



# Climate Change and Environment Strategy



## 2020 – 2025

Published May 2020

## Foreword

Human driven Climate Change is the greatest environmental challenge of our time and of any time before. Driven by human activities, our climate is changing at an unprecedented pace and scale that threatens all life on Earth. There is an urgent need for stronger and more integrated action.

I put forward an Environment Motion in May 2019 to Full Council. As a result the Council declared a Climate and Environment Emergency which has set us on a pathway to securing a sustainable future for our County and its residents. Our strategy is focussed on reducing greenhouse gas emissions, so that climate impacts will be less severe and biodiversity improved for future generations.

We must build on the good things we already do on the environment. We are proud of our work on renewable energy, flood risk, plastic pollution, efforts to increase modal shift and creating new green spaces, but more is needed. We must strengthen our policies across all areas of our work and find new financing mechanisms to support rapid and sustained change in how we do things. It is vital we work alongside and communicate with our communities about the actions we must take. Tackling Climate Change requires everyone, our citizens, all levels of government and businesses, to work in the same direction whilst protecting and caring for the most vulnerable in our society.



A handwritten signature in black ink, appearing to read "Steve Count".

Councillor Steve Count, Leader

Over the last two decades, the UK has led the world in demonstrating that cutting our emissions does not mean sacrificing standards of living for everyone. Since 1990, UK emissions have fallen by more than 40%, while our economy has grown by two thirds. Our vision for Cambridgeshire as a whole, is to deliver net-zero carbon emissions by 2050 in partnership with all stakeholders. For the first time this year, we developed carbon footprints for Cambridgeshire and our own organisation. Young researchers from Cambridge University's Science and Policy Exchange (CUSPE) developed the County-wide footprint which informs our strategy. We are proud to tell you that since our solar park near Soham went live generating clean electricity in 2017 and buying only green electricity for our buildings and streetlighting, we have saved 28,452 tonnes of greenhouse gas emissions.

**It is our intention that by 2025 all buildings that are both owned and occupied by the Council will be heated without fossil fuels, and all the Council's car and van fleet will be electric.**

In addition, we pledge to:

- Reduce the Council's carbon footprint on by 50% on 2018-19 levels, by 2023 on scopes 1& 2;
- Adapt our services to manage the impacts of Climate Change to benefit service users
- Improve air quality, increase biodiversity and natural capital across our estate and wildlife sites;
- Work with our supply chain to deliver 50% reduction on our 'scope 3' carbon emissions by 2030;
- Develop all Council strategies to include policies to tackle Climate Change and enhance our natural capital;
- Collaborate with Cambridgeshire businesses, residents and the public sector to deliver our ambitious targets, and net-zero carbon by 2050
- Work with Government, partners and stakeholders to support the 10,000 homes dependent on oil for heating and hot water in Cambridgeshire to switch to 100% clean energy by 2050

## Executive Summary

The Council declared a Climate and Environment Emergency in May 2019, which was passed unanimously, and committed us to the development of a Climate Change and Environment Strategy and Action Plan.

Our vision is to deliver net-zero carbon emissions for Cambridgeshire by 2050, in partnership with all stakeholders, whilst supporting our communities and Cambridgeshire's biodiversity and environmental assets to adapt and flourish as our climate changes.

The purpose of this strategy is to provide a clear statement of the Council's Climate Change and environmental objectives and to set out how the Council will meet environmental sustainability and Climate Change challenges. The Strategy is for Cambridgeshire *County Council* and focusses primarily on what the Council itself can achieve. However, tackling Climate Change, adapting to its ongoing impacts and protecting and enhancing our natural capital is bigger than any one organisation. So the Strategy also identifies how we must work with public and private sector partners and communities across the county to support the transformation needed to tackle these challenges together.

This Strategy has been developed around three key themes:

- Quantifying our carbon footprints to inform and deliver Climate Change **mitigation** through efforts to reduce or prevent carbon emissions;
- **Adaptation** to cope with the existing and future impacts of Climate Change;
- Enhancing and conserving **natural capital** such as wildlife, plants, air, water and soils.

Our priority areas for the Climate Change **mitigation** theme (reducing our carbon footprint) are:

- Energy efficient, low carbon buildings – improving energy efficiency and installing low carbon heating.
- Low carbon transport – prioritising walking, cycling and public transport, and supporting the uptake of electric vehicles.
- Waste management strategies to reduce carbon,
- Afforestation – planting trees
- Peatland - developing understanding and management best practice

Our priority areas for the Climate Change **adaptation** theme are:

- Resilience of our services and buildings, effective Climate Change risk management strategies across all services, and supporting vulnerable people in severe weather or temperatures.
- Resilient infrastructure and highways;
- Flood risk;
- Water availability;
- Green and Blue Infrastructure.

Our priority areas for the **natural capital** theme are:

- Reducing waste and tackling plastic pollution;
- Air pollution;
- Green spaces, restoring and/or creating natural habitats, and land management, including more tree planting and continued environmental stewardship as part of rural estate management.
- Peatland;
- Water management.

Seven targets have been identified in the Action Plan. Targets 1 to 5 are for the County Council to deliver, which are reflected in the pledge above, and targets 6 and 7 will be in collaboration with partners and communities.

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# 1 Introduction

## 1.1 Why have we declared a Climate and Environment Emergency?

In May 2019, Cambridgeshire County Council declared a climate and environment emergency, and committed to the development of this Climate Change and Environment Strategy.

It recognised that our natural, historic and built environment is the most precious inheritance for which we act as caretakers for the next generation, and that society is facing global challenges of population growth, Climate Change and equalisation of living standards not before faced at this scale. It is a highly time sensitive problem; every day action is delayed it becomes more likely we will pass irreversible environmental tipping points.

Human driven climate change is one of the most complex issues facing us today. It poses significant risk to our health, economy and environment, and endangers the wellbeing of future generations. Air borne, water and land pollution is also a global environmental concern. It involves many dimensions – science, economics, society, politics and moral and ethical questions – and is a global problem, felt on local scales, that will be around for decades and centuries to come.

People of all ages, all walks of life and all social and economic backgrounds in Cambridgeshire are becoming increasingly concerned they will leave or inherit an environment that is irreparably damaged, forcing others to live with the consequences of the decisions we make today. Carbon dioxide, the greenhouse gas that has driven recent changes in our climate, lingers in the atmosphere for hundreds of years, and the planet (especially the oceans) takes a while to respond. Even if we stopped emitting all greenhouse gases today, Climate Change will continue to affect future generations.

All governments (national, regional and local) have a duty to limit the negative impacts of environmental change by cutting carbon emissions, protecting biodiversity and reducing pollution. The necessity of reaching net-zero was enshrined in UK law on 27th June 2019, with a target requiring the UK to bring all greenhouse gas emission to net-zero by 2050.

## 1.2 Sustainable development in a resource constrained world

The United Nations General Assembly approved 17 global goals in 2015, to achieve a more sustainable future for everyone by 2030. The sustainable development goals (SDG's) include specific goals on Climate Change, life on land and life in water, but also cover wider societal needs such as jobs, economic development, infrastructure, health, poverty and education.

**Fundamental to sustainable development is resource efficiency.** Achieving a future free from major global conflict over resources, can only be achieved through equitable distribution of natural resources and their conservation. Quality of life for everyone is possible, if developed countries significantly reduce consumption and improve resource efficiency to keep within one planet's resources rather than the 3, 4 or 5 planets' worth of some countries. For developed countries, this will require investment into new technical innovations, upgrading infrastructure to reduce future resource consumption, promoting nature and making cleaner and greener lifestyle choices as part of our policy making.

## 1.3 The impacts of Climate Change

Climate Change is already occurring, and it is known that human activities contribute significantly to the increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level.

The International Panel on Climate Change (IPCC) estimates that human activities have already caused 1°C warming above pre-industrial levels (1). If temperatures increase at the current rate, warming is likely to reach 1.5°C between 2030 and 2052, leading to regional scale changes to

climate, including dramatic increases in the frequency and intensity of flood or drought events across the world including the UK. These risks are set to increase should warming reach 2°C, and the longer that temperatures remain high, the harder it becomes to reverse the damage.

*Please see section 10.1 for further information on the impacts of Climate Change.*

## **1.4 Population and growth**

Global population in 2019 is estimated by the United Nations (UN) to be at 7.8 billion with 55% of people living in urban areas. By 2050, this will increase and forecasts suggest our planet must support 9.7 billion people and 69% of people living in urban areas. A significant proportion of this population growth, close to 90%, will be across Africa and Asia. For the UK, by 2050 more than 25% of our population will be over 65. This is due to a combination of declining fertility rates and people living longer. This is really important when we are planning for growth.

Greenhouse Gas Emissions (GHG) must reduce for existing population and growth cannot add to the problem. ‘One planet living’ must design out waste, reduce consumption and improve resource efficiency. The Government published its Clean Growth Strategy in 2018 and will be bringing forward a Transport Decarbonisation Plan at the end of 2020 (2). For Cambridgeshire this means we need to plan and invest in local, clean energy for buildings, new mass transport systems and zero carbon goods and services to reduce carbon emissions to net-zero by 2050. It also means that as part of clean growth, investment in regeneration and renewal of existing buildings and infrastructure is supported, along with improved energy efficiency and zero waste. Our future growth success will be measured by the energy intensity of new developments driving innovation into building design, consumption patterns and infrastructure provision.

Clean growth covers more than buildings and infrastructure. It covers everything we do including new agricultural and land management practices. Reducing carbon emissions and pollutants, whilst improving productivity and supporting biodiversity is a priority - our natural assets such as peatland and trees are also some of our biggest opportunities to store carbon.

The Quality Charter for Growth is a good example of collaboration between Local Authorities. Developed in 2010, this charter guides better quality developments across Cambridgeshire, and is supported by an expert Quality Panel for Cambridgeshire. The Panel assess schemes against the four ‘C’s of the Quality Charter: community, connectivity, climate and character, within the context of the adopted planning policy framework. The aim was to drive sustainable development in Cambridgeshire to achieve better places for people to live and call home. The Quality Charter offers us opportunity to redefine and understand clean growth in the context of net-zero by 2050 and to use it to bring the changes we need.

*Detailed analysis of the different types of environmental assets can be found in section 10.4.*

## **1.5 Imperatives for action**

Reaching and sustaining net-zero global human-made CO<sub>2</sub> emissions, and reducing net emissions from other greenhouse gases, can “halt human driven climate change” within decades if we act at all levels and across all sectors to mitigate carbon emissions and plan for impacts that we already know will happen. There are three clear imperatives for action, as outlined by the Global Commission for Adaptation (3) which will impact our ability to serve our communities in the most effective way.

### **The Human Imperative**

Climate Change exacerbates existing challenges to our services and the communities we serve. Increasing frequencies of heatwaves, and flooding and its contamination of water supplies, pose a particular threat for our most vulnerable residents. Climate refugees, people displaced from their homes as a result of the impacts of Climate Change, are likely to bring increased pressure on our social care delivery by 2050. It also puts an unfair burden on future generations who will have to cope with the challenges we are leaving them.

## The Environmental Imperative

The natural environment is our first line of defence against extreme environmental events such as floods, droughts and heatwaves. A thriving natural environment is fundamental to effective and lasting adaptation, as well as contributing to mitigation. Yet one in four species is facing extinction, about a quarter of all ice-free land is now subject to degradation, and ocean temperatures and acidity are rising. Climate Change will bring adverse effects on our natural environment everywhere. We must protect and work with nature to build resilience and reduce climate risks at all scales before the damage has gone too far.

## The Economic Imperative

Mitigation and adaptation are now in our strong economic self-interest: the cost of doing nothing far outweighs the cost of taking positive action now. The Global Commission on Adaptation has demonstrated that the overall rate of return on investments in improved resilience is high, with benefit-cost ratios ranging from 2:1 to 10:1, and in some cases even higher (3). Introducing climate adaptation considerations into our financial decision making will have commercial benefit to our economy in the long run.

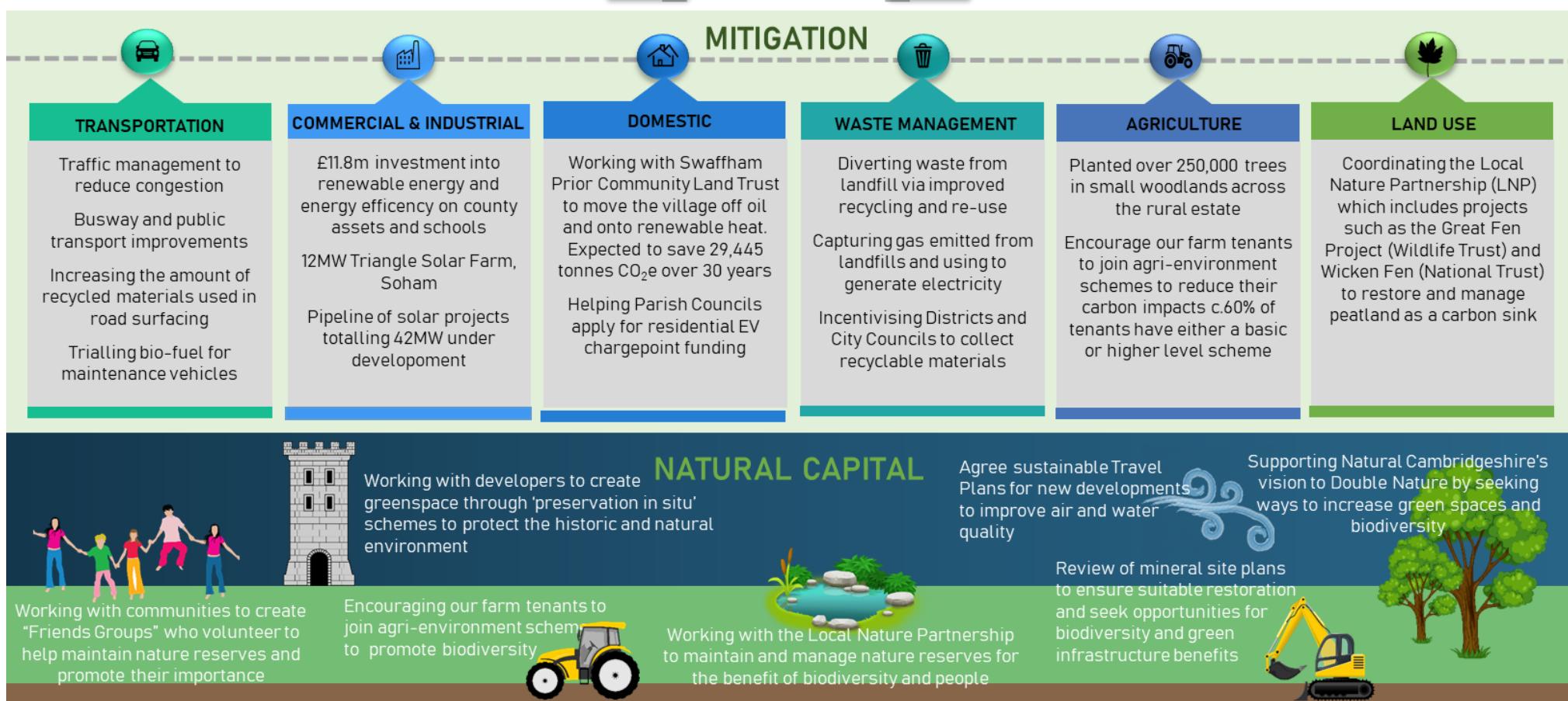
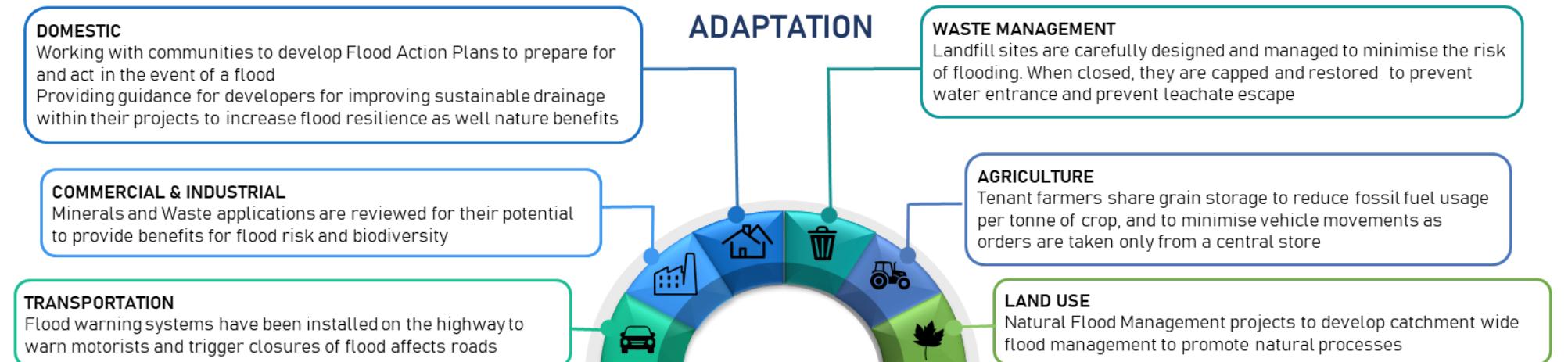
## 1.6 Building on the work we already do

Cambridgeshire County Council has a history of leading work on environmental improvements and more recently tackling Climate Change at the local level. Over the years much has been achieved. However, there is an urgent need for stronger and more integrated action. This is a challenge we have not faced before. We must build on the good things we already do, strengthen our policies across all areas of our work to tackle Climate Change and environmental degradation, and find new solutions and financing mechanisms to bring rapid and sustained change in how we do things. Most importantly of all, we and our partners must talk to and be guided by our communities about the actions we must take to bring about the change that is needed.

*Table 1 Work the Council and its partners are already doing through its environmental and related strategies*

Corporate Energy Strategy	<ul style="list-style-type: none"><li>Reducing carbon emissions, improving energy efficiency and investing in renewable energy projects to displace fossil fuels</li></ul>
Plastics Strategy	<ul style="list-style-type: none"><li>To eliminate avoidable single use plastics to protect the biodiversity of our local freshwater systems, oceans and marine life</li></ul>
Natural Cambridgeshire Local Nature Partnership	<ul style="list-style-type: none"><li>Managing and protecting our County wildlife sites and their biodiversity</li></ul>
Joint Municipal Waste Management Strategy	<ul style="list-style-type: none"><li>Taking measures to reduce waste and employ best environmental options for the waste that we are responsible for</li><li>Advocating responsible approaches to waste for residents and businesses within the Cambridgeshire area.</li></ul>
Highways Asset Management Strategy	<ul style="list-style-type: none"><li>Traffic management to minimise congestion</li><li>Busway and public transport improvements to promote mass-transit</li></ul>
Minerals and Waste Management Plan	<ul style="list-style-type: none"><li>Ensuring all planning proposals take account of Climate Change and the need to reduce carbon emissions, whilst exploring opportunities to use decentralised and renewable or low carbon energy</li></ul>
Local Flood Risk Management Strategy	<ul style="list-style-type: none"><li>Supplementary planning guidance to improve embed approaches that minimises flood risk, reduce water consumption and improve biodiversity</li><li>Supporting natural management of flooding and improved community resilience to flood risk</li></ul>

# What is the Council already doing to Mitigate and Adapt to climate change and enhance Natural Capital?



## 2 About Our Strategy

### 2.1 Our vision for 2050

Our vision is to deliver net-zero carbon emissions for Cambridgeshire by 2050 in partnership with all stakeholders, whilst supporting our communities and Cambridgeshire's biodiversity and environmental assets to adapt and flourish as our climate changes.

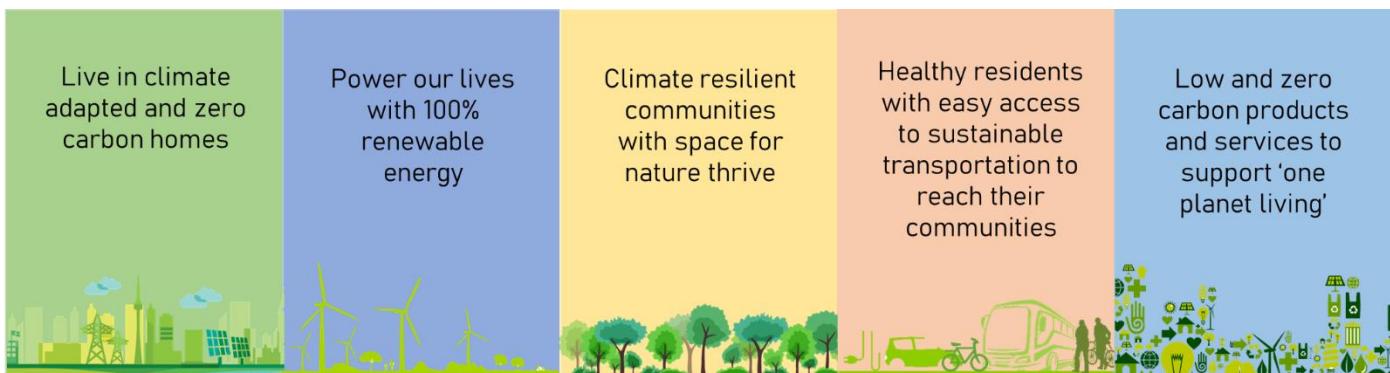


Figure 1 Cambridgeshire County Council's Vision for 2050

### 2.2 Purpose of the strategy

The purpose of the strategy is to provide a clear statement of the Council's Climate Change and environmental objectives and to set out how we will meet environmental sustainability and Climate Change challenges. It describes how we will get our own house in order and how working together with our public sector partners and our communities will support the transformation needed across Cambridgeshire and beyond to tackle these challenges.

