

SEA ENVIRONMENTAL REPORT NON-TECHNICAL SUMMARY

FOR THE

DUBLIN TO GALWAY GREENWAY PLAN

for: Department of Transport, Tourism and Sport

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Dublin 2



**An Roinn Iompair
Turasóireachta agus Spóirt**

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Section 1 Introduction and Terms of Reference

This is the Non-Technical Summary of the Strategic Environmental Assessment (SEA) Environmental Report for the Dublin to Galway Greenway Plan. The purpose of the Environmental Report is to comply with SEA legislation and provide a clear understanding of the likely environmental consequences of decisions regarding the adoption and implementation of the Plan.

What is an SEA?

SEA is a systematic process of predicting and evaluating the likely environmental effects of implementing a proposed plan, or other strategic action, in order to ensure that these effects are appropriately addressed at the earliest appropriate stage of decision-making on a par with economic, social and other considerations.

Why is it needed?

The SEA has been carried out in order to comply with the provisions of the SEA Regulations, as amended, and in order to contribute towards environmental management and sustainable development. The output of the process is an Environmental Report which should be read in conjunction with the Greenway Plan.

How does it work?

Relevant aspects of the current state of the environment were assembled and presented to the team who prepared the Plan. This helped them to devise a Plan that protects whatever is sensitive in the environment. To decide how best to make a Plan that protects the environment as much as possible, the Department examined different alternatives on how the greenway could be developed. This helped to highlight where conflicts could occur and facilitated the development of mitigation measures which will help to avoid/reduce adverse environmental effects.

What is included in the Environmental Report which accompanies the Plan?

The Environmental Report contains the following information:

- A description of the relevant aspects of the current state of the environment;
- A description and assessment of alternatives for the development of the Greenway;
- An assessment of Plan provisions; and,
- Mitigation measures which set out to aid compliance with important environmental protection legislation - e.g. the Water Framework Directive, the Habitats Directive - and which will help to avoid/reduce the adverse environmental effects of implementing the Plan.

What happens at the end of the process?

When the Plan is finalised, an SEA Statement is prepared and made available. The SEA Statement includes information on how environmental considerations were integrated into the Plan and why the preferred alternative was chosen for the Plan.

Section 2 The Plan

2.1 Content of the Plan

The Plan sets out the Department's high level vision, policy and objectives for the development of a greenway between Dublin City to Clifden, Galway via Galway City.

The Plan document is text based and does not identify a route for the greenway¹. The greenway will be developed at project level at which Environmental Impact Assessment (EIA) and Appropriate Assessment (AA) will be undertaken as relevant.

All SEA and AA recommendations have been integrated into the Plan. The content of the main Plan document is as follows (SEA and AA recommendations in **green**):

Vision

Develop a segregated cycling and walking trail to international standards, extending from Dublin City to Galway which is of a scale that will allow Ireland to harness the potential of an identified growing tourism market for cycling. This route will form part of an interconnected National Cycle Network of high quality, substantially traffic free, inter urban routes, which will establish Ireland as a quality international tourism destination for a broad range of associated recreational activities and pursuits.

Policy

To provide a segregated, substantially off road cycle route from Dublin City to Clifden via Galway City, maximising the use of - where feasible - existing and approved routes and disused railway line corridors and to also use existing plans and/or permitted projects where these have been subject to a consent process that has previously included the carrying out or screening for Strategic Environmental Assessment (SEA)/ Environmental Impact Assessment (EIA) and/or Appropriate Assessment (AA).

The development of this route shall be subject to the requirements of Habitats and EIA Directives **and shall comply with the provisions detailed in Appendix I 'Environmental Management and Sustainable Development' to this Plan**. Where State lands are not available, land will be acquired in order to secure the use of the infrastructure for future years, thereby securing the State's investment.

Objectives

- Establish a cycleway route connecting Dublin to Clifden via Galway City which is substantially segregated from vehicular traffic and is safe, attractive and comfortable.
- Maximise the value of existing infrastructure including canal towpaths, disused railway lines and state owned lands.
- Secure permanent access to the entire route through land acquisition if required.
- Develop a tourism experience that caters for a broad range of users in key tourism markets.
- Route to be designed and built to international best practice and in accordance with adopted standards.

¹ The Greenway Plan is a high-level, strategic, text based document which does not identify the design, route or possible route corridors for the greenway. Details of the project(s) which will emanate from the Plan will allow for a more detailed consideration of environmental effects – including in-combination/cumulative effects – by project level assessments i.e. EIA and AA.

The Greenway Plan constitutes an assemblage of elements – some will be new, some exist already, some are being developed as parts of existing local initiatives. Furthermore the Greenway contains elements that have already been adopted – following consultation and assessment - into County and Local Plans.

Finally, some parts of the final scheme may consist of elements that emerge from new and emerging local plans and initiatives.

The Plan sits within a hierarchy of strategic actions such as plans and programmes, including those referred to at Section 2.2.

- Maximise the value of existing and proposed investment in key tourism destinations.
- Facilitate regular access to visitor attractions and services along the corridor.
- Facilitate connections with public transport hubs which will provide access to the route from bus and rail.
- Provide frequent connections to towns, tourism facilities, natural amenities and other attractions in proximity to the route in collaboration with local communities and tourism providers.
- To generate ongoing economic benefits for rural and urban areas along the route.
- To maximise the number of potential commuter, leisure and tourist users.
- To facilitate the achievement of Smarter Travel targets for sustainable travel.
- To market and promote the cycleway internationally.
- To provide comprehensive route signage, mapping and distinct branding to international standards.
- To provide for maintenance of the route and monitoring of patterns of use.
- To create and economic stimulus for growth in the national and local economy, providing opportunities for new and existing businesses and communities.
- **To implement the provisions detailed in Appendix I 'Environmental Management and Sustainable Development' to this Plan.**

2.2 Relationship with other relevant Plans and Programmes

The Plan sits within a hierarchy of strategic actions such as plans and programmes, including:

- Habitats Directive (92/43/EEC)
- Birds Directive (2009/147/EC)
- The Clean Air for Europe Directive (2008/50/EC)
- Water Framework Directive (2000/60/EC)
- Drinking Water Directive (98/83/EC)
- Urban Waste Water Treatment Directive (91/271/EEC)
- SEA Directive (2001/42/EC)
- EIA Directive (2011/92/EU as amended by 2014/52/EU)
- Smarter Travel - A Sustainable Transport Future - A New Transport Policy for Ireland 2009-2020
- Investing in our Transport Future – A Strategic Investment Framework for Land Transport Smarter Travel Initiative 2012-2016
- National Cycle Network Scoping Study 2010
- Climate Action and Low Carbon Development Act 2015
- Regional & County Green Infrastructure Plans/Strategies
- River Basin Management Plans and associated Programmes of Measures
- County and Town Development Plans
- Local Plans e.g. Local Area Plans, Tullamore Town and Environs Development Plan, Edenderry Local Area Plan, Leixlip Local Area Plan, Maynooth Local Area, Kilcock Local Area Plan
- Athlone Waterfront Study 2010
- Athlone Canal Study 2013

The Plan must comply with relevant higher level strategic actions and may, in turn, guide lower level strategic actions. The Plan is subject to a number of high level environmental protection policies and objectives with which it must comply, including those which have been identified as Strategic Environmental Objectives in in Section 3.12. An example of an environmental protection objective is the aim of the EU Habitats Directive - which is to contribute towards ensuring biodiversity through the conservation of natural habitats and of wild fauna and flora in the European territory of Member States.

Section 3 The Environmental Baseline

3.1 Introduction

Reflecting the specifications in the SEA Directive, the relevant aspects of the current state of the environment for the various environmental components are summarised in this section.

Information which is relevant to lower tier project planning and development and associated environmental assessments is identified. When compiled for relevant areas at project level, the information specified will be made available for use in the identification of Opportunity Corridors and will provide an indication of the areas that: are most sensitive with respect to the development of a greenway; and those that are most suited.

As the Plan will not provide a route, the compilation of detailed information at Plan level would be inappropriate at this stage.

An indicative study area for the Plan and the SEA has been selected between and within Dublin and Galway as shown on Figure 3.1 overleaf. This area includes part of the administrative areas of ten County Councils and two City Councils.

A potential challenge to future route selection processes of lower tier environmental assessments is the lack of a centralised database that could make all environmental baseline data readily available and in a consistent format.

3.2 Likely Evolution of the Environment in the Absence of the Plan

In the presence of the new Plan, a range of positive environmental effects and residual (after mitigation) adverse effects would occur.

