Nature and the City

Policy Exchange

Policies to enhance access to nature in cities

William Nicolle

Foreword by Tony Juniper CBE

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Foreword

By Tony Juniper CBE

Ever since the first conservation pioneers set out to protect the natural world more than a century ago, the emphasis in most efforts to halt the loss of wildlife and wild spaces has been in rural areas, wilderness and those places that had avoided the worst impacts of human pressures. During the 1980s, however, some conservation leaders began to initiate urban wildlife projects, blazing a trail that today brings us to a new realization that steps to achieve Nature recovery must not only embrace work to sustain the rare and remote, but also the familiar and nearby, including where most of us live: in towns and cities.

The reasons for this are several-fold. One is the founding motivation for conservation action, for Nature itself, and predicated on the fact that some species are dependent on effective action in urban areas, such as House Sparrows, Swifts and Hedgehogs, all of which have declined significantly, and all of which need to do well in towns and cities to do well overall. Another is for the benefits that accrue to people through access to wildlife-rich natural areas. A vast body of evidence reveals how time outside in green spaces is beneficial for both physical and psychological health, and that this effect is disproportionately positive among socially disadvantaged groups.

On top of this are other benefits that can be derived from more natural areas in urban environments, including how design for sustainable drainage, such as natural wetlands and lakes, can reduce flood risk and the effect of trees in ameliorating the urban heat island effect, both of which are being exacerbated by climate change. Blending this kind of green and blue infrastructure into the urban fabric can bring wider economic upsides too, for example encouraging inward investment and enhancing property values.

Intelligent design can combine all three of these broad values – for wildlife, public health and practical and economic benefit, so long as integrated approaches are taken. And this is where the biggest challenge to my mind lies, in finding the ways to combine new housing, infrastructure and industrial capability with the recovery of Nature, while also doing that in the existing built environments, for example through enhancing green corridors by rivers and canals, creating wilder areas in parks, and harnessing the vast area of urban gardens to grow and sustain wildlife populations.

Fortunately, we have some potentially powerful avenues along which to pursue this work. These include the goal in the Government's 25 Year Environment Plan to establish a Nature Recovery Network, creating

habitats and connecting up wildlife-rich places. This will in turn in large part be facilitated through the Local Nature Recovery Strategies, and a new spatial planning framework mandated through the 2021 Environment Act. It is to be hoped that any reforms to the planning system that follow recent consultation will be firmly combined with these ambitions, to the point where they are one and the same thing, with the recovery of Nature being planned *as part of* wider future urban future, rather than an afterthought, or worse still being seen as a 'green issue' that gets in the way of development.

There is much to be gained if we can get this right: urban environments that are healthy and resilient, attractive and diverse, great places to live and work, the kind of places that people wish to spend time and bring up families. Glimpses of what can be done can be seen across England, Europe and the World, and now the task is to cement a vision and to reflect that in policy and practice.

As we plan responses to the combined Nature and climate change emergencies, I very much hope this Policy Exchange report will inspire the kind of reflection and action fit for our times, leading to outcomes that benefit both people and wildlife.

Tony Juniper CBE is the Chair of Natural England.

Executive Summary

As part of the 25 Year Environment Plan, the Government's long-term strategy for improving the environment in England, DEFRA is creating a suite of 66 metrics to monitor progress against its goals. One of these goals is focused on improving access to nature: "making sure that there are high quality, accessible, natural spaces close to where people live and work, particularly in urban areas".[1]

Nearly four years on from the publication of the 25 Year Environment Plan, DEFRA is yet to finalise all of its metrics for tracking access to nature.[2] At the same time, a window of opportunity has opened for policy to drive urban greening through the Government's generational reforms to England's environmental and planning policy frameworks. This report sets out the case for enhancing access to nature in and around urban areas in England, presenting a series of credible policy ideas to reverse the decline of greenspace in England's towns and cities and realise the 25 Year Environment Plan's ambitions to ensure everyone can engage with nature near to where they live.

What is access to nature?

Access to nature is defined in a wide range of ways; some studies focus on the subjective elements of interacting with nature, based on polling data of people's experiences, while others use one or a set of quantitative metrics to measure access, such as the average walking distance to a park.

Broadly, there are two sides to the "access to nature" coin:

- **Quantity,** referring to how easily people can interact with nature. This is typically expressed through several different quantitative metrics focused on people's contact with or exposure to nature. The most common metric used is walking distance to green space, which provides an idea of how easily people can access greenspace. Another common metric is the number of people per area of green space in an area, providing an idea of the demands on a local greenspace. Dense urban areas tend to perform worse on these metrics, due to low levels of publicly accessible greenspace compared to the number of people accessing them. A recent Friends of the Earth study defined access to nature based on a graded system of how long residents had to walk to access at least two hectares (Ha) of open green space, which is the standard recommended by Natural England.[3]

1. HM Gov (2018). *A Green Future: Our 25 Year Plan to Improve the Environment*. Page 28 (Link); see DEFRA (June 2021). *Outcome Indicator Framework for the 25 Year Environment Plan: June 2021 Update: Enhancement of Green/Blue Infrastructure: Readiness and links to data*. Pages 120 – 121 (Link, Link).
2. DEFRA recently published an interactive *Outcome Indicator Framework* in October 2021 as part of the 25 Year Environment Plan (Link). Some of the indicators are finalised, whereas others in "interim" or "in development".
3. Friends of the Earth (2020). *England's green space gap*. Page 8 [note: this is the page of the PDF, as no page numbers are included in the report] (Link); Note: Friends of the Earth acknowledge in their report that their analysis does not reflect the quality of green space owing to data limitations.

- **Quality,** referring to the value of people's subjective enjoyment of interacting with nature, defined by things like emotional connection to nature and how nature contributes to a sense of place. Due to its subjective nature, evidence for the quality of access tends to be captured through surveys of the public's self-reported interaction with nature. Our research finds that high quality interactions with nature depend on two things: the condition of greenspace, which is a measure of how valuable existing greenspace is to residents, and ecological quality. Metrics that track ecological quality tend to use the general biological diversity and habitat quality of an area as a proxy for the value of nature. Natural England's "*Monitor of Engagement with the Natural Environment*" is based on the concept of 'nature connectedness' which is comprised of five 'pathways' to nature: contact (e.g. visit frequency), emotion, compassion, meaning and beauty.[4]

Enhancing access to nature is therefore about enhancing the quantity *and* quality of natural infrastructure (Box 1) by making it easy for people to interact with nature close to where they live and to maximise the value of these interactions by ensuring urban natures meet people's needs.

Box 1: What is 'natural infrastructure'?

Natural infrastructure is an umbrella term that refers to planned networks of green and blue features in urban areas that make up part of the urban fabric. They tend to include a mixture of vegetation (green), water (blue), and manmade materials like concrete. They are commonly described as 'multifunctional' because they are included in development projects for their multiple purposes, such as providing recreational/cultural value as well as benefitting wildlife. Other names for natural infrastructure include green/blue infrastructure, nature-based solutions and natural capital.

Green natural infrastructure includes green roofs and walls, grassed areas in parks, and street trees. Blue natural infrastructure can include ponds, fountains, and drainage systems. Some natural infrastructure includes blue and green elements, such as sustainable drainage systems (SuDS), which use green vegetation to manage water quantity (flooding) and quality (pollution).

Natural infrastructure is included in projects because it provides a range of benefits that non-natural infrastructure (e.g. buildings made out of concrete) cannot provide. These are often referred to as 'ecosystem services', and the value of these services is determined by the quantity and quality of natural infrastructure. The services natural infrastructure provides are highest where the specific benefits that a piece of natural infrastructure provides are matched to demand. For instance, including high quality, biodiverse SuDS in flood-prone urban areas maximises the benefits SuDS provides.

The value of enhancing access to nature can be usefully categorised into benefits for society and benefits for nature (Table 1 and Table 2). Fundamentally, natural infrastructure in urban areas needs to meet the needs of residents to benefit society, because competition for land in

4. Natural England (2020). *A summary report on nature connectedness among adults and children in England.* Page 7 (Link); Ryan Lumber et al (2017). *Beyond knowing nature: Contact, emotion, compassion, meaning and beauty are the pathways to nature connection. PloS One,* 12(5) (Link).

urban areas is high. This means that natural infrastructure is not necessarily just installed to benefit nature, unlike in rural areas where there is more space and lower opportunity cost to make space for nature. Yet, there are clear additional benefits for nature through including more natural infrastructure in urban areas, primarily through creating more habitat in urban areas where existing habitat baselines are low.

Table 1. The value of enhancing access to nature: Benefits for society.

Benefit	Description
Mental and physical health improvements	Survey evidence suggests that mental health benefits significant mental health benefits are gained after engaging with nature for at least 120 minutes. Interestingly, the results suggest it does not matter how people interact with nature - either in one 120-minute block or sporadically throughout the week – or what type of nature they interact with.
Recreational, social & cultural	There is good evidence that well-managed communal gardens lead to measurably higher levels of neighbourliness and community awareness, at least in well-off areas.
Carbon storage	Urban woodland makes up around 7.5% of all UK woodland, absorbing 1.3 million tonnes of CO_2 a year. A study based on four neighbourhoods in Merseyside found that a neighbourhood with 0.3% canopy cover stored around 0.5 tonnes of carbon dioxide per hectare (t/CO_2/Ha), but this rose to 17 t/CO_2/Ha with just over 10% canopy cover.
Lowered flood risk	The number of people exposed to frequent flooding (1 flood every 75 years) in urban areas throughout the UK is estimated to rise from around 1.4 million today to between 2.3 – 3.1 million by 2050. Sustainable Urban Drainage Systems (SuDS) can reduce flood risk. In England, SuDS schemes are around 5% of development area, and a recent study in London conservatively estimated that for every £1 invested in SuDS on a borough level, £3.80 worth of flooding-related benefits are created.
Heat mitigation	There is a small chance that some urban areas may experience temperature extremes above 40°C by 2040. A study estimated that in Manchester increasing the cover of green natural infrastructure to 10% could result in temperature reductions of 2.5°C under a high emissions scenario. The ONS estimates that the benefits of green natural infrastructure across 11 city regions in the UK leads to £300 million in benefits, stemming from avoided productivity losses and reduced cooling costs.

Source: Policy Exchange analysis

Table 2. The value of enhancing access to nature: Benefits for nature.

Benefit	Description
More habitat	Natural infrastructure can create habitat in underutilised spaces, such as on walls, roofs or roadsides. This uses urban space efficiently, creating more space for nature without detracting from the amount of urban space which society uses for itself for infrastructure, roads, shops, houses and more.
Bigger habitat	Large parks are unlikely to be included in dense urban areas, given the high competition for land, but pockets of publicly accessible greenspace are commonly created as part of developments in dense urban areas under Section 106 agreements, which are conditions local authorities attach to planning consents. These create bigger spaces for nature, complementing smaller slices of natural infrastructure like green walls which provide as much habitat for nature as possible without detracting from urbanisation.
Better habitat	High densities of people and some economic activities create fluxes of pollution, putting pressures on urban habitat quality and wildlife. Creating better spaces for nature involves managing existing natural infrastructure sensitively, while ensuring it still delivers its function.
Joined up habitat	England's natural environment is increasingly fragmented, which can at the extremes reduce biodiversity levels by 75%. Connectivity can be promoted in urban environments via coordinating natural infrastructure. Recent ideas include lining streets with trees to create 'green corridors' and creating centralised databases of city-wide natural infrastructure. The idea is to join existing habitats with new ones, and allowing wildlife to move more easily throughout towns and cities.

Source: Policy Exchange analysis

Current trends

Despite the benefits of having higher levels of access to natural infrastructure, our research suggests that access to nature is deteriorating in terms of quantity and quality.

In terms of quantity, the clearest analysis of trends in urban greenspace over time was undertaken by environmental research consultancy ADAS for the Climate Change Committee. They estimate that greenspace has declined in England's urban areas from 63% in 2001 to 55% in 2018.[5] Most other analyses using measures that focus on the quantitative aspects of access to nature are difficult to compare because they use different methodologies. For example, different analyses may use unlike definitions of what is urban and what counts as natural infrastructure. However, most analyses tend to show a downward trend in access to nature over time.

The distribution of existing greenspace is also important to consider. Natural infrastructure is most valuable when the most people benefit from its services, which is why groups of analyses measure access to nature by looking at people's proximity to greenspace. For instance, the average walking distance to a public greenspace in London (400m) is at least three times shorter than in the urban areas of the South West, the East of

5. Charles Ffoulkes et al (2019). *Research to update the evidence base for indicators of climate-related risks and actions in England*, Page 13 (Link); Note: the authors also include the results for an updated method for mapping urban green space. This is excluded here because it only includes data for 2016 and 2018, but the trends are likely to be the same.

England and the East Midlands. London's urban greenspaces on average serve 40% more people than the urban greenspace in England, which equates to around 7,000 more people per urban greenspace. Notably, access to private gardens is also the lowest in London, with over double the proportion of households in London lacking access to private gardens than the average for Great Britain (25% vs. 12%).[6]

Indeed, proximity to greenspace is important because most people's engagements with nature occur locally: According to Natural England, in 2019, 44% of all engagements with nature in England happened within 2 miles of the home, with over two thirds of these trips occurring within 1 mile of the home.[7]

Access to nature has been shown by multiple studies to vary by measures of deprivation, ethnicity and income. These differences are likely to be driven by multiple factors. For instance, if ethnic minorities are likely to be younger, and live in denser urban areas like inner London, as well as be in lower socioeconomic groups, then the association above is clearly more complicated than the two factors alone suggest.[8]

In terms of quality, higher levels of biodiversity and wildlife are generally reported as increasing the quality of peoples' interactions with nature. For instance, in Natural England's long-running survey, *Monitor of Engagement with the Natural Environment*, 'wildlife watching' received the most positive results out of all the interactions people had with nature, including running, eating out and playing with children.[9]

However, existing evidence suggests that many urban species are not thriving. For instance, urban specialists, which are species that do particularly well in the built environment, are good indicators of general urban biodiversity levels. Urban specialist birds are a particularly good indicator here, because good quality and long-term datasets exist on their populations and lots is known about their ecology and the pressures facing them.[10] Since 1994, a number of these species have experienced declines in biodiversity of at least 15%.[11] Swift populations have declined by almost 60%.

Some iconic species are particularly useful for enhancing access to nature because people tend to value them more than other species. Many of these 'charismatic' species are declining in urban areas, such as hedgehogs and grey squirrels which have falls in their abundances of around 25% and 10% respectively since the early 2000s. Notably, other urban species are enjoying population growth, such as badgers and roe deer.

Insects are an important component of urban wildlife, helping to sustain plant life and acting as a food source for other wildlife. There is little evidence on the general trends in urban insect populations, although a government indicator of pollinator observations within in 1km grid squares throughout the UK shows that pollinators were recorded in 30% fewer grid squares times between 1980 and 2017.[12]

Improving the quality of river water in England is also a key way to improve access to nature, but progress has flatlined over the last decade. The levels of some pollutants have notably reduced; for instance, since 1995,

6. ONS (2020). *One in eight British households has no garden* (Link); Note: The ONS' data on access to private gardens is not readily available for only urban areas.
7. Natural England (2020). *People's engagement with nature: summary storyboard: 'on our doorstep'* (Link).
8. ONE (2020). *Access to garden space: England* (Link)
9. Natural England (2019). *Monitor of engagement with the Natural Environment – The national survey on people and the natural environment: Headline report 2019.* Page 14, Figure 15 (Link).
10. Environment Agency, Chief Scientist's Group (2021). *The state of the environment: the urban environment.* Page 10 – 11 (Link).
11. Environment Agency, Chief Scientist's Group (2021). *The state of the environment: the urban environment.* Page 11 (Link).
12. Joint Nature Conservation Committee (2020). *UK Biodiversity Indicators 2020: Indicator D1c* (Link).

ammonia levels have fallen 70%, and health-harming metals like copper, lead, cadmium and mercury have all been reduced, the last two by 50% since 2008.[13] However, only 16% of England's rivers meet the EU's Water Framework Directive's label of 'good ecological status', a test decided by 11 different descriptors. Indeed, pollution levels are rising according to other metrics, notably for nitrogen (primarily from agricultural fertiliser use) and sewerage spill incidents.[14]

As part of this report, we commissioned a poll of the UK public to explore how people's engagement with nature has changed over the recent lockdowns, and their views on the future of urban greening.

Our polling found three main trends (Figure 1).

Figure 1. Main trends in our polling.

1	Lockdowns up to Spring 2021 have increased the value people attach to nature, although parks are being used less.	62% value nature more in their local area more since the public lockdowns. People reported using parks less over lockdown, e.g. 9% rise in the number of people 'never' using parks over the past year. Out of the pairs of images included in our visual preference survey, 78% of people prefer greened buildings and streets (seven pairs of images) and 57% prefer wilder parks and verges (two pairs).
2	Urban greening is a popular way to improve the attractiveness of urban areas, with some forms of natural infrastructure being more popular than others.	Greening urban areas were chosen as the 3rd and 4th most common priorities out of 12 for improving local urban areas People prefer dedicated park spaces and natural water features over more dispersed street furniture.
3	Public bodies should take a strong lead in greening England's towns and cities.	41% of the public think Local Authorities should take the lead on urban greening. 31% think a mixture of organisations (eg private sector, residents) should also be responsible.

Source: Policy Exchange analysis of polling results.

Current window of opportunity

As we recover from COVID-19, there is a unique political and policy opportunity to implement ambitious reforms to green England's urban areas.

Politically, the impact of COVID-19 has increased support for greening urban areas. Our polling suggests this self-reported growth in support for urban nature is driven by consecutive lockdowns, which deprived people of regular interaction with nature, especially the 12% of households in Britain that lack access to a garden.[15]

A unique policy opportunity is opening up to reverse the decline in England's urban greenspace through the Government's reforms to England's planning and environmental frameworks. Urban greening sits between the planning and environmental policy: the planning system drives how urban areas develop through plans, design guides and consents, while environmental policies and regulations shape this process

13. Sir James Bevan (2020). *The state of our waters: the facts* (Link).
14. DEFRA (2021). *Latest water classifications results published* (Link); Rob England (2021). *Water pollution causing 'death by a thousand cuts' for rivers'.* BBC News (Link).
15. ONS (2020). *One in eight British households has no garden* (Link).

to ensure it promotes greening via tools like protecting threatened species and habitats. The confluence of major reforms in both areas - ongoing planning reforms and the recently-passed Environment Act 2021 - creates a rare opportunity to ensure future urbanisation promotes greater access to nature.[16]

However, by themselves, both programs of reform are likely to have limited impacts on access to nature in urban areas. Many of the Government's policies are incentive-based, such as grants for environmentally-beneficial activities like tree planting. While these can be important as part of a suite of policies for improving access to the environment, they tend to lack certainty and act as substitutes for more concrete actions rooted in regulation. In fairness, the Government is putting some policies on a statutory footing, notably biodiversity net gain and Nature Recovery Networks, but both these policies show limited potential for enhancing biodiversity in urban areas themselves, instead incentivising improvements outside of towns and cities where access to nature is naturally higher.

There is therefore a risk that urban areas fall through the cracks in the Government's reforms. Given the combination of strong public support for urban greening and the confluence of reforms to England's planning and environmental frameworks, there is a clear window for plugging these gaps during this Parliament.

Policy recommendations

Our recommendations are informed by the three principles (Figure 2), which blend the Lawton Review's emphasis on improving outcomes for wildlife with the idea that urban natural infrastructure should be designed around the needs of society.

Figure 2. Recommended policy principles for enhancing access to nature.

16. On 10th November 2021 the Environment Act became law (Link).

Our recommendations fall into five themes:

Theme #1: Where access to nature is low, mandate Local Authorities to improve it.

Recommendation 1.1: Where access to nature is low, mandate Local Authorities to adopt Urban Greening Factors through the National Planning Policy Framework.

Theme #2: Strengthen the role of nature in urban design:

Recommendation 2.1: The Government should strengthen the National Model Design Code to strengthen the role of nature in Local Design Guides.

Recommendation 2.2: The Government should begin a blitz behavioural campaign to encourage people in urban areas to green private property.

Theme #3: DEFRA should take an explicit lead driving Local Authority-led urban greening:

Recommendation 3.1: Produce statutory guidance for Local Authorities on how to manage public land to promote urban greening.

