

Environmental Report

Volume 2 - Main Report

Greater Dublin Area **Draft Transport Strategy** **2011-2030** **2030 vision**



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1.1 INTRODUCTION

This chapter provides a brief overview of the draft Environmental Report. It is presented under three headings - the Purpose of the Report, the Background (including guiding legislation) and the Structure of this Report.

1.2 PURPOSE OF THIS DOCUMENT

This document is the draft **Environmental Report** and has been prepared as part of the strategic environmental assessment (SEA) of *2030Vision*, the regional transport Strategy for the Greater Dublin Area (GDA). *2030Vision* has been prepared by the National Transport Authority (NTA).

An Environmental Report 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.

This draft Environmental Report is being published for public consultation. It will also be formally submitted to a range of statutory and non-statutory public organisations, bodies and authorities and their views and observations on the document will be invited. Following the conclusion of the consultation process, all submissions received will be reviewed and then a Final Environmental Report will be prepared.

While public consultation is a requirement of the SEA process, there is no legal requirement to prepare a *Final* Environmental Report (i.e. post-consultation). However, the NTA is keen to ensure that the findings of consultations are fully reflected in the Environmental Report and have voluntarily chosen to prepare a draft (pre-consultation) and a Final (post-consultation) version of the Environmental Report. It is hoped that this will allow consultees to see the responses to their consultation submissions more clearly.

In addition to the publication and availability of this document for consultation, the Preliminary Draft Transport Strategy document of *2030Vision* is also available. Both the Preliminary Draft Transport Strategy document and this draft Environmental Report should be read together as both documents are interdependent. As with the Final Environmental Report, a Final Strategy document of *2030Vision* will also be produced after the consultation stage, taking into account the consultation responses.

This Environmental Report is being prepared as part of the SEA of *2030Vision*. 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 (e.g. *2030Vision*) of certain sectors (including transport and land use), which are likely to have significant effects on the environment, be subject to environmental assessment. This process is called SEA.

2030Vision is being prepared by the NTA as it is statutorily required to prepare a regional transport Strategy for the GDA under the Dublin Transport Authority Act 2008 and the Public Transport Regulation Act 2009.

The NTA came into existence on 1st December 2009. Prior to the NTA, the Dublin Transportation Office (DTO) was the organisation with responsibility for transport Strategy in Dublin. The DTO was established in 1995 to coordinate the implementation by the relevant agencies of an agreed integrated transport Strategy for the Greater Dublin Area, namely the Dublin Transportation Initiative (DTI) which was adopted as government policy in 1995. The DTO was required to review the transport Strategy for the GDA at least once every five years.

In November 2001, the DTO published an integrated transport Strategy for the Greater Dublin Area 2000 to 2016 called *A Platform For Change. 2030Vision* comprises the update of *A Platform for Change*. The dissolution of the DTO and the subsequent creation of the NTA resulted in the NTA becoming the statutory plan making authority responsible for the preparation of the *2030Vision*.

The remainder of this draft Environmental Report is structured as follows:

Chapter 2 provides an overview of *2030Vision*. In this section, the Strategy policies and measures are presented.

Chapter 3 presents a summary of the SEA process and the key stages. A brief summary of the legislative basis for SEA in Ireland is provided along with an overview of the progress of the *2030Vision* SEA process to date.

Chapter 4 presents an overview of the scope of the SEA and a summary of the SEA Scoping stage. The summary of the scope is presented under three headings: spatial, temporal and technical.

Chapter 5 outlines the overall SEA methodology and the approach to the assessment. The SEA Objectives, which are the key element in the environmental assessment process, are also introduced and explained.

Chapter 6 identifies the key policy, plans and programmes of relevance to the Strategy and to the SEA process. Details are provided in *Annex A*.

Chapter 7 presents the baseline environmental conditions in the GDA, highlights some of the relevant environmental issues and outlines the implications for the Strategy.

Chapter 8 contains a summary of the environmental assessment of the alternatives considered as part of the development of *2030Vision*.

Chapter 9 presents an identification and evaluation of the likely significant effects on the environment from the implementation of the Preliminary Draft Transport Strategy.

Chapter 10 contains proposed mitigation measures which have been developed to address the various significant effects on the environment.

Chapter 11 provides a draft monitoring programme which has been developed to monitor the implementation of *2030Vision*.

Annex A provides detail on the key policy, plans and programmes of relevance to the Preliminary Draft Transport Strategy and to the SEA process.

2.1 INTRODUCTION

This chapter introduces the Preliminary Draft Transport Strategy and outlines its main features and contents. This chapter is based on information provided by the NTA. The entire Strategy can be found in the Preliminary Draft Transport Strategy document.

This Preliminary Draft Transport Strategy is not a standalone document – it is the top level in a hierarchy of transport plans for the GDA that will include an Implementation Plan and Strategic Traffic Management Plan, both of which will be published by the Authority after the adoption of this Strategy.

The Strategy vision and objectives and the preparation of the Strategy itself were guided and informed by extensive stakeholder and public consultation. Preparation was also informed by the outcome of the appraisal of the merits of various potential measures and alternative Strategy options that were developed and assessed.

2.2 OVERVIEW

The Preliminary Draft Transport Strategy objectives can be grouped into economic, social and environmental categories. The Strategy aims to meet:

- *Economic objectives* by reducing delays and improving journey time reliability, particularly for business travel and the movement of goods, and by improving access to and within town centres;
- *Social objectives* by improving safety, reducing travel related stress and reducing the adverse impacts of traffic on neighbourhoods and centres whilst enabling all sectors of society to travel to the destinations they need to reach; and
- *Environmental objectives*, by giving priority to those means of travel that are less damaging to our natural and built environment.

In developing the Strategy, Government and regional planning policies and Strategy targets also have been taken into account, as well as environmental, physical, financial and other constraints.

A wide range of policies and measures is required to provide the transport solutions for the Greater Dublin Area over the next twenty years. A particular emphasis has been placed on measures that meet the full range of Strategy objectives - supporting the region's economy, whilst promoting social equity, and reducing adverse impacts on the built and natural environment.

In keeping with Strategy objectives, a clear hierarchy of transport users is supported, with pedestrians, cyclists and public transport users at the top of the hierarchy. As a general principle, these users should have their needs considered first in the planning of transport provision.

2.3 MAIN COMPONENTS

The Preliminary Draft Transport Strategy can be broadly divided into four main components. These will now be summarised in turn.

2.3.1 *Planning for sustainable living*

The Strategy sets out a three-tier settlement hierarchy, linked to the RPG settlement categorization. The three categories are Dublin City, Designated Towns and Designated Districts. For the purposes of the Strategy, Dublin City refers to the part of Dublin that lies within the two canals and includes the Heuston area and Docklands area. The Designated Towns are the key growth towns in the area, numbering eleven in total. Designated Districts are towns and suburban areas of varying scale and function which, predominately, are intended to link with adjacent Designated Towns.

The Strategy states that intensive development should also take place in areas well served by rail. Development should take place at these locations in advance of other locations.

Historic low-density urban development patterns need to be redressed through a process of development consolidation and the promotion of an appropriate mix of land uses within areas that bring people closer to their needs and allow a high emphasis on walking, cycling and public transport.

As part of local authority Development Plans and Local Area Plans, local authorities should prepare local transport plans, for town centres and district centres in their area. These transport plans should address access to the centre by all modes of transport, focusing in particular on the provision of direct, safe and attractive walking, cycling and public transport connections from the surrounding area.

2.3.2 *Walking and Cycling*

The Strategy envisages the Greater Dublin Area becoming a recognised city-region for walking and cycling, with an environment that is attractive, safe and designed with the pedestrian and cyclist in mind at all times.

Strategy measures that support walking and cycling include restrictions on motorised traffic and traffic speeds travelling through the heart of Dublin city centre and other town centres, whilst permitting through movement for cyclists, buses, trams or taxis where necessary.

Strategy measures that specifically support walking include widening of footpaths, rationalisation of street furniture and the upgrade of footpath surfaces with higher quality materials where appropriate. Other measures include reducing crossing delays for pedestrians and additional pedestrian crossing points and improvements to walking and cycling routes especially approaching town centres, public spaces and other areas of civic importance.

Strategy measures that specifically support cycling include provision of high quality cycling corridors where required, in and on the key radial approaches to Dublin city centre and larger town centres and also improving cyclist priority and safety at junctions. The Strategy also supports the expansion of the city centre cycle hire area and the provision of secure cycle parking in Dublin city centre and other town and village centres, in particular close to major retail, leisure or cultural destinations, as well as at workplaces, education facilities and public transport stations and stops.

2.3.3 *Public Transport*

Public transport is essential for the economy of the Greater Dublin Area. It is the only means of transport that can provide the capacity needed to move the large volumes of people who travel to work, education, shops and leisure facilities in the Greater Dublin Area each day. It also enables much of the business and tourist travel in the region.

Over the lifetime of the Strategy, bus will continue to be the predominant public transport mode in terms of network coverage throughout the Greater Dublin Area. Outside of the corridors served by rail, buses will be the nucleus of the public transport offering, providing services over a large geographic area.

Bus-specific measures in the Strategy include regular bus network reviews and commitment to alterations to improve services as required and upgrading of four major Dublin bus corridors to high quality Bus Rapid Transit type operations – Stillorgan Road, Malahide Road, Lucan Road and Navan Road. In addition, five further key QBC routes will be targeted for upgrade, including increased segregation, along with northern and southern orbital routes.

Rail-specific measures in the Strategy include:

- implementation of Metro North (Swords and Airport to Dublin city centre);
- implementation of Dart Underground project and electrification of the Maynooth and Kildare lines, thus allowing DART services to run from Balbriggan and Malahide to the Kildare rail corridor and DART services to run from between Maynooth and Bray/Greystones;
- Metro West (Tallaght, Clondalkin and Blanchardstown to Swords and the city centre);

- Luas Line BXD (St. Stephen's Green to Grangegorman and Broombridge) projects;
- provision of Luas from Lucan to city centre – possible extension to Poolbeg;
- provision of Luas from south west sector (via Kimmage) to city centre – possible extension to Poolbeg;
- extension of Luas Green Line to serve Bray area and southwards extension of Metro North enabling its services to run onto the Green Line; and
- additional track between Balbriggan and Connolly and track work south of Greystones and closures of level crossings (to the extent feasible and necessary) to enable increased train frequencies and reliability.

Measures are also proposed to make public transport easier to use and these include the introduction and further development/expansion of Smartcard ticket system and using development planning process to ensure that no new home in an urban area is more than 800 metres from a bus, tram or rail stop with a shorter distance of 500 metres to be targeted wherever feasible. Providing safe, convenient and secure routes for pedestrians and cyclists to local bus stops, tram stops and rail stations as part of development planning process is also within the Strategy.

2.3.4 *Roads, Freight and Travel Demand Management*

Following substantial improvements in strategic road provision in the GDA in recent years, only limited road development is envisaged during the period of the Strategy. However, the Strategy recognises the need for some road development to address issues such as safety concerns, provision of space for public transport priority or local servicing of development lands that meet Strategy planning objectives.

The Eastern Bypass corridor will be protected, and a Leinster Orbital Route corridor will be confirmed and protected, with possible incremental implementation of this road. Local accident remedial measures at locations with a poor road safety record are also within the Strategy.

The Strategy includes a series of measures to move freight more efficiently and sustainably. These include the identification, as part of the local authority Development Plan process, of appropriate locations for freight intensive activities and the preparation and implementation of Construction Logistics Plans and Distribution and Servicing Plans for freight intensive developments. The Strategy also supports an extension of the existing HGV Management scheme.

The Government's Smarter Travel policy sets two key targets - (i) that overall kilometres of car travel does not increase from 2009 levels; and (ii) that work-related commuting by car is reduced to 45% of overall journeys by 2020. Even with all of the other elements of the Strategy in place, these Smarter Travel targets will not be realised without additional demand management measures being implemented. To achieve these targets the following measures are included:

- develop and introduce a road use charging scheme for the GDA prior to 2020. Following public consultation, and as part of a future Implementation Plan, the exact form of the charging scheme, including the structure of the charges and the area to which they are to be applied will be decided;
- evaluate the feasibility of introducing parking levy proposals for private non-residential parking and further develop on-street parking charges and management; and
- seek the preparation and implementation of site or area-wide Travel Plans targeted at reducing car use at workplaces, schools and in residential areas.

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 2030Vision SEA process completed to date.

3.2 SEA LEGISLATION AND GUIDANCE

3.2.1 Legislation

SEA can be 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).

This SEA is being carried out in accordance with S.I. 435 of 2004, 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 2030Vision SEA process 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 draft Environmental Report.

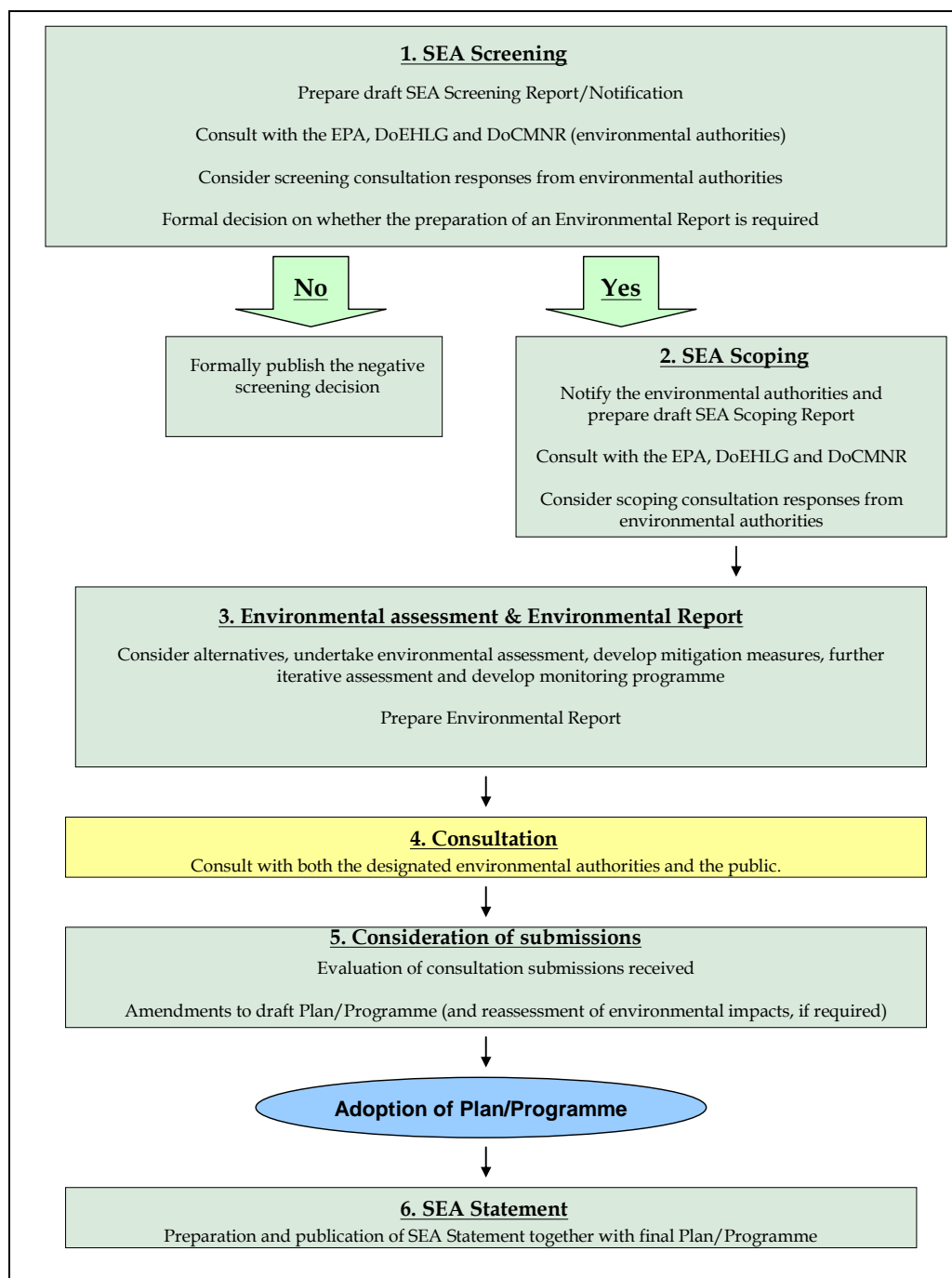
The Department of Environment, Heritage and Local Governments' SEA guidelines (*Implementation of SEA Directive (2001/42/EC): Assessment of the Effects of Certain Plans and Programmes on the Environment Guidelines for Regional Authorities and Planning Authorities*, 2004) were also used in this SEA process. 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 generally on the SEA process.

3.3

SEA PROCESS SUMMARY

The SEA process can be divided into six broad stages and these are summarised in *Figure 3.1* below. Relevant information on the outcomes of these stages regarding *2030Vision* is also provided. A brief summary of each of these stages in the SEA process is then provided.

Figure 3.1 *Key stages in the SEA Process*



Yellow box is indicating the current stage of the SEA process.

Source: ERM (2010)

3.3.1 *SEA Screening*

This is the first stage in the SEA process and is the mechanism for determining whether the preparation of an Environmental Report 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. Further guidance on the need for the preparation of an

Environmental Report is provided in S.I. 435 of 2004, including a series of criteria to assist with the screening process. Further screening guidance is also provided in the EPA SEA guidelines.

The NTA prepared a Screening Report (*Strategic Environmental Assessment Screening Report and Determination – Transport Strategy for the Greater Dublin Area 2010-2030*) in March 2008 that concluded that SEA of the Strategy was necessary as significant effects on the environment were likely to arise as a result of the implementation of *2030Vision*. Consultation on this Screening Report with the designated environmental authorities (discussed below) and also some non-statutory bodies, such as the relevant local authorities in the GDA, was undertaken and the views expressed in their submissions received were that full SEA was required.

Designated environmental authorities are specific public bodies and authorities with whom consultation is legally required as part of the SEA process. There are three designated environmental authorities under S.I. 435 of 2004:

- Department of Communications, Marine & Natural Resources;
- Department of Environment, Heritage & Local Government (Development Applications Unit); and
- Environmental Protection Agency.

Following a review of the submissions, the NTA's final determination was that SEA was required and that it would proceed to the next stage in the SEA process, which is the scoping stage.

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.

Scoping requires the preparation of a scoping notification and this must be submitted to the designated environmental authorities that must be invited to comment on the notification. Scoping can be assisted by the preparation of a Scoping Report, which is more detailed than a notification. However there is no legal requirement to prepare a Scoping Report, but it is generally recognised as good practice to prepare one as this typically assists consultation and helps to lead to a well-defined SEA scope.

To ensure that the *2030Vision* SEA was adequately scoped, the NTA voluntarily elected to prepare both a draft and Final SEA Scoping Report. The Draft Scoping Report was submitted in September 2008 to the relevant designated environmental authorities so that they could make submissions on the scope of the SEA. In addition to consultation with the designated

environmental authorities, other public bodies and authorities were also consulted on the draft SEA Scoping Report. A summary of the consultation findings and the final scope of the SEA can be found in *Chapter 4*.

3.3.3 *Environmental Assessment and Environmental Report*

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

1. SEA Potential Measures Assessment;
2. Alternatives Assessment; and
3. Preliminary Draft Transport Strategy Assessment.

SEA Potential Measures Assessment

The NTA chose to undertake a preliminary environmental assessment during the early stages of the Strategy development process. This preliminary assessment was undertaken on a suite of high level Measures and is shown in *Figure 3.2*. This assessment fed into the development of the various detailed proposals which comprised the alternatives and the Preliminary Draft Transport Strategy.

The preliminary environmental assessment results were published in the *Draft Strategy Potential Measures SEA Report* in February 2009 for public consultation. It was also formally submitted to the designated environmental authorities and a range of public bodies and authorities. A total of 32 of these consultees were notified and invited to make written submissions on the Draft Report. The *Final Strategy Potential Measures SEA Report* was published in July 2009.

Alternatives Assessment

The results of preliminary Strategy appraisal of the potential measures, which directly incorporated the SEA outputs from the SEA Potential Measures Assessment, were then used in combination with a set of detailed transport proposals and policies to prepare three Strategy alternatives. These were also subject to environmental assessment as part the SEA process. The results of this alternatives assessment can be found in *Chapter 8*. These results were then directly incorporated into the MCA and this led to the development of the Preliminary Draft Transport Strategy.

Preliminary Draft Transport Strategy Assessment

This stage involves the environmental assessment of the *Preliminary Draft Transport Strategy*. 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 iterative process through which mitigation measures to address the significant adverse effects have been considered and

recommended (*Chapter 10*). 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 or programme (in this case a Strategy); and
- identify the reasonable alternatives, taking account of the objectives and the geographical scope of the plan or programme or modification.

Further detail on proposed content of the Environmental Report for *2030Vision* is provided in *Chapter 4*.

As noted earlier, there is no specific requirement to prepare both a draft and Final Environmental Report and the NTA has elected to undertake this to ensure that consultation findings are fully reflected in the Final Environmental Report.

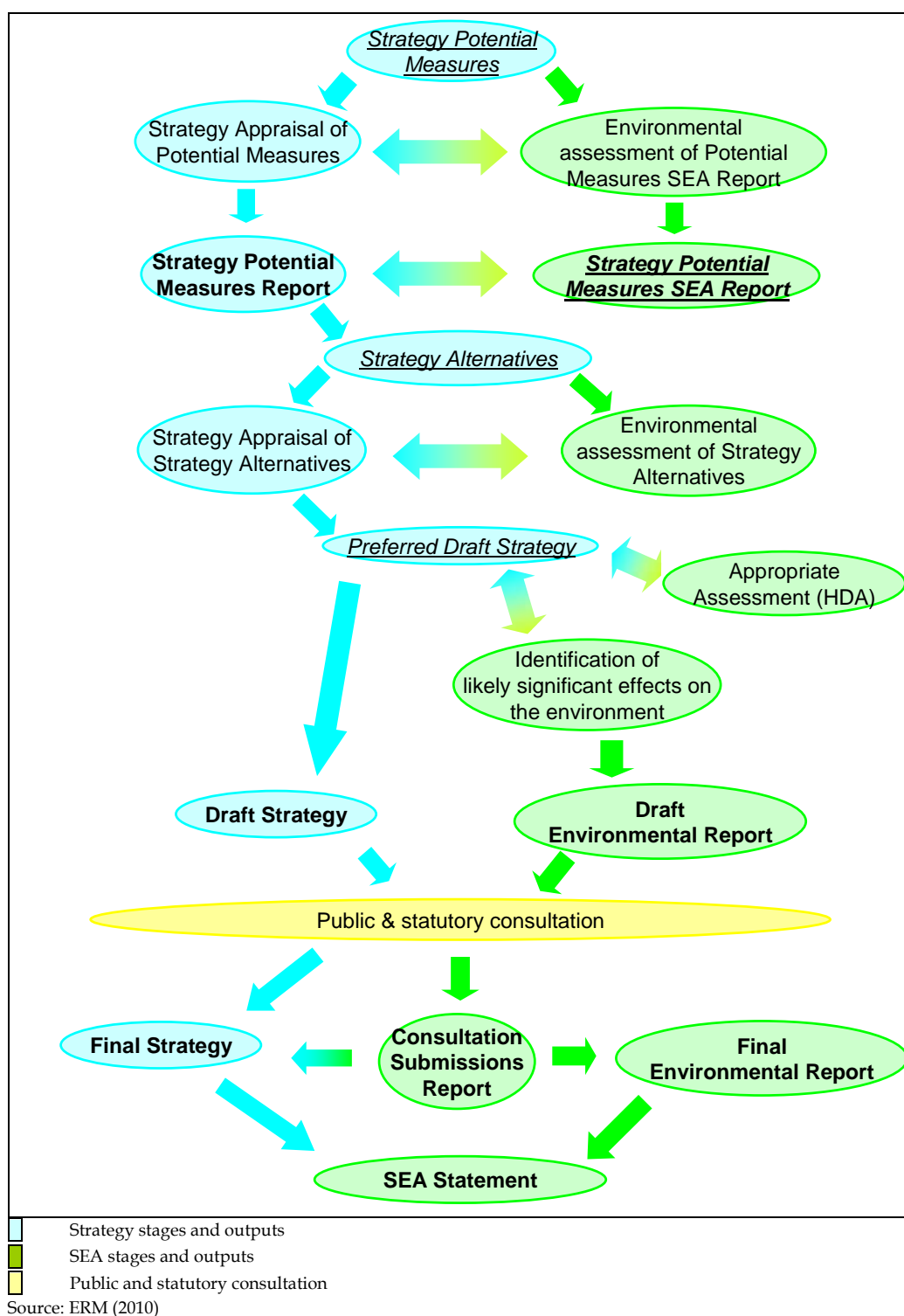
Habitats Directive Assessment (HDA)

There is a requirement to undertake an assessment under the Habitats Directive (92/42/EEC) as *2030Vision* 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 and the screening report was published and consulted on in May 2010.

An Appropriate Assessment was deemed necessary and carried out. The results were published in a Natura Impact Statement which accompanied the Draft Strategy. The National Parks and Wildlife Service were consulted at all stages of the HDA.

This assessment is in addition to the SEA process. However, there are links between both processes and the results of the HDA screening and appropriate assessments are considered and referenced in *Chapter 9*.

Figure 3.2 Environmental Assessment of 2030Vision



3.3.4

Consultation

Consultation on the Strategy and the Environmental Report is required with the relevant designated environmental authorities and the public before the Strategy can be approved by the Minister for Transport. Both the draft plan

and the Environmental Report (or draft Environmental Report in the case of the 2030*Vision* SEA) must be publicly available for comment. Comments and submissions may be made on either, or both, documents by the designated environmental authorities and the public, including any public authority or body.

This is the current stage of the 2030*Vision* SEA.

3.3.5 *Consideration of Submissions*

It is a formal requirement of the SEA Directive that all consultation submissions received must be considered and the Strategy amended, if deemed necessary. Any amendments to the Strategy may warrant the identification of additional significant environmental effects. If such additional significant effects do arise, then there is likely to be a need to develop additional mitigation measures.

Following consideration of the consultation submissions received and associated amendments to the Strategy, the NTA may begin procedures to adopt the Strategy.

As the NTA has chosen to prepare both a draft (consultation) and Final (post-consultation) Environmental Report, the latter task will be completed following the consideration of the consultation submissions and any amendments to the Strategy. It will be based on any amendments deemed necessary to the draft Environmental Report as a result of consultation and will accompany the Final Strategy submitted by the NTA for approval by the Minister for Transport.

3.3.6 *Preparation of the SEA Statement*

Following the formal adoption of the 2030*Vision* by the Minister for Transport, the next stage in the SEA process is the preparation of the SEA Statement, which is a document summarising how environment considerations have been integrated into the adoption of 2030*Vision*. It also summarises how the consultation submissions were considered and if these resulted in the draft 2030*Vision* being amended.

3.3.7 *Monitoring*

Monitoring of the implementation of 2030*Vision* will be undertaken for the duration of the plan up until its review.

The overall objective of this stage is to monitor the significant environmental effects of the implementation of 2030*Vision* 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 Strategy can be found in *Chapter 11*.

4.1 INTRODUCTION

This chapter outlines the scope of the 2030Vision SEA. This is presented against three different headings: spatial, temporal, and technical. This chapter is based on the results of the scoping process and the written output from that process: the *Final SEA Scoping Report*. A short summary of scoping is presented in this chapter.

4.2 OVERVIEW OF THE SCOPING PROCESS FOR 2030VISION SEA

4.2.1 SEA Scoping Workshop

Scoping identifies the key issues to be addressed in the SEA Environmental report. It ensures that the process is focussed on the relevant issues and carries out the assessment at the appropriate level. To assist with the preparation of the SEA Scoping Report, a scoping workshop was held on the afternoon of 24th June 2008. The main objective of the Workshop was to obtain initial feedback on two elements of scoping:

- Outline of the Draft SEA Scoping Report; and
- Provisional draft SEA Objectives.

A total of 22 authorities, agencies and departments were invited to the scoping workshop. The invitees are listed below and those who attended are highlighted in bold.

Designated (statutory SEA) environmental authorities:

- Department of Communications, Marine & Natural Resources;
- **Department of Environment, Heritage & Local Government;** and
- **Environmental Protection Agency.**

Local Authorities:

- **Dublin City Council;**
- **Dun Laoghaire-Rathdown County Council;**
- Fingal County Council;
- **Kildare County Council;**
- **Meath County Council;**
- **South Dublin County Council;** and
- Wicklow County Council.

Other and Regional Authorities and other bodies:

- Border Regional Authority;
- Dublin Docklands Development Authority;
- Dublin Regional Authority;
- Mid East Regional Authority;
- Midlands Regional Authority; and
- South East Regional Authority.

Government Departments:

- **Department of Transport.**

Transport agencies:

- **Bus Éireann;**
- **Dublin Bus;**
- **Irish Rail;**
- National Roads Authority; and
- **Railway Procurement Agency.**

The workshop included an overview of the Strategy development process and work carried out to date, the role of scoping in the SEA process, the range of proposed SEA consultees and the anticipated contents of the draft Scoping Report.

Attendees were asked to review the proposed draft SEA Objectives. The group held a detailed discussion on various aspects of the SEA Objectives. A summary report of the SEA Workshop (Scoping Workshop Report) was provided to all participants in July 2008. The findings of the SEA Workshop then formed the basis for the preparation of the Draft SEA Scoping Report.

4.2.2 ***SEA Scoping Report***

A draft SEA Scoping Report was prepared and formally submitted to a total of 32 consultation bodies in September 2008. These consultation bodies were formally invited to make a written submission on the Draft Scoping Report. A total of 10 submissions were received. *Table 4.1* presents the list of the consultation bodies and also those who made a submission.

Table 4.1 *Authorities who made a formal Scoping Submissions*

Consultee	Formal submission
<i>Designated environmental authorities (as per S.I. 435 of 2004)</i>	
Dept. of Env. Heritage & Local Government: DAU	✓
Environmental Protection Agency	✓
Dept. of Communications, Energy & Natural Resources	✓
<i>Other Authorities</i>	
Fingal County Council	
Dublin City Council	✓
Dun Laoghaire-Rathdown County Council	
South Dublin County Council	
Meath County Council	✓
Kildare County Council	
Wicklow County Council	
Irish Rail	✓
Dublin Bus	
Bus Eireann	
Railway Procurement Agency	
National Roads Authority	✓
Dept. of Transport	
Dept. of Env. Heritage & Local Government: Spatial Policy Unit	
Dublin Regional Authority	
Border Regional Authority	
Mid-East Regional Authority	
South-East Regional Authority	
Midlands Regional Authority	
An Taisce	
Dept. for Regional Development Northern Ireland	
Northern Ireland Environment Agency	✓
Dublin Airport Authority	✓
Geological Survey of Ireland	✓
Grangegorman Development Agency	
Eastern Regional Fisheries Board	
Fáilte Ireland	
Office of Public Works	
Dublin Docklands Development Authority	

The 10 submissions received were considered by the NTA and the Draft Scoping Report was amended as appropriate to reflect the views and information provided by the consultees. The Final SEA Scoping Report was

then prepared and sent to the 10 consultees who had made submissions on the Draft Scoping Report.

Additionally, a separate *SEA Scoping Consultation Submissions Report* was prepared in parallel with the Final SEA Scoping Report. This summarised the content of the submissions received during the consultation, responds to the matters raised in each and records where the submission has resulted in changes to the Draft Scoping Report.

The Final Scoping Report and the Submissions Report were then uploaded to the *2030Vision* website and the remaining consultees were informed of their availability. They also were available to the public as background reading for the Strategy consultation process itself.

4.3

SPATIAL SCOPE

The term spatial scope refers to the spatial area to be covered by the SEA in terms of location, distribution, scale and characteristics of its population and places and its relationship with adjoining areas. The area covered by the Strategy is the GDA, which comprises Dublin (and its four Local Authorities: Dublin City Council, Fingal County Council, South Dublin County Council and Dun Laoghaire-Rathdown County Council), and the three county councils in the Mid-East: Meath, Kildare and Wicklow. This area is shown in *Figure 4.1* below.

Figure 4.1 Spatial area of the 2030Vision SEA



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 size and importance of the GDA in relation to the country as a whole, comparisons against some environmental topics will be made between

GDA-scale impacts and those on a national basis impacts. In essence, the spatial scope of the SEA will take into account the *area of influence* of *2030Vision*. As such, the effects of the Strategy on transport patterns (and also on the environment) outside, the boundary of the GDA, will be highlighted where relevant.

Furthermore, trans-boundary effects with Northern Ireland are possible, given the movement of people and goods between the GDA and Northern Ireland. The environmental assessment will identify any existing trans-boundary environmental problems and assess the likely significant trans-boundary effects of implementing the Strategy.

Given the variety of geographical locations and contexts across the GDA, the Strategy and resulting environmental impacts are likely to vary significantly depending on the receiving environment. This relates to contrasts between, for example, urbanised inner-city locations and suburban or semi-rural locations.

This will be taken into account, as far as is possible, in the SEA, in order to ensure that the environmental effects across the differing parts of the GDA are identified and considered, where relevant.

The Strategy itself will also recognise the needs of the diverse and contrasting areas within the GDA. The existence of seven Local Authorities in the GDA will not impact on the development of the Strategy or mitigation measures. *2030Vision* and SEA considers the GDA as a single region.

4.4

TEMPORAL AND TECHNICAL SCOPE

The temporal scope refers to the time horizons to be considered in the SEA. The duration period of *2030Vision* is from 2010 to 2030.

Technical scope refers to the range of technical issues that will be considered by the SEA. To determine the range of environmental topics and potential issues to be considered in the SEA process, a high-level screening appraisal was undertaken. The screening appraisal methodology was straightforward: it comprised of the consideration of the range of potential effects under a series of environmental headings. The range of environmental headings considered in this screening appraisal is based on the list of environmental topics as specified in European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004 (S.I. 435 of 2004). These include:

- Biodiversity, flora & fauna;
- Landscape;
- Population;
- Human health;
- Water;

- Air quality;
- Climatic factors & climate change;
- Soil & geology;
- Material assets;
- Cultural heritage (inc. architectural and archaeological heritage), and
- The inter-relationships between the above.

In identifying the likely significant effects on the environment of *2030Vision*, the SEA considers 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 Final SEA Scoping Report also outlined the SEA methodology and the approach to the environmental assessment. This is discussed in *Chapter 5* (SEA Methodology).

4.5

SEA OBJECTIVES

The *2030Vision* SEA is primarily an objectives-led exercise. A set of SEA Objectives was presented in the Draft SEA Scoping Report and then subject to consultation with the relevant bodies, as summarised in *Section 4.2.2* above. These Objectives were then finalised and published in the Final SEA Scoping Report.

The SEA Objectives were used in the initial environmental assessment of the high-level Strategy Measures. The final SEA Objectives are presented in *Table 4.2* below, together with additional context information about each Objectives and associated indicators.

