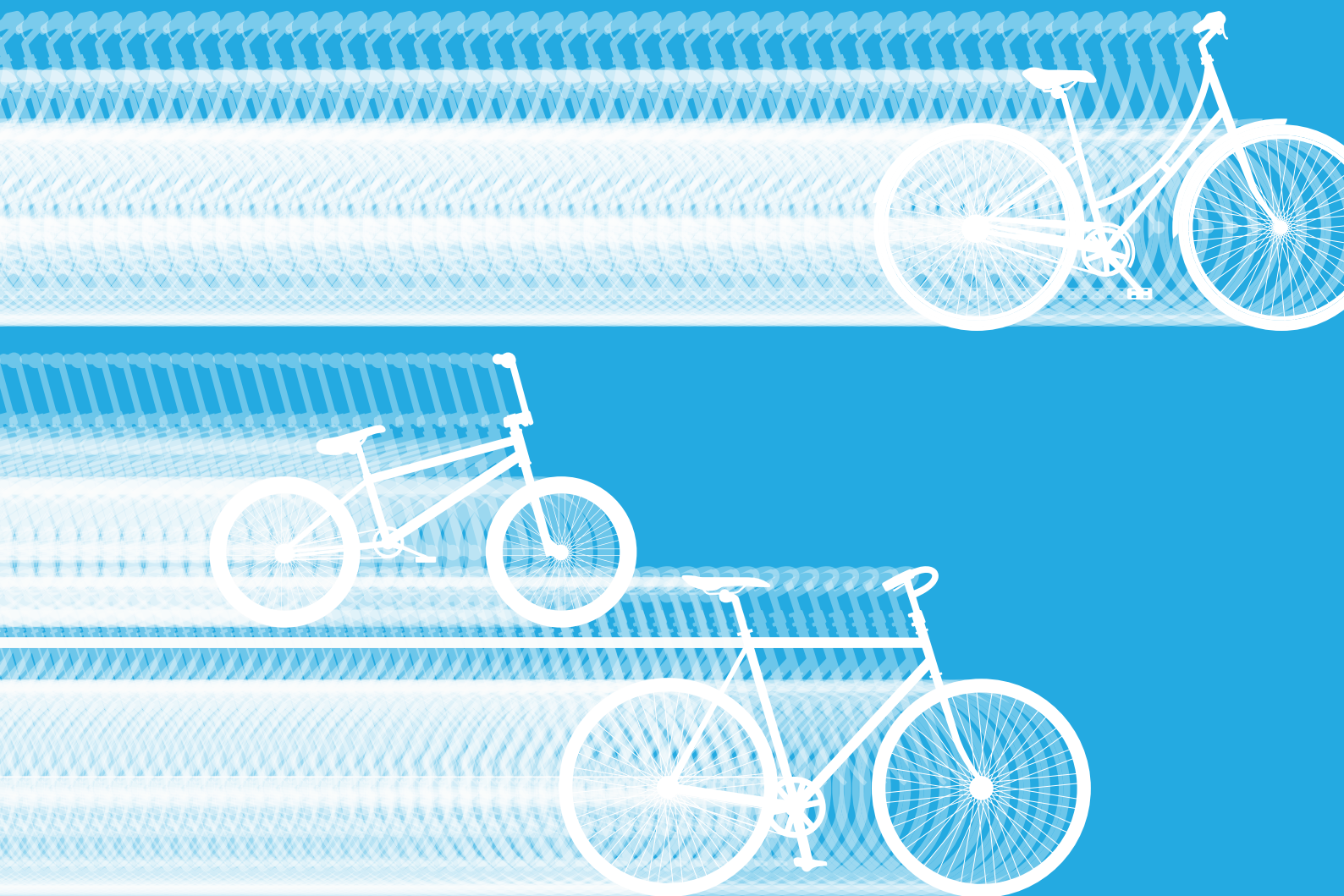


Greater Dublin Area

Cycle Network Plan

SEA Environmental Report



Greater Dublin Area Cycle Network Plan

Strategic Environmental Assessment Environmental Report

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1.0 Introduction

This Environmental Report (ER) has been prepared as part of the Strategic Environmental Assessment (SEA) of the National Transport Authority's (NTA) Greater Dublin Area Cycle Network Plan. The report presents the findings from the SEA, identifies options for mitigating adverse effects and opportunities for enhancing or improving the Plan in terms of the environment and the principles of sustainable development. This version of the ER has taken into account all the consultation responses received on the draft Plan and draft SEA ER. The details of the changes made as a result of these consultation responses can be found in Appendix C.

1.1 Purpose of this Document

This document has been prepared as part of the SEA of the Greater Dublin Area Cycle Network Plan (hereafter referred to as the "Plan"). The Irish Government, the NTA and various State Agencies are committed to ensuring that cycling as a transport mode is supported, enhanced and exploited, in order to achieve strategic objectives and reach national goals. The National Cycle Policy Framework (NCPF) is the key document that sets out 19 specific objectives, and details the 109 individual but integrated actions, aimed at ensuring that a cycling culture is developed in Ireland to the extent that, by 2020, 10% of all journeys will be by bike. The Plan proposes a cycle network for the GDA and emphasises the need for stakeholder participation.

The requirement to undertake an SEA is based on Directive 2001/42/EC ('SEA Directive') which was transposed into Irish Law under two sets of Irish Regulations. These regulations require that the plans and programmes of certain sectors, including transport, which are likely to have significant effects on the environment, be subject to environmental assessment. This process is called SEA.

An Environmental Report (ER) is a legal requirement of the SEA process and it provides key information on the process and its findings, such as the likely significant effects on the environment as a result of implementing a plan or programme.

A Draft Environmental Report was published for public consultation alongside a Draft GDA Cycle Network Plan. Along with the plan it was also formally submitted to a range of statutory and non-statutory public organisations, bodies and authorities and their views and observations on the documents was invited. Following the conclusion of the consultation process, all submissions received were reviewed and then a Final Cycle Network Plan prepared and approved by the National Transport Authority.

1.2 Structure of this Report

The remainder of this Environmental Report is structured as follows:

- **Chapter 2** provides an overview of the GDA Cycle Network Plan. In this section, the plan aims and measures are presented;
- **Chapter 3** presents a summary of the key stages of the SEA process. A brief summary of the legislative basis for SEA in Ireland is also provided;
- **Chapter 4** presents an overview of the scope of the SEA and a summary of the SEA Scoping stage, as well as how the consultation responses from the statutory environmental authorities have been taken into account as part of this ER;

- **Chapter 5** outlines the overall SEA methodology and the approach to the assessment;
- **Chapter 6** identifies the key policy, plans and programmes of relevance to the Plan and to the SEA process. Details are provided in Appendix A;
- **Chapter 7** presents the baseline environmental conditions in the GDA, highlights some of the relevant environmental issues and outlines the implications for the plan. Supplementary detail is provided in Appendix B.1 to B.4;
- **Chapter 8** contains a summary of the environmental assessment of the alternatives considered as part of the development of the Plan;
- **Chapter 9** presents an identification and evaluation of the likely significant effects on the environment from the implementation of the Plan;
- **Chapter 10** contains proposed mitigation measures which have been developed to address any effects on the environment;
- **Chapter 11** presents a monitoring programme;
- **Appendix A** provides detail on the key policy, plans and programmes of relevance to the Plan and to the SEA process; and
- **Appendix B** contains supplementary information on the Baseline Chapter.
- **Appendix C** contains the feedback comments on the Scoping report from the environmental authorities and how the plan proposes to address each comment.
- **Appendix D – Complete List of Routes per GDA District**
- **Appendix E – Maps**

2.0 The GDA Cycle Network Plan

2.1 Overview

The National Transport Authority (NTA) was established by the Dublin Transport Authority Act (2008) and the subsequent Public Transport Regulation Act (2009). Under Section 11.(1) of the DTA Act 2008, the principal functions of the Authority are, *inter alia*, to:

- (a) undertake strategic planning of transport, and
- (d) promote increased recourse to cycling and walking as a means of transport,

In order to carry out these functions effectively, and in line with principles of proper planning and sustainable development, a Cycle Network Plan has been developed for the Greater Dublin Area.

Pursuant to European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004 (S.I.435 of 2004), Section 9 (1) (a), which states that:

Environmental assessment shall be carried out for all plans and programmes,

- (a) which are prepared for agriculture, forestry, fisheries, energy, industry, transport, waste management, water management, telecommunications, tourism, and which set the framework for the future development consent of projects listed in Annexes I and II to the Environmental Impact Assessment Directive.

It is the view of the NTA that this plan, a network for cycling in the Greater Dublin Area (GDA), is likely to set a framework for the development consent of such projects referred to above and is therefore subject to Strategic Environmental Assessment.

2.2 Main Components of the Plan

2.2.1 Plan Objectives

The main objective for this plan which translates directly from the National Cycle Policy Framework (NCPF) is that by 2020, 10% of all journeys will be by bike. The Irish Government, the NTA and various State Agencies are committed to ensuring that cycling as a transport mode is supported, enhanced and exploited, in order to achieve strategic objectives and reach national goals.

In order to ensure that national resources are applied in an efficient manner that will help in reaching this ambitious target, the NTA and the Local Authorities within the GDA needed to know what cycling facilities are currently available, where they are missing sections, their condition, and what improvements are likely to be required. This study's purpose was therefore to define a strategic cycle network for the GDA.

To work towards achieving the above goals the Cycle Network Plan will identify and determine in a consistent, clear and logical manner cycle networks within the GDA which can be used in the future to further encourage the modal shift to cycling. This will include the following three types of routes which will work together as an overall cycle network for the GDA:

- The Urban Cycle Network (as described in 3.2.1 of the NTA Cycle Manual) at the Primary, Secondary and Feeder level;

- The Inter-urban Cycle Network linking the relevant sections of the Urban Network and including the elements of the National Cycle Network within the GDA. It shall also include linkages to key transport locations outside of urban areas such as airports and ports; and
- The Green Route Network being cycle routes developed predominately for tourist, recreational and leisure purposes, but which will also be used for commuting where appropriate. There are numerous natural corridors through the Dublin metropolitan area that provide opportunities for greenway routes, and these have been identified in this study. By and large these routes follow rivers, streams, canals and the coastline. In certain cases there may be significant environmental sensitivities where a greenway might pass along the edge of, over or through an area with designated environmental protections. Careful environmental assessment will be required at such locations through a staged process to determine if the suggested route is actually viable or if an alternative route is necessary and preferable.

3.0 GDA Cycle Network SEA: Process Overview and Progress to Date

3.1 Introduction

This chapter provides an overview of the requirements of the SEA process. Information is presented on the legal basis and legislative framework of SEA in Ireland, the key stages in the SEA process, and a brief summary of the key findings and outcomes of the GDA Cycle Network Plan SEA process completed to date.

3.2 SEA Legislation and Guidance

3.2.1 Legislation

SEA is defined as a formal, systematic evaluation of the likely significant environmental effects of implementing a plan or programme, before a decision is made to adopt the plan or programme. The legal basis of SEA in Ireland is Directive 2001/42/EC (Assessment of the Effects of Certain Plans and Programmes on the Environment), more commonly known as the 'SEA Directive'.

Article 1 of the SEA Directive notes that "the objective of this Directive is to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development."

Directive 2001/42/EC came into force in Ireland in July 2004. The Directive has been transposed into Irish Law through two sets of Regulations:

- European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004 (S.I. 435 of 2004); and
- Planning and Development (Strategic Environmental Assessment) Regulations 2004 (S.I. 436 of 2004).

Amending Regulations have been signed into Irish Law in 2011:

- European Communities (Environmental Assessment of Certain Plans and Programmes) (Amendment) Regulations 2011, (S.I. No. 200 of 2011), amending the European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004 (S.I. 435 of 2004) to include town and country planning and land use plans among the plan/programme types to which SEA applies.
- Planning and Development (Strategic Environmental Assessment) (Amendment) Regulations 2011 (S.I. 201 of 2011), amending the Planning and Development (Strategic Environmental Assessment) Regulations 2004 (S.I. 436 of 2004) - sets thresholds as to the level of LAP to which SEA applies, and sets out the procedure for making a determination re same.

This SEA is being carried out in accordance with S.I. 435 of 2004, as amended, which is focused on a range of sectoral plans and programmes such as transport, water, waste, forestry and energy, whereas S.I. 436 of 2004 is focused on the assessment of various land use plans in Ireland such as City and County Development Plans and Local Area Plans.

3.2.2 Guidance

The SEA process for the Plan also considered SEA guidance provided by the Environmental Protection Agency (EPA): Development of Strategic Environmental

Assessment (SEA) Methodologies for Plans and Programmes in Ireland (2003). This guidance document provided advice on the overall SEA process as well as specific advice on the SEA scoping process, preparation of the Environmental Report and on monitoring. Where the EPA SEA guidance was specifically used, it is referenced in this Environmental Report.

The information in the EPA's SEA Pack (updated August 21st 2012) was also applied when formulating this Environmental Report. The Pack comprises a combination of guidance, checklists and reference material for use in the SEA and Plan making process.

The Department of Environment, Community and Local Governments' SEA guidelines (Implementation of SEA Directive (2001/42/EC): Assessment of the Effects of Certain Plans and Programmes on the Environment Guidelines for Regional Authorities and Planning Authorities, 2004) were also used in this SEA process. Although these specific guidelines are focused on SEA of Regional Development Plans, County Development Plans and Local Area Plans, useful information and advice was provided on the SEA process generally.

The DoECLG Circular (PSSP 6/2011) 'Further Transposition of the EU Directive 2001/42/EC on Strategic Environmental Assessment (SEA)' has also been taken into account, as well as the recent DoECLG Circular (Circular PL 9 of 2013) 'Article 8 (Decision Making) of EU Directive 2001/42/EC on Strategic Environmental Assessment (SEA) as amended' during the preparation of the Plan and in undertaking the SEA process.

3.3 SEA Process – Key Stages

The key stages in the SEA process are summarised below.

3.3.1 SEA Screening

This is the first stage in the process and is the mechanism for determining whether an SEA is required for a plan or programme. The basis for this decision is whether significant effects on the environment are likely to arise as a result of the implementation of the plan or programme.

The Screening exercise concluded that the view of the NTA is that the GDA Cycling Network Plan is likely to set a framework for the development consent of projects of a significant scale and is therefore likely to have significant environmental effects within the Plan area. The NTA, therefore, made a determination that a full SEA of the proposed Plan is required in keeping with a purposive interpretation of Directive 2001/42/2004.

3.3.2 SEA Scoping

The second stage in the SEA process is the determination of the key issues, which are to be addressed in the Environmental Report. Scoping ensures that the SEA is focused on the relevant environmental issues and examines issues at the appropriate level of detail.

To ensure that the SEA of the Plan was adequately scoped, a Scoping Notification was circulated to the relevant designated environmental authorities. In this case, the authorities comprised the Environmental Protection Agency (EPA), Department of the Environment, Community and Local Government (DECLG), Department of Arts, Heritage and the Gaeltacht (DAHG), Department of Agriculture, Forestry and the Marine (DAFM), and Department of Communications, Energy and Natural Resources

(DCENR) so that they could make submissions on the scope of the SEA. Two submissions were received back from these authorities, on 31st July 2013 from the DAHG and on 2nd August 2013 from the EPA and these have been taken fully into account in this SEA.

3.3.3 Environmental Assessment and Environmental Report

A two-part assessment was undertaken by the NTA as follows:

1. Alternatives Assessment; and
2. GDA Cycle Network Plan Assessment.

3.3.4 Alternatives Assessment

Alternatives were derived on the basis of how different approaches could be taken to achieve the objectives of the Plan. The overarching consideration was that they must be reasonable and implementable. These alternatives were subject to environmental assessment and the results of this can be found in Chapter 8. These results led to the development of the GDA Cycle Network Plan.

3.3.5 GDA Cycle Network Plan Assessment

This stage involves the environmental assessment of GDA Cycle Network Plan. The results of this assessment can be found in Chapter 9.

The Environmental Report is the key document in the SEA process and it outlines, amongst other items, the likely significant effects on the environment and details the process through which mitigation measures to address the significant adverse effects have been considered and recommended (Chapter 11). In summary, the key objectives of an Environmental Report are to:

- Identify, describe and evaluate the likely significant effects on the environment of implementing a plan or programme. or modifying a plan; and
- Identify the reasonable alternatives, taking account of the objectives and the geographical scope of the plan or programme or modification;
- Ensure mitigation is implemented into the plan or programme where needed to ensure that the expected negative environmental impacts are addressed.

3.3.6 Habitats Directive Assessment (HDA)

There is a requirement to undertake an assessment under the Habitats Directive (92/42/EEC) as the Plan may have the potential to significantly impact on the integrity of a SAC or SPA within the GDA. The screening assessment is a provisional assessment to determine if a more detailed assessment is required. This assessment is in addition to the SEA process. However, there are links between both processes and the results of the SEA assessment and HDA screening may overlap and this is considered and referenced in Chapter 9.

3.3.7 Consultation

Consultation on the Plan and the Environmental Report with the relevant designated environmental authorities and the public is required before the Plan can be approved by the National Transport Authority. Both the plan and the Environmental Report were made publicly available for comment. Comments and submissions were made on either or both documents by the designated environmental authorities and the public, including any public authority or body.

3.3.8 Consideration of Submissions

It is a formal requirement of the SEA Directive that all consultation submissions received must be considered and the Plan amended, if deemed necessary. Any amendments to the Plan were screened in order to identify any additional significant environmental effects. Where such additional significant effects arose, additional mitigation measures were developed.

Following consideration of the consultation submissions received and associated amendments to the Plan, the formal plan adoption procedures commenced.

3.3.9 Preparation of the SEA Statement

Following the formal adoption of the plan by the National Transport Authority, the next stage in the SEA process is the preparation of the SEA Statement, which is a document summarising how environmental considerations have been integrated into the adoption of the plan. It also summarises how the consultation submissions were considered and if these resulted in the plan being amended. This statement accompanies this final Environmental Report.

3.3.10 Monitoring

Monitoring of the implementation of the plan will be undertaken up until its review. The overall objective of this stage is to monitor the significant environmental effects of the implementation of the plan so as “to identify at an early stage unforeseen adverse effects and to be able to undertake appropriate remedial action” (Article 10/1; SEA Directive 2001/42/EC). The monitoring programme for the Plan can be found in Chapter 11.

4.0 Scope of the GDA Cycle Network Plan SEA

4.1 Introduction

This chapter outlines the scope of the GDA Cycle Network Plan SEA. Scoping identifies the key issues to be addressed in the Environmental Report. It ensures that the process is focussed on the relevant issues and carries out the assessment at the appropriate level. A short summary of scoping is presented in this chapter.

The detailed comments received from the environmental authorities on the scoping report for the Plan are also included in Appendix C. Details of how each comment has been addressed is also included in this appendix. The summary of the scope is presented under three headings: spatial, temporal and technical.

4.2 Overview of the Scoping Process for SEA

4.2.1 SEA Scoping

The second stage in the SEA process is the determination of the key issues, which are to be addressed in the Environmental Report. Scoping ensures that the SEA is focused on the relevant environmental issues and examines issues at the appropriate level of detail.

To ensure that the SEA of the plan was adequately scoped, a Scoping Report was circulated to the relevant designated environmental authorities:

- Environmental Protection Agency (EPA);
- Department of the Environment, Community and Local Government (DECLG);
- Department of Arts, Heritage and the Gaeltacht (DAHG);
- Department of Agriculture, Food and Marine (DAFM), and;
- Department of Communications, Energy and Natural Resources (DCENR).

This enabled the authorities to make submissions on the scope of the SEA. Responses were received from two of the Environmental Authorities:

- DAHG received 31st July 2013
- EPA received 2nd August 2013

The spatial scope of the plan corresponds to the jurisdictions of the 7 Local Authorities of the Greater Dublin Area – Dublin City, South Dublin, Dún Laoghaire-Rathdown, Fingal, Meath, Kildare and Wicklow. Approximately 40% of the population of Ireland live in the GDA. It is also the location of a range of services of national importance including a major port and airport, the seat of central government and a number of universities. Given the potential for impacts beyond the boundary of the GDA, the spatial scope of the SEA will take into account the area of influence of the plan. As such, the effects of the plan on the environment outside the boundary of the GDA will be highlighted where relevant.

The temporal scope will be from 2013 to 2021, the latter being the horizon year for the plan forecast cycle demand. It is anticipated, however, that the full implementation of the plan may take longer.

In relation to the technical issues that will be considered by the SEA and included in the environmental report, the range of environmental headings considered was

based on the list of environmental topics as specified in S.I. 435 of 2004. These are as follows:

- Biodiversity, flora & fauna;
- Landscape;
- Population;
- Human health;
- Water;
- Air quality;
- Climatic factors & climate change;
- Soil & geology;
- Material assets;
- Cultural heritage (incl. architectural and archaeological heritage), and
- The inter-relationships between the above.

In identifying the likely significant effects on the environment of the GDA Cycle Network Plan, the SEA will address positive and negative effects; direct and indirect effects; temporary and permanent effects; short, medium and long-term effects; and secondary, cumulative and synergistic effects.

The table below provides an overview of the potential environmental issues which are typically relevant to the development of a cycle network plan. It is these types of potential environmental issues that will require consideration in undertaking the SEA of the GDA Cycle Network Plan. This helps to set a context for the identification of baseline environmental issues, the consideration of the interactions with other plans and programmes and the formulation of SEA Objectives.

Table 4.1 Potential issues to be considered in the GDA Cycle Network Plan SEA as presented in the Scoping Report

Environmental topic	Potential effects
Biodiversity, flora & fauna	<p>Potential adverse effects on the integrity of designated sites and on flora & fauna due to land take for new or improved transport infrastructure.</p> <p>Potential effects on sensitive habitats from transport emissions.</p> <p>Potential beneficial effects through ecological enhancement interventions along new and existing transport corridors.</p> <p>Potential risk of disturbance to sensitive species due to noise and lighting along transport corridors.</p> <p>Potential effects on vegetation from transport emissions arising from increases and reductions in traffic flows.</p>

Environmental topic	Potential effects
Landscape	<p>Potential adverse effects on the integrity of designated sites and landscape character due to land take for new or improved transport infrastructure.</p> <p>Potential beneficial effects on landscape and amenity arising from reductions in the presence of heavy traffic flows.</p> <p>Potential adverse effects arising from increases in traffic flows.</p> <p>Potential beneficial effects on townscape and amenity arising from reductions in traffic flows</p> <p>Potential beneficial effects through landscape enhancement interventions along new and existing transport corridors (these measures can be combined with ecological enhancement measures).</p>
Population	<p>Potential effects on the access to employment/economic, social and educational opportunities from transport projects and policy recommendations.</p> <p>Potential effects on people with physical mobility limitations from transport projects and policy recommendations.</p> <p>Potential community severance.</p>
Human health	<p>Effects arising from changes in physical fitness and the extent to which people are encouraged to walk and cycle on a regular basis.</p> <p>Effects arising from changes in transport-related accidents.</p> <p>Effects arising from changes in accessibility to employment/economic, social and educational opportunities which are key determinants of health.</p> <p>Potential effects on the quality of life arising from the GDA Cycle Network Plan.</p>
Water	<p>Effects on surface water, groundwater, coastal and transitional systems from transport interventions.</p> <p>Potential compatibilities and conflicts with the policies and programmes in relevant River Basin Management Plans (RBMPs) under the Water Framework Directive (WFD) from transport projects and policy recommendations.</p> <p>Changes in the risk of flooding</p>

Environmental topic	Potential effects
Air quality	<p>Potential beneficial effects on air quality arising from reductions in motorised traffic flows.</p> <p>Potential adverse effects may arise in areas where there are any traffic flows increases.</p> <p>Potential effects on vegetation from transport emissions arising from increases and reductions in traffic flows.</p>
Climatic factors & climate change	<p>Potential reductions in CO₂ from reductions in motorised traffic flows</p> <p>Potential adverse effects may arise in areas where there are any traffic increases.</p>
Soil & geology	<p>Potential negative effects due to developments on important and vulnerable soil resources</p> <p>Potential adverse effects on the integrity of designated geological and geomorphological sites due to land take for new or improved transport infrastructure.</p> <p>Potential for increases in coastal erosion due to measures in the GDA Cycle Network Plan.</p> <p>Potential positive impact on coastal protection.</p>
Material assets	<p>Potential positive and negative effects on public assets</p> <p>Potential positive effects regarding greater reuse of brownfield sites for development</p> <p>Potential reductions in fuel consumption from reductions in motorised traffic flows contributing to an improved fuel security position.</p>
Cultural heritage (incl. architectural and archaeological heritage)	<p>Potential adverse effects on designated and important sites from land take for new or improved transport infrastructure.</p> <p>Potential beneficial effects on setting of cultural heritage features (townscapes, Conservation Areas, heritage buildings etc.) arising from reductions in the presence of heavy traffic flows. Potential adverse effects may arise should traffic flows increase.</p>

It can be seen from the table above that there is potential for likely significant effects, of both a positive and negative nature in relation to all of the environmental topics listed in the SEA Directive when developing the NTA GDA Cycle Network Plan. On this basis, it was decided not to scope out any environmental topics at scoping stage and that all the environmental topics set out in the table above would be covered in the SEA.

4.3 Habitats Directive Assessment

An Article 6 Screening assessment has been undertaken for the GDA Cycle Network Plan development process. This screening assessment considered if potential significant effects are likely on the aforementioned European Sites. The screening assessment concluded that significant effects on the integrity of Natura 2000 sites are likely, and therefore a full Article 6 Assessment was to be undertaken for each significantly affected site. The assessment process included consultation with National Parks and Wildlife Service (NPWS) and the results have been made available to the public in the accompanying Natura Impact Statement.

4.4 SEA Objectives

The SEA of the Plan is primarily an objectives-led exercise. The SEA Objectives are used in the initial environmental assessment of the proposed measures contained in the Plan. The final SEA Objectives are presented in Table 4.2 below, together with additional context information about each objective and associated indicators.

The SEA Objectives listed below were formulated using the environmental topics that have been highlighted at scoping stage. These objectives take account of the key environmental issues outlined in the scoping notification under the table headed 'Potential issues to be considered in the GDA Cycle Network Plan SEA' (see table 4.1 above) and their relevance to the specific scope and influence of the Plan. The comments received from the environmental authorities (**See Appendix C**) at scoping stage have also been incorporated into the SEA Objectives and minor changes have been made to ensure they are focussed and that they remain measureable through appropriate indicators. The environmental effects of the Plan will be assessed against the objectives in Table 4.2 below in chapters 8 and 9.

Information on the environmental assessment methodology and the actual use of the SEA Objectives is provided in Chapter 5.

Table 4.2 Final SEA Objectives

SEA Topic	Proposed SEA Objective	Comments	Potential Indicators
Biodiversity, Flora and Fauna	1. To avoid impacts on the integrity of European Conservation Sites (SACs and SPAs) and nationally designated sites (NHAs), which includes taking account of protected species or qualifying interests that may occur/use areas outside designated sites.	This objective is focused on the protection of Natura 2000 sites (SACs and SPAs). The focus is on significant impacts, as this is the threshold used in the Habitats Directive with regards to European-designated ecological sites and also on the species protected under the EU Legislation including; <ul style="list-style-type: none"> • Habitats listed on annex I of the Habitats Directive, • Species listed on Annexes II and IV of the Habitats Directive, • Habitats important for birds, • Birds listed on Annex I of the EC Birds Directive, Red Data List Species • Species protected under the Wildlife Acts including protected flora NHAs and those species and habitats protected. 	Number of designated sites likely to be affected by the Plan strategies and the change in the condition of their notified features through monitoring results derived from GIS analysis.
	2. To support the strategic objectives of the National Biodiversity Plan.	The strategic objectives are to mainstream biodiversity in the decision making process; to substantially strengthen the knowledge base for conservation, management and sustainable use of biodiversity; to increase awareness and appreciation of biodiversity and ecosystems services; to conserve and restore biodiversity and ecosystem services in the wider countryside; to conserve and	Qualitative assessment against overall goal and key objectives in the National Biodiversity Plan.

