Lancashire
Independent Economic Review

Final Report:

State of the Environment

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Client Name:	Lancashire County Council
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Project Manager:	Kathleen Harrison
Author:	Amanda Wharton/ Paul Stephenson/ James Killick/ Richard Jones
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Jacobs U.K. Limited

7th Floor, 2 Colmore Square
38 Colmore Circus, Queensway
Birmingham, B4 6BN
United Kingdom
T +44 (0)121 237 4000

www.jacobs.com

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Contents

1 Summary

The COVID-19 pandemic has brought home the important role nature and the natural environment play in improving our health and wellbeing. Access to parks, woodlands and greenspaces became increasingly important through times of lockdowns and pandemic restrictions, and people have become more aware of the role nature plays in our health and wellbeing. At the same time 12 of Lancashire's 14 councils have declared a climate emergency and the UN are reporting that nature is declining globally at rates unprecedented in human history.

Environmental indicators are useful metrics for summarising and communicating broad trends in how the state of the environment is changing. They are not intended to incorporate all the relevant information. They are at best seen, as their name suggests, as indicative of wider changes. This report has used a suite of key indicators to take a high-level look at the condition of the environment in Lancashire together with an assessment of its current state against the ambitions of relevant policy, strategy, plans or legislation.

The State of the Environment Dashboard below summarises the finding across 24 environmental indicators. The aggregated findings are:

- There have been long-term trends associated with positive environmental changes for 15 indicators. There have been long-term trends associated with detrimental environmental changes for six indicators. Data hasn't allowed long-term trend analysis for three indicators.
- Despite some long-term associated with positive environmental changes, no indicators are currently achieving the desired state. Nine indicators are partly achieving the desired state and 15 indicators are currently not achieving the desired state.

The protection and improvement of our stocks of natural assets or 'natural capital' is now acknowledged as critical to enabling economic growth. The Natural Capital Committee has advised the Government on A Green Future: Our 25-year Plan to Improve the Environment and has recommended a natural capital asset-based framework for assessing progress against the 25 Year Environmental Plan. Recovery from the economic impacts of the COVID-19 pandemic presents the opportunity for Lancashire to build back "better, greener, and faster" and bring about a step-change in environmental improvement. Embedding natural capital considerations into the decision-making process will be key to delivering a greener recovery.

Building on the trend analysis and assessment of current state, this report also sets out some key high-level opportunities that have the potential to deliver further environmental improvements within Lancashire. In many cases opportunities for creating environmental improvements will also underpin economic value creation through socio-economic co-benefits such as job creation, increased skills base and improvements in health and wellbeing. Therefore, to inform the wider development of the Greater Lancashire Plan (GLP), the Environmental Improvement Opportunities have been mapped against the set of environmental sustainability principles. A total of 32 high level Environmental Improvement Opportunities have been brought together in **Appendix A.1** to inform development of the GLP.

State of the Environment Dashboard

The main findings of the State of the Environment study are presented for each indicator in the dashboard below:

Dashboard Key:

Trend/State	Symbol
Long-term trends associated with detrimental environmental changes. Comparisons made between 1991 and 2021 where possible. Where comparable data is only available for shorter time periods this has been noted.	
Long-term trends associated with positive environmental change. Comparisons made between 1991 and 2021 where possible. Where comparable data is only available for shorter time periods this has been noted	
Desired environmental condition is being achieved. Current state (or rate of change) meets the ambitions of relevant policy, strategy plans or legislation.	
Desired environmental condition is being partly achieved. Current state (or rate of change) partially meets the ambitions of relevant policy, strategy plans or legislation. Some improvements needed.	
Desired environmental condition is not being achieved. Current state (or rate of change) does not meet the ambitions of relevant policy, strategy plans or legislation. Improvements needed.	

Environmental Theme	Environmental Indicator	Environmental Long-term Trend 1991 - 2021	Trend Discussions	Current Concerns	Current State
Air Quality	AURN Annual mean PM_{10}		Comparable data is available from 2001. The long-term trend since 2001 has been falling levels at both AURN stations where PM_{10} is measured. Levels at Blackpool have fallen more than they have at Preston. The reductions are not consistent and there has been inter annual increases, most recently in 2020.	PM_{10} levels for both monitoring stations (Preston and Blackburn) are below the national air quality objective. However, currently, there is no clear evidence of a safe level of exposure below which there is no risk of adverse health effects. Therefore, further reduction of PM below air quality standards is likely to bring additional health benefits to the population Lancashire.	
	AURN Annual mean $PM_{2.5}$		The long-term trend since 2009 has been falling levels of $PM_{2.5}$ at both monitoring stations where $PM_{2.5}$ is measured. However, levels at Blackpool have only fallen by 1 ug/m^3 and reductions are not consistent, with short-term increases at both monitoring stations during this time.	$PM_{2.5}$ levels for both monitoring stations (Preston and Blackburn) are below the national air quality objective. However, currently, there is no clear evidence of a safe level of exposure below which there is no risk of adverse health effects. Therefore, further reduction of PM below air quality standards is likely to bring additional health benefits to the population Lancashire.	
	AURN Annual mean NO_2		The long-term trend since 2001 has been falling levels of NO_2 at the monitoring stations. However, reductions are not consistent and there have been short-term increases at all monitoring stations during this time.	NO_2 levels at three monitoring stations are below the national air quality objective. However, currently, there is no clear evidence of a safe level of exposure below which there is no risk of adverse health effects. Therefore, further reduction of NO_2 below air quality standards is likely to bring additional health benefits to the population Lancashire.	

Environmental Theme	Environmental Indicator	Environmental Long-term Trend 1991 - 2021	Trend Discussions	Current Concerns	Current State
	Number of Air Quality Management Areas (AQMAs)		AQMAs indicate that air quality levels may be above limit values and require monitoring and management. The total number of AQMAs in Lancashire has risen since 2004 although the number did peak in 2018.	There are currently 24 AQMAs in Lancashire declared for exceedances of national air quality objectives, primarily due to road vehicle emissions. Despite plans being developed to improve air quality 16 of the AQMAs have been in place for 10 years or longer.	
Water Quality	Ecological status of water bodies		The majority of water bodies (>73%) have not been in 'good' or 'high' ecological status since 2009. There has also been a decrease in the proportion of surface water bodies achieving good ecological status since 2009. 41% of Lancashire's rivers achieved a 'good' status in 1988 (under the NWC classification scheme). The data isn't directly comparable but suggests a general long-term worsening of surface water body quality.	Most water bodies (>80%) are now not achieving good ecological status and there has been a decrease in water quality since 2009 in some locations, with three water bodies now rated as 'bad'.	
	Chemical status of water bodies		The trend from 2009 had been one of increasing number of water bodies with a 'good' chemical classification up until 2016.	All water bodies in Lancashire failed for chemical classification in 2019 due to new assessments for additional substances.	

Environmental Theme	Environmental Indicator	Environmental Long-term Trend 1991 - 2021	Trend Discussions	Current Concerns	Current State
	Bathing water quality		In 1990 all beaches failed compliance with bathing water standards for *E. coli*. The number passing bathing water standards steadily increased from 2012 and has been at 100% since 2016.	All 10 of Lancashire bathing waters met minimum standards in 2019. One of the beaches in Lancashire were classed as excellent, six were classed as good, while the remaining three beaches attained the 'sufficient' standard.	
Waste	Waste to landfill (%)		In 1991 landfill disposal was 99% and use of landfill has steadily decreased since this time by all authorities.	11% of Blackpool's waste is sent to landfill. For Blackburn with Darwen it is 24% and for Lancashire County Council WDA, it is 35%. Waste sent to landfill results in resources that are lost to the economy and require replacement with virgin raw materials.	
	Recycling rate (%)		The long term recycling rate has increased significantly from 1%, however recycling rates have now plateued or in some authorities, are decreasing.	Nearly 46% of household waste is recycled in Lancashire. Blackpool's rate is 38% and Blackburn with Darwen's rate is 29%. The EU 2020 target of 50% was not achieved. When not recycled, materials are lost to the economy and require replacement with virgin raw materials.	
	Number of reports of fly tipping		The total number of reported incidents and the number of incidents per 1,000 residents have both fallen over the past eight years.	There were 27,323 reported incidents of fly tipping in 2019/2020. This is 18 reports per 1,000 residents. Despite continuing education and enforcement activites, littering has a detrimental impact on our environmental and the impact of plastic waste on the seas is of particular concern.	

Environmental Theme	Environmental Indicator	Environmental Long-term Trend 1991 - 2021	Trend Discussions	Current Concerns	Current State
Noise	Total number of noise complaints		Noise complaint data isn't directly comparable as 2020 data was only available for 13 of the 14 local authorities. However, from the data that is available there is an indication of a long-term trend of increasing noise complaints in Lancashire, from 4,120 in 1988/89 to 7,157 in 2020.	The Lancashire councils received 7,157 noise complaints in 2020. One aim of the Noise Policy Statement for England is to contribute to the improvement of health and quality of life through the effective management of noise.	
	Important Areas (2017 only)	**No trend data presented**	The data is a snapshot of noise conditions in 2017 rather than a trend. Going forward this indicator can be incorporated into state of the environment reporting for Lancashire.	There is a total of 423 Important Areas (areas exposed to the highest levels of noise) across the Lancashire region with 387 due to road traffic noise and 36 due to railway noise.	
Energy	Total energy consumption (GWh)		Total energy use in Lancashire is declining in recent years. Between 2005 and 2017 total energy use across all sectors decreased by 20% from 40,205 GWh to 31,977 GWh. All sectors have seen decreases.	Total energy consumption in 2017 was 33,017 GWh. Domestic use of energy was the largest sectoral use in 2017 at 35% of final energy. Industrial use consumed similar amounts (34%). Transport use consumed 30%. Further improvements in energy efficiency will be important for net zero.	
	Total energy use by sector (%)	**No trend data presented**	The changes in sector energy consumption are a decrease in Industrial and Commercial sectors, from 59% in 1987 to 34%. Domestic consumption has increased from 15% to 35% while Transport consumption increased from 21% to 31%.	Domestic consumption is now the greatest use of energy in Lancashire followed by Commercial/Industrial uses and then Transport. Tackling domestic energy consumption and efficiency will be important for the transition to net zero.	

Environmental Theme	Environmental Indicator	Environmental Long-term Trend 1991 - 2021	Trend Discussions	Current Concerns	Current State
	Total energy by fuel source (%)		Consumption of all fuel types has decreased since 2005. Use of coal has continued to decline in Lancashire from its peak in the 1960s. The contributions of gas and electricity has remained constant since 2005 but both have increased since 1991. Consumption of petroleum products is broadly similar to 1991 levels.	Gas and petroleum products are the main fuels used in Lancashire. Electricity is also widely used; the contribution of low-carbon and renewable sources is small. Coal and bioenergy make up small contributions to the energy mix. A move away from fossil fuel consumption will be critical for the transition to net zero.	
	Installed renewable energy capacity (MW)		Installed renewable energy generation is growing rapidly year on year and is up 41% in the last five years.	Total installed renewable energy capacity in 2019 was 1,745 MW which generated 4,487,083 MWh of energy. Despite this growth, renewable energy generation still accounts for only 13% of power and 8% of heat demand for the region. As Lancashire looks to 2030 and beyond to decarbonise energy system a more radical approach will be required to achieve targets.	
Climate Change	Total CO_2 emissions (kt CO_2)		CO_2 emissions across all sectors and authorities in Lancashire are following a long-term decreasing trend and have decreased by 40% since 1990. There have been large decreases from the industrial/commercial sector but transport emissions have increased as a proportion.	Total CO_2 emissions in Lancashire in 2018 were 8,160 kt. However, emission reductions need to be accelerated in order to meet statutory Government targets and the earlier carbon reduction goals associated with those local authorities declaring climate emergencies.	

Environmental Theme	Environmental Indicator	Environmental Long-term Trend 1991 - 2021	Trend Discussions	Current Concerns	Current State
Nature Recovery (Biodiversity)	Number of protected sites		The number of statutory and non-statutory protected sites has increases substantially between 1991 and 2021.	The increase in numbers of protected sites is a positive trend; however, to have a positive impact on nature recovery these sites need to be in good condition and well connected. Current data on condition and connectivity isn't comprehensive enough to fully understand their contribution to biodiversity at Lancashire level.	
	Condition of SSSIs	**No trend data available.**	In 1990, SSSIs covered 39,456 hectares of Lancashire. This has increased to 91,304 hectares, an increase of 131%. Over 40% of SSSIs in Lancashire have not had a condition assessment made in the last 10 years.	According to Natural England records less than half the area (44%) of 67 SSSIs wholly within Lancashire are currently in 'favourable' condition. A further 45% are 'unfavourable recovering'. However, nearly half of the condition assessments are over 10 years old.	
	Area of nature reserves		The number of LNRs has increased from 5 in 1990 to 30 in 2021, a six-fold increase. The number of NNRs has stayed constant. Total area of all nature reserves has increased from 2,383 ha to 5,206 ha.	There are currently 28 LNRs and 2 NNRs in Lancashire covering an area of 5,145 hah. To have a positive impact on nature recovery these sites need to be in good condition and well connected. Current data on condition and connectivity isn't comprehensive enough to fully understand their contribution to biodiversity at Lancashire level.	
	Area of woodland, forestry, and tree cover		Total area of woodland, forestry and trees in Lancashire increased from 17,518 ha in 2011 to 19,616 ha in 2014 but has since decreased to 17,607 ha in 2018. Although the data sets are not directly comparable, Lancashire – A Green Audit,	Lancashire's current woodland cover is approximately 5.7%. The England Trees Action Plan 2021-2024 sets out the vision that England will have at least 12% woodland cover by 2050. Woodland and trees provide diverse habitats for a	

Environmental Theme	Environmental Indicator	Environmental Long-term Trend 1991 - 2021	Trend Discussions	Current Concerns	Current State
			1991 reported 16,479 ha of coniferous and broadleaved woodland in 1985, potentially indicating a slight long-term increase in the total area of woodland in Lancashire.	range of species and are increasingly important for their ability to natural sequester atmospheric carbon dioxide.	
	Area and condition of peatlands.		Since the post-war period, Lancashire's peatlands have seen a decline in both extent and condition, in particular within the lowlands. Data indicates that roughly only half the upland peaty soils are now covered with semi-natural vegetation, this falls to less than 2% for lowland peatland.	Restoration efforts will need to increase significantly if Lancashire is to align with the peatland restoration targets for 2050 advocated by the Committee on Climate Change. Most recent data suggest that just 1% of both upland and lowland peatlands have been hydrologically restored, compared to the recommended targets of 50% and 25%, respectively.	
Transport	Mode of commuting		There is a continuing trend of fewer journeys being made by public transport and more journeys being made by private motor vehicle.	In Lancashire most commuter journeys are being made by private motor vehicle (69%). Just 7% of commuters travel to work using public transport.	
	Car Ownership		Vehicle ownership has increased by 20% since 1988. The proportion of vehicle types has stayed similar although there has been growth in the light goods vehicle sector.	There are 868,600 licensed vehicles in Lancashire, of which 714,000 are cars (82%). In 2020, less than 4,400 vehicles (<1%) were classified as ultra-low emission vehicles.	

Table 1.1.1 - State of the Environment for Lancashire Dashboard (2021)

2 Introduction

2.1 Methodology

A study has been undertaken to review the state of the environment within Lancashire over a 30-year period between 1991 and 2021. The geographical area for the study is the area of Lancashire County Council (LCC), together with the areas of the unitary authorities of Blackpool and Blackburn with Darwen.

This study has identified a set of 'environmental indicators', which are metrics that allow the temporal and spatial comparison of the state of the environment. These indicators have been grouped under eight 'environmental themes' which form the main section of this report:

- Air Quality
- Water Quality
- Waste
- Noise
- Energy
- Climate Change
- Nature Recovery/ Biodiversity
- Transport

The primary role of the selected environmental indicators is to enable consistent comparison over time, and where possible at county, unitary and district level. The secondary role of the environmental indicators is to identify any current environmental concerns and the current state relative to relevant targets, regulations or policy.

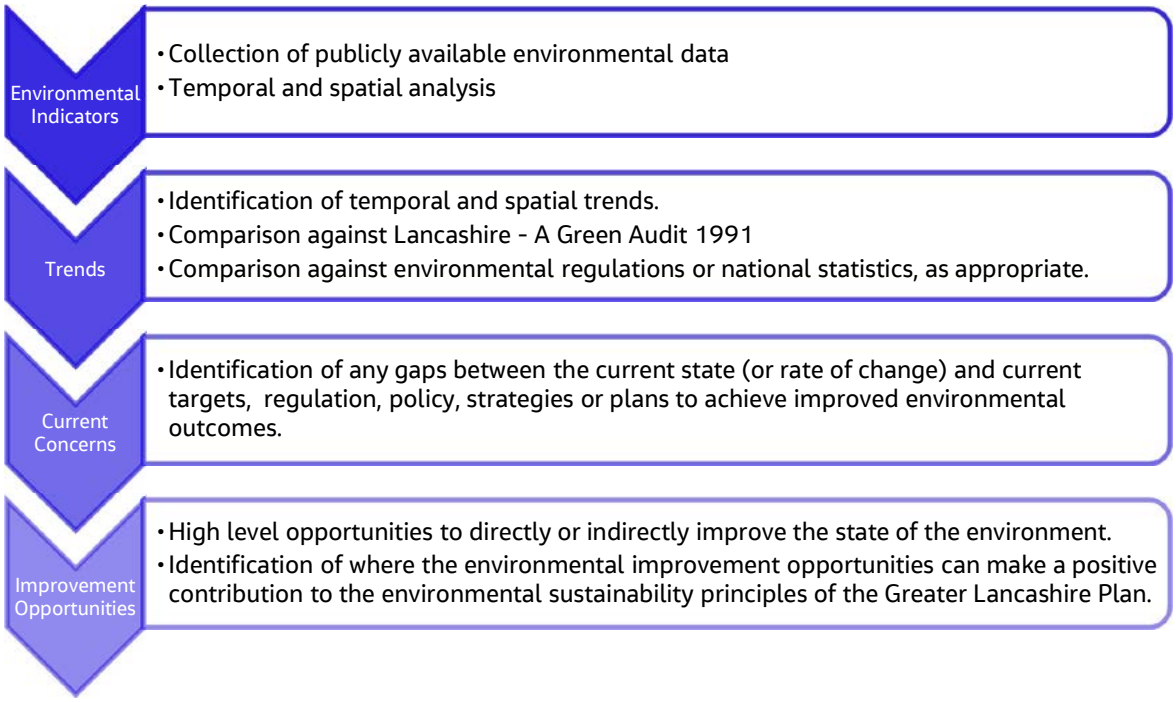

Figure 2.1.1: Assessment Framework followed for each Environmental Theme

Data analysis for each environmental indicator is based on existing publicly available data and data already held by LCC. This study has not included any new primary data collection. Data sources have been referenced where

data has been quoted or presented in graphs, charts or tables. Where possible comparisons have been made to A First State of the Environment Report (Lancashire – A Green Audit) carried out in 1991.

The environmental indicators have also been used to identify any current environmental concerns. This has been done through identifying any gaps between the current state (or rate of change) and current regulation, policy, strategies or plans to achieve improved environmental outcomes. The regulatory and policy framework has been considered at both national and regional level.

2.2 Identifying Environmental Improvement Opportunities

Where gaps have been identified between the current state of the environment and the regulatory or policy ambition then high-level 'Environmental Improvement Opportunities' have been identified that are relevant to Lancashire. Environmental Improvement Opportunities have been identified within each environmental theme and reported within the main sections of this report.

The Environmental Improvement Opportunities identified across all themes have been brought together in Appendix A.1. In many cases opportunities for creating environmental value will also create economic value. Therefore, to inform the wider development of the Greater Lancashire Plan (GLP) Appendix A.1 has mapped the Environmental Improvement Opportunities against the set of environmental sustainability principles. Overall, the Environmental Improvement Opportunities have been identified as making a positive contribution to at least one of the following:

- **Net environmental gain** which recognises the role of development in securing long term environmental sustainability, in line with the Government's 25-year environmental plan, and which can be embedded in all the emerging development and spatial policies in the Lancashire area.
- Proposals for **investment in Lancashire's natural capital and assets** to support public health, workforce productivity, better amenities, and environmental resilience.
- **Environmental standards in design** to promote an internationally competitive and distinctive manufacturing-based economy including the deployment of new energy technologies.
- **Aligning targets for carbon neutrality to transport strategies** designed to facilitate total mobility, overcoming weaknesses in Lancashire's economic geography, improve access to employment, and productivity.
- Improving the **resilience of the built environment to the impacts of climate change.**
- Radical resource efficiencies, **exploiting the availability of new technologies,** which will enable a system wide approach to **waste elimination, carbon** reduction and productivity (including food processes and the supply chain).
- **Celebrating heritage** as part of the effective management and enhancement of the ecological and cultural network – creating pride in place and ownership of environmental goals in all aspects of Lancashire as place.
- Exploiting new **environmental and energy technologies** to create new opportunities for both rural and urban renewal, businesses, and people.

3 Air Quality

3.1 Overview

Poor air quality is the largest environmental risk to public health in the UK, as long-term exposure to air pollution can cause chronic conditions leading to reduced life expectancy. Epidemiological studies have shown that long-term exposure to air pollution (over years or lifetimes) reduces life expectancy, mainly due to cardiovascular and respiratory diseases and lung cancer. Short-term exposure (over hours or days) to elevated levels of air pollution can also cause a range of health impacts, including effects on lung function, exacerbation of asthma, increases in respiratory and cardiovascular hospital admissions and mortality. Public Health England have estimated that long-term exposure to man-made air pollution in the UK has an annual effect equivalent to 28,000 to 36,000 deaths.

Air pollutants are emitted from a range of both man-made and natural sources. Many everyday activities such as transport, industrial processes, farming, energy generation and domestic heating can have a detrimental effect on air quality. Increased pressures arise primarily from the expansion of the transport network, and particularly the continued national trend in rise in car use and road freight. Other sources include increased power generation, new industrial processes, and domestic heating. These pressures are present in various locations across Lancashire and can affect local air quality.

3.2 Indicators and Data Analysis

Key indicators for air quality comprise:

- measured ground level concentrations of nitrogen dioxide (NO_2);
- measured ground level concentrations of particulate matter (PM_{10}, $PM_{2.5}$); and
- numbers of Air Quality Management Areas (AQMAs).

Defra estimates that 80% of oxides of nitrogen (NO_x) emissions in areas where the UK is exceeding NO_2 limits are due to transport, with the largest source being emissions from diesel light duty vehicles (cars and vans). The main sources of man-made PM are the combustion of fuels (by vehicles, industry and domestic properties) and other physical processes such as tyre and brake wear. Natural sources include wind-blown soil and dust, sea spray particles, and fires involving burning vegetation.

The size of particles and the duration of exposure are key determinants of potential adverse health effects. Particles larger than 10 µm are mainly deposited in the nose or throat, whereas particles smaller than 10 µm pose the greatest risk because they can be drawn deeper into the lung. The strongest evidence for effects on health is associated with fine particles ($PM_{2.5}$).

The Committee on the Medical Effects of Air Pollutants (COMEAP) has established that short-term exposure to NO_2, particularly at high concentrations, is a respiratory irritant that can cause inflammation of the airways leading to – for example – cough, production of mucus and shortness of breath. Studies have shown associations of NO_2 in outdoor air with reduced lung development, and respiratory infections in early childhood and effects on lung function in adulthood

The concentrations of these pollutants are measured continuously at the three Automatic Urban and Rural Network (AURN) monitoring stations within Lancashire. Additionally, where air quality exceeds nationally set standards local authorities are required to declare an Air Quality Management Area (AQMA) and draw up plans to improve air quality.

Figures 3.21 through to 3.2.4 graph the data currently available in the Lancashire region. A discussion of this data is provided in Section 3.3.