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 & fauna	1. To avoid impacts on the integrity of European Conservation Sites (SACs and SPAs) and nationally designated sites (NHAs).	This Objective is focused on the protection of Natura 2000 sites (SACs and SPAs), which are ecological sites of European-level importance. Also included are NHAs; ecological sites of national importance. The focus is on significant impacts, as this is the threshold used in the Habitats Directive (and associated Irish Regulations) with regards to European-designated ecological sites.	Proximity to and landtake from designated sites.
	2. To support the overall goal of the National Biodiversity Plan.	The overall goal is to secure the conservation, including where possible the enhancement, and sustainable use of biological diversity in Ireland and to contribute to conservation and sustainable use of biodiversity globally.	Qualitative assessment against overall goal and key objectives in the National Biodiversity Plan.
	3. To minimise impacts on locally-important biodiversity in the Greater Dublin Area.	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.	Qualitative assessment of effects on wider biodiversity.
Landscape	4. To avoid or, where infeasible, minimise impacts on designated and protected landscapes and conservation areas.	This Objective is focused on the protection of designated and protected landscapes and landscape features. Also included are Conservation Areas, primarily in urban or townscape settings.	Proximity to and landtake from designated landscapes and related features.
	5. To minimise impacts on undesignated landscape resources (townscapes, seascapes, riverscapes, general landscapes).	This Objective addresses the various undesignated landscape features and areas, which make up the majority of the GDA.	Qualitative assessment on undesignated landscapes and features.

SEA Topic	Proposed SEA Objective	Comments	Potential indicators
Population	6. To increase accessibility to economic and employment opportunities, in particular for those who are physically, economically or socially disadvantaged within the GDA.	This Objective is focused on increasing access to employment opportunities, especially for those who are physically, economically or socially disadvantaged. Access refers to both assisting with the creation of additional employment opportunities and also providing better, faster, reliable and frequent access to the main centres of employment in the GDA.	Use of quantitative data from the Strategy assessment process.
	7. To increase accessibility to quality public, cultural and community services, in particular, for those who are physically, economically or socially disadvantaged within the GDA.	The purpose of this Objective is to increase accessibility to quality public, cultural and community services, such as the full range (pre-school to 3 rd /4 th level) of education facilities, health and medical care facilities and services, public offices and community facilities (e.g. libraries, local authority offices, community halls), professional services (e.g. banking), cultural and leisure facilities (e.g. cinemas, theatres, museums etc.) and retail and service areas (e.g. local shops to large/regional retail centres).	Use of quantitative data from the Strategy assessment process

SEA Topic	Proposed SEA Objective	Comments	Potential indicators
Human health	8. To contribute to improvements to transport-related aspects of quality of life for residents, workers and visitors to the GDA.	This Objective is directed at the relevant (i.e. transport-related) aspects of quality of life (QoL) of the residents, workers and visitors in the GDA. Potential positive aspects of QoL related to transport include reduced travel times; more attractive and pleasant journeys through reduced overcrowding and delays and by providing modern transport infrastructure and reducing travel/commuting stress with more frequent, safer and reliable transport services. It is acknowledged that the overall Vision for the Strategy (<i>Section 3.3</i>) is also focused on “improving quality of life”; however, QoL as it relates this specific SEA Objective is primarily focused on aspects of QoL linked to travel and transport use.	Use of quantitative data from the Strategy assessment process.
	9. To support the objectives of the Environmental Noise Directive in relation to transport-related noise.	This Objective is focused on the impact that noise and vibration from transport activities and infrastructure (road traffic, rail and tram/LUAS transport etc.) and is based around the Environmental Noise Directive (EU Directive 2002/49/EC). 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, aircraft, outdoor and industrial equipment.	Quantified data regarding ‘estimated population annoyed by noise’ using outputs from the NTA transport model.
	10. To minimise safety risks to human health arising from transport related activity.	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.	Potential use of quantitative data from the Strategy assessment process.
	11. To support health improvements and benefits from transport-related activities.	This Objective is focused on potential health improvement and benefits, which could arise from transport-related activities, principally promoting and encouraging greater uptake of walking and cycling.	Potential for people to walk or cycle for more than 30mins a day

SEA Topic	Proposed SEA Objective	Comments	Potential indicators
Water	12. 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).	The Objective is focused on the WFD and the associated RBMP and POMs. 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. The WFD sets a framework for comprehensive management of water resources in the European Community, within a common approach and with common objectives, principles and basic measures. The WFD will be implemented by the local authorities through a series of RBMPs (8 for the island of Ireland) and associated POMs.	Qualitative assessment of likely conflicts with relevant elements of RBMPs and POMs.
	13. To minimise impacts to surfacewater systems and resources.	The aim of this Objective is to minimise impacts to surfacewater systems and resources, such as rivers, streams, lakes and surfacewater abstraction points.	Qualitative assessment of potential effects on surfacewater resources.
	14. To minimise impacts to groundwater systems and resources.	The purpose of this Objective is to minimise impacts to groundwater systems and resources, such as vulnerable aquifers and groundwater abstraction points.	Qualitative assessment of potential effects on groundwater resources.
	15. 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.
	16. 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.
	17. To minimise the risk of flooding.	This Objective is focused on minimising the risk of flooding.	Qualitative assessment of potential effects on floodrisk.

SEA Topic	Proposed SEA Objective	Comments	Potential indicators
Air	18. 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)	Quantitative assessment of traffic-related air quality emissions.
	19. 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.	Comparison of traffic-related air quality concentrations against relevant pollutant thresholds.
Climatic factors & climate change	20. To contribute to the reduction of greenhouse gas emissions arising from transport-related activities.	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 forms of mechanised transport produce greenhouse gases and consume fossil fuels either directly or indirectly. Where there is a need to travel, the Strategy will seek to cater for this need in an environmentally optimal manner. This would imply a higher percentage use of walking and cycling and public transport services such as bus, Luas, and DART. These more sustainable forms of travel have lower greenhouse gas production levels per capita and lower fossil fuel consumption levels in comparison to equivalent private-car based journeys.	Quantitative assessment of traffic-related CO ₂ emissions, based on outputs from the NTA's transport model.

SEA Topic	Proposed SEA Objective	Comments	Potential indicators
Soil & geology	21. 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.
	22. To reduce consumption of construction material and generation of construction waste as part of transport infrastructure projects.	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.
	23. 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 landtake from designated sites.

SEA Topic	Proposed SEA Objective	Comments	Potential indicators
Material assets	24. 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 with the development of future transport infrastructure projects.	Qualitative assessment of effects on important material assets.
	25. 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.	Quantitative assessment of traffic-related CO ₂ emissions (based on outputs from the NTA's transport model) and fossil fuel consumption.
	26. To assist with the reuse and regeneration of brownfield sites.	The basis for this Objective is to promote the reuse and regeneration of previously developed brownfield sites instead of undeveloped greenfield sites, especially those close to key transport corridors and large centres of population in the GDA.	Qualitative assessment on the potential to increase brownfield reuse.
Cultural heritage (inc. architectural and archaeological heritage)	27. 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 (e.g. Protected Structures, Areas of Architectural Heritage, Areas of High Archaeological Potential), which may be affected by transport infrastructure projects or policy recommendations in the Strategy.	Proximity to and landtake from designated sites.

Source: ERM & NTA (2010)

5.1 INTRODUCTION

This chapter explains the SEA methodology and assessment techniques used in the environmental assessment of *2030Vision*. An overview of the overall approach and methodology is first provided. Greater detail on the SEA Objectives is then provided. This is followed by the assessment methodology for the three Strategy alternatives and the Preliminary Draft Transport Strategy. An overview of the SEA process and SEA legislation is provided in *Chapter 3*.

5.2 OVERALL APPROACH AND SEA METHODOLOGY

This SEA uses an 'objectives-led' approach. The concept behind this approach is that the Strategy is tested to determine if it meets the objectives of the SEA. There are 27 SEA Objectives which were agreed following the scoping stage of the SEA. These cover all the environmental topics as specified in the SEA Regulations.

In addition to undertaking the SEA to comply with the legal SEA requirements; the SEA outputs have also been formally incorporated into the wider Strategy appraisal process. This separate process considered the environmental issues using the SEA results as well as a range of non-environmental criteria such as safety, social inclusion, economic issues and accessibility. Further details on this overarching appraisal can be found in *Chapters 6 and 12* of the Preliminary Draft Transport Strategy document.

All key stages of the Strategy development are assessed through the SEA Objectives. The integration of the SEA into the Strategy development process is shown in *Figure 5.1* below. SEA stages are shown in green boxes and Strategy-related stages are shown in the blue boxes.

The first stage of the Strategy preparation work involved the identification of a set of **Potential Measures** - which consisted of various types of generic and high-level/strategic transport interventions. The Measures were assessed against the SEA Objectives. A Report on this environmental assessment (*Strategy Potential Measures SEA Report*) was published in February 2009 and made available on the Strategy website *2030vision.ie* as part of the public consultation process.

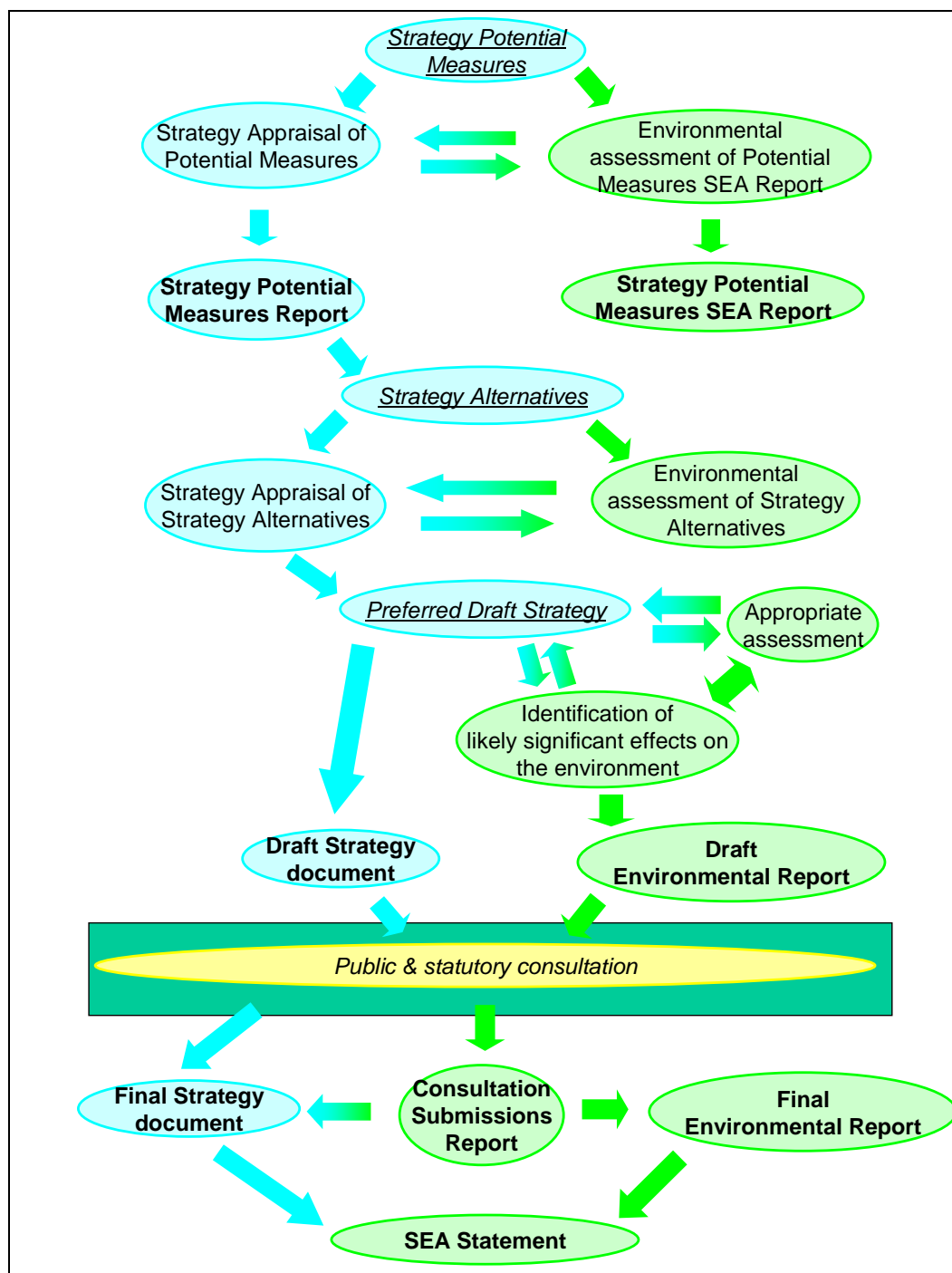
The next stage in the Strategy preparation was the development of three **Alternative** Strategy Options (Economic, Social and Environment). These Alternatives consisted of specific proposals under the Measures that scored well against agreed Strategy objectives during the previous stage. The Alternatives were in turn assessed using the SEA Objectives (the results of

which are summarised in *Chapter 8*). Details on the composition and development of the three Alternatives are described in *Sections 6.4 to 6.8* of the Preliminary Draft Transport Strategy document. The environmental assessment of the Alternatives is focused on the performance differences between each of the three Alternatives Packages, so that the various advantages and disadvantages of each of the Alternatives can be highlighted and then considered in the development of the Preliminary Draft Transport Strategy.

The information from the environmental assessment of the Alternatives was taken into account, together with the outcome of the wider appraisal of Alternatives, in the development of a **Preliminary Draft Transport Strategy**. Further details on this can be found in *Section 6.11* of the Preliminary Draft Transport Strategy document.

The SEA Objectives were then used to assess the likely significant effects on the environment of the Preliminary Draft Transport Strategy. 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.

Figure 5.1 Integration of the Strategy development process and the SEA



Reports and outputs are presented in **bold**.

Strategy outputs as developed by the NTA are presented underlined and in italics.

Green box indicates the current stage in the SEA process (i.e. Public and statutory consultation).

Source: ERM (2010)

5.3

SEA OBJECTIVES

Chapter 4 reports on the scope of the SEA, including the 27 SEA Objectives. In order to undertake the assessment, some of these objectives will rely on data from the GDA transport model, qualitative assessment data, some on GIS-

based data and some on inputs from the Multi Criteria Analysis (MCA) carried out as part of the wider Strategy appraisal. *Table 5.1* summarises the four data categories which relate to the SEA Objectives and *Table 5.2* presents the text of each objective and to which of the four categories each one belongs.

Table 5.1 *Categories for SEA Assessment of Objectives*

SEA Objective type	Overview
1. Modelling-output	These SEA Objectives are based on data from the NTA transport model outputs. The model data is used to determine traffic noise, traffic air quality and traffic CO ₂ emissions. The model outputs will comprise changes in traffic flow and travel behaviour as a result of the overall effect of all the measures in an Alternative package or in the Preliminary Draft Transport Strategy. These outputs will be quantitative.
2. GIS	These SEA Objectives are associated with parts of the Alternatives or Preliminary Draft Transport Strategy which can be spatially identified (e.g. new or modified infrastructure, such as new rail lines or new strategic roads etc.) and presented in GIS format. These outputs will generally rely on GIS analysis (where possible).
3. Qualitative	This type of SEA Objectives is based on qualitative data. They relate to potential environmental effects of Strategy proposals which are land use, policy or best-practice based, that cannot be fully represented through NTA's transport model or in GIS. Note that there may be some limited spatial information for these proposals and where this is the case, some GIS and qualitative assessment will be then undertaken.
4. Wider Strategy appraisal (MCA)	This final type of SEA Objective is based on outputs from the wider Strategy appraisal process. Relevant SEA Objectives include population and human health.

Table 5.2 *Classification of SEA Objectives*

SEA Objectives		Category ¹
Biodiversity Flora & fauna	1. To avoid impacts on the integrity of European Conservation Sites (SACs and SPAs) and nationally designated sites (NHAs).	2
	2. To support the overall goal of the National Biodiversity Plan.	3
	3. To minimise impacts on locally-important biodiversity in the Greater Dublin Area.	3
Landscape	4. To avoid or, where infeasible, minimise impacts on designated and protected landscapes and conservation areas.	2
	5. To minimise impacts on undesignated landscape resources (townscapes, seascapes, riverscapes, general landscapes).	3
Population	6. To increase accessibility to economic and employment opportunities, in particular for those who are physically, economically or socially disadvantaged within the GDA.	4
	7. To increase accessibility to quality public, cultural and community services, in particular, for those who are physically, economically or socially disadvantaged within the GDA.	4
Human Health	8. To contribute to improvements to transport-related aspects of quality of life for residents, workers and visitors to the GDA.	4
	9. To support the objectives of the Environmental Noise Directive in relation to transport-related noise.	1 & 3
	10. To minimise safety risks to human health arising from transport related activity.	4
	11. To support health improvements and benefits from transport-related activities.	4
Water	12. 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)	3
	13. To minimise impacts to surfacewater systems and resources.	3
	14. To minimise impacts to groundwater systems and resources.	3
	15. To minimise impacts to coastal systems and resources.	3
	16. To minimise impacts to transitional systems and resources.	3
	17. To minimise the risk of flooding.	3
Air	18. To reduce negative air quality impacts arising from transport-related emissions.	1 & 3
	19. To ensure compliance with the Air Framework Directive and associated daughter Directives (and the transposing Regulations in Ireland).	1 & 3
Climate	20. To contribute to the reduction of greenhouse gas emissions arising from transport-related activities.	1 & 3
Soils & geology	21. To minimise negative impacts on important and vulnerable soils resources used for agricultural purposes.	3
	22. To reduce consumption of construction material and generation of construction waste as part of transport infrastructure projects.	3
	23. To avoid or, where infeasible, minimise impacts to protected and designated geological and geomorphological sites.	2
Material assets	24. To protect public assets and infrastructure.	3
	25. To reduce the fossil fuel demand by the transport sector.	1 & 3
	26. To assist with the reuse and regeneration of brownfield sites.	3
Cultural Heritage	27. To avoid or, where infeasible, minimise impacts to designated cultural, architectural and archaeological resources.	2

1: Refer to *Table 5.1* for an explanation of categories 1 to 4.

The various stages of the environmental assessment establishes the significance of the effects on the environment through determining whether an Alternative Strategy Option or the Preliminary Draft Transport Strategy will alter the current (and future, where applicable) baseline environment and what the outcome of this change will be in relation to the SEA Objectives. The

SEA 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 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 STRATEGY ALTERNATIVES AND PRELIMINARY DRAFT TRANSPORT STRATEGY COMPONENTS

Both the Strategy Alternatives and the Preliminary Draft Transport Strategy consist of a number of related components. *Table 5.3* below shows which type of SEA Objectives are used to assess the various Strategy Alternatives and the Preliminary Draft Transport Strategy components. There are four overall types of components within the Strategy and these are summarised in *Table 5.3*.

Table 5.3 *Components in Strategy Alternatives and Preliminary Draft Transport Strategy*

Component-class	Summary	SEA Objectives types used for assessment (Table 5.1)			
		1	2	3	4
1. Infrastructure	These are transport infrastructure schemes such as roads, rail lines and light rail. Many of these proposals were spatially depicted in GIS.				
2. Policy and Best Practice (modelled within the NTA model)	These are transport policy and best practice interventions such as road charging, or parking controls that are modelled within the NTA model				
3. Policy and Best Practice (<i>not</i> modelled within the NTA model)	These are transport policy and best practice interventions such as certain traffic management interventions that are not modelled within the NTA model.				
4. Land Use Planning Policy	These are land use planning policy components which are not geographically specific or modelled within the NTA model.				

Key:



Assessed using this SEA Objective class.



This type of SEA objective not applicable to this type of Strategy component .

As an example, the land use planning policy component (#4) cannot be assessed by the GIS SEA Objectives (category 2 in Table 5.1) as they are not based on interventions at specific locations and are not subject to specific outputs from the NTA transport model.

5.5

ASSESSMENT OF STRATEGY ALTERNATIVES

Each of the three Strategy Alternatives is assessed as a stand alone set of proposals against the 27 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 three Alternatives under each of the 27 SEA Objectives. This approach allows the key performance differences (positive and negative) between the three Alternatives to be highlighted.

This is undertaken by completing the assessment of each of the Strategy Alternatives against the SEA Objectives and then preparing a summary evaluation matrix (please see Table 7.1), which contains data and supporting narrative describing the relative performances against the SEA Objectives.

While the assessment focuses on the collective effect of all the proposals in each Strategy 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 matrix.

Traffic data provided by the NTA was one of the main sources of information for this stage of the SEA process. This data was used to undertake noise, air quality and climate change modelling for the relevant SEA Objectives (*Table 5.2*). GIS information on the various transport schemes in the Alternatives packages was used to undertake GIS/spatial analysis. Other information provided included general Strategy assessment information undertaken by NTA (addressing issues such as accessibility, journey time savings, modal shift changes and public transport capacity).

The results of the Strategy Alternatives assessment is presented in *Chapter 8*. These results were taken into account, together with the wider appraisal results, in developing the Preliminary Draft Transport Strategy. Further details of this can be found in *Section 6.9 to 6.11* of the Strategy document.

5.6

ASSESSMENT OF PRELIMINARY DRAFT TRANSPORT STRATEGY

The Preliminary Draft Transport Strategy 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 Preliminary Draft Transport Strategy against a Do-Minimum. This is different to the environmental assessment of the Alternatives which is more focused on the differences between each of the three Alternative packages.

As with the previous stage, traffic data provided by the NTA was one of the main sources of information for the assessment of the Preliminary Draft Transport Strategy. This data was used to undertake noise, air quality and climate change and also formed the basis for the GIS mapping (*Chapter 9*). GIS information on transport schemes in the Preliminary Draft Transport Strategy was used to undertake GIS/spatial analysis. Preliminary Draft Transport Strategy assessment information was provided by NTA and considered in the environmental assessment.

The full range of likely significant effects on the environment of the Preliminary Draft Transport Strategy 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 Strategy refinement. However, the process of iterative improvement of the Strategy will have started with the assessment of the Alternatives where major issues emerged. The SEA process is one of iterative assessment and ongoing refinement and improvement of the Strategy. 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*.

5.7

CONSULTATION AND FINALISATION OF THE STRATEGY

This document reports on the environmental assessment of alternatives and on the Preliminary Draft Transport Strategy. Following consultation with the public and statutory environmental authorities, all submissions received will be considered and the Preliminary Draft Transport Strategy and the draft Environmental Report revised, where necessary.

The Final Strategy document of *2030Vision* will then be published along with a Final Environmental Report. This will be accompanied by a document which summarises the consultation process.

The Final Strategy document will then be presented to the Minister for Transport for formal approval after which the SEA Statement will be prepared.

Monitoring of the environmental impacts of the Strategy will be ongoing as subsequent implementation plans progress.

6.1 INTRODUCTION

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

1. to assist the development of *2030 Vision*; and (PPPs which guided the development of *2030 Vision*; and
2. to input in the SEA scoping process and guided the development of SEA Objectives.

Annex A to this Report contains the full presentation of the results of the PPP review. The Draft and Final SEA Scoping Reports had contained a summary of the PPP considered during the scoping stage of the SEA. Since the completion of this stage, additional PPPs have emerged and these are also listed below. Additionally, subsequent PPP reviews have resulted in further additions to the overall list of PPPs.

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 legislation and policy;
- County legislation and policy;
- Northern Ireland policy; and
- Other land use and transport policy.

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); and
- Directive on the Protection of Groundwater Against Pollution and Deterioration (2006/118/EC).

6.2.2 *National legislation and policy*

- Planning and Development Act (2000);
- National Spatial Strategy (2002);
- National Development Plan 2007 – 2013 (2007);
- Transport 21 (2005);
- 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 (2002);
- National Heritage Plan (2002);
- BioEnergy Action Plan for Ireland (2007);
- Strategic Rail Review (2003);
- National Roads Needs Study (1998);
- Road Safety Strategy (2007);
- Ten-Year Framework Social Partnership Agreement 2006 – 2015 (2006);
- National Action Plan for Social Inclusion 2007 – 2016 (2007);

- 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 Hazardous Waste Management Plan 2008 – 2012 (2008);
- The Planning System and Flood Risk Management – Guidelines for Planning Authorities (2009);
- Ports Policy Statement (2005);
- Transport Access for All – The Sectoral Plan for Accessible Transport under the Disability Act 2005 (2008 Edition);
- Water Services Act 2007;
- Dublin Port National Development Plan Study (2009);
- European Communities (Natural Habitats) Regulations, 1997 (S.I. No. 94 of 1997) (which has been amended twice, S.I. No. 233 of 1998 & S.I. No. 378 of 2005);
- Wildlife Act of 1976 & 2000;
- Smarter Travel – A Sustainable Transport Future – A New Transport Policy for Ireland 2009 – 2020 (2009); and
- Ireland’s First National Cycle Policy Framework (2009).
- 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).
- Water Pollution Acts 1977 to 1990

6.2.3 *Regional legislation and policy:*

- Regional Planning Guidelines for the Greater Dublin Area 2004-2016 (2004);
- Regional Planning Guidelines for the Greater Dublin Area 2010 – 2022 (Draft for Public Consultation);
- DTO Strategy 2000 – 2016: ‘A Platform For Change’ (2001);
- 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
- Dublin Region Economic Action Plan (2009).

6.2.4 *County legislation and policy*

- Waste Management Plan for Dublin 2005 – 2010 (2005);
- Climate Change Strategy for Dublin City 2008 – 2012 (2008);
- County Wicklow Replacement Waste Management Plan 2006 – 2011 (2006);
- Kildare Waste Management Plan 2005 – 2010 (2006);
- North East Region Waste Management Plan 2005 – 2010 (2006);
- The County Development Plans of the seven GDA local authorities;
- Noise Action Plans;
- Local Area Plans (and other sub-County planning documents); and
- Biodiversity Action Plans.

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);
- Regional Strategic Transport Network Transport Plan 2015 (2004);

- Sub-Regional Transport Plan, 2015 (2007); and
- Accessible Transport Strategy (2005).

6.2.6 *Other land use and transport policy*

- Grangegorman Development Agency Strategic Plan;
- Dublin Docklands Area Masterplan (2008);
- Dublin Bus Network Review (2006);
- Dublin Airport Authority: Transforming Dublin Airport;
- Fingal East Meath Flood Risk Assessment and Management Study (plan due to be published 2010); and
- River Dodder Catchment Flood Risk Assessment & Management Study (plan to be published mid 2010).

Relationship to Regional Planning Guidelines for the Greater Dublin Area

2030 Vision should be considered within the context of the Regional Planning Guidelines in so far as it must be consistent with the overarching policies and targets as set out in the RPG. In relation to future reviews of the Regional Planning Guidelines for the Greater Dublin Area, the Dublin and Mid-East Regional Authorities are required to consult with the NTA when making regional planning guidelines. The Transport Strategy for the GDA will form the basis for these consultations. It will comprise the NTA policy platform upon which the authority's statutory role in the planning process will be based.

The NTA shall prepare and submit to the Dublin and Mid East regional authorities, a report on the issues which, in its opinion, should be considered in making the RPG. A statement is required in both the Draft and Final RPG explaining how there will be effective integration of transport and land use planning in line with the Transport Strategy. This has occurred for the RPG which cover the period from 2010 to 2022 adopted in June 2010, with reference to the emerging policies of the Preliminary Draft Transport Strategy.

Summary

As such, *2030 Vision* 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:

Transport is the sector of the Irish economy which is responsible for the largest increase in greenhouse gas emissions. Thus, transport-related emissions need to be tackled and the trend reversed.

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 and one which considers the subsequent transport patterns.

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 and transport has wider benefits in the areas of economics, quality of life and social inclusion.

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.

Road-based transport emissions are the greatest source of air quality impacts in the GDA. Overall, use of the private car needs to be reduced and usage of forms of transport which have a lower per-capita emission increased.

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.

Annex A presents a summary of the key pieces of international, European, national, regional and county policy and legislation that have been considered as part of the preparation of the Strategy SEA and also within the SEA process.

7.1**INTRODUCTION**

This chapter presents the existing environmental conditions (baseline) in the Greater Dublin Area and the likely future conditions in the absence of *2030Vision*. 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 *2030Vision* identified. Finally, a list of data sources is provided within each of the environmental topics sections.

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 – where possible – during the preparation of *2030Vision* ; 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 Transport Strategy being prepared.

7.2**OVERVIEW OF GDA**

The GDA is in the east of Ireland and consists of 2 regions, Dublin and the Mid East. The Dublin region is split into 4 Local Authority areas, namely

Dublin City, Fingal, South Dublin and Dun Laoghaire Rathdown. The Mid East comprises Meath, Kildare and Wicklow Counties.

The GDA is the dominant area of Ireland in terms of both population and employment with 39% of the population of the State and 42% of the jobs according to Census 2006. This equates to 1,662,536 persons and 774,025 jobs¹.

The region contains Dublin City and suburbs and a number of large towns such as Naas, Navan and Bray. Dublin city is the capital of Ireland and is the economic driver of both the GDA and the State. 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.

7.3 *BIODIVERSITY, FLORA & FAUNA*

7.3.1 *Baseline Description*

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

Natura 2000 Network in the GDA

The key biodiversity, flora and fauna resources in the GDA are the network of Natura 2000 sites consisting 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 National 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.

¹CSO POWCAR 2006. This figure only includes those enumerated at home on Census night and those who indicated that their Present Principal Status was working for payment or profit. As such this figure does not include jobs which are filled by, for example, students who work part-time.

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
<i>GDA Total</i>	<i>18</i>	<i>41</i>	<i>6</i>	<i>118</i>

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

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 *Table 7.2* below and illustrated in *Figure 7.1*.

Table 7.2 *SPAs within the GDA*

County	Site Code	Site Name
Dublin	004016	Baldoyle Bay
Dublin	004025	Broadmeadow/Swords Estuary
Dublin	004113	Howth Head Coast
Dublin	004117	Ireland's Eye
Dublin	004069	Lambay Island
Dublin	004006	North Bull Island
Dublin	004014	Rockabill
Dublin	004015	Rogerstown
Dublin	004122	Skerries Islands
Dublin	004024	South Dublin Bay and River Tolka Estuary
Kildare	004063	Poulaphouca Reservoir
Meath	004065	Lough Sheelin
Meath	004080	Boyne Estuary
Meath	004158	River Nanny Estuary and Shore
Wicklow	004063	Poulaphouca Reservoir
Wicklow	004186	The Murrough
Wicklow	004127	Wicklow Head
Wicklow	004040	Wicklow Mountains

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

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.

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

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 *Table 7.3* and also illustrated above in *Figure 7.1*.

Table 7.3 *SACs within the GDA*

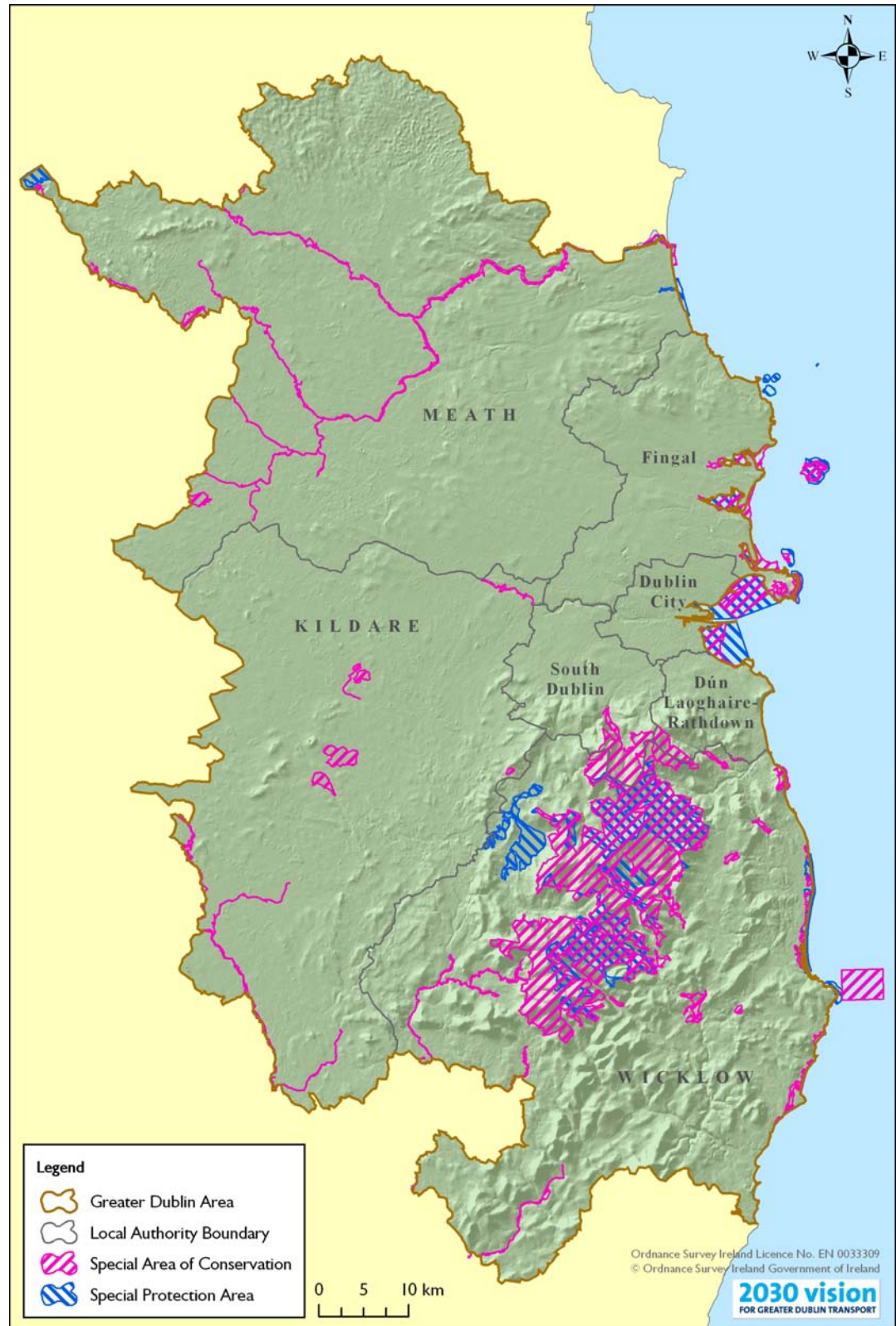
County	Site Code	Site Name
Dublin	000208	Rogerstown Estuary
Dublin	000204	Lambay Island
Dublin	000205	Malahide Estuary
Dublin	000199	Baldoyle Bay
Dublin	002193	Ireland's Eye
Dublin	000202	Howth Head
Dublin	000206	North Dublin Bay
Dublin	000210	South Dublin Bay
Dublin	001209	Glenasmole Valley
Dublin	002122	Wicklow Mountains
Dublin	000725	Knocksink Wood
Dublin	000713	Ballyman Glen
Kildare	001398	Rye Water Valley/ Carton
Kildare	001387	Ballynafagh Lake
Kildare	000391	Ballynafagh Bog
Kildare	002331	Mouds Bog
Kildare	000397	Red Bog
Kildare	000396	Pollardstown Fen
Kildare	002162	River Barrow And River Nore
Meath	000006	Killyconny Bog (Cloghbally)
Meath	002340	Moneybeg and Clareisland Bogs
Meath	002299	River Boyne And River Blackwater
Meath	001957	Boyne Coast And Estuary
Meath	001810	White Lough, Ben Loughs And Lough Doo
Meath	002120	Lough Bane And Lough Glass
Meath	002342	Mount Hevey Bog
Meath	001398	Rye Water Valley/ Carton
Wicklow	000713	Ballyman Glen
Wicklow	000714	Bray Head
Wicklow	000729	Buckroney-Brittas Dunes and Fen
Wicklow	000716	Carriggower Bog
Wicklow	000717	Deputy's Pass Nature Reserve
Wicklow	000719	Glen of the Downs
Wicklow	001757	Holdenstown Bog
Wicklow	000725	Knocksink Wood
Wicklow	001766	Magherabeg Dunes
Wicklow	000781	Slaney River Valley
Wicklow	002249	The Murrough Wetlands
Wicklow	000733	Vale of Clara (Rathdrum Wood)
Wicklow	002122	Wicklow Mountains
Wicklow	002274	Wicklow Reef

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

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 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*

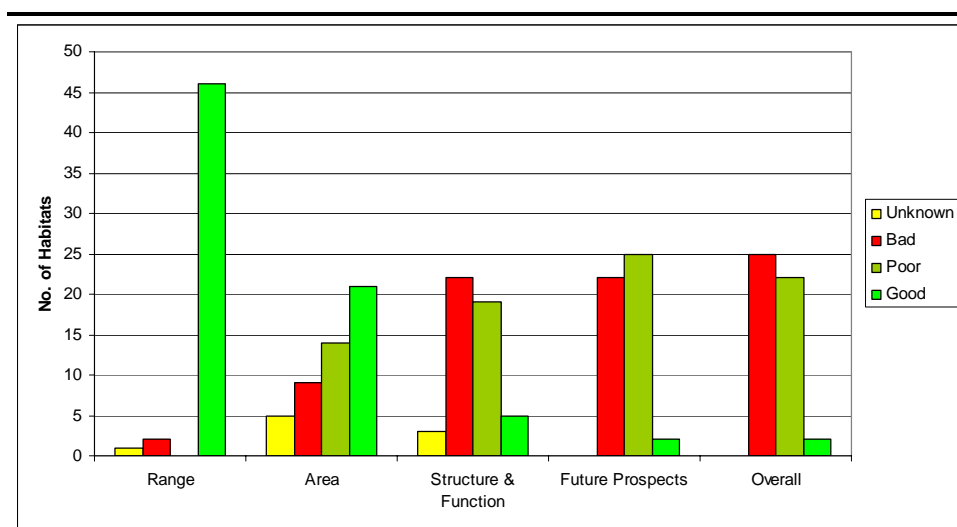


Designated species of plants and animals

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.