Recommendation 3.2: Establish a league table of Urban Greening and an associated place-based accreditation scheme for Nature Recovery Cities.

Theme #4: Where appropriate, Local Authorities should provide communities with more autonomy over local public land.

Recommendation 4.1: Where appropriate, Local Authorities should provide communities with more autonomy over local public land.

Theme #5: Government should initiate quick wins now to ensure that the post-COVID recovery is as green as possible:

Recommendation 5.1: Mandate swift and bee bricks in all suitable new build residential homes in England.

Recommendation 5.2: All Local Authorities should introduce a 'green flat roof obligation' in urban areas.

Recommendation 5.3: Mandate Local Authorities to adopt canopy cover targets.

Recommendation 5.4: Ringfence 5% of Stamp Duty Land Tax (SLDT) for investment in local urban greening.

Recommendation 5.5: Introduce 'Wildbelts' as a land use category.

Recommendation 5.6: Kick start rewilding in National Parks via strengthened National Park Management Plans.

Introduction

> *"If we concentrate our attention solely upon the city, seeing in it the ultimate symbol of "man's" conquest of "nature", we miss the extent to which the city's inhabitants continue to rely as much on the nonhuman world as they do on each other"*
>
> Environmental historian William Cronon in *Nature's Metropolis: Chicago and the Great West* (1991)

Chicago is one of Midwestern America's most expansive cities, covering around a third of the built-up area of Greater London.[17] As the historian William Cronon traces, Chicago's expansion from a small settler town in the late 18th Century to its modern-day form was only possible thanks to its relationship with nature. Its thriving grain, lumber and timber industries and accessible geography allowed settlers to transform what Cronon calls 'first natures' – the pristine, untouched environment, ranging from primary forests to large wildlife – into economic growth, fuelling the cities expansion.

Modern Chicago is becoming less visibly 'natural' as it densifies, but its growth as a city is still equally driven by ecological processes. Although pristine forests have long disappeared around the central districts of Chicago, Cronon argues its growth is still fuelled by distant 'first natures' through trade, which link it to distant countryside. The city's development is also increasingly dependent human-created environments within the city boundaries, such as parks, waterways, verges and more. Cronon terms these 'second natures', because they are less obviously 'natural' environments, yet they continue to act underpin the city. They perform a different role to the first natures the colonisers used to grow Chicago, such as by providing space for residents to unwind, rather than raw material to be traded. Yet, as will be outlined in this report, these second natures are nonetheless central to the functioning of the city's economic, social and cultural activities.

Cronon's work is highly relevant to England's modern urban areas, in which natural habitats and wildlife are becoming a less common feature of everyday life. Regardless of where they are geographically located, thriving urban areas dependent on the natural world within and beyond their boundaries. This report provides a series of policy ideas aimed at enhancing access to nature in urban areas throughout England. The rest of this section outlines what access to nature is and why it is important, and Section 2 outlines the current trends in access to nature. Section 3 outlines the current window of opportunity created by the Government's once-

17. Chicago city area = 234 sq miles (2020) vs. London Built Up Area = 671 sq miles (2011); United States Census Bureau (2020). *2019 US Gazetteer Files* (Link); Office for National Statistics (2011). *2011 Census – Built-up Areas* (Link).

in-a-generation reforms to the country's planning and environmental frameworks. Finally, Section 4 outlines new policy ideas to act on this opportunity, in turn fleshing out what 'Building Back Better' from the COVID-19 pandemic could look like in practice. This report refers to elements of the natural world that provide society with clear value as 'natural infrastructure'.

1. Access to nature

What is access to nature?

A challenge for defining access to nature is the sheer breadth of definitions used. Some analyses use a high level, more qualitative definition. For instance, Natural England's *Monitor of Engagement with the Natural Environment* is based on the concept of 'nature connectedness' which is comprised of five 'pathways' to nature: contact (e.g. visit frequency), emotion, compassion, meaning and beauty.[18] Other analyses use one or more quantitative metrics, based on how easily people can interact with nature, such as a recent Friends of the Earth study which defined access to nature based on whether urban residents were within five minutes' walk from at least two hectares (Ha) of open green space, the minimum standard recommended by Natural England.[19]

As part of the Government's 25 *Year Environment Plan*, DEFRA is creating a suite of metrics to monitor progress towards the Plan's goals. One of the 25 *Year Environment Plan's* goals specifically relates to access to nature: "making sure that there are high quality, accessible, natural spaces close to where people live and work, particularly in urban areas".[20] However, some of the indicators to monitor this goal are still not finalised.[21]

Access to nature defies definition in a single metric, and it is therefore best to understand it through broad ideas of quantity and quality:

- **Quantity of access** refers to how easily people can interact with nature. This is typically expressed through several different quantitative metrics focused on people's contact with or exposure to nature. The most common metric used is walking distance to green space, which provides an idea of how easily people can access greenspace. Another common metric is the number of people per area of green space in an area, providing an idea of the demands on a local greenspace. Dense urban areas tend to perform worse on these metrics, due to low levels of publicly accessible greenspace compared to the number of people accessing them.
- **Quality of access** refers to the value of people's subjective enjoyment of interacting with nature, defined by things like emotional connection to nature and how nature contributes to a sense of place. Due to its subjective nature, evidence for the quality of access tends to be captured through surveys of the public's self-reported interaction with nature. Our research finds that high quality interactions with nature depend on two things:

18. Natural England (2020). *A summary report on nature connectedness among adults and children in England.* Page 7 (Link); Ryan Lumber et al (2017). *Beyond knowing nature: Contact, emotion, compassion, meaning and beauty are the pathways to nature connection. PloS One,* 12(5) (Link).

19. Friends of the Earth (2020). *England's green space gap.* Page 8 [note: this is the page of the PDF, as no page numbers are included in the report] (Link); Note: Friends of the Earth acknowledge in their report that their analysis does not reflect the quality of green space owing to data limitations.

20. HM Gov (2018). *A Green Future: Our 25 Year Plan to Improve the Environment.* Page 28 (Link).

21. DEFRA (June 2021). *Outcome Indicator Framework for the 25 Year Environment Plan: June 2021 Update.*

Pages 120 – 121 (Link).

> the condition of greenspace, which is a measure of how valuable existing greenspace is to residents, and ecological quality, which tend to use the general biological diversity and habitat quality of an area as a proxy for the value of nature.. Indeed, several different voluntary standards are attempting to define quality, such as the Green Flag Award (a scheme for well managed parks), Building with Nature (a set of green infrastructure standards for development), and the Place Standard Tool (framework to assess the physical and social aspects of place).[22]

Notably, what 'good' access to nature looks like tends to be locally defined. For instance, green roofs and sky gardens may benefit those that have physical access to them, but they provide limited amenity value to pedestrians on the street. Further, natural infrastructure that provides lots of value to residents on one street may be an entirely inappropriate intervention on the next. While green walls can be pragmatic ways to regreen dense highstreets, they are rarely the most efficient way to green less dense residential areas.

Why is access to nature valuable?

This section outlines the benefits natural infrastructure provides urban residents as well as urban areas, which can be usefully divided into benefits for society and benefits for nature. Some forms of value stem from people directly interacting with nature, such as the multiple benefits that accessible parks create for residents/ Others forms of value are more indirect, created as by-products of enhancing access to nature, such as lowering flood risk through more vegetated surfaces. Our research highlighted that maximising the value of natural infrastructure is highly dependent on local circumstances; paying attention to what kinds of natural infrastructure are locally suitable is important to ensuring the right kind of natural infrastructure is invested in.

Benefits for society

Incorporating natural infrastructure into towns and cities provides a number of important benefits for people. These benefits primarily accrue residents, as the people that are exposed to natural infrastructure in their local area on a daily basis. However, the benefits can be broader, spilling over to those passing through and visiting places through natural infrastructures contribution to quality place-making, as well as society at large via its contributions to broader regional trends, such as enhancing biodiversity and reducing catchment-scale flood risk. These benefits include:

#1: Mental and physical health improvements: There is a clear evidence base on the relationship between natural infrastructure and better physical and mental health outcomes.[23]

- Multiple meta-analyses find high levels of self-reported physical

22. Public Health England (2020). *Improving access to greenspace: a new review for 2020.* Page 25 (Link).

23. Public Health England (2020). *Improving access to green space: A new review for 2020.* Pages 21 – 23 (Link); Jules Pretty et al (2016). *Improving health and well-being independently of GDP: dividends of greener and prosocial economies.* Int. J. Environ Health Res 26(1): 11 – 36 (Link).

health in greener areas, based on both the quality and quantity of greenspace.[24] Studies have found positive associations between greenspace and physical conditions such as heart rate, blood pressure, cholesterol levels, type 2 diabetes and birth weight.[25]

- In terms of mental health, people living in greener areas tend to report that they have a much better state of mind, owing to lower levels of stress and anxiety, and greater resilience to swings in emotions.[26] The mental benefits depend on someone's age: in children and young people, the benefits partly depend on a child's developmental state and the type and accessibility of greenspace; in adults, additional factors like gender and exercise behaviours also shape the mental health benefits of natural infrastructure.[27] Analysis of Natural England's long-running *Monitor of Engagement with the Natural Environment* survey suggests that people experience high levels of mental health benefits after at least 120 minutes of engagement with nature a week. Interestingly, people reported strong mental health benefits regardless of how they interacted with nature - either in one 120-minute block or sporadically throughout the week – or the type of nature they interacted with.[28] This suggests that simply having more natural infrastructure provides mental health benefits, regardless of what kind of natural infrastructure it is.
- Many analyses also point to potentially large health cost savings through greater access to greenspace through avoided illness. For instance, Natural England has estimated that if everyone in the UK had good access to greenspace, the NHS could save £2.1bn through more people walking.[29] Notably, the exact level of savings is uncertain, given a lack of recent estimates, and there is high levels of uncertainty in the cause-effect assumptions at play, such as the amount of people that exercise more as a result of new greenspace. Notably, how much someone benefits varies substantially; for instance, for many health indicators, deprived urban area and certain ethnic groups benefit the most from new natural infrastructure.[30]

#2: Recreational, cultural and social value:

- The recreational, cultural and social value of natural infrastructure depends on sensitivity to place, integrating with local vernaculars and meeting the needs of local residents. As the Building Better, Building Beautiful Commission outlines, "green is good for us… but a strip of grass or a couple of trees cannot rescue a polluted, ugly and profoundly inhumane place".[31] For instance, there is some evidence that in dense urban areas greenery placed little and often is the most popular approach to greening, while in other areas large parks are more suitable.[32] Design is therefore integral to maximising the subjective elements of value that natural infrastructure provides. Indeed, 'bad' design can reduce

24. Caoimhe Twohig-Bennett and Andy Jones (2018). *The health benefits of the great outdoors: a systematic review and meta-analysis of greenspace exposure and health outcomes.* Environ. Res., 166: 628 – 637 (Link).
25. Ibid, Caoimhe Twohig-Bennett and Andy Jones (2018). *The health benefits of the great outdoors;* Peter James et al (2015). *A review of the health benefits of greenness.* Curr. Epidemi. Rep., 2(2): 131 – 142 (Link).
26. Michelle Kondo et al (2018). *Urban green space and its impact on human health.* Int. J. Environ. Res. Public. Health. 15(3): 445 (Link).
27. Ibid, Lovell et al (2020). *Rapid scoping review of health and wellbeing.* Page 27.
28. Mathew White et al (2019). *Spending at least 120 minutes a week in nature is associated with good health and wellbeing. Sci. Rep.* 9, 7730 (Link).
29. Natural England (2009). *Natural England Technical Information Note TIN055: An estimate of the economic and health value and cost effectiveness of the expanded WHI scheme 2009.* Table 7 (Link).
30. Rebecca Lovell et al (2020). *A rapid scoping review of health and wellbeing evidence for the Framework of Green Infrastructure Standards: 1st Edition September 2020.* Pages 9 – 11 (Link).
31. Building Better Building Beautiful Commission (2020). *Living with beauty: Promoting health, well-being and sustainable growth.* Page 105 (Link).
32. Nicholas Boys Smith (2016). *Heart in the right street.*

an effective sense of place, with studies showing that parks are less valued when users feel unsafe through dark corners or hidden spaces.[33]

- With the right combination of quality and quantity, natural infrastructure can help facilitate community and place building. For instance, there is good evidence that well-managed communal gardens lead to measurably higher levels of neighbourliness and community awareness, at least in well-off areas.[34] Green spaces enable social contact, reducing isolation. One Dutch study found that urban areas with less greenery were associated with a higher likelihood of people reporting they felt lonely and a perceived shortage of lacking social support.[35]

#3: Carbon storage:

- The potential for nature-based carbon storage is much larger in rural compared to urban areas, due to the availability and lower competition for land. However, there are still important opportunities to absorb carbon in urban areas, and the UK needs to take advantage of all the opportunities for nature-based solutions to meet its climate targets.[36] Street trees are particularly important; For instance, a study based on four neighbourhoods in Merseyside found that one neighbourhood with 0.3% canopy cover stored around 0.5 tonnes of carbon dioxide per hectare ($t/CO_2/Ha$), but this rose to 17 $t/CO_2/Ha$ with just over 10% canopy cover. Over the whole UK, urban woodland made up around 7.5% of all woodland in the UK in 2017, absorbing 1.3 million tonnes of CO_2 annually.[37]

#4: Lowering flood risk:

- Surface water flooding is expected to grow as climate change progresses. For instance, the number of people exposed to frequent flooding (1 flood every 75 years) in urban areas throughout the UK is estimated to rise from around 1.4 million today to between 2.3 – 3.1 million by 2050, with an associated increase in the flooding-related damages increasing from around £1.5bn today to between £1.9 - £2.2bn by 2050.[38]
- Natural infrastructure, such as water gardens and green roofs, is an important tool for reducing flood risk across urban areas and catchments. Natural Infrastructure that is installed specifically for its flood reduction qualities is typically referred to as a Sustainable Urban Drainage Systems ('SuDS'). In England, SuDS schemes are around 5% of development area.[39] Under the right conditions, a green roof can intercept 100% of incident rainfall.[40] Modelling conducted as part of another study suggests that with 10% of all roofs greened, a 2.7% reduction in overall storm water runoff can be achieved, as well as an average reduction in the rate of run-off per building of 54%.[41]

33. Linde Van Hecke et al (2018). *Public open space characteristics influencing adolescents' use and physical activity: A systematic review of qualitative and quantitative studies.* Health Place, 51:158 – 173 (Link).
34. Jamie Anderson (2015). *"Living in a communal garden" associated with well-being while reducing urban sprawl by 40%: a mixed-methods cross-sectional study.* Public Health (Link).
35. Terry Hartig et al. *Nature and health.* Annual Review of Public Health, 35: 207 – 228 (Link).
36. William Nicolle (2021). *Will history repeat itself on negative emissions?* Policy Exchange (Link).
37. Office for National Statistics (2019). *UK natural capital accounts: urban accounts* (Link).
38. Paul Sayers et al (2020). *Third UK Climate Change Risk Assessment (CCRA3) Future Flood Risk: Main Report.* Pages 61 – 62, Figures 7-7, 7-8 and 7-9 (Link); 'Urban areas' here includes urban cities and towns, urban minor conurbations and urban major conurbations.
39. Ibid, Sayers et al (2020). *CCRA3 Future Flood Risk: Main Report.* P35, Table 6-1, and P41 (Link).
40. Kathryn Brown and Ana Mijic (2019). *Grantham Institute Briefing paper no. 30: Integrating green and blue spaces into our cities: Making it happen.* Page 7 (Link).
41. Jeroen Mentens et al (2006). *Green roofs as a tool for solving the rainwater runoff problem in the urbanised 21st Century?* Landscape and Urban Planning, 77: 217 – 226 (Link).

- Notably, natural infrastructure is not a silver bullet for reducing flood risk. In some areas, flooding risk is too high to rely on green roofs alone, and hard infrastructure solutions are necessary. Retrofitting existing neighbourhoods with SuDS schemes can also be expensive. Nonetheless, natural infrastructure offers multiple benefits compared to hard infrastructure, such as enhancing biodiversity, and incorporating it in the design stage of development as part of a wider flood management strategy can reduce capital costs substantially. A recent study in London conservatively estimated that for every £1 invested in SuDS on a borough level, £3.80 worth of flooding-related benefits are created.[42] Indeed, SuDS are increasingly common in developments due to their favourability in planning decisions, with an estimated 50% of *new* developments in England incorporating SuDS.[43]

#4: Heat mitigation:

- Urban areas are typically warmer than the surrounding countryside due to the 'Urban Heat Island effect', driven by densification, heat given off from human activities, and smaller areas of greenspace. The Committee on Climate Change estimate that, due to this, there is a small chance that some urban areas may experience temperature extremes above 40°C by 2040.[44] This can lead to direct economic losses, such as rail infrastructure shutting down, as well as higher rates of heat-related mortality.[45]
- Natural infrastructure can have significant temperature regulation effects in urban areas, not only cooling down buildings in summer but warming them in winter. One study found that trees positioned next to buildings reduced internal summer temperatures by 6°C and raised winter temperatures by 6°C. They also led to a 26% fall in energy consumption, helping combat the expected future rise in urban energy consumption for air conditioning.[46] Although the exact level of cooling varies over the year and with the building, green roofs have been shown to reduce surface temperatures on retrofitted roofs by around 20°C, and green walls can reduce temperatures by 4-6°C in summer.[47]
- When scaled up, there are clear benefits across whole cities; one study estimated that in Manchester increasing the cover of green natural infrastructure to 10% could result in temperature reductions of 2.5°C under a high emissions scenario.[48] The ONS estimates that the benefits of green natural infrastructure across 11 city regions in the UK leads to £300 million in benefits, stemming from avoided productivity losses and reduced cooling costs.[49]

42. Juan Ossa-Moreno et al (2017). *Economic analysis of wider benefits to facilitate SuDS uptake in London, UK.* Sustainable Cities and Society, 28: 411 – 419, Table 5 (Link); the Benefit-Cost Ratio includes flood benefits only.
43. Ibid, Sayers et al (2020). *CCRA3 Future Flood Risk: Main Report.* P41 (Link).
44. The CCC (2021). *Independent Assessment of UK Climate Risk (CCRA3).* P48 (Link).
45. Charles Ffoulkes et al (2019). *Research to update the evidence base for indicators of climate-related risks and actions in England.* Pages 19-21 (rail infrastructure), 120 (heat-related deaths) (Link).
46. Ranko Bozovic et al (2017). *Blue Green Solutions. A Systems Approach to Sustainable, Resilient and Cost-Efficient Urban Development* (Link).
47. Susanne Charlesworth (2010). *A review of the adaptation and mitigation of global climate change using sustainable drainage in cities.* Journal of Water and Climate Change, volume 1 (3): 165-180 (Link); Kenneth Ip et al(2010), *Shading performance of a vertical deciduous climbing plant canopy.* Build. Environ., 45(1), 81–88 (Link).
48. Susannah Gill (2007), *Adapting cities for climate change: the role of the green infrastructure.* Built Environment, 33(1), 115-133 (Link).
49. Office for National Statistics (2019). *UK Natural Capital Accounts: 2019.* See Table 7 (Link).

#5: Air quality:

- The effect of natural infrastructure on air quality depends on using the right kind of natural infrastructure in the right situations.[50] For instance, hedges between pedestrians and traffic act as an effective barrier between people and tailpipe emissions, reducing exposure. Further, several studies find strong correlations between higher amounts of greenery and few cases of disease related to air pollution, such as lower asthma hospitalisations in areas with more greenery.[51]
- While there are clear win-wins, not all-natural infrastructure reduces air pollution. Several recent reviews of the relationship between natural infrastructure and air quality point out that the positive impacts of greenery are often overstated.[52] For instance, there is uncertainty around the benefits of green walls for air quality; a recent study found minimal differences between 12 green and adjacent non-green walls for air quality.[53] In some cases, natural infrastructure can make local air quality worse; if the canopy overhead in a polluted street is thick, it can slow down the dispersion of tail-pipe air pollutants by acting as a lid, allowing higher concentrations of air pollutants to build up at a street level.[54]

Natural infrastructure is therefore clearly valuable to society. Indeed, urban natural infrastructure is disproportionately valuable relative to the area it covers, because the high density of people increases the number of people receiving these benefits. Throughout our research, costs were frequently raised as a barrier to increasing these benefits (Box 2), but there is a strong case for public policy to promote more urban greening more extensively given the clear benefits that flow from natural infrastructure and that these benefits are received by a large number of people.

