

Appendix E - Alternative National Developments

E1.1 Introduction

E1.1.1 This appendix contains a summary of the assessment findings for the alternative national developments. The alternative National Developments are those suggestions received by the Scottish Government with potential, but not contributing to, the proposed national developments in the draft National Planning Framework 4 (NPF4).

E1.1.2 Further information on the policy consideration of suggestions received for National Developments is set out in the “*Scottish Government’s National Developments: Report of Assessment*” available to view online¹. Assessment findings for the proposed national developments included in the draft NPF4 are set out separately in Appendix E.

E1.1.3 The following alternative national developments have been assessed:

Longannet	E-3
National Centre for Community Heat.....	E-4
National electric vehicle network	E-5
Ravenscraig	E-6
Climate Evolution Zone including: Blindwells – Cockenzie – Energy Transition Zone – mixed development.....	E-7
Ardeer Peninsula.....	E-9
Vacant and Derelict Land re-development	E-10
Renewable energy generation.....	E-11
Edinburgh, East Lothian and Midlothian Innovation Zone	E-12
West Edinburgh.....	E-14
Glasgow Airport – business land, AMID, Surface access.....	E-15
Advanced Manufacturing.....	E-16
Zero Carbon Innovation Zones.....	E-17
Lochaber Smelter	E-19
Space industry and space ports	E-20
Freeport on the Clyde.....	E-21
Port of Inverness	E-22
National Inter-City Network.....	E-23
National Rail Freight Terminal, Mossend and Eurocentral	E-24
National Low-Carbon Freight Network.....	E-25
A National City Centre Transformation Programme for Scotland	E-26

¹ <https://www.transformingplanning.scot/national-planning-framework/>

Edinburgh Orbital Bus Project	E-27
North East Transport Investment.....	E-28
Trunk and Strategic Road Improvements (Various)	E-30
Outer Hebrides Fixed Links and Minch Tunnel.....	E-32
Development on community-owned land.....	E-33
National Tartan Centre	E-35
Clyde tidal barrier	E-36
10,000 Raingardens for Scotland	E-37
Opportunity Cromarty Firth	E-38
National Green & Blue Infrastructure Network.....	E-40
Scottish Nature Network.....	E-41
Glasgow National City Park.....	E-42
Sea Ports.....	E-43
Strategic Ports and Roads.....	E-45

E1.2 Methodology

E1.2.1 The assessment has been informed by the SEA objectives (which can be found in Table 2.1 in the main report), alongside evidence set out in the baseline information. Where relevant, any assumptions used to inform the assessments have been highlighted.

Uncertainty

E1.2.2 It is recognised that the suggestions received vary significantly in the level of detail and information provided and therefore there may be significant uncertainty as to how individual proposals would be taken forward. Particular areas of uncertainty are highlighted where relevant to the assessment.

E1.3 Assessment conclusions

E1.3.1 Overall assessment conclusions are reported for each alternative national development in the tables below. In addition, the assessment identified the potential for construction activities generally to have localised adverse environmental effects on most of the SEA topic areas. Examples include increased levels of noise, dust and vibration; disturbance from construction traffic; temporary visual impacts; sealing and loss of soil; increased sedimentation and soil erosion; potential for increased flooding and water pollution; and fragmentation or loss of habitats, amongst others. To avoid repetition, these potential impacts have not been set out within each assessment.

E1.3.2 It is also recognised that there are existing mechanisms in place through planning and consenting systems to identify and manage the potential for adverse impacts arising including through the detailed siting and design process.

E1.4 Alternative National Developments

Development

Longannet

Description

Use of the site that recognises its importance to the energy sector and large scale manufacturing as part of economic development; Local and regional connections for people to access the site should be included; Initial focus is creating a hub for the development of a low carbon rail cluster; Associated infrastructure improvements.

Summary of assessment findings:

- Potential for negative effects on **biodiversity**, through disturbance/loss of habitats and pollution of aquatic habitats. Proposed development is in close proximity to the Firth of Forth SPA which is likely to require further consideration.
- Potential benefits from reductions in **GHG emissions** where development supports the decarbonisation of rail lines/travel. The site could also support manufacturing, maintenance and innovation for low carbon rail. However, potential negative effects for GHG emissions can arise as a result of manufacturing activities. These are currently uncertain and will depend on the type of processes undertaken.
- Potential for negative impacts on localised **air** quality from increased surface traffic; with no note of support for sustainable/active travel beyond consideration of rail.
- Depending on the scale of development, negative impacts could arise on nearby **heritage** sites such as the Dunimarle Castle designated landscape near Culross.
- Potential for significant positive impacts on **material assets** through supporting manufacturing and the decarbonisation of rail, as well as road and rail network improvements.
- Significant positive impacts on **population and human health** are likely as a result of employment opportunities, particularly as some areas within/nearby the proposal are of significant deprivation. The proposal shows an active and direct effort to ensure that opportunities for jobs, training, research and development are targeted locally.

Assumptions: Development sited on previously utilised land with some existing infrastructure.

Uncertainties: General location known but precise details and scale of development unknown.

Development

National Centre for Community Heat

Description

Leveraging the engineering base in North East Scotland to develop a national hub for district heating excellence and supporting a just transition for the offshore oil industry; Bringing the experience of the current Aberdeen district heating scheme and local engineering expertise together with the proposed Inverurie district heating scheme to create a national centre for excellence.

Summary of assessment findings:

- Potential negative impacts for **biodiversity** from infrastructure requirements, both in the short and long-term, including disturbance and habitat loss and fragmentation. Potential for this to be minimised through siting and design and enhancement measures applied in keeping with national policy.
- Positive contribution to reducing **GHG emissions** through support for decarbonisation of the energy sector. Benefits should also arise from increased diversity in the provision of heat at a local/regional level, reduced risk of disruption and increased resilience, supporting **climate change adaptation**.
- Possible benefits for local/regional **air** quality where this leads to the displacement of traditional energy sources derived from fossil fuels, however, this would depend on the heat source used.
- Potential benefits arise for **material assets** through support for the decarbonisation of the energy sector, including through improved resilience.
- Potential benefits over the longer term for **population and human health** through community access to low carbon heat, which could be of relevance to those experiencing fuel poverty and potential for access to employment and training opportunities. Localised and community energy schemes could also lead to long-term benefits from increased resilience and efficiencies within the energy network. This could lead to benefits which could be of relevance to those in greatest need, for example, those experiencing fuel poverty.

Assumptions: Localised and community access to heat source.

Uncertainties: Main fuel source of the heat network, which may impact overall health impacts. Unclear if heating costs will be consistently reduced for consumers.

Development

National electric vehicle network

Description

To assist the decarbonisation of road transport.

Summary of assessment findings:

- Potential significant benefits from reducing **GHG emissions** where proposals support a transition away from road transport currently reliant on fossil fuels. Additionally, there is potential for improved infrastructure to further support take up of electric and alternatively-powered vehicles facilitating further decarbonisation of the road transport sector.
- Potential for significant positive effects from the displacement of fossil fuel vehicles, leading to reduced **air** pollution. This is of particular relevance to areas where air quality issues are currently experienced, such as Air Quality Management Areas (AQMAs).
- Potential benefits for **material assets** where this supports sustainable modes of transport within the network. The electrification of the transport network could also help support electricity storage in the form of battery storage and, in turn, potentially lead to improved efficiencies and resilience within the network.
- Potential for significant benefits for **population and human health** from improvements in air quality, particularly in urban areas where issues have been identified, such as AQMAs. This could be particularly relevant for those vulnerable to the effects of poor air quality. Potential benefits may also arise through reduced exposure to noise as electric vehicles are quieter. Conversely, however, there may be increased traffic safety risks, particularly for pedestrians and cyclists.

Assumptions: Proposal leads to the displacement of fossil fuel vehicles within the transport sector.

Uncertainties: Location and scale of infrastructure requirements unknown.

Development

Ravenscraig

Description

Continuation of one of the largest regeneration opportunities in Western Europe; 4,500 new homes, new mixed use town centre including retail, leisure, education facilities, green network/spaces, multi-modal transport links.

Summary of assessment findings:

- Potential for negative impacts on **biodiversity** where remediation works lead to the displacement of species which colonising the current brownfield site however there is potential for this to be minimised and enhancement measures applied in keeping with national policy. The enhancement/creation of green networks and spaces, as well as the use of nature based solutions for flood management, should lead to associated benefits.
- Potential for negative impacts where increased travel, electricity and heat demand leads to associated increases in **GHG emissions**, however, over the long-term, development could support reductions in GHG emissions through a focus on demonstrating the development as an exemplar of a net-zero settlement, support for sustainable and active travel, as well as the co-location of services. Additionally, potential benefits could arise where a new energy centre supports the displacement of fossil fuels. The use of natural solutions to flood management and enhancement/creation of green infrastructure should also support **climate change adaptation**.
- Potential for long-term positive impacts on **water** and **soil** from efforts to decontaminate the site and implementation of natural solutions to manage flood risk.
- Significant positive impacts should arise on localised **landscape** through the restoration of vacant and derelict land which has a poor landscape quality.
- Potential for significant long-term positive impacts on **population and human health**, as well as soil and **material assets**, from focus on regeneration of vacant and derelict land, alongside potential employment opportunities and improving access to goods and services.