In the absence of a new Plan, it is uncertain whether all of the greenway would be developed under either locally coordinated (under local plans) or uncoordinated individual projects. If such development were to occur, compliance with the mitigation measures which have been integrated into the Plan would be necessary in order to ensure that the following significant adverse environmental effects do not occur:

- Increases in waste levels;
- Interactions with human health arising from effects upon environmental vectors;
- Arising from both construction and operation of the greenway 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 and displacement of protected species and coastal squeeze
- Effects in riparian zones where new crossings of waters, if any, are progressed
- Potential interactions with the status of water bodies and entries to the WFD Register of Protected Areas, arising from:
 - Changes in quality, flow and/or morphology at construction stage (including of greenway and associated facilities/infrastructure); and
 - Increases in outflow at waste water treatment plants as a result of increases in numbers of visitors to settlements along the route.
- Increase in the risk of flooding;
- Adverse impacts on the hydrogeological and ecological function of the soil resource as a result of construction of associated facilities/infrastructure;

- Effects on protected and unknown archaeology and protected architecture arising from construction activities (for both greenway and associated facilities/infrastructure); and
- Occurrence of adverse visual impacts and conflicts with the appropriate protection of statutory designations relating to the landscape.

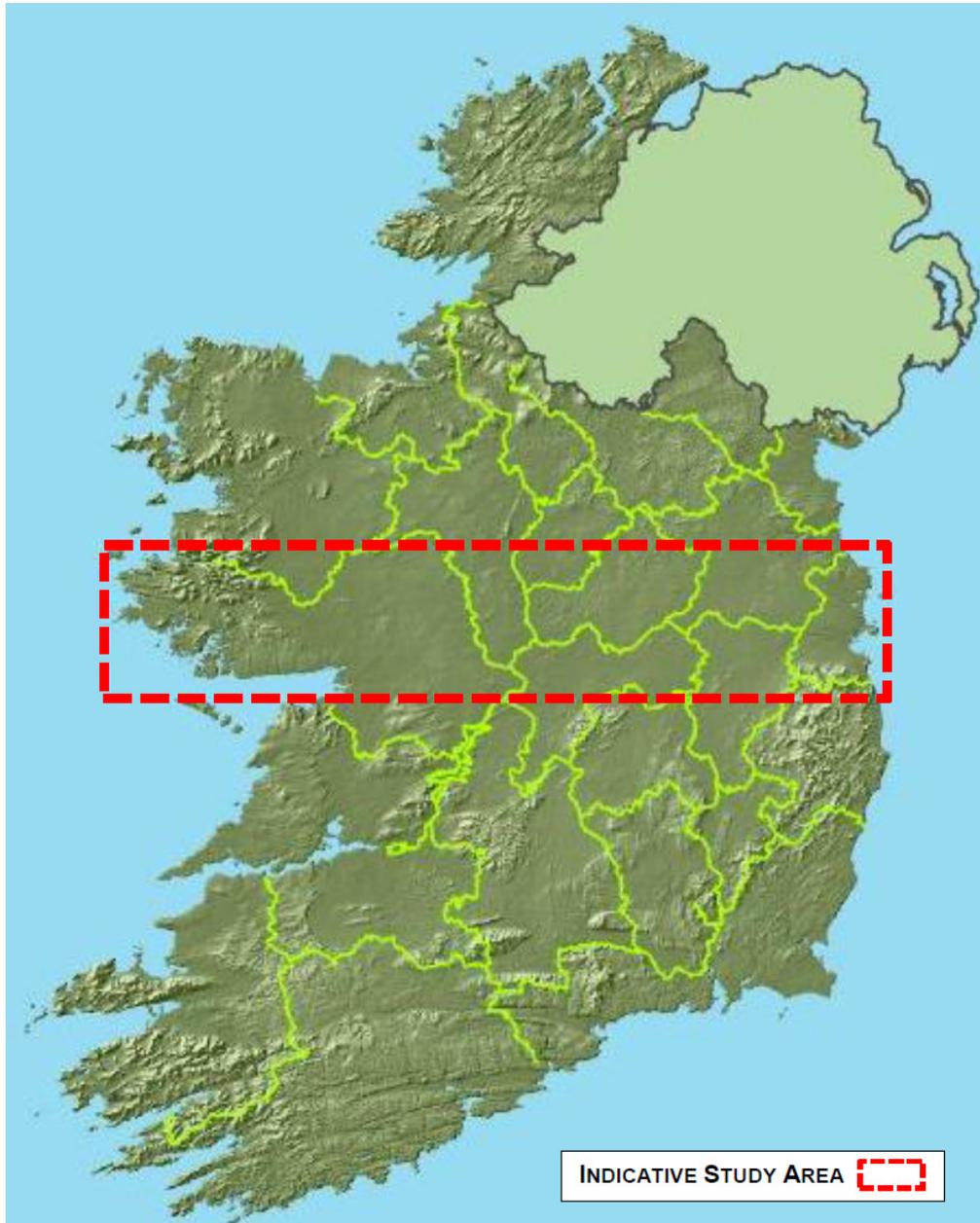


Figure 3.1 Indicative Study Area

3.3 Air and Climatic Factors

Climatic Factors

The key issue involving the assessment of the effects of implementing the Plan on climatic factors relates to greenhouse gas emissions arising from transport. The Plan improves options for sustainable mobility (cycling and walking), thereby reducing and limiting increases in greenhouse gas emissions, noise emissions and other emissions to air.

Ireland's emissions profile has changed considerably since 1990, with the contribution from transport more than doubling and the share from agriculture reducing since 1998. Travel is a source of:

1. Noise;
2. Air emissions; and
3. Energy use (39% of Total Final Energy Consumption in Ireland in 2012 was taken up by transport, the largest take up of any sector)².

Between 2008 and 2011, Ireland's greenhouse gas emissions decreased across all sectors due to the effects of the economic downturn with emissions falling by 15.2% between 2008 and 2011. However, 2012 saw emissions rise by 1.2% when compared with 2011³.

Maximising sustainable mobility will help Ireland meet its emission target for greenhouse gases under the 2020 EU Effort Sharing target which commits Ireland to reducing emissions from those sectors that are not covered by the Emissions Trading Scheme (e.g. transport, agriculture, residential) to 20% below 2005 levels.

The greenway has the potential to achieve objectives and synergies with regard to the following:

- Provision of open space amenities;
- Sustainable management of water;
- Protection and management of biodiversity;
- Protection of cultural heritage; and
- Protection of protected landscape sensitivities.

Flooding - see Section 3.8 - is influenced by climatic factors. The greenway has the potential to contribute towards climate adaptation and flood risk management through preserving floodplains.

Ambient Air Quality

In order to protect human health, vegetation and ecosystems, EU Directives set down air quality standards in Ireland and the other Member States for a wide variety of pollutants. These pollutants are generated through fuel combustion, in space heating, traffic, electricity generation and industry and, in sufficient amounts, could affect the well-being of the areas inhabitants. The EU Directives include details regarding how ambient air quality should be monitored, assessed and managed.

The principles to this European approach are set out under the Air Quality Framework Directive 1996 as transposed into Irish law under the Environmental Protection Agency Act 1992 (Ambient Air Quality Assessment and Management) Regulations 1999 (SI No. 33 of 1999).

Four daughter Directives lay down limits or thresholds for specific pollutants. The first two of these directives cover: sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead; and, carbon monoxide and benzene. Two more daughter directives deal with: ozone; and polyaromatic hydrocarbons, arsenic, nickel, cadmium and mercury in ambient air.

² Sustainable Energy Ireland (2014) *Energy in Ireland 1990 – 2012*

³ EPA (2014) Ireland's Greenhouse Gas Emissions in 2012

The EPA's (2015) *Air Quality in Ireland 2014* identifies that, overall, air quality in Ireland compares favourably with other EU Member States and continues to be of good quality relative to other EU countries.

The Plan facilitates improvements in sustainable mobility, thereby facilitating reductions in and limiting increases of emissions to air including noise. Such emissions would occur otherwise with higher levels of motorised transport and associated traffic.

Existing Problems

Legislative objectives governing air and climatic factors were not identified as being conflicted with.

3.4 Material Assets

Settlements

Local users of the greenway will reside in and commute to and from established settlements and their environs. Tourists will use facilities and services within these settlements. Urbanised areas can be identified on the most recent OSI 1:50,000 Discovery Series of maps.

Existing Linear Infrastructure

Existing linear infrastructure provides opportunities for the development of the greenway or parts thereof. Existing linear infrastructure includes canal rights of way, river corridor rights of way, railway rights of way, motorways/roads, cycle networks along roads and through parks and tracks on state owned lands (see below).

State Owned Lands

State owned lands such as those owned by Bord na Móna and An Coillte provide opportunities for the development of the greenway or parts thereof. These lands are often in rural areas and can include existing tracks (see above).

Water Services – Irish Water

The delivery, integration and implementation of strategic water and waste water projects and infrastructural improvements are now the responsibility of the newly established State body Irish Water.

Water services infrastructure and services are planned and permitted through specific processes which are informed by, inter alia, the needs of land use plans including County Development Plans and Local Area Plans which are required to take into account fluctuating needs, such as those that may arise as a result of existing and future numbers of residents and tourists.