		<p>restore biodiversity and ecosystem services in the marine environment; to expand and improve on the management of protected areas and legally protected species; to substantially strengthen the effectiveness of international governance for biodiversity and ecosystem services.</p>	
	<p>3. To minimise impacts on locally important biodiversity in the Greater Dublin Area.</p>	<p>The focus for this Objective is local-level biodiversity. The basis for this Objective is that ecological sites can still be of value, even if they are not designated.</p>	<p>Qualitative assessment of effects on wider biodiversity.</p>
	<p>4. To protect against the accidental introduction of alien plant species such as Japanese Knotweed and Giant Hogweed during the development and maintenance of the cycling network.</p>	<p>Alien invasive species such as Japanese Knotweed and Giant Hogweed are extremely easy to spread and can be damaging to local biodiversity and can be costly to address.</p>	<p>Qualitative assessment of recorded alien invasive species along or in close proximity to cycle routes. There should be no overall increase in these numbers due to development of the cycle network.</p>
	<p>5. To ensure suitable buffer zones are in place on any proposed routes that may be likely to have a significant environmental impact on habitats or species along rivers, riparian areas, coastal areas or mountain paths.</p>	<p>Negative impacts on biodiversity and designated sites, particularly in the mountains, by the coast and along rivers, can occur as a result of development such as walking routes, cycleways, seating, lighting, loss of riparian zone and mowing of riparian zone, and can lead to erosion and added disturbance by humans and dogs. Such developments along waterways for example could impact on species such as Otters Bats and Kingfishers.</p>	<p>Area of these aforementioned zones that have been negatively affected by the cycle network development.</p>

	<p>6. To protect existing hedgerows against unnecessary damage during the development of the cycle network.</p>	<p>Hedgerows form important wildlife corridors and provide areas for birds to nest in and in addition, Badger setts may be present. If suitable trees are present, bats may roost there and they use hedgerows as flight routes. Hedges also provide a habitat for woodland flora.</p> <p>Where a hedgerow forms a townland or other historical boundary it generally is an old hedgerow. Such hedges will contain more biodiversity than a younger hedge.</p> <p>Hedgerows should be maintained where possible. Where trees or hedges have to be removed there should be suitable planting of native species in mitigation.</p> <p>Where possible hedges and trees should not be removed during the nesting season (i.e. March 1st to August 31st).</p>	<p>Ensure records are kept of the time of year that any works to hedgerows is carried out (with March 1st to 31st August avoided)</p> <p>No. of derogation licences approved for bats and also disturbance to nesting birds under the Wildlife Acts of 1976 to 2010. Regulations and such a licence would only be given if suitable mitigation measures were implemented.</p>
Landscape	<p>7. To avoid or, where infeasible, minimise impacts on designated and protected landscapes and conservation areas.</p> <p>8. To minimise impacts on undesignated landscape resources (townscapes, seascapes, riverscapes, general landscapes) and also consider protected views and scenic areas within the Plan</p>	<p>This Objective is focused on the protection of designated and protected landscapes and landscape features such as Natural Heritage Areas. Also included are Conservation Areas, primarily in urban or townscape settings.</p> <p>This Objective addresses the various undesignated landscape features and areas, which make up the majority of the GDA.</p>	<p>Proximity to and land take from designated landscapes and related features - derived from GIS analysis.</p> <p>Qualitative assessment on undesignated landscapes and features.</p>

	area, and where possible create an improved sense of place through appropriate design and development of the cycle network.		
Population	<p>9. To increase accessibility to economic and employment opportunities through the cycle network, in particular for those who are physically, economically or socially disadvantaged within the GDA.</p> <p>10. To increase accessibility to public, cultural and community services through use of the cycle network, in particular, for those who are physically, economically or socially disadvantaged within the GDA.</p>	<p>This Objective is focused on increasing access to employment opportunities, especially for those who are physically, economically or socially disadvantaged.</p> <p>The purpose of this Objective is to increase accessibility to the full range of education facilities, health and medical care facilities and services, public offices and community facilities, professional services, cultural and leisure facilities and retail and service areas.</p>	<p>A qualitative assessment of the likely potential impacts arising from changes to the transport network in the GDA through the creation of the cycle network.</p> <p>A qualitative assessment of the likely potential impacts arising from the introduction of the GDA cycle network.</p>
Human Health	<p>11. To contribute to improvements to transport-related aspects of quality of life for residents, workers and visitors to the GDA through utilization of the cycle network</p> <p>12. To support the objectives of the Environmental Noise Directive in relation to transport-related noise.</p>	<p>This Objective is concerned with the relevant aspects of quality of life (QoL) of the residents, workers and visitors in the GDA. Potential positive impacts include reduced travel times; more attractive and pleasant journeys through reduced overcrowding and delays and reducing travel/commuting stress.</p> <p>The overall objective of this Directive is to provide a basis for developing EU-wide measures to reduce noise emitted by the major sources of noise, in particular road and rail vehicles and infrastructure. The</p>	<p>A qualitative assessment of the likely potential impacts arising from the introduction of the GDA cycle network..</p> <p>A qualitative assessment of the likely potential impacts arising from the introduction of the GDA cycle network.</p>

	<p>13. To minimise safety risks to human health arising from transport related activity.</p> <p>14. To support health improvements and benefits from a modal shift to cycling related transport options.</p>	<p>introduction of the GDA cycle network would help achieve this reduction in noise.</p> <p>This Objective is designed to address the risks to human safety and health from transport activities and infrastructure. This relates primarily to road traffic Accidents.</p> <p>This Objective is focused on potential health improvement and benefits, which could arise from transport-related activities, principally promoting and encouraging greater uptake of cycling.</p>	<p>A qualitative assessment of the likely potential impacts arising from the introduction of the GDA cycle network.</p> <p>A qualitative assessment of the likely potential impacts from the introduction of the GDA cycle network.</p>
Water	<p>15. To support the forthcoming River Basin Management Plans (RBMP) and Programme of Measures (POM). Where these are not available, the objective is to support the aims and objectives of the Water Framework Directive (WFD).</p> <p>16. To minimise impacts to surfacewater systems and resources.</p> <p>17. To minimise impacts to groundwater systems and resources.</p>	<p>The fundamental objective of the WFD aims at maintaining 'high status' of waters where it exists, preventing any deterioration in the existing status of waters and achieving at least 'good status' in relation to all waters by 2015.</p> <p>The aim of this Objective is to minimise impacts to surfacewater systems and resources, such as rivers, streams, lakes and surfacewater abstraction points.</p> <p>The purpose of this Objective is to minimise impacts to groundwater systems and resources, such as vulnerable aquifers and groundwater abstraction points.</p>	<p>Qualitative assessment of likely conflicts with relevant elements of RBMPs and POMs.</p> <p>Qualitative assessment of potential effects on surfacewater resources.</p> <p>Qualitative assessment of potential effects on groundwater resources.</p>

	18. To minimise impacts to coastal systems and resources.	The purpose of this Objective is to minimise impacts to coastal systems and resources.	Qualitative assessment of potential effects on coastal resources.
	19. To minimise impacts to transitional systems and resources.	The purpose of this Objective is to minimise impacts to transitional systems and resources, such as estuarine and wetland systems.	Qualitative assessment of potential effects on transitional resources.
	20. To minimise the risk of flooding.	This Objective is focused on minimising the risk of flooding.	Qualitative assessment of potential effects on flood risk.
Air	21. To protect and improve air quality in the GDA to create conditions to improve the health of the population and to reduce negative air quality impacts arising from transport-related emissions.	The focus of this Objective is on reducing negative air quality impacts from transport-related emissions, such as traffic emissions (e.g. PM _{10s} , NO ₂ , etc.) and protect and improve on areas with already good standards of air quality.	A qualitative assessment of the likely potential impacts arising from changes to transport provision.
	22. To ensure compliance with the Air Framework Directive and associated daughter Directives (and the transposing Regulations in Ireland).	This Objective is focused on the EU Air Quality Directives, which set down air quality standards in Ireland and the other member states for a wide variety of pollutants. The various thresholds in the Directives have been transposed into Irish Law via appropriate Irish Regulations.	A qualitative assessment of the likely potential impacts arising from transport improvements.
Climatic factors & climate change	23. To contribute to the reduction of greenhouse gas emissions arising from transport-related activities and to promote sustainable, useable cycle routes in the GDA.	The overall purpose of this Objective is to reduce the production of greenhouse gas emissions arising from transport-related activities and to reduce the overall carbon footprint of transport in the GDA. The Objective is focused on the fact that all	A qualitative assessment of the likely potential impacts.

	24. Ensure that any new development along coastal areas takes into account the impacts of sea level rise/increased storm occurrence and coastal erosion.	<p>forms of mechanised transport produce greenhouse gases and consume fossil fuels either directly or indirectly. Where there is a need to travel, the Plan will seek to cater for this need in an environmentally optimal manner. This would imply a higher percentage use of cycling in the GDA. This is a more sustainable form of travel with no greenhouse gas production.</p> <p>Where cycle routes are proposed in coastal areas that may be susceptible to flooding due to sea level rise or increased storm occurrence which may result in coastal erosion, the design of the cycle route will take these issues into consideration.</p>	<p>% of persons cycling to work/leisure activities/education</p> <p>% of transport related CO2 emissions.</p> <p>Number of occurrences of coastal flooding in areas where coastal routes are proposed. Monitor level of coastal erosion.</p>
Soils and Geology	25. To minimise negative impacts on important and vulnerable soils resources used for agricultural purposes.	This Objective is focused on the conservation of important and vulnerable soils which are used for agricultural production.	Qualitative assessment of effects on important agricultural soil resources.
	26. To reduce consumption of construction material and generation of construction waste as part of the development if the cycle network.	This Objective is designed to reduce the overall need for new construction materials and to reduce the generation of construction wastes as part of the construction of transport infrastructure projects. Ways to achieve this Objective include greater reuse of demolition and construction materials reuse and recycling.	Qualitative assessment of construction resources saved due to recycling and reuse.
	27. Ensure the remediation of	Where excavation of soils is considered	Qualitative assessment of the

	contaminated soils removed as part of any cycle route	to facilitate cycle route construction, measures should be included to address remediation of any potential contaminated lands identified	amount of contaminated soil removed as part of the development of the cycle network.
	28. To avoid or, where infeasible, minimise impacts to protected and designated geological and geomorphological sites.	The focus of this Objective is to minimise impacts to protected and designated geological and geomorphological sites, which may arise as a result of transport infrastructure projects.	Proximity to and land take from designated sites.
Material assets	29. To protect public assets and infrastructure.	This Objective covers a wide-range of 'on the ground' resources, such as public open spaces, parks and recreational areas; public buildings and services; utility infrastructure (electricity, gas, telecommunications, water supply, wastewater infrastructure etc.). These may be impacted by the development of future cycle routes in some areas.	Qualitative assessment of effects on important material assets.
	30. To reduce the fossil fuel demand by the transport sector.	This Objective is focused on the rising demand for fossil fuels for transport-related proposals and activities. Fossil fuels are an important non-renewable asset from an economic, environmental and social point of view for the State. Reducing fossil fuel consumption will make a contribution to addressing the issue of fuel security, a significant issue as Ireland is heavily dependent on the importation of fossil fuels.	A qualitative assessment of the likely potential impacts from changes in travel behaviour.
	31. To assist with the reuse and regeneration of brownfield sites.	The basis for this Objective is to promote the reuse and regeneration of previously	Qualitative assessment on the potential to increase brownfield

		developed brownfield sites instead of undeveloped greenfield sites, especially those close to key transport corridors and large centres of population in the GDA.	reuse.
Cultural heritage (architectural and archaeological heritage)	32. To avoid or, where infeasible, minimise impacts to designated cultural, architectural and archaeological resources.	This Objective is focused on minimising impacts to designated cultural, architectural and archaeological resources which include Architectural Conservation Areas (ACAs), Protected Structures and structures and zones of archaeological interest listed on the Record of Monuments and Places (RMPs) which may be affected by transport infrastructure projects or policy recommendations in the Plan.	Proximity to and land take from designated sites, protected structures, ACAs or RMPs.

5.0 SEA Methodology

5.1 Introduction

This chapter explains the SEA methodology and assessment techniques used in the environmental assessment of the GDA Cycle Network Plan. An overview of the overall approach and methodology is first provided. Greater detail on the SEA Objectives is then set out. This is followed by the assessment methodology for the Plan alternatives and the Plan.

5.2 Overall Approach and SEA Methodology

This SEA uses an 'objectives-led' approach. The concept behind this approach is that the plan is tested to determine if it meets the objectives of the SEA. 32 SEA objectives have been derived for the Greater Dublin Area Cycle Network Plan. These cover all the environmental topics as specified in the SEA Regulations.

The four Alternatives were assessed using the SEA Objectives and the results are summarised in Chapter 8. The environmental assessment of the 'Alternatives' is focused on the performance differences between each of the options, so that the various advantages and disadvantages of each can be highlighted and then considered in the development of the Plan.

The SEA Objectives were then used to assess the likely significant effects on the environment of the Plan. Following the identification and assessment of the likely significant effects on the environment (Chapter 9), mitigation measures were developed and these are reported in Chapter 10 of this Environmental Report.

5.3 SEA Objectives

Chapter 4 reports on the scope of the SEA, including the 32 SEA Objectives. In order to undertake the assessment, some of these objectives will rely on qualitative assessment data, and some on GIS-based data.

The various stages of the environmental assessment establish the significance of the effects on the environment through determining whether an Alternative or the Plan will alter the baseline environment and what the outcome of this change will be in relation to the SEA Objectives. The SEA also establishes whether the intervention is moving in a positive direction, a negative direction or has no effect (i.e. it is neutral).

To assist with the clarity of reporting, a seven-point rating scale is used at all levels of the assessment:

- 3 Major negative effect (significant);
- 2 Moderate negative effect (significant);
- 1 Minor negative effect (not significant);
- 0 Neutral;
- + 1 Minor positive effect (not significant);
- + 2 Moderate positive effect (significant); and
- + 3 Major positive effect (significant).

A +/- 3 rating signifies a significant positive/negative effect and one that requires careful consideration and attention. For example, a clear breach of an international or national standard (e.g. air quality standards and limits) or legislation (e.g. significant effects under the Habitats Regulations) is typically representative of a - 3 rating. A

+/-3 rating might also be applied to a lower magnitude impact but one that is arising across a very large spatial area.

A +/-2 rating also indicates a significant effect, but one that is of lower magnitude and significance.

A +/-1 rating is applied to minor effects which are not considered significant in the context of the regional study area as a whole. This rating does not imply that the effects are unimportant and that they should not be considered; only that they are likely to result in a smaller deviation from the baseline situation.

In addition to the rating scale, commentary text will also be provided, highlighting the key conclusions to emerge from the application of the SEA Objectives. This commentary will also outline the full range of effects i.e. if they are short-term, long-term, cumulative or in-combination.

5.4 Assessment of GDA Cycle Network Plan Alternatives

Each of the Plan Alternatives is assessed as a stand-alone set of proposals against the 32 individual SEA Objectives. The assessment provides an overall rating on the - 3 to + 3 scale as outlined in Section 5.3 above for each of the Alternatives under each of the SEA Objectives. This approach allows the key performance differences (positive and negative) between the three Alternatives to be highlighted.

While the assessment focuses on the collective effect of all the proposals in each Plan Alternative, where there are specific proposals which have a significant impact this is drawn out in the reporting. For example, where a specific proposal results in important positive or negative impacts (such as impacting on Natura 2000 sites); this is highlighted in the table.

5.5 Assessment of GDA Cycle Network Plan

The Plan is also assessed using the SEA Objectives. The focus of this stage of the environmental assessment is on the identification of likely significant effects on the environment of implementing the Plan against a Do-Nothing scenario.

The full range of likely significant effects on the environment of the Plan is identified. This is one of the key requirements of an Environmental Report. Mitigation measures are then developed to address the identified likely significant effects and these mitigation measures are integrated into the iterative process of plan refinement. The results of this stage of the assessment are presented in tabular format.

The results of the environmental assessment can be found in Chapter 9 and mitigation measures are presented in Chapter 10.

5.6 Consultation and Finalisation of the Plan

Following consultation with the public and statutory environmental authorities, all submissions received were considered and the Plan and the Environmental Report revised, where necessary.

The Final GDA Cycle Network Plan has been published, accompanied by a document which summarises the consultation process.

The Final Plan document has been presented to the Board of the National Transport Authority for formal approval after which the SEA Statement was prepared. Monitoring of the environmental impacts of the Plan will be on-going.

6.0 Plan and Programme Context

6.1 Introduction

This chapter of the Environmental Report provides an overview of the legislation, policies, plans and programmes (PPPs) that have been considered as part of the SEA. The consideration and review of the PPPs listed below was undertaken for two main objectives:

1. to assist the development of the Plan;
2. to input into the SEA scoping process and guide the development of SEA Objectives.

6.2 Overview of Legislation, Policy, Plan and Programme Context

The consideration of the PPP context was undertaken in a hierarchical manner as follows:

- International & European legislation and policy;
- National legislation and policy;
- Regional policy;
- County policy;
- Northern Ireland policy; and
- Other land use and transport policy.

The plans and programmes that have been considered as part of this SEA are presented according to this hierarchy below:

6.2.1 *International & European legislation and policy:*

- United Nations (UN) Convention on Biological Diversity;
- UN Kyoto Protocol and the Second European Climate Change Programme (ECCP II);
- EU Birds Directive (Council Directive 79/409/EEC) and EU Habitats Directive (Council Directive 92/43/EEC);
- Water Framework Directive (2000/60/EC);
- Air Quality Framework Directive (1996/62/EC);
- Assessment and Management of Environmental Noise Directive (2002/49/EC);
- EU Sustainable Development Strategy (2006);
- Floods Directive (2007/60/EC); Directive on the Protection of Groundwater against Pollution and Deterioration (2006/118/EC), and
- European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011).

6.2.2 *National legislation and policy;*

- Infrastructure and Capital Investment 2012-16: Medium Term Exchequer Framework
- Dublin Transport Authority Act (2008);

- Smarter Travel – A Sustainable Transport Future – A New Transport Policy for Ireland 2009 – 2020 (2009);
- Ireland's First National Cycle Policy Framework (2009);
- Design Manual for Urban Roads and Streets (2013);
- National Cycle Manual (2012);
- Road Safety Strategy (2013-2020);
- Guidelines for Planning Authorities on Sustainable Residential Development in Urban Areas (Cities, Towns and Villages) (2009);
- Sustainable Rural Housing – Guidelines for Planning Authorities (2005);
- Retail Planning Guidelines for Planning Authorities (2005);
- National Spatial Strategy 2002-2020 (2002);
- Transport Access for All – The Sectoral Plan for Accessible Transport under the Disability Act 2005 (2008 Edition);
- National Climate Change Strategy 2007 – 2012 (2007);
- Delivering a Sustainable Energy Future for Ireland – The Energy Policy Framework 2007 – 2020 (2007);
- National Energy Efficiency Action Plan for Ireland 2007 – 2020 (2007);
- Sustainable Development – A Strategy for Ireland (1997);
- National Biodiversity Plan (2011);
- Bioenergy Action Plan for Ireland (2007);
- National Action Plan for Social Inclusion 2007 – 2016 (2007);
- National Hazardous Waste Management Plan 2008 – 2012 (2008);
- The Planning System and Flood Risk Management – Guidelines for Planning Authorities (2009);
- Water Services Act 2007;
- Wildlife Act of 1976 & 2000;
- European Communities (Water Policy) Regulations of 2003 (SI 722 of 2003);
- European Communities Environmental Objectives (Surface waters) Regulations of 2009 (SI 272 of 2009);
- European Communities Environmental Objectives (Groundwater) Regulations of 2010 (SI 9 of 2010); and
- Water Pollution Acts 1977 to 1990.

6.2.3 Regional legislation and policy:

- Regional Planning Guidelines for the Greater Dublin Area 2010-2022 (2010);
- Greater Dublin Strategic Drainage Study (2005);
- Greater Dublin Water Supply Strategic Study – Meeting Dublin's Needs into the 21st Century (1996);
- Retail Strategy for the Greater Dublin Area 2008 – 2016 (2008) and;
- Integrated Implementation Plan for the Greater Dublin Area 2013-2018 (2013).

6.2.4 County legislation and policy

- The County Development Plans of the seven GDA local authorities;
- Strategic Development Zones Planning Schemes;
- Local Area Plans of the seven GDA local authorities.
- Local Biodiversity Action Plans (BAPs) which have been adopted by Dublin City Council, Wicklow County Council and Dún Laoghaire Rathdown County Council..
- Draft Local Biodiversity Action Plans adopted by Fingal and Meath County Councils.
- Dunlaoighre Rathdown Heritage Plan 2013-2018
- Fingal Heritage Plan 2011-2017
- South Dublin County Heritage Plan 2010 - 2015.
- Dublin City Heritage Plan 2002-2006
- Kildare County Heritage Plan 2014-2018
- Wicklow County Heritage Plan 2009-2014
- Meath County Heritage Plan 2007-2011

6.2.5 Northern Ireland policy;

- Shaping Our Future – Regional Development Strategy for Northern Ireland, 2025 (2001);
- Regional Transport Strategy for Northern Ireland 2002-2012 (2002).

6.3 Summary

As such, the Plan will be influenced by European legislation and national and regional plans and programmes. It will also interact with and influence other regional, county, local and other plans and programmes.

The following central points emerge from the policy, plan and programme review:

- The transport sector has been responsible for the largest increase in greenhouse gas emissions. Transport-related emissions therefore need to be addressed;
- Land use planning is one the key factors which influences transport and travel patterns in Ireland. Future growth and development needs to be undertaken in a sustainable manner which considers the subsequent transport patterns. In particular, the consolidation of development into higher-order urban centres in accordance with the Regional Planning Guidelines settlement hierarchy is key to reducing the need to travel.
- Development Plans and Local Area Plans may benefit from the adoption of a sequential approach to development whereby lands which are most accessible by walking and cycling are developed firstly;
- The increasing use of the private car needs to be addressed and a shift towards cycling and walking and public transport encouraged;
- Encouraging greater use of non-car modes of travel has wider benefits in the areas of economics, quality of life and social inclusion;

- The plan should seek to maximise the use of cycling for the large-scale movement of people, balancing the demand for car travel with other modes;
- Long-term biodiversity loss is one of the key challenges facing the State and recent development patterns have further impacted on biodiversity resources in the GDA;
- Energy and fossil fuel security are challenges for Ireland to address as the State currently imports the vast majority of its energy needs, primarily for the transport and power generation sectors. Reducing fossil fuel consumption (and thus dependence on fuel imports) in the transport sector is a requirement.

7.0 Baseline

7.1 Introduction

This chapter presents the existing environmental conditions in the Greater Dublin Area and the likely future conditions in the absence of the Implementation Plan. The baseline information is described under the following environmental topics:

- Biodiversity, flora & fauna;
- Landscape;
- Population;
- Human health;
- Noise;
- Water;
- Air;
- Climatic factors & climate change;
- Soils & geology;
- Cultural heritage (including architectural and archaeological heritage);
- Material assets; and
- Inter-relationships.

Within each environmental topic, a description of the baseline is provided and its likely future evolution is then discussed. Current issues and problems for each environmental topic are identified and specific implications for the Cycle Network Plan identified. A list of data sources and supplementary information is provided in Appendix B.5.

The purpose of describing the environmental baseline is two-fold:

1. To ensure that relevant environmental problems and issues are highlighted, so that they may be considered and addressed during the preparation of the Implementation Plan; and
2. To form a base-case from which future impacts can be predicted, evaluated and then mitigated.

It should be noted that this baseline description is not intended to be an exhaustive description of all baseline environmental data in the GDA; rather, it is focused on an appropriate scale and detail with regards to the regional-scale plan being prepared.

7.1.1 Overview of the GDA

The Greater Dublin Area consists of 2 regions, Dublin and the Mid-East, comprising the local authority areas of Dublin City, Fingal, South Dublin, Dún Laoghaire Rathdown, Meath, Kildare and Wicklow. The region contains Dublin City and suburbs and a number of large towns such as Naas, Navan, Swords and Bray.

According to the 2011 Census, there were approximately 1.8 million people living in the GDA, of whom, approximately 750,000 stated 'At Work' as their Principal Economic Status. Employment in the GDA is diverse with an emphasis on service industries such as finance and retail. The GDA contains a number of 3rd level

educational institutions and key transport infrastructure such as Dublin Port and Airport.

The main topographical features of the GDA include the Wicklow Mountains, Dublin Bay, the coastline and a number of major rivers. The generally flat or rolling land of the GDA supports agriculture and associated industries.

7.2 Biodiversity, Flora & Fauna

This section provides a description of the biodiversity and ecology present within the GDA and details of their spatial distribution.

7.2.1 Natura 2000 Network in the GDA

The key biodiversity, flora and fauna resources in the GDA comprise the network of Natura 2000 sites. This is made up of Special Protection Areas (SPAs) and Special Area of Conservations (SACs). These are sites of international ecological importance protected by the European Union.

Below these European sites are nationally-protected sites, called Natural Heritage Areas. These can be divided into two main classifications: those that are fully designated (NHAs) and those that are awaiting formal and official designation (pNHAs). Table 7.1 below presents an overview of the key ecological designations with the GDA.

Table 7.1 Total No. of SPAs, SACs, NHAs and pNHAs within the GDA

County	SPAs	SACs	NHAs	pNHAs
Dublin (1)	10	12	1	32
Kildare	1	7	2	24
Meath	3	8	3	27
Wicklow	4	14	0	35
GDA Total	18	41	6	118

Source: NPWS website www.npws.ie/en/MapsData

7.2.2 Special Protection Areas (SPAs)

SPAs are designated under the EU Birds Directive (79/409/EEC) and protect areas where there are listed rare and vulnerable bird species present; where there are regularly occurring migratory species, such as ducks, geese and waders; and wetlands of international importance that attract large numbers of migratory birds each year. There are 135 SPAs in the Republic of Ireland, including 18 within the GDA, designated under the Birds Directive, and these are listed in Appendix B.1.

7.2.3 Special Areas of Conservation (SACs)

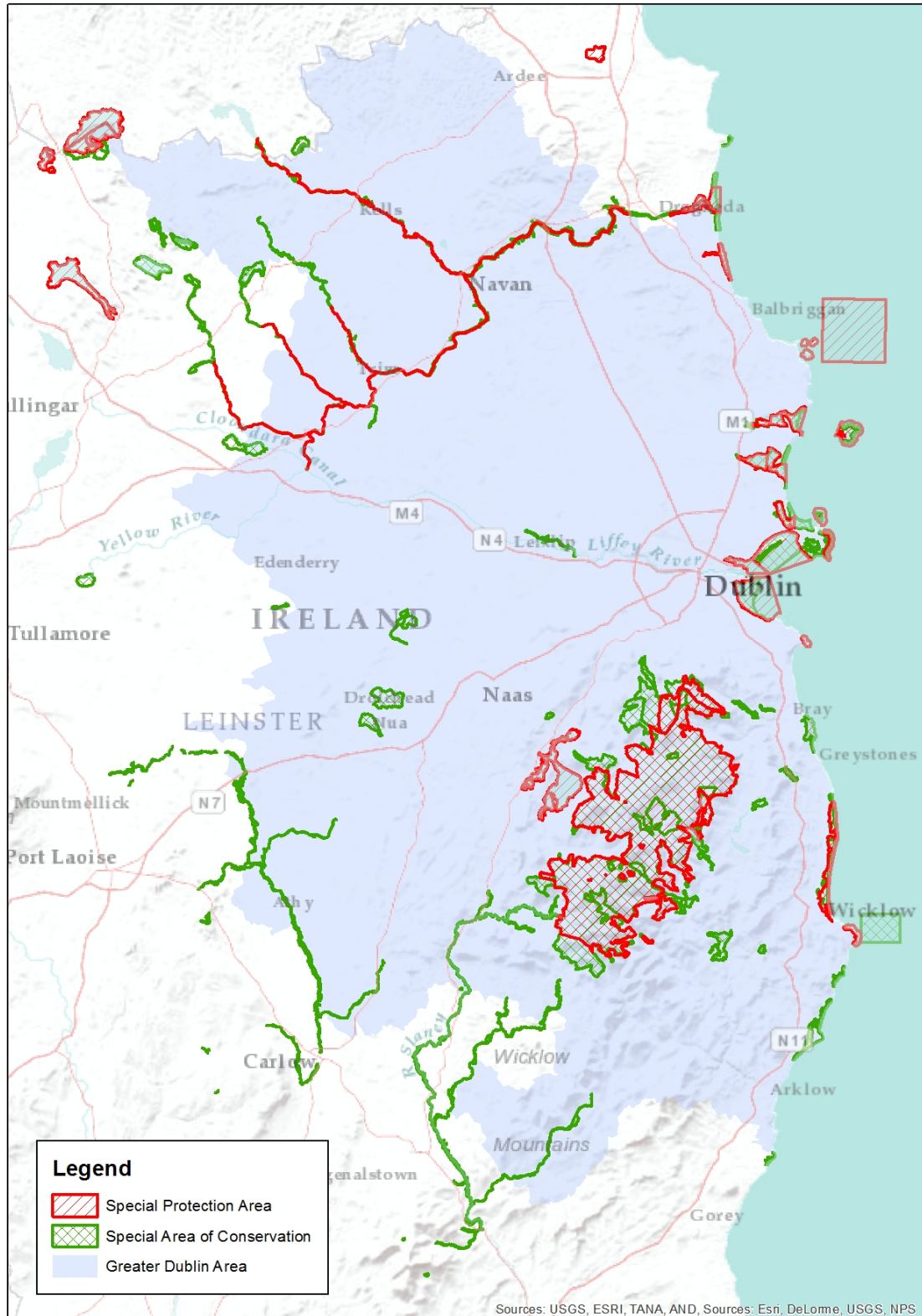
SACs, designated under the EU Habitats Directive, are prime wildlife conservation areas and are considered to be important on a European level. There are 424 SACs within the Republic of Ireland, in the process of being formally designated under the Habitats Directive (410 have been transmitted and formally adopted). 41 SACs have been designated within the GDA and these are listed in Appendix B.2 and also illustrated below in Figure 7.1.

SPAs and SACs are designated on the basis of having specific habitat types as designated in the Habitats Directive and the Birds Directive. In Ireland, there are 59

(1) Dublin refers to the four Local Authorities of Dublin City, Fingal, South Dublin and Dun Laoghaire-Rathdown County Councils.

of these habitat types (spread across Ireland's Natura 2000 network) that the EU considers require particular protection because their global distribution largely falls within the EU and they are in danger of disappearance.

Figure 7.1 Natura 2000 Sites in the GDA

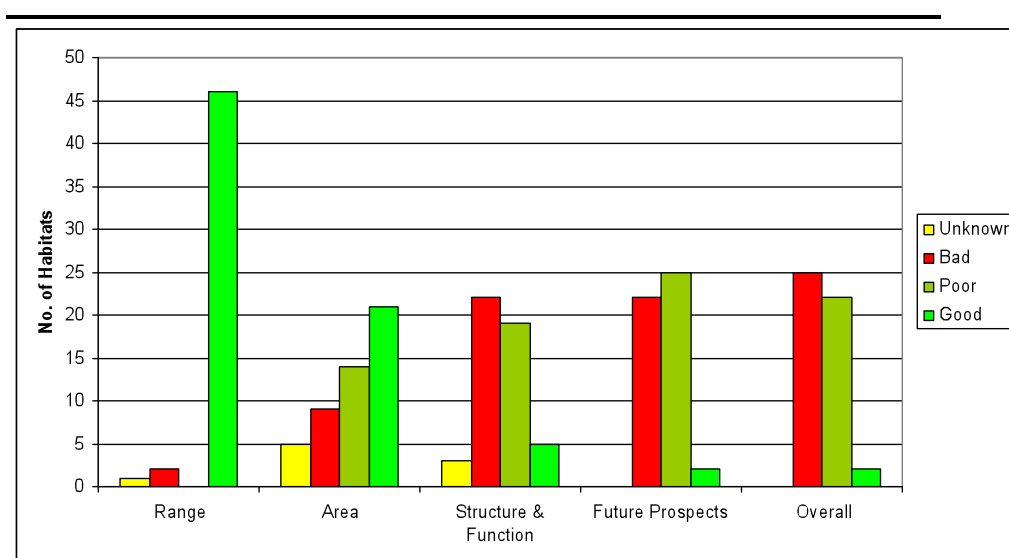


7.2.4 Designated species of plants and animals

The Habitats Directive also designates 26 species of plant and animal whose conservation requires the designation of SACs and 41 species of animal and plant present in the Ireland which are in need of strict protection.

NPWS has assessed the condition of each of the species and habitats listed in the Annexes of the Habitats Directive in its publication The Status of EU Protected Habitats and Species in Ireland (2008). These assessments were based on extensive research and were supported by detailed reporting from appropriate experts. Figures 7.2 to 7.4 summarise the findings of a national assessments undertaken by NPWS for the habitats, flora and fauna species. The terms 'Range', 'Area', 'Structure & Function', 'Future prospects' and 'Overall' are based on the various criteria under which NPWS assessed each of the designated habitats and species on a nationwide basis.