Assumptions: Regeneration focus, including the remediation of vacant and derelict land. Supports the development of an exemplar net-zero settlement and energy centre, alongside sustainable/active travel and green networks. Use of nature based solutions to flood risk management.

Uncertainties: Precise details and scale of development. Potential for brownfield land to be affected by contamination with the extent/level of potential contamination and scale/type of remediation work that may be required, unknown.

Development

Climate Evolution Zone including: Blindwells – Cockenzie – Energy Transition Zone – mixed development

Description

New settlement and mixed use development at Blindwells linking into redevelopment of the Cockenzie power station site and associated climate change zone. New railway station/transport interchange, A1 interchange, heat and decentralised energy networks. An exemplar of sustainable inclusive development. Alternative vision for Blindwells element presented that shifts the development east to concentrate on further expanding Longniddry around the railway station to create a 20 minute neighbourhood, making use of existing services and facilities including the railway station.

Summary of assessment findings:

- Development could lead to significant negative impacts on **biodiversity**, however there is potential for this to be minimised through siting and design and enhancement measures applied in keeping with national policy. In addition, the proposed use of geothermal energy from minewater could have an impact on already established vegetation/biodiversity within the reedbed minewater treatment scheme. Long-term positive impacts could arise through the creation of blue-green infrastructure, with the extent of benefits likely to be influenced by factors such as scale and location of greenspace provision.
- Potential benefits from reducing **GHG emissions** through support for low/zero carbon energy networks. However, increased emissions associated with additional transport and energy demand could arise. Support for green-blue infrastructure/nature based solutions to flood management should lead to improved **climate change adaption**.
- Provisions for multi-modal transport and an emphasis on sustainable transport, such as active travel, should help reduce/minimise any potential negative effects on **air** quality where increased surface traffic could arise.
- The site is within the surface **water** catchment for Longniddry and Seton Sands bathing water, which is an environmentally sensitive receptor that may be at risk from increased rates of surface water discharge and potential for increased run off. The effects of this should be reduced/minimised by support for nature based solutions to flood risk management.
- Potential for negative effects on **soil** structure and function as a result of potential loss of prime agricultural land (classes 3.2 and 2).
- There are a number of listed buildings within the sites and several close to boundaries, including two listed buildings at Greendykes and Seton House (Palace). Potential for positive impacts to arise through support of the key role that cultural and historic assets have in placemaking.
- Positive impacts on built **material assets** from the provision of low and zero carbon energy sources, renewable energy development and creation of efficient energy systems. Redevelopment of previously developed land, where undertaken, should also lead to benefits.
- Increased access to and provision of travel hubs and support for sustainable travel infrastructure could have positive impacts for **population and human health**. Green infrastructure and open space for outdoor recreation, including where this supports active travel, can contribute to both physical and mental

health benefits. Positive impacts could also arise through increased accessibility to localised energy sources.

Assumptions: Mixed use development with a focus on 20 minute neighbourhoods approach, including improved public and active travel. An exemplar sustainable and inclusive development. Development of district heating and decentralised energy network. Support for blue-green infrastructure, including use of nature based solutions to flood risk management.

Uncertainties: Precise details, location and scale of development unknown.

Development

Ardeer Peninsula

Description

Mixed-use masterplan including coastal tourism and recreation destination, residential community with associated education, Energy Centre, retail business and industrial/logistics uses, and green space/outdoor recreation

Summary of assessment findings:

- Potential for negative long-term impacts for **biodiversity** as a result of infrastructure requirements, including disturbance and loss/fragmentation of habitats. Potential for this to be minimised through siting and design and enhancement measures applied in keeping with national policy. Longer-term benefits have the potential to arise through remediation of brownfield sites and potential enhancements to the environmental quality of the area, including through the creation of green spaces.
- Support for low emissions construction, energy efficient design and low/zero carbon energy sources has the potential to minimise negative effects from **GHG emissions** associated with construction/operation. Improved **climate change adaptation** should arise from support for green infrastructure.
- Potential for increased surface travel, with associated localised negative impacts on **air** quality. Support provided for localised work opportunities and active travel should help to minimise these.
- Long-term, the development could decrease the permeability of surfaces, potentially leading to increased surface run off with associated negative impacts on **water** quality and quantity. Potential impacts could be minimised from the creation of open/greenspaces.
- A degree of **landscape** change is expected with mixed impacts.
- Positive impacts for **material assets** should arise for the built environment, including through the provision of energy efficient building stock. Additional benefits should also arise through support for localised energy generation.
- Support for high quality housing, supporting inclusive growth, could lead to significant positive impacts for **population and human health**. The provision of affordable housing also has the potential to address inequalities, particularly in areas with high levels of deprivation. Improved energy efficiency and connection to localised energy networks should lead to warmer homes, potentially helping to address fuel poverty issues.

Assumptions: Mixed use development supporting localism agenda and reduced unsustainable mode trips. Includes the remediation of vacant and derelict land. Support for green infrastructure/open space development. Focus on provision of housing to meet specialised needs. Renewable energy opportunities as well as low emissions construction and energy efficient design potential.

Uncertainties: Precise details, location and scale of development unknown. Potential for brownfield land to be affected by contamination, with the extent/level of potential contamination and scale/type of remediation work that may be required, unknown.

Development

Vacant and Derelict Land re-development

Description

Remediate/transform vacant and derelict land including that on the Vacant and Derelict Land register to promote economic resilience and create a priority for such land in development plans.

Summary of assessment findings:

- Potential for significant positive impacts on **biodiversity** as a result of vacant and derelict land reclamation, particularly if used for the creation of a green network. The remediation of vacant and derelict land can, however, lead to the displacement of species which might have colonised these sites, which may require further consideration at the application stage.
- Bringing land back into productive use could lead to benefits through carbon sequestration with associated reductions **GHG emissions**. The scale of potential benefits is likely to depend on factors such as the types of developments delivered and scale of soils and vegetation preserved.
- Potential for localised benefits for **air** quality to arise from remediation works.
- Contaminated vacant and derelict sites can result in the pollution of watercourses with potential for positive impacts to arise from remediation, which could be significant depending on surrounding environmental conditions.
- Significant benefits should arise for **soil** from remediation works, particularly where contamination is present and land will be decontaminated through the development process. However, development can impact on soils, for example by increasing soil sealing.
- Potential for significant positive impacts on **landscape** through the restoration of vacant and derelict land, which has a poor landscape quality.
- Likely positive impacts for natural **material assets** through land use changes, particularly the provision of green infrastructure and land remediation/decontamination, including where this leads to improved placemaking.
- The remediation of vacant and derelict land should lead to positive impacts on **population and human health** by addressing the negative impacts associated with such land both socially and environmentally.

Assumptions: Remediation/transformation of vacant and derelict land including that on the Vacant and Derelict Land register to promote economic resilience.

Uncertainties: Precise details, location and scale of development unknown. Potential for brownfield land to be affected by contamination with the extent/level of potential contamination and scale/type of remediation work that may be required, is unknown.

Development

Renewable energy generation

Description

Proposal at former nuclear research site. Substations for renewable energy generation; Power generation from solar and other renewables.

Summary of assessment findings:

- Negative impacts on **biodiversity**, including habitat loss, could arise if the scale of development extends beyond that currently developed. This may be of relevance to North Caithness Cliffs SPA and SSSI: Sandside Bay which are located West of the development.
- Potential benefits from reducing **GHG emissions** should arise long-term through support for renewable technologies including solar support and transition to net zero. Extent of benefits will be dependent on factors such as scale.
- Potential long-term benefits for **air** quality through support for transition away from traditional fossil fuels.
- Benefits for **soil** should arise from the re-use of brownfield land. This will be dependent on the extent of the proposed re-development.
- Positive impacts for **material assets** should arise through the redevelopment of brownfield land and support for diversification within the energy mix.
- Potential for long-term benefits for **population and human health** from inward investment and employment opportunities. The remediation of brownfield land could also lead to associated benefits, however, the extent of effects are uncertain and the site is not densely populated.

Assumptions: Regeneration/renewable energy focus. Includes the remediation of vacant and derelict land.

Uncertainties: Location specific but scale of infrastructure requirements is unknown. Potential for brownfield land to be affected by contamination with the extent/level of potential contamination and scale/type of remediation work that may be required unknown.

Development

Edinburgh, East Lothian and Midlothian Innovation Zone

Description

Edinburgh BioQuarter, Usher Institute, Edinburgh Innovation Park (Food and Drink), Shawfair (including City Region Deal strategic site) and Easter Bush; world leading innovation (including for global health challenges) and business potential, together with significant infrastructure improvements to accommodate and facilitate growth. Creating a mixed use new city quarter around the Edinburgh Royal Infirmary and Medical School. City Region Deal strategic sites collectively deliver 45,000 new homes, 9,500 jobs and £12.6 billion to the economy. The BioQuarter is anticipated to add a further 5,000 employees over 5 years from committed development including through the City Region Deal with a 20,000 living/working population by completion (currently 8,000 employees in the BioQuarter); Additional 150,000sqm of lifescience and 350sqm mixed use accommodation plus housing of mixed tenure are anticipated to create a vibrant sustainable community for live, work and play; Public transport and active travel are at the heart of the development strategy and the BioQuarter is on City of Edinburgh Council's City Choices 2020 Strategic Sustainable Transport Corridor 3 for transit-led development to reduce carbon, promote equity, support healthier lifestyles and deliver sustainable economic growth; National development status will provide investor confidence about commitment to the project.