50. Rebecca Lovell et al (2020). *A rapid scoping review of health and wellbeing evidence for the Framework of Green Infrastructure Standards: 1st Edition September 2020.* Pages 14 (Link).
51. Ian Alcock et al (2017). *Land cover and air pollution are associated with asthma hospitalisations: A cross-sectional study*. Environment International, 109, 29-41 (Link).
52. Rebecca Lovell et al (2020). *A rapid scoping review of health and wellbeing evidence for the Framework of Green Infrastructure Standards: 1st Edition September 2020.* Pages 14 (Link).
53. Naomi Paull et al (2020). *Can green walls reduce outdoor ambient particulate matter, noise pollution and temperature?* Int. J. Environ. Res Public Health, 17(14): 5084 (Link).
54. Prof. Nick Hewitt et al (2019). *Using green infrastructure to improve urban air quality.* Ambio, 49: 62 – 73 (Link).

Box 2: The cost of natural infrastructure

Our research found that perceptions of the costs and benefits of natural infrastructure act as a barrier investing in it in urban areas in four ways.

Firstly, the benefits of natural infrastructure generally flow to a large number of people, rather than the person or entity installing it. The fact natural infrastructure tends to be a 'public good' creates little incentive for private developers to invest in it due to a perception that all the benefits do not flow to them. For instance, installing SuDS schemes reduces the flood risk for a whole street rather than a single property, despite the cost often being borne by a single development.

Secondly, the benefits of natural infrastructure tend to be unmonetizable. As outlined in this chapter, the benefits tend to be in terms of things which are difficult to attach a money value to, such as reduced flood risk and air pollution. While econometric studies can estimate the public value these services, the upfront costs remain daunting for cash-strapped Local Authorities when the investment generates uncertain direct returns. The same principle applies for private sector investment in natural infrastructure, which is mainly driven by the demands of planning consents. Notably, natural infrastructure can create some opportunities for revenue creation, such as greener commercial centres attracting more consumers, leading to more business for local shops. However, these effects are hard to attribute to the natural infrastructure itself. As such, the private investment case for natural infrastructure tends to be challenging, despite the high public benefits.

Thirdly, the costs and benefits of natural infrastructure vary significantly, particularly upfront costs. For instance, a recent review estimated that green roofs have a wide range in their upfront costs of between £40 - £530/m^2 dependent on the site.[55] Older buildings often necessitate roof reinforcement for 'intensive' green roofs with thick soils, so that the roof can bear the additional weight. In some instances, shallower green roofs with thinner soils can be used to avoid costly reinforcements to roofs, but these incur a trade-off of lower biodiversity and flood risk benefits. These wide variations apply to other natural infrastructure too; the CCC recently estimated that for every £1 invested in greenspaces and SuDS, around £0.80 - £2.80 is generated dependent on the site in question.[56] This variability means policies need to be careful to not overburden the private sector by mandating overly costly infrastructure. Rather, developers should be incentivised as much as possible to look for the most efficient opportunities for natural infrastructure.

Fourthly, our research highlighted that maintenance costs are perceived as a particular barrier. Green infrastructure requires more regular maintenance than grey infrastructure, such as to ensure vegetation is healthy on a seasonal basis, which is seen as an ongoing financial liability. A recent example can be found in Sheffield Council's contracting of tree maintenance to a private company, who reportedly viewed the trees as cheaper to chop down than maintain, sparking local protests.[57] The issue lies in the installers of natural infrastructure viewing it on an upfront cost basis, which only accounts for installation and possibly some short-term maintenance costs, rather than on a lifetime basis which accounts for full capital, maintenance and replacement costs.

These four factors create a strong case for public investment in natural infrastructure, because benefits tend to accrue to the public while the costs tend to be borne by a few. This is in line with the growing 'public money for public goods' principle, currently being implemented through England's new Environmental Land Management system.[58]

Our research found that the most efficient ways to fund natural infrastructure are those which use a mixture of sources based on local circumstances. Funding opportunities can range from commercial areas paying their way, such as London's Business Improvement Districts part-funding local natural infrastructure via a levy, government-backed loans and public grants, foundations and philanthropy, and involving local community groups in maintenance.[59]

55. Maria Manso et al (2021). *Green roof and green wall benefits and costs: A review of the quantitative evidence.* Renewable and Sustainable Energy Reviews, 135. Page 9, Figure 11 (Link).
56. Ibid, CCC (2021). *CCRA3.* Page 28, Figure 4 (Link).
57. Jess Clark (2018). Special report: Sheffield tree row. New Civil Engineer (Link); Sheffield City Council et al (2018). Joint Position Statement on Mediated Talks between Sheffield City Council, Amey, and the Steering Group for Sheffield Tree Action Groups (STAG SG) (Link).
58. DEFRA and the Rt Hon Michael Gove (2018). *Press release: Once-in-a-generation opportunity to shape future farming policy* (Link).
59. C40 Cities (undated). *Good Practice Guide: Cool Cities.* Page 9 (Link).

Benefits for nature

Urban areas face inherent challenges to improving their environments. A third of urban areas in England are classed as 'natural land cover', which includes parks, grassland, and other public green spaces, but most are too fragmented, small or of poor quality to support high levels of biodiversity.[60] The Lawton Review, which investigated how to improve England's wildlife and ecological networks in 2010, eloquently captured how to create better outcomes for nature through its simple conclusion: *more, bigger, better, and joined*:[61]

- **More:** While large parks are important to provide for larger habitats and to provide people space to unwind, they are unlikely to be introduced in the densest urban areas, where access to nature is lowest**.** Natural infrastructure overcomes this barrier by tending to use urban space efficiently by creating habitat in underutilised spaces, such as on walls, roofs or roadsides. These spaces are not the target of competition for land, such as for infrastructure, shops and offices. This creates *more* space for nature without detracting from the amount of urban space which society uses for itself.
- **Bigger:** Large parks are unlikely to be included in dense urban areas, given the high competition for land, but pockets of publicly accessible greenspace are commonly created as part of developments in dense urban areas under Section 106 agreements, which are conditions local authorities attach to planning consents. These create *bigger* spaces for nature, complementing smaller slices of natural infrastructure like green walls which provide as much habitat for nature as possible without detracting from urbanisation.
- **Better**: High densities of people and some economic activities create fluxes of pollution, putting pressures on urban habitat quality and wildlife. Creating *better* spaces for nature involves managing existing natural infrastructure sensitively, while ensuring it still delivers its function. For instance, footfall in parks can trample underlying vegetation, but managing specific areas to have lower or no footfall mitigates this. Additionally, new natural infrastructure is typically designed and managed to create high quality local habitat, creating *better* outcomes for local ecosystems.
- **Joined:** England's natural environment is increasingly fragmented, which can at the extremes reduce biodiversity levels by 75%.[62] Connectivity can be promoted in urban environments via coordinating natural infrastructure. Recent ideas include lining streets with trees to create "green corridors", and creating centralised databases of city-wide natural infrastructure to inform development of what type of natural infrastructure has highest local benefits.[63] Natural infrastructure can therefore create new links in urban ecological networks, *joining* existing habitats with new ones, and allowing wildlife to move more easily throughout towns and cities.

60. Environment Agency (2021). *The State of the environment: the state of the urban environment.* Page 8 (Link).

61. Prof. Sir John Lawton et al (2010). *Making space for Nature: A review of England's Wildlife Sites and Ecological Networks* (Link).

62. Prof. Partha Dasgupta highlighted this fact, taken from Nick Haddad et al (2015). *Habitat fragmentation and its lasting impact on Earth's ecosystems.* Science Advances, 1(2) (Link), in his evidence to the Environmental Audit Committee (2021). *Biodiversity in the UK: Bloom or Bust?*. Page 102 (Link).

63. Wild West End (2021). *London's green corridors set to expand* (Link); Greater London Authority (2019). *Green Infrastructure Focus Map* (Link).

Summary

When it is sensitive to local circumstance, enhancing access to natural infrastructure is highly beneficial for both society and nature. This includes making cities nicer places to live and increasing habitat connectedness, quality and availability for wildlife.

2. Current trends

England is one of the most built-up countries in Europe, with 8% of its land covered by urban areas and 80% of its population living in those areas.[64] Living in urban areas has clear benefits for society and residents, such as enough people in close proximity to sustain social and cultural activities, and an abundance of services being close by.

Yet these benefits come with trade-offs, which puts pressure on the natural infrastructure and the benefits it provides. For instance, high densities of people, transport and economic activity can create large flows of pollution which reduce the quality of natural infrastructure, such as waste and air and water pollutants. Due to such drivers, both the quantity and quality of a range of urban natural infrastructure have been falling in recent years.

Quantity

Most analyses people's access to nature through estimates of how the amount of greenspace has changed in urban areas over time. These estimates are difficult to compare based on using different methodologies, such as using different definitions of what is urban and what counts as natural infrastructure, but they all show a downward trend in access to nature over time.

Notably, by focusing on greenspace, these metrics tend to ignore small bits of natural infrastructure that are still valuable to urban residents, such as green walls. Alternative metrics can therefore help build a more nuanced picture of access to nature beyond holistic ideas of the quantity and distribution of greenspace (Box 3).

64. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1003854/The_state_of_the_environment_the_urban_environment.pdf, page 6

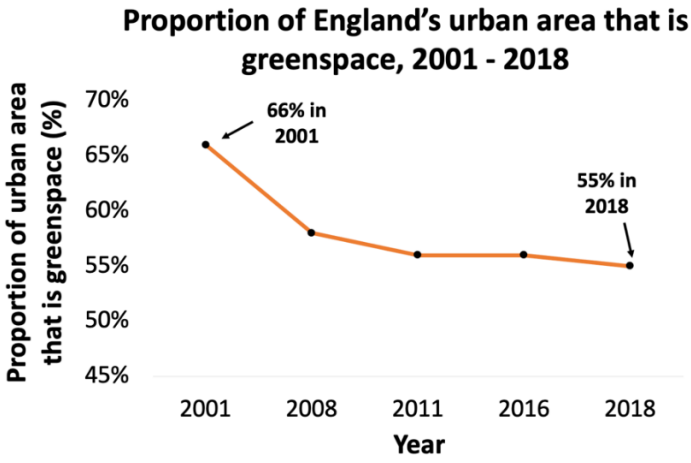
Box 3: Alternative metrics for urban greening.

Most of the evidence drawn on in this section focuses on the amount and distribution of natural infrastructure that is detectable on maps, such as large open greenspaces. This usefully provides a high-level understanding of how much urban greenery exists around England, yet it excludes smaller elements of natural infrastructure, which are still important to the value it provides people. Urban residents derive value from large green spaces as well as smaller natural infrastructures, such as green walls and in-street greenery.

Alternative metrics are emerging to capture more of these smaller natural infrastructures that are valuable but hard to measure at large scales. For instance, recent work from Forest Research uses canopy cover as a proxy for urban greening. The average canopy cover for 293 English Local Authorities is 16%, ranging from 45% in Farnham Surrey to 3% Fleetwood, Lancashire. Not enough quality data exists to examine this over time, but it provides a more nuanced picture of access to nature beyond greenspace metrics.[65]

The clearest analysis of trends in urban greenspace over time was undertaken by environmental research consultancy ADAS for the Committee on Climate Change. They estimate that in greenspace has declined in England's urban areas from 63% in 2001 to 55% in 2018 (Figure 3).

Figure 3. Fall in England's urban greenspace, 2001 – 2018. [66]



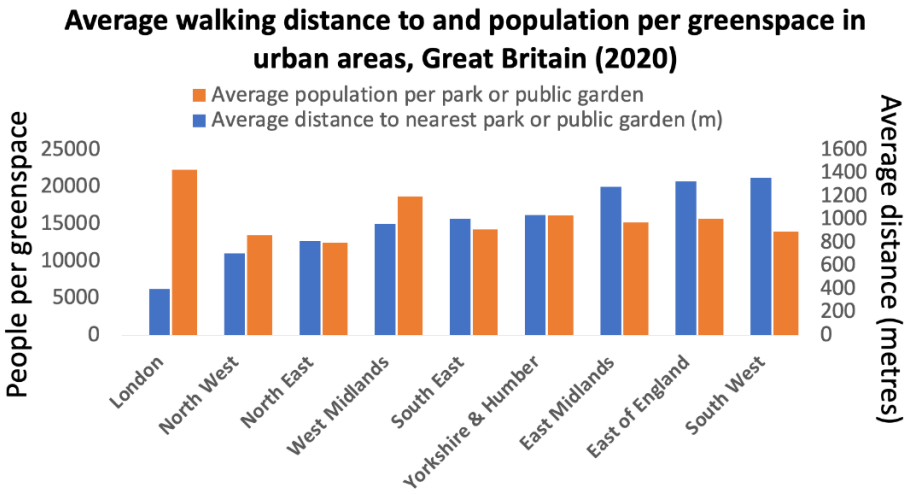
The distribution of existing greenspace is also important to consider. Natural infrastructure is its most valuable when the most people benefit from its services, which is why group of analyses measure access to nature by looking at people's proximity to greenspace (Figure 4). For instance, the average walking distance to a public greenspace in London (400m) is at least three times shorter than in the urban areas of the South West, the East of England and the East Midlands. Indeed, proximity to greenspace is important because most people's engagements with nature occur locally: according to Natural England, in 2019 44% of all respondents self-reported 'engagements with nature', referring to everything from trips to local greenspace to a private garden, happened within 2 miles of the home. Over two thirds of these trips were even more local, occurring within 1 mile of where someone lives.[67]

66. Charles Ffoulkes et al (2019). *Research to update the evidence base for indicators of climate-related risks and actions in England*, Page 13 (Link); Note: the authors also include the results for an updated method for mapping urban green space. This is excluded here because it only includes data for 2016 and 2018, but the trends are likely to be the same.

67. Natural England (2020). *People's engagement with nature: summary storyboard: 'on our doorstep'* (Link).

65. Kieron Doick et al (2017). *The canopy cover of England's Towns and Cities: baselining and setting targets to improve human health and well-being.* Forest Research (Link).

Figure 4. Average proximity to public greenspaces and the number of people per green space for urban areas in Great Britain, by region (2020).[68]



However, with proximity comes pressure, and London's urban greenspaces on average serve 40% more people than the urban greenspace in England, which equates to around 7,000 more people per urban greenspace. Notably, access to private gardens is also the lowest in London, with over double the proportion of households in London lacking access to private gardens than the average for Great Britain (25% vs. 12%).[69] As a consequence, more people in London are likely to be dependent on public urban greenspace.

Access also varies by other factors, such as income, deprivation and ethnicity (Box 4). Generally, more deprived groups have lower access to local greenspace. Although this varies a lot by the urban area in question, it highlights the importance of enhancing access to natural infrastructure both in terms of the overall *amount* of greenspace as well as its *distribution*. The driving factor for doing so is to ensure the benefits natural infrastructure provides, as outlined in the last section, are received by the largest number of people.

68. Policy Exchange analysis of Office for National Statistics (2020). *Access to gardens and public greenspace in Great Britain: Data* (Link); Note: data excludes playing fields which may be private to provide a conservative estimate.

69. ONS (2020). *One in eight British households has no garden* (Link); Note: The ONS' data on access to private gardens is not readily available for only urban areas.

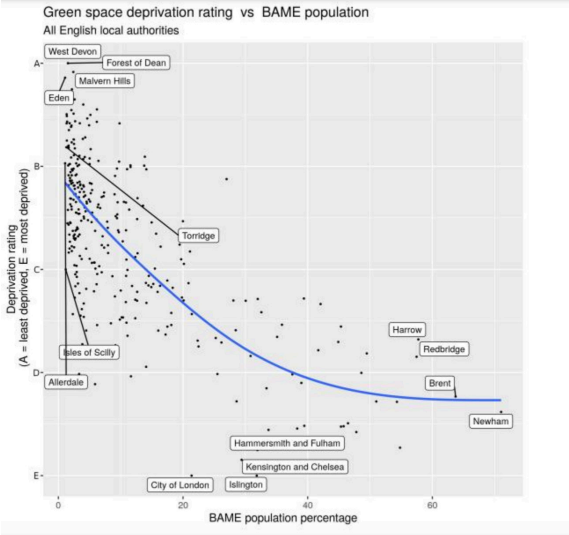
Box 4: Access to nature varies based on income, deprivation and ethnicity.

There is some evidence that access to urban greenspaces varies with income and more comprehensive measures of wealth like deprivation. For instance, recent survey data suggests that low-income households are further away from public greenspace; 63% of households that earn above £35,000 are within a 5-minute walk of their nearest greenspace, but this drops for households with an annual income of £15,000 or below.[70] Further, a recent report led by Vivid Economics looked at the 40% most deprived urban areas in Britain, arguing there are 440,000 residents in 295 neighbourhoods that are missing out on the benefits of "accessible greenspace provision".[71]

Interestingly, this trend appears to reverse for parks when rural areas are also included. For instance, using Ordnance Survey data, the Office for National Statistics found that more deprived neighbourhoods in Britain are around twice as likely to be within a five minutes' walk of a public park than the least deprived (34% vs. 18%).[72]

Access to greenspace also varies with ethnicity. Mapping work undertaken by Friends of the Earth shows a strong association between BAME ethnic groups and lower access to greenspace (Figure 5). In their study, access to nature is based on the time it takes to walk to public greenspaces which are over 2 hectares, which Natural England recommends as a standard for neighbourhoods to achieve.[73]

Figure 5. Association between lower access to greenspace and selected ethnic groups. Original source: Friends of the Earth.



Source: Friends of the Earth.[74]

There is a danger of overinterpretation here; although access to nature varies by wealth and ethnicity, these differences are likely driven by multiple factors. For instance, if ethnic minorities are likely to be younger, and live in dense urban areas like inner London, as well as be in lower socioeconomic groups, then the association above is clearly more complicated than the two factors alone suggest.[75]

Quality

While this section focuses the available evidence for urban natures, it is important to note that ecological networks work across urban areas. Biodiverse environments are likely to 'spill' into neighbouring areas, regardless of whether they are urban, peri-urban or rural. In fact, although urban areas tend to be less biodiverse than rural areas, they can contain a wide range of species and habitats.[76]

76. RSPB (2019). *State of Nature 2019: Urbanisation.* Page 13 (Link).

70. The Ramblers (2020). *The grass isn't greener for everyone: Why access to green space matters.* P12 (Link).

71. Vivd Economics and Barton Willmore (2020). *Levelling Up and Building Back Better through Urban Green Infrastructure: An Investment Options Appraisal.* Pages 5 – 6 (Link); Note: Vivid Economics and Barton Willmore provide no information on their definition of good access to green infrastructure.

72. ONS (2020). *One in eight British households has no garden* (Link).

73. Natural England (2010). *'Nature Nearby': Accessible Natural Greenspace Guidance.* Page 12 (Link)

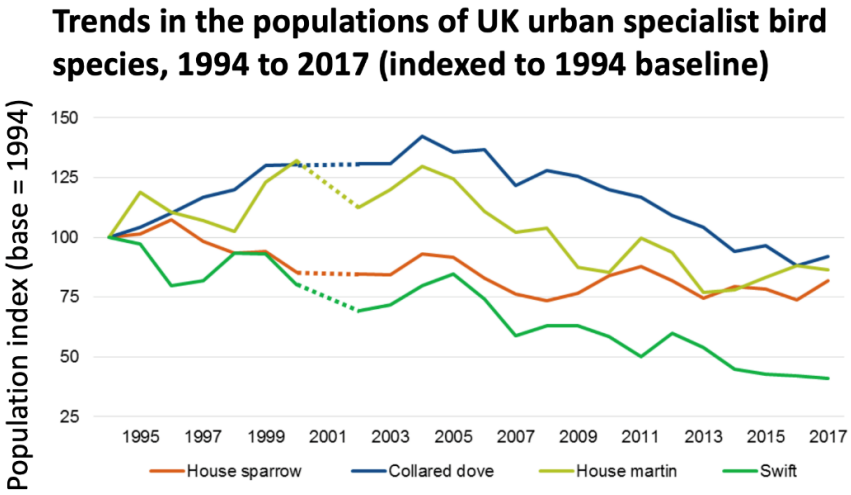
74. Friends of the Earth (2020). *England's green space gap.* Page 9 (Link).

