



Deep Demonstration

Resilient Regions
GLASGOW CITY REGION
Clyde Rebuilt

Sniffer

GLASGOW CITY REGION

Climate Change Adaptation Strategy SEA
Environmental Report





Sniffer

GLASGOW CITY REGION

Climate Change Adaptation Strategy SEA Environmental Report

TYPE OF DOCUMENT (VERSION) PUBLIC

PROJECT NO. 70073833

DATE: MAY 2021

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QUALITY CONTROL

Issue/revision	First issue	Revision 1	Revision 2	Revision 3
Remarks	Draft	Consultation Version	Post Consultation Version	Final
Date		November 2020	April 2021	May 2021
Prepared by	Katie Dean	Katie Dean	Katie Dean	Katie Dean
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Project number	70073833	70073833	70073833	70073833
Report number	003	004	005	006
File reference	SEA Environmental	SEA Environmental	SEA Environmental	SEA Environmental



The Strategic Environmental Assessment process for the Glasgow City Region Climate Adaptation Strategy and Action Plan was partly funded under the Resilient Regions: Clyde ReBuilt project. The Resilient Regions: Clyde ReBuilt Project ran from April 2020 to December 2020 and was delivered by a consortium including Sniffer, Paul Watkiss Associates and Creative Carbon Scotland, and EIT Climate-KIC, and was funded by EIT Climate-KIC and 15 Local Partners.

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The project has received funding from Climate KIC, supported by EIT, a body of the European Union.

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NON-TECHNICAL SUMMARY

INTRODUCTION

Sniffer, on behalf of the Climate Ready Clyde (CRC) initiative, is preparing the Strategic Environmental Assessment (SEA) of a new Regional Climate Change Adaptation Strategy (the “Strategy”) for the Glasgow City Region (“the City Region”).

This Non-Technical Summary introduces SEA and summarises the contents of the full technical report.

THE STRATEGY

CRC has voluntarily committed to developing the Strategy to drive the City Region’s climate adaptation approach. The Strategy is intended to set the framework for adaptation to build resilience to the range of possible climate futures in the City Region, over the next ten years.

The overarching vision is: ***“A Glasgow City Region that flourishes in the future climate”*** which is underpinned by five objectives:

- Strategy Objective 1 - Seeks to build the region’s social, economic, and environmental resilience to climate change
- Strategy Objective 2 - Outlines the processes and early interventions needed to manage climate risks and realise opportunities in line with our Theory of Change.
- Strategy Objective 3 – Provides a strategic framework for adaptation in and by the Glasgow City Region that fits alongside and supports key plans, policies, and activities to enable delivery.
- Strategy Objective 4 – Sets out how we will deepen and expand collaboration and collective impact by working together and engaging, equipping, and enabling citizens and organisations to play their role in realising the vision.
- Strategy Objective 5 - Sets out how progress in increasing climate resilience will be monitored, evaluated, and learnt from to improve policies, strategies, programmes and projects.

As well as these key objectives, the Strategy includes 11 interventions and associated sub interventions that were assessed through the SEA Process. The 11 interventions are as follows:

1. Reform and reshape governance mechanisms so they respond to adaptation needs, nurture new leadership, and create expectations in society
2. Develop the ability of organisations, businesses and communities to adapt
3. Increase adaptation finance through leverage and innovation
4. Enable and equip communities to participate in adaptation, focusing on the most vulnerable
5. Embed reflection, monitoring, evaluation, and learning into adaptation action
6. Adapt the Clyde Corridor for the 22nd Century
7. Enhance early warning and preparedness for floods and heatwaves
8. Ensure everyone’s homes, offices, buildings and infrastructure are resilient to future climate impacts
9. Deliver nature-based solutions for resilient, blue-green ecosystems, landscapes and neighbourhoods
10. Enhance regional decision making and establish Glasgow City Region as a global research and knowledge hub for adaptation

11. Begin the transition to an economy resilient to future climate impacts

WHAT IS SEA?

SEA is an iterative process of gathering data and evidence, assessing environmental effects, developing mitigation measures and making recommendations to refine plans or programmes in view of the predicted environmental effects. The effects predicted at this stage will remain at a strategic level.

The key stages of the SEA undertaken for the Strategy are as follows:

1. **Screening** – Completed in April 2020 and confirmed the need to complete a SEA.
2. **Scoping** – Completed in September 2020 and confirmed the scope of the SEA.
3. **Environmental Report** – This Stage.
4. **Post Adoption Statement** – 2021 prior to the publication of the final Strategy.

METHOD AND APPROACH TO THE ASSESSMENT

The Scoping Report identified the key issues for sustainability in relation to climate adaptation, using the policy context, environmental baseline and future trends occurring without implementation of the Strategy.

The method and approach to the assessment was developed from the process outlined in the Scoping Report. This involved:

- A summary of the issues and opportunities for each of the SEA topic areas developed from a review of existing environmental information and data – Section 4 of the Environmental Report.
- A review of the existing plans, policies and strategies (from International to Local policy), identified from a review of the main policy documents – Section 2 and Appendix B of the Environmental Report.
- Assessment of three strategy alternatives – Section 6 of the Environmental Report.
- Compatibility assessment of the Strategy's vision and key objectives – Section 7 of the Environmental Report.
- The assessment of the Strategy interventions against objectives for each of the SEA topic areas – Section 8 and Appendix D of the Environmental Report.
- The identification of mitigation and enhancement measures – Section 9 of the Environmental Report.

The development of the SEA is iterative to the development of the Adaptation Strategy. Sniffer utilised the outputs from the SEA Assessment and previous SEA Scoping Stage to challenge and inform the narrative within the Strategy.

A high level review of the initial draft of the Strategy was carried out by WSP, prior to undertaking the environmental assessment presented in this Environmental Report. This feedback allowed Sniffer to make changes to the Strategy, the overarching Strategy Objectives and interventions.

SEA OBJECTIVES

Following the findings identified at scoping an Appraisal Framework was produced, which was used to guide the assessment process of the Strategy. The framework sets a number of SEA Objectives, which are outlined in Table NTS 1 below .

Table 1 – NTS 1 – SEA Framework

SEA Topic	SEA Objective
Natural Capital	SEA1 - To maintain, enhance and protect the City Region's natural capital stock and the ecosystem services they provide
Climatic Factors	SEA2 - To increase resilience to the impacts of climate change SEA3 -To reduce / limit emissions of greenhouse gases and support the transition to net zero SEA4 - To reduce energy use and ensure sustainable use of energy
Population and Human Health	SEA5 - To improve physical and mental human health and community well-being and reduce inequalities across the City Region SEA6 -To promote economic growth and prosperity and ensure equality and social inclusion
Biodiversity	SEA7 -To preserve, protect and enhance protected habitats, species, peatlands, woodlands and valuable ecosystem services in the City Region SEA8 -To maintain and enhance existing green networks and improve habitat connectivity
Landscape	SEA9 -To conserve and enhance the quality of the City Region's landscapes and its character and promote access to the wider environment.
Cultural Heritage	SEA10 - To protect, enhance and promote the historic environment, including heritage assets (designated and undesignated) historic townscapes and their unique landscape settings
Water Environment	SEA11 - To protect water quality and manage and enhance the water environment SEA12 - To reduce the risk of flooding from all sources and mitigate impacts of flooding and droughts SEA13 - To protect the water environment from the effects of climate change SEA14 - To reduce water use, ensure sustainable use of water and improve efficiency
Air Quality	SEA15 - To support the development of local authority measures for the protection and enhancement of air quality
Material Assets (incl. Soil Resources)	SEA16 - To ensure the efficient use of land and promote sustainable use of resources SEA17 - To protect geological and agriculturally important land and carbon rich soils from the effects of climate change SEA18 - To reduce the impact of climate change on the City Region's key infrastructure and incorporate climate change adaptation to help maximise resilience

KEY FINDINGS FROM THE ASSESSMENT

CONSIDERATION OF ALTERNATIVES

The SEA process requires the consideration of ‘reasonable alternatives’ to the proposed strategy. The SEA considered three alternatives:

- Alternative 1: Continuation of existing work.
- Alternative 2: Incremental adaptation planning approach.
- Alternative 3: Transformational approach.

Of the three alternatives, it is clear that taking a more transformative approach to climate change adaptation in the City Region has the potential for the greatest benefit across the 18 SEA Objectives. The transformational approach offers the potential to deliver a larger, more sustainable, permanent, long-term change, compared to the incremental approaches identified in Alternatives 1 and 2.

COMPATIBILITY ASSESSMENT

The Strategy Vision and Objectives were assessed against the SEA Objectives to determine their compatibility and highlight areas that may require further consideration or where gaps in data existed.

Generally, compatibility was positive or had no effect for most of the elements of the Vision and Strategy Objectives compared against the SEA Objectives. No direct incompatibilities were identified for the vision or Strategy Objectives.

Strategy Objectives 1, 2 and 3 were the most compatible with the SEA Objectives, whilst Strategy Objective 4 resulted in the greatest level of uncertainty, as it is very much dependent upon implementation and the groups and organisations targeted by the objective.

ASSESSMENT OF STRATEGY INTERVENTIONS

The assessment has identified a number of uncertainties due to the strategic nature of the Strategy, however, an Action Plan will be developed to support delivery of the Strategy which will contain further detail around future projects and developments which will allow more detailed assessment of impacts

In general, the interventions performed well against most SEA Objectives, with no significant negative effects being identified. However, a number of uncertain effects were identified for natural capital, air quality, biodiversity, water, material assets landscape and townscape and the historic environment.

A summary for each intervention has been provided in Table NTS2 below:

Table 2 – NTS 2 – Assessment Summary

Intervention	Assessment Summary
Intervention 1	<ul style="list-style-type: none"> ■ Significant positive effects were identified on SEA2 in that the commitment to bring institutions, networks and people together to plan for the future will help share and disseminate ideas. ■ Proactively engaging with new public groups could help communities to become more climate resilient. This resulted in significant positive effects on SEA5.

Intervention	Assessment Summary
	<ul style="list-style-type: none"> ■ The potential for technological advances could bring employment opportunities and resulted in significant positive effects on SEA6. ■ Uncertain effects have been identified in relation to all other SEA Objectives as it's uncertain on the implementation at this stage.
Intervention 2	<ul style="list-style-type: none"> ■ The intervention could lead to productive investment toward adaptation measures, bringing significant economic growth to the region. Significant positive effects were therefore, identified for SEA6 and SEA18. ■ The intervention could help business and organisations identify key climate risks helping them to build greater climate resilience. This resulted in significant positive effects in relation to SEA2. ■ The effects of climate change can have negative effects on mental health (e.g. stress and anxiety) therefore, the reference to 'mental welfare' may bring about a more holistic approach. Significant positive effects were therefore identified in relation to SEA5. ■ Uncertain effects have been identified in relation to SEA1 and SEA7-SEA17 as it is not yet clear which future plans, programmes and strategies will emerge.
Intervention 3	<ul style="list-style-type: none"> ■ The deployment of various sources of finance, to maintain and enhance the resilience of assets to climate change resulted in significant positive effects for SEA2 and SEA18. ■ The creation of an 'Adaptation Climate Finance Lab' could result in an increase in job opportunities and could result in substantial investment, resulting in significant positive effects on SEA5 and SEA6. ■ Increased public and private sector investments could result in substantial resilience funding that will benefit all SEA Objectives. However, at this stage the level of funding and the target areas for investments are not known, which has therefore resulted in uncertain effects across many of the SEA Objectives.
Intervention 4	<ul style="list-style-type: none"> ■ Community focused approaches could help communities to become climate resilient, so they are able to better absorb the threats and variability of climate change. Significant positive effects were therefore identified for SEA2, SEA5 and SEA6. ■ There is potential for significant positive effects on all SEA Objectives, however, the focus of community engagement is not yet clear and is likely to differ between communities depending on their priorities. For this reason, a number of uncertainties have been recorded.
Intervention 5	<ul style="list-style-type: none"> ■ This intervention will build further climate change resilience across the City Region and improved knowledge sharing will help to protect its key infrastructure. For these reasons, significant positive effects have been identified for SEA2 and SEA18. ■ The Task Force on Climate related Financial Disclosures (TCFD) puts a lot of focus on physical risk and transition risk (risks to an organisation from the transition to the low carbon climate) so significant positive effects have been identified in relation to SEA3.
Intervention 6	<ul style="list-style-type: none"> ■ The long term management of flood risk has resulted in significant positive effects for SEA11, SEA12 and SEA13. ■ The use of vacant and derelict land in providing space for management of flooding, supports the efficient use of land (SEA16) and has resulted in significant positive effects. ■ Uncertain effects have been identified for both landscape (SEA9) and the historic environment (SEA10). Effects will be dependent upon scheme level design.

Intervention	Assessment Summary
	<ul style="list-style-type: none"> ■ The introduction of natural flood defences and green and blue infrastructure will help to increase natural stocks and enhance green infrastructure networks. Significant positive effects were therefore identified in relation to SEA1 and SEA2. ■ Uncertain effects have been identified in relation to SEA17. Whilst the use of derelict sites might conserve geological and agriculturally important land, some natural flood defences could result in the sterilisation of agricultural land.
Intervention 7	<ul style="list-style-type: none"> ■ This intervention could help deliver a more economically efficient approach to reduce flood risks and heatwaves, which has resulted in significant positive effects for SEA2, SEA6, SEA12 and SEA18. ■ The development of a property flood resilience and resistance programme, which will prioritise the most socially vulnerable, will help to narrow the climate inequality gap. Significant positive effects were therefore identified in relation to SEA5.
Intervention 8	<ul style="list-style-type: none"> ■ Ensuring infrastructure which is resilient to climate change will include measures to reduce the risk of flooding and has therefore resulted in significant positive effects on SEA12. ■ Uncertain effects have been identified for SEA9, as it is not clear what types of development and key infrastructure will be targeted by this intervention, and their impact on the landscape. ■ Retrofitting existing buildings and homes may have substantial carbon-mitigation and cost-saving potential, helping to reduce energy use and greenhouse gas (GHG) emissions and fuel poverty. Significant positive effects were identified in relation to SEA2, SEA3, SEA4, SEA5, SEA6, SEA15 and SEA16. ■ The intervention includes specific measures to evaluate the impacts of climate change on the historic environment, which resulted in significant positive effects.
Intervention 9	<ul style="list-style-type: none"> ■ The addition and maintenance of green and blue infrastructure has potential to improve water quality which could help to protect and enhance fluvial and coastal habitats. This resulted in significant positive effects for SEA1, SEA2, SEA7, SEA8, SEA9, SEA11 and SEA13. ■ Greater access to green and blue spaces will have direct and indirect impacts on people's physical and mental health and will help to promote social inclusion. This resulted in significant positive effects on SEA5 and SEA6. ■ Uncertainty was recorded in relation to SEA10 as it is not clear as to whether the removal of urban form could include heritage assets that are of local or national importance. ■ The use of vacant and derelict land will be explored in order to support the interventions, which will support the efficient use of land and protect the region's green spaces. This resulted in significant positive effects on SEA16. ■
Intervention 10	<ul style="list-style-type: none"> ■ The intervention aims to proactively promote the City Region as a place for research and experimentation on climate change adaptation. This could result in significant financial investment and economic growth within the City Region, which has resulted in significant positive effects on SEA6. ■ A priority to work towards net zero has resulted in significant positive effects on the reduction of greenhouse gases (SEA3), reduction in energy use (SEA4) and enhancement of air quality (SEA15). ■ Reductions from GHG emissions, energy use and air emissions have also resulted in significant positives for SEA2. ■ The intervention could result in adaptation measure that address climate change whilst making progress towards equity and the protection of all of the Region's

Intervention	Assessment Summary
	residents. For this reason, significant positive effects were identified in relation to SEA5.
Intervention 11	<ul style="list-style-type: none"> By ensuring that adaptation transitions are fair and just, and providing support to the most vulnerable workers and businesses this intervention will help to protect jobs and businesses from the impact of climate change. Significant positive effects were therefore identified in relation to SEA6. Moving towards a more circular economy could deliver benefits such as reducing GHG emissions, improving the security of the supply of raw materials, increasing competitiveness, boosting economic growth and creating further employment opportunities. For these reasons, significant positive effects have been identified in relation to SEA2, SEA3, SEA4, SEA14 and SEA15.

CUMULATIVE EFFECTS

A cumulative effects assessment was undertaken during the assessment of interventions. The following cumulative effects were identified:

- Potential for positive cumulative effects to arise across all SEA topics if multiple climate investments and developments within the region were to come forward.
- Potential for positive cumulative effects on climate resilience, flooding, air quality, population and human health from the provision multiple areas of green and blue infrastructure.
- Potential for positive cumulative effects on energy usage, greenhouse gas emissions and economic growth if widespread implementation of a circular economy across the region's supply chains were to occur.
- If multiple natural flood prevention measures were to come forward in multiple locations, there is potential for a large cumulative loss in land, which could lead to a loss in heritage assets, high quality agricultural land and geologically important land, all of which could have negative effects on the landscape.
- Potential for negative effects if technological advances lead to the need for large scale infrastructure and land take within the City Region. This will have particular negative effects on natural capital, biodiversity, landscape and the historic environment.
- Negative synergistic effects on both the landscape and the historic environment if multiple infrastructure adaptation and retrofitting measures were to come forward, particularly in those locations with high landscape and / or heritage value.

MITIGATION

Where the assessment resulted in uncertain effects on the environment, mitigation measures were identified to compensate for this. A summary of the broad measures which will be taken to help mitigate the uncertain (or enhance the positive) effects of the interventions can be found in **Table NTS 3** below.

Table 3 – NTS 3 – Mitigation Measures

SEA Topic	Mitigation Measures
General	<ul style="list-style-type: none"> ■ CRC could provide further details on the types of projects, adaptation measures and general implementation of the interventions. This could result in a more accurate assessment across the SEA topics. ■ CRC should seek public views on the consequences and trade-offs between potential actions to achieve net zero. ■ The implementation of interventions at a local level will require the development of project specific mitigation measures in consultation with both statutory and non-statutory consultees in order to minimise impacts and maximise the potential for enhancements to the local environment. ■ The strategy could include further details on the Action Plan in order to identify potential effects for population and health
Vision and Strategy Objectives	<ul style="list-style-type: none"> ■ The overall vision of the Strategy could be updated to reference a future 'high quality environment'. ■ Strategy Objective 1 could be amended to specifically reference environmental enhancement, to strengthen the policy. ■ Strategic Objective 3 could include emphasis on the natural and built environment and further indication on the types of organisations targeted. ■ Strategic Objective 4 could be amended to specifically reference social, economic and environmental resilience to climate change.
Natural Capital	<ul style="list-style-type: none"> ■ Nature based solutions should be sought over hard engineering options in order to protect, sustainably manage and potentially restore the natural environment. ■ Promoters and designers should liaise closely with CRC to avoid or minimise negative impacts.
Climatic Factors	<ul style="list-style-type: none"> ■ Building material selection of any hard engineering adaptation measures will need to adequately consider embodied carbon. ■ Any form of construction and operation should be undertaken as sustainably as possible, making use of tools and processes, such as circular economy, waste hierarchy, CEEQUAL and BREEAM.
Population and Human Health	<ul style="list-style-type: none"> ■ Ensure the needs and aspirations of groups with protected characteristics are considered in delivering climate adaptation solutions. ■ Community involvement would need to be inclusive in order to facilitate meaningful involvement of all community groups, particularly the most vulnerable. ■ Consideration needs to be given to those who may not have the same understanding of, or access to emerging technology.
Biodiversity	<ul style="list-style-type: none"> ■ Nature based solutions should be sought over hard engineering options, in order to protect, sustainably manage and potentially restore the natural environment. ■ Promoters and designers should liaise closely with CRC to avoid or minimise negative impacts.
Landscape	<ul style="list-style-type: none"> ■ Climate adaptation solutions must seek to maximise sustainability benefits from existing landscape, townscape by valuing them inherently and for the wider services they provide. ■ Promoters and designers should liaise closely with CRC to avoid or minimise negative impacts.

SEA Topic	Mitigation Measures
Cultural Heritage	<ul style="list-style-type: none"> Climate adaptation solutions must seek to maximise sustainability benefits from existing heritage assets by valuing them inherently and for the wider services they provide. Promoters and designers should liaise closely with CRC to avoid or minimise negative impacts.
Water Environment	<ul style="list-style-type: none"> Any form of construction and operation should be undertaken as sustainably as possible, making use of tools and processes, such as circular economy, waste hierarchy, CEEQUAL and BREEAM.
Air Quality	<ul style="list-style-type: none"> Any form of construction and operation should be undertaken as sustainably as possible, making use of tools and processes, such as circular economy, waste hierarchy, CEEQUAL and BREEAM.
Material Assets	<ul style="list-style-type: none"> Building material selection of any hard engineering adaptation measures will need to adequately consider embodied carbon and the implications that this could have for meeting net zero targets. Any form of construction and operation should be undertaken as sustainably as possible, making use of tools and processes, such as circular economy, waste hierarchy, CEEQUAL and BREEAM.

Section 9 of the main report contains a detailed description of the significant effects of each aspect of the plan and what mitigation measures we have identified to address them.

MONITORING

As the Strategy moves into delivery, the CRC Board will monitor progress both on the delivery of interventions and the effects on reducing climate risks.

The final Strategy and Action Plan recognises the importance of monitoring progress and includes provisions for the Secretariat to monitor progress, through an annual report, a two-yearly independent assessment of progress and a five-yearly update of the Risk and Opportunity Assessment and Theory of Change. The CRC Secretariat and members will also work with Scottish Government to ensure efforts feed into the national reporting processes for monitoring performance against the Public Bodies Duties and the Scottish Climate Change Adaptation Programme. Furthermore, CRC will work with the Climate Change Committee to support progress evaluations and the UK Climate Change Risk Assessment process.

A detailed set of indicators for monitoring the implementation of the Strategy have not been selected at this stage of the process, so an initial indicative set of high level SEA monitoring indicators have been developed. These will be included as part of the finalising the independent assessment report.

The purpose of the monitoring is to provide an important measure of the sustainability outcome of the Strategy and to measure the performance of the Strategy against sustainability objectives and targets.

These are not about monitoring the success of adaptation actions in relation to these issues, but about ensuring that significant improvements to the environment are delivered as part of the implementation of the strategy.

The monitoring indicators can be found in **Section 10** of the main report.

NEXT STEPS

The updated SEA Environmental Report will be published alongside the final Adaptation Strategy in June 2021. This will be supported by a SEA Post Adoption Statement, which is the last formal output of the SEA process.

1 INTRODUCTION

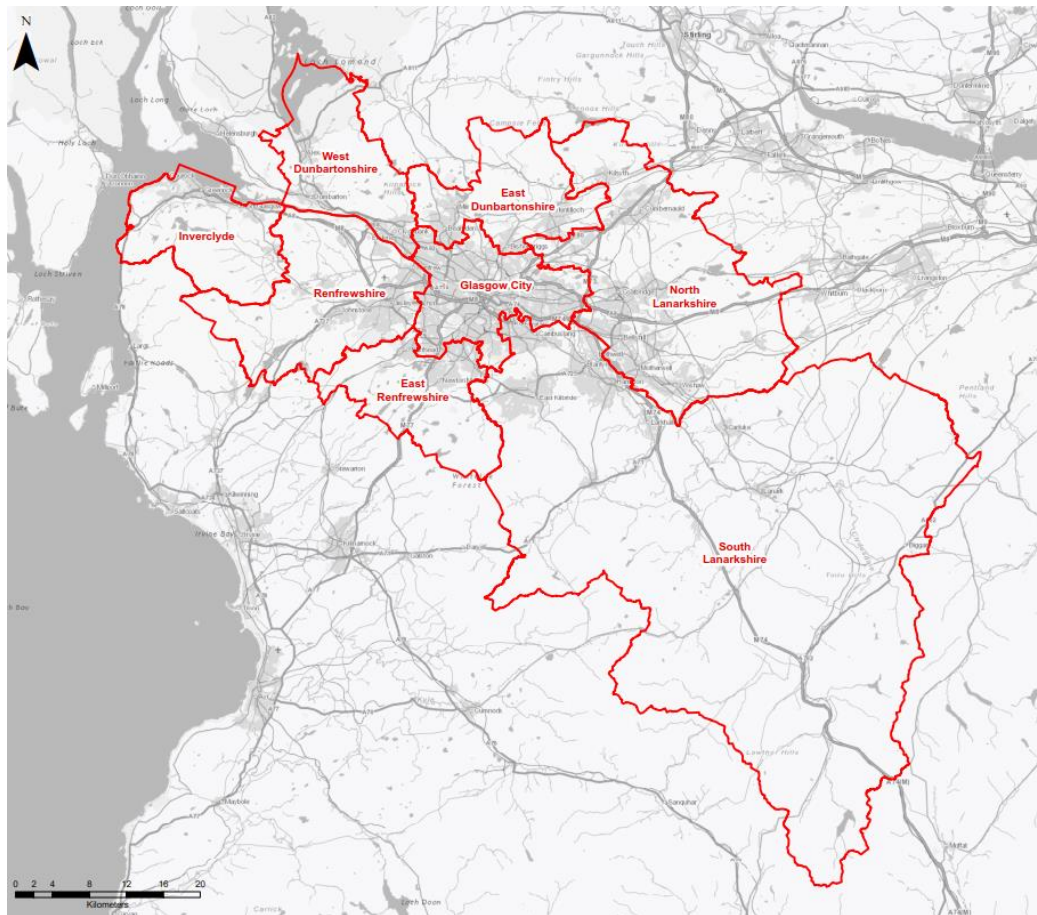
1.1 BACKGROUND

- 1.1.1. Sniffer, on behalf of the Climate Ready Clyde (CRC) initiative, is preparing the Strategic Environmental Assessment (SEA) of a new Regional Climate Change Adaptation Strategy (the “Strategy”) for the Glasgow City Region (“the City Region”) with funding from the funding from EIT Climate-KIC.
- 1.1.2. The Strategy sets the strategic framework for climate change adaptation in the City Region through to 2030. It comprises a high-level vision and objectives that are supported by a number of interventions across the City Region which build on the Theory of Change for a Climate-Ready City Region¹ (developed by CRC to outline the pathways of change in the City Region).
- 1.1.3. CRC is an unincorporated association of 15 public and private sector partners (supported by the Scottish Government) working on climate change adaptation. It includes the region’s eight local authorities, the Scottish Environment Protection Agency (SEPA), Transport Scotland, Strathclyde Partnership for Transport (SPT), University of Glasgow, University of Strathclyde, SGN and NHS Greater Glasgow and Clyde. The City Region which CRC covers is shown in **Figure 1.1** below.

CRC is currently co-funding an initiative, Clyde Re:Built, along with EIT Climate-KIC to develop and pilot an approach to innovation that seeks to create transformative change. The development of the Strategy has been funded through this project. Through this project, Sniffer is also working with the cultural and climate change charity Creative Carbon Scotland, the specialist climate change and economic research consultancy Paul Watkiss Associates and the European Union’s climate innovation hub EIT Climate-KIC. This consortium is managed by Sniffer, a climate resilience charity and knowledge broker.

¹ Climate Ready Clyde (2020). Theory of change for a Climate Ready Glasgow City Region. [online] available at: <http://climatereadyclyde.org.uk/theory-of-change/>

Figure 1-1 - Glasgow City Region covered by Climate Ready Clyde



1.2 STRATEGIC ENVIRONMENTAL ASSESSMENT

- 1.2.1. This report constitutes an Environmental Report (ER) in accordance with the requirements of the European Community (EC) SEA Directive (2001/42/EC) (the “SEA Directive”) which is implemented in Scotland by the Environmental Assessment (Scotland) Act 2005 (the “SEA Act”). This report has been prepared in accordance with the SEA Directive and Section 14 of the SEA Act. The SEA Act requires all qualifying policies, plans, programmes and strategies (PPS) to undergo SEA, which is the process for identifying, reporting and mitigating the environmental impacts of the proposed PPS.
- 1.2.2. The ER sets out the process and methodology followed throughout the SEA and the identification of potentially significant environmental effects (both positive and negative) associated with the implementation of the Strategy. The aim of the SEA for the Strategy is to:
- Assess the reasonable alternatives to the Strategy.
 - Identify the environmental issues associated with the Strategy to inform its iterative development.
 - Evaluate the likely significant environmental effects associated with the Strategy to ensure the issues are identified and evaluated and inform the Strategy prior to its adoption.
 - Provides an opportunity for the public to participate in environmental decision making through consultation on the Strategy and the associated ER.

CONSULTATION

- 1.2.3. A SEA Scoping Report was issued to the Scottish Government's SEA Gateway on 3rd September 2020. The report was issued by the SEA Gateway to the Consultation Authorities (CAs) – NatureScot, SEPA and Historic Environment Scotland (HES) to enable them to make comments on the proposed content and scope of the SEA ER. The responses received from the CAs and how these have been addressed in the SEA ER are set out in **Appendix A**.
- 1.2.4. The SEA ER was issued to consultees, via the SEA Gateway, in November 2020 for a six-week consultation period, alongside the Adaptation Strategy. This later report, an update to the SEA ER, has been prepared following that consultation period. This will be made available alongside the Adopted Adaptation Strategy as well as the Post Adoption Statement, which will summarise how responses to consultation and the SEA have influenced the development of the Strategy.

1.3 REPORT STRUCTURE

- 1.3.1. The contents of this ER are detailed below:

- The background to the Strategy including information on the draft vision, objectives and interventions (**Section 2**).
- The methodology for, and a broad overview of the requirements of SEA (**Section 3**).
- Summary of the environmental baseline of the City Region as well as those issues and opportunities for the Strategy and the likely evolution of the environment should the Strategy not be adopted (**Section 4**).
- The Assessment process and the development of the SEA Objectives (**Section 5**).
- **Sections 6 to 8** present:
 - the assessment of the alternatives to the Strategy and their performance against the SEA Objectives;
 - the compatibility assessment of the Strategy vision and objectives against the SEA Objectives; and
 - the assessment of the Strategy interventions against the SEA.
- Consideration of mitigation and enhancement measures to prevent or reduce any negative effects and enhance significant positive effects (**Section 9**).
- Recommendations for monitoring the environmental effects of implementing the Strategy (**Section 10**).
- Setting out the next steps (**Section 11**).

2 THE GLASGOW CITY REGION CLIMATE ADAPTATION STRATEGY

2.1 INTRODUCTION

- 2.1.1. CRC has voluntarily committed to developing the Strategy as an innovative and ambitious way to drive the City Region's transformational adaptation approach, particularly in sectors and systems that work at the regional scale (e.g. infrastructure, housing, transport, economic development and land use planning) and which require collective, concerted, collaborative effort to adapt.
- 2.1.2. This Strategy forms a key milestone in the transition over the next ten years to a City Region that it is resilient and prepared for the changes ahead.

2.2 STRATEGY CONTEXT AND OVERVIEW

- 2.2.1. The Strategy is intended to set the strategic framework for adaptation to build resilience to the range of possible climate futures in the City Region in line with the goals set out in the Theory of Change¹, which state:
 - People shape their own lives and places so they are climate ready.
 - Glasgow City Region is made climate ready by the way resources, services and assets are directed and used.
 - Actors collectively create the right conditions for the City Region to become climate ready.
- 2.2.1. These will be supported by seven principles from the Theory of Change which cut across the outcomes in the Strategy:
 - **More of the same will not do:** An effective response to climate change will require a revolutionary and systemic approach.
 - **Climate and social justice:** People's lives can be made healthier and happier, and inequality/ vulnerability lessened by efforts to build climate resilience.
 - **Revolution in understanding:** There needs to be a 'revolution in understanding' the potential impacts of climate change, and the adaptation options available to a much wider cohort of people and communities.
 - **Revolution in planning:** There needs to be a 'revolution in planning'. We must rethink how we use land and space and where and what we build, with planners and developers empowered to prioritize climate resilience.
 - **Revolution in finance:** There needs to be a 'revolution in finance' to ensure that the funds and resources necessary to build climate resilience are made available.
 - **Recognising uncertainty:** Our future is uncertain; we need to reduce global heating and plan for worst-case scenarios, recognizing that climate change is not a linear process.
 - **Intrinsic value of nature:** Nature/biodiversity has tangible cultural and spiritual value and efforts to build climate resilience should do so in ecological, as well as human, communities.

- 2.2.2. The Strategy will address the priority areas of climate change risk and opportunity as set out in Glasgow City Region's first Climate Risk and Opportunity Assessment².

2.3 DRAFT VISION, OBJECTIVES AND INTERVENTIONS

- 2.3.1. The Strategy seeks to ensure the City Region's economy, society and environment is not only prepared, but continues to flourish in the face of the impacts arising from the climate crisis. In this context, the overarching vision is: ***"A Glasgow City Region that flourishes in the future climate"***. The Strategy outlines how CRC members and wider actors in the City Region achieve this vision, in line with the conditions set out in the Theory of Change for a climate ready City Region.
- 2.3.2. As such, the Strategy and Action Plan Objectives are to:
- Strategy Objective 1 - seeks to build the region's social, economic, and environmental resilience to climate change
 - Strategy Objective 2 - Outlines the processes and early interventions needed to manage climate risks and realise opportunities in line with our Theory of Change.
 - Strategy Objective 3 – Provides a strategic framework for adaptation in and by the Glasgow City Region that fits alongside and supports key plans, policies, and activities to enable delivery.
 - Strategy Objective 4 – Sets out how we will deepen and expand collaboration and collective impact by working together and engaging, equipping, and enabling citizens and organisations to play their role in realising the vision.
 - Strategy Objective 5 - Sets out how progress in increasing climate resilience will be monitored, evaluated, and learnt from to improve policies, strategies, programmes and projects.
- 2.3.3. These objectives will be achieved through a number of interventions that have been subject to assessment as part of the ER.

STRATEGY INTERVENTIONS

- 2.3.4. The Strategy sets out a series of interventions³ that address individual or multiple conditions and changes identified in the Theory of Change. To develop the interventions in the Strategy, CRC built on recommendations from the existing evidence base on climate risk and adaptation and clustered them to an initial set of draft interventions.
- 2.3.5. The interventions were then refined and further developed by evaluating the extent to which they aligned with the Theory of Change, drawing in wider perspectives from stakeholders, and undertaking systems analysis, Impact Assessment and Multi Criteria Analysis; all of which enhanced and strengthened the interventions further. The interventions draw on both Glasgow City Region's own climate risk and opportunity assessment, the UK's emerging Third Iteration of the Climate Change Risk Assessment analysis, and the different types of decisions and early adaptation. They recognise:

² Climate Ready Clyde, Climate Risk and Opportunity Assessment for Glasgow City Region, 2018 [online] available at: <http://climateradyclyde.org.uk/climate-risk-and-opportunity-assessment-for-glasgow-city-region-key-findings/>

³ A strategic package of activities designed to achieve intermediate outcomes and contribute to our long-term outcomes

- The benefits of early low and no-regret adaptation to address current risks and build early resilience;
- The need to intervene early in decision that have long lifetimes (notably land-use and infrastructure) with climate smart development; and
- The need to start planning for the longer term using an adaptive management framework (i.e. using an iterative approach that recognises uncertainty) that includes more transformational actions.

2.3.6. There are 11 interventions and associated sub interventions in total, and these are outlined in **Table 2-1** below.

Table 2-1 – Adaptation Strategy Interventions

Interventions
1. Reform and reshape governance mechanisms so they respond to adaptation needs, nurture new leadership and create expectations in society 1.1 A detailed review of the new institutional landscape needed for adaptation 1.2 A broader coalition of actors mobilised to deliver the Adaptation Strategy 1.3 Adaptation leadership at all levels that is nurtured and developed 1.4 News, arts, media, and cultural organisations telling stories about the climate crisis and opportunities to adapt
2. Develop the ability of organizations, businesses, and communities to adapt 2.1 An enhanced programme to increase awareness of the potential impacts of climate change on organisations and communities and opportunities to adapt 2.2 Establishment of a City Region working group/forum and mentoring programme 2.3 Targeted community capacity building for adaptation
3. Increase adaptation finance through leverage and innovation 3.1 Strategic use of public sector funds to attract private sector investment 3.2 A Regional Adaptation Finance Strategy and Action Plan 3.3 Mapping and measurement of regional adaptation finance flows 3.4 Piloting of new approaches to transformative adaptation finance
4. Enable and equip individuals and communities to participate in adaptation, focusing on the most vulnerable 4.1 A shared understanding of how current community engagement is structured for adaptation 4.2 Increased community involvement in the region's adaptation governance, decision-making, planning, and delivery 4.3 Resource, training and education for communities and young people to shape their places 4.4 Collaborations between organisations, communities, artists, and cultural practitioners to stimulate creative and relevant adaptation responses
5. Embed reflection, monitoring, evaluation and learning into adaptation action

Interventions

- 5.1 Learning by doing – building in active reflection and learning process
- 5.2 Encourage large organisations to sign up to relevant international reporting initiatives
- 5.3 Alignment of planning assumptions between domestic adaptation planning and the emerging TCFD/investor regimes
- 5.4 Learning and knowledge exchange with other cities and regions

6. Adapt the Clyde Corridor for the twenty-second century

- 6.1 Work through Clyde Mission to govern climate risks for the entire river corridor
- 6.2 An iterative adaptation pathway for the Clyde developed
- 6.3 The climate resilience of the river corridor reflected as a national priority

7. Enhance early warning and preparedness for floods and heatwaves

- 7.1 Extension of the flood warning scheme in the Glasgow City Region
- 7.2 Implementation of an integrated climate alert warning system for Glasgow City Region
- 7.3 Continued delivery of strategic Flood Risk Management activities
- 7.4 A regional property flood resilience and resistance installation programme
- 7.5 Exploration of new insurance models

8. Ensure everyone's homes, offices, buildings, and infrastructure are resilient to future climate impacts

- 8.1 Adaptation embedded in the Glasgow City Region's net-zero transition
- 8.2 Creation of an adaptation forum for Glasgow City Region infrastructure
- 8.3 Adaptation of existing infrastructure, with policies and regulation to require all new investment to be climate resilient
- 8.4 Strengthening of adaptation requirements in the planning system
- 8.5 Creation of a regional retrofit framework for climate resilience
- 8.6 Creation of a framework for adapting cultural heritage assets
- 8.7 Lobby UK and Scottish Governments to reform infrastructure investment frameworks
- 8.8 Evaluation of future adaptation infrastructure needs

9. Deliver nature-based solutions for resilient, blue-green ecosystems, landscapes, and neighbourhoods

- 9.1 Identify regional priorities for nature-based solutions
- 9.2 Delivery of the regional Strategic Green Network
- 9.3 Creation of the Clyde Climate Forest
- 9.4 Increase investment in targeted habitat restoration
- 9.5 Roll out of large-scale blue and green infrastructure projects to demonstrate benefits to communities – either through new green infrastructure or removal of urban form
- 9.6 Support for local infill and expansion of nature-based solutions to strengthen the regional network

Interventions

9.7 Develop and accelerate blue and green infrastructure financing

10. Enhance regional decision making and establish Glasgow City Region as a global research and knowledge hub for adaptation

10.1 Enhanced adaptation research through open invitation to collaborate on publicly available research priorities

10.2 Glasgow City Region established as a living lab for climate adaptation

10.3 Convene an Expert Advisory Committee on Adaptation

11. Begin the transition to an economy resilient to future climate impacts

11.1 Adopt a climate smart regional economic development approach

11.2 Delivery of a just, climate resilient transition which nurtures adaptation skills

11.3 Climate-resilient supply chains as part of a net-zero, circular economy

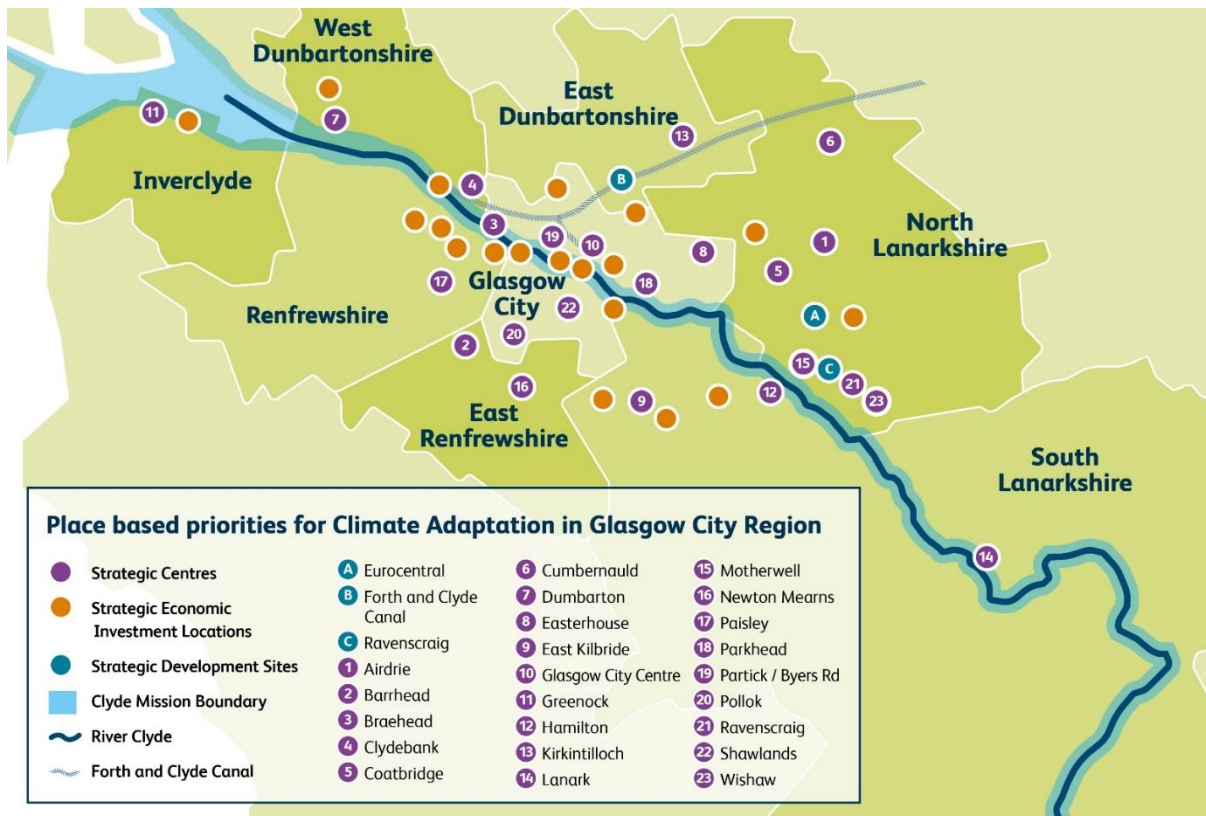
11.4 An SME (Small and Medium Enterprise) support plan

2.3.7. Five place-based priority areas have been identified within the City Region. These are areas where there are one or more of the following conditions: current and future climate hazards are most acute; there is the potential to affect disproportionately vulnerable communities; there are significant concentrations of economic assets; or where significant regional decisions are being taken in relation to new development. These priority areas are:

- **The Clyde River corridor** – The 109km River Clyde, running from the Lowther Hills in South Lanarkshire, and ending at the Firth of Clyde is a national economic asset, but is also where the City Region has a significant concentration of climate risks, with river, surface water and coastal flooding all coming together, alongside erosion. It is also home to a significant number of people who are disproportionately affected by flooding. Within this, the Clyde Mission area, running from the Firth of Clyde in the west to Clyde Gateway in the east, is a focus for long-term economic development and for regeneration of regional and national significance.
- **New priority development sites** – The wider sites set out in the indicative Regional Spatial Strategy, including the major regeneration of Ravenscraig in North Lanarkshire, Eurocentral / Mossend and the Forth and Clyde Canal, are priorities to make sure we do not lock in future climate risks as part of the region's development.
- **Strategic Economic Investment Locations (SEILs)** - These locations offer potential for a rebalanced low carbon economy, boosting competitiveness and tackling inequality. They also promote the Scottish Government's key economic sectors and Scottish Enterprise's locational priorities. The large scale, long-term investment planned to achieve these outcomes means they have a high potential to lock in future climate risks.
- **Our coasts** – The coastal landscape is a unique part of the City Region's heritage and culture, but erosion and sea level rise will alter their shape and form significantly in places like Dumbarton, Greenock and Gourock, where there are already significant socio-economic challenges.
- **Our urban and town centres** – The centre of Glasgow and town centres are vital links in the City Region's overall economy. But they are also heat islands. In future, the concentration of urban development is likely to be affected by rising temperatures and heatwaves.

2.3.8. **Figure 2-1** below shows approximate locations for place based priorities. It should be noted that the areas outlined above are indicative, based on high level assessment by the Climate Ready Clyde secretariat. Each of the factors above, will be assessed further at a lower spatial scale, in order to better define them in future.

Figure 2-1 - Place Based Priorities for Climate Adaptation in the City Region



2.4 ITERATIVE DEVELOPMENT OF THE STRATEGY

2.4.1. The development of the SEA is iterative to the development of the Adaptation Strategy. Sniffer utilised the outputs from the SEA Assessment and previous SEA Scoping Stage to challenge and inform the narrative within the Strategy.

2.4.2. A high level review of the initial draft of the Strategy was carried out by WSP, prior to undertaking the environmental assessment presented in this Environmental Report. This feedback allowed Sniffer to make changes to the Strategy, the overarching Strategy Objectives and interventions.

2.5 RELATIONSHIP WITH OTHER PLANS, PROGRAMMES, AND STRATEGIES

2.5.1. The SEA Act requires information on:

“The degree to which the plan or programme influences other plans and programmes including those in a hierarchy” (Schedule 2, Paragraph 1(b)).

2.5.2. In order to establish a clear scope for the SEA, an understanding of the environmental, social and economic objectives contained within international, national and regional legislation, policies and plans that are of relevance to the Strategy was undertaken during the SEA Scoping stage.

- 2.5.3. At SEA Scoping the task of identifying related legislation, policies and plans cannot yield an exhaustive or definitive list, therefore, the review focussed to ensure that only policies that are current and of direct relevance to the Strategy were included.
- 2.5.4. In order to inform the ER, consultation responses from the CAs were reviewed and a further review of any relevant plans, programmes and strategies (PPS) was undertaken to ensure that the SEA complies with existing international, national and regional governance. The process entailed identifying and reviewing those environmental protection objectives that are directly relevant to both the Strategy and the SEA.
- 2.5.5. **Appendix B** sets out the updated PPS Assessment undertaken.