Water Services – Waste Water Compliance

Key findings of the EPA's recent assessment of waste water treatment capacity in urban areas⁴ include:

- *94% of the national waste water load received secondary (biological) treatment in 2012, a three-fold increase in just over a decade.*
- *Continued infrastructural investment is required however as some areas did not have the necessary treatment infrastructure in place in 2012.*
- *The trend in improving national compliance with the observed in recent years for the EU Urban Waste Water Treatment continued in 2012 but there is still room for significant improvement as compliance rates are below those found in many other European countries.*

In most rural areas the majority of the population use on-site wastewater treatment systems such as septic tanks. If poorly sited and/or not properly maintained, these systems can pollute groundwater, surface water and drinking water supplies and impact on human health. The EPA's 2010 revised code of practice for wastewater treatment and disposal systems in unsewered areas is applicable for all

⁴ EPA (2014) *Focus on Urban Waste Water Treatment in 2012*

new builds. Under the Water Services (Amendment) Act 2012, the EPA has put in place national inspection plan for septic tanks which is being implemented at present.

Water Services - Drinking Water

The EPA's most recent (2013) report on the provision and quality of drinking water in Ireland⁵ identifies that:

- *In general, drinking water quality in public water supplies continued to improve in 2012. However, the ability of public supplies to maintain supply quality during adverse weather events was severely tested in 2012.*

The most recent EPA Remedial Action List (Q3 of 2014) identifies 126 water supplies in need of improvement. The Remedial Action List identifies measures solving the issues at these supplies.

Waste Management

Any construction waste arising from the development of infrastructure is required to be dealt with in compliance with relevant EU and National waste management policy, including that relating to the waste hierarchy of prevention, recycling, energy recovery and disposal.

For the purposes of waste management planning, Ireland is now divided into three regions: Southern, Eastern-Midlands and Connacht-Ulster.

Existing Problems

There are a number of challenges with respect to water services which are referred to above.

3.5 Population and Human Health

Population

Local users of the greenway (commuters and recreational users) will reside in and commute to and from established settlements and their environs. Tourists will use facilities and services within these settlements. Urbanised areas can be identified on the most recent OSI 1:50,000 Discovery Series of maps. Higher populations and population densities closer to the greenway would indicate higher amounts of services and higher amounts of potential local users.

Human Health

With regard to human health, impacts relevant to the SEA are those which arise as a result of interactions with environmental vectors (i.e. environmental components such as air, water or soil through which contaminants or pollutants, which have the potential to cause harm, can be transported so that they come into contact with human beings). Hazards or nuisances to human health can arise as a result of exposure to these vectors arising from incompatible adjacent land uses, for example.

Existing Problems

There is historic and predictive evidence of flooding in various locations across the country. Compliance issues in relation to water services are detailed under Section 3.4.

⁵ EPA (2013) *The Provision and Quality of Drinking Water in Ireland: A Report for the Year 2012*

3.6 Biodiversity and Flora and Fauna

Information on biodiversity and flora and fauna which is relevant to lower tier project planning and development of the greenway and associated environmental assessments includes available information on designated ecological sites and protected species, ecological connectivity (including stepping stones and corridors) and non-designated habitats.

Ecological designations include:

- Candidate Special Areas of Conservation⁶ (cSACs) and Special Protection Areas⁷ (SPAs);
- UNESCO World Heritage and UNESCO Biosphere sites⁸;
- Ramsar Sites⁹;
- Salmonid Waters¹⁰;
- Shellfish Waters¹¹;
- Freshwater Pearl Mussel catchments¹²;
- Flora Protection Order¹³ sites;
- Wildlife Sites (including Nature Reserves¹⁴);
- Certain entries to the Water Framework Directive Register of Protected Areas¹⁵;
- Natural Heritage Areas (NHAs) and proposed Natural Heritage Areas (pNHAs)¹⁶;
- Wildfowl Sanctuaries (see S.I. 192 of 1979)¹⁷; and
- Tree Preservation Orders (TPOs)¹⁸.

⁶ cSACs have been selected for protection under the European Council Directive on the conservation of natural habitats and of wild fauna and flora (92/43/EEC) by the DECLG due to their conservation value for habitats and species of importance in the European Union. The sites are *candidate* sites because they are currently under consideration by the Commission of the European Union. The Habitats Directive seeks to establish Natura 2000, a network of protected areas throughout the EU.

⁷ SPAs have been selected for protection under the 1979 European Council Directive on the Conservation of Wild Birds (79/409/EEC) - referred to as the Birds Directive - by the DECLG due to their conservation value for birds of importance in the European Union.

⁸ United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage List comprises sites of outstanding universal value: cultural, natural or mixed. The UNESCO Biosphere Reserves List comprises areas of terrestrial and coastal ecosystems promoting solutions to reconcile the conservation of biodiversity with its sustainable use.

⁹ Ramsar sites are designated and protected under the Convention of Wetlands of International Importance, especially as Water Fowl Habitat, which was established at Ramsar in 1971 and ratified by Ireland in 1984. Ireland presently has 45 sites designated as Wetlands of International Importance, with surface areas of 66,994 hectares.

¹⁰ Salmonid waters are designated and protected as under the European Communities (Quality of Salmonid Waters) Regulations 1988 (SI No. 293 of 1988). Designated Salmonid Waters are capable of supporting salmon (*Salmo salar*), trout (*Salmo trutta*), char (*Salvelinus*) and whitefish (*Coregonus*).

¹¹ In order to protect existing shellfish waters and to ensure the future protection of these areas, the European Union introduced the Shellfish Waters Directive (2006/113/EC).

¹² Freshwater pearl mussel is a globally threatened, long-lived and extremely sensitive species that can be impacted by many forms of pollution, particularly sediment and nutrient pollution and by hydrological and morphological changes, which may arise from developments, activities or changes in any part of the catchment.

¹³ The current list of plant species protected by Section 21 of the Wildlife Act, 1976 is set out in the Flora (Protection) Order, 1999.

¹⁴ A Nature Reserve is an area of importance to wildlife, which is protected under Ministerial order. There are currently 78 Statutory Nature Reserves. Most are owned by the State but some are owned by organisations or private landowners.

¹⁵ In response to the requirements of the Water Framework Directive a number of water bodies or parts of water bodies which must have extra controls on their quality by virtue of how their waters are used by wildlife have been listed on Registers of Protected Areas (RPAs). RPAs include those for Protected Habitats or Species, Shellfish, Salmonid, Nutrient Sensitive Areas, Recreational Waters and Drinking Water.

¹⁶ NHAs are designated due to their national conservation value for ecological and/or geological/geomorphological heritage. They cover nationally important semi-natural and natural habitats, landforms or geomorphological features, wildlife plant and animal species or a diversity of these natural attributes. NHAs are designated under the Wildlife (Amendment) Act 2000. pNHAs were published on a non-statutory basis in 1995, but have not since been statutorily proposed or designated. These sites are of significance for wildlife and habitats.

¹⁷ Wildfowl Sanctuaries are areas that have been excluded from the 'Open Season Order' so that game birds can rest and feed undisturbed. There are 68 sanctuaries in the State. Shooting of game birds is not allowed in these sanctuaries.

¹⁸ TPOs are a planning mechanism whereby individual trees or groups of trees can be identified as important and protected by a TPO.

Protected Species include:

- Annex IV (Habitats Directive) species of flora and fauna, and their key habitats (i.e. breeding sites and resting places), which are strictly protected wherever they occur, whether inside or outside the above sites, e.g. Otter and bats;
- Other species of flora and fauna and their key habitats which are protected under the Wildlife Acts, 1976-2000, wherever they occur; and
- 'Protected species and natural habitats' as defined in the European Liability Directive (2004/35/EC) and European Communities (Environmental Liability) Regulations, 2008, including: Birds Directive – Annex I species and other regularly occurring migratory species, and their habitats (wherever they occur) and Habitats Directive – Annex I habitats, Annex II species and their habitats, and Annex IV species and their breeding sites and resting places (wherever they occur).

The following information is relevant to ecological networks and connectivity and non-designated habitats:

- CORINE land cover mapping (including areas likely to contain a habitat listed in annex 1 of the Habitats Directive)¹⁹;
- Watercourses, wetlands and peatlands;
- Other relevant County Development Plan designations;
- The EPA's Framework National Ecological Network for Ireland²⁰; and
- Other sites of high biodiversity value or ecological importance, as identified by, for example, the Department of Agriculture, Food and the Marine (badger sets), relevant datasets from the National Biodiversity Data Centre and BirdWatch Ireland's 'Important Bird Areas' (Crowe et al., 2009).

Ecological networks are important in connecting areas of local biodiversity with each other and with nearby designated sites so as to prevent ecological resources from being isolated entities. They are composed of linear features, such as treelines, hedgerows and rivers/streams, which provide corridors or stepping stones for wildlife species moving within their normal range. They are important for the migration, dispersal and genetic exchange of species of flora and fauna particularly for mammals, especially for bats and small birds and facilitate linkages both between and within designated ecological sites, the non-designated surrounding countryside and urban areas.

Article 10 of the Habitats Directive recognises the importance of ecological networks as corridors and stepping stones for wildlife, including for migration, dispersal and genetic exchange of species of flora and fauna. The Directive requires that ecological connectivity and areas of ecological value outside the Natura 2000 network of designated ecological sites are maintained.