75. ONE (2020). *Access to garden space: England* (Link)

One way to gauge the quality of urban nature is in wildlife trends. High levels of biodiversity and wildlife populations is generally reported in surveys as increasing the quality of their interaction with nature. For instance, in Natural England's long-running *Monitor of Engagement with the Natural Environment*, "wildlife watching" received the most positive results out of all the interactions people had with nature, including running, eating out and playing with children.[77] While the value some derives from simply seeing wildlife varies by the context and species, in general higher biodiversity increases the quality of people's access to nature.

Good data does not exist on all urban species, and many species operate across urban areas. However, some urban specialists, which are species that do particularly well in the built environment, are good indicators of general urban biodiversity levels. Urban specialist birds are a particularly good indicator here, because good quality and long-term datasets exist on their populations and lots is known about their ecology and the pressures facing them.[78] Since 1994, a number of these species have experienced declines in biodiversity of at least 15% (Figure 6). Swift populations have declined by almost 60%.

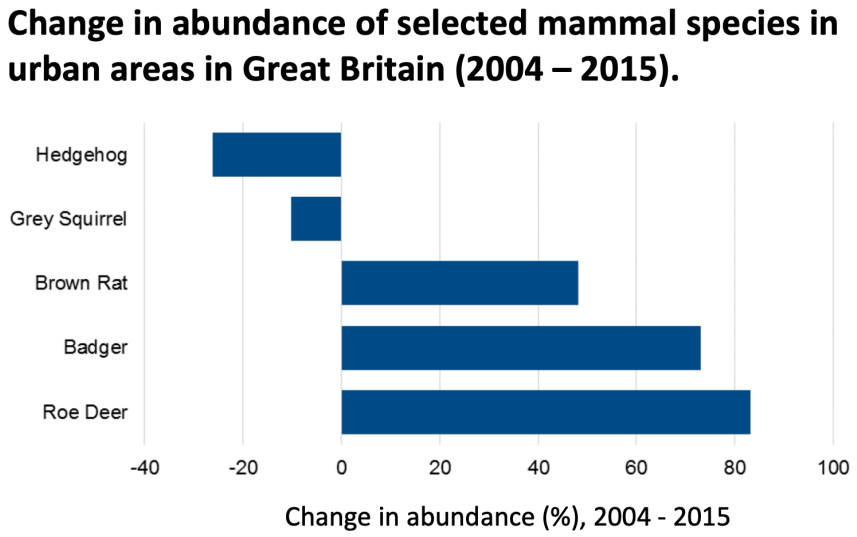
Figure 6. The populations of UK urban bird specialists have declined since 1994.[79]



Notably, some wildlife thrive in cities, particularly generalist mammals (Figure 7). Urban badgers, rats and roe deer have all experienced population increases of around 50% or more since 1994. However, other species are in decline. Grey squirrels and hedgehogs are examples of certain species that the public tend to value highly, what geographer Jamie Lorimer to refers to 'charismatic species'. This is due to their popularly desirable characteristics and they fact they tend to be used as the face of conservation campaigns.[80]

77. Natural England (2019). *Monitor of engagement with the Natural Environment – The national survey on people and the natural environment: Headline report 2019*. Page 14, Figure 15 (Link).
78. Environment Agency, Chief Scientist's Group (2021). *The state of the environment: the urban environment*. Page 10 – 11 (Link).
79. Environment Agency, Chief Scientist's Group (2021). *The state of the environment: the urban environment*. Page 11 (Link).
80. Jamie Lorimer (2007). *Nonhuman charisma*. Environment and Planning D: Society and Space (Link).

Figure 7. Some urban mammal generalists are doing very well, while others face pressures.[81]



Insects are an important component of urban wildlife, helping sustain plant life and acting as a food source for other wildlife. There is little evidence on the general trends in urban insect populations. The exception here is for particular species that are monitored for their significance, such as bees as important pollinators. Recent evidence suggests that urban domesticated bee populations are very healthy, with a greater variety found in urban sites than compared to surrounding agricultural areas, partly due to the high concentration of bee keepers in urban areas. However, pollinators are generally in decline; a government indicator of pollinator observations within in 1km grid squares throughout the UK shows that pollinators were recorded in 30% fewer grid squares times between 1980 and 2017.[82]

The quality of river water in England has largely flatlined over the last decade. The levels of some pollutants have notably reduced; for instance, since 1995, ammonia levels have fallen 70%, and health-harming metals like copper, lead, cadmium and mercury have all been reduced, the last two by 50% since 2008.[83] However, only 16% of England's rivers meet the EU's Water Framework Directive's label of 'good ecological status', a test decided by 11 different descriptors. Indeed, pollution levels are rising according to other metrics, notably for nitrogen (primarily from agricultural fertiliser use) and sewerage spill incidents.[84]

Notably, few analyses look at just urban areas in terms of river quality because the levels of water pollution are determined on a catchment-wide basis, with polluting activities worsening water quality downstream of them. Large urban centres tend to be geographically downstream, where pollutant levels are higher, but they also exert their own pressures on rivers. For instance, littering levels tend to be higher in urban areas, with more waste ending up in urban water bodies. A recent analysis suggests that 18% of water bodies are identified as being polluted by urban areas and transport, although this excludes sewerage discharges.[85]

81. Environment Agency, Chief Scientist's Group (2021). *The state of the environment: the urban environment.* Page 11 (Link).
82. Joint Nature Conservation Committee (2020). *UK Biodiversity Indicators 2020: Indicator D1c* (Link).
83. Sir James Bevan (2020). *The state of our waters: the facts* (Link).
84. DEFRA (2021). *Latest water classifications results published* (Link); Rob England (2021). *Water pollution causing 'death by a thousand cuts' for rivers'.* BBC News (Link).
85. Environment Agency, Chief Scientists Group (2021). *The state of the environment: the urban environment.* Page 13 (Link).

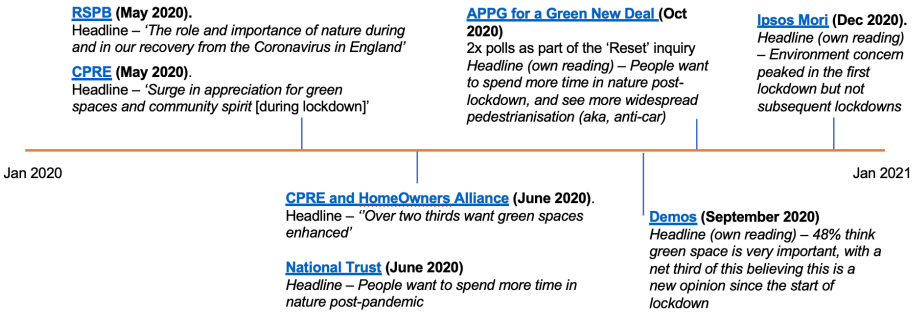
Effects of the current pandemic

As part of this project we polled the UK public to understand how the pandemic affected them and their preferences for how access to nature could be improved. Three trends stood out.

1. Lockdowns up to Spring 2021 are increasing the value people attach to nature, but parks are being used less.

During 2020, many surveys exploring people's relationship with nature were conducted in response to the UK's lockdown (Figure 8). Generally, these surveys found that people were reporting they valued nature more highly as a consequence of lockdowns, and engaging with nature more by going to parks as lockdowns were lifted.

Figure 8. Range of access to nature polls commissioned during 2020.

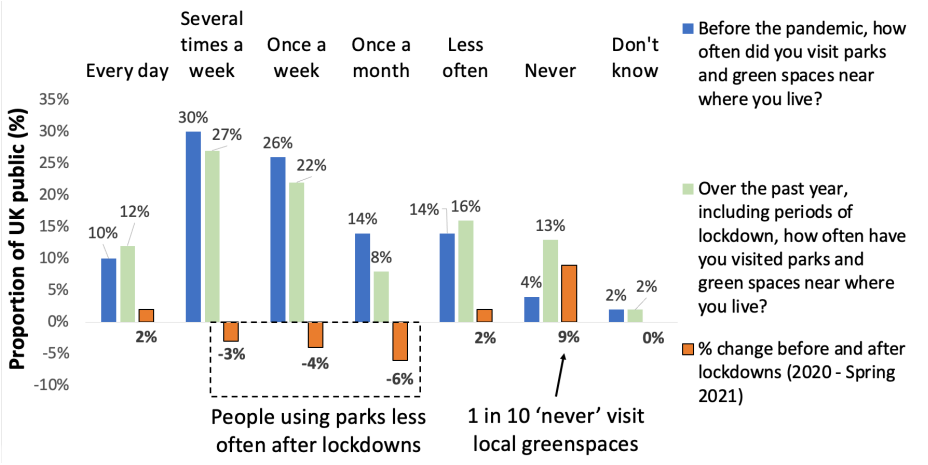


Our poll, conducted shortly after the Spring 2021 lockdown, reveals similar results.. For instance, the majority of the public reported lockdowns increased the value they attach to nature in their local area (62%).

However, our results suggest that the last year of lockdowns have led to the public using parks less. For instance, the proportion of people reporting that they never visit public parks increased by 9%, from 4% pre-pandemic to 13% after the Spring 2021 lockdown. Indeed, our results suggest that after subsequent lockdowns, people in urban areas visit parks less and less often (Figure 9).

Additionally, when asked how lockdowns have affected their use of parks, 25% of people said they use parks more, but this increase is offset by an equal number saying they use parks less (23%). Across the two questions, the number of people saying they never use parks due to lockdowns was the same (13%).

Figure 9. Change in the use of parks and other local green spaces before and over the pandemic, British adults (April 2021, n = 1,553).



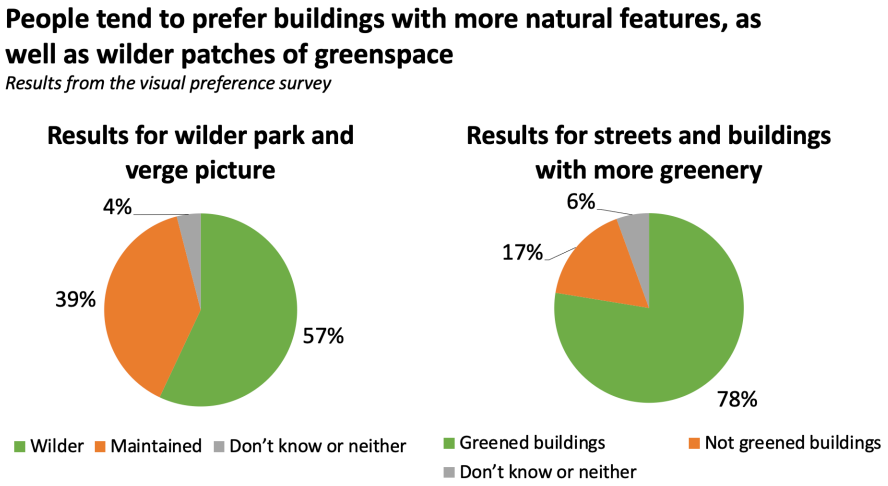
Our polling therefore suggests there was a marginal shift away from using local greenspaces in urban areas after the lockdowns up to the Spring 2021, while at the same time the same time people reported valuing local nature *more*. Interestingly, the same proportion of British adults (37%) that reported lockdowns worsened their mental health also want to move to the countryside, which stands in contrast to 80% of British adults in urban areas who only visit the countryside once a month or less. This could suggest that lockdowns are incentivising urban residents to move out of dense urban areas in pursuit of higher quality engagements with nature.

Indeed, while the public are likely to still place a high premium on local greenspaces, our polling suggests they increasingly value more distributed forms of natural infrastructure alongside open greenspaces. For instance, when asked if you want to see more in-street natural infrastructure like street trees and grassy verges, 48% reported "significantly more" or "slightly more", with the vast majority of the rest (41%) reporting "about the same as now", and only 3% choosing less.

Additionally, a small visual preference survey was included in our polling. This tested two things by getting people to choose between before and after photos of building and in-street after urban greening was added (seven pairs of photos), and parks and verges that were wild (e.g. left unmown) and maintained (e.g. mown). The results show a clear preference for more natural infrastructure in the urban fabric, and a strong but more moderate preference for wilder parks and verges (Figure 10).

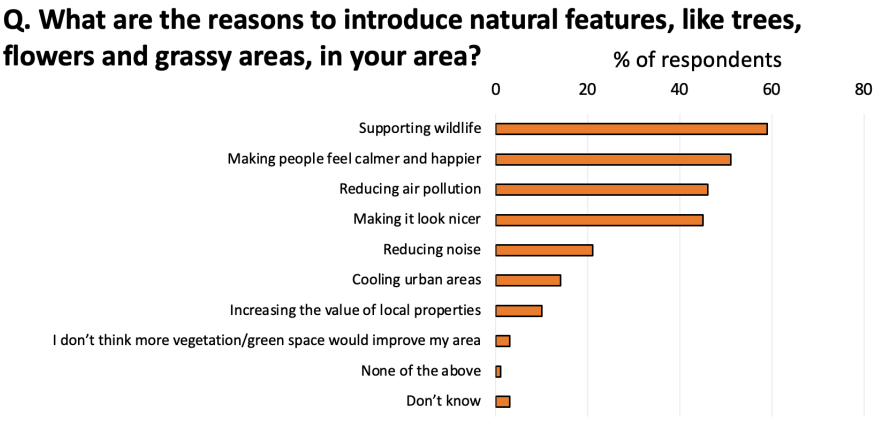
Notably, it is important not to stretch these results. Our survey included a small number of images, and while all the images were of the same building or street before and after works, they are often not identical, such as having different weather conditions between the photos, which means respondents are comparing slightly unlike photos. Nonetheless, the results show a preference for greenery, which agrees with the fact 62% of people value nature more after the 2020 – Spring 2021 lockdowns.

Figure 10. Results from visual preference survey for greened vs. non-greened streets and buildings (seven pairs of images) and wild vs. maintained parks and verges (two pairs of images), British adults (April 2021, n = 1553).



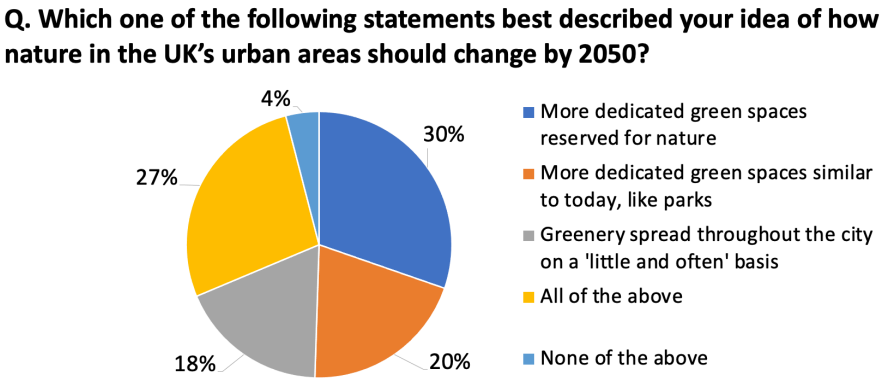
The driving force beyond people's support for greening urban areas is largely to support wildlife (Figure 11). However, three other reasons also polled highly: improving peoples mental wellbeing, reducing air pollution, and making places look nicer. Interestingly, some of the benefits of urban greening polled much less well, including reducing noise, urban cooling and the uplift in the value of properties in greener areas.

Figure 11. Polling results for the reasons to introduce urban nature, British adults (April 2021, n = 1,553).



Despite this support for more urban natural infrastructure, there was surprisingly fragmented response in the public's ideal outcome for urban greening by 2050 (Figure 12). Around a third wanted more areas reserved just for nature, around a fifth wanted more dedicated greenspaces for people and same wanted more distributed greenery, while a quarter wants more parks, reserved greenspaces and distributed natural infrastructure.

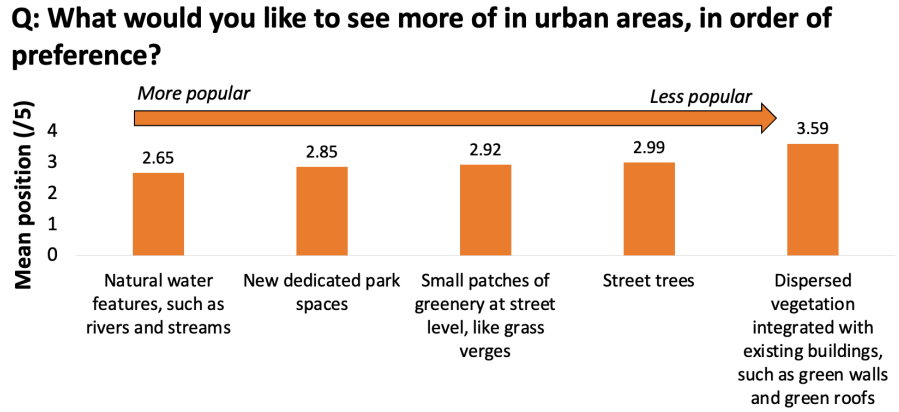
Figure 12. Public's views on the ideal state of nature in the UK's urban areas by 2050, British adults (April 2021, n = 1,553).



2. The public prefer certain kinds of urban nature but a balance needs to be struck with other demands on urban space.

The British public do not just support anything green, but they have preferences for certain kinds of natural infrastructure (Figure 13). Interestingly, natural water features were the most popular, with new parks, small patches of greenery and street trees all finishing relatively evenly. Despite the public using parks less, they still appear to value them more highly than dispersed vegetation, which was the lowest preference by some margin. However, this does not mean distributed greenery is not popular, as our visual preference survey shows strong support for buildings with more natural infrastructure integrated into them.

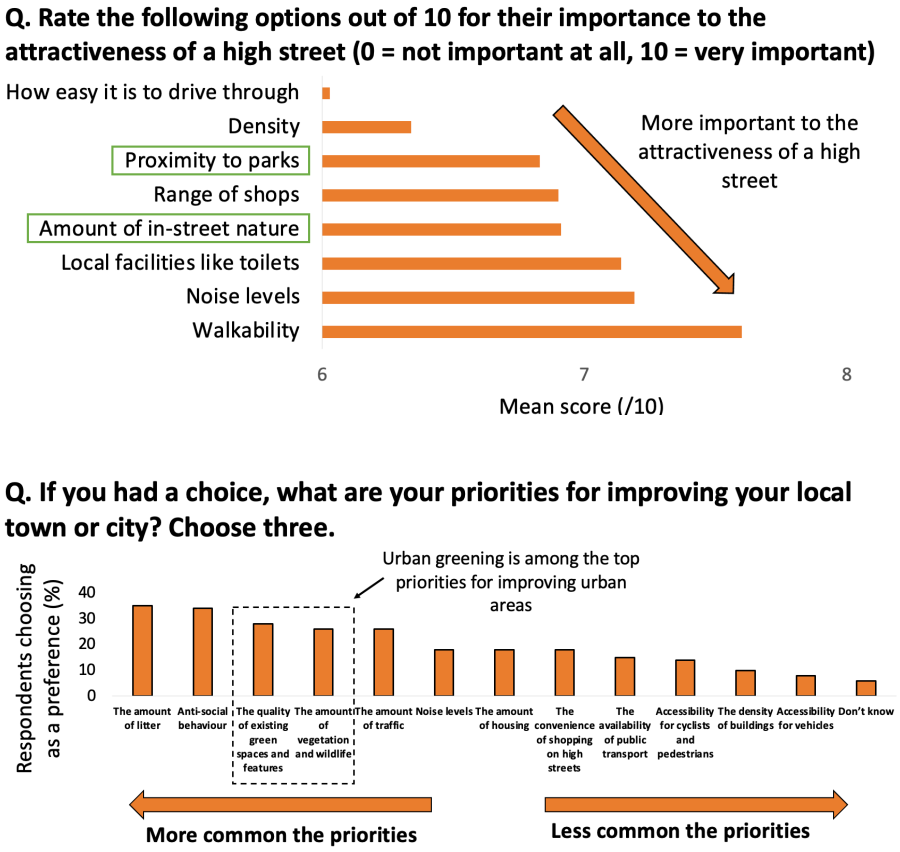
Figure 13. Preferences for selected natural infrastructure, British adults (April 2021, n = 1,553).



