



Figure 3.7 Overall Potential Environmental Opportunities/Robustness

3.13 Appropriate Assessment

Stage 2 Appropriate Assessment (AA) has been undertaken alongside the preparation of the Plan. The requirement for AA is provided under the EU Habitats Directive (Directive 1992/43/EEC). The emerging conclusion of the AA is that it will not affect the integrity of the Natura 2000 network²⁴.

3.14 Strategic Environmental Objectives

Strategic Environmental Objectives (SEOs) are methodological measures developed from policies which generally govern environmental protection objectives established at international, Community or Member State level and are used as standards against which the provisions of the Plan and the alternatives can be evaluated in order to help identify significant environmental effects. SEOs are shown on the table below.

Table 3.1 Strategic Environmental Objectives

Environmental Component	SEO Code	SEO
Air and Climatic Factors	SEO AC1	To contribute towards reductions in travel related emissions (including pollutants, noise and greenhouse gas emissions) to air
	SEO AC2	To encourage modal change from car to more sustainable forms of transport
	SEO AC3	To facilitate a reduction in energy use by the transport sector and an increase in the proportion of energy from renewable sources by the transport sector
Population and Human Health	SEO PHH1	To develop transport infrastructure and services closer to urban/suburban areas thereby facilitating consolidation of growth and limiting urban sprawl
	SEO PHH2	To contribute towards the protection of populations and human health from exposure to incompatible land uses
Biodiversity, Flora and Fauna	SEO B1	To contribute towards compliance with the Habitats and Birds Directives with regard to the protection of European Sites and Annexed habitats and species ²⁵
	SEO B2	To contribute towards compliance with Article 10 of the Habitats Directive with regard to the management of features of the landscape which - by virtue of their linear and continuous structure or their function as stepping stones (designated or not) - are of major importance for wild fauna and flora and essential for the migration, dispersal and genetic exchange of wild species
	SEO B3	To contribute towards avoidance of significant impacts on relevant habitats, species, environmental features or other sustaining resources in designated sites including Wildlife Sites and to contribute towards compliance with the Wildlife Acts 1976-2012 with regard to the protection of listed species
Material Assets	SEO MA1	To contribute towards the protection of built/amenity assets and infrastructure
	SEO MA2	To assist with the reuse and regeneration of brownfield sites
	SEO MA3	To reduce waste volumes, minimise waste to landfill and increase recycling and reuse
Water	SEO W1	To contribute towards the maintenance and improvement, where possible, of the quality and status of surface waters
	SEO W2	To contribute towards maintaining and improving, where possible, the chemical and quantitative status of groundwaters
	SEO W3	To comply as appropriate with the provisions of the Flood Risk Management Guidelines
Landscape	SEO L1	To contribute towards avoidance or, where infeasible, minimisation of conflicts with the appropriate protection of statutory designations relating to the landscape, including those included in the land use plans of planning authorities
Cultural Heritage	SEO CH1	To contribute towards the protection of archaeological heritage (including entries to the Record of Monuments and Places) and its context
	SEO CH2	To contribute towards the protection of architectural heritage (including entries to the Record of Protected Structures, entries to the National Inventory of Architectural Heritage and Architectural Conservation Areas) and its context
Soil	SEO S1	To minimise land take and loss to extent of soil resource

²⁴ Except as provided for in Article 6(4) of the Habitats Directive, viz. There must be:

- (a) no alternative solution available;
- (b) imperative reasons of overriding public interest for the plan/programme/project to proceed; and
- (c) adequate compensatory measures in place.

²⁵ 'Annexed habitats and species' refer to those listed under Annex I, II & IV of the EU Habitats Directive and Annex I of the EU Birds Directive.

Section 4 Consideration of Alternatives

4.1 Need for the Plan

The emergence of increasing road congestion in recent years has underlined the need to provide an enhanced level of public transport provision to provide an alternative to car-based commuting. Congestion is a challenge that must be addressed by the transport system in a context where significant population growth, and associated economic activity and social, cultural and recreational activity is being planned for.

Furthermore, the significance of the need for action to reduce the use of fossil fuels and diminish the generation of greenhouse gases is recognised and required by legislation. The National Transport Authority is required to adhere to the National Climate Change Adaptation Framework, which was published by the Minister for Communications, Climate Action and Environment in 2018, and the Department of Transport, Tourism and Sport's Sectoral Adaptation Plan, published in 2017.

The National Transport Authority is required by the Dublin Transport Authority Act 2008 to prepare a six year Integrated Implementation Plan to, inter alia, facilitate the implementation of the Transport Strategy for the Greater Dublin Area 2016-2025. The Transport Strategy, which was subject to full SEA and Stage 2 AA, is therefore a key in shaping the six-year Integrated Infrastructure Plan.

4.2 Existing provisions already in place

The Transport Strategy for the Greater Dublin Area 2016-2035 establishes an overall framework for transport investment in Counties Dublin, Meath, Kildare and Wicklow over the next two decades.

The Transport Strategy (and consequently the Implementation Plan) focuses on improving public and sustainable transport across the Greater Dublin Area while seeking to ensure primacy for transport options that provide for unit reductions in carbon emissions. This involves: promoting public transport, walking and cycling; seeking to reduce car use in circumstances where alternative options are available; and transitioning to lower emission vehicles for transport use. Transport Strategy provisions include those relating to: light rail; including the development of the MetroLink project; heavy rail (inclusive of expanded electrification on the suburban rail lines); cycling facilities; pedestrian movement; interchange facilities; information provision; and park and ride developments. To date the Authority has focused significant levels of investment in these sustainable modes, including the reopening of the Phoenix Park Tunnel and the delivery of Luas Cross City. The continuation of this focus is facilitated by the Transport Strategy and it is intended that it will continue under the Implementation Plan.