Our Objectives are to:

- Reduce greenhouse gas emissions to mitigate the impacts of human-made Climate Change
- Support our communities and biodiversity to adapt to a changing climate
- Improve Cambridgeshire and Peterborough's Natural Capital<sup>1</sup> for future generations
- Empower Cambridgeshire communities and businesses to buy-into and support the delivery of the Strategy vision
- Work with our public sector partners to join up policies and strategies across different levels of government to deliver net-zero carbon by 2050
- Deliver our UK100 pledge for 100% clean energy for our communities by 2050

### 2.3 Our approach

To deliver the vision and objectives of the Strategy we will engage with Officers, Members, partners, businesses and our communities to build a shared understanding of the challenges and grow our collective knowledge, capacity and skills to create the place we want for our children's future. This includes:

- Identifying the carbon footprint for the whole of Cambridgeshire and Peterborough and placing our organisational carbon footprint within this broader context;
- Developing carbon targets and tracking carbon emissions reductions for the Council's operational footprint and the broader impact of its activities and policies;
- Co-designing an action plan with our staff, communities and partners that shows how we are going to deliver our Strategy, where we will lead or where we must support others to lead;

<sup>1</sup> Natural Capital: elements of nature that directly or indirectly produce value to people, including ecosystems, species, freshwater, land, minerals, the air and oceans.

- Demonstrating leadership and setting a good example, through using our numerous statutory responsibilities and duties such as planning and regulation, highways and public transport, waste treatment and disposal, delivery of major infrastructure projects, education, social and other services to bring forward positive change;
- Financing the delivery of the Strategy and Action Plan and providing a framework for the Council to inform its budget setting and delivery of its **corporate priorities for the people of Cambridgeshire**.

## 2.4 Key themes for our strategy and action plan

This Strategy is built upon a number of key themes, technical, organisational and engagement aspects to provide the context and how we work with partners and our community.

### Three themes:

1. Quantifying our carbon footprints to inform and deliver Climate Change **mitigation** through efforts to reduce or prevent carbon emissions;
2. **Adaptation** to cope with the existing and future impacts of Climate Change;
3. Enhancing and conserving **natural capital** such as wildlife, plants, air, water and soils.

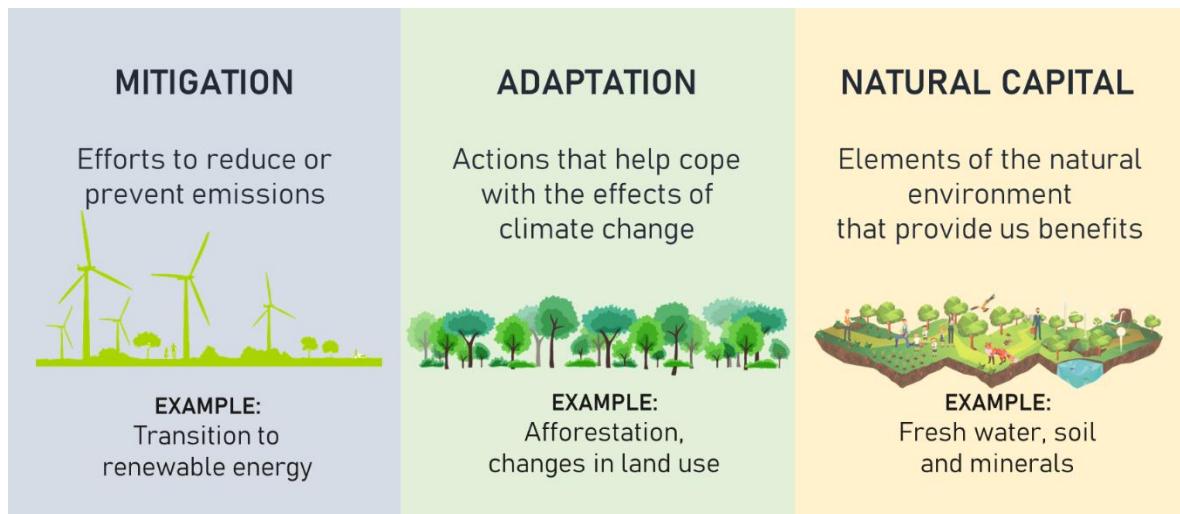


Figure 2 Mitigation, adaptation and natural capital

Mitigation of carbon emissions addresses the causes of Climate Change. It describes those actions which reduce, prevent or capture greenhouse gas emissions. A strong strategy must be informed by robust evidence. The current carbon footprints of both the County Council itself as an organisation, and that of the entire geographical area of Cambridgeshire will inform our action planning as well as the views of our communities. See chapter 3.

Adaptation consists of those actions that enable us to deal with the effects of Climate Change, such as flood risk management in response to heavier more frequent rainfall. The adaptation actions the council can take are discussed in Chapter 4.

Natural capital comprises our ‘stock’ of waters, land, air, species, minerals and oceans. This stock underpins our economy by producing value for people, both directly and indirectly. Goods provided by natural capital include clean air and water, food, energy, wildlife, recreation and protection from hazards (4). Improving our natural capital addresses how to enhance our existing nature reserves, improve biodiversity and tackle air, land and water pollution to keep our planet healthy for all species. See Chapter 5.

## 2.5 Our priority areas

We have identified several priority areas, for each of the three key themes. Some of these are areas where we can lead, and others will require collaboration with partner organisations and wider communities. All of our priority areas are set out in more detail in chapters 3, 4 and 5.

Our Priority Areas For Mitigation	Our Priority Areas For Adaptation	Our Priority Areas For Natural Capital
<ul style="list-style-type: none"> <li>• Energy efficient, low carbon buildings</li> <li>• Low carbon transport</li> <li>• Waste management</li> <li>• Afforestation and land use</li> <li>• Peatland</li> </ul>	<ul style="list-style-type: none"> <li>• Resilience of our services and supporting vulnerable people</li> <li>• Resilient infrastructure and highways</li> <li>• Flood risk</li> <li>• Water availability</li> <li>• Green and Blue Infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>• Reducing waste and tackling plastic pollution</li> <li>• Air pollution</li> <li>• Green spaces, habitats and land management</li> <li>• Peatland</li> <li>• Water management</li> </ul>

Several of these priority areas overlap, as shown in Figure 3.

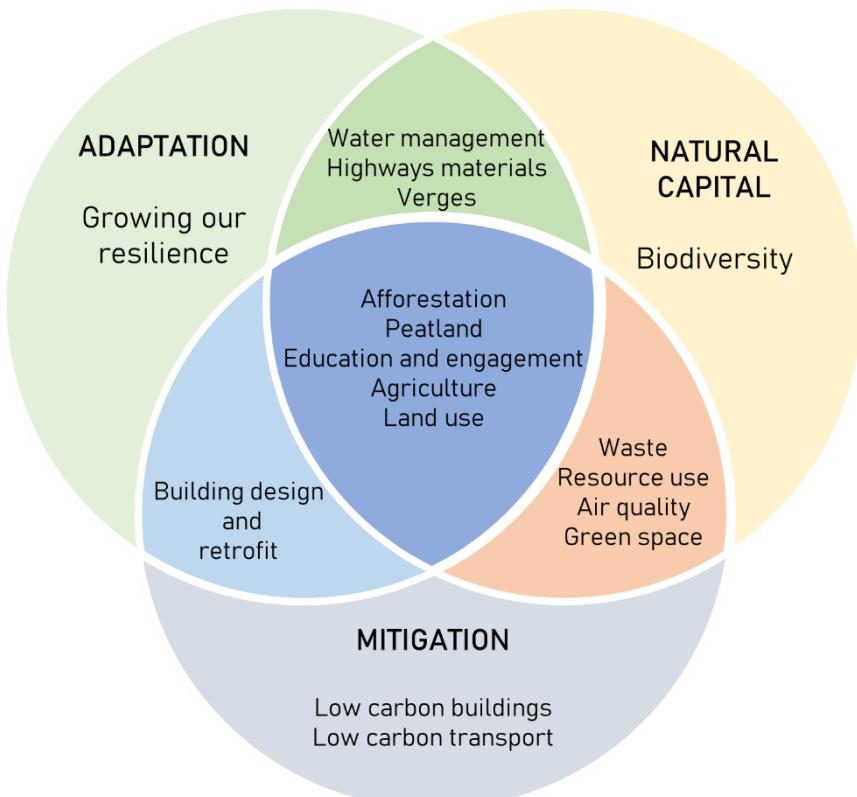


Figure 3 Overlap of the priority areas identified

## 2.6 Levels of control and influence

This is a strategy for Cambridgeshire *County Council* (rather than the county of Cambridgeshire) and identifies how we must work with our public and private sector partners and communities across Cambridgeshire. As part of its strategy, the Council recognises what is under its direct control (where we can show leadership) and wider influence, as shown in Figure 4.

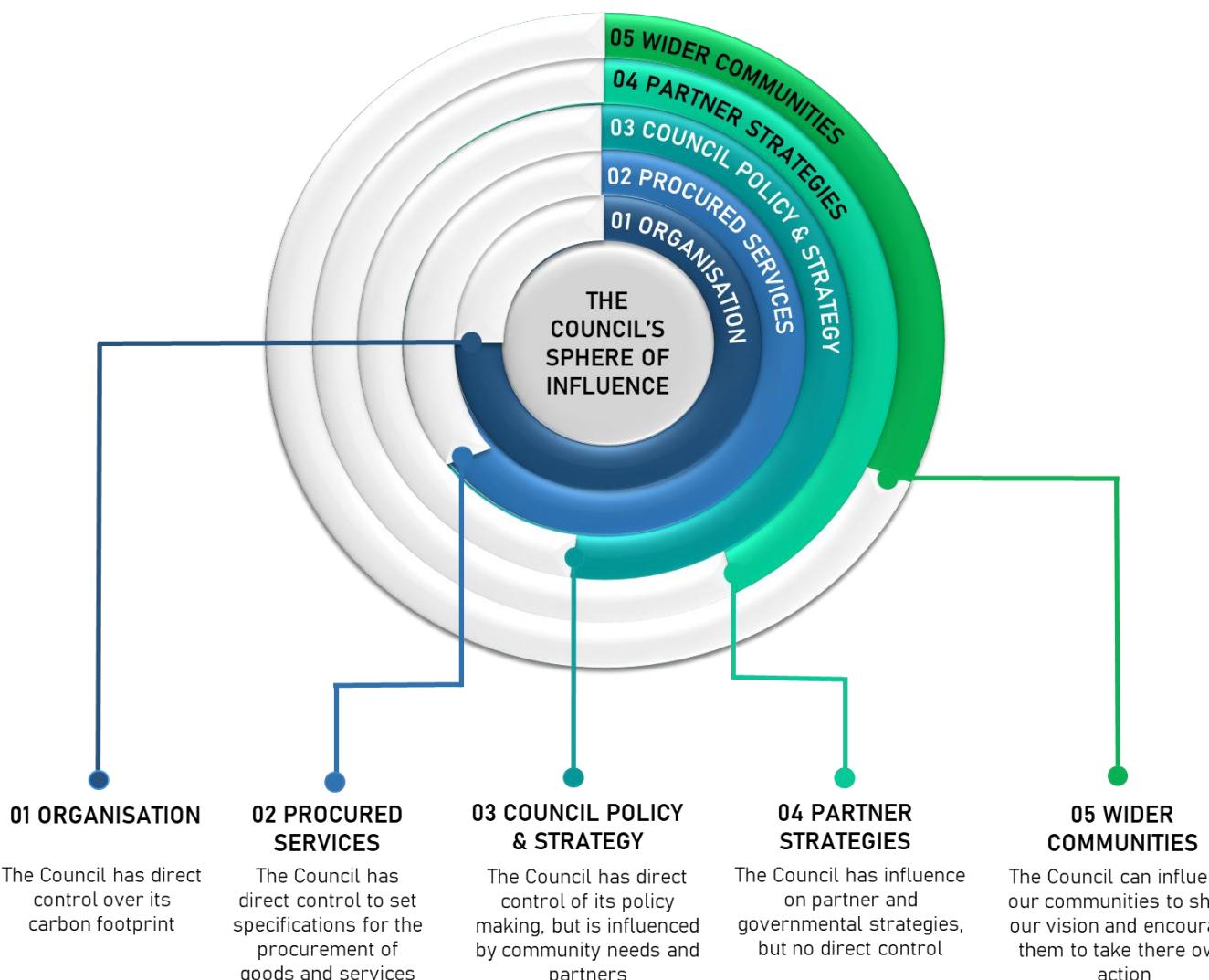


Figure 4 Defining our control (opportunities for leadership) over different causes and consequences of Climate Change.

## 2.7 Our targets

The Council has set seven targets (Table 2). The first five targets focus on how the Council will lead on how it runs its business and manages its assets. The last two targets reflect the Government's carbon budgeting process for 2030 and 2050 – these two can only be achieved in collaboration with our partners and our communities. The target setting has been informed by two carbon footprints developed during 2019 as set out in section 3.

The targets will be reviewed in 2023 to check progress and reset. It is clear that the next 10 years are the most important to deliver GHG reductions to keep global temperature rise within 1.5 degree warming. Every effort will be made to exceed targets. The next three years could be transformational as the journey to low carbon through planning and policy change starts and direct actions to minimise GHG emissions gets underway.

*Table 2 Targets set within the Strategy, under which sit the actions in the Action Plan. The targets flow from blue (most control) to green (collaborative), in line with figure 3 above*

Reduce the Council's organisational net carbon footprint for our buildings and transport assets ('scopes 1 and 2) by 50% by 2023 compared to 2018 levels
All Council departments to implement measures to ensure their services are adapted to Climate Change in line with the National Adaptation Programme recommendations by 2030
Deliver a net 20% increase in biodiversity ("net-gain") across all Council property, land projects and wildlife sites by 2030
Reduce the Council's emissions from purchased goods and services ('scope 3') emissions by 50.4% by 2030
100% of Council strategies include policies that tackle Climate Change and provide natural capital enhancement by 2023
By 2023, sign up to a shared target with partners and the community to deliver 50.4% greenhouse gas emissions reductions by 2030 in tonnes/CO <sub>2</sub> per annum for Cambridgeshire based on the 2018 baseline
Deliver Government's net-zero-carbon target for Cambridgeshire by 2050

## 2.8 Governance of the strategy

In February 2020, Cambridgeshire County Council approved a fourth corporate objective to deliver net-zero carbon emissions for Cambridgeshire by 2050 and created a Fund of £16 million to deliver its near term targets including getting its own house in order. The Council's Strategic Framework (SF), Medium Term Finance Strategy (MTFS) and Capital Strategy (CS) have all been updated to reflect the importance of this new objective, putting this strategy at the heart of all that we do.

Overseeing the delivery of the Council's Strategy ambitions, it is our intention to create a new 'Environment' Committee to help drive change and deliver a greener and better future. One of the remits of this committee will be to oversee the Environment Fund to ensure it delivers our targets and wider climate commitments set out in our action plan.

Every year we will publish our 'Annual Carbon Footprint Report', the first of which accompanies this strategy and every year we will report progress against our targets.

Looking outwards, Cambridgeshire County Council has supported proposals to setup an independent Cambridgeshire and Peterborough Climate Commission. The local commission will look to scrutinise progress with carbon reductions across Cambridgeshire in line with government's carbon budgets and identify key areas of research to guide Cambridgeshire in its decarbonisation ambitions. The Commission will hold all sectors to account on their journey to net-zero and ensure adaptation and climate risk are part of our green DNA.

## 2.9 Financing climate and environmental change

All governments (national, regional and local) have a duty to limit the negative impacts of environmental change by cutting carbon emissions, protecting biodiversity and reducing pollution. The challenging financial and resource pressures we face as a County Council, is common to many

Local Authorities. This cannot be used an excuse for not finding new ways of living, working and sharing low carbon lifestyles to prevent runaway climate change.

Responding to Climate Change has traditionally been seen as the realm of Government policy. There is growing recognition that the financial system, including the insurance sector, has a major contribution to help drive investment into low carbon infrastructure and manage climate related risks.

In 2017 the UK Government set up an independent Green Finance Taskforce (GFT) to review how to finance our commitments to both the 2015 Paris Agreement on Climate Change and UN Sustainable Development Goals. The scale of investment needed to keep temperatures within the 1.5/2°C trajectory requires a fundamental reorganisation of our finance systems and a rethink of how our economy works.

The GFT made 10 recommendations (5), now reflected into the UK's Green Financing Strategy (6). Climate risk management is key. Financial institutions have been slow to price climate risk into long term financial thinking partly due to uncertainty of when and where negative impacts arise but also as a result of short time horizons in investment decision-making, miss-education and a lack of good available data. This has resulted in an under-allocation of capital for climate related risk, with insurance risk from climate impacts (Figure 5) becoming increasingly untenable. There are significant opportunities for growth and development of 'climate smart' finance as society and the economy move to being both low carbon and more resilient to a changing climate.

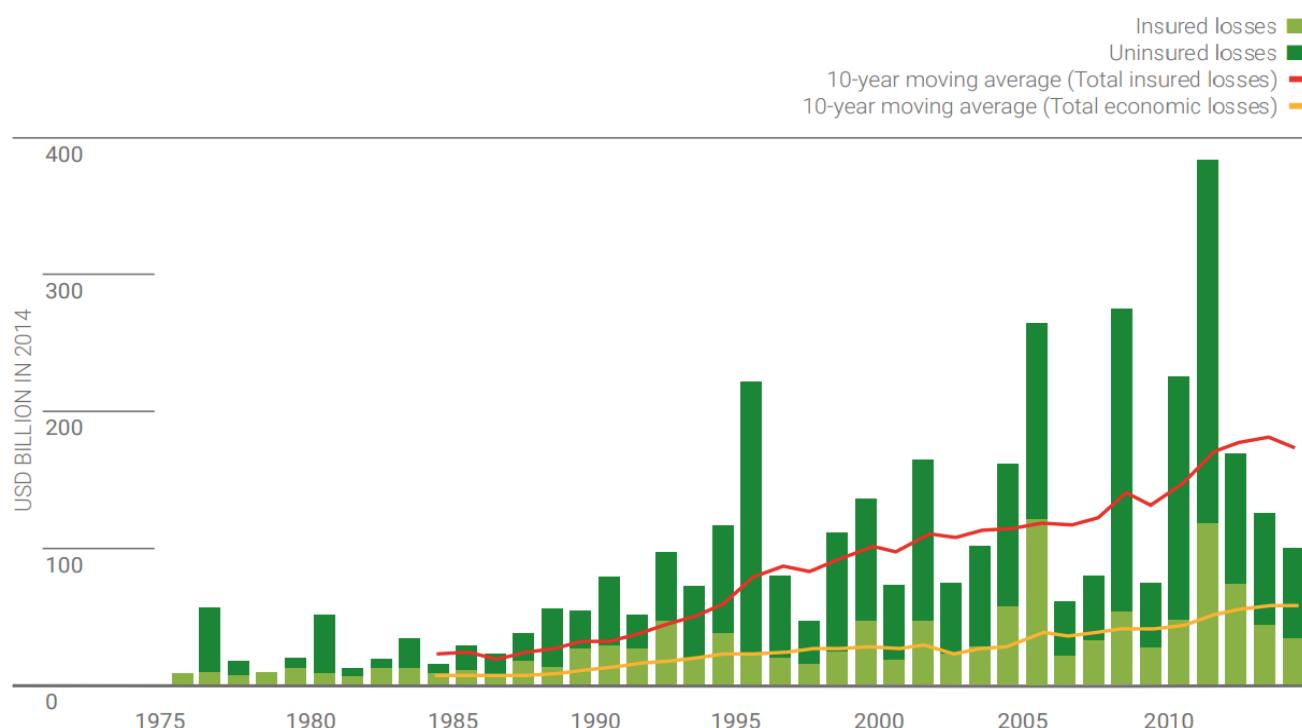


Figure 5 Increase in global insurance loss volumes volatility of catastrophic events. Source: Swiss Re Institute and Cat Perils

The taskforce also identified a need to align UK infrastructure planning with the Clean Growth Strategy and 25 Year Environment Plan. To support local place making, it recommended setting up local development finance funds to support Clean Growth Regeneration Zones and public bodies' pension providers to deliver place-based low carbon investments to drive change.

In the UK Green Finance Strategy three key themes will shape the financing framework for clean growth (Figure 6). These are: "Greening Finance"; "Financing Green"; and "Capturing the opportunity".