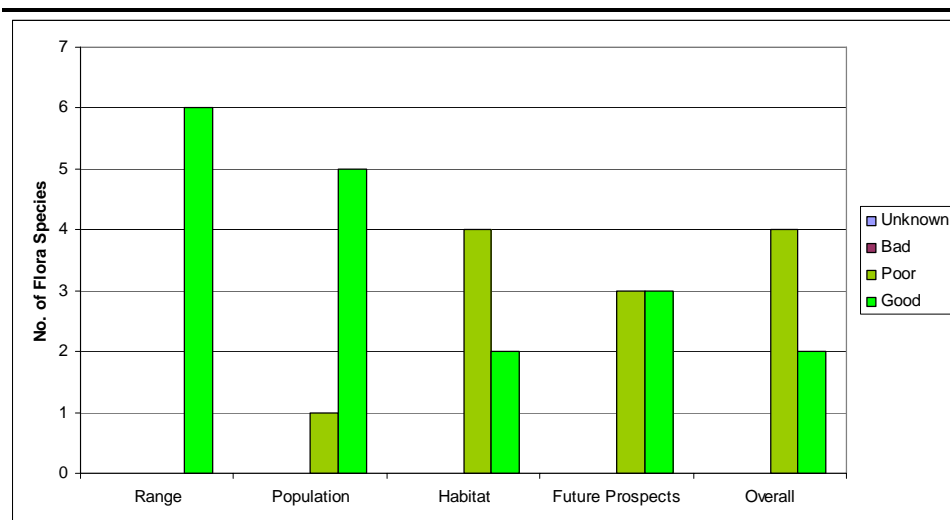
Figure 7.2 NPWS National Assessment of Habitats included in Annexes of Habitats Directive



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*

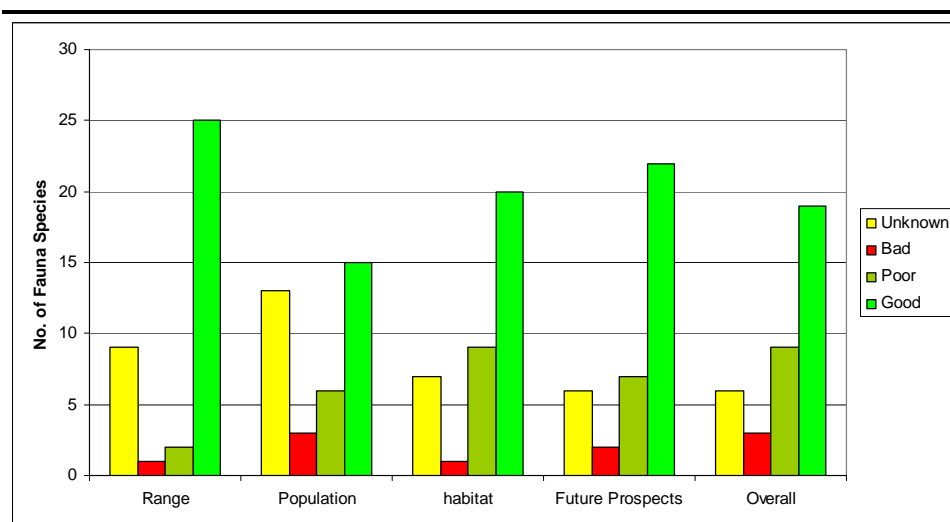


Source: NPWS (2008) *The Status of EU Protected Habitats and species in Ireland*

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.

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

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.

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).

National 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 *Table 7.4* and shown in *Figure 7.5*.

Table 7.4 *NHAs within the GDA*

County	Site Code	Site Name
Dublin	001218	Skerries Islands
Kildare	001388	Carbury Bog
Kildare	001393	Hodgestown Bog
Meath	001580	Girley Bog
Meath	001324	Jamesown Bog
Meath	001582	Molerick Bog

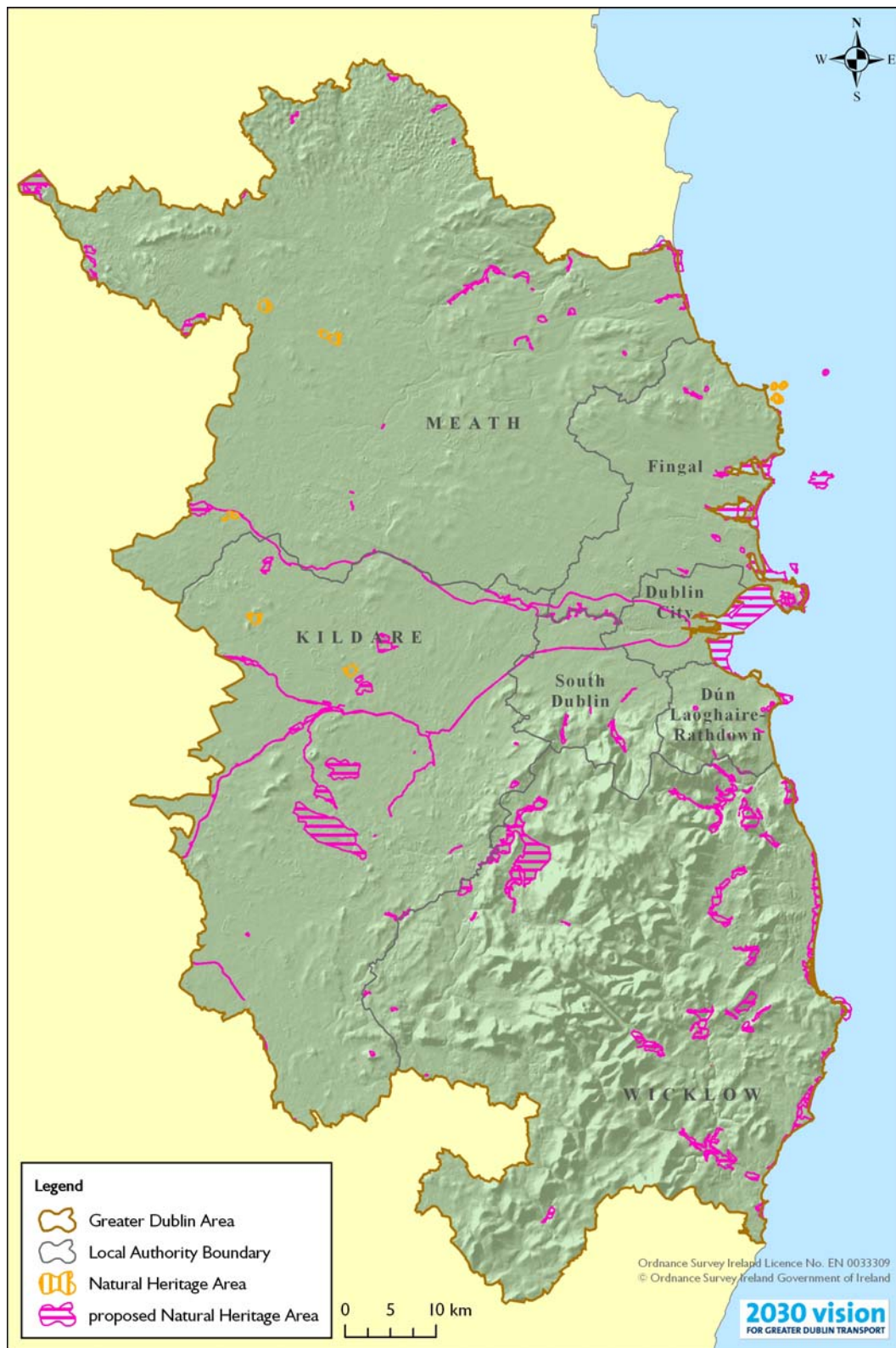
Source: NPWS website www.npws.ie/en/MapsData

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 following means:

- Rural Environment Protection Scheme (REPS) plans which require conservation of pNHAs and operate for a period of 5 years;

- Forest Service requirements – Afforestation grants for works on pNHA lands require approval of the NPWS before payment; and
- recognition of the ecological value and the protection of pNHAs by planning and licensing authorities through relevant policies in County Development Plans and Local Area Plans.

Figure 7.5 NHA and pNHAs in the GDA



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. In Ireland there are two UNESCO Biosphere Reserves, one of which - North Bull Island - is located within the GDA.

Other designations

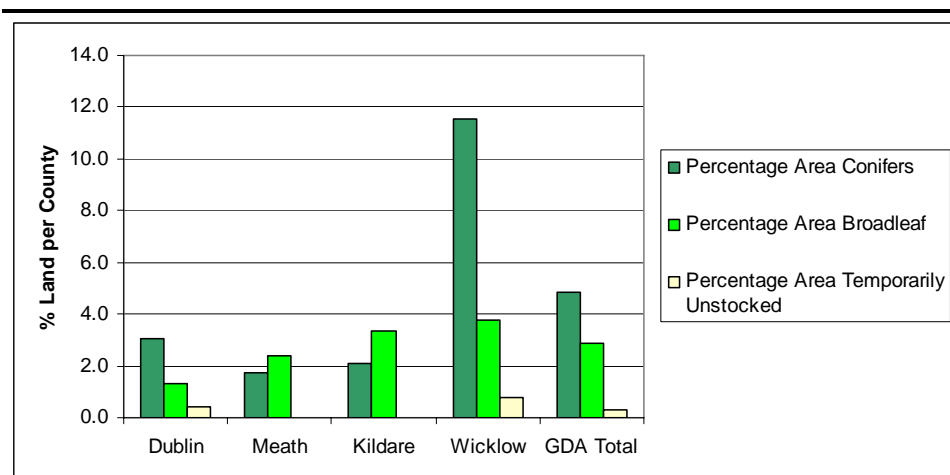
Baldoyle Estuary, North Bull Island (both in Dublin), Pollardstown Fen Nature Reserve (Kildare), Deputy's Pass Nature Reserve, Glendalough Nature Reserve, Glenealo Valley Nature Reserve, Glen of the Downs Nature Reserve, Knocksink Wood Nature Reserve and Vale of Clara Nature Reserve (Wicklow) are all designated Nature Reserves due to their importance to wildlife.

The GDA contains one National Park, the Wicklow Mountains National Park, which covers part of the mountain range that extends over most of County Wicklow. The primary purpose of the Wicklow Mountain National Park is the conservation of local biodiversity and landscape. The National Park is also a valuable recreational space for locals and visitors.

Forestry

Although forestry is not an ecological designation, it is an important aspect of the GDA's overall biodiversity as forested areas provide habitats and refuges for flora and fauna. In addition, the national forest estate is an important sink for carbon, at approximately 321 million tonnes. Also, 15% (88,000 hectares) of Coillte's (a semi-state commercial company operating in forestry, land based businesses, renewable energy and panel products) estate is managed with 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 is the county with the highest percentage of forest cover nationally with approximately 18% of land covered in forestry, exceeding the national forest objective of 17%. Forestry coverage for all counties in the GDA is shown below is *Figure 7.6*.

Figure 7.6 *Percentage Area of Each County under Forestry*



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

However, it should be noted that the plantation of species-poor forestry can also harm the overall biodiversity of an area.

Biodiversity Action Plans

Some County Councils 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 (including draft versions) have been prepared by Dublin City Council, Dun Laoghaire / Rathdown County Council and Meath County Council.

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

7.3.2 *Current Issues and Problems*

There has been a 20% increase in artificial land from 2000 – 2006 in the GDA due to the growth of Dublin's Metropolitan area and the growth of towns and villages in the Hinterland. This increased level of urban development has increased pressures on habitats and species throughout the region, resulting in habitat and biodiversity loss and damage. This is of greater significance within the GDA due to the relatively higher levels of urban development and expansion. According to *The Status of EU Protected Habitats and Species in Ireland* (NPWS, 2008) the most significant pressures on habitats are from:

- Grazing (including over grazing and undergrazing);
- Recreation (sports and leisure structures and activities);
- Peat extraction;

- Communication networks;
- Forestry; and
- Urbanisation.

The most significant pressures on flora and fauna species are:

- Fishing (including trawling and other commercial fishing);
- Drainage, pollution;
- Communication networks;
- Forestry; and
- Recreation (sports and leisure structures and activities).

Within the GDA, the main threats on biodiversity are:

- loss of extent of biodiversity (removal of an area of habitat; sometimes even the removal of buildings or bridges can be termed as habitat loss);
- habitat fragmentation (the breaking up of large areas into isolated smaller parts, reducing the ability of animals to retreat from threats and reducing food and cover); and
- presence of invasive species (plants and animals which are introduced from elsewhere that pose a threat).

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 associated urban development and expansion during the period and is a reflection of the large increase in the GDA's population in recent years (*Section 7.5*).

Figure 7.7 shows that there has been over a 20% increase in artificial land development over this year period from 2000 (49,799.58 Ha) to 2006 (60,014.50 Ha) and a corresponding decrease in the other land cover types (primarily agricultural land). This land cover data was taken from the Corine¹ database.

¹ Corine Land Cover (CLC) is a map of the European environmental landscape based on interpretation of satellite images.

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

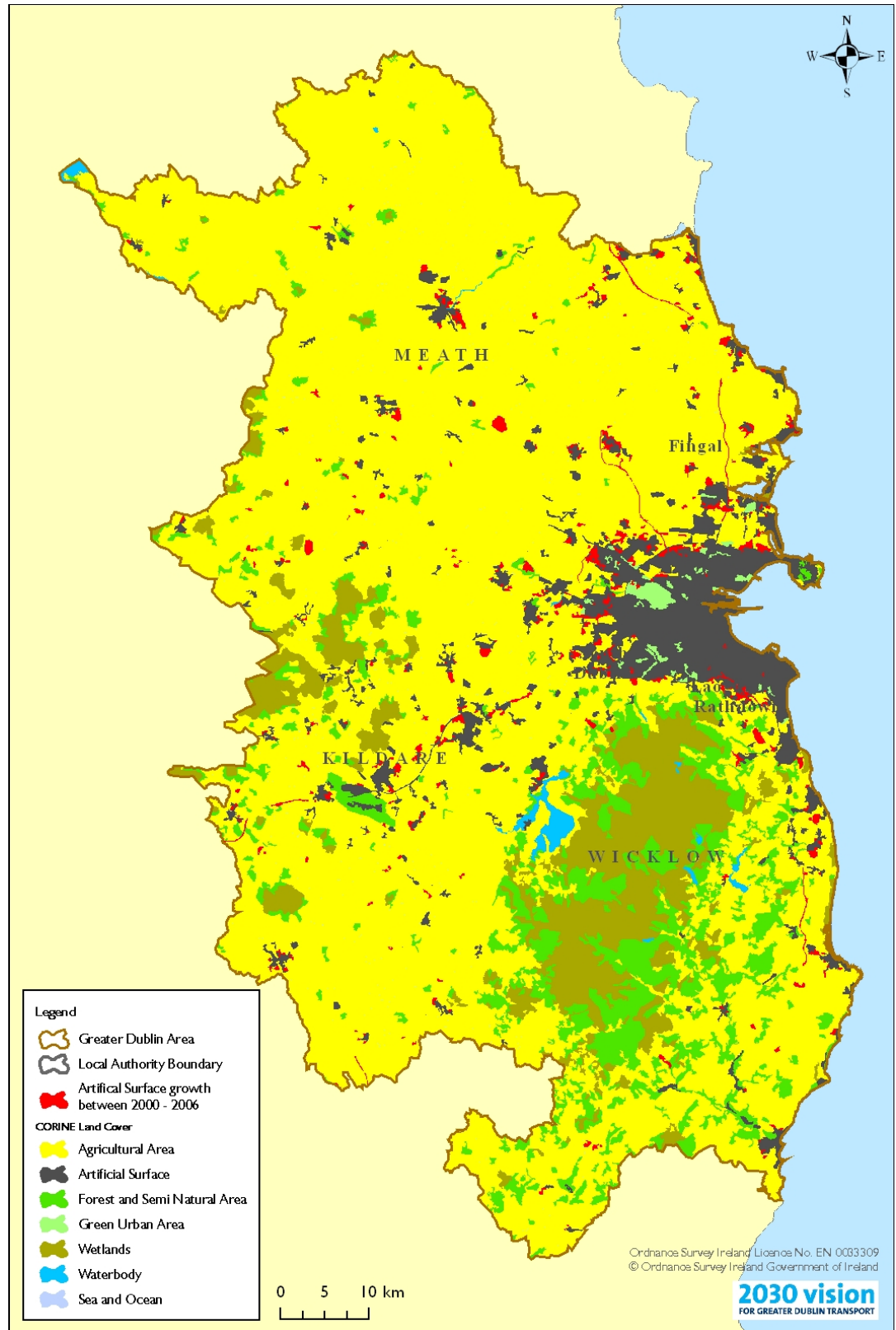
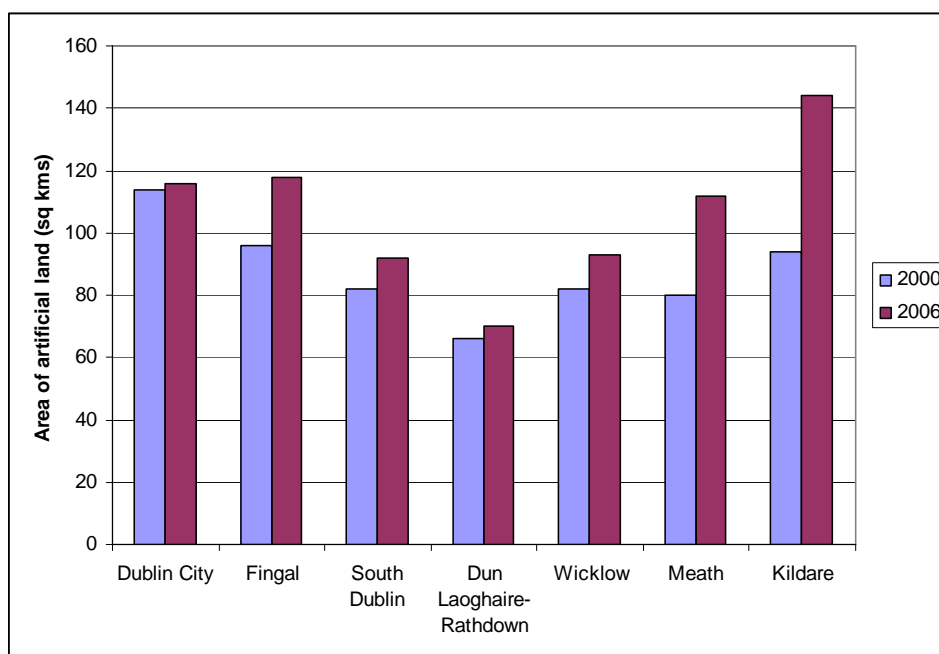


Figure 7.8 below shows respective levels of artificial land covering in the seven local authority areas of the GDA for both 2000 and 2006. The increases in

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 the 'outer' counties of Meath, Kildare and Wicklow. Fingal is the local authority within the Dublin agglomeration with the greatest increase in artificial land – a result of the largest population increase and associated urban development in this authority. Dublin City and Dun Laoghaire-Rathdown have the smallest increases in artificial land, a reflection of their historically high-levels of urban development.

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*

7.3.3 *Likely Evolution in the Absence of 2030 Vision*

With the recent major slowdown in economic activity and the potential continuation of this trend over the coming years, it is likely that the rate of urbanisation of the GDA will also significantly slow down in the short to medium term. However, in the long term it can be anticipated that the extent of urban development in the GDA will grow. This is due to the predicted increase in overall population with the area and falling average household sizes as discussed in *Section 7.5*. It is expected that this will take place at a slower pace in comparison to the period 2000 – 2006 which is regarded as an exceptional period.

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 following "enormous" national challenges:

1. Protection of peatlands and wetlands generally;
2. Sustainable management of coastal resources much valued for recreation and development;
3. Improving water quality;
4. Incentives for landowners to manage important grasslands and prevent spread of scrub and invasive alien species; and
5. Control of alien species in freshwater, marine and terrestrial habitats.

Challenges 2 and 3 are most relevant for the GDA.

Climate change (a key 'driver' of which is emissions from the transport sector) 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. Climate change may – in the long-term – result in a different assemblage of habitats and species in Ireland and this will result in significant biodiversity changes.

7.3.4 *Implications for 2030Vision*

A significant proportion (10.3% or 719 sq kms) of the GDA is designated as Natura 2000 sites for its biodiversity value. The remaining (non-designated) areas of the GDA also provide some biodiversity value to the GDA. 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 *2030Vision* does not unintentionally promote further biodiversity loss or damage. It should also be noted that greenfield development may also negatively impact on biodiversity.

2030Vision will be a factor in influencing the locations of future development within the GDA (although it should be noted that this is the direct remit of the Regional Planning Guidelines (RPGs) and the City and County Development Plans of the GDA). *2030Vision* will have a role in influencing development patterns such that future urbanisation and growth of the GDA does not significantly impact on the region's biodiversity resources. Ways of achieving this include encouraging redevelopment of brownfield sites (previously developed sites) instead of greenfield development, especially brownfield sites along key transport corridors, such as rail, Luas and Metro lines and QBCs.

In developing the Strategy there should be an awareness of potential opportunities to enhance or support biodiversity. Major transport corridors can also provide relatively undisturbed green corridors (especially along the

vegetation and landbanks immediately alongside rail corridors and motorways) and these can be of value to biodiversity through providing habitat linkages across the GDA.

7.3.5 *Data Sources*

Data regarding the Natura 2000 sites was obtained from the NPWS website, www.npws.ie. However, detailed individual Conservation Management Plans are not available for the majority of sites in Ireland.

NPWS (2008) *The Status of EU Protected Habitats and species in Ireland*.

Ramsar Convention Website: www.ramsar.org.

Information on the UNESCO Biosphere Reserves was obtained from: <http://www.unesco.org/mab/doc/brs/Eur.pdf> and http://whc.unesco.org/en/list/659/multiple=1&unique_number=780.

Information on the Wicklow National Park was obtained from the NPWS website www.npws.ie.

Data on areas covered by forestry was provided by the Forest Inventory and Planning System (FIPS) Unit of the Department of Agriculture, Fisheries and Food.

The EPA website provided information on protected species, www.epa.ie/environment/biodiversity/protectedspecies/

Department of Arts, Heritage, Gaeltacht and the Islands (2002) *National Biodiversity Action Plan*.

Dublin City Council (2008) *Dublin City Biodiversity Action Plan 2008 – 2012*.

Forest Service (2007) *National Forestry Inventory – Results*.

Corrine landcover database.

7.4 *LANDSCAPE*

7.4.1 *Baseline Description*

The environmental topic of Landscape covers strategic landscape and landscape character issues.

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.) have 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 Irish Sea coastline (both north and south of Dublin city). The GDA also contains many urban areas which provide landscape benefits, particularly some of the historic centres and streets such as those in Georgian Dublin and the heritage towns of Kells, Trim and Dalkey.

As noted in the Scoping Report, there is no common/ standard landscape designation system available in Ireland. Each county has its own landscape characterisation and classification systems. This has led to difficulties in describing a 'common' landscape baseline (unlike, for example; flora and fauna, where SAC and SPAs are common throughout).

This baseline provides an overview of the relevant strategic landscape conditions throughout the GDA and not on the smaller or local-scale landscape components. Some of the key landscape types/classifications are listed in *Table 7.5* below.

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. There are several areas within the GDA which have been designated under Special Amenity Area Orders (SAAO) and these include the Sugar Loaf Mountain, Co. Wicklow; Howth Head, Liffey Valley – Lucan Bridge to Palmerstown and North Bull Island, Co. Dublin.

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). Although these don't have specific protection, the planning and development system does explicitly consider landscape and visual impacts in determining and assessing development proposals. Thus, such landscapes do have a level of protection.

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* above.

Table 7.5 *Examples of Landscape Classifications in the GDA*

Local Authority	Landscape designation
Dublin City	<u>SAAO</u>
	Liffey Valley
	North Bull Island
	Sandymount Strand, Merrion Strand & Irishtown Nature Park
	<u>Landscape Conservation Areas</u>
	Phoenix Park
	North Bull Island
	Botanic Gardens
Fingal County	St. Anne's Park
	<u>High Amenity Areas</u>
	Howth
	Tolka River
	Lambay Island
	Liffey Valley
	Naul Hills
	Portrane-Donabate Peninsula
South Dublin	Portmarnock Peninsula
	Ward River
	<u>SAAO</u>
	Liffey Valley
	<u>High Amenity Zones/Areas of Outstanding Natural Beauty</u>
	Dodder Valley
	Liffey Valley
	Dublin Mountain areas
Dun Laoghaire-Rathdown	<u>SAAO</u>
	Dalkey Hill
	Killiney Hill
	Roches Hill
	<u>High Amenity Areas</u>
	Kilmashogue Valley
	Glendoo Valley
	Glencullen Valley
Meath	Carrickgollogan Hill
	<u>Landscapes of Exceptional Value</u>
	Tara Skryne Hill
	<u>Sensitive Landscapes</u>
	Tara Skryne Hills
	Coastal Plains
	Ward Lowlands
Kildare	<u>SAAO</u>
	River Liffey Valley
	Grand Canal
	<u>Special Landscape Areas</u>
	Allen Remnant Bog
	Pollardstown Fen
Wicklow	<u>SAAO</u>
	Bray Head
	Little Sugar Loaf
	Great Sugar loaf
	Dargle Glen
	<u>Areas of Outstanding Natural Beauty</u>
	Glencullen Valley
	Bray Head
	Great Sugar Loaf
	Little Sugar Loaf

The Department of Environment, Heritage and Local Government's National Landscape Strategy is expected to be published in 2010.

7.4.2 *Current Issues and Problems*

Landscapes, urban and rural, face growing pressures and forces for change. As with biodiversity, flora and fauna, a primary pressure on designated landscapes is ongoing urban development within the GDA. Although this is limited in designated and protected landscapes, it is one of the key factors in the pressures on such landscapes. Additionally, the growth of the GDA's population is placing indirect pressure on designated landscapes through increased recreational usage.

Regarding undesignated landscapes – which comprise the majority of the GDA – urban development pressure is a much larger driver of landscape change. The GDA has undergone a large increase in population in recent years, coupled with decreasing average household sizes. This has resulted in a large increase in the amount of housing, retail, employment, recreation and associated urban development.

This large growth in the population of the GDA has also resulted in significant growth in the smaller towns and villages in the GDA, primarily within the three outer Local Authorities (Meath, Kildare and Wicklow). Much of this development is low density in nature resulting in large residential areas encroaching into the countryside surrounding much of these smaller town and villages.

7.4.3 *Likely Evolution in the Absence of 2030 Vision*

Given the ongoing economic difficulties and the corresponding impact on the rate of urban development and expansion, it is likely that pressures on undesignated and designated landscapes will ease in the immediate term, though pressure is likely to increase again in the period up to 2030 (the temporal focus for the Strategy and the SEA) due to the long-term trend of increased population growth and the subsequent urban development requirements.

7.4.4 *Implications for 2030Vision*

2030Vision will be a factor in influencing the broad locations of future development within the GDA, and thus, impacts on designated and undesignated landscapes (but as mentioned previously, this is the remit of the RPGs and City and County Development Plans).

2030Vision should try to use its ability to influence development patterns such that future urbanisation and growth of the GDA does not significantly impact on the region's protected/designated landscape resources and the wider (undesignated) landscape. Potential ways of achieving this include

encouraging redevelopment of brownfield sites instead of greenfield development. This has the effect of avoiding impacting on the undeveloped landscapes and also redeveloping brownfield sites (which are often of very poor quality and can have a significant negative impact on the local landscape).

Additionally, *2030Vision* should encourage better and more efficient use of land through, for example, increasing development densities for new developments. In attempting to encourage better use of development land, it is important that higher densities are also accompanied by high quality urban designs as poor quality design can result in adverse landscape impacts, often exacerbated by high development densities.

Transport infrastructure may also positively contribute to local landscape quality through the provision of high-quality interchanges and stations, local streetscape improvements and associated traffic calming measures.

7.4.5 *Data Sources*

Relevant landscape character and designations data have been obtained for each of the seven County and City Development Plans. However, as noted above, there is no common/standard landscape character assessment and classification system so each County Council has adopted a different approach to landscape characterisation.

Dublin City Council (2005) *Dublin City Development Plan 2005 – 2011*.

Fingal County Council (2005) *Fingal Development Plan 2005 – 2011*.

South Dublin County Council (2004) *South Dublin County Development Plan 2004 – 2010*.

Dun Laoghaire – Rathdown County Council (2004) *Dun Laoghaire Rathdown County Development Plan 2004 – 2010*.

Kildare County Council (2005) *Kildare County Development Plan 2005 – 2011*.

Meath County Council (2007) *County Meath Development Plan 2007 – 2013*.

Wicklow County Council (2004) *Wicklow County Development Plan 2004 – 2010*.

7.5 POPULATION

7.5.1 Baseline Description

The environmental topic of population includes demographic trends, commuting patterns and socio-economic issues such as accessibility to services and employment.

Population

The population of Ireland was recorded as approximately 4.23 million at the last census (April 2006). In the period 2002-2006 the annual increase amounted to 79,000 – consisting of a natural increase of 33,000 supplemented by annual net inward migration of 46,000.

All counties within the GDA experienced population growth during each of the intercensal periods of 1996 to 2002 and 2002 to 2006, as shown in *Table 7.6* below.

Table 7.6 Trends in population for counties within the GDA

Local Authority	1996	2002	% Change '96-'02	2006	% Change '02-'06	% Change 96-06
Meath	109,732	134,005	22.1	162,831	21.5	48.4
Kildare	134,992	163,944	21.4	186,335	13.7	38.0
Wicklow	102,683	114,676	11.7	126,194	10	22.9
Fingal	167,683	196,413	14.6	239,992	18.2	43.1
Dublin City	481,854	495,781	2.8	506,211	2.0	5.0
South Dublin	218,728	238,835	8.4	246,935	3.4	12.9
Dun Laoghaire – Rathdown	189,999	191,792	0.9	194,038	0.1	2.1
GDA Total	1,405,671	1,535,446	9.2	1,662,536	8.3	18.3
State	3,626,087	3,917,203	8.0	4,239,848	8.2	16.9

Source: Central Statistics Office website www.cso.ie

Some of the most significant population increases over the period 1996 to 2006 were in areas of Kildare, Meath and especially Fingal. These population growths were largely attributable to the growth of the towns 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. In 2006, the population of the GDA was 1,662,536, an increase of over 18% since 1996. This growth has been broadly equally split between the Dublin Region (comprising the four Dublin Local Authorities) and the Mid East Region (Meath, Kildare and Wicklow County Councils). *Figure 7.9a and b* shows the increase in population across the GDA, on an Electoral District (ED)

basis. Figure 7.10 shows the population density (2006 population data), based on 250m grids across the GDA.

