



Scotland 2045

Scotland's Fourth National
Planning Framework: Draft

**Integrated Impact Assessment
Environmental Report**

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Abbreviations

AQMA	Air Quality Management Area
CCUS	Carbon Capture Utilisation and Storage
CLRTAP	Convention on Long-Range Transboundary Air Pollution of 1979
CSGN	Central Scotland Green Network
EEC	European Economic Community
EC	European Commission
EIA	Environmental Impact Assessment
EfW	Energy from Waste
GDP	Gross Domestic Product
GHG	Greenhouse gas
HEPS	Historic Environment Policy for Scotland
HES	Historic Environment Scotland
HRA	Habitats Regulations Appraisal
IIA	Integrated Impact Assessment
LAQM	Local Air Quality Management
LNG	Liquefied Natural Gas
LULUCF	Land Use, Land-Use Change, and Forestry
MPA	Marine Protected Area
MtCO ₂ e	Million tonnes of carbon dioxide equivalent
NPF4	National Planning Framework 4
NSA	National Scenic Area
NTS	Non Technical Summary
PHS	Public Health Scotland
PM _{2.5} /PM ₁₀	Particulate matter 2.5/10 micrometres
RBMP	River Basin Management Plan

RTPI	Royal Town Planning Institute
SAC	Special Area of Conservation
SEA	Strategic Environmental Assessment
SEPA	Scottish Environment Protection Agency
SIMD	Scottish Index of Multiple Deprivation
SPP	Scottish Planning Policy
NatureScot	Scotland's Nature Agency (formerly Scottish Natural Heritage)
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
STPR	Strategic Transport Projects Review
SUDS	Sustainable Urban Drainage System
UNECE	United Nations Economic Commission for Europe

Non-Technical Summary

Introduction

The Scottish Government is reviewing its National Planning Framework (NPF), a long term plan for Scotland 2045.

The current National Planning Framework (NPF3) was published in 2014 and will remain in place until a fourth NPF (NPF4) is adopted by the Scottish Ministers. The NPF4 spatial strategy will set out where the Scottish Government wants to see development located in the future, and will explore how each part of Scotland can play to its strengths to contribute to a shared national vision. It will also include national planning policies to guide local development plans and decisions on planning applications across Scotland. Finally, NPF4 will also designate certain developments or types of development as ‘national developments,’ for which the Scottish Ministers have established a need in principle.

NPF4 will work with the Scottish Government’s wider programmes and strategies, including on infrastructure and economic investment, and will contribute to the following high level outcomes:

- Meeting the housing needs of people living in Scotland including, in particular, the housing needs for older people and disabled people;
- Improving the health and well-being of people living in Scotland;
- Increasing the population of rural areas of Scotland;
- Improving equality and eliminating discrimination;
- Meeting any targets relating to the reduction of emissions of greenhouse gases; and
- Securing positive effects for biodiversity.

What is Strategic Environmental Assessment (SEA) and how was the SEA undertaken?

Strategic Environmental Assessment (SEA) assesses the likely significant environmental effects of a public plan, programme, or strategy. It considers how negative impacts can be avoided or minimised and, where appropriate, identifies opportunities for positive effects to be enhanced. This Environmental Report sets out the findings of the SEA of the draft NPF4 and has been prepared in accordance with the Environmental Assessment (Scotland) Act 2005 (‘the 2005 Act’). The Environmental Report is in turn supported by:

- Habitats Regulations Appraisal – Updated Baseline Information Report;
- Habitats Regulations Appraisal of National Planning Framework 4 – Initial HRA Screening Record; and
- Lifecycle Greenhouse Gas Emissions of NPF4 Proposed National Developments Assessment Findings.

We have also assessed the likely health effects of proposed national developments as part of the SEA process.

The SEA is itself one of a range of Impact Assessments which have informed the draft NPF4. Views are invited on both the draft NPF4 and on the Integrated Impact Assessment Reports, including the Environmental Report.

What is the current state of the environment?

Scotland's environment is rich in natural and cultural heritage. Our network of European protected sites supports many important and rare plants, birds and animals; however, global declines in biodiversity are mirrored in Scotland. Scotland's air, soil and water are generally in good condition, but there are concentrations of pollution in some parts of the country. Some of this is historic, but there are also on-going challenges, including diffuse pollution from urban and rural areas.

Scotland has high quality landscapes, with many iconic views and scenic areas supporting quality of life, recreation and tourism. The historic environment includes World Heritage Sites, listed buildings, conservation areas, gardens and designed landscapes and archaeology, including scheduled monuments. Many archaeological resources remain undiscovered. Scotland also has many natural resources and material assets, including high quality agricultural land, and extensive areas of forestry and woodland.

Global climate change is predicted to lead to more extreme weather events, increasing water temperature and acidity, a rise in sea levels, and changes to coastlines; all of which have the potential to affect other aspects of the environment.

Scotland's population is estimated to be just under five and a half million. Scotland has the lowest life expectancy in Western Europe, and the overall population density in the country is among the lowest in Europe. Scotland's overall population is increasing, however there is significant variation in how people are distributed, with more densely populated areas in the Central Belt and decreasing population mainly in the rural and island areas, particularly in the west of the country.

Approximately 19% of Scotland's population live in relative poverty after housing costs, and poverty and income inequality rates are rising. The Scottish Index of Multiple Deprivation is the Scottish Government's official tool to identify areas of multiple deprivation in Scotland, with the most deprived areas located predominantly in cities and towns.

A high quality environment with good air, soil and water quality is an important contributor to health and well-being. Human health is also dependent on factors including access to health facilities and education, employment, and access to outdoor recreation facilities. Physical assets, such as transport, water, power, waste and digital communications also play an essential part in building a sense of place.

What are the likely significant environmental effects of the NPF4?

Biodiversity, flora and fauna

The draft NPF4 would establish climate change and nature recovery as primary guiding principles for all plans and decisions. The emphasis on protecting and enhancing biodiversity is expected to lead to significant long term cumulative positive effects on biodiversity, flora and fauna, including through new universal policies on enhancing biodiversity.

Climatic factors

Collectively, the draft policies and proposals set out in the draft NPF4 are expected to have significant long term positive effects on climatic factors, contributing to reduced greenhouse gas (GHG) emissions, and helping facilitate a transition to net zero. As they embed actions to increase community and infrastructure resilience to extreme weather events, the policies and proposals can also support adaptation to climate change.

The lifecycle GHG assessment of the proposed national developments found that overall, the greatest reductions are likely to be in terms of electricity and, to a lesser extent, transport. While the industrial, manufacture and construction processes sector is likely to experience the largest increase in direct emissions, this will enable direct and indirect emission reductions across other sectors.

Air

Draft policies and proposals which reduce emissions overall are likely to have cumulative positive effects on air quality. In addition to effects on ecosystems, air pollution affects health, and this can impact on more vulnerable people, making air quality an important health inequalities issue. Measures to improve air quality can therefore have cumulative secondary benefits for biodiversity and population and human health. This could be particularly beneficial in areas where air quality issues currently arise.

Negative impacts on noise and air quality, including dust and odour, may arise during construction of the national developments. These will be temporary and local in nature, and will be managed at the stage when specific projects are brought forward for consent.

Water

The overall focus on climate change and climate change adaptation will have cumulative positive effects on water through increased focus on flood risk, water shortages and coastal erosion. Secondary benefits to biodiversity may arise where nature based solutions to flood risk management are implemented. Policies and proposals may also improve water supply and waste-water systems.

Proposals for waterfront developments and new development at ports and harbours may negatively impact water during construction and operational phases, and will require managed at the stage when specific projects are brought forward for consent.

Soil

Several aspects of the draft NPF4 are likely to have positive cumulative benefits for soils. For example, draft policies seek to protect peat and carbon-rich soils. Proposals relating to woodland expansion and green infrastructure can help improve soil stability and drainage, and can help to improve the quality of places. Positive cumulative effects on soils are also expected from the emphasis on the reuse of derelict and vacant land, with secondary positive impacts on water quality.

There is potential for negative effects on soils arising from some of the proposed national developments, which will need to be managed in plans and at the stage when specific projects are brought forward for consent.

Cultural heritage and Historic Environment

Significant positive cumulative effects on cultural heritage are expected, given the emphasis within the draft NPF4 on protecting and enhancing locally, regionally, nationally and internationally valued historic assets and places. Draft policies and proposals relating to woodland expansion and green infrastructure may act to improve the setting of historic assets. The emphasis within draft NPF4 on reusing vacant buildings may help to bring buildings at risk back into use.

There is potential for negative effects arising, including from some of national development proposals, which will need to be managed in plans and at the stage when specific projects are brought forward for consent.

Landscape and Geodiversity

There is potential for some of the proposed national developments and draft policies to result in negative effects on landscapes and careful consideration will be required at plan and project consenting stages.

Initiatives such as the Central Scotland Green Network and national walking and cycling routes provide opportunities to protect and enhance townscapes and landscapes and to increase experience and enjoyment of these. Draft policies which lead to increased woodland and forestry have potential to improve landscape character, depending on the scale and nature of change. Furthermore, support for peatland protection and restoration could also benefit some iconic and culturally significant landscapes.

Material Assets

The focus on an infrastructure first approach within the draft NPF4 can ensure that places function effectively and development improves, rather than detracts from quality of life. Promoting greater coordination of infrastructure works and planning, at both the regional and local scales, can minimise the potential for negative indirect and cumulative effects, for example through reduced disturbance during construction stages, and through reduced fragmentation of green infrastructure and nature networks.

An increase in development, for example housing or renewable energy, could lead to increased pressures on existing land uses, through increased competition between land uses and with other forms of development. However, the potential for such conflicts would remain key considerations in the planning system, particularly through development plans where key decisions on sites and delivery are made. The potential for environmental impacts will continue to be considered through SEA and HRA of development plans, as well as through the development management process at individual project level.

Population and Human Health

The draft policies and proposals have potential to give rise to significant benefits for population and human health.

Health and wellbeing benefits may arise where policies and certain proposed national developments lead to more people walking, wheeling and cycling. Increased physical activity, improved access to the outdoors, education, facilities and services, and quality local green spaces, are also likely to have long term significant positive effects on physical and mental health. Positive impacts could also arise from improved sense of place, including benefits for communities. These can be maximised where a focus is given to areas currently experiencing levels of disadvantage.

What reasonable alternatives have been considered?

The 2005 Act requires that the Scottish Government also identify, describe and evaluate the likely significant effects on the environment of any reasonable alternatives to the draft Plan, taking into account its objectives and geographical scope.

The assessment considers the effects of the draft national planning policies, and where relevant any 'reasonable alternatives' to them. No reasonable alternatives have been identified to the spatial strategy, however alternative proposals for national developments have been assessed. This approach means that consultees can consider the impact of the proposed policies and proposals, and the reasonable alternatives to them, when responding to the consultation

Views are invited on the assessment of alternatives through the consultation process.

How can these environmental effects be effectively managed, mitigated or enhanced?

Many of the potential effects arising from the draft NPF4 will be addressed as they are interpreted and applied through the planning system, and national level SEA can be viewed as the first stage in the environmental assessment process.

Potential positive effects arising from the draft NPF4 could be enhanced, and negative effects avoided or reduced, as the policies and proposals are applied through the planning system.

In general terms, development has the potential for largely localised adverse environmental effects on each of the SEA topic areas. Effects are likely to be influenced by the scale and nature of development, and the sensitivity of the receiving environment. The draft planning policies seek to mitigate such effects through the application of detailed criteria to be applied at planning application stage.

A range of mitigation is also identified for the individual proposed national developments and spatial strategy.

What monitoring is proposed?

The Scottish Government has committed to working with a range of stakeholders to develop an appropriate monitoring programme for NPF4 that allows us to assess progress and take action where required. Monitoring will be required at both a national and local level and will be proportionate and effective.

An agreed monitoring programme will complement, and potentially combine, wider planning performance work including Planning Performance Frameworks and Royal Town Planning Institute work on monitoring outcomes, as well as reflecting national outcomes set out in the National Performance Framework.

Next Steps

The consultation on draft NPF4 closes on 31 March 2022. Following the consultation and the end of the Parliamentary scrutiny process, we will analyse the responses and produce a final NPF4. The final adoption date will depend on the approval of NPF4 by the Scottish Parliament, but we are currently aiming to lay a finalised version for approval by summer 2022.

Following the consultation, a Post-Adoption Statement will be prepared. The Statement will reflect on the views provided on the findings of the assessment and the proposals in the draft NPF4, and will explain how the comments received were taken into account.

How to comment

Details on how to comment can be found on the Scottish Government's Consultation Hub, Citizen Space at www.consult.gov.scot. You can also request a hard copy of this report and consultation documents at scotplan@gov.scot

If you are unable to respond using our consultation hub, please complete the Respondent Information Form and return it, together with your response to scotplan@gov.scot or by mail to:

National Planning Framework Team
Planning and Architecture Division
Area 2F South
Victoria Quay
Edinburgh
EH6 6QQ

Consultees may wish to consider the following questions:

Q 1: What are your views on the accuracy and scope of the environmental baseline set out in the environmental report?

Q 2: What are your views on the predicted environmental effects of the draft NPF4 as set out in the environmental report? Please give details of any additional relevant sources.

Q 3: What are your views on the potential health effects of the proposed national developments as set out in the environmental report?

Q 4: What are your views on the assessment of alternatives as set out in the environmental report?

Q 5: What are your views on the proposals for mitigation, enhancement and monitoring of the environmental effects set out in the environmental report?

1.0 Introduction

1.1 Introduction

1.1.1 The Scottish Government is reviewing its National Planning Framework (NPF), a long term plan for Scotland to 2045. As part of the preparation of the NPF4, the Scottish Government is undertaking a Strategic Environmental Assessment (SEA). This Environmental Report details the SEA process and presents the findings from the assessment.

1.2 Purpose of this Report

1.2.1 The purpose of this Environmental Report is to:

- Provide information on the draft NPF4;
- Identify, describe and evaluate the likely significant effects of the draft NPF4 and the reasonable alternatives; and
- Provide an opportunity for the Consultation Authorities and the public to offer views on any aspect of this Environmental Report.

1.3 The National Planning Framework 4: Context and Overview

1.3.1 The current National Planning Framework (NPF3) was published in 2014 and will remain in place until a fourth NPF (NPF4) is adopted by Scottish Ministers. The NPF4 spatial strategy will set out where the Scottish Government wants to see development located in the future, and will explore how each part of Scotland can play to its strengths to contribute to a shared national vision. It will also include national planning policies to guide local development plans and decisions on planning applications across Scotland. Finally, NPF4 will also designate certain developments or classes of development as 'national developments', for which the Scottish Ministers have established a need in principle.

1.3.2 NPF4 will align with the Scottish Government's wider programmes and strategies, including on infrastructure and economic investment, and will address 6 statutory outcomes set out in the Planning (Scotland) Act 2019. See Figure 1.1 below.



Figure 1.1 NPF4 Outcomes

1.4 The Relationship of NPF4 with Other Plans, Programmes and Strategies

- 1.4.1 NPF4 will have the status of the development plan for planning purposes. This means that its policies should inform day to day decision making in the planning system. It will also guide local development plans and will be relevant to regional spatial strategies and important for communities as they develop their Local Place Plans. The draft NPF4 takes into account indicative regional spatial strategies prepared by local authorities ahead of new provisions in the Planning (Scotland) Act 2019 on regional spatial strategies coming into effect.
- 1.4.2 Additionally, a wide range of existing and established objectives for planning and environmental protection are set out in relevant legislation, plans, programmes and strategies at the international, UK and Scottish levels. Further information is set out in section 3 of this report and in Appendix B.
- 1.4.3 In preparing the revised NPF, the Planning (Scotland) Act 2019 requires the Scottish Ministers to have regard to relevant policies and strategies, including specifically those set out in Figure 1.2.

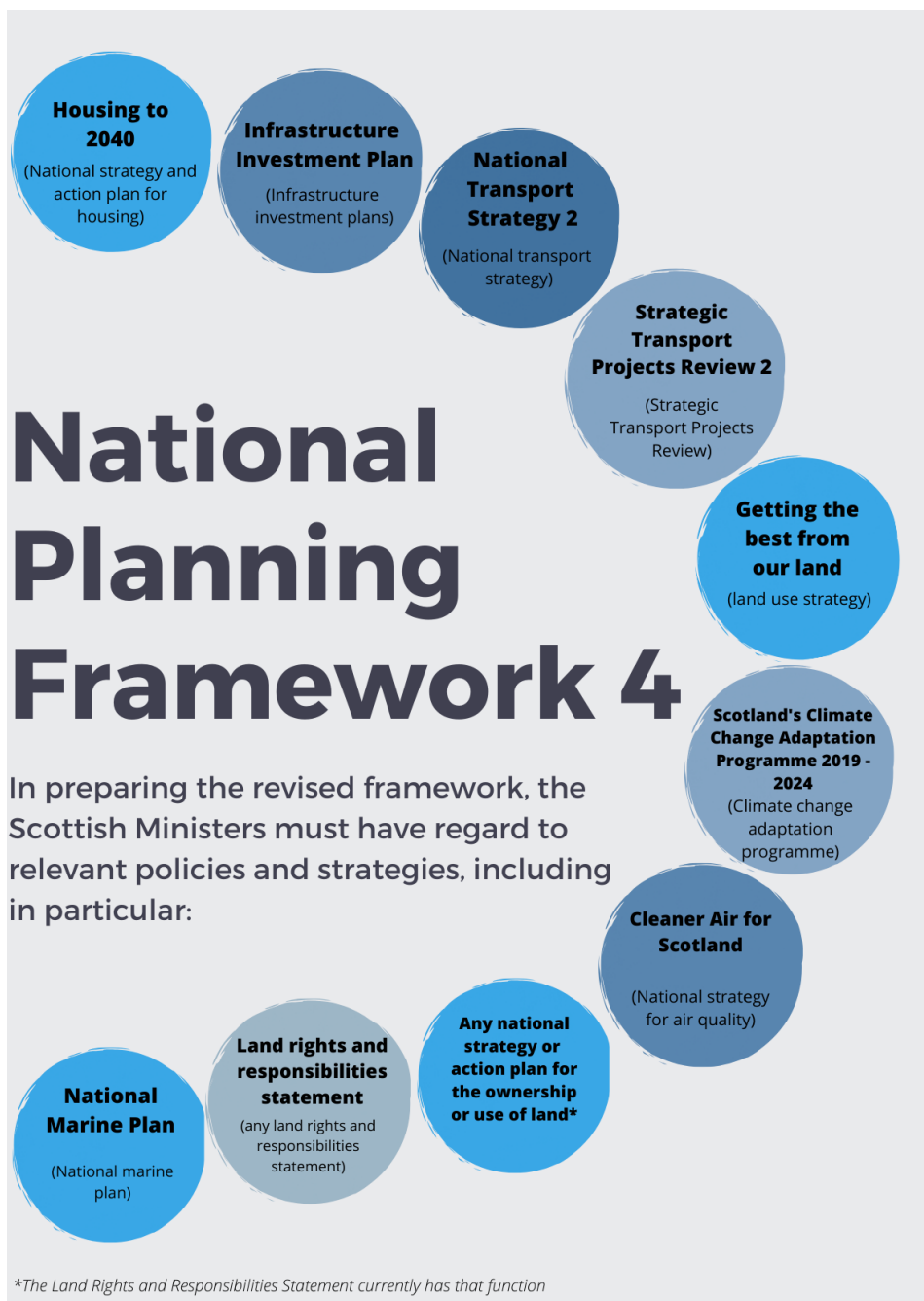


Figure 1.2 Legislative requirements as outlined in the Planning (Scotland) Act 2019

1.4.4 The NPF4 will also align with wider Scottish Government plans, strategies and policies including the Update to the Climate Change Plan 2018 – 2032;¹ Scotland’s Environment Strategy;² the National Islands Plan³ as well as with City Region Deals and Growth Deals, and will support the delivery of many of Scotland’s National Outcomes under the National Performance Framework⁴.

¹ Scottish Government (2020) Climate Change Plan Update. [Online] Available at <https://www.gov.scot/publications/securing-green-recovery-path-net-zero-update-climate-change-plan-20182032/> Accessed 26/10/2021

² Scottish Government (2020) the Environment Strategy for Scotland: vision and outcomes [online] Available at <https://www.gov.scot/publications/environment-strategy-scotland-vision-outcomes/> Accessed 26/10/21

³ Scottish Government (2019) The National Plan for Scotland’s Islands [Online] Available at <https://www.gov.scot/publications/environment-strategy-scotland-vision-outcomes/> Accessed 26/10/21

⁴ Scottish Government (2021) National Outcomes [Online] Available at <https://nationalperformance.gov.scot/national-outcomes> Accessed 26/10/21

2.0 Assessment Approach

2.1 What is Integrated Impact Assessment?

- 2.1.1 A range of statutory and non-statutory assessments have informed the preparation of the draft NPF4 and we have integrated these assessment requirements, wherever possible, into the NPF4 preparation process. We have also co-ordinated the preparation of the evidence base across the individual assessments to minimise duplication, sharing information and links between the different assessment topics and making connections. In light of the statutory and non-statutory reporting requirements for individual impact assessments, clear findings are reported for each of the assessments individually. We are also publishing a IIA Non-Technical Summary which draws together and further considers these findings in a holistic way.
- 2.1.2 This report sets out the findings of the Strategic Environmental Assessment (SEA) of the draft NPF4, and is one of the statutory environmental ‘themed’ assessments which Scottish Ministers are required to undertake. Additionally, this report also sets out the findings of consideration given to the likely health effects of the proposed national developments.

Assessing the Likely Health Effects of Proposed National Developments

- 2.1.3 The Planning (Scotland) Act 2019 requires Scottish Ministers to bring forward new provisions on the assessment of the likely health effects of national or major developments. To help inform this work, the likely health effects of proposed national developments have been considered as part of the SEA process. This work has been informed in part by Public Health Scotland’s NPF4: Briefing on Health and Proposed National Developments⁵. In addition to considering the national development proposals specifically, we have also sought to draw out the likely health impacts of the NPF4 as a whole, where possible, through the SEA topic of ‘population and human health’, and taking into account emerging findings from relevant aspects of the Equalities Impact Assessment, which also accompanies the consultation draft NPF4.

Habitats Regulations Appraisal

- 2.1.4 The Scottish Government commissioned independent consultants AECOM to undertake a Habitats Regulations Appraisal (HRA) of NPF4, and the findings of the initial HRA screening report⁶ have helped to guide and inform

⁵ Public Health Scotland (2021) NPF4: Briefing on Health and Proposed National Developments [online] Available at: <https://www.publichealthscotland.scot/publications/national-planning-framework-4-briefing-on-health-and-proposed-national-developments/>

⁶ AECOM (2021) Habitats Regulations Appraisal of National Planning Framework 4 – Initial HRA Screening Record Available online at: <https://www.transformingplanning.scot/>

the SEA where relevant. An Appropriate Assessment will be completed before the NPF4 is finalised.

Life-Cycle Greenhouse Gas Emissions of National Developments

- 2.1.5 The Planning (Scotland) Act 2019 requires the Scottish Government to undertake an assessment of the likely impact of each proposed national development's lifecycle greenhouse gas emissions on achieving national greenhouse gas emissions reduction targets. We have commissioned independent consultants LUC to undertake this assessment and the findings⁷ have also been taken into account in the SEA of the proposed national developments where relevant.

2.2 What is Strategic Environmental Assessment?

- 2.2.1 SEA is a systematic method for considering the likely environmental effects of certain Plans, Programmes or Strategies. SEA aims to better protect the environment, ensure any development is sustainable and increase opportunities for public participation in decision making.
- 2.2.2 The Environmental Assessment (Scotland) Act 2005 ('the 2005 Act') requires all qualifying policies, plans, programmes and strategies (referred to generally as 'plans') to undergo SEA. The 2005 Act ensures that the environmental effects of public plans that fall within its scope are properly assessed and the findings set out in an Environmental Report. The Environmental Report and the plan to which it relates must then be open for public consultation.
- 2.2.3 NPF4 is considered to be a qualifying plan under Section 5(3) of the 2005 Act and this Environmental Report has been prepared in accordance with the Act. The NPF4 SEA process includes the following distinct stages:
- **Scoping** – establishing significant environmental topics, setting the environmental baseline, developing the proposed method(s) and intended approach to the assessment and setting out the intended consultation period;
 - **Environmental Assessment** – assessing the likely significant environmental effects of the proposed plan and any reasonable alternatives, and consulting on both the draft plan and Environmental Report;
 - **Post Adoption Statement** – sets out how the assessment and the consultation results have been taken into account in the finalised plan: and

⁷ Research Project: Lifecycle Greenhouse Gas Emissions of NPF4 Proposed National Developments Assessment Findings (2021) Available at: <https://www.transformingplanning.scot/national-planning-framework/> (accessed 09/11/2021)

- **Monitoring** – monitoring the significant environmental effects of the implementation of the plan and identifying any unforeseen adverse effects at an early stage in order to undertake appropriate remedial action.

2.3 Structure of the Environmental Report

2.3.1 This Environmental Report includes the following information:

- Section 1 introduces NPF4 and sets out its relationship to other plans, programmes and strategies
- Section 2 details the approach to the assessment
- Section 3 describes the current baseline environmental conditions and environmental protection objectives
- Section 4 presents the assessment findings of the spatial strategy and proposed national developments
- Section 5 presents the assessment findings of the draft national planning policy
- Section 6 describes the overall cumulative effects of the draft NPF4
- Section 7 outlines the mitigation identified and proposals for monitoring
- Section 8 sets out the next stages in the preparation of the NPF4 and the environmental assessment process, and on the consultation process.

2.4 SEA Activities to Date

2.4.1 Our Integrated Impact Assessment (IIA) Scoping Report⁸ set out our early thinking on the assessment method(s) and on the baseline information to inform the assessment, and invited comments as part of the early 'call for ideas' on NPF4 in January to April 2020. To further support the policy process we published our NPF4: Update on Integrated Impact Assessment⁹ alongside the NPF4 Position Statement¹⁰ in November 2020. Comments received from the SEA consultation authorities¹¹ (SEPA, NatureScot and

⁸ Scottish Government (2020) Integrated Impact Assessment (IAA): Screening / Scoping Report [online] Available at: <https://www.transformingplanning.scot/media/1293/national-planning-framework-4-integrated-impact-assessment-scoping-report.pdf> Accessed 12/11/2021

⁹ Scottish Government (2020) Integrated Impact Assessment: Update [online] Available at <https://www.transformingplanning.scot/media/2135/national-planning-framework-4-integrated-impact-assessment-position-statement-update-on-iaa.pdf> Accessed 12/11/2021

¹⁰ Scottish Government (2020) Fourth National Planning Framework: position statement [online] Available at <https://www.gov.scot/publications/scotlands-fourth-national-planning-framework-position-statement/> Accessed 12/11/2021

¹¹ <https://www.strategicenvironmentalassessment.gov.scot/Details.aspx?sid=5&id=SEA\01563>

HES), from Public Health Scotland, and from the early engagement process more generally have helped to inform the overall approach to the IIA as well as the SEA specifically.

- 2.4.2 A follow up meeting with the SEA consultation authorities and with Public Health Scotland took place on 16th December 2020, which helped to further shape the overall assessment approach and refine the environmental baseline.

Scoping the Environmental Topics

- 2.4.3 The IIA Screening/Scoping Report considered that all environmental topics should be scoped into the assessment due to the nature and scale of NPF4 and the potential for likely significant effects to occur across all topics. This Environmental Report therefore considers the following environmental topics, and their inter-relationships:

- Biodiversity, Flora and Fauna
- Population and Human Health
- Climatic Factors
- Air
- Water
- Soil
- Cultural Heritage and Historic Environment
- Landscape and Geodiversity
- Material Assets

2.5 Assessment Methodology

- 2.5.1 The draft NPF4 includes the following components, which form the focus of this assessment:

- **Spatial Strategy;** an overarching spatial strategy for Scotland in the future. This will guide the preparation of regional spatial strategies, local development plans, and local place plans and will also be relevant to wider policies and strategies relating to land use.
- **National Developments;** setting out proposed national developments to support the spatial strategy.
- **National Planning Policy Handbook;** setting out policies for the development and use of land which are to be applied in the preparation of local development plans; local place plans; masterplans and briefs; and for determining the range of planning consents.

- 2.5.2 The Planning (Scotland) Act 2019 also requires the National Planning Framework to include ‘targets for the use of land in different areas of Scotland for housing’. Draft targets are included in Annex B of the draft NPF4 and these are considered alongside the assessment of the draft planning policies.
- 2.5.3 Finally, part 4 of the draft NPF4 sets out an intended high-level approach to delivering the finalised strategy, to be further developed into a standalone, live delivery programme once NPF4 has been finalised. This is not a focus of the assessment though the intended approach to delivery has been taken into account where relevant in the overall assessment.
- 2.5.4 This SEA has been undertaken by the Scottish Government’s Environmental Assessment Team, working closely with officials in the NPF4 drafting team. As part of our wider Integrated Impact Assessment process, we have sought to integrate the SEA assessment requirements wherever possible, into the NPF4 preparation process, to inform and influence NPF4 development and maximise the effectiveness of the SEA within the NPF4 preparation process. In keeping with the broad and strategic nature of the draft NPF4, it is a strategic level assessment which draws on a range of methods to identify potentially significant environmental effects.

Stage 1 - Evidence Gathering and Setting Objectives

- 2.5.5 A series of SEA objectives (see Table 2.1) were developed to assist in predicting and evaluating the potential effects of the NPF4 on the environment, informed by the likely scope and content of the plan and its policy context; relevant environmental protection objectives; and the environmental baseline. The draft objectives were established during scoping and refined through the subsequent SEA process, including in consultation with the SEA consultation authorities. These objectives form the basis of the assessment of the national planning policies, which is presented in tables using a scoring system (see Table 2.2 below). The objectives have also helped to inform and guide the assessment of the spatial strategy and proposed national developments, which are presented in narrative form.
- 2.5.6 The assessment has also drawn on previously undertaken SEAs where relevant, including of NPF3 and Scottish Planning Policy; the Infrastructure Investment Plan 2021 – 2025-26; and the Review of the Scottish Planning System – Planning Bill.

Stage 2 – Iterative Assessment

- 2.5.7 Iterative assessment of the emerging draft spatial strategy, and draft national planning policies, took place in tandem.
- 2.5.8 At the same time, early consideration of suggested national developments, alongside the Habitats Regulations Appraisal screening process and consideration of equalities impacts, helped to inform and guide the selection of proposed national developments. Figure 2.1 illustrates the approach to selecting the proposed national developments.

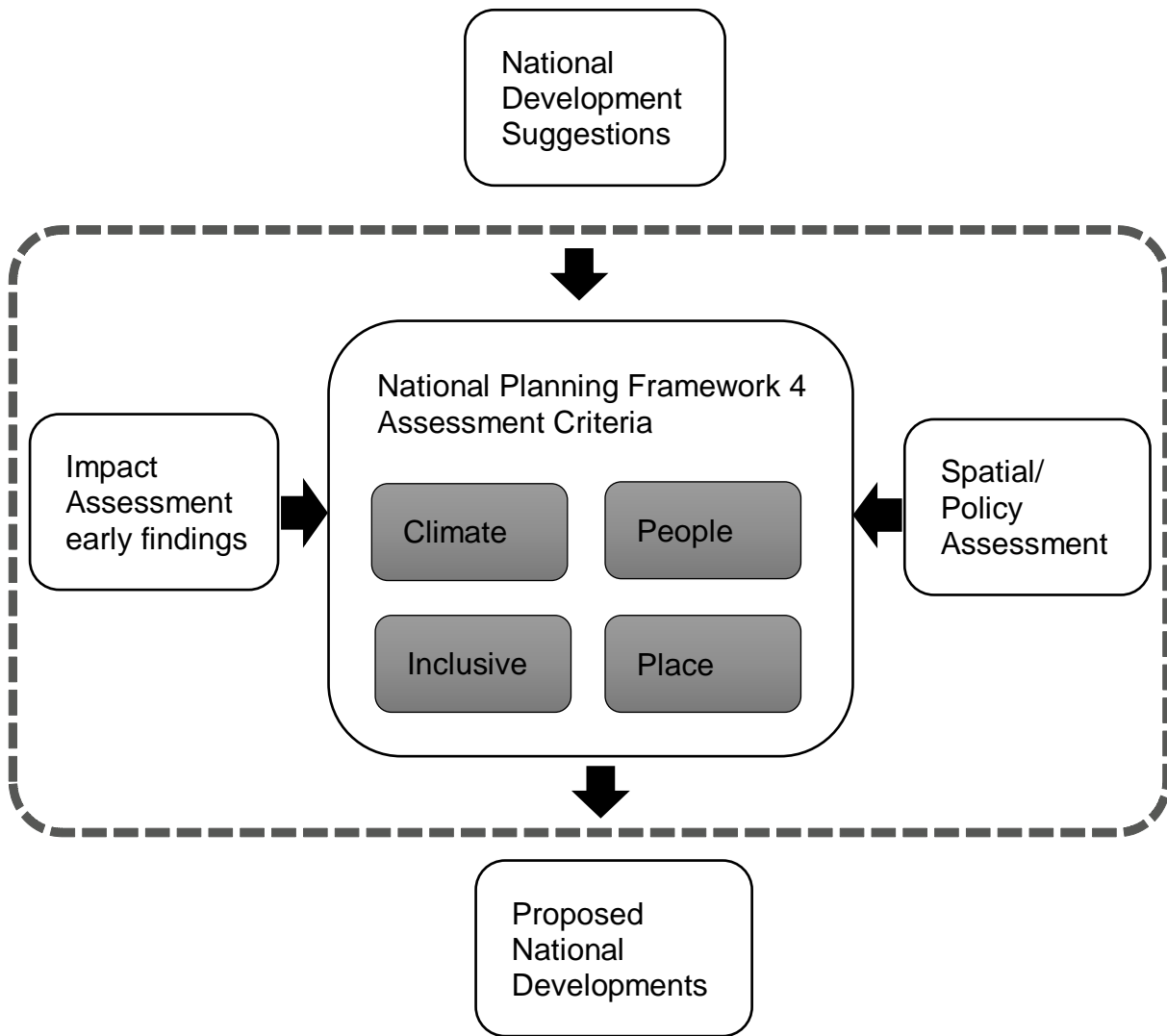


Figure 2.1 Assessment process of national developments

Stage 3 – Cumulative Assessment

2.5.9 The third stage of assessment explored the potential for cumulative and in-combination effects of the draft NPF4, and draws together the findings from stage 2.

Table 2.1 SEA Objectives

Topic	SEA objectives
Biodiversity, Flora and Fauna	Avoid adverse impacts to designated habitats and species
	Avoid adverse impacts to undesignated habitats and species
	Protect, maintain and enhance biodiversity
Climatic Factors	Avoid new Greenhouse Gas (GHG) emissions
	Reduce GHG emissions in order to meet Scotland’s emissions reduction target of net zero by 2045
	Promote and enable adaptation to climate change
Air	Avoid adverse impacts to air quality
	Reduce emissions of key pollutants and improve air quality throughout Scotland
	Reduce levels of nuisance e.g. noise, vibration, dust, odour and light
Water	Avoid adverse impacts on the ecological status of water bodies
	Ensure the sustainable use of water resources
	Reduce the number of people and properties at risk of flooding and promote adaptive flood risk management
	Protect, maintain and improve the ecological status and physical state of the water environment
Soil	Safeguard and improve soil health, protect soil resource and soil functions of all soil types in Scotland
	Safeguard and improve high value agricultural land and carbon-rich soils
	Reduce the extent of contaminated and vacant and derelict land

Cultural Heritage and Historic Environment	Avoid adverse impacts on the historic environment including its setting
	Protect and enhance valued landscapes, historic and archaeological sites and other culturally and historically important features, landscapes and their settings
Landscape and Geodiversity	Avoid adverse effects on landscapes and geodiversity
	Safeguard and enhance the character and diversity of the Scottish landscape and areas of valuable landscape and geodiversity
Material Assets	Avoid adversely impacting on material assets (e.g. water, heat, energy and flood protection infrastructure etc)
	Promote the principles of circular economy
	Reduce use and promote sustainable management of natural and built environment resources
	Promote the sustainable design, use and management of new and existing assets/infrastructure to support the development of high-quality places
Population and human health	Reduce the health gap and inequalities and improve healthy life expectancy
	Promote and enhance/improve access to open space, greenspace and the wider countryside
	To protect and improve human health and wellbeing through improving the quality of the living environment of people and communities
	Increase sustainable access to essential services, employment and the natural and historic environment

2.6 Assessing Significance

2.6.1 The 2005 Act requires the Environmental Report to set out the likely significant environmental effects expected from the proposed plan.

2.6.2 As may be the case with many strategic level assessments, significance can be difficult to define, requiring the application of professional judgement and experience. To achieve a consistent approach, the following criteria have been used as a broad guide to evaluate the significance of both positive and negative effects:

- Effects on nationally or internationally protected environmental features.

- Effects of greater than regional scale (though consideration has been given to the potential for localised and regional effects where relevant and applicable).
- Effects that could impact on delivery of national policies, targets or commitments.
- Effects that exacerbate or address existing, national and international environmental problems or issues, as identified in the baseline analysis.

2.6.3 Additionally, the Environmental Report notes more minor effects arising where these are identified, but aims to focus particularly on effects that are considered to be significant when considered in relation to the above criteria.

2.6.4 The scoring system in Table 2.2 is used in the detailed policy assessment tables. Where findings are presented in narrative form, the same terminology has also been used.

Table 2.2 Assessment Key

✓	Positive Effect
X	Negative Effect
0	Negligible Effect
X✓	Mixed Effect
✓✓	Positive Effect (Significant)
XX	Negative Effect (Significant)
?	Uncertain

2.7 Consideration of Reasonable Alternatives

2.7.1 The 2005 Act requires the Environmental Report to identify and assess any reasonable alternatives to the plan or programme, taking into account its objectives and geographical scope.

2.7.2 The NPF is a spatial plan for Scotland setting out Scottish Ministers' policies and proposals for the development and use of land. As such, the draft NPF4 sets out a vision for how Scotland's places will change in the future and reflects priorities across Scottish Government portfolios, bringing together a wide range of plans, programmes and policies. The draft NPF4 has been prepared in accordance with the Town and Country Planning (Scotland) Act 1997, as amended, which specifies certain matters to be addressed and sets out the statutory outcomes for the NPF. Its preparation has been informed by an iterative process of extensive stakeholder engagement as part of the NPF review process.

2.7.3 **Do nothing:** Preparation of NPF4 is part of a wider and ongoing programme of planning reform¹² informed by an independent review of the planning system. It sits within the legislative framework set by the Town and Country Planning (Scotland) Act 1997, as revised and updated by the Planning (Scotland) Act 2019, which introduced new statutory provisions on the content and outcomes for the NPF. At the same time, there is a need to update the current NPF3 and Scottish Planning Policy to give fuller regional coverage and improve alignment with wider programmes and strategies, including on infrastructure and economic investment and responding to the twin global emergencies on climate and nature. 'Do nothing' is therefore not considered to be an option.

2.7.4 **Alternative focus:** As discussed in section 1 above, the draft NPF4 sets out the Scottish Government's vision for how planning and development will deliver a net zero, sustainable Scotland by 2045. It sets out how each part of Scotland can be planned and developed to create: **sustainable places; liveable places; productive places; and distinctive places.** Annex A of the draft NPF4 sets out how development will contribute to each of the statutory outcomes identified in The Planning (Scotland) Act 2019. In light of this statutory and wider policy framework, we do not consider that a fundamental change in focus can be viewed as a 'reasonable alternative'.

2.7.5 In assessing the draft spatial strategy, proposed national developments, and National Planning Policy Handbook components of the draft NPF4 we have however given consideration to any alternative options or approaches. Views are also invited on this aspect of the SEA through the consultation process:

- **Spatial strategy:** In advance of the new duty to produce Regional Spatial Strategies (RSS), the draft NPF4 spatial strategy was developed in collaboration with a range of partners and wider stakeholder interests, to develop thinking across regional and national spatial scales. No reasonable alternatives have been identified.
- **National developments:** Appendix E sets out the assessment of alternative national developments.
- **Policy handbook:** This part should be taken as a whole, and all relevant policies should be applied to individual planning applications. Nevertheless, as part of the iterative drafting process, we have given consideration as to whether any reasonable alternatives to policies may arise and where these have been identified they are discussed further in Appendix C of this report.

¹² Scottish Government (2021) What is the Planning Reform Programme? [online] available at <https://www.transformingplanning.scot/planning-reform/what-is-the-planning-reform-programme/> (accessed 16/11/2021)

2.8 Difficulties and Limitations Encountered

- 2.8.1 The 2005 Act requires those undertaking SEA to identify any difficulties encountered during the assessment process. Whilst no issues have hindered the assessment of draft NPF4, it is important to recognise that this is a strategic level assessment of a national level framework and so the findings are necessarily broad-brush.
- 2.8.2 It is acknowledged that many of the specific environmental effects arising from NPF4 will depend on the context within which policy is applied. Local Development Plans prepared by individual planning authorities will themselves be subject to SEA, and where individual development proposals are likely to have significant environmental effects, these will be subject to relevant Environmental Impact Assessment (EIA) legislation. This is a natural feature of a strategic level assessment, and does not undermine the benefits of undertaking SEA at this level. Any uncertainties or likely dependencies have been identified and taken into account throughout the assessment process.
- 2.8.3 As 2020 was atypical in terms of many environmental trends due to the Covid-19 pandemic, this year may be considered an anomaly. This has been discussed, where relevant within the environmental baseline.

3.0 Environmental Baseline

3.1 Purpose of this Section

3.1.1 This section presents the environmental baseline to meet the requirements of Schedule 3 of the 2005 Act, which requires the Environmental Report to identify:

- Relevant aspects of the current state of the environment and its likely evolution without the implementation of the plan or programme
- Environmental characteristics of areas likely to be significantly affected
- Relevant existing environmental problems
- Relevant environmental protection objectives established at the international or national level which are relevant to the plan or programme.

Structure of this Section

3.1.2 The following information is provided for each of the environmental topics:

- High-level summary of relevant environmental protection objectives established at an international or national level. A fuller analysis is provided in Appendix B
- Overview of baseline conditions
- Key pressures and trends
- Relevant SEA objectives
- Summary of key points

Geographical Scope

3.1.3 NPF4 will be a long-term plan for Scotland, therefore the environmental baseline takes a largely national perspective with reference to the marine environment where appropriate. This approach allows the SEA to reflect on the interaction of the draft NPF4 with wider environmental trends. In addition, further more detailed baseline information has been set out, where relevant in the assessment sections of this report, for example where relevant to the spatial strategy and national developments.

3.2 Biodiversity, Flora and Fauna

Relevant Environmental Protection Objectives

3.2.1 The importance of halting and reversing biodiversity loss is recognised at international and national level, including through the international Aichi Targets¹³ and the 2020 Challenge for Scotland's Biodiversity¹⁴, which set out objectives for the conservation and enhancement of biodiversity in Scotland. As the United Nations (UN) moves from the Decade of Biodiversity to the Decade of Ecosystem Restoration, it will set new international targets and Scotland will set out a post 2020 biodiversity strategy accordingly¹⁵. Habitats and species identified as of particular value are also considered in legislation and policies relating to the protection of biodiversity, flora and fauna. These establish a hierarchy of protection, from the international to local level. Beyond designated sites and species, there are longer-term aspirations for enhancing biodiversity, strengthening nature networks and addressing the impacts of climate change on the natural environment, so that Scotland's nature is protected and restored¹⁶.

Baseline

3.2.2 Biodiversity is crucial for the functioning of healthy ecosystems and supports life by providing resources such as clean air, water and food. Biodiversity is also closely linked with the other environmental topics.

3.2.3 Scotland is well known for its rich biodiversity and the complex and varied habitats that make up the diverse landscapes; approximately 90,000 animal, plant and microbe species are found in Scotland¹⁷ along with habitats, ranging from raised bog to native and ancient woodland. Scotland is home to a wide range of species and internationally important habitats. For example:

- Scotland has 90% of the high mountain habitat in the UK, which accommodates some of the best examples of near-natural habitats and wildlife in the northern and remote parts of Europe.

¹³ Convention on Biological Diversity (2020) Aichi Biodiversity Targets [online] Available at: <https://www.cbd.int/sp/targets/> (accessed 30/08/2021)

¹⁴ Scottish Government (2013) 2020 Challenge for Scotland's Biodiversity [online] Available at: <https://www.gov.scot/publications/2020-challenge-scotlands-biodiversity-strategy-conservation-enhancement-biodiversity-scotland/> (accessed 30/08/2021)

¹⁵ Scottish Government (2020) Scottish Biodiversity Strategy Post-2020: Statement of Intent [online] Available at: <https://www.gov.scot/publications/scottish-biodiversity-strategy-post-2020-statement-intent/> (accessed 31/08/2021)

¹⁶ Scottish Government (2020) The Environment Strategy for Scotland: Vision and Outcomes [online] Available at: <https://www.gov.scot/publications/environment-strategy-scotland-vision-outcomes/pages/5/> (accessed 04/11/2021)

¹⁷ NatureScot (2020) Scotland's Biodiversity [online] Available at: <https://www.nature.scot/scotlands-biodiversity> (accessed 06/05/2020)

- Wetlands, including peatlands, can be found across Scotland and are a key provider of services such as carbon sequestration and water purification.
- Scotland's seas, which make up around 61% of the UK's total marine area, are highly dynamic, supporting a diverse range of habitats and species and an increasingly varied array of marine industries¹⁸.
- Agriculture is Scotland's dominant use of land, covering over 70% of the country, with woodlands and forests covering 18% (Figure 3.1). These support a wide range of important flora and fauna diversity, including rare and threatened species.

3.2.4 Scotland's protected areas include 251 Special Areas of Conservation, 153 Special Protection Areas, 51 Ramsar sites and 2 Biosphere Reserves, 1,422 Sites of Special Scientific Interest (SSSI), 43 National Nature Reserves and 2 National Parks, among other designations¹⁹. There are also 244 Marine Protected Areas and a wide range of designated Priority Marine Features which help conserve and enhance the marine environment²⁰. Figure 3.2 - Figure 3.6 show the spatial distribution of designated natural heritage sites across Scotland. Many sites are concentrated in rural areas, particularly in the north and west but also more widely around coastal areas.

3.2.5 Greenspaces such as public and private gardens, parks, woodlands, recreational grounds, green corridors, allotments and community growing spaces can also provide habitats and ecosystems which are not only important to wildlife, but for human health and wellbeing¹⁸.

Key Pressures and Trends

3.2.6 Global declines in biodiversity are mirrored in Scotland and the abundance and distribution of Scotland's species has on average declined over recent decades, with most measures indicating this decline has continued in the most recent decade¹⁸. The State of Nature Scotland Report 2019 shows that from 1994 to 2016, 49% of Scottish species have decreased and 28% have increased in abundance¹⁸. Further, 11% of species have been classified as threatened with extinction from Great Britain and 133 (of those assessed) have already become extinct¹⁸. Since 1970, changes in species distribution have also been recorded, with 33% of Scotland's wildlife found in fewer places and 20% found in more places²¹. The condition of protected nature

¹⁸ Walton P et al. (2019) The State of Nature Scotland 2019 [online] Available at: <https://www.nature.scot/state-nature-scotland-report-2019> (accessed 26/08/2021)

¹⁹ NatureScot (undated) Protected Areas [online] Available at: <https://www.nature.scot/professional-advice/protected-areas-and-species/protected-areas> (accessed 05/10/2021)

²⁰ NatureScot (undated) Priority Marine Features in Scotland's Seas [online] Available at: <https://www.nature.scot/professional-advice/safeguarding-protected-areas-and-species/priority-marine-features-scotlands-seas> (accessed 04/02/2020)

²¹ Walton P et al. (2019) The State of Nature Scotland 2019 [online] Available at: <https://www.nature.scot/state-nature-scotland-report-2019> (accessed 26/08/2021)

sites is monitored by NatureScot and currently shows that 78.2% of sites are in favourable or recovering condition while 21.8% of sites are in unfavourable condition²².

- 3.2.7 There are a range of pressures with the potential to impact Scotland's wildlife and biodiversity. The greatest drivers of change in biodiversity in Scotland are: climate change, urbanisation, pollution, woodland management, fisheries, invasive non-native species, freshwater management and agricultural management.
- 3.2.8 Climate change in particular impacts biodiversity on a global scale and changes in temperature, precipitation and other climatic changes have affected species distribution in Scotland (including the spread of invasive non-native species), population dynamics and ecosystem functions²¹. Climate change will alter both habitats and species in a number of ways, however there is considerable uncertainty over exactly what the changes may look like^{23,24}. Some habitat loss may occur, with significant changes within existing habitats likely. Commercially important species may also be lost. Indirect impacts may also arise through climate change adaptation and action taken in sectors such as agriculture, forestry, planning, water and coastal management in the face of a changing climate²⁵. New species are already arriving in Scotland as the climate becomes more suitable for them, like the nuthatch. Most new species will have little impact on our existing species. But some will outcompete existing species and become problem invasive species²⁴. Climate change is also likely to affect vegetation growth²³. There are also potential opportunities for agriculture and forestry in the form of extended growing seasons²⁶.
- 3.2.9 Changes in land-use, such as the intensification of agriculture and woodland expansion can adversely impact habitats, soil and water quality, with land use reported to have had the largest negative impact on terrestrial and freshwater ecosystems²⁷. Land-use intensification, modification and overgrazing can also reduce diversity, quality and connectivity of landscapes and habitats. Across the uplands, this has been due to increased grazing pressure, and historically, as a result of forestry. In the lowlands, land-use

²² NatureScot (2021) Protected Nature Sites [online] Available at: <https://informatics.sepa.org.uk/ProtectedNatureSites/> (accessed 22/07/2021)

²³ NatureScot (2017) Impacts on Habitats [online] Available at: <https://www.nature.scot/climate-change/climate-change-impacts-scotland/impacts-habitats> (accessed 26/10/2021)

²⁴ NatureScot (2021) Impacts on Species [online] Available at: <https://www.nature.scot/climate-change/climate-change-impacts-scotland/impacts-species> (accessed 26/10/2021)

²⁵ JNCC (2010) Biodiversity and Climate Change – A Summary of Impacts in the UK [online] Available at: [Biodiversity and Climate Change - a summary of impacts in the UK \(jncc.gov.uk\)](https://www.jncc.gov.uk/publications/biodiversity-and-climate-change-a-summary-of-impacts-in-the-uk) (accessed 10/06/2021)

²⁶ Committee on Climate Change (2021) Independent Assessment of UK Climate Risk [online] Available at: <https://www.theccc.org.uk/wp-content/uploads/2021/07/Independent-Assessment-of-UK-Climate-Risk-Advice-to-Govt-for-CCRA3-CCC.pdf> (accessed 26/08/2021)

²⁷ IPBES (2019) Summary for Policymakers of the Global Assessment Report on Biodiversity and Ecosystem Services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services [online] Available at: <https://doi.org/10.5281/zenodo.3553579> (accessed 11/05/20)

changes are primarily due to agricultural intensification, and more recently, changes in grazing²⁸. Urbanisation can lead to habitat fragmentation due to the expansion of transport systems and infrastructure. However, many species have become reliant on urban environment habitats such as allotments and other greenspaces²⁸. Overexploitation of natural resources is also a known pressure, with the consumption of goods and services negatively impacting biodiversity²⁹.

- 3.2.10 The main air emissions that affect habitats and species are the gases ammonia, sulphur dioxide and oxides of nitrogen, mainly sourced from intensive livestock units and combustion plants. The impacts range from direct toxic effects, eutrophication of habitats, to acidification altering the availability of nutrients for plants³⁰.

Relevant SEA Objectives

- 3.2.11 The above baseline conditions, pressures and trends helped identify the following SEA objectives for biodiversity, flora and fauna:

Topic	SEA objectives
Biodiversity, flora and fauna	Avoid adverse impacts to designated habitats and species
	Avoid adverse impacts to undesignated habitats and species
	Protect, maintain and enhance biodiversity

Biodiversity, Flora and Fauna – summary of pressures and trends

- The abundance and distribution of Scotland’s species has on average declined over recent decades
- 78% of protected sites are in favourable or recovering condition while 22% of sites are in unfavourable condition
- 11% of species have been classified as threatened with extinction from Great Britain and 133 (of those assessed) have already become extinct

²⁸ Walton P et al. (2019) The State of Nature Scotland 2019 [online] Available at: <https://www.nature.scot/state-nature-scotland-report-2019> (accessed 26/08/2021)

²⁹ Committee on Climate Change (2017) UK Climate Change Risk Assessment 2017 Evidence Report [online] Available at: <https://www.theccc.org.uk/uk-climate-change-risk-assessment-2017/> (accessed 26/08/2021)

³⁰ NatureScot (2017) Considering Air Pollution Impacts in Development Management Casework [online] Available at: <https://www.nature.scot/doc/guidance-considering-air-pollution-impacts-development-management-casework> (accessed 27/10/2021)

- The greatest drivers of change in biodiversity in Scotland are: climate change, urbanisation, pollution, woodland management, fisheries, invasive non-native species, freshwater management and agricultural management

■ National Forest Inventory Woodland



Figure 3.1 Forest and woodland cover

Source: Forestry and Land Scotland (2019) [SpatialData.gov.scot](https://spatialdata.gov.scot) Contains, or is based on, information supplied by the Forestry Commission. © Crown copyright and database right [2021] Ordnance Survey

■ Biosphere Reserves

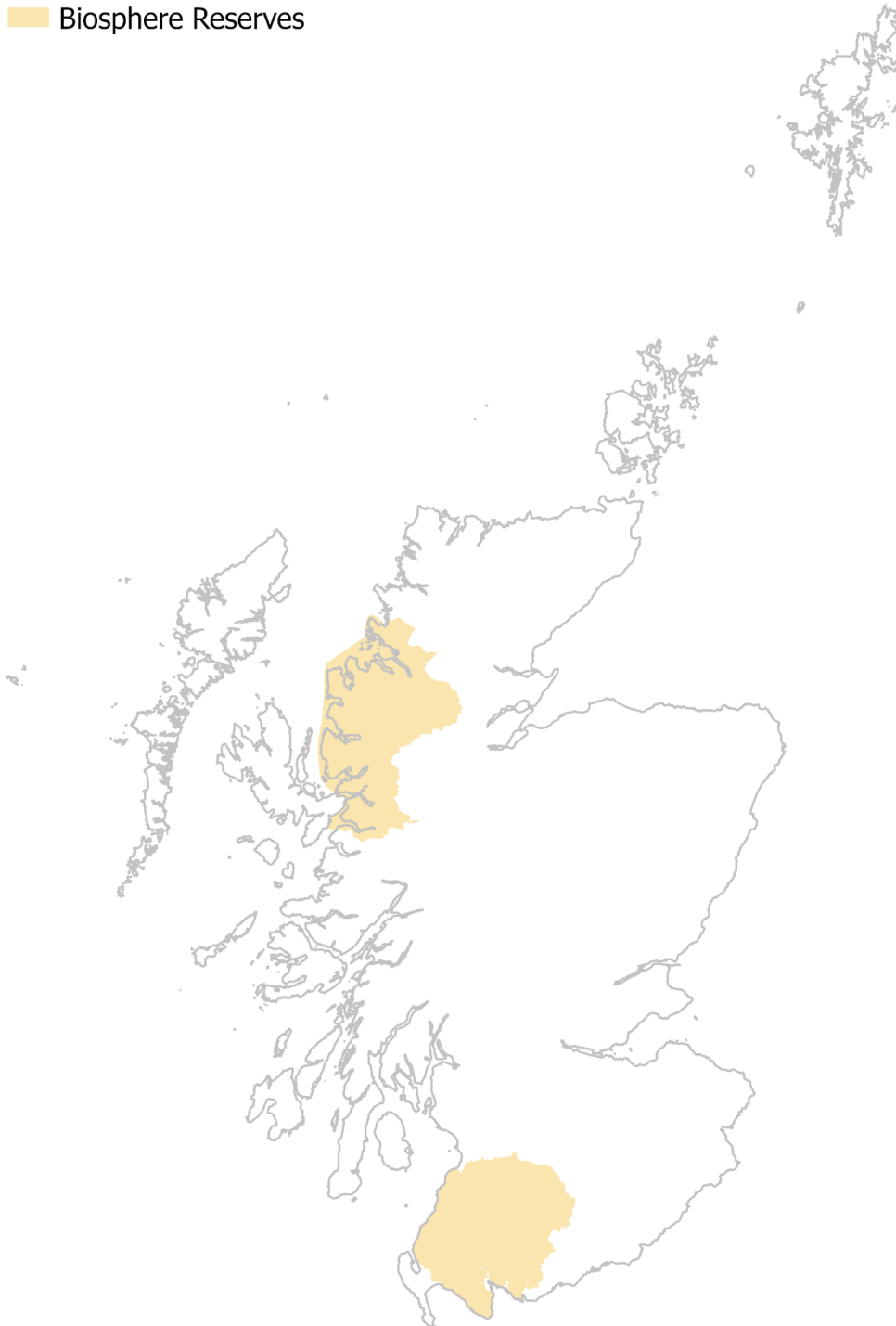


Figure 3.2 UNESCO designated Biosphere Reserves

Source: NatureScot (2016) [Natural Spaces - Scottish Natural Heritage \(snh.gov.uk\)](https://www.snh.gov.uk)

Contains SNH information licensed under the Open Government Licence v3.0. Contains Ordnance Survey data © Crown copyright and database right (2021)

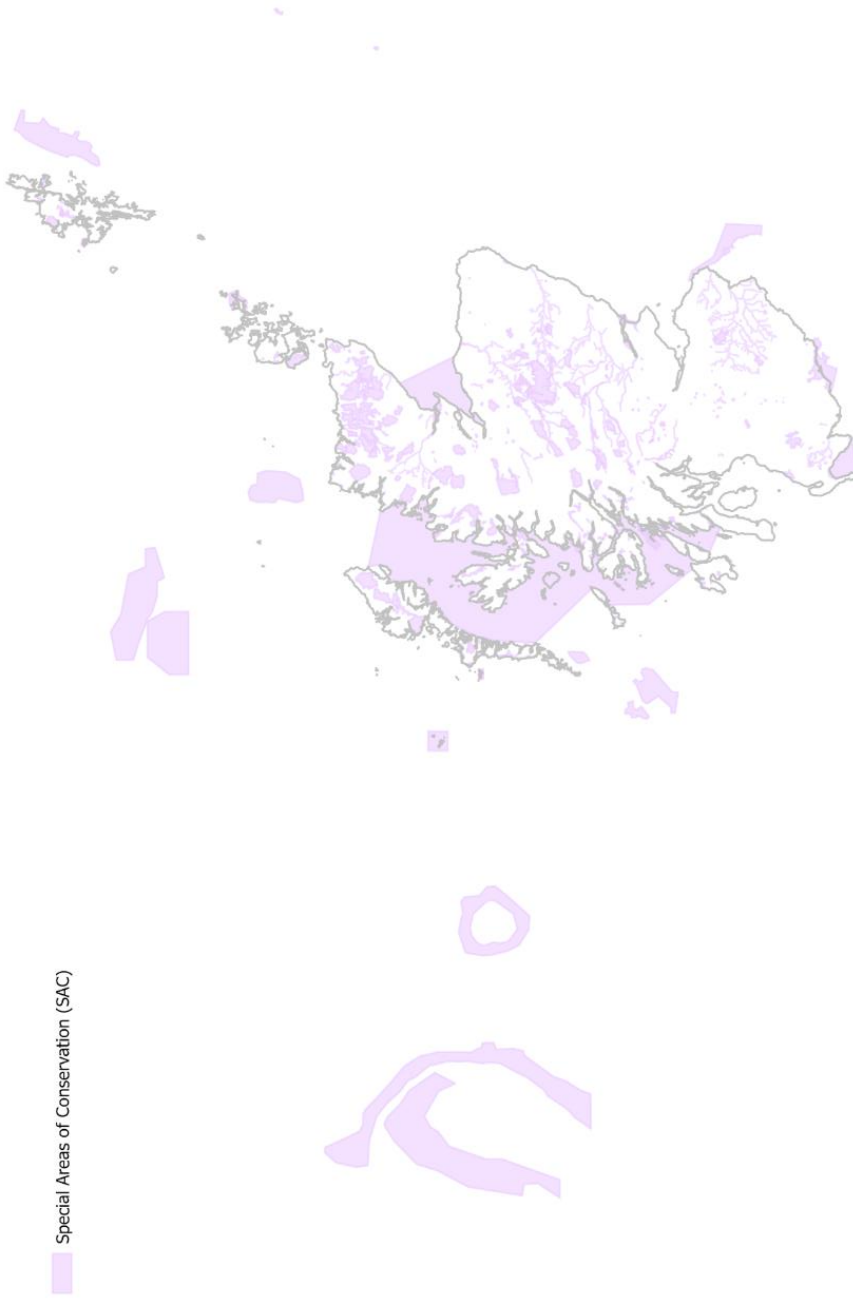


Figure 3.3 Special Areas of Conservation
 Source: NatureScot (2019) [Natural Spaces - Scottish Natural Heritage \(snh.gov.uk\)](#) Contains SNH information licensed under the Open Government Licence v3.0. Contains Ordnance Survey data © Crown copyright and database right (2021)

■ Special Protection Areas (SPA)

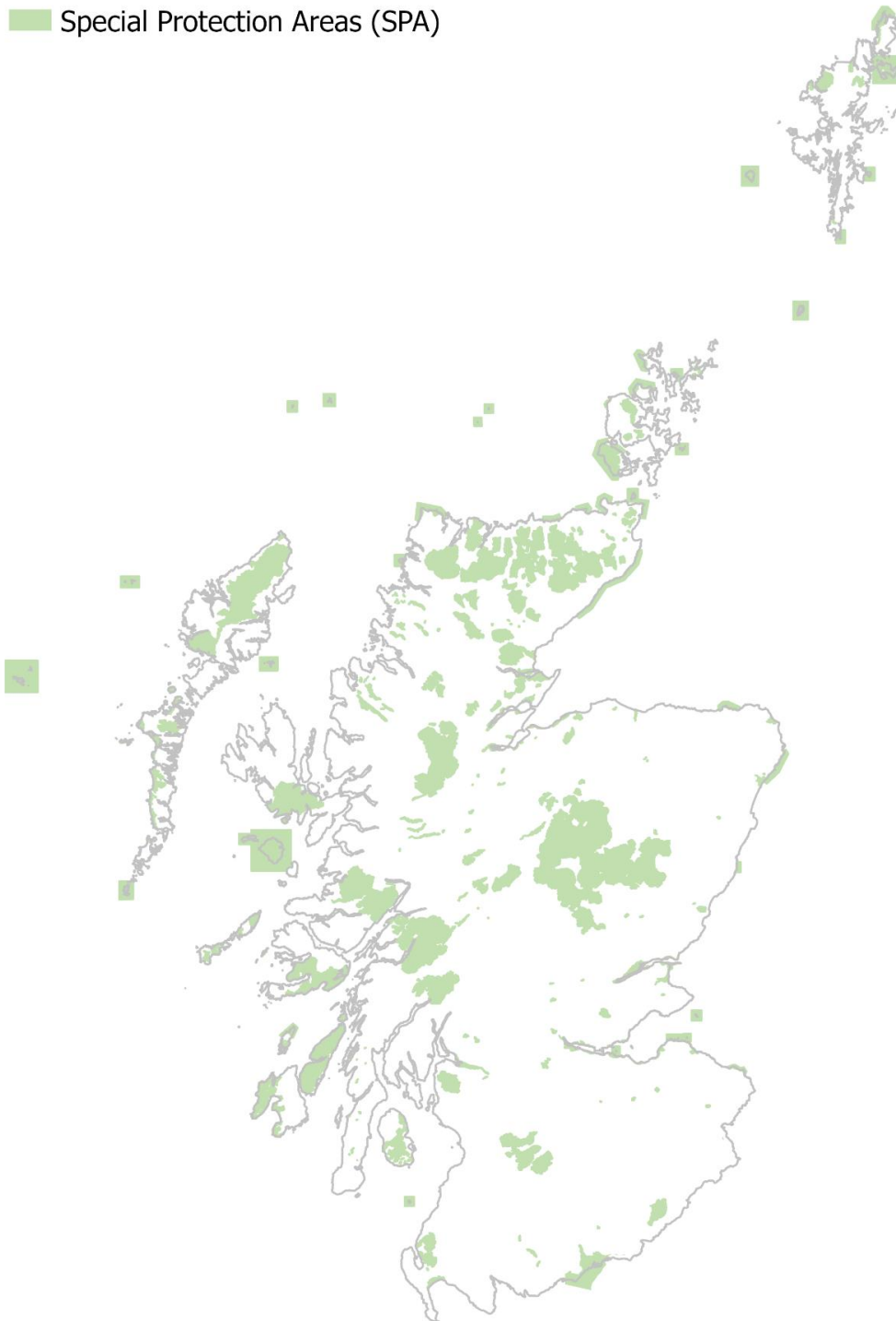


Figure 3.4 Special Protection Areas

Source: NatureScot (2020) [Natural Spaces - Scottish Natural Heritage \(snh.gov.uk\)](https://www.nature.scot/natural-spaces) Contains SNH information licensed under the Open Government Licence v3.0. Contains Ordnance Survey data © Crown copyright and database right (2021)

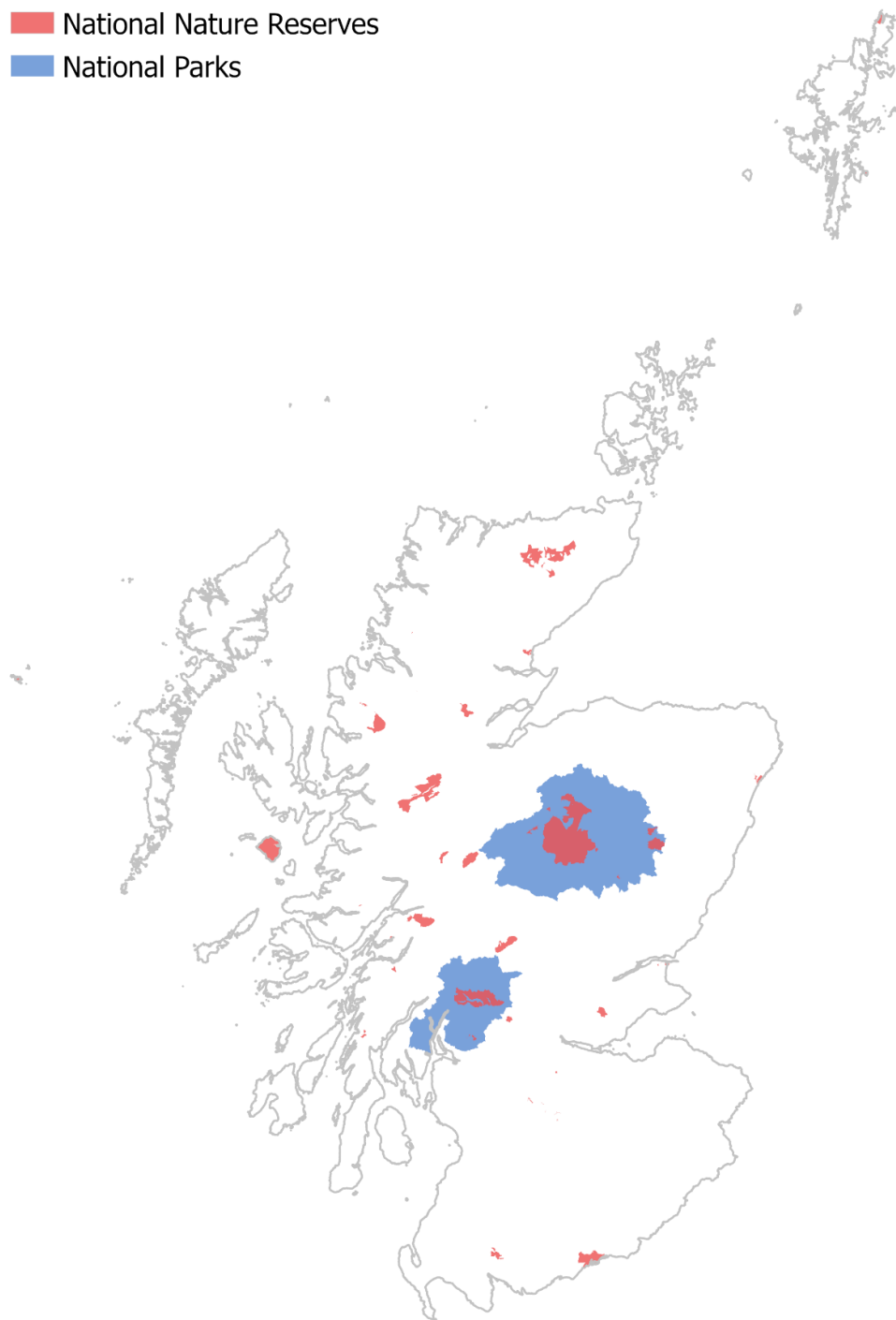


Figure 3.5 National Parks and National Nature Reserves

Source: Scottish Government (2010) [SpatialData.gov.scot](https://spatialdata.gov.scot), [SpatialData.gov.scot](https://spatialdata.gov.scot), [SpatialData.gov.scot](https://spatialdata.gov.scot) Licensed under the Open Government Licence v3.0.

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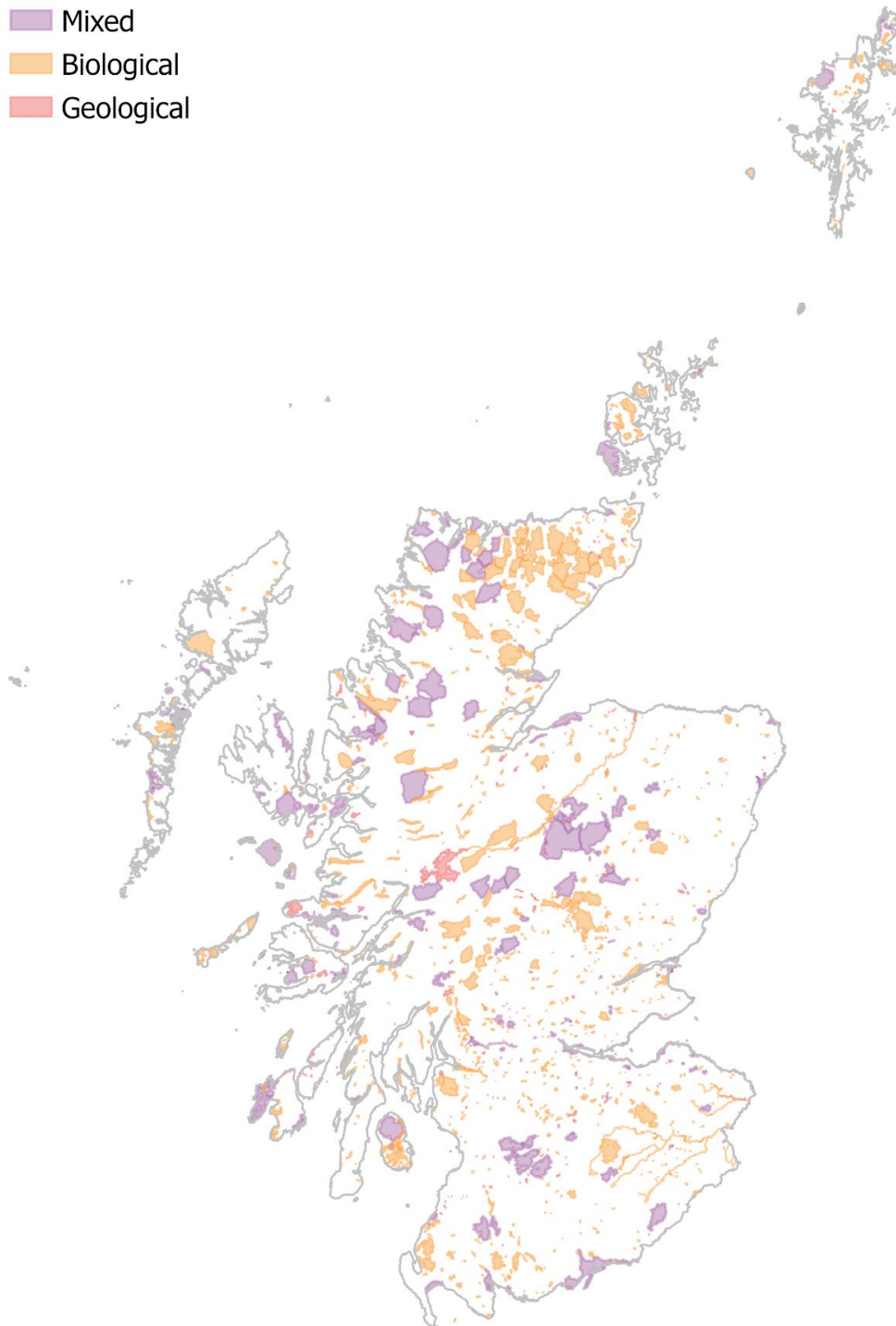


Figure 3.6 Sites of Special Scientific Interest

Source: NatureScot (2020) [Natural Spaces - Scottish Natural Heritage \(snh.gov.uk\)](https://www.snh.gov.uk/natural-spaces/)

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3.3 Climatic Factors

3.3.1 The Scottish Government commissioned independent consultants LUC to undertake an assessment of the likely impact of each proposed national development's lifecycle greenhouse gas (GHG) emissions on achieving national greenhouse gas emissions reductions targets³¹ (the 'GHG research'). This section of the baseline takes into account information to support that assessment, ensuring linkages between the GHG research findings and the wider SEA climatic factors assessment are fully explored.

Introduction

3.3.2 There is a global climate emergency. Due to human activities including industrialisation, deforestation, and large scale agriculture, quantities of GHG in the atmosphere have risen to record levels not seen in three million years³². The concentration of GHGs in the atmosphere is directly linked to the average global temperature, and there is unequivocal evidence that human influence has warmed the atmosphere, ocean and land³³. The scale of recent changes across the climate system as a whole, and the present state of many aspects of the climate system, are unprecedented over many centuries to many thousands of years³³. Scotland's climate has already changed and is both warmer and wetter on average³⁴. In Scotland an estimated 284,000 homes and premises are at risk of flooding; with an additional 110,000 properties predicted to be at risk by the 2080s³⁵.

Relevant Environmental Protection Objectives

3.3.3 The Climate Change (Scotland) Act 2009, as amended³⁶ ('the Climate Change (Scotland) Act') created a statutory framework for GHG emissions reduction in Scotland and set targets for reduction in emissions of the Kyoto Protocol GHGs. This "basket" of seven GHGs include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFC), perfluorocarbons (PFC), sulphur hexafluoride (SF₆) and nitrogen trifluoride (NF₃).

³¹ LUC (2021) Research project: Lifecycle Greenhouse Gas Emissions of NPF4 Proposed National Developments Assessment Findings [online] Available at: <https://www.transformingplanning.scot/national-planning-framework/supporting-information-for-draft-npf4/>

³² United Nations (2021) Climate Change [online] Available at: <https://www.un.org/en/global-issues/climate-change> (accessed 15/10/2021)

³³ The UN Intergovernmental Panel on Climate Change (2021) The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [online] Available at: <https://www.ipcc.ch/report/ar6/wg1/> (accessed 15/10/2021)

³⁴ Kendon M et al. (2021) State of the UK Climate 2020 [online] Available at: <https://rmets.onlinelibrary.wiley.com/doi/10.1002/joc.7285> (accessed 19/10/2021)

³⁵ SEPA (2018) National Flood Risk Assessment 2018 [online] Available at: <https://www.sepa.org.uk/data-visualisation/nfra2018/> (accessed 19/10/2021)

³⁶ Climate Change (Scotland) Act 2009 (asp 12) [online] Available at: <https://www.legislation.gov.uk/asp/2009/12/contents> (accessed 15/10/2021)

- 3.3.4 In direct response to the Paris Agreement³⁷, a legally binding international treaty on climate change, the 2009 Act was amended by the Climate Change (Emissions Reduction Targets) (Scotland) Act 2019³⁸. This set new, more ambitious, targets to reduce emissions of all GHGs to net-zero by 2045 at the latest, with interim targets for reductions of at least 56% by 2020, 75% by 2030 and 90% by 2040, relative to a 1990/1995 baseline. An update to the Climate Change Plan³⁹ was subsequently published to set a pathway to achieve the new targets.
- 3.3.5 The Climate Change (Scotland) Act also requires a programme for climate change adaptation to be set out every 5 years. This must address risks identified in statutory UK Climate Change Risk Assessments (UKCCRA), which are also updated every five years, based on independent expert advice. The second Scottish Climate Change Adaptation Programme (the Adaptation Programme)⁴⁰ addresses the impacts identified for Scotland in the UK Climate Change Risk Assessment (CCRA)⁴¹. The Adaptation Programme sets out Scottish Ministers' objectives in relation to adaptation to climate change, their proposals and policies for meeting these objectives, and the period within which these proposals and policies will be introduced.

Baseline Conditions

Sources of Scottish GHG Emissions

- 3.3.6 The Climate Change (Scotland) Act 2009 (as amended) places annual emissions reporting on a statutory footing. An annual Scottish GHG Inventory is used to report progress against all emissions reduction targets under the Act.
- 3.3.7 In 2019, Scottish source emissions of the basket of seven GHGs were estimated to be 47.8 million tonnes carbon dioxide equivalent (MtCO_{2e})⁴¹. Domestic Transport (excluding International Aviation and Shipping) (12.0 MtCO_{2e}) was the largest source of net emissions, followed by Business (7.9 MtCO_{2e}), Agriculture (7.5 MtCO_{2e}), Energy Supply (6.4 MtCO_{2e}) and Residential (6.2 MtCO_{2e}) (Table 3.1).

³⁷ United Nations (2021) The Paris Agreement [online] Available at: <https://www.un.org/en/climatechange/paris-agreement> (accessed 15/10/2021)

³⁸ The Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 (asp 15), Scottish Parliament, 2019 [online] Available at: <http://www.legislation.gov.uk/asp/2019/15/enacted> (accessed 15/10/2021)

³⁹ Scottish Government (2020) Securing a Green Recovery on a Path to Net Zero: Climate Change Plan 2018–2032 - Update [online] Available at: <https://www.gov.scot/publications/securing-green-recovery-path-net-zero-update-climate-change-plan-20182032/> (accessed 15/10/2021)

⁴⁰ Scottish Government (2019) Climate Ready Scotland: Climate Change Adaptation Programme 2019-2024 [online] Available at: <https://www.gov.scot/publications/climate-ready-scotland-second-scottish-climate-change-adaptation-programme-2019-2024/> (accessed 04/10/2021)

⁴¹ Scottish Government (2021) Scottish Greenhouse Gas Statistics: 1990-2019 [online] Available at: <https://www.gov.scot/publications/scottish-greenhouse-gas-statistics-1990-2019/documents/> (accessed 15/10/2021)

3.3.8 Table 3.1 details GHG emissions by gas and by Scottish Government source sector. Carbon dioxide was the main greenhouse gas emitted or removed in most sectors, with the exceptions of the Agriculture, Land use, Land Use Change and Forestry (LULUCF) and Waste Management sectors. Methane was the main net gas emitted in the Agriculture sector (4.1 MtCO₂e), followed by nitrous oxide (2.2 MtCO₂e) and carbon dioxide (1.1 MtCO₂e). Almost all emissions in the Waste Management sector were emitted in the form of methane (1.4 MtCO₂e). Where Fluorinated gases are emitted, they have been in relatively small amounts via the Business and Residential sectors.

Table 3.1 Scottish Greenhouse Gas Emissions by Gas, 2019⁴².
Values in MtCO₂e

NC Category	Carbon dioxide	Methane	Nitrous oxide	Fluorinated gases	Total
Agriculture	1.1	4.1	2.2		7.5
Business	6.7	0.0	0.1	1.1	7.9
Energy supply	6.0	0.4	0.1		6.4
Industrial processes	0.5	0.0	0.0	0.0	0.5
International aviation and shipping	1.9	0.0	0.0		1.9
Land use, land use change and forestry	-1.7	3.2	1.2		2.7
Public	1.1	0.0	0.0		1.1
Residential	6.0	0.1	0.0	0.1	6.2
Transport	11.9	0.0	0.1		12.0
Waste management	0.0	1.4	0.1		1.5
Total	33.5	9.2	3.8	1.2	47.8

Emission Targets

- 3.3.9 The Climate Change Committee (CCC) recommended a new method of reporting emissions for the purposes of reporting against statutory targets which was implemented for the first time in June 2020. This is known as the GHG Account, and includes net source emissions adjusted to remove the effect of successive revisions to the data over time⁴². On this adjusted basis, the GHG Account reduced by 51.5% between the baseline periods and 2019 (Table 3.2). The Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 specifies a 55.0% reduction over the same period. Therefore the target for 2019 was not met. A statutory report setting out proposals and policies to compensate in future years for the excess emissions resulting from the missed 2019 emissions reduction target was published in October 2021⁴³.

Table 3.2 Calculation of the Scottish GHG Account for 2019⁴²

	Baseline period	2016	2017	2018	2019
GHG Account (latest inventory, less combined revision)	75.7	38.6	37.2	37.8	36.7
GHG Account figures, expressed as a percentage reduction from the baseline period	0.0%	-49.0%	-50.9%	-50.0%	-51.5%

Key Pressures and Trends

Source Emissions Trends

- 3.3.10 As noted above, Scottish source emissions of the basket of seven GHGs were estimated to be 47.8 million tonnes carbon dioxide equivalent (MtCO_{2e}) in 2019. This is a 43.8% reduction in estimated emissions from 1990, a 37.3 MtCO_{2e} decrease.
- 3.3.11 Emissions in 2019 were 2.3% lower than the 2018 figure of 48.9 MtCO_{2e}; a 1.1 MtCO_{2e} decrease. The main contributors to the decrease in emissions between 2018 and 2019 were reductions in emissions in the business (-0.6 MtCO_{2e}), Energy Supply (-0.4 MtCO_{2e}), and Domestic Transport (-0.3 MtCO_{2e}) sectors. All other sectors demonstrated modest reductions over this

⁴² Scottish Government (2021) Scottish Greenhouse Gas Statistics: 1990-2019 [online] Available at: <https://www.gov.scot/publications/scottish-greenhouse-gas-statistics-1990-2019/> (accessed 04/10/2021)

⁴³ Scottish Government (2021) Reducing greenhouse gas emission – proposals and policies: report. [online] Available at <https://www.gov.scot/publications/report-proposals-policies-reduce-greenhouse-gas-emissions-following-annual-target-2019-not-being-met/> Accessed 12/10/2021)

period, with the exception of Land Use, Land Use Change and Forestry (LULUCF) which increased by 0.4 MtCO_{2e}. The Agriculture and International Aviation and Shipping sectors showed essentially no change in emissions in the latest year⁴⁴. Between 1990 and 2019, most sectors saw a general downward trend (Figure 3.7). Energy Supply emissions have seen the largest decrease in GHG emissions (-16.3 MtCO_{2e}, a reduction of 71.8 per cent) followed by LULUCF (-6.4 MtCO_{2e}, a reduction of 70.0 per cent), Business (-4.6 MtCO_{2e}, a reduction of 36.7 per cent), and Waste Management (-4.3 MtCO_{2e}, a reduction of 73.5 per cent). International Shipping and Aviation emissions are the only category to have increased (0.6 MtCO_{2e}, a 46.0 per cent increase) over the period⁴⁴.

⁴⁴ Scottish Government (2021) Scottish Greenhouse Gas Statistics: 1990-2019 [online] Available at: <https://www.gov.scot/publications/scottish-greenhouse-gas-statistics-1990-2019/> (accessed 04/10/2021)

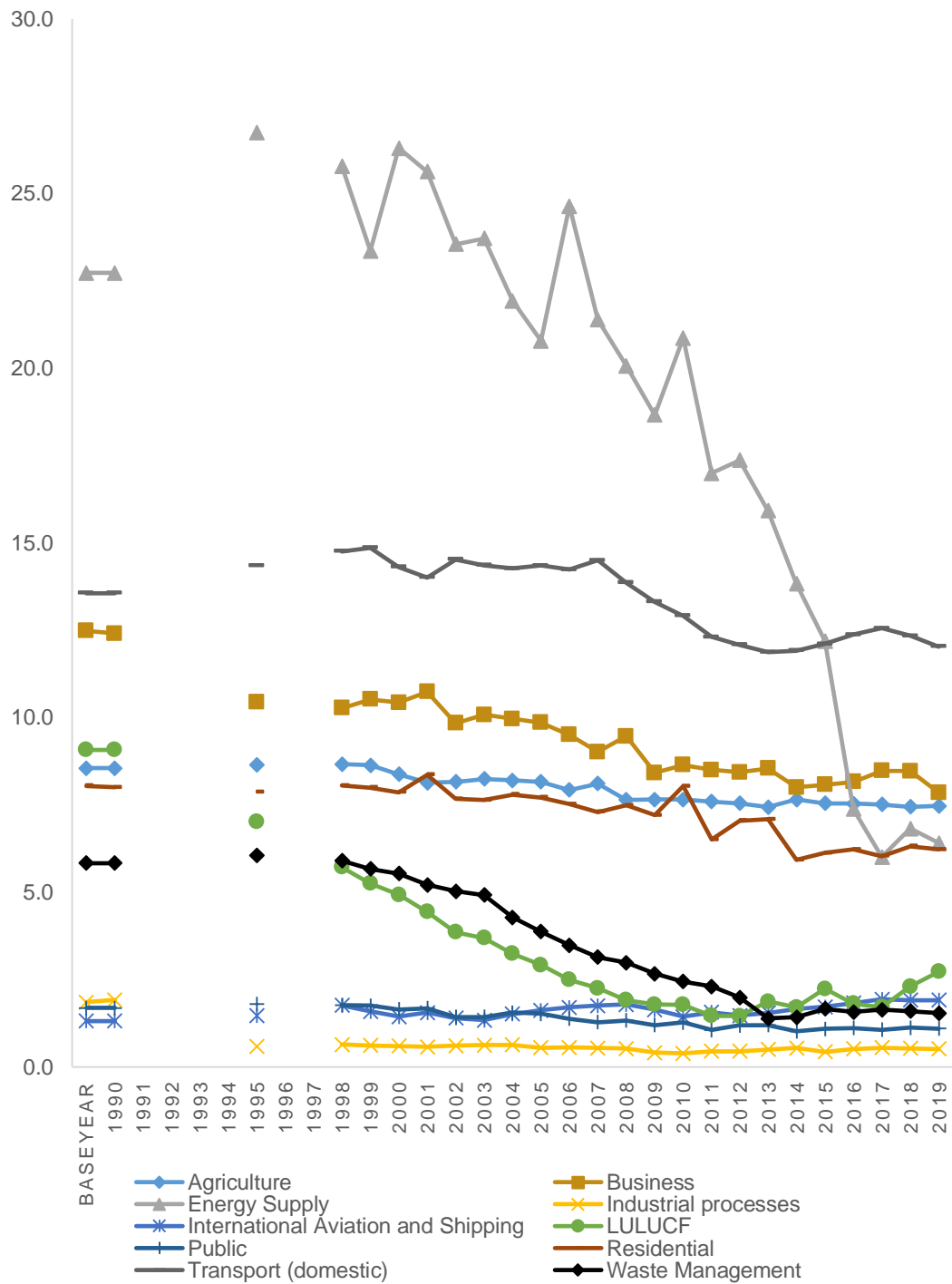


Figure 3.7 Main Sources of Greenhouse Gas Emissions in Scotland, 1990 to 2019. Values in MtCO₂e⁴⁵

⁴⁵ Scottish Government (2021) Scottish Greenhouse Gas Statistics: 1990-2019 [online] Available at: <https://www.gov.scot/publications/scottish-greenhouse-gas-statistics-1990-2019/documents/> (accessed 12/10/2021)

Key Sector GHG Emission Trends

Land use, land use change and forestry (LULUCF)

- 3.3.12 Emissions are reported as a combination of emissions minus removals from the atmosphere. The LULUCF sector includes removals associated with carbon sequestration by grasslands and forestry, as well as the carbon stored in wood products. Carbon emissions can occur where land use changes, for example, where existing cropland or natural land is converted to cropland or settlement⁴⁶. Emissions of other GHG can occur from drainage and rewetting of soils, nitrogen mineralisation associated with loss and gain of soil organic matter, and fires⁴⁷.
- 3.3.13 Additional emissions associated with the historical drainage and rewetting of peatlands have been added to the scope of LULUCF in the latest Scottish GHG inventory (1990-2019)⁴⁷. With this addition, LULUCF emissions in Scotland are now shown to be a net-source of greenhouse gas emissions for all periods where previously this category has been shown to be a net-sink. LULUCF emitted 2.7 MtCO₂e of emissions in 2019; in 1990 emissions were 9.1 MtCO₂e⁴⁷.
- 3.3.14 Peatland restoration had been identified as one of the key actions needed to prevent further carbon loss and help remove excessive GHG from the atmosphere. The Scottish Government's Climate Change Plan Update⁴⁸ sets targets to restore 250,000 ha of degraded peatland by 2030. The Climate Change Plan Update also emphasises the role woodland plays in reducing emissions through sequestration, and introduces a stepped increase in the annual woodland creation rates from 2020-2021.
- 3.3.15 The 'Biodiversity, flora and fauna' and 'Soils' section of this baseline, identifies the areas of forestry and peatland in Scotland, and highlights the pressures of land use intensification, modification and overgrazing which also impacts on GHG release.

Agriculture

- 3.3.16 In 2019, agriculture was responsible for 7.5 MtCO₂e of the total Scottish emissions and was the largest source of methane emissions. This is a 1.1 MtCO₂e (12.7 per cent) reduction in net emissions between 1990 and 2019. Between 2018 and 2019 there was essentially no change in net emissions of overall greenhouse gases from this sector⁴⁹.

⁴⁶ Committee on Climate Change (2013) Factsheet: Land Use, Land Use Change and Forestry [online] Available at: <https://www.theccc.org.uk/wp-content/uploads/2013/03/LULUCF.pdf> (accessed 04/02/2021)

⁴⁷ Scottish Government (2021) Scottish Greenhouse Gas Statistics: 1990-2019 [online] Available at: <https://www.gov.scot/publications/scottish-greenhouse-gas-statistics-1990-2019/> (accessed 15/10/2021)

⁴⁸ Scottish Government (2020) Securing a Green Recovery on a Path to Net Zero: Climate Change Plan 2018–2032 - Update [online] Available at: <https://www.gov.scot/publications/securing-green-recovery-path-net-zero-update-climate-change-plan-20182032/> (accessed 15/10/21)

⁴⁹ Scottish Government (2021) Scottish Greenhouse Gas Statistics: 1990-2019 [online] Available at: <https://www.gov.scot/publications/scottish-greenhouse-gas-statistics-1990-2019/> (accessed 04/10/2021)

- 3.3.17 Emissions from agriculture are predominantly methane and nitrous oxide gases, with smaller amounts of carbon dioxide. Methane emissions have reduced by 14.9% between 1990 and 2019 mainly due to a decrease in livestock numbers.
- 3.3.18 Poor land management leads to increased soil erosion by decreasing the amount of soil organic carbon. This as a result can lead to reduced capacity of soil to sequester carbon and increase the overall carbon emissions from agriculture.

Transport

- 3.3.19 Domestic transport has consistently been a large part of Scotland's emissions, and was the largest source of net emissions in 2019. Emissions show a relatively small decrease of 11.3% between 1990 (13.6 MtCO₂e) and 2019 (12.0 MtCO₂e). These emissions have decreased by 0.3 MtCO₂e (2.5%) between 2018 and 2019⁴⁹.
- 3.3.20 Emissions from international aviation and shipping has increased by 0.6 MtCO₂e (46.0 per cent) from 1990 to 2019. There was essentially no change in emissions between 2018 and 2019, with the value remaining at 1.9 MtCO₂e.
- 3.3.21 Improved efficiency for given car classes enforced by international standards⁵⁰ contributes to lower emissions, however this is counterbalanced by increases in kilometres driven as traffic levels (vehicle km) have increased slightly over the last few years⁵¹.
- 3.3.22 Newly registered cars are becoming more efficient, and there has been an increase in the numbers of ultra-low emission vehicles registered in Scotland with 22,095 vehicles registered at the end of September 2020, a 24% increase since March 2020. However, this still represents a very small proportion of cars on roads⁵².
- 3.3.23 Although Scotland has implemented policies such as Smarter Choices Smarter Places, and the Cycling Action Plan, there has been no significant behavioural shift away from cars towards public transport, walking and cycling in the last decade⁵³.

⁵⁰ Committee on Climate change (2020) Reducing Emissions in Scotland Progress Report to Parliament [online] Available at: <https://www.theccc.org.uk/wp-content/uploads/2020/10/Reducing-emissions-in-Scotland-Progress-Report-to-Parliament-FINAL.pdf> (accessed 03/02/2021)

⁵¹ Transport Scotland (2020) Carbon Account for Transport No. 12: 2020 Edition [online] Available at: <https://www.transport.gov.scot/media/48199/sct07209535161.pdf> (accessed 01/02/2021)

⁵² Transport Scotland (2020) Scottish Transport Statistics No 39: 2020 Edition [online] Available at: <https://www.transport.gov.scot/media/49177/scottish-transport-statistics-2020-publication-final-version.pdf> (accessed 13/04/2021)

⁵³ Committee on Climate change (2020) Reducing Emissions in Scotland Progress Report to Parliament [online] Available at: <https://www.theccc.org.uk/wp-content/uploads/2020/10/Reducing-emissions-in-Scotland-Progress-Report-to-Parliament-FINAL.pdf> (accessed 03/02/2021)

Energy

- 3.3.24 The Energy Supply category has seen large reductions in emissions from 22.7 MtCO₂e in 1990 to 6.4 MtCO₂e in 2019 (71.8%)⁵⁴. These reductions are mainly driven by the complete cessation of coal use in electricity generation and reductions in emissions from power stations, balanced by the expansion of renewable capacity. The progress in decarbonising the electricity generation sector now provides the basis for decarbonising other sectors of the economy via electrification⁵³.

Waste

- 3.3.25 Emissions from waste management have been relatively static over recent years, with a value of 1.5 MtCO₂e for 2019, very slightly down from 1.6 MtCO₂e between 2016-2018. However, between 1990 and 2019 emissions reduced by 4.3 MtCO₂e (73.5 per cent). Almost all emissions in the waste management sector were emitted in the form of methane (1.4 MtCO₂e). This decrease is largely due to the progressive introduction of methane capture and oxidation systems within landfill management⁵⁴.
- 3.3.26 The Scottish Carbon Metric measures the whole-life carbon impacts of Scotland's waste⁵⁵. The most recent report indicates that in 2019, Scottish household waste increased by 0.7% to 2.4 million tonnes. The household waste recycling rate was 44.9%, a slight increase from 44.7% in 2018, and the volume of Scottish household waste landfilled in 2019 was 758,141 tonnes, a reduction of 26.5% from 2018⁵⁶. Additional information on waste generation and recycling is provided in the 'Material Assets' section of this baseline.
- 3.3.27 The total carbon impacts per tonne of household waste has steadily declined since 2011, primarily due to increased recycling rates and reduced waste to landfill. The net carbon intensity of Scottish Household waste decreased by 2% in 2019 to 2.34 tCO₂e /tonne⁵⁵.
- 3.3.28 The carbon impacts of household waste decreased by 1.6% from 2018 to 5.7 MtCO₂e equivalent in 2019, resulting in the lowest recorded carbon impacts for household waste since Carbon Metric reporting began in 2011⁵⁷.

⁵⁴ Scottish Government (2021) Scottish Greenhouse Gas Statistics: 1990-2019 [online] Available at: <https://www.gov.scot/publications/scottish-greenhouse-gas-statistics-1990-2019/> (accessed 01/09/2021)

⁵⁵ Zero Waste Scotland (2021) The Carbon Footprint of Scotland's Household Waste [online] Available at: <https://www.zerowastescotland.org.uk/download/carbon-footprint-scotlands-household-waste> (accessed 28/10/2021)

⁵⁶ SEPA (2021) Scottish Household Waste [online] Available at: <https://informatics.sepa.org.uk/HouseholdWaste/> (accessed 28/10/21)

⁵⁷ Zero Waste Scotland (2021) The Carbon Footprint of Scotland's Household Waste [online] Available at: <https://www.zerowastescotland.org.uk/download/carbon-footprint-scotlands-household-waste> (accessed 28/10/2021)

Circular Economy

- 3.3.29 A circular economy can reduce the demand for raw material in products; to encourage reuse, repair and manufacture by designing and selling products and materials to last as long as possible, in line with the waste hierarchy.
- 3.3.30 In order to reduce the carbon footprint of infrastructure it is important that account is taken of the energy that is embodied in the materials used⁵⁸. The dictionary of energy defines “embodied energy” as “the sum of the energy requirements associated, directly or indirectly, with the delivery of a good or service”⁵⁸. This includes the emissions caused by extraction, manufacturing/processing, transportation and assembly of every product and element in an asset⁵⁹. In some cases, (depending on the boundary of an assessment), it may also include the maintenance, replacement, deconstruction, disposal and end-of-life aspects of the material and systems that make up the asset⁵⁹. It excludes operational emissions of the asset.
- 3.3.31 Taking a circular economy approach to construction, such as designing to enable adaptability and use of discrete elements that can facilitate low cost repair and maintenance, can increase life-span and can reduce the need for new construction materials with associated embodied carbon. Designing out waste from the outset is estimated to have the potential to divert 11 million tonnes from landfill⁶⁰.