3.2.1 Automatic Urban and Rural Network (AURNs)

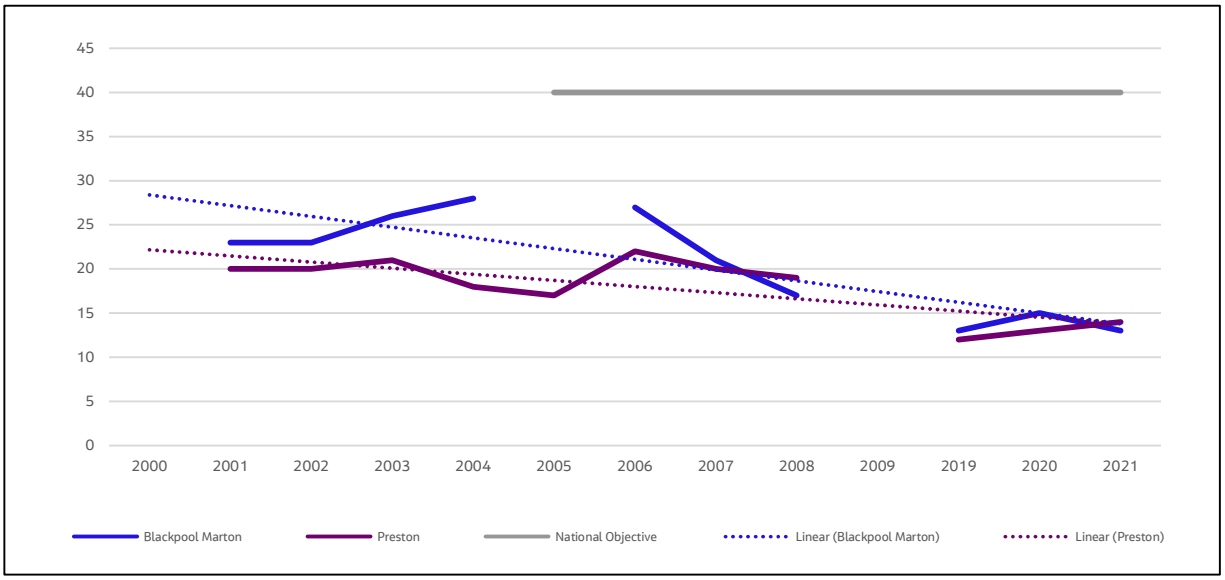

Figure 3.2.1 – Annual Mean PM_{10} concentrations (µg/m^3), 2000-2021 measured at two AURNs sites within Lancashire (Data source: uk-air.defra.gov.uk)

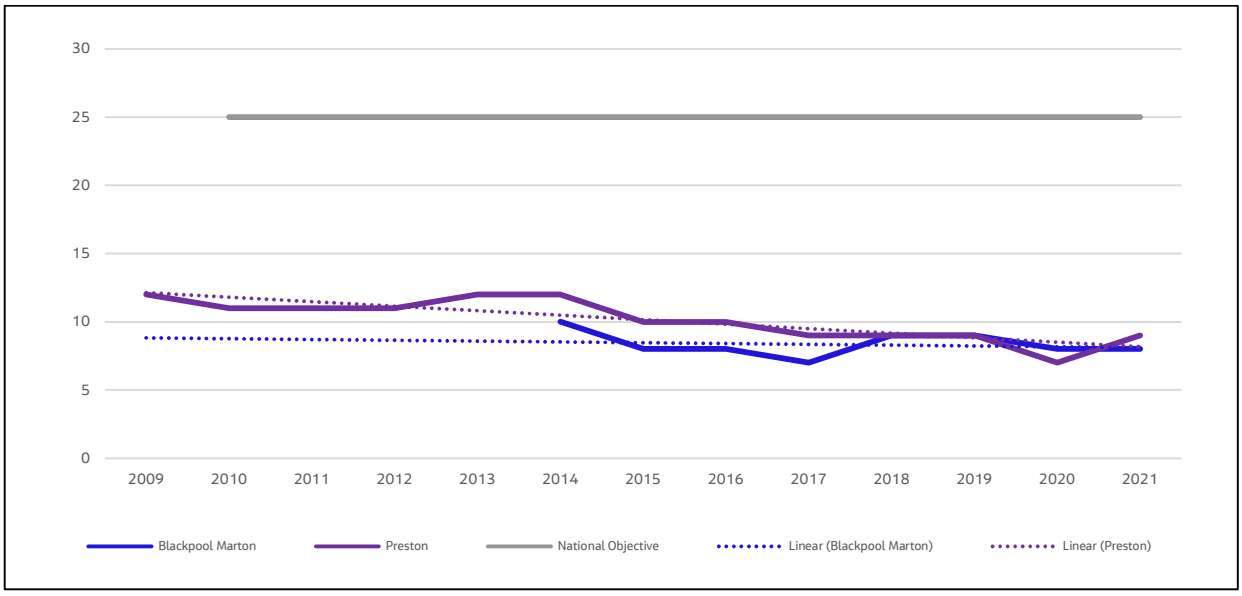

Figure 3.2.2 – Annual Mean $PM_{2.5}$ concentrations (µg/m^3), 2009-2021 measured at two AURNs sites within Lancashire (Data source: uk-air.defra.gov.uk)

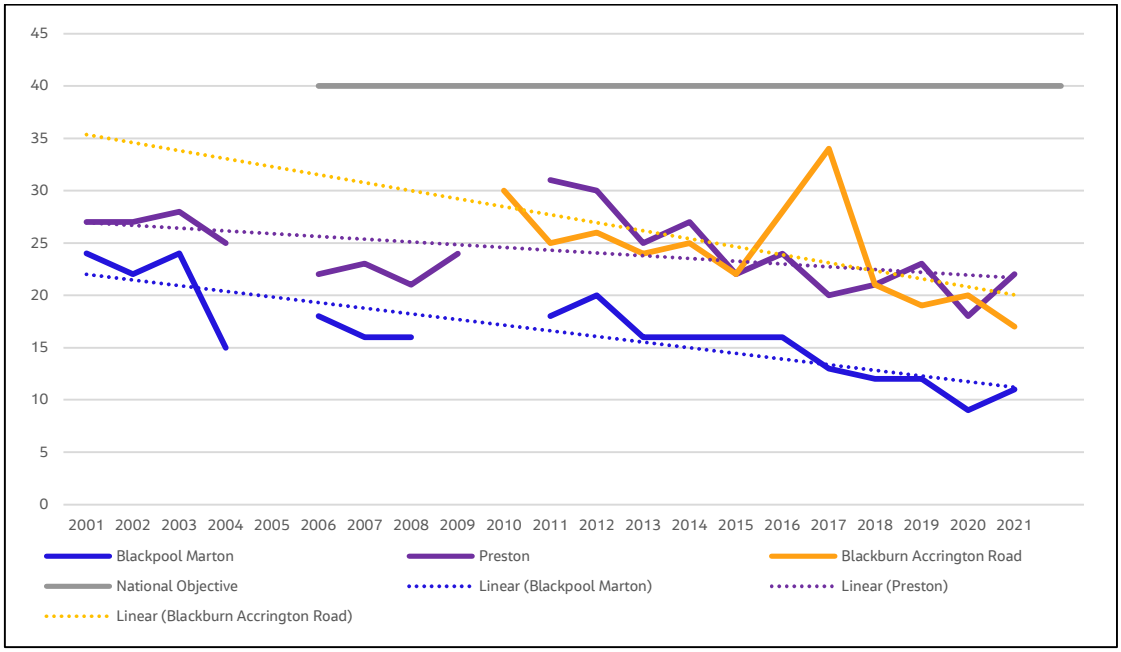

Figure 3.2.3 – Annual mean NO_2 concentrations (µg/m^3) between 2001 and 2021 measured at three AURNs sites within Lancashire (Data source: uk-air.defra.gov.uk)

3.2.2 Air Quality Management Areas

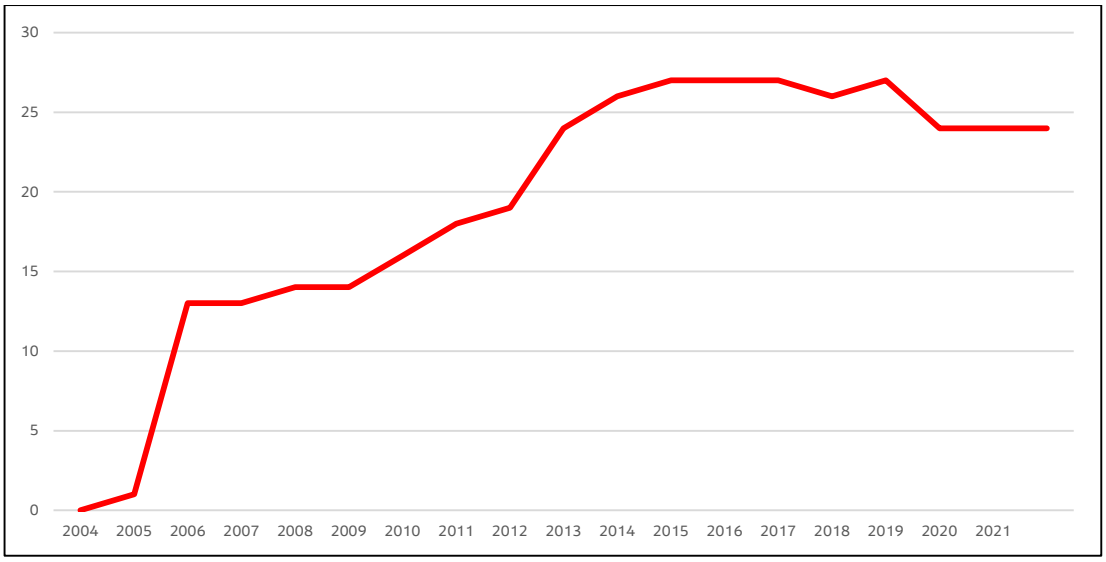

Figure 3.2.4 – Number of AQMAs in Lancashire between 2004 and 2021 (Data source: uk-air.defra.gov.uk)

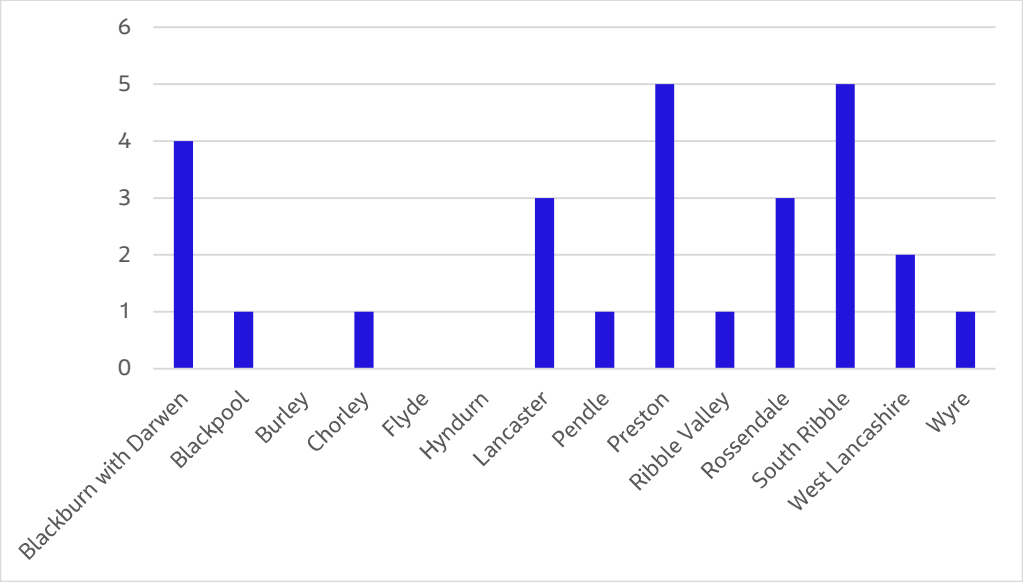

Figure 3.2.5 - Number of AQMAs in 2017 split by Local Authority (Data source: uk-air.defra.gov.uk)

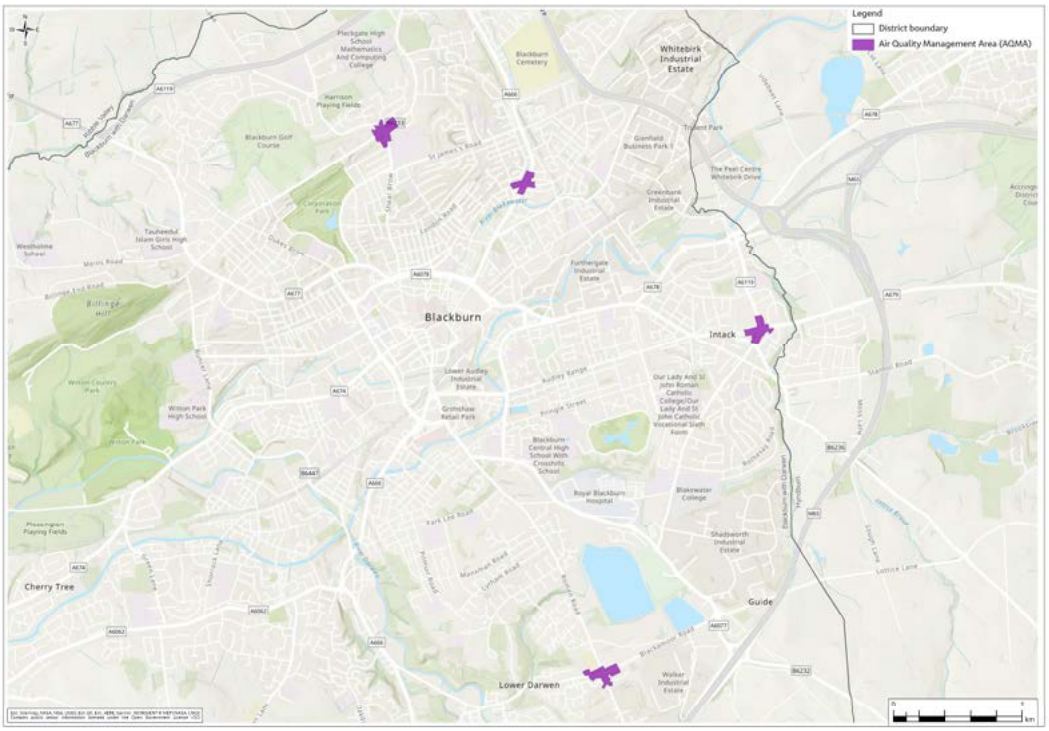

Figure 3.2.6 - AQMAs in Blackburn shown as purple highlights (Also included in Appendix A.2)

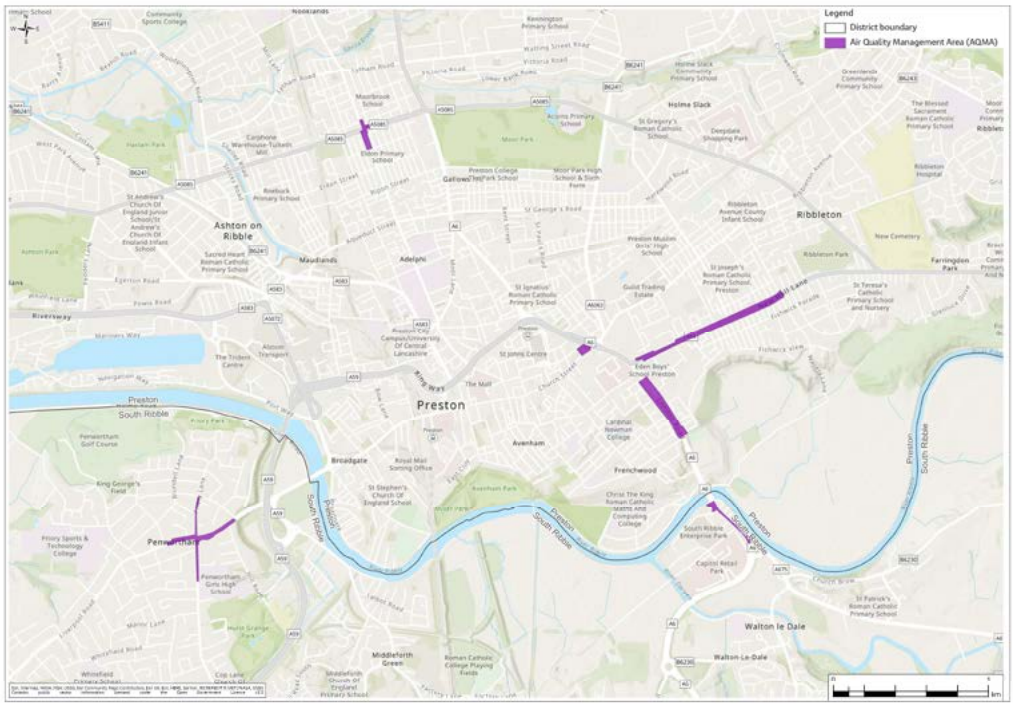

Figure 3.2.7 – AQMAs in Preston– shown by purple highlights

3.3 Historic Trends

3.3.1 Automatic Urban and Rural Network (AURNs)

Within Lancashire AURN monitoring stations are located at Blackpool Marton, Preston and Blackburn Accrington Road. This network of automatic monitoring stations monitor compliance with national air quality objectives (which are statutory requirements) and measure oxides of nitrogen (NO_x) and particulate matter (PM_{10}, $PM_{2.5}$).

Data in Figure 3.2.1 shows an overall decline in annual mean PM_{10} concentrations for Preston between 2001 and 2021. Concentrations peaked in 2006 and fell to 2008 and onwards to 2019. A slight rise in concentrations has been identified from 2019 to 2021. Blackpool Marton also shows an overall decline in annual mean PM_{10} concentrations between 2001 and 2021, but it also has greater PM_{10} concentrations in comparison to those in Preston. Increasing concentrations were observed between 2001 and 2004 and then a substantial decrease occurred between 2006 and 2008. More recently between 2019 and 2020 another increase was measured followed by a decrease to 2021.

Figure 3.2.2 shows an overall decline in annual mean $PM_{2.5}$ concentrations for both Preston and Blackpool Marton. Overall $PM_{2.5}$ annual mean concentrations have remained within a range of 7-12 µg/m^3 (micrograms of gaseous pollutant per cubic meter) and below the national target of 25 µg/m^3. For Preston annual mean $PM_{2.5}$ concentrations have remained reasonably constant between 2009 and 2012 before a rise until 2014. Beyond 2014 a decrease was measured until 2020, concentrations have then slightly rose in 2021. The data for Blackpool shows that concentrations have decreased during 2014 and 2017, increased from 2017 to 2019, and then slightly decreased to 2021.

Figure 3.2.3 shows that overall, all measurements of AURN monitoring stations fall within the UK objective limits for NO_2. All reported NO_2 concentrations fall within a range of 9 – 31 µg/m^3 (micrograms of gaseous pollutant

AURNs show an overall decline in NO_2 between 2001 and 2021. Preston notes a state of equilibrium between 2001 and 2021.

Both Preston and Blackpool Marton concentrations increase slightly in 2011 when compared to 2009 and 2008 respectively and data for Blackburn begins from 2010.

Preston AURN measures a reduction of NO_2 between 2011 to 2013, 2014 and 2015, 2016 and 2017 and finally 2019 and 2020. However, increased concentrations are measured between 2013 and 2014, 2015 and 2016, 2017 and 2019 and finally 2020 to 2021. Blackpool Marton's concentrations increased between 2011 and 2012 and again between 2020 and 2021. A reduction is noted between the other years, 2012 and 2020. Although Blackburn Accrington Road annual mean NO_2 concentrations rose sharply between 2015 and 2017 concentrations reported an overall decline and they remained within the thresholds of the UK Objective of 40 $\mu g/m^3$.

3.3.2 Air Quality Management Areas, AQMAs

Since 1997 there has been a requirement for each local authority to carry out a review and assessment of air quality. Accordingly, by 2005 Lancashire had 13 AQMAs and this has since risen to a total of 27 by 2017 before reducing to 24 active AQMAs in 2020 (Figure 3.2.4).

AQMAs necessitate the measuring of air pollution with the goal being to ensure that the national air quality objectives will be achieved throughout the UK by the relevant deadlines. Typically, AQMAs are declared where a local authority identifies areas where meeting national objectives is unlikely. This area could be just one or two streets, or it could be much bigger. Once declared the local authority creates a Local Air Quality Action Plan with a view to improve the air quality. If air quality objectives are achieved, the AMQA can be revoked and therefore the presence of an AQMA in a location does not always indicate that air quality has not been improving. Five AQMAs have been revoked since 2005 in Lancashire.

In Lancashire the AQMAs are primarily located within the main conurbations of Blackburn (Figure 3.2.6) and Preston (Figure 3.2.7). There are a total of seven AQMAs within the wider Preston area (spread between Preston City Council [five] and South Ribble Borough Council areas [two]) and four AQMAs within Blackburn. This is likely the result of commuting behaviours and resulting congestion. Of the other AQMAs in Lancashire, of note there are a further three AQMAs within the area of South Ribble Borough Council, around Bamber Bridge and Leyland, three within separate areas of the Lancaster City Council region.

3.4 Environmental Concerns and Improvement Opportunities

3.4.1 Policies, Strategies and Plans Already in Place

The Clean Air Strategy 2019 sets out the UK Governments plans for dealing with all sources of air pollution. Local authorities in the UK have a responsibility under Local Air Quality Management (LAQM) legislation to review air quality. Where concentrations exceed national objectives, measures should be put in place to reduce emissions, and be reported in the local Air Quality Action Plan (AQAP). All the local authorities within Lancashire with AQMAs within their region have AQAPs in place.

The UK Government published Road to Zero, which sets out plans to end the sale of new conventional petrol and diesel cars and vans by 2040. It also outlines how the government will support the transition to zero emission road transport and reduce emissions from conventional vehicles during the transition. Whilst the transition to ultra-low emissions vehicles should significantly reduce tailpipe emissions, most transport $PM_{2.5}$ emissions are not from the tailpipe but from road abrasion, tyre wear and break wear. Reduction of transport $PM_{2.5}$ emissions will remain a challenge.

A number of key initiatives are already underway across Lancashire that could directly or indirectly improve air quality. These include:

- Lancashire County Council are working in partnership with bpPULSE to increase the number of on-street and county council car park charging points and the enforcement of electric vehicle only parking bays.
- Having Environmental Health officers in place to consult on new infrastructure developments and their associated environmental air quality effects.
- Introducing Park and Ride facilities such as those near M6 J34 at Lancaster. This encourages a modal shift in the congested urban areas. The initiative is aimed at reducing congestion in the centre of Lancaster. A reduction in congestion assists in the reduction of emissions on key roads.
- Maintaining Smoke Control Areas (where only smokeless fuels may be burned)
- Inspecting industrial sources of air pollution that are prescribed for permitting controls.
- Construction air quality controls are in place for all infrastructure developments, these include the promotion of good practice on demolition and building sites.

3.4.2 Current Status

Despite the declaration of AQMAs and associated actions to improve air quality, 16 of the AQMAs within Lancashire have been in place for ten years or more. Whilst reductions in concentrations have occurred at the AURN monitoring stations the long-term linear trend masks inter annual increases. Local air quality issues in Lancashire are primarily near busy or congested roads and therefore associated with traffic emissions. Tighter vehicle emissions standards appear to have been offset by growth in traffic flows (See Section 10) and the increases in diesel vehicles within the fleet, which is a general trend across the UK (as shown by DfT licensing statistics up to 2020 Q2). Moreover, currently, there is no clear evidence of a safe level of exposure below which there is no risk of adverse health effects. Therefore, further reduction of PM and NO_2 below air quality standards is likely to bring health benefits to the population of Lancashire.

3.4.3 Improvement Opportunities

There are multiple benefits achieved from improving air quality, especially where this is linked to transport emissions. Reducing vehicle emissions by promoting the use of cleaner vehicles helps to reduce tailpipe emissions of CO_2 as well as NO_2, PM_{10} and $PM_{2.5}$. If use of private vehicles can be replaced by more sustainable forms of public transport or active travel, emissions of noise and congestion can also be reduced. This brings short- and long-term health benefits to vulnerable groups of society and those with underlying health conditions as well as the direct benefits to the travelling population.

Whilst air quality improvement measures should primarily focus on tackling the emissions source itself, trees can play a role in improving air quality. Trees can be effective at removing PM through both dispersion and deposition. In general, bigger tree canopies are more effective at reducing PM concentrations than smaller ones, and larger leaves are more effective at removing pollutants from the air than smaller ones. However, careful species selection is required to suit the location. Trees can also provide vital habitat as well improvements to streetscape. In addition, trees may improve human health and wellbeing.

Lancashire can help improve air quality and address health impacts in several ways, including:

- 3.A: Promoting active travel and sustainable transport to residents and businesses and putting in the necessary infrastructure to support the transition.
- 3.B: Promoting the uptake of electric and alternative fuels for road vehicles including installation of new charging/refuelling infrastructure.
- 3.C: Introducing intelligent transport systems that maximise the efficiency of the transport network and also give real time information on traffic delays and journey times, car parking availability, and bus arrival times; together, these allow people to make better informed travel choices and also reduce traffic emissions.
- 3.D: Introducing Clean Air Zones for conurbations with multiple AQMAs or requiring area wide solutions.
- 3.E: In addition to vehicular emissions reduction measures, trees can be effective in reducing pollutant concentrations with careful species selection.

3.5 Key Messages

PRESSURES: Increased pressures on air quality arise primarily from the increase in road transport and expansion of the network, and particularly the continued national trend towards increase in car use and road freight.

HISTORIC TRENDS: There has been a long-term decrease in the measured concentrations on nitrogen dioxide and particulate matter at the Automatic Urban and Rural Network (AURN) monitoring stations within Lancashire and concentrations are below national air quality objectives. However, there are areas across the region where air quality exceeds national objectives and the number of Air Quality Management Areas increased to a total of 27 by 2017 before reducing to 24 in 2020.