Figure 7.9a *Population Increase Per ED in the GDA 2002 - 2006 (Source CSO Census 2002 and 2006)*

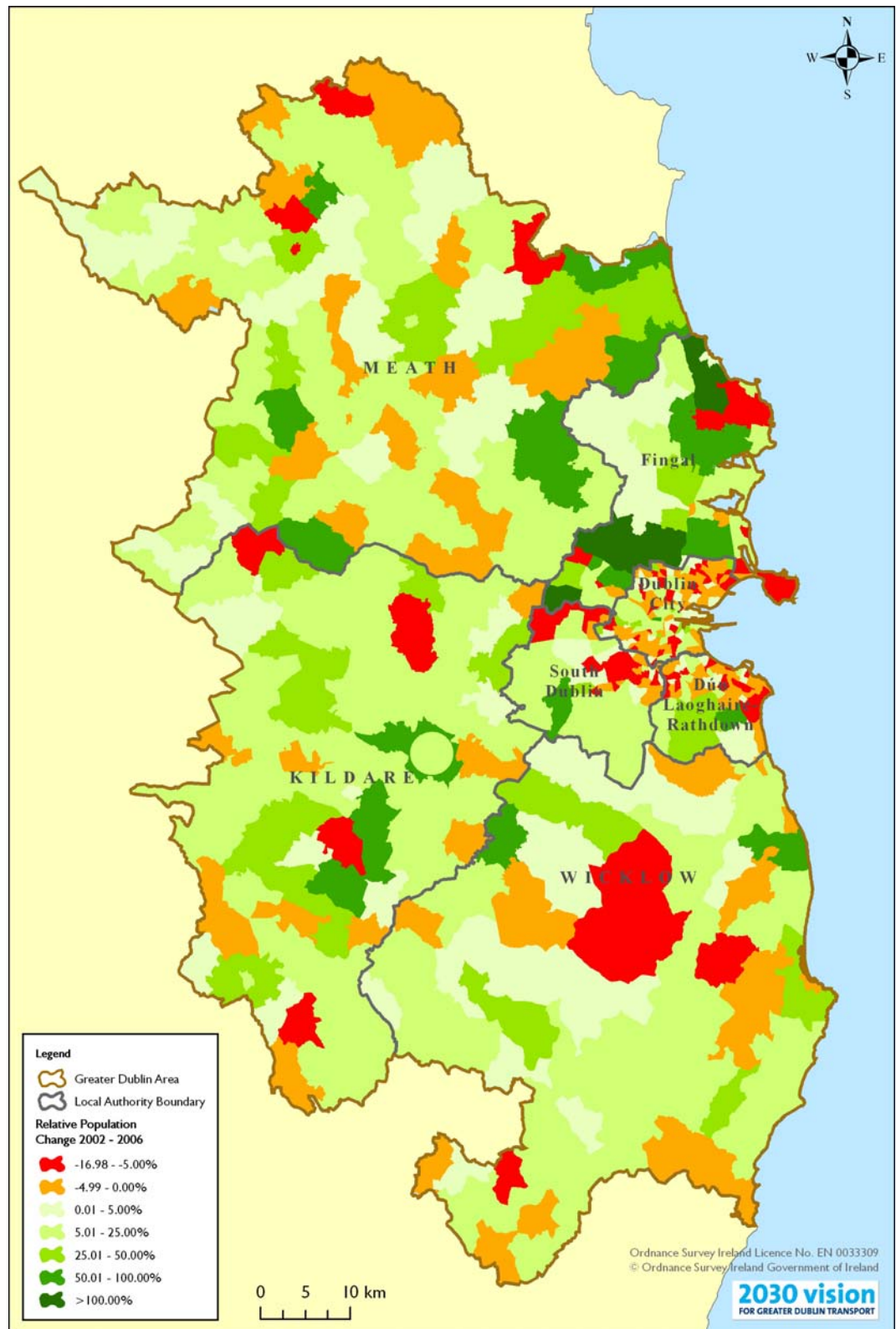


Figure 7.9b Population Increase Per ED in the GDA Metropolitan area 2002 – 2006
(Source CSO Census 2002 and 2006)

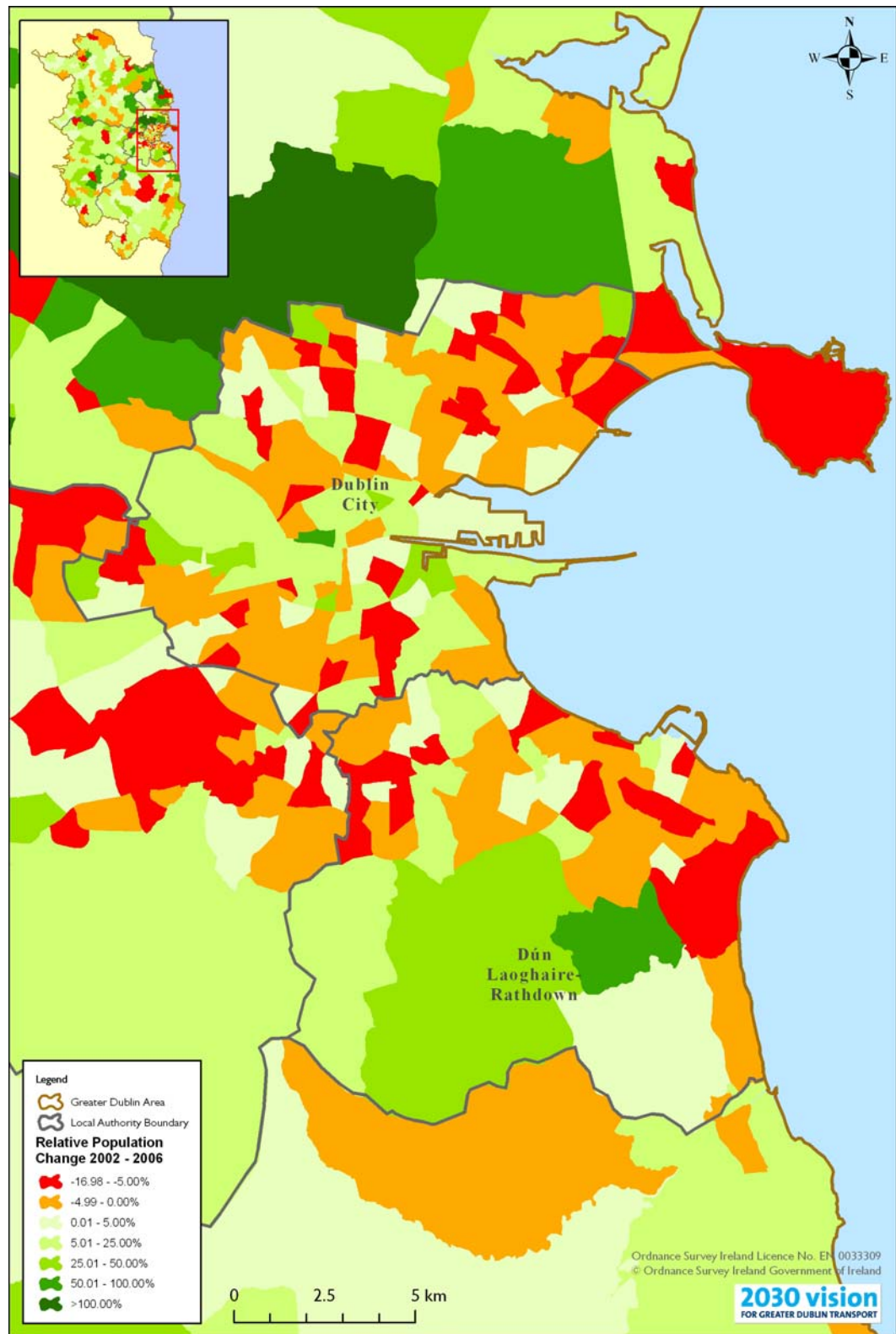
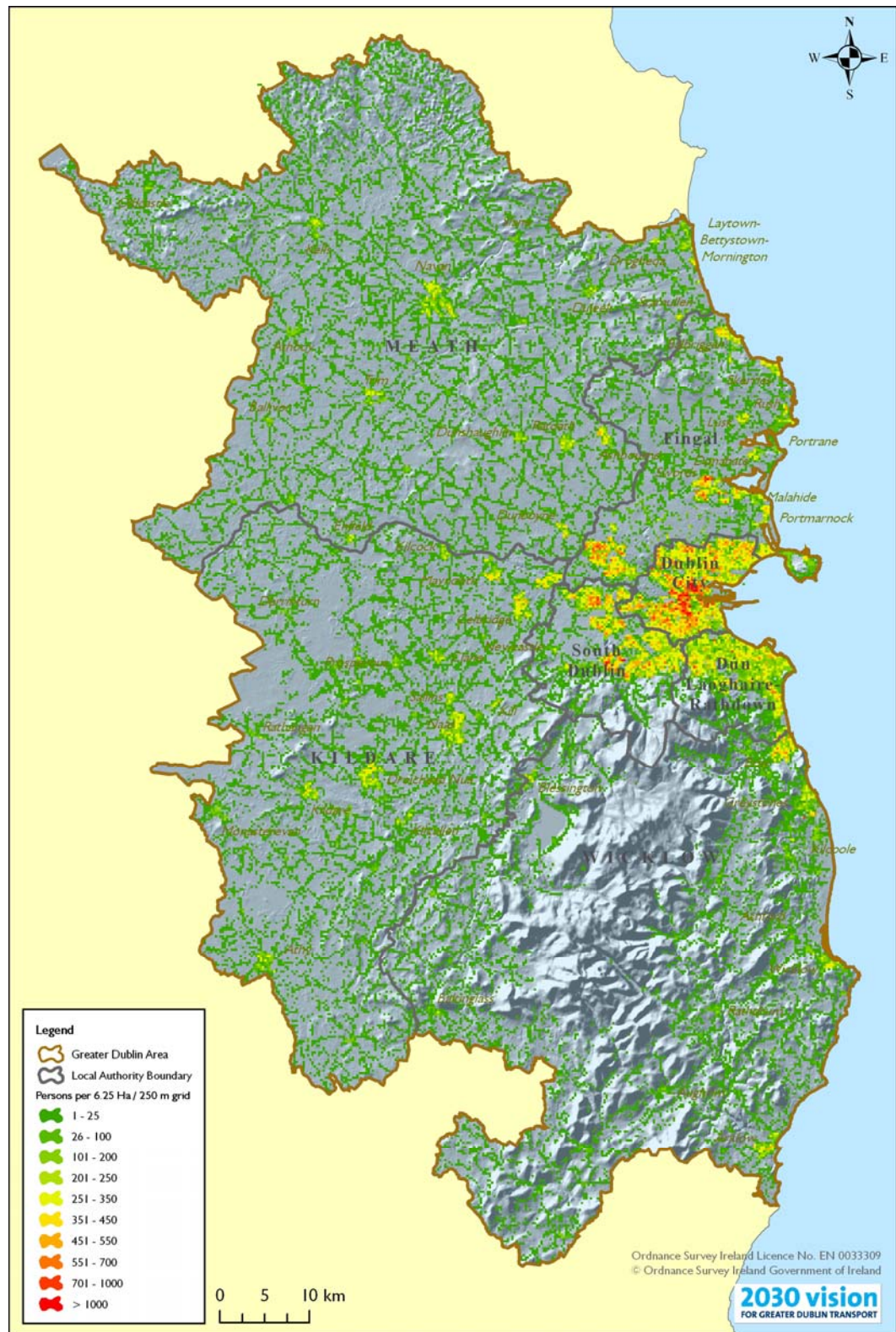


Figure 7.10 2006 Population Distribution and Density in the GDA (Source CSO Census 2006)



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 7.6 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 7.6 *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	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	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 7.6 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.

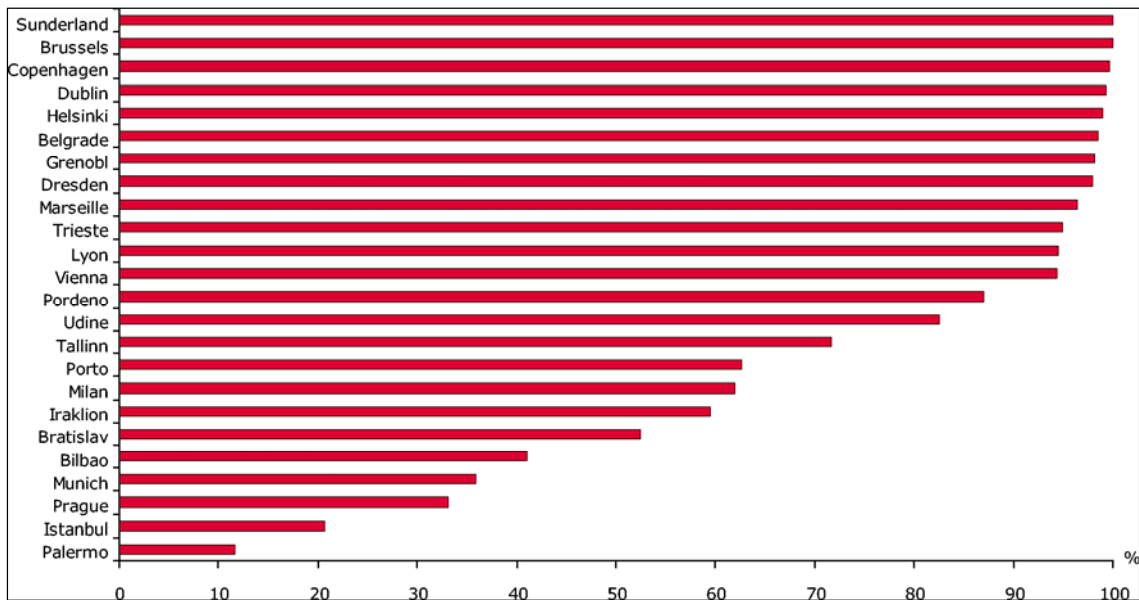
As a comparison, the data for the Dublin Metropolitan Area (as defined by the Regional Planning Guidelines) is also provided in Table 7.6. When the urban agglomerations are compared it can be seen that Dublin is of a significantly lower density than comparable cities such as Zurich or Amsterdam. The 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.

This finding is also noted in an EU research report on urban sprawl⁽¹⁾ published in 2006. Figure 7.11 (figure 2, pg 12) from this report is produced below and this provides information on low density residential development

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

as a proportion of all residential areas built after the mid-1950s, selected European cities, including Dublin.

Figure 7.11 *Low density residential development as a proportion of all residential areas built after the mid-1950s*

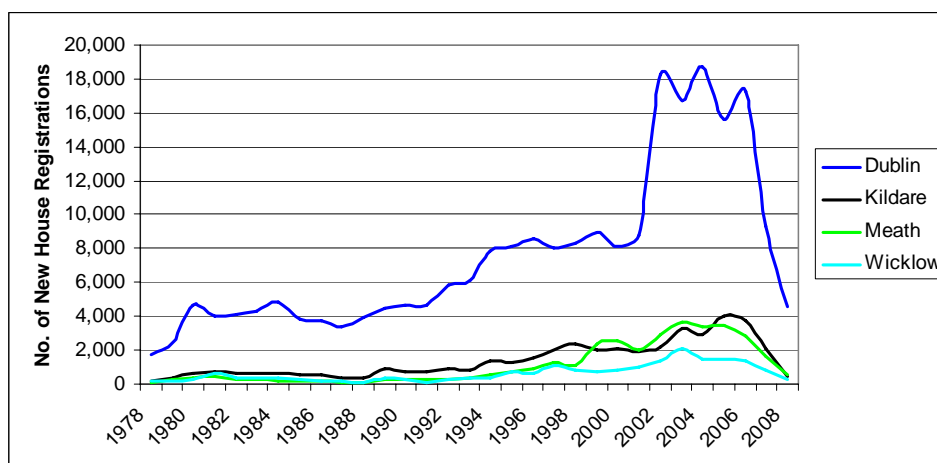


It can be seen that almost 100% of all post-1950 residential development in Dublin has been of low density. It should also be noted that this is not an exclusive development trend to Dublin and that majority of the cities studies also have substantial proportion of low density residential development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

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 7.12* 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 (part of the wider economic recession).

Figure 7.12 No. of New House Registrations by County in the GDA ('78-'08)



Source: Department of the Environment, Heritage and Local Government Statistics website: www.cso.ie/px/doehlg/database/doehlg/doehlg.asp

Demographics

Since 1996, there has been a large increase 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 current economic recession and the corresponding substantial decrease in housing prices may reverse this pattern.

Employment

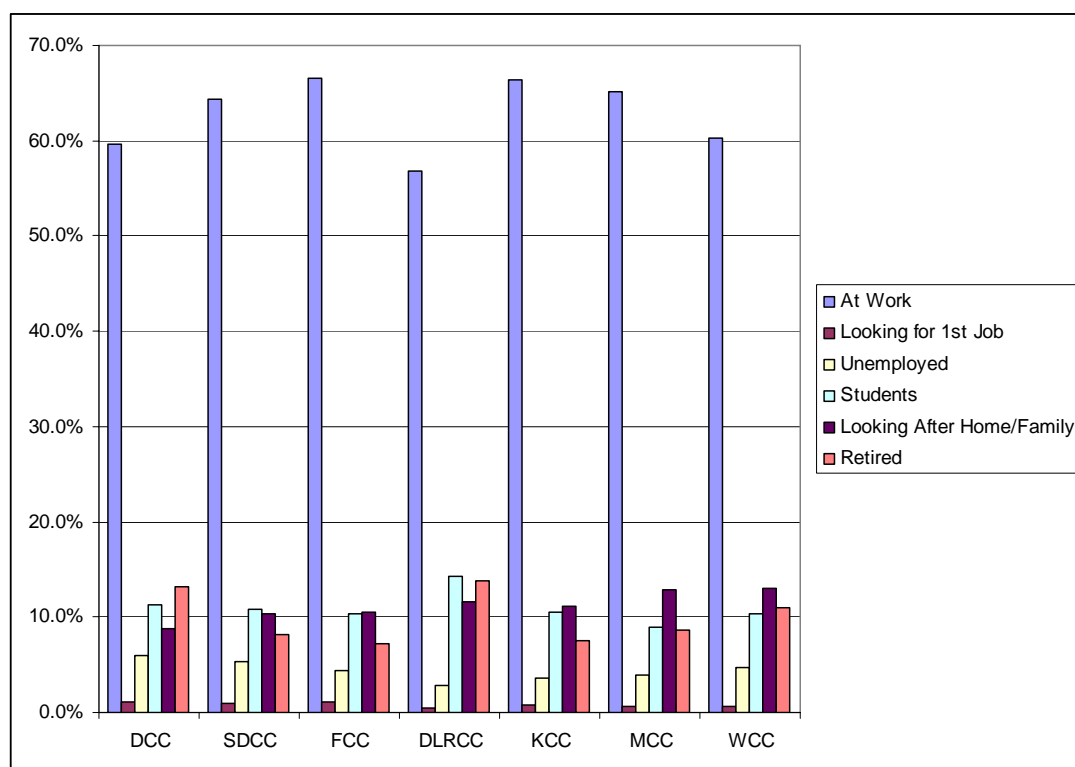
There has been a consistent growth in employment in the period from 1996 to 2007. However, the recent economic slow-down has resulted in a decrease in overall employment and a corresponding increase in unemployment. From the period 1996 to 2006, there was an overall growth in employment of 262,890, an increase of approximately 49% over that 10 year period.

Table 7.7 and Figures 7.13 and 7.14 below show an employment classification breakdown (2006 data) for the GDA. It can be seen that, in 2006 there were very low levels of unemployment. Figure 7.14 shows that professional employment is the dominant class of employment in all seven local authority areas.

Table 7.7 *Principal Socio-Economic Status 2006*

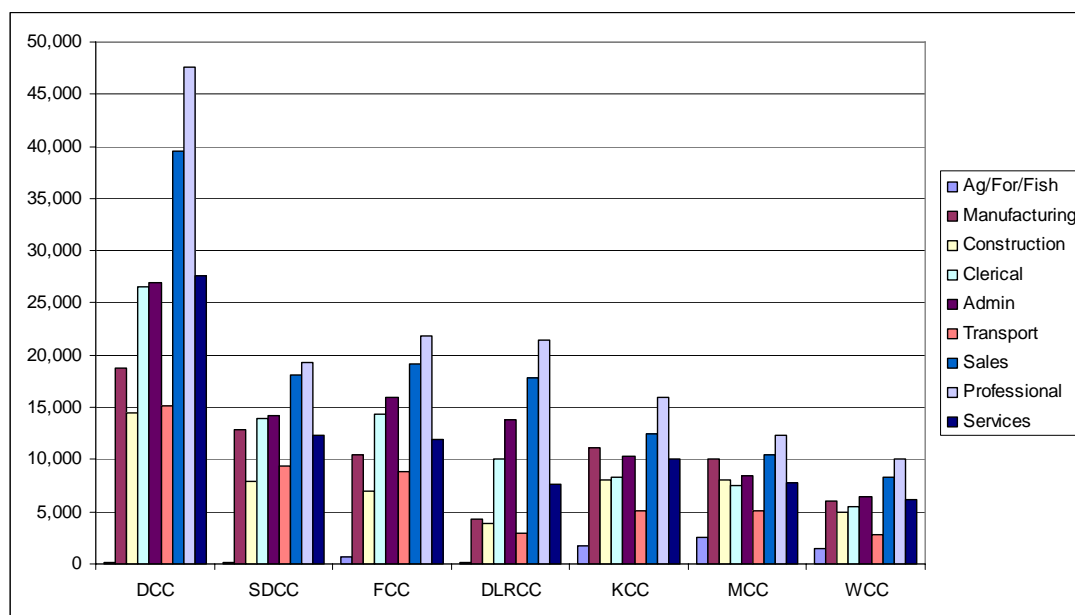
Local Authority	At Work	Looking for 1st Job	Unemployed	Students	Looking After Home/Family	Retired
DCC	245,007	4,726	24,577	46,502	35,997	54,161
SDCC	119,280	1,771	998	19,966	19,287	15,208
FCC	120,794	2,095	7927	18,755	19,088	12,985
DLRCC	87,815	763	4258	22,153	18,042	21,338
KCC	91,581	1,108	5030	14,506	15,425	10,333
MCC	78,437	846	4637	10,771	15,428	10,347
WCC	57,326	633	4410	9,876	12,452	10,519

Figure 7.13 *Principal Socio-Economic Status 2006*



Source: CSO [SAPS](#) Database

Figure 7.14 *Number of Persons Aged 15 Years and Over per Broad Employment Classification (2006 data)*

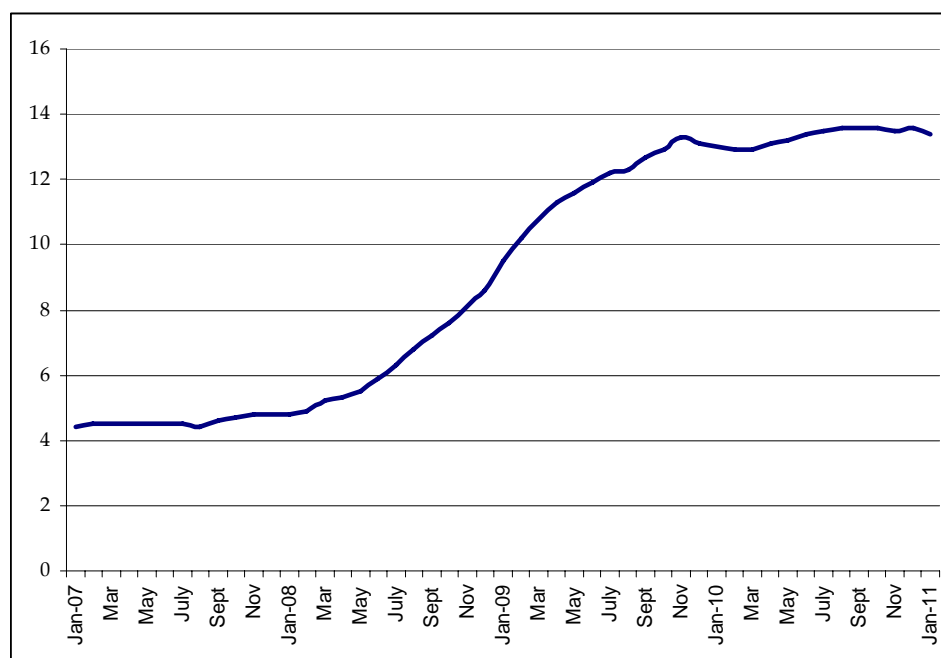


Source: [CSO](#) SAPS Database

Recent trends in Employment

Figure 7.15 below shows monthly seasonally adjusted standardised unemployment rates for each month for the period January 2007 to January 2011.

Figure 7.15 *Seasonally Adjusted Standardised Unemployment Rate (%)*



Source: CSO website

The Winter 2010 Quarterly Economic Commentary ⁽¹⁾ (published in January 2011) from the ESRI notes: “the rate of unemployment is expected to average 13½% in 2011 and 13% in 2012”. This expected fall in the rate of unemployment is related in part to expected migratory outflows – 100,000 in the 2 year period ending April 2012.

Deprivation

Relative Deprivation data is provided in *Figure 7.16* below. Relative deprivation is an index used to measure and identify spatial areas which suffer for various form of deprivation (such as educational, economic and labour). The data used to prepare *Figure 7.16* is based on Census 2006 data and was published in 2008 by *Trutz Haase/Pobal* on behalf of the Department of Community, Rural and Gaeltacht Affairs.

(1) Quarterly Economic Commentary, Summer 2010; Economic and Social Research Institute, July 2010.

Figure 7.16a Relative Social Deprivation Index (2006 data) for the GDA (Source Trutz Haase/Pobal 2009)

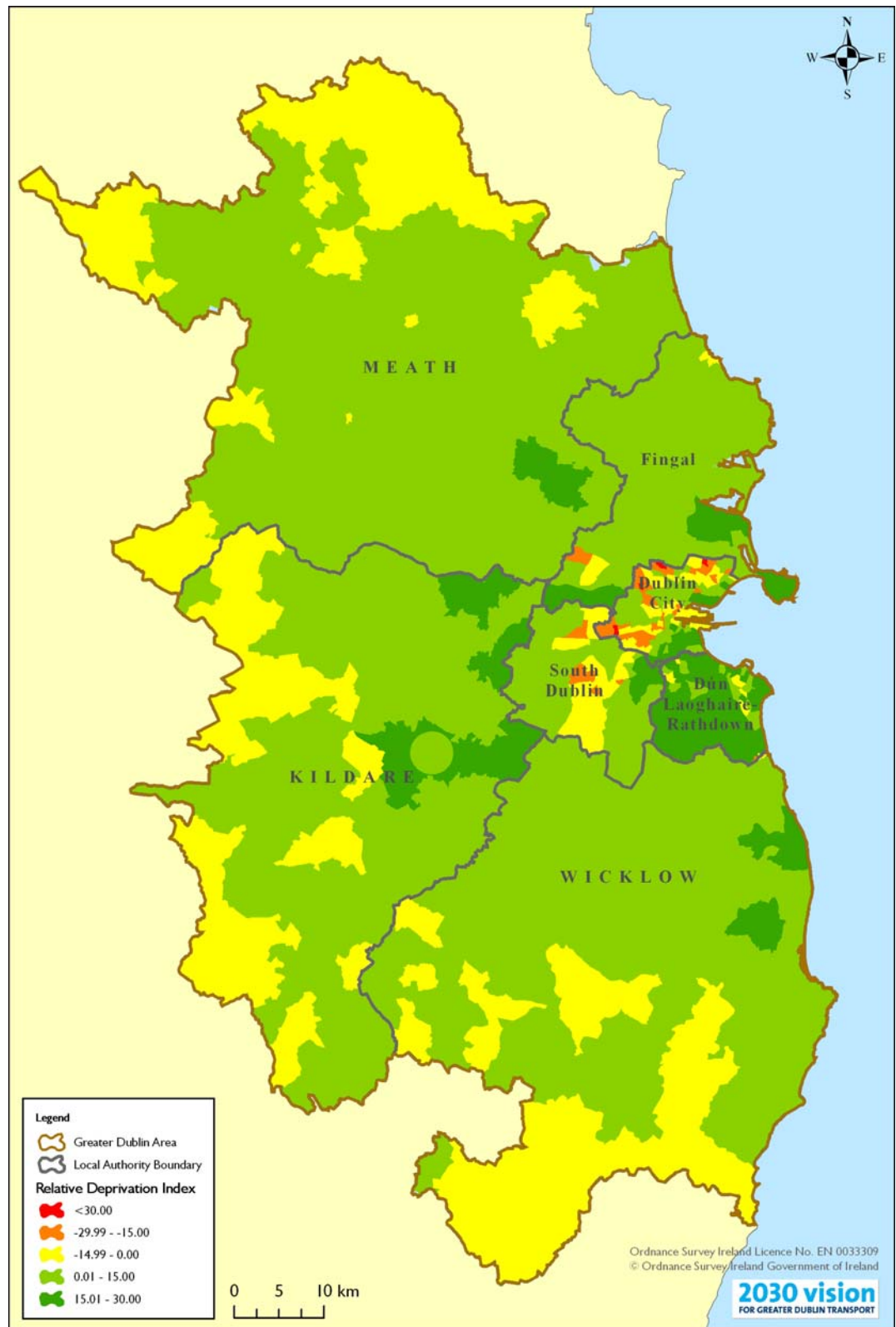
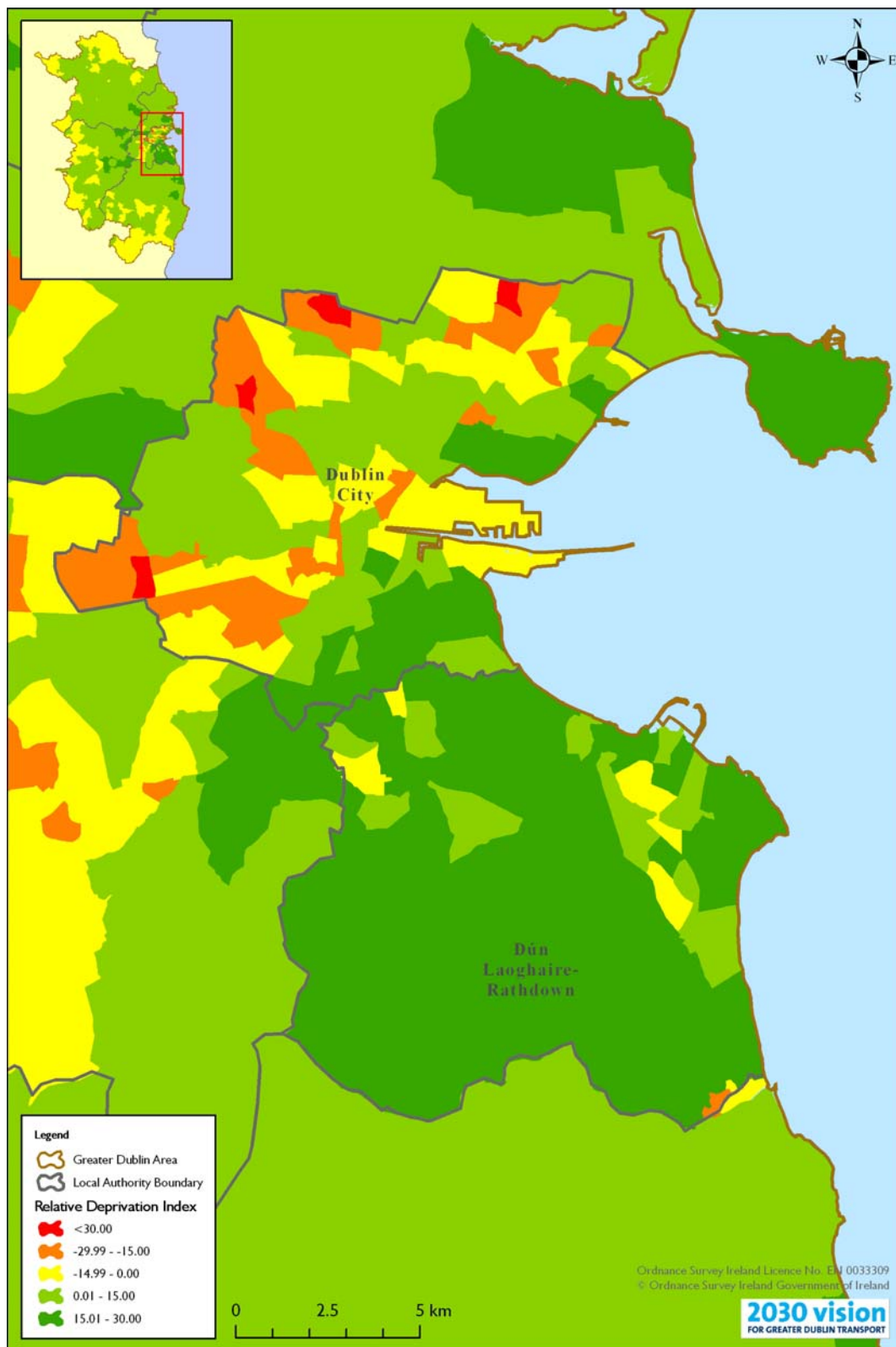


Figure 7.16b Relative Social Deprivation Index (2006 data) for the GDA Metropolitan area
 (Source Trutz Haase/Pobal 2009)



This data shows that the main areas in the Greater Dublin Areas which were in relative deprivation in 2006 are: Coolock, Darndale, Ballymun, Finglas, Cabra, Ballyfermot, Inchicore, Cherry Orchard, Clondalkin, Blanchardstown, Crumlin, Walkinstown, Tallaght, and parts of Dublin's Inner City as well as parts of the rural hinterland.

It should be noted that an analysis of historic social deprivation data showed that there had been considerable improvements on overall deprivation rates across the State over the period 1991 to 2006. Given the growth of the national economy from 2002 to 2007, it is likely that further improvements of social deprivation rates continued until the economic recession started in 2007. Since then, it is likely that some of the improvements in social deprivation have been reversed, especially in the areas which are at the lowest level of the relative deprivation index.

In addition to the relative deprivation data, other socio-economic data exists. *Table 7.8* presents a summary of the Department of Education's social inclusion programmes *Delivering Equality of Opportunity in Schools* (DEIS). The DEIS initiative is designed to ensure that the most disadvantaged schools benefit from Government support.

Table 7.8 *DEIS schools in the GDA*

	Dublin	Meath	Kildare	Wicklow
Primary	166	4	9	10
Post-primary	60	4	9	6

The Department of Community, Rural and Gaeltacht Affairs has also designated a set of RAPID (Revitalising Areas by Planning Investment and Development) and CLAR 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 7.9* below.

Table 7.9 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
Kildare	Bray	Fassaroe, Oldcourt, Kilbride Grove, Ballywaltrim Heights, Deerpark/Heatherwood
	Athy	
Meath	Drogheda	Ballsgrove, Marian Park, St Finians Park, Rathmullen, Pearse Park, Yellowbatter, Moneymore
	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 Department of Community, Rural and Gaeltacht Affairs has also designated CLÁR areas. The CLÁR programme (Ceantair Laga Árd-Riachtanais) 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 7.10* below.

Table 7.10 *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

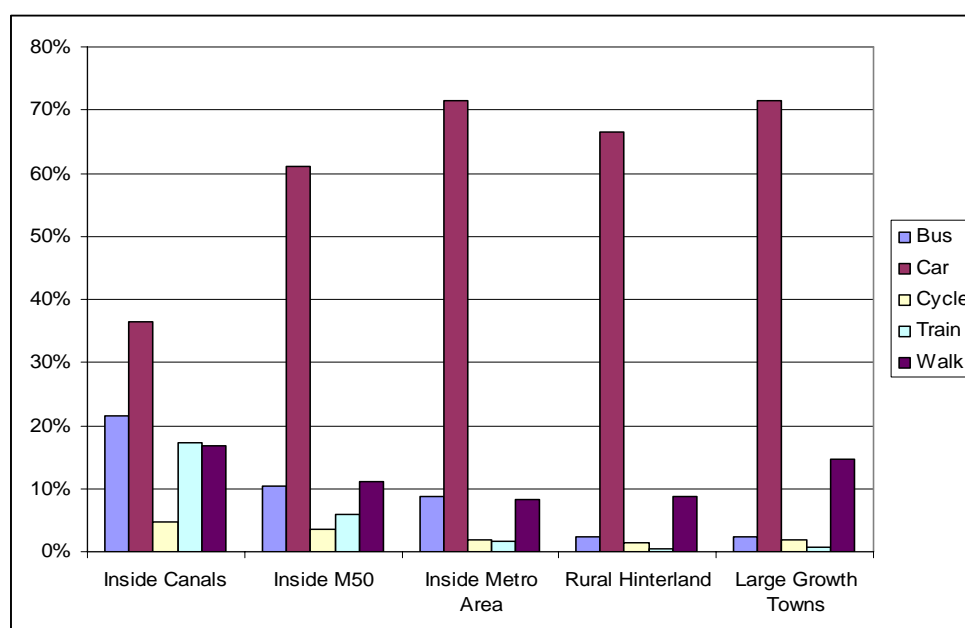
Transport patterns

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 three outer Local Authorities; 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.