Residential

- 3.3.32 The residential sector is dominated by direct fuel combustion in households. There has been a decrease in direct fuel combustion of 22.3% between 1990 and 2019, mainly due to a switch from less efficient solid (e.g. coal) and liquid fuels to natural gas for heating, and improvements in energy efficiency. Residential emissions decreased between 2018 and 2019 by 1.5%. This marginal change was possibly driven by a warmer January-March in 2019 compared to 2018, resulting in less fuel burned for domestic heating⁶¹. Scotland’s building stock is extremely varied in terms of building type, construction method, age and energy efficiency rating. Natural gas is used to supply the majority of heat in Scotland, but electricity and heating oil also account for significant shares. More recently, renewable sources have been used for supplying heat and they include biomass, heat pumps and Energy

⁵⁸ Institute of Civil Engineers (2015) Embodied Energy and Carbon [online] Available at: <https://www.ice.org.uk/knowledge-and-resources/briefing-sheet/embodied-energy-and-carbon> (accessed 03/02/2020)

⁵⁹ UK Green Building Council (2017) Embodied Carbon: Developing a Client Brief [online] Available at: <https://www.ukgbc.org/wp-content/uploads/2017/09/UK-GBC-EC-Developing-Client-Brief.pdf> (accessed 20/06/2021)

⁶⁰ Zero Waste Scotland (undated) Reducing Construction Waste [online] Available at: <https://www.zerowastescotland.org.uk/content/reducing-construction-waste> (accessed 20/06/2021)

⁶¹ Scottish Government (2021) Scottish Greenhouse Gas Statistics: 1990-2019 [online] Available at: <https://www.gov.scot/publications/scottish-greenhouse-gas-statistics-1990-2019/> (accessed 01/09/2021)

from Waste (EfW)⁶². The remaining challenge to decarbonising buildings in Scotland includes provision of heating and hot water. Specifically, it includes low-carbon heat and energy efficiency in existing homes and ensuring that new homes use low-carbon heat, are ultra-energy efficient and are resilient to a changing climate.

- 3.3.33 The Scottish House Condition Survey 2019 highlights that 45% of Scottish homes were rated as Energy Performance Certificate rating C or better and only one third of dwellings had an Environmental Impact Rating in band C or better. Approximately 17% of dwellings in Scotland are estimated to be off gas grid. The majority (93%) of urban dwellings are within the coverage of the gas grid, whereas 65% of those in rural areas are not⁶³.
- 3.3.34 Electrification of heat and power for homes is significant in terms of achieving carbon reductions for buildings and business. For new build homes, net zero standards are anticipated to come into force in 2024.
- 3.3.35 Timber is frequently used in construction, and it accounts for 75% of all new homes in Scotland, locking carbon in for the life of the building. It is estimated that a typical timber-framed house saves 4 tonnes of carbon dioxide compared with an equivalent masonry house. Moreover, timber creates less waste, and has lower emissions in its manufacture than materials such as brick, plastic, concrete or steel.

Climate trends and adaptation

- 3.3.36 Scotland's climate has already changed. Over the last few decades Scotland has experienced a warming trend, shifting rainfall patterns and rising sea levels⁶⁴:
- Scotland's 10 warmest years on record have all occurred since 1997. The average temperature in the last decade (2010-2019) was around 0.7 °C warmer than the 1961-1990 average.
 - There has been an increase in rainfall over Scotland in the past few decades, with an increasing proportion coming from heavy rainfall events. The annual average rainfall in the last decade (2010-2019) was 9% wetter than the 1961-1990 average.
 - Average sea level around the UK has risen by approximately 1.4 mm/year from the start of the 20th century.

⁶² Scottish Government (2019) Energy Efficient Scotland: The Future of Low Carbon Heat for off Gas Buildings – Call for Evidence [online] Available at: <https://www.gov.scot/publications/energy-efficient-scotland-future-low-carbon-heat-gas-buildings-call-evidence/> (accessed 05/02/2021)

⁶³ Scottish government (2020) Scottish House Condition Survey: 2019 Key Findings [online] Available at: <https://www.gov.scot/publications/scottish-house-condition-survey-2019-key-findings/pages/4/> (accessed 05/02/2021).

⁶⁴ Adaptation Scotland (2021) Climate Trends and Projections [Online] Available at: <https://adaptationscotland.org.uk/why-adapt/climate-trends-and-projections> (accessed 29/10/2021)

- 3.3.37 Key long-term climate change trends for Scotland are:
- Average temperatures will increase across all seasons
 - Weather will remain variable and may become more variable
 - Typical summers will be warmer and drier
 - Typical winters will be milder and wetter
 - Intense, heavy rainfall events will increase in both winter and summer
 - Sea levels will rise
 - Reduced frost and snowfall
- 3.3.38 Climate change adaptation aims to increase society's resilience to climate change. Adaptation serves as a framework for managing future risk, and offers the potential of reducing future economic, environmental and social costs⁶⁵. It refers to changes in processes, practices, and structures to minimise potential damages or to benefit from opportunities associated with climate change. Adaptation solutions take different shapes and forms, and there is no 'one-size-fits-all-solution'⁶⁶. Climate adaptation will be crucial to ensure that Scotland's society and economy will be resilient to future climate impacts.
- 3.3.39 The extent of the effects of climate change will vary by location and projections indicate that climate change trends observed over the last century will continue and intensify over the coming decades.
- 3.3.40 It is predicted that the greatest climate change impacts for the UK are large increases in flood risk, exposure to high temperatures and heat waves; shortages in the public water supply and for agriculture, energy production and industry; substantial risks to wildlife and natural ecosystems risks to domestic and international food production and trade⁶⁷.
- 3.3.41 Climate change can also give rise to indirect impacts arising from mitigation and adaptation measures. For example, renewable energy is crucial to meeting Scotland's emissions reduction targets. However, individual technologies can have negative environmental impacts such as localised visual effects, changes in landscape and land use, and impacts on biodiversity, water and air quality, amongst others. Climate change has been identified as a primary pressure on the SEA topic areas of air quality, population and human health, soil, water, biodiversity, cultural heritage and

⁶⁵ European Commission (undated) Adaptation to Climate Change [online] Available at: https://ec.europa.eu/clima/policies/adaptation_en#:~:text=An%20Adaptation%20Strategy%20aims%20to,economic%2C%20environmental%20and%20social%20costs. (accessed 05/02/2021)

⁶⁶ United Nations Climate Change (undated) What do Adaptation to Climate Change and Climate Resilience Mean? [online] Available at: <https://unfccc.int/topics/adaptation-and-resilience/the-big-picture/what-do-adaptation-to-climate-change-and-climate-resilience-mean> (accessed 05/02/2021)

⁶⁷ Scottish Natural Heritage (2014) SNH Commissioned Report 761 – Assessment of carbon budgets and Potential Blue Carbon Stores in Scotland's Coastal and Marine Environment [online] Available at: <https://www.nature.scot/snh-commissioned-report-761-assessment-carbon-budgets-and-potential-blue-carbon-stores-scotlands> (accessed 01/02/2021)

the historic environment. These pressures and predicted impacts have been discussed further under the individual SEA topics.

- 3.3.42 Further changes in temperature and rainfall are expected to change the patterns of Scotland's agricultural land-uses and could lead to increased pressure on the land⁶⁸.

Relevant SEA Objectives

- 3.3.43 The above baseline conditions, pressures and trends helped identify the following SEA objectives for climatic factors:

Topic	SEA objectives
Climatic factors	Avoid new Greenhouse Gas (GHG) emissions
	Reduce GHG emissions in order to meet Scotland's emissions reduction target of net zero by 2045
	Promote and enable adaptation to climate change

Climatic Factors - Summary of Pressures and Trends

- Source emissions continue to fall.
- Between 1990 and 2019, there was a 43.8 per cent reduction in estimated emissions, a 37.3 MtCO₂e decrease.
- The most significant contributors to this decrease were energy supply, waste management, business and land use, land use change and forestry (LULUCF).
- In 2019, domestic transport was the largest source of net emissions.
- Climate change adaptation needs to be integrated into all aspects of future development to withstand the impacts of changes in weather patterns, and sea level rise.

⁶⁸ NatureScot (2019) Farming and Climate Change [online] Available at: <https://www.nature.scot/professional-advice/land-and-sea-management/managing-land/farming-and-crofting/farming-and-climate-change> (accessed 20/08/2021)

3.4 Air

3.4.1 Air pollution has significant effects on public health and the environment. Exposure to air pollution is harmful to human health in terms of premature mortality and morbidity, mainly related to respiratory and cardiovascular disease⁶⁹. Air pollution can impact on the more vulnerable members of society – the very young, the elderly and those with existing health conditions such as asthma, respiratory and heart disease, thus making air quality an important health inequalities issue⁶⁹ (refer to section 3.10 Population and Human Health). Air pollution also effects ecosystems. Air pollution and its deposition onto vegetation, soil and water can damage vegetation directly or indirectly through the addition of nutrients or changes in acidity levels within a habitat. These can lead to a shift in the competitive balance between species, changes in plant species composition or subtle changes in vegetation structure, which can affect the use of a habitat by an animal species⁷⁰. Refer to section 3.2 Biodiversity, Flora and Fauna for further information.

Relevant Environmental Protection Objectives

3.4.2 Cleaner Air for Scotland 2⁶⁹, sets out the Scottish Government's air quality policy framework with a series of actions to deliver continued air quality improvement and secure compliance with international commitments. The strategy notes that policies that improve air quality can potentially have multiple co-benefits for biodiversity, population health, for addressing inequality and for mitigating and adapting to climate change. For example, policies to promote active travel such as walking, wheeling and cycling, can increase physical activity, significantly reduce cardiovascular incidence and mortality, and have been shown to reduce all-cause mortality.

3.4.3 The National Emission Ceilings Directive⁷¹ (NECD) (2016/2284/EU) sets national emission ceilings for certain atmospheric pollutants in keeping with the United Nations Economic Commission for Europe (UNECE) Convention on Long-Range Transboundary Air Pollution of 1979⁷² (CLRTAP) and, in particular, its 1999 Protocol⁷³ to Abate Acidification, Eutrophication and Ground-level Ozone of 1999, which was revised in 2012 (the revised Gothenburg Protocol). The NECD transposes 2020 targets agreed under the

⁶⁹ Scottish Government (2021) Cleaner Air for Scotland 2 [online] Available at: <https://www.gov.scot/publications/cleaner-air-scotland-2-towards-better-place-everyone/> (Accessed 26/10/2021)

⁷⁰ Institute of Air Quality Management (2019) A Guide to the Assessment of Air Quality Impacts on Designated Nature Conservation Sites [Online] Available at: <https://iaqm.co.uk/text/guidance/air-quality-impacts-on-nature-sites-2019.pdf> (Accessed 26/10/2021)

⁷¹ Directive (EU) 2016/2284 [online] Available at: <https://eur-lex.europa.eu/eli/dir/2016/2284/oj> (accessed 02/11/2021)

⁷² Convention on Long-range Transboundary Air Pollution (1979) [online] Available at: <https://unece.org/convention-and-its-achievements> (accessed 02/11/2021)

⁷³ 1999 Protocol to Abate Acidification, Eutrophication and Ground-level Ozone and its 2012 Amended Version [online] Available at: <https://unece.org/protocols> (accessed 02/11/2021)

revised Gothenburg Protocol, along with more ambitious targets for 2030. The NECD is part of retained EU law and has been transposed into domestic law through the National Emission Ceilings Regulations (NECR) 2018⁷⁴ with the requirements implemented at UK level through a National Air Pollution Control Programme⁷⁵ (NAPCP).

Local Air Quality Management

- 3.4.4 Objectives relevant to local air quality management (LAQM) are set out in the Air Quality (Scotland) Regulations 2000⁷⁶, as amended. Where targets are not met, local authorities must declare an Air Quality Management Area (AQMA) and produce an action plan setting out measures to address the issues identified.

Baseline

- 3.4.5 There are currently 100 monitoring sites in Scotland which record pollutant concentrations, including ground-level ozone, ammonia, nitrogen oxides, sulphur oxides, carbon monoxide and PM. Currently, 36 AQMAs have been declared, with 14 of Scotland's 32 local authorities having declared at least one⁷⁷. All but two of the AQMAs were declared for transport-related exceedances of nitrogen dioxide and/or PM₁₀. The majority of issues in these AQMAs relate to localised pollution hotspots within urban centres. The remaining two AQMAs have been declared for industrial emissions of sulphur dioxide and PM₁₀ respectively⁷⁷.

Key Pressures and Trends

- 3.4.6 In summary, emissions of the eight main air pollutants (NH₃, CO, NO_x, NMVOCs, PM₁₀, PM_{2.5}, SO₂, and Pb) were lower in 2019 than they were in 2005⁷⁸. SO₂ emissions show the greatest rate of decline, with more modest declines evident for CO, NO_x, Pb, VOCs, PM_{2.5} and PM₁₀. By contrast, emissions of NH₃ are less varied over the time series with no strong decline observed since 2005 (Figure 3.8).

⁷⁴ The National Emission Ceilings Regulations 2018 [online] Available at: <https://www.legislation.gov.uk/ukxi/2018/129/contents/made> (accessed 02/11/2021)

⁷⁵ DEFRA (2019) Air Quality: National Air Pollution Control Programme [online] Available at: <https://www.gov.uk/government/publications/air-quality-uk-national-air-pollution-control-programme> (accessed 03/11/2021)

⁷⁶ The Air Quality (Scotland) Regulations 2000 [online] Available at: <https://www.legislation.gov.uk/ssi/2000/97/contents/made> (accessed 02/11/2021)

⁷⁷ Air Quality in Scotland (2021) Air Quality Management Areas [online] Available at: <http://www.scottishairquality.co.uk/laqm/aqma> (accessed 08/10/2021)

⁷⁸ National Atmospheric Emission Inventory (2021) Air Quality Pollutant Inventories for England, Scotland, Wales and Northern Ireland: 2005-2019 [Online] Available at: https://naei.beis.gov.uk/reports/reports?report_id=1030 (accessed 27/10/21)

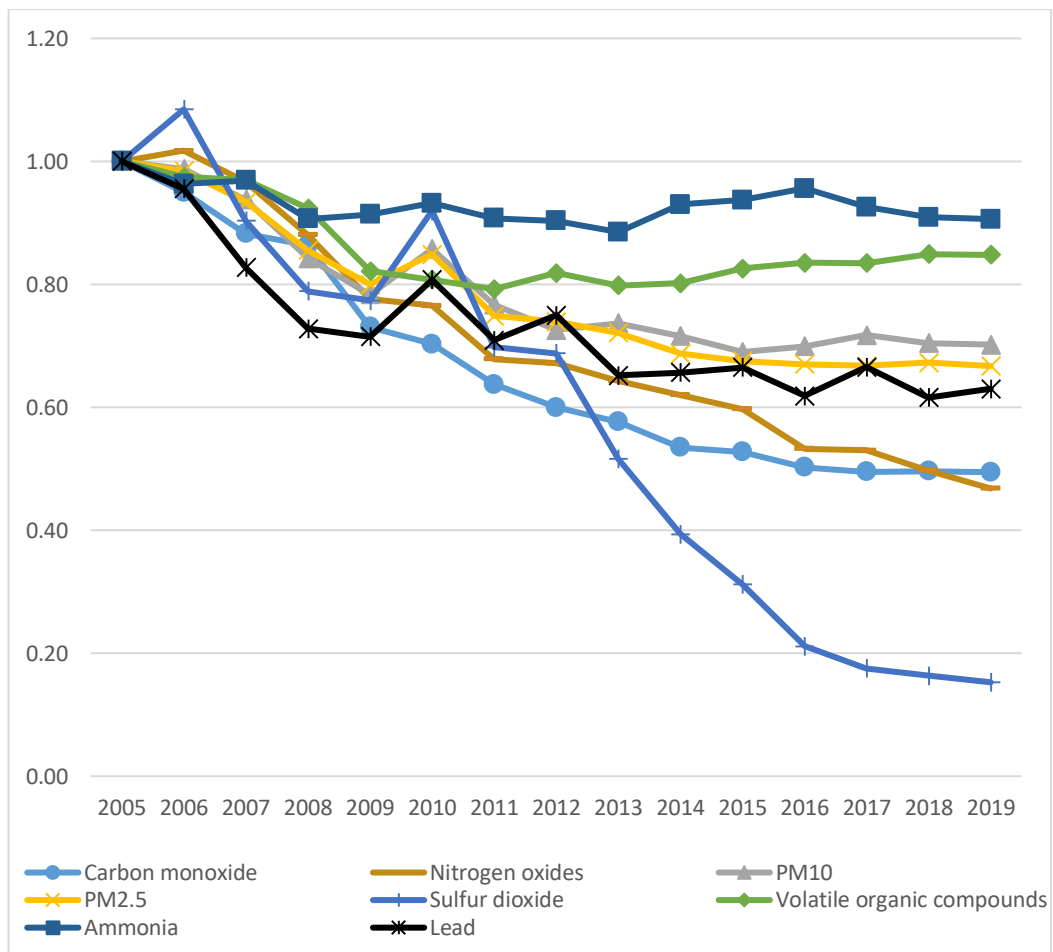


Figure 3.8 Scotland normalised trends for key pollutants⁷⁹

Emission trends

Ammonia (NH₃)

3.4.7 In 2019, emissions of ammonia in Scotland were estimated to be 31kt, a decline of 9% since 2005. Agriculture is the main source of ammonia emissions, with initial reductions driven primarily by decreases in livestock numbers and declines in the use of nitrogen-based fertilisers. However, since 2010, the decline began to be offset by increased application of urea-based and organic fertilisers to agricultural soils causing fluctuating emissions totals, with no significant trends since⁷⁹.

Carbon monoxide (CO)

3.4.8 In 2019, emissions of carbon monoxide in Scotland were estimated to be 113 kt, a decline by 51% since 2005. This decline is due to changes in the contribution of transport sources, particularly in the road sector where emissions have declined by 86% since 2005. This trend is associated with increased numbers of vehicles compliant with more recent standards, and a

⁷⁹ National Atmospheric Emission Inventory (2021) Air Quality Pollutant Inventories for England, Scotland, Wales and Northern Ireland: 2005-2019 [Online] Available at: https://naei.beis.gov.uk/reports/reports?report_id=1030 (accessed 27/10/21)

switch from petrol cars to diesel cars which have lower associated CO emissions rates. Emissions from the residential, commercial and public sector combustion have steadily increased since 2005 which corresponds with an increase in use of wood fuel in the domestic sector⁸⁰.

Nitrogen oxides

- 3.4.9 In 2019, emissions of nitrogen oxides in Scotland were estimated to be 85kt, a decline of 53% since 2005. Emission reductions are predominantly due to changes in transport sources, particularly in road transport. This decline is associated with more stringent emission standards and improvements in catalyst repair rates. However, an uptake of diesel cars over petrol cars partly offsets these emissions reductions, as diesel cars emit higher NO_x relative to their petrol counterparts⁸⁰.
- 3.4.10 Energy industry emissions have declined since 2005, linked to installation of abatement systems at Longannet and Cockerhills power stations. Longannet power station closed in March 2016 marking the end of coal combustion for power generation in Scotland, and causing a step-change in emissions between 2015 and 2016⁸⁰.

PM₁₀

- 3.4.11 In 2019, emissions of PM₁₀ in Scotland were estimated to be 14kt, declining by 30% since 2005. Transport sources, residential and industrial processes each accounted for over 16% of total emissions in 2019. Reductions in PM₁₀ emissions from energy, primarily due to abatement at coal-fired stations, the increase in renewable energy sources and the increase in the use of natural gas in energy generation in place of coal⁸⁰.
- 3.4.12 In the transport sector, decreasing exhaust emissions from diesel-fuelled vehicles are leading to PM₁₀ emission reductions. However, non-exhaust sources of PM₁₀ (for example tyre wear) have become more important to consider as exhaust PM₁₀ has been reduced, with 79% of emissions from the road transport sector related to non-exhaust sources in 2019. Emissions from the residential and other combustion sectors have slightly increased recently, and is considered due to an increasing quantity of wood fuel use⁸⁰.

PM_{2.5}

- 3.4.13 In 2019, emissions of PM_{2.5} in Scotland were estimated to be 9kt, declining by 33% since 2005. The primary drivers for this decline are the continued switch from coal to natural gas in electricity generation, and reductions in emissions from the transport sector. However, these declines in emissions

⁸⁰ National Atmospheric Emission Inventory (2021) Air Quality Pollutant Inventories for England, Scotland, Wales and Northern Ireland: 2005-2019 [Online] Available at: https://naei.beis.gov.uk/reports/reports?report_id=1030 (accessed 27/10/21)

have been offset by increases in emissions from the residential sector, and in particular, the combustion of wood⁸¹.

Sulphur dioxide

3.4.14 In 2019, emissions of sulphur dioxide in Scotland were estimated to be 14kt, declining by 85% since 2005. This is primarily due to continued changes in the power generation sector including improved emission controls on some large coal fired plants; the use of coal of lower sulphur content in later years at Cockerzie (Scottish Power, 2012) before its closure in 2013, and finally the complete cessation of coal combustion for power generation in Scotland in 2016. SO₂ emissions from transport sources have also declined, coincident with the reduced sulphur content of road fuels, for both petrol and diesel⁸¹.

Lead

3.4.15 In 2019, emissions of lead in Scotland were estimated to be 5.5 tonnes, declining by 37% since 2005 due to changes in energy sources, industrial combustion, and industrial processes. Emissions from power stations have decreased by 86% since 2005, due to the phase out of coal from the energy generation mix in 2016. Transport sources, in particular non-exhaust emissions, account for 50% of total lead emissions in 2019. Industrial combustion accounted for 15% of total lead emissions in 2019, and use of fireworks contributed a further 10%. Three of the seven sites in the UK which manufacture fibreboard, chipboard and oriented strand board are located in Scotland, and are key sites for lead emissions due to the burning of waste wood as fuel⁸¹.

Relevant SEA Objectives

3.4.16 The above baseline conditions, pressures and trends helped identify the following SEA objectives for air:

SEA Topic	SEA Objectives
Air	Avoid adverse impacts to air quality
	Reduce emissions of key pollutants and improve air quality throughout Scotland
	Reduce levels of nuisance e.g. noise, vibration, dust, odour and light

⁸¹ National Atmospheric Emission Inventory (2021) Air Quality Pollutant Inventories for England, Scotland, Wales and Northern Ireland: 2005-2019 [Online] Available at: https://naei.beis.gov.uk/reports/reports?report_id=1030 (accessed 27/10/21)

Air – Summary of Pressures and Trends

- Air pollution has significant effects on human health, and is an important health inequalities issue.
- Air pollution can also effect habitats and species.
- Currently, 36 AQMAs have been declared in Scotland, 34 are transport-related and the remaining two have been declared for industrial emissions.
- Emissions of the eight main air pollutants are lower in 2019 than they were in 2005.
- Sulphur dioxide emissions show the greatest rate of decline, with more modest declines evident for other pollutants. Emissions of Ammonia show no strong decline since 2005.
- The main sources of emissions are transport, domestic and industrial.
- Policies that improve air quality can potentially have multiple co-benefits for biodiversity, population health, for addressing inequality and for mitigating and adapting to climate change.

3.5 Water

Relevant Environmental Protection Objectives

- 3.5.1 Objectives for the protection and improvement of Scotland's water environment are set out in a policy and regulatory framework, including through the Water Environment and Water Services (Scotland) Act 2003 (as amended)⁸² which governs objectives for rivers, lochs, transitional waters, coastal waters and groundwater resources. Objectives and action programmes are set out in River Basin Management Plans⁸³ (RBMPs), produced by SEPA every six years.
- 3.5.2 Activities that may affect Scotland's water environment, including discharges of wastewater or industrial effluent; abstractions for irrigation, hydropower or drinking water; and engineering activities in or near rivers are controlled by The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended)⁸⁴.

Baseline Conditions

- 3.5.3 Water provides numerous benefits including; drinking water provision, water for use in industry and agriculture, hydropower, wave and tidal energy, fisheries, aquaculture, recreation from, for example, wildlife watching, angling and water sports^{85,86}, and carbon storage⁸⁷. The water environment also supports diverse species and habitats of national and international importance.
- 3.5.4 Scotland has a wide range of water bodies including two thirds of British river systems and streams, varying from mountain burns to wide lowland rivers such as the Tay. There are over 30,000 lochs in Scotland, Loch Ness holds the most water with 7.4 million m³, more than all English and Welsh lakes combined⁸⁸. Scotland's coast stretches 18,000 km with marine waters out to 12 and 200 nautical miles making up Scotland's territorial and offshore waters, which combined make up 13% of all European seas. There are also 1,526 protected areas associated with the water environment. These are

⁸² Water Environment and Water Services (Scotland) Act 2003 [online] Available at: <https://www.legislation.gov.uk/asp/2003/3/contents> (accessed 29/10/2021)

⁸³ SEPA (2021) River Basin Management Planning [online] Available at: <https://www.sepa.org.uk/environment/water/river-basin-management-planning/> (accessed 29/10/2021)

⁸⁴ The Water Environment (Controlled Activities) (Scotland) Regulations 2011 [online] Available at: <https://www.legislation.gov.uk/ssi/2011/209/contents/made> (accessed 29/10/2021)

⁸⁵ Scotland's Environment (2019) Scotland's Freshwater [online] Available at: <https://www.environment.gov.scot/our-environment/water/scotland-s-freshwater/> (accessed 17/08/2021).

⁸⁶ Scotland's Environment (2016) Scotland's Seas [online] Available at: <https://www.environment.gov.scot/our-environment/water/scotland-s-seas/> (accessed 17/08/2021).

⁸⁷ Shafiee R. (2021) Blue Carbon [online] Available at: <https://digitalpublications.parliament.scot/ResearchBriefings/Report/2021/3/23/e8e93b3e-08b5-4209-8160-0b146bafec9d> (accessed 17/08/2021)

⁸⁸ NatureScot (2020) Freshwater Lochs [Online] Available at <https://www.nature.scot/landscapes-and-habitats/habitat-types/lochs-rivers-and-wetlands/freshwater-lochs> (accessed 28/10/2021)

shellfish waters, predominantly found along Scotland’s west coast and in the Shetland Islands, bathing waters, areas protected for wildlife conservation or areas used to supply drinking water⁸⁹.

3.5.5 Much of the water environment in Scotland is in good condition. However, there are still significant problems affecting water quality, physical condition, water flows and levels, and the migration of wild fish. Invasive non-native species are also damaging aquatic plant and animal communities. The river basin management plans for Scotland set out a range of actions to address these impacts⁹⁰.

Key Pressures and Trends

3.5.6 In 2019, 63% of Scotland’s surface waters were assessed as being in good or better condition, improving 8% since 2007 (Figure 3.9), and 84% of groundwaters were assessed as good condition in the same year, an 8% improvement on 2012. It is forecasted that 71% of waterbodies are expected to be in good or better condition by 2021 an almost 8% increase from the start of the last RBMP cycle⁹¹. In 2018, 73% of Scotland’s bathing waters were in good condition or better condition, up from 66% in 2015⁹².

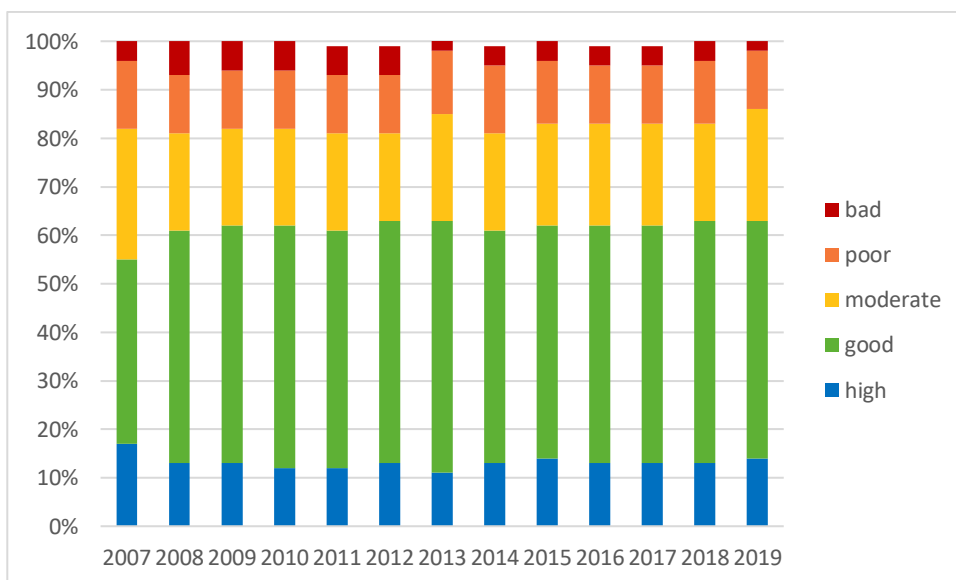


Figure 3.9 Overall status of surface waters in Scotland
Source: SEPA⁹²

⁸⁹ Natural Scotland (2019) Scotland’s Water Environment 2019: A Summary and Progress Report [online] Available at: <https://www.sepa.org.uk/environment/water/river-basin-management-planning/publications/> (accessed 29/10/2021)

⁹⁰ SEPA (2021) River Basin Management Planning [online] Available at: <https://www.sepa.org.uk/environment/water/river-basin-management-planning/> (accessed 28/10/2021)

⁹¹ Natural Scotland (2019) Scotland’s Water Environment 2019: A Summary and Progress Report [online] Available at: <https://www.sepa.org.uk/environment/water/river-basin-management-planning/publications/> (accessed 29/10/2021)

⁹² SEPA (undated) Water Classification Hub [online] Available at: <https://www.sepa.org.uk/data-visualisation/water-classification-hub/> (accessed 28/10/2021)

- 3.5.7 Key pressures on the surface water environment include urbanisation, invasive non-native species, intensive agriculture/aquaculture and climate change. Rural and urban diffuse pollution remains a concern for water quality, particularly in relation to agriculture, forestry, and urban development⁹³. Groundwater quality and flow can be affected by diffuse pollution from rural sources, discharges from industries such as mining and quarrying, and agriculture irrigation⁹⁴. Water abstraction and storage can also place a burden on water resources, with public demand, and abstraction and demand for irrigation in agriculture both growing⁹⁵.
- 3.5.8 As mentioned under the Air topic, airborne pollution can impact water bodies. Heightened nitrogen concentrations can cause the acidification and eutrophication of water bodies. Eutrophication occurs when the concentrations of otherwise limiting nutrients increase, allowing aquatic plants and algae to grow unchecked and deplete oxygen levels.
- 3.5.9 Flooding can have significant and long-lasting impacts on people, communities, and businesses. Flood Risk Management Strategies⁹⁶ coordinate action to tackle flooding in Scotland, setting out the national direction for flood risk management and helping target investment and coordinate action across public bodies. Flood risk maps show where areas are likely to be at risk of flooding from rivers, seas and surface water⁹⁷.
- 3.5.10 Water scarcity is expected to increase due to climate change⁹⁸ with Scotland predicted to experience more frequent and more severe droughts with associated implications on water availability for drinking, agriculture and ecosystems⁹⁹. The vulnerability to water scarcity is not expected to be evenly distributed, the west of Scotland is predicted to become wetter and the east drier, with the north-east expected to face the most issues around water

⁹³ SEPA (2015) The River Basin Management Plan for the Scotland River Basin District: 2015–2027 [online] Available at: <https://www.sepa.org.uk/media/163445/the-river-basin-management-plan-for-the-scotland-river-basin-district-2015-2027.pdf> (accessed 14/01/2020)

⁹⁴ SEPA (undated) Groundwater [online] Available at: <https://www.sepa.org.uk/regulations/water/groundwater/> (accessed 29/10/2021)

⁹⁵ SEPA (2019) Guidance on Consideration of Water in SEA [online] Available at: <https://www.sepa.org.uk/media/162987/lups-sea-gu3-consideration-of-water-in-sea.pdf> (accessed 27/08/2021)

⁹⁶ SEPA (undated) Flood Risk Management Strategies [online] Available at: <http://apps.sepa.org.uk/FRMStrategies/> (accessed 16/06/2021)

⁹⁷ SEPA (undated) Flood Maps [online] Available at: <http://www.sepa.org.uk/environment/water/flooding/flood-maps/> (accessed 14/01/2020)

⁹⁸ SEPA (undated) Water Scarcity [online] Available at: <https://www.sepa.org.uk/environment/water/water-scarcity/> (accessed 16/06/2021)

⁹⁹ ClimateXchange (2019) The Increased Risk of Water Scarcity in Scotland Due to Climate Change and the Influence of Land Use on Water Scarcity [online] Available at: <https://www.climatechange.org.uk/media/3680/cxc-water-scarcity-climate-change-and-land-use-options.pdf> (accessed 16/06/2021)

scarcity¹⁰⁰ A changing climate is also expected to lead to warmer sea and river temperatures and an increased risk of non-native species spreading and becoming established in water environments¹⁰¹, further impacting aquatic ecosystems.

3.5.11 The risk of flooding from rivers, surface waters and seas is predicted to increase. It is estimated that there are currently 284,000 homes, businesses and services at risk of flooding in Scotland, more than double that identified to be at risk in 2015¹⁰². It is predicted that the number of properties at risk will increase by a further 110,000 by 2080¹⁰². Flooding can damage material assets, pose risks to population and human health through the spread of infectious diseases, and lead to a loss of habitats, resulting from erosion.

3.5.12 Development has the potential to negatively impact water quality, for example during construction or via pollution run-off where applicable. New structures on land can also affect the capacity of flood plains or flood defences.

Relevant SEA Objectives

3.5.13 The above baseline conditions, pressures and trends helped identify the following SEA objectives for water:

SEA Topic	SEA Objectives
Water	Avoid adverse impacts on the ecological status of water bodies
	Ensure the sustainable use of water resources
	Reduce the number of people and properties at risk of flooding and promote adaptive flood risk management
	Protect, maintain and improve the ecological status and physical state of the water environment

¹⁰⁰ Centre Of Expertise For Waters (2020) Private water supplies and the potential implications of climate change [online] Available at: <https://www.crew.ac.uk/publication/PWS-water-scarcity> (accessed 08/11/2021)

¹⁰¹ SEPA (2015) The River Basin Management Plan for the Scotland River Basin District: 2015–2027 [online] Available at: <https://www.sepa.org.uk/media/163445/the-river-basin-management-plan-for-the-scotland-river-basin-district-2015-2027.pdf> (accessed 14/01/2020)

¹⁰² Infrastructure Commission for Scotland (2020) Key Findings Report [online] Available at: <https://infrastructurecommission.scot/page/key-findings-report> (accessed 20/01/2020)

Water – Summary of Pressures and Trends

- Water quality in most of Scotland is in good or better condition, however, some localised areas of concern remain.
- Key pressures on the surface water environment include urbanisation, invasive non-native species, intensive agriculture/aquaculture and climate change.
- Groundwater quality and flow can be affected by diffuse pollution from rural sources, discharges from industries such as mining and quarrying, and agriculture irrigation.
- Water abstraction and storage can also place a burden on water resources, with demand growing.
- Airborne pollution can impact water bodies causing overgrowth of plants and algae and depleting oxygen levels.
- Climate change is expected to lead to increases in water scarcity, flood risk, and to increase the risk of non-native species spreading and becoming established in water environments.
- The development and operation of new infrastructure has the potential to negatively impact water quality. New structures on land can also affect the capacity of flood plains or flood defences.

3.6 Soil

Relevant Environmental Protection Objectives

3.6.1 Nationally, the protection of prime quality agricultural land and peatlands is set out in the Scottish Soil Framework¹⁰³. Soil objectives include national commitments to sustainable soil management that protect valued soils including prime quality agricultural land and those with a high carbon content, such as peat (for example via the Scottish Soil Framework, Scotland's National Peatland Plan¹⁰⁴).

Baseline Conditions

3.6.2 Soil is a non-renewable resource and is one of Scotland's most important assets. Soils support a wide range of functions and provide many environmental, economic and societal benefits including¹⁰⁵:

- Providing the basis for food and biomass production.
- Storing carbon and maintaining the balance of gases in the air as a major store of terrestrial carbon.
- Providing raw materials such as the use of sand and sand gravel in construction.
- Providing valued habitats and sustaining and supporting biodiversity.
- Controlling and regulating environmental interactions such as water flow and quality – for example, soil sealing can change the rate at which water enters rivers and other water functions.
- Preserving cultural and archaeological heritage by providing records and protective cover.
- Providing a platform for buildings and roads but therein largely losing its capacity to carry out other functions.

3.6.3 Soil quality is defined as the ability of soil to carry out these functions¹⁰³. Soils contribute to ecosystem services such as food provision, fibre and raw material (a provisioning service), provision of clean water (a regulating service), protects and is part of Scotland's cultural heritage (a cultural service) and soil formation itself (a supporting service)¹⁰⁵.

3.6.4 Scotland has a diverse range of soils, which are generally more organic, more acidic, more leached and wetter than those of most other European countries. Over 25% of Scotland is used for arable crops (mostly in the eastern half of the country) and improved grassland, mostly on the more

¹⁰³ Scottish Government (2009) The Scottish Soil Framework [online] Available at: <https://www.gov.scot/publications/scottish-soil-framework/> (accessed 27/08/2021)

¹⁰⁴ NatureScot (2015) Scotland's National Peatland Plan [online] Available at: <https://www.nature.scot/scotlands-national-peatland-plan-working-our-future> (accessed 17/06/21)

¹⁰⁵ Natural Scotland, Scottish Government (2011) The State of Scotland's Soil [online] Available at: <https://www.sepa.org.uk/media/138741/state-of-soil-report-final.pdf> (accessed 27/08/2021)

mineral soils of the central belt and in lowland areas, and predominantly found in the south west. The remainder of the country is occupied by semi natural habitats over more organic soils with over 20% of Scotland being covered in peatland habitat on peat soils¹⁰⁶ (Figure 3.10).

- 3.6.5 Scotland's soils play a key role as the main store of terrestrial carbon, acting as "carbon sinks", most of it being held in soils under peatland habitat, estimated to store 1.6 billion tonnes of carbon¹⁰⁷. As with all soils, those under peatland habitat are at risk from land use change and the effects of climate change, and their loss or degradation (and the associated loss of carbon) has the potential to be a significant contributor to Scotland's GHG emissions¹⁰⁸. The role of healthy peatland in sequestering soil carbon, helping to reduce downstream flood risk and providing benefits to biodiversity is recognised in Scotland's National Peatland Plan.
- 3.6.6 Other soils can also act as a sink for GHG. Soil organic carbon content is higher in the North West Highlands and Islands and Shetland, and the uplands of southern Scotland. Higher quality agricultural land suitable for crops is distributed throughout the Lothians, Fife, Tayside and the eastern Scottish Borders through to Ayrshire, the Clyde Valley, parts of Dumfries and Galloway and the north east of Scotland including the coastal areas around the Moray and Cromarty Firths (Figure 3.11 & Figure 3.12).
- 3.6.7 There is a strong interrelation between soil deterioration and the increased number of extreme floods as soils sealing, soil compaction and capping exacerbates flooding as the capability of soils to absorb water decreases and water runs off more quickly. Appropriate soil management therefore is a central plank for the development of a sustainable approach to flood risk management¹⁰⁶.

Key Pressures and Trends

- 3.6.8 While Scotland's soils are considered to generally be in good health, there are a range of pressures on them. Climate change and loss of organic matter pose significant threats to Scottish soils, with both likely to affect soil function, including loss of soil carbon. Other threats include upland development such as tracks and renewable energy schemes. Poorly located and designed built developments with associated drainage and excavation of peat can result in peatland degradation and habitat loss¹⁰⁹. The loss of valued soils in particular has the potential for national impacts which will be

¹⁰⁶ Scottish Government (2009) The Scottish Soil Framework [online] Available at: <https://www.gov.scot/publications/scottish-soil-framework/> (accessed 17/06/21)

¹⁰⁷ Scotland's Soils (2019) Why Restore Peatland [online] Available at: <https://soils.environment.gov.scot/resources/peatland-restoration/> (accessed 27/08/2021)

¹⁰⁸ NatureScot (2014) Commissioned Report No. 701 - Scotland's Peatland – Definitions & Information Resources [online] Available at: <https://www.nls.uk/e-monographs/2014/701.pdf> (accessed 27/08/2021)

¹⁰⁹ IUCN (2018) UK Peatland Strategy 2018-2040 [online] Available at: <https://www.iucn-uk-peatlandprogramme.org/uk-strategy> (accessed 31/08/2021)

difficult to reverse. In the case of climate change, these impacts have the potential to be felt on a global scale¹¹⁰.

- 3.6.9 Approximately 80% of peatland is thought to be damaged¹¹¹. However, in 2018, of the sites designated as SSSIs, SACs, and RAMSAR sites, the majority were found to be in favourable condition; upland bog (67%), wetland bog (64%), upland fen, marsh and swamp (77%), wetland fen, marsh and swamp (72%)¹¹². Damaged bogs can also lead to reduced water quality and negatively impact a range of other services¹¹³.
- 3.6.10 Changes in land use and land management practices are also a key pressure on soil. These include activities such as transport and development, including road building and the expansion of agriculture and forestry¹¹⁴. At present, there is uncertainty and a lack of quantitative information regarding threats to soil functions, particularly in relation to the extent of soil sealing, changes in soil biodiversity, and compaction of soils¹¹⁵. Estimates of soil sealing suggest figures of approximately 1000 hectares a year¹¹⁶. Soil contamination can also arise from many causes, including atmospheric deposition, agriculture and forestry operations, mining and historic land contamination, and can impact soil function and biodiversity¹¹⁷. It is the case that urban soils typically exhibit higher degrees of metal contamination than rural soils formed from the same parent material¹¹⁶.

¹¹⁰ Scottish Government (2009) The Scottish Soil Framework [online] Available at: <https://www.gov.scot/publications/scottish-soil-framework/> (accessed 17/06/21)

¹¹¹ NatureScot (2021) Restoring Scotland's Peatlands [online] Available at: <https://www.nature.scot/professional-advice/land-and-sea-management/carbon-management/restoring-scotlands-peatlands> (accessed 21/10/2021)

¹¹² Office for National Statistics (2019) UK Natural Capital: Peatlands [online] Available at: <https://www.ons.gov.uk/economy/environmentalaccounts/bulletins/uknaturalcapitalforpeatlands/naturalcapitalaccounts> (accessed 21/10/2021)

¹¹³ NatureScot (2015) Scotland's National Peatland Plan [online] Available at: <https://www.nature.scot/scotlands-national-peatland-plan-working-our-future> (accessed 17/06/21)

¹¹⁴ Scotland's Environment (2011) Soils [online] Available at: <https://www.environment.gov.scot/media/1213/land-soils.pdf> (accessed 17/06/2021)

¹¹⁵ European Commission (2016) JRC Technical Reports - Soil Threats in Europe - Status, Methods, Drivers and Effects on Ecosystem Services [online] Available at: http://esdac.jrc.ec.europa.eu/public_path/shared_folder/doc_pub/EUR27607.pdf (accessed 17/06/2021)

¹¹⁶ SEPA (2011) The State of Scotland's Soil [online] Available at: <https://www.sepa.org.uk/media/138741/state-of-soil-report-final.pdf> (accessed 17/06/2021)

¹¹⁷ SEPA (2019) Guidance on Consideration of Soil in Strategic Environmental Assessment [online] Available at: <https://www.sepa.org.uk/media/162986/lups-sea-gu2-consideration-of-soil-in-sea.pdf> (accessed 17/06/2021)

3.6.11 Contaminated and vacant and derelict land can have a number of negative impacts on the environment, including on soil, air and water quality, both within the sites and potentially outside its boundaries. The amount of derelict and urban vacant land in Scotland has decreased by 164 hectares (1.5%) from 11,090 hectares in 2018 to 10,926 hectares in 2019¹¹⁸. The impacts of vacant and derelict land have also been considered under Population and Human Health.

Relevant SEA Objectives

3.6.12 The above baseline conditions, pressures and trends helped identify the following SEA objectives for soil:

SEA Topic	SEA Objectives
Soil	Safeguard and improve soil health, protect soil resource and soil functions of all soil types in Scotland
	Safeguard and improve high value agricultural land and carbon-rich soils
	Reduce the extent of contaminated and vacant and derelict land

Soils – Summary of Pressures and Trends

- Scotland's soils are considered to generally be in good health
- Approximately 80% of peatland is thought to be damaged. However, the majority of designated peatland sites were found to be in favourable condition
- Climate change and loss of organic matter pose significant threats to Scottish soils, with both likely to affect soil function
- Changes in land use and land management practices are also a key pressure on soil
- Contaminated and vacant and derelict land can have a number of negative impacts on the environment, including on soil

¹¹⁸ Scottish Government (2020) Scottish Vacant and Derelict Land Survey 2019 [online] Available at: <https://www.gov.scot/publications/scottish-vacant-derelict-land-survey-2019/> (accessed 17/06/2021)

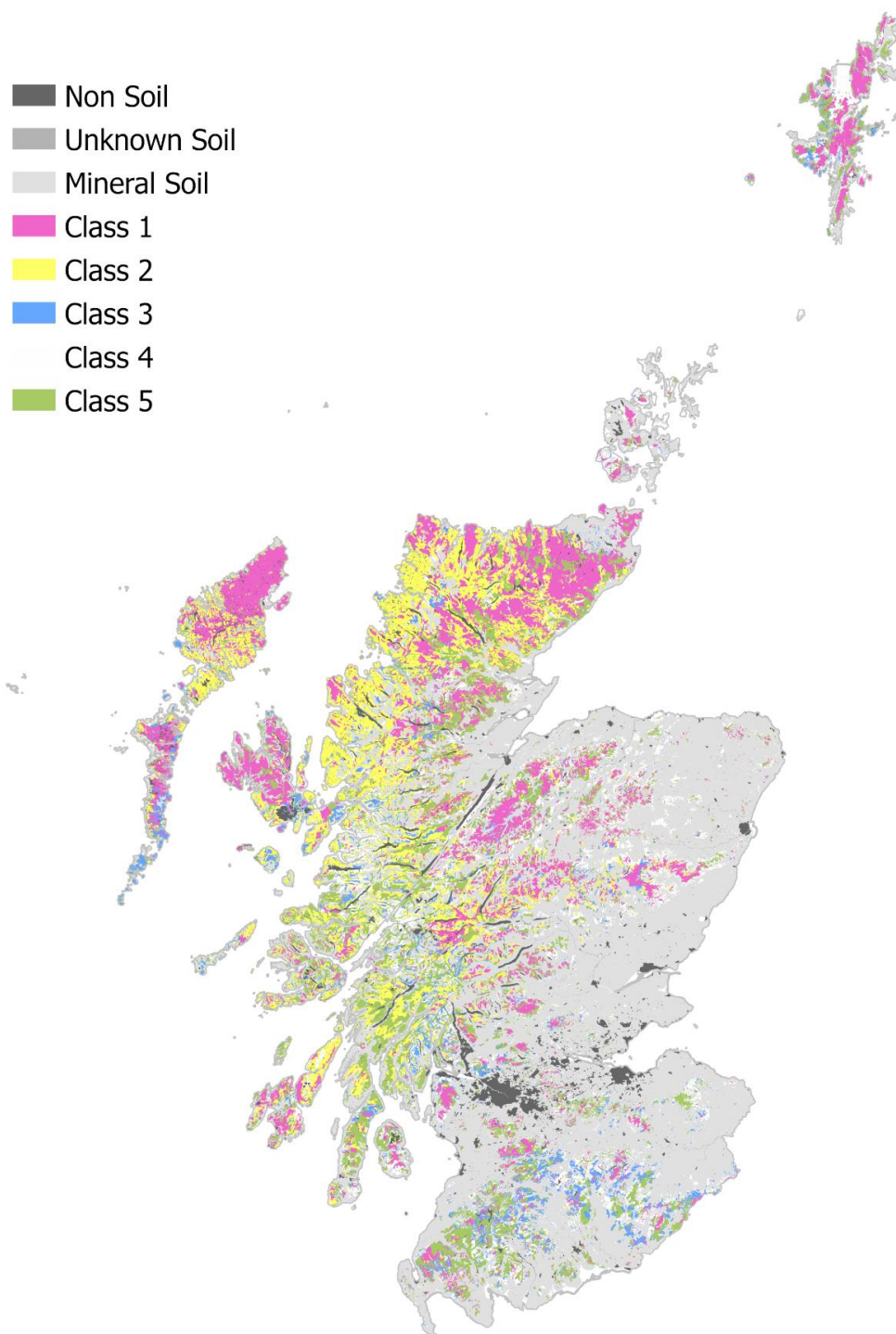


Figure 3.10 Carbon and Peatland

Source: NatureScot (2016) [Natural Spaces - Scottish Natural Heritage \(snh.gov.uk\)](https://www.snh.gov.uk)

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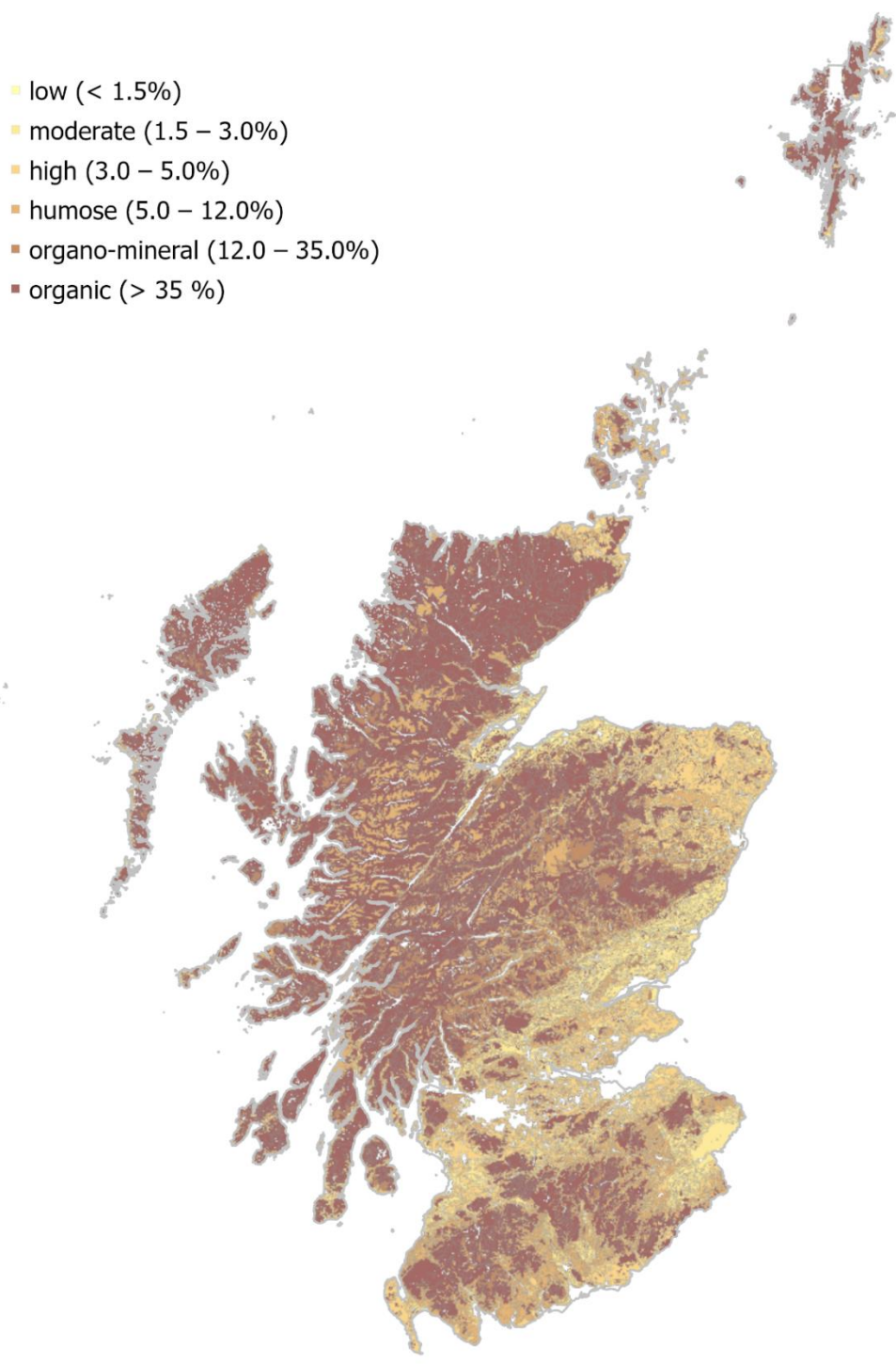


Figure 3.11 Topsoil Organic Content

Source: James Hutton Institute (2014) [Scotland's Soil Data | Soils@Hutton | The James Hutton Institute](#) Copyright and database right, The James Hutton institute (2021). Used with the permission of The James Hutton institute. All rights reserved. Licensed under the Open Government Licence v3.0.

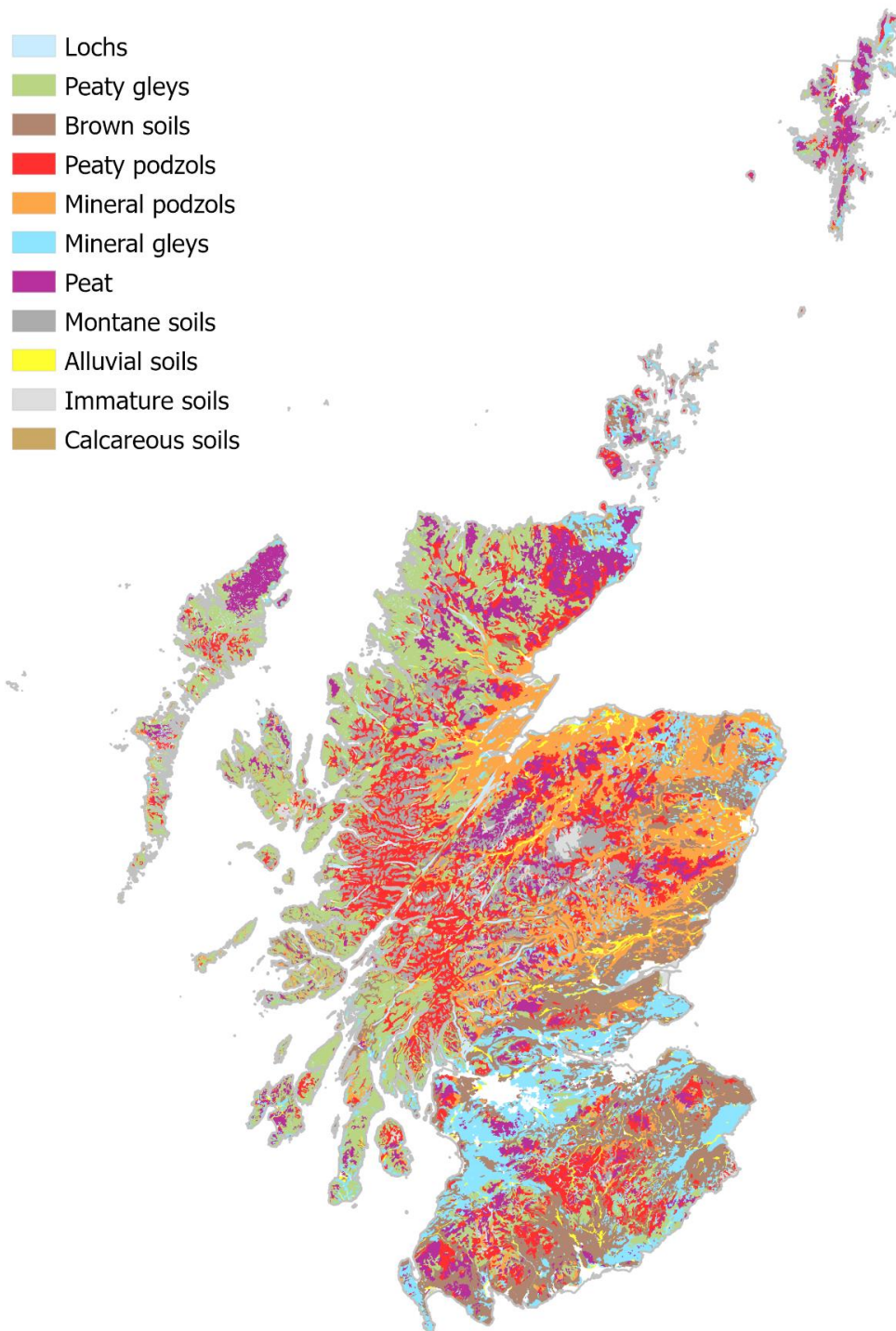


Figure 3.12 National Soil Map of Scotland

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3.7 Cultural Heritage and Historic Environment

Relevant Environmental Protection Objectives

- 3.7.1 Existing cultural heritage objectives are set out in legislation including the Town and Country Planning (Scotland) Act 1997, as amended¹¹⁹, the Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997¹²⁰ and the Ancient Monuments and Archaeological Areas Act 1979¹²¹. These objectives are focused primarily on the protection of valued sites and features, including townscapes (i.e. places, buildings and open spaces), buildings, archaeological sites, battlefields, wrecks and landscapes that have been recognised at the international, national and local levels through a hierarchy of designations.
- 3.7.2 Policies such as the current Scottish Planning Policy (SPP)¹²² aim to improve the quality of settlements and built environment with a national level focus. These are complemented by the Historic Environment Scotland (HES) Policy¹²³ which defines how the historic environment in Scotland should be managed. Together, they emphasise the importance of preserving recognised sites, avoiding negative impacts on them and their wider setting, and contributing to their enhancement where possible. Key objectives also extend to taking account of, and avoiding damage to, or loss of currently unknown archaeology.

Baseline Conditions

- 3.7.3 Scotland's many and varied historical sites are unique and irreplaceable. These sites and features are regarded as making a valuable contribution to quality of life, cultural identity, education and economy. While these assets are distributed widely throughout Scotland, there are clusters of sites in and around Scotland's settlements and coastlines.
- 3.7.4 The majority of Scotland's historic environment is undesignated, with estimates that the scale of the undesignated resource is around 90-95% of the total resource¹²⁴. There are more than 56,000 designated/protected

¹¹⁹ Town and Country Planning (Scotland) Act 1997 [online] Available at: <https://www.legislation.gov.uk/ukpga/1997/8/contents> (accessed 27/09/2021)

¹²⁰ Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997 [online] Available at: <http://www.legislation.gov.uk/ukpga/1997/9/contents> (accessed 27/09/2021)

¹²¹ Ancient Monuments and Archaeological Areas Act 1979 (as amended) [online] Available at: http://www.legislation.gov.uk/ukpga/1979/46/pdfs/ukpga_19790046_en.pdf (accessed 27/09/2021)

¹²² Scottish Government (2014) Scottish Planning Policy [online] Available at: <http://www.gov.scot/Publications/2014/06/5823> (accessed 27/09/2021)

¹²³ Historic Environment Scotland (2019) Historic Environment Policy for Scotland <https://www.historicenvironment.scot/advice-and-support/planning-and-guidance/historic-environment-policy-for-scotland-heps/> (accessed 27/09/2021)

¹²⁴ Historic Environment Scotland (2020) Scotland's Historic Environment Audit 2016 [Online] Available at: <https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationid=bac8296b-fcd4-4fdf-8617-ab9e009235db> (accessed 27/09/2021)

historic assets across Scotland (Figure 3.13). These are protected through the process of designation, which aims to identify the most important parts of the historic environment, to recognise their significance and enhance protection. Designations include world heritage sites, listed buildings, scheduled monuments, gardens and designed landscapes, battlefields, historic marine protected areas and conservation areas.

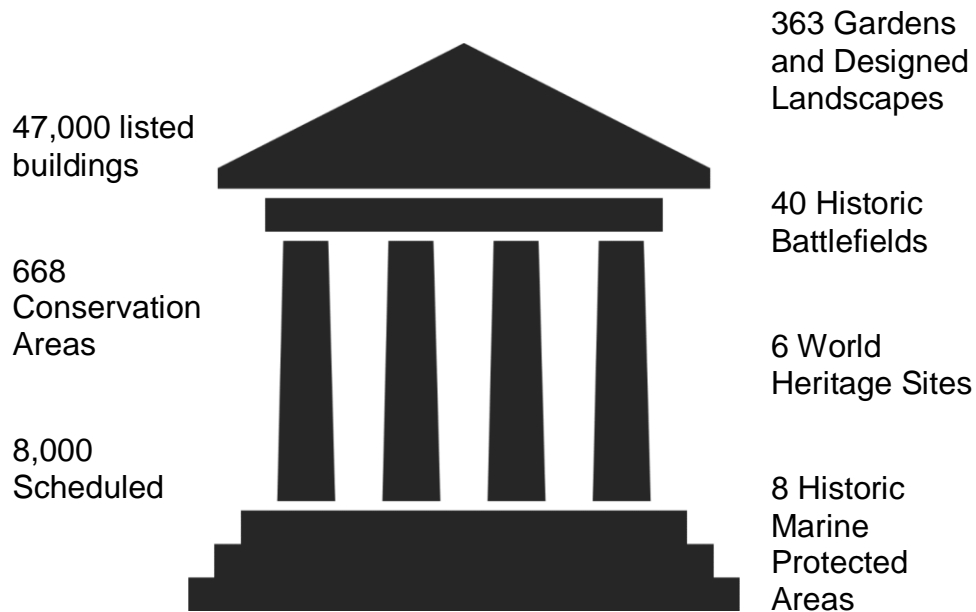


Figure 3.13 Scotland's Historic Environment
Source: Historic Environment Scotland¹²⁵

Key Pressures and Trends

3.7.5 Scotland's Historic Environment Audit provides statistics on Scotland's heritage assets, and details of how these are changing over time. Key trends from the 2018 audit include¹²⁵:

- 67% of pre-1919 housing stock is in need of critical repairs (which refers to weather tightness and structural stability). This has reduced from 74% in 2008.
- 83% of scheduled monuments are perceived to be in an optimal or generally satisfactory condition.

¹²⁵ Historic Environment Scotland (2020) Scotland's Historic Environment Audit 2018 [online] Available at: <https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=11a63865-9bd4-4d26-9fd4-ab9e0093460e> (accessed 19/10/2021)

- 750 historic buildings on the Buildings at Risk Register (BARR) have been saved between 2009 and 2018 and more than 200 others are in the process of being restored. Almost 2,000 buildings have been saved since 1990 when BARR began.
- One in five (483,000) of Scotland's dwellings are more than 99 years old (built pre-1919).
- 35% of adults had visited a historic site (increased from 28% in 2012).
- 336 Properties in Care of HES, decreased from 345 in 2008.

3.7.6 Key existing pressures affecting the historic environment include development pressures, maintenance, land use, coastal erosion and climate change.

3.7.7 Climate change, including a continuous increase in temperatures, altering patterns of precipitation and increased frequency of unpredictable and extreme weather events may alter and accelerate decay processes of historic monuments and archaeological sites. Sites may also be exposed to changing flood risk, and altered vegetation growth patterns which could accelerate decay of vulnerable stonework. Changing weather patterns can change the distribution of plant species which may impact the character of historic gardens and landscapes¹²⁶.

3.7.8 An indirect impact of climate change is that to maintain or repair historic buildings and sites at risk of degradation, access to appropriate repair material may be needed (e.g. various rock materials) to maintain its characteristic look¹²⁷. This may increase pressure on natural assets from which the materials are sourced. Often, sourcing of such material was local and many of the ancient quarry sites have been reused, backfilled, or designated¹²⁸.

¹²⁶ Historic Environment Scotland (2018) Climate Change Risk Assessment [online] Available at: <https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=55d8dde6-3b68-444e-b6f2-a866011d129a> (accessed 27/08/2021)

¹²⁷ Historic Environment Scotland (2017) Short Guide: Climate Change Adaptation for Traditional Buildings [online] Available at: <https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=a0138f5b-c173-4e09-818f-a77ac00ad04fb> (accessed 17/06/21)

¹²⁸ Historic Environment Scotland (2017) Scotland's Traditional Building Materials [online] Available at: <https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=d528a605-e25a-4824-933d-a77700968f1f> (accessed 17/06/21)

Relevant SEA Objectives

3.7.9 The above baseline conditions, pressures and trends helped identify the following SEA objectives for cultural heritage and historic environment:

SEA Topic	SEA Objectives
Cultural heritage and historic environment	Avoid adverse impacts on the historic environment including its setting
	Protect and enhance valued landscapes, historic and archaeological sites and other culturally and historically important features, landscapes and their settings

Cultural Heritage and Historic Environment – Summary of Pressures and Trends

- 67% of pre-1919 housing stock is in need of critical repairs
- Key existing pressures affecting the historic environment include development pressures, maintenance, land use, coastal erosion and climate change
- Climate change has the potential to affect cultural heritage and historic sites by accelerating decay, this may increase the pressure on natural assets needed to repair or maintain sites

3.8 Landscape and Geodiversity

Relevant Environmental Protection Objectives

- 3.8.1 Landscape objectives, including those from the European Landscape Convention¹²⁹, recognise and protect special landscapes but also aim to improve degraded landscapes and highlight the importance of all landscapes. Areas identified as having outstanding scenic value in a national context are designated as National Scenic Areas, which protects the special qualities of nationally important landscapes and seascapes¹³⁰. Policies include a commitment to protecting the special qualities of nationally important landscapes, with planning also recognising and protecting regional and locally important landscapes. The importance of quality local places for population and human health and areas without statutory protection such as wildland, are also recognised¹³¹.
- 3.8.2 The environmental protection objectives set out in legislation and policy for geodiversity are broadly aimed at protecting geological and geomorphological features from damage and disturbance, principally by identifying and conserving areas of particular value. Scotland's geodiversity is safeguarded in protected areas and Geological Conservation Review sites and through local geodiversity action plan activities. Sites are mainly protected at a national level through designation of SSSI but also through other designations such as National Parks¹³². Some sites also have international recognition as UNESCO Global Geoparks¹³³.

Baseline Conditions

- 3.8.3 Scotland's diverse and distinctive landscapes are a significant part of the country's natural and cultural heritage contributing to the economy and the population's wellbeing and providing a range of benefits¹³⁴. Scotland is internationally renowned for its varied and dramatic landscapes (Figure 3.14) including impressive mountain ranges, broad plateaus, expansive lowlands, and striking coastal features¹³⁵. Many of these landscapes are the result of

¹²⁹ Council of Europe (undated) Council of Europe Landscape Convention [online] Available at: <https://www.coe.int/en/web/landscape/home> (accessed 21/10/2021)

¹³⁰ NatureScot (2020) National Scenic Areas [online] Available at: <https://www.nature.scot/professional-advice/protected-areas-and-species/protected-areas/national-designations/national-scenic-areas> (accessed 21/10/2021)

¹³¹ NatureScot (2017) Landscape Policy and Guidance [online] Available at: <https://www.nature.scot/professional-advice/landscape/landscape-policy-and-guidance> (accessed 21/10/2021)

¹³² NatureScot (undated) Protecting Our Geodiversity [online] Available at: <https://www.nature.scot/landforms-and-geology/protecting-our-geodiversity> (accessed 21/10/2021)

¹³³ UNESCO (undated) UNESCO Global Geoparks [online] Available at: <https://en.unesco.org/global-geoparks> (accessed 21/10/2021)

¹³⁴ Scotland's Environment Web (2014) Landscape [online] Available at: <https://www.environment.gov.scot/media/1196/land-landscape.pdf> (accessed 27/08/2021)

¹³⁵ James Hutton Institute (2018) Regional Landscapes of Scotland [online] Available at: <http://www.hutton.ac.uk/learning/exploringscotland/regional-landscapes-scotland> (accessed 21/10/2021)

ancient glacial and periglacial activity as well as changes in sea level¹³⁶. The primary classifications are the Central Lowlands, the Highlands and Islands to the north and west, and the Southern Uplands¹³⁷. Situated among these natural features are the many iconic built landmarks and townscapes that help give Scotland its reputation as a tourist destination¹³⁸.

3.8.4 Geodiversity underpins landscape, and protecting our rocks, landforms and soils is also an important part of landscape planning and management¹³⁹. Many places in Scotland are of great importance to geoscience for their rocks, fossils and landforms, demonstrating important geological processes or events that have significant value for education and research and as part of Scotland's geo-heritage¹⁴⁰.

3.8.5 The character and quality of Scotland's landscape and geodiversity provide various benefits and underpins most types of ecosystem services. It is a fundamental component of supporting services, but also contributes to provisioning, regulating and cultural services. These include improving the population's health by providing space for recreation, exercise and improvements in wellbeing. Attractive, accessible landscapes, including urban greenspace, can make an important contribution to quality of life. Landscape inspires art and culture, contributing to a sense of place and belonging. Alongside supporting Scotland's economy, attracting investment and adding value, landscape makes an important contribution to quality of life and local distinctiveness and identity^{141,142}.

¹³⁶ NatureScot (undated) Landforms [online] Available at: <https://www.nature.scot/landforms-and-geology/scotlands-rocks-landforms-and-soils/landforms> (accessed 21/10/2021)

¹³⁷ James Hutton Institute (2018) Regional Landscapes of Scotland [online] Available at: <http://www.hutton.ac.uk/learning/exploringscotland/regional-landscapes-scotland> (accessed 21/10/2021)

¹³⁸ Historic Environment Scotland (2020) Scotland's Historic Environment Audit 2018 [online] Available at: <https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=11a63865-9bd4-4d26-9fd4-ab9e0093460e> (accessed 19/10/2021)

¹³⁹ NatureScot (2017) Landscape Policy and Guidance [online] Available at: <https://www.nature.scot/professional-advice/landscape/landscape-policy-and-guidance> (accessed 21/10/2021)

¹⁴⁰ Scotland's Environment (2019) Rocks and Landforms [online] Available at: <https://www.environment.gov.scot/our-environment/land/rocks-and-landforms/> (accessed 21/10/2021)

¹⁴¹ NatureScot (2021) Landscape Character [online] Available at: <https://www.nature.scot/professional-advice/landscape/scotlands-landscape-charter> (accessed 22/10/2021)

¹⁴² NatureScot (undated) Importance of Geodiversity [online] Available at: <https://www.nature.scot/landforms-and-geology/importance-geodiversity> (accessed 21/10/2021)

- 3.8.6 Geodiversity is also the physical basis for Scotland's varied landscapes (both rural and urban) and scenery. It has a profound influence on terrestrial and marine habitats, wildlife and use of land and water¹⁴³. Geodiversity assets of regional or local importance may be protected as Local Geodiversity Sites but coverage is not complete. Around 9.5% of the total area covered by Scotland's National Parks and 37% of National Nature Reserve areas have Geological Conservation Review site status¹⁴⁴. Some of these are also protected at the national level by SSSI legislation¹⁴⁵. Landscapes of the highest quality have been designated and include 40 National Scenic Areas and two National Parks (Loch Lomond and the Trossachs, and the Cairngorms). There is a high concentration of wildland areas, National Scenic Areas and other designations along the west coast of Scotland, and in the Highlands (Figure 3.15 - Figure 3.17).
- 3.8.7 Wild land character is displayed in some of Scotland's more remote upland, mountain and coastal areas that show minimal signs of human influence¹⁴⁶. Areas with stronger wild land characteristics are more commonly found in the north and west, particularly in areas of higher ground, although additional areas of wild land are present in other areas of Scotland (Figure 3.15)¹⁴⁷.

Key Pressures and Trends

- 3.8.8 Scotland's landscapes have evolved over thousands of years due to natural and cultural forces, and are still changing. Regional and local landscapes are becoming less distinct due to more similarities in building form, settlement patterns, agricultural practices and infrastructure, for example, the development of renewable energy technology. Similarly, in agriculture there has been a focus on maximising yields, resulting in a move towards a monoculture, at the expense of a more diverse landscape of field types and hedgerows¹⁴⁸. Changes in landscape tend to occur over long periods, and

¹⁴³ NatureScot (undated) Importance of Geodiversity [online] Available at: <https://www.nature.scot/landforms-and-geology/importance-geodiversity> (accessed 21/10/2021)

¹⁴⁴ NatureScot (undated) Protecting Our Geodiversity [online] Available at: <https://www.nature.scot/landforms-and-geology/protecting-our-geodiversity> (accessed 21/10/2021)

¹⁴⁵ NatureScot [undated] Geodiversity in Protected Areas: International Designations [online] Available at: <https://www.nature.scot/landforms-and-geology/protecting-our-geodiversity/places-and-plans-safeguard-geodiversity/geodiversity-protected-areas> (accessed 18/06/21)

¹⁴⁶ NatureScot (2017) Landscape Policy and Guidance [online] Available at: <https://www.nature.scot/professional-advice/landscape/landscape-policy-and-guidance> (accessed 21/10/2021)

¹⁴⁷ NatureScot (2014) Mapping Scotland's Wildness and Wild Land [online] Available at: <https://www.nature.scot/doc/wild-land-areas-map-and-descriptions-2014> (accessed 27/08/2021)

¹⁴⁸ Scotland's Environment (2014) Landscape [online] Available at: <https://www.environment.gov.scot/our-environment/state-of-the-environment/2014-state-of-the-environment-report/> (accessed 22/10/2021)

gradual change, as a result of development such as housing, and changes in farming and forestry practice, can be difficult to determine¹⁴⁹.

- 3.8.9 Climate change is expected to lead to extensive landscape change across Scotland with the greatest changes likely to occur in lowland and coastal areas where human population is highest. Geodiversity assets are also expected to be affected by climate change. Direct impacts are likely to occur due to changing temperatures and patterns of precipitation, weather events, and sea level change. However, mitigation and adaptation measures are expected to have a greater influence on Scotland's landscapes, geodiversity and quality of life than the direct effects of climate change¹⁵⁰.
- 3.8.10 The coast and foreshore are under many pressures particularly from climate change, rising sea levels and coastal erosion. These areas are also very important recreational resources, dependent on the landscape, geodiversity and environmental quality of these areas¹⁵¹. Coastal erosion currently affects 46% of soft shorelines (an increase from 38% over that reported in 2017). The extent and rate of coastal erosion, and the risk to coastal assets, is expected to increase. As much as 75% of soft coasts are expected to be eroding by 2050 depending on the extent of future climate change¹⁵². Aquaculture development, energy generation development, including on and offshore windfarms can impact landscape, geodiversity and seascape if poorly sited and designed¹⁵³.
- 3.8.11 Development and changes in land use associated with urban expansion and associated infrastructure are also a key pressure and the distinctive landscape settings of many towns and cities are under pressure.
- 3.8.12 Natural landscapes, landforms and geodiversity assets can be lost, destroyed or obscured due to inappropriate building or infrastructure development, waste practices, and associated pollution, commercial afforestation or extraction processes¹⁵⁴.

¹⁴⁹ Scotland's Environment (2014) Landscape [online] Available at: <https://www.environment.gov.scot/our-environment/state-of-the-environment/2014-state-of-the-environment-report/> (accessed 22/10/2021)

¹⁵⁰ NatureScot (undated) Landscape: Climate Change [online] Available at: <https://www.nature.scot/professional-advice/landscape-change/landscape-policy-and-guidance/landscape-climate-change> (accessed 27/08/2021)

¹⁵¹ Scottish Government (2019) Climate Ready Scotland: Climate Change Adaptation Programme 2019-2024 [online] Available at: <https://www.gov.scot/publications/climate-ready-scotland-second-scottish-climate-change-adaptation-programme-2019-2024/> (accessed 04/10/2021)

¹⁵² Rennie A.F et al. (2021) Dynamic Coast Research Summary [online] Available at: <https://www.dynamiccoast.com/reports> (accessed 27/10/2021)

¹⁵³ NatureScot (2019) Climate Change Impacts in Scotland [online] Available at: <https://www.nature.scot/climate-change/climate-change-impacts-scotland> (accessed 22/10/2021)

¹⁵⁴ NatureScot (2017) Landscape Considerations in Strategic Environmental Assessment [online] Available at: <https://www.nature.scot/sites/default/files/2017-09/Guidance%20-%20Strategic%20Environmental%20Assessment%20-%20Landscape%20Considerations.pdf> (accessed 27/08/2021)

Relevant SEA Objectives

3.8.13 The above baseline conditions, pressures and trends helped identify the following SEA objectives for landscape and geodiversity:

SEA Topic	SEA Objectives
Landscape and geodiversity	Avoid adverse effects on landscapes and geodiversity
	Safeguard and enhance the character and diversity of the Scottish landscape and areas of valuable landscape and geodiversity

Landscape and Geodiversity – Summary of Pressures and Trends

- Regional and local landscapes are becoming less distinct due to more similarities in building form, settlement patterns, and agricultural practices
- A move towards a monoculture has created a less diverse landscape of field types and hedgerows
- Climate change is expected to lead to extensive landscape change across Scotland, with the greatest changes likely to occur in lowland and coastal areas where human population is highest. Geodiversity assets are also expected to be affected by climate change
- The coast and foreshore are under many pressures, particularly from climate change, rising sea levels and coastal erosion
- Aquaculture development, energy generation development, including on and offshore windfarms, can impact landscape, geodiversity and seascape
- Development and changes in land use associated with urban expansion and associated infrastructure are also a key pressure

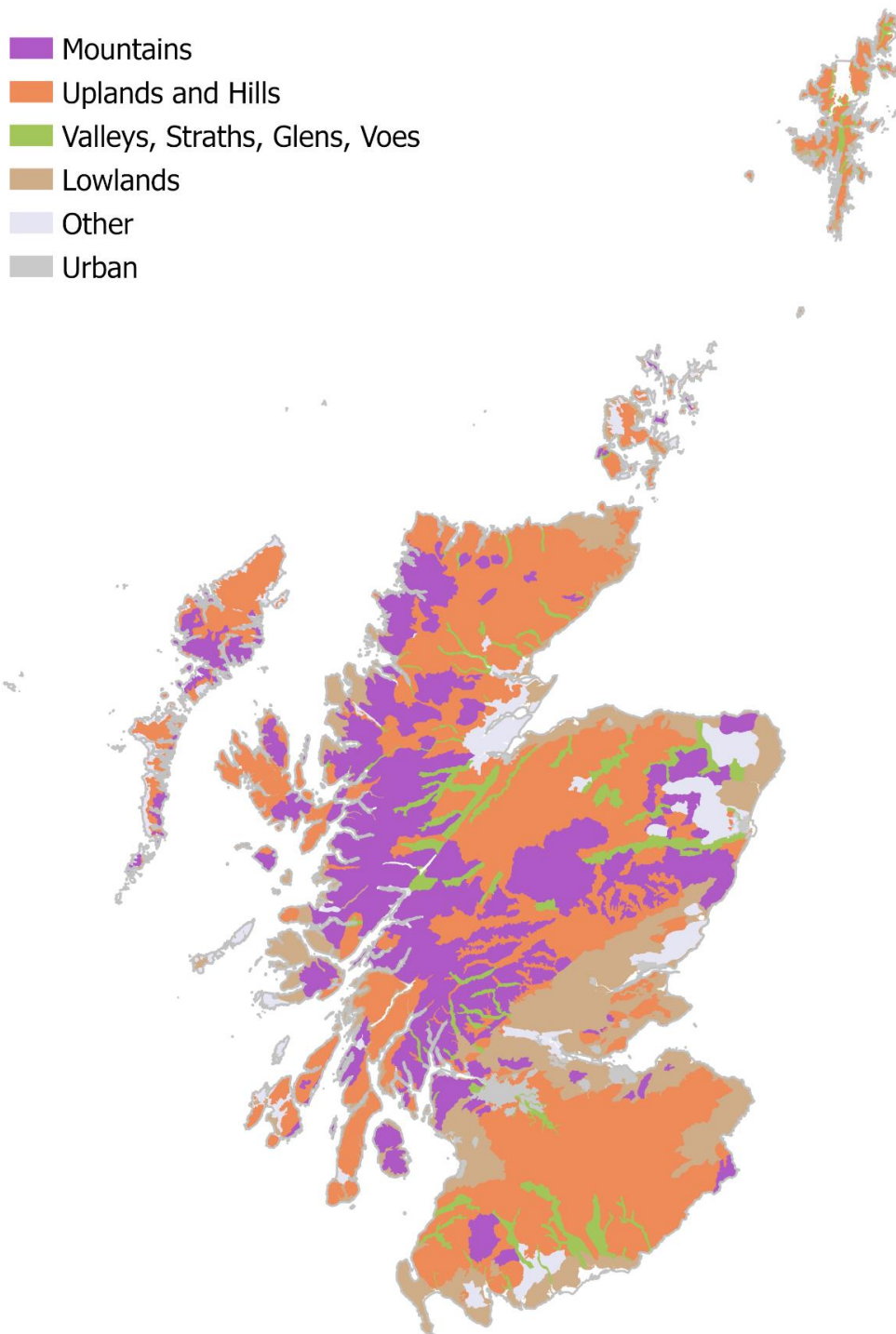


Figure 3.14 Landscape Character Types

Source: NatureScot (2019) [Natural Spaces - Scottish Natural Heritage \(snh.gov.uk\)](https://www.snh.gov.uk/natural-spaces)

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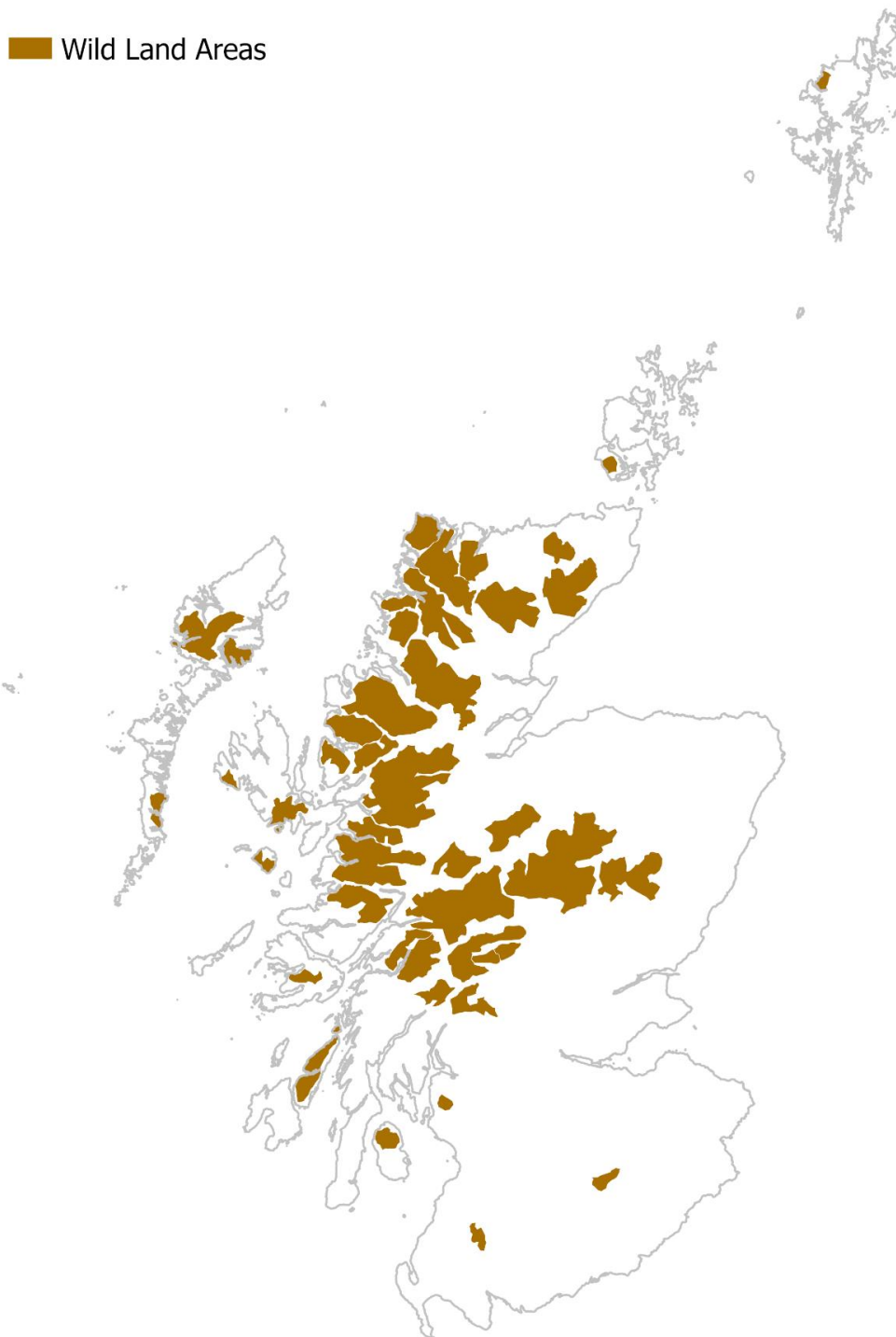


Figure 3.15 Areas of Wild Land

Source: NatureScot (2014) [Natural Spaces - Scottish Natural Heritage \(snh.gov.uk\)](http://snh.gov.uk)

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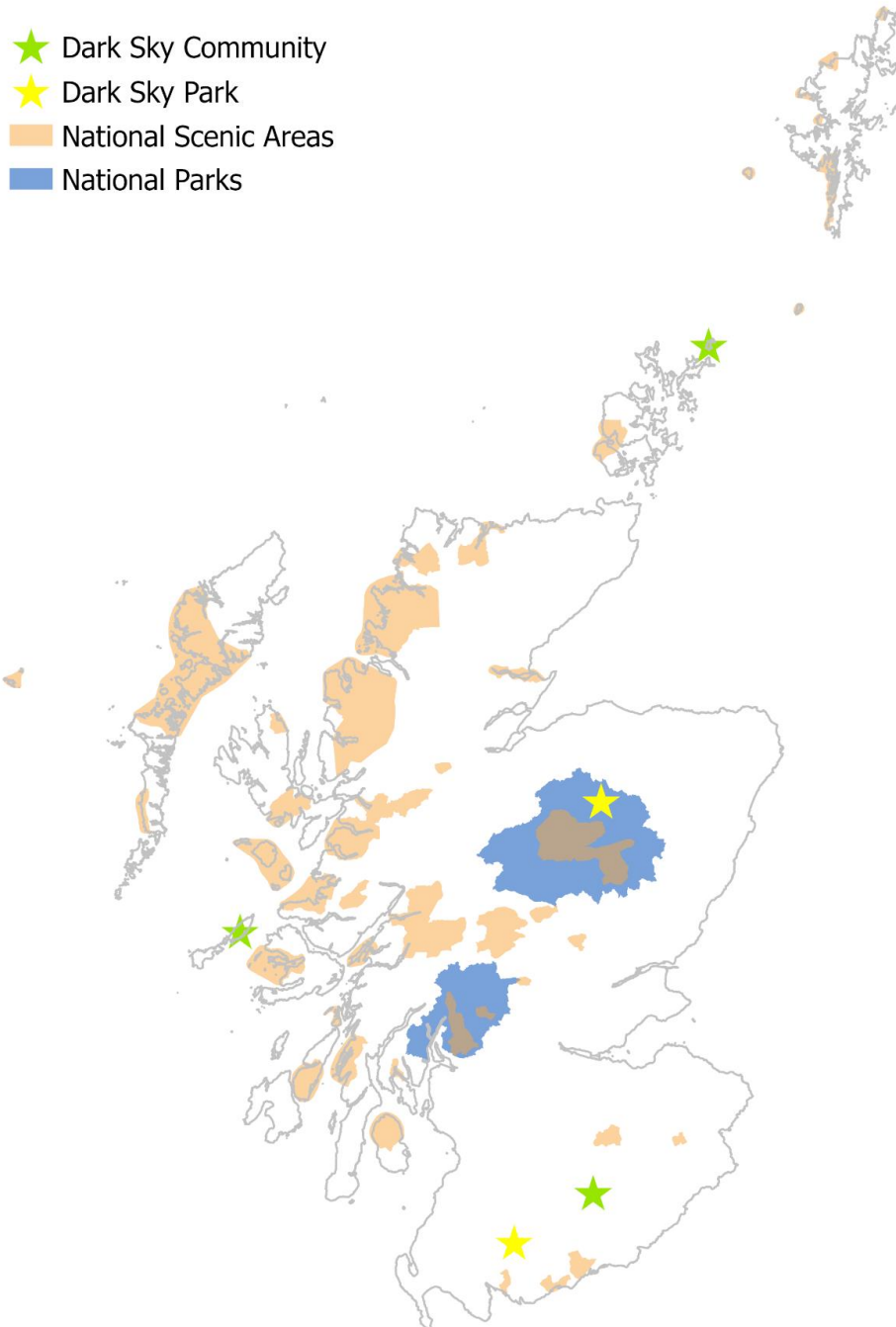


Figure 3.16 National Scenic Areas, National Parks, Dark Sky Parks and Communities
 Source: NatureScot (1998, 2010), International Dark Sky Association (2021)
[Natural Spaces - Scottish Natural Heritage \(snh.gov.uk\)](https://www.snh.gov.uk/natural-spaces/), [International Dark Sky Communities - International Dark-Sky Association](https://www.iaa.org/), Contains SNH information licensed under the Open Government Licence v3.0. Contains Ordnance Survey data © Crown copyright and database right (2021). Information provided by the International Dark Skies Association

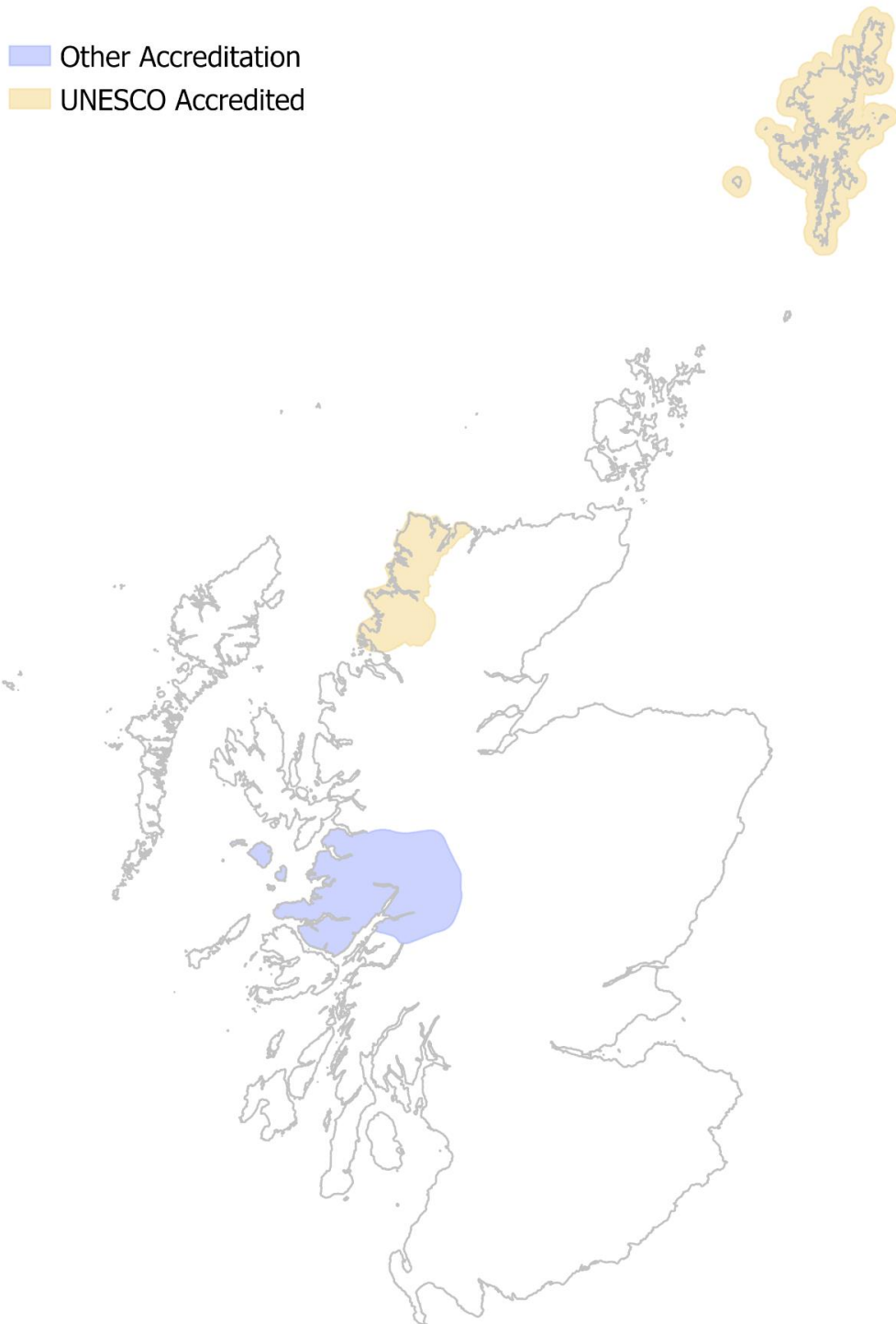


Figure 3.17 Geoparks

Source: NatureScot (2020) [Natural Spaces - Scottish Natural Heritage \(snh.gov.uk\)](https://www.snh.gov.uk/natural-spaces)

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3.9 Material Assets

- 3.9.1 The 2005 Act requires material assets as a topic to be addressed in SEA but does not set out a specific definition of the factors it should encompass. SEPA guidance¹⁵⁵ notes that consideration of material assets in SEA is usually taken to cover a wide variety of both natural (e.g. minerals, water, forestry, agriculture) and built assets (e.g. transport infrastructure, built infrastructure and buildings).
- 3.9.2 Relevant natural material assets including soil and water are addressed elsewhere within this environmental baseline, with this section describing built assets most relevant to the draft NPF4 including:
- Energy infrastructure
 - Transport infrastructure
 - Blue-green infrastructure
 - Waste
 - Housing
 - Digital infrastructure

Relevant Environmental Protection Objectives

- 3.9.3 Objectives and policies related to material assets are wide-ranging, taking into account the broad nature of the topic. Multiple policies and plans address built material assets including the programme for long-term infrastructure investment in Scotland set out in the Infrastructure Investment Plan¹⁵⁶, and practices and commitments for action against climate change such as the Climate Change Plan¹⁵⁷ and update to the Climate Change Plan¹⁵⁸ are also relevant. Making Things Last: A Circular Economy Strategy for Scotland sets out Scotland's ambitions for changing how waste is considered in the economy, including promoting a circular economy¹⁵⁹.

¹⁵⁵ SEPA (2019) Guidance on Consideration of Material Assets in Strategic Environmental Assessment [online] Available at: <https://www.sepa.org.uk/environment/land/planning/strategic-environmental-assessment/> (accessed 03/09/2021)

¹⁵⁶ Scottish Government (2015) Infrastructure Investment Plan [online] Available at: <http://www.gov.scot/Topics/Government/Finance/18232/IIP> (accessed 30/08/2021)

¹⁵⁷ Scottish Government (2018) Climate Change Plan: the Third Report on Proposals and Policies 2018-2032 (RPP3) [online] Available at: <https://www.gov.scot/publications/scottish-governments-climate-change-plan-third-report-proposals-policies-2018/> (accessed 30/08/2021)

¹⁵⁸ Scottish Government (2020) Securing a Green Recovery on a Path to Net Zero: Climate Change Plan 2018–2032 – Update [online] Available at: <https://www.gov.scot/publications/securing-green-recovery-path-net-zero-update-climate-change-plan-20182032/> (accessed 30/08/2021)

¹⁵⁹ Scottish Government (2016) Making Things Last: A Circular Economy Strategy for Scotland [online] Available at: <https://www.gov.scot/publications/making-things-last-circular-economy-strategy-scotland/> (accessed 29/10/2021)

Baseline

3.9.4 This section summarises the baseline and key trends for the key material assets identified above.

Energy

3.9.5 The Scottish Energy Strategy¹⁶⁰ sets out the Scottish Government's vision for how the energy system in Scotland would look in 2050. The strategy notes that a diverse, well-balanced energy supply portfolio is essential to decarbonise heat, transport and electricity systems and provide the basis for secure and affordable heat, mobility and power in future decades. The Energy Strategy Position Statement published in 2021 identified key priorities, and aligned the Energy Strategy with recent policy publications including the Hydrogen Policy Statement¹⁶¹, Local Energy Policy¹⁶² Statement and Offshore Wind Policy Statement¹⁶³ which collectively support the delivery of the Climate Change Plan¹⁶⁴. The Onshore Wind Policy Statement was published in 2017 and was intended as a statement of the Scottish Government's support for the onshore sector. This publication did not take account of the climate emergency (declared in April 2019) and the legal commitments stemming from this and achieving net zero. Therefore, on 28 October 2021 a consultation on a new draft Onshore Wind Policy Statement was launched, and will run until 21 January 2022 reflecting the increased deployment of onshore wind necessary to achieve net zero¹⁶⁵.