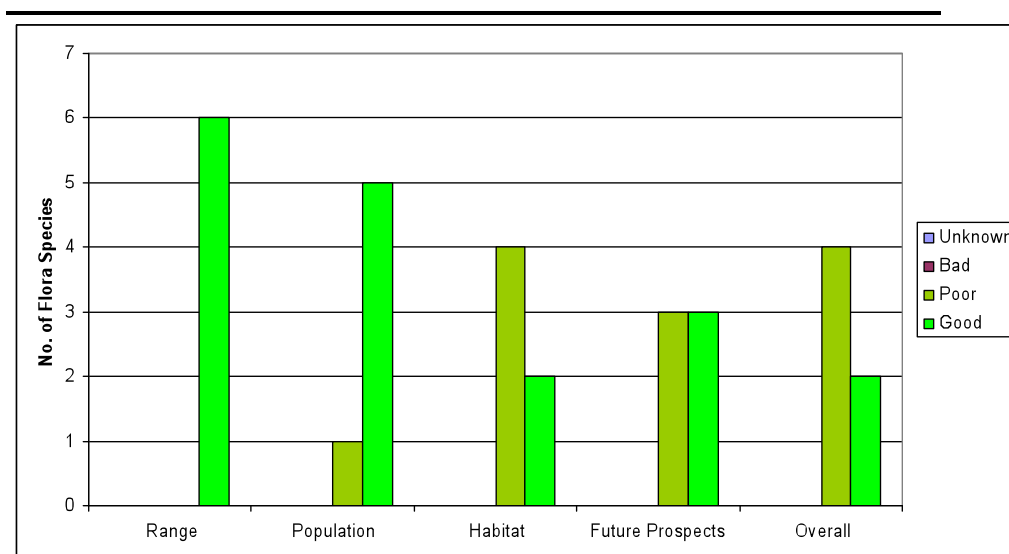
Figure 7.2 NPWS National Assessment of Habitats included in Annexes of Habitats Directive



Source: NPWS (2008) The Status of EU Protected Habitats and species in Ireland

It can be seen that the majority of Annex-listed habitats are either in a poor or bad condition (under the 'Overall' category) and this also applies to their future prospects. The reasons for this are discussed later in this section.

Figure 7.3 NPWS National Assessment of Flora Species included in Annexes of Habitats Directive

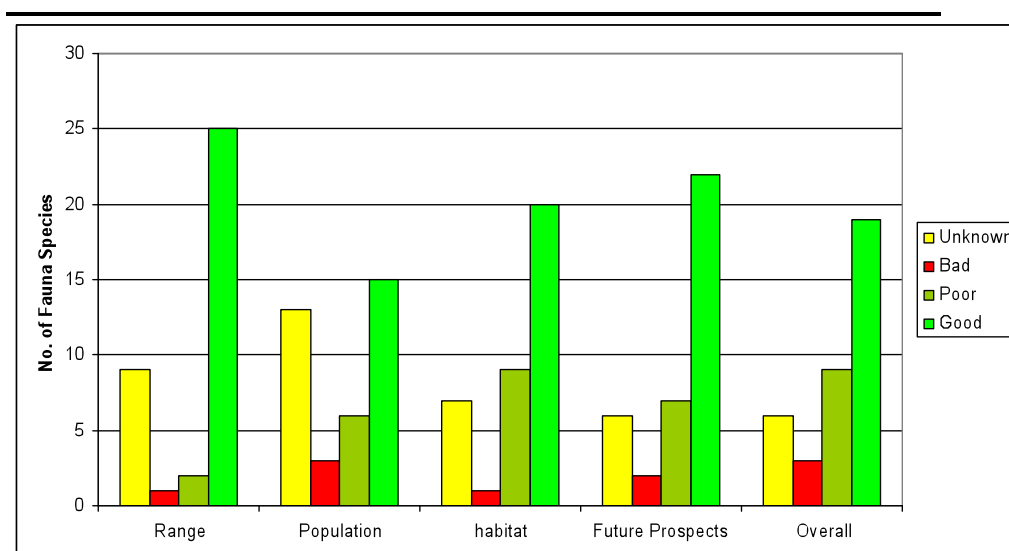


Source: NPWS (2008) The Status of EU Protected Habitats and species in Ireland

The GDA also contains many undesignated species of plant and these also provide some biodiversity value to the region.

Figure 7.3 shows that the overall condition of flora species is significantly better than that of habitats in general. However the overall prospects for the majority of designated flora species is poor. Figure 7.4 below presents data regarding fauna species.

Figure 7.4 NPWS National Assessment of Fauna Species included in the Annexes of the Habitats Directive



Source: NPWS (2008) The Status of EU Protected Habitats and species in Ireland

The national assessment of fauna species (Figure 7.4) shows that approximately half have good overall condition with the majority having good prospects. However, a proportion of fauna species is in poor or bad condition and has poor prospects.

7.2.5 Ramsar Sites

Ramsar sites are wetlands of international importance designated under the Ramsar Convention, an international treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. There are six Ramsar sites within the GDA (these are also designated as SACs within the Natura 2000 network):

- Three within Fingal (Rogerstown Estuary, Broadmeadow Estuary and Baldoyle Bay);
- Two within Dublin City (North Bull Island and Sandymount Strand / Tolka Estuary); and
- One in Kildare (Pollardstown Fen).

7.2.6 Natural Heritage Areas (NHAs)

NHAs are ecological sites, which are protected on a national level under the Wildlife Amendment Act 1976 and the Wildlife Amendment Act 2000. They are legally protected against damage from the date on which they are formally proposed for designation as pNHAs. Within the GDA there are 6 designated NHAs and these are listed in Appendix B.3 and shown in Figure 7.5.

In addition, there are 118 proposed pNHAs in the GDA. The list was published on a non-statutory basis in 1995, but none have yet been formally proposed or designated. Prior to formal statutory designation, pNHAs are subject to limited protection through the Rural Environment Protection Scheme, Forestry service requirements and planning policies.

Legend

- Proposed Natural Heritage Area
- Natural Heritage Area
- Greater Dublin Area

Sources: USGS, ESRI, TANA, AND, Sources: Esri, DeLorme, USGS, NPS

7.2.7 UNESCO Biosphere Reserves

The biosphere reserve designation is an international conservation designation given by UNESCO under its Programme on Man and the Biosphere (MAB). Reserves are designated in order to promote and demonstrate a balanced relationship between humans and the biosphere. North Bull Island is a designated biosphere.

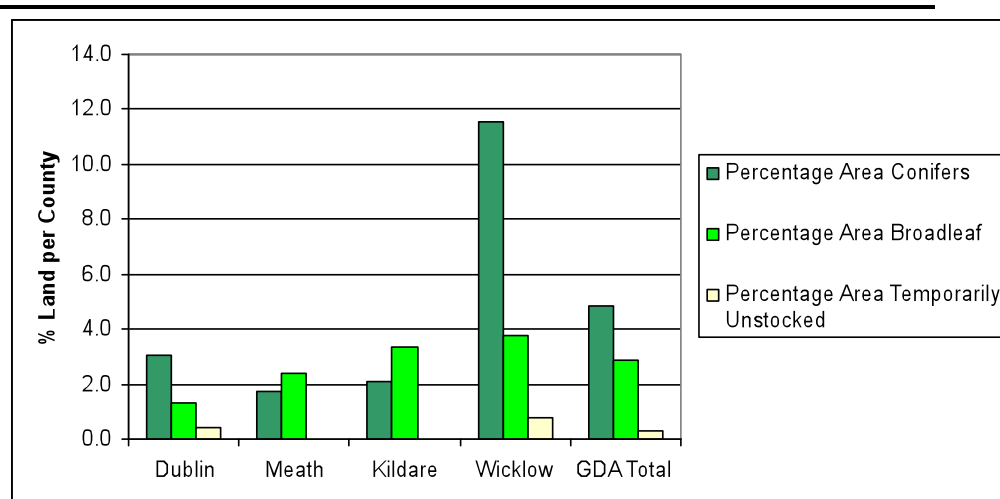
7.2.8 Other designations

Due to their importance to wildlife, Nature Reserves have been designated at Baldoyle Estuary, North Bull Island (both in Dublin), Pollardstown Fen (Kildare), Deputy's Pass, Glendalough, Glenealo Valley, Glen of the Downs, Knocksink Wood and the Vale of Clara (all Wicklow). The Wicklow Mountains are also designated as a National Park.

7.2.9 Forestry

The national forest estate is an important sink for carbon, at approximately 321 million tonnes. Also, 15% (88,000 hectares) of Coillte's estate is managed with the maintenance and promotion of biodiversity as the primary objective. While the total national growing stock is 70 million m² - mostly consisting of spruce and pine species - there is also a significant quantity of growing stock present in older broadleaf stands in natural or semi-natural woodlands. Wicklow has the highest percentage of forest cover nationally with approximately 18% of land covered in forestry, exceeding the national objective of 17%. Forestry coverage for all counties in the GDA is shown below in Figure 7.6.

Figure 7.6 Percentage Area of Each County under Forestry



Source: Forest Service (2007) National Forestry Inventory - Results

7.2.10 Biodiversity Action Plans

Some of the County Councils within the GDA have prepared Biodiversity Action Plans (BAPs). BAPs outline a set of actions and policy objectives which will raise awareness of biodiversity and also promote data gathering, protection and enhancement of biodiversity. Baseline information on protected species and designated sites is also typically presented. BAPs have been adopted by Dublin City Council, Wicklow County Council and Dún Laoghaire Rathdown County Council, while Fingal and Meath County Councils have prepared drafts.

Under Chapter 3 of the Dublin City Council BAP 2008-2012 reference is made to the importance of waterways and their associated riparian/edge vegetation which provide important feeding and commuting corridors for a range of species. This BAP also refers in particular to Bats dependent upon vegetated 'corridors', insect-attracting plants and waterbodies for commuting and feeding.

Page 18 of the Wicklow County Council Biodiversity Action Plan 2010-2015 states hedgerows and verges are an important part of the network that connects habitats around the county. In such a highly wooded county as Wicklow, hedgerows can really enhance the county's biodiversity by providing important routes for species movement between woodland sites. BAP Action no. 20 sets out a medium term action that states *'Support the development of a 'Green Corridors' strategy for the Council, underpinned by Article 10 of the EU Habitats Directive and identification of 'Biodiversity Hotspots', to encourage integrity and connectivity between important sites and habitats. Including policy protection approaches for river corridors and hedges / verges'*, currently no work has been carried out on the identification of these areas; therefore specific examination of locations where cycletracks may impact on this aspect of the environment was not possible through the BAP.

Page 11 of the Dún Laoghaire Rathdown County Council BAP 2009-2013 details the importance of hedgerows which are used as ecological corridors by species common in the area e.g. birds, bats etc. The plan also states on page 12 how important it is for future areas of habitat to ensure connectivity to existing ecological corridors to ensure expansion of the wildlife network in the plan area which allows local species to take advantage of the additional resources.

Section 3.1 of the Draft Fingal Biodiversity Action Plan 2010-2015 states that Article 10 of the Habitats Directive seeks to provide for the maintenance and enhancement of natural habitats in the wider landscape. It calls for land-use planning and development policies to *"encourage the management of features of the landscape which are of major importance for wild fauna and flora"*. Such features are defined as *"those which by their linear and continuous structure (such as rivers and their banks or the traditional systems of marking field boundaries) or their function as stepping stones (such as ponds or small woods), are essential for the migration, dispersal and genetic exchange of wild species"*. The plan also acknowledges that throughout Europe and further afield the issues of habitat fragmentation and habitat & species conservation are being addressed by establishing national and regional Ecological Networks. This Biodiversity Action Plan is concentrates on the development and delivery of an Ecological Network across Fingal. The Ecological Network in Fingal covers 13,120 ha, including the islands and estuaries. Page 48 of the Draft BAP states *'where access is provided for amenity purposes, it will be planned in such a manner that the ecological qualities are not impacted upon or are improved where possible'*. The Ecological Network Maps contained in the Biodiversity Action Plan have been examined as part of this Environmental Report and any issues in relation to impacts from the proposed cycle tracks have been addressed in Section 9.2.

The EPA has also published a Biodiversity Action Plan and this provides more strategic policy objectives to enhance biodiversity and increase biodiversity data availability.

7.2.11 Current Issues and Problems

There was a 20% increase in artificial land from 2000 – 2006 in the GDA due to urban development in previously greenfield areas. Since then there has been further

significant growth, but in recent years the rate and extent of this growth has slowed. The general trend over the last 15 years has increased pressures on habitats and species throughout the region, resulting in habitat and biodiversity loss and damage. According to The Status of EU Protected Habitats and Species in Ireland (NPWS, 2008) the most significant pressures on habitats are from:

- Grazing;
- Recreation;
- Peat extraction;
- Communication networks;
- Forestry; and
- Urbanisation.

The most significant pressures on flora and fauna species are:

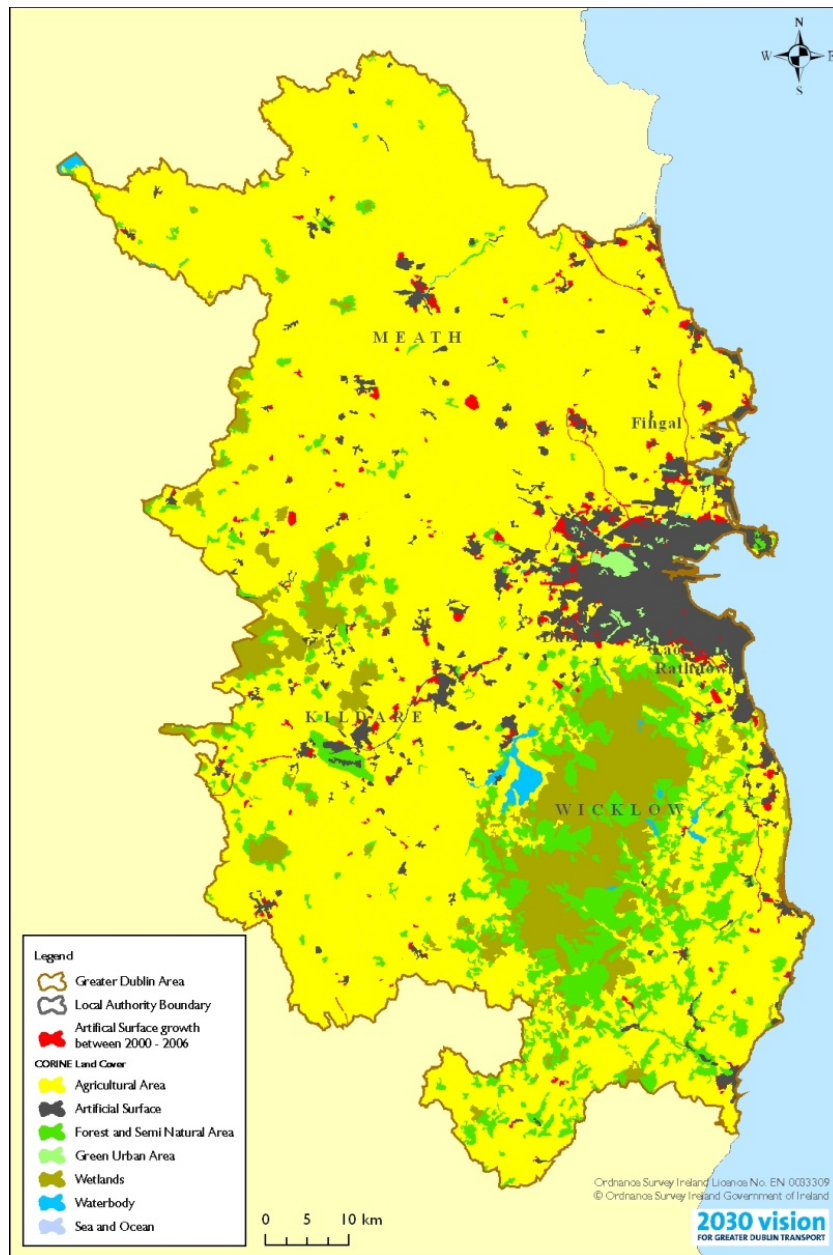
- Fishing;
- Drainage, pollution;
- Communication networks;
- Forestry; and
- Recreation.

Within the GDA, the main threats on biodiversity are:

- Loss of extent of biodiversity;
- Habitat fragmentation; and
- Presence of invasive species.

There has been a significant impact on the vitality of habitats and species due to the considerable change in land use patterns in recent years. Due to changes in land cover, the amount of land within the GDA that is capable of supporting biodiversity has been reduced. Figure 7.7 and 7.8 present a summary of the key land use changes between 2000 and 2006. This trend is driven by the large increase in residential and commercial development during the period.

Figure 7.7 2006 Land Cover data (including key changes from 2000 – 2006)



Source: Environmental Report - NTA Draft Transport Strategy for the GDA, 2011

Figure 7.8 below shows respective levels of artificial land covering in the seven local authority areas of the GDA for both 2000 and 2006. The increases in artificial land cover over this six year period can be then determined. It can be seen that the counties with the greatest level of increased artificial land are Meath, Kildare and Wicklow and Fingal.

Figure 7.8 Artificial Land Use by County in the Greater Dublin Area (GDA), 2000 and 2006



Source: Data: JRC/UII; Analysis: EPA in EPA (2008) Ireland's Environment 2008

7.2.12 Likely Evolution in the Absence of the Cycle Network Plan

It is likely that the recent slowdown in the rate of urbanisation in the GDA will continue over the lifetime of the Plan as the economic recovery continues and take-up of vacant housing and commercial premises takes place in advance of any major new developments, with a few exceptions.

The NPWS Conservation Status Report (from which the data in Figure 7.2 and 7.3 was obtained) notes: "many Irish species of fauna and flora have a moderately satisfactory status, but a small number are in urgent need of concerted efforts to protect them. The assessments of habitats present a much bleaker picture with the majority being rated as having poor or bad overall status". This Report also notes the "enormous" national challenges, the following of which are of most relevance to the GDA:

- Sustainable management of coastal resources much valued for recreation and development;
- Improving water quality.

Climate change is also considered as a potential threat to the health and vitality of biodiversity throughout the GDA and may potentially lead to changes to native species.

7.2.13 Implications for the GDA Cycle Network Plan

Natura 2000 sites make up 10.3% of the GDA (719 sq. kms.). The remaining areas of the GDA also provide some biodiversity value. However, in light of the poor condition of some SACs / SPAs and continuing loss of biodiversity, it is likely that care will be needed to ensure that the Cycle Network Plan does not unintentionally promote further biodiversity loss or damage.

As some of the proposed greenway routes are to be located along coastal sites and other sensitive areas, certain impacts on biodiversity features may occur. The finalised routes for the Cycle Network Plan should therefore be designed in such a way as to avoid significantly impacting on the region's protected/designated biodiversity resources.

Cycle Network infrastructure may also positively contribute to local biodiversity quality through the provision of new habitats as part of projects.

7.3 Landscape

The landscape in the GDA is diverse and includes urban areas, rural areas, mountains and upland areas, plains, canals, valleys and coastal areas. Transport infrastructure (roads, rail-lines, etc.) has historically formed a key component and influence on the development and evolution of the landscape character of the GDA. Some key landscape features of the GDA include the Dublin/Wicklow Mountains and the coastline of the Irish Sea. The GDA also contains many urban areas which provide landscape features, particularly some of the historic centres and streets such as those in Georgian Dublin and the heritage towns of Kells, Trim and Dalkey.

Local Authorities are responsible for the conservation and protection of landscapes and visual amenities and the designation of certain landscapes as Areas of High Amenity, Areas of Outstanding Natural Beauty, Protected Views, Architectural Conservation Areas and Areas of Special Planning Control. The County and City Development Plans drawn up by each of the Local Authorities outline these designations. Appendix B.4 sets out examples of landscape classifications in the GDA.

In addition to the various designated and protected landscapes, the rest of the GDA can be considered as a series of undesignated landscapes ranging from urban areas (townscapes) to rural areas (agricultural lands). Impacts on the landscape generally are considered in the development management system which is the responsibility of local authorities.

In terms of land cover in the GDA, data from the Corine database shows that agriculture comprises 23% of all land cover, followed by wetlands (9.6%) and forestry (8.2%). This information is shown in Figure 7.7 in the previous section. The Department of Arts, Heritage and the Gaeltacht's Draft National Landscape Strategy was published in September 2011.

7.3.1 Current Issues and Problems

Urban development patterns in the GDA in recent years have been notable for the spatial expansion of existing towns and villages into the surrounding countryside. Urban development has the potential to change all landscapes, both designated and undesignated. Unwelcome physical changes may result from new development occurring within such landscapes or from the increased recreational usage of landscapes as a result of increased urbanisation generally in the GDA.

7.3.2 Likely Evolution in the Absence of the Cycle Network Plan

It is expected the Cycle Network Plan will encourage a greater use and modal shift to cycling from unsustainable modes of transport. It is likely that care will be needed to ensure that the Cycle Network Plan does not significantly affect both designated and undesignated landscape features.

Therefore in the absence of the plan the modes of transport used by the population in the GDA will remain more or less unchanged. There may be exceptions where investment in public transport is prioritised. A lot of the existing cycling routes in the GDA are currently overloaded with cyclists therefore the absence of the development of new routes may cause a freeze in numbers for the modal shift to cycling or may even cause a reverse of the existing situation and a modal shift back to other modes of transport.

7.3.3 Implications for the GDA Cycle Network Plan

As some of the proposed greenway routes are to be located along coastal and other sensitive landscape areas, certain impacts on landscape features may occur. Similar to the points raised under Biodiversity, the finalised routes for the Cycle Network Plan should be designed in such a way as to not significantly impact on the region's protected and designated landscape resources and the wider undesignated landscape.

Cycle Network infrastructure may also positively contribute to local landscape quality through the provision of planting and landscaping as part of projects and local streetscape improvements.

7.4 Population

The population of Ireland was recorded as approximately 4.57 million at the last census in April 2011, up from 4.24 million in 2006. In 2011, the population of the GDA was 1,804,156, an increase of over 8% since 2006. All local authority areas within the GDA experienced population increases between 2006 and 2011, as shown in Table 7.2 below.

Table 7.2 Trends in population for counties within the GDA

Local Authority	2006	2011	% Change 06-11
Meath	162,831	184,135	13.08
Kildare	186,335	210,312	12.87
Wicklow	126,194	136,640	8.28
Fingal	239,992	273,991	14.17
Dublin City	506,211	527,612	4.23
South Dublin	246,935	265,205	7.40
Dun Laoghaire – Rathdown	194,038	206,261	6.30
GDA Total	1,662,536	1,804,156	8.52
State	4,239,848	4,588,252	8.22

Source: Central Statistics Office website www.cso.ie

The most significant population increases over the period 2006 to 2011 were in Fingal, Meath and Kildare. This population growth was accommodated, primarily, by

the growth of towns and villages in these counties, from where commuters travel to work in Dublin City and suburban employment centres in areas along the M50 Corridor such as Sandyford and Park West.

The population density of Dublin city (as defined by the City Council area) is broadly comparable to that of other major cities in the world, as shown in Table 7.3 below. This data has been obtained from the UN website (Population of capital cities and cities of 100 000 or more inhabitants: latest available year, 1988 – 2007).

Table 7.3 City population densities

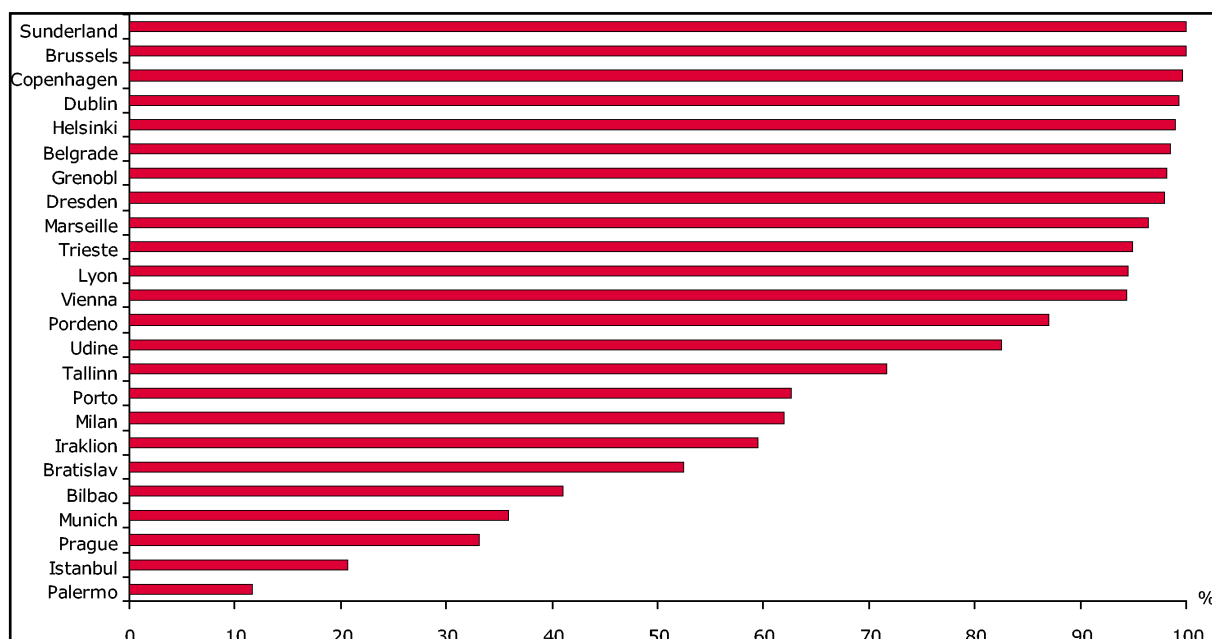
City (Country)	Population	Surface area (km ²)	Population/km ²
Dhaka (Bangladesh) *	5,333,571	154	34,633.6
Paris (France)	2,125,017	105	20,238.3
New York (US)	8,274,527	786	10,527.4
Hong Kong (China)	6,925,900	1,104	6,273.5
Lisbon (Portugal)	504,726	85	5,937.9
Tokyo (Japan) *	12,576,601	2,187	5,750.6
Rio de Janeiro (Brazil)	6,136,652	1,256	4,885.9
Chicago (US)	2,836,658	589	4,816.1
Bangkok (Thailand) *	6,842,000	1,569	4,360.7
Stockholm (Sweden)	789,024	187	4,219.4
Dublin City (2002)	495,781	118	4,201.5
Zürich (Switzerland) *	348,680	87	4,007.8
Berlin (Germany)	3,386,667	891	3,801.0
Amsterdam (Netherlands) *	1,022,487	367	2,786.1
Rome (Italy)	2,626,640	1,308	2,008.1
Barcelona (Spain)	1,605,602	991	1,620.2
Dublin Metropolitan Area (2006)	1,242,709	838	1,482.9
Oslo (Norway)	554,551	426	1,301.8
Madrid (Spain)	3,128,600	6,058	516.4
Canberra (Australia)	339,573	810	419.2
Sydney (Australia)	4,336,374	12,140	357.2

However, it should be noted that the data in Table 8.3 is comprised of a range of non-identical urban population and area measures. For example, data provided for some cities such as Dublin and Rio de Janeiro is based on the city boundaries, which excludes population growth and urban expansion in adjoining jurisdictions, whereas the data for other cities is based on the wider urban agglomeration such as Bangkok and Tokyo: these are marked with an ‘*’ and therefore is a more accurate presentation of actual city population density.

As a comparison, the data for the Dublin Metropolitan Area in 2006, as defined by the Regional Planning Guidelines, is also provided in Table 8.6. When the urban agglomerations are compared it can be seen that Dublin is of a significantly lower density than comparable cities such as Zurich or Amsterdam. The most densely populated areas of Dublin are the areas located nearer the city centre (especially between the canals) and – to a lesser extent - in the older suburban areas. It should be noted also that many recent suburban developments in Dublin were of higher densities than those which pertained through most of the late 20th Century.

This finding is also noted in an EU research report on urban sprawl ⁽¹⁾ published in 2006. Figure 8.9 below is taken from this report (figure 2, pg. 12) and provides information on low density residential development as a proportion of all residential areas built after the mid-1950s, in selected European cities, including Dublin.

Figure 7.9 Low density residential development as a proportion of all residential areas built after the mid-1950s



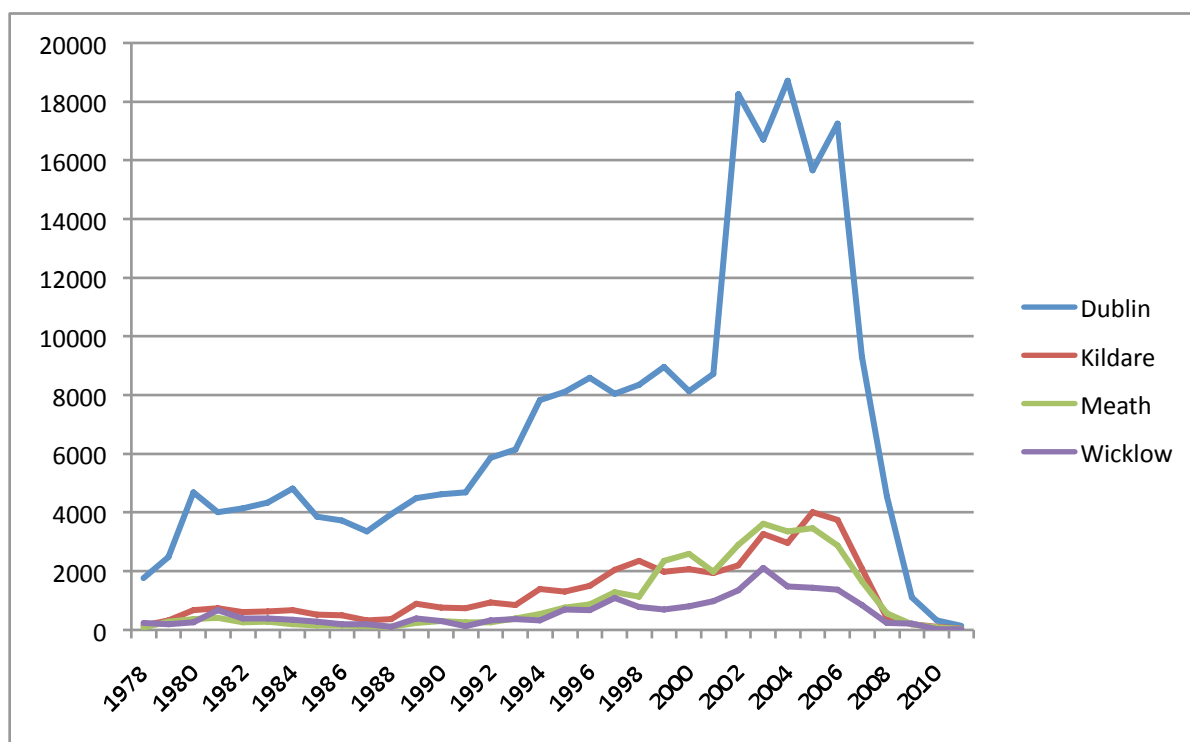
It can be seen that almost 100% of all post-1950 residential development in Dublin has been of low density. It should also be noted that this is not an exclusive development trend to Dublin and that majority of the cities studied also have substantial proportion of low density residential development over the same period of time.

7.4.1 Household Formation

The growth in population within the GDA and decreasing average household sizes is also reflected in the increase in the number of new households registered in the GDA, as shown in Figure 8.10 below. It can be seen that there was a substantial increase in the number of registrations (especially in the Dublin Region) in the period 2002 to 2007, quickly followed by a rapid tail-off in registration over 2007 and 2008. This is symptomatic of the general economic slow-down, a key factor of which is the substantial decline in the residential construction sector.

(1) Urban sprawl in Europe - The ignored challenge [EEA Report No 10/2006]; European Environment Agency, November 2006.