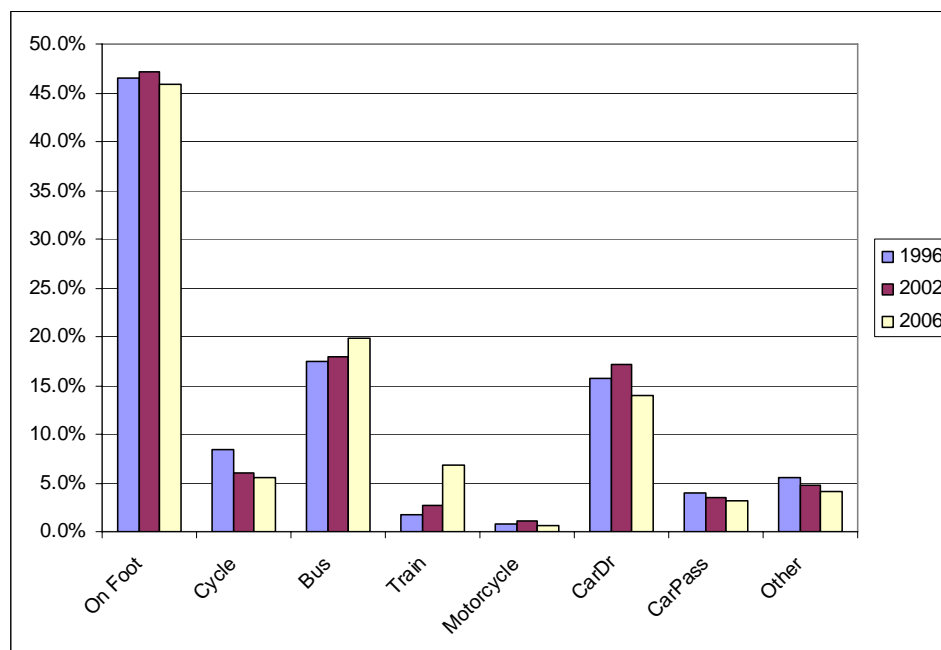
Figure 7.17 below shows a breakdown of the modes of transport to work for various spatial areas within the GDA and shows that as a person's place of work moves away from the city centre the more likely it is that people will drive to work. Dublin City Centre, as defined by the Canals, is the only part of the GDA to have a below average mode share for Car.

Figure 7.17 *Persons at Work, Aged 15 Years and Over and Their Means of Travel to Work at Place of Work, 2006*



However, walking and cycling are significant modes of transport in Dublin, especially within 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, as defined by the Canals. Indeed, travel data from the NTA shows that car use declined in the period 1996 - 2006 with an increase in walking for this area. This is illustrated in *Figure 7.18* below.

Figure 7.18 *Mode Splits for those resident Inside the Canals*



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

The increase in capacity across all public transport options has also resulted in an increase in their respective usage. Employment areas such as Sandyford and the North Docks in Dublin city centre have seen a modal shift towards public transport as a direct result of investment in infrastructure. Increased residential development densities have also assisted the modal shift toward public transport, walking and cycling.

Distance travelled to Work

The outlying areas of the GDA have, in recent years, become part of the Dublin commuter belt. The commuter belt could now be described as stretching beyond the GDA into other parts of Leinster and Ulster such as Wexford, Louth and Cavan. 2006 data shows that approximately 36,000 people commute into the GDA for work with 80% of these originating in adjoining counties and the remainder originating from further afield.

Table 7.11 below shows a summary of commuting distances within the GDA. Journeys to work tend to be shorter for those living in the Metropolitan Area. These journeys are dominated by commutes of less than 10 kms whereas

journeys from the Hinterland and Large Growth Towns have a greater tendency to be of longer distances as highlighted.

Table 7.11 *Breakdown of commuting journey length in the GDA*

Spatial area	1-5km	6-10km	11-15km	16-20km	21-30km	31-50km	51 - 100km	101+
Inside Canals	72.5%	15.5%	6.1%	3.0%	1.6%	0.8%	0.3%	0.1%
Between Canals and M50	50.5%	30.7%	9.5%	4.9%	2.6%	1.2%	0.4%	0.1%
Between M50 and Metropolitan Area boundary	33.9%	24.9%	17.8%	12.3%	7.3%	2.9%	0.7%	0.1%
GDA rural hinterland	27.2%	13.3%	9.3%	11.1%	15.3%	17.6%	6.0%	0.2%
Large growth hinterland towns	42.9%	8.4%	5.5%	6.4%	11.3%	19.8%	5.5%	0.2%
<i>GDA total</i>	<i>42.1%</i>	<i>23.3%</i>	<i>11.2%</i>	<i>8.0%</i>	<i>6.8%</i>	<i>6.2%</i>	<i>2.2%</i>	<i>0.1%</i>

7.5.2 *Current Issues and Problems*

The growth in population and employment numbers in the GDA has led to an increase in the number of daily movements into, out of and within the GDA. This travel demand has been primarily met by the private car.

Where public transport options (especially rail and Luas) do exist, these are well used. Census data for 2006 reveals that where rail links places of residence to places of work, it is the dominant mode of commuting. For example approximately 70% of those living in parts of Dundrum and working in the South East of the city travel to their place of work by Luas. However, there are issues with peak-time capacity on the network.

The bus is still the dominant form of public transport in Dublin city centre and is likely to remain so until the key elements of Transport 21 are completed (such as Metro North and the DART Interconnector). 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 (or Luas or Metro) in relation to capacity, speed and reliability (notwithstanding the significant improvements as a result of the Quality Bus Corridor network). This, in turn, impacts on its image as a viable alternative to the private car.

For places of work within Dublin city centre, considerably greater use is made of walking and cycling and public transport. Recent changes in city centre traffic management arrangements are expected to increase the attractiveness of these modes and the implementation of a city bicycle rental scheme in 2009 has increased the profile of this mode and facilitated short trips within this area. However, car use remains the most popular mode of travel to work, with approximately 36% of mode share for trips to work inside the canals.

There is evidence of significant car-based commuting from the outer regions of the GDA to Dublin city centre and its suburbs. NRA traffic data shows a 32% increase in total flows on all National Roads over the period 2002 – 2006. The expansion of the urban footprint within the GDA over this period has exacerbated the dominance of the car as the primary mode of travel in the GDA.

The impact of the recession is likely to reduce overall travel demand and overall journeys in the GDA in the short to medium term. Recent evidence points to a reduction in total traffic volumes on the national roads in the GDA, while Dublin Bus and Irish Rail have also noted a fall in overall passenger demand and journeys made.

7.5.3 *Likely Evolution in the Absence of 2030 Vision*

Population and Employment Distribution

The evolution of this environmental topic is related to the land use assumptions used in the Strategy. *2030Vision* is not a statutory land use plan in the sense that it does not zone land or set the basis for patterns of development. The Regional Planning Guidelines (adopted in mid-2010) and the City and County Development Plans provide the statutory land use planning guidance for the GDA.

This section will therefore outline the methodology for the distribution of land use in the Strategy and how, in essence, this comprises another source of data for the SEA to take into account.

The assumptions related to travel demand, which consist of a distribution of population, employment, education and retail, are derived from a hierarchy of sources, namely:

- CSO Regional Population Projections 2022;
- Department of Environment Targets for RPGs 2022;
- Regional Planning Guidelines Spatial Splits; and
- Consultation with Local Authorities in the GDA.

When CSO regional projections are extrapolated out to 2030, an estimated GDA population of 2.29 million and 1.07 million jobs was estimated. The NTA has optimised these regional projections to locate more development on rail lines in the period from 2022 to 2030 in consultation with the Local Authorities. *Figure 7.19* shows the assumed population distribution for the GDA up in 2030. *Figure 7.20* shows the assumed population change between 2006 and 2030.

Figure 7.19 2030 Population distribution

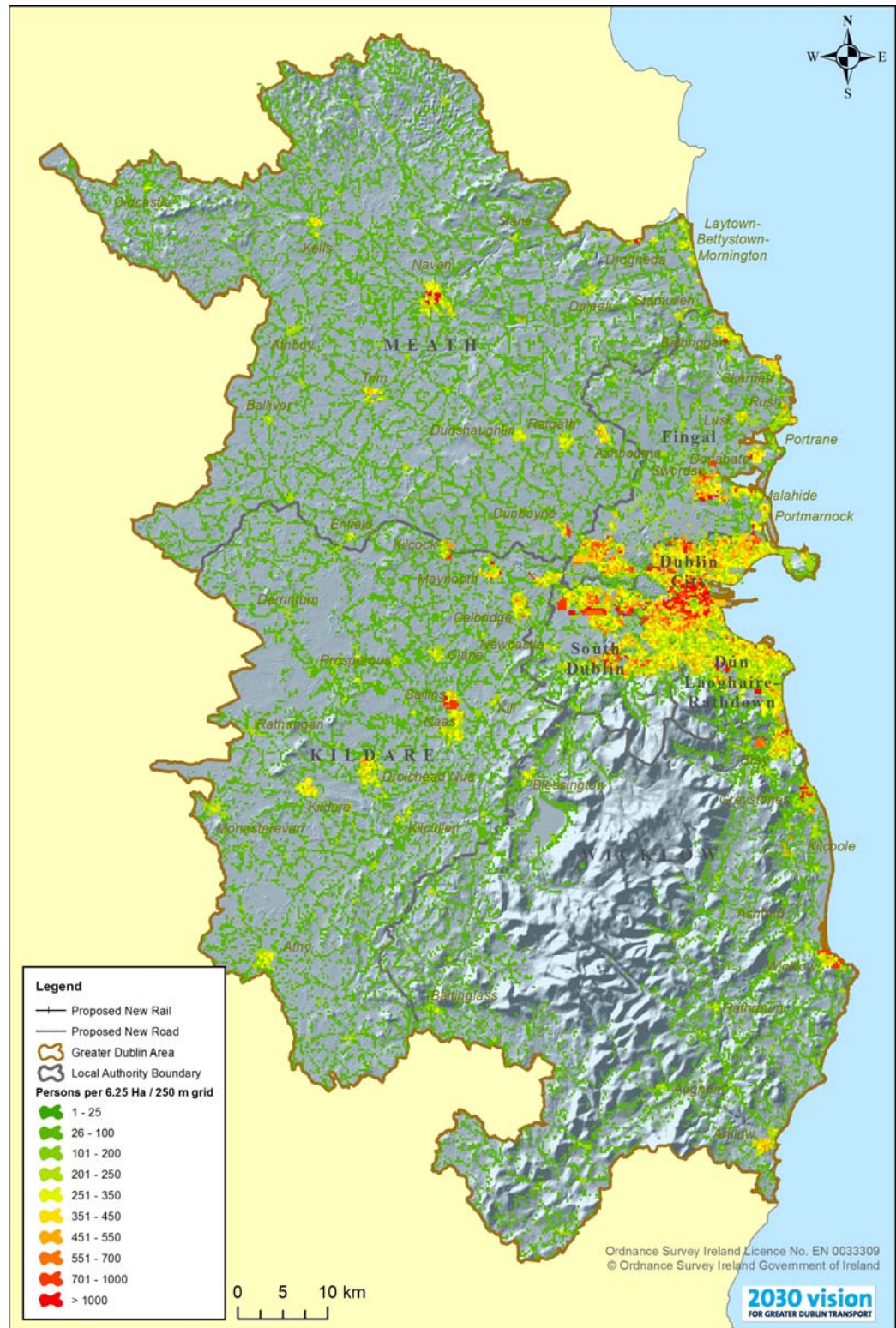


Figure 7.20 Population growth and spatial distribution between 2006 and 2030



Transport Patterns

The implementation of policies and programmes of central and local government is likely to improve the overall performance and reliability of

non-car modes of transport. This would be reflected in a shift in travel behaviour in favour of public transport, walking and cycling and a corresponding reduction in the use of the private car, especially in areas where viable alternatives exist. The implementation of Transport 21 will provide significant public transport capacity along key transport corridors such as Metro North and the two DART lines, once the DART Underground is complete.

7.5.4 *Implications for 2030Vision*

2030Vision includes objectives to increase the overall capacity, reliability and frequency of transport infrastructure. Through providing high-quality, reliable and frequent public transport options, a greater proportion of the population is likely to regularly use public transport and cycling and walking over the private car.

Additionally transport-related expenditure and investment under *2030Vision* may be best prioritised by targeting development at locations which will maximise the benefits of investment in the transport system and also provide the greatest use of public transport.

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

Social inclusion is an objective of the Strategy with access to employment and social, cultural and recreational facilities in the GDA a key concern, especially for areas which are known to be socially deprived.

7.5.5 *Data Sources*

Detailed population and associated data obtained from the CSO is being analysed by the NTA as part of the Strategy development process and is included in this baseline. The main datasets are:

- *Small Area Population Statistics (SAPS)*, which present Census results at place of enumeration. This data is available for 1996, 2002 and 2006 Census.
- *Quarterly Economic Commentary, Winter 2010*; Economic and Social Research Institute, July 2010.
- *Place of Work Census Area Records (POWCAR)*, which presents Census results at Place of Work. This dataset is available for the 2006 Census and a sample dataset available for the 2002 Census.
- *Department of Environment, Heritage and Local Government, Regional Planning Guidelines Review – Gateway and Hub Population Targets*. August 2009.

- *Seasonally Adjusted Standardised Unemployment Rate*; CSO web site.
- *Trutz Haase / Pobal*, Irish Measures of Deprivation.
- *Urban sprawl in Europe - The ignored challenge* [EEA Report No 10/2006]; European Environment Agency, November 2006.

7.6 **HUMAN HEALTH**

7.6.1 **Baseline Description**

The Human health environmental topic addresses general health and also specific issues associated with human health and transport including personal safety, mental and physical wellbeing and relevant quality of life issues. A separate description of noise issues (*Section 7.7*) includes the human health implications of noise and the air quality sections addressed health-related aspects from air quality.

General Health and Life Expectancy

According to the *Survey of Lifestyle, Attitudes and Nutrition 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. While there were no gender differences, 25% of respondents aged 65 and over reported chronic long-term conditions. 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.

The following data (*Table 7.12*) shows how life expectancy at birth has increased over recent years in Ireland; increasing by over ten years for males and by over thirteen years for females since 1950/52. This is a significant change for a developed nation and reflects a dramatic improvement in the health of the nation's population.

Table 7.12 *Life Expectancy at Birth, 1950 to 2003*

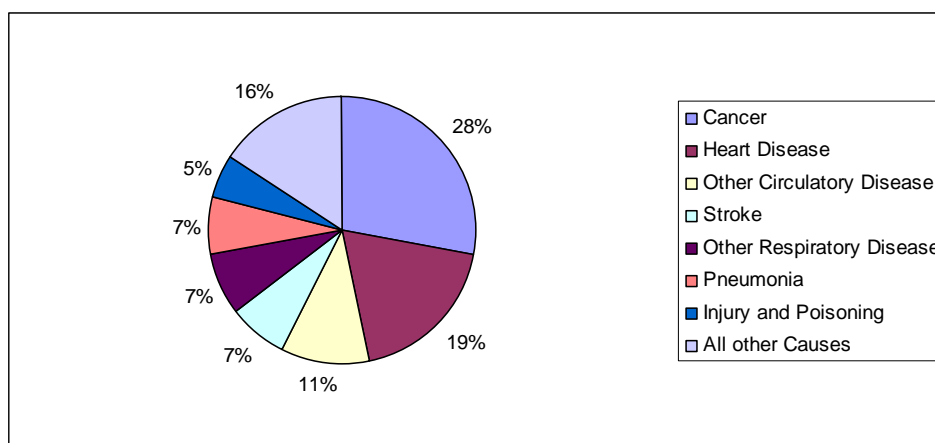
Gender	1950-52	1960-62	1970-72	1980-82	1990-92	1995-97	2001-03
Male	64.5	68.1	68.8	70.1	72.3	73.0	75.1
Female	67.1	71.9	73.5	75.6	77.9	78.5	80.3

Source: Department of Health & Children (2007) *Health in Ireland – Key Trends*

According to the Department of Health and Children's report (2007) *Health in Ireland –Key Trends* Ireland has the highest levels of self-perceived health of those countries in Europe, which have conducted a survey. Approximately 83.7% of men and 82.1% of women rate their health as being good or very good. The main causes of death in Ireland are diseases of the circulatory system and cancer, but there have been very significant reductions in rates of circulatory system disease. There has been a reduction of 38% since 1997 and a reduction of 50% over the last 30 years. Overall, public health expenditure has risen from €3.6 billion in 1997 to over €12.3 billion in 2006, an increase of more than 236%.

Figure 7.21 below illustrates the main causes of death for 2005.

Figure 7.21 *Percentage of Deaths by Principal Causes, 2005*



Source: Department of Health & Children (2007) *Health in Ireland – Key Trends*

With regards to health statistics there is very little available other than what is compiled by the Central Statistics Office. The Health Service Executive's *Health Atlas for Ireland* was unavailable at the time of writing and thus could not be used for the compilation of data relating to the GDA.

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* (SLÁN 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. This level of activity has not changed much over the past ten years – 40% in 2002 compared with 38% in 1998. 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. By 15 years of age, almost nine out of 10 girls and seven out of 10 boys don't achieve the recommended level. Children and young people need at least 60 minutes of moderate physical activity five times a week. 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 SLÁN report showed that 38% of Irish people were overweight and another 23% were obese. When the figures from SLÁN 2007 are compared with figures from previous SLÁN surveys and the 1999 North/South Ireland Food Consumption Survey (Irish Universities Nutritional Alliance 2001), they show that there has been a notable increase in the levels of overweight and obesity. One in five Irish children and teenagers is overweight or obese (Irish Universities Nutrition Alliance, 2008). The increasing 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.

Road Safety

Road Safety Authority preliminary data from the RSA website notes that the number of Irish road deaths was 239 in 2009, the lowest level on record (down 40 from 2008). The 239 who died comprised: 40 pedestrians, 7 cyclists, 128 drivers, 38 passengers and 27 bikers.

According to 2006 data, Ireland currently ranks 12th out of 27 countries in the European Union in relation to the number of road deaths per capita. The EU average in deaths per million population is 86, with Ireland averaging 87. Malta is the lowest with 25, followed by Netherlands with 43 and Sweden at 49.

By 2007, Ireland's road fatality rate had fallen to 78 per million population. The 1997 rate was 129 road deaths per million population. This represents a decrease of almost 40% over a 13 year period.

The main causes of road collisions, deaths and injuries in Ireland are:

- inappropriate speed, inconsistent with the prevailing circumstances or driving conditions;

- impairment of driving through intoxication or fatigue;
- failure to properly use seatbelts and child safety restraints; and
- unsafe behaviour towards or by vulnerable road users such as pedestrians, cyclists, motorcyclists, young children and older people.

Table 7.13 (and Figure 7.22) below presents traffic accident data (2007) for the GDA. It can be seen that the GDA has 28.5% of all accidents in Ireland and 37% of all registered vehicles. The four Dublin Local Authorities account for 17.7% of all reported collisions and 25% of registered vehicles in the State.

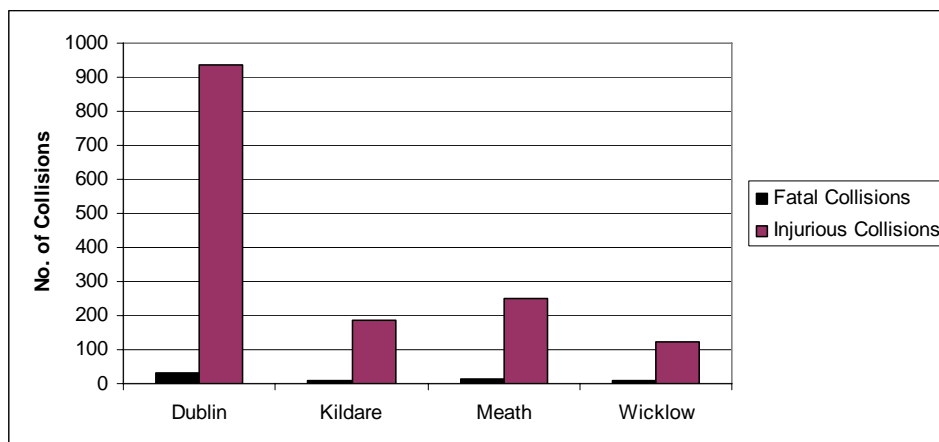
Regarding road fatalities, the four Dublin Local Authorities have a combined total of 10.3%, with the GDA having 21% of all road fatalities in Ireland. Statistics from the Road Safety Authority show that the majority of road fatalities were males aged 21 to 34.

Table 7.13 *Traffic Collisions and Casualties in the GDA, 2007*

County	Reg. Motor Vehicles	Fatal Collisions	Injurious Collisions	Total Collisions	Total Killed	Total Injured	Total Casualties
Dublin	610,000	33	937	970 (17.7%)	35 (10.3%)	1,217	1,252 (15.4%)
Kildare	109,000	11	186	197 (3.6%)	13 (3.8%)	279	292 (3.6%)
Meath	98,000	14	248	262 (4.8%)	14 (4.1%)	388	402 (4.9%)
Wicklow	76,000	8	123	131 (2.4%)	9 (2.6%)	188	197 (2.4%)
GDA	893,000	66	1,494	1560 (28.5%)	71 (21%)	2,072	2,143 (26.3%)
State	2,442,000	309	5,158	5,467 (100%)	338 (100%)	7,806	8,144 (100%)

Source: Road Safety Authority (2008) *Road Collision Facts Ireland 2007*

Figure 7.22 *Traffic Collision Classification in the GDA, 2007*



Source: Road Safety Authority (2008) *Road Collision Facts Ireland 2007*

However, it should be noted that since 1996, there has been a dramatic decrease in overall accidents in the GDA, falling from just under 17,000 in 1996 to just over 4,200 in 2005. The Road Safety Authority noted that since 1997, there has been a 68% reduction in fatalities in Dublin city and a 73% reduction in numbers killed and seriously injured in Dublin city.

Table 7.14 below present's data regarding the split between all road users involved in accidents. It can be seen that car users comprise almost 70% of those involved in accidents, followed by pedestrians.

Table 7.14 *All Casualties Classified by Road User Type throughout Republic of Ireland 2007*

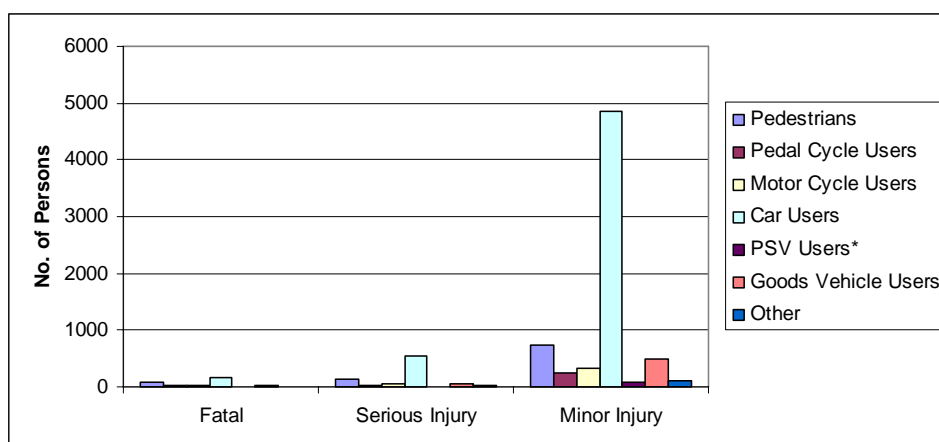
Casualty Class	Killed	Serious Injury	Minor Injury	Total	%
Pedestrians	81	146	732	959	12.0
Pedal Cycle Users	15	19	238	272	3.4
Motor Cycle Users	33	61	316	410	5.1
Car Users	171	542	4,848	5,561	69.4
PSV Users*	1	3	81	85	1.1
Goods Vehicle Users	32	67	482	581	7.2
Other	5	22	120	147	1.8
Total	338	860	6,817	8,015	100

* Public Service Vehicles

Source: Road Safety Authority (2008) *Road Collision Facts Ireland 2007*

Figure 7.23 classifies road accident casualties by road user type. Again, car users dominate all three categories of causality (fatal, serious injury and minor injury), followed by pedestrians.

Figure 7.23 *Road Casualties Classified by Road User Type*



Source: Road Safety Authority (2008) *Road Collision Facts Ireland 2007*

7.6.2 *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:

- ongoing 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;
- improvements to the national, regional and local road networks; and
- improvements to the pedestrian and cycling infrastructure.

While Ireland is broadly at the EU average with regards to total road fatalities per million population (87 against the EU average of 86: 2006 data), Ireland is the worst with regards to deaths involving young people (below 25 years old). The EU average is 27 deaths involving young people whereas Ireland had 38 such deaths per million-population in 2007, the highest in the EU. The GDA accounted for 21% of all fatal accidents in 2007. A greater portion of these fatal accidents involving young people take place outside the GDA, however, young people are still involved in a greater proportion of all accidents in the GDA.

7.6.3 *Likely Evolution in the Absence of 2030 Vision*

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 ongoing implementation of the Road Safety Authority's plans to improve Ireland overall road accident performance, coupled with ongoing improvements to the road network is likely to further reduce the overall level of accidents in the GDA.

7.6.4 *Implications for 2030Vision*

One of the key aims of *2030Vision* (and wider Government transport policy) is to promote walking and cycling and increase the general use of public transport. This must be managed in the context of (long-term) population growth within the GDA. Increasing the use of walking and cycling will result in greater health benefits to the parts of the populations who cycle and walk regularly. It is essential that any increase in these modes considers the wider health and accident risks and that appropriate infrastructure is carefully designed and located. However, it is acknowledged that in relation to cycling,

there is a perceived 'safety in numbers' – i.e. the more people who cycle, the safer it is.

2030Vision will aim to improve the overall health and fitness of the GDA's population through the promotion of walking and cycling. This is likely to 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 softer modes of transport on a regular basis.

7.6.5 Data Sources

Road Safety Authority (2007) *Road Safety Strategy 2007 – 2012*.

Road Safety Authority (2008) *Road Collision Facts Ireland 2007*.

Department of Health & Children (2007) *Health in Ireland – Key Trends*.

Department of Health & Children (2008) *SLÁN 2007 – Survey of Lifestyle, Attitudes and Nutrition in Ireland*.

National Guidelines for Physical Activity in Ireland (Department of Health and Children, Health Service Executive, 2009)

European Commission (2007) *Road Safety: how is your country doing?*

7.7 NOISE

7.7.1 Baseline Description

This section outlines the current situation with regards to environmental noise levels, highlighting the areas of the GDA where it is of special concern. It should be noted that this section will focus on the concept of noise as defined by the EU Directive 2002/49/EC on the Assessment and Management of Environmental Noise ('EU Noise Directive'). This is focused on strategic noise issues rather than more localised noise issues, such as noise at work, nuisance noise from neighbouring properties or noise from construction activities. The consideration of strategic noise issues will focus on noise sources such as major roads and rail lines.

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 above 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 and this is called *Dublin Agglomeration Action Plan Relating to the Assessment & Management of Environmental Noise* ('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 7.15* below provides summary information regarding the results from the strategic noise mapping. It provides the percentage breakdown for residential population within specified noise bands for each of the four Dublin Local Authorities.

Table 7.15 *Residential population exposure to road traffic noise*

	Dublin City		South Dublin		Fingal		Dun Laoghaire	
dB(A)	<i>Day %¹</i>	<i>Night %²</i>	<i>Day %¹</i>	<i>Night %²</i>	<i>Day %¹</i>	<i>Night %²</i>	<i>Day %¹</i>	<i>Night %²</i>
< 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 (gray shading).

2: Night time (7pm – 7am) noise levels >55dB are considered undesirable (gray shading).

Source: South Dublin County Council (2008) *Dublin Agglomeration Draft Action Plan Relating to the Assessment & Management of Environmental Noise*

These results show that – broadly – the proportion of the population exposed to undesirable day time noise levels (>70dB) from traffic (the dominant strategic environmental noise source in Dublin) 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.

Regarding the Kildare and Meath Noise Action Plans, these note that major roads (national roads and motorways) are the main sources of environmental noise (as defined in the Environmental Regulations 2006 (S.I. 140 of 2006)).

7.7.2 *Current Issues and Problems*

Statistics from noise modelling within each of the Local Authorities in Dublin show that railway noise does not have a major impact on the overall noise levels and that traffic noise is the dominant noise source. The greatest level of noise impact is that at night time, with a considerable proportion of the population of Dublin being exposed to levels greater than 55dB.

Regarding Kildare, the greatest noise source are the existing major roads (M4, M7/N7/M9 and the N9 (Ballitore)) and this is likely to remain the case for the future years. In relation to Meath, the main environmental noise sources are: M1, M4, N2, N3 and R132.

The dramatic growth in population and employment in the GDA in recent years has resulted in a greater quantum of people being exposed to undesirable noise levels. A key concern is the potential impacts of night time noise levels and this can impact on sleeping patterns of people, with negative health consequences.

7.7.3 *Likely Evolution in the Absence of 2030 Vision*

The implementation of the various Noise Action Plans (over a five year period) 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 density, promoting public transport, walking and cycling, traffic management measures, restricting HGV access to certain areas and/or times, traffic calming and improved road surfaces. However, the effectiveness of this is also dependent on assistance and actions from many other agencies outside the Local Authorities in the GDA.

Despite this, significant reductions in the proportions of the population which are exposed to undesirable noise levels are not expected in the short-term.

7.7.4 *Implications for 2030Vision*

The promotion of transport options and choices – one of the target outcomes of *2030Vision* – away from the use of the private car is likely to improve the day time noise characteristics of the GDA. However, bus-based public transport has the potential to exacerbate the day-time noise environment.

In particular, *2030Vision* should seek to protect the ‘Quiet Areas’ to be identified in the future iterations of the Noise Action Plans. These are areas where noise levels should be low, either absolutely or relative to neighbouring areas. Both quantitative and qualitative criteria will be used to select these Quiet Areas, which will be identified during the course of the implementation of the Noise Action Plans.

Night-time noise levels present a difficult challenge for *2030Vision*. Road traffic is the main source of undesirable night-time (and day-time) levels for

significant parts of the GDA. However, at night, public transport and the walking and cycling are often less attractive from a road safety and personal security point of view. Thus *2030Vision* should promote and assist the recommended actions to address night-time road traffic noise as proposed by the various Noise Action Plans.

It is likely that *2030Vision* will be adopted before the actions as stated in the Noise Action Plan are fully implemented. Thus, it is essential that *2030Vision* is aware of these future actions, especially those which can be influenced or impacted by *2030Vision*.

7.7.5 Data Sources

Dublin City Council (2008) *Dublin Agglomeration Action Plan Relating to the Assessment & Management of Environmental Noise*.

Dublin City Council (2008) *Dublin Agglomeration Action Plan Relating to the Assessment & Management of Environmental Noise (Summary)*.

South Dublin County Council (2008) *Dublin Agglomeration Draft Action Plan Relating to the Assessment & Management of Environmental Noise*.

Meath County Council and Navan Town Council (2008) *Noise Action Plan*.

Kildare Local Authorities (2009) *Noise Action Plan*.

7.8 WATER

7.8.1 Baseline Description

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 GDA is a well drained area, with the majority of surface waters running from west to east, predominantly forming dendritic drainage patterns with some parallel drainage. The main rivers of the GDA include the Boyne, the Liffey, the Avoca, the Vartry, the Nanny and the Delvin. Dublin City is also drained by the Tolka and the Dodder.

The EPA's (2008) *Water Quality in Ireland 2004 - 2006* report indicate that river water quality between 2004 to 2006 showed a small improvement compared with the 2001 to 2003 period. It also reports that throughout Ireland 71.4% of watercourses have been determined to be unpolluted, 18.1% slightly polluted, 10.0% moderately polluted and 0.6% seriously polluted. However, within the Eastern River Basin District, the river basin district which covers almost 75% of the GDA, there have been signs of deterioration in the river water quality

between 1998 and 2003, but with some significant improvement between 2003 and 2006.

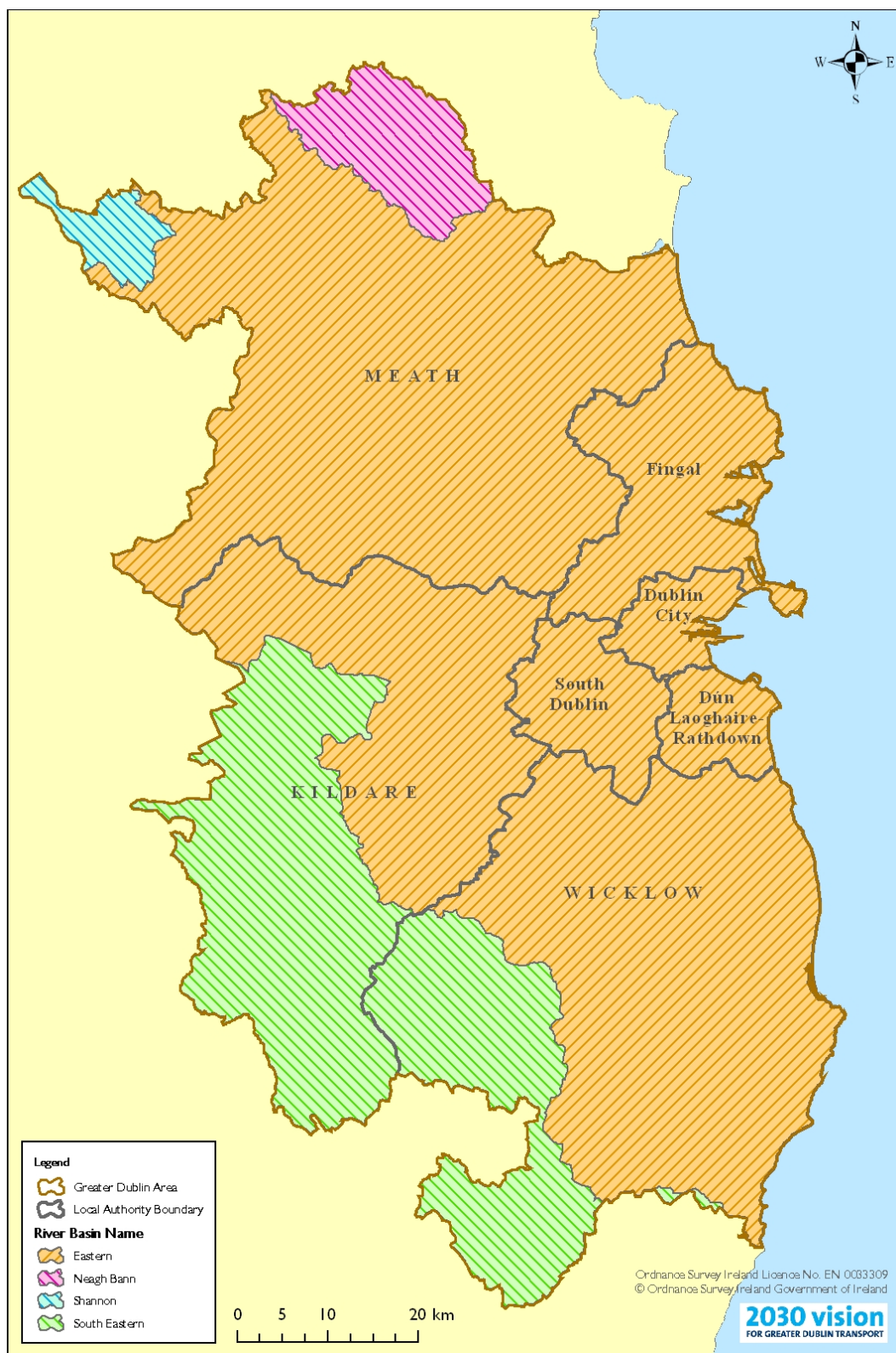
Water Framework Directive

Under the Water Framework Directive (WFD) (2000/60/EC) Ireland's various water resources are managed on a catchment basis (rather than administrative boundaries). 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 7.24*.