¹⁶⁰ Scottish Government (2017) The Future of Energy in Scotland: Scottish Energy Strategy [online] Available at: <https://www.gov.scot/publications/scottish-energy-strategy-future-energy-scotland-9781788515276/> (accessed 01/10/2021)

¹⁶¹ Scottish Government (2020) Hydrogen Policy Statement [online] Available at: <https://www.gov.scot/publications/scottish-government-hydrogen-policy-statement/> (accessed 01/10/2021)

¹⁶² Scottish Government (2021) Local Energy Policy Statement [online] Available at: <https://www.gov.scot/publications/local-energy-policy-statement/> (accessed 01/10/2021)

¹⁶³ Scottish Government (2020) Offshore Wind Policy Statement [online] Available at: <https://www.gov.scot/publications/offshore-wind-policy-statement/> (Accessed 01/10/21)

¹⁶⁴ Scottish Government (2020) Update to the Climate Change Plan [online] Available at: <https://www.gov.scot/publications/securing-green-recovery-path-net-zero-update-climate-change-plan-20182032/> (accessed 01/10/21)

¹⁶⁵ Scottish Government (2021) Onshore Wind Policy Statement [online] Available at: <https://consult.gov.scot/energy-and-climate-change-directorate/onshore-wind-policy-statement-refresh-2021/> (accessed 03/11/2021)

3.9.6 Table 3.3 below outlines progress against current energy targets.

Table 3.3 Progress against energy targets¹⁶⁶

Energy Target	Latest	Target
Overall renewable energy target Total Scottish energy consumption from renewables	23.8% In 2019	50% by 2030
Renewable electricity target Gross electricity consumption from renewables	95.9% in 2020 (provisional)	100% By 2020
Renewable heat target Non-electrical heat demand from renewables	6.6% in 2019	11% By 2020
Energy consumption target Reduction in total energy consumption from 2005-07	-14.14% in 2019	-12% By 2020
Energy productivity target % change in gross value added achieved from the input of one gigawatt hour of energy from 2015.	+ 4.6% in 2019	+ 30% In 2030

3.9.7 In March 2021, Scotland had 11.9 GW of installed operational renewable electricity generation capacity. This has steadily risen over time, however, has levelled off since June 2019 possibly as fewer projects have been able to access subsidies. Most of Scotland's operational capacity comes from onshore wind (8.4 GW), with offshore wind (0.9 GW) capacity increasing in the last few years. Half of the renewable capacity in Scotland comes from large installations of over 50 MW (6.2 GW in total). However, a total of 1.3 GW comes from small-scale installations of less than 5 MW. These projects are important as they are likely to contribute to the development of smart, decentralised and local energy markets in Scotland. This is made up of 0.5

¹⁶⁶ Scottish Government (2021) Energy Statistics for Scotland Q2 2021 Figures [online] Available at: <https://www.gov.scot/binaries/content/documents/govscot/publications/statistics/2018/10/quarterly-energy-statistics-bulletins/documents/energy-statistics-summary---september-2021/energy-statistics-summary---september-2021/govscot%3Adocument/Scotland%2BEnergy%2BStats%2BQ2%2B2021.pdf> (accessed 01/10/21)

GW of onshore wind, 0.3 GW of solar PV, 0.3 GW of hydro and 0.1 GW of bioenergy and waste¹⁶⁷.

- 3.9.8 The renewable electricity capacity pipeline in June 2021 was 14.8 GW. Of this, 5.4 GW is in planning, 6.8 GW is awaiting construction and 2.6 GW is under construction¹⁶⁸.
- 3.9.9 As Scotland's energy mix continues to change, the electricity transmission network (grid) that supports the balance between energy generation and demand will change significantly, for example, as a result of the increased electrification of the transport and heat network. Infrastructure will play a key role in ensuring security of supply and decarbonising Scotland's energy systems in the most cost effective and affordable way¹⁶⁹. This is partly because the spatial pattern of electricity generation is changing from a centralised system focused on small number of large power stations to a decentralised system with development in areas with a previously weak network. Figure 3.18 illustrates the location of electricity generators in Scotland.
- 3.9.10 Energy storage is likely to be an increasingly important part of the transition to delivering clean, affordable and secure supplies of energy¹⁷⁰. For example, the continued development of battery storage technologies and hydrogen fuel cells for vehicle use in the transport sector. Offshore wind and the development of hydrogen can make important contributions to reducing the carbon emissions of energy. As part of the transition to net zero, technologies such as Carbon Capture Utilisation and Storage can enable further reductions of carbon emissions.
- 3.9.11 Considerable opportunities for the re-use of energy infrastructure have also been identified. The reuse of equipment from wind turbines and decommissioned oil and gas platforms is one of four key priority areas for action within "Making Things Last: A Circular Economy Strategy for Scotland"¹⁷¹. There are also opportunities to extend the lifespan of infrastructure; for example, through repowering of existing windfarms.

¹⁶⁷ Scottish Government (2021) Scottish Energy Statistics Hub [online] Available at: <https://scotland.shinyapps.io/sg-scottish-energy-statistics/?Section=RenLowCarbon&Subsection=RenElec&Chart=RenElecCapacity> (accessed 01/10/21)

¹⁶⁸ Scottish Government (2021) Energy Statistics for Scotland Q2 2021 Figures [online] Available at: <https://www.gov.scot/binaries/content/documents/govscot/publications/statistics/2018/10/quarterly-energy-statistics-bulletins/documents/energy-statistics-summary---september-2021/energy-statistics-summary---september-2021/govscot%3Adocument/Scotland%2BEnergy%2BStats%2BQ2%2B2021.pdf> (accessed 01/10/21)

¹⁶⁹ DECC (2015) Towards a Smart Energy System [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/486362/Towards_a_smart_energy_system.pdf (accessed 01/02/2021)

¹⁷⁰ ClimateXChange (2016) Energy Storage in Scotland - Summary of Reports on Thermal and Electrical Energy Storage [online] Available at: https://www.climatechange.org.uk/media/1391/summary_energy_storage.pdf (accessed 01/02/2021)

¹⁷¹ Scottish Government (2016) Making Things Last A Circular Economy Strategy for Scotland [online] Available at: <http://www.gov.scot/Resource/0049/00494471.pdf> (accessed 18/06/2021)

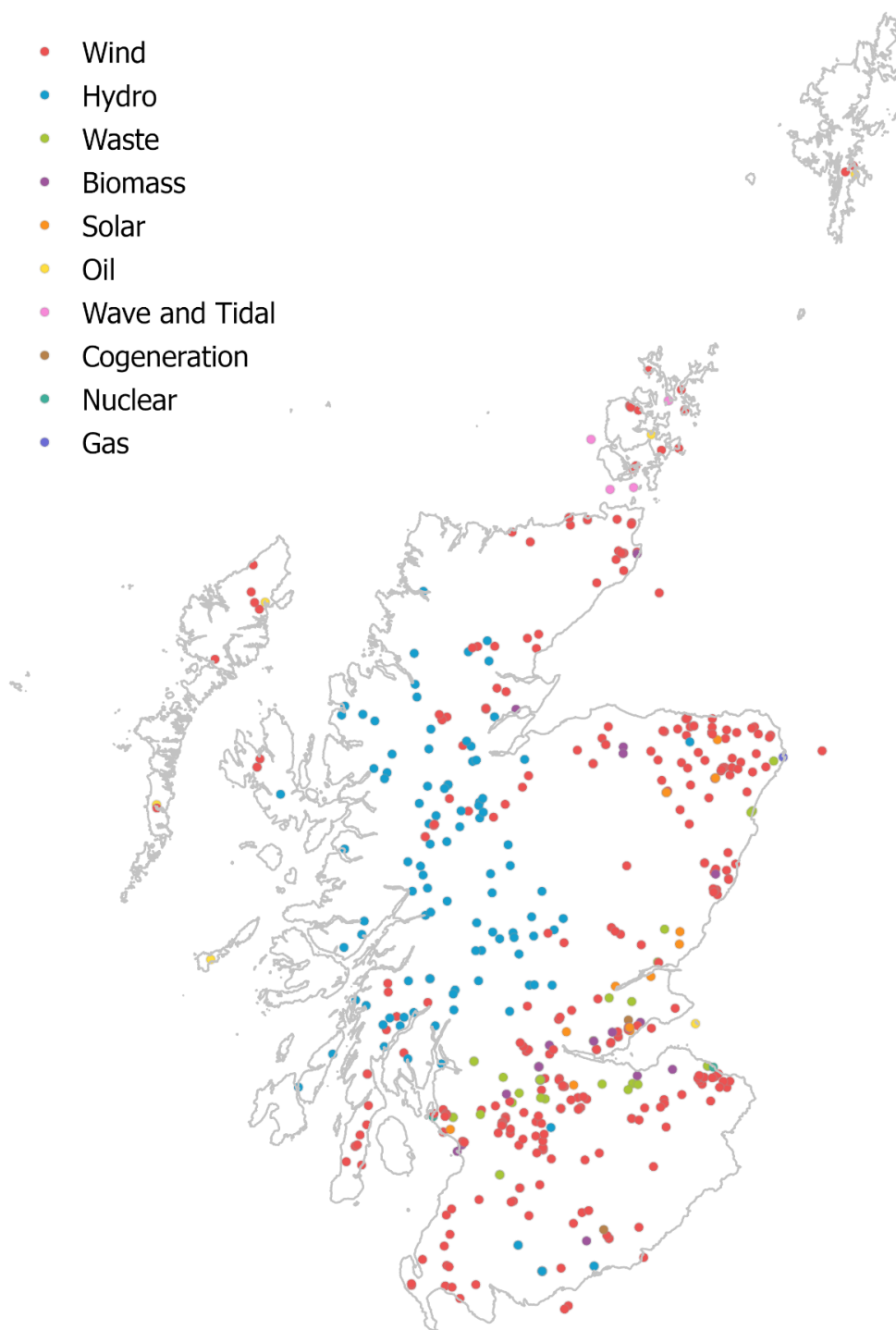


Figure 3.18 Electricity generators with a capacity greater than 1 MW
 Source: BEIS (2020) [Digest of UK Energy Statistics \(DUKES\) 2021 - GOV.UK](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/94222/digest_of_uk_energy_statistics_dukes_2021.pdf)
www.gov.uk © Crown copyright 2021. Licensed under the Open Government
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Transport Infrastructure

- 3.9.12 Scottish Transport Statistics¹⁷² show that over the last five years there have been increases in car traffic, and in air, rail and ferry passenger numbers. Conversely, the number of bus passengers decreased over the same time period. In 2019-20 of journeys made by public transport, 73% were by bus, 19% by rail, 6% by air and 2% by ferry. In 2019, 30% of journeys to work were by public or active travel, one percent lower than in 2009. Public and active travel to work has remained at around 30% since 2009, with cycling retaining a low modal share.
- 3.9.13 In 2019, 49 billion vehicle kilometres were travelled on Scotland's roads, the highest level ever recorded. Cars account for 75% of the total volume of traffic on the roads while the remaining traffic is split between light goods vehicles (17%), heavy goods vehicles (5%) and other (3%). More than 98% of road vehicles in Scotland ran on petrol (50%) or diesel (48%) in 2019. In the same year, there were 56,722km of public roads in Scotland. Overall, there was a minor increase in the amount of trunk road that was newly constructed, reconstructed, strengthened, or surface dressed in 2018-19 compared to the previous year. Trunk roads are the most frequently used, in 2019, 40% of distance travelled by road vehicles was on trunk roads, which account for only 7% of the road network¹⁷².
- 3.9.14 Scotland's primary train operator, Scotrail, recorded 96.4 million passenger journeys in 2019-2020, an increase of 26% since 2008-2009. As of the end of 2018/19, the Scottish rail network had 2,758 kms of rail network and 359 stations. In 2019-20, Glasgow Central was the busiest national rail station in Scotland, with 32 million passenger journeys. Edinburgh Waverley was used by 23 million passengers, Glasgow Queen Street by 17 million, Paisley Gilmour Street by 4 million, Haymarket by 3.0 million, Partick by 2.9 million, Aberdeen and Stirling by 2.5 million, Charing Cross by 2.2 million, Exhibition Centre Glasgow by 2.0 million and Dundee by 1.9 million. Including those already listed, there were 77 stations for which more than half a million passenger journeys each were recorded in the national ticketing system.
- 3.9.15 There has been an increase in air travel with 28.9 million passengers in 2019 down 2% compared to the previous year, and 28% higher than 2009. Scotland's busiest airport by passenger numbers is Edinburgh followed by Glasgow, Aberdeen and Inverness.
- 3.9.16 In 2019, 117 million tonnes of road freight was lifted in Scotland. By weight, much more freight is carried by road than by any other mode of transport. Prior to 2011, more tonne-kilometres of freight (a measure which takes account of the distance that freight is carried) were moved by coastwise shipping than any other mode of transport. However, since then more tonne-kilometres are moved by road. After falling between 1960 and 1994-5, rail freight traffic has since increased in most years until 2005, when it began to

¹⁷² Transport Scotland (2021)) Scottish Transport Statistics No 39: 2020 Edition [online] Available at: <https://www.transport.gov.scot/publication/scottish-transport-statistics-no-39-2020-edition> (accessed 16/09/2021)

decline again. Fourteen million tonnes of freight were lifted by coastwise shipping in 2015 – a fall from 25 million in 2000.

3.9.17 The key transport routes in Scotland are shown in Figure 3.19 Key Transport Routes

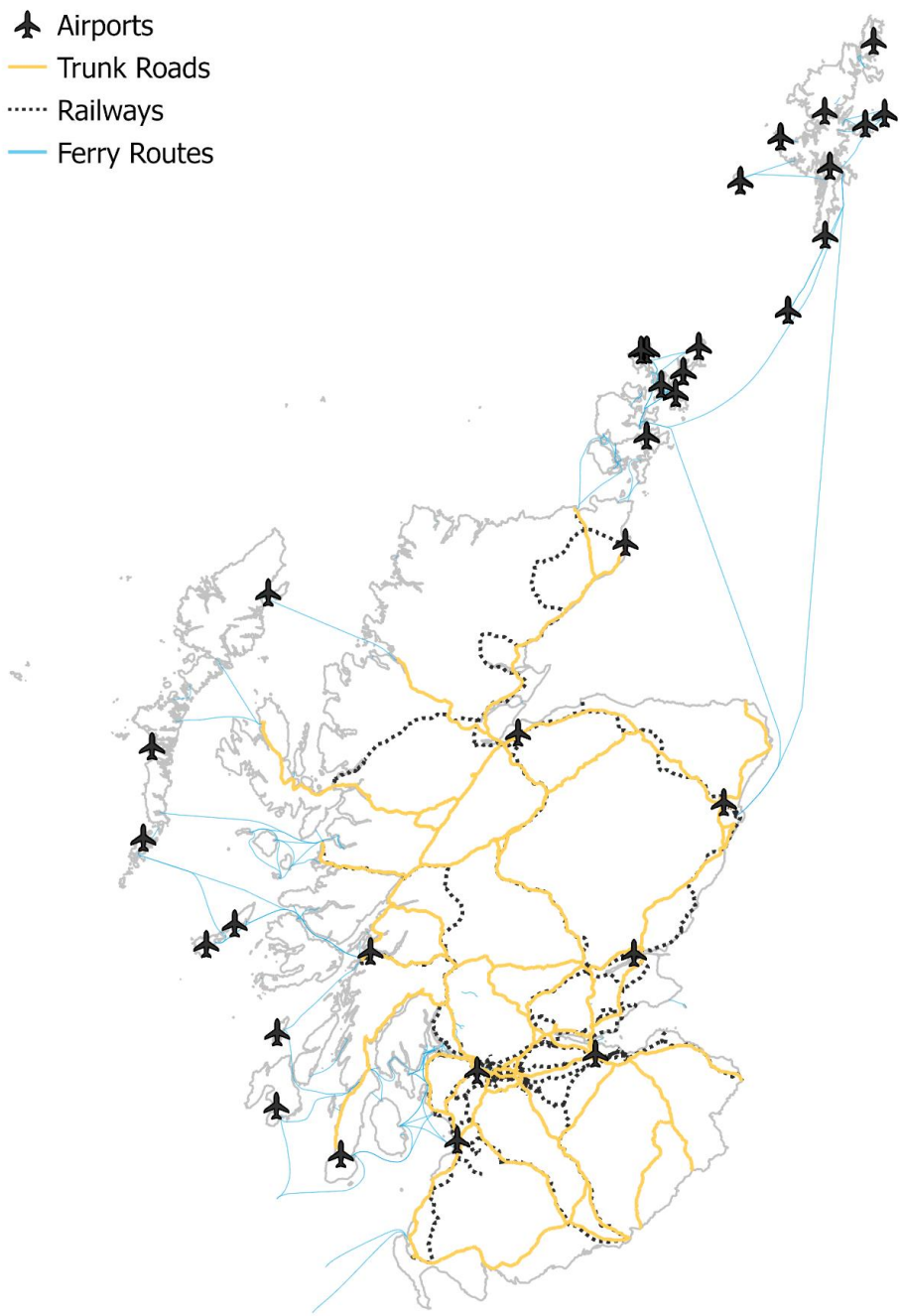


Figure 3.19 Key Transport Routes
 Source: NapTAN (2021) [NaPTAN user guide - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/94822/NaPTAN_user_guide.pdf) Ordnance Survey (2021) [Free OS OpenData Map Downloads | Free Vector & Raster Map Data | OS Data Hub](https://www.ordnancesurvey.co.uk/open-data/) Scottish Government (2021) [SpatialData.gov.scot](https://spatialdata.gov.scot/) Licensed under the Open Government Licence v3.0. Copyright Scottish Government, contains Ordnance Survey data © Crown copyright and database right (2021). © Crown copyright 2021 Licensed under the Open Government Licence v3.0. Contains Ordnance Survey data © Crown copyright and database right (2021)

Blue-green infrastructure

3.9.18 Blue-green infrastructure is an interconnected network of natural and semi-natural areas, ranging in size from small rain gardens and green streets to larger parks and greenspace including ponds and watercourses. These features can perform several functions and provide a range of benefits within the same spatial area¹⁷³. Benefits of blue–green infrastructure include a reduced potential for flooding, improved water quality, reduced infrastructure costs, and increased space for communities and wildlife¹⁷⁴. For example sustainable urban drainage systems mimic natural drainage processes, improving the quality and reducing the quantity of runoff from development¹⁷⁵. In addition to reducing the risk of flooding and diffuse pollution, other benefits include creating attractive open spaces and diverse habitats for wildlife¹⁷⁶. Green infrastructure can also encourage active travel, improve accessibility and connectivity, and lead to wider health benefits through increased physical activity, providing spaces to relax, benefitting mental health and improving air quality. As a key component in placemaking it can also influence the economy through land values, tourism and economic development and enhance communities by building community cohesion and regeneration¹⁷⁷.

Waste

3.9.19 The Scottish Government has several targets for reducing waste and increasing recycling¹⁷⁸. By 2025, the Scottish Government aims to:

- reduce total waste arising in Scotland by 15% against 2011 levels
- reduce food waste by 33% against 2013 levels
- recycle 70% of remaining waste
- send no more than 5% of remaining waste to landfill

¹⁷³ Scottish Government (2011) Green Infrastructure: Design and Placemaking [online] Available at: <https://www.gov.scot/publications/green-infrastructure-design-placemaking/> (accessed 03/11/2021)

¹⁷⁴ Green Growth Knowledge Platform (undated) Blue and Green Cities [online] Available at: <https://www.greengrowthknowledge.org/blog/blue-and-green-cities-role-blue-green-infrastructure-managing-urban-water-resources> (accessed 20/01/2020)

¹⁷⁵ GovUK (2021) Valuing the Benefits of Blue-Green Infrastructure [online] Available at: <https://www.gov.uk/government/publications/valuing-the-benefits-of-blue-green-infrastructure> (accessed 18/06/2021)

¹⁷⁶ Green4Grey (2020) Integrated Planning for Multifunctional Land Use [online] Available at: <https://green4grey.be/en/project-objective#integrale%20planning%20voor%20een%20veelzijdig%20landgebruik> (accessed 18/06/2021)

¹⁷⁷ Greenspace Scotland (2008) Health Impact Assessment of Greenspace - A Guide [online] Available at: <https://www.greenspacescotland.org.uk/Pages/FAQs/Category/resources> (accessed 03/11/2021)

¹⁷⁸ Scottish Government (undated) Managing Waste [online] Available at: <https://www.gov.scot/policies/managing-waste/> (accessed 08/09/2021)

- The Scottish Government also aims to match the EU ambition for all plastic packaging to be economically recyclable or reusable by 2030 and end the practice of landfilling biodegradable municipal waste by 2025

- 3.9.20 Around 11.45 million tonnes of waste were generated in Scotland in 2018, which was unchanged from 2017 and a 4.2% reduction since 2011. There was no significant change in the total amount of waste produced between 2017 and 2018 as the continued reduction in commercial and industrial and household wastes was offset by an increase (3.9%, 0.2 million tonnes) in Construction and Demolition waste generated. In terms of the types of waste generated, Soils was the largest waste category generated in 2018 (4.29 million tonnes, 37.5% of all waste generated), followed by Household and Similar Wastes (2.06 million tonnes, 18.0%) and Mineral Waste from Construction and Demolition (1.28 million tonnes, 11.1%)¹⁷⁹.
- 3.9.21 In 2018, the recycling rate for waste from all sources was 60.7%, an increase of 1.1 percentage points from the 59.6% of waste recycled in 2017. Of the estimated 11.45 million tonnes of waste generated in 2018, around 7.07 million tonnes were recycled, an increase of 0.4% from 2017¹⁷⁹. In 2018, the waste category with the largest amount recycled was Soils (2.90 million tonnes, 41.1% of all waste recycled) followed by Mineral waste from construction and demolition (1.02 million tonnes, 14.4%).
- 3.9.22 The total amount of waste disposed of to landfill has generally decreased steadily since 2009, following large reductions between 2007 and 2009. In 2018, around 4.0 million tonnes of waste was disposed of by landfill or incineration without energy recovery, with 32.1% of all waste being sent to landfill¹⁷⁹. A further 0.5 mt was recovered by incineration with energy recovery or co-incineration. Scotland sent 3 million tonnes of waste to landfill in 2019 (latest data), a reduction of 735,807 tonnes (20%) from 2018 and a reduction of over 4 million tonnes (57%) from 2005. The reduction was largely due to the amount of Household and similar wastes landfilled, which fell by 36% from 1.19 million tonnes in 2018 to 0.76 million tonnes in 2019¹⁸⁰. The total quantity of waste incinerated in Scotland in 2019 was 1.23 million tonnes, an increase of 0.52 million tonnes (72%) from 2018, and an increase of 0.82 million tonnes (199%) from 2011. This was largely due to the Household and similar wastes incinerated, which increased by 131% from 2018 to 330,368 tonnes in 2019¹⁸⁰.

¹⁷⁹ SEPA (2020) Waste From All Sources – Summary Data 2018 [online] Available at: <https://www.sepa.org.uk/environment/waste/waste-data/waste-data-reporting/waste-data-for-scotland/> (accessed 11/10/2021)

¹⁸⁰ SEPA (2020): Waste Landfilled in Scotland – 2019 [online] Available at: <https://www.sepa.org.uk/environment/waste/waste-data/waste-data-reporting/waste-data-for-scotland/> (accessed 08/09/2021)

- 3.9.23 In 2019, the amount of biodegradable municipal waste disposed to landfill fell below one million tonnes for the first time. The drop to 0.7 million tonnes is a decrease of 324,486 tonnes (32%) from 2018 and 1.3 million tonnes from 2005.
- 3.9.24 Emissions from Waste Management declined significantly from 1995 to 2013, from 6.1 to 1.4 million tonnes per year, and have remained relatively stable in recent years, with a value of 1.5 Mt per year in 2019¹⁸¹. The Climate Change Plan sets out an ambition to reduce these emissions to 1.2 Mt per year by 2025, and to 0.8 Mt per year by 2030¹⁸²
- 3.9.25 Every year SEPA provides an estimate of the national shortfall in waste management infrastructure capacity required to meet the targets set out in 'Making Things Last: a circular economy strategy for Scotland'¹⁸³. The total estimates for 2018 are reported in Table 3.4.

Table 3.4 Additional operational waste management capacity required to meet the 'Making Things Last' targets (tonnes)¹⁸³.

Total additional diversion capacity needed	1,785,000
Additional capacity needed to manage source segregated recyclables	775,000
Additional capacity needed to manage unsorted waste	1,010,000
10 year capacity of existing landfill infrastructure	20,590,000
10 year landfill required capacity	13,370,000

¹⁸¹ Scottish Government (2021) Scottish Greenhouse Gas Statistics: 1990-2019 [online] Available at: <https://www.gov.scot/publications/scottish-greenhouse-gas-statistics-1990-2019/> (accessed 04/10/2021)

¹⁸² Scottish Government (2020) Climate Change Plan Update Chapter 5: Waste and the Circular Economy [online] Available at: <https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2020/12/securing-green-recovery-path-net-zero-update-climate-change-plan-20182032/documents/update-climate-change-plan-2018-2032-securing-green-recovery-path-net-zero/update-climate-change-plan-2018-2032-securing-green-recovery-path-net-zero/govscot%3Adocument/update-climate-change-plan-2018-2032-securing-green-recovery-path-net-zero.pdf?forceDownload=true> (accessed 13/04/2021)

¹⁸³ SEPA (2020) Waste Site Information [online] Available at: <https://www.sepa.org.uk/environment/waste/waste-data/waste-data-reporting/waste-site-information/> (accessed 12/11/2021)

Housing

- 3.9.26 Housing to 2040¹⁸⁴ sets out a vision for housing in Scotland to 2040, and aims to deliver an ambition for everyone to have a safe, good quality and affordable home that meets their needs in the place they want to be. The strategy notes a desire for all homes to be digitally connected and have easy access to quality green space, services and public transport links – with no barriers to walking, wheeling or cycling and easy access to learning, health services and employment opportunities.
- 3.9.27 The strategy also highlights the role homes can play in tackling the global climate emergency. It notes a vision that all homes will be warm, affordable to heat, and will reduce direct emissions from heating to zero.
- 3.9.28 The strategy sets an ambition to deliver 100,000 affordable homes by 2031/32 with at least 70% of these for social rent. It also looks to accelerate funding from 2027/28 to bring more existing homes into this programme, as well as building new ones. More recently A Fairer, Greener Scotland: Programme for Government 2021-22¹⁸⁵, commits to the delivery of 110,000 affordable homes by 2032, of which at least 70% will be available for social rent and 10% will be in remote, rural and island communities.

Digital Infrastructure

- 3.9.29 Scotland's digital strategy recognises digital and data infrastructure as critical national infrastructure, and notes that robust and resilient digital infrastructure is essential to maintain and improve the ability of businesses to compete in a global market place; be successful in attracting inward investment; transform the delivery of public services; respond to the challenges of a low carbon economy and have vibrant, strong and connected communities in cities, towns and rural areas¹⁸⁶.
- 3.9.30 Modern digital connectivity is recognised as an essential component of creating a successful country. For businesses and social enterprises, it enhances productivity and drives innovation. In rural communities and fragile areas, it has the potential to boost economic development, retain young people and attract new residents. Connectivity, both fixed and mobile, is central to the successful development of emerging sectors such as renewables, digital healthcare and cloud computing, but also to more traditional sectors, such as tourism or business services, which are increasingly using digital technologies.

¹⁸⁴ Scottish Government (2021) Housing to 2040 [Online] Available at: <https://www.gov.scot/publications/housing-2040-2/> (accessed 18/10/21)

¹⁸⁵ Scottish Government (2021) A Fairer, Green Scotland: programme for Government 2021-22 [online] Available at <https://www.gov.scot/publications/fairer-greener-scotland-programme-government-2021-22/> (Accessed 18/10/21)

¹⁸⁶ Scottish Government (2021) A Changing Nation: How Scotland Will Thrive in a Digital World. [online] Available at: <https://www.gov.scot/publications/a-changing-nation-how-scotland-will-thrive-in-a-digital-world/> (Accessed 18/10/21)

- 3.9.31 The digital strategy also addresses inequalities associated with a digital divide. The 2019 Scottish Household Survey indicates that home internet access has increased steadily and is now at an all-time high. However, access to getting online in the most deprived areas is lower (82%) than in the most affluent areas (96%)¹⁸⁷. Other studies also suggest that a digital divide exists across generations.
- 3.9.32 A progress report published in 2021¹⁸⁸ reported progress against actions identified in the digital strategy, key infrastructure actions include:
- The commitment to provide 100% of residential and business premises in Scotland with access to superfast broadband by the end of 2021 will be met;
 - The Scottish 4G Infill programme is investing in future-proofed infrastructure to improve rural 4G mobile coverage. 11 masts are now live, with delivery anticipated at up to 46 locations;
 - The 5G strategy was published August 2019¹⁸⁹, and continued with the establishing of the Scotland 5G Centre (S5GC), to facilitate investment in the development, deployment and commercialisation of 5G in Scotland;
 - The S5GC will deliver a network of 5G Innovation Hubs; and
 - The commitment to ensuring Scotland is equipped with the underlying infrastructure capable of supporting a widespread sensor network to maximise the benefits to our businesses and communities of the Internet of Things (IoT) is delivering through multiple initiatives. For example, in 2018 £2.7 million was in IoT Scotland, a three year programme to create a widespread network using one of the world's most popular standards (LoRa).

Key Pressures and Trends

- 3.9.33 Built and natural assets are a key part of Scotland's environment, they include infrastructure for energy, heat, flood protection, water supply, and waste and wastewater management.
- 3.9.34 In some areas the capacity of some material assets to deal with demand is being over-stretched such as wastewater management systems and energy generation, which can affect human health and wellbeing. Increasing demand for goods and services puts pressure on existing material assets

¹⁸⁷ Scottish Government (2020) Scottish Household Survey 2019: Annual Report [online] Available at: <https://www.gov.scot/publications/scottish-household-survey-2019-annual-report/> (accessed 18/10/2021)

¹⁸⁸ Scottish Government (2021) Realising Scotland's Full Potential in a Digital World - A Digital Strategy for Scotland: Progress Report 2017-2021 [online] Available at: <https://www.gov.scot/publications/realising-scotlands-full-potential-digital-world-digital-strategy-scotland-progress-report-2017-2021/> (accessed 18/10/21)

¹⁸⁹ Scottish Government (2018) 5G: Strategy for Scotland [online] Available at: <https://www.gov.scot/publications/forging-digital-future-5g-strategy-scotland/> (accessed 30/08/2021)

and causes an increased demand for resources together with the need for waste management and disposal mechanisms.

- 3.9.35 Consumption of products and materials now accounts for up to 74% of Scotland's carbon footprint¹⁹⁰. Further, infrastructure is estimated to account for 53% of total UK emissions in 2013 and is predicted to increase to 90% by 2050¹⁹¹. Construction also accounts for around 50% of all waste in Scotland and has a major influence on the efficient use of resources¹⁹². Consideration of embodied carbon within the built environment at the initial design and construction stages can not only contribute to meeting GHG emissions reductions, but also reduce pressure on resources.
- 3.9.36 Most of the underlying infrastructure that will be required in the next 30 years already exists today and it is essential that these assets are maintained, effectively and efficiently utilised, and enhanced to net zero readiness¹⁹¹. Additionally, infrastructure does not sit in isolation, for example, homes and schools need roads and utilities and it is anticipated that this interdependency is expected to increase with a transition to low and zero carbon solutions¹⁹¹.
- 3.9.37 As Scotland transitions to net zero, a growing and increasingly decarbonised electricity sector is critical to enabling other parts of the economy to decarbonise, notably, transport, buildings and industry¹⁹³. Infrastructure will play a key role in ensuring security of supply and decarbonising Scotland's energy systems in the most cost effective, affordable way¹⁹⁴. Data infrastructure will also become more vital as the population grows and economies and societies become more reliant on getting more value from data to meet a range of needs¹⁹⁵. There are also key synergies between digital and data infrastructure and other forms of infrastructure such as energy and transport.
- 3.9.38 Agricultural change can impact landscape character, and the viability of rural communities and offer some ways to help tackle climate change. Expanding the area of Scotland's forests and woodlands can also contribute to reduced GHG emissions, and provide an important commercial natural resource,

¹⁹⁰ Zero Waste Scotland (2015) The Carbon Impacts of the Circular Economy [online] Available at: <https://www.zerowastescotland.org.uk/sites/default/files/CloCE%20Summary%20Report%20-%20FINAL%20-%2015.06.15.pdf> (accessed 30/08/2021)

¹⁹¹ Infrastructure Commission for Scotland (2020) Key Findings Report [online] Available at: <https://infrastructurecommission.scot/page/key-findings-report> (accessed 20/01/2020)

¹⁹² Zero Waste Scotland (undated) Reducing Construction Waste [online] Available at: <https://www.zerowastescotland.org.uk/content/reducing-construction-waste> (accessed 03/02/2020)

¹⁹³ Scottish Government (2020) Securing a Green Recovery on a Path to Net Zero: Climate Change Plan 2018-2032 Update [online] Available at: <https://www.gov.scot/publications/securing-green-recovery-path-net-zero-update-climate-change-plan-20182032/> (accessed 30/08/2021)

¹⁹⁴ DECC (2015) Towards a Smart Energy System [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/486362/Towards_a_smart_energy_system.pdf (accessed 14/01/2020)

¹⁹⁵ Open data for development (undated) State of Open Data - Data Infrastructure [online] Available at: <https://www.stateofopendata.od4d.net/chapters/issues/data-infrastructure.html> (accessed 16/01/2020)

improve biodiversity and provide spaces for people to enjoy¹⁹⁶. Increasing development, land use change and poor land management can impact forestry and agriculture.

- 3.9.39 Technological developments, behaviour change and reducing demand for less sustainable modes of transport, following the sustainable travel hierarchy, will play a key role in reducing emissions arising from the transport sector. However, the reasons for how, why and when people travel have fundamentally changed due to COVID-19¹⁹⁶. For example, demand for public transport reduced during lockdown from March to June 2020, whilst there has been a mass shift to home working in some professions¹⁹⁶.
- 3.9.40 Derelict and vacant land can affect a community's health, environment, economy and social cohesion¹⁹⁷. Transforming vacant and derelict land, for example, through new homes or creating urban greenspaces, can deliver both environmental and broader social benefits, including addressing health inequalities¹⁹⁸.
- 3.9.41 The benefits of blue-green infrastructure include a reduced potential for flooding, improved water quality, reduced infrastructure costs, and increased space for communities and wildlife¹⁹⁹. A key aspect of blue-green infrastructure is its ability to perform several functions and provide multiple benefits in the same spatial area. Blue-Green infrastructure can also contribute to climate change mitigation and adaptation.
- 3.9.42 Flooding poses the greatest long-term climate related risk to infrastructure performance, however, growing risks posed from heat, water scarcity and slope instability caused by severe weather could also prove significant²⁰⁰. Road and rail transport are generally more vulnerable to a changing climate than air and water transport and flooding is anticipated to be the most significant impact on these networks, as well as those arising from extreme weather conditions and landslides²⁰⁰.

¹⁹⁶ Scottish Government (2020) Securing a Green Recovery on a Path to Net Zero: Climate Change Plan 2018-2032 Update [online] Available at: <https://www.gov.scot/publications/securing-green-recovery-path-net-zero-update-climate-change-plan-20182032/> (accessed 30/08/2021)

¹⁹⁷ Greenspace Scotland (2020) Negative Impact of Vacant Land on Communities [online] Available at: <https://www.greenspacescotland.org.uk/news/derelict-sites-contribute-to-perceptions-of-urban-decline> (accessed 06/02/2020)

¹⁹⁸ Scottish Land Commission (2019) The Impact of Vacant and Derelict Land [online] Available at: <https://landcommission.gov.scot/news-events/news-blog/the-impact-of-vacant-and-derelict-land> (accessed 06/02/2020)

¹⁹⁹ Green Growth Knowledge Platform (undated) Blue and Green Cities [online] Available at: <https://www.greengrowthknowledge.org/blog/blue-and-green-cities-role-blue-green-infrastructure-managing-urban-water-resources> (accessed 20/01/2020)

²⁰⁰ Committee on Climate Change (2017) UK Climate Change Risk Assessment 2017 Evidence Report – Summary for Scotland [online] Available at: <https://www.theccc.org.uk/wp-content/uploads/2016/07/UK-CCRA-2017-Scotland-National-Summary.pdf> (accessed 04/02/2020)

- 3.9.43 It is estimated that 33-50% of coastal buildings, roads, rail and water networks lie in erodible areas²⁰¹. Some stretches of the Scottish coastline is reported as actively eroding, exposing these networks²⁰⁰. If the current rate of coastal erosion continues, around £400 million of assets could be threatened by 2050, including residential and non-residential buildings, railways, roads and the freshwater aquatic environment²⁰¹.
- 3.9.44 The network support services underlying energy, transport, water, and information and communications technology are vital to health and wellbeing and economic prosperity. The effect of climate change on these infrastructure systems will be varied but is likely to include an increase in disruptive events such as flooding, landslides, drought, and heatwaves. Further, this infrastructure is closely inter-linked and failure in any area can lead to wider disruption across these networks²⁰².

Relevant SEA Objectives

- 3.9.45 The above baseline conditions, pressures and trends helped identify the following SEA objectives for material assets:

SEA topic	SEA objectives
Material Assets	Avoid adversely impacting on material assets (e.g. water, heat, energy and flood protection infrastructure etc)
	Promote the principles of circular economy
	Reduce use and promote sustainable management of natural and built environment resources
	Promote the sustainable design, use and management of new and existing assets/infrastructure to support the development of high-quality places

²⁰¹ Infrastructure Commission for Scotland (2020) Key Findings Report [online] Available at: <https://infrastructurecommission.scot/page/key-findings-report> (accessed 20/01/2020)

²⁰² Adaptation Scotland (undated) 15 Key Consequences of Climate Change for Scotland [online] Available at: <http://adaptationscotland.org.uk/climatereadyplaces/impacts/> (accessed 14/01/2020)

Material Assets – Summary of Pressures and Trends

- Material assets is considered to comprise all natural and built assets in Scotland.
- Examples of material assets include infrastructure for transport, energy, heat, flood protection, water supply, and waste and water treatment.
- Increasing demand for goods and services puts pressure on natural resources.
- Flooding poses the greatest long-term climate related risk to infrastructure performance, however, growing risks posed from heat, water scarcity and slope instability caused by severe weather could also prove significant.
- Network services for energy, transport, water, and information & communications technology are vital, and failure in any one area can lead to wider disruption across these networks.
- Expanding the area of Scotland’s forests and woodlands can also contribute to reduced GHG emissions, and provide an important commercial natural resource, improve biodiversity and provide spaces for people to enjoy.

3.10 Population and Human Health

Relevant Environmental Protection Objectives

- 3.10.1 A wide range of environmental protection objectives are relevant to population and human health. Protection against environmental effects such as impacts to air, water, land and disturbance, particularly from noise and vibration are established in legislation at International, UK and national levels. The provision of access to the outdoors for recreational and educational purposes, sustainable transport and housing, green infrastructure and the role of the environment and place in mental and physical health and wellbeing are also well established. Wider policy including reducing inequalities, social inclusion and improving health also form an important context for the NPF4.

Baseline Conditions

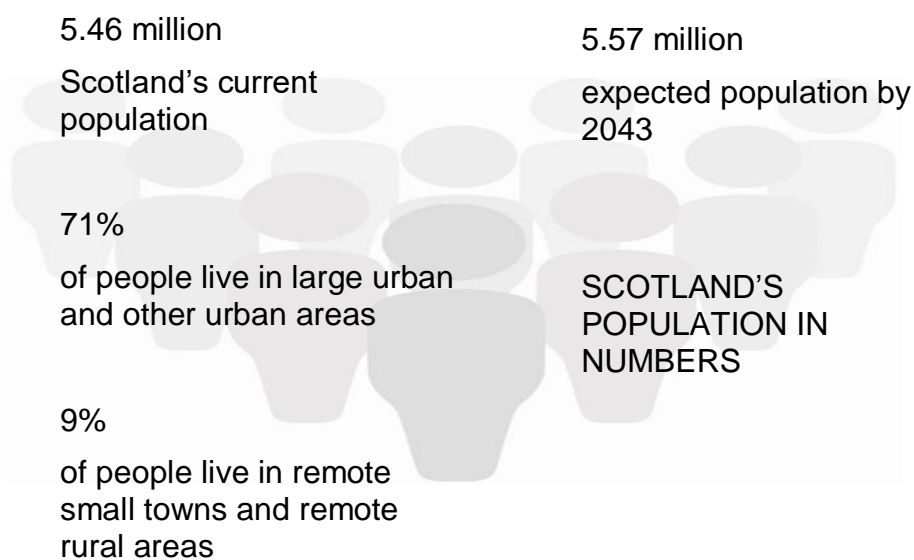


Figure 3.20 Scotland's Population in Numbers
Source: National Records for Scotland^{203,204,205}

²⁰³ National Records for Scotland (2021) Mid 2020 Population Estimates Scotland [online] Available at: <https://www.nrscotland.gov.uk/statistics-and-data/statistics/statistics-by-theme/population/population-estimates/mid-year-population-estimates/mid-2020> (accessed 07/10/2021)

²⁰⁴ National Records for Scotland (2019) Projected Population of Scotland 2018 Based [online] Available at: <https://www.nrscotland.gov.uk/statistics-and-data/statistics/statistics-by-theme/population/population-projections/population-projections-scotland/2018-based> (accessed 07/10/2021)

²⁰⁵ National Records for Scotland (2021) Mid-2020 Small Area Population Estimates for 2011 Data Zones [online] Available at: <https://www.nrscotland.gov.uk/statistics-and-data/statistics/statistics-by-theme/population/population-estimates/small-area-population-estimates-2011-data-zone-based/mid-2020> (accessed 07/10/2021)

- 3.10.2 The population of Scotland was estimated at 5,466,000 in 2020²⁰⁶. Projections forecast that the population will continue to rise to around 5.57 million by 2043, an increase of 2.5%²⁰⁷. Whilst life expectancy is also projected to increase by 2043, the expected rate of increase will be slower than previous projections²⁰⁷.
- 3.10.3 In mid-2020, 71% (over 3.8 million) of Scotland's population lived in large urban and other urban areas, 20% (over 1 million) in accessible small towns and accessible small rural areas and 9% (over 500,000) in remote small towns and remote rural areas²⁰⁸. The highest population density per council is found in Glasgow City, with a cluster of high-density council areas in the central belt, whilst the lowest population density is in Na h-Eileanan Siar and Highland Council²⁰⁶.
- 3.10.4 Over the last decade, rural and island areas have aged the most in terms of median age. Conversely, the areas becoming more youthful tend to be in cities. Over the past decade, the average age of data zones increased the most in Na h-Eileanan Siar (+4.1 years) and the least in Dundee City (-0.1 years)²⁰⁸.
- 3.10.5 After housing costs, 19% of people were living in relative poverty in 2017-20. The council areas with the most data zones within the most deprived 20% were Inverclyde, Glasgow City, North Ayrshire, West Dunbartonshire, and Dundee City, while those with the most data zones in the least deprived 20% were Aberdeenshire, Aberdeen City, City of Edinburgh, East Dunbartonshire, and East Renfrewshire (Figure 3.21)²⁰⁹. Finally, the Scottish index of multiple deprivation also shows that over half of people on low income do not live in the 20% most deprived areas in Scotland²⁰⁹.
- 3.10.6 Among all adults in 2019, 72% described their general health as 'good' or 'very good' and 9% described their general health as 'bad' or 'very bad'. Among children, 95% described their general health as 'good' or 'very good' and 1% described their general health as 'bad' or 'very bad'. Self-assessed 'good' or 'very good' general health in all adults has reduced since 2009 when it was at 77%. The proportion of adults who self-assessed their general health as 'good' or 'very good' varied by area deprivation in 2019, with 83% in the least deprived areas and 54% in the most deprived areas.

²⁰⁶ National Records for Scotland (2021) Mid 2020 Population Estimates Scotland [online] Available at: <https://www.nrscotland.gov.uk/statistics-and-data/statistics/statistics-by-theme/population/population-estimates/mid-year-population-estimates/mid-2020> (accessed 07/10/2021)

²⁰⁷ National Records for Scotland (2019) Projected Population of Scotland 2018 Based [online] Available at: <https://www.nrscotland.gov.uk/statistics-and-data/statistics/statistics-by-theme/population/population-projections/population-projections-scotland/2018-based> (accessed 07/10/2021)

²⁰⁸ National Records for Scotland (2021) Mid-2020 Small Area Population Estimates for 2011 Data Zones [online] Available at: <https://www.nrscotland.gov.uk/statistics-and-data/statistics/statistics-by-theme/population/population-estimates/small-area-population-estimates-2011-data-zone-based/mid-2020> (accessed 07/10/2021)

²⁰⁹ Scottish Government (2020) Scottish Index of Multiple Deprivation 2020 [online] Available at: https://www.gov.scot/collections/scottish-index-of-multiple-deprivation-2020/?utm_source=redirect&utm_medium=shorturl&utm_campaign=simd (accessed 07/10/2021)

- 3.10.7 Compared to 2019, the findings from the Scottish Health Survey 2020 found that 20% less adults undertook at least 150 minutes of moderate physical activity, 75 minutes of vigorous physical activity, or an equivalent combination per week. The implications of this are currently unclear, as the context for public health in 2020 presented unique and unprecedented challenges with the emergence of the COVID-19 pandemic²¹⁰.
- 3.10.8 Scotland has the lowest life expectancy in western Europe. There is a strong relationship between deprivation and life expectancy, with people living in more deprived areas expected to have shorter lives. In the most deprived 10% of areas in Scotland in 2018-2020, life expectancy at birth was on average 68.9 (\pm 0.3) years for males and 75.4 (\pm 0.3) years for females. In contrast, in the least deprived areas, it was 82.4 (\pm 0.3) years and 85.6 (\pm 0.2) years respectively²¹¹.
- 3.10.9 The physical environment can influence health directly (e.g. through air quality or water pollution) and more widely through how people interact with the natural and built environment (e.g. enjoying well-designed public and/or green spaces within our towns and cities). The impact of environmental factors such as climate, geography, geology, topography and environmental hazards on health is termed the environmental burden of disease, much of which (in theory) could be preventable²¹². Key service areas such as social care, housing, education, employability and leisure also have a relationship with health inequalities and health improvement²¹³
- 3.10.10 Socioeconomic inequalities, such as those related to income, employment, education, as well as demographic differences, such as age or gender, are associated with unequal exposure to environmental risk factors. They contribute to health inequalities and most often put disadvantaged groups at significantly higher risk to environmental health effects²¹⁴. Age, pre-existing medical conditions and social deprivation are also key factors that make

²¹⁰ Scottish Government (2021) Scottish Health Survey – Telephone Survey – August/September 2020: Main Report [online] Available at: <https://www.gov.scot/publications/scottish-health-survey-telephone-survey-august-september-2020-main-report/> (accessed 26/08/2021)

²¹¹ National Records of Scotland (2021) Life Expectancy in Scotland, 2018-2020 [online] Available at: <https://www.nrscotland.gov.uk/statistics-and-data/statistics/statistics-by-theme/life-expectancy/life-expectancy-in-scotland/2018-2020> (accessed 08/10/2021)

²¹² SEPA (2019) Guidance on Consideration of Human Health in Strategic Environmental Assessment [online] Available at: <https://www.sepa.org.uk/environment/land/planning/strategic-environmental-assessment/> (accessed 14/10/2021)

²¹³ Scottish Government (2016) 2015 Review of Public Health in Scotland: Strengthening the Function and Re-Focusing Action for a Healthier Scotland [online] Available at: <https://www.gov.scot/publications/2015-review-public-health-scotland-strengthening-function-re-focusing-action-healthier-scotland/> (accessed 14/10/2021)

²¹⁴ World Health Organisation (undated) Social Inequalities in Environment and Health [online] Available at: <https://www.euro.who.int/en/health-topics/environment-and-health/social-inequalities-in-environment-and-health> (accessed 26/08/2021)

populations more vulnerable to the health impacts of climate change, and they experience greater adverse health outcomes²¹⁵.

Key Pressures and Trends

- 3.10.11 Climate change poses a wide range of potential effects on human health, both positive and negative. For example, increases in flood events can affect dwellings and human health, whilst milder winters can positively affect health and reduce cold-related service disruptions²¹⁶.
- 3.10.12 Scotland's population is ageing, with around 19% of the population aged 65 or over, compared with 17% ten years ago²¹⁷. It is projected that those aged 75 and over will be the fastest-growing age group in Scotland, with estimated increases of 27% by 2026 and 29% by 2041 expected²¹⁸.
- 3.10.13 In the year to mid-2020, 25 of the 32 council areas saw more people move to the area than leave. Only one council area, Midlothian, had more births than deaths over the same period. Areas experiencing the highest population increases include East Lothian, Midlothian, Orkney Islands, and East Renfrewshire. The largest decreases included Inverclyde, Na h-Eileanan Siar, and West Dunbartonshire²¹⁷. Most of the central belt and other urban areas are projected to grow in population. But it is projected that the population in almost half of the 32 local authorities will decline. These are mainly in the west and south west of Scotland²¹⁹.
- 3.10.14 There is significant variation between areas such as the Highlands and Islands and some areas in the Southern Uplands versus the more densely populated areas. The sparsely populated areas of Scotland have a demographic legacy which, without intervention is predicted to result in long term population decline, and shrinkage of its working-age population (projected to decrease by 33% by 2046), on a scale that implies serious challenges for economic development²²⁰.

²¹⁵ Paavola, J. (2017) Health Impacts of Climate Change and Health and Social Inequalities in the UK [online] Available at: <https://ehjournal.biomedcentral.com/articles/10.1186/s12940-017-0328-z> (accessed 26/08/2021)

²¹⁶ Kovats S (2015) Health Climate Change Impacts Report Card 2015 [online] Available at: <https://nerc.ukri.org/research/partnerships/ride/lwec/report-cards/health/> (accessed 26/08/2021)

²¹⁷ National Records for Scotland (2021) Mid 2020 Population Estimates Scotland [online] Available at: <https://www.nrscotland.gov.uk/statistics-and-data/statistics/statistics-by-theme/population/population-estimates/mid-year-population-estimates/mid-2020> (accessed 29/07/2021)

²¹⁸ Infrastructure Commission for Scotland (2020) Key Findings Report [online] Available at: <https://infrastructurecommission.scot/page/key-findings-report> (accessed 20/01/2020)

²¹⁹ National Records of Scotland (2021) Scotland's Population 2020 the Registrar General's Annual Review of Demographic Trends [online] Available at: <https://www.nrscotland.gov.uk/statistics-and-data/statistics/stats-at-a-glance/registrar-generals-annual-review/2020> (accessed 07/10/2021)

²²⁰ The James Hutton Institute (2018) Demographic Change in the Sparsely Populated Areas of Scotland (1991-2046) [online] Available at: <https://www.hutton.ac.uk/sites/default/files/files/research/srp2016-21/RD3.4.1%20Note%20WP1-3%20web%20-%20published.pdf> (accessed 26/08/2021)

- 3.10.15 The number of households in Scotland increased by 15% in 2018-2019, but it is still 19% below the level seen in 2007-2008. New housing supply remains below pre-recession levels and is 19% below the 2007-08 figure, however annual supply has increased by 49% since 2012-13. Housing completions in 2018-2019 show the highest rates were observed in Midlothian, East Lothian, Perth and Kinross, Highland and Orkney Islands. The lowest rates were observed in Dumfries and Galloway, Dundee City, Stirling, Na h-Eilean Siar and Argyll and Bute²²¹.
- 3.10.16 Fuel poverty is linked to health issues. Challenging weather, poor energy efficiency at home and reduced heating options (especially in rural areas) can make fuel bills unaffordable, resulting in fuel poverty²²². In 2018, 25.0% of households (619,000) were estimated to be in fuel poverty, a similar level to 2017 (23.7% or 583,000 households). 11.3% (or 279,000 households, a subset of the 619,000 in fuel poverty) were living in extreme fuel poverty in 2018²²³,
- 3.10.17 Greenspace has substantial environmental and health impacts, and links to community aspects, such as community cohesion, social connectedness and community resilience. Accessing high-quality greenspace can improve the health, wellbeing and confidence of people and communities as well as creating a sense of place²²⁴. There is a corresponding greenspace indicator²²⁵. 65.6% of adults lived within a 5-minute walk of their nearest greenspace in 2019, compared to 65.3% in 2018. People living in the most deprived areas are less likely to live within a 5-minute walk of their nearest greenspace than those in less deprived areas. Over 90% of urban Scots feel that it is important to have greenspace in their local area, however, the quality of Scotland's parks and greenspaces has continued to decline, with fewer people using these spaces regularly²²⁶.

²²¹ Scottish Government (2019) Housing Statistics Scotland 2019 Key Trends Summary [online] Available at: <https://www.gov.scot/publications/housing-statistics-scotland-2019-key-trends-summary/pages/2/> (accessed 26/08/2021)

²²² Scottish Government (2020) Home Energy and Fuel Poverty [online] Available at: <https://www.gov.scot/policies/home-energy-and-fuel-poverty/> (accessed 26/08/2021)

²²³ Scottish Government (2020) Scottish House Condition Survey: 2018 Key Findings [online] Available at: <https://www.gov.scot/publications/scottish-house-condition-survey-2018-key-findings/pages/6/> (accessed 25/10/2021)

²²⁴ Scottish Government (2020) Summary Knowledge Account – Quality Greenspace [online] Available at: <https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2020/02/environment-strategy-scotland-vision-outcomes/documents/quality-greenspace-knowledge-account/quality-greenspace-knowledge-account/govscot%3Adocument/quality-greenspace-knowledge-account.pdf> (accessed 04/11/2021)

²²⁵ Scottish Government (2019) National Indicator Performance [online] Available at: <https://nationalperformance.gov.scot/measuring-progress/national-indicator-performance> (accessed 26/08/2021)

²²⁶ Greenspace Scotland (2018) The Third State of Scotland's Greenspace Report [online] Available at: <https://drive.google.com/file/d/1aQLMu60G5WRi4QKBCuZJ92oT8eM2sxd3/view> (accessed 19/10/2020)

- 3.10.18 Vacant and derelict land can affect a community's health, environment, economy and social cohesion²²⁷. Overall in Scotland, 28% of the population were estimated to live within 500 metres of a derelict site, though there are differences across the country. Shetland and Orkney had the lowest percentage, both less than 1%. 55% of people living in the most deprived decile in Scotland are estimated to live within 500 metres of derelict land, compared to 11% of people in the least deprived decile²²⁸. Transforming vacant and derelict land, for example, through new homes or the creation of urban greenspaces, has the potential to deliver both environmental and broader social benefits, including addressing health inequalities²²⁹.
- 3.10.19 While air quality is generally good in Scotland, improvements are required to reduce the adverse effects caused by air pollution particularly in urban areas. Certain pollution hotspots in Scotland have been declared Air Quality Management Areas (AQMAs). Health effects range from chronic (long-term) disease and premature death to lesser symptoms affecting a large percentage of the population and contributing to greater use of medication, more days of restricted activity, and increased requirements for medical care. Air quality, as well as nuisances such as odour, dust and noise are affected by human activities, including transport, energy generation, industry, waste management, construction and agriculture, and natural sources.
- 3.10.20 Ill health caused by air pollution is a health inequalities issue. It disproportionately affects the most vulnerable members of society, including the very young, the elderly, people with existing medical conditions and those living in deprived urban areas and deprived circumstances. Thus, reducing air pollution can help protect human health, eliminate health inequalities, and improve the quality of places and habitats in the wider environment^{230,231}.

²²⁷ Greenspace Scotland (undated) Negative impacts of vacant Land on Communities [online] Available at: <https://www.greenspacescotland.org.uk/news/derelict-sites-contribute-to-perceptions-of-urban-decline> (accessed 08/09/2020)

²²⁸ Scottish Government (2020) Scottish Vacant and Derelict Land Survey 2019 [online] Available at: <https://www.gov.scot/publications/scottish-vacant-derelict-land-survey-2019/> (accessed 11/06/2021)

²²⁹ Scottish Land Commission (2019) the Impact of Vacant and Derelict Land [online] Available at: <https://landcommission.gov.scot/news-events/news-blog/the-impact-of-vacant-and-derelict-land> (accessed 11/06/2021)

²³⁰ Scottish Government (2021) Cleaner Air for Scotland 2 - Towards a Better Place for Everyone [online] Available at: <https://www.gov.scot/publications/cleaner-air-scotland-2-towards-better-place-everyone/> (accessed 08/10/2021)

²³¹ Scotland's Environment Web (undated) Air Quality and Health [online] Available at: <https://www.environment.gov.scot/our-environment/air/air-quality-and-health/> (accessed 26/08/2021)

- 3.10.21 Flooding can have significant environmental impacts and affect people, communities and businesses²³². When floods occur, they disrupt day-to-day lives and their impacts can be long lasting. Climate change is expected to increase the risk of flooding in coming years, and it also brings additional risks to human health posed by changes to air quality and rising temperatures²³². In 2018, around 284,000 homes, businesses and services across Scotland were identified to be at risk of flooding. By 2080, it is reported that climate change will increase the numbers at risk by an additional 110,000 properties²³³.
- 3.10.22 It is expected that potential risks and benefits to population and health from climate change will not be evenly distributed. For example, areas of dense urban development will be more at risk of surface water flooding and summer heat stress. Remote coastal communities may be more vulnerable to disruption to services from extreme weather events. The negative health effects are also likely to be disproportionately severe in areas of high deprivation because of the reduced ability of individuals and communities in these areas to prepare, respond and recover²³⁴.

Relevant SEA Objectives

- 3.10.23 The above baseline conditions, pressures and trends helped identify the following SEA objectives for population and human health:

SEA Topic	SEA Objectives
Population and human health	Reduce the health gap and inequalities and improve healthy life expectancy
	Promote and enhance/improve access to open space, greenspace and the wider countryside
	To protect and improve human health and wellbeing through improving the quality of the living environment of people and communities
	Increase sustainable access to essential services, employment and the natural and historic environment

²³² Committee on Climate Change (2017) UK Climate Change Risk Assessment 2017 Evidence Report [online] Available at: <https://www.theccc.org.uk/uk-climate-change-risk-assessment-2017/> (accessed 26/08/2021)

²³³ SEPA (2018) Flood Risk Management in Scotland 2018 Publication of NFRA and PVAs FAQ's [online] Available at: <https://www.sepa.org.uk/media/399172/nfra-faq.pdf> (accessed 26/08/2021)

²³⁴ Scottish Government (2020) Securing a Green Recovery on a Path to Net Zero: Climate Change Plan 2018–2032 - Update [online] Available at: <https://www.gov.scot/publications/securing-green-recovery-path-net-zero-update-climate-change-plan-20182032/> (accessed 26/08/2021)

Population and Human Health - Summary of Pressures and Trends

- Projections forecast that the population will continue to rise. Most of the central belt and other urban areas are projected to grow in population. But it is projected that the population in almost half of the 32 local authorities will decline.
- Life expectancy is projected to increase.
- Over the last decade, rural and island areas have aged the most in terms of median age. Conversely, areas becoming more 'youthful' tend to be in cities.
- Climate change poses a wide range of potential effects on human health. It is expected that climate change's potential risks and benefits to population and health will not be evenly distributed.
- New housing supply remains below pre-recession levels and is 19% below the 2007-08 figure, however annual supply has increased by 49% since 2012-13.
- The overall fuel poverty rate in 2018 was 25%, similar to 2017.
- The quality of Scotland's parks and greenspaces has continued to decline, with fewer people using these spaces regularly.
- Derelict and vacant land can affect a community's health, environment, economy and social cohesion.
- Air quality is generally good in Scotland, but improvements are required to reduce the adverse effects caused by air pollution, particularly in urban areas.
- In 2018, around 284,000 homes, businesses and services across Scotland were identified to be at risk of flooding from rivers, surface water and the sea. By 2080, climate change will increase the numbers at risk by 110,000 properties.

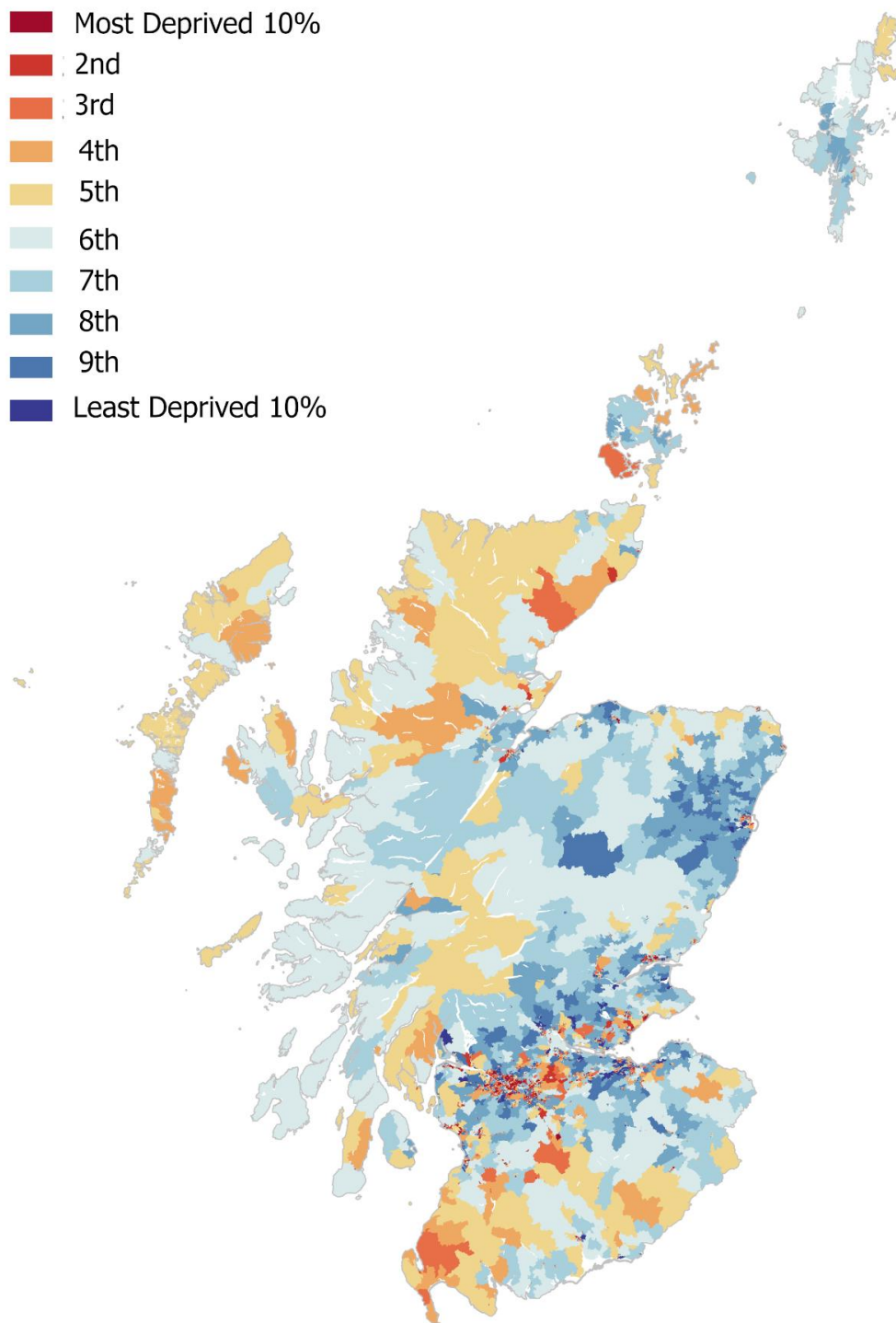


Figure 3.21 Scottish Index of Multiple Deprivation
 Source: Scottish Government (2020) <https://simd.scot/> Licensed under the Open Government Licence v3.0. Copyright Scottish Government, contains Ordnance Survey data © Crown copyright and database right (2021)

4.0 Significant Environmental Effects of the Spatial Strategy and National Developments

4.1 Introduction

4.1.1 NPF4 sets out an approach to planning and development which aims to achieve a net zero, sustainable Scotland by 2045. The amended Town and Country Planning (Scotland) Act 1997 requires that the National Planning Framework must contribute to a series of 6 outcomes: improving the health and wellbeing of our people; increasing the population of rural areas; meeting housing needs (particularly of elderly and disabled); improving equality and eliminating discrimination; meeting targets for emissions of GHG; and securing positive effects for biodiversity.

4.1.2 The main components of the NPF4 include:

- Spatial strategy: This includes priorities, spatial principles and action areas;
- 18 proposed national developments to support the spatial strategy;
- Policies for the development and use of land;
- Minimum All-Tenure Housing Land Requirements (MATHLR) for each planning authority in Scotland. This is to meet the requirement of Section 3A(3)(d) of the Town and Country Planning (Scotland) Act 1997, as amended, and is discussed further in section 5 of this report.

4.2 Environmental Effects of the Draft Spatial Strategy and Proposed National Developments

4.2.1 This section considers the likely significant environmental effects arising from the draft spatial strategy and the proposed national developments. A summary assessment of the national planning policies is set out in Section 5. A summary of the overall cumulative and synergistic effects arising from the NPF4 as a whole is set out in Section 6. A more detailed assessment of the proposed national developments is included in Appendix D, and an assessment of the alternative national developments (those suggestions received by the Scottish Government with potential, but not contributing to, the proposed national developments in the draft NPF4) is located in Appendix E.

Introduction to the Spatial Strategy

4.2.2 The draft spatial strategy includes priorities, spatial principles and action areas and is to be used to guide the preparation of regional spatial strategies, local development plans and local place plans. The strategy will also be relevant to wider policies and strategies relating to land use.

4.2.3 The spatial principles are: Compact growth; Local living; Balanced development; Conserving and recycling assets; Urban and rural synergy; Just transition.

- 4.2.4 Five action areas are identified: North and west coastal innovation; Northern revitalisation; North east transition; Southern sustainability; and Central urban transformation.
- 4.2.5 The spatial strategy is intended to be a shared vision that guides future development in a way that reflects the overarching spatial principles, with each part of Scotland contributing to realising the shared vision. Each part of Scotland can be planned and developed to create:
- **Sustainable places**, where emissions are reduced, and biodiversity is restored and better connected:
 - **Liveable places**, where people can live better, healthier lives.
 - This is supported by six national developments: Central Scotland Green Network, National Walking: Cycling and Wheeling Network: Urban Mass/Rapid Transit networks: Urban Sustainable, Blue and Green Drainage Solutions; Circular Economy Material Management Facilities; and Digital Fibre Network
 - **Productive places**, where Scotland can have a greener, fairer and more inclusive wellbeing economy.
 - This supported by seven national developments including the Islands Hub for Net Zero; Industrial Green Transition Zones; Pumped Hydro Storage; Hunterston Strategic Asset; Chapelcross Power Station Redevelopment; Strategic Renewable Electricity Generation and Transmission Infrastructure; and High Speed Rail
 - **Distinctive places**, where assets are recognised and worked with.
 - This is supported by five national developments including Clyde Mission; Aberdeen Harbour; Dundee Waterfront; Edinburgh Waterfront; and Stranraer Gateway.
- 4.2.6 This section is structured as follows: Firstly, the priorities of each of the 4 NPF4 / spatial strategy themes and their reasons for selection are given. This is followed by an assessment of the environmental effects of each spatial strategy theme, and their respective national developments. Finally, an assessment of each action area allows spatial cumulative impacts to be considered.

Sustainable Places

4.2.7 Sustainable places aims to achieve net zero, nature-positive places which are more resilient to the impacts of climate change and supports the recovery and restoration of the natural environment.

Preferred Approach	Reason for Selection
Maximise new economic and wellbeing opportunities from a just transition to a net zero, nature-positive economy.	This supports multiple statutory outcomes for the NPF: <ul style="list-style-type: none"> - securing positive effects for biodiversity; - improving the health and wellbeing of our people; - meeting targets for the reduction of emissions of greenhouse gases; and - improving equality and eliminating discrimination.
Encourage low and zero carbon design	This supports the NPF statutory outcome - meeting targets for the reduction of emissions of greenhouse gases
Encourage energy efficiency	This supports the NPF statutory outcome - meeting targets for the reduction of emissions of greenhouse gases
Reduce the need to travel unsustainably	This supports the following NPF statutory outcomes: <ul style="list-style-type: none"> - meeting targets for the reduction of emissions of greenhouse gases; and - improving the health and wellbeing of our people
Diversify and expand renewable energy generation	This supports the NPF statutory outcome - meeting targets for the reduction of emissions of greenhouse gases and will contribute to meeting targets for renewable energy generation
Secure positive effects for biodiversity, creating and strengthening nature networks and investing in nature-based solutions to support nature recovery and create multiple benefits for our natural	This supports the following NPF statutory outcomes: <ul style="list-style-type: none"> - securing positive effects for biodiversity; and -improving the health and wellbeing of our people; and - meeting targets for the reduction of emissions of greenhouse gases

capital, health, wellbeing, resilience and jobs.	
Encourage sustainable design and use of resources including circular economy approaches to construction and development.	This supports the NPF statutory outcome - meeting targets for the reduction of emissions of greenhouse gases.
National Developments	
N/A	

Summary of Effects – Sustainable Places

- 4.2.8 The strategy focus on achieving net zero emissions and increasing resilience to the impacts of climate change will have significantly positive effects on climatic factors objectives.
- 4.2.9 The transport sector is one of the largest sources of emissions in Scotland and measures which reduce the need to travel unsustainably will contribute to meeting statutory emissions reductions targets and reduce atmospheric pollutants, with positive impacts for air quality and associated benefits for human health and biodiversity. Additional secondary positive effects on human health may arise where there is an uptake in active travel leading to increased physical activity.
- 4.2.10 Similarly, the energy sector is also a large source of emissions in Scotland. Emission reductions in this sector could therefore make a significant contribution towards meeting net zero targets. Diversifying and expanding renewable energy generation will support wider climate change objectives and emissions reductions targets, and ensure a broad mix of technologies that will help improve security and flexibility of supply. Furthermore, reducing the overall demand for electricity and energy within the buildings and industry sector by improving the energy efficiency of both domestic and non-domestic buildings will further contribute towards reducing emissions. Improvements to energy efficiency in domestic buildings may have positive effects for population and human health through contributing to reducing to fuel poverty.
- 4.2.11 There is, however, potential for negative effects on marine and terrestrial biodiversity, landscape, soils, water and cultural heritage associated with construction and operation of renewable energy developments, and improvements of infrastructure and buildings. This will require consideration at plan and project consenting stages to identify and mitigate any potentially significant effects.
- 4.2.12 Significant long-term positive effects on biodiversity may arise through a focus on strengthening nature networks and investing in nature-based solutions. This may lead to secondary benefits on air quality, soils and water

through reduced flood risk and improved water quality. Where a focus on supporting the recovery and restoration of the natural environment leads to increased woodland and forestry, and restoration of peat, positive effects on climate factors may arise through increased carbon sequestration contributing to emissions reductions. Nature based solutions have an important role in climate change adaptation by, for example, reducing flood risk.

- 4.2.13 Positive effects on both natural and built material assets are likely to arise through a focus on sustainable design and use of resources.

Liveable Places


- 4.2.14 This section aims for future places, homes and neighbourhoods to be better, healthier and more vibrant places to live with communities that are inclusive, empowered, resilient and safe.

Preferred Strategy	Reason for Selection
Address longstanding inequality and eliminate discrimination	This supports the NPF statutory outcome of improving equality and eliminating discrimination.
Create the conditions for lifelong health and wellbeing for all, restore biodiversity and strengthen our future resilience	This supports the NPF statutory outcomes of: -improving the health and wellbeing of our people; and - securing positive effects for biodiversity.
Create places with good quality homes	This supports the NPF statutory outcome of: - meeting the housing needs of people living in Scotland including, in particular, the housing needs for older people and disabled people. This will also help to ensure housing targets, in the form of housing land requirements, are met.
Applying the concept of 20 minute neighbourhoods	By contributing to the creation of walkable, liveable and thriving places that provide communities with local access to the facilities and services needed, applying the 20 minute neighbourhood concept can support the NPF statutory outcomes: - improving the health and wellbeing of people living in Scotland; and - meeting any targets relating to the reduction of emissions of greenhouse gases.
Create spaces to support physical activity, relaxation and play, to bring people together and to celebrate our culture, diversity and heritage.	This reflects multiple NPF statutory outcomes: - improving the health and wellbeing of people living in Scotland; - improving equality and eliminating discrimination; and - securing positive effects for biodiversity.

National Developments	Reason for Selection as set out in draft NPF4
1. Central Scotland Green Network	This national development is needed to improve quality of place and create new opportunities for investment. This will support delivery of the spatial strategy which highlights the importance of accelerating urban greening in this most densely populated part of Scotland.
2. National Walking, Cycling and Wheeling Network	This national development will significantly support modal shift and deliver multiple outcomes including the commitment to a 20% reduction in car kilometres, associated emissions reduction, health and air quality improvement. This will support the delivery of our spatial strategy by creating a more sustainable distribution of access across Scotland as a whole.
3. Urban Mass/Rapid Transit Networks	This national development will help reduce transport related emissions overall, improve air quality, reduce the demand for private vehicle use, support the roll out of 20 minute neighbourhoods and improve transport equity.
4. Urban Sustainable, Blue and Green Drainage Solutions	A large proportion of our population lives in our largest cities. The management of surface water drainage at scale across these city regions will help us to adapt to extreme weather events that will become more frequent as a result of climate change. Whilst focused on drainage, a nature-based approach to surface water management has the potential to deliver multiple health, wellbeing, economic and climate adaptation and emissions reduction benefits. It will also free up sewer capacity for connections to new development.
5. Circular Economy Material Management Facilities	This national development helps maximise Scotland's potential to retain the energy and emissions values within materials already in the economy.
6. Digital Fibre Network	This is a fundamentally important utility, required to support development, community wellbeing, equal access to goods and services, and emissions reduction from reduced demand for travel.

Alternatives
The assessment findings for the alternative national developments are located within Appendix E.

Summary of Effects - Proposed National Developments

<p>1. Central Scotland Green Network</p> <p>The proposed national development is to support delivery of green infrastructure in Central Scotland.</p>	
<p>Summary of potential environment effects</p> <ul style="list-style-type: none"> • Significant long term benefits for biodiversity may arise where a focus on green infrastructure supports delivery of high quality and multifunctioning spaces at scale. • Overall net positive impact on achieving national GHG emissions reduction targets is expected due to reduced transport emissions associated with higher uptake of active travel, reduced flood risk and greater rates of carbon sequestration due to the creation of new greenspace and large-scale planting of trees. • Significant positive effects on climate change adaptation are expected where the development leads to multi-functional green infrastructure for climate adaptation purposes, or new or upgraded sustainable water management and drainage systems through increased resilience to flood risk. Secondary benefits for population and human health may arise through creation of attractive open spaces, particularly where these play a key role in supporting improved placemaking. • Long-term benefits on noise and air quality should arise where support for active travel achieves a modal shift from more polluting forms of transport. • Wider secondary benefits should also arise through the role of natural infrastructure in improving air quality. • Potential for positive impacts through support for broader environmental improvements leading to improved ecosystem health. Further benefits should also arise from the remediation of vacant and derelict land. • Positive impacts on cultural heritage should arise where proposals take account of and work positively with the historic environment to add value, including through the role these assets can play in placemaking. • Potential for significant benefits to arise through improvements in landscape, particularly where focus is given to restoring and enhancing degraded landscapes. 	

- Increased access and uptake of active travel may give rise to significant benefits for both physical and mental health. Wider societal benefits including improved levels of social interaction and sense of place may also arise.

2. National Walking, Cycling and Wheeling Network

Proposed national development for upgrading and provision of additional active travel.



Summary of potential environment effects

- Potential for negative impacts on biodiversity from new infrastructure requirements.
- Overall net positive impact on achieving national GHG emissions reduction targets due to the support for low carbon and active travel.
- Positive impacts on noise and air quality should arise where measures lead to a modal shift from more polluting forms of transport.
- Potential for localised negative effects on soil such as compaction leading to a loss of soil function where infrastructure development is required.
- Potential for significant positive impacts on material assets where this leads to an integrated transport system that supports multi modes of travel and leads to improved sense of place.
- Re-use of existing infrastructure alongside remediation of brownfield land, where possible, should reduce pressure on natural resources and align with circular economy principles.
- Increased uptake of active travel options can lead to positive effects on population and human health through improved physical and mental health.

3. Urban Mass/Rapid Transit Networks

The proposed national development is to deliver low carbon transport solutions to support reduction in private car use in Aberdeen, Edinburgh and Glasgow providing better access to employment and supporting investment.



Summary of potential environment effects

- Potential for negative impacts from the construction and operation of supporting infrastructure.
- Overall net positive impact on achieving national GHG emissions reduction targets. This is considered likely as the long-term

positive effects of three of Scotland's major cities using sustainable transport powered by low carbon electricity is likely to outweigh the short-term negative effects.

- Construction of new, or modifications to existing infrastructure/interventions could impact on waterbodies, including physical changes and water pollution.
- Significant positive impacts on air quality should arise where modal shift leads to more sustainable, low-carbon modes of transport.
- Potential for long term negative effects such as compaction leading to a loss of soil function, resulting from improvements and development of associated infrastructure.
- Potential impacts, both positive and negative, on historic buildings the setting of some historic sites are likely to require consideration at project level.
- Negative impacts could arise on landscape and geodiversity where new physical infrastructure is required, however, the scale of effect is uncertain.
- Positive impacts on material assets may arise through support for increased interconnectivity and sustainable modes of transport.
- Improved access and connectivity to key services, such as employment opportunities has the potential to lead to positive impacts on population and human health.

4. Urban Sustainable, Blue and Green Drainage Solutions

The proposed national development aims to build on the benefits of the Metropolitan Glasgow Strategic Drainage Partnership, to continue investment and extend the approach to the Edinburgh city region.



Summary of potential environment effects

- Infrastructure requirements, including the use of built engineered structures, has the potential to lead to negative effects on biodiversity.
- Overall net positive impact on achieving national GHG emissions reduction targets. This is due to reduced flood risk and delivery of more green spaces that will enhance carbon sequestration.
- Long term positive impacts should also arise where infrastructure supports adaption to climate change through reducing risk of flooding.
- Development activities could impact on known and unknown archaeological sites and historic assets.
- Nature based solutions have the potential to lead to positive effects on water by reducing flood risk and diffuse pollution with secondary benefits on biodiversity and human health. Improved social cohesion through the creation of attractive open spaces

may arise with the “green” and “blue” features of the natural and built environment widely recognised and valued as essential components of successful places.

5. Circular Economy Material Management Facilities

The proposed national development is to deliver a range of facilities required to manage waste streams and their re-processing back to the economy, where sites and facilities will enable retaining the value of waste materials to maximise the use of materials and minimise the use of virgin materials to reduce GHG emissions.



Summary of potential environment effects

- Significant long term benefits on biodiversity should arise where development leads to reduced pressure on natural resources through support for circular economy principles.
- Negative impacts on biodiversity may arise from the construction and operation of new supporting infrastructure. Potential impacts include land take, leading to habitat loss or damage and disturbance/displacement.
- Overall net positive impact on achieving national GHG emissions reduction targets. This is due to increased efficiency in waste management and use of raw materials.
- Reduced waste going to landfill should also lead to secondary benefits for water quality. Remanufacturing can also reduce pressure on resources compared to manufacturing from new, with associated benefits for water quality and quantity.
- Long term benefits could arise from improved air quality, for example, from reduced energy requirements for manufacturing purposes and pollutants associated with the landfilling of waste.
- Potential for operational activities to give rise to impacts including dust, noise, odour and particulate pollution.
- Potential for negative effects such as compaction leading to a loss of soil function resulting from infrastructure requirements.
- There is potential for localised negative effects on landscapes and the setting of both designated and undesignated historic assets.
- Long term significant positive impacts on material assets should arise through greater efficiency in resource use and reduced pressure on raw materials.
- Additional benefits should arise through reduced pressure on existing waste management facilities. The re-use of existing infrastructure, including brownfield land should also reduce pressure on natural resources.
- Long term benefits on population and human health may arise from potential investment in innovation and productivity, and

where inclusive growth leads to employment and the creation of up-skilling opportunities.

6. Digital Fibre Network

The proposed national development is to deliver enhanced digital connectivity providing high speed broadband or equivalent mobile service, prioritising those areas with weaker networks across Scotland.



Summary of potential environment effects

- Potential for negative impacts on biodiversity during the laying of cables during construction, and habitat damage or loss.
- Overall negligible effects on achieving national GHG emissions reduction targets. This is because the potential increases in maintenance travel and electricity use, and to industrial, manufacture and construction processes, should be counterbalanced by reduced journeys from improved digital connectivity.
- Localised negative impacts on water, soil, noise and air quality may arise during installation of cables.
- Positive secondary impacts on air quality may arise where development reduces the need for travel and where this supports the decarbonisation of the energy and transport sector.
- Positive impacts on material assets likely, including through the role of digital infrastructure in supporting other systems such as energy and transport and through increased resilience across sectors.
- Significant positive impacts on population and human health should arise where digital connectivity leads to increased access to goods and services, particularly key services, including health and employment opportunities.

Summary of Effects – Liveable Places

- 4.2.15 An overall equalities-led approach will have long-term positive effects on population and human health through an increased focus on addressing inequalities and discrimination.
- 4.2.16 Health and wellbeing benefits may arise where the proposed national developments lead to more people walking, wheeling and cycling. Increased physical activity, improved access to outdoors, education, facilities and services, and quality local green spaces are also likely to have long term significant positive effects on physical and mental health. Positive impacts could also arise from improved sense of place including societal benefits. Benefits can be maximised where focus is given to areas experiencing current levels of disadvantage.
- 4.2.17 Potential for significant positive effects on population and human health where proposals give rise to good quality homes, linked to need and demand

within an area. There is an opportunity to promote energy efficient homes which may contribute to reducing fuel poverty, with associated societal benefits.

- 4.2.18 Potential for positive effects on population and human health where the Digital fibre network development leads to improved digital connectivity, particularly in areas where gaps in connectivity and barriers to digital access gaps exist. This could support reducing inequalities and digital exclusion as access to getting online is lower the most deprived areas in Scotland. Additional benefits may also arise where improved connectivity supports access to essential services including healthcare and education. The extent to which digital initiatives address the risk of digital exclusion will need to be considered to ensure these benefits are realised across all members of society.
- 4.2.19 Long term localised positive effects on noise and air quality may arise where proposals encourage a shift to more sustainable modes of travel. Air pollution can impact on the more vulnerable members of society – the very young, the elderly and those with existing health conditions such as asthma, respiratory and heart disease, thus making air quality an important health inequalities issue. As air pollution can also effect ecosystems, secondary benefits to biodiversity may also arise through improved air quality.
- 4.2.20 Positive effects on climatic factors through improved community resilience to the effects of climate change should arise where proposals lead to increased use of multi-functional green infrastructure for climate adaptation purposes, or new or upgraded sustainable water management and drainage systems are implemented. Secondary benefits for population and human health may arise through the creation of attractive open spaces, particularly where these play a key role in supporting improved placemaking.
- 4.2.21 The identified proposed national developments are predicted to have a cumulative net positive impact on achieving national GHG emission reduction targets.

Productive Places


- 4.2.22 Productive places aims to ensure future places will attract new investment, build business confidence, stimulate entrepreneurship and facilitate future ways of working – improving economic, social and environmental wellbeing.

Preferred Strategy	Reason for Selection
Build a wellbeing economy that benefits everyone, and every place, in Scotland	This supports the NPF statutory outcomes: <ul style="list-style-type: none"> - improving equality and eliminating discrimination; and - improving the health and wellbeing of people living in Scotland.
Green investment is a key priority	This supports NPF statutory outcomes: <ul style="list-style-type: none"> - improving the health and wellbeing of people living in Scotland; - meeting any targets relating to the reduction of emissions of greenhouse gases; and - securing positive effects for biodiversity.
Encourage development that supports the prosperity of key sectors, supports community wealth building and creates fair work and good green jobs where they are most needed.	This supports NPF statutory outcome: <ul style="list-style-type: none"> - improving the health and wellbeing of people living in Scotland.
National Developments	Reason for Selection as set out in draft NPF4
7. Islands Hub for Net Zero	These classes of development support the potential of the three island authorities to exemplify a transition to a net zero society. This will support delivery of our spatial strategy by helping to sustain communities in rural and island areas by stimulating employment and innovation.
8. Industrial Green Transition Zones	This national development is required to meet our targets for emissions reduction. It also supports a just transition by creating new jobs in emerging technologies and significant economic opportunities for lower carbon industry. It will help to decarbonise other sectors, sites and regions, paving the way for increasing demand to be complemented by the production of further

	hydrogen in the future. This will also help to deliver our spatial strategy by supporting investment in the North East and the Central Belt where there has been a relatively high level of output from fossil fuel industries.
9. Pumped Hydro Storage	This national development supports pumped hydro storage capacity within the electricity network through significant new or expanded sites. This supports the transition to a net zero economy through the ability of pumped hydro storage schemes to optimise electricity generated from renewables by storing and releasing it when it is required.
10. Hunterston Strategic Asset	These classes of development support the redevelopment and reuse of existing strategic assets and land contributing to a net zero economy. It also supports delivery of our spatial strategy by stimulating investment in the west of Scotland, potentially contributing to the wider aim of tackling inequalities.
11. Chapelcross Power Station Redevelopment	This national development supports the reuse of a significant area of brownfield land in a rural area with economically fragile communities. It will also support the just transition to net zero.
12. Strategic Renewable Electricity Generation and Transmission Infrastructure	Additional electricity generation from renewables and electricity transmission capacity of scale is fundamental to achieving a net zero economy and supports improved network resilience in rural and island areas. Island transmission connections in particular can facilitate capturing the significant renewable energy potential in those areas as well as delivering significant social and economic benefits.
13. High Speed Rail	This national development aims to ensure a low emissions air-competitive journey time to cities in the UK as well as connectivity with European cities and benefits to freight. This will support Scotland's ability to attract and compete for investment.

Alternatives
The assessment findings for the alternative national developments are located within Appendix E.

Summary of Effects - Proposed National Developments

<p>7. Islands Hub for Net Zero</p> <p>This national development supports proposed developments in the Western Isles, Shetland and Orkney island groups, for renewable energy generation, renewable hydrogen production, infrastructure and shipping, and associated opportunities in the supply chain for fabrication, research and development.</p>	
<p>Summary of potential environment effects</p> <ul style="list-style-type: none"> • Projects which involve the creation of new ports, or the extension of existing port facilities have the potential to significantly affect the qualifying features of nearby nature designated sites. • Overall net positive impact on achieving national GHG emissions reduction targets. This is due to uncertainty of the scale and type of renewable energy production, renewable hydrogen production, distribution and storage, supporting infrastructure, supply chain for fabrication and R&D, and the use of lower emission fuels for shipping. • There may be short term localised adverse effects on the ecological quality of the water environment. • Possible localised air quality impacts could arise from operational activities, including surface transport and vessel movement, which could also give rise to increased exposure to noise. • Likelihood of both short term and long term impacts, including sediment disturbance and loss of soil from construction activities and infrastructure requirements. • Potential for long term negative impacts on both known and unknown, as well as designated and undesignated offshore archaeology and protections sites, including historic wrecks. • Potential for adverse effects on local landscape character with particular implications for coastal landscapes and seascapes. • Potential benefits on material assets through provision of key infrastructure to support a move towards decarbonisation and increased diversification and resilience within the energy mix. Benefits should also arise through improvements to port/harbour, key transport hubs, which are of particular importance to island communities in supporting lifeline services. The re-use/ enhancement of infrastructure, such as repurposing of offshore pipelines for hydrogen, should also reduce pressure on natural resources through alignment with circular economy principles. 	

- Positive effects should arise from high value employment opportunities and the creation of strategically important new capacity, capabilities and skills in the delivery of net-zero targets, supporting the attractiveness of the area and improving the vitality of islands communities.

8. Industrial Green Transition Zones

Industrial Green Transition Zones will support the generation of significant economic opportunities while minimising carbon emissions. Technologies that will help Scotland transition to net-zero will be supported at these locations, with a particular focus on low carbon and zero emissions technologies including renewables and the generation, storage and distribution of low carbon hydrogen.



Summary of potential environment effects

- Project sites in locations around St Fergus, Peterhead and the Firth of Forth have the potential to significantly affect the qualifying features of nearby designated sites.
- Overall net positive impact on achieving national GHG emissions reduction targets. This is due to support for the transition to hydrogen from direct fossil fuel dependency using low carbon hydrogen production with carbon capture, utilisation and storage.
- Potential for both short and long term negative impacts to arise on both the terrestrial and marine environments from the construction of new and upgraded infrastructure and operational activities.
- Short and long term negative impacts on noise and air quality including odour and dust, may arise from construction and operational activities.
- Potential for negative impacts for soil, both short term during construction activities to long term, for example, sediment disturbance and loss of seabed from laying of pipes and through land take for infrastructure requirements.
- Potential for long term negative effects on both known and unknown historic and cultural heritage assets.
- Long term negative impacts on landscape and seascapes could arise from siting of infrastructure, particularly where new infrastructure is required.
- Positive impacts on material assets should arise from increased support for the diversification of the energy mix. Increased resilience should also arise through the role of hydrogen in energy storage, supporting fluctuations in peak demand and enabling supply to be met when disruptions arise.
- The reuse and refurbishment of existing infrastructure, where possible, should reduce pressure on natural resources and align with circular economy principles.

- Positive impacts should arise for human health through inward investment, including where this leads to employment and skills transfer opportunities. Regeneration measures also have the potential to improve access to key goods and services and lead to wider benefits.

9. Pumped Hydro Storage

The proposed national development is to deliver additional capacity at existing sites as well as new sites. It will include expansion of the capacity at Cruachan.



Summary of potential environment effects

- Pumped hydro storage projects have potential for significant negative direct effects on biodiversity from loss of habitat and disturbance to species. Indirect effects can arise through changes in lighting or noise. Both terrestrial and freshwater habitats and species can be effected by pumped hydro schemes. There is potential for the Cruachan project to impact on internationally, nationally, and locally designated sites.
- Overall net positive effect on achieving national GHG emissions reduction targets due to the facilitation and enabling of renewable energy development across Scotland from the provision of energy storage and rapid capacity during demand peaks.
- Construction of large storage or pumped storage hydropower can lead to blocking, diverting and changes to the natural course of river systems.
- Negative impacts could include effects on water quality and quantity, morphological changes to standing and running waters.
- Construction and operation of pumped hydro storage can lead to negative impacts, including noise, vibration and dust, including from increased transports movements, which can in turn effect human health and biodiversity.
- Secondary benefits could arise for air quality through support for the decarbonisation of the energy sector.
- Permanent loss of soil during reservoir construction and site development, including associated infrastructure requirements is expected. Extensive areas of land could be required where new reservoirs are created.
- Pumped hydro storage has potential for direct and indirect effects on the historic environment, including designated and undesignated, features and their settings.
- Pumped hydro storage infrastructure has the potential to give rise to significant landscape impacts. Access tracks, pipelines, grid connections and other components could have significant impacts requiring mitigation through appropriate siting and post-construction restoration where possible.

- Potential benefits should arise on material assets from pumped hydro storage through supporting diversification and increased resilience within the energy network.
- Support for long term transition to net-zero should lead to benefits for human health as the impacts of current and future climate change is likely to affect health both locally and globally.
- Positive impacts on population and human health may also arise from employment opportunities for local communities.

10. Hunterston Strategic Asset

This proposed national development will support an increased mix of opportunities including port, electricity and hydrogen generation including servicing for offshore energy, carbon capture, aquaculture, business, commercial and industrial uses.



Summary of potential environment effects

- Potential for impacts to arise for internationally, nationally and locally designated nature sites will require further consideration at project level.
- Overall net positive impact on achieving national GHG emissions reduction targets. This is due to support for renewable and low carbon hydrogen production, and electricity generation, including from renewable energy, increasing the renewable energy supply and security of supply over a long time period and displacing fossil fuel use including through use of carbon capture.
- Overall long term secondary benefits should arise for air quality through support for decarbonisation.
- Potential for negative impacts on water from construction and operational activities.
- Benefits for soil from the re-use of brownfield land will be dependent on the extent of proposed re-development. Possible disturbance to seabed through construction and operation of marine activities could lead to negative impacts.
- There is potential for negative effects on the setting of historical assets.
- Negative impacts could arise from the development of new infrastructure which is likely to lead to a degree of landscape change.
- Potential for significant positive impacts on material assets through redevelopment of existing assets, such as decommissioned oil and gas infrastructure, key infrastructure hubs including the deep water harbour and dry dock, aligning with circular economy principles. Positive impacts should also arise through improved diversification and resilience of the energy network, helping to manage fluctuations in energy

demand and potential for reduced risk of flooding, which can negatively impacts on built assets.

- Benefits on population and human health could also arise from the creation of employment opportunities and localising life/work options, including through improving access to facilities and services.

11. Chapelcross Power Station Redevelopment

The proposed national development is to redevelop the former nuclear power station site. The development may include for example business development with a particular focus on energy and energy supply chain; energy generation from solar; electricity storage; generation of heat; production and storage of low carbon and renewable hydrogen.



Summary of potential environment effects

- Potential for impacts on internationally designated sites will require further consideration including at project level
- Overall net positive impact on achieving national GHG emissions reduction targets. This is due to the production of renewable and low carbon energy and support for energy related business development.
- Negative and localised impacts from construction activities on water quality could arise, which should be short term in nature. Operational activities could also lead to long term negative impacts, for example, the production of hydrogen may impact on water quality and quantity
- Longer term positive effects on air quality should arise through potential displacement of traditional energy fuels, however, potential for localised impacts from operational activities will be influenced by the technologies employed and may require further consideration.
- Positive impacts on soils should arise from the remediation of vacant and derelict land.
- Potential for negative impacts on unknown archaeology through construction activities.
- Positive impacts for material assets through support for diversification in the energy mix and re-use of infrastructure, including vacant and derelict land.
- There is the potential for mixed effects on landscapes as a result of land use change resulting from development.
- Potential for positive impacts on population and human health to arise from improved access to key services such as employment opportunities, the benefits of which should be maximised through support provided for taking a community wealth building approach. Where the development leads to localised energy

supply, further positive impacts should also arise, including from the potential provision to local communities/businesses of heat and electricity.

12. Strategic Renewable Electricity Generation and Transmission Infrastructure

This national development supports renewable electricity generation (of or exceeding 50MW), repowering, and expansion of the electricity grid for domestic consumption and export to the UK and beyond. This development will include new infrastructure to support off-shore renewables.



Summary of potential environment effects

- Potential for significant negative impacts on biodiversity to arise for example, disturbance and risk of pollution during construction, or long term loss of habitat and fragmentation.
- Overall net positive impact on achieving national GHG emissions reduction targets. This is due to potential for substantial generation and transmission of low carbon electricity.
- Potential for negative impacts on ground and surface water and coastal waters, depending on installation requirements.
- Longer term secondary positive impacts for air quality should arise where development supports emissions reductions.
- There is the potential for long term negative effects on soil arising from construction and installation of infrastructure, including from compaction, erosion and soil sealing. Potential for disturbance or loss of peat and carbon rich soils which may reduce carbon sequestration.
- Potential for physical impacts on both known and unknown archaeological features in both marine and terrestrial environments. There is also potential to effect the setting of historic assets.
- Potential for negative effects on landscape character, including implications for coastal landscapes and seascapes where new infrastructure development is required.
- Significant positive impacts on material assets should arise through support for energy grid infrastructure and potential to increase flexibility, efficiency and resilience of the energy network as a whole, with increased resilience of significant importance in rural, remote and fragile locations.
- Increased access and reliability of the energy network, including where focus is given to community sustainability and storage, should lead to significant positive effects on population and human health, particularly in rural, remote and fragile locations,

including from reduced risk of disruption during extreme weather events.

13. High Speed Rail

The proposed national development is to support the implementation of increased infrastructure to improve rail capacity and connectivity on the main cross-border routes, the east and west coast mainlines.



Summary of potential environment effects

- Negative impacts likely to arise for biodiversity.
- Overall net positive impact on achieving national GHG emissions reduction targets. This is due to displacement of emissions from private cars and air travel over a long time period.
- Potential for negative impacts on waterbodies. This could include physical changes and water pollution arising from construction activities.
- Localised impacts on air quality are likely to arise from construction activities, including from increased surface traffic activity to and from sites. Potential for long term benefits from support for modal shift to a less polluting mode of transport.
- The construction of the new rail stations, depots and high speed line could result in permanent soil sealing and compaction, including from possible development of agricultural land and carbon rich soils, with potential for associated implications for GHG emissions.
- There is potential for permanent negative effects on cultural heritage, including loss of known and unknown archaeological resources, impacts on historic buildings where established railway infrastructure is modified, and effects on the setting of some historic sites.
- Potential for significant short and long term negative impacts to arise from changes to the character and appearance of local landscapes.
- Positive impacts on material assets should arise through support for improved interconnectivity of more sustainable modes of transport.
- Potential for long term positive impacts on population and human health to arise from increased connectivity, including to goods and services, including through reduced travel times and improved job prospects. Displacement from less sustainable modes of travel could also lead to improved air quality, with associated benefits, including societal.

Summary of environmental effects – Productive Places

- 4.2.23 An overall focus on building a wellbeing economy that benefits everyone and every place will have positive effects on population and human health by addressing inequalities and creation of high value employment opportunities. These benefits should be maximised through support provided for taking a community wealth building approach.
- 4.2.24 Positive effects on both population and human health and climatic factors should arise from prioritising green investment and the creation of strategically important new infrastructure capacity, capabilities and skills in the delivery of net-zero targets.
- 4.2.25 Potential benefits on material assets may arise through the provision of key infrastructure to support a move towards decarbonisation and increased diversification and resilience within the energy mix.
- 4.2.26 Benefits to built material assets should also arise through improvements to port/harbour, key transport hubs, which are of particular importance to island communities in supporting lifeline services.
- 4.2.27 The re-use/enhancement of infrastructure, such as repurposing of offshore pipelines for hydrogen, should also reduce pressure on natural resources through alignment with circular economy principles.
- 4.2.28 Developments have potential to negatively affect a range of receptors including communities, biodiversity, cultural heritage, landscapes, water and soil. This can be minimised through siting and design and enhancement measures applied where relevant in keeping with national policy.
- 4.2.29 The identified proposed national developments are predicted to have a cumulative net positive impact on achieving national GHG emission reduction targets. This is predominantly due to the overall support for the transition to low carbon and renewable energy, and low-carbon travel.