Most proposals included within the Plan have been already included within plans that have already been subject to SEA including the Transportation Strategy for the Greater Dublin Area 2016-2035, Project Ireland 2040 (including the National Planning Framework 2018) and the Greater Dublin Area Cycle Network Plan 2016.

In addition to aligning with the Transportation Strategy, the Implementation Plan aligns with other existing provisions including those included within the Project Ireland 2040 (including the National Planning Framework 2018) and the Greater Dublin Area Cycle Network Plan 2016. These existing provisions have been subject to SEA.

4.3 Alternative Scenarios

The various elements of the Plan are at different stages in the planning/environmental process. Furthermore, different elements of the Plan will be developed by different agencies, at different

times, according to different funding allocations. For these reasons the alternatives are expressed as alternative scenarios about the sequence and degree of implementation of key elements that make up the Plan.

Transportation is highly integrated with both land-use planning and the provision of other public infrastructure, such as water services. Different alternative scenarios will give rise to different land-use patterns, resulting in different environmental effects.

The following three alternative scenarios are examined:

- Scenario A: Balanced Bus and Rail;
- Scenario B: MetroLink Prioritisation of Funding; and
- Scenario C: MetroLink Reduced Funding.

Each scenario has been developed in line with government priorities in investment and taking into account the overarching provisions of the Transport Strategy for the Greater Dublin Area 2016-2035.

4.3.1 Scenario A: Balanced Bus and Rail

This scenario will advance the implementation of the National Transport Authority's Transport Strategy in a manner which balances investment into rail and bus projects (including both the Core Bus Network and the new MetroLink urban light rail metro service project), along with the complimentary implementation of cycling and walking infrastructure across the Greater Dublin Area.

This scenario will give rise to orderly development with balanced patterns of land use allocation – resulting in a greater likelihood of financially viable supporting utilities and amenities – as well as earlier attainment of income generation goals (through fares from orderly provision of new housing concentrations at scale). Growth will be balanced as a result of this scenario.

4.3.2 Scenario B: MetroLink Prioritisation of Funding

This scenario will advance the implementation of the National Transport Authority's Transport Strategy in a manner which prioritises investment into rail projects (specifically the new MetroLink) along with the complimentary implementation of cycling and walking infrastructure across the Greater Dublin Area.

In established urban nodes served by the MetroLink project and its associated feeder routes, this scenario will give rise to orderly development with very concentrated patterns of land use allocation within the immediate catchment of new stations. This will result in a in a greater likelihood of financially viable supporting utilities and amenities – as well as earlier attainment of income generation goals (through fares from orderly provision of new housing concentrations at scale). However, elsewhere in the Greater Dublin Area, growth will be uneven as a result of this scenario.

4.3.3 Scenario C: MetroLink Reduced Funding

This scenario will advance the implementation of the National Transport Authority's Transport Strategy in a manner which prioritises investment into bus projects (including the Core Bus network), along with the complimentary implementation of cycling and walking infrastructure across the Greater Dublin Area.

This scenario will give rise to orderly development with very dispersed patterns of land use allocation within the Greater Dublin Area. This will result in a significantly reduced and/or deferred likelihood of financially viable supporting utilities and amenities – as well as much later attainment of income generation goals (through loss of fares from orderly provision of new housing concentrations at scale). Growth will be very uneven as a result of this scenario.

4.4 Summary of Evaluation of Alternatives

4.4.1 Scenario A: Balanced Bus and Rail

This scenario will advance the implementation of the Transport Strategy for the Greater Dublin Area 2016-2035 in a manner which balances investment into rail and bus projects (including both the Core Bus Network and the new MetroLink urban light rail metro service project), along with the complimentary implementation of cycling and walking infrastructure across the Greater Dublin Area.

This scenario will give rise to orderly development with balanced patterns of land use allocation – resulting in a greater likelihood of financially viable supporting utilities and amenities – as well as earlier attainment of income generation goals (through fares from orderly provision of new housing concentrations at scale). Growth will be balanced as a result of this scenario.

This scenario will give rise to the least adverse environmental effects as it would facilitate the concentration of development around planned nodes – which will have appropriate social, environmental and mobility resources – because development will occur on lands that have been zoned and subject to SEA, AA and SFRA. Orderly development of this kind will give rise to the least adverse effects on populations, biodiversity and environmental components including air and water. The orderly and timely provision of services will help to anticipate and avoid effects on water and associated interactions with ecology and human health.

This scenario will:

- Facilitate the greatest improvement in sustainable mobility of all alternatives (reducing and limiting increases in the number of journeys by car taken as a percentage of all journeys taken), thereby facilitating the greatest reduction and limit of increases in greenhouse gas emissions, noise emissions and other emissions to air (with associated effects on human health). Such emissions would occur otherwise with higher levels of motorised transport and associated traffic. By significantly increasing the potential for plan-led, integrated development, greater usage of public transportation and less movement within denser settlements, this alternative would also be likely to result in a higher efficiency of energy resource utilisation.
- Provide for the development of transport infrastructure and services in locations which will facilitate use by those living and working in urban/suburban areas.
- Facilitate lower overall effects on ecology (including designated sites, ecological connectivity, habitats) – due to increased utilisation of lands within existing development boundaries and use of existing utilities and brownfield sites.
- Facilitate the reuse and regeneration of brownfield lands thereby contributing towards a higher efficiency of land utilisation, sustainable mobility and a reduction in the need to develop greenfield lands. By facilitating increased utilisation of lands within existing development boundaries and use of existing utilities and brownfield sites there will be lower adverse effects upon ecology, landscape designations, architectural and archaeological heritage and land take/ soil.
- Facilitate lower effects on ground and surface waters due to higher levels of development within established and serviced settlement centres that have installed/upgraded water services capable of delivering Water Framework Directive targets (and associated effects on the protection of ecology and human health).
- Facilitate the enhancement of cultural heritage and its context in urban areas and their surrounds as a result of replacing motorised transport modes with more sustainable and non-motorised modes such as walking, cycling and the new MetroLink.
- The higher levels of certainty under this alternative is likely to increase spatial concentrations of market-led development – residential, commercial and industrial – in areas that are consistent with regional and local land-use planning objectives. These planning objectives are required to be subject to SEA, AA and SFRA that facilitate the integration of environmental considerations. Also, the timely availability of transportation infrastructure will significantly increase the likelihood of co-location of other services – especially water services – in areas that are consistent with the principles of proper planning and sustainable development.