However, we also sought to test where urban greening is in the public's priorities for changes to their local areas (Figure 14). For instance, when asked what their priorities were for the attractiveness of highstreets, urban greening is a clear priority, with most of the public rating it highly, particularly in-street greenery over parks. Yet other characteristics of highstreets are more important, particularly walkability and noise levels.

We also polled a wider set of priorities for improvements to whole towns and cities, where the quality and quantity of natural infrastructure.

Figure 14. Public's preferences for the attractiveness of highstreets and improving local urban areas, British adults (Spring 2021, n = 1,553).

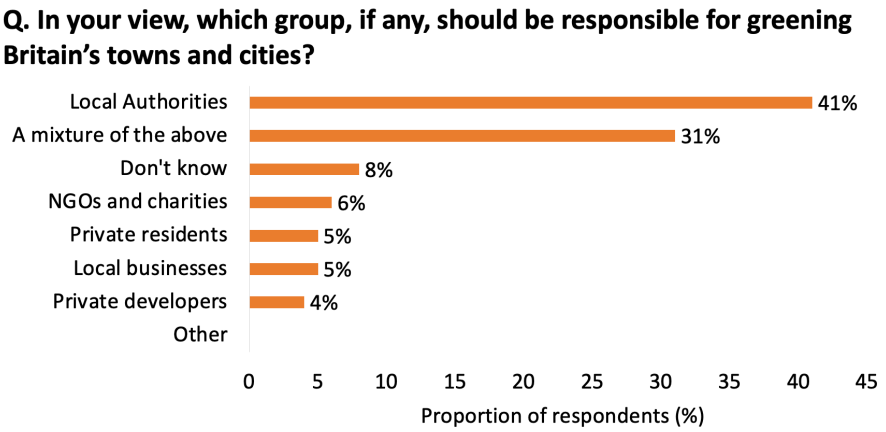


3. Public bodies should take a strong lead

When asked who should be responsible for greening the Britain's towns and cities, the public clearly favour two options: either getting Local Authorities to take the lead, or a mixture of actors, including business, the third sector and individuals (Figure 15).

These results are encouragingly aligned with how urban greening occurs in practice. Typically, Local Authorities will promote local urban greening through the tools at the disposal, such as local planning designations and rules. However, greening projects commonly involve a range of actors, such as community groups and businesses. Our conversations with experts suggest this is because Local Authorities tend to lack enough resources to carry out the projects, and other actors are willing to engage in projects as it tends to benefit them.

Figure 15. Views on who should be responsible for urban greening, British adults (Spring 2021, n = 1553).



Why is access to nature falling in urban areas?

Our conversations with experts and evidence gathering suggests that a mix of factors is responsible for the decline in the quantity and quality of urban natural infrastructure over time.

Any analysis of these factors must be general, for several reasons. Foremost is that the evidence on biodiversity monitoring can be patchy, particularly for hard to monitor species that are highly mobile and rarely seen. Many of drivers of biodiversity loss are context specific, and they therefore vary with the species, habitat or geography in question.[86] Some drivers, particularly land-use change and pollution, act across urban and rural areas; they are therefore part of the wider backdrop in the decline of biodiversity, rather than specific to urban areas. Finally, other factors that limit increasing access to nature are inherent in how society and the economy functions. For instance, the benefits of natural infrastructure are inherently difficult to monetise, due to their public nature. This creates a barrier to creating an attractive investment case for natural infrastructure, despite to its high private costs but substantially high public benefits.

The primary factors driving the decline in access to nature can be split into two categories: pressures on nature, and society's approach to nature.

Pressures on nature:

- **Land-use change:** The development of land is an unavoidable process, but it is thought to be the leading driver of biodiversity and habitat loss. In England, around 28,000 hectares of land were developed from 2017 – 2018, of which 55% was previously undeveloped land.[87] While some habitat restoration will have offset this, developed land generally has lower biodiversity value than undeveloped, leading to falls in biodiversity over time as more land is developed. In particular, fragmentation of existing natural areas can accelerate biodiversity loss even if the overall amount of habitat remains unchanged.[88] The proportion of urban areas that are made up of impermeable surfaces is a good proxy for their general contribution to land-use change. This increased

86. RSPB (2019). *State of Nature 2019*. Pages 31 – 33 (Link).

87. Environment Agency, Chief Scientists Group (2021). *The state of the environment: the urban environment*. Pages 12 – 13 (Link).

88. Prof. Partha Dasgupta highlighted this fact, taken from Nick Haddad et al (2015). *Habitat fragmentation and its lasting impact on Earth's ecosystems*. Science Advances, 1(2) (Link), in his evidence to the Environmental Audit Committee (2021). *Biodiversity in the UK: Bloom or Bust?*. Page 102 (Link).

from 37% in 2001 to 45% in 2018, implying urban areas are driving more land-use related biodiversity losses.[89] However, urbanisation does not automatically lower the biodiversity value of the land it develops. For instance, although many urban areas are becoming dominated by more concrete and tarmac, recent analysis of Bristol, Edinburgh, Reading and Leeds found that 24 – 36% of the cities are gardens.[90] Moreover, if development converts low biodiversity value agricultural land into residential areas with large amounts of greenspace, a net gain in biodiversity value can easily be achieved.

- **Pollution:** Society is increasingly polluting the environment, which degrades the quality of habitats and the ability of species to live in them. Pollution is emitted by a range of activities, both inside and outside of urban areas. For instance, water quality in rivers is determined by the dispersed emission of pollutants such as hydrocarbons, metals, litter, nutrients and pathogens from across a whole catchment area. In 2020, around 18% of water bodies in England were identified as being polluted by urban areas and transport, which is a conservative estimate given this analysis does not include waste water management, such as storm overflows, much of which originates in urban areas.[91] Air, noise, light and litter pollution also puts pressure on environments in and around urban areas, decreasing their quality and abundance.
- **Invasive species:** Invasive species are any wildlife that settles somewhere outside of its natural range. These newcomers can upset the balance of the ecosystems they settle in through predation, competition or diseases. The Joint Nature Conservation Committee (JNCC), the Government's nature conservation advisors, maintains an invasive species indicator. From 1960 to 2019, the number of invasive species that have established themselves and are frequently found in Great Britain has increased for freshwater (from 4 to 13 species), marine (2 to 29) and terrestrial (28 to 61) environments.[92] Data specifically on urban areas appears to be unavailable.

Society's approach to nature:

- **Lack of compulsory standards:** From our research, a clear reason why levels of greenspace are falling in urban areas is a lack hard regulation to ensure that as urban areas expand and densify, they also become greener. England does have a number of regulations and policies in place to promote the inclusion of natural infrastructure, but they leave significant room for urban areas to develop without considering access to nature. For instance, while the National Planning Policy Framework and Local Plans tend to give greater weight to greener planning proposals, there are generally few hard requirements for their inclusion. This leads to many sustainability concerns being side-lined or not

89. ADAS, P9 (Link).
90. Baldock KC, et al. (2019). A systems approach reveals urban pollinator hotspots and conservation opportunities. Nature Ecology & Evolution, 3: 363.
91. Environment Agency, Chief Scientists Group (2021). *The state of the environment: the urban environment.* Pages 12 – 13 (Link).
92. JNCC (2020). *Biodiversity indicators B6. Pressure from invasive species* (Link); Note: data for only the most established invasive species is included (Level 3 ('established and frequent in part of the territory') and Level 4 ('Widespread') species).

enforced post-consent, as recent analysis of England's Local Plans in the context of Net Zero commitments has shown.[93] Notably, the UK's planning system is increasingly considering biodiversity. For instance, in 2019 the JNCC assessed the UK's progress against the 19 of the Aichi biodiversity targets, which are international biodiversity targets agreed in 2010 under the Convention on Biological Diversity. It concluded that the UK was only on track for five targets, one of which was the integration of biodiversity into planning and national accounting.[94] The general phrasing of obligations is a function of how planning works, using phrases like "should" rather than "must". There are good reasons for this, such as avoiding over-burdening developers, but a consequence is that urbanisation is including less and less natural infrastructure.

- **Valuing natural infrastructure:** As highlighted earlier, the benefits of natural infrastructure tend to flow to many people, while the costs are borne by only a few parties where it is not publicly funded. Buy conventional accounting methods, urban greening has a poor investment case next to cheaper materials. This partly explains urban areas are increasingly greying rather than greening, particularly in the densest urban areas where the low-cost opportunities for urban greening are the fewest, owing to high competition for space. Notably, our research highlighted that costs are highly site specific. This means that creative thinking is often needed to affordably incorporate green infrastructure into developments, because there is rarely a 'one size fits all' option. Any policies which incentivise developers to think creatively about how to incorporate natural infrastructure into their designs, such as using an under-underutilised façade or roof, can therefore substantially lower the overall development costs of urban greening.
- **Ability of individuals to engage with nature**: Some of the benefits of introducing more natural infrastructure rely on people engaging with nature more. Indeed, analyses that try to quantify these benefits often rest on assumptions of people's engagement with nature increasing as more natural infrastructure is built. However, there is evidence that some groups struggle to engage with nature, for a range of reasons beyond access. For instance, Natural England's MENE survey, which ran from 2009 to 2019 and with a sample size of over 40,000 people, found that around 16% of people engage with nature less than once a month (2019). Of these people over the 10-year period, only 5% said it is due to lack of access; around half said they do so due to lack of time, around a third said it is due to poor health or old age, and one fifth said they were simply "not interested".[95] While this group is in the minority, a lack of engagement with nature can limit the benefits natural infrastructure provides, as well as the effectiveness of policies which rely on individual action, such as incentives to green residential homes.

93. Dan Stone (2020). *Are local plans planning for the zero-carbon future we need?* Centre for Sustainable Energy (Link).

94. JNCC (2019). *United Kingdom's 6th National Report to the Convention on Biological Diversity.* See Target 2, Pages 84 – 88 (Link).

95. Natural England (2020). *Monitor of engagement with the Natural Environment 2009 – 2019: Datasets and guidance on use: Interactive storyboard.* See figure 'Key reasons for not taking visits to the natural environment' (Link); Natural England (2020). *MENE Headline report, 2019.* Page 7 (Link); Note: Statistic on the proportion of people visiting nature once a month is taken from the 2019 headline report, while the rest of the data is for the whole MENE survey period (2009 – 2019).

3. Current opportunity

> *"Just as our own lives continue to be embedded in a web of 'natural' relationships, nothing in nature remains untouched by the web of 'human' relationships that constitute our common history"*
>
> Environmental historian William Cronon in *Nature's Metropolis: Chicago and the Great West* (1991)

Post-COVID-19, there is a political and policy opportunity to implement ambitious reforms to green England's urban areas.

Politically, the impact of COVID-19 has increased support for greening urban areas. Our polling suggests this self-reported growth in support for urban nature is driven by consecutive lockdowns, which deprived people of regular interaction with nature, especially the 12% of households in Britain that lack access to a garden.[96]

This increase in public support for greening is more nuanced than 'green for greens sake', because certain forms of natural infrastructure are preferred over others. As explained in Section 3, parks remain highly valued as places to relax, despite a self-reported drop in their use before and over the lockdowns up to Spring 2021. In-street urban greenery is also a priority for the public to improve high streets and urban areas. Nevertheless, urban greening currently has a clear public mandate.

A unique policy opportunity is opening up to reverse the decline in England's urban greenspace through the Government's reforms to England's planning and environmental frameworks. Urban greening sits between the planning and environmental policy: the planning system drives how urban areas develop through plans, design guides and consents, while environmental policies and regulations shape this process to ensure it promotes greening via tools like protecting threatened species and habitats. The confluence of major reforms in both areas – ongoing planning reforms and the recently-passed Environment Act 2021- creates a rare opportunity to ensure future urbanisation promotes greater access to nature.

The Government set out its vision in the 25 *Year Environment Plan* to "*make sure there are high quality, accessible natural spaces close to where people live and work, particularly in urban areas*"[97] Since then, it has sought to implement this vision primarily through the Environment Act. While the Act's policies are setting the right course, they are unlikely to lead to widespread urban greening for two reasons:

96. ONS (2020). *One in eight British households has no garden* (Link).

97. HM Gov (2018). *A Green Future: Our 25 Year Plan to Improve the Environment.* Page 28 (Link).

1. **Lack of certainty.** The Government's current and planned policies provide no certainty that urban areas will green as they develop. Instead, they tend to promote single types of natural infrastructure on a project-by-project basis. For instance, most of the Government's reforms have been standalone projects to incentivise greening in certain areas, such as the *Urban Tree Challenge Fund* which supports the planting of trees in urban and peri-urban areas.[98] The same point applies to the reforms in the Planning White Paper. For instance, the National Model Design Code and National Design Guide both include clear references to natural infrastructure. These are only references, rather than obligations, and there is therefore no clear mechanism through which urban greening is guaranteed. Arguably there is a strong case for introducing policies which provide certainty that as time passes, natural infrastructure will be increasingly integrated into towns and cities. Indeed, the Government's ambition for making sure everyone has "*access to high quality, accessible natural spaces*" in the 25 Year Environment Plan still lacks an indicator for tracking progress.[99] Without such certainty, the greenness of urban areas is likely to keep falling, as it has for the last two decades (Figure 3).
2. **Little focus on urban areas.** Current policies lack a focus on improving the environment specifically in urban areas. For instance, Biodiversity Net Gain (BNG) is unlikely to deliver substantial levels of natural infrastructure in urban areas. While BNG prioritises onsite habitat creation, there are limited options in urban areas for this, leading most developers to fulfil their net gain obligations by investing in habitats outside of dense urban areas. A recent study tracking six 'early adopter' councils in England found that BNG led to a 34% reduction in the area of onsite habitat, and that most promises to invest in new habitat are likely to be made years later in the development cycle.[100] Additionally, Nature Recovery Networks will map England's priority habitats, including in urban areas, providing an evidence base of what environmental assets. This is likely to lead prioritise investment in already biodiverse areas, which primarily reside outside of towns and cities.

There is therefore a risk that urban areas fall through the cracks in the Government's upcoming reforms. Given the combination of strong public support for urban greening and the confluence of reforms to England's planning and environmental frameworks, there is a clear window for plugging these gaps this parliament.

The rest of this report puts forward a series of policy recommendations to enhance access to nature in urban areas, based on these opportunities. The recommendations are informed by the following principles (Figure 16), which blend the Lawton Review's emphasis on improving outcomes for wildlife with the idea that urban natural infrastructure should be designed around the needs of society:

98. Forestry Commission (2021). *Urban Tree Challenge Fund* (Link).
99. DEFRA (2021). *Outcome Indicator Framework for the 25 Year Environment Plan: 2021 Update.* Pages 120 – 121 (Link).
100. Sophus ze Ermgassen et al (2021). *Exploring the ecological outcomes of mandatory biodiversity net gain using evidence from early-adopter jurisdictions in England.* Conservation Letters, Wiley (Link).

Figure 16. Policy principles for urban greening.

4. Policy recommendations

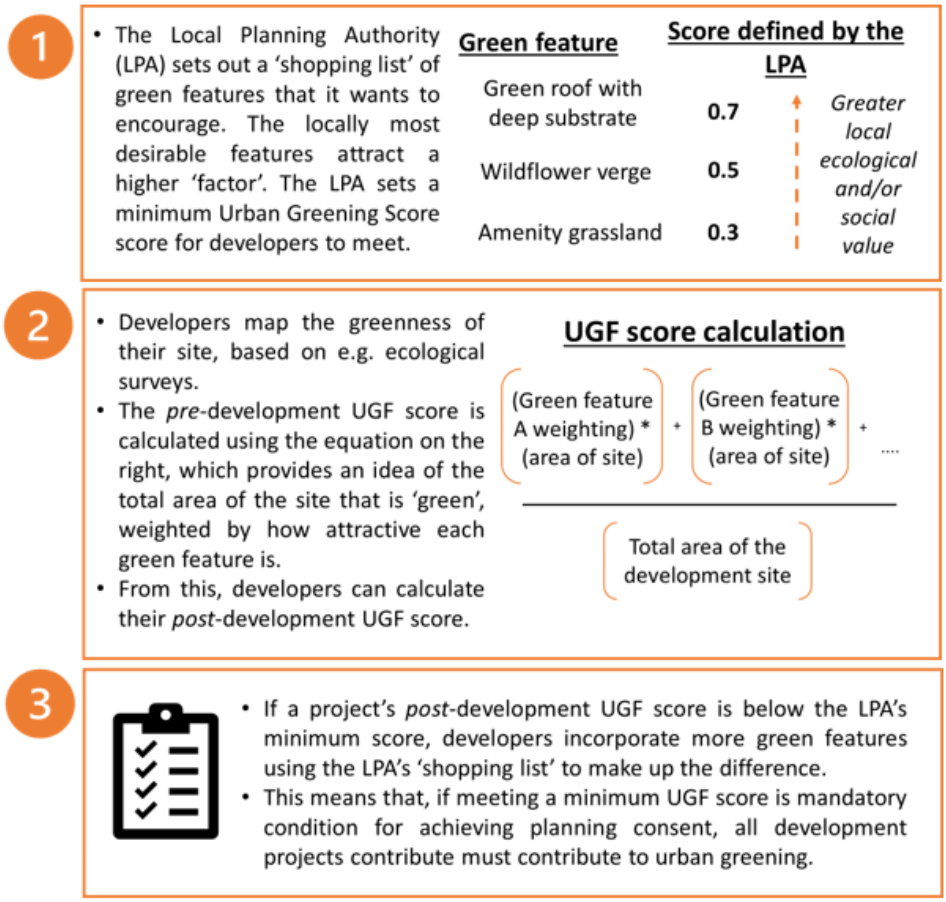
> *"We cannot solve this dilemma by seeking permanent escape from the city in a "wild" nature untouched by human hands, for such an escape requires us to build the same artificial mental wall between nature and un-nature."*
>
> Environmental historian William Cronon in *Nature's Metropolis: Chicago and the Great West* (1991)

Theme #1: Where access to nature is low, mandate Local Authorities to improve it.

Recommendation 1.1: Where access to nature is low, mandate Local Authorities to adopt Urban Greening Factors through the National Planning Policy Framework.

Urban Greening Factors (UGFs) are a tool used at the design and planning stage of new developments to evaluate how much a development contributes to urban greening, in terms of the quality and quantity of the greening that a project provides. UGFs are relatively simple in how they work (Figure 17).

Figure 17. Three steps of an Urban Greening Factor



LPAs set a minimum target for urban greening in the form of a minimum UGF score that all planning applications need to meet. First, LPAs create a 'shopping list' of green and blue infrastructure investment, weighting each investment by its *local* desirability. Green infrastructure that is valued in one place may not be as valuable in another. For instance, a particular species of street tree may be given a higher weighting than other species because it is more valuable to a local ecosystem.

Each developer can then calculate whether their planning proposal meets the LPAs minimum UGF score. They do this by multiplying the area of each green feature in their proposal by its weighting in the LPAs shopping list, summing this up for the whole site, and dividing by the overall area of the site. This provides an idea of the quantity and quality of urban greening; how much "green" is in a site, as a proportion of the site's area, and whether the green in a site is locally desirable, as decided by the weighting the LPA ascribes each feature in its shopping list.

If a planning application does not meet an LPA's minimum UGF score – in other words, the project does not contribute enough to urban greening – the developer has to make up the difference by including more features from the LPA's shopping list.

Urban Greening Factors have a number of advantages and disadvantages in terms of how they affect people and nature (Figure 18).

Figure 18. Advantages and limitations of Urban Greening Factors

	Advantages	Limitations
People	• **Flexible**: incentivises green features that communities value • **Simple:** can be met as a precondition for development • **Pro-densification,** by incentivising creative planning	• **Additional burden** on developers • **Voluntary:** risk of not being adopted by Local Authorities or used by developers • **No immediate solutions for ongoing maintenance**
Nature	• **Upfront consideration** of quality natural features in planning • **Incentivises increases where planning net gain does not** – urban areas where baseline habitat is low • **Creates small spaces for nature** 'in between the cracks' of dominant urban land uses	• Could incentivise **undesirable or low 'value-added' green features,** depending on design • **Hard to quantify the benefits** for nature • **Slow, incremental** increases in urban nature

UGFs are not without their flaws. Through conversations with a wide range of experts and a review of the literature, our research highlighted five main concerns (Figure 19).