CURRENT STATUS: There are 24 Air Quality Management Areas in Lancashire with the greatest numbers in the urban conurbations of Blackpool and Preston. Currently, there is no clear evidence of a safe level of exposure below which there is no risk of adverse health effects. Therefore, further reduction of PM and NO_2 below air quality standards is likely to bring health benefits to the population of Lancashire.

OPPORTUNITIES: Improvements in air quality will come from the promotion of active travel and the adoption of cleaner vehicles. Intelligent transport systems that maximise the efficiency of the highway network and give real time information on journeys will also help reduce congestion and traffic emissions. Trees can play a secondary role in improving air quality in some situations.

4 Water Quality

4.1 Overview

Water quality is critical to sustainable development, it is the focus of two of the United Nations Sustainable Development Goals, and it seen as being critical to achieving all 17 goals. Therefore, it is vital to provide safe drinking water for public health and wellbeing, safe recreational water for use and a good habitat for a wide range of wildlife species.

Over the last 30 years there has been an increased demand for water and use of "clean" water, linked to population growth, urbanisation and behavioural changes. This has driven the need for improved testing, regulation and treatment of water.

The biggest pressures on the state of the water environment are from physical modifications to the water bodies, and from diffuse and point source pollution. In particular pollution from rural and wastewater sources, and the flow and volume of water available to dilute any pollution entering a water body. Pressures also come from storm sewage overflows, illegal discharges, and runoff from agriculture and the urban environment. Given future climate change predictions, the flow and volume of water bodies is likely to be more variable with a greater number of extreme flood and drought events, this will add to the pressure on the water environment.

4.2 Indicators and Data Analysis

This report has considered three key indicators for water quality:

- Ecological status classification of surface water bodies;
- Chemical status classification of surface water bodies; and
- Bathing water quality.

For surface waters (both freshwater and estuarine waters) water quality is assessed for its chemical and ecological status. The chemical status for a water body is calculated by assessing a number of different priority chemical elements and is recorded as good or failing. The ecological status is assigned using various quality elements including: biological quality, general chemical and physico-chemical quality, water quality with respect to specific pollutants (synthetic and non-synthetic), and hydromorphological quality.

There are five classes of ecological status: high, good, moderate, poor or bad. The chemical status is classified as either good or failed. The combination of chemical status and ecological status together define the overall status of a water body.

For designated bathing waters, weekly samples are taken during the bathing season (May to September) and tested for bacteria that indicate whether there is faecal matter in the water, with bathing water classifications of: excellent, good, sufficient or poor. The classification for each bathing water is calculated annually, based on samples from the previous four years although different standards were used before 2015, with classifications of fail, minimum or higher.

For the purposes of this report, drinking water has not been used as an indicator. Drinking water in Lancashire is supplied by United Utilities, who monitor the quality of drinking water against enforceable quality standards from both European Directives and UK legislation as is leaves the water treatment works and service reservoirs. They also carry out random testing from customer addresses with all results recorded in the Drinking Water Registers.

Figures 4.21 through to 4.2.4 summarise the water environment data currently available in the Lancashire region. A discussion of this data is provided in Section 4.3.

4.2.1 Ecological Status of Surface Water Bodies

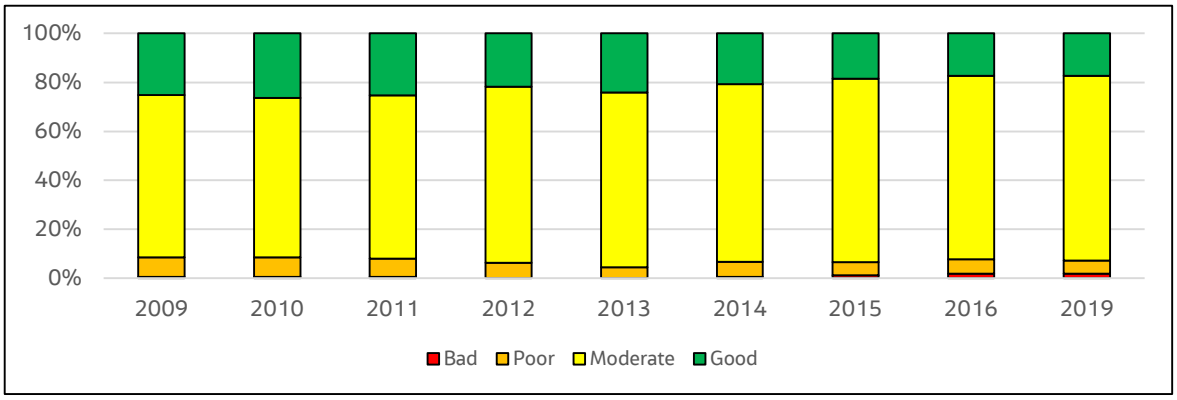

Figure 4.2.1 –Stacked bar graph showing ecological status of Lancashire water bodies, 2009-2019, by classification. No water bodies achieved 'high' status. (Data source: https://environment.data.gov.uk/catchment-planning/RiverBasinDistrict/12)

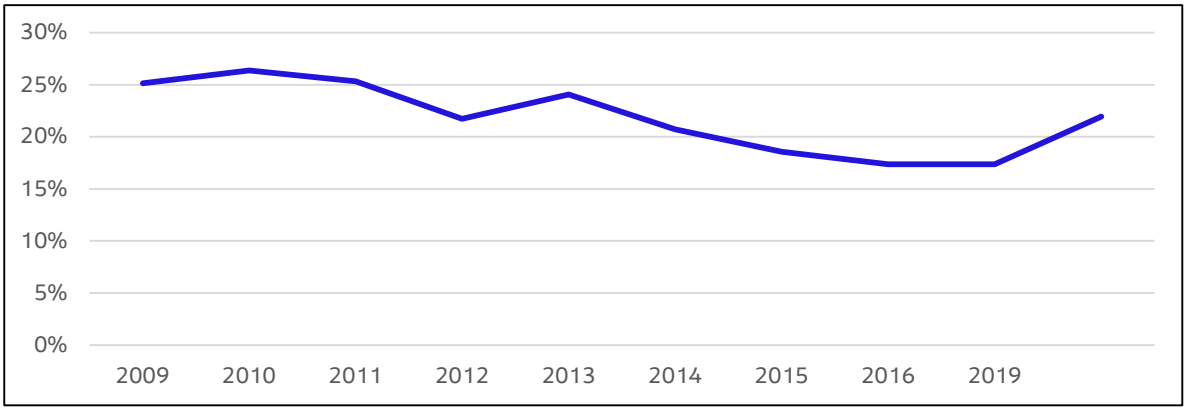

Figure 4.2.2 - Graph showing the percentage of Lancashire rivers achieving an Ecological status of 'Good', 2009-2019 (Data source: https://environment.data.gov.uk/catchment-planning/RiverBasinDistrict/12)

4.2.2 Chemical Status of Surface Water Bodies

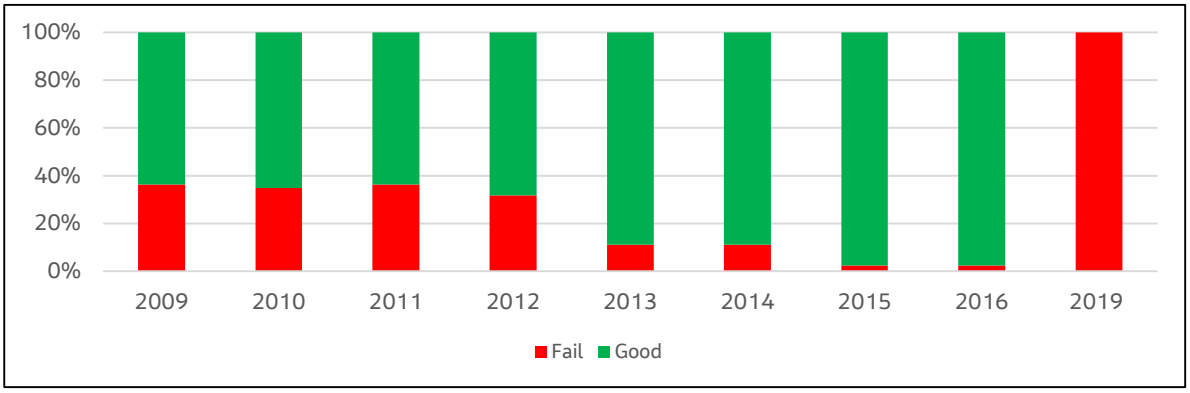

Figure 4.2.3 - Stacked bar graph showing chemical classification status of Lancashire water bodies, 2009-2019, by classification 'Fail' or 'Good' (Data source: https://environment.data.gov.uk/catchment-planning/RiverBasinDistrict/12)

4.2.3 Bathing Water Quality

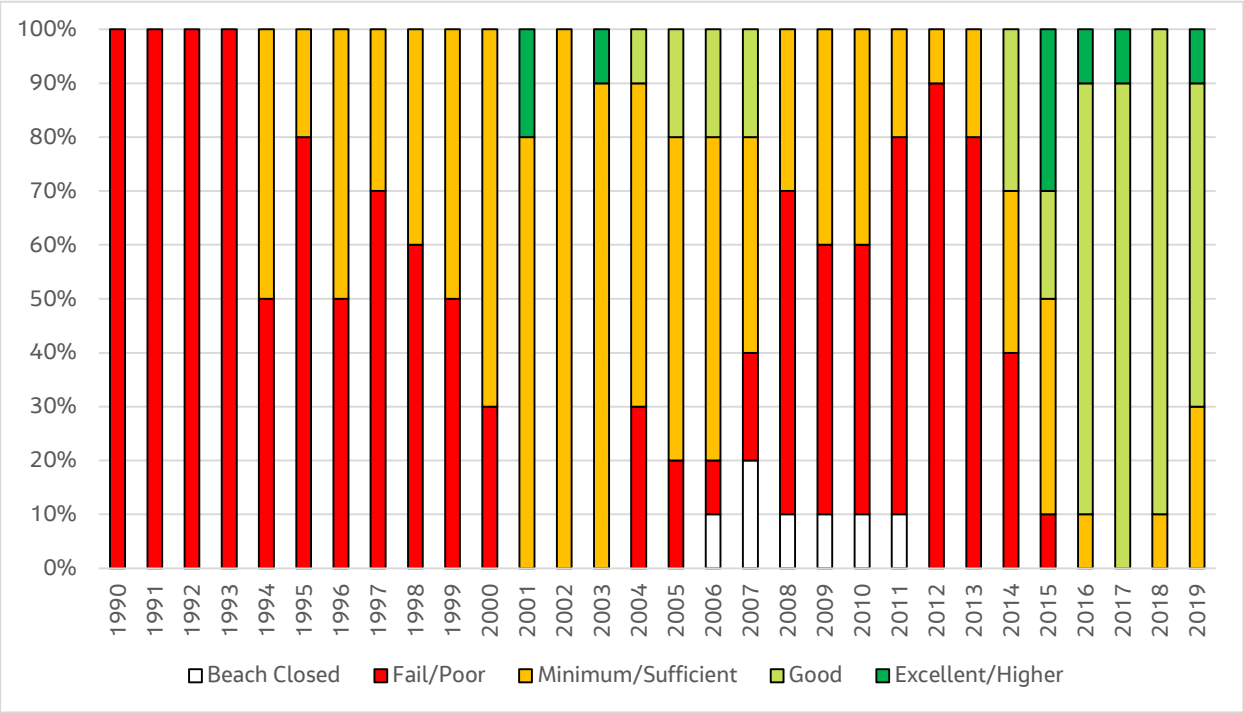

Figure 4.2.4 – Stacked bar graph showing Bathing Water Annual Classification of Beaches in Lancashire, 1990-2019, by classification (Data source: https://environment.data.gov.uk/bwq/profiles/data.html)

4.3 Historic Trends

4.3.1 Ecological Status of Surface Water Bodies

Comparable data for this indicator is available from 2009 onwards. The majority of water bodies (>73%) have not been in 'good' or 'high' ecological status since 2009 (Figure 4.2.1 and Figure 4.2.2). Since 2015 there has been a small number of water bodies (one in 2015 and three in 2019) achieving 'bad' status. Due to a change in the classification system the data isn't directly comparable to that presented in Lancashire – A Green Audit (1991). However, as 41% of Lancashire's rivers achieved a 'good' status in 1998 (under the NWC classification scheme), this suggests a general long-term worsening of surface water body quality.

In 2019 (the latest year of available data) 17% of water bodies were classified as having 'good' ecological classification, approximately the same as the average for England (16%) but less than in 2009 when 25% of Lancashire's water bodies achieved this rating.

4.3.2 Chemical Status of Surface Water Bodies

The chemical classification of water bodies in Lancashire between 2009 and 2016 shows an improving trend, with a greater number achieving a 'good' chemical status (Figure 4.1.3). However, in 2019, all water bodies in England, including those in Lancashire, failed chemical classifications due to new assessments for additional substances.

4.3.3 Bathing Water Quality

Bathing water quality at beaches has improved since 1990 when all Lancashire's bathing waters failed to meet standards (Figures 4.2.4). In Lancashire, bathing water quality peaked in 2000 when all bathing waters achieved

bathing waters were classified as poor and not meeting minimum standards. Since 2012, standards have improved and since 2016, all bathing waters have met minimum standards.

4.4 Environmental Concerns and Improvement Opportunities

4.4.1 Policies, Strategies and Plans Already in Place

Since 2009 the legislative driver for surface water body quality improvements has been the Water Framework Directive (WFD). The aim of the WFD is for all water bodies to achieve a good status. Future improvements to water quality will require a catchment focus, bringing together all stakeholders and developing local solutions to current and future pressures.

England is covered by 10 'River Basin Districts'. Lancashire mainly lies within the North West river basin district. A very small part near Earby in Pendle district including Kelbrook and Salterforth is in the Humber river basin district. In acknowledgement of the required catchment focus the North West River Basin Management Plan (RBMP) was put in place to set out the current state of the water environment pressures affecting the water environment, environmental objectives for protecting and improving the waters, programme of measures and actions needed to achieve the objectives, and reporting of progress made. It also informed decisions on land-use planning due to the close link between water and land resources.

4.4.2 Current Status

In terms of overall surface water body status (the combination of ecological status and chemical status), in 2019 the majority of water bodies (88%) were classified as having a 'moderate' overall status. 8% were 'poor' and 4% were 'bad'. Due to all water bodies failing the chemical classification status, no water bodies could achieve the desired 'good' rating in 2019.

There has been an increase since 2009 in the number of water bodies classified 'bad', there has also been an associated decrease in the number classified 'poor' or 'good'. There do not appear to be any geographical or activity trends for water bodies achieving bad or poor status, although these water bodies tend to be located in peripheral areas of Lancashire.

In 2019 all 10 of Lancashire's designated bathing waters met minimum standards. One of the beaches in Lancashire was classed as excellent, six were classed as good, while the remaining three beaches only reached the 'sufficient' standard.

4.4.3 Improvement Opportunities

Improving the quality of water bodies is important as water is essential to life and livelihoods, enabling nature to flourish and economies to prosper. Opportunities for improving water quality can also deliver wider environmental, social and economic value. This is why water quality is acknowledged as critical to meeting all 17 United Nations Sustainable Development Goals. Water quality has improved in Lancashire but more that can be done, particularly taking a holistic integrated catchment management approach, which is the framework provided by the North West RBMP.

Lancashire can help improve water quality and enhance natural ecosystems in a number of ways, including:

- 4.A: Promoting the management of catchments as one connected system of land and water and supporting existing partnerships to achieve this.
- 4.B: Encouraging uptake of schemes under the Environmental Land Management programme to manage land in a way that improves water quality and enhances biodiversity such as buffer strips between water bodies and livestock, and read beds for natural filtration.
- 4.C: Using planning controls to incorporating blue green infrastructure into the urban environment, which also delivers wider environmental and social value.
- 4.D: Aiming to gain the Blue Flag award at a greater number of beaches within Lancashire. Currently only Blackpool South has been awarded the Blue Flag.

4.5 Key Messages

PRESSURES: The biggest pressures on the state of the water environment are from physical modifications to the water bodies, and from diffuse and point source pollution. In particular pollution from agricultural and wastewater sources. Given future climate change predictions, the flow and volume of water bodies is likely to be more variable with a greater number of extreme flood and drought events, this will add to the pressure on the water environment.

HISTORIC TRENDS: Comparable data for the ecological, chemical and overall status of surface water bodies is available for 2009 onwards. There has been a general trend of worsening water quality; since 2015 there has been a small number of water bodies (one in 2015 and three in 2019) achieving 'bad' ecological status. Bathing water quality at beaches in Lancashire has improved from 2012 onwards and since 2016 all bathing waters have met minimum standards.

CURRENT STATUS: In terms of overall surface water body status (the combination of ecological status and chemical status), in 2019 the majority of water bodies (88%) were classified as having a 'moderate' overall status. 8% were 'poor' and 4% were 'bad'. Due to all water bodies failing the chemical classification status, no water bodies could achieve the desired 'good' rating in 2019. In 2019 all 10 of Lancashire's designated bathing waters at beaches met minimum standards. One of the beaches in Lancashire was classed as excellent, six were classed as good, while the remaining three beaches only reached the 'sufficient' standard.

OPPORTUNITIES: Opportunities for improving water quality can also deliver wider environmental, social and economic value. Taking a holistic integrated catchment management approach can help improve water quality and, by encouraging nature-based solutions, can deliver gains in biodiversity too. Currently only Blackpool South has been awarded the Blue Flag and a greater number of beaches in Lancashire could aspire to this standard.

5 Waste

5.1 Overview

The management of waste can result in many impacts which can negatively affect the environment. Collection of waste from households and businesses generates emissions to air from the collection vehicles and waste treatment at waste management facilities can cause emissions of dust, noise and odour. Energy is also consumed by these facilities although more recently, waste has been used as a fuel to generate electricity. Disposal of waste to landfill, the least preferrable solution, leads to the generation of potent greenhouse gases and can contaminate soils and waters if not managed correctly. Littering, caused by mismanagement of waste at all levels, can be particularly harmful to our environment and in particular to marine ecosystems if waste reaches our seas and oceans. Littering also has a detrimental impact on resident wellbeing and amenity value.

By re-using and recycling waste, these impacts can be reduced as associated greenhouse gases and other emissions are reduced, while moving to a more circular economy where products are kept in service for as long as possible, jobs can be created, and extraction of raw materials is minimised.

Waste is generated by all economic sectors and activities, with some types of waste easier to re-use or recycle than others. Social pressures are driving pro-environmental behaviour amongst society which, along with new legislation, is putting pressure on businesses to operate responsibly, reduce the amount of material being placed onto the market and facilitate its ease of recycling. However, a growing population and increasing number of households along with changes to retail habits, waste collection and disposal systems and infrastructure is changing the type and volumes of waste being presented for collections by local authorities and private businesses. These factors are putting pressure on how Waste Collection Authorities (WCA), Waste Disposal Authorities (WDA) and Unitary Authorities (UA) are able to fulfil statutory duties, changing the waste composition and potentially influencing material rebates and/or disposal gate fees.

5.2 Indicators and Data Analysis

Key indicators for waste and litter comprise:

- the amount (in kilograms) of household waste arisings collected that is not suitable for reuse, recycling, composting or anaerobic digestion and therefore requiring disposal, per household;
- the percentage of municipal waste sent for disposal to landfill;
- the percentage of household waste arisings which have been sent for reuse, recycling, composting or treatment by anaerobic digestion; and
- the number of reported fly-tipping incidents reported by local authorities.

Waste is generated by all households and businesses, and local authorities are responsible for the collection and disposal of household and municipal wastes and for provision of litter collection in the form of street and beach cleansing. These activities come at an economic cost and all collected materials require treatment or disposal which comes at an environmental cost. Waste must be managed in accordance with the waste hierarchy which prioritises prevention of waste, preparation for re-use, recycling, recovery of waste and disposal of waste in order to minimise environmental and economic impacts.

Information and data have been sourced from nationally available data sets that are produced from local authority returns to Defra and the Environment Agency. Figures 5.2.1 through to 5.2.5 and Table 5.2.1 summarise the waste, recycling and littering data currently available in the Lancashire region. A discussion of this data is provided in Section 5.3.

5.2.1 Waste Disposal

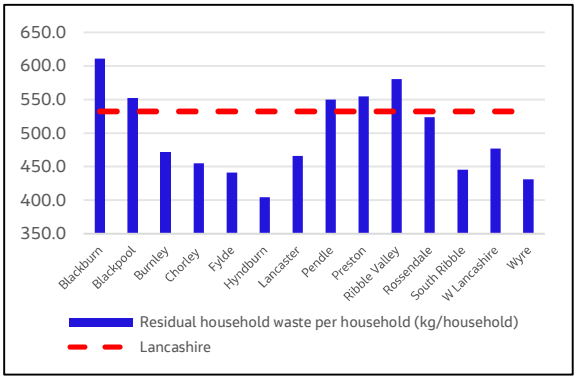

Figure 5.2.1 – Residual household waste (kg/household) Lancashire-14 2019/2020 (Data source: https://www.gov.uk/government/statistics/local-authority-collected-waste-management-annual-results)

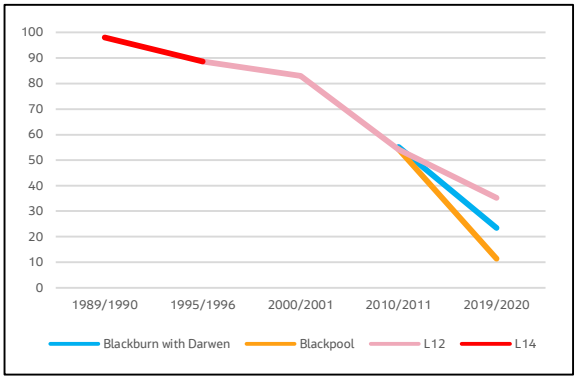

Figure 5.2.2 – Percentage of waste sent to landfill 1989/90 to 2019/20 (Data source: various)

5.2.2 Recycling

Year	Lancashire County Council (WDA)	Blackburn with Darwen (UA)	Blackpool (UA)
1989/1990	1%		
1995/1996	11.4%		
2000/2001	17%		
2009/2010	45.0%	43.6%	38.3%
2010/2011	46.1%	44.9%	37.2%
2019/2020	45.7%	29.1%	38.4%

Table 5.2.1 – Lancashire Recycling Rate 1990-2020 (Data source: various)

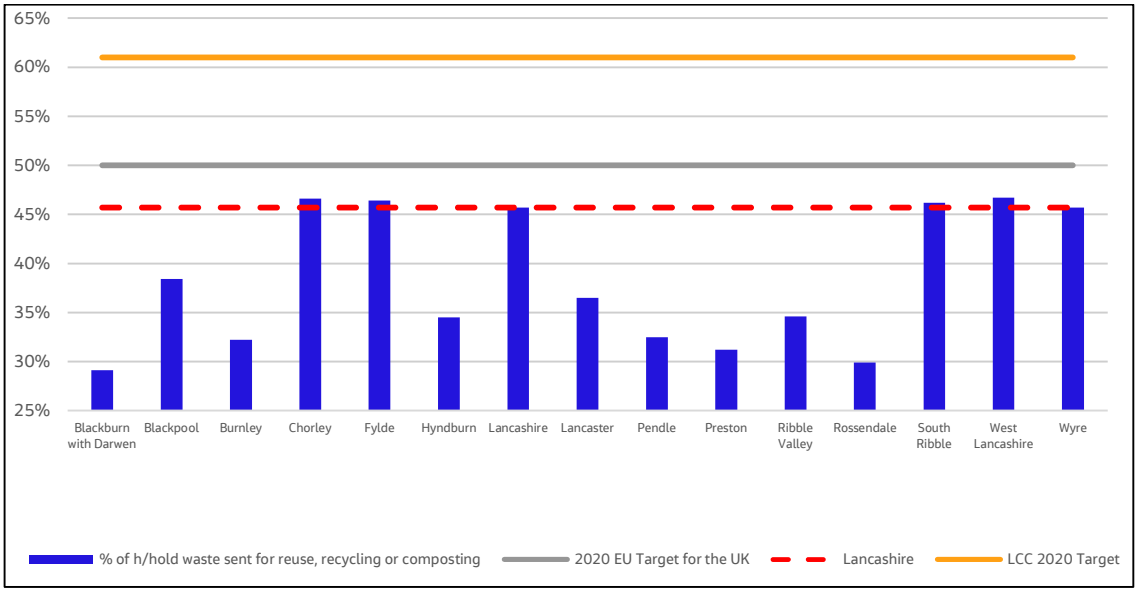

Figure 5.2.3 – Percentage of household waste sent for reuse, recycling or composting 2019/2020 (Data source: https://www.gov.uk/government/statistics/local-authority-collected-waste-management-annual-results)

5.2.3 Littering

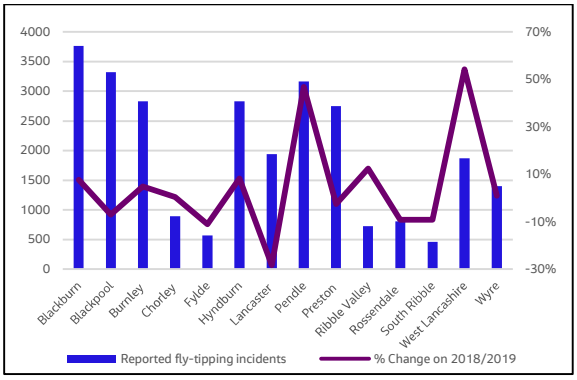

Figure 5.2.4 – Recorded number of fly-tipping incidents, 2019/20 and percentage change on 2018/19, Local Authorities (Data source: https://www.gov.uk/government/statistics/fly-tipping-in-england)

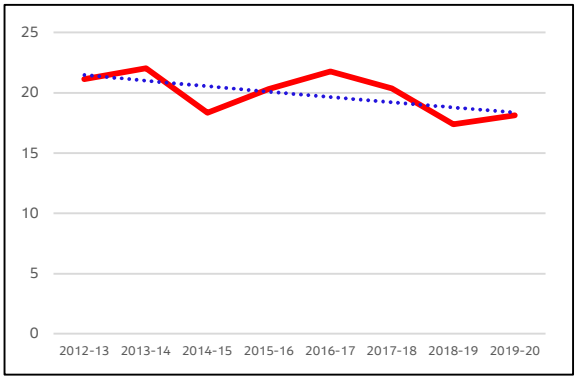

Figure 5.2.5 – Recorded number of fly-tipping incidents per 1,000 residents (2019 pop.); Lancashire, 2012/13 – 2019/20 (Data source: https://www.gov.uk/government/statistics/fly-tipping-in-england)

5.3 Historic Trends

5.3.1 Waste Disposal

The residual household waste per household (kg/household) in Lancashire for the 14 local authorities in 2019/2020 is shown in Figure 5.2.1. The average total waste per household for Lancashire WDA is 532.2 kg, for Blackburn with Darwen it is 611.1 kg and for Blackpool it is 552.5 kg. The total household waste per household varies from 404.1 kg in Hyndburn to 611.1 kg in Blackburn with Darwen. The longer-term trend within

however there is variability between local authorities and over time, with figures ranging from a low of 391. 3 kg (Hyndburn, 2018/19) to a high of 647.6 kg (Blackburn with Darwen, 2018/19).