4.4.2 Scenario B: MetroLink Prioritisation of Funding

This scenario will advance the implementation of the Transport Strategy for the Greater Dublin Area 2016-2035 in a manner which prioritises investment into rail projects (specifically the new MetroLink) along with the complimentary implementation of cycling and walking infrastructure across the Greater Dublin Area.

In established urban nodes served by the MetroLink project and its associated feeder routes, this scenario will give rise to orderly development with very concentrated patterns of land use allocation within the immediate catchment of new stations. This will result in a greater likelihood of financially viable supporting utilities and amenities – as well as earlier attainment of income generation goals (through fares from orderly provision of new housing concentrations at scale). However, elsewhere in the Greater Dublin Area, growth will be uneven as a result of this scenario.

In established urban nodes served by the MetroLink project and its associated feeder routes, this scenario will give rise to a low amount and extent of adverse environmental effects as it would facilitate the concentration of development around planned nodes – which will have appropriate social, environmental and mobility resources, because development will occur on lands that have been zoned and subject to SEA, AA and SFRA. Orderly development of this kind will give rise to least adverse effects on – and therefore would contribute towards the protection of – populations, biodiversity and environmental components including air and water. The orderly and timely provision of services will help to anticipate and avoid effects on water and associated interactions with ecology and human health.

In established urban nodes served by the MetroLink project and its associated feeder routes, Scenario B will give rise to the effects described under Section 4.4.1.

However, elsewhere in the Greater Dublin Area, under this scenario:

- There will be uneven growth which would mean that unsustainable patterns of mobility and land-use will persist – with unchanged trend levels of effects on populations, biodiversity and environmental components including air and water.
- There would be an increased likelihood of congestion and delay issues at critical locations including major junctions, especially along the M50 in the near term; and over-crowding on key public transport routes, especially within the M50. Congestion will mean that there will be significant delays in reaching targets for lower emissions to air – including noise and pollutants – and this will be compounded by lower utilisation of public transportation. There would be a failure to maximise contributions towards improving sustainable mobility (there would be increases in the number of journeys by car taken as a percentage of all journeys taken) and a failure to contribute towards managing traffic flows. Uneven growth would also be likely to result in a reduced efficiency of energy resource utilisation.
- There would not be enough transport infrastructure and services to maximise use by those living and working in urban/suburban areas.

4.4.3 Scenario C: MetroLink Reduced Funding

This scenario will advance the implementation of the Transport Strategy for the Greater Dublin Area 2016-2035 in a manner which prioritises investment into bus projects (including the Core Bus network), along with the complimentary implementation of cycling and walking infrastructure across the Greater Dublin Area.

This scenario will give rise to orderly development with very dispersed patterns of land use allocation within the Greater Dublin Area. This will result in a significantly reduced and/or deferred likelihood of financially viable supporting utilities and amenities, as well as much later attainment of income generation goals (through loss of fares from orderly provision of new housing concentrations at scale). Growth will be very uneven as a result of this scenario.

This scenario would:

- Through the progression of bus projects, facilitate the improvements in sustainable mobility (reducing and limiting increases in the number of journeys by car taken as a percentage of all journeys taken), thereby facilitating the greatest reduction and limit of increases in greenhouse gas emissions, noise emissions and other emissions to air (with associated effects on human health). Such emissions would occur otherwise with higher levels of car transport and associated traffic. By increasing the potential for plan-led, integrated development in some areas and greater usage of bus transportation, this alternative would also be likely to contribute towards a higher efficiency of energy resource utilisation.
- Facilitate orderly development in some (dispersed) locations, including lands that have been zoned and subject to SEA, AA and SFRA; this would contribute towards sustainable development and environmental protection and management locally.

This scenario gives rise to the most potential adverse environmental effects as:

- Development will not concentrate solely around planned nodes – which will have appropriate social, environmental and mobility resources. Very uneven growth means that unsustainable patterns of mobility and land-use will persist throughout the Greater Dublin Area on both zoned and unzoned lands as well as in areas with poor public transport.
- There would be an increased likelihood of congestion and delay issues at critical locations including major junctions, especially along the M50 in the near term; and over-crowding on key public transport routes, especially within the M50. Congestion will mean that there will be significant delays in reaching targets for lower emissions to air – including noise and pollutants – and this will be compounded by lower utilisation of public transportation. There would be a failure to maximise contributions towards improving sustainable mobility (there would be increases in the number of journeys by car taken as a percentage of all journeys taken) and a failure to contribute towards managing traffic flows. Uneven growth would also be likely to result in a reduced efficiency of energy resource utilisation.
- There would not be enough transport infrastructure and services to maximise use by those living and working in urban/suburban areas.
- Very uneven development will give rise to adverse effects on populations, biodiversity and environmental components including air and water.
- The lack of orderly and timely provision of services will generally not avoid effects on water and associated interactions with ecology and human health.