## OBJECTIVES

To align private sector financial flows with clean, environmentally sustainable and resilient growth, supported by Government action.  
To strengthen the competitiveness of the UK financial sector.

## STRATEGY

### Greening Finance

Ensuring current and future financial risks and opportunities from climate and environmental factors are integrated into mainstream financial decision making, and that markets for green financial products are robust in nature.

### Financing Green

Accelerating finance to support the delivery of the UK's carbon targets and clean growth, resilience and environmental ambitions, as well as international objectives.

### Capturing the Opportunity

Ensuring UK financial services capture the domestic and international commercial opportunities arising from the 'greening of finance', such as climate related data and analytics, and from 'financing green', such as new green financial products and services.

Figure 6 The Strategy and objectives underlying the UK's Green Finance Strategy. Adapted from UK Green Finance Strategy, p7.

## Greening finance for the Council

### Greening Finance

The Council and its Local Authority partners, together, are well placed to drive emission reductions and improve resilience through their policy functions on land, buildings, water, waste and transport. These policy functions can embed low carbon measures into strategic plans such as social care, transport, and waste, to deliver clean growth and drive market change. Defra's 25 Year Environment Plan also provides the impetus to make better decisions on land use and its development to reflect the level of current and future flood risk that can impact people, the environment and the economy.

Environmental, social and governance (ESG) are the three central factors in measuring the sustainability and societal impact of an investment in a company or business. These criteria help to better determine the future financial performance of companies (return and risk) and there is an increasing focus on these factors in the private sector.

Natural capital plays a major role managing climate risk and storing carbon. Cambridgeshire's Local Nature Partnership has a vision to 'Double Nature' and is developing an Investment Plan to seek new public/private partnerships to invest in its natural capital to drive 'value'. In light of the increasing appetite for ESG, Councils may also be able to attract new funds to support the 'Doubling Nature' vision and look to capture funding through green (or ESG) bonds offering a social return. Opportunities are also expected from the Agriculture and Environment Bills e.g. Environmental Land Management Schemes (ELMS), biodiversity and environmental net gain can also deliver the vision.

### Financing Green

The Council approved a budget of £16 million in February 2020 to support carbon emissions reductions on Council assets and to build resilience for local oil dependent communities. This builds on the £22 million already invested into schools, a solar PV park and energy improvements in its office buildings. A commitment of a further £56 million into the development of large energy projects up to 2023/24 has also been supported to reduce carbon emissions, generate renewable energy for local businesses and support electric vehicle charging.

## Capturing the Opportunity

Since 2014 the Council has been building its internal capacity to develop and deliver clean energy projects to address local market barriers. It is using a number of green finance models to facilitate these projects and is keen to build on this work to secure deeper and faster change to benefit its communities.

The Council has access to a number of funding streams which can support investment into green energy technologies and skills development, principally falling into three categories:

- **Capital Investment:** The Council is able to borrow from the Public Works Loan Board and Municipal Bonds Agency, amongst other lenders, for capital investment projects
- **Grant Funding:** Local Authorities can submit bids for Government and other funding streams for projects which meet the eligibility criteria of a number of clean energy programmes
- **Transformation Funding:** The Council can invest reserve funding into projects which generate longer term savings or income streams for the Council

Local Authorities and Local Enterprise Partnerships are also exploring community based ownership approaches whereby communities develop and own projects in partnership with public sector organisations, contributing funding and sharing in the financial returns generated. The Council has utilised these funding streams to implement the following models for energy investment:

- **Invest to save:** Capital investment into energy measures to save money on energy bills. For example, £11million has been invested into Cambridgeshire's schools which will be fully repaid, whilst also helping 55 Cambridgeshire schools reduce energy bills by £750,000 each year – so they can spend more on educating children.
- **Innovations/future market model:** Investment in pioneering innovation in low carbon technology, renewable energy community projects, and new business models to shape the market for a net-zero carbon 2050. We have two projects under development, [St Ives Park and Ride Smart Energy Project](#) and working with [Swaffham Prior Community Land Trust](#) to take the village off oil onto renewable heat and hot water.
- **Income Generation model:** **We have already had much success in this area, such as the £10million** which was invested into [Triangle Solar Farm](#), which generates approximately £1million gross revenue per annum. We will continue to prioritise environmental projects that deliver a net surplus, through all mechanisms at our disposal. Just one example would be a capital loan designed to bring forward projects to generate a profit (over the project lifetime) and hence contribute to carbon reduction and generate income for services.
- **Capacity and skills building:** Investment to build new skills for the future. For example, the Council secured a grant for the [Mobilising Local Energy Investment Project funded by Intelligent Energy Europe](#) for £1 million to build the capacity of staff and politicians to develop and invest in energy projects. We now have £22 million of investments in Cambridgeshire and a £56 million pipeline of investment.

### 3 Mitigating Climate Change

#### 3.1 What is Climate Change mitigation?

**Mitigation** can mean using new technologies and renewable energies; making older equipment more energy efficient; reducing consumption and waste; or changing management practices or consumer behaviour, to reduce or prevent emission of greenhouse gases. It is undertaken to limit the magnitude or rate of long-term Climate Change due to human emissions of greenhouse gases.

It is important to understand that the sooner mitigation of carbon emissions occurs, the greater the overall reduction of carbon emissions generated by 2050. For example, if you reduce 20 tonnes of annual CO<sub>2</sub> in 2020, this reduces the cumulative impact of 600 tonnes by 2050.

'Net-zero Carbon' means the reduction of greenhouse gas emissions to the lowest possible level and any remaining emissions, offset through carbon removal methods such as tree planting or carbon capture and storage, so we have net-zero emissions to the atmosphere. This does not mean that high levels of offsetting will get us to net-zero, as the scale of emissions is so large. For the UK as a whole, the net-zero target legally must be reached by the end of 2050.



Figure 7 Pathway to Net-zero Carbon

There are a number of ways to mitigate Climate Change; some of these are detailed in section 10.2.

#### 3.2 Current carbon footprints

##### 3.2.1 Cambridgeshire's carbon footprint

In 2019, Cambridgeshire County Council's annual collaboration with the Cambridge University Science and Policy Exchange (CUSPE) brought a team of researchers together to develop an evidence base of current carbon emissions for Cambridgeshire and Peterborough, improving on the 'CO<sub>2</sub>-only' data published by the department for Business Energy and Industrial strategy to provide a more accurate carbon footprint for the area.

The Council adopted the CUSPE report as an evidence base for its Climate Change and environment Strategy in October 2019.

This report found that **Cambridgeshire and Peterborough communities together produced 6.1 million tonnes of carbon dioxide equivalent (CO<sub>2</sub>e) in 2017**. The breakdown of this is shown in Figure 8.<sup>2</sup>

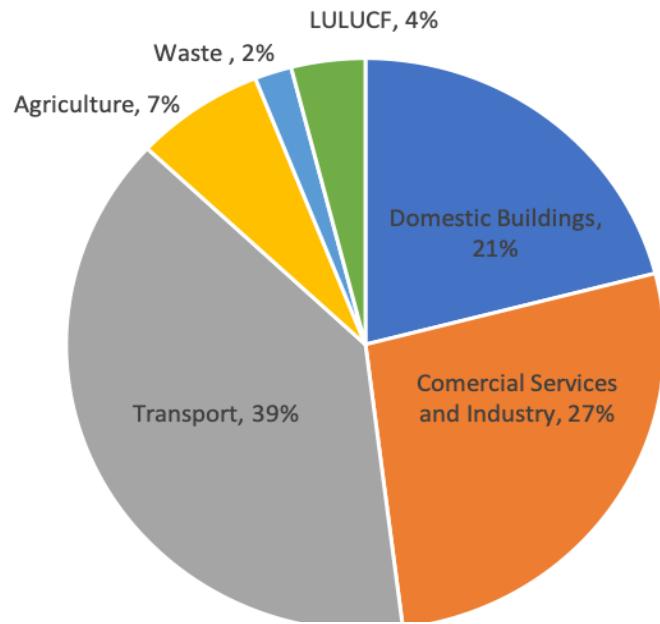


Figure 8 Breakdown of Cambridgeshire and Peterborough GHG emissions by source, 2017.

<sup>2</sup> LULUCF = Land use, land use change and forestry

The research team also modelled two scenarios projecting future emissions to 2050, presented as: “business as usual” and “net-zero emissions by 2050” (Figure 9). The difference between the two scenarios highlights the policy gap to reach Government’s ambition of net-zero carbon by 2050.

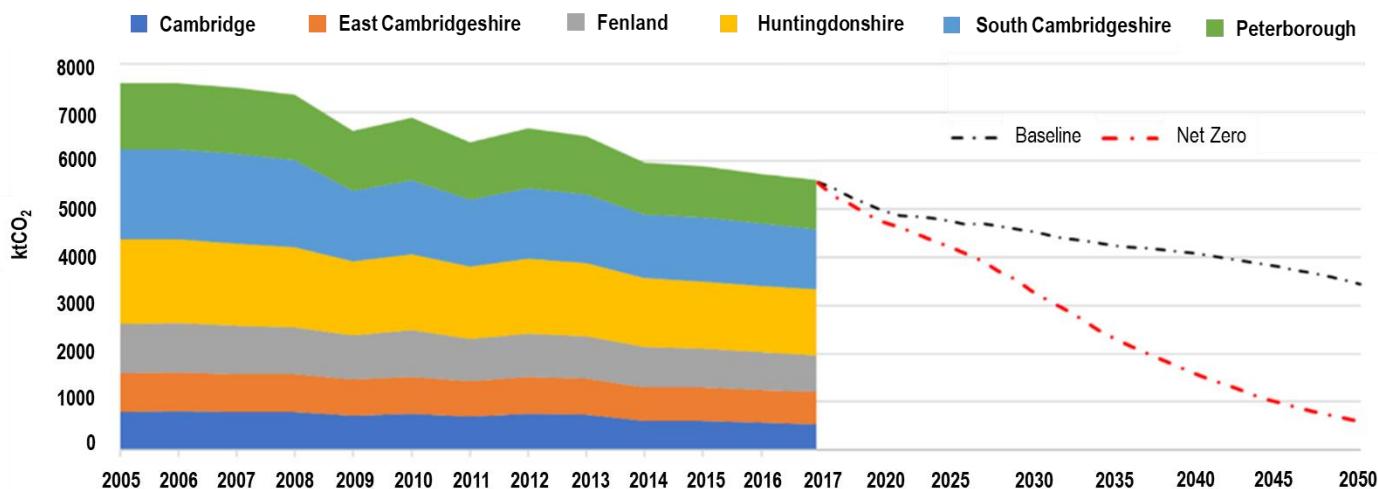


Figure 9 GHG Emissions Pathways to 2050

To achieve the ambitious reduction scenario, the report highlighted the key areas the Council and its partners should consider incorporating into new policy, including:

- Decarbonisation of heat and improvements to the energy efficiency of the housing stock;
- Implementation of low carbon heating and carbon capture and storage in commercial and industrial buildings;
- All cars, vans, buses and motorcycles and most HGVs to be electric, as well as shifting more transport away from cars to walking, cycling and public transport;
- A significant reduction of food waste, reduction of demand for red meat and dairy by 20%, and increased fertiliser efficiency, breeding measures, and livestock food additives;
- Deployment of carbon capture and storage on waste sites, increasing capture of landfill and compost gas emissions and electrification of waste transport;
- Extensive afforestation;
- Further research on peatland emissions and work with experts to find the best solution to ameliorate the current impact of our peatland areas.

The full report from the CUSPE team can be viewed [online](#) (7).

### 3.2.2 The County Council's carbon footprint

Cambridgeshire County Council has calculated the carbon footprint of its own operations for the financial year 2018-19, in line with the UK Government's Environmental Reporting Guidelines for Voluntary Greenhouse Gas Reporting (8). We are unable to compare this to previous years as we did not collect the same data.

Scope 1 (direct) and scope 2 (purchased electricity) emissions amounted to **7,711 tonnes CO<sub>2</sub>e** (gross). This includes emissions from gas and oil for heating our buildings, electricity for our buildings and street lighting etc., emissions from fleet vehicles, and fugitive emissions from air conditioning units.

Our **Net** GHG emissions for scopes 1 and 2, after taking into account purchasing of 100% renewable electricity, were **1,985 tonnes CO<sub>2</sub>e**. The breakdown of this is shown in Figure 11, with the largest share coming from gas to heat our buildings.

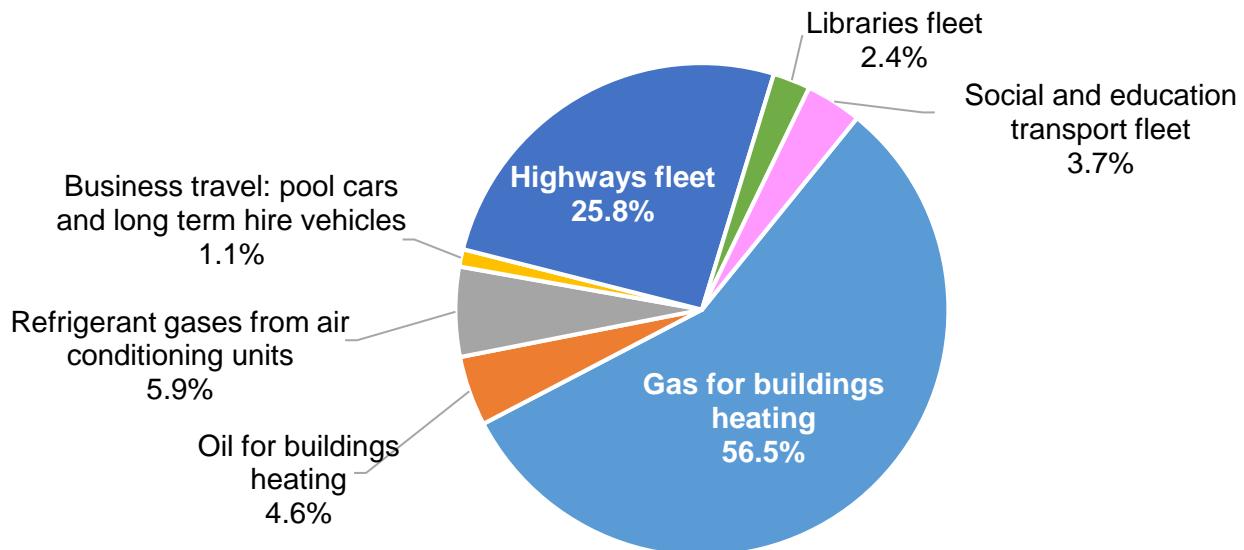


Figure 11 CCC Scopes 1&2 net GHG emissions, 2018-19, by source

If we also include those indirect emissions by third parties (scope 3) for which we have data, this increases to **203,665 tonnes** (gross) CO<sub>2</sub>e, of which Scope 3 emissions are 96% of the total. A breakdown of the sources of emissions from all scopes is shown in Figure 10. These scope 3

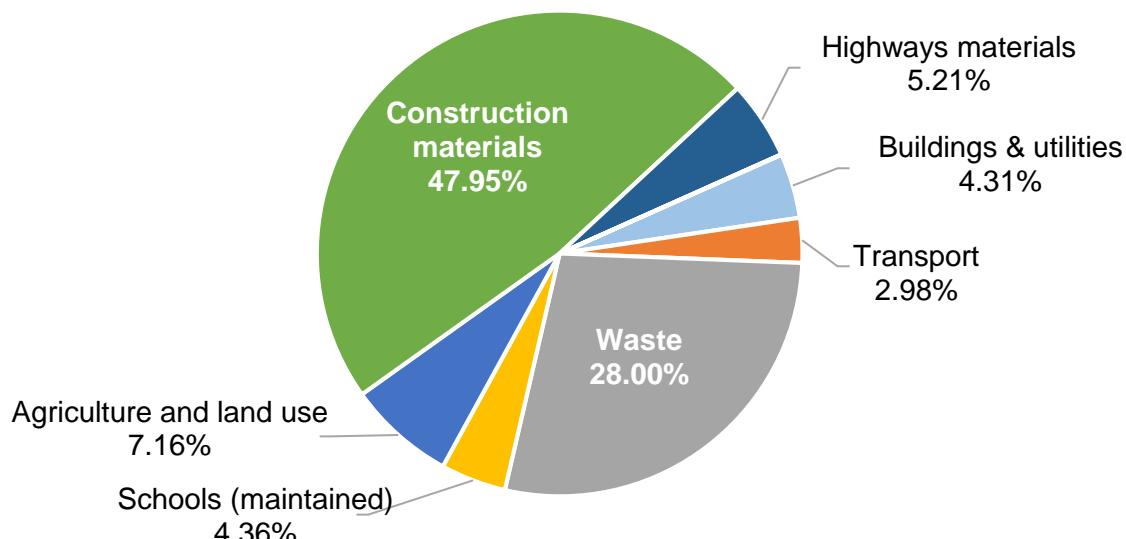


Figure 10 CCC total known (all scopes) gross GHG emissions, 2018-19, by source

(indirect) emissions include transport emissions from vehicles not under Council control (such as employee's own cars or contractors' travel), emissions from County waste disposal and treatment, emissions from Local Authority maintained schools' energy usage, agricultural emissions from the County Farms estate, and emissions from purchased goods and services, such as materials for construction works (which account for the largest share). The greatest certainty and accuracy of the carbon footprint is in the Scopes 1 and 2 data. Scope 3 data often lies with other organisations and so more of it is estimated.

Deducting the emissions that can be offset through our renewable electricity generation assets (including our 12MW solar farm) and for purchasing 100% renewable electricity, gave a reduction of -9,484 tonnes CO<sub>2</sub>e.

A more detailed breakdown and full analysis of the Council's carbon footprint can be found in our *Carbon Footprint Annual Report 2018-19*.

### 3.3 Our priority areas for mitigation

Priority areas have been identified based on where the council can have the greatest impact. Many of these areas will have significant co-benefits to our communities such as to health through reducing air pollution, or to communities through better transport connections.

#### 3.3.1 Energy efficient, low carbon buildings

**Leadership:** The Council has over 200 buildings (including offices, libraries, community centres and others), and Cambridgeshire has a schools portfolio of 260 buildings (including 138 Council-maintained schools) plus new schools being built. It is a priority for the Council to design and build new buildings to higher policy standards that deliver net-zero carbon by 2050. It must also consider higher standards for construction, and greater emphasis on carbon lifecycles for new and existing buildings.

We will bring forward new opportunities for installing ground source and/or air source heat pumps (see section 10.2) to replace gas or oil heating in our buildings. We will also look to substantially improve the energy efficiency of our existing buildings as a priority, for example through replacing old lighting with efficient LEDs.

**Collaboration:** We will work with local business to support decarbonisation of commercial and industrial buildings and operations and look to good-practice to drive this priority (Figure 12).

We will develop circular economy principles such as reuse, repair, refurbishment, remanufacturing and recycling to create a closed-loop system, minimising the use of resource inputs and the creation of waste, pollution and carbon emissions.

**Case Study: Anglian Water Services**

Anglian Water is a locally based business leading the way in developing and implementing a significant decarbonisation strategy across East Anglia.

Since the creating of @one Alliance in 2004 - the company's first supply chain partnership to bring about a step-change in capital project delivery- the business has significantly increased its carbon reduction commitment..

2007 saw the measurement of the carbon impact of all upcoming schemes, with 1,300 models developed and carbon value used to measure performance, leading to the development of bespoke carbon-modelling tool for the supply chain allowing engineers to choose between designs for the lowest carbon solution

By 2013, innovation in Supply Chain sees lower carbon options for capital works across the organisation: from 95% open-digs for laying pipes to 75% using no-dig techniques

2015 saw the company receive the Queens Award for Enterprise: Sustainable Development, in recognition of its carbon reduction achievements: Over 300,000 tonnes of carbon saved since 2010

By 2017 a new target was set for carbon neutrality by 2050 and further recognition as Winner of the British Construction Industry Awards: Carbon Reduction Project of the Year, for the Graftham Resilience scheme

In 2018, construction of the first site of a 30 GWh solar Programme completed to deliver against a target of 30% renewables by 2020.

2019 The first UK water company to install fully integrated energy storage and solar array on a site in Norfolk.

**love every drop.**  
anglianwater

Figure 12 Case Study: Anglian Water Services Ltd.