For residual waste, the use of landfill continues to decrease in use (and availability) and is gradually being replaced by disposal to incineration with energy recovery. Landfill is still the predominant treatment method in Lancashire (35.2%), however, as can be seen in Figure 5.2.2, the Unitary Authorities have reduced landfill disposal to a greater extent.

5.3.2 Recycling

The percentage of household waste sent for reuse, recycling or composting (recycling rate) in Lancashire in 2019/2020 is shown in Figure 5.2.3. The average recycling rate for the WDA is 45.7%, is 29.1% in Blackburn with Darwen and 38.4% in Blackpool. There is large variability between local authorities, with West Lancashire the top performing (46.7%) and Blackburn with Darwen the lowest performing (29.1%).

The long-term trend has been increasing recycling rates from 1990 when 1% of waste was recycled to approximately 45% in 2010, however this peaked at 51.6% in 2015/2016 and has declined in recent years (Table 5.2.1) and is now lower than in 2010/2011. Within Lancashire since 2010/2011, only three authorities have seen increases in the recycling rate. This compares to the trend across most areas in England in the last decade which have seen small annual increases or plateauing of recycling rates.

5.3.3 Littering

As can be seen in Figure 5.2.4, there were a total of 27,326 recorded fly-tipping incidents in Lancashire in 2019/2020. The average disguises large differences with some local authorities recording a high number of incidents and some recording a relatively low number while there are also big differences in the year on year change.

Due to the differences in terms of area and population between the 14 local authorities, which will impact upon the number of incidents both taking place and being recorded, the incidents per 1,000 people provides a better comparison. Figure 5.2.5 shows that there has been a downward trend in the recorded number of incidents from 2012/2013 to 2019/2020.

This positive trend in reduced reports of littering incidents brings about both economic and environmental benefits in reduced financial costs from recording complaints, responding to incidents and disposing of waste.

5.4 Environmental Concerns and Improvement Opportunities

5.4.1 Policies, Strategies and Plans Already in Place

Waste policy in England is centred around the Resource and Waste Strategy for England which sets how waste will be minimised and resources used efficiently. The Environment Bill, which is currently passing through Parliament, will enable many of the commitments from the Resource and Waste Strategy for England to be enacted, such as mandatory weekly food waste collections from all households and businesses and a deposit return system (DRS) on single use drinks containers. The overall impact may be reduced waste disposal costs to authorities, from less residual waste requiring management as a result of the impact of increased segregation of waste. Circular economy elements of the Environment Bill may also provide environmental, economic and employment opportunities through greater resource efficiency. Within Lancashire, all authorities are part of the Lancashire Waste Partnership (LWP) who produce a Municipal Waste Management Strategy for Lancashire, 2008 ~ 2020 including a number of targets and objectives to maximise efficiencies and minimise environmental impacts. This included recycling and composting target of 61% of all waste by 2020 and extending the three-stream waste collection scheme more widely.

The Government also has a Litter Strategy, aimed at tackling littering and delivering a reduction in litter through

litter with a number of qualitative objectives in place. Lancashire has already completed a number of initiatives aimed at reducing the impacts of waste and littering on the environment, including:

- Provision of waste education campaigns and waste awareness raising activities;
- Provision of a three-stream waste collection service to over 90% of households and greater partnership working through the Lancashire Waste Partnership;
- Providing planning guidance to developers about best practice waste management that maximises recycling within new developments;
- Local authority Environmental Enforcement Officers providing education and awareness campaigns to schools and with community groups to prevent littering; and
- Street Scene teams supporting local community action and small-scale volunteer campaigns through provision of equipment and disposal of collected litter.

5.4.2 Current Status

The average total waste per household for Lancashire is slightly higher than the figure for the north-west region (531 kg) with the amount for both Blackburn with Darwen and Blackpool higher still. Although average waste per household has generally decreased, some authorities have seen increases. The predominant waste disposal method in Lancashire is still landfill (35.2%), but both Blackburn with Darwen and Blackpool send less waste to landfill. All authority recycling rates are currently less than both the European Union 2020 target of 50% and the LWP target to recycle and compost 61% of all municipal waste by 2020 and exceed the target of sending less than 10% of waste to landfill that was specified in the Greening Government Commitments for 2019/2020.

The reported number of incidents of littering was 27,326 in 2019/20, which is 18.1 incidents per 1,000 residents and an increase of 4% on 2019/18. This increase is slightly higher than the wider north-west region increase of 3.2%. Littering data shows that the most frequent location for reported incidences of fly-tipping is in back alleyways and the most frequent type of waste to be fly-tipped was 'other household waste'.

5.4.3 Improvement Opportunities

Opportunities exist that can both decrease the amount of waste generated and increase the recycling rate which will benefit the environment and the economy. There are opportunities to target additional materials and harmonise collection systems to make recycling easier and prevent the loss of resources into residual waste. As the Environment Bill passes through Parliament and reaches Royal Assent, direction of Government policy will become clearer and the Lancashire Waste Partnership's (LWP) Waste Management Strategy can be updated to implement required changes. There could also be opportunities to attract business investment in the area for new waste management facilities to process the collected materials and for circular economy opportunities if local users can be found for collected materials, providing investment, jobs and environmental benefits.

While volunteering opportunities exist and community action takes place to help remove littered materials from the environment, recent technological advances are allowing smarter investments in the streetscape and 'binfrastructure' to be considered. This includes self-compacting, solar powered litter bins or internet enabled sensors within bins, so that they are only emptied when full, instead of on a just in case basis. This improves operational efficiency, reduces environmental impacts and help to reduce littering. There are also positive impacts on the natural environment, marine environment and resident's amenity as a result of decreased littering. Clean, attractive beaches and tourist destinations may also attract greater numbers of tourists to a region, and investment in services aimed at the tourism and leisure services sectors.

Lancashire can help reduce waste management and littering impacts in a number of ways, including:

- 5.A: Promoting waste reduction and waste awareness campaigns that raises awareness about waste segregation and promotes recycling in order to reduce the amount of residual wastes that cannot be reused, recycled, composted and sent for anaerobic digestion.
- 5.B: Provision of a consistent and easy to use recycling collection service to all residents, with flexibility to add additional priority materials as required by local or national factors.
- 5.C: Investment in streetscape and beachscape furniture that facilitates smarter recycling and minimises the impacts of littering while improving the operational efficiencies of authority services and social value of leisure and tourism destinations.

5.5 Key Messages

PRESSURES: Economic and population pressures are changing the types and quantities of waste being produced but this is being met by legislative and social drivers forcing businesses to operate more responsibly. There is also growing awareness on the impacts that waste has on the environment.

HISTORIC TRENDS: Waste disposal to landfill has decreased significantly since 1991 and the amount of household waste requiring disposal has generally decreased since 2010. Recycling – the long-term trend has been for a significant increase in the rate of recycling. Litter – although there is variability across Lancashire, the recent trend has been a decrease in the number of recorded incidents per 1,000 residents

CURRENT STATUS: The average household in Lancashire generates 532.2 kg of waste for disposal, slightly higher than the north-west region's average, and sends approximately one third of this to landfill, higher than the average for the region. Blackburn with Darwen and Blackpool households produce more waste but send less to landfill. Lancashire's recycling rate of 45.7% is higher than the average for the north-west region but below targets set in 2008. The rates in Blackburn with Darwen and Blackpool are both lower than this at 29.1% and 38.4%. Litter – 27,326 littering incidents were reported in 2019/20, 18.1 per 1,000 residents.

OPPORTUNITIES: Changes to waste collection services through national deposit return systems and improved consistency of services provides an opportunity to increase the amount of waste recycled and reduce household waste for disposal. Waste minimisation campaigns also provide opportunities to reduce waste, help residents save money and reduce the environmental impact of waste disposal. Technological advancements provide opportunities for authorities to invest in their streetscapes in order to improve efficiencies while managing the generation of litter.

6 Noise

6.1 Overview

According to the World Health Organisation, environmental noise comes second in burden of disease to air pollution and is arguably responsible for more disturbance to quality of life. A simple way to understand noise in the case of this review, is sound which is undesired by the recipient of noise. It is a subjective topic in that noise levels are tolerated differently by different people due to a variance in their perceptions.

Local authorities are responsible for receiving, investigating, and resolving noise complaints that could be a statutory nuisance under the Environmental Protection Act 1990. This process is led by Environmental Health Practitioners (EHPs). For noise to be considered statutory nuisance, it must 'unreasonably and substantially interfere with the use or enjoyment of a home or other premises' or 'injure health or be likely to injure health'.

Noise from transport (road, rail and aviation) is a significant issue across the UK and covered under the Environmental Noise (England) Regulations 2006. These regulations require regular noise mapping and action planning for road, rail and aviation noise and noise in large urban areas.

Noise in this review covers all sources, including from domestic and commercial sources and those from the road and rail network. Pressures arise from the expansion of the transport network particularly the continued national trend in rise in car use and road freight, and also where new developments would be sensitive to the existing noise environment.

6.2 Indicators and Data Analysis

Key indicators for noise comprise reported noise complaints and Defra identified noise Important Areas.

- Total number of noise complaints (from all sources); and
- Number of Important Areas identified through the Defra Noise Action Plans.

The total number of noise complaints has been obtained for 2011 to 2021 by obtaining information from the local authorities within Lancashire. Lancashire – A Green Audit (1991) also presented data on the total number of noise complaints and this has allowed a comparison over the 30-year period.

The Environmental Noise (England) Regulations 2006 transpose the Environmental Noise Directive into domestic law for England. These Regulations apply to environmental noise, mainly from transport. The regulations require regular noise mapping and action planning for road, rail and aviation noise and noise in large urban areas. They also require Noise Action Plans based on the maps for road and rail noise and noise in agglomerations. The Action Plans identify 'Important Areas' (areas exposed to the highest levels of noise) and suggests ways the relevant authorities can reduce these.

The Important Areas give a snapshot of the areas exposed to the highest levels of noise in 2017.

Figures 6.2.1 charts the total number of noise complaints received per local authority; it comprises data for 12 of the 14 local authorities in Lancashire, data from Hyndburn Borough Council and Wyre Council was not available at the time of reporting. Appendix A.3 provides a breakdown of the noise complaints by local authority. Figure 6.2.2 presents the breakdown of the Important areas identified in Defra Noise Action Plans. The figure within Appendix A.4 shows the Important Areas within Lancashire identified in Defra Noise Action Plans.

A discussion of this data is provided in Section 6.3.

6.2.1 Noise Complaints

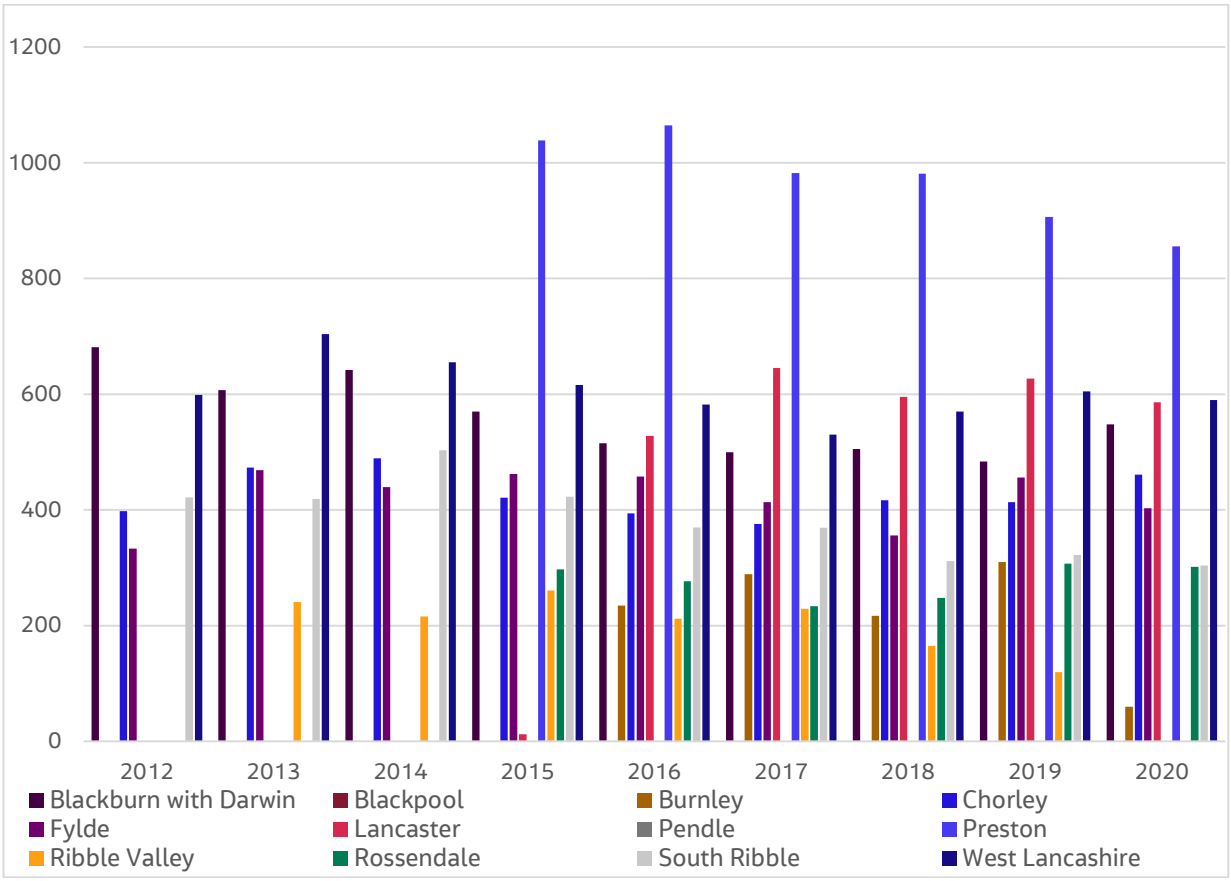

Figure 6.2.1 - Total Number of Noise Complaints reported in the Lancashire region, split by local authority (Data source: local authority complaints records)

6.2.2 Important Areas

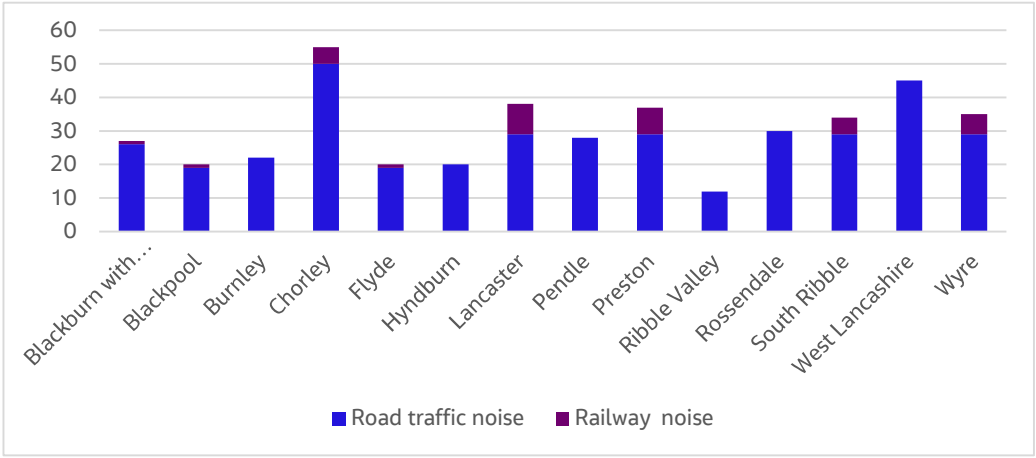

Figure 6.2.2 – Breakdown of the Important Areas in the Lancashire region (Data source: Defra 2017 strategic noise mapping)

6.3 Historic Trends

6.3.1 Noise Complaints

Noise complaint data isn't directly comparable as data for 2020 was only available for 13 of the 14 local authorities at the time of reporting. However, from the data that is available there is an indication of a long-term trend of increasing noise complaints in Lancashire, from 4,120 in 1988/89 to 7,157 in 2020. Preston City Council have consistently received the largest number of noise complaints and Ribble Valley Council typically receive the lowest number of complaints.

6.3.2 Important Areas

Appendix A.4 show the Important Areas associated with transport noise Lancashire region. The data is a snapshot of noise conditions in 2017 rather than a trend however it does identify the current issue of road traffic noise. There is a total of 423 Important Areas across the Lancashire region with 387 due to road traffic noise and 36 due to railway noise. Transport only made up 2% of the total noise complaints in Lancashire for data collected in 1988/89. Noise complaint data and Important Area data isn't directly comparable but by inference, it seems reasonable to draw the conclusion that transport noise has become a growing issue over the last 30 years.

6.4 Environmental Concerns and Improvement Opportunities

6.4.1 Policies, Strategies and Plans Already in Place

A Noise Action Plan has been developed by Defra as the Competent Authority for preparing and adopting this Action Plan under the terms of the Environmental Noise (England) Regulations 2006. Important Areas, where identified through the process, map the populations that are affected by the highest noise levels. These are then managed through the adoption of Action Plans which are designed to manage environmental noise and its effects, including noise reduction if necessary.

These areas are monitored as the neighbouring populations have been identified as being at the greatest risk of experiencing a significant adverse impact to health and quality of life. All Noise Action Plans and associating Important Areas are reviewed on a five-year cycle.

With regard to reducing and/or managing noise complaints the following actions have been taken in the Lancashire region:

- Investigation of noise complaints and taking action for noise abatement;
- Having Environmental Health officers in place to consult on new transport infrastructure developments and their associated environmental noise effect;
- Planning controls are in place to impose noise controls when planning applications are considered. This aims to prevent noise levels from 'creeping' up due to successive developments over a period of years;
- Licensing controls are in place to impose noise controls on places of public entertainment when licence applications are considered;
- Construction noise controls are in place for all infrastructure developments, these include the promotion of good practice on demolition and building sites; and
- Issuing of financial penalties under the Environmental Protection Act 1990 following Abatement Notice.

6.4.2 Current Status

Noise issues in Lancashire are primarily near busy roads and therefore due to road traffic noise. There is a total of 423 Important Areas across the Lancashire region with 387 due to road traffic noise and 36 due to railway noise. Tighter vehicle noise limit values appear to have been offset by growth in traffic flows (See Section 10), which is a general trend across the UK.

6.4.3 Improvement Opportunities

Environmental noise comes second in burden of disease to air pollution and is arguably responsible for more disturbance to quality of life. Therefore, further reduction of noise is likely to bring health and wellbeing benefits to the population of Lancashire.

Reduced levels of noise, particularly in urban areas, can have positive impacts on resident's quality of life, reducing levels of stress and improving quality of sleep. This has indirect benefits on economic productivity and levels of ill-health related absenteeism. Therefore, there are multiple benefits and co-benefits that can be realised by working to reduce noise emissions. Work to reduce emissions of noise from traffic will also contribute towards efforts to address air quality issues in AQMAs and there are mutual benefits to be achieved between the two areas.

Lancashire can help improve noise, and address health and wellbeing impacts in a number of ways, including:

- 6.A: Promoting a model shift from car use to active travel and low noise public transport and putting in the necessary infrastructure to support the transition.
- 6.B: Promoting schemes that encourages operators of HGVs, buses, coaches, vans and taxis to run fleets efficiently and with low noise emissions.
- 6.C: Working through the relevant highway authority to install low noise surfaces and other noise mitigation.
- 6.D: Incorporating noise improvements (insulation) into planning considerations for new developments and refurbishments.

6.5 Key Messages

PRESSURES: Increased noise levels arise from the increase in road transport and expansion of the network, and particularly the continued national trend in rise in car use and road freight. Noise complaints also arise for a variety of sources including construction activities, domestic noise and noise from commercial premises.

HISTORIC TRENDS Noise complaint data isn't directly comparable as data for 2020 was only available for 12 of the 14 local authorities at the time of reporting. However, from the data that is available there is an indication of a long-term trend of increasing numbers of noise complaints in Lancashire, increasing from 4,120 in 1988/89 to 6,818 in 2020.

CURRENT STATUS: The highest levels of noise in Lancashire are primarily near busy roads, and therefore due to road traffic noise. There is a total of 423 Important Areas (areas affected by the highest levels of noise) across the Lancashire region with 387 due to road traffic noise and 36 due to railway noise. Environmental noise comes second in burden of disease to air pollution and is arguably responsible for more disturbance to quality of life. Therefore, further reduction of noise is likely to bring health and wellbeing benefits to the population of Lancashire.

OPPORTUNITIES: Improvements in noise will come from the promotion of active travel and the adoption of quieter vehicles. Planning controls to reduce the need to travel and the incorporation of noise insulation into new developments and refurbished will help to control the impacts of noise. The relevant highways authority can install mitigation on road infrastructure such as low noise road surfaces and noise barriers.

7 Energy

7.1 Overview

The generation of energy is a major contributor to UK emissions of greenhouse gases. It also leads to emissions to air of other pollutants that have negative impacts on human health and ecosystems. The energy sector has been steadily decarbonising since 1990 due to the switch from coal fired power stations to gas-fired and renewable sources. There has also been end user efficiency improvements and a general decline in energy intensive industry in the UK, reducing the demand for electricity. The burning of fossil fuels (petrol and diesel) in the transport sector also causes greenhouse gas emissions and air pollution.

This section considers energy use and generation, including renewable, non-renewable and energy recovery sources, within Lancashire. Energy use includes all forms of energy consumption for six fuel types between 2005 and 2017 for the main sectors. Renewable energy considers the installed capacity of all types of renewable electricity sources and the amount of electricity these installations generated in 2014 and 2019.

Energy demand is driven by economic and population growth, which is balanced by improvements in energy efficiency and demand management. There are growing pressures to reduce the reliance on fossil fuel generated electricity in order to meet international agreements and reduce the impacts of climate change caused by emissions of greenhouse gases. Going forward a big driver will be commitments by Government and local authorities to achieve net zero greenhouse gas emissions. Given the commitments to reduce emissions of greenhouse gases there is now an urgent need to decarbonise the energy mix, use energy more efficiently and supply more energy from micro scale decentralised renewable sources.

7.2 Indicators and Data Analysis

Key indicators for energy comprise:

- Total energy consumption from industrial, commercial and transport sectors;
- Total energy consumption by fuel source; and
- The total installed capacity of renewable electricity technologies and the total electricity generation from these sources.