Ecological islands or areas of habitat that are not connected to surrounding ecologically valuable habitats can also be important.

Existing Problems

Previous changes in land uses arising from human development have resulted in a loss of biodiversity and flora and fauna however legislative objectives governing biodiversity and fauna were not identified as being conflicted with.

The Department of Arts, Heritage and the Gaeltacht's Article 17 report on the Status of EU Protected Habitats and Species in Ireland (2013) identifies many Irish habitats to be of unfavourable status and many to be still declining, although it also identifies that a range of positive actions are underway. The report identifies that the majority of EU-protected species are, however, in "Favourable" status in

¹⁹ The CORINE land cover mapping classifies land cover under various headings. This dataset allows for the identification of lands that are likely to be most valuable to biodiversity including those which are likely to contain a habitat listed in Annex 1 of the Habitats Directive e.g. natural grasslands, peat bogs, salt marshes. CORINE Land Cover (CLC) is a map of the European environmental landscape based on interpretation of satellite images. Land cover is the observed physical cover, as seen from the ground or through remote sensing, including for example natural or planted vegetation, water and human constructions which cover the earth's surface.

²⁰ The EPA's Framework National Ecological Network provides a classification of the relative importance of areas by virtue of the biodiversity and flora that they contain and the connectivity they provide. Many of the areas identified are corridors.

Ireland, and stable, although a small number are considered to be in "Bad" status and continue to require concerted efforts to protect them.

The Greenway Plan includes robust measures to contribute towards the protection of biodiversity and flora and fauna.

3.7 Soil

Information sources relevant to the environmental component of soil which may be used in lower tier planning and environmental assessments includes:

- Soil types (2006) published by Teagasc, Geological Survey of Ireland (GSI), Forest Service & EPA;
- Soils and Subsoils Class (2006) published by Teagasc, GSI, Forest Service & EPA (2006);
- Sites of Geological Interest which have been published for some counties and provisional information on same for other counties (both available from GSI);
- Other datasets published by and available from GSI including those relating to Bedrock Geology, Quaternary Geology, Mineral deposits, Groundwater Resources and Landslides; and
- Datasets on contaminated soils which may be kept by planning authorities (these occur most often in urban areas).

Legislative objectives governing soil were not identified as being conflicted with.

3.8 Water

The Water Framework Directive

Since 2000, Water Management in the EU has been directed by the Water Framework Directive 2000/60/EC (WFD). The WFD requires that all Member States implement the necessary measures to prevent deterioration of the status of all waters - surface, ground, estuarine and coastal - and protect, enhance and restore all waters with the aim of achieving "good status" by 2015. All public bodies are required to coordinate their policies and operations so as to maintain the good status of water bodies which are currently unpolluted and improve polluted water bodies to good status by 2015. Article 4 of the WFD sets out various exemptions for deterioration in status caused as a result of certain physical modifications to water bodies. This is provided: all practicable mitigation measures are taken; there are reasons of overriding public interest or the benefits to human health, safety or sustainable development outweigh the benefits in achieving the WFD objective; there are no better alternatives; and the reasons for the physical modification are explained in the relevant river basin management plan.

The EU's Common Implementation Strategy Guidance Document No. 20 provides guidance on exemptions to the environmental objectives of the Water Framework Directive.

For the purpose of implementing the WFD, Ireland has been divided into eight River Basin Districts (RBDs) or areas of land that are drained by a large river or number of rivers and the adjacent estuarine/coastal areas. Within each RBD - for the purpose of assessment, reporting and management - water has been divided into groundwater, rivers, lakes, estuarine waters and coastal waters which are in turn divided into specific, clearly defined water bodies. The indicative study area for the Greenway Plan covers part of four of the eight WFD RBDs on the island of Ireland: the Western RBD; the Shannon International RBD; the Eastern RBD; and the South Eastern RBD. River Basin Management Plans have been prepared for each RBD which are being implemented in order to help protect and improve all waters. The Management Plans provides specific policies for individual river basins in order to implement the requirements of the WFD.

Sources of Information

Sources of information relevant to the environmental component of water which may be used in lower tier planning and environmental assessments includes:

- Status of surface and ground waters (current overview of status for monitored waterbodies was published by the EPA in 2011)
- Integrated Water Quality Assessment 2013. This EPA assessment covers the entire Western and South Eastern River Basin Districts (RBDs) and the parts of the North Western and Neagh-Bann RBDs that are in the Republic of Ireland. The assessment also includes overall national statistics.
- Detailed EPA monitoring data for river water quality and trends, estuaries and bays, bathing waters and groundwater.

The WFD requires that Registers of Protected Areas (RPAs) are compiled for a number of water bodies or part of water bodies which must have extra controls on their quality by virtue of how their waters are used by people and by wildlife. The WFD requires that these RPAs contain: areas from which waters are taken for public or private water supply schemes; designated shellfish production areas; bathing waters; areas which are affected by high levels of substances most commonly found in fertilizers, animal and human wastes - these areas are considered nutrient sensitive; areas designated for the protection of habitats or species e.g. Salmonid areas; Special Areas of Conservation (SACs); and, Special Protection Areas (SPAs).

Flooding

Flooding is an environmental phenomenon which, as well as causing economic and social impacts, could in certain circumstances pose a risk to human health. The existence of flood risk across the country is illustrated by the mapping of locations of historical flooding events - accessible from the Office of Public Works' (OPW), the lead Authority on flooding in the country, National Flood Hazard Mapping website. In addition to this historic mapping there is predictive, modelled Preliminary Flood Risk Assessment mapping available from the OPW.

The OPW commenced a National Catchment Flood Risk Assessment and Management (CFRAM) programme in 2011. CFRAM studies are currently being carried out for all River Basin Districts and predictive, modelled CFRAM flood risk maps have been made available with Flood Risk Management Plans currently being finalised.

Existing Problems

Preliminary results for 2013-2015 and key findings in the EPA water quality report (2010-2012) included:

- There has been a gradual decline in high-status river sites across Ireland. Numbers halved in the 22-year period between 1987 and 2015 (Figure 5.5) with the most dramatic losses occurring in the highest quality sites (Q5 sites).
- These sites represent the best-quality rivers across Ireland, and therefore their continuing loss is a very significant concern. For this figure river water quality is solely based on Q values. Lake data only covers monitored lakes.
- Seriously polluted rivers has fallen to just over 6 km compared to 17 km in 2010-2012 and 53 km 2007-2009.
- Reported fish kills have declined to an all-time low of 70 between 2010 and 2012 (EPA, 2015b).
- Water quality in canals remains very high, with over 90% of canals rated satisfactory in 2012.
- The south and south-east of the country continue to have the largest proportion of groundwater and rivers with elevated nitrate concentrations over 10 mg/l NO₃. This contributes to eutrophication in certain downstream estuaries.
- In 2012, 18% of monitored rivers and 27% of monitored lakes were less than good status due to fish status. Preliminary assessment suggests that barriers to fish migration and physical deterioration of habitats may be partly to blame.
- In 35% of designated shellfish waters with elevated faecal contamination, additional measures to improve quality and achieve higher objectives are required.

There is historic and predictive evidence of flooding in various locations across the country.

3.9 Cultural Heritage

Archaeological Heritage

Archaeology is the study of past societies through the material remains left by those societies and the evidence of their environment. Archaeological sites and monuments vary greatly in form and date; examples include earthworks of different types and periods, (e.g. early historic ringforts and prehistoric burial mounds), megalithic tombs from the Prehistoric period, medieval buildings, urban archaeological deposits and underwater features.

Archaeological heritage is protected under the National Monuments Acts (1930-2004), Natural Cultural Institutions Act 1997 and the Planning Acts.

The Record of Monuments and Places (RMP) is an inventory, put on a statutory basis by amendment to the National Monuments Act 1994, of sites and areas of archaeological significance, numbered and mapped. It is available from the National Monuments Service and at archaeology.ie.

The term 'monument' includes all man-made structures of whatever form or date except buildings habitually used for ecclesiastical purposes. All monuments in existence before 1700 A.D. are automatically considered to be historic monuments within the meaning of the Acts. Monuments of architectural and historical interest also come within the scope of the Acts. Monuments include: any artificial or partly artificial building, structure or erection or group of such buildings, structures or erections; any cave, stone or other natural product, whether or not forming part of the ground, that has been artificially carved, sculptured or worked upon or which (where it does not form part of the place where it is) appears to have been purposely put or arranged in position; any, or any part of any, prehistoric or ancient tomb, grave or burial deposit, or, ritual, industrial or habitation site; and any place comprising the remains or traces of any such building, structure or erection, any such cave, stone or natural product or any such tomb, grave, burial deposit or ritual, industrial or habitation site, situated on land or in the territorial waters of the State, but excludes 'any building or part of any building, that is habitually used for ecclesiastical purposes' (National Monuments Acts 1930-2004).

A recorded monument is a monument included in the list and marked on the map which comprises the RMP set out county by county under Section 12 of the National Monuments (Amendment) Act, 1994 by the Archaeological Survey of Ireland. The definition includes Zones of Archaeological Potential in towns and all other monuments of archaeological interest which have so far been identified.

