENT EXTREME COLD RISK MATRIX

Impact

Likelihood by 2040

RISKS OF EXTREME COLD IN BRENT

Infrastructure

Extreme cold temperatures are usually accompanied by snow and/or ice which can have a substantive impact on the transport infrastructure in local areas. There is a greater risk of traffic accidents, plus disruption and delays across major rail networks which can impact on the delivery of services or amenities being provided within local areas. Utilities can be affected, through the potential risks of burst mains water pipes in particular due to water freezing and expanding within the pipe, and therefore impacting on water supply and an increased likelihood of repairs call-outs. Power infrastructure and internet problems can also be affected by cold weather snaps, potentially affecting thousands of consumers.

Public Health

Extreme cold will continue to represent the biggest weather-related cause of mortality. 13% of households in Brent suffer from fuel poverty. The physical impacts of living in a cold home are causing acute suffering for many residents, with children living in cold, damp and mouldy homes almost three times more likely to suffer from respiratory illnesses. This can not only affect children physically, but educationally; adversely impacting how children perform at school. Examples include increased school absence due to illness or children being unable to find a quiet and warm place to study. Falls and injuries from snow and ice also have direct effects on health.

Natural Environment

Extreme cold can also affect the natural environment. Of particular concern is the "fool's" or "false spring" trend, when a deceivingly warm, early spring is soon followed by a cold snap. Flowers and leaves' growth is stunted in colder conditions or killed in hard frost. Reduced plant growth means less carbon stored in vegetation, and more carbon dioxide in the atmosphere. Pollinators such as bees may not find enough nectar from plants, which could damage important initiatives like Brent's Bee Corridor. The partial or complete freezing of "blue spaces" such as the Brent Reservoir threatens frogs' and other amphibians' habitats, as well as some birds, who are unable to catch fish. Extreme cold can even impacting on farming and potentially drive up prices. This would disproportionately affect the estimated 33% of people living in poverty in our borough.

EXTREME COLD RESILIENCE ACTIONS

Action	Urgency Score
Provide a home energy advice service to support residents in need to keep their homes warm.	More action needed
Train frontline staff (including health and social care workers, housing officers) to recognise vulnerabilities during cold snaps.	Further Investigation
Work together with the Voluntary and Community Sector, the Department for Health and Social Care and the National Health Service in identifying vulnerable people, planning, and delivering the best outcomes possible during extreme cold.	Further Investigation
Consider developing a SWIMS (Severe Weather Impacts Monitoring System) model for Brent.	Further Investigation
Review the distribution of Cold Weather Alerts in Brent to ensure that alerts reach those that need to take action. Actions should be clear for key organisations and based on Cold Weather Plan best practice.	Further Investigation
Follow the Cold Weather Plan in the event of extreme cold events.	Sustain current action

8 WHAT ACTIONS CAN RESIDENTS AND BUSINESSES TAKE TO MAKE BRENT A MORE RESILIENT BOROUGH?

Flooding

- If you have a garden, ensure your gutters and down spouts are working and clear to help direct rain water from your roof to your garden.
- Build a rain garden in outside spaces. Plant resilient native plants with deep roots which can soak up water runoff, and add a berm (a type or barriers) around the edge of the garden so that water is contained during heavy rain.
- Check your lawn is level to avoid puddles forming.
- If you have a paved outdoor space, add some plants in pots where possible: these still assist with the absorption of water in heavy downpour.
- Consider making your home or business more flood proof if you can: use resistant solutions like steel skirting boards, solid flooring, door and window guards and temporary flood barriers.
- Ensure your roof is in good repair to protect your home or business from heavy rainwater: check for loose tiles at least once a year and after extreme weather events.
- If you have a hard outdoor surface, try swapping to loose stone or gravel for parking spaces, or decking for patios, to make it easier for water to soak throughthe ground.

Extreme Heat

- Contact the council and volunteer your business to become a "cool space" where residents who live in homes which are at risk of overheating can come in to temporarily cool down.
- If possible, ensure your home or building is insulated to a high standard. Opt for double or triple glazing with shading (like a tinted window, curtains, or a tree or shutters outside).
- Try and use energy efficient appliances.
- Green your garden to provide more shade in case of heatwaves.
- Use reflective paint on external walls and roofs or consider planting a green roof to help counter the urban heat island effect.
- Volunteer to join a local community garden project like the Harlesden Town Garden to improve the quality of Brent's green spaces and help mitigate carbon emissions.
- During a heatwave, avoid extreme physical exertion and wear light, loose-fitting cotton clothes.

Drought and Water Shortages

- Consider installing water butts at the base of your down spout if you have a garden to capture any rainwater in advance to be used for watering during periods of drought.

- Contact your water provider to get a water meter installed for free: this smart monitoring device will help you be more efficient with your water usage, whilst also providing you a way to save money each month!

- Never pour water away unless you have no other use for it – you could use it to water plants for example.

- Use an ultra-low-flow showerhead and try timing your showers! You'll be surprised how long you spend in there – challenge yourself to be quicker every time.

- Let your lawn grow – longer grass allows roots to grow deeper and keep more soil moisture, requiring less watering.

- Only use your washing machine when it is full and set it on the "eco" function, or select a fast wash.

- Add a bird bath or bowls of fresh water in an outdoor space to provide relief for birds, insects and hedgehogs, who will be suffering.

Extreme Cold

- Make the most of the grit bins situated around the borough to grit your road or footway if the council has not already done so. This will help reduce the amount of slips and falls on snow and ice.

- Consider installing pipe insulation to avoid the possibility of your pipes freezing.

- Try and keep a consistent temperature of around 21ºC in the day and 18 ºC at night.

- If you are too cold, use a hot water bottle or electric blanket to keep you warm – but never together, as there is a risk of electrocution.

- Stay home if you can to avoid travelling on roads where the risk of accidents is higher. If you have a business and you are able to, minimise the amount of people who need to come to work and encourage working from home.

- Bring any potted plants indoors to protect them from frost.

- If you have a garden, water it in the morning when there is a risk of frost – the wet soil absorbs heat and has an insulation effect.

Do you need this information in another language or reading format such as Braille or large print?

If so, please contact:
climateemergency@brent.gov.uk

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