Figure 7.10 No. of New House Registrations by County in the GDA – 1978-2011



Source: Department of the Environment, Heritage and Local Government Statistics website:
<http://www.cso.ie/px/doi/doi/Dialog/Saveshow.asp>

7.4.2 Demographics

From 1996 to 2006, there was a large increase in the population in the 25 – 64 age group, especially in the Mid-East Region (+59%). There has also been a smaller increase in the Mid-East Region of those within the 15 – 24 age demographic (+16.5%). This is a reflection of the movement of people of family-forming age away from the Dublin Region to satellite towns in the Outer Counties of Meath, Kildare and Wicklow, primarily driven by the lack of affordable appropriate accommodation in areas of Dublin itself. Associated with this, parts of Dublin have seen some population decline. In these areas, the demographics are skewed toward an older, aging population, which is a reflection of the trend described above. The prevailing economic trends, including the substantial decrease in housing prices may reverse this pattern to an extent.

7.4.3 Employment

There had been a consistent growth in employment in the period from 1996 to 2007. However, the recession has resulted in a decrease in overall employment and a corresponding increase in unemployment. According to the 2011 Census, there were c.750,000 persons at work living in the GDA, down from 800,240 in 2006. The Quarterly National Household Survey from Q3 2012 revealed an unemployment rate of 13.2% for the GDA. Table 8.4 shows the Principal Economic Status of the 7 local authority areas in the GDA from the 2011 Census.

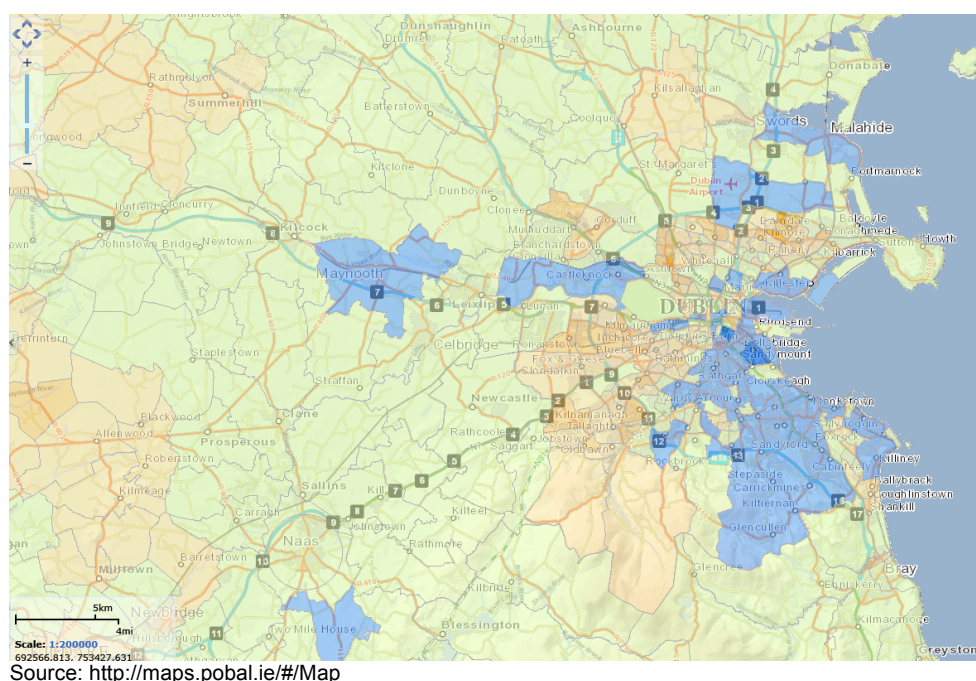
Table 7.4 Principal Socio-Economic Status 2011

	Persons at work	Unemployed	Student or pupil	Looking after home/family	Retired
Dublin City	227,429	51,699	56,377	32,058	58,475
Dún Laoghaire-Rathdown	87,490	11,071	24,481	15,625	25,722
Fingal	119,276	22,640	21,762	18,759	18,370
South Dublin	106,534	26,039	22,307	19,362	20,611
Kildare	85,587	18,639	18,009	15,680	14,639
Meath	74,342	16,292	13,775	14,345	13,959
Wicklow	52,907	12,674	11,687	11,216	12,845
GDA	753,565	159,054	168,398	127,045	164,621

7.4.4 Deprivation

Deprivation data is provided in Figure 7.16 below. The data used to prepare this is based on the 2011 Census published by Pobal and Trutz Haase. The bluest areas are the most affluent while the darkest brown represent 'very disadvantaged' areas.

Figure 7.11 Relative Social Deprivation Index for the Dublin Area



This data shows that the most deprived areas in Dublin in 2011 were in Darndale, Coolock and Finglas. The most affluent areas were along the coast from Malahide to Dún Laoghaire and large parts of the southern suburbs.

The Department of Community, Rural and Gaeltacht Affairs has also designated a set of RAPID (Revitalising Areas by Planning Investment and Development) and CLÁR (Ceantair Laga Árd-Riachtanais) spatial areas. The RAPID Programme is a

Government initiative which targets 45 of the most disadvantaged areas in Ireland. The Programme aims to ensure that priority attention is given to the 45 designated areas by focusing State resources available under the National Development Plan. RAPID areas in the GDA are summarised in Table 7.5 below.

Table 7.5 RAPID areas in the GDA

County	Area	Sub-area
Dublin	Dublin Northside	Darndale, Belcamp, Bunratty Road Maisonettes
	Ballymun	Poppintree, Balcurris Gardens, Silogue Gardens, Shangan Gardens, Coultry Gardens
	Finglas	District Electoral Divisions of Finglas South A and Finglas North A
	North West Inner City	Kings Inns, Marmion Court/Queens St, O'Devaney Gardens, Hardwick Street Flats, Dominick Street Flats, Dorset Street Flats
	North East Inner City	Mountjoy Square, Alfie Byrne House/Hill St, Ballybough Road, the area around Sean McDermott St, Summerhill
	South Inner City	Mary Aikenhead House, Emmett Buildings, Bridgefoot St, Oliver Bond House, St Audeon's House, Braithwaite St/Summer St, Chamber Court/Weaver St, St Teresa's Gardens
	South West Inner City	Bluebell/Bernard Curtis House, St Michael's Estate/Tyrone Place, Rutland Avenue/Rutland Grove
	South East Inner City	Charlemont St/Tom Kelly Rd, Power's Court/Verschoye, Leo Fitzgerald House, St Andrews Court, Macken Villa's
	Tallaght- Fettercairn	District Electoral Division of Fettercairn
	Tallaght- Jobstown	District Electoral Division of Jobstown
	Clondalkin	Rowlagh, Shancastle, Greenfort, Harelawn, Neilstown Estate
	Blanchardstown	Tyrrelstown, Mulhuddart and Local Authority Housing Estates in Corduff
	Dun Laoghaire / Rathdown	Loughlinstown and Shanganagh
	Bray	Fassaroe, Oldcourt, Kilbride Grove, Ballywaltrim Heights, Deerpark/Heatherwood
Kildare	Athy	
Meath	Drogheda	Ballsgrove, Marian Park, St Finians Park, Rathmullen, Pearse Park, Yellowbatter, Moneymore

County	Area	Sub-area
	Navan	Claremont Estate, Woodview Estate, Clogherboy/Oaklawns Estate, Townspark Estate, Reask Estate, St. Columba's Crescent, St. Benildus Villas, Dean Cogan Place, McDermott Villas, Emmet Terrace, St Bridgids Villas, Parnell Park, Connolly Avenue, St Patrick's Terrace

The CLÁR programme is a targeted investment programme for deprived rural areas. CLÁR complements both the RAPID programme for disadvantaged urban areas and provincial towns. CLÁR provides funding and co-funding to Government Departments, State Agencies and Local Authorities and these investments support physical, economic and social infrastructure across a variety of measures. CLAR areas within the GDA are summarised in Table 7.6 below.

Table 7.6 CLAR areas in the GDA

County	DED
Meath	Ballinlough, Moybolgue, Crosskeys, Moylagh, Burry, Newcastle, Killallon, Stonefield, Castlekeeran, Trohanny, Killeagh, Kilskeer, Crossakeel and Knocklough
Wicklow	Ballinguile, Lugglass, Ballybeg, Kilpipe, Imeal North, Ballinacor and Coolballintaggart

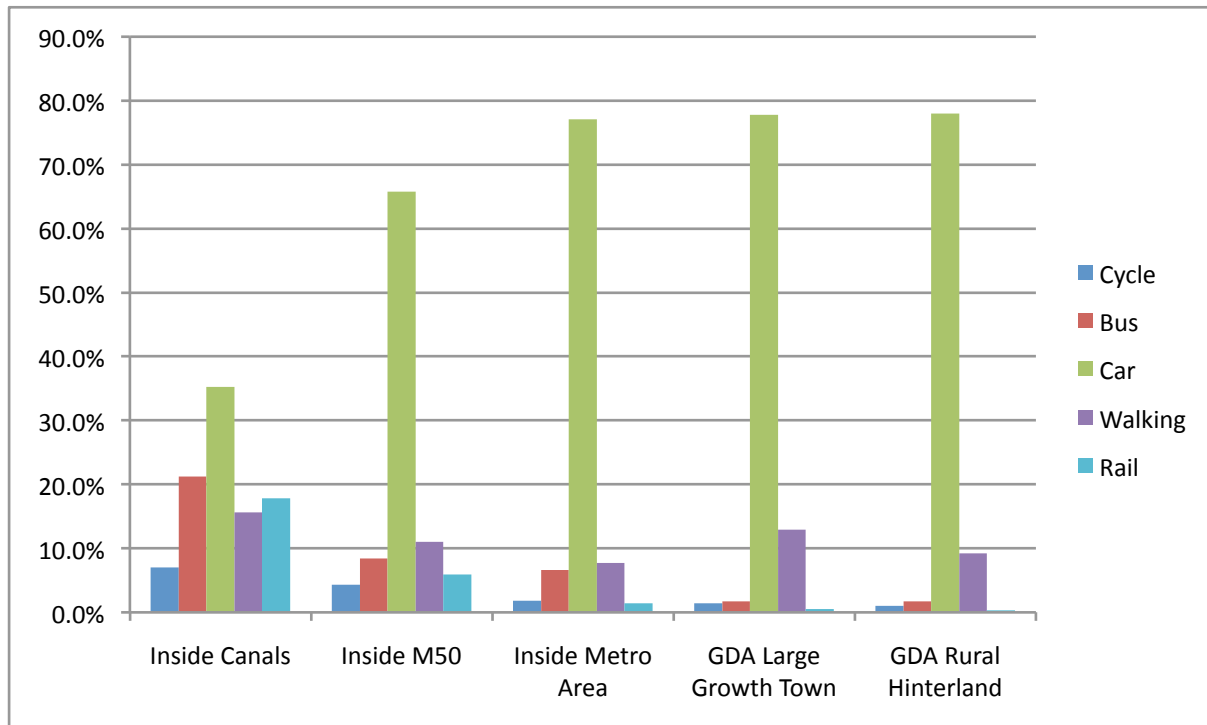
7.4.5 Transport Patterns

Mode Split

With the large increase in overall population and employment from the late 1990's, and the pattern of urban development and expansion in the peripheral Local Authority areas, there has been an associated increase in travel demand in the GDA. The majority of this demand is being met by the private car as a mode of transport, accounting for just under 60% of work-related journeys in the GDA.

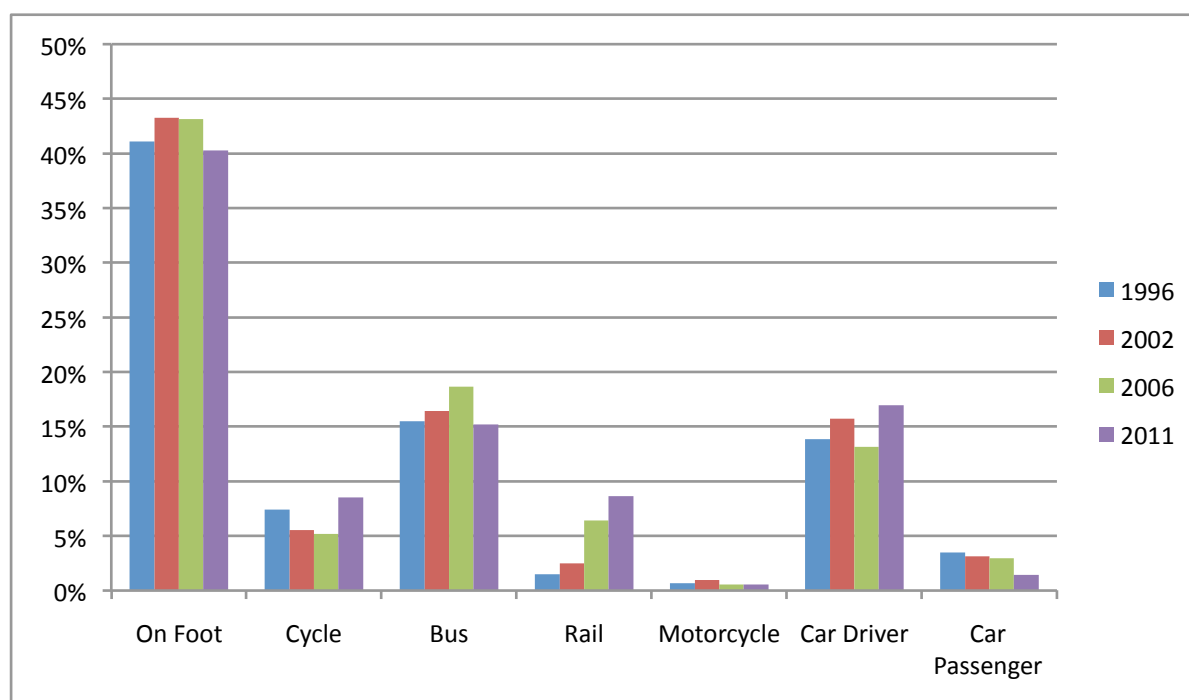
Figure 7.12 below shows a breakdown of the modes of transport to work for various spatial areas within the GDA and shows that as a person's place of work moves away from the city centre the more likely it is that people will drive to work. Dublin City Centre, as defined by the Canals, is the only part of the GDA to have a below average mode share for Car.

Figure 7.12 Persons at Work and Their Means of Travel to Work at Place of Work, 2011



Walking and cycling are also significant modes of transport for those living within the city centre, as defined by the canals, where approximately 50% of residents walk or cycle to work. Likewise, public transport is also significant for transport for those living within Dublin city centre. Indeed, travel data from the NTA shows that car use declined in the period 1996 - 2006 with an increase in walking for this area. Since 2006 this trend has reversed, but rail and cycling have both increased. This is illustrated in Figure 7.13 below.

Figure 7.13 Mode Splits for work trips for those resident Inside the Canals 1996-2011



Source: Central Statistics Office [POWCAR](#) database

7.4.6 Current Issues and Problems

Based on 2011 data at place of work, car is the most popular mode of transport in Dublin and is likely to remain so until the key pieces of public transport infrastructure are completed, such as Metro North and DART Underground. While the bus generally presents a very flexible and relatively cost-effective form of public transport, it does not offer the equivalent level of service offered by rail in relation to capacity, speed and reliability. This, in turn, impacts on its image as a viable alternative to the private car, even though it is more widely available than rail.

For those resident within Dublin city centre, considerably greater use is made of walking and cycling. The implementation of a city bicycle rental scheme in 2009 has increased the profile of this mode and facilitated short trips within this area.

7.4.7 Likely Evolution in the Absence of the Cycle Network Plan

Population and Employment Distribution

The distribution of population and employment is likely to remain relatively constant over the lifetime of this plan, with moderate growth in some developing areas. Over a longer period of time, and as land-use and transport are more closely integrated, the location of cycle networks may influence patterns of development, in that areas closest to good networks may in some cases be favoured locations for growth. Without the plan, this is less likely to occur and recent trends would be likely to persevere.

Transport Patterns

Without the plan, it is likely that the transport patterns would remain unchanged. Car will continue to dominate to the extent it does at present. It is hoped that by improving

cycling infrastructure and by implementing the objectives of the plan, cycling would grow as a mode for all trips.

7.4.8 Implications for the Cycle Network Plan

The Plan includes objectives to increase the overall capacity, reliability and safety of cycling infrastructure. Through providing high-quality and safe cycling route options, a greater proportion of the population is likely to regularly use cycling over the private car.

The Cycle Network Plan will also aim to promote more efficient use of land, especially brownfield land close to urban centres or close to major transport routes.

7.5 Human Health

The Human health environmental topic addresses general health and specific issues associated with human health and transport, including personal safety, mental and physical wellbeing and relevant quality of life issues.

7.5.1 General Health and Life Expectancy

According to the Survey of Lifestyle, Attitudes and Nutrition (SLAN) in Ireland in 2007, self-rated health was recorded as 'excellent' or 'very good' by approximately 58% of respondents, with only 3% rating their health as 'poor', an increase in those rating as 'excellent' or 'very good' from 1998 (45%) and 2002 (50%). Approximately 11% of respondents reported a long-term illness, health problem or disability that limited their daily activity. Lower social class groups showed higher than average long-term illnesses. Overall, 12% of respondents indicated that they had recently suffered from ill-health and limitations because of mental or physical health in the previous 30 days.

In the same survey, relatively high levels of positive mental health were reported. Approximately 6% of respondents reported suffering from major depression, while 3% suffered from generalised anxiety disorder. In general, men, younger people, and those in higher social class groups reported lower levels of mental health problems.

7.5.2 Physical activity and exercise

The National Guidelines for Physical Activity in Ireland (Department of Health and Children, Health Service Executive, 2009) quotes the National Survey of Lifestyles Attitudes and Nutrition (SLAN 2007) which showed that only 41% of Irish adults took part in moderate or strenuous physical activity for at least 20 minutes three or more times a week. The recommended level of physical activity from which adults start to get health benefits comprises at least 150 minutes a week of moderate physical activity (an average of 30 minutes of activity on five days a week).

The Health Behaviours in School Children (HBSC, 2006) survey revealed that over half of primary school age children did not achieve the recommended level of physical activity. The evidence shows that the majority of the Irish population is not getting sufficient exercise and this is causing long-term health impacts.

According to the Department of Health and Children, obesity is a major public health concern in Ireland. The 2007 SLAN report showed that 38% of Irish people were overweight and another 23% were obese. One in five Irish children and teenagers is overweight or obese (Irish Universities Nutrition Alliance, 2008). The trend of increasing incidents of obesity can be linked to a range of factors, but a key driver is an increase in sedentary lifestyles and higher calorie intake.

7.5.3 Road Safety

Data from the Road Safety Authority website notes that the number of Irish road deaths was 186 in 2011, the lowest level on record. The 186 who died consisted of 47 pedestrians, 9 cyclists, 95 car users and 18 bikers.

On the basis of road deaths per million population, in 2010, the latest year for which international comparative information is available, Ireland is ranked seventh out of the EU-27.

Table 7.7 below presents traffic accident data for 2011 for the GDA. It can be seen that the region accounts for 35.2% of all accidents in Ireland and 36% of all registered vehicles. The four Dublin Local Authorities account for 24.5% of all reported collisions and 24.4% of registered vehicles in the State. In relation to road fatalities, the four Dublin Local Authorities have a combined total of 5.9%, with the GDA having 17.7% of all road fatalities in Ireland.

Table 7.7 Traffic Collisions and Casualties in the GDA, 2011

County	Reg. Motor Vehicles	Fatal Collisions	Injurious Collisions	Total Collisions	Total Killed	Total Injured	Total Casualties
Dublin	595,000 (24.5%)	11	1,268	1,278 (24.4%)	11 (5.9%)	1,607	1,618 (21.8%)
Kildare	109,000 (4.5%)	14	178	192 (3.7%)	15 (8.1%)	268	283 (3.8%)
Meath	95,000 (3.9%)	3	194	197 (3.8%)	4 (2.1%)	279	283 (3.8%)
Wicklow	75,000 (3.1%)	3	174	177 (3.4%)	3 (21.6%)	255	258 (3.5%)
GDA	874,000 (36.0%)	31	1,814	1,844 (35.2%)	33 (17.7%)	2,409	2,442 (26.3%)
State	2,425,000 (100%)	172	5,058	5,230 (100%)	186 (100%)	7,235	7,421 (100%)

Source: Road Safety Authority (2011) Road Collision Facts Ireland 2010

7.5.4 Current Issues and Problems

In relation to human health, obesity is a considerable health risk for both adults and children, with incident rates rising continuously. A lack of exercise and activity is a key factor behind this growing health problem.

With regard to road safety, while the number of vehicles has been increasing in recent years it is also shown above that the number of fatal or injurious road collisions has been decreasing over time. This can be attributed to:

- on-going and high-profile road safety campaigns;
- implementation and enhancement of the penalty points system;
- regular road-side police checks (drink-driving etc.);
- improved vehicle conditioning as a result of the NCT regulations; and
- improvements to the national, regional and local road networks.

7.5.5 Likely Evolution in the Absence of the Cycle Network Plan

It has hard to predict the effect of various Government initiatives to encourage greater physical activity, but it is expected that encouraging and promoting greater

levels of physical activity may partially address future levels of obesity and associated health problems.

The Cycle Network Plan seeks to encourage a shift towards cycling as a prime mode of transport in the GDA, therefore encouraging physical activity which should have knock on health benefits for the population. This along with the introduction of new cycle routes and segregated cycle lanes as part of the plan is likely to further reduce the overall level of cycling related accidents in the GDA.

7.5.6 Implications for the Implementation Plan

One of the key aims of the Plan is to promote cycling in the GDA. As mentioned above increased levels of cycling will benefit people's health. It is essential that any increase in the use of this mode considers the wider health and accident risks and that appropriate infrastructure is carefully designed and located.

The Plan will seek to improve the overall health and fitness of the GDA's population through the promotion and facilitation of cycling. This may increase long-term life expectancy and address some of the health issues associated with lack of exercise, especially for those portions of the population who make the modal shift from motorised transport to cycling on a regular basis.

7.6 Noise

The main sources of available data on baseline noise are the Strategic Noise Maps and Noise Action Plans. The preparation of these is a requirement of the EU Noise Directive, which was transposed into Irish law by Environmental Regulations 2006 (S.I. 140 of 2006). These regulations require Local Authorities to prepare Noise Action Plans and undertake noise mapping if their administrative areas meet certain criteria, such as traffic flows on key roads being above specific thresholds or rail lines having a certain volume of total train movements.

Within the GDA, the four Dublin Local Authorities are required to produce Noise maps and Noise Action Plans. They have jointly prepared a single Noise Action Plan, called Dublin Agglomeration Action Plan Relating to the Assessment & Management of Environmental Noise, October 2008 – November 2013 ('Dublin Noise Action Plan'). Kildare and Meath County Councils have also prepared Noise Action Plans.

The Dublin Noise Action Plan notes that road traffic is the main source of environmental noise in the four Local Authorities of County Dublin and that railway noise does not have a major impact on overall noise levels. Table 7.8 below shows the results from the strategic noise mapping. It provides the percentage breakdown for residential populations within specified noise bands for each of the four Dublin Local Authorities.

Table 7.8 Residential population exposure to road traffic noise

	Dublin City		South Dublin		Fingal		Dun Laoghaire	
dB(A)	Day % ¹	Night % ²	Day % ¹	Night % ²	Day % ¹	Night % ²	Day % ¹	Night % ²
< 55	5.5	41.5	28.3	55.6	29.0	78.4	6.0	68.0
55 – 59	48.0	32.2	42.3	24.2	42.6	12.8	32.4	16.0
60 – 64	27.0	20.5	16.3	12.4	15.4	6.7	37.1	12.3
65 – 69	15.8	5.7	8.5	6.9	9.3	1.9	12.5	3.6
70 – 74	3.7	0.1	4.4	0.9	3.5	0.1	9.5	0.1
> 75	0.0	0.0	0.2	0.0	0.2	0.0	2.4	0.0

1: Day time (7am – 7pm) noise levels >70dB are considered undesirable (grey shading).
2: Night time (7pm - 7am) noise levels >55dB are considered undesirable (grey shading).
Source: South Dublin County Council (2008) Dublin Agglomeration Draft Action Plan Relating to the Assessment & Management of Environmental Noise

7.6.1 Current Issues and Problems

These results show that – broadly - the proportion of the population exposed to undesirable day time noise levels (>70dB) from traffic are relatively minor (3.7% in Dublin City Council to 9.5% in Dun Laoghaire-Rathdown County Council). However, the percentage of the population exposed to undesirable night time noise levels (>55dB) is considerably greater (58.5% in Dublin City Council to 21.6% in Fingal County Council).

Other results also reveal that the greatest source of road traffic noise exposure is not limited to 'Major roads' (defined as carrying more than 16,438 vehicles per 24 hours): these comprise 9.9% of the overall roads in the Dublin agglomeration), with all other roads being the greatest source of this exposure.

In relation to the Kildare and Meath Noise Action Plans, these note that major roads (national roads and motorways) are the main sources of environmental noise.

7.6.2 Likely Evolution in the Absence of the Cycle Network Plan

The review and implementation of the various Noise Action Plans is likely to reduce noise levels. The Local Authorities aim to reduce the levels of noise through the introduction of various measures including the reduction of traffic, promoting public transport, walking and cycling, traffic management measures, restricting HGV access to certain areas and/or times, traffic calming and improved road surfaces. Despite this, significant reductions in the proportions of the population which are exposed to undesirable noise levels are not expected in the short-term.

7.6.3 Implications for the Cycle Network Plan

The promotion of cycling rather than the use of private car is likely to improve the day time noise characteristics of the GDA.

Night-time noise levels present a difficult challenge for the Cycle Network Plan. Road traffic is the main source of undesirable night-time levels for significant parts of the GDA. However, at night, cycling is often less attractive from a road safety and personal security point of view. The Cycle Network Plan can only ensure that routes being used at night consider additional lighting, surveillance and other safety precautions to help encourage their use.

7.7 Water

Water refers to all water-based resources in the GDA. These resources consist of surface waters (rivers, streams, lakes and canals), groundwaters (aquifers and public water sources), transitional waters (estuaries) and coastal waters.

The EPA's (2010) Water Quality in Ireland 2007 - 2009 report indicate that river water quality between 2007 to 2009 showed a small decline compared with the 2004 to 2006 period. It reports that throughout Ireland 68.9% of watercourses have been determined to be unpolluted, 20.7% slightly polluted, 10.0% moderately polluted and 0.5% seriously polluted. However, the Eastern River Basin District, which covers almost 75% of the GDA, despite the steady reduction in seriously polluted channel length, had the lowest percentage of unpolluted channel length in the 2007-2009 survey period. The percentage of unpolluted channel length has decreased from 52% to 46% since the 2004-06 period.

7.7.1 Water Framework Directive

Under the Water Framework Directive (WFD) (2000/60/EC) Ireland's various water resources are managed on a catchment basis. There are a total of 8 River Basin Districts (RBDs) across Ireland. The GDA contains all or parts of four RBDs: the Eastern River Basin District (ERBD), a proportion of the South-Eastern River Basin District (SERBD) and a small area of the Neagh Bann River Basin District (NERBD) and the Shannon International River Basin District (ShIRBD). These RBD's are shown in Figure 7.14.

Figure 7.14 River Basin District Boundaries within the GDA



Source: Environmental Report - NTA Draft Transport Strategy for the GDA, 2011

The key objective of the WFD is the attainment of good status by 2015 for all water bodies. Under the WFD, a 4-category risk assessment rating has been developed, based on the likelihood of a water body attaining good status. The risk assessment was initially completed in 2005. This was then replaced with interim status data which was determined as part of the preparation of draft River Basin Management Plans (RBMPs) published in 2010. .

7.7.2 Surface waters

Many of the rivers and surface water bodies of the GDA are under pressure and are at risk of not attaining the standards as required under the WFD. The key reason for this is that most of the surface water bodies in the GDA are at risk from point sources of pollution such as industrial and wastewater discharges and diffuse sources of pollution such as urban and agricultural runoff.

In the Eastern RBD (representing almost 75% of the GDA, including the majority of the urban and semi-urban areas) the percentage of Class A unpolluted length of river

channel has increased from 42% (in 1998-2000) to 46% (in 2004-2006). However, this is still below the national average of 68.9%.

7.7.3 Groundwater

Groundwater is an important source of drinking water but also makes an important contribution to river flows and lake levels. Status data regarding groundwaters in the ERBD is shown in Table 7.9 below.

Table 7.9 Groundwater Status in the ERBD

Groundwater	Good	Failing to achieve Good
Chemical Status (% of total area)	91%	9%
Quantitative Status (% of total area)	99%	1%

Groundwater sources, particularly public, group scheme and industrial supplies, are of critical importance in many regions. The objective of Groundwater Source Protection Zones is to provide protection by placing tighter controls on activities within all or part of the zone of contribution (ZOC) of the source.

Groundwater status in the ERBD has been found to be generally good with almost 91% of the groundwater area achieving good chemical status (chemical composition of groundwater) and 99% of the area achieving good quantitative status (groundwater flows).

7.7.4 Drinking water supplies

Approximately 26% of the total drinking water supplied in Ireland is directly from groundwater supplies (EPA, 2008). Drinking water compliance is not a significant issue in the GDA.

7.7.5 Flooding

Flooding is a regular occurrence at specific locations within the GDA. The onset of climate change is predicted to increase both the frequency and severity/magnitude of flooding in the GDA. Currently there is no flood risk mapping available for the GDA. However, the OPW has commissioned three sub-regional flooding and drainage studies (called Catchment Flood Risk Assessment and Management Studies or CFRAMS and one of these is in the GDA - the Fingal-East Meath CFRAMS).

The Tolka and the Dodder Rivers have been causes of historical flooding in parts of Dublin city. Coastal flooding has also occurred in the Docklands area of the city and other coastal areas. The Boyne River has also caused significant flooding within its catchment.

Inadequately designed or sized drainage infrastructure is also responsible for more localised flooding-events – these situations arise where the infrastructure cannot drain land faster than water is collecting on the surface. Serious flooding caused by severe rainfall occurred in several locations in metropolitan Dublin, including the City Centre, in October 2011.

Poor siting of new developments on land prone to flooding has also resulted in an increase in the physical and financial damage to property and infrastructure from flooding.

7.7.6 Current Issues and Problems

Impacts on general water quality

Within the GDA, there has been a general problem of water pollution due to the inadequate treatment of effluents and spillages and leaks from sewerage networks. The issue of poor and inadequate treatment of wastewater is exacerbated by the large growth in the population and level of employment of the GDA up to 2008.

In the rural areas of the GDA, onsite water treatment systems can also cause contamination of surface and groundwaters. Pollution of waters can result in a restriction of downstream uses and negatively impact on sensitive and protected species, such as those designated under the Habitats Directive (e.g. freshwater pearl mussel).

The urban areas of the GDA are also the primary locations of industrial land uses which, through the discharge of dangerous substances, can result in negative impacts on drinking water sources.