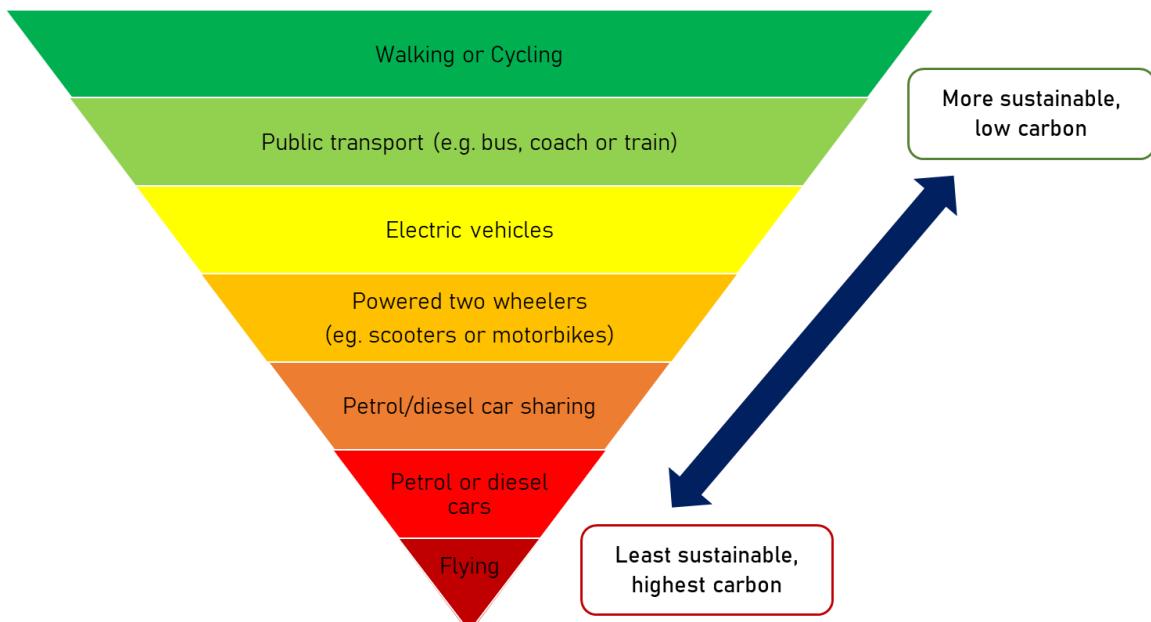
## **Collaboration: Domestic Buildings**

The Planning System and Building Regulations are key mechanisms for delivering improvements to new homes standards. Facilitating growth is a shared accountability across Local Government with district councils having responsibility for local plans and the Combined Authority for the non-statutory spatial plan.

A key role for the County Council is to support the 10,000 existing homes in Cambridgeshire dependent on oil to shift onto renewable energy. This can be achieved through supporting communities to develop community heat projects, accessing grants to develop business cases, assembling professional teams to support projects and using the Council's land assets to host or facilitate energy centres.

### **3.3.2 Low carbon transport**

**Leadership:** As managers of the local highways network, how we prioritise walking, cycling and public transport ahead of the private car to minimise carbon emissions and improve air quality, must be further developed. The travel hierarchy (Figure 13) provides a framework for promoting a shift to more sustainable travel modes. This hierarchy is due to form a central pillar of the Department for Transport's upcoming Transport Decarbonisation Plan, in which modal shift to public transport and active travel features as a core action.



*Figure 13 Travel Hierarchy*

We must also make more use of this hierarchy in our own operations, planning for minimising travel, and switching essential travel to more sustainable methods wherever possible.

Our 'transport network' has many assets along with the Council's offices and rural estate – so the plan will include EV charging at Council offices for staff and visitors, EV pool cars, and use of our assets to contribute to a credible EV charging infrastructure accessible to all.

Active network management systems must allow all communities, both urban and rural, to access alternatives such as autonomous vehicles and charging infrastructure for a range of transport options including electric vehicles and electric bikes, to reduce carbon emissions.

## Bringing Innovation to public transport

Several innovative projects are already underway to develop new approaches to mass-transit in Cambridgeshire.

- In collaboration with Stagecoach, the Greater Cambridge Partnership is currently trialling electric buses on the network
- Smart Cambridge is trialling autonomous vehicles on the southern section of the existing guided busway. If successful, self-driving vehicles could be rolled-out elsewhere around Greater Cambridge, for example, to link some of the science and business campuses to each other or to rural travel hub
- The Cambridgeshire and Peterborough Combined Authority is developing Cambridgeshire Autonomous Metro (CAM) – an electrified new public transport system for the county. It will provide the transformational change required to the area's under pressure transport network, while also fulfilling the ambitions for sustainable clean growth



Smart Cambridge's autonomous vehicle

**Collaboration:** Responsibility for transport sits across a wide range of organisations in Cambridgeshire (Figure 14).

It is important that at the local level there is alignment between the different organisations as to what needs to be achieved to deliver a sustainable transport system, what this looks like for public transport and active travel options. As highlighted in the DfT's *Decarbonising Transport: Setting the Challenge* (2), the task of reaching net-zero by 2050 will require significantly greater investment into mass transit, public transport and active travel solutions.

The Greater Cambridge Greater Peterborough Combined Authority has the responsibility for the development of the Local Transport Plan and is leading the development of a County-wide Electric Vehicle Infrastructure Plan. This plan sets the context within which our transport system in Cambridgeshire will develop. The County Council, as a statutory consultee to this plan will prioritise active travel (walking and cycling), public transport and mass-transit solutions such as the CAM (metro) to reduce carbon emissions, in line with the travel hierarchy in Figure 13.

The Council will also use its highways network, transport and building assets to facilitate, with other local partners and businesses, the implementation of EV charging infrastructure by planning and installing these on our assets along with other low carbon transport technologies as they come forward.

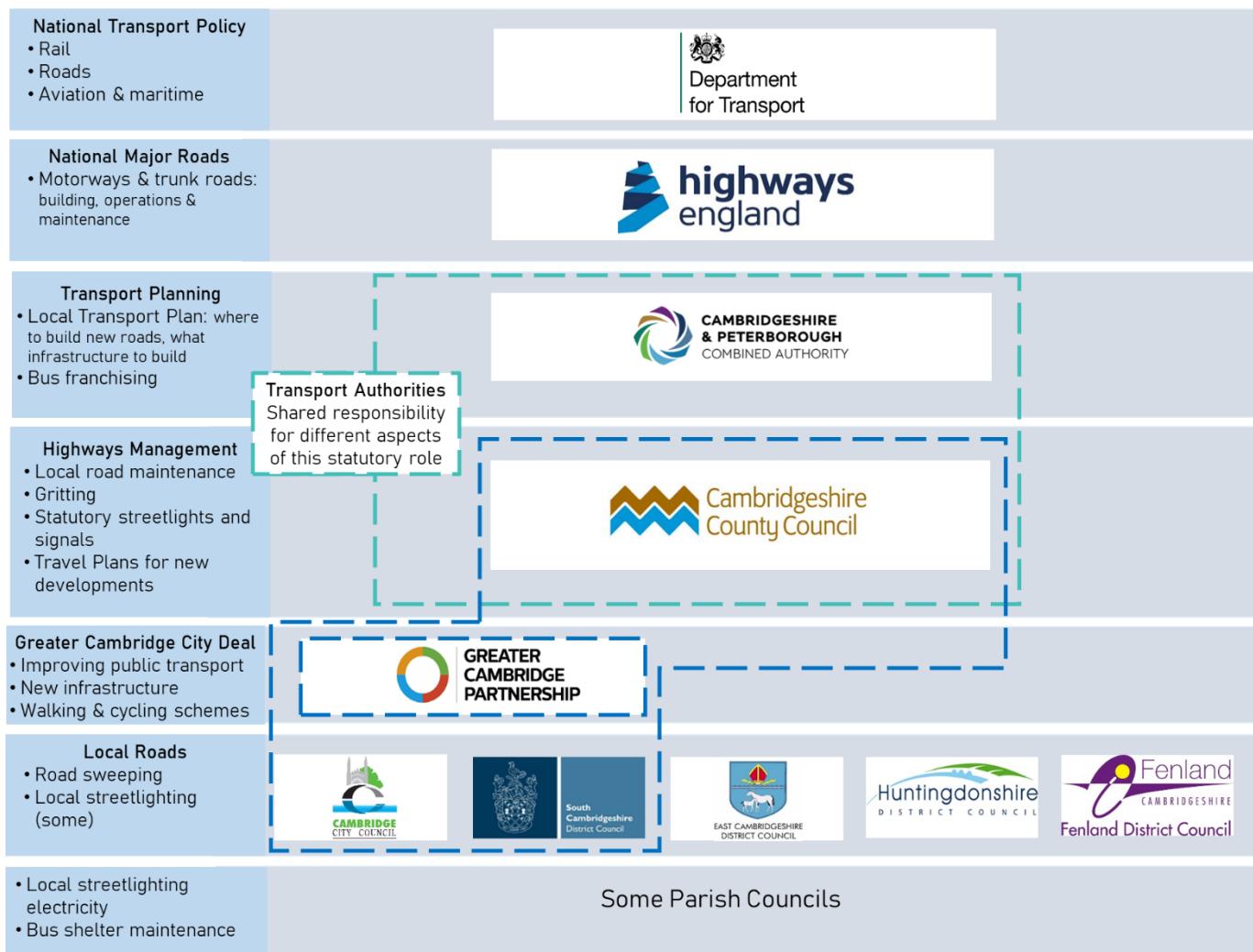


Figure 14 Responsibility for transport across Cambridgeshire sits with a number of different organisations

### 3.3.3 Waste management

**Leadership:** The County Council is the statutory waste authority. We have a waste PFI contract with Amey that includes landfill reduction targets. Some of the targets relate to reducing the volume of garden and food waste that is landfilled, and reducing the residual waste landfilled by processing it through a Mechanical Biological Treatment Plant (MBT) to save emissions. The PFI contract also includes targets to increase the levels of recycling at the Household Recycling Centres (HRCs).

In future the government may introduce specific recycling targets for the County Council and Peterborough City Council. We will also need to reduce carbon emissions reductions from transporting waste if we are to deliver net-zero carbon emissions by 2050. The Environment Bill sets out the legislative framework for increasing the capture of recyclable materials and the move away from a make, use and dispose economy to a circular economy where all waste becomes a feedstock for manufacturing to ensure valuable natural resources are used as efficiently as possible. Local closed loop recycling solutions and bringing forward new technology for carbon capture and storage from landfill and composting operations will help reduce the carbon impact of waste management.

Circular economy principles are key to resource efficiency. Our aim is to deal with Cambridgeshire's waste in Cambridgeshire, through keeping products, equipment and infrastructure in use for longer, reducing the transport of waste where feasible, improving the productivity of these resources and attracting increased opportunities for waste remanufacturing locally to repurpose waste into new products.

Please also see section 5.4.4 for how waste is also a priority area in the Natural Capital theme.

### [3.3.4 Afforestation and land use](#)

**Leadership:** The County Council is a major landowner across all four rural districts which presents a potential opportunity to plant new woods and create wildlife habitats that link up in places, for the long term. Planting woodlands and forests can play a role in the offsetting of carbon emissions and provide for biodiversity enhancement. Some areas of the county will not be suitable for woodland but alternative land uses such as grassland, hedges and wetlands could be more appropriate in some locations.

The Council is already developing clean energy projects on its rural estate. A 12MW solar farm started producing renewable energy in 2017 and provides enough electricity for approximately 3000 homes. Currently in the pipeline a further solar park is under development that can supply the equivalent of 8-10,000 homes. When choosing sites for energy projects, we prefer to use grade 3 agricultural or land that is at risk of flooding and of lower agricultural value.

### [3.3.5 Peatland](#)

**Leadership and Collaboration:** Between 60 – 80% of wasted peatland in the UK is located within Cambridgeshire. The CUSPE Net-Zero by 2050 report highlighted that Cambridgeshire's peatland is producing around 5.5 million tonnes CO<sub>2</sub>e per annum (7). This is almost the equivalent of all other emissions from all other sectors across Cambridgeshire put together. Peatland degradation is an international challenge and Cambridgeshire is well placed to host international and national research projects. The Council can use its extensive land holdings to work with the scientific community to trial innovative projects as well as build on the work of The Wildlife Trust at Great Fen, The National Trust at Wicken Fen and collaborate with the Agri-businesses to find solutions of international interest.

## 4 Adapting to Climate Change

### 4.1 What is adaptation, and why is it needed?

Adaptation is the process of adjusting to Climate Change and its effects, and to seek to moderate harm or exploit any beneficial opportunities of Climate Change (9). Historically, Climate Change adaptation has received far less attention than mitigation (9). Scientists have identified lags in the time it takes for our climate to respond to greenhouse gas emissions and some aspects of our climate are only now responding to greenhouse gas emissions from previous decades. Therefore, even with mitigation, the impacts of Climate Change will continue to exist into the foreseeable future. The term ‘locked-in’ can be used to describe those impacts which society will definitely face in the next century.

Most importantly, we cannot ignore the Climate Change risks we are facing globally and locally including flooding, hurricanes, bush fires – all natural hazards and risks faced every year. Adaptation actions taken today to manage these risks will have benefits long into the future.

In July 2019, Cambridgeshire was the hottest place in the UK reaching an all-time record high temperature of 38.1°C. The latest UK Climate Projections (UKCP18) suggest that the UK climate will continue to warm over the rest of this century, and on average, rainfall is expected to increase in winter and decrease in summer, though individual years may not conform to this pattern. This will result in, on average, hotter and drier summers, and warmer and wetter winters. These anticipated seasonal changes means we will see an increased risk of summer heat waves and drought, and an increased risk of winter storms and flooding.

Sea levels around the UK have increased and will continue increasing according to the latest Climate Change projections. By 2100, sea level on the coast near London, for example, is expected to rise by 29 to 70 cm under a low emissions scenario and by 53 to 115 cm under a high emissions scenario. Even if net-zero is achieved globally, our climate will continue to warm in the short term, and sea level will continue to rise for centuries. We must plan for this reality. For a low lying region of East Anglia and Cambridgeshire a sea level rise of this magnitude will bring significant changes to the places we live and work and higher economic costs if we don’t adapt.

The Committee for Climate Change’s recent evaluation of the second UK National Adaptation Programme (July 2019) identified that priority must be given to adaptation, as many areas are not prepared for even a 2°C rise in global temperature, let alone more extreme levels of warming (10).

### 4.2 What adaptation measures are already happening?

Some sectors such as the water sector, are making detailed plans for dealing with a range of future water availability scenarios and looking to reduce consumption and water leaks. The Environment Agency is in the process of developing an ambitious flood and coastal erosion risk management strategy which has the potential to form an overarching national strategy for flooding, with clear objectives and targets.

The finance sector, led by FTSE 100 companies and the insurance sector, are making significant progress towards better assessment and disclosure of the physical risks from Climate Change. Their focus to date has been on only a 2°C global temperature rise and not the 4°C relevant for adaptation risks, but it’s a start. Infrastructures such as road, energy and rail are developing long term plans to improve resilience, identifying where key vulnerabilities lie and what needs protection.

Managing the impact of Climate Change is about risk management. The more we can do today through our plans and policies to adapt infrastructure, homes, our natural environment, business and people to the reality of a different climate, the better future quality of life for everyone, especially vulnerable people.

Leaving adaptation responses solely to local communities and individual organisations without a strategic plan, will not manage the risks from Climate Change in the most economical way. Individuals can build resilience in their own homes and buildings but as individual businesses, organisations or the public, they cannot take adaptation actions at a scale that is effective and efficient, and that accounts for social costs and benefits.

The National Committee for Climate Change has developed a risk matrix (Figure 15) to identify progress in managing Climate Change adaptation risks across different sectors (10). For Cambridgeshire, it will be important to review its vulnerability and exposure to climate change to prioritise actions it now needs to take to build infrastructure resilience. The risk table scores each adaptation priority on the quality of its plan; higher numbers are better and the x-axis scores each adaptation priority on the extent to which progress is being made in managing vulnerability and exposure to Climate Change risks. The result is a numerical score (1 to 9). The higher the score the better management is in place.

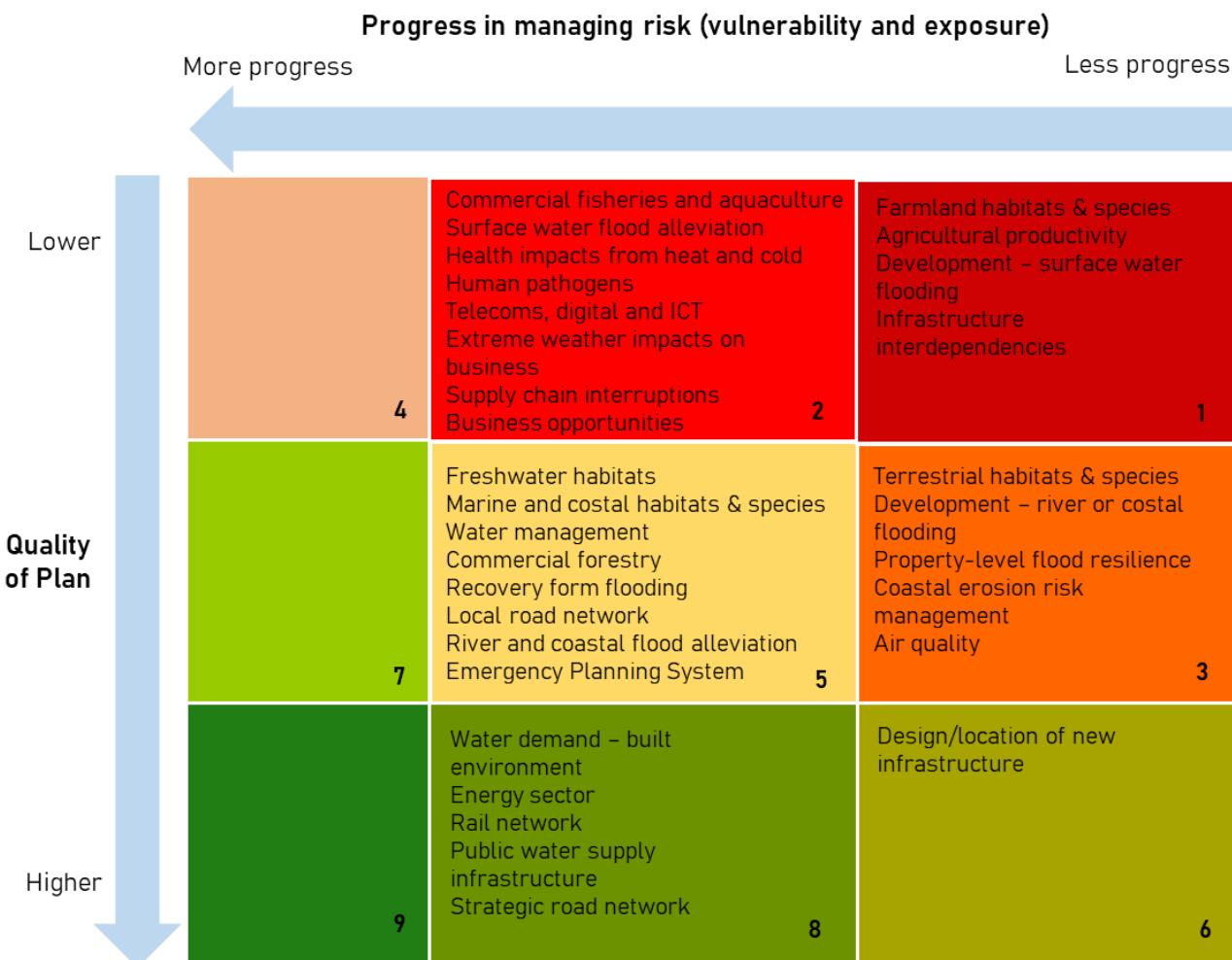


Figure 15 Adaptation progress risk matrix taken from: Committee for Climate Change, Progress in preparing for climate change report, 2019 Report to Parliament

### 4.3 Cambridgeshire's ability to adapt to Climate Change

The types of adaptation measures that will help manage key risks associated with infrastructure, people and health, buildings and finance are described in Figure 16 and section 10.3. The Council will develop plans to address the different areas of adaptation it can lead and collaborate with partners, businesses and the community in areas where they are best leading. Climate Change adaptation measures can be incorporated into both existing and new infrastructure.

Buildings and infrastructure can be adapted to become more resilient to flooding, heat waves, drought and air pollution. For example, incorporation of water and green spaces into developments can provide urban cooling whilst also providing opportunities for water storage. This can allow us to adapt to both heat waves and flooding. Furthermore, planting of trees, where appropriate, provides shading locally to adapt to higher temperatures and also provides adaptation to flooding by increasing rainwater interception. The introduction of more green spaces to towns and cities also encourages more rainfall to be absorbed into the ground, which recharges groundwater supplies and aquifers, allowing adaptation to Climate Change related droughts.