The Water Framework Directive was transposed into Irish Legislation through the following instruments:

- 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).

Figure 7.24 River Basin District Boundaries within the GDA



The key objective of the WFD is the attainment of good status by 2015 for all water bodies. Good status comprises a range of parameters, such as physical, biological and chemical. 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. RBMPs outline a range of management measures to ensure that the overall objectives of the WFD and national legislation are met by 2015.

Surface waters

According to the data on the EPA website, 70.2% of Ireland's rivers can be classed as unpolluted. The EPA also notes that significant efforts are required to improve the remaining 29.8% of river waters which are classed as being polluted.

Many of the rivers and surfacewater 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 waterbodies 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.

Table 7.16 below presents data on the proportions of unpolluted river channels in a selection of RBDs in Ireland.

Table 7.16 *Percentage of Surveyed Channel Length in Class A (unpolluted)*

River Basin District	1998-2000 (%)	2001-2003 (%)	2004-2006 (%)
Eastern RBD	42	41	52
Shannon RBD	67	63	67
South Eastern RBD	62	58	62
Neagh Bann RBD	54	55	49
<i>National Average</i>	<i>70</i>	<i>69</i>	<i>71.4</i>

Source: *Water Quality in Ireland 2004-2006* (EPA, 2007)

It can be seen that 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 (or unpolluted) length of river channel has increased from 42% (in 1998-2000) to 52% (in 2004-2006). However, this is still below the national average of 71.4%.

Table 7.17 presents a summary of the overall water status of the various types of surface waters in the ERBD.

Table 7.17 *Summary of the status of the various surface waters in the ERBD*

Surface water type	High	Good	Moderate	Poor	Bad	Yet to be determined
Rivers (% of total number of river bodies)	22%	21%	33%	20%	4%	0
Lakes and reservoirs (% of total area)	4%	12%	64%	3%	7%	0
Transitional (% of total area)	0	0	100	0	0	0
Coastal (% of total area)	58%	0	26%	0.0	0.0	16%

Source: Eastern River Basin District River Basin Management Plan 2009 – 2015 Executive Summary
Compilation (2009)

The data in *Table 7.17* above show that the majority of rivers in the ERBD have generally good or moderate water quality status. All transitional waterbodies are classed moderate, while the coastal waterbodies are classed as either of high or moderate status. The majority of coastal water bodies are classed as having high water quality.

Figure 7.25 illustrates the overall status of the surface waters in the GDA. It can be seen that the majority of rivers are likely not to meet the required WFD standards by 2015. Additionally, the majority of the coastline south of Howth is also at risk of not attaining the required WFD standards. The urbanised nature of a significant portion of the GDA and agricultural landuses in rural parts of the GDA are the main reasons for the risks posed to surface waters in the GDA.

Figure 7.25 *Main Surface Rivers in the GDA (WFD data)*



Groundwaters

Groundwater is an important source of drinking water but also makes an important contribution to river flows and lake levels. *Figure 7.26* below

illustrates the aquifer distribution in the GDA. Status data regarding groundwaters in the ERBD is shown in *Table 7.18* below.

Figure 7.26 *Bedrock Aquifer Status in the GDA Date*

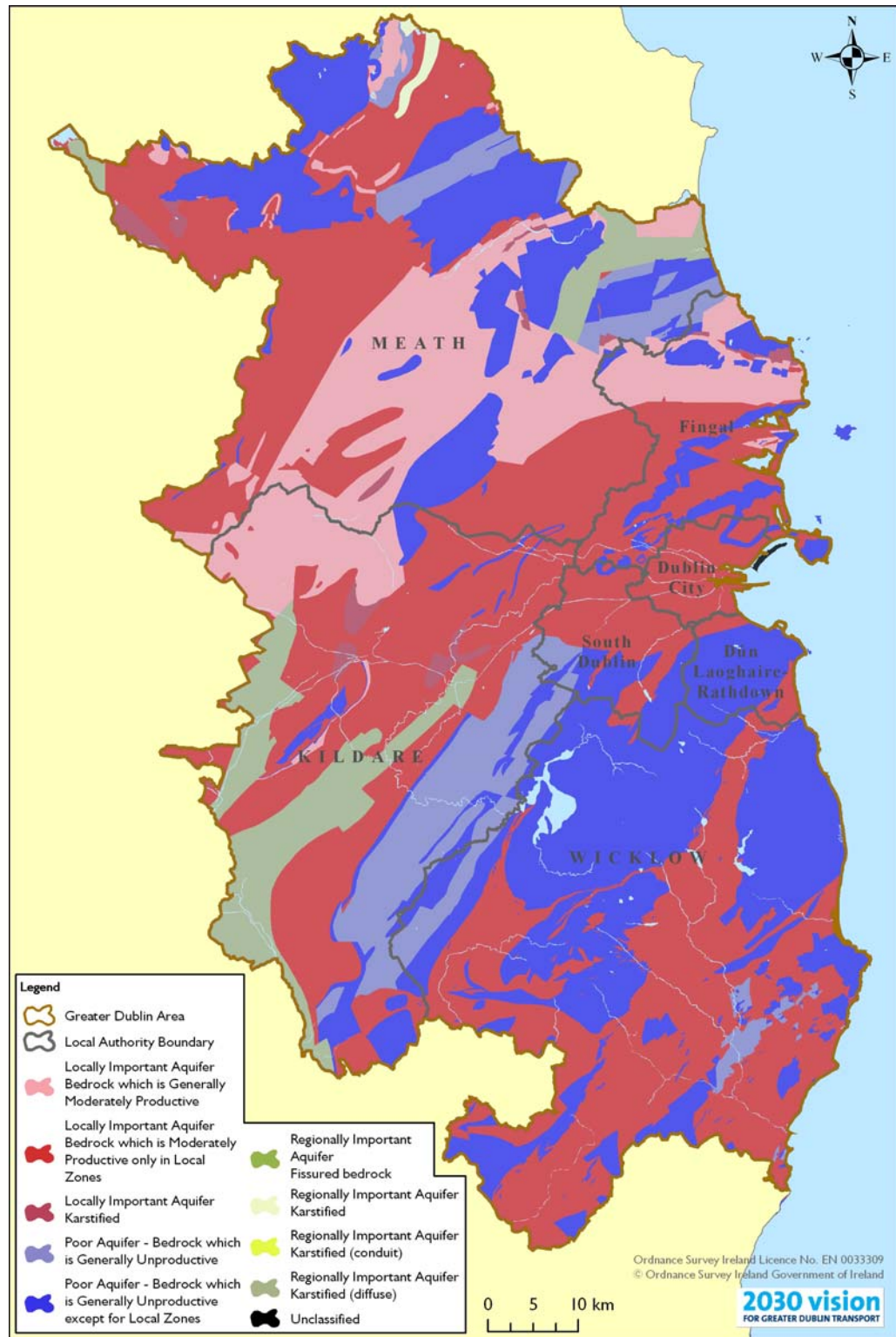


Figure 7.27 shows Groundwater Source Protection Zones (GSPZ) in the GDA. Groundwater sources, particularly public, group scheme and industrial supplies, are of critical importance in many regions. The objective of GSPZ is to provide protection by placing tighter controls on activities within all or part of the zone of contribution (ZOC) of the source. There are two main elements to source protection land surface zoning:

- Areas surrounding individual groundwater sources: these are termed *source protection areas* (SPAs); and
- Division of the SPAs on the basis of the vulnerability of the underlying groundwater to contamination: *Inner Protection Area* (most sensitive part of the ZOC) and *Outer Protection Area*, encompassing the remainder of the source catchment area or ZOC.

Figure 7.27 Groundwater Source Protection Schemes in the GDA



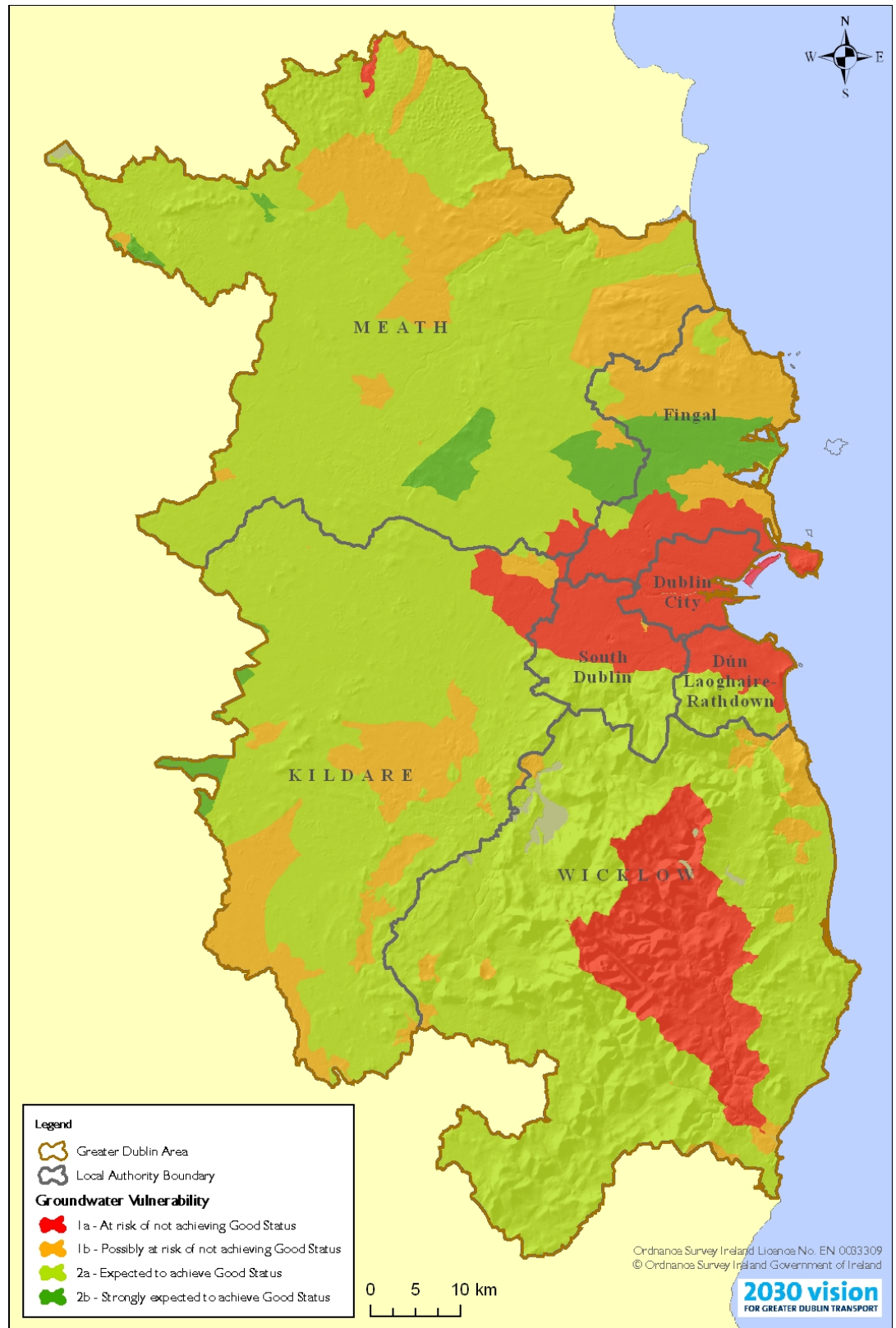
Table 7.18 **Groundwater Status in the ERBD**

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

Table 7.18 shows that 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). In order to meet the requirements of the WFD all groundwater bodies must achieve good chemical and quantitative status.

Figure 7.28 below shows Groundwater Vulnerability mapping within the GDA. It classifies all the area of the GDA into one of four risk classifications (as shown in the legend). It can be seen that Groundwater in the urbanised parts of the GDA and in the Wicklow Mountains are at risk of not achieving Good Status.

Figure 7.28 Groundwater Risk Assessment (WFD data)



Drinking water supplies

Approximately 26% of the total drinking water supplied in Ireland is directly from groundwater supplies (EPA, 2008). *Table 7.19* below presents information on the overall drinking water compliance rate with regards the EU (Drinking Water) Regulations (No. 2) 2007. It can be seen that drinking water compliance is not a significant issue in the GDA. However, the pattern whereby rural water supplies have slightly lower compliance rates is evident in the respective compliance rates for Counties Meath and Wicklow (97.5% and 96.1%) and in the number of drinking water facilities on the EPA's Remedial Action List in each County. It is likely that these less urbanised counties contain water supplies which have been contaminated.

Table 7.19 *Overall drinking water compliance within the GDA, 2007*

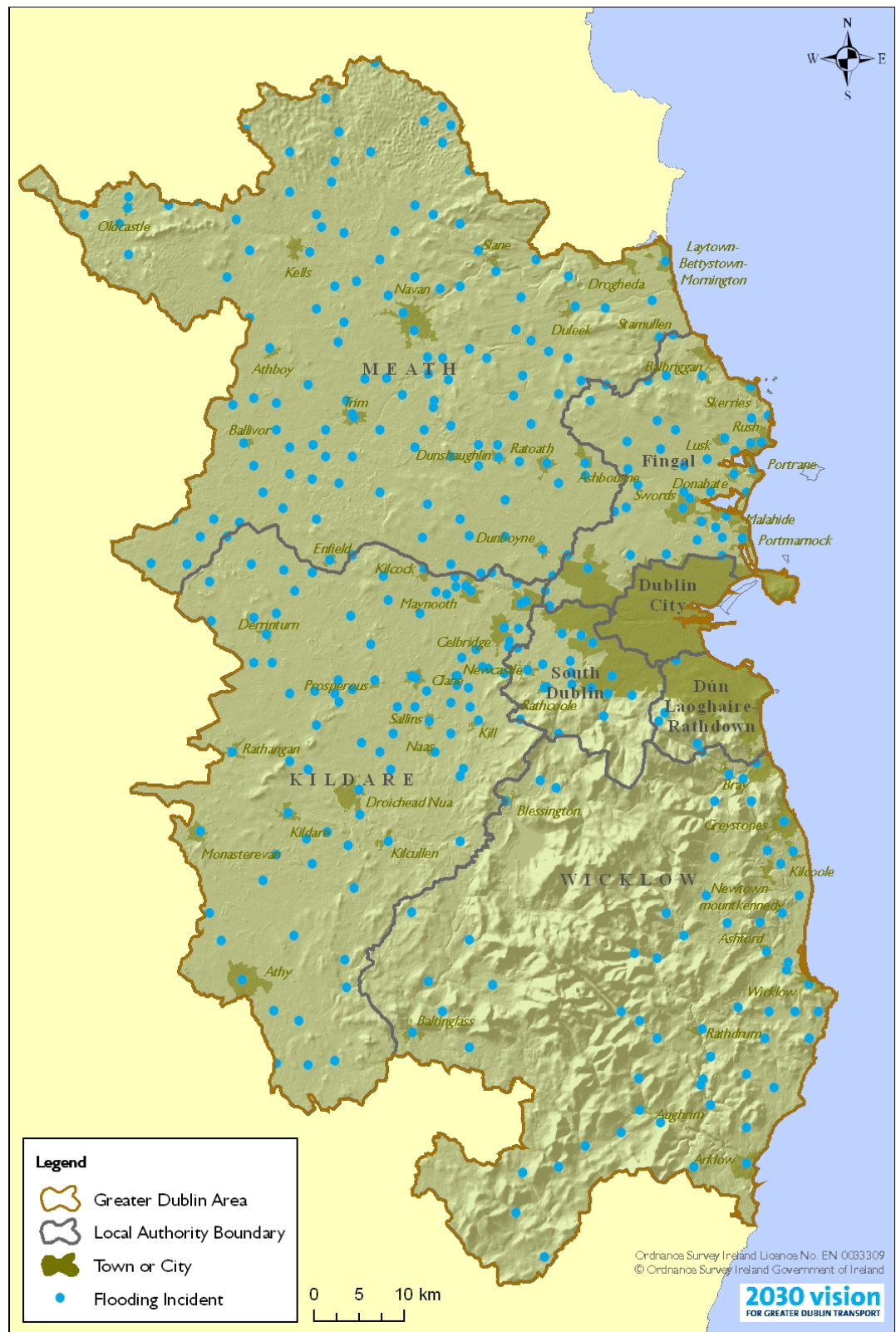
County	Overall Compliance Rate	EPA Remedial Action List
Dublin City	98.9%	1
Fingal	99.0%	0
South Dublin	99.2%	0
Dun Laoghaire – Rathdown	98.9%	0
Meath	97.5%	10
Wicklow	96.1%	16
Kildare	98.9%	0

Source: EPA (2009) *The Provision and Quality of Drinking Water in Ireland 2007-2008*

Flooding

Flooding is a regular occurrence at specific location within the GDA. The onset of climate change is predicted to increase both the frequency and severity/magnitude of flooding in the GDA (and in Ireland). *Figure 7.29* below shows the spatial distribution of recorded flooding events in the GDA. This data has been obtained from the Office of Public Works (OPW), who are the public authority with responsibility for flooding and drainage issues in Ireland.

Figure 7.29 Previously recorded Flooding Events in the GDA



Currently there is no flooding risk mapping available for the GDA (or Ireland). 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. This is the Fingal-East Meath CFRAMS. One of the objectives of this study is to produce flood risk assessment maps and an associated Flood Risk Management Plan. The flood maps will be available on the OPW flood mapping website (www.floodmaps.ie) once the project has been completed. Draft flood maps for consultation are expected to be published along with the draft Flood Risk Management Plan in late 2010. However this draft management plan will not cover the entire GDA and further flooding studies like the CFRAMS will need to be completed for the rest of the GDA to provide region-wide coverage of flood risk management and planning.

The OPW are also nearing completion of the Irish Coastal Protection Strategy Study which will produce flood and erosion risk maps for the entire coastline of the GDA which, when finalised, will provide an important data source to Local Authorities.

The Tolka and the Dodder Rivers have been causes of historical flooding in Dublin city centre. Coastal flooding has also caused flooding in the Docklands area of the city and also on 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 (typically rainfall) is collecting on the surface.

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.

7.8.2

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. This has placed even greater pressure on the existing wastewater treatment network of the GDA.

In the rural areas of the GDA, onsite water treatment systems can also cause contamination of surface and groundwaters (and this can be seen in the slightly lower levels of drinking water compliance rates and the greater need for remedial action as identified by the EPA in Counties Meath and Wicklow). 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).

In areas of the rural GDA which are dominated by agricultural landuses, there are problems caused by the nutrient enrichment and organic pollution of surface waters from slurry and silage effluent. Pesticides, used inappropriately, can also negatively impact on watercourses. Watercourses are also negatively impacted by poor forestry management and improper agricultural practices such as over-planting and over-grazing.

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 large growth and expansion 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, whereas groundwater resources under the less developed areas are considered more likely to attain the required standards. 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.

A slight increase in nitrates and phosphates was recorded in groundwater across the country between 1995 and 2006, with elevated nitrate concentrations observed in the GDA. Microbial problems have also been observed at vulnerable aquifers due to the absence of protection against pollutants in organic wastes (which may contain faecal bacteria), such as septic tank effluent and farm manures and slurries.

It is hoped that the installation and upgrading of sewage treatment works funded by the Department of the Environment, Heritage and Local Government and the new 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.

The presence of phosphorous and nitrogen in lakes at concentrations in excess of natural levels results in eutrophication. This is the main pressure impacting on the water quality of lakes in Ireland and the GDA. Eutrophication leads to increased planktonic algal and higher plant biomass which creates an

undesirable disturbance to the balance of organisms in a lake and thus seriously affects the water quality. The principal sources of phosphorous and nitrogen which causes problems in lakes are agricultural activities and municipal and industrial waste discharges.

According to the EPA's *Ireland's Environment* (2008) the main water management issues that have been identified as being of national importance include:

- Wastewater and industrial discharges;
- Landfills, quarries, mines and contaminated lands;
- Agriculture;
- Waste from unsewered properties;
- Forestry;
- Usage and discharge of dangerous substances;
- Physical modifications to surface waters; and
- Abstractions.

Given the size and importance of the GDA relative to Ireland, all of the above issues as identified by the EPA will apply to the GDA.

Drinking water supply

It is essential to ensure that there is adequate water supply for the growing population of the GDA. An SEA is currently being conducted to examine a series of alternatives to ensure that a sustainable and viable water supply to the Dublin region can be implemented. It is currently examining ten options, including a proposal to transport water from the Shannon Region to supplement existing drinking water supplies in the GDA as medium-term drinking water supply deficits have been identified. 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.

7.8.3

Likely Evolution in the Absence of 2030 Vision

The gradual implementation of the WFD is expected to improve the status of waters in Dublin. The 2005 WFD risk assessment noted that 87% of the river water bodies in the ERBD were classified as either At Risk or Probably At Risk of not meeting the required good standards by 2015. Furthermore, a total of 20 lake water bodies (76%) were classified as either At Risk or Probably at Risk

of not meeting the required standards by 2015. All of the transitional water bodies within the ERBD were classified as either 'At Risk' or 'Probably At Risk' and five of the eight coastal water bodies included within the ERBD were classified as either At Risk or Probably at Risk.

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. The implementation of this draft plan is expected to provide an improvement on the 2005 risk assessment results; however, given the pressures that the GDA's waters are currently under, it is likely that this will be longer than expected and that parts of the GDA's water environment may not achieve good status.

Regarding water supply, the SEA on the Dublin water supply project has not yet finished (public consultation concluded in February 2009) and any recommendations will not be finalised until the mid 2010 at the earliest.

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.

7.8.4 *Implications for 2030Vision*

It is the objective of the Strategy that any additional transport 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 *2030Vision*, although encouraging brownfield development and higher population densities adjacent to Dublin and its transport network would contribute to efficient use of the existing water and wastewater networks, thereby reducing the need for excessive and additional pipe networks and pumping requirements.

Regarding flooding, it is important that the Strategy does not encourage land uses to be developed on sites which are prone to flooding or that key transport infrastructure is exposed to flood risk.

7.8.5 *Data Sources*

EPA (2008) *Ireland's Environment 2008*.

EPA (2008) *Water Quality in Ireland 2004 – 2006*.

WFD Characterisation Reports (www.wfdireland.ie).

EPA Website www.epa.ie.

Water Supply Project - Dublin Region 2010.

7.9 AIR

7.9.1 *Baseline Description*

This section describes the current air quality baseline in the GDA. 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 as they provide very good air mixing and dispersion. However there was an exceedance 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. These are presented in *Table 7.20* and *7.21* below.

Table 7.20 Limit Values Relating to the Protection of Human Health

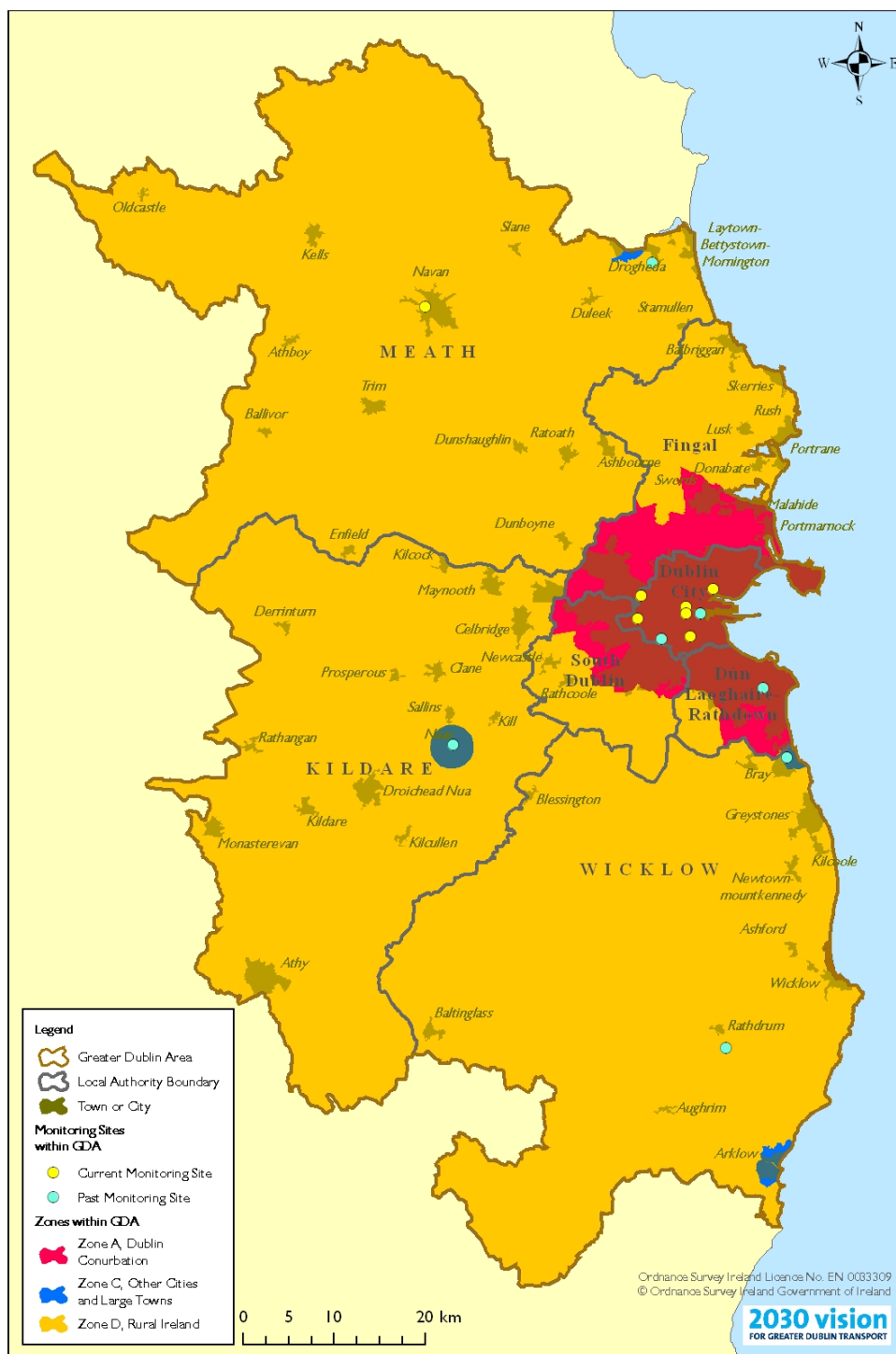
Pollutant	Regulation	Limit Type	Margin of Tolerance	Value
Nitrogen Dioxide (NO ₂)	1999/30/EC	Hourly limit not to be exceeded more than 18 times/year	40% until 2003 reducing linearly to 0% by 2010	200 µg m ⁻³ NO ₂
		Annual limit	40% until 2003 reducing linearly to 0% by 2010	40 µg m ⁻³ NO ₂
Carbon monoxide (CO)	1999/30/EC	8 hour mean limit	40% until 2003 reducing linearly to 0% by 2010	10,000 µg m ⁻³ CO
Benzene	1999/30/EC	Annual limit	40% until 2003 reducing linearly to 0% by 2010	16.5 µg m ⁻³ Benzene
Particulate Matter (PM ₁₀) Stage 1	1999/30/EC	24-hour limit not to be exceeded more than 35 times/year	30% until 2003 reducing linearly to 0% by 2005	50 µg m ⁻³ PM ₁₀
		Annual limit	12% until 2003 reducing linearly to 0% by 2005	40 µg m ⁻³ PM ₁₀
Particulate Matter (PM ₁₀) Stage 2	1999/30/EC	24-hour limit not to be exceeded more than 7 times/year	Not to be exceeded more than 28 times until 2006, 21 times until 2007, 14 times until 2008, 7 times until 2009 and zero times by 2010.	50 µg m ⁻³ PM ₁₀
		Annual limit	50% from 2005 reducing linearly to 0% by 2010	20 µg m ⁻³ PM ₁₀
PM _{2.5}	COM (2005) 447	Annual target value designed to limit unduly high risks to the population	None. Limit value applicable in 2015	25 µg m ⁻³ PM _{2.5}

Table 7.21 Limit Values Relating to the Protection of Vegetation and Ecosystems

Pollutant	Regulation	Limit Type	Value
Nitrogen (N) and Nitrogen Dioxide (NO ₂)	1999/30/EC	Annual mean over the calendar year	30 µg m ⁻³ NO ₂
Sulphur Dioxide (SO ₂)	1999/30/EC	Annual mean over the calendar year	20 µg m ⁻³ SO ₂
		Winter mean (1 st October to 31 st March)	20 µg m ⁻³ SO ₂

These have been implemented in Ireland via a series of regulations. The responsibility for air quality monitoring in Ireland lies with the EPA and the local authorities. Monitoring is conducted on a continuous basis and the EPA compiles annual reports on air quality. *Figure 7.30* shows the network of monitoring stations in the GDA as well as the air quality zones.

Figure 7.30 *Air Quality Monitoring Stations and AQ Zones in the GDA*



The air quality limits for the main chemicals and methodologies for the measurement of these substances are detailed in the recently adopted 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 (*Table 7.20* above). By way of illustration, summary air quality data (based on the most recent monitoring time periods – all of which vary) from various Dublin city centre monitoring stations is provided below in *Table 7.22*.

Table 7.22 *Summary Air Quality data for Dublin*

Parameters (in ug/m ³)	EU limit value	Winetavern St.	Coleraine St.	Marino	Rathmines	Phoenix Park	Tallaght	Blanchardstown	Dun Laoghaire	Knocklyon	Ballyfermot
NO ₂ : annual mean	40	34	36	-	23	-	-	29	19	16	17
NO ₂ : hourly max ^a and no. of days greater than the limit value	200	0	0	-	0	-	-	1	0	0	0
PM ₁₀ : annual mean	40	17	19	13	17	11	13	17	15	17	12
PM ₁₀ : daily limit ^b and no. of days greater than the limit value	50	7	11	1	11	1	4	13	5	1	0
CO: annual mean ^c	-	0.3	0.5	-	-	-	-	-	-	0.4	-
CO: 8-hr mean limit and no. of days greater than the limit value	10	3.5	6.2	-	-	-	-	-	-	1.2	-

a: no more than 18 hours greater than 200 ug/m³ from 2010

b: no more than 35 days greater than 50 ug/m³ from 2005

c: measured in mg/m³ (not ug/m³)

The above data shows that air quality within Dublin city centre is within the EU Air Quality limit values.

7.9.2 *Current Issues and Problems*

Generally, air quality in Ireland is good with air quality 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.

7.9.3 *Likely Evolution in the Absence of 2030 Vision*

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 in the short term. Additionally, ongoing improvement in engine and fuel technology (and also the gradual replacement of the national car fleet with younger and more efficient cars) will also enhance this positive effect of reducing emissions on a per-vehicle basis.

National and local transport policies and programmes (such as Transport 21 including the expansion of the QBC network) are likely to increase the use of non-car modes of transport, reducing total emissions. However, this must be balanced against the historic trend of increasing rates of car ownership and car use.

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 (e.g. M50).

The draft Dublin Regional Air Quality Management Plan 2008 - 2012 has been published. It notes that:

“The biggest threat now facing our air quality is emissions from the transport sector. The main challenge to air quality now stems from rising vehicle emissions. While progressively stricter emission standards and improved fuel economy of new cars are reducing emissions per vehicle, individual vehicle gains are counter balanced by the increasing numbers of vehicles”, and

“There is a universal acceptance that tackling the transport problem is the key to improving air quality in the Dublin Region. Tackling the traffic management challenges of the Dublin region rests with several agencies and while it is not within the remit of the Air Quality Management Plan to be the primary motivating force on

this matter, it is proper that the linkages between traffic policy and air quality continue to be emphasised”.

The EPA’s State of the Environment (2008) Report further notes that:

“Emissions of air pollutants, particularly PM₁₀ and NO_x, from road traffic remain the main threat to air quality in urban areas. While new standards for car emissions and the resultant cleaner technology have curbed emissions from individual vehicles, this has been offset by the increasing number and bigger engine sizes of vehicles on Ireland’s roads. Air quality issues must therefore be an integral part of traffic management and planning processes, and there needs to be a modal shift from the private car to high-quality public transport...”.

To conclude, air quality in the GDA is at greatest risk from increased road traffic emissions. A combination of various measures (such as improved fuel and engine technology) and reduced overall car travel due to the recession has slightly reduced this trend. However when the national economic recovery starts, this may result in an increase in traffic-based emissions, thus increasing the potential for breaches of the EU air quality thresholds.

7.9.4 *Implications for 2030Vision*

2030Vision can play one of the major roles in addressing future air quality issues which may arise in the GDA as a result of transport. Key tasks which 2030Vision should try to achieve are encouraging a region-wide modal shift away from use of the private car as the dominant mode of transport, thereby reducing the main cause of air quality impacts in Ireland (car-based emissions). The promotion of electric vehicles may also play a significant role in this regard. 2030Vision will address both the total use of car-based travel (i.e. total kms travelled) as well as the number of trips made using car-based travel options.