Summary of assessment findings:

- Potential for negative impacts on **biodiversity**, including disturbance and fragmentation of habitats, which could be significant where development includes previously undeveloped land. Support for green infrastructure should lead to associated biodiversity benefits. Consideration will need to be given to possible impacts on designated sites, such as the Firth of Forth SPA, for example, through recreational disturbance and pressures on water quality.
- Support for low carbon development, the implementation of low carbon heat sources and improved energy efficiency has the potential to reduce the potential for negative effects from **GHG emissions** associated with construction and operation. Potential for increased surface traffic to lead to associated emissions which could be reduced/minimised over the long-term through sustainable travel options and where localising work/access to services leads to a reduced need to travel.
- Provision of sustainable travel options could help to minimise possible impacts on local **air** quality from possible increases in surface traffic.
- Potential for increased surface run off and abstraction/discharges to lead to negative impacts on **water** quality and quantity.
- Potential for long-term negative impacts to arise as a result of loss of **soil** and soil sealing from development associated infrastructure. Use of existing infrastructure should help to reduce possible effects, however, these could be significant where development includes previously undeveloped land and areas of high land capability classification.
- Localised negative changes to **landscape** could arise, including through potential for land use change, which is likely to require further consideration at project level. The significance of impacts will be influenced by aspects such as scale and design.

- Positive impacts for **material assets** should arise for the built environment, particularly through support for placemaking, including through the provision of energy efficient building stock, localised energy generation and improved connectivity of the transport network that facilitates sustainable modes of travel. Potential for negative impacts on natural assets such as forestry, minerals and farmland through land use change will require further consideration at application stage.
- Positive impacts for **population and human health** should arise through the provision of energy efficient housing and improved connectivity, including through increased access to services, as well as localised employment opportunities. This could also lead to wider benefits, including improved quality of life, particularly from focus placemaking.

Assumptions: Mixed use development with a focus on placemaking and including support for low carbon development/provision of low carbon heat. Potential for development of previously undeveloped land. Support for green infrastructure/open space development, sustainable travel options and utilising existing assets, including road and rail infrastructure.

Uncertainties: Precise details and scale of development unknown.

Development

West Edinburgh

Description

Mixed use development and transport infrastructure, ensuring that development in the area also helps to tackle inequality in neighbouring areas including in Wester Hailes, Sighthill and the Calders; Elements to include: Edinburgh Airport, Royal Bank of Scotland, Heriot-Watt University, Royal Highland Showground, Development sites, Residential development (including land at Norton Park), Sustainable infrastructure focused on public and active travel, including tram extension to Newbridge; Spatial Strategy for Inclusive and Sustainable Growth.

Summary of assessment findings:

- Support for green infrastructure and high quality green spaces should lead to associated **biodiversity** benefits, however infrastructure requirements could lead to negative impacts including disturbance and fragmentation of habitats. Consideration will need to be given to where proposal could impact on designated sites, such as the Firth of Forth SPA, for example, through loss of functionally linked habitat.
- The development is likely to increase resource use, transport, electricity and heat demand, use of materials and generation of waste, with potential for overall increases in **GHG emissions**. This is influenced by factors such as the provision of sustainable energy sources and the area of previously undeveloped land developed. Improved climate change adaptation should arise from natural infrastructure and creation of high quality greenspace.
- Green infrastructure and creation of high quality open spaces should help to reduce/minimise potential effects on **water** quality/quantity from increased surface run off, with the River Almond and Gogar Burn flood risk areas requiring consideration. Potential negative impacts could also arise from increased abstraction and discharging.
- Potential for long-term negative impacts for **soil**, including loss/compaction from infrastructure requirements, which could be significant where this leads to the loss of land used for agriculture purposes.
- Potential for long-term negative impacts on local **landscape**, particularly where land use changes could arise.
- Taking an infrastructure-first approach, maximising the use of existing assets, has the potential to lead to benefits for **material assets**, particularly where focus is given to improved placemaking. Support for the decarbonisation of the transport sector, including from increased connectivity, should also be beneficial.
- Improved connectivity, including increased access to active and public transport and high quality greenspaces, should lead to associated health benefits, including improved wellbeing and sense of place.

Assumptions: Mixed use development which supports infrastructure first approach and use of existing infrastructure and focusing action towards focus action to those greatest need, including focus on addressing inequalities. Support for green infrastructure/high quality green spaces and sustainable and active travel options alongside decarbonisation of aviation. Potential for development of previously undeveloped land.

Uncertainties: Precise details, location and scale of development unknown.

Development

Glasgow Airport – business land, AMID, Surface access

Description

Extended airport boundary; New/extended airfield, terminal, landside infrastructure; Airport related business, industrial and logistics; Strategic sustainable surface access links; On-site renewable energy generation; Advanced Manufacturing and Innovation District Scotland; Link in the airport to the Clyde Mission.

Summary of assessment findings:

- Significant impacts on **biodiversity** could arise, with the potential for loss of habitats, including previously undeveloped land. Black Cart SPA/SSSI, designated for Whooper Swans, is located close to the airport, which could be impacted from construction and operational activities.
- Negative impacts in the short to medium-term from increased uptake of flights and surface traffic leading to associated **GHG emissions**, which could be potentially significant. Long-term emissions from operational activities is less certain, with potential for this to be mitigated from wider sectoral measures.
- Negative impacts on local **air** quality could arise, including from surface traffic to and from the airport, flights and development activities. Support for measures which seek to improve sustainable access to and from the airport should help to reduce/minimise possible implications.
- Potential for negative impacts on **water** quality long-term from operational activities, for example, from surface run off. Discharges are subject to permission from SEPA and risk of pollution managed through airport operational management processes.
- Development activities are likely to lead to long-term negative impacts on **soil**, for example, through sealing and loss/compaction, which could be potentially significant where loss of agricultural land arises.
- This part of the green belt is identified as a sensitive wedge within the overall green network of Glasgow and Clyde Valley. Loss of greenbelt land could have negative impacts for **landscape** and any proposed development should be assessed at project level for possible negative effects.
- Potential benefits for **material assets** through support for increased connectivity within the transport network, as well as renewable energy generation assets.
- Increased accessibility through transport improvements has the potential for positive impacts on **population and human health**. Improved surface access could also improve general transport links within the area, supporting wider uptake. Potential for negative impacts to arise through reduced air quality and increased exposure to noise.

Assumptions: Extension of airport boundary and related infrastructure could increase uptake of flights. On-site renewable energy generation, including energy efficiency measures and support for measures to reduce effects associated with surface traffic to/from airport. Some atmospheric pollutants have greater effects at higher altitudes.

Uncertainties: Precise details, location and scale of development unknown. Scale/timeline of wider decarbonisation efforts in the aviation sector is also unknown.

Development

Advanced Manufacturing

Description

South West Scotland Advanced Manufacturing for food and drink as well as life sciences; Advanced Manufacturing Investment Corridor in Kilmarnock focused on food and drink; i3 Campus in Irvine for a regionally significant and nationally recognised centre of excellence in digital automation and advanced manufacturing for life science sector. Partnership with NMIS, University of Strathclyde and Ayrshire College. Site previously known as Riverside Business Park, previously had Enterprise Area Status. 9,000m² of flexible business space for chemical and life sciences manufacturing, digital automation and other advanced manufacturing.

Summary of assessment findings:

- Negative impacts on **biodiversity** could arise from associated road infrastructure and industrial buildings. Potential for this to be minimised through siting and design and enhancement measures applied in keeping with national policy.
- Long-term increases in transport and energy use for manufacturing processes and generation of waste could lead to overall increases in **GHG emissions**.
- Potential for mixed impacts for **air** quality. Increased surface movements could arise, however, advanced manufacturing can enable shorter, more localised supply chains, in turn, potentially reducing freight journeys and benefiting air quality.
- Possible long-term negative impacts on **water** quality from operational abstraction requirements.
- There are a number of conservation areas (e.g. Irvine town centre) and scheduled monuments (e.g. Seagate Castle), the setting of which might be affected by development.
- Positive impacts on **material assets** could arise where new opportunities are sought to reduce pressure on natural resources, keep products and materials in circulation for longer and reduce waste.
- Potential benefits for **population and human health** through the potential to drive investment, innovation, productivity and inclusive growth through employment and the creation of up-skilling opportunities.

Assumptions: The development of business space for chemical and life sciences manufacturing, digital automation and other advanced manufacturing.

Uncertainties: Precise details, location and scale of development unknown.

Development

Zero Carbon Innovation Zones

Description

A network of sites that promote a transition from high carbon intensity industry and/or power generation to zero carbon innovation. A key objective would be to nurture and showcase new and emerging low and zero carbon technologies in a way that promotes inclusive growth and delivers wider place outcomes for local communities. Includes surface water management, flood risk resilience, biodiversity.