Architectural Heritage

The term architectural heritage is defined in the Architectural Heritage (National Inventory) and Historic Monuments Act 1999 as meaning all: structures and buildings together with their settings and attendant grounds, fixtures and fittings; groups of structures and buildings; and, sites which are of technical, historical, archaeological, artistic, cultural, scientific, social, or technical interest.

Records of Protected Structures are legislated for under Section 12 and Section 51 of the Planning and Development Act 2000 as amended. Protected Structures are defined in the Planning and Development Act 2000 as amended as structures, or parts of structures that are of special interest from an architectural, historical, archaeological, artistic, cultural, scientific, social or technical point of view.

In relation to a protected structure or proposed protected structure, the following are encompassed:

- (i) The interior of the structure;
- (ii) The land lying within the curtilage²¹ of the structure;

²¹ Curtilage is normally taken to be the parcel of ground immediately associated with the Protected Structure, or in use for the purposes of the structure. Protection extends to the buildings and land lying within the curtilage. While the curtilage sometimes coincides with the present property boundary, it can originally have included lands, features or even buildings now in separate ownership, e.g. the lodge of a former country house, or the garden features located in land subsequently sold off. Such lands are described as being attendant grounds, and the protection extends to them just as if they were still within the curtilage of the Protected Structure.

- (iii) Any other structures lying within that curtilage and their interiors; and,
- (iv) All fixtures and features which form part of the interior or exterior of any structure or structures referred to in subparagraph (i) or (iii).

In addition to Protected Structures, the Planning and Development Act, 2000 provides the legislative basis for the protection of Architectural Conservation Areas (ACAs). An ACA is a place, area or group of structures or townscape which is of special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest or value, or contributes to the appreciation of protected structures, whose character it is an objective to preserve in a development plan. The ACA designation requires that planning permission must be obtained before significant works can be carried out to the exterior of a structure in the ACA which might alter the character of the structure or the ACA.

Entries from to the Records of Protected Structures and ACAs are identified in the relevant planning authority Development Plan and at myplan.ie.

Existing Problems

The context of archaeological and architectural heritage has changed over time across the country however no existing conflicts with legislative objectives governing archaeological and architectural heritage have been identified.

3.10 Landscape

Landscapes are areas which are perceived by people and are made up of a number of layers: landform, which results from geological and geomorphological history; landcover, which includes vegetation, water, human settlements, and; human values which are a result of historical, cultural, religious and other understandings and interactions with landform and landcover.

The importance of landscape and visual amenity and the role of its protection are recognised in the Planning and Development Act 2000 as amended, which requires that Development Plans include objectives for the preservation of the landscape, views and the amenities of places and features of natural beauty. These objectives and associated plan content often designate different aspects of the landscape such as the following:

- Landscape character areas;
- Landscape sensitivity and value areas;
- High amenity zones;
- Scenic views and prospects; and
- Land use objectives relating to landscape protection.

Such designations, which vary from local authority to local authority and change over time, should be taken into account by lower tier planning and environmental assessments.

In addition to the aforementioned landscape designations, planning authorities are empowered (under section 202 of the Planning and Development Act 2000), to make a Special Amenity Area Order for reasons of outstanding natural beauty or an area's special recreational value and having regard to any benefits for nature conservation. The purpose of these Orders is to preserve/enhance landscape character and to prevent/limit development. Such areas should also be taken into account by lower tier planning and environmental assessments where/if relevant.

Existing Environmental Problems

New developments have resulted in changes to the visual appearance of lands across the country however legislative objectives governing landscape and visual appearance were not identified as being conflicted with.

3.11 Appropriate Assessment and Strategic Flood Risk Assessment

Stage 2 Appropriate Assessment (AA) has been undertaken alongside the Plan. The requirement for AA is provided under the EU Habitats Directive (Directive 1992/43/EEC).

The AA concluded that the Plan, having integrated all recommendations made by the AA, will not affect the integrity of the Natura 2000 network.

Various content has been integrated into the Plan through the SEA and AA processes (see Section 5). The preparation of the Plan, SEA and AA has taken place concurrently and the findings of the AA have informed both the Plan and the SEA.

3.12 Strategic Environmental Objectives

Strategic Environmental Objectives (SEOs) are methodological measures against which the environmental effects of the Plan can be tested. If complied with in full, SEOs would result in an environmentally neutral impact from implementation of the Plan. The SEOs are set out under a range of topics and are used as standards against which the provisions of the Plan can be evaluated in order to help identify which provisions in which potential adverse impacts may occur. SEOs are distinct from the objectives of the Plan and are developed from international and national policies which generally govern environmental protection objectives. SEOs used in the assessment are as follows:

- *SEO C1: To reduce travel related emissions to air and to encourage modal change from car to more sustainable forms of transport*
- *SEO M1: For new development to be served with adequate and appropriate waste water treatment*
- *SEO M2: For new development to be served with adequate drinking water that is both wholesome and clean*
- *SEO M3: To reduce waste volumes, minimise waste to landfill and increase recycling and reuse*
- *SEO M4: To maximise the use of existing linear infrastructure*
- *SEO P1: To develop the greenway close to existing settlements*
- *SEO HH1: To protect populations and human health from exposure to incompatible landuses*
- *SEO B1: To ensure compliance with the Habitats and Birds Directives with regard to the protection of Natura 2000 Sites and Annexed habitats and species²²*
- *SEO B2: To ensure 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 act 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 avoid significant impacts on relevant habitats, species, environmental features or other sustaining resources in designated sites including Wildlife Sites and to ensure compliance with the Wildlife Acts 1976-2010 with regard to the protection of listed species*
- *SEO S1: To avoid damage to the hydrogeological and ecological function of the soil resource*
- *SEO W1: To maintain and improve, where possible, the quality and status of surface waters*
- *SEO W2 : To prevent pollution and contamination of groundwater*
- *SEO W3: To comply as appropriate with the provisions of the Planning System and Flood Risk Management: Guidelines for Planning Authorities*
- *SEO CH1: To protect archaeological heritage including entries to the Record of Monuments and Places and/or their context*
- *SEO CH2: To protect architectural heritage including entries to the Records of Protected Structures and Architectural Conservation Areas and their context*
- *SEO L1: To avoid conflicts with the appropriate protection of statutory designations relating to the landscape, including those included in the Development Plans of planning authorities*

²² '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 Effects of Alternatives and the Plan

4.1 Description of Alternatives

4.1.1 Introduction

As per the requirements of the SEA Directive, this SEA considers reasonable alternatives, which are capable of being implemented for the Greenway Plan, taking into account the objectives and the geographical scope of the Plan. The vision of the Plan is to:

Develop a segregated cycling and walking trail to international standards, extending from Dublin City to Galway which is of a scale that will allow Ireland to harness the potential of an identified growing tourism market for cycling. This route will form part of an interconnected National Cycle Network of high quality, substantially traffic free, inter urban routes, which will establish Ireland as a quality international tourism destination for a broad range of associated recreational activities and pursuits.

The evaluation of alternatives provided in the SEA Environmental Report is summarised under Section 4.2.

4.1.2 Rational

The assessment of alternatives will be limited by the content of the Plan which will not specify a route or a route corridor. As the plan will not provide a route the consideration of alternative routes would be inappropriate. Alternatives will centre on how the greenway could be developed using both, to varying extents, existing infrastructure (such as roads, canal towpaths and disused railway lines) and new greenfield development.

4.1.3 Strategic Alternatives

The final Greenway will consist of a combination of a number of existing and new components. Not all of these elements can be foreseen at this time. 'Scenarios' that describe different alternative combinations of elements are often used to consider the effects of a range of possible outcomes and their associated environmental effects.

In this instance it appears that three main scenarios that could occur.

Scenario One: *Maximum use of existing and previously permitted components.*

In this scenario, existing pathways along canals, rivers and publically accessible rural lands would be used. This scenario would also use existing public roads and pathways in both urban and rural areas.

This scenario would use the least number of new projects that have not yet been permitted or included in existing, assessed plans.

This scenario would also use existing plans and/or permitted projects where these have been subject to a consent process that has previously included the carrying out or screening for SEA/EIA and/or AA.

Scenario Two: *Substantial use of existing and some use of new projects*

In this scenario, the above-mentioned existing components would be augmented in places by more optimal routes that would involve new works – such as additional paths, routes and crossings of streams, rivers, canals, road, rail or bog.

It is anticipated that all such components would be subject to relevant assessment including SEA, EIA, and AA etc.

Scenario Three: *Use of existing and substantial new elements*

In this scenario, the Greenway would involve the development of substantial new components. This may involve bypassing and or duplicating existing and/or permitted elements.

It is anticipated that all such components would be subject to relevant assessment including SEA, EIA, and AA etc.