The key challenge in relation to air quality is to ensure compliance with the daily and annual limit values for particulate matter (PM₁₀). Levels have approached legal limit values in recent years and there is a risk that limits could be exceeded in urban areas. PM₁₀ levels vary significantly depending on meteorological conditions. As such, average levels need to be well below the limit to ensure that compliance is maintained. Ongoing improvements in engine technology, cleaner fuels and the gradual replacement and renewal of the national vehicle fleet will all contribute to reduced air quality emissions and, thus, reduced air pollution. However, the increase in the use of the private car is negating these improvements.

7.9.5 *Data Sources*

Draft Dublin Regional Air Quality Management Plan 2008 – 2012.

EPA Website www.epa.ie.

7.10 CLIMATIC FACTORS & CLIMATE CHANGE

7.10.1 Baseline Description

Climate background

This section describes the current climatic conditions within the GDA and details the various factors behind the recent increases in greenhouse gas (GHG) emissions and how they are expected to influence future climatic conditions.

Ireland's climate is primarily influenced by the Atlantic Ocean, and does not suffer from the extremes of temperatures experienced by many other countries at similar latitudes.

The average annual temperature in Ireland is approximately 9°C. Temperatures in the midlands and in the east of the country, including the GDA, tend to be slightly higher than the rest of the country. Mean annual windspeeds vary across the country ranging from 4m/sec to 7m/sec in the more exposed Atlantic coastal areas. Similarly, average rainfall also varies between approximately 88 mm and 2,800 mm, with the highest rainfall figures in the northwest, the west and southwest. Rainfall accumulation is generally highest in winter.

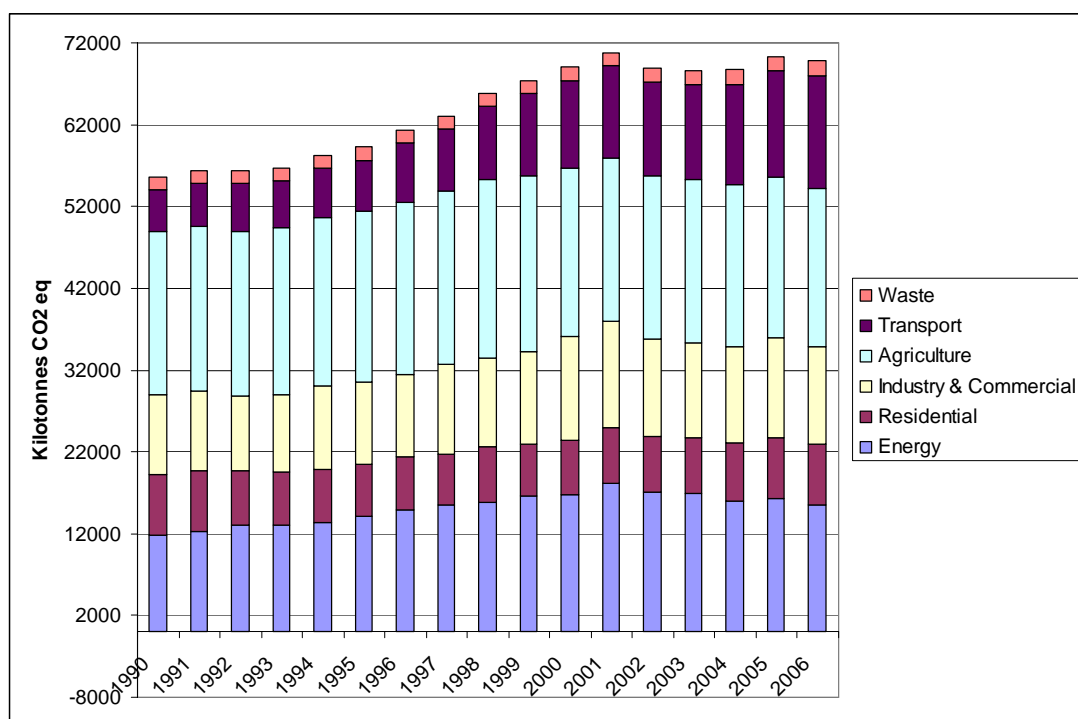
The draft Dublin Regional Air Quality Management Plan 2008 – 2012 notes that *“for most of the year emissions are easily dispersed and periods of elevated pollution levels are relatively infrequent”*. It further notes that *“the coastal location of Dublin ensures that even during warm summer days the local on-shore sea breeze over the area prevents high air pollution levels forming within the inner city”*.

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). The emissions of these GHGs changes the chemical composition of the atmosphere. These changes then alter the way that incoming sunlight interacts with the atmosphere, resulting in greater proportions of heat being effectively 'trapped' and thus changing the Earth's overall climatic circulation systems. This change subsequently causes changes in global precipitation and temperature patterns, resulting in a wide range of negative impacts such as melting of polar icecaps, rise in sea-levels, an increase in extreme weather events such as flooding or drought and biodiversity changes.

In the period 1990 to 2006, Ireland's GHG emissions, increased by 25.5% from 55.5 million tonnes of carbon dioxide equivalent to 69.7 million tonnes carbon dioxide equivalent, as shown below in *Figure 7.31*.

Figure 7.31 Ireland's Greenhouse Gas Emission 1990 – 2006

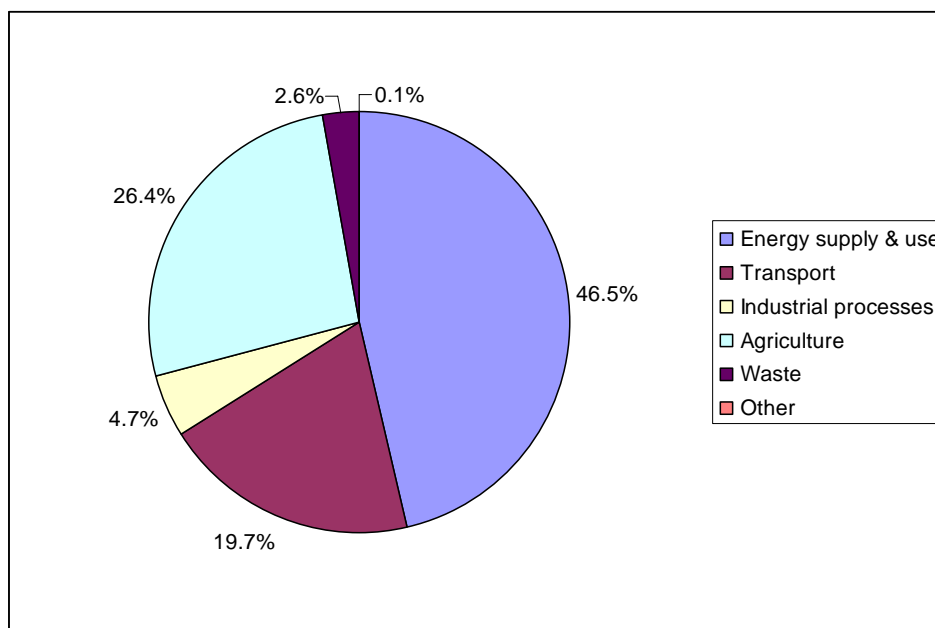


Source: European Environment Agency.

The EPA noted that the transport sector showed the greatest increase in emissions at 165% between 1990 and 2006 due to the increased number of private cars and goods vehicles on Irish roads, a trend towards purchasing larger vehicles and an overall increase in number of journeys made and the length of the average journey. On a per capita basis, Ireland is one of the highest emitters of GHGs (16.8 tonnes per person in 2004) and above the EU average (10.9 tonnes per person in 2004).

Figure 7.32 below presents 2006 data regarding the breakdown of the sources of Ireland's GHG emissions.

Figure 7.32 Breakdown of the Sources of Ireland's GHG emissions for 2006



It can be seen that transport represented 19.7% of the total emissions. The European average for the same period is 19.3%. 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. Transport is the sector with the largest increase in GHG emissions with other sectors actually falling (such as energy and agriculture).

In response to the global issue of climate change, various international agreements and mechanisms have been proposed. The most recent is the Kyoto Protocol which proposed overall GHG ceilings for member countries. Regarding Ireland, the State is to limit carbon dioxide emissions to 13% above 1990 levels (62.8 million tonnes carbon dioxide equivalent) over the five-year period, 2008 – 2012. This is part of the EU's overall commitment to reduce emissions EU-wide by 8% over the same timeframe. Beyond 2012, the EU aims to reduce greenhouse gas emissions by at least 20% by 2020, compared to 1990 levels.

7.10.2 *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 proportion of agricultural emissions within the EU and until the recession saw significant ongoing growth in transport-related emissions. Addressing the issue of transport emissions is likely to be particularly problematic.

The EPA notes that there could be the following potential impacts as a result of climate change:

- an increase in the pace of sea-level rise;
- more intense storms and rainfall events;
- increased likelihood and magnitude of river and coastal flooding; increased storm surges;
- water shortages in summer in the east, need for irrigation of crops;
- negative impacts on water quality;
- changes in the distribution of species, and possible extinction of vulnerable species requiring cooler conditions, e.g. The Arctic char;
- effects on fisheries that are sensitive to small changes in temperature, e.g. Cod; and
- increased frequency of wild fires and pest infestation.

The average temperature in Ireland has increased by approximately 0.7°C over the period 1890-2004, at an average rate of 0.06°C per decade. The temperature increase was particularly rapid during the period 1980-2004. This trend has been replicated in numerous countries around the globe. Climate models suggest that at current atmospheric GHG levels the global temperature will increase by a further 0.6°C over the coming decades. The Intergovernmental Panel on Climate Change (IPCC) is of the view that severe climate change impacts will increase significantly if global temperatures increase by more than 2°C above pre-industrial times.

National precipitation rates also show an increasing trend over time. Total annual precipitation levels for Ireland, based on averaging 11 of 14 weather stations, shows a general trend of increasing precipitation over a 40-year period, with notable increases since the 1970's. Rainfall data from Malin Head (Co. Donegal) shows a significant increase in rainfall levels over more than a century. However, 2001 and 2003 were two of the driest years recorded since 1960. An increased gradient in precipitation with wetter winters and drier summers, particularly in the southeast, is becoming evident from the meteorological records.

7.10.3 *Likely Evolution in the Absence of 2030 Vision*

Current projections show that Ireland will still exceed its Kyoto Protocol carbon thresholds by 2012. Even if all projected reductions from existing and planned policies and measures (as outlined in the *National Climate Change Strategy*) are delivered, Ireland is still expected to exceed its target (a 13% increase over 1990 levels) by 1.4 Million tonnes of CO₂e (CO₂ equivalent – a index measure of GHG). The EPA notes that additional domestic policies and

measures and/or additional Government purchases will be required to bridge this gap.

This analysis is based on data before the current global economic downturn. It is possible that the significant slowdown in the Irish economy will reduce the rate of increase in overall Irish GHG emissions. However, this is still not likely to result in Ireland meeting its Kyoto Protocol targets. Additionally, when the national economy returns to economic growth, there is likely to be a potential for growth in Ireland's overall GHG emissions.

7.10.4 *Implications for 2030Vision*

2030Vision has the ability to influence and address the transport sector's contribution to the production of GHG in the GDA. Shifting travel patterns away from the private car and towards walking, cycling and public transport is to reduce overall GHG production from the transport sector. *2030Vision* can support this through enhancing and expanding the existing public transport network. It can also promote walking and cycling and place financial disincentives on modes of transport, which have high per-capita GHG emissions.

2030Vision could also promote increased population densities adjacent to the major transport corridors and also consider additional transport measures to widen the catchment areas along these corridors (such as feeder buses and enhanced cycling and pedestrian facilities at stations and stops). Increased development densities are also likely to reduce the overall energy consumed by heating requirements, in comparison to the historic trends of lower density developments.

2030Vision could also promote mixed and varied land uses such that new developments (and infill and redevelopment) provide a range of land use mixes such that some trips are not required or minimised (e.g. providing retail, recreational and other services which are close to residential areas etc.).

7.10.5 *Data Sources*

Draft Dublin Regional Air Quality Management Plan 2008 – 2012.

Met Eireann www.met.ie/climate.

EPA (2008a) *Ireland's Environment 2008*.

EPA (2008b) *EPA Annual Highlights 2008*.

EPA (2006) *Environment in Focus 2006*.

European Environment Agency (2006) Greenhouse gas emission trends and projections in Europe 2006

7.11 SOILS & GEOLOGY

7.11.1 *Baseline Description*

The environmental topic of soils and geology is concerned with vulnerable soil resources (e.g. prime agricultural land) and designated geological and geomorphological sites. The issue of aquifers is being considered separately under the water topic, although clear links and overlaps are acknowledged.

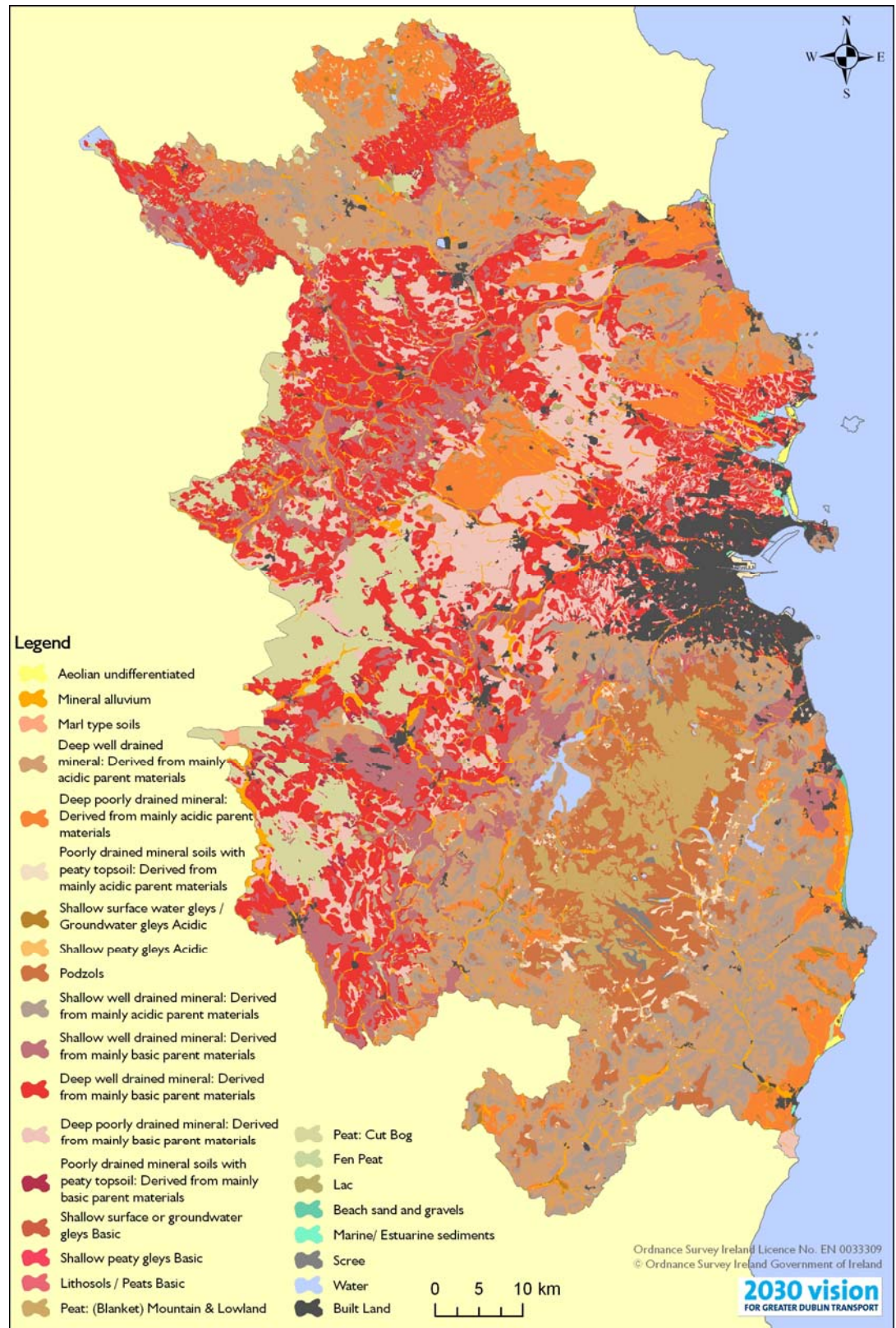
Soils

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. These are shown in *Figure 7.33* below.

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.

Figure 7.33 Soils data for the GDA



Source: Teagasc

GSI is carrying out a chemical survey of the topsoil around Dublin city and county. It involves taking samples of soil from areas that are publicly accessible (e.g. public parks and school grounds). The aim of the survey is to acquire important information about Dublin soils that will help us to better manage our environment. The results of the survey will be publicly available towards the end of 2010. At present, no baseline geochemical information of any significance exists for Irish urban environments.

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.

The National Soil Survey of Ireland, carried out by Teagasc on behalf of the EPA, comprised several evaluations of soil suitability within the GDA, assessing the range of uses to which a given soil is adaptable. These surveys also assess the production potential of each soil for the normal range and economic aspects of the use of the soils. In March 2009 Teagasc embarked on a project to complete the mapping of all of Ireland's soils resources. Currently, only 44% of Ireland is mapped (excluding the national soils map – which is indicative and based on other data sources) and, regarding the GDA, soil data is only available for Meath and Kildare (not for the other five Local Authorities in the GDA). Within the mapped counties of Meath and Kildare, data is available only for Class A and Class B soils, as shown in *Table 7.23* below.

Table 7.23 *Classification of Soil Use for Meath & Kildare*

County	Class A ¹	Class B ²
Meath	37% (85,716 ha)	41% (96,285 ha)
Kildare	49% (82,238 ha)	25% (42,715 ha)

1: Well adapted to new techniques and is mainly suitable for cultivated crops, pasture or forestry.

2: Has a more limited range of uses than class A and being generally of only moderate suitability for cultivated crops, pasture or forestry.

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. Regarding Wicklow, this county's soil characteristics are dominated by the Wicklow Mountains, presenting 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.

Construction & demolition and quarrying waste

Construction and demolition (C&D) waste and mining and quarrying wastes (4.7 million tonnes) together constituted over 70% of total waste generated in Ireland in 2006. C&D waste amounted to over 16.8 million tonnes in 2006, a 13% increase compared to 2005. Recovery of the stone and soil fraction was reported as being at almost 89%. Of the remaining fraction of C&D waste (e.g. blocks, concrete, wood, plastics), only 35% was reported as being recovered.

7.11.2 *Current Issues and Problems*

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

The global economic recession has also resulted in a significant fall-off in global demand for most forms of construction materials (which are primarily sourced from the geological environment). This trend has been exacerbated in Ireland, due to the deeper, construction-led recession. 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 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 recession.

7.11.3 *Implications for 2030Vision*

2030Vision should try to reduce the extent of greenfield development, where feasible, and land consumption, especially where the lands being potentially developed are prime agricultural lands. Encouraging general brownfield development will go some way to maintaining existing greenfield resources.

2030Vision could promote the reuse and recycling of construction and demolition waste for any of the large-scale transport projects which are envisaged in the transport Strategy.

7.11.4 *Data Sources*

GSI website

Teagasc

EPA

7.12 *MATERIAL ASSETS*

7.12.1 *Baseline Description*

Introduction

Material assets are concerned with the considerations of a range of assets of both intrinsic and economic value. Three principal classes of assets are considered relevant for this SEA:

1. *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;
2. *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
3. *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 more 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-based transport networks. The M50 is the radial 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.) through out the GDA, serving the various towns and urban areas. These include the ESB generating station at Poolbeg, drinking water reservoirs at Sandyford and Pollaphuca and the wastewater treatment plant at Ringsend. Future planned nationally-significant infrastructure for the GDA includes a waste-to-energy facility in Poolbeg (currently under construction).

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 such as Stillorgan, Kells and Phibsboro, major town centres such as Bray, Dundrum and Swords 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 of fossil fuels further justifies this status. The Department of Communications Energy and Natural Resources publication *Handbook On Oil Supply Disruption Contingency Measures* (2008) notes that:

“Oil is currently the dominant energy source in Ireland - accounting for 53% of Ireland’s Total Primary Energy Requirement (TPER) in 2006. Geographically isolated, and with no indigenous commercial oil reserves/production to date or interconnecting pipeline infrastructure, Ireland relies on sea-borne importations of both crude oil and petroleum products.”

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 and provides that Member States of the EU may hold such oil stocks, under agreements between Governments, within the territory of another Member State. 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 has risen by 18.8% during the period 2000-2006. The total consumption in 2006 stood at 1.73 million tonnes. Regarding 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 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.

7.12.2 *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 recession both international and in Ireland, is likely to reduce this pressure on existing material assets in the GDA.

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.

The amount and extent of brownfield sites in Ireland is not known (EPA, 2006) and it is generally up to each Local Authority to identify strategic brownfield sites for redevelopment. However, key brownfield sites do exist in the GDA and the most important of these (in relation to the Strategy) are those along key transport corridors and those in urban areas, which may or may not be along transport corridors.

7.12.3 *Implications for 2030Vision*

Given the transport Strategy's primary focus on transport, it is likely it will improve the transport network both through direct investment and expansion of the network and also through improving and enhancing the existing network.

2030Vision should look to identify ways in which it can make a contribution to reducing Ireland's dependence on imported fossil fuels and, where practical and feasible, attempt to reduce total 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.

2030Vision should promote and encourage the development of brownfield sites, especially those adjacent to key transport corridors and those close to urban centres, town and villages.

7.12.4 *Data Sources*

Central Statistics Office (2007) *Measuring Ireland's Progress 2006*.

Central Statistical Office (2007) *Statistical Yearbook of Ireland*.

EPA (2008) *Ireland's Environment 2008*.

EPA (2006) *National Waste Report*.

DCENR (2008) *Handbook On Oil Supply Disruption Contingency Measures*.

Sustainable Energy Ireland (2007) *Energy in Ireland 1990 – 2007*.

7.13 CULTURAL HERITAGE (INCL. ARCHITECTURAL HERITAGE & ARCHAEOLOGICAL HERITAGE)

7.13.1 Baseline Description

The Cultural heritage environmental topic includes cultural, architectural and archaeological resources.

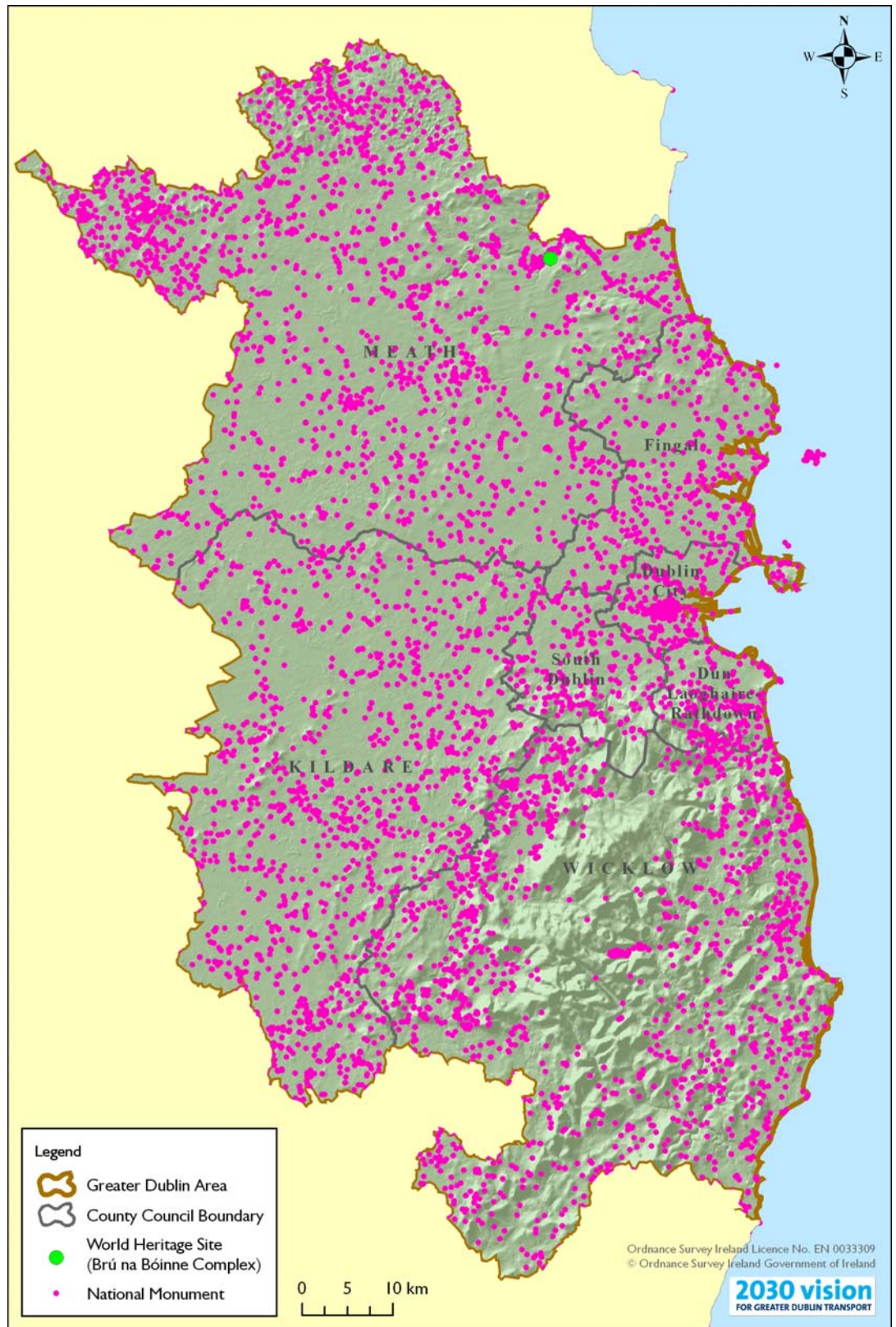
The Record of Monuments and Places, provided by the DEHLG, is a statutory list of all known National Monuments in Ireland. National Monuments are defined in Section 2 of the National Monuments Act (1930) as a feature, “the preservation of which is a matter of national importance by reason of the historical, architectural, traditional, artistic or archaeological interest attaching thereto”. *Figure 7.34* below shows the distribution of National Monuments in the GDA. 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 DEHLG. 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. Bull Island has been proposed as a UNESCO Biodiversity Site, and 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.

Figure 7.34 National Monuments in the GDA



Source: Department of the Environment, Heritage and Local Government, National Monuments Service website www.archaeology.ie

7.13.2 *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.

7.13.3 *Implications for 2030Vision*

2030Vision will facilitate and promote the consolidation of growth within the existing urban footprint of the GDA and direct future growth, expansion and development to brownfield sites or close to existing urban areas, town and villages. This may avoid impacting on additional cultural heritage resources on Greenfield sites in the future. However, over-consolidation of the existing urban areas of the GDA may also impact (both directly and indirectly) on cultural heritage resources within these urban locations.

Any physical transport infrastructure which directly arises from *2030Vision* may also result in site-specific cultural impacts.

7.13.4 *Data Sources*

National Monuments Service www.archaeology.ie.

National Inventory of Architectural Heritage www.buildingsofireland.ie.

OPW – Heritage Sites under the management of OPW.

7.14 *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 7.24 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 7.24 *Environmental topic interactions matrix*

	Biodiversity, flora & fauna										
Biodiversity, flora & fauna		Landscape									
Landscape	1		Population								
Population		9		Human health							
Human health			13		Noise						
Noise	2			14		Water					
Water	3			15			Air				
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	

1-22: Environmental topic interrelationship

- 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 (unless, the landscape is a purely urban one). 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 (e.g. impacting on their communication potential) and fauna (e.g. startling animals and forcing them to change their feeding areas). Examples of this include an increase in road (or rail) noise which can impact on fauna, such as mammals including 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 (e.g. aquatic-based SACs and SPAs). Many of the Natura 2000 sites in the GDA are dependent on the water environment to ensure their success and status. For example, there are 32 water-dependent SACs and 14 water-dependent SPAs in the ERBD. An impact to these resources will impact both on water and on biodiversity, flora and fauna.
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. These changes have the potential to be both positive and negative. Regarding 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* – Biodiversity is related to material assets such as parks and open spaces – an important material asset –often contain important biodiversity resources, such as Dublin Bay and 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 (often preserved or close to their original condition).

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 townscape (a subset of landscape resources) 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* – As with biodiversity, the underlying soils and geology characteristics of an area are often the key determinant of a landscape's features and overall characteristics. Soils will often determine the type of surface flora, a key landscape characteristic.
11. *Landscape and Material assets* - Landscape is also part of material assets as it is the landscape characteristics of these parks that is a key reason 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. This approach has informed the development of the relevant SEA Objectives under the two headings.
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. Generally,

drinking water standards in the seven local authorities in the GDA are acceptable and of good quality.

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 (as a water supply), 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. Regarding transport one of the key sources of air pollution (motor vehicles) is also the primary source of emissions which contribute to climate change. It was decided to focus the SEA Objectives relating to Air on local pollution and related effects, with Climatic factors & Climate Change focusing on the wider issue of greenhouse gas emissions.
20. *Climatic factors & climate change and Material assets* – Inter-relationships exist between climatic factors & climate change and material assets with regard to fossil fuels. Given their non-renewable status and likely medium and long-term global concern regarding security of national oil supply the availability of these fuels for transport uses, their cost and the rate at which they are being consumed means they can be considered an important material asset, of great importance to the wider population of the GDA (and the national population). There are also strong links between fossil fuel consumption and climatic factors & climate change.
21. *Soils & geology and Material assets* – Regarding soils and geology and material assets, it was decided that the issue of reuse of previously developed land (brownfield land) would be located under the material assets heading, rather than the Soils and geology heading (where it could be located as it is often linked with potentially contaminated soils). 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.

7.15

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 with regards to the regional-scale transport Strategy and environmental assessment being prepared.

Data presented in this chapter has been obtained from various publicly-available data sources as listed in each of the baseline sections. No site-specific surveys, field visits or specific investigations were undertaken.

The data gaps and limitations listed below should be addressed, where practicable and feasible within the requirements of the SEA process, in future iterations of *2030Vision*.

A key data limitation was that some of the data (e.g. climate change emissions data) was not available at a regional or local scale and that some of the data (such as air quality) 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 (the types of which also differ from county to county). A National Landscape Strategy is expected in 2011 but was not published when this Report was prepared.

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 socio-economic data was taken from the period around 2006. However, the dramatic economic downturn from 2008 onwards is likely to have impacted on the future socio-economic trends (such as population growth, economic growth and development, social deprivation etc.). This point also applies to much of the recent climate change data.

Notwithstanding the above data gaps and limitations, adequate baseline information was gathered to enable an assessment of the significant effects of the environment from *2030Vision*.

8.1 INTRODUCTION

This chapter summarises the environmental assessment of the Strategy *alternatives*. These comprise three themed packages called **Economic (ECON)**, **Social (SOC)** and **Environment (ENV)** and they are summarised in *Section 8.2* below. Further detail on the three Alternative Strategy Options is provided in *Sections 6.4 to 6.8* of the Draft Strategy document. The assessment is being undertaken in accordance with the methodology discussed in *Chapter 5*.

The general basis of the alternatives assessment consists of a comparison between each of the three themed packages versus the Do-Minimum scenario. An assessment rating of – 3 (major negative) to +3 (major positive) and associated text commentary has been made for the entire package against each of the individual SEA Objectives.

8.2 OVERVIEW OF THE THREE ALTERNATIVES PACKAGES

Three themed alternatives were derived for the purposes of the environmental assessment and Strategy appraisal. Each one corresponded to a theme which related to the overall strategic objectives, namely, Economic, Social and Environmental. It is important to emphasise that each alternative attempts to meet *all* Strategy objectives to some extent, however they vary in the emphasis they place on particular objectives. Further detail on the themed alternatives is provided in *Boxes 8.1 to 8.3* below.

A simplified traffic model output was used by the NTA to produce traffic data for all three Alternatives (plus the corresponding Do-Minimum) which was then utilised by ERM to undertake some of the main assessments (such as noise, air quality and climate change). These assessments used information from the NTA's traffic model such as total flows, proportion of HGVs, speed, length of road link and other information.

Several major infrastructure schemes were assumed in all three alternatives including all Transport 21 rail schemes (i.e. Metro North, DART Underground Metro West and Luas Lines F and B2 to Lucan and Bray respectively), and additional park and ride facilities. Policies that support Strategy objectives, particularly in relation to sustainable travel also apply to all alternatives. These policies include better traffic management, travel information, improved walking and cycling environments, and planning policies which seek to better integrate land use and transport.

The main differences between the alternative options, therefore, relate to additional transport infrastructure beyond Transport 21 and in the approaches

to charging for road use and public transport fares. A summary of the key features of each alternative is also provided below in *Boxes 8.1* to *8.3*.

Box 8.1 *Economic Alternative*

The Economic themed alternative places an emphasis on measures that would support the objectives of improving economic competitiveness. To this end it focuses heavily on infrastructure provision. A large number of major road and rail upgrades or new roads are contained in this option with many new Luas and Metro lines, new roads and road improvement schemes.

Two cordon charges are also included, a €3 charge at the M50 and a €6 charge at the Canals, with the goal of reducing congestion delays and freeing up road-space for economically essential traffic (deliveries, freight etc.). To encourage spreading of peak public transport demand, enabling more economically efficient operation of public transport services, fares are reduced in the off peak and increased at peak times.

Key features:

- Metro North extension to Donabate
- Finglas Luas (to join Line BXD)
- Lucan Luas extension to Adamstown
- City Centre to Tallaght Metro via Kimmage
- Luas Red Line extension from Saggart to Baldonnell
- Metro West extension from Tallaght to Dundrum area
- Upgrade of Green Line to Metro
- M2 Dualling north of Ashbourne
- M3 Clonee to M50 widening
- M50/M11 widening south of Sandyford
- Eastern Bypass
- Leinster Outer Orbital Route
- Orbital road links outside M50 linking Clongriffin, M1, M2, N3, N4 to N7
- Congestion Charge M50 (€3) and City Centre/Canal cordon Charge (€6)
- Fares: 10% higher in peak and 20% lower in off-peak

Box 8.2 *Social Alternative*

The overarching aim of the Social themed alternative was to build and strengthen communities. The objective of improving connections between communities and facilities they require meant it also included new or upgraded road, rail and Luas schemes. However bus or Bus Rapid Transit schemes were included instead of certain Luas/Metro proposals. There was no road charging, but all public transport fares were reduced by 20% to encourage public transport usage.

Key features:

- City Centre to Tallaght Luas via Kimmage
- Upgrade Green Line to Metro
- M2 Dualling north of Ashbourne
- M3 Clonee to M50 widening
- M50/M11 widening south of Sandyford
- Eastern Bypass
- Leinster Outer Orbital Route
- Orbital road links outside M50 linking Clongriffin, M1, M2, N3, N4 to N7

- Fares: 20% reduction at all times

Box 8.3 *Environment Alternative*

The general thrust of the Environment themed alternative is to protect and enhance the built and natural environment. The main focus was on new rail and bus infrastructure, coupled with a per-kilometre road user charge. No major new roads are included.