Summary of assessment findings:

- Infrastructure requirements could lead to associated negative impacts on **biodiversity** including habitat loss or damage. Potential for this to be minimised through siting and design and enhancement measures applied in keeping with national policy. Benefits should arise from measures to support biodiversity, including implementation of blue/green networks and where remediation of vacant and derelict land is undertaken.
- Potential benefits from reducing **GHG emissions** through the transition away from high carbon intensity industry and support for active travel. Improved connectivity of blue/green networks and wider biodiversity enhancements should also benefit climate change adaptation.
- Long-term benefits for **air** quality, where a transition from high carbon intensity industry and/or power generation arises.
- Potential for **water**-related benefits to arise where innovation leads to reduced pressure on water resources, however the extent of positive impacts will depend on factors such as the technologies implemented and scale of uptake. Wider benefits should also arise from surface water management and flood risk resilience measures.
- The redevelopment of vacant and derelict land has to potential to lead to benefits for **soil**, however, the extent of this will be influenced by the scale of proposed work.
- Potential for positive impacts to **material assets** through support for innovation in new technologies which could play a key role in decarbonisation, and where opportunities for heat recovery support increases diversity and resilience within the energy network.
- Possible long-term benefits for **population and human health** through the potential to drive investment, innovation, productivity and inclusive growth. Support for active travel, employment opportunities and improved sense of place, including through focus on transforming areas of vacant and derelict land, has the potential for positive effects. Additional benefits could also arise through community access to low carbon and affordable energy.

Assumptions: A network of sites that promote a transition from high carbon intensity industry and/or power generation to zero carbon innovation and localised energy generation. Remediation of vacant and derelict land, alongside support for sustainable/active travel, flood risk resilience and biodiversity enhancement.

Uncertainties: Not location specific but initial focus on Grangemouth, Levenmouth, Blindwells (including Cockenzie), Longannet, and Chapelcross. Scale of infrastructure requirements is unknown. Potential for brownfield land to be affected

by contamination. The extent/level of potential contamination and scale/type of remediation work that may be required, is unknown.

Development

Lochaber Smelter

Description

Downstream Lochaber Smelter works / industrial expansion; and Rural Estate Regeneration and Renewable Energy Supply; Investment needed in: Water infrastructure, Rail infrastructure, Road infrastructure.

Summary of assessment findings:

- Proposed development on currently developed site, but could include additional infrastructure. Where required, this has the potential to lead to negative impacts on **biodiversity**, including habitat loss, fragmentation and disturbance. Potential for this to be minimised through siting and design and enhancement measures applied in keeping with national policy. Consideration of possible impacts on designated sites, is likely to be required, for example, from potential air quality impacts associated with increased operational activities.
- Operational **GHG emissions** associated with aluminium/steel manufacturing and transportation of materials are likely to arise. Over the longer-term, support for carbon neutral operations and the expansion of renewable energy development should help to reduce/minimise possible implications and will influence potential scale of GHG emissions which could range from negative to positive.
- Long-term implications for **air** quality associated with increased operational activities could arise.
- Potential for negative impacts on **soil** to arise, including soil sealing and compaction, where development extends beyond previously developed area.
- Potential for long term benefits for **population and human health** from access to employment and training opportunities and inward investment. Further benefits could arise through improved sense of place, for example, through opportunities to strengthen cultural identity and physical improvements within the proposed development area. However, benefits are likely to depend on measures taken forward and the scale of these are unclear.

Assumptions: Business/regeneration focus which includes the use/expansion of existing site footprint/infrastructure but new/additional requirements likely. Support for carbon neutral operations, including via renewable energy sources, such as hydro.

Uncertainties: General location known but scale of infrastructure requirements is unknown.

Development

Space industry and space ports

Description

National Spaceport Infrastructure Development - sector innovation, product development and launch sites; Prestwick Centre for Excellence for Aerospace and Space development in Scotland and UK to start-up, grow and consolidate the sector. Entails: road infrastructure and wider transport links (submitted to Strategic Transport Projects Review), new commercial and industrial buildings (140,000 – 715,000 sq ft), hangars (110,000 - 138,000 sq ft), future development platform (350,000 sq ft), research and development space (50,000 sq ft), spaceport including launch operation facilities, Aerospace and Space Innovation Centre and National Flight Centre, enhanced digital infrastructure; Outer Hebrides Space Industries/Space Port 1 – Entails vertical rocket launch facility and Space Enterprise Park; Space Hub Sutherland, facility for small satellite launch. Entails control centre, site integration facility, launch pad complex, antenna park, access road, services, associated infrastructure; Shetland Space Centre: facility for small satellite launch and associated support infrastructure.

Summary of assessment findings:

- Potential for significant negative impacts on **biodiversity** to arise as a result of infrastructure development activities, such as road and spaceport infrastructure. Consideration will need to be given to where proposal could impact on designated sites for potential implications, including through pollution of and loss of supporting habitat and disturbance/displacement of qualifying species.
- Potential for significant increases in **GHG emissions** from impacts on peatland and arising from operational activities e.g. launches, ancillary activities and increased transport to and from sites.
- Potential for long-term negative impacts on **soil** arising from construction and installation of infrastructure. This has the potential to be significant where there are implications for peatland.
- Benefits for **population and human health** should arise through employment and upskilling opportunities and potential to support inclusive growth, further supporting wellbeing and quality of life. Negative impacts could arise over the long term from operational activities which could have noise and air quality implications, which may require further consideration as part of the planning application process.

Assumptions: Development of space port infrastructure. Support provided to reduce potential emissions arising from construction activities, including low carbon design. Some atmospheric pollutants have greater effects at higher altitudes.

Uncertainties: General location known but scale of infrastructure requirements is unknown.

Development

Freeport on the Clyde

Description

Post-Brexit, securing a Freeport on the Clyde should be a national priority – for example at Greenock (given SIMD statistics) or King George V Dock in Glasgow.

Summary of assessment findings:

- Potential for negative impacts on **biodiversity**, both in the terrestrial and marine environment during construction and operation. For example, increased vessel movement could lead to increased risk of pollution and introduction/spread of invasive non-native species. Designated sites such as the Inner Clyde SPA , could be impacted through loss of habitat or disturbance, the effects of which could be significant.
- Potential for increases in **GHG emissions** to be significant, depending on the amount of marine transport and electricity/energy requirements of the port and may also depend on the uptake of low carbon fuels in the marine sector and quantities of waste generated.
- Localised **air** quality implications could arise from increased surface traffic/vessel movement, depending on fuel use. Longer-term, wider transition to renewable/low carbon fuels in the shipping industry should reduce/minimise potential effects.
- Potential for impacts to **water** quality during both construction and operation. Whilst an existing working port, this could include impacts from dredging depending on infrastructure requirements and from increased vessel movement leading to pollution risk and potential introduction/spread of invasive non-native species, the effects of which could be significant.
- Construction activities and operational activities, such as increased vessel movements, could lead to negative impacts on **soil**, including smothering/loss of seabed and general disturbance of sediment.
- Potential for negative impacts on marine **heritage** and scheduled monuments. Unknown historic heritage should be considered during development to ensure no unintended negative effects.
- Benefits for **material assets** should arise through enhancement and improvements to a key infrastructure hub.
- Potential employment or economic opportunities could benefit local communities, with associated positive impacts for **population and human health**.

Assumptions: Increased surface and vessel movements. Onshore elements of port infrastructure will require energy for operational activities.

Uncertainties: General location known but scale of infrastructure requirements is unknown.

Development

Port of Inverness

Description

Mixed use – expansion of port operations, expansion of marina facilities and associated accommodation, commercial uses (retail, food & drink, hotel, leisure) and a cultural & tourism hub.

Summary of assessment findings:

- Negative impacts likely to arise for terrestrial and marine **biodiversity** from construction and operation activities, including disturbance, loss of habitat, increased risk of waterborne pollution and introduction/spread of invasive non-native species. Nearby designations including Inner Moray Firth SPA and Moray Firth SAC, where potential impacts could be significant.
- Potential for increases in **GHG emissions** to arise. Support for carbon neutrality through design, renewable technology and sustainable/active travel should help to reduce/minimise potential emissions.
- Localised implications for **air** quality from possible increases in surface/vessel movements, depending on fuel used. Support for more sustainable modes of travel and wider decarbonisation in the transport sector should reduce/minimise effects.
- Negative impacts on **water** quality from construction and operational activities could arise, including sediment disturbance and increased risk of pollution incidents and introduction/spread of invasive non-native species.
- Potential for long term negative effects on **soil** from infrastructure requirements. Increased vessel movements could also lead to smothering and loss of seabed and general disturbance of sediment.
- Implications for localised **landscapes** could arise. Where underwater geological works such as dredging are required, potential impacts for marine and coastal processes could arise.
- Potential for negative impacts on the setting of both designated and undesignated **heritage** in the local area, with designations in the area including scheduled monuments.
- Potential for positive impacts for **material assets** from provision of built assets with focus on high quality sustainable placemaking.
- Positive impacts on **population and human health**, including from potential improved access to goods and services, particularly from focus on placemaking and addressing inequalities.