Distinctive Places

4.2.30 This section aims to ensure future places will be distinctive, safe and pleasant, easy to move around, welcoming, nature-positive and resource efficient.

Preferred Strategy	Reason for Selection
Value, enhance, conserve and celebrate our best places and to build better places for future generations.	This supports the NPF statutory outcomes of: <ul style="list-style-type: none"> - improving the health and wellbeing of people living in Scotland, and - securing positive effects for biodiversity.
A stronger commitment to place-making, through a design-led approach and a focus on quality, will ensure every new development will support and improve the experience of our places.	This supports the NPF statutory outcomes of: <ul style="list-style-type: none"> - improving the health and wellbeing of people living in Scotland, and - securing positive effects for biodiversity
Reshape future city and town centres, reuse vacant and derelict land and buildings, enhance our natural and cultural heritage, and create new rural opportunities.	This supports the NPF statutory outcomes of: <ul style="list-style-type: none"> - improving the health and wellbeing of people living in Scotland, - securing positive effects for biodiversity, and - increasing the population of rural areas.
Restore the richness of Scotland's natural environment, protect and enhance our historic environment, and safeguard our shared heritage for future generations.	This supports the NPF statutory outcomes of: <ul style="list-style-type: none"> - securing positive effects for biodiversity.
Work together to ensure that development onshore aligns with national and regional marine plans so that we can protect and enhance the marine environment and unlock the potential of our coastal assets.	This supports the NPF statutory outcome of securing positive effects for biodiversity as well as alignment with wider Scottish Government policies and plans.

National Developments	Reason for Selection as set out in draft NPF4
14. Clyde Mission	These classes of development revitalise a major waterfront asset which is currently under-utilised. This will support the delivery of our spatial strategy by attracting investment and reuse of vacant and derelict land in west central Scotland where there is a particular need to improve quality of place, generate employment and support disadvantaged communities. It will also support adaptation to climate risks.
15. Aberdeen Harbour	This national development supports the optimisation of Aberdeen Harbour to support net zero and stimulate economic investment. It is also a significant opportunity to support better placemaking including city centre transformation, and regeneration of existing land by optimising the use of new and existing assets. This will deliver our spatial strategy by helping the north east of Scotland to achieve a just transition from a high carbon economy whilst improving quality of place.
16. Dundee Waterfront	This national development supports the continued revitalisation of Dundee waterfront, expanded to include Michelin Scotland Innovation Parc in support of the Tay Cities Regional Economic Strategy and its continued use for economic purposes. Waterfront locations may be particularly vulnerable to climate change and so development requires to be carefully designed to manage likely risks.
17. Edinburgh Waterfront	Waterfronts in our largest urban areas are frequently under-utilised and contain significant areas of vacant and derelict land as well as existing infrastructure assets. Their location may be particularly vulnerable to climate change and likely risks will require careful management. This will support delivery of our spatial strategy, which recognises the importance of our urban coastline in supporting our sense of place, economy and wellbeing.

18. Stranraer Gateway	Loch Ryan and Stranraer act as a gateway to Scotland. Reusing the assets in this location will support the wellbeing, economy and community in line with the regional growth deal. It will help to deliver our spatial strategy by driving forward regeneration of a key hub.
Alternatives	
The assessment findings for the alternative national developments are located within Appendix E.	

Summary of Effects - Proposed National Developments

<p>14. Clyde Mission</p> <p>The proposed national development is to deliver an ambitious programme to bring forward sites and assets which are ready for redevelopment to sustain a range of uses.</p> <p>The location includes the river Clyde and land immediately next to it (up to around 500 meters from the river) along its length.</p>	
<p>Summary of potential environment effects</p> <ul style="list-style-type: none"> • Potential for impacts on internationally designated sites will require consideration at project level. • Likely overall net negative effect on lifecycle GHG emissions due to increased emissions from transport, electricity, heat, industrial, manufacture and construction processes and waste. • Long term positive effects on the water environment should arise where development leads to remediation of land contamination and/or redevelopment of vacant and derelict land. • Potential negative impacts on the water environment may arise through waterfront infrastructure development and operations. • Use of sustainable urban drainage systems (SUDs)/natural infrastructure to manage flood risk, should lead to associated benefits for water quality and quantity. • Potential for negative impacts on air quality and noise where proposals lead to increased traffic. • Positive impacts on soil should arise from the remediation of vacant and derelict land, particularly where focus is given to areas with existing contamination. • Potential for development to effect the setting of historic assets, and impact unknown archaeological assets in the marine and terrestrial environments. Opportunities to bring vacant or buildings at risk back into use, and improve the setting of historic assets. 	

- Positive effects on townscape and landscape may arise from the overall approach to sustainable regeneration of an extensive area, particularly though focus on the remediation of vacant and derelict land and support for high quality public realm spaces.
- Potential for significant positive effects for material assets as a result of sustainable regeneration activities and through support for decarbonisation within the energy and transport sectors.
- Potential for long term significant benefits for population and human health particularly from remediation of vacant and derelict land and support for 20 minute neighbourhoods, with associated benefits including improved quality of place and quality of life.

15. Aberdeen Harbour

This national development supports the continued and repurposing of Aberdeen Harbour.



Summary of potential environment effects

- Potential for impacts on internationally designated sites will require consideration at project level.
- Likely overall net positive impact on achieving national GHG emissions reduction targets. This is likely due to the facilitation and enabling of renewable energy development across Scotland, and the production of renewable hydrogen over long timescales.
- There is potential for localised negative impacts on water resulting from development-related operational and construction activities.
- Measures to support improved active travel links should help to reduce possible localised negative impacts on air quality that could arise from increased surface traffic within the area.
- Impacts on soils will be minimal where development occurs on brownfield land.
- There is potential for significant negative effects on the setting of known historical assets within the vicinity of Aberdeen harbour. There is also potential for physical impacts on unknown buried archaeological assets in both terrestrial and marine environments.
- Potential for significant permanent negative effects on local seascape and landscape character and on visual amenity resulting from upgraded port facilities, infrastructure for renewable hydrogen production and mixed use developments and from increased vessel movements.
- Positive impacts for built material assets should arise from support for making best use of existing assets, and from the enhancement of key infrastructure port and harbour assets.

- Positive impacts on population and human health have the potential to arise from access to training and employment opportunities and inward investment.
- At the South Harbour, consideration should be given to the potential impacts for recreational users of the local area.

16. Dundee Waterfront

This national development supports the continued delivery of the waterfront transformation securing the role of the city as a location for investment in the net zero economy.



Summary of potential environment effects

- Potential for negative impacts on nature sites with international designations which will require consideration at project level.
- Where implemented, blue/green infrastructure should lead to long term benefits, including habitat creation and through improved connectivity.
- Likely overall net positive impact on achieving national GHG emissions reduction targets. This is due to emissions associated with transport generated by a mixed-use development which are partly balanced by indirect support for renewable energy development.
- Negative impacts on water could arise during both construction and operational phases.
- Potential for long term positive impacts on water quality through new and/or upgraded blue and green infrastructure.
- Increased surface traffic and vessels may negatively impact local air quality with secondary effects on human health and biodiversity. This is of particular relevance as the area is within Dundee AQMA (designated due to NO₂ and PM₁₀).
- Negative impacts on soils, such as soil sealing and compaction and loss of soil, may arise from infrastructure requirements.
- Potential for long term negative effects on the setting of both designated and undesignated historic assets, and potential for direct impacts on these and unknown archaeological assets.
- The development of infrastructure could also lead to a degree of landscape change. This will be within the context of a developed and industrial landscape, and are therefore expected to be localised and require consideration at project level.
- Potential for positive impacts on built material assets through redevelopment of existing infrastructure, and the redevelopment of brownfield land, particularly where focus is given to improved placemaking. Additional benefits should also arise through the provision of infrastructure to support the decarbonisation of the energy and transport sectors.

- Potential for positive impact to arise where development leads to improved access to training, employment opportunities and inward investment with factors such as ability to access services and facilities playing a key role in health and in tackling health inequalities.

17. Edinburgh Waterfront

This proposed national development supports regeneration that will include high quality mixed-use proposals that optimise the use of the strategic asset for residential, community, commercial and industrial purposes, including support for off-shore energy relating to port uses.



This area includes Edinburgh, with an initial focus on Leith to Granton.

Summary of potential environment effects

- Potential for negative impacts on nature sites with international designations which will require consideration at project level.
- Likely overall net positive impact on achieving national GHG emissions reduction targets. This is due to the indirect positive effect from the support for the renewables industry which is judged to outweigh the negative direct effects of the development from the provision of housing, employment and industry leading to increased GHG emissions from transport, electricity and heat demand.
- Benefits should arise where consideration is given to improved resilience to the impacts of climate change, with coastal infrastructure likely to be at increased risk, including from extreme weather events.
- Negative impacts on water could arise during both construction and operational phases.
- Potential for long term positive impacts for water where consideration is given to blue/green infrastructure as a natural solution to flood risk management.
- Projects taken forward have potential to impact local air quality through transport emissions, vessel emissions and dust generated during construction, with secondary effects on human health and biodiversity. This is of particular relevance as multiple AQMAs have been declared in the wider area.
- Benefits on soils should arise where new/upgraded blue and green infrastructure leads to habitat creation and improved ecosystem health. Negative impacts, such as soil sealing and compaction and loss of soil may arise from infrastructure requirements.
- Potential for negative effects to arise on cultural heritage which is likely to require consideration at project level.

- Infrastructure development is likely to lead to a degree of landscape change, and will require consideration at project level.
- Potential for positive effects through the provision of built assets. Benefits should also arise from consideration of improved resilience to the impacts of climate change, particularly given the predicted increased risks to coastal assets.
- Potential for positive effects to arise on population and human health from the provision of housing and amenities and improved access to employment opportunities. Associated benefits should also arise where focus is given to placemaking.

18. Stranraer Gateway

The proposed national development is to deliver a high quality place-based regeneration in Stranraer that will also support the wider population of southwest Scotland acting as a hub and providing a platform for future investment, that may include commercial, residential, industrial development and transport connectivity enhancement.



The area includes Stranraer and associated transport routes.

Summary of potential environment effects

- Potential for negative impacts on nature sites with international designations which will require consideration at project level.
- Likely overall net positive impact on achieving national GHG emissions reduction targets. This is due to positive effects from use and distribution of low carbon fuels, increased transport efficiency from new rail facilities and transportation which is judged to outweigh the negative effects from increased transport emissions. The scale of this effect is likely to be low.
- Potential for positive impacts on climatic factors where consideration is given to adaptation due to the increased risk from climate change impacts sea level rise and erosion to coastal assets.
- Potential for both short term and longer term negative impacts on the water environment from construction and operational activities.
- Localised negative impacts on air quality may arise due to increased surface transport and vessel movements.
- Likelihood of both short term and long term negative impacts for soils and geodiversity, in the marine and terrestrial environments, from construction and operational activities, however positive effects on soils are expected where vacant and derelict land is reused.
- Potential for negative effects on the setting of known historic assets in the vicinity of Stranraer and the trunk road network.
- Depending on the nature of the projects taken forward, there is potential for negative effects on seascape and landscapes.

- Positive effects should arise on material assets through focus on high quality placemaking, including through the reuse of existing infrastructure and re-use of vacant and derelict land, aligning with circular economy principles.
- Positive long term benefits likely to arise from a focus on high quality placemaking, including through redevelopment of vacant and derelict land. Improved transport links, including international connectivity, should lead to increased access to key services such as employment/upskilling opportunities and potential to support inclusive growth, with associated benefits including improved quality of life.

Summary of Effects – Distinctive Places

- 4.2.31 The overall strategy to value, enhance, conserve and celebrate our best places and to build better places for future generations will have positive effects across a range of receptors including population and human health, biodiversity, cultural heritage, landscape, water and soils.
- 4.2.32 Positive effects on townscape and landscape may arise from the overall approach to sustainable regeneration of extensive areas such as Clyde Mission, and where focus is on reshaping future cities and town centres.
- 4.2.33 The remediation of vacant and derelict land and empty buildings, particularly buildings at risk, and support for high quality public realm spaces, will have positive benefits on soils, cultural heritage, biodiversity and population and human health.
- 4.2.34 Significant positive effects on biodiversity, flora and fauna should arise where opportunities to enhance natural heritage are taken forward. For example, benefits in enhancing biodiversity, linking areas through wildlife corridors, and contributing towards greater ecosystem resilience against invasive non-native species, may occur.
- 4.2.35 Increased development of green infrastructure may facilitate greater levels of active travel. This can have secondary impacts on air quality, in addition to reducing GHG emissions, with secondary benefits for human health and biodiversity.
- 4.2.36 Positive effects on landscape and the setting of cultural assets are expected where proposals lead to their enhancement. This could include direct effects, for example, through the protection given to Inventory Gardens and Designed Landscapes, and also indirect effects from the commitment to protecting the wider setting of historic assets and places.
- 4.2.37 Positive impacts on material assets should arise from support for making best use of existing assets, and from the enhancement of key infrastructure including port and harbour assets.
- 4.2.38 Benefits should arise where consideration is given to improved resilience of assets to the impacts of climate change, with coastal infrastructure likely to be at increased risk, including from extreme weather events.

4.3 Regional Level Assessments

4.3.1 This section brings together consideration of the proposed spatial strategy and national developments, to identify environmental issues that may arise within the five actions action areas (Figure 4.1). This allows for the cumulative effects arising from the spatial strategy to be considered in more detail, together with opportunities to coordinate mitigation. For each area, a regional environmental baseline is first described, followed by a summary of likely effects arising.

North and west coastal innovation – making sustainable use of coasts and islands to sustain communities and pioneer investment in the blue economy.

North east transition – actively planning a just transition from oil and gas to a net zero future.

Northern revitalisation – growing low carbon rural communities, capitalising on digital innovation and making the most of exceptional natural and cultural heritage.

Central urban transformation – transforming and pioneering a new era of low carbon urban living.

Southern sustainability – creating connected, liveable places which benefit from further investment and innovation.



Figure 4.1 Action Areas for Scotland 2045

North and West Coastal Innovation

4.3.2 This area broadly comprises the island communities of Shetland, Orkney, the Western Isles, and parts of Highland and Argyll and Bute including the north and west mainland coastline.

Regional Environmental Baseline

4.3.3 The area benefits from an exceptional environment with iconic coastal landscapes and is rich in biodiversity, sustaining many internationally significant ecological sites and species. There are around 900 offshore islands which vary in character from the dramatic coast of Shetland and the historic crofting landscapes of Orkney and the Outer Hebrides, to the iconic mountains of Skye, the rugged character of Mull and lower lying islands including Tiree and Islay. Each island and coastal area has a strong

individual identity, a rich history and distinctive built heritage including the St Kilda and Neolithic Orkney UNESCO World Heritage Sites.

- 4.3.4 This area as a whole is of ecological importance, as reflected in the number of sites designated at international, national, and local levels in the marine, coastal and terrestrial environments.
- 4.3.5 The coasts, and the communities they support, are particularly exposed to climate change due to the effects of rising sea level, extreme weather events and also temperature and rainfall changes. Coastal erosion is a naturally occurring process that affects much of Scotland's coastline and is predicted to intensify with rising sea levels.
- 4.3.6 Connectivity is essential for the local economy with key centres where lifeline links provide access to the islands including Lerwick, Kirkwall, Stromness, Stornoway, Wick and Thurso, Ullapool, Mallaig and Oban, whilst Tarbert, Lochgilphead and Campbeltown are important hubs towards the south of the area. These centres provide important services to their wider hinterlands. Local projects are ongoing, including the regeneration of Stromness, the Stornoway Deep Water Port development, the linked Islands Growth Deal Outer Hebrides Energy Hub project in Stornoway, and the Islands Growth Deal Knab Redevelopment project in Shetland.
- 4.3.7 The draft NPF4 identifies the following priorities for this area:
- create carbon neutral coastal and island communities;
 - support the blue and wellbeing economies;
 - protect and enhance blue and green infrastructure; and
 - strengthen resilience and decarbonise connectivity.
- 4.3.8 The proposed national developments relevant to this area include:
- National Walking, Cycling and Wheeling Network;
 - Circular Economy Material Management Facilities;
 - Digital Fibre Network;
 - Islands Hub for Net Zero; and
 - Strategic Renewable Electricity Generation and Transmission Infrastructure.

Potential for Regional Scale Cumulative Effects

- 4.3.9 The baseline highlights the number and range of protected sites within the area. The coastal proximity of relevant proposed national developments and key assets identified indicates that there is potential for cumulative effects on the coastal and marine environment which will require further consideration.
- 4.3.10 Some of the proposed developments located within this region will service renewable energy developments. Collectively, these proposals can contribute to Scotland's low carbon economy by safeguarding infrastructure and facilitating the further development of renewable energy generation in the region.

- 4.3.11 Improvements associated with these developments, which include electricity generation and transmission infrastructure, digital fibre network and transport infrastructure, should provide long term benefits for the area's communities and economy, whilst potentially reducing emissions in the energy and transport sectors.
- 4.3.12 A focus on creating carbon neutral coastal and island communities and to decarbonise connectivity, in addition to national developments such as the national walking, cycling and wheeling network have potential to reduce emissions and improve air quality, with associated positive effects on biodiversity and human health and wellbeing.
- 4.3.13 Protecting and enhancing blue and green infrastructure, and increasing community resilience to the effects of climate change which is of specific relevance to coastal communities, will have long term benefits. Investment in nature-based solutions can contribute to climate change resilience, while reducing emissions through carbon sequestration and improving air quality, water and soils with associated benefits for biodiversity and human health and wellbeing.
- 4.3.14 Where new infrastructure is required, impacts during construction phases may affect surrounding communities, habitats and species both individually or cumulatively. However, such impacts are expected to be managed and mitigated through the planning and consenting process and through the adoption of appropriate controls during the implementation stage. This may include the use of management planning, staging development works, timing of works outside of bird breeding periods, and use of sediment and erosion controls, amongst others. Several of the proposed developments are expected to be located on existing industrial or port sites, and where possible, use existing infrastructure. In such cases, the potential for adverse impacts on nearby sensitive areas may not be significant in light of existing development and activity at these sites.
- 4.3.15 In operational terms, there is also potential for cumulative impacts arising from increased activity in the region as a whole. The likely increase in marine vessel numbers associated with renewable energy development in Scapa Flow, from the servicing of marine energy installations, could have disturbance impacts on bird populations in the region. There is also potential for effects on valued landscapes or historic features. However any such impacts may be mitigated in the design stage of developments and will be considered through planning and consenting processes. Given the proximity of many of the proposed developments to protected coastal areas, these issues may require consideration in project-level environmental assessments (i.e. HRA/EIA of specific developments).

Northern Revitalisation

- 4.3.16 This area broadly includes Highland with parts of Argyll and Bute, Moray and much of the national parks. There are links west and north to the island communities.

Regional Environmental Baseline

- 4.3.17 These areas are world renowned for their stunning landscapes, rich biodiversity and cultural heritage. In some places settlements are dispersed or take the form of low density crofting townships, whilst in others communities come together in key centres including Inverness, Oban, Fort William, Thurso and Wick.
- 4.3.18 This area includes the Cairngorms National Park and much of Local Lomond National Park. Both are national assets with internationally significant habitats and landscapes. Further north, the Flow Country contains one of the world's largest areas of blanket bog with a wide range of vegetation and surface pattern types, including numerous pool systems. There are proposals to make the Flow Country a UNESCO World Heritage Site.
- 4.3.19 With large areas of forestry, peatland, blanket bog and vegetation, this area is important for carbon sequestration.
- 4.3.20 The coastline within this area contains numerous designated sites, including the Moray Firth itself with protected subtidal sandbanks, resident bottlenose dolphins, and a series of other important features, as reflected in its status as an SAC, SPA, Ramsar site and SSSI. The Dornoch Firth is also a National Scenic Area.
- 4.3.21 There are a wide range of cultural heritage features found throughout the region, including scheduled monuments, listed buildings, gardens and designated landscapes and archaeological sites.
- 4.3.22 The draft NPF4 identifies the following priorities for this area:
- strengthen networks of resilient communities;
 - stimulate green prosperity;
 - nurture nature-based solutions; and
 - strengthen resilience and decarbonise connectivity.
- 4.3.23 The proposed national developments identified relevant to this area include:
- National Walking, Cycling and Wheeling Network;
 - Circular Economy Material Management Facilities;
 - Digital Fibre Network;
 - Pumped Hydro Storage; and
 - Strategic Renewable Electricity Generation and Transmission Infrastructure.

Potential for Regional Scale Cumulative Effects

- 4.3.24 A focus on a flexible approach to the concept of 20 minute neighbourhoods and national developments such as the National Walking, Cycling and Wheeling Network may lead to long term significant positive effects on climatic factors where a shift to more sustainable modes of travel leads to reductions in emissions. A potential increased uptake of low and zero emissions modes of travel will also create positive impacts on noise and air quality, particularly at a local level, with associated benefits for human health and biodiversity. This could be of particular relevance where air quality issues currently exist such as Air Quality Management Areas (AQMAs) and to those most vulnerable to the impacts of atmospheric pollution.
- 4.3.25 Positive effects on built material assets and emissions reduction targets may arise through a focus on refurbishing existing building stock to reduce the release of embedded carbon and delivering more affordable, energy efficient new homes. Further benefits on culture heritage may arise where buildings at risk are brought back into use, which may contribute positively to the character and sense of place. Positive effects on population and human health may arise through continued innovation of holistic place based solutions, such as the Rural Housing Initiative, and creation of homes that meet diverse community needs, including homes for an ageing population and to help young people to stay in or return to their communities.
- 4.3.26 A focus on nature-based solutions can create climate change adaptation opportunities, with additional benefits for biodiversity and population and human health.
- 4.3.27 As with the Coastal Innovation area, some of the proposals will support the renewable energy sector. Collectively, these proposals could make a substantial contribution to Scotland's low carbon agenda. Low carbon transport proposals will also contribute to these decarbonisation ambitions, particularly if used by communities for everyday use. However, these proposals may lead to negative impacts on biodiversity through loss of habitat, disturbance or land use change. Many of these impacts are expected to be managed through the planning and consenting process, and through adoption of control mechanisms in the construction stage. Further measures such as seasonal timing and staging of development works, and adoption of sediment and erosion controls at the site level can also reduce the significance of potential individual or cumulative impacts.
- 4.3.28 The proposals may impact on valued landscapes or historic environment assets. However, it is expected these would be addressed at the planning and project consenting stages.
- 4.3.29 Potential for cumulative environmental impacts on sensitive coastal and marine sites should be addressed in planning and contenting processes, including through project-level environmental assessment (i.e. HRA/EIA) where relevant.

North East Transition

4.3.30 This area broadly includes Aberdeen City and Aberdeenshire with links through Moray towards Inverness, and south towards the Tay estuary.

Regional Environmental Baseline

4.3.31 This area is amongst the most prosperous parts of Scotland, but has experienced significant economic challenges in recent years and has pockets of deprivation. The area comprises a mix of rural and urban communities, with the city of Aberdeen and a surrounding network of towns including Elgin, Huntly, Fraserburgh, Peterhead, Ellon, Inverurie and Stonehaven, and significant rural areas including more accessible countryside around Aberdeen city. Whilst parts of the area have experienced population decline, several settlements around Aberdeen have grown.

4.3.32 A wide range of cultural heritage and landscape features are found throughout the region, including listed buildings, gardens and designated landscapes and historic battlefields. Features within the vicinity of Aberdeen Harbour include Girdleness lighthouse (Category A-listed structure), Torry Point Battery and Balnagask motte scheduled monuments, St Fittick's Church (scheduled monument and Category B-listed structure).

4.3.33 The area contains numerous SPA, SAC and SSSI designated sites including, for example, the River Dee SAC at Aberdeen designated for freshwater pearl mussel, Atlantic salmon and otter and the Ythan Estuary, Sands of Forvie, Forvie and Meikle Loch SPA on the north east coast and the Gamrie and Pennan Coast SSSI to the north.

4.3.34 Several local air quality management areas (AQMA) in the region have been declared for vehicle emissions, including three within Aberdeen itself.

Potential for Regional Scale Cumulative Effects

4.3.35 The draft NPF4 identified the following priorities for this area:

- Transition to net zero;
- improve local liveability;
- regenerate coastal communities; and
- decarbonise connectivity.

4.3.36 The proposed national developments identified within this area include:

- National Walking, Cycling and Wheeling Network;
- Urban Mass/Rapid Transit Networks;
- Circular Economy Material Management Facilities;
- Digital Fibre Network;
- Industrial Green Transition Zones;
- Pumped Hydro Storage;

- Strategic Renewable Electricity Generation and Transmission Infrastructure; and
 - Aberdeen harbour.
- 4.3.37 The focus on a transition to net zero with greener energy choices and proposals relating to Aberdeen Harbour will collectively contribute to the development of low carbon and zero emissions technologies for example through support for offshore wind, hydrogen production and carbon capture and storage. This will therefore support wider climate change objectives and emissions reductions targets.
- 4.3.38 Other proposals for improved local liveability and decarbonised connectivity, supported by proposed developments on urban mass/rapid transit networks and the National Walking, Cycling and Wheeling Network should provide benefits by reducing congestion and transport associated emissions. Measures to support a modal shift to lower carbon travel options will have a range of secondary benefits including reduced noise and improved air quality and health and wellbeing benefits. This could be of particular relevance in areas where air quality issues currently exist such as Air Quality Management Areas (AQMAs).
- 4.3.39 Generally, impacts such as soil sealing, reductions in soil, water and air quality, and disturbance from construction activities may occur at the site level, particularly where land take is required for developments. The timing of construction activities could be an important factor, and consideration should be given to cumulative effects on residential amenity and sensitive receptors. These potential impacts can be effectively managed through planning and consenting processes.
- 4.3.40 There is also potential for proposed developments to impact on historic assets located throughout the region, particularly within Aberdeen City and around Aberdeen Harbour. Consideration of potential impacts on conservation areas and opportunities to protect or enhance should be identified. Potential impacts can be addressed through the planning and consenting process, with mitigation applied.
- 4.3.41 Increased operational capacity in Aberdeen Harbour with associated increases in road traffic and vessel numbers could generate adverse effects on noise and air quality in the vicinity of the port. Potential adverse impacts from construction works and ongoing operations associated with these developments will be subject to greater consideration at the project level.

Central Urban Transformation

4.3.42 This area broadly covers central Scotland from the Glasgow city region and the Ayrshires in the west to Edinburgh city region in the east, including the Tay cities, the Forth Valley and Loch Lomond and The Trossachs National Park.

Regional Environmental Baseline

4.3.43 This area contains a significant share of essential national infrastructure with key industrial sites located in Grangemouth and Mossmorran, and port facilities including at Rosyth, Burntisland, Methil, Leith and Grangemouth. There are large urbanised and industrial areas particularly within much of the Glasgow conurbation where the industrial legacy in the region has left significant areas of contaminated, derelict or vacant land.

4.3.44 There are inequalities within each of the city regions, with local concentrations of economic deprivation. Overall, economic performance is higher in the cities of Edinburgh and Glasgow and lower in surrounding areas including Inverclyde, Ayrshire, along parts of the Clyde Coast and Lanarkshire.

4.3.45 Beyond the cities and towns there are many high quality environments, including areas of high landscape quality. Cultural heritage assets are found throughout the region, with internationally recognised sites such as the World Heritage Listed Old and New Towns in Edinburgh and the Antonine Wall which runs from modern Bo'ness on the Firth of Forth to Old Kilpartick on the River Clyde. The Forth Rail Bridge is also a World Heritage Site and this, with other historic assets including listed buildings such as Edinburgh Castle and historic gardens and designed landscapes, contribute to the landscape character of their respective areas.

4.3.46 The area has numerous protected biodiversity sites, the most notable being the SPAs, SACs, SSSIs and Ramsar sites in the coastal and in-shore areas of the Firths of Forth and Clyde, which supports a wide range of internationally and nationally important bird species including wildfowl, wading birds and breeding seabirds.

4.3.47 Multiple local air quality management areas (AQMA) have been declared in the area. While these are largely a result of vehicle emissions (Nitrogen dioxide and particulate matter), an area at Grangemouth encompassing the petrochemical complex has been declared for SO₂

Potential for Regional Scale Cumulative Effects

4.3.48 The draft NPF4 identified the following priorities for this area:

- pioneer low carbon, resilient urban living;
- reinvent and future proof city centres;
- accelerate urban greening;
- rediscover urban coasts and waterfronts;
- reuse land and buildings;
- invest in net zero housing solutions;

- grow a wellbeing economy;
- reimagine development on the urban fringe; and
- improve urban accessibility.

4.3.49 The proposed national developments relevant to this area include:

- Central Scotland Green Network;
- National Walking, Cycling and Wheeling Network;
- Urban Mass/Rapid Transit Networks;
- Urban Sustainable, Blue and Green Drainage Solutions;
- Circular Economy Material Management Facilities;
- Digital Fibre Network;
- Industrial Green Transition Zone;
- Hunterston Strategic Asset;
- Strategic Renewable Electricity Generation and Transmission Infrastructure;
- High Speed Rail;
- Clyde Mission;
- Dundee Waterfront; and
- Edinburgh Waterfront.

4.3.50 Many of the proposed developments and initiatives identified in the spatial strategy have important environmental components, aiming to improve the quality of the built or natural environments. Several proposals specifically aim to improve the natural environment, including the Central Scotland Green Network. Others, such as those involving the redevelopment of industrial sites and using existing infrastructure where possible, such as Clyde Mission, could collectively provide significant environmental benefits by improving land, and local positive impacts on water, townscape and landscape, and human health. There is potential for benefits for biodiversity, water quality and reduced flood risk, particularly for the Inner Clyde, from the focus on resilient urban living and the Urban Sustainable, Blue and Green Drainage Solutions national development proposal.

4.3.51 At the regional level, a focus on accelerating urban greening through the Central Scotland Green Network and other initiatives, and reduced development on the urban fringe will have significant long term positive effects on biodiversity, with secondary benefits on townscape and landscape, water, air quality, soils and climatic factors through increased carbon sequestration. Significant effects on population and human health where well-designed and managed green infrastructure assets, particularly those that engage local communities and which relate to landscape character and heritage, can enhance local sense of place and foster community spirit.

- 4.3.52 Positive impacts may arise including for population and human health where infrastructure considerations are embedded at the heart of place making and support improved access to goods and services, particularly to vital services such as employment. Wider societal benefits may arise where a focus is given to reducing barriers for individuals or communities with specific needs, and where inequalities currently exist.
- 4.3.53 Further health and wellbeing benefits may arise where proposals lead to increased uptake of walking, wheeling and cycling through improved urban accessibility. Increased physical activity, improved access to outdoors, education, facilities and services, and quality local green spaces are likely to have long term significant positive effects on physical and mental health. Benefits can be maximised where improvements are focused on areas experiencing economic inequalities.
- 4.3.54 Reuse of brownfield land can have positive effects on climatic factors, where the creation of green infrastructure on previously developed land, and reduced pressure on greenbelt, can lead to increased carbon sequestration. The re-use of vacant and derelict land can also create more walkable and liveable environments, including through supporting active travel routes, with potential benefits associated with reduced emissions where a modal shift to low carbon travel options arises.
- 4.3.55 A potential increased uptake of low and zero emissions modes of travel will also create positive impacts on noise and air quality, particularly at a local level, with associated benefits for human health and biodiversity. This could be of particular relevance in areas where air quality issues currently exist such as Air Quality Management Areas (AQMAs) and to those most vulnerable to the impacts of atmospheric pollution.
- 4.3.56 There is potential for additional benefits to arise where remediation of vacant and derelict land supports climate change adaptation, for example, through broader benefits to ecosystem services leading to increased resilience or the provision of sustainable flood management infrastructure (e.g. SUDS) or wider promotion of green / blue networks.
- 4.3.57 Where buildings are reused, there is an opportunity to maintain, restore and repurpose historic assets to support sustainable placemaking. Cultural activity can also drive local economic activity and benefit community cohesion
- 4.3.58 There is potential for positive impacts where opportunities are sought to bring historic buildings at risk back into use, including where consideration is given to their role in placemaking and town centre regeneration. This also supports a circular economy and the reuse of existing assets.
- 4.3.59 Cumulative construction impacts may raise issues for surrounding areas and habitats. While this is already a relatively urbanised area, temporary impacts in disturbance and soil, water and air quality may occur from undertaking some construction activities. However, many impacts are expected to be managed at the project level including through the adoption of appropriate controls during the construction works (i.e. management planning, staging of land disturbances, sediment and erosion controls, dust suppression).

4.3.60 In operational terms, increased activity at development sites could potentially contribute to cumulative impacts on sensitive receptors. For example, this could generate local air quality issues from vehicle emissions in some areas, although at present, congestion and air quality is not a significant issue in this region. Changes in land use and likely increases in vehicle and vessel numbers accessing the Hunterston site, for example, may have the potential to disturb sensitive sites and species for example breeding bird populations identified in the Renfrewshire Heights SPA and Southannan Sands SSSI.

Southern Sustainability

- 4.3.61 This area broadly includes Dumfries and Galloway and The Scottish Borders, with links to the Ayrshires and Glasgow city region in the west and to the Edinburgh city region in the east.

Regional Environmental Baseline

- 4.3.62 The South of Scotland is strategically important with a strong sense of identity centred on networks of towns and villages, supported by distinctive landscapes and coasts. This is a place with a rich cultural heritage and exceptional environmental assets and natural resources. This area is ambitious for positive change in the coming years, and the immediate work to recover from the pandemic will form the basis of a longer term plan to respond to the challenges of climate change and support nature restoration and recovery.
- 4.3.63 Cultural heritage assets are scattered throughout the region in both coastal and inland areas, including a significant number of listed buildings, and designated gardens and designed landscapes such as Drumlanrig Castle. The area also includes numerous scheduled monuments, battlefields and conservation areas.
- 4.3.64 The area includes multiple designated sites. At an international level, designated sites include the Solway Firth SPA, and the Upper Solway Flats and Marshes Ramsar site, designated for a range of wintering waterbirds. The area also includes Castle Loch, Lochmaben SPA and Ramsar site, designated for pink-footed geese, and the Raeburn Flow SAC and Solway Mosses North SAC, both designated for raised bog habitats which are sensitive to air quality impacts.

Potential for Regional Scale Cumulative Effects

- 4.3.65 The draft NPF4 identified the following priorities for this area:
- create a low carbon network of towns;
 - support sustainable development;
 - innovate to sustain and enhance natural capital; and
 - strengthen resilience and decarbonise connectivity.
- 4.3.66 The proposed national developments identified within this area include:
- National Walking, Cycling and Wheeling Network;
 - Circular Economy Material Management Facilities;
 - Digital Fibre Network;
 - Pumped Hydro Storage;
 - Chapelcross Power Station Redevelopment;
 - High Speed rail;
 - Strategic Renewable Electricity Generation and Transmission Infrastructure;

- Clyde Mission; and
 - Stranraer Gateway.
- 4.3.67 Of the many designated and protected areas located within this region, many are located in coastal and inland more remote rural areas. Given the scattered nature of these sites in the region, the potential for significant environmental effects will depend on development locations and are likely to be site and development specific.
- 4.3.68 An emphasis on creating a low carbon network of towns with a tailored response to the 20 minute neighbourhood concept, and national developments such as the National Walking, Cycling and Wheeling Network may lead to long term significant positive effects on climatic factors as a shift to more sustainable modes of travel should lead to reductions in GHG emissions. A potential increased uptake of low and zero emissions modes of travel can also create positive impacts on noise and air quality, particularly at a local level, with associated benefits for human health and biodiversity.
- 4.3.69 Health and wellbeing benefits may arise where proposals lead to more people walking, wheeling and cycling. Increased physical activity, improved access to outdoors, education, facilities and services, and quality local green spaces are likely to have long term significant positive effects on physical and mental health.
- 4.3.70 Connectivity and accessibility to wider areas will be improved through proposed national developments such as high speed rail and Stranraer Gateway, and a focus on supporting sustainable development and a wellbeing economy will enable access to employment opportunities and facilitate regeneration of town centres. Further community benefits are likely to arise from regeneration and may support tourism development.
- 4.3.71 Positive effects on biodiversity should arise where opportunities to sustain and enhance natural capital are implemented through the creation of nature networks to support improved ecological connectivity, the creation of new or restoration of degraded habitats, or through measures to increase populations of priority species. Additionally, well-designed and managed green infrastructure assets, particularly those that engage local communities and which relate to landscape character and heritage, can enhance local sense of place and foster community spirit
- 4.3.72 Construction impacts of developments and infrastructure works have the potential to create temporary adverse impacts on surrounding habitats and species. Impacts on soil, water, noise and air quality are commonly associated with construction works and will require managed through the planning and consenting process or through the adoption of appropriate controls during the construction works (i.e. management plans, sediment and erosion controls).
- 4.3.73 In operational terms, increased activity at key sites and along transport routes is expected over the long term. In some instances, this could potentially contribute to cumulative impacts on sensitive receptors. This could generate local air quality issues from vehicle emissions in some areas.

Action Areas - Summary of Key Issues Requiring Regional or Local Mitigation

- Impacts to sensitive and protected sites, including designated sites and historic environment assets, should be assessed at plan and project level.
- Effects on biodiversity should be minimised through siting and design, and enhancement measures applied in keeping with national policy.
- Focus should be given to designing buildings, infrastructure and spaces which are adaptable to climate change.
- Opportunities should be sought to maintain, restore and repurpose historic assets to support sustainable placemaking.
- Development proposals should be designed to a high quality so that the scale and nature of the development contributes positively to the character and sense of place of the area.
- Impacts during construction phase should be managed, with consideration given to cumulative effects, to minimise potential adverse impacts on residential amenity and habitats and species.

5.0 Significant Environmental Effects of the Draft National Planning Policy

5.1 Introduction

- 5.1.1 Part 3 of the draft National Planning Framework (NPF4) sets out draft national planning policies (“draft policies”) for day to day use: in the preparation of local development plans; local place plans; masterplans and briefs; and for determining the range of planning consents.
- 5.1.2 Part 3 of the draft NPF4 is to be taken as a whole, and all relevant policies are to be applied to each application. In addition, draft policies 1 – 6 are ‘Universal Policies’ which are to apply to all planning decisions.
- 5.1.3 The draft policies are set out under 4 themes of: Sustainable Places, (Universal Policies), Liveable Places, Productive Places, and Distinctive Places. Appendix C sets out the findings of the assessment of the draft policies. The following section considers the cumulative effects of the draft planning policies.

5.2 Cumulative Effects of the Draft Planning Policies

- 5.2.1 Overall, significant cumulative benefits are considered likely to arise for climatic factors, biodiversity, water, soil, air quality, population and human health, cultural heritage and material assets from the overarching aims of the draft policies. For example, a number of draft policies have the potential to support aligned ambitions, such as continued decarbonisation across sectors, the recovery and restoration of the natural environment and economic, social and environmental wellbeing, and in turn, improved placemaking. There is the potential for mixed impacts to arise on landscape from the combined draft policies. The likely significance of these will be influenced by a number of factors. For example, the siting and design of individual projects can affect the significance of potential impacts at the local level. However, policies individually and in combination will mitigate many of these effects at the plan and project level.
- 5.2.2 There may also be localised construction and operational implications, for example, from the implementation of technologies to support a transition to net-zero, and potential for land use change implications, such as the loss of soil and habitats, which can be long-term and permanent. This has the potential for mixed or uncertain effects to arise on a number of topics at local level, such as soil, water and air quality, from the combined draft policies. The significance of potential impacts is likely to be influenced by factors such as the scale of uptake and specific technologies employed but this is expected to be managed through the planning process.

5.3 Opportunities for Mitigation and Enhancement

- 5.3.1 There are opportunities for positive effects to be maximised, where a focus is given at planning and consenting stages to opportunities for multiple benefits to arise. For example, the role of natural solutions in flood risk management and support for transition towards net-zero, which should lead to benefits for

not only climate change mitigation and adaptation, but also for biodiversity. Additional benefits should also arise for population and human health through improved air quality and increased resilience to the impacts of climate change, benefiting both physical and mental wellbeing.

- 5.3.2 Where draft policies support reduced pressure on, and improved sustainability of, natural and built assets, positive impacts should arise for climatic factors, material assets and population and human health. Particularly where this leads to wider environmental benefits such as improved ecosystem health and increased resilience to the impacts of climate change. Furthermore, wider benefits should arise from the focus given to improved placemaking, including through the support for sustainable modes of travel and improved access to key goods and services and high quality open spaces. Where opportunities are taken to align with the overarching aims of the sustainable use of existing assets, benefits should be maximised.

6.0 Strategic Cumulative Effects

6.1 Introduction

6.1.1 This section brings together the assessment of the draft NPF4 spatial strategy, proposed national developments and draft national planning policies. It considers each of the SEA topics, and identifies the likely significant cumulative effects arising for each.

6.2 Biodiversity, Flora and Fauna

6.2.1 The draft NPF4 would establish climate change and nature recovery as primary guiding principles for all plans and decisions, and the emphasis on protecting and enhancing biodiversity is expected to lead to significant long term cumulative positive effects on biodiversity, flora and fauna, including through new universal policies on enhancing biodiversity.

6.2.2 Draft policies and proposals which support the creation of woodland and nature networks, and promote nature-based solutions and blue and green infrastructure are also likely to have long-term significant cumulative positive effects on biodiversity. Secondary benefits for climatic factors can also arise, for example policies supporting woodland expansion leading to increased carbon sequestration. Nature based solutions can also have secondary benefits where these support adaptation to climate change through improved resistance to flooding, and can help to buffer water courses against diffuse pollution.

6.2.3 The draft NPF4 also highlights the need to align onshore development with national and regional marine plans in order to protect and enhance coastal and marine environments, while unlocking the potential of coastal assets.

6.2.4 Where biodiversity is protected and enhanced, secondary benefits will arise on air quality, climatic factors, water, soils and, population and human health due to the interrelationships with these topics.

6.3 Climatic Factors

6.3.1 Cumulatively, the draft policies and proposals set out in the draft NPF4 are expected to have significant long term positive effects on climatic factors, contributing to reduced GHG emissions, and helping facilitate a transition to net zero. By embedding consideration of actions to increase community and infrastructure resilience to extreme weather events within decision making processes, the policies and proposals can also support adaptation to climate change.

6.3.2 The lifecycle GHG assessment of the proposed national developments found that overall, the greatest contributions to sectoral emission reductions are likely to be in terms of electricity and, to a lesser extent, transport. While the industrial, manufacture and construction processes sector is likely to experience the largest increase in direct emissions, this will enable direct and indirect emission reductions across other sectors.

Transport

- 6.3.3 The draft policies and proposals relevant to transport are expected to have significant positive cumulative effects for climatic factors through support for the decarbonisation of the transport sector, for example where new infrastructure supports low carbon travel options and policies encourage active travel and uptake of public transport. This will also lead to benefits for air quality, with associated benefits for biodiversity and human health.

Electricity

- 6.3.4 Draft policies and proposals relevant to the electricity sector are expected to have cumulative significant positive effects in relation to climatic factors through support for the decarbonisation of electricity generation, including through new technologies such as hydrogen and electricity storage and by actively supporting the roll out of renewable energy developments. Greater uptake of a diverse mix of technologies will benefit material assets due to improved flexibility and security of supply.
- 6.3.5 The majority of relevant national development proposals are likely to result in a minor increase in demand for electricity with potential for minor negative effects at a project level. This is likely to be balanced by positive direct effects from a number of developments which support low carbon or renewable electricity production at varying scales, including projects with large scale or national impact over a long time period.

Buildings (heat)

- 6.3.6 Draft policies and proposals relevant to energy efficiency and infrastructure to support low carbon heat are expected to have positive cumulative impacts on emissions reduction.

Industrial, Manufacture and Construction Processes

- 6.3.7 Draft policies and proposals within the industrial sector are expected to have positive cumulative effects on emissions reduction through support for low-carbon industry which may reduce emissions at scale.
- 6.3.8 Direct effects on GHG emissions related to industrial, manufacture and construction processes are typically negative across the proposed national developments, reflecting the carbon intensity of materials required for the construction and maintenance of the proposed developments, and their scale.
- 6.3.9 Positive indirect effects are identified for those developments that enable the production of low carbon fuel for use in industrial, manufacture and construction processes.

Waste

- 6.3.10 Draft policies and proposals are expected to have significant long term positive effects in relation to waste as they reflect the waste hierarchy and facilitate the delivery of new infrastructure required to achieve this.

- 6.3.11 Direct negative effects on emissions from waste largely relate to the potential for increased waste generation from new developments, however this is likely to be minor in scale. Positive direct effects on emissions are identified from the circular economy materials management national development proposal.

Land Use, Land-Use Change and Forestry (LULUCF)

- 6.3.12 The proposed national developments are likely to result in a net positive effect on emissions from this sector.
- 6.3.13 Draft policies and proposals which support peatland restoration and increased woodland and forestry, can increase carbon sequestration and contribute to meeting emission reduction targets.

Negative Emissions Technologies (NETs)

- 6.3.14 Draft policies and proposals which support Negative Emissions Technologies (NETS) are likely to achieve direct emission reductions and result in a net positive effect on emissions.

6.4 Air

- 6.4.1 Draft policies and proposals which reduce emissions overall are likely to have cumulative positive effects on air quality. In addition to effects on ecosystems, air pollution is a human health issue, which can impact on the more vulnerable members of society making air quality an important health inequalities issue. Measures to improve air quality can therefore have cumulative secondary benefits on biodiversity and population and human health. This could be of particular relevance in areas where air quality issues currently arise.
- 6.4.2 Negative impacts on noise and air quality, including dust and odour, may arise during construction of the national developments. These will be temporary and localised in nature, and will be managed at project level.

6.5 Water

- 6.5.1 The overall focus on climate change and climate change adaptation will have cumulative positive effects on water through increased focus on flood risk, water scarcity and coastal erosion. Secondary benefits to biodiversity may arise where nature based solutions to flood risk management are implemented. Secondary benefits on material assets may also arise where policies and proposals lead to improved water supply and waste-water systems.
- 6.5.2 Draft policies which aim to expand woodland cover and protect existing woodland and which support peatland restoration can lead to secondary benefits for water where woodland helps to intercept and filter pollutants and provides natural flood management measures.
- 6.5.3 Proposals for waterfront developments and new development at ports and harbours may negatively impact water during construction and operational phases, and will require managed at project level.

6.6 Soils

- 6.6.1 Several aspects of the draft NPF4 are likely to have positive cumulative benefits for soils, for example, where draft policies seek to protect peat and carbon-rich soils. Proposals relating to woodland expansion and green infrastructure can help improve soil stability and drainage, and can help to create a sense of place. Positive cumulative effects on soils are also expected from the emphasis on the reuse of derelict and vacant land, with secondary positive impacts on water quality.
- 6.6.2 There is potential for negative effects on soils arising from some of the proposed national developments, which will require management at plan and project consenting stages.

6.7 Cultural Heritage and Historic Environment

- 6.7.1 Significant positive cumulative effects on cultural heritage are expected, given the emphasis within the draft NPF4 on protecting and enhancing locally, regionally, nationally and internationally valued historic assets and places. Draft policies and proposals relating to woodland expansion and green infrastructure may act to improve the setting of historic assets. The emphasis within NPF4 on reusing vacant buildings may create opportunities to bring buildings at risk back into use.
- 6.7.2 There is potential for negative effects arising including from some national development proposals and, which will require managed at plan and project consenting stages.

6.8 Landscape and Geodiversity

- 6.8.1 There is potential for some of the proposed national developments and draft policies to result in negative effects on landscapes and careful consideration will be required at plan and project consenting stages.
- 6.8.2 Initiatives such as the Central Scotland Green Network and national walking and cycling routes provide opportunities to protect and enhance townscapes and landscapes and to increase experience and enjoyment of these. Draft policies which lead to increased woodland and forestry have potential to improve landscape character, depending on the scale and nature of change. Furthermore, support for peatland protection and restoration also has the potential to benefit some iconic and culturally significant landscapes.

6.9 Material assets

- 6.9.1 The focus on an infrastructure first approach within the draft NPF4 can ensure that places function effectively and development improves, rather than detracts from quality of life. Promoting greater coordination of infrastructure works and planning, at both the regional and local scales, can minimise the potential for negative indirect and cumulative effects, for example through reduced disturbance during construction stages, and through reduced fragmentation of green infrastructure and nature networks.
- 6.9.2 An increase in development, for example housing or renewable energy, could lead to increased pressures on existing land uses. However, the

potential for such conflicts would remain key considerations in the planning system, particularly through development plans where key decisions on sites and delivery are made. The potential for environmental impacts will continue to be considered through SEA and HRA of development plans, as well as through the development management process at individual project level.

- 6.9.3 Infrastructure can play an important role in facilitating the delivery of multiple benefits. For example, benefits to human health and well-being may arise where the roll out of digital infrastructure supports greater digital connectivity, and the provision of well-designed green infrastructure can help to promote active travel, assist in flood management, and support biodiversity. Alignment of development and community planning, alongside streamlined development planning could help identify opportunities such as these and provide an indication of suitable locations for potential deployment; particularly if these changes result in a greater focus on spatial planning at the local level.

6.10 Population and Human Health

- 6.10.1 The draft policies and proposals have potential to give rise to significant benefits for population and human health.
- 6.10.2 Health and wellbeing benefits may arise where policies and certain proposed national developments lead to more people walking, wheeling and cycling. Increased physical activity, improved access to the outdoors, education, facilities and services, and quality local green spaces, are also likely to have long term significant positive effects on physical and mental health. Positive impacts could also arise from improved sense of place including societal benefits. Benefits can be maximised where a focus is given to areas experiencing current levels of disadvantage.
- 6.10.3 Wider benefits should arise through a focus on blue/green networks and on the role of natural infrastructure as a natural solution to flood management, including where this improves local landscape and sense of place. The reuse of existing assets and remediation of vacant and derelict land also has the potential to be beneficial by reducing adverse environmental and social impacts including on nearby communities.

7.0 Mitigation and Monitoring

- 7.0.1 Many of the potential effects arising from the draft NPF4 will be addressed as they are interpreted and applied through the planning system, and national level SEA can be viewed as the first stage in the environmental assessment process.
- 7.0.2 There are opportunities for potential positive effects arising from the draft NPF4 to be enhanced, and for negative effects to be mitigated, as the policies and proposals are applied through the planning system.
- 7.0.3 In general terms, development has the potential for largely localised adverse environmental effects on each of the SEA topic areas. Effects are likely to be influenced by the scale and nature of development, and the sensitivity of the receiving environment. The draft planning policies seek to mitigate such effects through the application of detailed criteria to be applied at planning application stage.
- 7.0.4 A range of mitigation is also identified for the individual proposed national developments and spatial strategy.
- 7.0.5 This section of the Environmental Report brings together the proposed mitigation measures that have emerged from the SEA, and outlines the proposals for a NPF4 monitoring programme.

7.1 National Developments – Proposed Mitigation

- 7.1.1 Table 7.1 below summarises the key mitigation measures identified in the assessment of the proposed national developments (Appendix D).

Table 7.1 National Developments Mitigation

Proposed National Development	Outline of Mitigation
1. Central Scotland Green Network	<p>Consideration should be given to factors such as the type, quality, accessibility and proximity of natural spaces to where people live as this can influence how the infrastructure/spaces are used. Positive impacts could be maximised by ensuring natural infrastructure is accessible to a wide range of users and by focusing investment in areas to reduce inequalities.</p> <p>To increase carbon sequestration, the scale of expansion, number of trees and type of development should be maximised whilst protecting existing high carbon soils.</p> <p>Opportunities to enhance high carbon soils should be explored.</p> <p>The assessment supports draft NPF4 provisions that help to achieve a circular economy and prioritisation should be given to the reuse of</p>

	<p>materials in construction, use of low carbon construction materials prioritised (seating, lighting, tree protective equipment etc), and materials should be reused or recycled upon decommissioning.</p> <p>The green network should be accessible to a wide range of users, and should be well linked with other active travel routes and public transport modes to further reduce potential emissions from transport.</p> <p>Opportunities to maximise landscape benefits should be explored, for example through a focus on landscape quality and remediation of vacant and derelict land.</p>
<p>2. National Walking, Cycling and Wheeling Network</p>	<p>Opportunities should be sought to maximise benefits through targeted action, for example, the implementation of measures in, or close to areas with concentrations of poor health and low levels of physical activity and where current air quality issues or levels of deprivation exist.</p> <p>Opportunities should be sought to improve interconnectivity within existing networks, including wider street networks and public transport.</p> <p>Opportunities should be sought to ensure accessibility for all needs/users.</p> <p>Opportunities should be sought to use natural infrastructure to support active travel due to the multiple co-benefits they can deliver.</p> <p>Waste should be minimised during the construction phase. The reuse of material should be prioritised and low carbon construction material utilised.</p>
<p>3. Urban Mass/Rapid Transit Networks</p>	<p>Opportunity to give early consideration to future-proofing infrastructure including accommodating emerging technologies to further support climate change mitigation and adaptation.</p> <p>Opportunity to reduce emissions through use of low carbon/renewable sources of energy to power trams and light rail developments.</p> <p>Opportunity to ensure integration of the mass transit networks with active travel networks.</p>

	<p>Opportunity to increase the roll out of mass transit networks to other major towns and cities in Scotland.</p> <p>Opportunity to align with improved placemaking and to ensure consideration is given to transport equality.</p>
4. Urban Sustainable, Blue and Green Drainage Solutions	<p>Opportunities to target actions towards disadvantaged populations and communities at flood risk should to be sought to maximise benefits, including aligning with improved placemaking.</p> <p>Opportunities should be sought to prioritise nature-based solutions due to their ability to deliver multiple co-benefits benefits.</p> <p>The reuse of materials in construction and use of low carbon construction materials should be prioritised and waste materials reused or recycled on decommissioning.</p>
5. Circular Economy Materials Management Facilities	<p>Current knowledge gaps on potential negative impacts from the management of hazardous materials may require further consideration.</p> <p>Opportunities should be explored within the four priority areas of: food, drink, and the broader bio-economy, remanufacture, construction and the built environment and energy infrastructure, which have been identified based on their resource use, environmental impact and importance to the Scottish Economy.</p> <p>Ensure that where possible transport is decarbonised to reduce overall emissions.</p> <p>Opportunity to utilise surplus by-products, for example surplus heat.</p> <p>Opportunity to support local processing where possible.</p> <p>Opportunity to prioritise the use of brownfield land for development.</p>
6. Digital Fibre Network	<p>Benefits could be maximised by focusing action to areas experiencing digital exclusion.</p> <p>Opportunities to future proof should be sought to keep pace with new and emerging technology and data changes.</p> <p>Industry standards and overarching requirements and good practice should seek to mitigate impacts,</p>

	<p>including consideration of cable corridors to protect cables from damage, potential for co-location and shared use of corridors and pipelines, and a risk based approach to removal of redundant cables.</p> <p>Opportunities to ensure cable laying utilises conduits or existing infrastructure should be considered for lower carbon future cable replacement. Development in areas with high carbon soil should be avoided.</p>
<p>7 Islands Hub for Net Zero</p>	<p>Mitigation measures should be implemented where there is the potential for air pollutants to arise, including transport management mitigation measures.</p> <p>The reuse of materials in construction and use of low carbon construction materials should be prioritised and waste materials reused or recycled on decommissioning.</p> <p>Opportunities to minimise impacts on landscape and seascape should be explored.</p> <p>Effects on biodiversity should be minimised through siting and design, and enhancement measures applied in keeping with national policy.</p> <p>Ensure that disturbance of soil, particularly high carbon soils, vegetation and seabed is minimised and avoided where possible and consideration given to ensure site reinstatement to enhance carbon sequestration. Opportunities to enhance high carbon soils and habitats of high carbon sink value should be explored.</p> <p>The impacts of climate change, including flood risk, should be considered.</p> <p>Provide low carbon transport options to the sites to reduce car dependency</p>
<p>8 Industrial Green Transition Zone</p>	<p>Further consideration should be given at project level to possible localised implications on environmental quality, for example, air quality implications. This should include consideration of factors, such as the deprivation profile of the area, to ensure health inequalities are not widened.</p> <p>Measures should be implemented to ensure that potential leaking of hydrogen and carbon is minimised.</p>

	<p>Opportunities to prioritise use of existing infrastructure on and offshore which can be refurbished.</p> <p>The reuse of materials in construction and use of low carbon construction materials should be prioritised. Upon decommissioning, waste materials should be reused or recycled.</p>
9. Pumped Hydro Storage	<p>Waste/excavated materials should be reused where possible.</p> <p>The application of circular economy principles should support development that prioritises the reuse of materials in construction, use of low carbon construction materials and design principles that allows for materials to be reused/recycled upon decommissioning.</p> <p>To minimise GHG emissions, the design of the new and extended developments should have minimal impacts on LULUCF.</p> <p>Sediment creation and build up should be managed in such a manner as to reduce emissions.</p>
10. Hunterston Strategic Asset	<p>The application of circular economy principles should support development that prioritises the reuse of materials in construction, use of low carbon construction materials and design principles that allows for materials to be reused/recycled upon decommissioning.</p> <p>Prioritisation should be given to the use of renewable / low carbon energy to power projects taken forward.</p> <p>Opportunities to improve public access to the wider area through green infrastructure and active travel infrastructure should be considered at plan and project consenting stages.</p> <p>Effects on biodiversity should be minimised through siting and design, and enhancement measures applied in keeping with national policy.</p>
11. Chaplecross power Station Redevelopment	<p>Prioritise the use of low carbon construction materials and ensure upon decommissioning waste materials are reused again or recycled.</p> <p>Opportunity to consider the type and scale of green energy generation and whether it can be</p>

	<p>used to provide electricity to the businesses forming the development.</p> <p>Ensure public transport connections and links to active travel routes.</p> <p>Infrastructure for transmission of hydrogen should be sited to avoid impacts to sensitive receptors.</p>
12. Strategic Renewable Electricity Generation and Transmission Infrastructure	<p>Ensure that that disturbance of soil, particularly high carbon soils, vegetation and seabed is minimised and avoided where possible and consideration given to ensure site reinstatement to enhance carbon sequestration.</p> <p>In line with national policy on zero waste and promotion of circular economy, prioritisation should be given to the reuse of materials in construction, use of low carbon construction materials prioritised and materials should be reused or recycled upon decommissioning.</p> <p>Screening options should be considered to minimise visual impact of developments.</p> <p>Effects on biodiversity should be minimised through siting and design, and enhancement measures applied in keeping with national policy.</p>
13. High Speed Rail	<p>Opportunities to support improved placemaking should be undertaken.</p> <p>Consideration should be given to ensure that transport equality issues are taken into account.</p> <p>Potential impacts on high carbon soils or areas important for carbon sequestration should be avoided where possible.</p> <p>The application of circular economy principles should support development that prioritises the reuse of materials in construction, use of low carbon construction materials and design principles that allows for materials to be reused/recycled upon decommissioning.</p> <p>Opportunity to reduce emissions by utilising renewable energy for running of train services.</p>
14. Clyde Mission	<p>Where this development give rise to creation of active travel and green and blue infrastructure, consideration should be given to factors such as the type, quality, accessibility and proximity of natural spaces to where people live as this can influence how the infrastructure/ spaces are used.</p>

	<p>Positive impacts could be maximised through ensuring such infrastructure is accessible to a wide range of users and focusing investment in areas to reduce inequalities.</p> <p>To facilitate carbon sequestration, green infrastructure should be promoted and high carbon soils protected.</p> <p>The assessment supports draft NPF4 provisions that help to achieve a circular economy and prioritisation should be given to the reuse of materials in construction, use of low carbon construction materials prioritised, and materials should be reused or recycled upon decommissioning.</p> <p>Opportunities to maximise landscape benefits should be explored, for example through focus on landscape quality and remediation of vacant and derelict land.</p> <p>Opportunities to protect and enhance the setting of the historic assets, recognising their role in placemaking, and bring disused or buildings at risk back into use.</p>
<p>15. Aberdeen Harbour</p>	<p>A Construction Environmental Management Plan (CEMP) should be implemented where relevant at project level.</p> <p>Consideration should be given to cumulative effects arising from the continued relocation and repurposing of the Harbour and to minimising potential adverse impacts on residential amenity and sensitive receptors.</p> <p>Prioritisation should be given to the use of renewable / low carbon energy to power projects taken forward.</p> <p>In line with national policy on zero waste and promotion of circular economy, prioritisation should be given to the reuse of materials in construction, use of low carbon construction materials prioritised and materials should be reused or recycled upon decommissioning.</p> <p>Low carbon transport options should be considered for the site to reduce car dependency.</p> <p>The impacts of climate change, including flood risk, should be considered.</p> <p>Opportunities to improve public access to the wider area through green infrastructure and active</p>

	<p>travel infrastructure should be considered at plan and project consenting stages.</p> <p>Effects on biodiversity should be minimised through siting and design, and enhancement measures applied in keeping with national policy.</p>
<p>16 Dundee Waterfront</p>	<p>Future consideration should be given to possible localised implications on environmental quality, for example, air quality implications. This should include consideration of factors, such the deprivation profile of the area, to ensure health inequalities are not widened.</p> <p>To minimise emissions, public transport connections should be frequent and convenient to offer an effective alternative to private vehicles. This is of particular relevance given the area encompassed is located within Dundee AQMA.</p> <p>In line with national policy on zero waste and promotion of circular economy, prioritisation should be given to the reuse of materials in construction, use of low carbon construction materials prioritised and materials should be reused or recycled upon decommissioning.</p> <p>To minimise emissions, renewable energy generation should be incorporated into the development where appropriate.</p> <p>To minimise emissions, high energy efficiency buildings should be considered.</p> <p>Effects on biodiversity should be minimised through siting and design, and enhancement measures applied in keeping with national policy.</p>
<p>17 Edinburgh Waterfront</p>	<p>Future consideration should be given to possible localised implications on environmental quality, for example, air quality implications. This should include consideration of factors, such the deprivation profile of the area, to ensure health inequalities are not widened.</p> <p>To maximise emission reductions, ensure good public transport connections and active travel.</p> <p>To maximise emission reductions, ensure high levels of renewable energy and heat are installed.</p> <p>Prioritise the reuse of materials in construction, use of low carbon construction materials and ensure upon decommissioning waste materials are reused again or at least recycled.</p>

	Climate change mitigation measures, including flood risk, should be addressed through the consenting process.
18 Stranraer Gateway	<p>Effects on biodiversity should be minimised through siting and design, and enhancement measures applied in keeping with national policy.</p> <p>Prioritise the reuse of materials in construction, use of low carbon construction materials and ensure upon decommissioning waste materials are reused or recycled.</p> <p>Where applicable the nature of dredged sediments should be determined, and disposed of appropriately.</p> <p>Minimise disturbance to marine sediments.</p> <p>The impacts of climate change, including flood risk, should be considered.</p> <p>Opportunities to incorporate green infrastructure and active travel infrastructure should be considered at plan and project consenting stages.</p>

7.2 Spatial Strategy – Proposed Mitigation

- Impacts to sensitive and protected sites, including designated sites and historic environment assets, should be assessed at plan and project level.
- Effects on biodiversity should be minimised through siting and design, and enhancement measures applied in keeping with national policy.
- Focus should be given to designing buildings, infrastructure and spaces which are adaptable to climate change.
- Opportunities should be sought to maintain, restore and repurpose historic assets to support sustainable placemaking.
- Development proposals should be designed to a high quality so that the scale and nature of the development contributes positively to the character and sense of place of the area.
- Impacts during construction phase should be managed, with consideration given to cumulative effects, to minimise potential adverse impacts on residential amenity and habitats and species.

7.3 Draft National Planning Policy – Proposed Mitigation

- 7.3.1 There are opportunities for positive effects to be maximised, where a focus is given at planning and consenting stages to opportunities for multiple benefits to arise. For example, the role of natural solutions in flood risk management and support for transition towards net-zero, which should lead to benefits for not only climate change mitigation and adaption, but also for biodiversity.

Additional benefits should also arise for population and human health through improved air quality and increased resilience to the impacts of climate change, benefiting both physical and mental wellbeing.

- 7.3.2 Where draft policies support reduced pressure on, and improved sustainability of, natural and built assets, positive impacts should arise for climatic factors, material assets and population and human health, particularly where this leads to wider environmental benefits such as improved ecosystem health and increased resilience to the impacts of climate change. Furthermore, wider benefits should arise from the focus given to improved placemaking, including through the support for sustainable modes of travel and improved access to key goods and services and high quality open spaces. Where opportunities are taken to align with the overarching aims of the sustainable use of existing assets, benefits should be maximised.

7.4 Monitoring

- 7.4.1 The 2005 Act requires the responsible authority to monitor the significant environmental effects of the implementation of the plan which has been assessed. The 2005 Act requires this to be undertaken in a manner which allows the identification of any unforeseen adverse effects at an early stage.
- 7.4.2 The Scottish Government has committed to working with a range of stakeholders to develop an appropriate monitoring programme for NPF4 that allows us to assess progress and take action where required. Monitoring will be required at both a national and local level and will be proportionate and effective.
- 7.4.3 An agreed monitoring programme will need to complement, and potentially combine, wider planning performance work including Planning Performance Frameworks and Royal Town Planning Institute work on monitoring outcomes, as well as reflecting national outcomes set out in the National Performance Framework.

8.0 Next Steps

8.1.1 The consultation on Draft NPF4 closes on 31 March 2022. Following the consultation and the end of the Parliamentary scrutiny process, we will analyse the responses and produce a final NPF4. The final adoption date will depend on the approval of NPF4 by the Scottish Parliament, but we are currently aiming to lay a finalised version for approval by summer 2022.

8.2 How to comment

8.2.1 Details on how to comment can be found on the Scottish Government's Consultation Hub, Citizen Space at www.consult.gov.scot. You can also request a hard copy of this report and consultation documents at scotplan@gov.scot

8.2.2 If you are unable to respond using our consultation hub, please complete the Respondent Information Form and return it, together with your response to scotplan@gov.scot or by mail to:

National Planning Framework Team
Planning and Architecture Division
Area 2F South
Victoria Quay
Edinburgh
EH6 6QQ

Consultees may wish to consider the following questions:

Q 1: What are your views on the accuracy and scope of the environmental baseline set out in the environmental report?

Q 2: What are your views on the predicted environmental effects of the draft NPF4 as set out in the environmental report? Please give details of any additional relevant sources.

Q 3: What are your views on the potential health effects of the proposed national developments as set out in the environmental report?

Q 4: What are your views on the assessment of alternatives as set out in the environmental report?

Q 5: What are your views on the proposals for mitigation, enhancement and monitoring of the environmental effects set out in the environmental report?

8.3 How Will Responses Be Considered?

- 8.3.1 Following the consultation, a Post-Adoption Statement will be prepared. The Statement will reflect on the views provided on the findings of the assessment and the proposals in the draft NPF4 and will explain how the comments received have been taken into account in finalising the NPF.

Appendix A - Glossary

20 minute neighbourhood	A method of achieving connected and often compact neighbourhoods designed in such a way that people can meet the majority of their daily needs within a reasonable walk, wheel or cycle (within approx. 800m) of their home. The principle can be adjusted to include varying geographical scales from cities and urban environments, to rural and island communities. Housing would be planned together with local infrastructure including schools, community centres, local shops and health and social care to significantly reduce the need to use unsustainable methods of travel, to prioritise quality of life, help tackle inequalities, increase levels of health and wellbeing and respond to the climate emergency.
Affordable home/affordable housing	Housing of a reasonable quality that is affordable to people on low incomes. This can include social rented, mid-market rented, shared-ownership, shared-equity, housing sold at discount (including plots for self-build), self-build plots and low cost housing without subsidy.
Appropriate Assessment	Regulation 48 of The Conservation (Natural Habitats, &c.) Regulations 1994, as amended, requires an authority, before deciding to undertake, or give any consent, permission or other authorisation for certain plans or projects likely to have a significant effect on a European site in Great Britain (either alone or in combination with other plans or projects) to make an 'appropriate assessment' of the implications for the site in view of that site's conservation objectives.
Biodiversity	The variability in living organisms and the ecological complexes of which they are part. This includes diversity within species, between species and of ecosystems (UN Convention on Biological Diversity, 1992).
Blue infrastructure	Water environment features within the natural and built environments that provide a range of ecosystem services. Blue features include rivers, lochs, wetlands, canals, other water courses, ponds, coastal and marine areas including beaches, porous paving, sustainable urban drainage systems and raingardens.
Brownfield	Land which has previously been developed. The term may cover vacant or derelict land, land occupied by redundant or unused building and developed land within the settlement

	boundary where further intensification of use is considered acceptable.
Carbon sequestration	The long-term removal, capture, or sequestration of carbon dioxide from the atmosphere to slow or reverse atmospheric CO ₂ pollution and to mitigate or reverse climate change.
Circular economy	A circular economy is one that is designed to reduce the demand for raw material in products; to encourage reuse, repair and manufacture by designing products and materials to last as long as possible in line with the waste hierarchy
Climate change adaptation	The adjustment in economic, social or natural systems in response to actual or expected climatic change, to limit harmful consequences and exploit beneficial opportunities.
Climate change mitigation	Reducing the amount of greenhouse gases in the atmosphere and reducing activities which emit greenhouse gases to help slow down or make less severe the impacts of future climate change.
Conservation Area	Conservation areas are areas which have special architectural or historic interest that are considered worthy of protection. To be designated as a conservation area it must meet the criteria of 'special architectural or historic interest the character or appearance of which is desirable to preserve or enhance', as set out in Section 61 of the Planning Listed Buildings and Conservation Areas (Scotland) Act 1997 Act.
Ecosystem services	The benefits people obtain from ecosystems.
Gardens and Designed Landscapes	The Inventory of Gardens and Designed Landscapes recognises sites where garden grounds and landscapes have been intentionally laid out for artistic effect which are of national importance. The inventory is maintained by Historic Environment Scotland.
Flood	The temporary covering by water from any source of land not normally covered by water, but not including the overflow of a sewage system.
Flood risk	The combination of the probability of a flood and the potential adverse consequences associated with a flood, for human health, the environment, cultural heritage and economic activity.
Future Functional flood plain	The areas of land where water flows in times of flood which should be safeguarded from further development because of their function as flood water storage areas. For planning purposes the future functional floodplain will generally have

	a greater than 0.5% (1:200) probability of flooding by 2080 https://map.sepa.org.uk/floodmaps/FloodRisk
Gardens and Designed Landscapes	The Inventory of Gardens and Designed Landscapes recognises sites where garden grounds and landscapes have been intentionally laid out for artistic effect which are of national importance. The inventory is maintained by Historic Environment Scotland.
Green infrastructure	Features or spaces within the natural and built environments that provide a range of ecosystem services.
Green networks	Connected areas of green infrastructure and open space that together form an integrated and multi-functional network.
Green space	Space which provides a recreational function, an amenity function, or aesthetic value to the public such as areas of— (a) grass, (b) trees, (c) other vegetation, (d) water, but not including agricultural or horticultural land,
Historic Battlefields	The Inventory of Historic Battlefields recognises sites where a nationally important battle took place, soldiers fought and died, and where significant military activities happened. Their selection, assessment and designation is carried out by Historic Environment Scotland.
Historic Environment	The historic environment is ‘the physical evidence for human activity that connects people with place, linked with the associations we can see, feel and understand’.
Historic Environment Asset	An asset (or ‘historic asset’ or ‘heritage asset’) is a physical element of the historic environment – a building, monument, site, place, area or landscape identified as having cultural significance.
Historic Marine Protected Areas	Historic Marine Protected Areas are areas designated in Scottish territorial waters (0-12 miles) under the Marine (Scotland) Act 2010 for the purpose of preserving marine assets of national importance. These can be wrecks of boats or aircraft or more scattered remains, such as groups of artefacts on the seabed from a submerged prehistoric landscape. Their designation is carried out by Marine

	Scotland based on advice from Historic Environment Scotland.
Listed building	A listed building is a built structure of 'special architectural or historic interest'. The term 'building' can be defined as 'anything made by people' such as houses, schools, factories, boundary walls, bridges and sculptures. They are designated by Historic Environment Scotland under the Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997 and they maintain the list.
Mitigation hierarchy	The mitigation hierarchy indicates the order in which the impacts of development should be considered and addressed. These are: <ul style="list-style-type: none"> i. Avoid – by removing the impact at the outset ii. Minimise – by reducing the impact iii. Restore – by repairing damaged habitats iv. Offset – by compensating for the residual impact that remains, with preference to on-site over off-site measures.
Nature network	A Nature Network is a joined-up system of places important for wild plants and animals, on land and at sea. It allows plants, animals, seeds, nutrients and water to move from place to place and enables the natural world to adapt to change, providing plants and animals with places to live, feed and breed. Effectively functioning nature networks will connect existing nature rich areas through habitat corridors, habitat 'stepping stones' or habitat restoration areas.
Net-zero	Scotland has set a target to become ' Net Zero ' by 2045. This means the amount of greenhouse gas emissions we put into the atmosphere and the amount we're able to take out will add up to zero.
Open space	Space within and on the edge of settlements comprising green space or civic areas such as squares, market places and other paved or hard landscaped areas with a civic function
Placemaking	Placemaking is the process of creating good quality places that promotes people's health, happiness and wellbeing. It concerns the environment in which we live; the people that inhabit these spaces; and the quality of life that comes from the interaction of people and their surroundings. Placemaking is a collaborative approach involving the

	design and development of places over time, with people and communities central to the process.
Scheduled Monument	Scheduled monuments are archaeological sites or monuments of national importance that are legally protected under the Ancient Monuments and Archaeological Areas Act 1979. They are designated by Historic Environment Scotland who maintains the schedule.
Setting	<p>Setting is more than the immediate surroundings of a site or building, and may be related to the function or use of a place, or how it was intended to fit into the landscape of townscape, the view from it or how it is seen from areas round about, or areas that are important to the protection of the place, site or building.</p> <p>‘Setting’ is the way the surroundings of a historic asset or place contribute to how it is understood, appreciated and experienced.</p>
Strategic Transport Network	Includes the trunk road and rail networks. Its primary purpose is to provide the safe and efficient movement of strategic long-distance traffic between major centres, although in rural areas it also performs important local functions.
Sustainable development	Development that meets the needs of the present without compromising the ability of future generations to meet their own needs. (The Brundtland Definition. Our Common Future, The World Commission on Environment and Development, 1987.)
Sustainable Travel Hierarchy	The National Transport Strategy 2 Sustainable Travel Hierarchy should be used in in decision making by promoting walking, wheeling, cycling, public transport and shared transport options in preference to single occupancy private car use for the movement of people. The efficient and sustainable freight transport for the movement of goods, particularly the shift from road to rail should also be promoted.
Town Centre	<p>Centres which display:</p> <ul style="list-style-type: none"> - a diverse mix of uses, including shopping; - a high level of accessibility; - qualities of character and identity which create a sense of place and further the well-being of communities;

	<ul style="list-style-type: none"> - wider economic and social activity during the day and in the evening; and - integration with residential areas.
Vacant and derelict land	<p>Vacant land - Previously developed land, without physical constraint, which the Planning Authority has indicated is currently available for redevelopment.</p> <p>Derelict land - Previously developed land which is un-remediated and/or which has a constraint caused by its previous use which hampers its redevelopment or naturalisation.</p>
World Heritage Sites	<p>World Heritage Sites are internationally important cultural and/or natural heritage sites which have been inscribed for their “Outstanding Universal Value”. Though no additional statutory controls result from world heritage designation, the impact of proposed development upon the outstanding universal value, including its authenticity and integrity of a World Heritage Site and its setting, is a material consideration in determining planning applications. Their selection, assessment and designation is carried out by UNESCO based on advice from State Parties and the relevant devolved Government.</p>

Appendix B - Summary of Relevant Policy and Environmental Objectives

SOURCE	KEY ENVIRONMENTAL OBJECTIVES
Biodiversity, Flora and Fauna	
Conservation (Natural Habitats, &c.) Regulations 1994, as amended	Implements Council Directive 2009/147/EC on the conservation of wild birds and 92/43/EEC on the conservation of natural habitats and of wild fauna and flora. Relates to the long term conservation of all species of naturally occurring birds in the wild state across European Member States. Applies to factors with potential to affect birds including human activity leading to the destruction and pollution of habitats. Allows for designation of Special Protection Areas, as part of a coherent ecological network, known as European Sites. Aims to promote the maintenance of biodiversity as part of sustainable development. Notes that land-use planning and development policies should encourage the management of features of the landscape which are of major importance for wild fauna and flora. Also requires an Appropriate Assessment to be made of any plan or programme likely to have a significant effect on the conservation objectives of a designated site.
Nature Conservation (Scotland) Act 2004	Introduced the duty for public bodies to further the conservation of biodiversity, and the requirement for a Scottish Biodiversity Strategy. Also sets the framework designating Sites of Special Scientific Interest.
Wildlife and Natural Environment (Scotland) Act 2011	Amended in part the Wildlife and Countryside Act 1981, improving species protection through licensing and control of non-native species amongst other provisions. Outlines the requirement for every public body in Scotland to produce a publicly available report on compliance with the Biodiversity Duty every three years.

<p>UK Biodiversity Action Plan and UK Post-2010 Biodiversity Framework (2012–2019)</p>	<p>Emphasises the importance of biodiversity and notes the impact of human development and the use of land on the health of ecosystems. Includes the overall goal of conservation and enhancement of biodiversity within the UK, to contribute to the conservation of global biodiversity. Also aims to increase public awareness and involvement in conservation. The UK Biodiversity action plan was replaced in 2012 by the UK Post-2010 Biodiversity Framework. It was developed in response to two main drivers: the Convention on Biological Diversity's (CBD's) Strategic Plan for Biodiversity 2011-2020 and its five strategic goals and 20 'Aichi Targets', published in October 2010; and the EU Biodiversity Strategy (EUBS), released in May 2011.</p>
<p>The 2020 Challenge for Scotland's Biodiversity and Scottish biodiversity strategy post-2020: statement of intent</p>	<p>The 2020 Challenge is Scotland's response to the UN Aichi Targets for 2020 and the EU Biodiversity Strategy to 2020. The 2020 Challenge supplements the 2004 Scottish Biodiversity Strategy and key aims include preserving and restoring the health of Scotland's ecosystems at a catchment-scale and promoting climate change resilience.</p>
<p>The Environment Strategy for Scotland: vision and outcomes</p>	<p>The Environment Strategy creates an overarching framework for Scotland's existing environmental strategies and plans, including the Climate Change Plan. These are reviewed over time, to reflect international targets and other policy developments. The vision and outcomes set out in the Environment Strategy will help to guide the future development and delivery of these strategies and plans by establishing a long-term direction and shared goals.</p>
<p>Implications for the SEA:</p> <ul style="list-style-type: none"> • The SEA should assess the extent to which the NPF4 will contribute to the protection and enhancement of biodiversity. • Emphasises the importance of integrating the findings of the HRA with the SEA. • Emphasises the links between human health and biodiversity and consideration of these within the SEA. <p><u>Related SEA topics:</u> Direct or indirect effects on air, water and soil quality.</p>	

Population and Human Health	
<u>The Pollution Prevention and Control (Scotland) Regulations 2012</u>	The Regulations aim to prevent or reduce damage to air, water and land arising from industrial processes, potentially preventing or reducing adverse human health impacts caused by exposure to industrial-related discharges.
<u>Environmental Noise (Scotland) Regulations 2006</u>	Gives effect to provisions in the EU Environmental Noise Directive (2002/49/EC) which sets out measures relating to noise pollution and disturbance from vibration. Protection is also afforded within the Environmental Protection Action 1990 at the UK level which introduced methods for mapping noise, plans to address it and requirements for making information available to the public.
<u>A Healthier Future – Scotland’s Diet and Healthy Weight Delivery Plan</u>	The Delivery Plan sets out a range of actions that seek to improve the health of Scotland’s population, including through the promotion of increasing levels of physical activity.
<u>A More Active Scotland: Scotland’s Physical Activity Delivery Plan (2018)</u>	The Plan sets out a commitment to increase physical activity in Scotland. Focus is given to the supporting an increased uptake in active travel, including a commitment to invest in active travel infrastructure.
<u>A Connected Scotland: our strategy for tackling social isolation and loneliness and building stronger social connections</u>	The Scottish Government’s first national strategy to tackle social isolation and loneliness and build stronger connections. The role of the transport network in building social connections and importance of physical activity is noted in the Strategy.
<u>Let’s get Scotland Walking – The National Walking Strategy</u>	Aims to create a culture of where everyone walks more often as part of their everyday travel and for recreation and well-being, including through a focus on better quality walking environments with attractive, well designed and managed built and natural spaces for everyone.

Housing to 2040	<p>Housing to 2040 sets out a vision for housing in Scotland to 2040 and a route map to get there. It aims to deliver the Scottish Government’s ambition for everyone to have a safe, good quality and affordable home that meets their needs in the place they want to be.</p>
<p>Implications for the SEA:</p> <ul style="list-style-type: none"> • The SEA should explore the extent to which the NPF4 will contribute to the population’s health and wellbeing in terms of e.g. physical activity, active travel, mental health and wellbeing, community, social inclusion. • The SEA should consider the extent to which the NPF4 will contribute to preventing/reducing pollution as well as nuisances such as noise and vibration. • Housing is an issue which is relevant to assessing the performance of the NPF4 on population and human health. <p><u>Related SEA topics:</u> Many of the issues that affect population and human health have direct or indirect impacts on other SEA topics such as air quality.</p>	

<p>Climatic Factors</p>	
<p>Climate Change (Scotland) Act 2009 and Climate Change (Emission Reduction Targets) (Scotland) Act 2019</p>	<p>The 2019 Act increases the ambition of Scotland’s targets to reduce greenhouse gas emissions, including a target for net-zero emissions by 2045 and interim targets for reductions of 56%, 75% and 90% by 2020, 2030 and 2040 respectively. The 2019 Act also includes a range of measures to improve transparency of the targets, for example basing progress to targets on actual emissions from all sectors of the Scottish economy.</p>
<p>Securing a green recovery on a path to net zero: climate change plan 2018–2032 – update (2020)</p>	<p>The Climate Change Plan 2018-2032 Update sets out actions that will be taken and considered to ensure commitments to climate change targets are met, building on progress to date across a range of sectors, including electricity and transport, which are key sources of emissions and sets out the path to a low carbon economy.</p>

Climate Ready Scotland: Second Scottish Climate Change Adaption Programme: 2019-2024 (2019)	The Scottish Climate Change Adaptation Programme provides an overarching framework for adaptation to climate change, setting out Scottish Ministers' objectives in relation to adaptation to climate change and their policies and proposals for meeting those objectives, as required by the Climate Change (Scotland) Act 2009.
Climate Change Committee: Independent Assessment of UK Climate Risk (2021)	The 2021 Risk Assessment outlines the Climate Change Committee's (CCC) view on the key climate change risks and opportunities. It will directly inform the forthcoming statutory Climate Change Risk Assessment set to be published in 2022.
<p>Implications for the SEA:</p> <ul style="list-style-type: none"> • The SEA should focus the assessment on how the NPF4 will effect climatic factors i.e. whether it will have an effect on GHG emissions. • The SEA should also consider how the NPF4 will contribute to adaptation to climate change and requirements for long term resilience. <p><u>Related SEA topics:</u> Climate change impacts are likely to have a direct or indirect impact on the other SEA topics such as population and human health and air quality.</p>	

Air	
Air Quality (Scotland) Regulations 2000, as amended	Set objectives for a number of airborne pollutants with implications for human health under the Environment Act 1995.
Air Quality Standards (Scotland) Regulations 2010	Gives effect to provisions in EU Ambient Air Quality Directive (2008/50/EC). Sets limits and targets for a number of pollutants with implications for human health, including CO, oxides of nitrogen, sulphur dioxide, and particulates.

Local Air Quality Management Policy Guidance 2018	Explains the objectives for improving air quality and provides a framework for activities in Local Air Quality Management Area (AQMAs).
Cleaner Air for Scotland 2 - Towards a Better Place for Everyone	A new air quality strategy to replace Cleaner Air for Scotland - The Road to a Healthier Future, sets out the Scottish Government's air quality policy framework for the next five years and a series of actions to deliver further air quality improvements.
<p>Implications for the SEA:</p> <ul style="list-style-type: none"> • The SEA should explore the extent to which NPF4 could help to reduce or may increase emissions of pollutants to air at a national level. • The assessment should be cognisant of areas where pollution is already concentrated (AQMAs). • Emphasises the links between air quality and human health and consideration of these within the SEA. <p><u>Related SEA topics:</u> Air quality can directly or indirectly impact on other SEA topics, such as biodiversity and population and human health.</p>	

<p>Water (including marine and coastal)</p>	
Water Environment and Water Services (Scotland) Act 2003, as amended and River Basin Management Plans	Gives effect to provisions in the Water Framework Directive and establishes River Basin Management Plans. These plans provide an assessment of the condition of Scotland's water environment, and identify where efforts for protection and improvement must be targeted.
Water Environment (Controlled Activities) (Scotland) Regulations 2011, as amended	The Regulations, more commonly known as the Controlled Activity Regulations, and their further amendments, apply regulatory controls over activities which may affect Scotland's environment.

<p>Flood Risk Management (Scotland) Act 2009 and Flood Risk Management Plans and Strategies</p>	<p>The Act implements gives effect to provisions in the EU Floods Directive (2007/60/EC). The Directive mandates the creation of flood risk management plans for all inland and coastal areas at risk of flooding, integrating their development and employment with existing River Basin Management Plans. Flood risk management plans are designed to minimise negative impacts due to flooding on a range of receptors, including human health, the environment, and cultural heritage.</p>
<p>Bathing Waters (Scotland) Regulations 2008</p>	<p>Aims to protect and reduce pollution of bathing waters. Makes provisions for identifying and monitoring bathing waters and requires the identification of acceptable quality standards.</p>
<p>Scotland's National Marine Plan (2015)</p>	<p>Covers the management of both Scottish inshore waters (out to 12 nautical miles) and offshore waters (12 to 200 nautical miles). The plan provides direction to a wide range of marine decisions and consents made by public bodies and seeks to promote development that is compatible with the protection and enhancement of the marine environment.</p>
<p>Implications for the SEA:</p> <ul style="list-style-type: none"> • The SEA should assess the effect that the NPF4 could have on the water environment. • The SEA should explore the effects that the NPF4 could have on flooding. <p><u>Related SEA topics:</u> Water quality and quantity can have a direct or indirect impact on other SEA topics such as biodiversity and population and human health</p>	

<p>Soil</p>	
<p>Scottish Soil Framework 2009</p>	<p>The Framework acknowledges the multiple functions of soils and includes a vision that soils be recognised as a vital part of our economy, environment, and heritage, and be safeguarded for existing and future generations. It notes that while Scotland's soils are generally in good health,</p>

	<p>they face two significant pressures: climate change and the loss of organic matter, and identifies 13 key soil outcomes, such as protecting soil biodiversity, reducing and remediating soil erosion, and tackling greenhouse gas emissions.</p> <p>The Framework also considers that improving the availability of soil data and highlighting the knowledge gaps and research needs in Scotland are both important.</p>
Scotland's National Peatland Plan	The Plan sets out a number of targets regarding the protection and restoration of peatland.
Land use - getting the best from our land: strategy 2021 to 2026	The Strategy focuses on land as a key natural asset and recognises that it underpins much of Scotland's economic activity, further noting that the way it is used and managed is therefore of key importance.
Land Rights and Responsibilities Statement	Seeks to inform policy and practice around land issues in Scotland, operating jointly with other relevant strategies and policies.
<p>Implications for the SEA:</p> <ul style="list-style-type: none"> • Key pressures on soil biodiversity are identified as climate change, the loss of organic matter and changes in land use and land management practices. • The SEA should explore the effects that the NPF4 may have on soils, including with regard carbon rich soils and peatland, in the context of reducing greenhouse gas emissions. <p><u>Related SEA topics:</u> Loss of soil or poor quality soils can have direct or indirect impacts on other SEA topics such as biodiversity, climatic factors and water quality.</p>	

Cultural Heritage and Historic Environment	
<u>Ancient Monuments and Archaeological Areas Act, 1979, as amended</u>	Provides protection of scheduled monuments and areas of archaeological importance. Sites of national importance can be added to the inventory of historic battlefields or the inventory of gardens and designed landscapes under this legislation. Historic Environment Scotland is responsible for compiling and maintaining the inventories.
<u>Historic Environment Policy for Scotland (HEPS) (2019)</u>	The Historic Environment Policy for Scotland is a policy statement that should be taken into account where decision making affects the historic environment, both at national and local level. It sets out a series of principles and policies for the recognition, care and sustainable management of the historic environment, and promotes a greater understanding and enjoyment of the historic environment. The policy statement helps to deliver the vision and aims of Our Plan in Time and takes into account principles that the UK and Scottish Governments have agreed to in international and conventions on cultural heritage and landscape.
<u>Our Place in Time – The Historic Environment Strategy for Scotland (2014)</u>	Our Place in Time sets out a 10 year vision for Scotland’s historic environment. The vision is founded upon the fundamental aims of understanding, protecting, and valuing our historic environment, ensuring it continues to benefit Scotland’s wellbeing through its cultural, social, environmental, and economic contributions.
<u>Historic Environment Scotland’s Managing Change in the Historic Environment: Guidance Notes</u>	These set out to advise planning authorities in making decisions on applications for conservation area and listed building consents, and the consideration of planning applications on the potential impacts upon the historic environment and the greater context in which it is found. The guidance notes were developed in line with Scottish Historic Environment Policy and Scottish Planning Policy.
<u>Creating Places: A Policy Statement on Architecture and Place (2013)</u>	The policy statement sets out the value good design can deliver, noting that successful places can unlock opportunities, build vibrant communities and contribute to a flourishing community. The important role of maintaining cultural connections is also noted.

Designing Streets: A Policy Statement for Scotland (2010)	<p>Designing Streets is the first policy statement in Scotland for street design and marks a change in the emphasis of guidance or street design towards place-making and away from a system focused upon the dominance of motor vehicles.</p>
<p>Implications for the SEA:</p> <ul style="list-style-type: none"> • The SEA should consider the impacts of the NPF4 on cultural heritage from a national perspective • There is opportunity for the SEA to explore the contribution that the NPF4 will make to a sense of place. <p><u>Related SEA topics:</u> The SEA Topics of cultural heritage and landscape are closely linked. Also climate change can have direct or indirect impacts on cultural heritage and the historic environment.</p>	

<p>Landscape and Geodiversity</p>	
The European Landscape Convention (2000)	<p>The European Landscape Convention strives to promote landscape protection, management, and planning as well as achieve a more concerted approach to addressing landscape issues at the European scale. The Convention presents a highly inclusive definition of landscape, specifying that protection and enhancement activities should apply equally to both “outstanding” as well as less remarkable or degraded landscapes. This definition encompasses natural, rural, urban, and peri-urban landscapes across land, marine, and inland water environments.</p>
National Scenic Areas	<p>National Scenic Areas, are Scottish landscapes designated for their “outstanding scenic value in a national context.” The purpose of the designation is to identify our finest scenery and ensure such areas are afforded due consideration and protection within the planning system.</p>
NatureScot Landscape Policy Framework	<p>The Policy Framework sets out an overarching aim for landscapes “to safeguard and enhance the distinct identity, the diverse character and the special qualities of Scotland’s landscapes as a whole, so as to ensure tomorrow’s landscapes contribute positively to people’s environment and are at least as attractive and valued as they are today”.</p>

NatureScot Landscape Policy – Wild Land	<p>NatureScot identified 42 areas, where the most extensive areas of high wildness can be found across Scotland’s landscapes. This is based on four attributes: perceived naturalness of land cover; ruggedness of the terrain; remoteness from public roads or ferries; and lack of buildings, roads, pylons and modern artefacts. This informed the preparation of the 2014 map of wild land areas.</p> <p>Wild land is not a statutory designation, however wild land areas as identified on the 2014 NatureScot map are recognised as nationally important in National Planning Framework 3 and Scottish Planning Policy 2014.</p>
Scottish Geodiversity Charter 2018-2023	<p>The Scottish Government supported Scotland’s Geodiversity Charter encourages the promotion and management of Scotland’s geodiversity and better integration of geodiversity into policy and guidance, consistent with the economic, social, cultural and environmental needs of Scotland. This will help to protect a crucial aspect of our natural heritage and deliver more sustainable management</p>
People, Place and Landscape – A position statement from NatureScot and Historic Environment Scotland	<p>The position statement sets out the vision and approach of NatureScot and Historic Environment Scotland for managing change in Scotland’s landscapes. The Statement includes a shared Vision and Principles that will guide effort for landscape, and identifies key outcomes.</p>
<p>Implications for the SEA:</p> <ul style="list-style-type: none"> • The SEA should explore the effects of the NPF4 on landscape diversity. • There is opportunity for the SEA to explore the effects of the NPF4 on landscape including linkages to human health including access, recreation, providing a sense of place. <p><u>Related SEA topics:</u> Climate change can have direct or indirect impacts on landscape, cultural heritage, and the historic environment.</p>	

Material Assets	
Material Assets: Energy	
The Scottish Energy Strategy: The Future of Energy in Scotland (2017)	The Scottish Energy Strategy sets out Scottish Government’s vision for energy generation and consumption to 2050. The Strategy centres around three themes: meeting our energy supply needs, transforming Scotland’s energy use and smart local energy systems.
Energy Efficient Scotland: Route Map (2018)	The route map sets out a vision that: by 2040 our homes and buildings are warmer, greener and more efficient. The route map sets out a 20 year programme of action with two main objectives: removing poor energy efficiency as a driver for fuel poverty and reduce greenhouse gas emissions through more energy efficient buildings and decarbonising the heat supply.
Hydrogen Policy Statement	Sets out a vision for Scotland to become a leading hydrogen nation in the production of reliable, competitive, sustainable hydrogen, securing Scotland’s future as a centre of international excellence. Establishing the innovation, skills and supply chain to underpin our energy transition.
Heat in Buildings Strategy - achieving net zero emissions in Scotland's buildings	Building on the policies and actions set out in the Climate Change Plan Update, this Strategy sets out a pathway to zero emissions buildings by 2045 and details a series of near-term actions to put Scotland on a clear path towards this, as well as a range of further, longer-term commitments to accelerate the transformation of the nation’s building stock. It sets out the principles to ensure our zero emissions heat delivery programmes support fuel poverty objectives.
Material Assets: Transport	
National Transport Strategy 2 (2019)	Scotland’s second National Transport Strategy sets out a vision for transport for the next 20 years. Key priorities include the global climate emergency and the role of transport in helping to deliver net-zero emissions by 2045, alongside the role of transport in building a fairer society.

<p>Strategic Transport Projects Review (2008) and Strategic Transport Projects Review 2 (currently under development)</p>	<p>The Strategic Transport Projects Review (STPR) sets out a range of projects that aim to improve journey times and connections, reduce emissions and improve quality, accessibility, and affordability, identifying national, land-based transport priorities for the medium to long-term (2032). STPR seeks to compliment transport interventions taken forward at regional and local levels. STPR sets out a tiered approach to transport investment which includes promoting measures that make better use of existing capacity. The Scottish Government has committed to aligning the next review of the STPR and development of STPR2 with the preparation of NPF4, with both being informed by the National Transport Strategy 2.</p>
<p>Rail Enhancements & Capital Investment Strategy (2018)</p>	<p>Sets out the Scottish Governments approach to planning and funding rail projects. It looks beyond the traditional 5-year railway industry planning cycle and takes a strategic approach to all rail capital investments with a particular focus on making best use of the opportunities presented by major renewals.</p>
<p>Delivering the goods – Scotland’s rail freight strategy (2016)</p>	<p>Sets out a vision for a competitive, sustainable rail freight sector playing an increasing role in Scotland’s economic growth by providing a safer, greener and more efficient way of transporting products and materials. The Strategy notes the role of rail freight in tackling climate change and supporting stronger safer communities.</p>
<p>Material Assets: Forestry</p>	
<p>Scotland’s Forestry Strategy 2019-2029</p>	<p>The Scottish Forestry Strategy 2019-2029 aims to achieve sustainable development of forests and woodlands, through good management and better integration with other land uses. Priorities include ensuring forests and woodlands are managed sustainably, increasing the adaptability and resilience of forests and woodlands and expanding the area of forests and woodlands, recognising wider land-use objectives. The Strategy sets out a vision of ‘In 2070, Scotland will have more forests and woodlands, sustainably managed and better integrated with other land uses. These will provide a more resilient, adaptable resource, with greater natural capital value, that supports a strong economy, a thriving environment, and healthy flourishing communities’.</p>

Material Assets: Waste	
Making Things Last: A Circular Economy Strategy for Scotland (2016)	Sets out Scotland’s ambitions for changing how waste is seen in our economy. It seeks to reduce waste lost from the economy, and retain the value of materials through repair, reuse, recycling, and remanufacturing via a range of policies and proposals. This is noted as fundamental to helping tackle climate change and to preserve natural capital. Four priorities areas for action are identified in Making Things Last: food and drink and the broader bio-economy, remanufacture, construction and the built environment, and energy infrastructure.
Material Assets: Agriculture/ Rural Development and Miscellaneous	
Land use - getting the best from our land: strategy 2021 to 2026	The Land Use Strategy sets out the long term vision for sustainable land use in Scotland, the objectives and key policies for delivery.
Scotland's 10 Year Farmed Fish Health: strategic framework	Aims to plan and respond to new and developing challenges, such as the maintenance of high standards of fish health. It looks to the long-term and continues to evolve as knowledge of fish health challenges and possible mitigation evolves.
Scottish Plant Health Strategy	This strategy sets out the Scottish Government's approach to the protection of the health of plants (agricultural & horticultural crops, plants in parks and gardens, forestry and the natural environment) in Scotland.
Material Assets: Digital/ Media	
Realising Scotland’s full potential in a digital world: A Digital Strategy for Scotland (2017)	The Strategy is a refresh of the 2011 “Scotland’s Digital Future” sets out in action of how the Scottish Government intend to achieve its digital ambition.