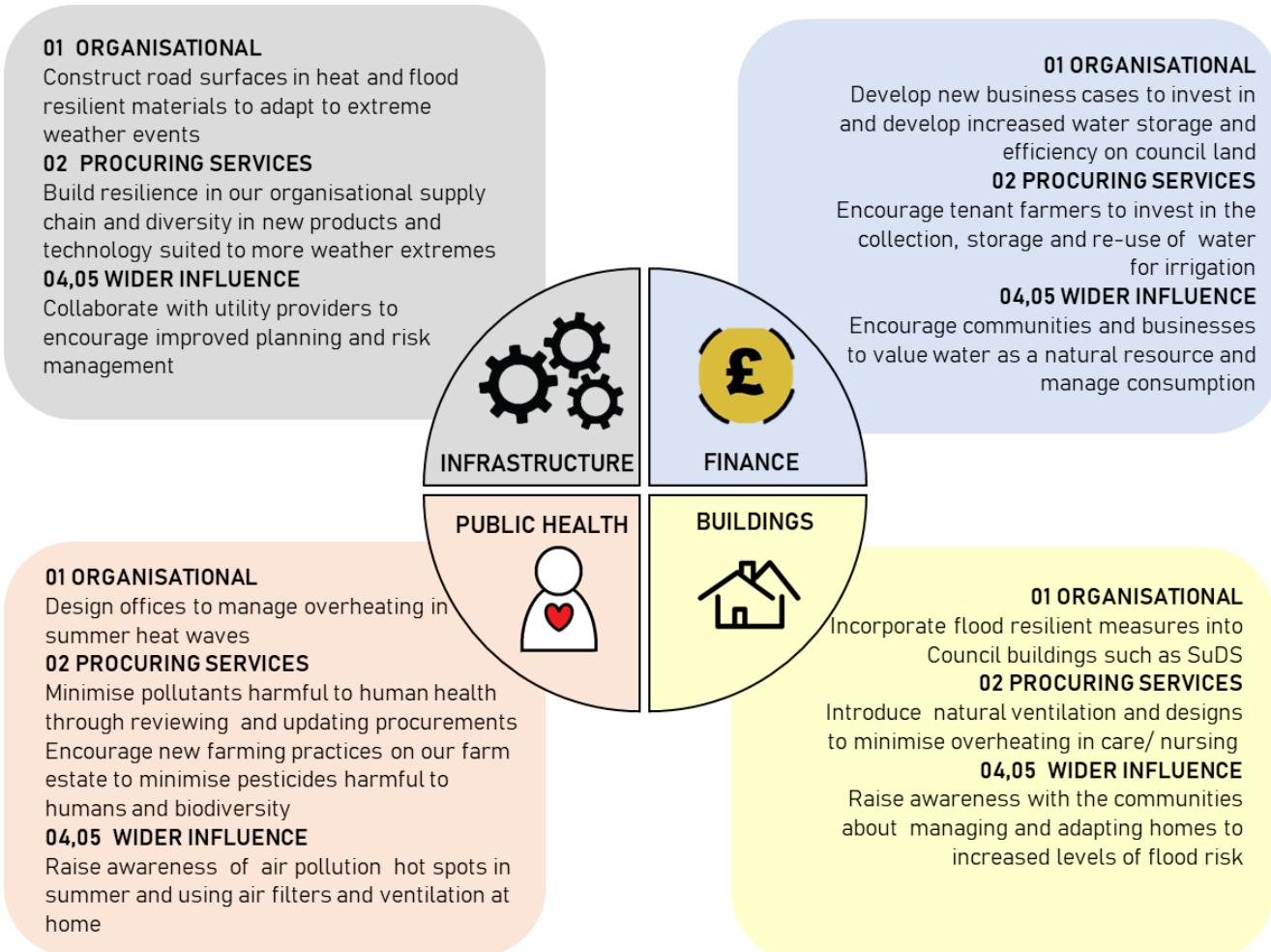


Figure 16 Types of adaptation measures that will help manage key risks

## 4.4 Our priority areas for adaptation

The Council has statutory responsibility for a number of important functions. For example, it is the Lead Local Flood Authority for Cambridgeshire, the Highways Authority (designing and maintaining our roads, cycle and walking assets) and the Planning Authority for Minerals & Waste. Importantly, the council also cares for the vulnerable, supports the education of young people, and manages a large rural estate, over 200 buildings and a number of nature reserves.

### 4.4.1 Resilience of our services and supporting vulnerable people

**Leadership:** As a Council we need to design effective plans and Climate Change risk strategies across all the Council's services. This will highlight the interdependencies between services, the scale of impact and the actions which can provide multi-benefits. Indicators and suitable data collection mechanisms need to be established to be able to report progress and support national adaptation programmes.

Vulnerable people will feel the impacts of severe weather, such as increasing temperatures or flood risk, more strongly than others. Our care services, covering Public Health, Social Care and

Emergency Planning must be tuned into climate risk and what this means for service delivery, including care home provision. Action will be needed to prevent the vulnerable in our communities becoming more susceptible to the impacts of Climate Change and strong ties with local communities will be essential to support elderly and vulnerable residents when they need them most in extreme weather events

Supporting staff to continue to work and deliver services when extreme weather events occur is also a priority. The Council employs more than 4000 people and it will be important that our own Council buildings and land holdings are resilient to the impacts of Climate Change, such as ability to withstand intense storms and be resilient to heat and flood risk to ensure continuity of service.

Water security is an emerging problem across Cambridgeshire. To be resilient we will need to manage water consumption within our Council estate and consider retrofit of water conservation measures, such as rainwater harvesting and greywater re-use, and encourage farm tenants to store water for irrigation. Storing water is also a means to help flooding, drought, peatland and the creation of natural habitats.

#### 4.4.2 Resilient highways and infrastructure

**Leadership:** Our extensive highways network must be reviewed to ensure resilience to climate risks and it is likely that we will need to trial new road surfacing that better manages heat and flooding.

Maintaining our roads and pavements could also move towards new management methods – ones that minimise damage to biodiversity allowing it to flourish and better management so that roadside verge management improves and enhances biodiversity. In some places, generating renewable energy to support local street lights may be useful to develop especially as we move to significantly higher levels of resource efficiency.

##### Working with our contractors

The council has a £900 million Highways contract with Skanska, which commenced summer 2017.

We are currently collaborating on the development of a carbon management plan to reduce emissions, and bring forward greater network resilience to climate change.

**Collaboration:** Nationally 41% of transport and utility infrastructure and 10% of roads are in areas at risk of flooding (11). The Council needs to work with its partners to ensure that adaptation to the effects of Climate Change is a key priority for existing infrastructure and where new infrastructure is planned, ensure resilience and climate proofing is factored into designs and construction. This applies to all infrastructure but in particular electricity, heating, water and transport must deliver robust standards.

The interdependence of Infrastructure must also be examined when assessing climate- risk and adaptive solutions. For example a shift from liquid fuels (petrol/diesel) for vehicles reduces the local impacts on air and water (highways runoff) pollution in a hotter climate and reduces risks from issues with liquid fuel supply and distribution. However supply and distribution disruption risks are moved to electricity networks. Or, if the Council adapts to weather conditions which make travelling more challenging and chooses digital solutions to manage this problem, the risk from loss of Wi-Fi or poor internet speeds can impact service delivery.

The Council is one of a number of partners in the future *Fens Flood Risk Management* project being co-ordinated by the Environment Agency. The project, currently in phase 1 of 3 (Figure 17), aims to develop a plan for future flood risk in the Great Ouse Fen area. The aim is to develop a long-term action plan to manage and adapt critical flood risk infrastructure in the Fens which accounts for Climate Change impacts such as sea level rise, volatile weather patterns and growth scenarios.

The key flood risk management infrastructure in the Fens is ageing. A new risk management system will be needed that is affordable and provides resilience into the future. The focus is currently on the development of a shared understanding across all partners and the community of the functioning of the Great Ouse Tidal River system in its management and distribution of water in this area is essential.

Later stages of the project, will involve working cross-sector (tourism, agriculture, conservation, flood management etc.) to develop a high level strategy and action plan based on an agreed approach to the future of the Fens. To give you some idea of the project scale, it is equivalent to the original plan to develop the Thames Barrier in London.

#### 4.4.3 Flood risk

**Leadership:** Greater innovation and adaptive approaches will be needed to enable the County to cope with unpredictable weather events. Significant investment is required to improve the situation from today's flood risk levels. The County's Local Flood Risk Management Strategy will be updated in 2020 and will support the long term objectives set out in the new National Flood and Coastal Erosion Risk Management (FCERM) Strategy (due summer 2020) and the National Planning Policy Framework.

**Collaboration:** Longer-term, a strategic approach should be taken to adapt to potentially significant increased flood risk. The Council will work with partners including the Environment Agency, Anglian Water, District Councils and the Internal Drainage Boards to take a coordinated and collaborative approach to flood risk management. We will work with communities to consider how flood risk management can be better managed locally, to deliver alleviation projects for high risk areas where possible, and to develop flood groups and local flood resilience plans. Projects are likely to include property level resilience (PLR) projects, or where catchments are suited to this approach, Natural Flood Management (NFM) schemes.

The Council will encourage cross-county partnerships to improve and adapt water management policy and practices. In 2016, the District Councils adopted a Flood and Water Supplementary Planning Document (SPD), which is a material consideration when determining planning applications and supports the implementation of Local Plan flood risk and water related policies. The Council will work with local planning authorities to update the SPD to ensure its effectiveness as new Local Plan polices develop.

#### 4.4.4 Water availability

**Collaboration:** Cambridgeshire is a water scarce region and subject to increasing drought. By the 2050's, there is predicted to be a shortfall of 5-17% in the amount of water required to meet demand (12).The Council will support partners like our Local Planning Authorities, tenant farmers and Water Resources East (WRE)<sup>3</sup> to consider suitable actions to manage this risk.

There are some areas of the County where water supplies for growth will be predicated on reducing water waste in existing communities. This may mean that policy trade-offs nationally will be needed



Figure 17 Stages of the Fen Flood Risk Project

<sup>3</sup> The County Council has joined the Strategic Advisory Group for Water Resources East. WRE's mission is to work in partnership to safe guard a sustainable supply of water for the East of England, resilient to future challenges and enabling the area's communities, environment and economy to reach their full potential.

such as improved resilience versus keeping water bills low. The demand for water resources to support growth could place our region's natural capital at risk, if appropriate adaptive plans are not developed that conserve water quality, aquatic habitat and biodiversity.

#### 4.4.5 Green and blue infrastructure development

**Collaboration:** Well designed and located multi-functional Green Infrastructure can deliver a wide range of environmental services and make a significant contribution to both Climate Change adaptation and to improving our natural capital. Maximising the creation, co-benefits and longevity of multi-functional green and blue (water) infrastructure to reduce our vulnerability and exposure to Climate Change is essential.

The Council has previously had a leading role in encouraging development of a Green Infrastructure strategy across the County and we encourage continued leadership and support for these plans and policies.

We will work with partners to deliver a local response to the 25-year Environment Plan, for example:

- 'Doubling Nature' (13) with the Natural Cambridgeshire LNP;
- Develop a 25-year strategy for the sustainable management of existing and future parks and open spaces through the Future Parks Accelerator project. This is a joint project with all of the councils in the Peterborough and Cambridgeshire area;
- Work with our tenant farmers on getting the best for our farms and our environment through the Environmental Land Management Scheme (ELMS) and;
- Work with other flood and water management partners to ensure joined up flood and water management. Multi-functional green and blue spaces can provide a huge range of benefits including recreation, temperature control, habitat, flood storage, water resources and water quality improvements.

#### The "Doubling Nature" Vision

Natural Cambridgeshire's Vision is that by doubling the area of rich wildlife habitats and natural green-space, Cambridgeshire and Peterborough will become a world-class environment where nature and people thrive, and businesses prosper.

To achieve this step-change, the aim is to, by 2050, double the area of wildlife rich habitats and green-space from 8.5% to 17%.



Note: Some of the priority areas in the *Natural Capital* theme are also connected to this priority area.

## 5 Conserving and Enhancing Natural Capital

### 5.1 What is natural capital?

Natural capital is our ‘stock’ of water, land, air, species, minerals and oceans. Our environment provides numerous benefits to humanity (also known as ecosystems services), many of which are fundamental to our lives (Figure 18). It enables the food we eat to grow and plants for medicines – providing for us to live. It also offers shelter from widespread disease, clean air to breathe and water. This is referred to as the ‘regulating’ services or benefits we get from nature. We also derive cultural, mental health and wellbeing benefits.

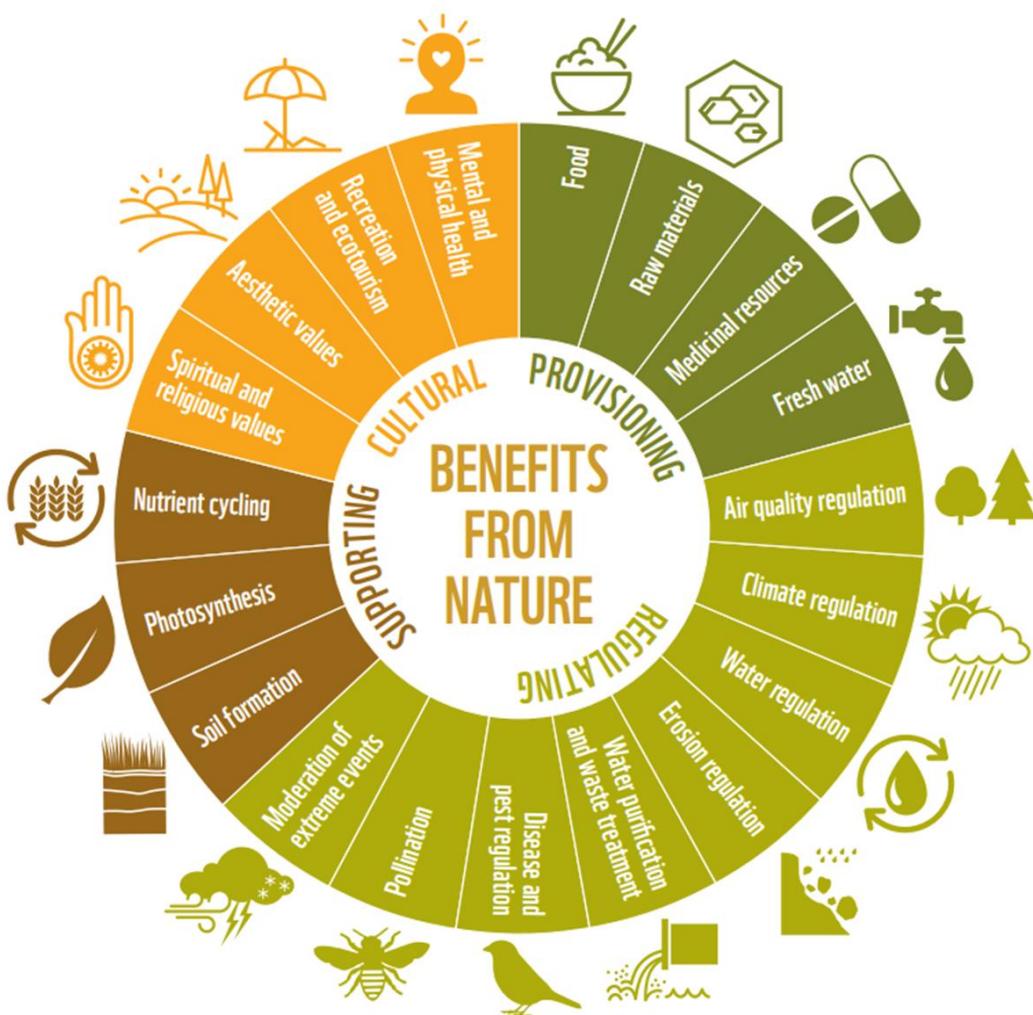


Figure 18 Benefits from nature, adapted from Millennium Ecosystem Assessment, 2005

Our reliance on the environment for these services is important for quality of life. Damaging our natural benefits beyond recovery and repair will mean a diminished quality of life for future generations.

*“We are the first generation that has a clear picture of the value of nature and the enormous impact we have on it. We may also be the last that can act to reverse this trend.”*

Living Planet report, 2018: Aiming higher

From the natural capital stock, goods and services are produced, including clean air and water, food and pollination, energy, wildlife, recreation and protection from hazards, (Figure 19), (4). These services provide economic, social, environmental, cultural, and well-being benefits.

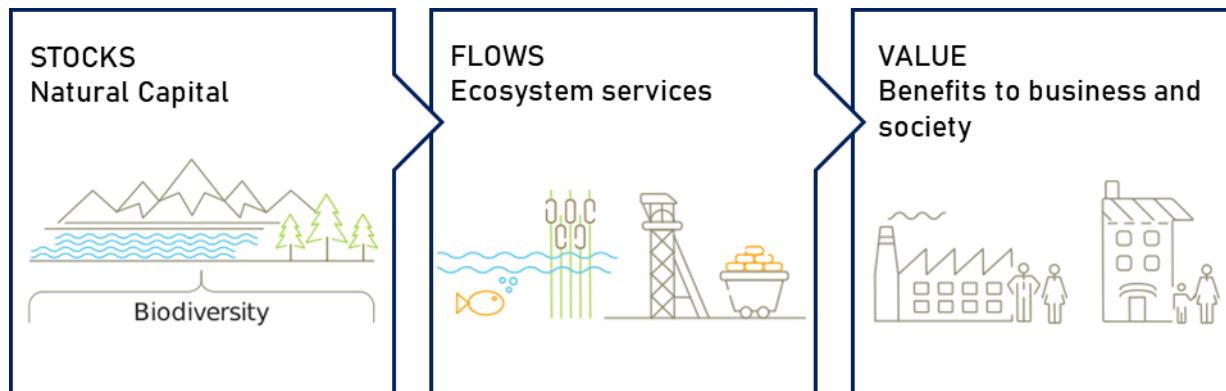


Figure 19 *Process of valuing natural capital*. Taken from Parliamentary Postnote 542 December 2016: *Natural Capital: an overview*

Biodiversity, our flora and fauna, is an essential component of natural capital stocks and an indicator of the stocks' condition and resilience. It provides benefits directly to people, for example, the pollination of plants to produce seeds. This benefits society primarily through food provision, and has a global economic value of approximately £120 billion and within the UK alone in the region of £690 million each year (9)

The UK government published 'A Green Future: Our 25 Year Plan to Improve the Environment" recognising that natural capital is crucial in the formation of all parts of society's wealth and will either directly or indirectly impact value to individuals. Natural capital needs to be protected but also expanded to sustain forecast population growth.

There are a range of established methodologies now available to value these benefits and quantify these financially to allow for incorporation into decision making. By providing a financial value to our ecosystems it can demonstrate to decision makers the full cost of exploiting our environment for short term gain rather than enhancing and protecting it.

Currently, the UK consumes resources equivalent to three planet earths - this is not sustainable. Our environment takes time to replenish itself. The most recent financial crisis in 2008, has shown what happens when individuals and organisations live beyond our means. Credit based consumption becomes dangerous when it outstrips our ability to build up financial reserves, and in the same way, so our economic growth is put at risk when our natural capital cannot replenish.

## 5.2 Natural capital components and how they are being impacted

Now is a critical time to act. If growth over the next five to ten years takes advantage of our rich natural capital without supporting its recovery - degradation of local, regional or even global ecosystems is inevitable. The drivers of natural capital degradation have been established through rigorous research, with our consumption-based culture driving many of the threats facing our environment (Figure 20).

All of these could have major impacts on the world economy and there is increasing evidence that we are already experiencing some of these. Natural capital has been used for 'free' for so long, and it is now important that it becomes valued in our financial and economic modelling to protect it for the benefit of all.

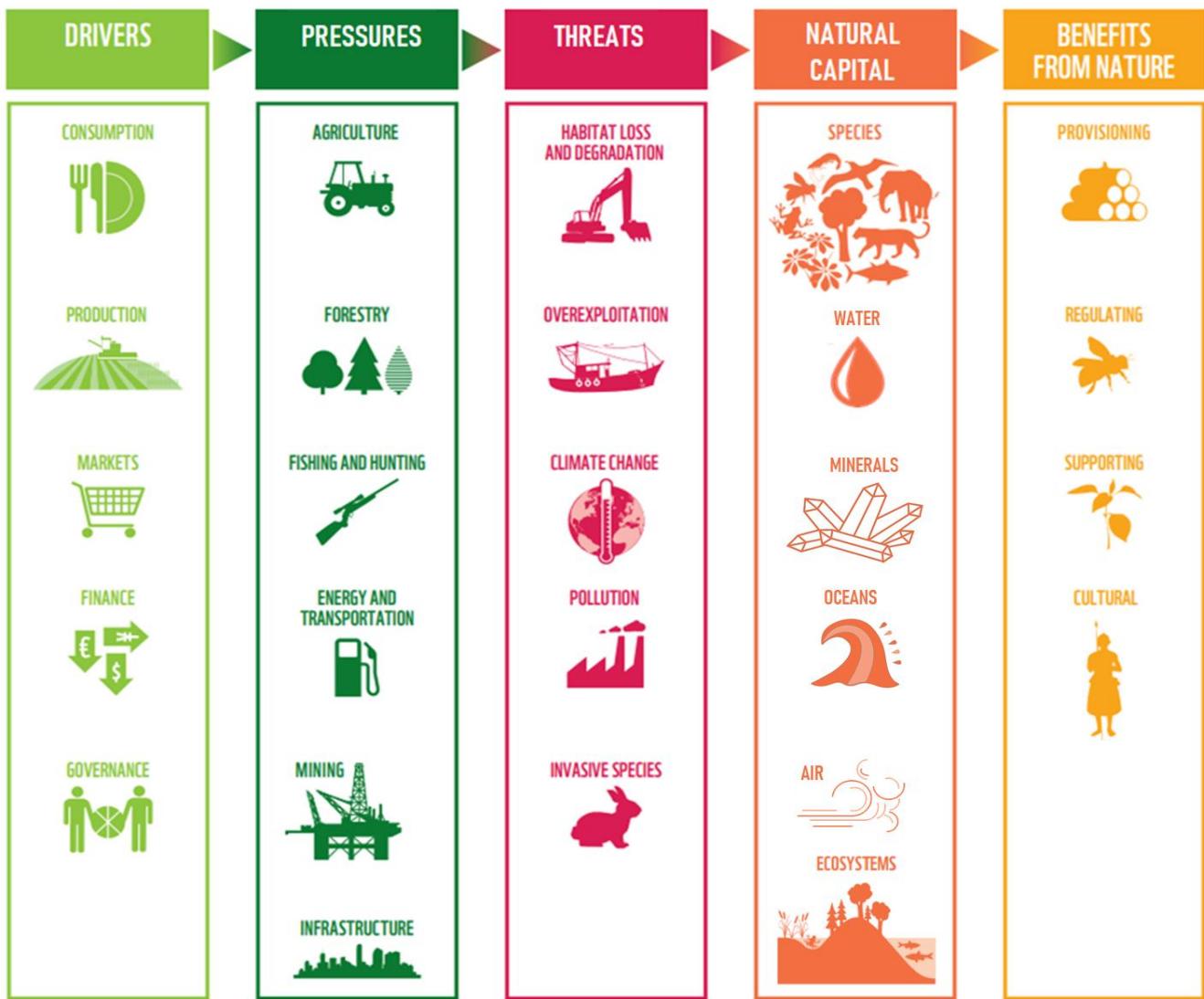


Figure 20 Threats to nature and the drivers and pressures behind them. Adapted from Living Planet Report, 2018

Examples of how this could play out include:

- The agricultural sector will suffer from the changing and more erratic weather patterns;
- Declining numbers of bees reduces pollination activity resulting in less future seed stores;
- Fish stocks are expected to decline due to rising temperature of the oceans;
- Sea level rise impacts coastal communities leading to increased migration;
- Industry and energy sectors will have to deal with reduced water availability, higher temperatures and changing agricultural productivity;
- The transport, insurance, infrastructure, real estate, and tourism sectors all have to deal with rising temperatures, more erratic rainfall patterns and higher probabilities of extreme weather events and corresponding damages;
- Insufficient tree re-growth could reduce our stock of building materials and carbon storage.