4.1.4 Routing Alternatives

Alternatives for the development of the greenway comprise:

Canal

1. Along existing canal right of way
2. Outside of canal right of way

River

3. Within the River Corridor
4. Outside of the River Corridor

Railway

5. Within the Railway right of way
6. Outside of the Railway right of way

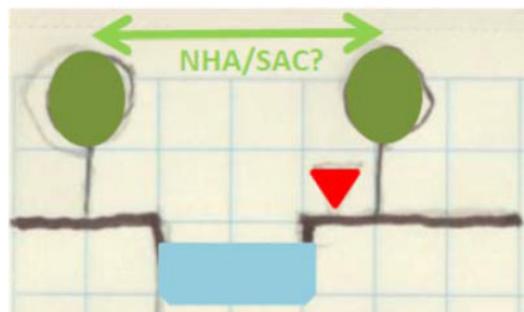
Roads

7. Along road (shared on smaller roads, for shorter distances)
8. Along roadside (cycleways)
9. Outside of road right of way

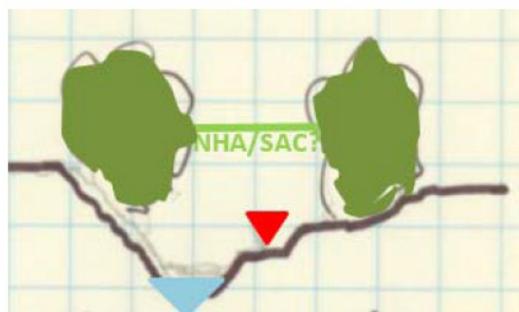
Tracks on State owned lands

10. Tracks on Forestry lands
11. Tracks on Peatland lands

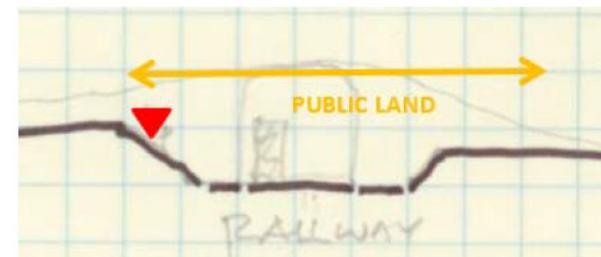
Sketches for alternatives 1 to 10 are provided on Figure 4.1.



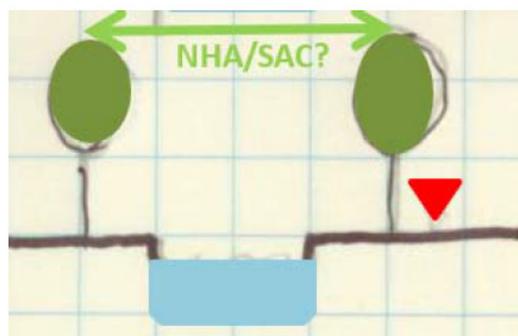
1. Within Canal right of way



3. Within River Corridor



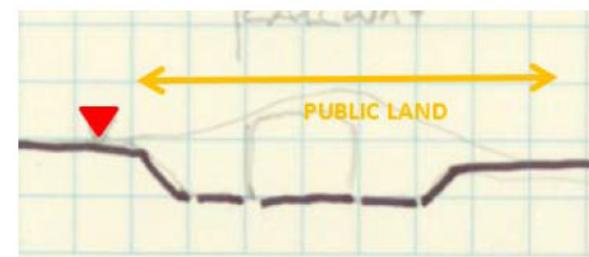
5. Within Railway right of way



2. Outside of Canal right of way



4. Outside of River Corridor



6. Outside of Railway right of way



7. Along road (shared on smaller roads)



8. Fringe to road right of way (cycleways)



9. Outside of road right of way

Figure 4.1 Sketches of Alternatives

4.2 Evaluation of Alternatives²³

4.2.1 Strategic Alternatives

The final Greenway will consist of a combination of a number of existing and new components. Not all of these elements can be foreseen at this time.

Scenario One: *Maximum use of existing and previously permitted components.*

By using existing pathways along canals, rivers and publically accessible rural lands and using existing public roads and pathways in both urban and rural areas, this scenario would minimise potential adverse environmental effects (these effects are as detailed under Section 4.2.2) arising from developing new projects that have not yet been permitted or included in existing, assessed plans.

By using existing plans and/or permitted projects where these have been subject to a consent process that has previously included the carrying out or screening for SEA/EIA and/or AA, this scenario would further contribute towards minimising potential adverse environmental effects arising from developing new projects that have not yet been permitted or included in existing, assessed plans.

Scenario Two: *Substantial use of existing and some use of new projects*

Augmenting the above-mentioned existing components would in places by more optimal routes that would involve new works – such as additional paths, routes and crossings of streams, rivers, canals, road, rail or bog – that would present a variety of potentially adverse environmental effects (these effects are as detailed under Section 4.2.2).

It is anticipated that all such components would be subject to relevant assessment including SEA, EIA, and AA etc.

Scenario Three: *Use of existing and substantial new elements*

The development of substantial new components under this scenario – including possible bypassing and or duplicating existing and/or permitted elements – would involve the greatest amount of potentially adverse environmental effects (these effects are as detailed under Section 4.2.2).

It is anticipated that all such components would be subject to relevant assessment including SEA, EIA and AA etc.

The content of the Plan mainly reflects scenarios 1 and 2. The Greenway Plan constitutes an assemblage of elements – some will be new, some exist already, some are being developed as parts of existing local initiatives. Furthermore the Greenway contains elements that have already been adopted – following consultation and assessment - into County and Local Plans. Finally, some parts of the final scheme may consist of elements that emerge from new and emerging local plans and initiatives.

²³ Footnotes like this are used in this section in order to identify instances where interactions between the relevant alternative and the relevant SEOs occur. The nature of these interactions is identified at Table 4.1.

4.2.2 Routing Alternatives

This section summarises the evaluation of environmental effects of the alternative scenarios that is provided in the SEA Environmental Report.

Air and Climatic Factors and Human Health

All alternatives would be likely to result in significant positive effects upon objectives relating to air and climatic factors as they would improve options for sustainable mobility (cycling and walking), thereby reducing and limiting increases in greenhouse gas emissions, noise emissions and other emissions to air²⁴.

By reducing and limiting increases in noise emissions and other emissions to air, **all alternatives** would be likely to contribute towards the protection of human health²⁵.

Population

All alternatives provide opportunities to route the greenway close to populations resident in settlements across the country²⁶.

Water Services

The greenway will comprise one of many types of infrastructure and services which will support existing populations and facilitate new populations. Consequently, **each of the alternatives** would, in combination with land use plans for the distribution of populations and other sectoral plans such as for the provision of water services, potentially interact with the need to provide adequate and appropriate water services (waste water and drinking water). It is the function of Irish Water to provide for these needs²⁷.

Existing Linear Infrastructure and Waste

The use of existing linear infrastructure varies across the alternatives. Developing the greenway along existing canal right of ways, within existing railway rights of way, along roads or the roadside and along existing tracks on forestry and peatland lands (**Alternatives 1, 5, 7, 8, 10 and 11**) would make most use of existing infrastructure and routes²⁸.

Developing the greenway outside of the canal right of way, within or outside of river corridors and outside of railway and road right of ways (**Alternatives 2, 3, 4, 6 and 9**) would be likely to require the most amount of new infrastructure²⁹ and result amounts of associated potential wastes³⁰ (from materials and excavations).

Development of the greenway along existing linear infrastructure would be unlikely to affect flood risk management issues³¹ while drainage would be taken into account into the design of new infrastructure thereby mitigating³² or enhancing any interaction with flood risk issues³³. By protecting certain areas from the encroachment of development, the greenway could make contributions towards climate adaptation and flood risk management.

²⁴ SEO C1

²⁵ SEO HHI

²⁶ SEO P1

²⁷ SEOs M1 M2

²⁸ SEO M4

²⁹ SEO M4

³⁰ SEO M3

³¹ SEO W3

³² SEO W3

³³ SEO W3

Biodiversity, Flora and Fauna, Water, Soil and Human Health

By protecting certain areas from the encroachment of development, all alternatives would provide for a continuation of (and further contribution towards) the protection of ecological, water and soil resources along the greenway route³⁴.

Research by Fáilte Ireland in the Burren has shown improved environmental outcomes (improved attainment of conservation objectives) in areas with visitor management strategies. A visitor management strategy during the implementation of the Greenway project could contribute positively to advancing the attainment of conservation objectives along and adjacent to the route, thereby benefitting the management of designated sites³⁵.

By reusing existing linear infrastructure and reducing the need for new construction, **Alternatives 1, 5, 7, 8, 10 and 11**, would avoid some potentially adverse effects upon ecology (e.g. habitat loss/fragmentation, species disturbance/displacement and effects in riparian zones where new crossings of waters, if any, are progressed³⁶), water (e.g. adverse effects upon status of waters arising from changes in quality, flow and/or morphology at construction stage or increases in outflow at waste water treatment plants³⁷), soil (e.g. loss of hydrogeological and ecological function as a result of construction of associated facilities/infrastructure on greenfield lands³⁸) and human health (interactions with environmental vectors³⁹).