2.6 POLICY HIERARCHY

- 2.6.1. Although the Strategy will be voluntary it will sit in a hierarchy, underneath the Second Scottish Climate Change Adaptation Programme (SCCAP2), but at a higher level than adaptation actions taken by local organisations such as Local Authorities.
- 2.6.2. Within this hierarchy it is intended that the Strategy will influence both national and UK policy on climate adaptation (e.g. the SCCAP2, Infrastructure Investment Plan, the Strategic Transport Projects Review, UK Green Finance Strategy, UK Research and Development Roadmap) as well as more local activities (e.g. Local Authority Adaptation Strategies, Local Development Plans, Locality Plans, etc.).
- 2.6.3. The Strategy will also complement, incorporate and influence the adaptation work undertaken by organisations that operate at a similar scale, e.g. Clydeplan, through the forthcoming Regional Spatial Strategy, SPT through the Regional Transport Plan, the Glasgow and Clyde Valley Green Network Partnership's Strategic Green Network and the Clyde Marine Planning Partnership's Regional Marine Plan. It will also play a role in influencing shorter term / interim plans arising from COVID-19 – e.g. the Transport Transition Plan or Glasgow City Region's economic recovery plans.
- 2.6.4. Given that climate change will have impacts across all sectors of the City Region's economy, society and environment, the Strategy is also intended to influence wider policies, plans and actions to ensure they adequately account for the need for resilience to future climate change. For example, this could include infrastructure investment plans from Infrastructure Operators or local community plans with a specific focus on climate change and adaptation.
- 2.6.5. The Strategy is designed to set the direction for all public, private and voluntary organisations working in the City Region. As a voluntary strategy, it will likely not directly apply to any organisations. However, in the first instance, it will likely be more highly regarded by institutions covered by the Public Sector Reporting Duties under the Climate Change (Scotland) Act 2009, financial institutions (e.g. banks, building societies and insurers) and large asset owners in the private sector expected to report the physical risks of climate change under the proposed commitments in the UK Government's Green Finance Strategy.

2.7 POLICY ASSESSMENT

- 2.7.1. An assessment was undertaken on those PPS that fall directly above / below the Strategy in the hierarchy of PPS during the SEA Scoping stage. This assessment has been updated following consultation on the SEA Scoping Report and the updated assessment is set out in **Appendix B**.

- 2.7.2. The assessment of PPS highlighted that at present, there are no overarching strategies for the City Region that provide an approach that improves the security for all and creates a fairer, more inclusive and climate-resilient place. Therefore, the Strategy is important in promoting the delivery of climate adaptation across all sectors within the City Region.
- 2.7.3. The assessment identified the need to align the Strategy to key legislation such as The Paris Agreement (2015), the National Planning Framework for Scotland (2014), SCCAP2 (2019-2024), the Climate Change Act, as well as considering programmes such as the UN Sustainable Development Goals and the UK's 25 Year Environment Plan (2018).
- 2.7.4. The PPS assessment identified a number of local and regional PPS such as the Clyde Plan Strategic Development Plan, Glasgow and Clyde Valley Green Network Strategy as well as local authority Local Development Plans. The strategy has been developed to take these plans into account, and has been designed to align with, and compliment them, without compromising their development.

3 SEA METHODOLOGY

3.1 THE SEA PROCESS TO DATE

- 3.1.1. The SEA was carried out in parallel with the development of the Strategy, which considered the potential environmental, social and economic impacts of the Strategy's objectives and interventions. The key stages of the SEA Process are set out in **Table 3-1** below and described in further details below.

Table 3-1 - The SEA Process to Date

SEA Stage	Strategy
Screening: Sniffer (as the 'Responsible Authority') sought the views of the Consultation Authorities on whether the Strategy was likely to have significant environmental effects and therefore whether a SEA is required. The SEA Screening was submitted in March 2020 and Screening Determination was received in April 2020.	
Scoping: This stage set out the context of the SEA, established the baseline, determined the scope of the SEA environmental report. This was undertaken in September 2020 and underwent a 5-week statutory consultation.	At this stage the scope of the Strategy, including aims and objectives were determined. Specific the problems and challenges in the City Region were identified along with ideas on how to solve them.
Environmental Assessment and Reporting: Each of the Strategy interventions, objectives and alternatives were assessed against the SEA Framework. Mitigation and enhancement measures were also identified. The ER report was produced alongside the assessment and outlined the findings from the environmental assessment. This stage was undertaken in October 2020.	At this stage, the Strategy objectives, interventions and alternatives were developed and refined. A publication draft of the strategy was prepared ready for consultation.
Main Consultation: The main consultation on the Environmental Report and the draft plan was undertaken in November – December 2020. This took place at a sufficient stage within a plan's preparation, to ensure and views received during the consultation process were taken into account. Following consultation, both the Strategy and the ER were updated in line with comments received. This report is the updated ER following consultation.	
Post Adoption Statement: This statement will be published alongside this final ER report. It outlines how the assessment and consultation responses have been considered, within the finalised plan.	Adoption: The plan will be adopted in June 2021.

SEA SCREENING

- 3.1.2. In April 2020 Sniffer conducted an initial SEA Screening exercise to determine the requirement for SEA to be undertaken. The SEA Screening concluded that the Strategy had the potential to achieve significant positive environmental effects, considering the cumulative potential across all areas of the Strategy. Proactively adapting to climate change through new actions, as well as by influencing

other national, regional and local plans and strategies, allocation of resources, and activities, is likely to reduce or reverse significant deterioration of, and impact on the environment as well as the region's economy and society.

- 3.1.3. The Strategy is a critical part of achieving sustainable development. At present climate risks present the possibility of compromising the ability of future generations to meet their own needs. It is not a case of 'if' climate impacts will happen, but when, and increasingly climate impacts are already being felt in the City Region. As such, Sniffer proposed to undertake a SEA of the strategy.
- 3.1.4. Through the screening consultation the SEA CAs were also of the view that a SEA was required and that a SEA Scoping Report would be required for further consultation in order to set the scope and level of detail required for the environmental assessments required to inform the ER.

SEA SCOPING

- 3.1.5. A SEA Scoping Report was prepared in September 2020 which provided information on the Strategy and set out the proposed methodology for undertaking the SEA. Consultation on the Scoping Report took place between 4th September and 8th October and allowed the CAs to provide comment on their views regarding the proposed assessment process. **Appendix A** sets out the comments received from the CAs on the Scoping Report along with a commentary on how they have been accounted for in the preparation of this ER.
- 3.1.6. The environmental issues set out in Schedule 3 of the SEA Act were scoped against the potential for the Strategy to result in significant effects (refer to Table 3-1 below). Those environmental issues 'scoped in' to the assessment were considered the most appropriate for assessing the Strategy and provided the basis for the development of the SEA Objectives.
- 3.1.7. The SEA Scoping concluded that the Strategy was considered to have the potential for likely significant effects on all the SEA topics listed in Schedule 3 of the SEA Act. The environmental topic areas scoped in the SEA and the justification for doing so are presented in **Table 3-2**.

Table 3-2 – Scoping of SEA Topics

SEA Topic	Scoped In / Out	Justification
Natural Capital	In	There is potential for both positive and negative effects on natural capital in the City Region as a result of the Strategy.
Climatic Factors	In	The Strategy is expected to have a positive effect on reducing the causes of climate change.
Population and Human Health	In	There is potential for both positive and negative effects on population and human health in the City Region as a result of the Strategy.
Biodiversity	In	There is potential for both positive and negative effects on biodiversity in the City Region as a result of the Strategy.
Landscape	In	There is potential for both positive and negative effects on the landscape across the City Region as a result of the Strategy.
Cultural Heritage	In	There is potential for both positive and negative effects on cultural heritage in the City Region as a result of the Strategy.

SEA Topic	Scoped In / Out	Justification
Water Environment	In	The Strategy is likely to have positive effects on the City Region's water environment.
Air Quality	In	The Strategy is likely to have positive effects on the City Region's air quality.
Material Assets (incl. Soil Resources)	In	The Strategy is likely to have positive effects on the City Region's material assets.

3.2 SEA ENVIRONMENTAL REPORT

3.2.1. The assessments presented in this SEA ER cover:

- The assessment of Strategy alternatives.
- A compatibility assessment of the Strategy.
- The assessment of Strategy interventions.

3.2.2. All three assessments have been undertaken using a matrix-based approach. The assessment of alternatives to the Strategy and the assessment of the Strategy interventions have been undertaken against the SEA Objectives (refer to **Section 5.2** for further details of the development of the SEA Objectives) and have been guided by the appraisal questions as set out in **Section 5**. This approach has been supplemented by a narrative on the likely significant effects.

COMPATIBILITY ASSESSMENT

3.2.3. The compatibility assessment of the Strategy (**Section 7**) has been undertaken using a matrix-based approach in order to assess the compatibility of the Strategy's Vision and Objectives. This assessment has been undertaken using the SEA Objectives and associated appraisal questions. The scoring has used the framework set out in **Table 3-3** below.

Table 3-3 – Compatibility Assessment Scoring Framework

Scoring Framework	Key
Vision / Objective supportive of SEA Objective	✓
Conflict between Strategy and SEA Objectives	X
No identified conflict / support	0
Uncertain	?

ASSESSMENT OF THE STRATEGY INTERVENTIONS AND ALTERNATIVES

3.2.4. The assessment of the interventions and alternatives has considered the following:

- Overall effect significance (negative, positive, uncertain, mixed or negligible);
- Nature of effect (direct, indirect);
- Spatial Extent (local, regional, national, international);
- Reversibility of effect:
 - Reversible: The receptor can return to baseline condition without significant intervention;

- Irreversible: The receptor would require significant intervention to return to baseline condition.
- Duration (short, medium or long term) – Short term: 0-5 years, Medium term: 5-10 years (up to the end of the plan period) Long term: 10+ years (beyond the plan period);
- Potential for cumulative and synergistic effects⁴.

3.2.5. **Table 3-4** below shows the key to assessments.

Table 3-4 – Key to the assessment of significance

Effect Significance	Key
Potential for significant positive effects	++
Potential for minor positive effects	+
Potential for minor negative effects	-
Potential for significant negative effects	--
Uncertain effects – Uncertain or insufficient information on which to determine the appraisal at this stage	?
Negligible / No effect	0
Nature of effect (direct / indirect).	D / I
Spatial Extent (local / regional / national / international)	L / R / N / I
Reversibility of effect (reversible / irreversible)	R / I
Duration (short / medium / long term).	ST / MT / LT
Cumulative Effects (positive / negative / synergistic/ Not applicable)	✓+ / ✓- / S / n/a

3.2.6. It should be noted that where uncertain and negligible effects have been identified, it has not been possible to determine the nature of effect, the spatial extent, the reversibility or the duration of effect. In this instance, these cells have been left blank.

3.2.7. The assessment of alternatives has followed the same approach as the assessment of interventions; however, it has just included the overall effect significance (negative, positive,

⁴ Synergistic effects occur when two or more effects identified within an assessment, are capable of working together to create a new effect, or a magnitude of effect which does not arise from the individual effects

uncertain, mixed or negligible). Due to the broad nature of the alternatives, the nature, spatial extent, reversibility, duration and the potential for cumulative effects have not been considered.

3.3 LIMITATIONS AND ASSUMPTIONS

- 3.3.1. Ignoring uncertainty could undermine an assessment's findings and communicate an inaccurate message to stakeholders, it is therefore important that any limitations / assumptions are clearly set out within the SEA ER. The following sets out those limitations / assumptions that are attributed to the SEA of the Strategy:
- Given the nature of the Strategy, i.e. Climate Change Adaptation, a degree of uncertainty about the assessment findings is considered likely. It is important to recognise that climate change impacts and the associated effects of the Strategy could vary significantly from those presented within the SEA ER. **Section 4.3** sets out the likely evolution of the environment within which the Strategy is based, taking account of climate change scenarios for the west of Scotland;
 - The SEA covers the whole of the City Region (the study area) and although the assessment of interventions covers many long-term developments it is considered that sufficient information and detail is available to capture significant effects at a strategic level;
 - The preparation of the Strategy alongside the SEA has allowed an iterative process of assessment and refinement in the narrative and policies within the Strategy (see **Section 2.4** above). Therefore, some of the recommendations set out in this report may already have been addressed in the Strategy;
 - The Strategy does not propose specific development sites with defined boundaries. As such, the main focus of the assessment is the strategic interventions;
 - The assessment has identified a number of uncertainties due to the strategic nature of the Strategy, however, an Action Plan will be developed to support delivery of the Strategy which will contain further detail around future projects and developments which will allow more detailed assessment of impacts.
- 3.3.2. The interventions set out in the Strategy are likely to be delivered by individual organisations / authorities, including CRC Partners. Although they form part of the Strategy, Sniffer is not the authority responsible for their development and delivery. The policy framework for the delivery of these interventions will ultimately be guided by local, regional and national planning policy; and During the preparation of the SEA, the City Region has been affected by the worldwide COVID-19 pandemic. This has led to unprecedented changes in people's behaviours and attitudes towards climate change including the way in which infrastructure has been used, over a very short period of time. There is uncertainty as to how these changes will continue to develop and what trends and needs may emerge in the short, medium and long term, particularly over the period covered by the Strategy.

4 ENVIRONMENTAL BASELINE AND KEY ENVIRONMENTAL ISSUES

4.1 INTRODUCTION

- 4.1.1. The SEA Act requires that the ER includes a description of the relevant aspects of the current state of the environment and its likely evolution without implementation of the Strategy. It also requires consideration of the environmental characteristics of areas likely to be significantly affected. The SEA Scoping Report set out information on the baseline environment, key issues / opportunities and its likely evolution for consultation with the CAs. This section provides an update to the information presented in the SEA Scoping Report following consultation and describes the environmental context within which the Strategy sits.
- 4.1.2. The environmental baseline for the City Region is set out in **Appendix C** and provides the basis for the assessment of the potential effects associated with implementing the Strategy. The likely future state of the environment without implementing the Strategy has been estimated and is set out in **Section 4.3**.

4.2 BASELINE DATA COLLATION

- 4.2.1. The SEA Act requires that the ER includes a description of the relevant aspects of the current state of the environment and its likely evolution without the Strategy. The SEA Act also requires a description of existing environmental problems, in particular those relating to any areas of environmental sensitivity.
- 4.2.2. **Appendix C** sets out the relevant characteristics of the environment to which the Strategy relates, with the key environmental issues / opportunities and the evolution of environment without the Strategy set out below, for each of the SEA topics. The information presented has been used to develop the SEA Objectives (refer to **Section 5.2**) and the appraisal frameworks set out in Sections 6 and 7 and **Appendix D**.
- 4.2.3. The Study Area referred to is shown in **Figure 1.1**. Where possible this report assesses the whole Study Area on a regional scale and does not compare sub-regions however in some instances data may be presented per local authority area.

KEY ISSUES / OPPORTUNITIES RELATING TO THE STRATEGY

- 4.2.4. A summary of the key risks and opportunities affecting the City Region are set out in **Table 5-1** with an indication of the implications for the Strategy. The information presented in **Table 4-1** has been developed from the identification of trends from the environmental baseline and through consultation with the CAs through the SEA Scoping Process.

Table 4-1 – Summary of Key Risk and Opportunities

SEA Topic	Key Risks / Opportunities	Implications for the Strategy
Natural Capital	<ul style="list-style-type: none"> Monitoring and measuring natural capital is important to ensure that the benefits of nature for society are recognised and protected. Climate change poses a risk to natural capital and its ability to provide ecosystem services. The region's ecosystems may be at threat of fragmentation from future development in response to population growth. 	<ul style="list-style-type: none"> The Strategy should promote actions to maintain and increase the region's natural capital assets and the ecosystem services they provide.
Climate Factors	<ul style="list-style-type: none"> The extent of future climate change will be strongly affected by the amount of greenhouse gases emitted. Interdependent and cascading risks will be exacerbated by climate change. Opportunities exist for retrofitting of energy efficiency measures in the new and existing building stock. Potential for synergies and trade-offs between adaptation and mitigation options associated with the zero-carbon transition. 	<ul style="list-style-type: none"> The Strategy will need to plan for and implement / facilitate climate change adaptation, in respect of rising temperatures and extreme weather events, particularly heavy rainfall / flooding and heat, to maximise resilience. The Strategy should have a strong focus on managing climate risks associated with the net zero transition and should take account of synergies and trade-offs in overall development of approaches.
Population and Health	<ul style="list-style-type: none"> Over the next 30 years the population is anticipated to rise by 2.3%, with the greatest increase expected to be in the over 65s. With an increasing, ageing population across the City Region, there is likely to be additional strain on the region's services and infrastructure. People could be vulnerable to an increase in the frequency and severity of severe weather. Increased risk to human health from disease and the invasion of new pests and pathogens. The worsening impacts of existing air pollution as a result of climate change are posing a risk to vulnerable groups like the elderly, children and those with chronic respiratory conditions or pre-existing medical conditions. Climate impacts may be greater for some socio-economic groups as they may be less able to respond to and adapt to climate change leading to a further widening of the inequality gap across the City Region. 	<ul style="list-style-type: none"> The Strategy should aim to reduce the impacts of climate change on the health, safety and wellbeing of the City Region's population. The Strategy should take into account the needs of all parts of society and increase understanding of the potential implications that climate change poses to human health and help to build resilience. Adaptation responses to climate change present opportunities to bring significant benefits to those populations at risk, as they are likely to be targeted in areas of the greatest level of risks and benefits.

SEA Topic	Key Risks / Opportunities	Implications for the Strategy
		<ul style="list-style-type: none"> The Strategy should aim to lessen any widening of inequality impacts due to the effects of climate change on more deprived areas.
Biodiversity	<ul style="list-style-type: none"> There are a wide range of statutory local, national and international sites designated for nature conservation in the City Region, which could be affected by increased levels of development, in order to support population growth. Biodiversity is also under threat from climate change, with changing temperatures and extreme weather events such as flooding, drought and wildfires resulting in the loss, degradation and movement of species and habitats. Protecting existing and creating new woodland can help to increase resilience to climate change as well as creating and protecting ecological networks. However, increased frequency and severity of summer drought and wildfires as a result of climate change, could be a particular threat to woodlands. Spread of non-native species across the City Region without appropriate controls. Increased risk to species and habitats from new diseases and pathogens. Natural flood management, such as re-naturalising the course of rivers, nature friendly SuDS and the restoration of their adjacent habitats will help to slow down and hold water during heavy rain events. There is an opportunity to manage coastal realignment in order to allow coastal habitats and the benefits they bring, to migrate landward instead of being lost to sea-level rise. Agroforestry shelter belts will benefit biodiversity (particularly if connecting to woodlands) in addition to providing abatement to air pollution by absorbing pollutants in the air, and thus benefit both air quality and biodiversity. 	<ul style="list-style-type: none"> The Strategy should mitigate the effects of climate change and the potential impacts it could have on biodiversity, natural capital assets and the ecosystem services they provide. The Strategy should promote actions to avoid fragmentation and impacts to wildlife and habitats. Both native and ancient woodland should be managed to conserve important biodiversity and heritage features. The Strategy should help promote the restoration of ancient, native and semi-natural woodland, in line with the Clydeplan Forestry and Woodland Strategy⁵. The Strategy should promote nature-based solutions, that go beyond woodland planting or natural woodland re-generation. The Strategy should promote natural flood management approaches to protect and enhance biodiversity.
Landscape	<ul style="list-style-type: none"> Future population growth across the City Region could risk compromising landscape character and key features with development potentially resulting in reduced greenspace 	<ul style="list-style-type: none"> The Strategy should promote resilient landscapes, protect designated landscape areas

⁵ Clyde Plan Strategic Development Plan Background Report – Forestry and Woodland Strategy, 2015 [online] available at: <https://www.clydeplan-sdpa.gov.uk/docman/current-plan-july-2017-background-reports/70-background-report-12-forestry-and-woodland-strategy/file>

SEA Topic	Key Risks / Opportunities	Implications for the Strategy
	<p>(including areas with potential for use as natural flood management). However, landscape-led designs with green infrastructure principles in place, could play a key role in the enhancement of the natural environment, visual amenity and physical and mental health of its people.</p> <ul style="list-style-type: none"> ■ Creating further access to the green / blue space can greatly improve health and wellbeing, help combat air pollution, provide storm water management, reduce flooding and provide connectivity for wildlife. ■ The land within the City Region is likely to continue to change in the future. The scale of climate change and the adaptation measures taken could be influential in this change. 	<p>and landscape character and help increase access to green and blue spaces.</p>
Cultural Heritage	<ul style="list-style-type: none"> ■ Future growth across the City Region has the potential to affect the survival, fabric, condition and Setting of cultural heritage assets (both above and below ground). ■ An increase in rainfall, extreme weather events and flooding may result in irreplaceable damage, degradation and / or erosion of heritage and archaeological sites. ■ Both noise and air pollution can adversely affect designated and non-designated heritage assets and their Setting. ■ Climate adaptation measures themselves can be inappropriate for historic/traditional buildings and structures and should therefore be considered in relation to the cultural heritage assets within the area in which the measures are being considered. 	<ul style="list-style-type: none"> ■ The Strategy should promote the management and maintenance of historic and cultural assets and improve the climate resilience of cultural sites, ensuring the maintenance of distinctive characteristics. ■ The Strategy should aim to enhance the understanding and appreciation of the significance of heritage assets.
Water Environment	<ul style="list-style-type: none"> ■ The physical and chemical quality of water resources is an important aspect of the natural environment and can be adversely affected by pollution generated by climate-induced increases in rainfall intensity and catchment erosion. ■ There is a need to plan for and implement / facilitate climate change adaptation, in respect of water scarcity and extreme weather events, particularly heavy rainfall / flooding. ■ Increased development can increase flood risk on a local and regional scale. ■ Climate change is likely to increase the occurrence of flooding from all sources and hence raise the flood risk. This has potential to have subsequent effects on overall water quality. ■ More intense summer rainfall events pose a significant risk of damaging infrastructure, particularly transport networks, and generating severe disruption. 	<ul style="list-style-type: none"> ■ The Strategy should aim to protect and improve the water environment particularly in relation to flood risk, erosion, surface water management and water quality.
Air Quality	<ul style="list-style-type: none"> ■ More severe and frequent heat episodes as a result of climate change can contribute to the worsening of air quality. 	<ul style="list-style-type: none"> ■ The Strategy should work towards reducing the impacts of poor air quality on the population's

SEA Topic	Key Risks / Opportunities	Implications for the Strategy
	<ul style="list-style-type: none"> Nitrogen pollution can cause the release of the potent greenhouse gas nitrous oxide to the atmosphere, contributing further to climate change. The number of vehicles on the roads is likely to increase as the population rises, putting air quality at further risk of degradation. The Scottish Government's plan to phase out the sale of all new conventional petrol and diesel cars and vans by 2032 and support for work and home-based electric charging facilities, could promote use of hybrid and electric vehicles, with positive effects for air quality. Future electricity, heat, transport and industrial policies could work together improve air quality and tackle climate change. 	<p>health in order to reduce the additional risk posed by climate change.</p> <ul style="list-style-type: none"> The Strategy should support national and local policies and targets that aim to reduce emissions and improve air quality making sure the City Region is more prepared for the impacts on air quality from climate change. The Strategy should recognise the impact of climate change on air quality and support the delivery of air quality management measures.
Material Assets (Incl. Soil Resources)	<ul style="list-style-type: none"> The City Region's transport infrastructure is under threat from climate change, particularly with regards to flooding. The growing population and associated need for development are also likely to increase use of mineral resources and waste generation. The City Region's soil resources are likely to be negatively impacted by climate change, which could lead to reduced levels of productivity. There's a continued increase in renewable energy supply across the City Region There is a need to reduce the environmental impact of prosperity and the provision of infrastructure and housing to accommodate it, and the need to address the vulnerability of the region to ensure resilience. Restoration of peatlands will help to support carbon sequestration and resilience to climate change. 	<ul style="list-style-type: none"> The Strategy should promote actions to protect natural resources, buildings and infrastructure from the impacts of climate change

SUMMARY OF THE ENVIRONMENTAL ISSUES RELATING TO THE STRATEGY

- 4.2.5. Schedule 3 (4) of the SEA Act requires the ER to include a description of existing environmental problems, in particular those relating to any areas of particular environmental importance. The existing environmental issues (outlined in **Table 4-1** above) need to be considered in relation to the Strategy and whether they will potentially exacerbate, reduce or otherwise affect existing issues.
- 4.2.6. Climatic risks stem from a range of hazards such as extreme rainfall, temperature rises, and sea level rise and erosion, which threaten a broad range of sectors, including the built environment, infrastructure, society and human health, the natural environment, the economy, business and industry.
- 4.2.7. Further development to address the needs of the City Region's growing population, in combination with a changing climate, has the potential to further fragment and deteriorate the region's habitats, landscapes and ecosystems, impacting on natural capital and its ability to provide ecosystem services. More extreme weather events will continue to increase in severity and frequency, affecting the natural resilience of these habitats and their ability to provide benefits in the future.
- 4.2.8. There are large disparities in health deprivation across the City Region, with high levels in Glasgow and Inverclyde. Climate change risks are often unevenly distributed across the City Region and are likely to disproportionately affect the most socio-economically deprived. With an increasing ageing population across the City Region, there is likely to be additional strain on the region's services and infrastructure.
- 4.2.9. There are 1.8 million people living and working in the City Region and a large number of businesses and organisations are based there, with the City Region having £40bn of Gross Value Added (GVA) – a third of Scotland's population and wealth⁶. The population are increasingly being impacted by the effects of climate change, both directly in the City Region, and from changes happening around the world.
- 4.2.10. Both future population growth and climate change across the City Region could risk compromising landscape and historic character and key features, with development potentially resulting in reduced greenspace and the loss of cultural heritage assets (both above and below ground).
- 4.2.11. The Strategy sees adaptation as a strategic issue for the City Region in terms of securing inward investment and protecting the economy, as well as contributing to good placemaking, addressing inequality and minimising and avoiding costs arising from unplanned climatic impacts.

4.3 LIKELY EVOLUTION OF THE ENVIRONMENT WITHOUT THE STRATEGY

- 4.3.1. The future climate hinges on humans reducing greenhouse gas emissions to the levels required by the Paris Agreement regardless of whether the Strategy is implemented across the City Region. However, the world is not currently on track to do this.

⁶ Climate Ready Clyde, Glasgow City Region Climate Adaptation Strategy 2020-2030

- 4.3.2. Current policy projections put the world on a course of 3.1-3.7°C of warming by 2100⁷. The Paris Agreement aims to hold the increase in global average temperatures ‘well below’ 2°C above pre-industrial levels, whilst also pursuing efforts to limit the temperature increase to 1.5°C. Even under the Paris Agreement, the combination of current policies, and future pledges are due to reach between 2.6- 3.2°C of warming.
- 4.3.3. In the years ahead, the ratchet mechanism of the Paris Agreement will increase ambition and will increase every five years, with the next due in 2020, but success is not guaranteed. However, this global agreement still commits the City Region to experience a further 0.5°C of warming, which will increase, even if Scotland reaches net zero emissions by 2045.
- 4.3.4. Towards a Climate Ready Clyde: Climate Risks and Opportunities for Glasgow City Region (2019) uses a high emissions scenario as a starting point for planning for climate risks and opportunities and this has informed the information presented below on the evolution of the baseline. This assumes that the Strategy is not implemented but that local and central government continue to work towards achieving the commitments set out in the Paris Agreement.
- 4.3.5. The long-term planning horizon presents uncertainty. The impact of factors such as “Brexit”, Covid-19, disruptive digital technologies, changing working patterns and preferences and extreme climactic events will play a part in determining the types of investments that will most benefit the City Region.
- 4.3.6. A summary of the likely evolution of the environment in the City Region is set out in **Table 4-2** focusing on those topics scoped into the SEA. The information presented in **Table 4-2** has been developed from the identification of trends from the environmental baseline and through consultation with the CAs through the SEA Scoping Process.

⁷ Climate Action Tracker, 2100 Warming Projections, [online] available at: <https://climateactiontracker.org/global/temperatures/>

Table 4-2 – Likely Evolution of the Baseline without the Strategy

SEA Topic	Likely Evolution of the Baseline without the Strategy
Natural Capital	<p>Although natural capital stocks have stabilised and marginally improved over the past six years, improving the stock of natural capital is important for increasing the overall resilience of natural systems in the City Region to the impacts of climate change and future development.</p> <p>Further development to address the needs of the City Region's growing population, in combination with a changing climate has the potential to further fragment and deteriorate the region's ecosystems, impacting on natural capital and its ability to provide ecosystem services. More extreme weather events will continue to increase in impact and frequency, affecting the natural resilience of these habitats and their ability to provide benefits in the future.</p> <p>Greenspace provides a range of ecosystem services which improve the quality of life within the City Region. The Glasgow City Region Green Network project will provide a well-connected, high quality greenspace through the region over the next 35 years. The project will provide 30km² of urban green infrastructure, 500km² of new woodland and wildlife habitats, 100km of new active travel routes, 4000 new community growing spaces and the greening of 3500 hectares (ha) of vacant and derelict land.</p> <p>Even without the Strategy, this project is likely to result in a substantial increase in the City Region's natural capital stock, however, the Strategy presents opportunities for a joined-up approach, where both new and old natural capital assets can be protected from climate change and provide climate resilience.</p>
Climate Factors	<p>The UKCP18 headline findings project hotter drier summers, warmer wetter winters, increases in the frequency and intensity of extreme events, and an increase in sea level rise by the end of the 21st century across all areas of the UK. Precipitation is of particular concern for Scotland, and although rainfall patterns across the UK will continue to vary on seasonal and regional scales, significant increases in hourly precipitation extremes²⁴ are expected. This will result in an increase in risk to the built environment, infrastructure assets and systems, and services in the region. The scale of this increase in risk will be dependent on the level of adaptation actions included in the Strategy, and the extent to which they lead to an overall increase in resilience.</p> <p>Emissions of greenhouse gases (GHGs) are having a detrimental impact upon the global atmosphere, and it is widely acknowledged that GHGs are already contributing to changes in the global climate, with extreme weather conditions becoming increasingly common. Equally, even if GHG emissions were stopped today, climate impacts would still be experienced in the future owing to lags in the climate system.</p> <p>Many of the City Region's infrastructure assets and services are located along the coast and riverbanks. Climate change is expected to cause sea level rise and increase the frequency and severity of storms and severe weather. Without the Strategy, these assets and services are at an increasing risk of damage from coastal flooding, erosion and extremes of heat. The Third UK</p>

SEA Topic	Likely Evolution of the Baseline without the Strategy
	<p>Climate Change Risk Assessment⁸ for the Clyde and Loch Lomond Region presents data based on current levels of climate adaptation. The data shows various assets and services at risk in a scenario of four degrees of warming by 2080.</p> <p>The scale of these future impacts will depend on the future global emissions pathways and the extent to which the low-carbon transition is successful. Failing to consider climate risks to the low carbon transition presents the potential for it to become more risky and costly. Scotland is committed to legally binding greenhouse gas emissions reduction targets of 56% by 2020 and net zero emissions by 2045 compared to 1990 levels⁹.</p> <p>These ambitious targets, associated with the transition to a net zero, climate resilient economy also have the potential to introduce a new set of policy, technology, market and reputational risks. For example, changes to energy efficiency regulations to help meet targets may require costly upgrades if not addressed in a timely manner.</p>
Population and Health	<p>Climate change impacts will not be spread equally across the City Region with changes potentially exacerbating existing inequalities / levels of deprivation without the implementation of interventions to reduce the impacts of climate change.</p> <p>By 2043 the population within the City Region is predicted to increase by 2.3%, with the largest growth predicted to be in the over 65s. A population with a larger proportion of older people would likely result in an increase in the number of people in the region with physical and sensory impairments which could result in a greater demand for access to health and social care services.</p> <p>In many areas of the City Region including along the River Clyde corridor as well as some rural towns and villages the most socially vulnerable are, on average, exposed to greater flood risk. In the future the most socially vulnerable, particularly in urban cities and towns are projected to experience disproportional increases in risk with the expected annual damages per person increasing by a factor of 2.5 on average but by 2.8 in the most socially vulnerable neighbourhoods¹⁰.</p> <p>Milder winters due to climate change are likely to reduce the risk of cold-related deaths but this has potential to be offset to an extent by hot days or heatwaves. Extreme increase in temperature associated with climate change has the potential to result in heat-health related issues, especially for more vulnerable groups, e.g., the elderly or young people, with extreme heat also</p>

⁸ Third UK Climate Change Risk Assessment (CCRA3) Future Flood Risk Main Report, 2020 [online] available at: <https://www.ukclimaterisk.org/wp-content/uploads/2020/07/Future-Flooding-Main-Report-Sayers-1.pdf>

⁹ Climate Change (Emissions Reduction Targets) (Scotland) Act 2019

¹⁰ Third UK Climate Change Risk Assessment (CCRA3) Future flood risk Main Report Final Report prepared for the Committee on Climate Change, UK July 2020

SEA Topic	Likely Evolution of the Baseline without the Strategy
	<p>potentially impacting infrastructure, and the built and natural environment. Climate change can also increase the risk of transmission of diseases from invasion of new pests and pathogens. However, warmer summers may result in greater use of parks and greenspace and improved physical and mental health and wellbeing.</p> <p>It is clear that climate change could present risks to public health and without the Strategy climate change may have a greater effect on the physical and mental health and wellbeing of the people of the City Region in the future.</p>
Biodiversity	<p>Studies such as the ‘State of Nature 2016’ report and State of Nature Report Scotland¹¹ have shown that national biodiversity has been declining despite the prevalence of conservation efforts, and approximately 13% of all species across the UK are under threat of extinction. The declining trend in the provision of many ecosystem services reported in the UK National Ecosystem Assessment is expected to continue – in part due to the continuing deterioration, loss and fragmentation of habitats¹².</p> <p>Many species and habitats both nationally and in the City Region are already under considerable pressure from urban development, transport and agriculture. Many habitats have already fragmented, and their nature has been altered. Connected habitats, and larger habitats, increase the potential for species and the habitats and resources they depend on to migrate and adapt together. Such circumstances could also facilitate the spread of invasive species and pests¹³.</p> <p>Biodiversity is also under threat from climate change, with changing temperatures and extreme weather events resulting in the loss, degradation and movement of species and habitats. Increased frequency and severity of summer drought and in particular wildfires could be a particular threat to woodlands, with sensitive tree species on shallow freely draining soils¹³.</p> <p>Sea level rise could see significant alterations and erosion to coastal habitats and landforms such as beaches, saltmarshes and mudflats. This is likely to be further exacerbated by ‘coastal squeeze’ from coastal developments, which could impede the potential for coastal habitats to shift further up the shore. Rising water temperatures in rivers, lochs and the sea could also affect the suitability of the habitat for certain species. Those colder adapted species may seek to move further north, however some may be limited in their ability to migrate.</p> <p>Without the Adaptation Strategy, the current negative effects on biodiversity are likely to continue, and without further intervention some of the region’s most important biodiversity and ecosystem services may be lost.</p>

¹¹ State of Nature Partnership (2019). State of Nature Report Scotland.

¹² UK National Ecosystem Assessment (2011) The UK National Ecosystem Assessment Technical Report. UNEP-WCMC

¹³ The Woodland Trust. 2011. The State of the UK’s Forests, Woods and Trees [online] available at: <https://www.woodlandtrust.org.uk/publications/2011/11/state-of-uk-forests/>

SEA Topic	Likely Evolution of the Baseline without the Strategy
Landscape	<p>Landscape character and quality is under particular threat from future development through, for example, loss of tranquillity, increased lighting (particularly into dark night skies), visual intrusion, and the incremental loss of landscape features and characteristic elements.</p> <p>Climate change has the potential to have negative impacts on the City Region's landscape character. Rock exposures and landforms, as well as the dynamics of the landform processes that shape the City Region's marine and terrestrial landscapes have potential to change the region's landscape, through sea level rise, coastal and fluvial erosion, flooding and drought.</p> <p>Without the Strategy, the impacts of climate change may not be as well managed across the City Region, placing the landscape at greater risk from flooding, erosion and sea level rise. This could lead to the degradation of the region's landscape character and loss of valuable green infrastructure.</p>
Cultural Heritage	<p>Protection of the historic environment is firmly embedded in national and local planning policy. .</p> <p>However, whilst direct (physical) impacts on designated historical sites are strongly restricted, adverse effects on the Setting of designated heritage assets does still occur, for example relating to visual intrusion, or aspects such as traffic, lighting and noise. This can be a sensitive planning issue.</p> <p>Climate change poses a significant threat to the historic environment, including undiscovered and undesignated heritage assets. Increased warmth may encourage a rise in the number of invasive plant and animal species, which could change the character of historic and designed landscapes by reducing numbers of or killing off native flora and fauna. Hotter, drier conditions may also increase the risk of fire as well as soil shrinkage, which can lead to building subsidence, structural deformation and building collapse.</p> <p>More extreme rainfall events and increased levels of flooding have the potential to increase flood risk to historic buildings. Water saturation can damage historic buildings and designed landscapes, particularly if standing water conditions persist.</p> <p>HES has devised a Climate Action Plan¹⁴ which aims to protect Scotland's historic places and landmarks, as well as the landscapes and infrastructure that support them, from the effects of climate change. Furthermore, recent work by on a Climate</p>

¹⁴ Historic Environment Scotland, Climate Action Plan 2020-2025, [online] available at: <https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=94dd22c9-5d32-4e91-9a46-ab6600b6c1dd>

SEA Topic	Likely Evolution of the Baseline without the Strategy
	<p>Vulnerability Index (CVI) assessment at the Heart of Neolithic Orkney World Heritage Site (WHS) is recommended to be applied to other heritage sites across Scotland to assesses the threat that climate change poses to all types of heritage sites. In the absence of the Strategy, it is likely that this would provide some protection to the City Region's cultural heritage, however, the Strategy is likely to provide a more localised focus.</p>
Water Environment	<p>At present, periods of dry weather and periods of flooding already lead to increased risks to the water environment, however, climate change is likely to further exacerbate this issue. Warmer air and sea temperatures as well as extreme weather associated with climate change may increase the intensity and severity of storms, which can lead to increased flooding and erosion and worsening of water quality, which can adversely affect transport infrastructure, people, property and access to greenspaces.</p> <p>Future development in response to population growth across the City Region could have an adverse effect on land use leading to a reduction in land available for natural flood management and the introduction of more hard standing sealed surfaces, which could exacerbate the frequency and severity of flood events.</p> <p>Rising sea-levels could see a further loss of land to the sea as well as decreasing functionality of existing drainage systems. With sea level rise, the differential levels between on land sewage drainage systems and the sea level are likely to be reduced, which could result in impacts on the drainage system.</p> <p>The water cycle is likely to be altered by climate change, which may increasingly affect demands on water resources and could increase the risk of water scarcity. Maintaining water supplies may pose a significant challenge across the City Region, which may be exacerbated by population growth. Under current population and water supply projections Scotland maintains a surplus supply-demand balance until the end of the century. However, without additional demand-side adaptation action there may be potential for deficits in supply¹⁵.</p>

¹⁵ HR Wallingford, Updated projections of future water availability for the third UK Climate Change Risk Assessment, Technical Report, [online] available at: https://www.ukclimaterisk.org/wp-content/uploads/2020/07/Updated-projections-of-future-water-availability_HRW.pdf

SEA Topic	Likely Evolution of the Baseline without the Strategy
Air Quality	<p>The number of vehicles on the roads is likely to increase as the population rises, putting air quality at further risk of degradation. More severe and frequent heat episodes (associated with the changing climate) can also worsen air quality, and therefore asthma, respiratory diseases and allergic reactions, without further intervention.</p> <p>The creation of Low Emission Zones in Scotland aims to improve air quality and would help to address sources of, and exposure to air pollution in the future.</p> <p>Improved engines and emission standards have helped bring about the reductions in NO_x emissions seen in recent decades. The use of catalytic convertors aided the decline in emissions of non-methane volatile organic compounds (NMVOCs) and the reduction of sulphur in fuels has contributed to a decline in SO₂ emissions from the transport sector. However, despite tighter emissions standards a rise in diesel vehicle numbers together with overall increases in volumes of traffic has held back further improvements¹⁶.</p>
Material Assets (Incl. Soil Resources)	<p>At present, 391km of the City Region's road network is at risk of surface water flooding, including the M73, M8, M80 and M74, and an additional 32.7km are at risk of river flooding¹⁷. Surface water also poses a huge risk to the rail network, with 127km of railways at risk of a 1 in 200-year flood event, 16.5km are at risk of river flooding and 2.8km of railway lines are at risk of coastal flooding¹⁷.</p> <p>Climate change could result in an increase in extreme weather events, sea level rise and fluvial and coastal erosion, which could put the City Region's transport infrastructure at further risk of flooding. In addition to major transport infrastructure, active travel facilities such as core paths and national cycleways could be at risk from climate change with flooding, erosion and extreme heat events potentially affecting material assets across the City Region.</p> <p>The City Region's soils may also be at risk from climate change. Both temperature and rainfall can influence the input of organic matter via photosynthesis and its subsequent decomposition through microbial activity. Increased levels of rainfall may result in waterlogging, whilst extreme heat may lead to cracking and compaction. This may lead to increases in erosion, soil loss and</p>

¹⁶ Defra (2018). The state of the environment: air quality. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/729820/State_of_the_environment_air_quality_report.pdf

¹⁷ Climate Ready Clyde, Technical report, Theme 1 – Infrastructure, 2019 [online] available at: <https://static1.squarespace.com/static/5ba0fb199f8770be65438008/t/5c6e7eac104c7bb63f95f6cd/1550745264841/03+Technical+-+Infrastructure.pdf>

SEA Topic	Likely Evolution of the Baseline without the Strategy
	<p>landslides with potential for associated impacts to material assets including transport infrastructure. Future development across the City Region could have an adverse effect on peatland leading to the release of stored carbon. With a growing population, a reduction in productive land may make it increasingly difficult to grow local produce to support the City Region's population.</p> <p>The growing capacity of renewables in the region should translate into variability in energy generation potential and an increase in renewable electricity output in the future. This should support the national renewable energy and decarbonisation targets. As the proportion of renewable electricity grows it should displace the need to generate electricity from fossil fuels, and subsequently reduce total carbon emissions.</p> <p>The growing population and associated need for development are also likely to increase use of mineral resources, heat demand and waste generation. As such, it would be necessary to apply resource efficiency and waste management measures, including the re-use and recycling of materials. Without the Strategy, both climate change and population growth are likely to continue to put demand on resources and infrastructure.</p>

5 DEVELOPMENT OF THE ASSESSMENT CRITERIA

5.1 INTRODUCTION

- 5.1.1. The purpose of the SEA is to inform the development of the Strategy by assessing the potential impacts it may have upon the environment. The SEA Scoping Report set out a series of SEA Objectives and Appraisal Questions that were proposed to be used for the assessment of the Strategy.
- 5.1.2. The SEA Objectives are separate from the Strategy Objectives and interventions although they can influence each other and even overlap. In order to fulfil the requirements of the SEA Act, the SEA Objectives cover the environmental issues scoped into the assessment, including the interrelationship between them.

5.2 DEVELOPMENT OF THE SEA OBJECTIVES

- 5.2.1. The Strategy is a regional level strategy, aimed at informing the implementation of other PPS. It sets the strategic framework for climate change adaptation in the City Region through to 2030. Whilst voluntary, once adopted the Strategy will sit in a hierarchy, underneath SCCAP2, but at a higher level than adaptation actions taken by local organisations such as Local Authorities.
- 5.2.2. The SEA Objectives have therefore been set at an appropriate level for assessing the Strategy.
- 5.2.3. The assessments presented in **Sections 6 to 8** ensure that the environmental implications of the Strategy are sufficiently assessed and that the environment is adequately protected. The use of SEA Objectives has the following advantages to the SEA process:
 - Offers a systematic and structured approach to the assessment;
 - Can be constructed and undertaken by those with limited environmental background;
 - Can be tailored to focus on key environmental topics;
 - Can help to promote environmental aspirations within a plan that might otherwise be overlooked;
 - Provide a strong link to the evidence base; and
 - Questions can be answered in tables or a narrative, providing options for reporting assessment results¹⁸.
- 5.2.4. The SEA Objectives have been supplemented by a series of indicator questions that were developed and consulted upon during the SEA Scoping Stage. The use of indicator questions provides a systematic way of interrogating the Strategy interventions. The use of these indicators has the following advantages to the SEA process:
 - Can help to focus the assessment onto key environmental topics and features likely to be directly affected;
 - Can provide a strong link to the evidence base;

¹⁸ Strategic Environmental Assessment Guidance. The Scottish Government, 2013.

- Well worded questions can help to communicate results transparently in the consultation process; and
- Questions can be answered in a table or narrative, providing different options for reporting and presentation of the findings.

5.2.5. The refined SEA Objectives (following consultation) and assessment criteria are presented in **Table 5-1**. These refined SEA Objectives and indicators have been used to assess the environmental impacts of the Strategy.

Table 5-1 – SEA Objectives

SEA Topic	SEA Objective	Indicator Questions. Will the Strategy...
Natural Capital	SEA1 - To maintain, enhance and protect the City Region's natural capital stock and the ecosystem services they provide	Support environmental net gain? Preserve and protect natural capital assets from the adverse effects of climate change? Increase or decrease natural capital stock?
Climatic Factors	SEA2 - To increase resilience to the impacts of climate change SEA3 -To reduce / limit emissions of greenhouse gases and support the transition to net zero SEA4 - To reduce energy use and ensure sustainable use of energy	Increase the resilience of people, infrastructure and the natural environment to the impacts of climate change (including flood risk, extreme weather, heat and cold)? Help people, communities and organisations reduce / limit their emission of greenhouse gases? Support the long-term security of carbon stored in vegetation and soils? Alleviate risk of flooding and support natural flood management?
Population and Human Health	SEA5 - To improve physical and mental human health and community well-being and reduce inequalities across the City Region SEA6 -To promote economic growth and prosperity and ensure equality and social inclusion	Help to reduce inequalities, particularly for those people and communities most vulnerable to climate impacts? Promote healthier lifestyles and promote the benefits associated with a rich, natural environment (including measures such as 20 minute neighbourhoods)? Improve quality, quantity and equality of access to green and blue space and increase opportunities for recreation? Promote health enhancing environments, behaviours and activities for local communities? Help prevent risks to human health, which arise from poor quality environments? Help to reduce impacts of climate change on human health?
Biodiversity	SEA7 -To preserve, protect and enhance protected habitats, species, peatlands, woodlands and valuable ecosystem services in the City Region	Preserve, protect and enhance priority species, habitats and sites designated for their nature conservation value? Protect and enhance native and ancient woodland?