The physical modification of watercourses, as is sometimes conducted in order to facilitate infrastructure and the increases in sealed surface areas can significantly affect surface run-off rates and lead to increased risks of flash flooding and over-spilling of rivers. The rapid development and expansion of the urban footprint of the GDA has been the driver for this water issue.

Climate change could also potentially lead to more frequent flood events due to an increase in the incidence of high-intensity rainfall, which in addition to potential summer droughts could affect the viability of drinking water supplies.

Groundwater resources under the urbanised areas of the GDA are at risk of not attaining the standards as required under the WFD. There is a range of identified risks, including potential impacts such as point and diffuse discharges (e.g. inadequate wastewater treatment and subsequent discharging, agricultural runoff), morphological factors (e.g. changes to river banks and streams) and impacts from dangerous substances.

It is hoped that the installation and upgrading of sewage treatment works funded by the Department of the Environment, Community and Local Government and the Waste Water Discharge (Authorisation) Regulations 2007 (S.I. 684 of 2007) will assist in the elimination of untreated discharges in most of the affected areas in the future.

Drinking water supply

It is essential to ensure that there is adequate water supply for the growing population of the GDA. The average water requirement, in 2007, for the Dublin Region was approx. 540 Mld (million litres per day). It is estimated that, as a result of forecast population growth, this figure will rise to approx. 800 Mld day by 2031. Peak requirements at 2031 are estimated at 880 Mld. The Dublin Region (Water Supply Area) is currently supplied with water from the Rivers Liffey, Vartry and Dodder and a number of groundwater sources in Fingal and north Kildare.

A major drinking water supply issue is the loss of water during transportation in the water network, prior to consumption. The Dublin Water Supply Plan noted that the average leakage in the Dublin region was approximately 30% in 2007.

7.7.7 Likely Evolution in the Absence of the Cycle Network Plan

The gradual implementation of the WFD is expected to improve the status of waters in Dublin. The publication of the ERBD's Draft River Basin Management Plan contains a Programme of Measures and mitigation measures designed to address potential negative effects and also assist the achievement of good status of waters by 2015.

Climate change is expected to lead to increased frequencies, extents and severity of flooding and this may be exacerbated in urban areas, which are less able to cope with the incoming sources of water. Sea-level rises may be a particular threat to populations living close to low lying coastal areas.

7.7.8 Implications for the Cycle Network Plan

It is the intention that any additional cycle network infrastructure envisaged will avoid significantly impacting on the key water resources of the GDA. The issue of wastewater treatment capacity and drinking water supply capacity cannot be addressed by the Plan.

In relation to flooding, it is important that the Plan does not encourage cycling routes or their associated infrastructure to be developed on sites which are prone to flooding.

7.8 Air

In comparison with other European countries, Ireland's air quality is generally good. This can be attributed to Ireland's general lack of old and heavy industry and to the meteorological systems which influence Ireland providing very good air mixing and dispersion. However there were exceedances in Dublin city centre of EU ambient air quality limit values in 2009.

Road traffic is one of the main sources of air pollution in Ireland. Common road traffic pollutants are nitrogen dioxide (NO₂), particulate matter (PM), sulphur dioxide (SO₂) and carbon monoxide (CO) causing harm to human health. These pollutants are taken as the key determinants of air quality in Ireland.

The Air Quality Framework Directive and its 'daughter' directives introduce measures to address issues of air quality in EU member States, and set out the approach for the management of air quality and the establishment of limit values for pollutants for the protection of humans and vegetation. The air quality limits for the main chemicals and methodologies for the measurement of these substances are detailed in the CAFÉ Directive (2008/50/EC).

Under the EU Framework Directive Member States are required to divide their territory into zones in order to facilitate the assessment and management of air quality. In Ireland those zones are as follows:

- Zone A – Dublin City and Environs;
- Zone B – Cork City and Environs;
- Zone C – 16 Urban Areas with populations greater than 15,000 (including Galway, Limerick, Waterford, Clonmel, Kilkenny, Sligo, Drogheda, Wexford, Athlone, Ennis, Bray, Naas, Carlow, Tralee and Dundalk); and
- Zone D – all other areas within the state excluding Zones A, B and C.

There are several zones present within the GDA. The majority of the area of the GDA is classed as either Zone A or Zone D, but with some Zone C areas, i.e. Bray and Naas. In Zone A the pollution levels are higher than average for Ireland due to the level of traffic on the road network of Dublin. However, monitoring of air quality shows that the air quality within Dublin is in compliance with the Air Quality limit values.

7.8.1 Current Issues and Problems

Generally, air quality in Ireland is good with pollutant levels below the EU limit values. However, the increase in traffic flows in Dublin city centre has resulted in the various air quality limit values almost being breeched on a number of occasions. The pollutant of most concern in Ireland is PM10, daily mean levels of which are close to the EU limit value across the country. Levels of NOX in traffic-impacted city centre areas will also continue to be a problem due to the difficulty in achieving large-scale reductions in road traffic numbers, according to the EPA's "Air Quality in Ireland, 2011" report.

7.8.2 Likely Evolution in the Absence of the Cycle Network Plan

The levelling off and slight reductions in traffic levels in the GDA due to the economic downturn may arrest the recent trend of regular increases in total air quality pollutant emissions for the short term. In the long term, on-going improvement in engine and fuel technology will also compound this positive effect by reducing emissions on a per-vehicle basis.

This does not imply that there will be an overall reduction in emissions in future years. While stricter emission standards and improved fuel economy will make a positive contribution to addressing air quality challenges, there is a potential that continued growth in traffic, based on an overall population and employment growth in the GDA, if not actively managed, may offset the benefits of technology improvements. The effect of this is that air quality limit values may be exceeded in future years in the GDA, especially in locations such as Dublin city centre and also on key roads, such as the M50.

7.8.3 Implications for the Cycle Network Plan

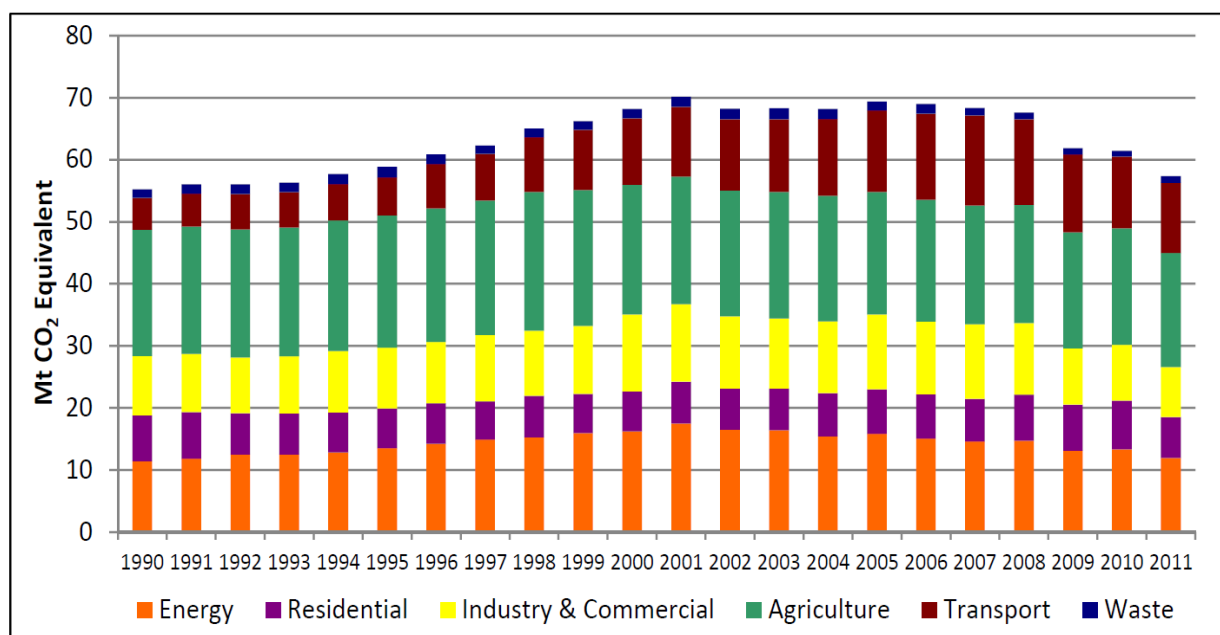
The EPA state that we must also reduce traffic emissions through implementing policies to reduce travel demand. One mechanism to address this would be through the implementation of this Cycle Network Plan and by encouraging the use of alternatives to the private car such as cycling. Therefore the Plan can play a role in addressing future air quality issues which may arise in the GDA as a result of transport by providing the strategic approach to the location of new cycle routes which would encourage a region-wide modal shift away from use of the private car as the dominant mode of transport, thereby reducing one of the main cause of air quality impacts in Ireland.

7.9 Climatic Factors & Climate Change

Greenhouse gas emissions

The use of fossil-fuelled transport results in the emission of greenhouse gases such as carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O). Since 1990 Ireland's GHG emissions increased from 55.5 million tonnes of carbon dioxide equivalent (ktCO₂eq.) to a peak of 70.1 ktCO₂eq. in 2001, but has since fallen to 57.3 ktCO₂eq. This is shown in Figure 7.15 below.

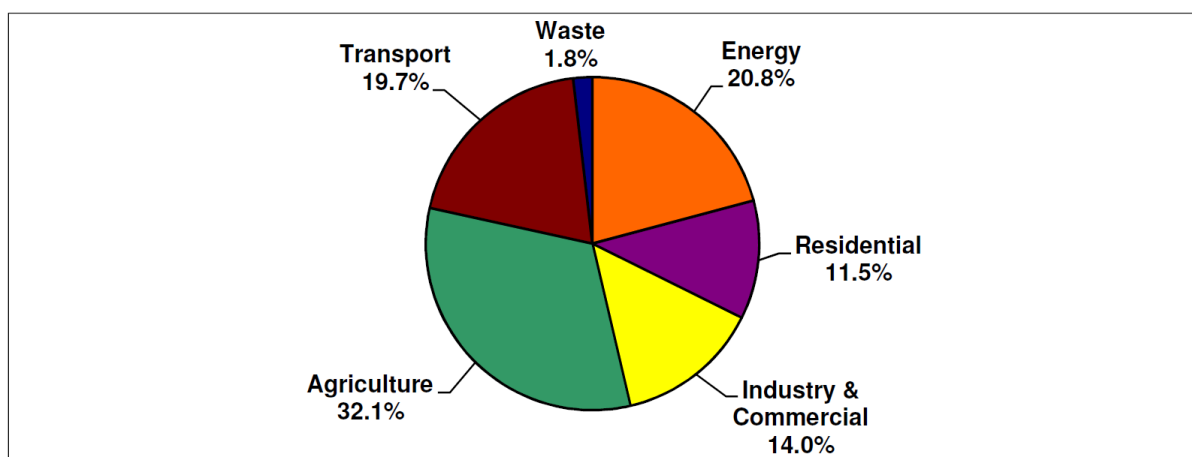
Figure 7.15 Ireland's Greenhouse Gas Emission 1990 – 2011



Source: Ireland's Greenhouse Gas Emissions 2011, Environmental Protection Agency

The EPA noted that between 1990 and 2011, the transport sector showed the greatest overall increase at 121%. However, transport emissions have decreased for four consecutive years and are now 22.0% below peak levels in 2007. This is primarily due to the economic downturn. The increase up to 2007 can be attributed to general economic prosperity, increasing population with a high reliance on private car travel as well as rapidly increasing road freight transport. Figure 7.16 below presents 2011 data showing the breakdown of the sources of Ireland's GHG emissions.

Figure 7.16 Breakdown of the Sources of Ireland's GHG emissions for 2011



Source: Ireland's Greenhouse Gas Emissions 2011, Environmental Protection Agency

It can be seen that transport represented 19.7% of the total emissions. No data is available for the GDA, although as this region has the largest population and the greatest volume of vehicles and car use, it is expected that the GDA is one of the largest contributors to the national transport-based GHG emissions.

7.9.1 *Current Issues and Problems*

Ireland faces a major challenge in meeting the EU's proposed reduction targets in the long term. Ireland has one of the highest national proportions of agricultural emissions within the EU and until the recession, saw significant on-going growth in transport-related emissions. Addressing the issue of transport emissions is likely to be particularly problematic.

7.9.2 *Likely Evolution in the Absence of the Cycle Network Plan*

The EPA notes that whilst the reduction in emissions is a positive outcome in terms of compliance with international agreements, this trend is, primarily, a direct result of the current economic situation. In order to meet future targets as economic growth returns, Ireland needs to develop as a low carbon economy.

7.9.3 *Implications for the Cycle Network Plan*

The Cycle Network Plan can influence the transport sector's contribution to the production of GHG in the GDA. Shifting travel patterns away from the private car and towards cycling will reduce overall GHG production from the transport sector. The Cycle Network Plan can support this through provision of safe and accessible cycle routes, particularly in high demand areas.

7.10 *Soils & Geology*

The environmental topic of soils and geology is concerned with vulnerable soil resources (e.g. prime agricultural land) and designated geological and geomorphological sites.

Soils

There are a variety of soil types to be found in the GDA, the most commonly found being Grey Brown Podzolics, Gleys, Acid Brown Earths and Brown Podzolics. Grey Brown Podzolics, Gleys and Acid Brown Earths which are found in the lowlands are naturally fertile and well suited for productive agriculture. There are also numerous areas in the GDA where Basin Peats are present and High Level Blanket Peats and Lithosols are found on the mountain ridges, with Brown Podzolics and Peaty Podzolics on the upper flanks.

Geology

The bedrock geology of the GDA is composed of igneous and sedimentary formations. Meath consists primarily of Dinantian Upper Impure Limestone and Dinantian Mixed Sandstone, Shale and Limestone. Dublin is comprised of mostly Dinantian Mixed Sandstone, Shale and Limestone. Kildare's bedrock consists of Dinantian Pure Bedded Limestone, Silurian Metasediments, Volcanics and Dinantian Early Sandstones, Shale and Limestone, whereas Wicklow's bedrock is primarily Granites and other igneous intrusive rocks, Ordovician Metasediments and Cambrian Metasediments.

Soils drainage and agricultural classification

The GDA is dominated by soils with drainage properties considered to be good, moderate and imperfect (they retain water for a period of time and can be considered 'wet' and takes a while to 'dry out'). The majority of the landscape of the ERBD is considered to have a low risk of runoff (65% of the area), with 15% and 20% rated as having moderate and high risks of runoff, respectively. As noted previously, the ERBD does not cover all of the study area of this SEA. However, it does represent over 75% of the overall GDA and, thus, is a valid data source and highly representative of the GDA.

It can be expected that the majority of the most valuable soils (in relation to agricultural production) will be located in the rural areas of Fingal, Meath and Kildare. In relation to Wicklow, the mountains, present greater challenges to agricultural practices. The soils within the four Local Authorities of Dublin (especially Dublin City and South Dublin and Dun Laoghaire-Rathdown County Councils) are under more limited agricultural use, given that urban development is the dominant land use.

7.10.1 Current Issues and Problems

The expansion of the urban footprint of Metropolitan Dublin and towns and villages in the GDA resulted in a loss of agricultural land over the last 20 or so years, especially in counties Meath, Kildare, Wicklow and Fingal. However, the economic downturn has greatly reduced the rate of expansion in recent years.

Recent economic trends have also resulted in a significant fall-off in demand for most forms of construction materials, which are primarily sourced from the geological environment. Demand for geological materials (primarily driven by the construction industry) in Ireland has greatly reduced and demand is likely to remain relatively low in the short term should activity in this sector remain at recent levels. In the medium to longer-term, demand would be expected to rise due to long-term rising population projections and associated development requirements.

Ireland does not have the same extent of historical contaminated sites, in comparison to the UK or the rest of Europe. There has been a general trend of re-developing such sites which are of economic value (e.g. Dublin Docklands and inner town/city sites), although the rate of remediation and subsequent redevelopment of these contaminated sites may be significantly reduced and may occur at a slower rate due to the economic climate.

7.10.2 Implications for the Cycle Network Plan

The Plan should seek to facilitate the consolidation of the urban footprint of Dublin and other towns in the GDA by ensuring that a convenient and safe cycling offer is provided in these locations. This may contribute in some way to reducing the extent

of greenfield development and associated land consumption, especially where the lands being potentially developed are prime agricultural lands.

7.11 Material Assets

Material assets consist of a range of assets of intrinsic, economic value. Three principal classes of assets are considered relevant for this SEA:

- Public assets and infrastructure: such as public open spaces; recreational assets/facilities; public buildings, services and facilities; cultural amenities and facilities; and infrastructural networks: electricity, gas, telecommunications, transport, water supply and wastewater;
- National fossil fuel supplies: such as petrol and diesel stores for the private car users, for public transport vehicles (bus and rail fleets), and for road-based transport and distribution network; and
- Previously developed land: such as brownfield development sites, especially those along transport corridors or in urban areas and greenfield areas.

Infrastructure

Given that the GDA contains approximately 40% of Ireland's population, the region contains a high proportion of the above material assets relative to the other regions in Ireland. Dublin has more of Ireland's public transport network and is the hub of the national bus and rail networks. The M50 is the hub of Ireland's radial national road network and Dublin Port and Dublin Airport are the largest port and airport in Ireland, respectively. There is an extensive network of utilities (electricity, gas, telecommunications, water supply, wastewater network etc.) throughout the GDA, serving the various towns and urban areas.

Another key material asset class consists of the various public recreational amenities such as Phoenix Park, Wicklow National Park, Dublin Bay and Liffey Valley Park. There are also many town and village centres, providing a range of public and community facilities for their local, regional and national catchments. These range from the many small village and neighbourhood centres, to district centres, major town centres and to Dublin city centre which serves a national function.

Fossil fuel supplies

The global focus on fossil fuel consumption and long-term reserves means that national fossil fuel supplies should be considered as a form of asset. The fact that the transport sector almost completely relies on fossil fuels further justifies this status.

EU Directive 68/414/EEC (as amended by Directive 98/93/EC) obliges Member States to maintain minimum stocks (90 days) of crude oil and/or petroleum products. For the period 2004 to 2006 (for which data was available), Ireland always maintained in-excess of 90 days oil supply (the lowest being 97 days' supply in January 2006 and the highest being 129 days' supply in December 2006).

Ireland's total unleaded petrol consumption rose by 18.8% during the period 2000-2006. The total consumption in 2006 stood at 1.73 million tonnes. In relation to diesel (and gasoil), this rose by over 22.9% over the same six-year period. 2006 consumption was 3.72 million tonnes. Ireland's overall oil consumption rose by over 10.5% over the period 2000-2006.

Contaminated brownfield sites

The EPA notes that “the total area of brownfield land in Ireland is unknown; however, there are some 50-80 disused gasworks sites that pose a risk to soil and groundwater”. The EPA published a Code of Practice in April 2007 which provides a framework for the identification of contaminated sites, the assessment of the potential risks associated with them and the identification of the appropriate remedial measures or corrective actions necessary to reduce the risk to human health. Local authorities have been trained in implementing this Code. However, a list of contaminated sites within the GDA is not centrally compiled.

7.11.1 Current Issues and Problems

The significant increase in the GDA's population during the period 2000 – 2006 resulted in considerable pressure on existing utility networks and also on existing infrastructure. However, the economic downturn has reduced this pressure.

Ireland's considerable reliance on fossil fuels imports is likely to remain for the foreseeable future, primarily driven by domestic energy, transport and agricultural demand. Notwithstanding the Government's aims to have renewable energy supplying 17% of Ireland's total energy supply by 2020, coal and gas will continue to fuel 72% of the total electricity demand by 2020, a significant amount of which will be imported.

7.11.2 Implications for the Cycle Network Plan

The plan is likely to improve the transport network by making a contribution to reducing Ireland's dependence on fossil fuel consumption for the transport sector. This will become a greater requirement in the long-term as global concerns regarding security of fossil fuel supply attain a higher profile and focus.

The Cycle Network Plan should seek to promote and encourage the development of brownfield sites, especially those adjacent to key transport corridors and those close to urban centres, town and villages.

7.12 Cultural Heritage (incl. Architectural Heritage & Archaeological Heritage)

The Record of Monuments and Places, provided by the DAHG, is a statutory list of all known National Monuments in Ireland. National Monuments are defined in Section 2 of the National Monuments Act (1930) as a feature, “the preservation of which is a matter of national importance by reason of the historical, architectural, traditional, artistic or archaeological interest attaching thereto”. There are in-excess of 10,000 such monuments in the GDA.

The National Inventory of Architectural Heritage is a state initiative under the administration of the DAHG. Its purpose is to identify, record and evaluate the post-1700 architecture of Ireland, uniformly and consistently as an aid in the protection and conservation of the built heritage.

In addition to the monument registers, there are a number of properties and areas managed by cultural heritage groups within the GDA.

There are also a number of sites with international importance for heritage within the GDA area. The Archaeological Ensemble of the Bend of the Boyne has been designated as a UNESCO world heritage site, and is Europe's largest and most important concentration of prehistoric megalithic art.

7.12.1 Current Issues and Problems

The growth and urban expansion of the GDA in the last 10 years has resulted in considerable pressure being placed on the status and condition of the GDA's cultural heritage resources. Although these resources are protected via legislation and also through the planning system, it is widely regarded that damage and deterioration has occurred.

7.12.2 Implications for the Cycle Network Plan

The Plan will facilitate and promote the expansion of cycling networks on certain already established routes in the GDA. This may avoid impacting on additional cultural heritage resources on greenfield sites in the future in these areas. However some development may be required on greenfield lands along the coast and in other areas and these new sections of greenway route may impact on cultural heritage resources within these locations. The plan should seek to minimise such impacts but also promote the cultural heritage of the GDA by facilitating access to these resources by bicycle.

7.13 Inter-Relationships and Interactions

Considering inter-relationships within the environment is an important aspect of SEA – i.e. where one environmental topic can also have both a direct or indirect effect on another environmental topic. Interrelationships are common through the environment and this is not surprising, given the interconnected nature of ecosystems and environmental cycles.

Table 7.10 summarises the various environmental topic interrelationships by way of a matrix. The matrix numbers each of the interactions – these numbers relate to where the interactions are discussed further in the sections which follow.

Table 7.10 Environmental topic interactions matrix

	Biodiversity, flora & fauna	Landscape	Population	Human health	Noise	Water	Air	Climatic factors & climate change	Soils & geology	Material assets	Cultural heritage
Biodiversity, flora & fauna											
Landscape	1										
Population	23	9									
Human health			13								
Noise	2			14							
Water	3			15							
Air	4			16							
Climatic factors & climate change	5					17	19				
Soils & geology	6	10				18					
Material assets	7	11						20	21		
Cultural heritage	8	12								22	

1. Biodiversity, flora & fauna and Landscape – Biodiversity, flora & fauna and landscape are closely linked as many landscapes are inherently dependent on the natural environment and the biodiversity within for its features, such as the Natura 2000 sites along the Dublin coast. Impacts to landscape will also result in impacts to biodiversity e.g., development of a greenfield site will change the landscape character and setting and also remove natural and semi-natural biodiversity resources. Additionally, landscaping along road and rail corridors can provide both biodiversity and landscape benefits.
2. Biodiversity, flora & fauna and Noise – Noise can impact on biodiversity, flora and fauna: impacts can affect bird populations and fauna. Examples of this include an increase in road noise which can impact on fauna, such as bats and birds.

3. Biodiversity, flora & fauna and Water - There are strong links between biodiversity, flora and fauna and water as these environmental components are often dependent on each other. For example, there are 32 water-dependent SACs and 14 water-dependent SPAs in the ERBD.
4. Biodiversity, flora & fauna and Air – Air quality impacts can have knock-on effects on animal and plant life and the success of ecosystems as a whole. The EU Air Quality Directives also prescribe specific standards for the protection of vegetation and ecosystems and these will be considered in this environmental assessment.
5. Biodiversity, flora & fauna and Climatic factors & climate change – Climatic changes and the consequences of climate change can fundamentally adjust a region's existing biodiversity and associated flora and fauna assemblages. In relation to the GDA, it is possible that future warmer and wetter summers will result in previously uncommon plant and animal species becoming more prevalent but possibly at the expense of existing species. Water shortages – also a potential result of climate change – could have significant negative impacts on aquatic-based ecosystems and also on the region's general biodiversity.
6. Biodiversity, flora & fauna and Soils & geology – Soils and geology form a fundamental component of biodiversity. Soils are often a key component of flora and also support associated fauna. Soil type and quality can also often be a key influence on the flora living in the soil. Geological conditions can dictate aquatic features and characteristics (e.g. ground regime) of an ecosystem.
7. Biodiversity, flora & fauna and Material assets – Parks and open spaces often contain important biodiversity resources, such as Phoenix Park.
8. Biodiversity, flora & fauna and Cultural heritage – Many historic cultural heritage resources can also be of biodiversity value, especially those in rural and isolated areas, such as hedgerows and field boundaries in rural areas and 'grounds' of historic properties.
9. Landscape and Population – There are inter-relationships between landscape and population as landscape and related effects are judged from a human perspective (e.g. particular sets of the population who may reside in a particular landscape may have a particular stance on its value or importance). Additionally, important townscapes are typically located close to or have high residential and working populations and there may be resistance to any perceived negative impacts.
10. Landscape and Soils & geology – Soils will often determine the type of surface flora, a key landscape characteristic.
11. Landscape and Material assets - Landscape is also related to material assets as it is the landscape characteristics of assets such as parks that is a key criteria for their designation as public open and recreational spaces, such as Phoenix Park and Liffey Valley Park. Even outside of 'formal' open and recreational spaces, an attractive landscape setting can enhance many aspects of a surrounding area.
12. Landscape and Cultural heritage – The importance of many cultural heritage resources – especially architectural heritage – is based on their historic setting

and landscape is a key aspect of this. Additionally, historic landscapes themselves have a cultural heritage value.

13. Population and Human health – Population and human health are listed as separate receptors in the Directive, but they are interrelated and intertwined. For the purpose of this environmental assessment the focus under the population heading will be on broad, overarching socio-economic issues while more direct effects (such as risk of accidents and general health effects) will be the focus under Human Health.
14. Human health and Noise – Noise is not a specific topic listed in the SEA Directive and is covered under the human health topic. A noise-related SEA Objective is one of the four under the human health environmental topic. In particular, night-time road traffic noise is an issue in the GDA with consequent possible sleep disturbance in sensitive portions of the GDA's population.
15. Human health and Water – As water is a key human requirement, it is linked to human health via the potential to impact on the health of a population through pollution of drinking water supplies.
16. Human health and Air – Inter-relationships also exist between human health and air. The focus in relation to air is on compliance with the various Air Quality Standards and Regulations, which are based on the protection of human health.
17. Water and Climatic factors & climate change – Climate change could significantly impact on water resources of the GDA in future years, through changing precipitation patterns, increased evaporation and knock-on effects on the hydrological cycle. One of the main consequences of climate change is a likely increase in rainfall intensity and this may result in a greater incidence of flooding. Additionally, sea-level rise is a longer-term risk to the GDA.
18. Water and Soils & geology – There are clear links between soils & geology and water through aquifers and groundwater resources, which can be considered under either environmental topic. It was decided to consider groundwater resources under the Water topic.
19. Air and Climatic factors & climate change – There are significant inter-relationships between air and climatic factors & climate change. In relation to transport, one of the key sources of air pollution (motor vehicles) is also the primary source of emissions which contribute to climate change.
20. Climatic factors & climate change and Material assets – Inter-relationships exist between climatic factors & climate change and material assets with regard to fossil fuels. There is a direct link between fossil fuel consumption and climatic factors & climate change.
21. Soils & geology and Material assets – In this case, land is seen as a material asset rather than a component of Soils & geology. However, reuse of previously developed land may require contaminated lands to be remediated, a positive effect under Soils & geology.
22. Material assets and Cultural heritage – Many cultural heritage resources are often a material asset in that they comprise important cultural and recreational assets.

23. Population and Biodiversity, Flora and Fauna – Any increase in the population/number of people using the proposed cycle networks could have a negative impact on biodiversity along the routes.

7.14 Data Gaps and Limitations

This baseline description is not intended to be an exhaustive description of all baseline environmental data in the GDA. Instead, it is focused on providing relevant baseline information at an appropriate scale and detail for the purposes of this GDA Cycle Network Plan.

Data presented in this chapter has been obtained from various publicly-available data sources as those listed in Appendix B.5. No site-specific surveys, field visits or specific investigations were undertaken.

A key data limitation was that some of the data was not available at a regional or local scale and that other data is really only 'spot data' at specific points in the GDA.

There is no national landscape designation or classification system and each local authority is responsible for its own set of designations, therefore it is hard to measure consistency across the board.

Regarding the health and status of the region's Natura 2000 network, no site-specific information was available for the SACs and SPAs. Although useful information was available on a national basis, it did not provide information on specific sites.

Much of the data was taken from the period from 2006 to 2011. However, the on-going economic downturn from 2008 is likely to have had an impact on indicators beyond 2011 such as land use change and noise.

Notwithstanding the above data gaps and limitations, adequate baseline information was gathered to enable an assessment of the significant effects of the environment from the Cycle Network Plan.

8.0 Alternatives Assessment

8.1 Introduction

This chapter summarises the environmental assessment of the plan alternatives. Alternatives are a range of rational choices open to the plan makers for meeting the plan objectives. Under Schedule 2 of the European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004, part (h) it is stated that the following should be included in an environmental report of this nature:

“an outline of the reasons for selecting the alternatives dealt with, and a description of how the assessment was undertaken including any difficulties (such as technical deficiencies or lack of know-how) encountered in compiling the required information”

As a mechanism of measuring the effects of each alternative on the environment, the alternatives will be tested against the SEA Objectives formulated in Section 4.4.

The general basis of the alternatives assessment consists of a comparison of the environmental effects that each alternative options may have. An assessment rating form – 3 (major negative) to +3 (major positive) and associated text commentary has been provided for the entire assessment against each of the individual SEA Objectives. Based on the results of the assessment in Table 8.1 the option which demonstrates the highest positive impacts and lowest possible negative impacts on the environment has been determined as the preferred option.

8.2 Overview of the Alternative Options

The alternatives derived for this SEA are as follows:

1. Option 1 - Do-Nothing;
2. Option 2 - Development of additional on street cycle lanes and retrofitting of existing cycle lanes on the Urban Cycle Network and Inter-Urban Cycle Networks;
3. Option 3 - Development of the Green Route Network only;
4. Option 4 - A combination of on road, segregated and green routes.

8.2.1 Option 1 - Do-Nothing

The Do Nothing Option assumes that no GDA Cycle Network Plan will be implemented and therefore no further cycle routes will be developed.

In the consideration of the baseline environment (presented in Chapter 7 of this report) it is clear there are a number of issues which will affect the GDA whether the Cycle Network Plan is in place or not.

In the absence of the Cycle Network Plan, traffic volumes are likely to continue to increase. This increase is expected to mainly consist of private car traffic with perhaps a few exceptions in locations where public transport investment is prioritised. This will result in decreasing air quality which in turn will impact on the environment and on the health of the population. Furthermore, without proposals to manage car traffic growth in the future, transport's contribution to carbon emissions will increase, potentially making a contribution to climate change. Therefore the Cycle Network Plan could have a significant impact on air quality across the region, particularly in Dublin

through encouraging modal shift away from the private car to more sustainable forms of transport which would include cycling.