4.5 Selected Alternative

The most preferable outcome from the environmental assessment of alternatives is identified as being Alternative Scenario A and the approach outlined by this alternative is the one that is followed by the Plan.

This alternative will give rise to orderly development with balanced patterns of land use allocation – resulting in a greater likelihood of financially viable supporting utilities and amenities – as well as earlier attainment of income generation goals (through fares from orderly provision of new housing concentrations at scale). Growth will be balanced as a result of this alternative.

This alternative will also facilitate the greatest improvement in sustainable mobility of all alternatives (reducing and limiting increases in the number of journeys by car taken as a percentage of all journeys taken), thereby facilitating the greatest reduction and limit of increases in greenhouse gas emissions, noise emissions and other emissions to air (with associated effects on human health).

Potentially significant adverse environmental effects will be mitigated by the various provisions that have been integrated into the Plan (see Section 6 of this report).

Section 5 Evaluation of Plan Provisions

5.1 Overall Findings

The overall findings of the SEA are that:

- **Compliance with Legislation and Guidelines – Environmental Protection and Sustainable Development**

The National Transport Authority have integrated all recommendations arising from the SEA and AA processes into the Integrated Implementation Plan, facilitating compliance of the Plan with various European and National legislation and Guidelines relating to the protection of the environment and the achievement of sustainable development.

Implementation of the Plan will contribute towards efforts to achieve a number of the 17 Sustainable Development Goals²⁶ of the 2030 Agenda for Sustainable Development, which were adopted by world leaders in 2015 at a United Nations Summit and came into force in 2016.

- **Improvements in Sustainable Mobility and Associated Effects (emissions, noise and energy usage)**

The Plan facilitates improvements in sustainable mobility, including a shift from car to more sustainable and non-motorised transport modes, through the development of transport infrastructure and services and transitioning to lower emission vehicles. Improvements in sustainable mobility will result in the following positive effects:

- Reductions in/limits in increases of greenhouse gas emissions and associated achievement of legally binding greenhouse gas emissions targets;
- Reductions in/limits in increases of all emissions to air and associated achievement of air quality objectives, thereby contributing towards improvement of air quality and protection of human health;
- Reductions in/limits in increases of consumption of non-renewable energy sources and achievement of legally binding renewable energy targets; and
- Energy security.

- **Positive Effects in Urban Areas**

In combination with other plans and programmes, including those from the land use sector, the Plan facilitates more consolidated urban areas, reuse and regeneration of brownfield lands and reductions in sprawl. In this way the Plan would facilitate a higher efficiency of land utilisation, increases in sustainable mobility and a reduction in the need to develop greenfield lands. The reduced need to develop greenfield lands further away from existing urban areas would result in lower adverse effects upon ecology, landscape designations, architectural and archaeological heritage and soil.

Among other positive environmental effects, the Plan facilitates the enhancement of the public realm (including cultural heritage and its context) in urban areas by facilitating the

²⁶ Including:

- Goal 3. Ensure healthy lives and promote well-being for all at all ages
- Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
- Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
- Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable
- Goal 12. Ensure sustainable consumption and production patterns
- Goal 13. Take urgent action to combat climate change and its impacts
- Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development
- Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

replacement of motorised transport modes with more sustainable and non-motorised modes such as light rail/metro, cycling and walking.

- **Potentially Significant Adverse Effects to be mitigated**

Potentially significant adverse environmental effects arising from the Plan are detailed on Table 5.1. These effects will be mitigated by the various provisions which have been integrated into the Plan including those which have arisen through the SEA and AA processes (see Section 6). These mitigating provisions together with the contribution that the Plan will make to sustainable mobility means that the Plan facilitates various significant positive effects upon the protection and management of environmental components.

Table 5.1 overleaf details the various types of environmental effects likely to arise with respect to the Integrated Implementation Plan as a direct result of development and activities under the Plan and in combination with the wider planning framework (see also Section 6). Environmental impacts which occur will be determined by the nature and extent of multiple or individual projects and site specific environmental factors. By complying with appropriate mitigation measures - including those which have been integrated into the Plan - potentially significant adverse environmental effects which could arise as a result of implementing the Plan would be likely to be avoided, reduced or offset.

5.2 Transboundary Effects (Northern Ireland)

Taking into account the geographical scope of Plan provisions (including the limited provisions contained in the Integrated Implementation Plan that apply outside of the Greater Dublin Area) and the detailed Plan provisions relating to environmental protection and management (please refer to Table 5.1 overleaf and Section 6 of this SEA Environmental Report), it is determined that significant environmental effects will not occur in Northern Ireland.

5.3 Alignment with the Transport Strategy for the Greater Dublin Area and Associated Issues/Assessment

The National Transport Authority is required by the Dublin Transport Authority Act 2008 to prepare a six year Integrated Implementation Plan to, inter alia, facilitate the implementation of the Transport Strategy for the Greater Dublin Area 2016-2025. The Transport Strategy, which was subject to full SEA and Stage 2 AA, is therefore a key in shaping the six-year Integrated Infrastructure Plan.

The Transport Strategy for the Greater Dublin Area 2016-2035 establishes an overall framework for transport investment in Counties Dublin, Meath, Kildare and Wicklow over the next two decades.

The Transport Strategy (and consequently the Implementation Plan) focuses on improving public and sustainable transport across the Greater Dublin Area while seeking to ensure primacy for transport options that provide for unit reductions in carbon emissions. This involves: promoting public transport, walking and cycling; seeking to reduce car use in circumstances where alternative options are available; and transitioning to lower emission vehicles for transport use.