Data on energy consumption and renewable energy has been obtained from the Department for Business, Energy and Industrial Strategy (BEIS) and the Office for National Statistics for available years, in order to reflect on the changes since 1991 for the use by sector and the source of fuel.

This state of the environment report takes a high-level look at energy. The State of Environment Report – Renewable Technology Input provides a technical report on renewable energy deployment opportunities across Lancashire.

A discussion of the energy data is provided in Section 7.3 with Figures 7.2.1 – 7.2.5 presenting the information in a graphical format of energy use and renewables.

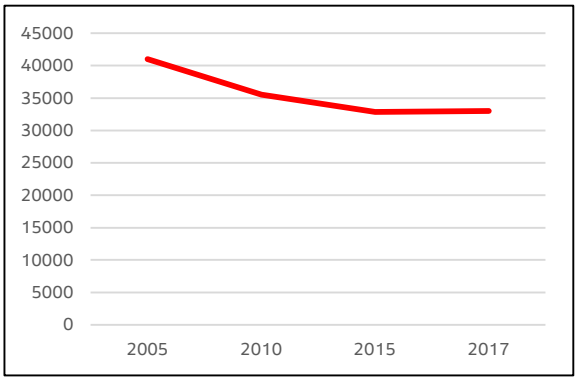

Figure 7.2.1 - Total Final Energy Consumption (GWh), Lancashire area, 2005 – 2017 (Data source: BEIS, 2019)

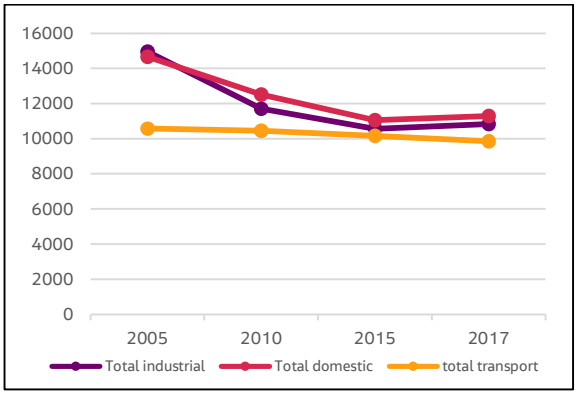

Figure 7.2.2 - Total Final Energy Consumption (GWh), by Sector Lancashire area, 2005 – 2017 (Data source: BEIS, 2019)

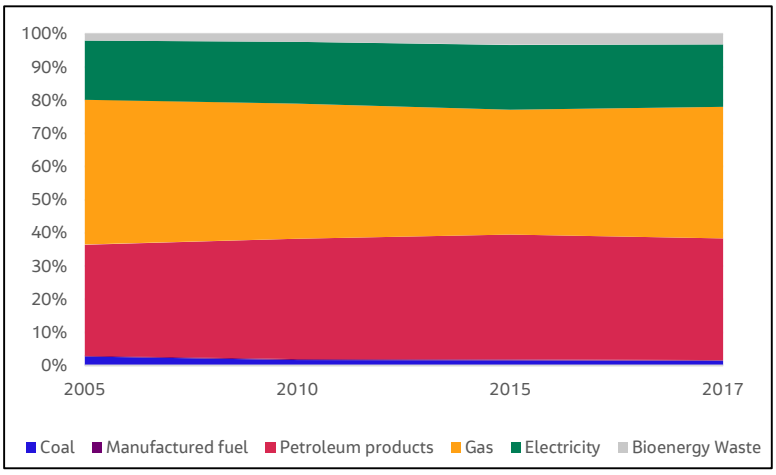

Figure 7.2.3 - Total Final Energy Consumption, % by fuel type, Lancashire area, 2005 – 2017 (Data source: BEIS, 2019)

7.2.1 Renewable Energy

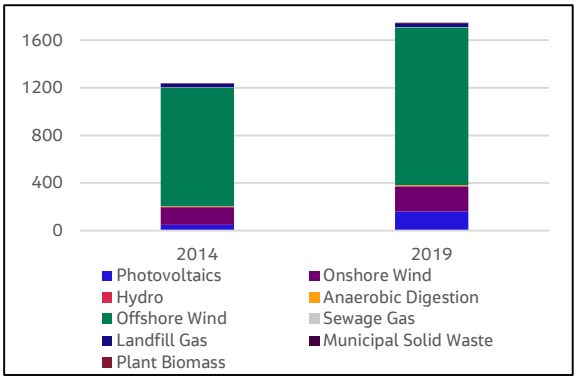

Figure 7.2.4 - Renewable Electricity: Installed Capacity (MW), Lancashire area, 2014 and 2019 (Data source: BEIS, 2020)

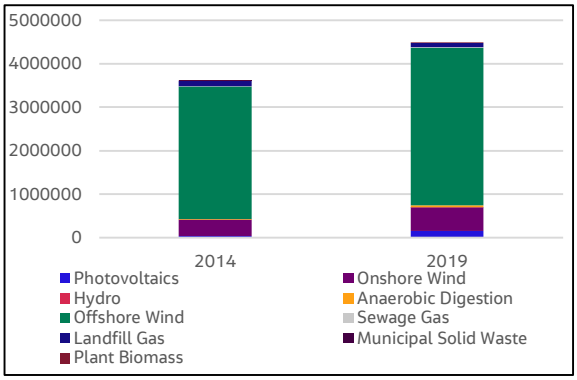

Figure 7.2.5 - Renewable Electricity: Generation (MWh), Lancashire area, 2014 and 2019 (Data source: BEIS, 2020)

7.3 Historic Trends

7.3.1 Energy Use

As shown by Figure 7.2.1, total final energy consumption for coal, manufactured fuels, petroleum products, gas, electricity (including both renewable and non-renewable sources) and bioenergy wastes (GWh) across Lancashire shows a long-term downward trend which has plateaued since 2015. Final energy consumption has decreased almost 20% from a total of 41,019 GWh in 2005 to 33,016 GWh in 2017.

Figure 7.2.2 shows that total final energy consumption from all fuels has decreased across all sectors (domestic, industrial/commercial, and transport) between 2005 and 2017, by 20% from 40,205 GWh to 31,977 GWh. All sectors have seen decreases, with the biggest decreased seen by the industrial/commercial sector (-27%) and domestic sector (-23%), with energy use in the domestic sector now exceeding that from the industrial/commercial sector. This may be a result of both the increasing population and a decrease in energy intensive manufacturing activities taking place within Lancashire. Transport emissions have only decreased by 7%. Increases in the efficiency of the transport sector, brought about by technological improvements and newer vehicles entering the market have possibly been offset by increased mobility, numbers of vehicles and use of the private motor vehicle and relative decreases in use of public transport. Compared to the 1985/86 data from the Lancashire – A Green Audit (1991) report, domestic use has increased from 30% to 35%, transport use has increased from 22% to 30% and industrial/commercial use has decreased from 48% to 34%.

The energy mix consumed in Lancashire has not changed significantly between 2005 and 2017 (Figure 7.2.3) despite an overall decrease in energy consumption. The energy mix is still dominated by consumption of gas (40%) and petroleum products (37%), along with large amounts of electricity (19%), all of which decreased in the quantity used between 2005 and 2017. This is similar to the energy mix in the north-west in 1985/86 when approximately 37% of fuel was gas, 36% was oil, 17% was electricity and 10% was solid fuel.

As the amount of electricity consumed decreases in the long-term, it has also become less carbon intensive with switch from coal to gas and growth in renewable energy generation being a significant trend and the contribution of renewables to the national electricity supply increasing fourfold since 2010. As coal is a relatively polluting fossil fuel decreasing its use has multiple benefits for decarbonising electricity and reducing emissions of greenhouse gases and the impacts on local air quality. There was a small amount of bioenergy waste energy consumption in 2005 (2%) growing to 3% in 2019. Use of coal has decreased from 3% of the energy mix in 2005 to 1% in 2017, continuing the trend which started in the 1960s.

7.3.2 Renewable Energy Generation

The number of renewable energy installations in Lancashire has increased by 51% between 2014 and 2019, while the total renewable generation capacity has increased by 41%, with increases across most generation categories. In particular, the number of solar photovoltaic installations have increased by 51% while the number of onshore wind installations has increased nearly 30%.

Renewable energy generation in Lancashire is dominated by six offshore wind turbines installations, installed off the Lancaster coastline, which has a total installed capacity of 1,327 MW (2019) and produced 3,626 GWh of electricity. This is 76% of the total installed capacity within Lancashire and generated over 80% of the renewable energy generated across Lancashire in 2019 (Figure 7.2.4). Although renewable electricity generation is dominated by the contribution of the offshore wind installations there are lesser contributions made by onshore wind (12%) and solar photovoltaics (4%). Small amounts of electricity are generated by using landfill gas (2%) and by anaerobic digestion (1%). Contributions (<1%) are made to the electricity mix by hydro, sewage gas, municipal solid waste and plant biomass (Figure 7.2.5). In particular, there has been large growth in the electricity generation from solar photovoltaics between 2014 and 2019, which increased by almost 400% and from anaerobic digestion, which increased by almost 350%. These sources of renewable electricity all contribute to reducing the reliance on fossil fuels as a source of energy for the electricity grid that is used by all Lancashire residents and businesses, and in the case of landfill gas generation, is reducing emissions of methane, a potent

7.4 Environmental Concerns and Improvement Opportunities

7.4.1 Policies, Strategies and Plans Already in Place

The UK Government has set targets to reduce all greenhouse gas emission to net zero by 2050 with a number of legislative requirements, policy and strategy documents in place to achieve this. The Climate Change Act (2008) and upcoming Environment Bill commit the UK to achieving net zero emissions. The Ten Point Plan for a Green Industrial Revolution (2020) and The Energy White Paper (2020) sets out plans for investment and job creation for an energy transition towards renewable sources in order to achieve net-zero requirements. These build on the existing legislation and subsidies (such as Renewable Obligation Certificates, Feed in Tariffs and Renewable Heat Incentives) that have favoured renewable energy generation at both small- and large-scales. The Government have also recently announced the banning of gas boilers in new homes and the sale of internal combustion engine cars, which will change the types of fuel used in the domestic and transport sectors.

There are plans to develop further renewable energy installations through plans that have been submitted to the planning process and on a larger scale, on Crown land as a result of the most recent Round 4 Offshore Wind Leasing programme. Finally, there are two nuclear power stations located at Heysham that are generating low-carbon electricity, equivalent to the supply to 4 million homes. As with other existing nuclear power stations around the UK, both power stations are estimated to end generation by 2030 and will subsequently be decommissioned. There are currently no plans to replace nuclear power generation at the sites however, Heysham is being considered for an innovative hydrogen supply project (Hydrogen to Heysham, H2H). As nuclear power stations, they will need to be replaced by new generating capacity in order to meet increasing demands as a result of decarbonisation of the heat and transport sectors.

Action on transforming energy generation and use within Lancashire has started including:

- Within Lancashire a number of authorities have committed to reduce emissions to net zero, transforming energy generation and use will be critical to achieving this;
- Installation of solar photovoltaic panels on some local authority buildings and housing;
- Replace inefficient street lighting;
- Provision of financial support to residents to improve the efficiency of homes through better insulation and renewable heating technologies; and
- Support for energy and low-carbon sectors though Lancashire Enterprise Partnership, bringing together key stakeholders from the public and private sector in order to maximise the economic potential of related industries.

7.4.2 Current Status

Total final energy consumption for all sectors and from all energy sources was 33,107 GWh in 2017 (latest available data) which is an increase of 0.5% from 2015. Domestic use of energy was the largest sectoral use in 2017, consuming 11,297 GWh (35%) of final energy although industrial use consumed similar amounts at 10,828 GWh (34%). Transport use consumed 9,852 GWh (30%). Gas at 40% and petroleum products at 37%, account for the majority of fuel types used. Electricity, which includes nuclear, renewable and non-renewable sources, accounts for 19% of fuel use along with small amounts of bioenergy and coal. There was minimal use of coal as a fuel but consumption primarily took place within Ribble Valley, accounting for 65% of the total coal consumption.

There are 18,637 renewable energy installations within Lancashire as of 2019 including a large number of solar photovoltaics installations (18,389), 202 onshore wind installations and small numbers of landfill gas engines, offshore wind turbines, hydro power plants, anaerobic digestion plants, sewage gas engines, municipal solid waste plants and plant biomass installations. These installations generated 4,487 GWh of renewable electricity, mainly from the offshore wind installations. Along with low-carbon electricity generated at the two nuclear power stations at Heysham, renewable electricity is reducing the carbon intensity of the National Grid by reducing the amount of electricity needed to be generated from non-renewable sources.

7.4.3 Improvement Opportunities

Opportunities exist to minimise environmental impacts from energy while also providing economic opportunity, innovation and social benefits. Lancashire currently has the greatest offshore wind capacity of any local authority on the west coast of England. As a result of continuing favourable conditions for the wind generation development, Lancashire will continue to attract economic investment in this high technology sector and has an opportunity to continue to grow renewable capacity over the coming decade from all sources.

There is also opportunity to innovate with new technology, such as the Wyre Tidal Barrage Project or through green hydrogen generation, (using renewable electricity) for which there is potential demand from regional urban areas. These opportunities would support local businesses, retain high skilled jobs which may be lost as a result of the nuclear plant decommissioning and attract further investment into the wider region. Local authorities can also play a key role in promoting deployment of micro scale renewable energy technology e.g. photovoltaics, during the development of new buildings, via the planning process and by demonstrating leadership in energy consumption and renewables generation through making local authority buildings and housing more energy efficient, resilient to climate change impacts and reduce incidence of fuel-poverty.

Lancashire can help reduce environmental impacts from energy consumption in a number of ways, including:

- 7.A: Continue to demonstrate leadership in areas of energy management, energy efficiency and renewable generation. Building on the climate emergency declarations, local authorities can commit to reduced energy consumption and installing resilient net-zero ready energy infrastructure for their own facilities and transport assets.
- 7.B: Collaborate with other public sector and private sector organisations to help stimulate the deployment of pilot energy projects which bring environmental and social benefits to the region.
- 7.C: Incorporating energy efficiency and generation measures into planning considerations for new developments and refurbishments. Continuing to provide support to residents to reduce impacts of fuel poverty.

7.5 Key Messages

PRESSURES: There is an increasing need to use less energy and to use energy more efficiently, while continuing to decarbonise the energy generation sector by installing low-carbon and renewable electricity sources. Government policy and legislative pressures will bring about changes to the types of fuel being used.

HISTORIC TRENDS: Energy consumption is following a downward trend across all sectors and towards more low-carbon and renewable sources of energy generation. Renewable electricity generation is increasing across Lancashire.

CURRENT STATUS: Energy consumption for all sectors and from all sources was 33,107 GWh in 2017. Some of this demand was met by renewable generation from 18,637 installations that generated 4,487 GWh of renewable electricity. The main sources of fuel are gas and petroleum products, A more radical approach to energy decarbonisation and demand management will be required to achieve net zero targets.

OPPORTUNITIES: Opportunities to decarbonise the energy grids provide multiple environmental, economic and social benefits. Reductions will come from demonstrating leadership and taking action to decarbonise local authority's own energy supplies. Planning controls to mandate renewable generation within new developments and refurbishments will help to influence small-scale deployments. There will also be opportunities to pilot innovative projects that have regional or national significance and through growing the existing renewable generation skills base.

8 Climate Change

8.1 Overview

There is clear evidence of a changing climate as a result of increased anthropogenic emissions of greenhouse gases but also clear evidence of the response to this global issue by individuals, governments and businesses. Climate change impacts are causing changes to sea levels, temperatures, precipitation patterns and leading to more frequent and more impactful extreme weather events. Such events are having negative economic and social impacts as communities have to respond to events, e.g. losses caused by flooding events, or adapt to new conditions from extreme summer temperatures contributing towards heat stress and health to residents in urban areas.

Greenhouse gas emissions (GHGs) are caused by nearly all global human and economic activity and includes gases including: carbon dioxide (or carbon), methane, nitrous oxides and fluorinated gases, some of which occur naturally and some that are man-made. Emissions of GHGs are being driven by population and economic growth, urbanisation and increased demands for electrical and heat energy, water and transportation of an increasingly mobile population. More locally, burning of fossil fuels to generate energy, emissions from industry including cement manufacturing, land use change and landfill sites are generating GHG emissions within Lancashire.

8.2 Indicators and Data Analysis

A globally recognised indicator of climate change is the emissions of carbon dioxide (CO_2) to air which is used as the key indicator for climate change.

- Total emissions of CO_2 from local authority areas; and
- Total emissions of CO_2 from the main sectors: Industrial/Commercial, Domestic and Transportation.

Data has been collated for local authority 'territorial' emissions of CO_2 from all sources, as CO_2 is the main greenhouse gas emitted and accounts for approximately 81% of UK greenhouse gas emissions. This provide a consistent indicator for identification of spatial and temporal trends at the local authority level as the data takes into account all territorial emissions from within a local authority area including emissions from production of goods and emissions from the end-use consumption of energy. Therefore, emissions from goods produced but exported to another local authority and emissions associated with energy generation for consumption within the local authority are included within the total, but, emissions from the production of good which are imported and emissions associated with energy generation and consumption elsewhere are excluded.

Emission data presented in this report is as published by the Department for Business, Energy and Industrial Strategy (BEIS). This state of the environment report has taken a high-level look at carbon emissions trends over the last 30 years, the current concerns and possible improvement opportunities. The Lancashire Net Zero Pathways Options Report has taken a deep dive into the area considering pathways to net zero in more detail.

CO_2 emission data is presented for each local authority and for different sectors between 2005 and 2018 in Figures 8.2.1 – 8.2.3 below along with a discussion on the trends in the data in Section 8.3.

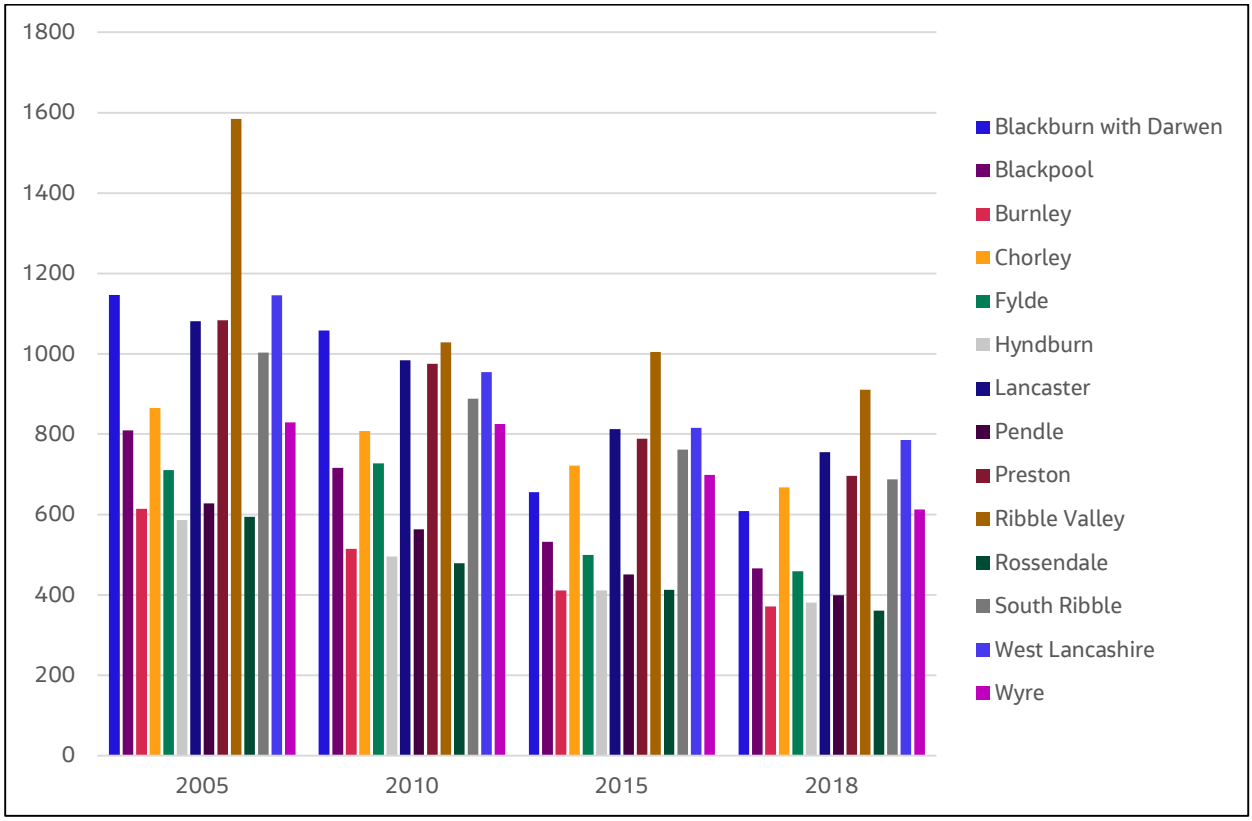

Figure 8.2.1 - Lancashire Territorial CO_2 Emissions 2005-2018 (kt CO_2) – emissions per Local Authority (Data source: National Statistics, 2020)

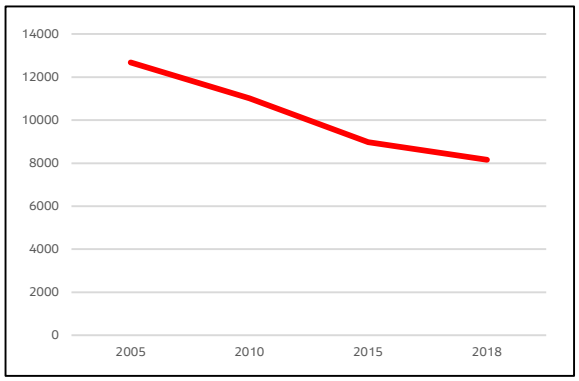

Figure 8.2.2 - Total CO_2 Emissions (kt CO_2), Lancashire Territorial - 2005-2018 (Data source: National Statistics, 2020)

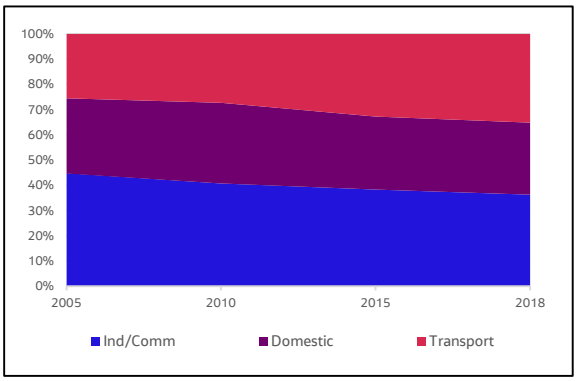

Figure 8.2.3 - Lancashire Territorial CO_2 Emissions 2005-2018 (kt CO_2) – percentage by sector (Data source: National Statistics, 2020)

8.3 Historic Trends

Total carbon emissions from all sources are shown for each local authority for selected years in Figure 8.2.1. This shows that Ribble Valley, Blackburn with Darwen and West Lancashire have been some of the highest emitting areas within Lancashire during this period, but these areas are also the source of a number of large operational industrial sites and sources of industrial emissions. Ribble Valley particularly stands out due to significant

Burnley, Hyndburn and Rossendale have been some of the lowest emitting areas within Lancashire over this time and have a low number of large industrial sites. There appears to be no correlation between the relative urban and rural nature of each authority, with the only mainly rural authority in Lancashire, Ribble Valley being one of the top emitters while the lower emitters are all classified predominantly urban.

Despite continued high emissions of carbon, Blackburn with Darwen and Ribble Valley in particular, have also seen the largest decreases in total CO_2 emissions between 2005 and 2018, down 47% and 43% respectively. This may be due to the reduction in the number of industrial sites giving rise to emissions, particularly so for Blackburn with Darwen which has reduced from six in 2005 to two in 2018 and industrial emissions down 60%. Concurrently across Europe, installations covered by the EU Emissions Trading Scheme (EU ETS) programme reduced emissions by about 35% between 2005 and 2019.

The trend in Lancashire for carbon emissions (Figure 8.2.2, kt CO_2, 2005-2018) has been a decrease across all local authorities and all sectors since 2005. Absolute emissions have decreased 35% since 2006 despite there being a small but steady growth in both population and economic activity during this time. Compared to a baseline figure of 13,545 kt CO_2 in 1990, this is a total decrease of 40%. This positive trend shows that CO_2 emissions from local authority areas are decreasing which will have a positive impact on the contribution of the UK to carbon budgets as set out in the Climate Change Act and global efforts to decrease GHG emissions and the impacts climate change.