### 5.2.1 Climate Change and natural capital

Climate Change impacts species and ecosystems, and therefore the services they provide, in many ways. Changes in prevailing weather conditions (temperature, precipitation, seasonality) directly affect ecosystem processes as well as species survival, encourage the spread of pathogens, and disrupt the timing of life cycle events. There are many lines of evidence that show that species are already being affected by Climate Change (14). With the damage to this natural capital come impacts on the services they provide us, and the development of feedback loops which exacerbate both the cause and effects of this damage.

The effects of Climate Change (including increased heat, drought, flood risk, sea level rise, and increased air pollution) create significant risks for the natural environment, including:

- Damage to crops from severe weather/lack of water;
- Loss of top soils due to floods;
- Changing temperatures impacting wildlife through changes to habitat and food chains;
- Damage to historic buildings from air pollution.

### 5.2.2 Air pollution

Clean air is one of our natural capital ‘stocks’ but air pollutants generated by a mixture of natural and human-made processes are creating health and environmental damage. Having clean air to breathe is the basic building block in creating a healthy environment for everyone. Our wildlife is also significantly impacted by poor air quality, reducing new growth and vulnerable species not thriving.

The main challenge is the production of particulates and nitrogen dioxide ( $\text{NO}_2$ ) resulting from the combustion of fossil fuels, causing unacceptable impacts on health. Particulates, when inhaled can lodge deeply in the lungs and exacerbate existing respiratory problems, whilst  $\text{NO}_2$  can increase asthma impacts in children. Small particulates from traffic also contribute to indoor air pollution, where people spend most of their time and receive most of their exposure to air pollutants.

In January 2019, Government published its [Clean Air Strategy](#). This recognised that air pollution is the top environmental risk to human health in the UK and the fourth greatest threat after cancer, heart disease and obesity. The Clean Air Strategy recognises the following main air pollution risks including:

- **Transport emissions** from the production of particulates and nitrogen dioxide ( $\text{NO}_2$ ) resulting from the combustion of fossil fuels and ground level Ozone is a harmful air pollutant and potent greenhouse gas (not to be confused with the ozone layer).
- **Industrial emissions** come from burning fossil fuels, use of solvents and account for 3% of UK particulate matter (PM2.5) emissions.
- **Agricultural practice** emits ammonia ( $\text{NH}_3$ ) released from manure and slurry, through the use of manmade nitrogenous fertiliser. Ammonia affects human health when it binds with other gases to form fine particulate nitrogen oxides ( $\text{NO}_x$ ).
- **Heating homes** through the burning of wood and coal in open fires and stoves makes up 38% (the largest share) of the UK’s primary emissions of fine particulate matter (PM2.5<sup>4</sup>). Harmful sulphur dioxide ( $\text{SO}_2$ ) is also emitted by coal burned in open fires.
- **Toxic household products** used for cleaning and other processes contain non-methane volatile organic compounds (NMVOCs). NMVOCs come from a wide variety of chemicals that are found in carpets, upholstery, paint, cleaning, fragrance, and personal care products.

### 5.2.3 Water pollution

Polluting our rivers and oceans from single-use plastics and agricultural run-off poses a significant threat to aquatic and marine-life and reduces the ability of our oceans to nurture and restock itself. In July 2019, the Council developed a plastics strategy and action plan to make a difference on this issue. An estimated 79% of all plastic waste ever created is still in our environment and needing to be cleaned up. Waterways become clogged with plastic pollution, preventing natural functioning of the systems and harming wildlife when consumed.

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<sup>4</sup> PM2.5 = particles of  $\leq 2.5\mu\text{m}$  diameter particles which are 200 times smaller than a grain of sand. PM is not a single pollutant; it is made up from a huge variety of chemical compounds and materials.

Fertiliser run-off from agriculture, can cause oxygen levels in waterways to diminish such that flora and fauna cannot survive. Ammonia pollution (from animals or fertilisers) causes significant and widespread impacts on our flora, and waterways are particularly at risk.

#### 5.2.4 Population growth and development

To achieve sustainable clean growth, as described in 1.4, it is important that everyone takes action to conserve and enhance our natural capital. Reducing consumption and improving resource efficiency will bring benefits to our natural capital as there will be more space for nature. Cambridgeshire's clean growth approach can bring opportunities to natural capital through:

- Restoring local historic environments;
- Provision of increased green spaces for people and nature;
- Increasing tree planting to assist with shade/urban cooling, air quality and biodiversity;
- Shifting from cars to more active travel choices such as walking, cycling and mass transport solutions.

### 5.3 The Council's role in conserving and enhancing natural capital

The Council is a land and asset owner, as well as having responsibilities for mineral and waste planning and other policy. This places us in a strong position to maintain and enhance natural capital in many ways. Greater detail can be found in section 10.5.

#### 5.3.1 Landowner and guardian for the future

The Council owns seven Local Nature Reserves as well as a large farming estate, some woodland, highways land and other land. Managing the impacts of Climate Change and growth will mean the planting of more trees and hedgerows (whilst recognising that some areas are not suitable for tree-planting), using a mix of location-appropriate species that complement Cambridgeshire's natural habitats while also thriving under different weather patterns. More planting will also help store excess water at times of excessive rainfall, helping to manage flood risk. Through the Council's rural estate, its land forms part of some of these important wildlife sites and we must support our partners in the careful management of these sites. The County is a partner to the Natural Cambridgeshire LNP and Cambridgeshire & Peterborough Biodiversity Group.

Over and above this key opportunity for conservation action, Cambridgeshire is home to a number of nationally and internationally important wildlife and historic sites. It has a number of Sites of Scientific Interest (SSSI) including Devil's Dyke, Cherry Hinton Chalk Pits, Thriplow Peat Holes, Upware South Pit, Whittleford- Thriplow-Hummocky Fields, Cam Washes and Grahams Water. It also hosts three Ramsar sites; the Nene Washes, Great Ouse Washes and Chippenham Fen, as well as a number of Special Areas of Conservation (SACs) including Eversden and Wimpole Woods and Fenland SAC. Through our partnerships we can help to maintain these valuable sites in positive conservation status.

#### 5.3.2 Policy maker

While the Council owns a number of designated and non-designated heritage assets, many of which can be managed to create a better environment for residents and for heritage itself, we also have a key role in advising on environmental stewardship schemes to help landowners to extract the best environmental and heritage related outcomes from sites. We advise on planning applications and work closely with developers to maximise the potential for open spaces in developments by use of 'preservation in situ' schemes that create greenspace to protect the historic environment

Our role in development and enforcement of the County Minerals and Waste Plan provides a key opportunity to design and implement policies to create new habitats as well as deliver strategic flood water storage as a restoration option. Similarly our role as the Lead Local Flood Authority for Cambridgeshire, entails close working with our District and City Councils to seek sustainable drainage systems and the protection of water resources for new developments. Availability of water

is a major challenge for Cambridgeshire, the driest part of the country, likely to face water shortages ahead of other areas. Tackling this issue is important and we must look to support our partners with leading roles on this issue.

As the local managers of the highways network, the County Council manages protected roadside verges and maintains Rights of Way that supports green infrastructure and biodiversity.

## 5.4 Our Priority areas for natural capital

There are some areas that the Council can lead but many areas in natural capital enhancement that others lead and we will look to support their efforts.

### 5.4.1 Reducing waste and tackling plastic pollution

Waste crime such as illegal dumping of domestic and business waste is an increasing challenge, with incidences increasing in scale and impact nationally. Illegal waste activity costs the UK economy around £600 million every year, and a 2019 review into serious and organised waste crime found that the lack of digital record-keeping is being exploited by organised criminals who mislabel waste to avoid landfill tax or illegally export it. Once dumped, this waste makes its way into our environment as a key source of pollution and also undermines the public's view of our waste management and recycling schemes, as they question whether their recycling will be illegally stored or dumped outside the United Kingdom by rogue operators leading to environmental pollution.

**Leadership:** As the Waste Disposal Authority, the Council has a duty of care to ensure the waste we deal with is sent to authorised reprocessors and does not contribute to pollution. We work with our local authority partners, who collect household waste and take it to our waste contractor Amey. The Council has a duty of care over this waste when it arrives with our contractors and there is effective collaboration between our contractors, the Environment Agency and ourselves to ensure where Cambridgeshire waste ends up is a transparent process and not a polluting hazard to our natural world.

One of the most important mechanisms at the Council's disposal to reduce waste, cut single use plastics from service delivery and ensure waste can support a circular economy, is through our procurement of goods and services. The Council spends more than £450 million per annum on its supply chain to deliver services. Our promise for our environment is to specify better, more sustainable options for service delivery, replacing single use plastics (where appropriate) and promote the concept of a circular economy within our service delivery. Our Plastics Strategy highlights much of the work we are already doing and actions we are undertaking right now to reduce use of un-necessary single-use plastics within the Council.

#### Developing a Local Circular Economy

In partnership with RECAP, University of Cambridge and Charpak Ltd (a local company who manufacture rigid plastic packaging), the UK's first Localised Circular Economy is being developed. The Cambridgeshire-wide programme has been running since January 2019.

The initiative takes plastic waste collected throughout Cambridgeshire, and following use, the packaging is sorted, recycled, cleaned and re-manufactured into plastic for new products for another use, again and again.

The project will analyse this initiative as part of a wider study to assess creative circular economy approaches to eliminate plastic waste.

Recycling performance in Cambridgeshire is already good. Recycling rates are amongst the best in the Country, however there is always room for improvement. Building confidence in the recycling services offered, and encouraging our communities to minimise the generation of waste and maximising recycling is key and we will continue to provide waste education services for our schools and communities.

We will work to improve the transparency of our recycling system and tracking of recycled materials and help to create and shape the market for greater levels of remanufacturing in Cambridgeshire and improve public confidence in our recycling services.

**Collaboration:** The Environment Agency is responsible for the enforcement of waste management legislation and operates a “Duty of Care” system for waste, whereby materials sent for recycling to waste sorting and processing facilitates can be followed to their end point. Significant investment is already underway to develop an improved, more technologically advanced system, and the Council is supportive of such improvements.

Nationally, work is underway to identify and embed the Circular Economy Principles and support local areas to do the same. Principles such as “polluter pays” will be applied to packaging and material producers who will be made responsible for the collection, recycling and re-use of the materials they put on the market. These are expected to be enshrined within the Environment Bill coming before Parliament in early 2020 and will be a significant step forward for waste management and pollution reduction

#### 5.4.2 Air pollution

Currently, there are seven Air Quality Management Areas (AQMA) in Cambridgeshire. These are primarily urban based and focussed around transport emissions and include measurement and monitoring of key identified pollutants for reporting annually to DEFRA. Each has an action plan describing the problem and measures to tackle the problem. Under the Clean Air Strategy and the inclusion of additional air quality impacts such as from agriculture, traffic growth (if not mitigated) and homes on solid fuel, together with the likely new objective on PM2.5, the number of air quality management areas could increase and broaden and is likely to include rural areas with intense agricultural practices and communities dependent on oil.

**Leadership:** In December 2019, the Council supported an Air Quality Motion to improve air quality across Cambridgeshire and identified a range of actions. The Council, using its current powers, will draw up designs and consult on plans to (i) deny access to bus lanes by end of 2021 to buses that are not electric or clean and (ii) review for pre-registered electric vehicles and two wheeled electric vehicles access to bus lanes.

It is also the Council’s intention to continue to improve cycling across Cambridgeshire, develop a tree strategy to support planting on highways assets and near schools to mitigate air pollution and to also lobby government for improved initiatives and grants to help pilot imaginative projects, such as Swaffham Prior which is looking to take a whole village off oil and onto renewable energy.

**Collaboration:** There are three joint working arrangements in place to address air quality across Cambridgeshire. These include:

- *Health and Wellbeing Board* – The Cambridgeshire Health and Wellbeing Board published a detailed Joint Strategic Needs Assessment on Transport and Health in 2015, with air pollution as one of three themes. The CCC Public Health Team reviews and signs off the district council air quality annual status reports. It is also expected that the JSNA and the Health and Wellbeing Strategy are taken into account in local plan making.
- The “*Cambridgeshire and Peterborough Pollution Prevention Group*”: air quality leads from each of the District/City Councils meet to discuss and progress air quality issues across the County, this group has representation from CCC Public Health and Place and Economy.
- *Cambridge Air Quality Action Plan Steering Group* – jointly chaired by the City and County, with representation from Greater Cambridge Partnership (GCP) and Cambridgeshire and Peterborough Combined Authority (CPCA).

The Council is keen to collaborate with partners to tackle air pollution. It is working with the Mayor and the Greater Cambridge Partnership to deliver the CAM metro and will continue to expand the

transport hub network, where you can leave your car and get on public transport to travel into Cambridge, Peterborough or other main centres and also develop plans for last mile delivery. These new approaches to personal and business related travel are central to government's decarbonisation plans for transport (2).

Critically, collaboration will be needed to for the planning of new developments to ensure air quality is at the heart of new developments. This will go hand in hand with planning for zero carbon development and a key next phase of work is to understand how to design local plan policies to deliver the nature and air quality benefits.

#### 5.4.3 Green spaces, habitats and land management

**Leadership: Habitat restoration through enhanced planning policy.** This requires mineral and waste management restoration proposals to reflect strategic and local objectives for countryside enhancement, green infrastructure and greenhouse gas emissions. Emphasis will be placed on restoring habitats and species that have been displaced or degraded through quarry activity, and the implementation of robust restoration ecology approaches to re-establish lost ecosystem dynamics.

**Leadership: Land management.** We need to shift our land and asset management approach to place greater emphasis on positive environmental outcomes. This will include support for additional tree planting on our rural estate (where appropriate) and managing our road verges better for biodiversity.

We can also enhance the natural environment through Council owned Local Nature Reserves, as well as continuation of participations in Governmental environmental stewardship schemes through the new Environment Land Managements Scheme (ELMs). Sustainable soil management policy on the rural estate will be established using emerging natural capital based soil metrics and management approaches to measure and evaluate the approaches supported.



Figure 21 Surveying insects at one of our Local Nature Reserves

**Leadership: Biosecurity** Changing climate is aiding the spread of plant and animal disease and invasive species across the UK. Ash dieback (*Hymenoscyphus fraxineus*), for example, has been prolific in recent years and is projected to kill up to 95% of ash trees across the UK, changing our landscape forever and threatening many species which rely on it. The cost to society of this disease is predicted to be in the region of £15 million (15). Similarly the spread of the highly invasive Japanese Knotweed (*Fallopia japonica*) has been an ongoing challenge for the last 35 years. This species is spreading as the UK's climate becomes milder, and emerging research suggests it reduces soil's capacity to sequester carbon.

We will pro-actively manage our rural estates and assets to improve the speed of identification disease symptoms and invasive species, and enhance our management approach to dealing these challenges. We will ensure all tenant farmers are able to react speedily to any disease or invasive event, and that biosecurity measures are incorporated in planning applications where relevant.

**Collaboration with our tenant farmers:** We will engage with our tenant farmers through government policy changes and new guidelines. We will aid our tenant farmers to keep informed of these changes, particularly where new subsidies may provide an opportunity to hasten "greening" of our estate and encouraging more sustainable agricultural practices.

We will also work with our tenant farmers to develop best routes to aid reductions in impacts from pesticides, herbicides and nitrogenous fertilisers on our land while ensuring that crops are produced sustainably and profitably. For example, ammonia escape from slurry stores can be reduced through the use of store covers, or the use of metaldehyde for slug control could be replaced with alternative chemicals that are easier to remove from drinking water (as demonstrated through the Anglian Water trial with Cambridgeshire farmers located near to Grafham Water).

**Collaboration: Doubling Nature.** Cambridgeshire has one of the smallest percentage of land managed for nature in the country. Currently only 8.5% of the county is covered by natural or green spaces. Doubling the county's natural and green spaces by 2050 will “secure access to *high quality natural green spaces within 300m of everyone's home*”. Nature Cambridgeshire, the Cambridgeshire and Peterborough Local Nature Partnership, is a partnership with district councils, the County Council, the Cambridgeshire and Peterborough Combined Authority, Natural England, the Environment Agency, the National Farmers Union and a number of others to reach the ‘Doubling Nature’ target of 17% natural and green space coverage.

#### 5.4.4 Peatland

**Collaboration:** Cambridgeshire’s fen peatlands are among the UK’s most diverse habitats for wildlife, but much have been lost to drainage and agriculture practices (16). These habitats rely on a delicate balance of water volume and quality to maintain their diverse range for flora and fauna many of which are internationally recognised.

Nationally, peatland research and restoration has focused on upland systems. With its extensive lowland systems with complex human-nature interactions, and rich research and technological communities, Cambridgeshire is well placed to take the lead in developing and implementing new sustainable management practices for the benefit of communities and nature.

Already there are projects such as Wicken Fen (the National Trust) and the Greater Fen Project (Wildlife Trust) working to conserve and re-wet our peatlands. This work must continue and extend to include agri-tech and other farming interests to find solutions to the carbon footprint.

#### 5.4.5 Water management

**Collaboration:** Holistic water management is essential to ensure efficient and long-lasting mechanisms are put in place. One example is the management of chalk rivers and streams, recognised as a priority habitat under the UK Biodiversity Action Plan. While England’s chalk rivers are ecologically important, they also have very high cultural and economic value leading them to have many demands placed on them from abstraction, irrigation, fisheries management, energy provision and navigation.

In Cambridgeshire, water companies, the Environment Agency and communities are seeking ways to best manage the cumulative impacts of groundwater abstractions on flows in chalk streams under low flow stress, to supply a growing Greater Cambridge area with drinking water. Management is complex because natural groundwater levels vary significantly from year to year, and are susceptible to dry periods and drought. Over abstraction can cause ecological impacts, but large scale reduction in abstraction from current levels could also lead to an increase in local groundwater flooding, as well as increasing environmental impacts from development of alternative sources for public water supplies.



Figure 22 Ponds are used to store water and provide aquatic habitats

Note: This priority area is also linked to the *Water availability* and *Green and Blue Infrastructure* priorities in the *Adaptation* theme.

## **6 Tackling Climate Change and Environmental Challenges Together**

### **6.1 Collaboration is essential**

Tackling Climate Change, adapting to its ongoing impacts and protecting and enhancing our natural capital is bigger than any one organisation. Success will only happen if we all choose to work together and share responsibility for changes in the way we live and work. Aligning our endeavours will allow us to make changes as fast as possible and at the least cost. This means policies and strategies across Government at all levels must be complementary and that we use the power of the market and people to bring forward new working practices, technological and other innovations and that society reacts positively to this shared responsibility.

Looking back to the past it's important to learn lessons but we must also recognise that no previous generations have experienced the choices that we must now make today to stop human-driven Climate Change. It is a new path for all of us which we need to create together. It must use resources sustainably, respect our natural capital and flourish without degrading the environments we so rely on. The scenario of runaway Climate Change is a bleak prospect for everyone, not just in the UK but globally, as faster sea level rises will damage coastal communities and cities, desertification will force mass migrations across continents and flooding will be commonplace.