Transport Strategy provisions include those relating to: light rail, including the development of the MetroLink project; the development of a Core Bus Network, inclusive of Bus Rapid Transit routes; heavy rail (inclusive of expanded electrification on the suburban rail lines); cycling facilities; pedestrian movement; interchange facilities; information provision; and park and ride developments.

To date the Authority has focused significant levels of investment in these sustainable modes, including the reopening of the Phoenix Park Tunnel and the delivery of Luas Cross City. The continuation of this focus is facilitated by the Transport Strategy and it is intended that it will continue under the Implementation Plan.

The Plan will further contribute towards the following effects identified by the SEA of the Transport Strategy for the Greater Dublin Area 2016-2025:

- **Mode Share**

The implementation of the Strategy will have a significant positive impact on the objective of reducing the proportion of all trips undertaken by private car from 59.9%, in 2011, to 52.2% in 2035²⁷, with a corresponding positive impact on the proportions using public transport, walking and cycling.

- **Journey Time**

The area within 1 hour's travel time to the city centre is far more extensive in the future and accordingly, the areas within shorter journey times are correspondingly greater. Of particular note, is the impact of the MetroLink on the northern corridor, including Dublin Airport, which facilitates significantly shorter journey times within this area.

- **Land Use Benefits**

The implementation of the Strategy will facilitate a more efficient use of land within the GDA and will improve the accessibility of central areas, which will potentially lead to the greater consolidation of trip intensive developments such as employment and retail into locations served by public transport.

- **Modelled Emissions**

All types of vehicle emissions (Carbon Monoxide, Carbon Dioxide, Nitrous Oxides and Hydrocarbons) reduce under the Transport Strategy, in comparison with a do minimum scenario. This highlights the air quality improvements associated with the introduction of the Strategy's provisions.

- **Modelled Noise**

There is significant improvements to noise levels within the Core City Centre network, where the Dublin City Centre Transport Plan measures are implemented.

- **Modelled Severance**

There is significant improvements to severance within the Core City Centre Network, where the Dublin City Centre Transport Plan measures are implemented. Substantial improvements to severance are noted on the quays, and at the Westmoreland Street / D'Olier Street public transport interchange area.

²⁷ Transport model output for all trip purposes, AM peak (2011 & 2035)

Table 5.1 Overall Effects Arising from the Integrated Implementation Plan

Environmental Component	Likely Environmental Effects, as a direct result of development and activities under the Plan and in combination with the wider planning framework		
	Significant Positive Effect likely to occur	Potentially Significant Adverse Effect, if unmitigated	Residual Adverse Effect ²⁸
Air and climatic factors	<ul style="list-style-type: none"> • Contributions towards reductions in greenhouse gas and other emissions to air and associated achievement of legally binding targets (in combination with plans and programmes from all sectors, including energy, transport and land use planning) as a result of: facilitating a shift from car to more sustainable and non-motorised transport modes; and facilitating more consolidated urban areas and reductions in sprawl. • Contributions towards reductions in consumption from non-renewables and associated achievement of legally binding renewable energy targets, including sectoral targets for transport (in combination with plans and programmes from all sectors, including energy, transport and land use planning). • Contributions towards managing traffic flows (and associated management of adverse effects as a result of traffic on air quality and noise levels). 	<ul style="list-style-type: none"> • Emissions to air and associated issues. 	<ul style="list-style-type: none"> • An extent of travel related greenhouse gas and other emissions to air. This has been mitigated by provisions which have been integrated into the Plan, including those relating to sustainable mobility.
Population and human health	<ul style="list-style-type: none"> • Provides for the development of transport infrastructure and services in locations which will facilitate use by those living and working in urban/suburban areas. • Facilitates contribution towards the protection of human health as a result of contributing towards the protection of environmental vectors, especially air. 	<ul style="list-style-type: none"> • Potential interactions if effects upon environmental vectors such as air are not mitigated 	<ul style="list-style-type: none"> • An extent of travel related greenhouse gas and other emissions to air. This has been mitigated by provisions which have been integrated into the Plan, including those relating to sustainable mobility.

²⁸ Residual adverse environmental effects would be generally non-significant. Significant residual adverse effects would be in compliance with the relevant environmental protection legislation.

Environmental Component	Likely Environmental Effects, as a direct result of development and activities under the Plan and in combination with the wider planning framework		
	Significant Positive Effect likely to occur	Potentially Significant Adverse Effect, if unmitigated	Residual Adverse Effect ²⁸
Biodiversity and flora and fauna	<ul style="list-style-type: none"> Facilitates lower overall effects on ecology (including designated sites, ecological connectivity, habitats) – due to increased utilisation of lands within existing development boundaries and use of existing utilities and brownfield sites. Contributions towards the protection of vegetation as a result of contributing towards the protection of environmental vectors, especially air. Potential ecological enhancement interventions along transport corridors. 	<ul style="list-style-type: none"> Arising from both construction and operation of transport infrastructure and services and associated facilities/ infrastructure: loss of/damage to biodiversity in designated sites, ecological connectivity and non-designated habitats; and disturbance to biodiversity and flora and fauna. Habitat loss, fragmentation and deterioration, including patch size and edge effects. Disturbance (e.g. due to noise and lighting along transport corridors) and displacement of protected species and coastal squeeze. Effects in riparian zones where new crossings of waters, if any, are progressed. Potential effects on vegetation from transport emissions. 	<ul style="list-style-type: none"> Loss of an extent of non-protected habitats as a result of new or widened transport infrastructure that involves the replacement of semi-natural land covers with artificial surfaces Losses or damage to ecology (these would be in compliance with relevant legislation)
Material Assets	<ul style="list-style-type: none"> Contributions towards energy security (in combination with plans and programmes from all sectors, including energy, transport and land use planning) as a result of reducing traffic flows and associated energy use. Contributions towards a mode shift away from the private car to public transport, walking and cycling and associated enhancement of the public realm. Contributions towards the protection of built/amenity assets and infrastructure. Contributions towards the reuse and regeneration of brownfield lands thereby contributing towards a higher efficiency of land utilisation, sustainable mobility and a reduction in the need to develop greenfield lands. By facilitating increased utilisation of lands within existing development boundaries and use of existing utilities and brownfield sites there will be lower adverse effects upon ecology, landscape designations, architectural and archaeological heritage and soil. Contributions towards appropriate waste management. 	<ul style="list-style-type: none"> Generation of construction waste. Loss or damage to built/amenity assets and infrastructure including as a result of new or widened transport infrastructure. 	<ul style="list-style-type: none"> Residual wastes (these would be disposed of in line with higher level waste management policies) Potential residual losses to built/amenity assets and infrastructure including as a result of new or widened transport infrastructure