Assumptions: Mixed use development, including the expansion of existing port infrastructure with focus on high quality sustainable placemaking. Carbon neutrality through design and provision of renewable energy technology. Support for sustainable/active travel. Action to be focused on population and communities in greatest need, including addressing inequalities.

Uncertainties: General location known but scale of infrastructure requirements is unknown.

Development

National Inter-City Network

Description

Systematic enhancement to the inter-city rail infrastructure north of the Central Belt so that rail can again provide competitive journey times between Scotland's cities. Including: Electrification from Edinburgh and Glasgow to Perth, to Aberdeen and Inverness, Double tracking Aberdeen to Inverness and Highland Main Line, New line: Inverkeithing-Kinross-Perth, Inter-city interchange at Perth station, Journey time and capacity enhancements, Further electrification up from 25.3% now.

Summary of assessment findings:

- Potential for short and long-term **biodiversity** impacts from infrastructure requirements, including disturbance and habitat loss/damage and fragmentation. Potential for this to be minimised through siting and design and enhancement measures applied in keeping with national policy.
- Reductions in **GHG emissions** have the potential to be significant depending on level of uptake.
- Benefits for **air** quality should arise over the long-term where a modal shift from more polluting forms of transport arises, which could be particularly beneficial where air quality issues currently exist, for example, in areas designated as AQMAs.
- Possible implications from infrastructure improvements/development on **soil**, **water** and cultural **heritage** assets, with changes to localised **landscapes** also expected.
- Positive impacts on **material assets** from potential for increased interconnectivity and provision of sustainable modes of transport, with potential additional benefits through reduced pressure on current road infrastructure.
- Potential for improved access and connectivity to key services and reductions in surface traffic should lead to associated benefits for **population and human health**, including wider societal benefits, such as improved levels of social interaction and sense of place.

Assumptions: Enhancement of the inter-city rail infrastructure, with some new infrastructure required. Will lead to modal shift. Electric rail will be powered from low carbon/renewable energy. Use of brownfield land where possible.

Uncertainties: Precise details and scale of development unknown

Development

National Rail Freight Terminal, Mossend and Eurocentral

Description

Combined opportunities of Mossend and Eurocentral; For Mossend: Railfreight interchange, Distribution centre, 750 metre+ rail terminal, Rail connected warehouse, Container handling facilities, Manufacturing and processing, West coast main line access improvements, M8/A8 access improvements, Community Woodland

Summary of assessment findings:

- Construction and operational activities could negatively impact on **biodiversity**. Potential for this to be minimised through siting and design and enhancement measures applied in keeping with national policy. Where habitat creation is undertaken, benefits should arise.
- Potential for significant reductions in **GHG emissions** to arise as currently the majority of freight transportation is undertaken by road. Habitat creation and natural solutions to flood management should also benefit climate change adaptation.
- Long-term benefits for **air** quality should arise through support for modal shift from more polluting modes of transport.
- Possible implications from infrastructure improvements or development on **soil**, **water** and cultural **heritage** assets and with changes to localised **landscapes** also expected.
- Positive impacts for **material assets** through improved transport infrastructure, including where this leads to reduced pressure on current road infrastructure. Re-use of infrastructure should also be beneficial.
- Long-term benefits for **population and human health** from potential employment, training and skills opportunities and improved access to goods. Potential reductions in surface traffic should also lead to associated benefits, including improvements in air quality reduced exposure to noise, and wider societal benefits, such as improved sense of place.

Assumptions: Use of existing infrastructure, but new infrastructure will be required with connections for active travel routes, improved. Support for open space/green networks and natural solutions to flood management.

Uncertainties: Precise details, location and scale of development unknown.

Development

National Low-Carbon Freight Network

Description

Lengthened overtaking loops on the East Coast Main Line to accommodate 775 metre freight trains; Lengthened overtaking loops on the West Coast Main Line to accommodate 775 metre freight trains; Electrification of Central Belt to Aberdeen and Inverness rail lines; Reinforced electricity supply to electrified rail lines; Double track and longer crossing loops for Highland Main Line from Perth to Inverness; Standardise clearances along the track network, in particular Aberdeen/Inverness to Central Belt; Loading gauge enhancement; New rail freight terminal in Speyside at Keith and/or Elgin (possibly utilising currently redundant facilities); Direct rail access for key whisky sites including Cameron Bridge (Fife) and Cambus/Blackgrange (Alloa)

Summary of assessment findings:

- Potential for negative impacts on **biodiversity** from the construction and operation including disturbance, habitat loss or damage and fragmentation, which should be minimised by the re-use of existing infrastructure and redevelopment of vacant and derelict land and biodiversity enhancement measures applied in accordance with relevant policy.
- Potential for significant reductions in **GHG emissions** to arise depending on uptake.
- Long-term benefits for **air** quality where modal shift from more polluting modes of transport arises.
- Possible implications from infrastructure improvements/development on **soil**, **water** and cultural **heritage** assets and with changes to localised **landscapes** also expected.
- Improved transport infrastructure and potential for reduced pressure on current road infrastructure should lead to positive impacts for **material assets**. Benefits should also arise where existing infrastructure is re-used/enhanced, alongside the re-development of vacant and derelict land.
- Potential benefits for **population and human health** include improved access to goods and services and benefits associated with reductions in surface traffic, including wider societal benefits. Additionally, wider positive effects including improved sense of place could arise where the re-development of vacant and derelict land is undertaken.

Assumptions: Use of existing infrastructure, but new infrastructure will be required with connections for active travel routes, improved. Re-use of vacant and derelict land.

Uncertainties: Precise details, location and scale of development unknown.

Development

A National City Centre Transformation Programme for Scotland

Description

Transformation of strategic sites for transport, public realm (outwith train stations) and economic regeneration:

- 1 - Edinburgh Waverley station and Haymarket Station
- 2 – Waverley / Edinburgh Royal Mile / Scottish Parliament
- 3 – Glasgow Queen Street and Central Stations
- 4 – Aberdeen Station / Union Street
- 5 – Inverness Station and vicinity
- 6 – Dundee Station and vicinity
- 7 – Perth Station and Bus Station
- 8 – Stirling Station, bus station and links to town centre

Summary of assessment findings:

- Potential for long-term benefits for **biodiversity** from support for green spaces and street greening.
- Potential for reductions in **GHG emissions** to arise from improve accessed to, and greater uptake of, more sustainable modes of travel. The use of green infrastructure should also lead to benefits for **climate change adaption**.
- Long-term benefits for **air** quality should arise where modal shift arises with a number of AQMAs designated areas set out within proposal.
- Negative impacts could arise for **soil** and **water** from construction activities. Long-term benefits have the potential to arise from broader environmental improvements, for example, where green infrastructure leads to improved ecosystem health.
- Designations within the proposal area include World Heritage Sites and a number of areas with conservation status, with consideration likely to be needed at project level for potential impacts, including where benefits could arise from the role of cultural **heritage** assets in placemaking.
- Positive impacts on local **landscapes** should arise through the support for high quality environment places.
- Focus on improved placemaking and increased interconnectivity between sustainable modes of transport should lead to positive impacts for **material assets**.
- Potential for improved access to goods and services and green/open spaces, should lead to positive impacts for **population and human health**, including improved sense of place. Additional associated benefits from potential reductions in surface traffic and increased access and uptake of active travel.

Assumptions: Transformation of strategic sites for transport, public realm (out-with train stations) and economic regeneration, with focus on placemaking, including promotion of sustainable travel (including through use of green infrastructure) and improved public realm spaces. Support for green spaces/street greening.

Uncertainties: General location known but scale of infrastructure requirements is unknown.

Development

Edinburgh Orbital Bus Project

Description

A high quality orbital bus route linking a number of key transport interchanges and areas of employment, reducing congestion on a major strategic freight corridor which accesses important areas for national productivity connected through the SEStran region. Including: Bus Rapid Transit system/improvements/bus priority, Connections to Fife networks, Connections to West Lothian Networks.

Summary of assessment findings:

- Potential for negative impacts on **biodiversity** to arise, including habitat loss/damage and fragmentation. Potential for this to be minimised through siting and design and enhancement measures applied in keeping with national policy.
- Depending on scale of uptake and improved connections with sustainable modes of transport, potential reductions in **GHG emissions** could be significant.
- Potential modal shift modal from more polluting forms of transport should lead to long-term localised benefits for **air** quality.
- Potential for localised impacts within **landscapes** where transport corridors are already established features.
- Positive impacts for **material assets** should arise from support for increased interconnectivity within the transport network.
- Potential for increased accessibility, including to areas where employment opportunities exist and associated benefits from possible reductions in surface traffic, should lead to associated benefits for **population and human health**.

Assumptions: Re-use of existing infrastructure, but new infrastructure is likely to be required.

Uncertainties: General location known but scale of infrastructure requirements is unknown.