Tourism	
Scotland Outlook 2030	Launched in March 2020, with an ambition to grow tourism in a way which has a positive impact on Scotland's communities, businesses and everyone who visits and stays in Scotland. It recognises that the role of tourism has changed as a result of our climate crisis, advances in technology, EU exit and changes in consumer behaviour which is reflected in the demands of today's traveller.
Tourism Scotland 2020	A national tourism strategy, developed by Scottish Tourism Alliance with support from the Scottish Government, aiming to make Scotland a "first-choice destination for a high quality, value for money and memorable customer experience delivered by skilled and passionate people". The mid-term review of Tourism Scotland 2020 identified four main priorities: digital tourism; leadership; quality of customer experience; investment in infrastructure.
<p>Implications for the SEA:</p> <ul style="list-style-type: none"> • The environmental objectives demonstrate strong links to other topics such as population and human health as well as climatic factors. • Many objectives focus on improvements to infrastructure and reduction in emissions and this will need to be reflected in the assessment of the NPF4. <p><u>Related SEA topics:</u> Changes made to material assets can directly or indirectly impact on other topic areas, such as air quality and population and human health.</p>	

General	
A National Mission with Local Impact: Infrastructure	The 2021-22 to 2025-26 Infrastructure Investment Plan was published in February 2021. It outlines a coherent, and strategic approach to delivering the National Infrastructure Mission. The

Investment Plan for Scotland 2021-22 to 2025-26	Plan demonstrates the vital role infrastructure has to play in helping businesses and communities to adapt and recover from the COVID-19 pandemic.
The Town and Country Planning (Scotland) Act 1997, as amended	The Planning (Scotland) Act 2019 was passed by the Scottish Parliament in June 2019. This will determine the future structure of the modernised planning system. The Act includes a broad range of changes to be made across the planning system such as arrangements for the preparation of development plans, proactive master planning, development management procedures, strengthening enforcement, and a focus on improved performance and positive outcomes.
<p>Implications for the SEA:</p> <ul style="list-style-type: none"> • Various environmental topics are highlighted in more overarching legislation. The SEA will need to have cognisance of these such as recreation and linkages to human health and a sense of place. 	

Appendix C - Policy Assessment

C1.1 Introduction

- C1.1.1 Part 3 of the draft National Planning Framework (NPF4) sets out draft national planning policies (“draft policies”) for day to day use: in the preparation of local development plans; local place plans; masterplans and briefs; and for determining the range of planning consents.
- C1.1.2 Part 3 of the draft NPF4 is to be taken as a whole, and all relevant policies are to be applied to each application. In addition, draft policies 1 – 6 are ‘Universal Policies’ which are to apply to all planning decisions.
- C1.1.3 The draft policies are set out under 4 themes of: Sustainable Places, (Universal Policies), Liveable Places, Productive Places, and Distinctive Places. This appendix sets out the findings of the assessment of the draft policies. Findings are set out as shown below and follow the same order as they appear in the draft NPF4.

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C1.2 Alternatives

C1.2.1 The 2005 Act requires the Environmental Report to identify and assess any ‘reasonable alternatives’ to the plan or programme, taking into account its objectives and geographical scope. The draft NPF4 makes clear the policies in Part 3 are to be taken as a whole, and all relevant policies should be applied to each application. Nevertheless, and where relevant and applicable, consideration of alternatives to the draft policies is included below. Views are invited on the SEA, including on the consideration of reasonable alternatives, through the consultation process.

C1.2.2 Table C1.1 sets out the key to the assessment findings.

Table C1.1 Assessment Findings Key

✓	Positive Effect
X	Negative Effect
0	Negligible Effect
X✓	Mixed Effect
✓✓	Positive Effect (Significant)
XX	Negative Effect (Significant)
?	Uncertain

C1.3 Universal Policies – Sustainable Places

The draft policy notes that to achieve a net zero, nature positive Scotland, the planning system must be rebalanced so that climate change and nature recovery are the primary guiding principles for all plans and decisions. The draft policy also notes that the planning system should apply the Place Principle and take a design-led approach to future development. This should include working with stakeholders and local communities to create liveable, healthy and sustainable places that improve lives, support sustainable and inclusive growth and contribute to net-zero and environmental ambitions.



To support this, six policies are set out:

- Policy 1: Plan-led approach to sustainable development
- Policy 2: Climate emergency
- Policy 3: Nature crisis
- Policy 4: Human rights and equality
- Policy 5: Community wealth building
- Policy 6: Design, quality and place

BIODIVERSITY, FLORA & FAUNA

Avoid adverse impacts to designated habitats and species	✓✓	The draft Universal Policies are expected to give rise to long term significant positive effects for biodiversity, flora and fauna. Draft Policy 3 - Nature crisis introduces new policies on enhancing biodiversity, including from new development, and facilitates the creation of nature networks to support improved ecological connectivity, the creation of new or restoration of degraded habitats, or through measures to increase populations of priority species. Focusing on emissions reduction and climate change adaptation, draft Policy 2: Climate emergency should further benefit biodiversity as biodiversity is intrinsically linked to climate and climate change.
Avoid adverse impacts to undesignated habitats and species	✓✓	
Protect, maintain and enhance biodiversity	✓✓	

CLIMATIC FACTORS

Avoid new Greenhouse Gas (GHG) emissions	✓✓	Significant long term positive effects are expected from new draft policy (Policy 2) requiring planning authorities to give significant weight to the global climate emergency , and through the focus given to designing buildings, infrastructure and spaces which are adaptable to climate change.
Reduce GHG emissions in order to meet Scotland emissions reduction target of net zero by 2045.	✓✓	
Promote and enable adaptation to climate change	✓✓	

AIR

Avoid adverse effects on air quality	✓✓	Draft Policy 2: Climate emergency , should lead to significant long term positive effects
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Reduce emissions of key pollutants and improve air quality throughout Scotland	✓✓	from continuing commitment to emissions reductions and climate change adaptation, for example, through use of blue/green infrastructure, which can help to absorb pollutants.
Reduce levels of nuisance e.g. noise, vibration, dust, odour and light	✓	
WATER		
Avoid adverse impacts on the ecological status of water bodies	0	Significant long term positive effects are expected from the continuing commitment to climate change adaptation. Draft Policy 2: Climate emergency notes development proposals for new, or alterations to, buildings, infrastructure and spaces, should be designed to be adaptable to the future impacts of climate change. Indirect positive effects may arise where consideration is given to nature based solutions to climate change adaptation.
Ensure the sustainable use of water resources	✓	
Reduce the number of people and properties at risk of flooding and promote adaptive flood risk management	✓✓	
Protect, maintain and improve the ecological status and physical state of the water environment	0	
SOIL		
Safeguard and improve soil health, protect soil resource and soil functions of all soil types in Scotland	✓	Whilst negative impacts may arise where new development lead to soil sealing, new draft policy on enhancing biodiversity and the creation of new or restoration of degraded habitats (Policy 3 - Nature crisis) should lead to indirect benefits from broader environmental improvements.
Safeguard and improve high value agricultural land and carbon-rich soils	✓	
Reduce the extent of contaminated and vacant and derelict land	✓	
CULTURAL HERITAGE AND HISTORIC ENVIRONMENT		
Avoid adverse impacts on the historic environment and its setting	✓✓	Potential for significant positive effects on historic assets and their settings through provisions in draft Policy 6: Design, quality and place which seek to achieve high quality designs that contribute positively to the character and sense of place, and through the incorporation of key principles of New Design in Historic Settings.
Protect and enhance valued landscapes, historic places and archaeological sites and other culturally and historically important features, landscapes and their settings	✓✓	
LANDSCAPE AND GEODIVERSITY		
Avoid adverse effects on landscapes and geodiversity	✓	Positive effects on landscape and geodiversity may arise as draft Policy 6: Design, quality and place emphasises that development proposals should be designed to a high quality so that the scale and nature
Safeguard and enhance the character and diversity of the Scottish landscape and	✓	

areas of valuable landscape and geodiversity		of the development contributes positively to the character and sense of place of the area.
MATERIAL ASSETS		
Avoid adversely impacting on material assets	✓✓	This suite of draft policies actively supports long term, positive effects on both natural and built material assets which has the potential to be significant.
Promote the principles of circular economy	✓	
Reduce use and promote sustainable management of natural and built environment resources	✓	
Promote the sustainable design, use and management of new and existing assets/infrastructure to support the development of high-quality places	✓	
POPULATION AND HUMAN HEALTH		
Reduce the health gap and inequalities and improve healthy life expectancy	✓✓	Positive effects through draft Policy 4: Human rights and equality which requires all planning to respect, protect and fulfil human rights, and seeks to eliminate discrimination and promote equality. Positive effects should arise from the focus on community wealth building (draft Policy 5) supporting a people-centric approach to local economic development. Benefits can be maximised where this is focused on areas experiencing economic inequalities.
Promote and enhance/improve access to open space, greenspace and the wider countryside	0	
To protect and improve human health and wellbeing through improving the quality of the living environment of people and communities	✓	
Increase sustainable access to essential services, employment and the natural and historic environment	✓✓	

Alternatives

- C1.3.1 The draft Universal policies include key provisions aligned to wider statutory and policy requirements, including on meeting emissions reductions targets, securing positive effects for biodiversity, and on achieving Scotland's national outcomes (within the meaning of Part 1 of the Community Empowerment (Scotland) Act 2015) and the UN Sustainable Development Goals.
- C1.3.2 They also introduce new targeted requirements which apply to certain scales or types of development – this is the case for draft provisions on contributing to community wealth building and on enhancing biodiversity. It follows that were such requirements to apply to a broader or narrower range of planning applications, the potential benefits and / or any adverse effects identified may be either magnified or reduced. However, we do

not consider it possible to meaningfully assess differences arising from the scale of application of the draft policies, taking into account taking the level of uncertainty arising in the application of policy to individual development proposals, and in light of factors such as development viability which may affect policy uptake.

- **The Presumption In Favour Of Development That Contributes To Sustainable Development**

- C1.3.3 SPP introduced a ‘presumption in favour of development that contributes to sustainable development.’ Paragraph 29 of the SPP sets out the principles of sustainable development, and paragraphs 32 and 33 explain how the presumption should be applied in development management. Paragraph 32 states that the presumption will be a material consideration for proposals that do not accord with up-to-date development plans. Paragraph 33 states that where relevant policies in a development plan are out-of-date the presumption will be a significant material consideration. Paragraph 33 also gives significant weight to the presumption if there is not enough ‘effective’ land available for housing development. In July 2020 the Scottish Government published a consultation paper setting out proposed interim changes to SPP, including the removal of the presumption. A subsequent December 2020 update to the SPP was removed following a legal challenge at the Court of Session in August 2021. Overall, views on the July 2020 proposals were divided.
- C1.3.4 Once adopted, the finalised NPF4 would replace SPP, including the ‘presumption in favour’. The draft NPF4: Sustainable Places sets out the need to rebalance the planning system so that climate change and nature recovery are the primary guiding principles for plans and decisions. In drafting part 3 of the draft NPF4, the Scottish Government has taken into account new statutory requirements introduced into the Town and Country Planning (Scotland) Act 1997 by the Planning (Scotland) Act 2019, in particular the new status of the NPF in day to day decision making¹. The policies also take into account, and align with, new and updated policy objectives including on climate and nature recovery.
- C1.3.5 It is recognised that there are a range of approaches that could be taken to updating planning policy in light of these wider changes. There is also the potential for changes to national planning policies to impact on all environmental topics. The nature and scale of the impacts will however depend on a range of factors, including the detail of the policy proposed, and the wider policy and statutory framework within which it would be given effect.
- C1.3.6 The discussion on ‘quality homes’ and on housing land requirements in the Liveable Places section below is also relevant.

¹ NPF4 will have the status of development plan for planning purposes. This is a change to the current position, and will mean that its policies will have a stronger role in informing day to day decision making.

C1.4 Liveable Places

20 minute neighbourhoods – local living

The draft policy aims to support development that contributes to the creation of walkable, liveable and thriving places that provide communities with local access to the facilities and services needed.

The draft policy notes this can be achieved by building on the Place Principle in the creation of 20 Minute Neighbourhoods - a method of achieving complete, connected and often compact neighbourhoods, designed in such a way that people can meet the majority of their daily needs within a reasonable walk, wheel or cycle.



BIODIVERSITY, FLORA & FAUNA		
Avoid adverse impacts to designated habitats and species	✓	Positive effects may arise long term through the creation of parks, green streets and spaces and community gardens.
Avoid adverse impacts to undesignated habitats and species	✓	
Protect, maintain and enhance biodiversity	✓	
CLIMATIC FACTORS		
Avoid new Greenhouse Gas (GHG) emissions	✓✓	Long term significant positive effects are expected to arise as a shift to more sustainable modes of travel should lead to reductions in GHG emissions. Incorporating blue green infrastructure into existing and new neighbourhoods can create climate change adaptation opportunities, aligning with wider placemaking aims of draft NPF4.
Reduce GHG emissions in order to meet Scotland emissions reduction target of net zero by 2045.	✓	
Promote and enable adaptation to climate change	✓	
AIR		
Avoid adverse effects on air quality	✓✓	Significant long term positive effects are expected through potential increased uptake of low and zero emissions modes of travel benefitting air quality, with positive effects also likely to be experienced at a local level. Uptake of more sustainable modes of travel, combined with green travel practices, should also lead to reduced exposure to noise pollution.
Reduce emissions of key pollutants and improve air quality throughout Scotland	✓✓	
Reduce levels of nuisance e.g. noise, vibration, dust, odour and light	✓✓	
WATER		
Avoid adverse impacts on the ecological status of water bodies	0	Overall, no significant effects on the water environment are expected from the draft policy. Secondary positive impacts could arise long term where modal shift reduces atmospheric pollution, which can impact on the water environment.
Ensure the sustainable use of water resources	0	
Reduce the number of people and properties at risk of flooding and promote adaptive flood risk management	0	

Protect, maintain and improve the ecological status and physical state of the water environment	?√	
SOIL		
Safeguard and improve soil health, protect soil resource and soil functions of all soil types in Scotland	X√	Potential effects are expected to be mixed and will be influenced by factors such as geographic location, soil properties and type of projects undertaken. There is potential for negative effects from new infrastructure. However these can be reduced through appropriate design and mitigation measures and where a focus is given to green infrastructure and broader environmental improvements. Positive impacts have the potential to arise where priority is given to the re-use and re-purposing of existing assets, particularly where previously developed sites are utilised, including vacant and derelict land. Additional benefits may also arise where from support for the creation of habitats, such as parks, and community gardens.
Safeguard and improve high value agricultural land and carbon-rich soils	0	
Reduce the extent of contaminated and vacant and derelict land	√	
CULTURAL HERITAGE AND HISTORIC ENVIRONMENT		
Avoid adverse impacts on the historic environment and its setting	0	Effects are uncertain. There is potential for temporary or localised effects arising from development of new or improved infrastructure, however the emphasis on placemaking within the overall draft NPF4 and the requirements of the Historic Assets and Places draft policy, can reasonably be expected to limit potentially negative impacts. Additionally, there is an opportunity to maintain, restore and repurpose historic assets to support sustainable placemaking. Cultural activity can also drive local economy growth and benefit community cohesion ² .
Protect and enhance valued landscapes, historic places and archaeological sites and other culturally and historically important features, landscapes and their settings	0	
LANDSCAPE AND GEODIVERSITY		

² Local Government Association (2017) People, culture, place – the role of culture in placemaking [online] Available at: <https://static.a-n.co.uk/wp-content/uploads/2017/03/People-culture-place-the-role-of-culture-in-placemaking-WEB.pdf> (accessed 28/10/2021)

Avoid adverse effects on landscapes and geodiversity	0	No significant effects on landscapes expected.
Safeguard and enhance the character and diversity of the Scottish landscape and areas of valuable landscape and geodiversity	?✓	Potential for positive effects to arise over the longer term for local landscapes where development supports improvements. For example, where green infrastructure and broader environmental improvements are supported.
MATERIAL ASSETS		
Avoid adversely impacting on material assets	✓✓	Significant positive effects are expected due to improved connectivity and emphasis on localism objectives.
Promote the principles of circular economy	✓	
Reduce use and promote sustainable management of natural and built environment resources	✓	
Promote the sustainable design, use and management of new and existing assets/infrastructure to support the development of high-quality places	✓	
POPULATION AND HUMAN HEALTH		
Reduce the health gap and inequalities and improve healthy life expectancy	✓	Potential significant positive effects are expected. Health and wellbeing benefits arise where policies lead to more people walking, wheeling and cycling. Increased physical activity, improved access to outdoors, education, facilities and services, quality local green spaces are likely to have long term significant positive effects on physical and mental health. Potential shift to more sustainable transport modes should lead to improvements in air quality and reduced pollution and exposure to noise. Positive impacts could also arise from improved sense of place including societal benefits. The benefits of this could be maximised where focus is given to areas experiencing current levels of disadvantage.
Promote and enhance/improve access to open space, greenspace and the wider countryside	✓✓	
To protect and improve human health and wellbeing through improving the quality of the living environment of people and communities	✓✓	
Increase sustainable access to essential services, employment and the natural and historic environment	✓	

Infrastructure First

The draft Infrastructure First policy supports an approach to planning which aims to put infrastructure considerations at the heart of place making. This approach is intended to support the provision of the infrastructure services and facilities that are necessary to create liveable and sustainable places. It can also support the drive towards a more sustainable use of infrastructure, making better use of existing assets and prioritising low-carbon infrastructure.



BIODIVERSITY, FLORA & FAUNA		
Avoid adverse impacts to designated habitats and species	?X✓	Potential for positive impacts where the draft policy leads to support for the sustainable use of infrastructure, including through making best use of existing assets. For example, where this leads to reducing the need for new infrastructure in the first instance, with associated benefits through reducing pressure on natural resources. Additional benefits may also arise from potential increased consideration of natural infrastructure ³ and nature based solutions to flood risk management, aligning with wider draft policy. Where required, new infrastructure or upgrades to existing infrastructure may lead to associated adverse impacts from construction and operation, including loss of habitat and disruption to habitat networks. Potential for negative impacts to be minimised through siting and design and enhancement measures applied in keeping with draft Policy 3 - Nature crisis .
Avoid adverse impacts to undesignated habitats and species	?X✓	
Protect, maintain and enhance biodiversity	?X✓	
CLIMATIC FACTORS		
Avoid new Greenhouse Gas (GHG) emissions	✓✓	Potential for benefits to arise where the draft policy leads to support for greater sustainability in the use of infrastructure, including through making better use of existing assets and prioritising low-carbon infrastructure. This has the potential to lead to significant benefits through reducing associated GHG emissions. Positive effects are expected where
Reduce GHG emissions in order to meet Scotland emissions reduction target of net zero by 2045.	✓	
Promote and enable adaptation to climate change	✓	

³ Scottish Government (2021) A National Mission with Local Impact: Infrastructure Investment Plan for Scotland 2021-22 to 2025-2026 [online] Available at: <https://www.gov.scot/publications/national-mission-local-impact-infrastructure-investment-plan-scotland-2021-22-2025-26/documents/> (accessed 29/10/2021)

		<p>infrastructure facilitates adaptation to climate change. Where the draft policy leads to infrastructure which facilitates a shift to more sustainable modes of transport, additional benefits may arise from associated reductions in emissions. Operational activities could also lead to associated emissions depending on activities, for example, more intensive use could give rise to increased associated GHG emissions from increased energy requirements.</p> <p>Additional benefits may also arise where the draft policy leads to greater consideration of the need to adapt to the impacts of climate change to support the creation of liveable and sustainable places, with opportunities to align with wider draft policy on placemaking and natural solutions to flood risk management and blue and green infrastructure.</p>
AIR		
Avoid adverse effects on air quality	?X✓	<p>Secondary overall positive impacts could arise. For example, where the greater consideration of the role of infrastructure in creating liveable and sustainable places, leads to co-location and sharing of resources, and in turn, reduced travel. Conversely, localised negative air quality impacts could arise where the draft policy leads to potential intensification in use of sites. This should be minimised through a focus on improved placemaking, including where opportunities are taken to align with wider draft policy on sustainable travel and transport.</p>
Reduce emissions of key pollutants and improve air quality throughout Scotland	?X✓	
Reduce levels of nuisance e.g. noise, vibration, dust, odour and light	?X✓	
WATER		
Avoid adverse impacts on the ecological status of water bodies	?✓	<p>Secondary benefits may arise over the longer term. For example, where the draft policy leads supports greater sustainability in the use of infrastructure, including making best use of existing infrastructure, leading to reduced pressure on natural resources. Secondary positive impacts may arise where the draft policy leads to increased consideration of nature based solutions to</p>
Ensure the sustainable use of water resources	?✓	
Reduce the number of people and properties at risk of flooding and promote adaptive flood risk management	?✓	
Protect, maintain and improve the ecological status	?✓	

and physical state of the water environment		flood management ⁴ . Additionally, there the draft policy leads to the development or upgrading of waste water treatment infrastructure, positive impacts may arise. Where undertaken, infrastructure developments have potential to create localised negative impacts on the water environment.
SOIL		
Safeguard and improve soil health, protect soil resource and soil functions of all soil types in Scotland	?√	Secondary positive impacts may arise over the longer term where the draft policy leads to reduced pressure on natural resources. For example, where this supports making the best use of existing infrastructure, alongside opportunities for greater consideration of the use of natural infrastructure. Localised effects may occur associated with new infrastructure proposals. Effects would vary depending on geographic conditions, soil physical properties and type of projects proposed for development. Appropriate design and mitigation measures would reduce impacts.
Safeguard and improve high value agricultural land and carbon-rich soils	0	
Reduce the extent of contaminated and vacant and derelict land	?	
CULTURAL HERITAGE AND HISTORIC ENVIRONMENT		
Avoid adverse impacts on the historic environment and its setting	?√	Where the draft policy leads to reduced requirements for new infrastructure, there is the potential that long term positive impacts could arise. There is an opportunity to maintain, restore and repurpose these assets to support sustainable placemaking. Additionally, in some instances, some infrastructure is also an important historical asset in its own right. Localised negative impacts could arise from infrastructure requirements, including on setting.
Protect and enhance valued landscapes, historic places and archaeological sites and other culturally and historically important features, landscapes and their settings	?√	
LANDSCAPE AND GEODIVERSITY		
Avoid adverse effects on landscapes and geodiversity	?√	Where the draft policy leads to reduced need for infrastructure, benefits could arise. There are also opportunities to improve local landscapes, particularly where focus
Safeguard and enhance the character and diversity of the Scottish landscape and	?√	

⁴ Green4Grey (2020) Integrated planning for multifunctional land use [online] Available at: <https://green4grey.be/en/project-objective#integrale%20planning%20voor%20een%20veelzijdig%20landgebruik> (accessed 25/08/2021)

areas of valuable landscape and geodiversity		is given to restoration and enhancement to support the creation of liveable and sustainable places. Additionally, well-designed and managed green infrastructure assets, particularly those that engage local communities and which relate to landscape character and heritage, can enhance local sense of place and foster community spirit ⁵ . Localised effects may occur associated with new infrastructure proposals.
MATERIAL ASSETS		
Avoid adversely impacting on material assets	✓	Support for making the best use of and maximising existing assets before building new, should lead to long term significant positive impacts, including where this leads to reduced pressure on natural resources and generation of waste, aligning with circular economy principles. Long term positive should also arise from the draft policy emphasis on basing Local Development Plans and delivery programmes on an infrastructure-first approach and ensuring infrastructure considerations are integral to planning decision making, including where this leads to improved placemaking.
Promote the principles of circular economy	✓✓	
Reduce use and promote sustainable management of natural and built environment resources	✓✓	
Promote the sustainable design, use and management of new and existing assets/infrastructure to support the development of high-quality places	✓✓	
POPULATION AND HUMAN HEALTH		
Reduce the health gap and inequalities and improve healthy life expectancy	✓	Potential for positive impacts where infrastructure considerations are embedded at the heart of place making and support improved access to goods and services, particularly to vital services such as employment. Wider societal benefits may arise where a focus is given to reducing barriers for individuals or communities with specific needs, and where inequalities currently exist. There may be opportunities to improve health and wellbeing through facilitating access to certain types of infrastructure and where consideration is given to active travel in infrastructure design, including through the use of natural infrastructure. For example, natural infrastructure can
Promote and enhance/improve access to open space, greenspace and the wider countryside	✓	
To protect and improve human health and wellbeing through improving the quality of the living environment of people and communities	✓	
Increase sustainable access to essential services, employment and the natural and historic environment	✓	

⁵ Landscape Institute (2009) Green Infrastructure: connected and multifunctional landscapes [online] Available at: <https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2016/03/GreenInfrastructurepositionstatement13May09.pdf> (accessed 29/09/2021)

	<p>contribute to the quality of place and to wellbeing by supporting sustainable everyday living and strengthening community resilience⁶. Further, where opportunities are sought to ensure that current infrastructure is repurposed and reused in a way that meets wider or changing user needs or is multifunctional, benefits should arise.</p> <p>Potential benefits could be maximised where focus is given to areas experiencing current levels of disadvantage or where barriers to accessibility exist.</p> <p>Where implemented, natural infrastructure contributes to quality of place and wellbeing by supporting sustainable everyday living and strengthening community resilience⁷.</p>
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⁶ Scottish Government (2021) A National Missions with Local Impact Infrastructure Investment Plan for Scotland 2021-22 to 2025-2026 [online] Available at: <https://www.gov.scot/publications/national-mission-local-impact-infrastructure-investment-plan-scotland-2021-22-2025-26/documents/> (accessed 29/10/2021)

⁷ Scottish Government (2021) A National Missions with Local Impact Infrastructure Investment Plan for Scotland 2021-22 to 2025-2026 [online] Available at: <https://www.gov.scot/publications/national-mission-local-impact-infrastructure-investment-plan-scotland-2021-22-2025-26/documents/> (accessed 29/10/2021)

Quality Homes

The draft policy notes that good quality homes should be at the heart of great places and contribute to strengthening the health and wellbeing of Scotland's communities. The draft policy also notes that energy efficient, net zero emissions homes are required to help tackle climate change. The draft policy highlights the role delivery of homes has in supporting inclusive growth and potential to help build community wealth.

The draft NPF4 also proposes Minimum All-Tenure Housing Land Requirement (MATHLR) for each planning authority in Scotland.



BIODIVERSITY, FLORA & FAUNA		
Avoid adverse impacts to designated habitats and species	?X	Potential negative effects may arise, including loss of habitat and disruption to habitat networks housing developments. Effects on non-protected sites and species are more likely, as designated areas will be protected through recognition of their value and vulnerability. Potential for negative impacts to minimised through siting and design and enhancement measures applied in keeping with draft Universal policy 3.
Avoid adverse impacts to undesignated habitats and species	?X	
Protect, maintain and enhance biodiversity	0	
CLIMATIC FACTORS		
Avoid new Greenhouse Gas (GHG) emissions	✓	Overall positive effects are expected long term. Construction of new homes has the potential to lead to negative direct effects, for GHG emissions, however, the draft policy supports the incorporation of energy efficiency measures, renewable energy and waste technologies, thereby contributing to long term reductions in GHG emissions. Additionally, there is an opportunity to align with wider draft policies that support the use of construction materials with the lowest forms of embodied emissions. .
Reduce GHG emissions in order to meet Scotland emissions reduction target of net zero by 2045.	✓	
Promote and enable adaptation to climate change	✓	
AIR		
Avoid adverse effects on air quality	✓	Positive effects should arise where land for new homes is allocated in line with the principles of 20 minute neighbourhoods, potentially reducing travel requirements and associated emissions.
Reduce emissions of key pollutants and improve air quality throughout Scotland	✓	
Reduce levels of nuisance e.g. noise, vibration, dust, odour and light	✓	
WATER		

Avoid adverse impacts on the ecological status of water bodies	0	Effects on the water environment are uncertain. Effects will be site specific, and managed at plan and project consenting stages.
Ensure the sustainable use of water resources	0	
Reduce the number of people and properties at risk of flooding and promote adaptive flood risk management	0	
Protect, maintain and improve the ecological status and physical state of the water environment	0	
SOIL		
Safeguard and improve soil health, protect soil resource and soil functions of all soil types in Scotland	X✓	There is potential for negative effects as use of additional land could result in soil sealing. Wider draft policies aim to encourage the re-use of existing buildings and use of vacant and derelict land, potentially reducing pressure on soil resources.
Safeguard and improve high value agricultural land and carbon-rich soils	?	
Reduce the extent of contaminated and vacant and derelict land	✓	
CULTURAL HERITAGE AND HISTORIC ENVIRONMENT		
Avoid adverse impacts on the historic environment and its setting	?	The emphasis on placemaking within the overall draft NPF4, including the requirements of the Historic Assets and Places draft policy, should limit potential for any direct negative impacts to arise. Potential for positive impacts where opportunities are sought to bring historic buildings at risk back into use, including where consideration is given to their role in placemaking and town centre regeneration.
Protect and enhance valued landscapes, historic places and archaeological sites and other culturally and historically important features, landscapes and their settings	?✓	
LANDSCAPE AND GEODIVERSITY		
Avoid adverse effects on landscapes and geodiversity	?	Effects on landscapes are uncertain and will be influenced by factors including the location and scale of development. The emphasis on placemaking within the overall draft NPF4, including draft policy relating to Natural Places, should help to limit any potentially negative impacts and could lead to opportunities for improvements to localised landscapes.
Safeguard and enhance the character and diversity of the Scottish landscape and areas of valuable landscape and geodiversity	?	
MATERIAL ASSETS		
Avoid adversely impacting on material assets	X✓	Positive, long term impacts are expected where this leads to the provision of good quality and energy efficient housing stock. Construction of new
Promote the principles of circular economy	✓	

Reduce use and promote sustainable management of natural and built environment resources	✓	developments could result in resource consumption, with potential to negatively impact natural material assets. Positive effects should arise where reuse of existing buildings and improved resource efficiency is supported and would contribute to promoting the principles of circular economy
Promote the sustainable design, use and management of new and existing assets/infrastructure to support the development of high-quality places	✓	
POPULATION AND HUMAN HEALTH		
Reduce the health gap and inequalities and improve healthy life expectancy	✓✓	Provision of sufficient, good quality housing, linked to need and demand within an area, has potential to result in significant positive effects. Additionally, the emphasis on energy efficient homes has potential to contribute to reducing fuel poverty, with associated benefits. The draft policy promotes an equalities led approach and aims to ensure that specific needs are met, with homes adaptable to change and diverse needs and lifestyles. Significant benefits should also arise where land allocation is consistent with the principles of 20 minute neighbourhoods.
Promote and enhance/improve access to open space, greenspace and the wider countryside	✓	
To protect and improve human health and wellbeing through improving the quality of the living environment of people and communities	✓✓	
Increase sustainable access to essential services, employment and the natural and historic environment	✓	

Sustainable Travel and Transport

The draft policy notes Scotland's transport system should contribute to the creation of great places through prioritising the need to reduce inequalities; taking climate action; helping to deliver inclusive economic growth; and improving health and wellbeing. It also notes that the planning system should support development that minimises the need to travel unsustainably and prioritises walking, wheeling, cycling, public transport and shared transport options in preference to single occupancy private car use for the movement of people.



BIODIVERSITY, FLORA & FAUNA		
Avoid adverse impacts to designated habitats and species	?✓	Potential for long term negative effects, including loss of habitat and disruption to habitat networks, associated with the construction of new transport infrastructure. Impacts on non-protected sites and species are more likely, as designated areas will be protected through recognition of their value and vulnerability. Impacts will be managed at plan and project stages. Positive effects should arise where blue and green infrastructure and nature rich habitats are incorporated into design of new infrastructure, as encouraged in the draft NPF4. In keeping with national policy, biodiversity enhancement measures should be incorporated into proposals.
Avoid adverse impacts to undesignated habitats and species	?X✓	
Protect, maintain and enhance biodiversity	?X✓	
CLIMATIC FACTORS		
Avoid new Greenhouse Gas (GHG) emissions	✓✓	Potential for long term significant positive effects.
Reduce GHG emissions in order to meet Scotland emissions reduction target of net zero by 2045.	✓	Domestic transport was the largest source of net GHG emissions in Scotland in 2019 ⁸ . Reducing the need to travel unsustainably, managing transport demand and promoting active travel choices, has been recognised as vital to reducing emissions associated with transport ⁹ .
Promote and enable adaptation to climate change	✓	Opportunity to increase the resilience of the transport network to the predicted effects of climate change. Benefits could also arise from potential increased use of blue and

⁸ Scottish Government (2021) Scottish Greenhouse Gas statistics: 1990-2019 [online] Available at: <https://www.gov.scot/publications/scottish-greenhouse-gas-statistics-1990-2019/documents/> (accessed 15/10/2021)

⁹ Scottish Government (2020) Update to the Climate Change Plan 2018-2032 [online] Available at: <https://www.gov.scot/publications/securing-green-recovery-path-net-zero-update-climate-change-plan-20182032/> (accessed 15/10/2021)

		green infrastructure which can play a key role in climate change adaptation.
AIR		
Avoid adverse effects on air quality	✓✓	Road transport in urban areas is a significant contributor to poor air quality ¹⁰ which can also impact on human health. Through seeking to improve consideration of the role that transport can play in reducing inequalities; taking climate action; and improving health and wellbeing there is potential for long term significant positive effects to arise. This could be of particular relevance in areas where air quality issues currently exist such as Air Quality Management Areas (AQMAs) and to those most vulnerable to the impacts of atmospheric pollution. Additional secondary benefits should also arise where a modal shift leads to improved air quality and reduced exposure to noise, particularly in urban locations. Reducing the noise impacts of transport directly benefits health, improves the ambience of street environments, and encourages active travel and human interaction ¹¹ .
Reduce emissions of key pollutants and improve air quality throughout Scotland	✓	
Reduce levels of nuisance e.g. noise, vibration, dust, odour and light	✓	
WATER		
Avoid adverse impacts on the ecological status of water bodies	0	Localised negative impacts may arise from construction and operation of upgraded or new infrastructure and should be managed at plan and project consenting stages.
Ensure the sustainable use of water resources	0	
Reduce the number of people and properties at risk of flooding and promote adaptive flood risk management	0	Secondary benefits could arise where natural infrastructure is enhanced or created to support increased uptake of active travel.
Protect, maintain and improve the ecological status and physical state of the water environment	?✓	
SOIL		
Safeguard and improve soil health, protect soil resource	X✓	Potential for long term negative impacts where infrastructure requirements could

¹⁰ Scottish Government (2021) Cleaner Air for Scotland 2 [online] Available at: <https://www.gov.scot/publications/cleaner-air-scotland-2-towards-better-place-everyone/> (Accessed 15/10/2021)

¹¹ Public Health England (2018) Healthy High Streets [online] Available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/699295/26.01.18_Healthy_High_Streets_Full_Report_Final_version_3.pdf (Accessed 21/11/2021)

and soil functions of all soil types in Scotland		result in compaction leading to loss of soil function. Secondary benefits could arise where natural infrastructure is enhanced or created to support increased uptake of active travel.
Safeguard and improve high value agricultural land and carbon-rich soils	0	
Reduce the extent of contaminated and vacant and derelict land	✓	
CULTURAL HERITAGE AND HISTORIC ENVIRONMENT		
Avoid adverse impacts on the historic environment and its setting	0	The emphasis on placemaking within the overall draft NPF4 and the requirements of the Historic Assets and Places draft policy, should limit any potentially negative impacts. Impacts will be subject to further consideration at plan and project consenting stages
Protect and enhance valued landscapes, historic places and archaeological sites and other culturally and historically important features, landscapes and their settings	0	
LANDSCAPE AND GEODIVERSITY		
Avoid adverse effects on landscapes and geodiversity	?X✓	Long term effects on landscapes will depend on the location of development, however the emphasis on placemaking within the overall draft NPF4 can limit negative impacts. Possible localised impacts will be subject to further consideration at plan and protect consenting stages.
Safeguard and enhance the character and diversity of the Scottish landscape and areas of valuable landscape and geodiversity	?X✓	
MATERIAL ASSETS		
Avoid adversely impacting on material assets	✓✓	Long term positive benefits are expected from the support given to making best use of existing infrastructure, including where this leads to reduced pressure on natural resources. Positive impacts should also arise where consideration of transport infrastructure capacity in the decision making process leads to an integrated transport system that supports multi-mode travel and improved placemaking.
Promote the principles of circular economy	0	
Reduce use and promote sustainable management of natural and built environment resources	✓	
Promote the sustainable design, use and management of new and existing assets/infrastructure to support the development of high-quality places	✓✓	
POPULATION AND HUMAN HEALTH		
Reduce the health gap and inequalities and improve healthy life expectancy	✓✓	Potential for long term significant positive effects to arise where draft policy leads to a reduction in traffic volumes. Road transport in urban areas is a significant contributor to poor air quality, which can be particularly
Promote and enhance/improve access to	✓	

open space, greenspace and the wider countryside		<p>relevant for the more vulnerable members of society including the very young and the elderly or those with existing health conditions, which makes air quality an important health inequalities issue¹². Further benefits may arise where the draft policy supports improvement of national and local routes that encourage increased uptake of active travel leading to increased physical activity.</p> <p>Ensuring the diverse needs of all population groups are recognised, and through increased accessibility to goods and services, especially vital services such as health care, should lead to positive impacts. This could be particularly relevant where a focus is given to reducing barriers for individuals or communities with specific needs.</p>
To protect and improve human health and wellbeing through improving the quality of the living environment of people and communities	✓	
Increase sustainable access to essential services, employment and the natural and historic environment	✓	

¹² Scottish Government (2021) Cleaner Air for Scotland 2 [online] Available at: <https://www.gov.scot/publications/cleaner-air-scotland-2-towards-better-place-everyone/> (Accessed 15/10/2021)

Heat and Cooling

The draft policy recognises the role of our places in helping to achieve zero emissions from heating and cooling our buildings and adapting to changing climates. It also sets out the role of heat networks in contributing to Scotland's net zero ambitions by using and storing heat from low or zero emissions sources, such as surplus or waste heat, heat from large scale heat pumps, particularly in conjunction with geothermal systems or bodies of water or clean hydrogen to provide zero emissions heat to homes. Examples of potential sources of waste heat include energy from waste, data centres, hydrogen production, the waste water system and industrial processes.



BIODIVERSITY, FLORA & FAUNA		
Avoid adverse impacts to designated habitats and species	0	Potential impacts on biodiversity are uncertain and would be managed at plan or project level. Possible negative effects, include disruption of habitats, habitat networks or species Effects on non-protected sites and species are more likely, as designated areas will be protected through recognition of their value and vulnerability.
Avoid adverse impacts to undesignated habitats and species	0	
Protect, maintain and enhance biodiversity	?X	
CLIMATIC FACTORS		
Avoid new Greenhouse Gas (GHG) emissions	✓✓	Significant long term positive effects should arise from support provided for a transition away from more polluting forms of energy for the heating and cooling of buildings, leading to reductions in associated GHG emissions. Increased diversity of technologies within the energy network can also support reduced risk of disruption and increased resilience, including to the impacts of climate change.
Reduce GHG emissions in order to meet Scotland emissions reduction target of net zero by 2045.	✓	
Promote and enable adaptation to climate change	✓	
AIR		
Avoid adverse effects on air quality	✓	Positive long term effects are expected where heat energy is generated from low or zero emissions sources, including through reducing associated atmospheric emissions from more polluting sources of energy. The draft policy notes domestic biomass energy systems should not be supported where networked systems are available. Additionally, where no alternatives are available, is it required that that the impact on local air quality and of smoke on neighbouring properties be considered.
Reduce emissions of key pollutants and improve air quality throughout Scotland	✓	
Reduce levels of nuisance e.g. noise, vibration, dust, odour and light	0	
WATER		

Avoid adverse impacts on the ecological status of water bodies	?X	Overall, no significant effects on water are expected, however consideration may need to be given to longer term impacts on water quality from individual technologies for example, where water is used as a source of heat such as geothermal energy from minewater.
Ensure the sustainable use of water resources	0	
Reduce the number of people and properties at risk of flooding and promote adaptive flood risk management	0	
Protect, maintain and improve the ecological status and physical state of the water environment	0	
SOIL		
Safeguard and improve soil health, protect soil resource and soil functions of all soil types in Scotland	0	Installation of heat network infrastructure may have negative effects on soils. This should be managed at plan or project level.
Safeguard and improve high value agricultural land and carbon-rich soils	0	
Reduce the extent of contaminated and vacant and derelict land	0	
CULTURAL HERITAGE AND HISTORIC ENVIRONMENT		
Avoid adverse impacts on the historic environment and its setting	?	New infrastructure has potential to negatively impacts historic assets and their setting, however the emphasis on placemaking within the overall draft NPF4 and the requirements of the Historic Assets and Places draft policy, should limit where potentially negative impacts could arise.
Protect and enhance valued landscapes, historic places and archaeological sites and other culturally and historically important features, landscapes and their settings	?	
LANDSCAPE AND GEODIVERSITY		
Avoid adverse effects on landscapes and geodiversity	?	There is potential for localised negative impacts associated with new infrastructure. These will be site specific and would be managed through the plan and project consenting stages.
Safeguard and enhance the character and diversity of the Scottish landscape and areas of valuable landscape and geodiversity	?	
MATERIAL ASSETS		
Avoid adversely impacting on material assets	✓	Positive effects on built material assets may arise. Utilising surplus or waste heat from low or zero emissions sources is aligned with circular economy principles.
Promote the principles of circular economy	✓	
Reduce use and promote sustainable management of	✓	

natural and built environment resources		
Promote the sustainable design, use and management of new and existing assets/infrastructure to support the development of high-quality places	✓	
POPULATION AND HUMAN HEALTH		
Reduce the health gap and inequalities and improve healthy life expectancy	✓	Positive effects on population and health are expected to arise.
Promote and enhance/improve access to open space, greenspace and the wider countryside	0	Heat networks have the potential to provide sustainable and affordable forms of heat, which can help address health inequalities. For example, this has the potential to be of greater relevance to those experiencing fuel poverty.
To protect and improve human health and wellbeing through improving the quality of the living environment of people and communities	✓	Support provided for localised and community energy schemes also has the potential for long term benefits from increased resilience within the energy network.
Increase sustainable access to essential services, employment and the natural and historic environment	0	Adaptation measures such as cooling are also likely to become of key importance, for example, due to increased occurrences and risk of extreme heat events.

Blue and green infrastructure, play and sport

The draft policy notes networks of blue and green infrastructure (such as green spaces, sustainable urban drainage systems, urban trees and green roofs and walls) are an integral part of successful places and can offer a wide range of benefits. Their role in supporting lifelong health and wellbeing, climate resilience, flood risk management, temperature regulation in urban areas, reduction of air and noise pollution, biodiversity and nature networks, while also supporting good, green jobs is also noted. The draft policy on play recognises the importance of providing play opportunities in the natural and built environments to support children’s physical, social and cognitive development, and uphold their right to play and relaxation.



BIODIVERSITY, FLORA & FAUNA

Avoid adverse impacts to designated habitats and species	✓	Significant positive effects should arise from the draft policy, particularly where this leads to enhancement of multifunctional green networks which support net zero, nature-positive, and climate-resilient places.
Avoid adverse impacts to undesignated habitats and species	✓	
Protect, maintain and enhance biodiversity	✓✓	

CLIMATIC FACTORS

Avoid new Greenhouse Gas (GHG) emissions	✓✓	Significant positive effects are expected where blue-green infrastructure which supports improved sequestration of carbon and increased resilience to flood risk.
Reduce GHG emissions in order to meet Scotland emissions reduction target of net zero by 2045.	✓	
Promote and enable adaptation to climate change	✓	

AIR

Avoid adverse effects on air quality	✓	Overall positive effects should arise where green infrastructure is utilised, including where this leads to increased uptake of active travel options. Opportunities for benefits to be optimised where focus is given to areas where air pollution is an existing problem, such as AQMAs.
Reduce emissions of key pollutants and improve air quality throughout Scotland	✓	
Reduce levels of nuisance e.g. noise, vibration, dust, odour and light	0	

WATER

Avoid adverse impacts on the ecological status of water bodies	✓✓	Significant positive effects should arise where the draft policies leads to blue-green infrastructure including sustainable urban drainage systems (SUDS) and Natural Flood Management which can reduce the risk of surface water flooding from
Ensure the sustainable use of water resources	0	
Reduce the number of people and properties at risk of flooding and promote adaptive flood risk management	✓✓	

Protect, maintain and improve the ecological status and physical state of the water environment	✓✓	development ¹³ . SUDs can also contribute to water quality objectives by reducing the impacts of diffuse pollution ¹⁴ .
SOIL		
Safeguard and improve soil health, protect soil resource and soil functions of all soil types in Scotland	?✓	Development of new infrastructure may lead to soil sealing, however the overall positive effects on soils may arise through improved soil condition associated with blue-green infrastructure. Benefits may be maximised where areas of unused or underused land are utilised.
Safeguard and improve high value agricultural land and carbon-rich soils	0	
Reduce the extent of contaminated and vacant and derelict land	✓	
CULTURAL HERITAGE AND HISTORIC ENVIRONMENT		
Avoid adverse impacts on the historic environment and its setting	?✓	Mixed effects from this draft policy may arise. Development of blue-green infrastructure may negatively impact on known and unknown cultural heritage and historic environment features through ground disturbance. However, the use of blue-green infrastructure may also benefit the setting of historic assets and places.
Protect and enhance valued landscapes, historic places and archaeological sites and other culturally and historically important features, landscapes and their settings	?✓	
LANDSCAPE AND GEODIVERSITY		
Avoid adverse effects on landscapes and geodiversity	?✓	The overall effects are uncertain and could be site specific. However, blue-green infrastructure can be used to improve landscapes, particularly in urban areas where vacant and derelict land exists.
Safeguard and enhance the character and diversity of the Scottish landscape and areas of valuable landscape and geodiversity	?✓	
MATERIAL ASSETS		
Avoid adversely impacting on material assets	✓✓	The emphasis within the draft policy on facilitating this type of infrastructure is expected to result in positive effects on natural material assets. Additionally, the “green” and “blue” features of the natural and built environment are widely
Promote the principles of circular economy	0	
Reduce use and promote sustainable management of natural and built environment resources	✓	

¹³ Environment Agency (2021) Valuing the benefits of blue-green infrastructure. [online] Available at: <https://www.gov.uk/flood-and-coastal-erosion-risk-management-research-reports/valuing-the-benefits-of-blue-green-infrastructure> (accessed 18/10/2021)

¹⁴ SEPA (2021) Diffuse pollution in the urban environment (SUDS) [online] Available at: <https://www.sepa.org.uk/regulations/water/diffuse-pollution/diffuse-pollution-in-the-urban-environment/> (accessed 18/10/2021)

Promote the sustainable design, use and management of new and existing assets/infrastructure to support the development of high-quality places	✓✓	recognised and valued as essential components of successful places ¹⁵ .
POPULATION AND HUMAN HEALTH		
Reduce the health gap and inequalities and improve healthy life expectancy	✓✓	Significant positive effects are expected to arise. Green infrastructure, including green networks, can encourage active travel, improve accessibility and connectivity, and can lead to wider benefits for health through increased physical activity and improved air quality. They can provide spaces to take part in sport, physical activity, play and other activities such as community growing, with the potential to improve mental health and wellbeing. Blue-green infrastructure can also provide spaces for social interaction and social cohesion through the creation of attractive open spaces.
Promote and enhance/improve access to open space, greenspace and the wider countryside	✓✓	
To protect and improve human health and wellbeing through improving the quality of the living environment of people and communities	✓✓	
Increase sustainable access to essential services, employment and the natural and historic environment	✓	

¹⁵ Nature Scotland (2019) the Place Principle – our contribution to place-based working [online] Available at: <https://www.nature.scot/place-principle-our-contribution-place-based-working> (accessed 25/08/2021)

Sustainable flood risk and water management

The draft policy aims to ensure places are resilient to future flood risk and to make efficient and sustainable use of water resources. It is also noted that the planning system should strengthen future resilience to flood risk by reducing the vulnerability of existing and future development to flooding, including encouraging the use of natural flood risk management to provide wider benefits for people and nature.



BIODIVERSITY, FLORA & FAUNA

Avoid adverse impacts to designated habitats and species	?	Effects on biodiversity may be mixed. There is potential for negative effects to arise where actions may disrupt natural processes and where built engineered structures are implemented. However, overall, natural flood risk management measures and blue-green infrastructure can provide opportunities to enhance biodiversity through the creation and/or restoration of habitats, as also supported by wider draft policies, and if undertaken at catchment scale.
Avoid adverse impacts to undesignated habitats and species	?X✓	
Protect, maintain and enhance biodiversity	✓	

CLIMATIC FACTORS

Avoid new Greenhouse Gas (GHG) emissions	0	Significant positive impacts should arise through improved resilience and adaptation to flood risk and by reducing the vulnerability of existing and future development to flooding.
Reduce GHG emissions in order to meet Scotland emissions reduction target of net zero by 2045.	0	
Promote and enable adaptation to climate change	✓✓	

AIR

Avoid adverse effects on air quality	0	No significant effects are expected. Wider secondary benefits could arise through the role of natural infrastructure in improving air quality ¹⁶ though the scale of this is uncertain.
Reduce emissions of key pollutants and improve air quality throughout Scotland	?	
Reduce levels of nuisance e.g. noise, vibration, dust, odour and light	0	

WATER

Avoid adverse impacts on the ecological status of water bodies	?✓	Significant long term positive effects are expected as this draft policy aims to reduce exposure to the impact of floods and
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¹⁶ Greater London Authority (2019) Using green infrastructure to protect people from air pollution [online] Available at: https://www.london.gov.uk/sites/default/files/green_infrastructure_air_pollution_may_19.pdf (accessed 08/11/2021)

Ensure the sustainable use of water resources	✓	supports the sustainable management of the water environment. There is an opportunity to support River Basin Management Plan objectives to improve water quality status. Where built engineered structures are implemented, local level negative impacts could arise. These should be managed at plan and project level.
Reduce the number of people and properties at risk of flooding and promote adaptive flood risk management	✓✓	
Protect, maintain and improve the ecological status and physical state of the water environment	?✓	
SOIL		
Safeguard and improve soil health, protect soil resource and soil functions of all soil types in Scotland	?✓	No significant effects are expected. Potential benefits may arise if high value agricultural and carbon-rich soils are protected from future flooding. Where natural solutions to flood risk management are implemented, there is potential for secondary long term positive effects from habitat creation.
Safeguard and improve high value agricultural land and carbon-rich soils	?✓	
Reduce the extent of contaminated and vacant and derelict land	?	
CULTURAL HERITAGE AND HISTORIC ENVIRONMENT		
Avoid adverse impacts on the historic environment and its setting	✓	Positive effects are expected to arise where this leads to increased protection and reduced flood risk for cultural heritage and historic environment assets. Potential impacts on the setting of cultural heritage assets should be considered in the design of flood protection measures to avoid negative impacts and identify opportunities for enhancement and mitigation.
Protect and enhance valued landscapes, historic places and archaeological sites and other culturally and historically important features, landscapes and their settings	?✓	
LANDSCAPE AND GEODIVERSITY		
Avoid adverse effects on landscapes and geodiversity	?	No significant effects on landscape and geodiversity are expected. The use of blue and green infrastructure to support natural flood risk management can create opportunities for the enhancement of local landscapes. Engineered flood management or defence measures have potential to negatively impact some landscapes, depending on the type, design and location. Potential negative impacts would however be localised, and managed at plan and project consenting stages.
Safeguard and enhance the character and diversity of the Scottish landscape and areas of valuable landscape and geodiversity	0	
MATERIAL ASSETS		
Avoid adversely impacting on material assets	✓✓	Significant long term positive effects are expected where this leads to improved

Promote the principles of circular economy	0	resilience, reducing the vulnerability of existing and future development to flood risk. Additional benefits could also arise from the potential to reduce pressure on existing water treatment assets.
Reduce use and promote sustainable management of natural and built environment resources	✓✓	
Promote the sustainable design, use and management of new and existing assets/infrastructure to support the development of high-quality places	✓✓	
POPULATION AND HUMAN HEALTH		
Reduce the health gap and inequalities and improve healthy life expectancy	✓	Significant benefits are expected through strengthened resilience to the impacts of climate change and reduced flood impacts. Where natural solutions to flood risk management are implemented indirect positive impacts can arise from habitat creation, including wider societal benefits such as access to greenspace and an improved sense of place. The impacts of climate change are likely to be disproportionately severe in areas of high deprivation because of the reduced ability of individuals and communities in these areas to prepare, respond and recover ¹⁷ .
Promote and enhance/improve access to open space, greenspace and the wider countryside	✓	
To protect and improve human health and wellbeing through improving the quality of the living environment of people and communities	✓✓	
Increase sustainable access to essential services, employment and the natural and historic environment	0	

¹⁷ Scottish Government (2019) Climate Ready Scotland: climate change adaptation programme 2019-2024. [online] Available at <https://www.gov.scot/publications/climate-ready-scotland-second-scottish-climate-change-adaptation-programme-2019-2024/pages/9/> (accessed 21/11/2021)

Lifelong health, wellbeing and safety

The draft policy notes planning should support development that reduces health inequalities and supports long and healthy life expectancy.



BIODIVERSITY, FLORA & FAUNA		
Avoid adverse impacts to designated habitats and species	0	No significant effects on biodiversity are expected.
Avoid adverse impacts to undesignated habitats and species	0	
Protect, maintain and enhance biodiversity	0	
CLIMATIC FACTORS		
Avoid new Greenhouse Gas (GHG) emissions	0	No significant effects are expected.
Reduce GHG emissions in order to meet Scotland emissions reduction target of net zero by 2045.	0	
Promote and enable adaptation to climate change	0	
AIR		
Avoid adverse effects on air quality	✓✓	Significant positive effects should arise as the draft policy notes developments which would have a significant adverse effect on air quality or result in unacceptable levels of noise should not be supported.
Reduce emissions of key pollutants and improve air quality throughout Scotland	✓✓	
Reduce levels of nuisance e.g. noise, vibration, dust, odour and light	✓✓	
WATER		
Avoid adverse impacts on the ecological status of water bodies	0	No significant effects on the water environment are expected.
Ensure the sustainable use of water resources	0	
Reduce the number of people and properties at risk of flooding and promote adaptive flood risk management	0	
Protect, maintain and improve the ecological status and physical state of the water environment	0	
SOIL		
Safeguard and improve soil health, protect soil resource and soil functions of all soil types in Scotland	0	No significant effects are expected.
Safeguard and improve high value agricultural land and carbon-rich soils	0	

Reduce the extent of contaminated and vacant and derelict land	0	
CULTURAL HERITAGE AND HISTORIC ENVIRONMENT		
Avoid adverse impacts on the historic environment and its setting	0	No significant effects are expected.
Protect and enhance valued landscapes, historic places and archaeological sites and other culturally and historically important features, landscapes and their settings	0	
LANDSCAPE AND GEODIVERSITY		
Avoid adverse effects on landscapes and geodiversity	0	No significant effects are expected.
Safeguard and enhance the character and diversity of the Scottish landscape and areas of valuable landscape and geodiversity	0	
MATERIAL ASSETS		
Avoid adversely impacting on material assets	0	No significant effects are expected.
Promote the principles of circular economy	0	
Reduce use and promote sustainable management of natural and built environment resources	0	
Promote the sustainable design, use and management of new and existing assets/infrastructure to support the development of high-quality places	0	
POPULATION AND HUMAN HEALTH		
Reduce the health gap and inequalities and improve healthy life expectancy	✓✓	The emphasis of the draft policy on creating vibrant, healthier and safer places is expected to have significant positive effects on population and human health. Benefits could be maximised were efforts to tackle health inequalities are targeted to areas or communities experiencing the most disadvantages.
Promote and enhance/improve access to open space, greenspace and the wider countryside	0	
To protect and improve human health and wellbeing through improving the quality of the living environment of people and communities	✓✓	
Increase sustainable access to essential services, employment and the natural and historic environment	0	

Alternatives

- **20 minute neighbourhoods**

C1.4.1 The pandemic highlighted the inequalities that can arise when amenities in a neighbourhood are insufficient. The '20 Minute Neighbourhood' is not a new strategy in urban design terms, but is the terminology that has become most recognised globally, gaining considerable momentum and support as a means of living locally with holistic benefits, for people, place and planet. A 'do nothing' option was not considered reasonable given the scale of the challenges we are presented with in recovering from the pandemic, tackling climate change, and tackling inequality.

C1.4.2 20 minutes (800m) is considered to be the optimum time/distance people are comfortable walking, wheeling or cycling to access services and facilities, taking account of the different abilities within communities. Whilst some might consider the time/ distance could be more tightly or more broadly drawn, research undertaken by Climate Xchange looked at applying the concept across Scotland, in all settlement types and scales. The 20 minute neighbourhood was seen as a flexible model which is the most applicable when taking into account the varied geography in Scotland. As a concept, it draws together the main objectives of NPF4 and is a means of working to the Place Principle to achieve climate resilience, improved health and equality by focusing on quality of place.

- **Quality Homes**

C1.4.3 New policies are introduced to set out how we will support the delivery of quality homes. The policy has been informed by extensive debate on the current (SPP2014) policy on planning for housing and takes into account new requirements introduced into the Town and Country Planning (Scotland) Act 1997 by the Planning (Scotland) Act 2019, including on the status of NPF; and, new provisions on the time frame for the review of local development plans. The Act also introduced new requirements on meeting the housing needs of older people and disabled people. In light of this new legislative context and issues resulting from implementation of the current policy, the Scottish Government does not consider that retention of existing SPP policies on housing is a 'reasonable alternative'.

- **Housing Land Requirements**

C1.4.4 The Town and Country Planning (Scotland) Act 1997, as amended by the Planning (Scotland) Act 2019, introduces the requirement for NPF to contain 'targets for the use of land in different areas of Scotland for housing'. The draft NPF4 meets this requirement through proposing Minimum All-Tenure Housing Land Requirements (MATHLR) for each planning authority in Scotland. This introduces a long-term, strategic and public interest approach that consistently and transparently establishes the housing land requirement earlier in the plan preparation process. Were a different / alternative methodology applied in determining MATHLR, this could lead to either higher or lower requirements and consequently to either more or less housing land being allocated, the precise location and scale of which is unknown. It follows that the likely significant effects identified above, both positive and negative, are likely to be either magnified or reduced. Additionally, were a

different / alternative methodology to lead to lower housing land requirements, this may give rise to more speculative planning applications, and could create greater uncertainty for infrastructure planning and for communities.

- **Play provision; Lifelong health and wellbeing**

C1.4.5 New policy is also introduced on **play provision**, which seek to protect children's outdoor play provision and design-in new opportunities for play in the built environment. There is also new policy on **lifelong health and wellbeing**, which aims to create healthier places and requires a Health Impact Assessment of any proposals considered likely to generate significant health effects. It follows that under a '**do nothing**' option these new policies would not be introduced, and the likely benefits, including for population and human health, may not be fully realised.

C1.5 Productive Places

Land and Premises for Business and Employment

The draft policy aims to support a green economic recovery from the COVID-19 pandemic, supporting good, green jobs, businesses and industries for the future. It notes ambitions to build a wellbeing economy that maximises economic, social and environmental wellbeing. The role of planning in supporting business, industry and innovation is highlighted, with emphasis on growth that is sustainable and inclusive and support the health and wellbeing of communities and environment.



BIODIVERSITY, FLORA & FAUNA		
Avoid adverse impacts to designated habitats and species	?X	Potential for negative effects where increased levels of land allocation arise. However this can be minimised through consideration of wider national policies, including those related to biodiversity enhancement and making best use of existing assets where possible. Effects on non-protected sites and species are more likely, as designated areas will be protected through recognition of their value and vulnerability.
Avoid adverse impacts to undesignated habitats and species	?X	
Protect, maintain and enhance biodiversity	?X	
CLIMATIC FACTORS		
Avoid new Greenhouse Gas (GHG) emissions	✓	Indirect positive effects are expected from support provided for the identification of sustainable locations for employment land, infrastructure and investment, and promoting alternative ways of working that reduce travel.
Reduce GHG emissions in order to meet Scotland emissions reduction target of net zero by 2045.	✓	
Promote and enable adaptation to climate change	0	
AIR		
Avoid adverse effects on air quality	0	There is potential for negative localised impacts on air quality and noise from operation activities. The draft policy notes proposals will be supported where environmental impacts have been assessed and considered acceptable. Additionally, wider draft policies seek to reduce travel requirements, including taking an infrastructure first approach.
Reduce emissions of key pollutants and improve air quality throughout Scotland	0	
Reduce levels of nuisance e.g. noise, vibration, dust, odour and light	0	
WATER		
Avoid adverse impacts on the ecological status of water bodies	0	Generally neutral effects on the water environment are expected as a result of the emphasis on sustainable locations and placemaking, in
Ensure the sustainable use of water resources	0	

Reduce the number of people and properties at risk of flooding and promote adaptive flood risk management	0	combination with wider draft policies relating to improved consideration of flooding risks and adaption.
Protect, maintain and improve the ecological status and physical state of the water environment	0	
SOIL		
Safeguard and improve soil health, protect soil resource and soil functions of all soil types in Scotland	0	Development in general has the potential to impact on soils through soil sealing. The extent of potential for negative localised impacts will depend on the nature and location of sites identified in the development plans. The draft policy notes proposals will be supported where environmental impacts have been assessed and considered acceptable.
Safeguard and improve high value agricultural land and carbon-rich soils	0	
Reduce the extent of contaminated and vacant and derelict land	0	
CULTURAL HERITAGE AND HISTORIC ENVIRONMENT		
Avoid adverse impacts on the historic environment and its setting	0	New developments have potential to negatively impact cultural heritage and historic environment assets, however the draft policy notes development proposals must take into account historic environment assets and their settings.
Protect and enhance valued landscapes, historic places and archaeological sites and other culturally and historically important features, landscapes and their settings	0	
LANDSCAPE AND GEODIVERSITY		
Avoid adverse effects on landscapes and geodiversity	0	Effects on landscapes are uncertain. Impacts at the local scale will depend on factors including the nature and scale of the development. Possible adverse impacts should be reduced by wider draft policy which supports an emphasis on placemaking, and should be managed at plan and project stages.
Safeguard and enhance the character and diversity of the Scottish landscape and areas of valuable landscape and geodiversity	0	
MATERIAL ASSETS		
Avoid adversely impacting on material assets	✓	Positive effects expect from a focus on plans meeting requirements for employment land and infrastructure to support sustainable growth. Construction of new developments will result in resource consumption. There is an opportunity to make the best use of existing assets and ensure developments are energy and resource efficient, in line with wider draft policy.
Promote the principles of circular economy	0	
Reduce use and promote sustainable management of natural and built environment resources	0	
Promote the sustainable design, use and management of new and existing assets/infrastructure to	✓	

support the development of high-quality places		
POPULATION AND HUMAN HEALTH		
Reduce the health gap and inequalities and improve healthy life expectancy	✓	Positive impacts should arise through aims to stimulate a wellbeing economy through meeting requirements for employment land, infrastructure and investment. Potential benefits should be maximised where development proposals take into account population health and wellbeing, including inequalities.
Promote and enhance/improve access to open space, greenspace and the wider countryside	0	
To protect and improve human health and wellbeing through improving the quality of the living environment of people and communities	✓	
Increase sustainable access to essential services, employment and the natural and historic environment	✓✓	

Sustainable Tourism

The draft policy notes that tourism can bring a wealth of economic, social and cultural benefits to our communities, cities and regions, perpetuating growth and stimulating job creation. Challenges facing this sector, including the recovery from COVID-19, are acknowledged. The draft policy notes the role of the planning system in supporting the recovery of the sector, ensuring that communities have a share in tourism benefits and that tourism uses are sustainable and safeguard our environmental, cultural and community assets.



BIODIVERSITY, FLORA & FAUNA		
Avoid adverse impacts to designated habitats and species	?X	Potential for largely indirect negative impacts arising where draft policy leads to new infrastructure requirements and increased visitor numbers, which can place pressure on habitats. Effects are uncertain at this stage and are likely to be influenced by the scale and nature of development, and the sensitivity of the receiving environment. Impacts would be managed at plan and project consenting stages.
Avoid adverse impacts to undesignated habitats and species	?X	
Protect, maintain and enhance biodiversity	?X	
CLIMATIC FACTORS		
Avoid new Greenhouse Gas (GHG) emissions	0	No significant effects on climatic factors are expected.
Reduce GHG emissions in order to meet Scotland emissions reduction target of net zero by 2045.	0	Potential negative effects may arise from transportation and construction of new developments. However, the overall focus on climate conscious places and wider draft policies, including sustainable transport, aim to reduce emissions.
Promote and enable adaptation to climate change	0	
AIR		
Avoid adverse effects on air quality	0	No significant effects are expected. Potential localised effects may arise from transportation where new tourism developments are considered to support sustainable growth of the tourism sector. However, wider draft policies including those supporting sustainable transport, aim to encourage a modal shift to more sustainable modes of transport.
Reduce emissions of key pollutants and improve air quality throughout Scotland	0	
Reduce levels of nuisance e.g. noise, vibration, dust, odour and light	0	
WATER		
Avoid adverse impacts on the ecological status of water bodies	0	No significant effects are expected. Potential localised impacts to be

Ensure the sustainable use of water resources	0	managed at plan and project stages where necessary.
Reduce the number of people and properties at risk of flooding and promote adaptive flood risk management	0	
Protect, maintain and improve the ecological status and physical state of the water environment	0	
SOIL		
Safeguard and improve soil health, protect soil resource and soil functions of all soil types in Scotland	0	New developments have potential to lead to localised impacts on soils, for example, through soil sealing. Impacts will be managed at plan and project consenting stages where necessary.
Safeguard and improve high value agricultural land and carbon-rich soils	0	
Reduce the extent of contaminated and vacant and derelict land	0	
CULTURAL HERITAGE AND HISTORIC ENVIRONMENT		
Avoid adverse impacts on the historic environment and its setting	?	Increased visitor numbers may create pressures on cultural heritage assets, and new or extended tourist facilities may affect the wider setting of historic environment assets and sites. Possible local impacts will be managed at plan and project consenting stages. Additionally, wider draft policies, such as Historic Assets and Places, set out aims to protect and enhance assets.
Protect and enhance valued landscapes, historic places and archaeological sites and other culturally and historically important features, landscapes and their settings	?	
LANDSCAPE AND GEODIVERSITY		
Avoid adverse effects on landscapes and geodiversity	?	Potential to impact landscapes, however, the draft policy notes proposals should be compatible in terms of scale and nature of the activity with the surrounding areas.
Safeguard and enhance the character and diversity of the Scottish landscape and areas of valuable landscape and geodiversity	?	
MATERIAL ASSETS		
Avoid adversely impacting on material assets	✓	Positive impacts on built material assets may arise due to focus on plans supporting the sustainable growth of the tourism sector.
Promote the principles of circular economy	0	
Reduce use and promote sustainable management of natural and built environment resources	0	
Promote the sustainable design, use and management of new and existing assets/infrastructure to	0	

support the development of high-quality places		
POPULATION AND HUMAN HEALTH		
Reduce the health gap and inequalities and improve healthy life expectancy	0	There is the potential to create positive effects on employment due to the emphasis on supporting the sustainable growth of the tourism sectors. Benefits should also arise where the draft policy sets out that consideration is given to the capacity of existing facilities and services in areas where existing tourism provision is having adverse impacts, to ensure proposals are only supported if satisfactory measures are proposed to alleviate existing pressures and prevent further adverse impacts. This has the potential to lead to benefits through ensuring the health and well-being of communities are maintained and potentially improved.
Promote and enhance/improve access to open space, greenspace and the wider countryside	0	
To protect and improve human health and wellbeing through improving the quality of the living environment of people and communities	?✓	
Increase sustainable access to essential services, employment and the natural and historic environment	✓✓	

Culture and Creativity

The draft policy recognises the important of culture and the creative industries to Scotland's wellbeing and cultural, social, economic and environmental prosperity. It also notes this can be an important catalyst for regeneration and town centre vibrancy that strengthens the sense of place.

The draft policy notes the planning system should support the expansion of Scotland's creative industries and ensure that there are suitable opportunities available for local communities to participate in artistic and cultural activities.



BIODIVERSITY, FLORA & FAUNA		
Avoid adverse impacts to designated habitats and species	0	No significant effects are expected.
Avoid adverse impacts to undesignated habitats and species	0	
Protect, maintain and enhance biodiversity	0	
CLIMATIC FACTORS		
Avoid new Greenhouse Gas (GHG) emissions	0	No significant effects are expected.
Reduce GHG emissions in order to meet Scotland emissions reduction target of net zero by 2045.	0	
Promote and enable adaptation to climate change	0	
AIR		
Avoid adverse effects on air quality	0	Potential for positive effects where the Agent of Change principle ensures noise levels for new development in the vicinity of existing arts venues are managed.
Reduce emissions of key pollutants and improve air quality throughout Scotland	0	
Reduce levels of nuisance e.g. noise, vibration, dust, odour and light	✓	
WATER		
Avoid adverse impacts on the ecological status of water bodies	0	No significant effects are expected.
Ensure the sustainable use of water resources	0	
Reduce the number of people and properties at risk of flooding and promote adaptive flood risk management	0	
Protect, maintain and improve the ecological status and physical state of the water environment	0	
SOIL		
Safeguard and improve soil health, protect soil resource and soil functions of all soil types in Scotland	0	No significant effects are expected.
Safeguard and improve high value agricultural land and carbon-rich soils	0	

Reduce the extent of contaminated and vacant and derelict land	0	
CULTURAL HERITAGE AND HISTORIC ENVIRONMENT		
Avoid adverse impacts on the historic environment and its setting	?√	Positive impacts should arise where management decisions affecting places of cultural significance focus on avoiding or minimising adverse impacts ¹⁸ to support the draft policy. Particularly where consideration is given to the role these assets can play in placemaking and where the draft policy leads to increased awareness and understanding of cultural heritage and historic environment assets.
Protect and enhance valued landscapes, historic places and archaeological sites and other culturally and historically important features, landscapes and their settings	?√	
LANDSCAPE AND GEODIVERSITY		
Avoid adverse effects on landscapes and geodiversity	0	No significant effects are expected.
Safeguard and enhance the character and diversity of the Scottish landscape and areas of valuable landscape and geodiversity	0	
MATERIAL ASSETS		
Avoid adversely impacting on material assets	?√	Potential for benefits to arise from draft policy aims to support the protection of cultural venues. Additional benefits should arise where greater consideration is given to the role cultural assets can play in providing a sense of place and aligning with emphasis on placemaking within the overall draft NPF4, including the requirements of the Historic Assets and Places draft policy.
Promote the principles of circular economy	0	
Reduce use and promote sustainable management of natural and built environment resources	?√	
Promote the sustainable design, use and management of new and existing assets/infrastructure to support the development of high-quality places	?√	
POPULATION AND HUMAN HEALTH		
Reduce the health gap and inequalities and improve healthy life expectancy	0	Significant positive effects are expected. Attracting investment

¹⁸ Historic Environment Scotland (2019) Historic Environment Policy for Scotland [online] Available at: <https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=1bcfa7b1-28fb-4d4b-b1e6-aa2500f942e7> (accessed 28/10/2021)

Promote and enhance/improve access to open space, greenspace and the wider countryside	0	into the cultural sector can help achieve outcomes related to health (physical and mental), the local economy (jobs and training) or quality of life ¹⁹ . Cultural activity can also drive local economy growth and benefit community cohesion ²⁰ . Further, the combined physical, social and cultural environment has an important influence on health and health inequalities ²¹ .
To protect and improve human health and wellbeing through improving the quality of the living environment of people and communities	✓✓	
Increase sustainable access to essential services, employment and the natural and historic environment	✓✓	

¹⁹ Local Government Association (2017) People, culture, place – the role of culture in placemaking [online] Available at: <https://static.a-n.co.uk/wp-content/uploads/2017/03/People-culture-place-the-role-of-culture-in-placemaking-WEB.pdf> (accessed 28/10/2021)

²⁰ Local Government Association (2017) People, culture, place – the role of culture in placemaking [online] Available at: <https://static.a-n.co.uk/wp-content/uploads/2017/03/People-culture-place-the-role-of-culture-in-placemaking-WEB.pdf> (accessed 28/10/2021)

²¹ NHS Scotland (2016) Place and communities [online] Available at: <http://www.healthscotland.scot/media/1088/27414-place-and-communities-06-16.pdf> (accessed 28/10/2021)

Green Energy

The draft policy notes that the planning system should support all forms of renewable energy development and energy storage, together with new and replacement transmission and distribution infrastructure. It should also support new and emerging technology including hydrogen and carbon capture utilisation and storage (CCUS).



BIODIVERSITY, FLORA & FAUNA		
Avoid adverse impacts to designated habitats and species	?X	Potential negative effects could arise, including loss of habitat and disruption to habitat networks from the continued expansion of low-carbon and net zero technologies. Effects on non-protected sites and species are more likely, as designated areas will be protected through recognition of their value and vulnerability. The draft policy sets out that potential effects on the natural heritage, including birds, must be taken into account. Potential impacts would be managed at plan and project consenting stages. Opportunities to enhance biodiversity should be identified at these stages, including through improved management of, and /or the creation of new habitats.
Avoid adverse impacts to undesignated habitats and species	?X	
Protect, maintain and enhance biodiversity	?X	
CLIMATIC FACTORS		
Avoid new Greenhouse Gas (GHG) emissions	✓✓	The draft policy seeks to aid the decarbonisation of the energy sector through support for renewable and low carbon technologies with abatement. Potential for long term significant benefits to arise through support for increased diversification of the energy mix and energy storage leading to greater system flexibility and efficiencies, helping to manage fluctuations in energy demand and support resilience from disruption, including from the impacts of climate change. However, consideration will need to be given to where development could give rise to releases of carbon through disturbance to peat and carbon rich soils. This will require appropriate
Reduce GHG emissions in order to meet Scotland emissions reduction target of net zero by 2045.	✓✓	
Promote and enable adaptation to climate change	✓	

		siting to avoid/reduce negative effects. Support for repowering existing sites can also help to reduce/minimise possible impacts.
AIR		
Avoid adverse effects on air quality	✓✓	Positive effects are expected where the draft policy supports a transition from non-renewable energy generation, which should also be beneficial for human health where this leads to a reduction in air pollutants. Scale of potential benefits will depend on factors such as level of uptake and type of technologies, but could be significant. Potential for localised implications to arise from operational activities depending on type of technology, such as, shadow flicker and low-frequency noise, potentially impacting populations in close proximity. Factors such as location and scale of uptake will influence potential effects. Design adjustments and planning conditions can mitigate potential impacts, for example through the consideration of matters such as hours of operation and noise attenuation.
Reduce emissions of key pollutants and improve air quality throughout Scotland	✓✓	
Reduce levels of nuisance e.g. noise, vibration, dust, odour and light	0	
WATER		
Avoid adverse impacts on the ecological status of water bodies	?X	Renewable energy developments including hydro, offshore renewable have potential to impact the water environment. Technologies such as hydrogen and CCUS could also lead to implications, for example disturbance of the seabed and there is potential for accidental CO2 leaks. Hydrogen production is also reliant on water supply ²² . The draft policy sets a requirement for consideration to be given to effects on hydrology, the water environment and flood risk. Impacts should be also be managed at plan and project stages.
Ensure the sustainable use of water resources	?X	
Reduce the number of people and properties at risk of flooding and promote adaptive flood risk management	0	
Protect, maintain and improve the ecological status and physical state of the water environment	?X	

²² Scottish Government (2021) SEA of Draft Hydrogen Action Plan for Scotland scoping report [online] Available at: <https://www.gov.scot/policies/environmental-assessment/strategic-environmental-assessment-sea/> (accessed 25/08/2021)

SOIL		
Safeguard and improve soil health, protect soil resource and soil functions of all soil types in Scotland	?X	Potential for negative effects to arise where developments disturb soils and their function. Impacts are likely to vary based on the type of development and the location, as well as the quality of soil, its condition and properties. Where peatland /carbon rich soils are present there is potential for negative impacts associated with disturbance, degradation, erosion or draining of functional peatland. The draft policy sets out a requirement that consideration must be given to potential impacts on carbon rich soils. Opportunities arise at individual project level through careful siting and design to minimise adverse effects and for restoration measures to be applied in alignment with wider draft policy. Depending on the technology, operational impacts could also arise, for example, through potential CO2 leakage from reservoirs and pipelines ²³ .
Safeguard and improve high value agricultural land and carbon-rich soils	?X	
Reduce the extent of contaminated and vacant and derelict land	0	
CULTURAL HERITAGE AND HISTORIC ENVIRONMENT		
Avoid adverse impacts on the historic environment and its setting	?X	Potential for negative effects arising from development of new or improved infrastructure. The draft policy sets out that the potential impacts on historic environment assets, including on setting, must be taken into account. Additionally, the emphasis on placemaking within the overall draft NPF4, including the requirements of the Historic Assets and Places draft policy, should limit any potentially negative impacts. Impacts will be managed at plan and project consenting stages.
Protect and enhance valued landscapes, historic places and archaeological sites and other culturally and historically important features, landscapes and their settings	?X	
LANDSCAPE AND GEODIVERSITY		
Avoid adverse effects on landscapes and geodiversity	X	Long term negative impacts could arise from siting of infrastructure in

²³ Nature Communications (2018) Estimating geological CO2 storage security to deliver on climate mitigation (online) Available at: <https://www.nature.com/articles/s41467-018-04423-1> (accessed 05/11/2021)

Safeguard and enhance the character and diversity of the Scottish landscape and areas of valuable landscape and geodiversity	X	<p>landscapes, particularly where new infrastructure is required or the landscape is sensitive to visual impacts. Careful attention to landscape designation criteria and other sensitivity factors should help inform design and mitigation, to enable possible negative impacts to be minimised.</p> <p>Significance of impacts will depend on a number of factors, including location, scale of development, and area characteristics. For example, this could include the extent to which development is taken forward within the context of existing developed and industrial landscapes. In some instances, existing infrastructure may be reused.</p> <p>The draft policy sets out that the potential landscape and visual impacts, including possible impacts on wild land, must be taken into account. The construction of the new and refurbishment of existing pipelines, and near shore geological storage facilities where required, also has the potential to impact on the seabed floor and activities such as increased anchoring of vessels could lead to negative impacts on the seabed, including long term damage.</p>
MATERIAL ASSETS		
Avoid adversely impacting on material assets	✓✓	<p>Significant positive effects are likely to arise where this leads to promotion of green energy technologies and greater diversification of technologies with the energy network, including where this leads to improved flexibility and security of supply.</p> <p>Positive impacts could also arise where opportunities are sought to support the re-use of infrastructure and extend lifetime operations, for example, through the repowering of existing wind farms, aligning with wider policy ambitions.</p>
Promote the principles of circular economy	✓	
Reduce use and promote sustainable management of natural and built environment resources	✓	
Promote the sustainable design, use and management of new and existing assets/infrastructure to support the development of high-quality places	0	
POPULATION AND HUMAN HEALTH		

Reduce the health gap and inequalities and improve healthy life expectancy	✓	Overall positive effects should arise where the promotion of green energy supports a transition to net zero, with associated benefits for air quality. The significance of benefits will be influenced by factors such as scale of uptake, displacement of more polluting forms of energy generation and the individual technologies. For example, there is on-going debate on the association between health outcomes and those living and working in close proximity to wind turbine developments ²⁴ . Benefits can arise where greater diversity of technologies and energy storage leads to reduced risk of disruption, including from the impacts of climate change. For example, greater uptake of small scale local and community energy generation could be of particular relevance in rural, remote and fragile locations where there can be increased risk of disruption from extreme weather events.
Promote and enhance/improve access to open space, greenspace and the wider countryside	0	
To protect and improve human health and wellbeing through improving the quality of the living environment of people and communities	?✓	
Increase sustainable access to essential services, employment and the natural and historic environment	✓	

²⁴ Public Health Scotland (2021) National Planning Framework 4: Briefing on health and proposed National Developments [online] Available at: <https://www.publichealthscotland.scot/publications/national-planning-framework-4-briefing-on-health-and-proposed-national-developments/> (accessed 4/11/2021)

Zero Waste

The draft policy notes that the circular economy represents a significant economic and environmental opportunity to manage waste and resources in a way that contributes to Scotland's net zero ambitions and green recovery.

The draft policy supports development which reflects the waste hierarchy, prioritising the reduction and re-use of materials, and facilitates the delivery of new infrastructure required to achieve this.



BIODIVERSITY, FLORA & FAUNA		
Avoid adverse impacts to designated habitats and species	0	Significant long term benefits should arise where greater efficiencies in resource use leads to reduced pressure on natural resources.
Avoid adverse impacts to undesignated habitats and species	0	
Protect, maintain and enhance biodiversity	✓✓	
CLIMATIC FACTORS		
Avoid new Greenhouse Gas (GHG) emissions	✓✓	Significant positive effects are expected. The draft policy emphasises the application of the waste hierarchy to prioritise the reduction and re-use of materials. This should lead to benefits through emissions savings, for example from manufacturing processes, the extraction of materials and those that arise from the disposal of waste to landfill. The draft policy also supports proposals for the capture, and distribution or use of gasses from landfill sites or waste water treatment plants.
Reduce GHG emissions in order to meet Scotland emissions reduction target of net zero by 2045.	✓	
Promote and enable adaptation to climate change	0	
AIR		
Avoid adverse effects on air quality	? X ✓	Overall benefits should arise long term through potential reductions in air pollutants associated with manufacturing processes and the landfilling of waste. Operational activities undertaken by some types of waste infrastructure may generate emissions to air, odour, dust or noise, and are subject to management
Reduce emissions of key pollutants and improve air quality throughout Scotland	? X ✓	
Reduce levels of nuisance e.g. noise, vibration, dust, odour and light	?	

		through existing regulatory processes. Significant effects on AQMAs are not expected from this type of development
WATER		
Avoid adverse impacts on the ecological status of water bodies	?X	Secondary positive effects may be achieved, including through the emphasis on reducing volumes of waste sent to landfill, thereby decreasing risks to the water environment. Additionally, reduced pressure on natural resources can also lead to secondary benefits
Ensure the sustainable use of water resources	?√	
Reduce the number of people and properties at risk of flooding and promote adaptive flood risk management	0	
Protect, maintain and improve the ecological status and physical state of the water environment	?√	
SOIL		
Safeguard and improve soil health, protect soil resource and soil functions of all soil types in Scotland	√	Positive effects on soils may be achieved overall through the emphasis on reducing volumes of waste sent to landfill, thereby decreasing risks to soils. Potential benefits through support for the reuse of existing buildings and infrastructure. Additionally, reduced pressure on natural resources should also lead to secondary benefits.
Safeguard and improve high value agricultural land and carbon-rich soils	0	
Reduce the extent of contaminated and vacant and derelict land	√	
CULTURAL HERITAGE AND HISTORIC ENVIRONMENT		
Avoid adverse impacts on the historic environment and its setting	?√	No significant effects on cultural heritage are expected. Overall, positive impacts could arise where the draft policy leads to the continued use and maintenance of existing cultural heritage and historic environment assets. There are opportunities to maximise benefits where this supports improved placemaking. The draft policy may result in increased infrastructure to support the circular economy, however, it is not expected these would generate significant effects
Protect and enhance valued landscapes, historic places and archaeological sites and other culturally and historically important features, landscapes and their settings	?√	

		on cultural heritage, and would be managed at plan and project level.
LANDSCAPE AND GEODIVERSITY		
Avoid adverse effects on landscapes and geodiversity	?X✓	<p>Infrastructure requirements can lead to both positive and negative impacts on landscape.</p> <p>Positive impacts could arise overall where the draft policy leads to making best use of existing assets, reducing pressure and minimising possible changes to landscapes.</p> <p>The draft policy may result in increased infrastructure to support the circular economy, effects on landscapes would be site-specific and managed at plan and project level.</p>
Safeguard and enhance the character and diversity of the Scottish landscape and areas of valuable landscape and geodiversity	?X✓	
MATERIAL ASSETS		
Avoid adversely impacting on material assets	✓✓	<p>The effects on material assets are expected to be significant positive.</p> <p>The draft policy emphasises the application of the waste hierarchy, prioritising the reduction and re-use of materials, and facilitating the delivery of new infrastructure required to support this.</p>
Promote the principles of circular economy	✓✓	
Reduce use and promote sustainable management of natural and built environment resources	✓✓	
Promote the sustainable design, use and management of new and existing assets/ infrastructure to support the development of high-quality places	✓✓	
POPULATION AND HUMAN HEALTH		
Reduce the health gap and inequalities and improve healthy life expectancy	✓	<p>Potential to have positive effects, including where this leads to greater efficiencies in resource use, benefiting the wider environment.</p> <p>Impacts to local communities associated with the construction and operation of new infrastructure to support the circular economy will be managed at project stage.</p>
Promote and enhance/improve access to open space, greenspace and the wider countryside	0	
To protect and improve human health and wellbeing through improving the quality of the living environment of people and communities	?✓	
Increase sustainable access to essential services, employment and the natural and historic environment	0	

Sustainable Aquaculture

The draft policy emphasises the importance of the aquaculture sector, and its contribution to sustained economic growth, in the rural and coastal communities of the north and west. The draft policy supports the sustainable growth of the finfish and shellfish sectors, including by guiding new development to coastal locations that reflect industry needs and take into account wider marine planning.



BIODIVERSITY, FLORA & FAUNA		
Avoid adverse impacts to designated habitats and species	?X	There is potential for overall direct and indirect negative impacts on species and habitats, particularly given the transient nature of some species. These may include displacement of native species from existing habitats, risk of parasite and disease transfer to wild fish, introduction of non-native species and altered genetic integrity of wild stocks arising from interbreeding with escaped farm fish. The draft policy identifies the need to guide new aquaculture development to locations that take account of environmental impact, including cumulative impacts, and wider marine planning, to reduce/mitigate potential negative impacts. The draft policy further notes that salmon and trout open pen fish farm developments on the north and east coasts of mainland Scotland should not be supported in order to safeguard migratory fish species. Potential impacts would also be addressed through the project consenting process.
Avoid adverse impacts to undesignated habitats and species	?X	
Protect, maintain and enhance biodiversity	?X	
CLIMATIC FACTORS		
Avoid new Greenhouse Gas (GHG) emissions	0	No significant effects are expected. Long term adaptation to climate change impacts would require consideration, in line with the draft policy on climate conscious places.
Reduce GHG emissions in order to meet Scotland emissions reduction target of net zero by 2045.	0	
Promote and enable adaptation to climate change	?	
AIR		
Avoid adverse effects on air quality	0	There is potential for impacts associated with operational activities

Reduce emissions of key pollutants and improve air quality throughout Scotland	0	including noise, light, waste, aquaculture litter and odour. The draft policy requires fish farm developments to demonstrate operational activities are acceptable, and would be assessed at project consenting stages.
Reduce levels of nuisance e.g. noise, vibration, dust, odour and light	?X	
WATER		
Avoid adverse impacts on the ecological status of water bodies	?	Aquaculture has potential to generate negative localised impacts on the water column and benthic environment. The draft policy aims to avoid significant impacts, through setting a requirement to take account of environmental impact, including cumulative impacts, to reduce/mitigate potential impacts. Potential impacts would also be considered during plan development and project consenting stages.
Ensure the sustainable use of water resources	?	
Reduce the number of people and properties at risk of flooding and promote adaptive flood risk management	0	
Protect, maintain and improve the ecological status and physical state of the water environment	?	
SOIL		
Safeguard and improve soil health, protect soil resource and soil functions of all soil types in Scotland	0	No significant effects are expected.
Safeguard and improve high value agricultural land and carbon-rich soils	0	
Reduce the extent of contaminated and vacant and derelict land	0	
CULTURAL HERITAGE AND HISTORIC ENVIRONMENT		
Avoid adverse impacts on the historic environment and its setting	0	Potential impacts are not expected to be significant and will be localised in nature, potentially impacting on the historic environment and its setting. This would be managed at plan and project consenting stages.
Protect and enhance valued landscapes, historic places and archaeological sites and other culturally and historically important features, landscapes and their settings	0	
LANDSCAPE AND GEODIVERSITY		
Avoid adverse effects on landscapes and geodiversity	0	There is potential for localised negative impacts on landscapes associated with aquaculture infrastructure. These have the potential to be site specific and would be managed through the plan and project stages.
Safeguard and enhance the character and diversity of the Scottish landscape and areas of valuable landscape and geodiversity	0	
MATERIAL ASSETS		

Avoid adversely impacting on material assets	0	No significant effects are expected to arise.
Promote the principles of circular economy	0	
Reduce use and promote sustainable management of natural and built environment resources	0	
Promote the sustainable design, use and management of new and existing assets/infrastructure to support the development of high-quality places	0	
POPULATION AND HUMAN HEALTH		
Reduce the health gap and inequalities and improve healthy life expectancy	0	The draft policy notes the increasing importance of the aquaculture industry by helping to sustain economic growth in rural and coastal communities. Potential impacts that could arise from operational activities, are required to be managed by requirements set out in the draft policy.
Promote and enhance/improve access to open space, greenspace and the wider countryside	0	
To protect and improve human health and wellbeing through improving the quality of the living environment of people and communities	?✓	
Increase sustainable access to essential services, employment and the natural and historic environment	✓	

Minerals

The draft policy aims to safeguard important mineral resources and ensure that sufficient resources are available to meet the demands of industry in a way that minimises the impacts of extraction on the environment and local communities.

It sets out a requirement that local development plans promote sustainable resource management and identify a landbank of permitted reserves for construction aggregates of at least 10 years at all times in relevant market areas.

The draft policy notes that planning applications that seek to explore, develop and produce fossil fuels will not be supported other than in exceptional circumstances, and that the Scottish Government does not support the development of unconventional oil and gas (UOG) in Scotland.




BIODIVERSITY, FLORA & FAUNA		
Avoid adverse impacts to designated habitats and species	?	Potential effects on biodiversity are uncertain. Minerals extraction can have negative impacts on biodiversity. Impacts will be site specific and managed at plan and project consenting level. However the draft policy notes proposals should be supported where they will not result in adverse impacts on biodiversity. The draft policy also sets out that proposals should be supported where they include schemes for a high standard of restoration and aftercare, with the potential for benefits to arise, for example, through habitat creation.
Avoid adverse impacts to undesignated habitats and species	?	
Protect, maintain and enhance biodiversity	?X✓	
CLIMATIC FACTORS		
Avoid new Greenhouse Gas (GHG) emissions	✓✓	Significant positive effects through draft policy which restricts fossil fuel extraction in line with climate change objectives and wider Scottish Government energy policy.
Reduce GHG emissions in order to meet Scotland emissions reduction target of net zero by 2045.	✓	
Promote and enable adaptation to climate change	0	Mineral extraction activities can lead to associated GHG emissions, through both the extraction process and transportation requirements. Potential for GHG emissions to be reduced long term where the draft policy leads to improved sustainable management of resources. Additionally, support provided in the draft policy for use of alternative modes of transport, such as rail and

		water, should also seek to minimise associated transport GHG emissions.
AIR		
Avoid adverse effects on air quality	?	Significant positive effects through draft policy which restricts fossil fuel extraction in line with wider Scottish Government energy policy leading to emissions avoided. Mineral extraction activities, including transportation requirements, can lead to localised negative impacts. The draft policy requires proposals to demonstrate acceptable levels (including cumulative impact) of noise, dust, vibration and potential pollution of air. The draft policy also sets out that proposals should be supported where they minimise transport impacts through the number and length of lorry trips and by using rail or water transport wherever practical.
Reduce emissions of key pollutants and improve air quality throughout Scotland	✓✓	
Reduce levels of nuisance e.g. noise, vibration, dust, odour and light	?	
WATER		
Avoid adverse impacts on the ecological status of water bodies	?	Potential for negative impacts to arise from minerals extraction activities. The draft policy requires proposals to demonstrate acceptable levels of potential pollution of land and water. Effects will also require mitigation at consenting stage. The draft policy also requires that proposals include schemes for a high standard of restoration and aftercare and that commitment is provided that such work is undertaken, which could potentially lead to secondary benefits through habitat creation.
Ensure the sustainable use of water resources	?X	
Reduce the number of people and properties at risk of flooding and promote adaptive flood risk management	0	
Protect, maintain and improve the ecological status and physical state of the water environment	?X	
SOIL		
Safeguard and improve soil health, protect soil resource and soil functions of all soil types in Scotland	?X	Minerals extraction has potential to negatively impact on soil, including through direct loss of resources and impacts on stability. Effects will require mitigation at consenting stage. The draft policy also requires that proposals include schemes for a high standard of restoration and aftercare and that commitment is
Safeguard and improve high value agricultural land and carbon-rich soils	0	
Reduce the extent of contaminated and vacant and derelict land	0	

		provided that such work is undertaken, which could potentially lead to secondary benefits through habitat creation.
CULTURAL HERITAGE AND HISTORIC ENVIRONMENT		
Avoid adverse impacts on the historic environment and its setting	?X	Minerals extraction can negatively impact on cultural heritage and historic environment assets, including their settings. The potential impacts could be long term and lead to permanent loss of assets. The draft policy sets out to support development proposals that will not result in adverse impacts on the natural and the historic environment.
Protect and enhance valued landscapes, historic places and archaeological sites and other culturally and historically important features, landscapes and their settings	?X	
LANDSCAPE AND GEODIVERSITY		
Avoid adverse effects on landscapes and geodiversity	?X	Minerals extraction may impact on landscapes and there remains a legacy of landscape change in areas where extraction has historically taken place. The draft policy sets out that proposals will be supported where they will not result in negative landscape and visual impacts. The draft policy also requires that proposals include schemes for a high standard of restoration and aftercare and that commitment is provided to such work being undertaken. Impacts will be required to be managed at a local level.
Safeguard and enhance the character and diversity of the Scottish landscape and areas of valuable landscape and geodiversity	?X	
MATERIAL ASSETS		
Avoid adversely impacting on material assets	✓	The draft policy aims to safeguard all important, workable mineral resources by promoting sustainable resource management.
Promote the principles of circular economy	0	
Reduce use and promote sustainable management of natural and built environment resources	✓	
Promote the sustainable design, use and management of new and existing assets/infrastructure to support the development of high-quality places	0	
POPULATION AND HUMAN HEALTH		
Reduce the health gap and inequalities and improve healthy life expectancy	?	Minerals extraction could result in adverse effects on people, health and living environments. However,

Promote and enhance/improve access to open space, greenspace and the wider countryside	0	the draft policy includes a number of requirements that are aimed specifically at ensuring any potential adverse impacts (including cumulative impact) on any nearby homes, local communities and known sensitive receptors and designations are at acceptable levels.
To protect and improve human health and wellbeing through improving the quality of the living environment of people and communities	?	
Increase sustainable access to essential services, employment and the natural and historic environment	0	

Digital Infrastructure

<p>The draft policy continues to support the roll-out of digital infrastructure across all of Scotland, recognising the importance of future-proofing infrastructure provision whilst addressing impacts on local communities and the natural and historic environment.</p>		
<p>BIODIVERSITY, FLORA & FAUNA</p>		
<p>Avoid adverse impacts to designated habitats and species</p>	<p>0</p>	<p>No significant effects are expected. Infrastructure requirements have the potential to negatively impact on biodiversity, including impacts such as disturbance on marine and terrestrial mammals, fish and habitats during construction, and operational effects, ranging from temporary to permanent. Potential impacts are likely to be site specific and be influenced by factors such as route and sensitivity of the receiving environment. Effects on protected species may require mitigation, and would be managed at project level.</p>
<p>Avoid adverse impacts to undesignated habitats and species</p>	<p>?X</p>	
<p>Protect, maintain and enhance biodiversity</p>	<p>?X</p>	
<p>CLIMATIC FACTORS</p>		
<p>Avoid new Greenhouse Gas (GHG) emissions</p>	<p>✓</p>	<p>Indirect positive effects are expected. The emphasis within the overall draft NPF4 on facilitating digital infrastructure is expected to result in indirect positive effects on climate change mitigation objectives, by helping to reduce the need to travel through improved virtual connectivity. As described within the baseline section of this report (Section 3), domestic transport was the largest source of net greenhouse gas emissions in Scotland in 2019²⁵. Greater levels of remote and flexible working could potentially enhance national levels of productivity, reducing travel and associated carbon emissions²⁶.</p>
<p>Reduce GHG emissions in order to meet Scotland emissions reduction target of net zero by 2045.</p>	<p>✓</p>	
<p>Promote and enable adaptation to climate change</p>	<p>0</p>	
<p>AIR</p>		

²⁵ Scottish Government (2021) Scottish Greenhouse Gas statistics: 1990-2019 [online] Available at: <https://www.gov.scot/publications/scottish-greenhouse-gas-statistics-1990-2019/documents/> (accessed 15/10/2021)

²⁶ Scottish Government (2018) 5G: Strategy for Scotland [online] Available at: <https://www.gov.scot/publications/forging-digital-future-5g-strategy-scotland/> (accessed 30/08/2021)

Avoid adverse effects on air quality	0	No significant effects are expected.
Reduce emissions of key pollutants and improve air quality throughout Scotland	0	
Reduce levels of nuisance e.g. noise, vibration, dust, odour and light	0	
WATER		
Avoid adverse impacts on the ecological status of water bodies	0	No significant effects are expected. Development of digital infrastructure and community hubs, installation of underground cables both onshore and offshore and have the potential to impact on coastal and marine environment with potential impacts likely to be site specific.
Ensure the sustainable use of water resources	0	
Reduce the number of people and properties at risk of flooding and promote adaptive flood risk management	0	
Protect, maintain and improve the ecological status and physical state of the water environment	0	
SOIL		
Safeguard and improve soil health, protect soil resource and soil functions of all soil types in Scotland	0	No significant effects are expected to arise.
Safeguard and improve high value agricultural land and carbon-rich soils	0	
Reduce the extent of contaminated and vacant and derelict land	0	
CULTURAL HERITAGE AND HISTORIC ENVIRONMENT		
Avoid adverse impacts on the historic environment and its setting	?X	There is the potential for individual and cumulative negative impacts on cultural heritage and historic environment assets. However the draft policy notes that the historic environment should be addressed, with careful design considerations to reduce any potential impacts. Existing regulatory mechanisms including Listed Building Consent apply.
Protect and enhance valued landscapes, historic places and archaeological sites and other culturally and historically important features, landscapes and their settings	?X	
LANDSCAPE AND GEODIVERSITY		
Avoid adverse effects on landscapes and geodiversity	?X	Telecommunications developments have potential to have negative effects on landscape. The draft policy notes telecommunications developments should only be supported where the
Safeguard and enhance the character and diversity of the Scottish landscape and areas of	?X	

valuable landscape and geodiversity		visual and amenity impact of the proposed development has been minimised through careful siting, design and where appropriate landscaping.
MATERIAL ASSETS		
Avoid adversely impacting on material assets	✓✓	Positive effects should arise from support provided to delivery of digital infrastructure, particularly in areas with gaps in connectivity and barriers to digital access.
Promote the principles of circular economy	0	
Reduce use and promote sustainable management of natural and built environment resources	0	
Promote the sustainable design, use and management of new and existing assets/infrastructure to support the development of high-quality places	✓	
POPULATION AND HUMAN HEALTH		
Reduce the health gap and inequalities and improve healthy life expectancy	✓	Potential for positive effects on population and human health objectives where the draft policy leads to improved digital connectivity across Scotland. The focus on areas with gaps in connectivity and barriers to digital access could also support reducing inequalities and digital exclusion and access to getting online in the most deprived areas in Scotland is lower (82%) than in the most affluent areas (96%) ²⁷ . Benefits may also arise where the draft policy supports improved access to essential services including healthcare and education. Monitoring of radio waves is undertaken as a matter of course to ensure it complies with requirements and standards. A wide safety margin is allowed for within these requirements.
Promote and enhance/improve access to open space, greenspace and the wider countryside	0	
To protect and improve human health and wellbeing through improving the quality of the living environment of people and communities	0	
Increase sustainable access to essential services, employment and the natural and historic environment	✓	

Alternatives

- **Sustainable tourism**

²⁷ Scottish Government (2020) Scottish household survey 2019: annual report [online] Available at: <https://www.gov.scot/publications/scottish-household-survey-2019-annual-report/> (accessed 18/10/2021)

C1.5.1 New policies are proposed on sustainable tourism, supporting the growth of the sector in a way which manages impacts on local communities in keeping with wider policy and statutory outcomes, and introducing new policy to manage short term holiday letting aligned to provisions in the Planning Act. A ‘do nothing option’ is not considered to be a reasonable alternative.