Environmental Component	Likely Environmental Effects, as a direct result of development and activities under the Plan and in combination with the wider planning framework		
	Significant Positive Effect likely to occur	Potentially Significant Adverse Effect, if unmitigated	Residual Adverse Effect ²⁸
Water	<ul style="list-style-type: none"> Contributions towards lower effects on ground and surface waters due to higher levels of development within established and serviced settlement centres that have installed/upgraded water services capable of delivering Water Framework Directive targets. Contributions towards compliance with the Flood Risk Management Guidelines. 	<ul style="list-style-type: none"> Adverse impacts upon the status of water bodies and entries to the WFD Register of Protected Areas, arising from changes in quality, flow and/or morphology. Increase in the risk of flooding. 	<ul style="list-style-type: none"> Flood related risks remain due to uncertainty with regard to extreme weather events
Landscape	<ul style="list-style-type: none"> Contributions towards the protection of landscape designations as a result of facilitating compliance with relevant plans. 	<ul style="list-style-type: none"> Occurrence of adverse visual impacts and conflicts with the appropriate protection of statutory designations relating to the landscape. 	<ul style="list-style-type: none"> Residual visual effects (these would be in compliance with landscape designation provisions)
Cultural Heritage	<ul style="list-style-type: none"> Contributions towards the protection of cultural heritage (archaeological and architectural) as a result of facilitating compliance with relevant legislation. Contributions towards the enhancement of cultural heritage and its context in urban areas and their surrounds as a result of replacing motorised modes with more sustainable and non-motorised modes of transport such as walking, cycling and light rail/metro. 	<ul style="list-style-type: none"> Potential effects on protected and unknown archaeology and protected architecture arising from construction and operation activities, including as a result of increasing traffic flows. 	<ul style="list-style-type: none"> Potential alteration to the context and setting of designated cultural heritage however these will occur in compliance with legislation. Potential loss of unknown archaeology however this loss will be mitigated by measures integrated into the Plan
Soil	<ul style="list-style-type: none"> Minimises land-take and loss of extent of soil resource – as a result of facilitating increased utilisation of lands within existing development boundaries and use of existing utilities and brownfield sites. Contributions towards the protection of the environment from contamination arising from brownfield development. Contributions towards the protection of features or areas of geological / geomorphological interest. 	<ul style="list-style-type: none"> Adverse impacts on the hydrogeological and ecological function of the soil resource as a result of construction of transport and associated transport facilities/ infrastructure. Adverse impacts on features or areas of geological / geomorphological interest as a result of construction of transport and associated transport facilities/ infrastructure. Potential for increase in coastal erosion. 	<ul style="list-style-type: none"> Loss of an extent of soil function arising from the replacement of semi-natural land covers with artificial surfaces and from sea level rise/coastal erosion

Section 6 Mitigation and Monitoring Measures

6.1 Mitigation

Mitigation measures are measures envisaged to prevent, reduce and, as fully as possible, offset any significant adverse impacts on the environment of implementing the Integrated Implementation Plan. Various environmental sensitivities and issues have been communicated to the Authority through the SEA and Appropriate Assessment (AA) processes.

By integrating all SEA and AA recommendations into the Integrated Implementation Plan, the Authority has helped to ensure that:

- The potential significant adverse effects of implementing the Plan are avoided, reduced or offset; and
- The beneficial environmental effects of implementing the Plan are maximised.

Mitigation was achieved through the following:

- Early work undertaken by the Authority to ensure contribution towards environmental protection and sustainable development – including the adoption of the closely related Transport Strategy for the Greater Dublin Area 2016-2035 and the focusing of significant levels of investment in sustainable modes of transport to date, including the reopening of the Phoenix Park Tunnel and the delivery of Luas Cross City;
- The consideration of alternatives (see Section 4); and
- The integration of individual measures into the Plan (see Table 6.1).

6.2 Monitoring

The Environmental Report contains proposals for monitoring the potential significant effects of implementing the Guidelines, if unmitigated, which are adopted alongside the preparation of the Plan. Monitoring enables, at an early stage, the identification of unforeseen adverse effects and the undertaking of appropriate remedial action.

Monitoring is an ongoing process and the Monitoring Programme allows for flexibility and the further refinement of indicators and targets. The Monitoring Programme may also be updated to deal with specific environmental issues - including unforeseen effects - as they arise.