Figure 19. Addressing the main concerns surrounding Urban Greening Factors.

Potential risk	How UGFs can address these risks	Risk rating (low/medium/high)
Additional bureaucratic burdens for developers	• Design UGFs to be met as a pre-condition of development. • Keep the UGF calculation and LPA shopping list as simple as possible. • Communicate that UGFs can be met through existing obligations, like net biodiversity gain (via onsite green infrastructure) + ecological surveys.	Low
Unreasonable financial burdens on developers	• Consider at the design stage, minimising costs by designing in green infrastructure from the start. • Ensure the LPA shopping list is broad. • By their nature, UGFs incentivise developers to look for the cheapest ways to incorporate quality green infrastructure, promoting efficiency.	Medium
May not incentivise the 'right' kinds of green and blue infrastructure	• Base shopping list options and weightings on Local Nature Recovery Strategies, to incentivise locally-valuable greening.	Low
Provide no answers for maintenance	• In Local Plans, include an obligation to put in place management options for green infrastructure for their lifetime, including operational financing.	Medium
May be too inflexible for sites with limited options for urban greening (e.g. skyscrapers)	• Increase the options available to some types of projects – e.g. allow high-rise buildings to use public sky gardens to contribute to their UGF score. • Specify different minimum UGF scores based on the development – e.g. the London Plan 2021 has different UGF scores for residential and commercial developments.	Low

Note: The risk ratings are based on the authors own judgement.

However, each of these concerns can be addressed through the design of UGFs at the local level. Taking each concern in order:

#1: Bureaucratic burdens: UGFs present a low risk in terms of creating unnecessary bureaucracy, for two reasons.

First, UGFs are a clear and transparent condition on development. The LPA sets out what the minimum UGF score developers need to meet is, and what greening options they can use to meet it. This provides developers with a clear bar to meet, and how to meet it, meaning UGFs are

unlikely to encumber planning applications. The UGF calculation is also relatively simple, especially when compared to the calculations needed for biodiversity net gain obligations. It's likely that LPAs will be given some flexibility in how they define the UGF in their local plan. The calculation, and the LPA's shopping list of urban greening options, should be kept as simple as possible for developers.

An additional consequence of their transparency is that UGFs can be met as a precondition of development, implying they will be effective urban greening tools in 'growth areas' under the Government's proposed zonal planning system. In these areas, planning consent is assumed if a set of conditions laid out in the Local Plan are met by a proposal, of which the UGF would be one condition.[101]

Second, UGFs involve little duplication of effort on the part of developers, because most of the UGF can be met by 'piggybacking' on other processes that happen as part of planning applications. For instance, developers need to prioritise onsite urban greening to meet their 10% net biodiversity gain obligations, all of which contribute towards the UGF. Further, routine ecological surveys undertaken for things like Environmental Impact Assessments (EIAs) can inform planning applications of existing green features and identify opportunities for new greenery to contribute to UGF scores.

#2: Financial burdens: As identified earlier in the report (Box 1), the costs of urban greening are highly site and context specific. This is because some green infrastructure may have lower lifetime costs on some sites compared to others, and the opportunities for funding natural infrastructure vary by the context. It is therefore difficult to generalise the financial burden on developers, given it will vary by the site and developer in question.

However, the fact UGFs are being used in cities in the UK and abroad show that UGFs are affordable. This is due to a number of reasons.

The flexibility of UGFs gives developers the space to find the lowest cost route to meeting a UGF score. The 'shopping list' of natural infrastructure set out by LPAs contains a wide range of urban greening options, each with a different weighting. Developers can mix and match natural infrastructure options to find the most cost and space efficient ways of greening urban areas. UGFs should therefore be as flexible as possible to provide developers as much space as possible to green their sites as cheaply as possible, while still installing high quality natural infrastructure.

Further, by designing natural infrastructure into planning proposals from the start, rather than retrofitting buildings at a later stage, their lifetime costs can be minimised. Lifetime costs includes both the capital cost of procuring and installing natural infrastructure, as well as their maintenance costs. Further, designing in natural infrastructure reduces the risk of unintended costs related to retrofitting arising later. For instance, retrofitting existing roofs to be green roofs can create substantial costs when roofs are not designed to be load bearing.

Moreover, UGFs may not create many *additional* costs for developments

101. MHCLG (2020). *Planning for the Future: White Paper August 2020*. Pages 28 – 29 (Link).

that are subject to the Environment Act's 10% biodiversity net gain obligation. The obligation requires specific types of development to create 10% more habitat compared to a pre-development baseline, prioritising onsite habitat creation. Any of this onsite habitat creation and its costs will count towards meeting a UGF score.

#3: The 'right kind' of greening: The 'right kind' of greening refers to promoting locally valuable and desirable natural infrastructure that provides the greatest benefits for people and wildlife.

However, questions of value around natural infrastructure vary intensely, often on a street-by-street level. What is valuable is therefore best answered at as local a level as practically possible. UGFs promote the use of locally valuable natural infrastructure through how the LPA's shopping list weights greening options. LPAs therefore have an important role in ensuring the weightings they ascribe to different natural infrastructures in their shopping lists reflect local value.

This is likely to be more of an art than a science, but there are several things that LPAs can do to ensure their choice of weightings is informed:

Using Local Nature Recovery Networks to inform ecological connectivity consulting on what people find attractive, in what kind of locations – local surveys, literature reviews

Costs should be a component to – a challenge reflecting local social and ecological value and lifetime costs in weightings.

#4: Maintenance: Maintenance was an issue raised in a GLA presentation, with no answers particularly given.

It should be down to the owner of the building to maintain it, and this should be considered when they decided what green options to use to meet a UGF score. Local Authorities are not placed to take on the liability.

As such, maintenance should be mandated in the regulatory plan for the lifetime of the GI, with enforceable penalties for those that flaunt this. Up to LPA to police.

#5: Inflexibility for some sites: Some sites may face fundamental limitations on the room for urban greening. For instance, a high-rise building that takes up its whole plot has limited room to incorporate ground-based features.

Notably, the strongest argument for UGFs is that they encourage creative thinking to incorporate nature in between the cracks of dominant land uses. In the context of sites with limited space for greening, UGFs are therefore at their most valuable. However, there are two options for LPAs to add further flexibility for difficult sites.

First, LPAs can increase the flexibility of its shopping lists by increasing the weighting attached to natural infrastructure that can be incorporated in difficult sites. For instance, high-rise buildings that occupy all of their plot may have no ground space for green infrastructure. Additional weighting could be given to sky gardens with public access, to deliver

urban greening while providing a route for these developments to meet their minimum UGF score.

Second, LPAs can have separate UGF scores, based on feasibility for greening. This should not undermine an emphasis on urban greening, but it is likely to be necessary for a minority of developments to be included in the UGF. There may be an added benefit that such flexibility wins a UGF local political support.

The practical implementation of UGFs aside, as a policy there are two strong arguments for their wider use. First, there is no policy option at present that guarantees urban areas will green over time. Given the societal benefits of enhancing access to nature, certainty that nature will improve in urban areas is necessary, rather than relying solely on uncertain policies.

Second, their flexibility means they can be adapted to local circumstances. This is important because the enhancing access to nature is entirely decided at the local level. Costs are site dependent; what is valuable can vary by the street. Attention to local circumstance is therefore a must, which a well-designed UGF can deliver.

Urban Greening Factors complement the Government's wider environmental agenda

UGFs complement a number of the Government's upcoming environmental policies (Figure 20). For instance, the Environment Act 2021 introduces an 'enhanced biodiversity duty' on Local Authorities. A UGF is a clear way for Local Authorities to demonstrate they are fulfilling this.

Further, the Environment Act obliges Local Authorities to produce Local Nature Recovery Strategies (LNRS). These will consist of a Statement of Biodiversity Priorities, which will set out the area's environmental priorities, and a Local Habitat Map, which will identify the existing distribution of habitats in the local area and areas that show promise for delivering the Local Authority's environmental priorities.

Figure 20. Urban Greening Factors complement upcoming environmental policies

	Net gain	Nature Recovery Network	Enhanced biodiversity duty
Concern	Little investment in urban areas due to: low baseline; few landbanks.	Unlikely to identify dense urban areas as sites for the enhancement of biodiversity.	Local Authority may lack affordable or practical ways to meet an enhanced duty.
Effect of a UGF	Incentivises environmental gains on dense urban and some brownfield sites. Can meet net gain obligations through a UGF.	UGFs informed by NRN maps and spatial strategies. UGFs are a way to act on the work of Local Nature Recovery Strategies.	Provide Local Authorities with a way to meet their enhanced Biodiversity Duty under the Environment Bill. Leverage private sector funding.

Source: Policy Exchange analysis

LNRSs and UGFs complement each other in two ways. First, the LNRSs can be used to design better UGFs, because Local Habitat Maps can inform the design of the UGF shopping list so that it complements local ecologies. Second, UGFs can be used to deliver the environmental priorities set out in the Statement of Biodiversity Priorities. For instance, the UGF's shopping list could ascribe higher weightings to urban greening options that deliver the LNRSs environmental priorities, incentivising developers to prioritise those urban greening options.

Urban Greening Factors particularly complement the Environment Act's biodiversity net gain provisions. These will require developers to achieve a 10% net gain in biodiversity post-development, as compared to a pre-development baseline. Net gain is unlikely to lead to much urban greening, because the baseline of existing habitat in urban areas is low; if a site has very little greenery, a 10% net gain can generate very little additional greenery. UGFs complement this by requiring onsite greening based on surface area, rather than as a proportion of existing habitat.

Further, net gain allows developers to use biodiversity credits generated offsite to meet their 10% net gain obligation. This means the gains in habitat can be created outside of urban areas where the initial damage to habitats is caused, removing the benefits it provides urban residents. While biodiversity net gain will generate additional habitats, it's unclear whether much of this will increase access to nature in urban areas local to development. UGFs require onsite urban greening, which creates certainty that urban greening will occur over time.

Implementing a national UGF

The National Planning Policy Framework (NPPF) sets out government planning policy for England. Policies within the NPPF are implemented around England through LPAs' Local Plans, which must reflect policies within the NPPF.

The Government intends to amend the NPPF to implement its vision for the planning system in England, as set out in its 2020 White Paper, *Planning for the Future*. Among the White Paper's proposals, the Government said it will amend the NPPF to ensure it "*targets those areas where a reformed planning system can most effectively play a role in mitigating and adapting to climate change and maximising environmental benefits*" (Proposal 15).[102]

Given the benefits of using Urban Greening Factors to promote urban greening, the Government should mandate Local Planning Authorities to adopt UGFs where they will enhance access to nature.

Notably, a UGF will not be appropriate in every LPA, such as rural areas where access to nature is already high. Requiring such LPAs to implement a UGF would be wasteful. As such, the Government should restrict the mandate to urban LPAs, such as LPAs which are 'predominately urban' under the 2011 Rural-Urban Classification for Local Authority Districts.[103]

There may be a case for targeting the mandate further. For instance, some 'predominately urban' LPAs are small towns where access to nature may be quite high. The mandate could therefore be based on a measure

102. MHCLG (2020). *Planning for the Future: White Paper August 2020*. Page 57 (Link).

103. Government Statistical Service (2018). *The 2011 Rural-Urban Classification for Local Authority Districts in England* (Link).

of access to nature, such as walking distance. Natural England is due to publish updated maps on access to nature later in 2021, which could form the basis of a metric which specifies with LPAs should be mandated to adopt UGFs.

Recommendations in the NPPF tend to be high-level, so that there is flexibility for them to be translated in Local Plans to suit local planning contexts, and the wording of a UGF mandate should be in keeping with this. However, the Government should reference in the NPPF and create a "Model Urban Greening Factor" guide, to act as statutory guidance for LPAs when designing their own UGFs.

Statutory guidance is necessary for two reasons. First, the effectiveness of UGFs to promote urban greening is sensitive to their design. They can easily become too burdensome on developers if they are not flexible enough, and they can generate unintended outcome if they do not include certain checks, such as obligations on development to maintain natural infrastructure once it is installed.

Second, LPAs' resources are likely to be under intense strain over the next few years. The Planning White Paper sets an expectation for LPAs to produce new Local Plans within 30 months. Setting out a 'model UGF' will provide LPAs with an oven-ready framework to work with, legitimised by national government. This will help to reduce any additional burdens a UGF mandate may place on LPAs.

The Model Urban Greening Factor Guide could be published as a standalone document and referenced as statutory guidance within the NPPF. It should be relatively general, setting out the qualities of an effective UGF while giving LPAs some room to shape UGFs to suit their local circumstances. The guide should contain several key elements (Box 5). The quality of UGFs can be checked against this government guidance by the Planning Inspectorate when it reviews the next iteration of Local Plans.

Box 5: Designing the Model Urban Greening Factor

The Model Urban Greening Factor Guide needs to establish the hallmarks of an effective UGF while remaining relatively general. It should ensure LPAs' own UGFs follow a consistent formula while providing them space to adapt UGFs to local circumstance.

As such, the Guide should be mainly principle-based, with only a few prescriptive design features to leave room for local innovation in how UGFs are designed.

In terms of principles, UGFs should:

- **Be flexible** so that developers are incentivised to find the most cost and space efficient ways to incorporate natural infrastructure into sites (e.g. ensure shopping lists include lots of greening options, separate minimum UGF scores based on the type of development);
- **Enhance access to nature**, because this is the primary reason for their use in dense urban areas where nature is being squeezed out (e.g. prioritise natural infrastructure at the street level);
- **Improve outcomes for nature**, because of the positive services nature provides in urban areas, which are likely to become more important in the future (e.g. weight natural infrastructure according to local ecosystem priorities);
- **Minimise unnecessary bureaucracy**, to avoid UGFs encumbering planning at a time when the Government is streamlining the system (e.g. create clear guidance and calculation templates, emphasise that onsite net gain obligations contribute towards UGF scores).

All UGFs should have the following features as standard:

- **Maintenance obligations** placed on the owner of natural infrastructure for its lifetime;
- **Shopping lists** of greening options for developers, with the weightings reflective of Local Nature Recovery Strategies;
- **Mandatory minimum UGF scores** for developers to meet, backed up with clear calculation templates and guidance;
- **Natural infrastructure quality standards**, such as Natural England's forthcoming Green Infrastructure standards.[104]

We suggest the following wording to be included in the revised NPPF for a mandatory UGF:

> *"Where a Local Plan covers a predominately urban area [or another condition, to be decided by Government], it should include proposals for a mandatory Urban Greening Factor scheme. These should reflect the approach set out in the Model Urban Greening Factor guidance."*

There is a political decision to make in whether UGFs are made mandatory or voluntary for predominately urban LPAs. A policy for mandatory UGFs is preferable to one for voluntary UGFs, as there is no guarantee they will be adopted in Local Plans given the growing strains on the resources of LPAs created by forthcoming planning reforms and likely political opposition from some groups.

104. Natural England (June 2021). *Natural England action plan 2021 to 2022: Corporate Report: Our priorities for 2021 / 2022* (Link).

As a second-best option, the Government could include a policy in the NPPF recommending that LPAs voluntarily consider adopting UGFs. This still has merit, because its inclusion in the NPPF legitimises the use of them on a national level, and it allows the Planning Inspectorate to quality check any UGFs against the Government's accompanying Model UGF Guide. We suggest the following wording for the revised NPPF for a voluntary UGF:

> *"Where Local Planning Authorities cover predominately urban areas [or another condition, to be decided by Government], their Local Plans should consider adopting an Urban Greening Factor scheme. Any Urban Greening Factor scheme should reflect the approach set out in the Model Urban Greening Factor guidance.*
>
> *If an Urban Greening Factor is not included in an eligible Local Plan, the Plan must clearly set out the reasons for its exclusion."*

Theme #2: Strengthen the role of nature in urban design

Recommendation 2.1: The Government should strengthen the National Model Design Code to strengthen the role of nature in Local Design Guides.

Following the work of the Building Better, Building Beautiful Commission, one of the key drivers of the Government's Planning White Paper is to ensure that development in England is beautiful.

To deliver this, the Government proposes that Local Planning Authorities create new Local Design Codes and Guides. These are documents which set out the key design principles for new developments to follow in a simple and mainly graphical format. The idea is that as new developments are built, consistent design will emerge across an area as Local Design Codes and Guides guide development within a consistent set of rules. As part of the Government's changes to the NPPF, Local Authorities will be expected to produce Local Design Codes or Guides, which will also be referenced in their revised Local Plans.

When drafting their Local Design Codes and Guides, two documents form the planning guidance that LPAs need to take into account. The first is the National Model Design Guide (NMDC), which was published in 2021. The NMDC is a high-level document that sets out a baseline standard for quality and practice across England.[105] The second document is the National Design Guide (NDG), which sets out the Government's priorities for well-designed places in the form of ten characteristics of a well-designed place.[106] A supplementary document, the Guidance Notes for Design Guides, contains detailed chapters fleshing out what each of the ten areas of well-designed places mean in practice.[107] Nature is one of the ten chapters, outlining how Local Design Codes and Guides should ensure developers consider nature as part of their planning applications. The

105. MHCLG (2020). *National Model Design Guide* (Link).
106. MHCLG (2020). *National Design Guide* (Link).
107. MHCLG (2020). *Guidance Notes for Design Codes*. Page 21 (Link).

NMDC is designed to act as a broad framework to promote a consistent approach to designing Local Design Codes and Guides. The NDG adds flesh to this framework by providing detailed guidance on the Government's priorities for well-designed places.

Figure 21. The Government's ten characteristics of a well-designed place (Source: National Design Guide).[108]

Local Design Codes and Guides offer a way to ensure the right kinds of nature are considered in the design of development. The Government's guidance on including nature in Local Design Codes and Guides are not to be scoffed at; they represent an effective step in the right direction.

However, our research suggests that the Government's reforms need tweaking in several areas to ensure their effectiveness. Local Design Codes and Guides are a promising tool for integrating locally popular natural infrastructure into the design of places. However, to be effective, their wording on when and how to use natural infrastructure in design needs to be clear and precise to create urban greening that is valuable. Our recommendations therefore seek to tweak the details of the Government's existing proposals, rather than recommend wholesale reform.

The Government should update the National Model Design Guide and National Design Guide and Guidance Notes on Design in the two ways:

- **To promote consistent and higher quality urban greening, the National Model Design Code and its associated guidance should widely endorse established standards and methodologies for integrating nature into the design process**. In places, the current draft of the Guidance Notes for Design Guides asserts high-level ambitions for what Local Design Codes should do to promote urban greening without specifying *how* they should do it. While there are benefits in drafting national planning guidance to be generalised, this misses an opportunity to promote the wider adoption of industry-leading standards and methodologies in

108. MHCLG (2020). *National Design Guide.* Page 8 (Link).

design codes. Referencing such standards within the guidance legitimises their use by Local Planning Authorities, which will promote more consistent and ultimately higher quality urban greening. For instance, the Planning for Biodiversity section (N.3.ii) could reference the Building with Nature standards, which provide a reliable way of evaluating and benchmarking natural infrastructure.[109] Referencing private standards and methodologies is an established precedent elsewhere in the guidance; for instance, Fields in Trust's work is referenced within the open space standards section.[110]

- **The National Model Design Code and its associated guidance should obligate Local Design Codes to contribute towards the UK's environmental targets.** The Guidance Notes for Design Codes includes provisions to ensure Local Design Codes and Guides implement biodiversity net gain and utilise Local Nature Recovery Strategies, which are both being introduced as part of the Environment Act. However, the guidance should include an obligation that Local Design Codes and Guides must demonstrably contribute to the UK's wider environmental objectives, encapsulated in the 25 Year Environment Plan. Local Design Codes and Guides will contribute in some ways – such as through their net gain provisions – but their contribution is likely to be patchy and focused on siloed areas of urban greening. Referencing holistic national environmental targets are a way to ensure different elements of urban greening within the guidance are aiming at the same goal. For instance, obligating Local Design Codes and Guides to positively contribute towards the UK's forthcoming 2030 Species Abundance Target would formalise the environmental goal posts for various existing parts of the guide, such as biodiversity net gain and the use of Local Nature Recovery Strategies.

Recommendation 2.2: The Government should begin a behavioural campaign to encourage people in urban areas to green private property.