SEA Topic	SEA Objective	Indicator Questions. Will the Strategy...
	SEA8 -To maintain and enhance existing green networks and improve habitat connectivity	<p>Provide natural flood defences?</p> <p>Protect and restore peatlands and carbon rich soils?</p> <p>Promote nature-based solutions for adapting to and mitigating the effects of climate change?</p> <p>Have an adverse effect on any international, national or locally designated site?</p> <p>Provide opportunities for biodiversity net gain?</p> <p>Avoid habitat fragmentation?</p> <p>Limit or prevent the spread of non-invasive species?</p>
Landscape	SEA9 -To conserve and enhance the quality of the City Region's landscapes and its character and promote access to the wider environment.	<p>Cause direct impacts through development or maintenance on any areas valued for their landscape, intrinsic value or visual character?</p> <p>Avoid adverse impacts on protected landscapes and seascapes?</p> <p>Enhance the landscape character?</p> <p>Promote access to the wider environment?</p>
Cultural Heritage	SEA10 - To protect, enhance and promote the historic environment, including heritage assets (designated and undesignated) historic townscapes and their unique landscape settings	<p>Cause direct physical impact upon any heritage asset (designated and undesignated) and their Setting?</p> <p>Protect, enhance and manage the character, Setting and appearance of historic landscapes, maintaining local character, distinctiveness and sense of place?</p> <p>Reduce the potential impact of climate change on the historic environment, including heritage assets (designated and undesignated) and their Setting?</p> <p>Achieve high quality sustainable design for buildings, spaces and the public realm?</p>
Water Environment	<p>SEA11 - To protect water quality and manage and enhance the water environment</p> <p>SEA12 - To reduce the risk of flooding from all sources and mitigate impacts of flooding and droughts</p>	<p>Support a whole river catchment approach to flooding through the development of flood prevention (including natural flood management) and regeneration programmes including the development of SuDS and blue / green infrastructure?</p> <p>Support the protection and enhancement of water bodies?</p>

SEA Topic	SEA Objective	Indicator Questions. Will the Strategy...
	<p>SEA13 - To protect the water environment from the effects of climate change</p> <p>SEA14 - To reduce water use, ensure sustainable use of water and improve efficiency</p>	<p>Improve water quality?</p> <p>Address coastal flood risk through a full range of approaches from protection of assets to re-location, using nature-based solutions where possible?</p> <p>Protect against coastal squeeze?</p> <p>Increase or decrease the risk of surface water flooding?</p> <p>Ensure efficient and sustainable use of water?</p>
Air Quality	SEA15 - To support the development of local authority measures for the protection and enhancement of air quality	<p>Support measures to reduce levels of air pollution?</p> <p>Help to improve air quality?</p> <p>Support measures for the reduction of congestion and traffic levels particularly in AQMAs and congestion hot-spots?</p> <p>Support the uptake of electric cars and bikes?</p>
Material Assets (incl. Soil Resources)	<p>SEA16 - To ensure the efficient use of land and promote sustainable use of resources</p> <p>SEA17 - To protect geological and agriculturally important land and carbon rich soils from the effects of climate change</p> <p>SEA18 - To reduce the impact of climate change on the City Region's key infrastructure and incorporate climate change adaptation to help maximise resilience</p>	<p>Support the protection and enhancement of buildings, infrastructure and transport network</p> <p>Provide protection to the City Region's agriculturally important land?</p> <p>Have an adverse effect on designated geological areas?</p> <p>Encourage the sustainable use of material assets and minimise waste?</p> <p>Increase the resilience of infrastructure and material assets to the impacts of climate change (including flood risk, extreme weather, heat and cold)?</p> <p>Support the further implementation of district heat networks?</p> <p>Protect carbon rich soils?</p> <p>Create more produce growing space within communities, e.g. through making more land available for allotments or establishing garden share schemes?</p>

6 ASSESSMENT OF ALTERNATIVES

6.1 INTRODUCTION

- 6.1.1. The SEA Act requires those preparing a PPS to consider and also outline the likely environmental effects of any reasonable alternatives. This section outlines the reasonable alternatives that have been considered to the Strategy.

6.2 CONSIDERATION OF REASONABLE ALTERNATIVES

- 6.2.1. The Strategy has devised three strategic alternatives:

- **Alternative 1. Continue Current Work** – Adaptation efforts in Glasgow City Region would continue through the existing planned adaptation work of local and regional actors, National and UK policy, as well as autonomous adaptation resulting from extreme weather events, or broader market trends;
- **Alternative 2. Incremental adaptation planning approach** – This would focus on incremental actions to address recommendations from the evidence base on climate risks a sectoral approach, aligned with the Theory of Change, as well as encouraging organisations involved in CRC adaptation actions where the central aim is to maintain the essence and integrity of a system or process at a given scale;
- **Alternative 3. Transformational approach** – This would seek to achieve fundamental change in the region's systems in line with the Theory of Change, so as to deliver a step change in resilience to climate change and adaptive processes, and mobilise a wider cohort of actors, including new communities, organisations and business. Use of systems thinking is adopted, to ensure a greater sense of scale is captured and to move beyond current silo thinking. Consideration would be given to transformational adaptation as a social process, and the need to ensure the political economy and power dynamics are considered, which would help to deliver new thinking. Finally, this approach analyses the barriers, and levers of change to help identify limits to incremental adaptation and the mechanisms to catalyse transformational adaptation. A key element of the Strategy would be the development and delivery of a climate resilient innovation portfolio as a new approach to transformation. In parallel, it would set out a series of adaptation solutions which address climate risks and opportunities, as well as broader enabling factors in finance and economics, governance and decision making, and culture and behaviours.

6.3 ALTERNATIVES ASSESSMENT

- 6.3.1. The SEA Act requires the identification and assessment of 'reasonable alternatives' to a plan. This can be used to achieve environmental benefits and, where well executed, can be an opportunity for the SEA to add value to the planning process by encouraging lateral thinking. Alternatives must be realistic and are likely to emerge from the plan-making process. The alternatives to the Strategy as set out in **Section 6.2** were developed and consulted upon during the SEA Scoping stage.
- 6.3.2. Any reasonable alternatives covered within an assessment should be considered to the same level of detail as the preferred option. Therefore, the assessment of alternatives has been conducted using the same methodology applied to the assessment of interventions.

SUMMARY ASSESSMENT FINDINGS

6.3.3. **Table 6-1** below summarises the assessment of alternatives. Key recommendations from this assessment have been summarised below Table 6-1.

Table 6-1 – Alternative Assessment

Alternative	SEA 1 – Natural Capital	SEA 2 – Climate Resilience	SEA 3 – Reduce GHGs	SEA 4 – Reduce energy use	SEA5 – Wellbeing and inequalities	SEA6 – Economic growth, equality and social inclusion	SEA7 – Preserve and protect habitats and species	SEA8 – Maintain and enhance green networks	SEA9 – Conserve and enhance landscapes	SEA10 – Protect and enhance the historic environment	SEA11 – Protect water quality and the water environment	SEA12 – Reduce the risk of flooding	SEA13 – Protect the water environment from climate change	SEA14 - To reduce water use, support sustainable use and efficiency	SEA15 – Protection and enhancement of air quality	SEA16 – Efficient use of land and resources	SEA17 - protect important geological and agricultural land from climate change	SEA18 - Reduce the impact of climate change on key infrastructure
Alternative 1: Continue existing work	?	-	-	?	0	0	-	?	-	-	-	-	?	?	-	?	-	?
	This alternative will ensure that current adaptation efforts in the City Region would continue through the existing planned adaptation work of local and regional actors as well as national and UK policy. It is assumed that this will include implementing measures such as Clyde Rebuilt and the GCV Green Network Strategy. Although there is potential for these strategies to deliver positive effects across the majority of the SEA Objectives, without the overarching strategy, it is unclear on how the risks and opportunities identified for the environmental topics will be acted on and how the region will build resilience to the range of possible climate futures. For this reason, uncertain effects have been identified across a number of SEA Objectives.																	
	Taking this approach may not be appropriate for some SEA topics, particularly where existing issues have been identified within the baseline. This is true for biodiversity (SEA7), landscape (SEA9), historic environment (SEA10) water environment (SEA11) and the protection of geological and agricultural land. Some vulnerabilities and risks may be too sizeable that they require transformational rather than incremental adaptations such as achieving net zero. This has therefore resulted in negative effects on climate resilience (SEA2), GHG reductions (SEA3), flood risk (SEA12) and the protection and enhancement of air quality (SEA15).																	

Alternative	SEA 1 – Natural Capital	SEA 2 – Climate Resilience	SEA 3 – Reduce GHGs	SEA 4 – Reduce energy use	SEA5 – Wellbeing and inequalities	SEA6 – Economic growth, equality and social inclusion	SEA7 – Preserve and protect habitats and species	SEA8 – Maintain and enhance green networks	SEA9 – Conserve and enhance landscapes	SEA10 – Protect and enhance the historic environment	SEA11 – Protect water quality and the water environment	SEA12 – Reduce the risk of flooding	SEA13 – Protect the water environment from climate change	SEA14 - To reduce water use, support sustainable use and efficiency	SEA15 – Protection and enhancement of air quality	SEA16 – Efficient use of land and resources	SEA17 - protect important geological and agricultural land from climate change	SEA18 - Reduce the impact of climate change on key infrastructure
Alternative 2: Incremental adaptation planning approach	+	?	-	+	+	+	+	+	+	+	+	-	+	+	-	+	+	-
	Taking an incremental approach is insufficient for some issues (such as achieving net zero) when compared to the large-scale transformational adaptation approaches. Making incremental changes often only address the near-term impacts of climate change and will likely to face challenges in the long term. This alternative may incur increasing costs in the longer term (due to lack of flexibility or longer term planning) and could act as barriers to more fundamental shifts needed for deeper adaptation in the long term.																	
	Some vulnerabilities and risks may be too sizeable that they require transformational rather than incremental approaches such as achieving net zero. This approach may also result in unnecessary negative trade-offs such as loss of land for renewable energy developments. Minor negative effects result for those SEA topics that require longer-term transformative change, such as reduction in greenhouse gas emissions (SEA3), reduction in flooding (SEA12), air quality improvements (SEA15) and risk to key infrastructure (SEA18). This alternative will address the recommendations from the evidence base from the City Region’s agenda using a sectoral approach, aligned with the Theory of Change. This approach will not necessarily result in negative effects; however, the longevity of the adaptation measures is unclear. The overall impact on long term climate resilience is not clear, as some incremental approaches could be sufficient, therefore, uncertain effects on SEA2.																	
	Smaller scale approaches may be effective for local communities, as it could help people play key roles within the of the larger picture of climate management and the avoidance of climate impacts and pressures on local people. Incremental approaches may also bring about climate resilience in the short term and have therefore resulted in minor positive effects across the majority of the SEA topics.																	

Alternative	SEA 1 – Natural Capital	SEA 2 – Climate Resilience	SEA 3 – Reduce GHGs	SEA 4 – Reduce energy use	SEA5 – Wellbeing and inequalities	SEA6 – Economic growth, equality and social inclusion	SEA7 – Preserve and protect habitats and species	SEA8 – Maintain and enhance green networks	SEA9 – Conserve and enhance landscapes	SEA10 – Protect and enhance the historic environment	SEA11 – Protect water quality and the water environment	SEA12 – Reduce the risk of flooding	SEA13 – Protect the water environment from climate change	SEA14 - To reduce water use, support sustainable use and efficiency	SEA15 – Protection and enhancement of air quality	SEA16 – Efficient use of land and resources	SEA17 - protect important geological and agricultural land from climate change	SEA18 - Reduce the impact of climate change on key infrastructure
Alternative 3: Transformational approach	++	++	++	++	+	+	++	++	++	++	++	++	++	++	++	++	++	++
By identifying the shortfalls of incremental adaptation and implementing a portfolio that set out a series of adaptation solutions which address climate risks and opportunities, and broader enabling factors in finance and economics, governance and decision making, and culture and behaviours, the alternative is likely to result in positive effects across all SEA topics. Transformational approaches often offer the potential to deliver a larger, more sustainable, permanent, long-term change.																		

- 6.3.4. The process of assessing alternatives identified the following key issues and areas for development that should be considered by the further development of the Strategy:
- The application of a timeframe for adaptation measures within the Strategy would be beneficial to assess the impacts across the SEA Objectives;
 - The potential for negative trade-offs should be considered within the Strategy; and
 - The Strategy should support a 'just transition' between current approaches and transformative measures in order to improve equality and consider impacts for different social groups.

7 COMPATIBILITY ASSESSMENT OF THE STRATEGY

7.1 INTRODUCTION

- 7.1.1. The Vision and Objectives of the Strategy were assessed against the environmental issues set out in Schedule 3 of the SEA Act, using the SEA Objectives (as set out in **Table 5-1**).
- 7.1.2. The SEA initially considers the Strategy's Vision and Objectives in broad terms and analyses the potential for improvement of environmental considerations within the Strategy. The assessment identifies any weaknesses in the framework which can then be fed into the assessment of interventions to give consideration of cumulative effects with the environmental impacts identified. In doing so this will ensure that proposed mitigation gives full consideration to both aspects of the proposals.

7.2 COMPATIBILITY ASSESSMENT

- 7.2.1. The Vision and Objectives were assessed against the SEA Objectives to determine their compatibility and highlight areas that may require further consideration, or where gaps in data existed. The assessment considered a Strategy Objective compatible with a SEA Objective if there was the likelihood that the Strategy Objective would deliver on the stated criteria for the SEA Objective. Where it was considered that the Strategy Objective could deliver but would depend on more detailed or supporting objectives the relationship was assessed as being uncertain.
- 7.2.2. The following elements were assessed:
 - **Vision:** "A Glasgow City Region that flourishes in the future climate"
 - **Strategy Objectives:**
 - Strategy Objective 1 - seeks to build the region's social, economic, and environmental resilience to climate change
 - Strategy Objective 2 - Outlines the processes and early interventions needed to manage climate risks and realise opportunities in line with our Theory of Change.
 - Strategy Objective 3 – Provides a strategic framework for adaptation in and by the Glasgow City Region that fits alongside and supports key plans, policies, and activities to enable delivery.
 - Strategy Objective 4 – Sets out how we will deepen and expand collaboration and collective impact by working together and engaging, equipping, and enabling citizens and organisations to play their role in realising the vision.
 - Strategy Objective 5 - Sets out how progress in increasing climate resilience will be monitored, evaluated, and learnt from to improve policies, strategies, programmes and projects.

SUMMARY ASSESSMENT FINDINGS

- 7.2.3. Generally, compatibility was positive or negligible for most of the elements of the Vision and Strategy Objectives compared against the SEA Objectives. There were no direct incompatibilities identified. **Table 7-1** below summarises the compatibility assessment findings.

Table 7-1 – Compatibility Assessment

Strategy Element	SEA 1 – Natural Capital	SEA 2 – Climate Resilience	SEA 3 – Reduce GHGs	SEA 4 – Reduce energy use	SEA5 – Wellbeing and inequalities	SEA6 – Economic growth, equality and social inclusion	SEA7 – Preserve and protect habitats and species	SEA8 – maintain and enhance green networks	SEA9 – Conserve and enhance landscapes	SEA10 – Protect and enhance the historic environment	SEA11 – Protect water quality and the water environment	SEA12 – Reduce the risk of flooding	SEA13 – Protect the water environment from climate change	SEA14 – To reduce water use, support sustainable use and efficiency	SEA15 – Protection and enhancement of air quality	SEA16 – Efficient use of land and resources	SEA17 - protect important geological and agricultural land from climate	SEA18 - Reduce the impact of climate change on key infrastructure	Summary Score
Vision	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	The overall Vision of the Strategy will help to compliment the SEA Objectives. It has been deemed that a region that ‘ <i>flourishes</i> ’ will bring about positive effects for society, the economy and the environment and build resilience to climate change that will allow the region to continue to prosper into the future.																		
Recommendations	The overall Vision could be updated to reference a future ‘high quality environment’.																		
Strategy Objective 1 - seeks to build the region’s social, economic, and environmental resilience to climate change	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Strategy objective 1 will help to compliment all SEA Objectives. The objective will bring about positive effects for society, the economy and the environment and build resilience to climate change, which will allow the region to continue to prosper into the future.																		
Recommendations	None identified																		

Strategy Element	SEA 1 – Natural Capital	SEA 2 – Climate Resilience	SEA 3 – Reduce GHGs	SEA 4 – Reduce energy use	SEA5 – Wellbeing and inequalities	SEA6 – Economic growth, equality and social inclusion	SEA7 – Preserve and protect habitats and species	SEA8 – maintain and enhance green networks	SEA9 – Conserve and enhance landscapes	SEA10 – Protect and enhance the historic environment	SEA11 – Protect water quality and the water environment	SEA12 – Reduce the risk of flooding	SEA13 – Protect the water environment from climate change	SEA14 – To reduce water use, support sustainable use and efficiency	SEA15 – Protection and enhancement of air quality	SEA16 – Efficient use of land and resources	SEA17 – protect important geological and agricultural land from climate	SEA18 – Reduce the impact of climate change on key infrastructure	Summary Score
Strategy Objective 2 - Outlines the processes and early interventions needed to manage climate risks and realise opportunities in line with our Theory of Change	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Making early preparations for future changes and challenges to ensure the best for society, environment and economy is likely to help build early resilience and provide practical solutions to tackling the challenge of climate change. Given the vulnerability of some areas and communities in the City Region and the cross cutting nature of climate change, applying early interventions for society, environment and the economy is likely to have positive effects across all SEA topics. Aligning with the Theory of Change will help to address the needs of communities across the City Region and recognise that the Region as a place where people, location and resources combine to create a sense of identity and purpose.																		
Recommendations	The Objective could be amended to specifically reference environmental enhancement.																		
Strategy Objective 3 - Provides a strategic framework for adaptation in and by the Glasgow City Region that fits alongside and supports key plans, policies, and activities to enable delivery.	✓	✓	✓	✓	?	?	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	This Strategy Objective will help with future planning, applying an adaptive management framework to apply early interventions. It is deemed that this Strategy Objective will have more beneficial effects on environmental SEA Objectives rather than social and economic SEA Objectives. There is potential for indirect benefits on SEA5 and SEA6 as a result of this Strategy Objective, however at this stage it is not certain on the focus of the strategic adaptation framework. It is assumed that the objective will support international and national PPS such as the EU Adaptation Strategy, NPF3 and Air quality regulations, as well as regional PPS such as the Glasgow and Clyde Valley Green Network Strategy and the ClydePlan.																		

Strategy Element	SEA 1 – Natural Capital	SEA 2 – Climate Resilience	SEA 3 – Reduce GHGs	SEA 4 – Reduce energy use	SEA5 – Wellbeing and inequalities	SEA6 – Economic growth, equality and social inclusion	SEA7 – Preserve and protect habitats and species	SEA8 – maintain and enhance green networks	SEA9 – Conserve and enhance landscapes	SEA10 – Protect and enhance the historic environment	SEA11 – Protect water quality and the water environment	SEA12 – Reduce the risk of flooding	SEA13 – Protect the water environment from climate change	SEA14 – To reduce water use, support sustainable use and efficiency	SEA15 – Protection and enhancement of air quality	SEA16 – Efficient use of land and resources	SEA17 - protect important geological and agricultural land from climate	SEA18 - Reduce the impact of climate change on key infrastructure	Summary Score
Recommendations	None identified																		
Strategy Objective 4 - Sets out how we will deepen and expand collaboration and collective impact by working together and engaging, equipping, and enabling citizens and organisations to play their role in realising the vision.	?	✓	✓	✓	✓	0	?	?	?	?	✓	?	?	?	?	✓	?	?	?
<p>This Strategy Objective has resulted in some uncertainties. The objective is compatible with social SEA Objectives and those SEA Objectives where citizens and organisations can easily take greater control e.g. reducing energy use and promoting efficient use of resources. Engaging with more communities to take action will help to empower communities to use their own knowledge and decision-making processes to take action. This could help to break down socio-economic barriers, reducing levels of inequalities.</p> <p>The Strategy Objective has the potential to support SEA Objectives relating to the protection of biodiversity, natural capital, landscape, flooding, historic environment and the protection soil and mineral resources, however, this is dependent upon whether interventions enable citizens and organisations to improve their local environment, e.g. tree planting, litter picking, etc.</p> <p>The success and compatibility of this objective will also be dependent upon the types of organisations targeted by interventions. A collaboration of large organisations who currently have adverse effects on the environment could have a substantial impact, leading to greater engagement and collaboration with similar companies. Smaller firms may require higher levels of engagement in order to have the same level of impact.</p>																			?

Strategy Element	SEA 1 – Natural Capital	SEA 2 – Climate Resilience	SEA 3 – Reduce GHGs	SEA 4 – Reduce energy use	SEA5 – Wellbeing and inequalities	SEA6 – Economic growth, equality and social inclusion	SEA7 – Preserve and protect habitats and species	SEA8 – maintain and enhance green networks	SEA9 – Conserve and enhance landscapes	SEA10 – Protect and enhance the historic environment	SEA11 – Protect water quality and the water environment	SEA12 – Reduce the risk of flooding	SEA13 – Protect the water environment from climate change	SEA14 – To reduce water use, support sustainable use and efficiency	SEA15 – Protection and enhancement of air quality	SEA16 – Efficient use of land and resources	SEA17 - protect important geological and agricultural land from climate	SEA18 - Reduce the impact of climate change on key infrastructure	Summary Score
Recommendations	The strategic objective could include emphasis on the natural and built environment and further indication on the types of organisations targeted.																		
Strategy Objective 5 - Sets out how progress in increasing climate resilience will be monitored, evaluated, and learnt from to improve policies, strategies, programmes and projects.	✓	✓	✓	✓	?	?	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	✓	✓	✓
	This Strategy Objective is more compatible with those SEA Objectives that have tangible measurable elements that can be monitored. Some elements of SEA Objectives, such as social inclusion and inequalities are harder to apply measurable targets to, however, monitoring measures could be implemented through the SEA to measure this.																		
Recommendations	The Objective could be amended to specifically reference social, economic and environmental resilience to climate change.																		
Summary Score	✓	✓	✓	✓	?	?	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	In general, the Strategy Objectives are compatible with the SEA Objectives. There is some uncertainty on the compatibility of the SEA5 and 6, as it is not clear on how some Strategy Objectives will bring about direct economic growth, prosperity and equality, however, there is potential to do so, depending on what interventions are implemented. Alignment with the Theory of Change has meant that Strategy Objective 2 is the most compatible with all SEA Objectives. Making early preparations for future changes and challenges to ensure the best for society, environment and economy is likely to help build early resilience and provide practical solutions to tackling the challenge of climate change.																		

8 EVALUATING THE POTENTIAL ENVIRONMENTAL EFFECTS

8.1 INTRODUCTION

8.1.1. The environmental implications of the Strategy interventions were assessed against the SEA Objectives in order to predict likely significant effects. Through predicting and evaluating the likely significant effects of the Strategy consideration was given to the individual interventions that deliver on environmental issues in line with the Vision and Objectives of the Strategy.

8.2 ASSESSMENT OF POTENTIAL ENVIRONMENTAL EFFECTS

8.2.1. The assessment first considered the impacts of the interventions against the SEA Objectives independently. The full assessment is presented in **Appendix D**. A summary of the key environmental effects is set out below.

8.2.2. Following the initial environmental assessment of the Strategy the potential for cumulative and synergistic effects across and between each of the environmental issues was also assessed. A summary of the cumulative and synergistic effects is set out below.

8.2.3. The assessment used the key to effects as set out in **Table 8-1** below and **Section 3** above.

Table 8-1 – Key to the assessment of significance

Effect Significance	Key
Potential for significant positive effects	++
Potential for minor positive effects	+
Potential for minor negative effects	-
Potential for significant negative effects	--
Uncertain effects – Uncertain or insufficient information on which to determine the appraisal at this stage	?
Negligible / No effect	0
Nature of effect (direct / indirect).	D / I
Spatial Extent (local / regional / national / international)	L / R / N / I
Reversibility of effect (reversible / irreversible)	R / I
Duration (short / medium / long term).	ST / MT / LT
Cumulative Effects (positive / negative / synergistic/ Not applicable)	✓+ / ✓- / S / n/a

SUMMARY OF POTENTIAL EFFECTS OF THE INTERVENTIONS

- 8.2.4. **Table 8-2** below summarises the effects of the 11 proposed interventions (pre-mitigation), against the 18 SEA Objectives. The table does not present details on the nature of effects, the spatial extent or the reversibility; these can be found in **Appendix D**.
- 8.2.5. The table shows that the assessment did not identify any negative effects, however, a large number of uncertain effects were identified, largely due to the current level of intervention detail available. The forthcoming Action Plan will provide more detail on the interventions and will allow for the completion of more accurate, local level assessments to be undertaken. A summary of the significant effects (significant positive and uncertain effects) for each of the SEA Topics has been provided below. Further details on minor effects can be found in **Appendix D**.

Table 8-2 – Summary of Potential Effects

Intervention	SEA 1 – Natural Capital	SEA 2 – Climate Resilience	SEA 3 – Reduce GHGs	SEA 4 – Reduce energy use	SEA5 – Wellbeing and inequalities	SEA6 – Economic growth, equality and social inclusion	SEA7 – Preserve and protect habitats and species	SEA8 – Maintain and enhance green networks	SEA9 – Conserve and enhance landscapes	SEA10 – Protect and enhance the historic environment	SEA11 – Protect water quality and the water environment	SEA12 – Reduce the risk of flooding	SEA13 – Protect the water environment from climate change	SEA14 - To reduce water use, support sustainable use and efficiency	SEA15 – Protection and enhancement of air quality	SEA16 – Efficient use of land and resources	SEA17 - Protect important geological and agricultural land from climate change	SEA18 - Reduce the impact of climate change on key infrastructure
Intervention 1	?	++	?	?	++	++	?	?	?	?	?	?	?	?	?	?	?	?
Intervention 2	?	++	+	+	++	++	?	?	?	?	?	?	?	?	?	?	?	++
Intervention 3	?	++	?	?	++	++	?	?	?	?	?	?	?	?	?	?	?	++
Intervention 4	?	++	?	+	++	++	?	?	+	+	?	?	?	?	?	+	?	?
Intervention 5	0	++	++	+	0	+	0	0	0	0	0	0	0	0	0	0	0	++
Intervention 6	++	++	+	+	+	+	+	++	?	?	++	++	++	+	+	++	?	+
Intervention 7	0	++	0	0	++	++	0	0	0	0	0	++	0	0	0	0	0	++
Intervention 8	+	++	++	++	++	++	+	+	?	++	+	++	+	+	++	++	0	++
Intervention 9	++	++	+	+	++	+	++	++	++	?	++	+	++	0	+	++	+	0
Intervention 10	+	++	++	++	++	++	+	+	+	+	+	+	+	+	++	+	+	+
Intervention 11	0	++	++	++	+	++	0	0	0	0	0	0	0	++	++	++	0	0

INTERVENTION 1

Reform and reshape governance mechanisms so they respond to adaptation needs, nurture new leadership, and create expectations in society

Assessment

- 8.2.6. The intervention identifies the requirement to work with public sector, trade and professional networks, and community leaders, in order to equip all those responsible in leading adaptation efforts to better understand the challenges of adaptation and what is needed across the City Region and beyond. Bringing institutions, networks and people together to plan for the future will help share and disseminate ideas and common practices to help foster collaborative change, to adapt to the effects of climate change. This intervention has therefore resulted in significant positive effects on SEA2 (Climatic Resilience).
- 8.2.7. A detailed review of the new institutional landscape needed for adaptation will be undertaken, which includes exploring the changing civic space. Climate change will dramatically shift how people in the region live their lives, and civic space is essential to ensure that citizens and civil society organisations are able to organise, participate and communicate. Proactively engaging with new public groups could help communities (particularly vulnerable groups) to become more climate resilient, so they are able to better absorb the threats and variability of climate change. For these reasons, significant positive effects have been identified for SEA5 (Wellbeing and Inequalities).
- 8.2.8. The review of the new institutional landscape needed for adaptation could bring about potential technological advances. This has potential to draw significant levels of investment, supporting economic growth and increased levels of employment. This has therefore resulted in significant positive effects on SEA6 (Economic Growth, Equality and Social Inclusion).
- 8.2.9. The intervention aims to ensure that the governance across the City Region has the mechanisms to adapt efficiently to a changing climate as well as the changing political landscape. Broadening the coalition with public, private and third sector parties to further the development of adaptation leadership has the potential to bring about positive effects on all SEA Objectives, however, at this stage the specific focus of adaptation activity is not known. For this reason, the majority of SEA Objectives have resulted in uncertain effects.

Mitigation / Enhancement

- 8.2.10. The wording of intervention could be amended to draw out more details on potential projects and technological advances, which would result in a more accurate assessment of the SEA Objectives.

INTERVENTION 2

Develop the ability of organisations, businesses and communities to adapt

Assessment

- 8.2.11. The intervention aims to ensure that climate change risks are considered and addressed in all strategies, plans, programmes and projects that influence the development of the City Region. Future plans and strategies have the potential to bring about positive effects on all SEA Objectives, however, at this stage the focus of emerging strategies and the embedding of climate adaptation measures are not known.

- 8.2.12. Partnership with Adaptation Scotland, Scottish Enterprise and Glasgow Chamber of Commerce, as well as the establishment of a working group and mentoring system with public sector organisations and businesses, will help to integrate climate change into strategic decision making of public sector organisations and businesses. This could help business and organisations in the region identify key climate risks helping them to build greater climate resilience. This has therefore resulted in significant positive effects in relation to SEA2 (Climate Resilience)
- 8.2.13. The effects of climate change can have negative effects on mental health (e.g. stress and anxiety) therefore, the reference to 'mental welfare' may bring about a more holistic approach. A more community focused approach could help communities (particularly those more vulnerable groups) to become climate resilient, so they are able to better absorb the threats and variability of climate change. Significant positive effects were therefore identified in relation to SEA5.
- 8.2.14. Climate change may alter the growth trajectory of many of the region's businesses and alter investment priorities (e.g. reducing productivity particularly during extreme events). This intervention could lead to productive investment toward adaptation measures, which could bring significant economic growth to the region and has therefore resulted in significant positive effects on SEA6 (Economic Growth, Equality and Social Inclusion) and SEA18 (Climate Impact on Infrastructure).

Mitigation / Enhancement

- 8.2.15. The mentoring programme could include a universal framework or overarching goals which identifies the importance of all strands of sustainability and ways in which businesses can contribute to bringing about climate resilience without compromise.

INTERVENTION 3

Increase adaptation finance through leverage and innovation

Assessment

- 8.2.16. Losses due to extreme weather and climate change related events have increased significantly and will continue to into the future. Therefore, the deployment of various sources of finance, are urgently needed to maintain and enhance the resilience of assets to climate change over its expected operational life which will also help to contribute to the climate resilience benefits of the system that the asset forms part of. For these reasons, significant positive effects have been identified in relation to SEA2 (Climate Resilience) and SEA18 (Climate Impact on Infrastructure).
- 8.2.17. Development of a regional adaptation finance strategy and action plan and increasing the value of public sector investments has potential to result in significant economic growth in the City Region. The creation of an 'Adaptation Climate Finance Lab' could result in an increase in job opportunities and could result in substantial investment
- 8.2.18. The intervention also aims to consider how changes to wider tax and subsidy regimes could be used to mobilise and direct finance towards most vulnerable households, which could help to reduce levels of inequalities and social exclusion within the region. This has resulted in significant positive effects on SEA5 (Wellbeing and Inequalities) and SEA6 (Economic Growth, Equality and Social Inclusion).
- 8.2.19. Increased public and private sector investments could result in substantial resilience funding that will benefit all SEA Objectives. However, at this stage the level of funding and the target areas for

investments are not known, which has therefore resulted in uncertain effects across many of the SEA Objectives.

Mitigation / Enhancement

- 8.2.20. The wording of the intervention could be amended to draw out more details on potential public and private sector investments, which would result in a more accurate assessment of the SEA Objectives.

INTERVENTION 4

Enable and equip communities to participate in adaptation, focusing on the most vulnerable

Assessment

- 8.2.21. Community focused approaches could help communities (particularly vulnerable groups) to become climate resilient, so they are able to better absorb the threats and variability of climate change. Empowering vulnerable communities to play a central role in decision making will help them to better understand how the climate is and will continue to impact on their lives. For these reasons, significant positive effects have been identified for, SEA2 (Climate Resilience), SEA5 (Wellbeing and Inequalities) and SEA6 (Economic Growth, Equality and Social Inclusion). There is potential for significant positive effects on all SEA Objectives, however, it is not clear on the focus of community engagement and this is likely to differ between communities depending on their priorities. For this reason, a number of uncertainties have been recorded.

Mitigation / Enhancement

- 8.2.22. The wording of interventions could be amended to draw out more details on potential community engagement approaches, which would result in a more accurate assessment of the SEA Objectives.

INTERVENTION 5

Embed reflection, monitoring, evaluation, and learning into adaptation action

Assessment

- 8.2.23. Working with international climate networks to develop new partnerships and relationships will help to progress and support further efforts in adaptation. Linkages and knowledge sharing with similar delta cities is likely to bring about solutions to common resilience challenges. Given the nature of these delta cities it is assumed that these cities will have similar infrastructure which face comparable climate related challenges. It is therefore likely that this intervention will build further climate change resilience across the City Region and further knowledge sharing will help to protect its key infrastructure. For these reasons, significant positive effects have been identified for SEA2 (Climate Resilience) and SEA18 (Climate Impact on Infrastructure).

The Task Force on Climate related Financial Disclosures (TCFD) puts a lot of focus on physical risk and transition risk (risks to an organisation from the transition to the low carbon climate) so significant positive effects have been identified in relation to SEA3 (GHG Reductions).

Mitigation / Enhancement

- 8.2.24. The assessment has identified either neutral or positive effects across all SEA topics and therefore no mitigation or enhancement measures are deemed to be required.

INTERVENTION 6

Adapt the Clyde Corridor for the 22nd Century

Assessment

- 8.2.25. The long term management of flood risk has resulted in significant positive effects for SEA11 (Water Quality), SEA12 (Reduce Flooding) and SEA13 (Water Environment), as it will directly help to reduce the risk of flooding, whilst protecting the water environment from climate change. It is also assumed that the use of natural flood defences and introduction of blue and green infrastructure will help to bring about further improvements to water quality.
- 8.2.26. The introduction of green and blue infrastructure will help to increase natural stocks and enhance green infrastructure networks. Natural flood defences along with green and blue infrastructure have the potential to improve the water quality which could help to protect and enhance fluvial and coastal habitats. There are, however, a number of designated (statutory and non-statutory) of significant biodiversity value within the River Clyde Valley, such as the Inner Clyde Special Protection Area (SPA), which could be more sensitive to changes. Significant positive effects were therefore, identified in relation to SEA1 (Natural Capital) and SEA2 (Climate Resilience).
- 8.2.27. Uncertain effects have been identified for both landscape (SEA9) and the historic environment (SEA10). The addition of green infrastructure has potential to contribute positively to the landscape, through the addition of more green spaces, however, the intervention is looking at the potential role of vacant and derelict land in providing space for management of flooding, which could result in the loss of some undiscovered or buried historic assets. Some natural flood defences such as sediment ponds may also deteriorate the landscape and historic environment, however, if the design takes into account the character and setting, there may be opportunity to protect and enhance distinctive heritage assets and their unique landscape settings.
- 8.2.28. The use of vacant and derelict land in providing space for management of flooding, supports the efficient use of land (SEA16) and has resulted in significant positive effects. The preference towards natural flood defences will include less resource intensive solutions, compared to hard engineering alternatives, and could include some natural, local sourced and sustainable resources e.g. use of woodland debris to form instream structures.
- 8.2.29. Uncertain effects have been identified in relation to SEA17 (Geological and Agriculturally Important Land). Whilst the use of derelict sites might conserve geological and agriculturally important land, some natural flood defences, such as large scale floodplain restoration could result in the sterilisation of agricultural land from water logging and erosion. The impact of the intervention on this SEA Objective will be highly dependent upon the schemes that come forward.

Mitigation / Enhancement

- 8.2.30. Negative effects on landscape, townscape and cultural heritage are likely to be mitigated at a local / project level through design that reflects local landscape and historic character. The implementation of interventions at this more local will require the development of project specific mitigation measures in consultation with both statutory and non-statutory consultees in order to minimise impacts and maximise the potential for enhancements to the local environment.
- 8.2.31. All development within the Clyde Corridor will need to be sensitively designed to ensure there are no negative impacts on internationally designated sites. As the detail of the intervention is developed further through the Action Plan consideration should be given at the local level to impacts upon

Natura 2000 sites and project level Habitats Regulations Assessment (HRA) should be undertaken as required.

INTERVENTION 7

Enhance early warning and preparedness for floods and heatwaves

Assessment

- 8.2.32. This intervention could help deliver a more economically efficient approach to reduce flood risks and heatwaves, with a combination of early warning, preparedness, and increased resilience of infrastructure, households, communities and businesses. For these reasons, significant positive effects have been identified in relation to SEA2 (Climate Resilience), SEA6 (Economic Growth, Equality and Social Inclusion), SEA12 (Reduce Flooding) and SEA18 (Climate Impact on Infrastructure).
- 8.2.33. The development of a property flood resilience and resistance programme, which will prioritise the most socially vulnerable, will help to narrow the climate inequality gap. A heatwave can affect anyone, but the most vulnerable people are older people (especially those over 75), those who live on their own or in care, people who have a serious or long term illness or disability and the very young. The implementation of a Heat Health Warning System could help to provide early warnings to some of the most vulnerable members of society, reducing the number of deaths associated with extreme heat. For these reasons, significant positive effects have been identified in relation to SEA5 (Wellbeing and Inequalities).

Mitigation / Enhancement

- 8.2.34. The wording of the intervention should be developed further to ensure that consideration is given to those who may not have the same understanding of, or access to emerging technology.

INTERVENTION 8

Ensure everyone's homes, offices, buildings and infrastructure are resilient to future climate impacts

Assessment

- 8.2.35. The adaptation of existing infrastructure and the evaluation of future adaptation needs will help to reduce the impact of climate change on the City Region's key infrastructure and incorporate climate change adaptation measures to help maximise resilience. This will have additional positive effects for the health and wellbeing of the City Region's population through increased levels of safety and maintaining access to jobs, services and recreation, both now and in future.
- 8.2.36. It is assumed that ensuring infrastructure which is resilient to climate change will include measures to reduce the risk of flooding and has therefore resulted in significant positive effects on SEA12 (Reduce Flooding).
- 8.2.37. There is potential for adaptation measures to infrastructure to result in negative impacts on the regions landscape, as they could include large development and numerous components that may have a major visual impact. Uncertain effects have been identified, as it is not clear on what types of development and the key infrastructure that will be targeted by this intervention.
- 8.2.38. Retrofitting existing buildings and homes may have substantial carbon-mitigation and cost-saving potential, helping to reduce both energy use and GHG emissions. Increasing the energy efficiency

of homes will help to reduce the cost of resident's energy bills, reduce fuel poverty and could result in wide-scale regeneration of low income communities over time. For these reasons, significant positive effects have been identified in relation to SEA2 (Climate Resilience), SEA3 (Reduce GHGs), SEA4 (Reduce Energy Use), SEA5 (Wellbeing and Inequalities), SEA6 (Economic Growth, Equality and Social Inclusion), SEA15 (Air Quality) and SEA16 (Efficient use of Land and Resources).

- 8.2.39. The intervention includes specific measures to evaluate the impacts of climate change on the historic environment, in particular the World Heritage Sites of Antonine Wall and New Lanark. Given that the baseline identified the irreplaceable damage that climate change poses to the historic environment, this intervention has resulted in significant positive effects on the historic environment (SEA10). Some adaptation measures to infrastructure and retrofitting could include large developments and / or numerous components that may have a major visual impact and erode the historic environment however, at this strategic stage of the assessments it is not clear on what types of development and the key infrastructure that will be targeted by this intervention. .

Mitigation / Enhancement

- 8.2.40. Embedding adaptation into the net zero transition should also ensure that the aims of the two programmes complement as opposed to compete with each other. It should also mean building material selection of any hard engineering adaptation measures adequately considers embodied carbon and the implications that this could have for meeting net zero targets.
- 8.2.41. Negative effects on landscape, townscape and cultural heritage are likely to be mitigated at a local / project level through design that reflects local landscape and historic character. The implementation of interventions at local level will require the development of project specific mitigation measures in consultation with both statutory and non-statutory consultees in order to minimise impacts and maximise the potential for enhancements to the local environment.

INTERVENTION 9

Deliver nature-based solutions for resilient, blue-green ecosystems, landscapes and neighbourhoods

Assessment

- 8.2.42. The addition and maintenance of green and blue infrastructure have potential to improve water quality which could help to protect and enhance fluvial and coastal habitats. Both blue and green infrastructure can provide climate resilience by providing solutions such as retention basins for surface water management. This has resulted in significant positive effects for SEA1 (Natural Capital), SEA2 (Climate Resilience), SEA7 (Biodiversity), SEA8 (Green Networks), SEA9 (Landscape), SEA11 (Water Quality) and SEA13 (Water Environment).
- 8.2.43. Greater access to green and blue spaces will have direct and indirect impacts on people's physical and mental health and will help to promote social inclusion. Living in areas with green spaces is often associated with significantly less income-related health inequality, which can help to weaken the effects of deprivation. Providing a more attractive and liveable region that connects visitors with the social and cultural locations could help to increase levels of tourism across the City Region. This intervention has therefore resulted in significant positive effects for SEA5 (Wellbeing and Inequalities) and minor positive effects for SEA6 (Economic Growth, Equality and Social Inclusion).

- 8.2.44. The intervention aims to deliver large-scale green and blue infrastructure projects through either the removal of urban form or addition of new green and blue infrastructure. Uncertainty has therefore been recorded in relation to SEA10 (Historic Environment) as it is not clear as to whether the removal of urban form could include heritage assets that are of local or national importance. There is, however, potential that the addition of green infrastructure could help to improve the unique settings of heritage assets and make them more accessible for the City Region's residents and visitors.
- 8.2.45. Significant positive effects have also been identified in relation to SEA16 (Efficient Use of Land and Resources), as the use of vacant and derelict land will be explored in order to support the interventions, particularly in the Clyde Corridor. This will support the efficient use of land and protect the region's green spaces.

Mitigation / Enhancement

- 8.2.46. Negative effects on cultural heritage are likely to be mitigated at a local / project level through design that reflects local landscape and historic character. The implementation of interventions at this more local will require the development of project specific mitigation measures in consultation with both statutory and non-statutory consultees in order to minimise impacts and maximise the potential for enhancements to the local environment.

INTERVENTION 10

Enhance regional decision making and establish Glasgow City Region as a global research and knowledge hub for adaptation

Assessment

- 8.2.47. The intervention aims to proactively promote the City Region as a place for research and experimentation on climate change adaptation and develop proposals in partnership with public sector bodies, communities and businesses. The intervention will also seek to create similar research for use in adaptation planning across Scotland. This could result in significant financial investment and economic growth within the City Region, which has resulted in significant positive effects on SEA6 (Economic Growth, Equality and Social Inclusion).
- 8.2.48. The intervention sets out early research priorities which include synergies and trade-offs with the region's path to net zero, sectoral gaps such as the natural and built environments. A priority to work towards net zero has resulted in significant positive effects on the reduction of greenhouse gases (SEA3), reduction in energy use (SEA4) and enhancement of air quality (SEA15). Reductions from greenhouse gas emissions, energy use and air emissions have also resulted in significant positives for SEA2 (Climate resilience).
- 8.2.49. Trade-offs in order to meet net zero, can often result in loss of land (to make space for renewable infrastructure) and job loss in traditional energy industries and those sectors that support them. Looking at this as a research priority could help to minimise the impact and support a just transition. This could be further supported by the early research priority of climate justice. It is assumed that this could result in adaptation measure that address climate change whilst making progress towards equity and the protection of all of the City Region's residents. For this reason, significant positive effects have been identified in relation to SEA5 (Wellbeing and Inequalities).

Mitigation / Enhancement

- 8.2.50. The assessment has identified positive effects across all SEA topics and therefore no mitigation or enhancement measures are deemed to be required.

INTERVENTION 11

Begin the transition to an economy resilient to future climate impacts

Assessment

- 8.2.51. Small and medium size enterprises (SMEs) are particularly vulnerable to climate change as they are less likely to have large financial reserves and are less able to prepare, respond and recover than larger organisations. Mobilising support to boost adaptation among SMEs will help to better prepare for the potential impacts of climate change, help to keep them financially viable and protect jobs both within the SMEs themselves as well as the wider supply chains.
- 8.2.52. By ensuring that adaptation transitions are fair and just to workers and businesses and providing support to the most vulnerable workers and businesses this intervention will help to protect jobs and businesses from the impact of climate change. It is assumed that the intervention could draw people from across various supply chains into an inclusive and participatory processes to help shape positive alternatives and identify the support, skills and safety nets to make the transition. This could present opportunities for new jobs, upskilling and help protect vulnerable people and businesses. For these reasons significant positive effects have been identified in relation to SEA6 (Economic Growth, Equality and Social Inclusion).
- 8.2.53. Promoting a circular economy, will help to keep resources in use for as long as possible, maximising their value. Moving towards a more circular economy could deliver benefits such as reducing greenhouse gas emissions, improving the security of the supply of raw materials, increasing competitiveness, boosting economic growth and creating further employment opportunities. For these reasons, significant positive effects have been identified in relation to SEA2 (Climate Resilience) , SEA3 (Reduce GHGs), SEA4 (Reduce Energy Use), SEA14 (Water Use), SEA15 (Air Quality) and SEA16 (Efficient use of Land and Resources).

Mitigation / Enhancement

- 8.2.54. The assessment has identified either neutral or positive effects across all SEA topics and therefore no mitigation or enhancement measures are deemed to be required.

SUMMARY OF CUMULATIVE AND SYNERGISTIC EFFECTS

- 8.2.55. **Table 8-2** summarises the cumulative and synergistic effects that were identified within the assessment of interventions. Further description of the potential cumulative and synergistic effects arising from the implementation of interventions have been described below.
- 8.2.56. Due to the strategic nature of some of the interventions and it not being clear at this stage how they will be implemented, the assessment was unable to predict cumulative and synergistic effects at this stage; this is reflected in **Table 8-2** below as 'n/a'. It is important to note that this does not necessarily mean that there is not potential for cumulative and / or synergistic effects to arise in the future, as a result of implementation. Those interventions where cumulative and/or synergistic effects could not be determined were:
- Intervention 4
 - Intervention 5; and
 - Intervention 7.
- 8.2.57. It should be noted that where uncertain and neutral effects have been identified, it has not been possible to determine the nature of effect, the spatial extent, the reversibility or the duration of effect. In this instance, these cells have been left blank.