- **Culture and Creativity**

C1.5.2 New policy on culture and creativity recognises the importance of the sector, requires proposals to make provision for public art, and reflects the agent of change principle²⁸. Without new express provision the likely environmental effects identified including for cultural heritage and the historic environment; material assets; and population and human health may not be fully realised.

- **Green energy**

C1.5.3 Draft policy 19 takes a more permissive approach than the current Scottish Planning Policy (SPP) in actively supporting the roll out of renewable energy developments, other than in National Parks and National Scenic Areas, to help meet our statutory climate change targets. Wider restrictions, such as environmental designations, would still be relevant considerations and all applications would still require full site specific assessments, including Environmental Impact Assessment and Habitats Regulations Appraisal where applicable.

C1.5.4 It is recognised that an **alternative approach** would be to retain the current spatial framework set out in SPP. However, the Scottish Government considers that this more strategic approach could inadvertently rule out good quality development which is needed to meet our climate change objectives.

C1.5.5 It is difficult to predict in any meaningful way how impacts may differ between the proposed green energy policy and the current SPP, taking into account the level of uncertainty arising in the application of policy to individual developments. Nonetheless, it is likely that were the current SPP retained, benefits for climate objectives are likely to be reduced, however a greater level of protection may be afforded particularly to undesignated sites and species, including to wild land.

²⁸ [Agent of change: Chief Planner letter February 2018 - gov.scot \(www.gov.scot\)](http://www.gov.scot)

C1.6 Distinctive Places

City, Town, Commercial and Local Centres

The draft policy notes that the planning system should consider the economic, environmental and societal challenges faced by city, town and local centres, and address these to create centres which are vibrant, creative, enterprising, accessible and resilient places for people to live, work, enjoy and visit.



BIODIVERSITY, FLORA & FAUNA		
Avoid adverse impacts to designated habitats and species	0	No significant effects on biodiversity are expected from this draft policy. Indirect positive effects could arise from reduced development pressure on green spaces. There is an opportunity for secondary benefits to arise where blue/green infrastructure is incorporated, as supported by wider draft policy.
Avoid adverse impacts to undesignated habitats and species	0	
Protect, maintain and enhance biodiversity	?✓	
CLIMATIC FACTORS		
Avoid new Greenhouse Gas (GHG) emissions	✓	Reducing the need for travel and repurposing vacant properties could have positive effects in relation to the need to reduce emissions. Higher density within existing settlements can also support the implementation of low carbon technologies, such as heat networks.
Reduce GHG emissions in order to meet Scotland emissions reduction target of net zero by 2045.	✓	
Promote and enable adaptation to climate change	0	
AIR		
Avoid adverse effects on air quality	✓	Improved public transport connections may reduce motorised travel needs; and increased access to and uptake of low and zero emissions modes of travel are likely to have positive effects long term, including on local air quality. The draft policy notes alignment with 20 minute neighbourhoods and the need for proposals to take into account connections with public transport and active travel. This could be of particular relevance with many AQMAs in Scotland have been designated in, or close, to existing town centres.
Reduce emissions of key pollutants and improve air quality throughout Scotland	✓	
Reduce levels of nuisance e.g. noise, vibration, dust, odour and light	✓	
WATER		

Avoid adverse impacts on the ecological status of water bodies	0	Generally neutral effects are expected.
Ensure the sustainable use of water resources	0	
Reduce the number of people and properties at risk of flooding and promote adaptive flood risk management	0	
Protect, maintain and improve the ecological status and physical state of the water environment	0	
SOIL		
Safeguard and improve soil health, protect soil resource and soil functions of all soil types in Scotland	0	Generally neutral effects on soils are expected. Secondary minor positive effects could arise by reducing out of town developments, avoiding additional soil sealing. The re-use of existing assets is also supported by wider draft policy.
Safeguard and improve high value agricultural land and carbon-rich soils	0	
Reduce the extent of contaminated and vacant and derelict land	0	
CULTURAL HERITAGE AND HISTORIC ENVIRONMENT		
Avoid adverse impacts on the historic environment and its setting	?X✓	Effects may be mixed, and will be at managed at plan and project consenting stages. There is an opportunity to lead to positive impacts through support given to improving town centres, alongside making use of existing buildings. Benefits could also arise where consideration is given to the intrinsic cultural heritage value and importance of town centres and to use this as an asset upon which local distinctiveness and identity can be strengthened. Aligning with wider placemaking aims of draft NPF4 can help in providing a sense of place.
Protect and enhance valued landscapes, historic places and archaeological sites and other culturally and historically important features, landscapes and their settings	?X✓	
LANDSCAPE AND GEODIVERSITY		
Avoid adverse effects on landscapes and geodiversity	?✓	No significant effects are expected. Secondary positive effects could arise by reducing out of town development and focussing on making best use of existing town centres, in turn, reducing possible changes to local landscapes.
Safeguard and enhance the character and diversity of the Scottish landscape and areas of valuable landscape and geodiversity	?✓	
MATERIAL ASSETS		
Avoid adversely impacting on material assets	✓	Potential for positive effects given emphasis on built assets, including

Promote the principles of circular economy	✓	where this supports improved placemaking and bringing vacant properties back into use.
Reduce use and promote sustainable management of natural and built environment resources	✓	
Promote the sustainable design, use and management of new and existing assets/infrastructure to support the development of high-quality places	✓	
POPULATION AND HUMAN HEALTH		
Reduce the health gap and inequalities and improve healthy life expectancy	✓	Generally positive impacts are expected from improving centres and responding to social and economic priorities, including through support for improved accessibility to key goods and services. The draft policy also sets out to avoid the additional density of non-retail uses that could have an adverse effect on health and wellbeing and promotes consideration of access to convenience goods/fresh healthier food and drink provision, especially in disadvantaged or remoter areas which could help improve diet through access to a variety of and healthier food.
Promote and enhance/improve access to open space, greenspace and the wider countryside	0	
To protect and improve human health and wellbeing through improving the quality of the living environment of people and communities	✓	
Increase sustainable access to essential services, employment and the natural and historic environment	✓	

Historic Assets and Places

The draft policy aims to protect and enhance the historic environment, and support the reuse of redundant or neglected historic buildings.

The draft policy also notes the planning system should protect and enhance historic environment assets and places and recognise their cultural heritage benefits and associated social, environmental and economic value to our national, regional and local economies, cultural identity, and for their potential to support health and wellbeing, the circular economy, and climate change adaptation.



BIODIVERSITY, FLORA & FAUNA

Avoid adverse impacts to designated habitats and species	?X	No significant effects on biodiversity are expected. The draft policy notes development proposals should ensure that existing natural features which contribute to the character of a conservation area are retained which may have potential positive effects on biodiversity. Support provided for the decarbonisation of historic environment assets could lead to secondary negative impacts. For example, the implementation of energy efficiency measures and low carbon energy technologies could lead to the disturbance of Protected Species through works to the building fabric of historic assets and places.
Avoid adverse impacts to undesignated habitats and species	?	
Protect, maintain and enhance biodiversity	0	

CLIMATIC FACTORS

Avoid new Greenhouse Gas (GHG) emissions	✓	No significant effects are expected. Where the draft policy supports the decarbonisation of historic environment assets, for example, the implementation of measures to enable energy efficiency and the decarbonisation of energy sources, potential positive impacts should arise from associated reductions in GHG emissions. The draft policy notes that Local Development Plans and their spatial strategies should identify, protect, manage and enhance historic assets and places, and consider climate change adaptation
Reduce GHG emissions in order to meet Scotland emissions reduction target of net zero by 2045.	?✓	
Promote and enable adaptation to climate change	?✓	

		measures, in line with wider draft policies.
AIR		
Avoid adverse effects on air quality	0	No significant effects are expected.
Reduce emissions of key pollutants and improve air quality throughout Scotland	0	
Reduce levels of nuisance e.g. noise, vibration, dust, odour and light	0	
WATER		
Avoid adverse impacts on the ecological status of water bodies	0	No significant effects are expected.
Ensure the sustainable use of water resources	0	
Reduce the number of people and properties at risk of flooding and promote adaptive flood risk management	0	
Protect, maintain and improve the ecological status and physical state of the water environment	0	
SOIL		
Safeguard and improve soil health, protect soil resource and soil functions of all soil types in Scotland	0	No significant effects are expected.
Safeguard and improve high value agricultural land and carbon-rich soils	0	
Reduce the extent of contaminated and vacant and derelict land	0	
CULTURAL HERITAGE AND HISTORIC ENVIRONMENT		
Avoid adverse impacts on the historic environment and its setting	✓✓	The draft policy should provide significant positive effects by ensuring cultural heritage and the historic environment remains a key consideration in the planning process.
Protect and enhance valued landscapes, historic places and archaeological sites and other culturally and historically important features, landscapes and their settings	✓✓	
LANDSCAPE AND GEODIVERSITY		
Avoid adverse effects on landscapes and geodiversity	✓	Positive effects on landscape are expected. This could include direct effects, for example, through the protection given to Inventory Gardens and Designed Landscapes, and also indirect effects from the commitment to protecting the wider setting of historic assets and places.
Safeguard and enhance the character and diversity of the Scottish landscape and areas of valuable landscape and geodiversity	✓	
MATERIAL ASSETS		

Avoid adversely impacting on material assets	✓	The draft policy sets out to retain, re-use and/or adapt historic assets and places, aligning with circular economy principles, with potential for positive impacts to arise, in particular where opportunities are taken to consider the role of existing assets in supporting wider draft policy ambitions on improved placemaking.
Promote the principles of circular economy	✓	
Reduce use and promote sustainable management of natural and built environment resources	✓	
Promote the sustainable design, use and management of new and existing assets/infrastructure to support the development of high-quality places	✓	
POPULATION AND HUMAN HEALTH		
Reduce the health gap and inequalities and improve healthy life expectancy	0	Generally positive effects are expected as result of the contribution that the draft policy could make to protecting and enhancing the quality of settlements and places.
Promote and enhance/improve access to open space, greenspace and the wider countryside	0	
To protect and improve human health and wellbeing through improving the quality of the living environment of people and communities	✓	
Increase sustainable access to essential services, employment and the natural and historic environment	✓	

Urban edges and the green belt

The draft policy notes the role green belts play as a settlement management tool around Scotland's towns and cities to help to direct growth to the most appropriate, sustainable locations. Their role in protecting and enhancing the character, landscape setting and identity of settlements and providing access to green networks is also noted.



BIODIVERSITY, FLORA & FAUNA

Avoid adverse impacts to designated habitats and species	✓✓	Significant positive effects expected. Limiting development on greenbelt has the potential to help avoid habitat loss and fragmentation.
Avoid adverse impacts to undesignated habitats and species	✓✓	
Protect, maintain and enhance biodiversity	✓✓	

CLIMATIC FACTORS

Avoid new Greenhouse Gas (GHG) emissions	0	Potential for long term positive effects should through sequestration of CO ₂ , including through trees and woodlands and vegetated habitats. Green belts can be used to direct growth to the most appropriate sustainable locations, influencing travel needs and associated emissions. There is the potential for emissions reductions where commuting needs are reduced. However there are mixed views on whether green belts can conversely direct development out beyond their boundaries, potentially giving rise to additional and/or longer commuting times ²⁹ . Secondary benefits could also arise where localising food production could lead to reductions in associated transport requirements. Greenbelts can also support resilience and adaptation to the impacts of climate change.
Reduce GHG emissions in order to meet Scotland emissions reduction target of net zero by 2045.	?X✓	
Promote and enable adaptation to climate change	✓	

AIR

²⁹ Scottish Government (2006) Review of Green Belt Policy in Scotland [online] Available at: <https://www.webarchive.org.uk/wayback/archive/20161020183614/http://www.gov.scot/Publications/2004/08/19785/41555> (accessed 09/11/2021)

Avoid adverse effects on air quality	✓	Secondary long term positive effects should arise as green networks can help remove pollutants including ozone, ammonia and particulates.
Reduce emissions of key pollutants and improve air quality throughout Scotland	✓	
Reduce levels of nuisance e.g. noise, vibration, dust, odour and light	0	
WATER AND COASTAL MARINE		
Avoid adverse impacts on the ecological status of water bodies	✓	Long term positive effects are expected as green networks can improve water quality and flow management by reducing rainwater run-off, and retaining sediments and other contaminants from entering watercourses.
Ensure the sustainable use of water resources	0	
Reduce the number of people and properties at risk of flooding and promote adaptive flood risk management	?✓	
Protect, maintain and improve the ecological status and physical state of the water environment	✓	
SOIL		
Safeguard and improve soil health, protect soil resource and soil functions of all soil types in Scotland	✓	Long term positive effects are expected from reduced disturbance of soil resources. Additional benefits should arise where the draft policy leads to reduced infrastructure requirements through making best use of existing assets, including the use of vacant and derelict land, as supported in wider draft policy.
Safeguard and improve high value agricultural land and carbon-rich soils	✓	
Reduce the extent of contaminated and vacant and derelict land	?✓	
CULTURAL HERITAGE AND HISTORIC ENVIRONMENT		
Avoid adverse impacts on the historic environment and its setting	0	Effects are likely to be positive as loss of green belt may affect the setting of historic assets and places. The draft policy notes development proposals should safeguard historic environment assets.
Protect and enhance valued landscapes, historic places and archaeological sites and other culturally and historically important features, landscapes and their settings	✓	
LANDSCAPE AND GEODIVERSITY		
Avoid adverse effects on landscapes and geodiversity	✓	Effects are likely to be positive as loss of green belt may impact landscapes. The draft policy requires development proposals to be fully compatible with the surrounding established countryside and landscape character.
Safeguard and enhance the character and diversity of the Scottish landscape and areas of valuable landscape and geodiversity	✓	
MATERIAL ASSETS		
Avoid adversely impacting on material assets	✓✓	The draft policy focus on protecting green belt should

Promote the principles of circular economy	0	have positive effects on natural material assets.
Reduce use and promote sustainable management of natural and built environment resources	✓	
Promote the sustainable design, use and management of new and existing assets/infrastructure to support the development of high-quality places	✓	
POPULATION AND HUMAN HEALTH		
Reduce the health gap and inequalities and improve healthy life expectancy	0	Long term significant positive impacts may arise through protecting outdoor access to green networks and where the broader benefits for environmental quality arise. Additionally, community growing spaces and access to locally grown food can lead to positive impacts, including physical and mental health benefits.
Promote and enhance/improve access to open space, greenspace and the wider countryside	✓✓	
To protect and improve human health and wellbeing through improving the quality of the living environment of people and communities	✓✓	
Increase sustainable access to essential services, employment and the natural and historic environment	✓	

Vacant and Derelict Land and Empty Buildings

The draft policy notes that the reuse of vacant and derelict land and properties can contribute to climate change targets and support biodiversity, health and wellbeing improvements and sustainable, inclusive, economic growth by providing communities with much needed greenspace, growing spaces and other community benefits. It also notes that redevelopment for housing or businesses can also turn an underutilised and latent asset into productive use and limit the need for urban expansion.



The draft policy prioritises the use of vacant and derelict land and properties, including supporting temporary uses where proposals for permanent development are unlikely to be imminent.

BIODIVERSITY, FLORA & FAUNA

Avoid adverse impacts to designated habitats and species	✓	Positive effects should arise through the proactive greening of vacant and derelict land, including habitat creation and reduced fragmentation, particularly where opportunities are taken to support biodiversity enhancement, in line with wider draft policy. However, consideration may need to be given to the potential displacement of species that might have colonised these sites. Benefits should also arise where the remediation of contaminated sites is undertaken. Indirect positive effects are expected due to the promotion of a 'brownfield first' approach which may reduce pressure on greenfield land.
Avoid adverse impacts to undesignated habitats and species	✓	
Protect, maintain and enhance biodiversity	✓	

CLIMATIC FACTORS

Avoid new Greenhouse Gas (GHG) emissions	✓	Bringing land into productive use can also have positive effects on climatic factors through carbon sequestration, however the scale of benefits will depend on the type of redevelopment activity undertaken. For example, the creation of green infrastructure should lead to benefits through improved carbon sequestration. Minimising loss of greenfield land may also have secondary impacts through reducing
Reduce GHG emissions in order to meet Scotland emissions reduction target of net zero by 2045.	✓	
Promote and enable adaptation to climate change	✓	

		pressure on assets that play a role in carbon sequestration. Additionally, the re-use of vacant and derelict land can also create more walkable and liveable environments, including through supporting active travel routes, with potential benefits associated with reduced GHG emissions where a modal shift arises. Potential for additional benefits to arise where remediation of vacant and derelict land supports climate change adaptation, for example, through broader benefits to ecosystem services leading to increased resilience or the provision of sustainable flood management infrastructure (e.g. SUDS).
AIR		
Avoid adverse effects on air quality	✓	Secondary benefits could arise where the draft policy supports modal shift and habitat creation. Contaminated sites can result in potential for airborne pollution which can also have implications for human health and biodiversity. Positive localised impacts should also arise where remediation works are undertaken.
Reduce emissions of key pollutants and improve air quality throughout Scotland	✓	
Reduce levels of nuisance e.g. noise, vibration, dust, odour and light	0	
WATER		
Avoid adverse impacts on the ecological status of water bodies	✓	Effects on the water environment may be positive as contaminated sites can result in the pollution of watercourses, which can also have implications for human health and biodiversity.
Ensure the sustainable use of water resources	0	
Reduce the number of people and properties at risk of flooding and promote adaptive flood risk management	0	
Protect, maintain and improve the ecological status and physical state of the water environment	?✓	
SOIL		
Safeguard and improve soil health, protect soil resource and soil functions of all soil types in Scotland	✓	Long term significant positive effects are expected from the 'brownfield first' approach, prioritising the use of vacant and derelict land. Additionally,
Safeguard and improve high value agricultural land and carbon-rich soils	?✓	

Reduce the extent of contaminated and vacant and derelict land	✓✓	significant benefits should arise where contamination is present and could be decontaminated through the development process. However, development can also impact on soils, for example by increasing soil sealing.
CULTURAL HERITAGE AND HISTORIC ENVIRONMENT		
Avoid adverse impacts on the historic environment and its setting	✓	Potential for long term positive effects on cultural heritage and historic environment assets due to re-use of buildings at risk and sensitive integration into development proposals. Additional benefits should arise where the draft policy leads to maintaining cultural heritage and preserving the legacy of former industrial landscape.
Protect and enhance valued landscapes, historic places and archaeological sites and other culturally and historically important features, landscapes and their settings	✓	
LANDSCAPE AND GEODIVERSITY		
Avoid adverse effects on landscapes and geodiversity	✓✓	Potential for significant positive impacts through the restoration of vacant and derelict land, which has a poor landscape quality. Positive effects on townscapes may be achieved by reuse of vacant and derelict land, and redundant buildings.
Safeguard and enhance the character and diversity of the Scottish landscape and areas of valuable landscape and geodiversity	✓	
MATERIAL ASSETS		
Avoid adversely impacting on material assets	✓	Effects are likely to be significant positive. The draft policy seeks to re-use vacant and derelict land and redundant buildings as a priority, potentially reducing waste and consumption of new resources, aligning with wider draft policy on making the best use of existing assets and placemaking.
Promote the principles of circular economy	✓✓	
Reduce use and promote sustainable management of natural and built environment resources	✓✓	
Promote the sustainable design, use and management of new and existing assets/infrastructure to support the development of high-quality places	✓✓	
POPULATION AND HUMAN HEALTH		
Reduce the health gap and inequalities and improve healthy life expectancy	✓	Positive effects are expected due to the promotion of redevelopment of vacant and derelict land, buildings at risk, and brownfield land.
Promote and enhance/improve access to open space, greenspace and the wider countryside	✓	
To protect and improve human health and wellbeing through improving the	✓	The draft policy requires priority to be given to establishing new

quality of the living environment of people and communities		uses for vacant and derelict land in, or adjacent to, areas where there are high levels of deprivation as identified in the Scottish Index of Multiple Deprivation. Evidence suggests that communities in areas of higher deprivation interact with vacant and derelict land more regularly, with disproportionate impacts on their health and wellbeing. There is evidence of a spatial association between interaction with vacant and derelict land and impacts on physical health with regard to poorer health outcomes, population health and life expectancy ³⁰ .
Increase sustainable access to essential services, employment and the natural and historic environment	✓	

³⁰ Scottish Land Commission Scotland (2019) Vacant and Derelict Land in Scotland, Assessing the impact of vacant and derelict land on communities [online] Available at: https://www.landcommission.gov.scot/downloads/5dd7d4dfa39b6_VDL%20in%20Scotland%20Final%20Report%2020191008.pdf (accessed 03/11/2021)

Rural Places

The draft policy encourages development that helps to support, sustain and grow rural areas and stimulate economic growth and sustainability whilst safeguarding and growing the natural assets that underpin businesses and jobs. The draft policy notes rural economic activity, innovation, and diversification should be encouraged, while ensuring that the distinctive character of the rural area, the service function of small towns and natural assets and cultural heritage are safeguarded and enhanced.



BIODIVERSITY, FLORA & FAUNA		
Avoid adverse impacts to designated habitats and species	X✓	Potential effects could be mixed. The draft policy supports sustainable economic growth in rural areas, and associated development generally. It notes the need to safeguard and enhance natural and cultural heritage. Effects on non-protected sites and species are more likely, as designated areas will be protected through recognition of their value and vulnerability.
Avoid adverse impacts to undesignated habitats and species	X✓	
Protect, maintain and enhance biodiversity	X✓	
CLIMATIC FACTORS		
Avoid new Greenhouse Gas (GHG) emissions	?	Potential for increased GHG emissions to arise from possible increases in surface traffic. This could be of particular relevance as there can be heavy reliance on private car and road transport within rural and remote areas. The draft policy sets out support for critical infrastructure required to support transport or digital connectivity, minimising any potential increased emissions associated with transport requirements. Additionally, wider draft policies, including those related to 20 minute neighbourhoods and sustainable transport aim to encourage a modal shift more sustainable modes of transport. The draft policy also emphasises that development proposals should be consistent with climate change mitigation targets.
Reduce GHG emissions in order to meet Scotland emissions reduction target of net zero by 2045.	?X	
Promote and enable adaptation to climate change	0	
AIR		
Avoid adverse effects on air quality	0	No significant effects on air quality are expected. Potential localised effects may arise from transportation where new
Reduce emissions of key pollutants and improve air quality throughout Scotland	0	

Reduce levels of nuisance e.g. noise, vibration, dust, odour and light	0	connections or improvement to existing infrastructure are considered to promote rural economic growth. However, wider draft policies including 20 minute neighbourhoods and sustainable transport aim to encourage a modal shift more sustainable modes of transport.
WATER		
Avoid adverse impacts on the ecological status of water bodies	0	No significant impacts are expected.
Ensure the sustainable use of water resources	0	
Reduce the number of people and properties at risk of flooding and promote adaptive flood risk management	0	
Protect, maintain and improve the ecological status and physical state of the water environment	0	
SOIL		
Safeguard and improve soil health, protect soil resource and soil functions of all soil types in Scotland	?X✓	The draft policy notes the importance of preventing the loss of prime agricultural or land of lesser quality that is culturally or locally important for primary use except in specific circumstances. However, the overall emphasis on facilitating development in rural areas could result in higher levels of development. This could result in localised impacts through soil sealing, which may have cumulative impacts. Benefits could also arise where the draft policy leads to increased reuse of vacant and derelict land or “brownfield” where a return to a natural state is not likely, aligning with wider draft policy.
Safeguard and improve high value agricultural land and carbon-rich soils	?X✓	
Reduce the extent of contaminated and vacant and derelict land	?✓	
CULTURAL HERITAGE AND HISTORIC ENVIRONMENT		
Avoid adverse impacts on the historic environment and its setting	?	There is the potential for positive effects on cultural heritage and historic assets and places. The draft policy notes development in rural areas should be supported where the proposal provides an appropriate use of a historic environment asset or is appropriate enabling development to secure the future of historic environment assets. However, the aim of facilitating more development in
Protect and enhance valued landscapes, historic places and archaeological sites and other culturally and historically important features, landscapes and their settings	✓	

		rural areas could lead to adverse impacts to the historic environmental and its setting, including archaeology. This should be managed at plan and project consenting stages. There is an opportunity to bring rural buildings at risk back into use, aligning with wider draft policy on making the best use of existing assets.
LANDSCAPE AND GEODIVERSITY		
Avoid adverse effects on landscapes and geodiversity	?✓	Potential effects are uncertain and could be mixed in nature.
Safeguard and enhance the character and diversity of the Scottish landscape and areas of valuable landscape and geodiversity	?✓	The draft policy notes development in rural areas should be supported where the proposals are suitably scaled, sited, and designed to be in keeping with the rural character of the area.
MATERIAL ASSETS		
Avoid adversely impacting on material assets	0	No significant effects are expected.
Promote the principles of circular economy	0	
Reduce use and promote sustainable management of natural and built environment resources	0	
Promote the sustainable design, use and management of new and existing assets/infrastructure to support the development of high-quality places	0	
POPULATION AND HUMAN HEALTH		
Reduce the health gap and inequalities and improve healthy life expectancy	✓	Potential for significant positive effects through facilitating development that supports sustainable and inclusive growth of rural communities and economies, while safeguarding and growing natural assets.
Promote and enhance/improve access to open space, greenspace and the wider countryside	✓	
To protect and improve human health and wellbeing through improving the quality of the living environment of people and communities	✓✓	
Increase sustainable access to essential services, employment and the natural and historic environment	✓✓	

Natural Places

The draft policy aims to protect and restore Scotland's natural environment.

It notes that the planning system should protect, restore and enhance Scotland's natural assets; make best use of nature based solutions; and actively support our national commitment to reverse biodiversity loss, and by facilitating the growth and connection of nature networks.



BIODIVERSITY, FLORA & FAUNA		
Avoid adverse impacts to designated habitats and species	✓✓	Significant positive effects expected where the draft policy gives rise to increased protection of locally, regionally, nationally and internationally valued natural assets, landscapes, species and habitats. The draft policy notes that spatial strategies should prevent fragmentation or isolation of habitats and identify opportunities to restore and enhance links which have been broken, including as part of wider green networks and active travel routes. Positive benefit should also be gained from integration of nature based solutions into development design. Protecting and enhancing the value of natural ecosystems in terms of the ecosystem services they provide in regulating the environment are also likely to have long-term positive benefits.
Avoid adverse impacts to undesignated habitats and species	✓✓	
Protect, maintain and enhance biodiversity	✓✓	
CLIMATIC FACTORS		
Avoid new Greenhouse Gas (GHG) emissions	✓	Long term, significant positive effects may be achieved through CO ₂ sequestration by protecting and enhancing the natural assets, contributing to wider targets for emission reduction.
Reduce GHG emissions in order to meet Scotland emissions reduction target of net zero by 2045.	✓✓	
Promote and enable adaptation to climate change	✓	
AIR		
Avoid adverse effects on air quality	✓	Long term positive effects have the potential to arise as natural assets can improve air quality through the removal of pollutants including ozone, ammonia and particles.
Reduce emissions of key pollutants and improve air quality throughout Scotland	✓	
Reduce levels of nuisance e.g. noise, vibration, dust, odour and light	✓	
WATER		

Avoid adverse impacts on the ecological status of water bodies	✓	Long term, positive effects are expected as natural assets can improve water quality and flow management by reducing rainwater run-off, and retaining sediments and other contaminants from entering watercourses.
Ensure the sustainable use of water resources	0	
Reduce the number of people and properties at risk of flooding and promote adaptive flood risk management	✓	
Protect, maintain and improve the ecological status and physical state of the water environment	✓	
SOIL		
Safeguard and improve soil health, protect soil resource and soil functions of all soil types in Scotland	✓	Positive effects are expected to arise.
Safeguard and improve high value agricultural land and carbon-rich soils	✓	
Reduce the extent of contaminated and vacant and derelict land	✓	
CULTURAL HERITAGE AND HISTORIC ENVIRONMENT		
Avoid adverse impacts on the historic environment and its setting	✓	Positive effects on cultural heritage and historic environment assets are expected from this draft policy.
Protect and enhance valued landscapes, historic places and archaeological sites and other culturally and historically important features, landscapes and their settings	✓	
LANDSCAPE AND GEODIVERSITY		
Avoid adverse effects on landscapes and geodiversity	✓✓	Significant benefits are expected to arise long term. The draft policy supports protection of locally, regionally, nationally and internationally valued landscapes.
Safeguard and enhance the character and diversity of the Scottish landscape and areas of valuable landscape and geodiversity	✓✓	
MATERIAL ASSETS		
Avoid adversely impacting on material assets	✓	Positive effects are expected where the draft policy leads to protection, restoration and enhancement of Scotland's natural assets.
Promote the principles of circular economy	0	
Reduce use and promote sustainable management of natural and built environment resources	✓	
Promote the sustainable design, use and management of new and existing assets/infrastructure to support the development of high-quality places	0	
POPULATION AND HUMAN HEALTH		

Reduce the health gap and inequalities and improve healthy life expectancy	✓	Long term significant positive effects are expected where this draft policy gives support to protecting and restoring open space and natural environments.
Promote and enhance/improve access to open space, greenspace and the wider countryside	✓✓	
To protect and improve human health and wellbeing through improving the quality of the living environment of people and communities	✓✓	
Increase sustainable access to essential services, employment and the natural and historic environment	✓	

Peat and Carbon Rich Soils

The draft policy aims to protect carbon rich soils and preserve and restore peat, including through restricting peatland extraction. The draft policy notes peat and carbon rich soils play a critical role in helping to achieve net zero targets through sequestration of carbon, provide essential ecosystem services for nature, people and economy, with a key role in adapting to future climate change.



BIODIVERSITY, FLORA & FAUNA		
Avoid adverse impacts to designated habitats and species	✓✓	Long term, significant positive effects on biodiversity are expected due to the draft policy intention to protect locally, regionally, nationally and internationally valued soils.
Avoid adverse impacts to undesignated habitats and species	✓✓	
Protect, maintain and enhance biodiversity	✓✓	
CLIMATIC FACTORS		
Avoid new Greenhouse Gas (GHG) emissions	✓✓	Long term significant positive effects should arise where the draft policy leads supports carbon sequestration by peat and carbon-rich soils. As peatlands are Scotland's largest natural carbon sink, however degraded peat can function as a source of carbon emissions ³¹ . Peatlands influence water regulation with intact peat bogs storing water. Natural and restored peatland provide reduced downstream flood risks, thereby contributing to climate change adaptation.
Reduce GHG emissions in order to meet Scotland emissions reduction target of net zero by 2045.	✓✓	
Promote and enable adaptation to climate change	✓	
AIR		
Avoid adverse effects on air quality	✓	Positive effects are likely where this draft policy gives rise to enhanced carbon sequestration by peat and carbon-rich soils.
Reduce emissions of key pollutants and improve air quality throughout Scotland	✓	
Reduce levels of nuisance e.g. noise, vibration, dust, odour and light	0	
WATER		
Avoid adverse impacts on the ecological status of water bodies	✓✓	Significant positive effects should arise as peatlands can play an
Ensure the sustainable use of water resources	0	

³¹ NatureScot (2015) Scotland's National Peatland Plan [online] Available at: <https://www.nature.scot/scotlands-national-peatland-plan-working-our-future> (accessed 06/10/21)

Reduce the number of people and properties at risk of flooding and promote adaptive flood risk management	✓	important role in maintaining water quality and regulation flow ³² .
Protect, maintain and improve the ecological status and physical state of the water environment	✓✓	
SOIL		
Safeguard and improve soil health, protect soil resource and soil functions of all soil types in Scotland	✓✓	Significant long term positive effects are expected through focus on the protection of peat and carbon rich soils, including by restricting peat extraction.
Safeguard and improve high value agricultural land and carbon-rich soils	✓✓	
Reduce the extent of contaminated and vacant and derelict land	0	
CULTURAL HERITAGE AND HISTORIC ENVIRONMENT		
Avoid adverse impacts on the historic environment and its setting	✓	Protection of peats and carbon rich soils is likely to have positive effects on the cultural heritage, historic environment assets and their setting.
Protect and enhance valued landscapes, historic places and archaeological sites and other culturally and historically important features, landscapes and their settings	✓	
LANDSCAPE AND GEODIVERSITY		
Avoid adverse effects on landscapes and geodiversity	✓	Protection of peat and carbon rich soils should help to minimise impacts on landscapes.
Safeguard and enhance the character and diversity of the Scottish landscape and areas of valuable landscape and geodiversity	✓	
MATERIAL ASSETS		
Avoid adversely impacting on material assets	✓✓	Protection of peat and carbon rich soils has potential for long term, significant positive effects on natural material assets.
Promote the principles of circular economy	0	
Reduce use and promote sustainable management of natural and built environment resources	✓	
Promote the sustainable design, use and management of new and existing assets/infrastructure to support the development of high-quality places	0	
POPULATION AND HUMAN HEALTH		

³² NatureScot (Scottish Natural Heritage) (2015) Scotland's National Peatland Plan [online] Available at: <https://www.nature.scot/scotlands-national-peatland-plan-working-our-future> (accessed 01/10/2021)

Reduce the health gap and inequalities and improve healthy life expectancy	0	No significant effect are expected. The restoration and management of peatland can lead to multiple benefits, including indirectly where the income from this helps to maintain rural skills and employment ³³ .
Promote and enhance/improve access to open space, greenspace and the wider countryside	0	
To protect and improve human health and wellbeing through improving the quality of the living environment of people and communities	0	
Increase sustainable access to essential services, employment and the natural and historic environment	?√	

³³ NatureScot (Scottish Natural Heritage) (2015) Scotland's National Peatland Plan [online] Available at: <https://www.nature.scot/scotlands-national-peatland-plan-working-our-future> (accessed 01/10/21)

Trees, Woodland and Forestry

The draft policy aims to expand woodland cover, and protect existing woodlands, limiting woodland removal in association with development. It recognises the critical role trees and woodland play in helping to achieve net zero targets.

The draft policy also notes trees and woodlands provide essential ecosystem services for nature, people and economy, with a key role in adapting to future climate change.



BIODIVERSITY, FLORA & FAUNA

Avoid adverse impacts to designated habitats and species	✓✓	Long term significant positive effects on biodiversity are expected. Benefits may arise as the draft policy requires Local Development Plans to identify existing woodland and potential for its protection, enhancement or expansion to avoid habitat fragmentation and improve ecological connectivity.
Avoid adverse impacts to undesignated habitats and species	✓✓	
Protect, maintain and enhance biodiversity	✓✓	

CLIMATIC FACTORS

Avoid new Greenhouse Gas (GHG) emissions	✓	Long term significant positive effects may be achieved by through CO ₂ sequestration by trees and woodland. The scale of effects will be influenced by the scale of planting, and type of tree planted. Research indicates faster-growing, generally coniferous tree species can sequester carbon quickly in the medium to long term (<50 years) and can avoid indirect emissions in the very long term (>50 years) by providing renewable wood products and fuel to replace non-wood products that can involve high GHG emission in their manufacture. Whereas, slower-growing broadleaf tree species can accumulate high carbon reserves within the woodland itself in the very long term (>50-100+ years), but cannot provide the same indirect benefits by replacing non-wood products ³⁴ . The future development of Negative Emissions Technologies, for example, the use of biogenic feedstocks with CCS could also play a key role in GHG emissions reductions. Supplies of sustainable biomass, and competing
Reduce GHG emissions in order to meet Scotland emissions reduction target of net zero by 2045.	✓✓	
Promote and enable adaptation to climate change	✓	

³⁴ Scottish Forestry (2020) Climate Mitigation: Woodland creation and management [online] Available at: <https://forestry.gov.scot/forests-environment/climate-change> (accessed 05/10/21)

		<p>demands for this, could limit the potential for role of bioenergy with CCS.</p> <p>Potential indirect benefits where the draft policy leads to increased tree cover in urban areas as strategically placed vegetation can contribute to overall temperature regulation of cities³⁵.</p> <p>Potential for benefits to arise through the key role trees and woodlands can play in adapting to the impacts of climate change. Conversely, a changing climate, in combination with novel pests and pathogens, can negatively impact on these assets³⁶ which could impact on the ambitions of the draft policy. For example, in order to enhance adaptability and resilience of new planting programmes both the current climate and the relatively uncertain projections of the future climate should be taken into account.</p>
AIR		
Avoid adverse effects on air quality	✓✓	<p>Long term significant positive effects may be achieved should the draft policy lead to increased tree cover, particularly in urban areas, as forests and woodlands can improve air quality through the removal of pollutants including ozone, ammonia, sulphur dioxide, oxides of nitrogen and particulate matter³⁷. The scale of effect will be influenced by tree species and local conditions.</p>
Reduce emissions of key pollutants and improve air quality throughout Scotland	✓✓	
Reduce levels of nuisance e.g. noise, vibration, dust, odour and light	?✓	
WATER		
Avoid adverse impacts on the ecological status of water bodies	✓	<p>Long term positive effects are expected.</p>
Ensure the sustainable use of water resources	0	<p>Poorly designed, managed, or unsuitably located woodland can have</p>

³⁵ Forest Research (2013) Air temperature regulation by urban trees and green infrastructure [online] Available at: <https://www.forestresearch.gov.uk/research/air-temperature-regulation-by-urban-trees-and-green-infrastructure/> (accessed 05/10/21)

³⁶ NatureScot (2020) Woodland and climate change [online] Available at: <https://www.nature.scot/professional-advice/land-and-sea-management/managing-land/forests-and-woodlands/woodland-and-climate-change> (accessed 29/10/2021)

³⁷ Forest Research (2021) Improving Air Quality [online] Available at: <https://www.forestresearch.gov.uk/tools-and-resources/fthr/urban-regeneration-and-greenspace-partnership/greenspace-in-practice/benefits-of-greenspace/improving-air-quality/> (accessed 05/10/21)

Reduce the number of people and properties at risk of flooding and promote adaptive flood risk management	✓	negative effects on water by exacerbating the effects of acid deposition, causing eutrophication, increasing sediment delivery, affecting water colour and contributing to local flooding. These impacts can be minimised through sustainable forest management ³⁸ . Appropriately sited and sustainably managed, forestry and woodland can provide many benefits including improved water quality, and flow management by reducing rainwater run-off, and retaining sediments and other contaminants from entering watercourses.
Protect, maintain and improve the ecological status and physical state of the water environment	✓	
SOIL		
Safeguard and improve soil health, protect soil resource and soil functions of all soil types in Scotland	✓	Positive impacts should arise as forests and woodlands can lead to positive impacts through reduced soil erosion and regulation of water run-off. The expansion of forestry & woodlands, and activities including planting and felling, planting and harvesting, has potential to negatively impact soils by acidification, compaction, contamination and erosion ³⁹ . Disturbance from forestry activities can also result in altered nutrient dynamics, and can lead to increased soil carbon loss in peaty and carbon-rich soils, reducing its value as a carbon store ⁴⁰ . These impacts can however be minimised through sustainable forest management ⁴¹ . There is an opportunity to use woodland to decontaminate soils on post-industrial sites.
Safeguard and improve high value agricultural land and carbon-rich soils	✓	
Reduce the extent of contaminated and vacant and derelict land	?	
CULTURAL HERITAGE AND HISTORIC ENVIRONMENT		

³⁸ Scottish Government (2019) Scotland's Forestry Strategy 2019-2029 [online] Available at: <https://www.gov.scot/publications/scotlands-forestry-strategy-20192029/> (accessed 05/10/2021)

³⁹ Forestry Commission (2017) The UK Forestry Standard [online] Available at: <https://www.gov.uk/government/publications/the-uk-forestry-standard> (accessed 05/10/2021)

⁴⁰ Forest Research (2021) Woodland creation and soil carbon and nutrient dynamics [online] Available at: <https://www.forestresearch.gov.uk/research/soil-sustainability/woodland-creation-and-soil-carbon-and-nutrient-dynamics/> (accessed 05/10/2021)

⁴¹ Scottish Government (2019) Scotland's Forestry Strategy 2019-2029 [online] Available at: <https://www.gov.scot/publications/scotlands-forestry-strategy-20192029/> (accessed 05/10/2021)

Avoid adverse impacts on the historic environment and its setting	? ✓	Increasing tree cover has potential to physically impact historic assets, and can change the setting. Effects are uncertain, site specific and will be managed at plan and project level. Planting in accordance with the Right Tree in the Right Place guidance should minimise negative impacts, and facilitate identification of enhancement opportunities. Depending on the species grown, there may also be benefits for cultural heritage. There are also a number of cultural heritage sites and features that are located within the forest or woodlands (typically scheduled ancient monuments) and sites and features of the forest (such as ancient trees, stands and landscapes) ⁴² .
Protect and enhance valued landscapes, historic places and archaeological sites and other culturally and historically important features, landscapes and their settings	? ✓	
LANDSCAPE AND GEODIVERSITY		
Avoid adverse effects on landscapes and geodiversity	?	Increasing tree cover may change landscapes. Effects are uncertain, site specific and will be managed at plan and project level. Planting in accordance with the Right Tree in the Right Place ⁴³ guidance should minimise negative impacts.
Safeguard and enhance the character and diversity of the Scottish landscape and areas of valuable landscape and geodiversity	?	
MATERIAL ASSETS		
Avoid adversely impacting on material assets	✓✓	Long term significant positive effects are expected on natural material assets where the draft policy leads to increased woodland cover and sustainably managed forests. Increased availability of locally grown timber may also promote its use as a building material.
Promote the principles of circular economy	0	
Reduce use and promote sustainable management of natural and built environment resources	✓✓	
Promote the sustainable design, use and management of new and existing assets/infrastructure to support the development of high-quality places	✓	

⁴² Forest Research (undated) Cultural and heritage [online] Available at: <https://www.forestresearch.gov.uk/tools-and-resources/fthr/urban-regeneration-and-greenspace-partnership/greenspace-in-practice/benefits-of-greenspace/culture-and-heritage/> (accessed 29/10/2021)

⁴³ Forestry Commission Scotland (2010) The Right Tree in the Right Place [online] Available at: <https://forestry.gov.scot/publications/support-and-regulations/control-of-woodland-removal/the-planning-system/96-the-right-tree-in-the-right-place-planning-for-forestry-and-woodlands> (accessed 04/10/2021)

POPULATION AND HUMAN HEALTH		
Reduce the health gap and inequalities and improve healthy life expectancy	✓	Long term significant positive impacts may arise where the draft policy increases provision of accessible woodland space which can be used for recreational purposes thereby providing opportunities to improve health and wellbeing. Increased tree planting can also enhance the environmental quality of urban areas and support adaption to the impacts of climate change, such as providing solutions to flood risk management.
Promote and enhance/improve access to open space, greenspace and the wider countryside	✓✓	
To protect and improve human health and wellbeing through improving the quality of the living environment of people and communities	✓	
Increase sustainable access to essential services, employment and the natural and historic environment	✓	

Coasts

The draft policy notes the role that Scotland's coastal areas and their communities play in supporting important economic sectors like tourism, outdoor recreation and food and drink. The draft policy also identifies a need to address the long-term resilience of some coastal communities against the impacts of climate change and notes the planning system should provide a framework for protecting coastal communities and assets.



BIODIVERSITY, FLORA & FAUNA		
Avoid adverse impacts to designated habitats and species	?	Impacts on biodiversity are uncertain, and subject to consideration at plan and project consenting stages. Opportunities to enhance biodiversity should be identified at project level, for example, through the use of natural solutions to flood risk management.
Avoid adverse impacts to undesignated habitats and species	?	
Protect, maintain and enhance biodiversity	✓	
CLIMATIC FACTORS		
Avoid new Greenhouse Gas (GHG) emissions	? ✓	The use of natural solutions for coastal flood and erosion management can play a key role in carbon sequestration, with long term positive impacts expected to arise. The use of built engineered structures often require materials with high associated embodied carbon, such as concrete. Significantly positive impacts should arise from the continuing commitment to climate change mitigation and adaptation. The draft policy requires planning to consider the long term impacts of climate change and provide a framework for protecting coastal communities and assets. The draft policy also notes proposals in undeveloped coastal areas should only be supported if the proposal is necessary to support the blue economy or net-zero emissions, and that any such developments should be also be designed to have a very short lifespan or be
Reduce GHG emissions in order to meet Scotland emissions reduction target of net zero by 2045.	✓	
Promote and enable adaptation to climate change	✓✓	

		in a location that will remain supportable in the long term.
AIR		
Avoid adverse effects on air quality	0	No significant effects on air quality are expected.
Reduce emissions of key pollutants and improve air quality throughout Scotland	0	
Reduce levels of nuisance e.g. noise, vibration, dust, odour and light	0	
WATER		
Avoid adverse impacts on the ecological status of water bodies	0	Long term significant positive effects are expected to arise. The draft policy requires plans to recognise that rising sea levels and more extreme weather events will potentially have a significant impact on coastal and islands areas, and that a precautionary approach to flood risk including by inundation should be taken.
Ensure the sustainable use of water resources	0	
Reduce the number of people and properties at risk of flooding and promote adaptive flood risk management	✓✓	
Protect, maintain and improve the ecological status and physical state of the water environment	✓	
SOIL		
Safeguard and improve soil health, protect soil resource and soil functions of all soil types in Scotland	0	No significant effects are expected. The draft policy notes development proposals in undeveloped coastal areas should not result in increased risk to people of coastal erosion, including through the loss of natural coastal defences including dune systems.
Safeguard and improve high value agricultural land and carbon-rich soils	0	
Reduce the extent of contaminated and vacant and derelict land	0	
CULTURAL HERITAGE AND HISTORIC ENVIRONMENT		
Avoid adverse impacts on the historic environment and its setting	?✓	No significant effects are expected. Positive impacts should arise where the draft policy helps to reduce the risks of flooding and coastal erosion, as many historic landscapes and sites located in the coastal zone are particularly vulnerable to the impacts of climate change. Any negative impacts on cultural heritage and historic environment assets would be minimised though application of the principles within the Historic Assets and Places draft policy, and would be managed at plan and project consent stages.
Protect and enhance valued landscapes, historic places and archaeological sites and other culturally and historically important features, landscapes and their settings	?✓	

LANDSCAPE AND GEODIVERSITY		
Avoid adverse effects on landscapes and geodiversity	?	Coastal defence measures have potential to impact coastal landscapes. The draft policy notes proposals should only be supported if consistent with any relevant coastal or marine plans with natural solutions utilised with any in-perpetuity hard defence measures demonstrated to be necessary. Impacts should be managed as plan or project consenting stage.
Safeguard and enhance the character and diversity of the Scottish landscape and areas of valuable landscape and geodiversity	?	
MATERIAL ASSETS		
Avoid adversely impacting on material assets	✓✓	Significant positive effects are expected due to the emphasis on protecting coastal communities and assets, with the coast and foreshore considered to be at particular risk, from both sea level rise and coastal erosion. The draft policy notes It requires a precautionary approach to flood risk including by inundation thereby minimising adverse impacts of flooding associated with climate change.
Promote the principles of circular economy	0	
Reduce use and promote sustainable management of natural and built environment resources	✓	
Promote the sustainable design, use and management of new and existing assets/infrastructure to support the development of high-quality places	✓	
POPULATION AND HUMAN HEALTH		
Reduce the health gap and inequalities and improve healthy life expectancy	?✓	Measures to address the long-term resilience of some coastal communities may create long-term indirect positive effects on employment with the draft policy recognising that coastal areas support important economic sectors including tourism, outdoor recreation and food and drink. Long term benefits should also arise where increased consideration is given to improving resilience to impacts of climate change, with coastal assets particularly, for example, from rising sea levels and coastal erosion. Where implemented, nature based solutions to flood management should also lead to
Promote and enhance/improve access to open space, greenspace and the wider countryside	?✓	
To protect and improve human health and wellbeing through improving the quality of the living environment of people and communities	✓	
Increase sustainable access to essential services, employment and the natural and historic environment	✓✓	

		benefits through creation of attractive open spaces ⁴⁴ .
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Alternatives

- **Urban edges and the green belt**

C1.6.1 Updated policy on urban edges and the green belt aims to protect countryside around cities and towns, and limits the circumstances where green belt development can be acceptable to specific uses. There are a wide range of views held on the role the greenbelt can play, with some stakeholders advocating for the most stringent protections whilst others argue for abolishing the greenbelt altogether. There were also differing views on the types of uses acceptable in green belt areas. The assessment identifies the potential for positive effects from the draft policy across the SEA topics, and it follows that without the draft policy these effects may not be fully realised. The assessment findings note there are mixed views on the role the greenbelt may play in commuting distances, and consequently in helping to reduce GHG emissions.

- **Natural Places – wild land**

C1.6.2 Draft Natural Places policy takes a more flexible and nuanced approach to wild land than the current Scottish Planning Policy (SPP), the overall objective of which is to open up wild land for more development where this supports rural repopulation and climate change targets, in keeping with statutory outcomes for NPF.

C1.6.3 It follows that an **alternative** approach would be to retain current policy on wild land as set out in SPP. However, the Scottish Government considers draft NPF4 policy 32 strikes an appropriate balance in protecting our natural places whilst meeting statutory outcomes on increasing the population of rural areas of Scotland, and on meeting emissions reductions targets.

C1.6.4 It is difficult to predict in any meaningful way how impacts may differ between the proposed policy 32 (i) and the current SPP, taking into account the level of uncertainty arising in the application of policy to individual developments. Nonetheless, it is likely that were the current SPP retained, benefits for climate objectives and in meeting population and human health objectives for sustainable access to essential services and employment may be reduced, whilst positive effects for landscape and biodiversity could be enhanced.

- **Peat and carbon rich soils**

⁴⁴ Green4Grey (2020) Integrated planning for multifunctional land use [online] Available at: <https://green4grey.be/en/project-objective#integrale%20planning%20voor%20een%20veelzijdig%20landgebruik> (accessed 25/08/2021)

C1.6.5 Currently, SPP sets a high bar for the protection of peat from commercial extraction. Building on this existing protection, and in keeping with statutory requirements in the Planning Act for the Scottish Ministers to have regard to the desirability of preserving peatland when preparing the revised NPF, the draft NPF4 introduces new restrictions on commercial peat extraction. The draft policy sets out that development proposals for new commercial peat extraction, including extensions to existing sites, should not be supported except in certain limited circumstances. Overall the draft policy aims to balance the highest levels of protection for peatland whilst protecting the nationally important whisky industry. It follows that, were the policy exceptions to be removed or further tightened, the potential for positive effects for the environment identified as arising from the draft policy may be further magnified. It is understood that peat extraction for whisky production is much less than that extracted for other purposes including horticulture.

- **Trees, woodland and forestry**

C1.6.6 We are aware of calls from some stakeholders for the introduction of new policy on 'buffer zones' around certain trees, including ancient and veteran trees. The draft NPF4 does not include such provision and we are not minded to introduce such provision, for the reasons set out below. Draft policy 34(b) does however include draft policy such that development proposals should not be supported where they would result in 'any loss of ancient woodlands, ancient and veteran trees, or adverse impact on their ecological condition'. It is considered that this approach will ensure high levels of protection whilst taking into account the circumstances of the individual case, including on matters such as topography, and of the condition of the tree(s) concerned, helping to avoid unintended consequences which could arise from a 'one size fits all' approach. This is complemented by the existing statutory duty on planning authorities, to ensure, whenever it is appropriate, that in granting planning permission for any development adequate provision is made, by the imposition of conditions, for the preservation or planting of trees. (Section 159 of the Town and Country Planning (Scotland) Act 1997 as amended).

C1.6.7 We are also aware of calls from some stakeholders for NPF4 to introduce targets for canopy cover. The Scottish Government is not minded to introduce such a requirement, for the reasons set out below.

C1.6.8 Whilst not every development proposal will be suitable for trees, there is an existing statutory duty on planning authorities, to ensure, whenever it is appropriate, that in granting planning permission for any development adequate provision is made, by the imposition of conditions, for the preservation or planting of trees. (Section 159 of the Town and Country Planning (Scotland) Act 1997 as amended). The draft NPF4 includes provision such that local development plans should identify and protect existing woodland and potential for its enhancement or expansion. The spatial strategy should also identify and set out proposals for the development of forestry and woodlands in their area, in associated Forestry and Woodland Strategies, including their development, protection

and enhancement, in accordance with The Right Tree in the Right Place guidance.

Appendix D - Proposed National Developments

D1.1 Introduction

- D1.1.1 This appendix contains the detailed assessment tables for the proposed National Developments.
- D1.1.2 Further information on the policy consideration of suggestions received for National Developments is set out in the “*Scottish Government’s National Developments: Report of Assessment*” available to view online¹. Assessment findings for alternative national developments are set out separately in Appendix E.

D1.1.3 The following proposed national developments have been assessed:

1. Central Scotland Green Network.....	D8
2. National Walking, Cycling and Wheeling Network.....	D12
3. Urban Mass/Rapid Transit Networks.....	D16
4. Urban Sustainable, Blue and Green Drainage Solutions.....	D20
5. Circular Economy Materials Management Facilities.....	D24
6. Digital Fibre Network.....	D27
7. Islands Hub for Net Zero.....	D31
8. Industrial Green Transition Zones.....	D36
9. Pumped Hydro Storage.....	D41
10. Hunterston Strategic Asset.....	D45
11. Chapelcross Power Station Redevelopment.....	D49
12. Strategic Renewable Electricity Generation and Transmission Infrastructure.....	D53
13. High Speed Rail.....	D56
14. Clyde Mission.....	D60
15. Aberdeen Harbour.....	D64
16. Dundee Waterfront.....	D69
17. Edinburgh Waterfront.....	D74
18. Stranraer Gateway.....	D78

¹ Scottish Government (undated) Transforming Planning: National Planning Framework (online) Available at: <https://www.transformingplanning.scot/national-planning-framework/> (accessed: 09/11/2021)

What are 'national developments'?

- D1.1.4 The Town and Country Planning (Scotland) Act 1997 (as amended)² enables 'national developments' to be designated in the National Planning Framework (NPF). The proposed national developments are those developments the Scottish Ministers consider strongly support the draft NPF4 spatial strategy, i.e. are 'needed'. Designation as a national development establishes the principle of need but does not remove the requirement for relevant consents to be obtained before development can begin. Establishing need can facilitate onward decision making, where the matter of the need should not be considered again. Proposals will however still be subject to consideration and assessment through relevant statutory mechanisms to ensure acceptable impacts prior to development consent being granted, including through the planning system, Environmental Impact Assessment, and Habitats Regulations Appraisal as appropriate.

D1.2 Assessment Methodology

- D1.2.1 In line with our Integrated Impact Assessment ('IIA') November 2020 Update³ we have taken an iterative approach to assessing suggested national developments, front-loading their consideration so that early and emerging assessment findings could help to guide and inform the selection of proposed national developments. Figure D1.1 below refers. This appendix sets out findings of the environmental assessment for the proposed national developments included in the draft NPF4.

² The Town and Country Planning (Scotland) Act 1997 (online) Available at: <https://www.legislation.gov.uk/ukpga/1997/8/contents> (accessed 09/11/2021)

³ Scottish Government (2020) Planning for Scotland in 2050 - National Planning Framework 4: Integrated Impact Assessment Update (online) Available at : <https://www.transformingplanning.scot/media/2135/national-planning-framework-4-integrated-impact-assessment-position-statement-update-on-ia.pdf> (accessed 09/11/2021)

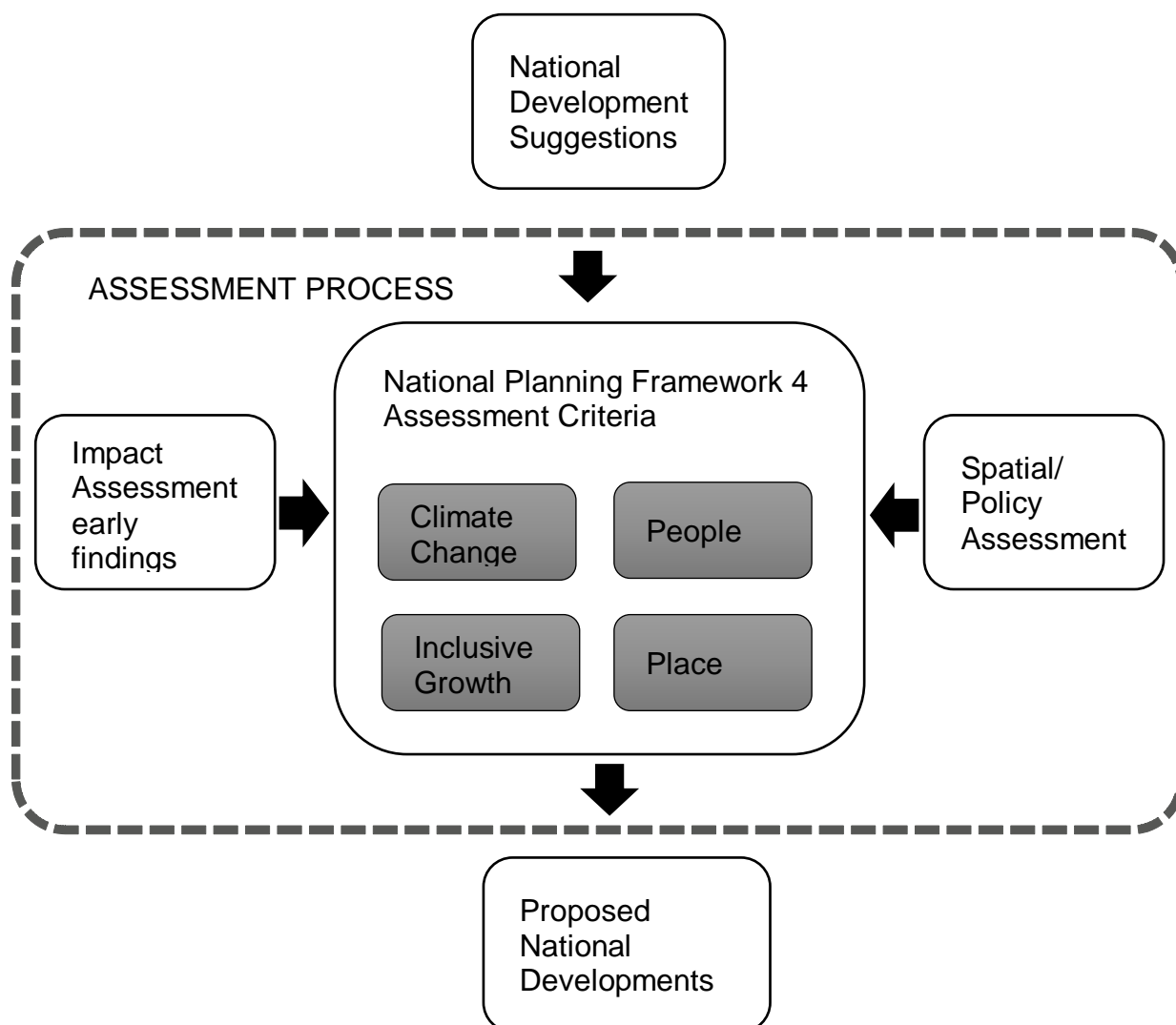


Figure D1.1 Assessment process of the national developments

Lifecycle Greenhouse Gas Emissions

D1.2.2 The Town and Country (Scotland) Planning Act 2019 requires the Scottish Government to undertake an assessment of the likely impact of each proposed national development’s lifecycle greenhouse gas emissions on achieving national greenhouse gas emissions reduction targets. We commissioned independent consultants LUC to undertake this assessment and the findings of their research⁴ have been taken into account in the assessment of the proposed national developments where relevant.

⁴ Research project: Lifecycle Greenhouse Gas Emissions of NPF4 Proposed National Developments Assessment Findings (2021) Available at: <https://www.transformingplanning.scot/national-planning-framework/> (accessed 09/11/2021)

D1.2.3 We commissioned independent consultants AECOM to undertake an HRA of the NPF4. The assessment has also been informed, where relevant, by their draft initial HRA screening findings⁵.

D1.2.4 The assessment has also built on other relevant SEAs, in particular the NPF3 SEA Environmental Report and Environmental Report update. Also of relevance are SEAs undertaken on other Scottish Government plans, programmes and strategies, such as the draft Infrastructure Investment Plan and Scotland’s Second National Transport Strategy. Finally, the assessment has been informed by the SEA objectives.

Table D1.1: SEA Objectives

Topic	SEA objectives
Biodiversity, flora and fauna	Avoid adverse impacts to designated habitats and species
	Avoid adverse impacts to undesignated habitats and species
	Protect, maintain and enhance biodiversity
Climatic Factors	Avoid new Greenhouse Gas (GHG) emissions.
	Reduce GHG emissions in order to meet Scotland emissions reduction target of net zero by 2045
	Promote and enable adaptation to climate change
Air	Avoid adverse impacts to air quality
	Reduce emissions of key pollutants and improve air quality throughout Scotland
	Reduce levels of nuisance e.g. noise, vibration, dust, odour and light

⁵ Habitats Regulations Appraisal of National Planning Framework 4 – Initial HRA screening record (online) Available at: <https://www.transformingplanning.scot/national-planning-framework/> (accessed 09/11/2021)

Water	Avoid adverse impacts on the ecological status of water bodies
	Ensure the sustainable use of water resources
	Reduce the number of people and properties at risk of flooding and promote adaptive flood risk management
	Protect, maintain and improve the ecological status and physical state of the water environment
Soil	Safeguard and improve soil health, protect soil resource and soil functions of all soil types in Scotland
	Safeguard and improve high value agricultural land and carbon-rich soils
	Reduce the extent of contaminated and vacant and derelict land
Cultural Heritage and Historic Environment	Avoid adverse impacts on the historic environment including its setting
	Protect and enhance valued landscapes, historic and archaeological sites and other culturally and historically important features, landscapes and their settings
Landscape and Geodiversity	Avoid adverse effects on landscapes and geodiversity
	Safeguard and enhance the character and diversity of the Scottish landscape and areas of valuable landscape and geodiversity
Material Assets	Avoid adversely impacting on material assets (e.g. water, heat, energy and flood protection infrastructure. etc)
	Promote the principles of circular economy
	Reduce use and promote sustainable management of natural and built environment resources
	Promote the sustainable design, use and management of new and existing assets/infrastructure to support the development of high-quality places
Population and human health	Reduce the health gap and inequalities and improve healthy life expectancy
	Promote and enhance/improve access to open space, greenspace and the wider countryside
	To protect and improve human health and wellbeing through improving the quality of the living environment of people and communities
	Increase sustainable access to essential services, employment and the natural and historic environment.

D1.3 Assessment of likely health effects

D1.3.1 The Planning (Scotland) Act 2019 requires Scottish Ministers to bring forward new provisions about the consideration to be given, before planning permission for a national development or a major development is granted, to the likely health effects of the proposed development. To inform this work, we have given consideration to the likely health effects of proposed national developments as part of the SEA process. In doing so, a holistic approach has been taken, recognising the interconnected nature of the SEA Topics, for example, the link between air quality and human

health. Further, this requirement has been integrated into the SEA process by:

- An expanded SEA objective on human health within the SEA topic of Population and Human Health to help frame the assessment.
- Drawing and building on evidence gathered through the wider IIA which accompanies the NPF4, and Public Health Scotland's NPF4: Briefing on health and proposed National Developments⁶.

Limitations and uncertainties in undertaking the SEA

- D1.3.2 It is recognised that many of the potential impacts that could arise from the proposed national developments will depend on factors such as siting, design and location. Designation as a national development does not remove requirements for relevant consents to be obtained before development can begin, and it follows that there is considerable uncertainty as to the detailed scale and location of development that may take place in future.
- D1.3.3 As such, it has not been possible for the SEA to provide a detailed assessment of all potential impacts. Rather, the assessment identifies and highlights wherever possible significant effects and potential issues that may arise to inform the more detailed consideration of individual proposals at project stage. Particular areas of uncertainty are highlighted where relevant to the assessment.

Assessment conclusions

- D1.3.4 Overall assessment conclusions are reported for each proposed national development in the tables below. In addition, the assessment identified the potential for construction activities generally to have localised adverse environmental effects on most of the SEA topics. Examples include increased levels of noise, dust and vibration; and, disturbance from construction traffic amongst others, which can in turn impact on human health. The potential for short term emissions associated with the construction of new developments/infrastructure, as well as long term negative effects associated with embodied carbon where sustainable construction practices are not utilised, is also acknowledged. To avoid repetition, these potential impacts have not been set out in each individual assessment.
- D1.3.5 It is also expected that in taking forward the proposed national developments, delivery partners will consider a number of actions that have the potential to reduce/minimise identified negative effects and/or enhance positive effects. These include that known and predicted climate risks are managed, biodiversity restoration/improvements are undertaken as far as possible and support is provided for a community wealth building

⁶ Public Health Scotland (2021) National Planning Framework 4: Briefing on health and proposed National Developments (online) Available at: <https://www.publichealthscotland.scot/publications/national-planning-framework-4-briefing-on-health-and-proposed-national-developments/> (accessed 09/11/2021)

approach, aligning with draft Policy in NPF4. Where applicable, this “assumed mitigation” proved by draft Policies has been factored into the assessment of significance of effects, with further opportunities for enhancing benefits set out where possible.

1. Central Scotland Green Network

D1.3.6 The proposed national development is to support delivery of green infrastructure in Central Scotland.

D1.3.7 Location: Central Scotland local authorities within a boundary identified by the Green Action Trust⁷.

Topic	Assessment Findings
Biodiversity, flora and fauna	<p>Significant long term benefits for biodiversity are expected where a focus on green infrastructure supports delivery of high quality and multifunctioning spaces at scale. Where focus is given to restoration and enhancement e.g. of existing low quality environments, or to addressing a lack of good quality open greenspace or habitat fragmentation, benefits could be maximised. Further, the remediation of vacant and derelict land should also lead to overall benefits. This can, however, lead to the displacement of species which might have colonised these sites, and may therefore require further consideration at the project stage.</p>
Climatic factors	<p>The Lifecycle GHG assessment concluded that, depending on the nature of the projects taken forward and considering both direct and indirect effects, this development will likely have an overall net positive impact on achieving national greenhouse gas emissions reduction targets. This is due to reduced transport emissions associated with higher uptake of active travel, reduced flood risk and greater rates of carbon sequestration due to the creation of new greenspace and large-scale planting of trees.</p> <p>The scale of this effect was considered likely to be in the range of medium to high as the development is likely to encourage a change in behaviour around active travel in central Scotland over a long time period. A medium scale of effect would result from higher embodied carbon in construction infrastructure, lower levels of active travel and lower levels of flood risk reduction. Conversely, lower embodied carbon in construction infrastructure, higher levels of active travel and higher levels of flood risk reduction would result in a higher scale of effect.</p> <p>Significant positive effects on climate change adaptation are expected for example where the development leads to multi-functional green infrastructure for climate adaptation purposes, or new or upgraded sustainable water management and drainage systems through increased resilience to flood risk.</p>
Water	<p>Positive impacts should arise through use of natural solutions to flood management from reduced risk of flooding and diffuse pollution and could also lead to benefits for population and human health including through creation of attractive open spaces⁸.</p>

⁷ CSGN (2021) Central Green Scotland Network: Local Authorities (online) Available at: <http://www.centralscotlandgreennetwork.org/partners/local-authorities> (accessed 01/10/2021)

⁸ Green4Grey (2020) Integrated planning for multifunctional land use (online) Available at: <https://green4grey.be/en/project-objective#integrale%20planning%20voor%20een%20veelzijdig%20landgebruik> (accessed 25/08/2021)

Air	Support for active travel should lead to long term benefits where this achieves a modal shift from more polluting forms of transport. This may be of particular relevance where air quality issues associated with transport exist, such as urban areas. Additional benefits could also arise from reduced exposure to noise which, alongside improved air quality, can have associated benefits including for population and human health. Wider secondary benefits should also arise through the role of natural infrastructure in improving air quality, for example, through the absorption of pollutants such as particulate matter.
Soil	Potential for positive impacts through support for broader environmental improvements leading to improved ecosystem health. Further benefits should also arise from the remediation of vacant and derelict land.
Cultural Heritage and Historic Environment	Where works undertaken take account of and work positively with the historic environment to add value, including through the role these assets can play in placemaking, associated positive impacts should arise. Potential impacts on known and unknown archaeological assets from activities such as planting will need to be taken into account and addressed by applying established good practice standards.
Landscape and Geodiversity	Potential for significant benefits to arise through improvements in landscape, particularly where focus is given to restoring and enhancing degraded landscapes. Further, well-designed and managed green infrastructure assets, particularly those that engage local communities and which relate to landscape character and heritage, can enhance local sense of place and foster community spirit ⁹ . Opportunities should be explored at project level to ensure that interventions are consistent with landscape character to maximise benefits.
Material assets	The use and enhancement of natural assets, including focus given to the remediation of vacant and derelict land, the role of blue/green infrastructure and re-use of existing built assets, has the potential to be significantly beneficial, particularly where these play a key role in supporting improved placemaking. Positive impacts should also arise from increased access to sustainable modes of travel, which can support improved sense of place.
Population and human health	Significant positive impacts may arise through improved access to open space and the wider environment and access to services, leading to societal benefits. For example, the “green” and “blue” features of the natural and built environment are widely recognised and valued as essential components of successful places ¹⁰ . Remediation of vacant and derelict land could be significantly beneficial due to the adverse environmental and social impacts it can have on nearby communities ¹¹ . Community food-growing spaces and food-growing can contribute to, and

⁹ Landscape Institute (2009) Green Infrastructure: connected and multifunctional landscapes (online) Available at: [GreenInfrastructurepositionstatement13May09.pdf \(windows.net\)](#) (accessed 29/09/2021)

¹⁰ Nature Scotland (2019) the Place Principle – our contribution to place-based working (online) Available at: <https://www.nature.scot/place-principle-our-contribution-place-based-working> (accessed 25/08/2021)

¹¹ Greenspace Scotland (2020) negative impact of vacant land on communities (online) Available at: <https://www.greenspacescotland.org.uk/news/derelict-sites-contribute-to-perceptions-of-urban-decline> (accessed 25/08/2021)

	<p>benefit, the environment and quality of life for local residents, including revitalising unused spaces or bringing vacant or derelict land back into use and supporting improved sense of community¹².</p> <p>Potential for modal shift and increased access and uptake of active travel to give rise to significant benefits for both physical and mental health and wider societal benefits, including improved levels of social interaction and sense of place. This could be particularly relevant in areas where poor health and low levels of activity exist and in deprived areas. Further, those living in deprived areas are more likely to live close to derelict and vacant land compared to those living in less deprived areas¹³. Benefits should also arise through improved flood management, and flooding can significantly affect people, communities and businesses¹⁴.</p>
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Summary of health implications

- D1.3.8 Potential for significant benefits for health and wellbeing, including both mental and physical, from the multiple benefits natural infrastructure can provide. For example, access to high quality greenspace can improve the health, wellbeing and confidence of people and communities as well as creating a sense of place¹⁵. Wider benefits should arise through a focus on blue/green networks and the role of natural infrastructure as a natural solution to flood management, including where this improves local landscape and sense of place. The remediation of vacant and derelict land also has the potential to be beneficial by reducing adverse environmental and social impacts on nearby communities.
- D1.3.9 It has been suggested that the benefits of high quality greenspace on physical and mental health might be most significant for certain groups within the population, for example children, older people, women and people on low incomes¹⁶. Currently there are a number of Scotland's 10% and 20% most deprived communities located within the Central Belt¹⁷ and within the Local Authority areas that comprise the Central Scotland Green

¹² Edible Estates (2019) Benefits of community growing (online) Available at:

<http://www.edibleestates.co.uk/benefits-of-community-growing/> (accessed 29/09/2021)

¹³ Public Health Scotland (2021) National Planning Framework 4: Briefing on health and proposed National Developments (online) Available at:

<https://www.publichealthscotland.scot/publications/national-planning-framework-4-briefing-on-health-and-proposed-national-developments/> (accessed 30/09/2021)

¹⁴ Public Health Scotland (2021) National Planning Framework 4: Briefing on health and proposed National Developments (online) Available at:

<https://www.publichealthscotland.scot/publications/national-planning-framework-4-briefing-on-health-and-proposed-national-developments/> (accessed 30/09/2021)

¹⁵ Scottish Government (2019) National Indicator: Greenspace (online) Available at:

<https://www2.gov.scot/About/Performance/scotPerforms/indicator/greenspace#importance> (accessed 25/08/2021)

¹⁶ Public Health Scotland (2021) National Planning Framework 4: Briefing on health and proposed National Developments (online) Available at:

<https://www.publichealthscotland.scot/publications/national-planning-framework-4-briefing-on-health-and-proposed-national-developments/> (accessed 30/09/2021)

¹⁷ Scottish Government (undated) Scottish Index of Multiple Deprivation 2020 (online) Available at:

<https://www.gov.scot/collections/scottish-index-of-multiple-deprivation-2020/> (accessed 29/09/2021)

Network¹⁸. There is potential for increased access to greenspace and uptake of active travel and physical activity to lead to significant benefits for both physical and mental health. Where opportunities are sought to ensure multiple benefits are achieved, positive impact should be maximised.

D1.3.10 Gaps/uncertainties:

- The precise nature, scale and location of projects that could be brought forward are unknown.
- Potential for brownfield land to be affected by contamination. The extent/level of potential contamination and scale/type of remediation work that may be required, is unknown.

D1.3.11 Mitigation/opportunities for enhancement:

- Consideration should be given to factors such as the type, quality, accessibility and proximity of natural spaces to where people live as this can influence how the infrastructure/spaces are used. Positive impacts could be maximised by ensuring natural infrastructure is accessible to a wide range of users and by focusing investment in areas to reduce inequalities.
- To increase carbon sequestration, the scale of expansion, number of trees and type of development should be maximised whilst protecting existing high carbon soils.
- Opportunities to enhance high carbon soils should be explored.
- The assessment supports draft NPF4 provisions that help to achieve a circular economy and prioritisation should be given to the reuse of materials in construction, use of low carbon construction materials prioritised (seating, lighting, tree protective equipment etc), and materials should be reused or recycled upon decommissioning.
- The green network should be accessible to a wide range of users, and should be well linked with other active travel routes and public transport modes to further reduce potential emissions from transport.
- Opportunities to maximise landscape benefits should be explored, for example through a focus on landscape quality and remediation of vacant and derelict land.

¹⁸ CSGN (2021) Central Green Scotland Network: Local Authorities (online) Available at: <http://www.centralscotlandgreennetwork.org/partners/local-authorities> (accessed 01/10/2021)

2. National Walking, Cycling and Wheeling Network

D1.3.12 Proposed national development for upgrading and provision of additional active travel.

D1.3.13 Location: all Scotland.

Topic	Assessment Findings
Biodiversity, flora and fauna	<p>Negative impacts could arise from new infrastructure requirements to facilitate modal shift, such as segregated cycle lanes. Impacts could be short term, during construction, or long term through disturbance, and particular consideration should be given at project level to any sensitive protected species and habitats.</p> <p>Negative impacts for biodiversity can be minimised by following good practice guidance for the development of active travel infrastructure and where possible, through the use of existing infrastructure. Consideration may also need to be given to the possible displacement of species that might have colonised brownfield sites where applicable.</p> <p>Wider benefits, including biodiversity enhancement and improved understanding of natural heritage are expected with potential to enhance biodiversity benefits through use of green infrastructure and opportunities to improve habitat corridors.</p>
Climatic factors	<p>The Lifecycle GHG Assessment concluded that, depending on the nature of the projects taken forward and considering both direct and indirect effects, this development will have a net positive impact on achieving national greenhouse gas emissions reduction targets due to the support for low carbon and active travel.</p> <p>The scale of this effect could range from high to very high positive assuming a high level of uptake and a long timeframe for the benefits. If this development facilitates a shift in travel behaviour, with a significant amount of people travelling through the network via active modes, very high positive effects are expected. These very high positive effects are likely to be further enhanced by opportunities for carbon sequestration linked to the provision of green and blue infrastructure. However, if uptake of active travel is less, and there are fewer opportunities for carbon sequestration this may reduce to high positive. Uncertainty about the nature and scale of these effects means that there is low confidence in this overall conclusion.</p> <p>The use of natural infrastructure to support active travel can lead to improved linkages with open space and habitat corridors, which has the potential to support adaptation to climate change.</p>
Water	<p>No significant effects on water are expected, although route design may need to take into account local characteristics and sensitivities.</p> <p>Where natural infrastructure is used to support active travel, this can lead to improved ecosystem health, in turn, potentially benefiting water quality and management.</p>
Air	<p>Positive impacts should arise where measures lead to a modal shift from more polluting forms of transport. These benefits could be significant depending on uptake and have the potential to be greater in areas where pollution issues currently exist, such as AQMAs, and by those most</p>

	vulnerable to the impacts of atmospheric pollution, for example, the elderly and young and those experiencing pre-existing health conditions.
Soil	Potential for localised negative effects such as compaction leading to a loss of soil function where infrastructure development is required. Route design should take into account local characteristics and sensitivities.
Cultural Heritage and Historic Environment	Project level consideration may need to be given to possible negative impacts that the construction of paths or routes could have though visual impacts or negative effects on sites and their settings. Any potential adverse effects on known and unknown archaeological remains should be avoided or minimised through appropriate design, routing and construction. Positive impacts have the potential to arise through raising awareness and understanding of cultural heritage.
Landscape and Geodiversity	Benefits should arise through increased awareness and enjoyment of landscapes. Consideration may need to be given at project level to potential localised impacts for example from signage, particularly in sensitive locations.
Material assets	Potential for significant positive impacts where this leads to an integrated transport system that supports multi modes of travel and leads to improved sense of place. Re-use of existing infrastructure alongside remediation of brownfield land, where possible, should reduce pressure on natural resources and align with circular economy principles.
Population and human health	Increased accessibility to a more connected transport network and uptake of alternative and more sustainable modes of transport, such as active travel, can lead to multiple benefits, including improved physical and mental health. Depending on uptake, the benefits of this have the potential to be significant, particularly in areas where low levels of activity or deprivation exist. For example, adults in the most deprived areas are more likely to have very low activity levels than those in the least deprived ¹⁹ . Significant inequalities in levels of obesity also exist between those within the least and most deprived groups in Scotland ¹⁹ . Additional secondary benefits should also arise where a modal shift leads to improved air quality and reduced exposure to noise, particularly in urban locations, including where this leads to increased levels of social interaction ²⁰ . This has the potential to be of greater relevance to those at higher risk, for example, those considered to be living in deprivation or experiencing pre-existing health conditions such as respiratory disease ²¹ . Additionally, a number of reviews have suggested that people in deprived communities tend to be exposed to higher levels of air and noise pollution compared to those in less deprived areas ²¹ .

¹⁹ Scottish Government (2018) Scottish health survey 2018: Key findings (online) Available at: <https://www.gov.scot/publications/scottish-health-survey-2018-summary-key-findings/pages/8/> (accessed 09/11/2021)

²⁰ WHO (2018) Health, environment and sustainable development (online) Available at: <http://www.who.int/sustainable-development/transport/health-risks/noise/en/> (accessed 25/08/2021)

²¹ Public Health Scotland (2021) National Planning Framework 4: Briefing on health and proposed National Developments (online) Available at: <https://www.publichealthscotland.scot/publications/national-planning-framework-4-briefing-on-health-and-proposed-national-developments/> (accessed 30/09/2021)

	<p>The use of green infrastructure to support active travel can lead to multiple benefits for population and human health, including through habitat creation and enhancement, improved air quality and improved sense of place. Where focus is given to reducing inequalities, these benefits can be maximised, further supporting accessibility and encouraging uptake.</p>
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Summary of health implications

- D1.3.14 Where development leads to increased connectivity and uptake of active travel, multiple benefits can arise including improved physical and mental health. Active travel can help to reduce road traffic accidents involving vehicles/cars²² and can help reduce GHG emissions, with those who are socially and economically disadvantaged more likely to experience the impacts of climate change, yet contribute least to the generation of GHG emissions²³. Further, those living in more deprived areas are more likely to experience poor quality environments or environmental burdens on health, for example, poorer air quality²⁴. It has been found by a number of reviews that those living on lower incomes are also more likely to live in high traffic areas²⁵.
- D1.3.15 Wider benefits, both societal and environmental, should also arise, including through the use of natural infrastructure, such as improved sense of place. Infrastructure that supports active travel can also reduce severance and social isolation. Poor accessibility to essential services such as health and social care can lead to negative impacts on health, including from potential reductions in social cohesion and social networks²⁶. Potential positive impacts should be maximised through ensuring supporting infrastructure is suitable for a wide range of users and focusing investment in areas to reduce inequalities, further supporting accessibility, and in turn, encouraging greater uptake. Additionally, this can create benefits through local inclusive economic growth which can

²² UK Health Alliance on Climate Change (2016) A Breath of Fresh Air, Addressing Climate Change and Air Pollution Together for Health (online) Available at: <http://www.ukhealthalliance.org/wp-content/uploads/2016/10/UK-Health-Alliance-A-Breath-of-Fresh-Air-Final-Report.pdf> (accessed 25/08/2021)

²³ Preston, I. et al. (2014) Climate change and social justice: An evidence review. York: Joseph Roundtree Foundation; 2014 (online) Available at: [Climate change and social justice: an evidence review | JRF](https://www.jrf.org.uk/publications/climate-change-and-social-justice-an-evidence-review) (accessed 03/09/2021)

²⁴ Public Health Scotland (2021) National Planning Framework 4: Briefing on health and proposed National Developments (online) Available at: <https://www.publichealthscotland.scot/publications/national-planning-framework-4-briefing-on-health-and-proposed-national-developments/> (accessed 30/09/2021)

²⁵ Public Health Scotland (2021) National Planning Framework 4: Briefing on health and proposed National Developments (online) Available at: <https://www.publichealthscotland.scot/publications/national-planning-framework-4-briefing-on-health-and-proposed-national-developments/> (accessed 30/09/2021)

²⁶ Public Health Scotland (2021) National Planning Framework 4: Briefing on health and proposed National Developments (online) Available at: <https://www.publichealthscotland.scot/publications/national-planning-framework-4-briefing-on-health-and-proposed-national-developments/> (accessed 30/09/2021)

have an important role in improving health and reducing health inequalities²⁷.

D1.3.16 Gaps/uncertainties

- The precise nature, scale and location of projects that could be brought forward are unknown.
- Potential for brownfield land to be affected by contamination. The extent/level of potential contamination and scale/type of remediation work that may be required, is unknown.

D1.3.17 Mitigation/opportunities for enhancement

- Opportunities should be sought to maximise benefits through targeted action, for example, the implementation of measures in, or close to areas with concentrations of poor health and low levels of physical activity and where current air quality issues or levels of deprivation exist.
- Opportunities should be sought to improve interconnectivity within existing networks, including wider street networks and public transport.
- Opportunities should be sought to ensure accessibility for all needs/users.
- Opportunities should be sought to use natural infrastructure to support active travel due to the multiple co-benefits they can deliver.
- Waste should be minimised during the construction phase. The reuse of material should be prioritised and low carbon construction material utilised.

²⁷ Local Government Association (2019) Nobody left behind: Maximising the health benefits of an inclusive local economy. London: Local Government Authority; 2019 (online) Available at: http://www.local.gov.uk/sites/default/files/documents/22.15%20inclusive%20growth_04.1.pdf (accessed 25/08/2021)

3. Urban Mass/Rapid Transit Networks

D1.3.18 The proposed national development is to deliver low carbon transport solutions to support reduction in private car use in Aberdeen, Edinburgh and Glasgow providing better access to employment and supporting investment.

D1.3.19 Location: Aberdeen, Glasgow and Edinburgh City Regions.

Topic	Assessment Findings
Biodiversity, flora and fauna	<p>Potential for negative impacts to arise from the construction and operation of supporting infrastructure/interventions, including tracks, passenger and depot infrastructure. Potential impacts could be both short and long term and include disturbance, habitat loss or damage. Negative impacts could also arise through the fragmentation of existing habitats and networks and impacts on species movement.</p> <p>The re-use of existing infrastructure where possible, should help to reduce/minimise potential negative impacts.</p> <p>Potential for negative impacts to be minimised through siting and design and enhancement measures applied in keeping with national policy.</p>
Climatic factors	<p>The Lifecycle GHG Assessment concluded that, depending on the nature of the projects taken forward and considering both direct and indirect effects, this development will likely have an overall net positive impact on achieving national greenhouse gas emissions reduction targets. This is considered likely as the long-term positive effects of three of Scotland's major cities using sustainable transport powered by low carbon electricity is likely to outweigh the short-term negative effects.</p> <p>The scale of this effect could range from medium to very high positive depending on the network extent and level of uptake. If this development facilitates a shift in travel behaviour, with a significant amount of people travelling via the mass/rapid transit networks very high positive effects are expected. However if uptake is less, positive effects may reduce to medium positive.</p>
Water	<p>Construction of new, or modifications to existing infrastructure/interventions could impact on waterbodies, including physical changes and water pollution. The scale of effect is uncertain at this stage and would depend on factors such as infrastructure requirements, with mitigation to avoid or minimise impacts likely to be required at site level.</p>
Air	<p>Significant secondary benefits should arise over the long term from potentially encouraging modal shift to more sustainable, low-carbon modes of transport²⁸. This is likely to be particularly relevant where air quality issues currently exist, with a number of Air Quality Management Areas (AQMAs) designated in urban areas due to transport emissions, and by those most vulnerable to the effects of air pollution.</p>
Soil	<p>Potential for long term negative effects such as compaction leading to a loss of soil function, resulting from improvements and development of</p>

²⁸ Strategic Transport Project Review 2 (2019) Scoping Report (online) Available at: <https://www.strategicenvironmentalassessment.gov.scot/> (accessed 25/08/2021)

	<p>associated infrastructure/interventions. The scale of effects is uncertain at this stage and is likely to depend on the interventions brought forward. The re-use of, and co-location with, existing infrastructure where possible should help to reduce/minimise possible negative impacts.</p>
Cultural Heritage and Historic Environment	<p>Potential impacts, both positive and negative, on historic buildings and effects on the setting of some historic sites are likely to require consideration at project level.</p> <p>Negative impacts on known and unknown archaeological remains could also arise which may also need to be taken into account at project level. There is the potential for positive impacts to arise, including through improved access and understanding of key assets²⁹ and through the key role of cultural heritage assets in placemaking.</p>
Landscape and Geodiversity	<p>Negative impacts could arise, including where new physical infrastructure/interventions are required, however, the scale of effect is uncertain. Where future works build on existing infrastructure within established transport corridors, negative impacts could be minimised. Benefits could arise where projects are integrated with wider placemaking decisions.</p>
Material assets	<p>Positive impacts through support for increased interconnectivity and sustainable modes of transport, particularly where opportunities are sought to support improved placemaking. The re-use of existing infrastructure should also reduce pressure on natural resources, aligning with circular economy principles. There is an opportunity to give early consideration to future-proofing infrastructure or identifying opportunities to accommodate new and emerging technologies to further support climate change mitigation and adaptation.</p>
Population and human health	<p>Improved access and connectivity to key services, such as employment opportunities, also has the potential to lead to positive impacts. The benefits of this should be maximised where measures seek to reduce social inequalities and give consideration to improved placemaking. Ensuring consideration is given to transport equality should reduce unintended consequences that could arise where members of society experience barriers to using some modes of transport, for example, due to low income or disability³⁰.</p> <p>Long term positive effects should also arise where a modal shift leads to improved air quality and reduced exposure to noise. This has the potential to be of greater relevance to those at higher risk, for example, those considered to be living in deprivation or experiencing pre-existing health conditions such as respiratory disease³¹ Wider benefits from reduced surface traffic could also include increased levels of social interaction and</p>

²⁹ Strategic Transport Project Review 2 (2019) Scoping Report (online) Available at: <https://www.strategicenvironmentalassessment.gov.scot/> (accessed 25/08/2021)

³⁰ Transport Scotland (2019) National Transport Strategy 2 – Strategic Environmental Assessment Environmental Report [online] Available at: <https://www.transport.gov.scot/publication/national-transport-strategy-2-strategic-environmental-assessment-environmental-report/> (accessed 25/08/2021)

³¹ Public Health Scotland (2021) National Planning Framework 4: Briefing on health and proposed National Developments [online] Available at: <https://www.publichealthscotland.scot/publications/national-planning-framework-4-briefing-on-health-and-proposed-national-developments/> (accessed 30/09/2021)

	reduced congestion, which may also lead to benefits including improved sense of place ³² . Additional benefits could include improved safety and reduced risk of accidents.
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Summary of health implications

- D1.3.20 Positive effects should arise from a potential modal shift, including where this leads to reduced congestion, and in turn wider societal benefits including through improved placemaking.
- D1.3.21 Transport significantly contributes to Scotland's GHG emissions but is essential in enabling people to move around and meet their daily needs. Significant positive impacts should arise, including reductions in GHG emissions, improvements in air quality and reduced exposure to noise. Further, those living on lower incomes or from deprived communities are more likely to live in high traffic areas³³.
- D1.3.22 Additional benefits should also arise from improved safety and reduced risk of accidents, increased levels of social interaction and improved sense of place. Transport can also play an important part in delivering a fully inclusive society by providing access to services such as healthcare facilities, education, employment and reducing social isolation³⁴. Transport can play a key role in promoting the planning and development of healthier, inclusive, sustainable and well-designed places³⁵. Positive impacts should be maximised where opportunities are sought to align with improved placemaking alongside ensuring consideration is given to transport equality.
- D1.3.23 Gaps/uncertainties
- The precise nature, scale and location of projects that could be brought forward are unknown.
- D1.3.24 Mitigation/opportunities for enhancement
- Opportunity to give early consideration to future-proofing infrastructure including accommodating emerging technologies to further support climate change mitigation and adaptation.
 - Opportunity to reduce emissions through use of low carbon/renewable sources of energy to power trams and light rail developments.

³² WHO (2018) Health, environment and sustainable development [online] Available at: <http://www.who.int/sustainable-development/transport/health-risks/noise/en/> (accessed 25/08/2021)

³³ Public Health Scotland (2021) National Planning Framework 4: Briefing on health and proposed National Developments [online] Available at: <https://www.publichealthscotland.scot/publications/national-planning-framework-4-briefing-on-health-and-proposed-national-developments/> (accessed 30/09/2021)

³⁴ Transport Scotland (2020) national transport Strategy 2 [online] Available at <https://www.transport.gov.scot/publication/national-transport-strategy-2/> (accessed 21/11/2021)

³⁵ Strategic Transport Projects Review 2 (2021) Strategic Transport Projects Review 2 update and phase 1 recommendations [online] Available at: <https://www.transport.gov.scot/media/49128/stpr2-update-and-phase-1-landscape-version-15-feb-2021.pdf> (accessed 25/08/2021)

- Opportunity to ensure integration of the mass transit networks with active travel networks.
- Opportunity to increase the roll out of mass transit networks to other major towns and cities in Scotland.
- Opportunity to align with improved placemaking and to ensure consideration is given to transport equality.

4. Urban Sustainable, Blue and Green Drainage Solutions

D1.3.25 The proposed national development aims to build on the benefits of the Metropolitan Glasgow Strategic Drainage Partnership, to continue investment and extend the approach to the Edinburgh city region.

D1.3.26 Location: City and wider catchment areas of Glasgow and Edinburgh.

Topic	Assessment Findings
Biodiversity, flora and fauna	<p>Infrastructure requirements, including the use of built engineered structures, has the potential to lead to negative effects, including habitat loss or damage. Potential for negative impacts to be minimised through siting and design and enhancement measures applied in keeping with national policy.</p> <p>Where nature based solutions are employed, this has the potential to lead to positive effects. For example, in addition to reducing the risk of flooding and diffuse pollution, in turn benefitting water ecology, nature based solutions can lead to benefits through creation of attractive open spaces and diverse habitats for wildlife³⁶. This may be of particular benefit given the catchment level scale of the project.</p>
Climatic factors	<p>The Lifecycle GHG assessment concluded that, depending on the nature of the projects taken forward and considering both direct and indirect effects, this development will likely have an overall net positive impact on achieving national greenhouse gas emissions reduction targets. This is due to reduced flood risk and delivery of more green spaces that will enhance carbon sequestration. The scale of effects can range from low to medium positive depending on how much flood damage is avoided and how many green spaces are delivered. A low scale of effect would result from minimal use of nature-based drainage solutions and the greater use of materials which contain higher embodied carbon. Conversely, if the drainage solutions are widespread and deliver green infrastructure, they will reduce greenhouse gas emissions due to limiting flood damage, with a medium positive effect.</p> <p>Long term positive impacts should also arise where infrastructure supports adaption to the impacts of climate change through reducing risk of flooding and could be significant depending on extent of application. Additionally, the use of natural assets can also play a key role in supporting improved resilience and adaptation to the impacts of climate change.</p>
Water	<p>Urban areas can be at greater risk of surface water flooding which can have significant negative impacts on people and communities. Natural solutions to flood risk management mimic natural drainage processes, reducing runoff from development³⁷ with significant benefits expected</p>

³⁶ Green4Grey (2020) Integrated planning for multifunctional land use [online] Available at: <https://green4grey.be/en/project-objective#integrale%20planning%20voor%20een%20veelzijdig%20landgebruik> (accessed 25/08/2021)

³⁷ GovUK (2019) Valuing the benefits of blue-green infrastructure [online] Available at: <https://www.gov.uk/government/publications/valuing-the-benefits-of-blue-green-infrastructure> (accessed 25/08/2021)

	through reduced risk of flooding and diffuse pollution. Flooding can also negatively impact on built assets and population and human health.
Air	Wider secondary benefits should arise through the role of natural infrastructure in improving air quality, for example, through the absorption of pollutants such as particulate matter.
Soil	Long term negative impacts could arise, including loss of soil function and compaction, depending on infrastructure requirements. Where planting or vegetation and habitat enhancement/creation is taken forward as part of natural flood management measures, there is potential for long term positive effects to arise.
Cultural Heritage and Historic Environment	Development activities could impact on known and unknown archaeological sites. The Antonine Wall World Heritage Site and other designations should be taken into account for possible impacts and may require consideration at project level.
Landscape and Geodiversity	There is the potential for changes to local landscapes to arise, which could be positive or negative depending on infrastructure requirements. For example, natural flood management measures have the potential to improve visual amenity. Conversely, the implementation of built structures could lead to negative effects.
Material assets	Significant long term benefits should arise where improved flood management leads to reduced risk of flooding of built material assets, particularly where natural infrastructure is utilised due to the role in placemaking. Additionally, benefits should also arise where this leads to reduced pressure on existing water treatment assets with the capacity of some assets currently overstretched.
Population and human health	Flooding can have significant negative impacts on human health and built assets, the impacts of which are likely to be disproportionately severe in areas of high deprivation because of the reduced ability of individuals and communities in these areas to prepare, respond and recover ³⁸ . Where priority is given to nature based solutions, additional benefits should also arise through the key role natural infrastructure can play in helping people and places adapt to climate change, for example, by providing natural flood defences and cooling. Additionally, those living in neighbourhoods with less greenspace, especially urban areas, may experience more extreme impacts from events like heatwaves, from example, from urban heat island effects ³⁹ . Natural solutions to flood risk management can also lead to improved social cohesion through the creation of attractive open spaces and diverse habitats for wildlife ⁴⁰ , with the “green” and “blue” features of the natural and built environment widely recognised and valued

³⁸ The Scottish Parliament (2012) SPICe Briefing: Climate Change and Health in Scotland [online] Available at: http://www.parliament.scot/ResearchBriefingsAndFactsheets/S4/SB_12-26rev.pdf (accessed 25/08/2021)

³⁹ Scottish Government (2019) Climate Ready Scotland: climate change adaptation programme 2019-2024 [online] Available at: <https://www.gov.scot/publications/climate-ready-scotland-second-scottish-climate-change-adaptation-programme-2019-2024/pages/8/> (accessed 25/08/2021)

⁴⁰ Green4Grey (2020) Integrated planning for multifunctional land use [online] Available at: <https://green4grey.be/en/project-objective#integrale%20planning%20voor%20een%20veelzijdig%20landgebruik> (accessed 25/08/2021)

	<p>as essential components of successful places⁴¹. Further benefits could also arise where improvements to drainage and sewage infrastructure leads to improved water quality and increased flood protection reduces the risk of flooding impacting on infrastructure assets, supporting the long term viability of an area. Additionally, where this leads to reduced disruption of key services, benefits should arise, as failure in one area can lead to wider disruption across networks due to their interlinked nature⁴².</p>
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Summary of health implications

- D1.3.27 Significant positive impacts should arise from improved resilience and adaptation to the impacts of climate change, particularly where priority is given to nature based solutions due the multiple co-benefits they provide.
- D1.3.28 Significant long term benefits should arise where this leads to increased reliance and adaptation to the impacts of climate change, particularly as the risk of flooding to people, communities and buildings is considered one of the most severe risks for the population, both now and in the future⁴³. Further, latest climate projections suggest greater sea level rise than had been projected previously. Risks associated with rising temperatures - such as more extreme heatwave events causing impacts on people's health and wellbeing - are likely to become more prevalent as a result⁴⁴. The impacts of flooding can also be disproportionately severe in areas of high deprivation with a number of disadvantaged populations and communities in and around Edinburgh and Glasgow.
- D1.3.29 Positive impacts should be maximised where nature based solutions are prioritised through the multiple co-benefits they provide, including surface water management, flood alleviation and greenspace creation, which also enhances local biodiversity and community wellbeing⁴⁵. Positive impacts should also arise where measures lead to reduced disruption to key services.