Up to the year 2021 (the temporal scope of the plan) the region's population levels are likely to continue to grow at a high rate, with a previous 8.52% population increase in the GDA between Census' 2006 and 2011. The health of the population could be affected in a positive way by the Cycle Network Plan, through policies to facilitate an increase in active forms of travel, which would help combat obesity. The Plan would also contribute to controlling the expected increase in traffic, therefore contributing to improved health through improved air quality. Without the plan, the health of the population could worsen and rates of asthma and obesity levels could increase.

Whilst there is limited information on noise across the GDA, it can be assumed that without the Cycle Network Plan, road traffic volumes in and around Dublin City, larger settlements and the main commuter routes are likely to increase. This will in turn result in increases in noise levels from road traffic in these areas.

Threats to cultural heritage through the implementation of the Cycle Network Plan (including provision and maintenance of infrastructure) may include the loss, damage or disturbance of known or unknown features of cultural heritage importance. Without the Plan however, traffic growth is likely to increase even further with knock on effects on air pollution which can also have an adverse impact on the historic environment, particularly in town and city centres. Similarly, through an increased fuel demand and usage, traffic growth could potentially impact on water resources, soil quality, biodiversity, flora and fauna. Furthermore, larger land takes may be required to provide for new traffic infrastructure which may have a significant effect on several environmental topics.

8.2.2 *Option 2 - Development of additional on street cycle lanes and retrofitting of existing cycle lanes on Urban Cycle Network and Inter-Urban Cycle Networks*

The predominant provision for cycling in the GDA is by means of either on street cycle lanes (both advisory and mandatory) bus lanes or retrofitted cycle lanes. Retrofitted cycle lanes are generally on road cycle lanes or have been provided in the place of the existing verge area.

The above facilities, in many cases, offer a low quality of service mainly due to the lack of width for cyclists and the discomfort caused by large volumes of vehicular traffic sharing the road space. This in turn has impacts on human health by causing stress levels to increase amongst users. Also these types of routes are usually located adjacent to busy transport routes which are the main areas where air pollution and noise pollution are concentrated, therefore making cycling less attractive as a mode of travel. These routes can, in some cases, however, provide a high quality of service which can cater for a large number of trips from origins to destinations.

When considering this option it should be noted that there has previously been difficulty in providing for cycle lanes in the city centre, where there is considerable competition for street space and provisions for the bus and on street parking is also required.

However an increase in these types of facilities is likely to have significant positive effects on the environment, for example an increase in on street and retrofitted cycle lanes may encourage more people to cycle in the GDA, where they can use a

continuous uninterrupted route to get to a variety of locations. This is expected to have a positive impact on human health by increasing the percentage of people who regularly exercise through cycling. Also, the air quality in these areas may be significantly improved over time as more and more people use bicycles over private car transport.

8.2.3 Option 3 - Development of the Green Route Network only

The green route network consists of routes developed predominantly for tourists, recreational and leisure purposes, though regular commuters are likely to also use the routes, particularly in urban areas.

Green routes are likely to have some negative impacts on the environment. New routes will require land take which can cause issues for biodiversity, flora and fauna with additional noise and lighting causing disturbance to species such as birds and bats in these areas. Also important habitats may be infringed upon during the construction of the new route and any possible severance of ecological networks will need to be taken into consideration.

The local landscape and historical environment may also be affected through additional land uptake. Some development may be required on greenfield lands along the coast and in other areas, these new sections of greenway route may impact on cultural heritage resources within these locations and also on the landscape values of the area.

Material assets may also be significantly affected where the new routes require the land take from agricultural or greenfield lands.

There may also be some issues with regard to increased artificially surfaced areas which may form part of the routes. Increased surface water flow may be created by these surfaces and unless mitigation is introduced this may cause local flooding issues.

Green cycle routes usually have significant positive impacts on human health due to the segregation from traffic and limited conflicts. They also have a positive impact on air quality as more people are inclined to use these routes due to the separation from busy road traffic and therefore with increased numbers cycling to their destinations, an overall reduction in the use of the car could be expected. This, however, must be balanced against the lower level of penetration of green routes across the region, relative to on-road cycle lanes, and that by relying solely on such routes, many origins and destinations in the GDA may not be linked by high quality cycle facilities.

8.2.4 Option 4 – A combination of on road, segregated and green routes

This option allows for a greater degree of flexibility when delivering the GDA Cycle Network. The above option combines those route way options previously discussed in Options 2 and 3 but the different elements can be applied where needed, to suit the different environments present at each location. Therefore the environmental impacts on an area can be minimised e.g. where a green route may have a significant impact on biodiversity, flora and fauna through impacts on a particular protected habitat or species, an alternative method of on road routes could be used in the area instead. The alternative of using agricultural lands where suitable would also be considered under this option.

This option may cause landscape and visual amenity impacts in areas where development on greenfield land is required. However, with the option in certain cases

of diverting to alternative routeings, sensitive areas could be avoided. The same could be said for avoiding any impacts on biodiversity, flora and fauna.

This option would also allow the use of existing green routes that may exist along canals and rivers. However it is worth noting that negative impacts on biodiversity, flora and fauna may be expected along these routes, due to disturbance from additional users and where new lighting is required. Additional littering of the water environment may also occur, though the increases number of cyclists is not expected to cause too much additional littering, as most users will be using the route as a link between origins and destinations and would be unlikely to stop along the route itself.

8.2.5 Summary of Alternatives

Each of the Alternative options above was considered and measured against the SEA objectives to determine which option would be most suitable i.e. which would have the least significant negative and most significant positive impacts on the environment. Though consideration of the economic and social aspects of each option also has its merits, it is not the purpose of the Environmental Report to fully assess these aspects and therefore the environmental aspects have been the primary focus of the assessment that follows.

8.3 Alternatives Assessment Results

Table 8.1 below presents the results for the alternatives assessment. The following key applies to the rating in Table 8.1 below.

+ 3	Major positive impacts
+ 2	Moderate Positive impacts
+ 1	Minor positive impacts
0	Neutral
- 1	Minor negative impacts
- 2	Moderate negative impacts
- 3	Major negative impacts

Table 8.1 SEA results for Alternative Strategies

					Assessment Against SEA Objectives and Assessment Scores
SEA Objective	Option 1	Option 2	Option 3	Option 4	Summary of Relative Performance
Biodiversity					
1. To avoid impacts on the integrity of European Conservation Sites (SACs and SPAs) and nationally designated sites (NHAs), which includes taking account of protected species or qualifying interests that may occur/use areas outside designated sites, including those protected under the Wildlife (Amendment) Act 2000.	0	0	-2	-1	GIS analysis of the existing cycling infrastructure revealed no potential adverse impacts on designated sites. A neutral score is given for Options 1 and 2 as no large amount of additional land is expected to be required. Option 3 and 4 have been given a score of -2 and -1 primarily due to the fact that the green routes may have a significant impact on designated sites, as some of the proposed routes are situated on or close to protected habitats or species. As Option 4 allows for diversion of the route in order to avoid impacts, it has been given a less negative score than Option 3. It must be borne in mind however that the level of detail which is available at present is not sufficient to make a definitive determination as some of these routes may change due to likely significant effects on European designated sites. Further detail in this regard is provided in the HDA Screening Report.
2. To support the strategic objectives of the National Biodiversity Plan.	0	0	-2	-1	Similar to the first objective, no impacts are anticipated as a result of Options 1 and 2 as they generally comprise the use or re-use of existing assets. Option 3 is likely to have a moderate negative impact on the objectives of the National Biodiversity Plan, in that some habitats and species of national or European importance may be affected by the proposed route. Option 4 though still having the potential to have a minor negative impact on the objectives of the National Biodiversity Plan has the option in it to direct certain amounts of cycle network development away from the more sensitive habitats and species.

					Assessment Against SEA Objectives and Assessment Scores
3. To minimise impacts on locally-important biodiversity in the Greater Dublin Area, including any known green networks or ecological corridors.	0	0	-1	1	Again, Options 1 and 2 primarily use existing infrastructure and road space and therefore no significant impacts should arise in terms of locally important biodiversity. It must also be borne in mind when examining Options 3 and 4 that the overall thrust of the plan is to promote cycling and that this may have the effect of reducing car use, with potential knock-on benefits for flora and fauna in the GDA generally, therefore, Option 4 has fared out best as it gives a broader range of options to ensure that locally-important biodiversity is protected through route changes when needed, while also encouraging cycling in a larger area through more location options for route development.
4. To protect against the accidental introduction of alien plant species such as Japanese Knotweed and Giant Hogweed during the development and maintenance of the cycling network.	0	-1	-2	-1	Option 1 is unlikely to have an effect on this objective as no development works are proposed from it. Option 2 has some potential to cause minor negative impacts due to the fact that some additional clearing of road side verges or areas where the invasive species may grow may be required to ensure broadening of some routes to fit the additional cycle lane space. Option 3 is likely to have a moderately negative impact as this option would require the most development and would be most likely be the route option that would encounter the most contact with invasive species. Option 4 – though an element of this option would be similar to option 3 above it is not a requirement of this option that all development should occur along green routes, therefore areas with invasive species can be identified, avoided and treated where necessary.

SEA Objective	Option 1	Option 2	Option 3	Option 4	Summary of Relative Performance
5. To ensure suitable buffer zones are in place on any proposed routes that may be likely to have a significant environmental impact on habitats or species along rivers, riparian areas, coastal areas or mountain paths.	0	-2	-2	-1	Option 1 will not require additional new development therefore its impact is expected to be neutral. Option 2 may require widening along several routes to allow for cycle lanes to be included adjacent to roadways, in some of these areas there may not be appropriate room to provide these buffer zones, therefore a moderate impact on the environment is expected in these sensitive areas. Option 3 is similar to option 2 in its results. The green routes at certain points may affect riparian areas and coastal and mountain paths. It is thought that Option 4 provides enough route choices within it to avoid any significant impact on the areas outlined in the SEA objective while still allowing for an alternative way of addressing the cycle demand. However, some minor impacts may occur as a result of this option along riparian zones, coastal areas and mountain paths.
6. To protect existing hedgerows against unnecessary damage during the development of the cycle network.	0	-1	-2	-1	Option 1 is not expected to require any development that may have an impact on hedgerows therefore its impact would be neutral. Option 2 through the widening of certain routes may require the removal of some hedgerows along the existing road routes, some of this may be avoidable but still a minor negative impact is expected. Option 3 as it involves all green routes will most likely have the greatest significant impact on hedgerows out of the four overall options, at a moderately negative impact even though again some areas may be avoidable. Option 4 is likely to have a minor negative impact at worst, again the reason being because it gives options as to where the routes can be located if for example a certain point on the green route may be likely to affect hedgerow and alternative routes around this may be provided.

SEA Objective	Option 1	Option 2	Option 3	Option 4	Summary of Relative Performance
Landscape					
7. To avoid or, where infeasible, minimise impacts on designated and protected landscapes and conservation areas.	-1	0	-3	-1	<p>The primary areas of concern in this regard were the city centre conservation areas and designated natural landscapes. In relation to the former, it is expected that an increase in cycling as a main mode of transport would physically remove cars from key areas such as the south Georgian core, therefore reducing the impacts of pollution at these locations. Therefore as option 1 proposes no way of addressing the existing pollution caused by vehicle traffic it has been marked negatively. Option 2 would see an increase in available cycling routes in all areas of the GDA. It is not expected that this addition of cycle track would not cause much of an impact on this objective therefore the option has been scored neutral.</p> <p>In relation to the natural landscape, as a good deal of the greenway network travels along coastal areas that have a high landscape significance and also areas that are occupied by the majority of Special Protection Areas Option 3 has been scored as possibly having a major significant adverse effect on this SEA objective.</p> <p>Although the issues discussed above for options 2 and 3, both positive and negative could also surface for option 3, it is again expected that as this option incorporates all three routes that choice will be available during construction to ensure the positive elements are enhanced over the negative. Though the green routes have been identified along protected landscapes and coastal areas it is expected that alternatives to these routes can be developed where project-level assessment deems it necessary.</p>

8. To minimise impacts on undesignated landscape resources (townscapes, seascapes, riverscapes, general landscapes).	0	0	-2	-1	In terms of undesignated natural landscapes, the differences between the options 1 and 2 are negligible due to the minimal land-take involved. Option 3 is likely to cause negative impacts on undesignated landscapes as the majority of these green routes travel through these areas. As green routes are included as part of Option 4 impacts on undesignated landscapes cannot be ruled out, therefore a minor negative outcome is expected.
Population					
9. To increase accessibility to economic and employment opportunities, in particular for those who are physically, economically or socially disadvantaged within the GDA.	-1	+2	+1	+2	<p>Cycling provides a relatively cheap mode of transport that can be used across all socio-economic groups. If the 'do nothing' scenario is implemented this would mean that no improvement to cycle provision would be expected, therefore this universal mode of transport would not be made as widely available to all. The remaining three options 2,3 and 4 all contribute positively to increased accessibility to employment for economically and socially disadvantaged people. In particular new cycle routes will enhance accessibility to the city centre employment areas for many people living in disadvantaged areas of the city. In the wider GDA these cycle networks will provide an alternative to car usage or public transport within a certain radius of employment areas.</p> <p>Option 3 scores less well due to its reliance on segregated greenways which may not link relevant origins with destinations to the extent that Options 2 and 4 would.</p>

SEA Objective	Option 1	Option 2	Option 3	Option 4	Summary of Relative Performance
10. To increase accessibility to quality public, cultural and community services, in particular, for those who are physically, economically or socially disadvantaged within the GDA.	-1	+2	+2	+2	The outcome of the assessment here is similar to that for 9. Many cultural and community outlets are located in the same areas as employment, e.g., major town centres such as Blanchardstown or Tallaght as well as Dublin City Centre. In contrast to 9, however, the green network scores the same as they are more likely to provide better access to parks and recreational areas than may have previously been available from the road network.
Human Health					
11. To contribute to improvements to transport-related aspects of quality of life for residents, workers and visitors to the GDA.	-1	+1	+2	+2	As Option 1 does not propose any additional development it cannot therefore contribute to improvements in transport related aspects of quality of life. However Options 2,3 and 4 all propose to introduce new or improved cycle routes that can be used by everyone to enhance aspects of quality of life. Options 3 and 4 score slightly higher than Option 2 as these include green route options, which are more likely to attract people and be used for recreation.
12. To support the objectives of the Environmental Noise Directive in relation to transport-related noise.	-1	+1	+1	+1	Option 1 does not seek to make any effort to improve on noise pollution as it does not encourage any switch to quieter modes of transport such as cycling. The other options all propose to address transport-related noise by developing new cycle routes around the GDA, though to varying degrees. Option 2 and 3 can be seen to have minor positive impacts, whereas option 4 is likely to have a moderate positive impact due to the fact that more routes will be available and thus more people will be encouraged to use them.
13. To minimise safety risks to human health arising from transport related activity.	-1	+1	+2	+3	It can be predicted that a shift towards cycle transport in particular will remove some potential for accidents by reducing the numbers of cars on the road network. Where cycle lanes are segregated from traffic entirely it is expected that a major positive impact will be seen for this SEA Objective. Option 1 does not seek to minimise safety risks in any way and may be viewed as a negative due to increased recourse to the private car.

14. To support health improvements and benefits from a modal shift to cycling related transport options.	-1	+2	+2	+2	Options 2, 3 and 4 all seek to promote cycling, and its associated health benefits, to a more or less equal extent. Option 1 does not seek to support health improvements in any way and it is thought that a negative impact would transpire as more people would resort to cars for transport.
Water					
15. To support the forthcoming River Basin Management Plans (RBMP) and Programme of Measures (POM). Where these are not available, the objective is to support the aims and objectives of the Water Framework Directive (WFD)	-1	+1	+1	+1	Option 1 seeks to make no improvements to current transport offer, therefore when considering the amount of run off from roads that may be contaminated with chemical elements that may reach waterways and then the perceived increase in car users if no alternative is offered, it is only expected that there would be a negative effect on water. All three of the other alternatives were deemed to have a minor positive impact on this objective due to the fact that they would encourage a modal shift to cycling and therefore away from cars and public transport.
16. To minimise impacts to surfacewater systems and resources.	0	+1	0	0	The new routes proposed that were not to be part of existing roadways were seen to have a neutral impact as they would both help improve surface water in the long term but may have a negative effect on it during construction.
SEA Objective	Option 1	Option 2	Option 3	Option 4	Summary of Relative Performance
17. To minimise impacts to groundwater systems and resources.	0	0	0	0	The extent of new infrastructure proposed in the four alternatives means no impacts on groundwater were predicted.
18. To minimise impacts to coastal systems and resources.	0	0	-1	-1	The only impacts to coastal resources predicted were through the introduction of the new green routes which may have an impact along the coastal areas on coastal resources such as sand dunes which provide coastal protection to certain areas.
19. To minimise impacts to transitional systems and resources.	0	0	-1	-1	As with the case above for SEA Objective 18, it is expected that where new green routes are proposed there may also be impacts on protected areas of wetland habitats and estuaries from construction and also through use for recreational purposes. Some examples of areas that are likely to be affected are Rogerstown Estuary and Baldoyle Bay.

20. To minimise the risk of flooding.	0	0	0	0	For options 1, 2 and 4 any infrastructure will be constructed in line with best practice and due to the use, in the main, of existing road space no impacts in relation to flooding are expected. However where new areas of routeway are proposed additional measures may be needed to ensure there is not an increase in surface run off and flooding risk. This will be addressed during construction.
Air					
21. To protect and improve air quality in the GDA to create conditions to improve the health of the population and to reduce negative air quality impacts arising from transport-related emissions.	-1	+2	+2	+2	All options, except Option 1, will have a positive impact on air quality as they will all potentially lead to greater numbers of people choosing cycling as a mode of travel for all trip purposes.
22. To ensure compliance with the Air Framework Directive and associated daughter Directives (and the transposing Regulations in Ireland).	-1	+2	+2	+3	Again, similar to 21, an increase in cycling can be predicted to enhance air quality and assist in compliance with the Directives, thereby leading to a positive score for options 2, 3 and 4. In the case of Option 4 a positive score of +3 has been recorded as this option does the most to address this objective. Again however option 1 does nothing to address improvements in to air quality in order to comply with the Air Framework Directive.

SEA Objective	Option 1	Option 2	Option 3	Option 4	Summary of Relative Performance
Climatic Factors					
23. To contribute to the reduction of greenhouse gas emissions arising from transport-related activities and to promote sustainable, useable cycle routes in the GDA.	-1	+2	+2	+3	Options 2, 3 and 4 all promote the sustainable transport mode of cycling, it is expected that an increase in the number of people using cycling as their main mode of transport over the car, which they may have previously used, would significantly reduce the amount of greenhouse gas emissions in the GDA. It can therefore be reasonably concluded that CO2 emissions will decrease as a result of all 3 alternatives. Option one again does nothing to encourage that modal shift away from motorised vehicles, therefore there is no expected reduction in GHG expected from this option.
24. Ensure that any new development along coastal areas takes into account the impacts of sea level rise/increased storm occurrence and coastal erosion	0	0	-1	-1	As Options 1 and 2 do not specifically propose new development they are not expected to have an impact on coastal erosion or sea level rise etc. The only routes that may have an impact on this SEA objective are the green routes as several of these come quite close to the coast and may be at risk in the future from coastal erosion, sea level rise or storm occurrence.
Soils & Geology					
25. To minimise negative impacts on important and vulnerable soil resources used for agricultural purposes.	0	0	-2	-1	By primarily exploiting existing roads options 1 and 2 are not expected to have any impacts on soil. Options 3 and 4 may have some minimal impacts on soil where green routes are proposed over greenfield land or high grade agricultural lands. As such, precautionary negative scores are given.

26. To reduce consumption of construction material and generation of construction waste as part of the development if the cycle network.	0	0	-1	-1	In terms of construction, none of these projects are expected to produce large volumes of waste material. The majority of the projects will not require new infrastructure as such, and only the green routes may require additional surfacing material worthy of any concern. Best practice standards will, however, reduce the impact of each option on this objective but it was felt prudent to highlight the difference with a -1 for both options.
27. Ensure the remediation of contaminated soils removed as part of any cycle route.	0	0	0	0	It is expected that best practice standards will address this issue if it does arise though the likelihood of it arising on the proposed green routes is low.
28. To avoid or, where infeasible, minimise impacts to protected and designated geological and geomorphological sites.	0	0	0	0	An assessment of any of the new routes proposed near designated NHAs, pNHAs or other geological or geomorphological sites in the GDA will be conducted prior to construction. It is not expected that any of the routes proposed will have a significant impact on these features.

SEA Objective	Option 1	Option 2	Option 3	Option 4	Summary of Relative Performance
Material Assets					
29. To protect public assets and infrastructure.	0	+1	+1	+1	Option 2, 3 and 4 are rated as positive for the protection of public assets and infrastructure as they generally increase regional accessibility in the GDA, thereby enhancing access to public assets and infrastructure. Enhancing and increasing access to these public assets (such as airports, ports, road network, rail network, recreational spaces and facilities, urban centres etc.) benefits them as they require certain levels of usage and therefore good accessibility to make them economically viable and to encourage on-going investment. It is assumed that utilities such as telecommunications networks, electricity transmissions network, gas network etc. will not be negatively impacted by any of the packages and that any potential temporary loss in service will be minimised during construction.
30. To reduce the fossil fuel demand by the transport sector.	-1	+1	+1	+2	All options except option 1 will reduce the use of fossil fuels as they are all likely to lead to greater numbers people choosing cycling as modes of travel for all trip purposes.
31. To assist with the reuse and regeneration of brownfield sites.	0	+1	0	+1	Options 2 and 4 both promote the re-use of brownfield land where possible by improving transport accessibility within the urban footprint of Dublin and thereby making brownfield sites in this area more attractive for redevelopment. Options 1 and 3 (green routes) are not expected to have any effect on brownfield sites as 1 proposes do-nothing while 3 proposes less investment in the built-up area than 2 or 4.
Cultural Heritage					
32. To avoid or, where infeasible, minimise impacts to designated cultural, architectural and archaeological resources.	0	0	-1	-1	Due to the re-use of existing road space across three of the alternatives, it was deemed reasonable to conclude that no significant impacts on this objective would arise across options 1 and 2. However in the case of option 3 and 4 where new green routes are proposed there may be an impact on cultural heritage though the majority of these are expected to be avoided. As such, a precautionary -1 has been given against this objective.

8.4 Summary of Alternatives Results

1. Option 1 - Do-Nothing
2. Option 2 - Development of additional on street cycle lanes and retrofitting existing cycle lanes on Urban Cycle Network and Inter-Urban Cycle Networks
3. Option 3 - Development of the Green Route Network only
4. Option 4 - A combination of on road, segregated and green routes

Looking at the results of the assessment of the 4 alternative options above, it can be seen that all except Option 1 (which has only negative) have both positive and negative elements when assessed against the 32 SEA objectives. The 'Do-Nothing' option has mainly resulted in neutral impacts, with some minor negative impacts due to the fact that no foreseen improvements for example in air quality, fossil fuel demand, accessibility for all levels of population can be expected. This option would mean that no solutions would be put in place to alleviate the issues with car dependency in the GDA and could also put more pressure on public transport services in the future. Overall, it could increase the requirement for further infrastructural development, thereby contradicting a number of SEA objectives to reduce air pollution, noise and minimise land-take etc.

When assessing the other three options, a mixture in the results can be seen when each of the SEA objectives are examined. However with a quick glance over the assessment table it can be seen that only Option 4 has resulted in 'Major positive impacts' on the SEA objectives, with 2 in total.

In terms of those objectives related to land-take, the absence of negative scores in Options 1 and 2 is due to the fact that very little or no new infrastructure is being proposed and the associated land-take required is therefore minimal.

Some of the positive scores in Options 2, 3 and 4 relate to the modal shift away from the private car anticipated as a result of these alternatives. These options propose to develop cycle routes throughout the GDA and therefore associated benefits, in the broadest sense, can be expected from enhanced air quality for flora and fauna in the GDA.

In terms of the comparison of the four options, the do-minimum, while neutral in a lot of cases, does not emerge as a preferred approach as it has less positive impacts than the other three and does not envisage any positive impacts on the SEA objectives.

Option 2 scores relatively positive or neutral against a lot of the SEA objectives, mainly due to the fact that the majority of development for this option will not involve that much additional land take or disturbance. This option envisages additional on street lanes and retrofitting of existing cycle routes. However this option does not leave much room for manoeuvre or innovation, as seen in Option 4. There is no provision to provide new routes beyond the main road network. Although the option goes some way to improving air quality, human health and climatic factors and has a minimum impact on landscape and visual amenity as well as soils and geology, on a negative side it may have an impact on biodiversity, as some of the routes may not allow adequate buffer zones between the cycle path and habitats or species of special interest.

Restricting development to green routes only as proposed in Option 3 results in a lot of negative impacts on several of the SEA objectives such as Biodiversity including

Flora and Fauna, Landscape and Visual Amenity, Soils and Geology and Cultural Heritage. This option will require the construction of new linkages and routes at several locations in the GDA. A lot of these would be located along coastal areas and also in areas with sensitive wildlife or important greenfield land. As this option gives no room for manoeuvre, its assessment results demonstrate a lot of negative impacts on the SEA objectives, in particular on objective no. 7 which seeks to protect designated landscapes.

According to the assessment table the preferred option is Option 4, which seeks to use a combination of both Options 2 and 3 to form a network that is both practical for the users and also takes into account environmental sensitivities by allowing alternative routes to be considered where required. Though some negative impacts have been recorded for this option (e.g. impacts on designated landscapes or biodiversity interests) the choice is available to avoid conflict by using the alternatives within the option, for example, use of existing cycle routes along transport corridors where conflict in other locations exists.

8.5 Development of Preferred GDA Cycle Network Plan (Option 4)

The assessment above has determined that Option 4 should be taken forward as the preferred option due to its limited negative impacts on the environment and its major positive impacts on the SEA objectives presented. The main aim of the GDA Cycle Network Plan is to ensure that cycling as a transport mode is supported, enhanced and exploited, in order to achieve strategic objectives and reach the national goals set out by the Irish Government, the NTA, various State Agencies and in particular the objectives and actions set out in the National Cycle Policy Framework (NCPF). The information outlined in the Plan will allow cycle infrastructure projects to be prioritised in terms of the importance to the strategic network. The next chapter sets out, in greater detail, the environmental impacts both positive and negative of Option 4. Where negative options identified require mitigation this is then further discussed in Chapter 10.

9.0 Environmental Assessment of GDA Cycle Network Plan

9.1 Introduction

This chapter presents the results of the environmental assessment of Preferred Alternative Option 4 – the GDA Cycle Network Plan. This option was chosen due to its significant positive impacts on the environment including the human health of the population in the GDA. As mentioned previously one of the GDA Cycle Network Plan's main tasks was to identify the existing cycle network in the GDA, its quality of service and gaps in the network that needed addressing. The Plan presents all the available routes in detail and also proposes potential routes which may be used. This chapter of the Environmental Report examines these potential routes and details where significant effects on the environment can be expected, some of which require mitigation.

The Plan outlines the following three types of proposed networks in the GDA as a means of attempting to address any gaps and demand in certain areas:

1. The Urban Cycle Network which is made up of primary, secondary and feeder routes and is largely made up of on road routes that anticipate the requirement for control measures such as speed restriction, signage, traffic management and road markings. New bridges may also be required in the future on the urban network, in places where gaps have been identified on the network or where river/canal crossing points may be necessary (e.g. New bridge over the River Liffey on Route no. 9 and proposed new bridges along the Liffey Greenway and over Grand Canal etc.). It is anticipated that there will be no direct impact as a result of the provision/ upgrade of the urban cycle network. However, consideration is given to direct impact as a result of the plan including increased visitor pressures and disturbance to sensitive habitats and species. These routes have been assessed in Table 9.1 below and any expected positive/negative or neutral impacts on the environment including long-term/medium-term/short-term have been flagged up. Mitigation to address these impacts is then presented in Chapter 10.
2. The Inter Urban Cycle network links towns, city and other facilities outside urban areas. Similar to the urban network, it largely concerns the provision of new signage, speed restriction, traffic management and road markings. However in situations where the existing road infrastructure exhibits constraints for cycling, such as those related to safety, there may occasionally be a requirement for the provision of cycle tracks within the verge of the existing roads, and where dangerous bends are present, minor realignment works. An assessment of these routes has been carried out also in Table 9.1 below and the impacts have been scored against the SEA objectives. Mitigation to address these impacts is then presented in Chapter 10.
3. The Greenway network comprises a combination of existing and proposed routes that are largely off road. Greenways generally are located in scenic areas, along coastal paths or riverine environments and due to the nature and location of these sites are most likely to come in contact with sites of conservation interest, often within or adjoining Natura 2000 Sites. Therefore these greenways required more detailed assessment than the other two route choices and have been examined in detail in Table 9.2.

Many of the proposed greenways are made up of existing amenities but will require upgrade ranging from minor upgrade works to the provision of new

infrastructure (i.e. bridges) and/or pedestrian and cycle facilities. Other Greenways may be new routes and will provide an amenity that did not exist previously. There is potential for some greenway routes to have a direct impact on Natura 2000 sites through construction of pathways within or in proximity to the site or indirectly by providing a new or improved access to sites that are sometimes highly sensitive to disturbance and visitor pressures. Table 9.2 assesses the impacts of each of these greenway routes against the SEA objectives and where mitigation is required this is flagged up and presented in Chapter 10.

All the routes mentioned above are denoted on the various maps included in the Plan itself. The environmental impacts of the proposed routes above have been assessed in section 9.2 below.

It is also worth noting that this is a strategic plan which provides recommended routes that have been derived from assessments carried out on cycle travel demand in the GDA. This Cycle Network Plan therefore allows for future schemes to be developed based on the mapping and objectives presented in the Plan. It is acknowledged that amendments to routes may be required as they are being developed.

9.2 Strategic Environmental Assessment Result

This section presents the results of the SEA assessment of the GDA Cycle Network Plan.

As stated above an analysis of the impacts of the plan was carried out in two separate assessment tables:

- Table 9.1 includes the assessment of 'The Urban Cycle Network' and 'The Inter-Urban Cycle Network'. As these routes are primarily to be located on existing routeways, the impacts were generally found to be minor or neutral. Routes included in these two networks that may have a minor variation off existing carriageways have been highlighted and assessed separately under table 9.1.
- Table 9.2 includes an assessment of all the Greenways routes within the GDA. A more detailed assessment of these routes was required due to the increased likelihood of potential impacts on the environment.

The following key applies to the rating in Table 9.1 and 9.2 below.