Figure 8.2.3 shows the percentage contribution of domestic, industrial/commercial, and transport sources to total emissions from Lancashire. Compared to historical data on UK level emissions, there has been a trend towards greater emissions from transport and domestic sources and away from industrial sources (which includes electricity supply industry). In 1987 domestic emissions were only 15% of the total, transport emissions were 21% and industrial emissions were 59% with 6% miscellaneous emissions. Current data shows emissions from industrial and commercial sources have decreased the most, from 5,618 kt CO_2 (44% of total) in 2005 to 2,928 kt CO_2 (36%) in 2018, while emissions from transport have decreased the least from 3,194 kt CO_2 to 2,838 kt CO_2 and increased from 25% to 35% of total emissions. Emissions from domestic sources have remained relatively constant at approximately 30% of total emissions, decreasing from 3,734 kt CO_2 to 2,306 kt CO_2.

Changes to the quantity of industrial emissions and sources in Lancashire have been driven by a number of local and national factors. Local factors include the impacts of industrial facilities improving the efficiency of their processes, and via the closure and reduction in outputs from larger industrial sites, e.g. closure of the Kruger paper mill near Belmont in 2007 and the DS Smith Paper Ltd mill in Blackburn with Darwen in 2012. National factors driving these changes include changes to the energy mix as less carbon intensive fuels are used with less coal used and more gas used. In 1990 coal accounted for 31% of UK energy consumption compared to just 3% in 2019, with the associated emissions from coal falling by 90% over the same period. There also have been reductions in emissions at large scale energy users as a result of both the EU Emissions Trading Scheme and the now withdrawn UK Carbon Reduction Commitment Energy Efficiency Scheme.

8.4 Environmental Concerns and Improvement Opportunities

8.4.1 Policies, Strategies and Plans Already in Place

The United Kingdom (UK) Government has recently committed to reducing greenhouse gas (GHG) emissions by 78% by 2035 and a path to net zero emissions by 2050. Many local authorities and businesses have declared a 'climate emergency' and are developing their own plans to reduce emissions of GHGs and become more resilient to the impacts of climate change. The Lancashire Climate Change Partnership has an existing Climate Change Strategy which aimed to ensure a low carbon and well adapted Lancashire by 2020 through implementing a number of initiatives and setting climate change targets.

Already a number of initiatives have been completed in order to reduce impacts on climate change:

- 12 local authorities making public declarations to reduce impacts of climate change and the climate

- Replacing 125,000 traditional streetlights with more energy efficient and reliable LED lighting which reduce energy consumption and greenhouse gas emissions;
- Local authority led programmes to improve the insulation and energy efficiency of housing stock with the dual social value of reducing household spending on energy bills and combats fuel poverty; and
- Regeneration of coastal defences at The Cleveleys to include public amenity co-benefits alongside provision of flood risk management to coastal properties and safeguard against longer term risks.

8.4.2 Current Status

Total territorial CO_2 emissions in 2018 were 8,160 kilotons. Emissions associated with industrial and commercial sources were most significant at 2,928 kt CO_2 followed by emissions from transport sources at 2,838 kt CO_2. Domestic sources contributed the least of all three sectors at 2,306 kt CO_2. The three local authorities with the highest territorial emissions in 2018 were Ribble Valley (910 kt), West Lancashire (785 kt) and Lancaster (755 kt); by contrast Rossendale has the lowest territorial emissions at 361 kt.

8.4.3 Improvement Opportunities

The opportunities presented here are high-level carbon reduction opportunities relevant to Lancashire. The Lancashire Net Zero Pathways Options Report has taken a detailed look at the interventions required to achieve carbon reduction glide paths of varying ambitions.

Opportunities exist in Lancashire to reduce emissions associated with the transport sector (which will have additional positive environmental impacts) through promoting increased use of low emissions public transport and multi-occupancy transport rather than single occupancy car journeys. Local authorities can also promote the switch to low emission public transport vehicles via the procurement of services that favour low emission vehicles e.g. for public bus services contract renewals.

Programmes making improvements to the efficiency of housing and building stock and in particular installing low-carbon heating, which will contribute towards the reduction in local fuel poverty. Opportunities also exist to reduce energy and generate renewable electricity which will reduce emissions of GHG and has been presented in Chapter 7.

Medium to long term opportunities exist around the decarbonisation of cement producing facilities although local authorities have limited ability to fast track these opportunities. There are potential opportunities for natural sequestration of carbon within Lancashire and these are discussed further in Lancashire Net Zero Pathways Options Report.

Lancashire can help reduce carbon emissions and work towards net zero targets through a number of the opportunities already identified for wider environmental improvement:

- 8.A: With a large housing stock, there is the opportunity to deliver a large-scale change to low-carbon heat sources for council and social housing by collaboration with social housing providers.
- 8.B: Prioritising and promoting the uptake of electric and alternative fuels for local authority fleets and installation of new charging/refuelling infrastructure to facilitate public and private use of low emission vehicles (10.B).
- 8.C: Continue to demonstrate leadership in areas of energy management, energy efficiency and renewable generation. Building on the climate emergency declarations, local authorities can commit to reduced energy consumption and installing resilient net-zero ready energy infrastructure for their own facilities and transport assets (7.A).
- 8.D: Incorporating active travel and public transport infrastructure into planning considerations for new developments. Make active travel a key consideration in spatial planning decisions (10.D).
- 8.E: Encouraging uptake of schemes under the Environmental Land Management programme and the Nature for Climate Fund to manage land in a way that enhances biodiversity and delivers carbon sequestration benefits (9.A).

8.5 Key Messages

PRESSURES: There is an increased awareness about the impacts of climate change with action being taken at all levels to reduce greenhouse gas emissions and to make adaptations to the changing climate. Government commitments mean that the United Kingdom has committed to becoming carbon net zero by 2050 and local authorities will need to take action to achieve this.

HISTORIC TRENDS: There has been a longer-term trend of decreasing emissions of CO_2 from all local authorities and from all sectors in Lancashire. Emissions have fallen 40% since 1990 with declining emissions from industrial and commercial sources in particular.

CURRENT STATUS: CO_2 emissions in 2018 were 8,160 kilotons in Lancashire with 36% coming from industrial and commercial sources, 35% from transport sources and 30% from domestic sources. Ribble Valley generated the highest CO_2 emissions and Rossendale had the lowest emissions.

OPPORTUNITIES: Opportunities that exist to reduce greenhouse gas emissions also overlap with many other environmental topics. Opportunities that reduce greenhouse gas emissions from transport will benefit air quality while improving efficiency of building stock will decrease domestic energy consumption and greenhouse gases while helping to tackle fuel poverty.

9 Nature Recovery (Biodiversity)

9.1 Overview

Biodiversity relates to the variety of plants and animals and other living things in a particular area or region. It encompasses habitat diversity, species diversity and genetic diversity. Globally there has been a significant decline in biodiversity for the last hundred years, with damaging implications for future wildlife. Increased pressure on biodiversity from human activity and disturbance has led to what is currently considered to be a biodiversity crisis, with global biodiversity declining at the highest rates ever recorded. As a result, the impacts on biodiversity within the UK and Lancashire are becoming increasingly important to assess, along with the condition of protected species and habitats.

Changes in biodiversity have been linked to increased development pressure for housing and commercial purposes. Local planning authorities now have a duty[1] to show regard for conserving biodiversity or integrate biodiversity as part of decision making; and the National Planning Policy Framework (NPPF) states that local planning authorities should set out a strategic approach to their Local Plans, by planning positively for the creation, protection, enhancement and management of networks for biodiversity and green infrastructure. Conserving biodiversity can include restoring or enhancing a population or habitat.

Additionally, changing human activity, agriculture, and increased consumption and reduced resource efficiency are also causing increased pressure on habitats and biodiversity. Many habitats are becoming fragmented or lost as a result of modern agricultural methods and agricultural intensification and changes in land use, causing an overall loss in biodiversity. Coastal squeeze (anthropogenic actions preventing the landward transgression of those habitats that would otherwise naturally occur) of inter-tidal habitats are increasing pressure on biodiversity in Lancashire. Lack of management is also a threat to remaining habitat fragments which may be too small to be managed effectively, particularly species-rich grasslands and wetlands.

9.2 Indicators and Analysis

The high-level indicators for biodiversity for this study comprise:

- Number of statutory and non-statutory protected sites;
- Condition of Sites of Special Scientific Interest;
- Area of National Nature Reserves and Local Nature Reserves;
- Areas of forestry, woodland and trees; and
- Area and condition of peatlands.

If a site of nature conservation importance has 'statutory protection', it means that it receives protection by means of certain legislation in recognition of its biodiversity and/or geological value. These sites can have a positive impact on biodiversity and nature recovery where they are connected, improved, expanded and actively managed to conserve and improve their condition.

Many important areas have no statutory protection but are nevertheless of substantive biodiversity significance and make an important contribution to ecological networks and nature's recovery. They can also provide wider benefits including public access (where agreed), climate mitigation and helping to tackle air pollution. They can be in in rural, urban or coastal locations, can vary considerably in size. In Lancashire such sites are called Biological Heritage Sites (BHS) and Local Geodiversity Sites (LGS).

Biological Heritage Sites together with the statutory protected sites, make the most significant contribution to the biological diversity of Lancashire. Collectively, these statutory and non-statutory sites have been referred to as Lancashire's "critical environmental capital". The protection, condition and connectivity of these sites is a key for future nature recovery in Lancashire.

[1] This is likely to change once the Environment Bill

Woodland and trees provide diverse habitats for a range of species and are increasingly important for their ability to naturally 'draw down' or sequester atmospheric carbon dioxide. However, care must be taken to plant the right mix of trees in the right place. Vast plantations of non-native trees, particularly when they're a single species, offer less useful habitat for wildlife, but a mix of climate resilient trees can benefit biodiversity and store more carbon in the long run.

Peatlands are a major feature of Lancashire's landscape. They are a key natural capital asset being important for biodiversity as well water regulation and a key terrestrial carbon store. The value of our peatlands is now recognised, and plans are being put in place to restore peatland landscapes to their natural state.

9.2.1 Number of Protected Sites

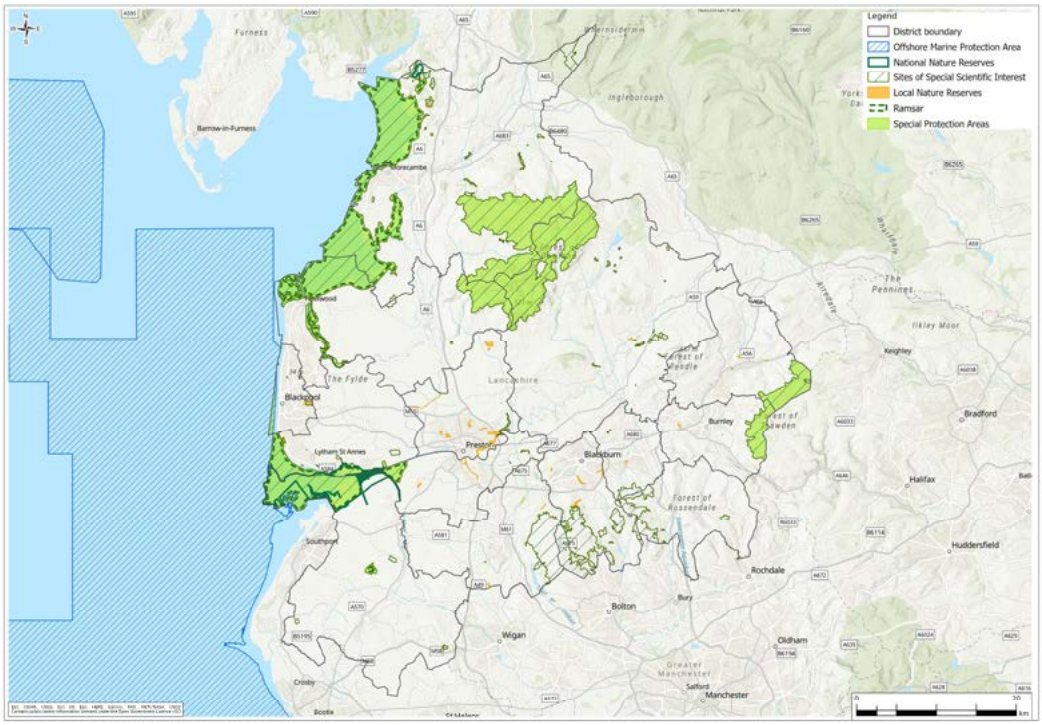

Figure 9.2.1 – Map of Statutory Protected Sites within Lancashire in 2021. (Data source: Natural England and JNCC). Also included in Appendix A5.

Site Designation	Number of Sites in 2021	Number of Sites in 1991
Local Nature Reserves	30	5
National Nature Reserves	2	2
Sites of Special Scientific Interest	All or part of 72 lie within Lancashire	50
Ramsar sites	All or part of 4 lie within Lancashire	2
Special Areas of Conservation	All or part of 5 lie within Lancashire	-
Special Protection Areas	All or part of 4 lie within Lancashire	2
Biological Heritage Sites	1,216 (last approved review 2012)	0

Table 9.2.1 – Number of Protected Sites within Lancashire in 2021(Data source: Lancashire Environmental Record Network and Lancashire – A Green Audit, 1991))

9.2.2 Condition of Sites of Special Scientific Interest

According to Natural England records, there are currently a total number of 67 SSSI sites wholly within Lancashire covering a total area of 91,305 ha (much of which is inter-tidal and mudflats), the majority of which (88.5%) are in favourable and unfavourable recovering condition. A total of 11.6% are in unfavourable no change, unfavourable declining condition. However, it should be noted that there are limitations on this data due to condition assessments for over 40% of the SSSI's having not been over 10 years ago.

	Total favourable or unfavourable recovering	Favourable	Unfavourable Recovering	Unfavourable No Change	Unfavourable Declining	Partially Destroyed	Destroyed	Not Recorded
Area	41,249.27	20,406.86	20,842.42	1606.77	3,795.55	0	0	0
Percentage %	88.45%	43.76%	44.69%	3.45%	8.14%	0%	0%	0%

Table 9.2.2 - Condition of SSSIs in Lancashire (Data source: Natural England)

9.2.3 Area of National Nature Reserves and Local Nature Reserves

District	Site	Type of Reserve	Date Declared	Area (ha)
Blackburn with Darwen	Arran Trail	LNR	2006	16.59
	Pleasington Old Hall Woods	LNR	2006	3.54
	River Darwen Parkway	LNR	2004	24.05
	Sunnyhurst Woods	LNR	2005	35.5
Blackpool	Marton Mere	LNR	1991	39.8
Burnley	Deer Pond	LNR	1997	1.51
	Lowerhouse Lodges	LNR	2000	10.26
Chorley	Hic Bibi, Coppull Nature Reserve	LNR	2000	7.86
	Withnell Nature Reserve	LNR	1995	4.27
Fylde	Lytham St Annes*	LNR	1968	16.08
Hyndburn	Foxhill Bank	LNR	1999	9.03
	Peel Park and the Coppice	LNR	2021	50.2
	Woodnook Vale	LNR	2021	42.5
Lancashire County Council	Preston Junction	LNR	1993	19.99
	Withnell Fold	LNR	1991	5.73
Lancaster	Gait Barrows*	NNR	1977	121.59
	Trowbarrow Quarry	LNR	1997	15.79
	Warton Crag*	LNR	1984	18.66
	Warton Crag Quarry	LNR	1984	6.78
Pendle	Alkincoats Woodland	LNR	2006	8.12
	Greenfield	LNR	2006	3.14
	Haslam Park, Preston	LNR	2006	16.51
	Lomeshaye Marsh	LNR	2005	2.05
	Upper Ball Grove Lodge	LNR	2004	2.82
Preston	Fishwick Bottoms	LNR	2006	26.8
	Grange Valley	LNR	2004	14.16
	Hills and Hollows	LNR	2009	7.02
	Pope Lane and Boilton Wood	LNR	2004	23.37
Ribble Valley	Cross Hill Quarry*	LNR	1989	9.63
	Salthill Quarry*	LNR	1989	8.6
South Ribble	Longton Brickcroft	LNR	1998	10.69
West Lancashire	Ribble Estuary (formerly Ribble Marshes)*	NNR	1981	4,623.35
** Indicates site was designated prior to 1991 report* *** In final stages of declaration*			**Total:**	5,206

Table 9.2.3 - Statutory Nature Reserves in Lancashire, 2021 (Data source: Natural England)

9.2.4 Areas of Forestry, Woodland and Trees

Interpreted Forest Type	2011		2014		2018	
	Hectares	%	Hectares	%	Hectares	%
Assumed Woodland	1,223	6.63	1,034	5.07	1,118	5.99
Broadleaved	11,050	59.87	12,598	61.75	11,208	60.05
Conifer	3,448	18.68	3,254	15.95	2,730	14.63
Mixed predominantly broadleaved	516	2.79	556	2.72	513	2.75
Mixed predominantly conifer	513	2.78	544	2.66	516	2.77
Young tress	939	5.09	1,086	5.32	1,051	5.63
Felled	253	1.37	786	3.85	1,057	5.66
Other	516	2.79	544	2.67	471	2.52
Total (minus Felled)	17,518	-	19,616	-	17,607	

Table 9.2.4 – Total areas of forestry, woodland and trees in Lancashire split by split by Interpreted Forest type. This spatial distribution is shown in Appendix A.6 (Data source: National Forestry Inventory England)

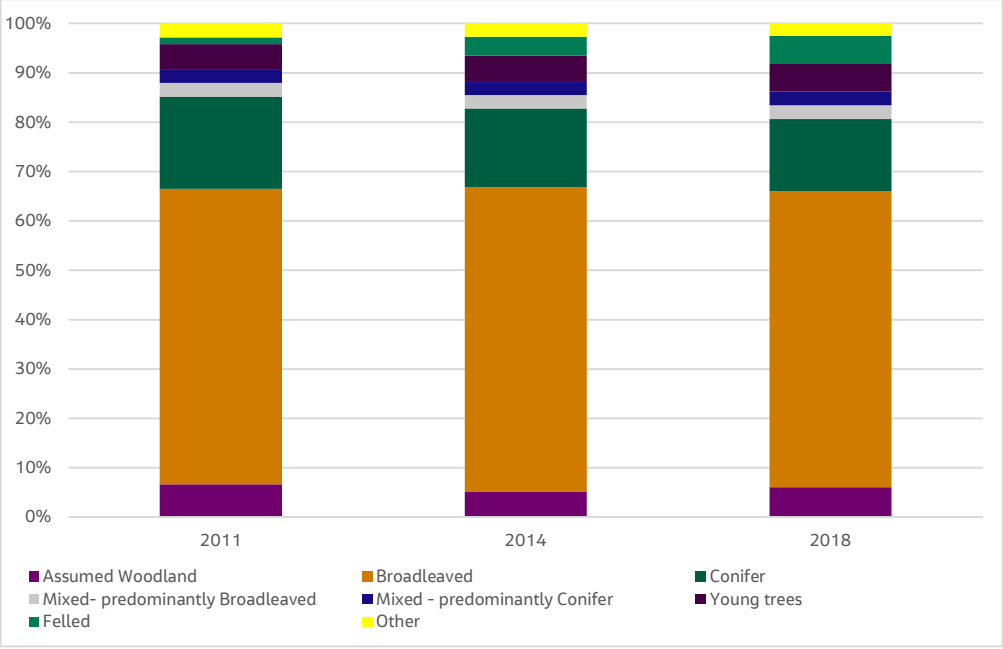

Figure 9.2.2 – Percentage of Interpreted Forest Types in Lancashire (Data source: National Forestry Inventory England)

Year	Coniferous and predominantly coniferous woodland (%)	Broadleaved and predominantly broadleaved woodland (%)	All Interpreted Forest Types minus Felled (%)
1985*	2.04%	3.33%	5.36%
2011	1.29%	3.76%	5.69%
2014	1.23%	4.28%	6.40
2018	1.06%	3.81%	5.73

Table 9.2.5 – Percentage landcover of coniferous and broadleaved woodland in Lancashire Data source: National Forestry Inventory England and * Lancashire – A Green Audit, 1991)

9.2.5 Areas and Condition of Peatlands

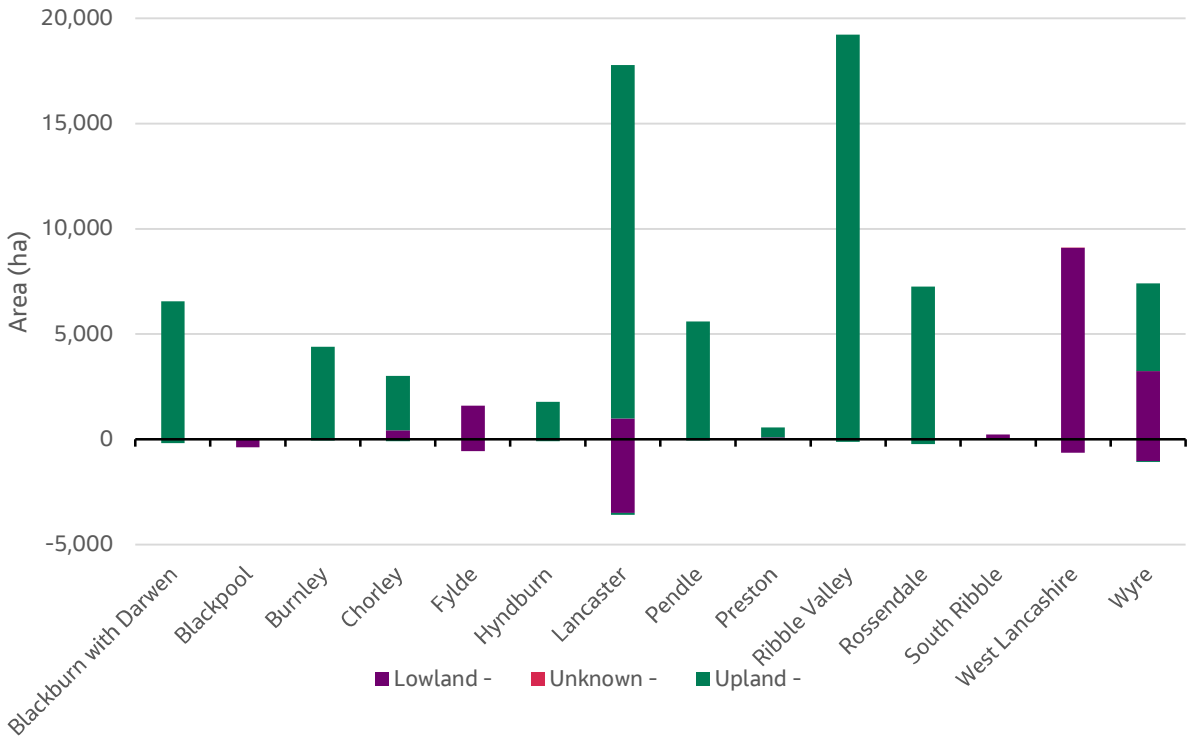

Figure 9.2.4-1- The area of peatland soils by district, with negative values representing the extent of peat lost due to agriculture, removal or development (Data source: England Peat Status GHG and C Storage, Natural England).

District	Upland Peatland			Lowland Peatland			Unknown		
	Total Area (ha)	Area Lost (ha)	% Lost	Total Area (ha)	Area Lost (ha)	% Lost	Total Area (ha)	Area Lost (ha)	% Lost
Blackburn with Darwen	6,727	-186	-2.77%	1	0	0.00%	0	0	0.00%
Blackpool	0	0	-	432	-386	-89.50%	0	0	0.00%
Burnley	4,442	-52	-1.16%	0	0	-	0	0	-
Chorley	2,681	-91	-3.39%	416	-3	-0.61%	0	0	-
Fylde	0	0	-	2,157	-572	-26.52%	0	0	-
Hyndburn	1,869	-94	-5.04%	8	-6	-80.86%	0	0	-
Lancaster	16,869	-84	-0.50%	4,487	-3,501	-78.01%	0	0	0.00%
Pendle	5,639	-66	-1.17%	14	0	0.00%	1	0	-16.09%
Preston	487	-12	-2.36%	89	-3	-2.87%	0	0	-
Ribble Valley	19,350	-135	-0.70%	13	0	0.00%	0	0	0.00%
Rossendale	7,477	-228	-3.05%	0	0	-	0	0	-
South Ribble	0	0	-	236	-4	-1.71%	0	0	-
West Lancashire	0	0	-	9,741	-649	-6.66%	1	0	0.00%
Wyre	4,203	-37	-0.89%	4,280	-1,046	-24.45%	0	0	0.00%
Lancashire Total	**69,745**	**-985**	**-1.41%**	**21,875**	**-6,170**	**-28.20%**	**4**	**0**	**-5.02%**

Note: 'Unknown' represents areas of peatland which lack sufficient data to be classified as upland or lowland, they comprise less than 1% of the total of Lancashire's peatland.

Table 9.2.5-1 – Area of peatland soils as well as the areas lost due to agriculture, removal or development (Data source: England Peat Status GHG and C Storage, Natural England).