A stand-alone Monitoring Report on the significant environmental effects of implementing the Plan will be prepared in advance of the review of the Plan. This report will address the indicators set out on Table 6.2. The National Transport Authority is responsible for the ongoing review of indicators and targets, collating existing relevant monitored data, the preparation of monitoring evaluation report(s), the publication of these reports and, if necessary, the carrying out of corrective action, in combination with the relevant authorities.

The hierarchy of planning and environmental assessment - including associated environmental monitoring requirements - in which the Transport Plan is situated is noted. This includes the environmental monitoring requirements associated with other transport plans, with plans from other sectors (such as land use planning) and with lower tier other projects, including those related to transport.

Table 6.1 SEA/AA recommendations included within the Integrated Implementation Plan

Plan Chapter No.	Text inserted into the Plan arising from SEA/AA processes
Chapter 2 Background to the Implementation Plan, Sub-section 2.3 Spatial Planning	Any future Transportation Strategies for these Metropolitan Areas will be required to be subject to SEA and AA as appropriate.
Chapter 4 Overall Infrastructure Investment Programme, Sub-section 4.6 Environmental considerations	<p>4.6.1 Regulatory Framework for Environmental Protection and Management</p> <p>In implementing this Plan, the Authority will cumulatively contribute towards – in combination with other users and bodies – the achievement of the objectives of the regulatory framework for environmental protection and management, in compliance with EU Directives - including the Habitats Directive (92/43/EEC, as amended), the Birds Directive (2009/147/EC), the Environmental Impact Assessment Directive (2011/92/EU, as amended by 2014/52/EC) and the Strategic Environmental Assessment Directive (2001/42/EC) – and relevant transposing Regulations.</p>
Chapter 4 Overall Infrastructure Investment Programme, Sub-section 4.6 Environmental considerations	<p>4.6.2 Lower-level Decision Making</p> <p>Lower levels of decision making and environmental assessment should consider the sensitivities identified in Section 4 of the SEA Environmental Report, including the following:</p> <ul style="list-style-type: none"> • Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) and Candidate SACs and SPAs; • Features of the landscape that provide linkages/connectivity to designated sites (e.g. watercourses, areas of semi-natural habitat such as linear woodlands etc); • Salmonid waters; • Shellfish waters; • Freshwater pearl mussel catchments; • Natural Heritage Areas and proposed Natural Heritage Areas; • Areas likely to contain a habitat listed in Annex 1 of the Habitats Directive; • Un-designated sites of importance to wintering or breeding bird species of conservation concern; • Entries to the Record of Monuments and Places and Zones of Archaeological Potential; • Entries to the Record of Protected Structures; • Architectural Conservation Areas; and • Relevant landscape designations.
Chapter 4 Overall Infrastructure Investment Programme, Sub-section 4.6 Environmental considerations	<p>4.6.3 Corridor and Route Selection Process for Relevant New Infrastructure</p> <p>The following Corridor and Route Selection Process will be undertaken for relevant new infrastructure:</p> <p>Stage 1 – Route Corridor Identification, Evaluation and Selection</p> <ul style="list-style-type: none"> • Environmental constraints (including those identified in Section 4 of the SEA Environmental Report) and opportunities (such as existing linear infrastructure) will assist in the identification of possible route corridor options; • Potentially feasible corridors within which infrastructure could be accommodated will be identified and these corridors assessed. The selection of the preferred route corridor will avoid constraints and meet opportunities to the optimum extent, as advised by the relevant specialists; and • In addition to the constraints identified above, site-specific field data may be required to identify the most appropriate corridors. <p>Stage 2 – Route Identification, Evaluation and Selection</p> <ul style="list-style-type: none"> • Potentially feasible routes within the preferred corridor will be identified and assessed. The selection of preferred routes will avoid constraints and meet opportunities to the optimum extent, as advised by the relevant specialists, taking into account project level information and potential mitigation measures that are readily achievable; • In addition to the constraints identified above, site specific field data may be required to identify the most appropriate routes; and • In addition to environmental considerations, the identification of route corridors and the refinement of route lines is likely to be informed by other considerations.
Chapter 4 Overall Infrastructure Investment Programme, Sub-section 4.6 Environmental considerations	<p>4.6.4 Appropriate Assessment</p> <p>All projects and plans arising from this Plan will be screened for the need to undertake Appropriate Assessment under Article 6 of the Habitats Directive. A plan or project will only be authorised after the competent authority has ascertained, based on scientific evidence, Screening for Appropriate Assessment, and subsequent Appropriate Assessment where necessary, that:</p> <ol style="list-style-type: none"> 1. The plan or project will not give rise to significant adverse direct, indirect or secondary effects on the integrity of any European site (either individually or in combination with other plans or projects); or