+ 3	Major positive impacts
+ 2	Moderate Positive impacts
+ 1	Minor positive impacts
0	Neutral
- 1	Minor negative impacts
- 2	Moderate negative impacts
- 3	Major negative impacts

Table 9.1 below focuses on cycle routes included in the Urban Cycle Network and Inter-Urban Cycle Network. A complete list of these routes is presented in Appendix D of this report. All of these routes were assessed using GIS and the maps available

in the main Plan. Due to the minimum impacts expected from these routes as outlined in section 9.1 an assessment of these routes against the 32 SEA objectives was combined into one table. Commentary on those routes where specific impacts have been identified follows this table.

Table 9.1 – Assessment of Urban and Inter-Urban Cycle Network routes against SEA Objectives

Urban Cycle Network and Inter-Urban Cycle Network		
SEA Objective	Rating	Assessment
Biodiversity		
1. To avoid impacts on the integrity of European Conservation Sites (SACs and SPAs) and nationally designated sites (NHAs), which includes taking account of protected species or qualifying interests that may occur/use areas outside designated sites, including those protected under the Wildlife Acts	0	<p>The routes that may have an impact on Natura 2000 sites have been listed in Table 9.2 below and the relevant mitigation to deal with these can be found in Section 10.3 Any development will be undertaken in accordance with the Habitats Directive and that no significant direct impacts will accrue as a result of its implementation.</p> <p>GIS analysis of the remaining cycle routes proposed revealed that there are no schemes in the plan which overlap with a Natura 2000 site, and as such the Authority is satisfied that the Urban and Inter-Urban elements of the GDA Cycle Network Plan will have no direct impact on Natura 2000 sites in terms of land-take.</p> <p>A preliminary 0 score is therefore given, but it must be borne in mind that the level of detail which is available at present is not sufficient to make a definitive determination across all elements of the plan. The Authority, in conjunction with other agencies and the local authorities, will not pursue any schemes arising out of this plan, or in-combination with other plans, which will adversely affect the integrity of a Natura 2000 site, unless there are no alternative solutions and that it has been demonstrated that the project is of overriding public interest. Further information is contained in the accompanying Natura Impact Statement.</p>

Urban Cycle Network and Inter-Urban Cycle Network		
2. To support the strategic objectives of the National Biodiversity Plan.	0	The routes assessed in this table will have a neutral impact on biodiversity in the Greater Dublin Area. There is minimal land-take involved and where any is required, it will be undertaken in a manner which is consistent with the principles of proper planning and sustainable development. In line with the objectives of the NBP, this plan has taken full account of biodiversity in its development; it fully sets out the elements of the GDA ecosystem which needs to be considered – not only in this plan but in subsequent infrastructural proposals; and will help conserve and restore biodiversity in the GDA by promoting a mode shift away from the private car to cycling, thereby reducing greenhouse gas emissions and improving air quality. Applying the precautionary principle, however, the SEA gives a rating of 0 as it cannot be definitively determined that a positive impact will accrue.
3. To minimise impacts on locally-important biodiversity in the Greater Dublin Area, including any known green networks or ecological corridors.	0	The reasoning and rationale for the 0 score for this SEA objective are identical to that set out for Objective no. 2.
4. To protect against the accidental introduction of alien plant species such as Japanese Knotweed and Giant Hogweed during the development and maintenance of the cycling network.	0	All development will take into account this objective and seek to address issues with invasive species as they arise. The majority of these routes are to be developed along existing roadways where invasive species should not arise as an issue. Therefore a neutral result has been given.
5. To ensure suitable buffer zones are in place on any proposed routes that may be likely to have a significant environmental impact on habitats or species along rivers, riparian areas, coastal areas or mountain paths	0	All development of routes will take into account this objective and where needed at project stage will investigate if buffer zones around these features are required.
6. To protect existing hedgerows against unnecessary damage during the development of the cycle network.	0	It is not envisaged that those routes along existing roads and carriageways will have a significant effect on hedgerows. Where these issues arise at project stage appropriate measures will be taken to address them.

Urban Cycle Network and Inter-Urban Cycle Network		
Landscape		
<p>7. To avoid or, where infeasible, minimise impacts on designated and protected landscapes and conservation areas.</p>	+1	<p>Due to the low level of intervention in the natural environment proposed by these Urban and Inter-Urban routes, the main focus in terms of landscape was the city centre and urban conservation areas where the bulk of the plan's proposals will be developed.</p> <p>Where new infrastructure including new bridges are proposed and construction is required – even within the curtilage of the existing carriageway – it is assumed for the purposes of this SEA that best practice methods, in terms of design and construction will ensure that no permanent adverse impacts on conservation areas related to the built environment and the rivers and canals in the GDA will arise.</p> <p>It is assumed that this programme will be undertaken in accordance with the all relevant environmental directives, and planning legislation and guidance, and that no significant impacts will accrue as a result of their implementation.</p> <p>Overall, due to the minimal extent of intervention required in the natural and built environment as a result of these routes, i.e. minimal land-take, demolition etc. – and when viewed in the context of a general decrease arising from an anticipated mode shift away from the private car on a regional basis, a minor positive score has been given for the plan against this SEA objective.</p>
<p>8. To minimise impacts on undesignated landscape resources (townscapes, seascapes, riverscapes, general landscapes).</p>	+1	<p>In a similar manner to Objective #7, the impacts on undesignated landscapes can be deemed to be minor positive due to the impacts in terms of traffic reduction brought about by the anticipated mode shift away from the private car to bicycle.</p>
Population		

Urban Cycle Network and Inter-Urban Cycle Network	
<p>9. To increase accessibility to economic and employment opportunities, in particular for those who are physically, economically or socially disadvantaged within the GDA.</p>	<div data-bbox="759 1171 791 1200" data-label="Text"> <p>+1</p> </div> <p>The urban and inter-urban elements of the plan are predicted to contribute positively to accessibility to employment for those who are economically and socially disadvantaged on a permanent basis across the entire Greater Dublin Area.</p> <p>The development of the cycling network is intended to facilitate safer and more convenient access by bicycle from people's places of residence to potential places of work and other social services. As cycling is a highly efficient mode in terms of costs, speed and reliability, the promotion of it as a means of travel should have major benefits in terms of accessibility for those who are economically and socially disadvantaged. This is of particular relevance for trips up to 10km in length.</p> <p>Whilst the primary purpose of the GDA Cycle Network is to provide an improved environment for cycling, such developments will, in many cases, also have direct benefits for non-cyclists, who will be entitled to use much of the infrastructure for recreation, leisure and daily travel needs in their local areas. This would include wheelchair users and others with physical disabilities.</p> <p>The five principles of Sustainable Safety, which are the basis for the planning and design of new and upgraded cycle routes, provide a robust methodology for the implementation of safe routes that cater not just for cyclists of all ages and abilities but also for a range of other users.</p> <p>Whilst this would apply in particular to shared greenway routes, it should be noted also that users of motorised wheelchairs are entitled in law to use cycle-specific infrastructure.</p> <p>Furthermore, changes to street layouts and junction designs that provide for safer cycling will, in general, enhance the travel experience of all users by means of improved pedestrian crossing facilities, reduced waiting times at crossings, slower traffic speeds in built-up areas and a more legible urban environment.</p> <p>It is reasonable therefore to give a minor positive score of +1 for this objective.</p>

Urban Cycle Network and Inter-Urban Cycle Network		
10. To increase accessibility to quality public, cultural and community services, in particular, for those who are physically, economically or socially disadvantaged within the GDA.	+1	The outcome of the assessment here is similar to that for Objective #9. Many cultural and community outlets are located in the same areas as employment, as such a positive impact score on this objective is given.
Human Health		
11. To contribute to improvements to transport-related aspects of quality of life for residents, workers and visitors to the GDA.	+2	The plan is predicted to have significant positive impacts on the cycling coverage of the GDA. The implementation of this element of the plan will also contribute positively to this objective in terms of costs and the reliability of these modes. Overall, a permanent, region-wide moderate positive impact can be predicted and a +2 score was deemed appropriate.
12. To support the objectives of the Environmental Noise Directive in relation to transport-related noise.	+1	This element of the plan is likely to lead to a higher proportion of trips being undertaken by bicycle than by private car, which will permanently lead to lower traffic noise levels, particularly in key central locations. Therefore a minor positive score of +1 was deemed to be reasonable against this objective.
13. To minimise safety risks to human health arising from transport related activity.	+1	It can be predicted that the further development of a safer cycling network will make the transport environment in the GDA safer. Overall this element of the plan is also anticipated to engender a shift towards this mode and will remove some potential for accidents by reducing the numbers of cars on the road network. A minor positive assessment has been given for this objective.
14. To support health improvements and benefits from transport-related activities.	+1	The plan facilitates the development of a GDA cycling network which is intended to deliver a mode shift towards active modes of travel for all trip purposes. As the extent of this shift is not fully evident at this point, a precautionary +1 has been given. This positive impact will be permanent and should accrue across the Greater Dublin Area.

Urban Cycle Network and Inter-Urban Cycle Network		
Water		
15. To support the forthcoming River Basin Management Plans (RBMP) and Programme of Measures (POM). Where these are not available, the objective is to support the aims and objectives of the Water Framework Directive (WFD)	0	The routes assessed here are rated as having a neutral effect on the relevant RBMPs and the overall objectives of the WFD, the primary focus of which is to achieve 'good' ecological status for all waters by 2015. The plan does have the potential to directly impact on water resources in the GDA, but these are actually relatively limited in their occurrence and are addressed in the assessment of the greenway routes. It is not anticipated that any new bridges which are to be constructed over waterways in the GDA will have any significant impact on water quality.
16. To minimise impacts to surface water systems and resources.	0	It is anticipated that these cycle routes will be constructed primarily within the curtilage of the existing roadways and that relevant design standards, good construction practice and management will apply in the implementation of all infrastructural schemes, including any future bridge construction. All of these routes will also require development consent and in some cases, project-level EIA/AA. These 'lower-tier' processes will also assist in reducing, managing and limiting negative impacts. As such, a neutral 0 score was considered appropriate.
17. To minimise impacts to groundwater systems and resources.	0	GIS analysis shows that no routes proposed will have direct impacts on Groundwater Source Protection Areas. As such, a neutral score is given for this objective.
18. To minimise impacts to coastal systems and resources.	0	In line with the commentary on SEA Objective #1, it is assumed that as projects are developed via the Part VIII or EIS process, as appropriate, principles of proper planning and sustainable development will apply and impacts to coastal systems will be minimised. At the level of a regional plan assessment, a neutral impact and a score of 0 has therefore been given against this objective for the Urban and Inter-Urban routes.
19. To minimise impacts to transitional systems and resources.	0	For the routes specifically examined as part of this assessment table a neutral impact is expected.

Urban Cycle Network and Inter-Urban Cycle Network		
20. To minimise the risk of flooding.	0	In assessing the potential for impacts in relation to this objective, it is taken to be the case that any schemes will not be allowed to proceed unless they meet design standards which avoid undue increases to the risk of flooding. On this basis, and taking into account the limited level of intervention in the environment proposed, it is considered unlikely that there would be significant impacts arising from flooding as a consequence of this element of the plan.
Air		
21. To reduce negative air quality impacts arising from transport-related emissions.	+1	The anticipated mode shift from the private car to cycling, as a result of the Urban and Inter-Urban network will lead to a reduction in transport-related emission. A +1 is therefore regarded as appropriate.
22. To ensure compliance with the Air Framework Directive and associated daughter Directives (and the transposing Regulations in Ireland).	+1	Similar to objective #21 it is expected that this element of the plan will only improve air quality in the region, therefore a +1 is considered appropriate.
Climatic Factors		
23. To contribute to the reduction of greenhouse gas emissions arising from transport-related activities.	+1	A similar logic applies here as to Objective #21. Taking a regional-level view, the enhancements to the cycling networks, by engendering a shift towards these modes away from the private car, will lead to a reduction in greenhouse gas emissions from transport.
24. Ensure that any new development along coastal areas takes into account the impacts of sea level rise/increased storm occurrence and coastal erosion	0	It is anticipated that these cycle routes will be constructed primarily within the curtilage of the existing roadways and that relevant design standards, good construction practice and management will apply in the implementation of all infrastructural schemes to ensure the impacts presented in objective #24 are mitigated.
Soils & Geology		
25. To minimise negative impacts on important and vulnerable soils resources used for agricultural purposes.	0	As the level of land-take proposed is minimal and confined to the urban area, no impact on soils is anticipated.
26. To reduce consumption of construction material and generation of construction waste as part of the cycle network development.	0	There will be a degree of construction required as part of this element of the plan but the potential for impacts will be reduced where the principles of sustainable development are applied to construction and procurement of materials, i.e. the re-use and recycling of materials.

Urban Cycle Network and Inter-Urban Cycle Network		
27. Ensure the remediation of contaminated soils removed as part of any cycle route	0	The principles of sustainable development will be applied to all route construction and contaminated soils will be addressed at project level.
28. To avoid or, where infeasible, minimise impacts to protected and designated geological and geomorphological sites.	0	The cycle routes included within the plan may have the potential to impact on geological and geomorphological sites, however, there is no national designation for such sites. Potential direct impacts are considered unlikely given the quantum of new infrastructure proposed and given that much of this is in urban areas which have already been developed. As such, a neutral rating is deemed reasonable for this SEA Objective.
Material Assets		
29. To protect public assets and infrastructure.	+1	The Urban and Inter-Urban elements of the plan are expected to increase accessibility for all to public assets and infrastructure through the new cycle network. It is assumed that utilities such as telecommunications networks, electricity transmissions network, gas network etc. will not be negatively impacted by the plan and that temporary loss in service will be minimised during implementation of the plan. A minor positive score has been given on this basis.
30. To reduce the fossil fuel demand by the transport sector.	+1	By securing a mode shift away from the private car towards cycling the delivery of the Urban and Inter-Urban elements of the plan should contribute to a reduction in fossil fuel demand on across the region. Therefore a minor positive +1 was seen as appropriate. In relation to those trips by car and goods vehicles that will still be undertaken with the plan in place, it is anticipated that the efficiency of these trips may be enhanced as a result of the removal of unnecessary journeys from the network. This will have the effect of easing congestion and reducing the amount of fuel wasted in stationary traffic.

Urban Cycle Network and Inter-Urban Cycle Network		
31. To assist with the reuse and regeneration of brownfield sites.	+1	It is anticipated that these cycle routes will be constructed primarily within the curtilage of the existing roadways (with the exception of any new bridges proposed – which should not have any significant impact on brownfield sites) and there will be the potential for redevelopment of brownfield sites along such routes. As these routes will enhance the accessibility of the urban areas of the GDA, they may also promote consolidation of development into the existing urban footprint, thereby increasing the likelihood of brownfield sites being regenerated.
Cultural Heritage		
32. To avoid or, where infeasible, minimise impacts to designated cultural, architectural and archaeological resources.	0	<p>The level of land-take required in this plan should ensure that there will be no significant impact on this SEA Objective, where issues are raised at project stage further mitigation and monitoring of these impacts will continue throughout the construction period.</p> <p>It is assumed that all future projects, including proposed bridges (Bridge over the River Liffey, northn of Fishamble Street along Primary Route no. 9) will be constructed in accordance with the required design standards; in accordance with all required planning and environmental regulations and that standard mitigation measures are incorporated into the design and construction. Potential disturbance of archaeological resources during scheme development will generally be mitigated by preservation in-situ where possible and preservation by recording. The various measures which will result in town and streetscape improvements can also be expected to potentially enhance the setting of the urban architectural and cultural heritage resources.</p> <p>Taking all of the above into account, the adverse impacts on archaeology, coupled with the potentially positive impacts on architecture mean a neutral score is reasonable for this objective.</p>

Urban Cycle Network and Inter-Urban Cycle Network	
Cumulative impacts and impact interactions	<p>0</p> <p>Section 7.13 presented a set of baseline impact interactions and interrelationships. These also apply to the environmental assessment results of the GDA Cycle Network Plan. However, a consideration of these impacts is that they will not cumulatively interact with the various impacts identified above in this table. Additionally, the potential for cumulative impacts and impact interactions was also directly considered when undertaking the assessment against each of the 32 SEA Objectives and any areas where common impacts were identified were generally expressed in such a manner. The methodology and information used to undertake the assessment also considered impact interactions (e.g. the reduction in traffic volume provided a cross-topic basis for air quality, noise, climate change and fossil fuel consumption and GIS information on the various schemes provided a basis for biodiversity, landscape, water and cultural heritage).</p> <p>Overall, it is not expected that interactions/interrelations between environmental topics and subsequent cumulative effects will lead to significant impacts over and above those identified already with respect to the SEA objectives and a neutral score has been given.</p>

9.3 Routes from the Urban Cycle Network and Inter-Urban Cycle Network whose impacts need to be considered

The routes listed below primarily relate to the Greenways and their impact on Natura 2000 sites in particular. With the exception of Route no. 9, further detail of their impacts are provided in the next section and in the Natura Impact Statement.

Route no. P1/N5 – Baldoye to Malahide (Same route as FG1/N5 – see table 9.2) **Biodiversity**

This route is within close proximity to Baldoye Bay SAC - While existing infrastructure is in place for much of this cycle route there is potential for additional works along the route including the provision of the Greenway FG1 which also runs along the route. This route has the potential to result in increased disturbance to the area, Salicornia habitats are identified as being under pressure from walking, horse-riding and not motorised vehicles. Atlantic salt meadows and Mediterranean salt meadow habitats are identified as under pressure from walking, horse riding and non-motorised vehicles along with the provision of paths, tracks and cycling tracks.

Route no. L1 (Lusk to Rush) and C7 (Harcourt Street to Islandbridge)

Biodiversity

Rye Water Valley/Carlton Site SAC 001398 - L1 and C7 primary / secondary feeder networks within SAC. Assessment needed at project level to determine impacts.

Route W13 (Laragh to Rathdrum)

W13 Interurban route intersects SAC, upgrading of paths may be deemed necessary, potential impacts on the SAC cannot be ruled out, therefore further investigation will be required at project level.

Route W14 (Laragh to Hollywood)

W14 Interurban route intersects Slaney River Valley SAC and Wicklow Mountains SPA , road to incorporate cycle network may be deemed necessary, potential impacts on the SAC cannot be ruled out, therefore further investigation will be required at project level.

Route W15 (Aughrim to Baltinglass)

W15 Interurban route intersects the Slaney River Valley SAC upgrading of road to incorporate cycle network may be deemed necessary, potential impacts on the SAC cannot be ruled out, therefore further investigation will be required at project level.

Route RU2 (Channel Road and Palmer Road to Kenure Park)

Route RU2 joins the Rogerstown estuary SAC 000208 to the north. Habitats are potentially directly impacted by works within the site along with the potential to increased visitor pressures, therefore further investigation will be required at project level.

Route 9 – Ormond Quay to River Poddle Greenway

This route proposes a new pedestrian and cycle bridge over the River Liffey between Fishamble Street and Ormond Quay. Potential impacts could include adverse visual impacts, impacts on the water system and impacts on cultural and architectural resources such as nearby protected structures. While there have been a number of new bridges built over the Liffey in central Dublin in recent years, care will need to be taken in the design and construction of this scheme in order to minimise impacts on this conservation area.

9.4 The Greenway Network

This section contains Table 9.2 and comprises the environmental assessment of the proposed Greenway Network. Each route is assessed against the SEA objectives and similar to previous tables given a rating from - 3 to + 3 depending on the level of impact expected on that particular environmental objective.

Individual elements of the plan which warrant specific commentary and assessment, by virtue of their specific impacts within the plan's overall cumulative impact, are addressed in the main text commentary under each SEA objective topic e.g. biodiversity. It should be reiterated at this point that the assessment focuses on those aspects of the plan which are predicted to have the most significant environmental impact. Mitigation measures to address these impacts are presented in the next chapter.

Table 9.2 Assessment of Greenway Routes against SEA Objectives

Cycle Greenway Route Ref - M1/N5 – Balbriggan to Drogheda

Cycle Route Ref.	Biodiversity Obj. no. 1,2,3,4,5,6	Landscape Obj. no. 7,8	Population Obj. 9,10	Human Health Obj. 11,12,13,14	Water Obj. 15,16,17,18,19,20	Air Obj. 21,22	Climatic Obj. 23,24	Soils Obj. 25,26,27,28	Material Assets Obj. 29,30,31	Cultural Heritage Obj. 32
M1	-3	-2	+2	+2	-1	+2	+2	-1	0	-3
<p>Potential Negative Likely Significant Effects of Cycle Route M1/N5</p> <p>Biodiversity</p> <p>1. Boyne Coast and Estuary SAC (001957) East Coast Greenway potentially directly impacting on the SAC, potential for increased visitor pressure. Other impacts expected from;</p> <ul style="list-style-type: none"> • Infilling • Pollution • Dunes are subject to intense recreations pressures which is likely to increase due to growing population in the general area <p>2. Boyne Estuary SPA (004080). Impacts expected from:</p> <ul style="list-style-type: none"> • Infilling • Pollution from Drogheda town • Planned port extension <p>3. River Nanny Estuary and Shore SPA (004158). Impacts expected from:</p> <ul style="list-style-type: none"> • Increased level of disturbance by beach users, walkers, dogs etc <p>4. Risk of spread of invasive species during construction.</p> <p>5. Protected species including Bats, Otters and Kingfishers may also be impacted by the proposed cycle route along riparian edges or close to waterways.</p> <p>Landscape</p> <p>Possible impacts on Coastal Plain – LCA 7 (Meath Co. Co.) Landscape Sensitivity – High</p> <p>Water</p> <p>Possible impacts on sea water quality and water quality of Boyne Estuary due to increases number of visitors expected.</p> <p>Soil</p> <p>Possible negative effect on soil in sensitive areas due to excavation. Possible loss of greenfield agricultural lands.</p> <p>Cultural Heritage</p> <p>Very sensitive area – Boyne Valley – historic sites</p>										

Cycle Greenway Route Ref - M5/N13 – Drogheda to Trim (via Navan)

Cycle Route Ref.	Biodiversity Obj. no. 1,2,3,4,5,6	Landscape Obj. no. 7,8	Population Obj. 9,10	Human Health Obj. 11,12,13,14	Water Obj. 15,16,17,18,19,20	Air Obj. 21,22	Climatic Obj. 23,24	Soils Obj. 25,26,27,28	Material Assets Obj. 29,30,31	Cultural Heritage Obj. 32
M5	-3	-2	+2	+2	-1	+2	+2	-1	0	-3

Potential Negative Likely Significant Effects of Cycle Route M5/N13:

Biodiversity

1. River Boyne and River Blackwater SAC (002299)

Proposed Boyne greenway along the banks of the Boyne River with potential to have impact directly on protected habitats, and indirectly through impact on water quality on some species

- Drainage, alteration of bankside
 - Water pollution
 - Dredging
 - Water quality due to agricultural runoff, domestic industry.
2. Boyne River Islands pNHA (001862)
 3. King William's Glen pNHA (001804)
 4. Dowth Wetland pNHA (001861)
 5. Rosnaree Riverbank pNHA (001589)
 6. Crewbane Marsh pNHA (000553)
 7. Boyne Woods pNHA (001592)
 8. Risk of spread of invasive species during construction.
 9. River Boyne and River Blackwater SPA (004232)

Likely Significant Effects (LSE) on Protected species

- Otter
- River lamprey
- Atlantic Salmon
- Kingfisher
- Bats

Landscape

Possible impacts on Boyne Valley – LCA 5 (Meath Co. Co.) Landscape sensitivity – High

Water

Possible impact on the water quality of designated sites from run off during construction and increased volume of litter from users of area.

Soil

Possible negative effect on soil in sensitive areas due to excavation. Possible loss of greenfield agricultural lands.

Cultural heritage

Very sensitive area Boyne Valley

Cycle Greenway Route Ref – M6 –Navan to Kingscourt

Cycle Route Ref.	Biodiversity Obj. no. 1,2,3,4,5,6	Landscape Obj. no. 7,8	Population Obj. 9,10	Human Health Obj. 11,12,13,14	Water Obj. 15,16,17,18,19,20	Air Obj. 21,22	Climatic Obj. 23,24	Soils Obj. 25,26,27,28	Material Assets Obj. 29,30,31	Cultural Heritage Obj. 32
M6	-1	0	+2	+1	0	+1	+1	0	0	-1

Potential Negative Likely Significant Effects of Cycle Route M6

Biodiversity

There may be some impacts on certain protected species such as bats, that may use the train line's linear route as a feeding or commuting area, however no major impact is expected on these species.

Cultural heritage

This routeway has a large amount of national monuments located along it, however as the routeway is proposed along an existing disused railway line there is not expected to be any major impacts.

Cycle Greenway Route Ref – M8a – Navan to Kells

Cycle Route Ref.	Biodiversity Obj. no. 1,2,3,4,5,6	Landscape Obj. no. 7,8	Population Obj. 9,10	Human Health Obj. 11,12,13,14	Water Obj. 15,16,17,18,19,20	Air Obj. 21,22	Climatic Obj. 23,24	Soils Obj. 25,26,27,28	Material Assets Obj. 29,30,31	Cultural Heritage Obj. 32
M8a	0	0	+1	+1	0	+1	+1	0	+1	0

Potential Negative Likely Significant Effects of Cycle Route M8a:

No significant impacts are expected from this greenway route, as it does not have an impact on any designated sites or water resources and also it is to be constructed along a disused railway line to the route should have no overall impact.

Cycle Greenway Route Ref – K1/N2 – Lexlip to Mullingar

Cycle Route Ref.	Biodiversity Obj. no. 1,2,3,4,5,6	Landscape Obj. no. 7,8	Population Obj. 9,10	Human Health Obj. 11,12,13,14	Water Obj. 15,16,17,18,19,20	Air Obj. 21,22	Climatic Obj. 23,24	Soils Obj. 25,26,27,28	Material Assets Obj. 29,30,31	Cultural Heritage Obj. 32
K1	-2	-1	+2	+2	-1	+1	+1	0	0	-1

Potential Negative Likely Significant Effects of Cycle Route K1/N2:

Biodiversity

Rye Water Valley/Carton SAC 001398 and pNHA 001398

This cycle route travels along the banks of the Royal Canal and may have an impact on the designated sites mentioned above. The site is protected for two species of snail which are sensitive to the following:

- Woodland clearance
- Pollution from agricultural and
- Petrifying springs and vertigo are particular vulnerable to urban development and to dumping.

Royal Canal pNHA 002103

The route travels along this pNHA which been designated due to its variety of habitats including calcareous grasslands, and species of plants that grow along the tow path therefore the route is likely to have a negative impact on these.

Otters, Bats and Kingfishers that may use the habitats along the route may also be impacted by the development.

Molerick Bog NHA 001582

Impacts possible from additional recreational pressure on bog.

Mount Hevey Bog SAC 002342 & pNHA – potential impact on hydrology.

Risk of spread of invasive species during construction

Landscape

The Kildare Landscape Character Assessment (LCA) outlines two areas of landscape designation that may be impacted on as a result of this project:

The 'Western Boglands' which has a medium level sensitivity and 'The Chair of Kildare' which may be affected by development near Enfield. However these impacts are expected to be minor in nature.

Water

As the cycle route is to travel alongside the canal there may be an impact on hydrology.

Cultural Heritage

There is the possibility that the cycle route may have an impact on national monuments where these are located along the route.

Cycle Greenway Route Ref – K8 – West of Enfield to Edenderry

Cycle Route Ref.	Biodiversity Obj. no. 1,2,3,4,5,6	Landscape Obj. no. 7,8	Population Obj. 9,10	Human Health Obj. 11,12,13,14	Water Obj. 15,16,17,18,19,20	Air Obj. 21,22	Climatic Obj. 23,24	Soils Obj. 25,26,27,28	Material Assets Obj. 29,30,31	Cultural Heritage Obj. 32
K8	-1	0	+2	+2	0	+1	+1	-1	0	0

Potential Negative Likely Significant Effects of Cycle Route K8:

Biodiversity

The proposed route may have an impact on the flora of the Carbury Bog NHA 001388. The raised bog habitat may also be impacted. As the route is proposed along an old disused railway line other negative impacts are unlikely.

Landscape

This cycle route is to be located along an old disused railway line; therefore no negative impact is expected on landscape character.

Cycle Greenway Route Ref – K10/N10 – Hazelhatch to Robertstown – K10 to Edenderry

Cycle Route Ref.	Biodiversity Obj. no. 1,2,3,4,5,6	Landscape Obj. no. 7,8	Population Obj. 9,10	Human Health Obj. 11,12,13,14	Water Obj. 15,16,17,18,19,20	Air Obj. 21,22	Climatic Obj. 23,24	Soils Obj. 25,26,27,28	Material Assets Obj. 29,30,31	Cultural Heritage Obj. 32
K10	-2	-1	+2	+2	-1	+1	+1	0	0	-1

Potential Negative Likely Significant Effects of Cycle Route K10/N10:

Biodiversity

The route runs along the Grand Canal which has been designated as a pNHA 002104, the route may have a possible negative impact on species such as otter, bat species and the Desmoulins' whorl snail that use the canal as part of their habitat. Important species of birds such as the kingfisher are also present and will require additional protection during construction

Risk of spread of invasive species during construction

Landscape

The route passes through 4 landscape designation areas in Kildare. The Chair of Kildare – Red Hill, Dunmurry Hill, Allen Hill has the highest sensitivity to change amongst these 4 areas.

Water

As the cycle route is to travel alongside the canal there may be an impact on hydrology.

Cultural Heritage

There is the possibility that the cycle route may have an impact on national monuments where these are located along the route.

Cycle Greenway Route Ref – K11/N10 – West of Robertstown to Athy

Cycle Route Ref.	Biodiversity Obj. no. 1,2,3,4,5,6	Landscape Obj. no. 7,8	Population Obj. 9,10	Human Health Obj. 11,12,13,14	Water Obj. 15,16,17,18,19,20	Air Obj. 21,22	Climatic Obj. 23,24	Soils Obj. 25,26,27,28	Material Assets Obj. 29,30,31	Cultural Heritage Obj. 32
K11	-2	-1	+2	+2	-1	+1	+1	0	0	-1

Potential Negative Likely Significant Effects of Cycle Route K11/N10:

Biodiversity

The route runs along the Grand Canal which has been designated as a pNHA 002104. The route may have a possible negative impact on species such as otter, bat species and the Desmoulins' whorl snail that use the canal as part of their habitat. Important species of birds such as the kingfisher are also present and will require additional protection during construction.

River Barrow & River Nore SAC 002162

The route passes through this designated site and therefore has a potential to impact on the species for which the site has been designated e.g. fresh water pearl mussel and twaite shad. Also potential impact on riparian habitat, water quality and aquatic environment. Hydrogeology potentially impacted, increased visitor pressure.

Risk of spread of invasive species during construction

Landscape

The route passes through 3 landscape designation areas in Kildare. The Chair of Kildare – Red Hill, Dunmurry Hill, Allen Hill has the highest sensitivity to change amongst these 3 areas.

Water

As the cycle route is to travel alongside the canal there may be an impact on hydrology.

Cultural Heritage

There is the possibility that the cycle route may have an impact on national monuments where these are located along the route.