Policies like Urban Greening Factors promote urban greening by targeting the behaviour of market actors, but the role of individual urban residents is important in enhancing access to nature as well.

This can be seen when considering the important role of individual behaviour in greening private property. For instance, residential gardens were estimated to take up around a third of the total urban area of England in 2019.[111] In Great Britain, one in eight households lacks access to private gardens, which rises to one in five in London.[112] While most residential gardens are likely to be private, benefitting those with access to them the most, they can enhance access to nature in the public realm through a number of ways. For example, gardens provide 'stepping stones' of habitat in dense urban areas, supporting broader populations of mobile

109. CIEEM (2021). *Revised Building with Nature Standards Published* (Link).
110. Ibid, MHCLG (2020). *Guidance Notes for Design Codes*, p21 (Link).
111. Office for National Statistics (2019). *UK natural capital: urban accounts: Private outdoor space* (Link).
112. Office for National Statistics (2020). *One in eight British households has no garden* (Link).

wildlife throughout whole towns and cities. Further, attractive natural infrastructure on private property that is visible from streets provides important benefits for passers-by, such as creating an attractive sense of place, or acting as shields against noise or air pollution.

While the benefits of urban greening are far higher when greening publicly accessible spaces, because the services natural infrastructure provide accrue to more people, policy would miss a trick by not promoting urban greening through behavioural campaigns. Indeed, encouraging individuals to drive urban greening has two particular benefits which policies that target market actors do not.

First, behavioural campaigns target urban land that is outside the scope of other policies. For instance, UGFs apply to new development and developers, and therefore do not capture existing public and private greenspace in their remit. As noted above, private gardens are an example of private greenspace offering significant opportunities for urban greening; for instance, if urban residents in England chose to let a third of their residential gardens to grow wilder, around 149,000 hectares of space for nature would exist in England's towns and cities in gardens alone.[113]

Second, behavioural campaigns are likely to encourage direct community involvement in and ownership of urban greening projects, creating urban natures that are higher quality and locally popular. There are many examples of this: for instance, a study of ten community green projects in Greater Manchester found that projects which were more community-led had higher biodiversity potential.[114] Promoting 'bottom-up' urban greening has the dual benefit of directly increasing people's interaction with nature, increasing the value of the services it provides, while encouraging people to take ownership of natural infrastructure, increasing the likelihood that it is both locally popular and will be maintained over the medium to long term.

Indeed, given the peak in the levels of public and political support for urban greening, post-Covid behavioural campaigns are likely to be particularly effective. As highlighted earlier in this report, the pandemic has drawn attention to the importance of having decent access to nature in urban areas. Judging the effectiveness of behavioural campaigns is difficult, given a general lack of post-campaign monitoring, but it is a reasonable assumption that people are more likely to respond to urban greening behavioural campaigns in the current context.

Given the current opportunity, DEFRA should lead a blitz behavioural campaign to support 'bottom up' urban greening. Two particular public campaigns may be effective:

1. **Campaign for people in urban areas to dedicate 30% of their gardens to providing space for nature, backed up with guidance.** As outlined above, there is significant opportunity for urban greening through residential gardens. They amount to a third of all urban space in England, and they are not targeted by other policies, such as UGFs. DEFRA should lead a campaign in nature-deprived

113. Office for National Statistics (2019). *UK natural capital: urban accounts: Private outdoor space* (Link); Policy Exchange calculation based on Table 4 (total residential garden area in England * 33%).

114. Matthew Dennis and Philip James (2016). *User participation in urban green commons: Exploring the links between access, voluntarism, biodiversity and wellbeing.* Urban Forestry and Urban Greening, 15: 22 - 31 / University of Salford (Link)

areas aiming to sign up the owners or managers of private residential gardens to dedicating 30% of their green space to nature, mirroring the UK's target of protecting 30% of land by 2030. The campaign should be backed up with guidance material on maximising the benefits of doing so, following similar NGO-led campaigns.[115] The guidance also provides an opportunity to raise the profile of the UK's environmental commitments, such as the 30% by 2030 and the 2030 Species Abundance targets. The campaign should be designed in line with the Behavioural Insight Team's "checklist for successful nudges".[116]

2. **Environmentally-ambitious households should be able to apply for Green 'Nature Recovery' plaques, similar to English Heritage's blue plaque system for houses of historical significance**. Over time, the increasing presence of green plaques in towns and cities would raise the profile and normalise 'bottom up' urban greening. These behavioural nudges are not without precedent: The Department for Transport (DfT) has implemented a similar policy for electric vehicles, with all new electric vehicles having a green stripe on their licence plate.[117] The campaign could be run by Natural England, as the Government's natural environment adviser, and the design of the plaques could mirror English Heritage's system of blue plaques for places of historical and cultural significance.[118] Natural England should establish a criteria for awarding a plaque. There are multiple options for this. For instance, a household may need to achieve a high 'household UGF', have a particularly biodiverse garden, or have unique natural infrastructure like a green roof. Whatever the criteria is, it should avoid being overly bureaucratic and it should be easily verifiable, such as through photo evidence.

These campaigns could form part of existing behavioural campaigns that focus on private property, such as the *Plant for Our Planet* campaign that was launched as part of the preparations for COP26.[119]

Theme #3: DEFRA should take an explicit lead driving Local Authority-led urban greening

Urban greening is arguably best driven by Local Authorities rather than central government departments. As Local Authorities are producing Local Nature Recovery Strategies, they are more likely to know where the opportunities for urban greening are, and what kind of natural infrastructure is most locally appropriate. Yet, central government departments play a key role in several areas, such as in incentivising Local Authorities to be ambitious, and ensuring urban greening meets a minimum standard through regulation and policy (e.g. biodiversity net gain) or guidance (e.g. Natural England's forthcoming Green Infrastructure Standards).

Given the political opportunity at hand, DEFRA should take an explicit lead to promote urban greening and reverse the decline of greenspace in England's cities.

115. E.g. Royal Horticultural Society (undated). *Lets get greening Britain* (Link); The Wildlife Trusts (undated). *Reconnecting Manchester with urban wildlife* (Link).
116. UN Environment Program, The Behavioural Insights Team, GRID Arendal, and the Youth & Education Alliance (2020). *The Little Book of Green Nudges.* Page 41: *Checklist for Successful Nudges* (Link).
117. Hugo Griffiths (2020). *Green number plates for electric cars arrive.* Auto Express (Link).
118. English Heritage (undated). *London's Blue Plaques* (Link).
119. DEFRA and Rebecca Pow MP (2021). *Public urged to Plant for Our Plant in a new campaign launched today* (Link).

Recommendation 3.1: Produce statutory guidance for Local Authorities on how to manage public land to promote urban greening.

Local Authorities have a number of distributed duties that they have to meet when managing public land, such as maintaining access to roadside verges. However, these duties can often be met in a wide variety of ways, and for some there is significant potential to improve the environment by sympathetically managing underutilised sections of urban public land.

The Environment Act will introduce an enhanced biodiversity duty, requiring Local Authorities to review the operations and policies at least every five years and ask what actions they can take "to further" conservation and enhancement of biodiversity.[120] Current proposals are Local Authority-led, and our research highlighted that there could be value in producing an authoritative document on managing public land to promote urban greening, particularly to add clarity on minimum expectations for meeting the enhanced biodiversity duty.

DEFRA should produce statutory guidance for managing public land to promote urban greening. The idea is that this guidance can guide Local Authorities to meet their other statutory obligations while managing public land for the benefit of nature, such as sympathetically mowing verges so long as they do not undermine the Local Authorities' statutory duty to maintain public highways.

While the content of the guidance should be general to provide flexibility to adapt it to local circumstances, it should include some minimum actions. Importantly, these minimum actions should avoid being overburdensome on already stretched Local Authorities, but our research highlighted a number of examples that would impose little extra burden on Local Authorities while benefitting nature (Table 3).

Table 3: Examples of low-hanging fruit policies for Local Authorities.

Policy	Local Authority considerations
Manage roadside grass verges sympathetically Highway Authorities regularly cut roadside grass verges to meet their statutory duties, such as to maintain visibility at junctions.[121] However, this duty reportedly leads to verges being overly cut back by some Local Authorities. A recent estimate suggests over a quarter of Britain's verges are maintained as frequently mown grassland.[122] A widely cited study shows that the area of lowland meadows fell by 97% between 1930 and 1984.[123] This is bad for biodiversity, because roadside verges that are allowed to grow more can act as important habitat for wildflowers and insects. By avoiding overly mowing verges and only mowing only once or twice a year at the right times, roadside verges can be managed as seasonally important habitats for wildlife and plants.[124]	For many Local Authorities, cutting roadside verges less often will save money. External ecologists may need to be consulted on appropriate mowing regimes, although there is plenty of authoritative NGO guidance. The Highways Authority will need to balance longer roadside verges with their statutory duties to maintain highway safety. In places, Local Authorities may face demands to keep verges "tidier" from residents.[125]

120. The Environment Act 2021 (Link).
121. The *Highways Act 1980*, Section 41 (Link)
122. Benjamin Philips et al (2021). *Road verge extent and habitat composition across Great Britain.* Landscape and Urban Planning. 214 (Link).
123. Robin Fuller (1987), *The changing extent and conservation interest of lowland grasslands in England and Wales: A review of grassland surveys, 1930 -1984.* Biological Conservation. 40(4): 281-300 (Link).
124. Plantlife (2019). *Managing grassland road verges: A best practice guide.* Page 13 (Link).
125. Patrick Greenfield (2020). *On the verge: a quiet roadside revolution is boosting wildflowers.* Guardian (Link).

Create pesticide-free zones in towns and cities, and targets to reduce amenity pesticide use over time Pesticides play an important in managing the UK's plant health, crop production, national infrastructure, and public spaces. The UK manages pesticide use through the *National Action Plan for the Sustainable Use of Pesticides.*[126] DEFRA are currently producing an updated version.[127] Most pesticides are sprayed in the agricultural sector, but many are also used in the amenity sector to urban manage public spaces. According to the Pesticides Action Network UK, the public are most exposed to pesticides through it being sprayed in urban area, although data collection on amenity pesticide use is notably limited with the last Government survey conducted in 2012.[128] Pesticides should be avoided in urban areas where their use poses unacceptable risks through exposing lots of people to them. Further, their use negates the benefits of letting nature grow in urban areas, where they are used primarily for aesthetic reasons. For instance, since 2020, Hackney Council has extended a policy of no-spraying on 200 housing estates, reducing urban pesticide use by 40%.[129]	Reducing pesticide use is likely to save most Local Authorities money, although the level of saving depends on a Local Authority's initial pesticide use and whether reducing their use increases alternative maintenance costs, such as by needing to rely on physically pulling out weeds and other pests. Hackney Council reportedly saved £10,000/ year by avoiding spraying busy walkways.[130] Pesticides may be the best option for land management on a practical and financial basis in places where there is little footfall, keeping human exposure low, and a need to manage pests, such as along important transport infrastructure that need to be maintained on a statutory basis.
Rewild underused section of public land Rewilding broadly refers to leaving areas of land alone for natural process to unfold. In practice, it has a variety of definitions, ranging from zero interventions to 'guided' interventions to shape natural processes along a desired trajectory.[131] Rewilding can have clear environmental and practical benefits depending on the site in question. Environmentally, it provides space for species to establish themselves and ecosystems to mature, furthering the Lawson Review's principles. However, sites need to be evaluated individually, as rewilding may not improve local biodiversity if, for instance, a habitat becomes dominated by scrub. Practically, rewilding offers councils ways to save money by managing land less intensively, although some interventions may be necessary to ensure scarce land retains high amenity value for residents in urban areas. However, rewilding is still a marginal practice in England. As of May 2021, around three quarters of councils in England have no rewilding plans in place.[132] Despite this, there is clear potential for rewilding in urban areas, with 73,400 hectares of publicly accessible green space in urban areas in England, most of which is likely to be owned by public estates.[133] Many Local Authorities are already implementing ambitious programs: For instance, North Somerset Council plans to rewild as much of its parks, verges and open spaces 'as possible'.[134]	There is limited evidence on the scope for rewilding in urban areas, due to limited mapping work on the amount of publicly owned land, what it is used for and the quality of the existing environment. However, this is likely to change soon, because ongoing work to inform Nature Recovery Networks will create detailed knowledge of urban environments. Nature Recovery Networks and the introduction of biodiversity net gain also provide opportunities to earn revenue from rewilding projects. Rewilding projects potentially offer financial savings for Local Authorities if they involve a more 'hands off' approach to managing different sites. Notably, any savings will vary with the rewilding approach adopted. Rewilding can involve restricting access to public areas to provide space for nature, which can be locally unpopular, especially in urban areas. Public consultation is therefore key to any project's success.

Source: Policy Exchange analysis

126. DEFRA held a consultation that ended in February 2021. A summary of responses was published in October 2021 (Link).
127. DEFRA (Dec 2020). *Consultation on the 'Revised National Action Plan for the Sustainable Use of Pesticides (Plant Protection Products)'* (Link).
128. Pesticide Action Network UK (undated). *Pesticide-free towns campaign: introduction: whats the problem?* (Link); A. Goulds (2012). *Amenity Pesticides in the United Kingdom 2021: Section 1: Quantitative Report* (Link).
129. Jon Burke (2021). *Ibid.*
130. Jon Burke (2021). *Where is the government support for pesticide-free towns and cities?* (Link).
131. Henrike Shcult to Buhne et al (2021). *The policy consequences of defining rewilding.* Ambio (Link).
132. Sophie Yeo (2021). *One quarter of England councils have plans to rewild. Does yours?* Inkcap Journal (Link).
133. ONS (2019). *UK natural capital: urban accounts: Table 3* (Link).
134. North Somerset Council (undated). *Rewilding in North Somerset* (Link).

The Office for Environmental Protection (OEP) has been established as part of the Environment Act to scrutinise government policy and compliance with environmental law.[135] Local Authority consideration of this statutory guidance could form part of the OEP's remit.

Recommendation 3.2: Establish a league table of Urban Greening and an associated place-based accreditation scheme for Nature Recovery Cities.

As set out earlier in this report, the impacts of COVID-19 are creating a strong consensus on the need to enhance access to nature in towns and cities. Making urban areas liveable for residents while ensuring they contribute to the recovery of nature is what 'Building Back Better' should look like in practice. This strengthened political and public mandate provides an opportunity to increase the scale and pace of positive actions at a city level.

Local Authorities are best placed to drive urban greening at a local level. They have the best knowledge of the local opportunities of for urban greening, particularly through working to create local Nature Recovery Networks. Further, Local Authorities have number of policy levers at their disposal to promote greening, such as through their Local Plans or through greening public estates. Empowering Local Authorities to increasingly drive urban greening 'from below' is therefore fundamental for enhancing access to nature throughout England.

To do so, DEFRA should create a new 'League Table of Urban Greening', which ranks nature-deprived towns and cities based on their greenness. The Department of Transport introduced a similar scheme to rank Local Authorities based on the number of electric vehicle changepoints per 100,000 they installed.[136] Urban areas could be ranked either by their absolute greenness or by their *rate* of urban greening. Towns and cities that meet a minimum threshold should be designated as 'Nature Recovery Cities' to tie the scheme into the broader 'Build Back Better' narrative.

Theme #4: Where appropriate, Local Authorities should provide communities with more autonomy over local public land

The budgets Local Authorities allocate to managing urban green spaces has been shrinking over the last decade. Recent data is not available, but according to the Heritage Lottery Fund in their *State of UK Public Parks 2016*, the average council budget for parks and green spaces fell by 18.4% between 2013 and 2016.[137] This is generally explained by broader austerity reducing the amount of money available. Park budgets are also reportedly one of the first to be reduced in Local Authority budget cuts because they tend to be seen as less critical than services like social care, which Local Authorities have a statutory duty to provide.[138] It is generally assumed Local Authorities own most public green spaces in urban areas, although exact data is unavailable.[139]

Driven by these financial pressures, urban green spaces are increasingly

135. DEFRA (2021). *News story: Interim Office for Environmental Protection to be launched* (Link).

136. Department for Transport et al (Nov 2019). *New 'league table' reveals electric car charging availability across the UK as Transport Secretary calls on local authorities to do more* (Link).

137. Heritage Lottery Fund (2016). *State of UK Public Parks 2016*. Page 46 (Link); Park revenue data is based on a survey of park managers conducted in 2016.

138. House of Commons Communities and Local Government Committee (2017). *Public parks*. Pages 21 – 22, (Link).

139. Guy Shrubsole (May 2020). *Who owns England?: What land is owned by councils?* (Link).

managed using a variety of less centralised models. Some green spaces are purely managed by Local Authorities, while the management of other parks is partly or fully contracted out to private companies or taken over by trusts.[140]

Our research highlighted one particularly promising model of governance, known as the 'broker model'. Under this model, Local Authorities provide some autonomy to a trusted 'broker' to manage local green spaces, which is typically an organisation with strong local links such as a local NGO or third sector organisation. Using their local networks, brokers can organise management of green spaces alongside local community groups.

There are several advantages to this model. Principally, Local Authorities can save money through park management budgets being applied to less greenspace. This means existing budgets go further, potentially leading to better management of other areas of the public green realm. While a council officer would need to monitor broker programs to ensure green spaces are being managed appropriately, it is likely this will cost less than any money saved.

Further, broker models offer significant potential to involve local communities more in the management of green spaces. Through brokers, informal neighbourhood 'friends' groups and other community organisations can directly become involved in their local green spaces. This enhances access to nature on a deeper level than only creating ways for people to engage with their natural environment; by allowing local groups to have a say in what and how they local green spaces are run, the quality of the interaction between people and nature is likely to be higher. For instance, managing green space as community allotments have been shown to lead to higher self-reported satisfaction among residents than other uses of urban green space. The current enthusiasm for enhancing access to nature in England's towns and cities – as outlined earlier in this report - could translate into high demand at a community level to participate in such programs.

Broker organisations are necessary because informal community groups tend to lack public liability insurance. Giving such groups direct control of green space creates legal and financial risks for Local Authorities. For instance, if an informal community group is managing a green space and drills into a local water main, the community group is unlikely to have liability insurance to cover damages, leaving the Local Authority to cover any damages. As more formal organisations, brokers can hold public liability insurance policies on behalf of local community groups, overcoming this barrier.

There are two other main concerns with broker models, but each can be addressed in practice. The first is a question of funding; Local Authorities are unlikely to be able to subsidise public liability insurance for brokers. However, there is often ample opportunity for local-scale funding opportunities; for instance, community groups are often well positioned to raise funds through fund raisers. Brokers are likely to be

140. Although published in 2006, CABE (2006). *Paying for parks: eight models for funding urban green spaces* (Link) provides a relevant summary of urban greenspace management models.

well positioned to apply for various government and corporate grants. Further, Local Authorities can create funding through policy levers at their disposal, such as through Section 106 agreements or the Community Infrastructure Levy.[141]

The second issue revolves around democratic concerns. Providing control of urban green spaces to local groups can mean that part of the public domain is managed in the interests of a small group of people; one expert described as this risk as creating 'self-perpetuating oligarchies' to the Communities and Local Government Committee's *Public Parks* inquiry.[142]

These issues are only navigable with Local Authorities staying involved with projects as they develop. Our conversations with experts and broader research suggest that two things are important here: a clearly agreed management plan between the Local Authority and broker, which sets out how a space should be used and on what terms and having Local Authority officers monitoring projects from time to time.

Theme #5: Government should initiate quick wins now to ensure that the post-COVID recovery is as green as possible

The UK's approach to planning and the environment is undergoing significant reform. Through the ambitions of the Planning White Paper, the planning system is undergoing its largest reforms in a generation. At the same time, the UK's policy framework for managing the environment is also being revolutionised through the Environment Act.

Our research highlighted a series of 'quick win' policies for enhancing urban greening. They are quick wins because they can all be implemented relatively easily, such as by avoiding the need for legislative changes. Many of them can also plug into the broader reforms to the UK's frameworks for planning and environmental management.

Each of the quick win policies presented below is a small piece of the urban greening puzzle, because each only addresses a narrow part of urban greening. Mandating swift bricks in newbuilds will help create habitat for a small number of species in urban areas, but it will clearly not reverse nature's decline. Our conversations with policymakers highlighted that these policies find it difficult to attract much political attention, due to a perceived small and isolated impact. As such, these policies are much more likely to be implemented through piggybacking on the political attention of the Planning White Paper and the Environment Act.