Table 8-3 – Summary of Cumulative and Synergistic Effects

Intervention	SEA 1	SEA 2	SEA 3	SEA 4	SEA5	SEA6	SEA7	SEA8	SEA9	SEA10	SEA11	SEA12	SEA13	SEA14	SEA15	SEA16	SEA17	SEA18
Intervention 1	S-✓+	✓+	✓+	✓+	✓+	✓+	S-✓+	S-✓+	S-✓+	S-✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+
Intervention 2	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+
Intervention 3	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+
Intervention 4	n/a																	
Intervention 5	n/a																	
Intervention 6	✓+	✓+			✓+		✓+	✓+	✓+S-	S-	✓+	✓+	✓+	✓+			S-	
Intervention 7	n/a																	
Intervention 8									S-	S-								
Intervention 9	✓+	✓+			✓+	✓+	✓+	✓+	✓+	✓-	✓+		✓+					
Intervention 10	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+
Intervention 11	✓+	✓+	✓+	✓+	✓+	✓+								✓+	✓+	✓+	✓+	

Intervention 1

- 8.2.58. There is potential for positive cumulative effects on all SEA Objectives if multiple interventions and adaptation measures were to be put into place. The intervention could result in further funding and greater climate change resilience to the City Region's environment and infrastructure, which will help to protect the region's economy and its residents.
- 8.2.59. Conversely, there is potential for negative synergistic effects to occur on natural capital (SEA1), biodiversity (SEA7), landscape (SEA9) and the historic environment (SEA10) particularly if technological advances lead to the need for large scale infrastructure and land take within the City Region.

Mitigation and Enhancement measures

- 8.2.60. Projects that come forward as a result of the intervention will need to be sensitively designed to minimise their impact on biodiversity, landscape and the historic environment. This is likely to be at a local / scheme level, however, an overall preference towards nature-based solutions could help to minimise potential negative effects.

Intervention 2

- 8.2.61. There is potential for positive cumulative effects on all SEA Objectives if current emerging plans and strategies and future plans and strategies consider climate risks and include adaptation. The intervention could result in greater climate change resilience to the City Region's environment and infrastructure, which will help to protect the region's economy and its residents.

Intervention 3

- 8.2.62. There is potential for positive cumulative effects on all SEA Objectives if multiple investments and funding streams were to be made available. The intervention could result in further funding and greater climate change resilience to the City Region's environment and infrastructure, which will help to protect the region's economy and its residents.

Intervention 6

- 8.2.63. There is potential for negative synergistic effects for SEA9 (Landscape), SEA10 (Historic Environment) and SEA17 (Geological and Agriculturally Important Land) if multiple natural flood prevention measures were to come forward (particularly if they are large scale such as floodplain restoration) in multiple locations within the River Clyde Corridor. This could lead to large cumulative loss in land, which could lead to a loss in heritage assets, high quality agricultural land and geological important land, all of which could have negative effects on the landscape.
- 8.2.64. The addition of green and blue infrastructure is likely to have positive cumulative effects on health and wellbeing, air quality, the risk of flooding and build climate resilience if multiple developments were to come forward.

Mitigation and Enhancement measures

- 8.2.65. Projects that come forward as a result of the intervention will need to be sensitively designed to minimise their impact on biodiversity, landscape and the historic environment. This is likely to be at a local / scheme level and through multi-disciplinary assessment.

Intervention 8

- 8.2.66. There is potential for negative synergistic effects on both the landscape and the historic environment if multiple infrastructure adaptation and retrofitting measures were to come forward in various locations within the City Region, particularly in those locations with high landscape and / or heritage value.
- 8.2.67. There is potential for multiple developments to erode both the historic environment and the landscape setting. If the design takes into account the character and setting, there may be opportunities to protect and enhance distinctive heritage assets and their unique landscape settings.

Mitigation and Enhancement measures

- 8.2.68. Projects that come forward as a result of the intervention will need to be sensitively designed to minimise their impact on both landscape and the historic environment. This is likely to be at a local / scheme level.

Intervention 9

- 8.2.69. The addition of green and blue infrastructure is likely to have positive cumulative effects on health and wellbeing, air quality, reducing greenhouse gases and building climate resilience, if multiple new sites were to come forward.
- 8.2.70. Urban form is the physical characteristics that make up built-up areas, if multiple sites are removed to make way for green infrastructure there is potential for a cumulative negative effect on the historic environment through the loss of heritage assets and the physical characteristics that make up built-up areas. If local level project design takes into account the character and setting, there may be opportunities to protect and enhance distinctive heritage assets and their unique landscape settings.

Mitigation and Enhancement measures

- 8.2.71. Projects that come forward as a result of the intervention will need to be sensitively designed to minimise their impact on the historic environment, taking into account the character and setting. This is likely to be at a local / scheme level.

Intervention 10

- 8.2.72. There is potential for positive cumulative effects on all SEA Objectives if multiple research opportunities materialise into key projects in the City Region. The interventions could result in further funding and investment in the region resulting in significant job growth and greater climate change resilience to the environment, infrastructure and the City Region's residents.

Intervention 11

- 8.2.73. There is potential for positive cumulative effects to occur if the widespread implementation of circular economy across the region's supply chains were to occur. The more businesses and organisations that adopt a circular economic approach, the greater the opportunities for preservation and enhancement of natural capital, reducing greenhouse gas emissions, supporting efficient use of land, improving security of the supply of raw materials, increasing economic growth and the creation of jobs.

9 MITIGATION AND ENHANCEMENT MEASURES

9.1 INTRODUCTION

- 9.1.1. Schedule 3 (7) of the SEA Act requires that mitigation measures are considered to prevent, reduce or offset any significant adverse effects on the environment of implementing the Strategy. The measures are known as 'mitigation' measures. Mitigation measures include both proactive avoidance of adverse effects and actions taken after potential effects are identified to minimise environmental problems and enhance the environmental benefits of the Strategy.
- 9.1.2. Where potential negative or positive effects have been identified, mitigation measures have been developed. **Table 9-1** provides a list of the mitigation measures identified through the assessment of the Strategy and the mechanism for their delivery. Table 9.1 also includes enhancement measures, which aim to optimise positive impacts and enhance sustainability. The mechanism for delivery will ensure the promotion, prevention, reduction and offset of any significantly adverse effects or enhancement opportunities on the environment.

Table 9-1 – Mitigation and Enhancement Measures

Reference	SEA Topic	Mitigation / Enhancement	Mechanism	Responsible	Timeframe
Strategy - Vision	All	The overall vision of the Strategy could be updated to reference a future 'high quality environment'	Embedded into Strategy narrative	Sniffer / CRC	Within the Strategy
Strategy – Objective 2	All	Strategy Objective 2 could be amended to specifically reference environmental enhancement, to strengthen the policy.	Embedded into Strategy narrative	Sniffer / CRC	Within the Strategy
Strategy – Objective 4	All	Strategic Objective 4 could include emphasis on the natural and built environment and further indication on the types of organisations targeted.	Embedded into Strategy narrative	Sniffer / CRC	Within the Strategy
Strategy – Objective 5	All	Strategic Objective 5 could be amended to specifically reference social, economic and environmental resilience to climate change.	Embedded into Strategy narrative	Sniffer / CRC	Within the Strategy
Intervention 1	All	The wording of the intervention could be amended to draw out more details on potential projects and technological advances, which would result in a more accurate assessment of the SEA Objectives.	Embedded into Strategy narrative	Sniffer / CRC	Within the Strategy
Intervention 2	All	The mentoring programme could include a universal framework or overarching goals which identifies the importance of all strands of sustainability and ways in which businesses can contribute to bring	Embedded into Strategy intervention and narrative	Sniffer / CRC and businesses targeted by the mentoring programme	Within the Strategy

Reference	SEA Topic	Mitigation / Enhancement	Mechanism	Responsible	Timeframe
		about climate resilience without compromise.			
Intervention 3	All	The wording of the intervention could be amended to draw out more details on potential public and private sector investments, which would result in a more accurate assessment of the SEA Objectives.	Embedded into Strategy narrative	Sniffer / CRC	Within the Strategy
Intervention 4	All	The wording of interventions could be amended to draw out more details on potential community engagement approaches, which would result in a more accurate assessment of the SEA Objectives.	Embedded into Strategy narrative	Sniffer / CRC	Within the Strategy
Interventions 2, 3, 4, 8, 9 and 11	Population and Human Health	Ensure the needs and aspirations of groups with protected characteristics (including those from low income households) are considered in delivering climate adaptation solutions. Community involvement would need to be inclusive in order to facilitate meaningful involvement of all community groups, particularly the most vulnerable.	Strategic and project-specific equality impact assessments and health impact assessments. Project level design and assessment	Sniffer / CRC and the responsible authority for project delivery	Prior to the delivery of the climate adaptation solution
Interventions 3, 6, 8 and 9	Landscape Cultural Heritage	Climate adaptation solutions must seek to maximise sustainability benefits from existing landscape, townscape and heritage assets by valuing them inherently and for the wider services they provide.	Historic Landscape Characterisation Project level design and assessment	Sniffer / CRC and the responsible authority for project delivery	Prior to the delivery of the climate adaptation solution

Reference	SEA Topic	Mitigation / Enhancement	Mechanism	Responsible	Timeframe
		Promoters and designers should liaise closely with CRC to avoid or minimise negative impacts, such as land take whilst seeking to maximise benefits, such as tranquillity.			
Interventions 3, 4 and 7	Population and Human Health	Consideration needs to be given to those who may not have the same understanding of, or access to emerging technology.	Project specific equality impact assessments	Sniffer / CRC and the responsible authority for project delivery	Prior to the delivery of the climate adaptation solution
Interventions 6, 8 and 9	Natural Capital Biodiversity	Development and retrofitting should incorporate design measures to lessen the impact on biodiversity and ensure biodiversity net gain. This could include the incorporation of green roofs and living walls. Nature based solutions should be sought over hard engineering options, in order to protect, sustainably manage and potentially restore the natural environment.	Embedded into Strategy intervention and narrative Project level design and assessment Biodiversity net gain assessment	Sniffer / CRC and the responsible authority for project delivery	Within the Strategy Prior to the delivery of the climate adaptation solution
Interventions 6, 8 and 9	Material Assets Climatic Factors	Building material selection of any hard engineering adaptation measures will need to adequately consider embodied carbon and the implications that this could have for meeting net zero targets.	Embedded into Strategy intervention and narrative Project level design and assessment	Sniffer / CRC and the responsible authority for project delivery	Within the Strategy Prior to the delivery of the climate adaptation solution
Interventions 6, 8 and 9	Biodiversity Natural Capital	These three interventions have the potential to facilitate projects that would	Project level design and assessment	Sniffer / CRC and the responsible authority for project delivery	Prior to the delivery of the climate adaptation solution

Reference	SEA Topic	Mitigation / Enhancement	Mechanism	Responsible	Timeframe
		themselves require HRA at project level in line with the Habitats Regulations.			
Interventions 6, 7, 8, 9 and 10	Climatic Factors Water Environment Material Assets	Any form of construction and operation should be undertaken as sustainably as possible, making use of tools and processes, such as circular economy, waste hierarchy, CEEQUAL and BREEAM	Embedded into Strategy intervention and narrative Project level design and assessment	Sniffer / CRC and the responsible authority for project delivery	Within the Strategy Prior to the delivery of the climate adaptation solution
Intervention 10	All	CRC should seek public views on the consequences and trade-offs between potential actions to achieve net zero.	Embedded into Strategy intervention and narrative Project level assessment	Sniffer / CRC and the responsible authority for project delivery	Within the Strategy Prior to the delivery of the climate adaptation solution
All Interventions	All	CRC could provide further details on the types of projects, adaptation measures and general implementation of the interventions. This could result in a more accurate assessment across the SEA topics.	Embedded into Strategy intervention and narrative	Sniffer / CRC	Within the Strategy and forthcoming Action Plan
All Interventions	All	The implementation of interventions at local will require the development of project specific mitigation measures in consultation with both statutory and non-statutory consultees in order to minimise impacts and maximise the potential for enhancements to the local environment.	Project level design and assessment	Sniffer / CRC and the responsible authority for project delivery	Prior to the delivery of the climate adaptation solution

10 MONITORING

- 10.1.1. Section 19 of the SEA Act requires that monitoring is undertaken on a PPS so that the significant environmental effects of implementation can be identified, and remedial action imposed.
- 10.1.2. The purpose of the monitoring is to provide an important measure of the sustainability outcome of the Strategy, and to measure the performance of the Strategy against sustainability objectives and targets. Monitoring is also used to manage uncertainty, improve knowledge, enhance transparency and accountability, and to manage sustainability information.
- 10.1.3. The final Strategy and Action Plan recognises the importance of monitoring progress and includes provisions for the Secretariat to monitor progress, through an annual report, a two-yearly independent assessment of progress and a five-yearly update of the Risk and Opportunity Assessment and Theory of Change. The CRC Secretariat and members will also work with Scottish Government to ensure efforts feed into the national reporting processes for monitoring performance against the Public Bodies Duties and the Scottish Climate Change Adaptation Programme. Furthermore, CRC will work with the Climate Change Committee to support progress evaluations and the UK Climate Change Risk Assessment process.
- 10.1.4. At this stage of the process an initial indicative set of high level SEA monitoring indicators have been developed as set out in **Table 10-1**.
- 10.1.5. These are not about monitoring the success of adaptation actions in relation to these issues, but about ensuring that significant improvements to the environment are delivered as part of the implementation of the strategy .
- 10.1.6. Whilst the high-level SEA indicators will enable emerging trends to be identified it may not be clear the level of influence that the Strategy itself has when compared to wider socio-economic changes being implemented at the local level through individual local authority plans, programmes and strategies. This is further complicated by the feedback loop of wider socio-economic change acting as a driver of vulnerability and exposure to climate risk. **Table 10-1** below includes a framework of sample SEA indicators and the data sources for monitoring the success of the Strategy.
- 10.1.7. The monitoring framework will rely heavily on data collated at a local authority level and may be required to be refined throughout the implementation of the Strategy. In addition, in some cases, such as in relation to climatic factors, private data may need to be purchased to allow for effective monitoring.

Table 10-1 – Monitoring Measures

SEA Topic	Sample Monitoring Indicators	Sample Data Sources and Mechanisms	Timescales
Natural Capital	<ul style="list-style-type: none"> The number of net gain enhancement schemes implemented through the Strategy Tree canopy cover data 	<ul style="list-style-type: none"> Baselining and measuring environmental assets and ecosystem services within the City Region 	<ul style="list-style-type: none"> Annually drawing upon data from the eight City Region local authorities and GCV Green Network Partnership
Climatic Factors	<ul style="list-style-type: none"> Changes in GHG emissions across the City Region Uptake in sustainable / renewable energy Number of flood alleviation / natural flood management schemes implemented Number of properties / businesses at risk of flooding 	<ul style="list-style-type: none"> Baselining and measuring the City Region's GHG estimates % increase / decrease in overall GHG emissions including relevant sectors. Energy generated by renewables (MWH) Energy statistics for Scotland (updated quarterly) SEPA / Local Authority – Flood Protection Schemes SEPA Flood Map (National Flood Risk Assessment) 4EI Heat Hazard data Dynamic Coast- the National Coastal Change Assessment 	<ul style="list-style-type: none"> Annually drawing upon data from the eight City Region local authorities
Population and Human Health	<ul style="list-style-type: none"> Uptake in people using active travel Access to greenspace The number of people living in deprivation 	<ul style="list-style-type: none"> Scottish Health Survey Scottish Household Survey – access to greenspace The Scottish Index of Multiple Deprivation 	<ul style="list-style-type: none"> Annually through the Scottish Health Survey and Household Survey Deprivation will be measured by the Scottish Index of Multiple Deprivation which is updated every four years. Next update is due in 2024.
Biodiversity	<ul style="list-style-type: none"> The number of biodiversity and / or green network enhancement schemes implemented through the Strategy Adverse impacts of future developments on biodiversity 	<ul style="list-style-type: none"> Baselining and measuring biodiversity within the City Region The number of schemes that arise from the Strategy that adversely / positively affect biodiversity and green networks 	<ul style="list-style-type: none"> Annually through reviewing local authority State of the Environment Reports. Review of the State of Scotland's Greenspace Report which is produced

SEA Topic	Sample Monitoring Indicators	Sample Data Sources and Mechanisms	Timescales
	<ul style="list-style-type: none"> Fragmentation and decline of habitats across the City Region Rate of loss of carbon rich soils / peat within Plan area (e.g. tonnes/ year) 	<ul style="list-style-type: none"> Number of schemes arrest decline and reinstate habitat connectivity, in order to sustain levels of biodiversity for the future. Greenspace Scotland Scotland's Biodiversity Intactness Index 	every 4-5 years, the last was produced in 2018.
Landscape	<ul style="list-style-type: none"> Impact of future development on areas with high landscape and / or townscape value Level of access to the wider environment 	<ul style="list-style-type: none"> Baselining the important landscape and townscape environments within the City Region The number of schemes that arise from the Strategy that adversely affect landscape and townscape character and setting. Addition of walking, cycling and horse-riding routes – information from organisations such as local authorities, Sustrans and Transport Scotland for the City Region. Greenspace Scotland – Accessible greenspace 	<ul style="list-style-type: none"> Annually through reviewing local authority State of the Environment Reports. Regular updates to the core path plans across the City Region local authorities Review of the State of Scotland's Greenspace Report which is produced every 4-5 years, the last was produced in 2018.
Cultural Heritage	<ul style="list-style-type: none"> Adverse impacts of future developments on the historic environment The number of historic sites that benefit from climate change protection 	<ul style="list-style-type: none"> The number of schemes that arise from the Strategy that adversely / positively affect the historic environment Historic Environment Scotland Climate Change Risk Assessments Historic Environment Scotland, Buildings at Risk Register The Scottish Housing Condition Survey 	<ul style="list-style-type: none"> Annually through reviewing local authority State of the Environment Reports. Annually through updates to the Buildings at Risk Register.
Water Environment	<ul style="list-style-type: none"> Adverse impacts of future developments on the water environment and water quality 	<ul style="list-style-type: none"> The number of schemes that arise from the Strategy that adversely / positively affect the water environment 	<ul style="list-style-type: none"> Annually through reviewing local authority State of the Environment Reports. Annual review data from SEPA

SEA Topic	Sample Monitoring Indicators	Sample Data Sources and Mechanisms	Timescales
	<ul style="list-style-type: none"> The number of homes, businesses and infrastructure that benefit from water efficiency or flood risk measures The number of schemes that result in the addition of blue infrastructure Number and type of flooding incidents within Plan area (per year) 	<ul style="list-style-type: none"> SEPA River Basin Management Plans and classification of waterbodies under the Water Framework Directive 	
Air Quality	<ul style="list-style-type: none"> An improvement in air quality arising from all sectors The uptake of electric cars and bikes 	<ul style="list-style-type: none"> Baselining and measuring air quality at identified sites across the City Region The number of people / households that use electric cars and bikes Number of exceedances of Air Quality Objectives (per month/year) Number of AQMAs (per year) 	<ul style="list-style-type: none"> Annually drawing upon data from the eight City Region local authorities Annually through reviewing local authority State of the Environment Reports Transport Scotland / Local Authority annual statistics
Material Assets	<ul style="list-style-type: none"> The number of homes and businesses that benefit from retrofitting measures Adverse impacts of future developments on geological and agriculturally important land and carbon rich soils An improvement in the minimisation of waste from all sectors Addition / removal of community allotments and growing spaces 	<ul style="list-style-type: none"> Scottish Housing Condition Survey – fuel poverty, dampness, condensation Total area (ha) of permitted loss / gain of best and most versatile (grades 1-3a) agricultural land, geologically important land and carbon rich soils Total area of brownfield / previously developed land used for development SEPA Waste data on local authority waste targets Greenspace Scotland Amount of waste generated and disposed of annually (by disposal route e.g. % of waste recycled, composted etc.). 	<ul style="list-style-type: none"> Annually through reviewing local authority State of the Environment Reports. Annual waste data from SEPA Review of the State of Scotland's Greenspace Report which is produced every 4-5 years, the last was produced in 2018

11 NEXT STEPS

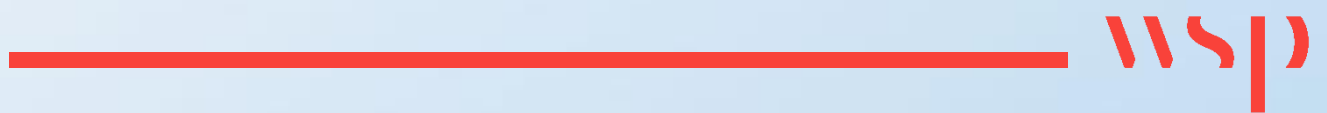
- 11.1.1. The SEA ER was issued to consultees, via the SEA Gateway, in November 2020 for a six-week consultation period, alongside the Adaptation Strategy. This later report, an update to the SEA ER, has been prepared following that consultation period. This will be made available alongside the final Adaptation Strategy as well as the Post Adoption Statement, which will summarise how responses to consultation and the SEA have influenced the development of the Strategy. This is the last formal output of the SEA process.
- 11.1.2. The Strategy timeline is set out in Table 11-1 below.

Table 11-1 – SEA and Strategy Timeline

Strategy Stage	Timeframe
Screening (completed)	April 2020
Scoping Consultation (completed)	September 2020
Strategy Options produced (completed)	September- October 2020
SEA Assessment (completed)	October – November 2020
Strategy produced (completed)	October – November 202
SEA Consultation (completed)	November – December 2020
Post Adoption Statement and Finalisation of the Strategy (this stage)	May 2021
Strategy Adoption	June 2021

Appendix A

CONSULTATION COMMENTS



Ref	Organisation	Comment	In Reference to	Action Required	Summary of Action
Scoping Consultation					
1	Historic Environment Scotland	It is our understanding that Glasgow City Region's first Climate Adaptation Strategy (the CAS) is intended to set the strategic framework for adaptation in the City Region to build resilience to the range of possible climate futures in Glasgow City Region.	General	No action required	Noted.
2	Historic Environment Scotland	We note that the historic environment has been scoped into the assessment.	General	No action required	Noted.
3	Historic Environment Scotland	On the basis of the information provided, we are content with this approach and are satisfied with the scope and level of detail proposed for the assessment, subject to the detailed comments provided below.	SEA Methodology	No action required	Noted.
4	Historic Environment Scotland	We recommend that you add the potential adverse effects of adaptation measures that are inappropriate for historic / traditional structures to the key challenges / opportunities. You should also note that noise and air pollution have the potential to affect both non-designated and designated historic environment assets.	Baseline - Heritage	Action required	Noted, Table 4-1 in the Environmental Report has been updated to reflect this comment.
5	Historic Environment Scotland	We are broadly content with the objectives proposed for cultural heritage but recommend that the second objective includes historic townscapes in addition to landscapes.	SEA Objectives	Action required	Noted, the objective in Table 5-1 has been updated to include historic townscapes
6	Historic Environment Scotland	You propose to consult over the period of November -December 2020, but do not state a specific time period. We recommend a minimum 6 week consultation period where possible, to give stakeholders sufficient time to engage and respond.	Next Steps	Action required	Noted, it is anticipated that the SEA ER along with the Draft Strategy will be consulted upon for a six week period commencing in November 2020.

Ref	Organisation	Comment	In Reference to	Action Required	Summary of Action
7	NatureScot	Subject to the specific comments set out below, NatureScot is content with the scope and level of detail proposed for the Environmental Report.	General	No action required	Noted.
8	NatureScot	Overall this scoping exercise is comprehensive, particularly in its use of baseline characterisation to derive SEA Objectives, and this matches the thoughtful approach to the Adaptation Strategy itself.	General	No action required	Noted.
9	NatureScot	We are satisfied that Table 6.1 (p33, 6.2.1) covers the main environmental issues associated with the strategy and that they are all scoped in.	SEA Methodology	No action required	Noted.
10	NatureScot	SNH notes that the consultation on the Environmental Report is proposed from November to December 2020. Hopefully this will be for a period of at least six weeks, which we would be content with.	Next Steps	No action required	Noted, it is anticipated that the SEA ER along with the Draft Strategy will be consulted upon for a six week period commencing in November 2020.
11	NatureScot	Consideration of strategic alternatives (p5, 2.2) We suggest the “Do Nothing” alternative should be re-named “Continue current work” or similar, if only to avoid misunderstanding by a casual reader. “Do Nothing” could incorrectly imply no adaptation effort at all.	Assessment of Alternatives	Action required	Noted, the 'Do Nothing' alternative has been renamed in Section 6 of the SEA ER as suggested.
12	NatureScot	The transformational approach appears the best option, as structural change is what is needed in order to take enough action to make a difference quickly enough.	Assessment of Alternatives	No action required	Noted.
13	NatureScot	There should be more specific reference to Local Development Plans in Appendix B (which are mentioned at 4.2.2), as land use planning is one of the key systems through which adaptation must be achieved.	PPS	Action required	Noted, Appendix B of the SEA ER has been updated to include the eight adopted Local Development Plans from the Glasgow City Region.

Ref	Organisation	Comment	In Reference to	Action Required	Summary of Action
14	NatureScot	The Scottish Rural Development Programme is included in Appendix B and this programme, and its future iterations, will be very important, as it potentially influences a lot of land management in the region.	PPS	No action required	Noted.
15	NatureScot	SEA Scoping Report - Table 5-4 (p19, 5.2.26) The SPA is called Slamannan Plateau (not Slamannan Heights as stated).	Baseline - Biodiversity	Action required	Noted, this has been updated within Appendix C of the SEA ER.
16	NatureScot	SEA Scoping Report - Table 5-5 (p20, 5.2.34) – on Biodiversity Increased risk to species and habitats from new diseases and pathogens could be added to the table.	Baseline - Biodiversity	Action required	Noted, Table 4-1 in the SEA ER has been updated to reflect this recommendation.
17	NatureScot	The following could also be added to the table as opportunities: <ul style="list-style-type: none"> Restoring peatlands to help increase resilience to climate change, Natural flood management, such as re-naturalising the course of rivers and restoration of their adjacent habitats to slow down and hold water during heavy rain events, Managed realignment to allow coastal habitats and the benefits they bring, to migrate landward instead of being lost to sea-level rise, and Creating nature friendly SUDS to cope with the predictions of increased rainfall. 	Baseline - Biodiversity	Action required	Noted, Table 4-1 (Biodiversity and Material Assets (Incl. Soil Resources)) in the SEA ER has been updated to reflect this recommendation.
18	NatureScot	An implication for the Strategy that could be added to this table might include promoting nature-based solutions, which cover more of the points listed above, rather than just woodland planting or natural woodland re-generation.	Baseline - Biodiversity	Action required	Noted, Table 4-1 in the SEA ER has been updated to reflect this recommendation.
19	NatureScot	Guidance recommends that plan-making bodies can consider opportunities to combine the earlier stages of SEA and Habitats Regulations Appraisal, where appropriate, even though the differing requirements mean that the two assessments cannot be fully integrated. One option is to conduct the earlier stages in parallel, such	Habitats Regulations Appraisal	No action required	Noted. At this regional stage the interventions presented are not considered to be developed to an extent whereby the spatial location / scale of the interventions is known,

Ref	Organisation	Comment	In Reference to	Action Required	Summary of Action
		<p>as environmental information gathering, prediction of plan effects, and some early consultation stages.</p> <p>If the Habitats Regulations Appraisal is undertaken in parallel with SEA, it is important that the findings of both appraisals are separately and clearly documented and that the record of the Habitats Regulations Appraisal uses the correct terminology, applying them appropriately. In practice, it is easier to set out the Habitats Regulations Appraisal in a separate record, and where appropriate provide a cross-reference to it in the Environmental Report.</p>			<p>nor would their potential for likely significant effects upon Natura 2000 sites be able to be predicted. As the interventions and actions detailed in the Strategy as developed further through the Action Plan consideration will be given to the potential for Natura Sites to be affected and Habitats Regulations Appraisal undertaken as required.</p>
20	NatureScot	<p>SEA Scoping Report - Table 6-2 Climatic Factors</p> <p>There is scope to re-work this section, to better reflect the valuable conclusions in Table 5-2 regarding integration of adaptation with net-emissions-reduction. Firstly, the proposed Appraisal Question “Support the transition to net zero greenhouse gas emissions” would work better as one of the Objectives. Secondly, the importance of this issue justifies unpacking it through the use of several Appraisal Questions – for example:</p> <ul style="list-style-type: none"> o “Help reduce / limit actual emissions of greenhouse gases?” o “Help reduce actual emissions from the food system?” (there are potential key synergies here with increased food security as an adaptation) o “Support the long-term security of carbon stored in vegetation and soils?” 	SEA Objectives	Action required	<p>Noted, Table 5-1 in the SEA ER has been revised to reflect this recommendation and this has been accounted for in the Environmental Assessment as set out in Section 8 and Appendix D. It should be noted that the second indicator question proposed in relation to emissions from the food system has been omitted. It is considered that, despite this being an issue which does need to be addressed, this indicator would be difficult to baseline and as such we would be unable to complete a meaningful assessment at this regional level.</p>
21	NatureScot	<p>Biodiversity</p> <p>An Appraisal Question could include whether the Strategy will help protect and restore peatlands, or more generally, whether the Strategy promotes nature-based solutions for adapting to and mitigating the effects of climate change?</p>	SEA Objectives	Action required	<p>Noted, Table 5-1 in the SEA ER has been revised to reflect this recommendation and this has been accounted for in the Environmental Assessment as set out in Section 8 and Appendix D.</p>

Ref	Organisation	Comment	In Reference to	Action Required	Summary of Action
		Peatlands could be added to the SEA Objective here as well so, not just woodlands but, other habits are highlighted.			
22	NatureScot	Water Environment The Appraisal Question “Protect the coastal environment from sea-level rise and inundation?” strongly implies a policy only of resistance. With the predicted acceleration of sea-level rise, building our way out of the problem with coastal defences cannot be a sufficient response and would harm the water environment. Therefore, I suggest the question is changed to “Address coastal flood risk through a full range of approaches from protection of assets to re-location, using nature-based solutions where possible?” or similar.	SEA Objectives	Action required	Noted, Table 5-1 in the SEA ER has been revised to reflect this recommendation and this has been accounted for in the Environmental Assessment as set out in Section 8 and Appendix D.
23	NatureScot	Material Assets Carbon-rich soils are briefly discussed at 5.2.83 and 5.2.92, but considering their importance to the regional level of net emissions, they should explicitly feature in both the Objectives and the Appraisal Questions.	SEA Objectives	Action required	Noted, Table 5-1 in the SEA ER has been revised to reflect this recommendation and this has been accounted for in the Environmental Assessment as set out in Section 8 and Appendix D.
24	NatureScot	Schedule 3 of the Environmental Assessment (Scotland) Act 2005 sets out the information to be included in the Environmental Report.	Next Steps	No action required	Noted.
25	NatureScot	Scoping Report - Appendix C Draft Assessment Matrices - Clarification is needed on the assessment of Alternative Strategies (Table C1) – i.e. will this use scoring as in Table C2?	SEA Methodology	Action required	Noted, further detailed in included in Sections 3.2 and 6 of the SEA ER.
26	NatureScot	Table C3 Assessment of Interventions – We suggest the scoring system could also include “?” and “+/-” for uncertain and mixed effects respectively (both of these are mentioned in 7.2.9).	SEA Methodology	Action required	Noted, further detail on the assessment criteria for the assessment of the interventions is included in Section 3.2 of the SEA ER.

Ref	Organisation	Comment	In Reference to	Action Required	Summary of Action
27	NatureScot	A section on monitoring the objectives within the Strategy / the success of the Strategy should be included.	SEA Methodology	Action required	Noted, a monitoring framework has been included in Section 10 of the SEA ER.
28	NatureScot	It will be a significant challenge to ensure that all of the relevant people are encouraged to allow this Strategy to influence their work and decision making. At present, there may be some that may not see the relevance or understand the links between their work and climate change. The Strategy therefore needs to be both easy for people to understand and written in a way that allows them to understand how it relates to their work, and also readable (i.e. a useful document, but not too long that people are put off reading it).	Adaptation Strategy	No action required	Noted.
29	SEPA	Scoping Report Appendix 2, Table B1 lists the relationship of the proposed climate change adaptation strategy with other relevant Plans, Programmes and Strategies (PPS) according to whether they are of International / National / Regional status. Some of the PPS included have themselves been subject to SEA. Where this is the case you may find it useful to prepare a summary of the key SEA findings that may be relevant to the Climate Change Adaptation Strategy. This may assist you with data sources and environmental baseline information and also ensure the current SEA picks up environmental issues or mitigation actions which may have been identified elsewhere	PPS	No action required	Noted, it is considered that the baseline as presented in Appendix C of the SEA ER and the subsequent assessment (including proposed mitigation) are sufficiently developed for this regional level strategy and each has drawn on information from local level PPS where deemed appropriate.
30	SEPA	We welcome the identification of a number of Plans, Programmes and Strategies that have identified the importance of renewable and low carbon energy. However, the approach that has been taken has referred only to electricity and has not included renewable and low carbon heat in the Material Assets chapter. We consider that this omission will make it difficult to adequately answer the appraisal question identified in Table 6-2 "Will the plan Increase the resilience of infrastructure and material assets to the impacts of climate change (including flood risk, extreme weather, heat and cold)". We recommend that, in order to appropriately scope the environmental impacts of renewable and low carbon heat in addition to electricity, that the	PPS	Action required	Noted, Appendix B of the SEA ER has been updated to include the relevant PPS as suggested.

Ref	Organisation	Comment	In Reference to	Action Required	Summary of Action
		<p>following PPS are included as baseline documents:</p> <p>National</p> <ul style="list-style-type: none"> o Scottish Government Heat Networks Bill – whilst this is not yet legislation, the implications of the measures contained in the bill could impact on the climate adaptation strategy. o Scottish Government Energy Strategy – as outlined in this document, heat accounts for more than half of the energy we consume (page18) o Scottish Government Heat Policy Statement: Towards Decarbonisation Heat: Maximising the Opportunities for Scotland (2015) o Scottish Government Programme for Government 2019 <p>Local</p> <ul style="list-style-type: none"> o Glasgow Local Heat and Energy Efficiency Strategy – pilot document which assesses the priorities for energy efficiency measures or encouragement of district heat or other low carbon heat for the whole Glasgow City area. This will contribute towards understanding of the energy (heat and electricity, and energy efficiency) baseline for the area. 			
31	SEPA	We consider that Scotland's Heat Map should be used as baseline data for identification of renewable and low or zero carbon heat sources within the Glasgow Climate Adaptation Strategy area. We understand that there are a number of proposed renewable and low or zero carbon heat projects that are under development in the Strategy area, and the heat map can be used to identify these.	Baseline - Material Assets	Action required	Noted, Appendix C of the SEA ER has been updated to include further information from Scotland's Heat Map.
32	SEPA	We consider that the environmental issues described generally highlight the main issues of relevance for the SEA topics within our remit.	General	No action required	Noted.
33	SEPA	We are satisfied with the alternatives outlined. These should be assessed as part of the SEA process and the findings of the assessment should inform the choice of the preferred option. This should be documented in the Environmental Report.	Assessment of Alternatives	No action required	Noted, the assessment of alternatives is set out within Section 6 of the SEA ER.

Ref	Organisation	Comment	In Reference to	Action Required	Summary of Action
34	SEPA	We agree that in this instance all environmental topics should be scoped into the assessment.	SEA Methodology	No action required	Noted.
35	SEPA	Appraisal Questions - Biodiversity o SEPA would recommend that the SEA considers the limiting / preventing of the spread of Invasive Non Native Species (INNS). o Agroforestry shelter belts will also benefit biodiversity (particularly if connecting to woodlands) in addition to providing abatement to air pollution by absorbing pollutants in the air, and thus benefit both Air Quality and Biodiversity topics.	SEA Objectives	Action required	Noted, Table 4-1 and Table 5-1 in the SEA ER has been revised to reflect these recommendations. This has also been accounted for in the Environmental Assessment as set out in Section 8 and Appendix D.
36	SEPA	Appraisal Questions - Water o We would suggest that for the water environment, the SEA considers whether the relevant River Basin Management water classifications require upgrading and whether or not finances from the Water Environment Fund (WEF) might be available. o An objective to reduce water use, ensure sustainable use of water and improve water use efficiency would be welcome. This could address rainfall harvesting and enabling grey water use in toilets (finding alternatives to using drinking water to flush toilets and other tasks that do not require this level of purification). o The question in relation to taking a whole catchment approach to flooding may also help to identify mitigation for the effects of surface sealing by using more permeable materials and construction to allow infiltration and reduce the amount of runoff, plus creating rain gardens and other integrated features within urban areas to catch and accelerate infiltration of flood water.	SEA Objectives	Action required	Noted, Table 5-1 in the SEA ER has been revised to reflect this recommendation and this has been accounted for in the Environmental Assessment as set out in Section 8 and Appendix D. With regards the availability of Water Environment Fund it is considered that this should be addressed at a local level as interventions are further developed.
37	SEPA	Appraisal Questions - Climatic Factors o The introduction of Heat Networks will be an important factor in helping to reduce Climate Change. Given the potential positive effects of heat networks, SEPA would expect the SEA to give them due consideration. We would therefore suggest that the ability of the Strategy to promote Heat Networks is included as an appraisal question within Table 6-2 - potentially against the topic of Climatic	SEA Objectives	Action required	Noted, Table 5-1 in the SEA ER has been revised to reflect these recommendations. Additions have been made under the Climatic Factors, Material Assets, Population and Human Health, and Air Quality topic headings. This has also been

Ref	Organisation	Comment	In Reference to	Action Required	Summary of Action
		<p>Factors.</p> <ul style="list-style-type: none"> o Questions in relation to microgeneration, neighbourhood grids, battery storage, uptake of electric vehicles (cars and bikes), renewable heat and active travel could also be included e.g. Does the plan promote development of 20 minute neighbourhoods, where everything essential is available within a 20 minute walk? o Questions could be included on increased resilience and shortened supply chains which could be achieved by promoting agriculture within the City Region area (on the areas identified suitable for mixed agriculture and on prime agricultural land) e.g. Does the plan increase resilience in the food system? Or, Does the plan create more produce growing space woven into communities e.g. through making more land available for allotments, making vacant / derelict land available or establishing garden share scheme? 			accounted for in the Environmental Assessment as set out in Section 8 and Appendix D.
2038	SEPA	<p>Appraisal Questions - Material assets (including soil resources)</p> <ul style="list-style-type: none"> o The disruption and exploitation of carbon rich soils, such as peatlands, and the subsequent loss of this form of carbon store, is a topic worthy of consideration. While the SEA will consider impacts to agricultural soils, SEPA would recommend that it also includes an assessment of potential impacts on carbon rich soils. We would recommend that the protection of carbon rich soils is added to the appraisal questions for the topic of Material Assets (including Soil Resources). 	SEA Objectives	Action required	Noted, Table 5-1 in the SEA ER has been revised to reflect this recommendation and this has been accounted for in the Environmental Assessment as set out in Section 8 and Appendix D.
39	SEPA	Including a commentary section within the matrices in order to state, where necessary, the reasons for the effects cited and the score given helps to fully explain the rationale behind the assessment results. This allows the Responsible Authority to be transparent and also allows the reader to understand the rationale behind the scores given.	SEA Methodology	Action required	Noted, the assessment matrices as set out in Appendix D of the SEA ER includes a commentary section which explains the rationale for the assessment undertaken for each intervention.
40	SEPA	Where it is expected that other plans, programmes or strategies are better placed to undertake more detailed assessment of environmental effects this should be clearly set out in the Environmental Report.	SEA Methodology	No action required	Noted, this information is set out in Appendix D of the SEA ER where deemed appropriate.

Ref	Organisation	Comment	In Reference to	Action Required	Summary of Action
41	SEPA	We would expect all aspects of the PPS which could have significant effects to be assessed.	SEA Methodology	No action required	Noted, refer to Appendix D of the SEA ER.
42	SEPA	We support the use of SEA Objectives as assessment tools as they allow a systematic, rigorous and consistent framework with which to assess environmental effects.	SEA Objectives	No action required	Noted.
43	SEPA	When it comes to setting out the results of the assessment in the Environmental Report please provide enough information to clearly justify the reasons for each of the assessments presented. It would also be helpful to set out assumptions that are made during the assessment and difficulties and limitations encountered.	SEA Methodology	Action required	Noted, the assessment matrices as set out in Appendix D of the SEA ER includes a commentary section which explains the rationale for the assessment undertaken for each intervention. Any assumptions / limitations encountered during the assessment are set out in Section 3.3 of the SEA ER.
44	SEPA	It is helpful if the assessment matrix directly links the assessment result with proposed mitigation measures	SEA Methodology	Action required	Noted. This will be set out clearly within the mitigation section (section 9) and within the assessment matrices
45	SEPA	We are content with the proposed detailed assessment matrix and particularly welcome the commentary box to fully explain the rationale behind the assessment results.	SEA Methodology	No action required	Noted.
46	SEPA	We are content with the proposed SEA Objectives to be used in the assessment.	SEA Objectives	No action required	Noted.
47	SEPA	We would encourage you to use the assessment as a way to improve the environmental performance of individual aspects of the final option; hence we support proposals for enhancement of positive effects as well as mitigation of negative effects.	SEA Methodology	No action required	Noted, the assessments undertaken have considered the potential for enhancement measures where possible.

Ref	Organisation	Comment	In Reference to	Action Required	Summary of Action
48	SEPA	It is useful to show the link between potential effects and proposed mitigation / enhancement measures in the assessment framework.	SEA Methodology	Action required	Noted, mitigation / enhancement measures are set out in Section 9 of the SEA ER and where appropriate linkages to the assessments undertaken have been included.
49	SEPA	<p>We would encourage you to be very clear in the Environmental Report about mitigation measures which are proposed as a result of the assessment. These should follow the mitigation hierarchy (avoid, reduce, remedy or compensate).</p> <p>One of the most important ways to mitigate significant environmental effects identified through the assessment is to make changes to the plan itself so that significant effects are avoided. The Environmental Report should therefore identify any changes made to the plan as a result of the SEA.</p>	SEA Methodology	Action required	Noted, mitigation / enhancement measures are set out in Section 9 of the SEA ER and where appropriate linkages to the assessments undertaken have been included.
50	SEPA	Where the mitigation proposed does not relate to modification to the plan itself then it would be extremely helpful to set out the proposed mitigation measures in a way that clearly identifies: (1) the measures required, (2) when they would be required and (3) who will be required to implement them. The inclusion of a summary table in the Environmental Report [such as that presented in SEPA's response] will help to track progress on mitigation through the monitoring process.	SEA Methodology	Action required	Noted, mitigation / enhancement measures are set out in Section 9 of the SEA ER and where appropriate linkages to the assessments undertaken have been included.
51	SEPA	Although not specifically required at this stage, monitoring is a requirement of the Act and early consideration should be given to a monitoring approach particularly in the choice of indicators. It would be helpful if the Environmental Report included a description of the measures envisaged to monitor the significant environmental effects of the plan.	General	Action required	Noted, a monitoring Section (section 10) has been included in the ER.
52	SEPA	We would find it helpful if the Environmental Report included a summary of the scoping outcomes and how comments from the Consultation Authorities were taken into account.	General	Action required	Noted, a summary of the responses to all comments from the SEA Consultation Authorities has been

Ref	Organisation	Comment	In Reference to	Action Required	Summary of Action
					set out above and is included in Appendix A of the SEA ER.
ER Consultation					
1	Public Questionnaire	<p>7. What are your views on the accuracy and scope of the information used to describe the SEA environmental baseline set out in the Environmental Report?</p> <p>The accuracy is poor as the rate of climate change and biodiversity loss is rapidly exceeding all the estimates and predictions.</p>	Baseline	No action required	The baseline information has been based upon the best available and up to date information.
2	Public Questionnaire	<p>7. What are your views on the accuracy and scope of the information used to describe the SEA environmental baseline set out in the Environmental Report?</p> <p>My expertise is not in the assessment of climate change impacts, and as such am not well-placed to comment on the information used to describe the SEA. However, relating to my following comment on the links between the SEA and the subsequent Social Impact Assessment, the following references may be of value in understanding the interface between environmental impacts of climate change and climate adaptation in the Glasgow City Region, and of how SEA outputs may be best mobilised to bring benefit to society.</p> <p>Baka, A., & Mabon, L. (2020). Assessing equality in neighbourhood availability of quality greenspace in Glasgow, Scotland, United Kingdom. SocArXiv. https://doi.org/10.31235/OSF.IO/D9JEH</p> <p>Cowley, J., Kiely, J., & Collins, D. (2016). Unravelling the Glasgow effect: The relationship between accumulative bio- psychosocial stress, stress reactivity and Scotland's health problems. Preventive Medicine Reports, 4, 370–375. https://doi.org/10.1016/j.pmedr.2016.08.004</p>	Baseline	Action required	The information sources have been reviewed and have been used to better inform the SEA assessment of SEA objectives.