Cycle Greenway Route Ref – K12 – South of Allenwood to Kildare/Newbridge (Pollardstown Feeder Greenway)

Cycle Route Ref.	Biodiversity Obj. no. 1,2,3,4,5,6	Landscape Obj. no. 7,8	Population Obj. 9,10	Human Health Obj. 11,12,13,14	Water Obj. 15,16,17,18,19,20	Air Obj. 21,22	Climatic Obj. 23,24	Soils Obj. 25,26,27,28	Material Assets Obj. 29,30,31	Cultural Heritage Obj. 32
K12	-1	-2	+1	+1	-1	+1	+1	0	0	-1

Potential Negative Likely Significant Effects of Cycle Route K12:

Biodiversity

Pollardstown Fen SAC 000396 - Greenway K12 is to end north of the fen, close to the village of Milltown and then joins the local road network to link to Kildare town and Newbridge. No likely significant impact is expected from this route, though there may be an increase in visitor traffic to the designated site.

Grand Canal pNHA 002104 - The route also runs along the Grand Canal which has been designated as a pNHA 002104, the route may have a possible negative impact on species such as otter, bat species and the Desmoulins' whorl snail that use the canal as part of their habitat. Important species of birds such as the kingfisher are also present and will require additional protection during construction.

Landscape

The route passes close to and through areas of both medium and high sensitivities including Pollardstown Fen and The Chair of Kildare included in the latter.

Water

Only minimum impacts on water are expected.

Cultural Heritage

There is the possibility that the cycle route may have an impact on national monuments where these are located along the route.

Cycle Greenway Route Ref – K13 – Sallins (via Naas) to east of Newbridge

Cycle Route Ref.	Biodiversity Obj. no. 1,2,3,4,5,6	Landscape Obj. no. 7,8	Population Obj. 9,10	Human Health Obj. 11,12,13,14	Water Obj. 15,16,17,18,19,20	Air Obj. 21,22	Climatic Obj. 23,24	Soils Obj. 25,26,27,28	Material Assets Obj. 29,30,31	Cultural Heritage Obj. 32
K13	-2	0	+2	+2	-1	+1	+1	0	0	-1

Potential Negative Likely Significant Effects of Cycle Route K13:

Biodiversity

The route runs along the Grand Canal which has been designated as a pNHA 002104. The route may have a possible negative impact on species such as otter, bat species and the Desmoulins' whorl snail that use the canal as part of their habitat. Important species of birds such as the kingfisher are also present and will require additional protection during construction.

Risk of spread of invasive species during construction.

Landscape

The cycle way is not expected to have any significant impact on landscape as it passes through a landscape area of low sensitivity.

Water

As the cycle route is to travel alongside the canal there may be an impact on hydrology.

Cultural Heritage

There is the possibility that the cycle route may have an impact on national monuments where these are located along the route.

Cycle Greenway Route Ref – K17 – Naas to north of Baltinglass

Cycle Route Ref.	Biodiversity Obj. no. 1,2,3,4,5,6	Landscape Obj. no. 7,8	Population Obj. 9,10	Human Health Obj. 11,12,13,14	Water Obj. 15,16,17,18,19,20	Air Obj. 21,22	Climatic Obj. 23,24	Soils Obj. 25,26,27,28	Material Assets Obj. 29,30,31	Cultural Heritage Obj. 32
K17	-1	0	+1	+1	0	+1	+1	0	0	0

Potential Negative Likely Significant Effects of Cycle Route K17:

Biodiversity

Impacts on biodiversity are expected to be minor, there are no designated sites along this greenway. The route runs along an old disused railway line, therefore significant impacts for development are not expected.

Invasive species may be encountered along the route.

Landscape

The proposed greenway passes through both medium and high sensitivity landscape in Kildare, however due to the fact that the greenway will be developed along an existing old railway line minimum landscape impact is expected.

Cycle Greenway Route Ref – W11/N5 – Bray to Wicklow (Indicative Route)

Cycle Route Ref.	Biodiversity Obj. no. 1,2,3,4,5,6	Landscape Obj. no. 7,8	Population Obj. 9,10	Human Health Obj. 11,12,13,14	Water Obj. 15,16,17,18,19,20	Air Obj. 21,22	Climatic Obj. 23,24	Soils Obj. 25,26,27,28	Material Assets Obj. 29,30,31	Cultural Heritage Obj. 32
W11	-2	-2	+1	+1	-1	+1	+1	-1	0	0
<p>Potential Negative Likely Significant Effects of Cycle Route W11/N5:</p> <p>Biodiversity Bray Head cSAC 000714 Sensitivities on site include those from:</p> <ul style="list-style-type: none"> • Burning • Development • Erosion • Grazing • Reclamation • Spread of Bracken • Trampling damage <p>W11 Greenway (East Coast Trail) potentially has a direct impact on the qualifying interests. Bray Head pNHA 000714 The Murragh SPA 004186 – main risks to site:</p> <ul style="list-style-type: none"> • Water pollution • Recreational disturbance <p>Eastern Greenway W11 directly adjoins and within the SPA, impact on habitat and disturbance to species. An established habitat for nesting little terns exists along this routeway, the introduction of additional visitors to the area may have a significant impact on this habitat. Also the further erosion of marram grass in the area as a result of construction of the route (mattress type structure) and increased visitor pressure needs to be considered.</p> <p>Landscape The proposed greenway will pass through 2 areas of LCA from the Wicklow County Development Plan including the urban areas of Bray, Greystones and Wicklow. It also passes through the 'Coastal Area of Area of Outstanding Natural Beauty' this is considered a sensitive area in the county.</p> <p>Soil Possible negative effect on coastal soil in sensitive areas due to excavation.</p>										

Cycle Greenway Route Ref – W13 – Avoca to Arklow

Cycle Route Ref.	Biodiversity Obj. no. 1,2,3,4,5,6	Landscape Obj. no. 7,8	Population Obj. 9,10	Human Health Obj. 11,12,13,14	Water Obj. 15,16,17,18,19,20	Air Obj. 21,22	Climatic Obj. 23,24	Soils Obj. 25,26,27,28	Material Assets Obj. 29,30,31	Cultural Heritage Obj. 32
W13	-1	-1	+2	+2	-1	+1	+1	-1	+1	0
Potential Negative Likely Significant Effects of Cycle Route W13: Biodiversity Avoca River Valley pNHA 001798 Sensitivities on site – potential impact on water quality and woodland. Greenway proposed through areas of forestry. Arklow Town Marsh pNHA 001931 – acts as a natural flood plain during peak flood periods. Landscape The proposed greenway passes through three areas of landscape character. The 'Area of Special Amenity' stretching from Avoca to the outskirts of Arklow being the most sensitive. Water Run off during construction may have an impact on the Avoca River. Soil Removal of soils from woodland areas may have an impact on tree routes and development.										

Cycle Greenway Route Ref – W16 – Woodenbridge to Shilelagh

Cycle Route Ref.	Biodiversity Obj. no. 1,2,3,4,5,6	Landscape Obj. no. 7,8	Population Obj. 9,10	Human Health Obj. 11,12,13,14	Water Obj. 15,16,17,18,19,20	Air Obj. 21,22	Climatic Obj. 23,24	Soils Obj. 25,26,27,28	Material Assets Obj. 29,30,31	Cultural Heritage Obj. 32
W16	-1	0	+1	+1	-1	+1	+1	0	0	0
Potential Negative Likely Significant Effects of Cycle Route W16: Biodiversity Slaney River Valley SAC 000781 - on the Slaney Upper Reaches. Potential for direct impact at crossing points to protected species including Kingfishers, Bats and Otters and their associated habitats. The greenway route will travel along the disused railway line 'The old Aughrim Railway Line' therefore the impacts from this route are expected to be minimum. There may be minimum impact on riparian zones. Tomnafinnoge Wood pNHA 001852 – impacts on woodland flora and fauna. Water Run off during construction may have an impact on the Slaney River where the route comes close to the riverbank										

Cycle Greenway Route Ref – FG1/N5 – Portmarnock to north of Balbriggan

Cycle Route Ref.	Biodiversity Obj. no. 1,2,3,4,5,6	Landscape Obj. no. 7,8	Population Obj. 9,10	Human Health Obj. 11,12,13,14	Water Obj. 15,16,17,18,19,20	Air Obj. 21,22	Climatic Obj. 23,24	Soils Obj. 25,26,27,28	Material Assets Obj. 29,30,31	Cultural Heritage Obj. 32
FG1	-3	-2	+2	+2	-1	+1	+1	0	-1	-1

Potential Negative Likely Significant Effects of Cycle Route FG1/N5:

Biodiversity

Badoyle Bay SAC and pNHA 000199 – increased recreational pressure may cause harm to habitats and species protected in these sites.

Baldoyle SPA 004016

- Impacts on wintering bird populations

Malahide Estuary SAC and pNHA 000205 – recreational activities on dunes and infilling of land

Malahide estuary SPA 004025- potential for loss of habitat and disturbance to birds, the proposed cycle route is to pass over this area alongside the existing railway viaduct, impacts on the SAC and SPA are likely during construction.

Portraneshore pNHA 001215 – possible impacts to dune habitat.

Rogerstown estuary SAC and pNHA 000208 – there are two options for the crossing points of the FG1 Greenway in this area. The first proposes crossing the SAC on the outer side of the inlet, the second proposed crossing is on the inside. Habitats are potentially directly impacted by works within the site along with the potential to increased visitor pressures on sites in particular Fixed and Shifting dunes.

Rogerstown Estuary SPA 004015 - Eastern Greenway adjoining and within SPA, potential for loss of habitat and disturbance to birds.

Landscape

The cycle route will cross through two areas of landscape character as identified in the Fingal Development Plan – 1. Estuary Character Type of which the areas of Malahide, Baldoyle and Rogerstown have been outlined as being of exceptional value and 2. Coastal Character which has also been outlined as exceptional. Construction of FG1 may have an impact on this landscape if not treated sensitively.

Water

There may be an impact on the coastal water resources due to run off during construction, though this is expected to be minimum.

Material Assets

Construction of the cycle way across the existing railway bridge from Malahide to Donabate may have an impact on railway services.

Cultural Heritage

There is the possibility that the cycle route may have an impact on national monuments where these are located along the route.

Cycle Greenway Route Ref – FG2 – North Swords

Cycle Route Ref.	Biodiversity Obj. no. 1,2,3,4,5,6	Landscape Obj. no. 7,8	Population Obj. 9,10	Human Health Obj. 11,12,13,14	Water Obj. 15,16,17,18,19,20	Air Obj. 21,22	Climatic Obj. 23,24	Soils Obj. 25,26,27,28	Material Assets Obj. 29,30,31	Cultural Heritage Obj. 32
FG2	-2	-2	+1	+1	-1	+1	+1	-1	0	-1

Potential Negative Likely Significant Effects of Cycle Route FG2:

Biodiversity

Malahide Estuary SAC and pNHA 000205 – impacts may include recreational activities on dunes and infilling of land. Malahide estuary SPA 004025- potential for loss of habitat and disturbance to birds, the proposed cycle route is to pass along the shore of this area which may have impacts on the SAC and SPA. These are likely during construction and operation.

Landscape

FG2 passes through an area of exceptional value categorised under the estuary Character Type in the LCA. Any development in this area will have to cognisant to the fact that it is a very flat area and in clear view except in certain areas where tree cover is found.

Water

There may be an impact on the estuarine water resources due to run off during construction, though this is expected to be minimum.

Soil

There may be a marginal loss of agricultural soils.

Cultural Heritage

There is the possibility that the cycle route may have an impact on national monuments where these are located along the route.

Cycle Greenway Route Ref – FG3 – via Swords

Cycle Route Ref.	Biodiversity Obj. no. 1,2,3,4,5,6	Landscape Obj. no. 7,8	Population Obj. 9,10	Human Health Obj. 11,12,13,14	Water Obj. 15,16,17,18,19,20	Air Obj. 21,22	Climatic Obj. 23,24	Soils Obj. 25,26,27,28	Material Assets Obj. 29,30,31	Cultural Heritage Obj. 32
FG3	-1	0	+1	+1	-1	+1	+1	0	0	-1

Potential Negative Likely Significant Effects of Cycle Route FG3:

Biodiversity

Impacts on riparian habitats and species of the Ward River from increased recreational pressure.

Water

Construction run off may have an impact on water quality during construction phase.

Cultural Heritage

The route may have an impact upon protected monuments that are located near the river in Swords town.

Cycle Greenway Route Ref – FG4 – Malahide to Swords

Cycle Route Ref.	Biodiversity Obj. no. 1,2,3,4,5,6	Landscape Obj. no. 7,8	Population Obj. 9,10	Human Health Obj. 11,12,13,14	Water Obj. 15,16,17,18,19,20	Air Obj. 21,22	Climatic Obj. 23,24	Soils Obj. 25,26,27,28	Material Assets Obj. 29,30,31	Cultural Heritage Obj. 32
FG4	-2	-2	+1	+1	-1	+1	+1	-1	0	0
Potential Negative Likely Significant Effects of Cycle Route FG4: Biodiversity Malahide Estuary SAC and pNHA 000205 – impacts may include recreational activities on dunes and infilling of land. Malahide estuary SPA 004025- potential for loss of habitat and disturbance to birds, the proposed cycle route is to pass along the shore of this area which may have impacts on the SAC and SPA. These are likely during construction and operation. Landscape FG4 passes through an area of exceptional value categorised under the estuary Character Type in the Fingal LCA. Any development in this area will have to cognisant to the fact that it is a very flat area and in clear view except in certain locations where tree cover is found. Water There may be an impact on the estuarine water resources due to run off during construction, though this is expected to be minimum. Soil There may be a marginal loss of agricultural soils.										

Cycle Greenway Route Ref – Dodder Greenway (DG)

Cycle Route Ref.	Biodiversity Obj. no. 1,2,3,4,5,6	Landscape Obj. no. 7,8	Population Obj. 9,10	Human Health Obj. 11,12,13,14	Water Obj. 15,16,17,18,19,20	Air Obj. 21,22	Climatic Obj. 23,24	Soils Obj. 25,26,27,28	Material Assets Obj. 29,30,31	Cultural Heritage Obj. 32
DG	-2	-1	+1	+1	-1	+1	+1	-1	0	-1
Potential Negative Likely Significant Effects of Cycle Route: Dodder Greenway Biodiversity Glenasmole Valley SAC 001209 Dodder Greenway within the valley and increases access to the site, Potential direct impacts on habitats present from <ul style="list-style-type: none"> • Construction works at the reservoirs • Dumping • Inappropriate development of recreational facilities • Spread of alien species and amenity planting There may be impacts on some species that may include otters, bats and kingfishers that use the riparian zone along the river in other areas outside of the SAC. An assessment of any rare or protected plants on site will also need to be carried out prior to development. The development of this greenway may include the construction of additional bridges which may span the river at Ringsend, Clonskeagh										

(back of Ashton's pub), Dropping Well, Templeogue Village and Dodder Valley Park in Firhouse (Route SO5). The impacts of these individual bridges will need to be assessed further at project stage.

Landscape

The Dodder Greenway passes through 'the Dodder valley' area of LCA for South Dublin. Therefore there is an aim in the LCA to Protect and enhance the scenic nature of the Dodder Valley.

Water

As the cycle route is to travel alongside the river there may be an impact on hydrology.

Soils

Removal of soils from riparian areas may have an impact on habitats and species adjoining the river.

Removal of soils from woodland areas may have an impact on tree roots and development.

Cultural Heritage

There is the possibility that the cycle route may have an impact on national monuments where these are located along the route.

Cycle Greenway Route Ref – River Camac (RC)

Cycle Route Ref.	Biodiversity Obj. no. 1,2,3,4,5,6	Landscape Obj. no. 7,8	Population Obj. 9,10	Human Health Obj. 11,12,13,14	Water Obj. 15,16,17,18,19,20	Air Obj. 21,22	Climatic Obj. 23,24	Soils Obj. 25,26,27,28	Material Assets Obj. 29,30,31	Cultural Heritage Obj. 32
RC	-1	0	+1	+1	-1	+1	+1	0	0	0

Potential Negative Likely Significant Effects of Cycle Route: River Camac

Biodiversity

Impacts on riparian habitats of the River Camac from development and increased recreational pressure.

Water

As the cycle route is to travel alongside the river there may be an impact on hydrology.

Cycle Greenway Route Ref – Grand Canal Greenway (GCG)

Cycle Route Ref.	Biodiversity Obj. no. 1,2,3,4,5,6	Landscape Obj. no. 7,8	Population Obj. 9,10	Human Health Obj. 11,12,13,14	Water Obj. 15,16,17,18,19,20	Air Obj. 21,22	Climatic Obj. 23,24	Soils Obj. 25,26,27,28	Material Assets Obj. 29,30,31	Cultural Heritage Obj. 32
GCG	-2	-1	+1	+1	-1	+1	+1	0	0	-1

Potential Negative Likely Significant Effects of Cycle Route: Grand Canal Greenway

Biodiversity

The route runs along the Grand Canal which has been designated as a pNHA 002104, the route may have a possible negative impact on species such as otter, bat species and the Desmoulins' whorl snail that use the canal as part of their habitat. Important species of birds such as the kingfisher are also present and will require additional protection during construction.

<p>Landscape Possibility of trees along the canal being impacted upon by development.</p> <p>Water As the cycle route is to travel alongside the canal there may be an impact on hydrology.</p> <p>Cultural Heritage There is the possibility that the cycle route may have an impact on national monuments where these are located along the route.</p>

Cycle Greenway Route Ref – Royal Canal

Cycle Route Ref.	Biodiversity Obj. no. 1,2,3,4,5,6	Landscape Obj. no. 7,8	Population Obj. 9,10	Human Health Obj. 11,12,13,14	Water Obj. 15,16,17,18,19,20	Air Obj. 21,22	Climatic Obj. 23,24	Soils Obj. 25,26,27,28	Material Assets Obj. 29,30,31	Cultural Heritage Obj. 32
Royal Canal	-2	-1	+1	+1	-1	+1	+1	0	0	-1

Potential Negative Likely Significant Effects of Cycle Route: Royal Canal Greenway

This cycle route travels along the banks of the Royal Canal and may have an impact on the designated sites mentioned above. The site is protected for two species of snail which are sensitive to the following:

- Woodland clearance
- Pollution from agricultural and
- Petrifying springs and vertigo are particular vulnerable to urban development and to dumping.

Royal Canal pNHA 002103 - The route travels along this pNHA which been designated due to its variety of habitats including calcareous grasslands, and species of plants that grow along the tow path therefore the route is likely to have a negative impact on these.

Otters, bats or kingfishers along the route may also be impacted by the development.

Landscape

Possibility of trees along the canal being impacted upon by development

Water

As the cycle route is to travel alongside the canal there may be an impact on hydrology.

Cultural Heritage

There is the possibility that the cycle route may have an impact on national monuments where these are located along the route

Cycle Greenway Route Ref – Western Parkway Greenway (WPG)

Cycle Route Ref.	Biodiversity Obj. no. 1,2,3,4,5,6	Landscape Obj. no. 7,8	Population Obj. 9,10	Human Health Obj. 11,12,13,14	Water Obj. 15,16,17,18,19,20	Air Obj. 21,22	Climatic Obj. 23,24	Soils Obj. 25,26,27,28	Material Assets Obj. 29,30,31	Cultural Heritage Obj. 32
WPG	0	0	+1	+1	0	+1	+1	0	0	0

Potential Negative Likely Significant Effects of Cycle Route: Western Parkway Greenway

No significant negative impacts are expected from this greenway route as it is mainly to be constructed in an existing built up area – no mitigation required.

Cycle Greenway Route Ref – Poddle Greenway (PG)

Cycle Route Ref.	Biodiversity Obj. no. 1,2,3,4,5,6	Landscape Obj. no. 7,8	Population Obj. 9,10	Human Health Obj. 11,12,13,14	Water Obj. 15,16,17,18,19,20	Air Obj. 21,22	Climatic Obj. 23,24	Soils Obj. 25,26,27,28	Material Assets Obj. 29,30,31	Cultural Heritage Obj. 32
PG	-1	0	+1	+1	0	+1	+1	0	0	0

Potential Negative Likely Significant Effects of Cycle Route: Poddle Greenway

This greenway route is mainly to be constructed in an existing built up area, therefore for the majority of the route no significant impacts are expected. However, the route will involve the construction of a new bridge across the Grand Canal directly to the north of Greenmount Court, close to Harold's Cross, this may have a negative impact on the biodiversity along this section of the canal.

Cycle Greenway Route Ref – Slang River Greenway (SLG)

Cycle Route Ref.	Biodiversity Obj. no. 1,2,3,4,5,6	Landscape Obj. no. 7,8	Population Obj. 9,10	Human Health Obj. 11,12,13,14	Water Obj. 15,16,17,18,19,20	Air Obj. 21,22	Climatic Obj. 23,24	Soils Obj. 25,26,27,28	Material Assets Obj. 29,30,31	Cultural Heritage Obj. 32
SRG	0	0	+1	+1	0	+1	+1	0	0	0

Potential Negative Likely Significant Effects of Cycle Route: Slang River Greenway

No significant negative impacts are expected from this greenway route as it is mainly to be constructed in an existing built up area – no mitigation required.

Cycle Greenway Route Ref – Kilbogget River Greenway (KG)

Cycle Route Ref.	Biodiversity Obj. no. 1,2,3,4,5,6	Landscape Obj. no. 7,8	Population Obj. 9,10	Human Health Obj. 11,12,13,14	Water Obj. 15,16,17,18,19,20	Air Obj. 21,22	Climatic Obj. 23,24	Soils Obj. 25,26,27,28	Material Assets Obj. 29,30,31	Cultural Heritage Obj. 32
KRG	0	0	+1	+1	0	+1	+1	0	0	0

Potential Negative Likely Significant Effects of Cycle Route: Kilbogget Greenway

No significant negative impacts are expected from this greenway route as it is mainly to be constructed in an existing built up area – no mitigation required.

Cycle Greenway Route Ref –Carrickmines Greenway (CRG)

Cycle Route Ref.	Biodiversity Obj. no. 1,2,3,4,5,6	Landscape Obj. no. 7,8	Population Obj. 9,10	Human Health Obj. 11,12,13,14	Water Obj. 15,16,17,18,19,20	Air Obj. 21,22	Climatic Obj. 23,24	Soils Obj. 25,26,27,28	Material Assets Obj. 29,30,31	Cultural Heritage Obj. 32
CRG	-2	-2	+1	+1	0	+1	+1	0	0	0
Potential Negative Likely Significant Effects of Cycle Route: Carrickmines Greenway Biodiversity Loughlinstown Woods NHA 001211 - Woodland is sensitive to change. Red Squirrel has been recorded in area. Landscape This is an area of sensitive amenity landscape and the woodland present should be protected.										

Cycle Greenway Route Ref – Liffey Greenway (LG)

Cycle Route Ref.	Biodiversity Obj. no. 1,2,3,4,5,6	Landscape Obj. no. 7,8	Population Obj. 9,10	Human Health Obj. 11,12,13,14	Water Obj. 15,16,17,18,19,20	Air Obj. 21,22	Climatic Obj. 23,24	Soils Obj. 25,26,27,28	Material Assets Obj. 29,30,31	Cultural Heritage Obj. 32
LG	-2	-1	+1	+1	0	+1	+1	0	0	-1
Potential Negative Likely Significant Effects of Cycle Route: Liffey Greenway Biodiversity Liffey Valley pNHA 000128 – sensitive to development. New bridges are proposed at several points where crossing of the river is required along this greenway. This may have a negative impact on the habitats and species that use the river and riparian zones. Please note also that route NO5 overlaps with the Liffey Greenway north of Roananstown in west Dublin, therefore route NO5 also crosses over the River Liffey at a new bridging point but the impact of this route and any mitigation measures required will be addressed under the Liffey greenway in Table 10.1. Landscape Riverine landscape - existing deciduous planting in the river valley should be protected. Cultural Heritage There is the possibility that the cycle route may have an impact on national monuments where these are located along the route.										

Cycle Greenway Route Ref – NO6 Greenway – Islandbridge to Ashtown (via Phoenix Park)

Cycle Route Ref.	Biodiversity Obj. no. 1,2,3,4,5,6	Landscape Obj. no. 7,8	Population Obj. 9,10	Human Health Obj. 11,12,13,14	Water Obj. 15,16,17,18,19,20	Air Obj. 21,22	Climatic Obj. 23,24	Soils Obj. 25,26,27,28	Material Assets Obj. 29,30,31	Cultural Heritage Obj. 32

NO6	-1	0	+1	+1	0	+1	+1	0	0	0
Potential Negative Likely Significant Effects of Cycle Route: N06 Greenway The majority of the route is not likely to have any significant impact on biodiversity as it travels along existing river paths and will require only minimum works. However where new bridges are proposed such as that between Phoenix Park and the Memorial Gardens there is the potential for impacts on biodiversity and water quality to occur during construction.										

Cycle Greenway Route Ref – Tolka Greenway (TG)

Cycle Route Ref.	Biodiversity Obj. no. 1,2,3,4,5,6	Landscape Obj. no. 7,8	Population Obj. 9,10	Human Health Obj. 11,12,13,14	Water Obj. 15,16,17,18,19,20	Air Obj. 21,22	Climatic Obj. 23,24	Soils Obj. 25,26,27,28	Material Assets Obj. 29,30,31	Cultural Heritage Obj. 32
TG	-1	-1	+1	+1	0	+1	+1	0	0	0
Potential Negative Likely Significant Effects of Cycle Route: Tolka Greenway Biodiversity The majority of the route is not likely to have any significant impact on biodiversity as it travels along existing river paths and will require only minimum works. However where new works are proposed on undeveloped land species and habitats that use the area should be considered. The eastern end of the greenway meets the South Dublin Bay and River Tolka SPA 004024 – this area has been designated for both breeding/wintering and passing birds of interest. The area is also designated for the North Dublin Bay pNHA 000206. Landscape There may be some minor impacts on landscape along the route where no former tracks exist and the river setting may be disturbed.										

Cycle Greenway Route Ref – Santry River Greenway (SRG)

Cycle Route Ref.	Biodiversity Obj. no. 1,2,3,4,5,6	Landscape Obj. no. 7,8	Population Obj. 9,10	Human Health Obj. 11,12,13,14	Water Obj. 15,16,17,18,19,20	Air Obj. 21,22	Climatic Obj. 23,24	Soils Obj. 25,26,27,28	Material Assets Obj. 29,30,31	Cultural Heritage Obj. 32
SRG	-2	-1	+1	+1	0	+1	+1	0	0	0
Potential Negative Likely Significant Effects of Cycle Route: Santry River Greenway Biodiversity Santry Demesne pNHA 000178 North Dublin Bay pNHA 000206 North Dublin Bay SAC 000206 – Impacts from Recreational pressure North Bull Island SPA 004006 – Impacts from Walkers, dogs sailing disturbance probably responsible for the abandonment of the site by <i>Sterna albifrons</i> An assessment of any rare or protected plants on site will also need to be carried out prior to development.										

Landscape

The provision of a new cycle network along the western section of this greenway may have a negative impact on the landscape character of the Santry Demesne pNHA 000178. However through sensitive development it is believed that this issue can be overcome.

Cycle Greenway Route Ref – East Coast Trail North Greenway (ECTNG)

Cycle Route Ref.	Biodiversity Obj. no. 1,2,3,4,5,6	Landscape Obj. no. 7,8	Population Obj. 9,10	Human Health Obj. 11,12,13,14	Water Obj. 15,16,17,18,19,20	Air Obj. 21,22	Climatic Obj. 23,24	Soils Obj. 25,26,27,28	Material Assets Obj. 29,30,31	Cultural Heritage Obj. 32
ECTNG	-2	-2	+1	+1	0	+1	+1	0	0	0

Potential Negative Likely Significant Effects of Cycle Route: East Coast Trail North Greenway

Biodiversity

Badoye Bay SAC and pNHA 000199 – increased recreational pressure may cause harm to habitats and species protected in these sites.

Baldoye SPA 004016 - Impacts on wintering bird populations

North Dublin Bay pNHA 000206

North Dublin Bay SAC 000206 – Impacts from Recreational pressure

North Bull Island SPA 004006 – Impacts from Walkers, dogs sailing disturbance probably responsible for the abandonment of the site by *Sterna albifrons*

Route 1A which the greenway also travels along is proposed along the edge of the SAC and SPA area. While much of the infrastructure is in place, the SAC is sensitive to disturbance and increased visitor pressure as well as direct impact from loss of habitat.

Landscape

The provision of a new routeway along the East Coast has the potential to have a significant impact on the landscape in the area.

Cycle Greenway Route Ref – East Coast Trail South Greenway (ECTSG)

Cycle Route Ref.	Biodiversity Obj. no. 1,2,3,4,5,6	Landscape Obj. no. 7,8	Population Obj. 9,10	Human Health Obj. 11,12,13,14	Water Obj. 15,16,17,18,19,20	Air Obj. 21,22	Climatic Obj. 23,24	Soils Obj. 25,26,27,28	Material Assets Obj. 29,30,31	Cultural Heritage Obj. 32
SCTG	-2	-2	+1	+1	0	+1	+1	0	0	-1

Potential Negative Likely Significant Effects of Cycle Route: East Coast Trail South Greenway

Biodiversity

South Dublin Bay and River Tolka SPA 004024 – this area has been designated for both breeding/wintering and passing birds of interest. Impacts likely from walkers and dogs.

South Dublin Bay pNHA 000210 and the South Dublin Bay SAC 000210 - Route 13E and Greenway for the East Coast Trail adjoins the length of the south Dublin bay. The site could be directly impacted by the greenway if construction was to occur on mudflats or sand flats and is therefore screened in. The habitat type is not sensitive to visitor pressure and there is no risk to the SAC indirectly.

Dalkey Coastal Zone and Killiney 001206 – Scenic coastal area

Landscape

The provision of a new routeway along the South East Coast is only expected to have a significant impact on those areas that are currently not developed.

Cultural Heritage

There is the possibility that the cycle route may have an impact on national monuments where these are located along the route.

Cycle Greenway Route Ref – D6 – Saggart to Brittas merging with D5

Cycle Route Ref.	Biodiversity Obj. no. 1,2,3,4,5,6	Landscape Obj. no. 7,8	Population Obj. 9,10	Human Health Obj. 11,12,13,14	Water Obj. 15,16,17,18,19,20	Air Obj. 21,22	Climatic Obj. 23,24	Soils Obj. 25,26,27,28	Material Assets Obj. 29,30,31	Cultural Heritage Obj. 32
D6	-1	-1	+1	+1	0	+1	+1	0	0	-1

Potential Negative Likely Significant Effects of Cycle Route: East Coast Trail South Greenway

Biodiversity

The route is largely in place as an old road exists in the area, through the Slade of Saggart and Crooksling therefore only minimum impact is expected through the Slade of Saggart and Crooksling pNHA.

Cultural Heritage

There is the possibility that the cycle route may have an impact on national monuments where these are located along the route.

Any negative impacts that have been highlighted as a result of this assessment have been considered and appropriate mitigation measures for each negatively impacted route area are presented in Chapter 10.