### **6.2 Working with our local Authority and public sector partners**

All but one of the Cambridgeshire Local Authorities declared a climate emergency during 2019, making commitments to reduce carbon emissions. Building consensus on carbon footprints and aligning methodologies for calculating carbon reductions has started between the Local Authorities. The CUSPE evidence base provides a consistent carbon footprint across Cambridgeshire but it will require individual authorities to dig deeper to really understand emissions in their patch and to share this widely.

Carbon reporting will become commonplace. It is important we develop this as a transparent process and where possible use the same accounting methodology to make comparisons easier. The Council and Cambridge University are both using the same methodology to calculate their organisational footprint, the Green House Gas Protocol promoted by Government. It will be important that we all understand what is meant when one Council pledges to deliver net-zero carbon by 2030 for its organisation whilst another pledges net-zero carbon by 2050 for the whole of Cambridgeshire. Delivering net-zero by 2030 for an organisation is much easier than net-zero for a community by 2050 and we must ensure communities understand this nuance.

Across Cambridgeshire our Local Authority and public sector partners are on the same journey as us. There is a growing body of experience and climate projects we must share and learn from. To deliver the carbon emissions savings and to prevent runaway Climate Change, the faster and quicker we act now, the better everyone will be. Allowing others to lead on their strengths and create a learning environment for everyone will bring success. Some of the great things already happening include Peterborough City Council developing a carbon management plan for its highways service, South Cambridgeshire District Council investing in local green infrastructure, East Cambs District Council is developing new Environment Supplementary Planning Guidance, Cambridge City Council is implementing EV charging infrastructure for taxis and the Greater Cambridge Greater Peterborough Combined Authority is setting up a Climate Commission with Cambridge University.

## **6.3 Collaborating with our communities**

There are a number of ways that the Council can work with communities. We are in a unique position to bring together a wide range of different people and organisations to act in a unified way on Climate Change.

**Building awareness** of the impacts of Climate Change and how households can adapt to hotter summers and wetter winters including increased flood risk.

**Supporting Parish Councils, Community Land Trusts** and other organisations to shift rural communities off oil onto renewables by using our land assets where possible to build and operate community energy centres to benefit communities. Neighbourhood Plans are a key opportunity for local communities to plan for local renewable energy and EV charging infrastructure. Undertaking community carbon footprints could help inform Neighbourhood Plans as this will provide the scale of local energy provision that needs to be planned for locally. Parish Councils can also be supported to access procurements for specialist energy services to design and construct projects and work with our in-house team to identify grants and share best practice from existing projects.

**Engaging with young people** is vital. Many schools have developed eco-councils. Working with head teachers, schools and eco-councils we will look to develop the idea of school Climate Change and environment strategies and link these to future skills provision, improving careers advice and guidance and building behavioural change.

Creating a sustainable future and quality of life for young people must involve the voices of, and engagement with young people. Current and future generations are inheriting a changing climate as a result of fossil fuel combustion worldwide and will experience even greater impacts of more extreme weather in their everyday lives, to that which we are experiencing today. The infrastructure developed now: housing, transport, energy and digital, will shape the way young people live their lives.

Education, from early year's provision through to schools, colleges and universities, is working hard to equip young people with the knowledge and skills on Climate Change impacts and preparing them for their future responsibilities. Tomorrow's decision makers, engineers and technologists already exist and it will be important to bring their new ideas and ambitions into the infrastructure we are designing and decisions we are taking now. Planning the transition from today's workforce to the future workforce needs development, ensuring the skills and knowledge are in place to make a successful and happy succession.

The **business community** can be a powerful force for change through product innovation, corporate social responsibility and core values of a business that support sustainable development. For example, energy efficiency improvements of 'white goods products' has reduced carbon emissions. On the other hand if robust governmental regulation and policy is not delivered, damaging practice such as the recent car emissions cheating scandal can also emerge. Our work with the business community will come through a number of mechanisms. We procure £450 million of services per annum which we will look to specify with strong environmental principles and carbon footprints. We will link with Member organisations such as Cambridge Cleantech, Agritech businesses, Cambridge Ahead, the Chamber of Commerce, Cambridge Network, the Business Board and small business organisations working across Fenland to start conversations on climate risk and the business opportunities ahead.

**Individuals** are highly influential of the 'market' and the provision of goods and services by businesses. For example, fast fashion is driven by consumer choices bringing significant carbon impact and waste challenges for society.

Cambridgeshire has strong networks of established **Community Groups**. Many of these groups deliver services to our community, while others address specific local issues. More recently, Climate Groups are setting up, for example, Cambridgeshire Climate Emergency. This group is looking to build capacity in the community to take climate action, share experience of projects across communities and train individuals in the community to undertake carbon footprinting. Linking into and supporting our community groups to take positive action is important. As part of Cambridgeshire's place making responsibilities, the public sector are developing a new way of working with its communities. This initiative is called 'Think Communities'. The aim is to use this new programme to collaborate on emissions reductions and adaptation to Climate Change impacts within communities. The details of this are still being worked through, however, it is essential that the Council helps build community climate capacity and harnesses the energy and ideas of local people to make change happen at scale.

## 6.4 Cultural change

All products and services that are accessed or bought have a carbon footprint through the use of resources (extraction from the ground for example), production of goods (energy to make the clothes or smart phones), distribution of these goods (energy for transportation), and then ultimately the treatment and disposal of the waste. Efforts to reduce or change consumption can impact positively on our carbon footprint and this comes from new consumer choices and political interventions. Positive examples of these changes include consumers choosing to avoid single use plastics to minimise polluting our oceans, and the shift towards LED lighting. Initially, LED lighting was not favoured by consumers but is now culturally accepted and in widespread use.

Figure 23 charts the journey we are making as a society to tackle Climate Change.

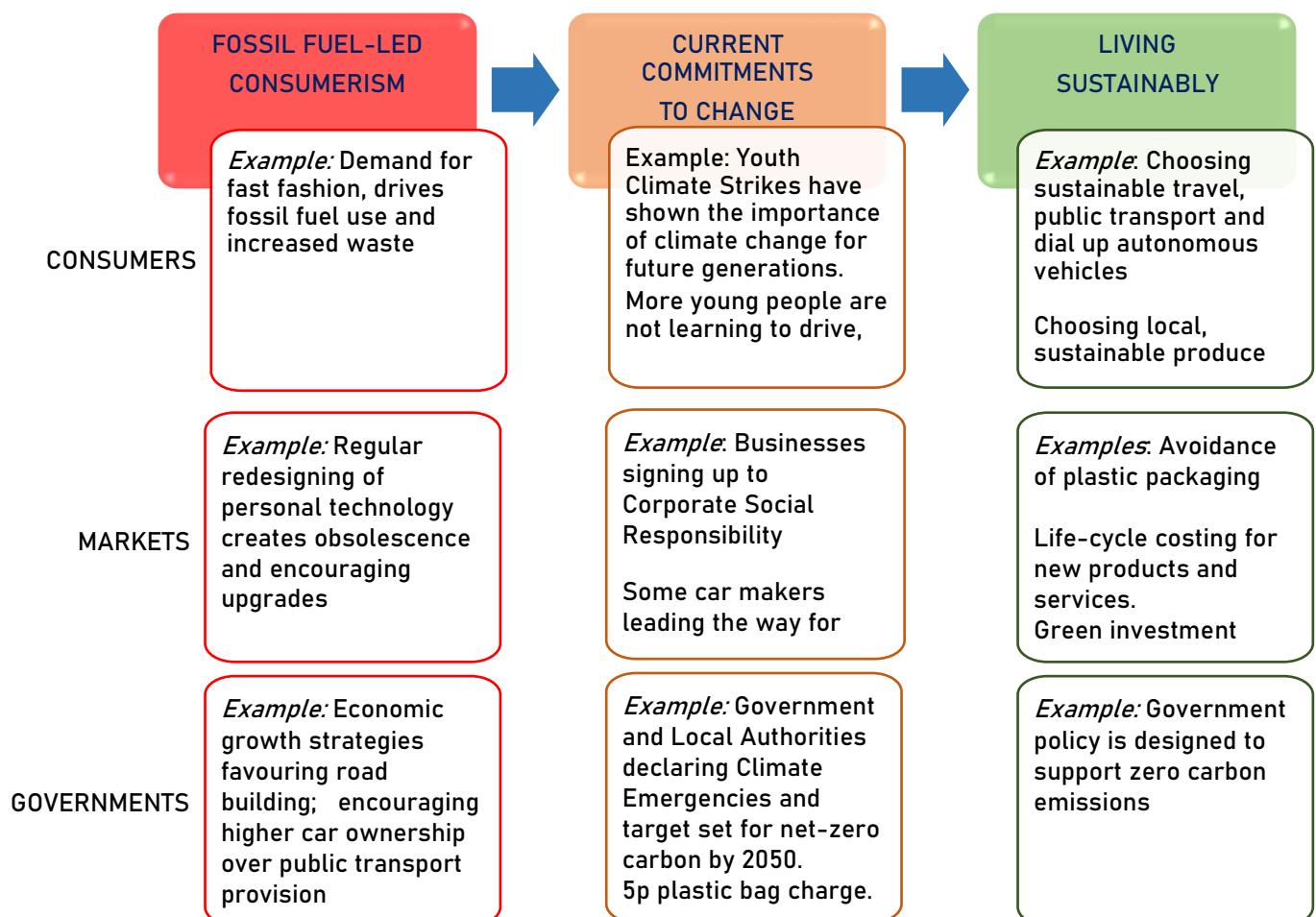


Figure 23 Cultural Change – consumer, market and political change

Fossil fuel consumption has been widely promoted by successive Governments and the market, in its drive to prosperity and economic growth. Until recently, policy instruments were developed without fully taking into account the impacts of fossil fuel consumption on Climate Change. Although the scientific evidence on the causes and impacts of Climate Change has been known for some time, there has been a delay in societal acceptance of the urgent need for change. The transition to a low carbon society wrestles with difficult trade-offs between competing priorities whilst policy begins to align across all sectors and all levels of government in a shared ambition to reach net-zero by 2050. In some cases it may take regulation and/or fiscal incentives to bring about cultural change, for example the 5p plastic bag charge.

Young people are worried that homes built now will continue to be inefficient and reliant on fossil fuels, where they need to be affordable with clean energy, smartly managing energy for efficiency and warmth whilst minimising waste. Public transport is also a particular concern for young people. It can offer opportunities to meet friends and work but people in rural areas don't have sufficient access to this, pushing them towards driving cars, often older and inefficient and more polluting models.

Broadly, the interaction between politics and consumer choices is changing our culture from one which did not consider its carbon or polluting impacts to one of greater knowledge and more discerning choices. We need to keep building on these changes together, learning from each other and sharing responsibility.

## **6.5 Public consultation and engagement**

A draft Climate and Environment Strategy was consulted on during December 2019 - January 2020. The results of the consultation have initiated changes to the strategy to reflect these comments. Engagement must continue even once the Strategy is approved and published as we all need to upskill and learn from each other.

Our sincere thanks to everyone that completed our questionnaire and submitted comments on the strategy. We now understand better what is wanted from us and will use this to inform our journey over the next few years. The plan is to review the strategy during 2024/25 unless there is an urgent need to update earlier. Our focus will now be on carbon reduction projects, new policy making for zero carbon and climate risk management. We will be in a different place in 5 years.

The consultation results can be found [here](#).

## 7 Implementation

Accompanying this document is an Action Plan. This describes the actions we will take to achieve our targets. The action plan will be a live document on our website and will be subject to change as new ideas and projects emerge and projects complete.

### Resource and Funding

In February 2020, a fund of £16 million to deliver the near term targets, including getting our own house in order, was established. This will, over the next 5 years, provide:

- £15m to shift all buildings that are both owned and occupied by the council off gas or oil heating system
- £500k to support project development and design for oil dependent schools and communities to move to more renewable sources of energy
- £200k to bring forward electric infrastructure so the council can move to electric vehicles for its small van and pool cars fleet.
- £300k to be made available to support further schemes as they are developed.

The Council has also committed funding to support 1.5 FTE new positions dedicated to bringing forward the actions outlined: a Climate Change Officer (full time) and Energy Project Officer (0.5 time). These roles will work corporately but will sit within the Energy Investment Unit.

### Timeline for Delivery



## 8 Glossary

Expression	Meaning
Adaptation	Methods to lower the risks posed by the consequences of Climate Change by improving resilience.
Carbon	Used as abbreviation for carbon dioxide or carbon dioxide equivalent.
Carbon Budget	An amount of carbon dioxide that a country, company, or organization has agreed is the largest it will produce in a particular period of time.
Carbon capture and storage (CCS)	The process of capturing and storing carbon dioxide before it is released into the atmosphere or used in other industrial processes. Current technology can capture up to 90% of carbon released by burning fossil fuels in electricity generation and industrial processes such as cement production.
Carbon dioxide equivalent (CO <sub>2</sub> e)	A standard unit for measuring carbon footprints. It express the impact of each different greenhouse gas in terms of the amount of CO <sub>2</sub> that would create the same amount of warming, using global warming potentials.
Carbon offset	A reduction in emissions of carbon dioxide or other greenhouse gases in order to compensate for emissions made elsewhere. This reduction could be through minimising emissions or capturing emissions. Offsets are measured in tonnes of carbon dioxide-equivalent.
Circular Economy Principle	An economy in which resources are kept in use for as long as possible, extract the maximum value from them whilst in use, then recover and regenerate products and materials at the end of each service life.
CO <sub>2</sub>	Carbon dioxide
EV	Electric Vehicle
Global Warming Potential (GWP)	A measure of how efficient a chemical is at trapping heat in the atmosphere relative to carbon dioxide. For example, methane has a GWP of 34 and nitrous oxide has a GWP of 298 (6). By definition, CO <sub>2</sub> has a GWP value of 1. Quantities of GHGs are multiplied by their GWP to give results in units of carbon dioxide equivalent (CO <sub>2</sub> e).
Green House Gas (GHG)	Any gas that absorbs heat and then emits it. These gases prevent heat from leaving the Earth's atmosphere, driving the warming of the planet. Common gases include: carbon dioxide, water vapour and methane.
Green/Blue Infrastructure	A network of multi-functional green space and other green features (or water), urban and rural, which can deliver quality of life and environmental benefits for communities.
Heritage Asset	A building, monument, site, place, area or landscape identified as having a degree of significance meriting consideration in planning decisions, because of its heritage interest. Heritage asset includes designated heritage assets and assets identified by the local planning authority (including local listing).
Historic Environment	All aspects of the environment resulting from the interaction between people and places through time, including all surviving physical remains of past human activity, whether visible, buried or submerged, and landscaped and planted or managed flora.
Kt	kilotonne = 1000 metric tonnes
LULUCF	Land Use, Land use change and forestry. Category within the Green House Gas Protocol.
Low carbon technology	Methods of generating energy that produce little to no carbon dioxide. These tend to be technologies that do not rely on combustion of fossil fuels.

Mitigation	Methods to reduce or prevent greenhouse gases entering the atmosphere. This can include carbon capture and storage.
Natural Capital	Natural assets, such as fresh water, minerals and biodiversity which confer a benefit to humans. These benefits are expressed in terms of their monetary value.
Net-zero	Achieving an overall balance between emissions produced and emissions taken out of the atmosphere. This can take place on different scales and is often achieved through offsetting.
Peat	The remains of wetland plants and animals that build-up in more or less permanently saturated conditions, and represents an important store of carbon. Peat soils in England have been accumulating carbon since the retreat of the last glaciers approximately 10,000 years ago.
Resilience	The ability to anticipate, prepare for, and respond to hazardous events, trends, or disturbances related to climate. Improving climate resilience involves assessing how Climate Change will create new, or alter current, climate-related risks, and taking steps to better cope with these risks.
Site of Special Scientific Interest (SSSI)	Sites protected because they have important special flora, fauna, or geological or physiographical features. Land is classed as an SSSI following a legal process that judges it to have one or a combination of these features.
Carbon sequestration	The long-term removal and storage of carbon dioxide from the atmosphere to reduce atmospheric concentrations.
Wasted peatland	A technical term for deep peat that has been substantially degraded following years of drainage and cultivation so that the peat is now more dominated by underlying mineral material (16).

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# 10 Appendices

## 10.1 Appendix 1: Impacts of Climate Change

Climate change has many impacts. These will be released by the Council in a variety of different ways. The table below summarises some of these.

Impact	Description	Possible Impacts for the Council
<b>Flood Risk</b>	Projected increases in extreme rainfall will bring increased risk of flooding (9). The nature of surface water rainfall means that many areas will be affected by increased flooding. Runoff from compacted or impermeable areas will increase and water will accumulate in low spots. As temperatures increase more and sea levels rise areas like the Fens will become more under threat.	<b>Infrastructure:</b> Disruption to transport links (17) could affect staff travel to work and access to parts of the County for meetings. Disruption to travel could disrupt Council response processes by restricting access to some parts of the County. There may be increased risk of power outages associated with flooding and thunderstorms, which could cause disruptions to transport, logistics and processes.
		<b>Finance:</b> Increased costs of flood related damage and flood investigations. Increased costs of providing flood resilient infrastructure to existing buildings. Increased social costs associated with providing support for people suffering from emotional issues associated with flooding and uncertainty.
		<b>People and health:</b> Council employees may suffer from increased stress or mental health problems associated with flooding of their homes or the uncertainty associated with increased flood risk.
		<b>Property:</b> Council buildings and property may be damaged by flooding if located within flood risk areas. Designated heritage assets could become damaged through water ingress.
<b>Heat Waves</b>	Climate change is projected to bring an increase in warm temperature extremes and it is very likely that heat waves will occur more frequently and last longer (9). Cambridgeshire is one of the warmer parts of the country, so could be significantly impacted by these changes. Cities will be impacted more than rural areas (18).	<b>Infrastructure:</b> Disruption to transport links could affect staff travel to work and meetings at various council buildings. Disruption to travel could also disrupt Council response processes by restricting access to some parts of the County.
		<b>Finance:</b> Increased costs associated with summer cooling (19) in Council buildings. Increased costs associated with installation of air conditioning and heat resilient infrastructure.
		<b>People and health:</b> Working conditions may become unsuitable for staff which could impact employee concentration and performance (17).
		<b>Property:</b> Office spaces may become unsuitable to work in during heat wave conditions. This will have implications on the design, construction and maintenance of existing and new office space.
<b>Drought</b>	With increased temperatures extremes and more frequent and longer lasting heat waves will mean increased water restrictions in Europe (9). Cambridgeshire is already one	<b>Infrastructure:</b> Roads can be affected under drought conditions and subject to cracking.
		<b>Finance:</b> Increased water costs for office buildings. Increased social costs as more people fall below the poverty line as a result of increased food and water costs.

<p>of the driest counties in England so could be significantly impacted by this. The frequency of drought is likely to increase in presently dry regions by the end of the 21<sup>st</sup> century (9).</p>	<p><b>People and health:</b> Employees may be emotionally or physically impacted by reduced food and water availability and increased costs associated with this.</p>
<p><b>Sea Level Rise (SLR)</b> Rising global temperatures are causing polar ice to melt and oceans to expand, resulting in global sea level rise. Global sea levels rose by circa 0.19 metres between 1901 and 2010 (9). Cambridgeshire is one of the most low-lying counties in England so could be significantly impacted by sea level rise in tidal and fen areas. It is anticipated that the East of England could experience a dramatic sea level rise of up to 0.54 metres by 2100 under a high greenhouse gas emission scenario (19).</p>	<p><b>Infrastructure:</b> Transport links may be impacted by SLR in low-lying parts of the county. SLR could restrict or prevent access to low-lying parts of the County, disrupting access for social care, flood risk management and other service provision.</p> <p><b>Finance:</b> Costs of re-locating Council buildings, infrastructure and Council housing away from high risk areas and provision of SLR resilient infrastructure. Council farms could become unproductive for current agriculture processes.</p>
<p><b>Air pollution</b> Transport is a major source of short-lived greenhouse gas pollutants, which can result in direct damage to human health (20). Road transport (particularly diesel traffic) is a significant contributor to air pollution such as particulate matter (PM) and ground-level ozone (<math>O_3</math>) (20). Rising temperatures are also projected to increase levels of ozone (21), as are other greenhouse gases such as carbon monoxide, methane and nitrogen oxides (22). Short-lived greenhouse pollution can also cause acid rain (22). Air pollutants have been linked to health conditions such as asthma (23) and eczema (24).</p>	<p><b>Infrastructure:</b> Ground level ozone could create a risk of damage to infrastructure, ecosystem services and functions. This could in turn influence agricultural productivity and water supply.</p> <p><b>Finance:</b> Increased social costs associated with providing support to people impacted by pollution related health impacts. Increased costs associated with repair of council buildings impacted by acid rain.</p> <p><b>People and health:</b> Poor air quality can pose a risk to employee health issues such which could lead to more sick days. Air pollution has been associated with the development and worsening of asthma and can also make people who already have asthma more sensitive to asthma triggers (23). Air pollutants have also been associated with health implications such as eczema (24). Urban air pollution can increase risk of cardiovascular, respiratory diseases and cancer (20). Council staff travelling for or to work may be particularly impacted by air pollution from vehicles.</p> <p><b>Property:</b> Ozone pollution can cause acid rain (22) which could cause damage to Council buildings. Indoor air pollution could increase mould and damp in office space.</p>

## 10.2 Appendix 2: Climate Change mitigation measures

Climate Change mitigation measures can be incorporated into both existing and new infrastructure to reduce carbon emissions and improve energy efficiency. There are a number of ways to do this, and the following table describes some of these measures.