Ref	Organisation	Comment	In Reference to	Action Required	Summary of Action
		<p>Mabon, L., et al (2020). Climate change, marginalised communities and considered debate within Scotland's climate emergency. Scottish Geographical Journal. https://doi.org/10.1080/14702541.2020.1834335</p> <p>Majekodunmi, M., Emmanuel, R., & Jafry, T. (2020). A spatial exploration of deprivation and green infrastructure ecosystem services within Glasgow city. Urban Forestry and Urban Greening, 52, 126698. https://doi.org/10.1016/j.ufug.2020.126698</p>			
3	Public Questionnaire	<p>SEA Background & Assessment Criteria</p> <p>We welcome the changes made to the Plans, Programmes and Strategies (PPS) assessment, baseline, SEA Objectives and indicator questions in line with our previous advice.</p>	Baseline	No action required	Noted
4	Public Questionnaire	<p>8. What are your views on the predicted environmental effects as set out in the Environmental Report?</p> <p>Serious underestimate.</p>	Environmental Assessment	No action required	Noted
5	Public Questionnaire	<p>8. What are your views on the predicted environmental effects as set out in the Environmental Report?</p> <p>Ok</p>	Environmental Assessment	No action required	Noted
6	Public Questionnaire	<p>8. What are your views on the predicted environmental effects as set out in the Environmental Report?</p> <p>As above, this is not an area where I feel I have sufficient expertise to comment.</p>	Environmental Assessment	No action required	Noted
7	Public Questionnaire	<p>8. What are your views on the predicted environmental effects as set out in the Environmental Report?</p> <p>We note the potential for negative impact on Landscape and Cultural Heritage.</p>	Environmental Assessment	No action required	Noted

Ref	Organisation	Comment	In Reference to	Action Required	Summary of Action
8	Public Questionnaire	8. What are your views on the predicted environmental effects as set out in the Environmental Report? The SEA clearly identifies cumulative benefits that will result from the implementation of the Strategy. This is particularly encouraging and highly supportive of a green recovery that is also socially inclusive.	Environmental Assessment	No action required	Noted
9	Public Questionnaire	9. What are your views on the findings of the SEA and the proposals for mitigation and monitoring of the environmental effects set out in the Environmental Report? Proposals do not go far enough to address the problems faced.	Environmental Assessment	No action required	Noted
10	Public Questionnaire	9. What are your views on the findings of the SEA and the proposals for mitigation and monitoring of the environmental effects set out in the Environmental Report? Ok	Mitigation and monitoring	No action required	Noted
11	Public Questionnaire	9. What are your views on the findings of the SEA and the proposals for mitigation and monitoring of the environmental effects set out in the Environmental Report? Whilst I do not have the expertise to comment meaningfully on the findings of the SEA, I would welcome the opportunity for the concurrent Social Impact Assessment to be opened up for comment and review. Scotland has an increasingly strong community of social science researchers working on climate justice issues across a breadth of disciplines (e.g. urban studies, geography, sociology, economics) who may be able to offer comment on the methodology and findings of the SIA and offer suggestions for follow-on research.	Mitigation and monitoring	No action required	CRC are undertaking a social impact assessment in parallel to the development of the main strategy. This is a voluntary assessment and is designed to reflect duties under the Equality Act 2010, but also to consider broader social issues associated with climate change in the Glasgow City Region.
12	Public Questionnaire	9. What are your views on the findings of the SEA and the proposals for mitigation and monitoring of the environmental effects set out in the Environmental Report?	Mitigation and monitoring	No Action required	CRC have undertaken consultation with the statutory consultees during November – December 2020, where comments were received on

Ref	Organisation	Comment	In Reference to	Action Required	Summary of Action
		For mitigation of potential negative effects on Landscape and Cultural Heritage, promoters and designers should liaise with Historic Environment Scotland, Nature Scotland, SEPA and other statutory consultees.			potential mitigation measures. These have been updated within this ER.
13	HES	<p>Intervention 8</p> <p>A significant proportion of the region's homes, offices, buildings and infrastructure will be historic or traditional structures, and we consider that there is likely to be a large degree of cross-over between Interventions 8.5 and 8.6. To ensure optimum outcomes, it will be important to ensure that the regional retrofit framework proposed in Intervention 8.5 takes a holistic approach which embeds appropriate measures for the historic environment from the outset.</p>	Adaptation Strategy: Interventions	Action required	Noted. The Interventions and Sub-interventions in the Strategy are not designed to be separate but considered together. However, as plans are developed to implement this, the role of historic and traditional structures will also be considered.
14	HES	Historic Environment Scotland has produced a range of case studies of energy efficiency retrofit, climate change adaptation and reuse of a wide range of different types of historic built assets that can inform this approach. Our work on climate change adaptation for historic and traditional buildings and structures is ongoing, and we would welcome further engagement on the delivery of Intervention 8.5 and exploration of how it will complement Intervention 8.6.	Adaptation Strategy: Interventions	Action required	CRC will continue to engage with Historic Environment Scotland throughout the delivery of the interventions.
15	HES	Well maintained buildings are more energy efficient, and more resilient to the impacts of climate change. In addition to retrofit, we recommend that you consider how encouraging regular maintenance and repair can contribute to securing the climate resilience of existing homes, offices, buildings and infrastructure through the Strategy.	Adaptation Strategy: Interventions	Action required	Noted. It was felt that this was covered as part of Intervention 4, enabling and equipping individuals to participate in adaptation, but there may be a need to strengthen this approach if not sufficiently effective in relation to the historic built environment
16	HES	We welcome the inclusion of Intervention 8.6, directly addressing the historic environment, and the commitment to collaboration to working with Historic Environment Scotland and other historic environment	Adaptation Strategy: Interventions	Action required	Agreed. The scope of the sub-intervention covers the range of the region's historic assets, with a

Ref	Organisation	Comment	In Reference to	Action Required	Summary of Action
		sector organisations. The wording of this intervention places a focus on some of the most high-profile and internationally valued historic environment sites in the region, and we welcome their inclusion. However, it will be important to ensure that in delivering this intervention, a holistic approach is taken which creates a framework for the whole historic environment, incorporating historic assets of varying types and levels of cultural significance.			couple of the most prominent ones shown for illustration.
17	HES	<p>Intervention 9</p> <p>Much existing blue and green infrastructure is also part of the historic environment. To make and keep our landscapes resilient, we have to consider the environment on a holistic basis and draw on both cultural and perceived natural heritage. However, established ways of managing the natural and historic environment do not always recognise that benefits and outcomes to both are often interdependent, and ecosystem services and natural capital accounting do not generally work well in recognising the contribution of the historic environment in the context of blue-green infrastructure. In view of this, we encourage you to take a holistic environmental approach to delivery of Intervention 9, and to explore the mutual benefits that can occur from the utilisation and enhancement of historic blue-green infrastructure.</p>	Adaptation Strategy: Interventions	Action required	Agreed – The updated strategy recognises the role of historic blue and green infrastructure through sub-intervention 9.6, which now emphasises the need for infill or expansion of existing blue and green infrastructure. Furthermore, a key principle to the Strategy is that since it is about transforming systems, all the Interventions must be delivered together as a holistic approach rather than being seen as individual silos. Cultural heritage is also referenced in Interventions 6, 8, whilst the wider role of culture is also included in Interventions 1 and 5.
18	HES	<p>Intervention 11</p> <p>Historic buildings can make a significant contribution to the circular economy. Nearly half of controlled waste comes from the construction and demolition industries. Existing buildings should be considered as assets. The preference should always be for their continued use and reuse – including materials salvaged from necessary demolitions. Retention and reuse of historic building stock and reuse of long lifespan salvaged materials can make a significant contribution to the circular economy and waste reduction, and we encourage you to explore how this can contribute to delivery of Intervention 11.</p>	Adaptation Strategy: Interventions	Action required	Intervention 11 was updated to acknowledge the wider shifts also taking place in the economy, such as the shift to circularity. In addition the Strategy was updated to reference the need to consider broader policy agendas, and the best practices in other areas of sustainability such as circularity mitigation as part of delivery (p.20).

Ref	Organisation	Comment	In Reference to	Action Required	Summary of Action
19	HES	<p>We are broadly content to agree with the findings presented in the Environmental Report, subject to the following detailed comments:</p> <ul style="list-style-type: none"> • As discussed in Part 1, we consider that there is a close alignment between Intervention 9 and the historic environment, and that there is potential for positive effects for SEA10 to occur. We also consider that there is potential for positive effects for SEA10 through the promotion of retention and reuse of historic environment assets in support of a circular economy. • Monitoring: The Scottish Housing Condition Survey is a useful source of data in relation to the condition and maintenance of historic / traditional homes. 	SEA ER Monitoring	Action required by WSP	The Scottish Housing Condition Survey has been added to the list of data sources within Table 10.1 - Monitoring Measures. The assessment of Intervention 9 has been reviewed.
20	NatureScot	<p>Chapter 3 – SEA Methodology</p> <p>3.2 – SEA Environmental Report</p> <p>The assessments in this section do not appear to make use of the ‘+/-’ conclusion – regularly utilised in other SEAs where both positive and negative impacts of an alternative or policy etc. have been identified, and as recommended by us in our scoping advice. However, it does not appear that this has significantly affected the conclusions of this SEA with regard to any of the topics that fall within our remit.</p>	SEA Methodology	Action required	Use of the +/- option was removed as it was considered that those effects where both positive and negative effects could arise were best described as uncertain, due to the nature of the strategy. The assessment narrative does, however, highlight the potential for positive and negative effects. The identification of uncertain effects also allows for mitigation and monitoring measures to be identified, whilst +/- effects do not necessarily warrant mitigation or monitoring measures.
21	NatureScot	<p>8.2 – Assessment of Environmental Effects</p> <p>In our scoping advice for this SEA we pointed out the necessity for all such plans and strategies to be made subject to a Habitats Regulations Appraisal (HRA), but suggested that the most practical approach would be to set out the HRA in a separate record, with cross-</p>	HRA	No action required	A HRA screening has been undertaken and will be published alongside the Strategy and PAS.

Ref	Organisation	Comment	In Reference to	Action Required	Summary of Action
		referencing between it and the SEA Environmental Report (ER) included in the text of both where appropriate.			
22	NatureScot	In response, the ER appears to state only (in the discussion of Mitigation/Enhancement at section 8.2.31) that "...project level Habitats Regulations Assessment (HRA) should be undertaken as required". This approach is justified in Appendix A (which discusses the scoping consultation responses received from the statutory consultees) by pointing out that the Strategy has not been "...developed to an extent whereby the spatial location / scale of the interventions is known, nor would their potential for likely significant effects upon Natura 2000 sites be able to be predicted."	HRA	No action required	A HRA screening has been undertaken and will be published alongside the Strategy and PAS.
23	NatureScot	While NatureScot would not necessarily disagree with that conclusion (though this is stated without prejudice to any views we may later wish to express in response to any consultation over an HRA for this Strategy), it does not negate the need for the requirements of the Habitats Regulations to be fulfilled in relation to this Strategy.	HRA	No action required	A HRA screening has been undertaken and will be published alongside the Strategy and PAS.
24	NatureScot	An HRA will need to be undertaken – and again, we advise that its findings be set out in a separate, stand-alone, record. However it may well be that it ends up being a fairly short appraisal – concluding in a straightforward manner that there will be no likelihood of significant effects on any European Site as a result of the Strategy itself, as it does not direct any specific development or projects to any specific locations (as has been stated).	HRA	No action required	A HRA screening has been undertaken and will be published alongside the Strategy and PAS.
25	SEPA	We have considered the ER and are satisfied that an adequate assessment of the Glasgow City Region Climate Change Adaption Strategy 2020 – 2030 has been carried out. We welcome the inclusion of Appendix A which summarises the comments from the consultation authorities and how these were taken into consideration in the assessment.	General	No action required	Noted

Ref	Organisation	Comment	In Reference to	Action Required	Summary of Action
26	SEPA	SEA Background & Assessment Criteria We welcome the changes made to the Plans, Programmes and Strategies (PPS) assessment, baseline, SEA Objectives and indicator questions in line with our previous advice.	ER -PPS Review	No Action required	Noted
27	SEPA	Assessment of Alternatives We are satisfied with the alternatives, and the assessment of these, set out in Section 6 of the ER. We note a transformational approach was likely to result in positive effects across all SEA topics.	ER - Alternatives	No Action required	Noted
28	SEPA	Compatibility Assessment We welcome the assessment of the compatibility of the Strategy Objectives with the SEA Objectives. Although these were found to be largely compatible, we note this identified some amendments to the Strategy Objectives.	ER - Compatibility Assessment	No Action required	Noted
29	SEPA	Evaluating the Potential Environmental Effects / Mitigation and Enhancement While the assessment did not identify any negative effects of the Strategy it did identify a number of uncertain effects. This is explained in many instances due to the level of detail currently available regarding the Interventions. Given the strategic nature of the Strategy, we acknowledge effects will ultimately depend on how the Interventions are implemented.	ER - Intervention Assessment	No Action required	Noted
30	SEPA	However, a theme across the mitigation / enhancement measures was that Intervention wording could be amended to draw out more details of the projects/investments/approaches etc to allow a more accurate assessment. While Table 9-1 suggests these measures are to be 'Embedded into Strategy narrative' it is unclear if it is anticipated that the SEA will be updated if that detail becomes available (this step isn't covered in Table 11-1 SEA and Strategy Timetable) or whether instead more local assessments will be undertaken once the forthcoming	ER – Mitigation	Action required	The Strategy has been updated and this version of the ER has been amended to reflect this update. The PAS outlines how the Strategy has considered the suggestions made within the SEA ER.

Ref	Organisation	Comment	In Reference to	Action Required	Summary of Action
		Action Plan, which will provide more detail on the Interventions, is published. If the detail becomes available at this stage, we would be happy to comment on any revisions to the assessment.			
31	SEPA	The mitigation identified for Interventions 6, 8 and 9 refers to the development of project specific mitigation measures. This is also a theme of the mitigation identified to address cumulative and synergistic effects. Table 9-1 suggests the mechanism for delivering these measures is at project level design and assessment. It may be useful to also capture this linkage within the Action Plan to ensure it is addressed.	ER – Mitigation	Action required	The indicators for monitoring the implementation of the Strategy will form part of the forthcoming Action Plan.
32	SEPA	Overall, one of the most important ways to mitigate significant negative environmental effects or enhance positive effects is to make changes to the Strategy itself. We note, as well as the matters discussed above, some changes have been identified through the assessment to mitigate / enhance the effects of the Strategy. We request the Post Adoption Statement clarifies where any changes have been made to the Strategy to reflect the assessment.	ER – Mitigation	Action required	The Strategy has been updated and this version of the ER has been amended to reflect this update. The PAS outlines how the Strategy has considered the suggestions made within the SEA ER.
33	SEPA	Monitoring We understand indicators for 'monitoring the implementation of the Strategy will form part of the forthcoming Action Plan'. This is a useful link between the assessment and the implementation of the Strategy. We recommend reference is made to our SEA guidance documents available on our website for further options and indicators to support monitoring of the environmental effects.	ER – Monitoring	Action required	Indicators in Table 10-1 have been updated in line with monitoring measures set out in SEPA's SEA guidance notes.

Appendix B

PPS ASSESSMENT



Table B-1 – Relationship with other Plans, Programmes and Strategies

Plan / Programme / Strategy		Environmental Objectives / Key Messages of the PPS	Implications for the Strategy	Compliance with Strategy Objectives (refer to Section 2.3 for the draft vision and objectives)				
				Vision	Obj. 1	Obj. 2	Obj. 3	Obj. 4
International								
Sustainability	Transforming our World: the 2030 Agenda for Sustainable Development	<ul style="list-style-type: none">• Sets a plan of action for people, planet and prosperity. It also seeks to strengthen universal peace in larger freedom.• Sets 17 Sustainable Development Goals (SDGs) and 169 targets. The SDGs seek to realise the human rights of all and to achieve gender equality and the empowerment of all women and girls. They are integrated and indivisible and balance the three dimensions of sustainable development: the economic, social and environmental.	The Strategy should promote the three dimensions of sustainable development and align with the 17 SDGs where possible.	✓	✓		✓	✓
	EU Adaptation Strategy	<ul style="list-style-type: none">■ Promoting action by member states and supporting adaptation in cities;■ Promoting adaptation in vulnerable sectors and ensuring Europe’s infrastructure is more resilient; and■ Better informed decision making by addressing gaps in knowledge about adaptation.	The Strategy will identify goals, objectives and action areas for the city to adapt to climate change.	✓	✓		✓	✓
Climatic factors	The Paris Agreement, 2015	Aims to limit the global warming change to well below 2°C above pre-industrial levels. However, countries aim to limit the increase to 1.5°C to reduce the impacts of global warming. The EU has committed to a binding target of a reduction	Whilst the Strategy should have cognisance of the Paris Agreement the Strategy should align with the more ambitious	✓	✓	✓		

Plan / Programme / Strategy		Environmental Objectives / Key Messages of the PPS	Implications for the Strategy	Compliance with Strategy Objectives (refer to Section 2.3 for the draft vision and objectives)				
				Vision	Obj. 1	Obj. 2	Obj. 3	Obj. 4
		of at least 40% in greenhouse gas emissions by 2030 compared to 1990.	targets which are set in legislation through the Climate Change (Emissions Reduction Targets) (Scotland) Act 2019					
	2030 Climate Framework	<p>The framework sets three key targets for the year 2030:</p> <ul style="list-style-type: none"> At least 40% cuts in greenhouse gas emissions (from 1990 levels); At least 27% share for renewable energy; and At least 27% improvement in energy efficiency 	The Strategy will need to align with 2030 targets	✓	✓	✓		
Biodiversity	Bern Convention on the Conservation of European Wildlife and Natural Habitats (1979)	<p>The convention has three main aims which are stated in Article 1:</p> <ul style="list-style-type: none"> to conserve wild flora and fauna and their natural habitats; to promote cooperation between states; and to give particular attention to endangered and vulnerable species including endangered and vulnerable migratory species. 	The Strategy should promote and protect the region's biodiversity and help build resilience to climate change	✓	✓			

Plan / Programme / Strategy	Environmental Objectives / Key Messages of the PPS	Implications for the Strategy	Compliance with Strategy Objectives (refer to Section 2.3 for the draft vision and objectives)				
			Vision	Obj. 1	Obj. 2	Obj. 3	Obj. 4
Conservation of Natural Habitats and Wild Fauna & Flora (the 'Habitats Directive') (1992)	The identification of a European network of Sites of Community Importance (SCIs) to be designated as Special Areas of Conservation (SACs). A SEA would need to report on any potential effects on SACs and all development plans should aim to avoid adverse effects on them	The Strategy should promote and protect the region's designated sites and help build resilience to climate change	✓	✓			
EU (2011) EU Biodiversity Strategy to 2020 – towards implementation	<p>Aimed at halting the loss of biodiversity and ecosystem services in the EU by 2020, the strategy provides a framework for action over the next decade and covers the following key areas:</p> <ul style="list-style-type: none"> • Conserving and restoring nature; ▪ Maintaining and enhancing ecosystems and their services; ▪ Ensuring the sustainability of agriculture, forestry and fisheries; ▪ Combating invasive alien species; and ▪ Addressing the global biodiversity crisis. 	The Strategy should promote and protect the region's biodiversity and help build resilience to climate change	✓	✓			

Plan / Programme / Strategy	Environmental Objectives / Key Messages of the PPS	Implications for the Strategy	Compliance with Strategy Objectives (refer to Section 2.3 for the draft vision and objectives)				
			Vision	Obj. 1	Obj. 2	Obj. 3	Obj. 4
EU (2013) 7th Environment Action Programme (EAP) to 2020	<p>The 7th EAP guided EU environmental policy up to 2020 and set ambitions for 2050. The Programme set the following as a priority objective: “to protect, conserve and enhance the Union’s natural capital.”</p> <p>The 7th EAP reflects the EU’s commitment to the preservation of biodiversity and the ecosystem services it provides for both its intrinsic value and the its contribution to economic well-being.</p> <p>The Programme highlights that integrating the value of ecosystem services into accounting and reporting across the Union and its member states by 2020 will result in the better management of natural capital.</p>	The Strategy should promote and protect the region’s biodiversity and help build resilience to climate change	✓	✓			
Air Quality	Ambient Air Quality Directive	The Ambient Air Quality Directive provides the current framework for the control of ambient concentrations of air pollution in the EU. The control of emissions from mobile sources, improving fuel quality and promoting and integrating environmental protection requirements into the transport and energy sector are part of these aims.	✓				

Plan / Programme / Strategy		Environmental Objectives / Key Messages of the PPS	Implications for the Strategy	Compliance with Strategy Objectives (refer to Section 2.3 for the draft vision and objectives)				
				Vision	Obj. 1	Obj. 2	Obj. 3	Obj. 4
Water Environment	<p>Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy ("The Water Framework Directive")</p>	<p>The main aims of the Water Framework Directive (WFD) are to:</p> <ul style="list-style-type: none"> prevent deterioration and enhance status of aquatic ecosystems, including groundwater promote sustainable water use reduce pollution contribute to the mitigation of floods and droughts <p>The WFD requires the creation of River Basin Management Plans (RBMPs).</p> <p>Statutory objectives are set for Scottish waters through River Basin Management Planning. These objectives are based on ecological assessments and economic judgments. The plans cover all types of water body, e.g. rivers, lochs, lakes, estuaries, coastal waters and groundwater.</p>	<p>The Strategy should support improved resilience to climate change and flood risk management and the integration of river basin management planning to protect and improve the status of water bodies across the City Region.</p>	✓	✓			✓
	<p>Directive 2007/60/EC of the European Parliament and of the Council of 23 October 2007 on the assessment and management of flood risks</p>	<p>Requires Member States to assess if all water courses and coast lines are at risk from flooding, to map the flood extent and assets and humans at risk in these areas and to take adequate and coordinated measures to reduce this flood risk.</p>	<p>The Strategy should promote sustainable flood risk management and align with key actions to protect humans and assets.</p>	✓	✓			✓

Plan / Programme / Strategy		Environmental Objectives / Key Messages of the PPS	Implications for the Strategy	Compliance with Strategy Objectives (refer to Section 2.3 for the draft vision and objectives)				
				Vision	Obj. 1	Obj. 2	Obj. 3	Obj. 4
	Directive 2006/118/EC of the European Parliament and of the Council of 12 December 2006 on the protection of groundwater against pollution and deterioration	This Directive establishes a regime which sets groundwater quality standards and introduces measures to prevent or limit inputs of pollutants into groundwater. The directive establishes quality criteria that takes account local characteristics and allows for further improvements to be made based on monitoring data and new scientific knowledge.	The Strategy should support the progressive reduction of pollution of groundwater and preventing further pollution.	✓	✓			✓
Material Resources (Incl. Soils)	Directive 2018/851 of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC on waste	Waste management in the EU should be improved and transformed into sustainable material management, with a view to protecting, preserving and improving the quality of the environment, protecting human health, ensuring prudent, efficient and rational utilisation of natural resources, promoting the principles of the circular economy, enhancing the use of renewable energy, increasing energy efficiency, reducing the dependence of the Union on imported resources, providing new economic opportunities and contributing to long-term competitiveness.	The Strategy should aim to support the improvement of waste infrastructure and promote both the efficient use of resources and reduction in waste to landfill.	✓	✓			✓

Plan / Programme / Strategy		Environmental Objectives / Key Messages of the PPS	Implications for the Strategy	Compliance with Strategy Objectives (refer to Section 2.3 for the draft vision and objectives)				
				Vision	Obj. 1	Obj. 2	Obj. 3	Obj. 4
National								
Overarching	National Planning Framework for Scotland 3 (NPF3), 2014	The NPF3 sets out the long-term vision for development and investment across Scotland over the next 20 years. The main aim is to create opportunities for all of Scotland to flourish, through increasing sustainable economic growth. To achieve this, the Government Economic Strategy aims to share the benefits of growth by encouraging economic activity and investment across all of Scotland’s communities, whilst protecting the nation’s natural and cultural assets.	The Strategy should take account of the spatial and environmental issues set out in the NPF3 to deliver benefits for communities, the economy and the wider environment.	✓	✓	✓		✓
	Protecting Scotland, Renewing Scotland, The Government's Programme for Scotland 2020-2021	<p>This Programme for Government sets out the Scottish Government's response to these connected challenges and opportunities. It commits to:</p> <ul style="list-style-type: none">■ A national mission to create new jobs, good jobs and green jobs - with a particular focus on our young people, supporting retraining and investing in our Green New Deal to tackle climate change■ Promoting lifelong health and wellbeing - by tackling COVID-19, remobilising and reforming the NHS and social care and tackling health inequalities■ Promoting equality and helping our young people fulfil their potential	The strategy should align with the government's key commitments.	✓				

Plan / Programme / Strategy	Environmental Objectives / Key Messages of the PPS	Implications for the Strategy	Compliance with Strategy Objectives (refer to Section 2.3 for the draft vision and objectives)				
			Vision	Obj. 1	Obj. 2	Obj. 3	Obj. 4
Planning (Scotland) Act 2006	Sets provision for the preparation, examination and publication of development plans. Defines duty of planning authorities to exercise development planning functions to contribute to sustainable development.	The Strategy should align with planning requirements and seek to contribute to sustainable development.	✓	✓	✓		
Scottish Planning Policy 2014	Identifies the Scottish Government's central purpose at sustainable economic growth. SPP sets out the main purpose and tasks of the planning system and national policies across all policy sectors.	The Strategy must act in accordance with the national policies set out in the SPP including a natural resilient place; a low carbon place; a successful, sustainable place; and a connected place.	✓	✓	✓		
Climate Ready Scotland: Second Scottish Climate Change Adaptation Programme 2019 -2024	<p>This is a 5 year programme to prepare Scotland for the challenges posed by the changing climate. It includes seven key outcomes:</p> <ul style="list-style-type: none"> Our communities are inclusive, empowered, resilient and safe in response to climate change; The people in Scotland who are most vulnerable to climate change are able to adapt and climate justice is embedded in climate change adaptation policy; Our inclusive and sustainable economy is flexible, adaptable and responsive to the changing climate; 	The Strategy should align with the outcomes of the Climate Change Adaptation Programme	✓	✓	✓	✓	✓

Plan / Programme / Strategy		Environmental Objectives / Key Messages of the PPS	Implications for the Strategy	Compliance with Strategy Objectives (refer to Section 2.3 for the draft vision and objectives)				
				Vision	Obj. 1	Obj. 2	Obj. 3	Obj. 4
		<ul style="list-style-type: none"> Our society's supporting systems are resilient to climate change; Our natural environment is valued, enjoyed, protected and enhanced and has increase resilience to climate change; Our coastal and marine environment is valued, enjoyed, protected and enhances and has increase resilience to climate change; and Our international networks are adaptable to climate change. 						
	UK Green Finance Strategy, 2019	<p>This strategy recognises the role of the financial sector in delivering global and domestic climate and environmental objectives. It sets out:</p> <ul style="list-style-type: none"> the proposals for green finance at the heart of delivering the UK's Clean Growth Strategy, 25 Year Environment Plan and Industrial Strategy how the proposals support the UK's economic policy for strong, sustainable and balanced growth 	The Strategy should align aims and targets with the Green Finance Strategy to support proposals for green finance to deliver strong, sustainable and balanced growth.	✓	✓			
Climatic Factors	UK Committee on Climate Change, Interim UK Carbon Budgets	<p>The UK has committed to an 100% reduction in its greenhouse gas emissions by 2050. In order to help meet this target, the UK Committee on Climate Change (CCC) has devised a series of interim UK "carbon budgets" as follows:</p> <ul style="list-style-type: none"> 1st carbon budget (2008 to 2012): 25% reduction; 	The Strategy should take cognisance of the Interim UK Carbon Budgets, however alignment with the reductions targets in the Climate Change (Emissions Reduction	✓	✓			

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		<ul style="list-style-type: none"> 2nd carbon budget (2013 to 2017): 31% reduction; 3rd carbon budget (2018 to 2022): 37% reduction by 2020; 4th carbon budget (2023 to 2027): 50% reduction by 2025; and 5th carbon budget (2028 to 2032): 57% reduction by 2030. 	Targets) (Scotland) Act 2019 is required.					
Climate Change (Emissions Reduction Targets) (Scotland) Act 2019		The 2009 Act sets the statutory framework for greenhouse gas emissions reductions in Scotland by setting an interim 56% by 2020, 75% by 2030, 90% by 2040, and net zero by 2045.	The Strategy should align with the 2019 Act.	✓	✓			
The Scottish Energy Strategy, 2017		The Scottish Energy Strategy sets out a clear vision for the development of energy systems across Scotland that will create economic opportunities whilst supporting work to achieve Scotland's long-term climate change targets.	The Strategy should align with the Strategy targets.	✓	✓			
UK Climate Change Risk Assessment (CCRA) 2012 and 2017		<p>The 2017 CCRA concluded that the most urgent risks for the UK resulting from periods of too much or too little water, increasing average and extreme temperatures and sea level rise include:</p> <ul style="list-style-type: none"> Flooding and coastal change; Health, wellbeing and productivity; Shortages in the public water supply; Natural capital; 	The assessment will inform the Strategy and is relevant to all Outcomes	✓	✓	✓		

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				Vision	Obj. 1	Obj. 2	Obj. 3	Obj. 4
		<ul style="list-style-type: none"> Domestic and international food production and trade; and New and emerging pests and diseases. 						
	UK Clean Growth Strategy, 2017	<p>Key polices of the strategy include:</p> <ul style="list-style-type: none"> Develop world leading Green Finance capabilities; Develop a package of measures to support businesses to improve their energy productivity, by at least 20 per cent by 2030; Establish an Industrial Energy Efficiency scheme; Demonstrate international leadership in carbon capture usage and storage; Publish joint industrial decarbonisation and energy efficiency action plans; Phase out the installation of high carbon forms of fossil fuel heating in new and existing businesses; Support recycling of heat; Upgrade all fuel poor homes to be upgraded to Energy Performance Certificate (EPC) Band C by 2030; Develop a long term trajectory to improve the energy performance standards of privately rented homes; Build and extend heat networks across the country; Invest in low carbon heating by reforming the Renewable Heat Incentive; 	The Strategy should align aims and targets with the Clean Growth Strategy	✓	✓			

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		<ul style="list-style-type: none"> Develop one of the best electric vehicle charging networks in the world; design a new system of future agricultural support to focus on delivering better environmental outcomes; zero avoidable waste by 2050; and Support peatland through a £10 million capital grant scheme for peat restoration. 						
Population and Health	Equality Act, 2010	<p>The Equality Act 2010 legally protects people from discrimination in the workplace and in wider society. It is against the law to discriminate against anyone because of:</p> <ul style="list-style-type: none"> age; being or becoming a transsexual person; being married or in a civil partnership; being pregnant or having a child; disability; race including colour, nationality, ethnic or national origin; religion, belief or lack of religion / belief; sex; and sexual orientation. 	The Strategy will need to ensure consideration of all protected groups.	✓	✓	✓	✓	

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	Good Places, Better Health, 2008	<p>Good Places, Better Health supports five National Outcomes</p> <ul style="list-style-type: none"> Our children have the best start in life and are ready to succeed; We live longer, healthier lives; We have tackled the significant inequalities in Scottish society; We live in well-designed, sustainable places where we are able to access the amenities and services we need; and We value and enjoy our built and natural environment and protect and enhance it for future generations. 	The Strategy should consider the impacts of climate change on health inequalities.	✓	✓	✓	✓	
	Equally Well, 2008	<p>The Strategy aims to tackle health inequalities in the following key areas:</p> <ul style="list-style-type: none"> Early years and young people; Tackling poverty and increasing employment; Physical environments and transport; Harms to health and wellbeing – alcohol, drugs and violence; and Health and wellbeing. 	The Strategy should consider the impacts of climate change on different equality groups	✓	✓	✓	✓	

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			Vision	Obj. 1	Obj. 2	Obj. 3	Obj. 4
Scotland's Economic Strategy, 2015	<p>The strategy focuses on two key pillars – increasing competitiveness and tackling inequality.</p> <p>These are underpinned by four key priorities:</p> <ul style="list-style-type: none"> Investing in our people and our infrastructure in a sustainable way; Fostering a culture of innovation and research and development; Promoting inclusive growth and creating opportunity through a fair and inclusive jobs market and regional cohesion; and Promoting Scotland on the international stage to boost trade and investment, influence and network. 	The Strategy should align with the Economic Strategy's key pillars and key priorities.	✓	✓		✓	
Community Empowerment (Scotland) Act, 2015	The Community Empowerment (Scotland) Act 2015 helps to empower community bodies through the ownership or control of land and buildings, and by strengthening their voices in decisions about public services.	The Strategy should help to promote community empowerment	✓	✓	✓	✓	
Foresight Mental Capital and Wellbeing Project (2008). Final Project report. The Government Office for Science	As the number of older adults increases substantially in the UK over the next six decades, the existing urban and rural infrastructure will need to be adapted so that the needs of these people are met. For example, issues of access, transport, amenity and security will substantially affect the wellbeing of older people.	The Strategy should consider the impacts of climate change on health inequalities. And mental health and wellbeing	✓	✓		✓	

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				Vision	Obj. 1	Obj. 2	Obj. 3	Obj. 4
	A More Active Scotland: Scotland's Physical Activity Delivery Plan, 2018	<p>The strategy includes six key outcomes:</p> <ul style="list-style-type: none"> Encourage and enable the inactive to be more active; Encourage and enable the active to stay active through life; Develop physical confidence and competence from the earliest age; Improve active infrastructure; Support wellbeing and resilience in communities through physical activity and sport; and Improve opportunities to participate, progress and achieve in sport. 	The Strategy should look at ways of building resilience to community facilities, greenspaces, footpaths and cycleways in order to help promote active lifestyles	✓	✓	✓	✓	
Biodiversity	The Nature Conservation (Scotland) Act 2004	<p>The Act sets out a series of measures, designed to conserve biodiversity and to protect and enhance the biological and geological natural heritage of Scotland.</p> <p>The Act places a general duty on all public bodies to further the conservation of biodiversity.</p>	The Strategy should promote and protect the region's biodiversity and help build resilience to climate change	✓	✓			

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Wildlife and Countryside Act (as amended 1981)	<p>The Wildlife and Countryside Act 1981 consolidates and amends existing national legislation to implement the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) and Council Directive 79/409/EEC on the conservation of wild birds (Birds Directive) in Great Britain (NB Council Directive 79/409/EEC has now been replaced by Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (codified version)).</p> <p>The Act provides for the notification and confirmation of Sites of Special Scientific Interest (SSSIs) and the protection of wildlife.</p>	The Strategy should promote and protect the region's biodiversity and help build resilience to climate change	✓	✓			
2020 Challenges for Scotland's Biodiversity	<p>Scotland's 2020 Challenge aims to:</p> <ul style="list-style-type: none"> protect and restore biodiversity on land and in our seas, and to support healthier ecosystems; connect people with the natural world, for their health and wellbeing and to involve them more in decisions about their environment; and maximise the benefits for Scotland of a diverse natural environment and the services it provides, contributing to sustainable economic growth. 	The Strategy should align with the 2020 Challenge aims and protect the region's biodiversity.	✓		✓		

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Environment Bill 2020	<p>The Environment Bill 2020 sets out how we plan to protect and improve the natural environment in the UK. Acting as one of the key vehicles for delivering the 25 Year Environment Plan, the Environment Bill brings about urgent and meaningful action to combat the environmental and climate crisis we are facing. It sets a domestic framework for environmental governance and helps to deliver on the government's commitment to be the first generation to leave our environment in a better state.</p> <p>The Environment Bill helps to manage the impact of human activity on the environment, creating a more sustainable and resilient economy, and enhancing well-being and quality of life. It will engage and empower citizens, local government and businesses to deliver environmental outcomes and create a positive legacy for future generations.</p>	The Strategy should align with the Environment Bill's objectives to manage the impact of human activity on the environment, creating a more sustainable and resilient economy, and enhancing well-being and quality of life.	✓	✓			

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The UK 25 Year Environment Plan, 2018	<p>The 25 Year Environment Plan outlines the Government's ambition to leave our environment in a better state than we found it. The Plan includes ten key targets of which two focus on biodiversity.</p> <p>Thriving plants and wildlife:</p> <ul style="list-style-type: none"> Restoring 75% of our one million hectares of terrestrial and freshwater protected sites to favourable condition, securing their wildlife value for the long term; Creating or restoring 500,000 hectares of wildlife-rich habitat outside the protected site network, focusing on priority habitats as part of a wider set of land management changes providing extensive benefits; and Taking action to recover threatened, iconic or economically important species of animals, plants and fungi and where possible to prevent human-induced extinction or loss of known threatened species in England and the Overseas Territories. <p>Enhancing biosecurity:</p> <ul style="list-style-type: none"> Managing and reducing the impact of existing plant and animal diseases; lowering the risk of new ones and tackling invasive non-native species; 	The Strategy should take the 25 year environment plan's objective into account	✓	✓	✓	✓	

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Scottish Biodiversity Strategy 2006	<p>The Strategy outlines the vision for the future health of biodiversity in Scotland. The strategy highlights the need to:</p> <ul style="list-style-type: none"> Undertake better planning, design and practice for landscapes and ecosystems; encourage more engagement with people in biodiversity conservation; To take biodiversity into account in decision making; and Halt the loss of biodiversity 	The Strategy should promote and protect the region's biodiversity and help build resilience to climate change	✓		✓		
Scotland's National Marine Plan, 2015	<p>The overall vision of the marine environment is for a <i>'clean, healthy, safe, productive and diverse seas; managed to meet the long term needs of nature and people'</i>.</p> <p>The vision for the marine environment is underpinned by a series of strategic objectives which are focused on key themes:</p> <ul style="list-style-type: none"> Economy; Social; Marine ecosystem; Climate change mitigation; and Climate change adaptation. 	The Strategy should align with the Marine Plan's climate change mitigation and adaptation proposals.	✓	✓	✓		

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Scottish Forestry Strategy 2006	<p>The Strategy provides a framework for well managed forests providing a wide range of benefits and recognising the role of forests in sustainable development.</p> <p>The Strategy highlights climate change as a key theme and includes ways for tackling the threats of climate change, adapting Scotland's woodlands and the forestry sector.</p>	The Strategy should promote and protect the region's forests and woodlands and help build resilience to climate change	✓		✓		
Landscape	The UK 25 Year Environment Plan, 2018	The Strategy should take the 25 year environment plan's objective into account	✓				
	SNH Landscape Policy Framework, 2006	The Strategy's sets out our overarching aim - <i>"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."</i>	✓				
	Green Infrastructure: An integrated approach to	The Landscape Institute's most recent position statement, 'Green Infrastructure LI Position Statement 2013' sets out why green infrastructure crucial to our sustainable future.	✓				

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	landscape use. Landscape Institute Position Statement, 2013	The publication showcases a range of successful green infrastructure projects and shows how collaboration is key to delivering multifunctional landscapes. It also illustrates why landscape professionals should take the lead on the integration of green infrastructure.						
	Scotland's Land Use Strategy 2016-2021	<p>The main vision of the strategy is 'A Scotland where we fully recognise, understand and value the importance of our land resources, and where our plans and decisions about land use will deliver improved and enduring benefits, enhancing the wellbeing of our nation'.</p> <p>This is underpinned by three objectives:</p> <ul style="list-style-type: none"> Land-based businesses working with nature to contribute more to Scotland's prosperity; Responsible stewardship of Scotland's natural resources delivering more benefits to Scotland's people Urban and rural communities better connected to the land, with more people enjoying the land and positively influencing land use. 	The Strategy should align with the overall vision and objectives of the Land Use Strategy.	✓	✓	✓	✓	
Cultural Heritage	Planning (Listed buildings and Conservation Areas) Act 1990	This is an Act relating to special controls in respect of listed buildings and areas of special architectural or historic interest.	The Strategy should promote and manage the adaptation and maintenance of its heritage assets and	✓				

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			landscapes in a sustainable way, without loss of character.					
	1979 Ancient Monuments and Archaeological Areas Act	Where Ancient Monuments are present the following Act influences the extent of public control to ensure the protection of scheduled ancient monuments.	The Strategy should promote and manage the adaptation and maintenance of its heritage assets and landscapes in a sustainable way, without loss of character.	✓				
	Historic Environment Scotland Act 2014	This sets out the functions for Historic Environment Scotland in investigating, caring for and promoting Scotland's historic environment.	The Strategy should promote and manage the adaptation and maintenance of its heritage assets and landscapes in a sustainable way, without loss of character.	✓				
	Our Place in Time: The Historic Environment Strategy for Scotland 2014	Sets out a vision to that Scotland's environment is understood and valued, cared for and protected. The key outcome is to ensure that the cultural, social, environmental and economic value of Scotland's historic environment continues to make a strong contribution to the wellbeing of the nation and its people.	The Strategy should promote and manage the adaptation and maintenance of its heritage assets and landscapes in a	✓				

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		sustainable way, without loss of character.					
Historic Environment Policy for Scotland 2019	Sets out the six policies which define how the historic environment should be managed	The Strategy should promote and manage the adaptation and maintenance of its heritage assets and landscapes in a sustainable way, without loss of character.	✓				
Water Environment	<p>The Act ensures that all human activity that can have a harmful impact on water is controlled by</p> <ul style="list-style-type: none"> ■ promoting sustainable use of water based on the long-term protection of available water resources; ■ ensuring the progressive reduction of pollution of groundwater and preventing further pollution; and ■ preventing further deterioration of, and protecting and enhancing, the status of water ecosystems. 	The Strategy should work towards reducing the impacts on the water environment from severe weather events, reduce level of run off and pollution to watercourses and address challenges from flooding and drought.	✓	✓			
	The UK 25 Year Environment Plan, 2018	"Improve at least three quarters of our waters to be close to their natural state as soon as is practicable by: [...] Reaching or exceeding objectives for rivers, lakes, coastal and ground	✓		✓		

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		waters that are specially protected, whether for biodiversity or drinking water".						
	Flood Risk Management (Scotland) Act 2009	The Act introduces a more sustainable and modern approach to flood risk management which are better suited to current needs and can accommodate the impacts of climate change. Under the Act the Government worked with SEPA to created 14 Flood Risk Strategies.	The Strategy should promote sustainable flood risk management and align with key actions.	✓	✓	✓	✓	
	Clyde and Loch Lomond Flood Risk Management Strategy, 2015	The Strategy highlights the main sources of flood risk in the region and the location of the region's vulnerable areas.	The Strategy should promote sustainable flood risk management and align with actions	✓	✓	✓	✓	✓
	River Basin Management Plan for the Scotland River Basin District 2015-2027	The Management Plan aims to protect and improve the water environment of the Scotland river basin district. It sets out how relevant authorities can tackle the pressures and improve the condition of their watercourses.	The Strategy should support improved resilience to climate change and flood risk management and the integration of natural flood management measures	✓	✓	✓	✓	✓
Air Quality	Air Quality (Scotland) Amendment Regulations 2016	The air quality objectives set out in the Air Quality (Scotland) Regulations 2000, the Air Quality (Scotland) Amendment Regulations 2002 and the Air Quality (Scotland) Amendment	The Strategy should recognise the impact of climate change on air quality and support the	✓				

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		Regulations 2016 provide the statutory basis for local air quality management areas.	delivery of air quality management measures.					
	National Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2007)	This Air Quality Strategy sets out air quality objectives and policy options to further improve air quality in the UK from today into the long term.	The Strategy should take air quality targets into account.	✓				
	Cleaner Air for Scotland – The Road to a Healthier Future 2015	The purpose of the strategy is to provide a national framework which sets out how the Scottish Government and its partner organisations propose to achieve further reductions in air pollution and fulfil our legal responsibilities as soon as possible. It focuses on key areas such as transport; health; placemaking; communications and climate change.	The Strategy should use the framework to align future targets	✓	✓			
Material Assets	Scotland's Zero Waste Plan, 2010	The plan outlines Scotland's key objectives in relation to waste prevention, recycling and reducing the amount of waste sent to landfill on the journey to a zero waste Scotland. The plan proposes targets for Scotland's waste	The Strategy should aim to protect waste infrastructure from the impacts of climate change and encourage ta reduction in waste to landfill.	✓		✓		

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The Scottish Soil Framework 2009	This aim of this framework is to instigate a process by which key stakeholders will work together to achieve better soil protection from future challenges including climate change.	The Strategy should understand the importance of the regions soils and protect resources from the impacts of climate change.	✓				
Scottish Government Heat Networks Bill (2020)	<p>The Heat Networks (Scotland) Bill will introduce regulation and a licensing system for district and communal heating to accelerate use of the networks across Scotland.</p> <p>The aim of the Bill is to encourage greater use of heat networks in Scotland. Heat networks are made up of insulated pipes and heat generation systems which make heat. This can be in the form of hot water or steam. This will help reduce emissions from homes and other buildings.</p>	The Strategy should support the implementation of heat networks across the City Region.	✓				
Heat Policy Statement: Towards Decarbonisation Heat: Maximising the Opportunities for Scotland (2015)	<p>The Heat Policy Statement sets out the future policy direction for addressing the three key aspects of the heat system:</p> <ul style="list-style-type: none"> ■ how it is used (heat demand and its reduction) ■ how it is distributed and stored (heat networks and heat storage) ■ where heat comes from (heat generation) 	The Strategy should support the implementation of heat networks across the City Region.	✓				

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	Each of these aspects of the heat system is addressed by three specific objectives as set out in the heat hierarchy: <ul style="list-style-type: none"> Reducing the need for heat Supplying heat efficiently and at least cost to consumers Using renewable and low carbon heat 						
National Transport Strategy, 2020	The overall aim of the strategy – “We will have a sustainable, inclusive, safe and accessible transport system, helping deliver a healthier, fairer and more prosperous Scotland for communities, businesses and visitors” The Strategy has four key areas: <ul style="list-style-type: none"> Reduce inequalities; Take climate action; Help deliver inclusive economic growth; and Improve health and wellbeing. 	The Strategy should aim to protect the transport network and associated infrastructure from climate change	✓	✓	✓		
Strategic Transport Projects Review, 2008	Sets out the Scottish Government's 29 transport investment priorities over the period to 2032. The STPR identifies those recommendations that most effectively contribute towards the Government's Purpose of increasing sustainable economic growth. STPR supports three strategic outcomes as set out in the National Transport Strategy: <ul style="list-style-type: none"> Improving journey times and connections Reducing emissions 	The Strategy should support the development of infrastructure in the STPR and align with the strategic outcomes.	✓	✓	✓		

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	<ul style="list-style-type: none"> Improving quality, accessibility and affordability. 						
The Scottish Rural Development Programme 2014-2020	<p>This programme delivers Pillar 2 of the EU Common Agricultural Policy and funds economic, environmental and social measures for the benefit of rural Scotland. The main priorities include:</p> <ul style="list-style-type: none"> Supporting agricultural and forestry businesses; Protecting and improving the natural environment; Enhancing the rural economy; Addressing the impact of climate change; and Supporting rural communities. 	The Strategy should align with the priorities of the Rural Development Programme.	✓	✓	✓		
Scotland: Making Things Last - A Circular Economy Strategy 2016	<p>The strategy's four priority areas, based on their resource use, environmental impact and importance to the Scottish economy, are:</p> <ul style="list-style-type: none"> Food, drink, and the broader bio-economy; Remanufacture; Construction and the built environment; and Energy infrastructure. 	The Strategy should support the development of a circular economy.	✓	✓	✓		
Infrastructure Investment Plan 2015	<p>The 2015 plan includes a set of guiding principles for infrastructure investment, which provide the framework for investment decisions. These are:</p>	The Strategy should aim to protect key infrastructure from the effects of climate change, in order deliver	✓	✓	✓		