Development

North East Transport Investment

Description

Regional transport connectivity improvements to settlements and hubs, including road, rail and port/ferry infrastructure. Inverness – Aberdeen (A2i); electrification/alternative traction. Highland Main Line, double tracking; electrification/alternative traction. Improved rail links Aberdeen to Central Belt. North Highland Lines, including re-signalling; electrification/alternative traction. West Highland Line; electrification/alternative traction. Regional commuter rail with additional stations: Montrose - Aberdeen – Inverurie. Inverness Airport station. Morayhill Freight Terminal. Lentrans Long Loop, Clachnaharry – Clunes. New station at Evanton including Dingwall–Invergordon new loop. New rail halt at Tomatin. Improved public transport access to Aberdeen International Airport. Aberdeen Rapid Transit and associated infrastructure/priorities: Craibstone – Airport – TECA – Aberdeen City Centre – Portlethen; Bridge of Don – Aberdeen South Harbour Orbital route. Improved connections to Peterhead and Fraserburgh strategic port developments. Portlethen new strategic Park and Ride. Sea freight and ferry connections to Orkney and Shetland

Summary of assessment findings:

- Construction and operational activities could lead to negative impacts on **biodiversity**, in the terrestrial and marine environment, including disturbance, habitat loss/damage and fragmentation and increased risk of pollution. Consideration may need to be given at project level to where implication for European sites could arise.
- Potential for longer-term benefits for **GHG emissions** and **air** through focus on supporting modal shift from more polluting modes of transport, for example, road to rail. The scale of benefits will be influenced by factors such as possible emissions from the operation of trains and ferries, and where road travel is still undertaken.
- Increased vessel movements may lead to negative impacts on **water** quality, including increased risk of water pollution and introduction/spread of invasive non-native species.
- Marine works and operational activities may impact on the seabed, including through loss of seabed and sediment disturbance.
- Possible implications for cultural **heritage** and localised **landscapes**, however, much of the development is likely to build on existing infrastructure and within landscapes where transport corridors are already established features.
- Potential for positive impacts on **material assets** through support for improved interconnectivity within the transport network including between sustainable modes of transport. Prolonging the lifespan of current infrastructure should also be beneficial.
- Potential for positive impacts on **population and human health** to arise from increased connectivity, including to goods and services such as employment opportunities.

Assumptions: Transport focused development, including rail, road ports and harbours, including increased electrification of the rail network and improved access

to public transport. Re-use and enhancement of existing infrastructure but new infrastructure likely to be required.

Uncertainties: Precise details, location and scale of development unknown.

Development

Trunk and Strategic Road Improvements (Various)

Description

East Ayrshire: Bellfield Interchange in Kilmarnock – Improving the interchange and developing the land around it.

Dundee: Dundee Northern Relief Road – either new road or upgrades to existing road. A90 Improvements for walking, cycling and public transport

Highland: A9 (Inverness-Perth) dualling completion; A96 (Inverness-Aberdeen) dualling completion; A9-A96 Inshes to Smithton Junction improvement works
A9-A82 Longman roundabout removal; A9 – North of Inverness, strategic safety and localised improvements: Munloch junction, Tomich junction, Berriedale junction;
A82 – Road improvements especially in/around Fort William, others identified in FW2040, and other known accident hot-spots (Aonachan Crossing; Tournalundy-Nevis Range; Corran-Fort William (3 Mile Water)) and lifeline links including Corran Ferry and A890 route Stromeferry Bypass; All subject to active travel as part of design; All subject to greater integration of park&ride, active travel, electric vehicle charging, e-bike provision, public transport infrastructure and interchanges; Infrastructure may be required within existing infrastructure as well as new. EV charging to be guided by Highland Council's EV Infrastructure Vision.

Summary of assessment findings:

- Construction and operational activities could lead to negative impacts on **biodiversity**, including disturbance, habitat loss/damage and fragmentation. Potential for this to be minimised through siting and design and enhancement measures applied in keeping with national policy.
- Potential benefits from reducing **GHG emissions** where proposal leads to a modal shift, including through better integration of more sustainable modes of travel, for example, active travel. The extent of this is however uncertain and road transport remains a significant proportion of GHG emissions with overall GHG emissions likely to remain potentially negative.
- Surface traffic contributes significantly to **air** quality issues, particularly in urban environments. Where proposals lead to a modal shift from more polluting forms of transport, localised benefits could arise, however, the extent of this is uncertain.
- Potential for long-term negative impacts on **soil** such as compaction leading to a loss of soil function resulting from infrastructure improvements and development.
- Possible implications for cultural **heritage** and localised **landscapes**, however, much of the development is likely to build on existing infrastructure and within landscapes where transport corridors are already established features.
- Potential for positive impacts on **material assets** through support for improved interconnectivity within the transport network, including through greater integration with sustainable modes of transport. Further benefits should arise through improvements to current infrastructure leading to prolonging its lifespan.
- Potential for positive impacts on **population and human health** to arise from increased connectivity and improved access to active travel.

Assumptions: Transport focused development, including integration of active travel, park and ride and charging points. Re-use and enhancement of existing infrastructure but new infrastructure likely to be required.

Uncertainties: General location known but scale of infrastructure requirements is unknown.

Development

Outer Hebrides Fixed Links and Minch Tunnel

Description

Minch Tunnel connecting Outer Hebrides to Mainland Scotland; Sound of Harris fixed link; Sound of Barra fixed link

Summary of assessment findings:

- Potential for negative impacts on seabed and marine **biodiversity** as a result of disturbance and displacement/loss of flora and fauna from construction of tunnel. Impacts, including loss of habitat and disturbance and risk of pollution, could be significant with many European sites located on or around the coast, including the Inner Hebrides and the Minches SAC, Sound of Barra SAC, and Loch nam Madadh SAC.
- Potential for the use of high carbon materials and disturbance of soil/seabed with associated implications for **GHG emissions**, to lead to significant impacts. The utilisation of existing renewable and low carbon technologies during design/construction is noted, however, further consideration will be required to establish to what extent this would provide mitigation. Negative effects may also arise where increased numbers of journeys are undertaken by less sustainable modes of transport.
- Potential for significant adverse effects on the ecological quality of the **water** environment, including marine biodiversity, during construction.
- Infrastructure requirements which could have significant implications for coastal **landscapes** and seascapes, depending on requirements. Implications for coastal and offshore processes, such as interference with sandbank mobility and altered seabed morphology could also arise from construction activities.
- Potential for significant environmental impacts on both known and unknown cultural assets, as well as designated and undesignated (and unprotected) offshore archaeology and protected sites
- Potential for large amounts of waste materials to arise, with associated negative impacts on **material assets**.
- Benefits for **population and human health** may arise from improved accessibility and connectivity, including societal benefits, particularly where proposal leads to increased reliability given the vulnerability of links in the proposal area to essential services, including from the impacts of climate change.

Assumptions: Transport focused development of Minch Tunnel connecting Outer Hebrides to Mainland Scotland; Sound of Harris fixed link; Sound of Barra fixed link. Potential for increased number of journeys to be undertaken, with the majority of vehicles powered by fossil fuels. Significant volumes of high carbon materials (concrete and steel) are likely to be required. New infrastructure likely to be required with renewable energy generation and energy transmission infrastructure to be considered in the design of this.

Uncertainties: General location known but scale of infrastructure requirements is unknown.

Development

Development on community-owned land

Description

Make community-owned land national developments. This could connect UN Sustainable Development, National Performance Framework. Local plans, policies and programmes supporting communities. National development status would provide primacy of the development plan force when new developments and changes of use are proposed for such land, which could be specific in the national development descriptions of development and statement of need; This would provide an effective plan-led approach to development on transferred land or buildings (following the Land Reform (Scotland) Acts and the Community Empowerment (Scotland) Act); National development status would enable assets transferred into community ownership outwith the local development plan preparation process to have development plan status without alteration to the development plan where they fall within prescribed classes within the national development. This allows certain types of development on community-owned land to be promoted or to a degree be protected.

Summary of assessment findings:

- Development has the potential to lead to localised negative impacts on **biodiversity**, including loss of habitat, fragmentation and disturbance. Potential for this to be minimised through siting and design and enhancement measures applied in keeping with national policy. Potential for longer-term positive impacts where proposal leads to habitat restoration, for example, the creation of community woodlands and where remediation of vacant and derelict land is taken forward.
- Potential long-term benefits from reducing **GHG emissions** from community owned renewable energy and energy storage projects. The scale of benefits is uncertain, Improved energy storage, alongside habitat restoration, should lead to increased resilience, benefiting climate change adaptation.
- Broader environmental improvements, such as habitat/watercourse restoration and improved riparian management, should lead to long term-benefits for **water** quality and quantity.
- Possible **landscape** improvements, for example, through the remediation of vacant and derelict land and habitat restoration.
- Potential positive impacts for **material assets**, including where focus is given to use of existing assets to support improved placemaking, including from the remediation of vacant and derelict land and habitat management/restoration.
- Potential for benefits to arise for **population and human health** from sense of ownership, with associated benefits, including where this gives rise to improved sense of place. Additional benefits should arise from community ownership of renewable energy and energy storage, including increased resilience of supply and reduced risk of disruption. Whilst benefits are likely to be felt to a greater extent at a local level, there is the potential for national implications from this approach at scale.