Plan Chapter No.	Text inserted into the Plan arising from SEA/AA processes
	<p>2. The plan or project will have significant adverse effects on the integrity of any European site (that does not host a priority natural habitat type/and or a priority species) but there are no alternative solutions and the plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature. In this case, it will be a requirement to follow procedures set out in legislation and agree and undertake all compensatory measures necessary to ensure the protection of the overall coherence of Natura 2000; or</p> <p>The plan or project will have a significant adverse effect on the integrity of any European site (that hosts a natural habitat type and/or a priority species) but there are no alternative solutions and the plan or project must nevertheless be carried out for imperative reasons for overriding public interest, restricted to reasons of human health or public safety, to beneficial consequences of primary importance for the environment or, further to an opinion from the Commission, to other imperative reasons of overriding public interest. In this case, it will be a requirement to follow procedures set out in legislation and agree and undertake all compensatory measures necessary to ensure the protection of the overall coherence of Natura 2000.</p>
Chapter 4 Overall Infrastructure Investment Programme, Sub-section 4.6 Environmental considerations	<p>4.6.5 Protection of European Sites</p> <p>No plans or projects giving rise to significant cumulative, direct, indirect or secondary impacts on European sites arising from their size or scale, land take, proximity, resource requirements, emissions (disposal to land, water or air), transportation requirements, duration of construction, operation, decommissioning or from any other effects shall be permitted on the basis of this Plan (either individually or in combination with other plans or projects²⁹).</p>
Chapter 4 Overall Infrastructure Investment Programme, Sub-section 4.6 Environmental considerations	<p>4.6.6 Climate Change, Emissions and Energy</p> <p>As identified in the SEA Environmental Report that accompanies this Plan, the Plan facilitates sustainable mobility and associated positive effects, including those relating to:</p> <ul style="list-style-type: none"> • Reductions in/limits in increases of greenhouse gas emissions and associated achievement of legally binding greenhouse gas emissions targets; • Reductions in/limits in increases of all emissions to air and associated achievement of air quality objectives, thereby contributing towards improvement of air quality and protection of human health; • Reductions in/limits in increases of consumption of non-renewable energy sources and achievement of legally binding renewable energy targets; and • Energy security. <p>In implementing the Plan, the Authority will support relevant provisions contained in the National Climate Change Adaptation Framework (2018), the National Mitigation Plan (2017) and the Department of Transport, Tourism and Sport's 2017 "Adaptation Planning – Developing Resilience to Climate Change in the Irish Transport Sector", the National Energy and Climate Plan, Climate Change Action Plans of local authorities and any Regional Decarbonisation Plan prepared on foot of commitments included in the RSESS.</p> <p>The implementation of the Plan will incorporate relevant targets and actions arising from the sectoral adaptation plan for transport that will be prepared to comply the requirements of the Climate Action and Low Carbon Development Act 2015.</p> <p>Cognisant of the imperative to reduce emissions, the Authority will seek to ensure primacy for transport options that provide for unit reductions in carbon emissions. This can most effectively be done by promoting public transport, walking and cycling, and by actively seeking to reduce car use in circumstances where alternative options are available.</p> <p>During the preparation and/or review of policies and plans relating to climate change, carbon emissions and energy usage, the Authority will seek to integrate Plan objectives, as appropriate.</p>
Chapter 4 Overall Infrastructure Investment Programme, Sub-section 4.6 Environmental considerations	<p>4.6.7 Other SEA Recommendations</p> <p>In implementing the Plan, the Authority will ensure that the mitigation measures included in Table 9.2 of the SEA Environmental Report are complied with.</p>

²⁹ Except as provided for in Article 6(4) of the Habitats Directive, viz. There must be:

- a) no alternative solution available,
- b) imperative reasons of overriding public interest for the plan/programme/strategy/project etc. to proceed; and
- c) Adequate compensatory measures in place.

Table 6.2 Indicators for Monitoring

Environmental Component	Indicators
Air and Climatic Factors	AC1i: Compliance with Ambient Air Quality and Cleaner Air for Europe (CAFE) Directive and associated legislation
	AC1ii: Greenhouse gas emissions from transport
	AC2: Percentage of population travelling to work, school or college by public transport or non-mechanical means
	AC3i: Energy use by the transport sector as a percentage of Total Final Energy Consumption AC3ii: Proportion of energy from renewable sources
Population and Human Health	PHH1: Extent of urban/suburban areas within the catchment of transport infrastructure and services
	PHH2: Occurrence (any) of a spatially concentrated deterioration in human health arising from environmental factors resulting from development provided for by the Plan, as identified by the Health Service Executive and Environmental Protection Agency
Biodiversity, Flora and Fauna	B1: Conservation status of habitats and species as assessed under Article 17 of the Habitats Directive
	B2: Percentage loss of functional connectivity without remediation resulting from development provided for by the Plan
	B3i: Number of significant impacts on relevant habitats, species, environmental features or other sustaining resources in designated sites including Wildlife Sites resulting from development provided for by the Plan
	B3ii: Number of significant impacts on the protection of listed species resulting from development provided for by the Plan
Material Assets	MA1: Protection of built/amenity assets and infrastructure
	MA2: Extent of brownfield land reused and regenerated which has been facilitated by the Plan
	MA3: Preparation and implementation of construction and environmental management plans
Water	W1i: Interactions with classification of Overall Status (comprised of ecological and chemical status) under the European Communities Environmental Objectives (Surface Waters) Regulations 2009 (SI No. 272 of 2009) resulting from development provided for by the Plan W1ii: Mandatory and Guide values as set by the EU Bathing Water Directive and transposing Bathing Water Quality Regulations (SI No. 79 of 2008)
	W2: Interactions with Groundwater Quality Standards and Threshold Values under Directive 2006/118/EC resulting from wind energy development (including associated development) permitted by planning authorities adhering to the Guidelines
	W3: Compliance of relevant lower tier assessments and decision making with the Flood Risk Management Guidelines
Landscape	L1: Number of unmitigated conflicts with the appropriate protection of statutory designations relating to the landscape, including those included in the land use plans of planning authorities, resulting from development provided for by the Plan
Cultural Heritage	CH1: Percentage of entries to the Record of Monuments and Places - including Zones of Archaeological Potential (and the context of the above within the surrounding landscape where relevant) - protected from significant adverse effects resulting from development provided for by the Plan
	CH2: Percentage of entries to the Record of Protected Structures and Architectural Conservation Areas and their context protected from significant adverse effects resulting from development provided for by the Plan
Soil	S1: Artificial surfaces land cover extent