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		<ul style="list-style-type: none"> delivering sustainable economic growth through increasing competitiveness and tackling inequality; managing the transition to a more resource efficient, lower carbon economy; supporting delivery of efficient and high quality public services; and supporting employment and opportunity across Scotland. 	sustainable economic growth.					
Regional								
Glasgow and Clyde Valley Green Network Strategy		<p>The Glasgow City Region's Green Network will provide well-connected, high quality, multi-functional greenspaces throughout the region. From cycle paths to allotments, wildlife habitats to urban rain gardens. The Green Network will provide easy and well-linked access to the outdoors for people of all ages, wherever they live or work, creating new opportunities to actively explore our region's wonderful assets as part of their everyday lives.</p> <p>In line with the Scottish Government's vision for Scotland, the region's Green Network has the potential to provide a wide range of meaningful and valuable benefits for this area, its environment and the people living and working here centred on:</p> <ul style="list-style-type: none"> A successful, sustainable place; A natural, resilient place; 	The Strategy should support the Green Network Strategy through the provision of interventions that benefit the City Region and delivering on the established goals.	✓	✓	✓	✓	✓

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	<ul style="list-style-type: none"> A connected place; and A low carbon place. 						
Clyde Marine Planning Partnership's Regional Marine Plan (Pre-Consultation Draft, 2019)	<p>The Vision of the Regional Marine Plan is “<i>The marine and coastal environment of the Clyde Marine Region is clean, healthy, safe, productive, biologically diverse and accessible for all. It is managed sustainably to support productive and thriving coastal communities and to allow nature to flourish.</i>” The Plan was developed in accordance with five overarching principles:</p> <p>GP1 – Sustainable Development</p> <p>GP2 – Support delivery of Good Environmental Status</p> <p>GP3 – Ecosystem Approach</p> <p>GP4 – Adding Value not Complexity</p> <p>GP5 – Multiple Responsible use of Marine Space</p>	The Strategy should align with the overarching principles of the Plan and aim to protect the marine environment from climate change.	✓	✓	✓	✓	✓

Plan / Programme / Strategy	Environmental Objectives / Key Messages of the PPS	Implications for the Strategy	Compliance with Strategy Objectives (refer to Section 2.3 for the draft vision and objectives)				
			Vision	Obj. 1	Obj. 2	Obj. 3	Obj. 4
Metropolitan Glasgow Strategic Drainage Partnership (MGSDP) Surface Water Management Masterplan, 2016	<p>The vision of the MGSDP to 2060 is “to transform how the city region thinks about and manages rainfall to end uncontrolled flooding and improve water quality”. This vision will be delivered through five overarching objectives:</p> <ul style="list-style-type: none"> ■ Flood risk reduction. ■ River water quality improvement. ■ Enabling economic development. ■ Habitat improvement. ■ Integrated investment planning. 	The Strategy should align with the objectives of the Strategy and aim to provide support to meet the 2060 Vision.	✓	✓	✓		✓
Political Economy Mapping of Adaptation and Climate Resilience in Glasgow City Region Pilot Study Findings, 2020	<p>This paper presents the results of a pilot study on political economy mapping of regional resilience in Glasgow City Region.</p> <p>The objective was to use the pilot test to determine whether it is possible to complete an assessment of the political economy of climate resilience in a region without first completing a national level assessment.</p>	Key barriers, challenges and opportunities identified should be considered within the Strategy.	✓	✓	✓		
Climate Risk and Opportunity Assessment for Glasgow City Region	<p>These risk assessments assess gaps in Glasgow City Region’s current approach to managing climate risk and cover the following key themes:</p> <ul style="list-style-type: none"> ■ Infrastructure; ■ Built environment; ■ Society and human health; ■ Natural environment; ■ Economy, business and industry; and ■ International and cross cutting. 	These risk and opportunity assessment form a key part of the Strategy.	✓	✓	✓	✓	✓

Plan / Programme / Strategy	Environmental Objectives / Key Messages of the PPS	Implications for the Strategy	Compliance with Strategy Objectives (refer to Section 2.3 for the draft vision and objectives)				
			Vision	Obj. 1	Obj. 2	Obj. 3	Obj. 4
Economic implications of climate change for Glasgow City Region – Adaptation Report, 2019	<p>The framework is designed to help identify those options that have a strong economic justification. It focuses on three different types of early priorities:</p> <ol style="list-style-type: none"> 1. Addressing existing climate risks in the region by implementing ‘no-regret’ or ‘low-regret’ actions. 2. Intervening early to ensure that adaptation is considered in decisions that have long lifetimes, such as major infrastructure developments, in order to avoid ‘lock-in’. 3. Starting the early adaptation steps, and putting plans in place, for decisions that have long lead times or involve long-term major risks. 	This report forms a key evidence base for the Strategy	✓	✓	✓	✓	✓
Clyde Plan, Strategic Development Plan, 2017	<p>The Strategic Plan is based upon four planning outcomes of:</p> <ul style="list-style-type: none"> ■ successful and sustainable places – supporting sustainable economic growth and regeneration and the creation of well-designed places; ■ low carbon places – reducing carbon emissions and adapting to climate change; ■ natural and resilient places – helping to protect and enhance the natural and cultural assets and facilitating their sustainable use; and, ■ connected places – supporting better transport and digital connectivity. 	Objectives of the Strategy should be aligned with the strategic development plan.	✓	✓	✓	✓	✓

Plan / Programme / Strategy	Environmental Objectives / Key Messages of the PPS	Implications for the Strategy	Compliance with Strategy Objectives (refer to Section 2.3 for the draft vision and objectives)				
			Vision	Obj. 1	Obj. 2	Obj. 3	Obj. 4
Glasgow City Region Economic Action Plan, 2017	The Glasgow City Region Economic Strategy sets out a vision for 2035 – “A strong, inclusive, competitive and outward-looking economy, sustaining growth and prosperity with every person and business reaching their full potential”	The Strategy shouldn’t compromise the success of the key objectives but look at ways to integrate.	✓		✓	✓	
Regional Transport Strategy Delivery Plan 2018/19 - 2020/21	The Plan is structured around the four strategy outcomes - Attractive Seamless Reliable Travel, Improved Connectivity, Access for All and Reduced Emissions.	The Strategy should align approaches with the delivery particularly in regard to reducing emissions.	✓		✓		✓
Local Heat and Energy Efficiency Strategies, 2019	<p>Local Heat and Energy Efficiency Strategies (LHEES) are currently being piloted under the Energy Efficient Scotland programme. LHEES aim to establish area-based plans and priorities for systematically improving the energy efficiency of buildings, and decarbonising heat.</p> <p>Under Phase 1 of the LHEES pilot programme, 12 local authorities around Scotland were awarded £50-70K to trial the development of an LHEES, which includes Glasgow City Council, and Renfrewshire Council.</p> <p>Under Phase 2 of the LHEES pilot programme, 11 local authorities around Scotland were awarded £30-60K to trial the development of an LHEES.</p>	The Strategy should take the LHEES pilot aims from the relevant City region local authorities into consideration.	✓				

Plan / Programme / Strategy	Environmental Objectives / Key Messages of the PPS	Implications for the Strategy	Compliance with Strategy Objectives (refer to Section 2.3 for the draft vision and objectives)				
			Vision	Obj. 1	Obj. 2	Obj. 3	Obj. 4
East Dunbartonshire Local Development Plan, 2017	<p>The main vision of the Plan is “<i>Working together to achieve the best with the people of East Dunbartonshire.</i>”</p> <p>This vision is supported by over-arching principles for good planning and lie at the heart of achieving the Council’s vision and high-quality places. These include:</p> <ol style="list-style-type: none"> 1. Sustainable economic growth 2. Design and placemaking 3. Supporting regeneration and protection of the Green Belt 4. Sustainable Transport 5. Green infrastructure and green network 	The Draft Strategy should take local plans and policies into consideration and ensure a joined-up approach.	✓		✓		✓
East Renfrewshire Local Development Plan, 2015	<p>The vision of the Plan is: “<i>East Renfrewshire is a modern, dynamic and ambitious area. In a period of significant change up to 2025 and beyond, the vision for the Plan is to maintain and build on the areas qualities and to ensure that East Renfrewshire remains a desirable place to live and work. By 2025 the area will have attracted significant investment, jobs and tourism, a range of house types and sizes to meet local needs has been provided, with improved public transport and an enhanced green network and leisure opportunities available to all</i>”.</p>	The Draft Strategy should take local plans and policies into consideration and ensure a joined-up approach.	✓		✓		✓

Plan / Programme / Strategy	Environmental Objectives / Key Messages of the PPS	Implications for the Strategy	Compliance with Strategy Objectives (refer to Section 2.3 for the draft vision and objectives)				
			Vision	Obj. 1	Obj. 2	Obj. 3	Obj. 4
Glasgow City Development Plan, 2017	<p>The Plan has two key aims:</p> <ul style="list-style-type: none"> ■ Creating and maintaining a high quality, healthy place. ■ Developing a compact city form that supports sustainable development. <p>To achieve the key aims set out above, and to address the City's challenges as identified in the City Profile, the Plan sets out a strategy that seeks to deliver on four strategic outcomes:</p> <ul style="list-style-type: none"> ■ A vibrant place with a growing economy ■ A thriving and sustainable place to live and work ■ A connected place to move around and do business in ■ A green place 	The Draft Strategy should take local plans and policies into consideration and ensure a joined-up approach.	✓		✓		✓
Inverclyde Local Development Plan, 2019	<p>The overall aim of this Plan is “<i>to contribute towards Inverclyde being an attractive and inclusive place to live, work, study, visit and invest, now and in the future, particularly through encouraging investment and new development, which is sustainably designed and located and contributes to the creation of successful places, and by protecting and enhancing the natural environment of Inverclyde</i>”.</p>	The Draft Strategy should take local plans and policies into consideration and ensure a joined-up approach.	✓		✓		✓

Plan / Programme / Strategy	Environmental Objectives / Key Messages of the PPS	Implications for the Strategy	Compliance with Strategy Objectives (refer to Section 2.3 for the draft vision and objectives)				
			Vision	Obj. 1	Obj. 2	Obj. 3	Obj. 4
North Lanarkshire Local Plan, 2012	<p>The Plan sets out the vision for the area as a place where:</p> <ul style="list-style-type: none"> ■ People want to live because of the range, quality, and affordability of housing; the safety of communities; the quality and accessibility of the natural environment; and the quality of amenities and services in the area. ■ People live well because health, well-being, and life chances are as good as those elsewhere in Scotland. ■ People choose to do business because support for new and existing businesses, business sites, the transport network, and the quality of workforce are second to none in Scotland. ■ People participate in learning at all ages and stages of life to achieve their full potential. ■ People have a fair chance in life and where factors that limit opportunities are overcome. ■ Particularly our children and young people are safe, nurtured, healthy, achieving, active, respected, responsible, and included. 	The Draft Strategy should take local plans and policies into consideration and ensure a joined-up approach.	✓		✓		✓

Plan / Programme / Strategy	Environmental Objectives / Key Messages of the PPS	Implications for the Strategy	Compliance with Strategy Objectives (refer to Section 2.3 for the draft vision and objectives)				
			Vision	Obj. 1	Obj. 2	Obj. 3	Obj. 4
Renfrewshire Local Development Plan, 2014	<p>The Plan aims to secure the principles of the spatial strategy in each new development and therefore all development proposals will require to be considered in relation to the following overarching outcomes:</p> <ul style="list-style-type: none"> ■ The quality of the development contributes positively to the character and appearance of the place, benefiting the amenity of the area and protecting the built heritage, its setting and the natural environment. ■ The design of new development is demonstrated to benefit the area by following the principles of 'Designing Places'. ■ Buildings and structures are designed to support the principles of low carbon generating technology to reduce emissions. ■ The development does not have an adverse effect on the integrity of any sites protected as a Natura 2000 site. 	The Draft Strategy should take local plans and policies into consideration and ensure a joined-up approach.	✓		✓		✓

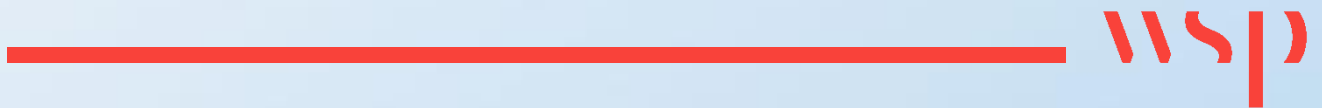
Plan / Programme / Strategy	Environmental Objectives / Key Messages of the PPS	Implications for the Strategy	Compliance with Strategy Objectives (refer to Section 2.3 for the draft vision and objectives)				
			Vision	Obj. 1	Obj. 2	Obj. 3	Obj. 4
South Lanarkshire Local Development Plan, 2015-2020 ¹⁹	The main aim of the Plan is to ' <i>To promote the continued growth and regeneration of South Lanarkshire by seeking sustainable economic and social development within a low carbon economy whilst protecting and enhancing the environment</i> '.	The Draft Strategy should take local plans and policies into consideration and ensure a joined-up approach.	✓		✓		✓

¹⁹ South Lanarkshire Council has now prepared a Proposed South Lanarkshire Local Development Plan 2 which has been submitted to the Scottish Government Planning and Environmental Appeals Division (DPEA) for examination. It is anticipated that the plan will be adopted in 2020.

Plan / Programme / Strategy	Environmental Objectives / Key Messages of the PPS	Implications for the Strategy	Compliance with Strategy Objectives (refer to Section 2.3 for the draft vision and objectives)				
			Vision	Obj. 1	Obj. 2	Obj. 3	Obj. 4
West Dunbartonshire Local Plans	<p>There are currently two local development plans covering the West Dunbartonshire Planning Authority area - These are the West Dunbartonshire Local Plan (Adopted 2010) and the West Dunbartonshire Local Development Plan (Proposed Plan 2015).</p> <p>A new Local Development Plan is currently being prepared, which will, on adoption, replace these plans.</p> <p>The Council's Strategic Priorities, which support and enable the key priorities of the Plan for Place, are:</p> <ul style="list-style-type: none"> • A strong local economy and improved job opportunities; • Supporting, individuals, families and carers living independently and with dignity; • Meaningful engagement with active, empowered and informed citizens who feel safe and engaged; • Open, accountable and accessible local government; and • Efficient and effective frontline services that improve the everyday lives of residents. 	The Draft Strategy should take local plans and policies into consideration and ensure a joined-up approach.	✓		✓		✓

Appendix C

UPDATED ENVIRONMENTAL BASELINE





NATURAL CAPITAL

Natural capital can be defined as the ‘*the stock of renewable and non-renewable resources that combine to yield a flow of benefits to people*’²⁰. Natural capital incorporates multiple different components of the living and non-living natural environment, as well as the functions and processes that link these components and sustain life. It is from this Natural Capital that humans utilise a wide range of services, which are often describe as ecosystem services.

NatureScot’s Natural Capital Asset Index (NCAI) tracks changes in the capacity of Scotland’s terrestrial ecosystems to provide benefits to people. The 2019 Index update showed that the potential of Scotland’s habitats to deliver ecosystem services has improved over the past 18 years and is now at its highest level since 2000, recovering from a low in 2012²¹.

The 2019 update contains results from 2000 up to 2017. The update showed that Scotland’s natural capital is now in an ‘increasing’ state, increasing over 2% in the three years to 2017 and has increased in each of the past five updates²². Since 2000, key habitat increases have been heathland, inland surface waters, coastal waters and woodlands. Mires, bogs and fens, heathland and grassland habitats have both seen decreases when compared to 2000 baseline year, however, they are showing signs of recovery²². Agricultural and cultivated land has continued to decrease since 2000²².

In 2016, the asset value of Scotland’s natural capital was valued at £196 million, which made up 20% of the whole UK’s asset value. Of this asset value, 37% was attributable to non-material benefits not directly captured in gross domestic product²³.

CLIMATIC FACTORS

Emissions of greenhouse gases (GHGs) are having a detrimental impact upon the global atmosphere, and it is widely acknowledged that GHGs are already contributing to changes in the global climate, with extreme weather conditions becoming increasingly common. Equally, even if GHG emissions were stopped today, climate impacts would still be experienced in the future owing to lags in the climate system.

According to UK Climate Projections 2018 (UKCP18)²⁴ over the past few decades there has been an increase in annual average rainfall over the UK, particularly over Scotland for which the most recent decade (2008–2017) has been on average 11% wetter than 1961–1990 and 4% wetter than 1981–2010²⁴.

²⁰ The Natural Capital Coalition <http://naturalcapitalcoalition.org/natural-capital/>

²¹ Scotland’s Natural Capital Asset Index, 2020 Summary, [online] available at:

<https://www.nature.scot/sites/default/files/2020-04/Scotland%27s%20Natural%20Capital%20Asset%20Index%202020%20-%20Update%20summary.pdf>

²² Nature Scot, Scotland’s Natural Capital Asset Index, Story Map, [online] available at:

<https://snh.maps.arcgis.com/apps/Cascade/index.html?appid=d5d1ed312b1f480f810a45a237cfeefc>

²³ Office for National Statistics, Scottish Natural Capital Accounts 2020, [online] available at:

<https://www.ons.gov.uk/economy/environmentalaccounts/articles/scottishnaturalcapitalaccounts/2020>

²⁴ Met Office, UKCP18 Science Overview Report, 2019 Update [online] available at:

<https://www.metoffice.gov.uk/pub/data/weather/uk/ukcp18/science-reports/UKCP18-Overview-report.pdf>

In general, climate change is projected to lead to wetter winters and drier summers although natural variation, including extreme events such as storms and heat waves, will continue to punctuate these trends. By the 2080s, winter precipitation is expected to increase in Scotland by 1.4% to 41.4%, with a central estimate of 19.5%. For summer projections, rainfall is projected to decrease by 39.3% to 1.2%, with a central estimate of a decrease in 20.2%. The Climate Ready Clyde Risk Assessment²⁵ supports this trend with winter precipitation predicted to increase by between 9% and 49.3% across the City Region.

Temperatures in Scotland are projected to continue to rise over the next century, with milder winters and hotter summers. By the 2080s, projected increases in the City Region reported in the Climate Ready Clyde Risk Assessment range from 1.9 – 4.8°C of warming during the winter, with summer increases projected to range from 2.4 – 6.9°C. As well as the general changes in temperature, the City Region is projected to see more frequent and severe heat waves. Under a medium emissions scenario, by the 2050s, the likelihood of a heat wave occurring in any year is 1 in 3. Across the City Region there will be a variance between urban and rural areas. This is due to a range of factors, including less vegetation, reduced reflectivity and the storing of heat in the built environment. In addition, the extra heat generated from heating, cooling and transport also contributes to overall variations.

Coastal flood risk is projected to increase over the 21st century, which would be dominated by the effects of time-mean sea level rise, rather than changes in atmospheric storminess associated with extreme coastal sea level events²⁴. Sea levels are rising due to a combination of thermal expansion of the water (60%) and the melting of glaciers, ice caps and polar ice sheets (40%). By 2080, sea levels in the Clyde Marine Region²⁶ are expected to rise by 0.47m²⁷ with extreme long-term predictions (to the year 2300) ranging from 0 – 3m. This is likely to cause coastal inundation, through erosion of the intertidal zones. Data for the Mull of Kintyre to the Mull of Galloway zone²⁸ suggests that the rate of erosion has increased from the historical to the current period by c.0.3 m/yr to 0.7 m/yr.

The Scottish Government is committed to a low carbon economy through reductions in carbon emissions and adaptation to climate change. The Climate Change (Emissions Reduction Targets) (Scotland) Act 2019²⁹ sets targets to reduce Scotland's emissions of all greenhouse gases 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. This net-zero target is five years ahead of the rest of the UK. Glasgow City Council have also set a more ambitious target to become carbon neutral by 2030.

²⁵ Towards a Climate Ready Clyde: Climate Risks and Opportunities for Glasgow City Region. Methods and Approach, 2019

²⁶ The Clyde Marine Region area extends from the Normal Tidal Limit of the River Clyde in Glasgow City centre, seawards to the outer firth in Argyll and Ayrshire.

²⁷ Hansom et al, Dynamic Coast - National Coastal Change Assessment: National Overview, 2017

²⁸ Dynamic Coast - National Coastal Change Assessment: Cell 6 - Mull of Kintyre to the Mull of Galloway [online] available at: <http://www.dynamiccoast.co.uk/files/reports/NCCA%20-%20Cell%206%20-%20Mull%20of%20Kintyre%20to%20the%20Mull%20of%20Galloway.pdf>

In 2018, the total CO₂ emissions across the City Region were 8425kt, a reduction of 29% over the 2008 total of 11,799kt. During 2018, the highest number of CO₂ emissions were attributed by the transport sector, making up 40.7% of total CO₂ emissions in the City Region³⁰. During the same period, there was a 37% reduction in CO₂ emissions nationally, with a fall from 39,814kt to 25,195kt. Nationally, the biggest contributor to CO₂ emissions is the industry and commercial sector with 13,280kt (53%)³⁰.

POPULATION AND HUMAN HEALTH

The City Region has a total population of 1,845,020, making up just over a third (34%) of Scotland's total population³¹. Of the eight local authorities making up the City Region, Glasgow City has the highest total population with 633,120 people³².

By 2043 the population within the City Region is anticipated to increase by 2.3%, which is slightly higher than the national average of 2%³². The largest increase in population is anticipated to be in East Renfrewshire with an 11.9% rise, whilst the population in Inverclyde is anticipated to decrease by 15.2%. Decreases in population are also anticipated in North Lanarkshire (-1%) and West Dunbartonshire (-7.1%).

The highest proportion of people in the region are aged between 25–29 (7.7% of the total City Region), which is particularly high in Glasgow³¹. The median age of City Region Population is 43 years, which is slightly higher than the national average of 42 years³³. The median age for men in the City Region is 41.2 years and 44.5 years for women, both of which are higher than the national averages (40.6 years and 43.4 years respectively). There is a slightly higher proportion of women living in the City Region compared to men (51.5% compared to 48.5%)³¹.

The City Region comprises of an area of 3346km², with a population density of 551.4 people per km², which is significantly higher than the national average of 70 people per km²³⁴. Glasgow City has the highest population density within the City Region with 3,624 people per km², whilst South Lanarkshire has the lowest population density with 181 people per km²³².

Overall the ethnic make-up of the City Region is more diverse than the national average, with 10.9% of the population coming from Black, Asian or Minority Ethnic groups (BAME), compared to 7.9% nationally³⁵. The population of the City Region is 94.4% white, 0.3% mixed ethnic, 4.0% Asian, 0.8% African and 0.2% Arab. Glasgow City is the most ethnically diverse of the eight local authority areas with 22.7% of the population identifying as BAME³³. Conversely, Inverclyde is the least ethnically diverse with 2.5% of the population identifying as BAME³³.

³⁰ Compiled using data from: Department for Business, Energy and Industrial Strategy, 2018 UK Greenhouse Gas Emissions, 2020, [online] Available at: <https://www.gov.uk/government/statistics/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics-2005-2016>

³¹ National Records Scotland, Mid-2019 Population Estimates

³² National Records Scotland, Population Projections for Scottish Areas (2018-based)

³³ National Records Scotland, Age and sex structure of administrative areas, Mid-2019 Population Estimates

³⁴ National Records Scotland, Land area and population density by administrative area, Mid-2019 Population Estimates

³⁵ Scotland's Census, Table DC2101SC - Ethnic group by sex by age, 2011

Those most affected by climate change tend to be the very poorest, predominantly from BAME communities. This was evidenced during the 2016 High Court enquiry into the UK government's efforts to tackle air pollution, where it was indicated that white-British people are exposed to 14.9% less air pollution than other ethnic groups³⁶. Socially vulnerable neighbourhoods are over-represented in areas prone to flooding (all sources), but most significantly in areas prone to coastal (and tidal) flooding³⁷.

Levels of overall deprivation across the City Region are varied. Of the eight local authority areas, Inverclyde is the most deprived (as well as the most deprived nationally), with 31.5% of its data zones³⁸ amongst the top 10% nationally, which is closely followed by Glasgow at 30.4%³⁹. East Renfrewshire and East Dunbartonshire are the least deprived local authorities in the City Region, ranking 26th and 27th respectively, out of Scotland's 32 local authorities in terms of overall deprivation³⁹.

With regards to health deprivation, Inverclyde is the most deprived, with 31.5% of its data zones located amongst the top 10% of deprived areas nationally³⁹. Again, this is closely followed by Glasgow City, with 30.4% of its data zones amongst the top 10% of deprived nationally, with regards to health. Similar to overall deprivation, East Renfrewshire and East Dunbartonshire are significantly less deprived with regards to health deprivation, with the highest number of data zones amongst the top 20% of least deprived nationally (57.38% and 50.77% respectively) ranking them first and second nationally³⁹.

The median life expectancy across the City Region for males is 76.4 years and 80.2 years for females, both of which are lower than the national averages which are 77.1 years for males and 81.1 years for females⁴⁰. East Dunbartonshire and East Renfrewshire are the only local authorities that exceed the national averages for both males (80.1 years) and females (83.5 years)⁴⁰. Glasgow City has the lowest life expectancy for males at 73.4 years, whilst West Dunbartonshire has the lowest for females at 78.8 years⁴⁰.

The City Region is covered by two regional NHS boards; Lanarkshire (covering North and South Lanarkshire) and Greater Glasgow and Clyde (East and West Dunbartonshire, East Renfrewshire, Glasgow City, Inverclyde and Renfrewshire). The Public Bodies (Joint Working) (Scotland) Act (2014) created a number of new public organisations, known as integration authorities of which there are eight joint integration bodies across the City Region, one per local authority area), with a view to breaking down barriers to joint working between NHS boards and local authorities. It placed a requirement on NHS boards and local authorities to integrate health and social care

³⁶ Noor, P, Climate justice is a black and white issue – so why isn't the environmentalist movement?, 2017, [online] available at: <https://lacuna.org.uk/environment/climate-justice-black-white-issue-isnt-environmentalist-movement/>

³⁷ Sayers, et al, Present and future flood vulnerability, risk and disadvantage, A UK Assessment, [online] available at: <https://www.climatejust.org.uk/sites/default/files/Sayers%20et%20al%202017%20-%20Assessment%20Methodology.pdf>

³⁸ The Scottish Index of Multiple Deprivation is a relative measure of deprivation across 6,976 small areas (called data zones)

³⁹ Scottish Index of Multiple Deprivation 2020, [online] available at: <https://www.gov.scot/collections/scottish-index-of-multiple-deprivation-2020/>

⁴⁰ National Records Scotland, Life Expectancy for Areas in Scotland, 2014-2016

budgets and identified nationally agreed outcomes and a requirement on partnerships to strengthen the role of clinicians and care professionals, along with the third and independent sectors, in the planning and delivery of services.

Health in the region is varied. In 2018, those describing their health as either good or very good was lower than the national average (73%) in both Greater Glasgow and Clyde and Lanarkshire at 70%⁴¹. Those describing their health as bad or very bad was higher than the national average in both Greater Glasgow and Clyde and Lanarkshire, at 10% compared to the national average of 8%⁴¹.

Levels of physical activity are significantly⁴² lower than the national average in Lanarkshire at 60% compared to 64% nationally⁴³. Levels in Greater Glasgow and the Clyde are similar to the national average at 63%⁴⁴. This pattern reflected when looking at the number of people classed as either overweight or obese, which is significantly higher than the national average (65%) in Lanarkshire (69%), whilst levels in Greater Glasgow and the Clyde are slightly lower than the national average at 63%⁴⁴.

The percentage of people in both Greater Glasgow and the Clyde and Lanarkshire, who have a limiting long-term illness is slightly higher than the national average (32%) at 33% and 35% respectively⁴⁵.

BIODIVERSITY

There is a large range of regionally, nationally and locally designated sites within the Glasgow City Region including:

- Loch Lomond and the Trossachs National Park;
- 137 Sites of Special Scientific Interest (SSSI);
- 31 Local Nature Reserves (LNR);
- 12 National Nature Reserves (NNR);
- 17 Country Parks;
- 6 Important Bird Areas.

In addition to these, there are numerous internationally designated sites within the City Region, outlined below in **Table C-1**. **Figure C2** shows the locations of the designated sites within the City Region.

Table C-1 – Internationally Designated Sites

RAMSAR	Special Areas of Conservation (SAC)	Special Protection Areas (SPA)
Loch Lomond Inner Clyde	Black Loch Moss Braehead Moss Clyde Valley Woods Coalburn Moss	Black Cart Loch Lomond Renfrewshire Heights Slamannan Plateau

⁴¹ The Scottish Health Survey, 2018 - Self-assessed general health, Very good/Good, All adults, 2015-2018

⁴² Significance has been determined by the ScotCen Social Research

⁴³ The Scottish Health Survey, 2018 - Physical activity, Meets recommendations, All adults, 2015-2018

⁴⁴ The Scottish Health Survey, 2018 - Overweight, Overweight (including obese), All adults, 2015-2018

⁴⁵ The Scottish Health Survey, 2018 - Long-term illness, Limiting long-term illness, All adults, 2015-2018

RAMSAR	Special Areas of Conservation (SAC)	Special Protection Areas (SPA)
	Cranley Moss Loch Lomond Loch Lomond Woods North Shotts Moss Waukenwae Moss West Fannyside Moss Red Moss	Muirkirk and North Lowther Uplands Inner Clyde

In addition, local authorities have identified a number of designated Local Nature Conservation Sites (LNCS) which include sites of Importance for Nature Conservation (SINCs), Listed Wildlife Sites (LWSs) and Local Geodiversity Sites.

Forests, woodlands and trees make an important contribution to the region's biodiversity. There are approximately 56,850 hectares of woodland within the City Region, making up 16.7% of total City Region area⁴⁶. The woodland within the City Region includes 14,691 hectares of native woodlands⁴⁷, making up 3.5% of the total City Region area and 21% of the City Region's total woodland⁴⁶. The native woodland networks of the City Region are internationally important for their biodiversity value and provide some of the best ancient and semi-natural woodlands in lowland Scotland⁴⁸.

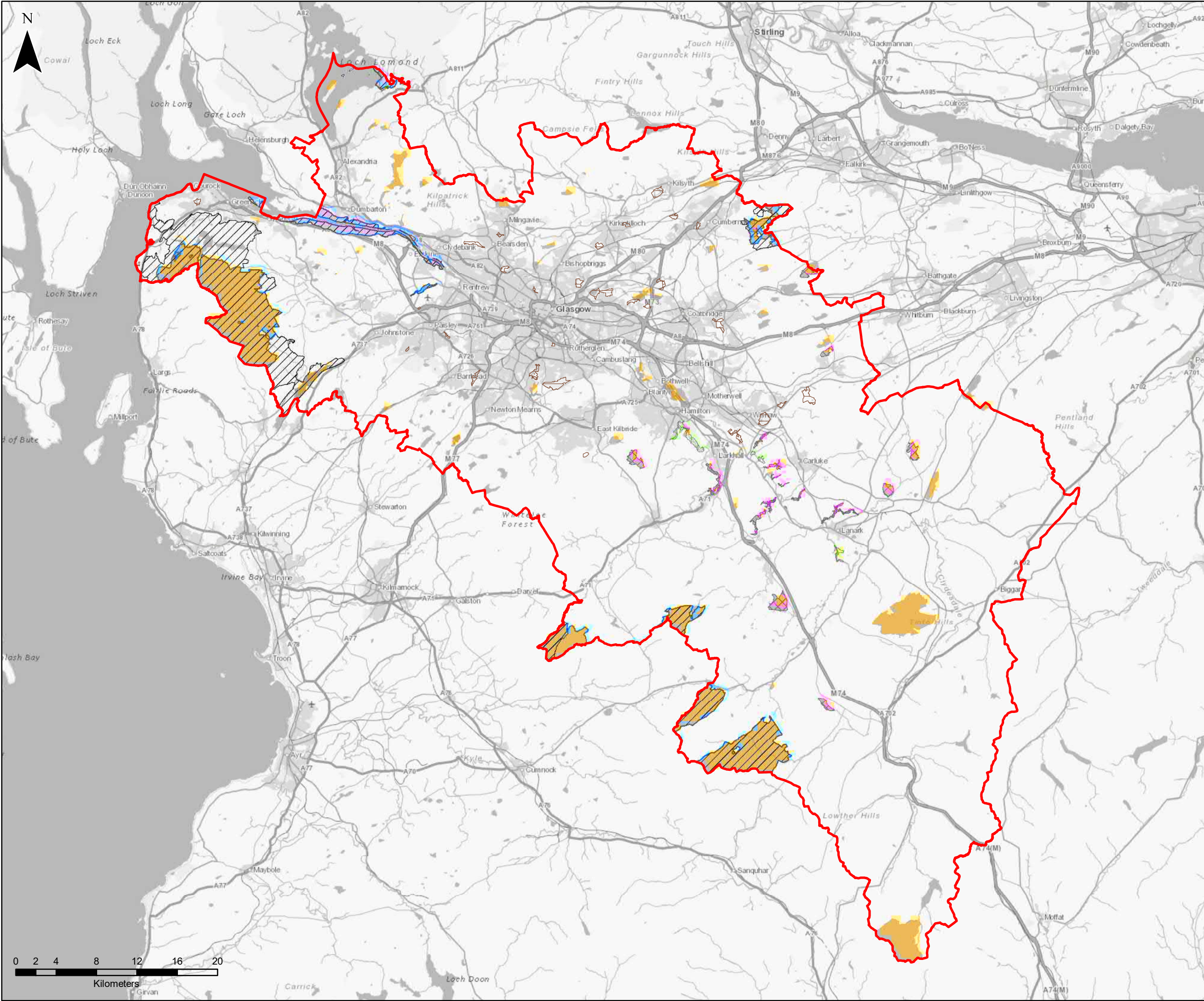
Figure C3 shows the region's woodland.

Within the region, some areas of productive forestry were planted on ancient, semi-natural and long established woodland sites, replanting with native or non-native species, which has resulted in the degradation in ecological value of these ancient woodland sites. The remaining ancient woodland sites within the City Region are few in number and largely fragmented, with some being felled and replanted, occasionally with non-native species.

⁴⁶ Derived from the National Forest Inventory Scotland 2013 and the Native Woodland Survey of Scotland 2014



⁴⁷ Climate Ready Clyde, Technical Note, Theme 4 – Natural Environment and Natural Assets [online] available at: <https://static1.squarespace.com/static/5ba0fb199f8770be65438008/t/5c6e8619f9619aea294ea01a/1550747167482/16+Technical+-+Natural+Environment.pdf>

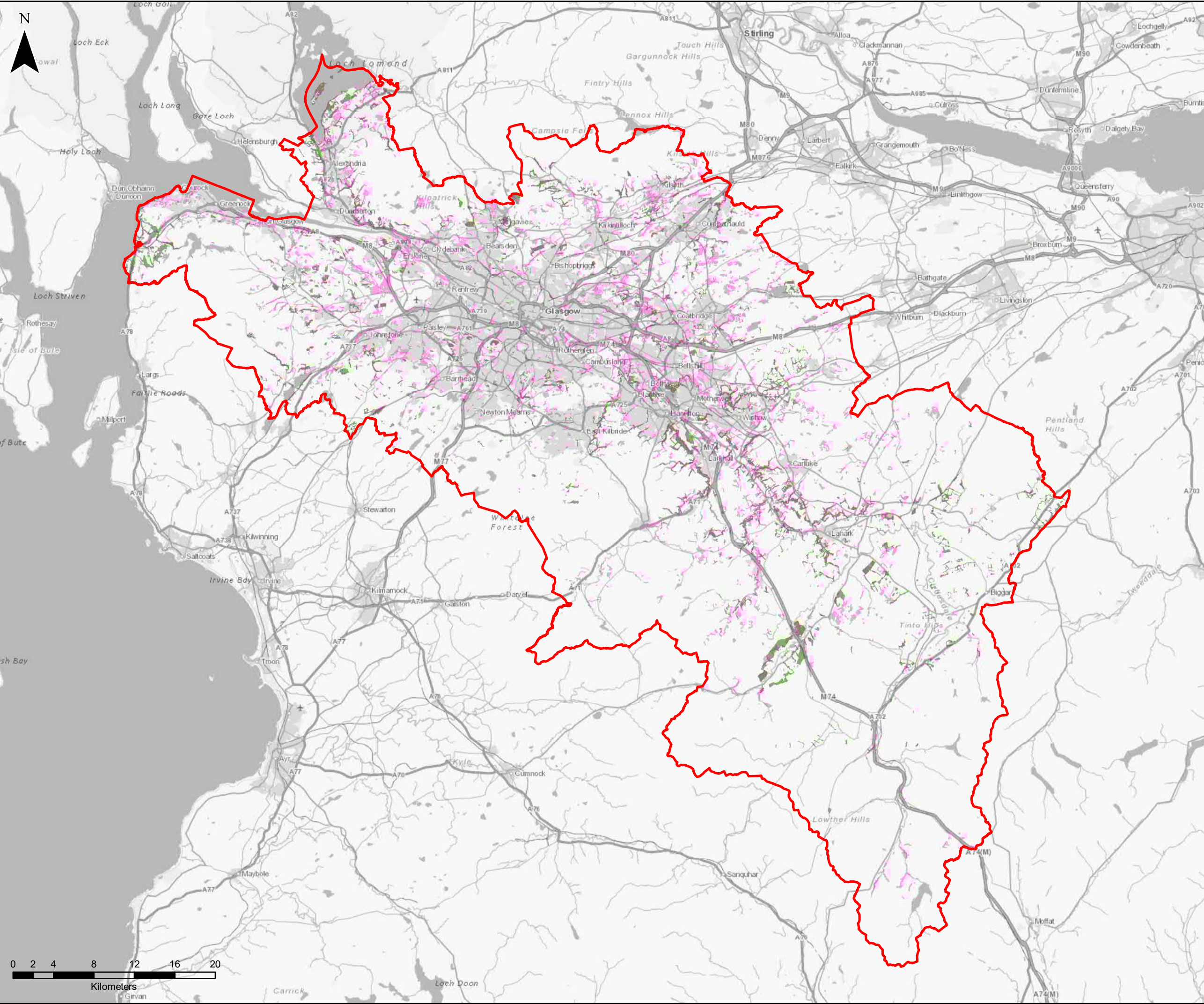
⁴⁸ Clyde Plan, Strategic Development Plan, Forest and Woodland Strategy, 2015 [online] available at: <https://www.clydeplan-sdpa.gov.uk/docman/current-plan-july-2017-background-reports/70-background-report-12-forestry-and-woodland-strategy/file>



- LEGEND**
- Glasgow City Region
 - RAMSAR
 - National Nature Reserves
 - Special Protection Areas
 - Special Areas of Conservation
 - Sites of Special Scientific Interest (Mixed & Biological)
 - Important Bird Areas
 - Local Nature Reserves

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P01	CW	CE	KD	13/10/2020
FIRST DRAFT ISSUE				
REVISION	DRAWN	CHECKED	APPROVED	DATE
DESCRIPTION				
				
PROJECT TITLE: Glasgow City Region Climate Adaptation Strategy SEA				
DRAWING TITLE: Figure C2: Biodiversity (Designated Sites)				
CONFIDENTIALITY		INTERNAL		
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SCALE @ A3 SIZE: 1:350,000		DATE: 13/10/2020	REVISION: P01	
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- LEGEND**
- Glasgow City Region
 - Ancient Woodland
 - Native Woodland

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PROJECT TITLE: Glasgow City Region Climate Adaptation Strategy SEA				
DRAWING TITLE: Figure C3: Biodiversity (Woodland)				
CONFIDENTIALITY INTERNAL				
DRAWN: CW	CHECKED: CE	APPROVED: KD	AUTHORISED: MR	
SCALE @ A3 SIZE: 1:350,000		DATE: 13/10/2020	REVISION: P01	
DRAWING NUMBER: GAS-WSP-V1-ZZ -DR-Z-0001-S0-P01				

LANDSCAPE

Loch Lomond and the Trossachs National Park (LLTNP) and the Loch Lomond National Scenic Area (NSA) are located in the north-west of the City Region in the local authority of West Dunbartonshire (as well as Argyll and Bute and Stirling) (**Figure C4**). The special qualities of the LLTNP and the NSA have been defined by Scottish Natural Heritage⁴⁹ as the following:

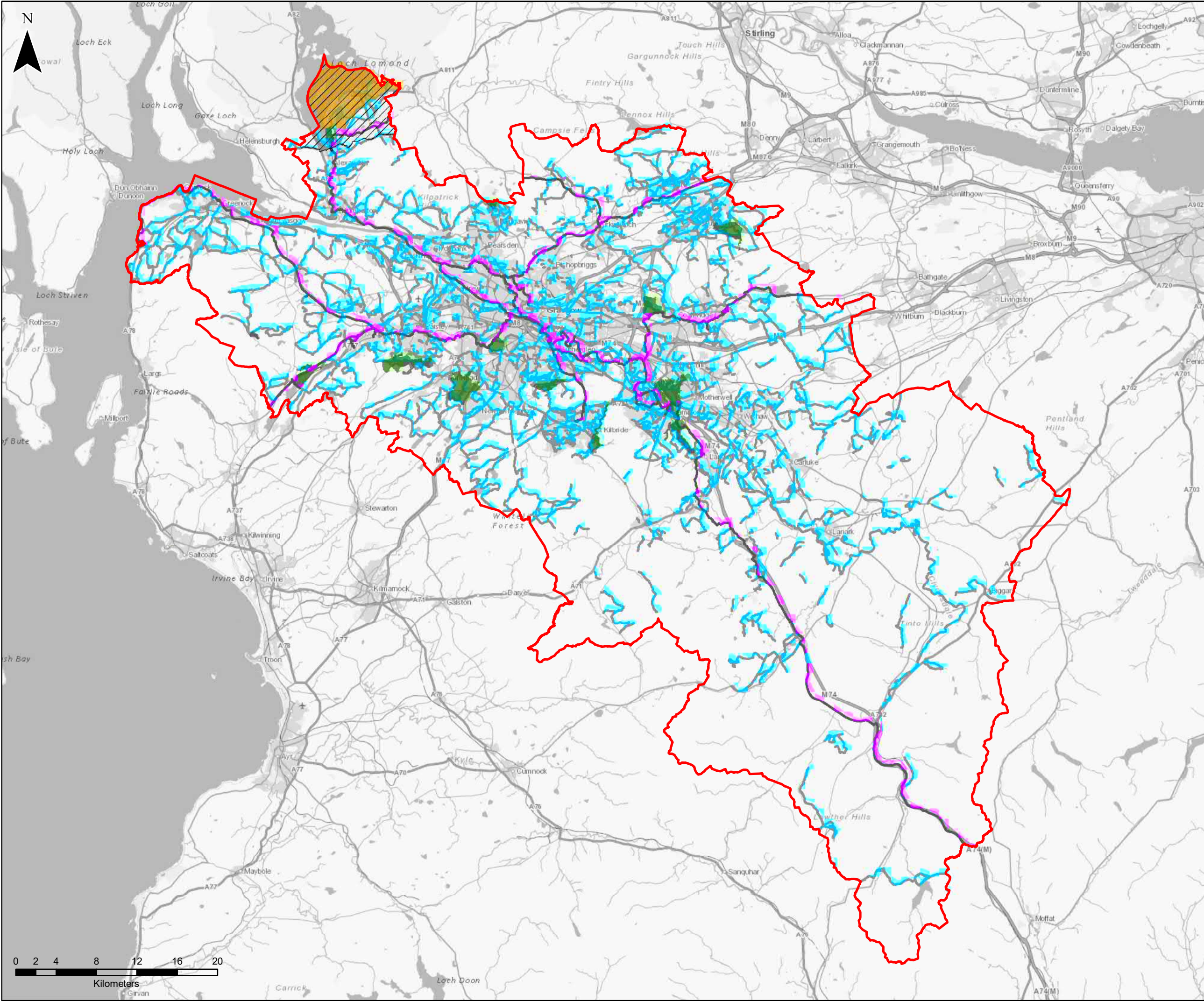
- General qualities:
 - A world-renowned landscape famed for its rural beauty;
 - Wild and rugged highlands contrasting with pastoral lowlands;
 - Water in its many forms;
 - A rich variety of woodlands;
 - Settlements nestled within a vast backdrop;
 - Famous through-routes;
 - Tranquillity; and
 - The easily accessible landscape splendour.
- Loch Lomond:
 - Two lochs in one;
 - Immensity of loch and landscape;
 - A multitude of beautiful islands;
 - Distinctive mountain groups;
 - Ben Lomond, widely known, popularly frequented;
 - Banks of broadleaved woodland; and
 - Peaceful side glens.

There are also 17 Country Parks located within the City Region. These are areas of public green spaces, which are often located often at the edge of urban areas, that provide places to enjoy the outdoors and experience nature in a semi-rural park setting.

Figure C4 also shows the core paths and national cycleways located within the City Region. In total there are 2796km of core paths and 579km of national cycleways. The most notable are:

- National Cycle Network Routes 7, 74, 75, 753 (north), 754, 755 and 756;
- Lochs & Glens North Cycle Route;
- The West Highland Way;
- Loch Lomond and Cowal Way
- Clyde Walkway;
- Three Lochs Way;
- John Muir Way;
- Forth and Clyde / Union Canal Towpath; and
- Southern Upland Way.

⁴⁹ Scottish Natural Heritage, The Special Landscape Qualities of the Loch Lomond and The Trossachs National Park, Commissioned Report No. 376, 2010, [online] available at: <https://www.nature.scot/sites/default/files/2017-07/Publication%202010%20-%20SNH%20Commissioned%20Report%20376%20-%20The%20Special%20Landscape%20Qualities%20of%20the%20Loch%20Lomond%20and%20The%20Trossachs%20National%20Park.pdf>



- LEGEND**
- Glasgow City Region
 - Loch Lomond and the Trossachs National Park
 - National Scenic Areas
 - Country Parks
 - Core Paths
 - National Cycle Network

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PROJECT TITLE:
Glasgow City Region
Climate Adaptation Strategy
SEA

DRAWING TITLE:

Figure C4:
Landscape Designations

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The City Region is covered by 68 landscape Character Areas as shown in **Figure C5**. In addition, the City Region has two National Coastal Character Areas – The Outer Firth and Islands and the Developed Inner Firths.

Local Landscape Areas (LLA) are local authority landscape designations, identified in local development plans and local policy. Also known in some authority areas as Special Landscape Areas or Areas of Great Landscape Value. Within the Study Area, there are local landscape designations in West Dunbartonshire, East Dunbartonshire, North Lanarkshire and South Lanarkshire. These are listed below:

- West Dunbartonshire – Kilpatrick Hills.
- East Dunbartonshire – Campsie Fells; Glazert Valley; Bardowie, Baldernock & Torrance; Kilpatrick Hills; and Bar Hill.
- North Lanarkshire – Kilsyth Hills; and Clyde Valley.
- South Lanarkshire – Lower Clyde and Calderglen; Middle Clyde Valley; Upper Clyde Valley and Tinto; Douglas Valley; Pentland Hills and Blackmount; and Leadhills and Lowther Hills.