Assumptions: Focus on development on community owned land. Re-use and enhancement of existing infrastructure but new infrastructure likely to be required. Promotes community cohesion, population growth in rural areas and supports

community-driven habitat restoration, including creation of community woodlands, watercourse restoration. Development could increase demand for both heat and energy but also support renewable energy/heat generation. Re-use of vacant and derelict land.

Uncertainties: Precise details, location and scale of development unknown. Potential for brownfield land to be affected by contamination with the extent/level of potential contamination and scale/type of remediation work that may be required unknown.

Development

National Tartan Centre

Description

UK Government £10 million capital support to a Stirling based National Tartan Centre. International class facility to reinforce Stirling as a cultural destination and centre of excellence for traditional crafts and skills in the heart of Scotland that is financially self-sustaining.

Summary of assessment findings:

- Potential negative impacts from infrastructure requirements on **biodiversity**. It is not clear if proposal includes the re-use of previously developed land, which would minimise possible effects. Potential for this to be minimised through siting and design and enhancement measures applied in keeping with national policy.
- Negative impacts from potential increases in **GHG emissions**, the scale of which will be influenced by factors such as visitor numbers and possible increased surface traffic, but are expected to be minor.
- Although the proposed development is likely to be on developed land, consideration may need to be given at local level to implications for **heritage** assets, both designated and un-designated, with a number of a number of listed buildings and the King's Park Conservation Area located in the proposal area.
- Potential benefits for **material assets** through support for improved placemaking.
- Long-term benefits for **population and human health** could arise from investment, inclusive growth and employment opportunities. Possible increases in surface traffic could lead to negative impacts, including from reduced air quality and increased exposure to noise.

Assumptions: Development of centre which will support visitor and traditional crafts economy. The centre will also support education, interpretation, skills development, demonstrations, participation and interaction focusing on traditional crafts, with focus on focus on local opportunities. Proposed development is likely to be on previously developed land. Close to railway station which provides opportunities for sustainable transport link but use of private vehicle fuelled by petrol/diesel may still arise.

Uncertainties: General location known but scale of infrastructure requirements is unknown.

Development

Clyde tidal barrier

Description

Clyde tidal barrier

Summary of assessment findings:

- Construction and operational activities could lead to negative impacts on **biodiversity**, including loss and damage/disturbance to seabed. Barrages can also impact on the movement of water into and out of estuaries, which can disrupt the life cycle of marine life, prevent the movement of fish and other species, increase silt deposits and change the structure of the coast, leading to erosion of dunes and other critical habitats. Nearby designations include the Inner Clyde SPA and Inner Clyde Estuary Marine SPA, with potential for impacts to be significant.
- Long-term positive impacts should arise from reductions in **GHG emissions** where renewable energy generation from tidal power supports a transition to net zero. If designed as a sea level rise/flooding defence mechanism, then further benefits in terms of climate change adaptation could arise, however this is unclear.
- Potential negative impacts over the longer term through changes in **water** flow and increased sedimentation, with inner Clyde Estuary surface water classified as moderate.
- Long-term benefits for **population and human health** could arise from access to localised sources of renewable energy, including improved resilience of supply.

Assumptions: Energy related development including support for in-stream/floating/barrage tidal power generators.

Uncertainties: Detailed location and scale of infrastructure requirements is unknown. Potential to design as flood defence mechanism, though this is currently unknown.

Development

10,000 Raingardens for Scotland

Description

Network of small scale vegetated features designed to hold back and slow water flows, reducing the need for grey infrastructure.

Summary of assessment findings:

- Long-term significant benefits for **biodiversity** could arise from support for nature based solutions to flood management and promotion of high quality and multifunctioning spaces. Benefits may include habitat creation and enhanced connectivity, through the proposed restoration of vacant and derelict land.
- Natural solutions to flood management can play a key role in carbon sequestration, with additional reductions in **GHG emissions** likely to arise where the proposal leads to increased uptake of active travel. Overall, the scale of positive effects from GHG emissions reductions will be influenced by the size of the of the raingardens, growing medium and vegetation chosen.
- Potential for long-term benefits through the role of natural infrastructure in improving **air** quality, for example, through the absorption of pollutants such as particulate matter.
- Long-term benefits for **water** should arise from the role of natural infrastructure in flood management and from a focus on provision of high quality environments leading to improved ecosystem health.
- Positive effects on **soil** over the long term are expected from broader environmental improvements, including from habitat creation and the remediation of vacant and derelict land leading to improved ecosystem health,
- The use/enhancement of natural assets, including focus given to blue/green infrastructure and its key role in placemaking, and the remediation of vacant and derelict land, should lead to benefits for **material assets**.
- Potential for significant positive impacts for **population and human health** from the role of natural infrastructure in placemaking. Increased access to good quality open spaces and should also lead to positive impacts, including where this leads to reduced risk of flooding. Potential benefits should be maximised where action is focused towards areas of greatest need.

Assumptions: Green infrastructure development and remediation of vacant and derelict land. Action will targeted towards areas of particular need.

Uncertainties: Precise details, location and scale of development unknown. Potential for brownfield land to be affected by contamination with the extent/level of potential contamination and scale/type of remediation work that may be required unknown.

Development

Opportunity Cromarty Firth

Description

A series of transformative projects for communities and businesses that provide the catalyst for decarbonising the economy at the local and national level. Includes: Global centre of excellence for renewable energy linked to the area's natural resources; transformative education; transformative employment; transformative regeneration; hydrogen hub/North of Scotland Hydrogen; serial (sic) manufacturing plant (for floating offshore wind substructures); Phase 2 Advanced manufacturing plant; Expanded Powerhouse Future Technology Centre; Potential Greenport status; Onshore electrolysis facility for green hydrogen production.

Summary of assessment findings:

- Potential for negative impacts for **biodiversity** as a result of infrastructure development activities. Impacts could include disturbance and fragmentation of habitats. Possible alteration of river flow may also arise, with associated impacts, where dredging activities are undertaken. Increased vessel movement could also lead to increased risk of pollution and introduction/spread of invasive non-native species. Further consideration required at project level, including for potential impacts on nearby designations including the Cromarty Firth SPA and Moray Firth SAC.
- Potential for increases in surface traffic and vessel movements to lead to associated increases in **GHG emissions**. Potential increased uptake of renewable/low carbon fuels and wider efforts to decarbonise transport could reduce/minimise impacts. Longer-term benefits could arise from transition away from fossil fuel use, for example, support for heat and hydrogen technologies, which have the potential to lead to significant GHG emissions reductions.
- Possible increased in surface traffic could lead to localised implications for **air** quality, depending on fuel used. Potential effects should be reduced/mitigated through longer term transition to decarbonise the transport network.
- Negative impacts on **water** could arise from construction and operational activities, for example, where dredging is required and increased vessel movement.
- Potential for negative impacts to arise on **soil** from sediment disturbance and loss and compaction of soils through infrastructure requirements, including processing plants and storage facilities, and operational activities.
- A number of listed buildings are located in the areas with potential for negative effects on the setting of both designated and undesignated **heritage**, as well as direct impacts on these, which is likely to require consideration at project level. Works such as dredging can impact on marine and coastal processes, including sediment disturbance, erosion and altered seabed morphology.
- Positive impacts should arise for **material assets** through increased diversity of the energy mix and potential for increased resilience. Additional benefits should also arise through enhancement of ports/harbours, which are key infrastructure hubs.
- Potential for positive impacts on **population and human health** should arise from employment/training opportunities, particularly from focus on maximising benefits towards local communities. Additional positive impacts could arise through connection to localised energy networks with the benefits of this likely to

be felt to a greater extent by those in greatest need, for example, those experiencing fuel poverty.

Assumptions: Port development to support the decarbonisation of the energy sector, both at local and national level. Existing infrastructure will be used but new/expanded infrastructure is likely to be required. Focus on maximising economic opportunity for the region and regenerating communities through creating new jobs. Green hydrogen will be produced at a large scale, alongside wind, wave and tidal energy.

Uncertainties: General location known but scale of infrastructure requirements is unknown.

Development

National Green & Blue Infrastructure Network

Description

NPF should frame development of national green and blue infrastructure network to be developed by RSS, LDP and LPP. A National Green-Blue Infrastructure Network would highlight the opportunities for renewable heat networks at a national, regional and local scale, including the energy potential of parks and greenspaces.

Summary of assessment findings:

- Significant long-term benefits for **biodiversity** are expected through focus on blue/green infrastructure and promotion of high quality and multifunctioning spaces.
- Potential significant benefits from reducing **GHG emissions** from support for renewable energy sources and the key role that natural infrastructure can play in carbon sequestration. Additional positive impacts should also arise from potential for modal shift from more polluting modes of transport, through support for active travel. Potential benefits from improved **climate change adaption** could also be significant.
- Potential for benefits through the role of natural infrastructure in improving **air** quality, for example, through the absorption of pollutants such as particulate matter. Benefits could also arise where increased uptake of sustainable/active travel leads to modal shift.
- Positive impacts for **water** quality and quantity should arise from the role of natural infrastructure in flood management and where broader improvements in ecosystem health arise.
- Positive effects on **soil** are expected from environmental improvements leading to improved ecosystem health.
- Potential adverse effects on known and unknown archaeological remains from activities such as planting and infrastructure requirements which will need to be taken into account at project level.
- Positive impacts on **landscapes** through the support for high quality environment spaces at local and national scale.
- The use and enhancement of natural assets and their key role in placemaking, has to potential to be significantly beneficial. Potential benefits for **material assets** could also arise from support for diversification within the energy network.
- Potential for significant positive impacts for **population and human health** from improved access to the open space and support for high quality greenspace, including through improved sense of place. Additionally, blue/green infrastructure can help reduce surface water flooding in urban environments and support improved reliance to the impacts of climate change.