The Government should therefore implement "quick wins" for urban greening as part of the broader changes to the UK's planning and environmental policy frameworks. Both the Planning White Paper and the Environment Act present a strategic opportunity to implement small pieces of the urban greening puzzle that outside of these reforms are unlikely to be adopted.

141. Public Health England (2020). *Improving access to greenspace: a new review for 2020.* Page 51 (Link).

142. Communities and Local Government Committee (2016). *Oral Evidence: Public Parks: HC45.* Q126 (Link).

Recommendation 5.1: Mandate swift and bee bricks in all suitable new build residential homes in England.

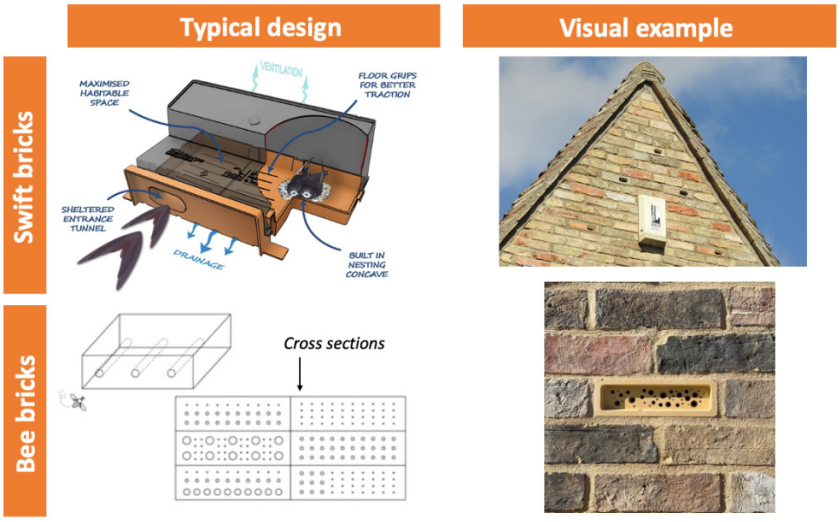
Many species in England's urban areas are experiencing population falls that are partly driven by not enough quality habitat.

For instance, according to the British Trust for Ornithology, the population of Swifts in England is estimated to have declined by 58% between 1995 and 2018.[143] The exact causes of this decline are unknown, but the loss of suitable nesting habitat for swifts in urban areas, owing to how new buildings are constructed, is thought to be a leading driver.[144]

Bees are experiencing a similar but less dramatic population declines. The UK's *Status of Pollinating Insects Indicator* tracks bee and hoverfly populations as a proxy for monitoring the overall health of pollinators. It suggests that wild bee population levels have decreased by around 11% between 1980 and 2018.[145] The trend appears more dramatic at a global scale, with 25% fewer bee species recorded in a global dataset between 2006 and 2015 compared to pre-1990.[146] Climate change, pesticides and land use change are all driving forces behind the decline of bee numbers. In urban areas, a lack of suitable habitat for wild bees and low density of wildflowers are two significant drivers of population loss.[147]

Introducing more bee and swift bricks is a "quick win". They are bricks which can be easily incorporated into new or renovated buildings, creating quality habitat for both species (FIGURE). They are relatively easy to incorporate in development proposals because they fulfil the same function as regular bricks, and they can be customised to fit local vernaculars. They are also relatively cheap, with unit costs for high quality bricks ranging from £25 - £160, although they are likely to be far cheaper with bulk orders.[148] Indeed, several Local Authorities already mandate bricks in new builds, such as Brighton and Hove City Council, who mandated a minimum of three swift bricks in all new developments that are 5 metres high and above from April 2021.[149]

Figure 22. Design and visual examples of bee and swift bricks.[150]



143. Data written up in Ian Woodward et al (2020). BirdTrends 2020: trends in numbers, breeding success and survival for UK breeding birds. BTO Research Report 732 (Link); data accessible from British Trust for Ornithology [BTO] (2019). Bird Trends: Swift: Population changes in detail (Link).
144. BTO (2019). *Bird Trends: Swift: Causes of change* (Link).
145. Joint Nature Conservation Committee [JNCC] (2020). *UK Biodiversity Indicators 2020. Indicator d1c – Status of pollinating insects: Wild Bees* (Link).
146. Eduardo Zattara and Marcelo Azien (2021). *Worldwide occurrence records suggest a global decline in species richness.* One Earth, 4(1): 114 – 123 (Link).
147. Royal Botanical Gardens Kew (2020). *State of the World's Plants and Fungi.* Page 15 – 16 (Link); Katie Pavid (2021). *Bee keeping in cities is harming other wildlife, study find.* Natural History Museum (Link).
148. CIEEM (2019). *Inpractice: Biodiversity Net Gain.* Issue 104. Page 39 (Link).
149. Brighton and Hove Council (2021). *Council takes swift action to protect birds* (Link).
150. Top left: Designing Buildings Wiki (2021). *Swift brick* (Link); Bottom left: Designing Buildings Wiki (2021). *Biocement* (Link); Bottom right: BBA Architecture [instagram] (2021). *Bee brick installed in Copper House project, Cambridge* (Link); Top right: Action for Swifts [blog] (2016). *Internal swift boxes in a difficult situation* (Link).

Recommendation 5.2: All Local Authorities should introduce a 'green flat roof obligation' in urban areas.

Green roofs perform important functions in urban areas: they can reduce heat stress, reducing the need for artificial cooling; slow the rate of rainfall runoff from surfaces, reducing flood risk; provide habitat for a range of wildlife, and create aesthetic value in nature-deprived areas.

In the next iteration of the NPPF, the Government should mandate all urban Local Authorities to include green roof obligations on new or retrofitted development: i.e. wherever flat roofs occur, they should be laid with turf to encourage wildlife and other benefits (assuming there are no technical reasons against installation of a green roof). Policies which encourage the most efficient use of urban space do not compete with existing development for land, and they are therefore likely to be the cheapest (lowest opportunity cost). Flat roofs are typically underutilised spaces, representing an opportunity to efficiently introduce more natural infrastructure into urban areas. Mandatory greening of flat roofs is common in American cities, as well as in a number of European cities.[151] The national obligation should explicitly reference minimum technical standards for different types of green roofs, such as the 2021 *GRO Green Roof Code*.[152]

However, the mandate should be flexibly worded, providing Local Authorities with the room to decide how to implement the obligation. This is because Local Authorities know the opportunities for urban greening, and therefore the most appropriate policies to implement locally. This increases the likelihood of the right regulations and incentives leading to the right kind of green roofs being installed. For instance, an urban Local Authority may be particularly flood prone, in which case green roofs with maximum flood mitigation effects may be the best to prioritise. Further, with the growing emphasis on promoting beautiful places through Local Design Guides, green roofs need to complement architectural vernaculars.

Our research has highlighted three approaches that Local Authorities can adopt. The first approach targets the *type* of roof. For instance, Copenhagen mandates all roofs with a pitch above 30° to be green.[153] The second targets the *size and type of buildings*: For example, in San Francisco, all new residential buildings under 10 occupied floors, and all new non-residential developments with an area above 2000m^2, must dedicate 30% of their roof to vegetation, or 15% to solar panels.[154] The third approach can target a mixture of the type of roof and size and type of buildings.

Recommendation 5.3: Mandate Local Authorities to adopt canopy cover targets.

The benefits of urban trees are well known, ranging from enhancing biodiversity to improving mental health. However, other forms of natural infrastructure also provide these services, but urban trees have a "competitive edge" in two important areas of climate adaptation: flood risk and urban temperature regulation.

151. Gary Grant and Dusty Genge (2019). *Living Roofs and Walls from Policy to Practice: 10 years of urban greening in London and beyond.* P28 - 44 (Link).

152. GRO (2021). *The GRO Green Roof Code: Green Roof Code of Best Practice incorporating Blue Roofs and BioSolar applications: Anniversay Edition 2021* (Link).

153. Gary Grant and Dusty Genge (2019). *Living Roofs and Walls from Policy to Practice: 10 years of urban greening in London and beyond.* P22 (Link).

154. Green Roofs for Healthy Cities (2019). *Green Roof and Wall policy in North America: Regulations, Incentives and Best Practices.* Page 17 (Link).

The first is reducing flood risk. According to Green Blue Urban, 5% canopy cover in a street can reduce rainfall runoff by 2%.[155] This includes the effect of their branches and structure slowing down rainfall, as well as tree pits storing water. The average canopy cover in English Local Authorities is much higher than this, at 16%.[156]

The second service urban trees are particularly good at providing is regulating the temperature of urban areas. As mentioned earlier in this report, urban areas will be subject to higher temperatures as climate change progresses. According to the CCC, there is a small chance that some urban areas may experience temperature extremes above 40°C by 2040, but the UK's building stock ill-equipped for such temperatures, owing to low levels of energy efficiency, air conditioning and design.[157] Street trees can lower mean urban temperatures through evaporatively cooling and humidifying urban air, and through shading. Ground temperature reductions are likely to range from 0.6-3.2°C depending on cover and development type, although one modelling study in the US estimate that all urban trees across the US reduce the air temperature by around 3°C compared to scenarios in which cities contained no trees.[158]

The Government is taking steps to increase urban tree canopy cover. In April 2021, the *Urban Tree Challenge Fund* opened, which supports the planting and maintenance of 44,000 urban trees by 2024.[159] In July 2021, through the new NPPF the Government has mandated that all new streets should be tree-lined.[160]

However, several gaps remain. For instance, the policy all new streets should be tree-lined fails to address incentivise more trees on existing streets. Entirely new streets are also unlikely to be constructed in dense urban areas. Further, while the Urban Tree Challenge Fund is a step in the right direction to being fund the planting of trees on existing streets, it extends only until 2024. Current policies are therefore do not address the need for street trees in current urban areas.

In the next iteration of the NPPF, the Government should mandate Local Authorities to adopt canopy cover targets. These are necessary to focus minds on getting trees into existing streets in urban areas, particularly for the flood and temperature regulation benefits trees offer. The target could be set around 20%, which is around a quarter more than the average canopy cover for English urban areas now (16%).[161] This is a reasonable target, as recommended by Forest Research, because many Local Authorities do not meet this yet, although many US cities have canopy cover targets ranging from 30% to 56%.[162]

Recommendation 5.4: Ringfence 5% of Stamp Duty Land Tax (SLDT) for investment in local urban greening.

Urban Greening is likely to be most popular when local communities help define its trajectory and shape, as set out in Recommendation 4. However, community groups often struggle to access meaningful funding for local urban greening projects.

155. GreenBlue Urban (2018). *Street Tree Cost Benefit Analysis*. P28 (Link).

156. Kieron Doick et al (2017). *The canopy cover of England's Towns and Cities: baselining and setting targets to improve human health and well-being*. Forest Research (Link).

157. The CCC (2021). *Independent Assessment of UK Climate Risk (CCRA3)*. P48 (Link).

158. Mat Santamouris, et al (2017). *Passive and active cooling for the outdoor built environment – Analysis and assessment of the cooling potential of mitigation technologies using performance data from 220 large scale projects*. Solar Energy, 154: 14–33 (Link); Chenghao Wang et al (2018). *Cooling effect of urban trees on the build environment of the contiguous United States*. Earth's Future, 6(8): 1066 – 1081 (Link).

159. Forestry Commission (2021). *Guidance: Urban Tree Challenge Fund* (Link).

160. MHCLG (2021). *The National Planning Policy Framework*. Page 39, Paragraph 131 (Link).

161. Forest Research (undated). *Resources: Tree canopy cover leaflet* (Link); Kieron Doick et al (2017). *The canopy cover of England's Towns and Cities: baselining and setting targets to improve human health and well-being*. Forest Research. Page 5 (Link).

162. Kieron Doick et al (2017). *The canopy cover of England's Towns and Cities: baselining and setting targets to improve human health and well-being*. Forest Research. Pages 6 – 7 (Link).

Policy Exchange has previously recommended that 5% of Stamp Duty Land Tax should be ringfenced for street-based urban greening.[163] This has benefits of raising money for greening projects that are often reliant on grants, as well as providing an incentive for communities to set the direction for greening in their local area. As set out in Policy Exchange's report, *Strong Suburbs*, the money should be controlled by the local street association.

Recommendation 5.5: Introduce 'Wildbelts' as a land use category.

As identified by the 2010 Lawton Review, providing space for nature is the key way to improve habitat availability for wildlife. At present, some 28% of England is covered by some kind of protected area, ranging from nature conservation areas like Sites of Specific Scientific Interest (SSSIs) to landscape designations like National Parks and Areas of Outstanding National Beauty (AONBs).[164]

The Government has committed to expand the area of land covered by these protections to at least 30% by 2030, as well as to create 500,000 hectares of land as a national Nature Recovery Network (NNR) by 2042.[165] It is expected that a lot of the national NNR will overlap with national parks and other land designations. To create an evidence base for the national NRN, Local Authorities will be mandated to produce Local Nature Recovery Strategies (LNRSs) through the Environment Act. These will cover the whole of England and map local habitats, biodiversity priorities and sites for recovery and enhancement.[166] The LRNSs will form the puzzle pieces, which can then be put together to form the national NRN puzzle.

However, a key concern with the forthcoming NRN is that it will neglect most urban areas due to their low biodiversity value. Most of the sites LRNSs will map - priority habitats, areas for recovery and areas for enhancement - are likely to lie outside of dense urban areas, where the scope for environmental gains is generally low. More details will emerge once the LNRSs have been conducted, but the national NRN may become a missed opportunity to connect areas non-urban habitats with urban habitats close to where people live and, in the process, enhancing access to nature.

As recommended by the Wildlife Trusts, the Government should introduce a new planning designation specifically for areas of low biodiversity value. These areas which could be called 'Wildbelts'.[167] Most existing environmental land designations protect areas of *existing* biodiversity value, leaving areas of low biodiversity value unprotected. Wildbelts specifically plug this gap by managing land of low biodiversity for nature recovery and connecting different patches.

The key benefit of Wildbelts is that they could stretch around and into urban areas as part of the national NRN. As highlighted in a recent Westminster Hall Debate, Wildbelts could be as small as strips of land on a neighbourhood level.[168] This makes them a more pragmatic environmental

163. Dr. Samuel Hughes and Ben Southwood (2021). *Strong Suburbs*. Page 56 (Link).
164. HM Gov (2020). *PM commits to protect 30% of UK land in boost for biodiversity* (Link).
165. Natural England et al (2020). *Biggest ever nationwide initiative to restore nature in England set for launch* (Link).
166. Environmental Audit Committee (2021). *Biodiversity in the UK: Bloom or bust?* Pages 71 – 72 (Link).
167. The Wildlife Trusts (2020). *Wildbelt: A briefing by The Wildlife Trusts, September 2020* (Link)
168. Hansard, House of Commons (2021). *Westminster Hall Debate: Planning System Reforms: Wild Belt Designation: Volume 697: debated on Tuesday 22 June 2021*. Column 325WH, Dr Luke Evans (Link).

land designation for urban areas than other existing ones (e.g. SSSIs, AONBs) because they are compatible with the high competition for land in urban areas. Private and public landowners could opt in to be part of the Wildbelt designation, and there are multiple streams of funding they could access, such as payments under the future Environmental Land Management system, other DEFRA family funds (e.g. the Nature for Climate fund) or lottery and other non-public sources of funding.

Recommendation 5.6: Kick start rewilding in National Parks via strengthened National Park Management Plans.

National Parks are landscape designations which identify areas of importance to the UK's national heritage. They are a devolved policy area, with 14 National Parks throughout the United Kingdom, 10 of which are in England. The Environment Act 1995 governs National Parks in England and Wales, setting their objective to *"conserve and enhance the natural beauty, wildlife and cultural heritage"* of the area within their bounds.[169]

However, despite their emphasis on conserving and enhancing natural beauty and wildlife, National Parks are not particularly effective conservation tools. For instance, the International Union for the Conservation of Nature (IUCN), a global authority on conservation, sets international standards for conservation areas. It has six categories for conservations areas, with *Category I* being the most protected, and *Category VI* the least. The international standard for National Parks is usually *Category II*, but due to the design of the UK's National Parks as having people working and living within them, they are classed as *Category V* ('Protected Landscapes').[170]

Indeed, as set out in Julian Glover's recent review of protected landscapes, England's National Parks are environmentally not very valuable; for instance, 75% of the Sites of Specific Scientific Interest (SSSIs) within national parks are in "unfavourable or unfavourable recovering" condition, which is considerably higher than the SSSIs for the rest England (66%) given National Parks are protected landscapes.[171] The Government intends to create new National Parks to contribute towards its aim of protecting 30% of UK land by 2030.[172] Given the current environmental state of England's National Parks, the conservation value of additional National Parks is doubtful relative to stronger protections.

National Parks are primarily managed via National Park Management Plans (NPMPs). NPMPs are strategies in which each National Park Authority sets out its objectives and how it will work with other organisations to achieve them. They are updated every five years, and they are strategic in nature, laying out ambitions rather than concrete steps and targets.[173]

The Government should enhance the environmental value of National Parks by updating the remit of NPMPs in several ways. Additionally, on top of their existing function NPMPs should become delivery documents for improving the environmental condition of National Parks rather than purely strategic in nature. This means setting out clear actions for

169. Environment Act 1995, Section 60 (Link).
170. Mark Rowe (2020). *Dossier: The failure of Britain's national parks.* Geographical (Link).
171. Julian Glover et al (2019). *Landscapes Review: Final Report.* Page 34 (Link).
172. HM Gov (2020). *The Ten Point Plan for a Green Industrial Revolution.* Page 24 (Link).
173. National Parks England (undated). *National Park Management Plans* (Link).

improving the environment in each park, underpinned by milestones. To ensure National Parks are furthering the aims of the 25 Year Environment Plan, these milestones could be linked to the Government's forthcoming target to reverse the decline in species abundance by 2030, as well as the establishment of England's Nature Recovery Network.[174]

In terms of actions, National Parks should be required to put forward a plan for rewilding underused areas within their bounds. A large proportion of England's National Parks are farmed, but large areas are also unused beyond recreation. Rewilding refers to leaving areas untouched so they become "wild", although it is a broad term and in practice it can involve some direct management by land managers, such as species reintroduction. Rewilding offers a way potentially low-cost method for conserving areas of National Parks that could contribute to delivering England's evolving environmental targets. Some National Parks are already taking the lead here, particularly Exmoor, which has set out a vision for enhancing biodiversity in its bounds, including setting aside 10% of its area where "nature and natural processes are allowed to take their course".[175] Additionally, the legal status of NPMPs should be strengthened from public bodies only having 'regard' to them to 'furthering' their goals, in line with recommendations made in the Glover Review.[176]

174. As per the Environment Act 2021.

175. Exmoor National Park Authority (2020). *Exmoor Nature Recovery Vision*. Page 4 (Link).

176. Ibid, *Landscapes Review*, Page 50.

5. Conclusion

Almost four years on from the publication of the 25 Year Environment Plan, DEFRA is yet to finalise all of its metric for "*making sure that there are high quality, accessible, natural spaces close to where people live and work, particularly in urban areas*".[177]

At the same time, a window of opportunity has opened for policy to drive urban greening through the Government's generational reforms to England's environmental and planning policy frameworks. It is a rare that both these frameworks are being reformed at the same time. Together with the significant public support for urban greening, there is an opportune moment for the Government to reverse the protracted decline of access to nature in English urban areas. At the same time, this will help ensure that urban areas contribute to the Government's wider agendas to beautify urban areas and reverse species lost by 2030.

This report puts forward ideas to enhance access to urban nature while delivering on both these objectives, ranging from high impact policies like Urban Greening Factors to quick wins that will improve access to nature at local scales in the short term.

Once England's new planning and environmental frameworks are implemented, these ideas will remain relevant for improving access to nature, given the identified shortcomings in the Planning White Paper's and Environment Act's measures for enhancing access to nature in urban areas (Section 4). If public support for urban greening continues to grow post-COVID, the political value in implementing some or all of these policies will also grow.

177. HM Gov (2018). *A Green Future: Our 25 Year Plan to Improve the Environment*. Page 28 (Link); DEFRA (June 2021). *Outcome Indicator Framework for the 25 Year Environment Plan: June 2021 Update.*

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