Nonetheless there would be potential for adverse effects to arise, if unmitigated, as a result of, for example, new signage and route maintenance and use. As with other issues, detailed project level examination would be required, especially with respect to: **Alternative 1** 'Within Canal right of way', as the Royal and Grand Canals are designated as proposed Natural Heritage Areas (pNHAs) and traverse a number of candidate Special Areas of Conservation (cSACs); and **Alternative 11** 'Tracks on Peatland lands', due to the protection afforded by the Habitats Directive to certain peatlands.

Alternatives 2, 3, 4, 6 and 9 comprise the development of new routes for the greenway and would require the most amount of new infrastructure and construction. Consequently these alternatives would present the potential for significant adverse effects upon ecology, water, soil and human health, generally to a greater extent than Alternatives 1, 5, 7, 8, 10 and 11. **Alternative 3** 'Within River Corridor' poses the greatest potential for the occurrence of significant effects upon ecology, water and soil resources due to the concentration of designations and sensitivities which can occur within river corridors.

Cultural Heritage and Landscape

All alternatives would provide opportunities for the continuation of (and further contribution towards) the protection from development of cultural heritage structures and landscape designations which are located within and adjacent to the greenway corridor⁴⁰.

By reusing existing linear infrastructure and reducing the need for new construction, **Alternatives 1, 5, 7, 8, 10 and 11**, would avoid some potentially significant adverse effects upon archaeological and architectural heritage⁴¹, including context, and landscape designations⁴². Nonetheless there would be potential for adverse effects to arise (if unmitigated) as a result of, for example, minor construction or new signage.

³⁴ SEOs B1 B2 B3 W1 W2 S1

³⁵ SEOs B1 B2 B3

³⁶ SEOs B1 B2 B3

³⁷ SEOs W1 W2

³⁸ SEO S1

³⁹ SEO HHI

⁴⁰ SEO CH1 CH2 L1

⁴¹ SEOs CH1 CH2

⁴² SEO L1

Due to the need to construct new routes for the greenway, **Alternatives 2, 3, 4, 6 and 9** would have the potential to result in significant adverse effects upon archaeological heritage⁴³ (e.g. disturbance of unknown archaeology or effects upon the context of archaeology) and architectural heritage⁴⁴ (e.g. effects upon the context of architectural heritage) and landscape designations⁴⁵. Higher concentrations of landscape designations and cultural heritage would be likely to occur within or adjacent to river corridors (see **Alternative 3** 'Within River Corridor' and **Alternative 4** 'Outside of River Corridor').

Comparative Evaluation against SEOs

Table 4.1 provides a comparative evaluation of alternatives against the SEOs. The provisions of the alternatives are evaluated using compatibility criteria in order to determine how they would be likely to affect the status of the SEOs (these are all detailed under Section 3.12). The SEOs and the alternatives are arrayed against each other to identify which interactions - if any - would cause effects on specific components of the environment. Where the appraisal identifies a conflict with the status of an SEO the relevant SEO code is entered into the conflict column - e.g. B1 which stands for the SEO likely to be affected - in this instance 'to ensure compliance with the Habitats Directive with regard to the protection of Natura 2000 Sites and Annexed habitats and species'.

⁴³ SEO CH1

⁴⁴ SEO CH2

⁴⁵ SEO L1

Table 4.1 Evaluation of Alternatives against SEOs

	Likely to Improve status of SEOs	Probable Conflict with status of SEOs- unlikely to be mitigated	Least Potential Conflict with status of SEOs- likely to be mitigated	Potential Conflict with status of SEOs- likely to be mitigated	Most Potential Conflict with status of SEOs- likely to be mitigated	No significant interaction with status of SEOs
1. Along existing canal right of way	C1 HH1 P1 W3 M4 CH1 CH2 L1		W1 W2 S1 CH1 CH2 L1	M1 M2 B1 B2 B3		M3
2. Outside of canal right of way	C1 HH1 P1 W3 CH1 CH2 L1			M1 M2 M3 M4 W3 B1 B2 B3 W1 W2 S1 CH1 CH2 L1		
3. Within the River Corridor	C1 HH1 P1 W3 CH1 CH2 L1			M1 M2 M3 M4 W3	B1 B2 B3 W1 W2 S1 CH1 CH2 L1	
4. Outside of the River Corridor	C1 HH1 P1 W3 CH1 CH2 L1			M1 M2 M3 M4 W3 B1 B2 B3 W1 W2 S1	CH1 CH2 L1	
5. Within the Railway right of way	C1 HH1 P1 M4 W3 CH1 CH2 L1		B1 B2 B3 W1 W2 S1 CH1 CH2 L1	M1 M2		M3
6. Outside of the Railway right of way	C1 HH1 P1 W3 CH1 CH2 L1			M1 M2 M3 M4 W3 B1 B2 B3 W1 W2 S1 CH1 CH2 L1		
7. Along road (shared on smaller roads, for shorter distances)	C1 HH1 P1 W3 M4 CH1 CH2 L1		B1 B2 B3 W1 W2 S1 CH1 CH2 L1	M1 M2		M3
8. Along roadside (cycleways)	C1 HH1 P1 W3 M4 CH1 CH2 L1		B1 B2 B3 W1 W2 S1 CH1 CH2 L1	M1 M2		M3
9. Outside of road right of way	C1 HH1 P1 W3 CH1 CH2 L1			M1 M2 M3 M4 W3 B1 B2 B3 W1 W2 S1 CH1 CH2 L1		
10. Tracks on Forestry lands	C1 HH1 P1 W3 M4 CH1 CH2 L1		B1 B2 B3 W1 W2 S1 CH1 CH2 L1	M1 M2		M3
11. Tracks on Peatland lands	C1 HH1 P1 W3 M4 CH1 CH2 L1		W1 W2 S1 CH1 CH2 L1	M1 M2 B1 B2 B3		M3

4.3 The Selected Combination of Routing Alternatives

The Greenway Plan encompasses all of the alternatives considered. Detailed route selection will inform the final project. The evaluation of alternatives will inform the decision-making framework for future projects.

The identification of route corridors and the refinement of the route line is likely to be informed by other considerations such as access to lands, perceptions of safety and attractiveness, costs and benefits and ease of maintenance.

The effects of implementing the selected combination of alternatives are detailed on Table 4.2 overleaf.

By complying with appropriate mitigation measures - including those which have been integrated into the Plan (see Section 5 of this report) – potentially significant adverse environmental effects which could arise as a result of implementing the Plan would be likely to be avoided, reduced or offset.

4.4 Note on Minor Changes made to the Draft Plan after public display, before adoption

This section was added to the SEA Environmental Report Non-Technical Summary that was originally placed on public display alongside the Draft Plan.

Submissions on the Draft Plan resulted in two minor changes to the Draft Plan before adoption (the insertion of the word 'substantial' in two locations). These changes provide clarification and internal consistency within the Draft Plan and would not result in any additional environmental effects to those already foreseen by the SEA of the Draft Plan; they are not considered as being material. Furthermore the selected combination of routing alternatives for the Draft Plan that was identified as part of the SEA process (see Section 4.3 above) does not change in any way.

4.5 Summary of Assessment of Individual Plan Provisions⁴⁶

- The Department have integrated all recommendations arising from the SEA and AA processes into the Plan (see Section 5);
- Some Plan provisions would be likely to result in significantly positive effects upon environmental management and protection and sustainable mobility; and
- Some provisions would have the potential to result in significant negative environmental effects however these effects will be mitigated by the measures which have been integrated into the Plan (see Section 5).

⁴⁶ Individual Plan provisions are detailed under Section 2.1 of this Non-Technical Summary