District	Upland Peatland					Lowland Peatland				
	Remaining Area (ha)	Pristine Peat (ha)	%	SNNPFV Peat (ha)	%	Remaining Area (ha)	Pristine Peat (ha)	%	SNNPFV Peat (ha)	%
Blackburn with Darwen	6,541	14	0.21%	2,564	39.20%	1	0	0.00%	0	0.95%
Blackpool	0	0	-	0	-	45	0	0.00%	0	0.02%
Burnley	4,391	8	0.18%	1,900	43.27%	0	0	-	0	-
Chorley	2,591	19	0.75%	1,636	63.15%	414	0	0.00%	4	0.86%
Fylde	0	0	-	0	-	1,585	0	0.00%	7	0.41%
Hyndburn	1,775	1	0.03%	324	18.24%	2	0	0.00%	1	62.13%
Lancaster	16,785	269	1.60%	10,390	61.90%	987	0	0.00%	14	1.40%
Pendle	5,573	53	0.96%	1,987	35.66%	14	0	0.00%	0	0.00%
Preston	476	0	0.00%	18	3.88%	87	0	0.00%	0	0.40%
Ribble Valley	19,215	221	1.15%	12,492	65.01%	13	0	0.00%	5	37.94%
Rossendale	7,248	12	0.17%	2,401	33.13%	0	0	-	0	-
South Ribble	0	0	-	0	-	232	0	0.00%	0	0.00%
West Lancashire	0	0	-	0	-	9,093	4	0.04%	178	1.96%
Wyre	4,166	1	0.03%	1,898	45.56%	3,234	0	0.00%	11	0.34%
Lancashire Total	**68,759**	**599**	**0.87%**	**35,609**	**51.79%**	**15,705**	**4**	**0.03%**	**219**	**1.40%**

Note: 'Pristine' peatland is actively peat-forming, 'SNNPFV' peatland refers areas covered with semi-natural non-peat-forming vegetation.

Table 9.2.5-2 – Area of remaining peatland soils (excluding areas lost due to agriculture, removal or development) for each district, along with their relative areas of pristine and semi-natural non-peat-forming vegetation coverage (Data source: England Peat Status GHG and C Storage, Natural England).

District	Upland Peatland			Lowland Peatland		
	Remaining Area (ha)	Restored Peat (ha)	%	Remaining Area (ha)	Restored Peat (ha)	%
Blackburn with Darwen	6,541	15	0.23%	1	0	0.00%
Blackpool	0	0	-	45	0	0.00%
Burnley	4,391	0	0.00%	0	0	-
Chorley	2,591	0	0.00%	414	0	0.00%
Fylde	0	0	-	1,585	10	0.66%
Hyndburn	1,775	0	0.00%	2	0	0.00%
Lancaster	16,785	166	0.99%	987	8	0.81%
Pendle	5,573	6	0.11%	14	0	0.00%
Preston	476	0	0.00%	87	0	0.00%
Ribble Valley	19,215	257	1.34%	13	0	0.00%
Rossendale	7,248	0	0.00%	0	0	-
South Ribble	0	0	-	232	0	0.00%
West Lancashire	0	0	-	9,093	31	0.34%
Wyre	4,166	40	0.96%	3,234	13	0.40%
Lancashire Total	**68,759**	**485**	**0.70%**	**15,705**	**62**	**0.39%**

Note: 'Restored' refers to hydrological restoration only.

Table 9.2.5-3 - Area of remaining peatland soils (excluding areas lost due to agriculture, removal or development) for each district, along with their relative areas which have been hydrologically restored (Data source: England Peat Status GHG and C Storage, Natural England).

9.3 Historic Trends

9.3.1 Number of Statutory Protected Sites

Since 1991 the number of sites important enough to merit international designation as Ramsar sites in Lancashire has increased from two sites (Leighton Moss and Martin Mere) to four sites currently, including Morecambe Bay and Ribble Estuary. Morecambe Bay was designated in 1996 and is the largest Ramsar site in Lancashire covering an area of 37,405 ha.

The number of sites important enough to merit international designation as Special Protection Areas (SPAs) in Lancashire has increased from two sites (Leighton Moss and Martin Mere) to four sites currently including Bowland Fells and Ribble Estuary. Morecambe Bay is a wetland site of international importance and also has national designations as a SSSI, Special Area for Conservation (SAC) and Special Protection Area (SPA) and was extended from 35,372 to 36,913 hectares in 1999. This important habitat for biodiversity is the largest continuous intertidal area in Britain and includes five river estuaries, supporting the third largest number of wintering wildfowl in the UK, recorded as >20,000 birds in 1999 by the Joint Nature Conservation Committee. Species recorded include Bar-tailed godwit, Curlew, Dunlin, Pintail and Redshank.

The Alt Estuary Ramsar site was also extended in 1996 to include the Ribble Estuary, and comprises 75% tidal flats, covering an area of 13,464 ha. The site is one of the most important sites in the UK for over wintering wildfowl and is primarily in favourable condition under SSSI status. The site also includes internationally important vegetation communities.

In 1991, there were 50 SSSI sites and 39,456 hectares designated as SSSIs and this has risen considerably since to 91,304 ha as recorded by data held with Natural England in 2021. The largest area of land designated as a SSSI within Lancashire is in the Forest of Bowland, covering an area of 15,759 ha. The Forest is also an Area of Outstanding Natural Beauty and has large areas of upland bogs, grassland and dwarf shrub heath.

There are also Marine Conservation Zones (MCZ's) that protect a range of nationally important, rare or threatened habitats and species; there are 91 MCZs in waters around England. Taking Lancashire to extend out to 12 miles offshore the there are four MCZs in Lancashire. These are: Wyre and Lune estuary, Ribble estuary, Flyde, and West of Walney. The Wyre-Lune MCZ is an inshore site that covers an area of approximately 92 km^2 and is located in the southern part of Morecambe Bay in the Irish Sea and provides a critical habitat for the small fish Smelt.

Site protection under statutory nature reserves has increased extensively since 1991. In 1991, there were five LNRs recorded in Lancashire covering an area of 87.1 hectares, this has significantly increased to 28 LNRs in 2021 with all of the NNRs and LNRS listed in Table 9.2.3. The additional 23 LNRs have been designated between 1995 and 2009 and have resulted in an increase of 313.4 ha. The largest Local Nature Reserve is Marton Mere, which was created in 1991 and covers an area of 39.8 hectares. The reserve is situated within Blackpool local authority and is a natural lake with open water, reedbed and grassland habitats with small pockets of both woodland and scrub, supporting a wide variety of fauna including migratory birds.

Two National Nature Reserves (NNRs) lie in Lancashire, Gait Barrows and Ribble Estuary. Gait Barrows NNR is in the Arnside and Silverdale Area of Outstanding Natural Beauty and is one of Britain's most important areas of limestone landscape. Notable species present on the site is the rarest British wildflower lady's-slipper orchid, once thought to be extinct in the UK. This has been part of Natural England's national species recovery programme which aimed to reintroduce the species to 12 sites by 2004. As a result, the species is now recorded as thriving at Gait Barrows.

There are also a large number of non-statutory Biological Heritage Sites within Lancashire. The last approved BHS review was in 2012 when there was a total of 1,216 sites covering a total area of 34,294 ha. There has been substantial commitment to supporting the development of Biological Heritage Sites, and this can be seen in the growth in number and area.

9.3.2 Condition of Sites of Special Scientific Interest (SSSI)

Less than half the area (44%) of the 67 SSSI sites wholly within Lancashire are in favourable condition (Table 9.2.2) according to the latest Natural England data. A further 45% are 'unfavourable recovering'. However, it should be noted that condition assessments for 42.5% of the SSSI's have not been made in the last 10 years which may limit the trend analysis.

Some areas of upland bogs are currently recorded by Natural England as in favourable condition, with a majority

England in 2012. There are also extensive areas of river, coastal and estuary SSSIs which predominantly are in favourable condition. Coastal and estuary SSSIs include Morecambe Bay and the Ribble Estuary are shown in Figure 9.2.1.

9.3.3 Area of National Nature Reserves and Local Nature Reserves

The number of LNRs has increased from 5 in 1990 to 30 in 2021, a six-fold increase. The number of NNRs has stayed constant. Total area has increased from 2,383 ha to 5,206 ha.

9.3.4 Areas of Forestry, Woodland and Trees

Comparable data on woodland cover is available from 2011 to 2018 from the National Forestry Inventory which is published by the Forestry Commission. The data indicates that the total area of woodland, forestry and trees in Lancashire increased from 17,518 ha in 2011 to 19,616 ha in 2014 but has since decreased to 17,607 ha in 2018. Although the data sets are not directly comparable, Lancashire – A Green Audit, 1991 reported 16,479 ha of coniferous and broadleaved woodland in 1985, potentially indicating a slight long-term increase in the total area of woodland, forestry, and trees within Lancashire.

Data indicates the percentage landcover (at Lancashire regional level) of coniferous woodland decreased from 2.0% in 1985 to 1.1% in 2018. Over the same period broadleaved woodland increased slightly from 3.3% to 3.8%. Landcover for all woodland types has increased slightly from 5.4% in 1985 to 5.7% in 2018.

The spatial distribution of woodlands types across Lancashire in 2018 is shown in Appendix A.6.

9.3.5 Areas and Condition of Peatlands

For a long time, there have been human pressures on peatlands which has led to only 13% of England's peatlands now being in a near natural state. This decline is echoed across Lancashire, where the best available evidence indicates that only roughly half of upland peaty soils are covered with semi-natural vegetation. This declines to less than 2% where lowland peatland is concerned. Moreover, less than 1% of both upland and lowland areas with peaty soils are considered pristine and actively peat-forming, which is roughly aligned with the national picture.

The most significant impacts come from agriculture, which can lead to 'wasted' peat – the degradation of deep peat through excessive drainage and cultivation so that the soil is dominated by underlying mineral material rather than peat. The removal of peat soils for development or mineral extraction has also had a significant impact on peatland extent. These impacts are most pronounced in the lowland areas, where these damaging activities are more practical. Data indicates that 985ha of upland peatland has been wasted though extensive agriculture, removed or developed, which relates to just over 1%. However, this figure is 6,170ha for lowland peatlands, which is almost 30%.

Agriculture and other damaging human practices have impacted the condition of the remaining areas not considered lost. Conversion of peatland vegetation to species-poor improved grassland for the purposes of livestock grazing degrades peat condition and reduces biodiversity. Across Lancashire, 19% of lowland peatland (3,042 ha) and 27% of upland peatland (18,859 ha) has been agriculturally 'improved'. Moreover, 3% of upland peatland (1,806 ha) is considered overgrazed, suffering from changes in vegetation, as well as compaction and erosion of underlying peat. Much of this damage is due to the intensification of agriculture, particularly in the uplands, in the post-war period. During this time, shallow drains known as grips were installed to dry out mossy peatland vegetation for agricultural purposes. The data suggest that 3% of upland peatland (2,018 ha) has been impacted by grips, contributing to a similar area (1,820 ha) of eroded (also known as hagged and gullied) peatland.

Efforts have been made to restore the hydrology of some areas of peaty soils to improve their condition. However, this relates to less than 1% of the total of both upland and lowland peatland areas. It should be noted that there are currently several restoration projects being undertaken across Lancashire, which will have likely

improved the area of restored peatland since the data used in this assessment were developed. Nevertheless, the area of restored peatland is likely to be lower than needed. To put things into perspective, the Committee on Climate Change's Land use: Policies for a Net Zero UK advocates restoring 50% of upland peat and 25% of lowland peat.

9.4 Environmental Concerns and Improvement Opportunities

9.4.1 Policies, Strategies and Plans Already in Place

Biodiversity 2020 – A strategy for strategy for England's wildlife and ecosystems was published by Defra in 2011 and is the most recent biodiversity strategy for England. It has as its mission to halt overall biodiversity loss, support healthy ecosystems and establish coherent ecological networks.

More recently the National Planning Policy Framework (NPPF), which was updated in 2019, sets out the Government's over-arching planning policies in relation to conserving and enhancing the natural environment. It sets out how the Government expects planning decisions to contribute to and enhance the natural environment through a number of measures including protecting landscapes, recognition of wider benefits from natural capital, minimising impacts on and achieving net gains for biodiversity.

The UK Environmental Bill, due to come into force in late 2021, will require the majority of new developments to enhance rather than reduce the biodiversity present on the site. It contains the key requirement to achieve at least a 10% net gain in biodiversity with the intention to drive future increases in biodiversity. The revised biodiversity duty will require local authorities to look strategically at their policies and operations, at least every five years, and produce a Biodiversity Report.

The Government's 25-year plan Environment Plan set out the importance of a landscape-scale approach to nature recovery and set out how Local Nature Recovery Strategies (LNRSs) will underpin the new Nature Recovery Network (NRN). The forthcoming Environment Bill is expected to require all areas in England to establish LNRSs. Greater Manchester and Cumbria are each one of the five areas selected by the Government to pilot the development of a Local Nature Recovery Strategy.

Defra has recently announced the introduction of three new schemes under the Environmental Land Management programme that will pay farmers and land managers to deliver environmental improvements, including positive impacts on biodiversity. These are: the Sustainable Farming Incentive scheme; the Local Nature Recovery scheme; and the Landscape Recovery scheme. The schemes are due to be launched between 2022 and 2024 and have the potential to deliver gains in biodiversity. These schemes will also provide the main mechanism for publicly funded woodland creation after 2024.

The long-term vision for trees, woodland and forestry in England is due to be set out in the England Tree Strategy, which is currently under consultation. In the interim the England Trees Action Plan 2021 to 2024 (Defra, 2021) sets out a framework for spend of the Nature for Climate Fund on trees and woodland between 2020 and 2025. The England Tree Action Plan has the aim to maximise benefits for people, the climate and the economy. It sets out the vision that England will have at least 12% woodland cover by 2050.

The England Peat Action Plan sets out the government's long-term vision for the management, protection and restoration of peatlands. Its aim is that through implementation of the plan peatland habitats will be restored to healthy, well-functioning ecosystems that are rich in biodiversity. The Government will set a target for peatland restoration as part of the forthcoming Net Zero Strategy, recognising the important role that peatlands play in naturally sequestering carbon. The government will fund at least 35,000 ha of peatland restoration by 2025, through the Nature for Climate Fund and other sources. After 2025 the new Sustainable Farming Incentive, Local Nature Recovery Scheme and Landscape Recovery Schemes will provide the main delivery mechanism for peatland restoration after 2024-25. The England Peat Map will be updated by 2024 to provide a detailed and current evidence base to support the goals of the Plan.

Some of key initiatives are already underway across Lancashire that could directly or indirectly improve biodiversity include:

- Upland peat restoration projects by the Lancashire Peat Partnership in the Forest of Bowland, and the Pennine PeatLIFE project sites within the Bowland Fells SSSI to restore, activate and maintain peat-forming blanket mire;
- Northern Peatland Project Most has funding for five lowland peat restoration projects;
- Forest of Bowland and Morecambe Bay have nature tourism networks working to establish them as top UK places to experience nature;
- Forest of Bowland is adopting a natural capital and an ecosystems approach aiming to join up biodiversity with greater ecological connectivity and enhanced landscapes that benefit wildlife and people in the AONB Management Plan 2019 – 2024; and
- Substantial commitment to supporting the development of Biological Heritage Sites.

9.4.2 Current Status

The substantial increases in statutory and non-statutory protected sites since 1991 has the potential for a positive impact on nature recovery and biodiversity in Lancashire. However, the designation of a site in itself does not lead to nature recovery and biodiversity gains. To have a positive impact on biodiversity and nature recovery these sites need to be expanded and actively managed to improve their condition and improve connectivity with other habitats.

Up-to-date information is required on site conditions and connectivity to be more certain of the state of biodiversity in Lancashire. However, these sites can be used as the basis on which to build future strategy to identify additional suitable sites and to also provide connectivity and help to prevent any further habitat fragmentation.

At national level the UK Biodiversity Indicators 2020 report showed a mixed picture in terms of long-term and short-term changes in biodiversity. Twenty-three of the 42 measures assessed over the long term show an improvement, compared to 18 of the 39 measures that are assessed over the short term. Fourteen measures show a decline in the long term, and eight a decline in the short term.

The England Trees Action Plan 2021-2024 sets out the vision that England will have at least 12% woodland cover by mid-century, contributing to net zero greenhouse gas emissions. Lancashire's current woodland cover of approximately 5.7% highlights the investment needed in Lancashire to work towards achieving this ambition. The Lancashire Woodland Vision sets out the challenges and opportunities for regenerating the woodland in the region.

The largest woodland currently within Lancashire is Gisburn Forest in the Forest of Bowland, this is under Forestry England management and covers an area of 1,245 hectares. The forest contains mixed woodland and has established walking and mountain biking trails providing strong amenity value to surrounding Districts including Lancaster, Pendle, Preston, Ribble Valley and Wyre and is also close to the urban centres of Preston, Lancaster, Blackburn and Blackpool.

Boilton, Nab, Red Scar and Tunbrook Woods form one of the largest remaining areas of ancient, semi-natural, deciduous woodland in Lancashire. The woods run in a narrow band along a terrace above the tidal River Ribble and the valley of its tributary, the Tun Brook near the Brockholes nature reserve on the outskirts of Preston. Managed by the Wildlife Trust for Lancashire, Manchester and North Merseyside, this mixed woodland contains elm, ash and oak trees covering an area of 70 hectares.

Ash dieback (also known as Chalara), is a highly destructive disease of ash trees, especially European or Common ash, the UK's native ash species. Ash dieback in the UK is beyond the point where the spread of infection can be stopped and, as of summer 2020, the disease is known to be present in over 60% of the total UK land area, including 96% of Lancashire. Managing the impacts of ash dieback is, and will continue to be, a significant issue in Lancashire.

Since the last national scale peat mapping was completed, several largescale peatland restoration projects have been undertaken. These have largely been across Lancashire's largest areas of remaining peatland, including the upland areas of the Forest of Bowland AONB, the West Pennine Moors and the Rossendale 'Gap', as well as the lowland peatlands of the Lancashire Mosslands. However, further significant action will likely be required to reverse the effects agricultural intensification and other damaging human practices.

9.4.3 Improvement Opportunities

While the substantial increases in statutory and non-statutory protected sites provide a good foundation for nature recovery in Lancashire further efforts will not only work towards reversing the global decline in biodiversity but also help to deliver benefits for people, the climate and the economy of Lancashire. Upcoming LNRS and the underpinning funding provided by the Environmental Land Management programme could bring significant nature recovery improvements, but two of the three funding schemes will not be launched until 2024. Also the NPPF and the UK Environment Bill should drive future increases in biodiversity.

Lancashire can help drive nature recovery and biodiversity gains, and deliver co-benefits to people and the economy in several ways, including:

- 4.A: Promoting the management of catchments as one connected system of land and water and supporting existing partnerships to achieve this
- 9.A: Encouraging uptake of schemes under the Environmental Land Management programme and the Nature for Climate Fund for a landscape-scale approach to nature recovery in a way that enhances biodiversity and delivers wider environmental, social, and economic value.
- 9.B: Use planning controls to deliver biodiversity net gain that also enhances connectivity between existing nature recovery sites and natural capital assets.
- 9.C: Support woodland and forestry partnerships that can regenerate and manage woodland and forestry in multi-functional ways that bring benefits to people, the environment, and the local economy.
- 9.D: Consider sustainable tourism opportunities for key environmental assets. Build on the pioneering sustainable tourism work undertaken for the Forest of Bowland and Morecambe Bay.
- 9.E: Manage local government public assets in an exemplar way that enhances biodiversity and delivers wider sustainability outcomes.
- 9.F: Collect appropriate information to facilitate the meaningful reporting of appropriate local and national biodiversity indicators.
- 9.G: Undertake a comprehensive regional natural capital and ecosystem services study to understand the existing habitats and the potential to improve biodiversity and ecosystems services, including carbon sequestration.

9.5 Key Messages

PRESSURES: Increased pressure on biodiversity from human activity and disturbance has led to what is currently considered to be a biodiversity crisis, with biodiversity globally declining at the highest rates ever recorded. As a result, the impacts on biodiversity within the UK and Lancashire are becoming increasingly important to assess, along with the condition of protected species and habitats.

HISTORIC TRENDS: There have been increases in the number of statutory and non-statutory protected sites since 1991, and an associated increase in total area under protection. However, there isn't enough data to draw a conclusion about the condition and connectivity of the protected sites to draw or to reach a conclusion about the overall impact this is having on nature recovery and biodiversity.

Landcover for all woodland types has increased slightly from 5.4% in 1985 to 5.7% in 2018.

A decline in the extent and condition of peatland areas since the post-war period is clear, with almost 30% of Lancashire's lowland peatlands lost to agriculture and development. The loss of upland peat areas is less severe, yet they continue to face pressures from the unsustainable management practices that negatively affect their condition.

CURRENT STATUS: The substantial increases in statutory and non-statutory protected sites since 1991 has the potential for a positive impact on nature recovery and biodiversity in Lancashire. However, the designation of a site in itself does not lead to biodiversity gains and in general more recent data is required to assess the condition, connectivity and rate of change.

With current woodland cover at 5.7% significant investment will be needed in Lancashire to work towards the governments ambition of 12% woodland cover in England by 2050.

Restoration projects have the potential to reverse the decline of Lancashire's peatlands, though more recent data are required to assess the success of ongoing projects. Efforts will need to be significant if the Committee on Climate Change's recommended targets of 50% upland restored and 25% of lowland peatland restored are to be met.

OPPORTUNITIES: Local Nature Recovery Strategies and the underpinning funding from the Environmental Land Management programme could bring significant nature recovery improvements, but two of the three funding schemes will not be launched until 2024. Also the NPPF and the UK Environment Bill should drive future increases in biodiversity. There are further opportunities for Lancashire to support partnership working and develop sustainable tourism opportunities around protected areas, similar to the pioneering work for the Forest of Bowland and Morecambe Bay. Multi-functional management of key natural capital can bring benefits to people, the environment, and the local economy.

10 Transport

10.1 Overview

There are multiple drivers that are leading to increases in demand for transport, these include: economic growth, urbanisation, connectivity and future mobility. Journeys are completed for multiple reasons including commuting, accessing education and for shopping/leisure reasons. Long-term and recent changes in these patterns are driving increased transport, including commuting longer distances for work or leisure, and increased delivery vehicles associated with home delivery of internet purchases. At the same time, there are policy drivers incentivising the use of vehicles that have low or zero emissions, mainly from electric vehicles but also UK Government trials of alternative modes of transport such as electric scooters.

Transport can have negative environmental impacts on air quality, climate change, noise, and can also impact upon health and wellbeing. The transport sector is a major user of energy and contributes to global warming through carbon emissions. Increased private car use coupled with a decrease in bus use and the shift of freight from rail to road have added pressure to road networks causing rises in congestion and greater air pollution. Health issues are of particular concern to vulnerable groups such as the elderly, young children and people with pre-existing respiratory conditions. The rising UK population is also adding pressure to the transport network, especially within urban areas, on already heavily congested main arterial routes which have not always been upgraded to meet additional demands. Demand for rail services is also growing, both from passengers and for freight, and peak hour crowding on passenger services was common pre COVID-19. The long-term impact of COVID-19 on the use of public transport is not clear but there are initial signs that it is resulting in increased use of private cars over public transport.

10.2 Indicators and Data Analysis

Key indicators for transport are:

- The number of vehicles owned;
- The modal split of commuting journeys; and
- The number of journeys completed by public transport.

Transport information is available from a number of sources including the Department for Transport who maintains records on vehicle ownership and the numbers of journeys completed via public transport. Census information has also provided information on commuting habits since 1981.

Transport data is presented in Figures 10.2.1 and 10.2.2 and Table 10.2.1 below along with a discussion on the trends in the data in Section 10.3.