In total, the City Region has 50,867 hectares (ha) of greenspace, of which 73% (37,365 ha) is accessible⁵⁰. On average there is 34ha of greenspace per 1000 people living in the region, however, this is varied across the City Region⁵². **Table C-2** below shows the amount of greenspace across the local authorities that make up the City Region.

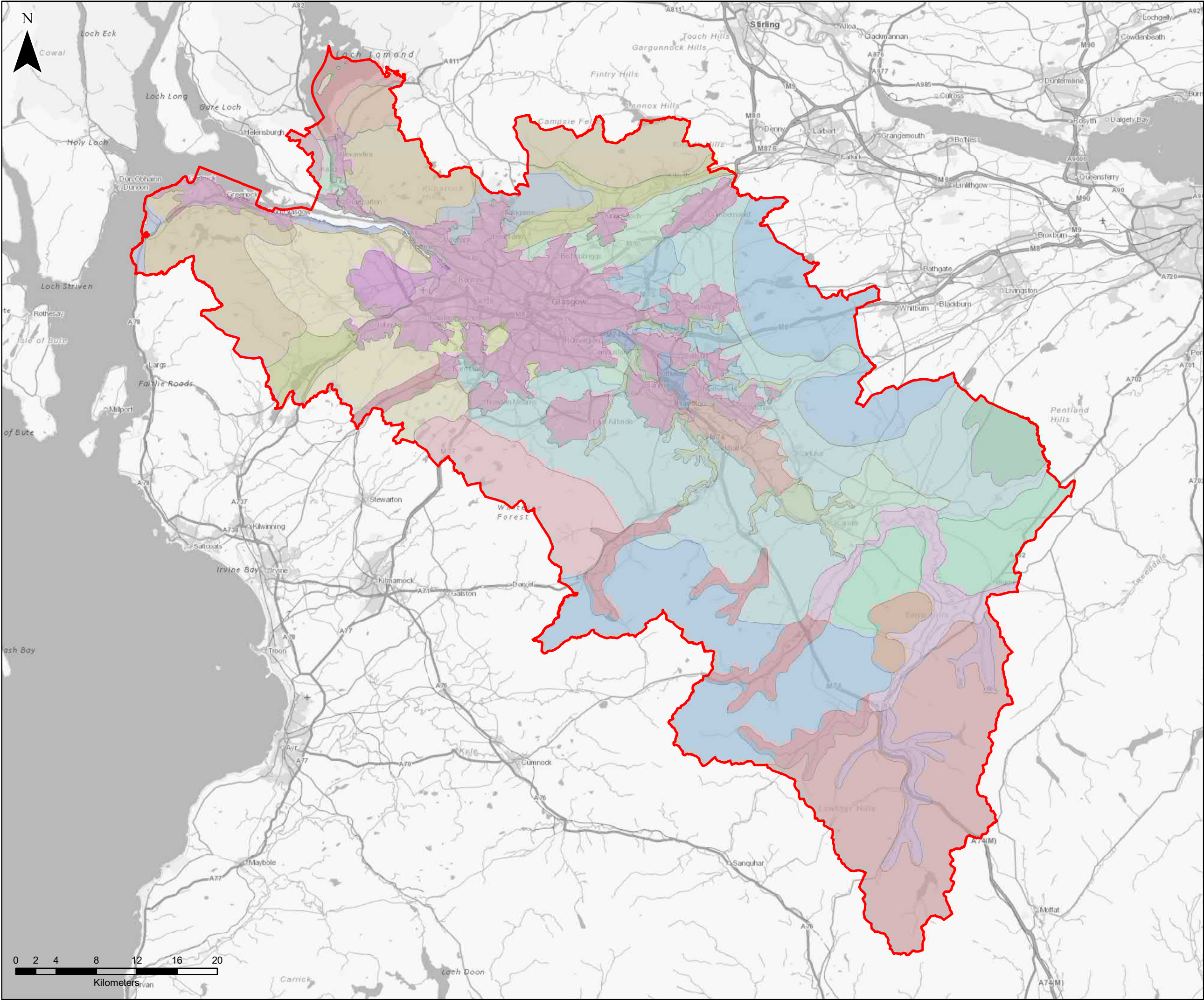
North Lanarkshire has the highest total amount of greenspace at 12,995ha, whilst East Renfrewshire has the lowest at 2,569ha. Considering the area of greenspace per 1,000 population, Glasgow has the lowest at 16ha, whilst North Lanarkshire has the highest at 42ha.

Table C-2 - Greenspace⁵²

Local Authority	Total Area of Greenspace (ha)	Area of publicly Accessible Greenspace (ha)	Area of greenspace per 1000 people (ha)
East Dunbartonshire	3,880	2,628	39
East Renfrewshire	2,569	1,538	29
Glasgow City	9,647	6,709	16
Inverclyde	3,126	2,439	40
North Lanarkshire	12,995	10,248	42
Renfrewshire	5,886	4,416	35

⁵⁰ Greenspace Scotland, The Third State of Scotland's Greenspace Report, 2018 [online] available at: <https://drive.google.com/file/d/1aQLMu60G5WRi4QKBCuZJ92oT8eM2sxd3/view>

Local Authority	Total Area of Greenspace (ha)	Area of publicly Accessible Greenspace (ha)	Area of greenspace per 1000 people (ha)
South Lanarkshire	9,421	6,733	34
West Dunbartonshire	3,343	2,654	37
City Region	50,867	37,365	34



For Legend See Sheet 2

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PROJECT TITLE:
Glasgow City Region
Climate Adaptation Strategy
SEA

DRAWING TITLE:
Figure C5:
Landscape Character Areas

Sheet 1 of 2

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Legend

- Glasgow City Region
- Landscape Character Areas (SNH, 2019)**
- Agricultural Lowlands - Ayrshire
- Agricultural Plain - Glasgow & Clyde Valley
- Broad River Valley
- Broad Urban Valley
- Broad Valley Lowland - Glasgow & Clyde Valley
- Broad Valley Lowlands - Ayrshire
- Broad Valley Upland
- Dissected Plateau Moorland
- Drumlin Foothills
- Foothills with Forest - Dumfries & Galloway
- Incised River Valleys
- Lowland Hill Fringes - Central
- Lowland Hills - Central
- Lowland Loch Basin - Loch Lomond & the Trossachs
- Lowland Loch Basin Islands
- Lowland Plateaux - Central
- Lowland Plateaux - Lothians
- Lowland River Valleys - Central
- Moorland Hills - Glasgow & Clyde Valley
- Open Ridgeland - Glasgow & Clyde Valley
- Open Ridges
- Parallel Ridges - Loch Lomond & the Trossachs
- Plateau Farmland - Glasgow & Clyde Valley
- Plateau Moorland - Ayrshire
- Plateau Moorland with Windfarms - Ayrshire
- Plateau Moorland with Windfarms - Glasgow & Clyde Valley

Plateau Moorlands - Glasgow & Clyde Valley

Raised Beach - Glasgow & Clyde Valley

Raised Beach Coast and Cliffs

Rolling Farmland - Borders

Rolling Farmland - Glasgow & Clyde Valley

Rolling Farmland - Loch Lomond & the Trossachs

Rolling Farmland with Estates - Argyll

Rounded Landmark Hills

Rugged Moorland Hills

Rugged Moorland Hills and Valleys

Rugged Upland Farmland

Southern Uplands - Borders

Southern Uplands - Dumfries & Galloway

Southern Uplands - Glasgow & Clyde Valley

Southern Uplands with Forest - Dumfries & Galloway

Undulating Farmland and Hills

Upland Fringe with Prominent Hills

Upland Fringes - Lothians

Upland Glen - Glasgow & Clyde Valley

Upland Glens - Dumfries & Galloway

Upland Hills - Lothians

Upland River Valley - Glasgow & Clyde Valley

Upland River Valleys - Ayrshire

Upland Valley with Pastoral Floor

Urban

Urban Fringe Farmland

Urban Greenspace



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PROJECT TITLE: <div>Glasgow City Region Climate Adaptation Strategy SEA</div>				
DRAWING TITLE: <div>Figure C5: Landscape Character Areas Sheet 2 of 2</div>				
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DRAWN: CW	CHECKED: CE	APPROVED: KD	AUTHORISED: MR	
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A review of the Scottish Vacant and Derelict Land Survey (SVDLS) - Site Register 2019⁵¹ has identified that across the City Region there is a total of 3,399ha of vacant / derelict land with North Lanarkshire having the greatest amount with 1396.5ha. **Table C-3** below sets out the amount of vacant and derelict land by local authority region.

Table C-3 - Vacant and Derelict Land⁵¹

Local Authority	Total Area of vacant / derelict land (ha)
East Dunbartonshire	69.1
East Renfrewshire	49.8
Glasgow City	954.5
Inverclyde	151.4
North Lanarkshire	1,396.5
Renfrewshire	230.8
South Lanarkshire	384.4
West Dunbartonshire	163.3
City Region	3,399.8

⁵¹ Scottish Vacant and Derelict Land Survey [online] available at: <https://www.gov.scot/publications/scottish-vacant-and-derelict-land-survey---site-register/>

CULTURAL HERITAGE

There are currently six UNESCO World Heritage Sites (WHS) located in Scotland, of which two are located within the City Region – the Antonine Wall and New Lanark. All WHS's are considered to be of 'Outstanding Universal Value', which have been inscribed on the World Heritage List by the World Heritage Committee. World Heritage status is a high accolade that brings international scrutiny. There are a number of designated assets throughout the City Region including⁵²:

- 371 Scheduled Monuments;
- 8,209 Listed Buildings;
- 19 Properties in Care;
- 5 Inventory Battlefield; and
- 22 Garden and Designed Landscapes.

Figure C6 provides detail on the location of these heritage assets.

Conservation Areas are areas of distinctive character which have been considered to have a special value due to their architectural, townscape and landscape qualities. Local authorities are required to identify areas which are of special architectural or historic interest which they wish to preserve or enhance which are designated as Conservation Areas. The City Region has 103 Conservation Areas, the highest number of which are located within South Lanarkshire with 30 designations. **Table C-4** below shows the split of Conservation Areas across the eight local authority districts.

Table C-4 - Conservation Areas⁵³

Local Authority	Conservation Areas
East Dunbartonshire	14
East Renfrewshire	5
Glasgow City	25
Inverclyde	8
North Lanarkshire	7
Renfrewshire	8
South Lanarkshire	30
West Dunbartonshire	6
City Region	103

In addition to conservation areas, local authorities hold Historic Environment Records, which record undesigned archaeological and cultural heritage assets. The majority of the historic environment in Scotland is undesigned (90–95%) and often these sites

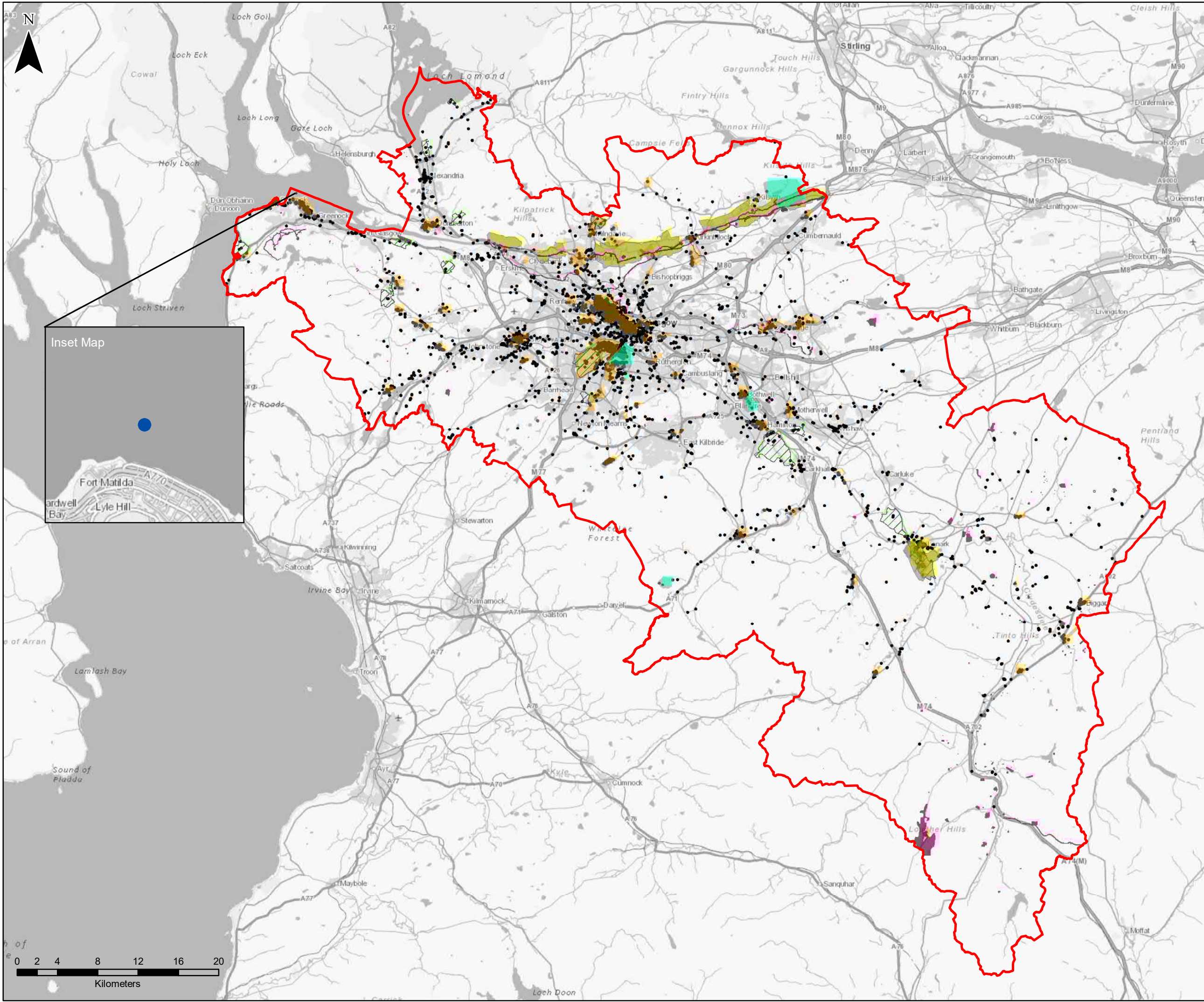
⁵² Historic Environment Scotland, Historic Environment Portal [online] available at: <http://portal.historicenvironment.scot/>

⁵³ Historic Environment Scotland, Conservation Areas [online] available at: <https://portal.historicenvironment.scot/downloads/conservationareas>



provide important contextual information, which aids in the understanding of designations⁵⁴.

⁵⁴ Historic Environment Scotland (2016), Scotland's Historic Environment Audit 2016 – Summary [online] available at: <https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationid=bac8296b-fcd4-4fdf-8617-ab9e009235db>



- LEGEND**
- Glasgow City Region
 - World Heritage Site
 - Scheduled Monument
 - Inventory Battlefield
 - Conservation Area
 - Historic Marine Protected Area
 - Listed Building
 - Garden and Designed Landscape

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PROJECT TITLE: Glasgow City Region Climate Adaptation Strategy SEA				
DRAWING TITLE: Figure C6: Cultural Heritage Designations				
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WATER ENVIRONMENT

Figure C7 shows the main water bodies within the City Region. In total the City Region's watercourses span 2,161km and waterbodies occupy 4449ha.

The City Region falls within Scotland's single River Basin District (RBD) which was created via the Scotland RBD designation order⁵⁵. Of those water bodies that fall within the City Region, 6% of the water bodies and 83% of its protected areas are currently assessed as being in a good or better condition⁵⁶.

SEPA produce annual Water Framework Directive classifications for all the water bodies in Scotland. Surface water bodies are classified using a system of five quality classes; bad; poor; moderate; good and high, whilst groundwater is either graded as 'poor' or 'good'.

Table C-5 below shows the number of aquatic classifications of both groundwater and surface water bodies within the City Region. Over a quarter (44) of the City Region's surface water bodies are classed as either 'bad' or 'poor', whilst 69 (41%) are achieving either 'good' or 'excellent' status. The majority of the City Region's groundwaters are classed as good (51).

Table C-5 - City Region Groundwater and Surface Water Quality (2018)⁵⁷

Waterbody Type	Bad	Poor	Moderate	Good	High
Surface Waters	8	36	56	66	3
Groundwaters	n/a	19	n/a	51	n/a

At present, 9km² of land in the City Region is currently at risk of coastal flooding, whilst 92km² of land is at risk of fluvial flooding⁵⁸. In addition, there are 22,400 residential properties in the Clyde and Loch Lomond Local Plan District Area that are at risk of flooding from river, coastal and surface water flooding⁵⁹. **Table C-6** below shows the number of residential properties at risk of flooding from each source. This shows that surface water poses the greatest risk (11,000 homes), however, fluvial flooding cost more each year in damages (£13 million).

⁵⁵ The Water Environment and Water Services (Scotland) Act 2003 (Designation of Scotland River Basin District) Order 2003

⁵⁶ Climate Ready Clyde, Technical Note, Theme 4 – Natural Environment and Natural Assets

⁵⁷ SEPA, Aquatic Classification, Water Classification Hub [online] available at: <https://www.sepa.org.uk/data-visualisation/water-classification-hub/>

⁵⁸ Climate Ready Clyde, Technical Note, Theme 4 – Natural Environment and Natural Assets, 2019 [online] available at: <https://static1.squarespace.com/static/5ba0fb199f8770be65438008/t/5c6e8619f9619aea294ea01a/1550747167482/16+Technical+-+Natural+Environment.pdf>

⁵⁹ Climate Ready Clyde, Technical Note, Theme 2 – Built Environment, 2019 [online] available at: <https://static1.squarespace.com/static/5ba0fb199f8770be65438008/t/5c6e81ca4785d3665ff9f7a1/1550746059947/06+Technical+-+Built+Environment.pdf>

Table C-6 – Properties at Risk ⁵⁹

Source	Number of Homes	Average annual damages
Fluvial (River Clyde)	7,800	£13 million
Coastal	3,600	£5.2 million
Surface Water	11,000	£9.4 million
Total	22,400	£27.6 million

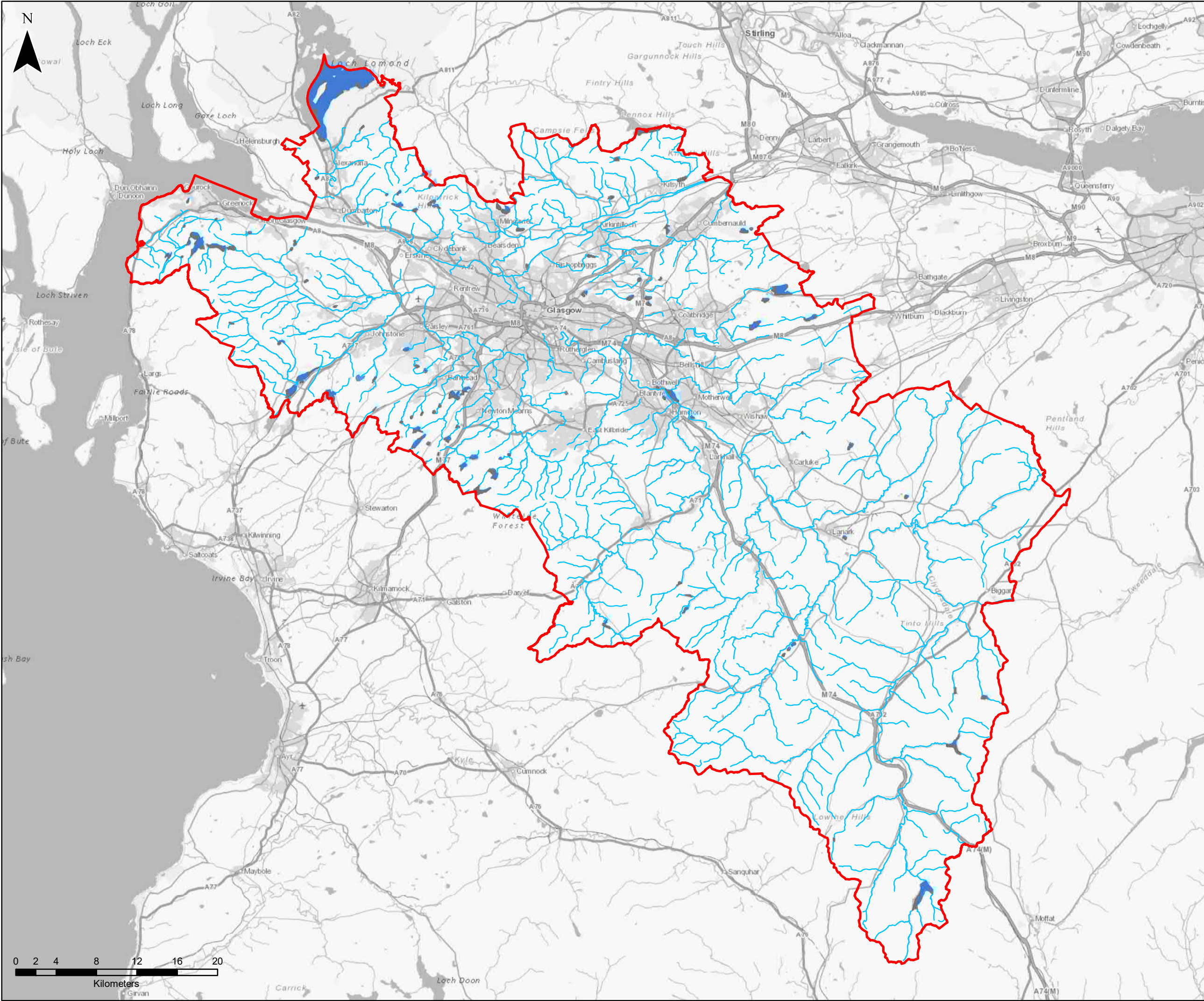
A review of the SEPA Flood Map⁶⁰ identifies that the Clyde Estuary and the coastline around Inverclyde, Renfrewshire and East Dunbartonshire are at high risk of future coastal flooding. The River Clyde presents a high risk of flooding particularly in Renfrewshire, Glasgow and both North and South Lanarkshire. Douglas Water, Loch Lomond, the River Leven, Forth and Clyde Canal and the River Kelvin all present a high risk of future flooding.

Potentially Vulnerable Areas (PVAs) are described as areas where significant flood risk exists now or is likely to occur in the future. The identification of PVAs is vital for the protection of people, properties, businesses, infrastructure and the environment from flooding. There are 23 PVAs located within the Clyde and Loch Lomond Local Plan District. CRC's assessment of SEPA's PVAs identifies 65,250 people at risk from a 1 in 200-year flood event (from all sources), although these figures do not currently include an uplift for climate change⁶¹.

Glasgow and surrounding areas are highly urbanised and therefore pose the greatest risk from surface water flooding in the Clyde and Loch Lomond Local Plan District. Approximately 98% of all properties at risk of surface water flooding in the Clyde and Loch Lomond Local Plan District are located within Potentially Vulnerable Areas.

⁶⁰ SEPA Flood Map [online] available at: <http://map.sepa.org.uk/floodmap/map.htm>


⁶¹ Climate Ready Clyde, Technical Note, Theme 3 - Society and Human Health, 2019 [online] available at: <https://static1.squarespace.com/static/5ba0fb199f8770be65438008/t/5c6e83f09b747a469b099b04/1550746619005/12+Technical+-+Society.pdf>




- LEGEND**
- Glasgow City Region
 - Watercourses
 - Waterbodies

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PROJECT TITLE:
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Climate Adaptation Strategy
SEA

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Figure C7:
Water Environment

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SCALE @ A3 SIZE: 1:350,000		DATE: 13/10/2020	REVISION: P01

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AIR QUALITY

In November 2015, the Scottish Government published Cleaner Air for Scotland – The Road to a Healthier Future (CAFS)⁶² which is Scotland's first separate air quality strategy. This strategy sets out in detail how Scotland intends to deliver air quality improvements over the coming years. Since CAFS was published, Scotland's first Low Emission Zone was introduced in Glasgow in 2018. It initially sets phased targets for Euro VI compliance for local buses, but upon full implementation in December 2022 it would require all vehicle types to be fully compliant.

According to the 2017 Greenhouse Gas Inventory⁶³, transport (including international aviation and Shipping) (14.9MtCO₂e) was the largest source of net emissions followed by agriculture and related land use (9.7 MtCO₂e) and Business and industrial process (8.7 MtCO₂e).

Where air quality objectives are not likely to be achieved, an Air Quality Management Area (AQMA) must be declared. These are predominantly associated with vehicle emissions, principally NO_x, although some have been declared for PM₁₀. As such, AQMAs are mostly located within urban areas and sections of the road network which are heavily trafficked and frequently congested.

There are 16 AQMAs (refer to **Figure C8**) within the City Region located in the following local authorities⁶⁴:

- East Dunbartonshire – 3 (NO₂ and PM₁₀).
- Glasgow City - 3 (NO₂).
- North Lanarkshire – 4 (PM₁₀).
- Renfrewshire – 3 (NO₂ and PM₁₀).
- South Lanarkshire – 3 (NO₂ and PM₁₀).

A Defra statistical release in April 2019⁶⁵ focussed on trends in NO₂, particulate matter and ozone between 1987 and 2018. It revealed that roadside NO₂ pollution has reduced in the long-term and in recent years, having been stable for most of the 2000s. However, Scotland is yet to achieve full compliance with the EU and Scottish legal requirements for air quality.

Despite lower levels of air pollution, it still poses significant harm to human health and the environment. Poor health caused by air pollution often highlights health inequalities with the more vulnerable members of the population disproportionately affected.

In the UK, the impact of poor air quality on health has been estimated to cost around £15 billion per year, whilst in Scotland in 2010 fine particulate matter was associated

⁶² The Scottish Government, Cleaner Air for Scotland, The Road to a Healthier Future, 2015, [online] available at: <http://www.scottishairquality.scot/lez/#:~:text=Cleaner%20Air%20for%20Scotland%20%2D%20The,responsibilities%20as%20soon%20as%20possible.>

⁶³ Scottish Government, Scottish Greenhouse Gas Emissions 2017 [online] available at: <https://www.gov.scot/publications/scottish-greenhouse-gas-emissions-2017/pages/3/#:~:text=In%202017%2C%20road%20transport%20was,in%20the%20efficiency%20of%20vehicles.>

⁶⁴ Air Quality in Scotland, Air Quality Management Areas, [online] available at: <http://www.scottishairquality.scot/lagm/aqma>

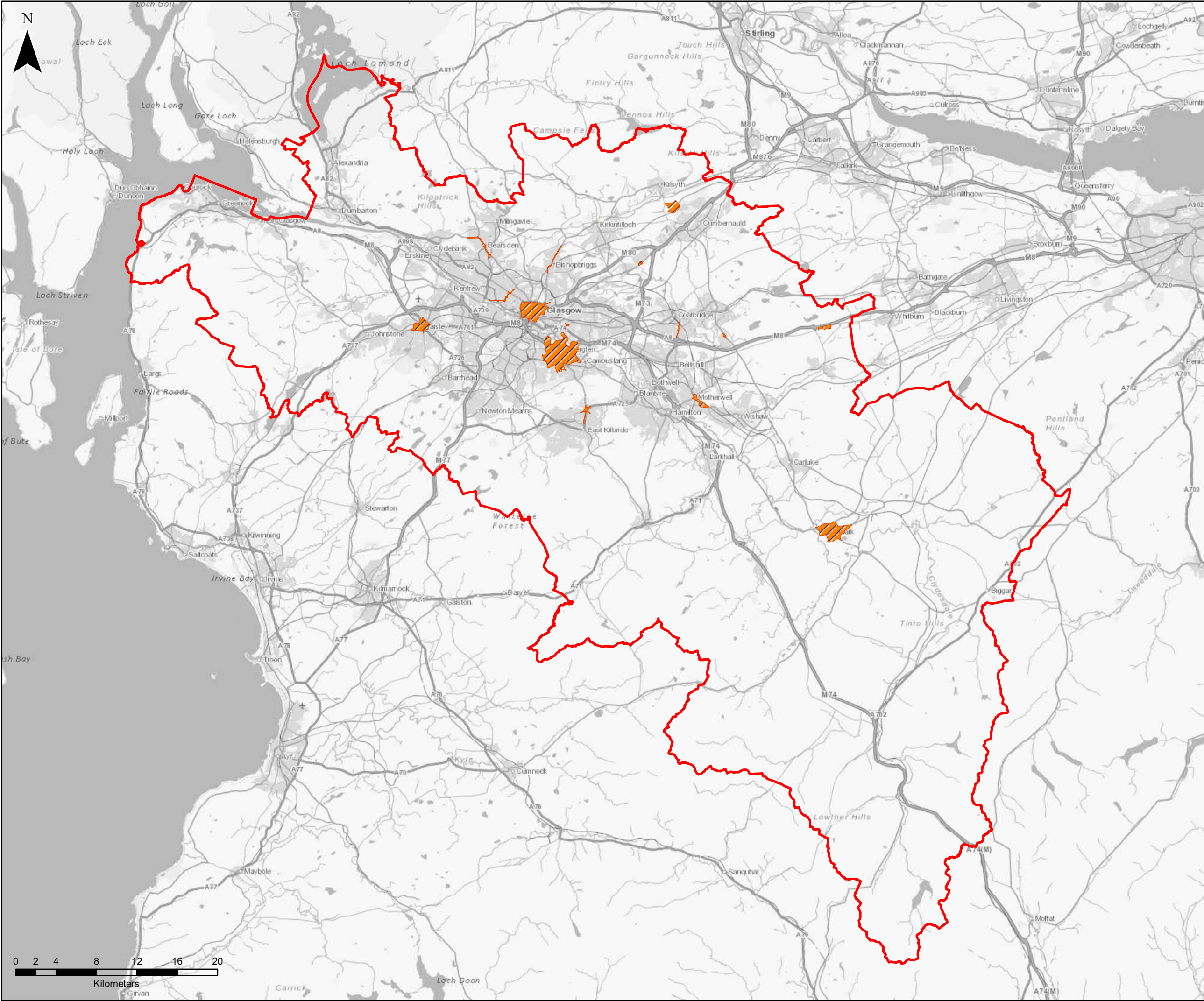
⁶⁵ Defra. 2019. Defra National Statistics Release: Air Quality statistics in the UK 1987 to 2018




with around 2,000 premature deaths and around 22,500 lost life-years across the population⁶⁶. In the City Region, air pollution in 2010 was estimated to be accountable for 800 attributable deaths, equivalent to 8,674 life years lost for those over 25 in Glasgow City Region. The majority of these were in Glasgow, North Lanarkshire and South Lanarkshire⁶⁷.


⁶⁶ The Scottish Government, Cleaner Air for Scotland, The Road to a Healthier Future, 2015, [online] available at: <http://www.scottishairquality.scot/lez/#:~:text=Cleaner%20Air%20for%20Scotland%20%2D%20The,responsibilities%20as%20soon%20as%20possible>.

⁶⁷ Climate Ready Clyde, Technical Report – Society and Human Health, 2019 [online] available at: <https://static1.squarespace.com/static/5ba0fb199f8770be65438008/t/5c6e83f09b747a469b099b04/1550746619005/12+Technical+-+Society.pdf>




LEGEND


 Glasgow City Region

 Air Quality Management Areas (2018)

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knowledge brokers
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PROJECT TITLE:
Glasgow City Region
Climate Adaptation Strategy
SEA

DRAWING TITLE:

Figure C8:
Air Quality Management Areas

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INTERNAL

DRAWN: CW	CHECKED: CE	APPROVED: KD	AUTHORISED: MR
SCALE @ A3 SIZE: 1:350,000		DATE: 13/10/2020	REVISION: P01

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MATERIAL ASSETS (INC. SOIL RESOURCES)

Figure C9 in shows the City Region's important geological sites. In total there are 34 geological SSSIs and a further 24 mixed SSSIs located in the City Region that are designated for their geological significance. In addition, there are 46 Geological Conservation Review Sites. These are sites that are of national and international importance that demonstrate key scientific elements and display sediments, rocks, fossils, and features of the landscape that make a special contribution to understanding the geological history of Britain.

The Land Capability for Agriculture Classification (LCA)⁶⁸ across the City Region is varied. Areas of South Lanarkshire and East Renfrewshire are dominated by rough grazing land (classes 6.1–7)⁶⁹, which are only capable of rough grazing due to severe physical limitations. More productive land capable of supporting mixed agriculture (classes 3.2–4.2) are located along the banks of the Clyde, across valley bottoms and the fringes of the urban areas of Glasgow, Lanark and Motherwell. There are some very small patches of prime agricultural land (classes 1–3.1) located in Inverclyde and East Dunbartonshire.

The soils found in the City Region tend to be waterlogged and have a high organic matter content / carbon rich. There are 337,122ha of carbon rich soils within the City Region⁷⁰. Carbon rich soils can be acidic, with low inherent fertility, often supporting a range of nutrient poor habitats such as: rough grass, improved grass, peatland, woodland and some heather moorland. Despite this, there are some productive brown earth soils in the Hamilton and Lanark areas.

Figure C10 in shows the carbon rich soils across the City Region which contains peatland habitats, carbon rich soils and deep peat. These can mostly be found along the northern and southern boundaries of the City Region, with the majority found in South Lanarkshire⁷⁰.

The City Region has 8,705km of roads, comprising 515km of trunk roads, and 8,191km of local authority roads⁷¹. The most notable roads are, M8, M73, M74, M77, M80, A82, A71, A73. In addition, the City Region has 2796km of core paths and 579km of national cycleways.

The City Region is well served by rail, connecting the City Region to Edinburgh, the Highlands, Northern Scotland as well as England. The main lines include the Glasgow South Western Line, InterCity Mainlines, Ayrshire Coastline, West Highland Line,

⁶⁸ The James Hutton Institute, Land Capability for Agriculture Classification [online] available at: <https://www.hutton.ac.uk/learning/exploringscotland/land-capability-agriculture-scotland>

⁶⁹ There are thirteen classes and divisions of the LCA system have been simplified into four categories: Arable Agriculture 1-3.1, Mixed Agriculture 3.2–4.2, Improved grassland 5.1-5.3 and Rough grazing (6.1-7). The lower the class number the higher the quality of agricultural land.

⁷⁰ Scottish Natural Heritage, Carbon and Peatland Map, 2016 [online] available at:

https://map.environment.gov.scot/Soil_maps/?layer=10

⁷¹ Climate Ready Clyde, Technical report, Theme 1 – Infrastructure, 2019 [online] available at:

<https://static1.squarespace.com/static/5ba0fb199f8770be65438008/t/5c6e7eac104c7bb63f95f6cd/1550745264841/03+Technical+-+Infrastructure.pdf>



Edinburgh and Glasgow local services and the Caledonian Line as well as the Glasgow Subway.

The Clydeport terminals at Glasgow and Greenock, along with sites outside the Glasgow City Region at Ardrossan and Hunterston, together process 5.4 million tonnes of cargo a year⁷¹. Clydeport is home to some of the biggest, deepest, busiest and most advanced facilities in Europe⁷². In addition the City Region is served by Glasgow International Airport which has over 9 million terminal passengers each year and 84,000 aircraft landings and take-offs⁷¹.

The Scottish Government have committed to 50% of Scotland's energy being from renewable sources by 2030, with the aim of decarbonising the energy system almost completely. During the first quarter of 2020, 11,891 Mega watts (MWs) of renewable energy capacity were installed across the country, which was predominantly provided by onshore wind and large scale hydropower, but also included technology such as biomass, solar photovoltaics and sewerage sludge digestion⁷³.

Across the City Region there are 39 planned renewable energy projects, either in the planning stages, consented and awaiting construction or currently under construction. Once completed, these would provide an additional 864MW capacity to the City Region⁷⁴. Of the eight local authorities, South Lanarkshire has the highest number of proposed developments with 21, followed by North Lanarkshire with 12. The majority of the projects are for onshore wind (31), however, proposals also include advanced conversion technologies (2), energy from waste incineration (1), anaerobic digestion (1) and solar photovoltaics (4)⁷⁴.

In addition to these proposed energy developments, Scotland's Heat Map⁷⁵ identifies that there are 17 district heating networks in development and a further 14 that are operational. District Heating provides heat to homes and businesses in the form of hot water or steam which is generated at an energy centre, which provides a more efficient alternative than oil or gas heating systems.

Table C-7 below shows the total heat demand across the local authorities located within the City Region. The total heat demand across the City Region is 21,824 gigawatts (GWh) per year⁷⁵. Given that Glasgow has the highest population of the local authorities, it is understandable that it has the highest heat demand across the region at 8,485GWh per year.

⁷² Peel Ports, Clyde Port [online] available at: <https://www.peelports.com/port-locations/clydeport>

⁷³ Scottish Government, Minister for Energy, Connectivity and the Islands, Renewable and low carbon energy [online] available at: <https://www.gov.scot/policies/renewable-and-low-carbon-energy/>

⁷⁴ Renewable Electricity Planning Statistics for Scotland, March 2020

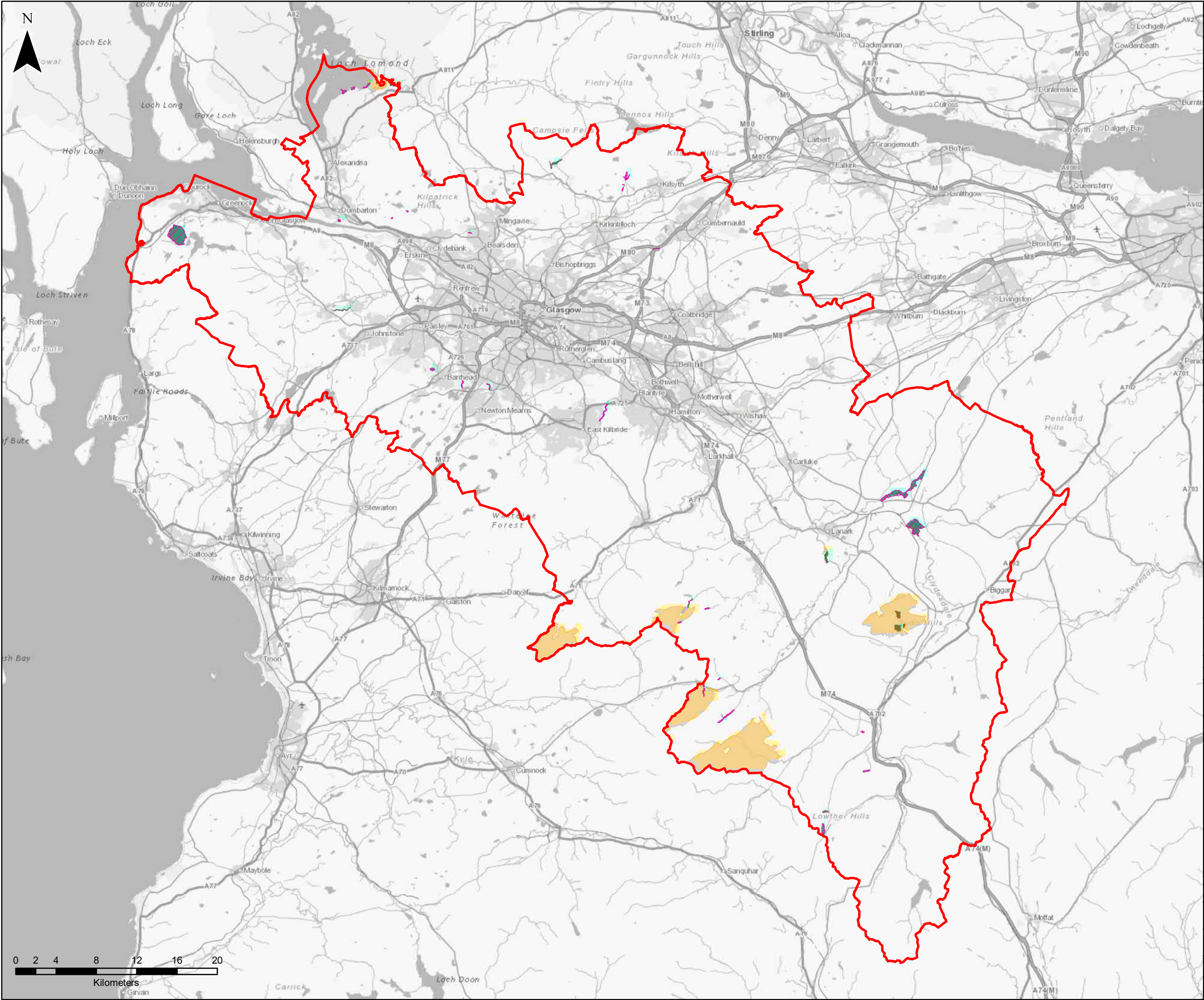
⁷⁵ Scotland Heat Map, [Online] available at: <http://heatmap.scotland.gov.uk/>

Table C-7 – Heat Demand⁷⁵

Local Authority	Total Heat Demand (GWh per year)
East Dunbartonshire	1,106
East Renfrewshire	872
Glasgow	8,485
Inverclyde	942
North Lanarkshire	3,800
Renfrewshire	2,368
South Lanarkshire	3,301
West Dunbartonshire	950
Total	21,824

In 2017, the City Region generated 791,728 tonnes of waste, making up 32% of the total waste generated nationally⁷⁶. Of the total waste generated, 41.6% of the waste was recycled, which is slightly lower than the national average of 45.5%. An additional 6.9% of the total waste generated was diverted from landfill via other means other than recycling⁷⁶.

⁷⁶ SEPA, Household Waste Statistics, 2018, [online] available at: <https://www.sepa.org.uk/environment/waste/waste-data/waste-data-reporting/household-waste-data>



- LEGEND**
-  Glasgow City Region
 -  Sites of Special Scientific Interest (Geological)
 -  Sites of Special Scientific Interest (Mixed)
 -  Geological Conservation Review Sites

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P01	CW	CE	KD	13/10/2020
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FIRST DRAFT ISSUE

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DESCRIPTION



PROJECT TITLE:
Glasgow City Region
Climate Adaptation Strategy
SEA

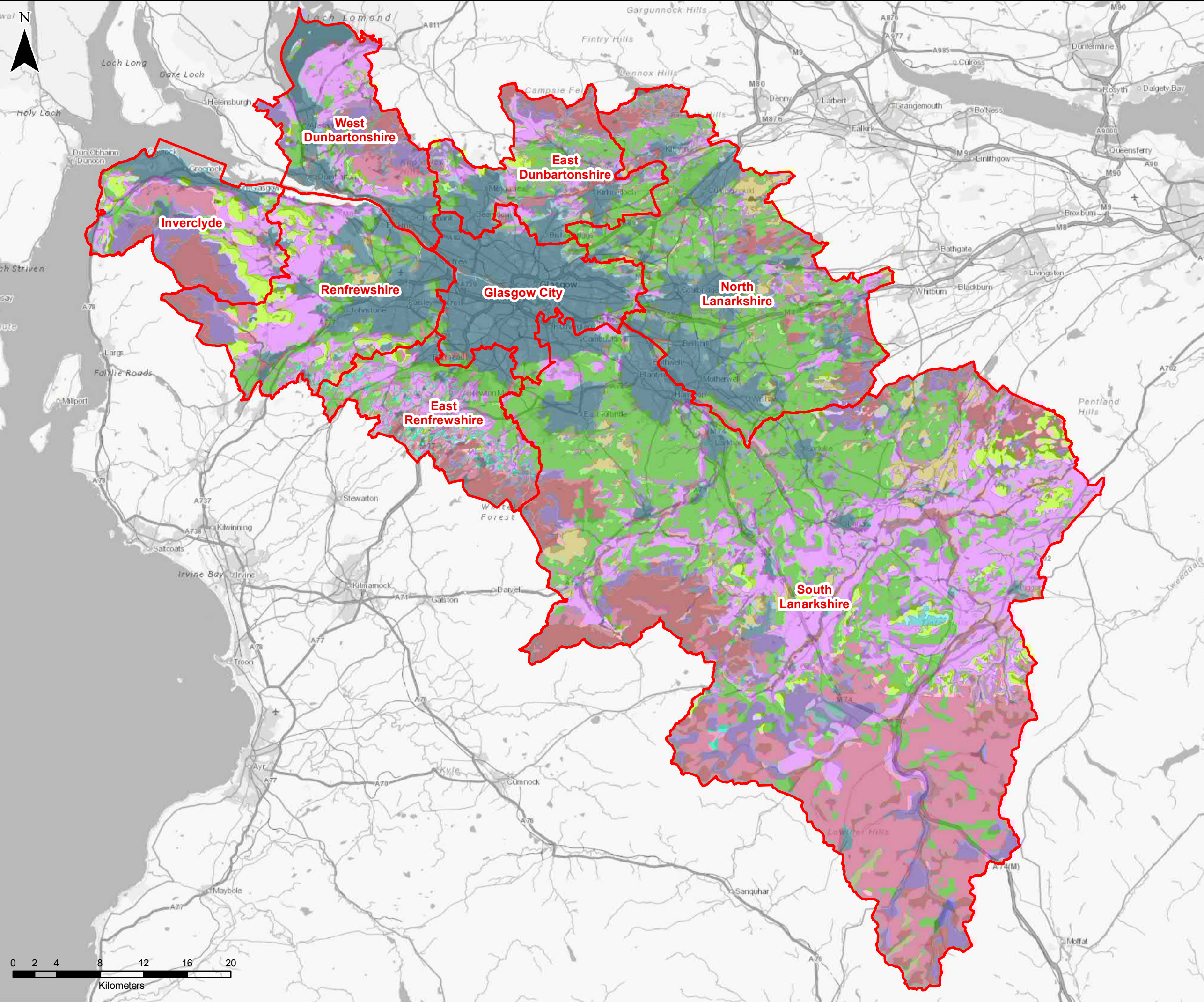
DRAWING TITLE:
Figure C9:
Geologically Designated Sites

CONFIDENTIALITY
INTERNAL

DRAWN: CW	CHECKED: CE	APPROVED: KD	AUTHORISED: MR
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SCALE @ A3 SIZE: 1:350,000	DATE: 13/10/2020	REVISION: P01
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DRAWING NUMBER:
GAS-WSP-V1-ZZ -DR-Z-0009-S0-P01



Legend

Glasgow City Region

Peatland Scotland Classification

- Alpine (Oroarctic) podzols
- Brown earths
- Brown rankers
- Dystrophic basin peat
- Dystrophic blanket peat
- Humic gleys
- Humus-iron podzols
- Made up ground
- Mineral alluvial soils
- No soil information
- Noncalcareous gleys
- Open cast
- Peaty alluvial soils
- Peaty gleyed podzols
- Peaty gleys
- Peaty podzols
- Peaty rankers
- Rock
- Saline alluvial soils
- Subalpine (Orohemiarctic) podzols
- Subalpine podzols
- Undifferentiated basin peats
- Undifferentiated lithosols
- Undifferentiated organic soils
- Undifferentiated rankers
- Undifferentiated semi-confined peats
- non-soil
- water

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P01	CW	CE	KD	14/10/2020

FIRST DRAFT ISSUE

REVISION	DRAWN	CHECKED	APPROVED	DATE
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knowledge brokers
for a resilient Scotland

PROJECT TITLE:
Glasgow City Region
Climate Adaptation Strategy
SEA

DRAWING TITLE:

Figure C10:
Carbon Rich Soils

CONFIDENTIALITY
INTERNAL

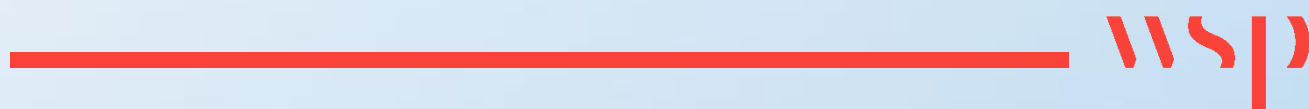
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SCALE @ A3 SIZE: 1:325,000	DATE: 14/10/2020	REVISION: P01
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DRAWING NUMBER:
GAS-WSP-V1-ZZ -DR-Z-0011-S0-P01

Appendix D

PREDICTION AND EVALUATION OF THE EFFECTS OF THE STRATEGY



As outlined in Section 3 of the ER, the assessment of the interventions will predict the following:

- overall effect significance;
- nature of effect;
- spatial extent;
- reversibility of effect;
- duration; and
- potential for cumulative and synergistic effects.