⁴¹ Nature Scotland (2019) the Place Principle – our contribution to place-based working (online) Available at: <https://www.nature.scot/place-principle-our-contribution-place-based-working> (accessed 25/08/2021)

⁴² Adaptation Scotland (undated) 15 Key Consequences of Climate Change for Scotland (online) Available at: <http://adaptationscotland.org.uk/climatereadyplaces/impacts/> (accessed 25/08/2021)

⁴³ Committee of Climate Change (2021) Evidence for the third UK Climate Change Risk Assessment (CCRA3) Summary for Scotland (online) Available at: <https://www.ukclimaterisk.org/independent-assessment-ccra3/national-summaries/> (accessed 25/08/2021)

⁴⁴ Committee of Climate Change (2021) Evidence for the third UK Climate Change Risk Assessment (CCRA3) Summary for Scotland (online) Available at: <https://www.ukclimaterisk.org/independent-assessment-ccra3/national-summaries/> (accessed 25/08/2021)

⁴⁵ Scottish Government (2019) Climate Ready Scotland: climate change adaptation programme 2019-2024 (online) Available at: <https://www.gov.scot/publications/climate-ready-scotland-second-scottish-climate-change-adaptation-programme-2019-2024/pages/8/> (accessed 25/08/2021)

D1.3.30 Gaps/uncertainties

- The precise nature, scale and location of projects that could be brought forward are unknown.

D1.3.31 Mitigation/opportunities for enhancement

- Opportunities to target actions towards disadvantaged populations and communities at flood risk should be sought to maximise benefits, including aligning with improved placemaking.
- Opportunities should be sought to prioritise nature-based solutions due to their ability to deliver multiple co-benefits benefits.
- The reuse of materials in construction and use of low carbon construction materials should be prioritised and waste materials reused or recycled on decommissioning.

5. Circular Economy Materials Management Facilities

D1.3.32 The proposed national development is to deliver a range of facilities required to manage waste streams and their re-processing back to the economy, where sites and facilities will enable retaining the value of waste materials to maximise the use of materials and minimise the use of virgin materials to reduce GHG emissions.

D1.3.33 Location: All Scotland.

Topic	Assessment Findings
Biodiversity, flora and fauna	<p>Significant long term benefits should arise where development leads to reduced pressure on natural resources through support for circular economy principles.</p> <p>Negative impacts could arise from the construction and operation of new supporting infrastructure. Potential impacts include land take, leading to habitat loss or damage and disturbance/displacement. Where possible, use of brownfield land could reduce/minimise possible impacts, however, consideration may need to be given to where negative impacts could arise from remediation works species have colonised individual sites.</p> <p>Potential for negative impacts to be minimised through siting and design and enhancement measures applied in keeping with national policy.</p>
Climatic factors	<p>The Lifecycle GHG assessment concluded that, depending on the nature of the projects taken forward and considering both direct and indirect effects, this development will likely have an overall net positive impact on achieving national greenhouse gas emissions reduction targets. This is due to increased efficiency in waste management and use of raw materials.</p> <p>The scale of the positive effects could range from low to high positive depending on the volume of waste reprocessed. If the amount of waste reprocessed is relatively minor, vehicle movements are higher, energy demands of reprocessing are higher and waste heat is not utilised the overall positive effect is likely to be minor. However, if this development enables reprocessing at a significant scale, uses low carbon transport, utilises waste heat and supports energy production, it is likely to lead to high positive effects.</p> <p>Reduced pressure on natural resources could lead to wider environmental benefits, such as improved ecosystem health, supporting climate change adaptation.</p>
Water	<p>Reduced waste going to landfill should also lead to secondary benefits for water quality. Remanufacturing can also reduce pressure on resources as compared to manufacturing from new, with associated benefits for water quality and quantity. This is likely to be of increasing importance with water scarcity expected to increase due to climate change⁴⁶.</p>

⁴⁶ SEPA (undated) Water scarcity (online) Available at: <https://www.sepa.org.uk/environment/water/water-scarcity/> (accessed 25/08/2021)

	Reduced pressure on natural resources should also lead to secondary benefits including improved ecosystem health.
Air	Long term benefits could arise from improved air quality, for example, from reduced energy requirements for manufacturing purposes and pollutants associated with the landfilling of waste. Potential for operational activities to give rise to impacts including dust, noise, odour and particulate pollution and consideration should be given at project level to manage and mitigate where negative localised impacts that could arise.
Soil	Potential for negative effects such as compaction leading to a loss of soil function resulting from infrastructure requirements. Negative impacts could be reduced/minimise through reuse of existing infrastructure and brownfield land, where possible. Long term secondary benefits should arise through reduced pressure on natural resources, including through improved ecosystem health.
Cultural Heritage and Historic Environment	There is potential for long term negative effects on the setting of both designated and undesignated heritage, as well as direct impacts on these which may require further consideration at project level.
Landscape and Geodiversity	Infrastructure requirements could give rise to changes in local landscapes with the scale of effects likely to be influenced by factors such as location.
Material assets	Long term significant positive impacts should arise through greater efficiency in resource use and reduced pressure on raw material, with many resources finite in nature. Additional benefits should arise through reduced pressure on existing waste management facilities. The re-use of existing infrastructure, including brownfield land should also reduce pressure on natural resources.
Population and human health	Long term benefits should arise from potential investment in innovation and productivity, and where inclusive growth leads to employment and the creation of up-skilling opportunities. Additional positive impacts should arise where uptake of circular economy principles leads to wider environmental benefits including improved ecosystem health and increased resilience to the impacts of climate change.

Summary of health implications

- D1.3.34 Positive effects should arise from improved environmental benefits, including ecosystem health and reductions in greenhouse gas emissions. Additional benefits could arise through investment in new markets and employment opportunities.
- D1.3.35 A more circular economy can benefit the environment by cutting waste and carbon emissions, and the economy by improving productivity and opening up new markets and creating employment opportunities⁴⁷. Further secondary benefits should arise through reduced pressure on

⁴⁷ Scottish Government (2019) Developing Scotland's Circular Economy: consultation on proposals for legislation (online) Available at: <https://www.gov.scot/publications/delivering-scotlands-circular-economy-proposals-legislation/pages/3/> (accessed 25/08/2021)

natural resources, many of which are finite. This is likely to be of key importance with population growth projected to continue. Positive impacts should also arise from improved ecosystem health and reduced pressure on natural resources⁴⁸.

D1.3.36 If hazardous material is likely to be handled, consideration should be given to relevant safeguards as it is recognised that there are knowledge gaps in this area⁴⁹.

D1.3.37 Gaps/uncertainties

- The precise nature, scale and location of projects that could be brought forward are unknown.
- Knowledge gaps exist with regard potential negative impacts, for example, from chemicals of concern, water re-use, electronic waste and distributional effects⁵⁰.
- Potential for land to be affected by contamination. The extent/level of potential contamination and scale/type of remediation work that may be required, is unknown.

D1.3.38 Mitigation/opportunities for enhancement

- Current knowledge gaps on potential negative impacts from the management of hazardous materials may require further consideration.
- Opportunities should be explored within the four priority areas of: food, drink, and the broader bio-economy, remanufacture, construction and the built environment and energy infrastructure, which have been identified based on their resource use, environmental impact and importance to the Scottish Economy⁵¹.
- Ensure that where possible transport is decarbonised to reduce overall emissions.
- Opportunity to utilise surplus by-products, for example surplus heat
- Opportunity to support local processing where possible.
- Opportunity to prioritise the use of brownfield land for development

⁴⁸ WHO (2018) Circular Economy and Health: Opportunities and Risks (online) Available at: https://www.euro.who.int/_data/assets/pdf_file/0004/374917/Circular-Economy_EN_WHO_web_august-2018.pdf (accessed 25/08/2021)

⁴⁹ University of Bath (2021) Circular Economy and its implications for Environment and Health (online) Available at: <https://www.bath.ac.uk/projects/circular-economy-and-its-implications-for-environment-and-health/> (accessed 25/08/2021)

⁵⁰ WHO (2018) Circular Economy and Health: Opportunities and Risks (online) Available at: https://www.euro.who.int/_data/assets/pdf_file/0004/374917/Circular-Economy_EN_WHO_web_august-2018.pdf (accessed 25/08/2021)

⁵¹ Scottish Government (2016) Making Things Last: a circular economy strategy for Scotland (online) Available at: <https://www.gov.scot/publications/making-things-last-circular-economy-strategy-scotland/> (accessed 25/08/2021)

6. Digital Fibre Network

D1.3.39 The proposed national development is to deliver enhanced digital connectivity providing high speed broadband or equivalent mobile service, prioritising those areas with weaker networks across Scotland.

D1.3.40 Location: All Scotland.

Topic	Assessment Findings
Biodiversity, flora and fauna	<p>Potential for negative impacts during the laying of cables, including short term disturbance during construction activities and habitat damage or loss. Negative impacts could also arise from the laying of subsea cables with potential to impact on seabed and marine ecology as a result of displacement or disturbance of flora and fauna. Where possible the re-use of existing infrastructure and use of previously developed land, for example for data centres, should reduce/minimise associated negative impacts. However, consideration may be need to be given to where remediation works could lead to negative impacts on species that could have colonised some brownfield sites.</p> <p>Potential for negative impacts to be minimised through siting and design and enhancement measures applied in keeping with national policy.</p>
Climatic factors	<p>The Lifecycle GHG assessment concluded that, depending on the nature of the projects taken forward and considering both direct and indirect effects, this development will have negligible effects on achieving national greenhouse gas emissions reduction targets. This is because the potential increases in maintenance travel and electricity use, and to industrial, manufacture and construction processes, should be counterbalanced by reduced journeys from improved connectivity. There is the potential for increased resilience across sectors due to their interconnected nature, with associated benefits from reduced risk of disruption to services and to supporting resilience and adaptation, with associated benefits.</p> <p>Consideration should be given to future proofing such that development keeps pace with new and emerging technology developments and data changes⁵². For example, to ensure that new and emerging technologies can be accommodated, including those that support innovation and decarbonisation.</p>
Water	<p>Installation of cables could result in localised impacts, such as sediment disturbance. These are expected to be temporary and are not expected to be significant.</p>
Air	<p>Positive secondary impacts arise where development reduces the need for travel and where this supports the decarbonisation of the energy and transport sectors.</p>
Soil	<p>Potential for localised negative effects on soil including compaction leading to a loss of soil function, for example, from associated infrastructure requirements and the laying of cables. This could be</p>

⁵² Infrastructure Commission for Scotland (2020) Key findings report (online) Available at: <https://infrastructurecommission.scot/page/key-findings-report> (accessed 25/08/2021)

	particularly relevant where development is undertaken on previously undeveloped land.
Cultural Heritage and Historic Environment	Possible impacts on known and unknown archaeological resources and the setting of historic assets may be affected through construction activities and may require consideration at project level.
Landscape and Geodiversity	There is potential for new infrastructure to have landscape and visual impacts, particularly within designated and sensitive landscapes. Where feasible, infrastructure sharing and undergrounding will reduce the significance of landscape and visual impacts.
Material assets	Positive impacts likely, including through the role of digital infrastructure in supporting other systems, such as energy and transport and through increased resilience across sectors due to their interconnected nature. This is likely to be of particular relevance as infrastructure continues to evolve and adapt, as the increasing importance of digital technology, connectivity and of whole-system approaches will serve to deepen the interdependencies ⁵³ . Potential for negative impacts at local level on natural assets such as minerals and farmland from new development, and consideration should be given at project level.
Population and human health	Significant positive impacts should arise where digital connectivity leads to increased access to goods and services, particularly key services, including health and employment opportunities ⁵⁴ . This is likely to be of particular relevance where barriers to access currently exist, for example, rural, remote and island communities, or for populations or communities where specific needs are currently unmet. Positive impacts should also arise through a reduced need to travel and where this leads to improved quality of life, including through increased viability of rural and remote communities. Strong data infrastructure can also increase collaboration, efficiency and productivity in public and private sectors, nationally and internationally and digital connectivity and data infrastructure will become more vital as the population grows and economies and societies become more reliant on getting more value from data to meet a range of needs ⁵⁵ . As more devices and control systems are connected online, increased data storage and collection will be required which has the potential to lead to increased vulnerability for cyber security and can increase the potential for disruption to physical assets, potentially leading to increased vulnerability to data breaches and to the interruption of infrastructure with negative impacts on

⁵³ Institution of Civil Engineers (2018) State of the Nation 2018: Infrastructure Investment (online) Available at: <https://www.ice.org.uk/news-and-insight/latest-ice-news/ice-launches-2018-state-of-the-nation-investment> (accessed 25/08/2021)

⁵⁴ Public Health Scotland (2021) National Planning Framework 4: Briefing on health and proposed National Developments (online) Available at: <https://www.publichealthscotland.scot/publications/national-planning-framework-4-briefing-on-health-and-proposed-national-developments/> (accessed 30/09/2021)

⁵⁵ Open data for development (undated) State of open data - Data Infrastructure (online) Available at: <https://www.stateofopendata.od4d.net/chapters/issues/data-infrastructure.html> (accessed 25/08/2021)

	<p>population and human health. Consideration may also need to be given to data changes⁵⁶ and data accessibility.</p> <p>There is also the potential for increased resilience across sectors due to their interconnected nature, with associated benefits from a reduced risk of disruption to services and to supporting resilience and adaptation.</p>
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Summary of health implications

- D1.3.41 Significant benefits should arise where digital connectivity leads to greater access to goods and services, particularly key services. Reduced need to travel could also lead to wider benefits such as improved quality of life. This is likely to be of greater relevance where barriers to access currently exist, or for populations or communities where specific needs are currently unmet. For example, there are significant differences in the availability of superfast broadband in urban and rural areas of Scotland, with 98% of residential premises in urban areas having access to superfast broadband compared to 72% in rural areas⁵⁷.
- D1.3.42 Additional benefits arise where digital infrastructure supports the continued decarbonisation of other sectors, such as energy and transport and there is potential for increased resilience across sectors due to their interconnected nature. There is potential risk of disruption to physical assets, including from cyber breaches through greater reliance on digital connectivity and of unintended consequences where data is not accessible to all.
- D1.3.43 Gaps/uncertainties
- The precise nature, scale and location of projects that could be brought forward are unknown. Uncertainties around the implementation of new technologies.
- D1.3.44 Mitigation/opportunities for enhancement
- Benefits could be maximised by focusing action to areas experiencing digital exclusion.
 - Opportunities to future proof should be sought to keep pace with new and emerging technology and data changes.
 - Industry standards and overarching requirements and good practice should seek to mitigate impacts, including consideration of cable corridors to protect cables from damage, potential for co-location and shared use of corridors and pipelines, and a risk based approach to removal of redundant cables.
 - Opportunities to ensure cable laying utilises conduits or existing infrastructure should be considered for lower carbon future cable

⁵⁶ Infrastructure Commission for Scotland (2020) Key findings report (online) Available at: <https://infrastructurecommission.scot/page/key-findings-report> (accessed 25/08/2021)

⁵⁷ Ofcom (2020) Connected nations 2020 Scotland Report (online) Available at: https://www.ofcom.org.uk/data/assets/pdf_file/0021/209442/connected-nations-2020-scotland.pdf (accessed 25/08/2021)

replacement. Development in areas with high carbon soil should be avoided.

7. Islands Hub for Net Zero

D1.3.45 This national development supports proposed developments in the Western Isles, Shetland and Orkney island groups, for renewable energy generation, renewable hydrogen production, infrastructure and shipping, and associated opportunities in the supply chain for fabrication, research and development, in particular at the proposed Orkney Research and Innovation Campus. Any strategy for deployment of these technologies must enable decarbonisation at pace and cannot be used to justify unsustainable levels of fossil fuel extraction or impede Scotland’s just transition to net zero.

D1.3.46 Location: Western Isles, Shetland, Orkney and surrounding waters.

Topic	Assessment Findings
Biodiversity, flora and fauna	<p>The initial draft NPF4 HRA screening report concluded that projects which involve the creation of new ports, or the extension of existing port facilities have the potential to significantly affect foraging seabirds from several nearby SPAs during the breeding season. Impacts which could arise include pollution of the marine environment, changes to coastal processes, and disturbance and/or displacement of birds due to construction activities or increased ship movements. The Arnish Renewables Base and Deep Water Port near Stornoway is also in very close proximity to the Inner Hebrides and the Minches SAC, designated for harbour porpoise. This species could be impacted in the same way as seabirds above, but could also be subject to collision with moving vessels.</p> <p>The onshore proposals for Shetland has the potential to significantly affect several European sites depending on the precise route of, for example, new pipelines.</p> <p>Potential for short and long term negative impacts on biodiversity from construction and operational activities for both terrestrial and marine environments. Impacts could include disturbance and loss of habitat, including the seabed. Coastal habitats and marine species could also be impacted negatively, for example through dredging activities and disturbance from increased vessel movement. Where possible, re-use of infrastructure and use of brownfield land could reduce/minimise possible impacts, however, consideration may need to be given to areas where species have colonised and negative impacts could arise from remediation works.</p> <p>Consideration is likely to be needed at project level, including the potential implications for European sites, of which there are many within and surrounding Orkney and Shetland, including the Inner Hebrides and the Minches SAC. Potential implications could be significant and include changes to coastal processes, direct loss of habitat, loss of functionally linked habitat, disturbance, displacement and/or mortality, and increased risk of waterborne pollution.</p>
Climatic factors	<p>The Lifecycle GHG assessment concluded that, depending on the nature of the projects taken forward and considering both direct and indirect effects, this development will likely have an overall net positive impact on</p>

	<p>achieving national greenhouse gas emissions reduction targets. This is due to uncertainty of the scale and type of renewable energy production, renewable hydrogen production, distribution and storage, supporting infrastructure, supply chain for fabrication and R&D, and the use of lower emission fuels for shipping. The GHG assessment assumed that these developments will be large scale and long-term and would outweigh the negative effects from the embodied carbon in the infrastructure. Indirect positive effects from the support for the renewables industry and production of renewable hydrogen are judged on balance to outweigh the negative direct effects identified due to relatively minor nature of these direct effects, which during the construction and decommissioning phases would be short term in nature. The positive indirect effects identified would be experienced throughout the operational phase of the development. The scale of this effect could range from low to high positive, depending on the scale of renewable energy and low carbon fuels produced over time. For example, smaller scale renewable energy and hydrogen production will likely have low positive effects. However, if this is deployed at a large scale, and is utilised across sectors, it could have high positive effects.</p> <p>Finally, increased diversification of the energy mix and energy storage could offer greater system flexibility and efficiencies, helping to manage fluctuations in energy demand and support resilience from disruption, including from the impacts of climate change.</p>
Water	<p>There may be short term adverse effects on the ecological quality of the water environment, including marine biodiversity, through construction activities, for example, sediment disturbance where dredging is undertaken. Long term negative impacts could arise from operational activities, including the production of hydrogen which is also reliant on water supply⁵⁸ and can lead to negative impacts on water quality and quantity with implications for marine ecology.</p> <p>Increased shipping and vessel activity could also lead to increased risk of pollution and introduction/spread of invasive non-native species.</p>
Air	<p>Possible localised air quality impacts could arise from operational activities, including surface transport and vessel movement, which could also give rise to increased exposure to noise. Potential impacts in air quality will depend on factors such as type of fuels used. Longer term decarbonisation of the transport sector and transition to use of low carbon fuels, such as LNG in shipping, which is particulate free, should reduce/minimise potential impacts. Long term significant secondary benefits for air quality through support for decarbonisation of key sectors such as the energy and transport sector.</p>
Soil	<p>Likelihood of both short term and long term impacts, including sediment disturbance and loss of soil from construction activities and infrastructure requirements. Increased vessel movements can also lead to negative impacts, including smothering and loss of seabed and general disturbance</p>

⁵⁸ Scottish Government (2021) SEA of Draft Hydrogen Action Plan for Scotland scoping report (online) Available at: [Environmental assessment: Strategic Environmental Assessment \(SEA\) - gov.scot \(www.gov.scot\)](https://www.gov.scot/publications/sea-2021-08/pages/10.aspx) (accessed 25/08/2021)

	<p>of sediment. Negative impacts could also arise from dredging or cutting and ploughing activities that may be undertaken, for example, for the laying of offshore pipelines.</p> <p>Making the best use of existing pipeline infrastructure should help to reduce/minimise potential negative effects. Benefits for soil from the re-use of brownfield land will be dependent on the extent of proposed re-development.</p>
Cultural Heritage and Historic Environment	<p>Potential for long term negative impacts on both known and unknown, as well as designated and undesignated offshore archaeology and protections sites, including historic wrecks. Possible adverse impacts should be explored as individual projects and the detail of proposed works, becomes clearer.</p>
Landscape and Geodiversity	<p>Potential for adverse effects on local landscape character with particular implications for coastal landscapes and seascapes. Impacts will depend on a number of factors, including scale of infrastructure requirements and location, with the potential for particular implications for coastal landscapes and seascapes, with some areas designated as National Scenic Areas.</p> <p>Impacts could be reduced/minimised through use of existing infrastructure where possible.</p> <p>Potential long term impacts for marine and coastal processes, including sediment disturbance, erosion and altered seabed morphology, where underwater geological works are undertaken.</p>
Material assets	<p>Potential benefits through provision of key infrastructure to support a move towards decarbonisation and increased diversification and resilience within the energy mix. Benefits should also arise through improvements to port/harbour, key transport hubs, which are of particular importance to island communities in supporting lifeline services. The re-use/enhancement of infrastructure, such as repurposing of offshore pipelines for hydrogen, should also reduce pressure on natural resources through alignment with circular economy principles. Where dredging is undertaken, benefits should arise where dredged material is utilised where uncontaminated and physically suitable⁵⁹.</p>
Population and human health	<p>Potential for construction and operational activities to lead to negative impacts, including from increased exposure to noise and air quality. Potential benefits should arise though increased resilience and connectivity to energy supplies, including reduced risk of disruption, with secondary benefits where displacement of traditional energy fuels leads to improved air quality.</p> <p>Positive effects should arise from high value employment opportunities and the creation of strategically important new capacity, capabilities and skills in the delivery of net-zero targets, supporting the attractiveness of the area and improving the vitality of islands communities, which can be fragile. Additional benefits could also arise where improvement to ports</p>

⁵⁹ Scottish Government (2011) Scotland's Marine Atlas: Information for the National Marine Plan (online) Available at: [Scotland's Marine Atlas: Information for The National Marine Plan - gov.scot \(www.gov.scot\)](https://www.gov.scot/ScotGov/Default/Scotland's-Marine-Atlas-Information-for-the-National-Marine-Plan) (accessed 25/08/2021)

	<p>and harbours leads to improved connectivity, particularly for life line services.</p> <p>There is potential for long-term adverse visual impacts to arise, including possible impacts on visual/residential amenity of some coastal communities and consideration will be required at project level.</p>
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Summary of health implications

- D1.3.47 Potential for significant benefits from inward investment and employment, particularly where this leads to improved viability and vitality of island communities. There is scope for the provision of quality jobs to support the vitality of island communities, where a lack of opportunities can be particularly relevant for the younger population^{60 61} leading to depopulation. For example, some areas in Shetland are considered particularly vulnerable to the impact of Brexit⁶². The provision of high value jobs and skills transfer opportunities can also support reducing health inequalities⁶³. Operational activities could however lead localised negative impacts and the visual and residential amenity of some coastal communities could also be impacted long term.
- D1.3.48 Support for long term transition to net-zero should lead to benefits as the impacts of current and future climate change is likely to affect human health both locally and globally⁶⁴. Benefits should also arise from increased flexibility and resilience of the energy network, including to the impacts of climate change. This could be of particular relevance to island communities where disruption to supply can be felt to a greater extent. Further, those in remote rural locations, can be at greater risk of experiencing poverty or deprivation due to higher costs of living⁶⁵.
- D1.3.49 Gaps/uncertainties
- The precise nature, scale and location of projects that could be brought forward are unknown and there are uncertainties around the implementation of new technologies.

⁶⁰ Highlands and Islands Enterprise (2018) Young People and the Highlands and Islands: maximising opportunities (online) Available at: <https://www.hie.co.uk/research-and-reports/our-reports/2018/may/31/yp-research/> (accessed 25/08/2021)

⁶¹ Scottish Government (2021) National Islands Plan Survey: final report (online) Available at: National Islands Plan Survey: final report - gov.scot (www.gov.scot) (accessed 25/08/2021)

⁶² Scottish Government (2019) Local level Brexit Vulnerabilities in Scotland: Brexit Vulnerabilities Index (BVI) (online) Available at: <https://www.gov.scot/publications/local-level-brex-it-vulnerabilities-scotland-brex-it-vulnerabilities-index-bvi/> (accessed 29/09/2021)

⁶³ NHS Scotland (undated) Income, Wealth and poverty (online) Available at: http://www.healthscotland.scot/media/1365/inequalities-briefing-8_income-wealth-and-poverty_apr17_english.pdf (accessed 25/08/2021)

⁶⁴ Public Health Scotland (2021) National Planning Framework 4: Briefing on health and proposed National Developments (online) Available at: <https://www.publichealthscotland.scot/publications/national-planning-framework-4-briefing-on-health-and-proposed-national-developments/> (accessed 30/09/2021)

⁶⁵ Public Health Scotland (2021) National Planning Framework 4: Briefing on health and proposed National Developments (online) Available at: <https://www.publichealthscotland.scot/publications/national-planning-framework-4-briefing-on-health-and-proposed-national-developments/> (accessed 30/09/2021)

D1.3.50 Mitigation/opportunities for enhancement

- Mitigation measures should be implemented where there is the potential for air pollutants to arise, including transport management mitigation measures.
- The reuse of materials in construction and use of low carbon construction materials should be prioritised and waste materials reused or recycled on decommissioning.
- Opportunities to minimise impacts on landscape and seascape should be explored.
- Effects on biodiversity should be minimised through siting and design, and enhancement measures applied in keeping with national policy.
- Ensure that that disturbance of soil, particularly high carbon soils, vegetation and seabed is minimised and avoided where possible and consideration given to ensure site reinstatement to enhance carbon sequestration. Opportunities to enhance high carbon soils and habitats of high carbon sink value should be explored.
- The impacts of climate change, including flood risk, should be considered.
- Provide low carbon transport options to the sites to reduce car dependency.

8. Industrial Green Transition Zones

- D1.3.51 Industrial Green Transition Zones will support the generation of significant economic opportunities while minimising carbon emissions. Technologies that will help Scotland transition to net-zero will be supported at these locations, with a particular focus on low carbon and zero emissions technologies including renewables and the generation, storage and distribution of low carbon hydrogen.
- D1.3.52 Industrial Green Transition Zones are the Scottish Cluster and Grangemouth Investment Zone.
- D1.3.53 The Scottish Cluster encompasses a Carbon Capture, Utilisation and Storage (CCUS) projects network and is a key strategic vehicle for industrial decarbonisation, energy generation, and the transportation and storage of captured carbon. The designation relates to projects that form a Scottish Cluster in the first instance specifically Peterhead, St Fergus and Grangemouth, as well as further industrial transition sites that are expected to emerge in the longer term. The creation of hydrogen and deployment of negative emissions technologies, utilising CCS, at commercial scale.
- D1.3.54 Grangemouth Investment Zone will be a focus for transitioning the petrochemicals industry and associated activities into a leading exemplar of industrial decarbonisation.
- D1.3.55 Decarbonisation could include opportunities for: renewable energy innovation; bioenergy; hydrogen production with carbon capture and storage; and repurposing of existing strategic and critical infrastructure such as pipelines.
- D1.3.56 Location: St Fergus, Peterhead, and Grangemouth.

Topic	Assessment Findings
Biodiversity, flora and fauna	<p>The draft initial HRA screening report concluded that project sites in locations around St Fergus, Peterhead and the Firth of Forth have the potential to result in impacts such as loss of functionally-linked habitat and disturbance of qualifying species on European Sites. Offshore works in the Firth of Forth also have the potential to effectively act as a barrier (due to disturbance) to migratory Atlantic salmon and/or lamprey species of the upstream River Teith SAC.</p> <p>Potential for negative impacts, including from associated infrastructure requirements. Impacts are likely to arise both in the short term during construction and longer term during operation, and could include effects on both the terrestrial and marine environment, including through pipeline requirements. Further consideration will be required at project level. Impacts could include loss of functionally linked habitat and potential disturbance, displacement and/or mortality of qualifying species.</p> <p>There is potential for in-combination effects with other projects and cumulative impacts that could arise on the Firth of Forth.</p> <p>The re-use of existing infrastructure and the implementation of marine utility corridors could reduce/mitigate impacts, alongside pollution control regulation and project level mitigation.</p>

Climatic factors	<p>The Lifecycle GHG assessment concluded that, depending on the nature of the projects taken forward and considering both direct and indirect effects, this development will likely have an overall net positive impact on achieving national greenhouse gas emissions reduction targets. This is due to support for the transition to hydrogen from direct fossil fuel dependency using low carbon hydrogen production with carbon capture, utilisation and storage.</p> <p>The scale of positive effect could range from low to very high. A low scale of effect would result from higher levels of increased transport emissions, lower levels of low carbon electricity generation, higher levels of fugitive emissions, smaller scale heat networks, and smaller scale Negative Emissions Technologies (NETs) development. Conversely, if a greater amount of low carbon energy and hydrogen is produced, there are lower levels of fugitive emissions, more widespread heat networks and larger scale NETs development and wider deployment and use of hydrogen, this could result in a very high positive effect.</p> <p>Potential for benefits to arise where measures are implemented to support climate change adaptation/improved resilience of infrastructure to the impacts of climate change. Particularly in locations where flood risk is identified as an issue, such as sites located on the coast.</p>
Water	<p>Potential for both short and long term negative impacts to arise on both the terrestrial and marine environments from the construction of new and upgraded infrastructure.</p> <p>Operational activities, including increased vessel movement, could also lead to increased risk of water pollution, disturbance of the seabed and. Operational discharges could also lead to potential long term adverse impacts. Hydrogen production is also reliant on water supply⁶⁶. For example, the production of hydrogen by gas reforming and gasification technologies also requires water as part of the process, including for cooling purposes.⁶⁷</p> <p>Fuller consideration may need to be given to the cumulative and in-combination effects that could arise on the Firth of Forth.</p> <p>Positive impacts should arise where development supports resilience and adaption to the impacts of climate change, for example through long term flood protection.</p>
Air	<p>Short and long term negative impacts from construction and operation could arise, including from increased exposure to noise and air quality implications. For example, operational activity could lead to increases in air pollutants depending on factors such as the type of technology and industrial processes undertaken. This is likely to be of particular relevance in locations where existing air quality issues could be exacerbated. For example, Grangemouth has an associated AQMA primarily arising from</p>

⁶⁶ Scottish Government (2021) SEA of Draft Hydrogen Action Plan for Scotland scoping report (online) Available at: <https://www.gov.scot/policies/environmental-assessment/strategic-environmental-assessment-sea/> (accessed 25/08/2021)

⁶⁷ Committee on Climate Change (2018) Hydrogen in a low-carbon economy (online) Available at: <https://www.theccc.org.uk/wp-content/uploads/2018/11/Hydrogen-in-a-low-carbon-economy.pdf> (accessed 25/08/2021)

	<p>industrial emissions⁶⁸. The longer term air quality impacts from widespread use of hydrogen are also unknown,⁶⁹ however there is potential for significant benefits where hydrogen displaces more polluting fuels⁷⁰.</p>
Soil	<p>Potential for negative impacts to arise, both short term during construction activities to long term, for example, sediment disturbance and loss of seabed from laying of pipes and through land take for infrastructure requirements. Impacts could include soil sealing and compaction, particularly where development takes place on previously undeveloped land. Potential for soil organisms to be impacted from possible CO₂ leakage from reservoirs and pipelines⁷¹.</p> <p>Construction activities and increased vessel movements could also lead to negative impacts, including smothering and loss of seabed and general disturbance of sediment.</p> <p>Making the best use of existing infrastructure, and of previously developed land, should help to reduce/minimise potential effects.</p>
Cultural Heritage and Historic Environment	<p>Potential for long term negative effects on both known and unknown historic and cultural heritage assets are likely to be associated with the upgrading or conversion of existing infrastructure, and the installation of new infrastructure necessary to facilitate CCUS and hydrogen.</p> <p>Where development takes place in the context of already existing industrial landscapes, effects should be minimised.</p>
Landscape and Geodiversity	<p>Long term negative impacts could arise from siting of infrastructure, particularly where new infrastructure is required. Significance of impacts will depend on a number of factors, including location and scale of development and the extent to which development is taken forward within the context of existing developed and industrial landscapes.</p> <p>The construction of the new and refurbishment of existing pipelines, and near shore geological storage facilities, has the potential to impact on the seabed floor and activities such as increased anchoring of vessels could lead to negative impacts on the seabed, including long term damage.</p> <p>The use of existing infrastructure should help to reduce/minimise possible impacts.</p>
Material assets	<p>Positive impacts should arise from increased support for the diversification of the energy mix. Increased resilience should also arise through the role of hydrogen in energy storage, supporting fluctuations in peak demand and enabling supply to be met when disruptions arise. There is also the potential for captured carbon to be utilised in other sectors via commercially viable products such as chemicals, polymers, building</p>

⁶⁸ Air Quality in Scotland (2021) Air Quality Management Areas (online) Available at: <http://www.scottishairquality.scot/lagm/agma> (accessed 01/10/2021)

⁶⁹ Committee on Climate Change (2018) Hydrogen in a low-carbon economy (online) Available at: <https://www.theccc.org.uk/wp-content/uploads/2018/11/Hydrogen-in-a-low-carbon-economy.pdf> (accessed 25/08/2021)

⁷⁰ Committee on Climate Change (2018) Hydrogen in a low-carbon economy (online) Available at: <https://www.theccc.org.uk/wp-content/uploads/2018/11/Hydrogen-in-a-low-carbon-economy.pdf> (accessed 25/08/2021)

⁷¹ Nature Communications (2018) Estimating geological CO₂ storage security to deliver on climate mitigation (online) Available at: <https://www.nature.com/articles/s41467-018-04423-1> (accessed 05/11/2021)

	<p>materials and fuels. The reuse and refurbishment of existing infrastructure, where possible, should reduce pressure on natural resources and align with circular economy principles. The benefits of this should be maximised where support is given to improved placemaking. Further benefits should also arise where increased flood protection leads to reduced risk of flooding of infrastructure assets and supports the long term viability of the area.</p>
<p>Population and human health</p>	<p>Positive impacts should arise from inward investment, including where this leads to employment and skills transfer opportunities. Regeneration measures also have the potential to improve access to key goods and services and lead to wider benefits, For example, the redevelopment of vacant and derelict land can lead to both environment and societal benefits, including the potential to lead to improved quality of life for nearby populations and communities, particularly where focus is given to improved place-making.</p> <p>Long term positive impacts should arise through the role of hydrogen in the decarbonisation of heat, and can help in meeting peaks in heat demand on colder days⁷² and support increased flexibility, efficiency and resilience of supply.</p> <p>Increased operational activity has the potential to lead to negative impacts, for example, air quality issues and increased exposure to noise, including from increased traffic movements. The transportation of CO₂, other than by pipeline could also give rise to health and safety implications. There is also the potential for current issues to be exacerbated, for example, in areas where air quality issues currently exist. There will be benefits for population and human health where flood protection measures are implemented.</p>

Summary of health implications

- D1.3.57 Benefits should arise from long term economic opportunities from investment as part of the transition to a net zero economy, particularly where this leads employment opportunities, with areas west and south of Grangemouth considered as being particularly vulnerable to EU Exit⁷³ and areas in the most deprived 20% located to the west and south of Grangemouth and in Peterhead⁷⁴. This could be of particular relevance as reducing poverty and inequalities in income and wealth is important in reducing health inequalities⁷⁵. Regeneration measures also have the potential to lead to benefits, particularly the redevelopment of vacant and

⁷² Committee on Climate Change (2018) Hydrogen in a low-carbon economy (online) Available at: <https://www.theccc.org.uk/wp-content/uploads/2018/11/Hydrogen-in-a-low-carbon-economy.pdf> (accessed 25/08/2021)

⁷³ Scottish Government (2019) Local level Brexit Vulnerabilities in Scotland: Brexit Vulnerabilities Index (BVI) (online) Available at: <https://www.gov.scot/publications/local-level-brex-it-vulnerabilities-scotland-brex-it-vulnerabilities-index-bvi/> (accessed 29/09/2021)

⁷⁴ Scottish Government (undated) Scottish Index of Multiple Deprivation 2020 (online) Available at: <https://www.gov.scot/collections/scottish-index-of-multiple-deprivation-2020/> (accessed 29/09/2021)

⁷⁵ NHS Scotland (2017) Income, Wealth and poverty (online) available at: http://www.healthscotland.scot/media/1365/inequalities-briefing-8_income-wealth-and-poverty_apr17_english.pdf (accessed 25/08/2021)

derelict land, due to the negative impacts it can have on a communities health and environment⁷⁶.

- D1.3.58 Possible localised implications from increased operational activity may require consideration at project stage, for example, localised air quality implications, particularly in areas where current issues exist.
- D1.3.59 Positive impacts should arise from inward investment.
- D1.3.60 Technologies such as hydrogen and CCUS are considered likely to play an increasing role in decarbonisation and increased diversity within the energy mix and improved energy storage can also help reduce disruption to the energy sector with associated benefits. For example, greater ability to meet peaks in heat demand on colder days.
- D1.3.61 Finally, the potential for operational activity to impact on environmental quality may require further consideration, including potential implications for air quality, increased exposure to noise and health and safety issues from transportation requirements, particularly where this could exacerbate existing issues.
- D1.3.62 Gaps/uncertainties
- The precise nature, scale and location of projects that could be brought forward are unknown and there are uncertainties around the implementation of new technologies.
 - Potential for brownfield land to be affected by contamination. The extent/level of potential contamination and scale/type of remediation work that may be required, is unknown.
- D1.3.63 Mitigation/opportunities for enhancement/monitoring
- Further consideration should be given at project level to possible localised implications on environmental quality, for example, air quality implications. This should include consideration of factors, such as the deprivation profile of the area, to ensure health inequalities are not widened.
 - Measures should be implemented to ensure that potential leaking of hydrogen and carbon is minimised.
 - Opportunities to prioritise use of existing infrastructure on and offshore which can be refurbished.
 - The reuse of materials in construction and use of low carbon construction materials should be prioritised. Upon decommissioning, waste materials should be reused or recycled.

⁷⁶ Public Health Scotland (2021) National Planning Framework 4: Briefing on health and proposed National Developments (online) Available at: <https://www.publichealthscotland.scot/publications/national-planning-framework-4-briefing-on-health-and-proposed-national-developments/> (accessed 30/09/2021)

9. Pumped Hydro Storage

D1.3.64 The proposed national development is to deliver additional capacity at existing sites as well as new sites. It will include expansion of the capacity of the Cruachan.

D1.3.65 Location: All Scotland with an initial focus on Cruachan.

Topic	Assessment Findings
Biodiversity, flora and fauna	<p>Pumped hydro storage projects have potential for significant negative direct effects on biodiversity from loss of habitat and disturbance to species. Indirect effects can arise through to changes in lighting or noise. Both terrestrial and freshwater habitats and species can be effected by pumped hydro schemes.</p> <p>The initial draft NPF4 HRA screening concluded that the Cruachan project would either be within or directly adjacent to the Glen Etive and Glen Fyne SPA (designated for golden eagle) and the Loch Etive Woods SAC (designated for woodland habitats and otter). It could therefore result in the direct loss of qualifying habitat and/or loss of habitat supporting these qualifying species. There is also the potential for pollution impacts on qualifying and supporting habitats, and for disturbance to qualifying species both within and outside of the boundaries of the European sites. The Cruachan site is also in close proximity to sites with national designations including the Coille Leitre SSSI (concurrent with the Loch Etive Woods SAC) designated for upland oak woodland. Two Local Nature Conservation Sites (LNCSSs) are also located within proximity to the Cruachan site.</p> <p>Further consideration at project level will be required, including through HRA and EIA where relevant.</p>
Climatic factors	<p>The Lifecycle GHG Assessment concluded that, depending on the nature of the project taken forward, and considering both direct and indirect effects, it is likely that this development will have a net positive effect due to the facilitation and enabling of renewable energy development across Scotland from the provision of energy storage and rapid capacity during demand peaks.</p> <p>The scale of this effect could range from medium to very high depending on the project details, the location and frequency of use. If the development enables significantly more renewable electricity to be generated, whilst minimising energy associated with construction and decommissioning, and effects on soil carbon, a very high positive effect will be expected. However, if renewable electricity generation provided by the development is lower, and there are more significant amounts of energy and carbon intensive materials used during construction, this positive effect might reduce to medium. Furthermore, significant disturbance to soils and release of soil carbon is likely to reduce the effect to medium.</p> <p>Energy storage can also offer greater system flexibility and efficiencies, helping to manage fluctuations in energy demand, including managing the</p>

	<p>intermittency of energy generation from other renewable technologies, supporting adaptation to the impacts of climate change.</p> <p>Further consideration of climate change adaptation, including flood risk, will be required where relevant at individual project stage.</p>
Water	<p>Construction of large storage or pumped storage hydropower can lead to blocking, diverting and changes to the natural course of river systems. Negative impacts could include effects on water quality and quantity, morphological changes to standing and running waters⁷⁷. Potential adverse impacts could also arise due to sediment transportation, including potential for increased turbidity. Significance of potential effects will be influenced by factors such as location and the scale of works proposed in combination with existing activity, and are likely to require further consideration.</p>
Air	<p>Construction and operation of pumped hydro storage can lead to negative impacts, including noise, vibration and dust, including from increased transports movements, which can in turn effect human health and biodiversity. Secondary benefits could arise for air quality through support for the decarbonisation of the energy sector.</p>
Soil	<p>Permanent loss of soil during reservoir construction and site development, including associated infrastructure requirements is expected. Extensive areas of land could be required where new reservoirs are created. The significance of this would be dependent on the scale of works proposed. Where this includes areas of peatland and carbon-rich soils, mitigation will be required to ensure reuse and restoration where possible. There is the potential for further negative impacts to arise through sediment transportation.</p>
Cultural Heritage and Historic Environment	<p>Pumped hydro storage has potential for direct and indirect effects on the historic environment, including designated and undesignated, features and their settings. Future projects brought forward, where locations are currently unknown are likely to require consideration at project level.</p> <p>At the Cruachan site, changing water levels in Loch Awe and other significant hydrological changes could impact on scheduled monuments, specifically crannogs. Access to Kichurn Castle (a scheduled monument and Property in Care) may also be affected.</p> <p>Ben Cruachan Hydroelectric Scheme - Cruachan Dam, is a Category B listed building and The Falls of Cruachan railway viaduct, adjacent to the site, is a Category A listed building.</p>
Landscape and Geodiversity	<p>Pumped hydro storage infrastructure has the potential to give rise to significant landscape impacts. Access tracks, pipelines, grid connections and other components could have significant impacts requiring mitigation through appropriate siting and post-construction restoration where possible. Effects during construction could be extensive, but temporary in nature. Operational effects include changes to landscape at a broad scale. The significance of these effects will depend on the character and sensitivity of the landscape within which developments are located.</p>

⁷⁷ NatureScot (2020) Hydroelectric power guidance (online) Available at: <https://www.nature.scot/professional-advice/planning-and-development/planning-and-development-advice/renewable-energy/hydroelectric-power> (accessed 25/08/2021)

	<p>Projects at existing hydroelectric power plants have the potential to have less significant effects on landscapes.</p> <p>The current Cruachan facility is within the vicinity of the Loch Etive mountains Wild Land Area. The potential for any significant effects on the qualities of this wild land area should be considered as the project plan progresses.</p> <p>Construction of new underground caverns to accommodate plant tunnels and pipes could have significant impacts on geology, for example, Cruachan reservoir is classed as a Geological Conservation Review Site.</p>
Material assets	<p>Potential benefits should arise from pumped hydro storage through supporting diversification and increased resilience within the energy network. Consideration will need to be given at project level to mitigate the potential generation of waste materials that could arise, for example, the excavation of rock, depending on scale of work. Where possible, this should include consideration of re-use.</p>
Population and human health	<p>Potential negative impacts that could arise from pumped hydro storage from construction and operation, such as noise and vibration, are likely to require consideration at project level with the scale of effects likely to depend on factors such as proximity of nearby populations. Negative implications may also arise for recreational users.</p> <p>Possible long term benefits could arise from reduced risk of disruption and increased diversity and resilience as pumped hydro can offer greater system flexibility and efficiencies, helping to manage fluctuations in energy demand, including managing the intermittency of energy generation from other renewable technologies. Greater storage of energy can also allow consumers to use energy differently and where this leads to energy efficiency, support reducing fuel poverty and wider poverty.</p> <p>Further possible benefits could arise from employment opportunities for local communities.</p>

Summary of health implications

- D1.3.66 Support for long term transition to net-zero should lead to benefits as the impacts of current and future climate change is likely to affect health both locally and globally⁷⁸. There is scope for energy storage to play an increasingly important part of the transition to delivering clean, affordable and secure supplies of energy⁷⁹. This could be particularly relevant in rural and remote areas where the risk of disruption to supply is greater. Improved energy storage can also allow consumers to use energy differently and benefits should arise where this leads to energy efficiency. Further, where this supports actions to reduce fuel poverty and wider

⁷⁸ Public Health Scotland (2021) National Planning Framework 4: Briefing on health and proposed National Developments (online) Available at: <https://www.publichealthscotland.scot/publications/national-planning-framework-4-briefing-on-health-and-proposed-national-developments/> (accessed 30/09/2021)

⁷⁹ ClimateXChange (2016) Energy Storage in Scotland - Summary of reports on thermal and electrical energy storage (online) Available at: https://www.climateexchange.org.uk/media/1391/summary_energy_storage.pdf (accessed 25/08/2021)

poverty, benefits should arise for health and wellbeing⁸⁰. Finally, the decarbonisation of the energy sector can lead to secondary benefits from improved air quality.

D1.3.67 Positive impacts may also arise from employment opportunities for local communities⁸¹. There is also the potential for visual and landscape effects and implications for recreational users to arise, which could have negative impacts on health and wellbeing. The significance of these effects will depend on factors including the character and sensitivity of the landscape within which developments are located.

D1.3.68 Gaps/uncertainties

- The precise nature and scale of projects that could be brought forward are unknown.

D1.3.69 Mitigation/opportunities for enhancement

- Waste/excavated materials should be reused where possible.
- The application of circular economy principles should support development that prioritises the reuse of materials in construction, use of low carbon construction materials and design principles that allows for materials to be reused/recycled upon decommissioning.
- To minimise GHG emissions, the design of the new and extended developments should have minimal impacts on LULUCF.
- Sediment creation and build up should be managed in such a manner as to reduce emissions.

⁸⁰ Public Health Scotland (2021) National Planning Framework 4: Briefing on health and proposed National Developments (online) Available at: <https://www.publichealthscotland.scot/publications/national-planning-framework-4-briefing-on-health-and-proposed-national-developments/> (accessed 30/09/2021)

⁸¹ Public Health Scotland (2021) National Planning Framework 4: Briefing on health and proposed National Developments (online) Available at: <https://www.publichealthscotland.scot/publications/national-planning-framework-4-briefing-on-health-and-proposed-national-developments/> (accessed 30/09/2021)

10. Hunterston Strategic Asset

D1.3.70 This proposed national development will support an increased mix of opportunities including port, electricity and hydrogen generation including servicing for offshore energy, carbon capture, aquaculture, business, commercial and industrial uses. Flood risk management, access, and biodiversity impacts will also be considered.

D1.3.71 Location: Hunterston Port and Hunterston A power station site.

Topic	Assessment Findings
Biodiversity, flora and fauna	<p>The initial draft NPF4 HRA screening report identified the nearest SPA for wide ranging seabird species as Ailsa Craig SPA, and noted any increase in marine vessel movements to and from Hunterston could impact on foraging by the qualifying seabirds (and potentially on other SPAs further afield), depending on the routes taken and the numbers involved. The only terrestrial SPAs identified within 20 km were Renfrewshire Heights SPA and Arran Moors SPA. These are both designated for breeding hen harrier, and are both situated beyond the core foraging range of this species from the Hunterston Strategic Asset National Development. The initial HRA screening concluded that likely significant effects cannot be excluded for SPAs designated for breeding seabirds. However, it is very unlikely to have any significant effects on terrestrial SPAs or SACs. Sites with national level designation and with close proximity to Hunterston include the Southannan Sands, a biological SSSI. Sandflats are a protected feature of this site and component habitats here include intertidal seagrass beds and blue mussel beds (both of which are Priority Marine Features). Developments at Hunterston may have potential to affect the qualifying features of this designated site, and further assessment at project stages may be required.</p> <p>Increased noise and visual disturbance could impact or displace species in both the marine and terrestrial environments including birds, fish or marine mammals. In addition, activities may have potential to pollute the marine environment should any release of contaminants from leakage of fuel, oils etc, or from dredged materials take place.</p>
Climatic factors	<p>The Lifecycle GHG assessment concluded that, depending on the nature of the projects taken forward and considering both direct and indirect effects, this development will likely have an overall net positive impact on achieving national greenhouse gas emissions reduction targets. This is due to support for renewable and low carbon hydrogen production, and electricity generation, including from renewable energy, increasing the renewable energy supply and security of supply over a long time period and displacing fossil fuel use including through use of carbon capture. The scale of these effects could range from low to high positive depending on the scale of electricity generation and storage, and the scale of use of fossil fuels. This development can deliver high positive effects if it will generate and store a significant amount of renewable and lower carbon energy displacing emissions from current fossil fuels. However, if this development delivers only a small amount of renewable or lower carbon energy then low positive effects are expected.</p>

	<p>Improved energy storage is likely to be an increasingly important part of the transition to delivering clean, affordable and secure supplies of energy⁸². This has the potential to lead to benefits for climate change adaptation where increased efficiencies and resilience within the energy network helps to reduce the risk of disruption, including through the impact of extreme weather events.</p> <p>Consideration of climate change adaption will be required a project level. This should include flood risk, with further positive benefits arising where sustainable flood risk management solutions are utilised.</p>
Water	<p>Potential for negative impacts from construction and operation. For example, increased vessel movement could lead to increased risk of pollution, introduction/spread of invasive non-native species and loss of seabed and smothering of the seabed. Renewable hydrogen production is also reliant on water supply, with requirements differing depending on production methods undertaken⁸³. This could include the use of freshwater or sea water (subject to desalinisation) with associated impacts on water quality and quantity, with potential effects on biodiversity/marine ecology⁸⁴.</p> <p>Positive impacts could arise where measures are taken to implement sustainable flood risk solutions as flooding can be an issue in the area.</p>
Air	<p>Localised positive impacts on air quality may arise where measures lead to reduced travel needs, including implementation of active travel networks. Depending on the nature of projects taken forward, air quality may require further consideration. Overall long term secondary benefits should arise for air quality through support for decarbonisation.</p> <p>Operational activities may increase noise, light and odour and will require assessment at project consenting stages.</p>
Soil	<p>Benefits for soil from the re-use of brownfield land will be dependent on the extent of proposed re-development. Possible disturbance to seabed through construction and operation of marine activities could lead to negative impacts.</p>
Cultural Heritage and Historic Environment	<p>There is potential for negative effects on the setting of historical assets including Kelburn Castle, a Category A listed structure and a garden and designed landscape. There is also potential for physical impacts on unknown buried archaeological assets in both terrestrial and marine environments. Further consideration will be required at project stage.</p>
Landscape and Geodiversity	<p>Negative impacts could arise from the development of new infrastructure which is likely to lead to a degree of landscape change and may require consideration at project level. Potential for positive effects on local</p>

⁸² ClimateXChange (2016) Energy Storage in Scotland - Summary of reports on thermal and electrical energy storage (online) Available at: https://www.climateexchange.org.uk/media/1391/summary_energy_storage.pdf (accessed 14/01/2020)

⁸³ Scottish Government (2021) SEA of Draft Hydrogen Action Plan for Scotland scoping report (online) Available at: <https://www.strategicenvironmentalassessment.gov.scot/PublicSearch.aspx> (accessed 25/08/2021)

⁸⁴ Scottish Government (2021) SEA of Draft Hydrogen Action Plan for Scotland scoping report (online) Available at: <https://www.strategicenvironmentalassessment.gov.scot/PublicSearch.aspx> (accessed 25/08/2021)

	landscape through the restoration of previously vacant land, which can have poor landscape quality.
Material assets	Potential for significant positive impacts through redevelopment of existing assets, such as decommissioned oil and gas infrastructure, key infrastructure hubs including the deep water harbour and dry dock, aligning with circular economy principles. Positive impacts should also arise through improved diversification and resilience of the energy network, helping to manage fluctuations in energy demand and potential for reduced risk of flooding, which can negatively impacts on built assets.
Population and human health	Potential for long term significant benefits from support for place based development, including through the remediation of vacant and derelict land. Additional benefits could also arise from the creation of employment opportunities and localising life/work options, including through improving access to facilities and services. Secondary benefits from improved air quality, including through increased opportunities for the uptake of active travel should also arise. Positive impacts are likely to be maximised through focus towards existing and incoming communities, particularly due to levels of deprivation experienced in the area and where a community wealth building approach is taken. Additionally, greater storage of energy can allow consumers to use energy differently and where this leads to energy efficiency, could also support reducing fuel poverty. Increased efficiencies and resilience within the energy network can also lead to reduced network disruption including through the impact of extreme weather events.

Summary of health implications

- D1.3.72 Support for the repurposing of existing sites, including through the remediation of vacant and derelict land, should lead to long term benefits. Areas within the 20% most deprived in Scotland can be found within a 10 mile radius (including Saltcoats, Ardrosson, West Kilbride and Dalry)⁸⁵ and these areas are also considered to be particularly vulnerable to EU Exit⁸⁶. Access to services and facilities can play a key role in health and tackling inequalities⁸⁷, and the benefits of this are likely to be maximised through providing opportunities towards current and incoming communities, supporting the long term viability of the area.
- D1.3.73 National and local benefits should arise from support for a transition to net zero, including through renewable energy sources, with associated benefits including increased reliability of energy supply and reduced risk of disruption. Flooding can negatively impact on human health and assets, the impacts of which are likely to be disproportionately severe in areas of

⁸⁵ Scottish Government (undated) Scottish Index of Multiple Deprivation 2020 (online) Available at: <https://www.gov.scot/collections/scottish-index-of-multiple-deprivation-2020/> (accessed 29/09/2021)

⁸⁶ Scottish Government (2019) Local level Brexit Vulnerabilities in Scotland: Brexit Vulnerabilities Index (BVI) (online) Available at: <https://www.gov.scot/publications/local-level-brexit-vulnerabilities-scotland-brexit-vulnerabilities-index-bvi/> (accessed 29/09/2021)

⁸⁷ NHS Scotland (undated) Place and communities (online) Available at: <http://www.healthscotland.scot/media/1088/27414-place-and-communities-06-16.pdf> (accessed 25/08/2021)

high deprivation because of the reduced ability of individuals and communities in these areas to prepare, respond and recover⁸⁸. Positive impacts should therefore arise where consideration is given to flood risk in the form of sustainable flood management measures, due to the potential for multiple co-benefits to arise.

D1.3.74 Gaps/uncertainties

- The precise nature, scale and location of projects that could be brought forward are unknown.
- Potential for brownfield land to be affected by contamination. The extent/level of potential contamination and scale/type of remediation work that may be required, is unknown.

D1.3.75 Mitigation/opportunities for enhancement

- The application of circular economy principles should support development that prioritises the reuse of materials in construction, use of low carbon construction materials and design principles that allows for materials to be reused/recycled upon decommissioning.
- Prioritisation should be given to the use of renewable / low carbon energy to power projects taken forward.
- Opportunities to improve public access to the wider area through green infrastructure and active travel infrastructure should be considered at plan and project consenting stages.
- Effects on biodiversity should be minimised through siting and design, and enhancement measures applied in keeping with national policy.

⁸⁸ The Scottish Parliament (2012) SPICe Briefing: Climate Change and Health in Scotland (online) Available at: http://www.parliament.scot/ResearchBriefingsAndFactsheets/S4/SB_12-26rev.pdf (accessed 25/08/2021)

11. Chapelcross Power Station Redevelopment

D1.3.76 The proposed national development is to redevelop the former nuclear power station site. The development may include for example business development with a particular focus on energy and energy supply chain; energy generation from solar; electricity storage; generation of heat; production and storage of low carbon and renewable hydrogen.

D1.3.77 Location: site of the former Chapelcross power station.

Topic	Assessment Findings
Biodiversity, flora and fauna	<p>Potential for negative impacts on biodiversity, including disturbance during construction and long term loss and fragmentation of habitat. The re-use of existing infrastructure should be maximised where possible. There is the potential for negative impacts to be minimised through siting and design and enhancement measures applied in keeping with national policy. Positive impacts could arise from the remediation of vacant and derelict land, however, consideration may need to be given to where remediation works could lead to displacement of species that might have colonised sites. Remediation works could also lead to potential release of contaminants. can also help to reduce/mitigate possible impacts. Operational activities could also lead to negative impacts, including through waterborne pollution and hydrological changes to watercourses. Depending on storage proposals, long term impacts could also include the potential for CO2 leakage into the marine environment with opportunity to mitigate through appropriate monitoring.</p> <p>The Solway Firth SPA and Upper Solway Flats and Marshes SPA are nearby, designated for a range of wintering waterbirds which could occur in grassland surrounding the proposed development site. The site is also within core foraging range of pink-footed geese belonging to the Castle Loch, Lochmaben SPA. Potential implications include loss of functionally linked habitat, either directly or due to disturbance. Potential for hydrological impacts to affect qualifying lamprey species of the downstream Solway Firth SAC. Depending on operational activities, there is also the potential for atmospheric emissions to impact on nearby SACs designated for raised bog habitat.</p>
Climatic factors	<p>The Lifecycle GHG assessment concluded that, depending on the nature of the projects taken forward and considering both direct and indirect effects, this development will likely have an overall net positive impact on achieving national greenhouse gas emissions reduction targets. This is due to the production of renewable and low carbon energy and support for energy related business development.</p> <p>The scale of effects could range from low negative to low positive. A low negative effect would result from a lower level of renewable / low carbon energy produced or stored, and lower levels of enabling support for renewable energy related development which could be insufficient to balance against the embodied energy of construction and on site energy demands and increase in transport emissions, Conversely, if the levels of renewable/low carbon energy production and storage are higher and the enabling effect of the development for renewable energy is greater a low positive effect could be achieved. An overall net positive effect is</p>

	<p>concluded based on the assumption of a higher level of renewable/low carbon energy production and storage</p> <p>Increased diversity within the energy mix and improved capacity of energy storage can help reduce disruption to the energy sector and adapt to the impacts of climate change, including from extreme weather events.</p>
Water	<p>Negative and localised impacts from construction activities could arise, which should be short term in nature. Operational activities could also lead to long term negative impacts, for example, the production of hydrogen can impact on water quality and quantity, potentially impacting on marine ecology⁸⁹. Longer term benefits could arise where remediation measures address historic contamination. However, consideration may need to be given to possible negative impacts could arise during works being undertaken. For example, from the release of contaminants, which could also have implications for human health.</p>
Air	<p>Longer term positive effects should arise through potential displacement of traditional energy fuels, however, potential for localised impacts from operational activities will be influenced by the technologies employed and may require further consideration. The provision of sustainable access to site should reduce/mitigate possible localised air quality impacts that could arise from potential increases in surface traffic.</p>
Soil	<p>Positive impacts should arise from the remediation of vacant and derelict land, particularly where focus is given to areas with existing contamination, with the benefits of this having the potential to be significant. Consideration should be given to impacts on nearby peatland from the possible construction of hydrogen transportation infrastructure.</p>
Cultural Heritage and Historic Environment	<p>Potential for negative impacts on unknown archaeology through construction activities.</p>
Landscape and Geodiversity	<p>There is the potential for mixed effects as a result of land use change resulting from development. However, this will depend on factors such as the scale of development and is likely to require consideration at local level.</p>
Material assets	<p>Likely positive effects through the remediation of vacant and derelict land which has been subject to historic contamination. Further positive impacts should arise through support for a diverse mix of technologies and potential for increased resilience within the energy network. Re-use of infrastructure, where possible, should also reduce impacts on natural resources.</p>
Population and human health	<p>Vacant and derelict land can lead to negative impacts both environmental and societal, with positive impacts expected where remediation works are undertaken, including through improved sense of place. Further benefits should arise where measures are implemented to remediate historical contamination within the area. For example, there is evidence that contaminated land can affect air and water quality, which can negatively</p>

⁸⁹ Scottish Government (2021) SEA of Draft Hydrogen Action Plan for Scotland scoping report (online) Available at: <https://www.strategicenvironmentalassessment.gov.scot/PublicSearch.aspx> (accessed 25/08/2021)

	<p>impact on health⁹⁰. Operational activities could also lead to negative impacts, for example, the transportation of CO₂, other than by pipeline, could give rise to potential health and safety implications.</p> <p>Potential for positive impacts to arise from improved access to key services such as employment opportunities, the benefits of which should be maximised through support provided for taking a community wealth building approach. Where the development leads to localised energy supply, further positive impacts should also arise, including from the potential provision to local communities/businesses of heat and electricity. Alongside support for improved energy storage, this can allow consumers to use energy differently, support energy efficiency and help address fuel poverty, with associated health and wellbeing benefits.</p> <p>Positive effects could also arise from recreation opportunities that could arise from improved access to active travel.</p>
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Summary of health implications

- D1.3.78 Long term benefits should arise through improved sense of place, particularly through the remediation of vacant and derelict land, which can lead to environmental and societal impacts on local populations and communities. Benefits arise particularly where this leads to the remediation of contaminated land. Additional benefits should also arise from increased access to local opportunities, such employment, with areas in and around Annan considered to be particularly vulnerable to the impacts of EU Exit⁹¹ and areas in Annan East assigned as being in the 20% most deprived areas of Scotland⁹². The benefits of this should be maximised by taking a community wealth building approach.
- D1.3.79 National and local benefits should arise from support for the continued decarbonisation and increased diversity of mix of technologies within the energy sector. Improved energy storage can also allow consumers to use energy differently and benefits should arise where this leads to energy efficiency. In turn, where this supports reducing fuel poverty and wider poverty, benefits should arise for health and wellbeing⁹³.
- D1.3.80 Gaps/uncertainties
- The precise nature, scale and location of projects that could be brought forward are unknown.

⁹⁰ Public Health Scotland (2021) National Planning Framework 4: Briefing on health and proposed National Developments (online) Available at: <https://www.publichealthscotland.scot/publications/national-planning-framework-4-briefing-on-health-and-proposed-national-developments/> (accessed 30/09/2021)

⁹¹ Scottish Government (2019) Local level Brexit Vulnerabilities in Scotland: Brexit Vulnerabilities Index (BVI) (online) Available at: <https://www.gov.scot/publications/local-level-brexit-vulnerabilities-scotland-brexit-vulnerabilities-index-bvi/> (accessed 29/09/2021)

⁹² Scottish Government (undated) Scottish Index of Multiple Deprivation 2020 (online) Available at: <https://www.gov.scot/collections/scottish-index-of-multiple-deprivation-2020/> (accessed 29/09/2021)

⁹³ Public Health Scotland (2021) National Planning Framework 4: Briefing on health and proposed National Developments (online) Available at: <https://www.publichealthscotland.scot/publications/national-planning-framework-4-briefing-on-health-and-proposed-national-developments/> (accessed 30/09/2021)

- Potential for brownfield land to be affected by contamination. The extent/level of potential contamination and scale/type of remediation work that may be required, is unknown

D1.3.81 Mitigation/opportunities for enhancement

- Prioritise the use of low carbon construction materials and ensure upon decommissioning waste materials are reused again or recycled.
- Opportunity to consider the type and scale of green energy generation and whether it can be used to provide electricity to the businesses forming the development.
- Ensure public transport connections and links to active travel routes.
- Infrastructure for transmission of hydrogen should be sited to avoid impacts to sensitive receptors.

12. Strategic Renewable Electricity Generation and Transmission Infrastructure

D1.3.82 This national development supports renewable electricity generation (of or exceeding 50MW), repowering, and expansion of the electricity grid for domestic consumption and export to the UK and beyond. This development will include new infrastructure to support off-shore renewables.

D1.3.83 Location: All Scotland.

Topic	Assessment Findings
Biodiversity, flora and fauna	Potential for significant negative impacts to arise for example, disturbance and risk of pollution during construction, or long term loss of habitat and fragmentation. Potential for negative impacts to be minimised through siting and design and enhancement measures applied in keeping with national policy. Offshore links, including through the laying of underground cables could impact on the seabed, coastal habitats and marine species.
Climatic factors	<p>The Lifecycle GHG assessment concluded that, depending on the nature of the projects taken forward and considering both direct and indirect effects, this development will likely have an overall net positive impact on achieving national greenhouse gas emissions reduction targets. This is due to potential for substantial generation and transmission of low carbon electricity.</p> <p>The scale of positive effect is assumed to be between medium and very high positive, depending on the scale of renewable energy generation and the role of the development in facilitating further renewable energy development. A medium scale of effect would result from higher embodied carbon in construction infrastructure, and lower levels of renewable energy generation and use. Conversely, lower embodied carbon in construction infrastructure, and higher levels of renewable energy generation would result in a very high scale of effect.</p> <p>Significant positive impacts should also arise where development improves resilience and reduces risk of disruption within the network, including to the impacts of climate change, for example, through increased electricity storage capacity. This is likely to be of particular relevance in coastal areas due to increased risk of sea level rise/erosion.</p>
Water	Potential for negative impacts on ground and surface water and coastal waters, depending on installation requirements which are likely to require further consideration at project level. Where possible, the re-use of existing infrastructure should help to reduce/minimise possible impacts. Coastal areas may be particularly vulnerable to flooding in relation to onshore grid connections where marine cables connect to land cables or overhead lines with benefits likely to arise where consideration is given to increased resilience.
Air	Overall, longer term secondary positive impacts for air quality should arise where development supports emissions reductions.
Soil	There is the potential for long term negative effects on soil arising from construction and installation of infrastructure, including from compaction, erosion and soil sealing. Potential for disturbance or loss of peat and

	carbon rich soils which may reduce carbon sequestration. Consideration, including appropriate siting, should seek to avoid/reduce negative impacts. The enhancement and use of existing infrastructure where possible should help to reduce/mitigate possible impacts.
Cultural Heritage and Historic Environment	Potential for physical impacts on both known and unknown archaeological features in both marine and terrestrial environments. There is also potential to effect the setting of historic assets. Both will require further consideration at project level.
Landscape and Geodiversity	Potential for negative effects on landscape character, including implications for coastal landscapes and seascapes where new infrastructure development is required. This has the potential to be significant depending on factors such as specific infrastructure requirements and the extent to which existing infrastructure/existing sites are utilised. Potential impacts for marine and coastal processes, including sediment disturbance, erosion and altered seabed morphology, could also arise where underwater geological works are undertaken.
Material assets	Significant positive impacts should arise through support for energy grid infrastructure and potential to increase flexibility, efficiency and resilience of the energy network as a whole, with increased resilience of significant importance in rural, remote and fragile locations. Re-use and enhancement of existing infrastructure where possible, should lead to reduced pressure on natural resources, aligning with circular economy principles.
Population and human health	Increased access and reliability of the energy network, including where focus is given to community sustainability and storage, should lead to significant positive effects, particularly in rural, remote and fragile locations, including from reduced risk of disruption during extreme weather events. Facilitating local and community energy generation can also help to meet local needs, helping to optimise demand and increase energy efficiency across the network. Long term positive impacts could also arise from employment opportunities, which could be particularly significant where this leads to increased growth and viability of local communities. Support for a transition to renewable and low carbon energy generation should also lead to long term secondary benefits from improved air quality. Potential for long term negative impacts due to possible impacts on visual/residential amenity. The significance of this will be influenced by a wide range of factors including scale of uptake, individual technologies and siting, and consideration will be required at project level.

Summary of health implications

- D1.3.84 Support for long term transition to net-zero should lead to benefits, both at a national and local level through reducing GHG emissions and where this leads to secondary benefits for air quality. New and/or reinforced grid infrastructure should also lead to increased resilience from disruption and security of supply, including from the impacts of climate change. This could be of particular relevance where local and community energy generation is facilitated, helping to support local needs, optimising demand and increasing energy efficiency across the network. This of key

importance for many remote and island communities where disruption to supply can be felt to a greater extent.

D1.3.85 Where employment opportunities arise, this could be particularly significant in areas experiencing employment deprivation⁹⁴. Additionally, there is the potential for increased inclusive growth and improved viability of local communities in rural and remote areas, with a lack of opportunities felt to be particularly relevant for the younger population⁹⁵ ⁹⁶ which can lead to depopulation. Negative impacts could arise on visual / residential amenity depending on location and scale of infrastructure requirements.

D1.3.86 Gaps/uncertainties

- The precise nature, scale and location of projects that could be brought forward are unknown.

D1.3.87 Mitigation/opportunities for enhancement

- Ensure that that disturbance of soil, particularly high carbon soils, vegetation and seabed is minimised and avoided where possible and consideration given to ensure site reinstatement to enhance carbon sequestration.
- In line with national policy on zero waste and promotion of circular economy, prioritisation should be given to the reuse of materials in construction, use of low carbon construction materials prioritised and materials should be reused or recycled upon decommissioning.
- Screening options should be considered to minimise visual impact of developments
- Effects on biodiversity should be minimised through siting and design, and enhancement measures applied in keeping with national policy.

⁹⁴ Public Health Scotland (2021) National Planning Framework 4: Briefing on health and proposed National Developments (online) Available at:

<https://www.publichealthscotland.scot/publications/national-planning-framework-4-briefing-on-health-and-proposed-national-developments/> (accessed 30/09/2021)

⁹⁵ Highlands and Islands Enterprise (2018) Young People and the Highlands and Islands: maximising opportunities (online) Available at: <https://www.hie.co.uk/research-and-reports/our-reports/2018/may/31/yp-research/> (accessed 25/08/2021)

⁹⁶ Scottish Government (2021) National Islands Plan Survey: final report (online) Available at: <https://www.gov.scot/publications/national-islands-plan-survey-final-report/> (accessed 25/08/2021)

13. High Speed Rail

D1.3.88 The proposed national development is to support the implementation of increased infrastructure to improve rail capacity and connectivity on the main cross-border routes, the east and west coast mainlines.

D1.3.89 Location: Central and southern Scotland to the border with England.

Topic	Assessment Findings ⁹⁷
Biodiversity, flora and fauna	<p>Negative impacts likely to arise for biodiversity from the construction and operation of new supporting infrastructure. Potential impacts include land take to accommodate new or improved tracks, multimodal stations and depots, leading to habitat loss or damage. Potential for disturbance during construction and operation can also lead to negative impacts. Potential for negative impacts to be minimised through siting and design and enhancement measures applied in keeping with relevant national policy. Additionally, linear works, such as transport routes, can lead to fragmentation of existing habitats and networks, acting as a barrier which can prevent wildlife moving through the landscape. Where possible, re-use of infrastructure and use of brownfield land can reduce/minimise possible impacts.</p> <p>Consideration will need to be given to where there could be implications for European sites, for example, through loss of functionally linked habitat and disturbance of qualifying species.</p>
Climatic factors	<p>The Lifecycle GHG assessment concluded that, depending on the nature of the projects taken forward and considering both direct and indirect effects, this development will likely have an overall net positive impact on achieving national greenhouse gas emissions reduction targets. This is due to displacement of emissions from private cars and air travel over a long time period.</p> <p>The scale of this effect could range from negligible to high positive depending on the level of uptake of train travel. If this development enables a significant amount of modal shift from private car and aeroplane to train, then a high positive effect is expected. Whereas, if this development enables only a relatively small modal shift, negligible effects are expected.</p> <p>Given the critical nature of the infrastructure consideration should be given to supporting resilience to the impacts of climate change including to the impacts of extreme weather events.</p>
Water	<p>Potential for negative impacts on waterbodies. This could include physical changes and water pollution arising from construction activities. The degree of impact depends on the route chosen and mitigation to avoid or minimise impacts would be required at the site level. Effects may be cumulatively significant on water quality depending on the scale of development.</p>
Air	<p>Localised impacts on air quality are likely to arise from construction activities, including from increased surface traffic activity to and from sites.</p>

⁹⁷ Assessment informed by findings set out in GOV.UK (2017) HS2 Phase 2a environmental statement (2017) (online) Available at: <https://www.gov.uk/government/collections/hs2-phase-2a-environmental-statement> (accessed 21/10/2021)

	<p>Potential for long term benefits from support for modal shift to a less polluting mode of transport, including through increased interconnectivity through development of multimodal stations. This is likely to be of particular benefit where existing air quality issues due to transport emissions exist.</p> <p>Noise and vibration impacts could also arise during operation, which could lead to associated negative impacts on human health.</p>
Soil	<p>The construction of the new rail stations, depots and high speed line could result in permanent soil sealing and compaction, including from possible development of agricultural land and carbon rich soils, with potential for associated implications for GHG emissions. Where possible, the re-use of existing infrastructure should reduce/minimise potential negative impacts, including through utilising areas of brownfield land.</p>
Cultural Heritage and Historic Environment	<p>There is potential for permanent negative effects on cultural heritage, including loss of known and unknown archaeological resources, impacts on historic buildings where established railway infrastructure is modified, and effects on the setting of some historic sites.</p>
Landscape and Geodiversity	<p>Potential for significant short and long term negative impacts to arise from changes to the character and appearance of local landscapes. While there is the potential for negative impacts to substantially reduce over time as mitigation planting grows and matures, significant negative effects could remain.</p> <p>The extent to which new infrastructure/interventions, including stations, will be located within landscapes where transport corridors are already established features will also influence the scale of landscape change.</p>
Material assets	<p>Positive impacts should arise through support for improved interconnectivity of more sustainable modes of transport.</p> <p>Construction activities could lead to the generation of significant amounts of waste and material resources, with the majority of this having the potential to be re-used. For example, in the construction of engineering embankments, landscape earthworks and as well as in the restoration of borrow pits. The re-use of existing infrastructure where possible, including vacant and derelict land, should help to reduce pressure on natural resources, and in some instances reduce the generation of waste, aligning with circular economy principles.</p> <p>Potential for negative impacts on natural assets such as forestry, minerals and farmland through land use change will require further consideration at project level. There is also an opportunity to align with development to support improved placemaking.</p>
Population and human health	<p>Construction and development activities could lead to short term negative impacts from noise and disturbance.</p> <p>Potential for long term positive impacts to arise from increased connectivity, including to goods and services, including through reduced travel times and improved job prospects. Displacement from less sustainable modes of travel could also lead to improved air quality, with associated benefits, including societal. For example, reduced exposure to noise and air pollutants has the potential to lead to increased levels of social interaction. However, the impacts from increased exposure to noise from operational activities has the potential to cause sleep disturbance, annoyance and health related issues for those living in close proximity to</p>

	<p>the route⁹⁸. Visual implications could also have associated negative impacts.</p> <p>There is an opportunity to integrate new infrastructure/interventions with improved placemaking and delivery of high quality transport interchanges, to positively influence design and access to and through spaces. At this stage the impacts of this are uncertain and will be influenced by factors such as design.</p> <p>Potential equality issues may require consideration to ensure that differing needs are taken into account to reduce possible negative impacts through creating barriers to inclusion⁹⁹.</p>
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Summary of health implications

- D1.3.90 Potential benefits include improved job prospects through reduced travel times and benefits where this leads to improved quality of life, including through work/life balance. Potential impacts are likely to be differential across society depending on whether people are benefiting from the infrastructure or are more directly impacted by its construction and use.
- D1.3.91 The long term displacement from less sustainable modes of travel should lead to associated benefits, such as reductions in GHG emissions, improved air quality and wider societal benefits. However, potential impacts may arise though the role of new infrastructure/interventions on quality of place, which could lead to both positive and negative impacts. For example, noise and visual impacts from passing trains during operation can impact on neighbourhood quality in areas close by¹⁰⁰. Negative impacts may also arise during construction activities. There is also the potential for land use change and significant impacts to the character and appearance of local landscapes to arise.
- D1.3.92 Gaps/uncertainties
- The precise nature, scale and location of projects that could be brought forward is unknown.
- D1.3.93 Mitigation/opportunities for enhancement
- Opportunities to support improved placemaking should be undertaken.
 - Consideration should be given to ensure that transport equality issues are taken into account.

⁹⁸ Gov.uk (2017) HS2 Phase 2a Equality Impact Assessment report [online] Available at: <https://www.gov.uk/government/consultations/hs2-phase-2a-equality-impact-assessment-report> (accessed 25/08/2021)

⁹⁹ Gov.uk (2017) HS2 Phase 2a Equality Impact Assessment report [online] Available at: <https://www.gov.uk/government/consultations/hs2-phase-2a-equality-impact-assessment-report> (accessed 25/08/2021)

¹⁰⁰ Gov.uk (2017) HS2 Phase 2a Equality Impact Assessment report [online] Available at: <https://www.gov.uk/government/consultations/hs2-phase-2a-equality-impact-assessment-report> (accessed 25/08/2021)

- Potential impacts on high carbon soils or areas important for carbon sequestration should be avoided where possible.
- The application of circular economy principles should support development that prioritises the reuse of materials in construction, use of low carbon construction materials and design principles that allows for materials to be reused/recycled upon decommissioning.
- Opportunity to reduce emissions by utilising renewable energy for running of train services.

14. Clyde Mission

- D1.3.94 The proposed national development is to deliver an ambitious programme to bring forward sites and assets which are ready for redevelopment to sustain a range of uses.
- D1.3.95 This development will repurpose and reinvigorate vacant and derelict land, and supporting local living as well as adapting the area to the impacts of climate change.
- D1.3.96 Location: The river and land immediately next to it (up to around 500 metres from the river) along its length.

Topic	Assessment Findings
Biodiversity, flora and fauna	<p>Three European sites could be linked to projects under this National Development: the Inner Clyde SPA, Black Cart SPA and Clyde Valley Woods SAC. The initial HRA screening concluded that impact sources will depend on the nature of projects brought forward, but could include: the spread of invasive non-native species, waterborne and airborne pollution, the loss of functionally-linked habitat, disturbance of species using functionally-linked habitat, and increased recreational pressure.</p> <p>There is potential for negative effects on undesignated habitats and species which will require assessment at project level. Consideration should be given to species which have colonised vacant or derelict land where this development gives rise to re-use.</p>
Climatic factors	<p>The Lifecycle GHG Assessment concluded that, depending on the nature of the project taken forward, and considering both direct and indirect effects, it is likely that this development will have a net negative effect on lifecycle GHG emissions due to increased emissions from transport, electricity, heat, industrial, manufacture and construction processes and waste. This development is likely to be delivered on vacant or derelict land which is assumed to protect greenfield sites from being developed. The scale of this effect is likely to be low depending on the uptake of sustainable transport modes and low carbon/energy efficiency solutions, and LULUCF benefits.</p> <p>Consideration of climate change adaptation, including flood risk, will require consideration for all projects taken forward.</p>
Water	<p>Condition status of surface and groundwater varies through the Clyde Mission area. Long term positive effects on the water environment should arise where development leads to remediation of land contamination and/or redevelopment of vacant and derelict land. Potential negative impacts on the water environment including sediment disturbance and flow changes may arise through waterfront infrastructure development and operations and will require further consideration at project level.</p> <p>Increased spread of invasive non-native species in freshwater and marine environments may arise as a result of river side development and will require management at project level.</p> <p>Use of sustainable urban drainage systems (SUDs)/natural infrastructure to manage flood risk, should lead to associated benefits for water quality and quantity.</p>

Air	<p>Potential for negative impacts on air quality and noise where proposals lead to increased traffic.</p> <p>Negative effects on air quality have potential to be more significant in areas where air pollution issues currently exist, e.g. areas where AQMAs have been declared. Air pollution can impact on the more vulnerable members of society – the very young, the elderly and those with existing health conditions such as asthma, respiratory and heart disease, thus making air quality an important health inequalities issue^{Error! Bookmark not defined}. Positive impacts on air quality may arise where nature-based solutions for climate change adaptation are implemented. These may minimise negative effects on species and habitats, and human health. There is potential for local level individual and cumulative noise effects on sensitive receptors including communities, with secondary effects on health, and protected species. Underwater noise associated with upgrade of existing port and harbour assets may have negative effects on freshwater or marine species. The effects of noise on sensitive receptors will require further consideration at plan or project consenting stages.</p>
Soil	<p>Positive impacts on soil should arise from the remediation of vacant and derelict land, particularly where focus is given to areas with existing contamination, with the benefits of this likely to be significant. Where required, infrastructure development on previously undeveloped land is likely to lead to soil sealing and compaction. Use of nature based solutions for flood risk management should also lead to benefits though broader environmental improvements.</p>
Cultural Heritage and Historic Environment	<p>There are numerous known historic assets within the area. Development has potential to effect the setting of historic assets. This should be assessed at project level. Opportunities to bring vacant or buildings at risk back into use, and improve the setting of historic assets. Development has potential to significantly impact unknown archaeological assets in the marine and terrestrial environments.</p>
Landscape and Geodiversity	<p>Development has potential to alter landscapes. Positive effects can arise from the overall approach to sustainable regeneration of an extensive area, particularly though focus on the remediation of vacant and derelict land and support for high quality public realm spaces</p>
Material assets	<p>Potential for significant positive effects for material assets as a result of sustainable regeneration activities in relation to both the natural (e.g. remediation of land) and built environment and through support for decarbonisation within the energy and transport sectors, including through improved interconnectivity and digitisation. Focus on the use of existing assets should lead to positive impacts through alignment with circular economy principles.</p>
Population and human health	<p>Potential for long term significant benefits for population and human health from support for place based development, particularly from remediation of vacant and derelict land, which can have negative impacts, both social and environmental and support for 20 minute neighbourhoods, with associated benefits including improved quality of place and quality of life. This will be the case particularly where this leads to the remediation of currently contaminated areas. Improved links with wider natural infrastructure should also lead to associated benefits through the role of</p>

	<p>natural infrastructure in placemaking, alongside support for high quality public realm spaces.</p> <p>Positive impacts should arise from improved access, including to employment and training opportunities, through support for inward investment, commitment to digital infrastructure, localising living/work options and support for sustainable and active travel.</p> <p>Measures to reduce the risk of flooding should lead to associated benefits, which are of particular relevance in relation to deprived communities on the River Clyde.</p> <p>Focusing action on areas of deprivation has the potential to maximise the benefits noted above.</p>
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Summary of health implications

- D1.3.97 Potential for long term significant benefits through support for placed based approach to development, including through inward investment and improved access to key services, such as employment and training opportunities. Transforming vacant and derelict land, such as through new homes or the creation of urban greenspaces, also has the potential to deliver both environmental and broader social benefits, including addressing health inequalities¹⁰¹. Where this includes the remediation of historically contaminated land, additional long term benefits should also arise due to the negative impacts contaminated land can have through risk of exposure to harmful contaminants.
- D1.3.98 A number of Scotland's 10% and 20% most deprived communities are located the proposal area, primarily within and around Glasgow City, including Inverclyde, and extending down to South Lanarkshire¹⁰². The focus on areas which are recognised as having some of the highest incidence of areas of deprivation, has the potential to maximise benefits. For example, those living in areas of greater socio-economic deprivation are more likely to experience poor quality environments or environmental burdens, such as poor air quality, and could experience reduced access good quality natural spaces¹⁰³.
- D1.3.99 Gaps/uncertainties
- The precise nature, scale and location of projects that could be brought forward are unknown.
 - Potential for brownfield land to be affected by contamination. The extent/level of potential contamination and scale/type of remediation work that may be required, is unknown.

¹⁰¹ Scottish Land Commission (2019) the Impact of vacant and derelict land (online) Available at: <https://landcommission.gov.scot/news-events/news-blog/the-impact-of-vacant-and-derelict-land> (accessed 25/08/2021)

¹⁰² Scottish Government (undated) Scottish Index of Multiple Deprivation 2020 (online) Available at: <https://www.gov.scot/collections/scottish-index-of-multiple-deprivation-2020/> (accessed 29/09/2021)

¹⁰³ Scottish Government (undated) NPF4 Call for Ideas: Public Health and Place (online) Available at: <https://www.transformingplanning.scot/media/1536/200-health-and-place-working-group.pdf> (accessed 25/08/2021)

D1.3.100 Mitigation/opportunities for enhancement

- Where this development give rise to creation of active travel and green and blue infrastructure, consideration should be given to factors such as the type, quality, accessibility and proximity of natural spaces to where people live as this can influence how the infrastructure/ spaces are used. Positive impacts could be maximised through ensuring such infrastructure is accessible to a wide range of users and focusing investment in areas to reduce inequalities.
- To facilitate carbon sequestration, green infrastructure should be promoted and high carbon soils protected.
- The assessment supports draft NPF4 provisions that help to achieve a circular economy and prioritisation should be given to the reuse of materials in construction, use of low carbon construction materials prioritised, and materials should be reused or recycled upon decommissioning.
- Opportunities to maximise landscape benefits should be explored, for example through focus on landscape quality and remediation of vacant and derelict land.
- Opportunities to protect and enhance the setting of the historic assets, recognising their role in placemaking, and bring disused or buildings at risk back into use.

15. Aberdeen Harbour

D1.3.101 This national development supports the continued and repurposing of Aberdeen Harbour.

D1.3.102 The south harbour can act as a cluster of port accessible offshore renewable energy research, manufacturing and support services. The facilities are important for international connections.

D1.3.103 At the south harbour the focus should be on regenerating existing industrial land and reorganising land use around the harbour in line with the spatial strategy of the local development plan. By focusing future port activity here, parts of the existing harbour in the city centre will become available for mixed use development, opening up development land to help reinvigorate Aberdeen city centre.

D1.3.104 Location: Aberdeen Harbour, Aberdeen South Harbour

Topic	Assessment Findings
Biodiversity, flora and fauna	<p>Projects brought forward under this National Development are likely to be immediately adjacent to (or even within) the River Dee SAC and in close proximity to the Ythan Estuary, Sands of Forvie and Meikle Loch SPA. Further afield, Aberdeen Harbour is within the foraging range of qualifying seabirds of Fowlsheugh SPA and several of the SPAs covering the Firth of Forth, in addition to grey seal and bottlenose dolphins associated with the following: Berwickshire and North Northumberland Coast SAC, Isle of May SAC and Moray Firth SAC.</p> <p>The initial HRA screening concluded that, depending on the nature of the projects brought forward, there is potential for a range of impacts to result in likely significant effects on the qualifying features of these European sites.</p> <p>Potential for biodiversity effects to be minimised through siting and design and enhancement measures applied in keeping with national policy. In particular, effects on the area of Green Belt and Green Space Network located to the south of Aberdeen Harbour should be considered, and opportunities to enhance biodiversity maximised.</p>
Climatic factors	<p>The Lifecycle GHG Assessment concluded that, depending on the nature of the projects taken forward and considering both direct and indirect effects, this development will likely have an overall net positive impact on achieving national greenhouse gas emissions reduction targets.</p> <p>This conclusion was considered likely due to the facilitation and enabling of renewable energy development across Scotland, and the production of renewable hydrogen over long timescales with the scale of effect ranging from low to high. A low scale of effect was considered likely from higher levels of increased transport emissions from the site operations using high carbon fuels, but with a lesser</p>

	<p>contribution by the development to enabling renewable energy and a lesser quantity of renewable hydrogen produced. Conversely, if the additional site transport emissions were lower overall and use low carbon fuels, and the proportion of renewable energy development enabled and renewable hydrogen produced is higher, this could result in a high positive effect.</p> <p>Consideration of climate change adaptations will be required for all projects taken forward.</p>
Water	<p>There is potential for negative impacts on water resulting from development-related operational and construction activities. Water quality impacts could arise from increased vessel movements, including loss or smothering of seabed and increased risk of pollution with the coastal waters surrounding the harbour.</p>
Air	<p>Measures to support improved active travel links should help to reduce possible localised negative impacts that could arise from increased surface traffic within the area, with further consideration required for potential to exacerbate current issues particularly within existing AQMAs. Two AQMAs have been declared within the vicinity of the area – Aberdeen City Centre AQMA and Wellington Road AQMA, both declared for NO₂ and PM₁₀¹⁰⁴.</p> <p>Measures to reduce transport related emissions will have associated benefits for both human health and biodiversity.</p> <p>Potential for operational activities to lead to adverse effects on receptors from noise and consideration should be given to cumulative noise impacts at project stages</p>
Soil	<p>Impacts on soils will be minimal where development occurs on brownfield land.</p>
Cultural Heritage and Historic Environment	<p>There are a number of historic assets in the vicinity of the existing (north) Aberdeen Harbour and South Harbour and there is potential for significant negative effects on the setting of historical assets. These include Footdee and Union Street conservation areas, Girdleness lighthouse (Category A-listed structure), Torry Point Battery and Balnagask motte scheduled monuments, St Fittick's Church (scheduled monument and Category B-listed structure). There are also clusters of funerary cairns (scheduled monuments) to the south, with the closest located appropriately 500m south of Aberdeen South Harbour. There is potential for physical impacts on unknown buried archaeological assets in both terrestrial and marine environments.</p>

¹⁰⁴ Air Quality in Scotland (2021) Air Quality Management Areas (online) Available at: [Air Quality Management Areas - Air Quality in Scotland \(scottishairquality.scot\)](https://www.scottishairquality.scot/) (accessed 01/10/2021)

	Developments in the existing (north) Aberdeen Harbour may require consideration of potential impacts on conservation areas and opportunities to protect or enhance identified. Consideration should be given to potential effects on historic assets and their setting, including cumulative, where the focus is on regenerating existing industrial land and reorganising land use around the south harbour.
Landscape and Geodiversity	Potential for significant permanent negative effects on local seascape and landscape character and on visual amenity resulting from upgraded port facilities, infrastructure for renewable hydrogen production and mixed use developments. and from increased vessel movements. The current Aberdeen Harbour Expansion Project is adjacent to and within the boundary of Nigg Bay SSSI.
Material assets	Positive impacts should arise from support for making best use of existing assets, Additional benefits should arise from the enhancement of key infrastructure port and harbour assets. Where possible, benefits should arise where dredged material is utilised where it is uncontaminated and physically suitable ¹⁰⁵ .
Population and human health	<p>Positive impacts have the potential to arise from access to training and employment opportunities and inward investment. Additional benefits should also arise from regeneration activities, however the extent of benefits will depend on the measures implemented. A focus on decarbonisation and localised access to energy sources should also lead to associated positive impacts, including secondary benefits from improved air quality.</p> <p>At the South Harbour consideration should be given to the potential impacts for recreational users of the local area, particularly users of the coastal path network around the site and the wider Green Space Network within this particular area of Aberdeen. Opportunities to improve public access to the wider area through green infrastructure and active travel infrastructure should be considered.</p>

Summary of health implications

D1.3.105 Positive impacts have the potential to arise from regeneration of the area and access to training, employment opportunities and inward investment including improved access to services and facilities. This could be of particular relevance with areas in and around the port area considered to

¹⁰⁵ Scottish Government (2011) Scotland's Marine Atlas: Information for the National Marine Plan (online) Available at: [Scotland's Marine Atlas: Information for The National Marine Plan - gov.scot \(www.gov.scot\)](http://www.gov.scot/Scotland's-Marine-Atlas:Information-for-The-National-Marine-Plan) (accessed 25/08/2021)

be particularly vulnerable to the impact of Brexit¹⁰⁶. National and localised long term benefits should arise through support for decarbonisation, including where this leads to long term secondary benefits of improved air quality.

D1.3.106 Potential benefits for air quality could also arise where regeneration measures also reduce car use, including from improved active travel links. However, operational activities could lead to negative impacts, including air quality implications and increased exposure to noise. This also has the potential to exacerbate existing air quality issues with Aberdeen subject to an existing AQMA due to transport emissions¹⁰⁷. Where infrastructure requirements lead to loss of natural assets, there is the potential for associated impacts. For example, a loss of biodiversity could negatively impact on health¹⁰⁸.

D1.3.107 Gaps/uncertainties

- The precise nature, scale and location of projects that could be brought forward are unknown.
- Potential for brownfield land to be affected by contamination. The extent/level of potential contamination and scale/type of remediation work that may be required, is unknown.

D1.3.108 Mitigation/opportunities for enhancement

- A Construction Environmental Management Plan (CEMP) should be implemented where relevant at project level.
- Consideration should be given to cumulative effects arising from the continued relocation and repurposing of the Harbour and to minimising potential adverse impacts on residential amenity and sensitive receptors.
- Prioritisation should be given to the use of renewable / low carbon energy to power projects taken forward.
- In line with national policy on zero waste and promotion of circular economy, prioritisation should be given to the reuse of materials in construction, use of low carbon construction materials prioritised and materials should be reused or recycled upon decommissioning.
- Low carbon transport options should be considered for the site to reduce car dependency.

¹⁰⁶ Scottish Government (2019) Local level Brexit Vulnerabilities in Scotland: Brexit Vulnerabilities Index (BVI) (online) Available at: <https://www.gov.scot/publications/local-level-brexit-vulnerabilities-scotland-brexit-vulnerabilities-index-bvi/> (accessed 29/09/2021)

¹⁰⁷ Air Quality in Scotland (2021) Air Quality Management Areas (online) Available at: <http://www.scottishairquality.scot/laqm/aqma> (accessed 01/10/2021)

¹⁰⁸ Public Health Scotland (2021) National Planning Framework 4: Briefing on health and proposed National Developments (online) Available at: <https://www.publichealthscotland.scot/publications/national-planning-framework-4-briefing-on-health-and-proposed-national-developments/> (accessed 30/09/2021)

- The impacts of climate change, including flood risk, should be considered.
- Opportunities to improve public access to the wider area through green infrastructure and active travel infrastructure should be considered at plan and project consenting stages.
- Effects on biodiversity should be minimised through siting and design, and enhancement measures applied in keeping with national policy.

16. Dundee Waterfront

D1.3.109 This national development supports the continued delivery of the waterfront transformation securing the role of the city as a location for investment in the net zero economy. Further projects associated with this include: the Michelin Scotland Innovation Parc which will become an innovation hub for net zero emission mobility; the Eden Project; and an expansion to Dundee Port. This national development includes reusing land on and around the Dundee Waterfront to support the lifelong health and wellbeing of communities, deliver innovation and attract investment. As the development progresses it will be important to support sustainable and active transport options and to build in adaptation to future climate risks.

D1.3.110 Location: Dundee Waterfront zones: Central Waterfront, Seabraes, City Quay, Dundee Port, Riverside Business Area and Riverside Park; and the Michelin Scotland Innovation Parc.