Transport Type	1981 Census	1991 Census	2011 Census
Public Transport	16%	8%	7%
Car/Van (driver/passenger)	55%	68%	69%
Walking/Cycling	21%	16%	13%
Not specified/Other	8%	7%	11%

Table 10.2.1 - Modal Split of Commuting in Lancashire (Data source: Office for National Statistics)

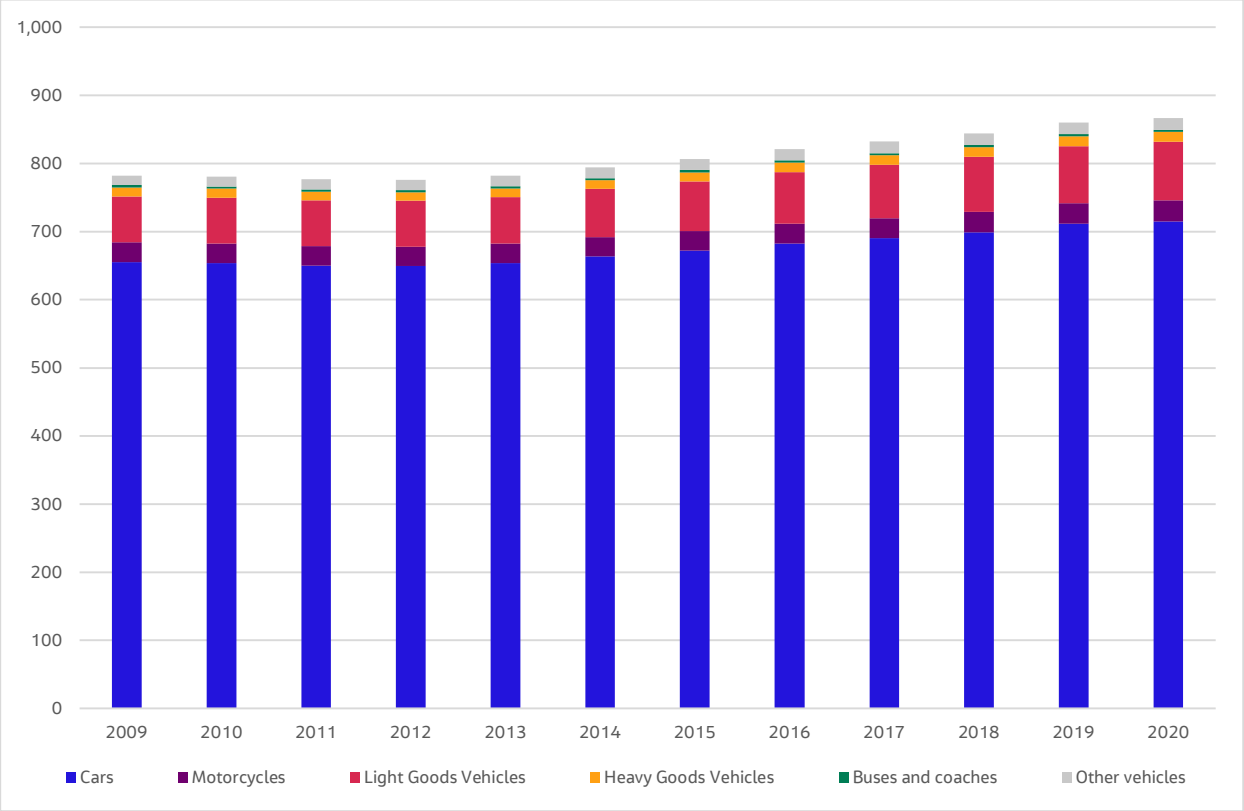

Figure 10.2.1 - Total Vehicle Ownership (Thousands), Lancashire 12, 2009-2020 (Data source: Department for Transport)

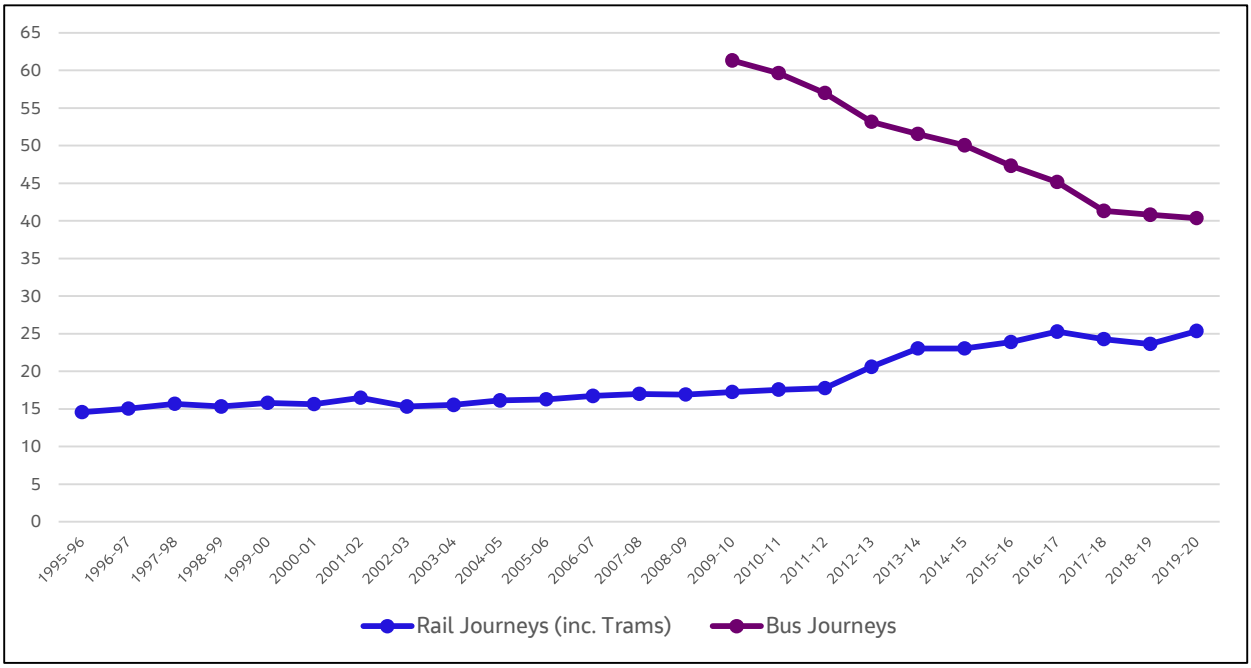

Figure 10.2.2 - Public Transport Journeys (millions), Bus and Rail/Tram, in Lancashire (Data source: Department for Transport)

10.3 Historic Trends

10.3.1 Numbers of Vehicles Owned

Ownership of all types of vehicles in Lancashire has increased by 11% between 2009 and 2020, (Figure 10.2.1) and continuing an increasing trend from the 1970s onwards. The most numerous type of vehicle ownership is that of cars, which accounts for 82% of vehicle ownership; this has grown from 495,000 cars in 1988. Cars are followed by 'light good vehicles' (LGVs), and motorbikes, although there has been a growth in ownership across most categories, the proportion of each type of vehicle has remained relatively consistent. The exception to this is the growth in ownership of LGVs which has increased by 30%, and the decrease in ownership of 'buses and coaches' which has fallen by 23%. The increase in LGVs, classified as vehicles with a gross vehicle weight of no more than 3.5 tonnes which includes most pick-up trucks, delivery vans, vans (such as those operated by skilled tradespersons) and some larger vehicles, was particularly acute from 2014 onwards. This may be explained by economic growth and demand for building services, or the growing impact of retail shopping on the internet.

10.3.2 Modal Split of Commuting Journeys

Public transport (bus, rail and light rail) continues to be a less significant mode of transport in Lancashire, comprising 7% of journeys to work, similar to the 1991 data but a large decrease on 1981 when 16% of people in Lancashire commuted via public transport; these public transport journeys are mainly by buses (Table 10.2.1). The predominant mode of transport for commuting to work has increased further since 1981 when 55% of commuters travelled by car or van. This trend for predominant use of the private motor vehicle is likely to continue, despite increasing levels of congestion although further increases may not be sustained due to working from home.

10.3.3 Number of Journeys Completed by Public Transport

Figure 10.2.2 shows the number of bus and train/tram journeys completed within Lancashire. This shows that, train/tram journeys have increased but bus journeys are decreasing. The number of train journeys has increased by 36.4% since 2009/2010 and by 112.9% since 1995/1996. Some of this growth may be associated with the opening of new railway stations on busy commuter lines servicing urban areas outside of Lancashire, while other growth may be associated with population growth, accessing jobs and leisure services.

Although they are still the most used form of public transport in Lancashire, bus journeys have decreased 33.3% since 2009/2010 and now account for only 6% of commuting journeys completed. This downward trend is following a similar trend to that seen within the north west region and across England. The final major public transport system is light rail system, for which the Blackpool Tramway network is the only system in Lancashire. The Blackpool Tramway network has seen journeys decrease by 17% since 1990/91, although reopened in 2012 after a major upgrade and extension Project which led to a large increase in passenger numbers.

As a result of the COVID-19 pandemic it can be expected that use of public transport will have decreased significantly since March 2020. Use of public transport may be reduced for the coming years if social distancing requirements remain in place, if members of staff continue to work away from their normal workplace locations and if the number of people in employment is reduced. With continued rise in online shopping, it can be expected that growth in light good vehicles ownership will continue to rise as more shopping is completed online.

10.4 Environmental Concerns and Improvement Opportunities

10.4.1 Policies, Strategies and Plans Already in Place

The National Planning Policy Framework, promotes sustainable transport and includes identifying and pursuing opportunities to promote walking, cycling and public transport use. The Government's commitment to achieving net zero emissions means that there will need to be large-scale decarbonisation of all forms of transportation. As

vans by 2040 while promoting the uptake of cleaner vehicles. The Department for Transport is expected to release its transport decarbonisation plan in mid-2021. At the time of writing the Transport for the North Decarbonisation Strategy was also under consultation.

There have been a number of different projects within Lancashire to encourage more sustainable forms of transport which includes:

- Lancashire County Council are working in partnership with bpPULSE to increase the number of on-street charging points and the enforcement of electric vehicle only parking bays. 150 additional on-street charging points have been installed in 2018 and 2019.
- Introducing Park and Ride facilities near M6 J34 at Lancaster including electric vehicle charging points. This reduces traffic travelling into the congested urban areas.
- Business travel plans are a requirement for planning applications that are likely to generated significant travel impacts. Very large developments may be required to make Section 106 contributions towards the costs of travel planning.
- Introducing 20 mile per hour speed limits in areas to help improve road safety and accessibility for all modes of transport, especially pedestrians and cyclists.

10.4.2 Current Status

In 2018 there were over 868,00 vehicles registered within Lancashire including over 714,000 cars, 86,000 LGVs and 31,000 motorcycles. Information also shows that the predominant mode of transport for commuting to work is the private motor vehicle as either a driver or passenger at 69% of commuting journeys. Public transport is only used for 7% of journeys and this may have declined further due to the COVID-19 pandemic.

Over 65 million journeys were complete by public transport in 2019/2020 and bus travel was the most frequently used form of public transport with over 40 million journeys. Railway journeys were 25 million of which, 4.8 million journeys were complete on the Blackpool Tramway network in 2019/2020

10.4.3 Improvement Opportunities

As transport accounts for 30% of energy use and is associated with 35% of carbon emissions in Lancashire measures need to be implemented in order to decarbonise transport. However, a shift to Low Emissions Vehicles will not in itself solve wider congestion and health and wellbeing issues, therefore, continued effort is required to facilitate the shift to more sustainable modes of transport and especially so for shorter, urban journeys.

Low Emissions Vehicles are undoubtably part of the transport solution and this could include enforcement of Low Emission Zones in order to reduce the impacts on human health of more polluting vehicles, and congestion charging in busy areas to reduce congestion and encourage modal shifts towards more sustainable forms of active travel and public transport.

Lowering speed limits can make roads more accessible and safer, encouraging use by pedestrians and cyclists, as well as reducing noise. Additional park and ride services could also be provided as a way of reducing transport impacts on urban or tourist areas and provide opportunities to change land use from city centre car parking space to land uses that maximise environmental, social and economic value. All these opportunities must be factored into Lancashire Transport Plans and Public Realm Masterplans that are being prepared and steering wider spatial development within the County.

Use of public transport, in particular buses, may continue to decrease in the longer term if there are reduced numbers of attractive bus services provided and the cost of fares increases. This may disproportionately affect rural populations and households that do not own a private vehicle, and who are more likely to use non-statutory and concessionary services (Transport Related Social Exclusion). Local Government Association research into the future of public transport in England has highlighted a number barriers that prevent delivery of sustainable and attractive local bus services. This research concluded that a variety of measures are needed, including: demand responsive transport, providing mobility as a service through integration of transport modes,

payment and ticketing, designing high quality interchange facilities as the hub of local services and being responsive to new patterns of travel, such as those experienced because of COVID-19.

Where it is not possible to change the mode of transport used, cleaner alternatives exist and there are opportunities to provide an electric charging infrastructure in Lancashire that encourages the shift from internal combustion engines to electrically powered vehicles. Electric vehicle charging points will need to be installed widely to facilitate this. Local authority public car parks and other public sector developments (e.g. hospitals, police Stations) and private developments (e.g. supermarkets, retail, leisure destinations) should all be required to provide a minimum number of charging spaces amongst the car parking provision associated with the development. While this may not contribute towards reducing issues of congestion, decreased tail-pipe emissions will contribute towards local air quality improvements and the health of residents.

Lancashire can contribute towards reducing environmental impacts of transport and travel by:

- 10.A: Examining the relationship between Transport Related Social Exclusion (TRSE) and transport decarbonisation to avoid worsening existing TRSE issues and to maximise the opportunities to reduce TRSE.
- 10.B: Promoting the uptake of electric and alternative fuels for road vehicles including installation of new charging/refuelling infrastructure at local government public assets and parking facilities.
- 10.C: Introducing intelligent transport systems that maximise the efficiency of the transport network and also give real time information on traffic delays and journey times, car parking availability, and bus arrival times; together, these allow people to make better informed travel choices and also reduce traffic emissions
- 10.D: Incorporating active travel and public transport infrastructure into planning considerations for new developments. Make active travel a key consideration in spatial planning decisions.
- 10.E: Be involved in pan-northern hydrogen transport refuelling studies to identify strategic locations for investment within Lancashire.

10.5 Key Messages

PRESSURES: The increased use of transport systems are having negative impacts on the environment, and human health caused by tail-pipe emissions of greenhouse gases and nitrogen oxides, congestion, noise and emissions of particulates. Demand for transport is growing but transport systems require decarbonisation to meet long term net zero ambitions.

HISTORIC TRENDS: The longer-term trend is that of increasing travel associated with increased private vehicle ownership and greater commuting by car/van. Although use of public transport is decreasing, particularly for buses, there has been recent growth in train travel. Active travel methods such as walking and cycling continue to be a minor mode of transport in Lancashire.

CURRENT STATUS: Vehicle ownership was over 868,000 in 2020 across all categories with cars accounting for 82% and their use accounting for 69% of journeys completed for work commuting. Over 65 million journeys were complete by public transport in 2019/2020 but public transport is only used for 7% of journeys.

OPPORTUNITIES: There are opportunities to reduce travel impacts by moving to more sustainable forms of transport. To achieve this, walking and cycling will need to be made more accessible and public transport services will need to be made more attractive. Where motor vehicle journeys are still required, infrastructure changes will be needed to encourage the switch to low emission vehicles and the uptake of low emissions vehicles will need to be accelerated.

11 Appendices

A.1 Environmental Improvement Opportunities

In many cases opportunities for creating environmental value will also enable economic value creation. Therefore, to inform the wider development of the Greater Lancashire Plan (GLP), the Environmental Improvement Opportunities have been mapped against the set of environmental sustainability principles. Overall, the Environmental Improvement Opportunities have been identified as making a positive contribution to at least one of the following:

- **Net environmental gain** which recognises the role of development in securing long term environmental sustainability, in line with the Government's 25-year environmental plan, and which can be embedded in all the emerging development and spatial policies in the Lancashire area.
- Proposals for **investment in Lancashire's natural capital and assets** to support public health, workforce productivity, better amenities, and environmental resilience.
- **Environmental standards in design** to promote an internationally competitive and distinctive manufacturing-based economy including the deployment of new energy technologies.
- **Aligning targets for carbon neutrality to transport strategies** designed to facilitate total mobility, overcoming weaknesses in Lancashire's economic geography, improve access to employment, and productivity.
- Improving the **resilience of the built environment to the impacts of climate change.**
- Radical resource efficiencies, **exploiting the availability of new technologies,** which will enable a system wide approach to **waste elimination, carbon** reduction and productivity (including food processes and the supply chain).
- **Celebrating heritage** as part of the effective management and enhancement of the ecological and cultural network – creating pride in place and ownership of environmental goals in all aspects of Lancashire as place.
- Exploiting new **environmental and energy technologies** to create new opportunities for both rural and urban renewal, businesses, and people.

Environmental Theme	Ref.	Environmental Improvement Opportunity	Net Environmental Gain	Investment in Lancashire's Natural Capital and Assets	Environmental Standards in Design	Aligning Targets for Carbon Neutrality to Transport Strategies	Resilience of the Built Environment to the Impacts of Climate Change	Exploiting the Availability of New Technologies	Celebrating Heritage	Environmental and Energy Technologies
Air Quality	3.A	Promoting active travel and sustainable transport to residents and businesses and putting in the necessary infrastructure to support the transition.	✓	✓		✓				
	3.B	Promoting uptake of electric and alternative fuels for road vehicles including installation of new charging/refuelling infrastructure.		✓	✓	✓		✓		✓
	3.C	Introducing intelligent transport systems that maximise the efficiency of the transport network.		✓	✓	✓				✓
	3.D	Introducing Clean Air Zones for conurbations with multiple AQMAs or requiring area wide solutions.	✓	✓		✓				
	3.E	In addition to vehicular emissions reduction measures, trees can be effective in reducing	✓	✓		✓	✓		✓	

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		pollutant concentrations with careful species selection.								
Water Quality	4.A	Promoting the management of catchments as one connected system of land and water and supporting existing partnerships to achieve this.	✓	✓	✓		✓	✓	✓	✓
	4.B	Encouraging uptake of schemes under the Environmental Land Management programme to manage land in a way that improves water quality and enhances biodiversity, such as buffer strips between water bodies and livestock, and read beds for natural filtration.	✓	✓			✓		✓	✓
	4.C	Using planning controls to incorporating blue green infrastructure into the urban	✓	✓			✓			✓

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		environment, which also delivers wider environmental and social value.								
	4.D	Aiming to gain the Blue Flag award at a greater number of beaches within Lancashire. Currently only Blackpool South has been awarded the Blue Flag.							✓	
Waste	5.A	Promoting waste reduction and waste awareness campaigns that raises awareness about waste segregation and promotes recycling in order to reduce the amount of residual wastes that cannot be reused, recycled, composted and sent for anaerobic digestion.	✓					✓		
	5.B	Provision of a consistent and easy to use recycling collection service to all residents, with flexibility to add additional priority materials as required by local or national factors.	✓		✓			✓		

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	5.C	Investment in streetscape and beachscape furniture that facilitates smarter recycling and minimises the impacts of littering while improving the operational efficiencies of authority services and social value of leisure and tourism destinations.	✓				✓	✓		
Noise	6.A	Promoting a model shift from car use to active travel and low noise public transport, and putting in the necessary infrastructure to support the transition.	✓	✓		✓				
	6.B	Promoting schemes that encourages operators of HGVs, buses, coaches, vans and taxis to run fleets efficiently and with low noise emissions.			✓	✓		✓		
	6.C	Working through the relevant highway authority to install low noise surfaces and other noise mitigation.		✓	✓		✓	✓		✓

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	6.D	Incorporating noise improvements (insulation) into planning considerations for new developments and refurbishments.		✓	✓			✓		✓
Energy	7.A	Continue to demonstrate leadership in areas of energy management, energy efficiency and renewable generation. Building on the climate emergency declarations, local authorities can commit to reduced energy consumption and installing resilient net-zero ready energy infrastructure for their own facilities and transport assets.		✓			✓	✓		✓
	7.B	Collaborate with other public sector and private sector organisations to help stimulate the deployment of pilot energy projects which bring environmental and social benefits to the region.		✓			✓	✓		✓
	7C	Incorporating energy efficiency and generation measures into planning considerations for new developments and refurbishments. Continuing to					✓	✓		✓

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		provide support to residents to reduce impacts of fuel poverty.								
Climate Change (Carbon)	8.A	With a large housing stock, there is the opportunity to deliver a large-scale change to low-carbon heat sources for council and social housing by collaboration with social housing providers.	✓	✓			✓	✓		✓
	8.B	Prioritising and promoting the uptake of electric and alternative fuels for local authority fleets and installation of new charging/refuelling infrastructure to facilitate public and private use of low emission vehicles (same as 10.B).	✓		✓	✓		✓		✓

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	8.C	Continue to demonstrate leadership in areas of energy management, energy efficiency and renewable generation. Building on the climate emergency declarations, local authorities can commit to reduced energy consumption and installing resilient net-zero ready energy infrastructure for their own facilities and transport assets (same 7.A)	✓		✓		✓	✓		✓
	8.D	Incorporating active travel and public transport infrastructure into planning considerations for new developments. Make active travel a key consideration in spatial planning decisions (same as 10.D).	✓			✓				
	8.E	Encouraging uptake of schemes under the Environmental Land Management programme and the Nature for Climate Fund to manage land in a way that enhances biodiversity and delivers carbon sequestration benefits (same as 9.A).	✓	✓					✓	

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Nature Recovery	9.A	Encouraging uptake of schemes under the Environmental Land Management programme and the Nature for Climate Fund for a landscape-scale approach to nature recovery in a way that enhances biodiversity and delivers wider environmental, social, and economic value.	✓	✓			✓		✓	
	9.B	Use planning controls to deliver biodiversity net gain that also enhances connectivity between existing nature recovery sites and natural capital assets.	✓	✓			✓			
	9.C	Encourage woodland and forestry partnerships that can regenerate and manage woodland and forestry in multi-functional ways that bring benefits to people, the environment, and the local economy.	✓	✓					✓	✓

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	9.D	Consider sustainable tourism opportunities for key environmental assets. Build on the pioneering sustainable tourism work undertaken for the Forest of Bowland.	✓	✓					✓	
	9.E	Manage local government public assets in an exemplar way that enhances biodiversity and delivers wider sustainability outcomes.	✓	✓			✓			
	9.F	Collect appropriate information to facilitate the meaningful reporting of appropriate local and national biodiversity indicators.	✓	✓						
	9.G	Undertake a comprehensive regional natural capital and ecosystem services study to understand the existing habitats and the potential to improve biodiversity and ecosystems services, including carbon sequestration.	✓	✓						

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Transport	10.A	Examining the relationship between Transport Related Social Exclusion (TRSE) and transport decarbonisation to avoid worsening existing TRSE issues and to maximise the opportunities to reduce TRSE.	✓			✓			✓	
	10.B	Promoting the uptake of electric and alternative fuels for road vehicles including installation of new charging/refuelling infrastructure at local government public assets and parking facilities.				✓		✓		✓
	10.C	Introducing intelligent transport systems that maximise the efficiency of the transport network and also give real time information on traffic delays and journey times, car parking availability, and bus arrival times; together, these allow people to make better informed travel choices and also reduce traffic emissions.				✓		✓		✓
	10.D	Incorporating active travel and public transport infrastructure into planning considerations for new				✓		✓		✓

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		developments. Make active travel a key consideration in spatial planning decisions.								
	10.E	Be involved in pan-northern hydrogen transport refuelling studies to identify strategic locations for investment within Lancashire.				✓		✓		✓

A.2 Air Quality Management Areas in Preston

A.3 Total Noise Complaints by Local Authority

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Blackpool with Darwen	607	642	570	515	500	505	484	548	533	589
Blackpool	1370	116	699	671	675	581	641	616	944	1382
Burnley	n/a	n/a	n/a	n/a	235	289	217	310	60	216
Chorley	n/a	398	473	489	421	394	376	417	413	461
Fylde	333	469	439	462	458	413	356	456	403	399
Hyndburn	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Lancaster	n/a	n/a	n/a	12	528	645	596	627	586	67
Pendle	n/a	n/a	n/a	n/a	n/a	n/a	371	404	341	380
Preston	n/a	n/a	n/a	1,039	1,065	982	981	906	856	1,105
Ribble Valley	n/a	241	216	261	212	229	165	120	n/a	124
Rossendale	n/a	n/a	n/a	297	277	234	248	307	302	392
South Ribble	422	419	503	423	370	369	312	322	304	385
West Lancashire	599	704	655	616	582	530	570	605	590	778
Wyre	327	306	308	247	226	236	212	268	268	339
TOTAL	**3,658**	**4,295**	**3,863**	**5,032**	**5,549**	**5,407**	**5,529**	**5,906**	**5,600**	**7,157**

n/a = data not available

A.4 Noise Important Areas within Lancashire

A.5 Statutory Protected Sites within Lancashire

A.6 Areas of Woodland and Forestry within Lancashire

A.7 Areas of Peatland within Lancashire

Lancashire

Independent Economic Review

The Lancashire Independent Economic Review (IER) is led and funded by Lancashire County Council, Blackburn with Darwen Borough Council, Blackpool Council and the Lancashire Enterprise Partnership on behalf of Lancashire Leaders. Lancashire Leaders comprises the leaders of Blackburn with Darwen Borough Council, Blackpool Council, Burnley Borough Council, Chorley Borough Council, Fylde Borough Council, Hyndburn Borough Council, Lancashire County Council, Lancaster City Council, Pendle Borough Council, Preston City Council, Ribble Valley Borough Council, Rossendale Borough Council, South Ribble Borough Council, West Lancashire Borough Council, Wyre Borough Council and the Lancashire Enterprise Partnership.

Designed by Freshfield