Assumptions: Development of a national blue/green infrastructure network. Support for opportunities for renewable heat networks at a national, regional and local scale. Will support uptake of sustainable/active travel.

Uncertainties: Precise details, location and scale of development unknown.

Development

Scottish Nature Network

Description

An integrated nation-wide strategic approach/vision to blue-green infrastructure for biodiversity net gain, emissions reduction, climate resilience and wellbeing, identifying and connecting up good quality natural habitats, which creates the conditions into which investment can be made and nature based solutions can be promoted and support local economies. Creating new accessible green spaces and equitable access to them.

Coordination of: Green and blue infrastructure investment, including through IIP; Replacement rural development/agriculture funding; Non-Governmental Organisation effort; Philanthropic spend; Major charitable investors; Biodiversity net gain projects; Conservation finance investment; Strategic planning/opportunity mapping of the key areas to protect and enhance: networks, corridors and stepping stones to create multiple benefits; Active travel

Summary of assessment findings:

- Focus on blue-green infrastructure and promotion of high quality and multifunctioning spaces could lead to significant long-term benefits for **biodiversity**.
- Potential long-term significant benefits from reducing **GHG emissions** through the key role that natural infrastructure can play in carbon sequestration. Additional positive impacts should also arise from support for active travel, where this leads to a shift from more polluting modes of transport. Improved **climate change adaption** should also arise, the benefits of which could be significant.
- Potential for long-term secondary benefits through the role of natural infrastructure in improving **air** quality, for example, through the absorption of pollutants and from support for active travel.
- Long-term benefits for **water** should arise from the role of blue/green infrastructure/natural infrastructure in flood management and from focus on provision of high quality environments leading to improved ecosystem health.
- Positive effects on **soils** are expected where broader environmental improvements lead to improved ecosystem health.
- Potential for positive impacts on local **landscapes**.
- The use and enhancement of natural assets through focus given to the role of blue/green infrastructure, including its key role in placemaking, has potential to be significantly beneficial.
- Significant positive impacts for **population and human health** could arise from improved access to active travel and support for high quality greenspace, including through improved sense of place. Improved resilience to the impacts of climate change, including reduced risk of flooding, should also lead to positive effects.

Assumptions: Nature based solutions promoted and support for local economies. The creation of new accessible green spaces and equitable access to these

Uncertainties: Not location specific. Scale of development is unknown.

Development

Glasgow National City Park

Description

Use the familiar idea of a National Park to inspire and deliver a shared vision for Glasgow, as a greener, healthier and wilder City where people, places and nature are better connected.

Summary of assessment findings:

- Potential for long-term benefits to arise for **biodiversity** from support for greener and better connected places, for example, through habitat creation and enhanced habitat connectivity.
- Potential for long-term benefits where sustainable/active travel and carbon sequestration leads to reductions in **GHG emissions**.
- Long-term benefits for **air** quality should arise through support for active and more sustainable modes of travel, alongside wider benefits from the role of natural infrastructure in improving air quality with Glasgow city centre currently designated as a AQMA due to traffic related air pollution issues.
- Positive long-term **water** quality and quantity benefits should arise through improved ecosystem health and the role of natural infrastructure in flood management.
- Positive effects on **soil** is expected from additional planting or vegetation taken forward as part of the proposal and from broader environmental improvements leading to improved ecosystem health.
- Positive localised impacts on **landscape** through the support for a high quality environment and spaces.
- Support for the use and enhancement of natural assets has the potential to be beneficial, including through the role of natural infrastructure in placemaking.
- Potential for long-term positive impacts on **population and human health** from improved access to open space and support for high quality greenspace, including through improved sense of place. Support for improved uptake of active travel and physical activity has the potential to lead to benefits for both mental and physical health.

Assumptions: Green infrastructure development.

Uncertainties: General location known but scale of infrastructure requirements is unknown.

Development

Sea Ports

Description

Development and investment in ports and harbours to support nationally significant employment, lifeline/ferry links, renewable energy, oil and gas decommissioning, hydrogen economy, bulky goods/freight handling, fishing, aquaculture, cruise and leisure boats. Potential Greenport status, in particular for Cromarty Firth.

Development includes: Construction of facilities; Installation/upgrade of infrastructure: piers; quays; deep water berths; lay-down areas; sheds for assembly; operation maintenance bases; road network and wider off-port infrastructure including active travel, electricity and heat networks.

Summary of assessment findings:

- Potential for significant negative impacts, both short and long-term, on marine and terrestrial **biodiversity** from development and operational activities, with many designated sites located on and around the coast. Potential for this to be minimised through siting and design and enhancement measures applied in keeping with national policy.
- Potential for increased **GHG emissions** associated with operational activities, including increased surface and vessel movements. Long-term benefits should also arise where development facilitates a transition towards net-zero economy, including offshore renewables and renewable/low carbon technologies.
- Increased surface transport and vessel movements could lead to localised negative impacts through pollution (such as particulate matter) depending on fuel used, which could also have implications for human health. Long-term, secondary positive impacts could arise for **air** quality where enhancement of key hubs supports the decarbonisation of the transport, particularly where this leads to a modal shift of freight and energy sectors.
- Potential for negative impacts on **water** and **soil** quality during operation e.g. depending on activities undertaken, potential impacts could include smothering or loss of seabed, accidental spills and introduction/spread of invasive/non-native species, which have the potential to be significant.
- Positive impacts on **material assets** should arise through improved connectivity and enhancement of current infrastructure with ports and harbours key hubs.
- The enhancement of port and harbour facilities has the potential to lead to changes to local character which will require consideration at project level.
- Potential for significant long-term benefits for **population and human health** through improved connectivity, particularly given the life line nature of ports and harbours for many island communities.

Assumptions: Supports upgrades to port infrastructure and landward access, with works including possible expansion of ports, new quaysides and road and rail links. Increased risk from climate change should be factored in to future plans. Ports and harbours play a key role supporting lifeline links for island communities.

Development will increase transport movement to and from ports on land and by sea. Alignment with Scotland's National Marine Plan objectives and policies on shipping, ports, harbours and ferries. Wider support for decarbonisation of the transport sector should reduce possible implications of increased surface movement over the longer term.

Uncertainties: Not location specific. Scale of infrastructure requirements is unknown.
Impacts on communities difficult to gauge where locations not set out

Development

Strategic Ports and Roads

Description

Both sides of the Minch, to support life line ferry traffic to the Islands, partnered with Highland Council and Argyll and Bute Council as appropriate; Maintaining and enhancing strategic road and sea corridors servicing the Outer Hebrides and providing lifeline links; Maximising freight, cruise ship and economic potential. Future-proofing for ferry function; Future-proofing for low carbon fuels and technologies; Facilities/investment to allow flexible deployment of vessels across the network to respond to demand.

Summary of assessment findings:

- Potential for negative impacts, both short and long-term, on marine and terrestrial **biodiversity** from development and operational activities. Impacts may include habitat loss, pollution; and disturbance, displacement and/or mortality of species. Potential for this to be minimised through siting and design and enhancement measures applied in keeping with national policy.
- Potential for **GHG emissions** associated with operational activities, such as increased surface and vessel movements. This could be of particular relevance for rural, remote and island communities, where there can be increased reliance on less sustainable modes of transport, such as private car. Potential for indirect benefits where support for low carbon fuels leads to emissions reductions.
- Increased surface transport and vessel movements could lead to localised negative impacts on **air** quality through pollution (such as particulate matter) depending on fuel used.
- Potential for negative impacts on ground and surface **water**, as well as coastal and marine waters, depending on the route/location and baseline environment. Potential for long-term benefits though improved ecosystem health, for example, through the role of natural infrastructure in flood management.
- Potential for long-term negative effects on **soil** where works are undertaken, including compaction, erosion and loss of soil/seabed. The enhancement of existing infrastructure should help to reduce/mitigate possible impacts.
- Positive impacts on **material assets** should arise through improved connectivity and enhancement of current infrastructure.
- Significant positive impacts on **population and human health** should arise from a reduced risk of accidents and improved accessibility, particularly through increased reliability of vulnerable links to essential services. Associated societal benefits and improved sense of place should also arise.

Assumptions: Seeks to make best use of existing assets, but some new infrastructure/interventions may be required. Supports interventions required to future proof the existing road, rail and port infrastructure to the impacts of climate change, maintaining lifeline links. Use natural infrastructure, including use of natural solutions to flood risk management

Uncertainties: Detailed location and scale of infrastructure requirements is unknown