Topic	Assessment Findings
Biodiversity, flora and fauna	<p>Where the National Development includes projects directly within the Firth of Tay and Eden Estuary SAC and Firth of Tay and Eden Estuary SPA, the initial HRA screening concluded that there is the possibility of direct habitat loss and for other impacts to European Sites including changes to coastal processes, loss of functionally-linked habitat, disturbance of qualifying species, mortality or injury of qualifying species, and the spread of invasive non-native species. In addition to the aforementioned sites, there are pathways for these impacts to affect: River Tay SAC, Isle of May SAC, and Berwickshire and North Northumberland Coast SAC.</p> <p>Potential for negative effects as a result of construction activities to impact on the marine and terrestrial environments, both in the short and long term. The use of previously developed land should help to mitigate/reduce potential terrestrial impacts. Consideration may also need to be given to where remediation works undertaken on previously developed land could lead to implications for species that may have colonised these areas. Where implemented, blue/green infrastructure should lead to long term benefits, including habitat creation and through improved connectivity. There is also the potential for negative impacts to be minimised through siting and design and enhancement measures applied in keeping with national policy.</p> <p>Possible impacts in the marine environment include disturbance, loss of established marine communities, sedimentation, release of contaminants and changes to marine ecology. The decommissioning of oil rigs could also lead to pollution events which has the potential to lead to significant effects on habitats and/or species.</p>
Climatic factors	<p>The Lifecycle GHG Assessment concluded that, depending on the nature of the projects taken forward and considering both direct and indirect effects, this development will likely have an overall net positive impact on achieving national greenhouse gas emissions reduction targets. This is due to emissions associated with transport generated by a mixed-use</p>

	<p>development which are partly balanced by indirect support for renewable energy development.</p> <p>The scale of this effect is likely to be low positive to negligible, depending on the level of renewable energy supported by the development and the level of travel generated by the development. If a relatively small amount of renewable energy generation supported by this development negligible effects are expected, whereas if this development supports a significant amount of renewable energy generation then minor positive effects are expected.</p> <p>However, it is assumed that a significant amount of renewable energy capacity will be supported considering the location of the harbour in relation to off-shore renewables and the relatively large-scale expansion of the harbour.</p> <p>Positive impacts should also arise should arise where measures are implemented to support improved adaptation to the impacts of climate change, particularly where this includes the use of natural solutions for flood risk management.</p>
Water	<p>Construction activities have the potential to lead to short term negative effects including sediment disturbance and leakage of contaminants into watercourses¹⁰⁹.</p> <p>Operational activities could also lead to negative impacts, for example, from increased shipping and vessel activity, which could lead to increased risk of pollution and introduction/spread of invasive non-native species. There is the potential for the negative impacts to be significant.</p> <p>Potential for long term positive impacts through new and/or upgraded blue/green infrastructure, including through improved ecosystem health and flood risk management.</p>
Air	<p>Increased surface traffic may negatively impact local air quality with secondary effects on human health and biodiversity. Support for active and more sustainable modes of travel and wider longer term efforts to decarbonise the transport sector, may reduce/mitigate potential issues. This is of particular relevance as the area is within Dundee AQMA (designated due to NO₂ and PM₁₀)¹¹⁰ and the potential for operational activities to exacerbate existing issues may need further consideration.</p> <p>Operational activities could also lead to increased exposure to noise, with secondary effects on human health and biodiversity.</p>
Soil	<p>The use of previously developed land has potential to lead to benefits, however the extent of this will be influenced by the scale of proposed work and associated negative impacts, such as soil sealing and compaction could still arise. There is also the likelihood of both short term and long term negative impacts, including sediment disturbance, smothering and</p>

¹⁰⁹ Naturescot (2018) Environmental Impact Assessment Handbook Guidance for competent authorities, consultation bodies and other involved in the Environmental Impact Assessment Process in Scotland (online) Available at: <https://www.nature.scot/sites/default/files/2018-05/Publication%202018%20-%20Environmental%20Impact%20Assessment%20Handbook%20V5.pdf> (accessed 25/08/2021)

¹¹⁰ Air Quality in Scotland (2021) Air Quality Management Areas (online) Available at: <http://www.scottishairquality.scot/laqm/aqma> (accessed 01/10/2021)

	loss of seabed, from construction activities. Long term benefits should arise for support for new and/or improved blue and green infrastructure, for example, through improved ecosystem health.
Cultural Heritage and Historic Environment	There are numerous historic assets located with the vicinity of the area, including, listed buildings, scheduled monuments and designated gardens and designed landscapes. The port area in particular has historic value and includes a number of 'A' listed buildings and industrial heritage sites. Potential for long term negative effects on the setting of both designated and undesignated historic assets, and potential for direct impacts on these and unknown archaeological assets. Consideration of potential impacts to both terrestrial and marine historic environmental will be required at project level.
Landscape and Geodiversity	The development of infrastructure could also lead to a degree of landscape change. This will be within the context of a developed and industrial landscape, and are therefore expected to be localised and require consideration at project level. Land reclamation has potential to lead to the displacement of marine sediments and change the physical characteristics of the terrestrial/marine interface.
Material assets	Potential for positive impacts through redevelopment of existing infrastructure, and the redevelopment of brownfield land, particularly where focus is given to improved placemaking. Additional benefits should also arise through the provision of infrastructure to support the decarbonisation of the energy and transport sectors. Ports and harbours are also key transport infrastructure hubs. Positive impacts should also arise where dredged material is utilised where possible ¹¹¹ . Increased flood protection and reduced risk of flooding should lead to benefits for infrastructure assets and support the long term viability of the area.
Population and human health	Potential for positive impact to arise where development leads to improved access to training, employment opportunities and inward investment with factors such as ability to access services and facilities playing a key role in health and in tackling health inequalities ¹¹² . Improved connectivity, including increased access to active and public transport, and new or upgraded blue/green infrastructure should lead to associated benefits, both physical and mental, including improved wellbeing and sense of place. Further benefits should arise from provision of flood risk management solutions, including improved resilience to the impacts of climate change. Potential implications from increased surface movement and operational activities, including through possible air quality issues and increased exposure to noise, may require further consideration. Additionally, a number of reviews have suggested that people in deprived

¹¹¹ Scottish Government (2011) Scotland's Marine Atlas: Information for the National Marine Plan (online) Available at: <https://www.gov.scot/publications/scotlands-marine-atlas-information-national-marine-plan/pages/54/> (accessed 25/08/2021)

¹¹² NHS Scotland (undated) Place and communities (online) Available at: <http://www.healthscotland.scot/media/1088/27414-place-and-communities-06-16.pdf> (accessed 25/08/2021)

communities tend to be exposed to higher levels of air and noise pollution compared to those in less deprived areas ¹¹³ .
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Summary of health implications

- D1.3.111 Long term benefits should arise where redevelopment leads to improved placemaking, including through improved ability to access services, facilities and employment opportunities, which plays a key role in health and in tackling health inequalities¹¹⁴. Support for natural infrastructure and sustainable travel options has the potential to lead to associated benefits, including improved air quality and mental and physical wellbeing. Natural infrastructure, including where this supports sustainable flood management solutions, should also help support adaptation to climate change, with associated wider benefits, including improved sense of place and community cohesion.
- D1.3.112 National and localised benefits long term should arise from the overarching aim of support for decarbonisation, including where this leads to long term secondary benefits from improved air quality. However, further consideration may need to be given to local air quality implications from the potential for increased surface traffic, with Dundee city centre currently designated as an AQMA due to traffic related emissions. This could be of particular relevance to vulnerable people in the population such as the elderly, children and people with respiratory conditions who can be the most affected by poorer air quality¹¹⁵. Additionally, people in more deprived areas are more likely to experience poor quality environments or environmental burdens on health, for example, poorer air quality¹¹⁶. Currently, there are relatively high levels of deprivation in Dundee, with areas to the north of the waterfront in Scotland's 20% most deprived areas¹¹⁷.

¹¹³ Public Health Scotland (2021) National Planning Framework 4: Briefing on health and proposed National Developments (online) Available at: <https://www.publichealthscotland.scot/publications/national-planning-framework-4-briefing-on-health-and-proposed-national-developments/> (accessed 30/09/2021)

¹¹⁴ NHS Scotland (undated) Place and communities (online) Available at: <http://www.healthscotland.scot/media/1088/27414-place-and-communities-06-16.pdf> (accessed 25/08/2021)

¹¹⁵ Public Health Scotland (2021) National Planning Framework 4: Briefing on health and proposed National Developments (online) Available at: <https://www.publichealthscotland.scot/publications/national-planning-framework-4-briefing-on-health-and-proposed-national-developments/> (accessed 30/09/2021)

¹¹⁶ Public Health Scotland (2021) National Planning Framework 4: Briefing on health and proposed National Developments (online) Available at: <https://www.publichealthscotland.scot/publications/national-planning-framework-4-briefing-on-health-and-proposed-national-developments/> (accessed 30/09/2021)

¹¹⁷ Scottish Government (undated) Scottish Index of Multiple Deprivation 2020 (online) Available at: <https://www.gov.scot/collections/scottish-index-of-multiple-deprivation-2020/> (accessed 29/09/2021)

D1.3.113 Gaps/uncertainties

- The precise nature, scale and location of projects that could be brought forward are unknown.
- Potential for brownfield land to be affected by contamination. The extent/level of potential contamination and scale/type of remediation work that may be required, is unknown.

D1.3.114 Mitigation/opportunities for enhancement

- Future consideration should be given to possible localised implications on environmental quality, for example, air quality implications. This should include consideration of factors, such the deprivation profile of the area, to ensure health inequalities are not widened.
- To minimise emissions, public transport connections should be frequent and convenient to offer an effective alternative to private vehicles. This is of particular relevance given the area encompassed is located within Dundee AQMA.
- In line with national policy on zero waste and promotion of circular economy, prioritisation should be given to the reuse of materials in construction, use of low carbon construction materials prioritised and materials should be reused or recycled upon decommissioning.
- To minimise emissions, renewable energy generation should be incorporated into the development where appropriate.
- To minimise emissions, high energy efficiency buildings should be considered.
- Effects on biodiversity should be minimised through siting and design, and enhancement measures applied in keeping with national policy.

17. Edinburgh Waterfront

D1.3.115 This proposed national development supports regeneration that will include high quality mixed-use proposals that optimise the use of the strategic asset for residential, community, commercial and industrial purposes, including support for off-shore energy relating to port uses.

D1.3.116 Location: _Edinburgh, Initial focus on Leith to Granton.

Topic	Assessment Findings
Biodiversity, flora and fauna	<p>The initial HRA screening concluded that projects progressed under this National Development could be immediately adjacent to, or otherwise in close proximity to the Firth of Forth SPA, Imperial Dock, Leith SPA, and the Outer Firth of Forth and St Andrews Bay Complex SPA. Birds associated with the Forth Islands SPA may also occur along the coast in the vicinity of this National Development. Projects involving works within the marine environment could impact upon grey seal, harbour seal and/or bottlenose dolphin from the Isle of May SAC, Berwickshire and North Northumberland Coast SAC, Firth of Tay and Eden Estuary SAC, and/or the Moray Firth SAC.</p> <p>Construction and operational activities have the potential to impact on marine and terrestrial environments, both in the short and long term, including loss and fragmentation of habitat, waterborne pollution and disturbance. Long term positive impacts should arise from support for blue/green infrastructure and the potential use of natural solutions for flood risk management, including where this leads to habitat creation. Where undertaken, the remediation of brownfield land should also lead to overall benefits, however, consideration may need to be given to the possible displacement of species that might have colonised these sites. There is also the potential for negative impacts to be minimised through siting and design and enhancement measures applied in keeping with national policy. Operational activities could also lead to disturbance and changes to marine ecology, including through increased vessel movements, the impacts of which could be significant.</p>
Climatic factors	<p>The Lifecycle GHG Assessment concluded that, depending on the nature of the projects taken forward and considering both direct and indirect effects, this development will likely have an overall net positive impact on achieving national greenhouse gas emissions reduction targets. This is due to the indirect positive effect from the support for the renewables industry which is judged to outweigh the negative direct effects of the development from the provision of housing, employment and industry leading to increased GHG emissions from transport, electricity and heat demand.</p> <p>The scale of this effect could range from low positive to negligible positive depending on the uptake of sustainable travel, energy efficiency measures, potential blue and green infrastructure, the nature of industries based within the development and their potential emissions, and the scale of support for the renewable sector. There is considerable uncertainty over the scale of renewable energy enabled by this development. If the scale is significant then this development could have low positive effects,</p>

	<p>whereas if the amount of renewable energy enables is relatively minor it would lead to negligible positive effects.</p> <p>Benefits should arise where consideration is given to improved resilience to the impacts of climate change, with coastal infrastructure likely to be at increased risk, including from extreme weather events. The impacts of climate change, including flood risk, should be considered at plan and project consenting stages.</p>
Water	<p>Localised negative impacts from construction activities could arise, which should be short term in nature. Operational activities, such as increased vessel movement, could give rise to negative impacts, including increased risk of pollution incidents. Potential for long term positive impacts where consideration is given to blue/green infrastructure as a natural solution to flood risk management.</p>
Air	<p>The City of Edinburgh Council has declared 6 AQMAs¹¹⁸. The nearest AQMAs to the area include Inverleith Road AQMA (declared for NO₂), Great Junction Street AQMA (declared for NO₂) and Salamander Street AQMA (declared for PM₁₀). Projects taken forward have potential to impact local air quality through transport emissions (including NO₂, PM₁₀ and PM_{2.5}), vessel emissions and dust generated during construction, with secondary effects on human health and biodiversity.</p> <p>Support for sustainable and/or active travel may reduce possible increases in surface traffic. Additionally, over the longer term, wider efforts to decarbonise the transport sector should also reduce potential impacts.</p>
Soil	<p>Where previously developed land is utilised, benefits should arise, however the extent of this will be influenced by the scale of proposed work and associated negative impacts, such as soil sealing and compaction and loss of soil from infrastructure requirements. There is also the likelihood of both short term and long term negative impacts to arise from sediment disturbance, smothering and loss of seabed.</p> <p>Wider benefits should arise where new/upgraded blue/green infrastructure leads to habitat creation and improved ecosystem health.</p>
Cultural Heritage and Historic Environment	<p>There are a number of historic assets in the vicinity of the area including Trinity, Newhaven and Leith conservation areas. Potential for negative effects to arise which is likely to require consideration at project level, alongside impacts on unknown heritage assets. There is an opportunity for sympathetic development to enhance local character through the placemaking approach being taken.</p>
Landscape and Geodiversity	<p>Infrastructure development is likely to lead to a degree of landscape change, and will require consideration at project level.</p>
Material assets	<p>Potential for positive effects through the provision of built assets, particularly where this leads to improved placemaking and re-use of existing infrastructure where possible. Benefits should also arise from consideration of improved resilience to the impacts of climate change, particularly given the predicted increased risks to coastal assets.</p>

¹¹⁸ Air Quality in Scotland (2021) Air Quality Management Areas (online) Available at: <http://www.scottishairquality.scot/lagm/aqma> (accessed 01/10/2021)

Population and human health	<p>Potential for positive effects to arise from the provision of housing and amenities and improved access to employment opportunities. Associated benefits should also arise where focus is given to placemaking, including where this includes incorporation of blue/green infrastructure due to the multiple co-benefits they provide. The potential for positive impacts to arise should be maximised where consideration is given to addressing health inequalities. This could be of particular relevance to pockets of multiple deprivation in Leith and Granton¹¹⁹.</p> <p>Further benefits should arise from provision of flood risk management solutions, including improved resilience to the impacts of climate change, particularly where this leads to the use of natural infrastructure, with wider associated benefits including both environmental and societal.</p> <p>Further consideration may need to be given to ensure current air quality issues are not exacerbated, with associated negative impacts for human health.</p>
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Summary of health implications

- D1.3.117 Positive impacts should arise from support for improved placemaking, including where this leads to improved access to goods and services and the provision of new and improved blue/green infrastructure, with associated benefits, including improved sense of place. Currently there are pockets of multiple deprivation located within Leith and Granton¹²⁰. Ensuring health inequalities are addressed has the potential to maximise benefits.
- D1.3.118 Support for the transition to a net zero economy, for example, facilitating renewable energy generation should lead to overall positive impacts, including where this leads to improved air quality. Where development leads to a reduced need to commute and improvements in sustainable and active travel links, associated benefits for air quality, increased physical activity and wider societal benefits should arise. Operational activities, and their possible implications on air quality, may require further consideration. This could be of relevance as current air quality issues exist in the area. Additionally, people in more deprived areas are more likely to experience poor quality environments or environmental burdens on health, for example, poorer air quality¹²¹.
- D1.3.119 Gaps/uncertainties
- The precise nature, scale and location of projects that could be brought forward are unknown.

¹¹⁹ Scottish Government (undated) Scottish Index of Multiple Deprivation 2020 (online) Available at: <https://www.gov.scot/collections/scottish-index-of-multiple-deprivation-2020/> (accessed 29/09/2021)

¹²⁰ Scottish Government (undated) Scottish Index of Multiple Deprivation 2020 (online) Available at: <https://www.gov.scot/collections/scottish-index-of-multiple-deprivation-2020/> (accessed 29/09/2021)

¹²¹ Public Health Scotland (2021) National Planning Framework 4: Briefing on health and proposed National Developments (online) Available at: <https://www.publichealthscotland.scot/publications/national-planning-framework-4-briefing-on-health-and-proposed-national-developments/> (accessed 30/09/2021)

- Potential for brownfield land to be affected by contamination. The extent/level of potential contamination and scale/type of remediation work that may be required, is unknown.

D1.3.120 Mitigation/opportunities for enhancement

- Future consideration should be given to possible localised implications on environmental quality, for example, air quality implications. This should include consideration of factors, such the deprivation profile of the area, to ensure health inequalities are not widened.
- To maximise emission reductions, ensure good public transport connections and active travel
- To maximise emission reductions, ensure high levels of renewable energy and heat are installed.
- Prioritise the reuse of materials in construction, use of low carbon construction materials and ensure upon decommissioning waste materials are reused again or at least recycled.
- Climate change mitigation measures, including flood risk, should be addressed through the consenting process.

18. Stranraer Gateway

D1.3.121 The proposed national development is to deliver a high quality place-based regeneration in Stranraer that will also support the wider population of southwest Scotland acting as a hub and providing a platform for future investment, that may include commercial, residential, industrial development and transport connectivity enhancement.

D1.3.122 Location: Stranraer and associated transport routes.

Topic	Assessment Findings
Biodiversity, flora and fauna	<p>The initial HRA screening concluded that onshore developments within the towns of Stranraer or Cairnryan are unlikely to affect any European site. Developments in the surrounding area could be connected to the Glen App and Galloway Moors SPA, or the Loch of Inch and Torrs Warren SPA (for example resulting in the loss of functionally-linked habitat used by qualifying Greenland white-fronted geese and/or hen harrier). The regeneration would be supported by any strategic transport interventions that emerge from the second Strategic Transport Projects Review which embeds the National Transport Strategy's sustainable travel and investment hierarchies. The precise nature of transport infrastructure projects that may be undertaken is unknown but consideration may be required to potential impacts arising for Lendalfoot Hills Complex SAC, Flow of Dergoals SAC, River Bladnoch SAC, Solway Firth SPA, and Loch Ken and River Dee Marshes SPA amongst others.</p> <p>Projects which involve works in the marine environment, particularly piling, or which increase the number of ship or other vessel movements, could impact on marine mammals through noise disturbance and/or injury or mortality. From Northern Ireland, grey seals from The Maidens SAC could be affected. Likewise, qualifying seabird species from the Ailsa Craig SPA (or more distant SPAs designated for seabirds) foraging outside of the boundary of the site could also be impacted by disturbance from the same sources. Loch Ryan is known for the presence of native oysters and Priority Marine Features seagrass and blue mussel beds. The invasive non-native species Japanese skeleton shrimp (<i>Caprella mutica</i>), and the orange-tipped sea squirt (<i>Corella eumyota</i>) are known to be present in Stranraer Marina.</p> <p>Potential for biodiversity effects to be minimised through siting and design and enhancement measures applied in keeping with national policy.</p>
Climatic factors	<p>The Lifecycle GHG Assessment concluded that, depending on the nature of the projects taken forward and considering both direct and indirect effects, this development will likely have an overall net positive impact on achieving national greenhouse gas emissions reduction targets. This is due to positive effects from use and distribution of low carbon fuels, increased transport efficiency from new rail facilities and transportation which is judged to outweigh the negative effects from increased transport emissions. The scale of this effect is likely to low.</p> <p>Positive impacts should also arise where consideration is given to address climate change adaption, including through improved resilience, due to the increased risk from the impacts of climate change, such as, sea level</p>

	rise/erosion to coastal assets. The impacts of climate change, including flood risk, should be considered at plan and project consenting stages.
Water	There is the potential for both short term and longer term negative impacts from construction and operational activities, including sediment disturbance and increased risk of pollution from shipping and vessel activity.
Air	Increased surface transport, including vessel movements, could lead to localised negative impacts on air quality through pollution (such as particulate matter) depending on fuel used, with potential secondary impacts on human health, habitats and species. Support for sustainable modes of transport, including strategic rail links, should help to reduce/minimise potential for associated negative impacts. Additionally, focus on place based regeneration could also lead to a reduction in the number of journeys being undertaken in the first instance, with associated benefits.
Soil	Likelihood of both short term and long term negative impacts for soil, including in the marine and terrestrial environment from construction and operational activities, including loss of soil function, sediment disturbance and smothering and loss of seabed. The re-use of existing infrastructure should reduce/minimise potential negative impacts, including through utilising areas of vacant and derelict land where possible. Depending on the location of projects taken forward, consideration of land contamination may be required during project consenting. This is of particular relevance where land was previously developed including vacant and derelict land. A former military WWII sea plane base is located in the area and consideration of contamination will be required if development occurs in this vicinity.
Cultural Heritage and Historic Environment	There are historic assets in the vicinity of Stranraer and the trunk road network, and there is potential for negative effects on the setting of these. There is potential for physical impacts on unknown archaeological assets in both terrestrial and marine environments. Further consideration would be required at project stage. Developments in Stranraer would require consideration of the Stranraer conservation area to ensure protection and, where possible, enhancement. Where the re-use of existing buildings includes those of historic importance, there is the potential for positive impacts to arise. Particularly where consideration is given to the key role these assets can play in supporting sense of place and improved placemaking.
Landscape and Geodiversity	Developments can alter the characteristics of the area in which it is located. Depending on the nature of the projects taken forward, there is potential for negative effects on the seascape and landscape. Further consideration would be required at plan and project stage to minimise visual impacts on local communities and designated sites such as the Lochryan and Castle Kennedy garden and designed landscapes. Potential impacts for marine and coastal processes, including sediment disturbance, erosion and altered seabed morphology, for example, where dredging is required.

Material assets	Positive effects should arise on built material assets through focus on high quality placemaking, including through the reuse of existing infrastructure and re-use of vacant and derelict land, aligning with circular economy principles. Additional benefits should arise through focus given to increased interconnectivity of the transport network to support sustainable modes of transport.
Population and human health	Positive long term benefits likely to arise from a focus on high quality placemaking, including through redevelopment of vacant and derelict land. Improved transport links, including international connectivity, should lead to increased access to key services such as employment/upskilling opportunities and potential to support inclusive growth, with associated benefits including improved quality of life. Additionally, people are also more likely to be physically active if they live in neighbourhoods with many places to go, such as shops and other facilities, and designing neighbourhoods well can better enable people to walk and cycle to destinations ¹²² , with associated benefits for physical and mental benefits. Positive impacts could arise through community access to low carbon and affordable energy, with the benefits of this potentially felt to a greater extent by those in greatest need, for example, those experiencing fuel poverty.

Summary of health implications

- D1.3.123 Potential for long term benefits to arise, particularly though the focus on high quality placemaking, including through the redevelopment of vacant and derelict land, as this can affect a community's health, environment, economy and social cohesion¹²³. Where regeneration leads to improved access to good and services, further benefits should arise. For example, ability to access services and facilities can affect quality of life in an area and place has a key role to play in health and wellbeing and in tackling health inequalities¹²⁴.
- D1.3.124 Positive impacts should also arise from improved transport links, including enhanced international connectivity, within an area that can rely heavily on private car use. Potential for employment/upskilling opportunities, which can in turn support inclusive growth, should also lead to associated benefits such as improved quality of life. This could be of particular relevance as large parts of the south west of Scotland are considered to

¹²² National Children's Bureau (2012) Environmental inequalities and their impact on the health outcomes of children and young people: Policy and evidence briefing (online) Available at: <https://www.ncb.org.uk/sites/default/files/field/attachment/Environmental%20Inequalities.pdf> (accessed 25/08/2021)

¹²³ Greenspace Scotland (2020) negative impact of vacant land on communities (online) Available at: <https://www.greenspacescotland.org.uk/news/derelict-sites-contribute-to-perceptions-of-urban-decline> (accessed 25/08/2021)

¹²⁴ NHS Scotland (undated) Place and communities (online) Available at: <http://www.healthscotland.scot/media/1088/27414-place-and-communities-06-16.pdf> (accessed 25/08/2021)

be particularly vulnerable to EU Exit¹²⁵ and areas within the north and west of Stranraer are in the 20% most deprived areas¹²⁶.

D1.3.125 Gaps/uncertainties

- The precise nature, scale and location of projects that could be brought forward are unknown.
- Potential for brownfield land to be affected by contamination. The extent/level of potential contamination and scale/type of remediation work that may be required, is unknown.

D1.3.126 Mitigation/opportunities for enhancement

- Effects on biodiversity should be minimised through siting and design, and enhancement measures applied in keeping with national policy.
- Prioritise the reuse of materials in construction, use of low carbon construction materials and ensure upon decommissioning waste materials are reused or recycled.
- Where applicable the nature of dredged sediments should be determined, and disposed of appropriately.
- Minimise disturbance to marine sediments.
- The impacts of climate change, including flood risk, should be considered.
- Opportunities to incorporate green infrastructure and active travel infrastructure should be considered at plan and project consenting stages.

¹²⁵ Scottish Government (2019) Local level Brexit Vulnerabilities in Scotland: Brexit Vulnerabilities Index (BVI) (online) Available at: <https://www.gov.scot/publications/local-level-brexit-vulnerabilities-scotland-brexit-vulnerabilities-index-bvi/> (accessed 29/09/2021)

¹²⁶ Scottish Government (undated) Scottish Index of Multiple Deprivation 2020 (online) Available at: <https://www.gov.scot/collections/scottish-index-of-multiple-deprivation-2020/> (accessed 29/09/2021)

Appendix E - Alternative National Developments

E1.1 Introduction

E1.1.1 This appendix contains a summary of the assessment findings for the alternative national developments. The alternative National Developments are those suggestions received by the Scottish Government with potential, but not contributing to, the proposed national developments in the draft National Planning Framework 4 (NPF4).

E1.1.2 Further information on the policy consideration of suggestions received for National Developments is set out in the “*Scottish Government’s National Developments: Report of Assessment*” available to view online¹. Assessment findings for the proposed national developments included in the draft NPF4 are set out separately in Appendix E.

E1.1.3 The following alternative national developments have been assessed:

Longannet	E-3
National Centre for Community Heat.....	E-4
National electric vehicle network	E-5
Ravenscraig	E-6
Climate Evolution Zone including: Blindwells – Cockenzie – Energy Transition Zone – mixed development.....	E-7
Ardeer Peninsula.....	E-9
Vacant and Derelict Land re-development	E-10
Renewable energy generation.....	E-11
Edinburgh, East Lothian and Midlothian Innovation Zone	E-12
West Edinburgh.....	E-14
Glasgow Airport – business land, AMID, Surface access.....	E-15
Advanced Manufacturing.....	E-16
Zero Carbon Innovation Zones.....	E-17
Lochaber Smelter	E-19
Space industry and space ports	E-20
Freeport on the Clyde.....	E-21
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National Inter-City Network.....	E-23
National Rail Freight Terminal, Mossend and Eurocentral	E-24
National Low-Carbon Freight Network.....	E-25
A National City Centre Transformation Programme for Scotland	E-26

¹ <https://www.transformingplanning.scot/national-planning-framework/>

Edinburgh Orbital Bus Project	E-27
North East Transport Investment.....	E-28
Trunk and Strategic Road Improvements (Various)	E-30
Outer Hebrides Fixed Links and Minch Tunnel.....	E-32
Development on community-owned land.....	E-33
National Tartan Centre	E-35
Clyde tidal barrier	E-36
10,000 Raingardens for Scotland	E-37
Opportunity Cromarty Firth	E-38
National Green & Blue Infrastructure Network.....	E-40
Scottish Nature Network.....	E-41
Glasgow National City Park.....	E-42
Sea Ports.....	E-43
Strategic Ports and Roads.....	E-45

E1.2 Methodology

E1.2.1 The assessment has been informed by the SEA objectives (which can be found in Table 2.1 in the main report), alongside evidence set out in the baseline information. Where relevant, any assumptions used to inform the assessments have been highlighted.

Uncertainty

E1.2.2 It is recognised that the suggestions received vary significantly in the level of detail and information provided and therefore there may be significant uncertainty as to how individual proposals would be taken forward. Particular areas of uncertainty are highlighted where relevant to the assessment.

E1.3 Assessment conclusions

E1.3.1 Overall assessment conclusions are reported for each alternative national development in the tables below. In addition, the assessment identified the potential for construction activities generally to have localised adverse environmental effects on most of the SEA topic areas. Examples include increased levels of noise, dust and vibration; disturbance from construction traffic; temporary visual impacts; sealing and loss of soil; increased sedimentation and soil erosion; potential for increased flooding and water pollution; and fragmentation or loss of habitats, amongst others. To avoid repetition, these potential impacts have not been set out within each assessment.

E1.3.2 It is also recognised that there are existing mechanisms in place through planning and consenting systems to identify and manage the potential for adverse impacts arising including through the detailed siting and design process.

E1.4 Alternative National Developments

Development

Longannet

Description

Use of the site that recognises its importance to the energy sector and large scale manufacturing as part of economic development; Local and regional connections for people to access the site should be included; Initial focus is creating a hub for the development of a low carbon rail cluster; Associated infrastructure improvements.

Summary of assessment findings:

- Potential for negative effects on **biodiversity**, through disturbance/loss of habitats and pollution of aquatic habitats. Proposed development is in close proximity to the Firth of Forth SPA which is likely to require further consideration.
- Potential benefits from reductions in **GHG emissions** where development supports the decarbonisation of rail lines/travel. The site could also support manufacturing, maintenance and innovation for low carbon rail. However, potential negative effects for GHG emissions can arise as a result of manufacturing activities. These are currently uncertain and will depend on the type of processes undertaken.
- Potential for negative impacts on localised **air** quality from increased surface traffic; with no note of support for sustainable/active travel beyond consideration of rail.
- Depending on the scale of development, negative impacts could arise on nearby **heritage** sites such as the Dunimarle Castle designated landscape near Culross.
- Potential for significant positive impacts on **material assets** through supporting manufacturing and the decarbonisation of rail, as well as road and rail network improvements.
- Significant positive impacts on **population and human health** are likely as a result of employment opportunities, particularly as some areas within/nearby the proposal are of significant deprivation. The proposal shows an active and direct effort to ensure that opportunities for jobs, training, research and development are targeted locally.

Assumptions: Development sited on previously utilised land with some existing infrastructure.

Uncertainties: General location known but precise details and scale of development unknown.

Development

National Centre for Community Heat

Description

Leveraging the engineering base in North East Scotland to develop a national hub for district heating excellence and supporting a just transition for the offshore oil industry; Bringing the experience of the current Aberdeen district heating scheme and local engineering expertise together with the proposed Inverurie district heating scheme to create a national centre for excellence.

Summary of assessment findings:

- Potential negative impacts for **biodiversity** from infrastructure requirements, both in the short and long-term, including disturbance and habitat loss and fragmentation. Potential for this to be minimised through siting and design and enhancement measures applied in keeping with national policy.
- Positive contribution to reducing **GHG emissions** through support for decarbonisation of the energy sector. Benefits should also arise from increased diversity in the provision of heat at a local/regional level, reduced risk of disruption and increased resilience, supporting **climate change adaptation**.
- Possible benefits for local/regional **air** quality where this leads to the displacement of traditional energy sources derived from fossil fuels, however, this would depend on the heat source used.
- Potential benefits arise for **material assets** through support for the decarbonisation of the energy sector, including through improved resilience.
- Potential benefits over the longer term for **population and human health** through community access to low carbon heat, which could be of relevance to those experiencing fuel poverty and potential for access to employment and training opportunities. Localised and community energy schemes could also lead to long-term benefits from increased resilience and efficiencies within the energy network. This could lead to benefits which could be of relevance to those in greatest need, for example, those experiencing fuel poverty.

Assumptions: Localised and community access to heat source.

Uncertainties: Main fuel source of the heat network, which may impact overall health impacts. Unclear if heating costs will be consistently reduced for consumers.

Development

National electric vehicle network

Description

To assist the decarbonisation of road transport.

Summary of assessment findings:

- Potential significant benefits from reducing **GHG emissions** where proposals support a transition away from road transport currently reliant on fossil fuels. Additionally, there is potential for improved infrastructure to further support take up of electric and alternatively-powered vehicles facilitating further decarbonisation of the road transport sector.
- Potential for significant positive effects from the displacement of fossil fuel vehicles, leading to reduced **air** pollution. This is of particular relevance to areas where air quality issues are currently experienced, such as Air Quality Management Areas (AQMAs).
- Potential benefits for **material assets** where this supports sustainable modes of transport within the network. The electrification of the transport network could also help support electricity storage in the form of battery storage and, in turn, potentially lead to improved efficiencies and resilience within the network.
- Potential for significant benefits for **population and human health** from improvements in air quality, particularly in urban areas where issues have been identified, such as AQMAs. This could be particularly relevant for those vulnerable to the effects of poor air quality. Potential benefits may also arise through reduced exposure to noise as electric vehicles are quieter. Conversely, however, there may be increased traffic safety risks, particularly for pedestrians and cyclists.

Assumptions: Proposal leads to the displacement of fossil fuel vehicles within the transport sector.

Uncertainties: Location and scale of infrastructure requirements unknown.

Development

Ravenscraig

Description

Continuation of one of the largest regeneration opportunities in Western Europe; 4,500 new homes, new mixed use town centre including retail, leisure, education facilities, green network/spaces, multi-modal transport links.

Summary of assessment findings:

- Potential for negative impacts on **biodiversity** where remediation works lead to the displacement of species which colonising the current brownfield site however there is potential for this to be minimised and enhancement measures applied in keeping with national policy. The enhancement/creation of green networks and spaces, as well as the use of nature based solutions for flood management, should lead to associated benefits.
- Potential for negative impacts where increased travel, electricity and heat demand leads to associated increases in **GHG emissions**, however, over the long-term, development could support reductions in GHG emissions through a focus on demonstrating the development as an exemplar of a net-zero settlement, support for sustainable and active travel, as well as the co-location of services. Additionally, potential benefits could arise where a new energy centre supports the displacement of fossil fuels. The use of natural solutions to flood management and enhancement/creation of green infrastructure should also support **climate change adaptation**.
- Potential for long-term positive impacts on **water** and **soil** from efforts to decontaminate the site and implementation of natural solutions to manage flood risk.
- Significant positive impacts should arise on localised **landscape** through the restoration of vacant and derelict land which has a poor landscape quality.
- Potential for significant long-term positive impacts on **population and human health**, as well as soil and **material assets**, from focus on regeneration of vacant and derelict land, alongside potential employment opportunities and improving access to goods and services.

Assumptions: Regeneration focus, including the remediation of vacant and derelict land. Supports the development of an exemplar net-zero settlement and energy centre, alongside sustainable/active travel and green networks. Use of nature based solutions to flood risk management.

Uncertainties: Precise details and scale of development. Potential for brownfield land to be affected by contamination with the extent/level of potential contamination and scale/type of remediation work that may be required, unknown.

Development

Climate Evolution Zone including: Blindwells – Cockenzie – Energy Transition Zone – mixed development

Description

New settlement and mixed use development at Blindwells linking into redevelopment of the Cockenzie power station site and associated climate change zone. New railway station/transport interchange, A1 interchange, heat and decentralised energy networks. An exemplar of sustainable inclusive development. Alternative vision for Blindwells element presented that shifts the development east to concentrate on further expanding Longniddry around the railway station to create a 20 minute neighbourhood, making use of existing services and facilities including the railway station.

Summary of assessment findings:

- Development could lead to significant negative impacts on **biodiversity**, however there is potential for this to be minimised through siting and design and enhancement measures applied in keeping with national policy. In addition, the proposed use of geothermal energy from minewater could have an impact on already established vegetation/biodiversity within the reedbed minewater treatment scheme. Long-term positive impacts could arise through the creation of blue-green infrastructure, with the extent of benefits likely to be influenced by factors such as scale and location of greenspace provision.
- Potential benefits from reducing **GHG emissions** through support for low/zero carbon energy networks. However, increased emissions associated with additional transport and energy demand could arise. Support for green-blue infrastructure/nature based solutions to flood management should lead to improved **climate change adaption**.
- Provisions for multi-modal transport and an emphasis on sustainable transport, such as active travel, should help reduce/minimise any potential negative effects on **air** quality where increased surface traffic could arise.
- The site is within the surface **water** catchment for Longniddry and Seton Sands bathing water, which is an environmentally sensitive receptor that may be at risk from increased rates of surface water discharge and potential for increased run off. The effects of this should be reduced/minimised by support for nature based solutions to flood risk management.
- Potential for negative effects on **soil** structure and function as a result of potential loss of prime agricultural land (classes 3.2 and 2).
- There are a number of listed buildings within the sites and several close to boundaries, including two listed buildings at Greendykes and Seton House (Palace). Potential for positive impacts to arise through support of the key role that cultural and historic assets have in placemaking.
- Positive impacts on built **material assets** from the provision of low and zero carbon energy sources, renewable energy development and creation of efficient energy systems. Redevelopment of previously developed land, where undertaken, should also lead to benefits.
- Increased access to and provision of travel hubs and support for sustainable travel infrastructure could have positive impacts for **population and human health**. Green infrastructure and open space for outdoor recreation, including where this supports active travel, can contribute to both physical and mental

health benefits. Positive impacts could also arise through increased accessibility to localised energy sources.

Assumptions: Mixed use development with a focus on 20 minute neighbourhoods approach, including improved public and active travel. An exemplar sustainable and inclusive development. Development of district heating and decentralised energy network. Support for blue-green infrastructure, including use of nature based solutions to flood risk management.

Uncertainties: Precise details, location and scale of development unknown.

Development

Ardeer Peninsula

Description

Mixed-use masterplan including coastal tourism and recreation destination, residential community with associated education, Energy Centre, retail business and industrial/logistics uses, and green space/outdoor recreation

Summary of assessment findings:

- Potential for negative long-term impacts for **biodiversity** as a result of infrastructure requirements, including disturbance and loss/fragmentation of habitats. Potential for this to be minimised through siting and design and enhancement measures applied in keeping with national policy. Longer-term benefits have the potential to arise through remediation of brownfield sites and potential enhancements to the environmental quality of the area, including through the creation of green spaces.
- Support for low emissions construction, energy efficient design and low/zero carbon energy sources has the potential to minimise negative effects from **GHG emissions** associated with construction/operation. Improved **climate change adaptation** should arise from support for green infrastructure.
- Potential for increased surface travel, with associated localised negative impacts on **air** quality. Support provided for localised work opportunities and active travel should help to minimise these.
- Long-term, the development could decrease the permeability of surfaces, potentially leading to increased surface run off with associated negative impacts on **water** quality and quantity. Potential impacts could be minimised from the creation of open/greenspaces.
- A degree of **landscape** change is expected with mixed impacts.
- Positive impacts for **material assets** should arise for the built environment, including through the provision of energy efficient building stock. Additional benefits should also arise through support for localised energy generation.
- Support for high quality housing, supporting inclusive growth, could lead to significant positive impacts for **population and human health**. The provision of affordable housing also has the potential to address inequalities, particularly in areas with high levels of deprivation. Improved energy efficiency and connection to localised energy networks should lead to warmer homes, potentially helping to address fuel poverty issues.

Assumptions: Mixed use development supporting localism agenda and reduced unsustainable mode trips. Includes the remediation of vacant and derelict land. Support for green infrastructure/open space development. Focus on provision of housing to meet specialised needs. Renewable energy opportunities as well as low emissions construction and energy efficient design potential.

Uncertainties: Precise details, location and scale of development unknown. Potential for brownfield land to be affected by contamination, with the extent/level of potential contamination and scale/type of remediation work that may be required, unknown.

Development

Vacant and Derelict Land re-development

Description

Remediate/transform vacant and derelict land including that on the Vacant and Derelict Land register to promote economic resilience and create a priority for such land in development plans.

Summary of assessment findings:

- Potential for significant positive impacts on **biodiversity** as a result of vacant and derelict land reclamation, particularly if used for the creation of a green network. The remediation of vacant and derelict land can, however, lead to the displacement of species which might have colonised these sites, which may require further consideration at the application stage.
- Bringing land back into productive use could lead to benefits through carbon sequestration with associated reductions **GHG emissions**. The scale of potential benefits is likely to depend on factors such as the types of developments delivered and scale of soils and vegetation preserved.
- Potential for localised benefits for **air** quality to arise from remediation works.
- Contaminated vacant and derelict sites can result in the pollution of watercourses with potential for positive impacts to arise from remediation, which could be significant depending on surrounding environmental conditions.
- Significant benefits should arise for **soil** from remediation works, particularly where contamination is present and land will be decontaminated through the development process. However, development can impact on soils, for example by increasing soil sealing.
- Potential for significant positive impacts on **landscape** through the restoration of vacant and derelict land, which has a poor landscape quality.
- Likely positive impacts for natural **material assets** through land use changes, particularly the provision of green infrastructure and land remediation/decontamination, including where this leads to improved placemaking.
- The remediation of vacant and derelict land should lead to positive impacts on **population and human health** by addressing the negative impacts associated with such land both socially and environmentally.

Assumptions: Remediation/transformation of vacant and derelict land including that on the Vacant and Derelict Land register to promote economic resilience.

Uncertainties: Precise details, location and scale of development unknown. Potential for brownfield land to be affected by contamination with the extent/level of potential contamination and scale/type of remediation work that may be required, is unknown.

Development

Renewable energy generation

Description

Proposal at former nuclear research site. Substations for renewable energy generation; Power generation from solar and other renewables.

Summary of assessment findings:

- Negative impacts on **biodiversity**, including habitat loss, could arise if the scale of development extends beyond that currently developed. This may be of relevance to North Caithness Cliffs SPA and SSSI: Sandside Bay which are located West of the development.
- Potential benefits from reducing **GHG emissions** should arise long-term through support for renewable technologies including solar support and transition to net zero. Extent of benefits will be dependent on factors such as scale.
- Potential long-term benefits for **air** quality through support for transition away from traditional fossil fuels.
- Benefits for **soil** should arise from the re-use of brownfield land. This will be dependent on the extent of the proposed re-development.
- Positive impacts for **material assets** should arise through the redevelopment of brownfield land and support for diversification within the energy mix.
- Potential for long-term benefits for **population and human health** from inward investment and employment opportunities. The remediation of brownfield land could also lead to associated benefits, however, the extent of effects are uncertain and the site is not densely populated.

Assumptions: Regeneration/renewable energy focus. Includes the remediation of vacant and derelict land.

Uncertainties: Location specific but scale of infrastructure requirements is unknown. Potential for brownfield land to be affected by contamination with the extent/level of potential contamination and scale/type of remediation work that may be required unknown.

Development

Edinburgh, East Lothian and Midlothian Innovation Zone

Description

Edinburgh BioQuarter, Usher Institute, Edinburgh Innovation Park (Food and Drink), Shawfair (including City Region Deal strategic site) and Easter Bush; world leading innovation (including for global health challenges) and business potential, together with significant infrastructure improvements to accommodate and facilitate growth. Creating a mixed use new city quarter around the Edinburgh Royal Infirmary and Medical School. City Region Deal strategic sites collectively deliver 45,000 new homes, 9,500 jobs and £12.6 billion to the economy. The BioQuarter is anticipated to add a further 5,000 employees over 5 years from committed development including through the City Region Deal with a 20,000 living/working population by completion (currently 8,000 employees in the BioQuarter); Additional 150,000sqm of lifescience and 350sqm mixed use accommodation plus housing of mixed tenure are anticipated to create a vibrant sustainable community for live, work and play; Public transport and active travel are at the heart of the development strategy and the BioQuarter is on City of Edinburgh Council's City Choices 2020 Strategic Sustainable Transport Corridor 3 for transit-led development to reduce carbon, promote equity, support healthier lifestyles and deliver sustainable economic growth; National development status will provide investor confidence about commitment to the project.

Summary of assessment findings:

- Potential for negative impacts on **biodiversity**, including disturbance and fragmentation of habitats, which could be significant where development includes previously undeveloped land. Support for green infrastructure should lead to associated biodiversity benefits. Consideration will need to be given to possible impacts on designated sites, such as the Firth of Forth SPA, for example, through recreational disturbance and pressures on water quality.
- Support for low carbon development, the implementation of low carbon heat sources and improved energy efficiency has the potential to reduce the potential for negative effects from **GHG emissions** associated with construction and operation. Potential for increased surface traffic to lead to associated emissions which could be reduced/minimised over the long-term through sustainable travel options and where localising work/access to services leads to a reduced need to travel.
- Provision of sustainable travel options could help to minimise possible impacts on local **air** quality from possible increases in surface traffic.
- Potential for increased surface run off and abstraction/discharges to lead to negative impacts on **water** quality and quantity.
- Potential for long-term negative impacts to arise as a result of loss of **soil** and soil sealing from development associated infrastructure. Use of existing infrastructure should help to reduce possible effects, however, these could be significant where development includes previously undeveloped land and areas of high land capability classification.
- Localised negative changes to **landscape** could arise, including through potential for land use change, which is likely to require further consideration at project level. The significance of impacts will be influenced by aspects such as scale and design.

- Positive impacts for **material assets** should arise for the built environment, particularly through support for placemaking, including through the provision of energy efficient building stock, localised energy generation and improved connectivity of the transport network that facilitates sustainable modes of travel. Potential for negative impacts on natural assets such as forestry, minerals and farmland through land use change will require further consideration at application stage.
- Positive impacts for **population and human health** should arise through the provision of energy efficient housing and improved connectivity, including through increased access to services, as well as localised employment opportunities. This could also lead to wider benefits, including improved quality of life, particularly from focus placemaking.

Assumptions: Mixed use development with a focus on placemaking and including support for low carbon development/provision of low carbon heat. Potential for development of previously undeveloped land. Support for green infrastructure/open space development, sustainable travel options and utilising existing assets, including road and rail infrastructure.

Uncertainties: Precise details and scale of development unknown.

Development

West Edinburgh

Description

Mixed use development and transport infrastructure, ensuring that development in the area also helps to tackle inequality in neighbouring areas including in Wester Hailes, Sighthill and the Calders; Elements to include: Edinburgh Airport, Royal Bank of Scotland, Heriot-Watt University, Royal Highland Showground, Development sites, Residential development (including land at Norton Park), Sustainable infrastructure focused on public and active travel, including tram extension to Newbridge; Spatial Strategy for Inclusive and Sustainable Growth.

Summary of assessment findings:

- Support for green infrastructure and high quality green spaces should lead to associated **biodiversity** benefits, however infrastructure requirements could lead to negative impacts including disturbance and fragmentation of habitats. Consideration will need to be given to where proposal could impact on designated sites, such as the Firth of Forth SPA, for example, through loss of functionally linked habitat.
- The development is likely to increase resource use, transport, electricity and heat demand, use of materials and generation of waste, with potential for overall increases in **GHG emissions**. This is influenced by factors such as the provision of sustainable energy sources and the area of previously undeveloped land developed. Improved climate change adaptation should arise from natural infrastructure and creation of high quality greenspace.
- Green infrastructure and creation of high quality open spaces should help to reduce/minimise potential effects on **water** quality/quantity from increased surface run off, with the River Almond and Gogar Burn flood risk areas requiring consideration. Potential negative impacts could also arise from increased abstraction and discharging.
- Potential for long-term negative impacts for **soil**, including loss/compaction from infrastructure requirements, which could be significant where this leads to the loss of land used for agriculture purposes.
- Potential for long-term negative impacts on local **landscape**, particularly where land use changes could arise.
- Taking an infrastructure-first approach, maximising the use of existing assets, has the potential to lead to benefits for **material assets**, particularly where focus is given to improved placemaking. Support for the decarbonisation of the transport sector, including from increased connectivity, should also be beneficial.
- Improved connectivity, including increased access to active and public transport and high quality greenspaces, should lead to associated health benefits, including improved wellbeing and sense of place.

Assumptions: Mixed use development which supports infrastructure first approach and use of existing infrastructure and focusing action towards focus action to those greatest need, including focus on addressing inequalities. Support for green infrastructure/high quality green spaces and sustainable and active travel options alongside decarbonisation of aviation. Potential for development of previously undeveloped land.

Uncertainties: Precise details, location and scale of development unknown.

Development

Glasgow Airport – business land, AMID, Surface access

Description

Extended airport boundary; New/extended airfield, terminal, landside infrastructure; Airport related business, industrial and logistics; Strategic sustainable surface access links; On-site renewable energy generation; Advanced Manufacturing and Innovation District Scotland; Link in the airport to the Clyde Mission.

Summary of assessment findings:

- Significant impacts on **biodiversity** could arise, with the potential for loss of habitats, including previously undeveloped land. Black Cart SPA/SSSI, designated for Whooper Swans, is located close to the airport, which could be impacted from construction and operational activities.
- Negative impacts in the short to medium-term from increased uptake of flights and surface traffic leading to associated **GHG emissions**, which could be potentially significant. Long-term emissions from operational activities is less certain, with potential for this to be mitigated from wider sectoral measures.
- Negative impacts on local **air** quality could arise, including from surface traffic to and from the airport, flights and development activities. Support for measures which seek to improve sustainable access to and from the airport should help to reduce/minimise possible implications.
- Potential for negative impacts on **water** quality long-term from operational activities, for example, from surface run off. Discharges are subject to permission from SEPA and risk of pollution managed through airport operational management processes.
- Development activities are likely to lead to long-term negative impacts on **soil**, for example, through sealing and loss/compaction, which could be potentially significant where loss of agricultural land arises.
- This part of the green belt is identified as a sensitive wedge within the overall green network of Glasgow and Clyde Valley. Loss of greenbelt land could have negative impacts for **landscape** and any proposed development should be assessed at project level for possible negative effects.
- Potential benefits for **material assets** through support for increased connectivity within the transport network, as well as renewable energy generation assets.
- Increased accessibility through transport improvements has the potential for positive impacts on **population and human health**. Improved surface access could also improve general transport links within the area, supporting wider uptake. Potential for negative impacts to arise through reduced air quality and increased exposure to noise.

Assumptions: Extension of airport boundary and related infrastructure could increase uptake of flights. On-site renewable energy generation, including energy efficiency measures and support for measures to reduce effects associated with surface traffic to/from airport. Some atmospheric pollutants have greater effects at higher altitudes.

Uncertainties: Precise details, location and scale of development unknown. Scale/timeline of wider decarbonisation efforts in the aviation sector is also unknown.

Development

Advanced Manufacturing

Description

South West Scotland Advanced Manufacturing for food and drink as well as life sciences; Advanced Manufacturing Investment Corridor in Kilmarnock focused on food and drink; i3 Campus in Irvine for a regionally significant and nationally recognised centre of excellence in digital automation and advanced manufacturing for life science sector. Partnership with NMIS, University of Strathclyde and Ayrshire College. Site previously known as Riverside Business Park, previously had Enterprise Area Status. 9,000m² of flexible business space for chemical and life sciences manufacturing, digital automation and other advanced manufacturing.

Summary of assessment findings:

- Negative impacts on **biodiversity** could arise from associated road infrastructure and industrial buildings. Potential for this to be minimised through siting and design and enhancement measures applied in keeping with national policy.
- Long-term increases in transport and energy use for manufacturing processes and generation of waste could lead to overall increases in **GHG emissions**.
- Potential for mixed impacts for **air** quality. Increased surface movements could arise, however, advanced manufacturing can enable shorter, more localised supply chains, in turn, potentially reducing freight journeys and benefiting air quality.
- Possible long-term negative impacts on **water** quality from operational abstraction requirements.
- There are a number of conservation areas (e.g. Irvine town centre) and scheduled monuments (e.g. Seagate Castle), the setting of which might be affected by development.
- Positive impacts on **material assets** could arise where new opportunities are sought to reduce pressure on natural resources, keep products and materials in circulation for longer and reduce waste.
- Potential benefits for **population and human health** through the potential to drive investment, innovation, productivity and inclusive growth through employment and the creation of up-skilling opportunities.

Assumptions: The development of business space for chemical and life sciences manufacturing, digital automation and other advanced manufacturing.

Uncertainties: Precise details, location and scale of development unknown.

Development

Zero Carbon Innovation Zones

Description

A network of sites that promote a transition from high carbon intensity industry and/or power generation to zero carbon innovation. A key objective would be to nurture and showcase new and emerging low and zero carbon technologies in a way that promotes inclusive growth and delivers wider place outcomes for local communities. Includes surface water management, flood risk resilience, biodiversity.

Summary of assessment findings:

- Infrastructure requirements could lead to associated negative impacts on **biodiversity** including habitat loss or damage. Potential for this to be minimised through siting and design and enhancement measures applied in keeping with national policy. Benefits should arise from measures to support biodiversity, including implementation of blue/green networks and where remediation of vacant and derelict land is undertaken.
- Potential benefits from reducing **GHG emissions** through the transition away from high carbon intensity industry and support for active travel. Improved connectivity of blue/green networks and wider biodiversity enhancements should also benefit climate change adaptation.
- Long-term benefits for **air** quality, where a transition from high carbon intensity industry and/or power generation arises.
- Potential for **water**-related benefits to arise where innovation leads to reduced pressure on water resources, however the extent of positive impacts will depend on factors such as the technologies implemented and scale of uptake. Wider benefits should also arise from surface water management and flood risk resilience measures.
- The redevelopment of vacant and derelict land has to potential to lead to benefits for **soil**, however, the extent of this will be influenced by the scale of proposed work.
- Potential for positive impacts to **material assets** through support for innovation in new technologies which could play a key role in decarbonisation, and where opportunities for heat recovery support increases diversity and resilience within the energy network.
- Possible long-term benefits for **population and human health** through the potential to drive investment, innovation, productivity and inclusive growth. Support for active travel, employment opportunities and improved sense of place, including through focus on transforming areas of vacant and derelict land, has the potential for positive effects. Additional benefits could also arise through community access to low carbon and affordable energy.

Assumptions: A network of sites that promote a transition from high carbon intensity industry and/or power generation to zero carbon innovation and localised energy generation. Remediation of vacant and derelict land, alongside support for sustainable/active travel, flood risk resilience and biodiversity enhancement.

Uncertainties: Not location specific but initial focus on Grangemouth, Levenmouth, Blindwells (including Cockenzie), Longannet, and Chapelcross. Scale of infrastructure requirements is unknown. Potential for brownfield land to be affected

by contamination. The extent/level of potential contamination and scale/type of remediation work that may be required, is unknown.

Development

Lochaber Smelter

Description

Downstream Lochaber Smelter works / industrial expansion; and Rural Estate Regeneration and Renewable Energy Supply; Investment needed in: Water infrastructure, Rail infrastructure, Road infrastructure.

Summary of assessment findings:

- Proposed development on currently developed site, but could include additional infrastructure. Where required, this has the potential to lead to negative impacts on **biodiversity**, including habitat loss, fragmentation and disturbance. Potential for this to be minimised through siting and design and enhancement measures applied in keeping with national policy. Consideration of possible impacts on designated sites, is likely to be required, for example, from potential air quality impacts associated with increased operational activities.
- Operational **GHG emissions** associated with aluminium/steel manufacturing and transportation of materials are likely to arise. Over the longer-term, support for carbon neutral operations and the expansion of renewable energy development should help to reduce/minimise possible implications and will influence potential scale of GHG emissions which could range from negative to positive.
- Long-term implications for **air** quality associated with increased operational activities could arise.
- Potential for negative impacts on **soil** to arise, including soil sealing and compaction, where development extends beyond previously developed area.
- Potential for long term benefits for **population and human health** from access to employment and training opportunities and inward investment. Further benefits could arise through improved sense of place, for example, through opportunities to strengthen cultural identity and physical improvements within the proposed development area. However, benefits are likely to depend on measures taken forward and the scale of these are unclear.

Assumptions: Business/regeneration focus which includes the use/expansion of existing site footprint/infrastructure but new/additional requirements likely. Support for carbon neutral operations, including via renewable energy sources, such as hydro.

Uncertainties: General location known but scale of infrastructure requirements is unknown.

Development

Space industry and space ports

Description

National Spaceport Infrastructure Development - sector innovation, product development and launch sites; Prestwick Centre for Excellence for Aerospace and Space development in Scotland and UK to start-up, grow and consolidate the sector. Entails: road infrastructure and wider transport links (submitted to Strategic Transport Projects Review), new commercial and industrial buildings (140,000 – 715,000 sq ft), hangars (110,000 - 138,000 sq ft), future development platform (350,000 sq ft), research and development space (50,000 sq ft), spaceport including launch operation facilities, Aerospace and Space Innovation Centre and National Flight Centre, enhanced digital infrastructure; Outer Hebrides Space Industries/Space Port 1 – Entails vertical rocket launch facility and Space Enterprise Park; Space Hub Sutherland, facility for small satellite launch. Entails control centre, site integration facility, launch pad complex, antenna park, access road, services, associated infrastructure; Shetland Space Centre: facility for small satellite launch and associated support infrastructure.

Summary of assessment findings:

- Potential for significant negative impacts on **biodiversity** to arise as a result of infrastructure development activities, such as road and spaceport infrastructure. Consideration will need to be given to where proposal could impact on designated sites for potential implications, including through pollution of and loss of supporting habitat and disturbance/displacement of qualifying species.
- Potential for significant increases in **GHG emissions** from impacts on peatland and arising from operational activities e.g. launches, ancillary activities and increased transport to and from sites.
- Potential for long-term negative impacts on **soil** arising from construction and installation of infrastructure. This has the potential to be significant where there are implications for peatland.
- Benefits for **population and human health** should arise through employment and upskilling opportunities and potential to support inclusive growth, further supporting wellbeing and quality of life. Negative impacts could arise over the long term from operational activities which could have noise and air quality implications, which may require further consideration as part of the planning application process.

Assumptions: Development of space port infrastructure. Support provided to reduce potential emissions arising from construction activities, including low carbon design. Some atmospheric pollutants have greater effects at higher altitudes.

Uncertainties: General location known but scale of infrastructure requirements is unknown.

Development

Freeport on the Clyde

Description

Post-Brexit, securing a Freeport on the Clyde should be a national priority – for example at Greenock (given SIMD statistics) or King George V Dock in Glasgow.

Summary of assessment findings:

- Potential for negative impacts on **biodiversity**, both in the terrestrial and marine environment during construction and operation. For example, increased vessel movement could lead to increased risk of pollution and introduction/spread of invasive non-native species. Designated sites such as the Inner Clyde SPA , could be impacted through loss of habitat or disturbance, the effects of which could be significant.
- Potential for increases in **GHG emissions** to be significant, depending on the amount of marine transport and electricity/energy requirements of the port and may also depend on the uptake of low carbon fuels in the marine sector and quantities of waste generated.
- Localised **air** quality implications could arise from increased surface traffic/vessel movement, depending on fuel use. Longer-term, wider transition to renewable/low carbon fuels in the shipping industry should reduce/minimise potential effects.
- Potential for impacts to **water** quality during both construction and operation. Whilst an existing working port, this could include impacts from dredging depending on infrastructure requirements and from increased vessel movement leading to pollution risk and potential introduction/spread of invasive non-native species, the effects of which could be significant.
- Construction activities and operational activities, such as increased vessel movements, could lead to negative impacts on **soil**, including smothering/loss of seabed and general disturbance of sediment.
- Potential for negative impacts on marine **heritage** and scheduled monuments. Unknown historic heritage should be considered during development to ensure no unintended negative effects.
- Benefits for **material assets** should arise through enhancement and improvements to a key infrastructure hub.
- Potential employment or economic opportunities could benefit local communities, with associated positive impacts for **population and human health**.

Assumptions: Increased surface and vessel movements. Onshore elements of port infrastructure will require energy for operational activities.

Uncertainties: General location known but scale of infrastructure requirements is unknown.

Development

Port of Inverness

Description

Mixed use – expansion of port operations, expansion of marina facilities and associated accommodation, commercial uses (retail, food & drink, hotel, leisure) and a cultural & tourism hub.

Summary of assessment findings:

- Negative impacts likely to arise for terrestrial and marine **biodiversity** from construction and operation activities, including disturbance, loss of habitat, increased risk of waterborne pollution and introduction/spread of invasive non-native species. Nearby designations including Inner Moray Forth SPA and Moray Firth SAC, where potential impacts could be significant.
- Potential for increases in **GHG emissions** to arise. Support for carbon neutrality through design, renewable technology and sustainable/active travel should help to reduce/minimise potential emissions.
- Localised implications for **air** quality from possible increases in surface/vessel movements, depending on fuel used. Support for more sustainable modes of travel and wider decarbonisation in the transport sector should reduce/minimise effects.
- Negative impacts on **water** quality from construction and operational activities could arise, including sediment disturbance and increased risk of pollution incidents and introduction/spread of invasive non-native species.
- Potential for long term negative effects on **soil** from infrastructure requirements. Increased vessel movements could also lead to smothering and loss of seabed and general disturbance of sediment.
- Implications for localised **landscapes** could arise. Where underwater geological works such as dredging are required, potential impacts for marine and coastal processes could arise.
- Potential for negative impacts on the setting of both designated and undesignated **heritage** in the local area, with designations in the area including scheduled monuments.
- Potential for positive impacts for **material assets** from provision of built assets with focus on high quality sustainable placemaking.
- Positive impacts on **population and human health**, including from potential improved access to goods and services, particularly from focus on placemaking and addressing inequalities.

Assumptions: Mixed use development, including the expansion of existing port infrastructure with focus on high quality sustainable placemaking. Carbon neutrality through design and provision of renewable energy technology. Support for sustainable/active travel. Action to be focused on population and communities in greatest need, including addressing inequalities.

Uncertainties: General location known but scale of infrastructure requirements is unknown.

Development

National Inter-City Network

Description

Systematic enhancement to the inter-city rail infrastructure north of the Central Belt so that rail can again provide competitive journey times between Scotland's cities. Including: Electrification from Edinburgh and Glasgow to Perth, to Aberdeen and Inverness, Double tracking Aberdeen to Inverness and Highland Main Line, New line: Inverkeithing-Kinross-Perth, Inter-city interchange at Perth station, Journey time and capacity enhancements, Further electrification up from 25.3% now.

Summary of assessment findings:

- Potential for short and long-term **biodiversity** impacts from infrastructure requirements, including disturbance and habitat loss/damage and fragmentation. Potential for this to be minimised through siting and design and enhancement measures applied in keeping with national policy.
- Reductions in **GHG emissions** have the potential to be significant depending on level of uptake.
- Benefits for **air** quality should arise over the long-term where a modal shift from more polluting forms of transport arises, which could be particularly beneficial where air quality issues currently exist, for example, in areas designated as AQMAs.
- Possible implications from infrastructure improvements/development on **soil**, **water** and cultural **heritage** assets, with changes to localised **landscapes** also expected.
- Positive impacts on **material assets** from potential for increased interconnectivity and provision of sustainable modes of transport, with potential additional benefits through reduced pressure on current road infrastructure.
- Potential for improved access and connectivity to key services and reductions in surface traffic should lead to associated benefits for **population and human health**, including wider societal benefits, such as improved levels of social interaction and sense of place.

Assumptions: Enhancement of the inter-city rail infrastructure, with some new infrastructure required. Will lead to modal shift. Electric rail will be powered from low carbon/renewable energy. Use of brownfield land where possible.

Uncertainties: Precise details and scale of development unknown

Development

National Rail Freight Terminal, Mossend and Eurocentral

Description

Combined opportunities of Mossend and Eurocentral; For Mossend: Railfreight interchange, Distribution centre, 750 metre+ rail terminal, Rail connected warehouse, Container handling facilities, Manufacturing and processing, West coast main line access improvements, M8/A8 access improvements, Community Woodland

Summary of assessment findings:

- Construction and operational activities could negatively impact on **biodiversity**. Potential for this to be minimised through siting and design and enhancement measures applied in keeping with national policy. Where habitat creation is undertaken, benefits should arise.
- Potential for significant reductions in **GHG emissions** to arise as currently the majority of freight transportation is undertaken by road. Habitat creation and natural solutions to flood management should also benefit climate change adaptation.
- Long-term benefits for **air** quality should arise through support for modal shift from more polluting modes of transport.
- Possible implications from infrastructure improvements or development on **soil**, **water** and cultural **heritage** assets and with changes to localised **landscapes** also expected.
- Positive impacts for **material assets** through improved transport infrastructure, including where this leads to reduced pressure on current road infrastructure. Re-use of infrastructure should also be beneficial.
- Long-term benefits for **population and human health** from potential employment, training and skills opportunities and improved access to goods. Potential reductions in surface traffic should also lead to associated benefits, including improvements in air quality reduced exposure to noise, and wider societal benefits, such as improved sense of place.

Assumptions: Use of existing infrastructure, but new infrastructure will be required with connections for active travel routes, improved. Support for open space/green networks and natural solutions to flood management.

Uncertainties: Precise details, location and scale of development unknown.

Development

National Low-Carbon Freight Network

Description

Lengthened overtaking loops on the East Coast Main Line to accommodate 775 metre freight trains; Lengthened overtaking loops on the West Coast Main Line to accommodate 775 metre freight trains; Electrification of Central Belt to Aberdeen and Inverness rail lines; Reinforced electricity supply to electrified rail lines; Double track and longer crossing loops for Highland Main Line from Perth to Inverness; Standardise clearances along the track network, in particular Aberdeen/Inverness to Central Belt; Loading gauge enhancement; New rail freight terminal in Speyside at Keith and/or Elgin (possibly utilising currently redundant facilities); Direct rail access for key whisky sites including Cameron Bridge (Fife) and Cambus/Blackgrange (Alloa)

Summary of assessment findings:

- Potential for negative impacts on **biodiversity** from the construction and operation including disturbance, habitat loss or damage and fragmentation, which should be minimised by the re-use of existing infrastructure and redevelopment of vacant and derelict land and biodiversity enhancement measures applied in accordance with relevant policy.
- Potential for significant reductions in **GHG emissions** to arise depending on uptake.
- Long-term benefits for **air** quality where modal shift from more polluting modes of transport arises.
- Possible implications from infrastructure improvements/development on **soil**, **water** and cultural **heritage** assets and with changes to localised **landscapes** also expected.
- Improved transport infrastructure and potential for reduced pressure on current road infrastructure should lead to positive impacts for **material assets**. Benefits should also arise where existing infrastructure is re-used/enhanced, alongside the re-development of vacant and derelict land.
- Potential benefits for **population and human health** include improved access to goods and services and benefits associated with reductions in surface traffic, including wider societal benefits. Additionally, wider positive effects including improved sense of place could arise where the re-development of vacant and derelict land is undertaken.

Assumptions: Use of existing infrastructure, but new infrastructure will be required with connections for active travel routes, improved. Re-use of vacant and derelict land.

Uncertainties: Precise details, location and scale of development unknown.

Development

A National City Centre Transformation Programme for Scotland

Description

Transformation of strategic sites for transport, public realm (outwith train stations) and economic regeneration:

- 1 - Edinburgh Waverley station and Haymarket Station
- 2 – Waverley / Edinburgh Royal Mile / Scottish Parliament
- 3 – Glasgow Queen Street and Central Stations
- 4 – Aberdeen Station / Union Street
- 5 – Inverness Station and vicinity
- 6 – Dundee Station and vicinity
- 7 – Perth Station and Bus Station
- 8 – Stirling Station, bus station and links to town centre

Summary of assessment findings:

- Potential for long-term benefits for **biodiversity** from support for green spaces and street greening.
- Potential for reductions in **GHG emissions** to arise from improve accessed to, and greater uptake of, more sustainable modes of travel. The use of green infrastructure should also lead to benefits for **climate change adaption**.
- Long-term benefits for **air** quality should arise where modal shift arises with a number of AQMAs designated areas set out within proposal.
- Negative impacts could arise for **soil** and **water** from construction activities. Long-term benefits have the potential to arise from broader environmental improvements, for example, where green infrastructure leads to improved ecosystem health.
- Designations within the proposal area include World Heritage Sites and a number of areas with conservation status, with consideration likely to be needed at project level for potential impacts, including where benefits could arise from the role of cultural **heritage** assets in placemaking.
- Positive impacts on local **landscapes** should arise through the support for high quality environment places.
- Focus on improved placemaking and increased interconnectivity between sustainable modes of transport should lead to positive impacts for **material assets**.
- Potential for improved access to goods and services and green/open spaces, should lead to positive impacts for **population and human health**, including improved sense of place. Additional associated benefits from potential reductions in surface traffic and increased access and uptake of active travel.

Assumptions: Transformation of strategic sites for transport, public realm (out-with train stations) and economic regeneration, with focus on placemaking, including promotion of sustainable travel (including through use of green infrastructure) and improved public realm spaces. Support for green spaces/street greening.

Uncertainties: General location known but scale of infrastructure requirements is unknown.

Development

Edinburgh Orbital Bus Project

Description

A high quality orbital bus route linking a number of key transport interchanges and areas of employment, reducing congestion on a major strategic freight corridor which accesses important areas for national productivity connected through the SEStran region. Including: Bus Rapid Transit system/improvements/bus priority, Connections to Fife networks, Connections to West Lothian Networks.

Summary of assessment findings:

- Potential for negative impacts on **biodiversity** to arise, including habitat loss/damage and fragmentation. Potential for this to be minimised through siting and design and enhancement measures applied in keeping with national policy.
- Depending on scale of uptake and improved connections with sustainable modes of transport, potential reductions in **GHG emissions** could be significant.
- Potential modal shift modal from more polluting forms of transport should lead to long-term localised benefits for **air** quality.
- Potential for localised impacts within **landscapes** where transport corridors are already established features.
- Positive impacts for **material assets** should arise from support for increased interconnectivity within the transport network.
- Potential for increased accessibility, including to areas where employment opportunities exist and associated benefits from possible reductions in surface traffic, should lead to associated benefits for **population and human health**.

Assumptions: Re-use of existing infrastructure, but new infrastructure is likely to be required.

Uncertainties: General location known but scale of infrastructure requirements is unknown.

Development

North East Transport Investment

Description

Regional transport connectivity improvements to settlements and hubs, including road, rail and port/ferry infrastructure. Inverness – Aberdeen (A2i); electrification/alternative traction. Highland Main Line, double tracking; electrification/alternative traction. Improved rail links Aberdeen to Central Belt. North Highland Lines, including re-signalling; electrification/alternative traction. West Highland Line; electrification/alternative traction. Regional commuter rail with additional stations: Montrose - Aberdeen – Inverurie. Inverness Airport station. Morayhill Freight Terminal. Lentrans Long Loop, Clachnaharry – Clunes. New station at Evanton including Dingwall–Invergordon new loop. New rail halt at Tomatin. Improved public transport access to Aberdeen International Airport. Aberdeen Rapid Transit and associated infrastructure/priorities: Craibstone – Airport – TECA – Aberdeen City Centre – Portlethen; Bridge of Don – Aberdeen South Harbour Orbital route. Improved connections to Peterhead and Fraserburgh strategic port developments. Portlethen new strategic Park and Ride. Sea freight and ferry connections to Orkney and Shetland

Summary of assessment findings:

- Construction and operational activities could lead to negative impacts on **biodiversity**, in the terrestrial and marine environment, including disturbance, habitat loss/damage and fragmentation and increased risk of pollution. Consideration may need to be given at project level to where implication for European sites could arise.
- Potential for longer-term benefits for **GHG emissions** and **air** through focus on supporting modal shift from more polluting modes of transport, for example, road to rail. The scale of benefits will be influenced by factors such as possible emissions from the operation of trains and ferries, and where road travel is still undertaken.
- Increased vessel movements may lead to negative impacts on **water** quality, including increased risk of water pollution and introduction/spread of invasive non-native species.
- Marine works and operational activities may impact on the seabed, including through loss of seabed and sediment disturbance.
- Possible implications for cultural **heritage** and localised **landscapes**, however, much of the development is likely to build on existing infrastructure and within landscapes where transport corridors are already established features.
- Potential for positive impacts on **material assets** through support for improved interconnectivity within the transport network including between sustainable modes of transport. Prolonging the lifespan of current infrastructure should also be beneficial.
- Potential for positive impacts on **population and human health** to arise from increased connectivity, including to goods and services such as employment opportunities.

Assumptions: Transport focused development, including rail, road ports and harbours, including increased electrification of the rail network and improved access

to public transport. Re-use and enhancement of existing infrastructure but new infrastructure likely to be required.

Uncertainties: Precise details, location and scale of development unknown.

Development

Trunk and Strategic Road Improvements (Various)

Description

East Ayrshire: Bellfield Interchange in Kilmarnock – Improving the interchange and developing the land around it.

Dundee: Dundee Northern Relief Road – either new road or upgrades to existing road. A90 Improvements for walking, cycling and public transport

Highland: A9 (Inverness-Perth) dualling completion; A96 (Inverness-Aberdeen) dualling completion; A9-A96 Inshes to Smithton Junction improvement works
A9-A82 Longman roundabout removal; A9 – North of Inverness, strategic safety and localised improvements: Munloch junction, Tomich junction, Berriedale junction;
A82 – Road improvements especially in/around Fort William, others identified in FW2040, and other known accident hot-spots (Aonachan Crossing; Tournalundy-Nevis Range; Corran-Fort William (3 Mile Water)) and lifeline links including Corran Ferry and A890 route Stromeferry Bypass; All subject to active travel as part of design; All subject to greater integration of park&ride, active travel, electric vehicle charging, e-bike provision, public transport infrastructure and interchanges; Infrastructure may be required within existing infrastructure as well as new. EV charging to be guided by Highland Council's EV Infrastructure Vision.

Summary of assessment findings:

- Construction and operational activities could lead to negative impacts on **biodiversity**, including disturbance, habitat loss/damage and fragmentation. Potential for this to be minimised through siting and design and enhancement measures applied in keeping with national policy.
- Potential benefits from reducing **GHG emissions** where proposal leads to a modal shift, including through better integration of more sustainable modes of travel, for example, active travel. The extent of this is however uncertain and road transport remains a significant proportion of GHG emissions with overall GHG emissions likely to remain potentially negative.
- Surface traffic contributes significantly to **air** quality issues, particularly in urban environments. Where proposals lead to a modal shift from more polluting forms of transport, localised benefits could arise, however, the extent of this is uncertain.
- Potential for long-term negative impacts on **soil** such as compaction leading to a loss of soil function resulting from infrastructure improvements and development.
- Possible implications for cultural **heritage** and localised **landscapes**, however, much of the development is likely to build on existing infrastructure and within landscapes where transport corridors are already established features.
- Potential for positive impacts on **material assets** through support for improved interconnectivity within the transport network, including through greater integration with sustainable modes of transport. Further benefits should arise through improvements to current infrastructure leading to prolonging its lifespan.
- Potential for positive impacts on **population and human health** to arise from increased connectivity and improved access to active travel.

Assumptions: Transport focused development, including integration of active travel, park and ride and charging points. Re-use and enhancement of existing infrastructure but new infrastructure likely to be required.

Uncertainties: General location known but scale of infrastructure requirements is unknown.

Development

Outer Hebrides Fixed Links and Minch Tunnel

Description

Minch Tunnel connecting Outer Hebrides to Mainland Scotland; Sound of Harris fixed link; Sound of Barra fixed link

Summary of assessment findings:

- Potential for negative impacts on seabed and marine **biodiversity** as a result of disturbance and displacement/loss of flora and fauna from construction of tunnel. Impacts, including loss of habitat and disturbance and risk of pollution, could be significant with many European sites located on or around the coast, including the Inner Hebrides and the Minches SAC, Sound of Barra SAC, and Loch nam Madadh SAC.
- Potential for the use of high carbon materials and disturbance of soil/seabed with associated implications for **GHG emissions**, to lead to significant impacts. The utilisation of existing renewable and low carbon technologies during design/construction is noted, however, further consideration will be required to establish to what extent this would provide mitigation. Negative effects may also arise where increased numbers of journeys are undertaken by less sustainable modes of transport.
- Potential for significant adverse effects on the ecological quality of the **water** environment, including marine biodiversity, during construction.
- Infrastructure requirements which could have significant implications for coastal **landscapes** and seascapes, depending on requirements. Implications for coastal and offshore processes, such as interference with sandbank mobility and altered seabed morphology could also arise from construction activities.
- Potential for significant environmental impacts on both known and unknown cultural assets, as well as designated and undesignated (and unprotected) offshore archaeology and protected sites
- Potential for large amounts of waste materials to arise, with associated negative impacts on **material assets**.
- Benefits for **population and human health** may arise from improved accessibility and connectivity, including societal benefits, particularly where proposal leads to increased reliability given the vulnerability of links in the proposal area to essential services, including from the impacts of climate change.

Assumptions: Transport focused development of Minch Tunnel connecting Outer Hebrides to Mainland Scotland; Sound of Harris fixed link; Sound of Barra fixed link. Potential for increased number of journeys to be undertaken, with the majority of vehicles powered by fossil fuels. Significant volumes of high carbon materials (concrete and steel) are likely to be required. New infrastructure likely to be required with renewable energy generation and energy transmission infrastructure to be considered in the design of this.

Uncertainties: General location known but scale of infrastructure requirements is unknown.

Development

Development on community-owned land

Description

Make community-owned land national developments. This could connect UN Sustainable Development, National Performance Framework. Local plans, policies and programmes supporting communities. National development status would provide primacy of the development plan force when new developments and changes of use are proposed for such land, which could be specific in the national development descriptions of development and statement of need; This would provide an effective plan-led approach to development on transferred land or buildings (following the Land Reform (Scotland) Acts and the Community Empowerment (Scotland) Act); National development status would enable assets transferred into community ownership outwith the local development plan preparation process to have development plan status without alteration to the development plan where they fall within prescribed classes within the national development. This allows certain types of development on community-owned land to be promoted or to a degree be protected.

Summary of assessment findings:

- Development has the potential to lead to localised negative impacts on **biodiversity**, including loss of habitat, fragmentation and disturbance. Potential for this to be minimised through siting and design and enhancement measures applied in keeping with national policy. Potential for longer-term positive impacts where proposal leads to habitat restoration, for example, the creation of community woodlands and where remediation of vacant and derelict land is taken forward.
- Potential long-term benefits from reducing **GHG emissions** from community owned renewable energy and energy storage projects. The scale of benefits is uncertain, Improved energy storage, alongside habitat restoration, should lead to increased resilience, benefiting climate change adaptation.
- Broader environmental improvements, such as habitat/watercourse restoration and improved riparian management, should lead to long term-benefits for **water** quality and quantity.
- Possible **landscape** improvements, for example, through the remediation of vacant and derelict land and habitat restoration.
- Potential positive impacts for **material assets**, including where focus is given to use of existing assets to support improved placemaking, including from the remediation of vacant and derelict land and habitat management/restoration.
- Potential for benefits to arise for **population and human health** from sense of ownership, with associated benefits, including where this gives rise to improved sense of place. Additional benefits should arise from community ownership of renewable energy and energy storage, including increased resilience of supply and reduced risk of disruption. Whilst benefits are likely to be felt to a greater extent at a local level, there is the potential for national implications from this approach at scale.

Assumptions: Focus on development on community owned land. Re-use and enhancement of existing infrastructure but new infrastructure likely to be required. Promotes community cohesion, population growth in rural areas and supports

community-driven habitat restoration, including creation of community woodlands, watercourse restoration. Development could increase demand for both heat and energy but also support renewable energy/heat generation. Re-use of vacant and derelict land.

Uncertainties: Precise details, location and scale of development unknown. Potential for brownfield land to be affected by contamination with the extent/level of potential contamination and scale/type of remediation work that may be required unknown.

Development

National Tartan Centre

Description

UK Government £10 million capital support to a Stirling based National Tartan Centre. International class facility to reinforce Stirling as a cultural destination and centre of excellence for traditional crafts and skills in the heart of Scotland that is financially self-sustaining.

Summary of assessment findings:

- Potential negative impacts from infrastructure requirements on **biodiversity**. It is not clear if proposal includes the re-use of previously developed land, which would minimise possible effects. Potential for this to be minimised through siting and design and enhancement measures applied in keeping with national policy.
- Negative impacts from potential increases in **GHG emissions**, the scale of which will be influenced by factors such as visitor numbers and possible increased surface traffic, but are expected to be minor.
- Although the proposed development is likely to be on developed land, consideration may need to be given at local level to implications for **heritage** assets, both designated and un-designated, with a number of a number of listed buildings and the King's Park Conservation Area located in the proposal area.
- Potential benefits for **material assets** through support for improved placemaking.
- Long-term benefits for **population and human health** could arise from investment, inclusive growth and employment opportunities. Possible increases in surface traffic could lead to negative impacts, including from reduced air quality and increased exposure to noise.

Assumptions: Development of centre which will support visitor and traditional crafts economy. The centre will also support education, interpretation, skills development, demonstrations, participation and interaction focusing on traditional crafts, with focus on focus on local opportunities. Proposed development is likely to be on previously developed land. Close to railway station which provides opportunities for sustainable transport link but use of private vehicle fuelled by petrol/diesel may still arise.

Uncertainties: General location known but scale of infrastructure requirements is unknown.

Development

Clyde tidal barrier

Description

Clyde tidal barrier

Summary of assessment findings:

- Construction and operational activities could lead to negative impacts on **biodiversity**, including loss and damage/disturbance to seabed. Barrages can also impact on the movement of water into and out of estuaries, which can disrupt the life cycle of marine life, prevent the movement of fish and other species, increase silt deposits and change the structure of the coast, leading to erosion of dunes and other critical habitats. Nearby designations include the Inner Clyde SPA and Inner Clyde Estuary Marine SPA, with potential for impacts to be significant.
- Long-term positive impacts should arise from reductions in **GHG emissions** where renewable energy generation from tidal power supports a transition to net zero. If designed as a sea level rise/flooding defence mechanism, then further benefits in terms of climate change adaptation could arise, however this is unclear.
- Potential negative impacts over the longer term through changes in **water** flow and increased sedimentation, with inner Clyde Estuary surface water classified as moderate.
- Long-term benefits for **population and human health** could arise from access to localised sources of renewable energy, including improved resilience of supply.

Assumptions: Energy related development including support for in-stream/floating/barrage tidal power generators.

Uncertainties: Detailed location and scale of infrastructure requirements is unknown. Potential to design as flood defence mechanism, though this is currently unknown.

Development

10,000 Raingardens for Scotland

Description

Network of small scale vegetated features designed to hold back and slow water flows, reducing the need for grey infrastructure.

Summary of assessment findings:

- Long-term significant benefits for **biodiversity** could arise from support for nature based solutions to flood management and promotion of high quality and multifunctioning spaces. Benefits may include habitat creation and enhanced connectivity, through the proposed restoration of vacant and derelict land.
- Natural solutions to flood management can play a key role in carbon sequestration, with additional reductions in **GHG emissions** likely to arise where the proposal leads to increased uptake of active travel. Overall, the scale of positive effects from GHG emissions reductions will be influenced by the size of the of the raingardens, growing medium and vegetation chosen.
- Potential for long-term benefits through the role of natural infrastructure in improving **air** quality, for example, through the absorption of pollutants such as particulate matter.
- Long-term benefits for **water** should arise from the role of natural infrastructure in flood management and from a focus on provision of high quality environments leading to improved ecosystem health.
- Positive effects on **soil** over the long term are expected from broader environmental improvements, including from habitat creation and the remediation of vacant and derelict land leading to improved ecosystem health,
- The use/enhancement of natural assets, including focus given to blue/green infrastructure and its key role in placemaking, and the remediation of vacant and derelict land, should lead to benefits for **material assets**.
- Potential for significant positive impacts for **population and human health** from the role of natural infrastructure in placemaking. Increased access to good quality open spaces and should also lead to positive impacts, including where this leads to reduced risk of flooding. Potential benefits should be maximised where action is focused towards areas of greatest need.

Assumptions: Green infrastructure development and remediation of vacant and derelict land. Action will targeted towards areas of particular need.

Uncertainties: Precise details, location and scale of development unknown. Potential for brownfield land to be affected by contamination with the extent/level of potential contamination and scale/type of remediation work that may be required unknown.

Development

Opportunity Cromarty Firth

Description

A series of transformative projects for communities and businesses that provide the catalyst for decarbonising the economy at the local and national level. Includes: Global centre of excellence for renewable energy linked to the area's natural resources; transformative education; transformative employment; transformative regeneration; hydrogen hub/North of Scotland Hydrogen; serial (sic) manufacturing plant (for floating offshore wind substructures); Phase 2 Advanced manufacturing plant; Expanded Powerhouse Future Technology Centre; Potential Greenport status; Onshore electrolysis facility for green hydrogen production.

Summary of assessment findings:

- Potential for negative impacts for **biodiversity** as a result of infrastructure development activities. Impacts could include disturbance and fragmentation of habitats. Possible alteration of river flow may also arise, with associated impacts, where dredging activities are undertaken. Increased vessel movement could also lead to increased risk of pollution and introduction/spread of invasive non-native species. Further consideration required at project level, including for potential impacts on nearby designations including the Cromarty Firth SPA and Moray Firth SAC.
- Potential for increases in surface traffic and vessel movements to lead to associated increases in **GHG emissions**. Potential increased uptake of renewable/low carbon fuels and wider efforts to decarbonise transport could reduce/minimise impacts. Longer-term benefits could arise from transition away from fossil fuel use, for example, support for heat and hydrogen technologies, which have the potential to lead to significant GHG emissions reductions.
- Possible increased in surface traffic could lead to localised implications for **air** quality, depending on fuel used. Potential effects should be reduced/mitigated through longer term transition to decarbonise the transport network.
- Negative impacts on **water** could arise from construction and operational activities, for example, where dredging is required and increased vessel movement.
- Potential for negative impacts to arise on **soil** from sediment disturbance and loss and compaction of soils through infrastructure requirements, including processing plants and storage facilities, and operational activities.
- A number of listed buildings are located in the areas with potential for negative effects on the setting of both designated and undesignated **heritage**, as well as direct impacts on these, which is likely to require consideration at project level. Works such as dredging can impact on marine and coastal processes, including sediment disturbance, erosion and altered seabed morphology.
- Positive impacts should arise for **material assets** through increased diversity of the energy mix and potential for increased resilience. Additional benefits should also arise through enhancement of ports/harbours, which are key infrastructure hubs.
- Potential for positive impacts on **population and human health** should arise from employment/training opportunities, particularly from focus on maximising benefits towards local communities. Additional positive impacts could arise through connection to localised energy networks with the benefits of this likely to

be felt to a greater extent by those in greatest need, for example, those experiencing fuel poverty.

Assumptions: Port development to support the decarbonisation of the energy sector, both at local and national level. Existing infrastructure will be used but new/expanded infrastructure is likely to be required. Focus on maximising economic opportunity for the region and regenerating communities through creating new jobs. Green hydrogen will be produced at a large scale, alongside wind, wave and tidal energy.

Uncertainties: General location known but scale of infrastructure requirements is unknown.

Development

National Green & Blue Infrastructure Network

Description

NPF should frame development of national green and blue infrastructure network to be developed by RSS, LDP and LPP. A National Green-Blue Infrastructure Network would highlight the opportunities for renewable heat networks at a national, regional and local scale, including the energy potential of parks and greenspaces.

Summary of assessment findings:

- Significant long-term benefits for **biodiversity** are expected through focus on blue/green infrastructure and promotion of high quality and multifunctioning spaces.
- Potential significant benefits from reducing **GHG emissions** from support for renewable energy sources and the key role that natural infrastructure can play in carbon sequestration. Additional positive impacts should also arise from potential for modal shift from more polluting modes of transport, through support for active travel. Potential benefits from improved **climate change adaption** could also be significant.
- Potential for benefits through the role of natural infrastructure in improving **air** quality, for example, through the absorption of pollutants such as particulate matter. Benefits could also arise where increased uptake of sustainable/active travel leads to modal shift.
- Positive impacts for **water** quality and quantity should arise from the role of natural infrastructure in flood management and where broader improvements in ecosystem health arise.
- Positive effects on **soil** are expected from environmental improvements leading to improved ecosystem health.
- Potential adverse effects on known and unknown archaeological remains from activities such as planting and infrastructure requirements which will need to be taken into account at project level.
- Positive impacts on **landscapes** through the support for high quality environment spaces at local and national scale.
- The use and enhancement of natural assets and their key role in placemaking, has to potential to be significantly beneficial. Potential benefits for **material assets** could also arise from support for diversification within the energy network.
- Potential for significant positive impacts for **population and human health** from improved access to the open space and support for high quality greenspace, including through improved sense of place. Additionally, blue/green infrastructure can help reduce surface water flooding in urban environments and support improved reliance to the impacts of climate change.

Assumptions: Development of a national blue/green infrastructure network. Support for opportunities for renewable heat networks at a national, regional and local scale. Will support uptake of sustainable/active travel.

Uncertainties: Precise details, location and scale of development unknown.

Development

Scottish Nature Network

Description

An integrated nation-wide strategic approach/vision to blue-green infrastructure for biodiversity net gain, emissions reduction, climate resilience and wellbeing, identifying and connecting up good quality natural habitats, which creates the conditions into which investment can be made and nature based solutions can be promoted and support local economies. Creating new accessible green spaces and equitable access to them.

Coordination of: Green and blue infrastructure investment, including through IIP; Replacement rural development/agriculture funding; Non-Governmental Organisation effort; Philanthropic spend; Major charitable investors; Biodiversity net gain projects; Conservation finance investment; Strategic planning/opportunity mapping of the key areas to protect and enhance: networks, corridors and stepping stones to create multiple benefits; Active travel

Summary of assessment findings:

- Focus on blue-green infrastructure and promotion of high quality and multifunctioning spaces could lead to significant long-term benefits for **biodiversity**.
- Potential long-term significant benefits from reducing **GHG emissions** through the key role that natural infrastructure can play in carbon sequestration. Additional positive impacts should also arise from support for active travel, where this leads to a shift from more polluting modes of transport. Improved **climate change adaption** should also arise, the benefits of which could be significant.
- Potential for long-term secondary benefits through the role of natural infrastructure in improving **air** quality, for example, through the absorption of pollutants and from support for active travel.
- Long-term benefits for **water** should arise from the role of blue/green infrastructure/natural infrastructure in flood management and from focus on provision of high quality environments leading to improved ecosystem health.
- Positive effects on **soils** are expected where broader environmental improvements lead to improved ecosystem health.
- Potential for positive impacts on local **landscapes**.
- The use and enhancement of natural assets through focus given to the role of blue/green infrastructure, including its key role in placemaking, has potential to be significantly beneficial.
- Significant positive impacts for **population and human health** could arise from improved access to active travel and support for high quality greenspace, including through improved sense of place. Improved resilience to the impacts of climate change, including reduced risk of flooding, should also lead to positive effects.

Assumptions: Nature based solutions promoted and support for local economies. The creation of new accessible green spaces and equitable access to these

Uncertainties: Not location specific. Scale of development is unknown.

Development

Glasgow National City Park

Description

Use the familiar idea of a National Park to inspire and deliver a shared vision for Glasgow, as a greener, healthier and wilder City where people, places and nature are better connected.

Summary of assessment findings:

- Potential for long-term benefits to arise for **biodiversity** from support for greener and better connected places, for example, through habitat creation and enhanced habitat connectivity.
- Potential for long-term benefits where sustainable/active travel and carbon sequestration leads to reductions in **GHG emissions**.
- Long-term benefits for **air** quality should arise through support for active and more sustainable modes of travel, alongside wider benefits from the role of natural infrastructure in improving air quality with Glasgow city centre currently designated as a AQMA due to traffic related air pollution issues.
- Positive long-term **water** quality and quantity benefits should arise through improved ecosystem health and the role of natural infrastructure in flood management.
- Positive effects on **soil** is expected from additional planting or vegetation taken forward as part of the proposal and from broader environmental improvements leading to improved ecosystem health.
- Positive localised impacts on **landscape** through the support for a high quality environment and spaces.
- Support for the use and enhancement of natural assets has the potential to be beneficial, including through the role of natural infrastructure in placemaking.
- Potential for long-term positive impacts on **population and human health** from improved access to open space and support for high quality greenspace, including through improved sense of place. Support for improved uptake of active travel and physical activity has the potential to lead to benefits for both mental and physical health.

Assumptions: Green infrastructure development.

Uncertainties: General location known but scale of infrastructure requirements is unknown.

Development

Sea Ports

Description

Development and investment in ports and harbours to support nationally significant employment, lifeline/ferry links, renewable energy, oil and gas decommissioning, hydrogen economy, bulky goods/freight handling, fishing, aquaculture, cruise and leisure boats. Potential Greenport status, in particular for Cromarty Firth.

Development includes: Construction of facilities; Installation/upgrade of infrastructure: piers; quays; deep water berths; lay-down areas; sheds for assembly; operation maintenance bases; road network and wider off-port infrastructure including active travel, electricity and heat networks.

Summary of assessment findings:

- Potential for significant negative impacts, both short and long-term, on marine and terrestrial **biodiversity** from development and operational activities, with many designated sites located on and around the coast. Potential for this to be minimised through siting and design and enhancement measures applied in keeping with national policy.
- Potential for increased **GHG emissions** associated with operational activities, including increased surface and vessel movements. Long-term benefits should also arise where development facilitates a transition towards net-zero economy, including offshore renewables and renewable/low carbon technologies.
- Increased surface transport and vessel movements could lead to localised negative impacts through pollution (such as particulate matter) depending on fuel used, which could also have implications for human health. Long-term, secondary positive impacts could arise for **air** quality where enhancement of key hubs supports the decarbonisation of the transport, particularly where this leads to a modal shift of freight and energy sectors.
- Potential for negative impacts on **water** and **soil** quality during operation e.g. depending on activities undertaken, potential impacts could include smothering or loss of seabed, accidental spills and introduction/spread of invasive/non-native species, which have the potential to be significant.
- Positive impacts on **material assets** should arise through improved connectivity and enhancement of current infrastructure with ports and harbours key hubs.
- The enhancement of port and harbour facilities has the potential to lead to changes to local character which will require consideration at project level.
- Potential for significant long-term benefits for **population and human health** through improved connectivity, particularly given the life line nature of ports and harbours for many island communities.

Assumptions: Supports upgrades to port infrastructure and landward access, with works including possible expansion of ports, new quaysides and road and rail links. Increased risk from climate change should be factored in to future plans. Ports and harbours play a key role supporting lifeline links for island communities.

Development will increase transport movement to and from ports on land and by sea. Alignment with Scotland's National Marine Plan objectives and policies on shipping, ports, harbours and ferries. Wider support for decarbonisation of the transport sector should reduce possible implications of increased surface movement over the longer term.

Uncertainties: Not location specific. Scale of infrastructure requirements is unknown.
Impacts on communities difficult to gauge where locations not set out

Development

Strategic Ports and Roads

Description

Both sides of the Minch, to support life line ferry traffic to the Islands, partnered with Highland Council and Argyll and Bute Council as appropriate; Maintaining and enhancing strategic road and sea corridors servicing the Outer Hebrides and providing lifeline links; Maximising freight, cruise ship and economic potential. Future-proofing for ferry function; Future-proofing for low carbon fuels and technologies; Facilities/investment to allow flexible deployment of vessels across the network to respond to demand.

Summary of assessment findings:

- Potential for negative impacts, both short and long-term, on marine and terrestrial **biodiversity** from development and operational activities. Impacts may include habitat loss, pollution; and disturbance, displacement and/or mortality of species. Potential for this to be minimised through siting and design and enhancement measures applied in keeping with national policy.
- Potential for **GHG emissions** associated with operational activities, such as increased surface and vessel movements. This could be of particular relevance for rural, remote and island communities, where there can be increased reliance on less sustainable modes of transport, such as private car. Potential for indirect benefits where support for low carbon fuels leads to emissions reductions.
- Increased surface transport and vessel movements could lead to localised negative impacts on **air** quality through pollution (such as particulate matter) depending on fuel used.
- Potential for negative impacts on ground and surface **water**, as well as coastal and marine waters, depending on the route/location and baseline environment. Potential for long-term benefits though improved ecosystem health, for example, through the role of natural infrastructure in flood management.
- Potential for long-term negative effects on **soil** where works are undertaken, including compaction, erosion and loss of soil/seabed. The enhancement of existing infrastructure should help to reduce/mitigate possible impacts.
- Positive impacts on **material assets** should arise through improved connectivity and enhancement of current infrastructure.
- Significant positive impacts on **population and human health** should arise from a reduced risk of accidents and improved accessibility, particularly through increased reliability of vulnerable links to essential services. Associated societal benefits and improved sense of place should also arise.

Assumptions: Seeks to make best use of existing assets, but some new infrastructure/interventions may be required. Supports interventions required to future proof the existing road, rail and port infrastructure to the impacts of climate change, maintaining lifeline links. Use natural infrastructure, including use of natural solutions to flood risk management

Uncertainties: Detailed location and scale of infrastructure requirements is unknown



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