Table 4.2 Effects Arising from the Selected Combination of Alternatives

Environmental Component	Likely Positive effect	Potentially Significant Adverse effect, if unmitigated (these effects will be mitigated)
Air and climatic factors	<ul style="list-style-type: none"> Improvements in air quality and reductions in greenhouse gas emissions resulting from: reduced car usage and increases in levels of cycling and walking Contributions towards climate adaptation and flood risk management arising from the preservation of natural floodplains 	<ul style="list-style-type: none"> None
Material Assets	<ul style="list-style-type: none"> Increases in the use of existing underutilised or disused infrastructure e.g. towpaths and railway lines 	<ul style="list-style-type: none"> The need to provide adequate and appropriate water services (it is the function of Irish Water to provide for such needs) Increases in waste levels
Population and human health	<ul style="list-style-type: none"> Contribution towards the protection of human health as a result of improving the quality in environmental vectors (e.g. improvements in air quality as a result of contributions towards sustainable mobility) 	<ul style="list-style-type: none"> Potential interactions if effects upon environmental vectors such as water are not mitigated
Biodiversity and flora and fauna	<ul style="list-style-type: none"> A visitor management strategy during the implementation of the Greenway project could contribute positively to advancing the attainment of conservation objectives along and adjacent to the route, thereby benefitting the management of designated sites. Continuation of and further contribution towards the protection of biodiversity and flora and fauna Enhancement of ecological connectivity by protecting certain areas from the encroachment of development 	<ul style="list-style-type: none"> Arising from both construction and operation of the greenway 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 and displacement of protected species and coastal squeeze Effects in riparian zones where new crossings of waters, if any, are progressed
Water	<ul style="list-style-type: none"> Continuation of and further contribution towards the protection of water resources along greenway route by protecting certain areas from the encroachment of development 	<ul style="list-style-type: none"> Potential interactions with the status of water bodies and entries to the WFD Register of Protected Areas, arising from: <ul style="list-style-type: none"> - Changes in quality, flow and/or morphology at construction stage (including of greenway and associated facilities/infrastructure); and - Increases in outflow at waste water treatment plants as a result of increases in numbers of visitors to settlements along the route. Increase in the risk of flooding
Soil	<ul style="list-style-type: none"> Preservation of hydrogeological and ecological function of the soil resource by protecting certain areas from the encroachment of development 	<ul style="list-style-type: none"> Adverse impacts on the hydrogeological and ecological function of the soil resource as a result of construction of associated facilities/infrastructure
Cultural Heritage	<ul style="list-style-type: none"> Continuation of and further contribution towards the protection from development of cultural heritage structures which are located within and adjacent to the greenway corridor 	<ul style="list-style-type: none"> Potential effects on protected and unknown archaeology and protected architecture arising from construction activities (for both greenway and associated facilities/infrastructure)
Landscape	<ul style="list-style-type: none"> Continuation of and further contribution towards the protection from development of landscape designations which are located within and adjacent to the greenway corridor 	<ul style="list-style-type: none"> Occurrence of adverse visual impacts and conflicts with the appropriate protection of statutory designations relating to the landscape

Section 5 Mitigation and Monitoring Measures

5.1 Mitigation

Introduction

The development of the Greenway will result in various positive environmental effects including those relating to sustainable mobility and associated benefits with respect to reductions in greenhouse gas emissions, noise emissions and other emissions to air and human health.

Mitigation measures have been devised for inclusion into the Plan by the SEA and AA processes to ensure that the potentially significant adverse environmental effects of implementing the Plan will be avoided, reduced and, as fully as possible, offset.

Various environmental sensitivities and issues have been communicated to the Department through the SEA and Appropriate Assessment (AA) processes. By integrating all related recommendations into the Plan, the Department have ensured that the beneficial environmental effects of implementing the Plan will be maximised and that potential adverse effects will be avoided, reduced or offset.

Changes to the main Plan document

A number of changes were recommended by the SEA and AA processes with respect to the main Plan document. These changes are flagged (in green) at Section 2.1 of this Non-Technical Summary. The changes primarily relate to the addition of a commitment to comply with provisions detailed in a new Appendix to the Plan. This Appendix, entitled 'Environmental Management and Sustainable Development' has been recommended for inclusion in the Plan by the SEA and AA.

Addition of Plan Appendix I 'Environmental Management and Sustainable Development'

In response to a recommendation by the SEA and AA processes, the Department added a new Appendix to the Plan document – Appendix I 'Environmental Management and Sustainable Development'. This appendix includes various provisions which will be complied at lower levels of decision making, including during project level Environmental Impact Assessment (EIA) and Appropriate Assessment (AA), as appropriate.

Two of the main provisions included in the Appendix are 'Environmental Constraints and Opportunity Mapping' and 'Corridor and Routeway Selection Process'. Other supporting, more detailed measures are also included.

The identification of route corridors and the refinement of the route line is likely to be informed by other considerations such as access to lands, perceptions of safety and attractiveness, costs and benefits and ease of maintenance.

Table 5.1 links mitigation measure titles to the likely significant effects of implementing the Plan, if unmitigated, as well as showing monitoring measures. The complete measures to which the titles relate can be found in both Section 9 of the main SEA Environmental Report and in Appendix I to the Plan.

5.2 Monitoring

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

The Environmental Report identifies indicators - which allow quantitative measures of trends and progress in the environment over time. Measurements for indicators generally come from existing monitoring sources. Existing monitoring sources include those maintained by the relevant authorities e.g. planning authorities, the Environmental Protection Agency, the National Parks and Wildlife Service and the Central Statistics Office. Monitoring is an ongoing process and some of the selected indicators will be further refined when the routeway and associated user catchments are defined at project level.

A stand-alone Monitoring Report on the significant environmental effects of implementing the Plan will be prepared on a multi annual basis. This report will address the indicators that are set out on Table 5.1.

Table 5.1 SEA Summary Table: Likely Significant Effects (if unmitigated), Mitigation Measures and Indicators for Monitoring

Potentially Significant Effect	Mitigation Measure Title(s) from the Plan	Primary Indicator(s) for Monitoring
All – see below	<ul style="list-style-type: none"> Key Measure: Environmental Constraints and Opportunity Mapping Key Measure: Corridor and Routeway Selection Process Regulatory framework for environmental protection and management Construction and Environmental Management Plan Maintenance Plan 	All – see below
Contribution towards sustainable transport and associated impacts	<ul style="list-style-type: none"> Maximising positive effects on sustainable mobility 	Percentage of population in catchment area travelling to and from work and school by non-mechanical means
The need to provide adequate and appropriate water services (it is the function of Irish Water to provide for such needs).	<ul style="list-style-type: none"> Irish Water 	<p>Number of new developments granted permission under the Greenway Plan and the land use plans of planning authorities which can be adequately and appropriately served with waste water treatment, if required</p> <p>Number of non-compliances with the 48 parameters identified in the European Communities (Drinking Water) Regulations (No. 2) 2007 which present a potential danger to human health as a result of implementing the Plan</p>
Increases in waste levels	<ul style="list-style-type: none"> Construction Waste Waste Creation Waste Disposal 	Preparation and implementation of a construction and environmental management plan
Maximise the use of existing linear infrastructure	<ul style="list-style-type: none"> Key Measure: Environmental Constraints and Opportunity Mapping Key Measure: Corridor and Routeway Selection Process 	Percentage length of the greenway aligned to existing linear infrastructure
Developing the greenway close to existing settlements	<ul style="list-style-type: none"> Key Measure: Environmental Constraints and Opportunity Mapping Key Measure: Corridor and Routeway Selection Process 	Number of settlements within the greenway's catchment area
Spatially concentrated deterioration in human health	<ul style="list-style-type: none"> Human Health 	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

Potentially Significant Effect	Mitigation Measure Title(s) from the Plan	Primary Indicator(s) for Monitoring
<p>Arising from both construction and operation of the greenway 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 and displacement of protected species and coastal squeeze Effects in riparian zones where new crossings of waters, if any, are progressed</p>	<ul style="list-style-type: none"> • Visitor Management Strategy • Protection of Biodiversity including Natura 2000 Network • Appropriate Assessment • Protection of Natura 2000 Sites • Areas of geological interest • NPWS & Integrated Management Plans • Coastal Zone • National Peatlands Strategy • Biodiversity and Ecological Networks • Waters • Protection of Riparian Zone and Waterbodies and Watercourses • Non-Designated Sites • Non-native invasive species 	<p>Conservation status of habitats and species as assessed under Article 17 of the Habitats Directive 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 Number of significant impacts on the protection of listed species Percentage loss of functional connectivity without remediation resulting from development provided for by the Plan</p>
<p>Damage to the hydrogeological and ecological function of the soil resource</p>	<ul style="list-style-type: none"> • Soil Protection and Contamination 	<p>Soil extent and hydraulic connectivity</p>
<p>Adverse impacts upon the status and quality of water bodies, including bathing waters</p>	<ul style="list-style-type: none"> • Directives and Regulations • River Basin Management Plan • Bathing Water 	<p>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) Mandatory and Guide values as set by the EU Bathing Water Directive and transposing Bathing Water Quality Regulations (SI No. 79 of 2008) Groundwater Quality Standards and Threshold Values under Directive 2006/118/EC</p>
<p>Increase in the risk of flooding</p>	<ul style="list-style-type: none"> • Flood Risk Management Guidelines • Improvement and/or Restoration of Natural Flood Risk Management Functions • Surface Water Drainage and Sustainable Drainage Systems (SuDs) 	<p>Compliance of development of greenway with the Flood Risk Management Guidelines</p>
<p>Effects on entries to the Record of Monuments and Places and other archaeological heritage</p>	<ul style="list-style-type: none"> • Archaeological Heritage • Protection of Archaeological Sites • Consultation 	<p>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 arising from development of the Greenway</p>
<p>Effects on entries to the Records of Protected Structures, Architectural Conservation Areas and other architectural heritage</p>	<ul style="list-style-type: none"> • Underwater Archaeological Sites • Architectural Heritage 	<p>Percentage of entries to the Records of Protected Structures and Architectural Conservation Areas and their context protected from significant adverse effects arising from development of the Greenway</p>
<p>Occurrence of adverse visual impacts and conflicts with the appropriate protection of statutory designations relating to the landscape</p>	<ul style="list-style-type: none"> • Landscape Designations • Coastal Areas and Seascapes • National Landscape Strategy 	<p>Number of unmitigated conflicts with the appropriate protection of statutory designations relating to the landscape, including those included in the Development Plans of planning authorities</p>