Table F1 below shows the key to effects that have been used within the assessments below. It should be noted that where uncertain and neutral effects have been identified, it has not been possible to determine the nature of effect, the spatial extent, the reversibility or the duration of effect. In this instance, these cells have been left blank.

Table F1 – Key to Effects

Effect Significance	Key
Potential for significant positive effects	++
Potential for minor positive effects	+
Potential for minor negative effects	-
Potential for significant negative effects	--
Uncertain effects – potential for both positive and negative effects	?
Negligible / No effect	0
Nature of effect (direct / indirect).	D / I
Spatial extent (local / regional / national / international)	L / R / N / I
Reversibility of effect (reversible / irreversible)	R / I



Effect Significance	Key
Duration (short / medium / long term).	/ ST / MT / LT
Cumulative Effects (Positive, negative and synergistic, not applicable)	✓+ / ✓- / S / n/a
Unable to determine nature of effect, the spatial extent, the reversibility or the duration of effect	

Intervention 1 - Reform and reshape governance so they respond to adaptation needs, nurtures new leadership and create expectations in society

- 1.1 A detailed review of the new institutional landscape needed for adaptation
- 1.2 A broader coalition of actors mobilized to deliver the Adaptation Strategy
- 1.3 Adaptation leadership at all levels that is nurtured and developed
- 1.4 News arts, media and cultural organisations in telling stories about the climate crisis and opportunities to adapt

Table F2 – Intervention 1: Reform and reshape governance so they respond to adaptation needs, nurtures new leadership and creates expectations in society

Intervention 1	SEA 1 – Natural Capital	SEA 2 – Climate Resilience	SEA 3 – Reduce GHGs	SEA 4 – Reduce energy use	SEA5 – Wellbeing and inequalities	SEA6 – Economic growth, equality and social inclusion	SEA7 – Preserve and protect habitats and species	SEA8 – Maintain and enhance green networks	SEA9 – Conserve and enhance landscapes	SEA10 – Protect and enhance the historic environment	SEA11 – Protect water quality and the water environment	SEA12 – Reduce the risk of flooding	SEA13 – Protect the water environment from climate change	SEA14 - To reduce water use, support sustainable use and efficiency	SEA15 – Protection and enhancement of air quality	SEA16 – Efficient use of land and resources	SEA17 - Protect important geological and agricultural land from climate change	SEA18 - Reduce the impact of climate change on key infrastructure
SEA Score	?	++	?	?	++	++	?	?	?	?	?	?	?	?	?	?	?	?
Nature		D			I	I												
Spatial Extent		R			R	R												
Reversibility		R			R	R												
Duration		LT			MT	MT												
Assessment Summary	The intervention aims to work with public sector, trade and professional networks, and community leaders, in order to equip all those responsible in leading adaptation efforts to better understand the challenges of adaptation and what is needed across the City Region and beyond. Bringing institutions, networks and people together to plan for the future will help share and disseminate ideas and common practices to help foster collaborate change, to adapt to the effects of climate change. This intervention has therefore resulted in significant positive effects on SEA2.																	

Cumulative / Synergistic Effects	<p>The intervention aims to undertake a detailed review of the new institutional landscape needed for adaptation, which includes exploring the changing civic space. Climate change will dramatically shift how people in the region live their lives, and civic space is essential to ensure that citizens and civil society organisations are able to organise, participate and communicate. Proactively engaging with new public groups could help communities (particularly vulnerable groups) to become more climate resilient, so they are able to better absorb the threats and variability of climate change. For these reasons, significant positive effects have been identified for SEA5.</p> <p>The review of the new institutional landscape needed for adaptation could bring about potential technological advances. This has potential to draw significant levels of investment, supporting economic growth and increased levels of employment. This has therefore resulted in significant positive effects on SEA6.</p> <p>The intervention aims to ensure that the governance across the region has the mechanisms to adapt efficiently to changing climate as well as the changing political landscape. Broadening the coalition with public, private and third sector parties to further the development of adaptation leadership has the potential to bring about positive effects on all SEA Objectives, however, at this stage the specific focus of adaptation activity is not known. For this reason, the majority of SEA Objectives have resulted in uncertain effects, however, they have the potential to result in significant positive effects depending on implementation. The wording of interventions could be amended to draw out more details on potential projects and technological advances, which would result in a more accurate assessment of the SEA Objectives.</p>																	
	SEA1	SEA2	SEA3	SEA4	SEA5	SEA6	SEA7	SEA8	SEA9	SEA10	SEA11	SEA12	SEA13	SEA14	SEA15	SEA16	SEA17	SEA18
	S- ✓+	✓+	✓+	✓+	✓+	✓+	S- ✓+	S- ✓+	S- ✓+	S- ✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+
<p>There is potential for positive cumulative effects on all SEA Objectives, if multiple interventions and adaptation measures were to be put into place. The intervention could result in further funding and greater climate change resilience to the City Region's environment and infrastructure, which will help to protect the region's economy and its residents.</p> <p>Conversely, there is potential for negative synergistic effects to occur, on natural capital, biodiversity, landscape and the historic environment particularly if technological advances lead to the need for large scale infrastructure and land take, within the City Region. Projects that come forward as a result of the interventions will need to be sensitively designed to minimise their impact on biodiversity, landscape and the historic environment. This is likely to be at a local / scheme level, however, an overall preference towards nature-based solutions could help to minimise potential negative effects.</p>																		

Intervention 2: Develop the ability of organisations, businesses and communities to adapt

- 2.1 An enhanced programme to increase awareness of the potential impacts of climate change on organisations and communities and opportunities to adapt
- 2.2 Establishment of a City Region working group/ forum and mentoring programme
- 2.3 Targeted community capacity building for adaptation

Table F3 – Intervention 2 - Develop the ability of organisations, businesses and communities to adapt

Intervention 2	SEA 1 – Natural Capital	SEA 2 – Climate Resilience	SEA 3 – Reduce GHGs	SEA 4 – Reduce energy use	SEA5 – Wellbeing and inequalities	SEA6 – Economic growth, equality and social inclusion	SEA7 – Preserve and protect habitats and species	SEA8 – Maintain and enhance green networks	SEA9 – Conserve and enhance landscapes	SEA10 – Protect and enhance the historic environment	SEA11 – Protect water quality and the water environment	SEA12 – Reduce the risk of flooding	SEA13 – Protect the water environment from climate change	SEA14 - To reduce water use, support sustainable use and efficiency	SEA15 – Protection and enhancement of air quality	SEA16 – Efficient use of land and resources	SEA17 - Protect important geological and agricultural land from climate	SEA18 - Reduce the impact of climate change on key infrastructure
SEA Score	?	++	+	+	++	++	?	?	?	?	?	?	?	?	?	?	?	++
Nature		D	I	I	D	D												D
Spatial Extent		R	R	R	R	R												R
Reversibility		R	R	R	R	R												R
Duration		LT	MT	MT	LT	LT												LT
Assessment Summary	<p>The intervention aims to ensure that climate change risks are considered and addressed in all strategies, plans, programmes and projects that influence the development of the City Region. Future plans and strategies have the potential to bring about positive effects on all SEA Objectives, however, at this stage the focus of emerging strategies and the embedding of climate adaptation measures are not known. For this reason, the majority of SEA Objectives have resulted in uncertain effects, however, they have the potential to result in significant positive effects depending on implementation. The mentoring programme could include a universal framework or overarching goals which identifies the importance of all strands of sustainability and ways in which businesses can contribute to bring about climate resilience without compromise.</p> <p>Partnership with the Adaptation Scotland Programme and public, private and third sector organisations, ,as along with the establishment of a working group and mentoring system with public sector organisations and businesses, will help to integrate climate change into strategic decision making of public sector</p>																	

	<p>organisations and businesses. This could help business and organisations in the region identify key climate risks helping them to build greater climate resilience. This has therefore resulted in significant positive effects in relation to SEA2 – climate resilience.</p> <p>Intervention 2.3 could result in significant positive effects on SEA5, as it focuses on those communities who are the most exposed and vulnerable to impacts. The effects of climate change can have negative effects on mental health (e.g. stress and anxiety) therefore, the reference to ‘mental welfare’ may bring about a more holistic approach. A more community focused approach could help communities (particularly those more vulnerable groups) to become climate resilient, so they are able to better absorb the threats and variability of climate change.</p> <p>Climate change may alter the growth trajectory of many of the region’s businesses and alter investment priorities (e.g. reducing productivity particularly during extreme events). This intervention could lead to productive investment toward adaptation measures, which could bring significant economic growth to the region and has therefore, resulted in significant positive effects on SEA6 and SEA18.</p> <p>This intervention is likely to indirectly raise awareness of transition climate risks (i.e. transition to a low carbon economy) which may encourage organisations to reduce carbon emissions. For this reason, minor positive effects have been identified in relation to SEA3 and SEA4.</p>																	
Cumulative / Synergistic Effects	SEA1	SEA2	SEA3	SEA4	SEA5	SEA6	SEA7	SEA8	SEA9	SEA10	SEA11	SEA12	SEA13	SEA14	SEA15	SEA16	SEA17	SEA18
	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+
	There is potential for positive cumulative effects on all SEA Objectives, if current emerging plans and strategies and future plans and strategies consider climate risks and include adaptation. The intervention could result in greater climate change resilience to the City Region’s environment and infrastructure, which will help to protect the region’s economy and its residents.																	

Intervention 3: Increase adaptation finance through leverage and innovation

- 3.1 Strategic use of public sector funds to attract private sector investment
- 3.2 A Regional Adaptation Finance Strategy and Action Plan
- 3.3 Mapping and measurement of regional adaptation finance flows
- 3.4 Piloting of new approaches to transformative adaptation finance

Table F4 – Intervention 3 - Increase adaptation finance through leverage and innovation

Intervention 3	SEA 1 – Natural Capital	SEA 2 – Climate Resilience	SEA 3 – Reduce GHGs	SEA 4 – Reduce energy use	SEA5 – Wellbeing and inequalities	SEA6 – Economic growth, equality and social inclusion	SEA7 – Preserve and protect habitats and species	SEA8 – Maintain and enhance green networks	SEA9 – Conserve and enhance landscapes	SEA10 – Protect and enhance the historic environment	SEA11 – Protect water quality and the water environment	SEA12 – Reduce the risk of flooding	SEA13 – Protect the water environment from climate change	SEA14 - To reduce water use, support sustainable use and efficiency	SEA15 – Protection and enhancement of air quality	SEA16 – Efficient use of land and resources	SEA17 - Protect important geological and agricultural land from climate	SEA18 - Reduce the impact of climate change on key infrastructure
SEA Score	?	++	?	?	++	++	?	?	?	?	?	?	?	?	?	?	?	++
Nature		D			I	D												D
Spatial Extent		R			R	R												N
Reversibility		R			R	R												R
Duration		LT			LT	LT												LT
Assessment Summary	<p>Losses due to extreme weather and climate change related events have increased significantly and will continue to into the future. Therefore, the deployment of various sources of finance, are urgently needed to maintain and enhance the resilience of assets to climate change over its expected operational life. This will also help to contribute to the climate resilience benefits of the system which the asset forms part of. For these reasons, significant positive effects have been identified in relation to SEA2 and SEA18.</p> <p>Development of a regional adaptation finance strategy and action plan and increasing the value of public sector investments has potential to result in significant economic growth in the City Region. Public sector investments are key for stimulating inclusive economic growth and developments. The intervention also aims to consider how changes to wider tax and subsidy regimes could be used to mobilise and direct finance towards most vulnerable</p>																	



	<p>households, which could help to reduce levels of inequalities and social exclusion within the region. This has resulted in significant positive effects on SEA6 and SEA5.</p> <p>Increased public and private sector investments could result in substantial resilience funding that will benefit all SEA Objectives. However, at this stage the level of funding and the target areas for investments are not known, which has therefore resulted in uncertain effects across many of the SEA Objectives. There is potential for this intervention to bring about significant positive effects across all SEA Objectives.</p>																	
Cumulative / Synergistic Effects	SEA1	SEA2	SEA3	SEA4	SEA5	SEA6	SEA7	SEA8	SEA9	SEA10	SEA11	SEA12	SEA13	SEA14	SEA15	SEA16	SEA17	SEA18
	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+
	<p>There is potential for positive cumulative effects on all SEA Objectives, if multiple investments and funding streams were to be made available. The intervention could result in further funding and greater climate change resilience to the City Region's environment and infrastructure, which will help to protect the region's economy and its residents.</p>																	

Intervention 4 - Enable and equip individuals and communities to participate in adaptation, focusing on the most vulnerable

- 4.1 A shared understanding of how current community engagement is structured for adaptation
- 4.2 Increased community involvement in the region's adaptation governance, decision making, planning and delivery
- 4.3 Resource, training and education for communities and young people to shape their places
- 4.4 Collaborations between organisations, communities and artists and cultural practitioners- to stimulate creative and relevant adaptation responses with new actors and communities

Table F5 – Intervention 4 - Enable and equip individuals and communities to participate in adaptation, focusing on the most vulnerable

Intervention 4	SEA 1 – Natural Capital	SEA 2 – Climate Resilience	SEA 3 – Reduce GHGs	SEA 4 – Reduce energy use	SEA5 – Wellbeing and inequalities	SEA6 – Economic growth, equality and social inclusion	SEA7 – Preserve and protect habitats and species	SEA8 – Maintain and enhance green networks	SEA9 – Conserve and enhance landscapes	SEA10 – Protect and enhance the historic environment	SEA11 – Protect water quality and the water environment	SEA12 – Reduce the risk of flooding	SEA13 – Protect the water environment from climate change	SEA14 - To reduce water use, support sustainable use and efficiency	SEA15 – Protection and enhancement of air quality	SEA16 – Efficient use of land and resources	SEA17 - Protect important geological and agricultural land from climate	SEA18 - Reduce the impact of climate change on key infrastructure
SEA Score	?	++	?	+	++	++	?	?	+	+	?	?	?	?	?	+	?	?
Nature		D		I	I	I										I		
Spatial Extent		R		L	L	L										L		
Reversibility		R		R	R	R										R		
Duration		LT		MT	MT	MT										MT		
Assessment Summary	Community focused approaches could help communities (particularly vulnerable groups) to become climate resilient, so they are able to better absorb the threats and variability of climate change. Empowering vulnerable communities to play a central role in decision making will help them to better understand how the climate is and will continue to impact on their lives. For these reasons, significant positive effects have been identified for, SEA2, SEA5 and SEA6.																	



	<p>Minor positive effects have been identified in relation to energy use (SEA4) and efficient use of resources (SEA16) as these can be tackled at a smaller community / household scale e.g. household recycling and waste reduction initiatives and smart metering.</p> <p>Intervention 4.4 could also result in minor positive effects on SEA9 and SEA10. Seeking approaches and methods that draw on the region's history of change and sense of place, could contribute to positive placemaking enhancing both the natural and built landscape and the region's historic environment.</p> <p>There is potential for significant positive effects on all SEA Objectives, however, it is not clear on the focus of community engagement and this is likely to differ between communities depending on their priorities. For this reason, a number of uncertainties have been recorded.</p>																	
Cumulative / Synergistic Effects	SEA1	SEA2	SEA3	SEA4	SEA5	SEA6	SEA7	SEA8	SEA9	SEA10	SEA11	SEA12	SEA13	SEA14	SEA15	SEA16	SEA17	SEA18
	n/a - No cumulative or synergistic effects were identified.																	

Intervention 5: Embed reflection, monitoring, evaluation, and learning into adaptation action

- 5.1 Learning by doing – building in active reflection and learning process
- 5.2 Encourage large organizations to sign up to relevant international reporting initiatives
- 5.3 Alignment of planning assumptions between domestic adaptation planning and the emerging TCFD / Investor regimes
- 5.4 Learning and knowledge exchange with other cities and regions

Table F6 – Intervention 5: Embed reflection, monitoring, evaluation, and learning into adaptation action

Intervention 5	SEA 1 – Natural Capital	SEA 2 – Climate Resilience	SEA 3 – Reduce GHGs	SEA 4 – Reduce energy use	SEA5 – Wellbeing and inequalities	SEA6 – Economic growth, equality and social inclusion	SEA7 – Preserve and protect habitats and species	SEA8 – Maintain and enhance green networks	SEA9 – Conserve and enhance landscapes	SEA10 – Protect and enhance the historic environment	SEA11 – Protect water quality and the water environment	SEA12 – Reduce the risk of flooding	SEA13 – Protect the water environment from climate change	SEA14 – To reduce water use, support sustainable use and efficiency	SEA15 – Protection and enhancement of air quality	SEA16 – Efficient use of land and resources	SEA17 – Protect important geological and agricultural land from climate	SEA18 – Reduce the impact of climate change on key infrastructure
SEA Score	0	++	++	+	0	+	0	0	0	0	0	0	0	0	0	0	0	++
Nature		D	D	D		I												I
Spatial Extent		I	I	I		R												I
Reversibility		R	R	R		R												R
Duration		LT	LT	LT		MT												LT
Assessment Summary	<p>The intervention aims to build networks to further develop relationships with similar vulnerable Cities and Regions around the world, in order to exchange knowledge and to foster a learning culture to accelerate the impact of the interventions made in the region. As adaptation measures and policies become more pertinent it is increasingly important that policymakers, practitioners and the general public have access to relevant and high-quality information, and they too are communicating relevant evidence, experience and knowledge.</p> <p>Working with international climate networks to develop new partnerships and relationships will help to progress and support further efforts in adaptation. Linkages and knowledge sharing with similar delta cities is likely to bring about solutions to common resilience challenges. Given the nature of these delta cities it is assumed that these cities will have similar infrastructure which face comparable climate related challenges. It is therefore likely that this</p>																	



	<p>intervention will build further climate change resilience across the City Region and further knowledge sharing will help to protect its key infrastructure. For these reasons, significant positive effects have been identified for SEA2 and SEA18.</p> <p>One of the key aims of the TCFD is to help to reduce the financial risk of climate change – helping business and organisations to remain viable and operational in the face of climate shocks and stressors. There is potential for economic benefits if businesses and organisations align themselves to the TCFD recommendations, therefore, an indirect minor positive effect has been identified in relation to SEA6. TCFD also puts a lot of focus on physical risk and transition risk (risks to an organisation from the transition to the low carbon climate) so significant positive effects have been identified in relation to SEA3 and minor positive effects in relation to SEA4.</p>																	
Cumulative / Synergistic Effects	SEA1	SEA2	SEA3	SEA4	SEA5	SEA6	SEA7	SEA8	SEA9	SEA10	SEA11	SEA12	SEA13	SEA14	SEA15	SEA16	SEA17	SEA18
	n/a - No cumulative or synergistic effects were identified.																	

Intervention 6 - Adapt the Clyde Corridor for the 22nd Century

- 6.1 Work through Mission Clyde to govern climate risks for the entire river corridor
- 6.2 An iterative adaptation pathway for the Clyde developed
- 6.3 The climate resilience of the River Corridor reflected as a national priority

Table F7 – Intervention 6 - Adapt the Clyde Corridor for the 22nd Century

Intervention 6	SEA 1 – Natural Capital	SEA 2 – Climate Resilience	SEA 3 – Reduce GHGs	SEA 4 – Reduce energy use	SEA5 – Wellbeing and inequalities	SEA6 – Economic growth, equality and social inclusion	SEA7 – Preserve and protect habitats and species	SEA8 – Maintain and enhance green networks	SEA9 – Conserve and enhance landscapes	SEA10 – Protect and enhance the historic environment	SEA11 – Protect water quality and the water environment	SEA12 – Reduce the risk of flooding	SEA13 – Protect the water environment from climate change	SEA14 - To reduce water use, support sustainable use and efficiency	SEA15 – Protection and enhancement of air quality	SEA16 – Efficient use of land and resources	SEA17 - Protect important geological and agricultural land from climate	SEA18 - Reduce the impact of climate change on key infrastructure
SEA Score	++	++	+	+	+	+	+	++	?	?	++	++	++	+	+	++	?	+
Nature	D	D	I	I	I	I	D	D			D	D	D	D	D	D		D
Spatial Extent	R	R	R	R	R	R	I	R			R	R	R	R	N	R		N
Reversibility	R	R	R	R	R	R	I	R			I	I	I	R	R	R		R
Duration	LT	LT	LT	LT	LT	LT	LT	LT			LT	LT	LT	LT	LT	LT		MT
Assessment Summary	<p>The intervention aims to provide climate resilience to the River Clyde Corridor, mainly through the long term management of coastal, river and surface water risks. The long term management of flood risk has resulted in significant positive effects for SEA11, SEA12 and SEA13, as it will directly help to reduce the risk of flooding, whilst protecting the water environment from climate change. It is also assumed that the use of natural flood defences and introduction of blue and green infrastructure will help to improve water quality.</p> <p>The introduction of green and blue infrastructure will help to increase natural stocks and enhance green infrastructure networks. Natural flood defences along with green and blue infrastructure have potential to improve the water quality which could help to protect and enhance fluvial and coastal habitats. There are, however, a number of designated (statutory and non-statutory) of significant biodiversity value within the River Clyde Valley, such as the Inner</p>																	

	<p>Clyde SPA, which could be more sensitive to changes. All development within the Clyde Corridor will need to be delicately designed to ensure there are no negative impacts on designated sites.</p> <p>Uncertain effects have been identified for both landscape (SEA9) and the historic environment (SEA10). The addition of green infrastructure has potential to contribute positively to the landscape, through the addition of more green spaces, which in turn will have additional positive effects for health and wellbeing (SEA5). However, the intervention is looking at the potential role of vacant and derelict land in providing space for management of flooding, which could result in the loss of some undiscovered or buried historic assets. Some natural flood defences such as sediment ponds may also deteriorate the landscape and historic environment, however, if the design takes into account the character and setting, there may be opportunity to protect and enhance distinctive heritage assets and their unique landscape settings. Negative effects are likely to be mitigated at a local / project level through design that reflects local landscape and historic character.</p> <p>The use of vacant and derelict land in providing space for management of flooding, supports the efficient use of land (SEA16). The preference towards natural flood defences will include less resource intensive solutions, compared to hard engineering alternatives, and could include some natural, local sourced and sustainable resources e.g. use of woodland debris to form instream structures.</p> <p>Uncertain effects have been identified in relation to SEA17. Whilst the use of derelict sites might conserve geological and agriculturally important land, some natural flood defences, such as large scale floodplain restoration could result in the sterilisation of agricultural land from water logging and erosion. The impact of the intervention on this SEA Objective will be highly dependent upon the schemes that come forward.</p> <p>The introduction of more blue and green infrastructure could also decrease urban heat island effect, reducing temperatures and therefore reducing the energy demand for cooling in summer and reduce GHG emissions. The potential in reduction of GHGs has resulted in minor positive effects on SEA3 and SEA4.</p>																	
Cumulative / Synergistic Effects	SEA1	SEA2	SEA3	SEA4	SEA5	SEA6	SEA7	SEA8	SEA9	SEA10	SEA11	SEA12	SEA13	SEA14	SEA15	SEA16	SEA17	SEA18
	✓+	✓+			✓+		✓+	✓+	✓+S-	S-	✓+	✓+	✓+	✓+			S-	
	<p>There is potential for negative synergistic effects for SEA9, SEA10 and SEA17 if multiple natural flood prevention measures were to come forward (particularly if they are large scale such as floodplain restoration) in multiple locations within the River Clyde Corridor. This could lead to large cumulative loss in land, which could lead to a loss in heritage assets, high quality agricultural land and geological important land, all of which could have negative effects on the landscape. Negative effects are likely to be mitigated at a local / project level through design that reflects local landscape and historic character.</p> <p>The addition of green and blue infrastructure is likely to have positive cumulative effects on health and wellbeing, air quality, the risk of flooding and build climate resilience, if multiple developments were to come forward.</p>																	

Intervention 7 - Enhance early warning and preparedness for floods and heatwaves

- 7.1 Extension the flood warning scheme in Glasgow City Region
- 7.2 Implementation of an integrated climate alert warning system for Glasgow City Region
- 7.3 Continued delivery of strategic Flood Risk Management activities
- 7.4 A regional property flood resilience and resistance installation programme
- 7.5 Exploration of new insurance models

Table F8 – Intervention 7 - Enhance early warning and preparedness for floods and heatwaves

Intervention 7	SEA 1 – Natural Capital	SEA 2 – Climate Resilience	SEA 3 – Reduce GHGs	SEA 4 – Reduce energy use	SEA5 – Wellbeing and inequalities	SEA6 – Economic growth, equality and social inclusion	SEA7 – Preserve and protect habitats and species	SEA8 – Maintain and enhance green networks	SEA9 – Conserve and enhance landscapes	SEA10 – Protect and enhance the historic environment	SEA11 – Protect water quality and the water environment	SEA12 – Reduce the risk of flooding	SEA13 – Protect the water environment from climate change	SEA14 - To reduce water use, support sustainable use and efficiency	SEA15 – Protection and enhancement of air quality	SEA16 – Efficient use of land and resources	SEA17 - Protect important geological and agricultural land from climate	SEA18 - Reduce the impact of climate change on key infrastructure
SEA Score	0	++	0	0	++	++	0	0	0	0	0	++	0	0	0	0	0	++
Nature		D			D	I						D						D
Spatial Extent		R			L	R						R						N
Reversibility		R			R	R						R						R
Duration		MT			MT	MT						MT						MT
Assessment Summary	Investing in early warning procedures and increasing preparedness will reduce the numbers of people and infrastructure impacted by climate hazards. In the long term, this will help reduce the strain on public and emergency services during floods and heatwaves. This intervention could help deliver a more economically efficient approach to reduce flood risks and heatwaves, with a combination of early warning, preparedness, and increased resilience of infrastructure, households, communities and businesses. For these reasons, significant positive effects have been identified in relation to SEA2, SEA6, SEA12 and SEA18.																	



	The development of a property flood resilience and resistance programme, which will prioritise the most socially vulnerable, will help to narrow the climate inequality gap. A heatwave can affect anyone, but the most vulnerable people are older people (especially those over 75), those who live on their own or in care, people who have a serious or long term illness or disability and the very young. The implementation of a climate alert warning system could help to provide early warnings to some of the most vulnerable members of society, reducing the number of deaths associated with extreme heat. For these reasons, significant positive effects have been identified in relation to SEA5.																	
Cumulative / Synergistic Effects	SEA1	SEA2	SEA3	SEA4	SEA5	SEA6	SEA7	SEA8	SEA9	SEA10	SEA11	SEA12	SEA13	SEA14	SEA15	SEA16	SEA17	SEA18
	n/a - No cumulative or synergistic effects were identified.																	



Intervention 8 - Ensure everyone's homes, offices and infrastructure are resilient to future climate impacts

- 8.1 Adaptation embedded in City Region's net zero transition
- 8.2 Creation of an adaptation forum for City Region infrastructure
- 8.3 Adaptation of existing infrastructure at risk, with policies and regulation to require all new investment to be climate resilient
- 8.4 Strengthening of adaptation requirements in the planning system
- 8.5 Creation of a regional retrofit framework for climate resilience
- 8.6 Creation of a framework for adapting cultural heritage assets
- 8.7 Lobby UK and Scottish Governments to reform infrastructure investment frameworks
- 8.8 Evaluation of future adaptation infrastructure needs

Table F9 – Intervention 8 - Ensure our homes, offices and infrastructure are resilient to future climate impacts

Intervention 8	SEA 1 – Natural Capital	SEA 2 – Climate Resilience	SEA 3 – Reduce GHGs	SEA 4 – Reduce energy use	SEA5 – Wellbeing and inequalities	SEA6 – Economic growth, equality and social inclusion	SEA7 – Preserve and protect habitats and species	SEA8 – Maintain and enhance green networks	SEA9 – Conserve and enhance landscapes	SEA10 – Protect and enhance the historic environment	SEA11 – Protect water quality and the water environment	SEA12 – Reduce the risk of flooding	SEA13 – Protect the water environment from climate change	SEA14 - To reduce water use, support sustainable use and efficiency	SEA15 – Protection and enhancement of air quality	SEA16 – Efficient use of land and resources	SEA17 - Protect important geological and agricultural land from climate	SEA18 - Reduce the impact of climate change on key infrastructure
SEA Score	+	++	++	++	++	++	+	+	?	++	+	++	+	+	++	++	0	++
Nature	I	D	I	I	I	I	I	I		D	I	I	I	I	D	D		D
Spatial Extent	L	R	R	R	L	R	L	L		N	R	R	R	R	R	R		N
Reversibility	R	R	R	R	R	R	R	R		R	R	R	R	R	R	I		I
Duration	MT	LT	LT	LT	MT	MT	MT	MT		LT	MT	LT	MT	MT	LT	MT		LT

Assessment Summary	<p>The adaptation of existing infrastructure and the evaluation of future adaptation needs will help to reduce the impact of climate change on the City Region's key infrastructure and incorporate climate change adaptation measures to help maximise resilience. This will have additional positive effects for the health and wellbeing of the City Region's population through increased levels of safety and maintain access to jobs, services and recreation, both now and in future.</p> <p>Embedding adaptation into the net zero transition should also ensure that the aims of the two programmes complement as opposed to compete with each other. For example, this should increase awareness of the potential to create an overheating risk when improving the energy efficiency of stock. It should also mean building material selection of any hard engineering adaptation measures adequately considers embodied carbon and the implications that this could have for meeting net zero targets.</p> <p>It is assumed that ensuring infrastructure which is resilient to climate change will include measures to reduce the risk of flooding and has therefore resulted in significant positive effects on SEA12. It has been assumed that resilience measures are incorporated to improve water quality and therefore, minor positive effects on SEA11, SEA13 and SEA14. There is potential for adaptation measures to infrastructure could have negative impacts on the regions landscape, as they could include large development and numerous components that may have a major visual impact. Uncertain effects have been identified, as it is not clear on what types of development and the key infrastructure that will be targeted by this intervention. Negative effects are likely to be mitigated at a local / project level through design that reflects local landscape character.</p> <p>The intervention aims to work with the region's building owners to assess climate resilience needs of building stock and develop a retrofit programme to ensure stock is fit for the future. Retrofitting existing buildings and homes may have substantial carbon-mitigation and cost-saving potential, helping to reduce both energy use and GHG emissions. Increasing the energy efficiency of homes will help to reduce the cost of resident's energy bills, reduce fuel poverty and could result in wide-scale regeneration of low income communities over time. For these reasons, significant positive effects have been identified in relation to SEA2, SEA3, SEA4, SEA5, SEA6, SEA15 and SEA16.</p> <p>The intervention includes specific measures to evaluate the impacts of climate change on the historic environment, in particular the World Heritage Sites of Antonine Wall and New Lanark. Given that the baseline identified the irreplaceable damage that climate change poses to the historic environment, this intervention has resulted in significant positive effects on the historic environment. There is, however, potential for some adaptation measures to infrastructure and retrofitting could include large developments and / or numerous components that may have a major visual impact and erode the historic environment.</p> <p>There is potential for this intervention to provide 'green' buildings (e.g. green roofs / walls) and the inclusion of features on buildings including bird and bat boxes, which could result in the increase the biodiversity and natural capital within the City Region. For this reason, minor positive effects have been identified for SEA1, SEA2 and SEA7.</p>																	
Cumulative / Synergistic Effects	SEA1	SEA2	SEA3	SEA4	SEA5	SEA6	SEA7	SEA8	SEA9	SEA10	SEA11	SEA12	SEA13	SEA14	SEA15	SEA16	SEA17	SEA18
									S-	S-								
	<p>There is potential for negative synergistic effects on both the landscape and the historic environment, if multiple infrastructure adaptation and retrofitting measures were to come forward in various locations within the City Region, particularly in those locations with high landscape and / or heritage value. There is potential for multiple developments to erode both the historic environment and the landscape setting. If the design takes into account the character and setting, there may be opportunities to protect and enhance distinctive heritage assets and their unique landscape settings.</p>																	

Intervention 9 - Deliver nature-based solutions for resilient, blue-green ecosystems, landscapes and neighbourhoods

- 9.1 Identify regional priorities for nature-based solutions
- 9.2 Support delivery of the regional Strategic Green Network
- 9.3 Creation of the Clyde Climate Forest
- 9.4 Increase investment in targeted habitat restoration
- 9.5 Roll out of large-scale green and blue infrastructure projects to demonstrate benefits to communities – either through new green infrastructure, or removal of urban form.
- 9.6 Support for new local infill or expansion of nature-based solutions to strengthen the regional network
- 9.6 Develop and accelerate Green and Blue Infrastructure financing

Table F10 – Intervention 9 - Deliver nature-based solutions for resilient, blue-green ecosystems, landscapes and neighbourhoods

Intervention 9	SEA 1 – Natural Capital	SEA 2 – Climate Resilience	SEA 3 – Reduce GHGs	SEA 4 – Reduce energy use	SEA 5 – Wellbeing and inequalities	SEA 6 – Economic growth, equality and social inclusion	SEA 7 – Preserve and protect habitats and species	SEA 8 – Maintain and enhance green networks	SEA 9 – Conserve and enhance landscapes	SEA 10 – Protect and enhance the historic environment	SEA 11 – Protect water quality and the water environment	SEA 12 – Reduce the risk of flooding	SEA 13 – Protect the water environment from climate change	SEA 14 - To reduce water use, support sustainable use and efficiency	SEA 15 – Protection and enhancement of air quality	SEA 16 – Efficient use of land and resources	SEA 17 - Protect important geological and agricultural land from climate	SEA 18 - Reduce the impact of climate change on key infrastructure
SEA Score	++	++	+	+	++	+	++	++	++	?	++	+	++	0	+	++	+	0
Nature	D	D	I	I	I	I	D	D	D		D	I	D		I	I	D	
Spatial Extent	N	R	R	R	R	R	R	R	R		R	L	R		R	R	R	
Reversibility	R	R	R	R	R	R	R	R	R		R	R	R		R	R	R	
Duration	LT	LT	LT	LT	LT	LT	LT	LT	LT		LT	MT	LT		LT	LT	LT	

Assessment Summary	<p>The intervention will help to provide well-connected, high quality greenspaces throughout the region. The introduction of green and blue infrastructure will help to increase natural stocks and enhance green infrastructure networks. The addition and maintenance of green and blue infrastructure have potential to improve water quality which could help to protect and enhance fluvial and coastal habitats. Both blue and green infrastructure can provide climate resilience by providing solutions such as retention basins for surface water management. This has resulted in significant positive effects for SEA1, SEA2, SEA7, SEA8, SEA9, SEA11 and SEA13. Provision of infrastructure that helps to slow the flow of surface waters will provide additional benefits including a reduction in flood risk and hence SEA12 is minor positive.</p> <p>Significant positive effects have also been identified in relation to SEA16, as the use of vacant and derelict land will be explored in order to support the interventions, particularly in the Clyde Corridor. This will support the efficient use of land and protect the region's green spaces.</p> <p>Greater access to green and blue spaces will have direct and indirect impacts on people's physical and mental health and will help to promote social inclusion. Living in areas with green spaces is often associated with significantly less income-related health inequality, which can help to weaken the effects of deprivation. Providing a more attractive and liveable region that connects visitors with the social and cultural locations could help to increase levels of tourism across the City Region. This intervention has therefore resulted in significant positive effects for SEA5 and minor positive effects for SEA6.</p> <p>Minor indirect positive effects have been identified for SEA3 and SEA15. The intervention aims to promote restoration of ancient native and semi-natural woodland, which will aid carbon sequestration in the City Region. The intervention also supports the GCV Green Network partnership, who are also aiming to restore peatland, which is also a key source for carbon storage. This is likely to help support the removal of GHGs from the atmosphere and protect and enhance local air quality. Without the known scale of this, it is not clear how beneficial this will be on these SEA Objectives, there is however, potential for significant positive effects.</p> <p>The intervention aims to deliver large-scale green and blue infrastructure projects through either the removal of urban form or addition of new green and blue infrastructure. Uncertainty has therefore been recorded in relation to SEA10 (protect and enhance the historic environment) as it is not clear as to whether the removal of hard landscaping and public realm could include heritage assets that are of local or national importance. There is, however, potential that the addition of green infrastructure could help to improve the unique settings of heritage assets and make them more accessible for the region's residents and visitors.</p> <p>The introduction of more blue and green infrastructure could also decrease urban heat island effect, reducing temperatures and therefore reducing the energy demand for cooling in summer and reduce GHG emissions. This has therefore, resulted in minor positive effects on SEA3 and SEA4.</p>																	
Cumulative / Synergistic Effects	SEA1	SEA2	SEA3	SEA4	SEA5	SEA6	SEA7	SEA8	SEA9	SEA10	SEA11	SEA12	SEA13	SEA14	SEA15	SEA16	SEA17	SEA18
	✓+	✓+			✓+	✓+	✓+	✓+	✓+	✓-	✓+		✓+					
<p>The addition of green and blue infrastructure is likely to have positive cumulative effects on health and wellbeing, air quality, reducing greenhouse gases and building climate resilience, if multiple new sites were to come forward.</p> <p>Urban form is the physical characteristics that make up built-up areas, if multiple sites are removed to make way for green infrastructure there is potential for a cumulative negative effect on the historic environment, through the loss of heritage assets and the physical characteristics that make up built-up areas. If the design takes into account the character and setting, there may be opportunities to protect and enhance distinctive heritage assets and their unique landscape settings.</p>																		

Intervention 10 – Enhance regional decision making and establish Glasgow City Region as a global research and knowledge hub for adaptation

- 10.1 Enhanced adaptation research through open invitation to collaborate on publicly available research priorities
- 10.2 Glasgow City Region established as a living lab for climate adaptation
- 10.3 Convene an Expert Advisory Committee on Adaptation

Table F11 – Intervention 10: Enhance regional decision making and establish Glasgow City Region as a global research and knowledge hub for adaptation

Intervention 10	SEA 1 – Natural Capital	SEA 2 – Climate Resilience	SEA 3 – Reduce GHGs	SEA 4 – Reduce energy use	SEA5 – Wellbeing and inequalities	SEA6 – Economic growth, equality and social inclusion	SEA7 – Preserve and protect habitats and species	SEA8 – Maintain and enhance green networks	SEA9 – Conserve and enhance landscapes	SEA10 – Protect and enhance the historic environment	SEA11 – Protect water quality and the water environment	SEA12 – Reduce the risk of flooding	SEA13 – Protect the water environment from climate change	SEA14 - To reduce water use, support sustainable use and efficiency	SEA15 – Protection and enhancement of air quality	SEA16 – Efficient use of land and resources	SEA17 - Protect important geological and agricultural land from climate	SEA18 - Reduce the impact of climate change on key infrastructure
SEA Score	+	++	++	++	++	++	+	+	+	+	+	+	+	+	++	+	+	+
Nature	I	D	D	D	I	I	I	I	I	I	I	I	I	I	D	I	I	I
Spatial Extent	R	R	N	N	L	R	R	R	R	R	R	R	R	R	N	R	R	R
Reversibility	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
Duration	MT	LT	LT	LT	MT	MT	MT	MT	MT	MT	MT	MT	MT	MT	LT	MT	MT	MT
Assessment Summary	The intervention aims to proactively promote Glasgow City Region as a place for research and experimentation on climate change adaptation and develop proposals in partnership with public sector bodies, communities and businesses. The intervention will also seek to create similar research for use in adaptation																	

	<p>planning across Scotland. This could result in significant financial investment and economic growth within the City Region, which has resulted in significant positive effects on SEA6.</p> <p>The intervention sets out early research priorities which include synergies and trade-offs with the region's path to net zero, sectoral gaps such as the natural and built environments. A priority to working towards net zero has resulted in significant positive effects on the reduction of greenhouse gases (SEA3), reduction in energy use (SEA4) and enhancement of air quality (SEA15).</p> <p>A focus on sectoral gaps such as the natural and built environment could bring about innovative adaptation measures to build climate resilience across all SEA Objectives. The intervention also makes reference to the Climate Risk and Opportunity Assessment, which highlights a number of priorities that need to be filled to support adaptation activity going forward, which align with the key priorities of the SEA Objectives. At this stage, the types of solutions and projects that may come forward are unknown, therefore, this intervention has resulted in minor positive effects on SEA1, SEA7, SEA8, SEA9, SEA10, SEA11, SEA12, SEA13, SEA14, SEA17 and SEA18. There is, however, potential for the intervention to bring about significant positive effects across these SEA Objectives.</p> <p>Trade-offs in order to meet net zero, can often result in loss of land (to make space for renewable infrastructure) and job loss in traditional energy industries and those sectors that support them. Looking at this as a research priority could help to minimise the impact and support a just transition. This could be further supported by the early research priority of climate justice. It is assumed that this could result in adaptation measure that address climate change whilst making progress towards equity and the protection of all of the City Region's residents. For this reason, significant positive effects have been identified in relation to SEA5 – wellbeing and inequalities.</p>																	
Cumulative / Synergistic Effects	SEA1	SEA2	SEA3	SEA4	SEA5	SEA6	SEA7	SEA8	SEA9	SEA10	SEA11	SEA12	SEA13	SEA14	SEA15	SEA16	SEA17	SEA18
	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+	✓+
	There is potential for positive cumulative effects on all SEA Objectives, if multiple research opportunities materialise into key projects in the City Region. The interventions could result in further funding and investment in the region resulting in significant job growth and greater climate change resilience to the environment, infrastructure and the City Region's residents.																	

Intervention 11 – Begin the transition to an economy resilient to future climate impacts

- 11.1 Adopt a climate smart regional economic development approach
- 11.2 Delivery of a just, climate resilient transition which nurtures adaptation skills
- 11.3 Climate-resilient supply chains, as part of a net zero, circular economy
- 11.4 An SME (Small and Medium Enterprise) support plan

Table F12 – Intervention 11 - Begin the transition to an economy resilient to future climate impacts

Intervention 11	SEA 1 – Natural Capital	SEA 2 – Climate Resilience	SEA 3 – Reduce GHGs	SEA 4 – Reduce energy use	SEA5 – Wellbeing and inequalities	SEA6 – Economic growth, equality and social inclusion	SEA7 – Preserve and protect habitats and species	SEA8 – Maintain and enhance green networks	SEA9 – Conserve and enhance landscapes	SEA10 – Protect and enhance the historic environment	SEA11 – Protect water quality and the water environment	SEA12 – Reduce the risk of flooding	SEA13 – Protect the water environment from climate change	SEA14 - To reduce water use, support sustainable use and efficiency	SEA15 – Protection and enhancement of air quality	SEA16 – Efficient use of land and resources	SEA17 - Protect important geological and agricultural land from climate	SEA18 - Reduce the impact of climate change on key infrastructure
SEA Score	0	++	++	++	+	++	0	0	0	0	0	0	0	++	++	++	0	0
Nature		D	D	D	I	I								D	D	D		
Spatial Extent		R	N	R	R	R								R	N	R		
Reversibility		R	R	R	R	R								R	R	R		
Duration		LT	LT	MT	MT	MT								MT	LT	MT		

Assessment Summary	<p>Small and medium size enterprises (SMEs) are particularly vulnerable to climate change, as they are less likely to have large financial reserves and are less able to prepare, respond and recover than larger organisations. Mobilising support to boost adaptation among SMEs will help to better prepare for the potential impacts of climate change, help to keep them financially viable and protect jobs both within the SMEs themselves as well as the wider supply chains.</p> <p>By ensuring that adaptation transitions are fair and just to workers and businesses and providing support to the most vulnerable workers and businesses, this intervention will help to protect jobs and businesses from the impact of climate change. It is assumed that the intervention could draw people from across various supply chains into an inclusive and participatory processes to help shape positive alternatives and identify the support, skills and safety nets to make the transition. This could present opportunities for new jobs, upskilling and help protect vulnerable people and businesses. For these reasons significant positive effects have been identified in relation to SEA6 and minor positive effects for SEA5.</p> <p>Promoting a circular economy, will help to keep resources in use for as long as possible, maximising their value. This will help to reduce the use of raw materials and minimise the amount of waste, both of which currently have a major impact on the environment. Moving towards a more circular economy could deliver benefits such as reducing greenhouse gas emissions, improving the security of the supply of raw materials, increasing competitiveness, boosting economic growth and creating further employment opportunities. For these reasons, significant positive effects have been identified in relation to SEA2, SEA3, SEA4, SEA14 and SEA15.</p>																	
Cumulative / Synergistic Effects	SEA1	SEA2	SEA3	SEA4	SEA5	SEA6	SEA7	SEA8	SEA9	SEA10	SEA11	SEA12	SEA13	SEA14	SEA15	SEA16	SEA17	SEA18
	✓+	✓+	✓+	✓+	✓+	✓+								✓+	✓+	✓+	✓+	
	<p>There is potential for positive cumulative effects to occur if the widespread implementation of circular economy across the region's supply chains were to occur. The more businesses and organisations that adopt a circular economic approach, the greater the opportunities for preservation and enhancement of natural capital, reducing greenhouse gas emissions, supporting efficient use of land, improving security of the supply of raw materials, increasing economic growth and the creation of jobs.</p>																	



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