*Table 3 Methods to mitigate carbon emissions*

Mitigation Measure	How does this mitigate carbon emissions?	Description
<b>Solar Panels</b>  ©michiganradio	Reduces fossil fuel usage for electricity and heating (if electric).	Sunlight is absorbed by the photovoltaic panels and is used to generate electricity.
<b>Solar Thermal</b>  ©Greentech Media	Reduces fossil fuel usage for water heating.	Heat from the sun is used to warm water running in pipes through the panel. Depending on the temperature the water reaches, the temperature can be “topped up” using conventional methods.
<b>Battery Energy Storage</b>  ©Greentech Media	Enables intermittent renewable energy sources to become viable alternatives to fossil fuels.	Stores electricity for use at times when generation is low.
<b>Air Source Heat Pump</b>  ©burtonwright	Reduces or removes fossil fuel usage for heating.	Air is used to heat liquid refrigerant. The pump uses electricity to compress the refrigerant to increase its temperature then condenses it back to release stored heat. This heat is sent to radiators and stored as hot water.
<b>Ground Source Heat Pump</b>  ©Homebuilding & Renovation	Reduces or removes fossil fuel usage for heating.	Coils or pipes containing refrigerant are buried in the ground. Heat from the ground is used to warm the refrigerant and an electric heat pump is used to raise this temperature further. This heat is transferred from the refrigerant via a heat exchanger in the building to providing hot water and heating.

## Hydrogen



©National Grid Planning



## National Planning Policy Framework

Presented to Parliament  
by the Secretary of State for Housing, Communities and Local Government  
by Command of Her Majesty  
February 2019

## Building Regulations



Reduces or removes fossil fuel usage for heating.

Hydrogen, produced through electrolysis of water using solar or renewable energy, or, produced using natural gas but using carbon capture and storage, is being considered for heating homes.

The Planning System in England is 'plan-led.' The Plan contains policies that set out what development is needed where – either by identifying specific sites or general types of site. When a planning application is submitted, it is tested against those policies to see whether or not it should be approved.

## Passive House



©Magnetitte

Can be set to reduce energy demand of homes (e.g. through energy efficiency measures below) and incorporate renewable energy generation.

These are statutory minimum standards for design, construction and alterations to virtually every building.

Homes designed to combine ultra-low energy consumption with consistently good air quality. They are built with superinsulation, low-volume heat recovery ventilation systems and tightly controlled rates of air infiltration, which combine to make sure the building's carbon footprint is as small as possible. These types of buildings do not require conventional heating systems.

## Fabric First/Insulation



©MyBuilder.com

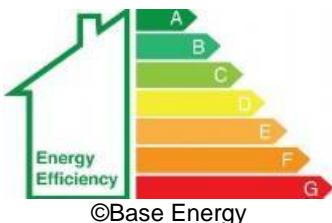
Little to no domestic heating requirements.

Reduces heat loss from buildings, reducing heating requirements.

Materials used to reduce heat loss from buildings – these can be built into new builds or retrofit. It can come in many forms specific to the area being insulated including:

- Pipe insulation
- Roof insulation
- Wall insulation

## Other energy efficiency measures



Reduce energy consumption, thereby reducing emissions from generation.

Various methods to reduce energy consumption. e.g. LED Lighting and double glazing

## TRANSPORTATION

### District Heating/Heat Networks



©Energy Saving Trust

Facilitates low carbon heating.

Groups of co-located (eg a village or town) buildings sharing the same heating source. They are directly connected via insulated pipes to a local renewable heating source, such as a ground source heat pump. This enables faster transition to renewables.

### Active transport eg. Cycling, walking



©The Independent

Zero carbon.

Avoids travel by vehicles.

### Car Sharing/Car Clubs



©Pacific Rent-A-Car

Reduces the number of vehicles on the road.

Car sharing is the sharing of car journeys so that more than one person travels in a car, and prevents the need for others to have to drive to a location themselves.

Car clubs are a model of car rental where people rent cars for short periods of time, often by the hour.

### Public Transport



©intelligenttransport.com

Reduces the number of vehicles on the road.

Public Transport reduces the number of vehicles on the road, but provides far greater benefits than car sharing as more people can use the same vehicle.

### Electric Vehicles and Chargepoints



©Rolec

Removes combustion of fossil fuels as the direct source of energy.



©Electrek

Electric vehicles (EVs) do not rely on the internal combustion engine (ICE) burning petrol or diesel to function. Instead they contain batteries which charge on electricity, removing their carbon emissions as well as reducing air quality impacts.

If the electricity comes from renewable sources, use of these vehicles is carbon free.

### Hydrogen Vehicles



©intelligenttransport.com

Removes combustion of fossil fuels as the direct source of energy.

For larger vehicles, Hydrogen could be used as a fuel source. This is where Hydrogen is electrolysed to produce electricity. Water vapour is the only by-product emitted from the exhaust.

## 10.3 Appendix 3: Adaptation measures

Climate Change adaptation measures can be incorporated into both existing and new infrastructure to reduce the effects of Climate Change. This is done by improving our resilience to the changes that are anticipated to come forward over the coming years. There are a number of ways to do this, and the following table describes some of these measures.

Table 4 Methods to adapt to Climate Change impacts

Adaptive measure	What change does this adapt to?	Description
<b>Rainwater harvesting/ water butts</b> 	Flood and drought	Rainwater is collected in water butts and used as a non-potable water resource such as toilet flushing. Harvested water can also be used for gardening and small-scale infrastructure. ©SusDrain 2019
<b>Grey water harvesting</b> 	Flood and drought	Wastewater from baths, showers, washing machines, dishwashers and sinks can be re-used for portable water sources. © The Green Age
<b>Sustainable Drainage Systems (SuDS)</b> 	Flood, heat waves and drought	SuDS mimic nature and manage rainfall at the source. They slow the flow of surface water and treat it before it enters watercourses. They provide areas to store water at the surface and allow green and blue infrastructure to be incorporated into urban spaces. ©SusDrain 2012
<b>Property Level Resilience (PLR)</b> 	Flood	Protective measures installed in existing homes and buildings to offer protection from flooding. This is best suited for existing buildings located in high flood risk areas which are expected to be impacted most by high intensity flooding and sea level rise associated with Climate Change. ©Flood Protection Solutions

<b>Green space and low level vegetation</b>	Flood, drought, heat waves	Can be incorporated into both new and existing developments. Areas of green space can be used as flood storage providing adaptation to flooding. They also allow water to be absorbed into the ground, recharging drinking water supplies to provide adaptation to drought.
 ©Cambridge Independent		
<b>Tree planting</b>	Air pollution, flood, heat waves and drought	Trees provide shading and urban cooling to allow adaptation to increased temperatures and heat waves. They provide adaptation to increased rainfall and flooding by intercepting rainfall. The interception of rainfall allows more water to be absorbed into the ground providing groundwater recharge and thus adaptation to drought. Trees can improve air quality by removing particles and gases from the air.
 ©Cambridge City Council		
<b>Resilient building design</b>	Heat waves, flooding, sea level rise, air pollution, drought	Buildings designed better to adapt to changing temperatures through installation of energy efficient air conditioning, window shading and tinting. Buildings can also be designed with air pollution filters, ventilation to reduce indoor air pollution. Green walls can be a successful air pollution adaptation measure in city areas, as planting of large trees along narrow streets can obstruct wind flow, limiting their ability to absorb pollutants. Buildings can be designed with floor levels above the projected flood or sea level to adapt to flooding and sea level rise. Buildings can also be adapted to include water re-use/ recycle measures and water saving features such as automatic taps to adapt to drought.
 ©Building Green		
<b>Locating services</b>	Flooding, sea level rise	Infrastructure services such as power supplies, property and transport links should be located in areas at less risk of flooding and sea level rise.
 ©The Independent		

## 10.4 Appendix 4: Natural capital components and impacts

Natural capital will be impacted in Cambridgeshire primarily through Growth and Climate Change.

*Table 5 summary of potential ways growth and Climate Change may affect natural capital*

Natural capital component	Example of benefit	Potential impacts within Cambridgeshire
Flora / Fauna	<p>Flora and Fauna provides us with numerous benefits such as:</p> <ul style="list-style-type: none"> <li>• Clean water</li> <li>• Clean air</li> <li>• Food (pollination)</li> <li>• Timber</li> <li>• Flood protection</li> <li>• Recreation (accessible green space/rights of way)</li> </ul>	<p><b>Climate Change (25):</b></p> <ul style="list-style-type: none"> <li>• Severe or altered weather patterns causing damage to habitats and species</li> <li>• Earlier onset of seasonal events, resulting in disruption of ecosystem, with early migrations &amp; mismatch of predator-prey relationships</li> <li>• Species distributions shifting northwards in response to warmer temperatures, resulting in loss of species at edge of their range but increase in southern / continental species (e.g. Great Green Bush Cricket), including new risks to local biodiversity, agriculture and health</li> <li>• Summer drought result in significant impact on tree species, leading to changes in woodland structure and timber production</li> <li>• Higher temperatures are not suitable for crops grown within Cambridgeshire, impacting food security</li> <li>• Milder winters lead to increased microorganisms and insect populations which can adversely affect health and agriculture</li> </ul>
		<p><b>Growth</b></p> <ul style="list-style-type: none"> <li>• Increased demand for food with a possible increase in the intensity of agricultural practices</li> <li>• Increased agricultural practices may reduce carbon storage and soil stability</li> <li>• Increased population may result in an increase in demand for, and an adverse impact on, existing green spaces and sensitive habitats and species</li> <li>• Fragmentation and isolation of habitats reducing ability for species to move through the landscape &amp; adapt to Climate Change</li> <li>• Increase in light, air and water pollution affecting quality of habitat and species populations and their resilience to Climate Change</li> </ul>
Water	<p>Fresh water is required for:</p> <ul style="list-style-type: none"> <li>• Drinking</li> <li>• Cooking</li> <li>• Cleaning</li> <li>• Irrigation (e.g. Farming)</li> <li>• Industrial uses e.g. Cooling</li> <li>• Wetland habitats</li> </ul>	<p><b>Climate Change (26):</b></p> <ul style="list-style-type: none"> <li>• Impacts on hydrological processes, including changes in temperature, evaporation and precipitation. Impacting the availability of water resources</li> <li>• Increased drought conditions through the reduction in surface water and groundwater resources</li> <li>• Increase in the demand for water resources to grow crops and to maintain important protected habitats</li> <li>• Increased flood risk especially in terms of sudden and intense thundery showers</li> </ul>

		<p><b>Growth (27):</b></p> <ul style="list-style-type: none"> <li>• Demand for water will increase which may cause environmental damage to surface water and groundwater</li> <li>• Increasing concentrations of pollutants in water bodies</li> <li>• Increases in impermeable areas leading to increased flood risk</li> </ul>
<b>Clean Air</b>	Air provides the oxygen we need to breath.	<p><b>Climate Change</b></p> <ul style="list-style-type: none"> <li>• Higher summer temperatures will increase potential for more atmospheric pollution</li> <li>• These pollutants include nitrogen oxides, particles, carbon monoxide and hydrocarbons</li> <li>• Air pollutants can travel great distances and cause harmful effects from afar</li> <li>• Pollutants being emitted into the atmosphere will have an impact on human health</li> <li>• Also impacting the surrounding natural environment</li> </ul> <p><b>Growth</b></p> <ul style="list-style-type: none"> <li>• Exponential growth expected will result in a heavy reliance upon the use of fossil fuels to provide energy</li> <li>• There is a correlation between growth and the number of cars on the roads</li> <li>• This will in turn will reduce the quality of the air (28)</li> </ul>
<b>Historic Environment</b>	<p>Education/understanding history of Cambridgeshire</p> <p>Provides our sense of community, identity and culture</p>	<p><b>Climate Change</b></p> <ul style="list-style-type: none"> <li>• Impacting preservation of the historic environment</li> <li>• Impacting the historic built environment (pollution)</li> <li>• Rise in water levels in fenland environments</li> <li>• Changes in agricultural practice rising from Climate Change</li> <li>• Impacts on land use viability refocussing development areas</li> </ul> <p>Cambridgeshire has adapted to changing environments, with rising and falling water levels in fenland environments influencing human interactions with those area. We can see these actions through the historic environment.</p> <p>Studying paleo-environments can help understand reactions to and environmental changes arising from Climate Change. It also helps understand the nature and development of the peat deposits, the management of which is intrinsic to managing the county's carbon footprint.</p> <p><b>Growth</b></p> <ul style="list-style-type: none"> <li>• Demand for land on new developments could lead to greater pressure on heritage assets</li> </ul>

<b>Green Infrastructure</b>	<p>Provides multi-functional uses (e.g. recreational, cultural experiences)</p> <ul style="list-style-type: none"> <li>• Clean water</li> <li>• Clean air</li> <li>• Food (pollination)</li> <li>• Timber</li> <li>• Flood protection</li> <li>• Recreation (accessible green space/rights of way)</li> </ul>	<p><b>Climate Change</b></p> <ul style="list-style-type: none"> <li>• Increased demand for green spaces due to increasing air temperature</li> <li>• Changes in water availability may cause damage</li> </ul> <p><b>Growth</b></p> <ul style="list-style-type: none"> <li>• Increase in formal green spaces</li> <li>• Reduction in natural green spaces</li> </ul>
<b>Minerals</b>	<p>Minerals provide raw material to build infrastructure and property.</p>	<p><b>Climate Change:</b></p> <ul style="list-style-type: none"> <li>• Increased sea level rises could lead to mineral sites not being accessible and therefore capable of being worked</li> <li>• Increased water table could result in areas of the mineral resource being unable, or uneconomic, to be worked</li> </ul> <p><b>Growth:</b></p> <ul style="list-style-type: none"> <li>• reduce the raw materials available for building / infrastructure through either the use of the mineral, or through sterilisation of the reserve by alternative development such as housing</li> <li>• Population increase may lead to intensification of agriculture which could in turn stop the underlying mineral being worked</li> </ul>
<b>Soils</b>	<p>High quality soils are essential for agriculture, carbon storage and habitat</p>	<p><b>Climate Change:</b></p> <ul style="list-style-type: none"> <li>• Reducing in soil quality for agriculture/flora/fauna</li> <li>• Decay of peat land</li> <li>• Reduction in carbon storage</li> </ul> <p><b>Growth:</b></p> <ul style="list-style-type: none"> <li>• Population increase may lead to intensification of agriculture which in turn may lead to increased use of pesticides and/or loss of natural habitat</li> <li>• Reduction in habitat for species</li> </ul>

## 10.5 Appendix 5: How the Council can approach natural capital conservation

The Councils can play a role in protecting Natural Capital through a variety of approaches.

*Table 6 Summary of ways in which the council can protect Cambridgeshire's Natural Capital.*

Biodiversity	
Influences	How can the council respond to these changes?
01 Organisation, 02 Procured Services	<p>Continue to maintain and enhance Council owned Local Nature Reserve assets, the following actions will be taken against Climate Change and Growth:</p> <ul style="list-style-type: none"> <li>• Store water for re-use</li> <li>• Plant more trees that are capable of thriving under predicted changes to weather patterns</li> <li>• Promote Natural Flood Risk Management</li> <li>• Provide new/improve new greenspaces to accommodate population increase</li> <li>• Restore or create natural habitats that have been used for quarrying , prioritising species of conservation concern and providing complimentary habitat for international sites that are degrading due to changes in weather patterns (e.g. flooding of ground nesting birds)</li> <li>• Planning policy and in the determination of planning applications</li> <li>• landowner of agricultural land, including managing SSSIs</li> <li>• highways and Rights of Way maintenance, including management of Protected Road Verges</li> </ul>
04 Partner Strategies	<p>The council can collaborate through:</p> <ul style="list-style-type: none"> <li>• Partnership working with the Local Nature Partnership and Cambridgeshire &amp; Peterborough Biodiversity Group</li> <li>• Biodiversity Net Gain</li> <li>• Future Parks Accelerator</li> <li>• Greenspaces Management</li> <li>• Local Nature Partnership incentives</li> </ul>
04 Wider Communities	<p>Working closely with other organisations and developers to help create, promote, conserve and enhance biodiversity as natural capital.</p> <ul style="list-style-type: none"> <li>• Decision made by the general public (e.g. fly tipping)</li> <li>• Decision made by the general public (e.g. fly tipping)</li> <li>• Farmers – agricultural intensification, including removal of habitats (e.g. removing hedgerows) and air, water and soil pollution (e.g. pesticides and herbicides)</li> <li>• National infrastructure projects resulting in significant land take and severance of the local habitats</li> <li>• Water abstraction causing very low summer flows</li> </ul>

Green Infrastructure (leisure and recreation space etc.)	
Influences	How can the council respond to these changes?
01 Organisation, 03 Council Policy & Strategy	<ul style="list-style-type: none"> <li>• planning policy which requires mineral and waste management restoration proposals to reflect strategic and local objectives for countryside enhancement and green infrastructure</li> </ul>
04 Partner Strategies,	<ul style="list-style-type: none"> <li>• Work with partners to design and implement green infrastructure through planning policy</li> </ul>

Water	
Influences	How can the council respond to these changes?
01 Organisation	<p>Work towards higher efficiency of water usage in the county council's offices and other owned buildings.</p> <p>Introducing new incentives (both behavioural and implementing new technologies).</p>
02 Procured Services, 03 Council Policy & Strategy	<p>The council has a direct influence through:</p> <ul style="list-style-type: none"> <li>• Working with suppliers / contractors regarding use of water and the water footprint in making our products.</li> <li>• Implementing SuDS features in new developments</li> <li>• Planning policy which seeks to protect water resources, and to deliver strategic flood water storage bodies through the restoration of mineral sites.</li> </ul>
05 Wider Communities	The way that our farmers abstract water and use it for irrigation.

Clean Air	
03 Council Policy & Strategy	<ul style="list-style-type: none"> <li>• planning policy which requires mineral and waste management development to minimise greenhouse gas emissions</li> <li>• Setting Public Health policy to incorporate adaptive measures to air pollution</li> </ul>
04 Partner Strategies	<ul style="list-style-type: none"> <li>• Working with partners to incorporate air quality measures into transport Plans</li> </ul>

Historic Environment	
01 Organisation	The Council owns numerous designated and non-designated heritage assets, many of which can be managed to create a better environment for residents and for the historic environment itself.
03, Council Policy & Strategy, 04 Partner Strategies	<ul style="list-style-type: none"> <li>• planning policy, and in the determination of planning applications, seeking in the first instance to avoid harm to the historic environment</li> <li>• Advising on environmental stewardship schemes to help landowners to extract the best environmental and heritage asset related outcomes from sites on their holdings</li> <li>• Working with developers to maximise the potential for open spaces in developments by use of 'preservation in situ' schemes that create greenspace to protect the historic environment</li> </ul>
05 Wider communities	The Council is a leader in the management of the historic environment across the county and acts as an exemplar to others. Other organisations and individuals come to us for advice and guidance.

Mineral	
03 Council Policy & Strategy Direct Influence Wider influence	<p>Continue to maintain leadership through adopted mineral planning policy to address:</p> <ul style="list-style-type: none"> <li>• Climate Change,</li> <li>• Soil preservation,</li> <li>• Restoration,</li> <li>• Aftercare,</li> <li>• Biodiversity benefits</li> <li>• Historic environment</li> <li>• Sustainable transport options etc.</li> </ul> <p>To allow full consideration of such matters ahead of mineral planning decisions being made.</p> <ul style="list-style-type: none"> <li>• Planning application decisions</li> <li>• Mineral site restoration plans and S106 legal agreements securing long term maintenance requirements</li> <li>• Net gain requirement through the National Planning Policy Framework</li> <li>• Negotiation with developers with regard to the extent of biodiversity gains within a scheme</li> <li>• Consideration of the proposals in line with adopted mineral planning policy</li> <li>• Allocating sites for the provision of mineral to meet the County's needs, including sand and gravel, and brickclay</li> <li>• Encouraging the production and use of secondary and recycled aggregates in preference to virgin minerals</li> </ul>

Soil	
03 Council Policy & Strategy, 04 Partner Strategies Direct Influence	<p>The Development Plan, which includes planning policy documents adopted by both the County Council and the City / District Councils, provide policies to preserve agricultural soils in relation to Climate Change.</p> <p>The council has a direct influence through:</p> <ul style="list-style-type: none"> <li>• Planning policy and in the determination of planning applications</li> <li>• Minerals and waste site restoration and aftercare plans which can reduce the erosion of, and conserve, valuable high quality soils e.g. through the creation of lowland wet grassland</li> </ul>