Key features:

- City Centre to Tallaght Luas via Kimmage
- Upgrade Green Line to Metro
- Distance based road user charge (25c/km)
- Fares: 10% higher in peak and 20% lower in off-peak

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	Economic package (ECON)	Social package (SOC)	Environment package (ENV)	Summary of Relative Performance
Biodiversity				
1. To avoid impacts on the integrity of European Conservation Sites (SACs and SPAs) and nationally designated sites (NHAs).	- 3	- 3	- 1	GIS analysis was undertaken to identify the number of permanent and direct Natura 2000 site impacts arising from each package. ECON has approximately 18 direct Natura impacts (30.5% of the Natura sites in the GDA). SOC has 14 (22%) direct impacts and ENV has 4 (6.7%). Note that a - 3 rating implies potentially significant impacts on the GDA's Natura network and will require mitigation to be developed to avoid these direct impacts. The - 1 rating for ENV is a reflection of the significantly lower level of impacts on the Natura 2000 network (compared to the other two Alternatives), rather than a direct assessment of the direct impacts of ENV. Should these elements of all three packages be taken forward in the Preferred Strategy, appropriate mitigation measures will need to be developed.
2. To support the overall goal of the National Biodiversity Plan (NBP).	- 2	- 2	- 1	All three packages will have the potential to give rise to permanent adverse impacts on the overall NBP goal through new infrastructure and associated landtake. A greater impact can be expected for ECON and SOC, due to the much greater level of infrastructural development. While new infrastructure introduces a potential for adverse impacts through landtake, it is recognised that there may also be some opportunities for enhancement too by creating biodiversity linkages, for example, along road and rail corridors. Overall, for assessment purposes, the overall impact is taken to be adverse.

Assessment Against SEA Objectives and Assessment Scores				
3. To minimise impacts on locally-important biodiversity in the Greater Dublin Area.	- 2	- 2	- 1	In addition to the above direct Natura 2000 impacts, ECON has approximately 94 river crossings and SOC has approximately 68, whereas ENV has approximately 35 based on GIS analysis. Both ECON and SOC have almost 170+ individual schemes each but ENV has only 100; a significantly lower quantum of new infrastructure. ECON and SOC have over 66 road-related schemes whereas ENV only has 2. Overall ECON and SOC are expected to have negative and permanent impacts of moderate significance.
Landscape				
4. To avoid or, where infeasible, minimise impacts on designated and protected landscapes and conservation areas.	- 2	- 2	- 1	Reasons for SEA objective #3 also apply here. Slightly greater impacts may be expected for the ECON package as it has more new infrastructure than SOC. However, high quality designs, careful use of landscaping and screening, use of high quality materials and finishing, and regular maintenance and cleaning all can reduce the severity of impacts on these important landscapes and conservation areas.
5. To minimise impacts on undesignated landscape resources (townscapes, seascapes, riverscapes, general landscapes).	- 2	- 2	- 1	Reasons for SEA objective #3 also apply here. Greater impacts may be expected for the ECON package as it has more new infrastructure than SOC (but not enough to warrant a - 3). Note also that some schemes have the potential to enhance townscapes, especially those which can result in urban renewal and streetscape enhancements such as new light rail lines and high quality transport interchanges. High quality designs, careful use of landscaping and screening, use of high quality materials and finishing, and regular maintenance and cleaning all can reduce the severity of impacts on landscapes and townscapes.

Population				
6. To increase accessibility to economic and employment opportunities, in particular for those who are physically, economically or socially disadvantaged within the GDA.	+ 2	+ 1	+ 2	All three packages increase overall accessibility to economic and employment opportunities. ENV provides the greatest accessibility benefits in relation to increasing car catchment and greatest reduction in car-based journeys times between communities. ECON is marginally the best in terms of overall distance to PT and reductions in average PT journey time (closely followed by ENV). ENV would have been given a + 3 score but for the fact that a lot of the employment accessibility benefits are derived from road-user pricing, which can financially exclude those on lower incomes from the expected accessibility benefits. No single package dominates in terms of specific PT enhancements for disadvantaged areas: each package provides specific benefits for specific areas, with SOC tending to provide slightly less PT accessibility benefits for disadvantaged areas than ENV and ECON. However, all three packages contains contain policies on Mobility impaired access.
7. To increase accessibility to quality public, cultural and community services, in particular, for those who are physically, economically or socially disadvantaged within the GDA.	+ 2	+ 1	+ 2	The results and rationales here are very similar to those for SEA Objective #6. Many services are located in the same areas as employment such as the city centre and major town centres (e.g. Swords, Blanchardstown and Navan).

Human Health				
8. To contribute to improvements to transport-related aspects of quality of life for residents, workers and visitors to the GDA.	+ 2	+ 1	+ 3	All three packages result in overall improvements to transport-related quality of life. ENV provides the greatest benefits in relation to business travel time savings and reliability due to having the most reliable road network. However this is primarily due to road-pricing and this actually results in the PT network operating close to capacity and prone to potential delays (and a more uncomfortable PT journey experience). ENV provides the greatest increase in total bus passenger kms travelled; the highest level of walking and cycling; and the greatest overall PT patronage. ECON provides the greatest benefit in terms of average journey times by PT (but lower overall PT passengers than ENV). ENV also performs the best under ease of use of the PT system (although ECON and SOC also perform well under this specific criterion).
9. To support the objectives of the Environmental Noise Directive in relation to transport-related noise.	0	0	+ 2	ENV performs significantly better than the other two alternatives, which are rated as neutral. This is primarily due to the significant decrease (approximately 20%) in traffic volume across the GDA with the ENV package, in comparison to SOC (no change) and ECON (0.6% reduction). ENV shows a significant reduction in the occurrence of noise levels greater than 80 dB(A) and an increase in the occurrence of noise levels in lower noise bands of 60 to 65 dB(A). This means that there are fewer occurrences of acute (maximum) noise events and a general reduction in noise levels over the study area. SOC and ECON also have an increase in the net change in total road length with an increase in noise but most of these increases are very small in magnitude. In contrast, ENV has a small reduction. ENV could address one of the Environmental Noise Directive's aims which is to prevent and reduce environmental noise.
10. To minimise safety risks to human health arising from transport related activity.	+ 1	+ 1	+ 2	All packages result in safety improvements and a lowering of accident rates. However, ENV provides a greater level of accident reduction.

11. To support health improvements and benefits from transport-related activities.	- 1	- 1	+ 2	ENV performs the best under this SEA Objective as it does most to encourage walking and cycling and results in the greatest modal shift to these modes of transport. ENV also has the greatest shift to PT. ECON and SOC also increase PT share but this is at the expense of walking and cycling.
Water				
12. 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)	- 2	- 2	- 1	The quantum of transport infrastructure being provided is the main influence of the packages performance against this SEA Objective. ECON and ENV have almost 170+ individual schemes (including 66 road-related schemes) each but ENV has only 100 (with only 2 road-related schemes); so is rated as only having an expected minor negative impact on relevant aspects of RBMPs and POMs in the GDA. Note that there are many aspects of RBMPs that are non-transport issues (such as policy elements related to agricultural run-off management, wastewater treatment capacity etc.).
13. To minimise impacts to surfacewater systems and resources.	- 2	- 2	- 1	GIS analysis was undertaken to identify the number of total river crossings by new infrastructure in all three packages. ECON has 94 river crossings and SOC has 68, whereas ENV has 35. It is assumed that relevant design standards, good construction practice and management will apply in the implementation of all infrastructural schemes.
14. To minimise impacts to groundwater systems and resources.	- 1	- 1	0	Both ECON and ENV have almost 170+ individual schemes (including 66 road-related schemes) each but ENV has only 100 (with only 2 road-related schemes); a significantly lower quantum of transport infrastructure. It is assumed that relevant design standards, good construction practice and management will apply in the implementation of any schemes. Generally, the potential to cause groundwater-based impacts from new surface infrastructure is likely to be less than for surfacewater; hence why the ratings for this SEA Objective are less negative than those for surfacewater. Note that the 0 (neutral) rating for ENV does not imply that there will be no impacts; rather the groundwater impacts for ENV are expected to be relatively small (on a strategic/regional-scale) in comparison to those of ECON and SOC.

15. To minimise impacts to coastal systems and resources.	- 2	- 2	- 1	All three packages impact the somewhat similar degrees on coastal resources. GIS analysis shows that the packages have 4 (ENV) to 11 (ECON) and 12 (SOC) direct impacts on coastal waters. However, the ECON and SOC infrastructure have broadly three-times the level of impacts of ENV. It is assumed that relevant design standards, good construction practice and management will apply in the implementation of all infrastructural schemes.
16. To minimise impacts to transitional systems and resources.	- 2	- 2	- 2	GIS analysis identifies the following crossings of transitional waters: ECON and SOC 13 and 12 for ENV. Thus, there is a potential for a similar level of impact for all three packages. It is assumed that relevant design standards, good construction practice and management will apply in the implementation of all infrastructural schemes and that impacts may be less than identified here where such measures are implemented.
17. To minimise the risk of flooding.	- 2	- 2	- 1	Negative impacts are expected for all three packages. Although it is assumed that all transport projects will be constructed in accordance with the required drainage and construction management systems and that standard mitigation measures are incorporated into the design and construction; more negative impacts are expected for ECON and SOC given their much greater level of infrastructural provision.
Air				
18. To reduce negative air quality impacts arising from transport-related emissions.	- 1	- 1	+ 2	Impacts on air quality were assessed by quantifying the number of roads on which there was a $>1\mu\text{g m}^{-3}$ change in pollutant concentration (measured as the average of the change in annual mean NO_2 and annual mean PM_{10}) compared to the Do-Min. ENV showed the greatest improvements with $>5\%$ of road links showing reductions; SOC and ECON showed overall degradation (i.e. increases in pollution) on 1 to 3% of road links within the road network.

19. To ensure compliance with the Air Framework Directive and associated daughter Directives (and the transposing Regulations in Ireland).	0	0	- 1	Impacts were assessed by identifying the worst case impacts predicted anywhere on the road network for each alternative and comparing this to the Do-Min, in the context of the annual mean air quality standards for NO ₂ and PM ₁₀ . The assessment showed that the worst-case impacts for the ECON and SOC scenarios were within 1µg/m ³ of the Do-Min. The ENV scenario actually showed an increase in worst-case impacts for NO ₂ of approximately 4µg/m ³ , compared to the Do-Min on a very small number of roads (8 road links); there was no such increase for PM ₁₀ . This is despite there being overall/regional reductions in total traffic emissions (see SEA Objective #18). However, no exceedances of the 40µg/m ³ NO ₂ standard were predicted, although the worst-case impact on 8 road links (7 of which are outside the Metropolitan area) does come within 3µg/m ³ of the NO ₂ standard.
Climatic Factors				
20. To contribute to the reduction of greenhouse gas emissions arising from transport-related activities.	- 1	- 1	+ 2	The assessment quantified the total annual CO ₂ emissions on the assessed road network, and compared this to the Do-Min CO ₂ emissions. ECON and SOC packages demonstrated total increases of between 5% and 15% of the Do Min. ENV demonstrated a decrease in overall CO ₂ compared to the Do-Min. This analysis takes account only of road traffic and makes no account of increased CO ₂ emissions from other/indirect sources, for example power generation required for additional light rail.
Soils & Geology				
21. To minimise negative impacts on important and vulnerable soils resources used for agricultural purposes.	- 2	- 2	- 1	ECON and SOC have almost 170+ individual schemes each but ENV has only 100; a significantly lower quantum of new infrastructure. Therefore a corresponding reduction in impacts on potential important soil resources may be expected. Note that there is no official soil protection or designation system available in Ireland so this comparative assessment is based on generic impacts on agricultural land.

22. To reduce consumption of construction material and generation of construction waste as part of transport infrastructure projects.	- 2	- 2	- 1	ECON and ENV have almost 170+ individual schemes each but ENV has only 100; a significantly less quantum of new infrastructure and a corresponding reduction in material usage and consumption. Impacts would be reduced where sustainability principles are applied to construction and the procurement of materials.
23. To avoid or, where infeasible, minimise impacts to protected and designated geological and geomorphological sites.	- 1	- 1	0	Although Ireland does not yet have a protection or designation status for geological sites, it is expected that some negative impacts will arise due to the new infrastructure being provided in each package (impacts are worse for ECON and SOC by virtue of their much greater number of schemes). Note that the 0 (neutral) rating for ENV does not imply that there will be no impacts; rather that the potential impacts on protected geological sites for ENV are relatively small (on a strategic/regional-scale) in comparison to those of ECON and SOC.
Material Assets				
24. To protect public assets and infrastructure.	+ 1	+ 1	+ 1	All packages are rated as positive for the protection of public assets and infrastructure as they generally increase regional accessibility through greatly enhanced transport infrastructure 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 ongoing 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 temporary loss in service will be minimised during construction.

25. To reduce the fossil fuel demand by the transport sector.	- 1	- 1	+ 2	The assessment quantified the total annual vehicle kilometres on the road network for each package as a proxy for fossil fuel usage. Percentage change bands were defined compared to the Do-Min of <5% change, 5-15%, 15-30% and >30% change. ECON and SOC generated changes of 5-15% increases in total kms travelled respectively, while ENV generated reduction of almost 20%, a positive impact.
26. To assist with the reuse and regeneration of brownfield sites.	+ 2	+ 2	+ 2	All three packages contain planning policy elements and assume a distribution of development which will directly and indirectly promote the reuse and regeneration of brownfield sites, especially those close to high quality public transport corridors.
Cultural Heritage				
27. To avoid or, where infeasible, minimise impacts to designated cultural, architectural and archaeological resources.	- 1	- 1	0	Although both ECON and SOC have a much greater level of infrastructural development than ENV, not all of the schemes will have a cultural heritage impact. GIS analysis shows that there are no direct impacts on the existing cultural heritage designations in the GDA. However, it is assumed that some negative impacts can be expected given the quantum of transport infrastructural development associated with the ECON and SOC packages. It is assumed that all transport projects 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. With respect to archaeology the expectation would be that any resources are preserved in-situ where practical or preserved by recording.

The broad conclusions that can be drawn from the assessment of alternatives are:

- ENV performs best against the GIS-based and relevant qualitative SEA Objectives i.e. those relating to direct impacts on protected sites (e.g. SACs) and on general spatial resources such as rivers, wider biodiversity, landscapes, cultural heritage etc. ENV has the smallest level of additional infrastructure provision whereas ECON and SOC give rise to much greater infrastructure (primarily roads) and thus moderately negative impacts are expected (with minor negative for ENV). However, note that ENV (as well as the other two Alternatives) have the potential to cause some direct impacts on the Natura 2000 network in the GDA and this poses significant challenges for their implementation.
- ENV also performs best against modelling-output based SEA Objectives. ENV provides positive impacts as it results in reduced fossil fuel consumption, reduced greenhouse gas emissions, lower overall road traffic emissions and lower noise emissions. Generally ECON and SOC result in negative impacts for these topics due to increases in overall kms travelled by cars, compared to the Do-Minimum traffic levels. However, ENV has some negative impacts for air quality standards on a small number of road links.
- ENV provides positive impacts under safety and reduction in predicted accidents (ECON and SOC are also positive, but to a lesser extent) and provides the prospect of significantly positive health benefits (through increasing uptake of walking and cycling). ECON and SOC actually result in anticipated minor negative impacts for health as there is a reduction in overall walking and cycling compared to the Do-Minimum.
- All three packages result in improvements in overall accessibility in the GDA. ENV and ECON perform best, followed by SOC. ENV would have performed the best but this package contains road-user pricing and while this provides a more efficient road-network, it has a negative impact on economically disadvantaged people with low or no incomes.

In addition to the above strategic environmental assessment, the three Alternative packages of Strategy options were separately appraised to determine the relative benefits and contribution that each package makes to meeting *2030Vision* objectives and to addressing the transport challenges. The appraisal took place in two stages:

1. Contribution of package to Strategy objectives (see the Strategy document for details); and

2. How they perform against transport criteria, guided by the Department of Transport's appraisal approach.

An outline assessment of the benefits and costs of major infrastructural schemes in each Alternative was also undertaken on a corridor by corridor basis. This helped determine which infrastructural elements within each alternative were contributing most to meeting Strategy objectives, and assisted in assembly of the Preliminary Draft Transport Strategy itself.

The Habitats Directive Assessment (HDA) process was also applied to this stage. Every transport proposal was screened for potential impacts on Natura 2000 sites and an outline of the need for mitigation, IROPI or alternative solutions was set out in a Screening Report and a HDA Stage 2 Briefing Report.

Overall, the 2-Stage Strategy Appraisal, SEA and HDA processes came to the following conclusions in relation to the Alternative Strategy options:

- Those containing policies and proposals to improve and promote cycling and walking facilities and public transport performed well.
- In general road building or widening proposals scored well in terms of economic objectives and in terms of improving links between communities. However they performed less well against the objectives of improving the built environment or minimising the impact on the environment.
- Options that included charges to road users in congested areas scored well, by freeing up roads space and reducing delays to economically productive business and goods traffic.
- Options that included a per kilometre charge for all private road vehicles in the Greater Dublin Area scored well against environment objectives, by reducing demand for car travel and encouraging a switch to less environmentally-damaging modes.

These combined results shaped the emerging Preliminary Draft Transport Strategy. Rather than choosing one particular Alternative, those elements that best met Strategy objectives and performed best in terms of transport appraisal were brought forward for inclusion. However, it was clear that the Environment option performed best across a range of considerations and, as such, the measures contained in the Draft Strategy are broadly similar to this option. In terms of roads, this meant that only two schemes were specifically included. Policy proposals that succeeded best in reducing car use also formed a major part of the Strategy.

Section 6.11 of the Preliminary Draft Transport Strategy document provides further information on the development and assembly of the Strategy.

9.1 INTRODUCTION

This chapter presents the results of the environmental assessment of the Draft 2030Vision. An assessment rating of - 3 (major negative) to +3 (major positive) and associated text commentary has been made for the entire Strategy against each of the individual SEA Objectives.

9.2 STRATEGIC ENVIRONMENTAL ASSESSMENT RESULTS

The results are presented in a tabular format (*Table 9.1*) with a - 3 to + 3 rating and associated text provided for each SEA Objective. Individual elements of the Preliminary Draft Transport Strategy which warrant specific commentary and assessment (by virtue of their specific impacts within the Strategy's overall cumulative impact) are addressed in the main text commentary under each SEA Objective.

For the assessment of the Draft Strategy, the NTA applied a more detailed methodology for estimating 18 and 24 hour flows from the traffic model, compared to that used for the Alternatives assessment. Traffic data using this approach has been applied in the environmental assessment of the Draft Strategy. GIS information on most of the infrastructure schemes (i.e. roads, rail and light rail) included in the Strategy was also provided by the NTA to allow strategic spatial analysis of potential impacts from landtake to be undertaken. Policy text was also provided and this was qualitatively assessed by ERM, where the policy was not represented in the NTA's traffic model.

The following key applies to the rating in *Table 9.1* 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 9.1 *SEA results for the Preliminary Draft Transport Strategy*

SEA Objective	Rating	Assessment
Biodiversity		
1. To avoid impacts on the integrity of European Conservation Sites (SACs and SPAs) and nationally designated sites (NHAs).	0 to -2	<p>GIS analysis shows the location of Natura 2000 sites and the alignment of new or improved infrastructure included in the Strategy (Figure 7.1). A Habitats Directive Appropriate Assessment; Natura Impact Statement (HDA) Report has been prepared which identified 13 Natura 2000 sites for consideration in relation to the Strategy. The assessment has identified five prospective infrastructure projects that are included in the Strategy which could potentially result in significant direct permanent impacts on Natura 2000 sites (see Section 3.1 of the HDA Report). No in-combination effects nor indirect effects have been identified that do not relate to Natura 2000 sites or types of impact that have already been identified. Mitigation in the form of amendments to the text of the Strategy has been proposed in regard to all of the identified potentially significant impacts (see Section 4 of the HDA Report). The five projects where mitigation in the form of amendments to the text is proposed are as follows:</p> <ul style="list-style-type: none"> • Development of the proposed Sutton to Sandycove Cycle Track; Measure WCY 13 of the Strategy (see Section 4.3 of the HDA Report); • Upgrades to the Northern Rail Line Upgrade; Measure RAIL 2 of the Strategy (see Section 4.4); • Upgrades to the Southern Rail Line Upgrade; Measure RAIL 2 of the Strategy (see Section 4.4); • Development of the proposed new Navan Rail Line; Measure RAIL 4 of the Strategy (see Section 4.4); and • Development of the proposed Leinster Orbital Route road; Measure ROAD 3 of the Strategy (see Section 4.5). <p>In addition to these amendments to the text relating to specific projects, mitigation in the form of amendments to the text of the Strategy is also proposed in regard to the following:</p> <ul style="list-style-type: none"> • Additional Text describing the way in which the Strategy has been Appropriately Assessed throughout the period of its development has also been prepared (see Sections 5.1 and 5.2 of the HDA Report) ; and • Additional text discussing the retention of a route corridor for the sections of the Eastern Bypass that cross Dublin Bay. <p>Whilst the Strategy's recommendation is limited to the retention of a route corridor for this proposal, and it is not considered that retention of the route could in itself result in any negative impact on Natura 2000 sites, it is considered that this inclusion in the Strategy requires mitigation in the form of additional text highlighting significance of effects has been assessed. For all of the projects listed above except the Northern Rail Line Upgrade, the HDA Report concludes that provided the Final Strategy, incorporates all of the mitigation measures that have been proposed in Section 4 of the Natura Impact Statement, it is considered that the Strategy's implementation will not result in any adverse effect on the Conservation Objectives of any of the Natura 2000 sites they affect, and hence there will be no adverse effects on the integrity of the Natura 2000 sites. The Northern Railway Line Upgrade has the potential for greater effects on the Natura 2000 sites of the Malahide, Rogerstown and Broadmeadows/Swords Estuaries. The detailed design at the project level is required to be able to determine whether there will be any adverse effects on the integrities of these sites. It would have to demonstrate that the requirements for the Habitats Directive could be met before the scheme could proceed. However there are a numbers of reasons to suggest at this stage that an upgrade which could meet the requirements of the Habitats Directive may be possible. Examples are listed below.</p>

SEA Objective	Rating	Assessment
		<ul style="list-style-type: none"> • The extent of made ground beneath the existing lines which extends either side of the lines. At Rogerstown in particular, it even may be possible to upgrade the line without increasing the existing footprint. • The flexibility that will be allowed in the design including minimising the number of bridge piers and associated habitat loss and effects on sediments through maximising long spans, and using cantilevered structures attached to the existing structures to avoid piers. • Upgrading the track to the western side of the existing alignment especially at Malahide which would avoid saltmarsh and other intertidal habitats, which also support birds. There are also more water sports in the inner estuary to the west and hence there may be fewer birds because of disturbance. In addition it is more lagoonal and birds may be less constrained to specific areas. • Seasonal constraints could be imposed on construction to avoid effects on birds at sensitive times of the year (eg winter, or passage). • Measures could be implemented to avoid effects on water quality and surrounding habitats during construction and operation. <p>The elements of the Strategy could have differing effects on sites of European importance and this is reflected in the rating range which has been provided. The integrity of most of the European sites will not be adversely affected given the mitigation set out in the Strategy, and hence a zero rating would apply. The remaining sites could be significantly affected by the Northern Rail Line Upgrade. There are, however, a number of reasons to suggest that this upgrade could be undertaken without adverse effects on the European sites. As these cannot be confirmed until the detailed design is available at the project level, a risk still remains at this stage and hence a more precautionary rating range of 0 to - 2 has been applied.</p>

SEA Objective	Rating	Assessment
2. To support the overall goal of the National Biodiversity Plan (NBP).	0	<p>The overall goal of the NBP is to secure the conservation, including where possible the enhancement, and sustainable use of biological diversity in Ireland and to contribute to conservation and sustainable use of biodiversity globally. The transport schemes proposed within the Preliminary Draft Transport Strategy have the potential, in the absence of scheme specific mitigation, to result in some localised and permanent loss of biodiversity (especially in greenfield locations such as along the Metro West corridor and the P&R schemes located on undeveloped lands), though, in the context of the study area as a whole, this would not be expected to have a significant outcome for biodiversity across the region. It is also noted that these various schemes have the potential to enhance biodiversity by creating biodiversity linkages, for example, along road and rail corridors. It is assumed that good practice design and construction standards and regulations will be applied during the implementation of these schemes.</p> <p>It should also be noted that measures in the Strategy to support consolidation of urban areas of the GDA would be expected to reduce long-term development pressure on greenfield sites and hence on biodiversity. This would contribute to “conservation and sustainable use of biodiversity globally”. Further details on these specific measures are provided in SEA Objective #3.</p> <p>Overall, a neutral rating is judged to be appropriate for this SEA Objective. Note that it is possible that urban consolidation and more sustainable land use patterns which will result from <i>2030Vision</i> may actually result in a more positive contribution to the overall goal of the NBP. However, it is not possible to make this determination at this stage.</p> <p>A separate HDA Report has been prepared and is considered in relation to the objective above.</p>

SEA Objective	Rating	Assessment
3. To minimise impacts on locally-important biodiversity in the Greater Dublin Area.	- 1	<p>There are no NHA (<i>Figure 7.5</i>) impacts from the Preliminary Draft Transport Strategy. The quantum of infrastructure being provided in the Preliminary Draft Transport Strategy is relatively low with only two new roads and the rest consisting of rail infrastructure, such as Metro North, DART Underground and Luas Lucan. There are also a number of P&R schemes in the Strategy. The transport schemes proposed within the Preliminary Draft Transport Strategy have the potential, in the absence of scheme specific mitigation, to result in some localised permanent loss of biodiversity (especially in greenfield locations such as along the Metro West corridor and the P&R schemes located on undeveloped lands). It is assumed that relevant design standards, good construction practice and management will apply in the implementation of all infrastructural schemes. All of these schemes will also require development consent and in some cases, project-level EIA; and these 'lower-tier' processes will also assist in reducing, managing and limiting negative impacts.</p> <p>Against these direct impacts on local biodiversity is the positive aspect for biodiversity in the Preliminary Draft Transport Strategy, a key one of which is the commitment to address urban sprawl and urban expansion of the GDA. Measure LU4 contains a commitment to increase development densities (especially in existing urban centres and close to rail lines) and this will partially address the historic instances of urban sprawl and population growth in suburban areas and outer towns of the GDA (a consequence of which is the dominance of the private car for commuter journeys). Measure LU1 proposes the consolidation of the urban areas of the GDA and will result in better conservation of undeveloped lands in the GDA and this will avoid future long-term impacts on local biodiversity.</p> <p>It should be noted that the quantum of schemes proposed in the Preliminary Draft Transport Strategy is lower than that in the ENV Alternative package (which has the lowest number of transport schemes of all three alternatives).</p>
Landscape		
4. To avoid or, where infeasible, minimise impacts on designated and protected landscapes and conservation areas.	- 1	<p>Potential negative impacts on important and sensitive landscapes can be expected from the new infrastructure which is proposed in the Preliminary Draft Transport Strategy (such as the Leinster Orbital or schemes in sensitive urban streetscapes, such as Luas BX). It should be noted that there is no national and statutory landscape designation in existence and classification and protection of landscapes is currently different in each local authority in Ireland. However, regardless of this; where there is a commitment to good quality designs, careful use of landscaping and screening, use of good quality materials and finishing, and regular maintenance and cleaning, all of these can reduce the severity of short-term and long-term impacts on these important landscapes and conservation areas. All of these schemes will also require development consent and in some cases, project-level EIA, and these 'lower-tier' processes will also assist in reducing, managing and limiting negative landscape impacts.</p> <p>Many of the positive impacts identified for SEA Objective #3 also apply here. Greater development densities, urban consolidation and more sustainable forms of future urban development will also result in less long-term landscape impacts, including protected and designated landscapes.</p> <p>Given the potential impacts from transport schemes in greenfield locations on important, sensitive landscapes and also on sensitive urban streetscapes; a minor negative rating is appropriate for this SEA Objective.</p>

SEA Objective	Rating	Assessment
5. To minimise impacts on undesignated landscape resources (townscapes, seascapes, riverscapes, general landscapes).	+ 1	<p>The transport schemes proposed within the Preliminary Draft Transport Strategy will introduce new infrastructure into the landscape, including in some greenfield locations such as along the Metro West corridor and the P&R schemes located on undeveloped lands. In the absence of scheme mitigation, this may lead to localised, permanent adverse landscape impacts, though, in the context of the study area as a whole, this would not be expected to have a significant impact on undesignated landscape across the region. It is also assumed that relevant design standards, good construction practice and management will apply in the implementation of all infrastructural schemes. All of these schemes will also require development consent and in some cases, project-level EIA; and these 'lower-tier' processes will also assist in reducing, managing and limiting negative impacts.</p> <p>It is also noted, as with SEA Objective #4, that greater development densities, urban consolidation and more sustainable forms of future urban development, which the Strategy is designed to encourage, would also result in less long-term landscape impacts across the region and this benefit will all to all landscapes and townscapes.</p> <p>With regard to this specific objective and the townscape aspect of it, some schemes included in the Strategy have the potential to enhance townscapes, especially those which can result in urban renewal and streetscape enhancements such as new light rail lines and high quality transport interchanges. Measure LU3 promotes the positive aspects of transport-related development in urban environs and also recognises the potential negative impacts to arise from poorly planned transport interventions. Measures WCY 3, WCY 4, WCY 5, WCY 7, WCY 8, WCY 11 and WCY 13 all promote positive, high-quality and attractive walking and cycling urban environs in the GDA urban centres and these measures will result in positive direct and secondary impacts to townscapes and streetscapes.</p> <p>Overall, this SEA Objective has been assigned a minor positive rating on the basis of the Strategy's focus on improving streetscape through good transport and urban planning. The actual long-term benefits which arise may actually be greater once the designs and implementation is underway, but it is too early in the development process to confirm such a conclusion.</p>

SEA Objective	Rating	Assessment
Population		
6. To increase accessibility to economic and employment opportunities, in particular for those who are physically, economically or socially disadvantaged within the GDA.	+ 2	<p>Accessibility modelling undertaken by the NTA indicates that the Preliminary Draft Transport Strategy will result in direct, long-term, permanent improvements in accessibility to employment and economic opportunities for the general population of the GDA. It will also result in specific access improvements for those who are economically and socially disadvantaged. Transport modelling demonstrates that the various transport schemes and other measures which promote and enhance public transport services will shorten travel times and increase overall public transport options, availability and frequency to and between key employment locations (such as Dublin city centre, Dublin Docklands, Sandyford, Dublin Airport) where there is high-value employment.</p> <p>The Strategy provides a large benefit for car-based commuters travelling to business locations from home (a 22% reduction in this specific journey time): this is due to the significant modal shift - from car-based commuting to various public transport modes of travel. Public transport journey times to/from work are also reduced but to a much lesser extent. However, there is a significant increase in overall public transport usage (including a 46% increase in peak passenger kms travelled) and its proportion of the modal split in 2030 (rising from 58% to 66%) due to the majority of the population travelling by public transport rather than car. There will also be direct and indirect improvements in overall public transport provision, frequency, availability, journey reliability and significant reductions in peak-time overcrowding.</p> <p>The reductions in off-peak fares will directly benefit those on lower incomes and the greater availability and frequency in public transport options will also benefit those without access to a car. However, the road-user charging element of the Strategy will impact on those with lower incomes (assuming they have a car). Bus network improvements will also significantly benefit parts of the GDA which are not directly served by rail-based public transport. There will also be significant improvements in information and ease of use of all forms of public transport, indirectly increasing accessibility.</p> <p>Overall, the Preliminary Draft Transport Strategy is rated as having a moderate long-term benefit against this SEA Objective.</p>

SEA Objective	Rating	Assessment
7. To increase accessibility to quality public, cultural and community services, in particular, for those who are physically, economically or socially disadvantaged within the GDA.	+ 2	<p>The modelling results for SEA Objective #6 also apply here in that the Strategy will improve long-term accessibility to city, town and local centres where public, cultural and community services tend to be located.</p> <p>In addition to the various transport benefits identified in SEA Objective #6, increases in the uptake of walking and cycling are also expected as a result of the measures WCY1 to WCY 6 (traffic restrictions, streetscape improvements, lower speeds in town centres etc.). These forms of trip can be very effective in increasing accessibility to local services and facilities and can also specifically benefit populations in disadvantaged areas (CLAR and RAPID areas: <i>Section 7.5</i>). Overall, the Preliminary Draft Transport Strategy is rated as having a moderate benefit against this SEA Objective.</p>
Human Health		
8. To contribute to improvements to transport-related aspects of quality of life for residents, workers and visitors to the GDA.	+ 2	<p>The Preliminary Draft Transport Strategy will result in significant and long-term improvements to the transport-related quality of life for residents, workers and visitors of the GDA. There will be a significant increase in overall public transport availability, accessibility, frequency and journey reliability with the Strategy. The Strategy results in a 10% reduction of services operating over-capacity, despite there being a 46% increase in peak-passenger km on public transport (and a 7% increase in public transport's modal shift; to 66% by 2030).</p> <p>There will also be significant direct and indirect improvements in transport interchanges, connectivity, information and usability; all of which will result in significant positive benefits for all users of public transport and their quality of life. Associated improvements in walking and cycling infrastructure will also benefit public transport users as walking and cycling are usually required at the end of a bus, rail or Luas journey. Improvements in travel safety and security will also further benefit public transport users.</p>

SEA Objective	Rating	Assessment
9. To support the objectives of the Environmental Noise Directive in relation to transport-related noise.	+ 1	<p>The analysis shows that the Preliminary Draft Transport Strategy creates a general shift to lower noise levels and eliminates the occurrence of high noise levels in the 84 - 86 dB(A) range. However, there is an increase in the number of road links in the 74 to 78 dB(A) range for the Preliminary Draft Transport Strategy. Overall, this results in a net reduction of overall average L10,18hr Road Traffic Noise Level (RTNL) across the modelled road network.</p> <p>The Preliminary Draft Transport Strategy can be summarised with the following results:</p> <ul style="list-style-type: none"> • 39% of road links would experience an increase in L10,18hr RTNL; • 49% of road links would experience a decrease in L10,18hr RTNL; and • 7% of road links would experience no change in L10,18hr RTNL. <p>The result is a net benefit of approximately 10% of road links experiencing a reduction in RTNL. The remaining 5% of road links are those where a noise level could not be calculated due to low traffic flow or low speed. A distribution of noise levels is shown graphically in <i>Figure 9.3</i>. The reduction the highest band (84 - 86 dB) is significant in for the group of road links in populated areas in terms of the Dublin Agglomeration Noise Action Plan (which responds to the Environmental Noise Directive) which aims, in the long term to remove populations from this level of exposure. <i>Figure 9.5</i> illustrates the links where changes in road traffic noise are predicted.</p>
		<p>The overall average L10,18hr RTNL is decreased by 0.2 dB across the road network. Noise reductions of this magnitude are not generally perceptible in particular cases, but when integrated over a large population imply overall lessening of health effects such as general annoyance. In terms of reductions and increases in L10,18hr RTNL for the network, the change in noise RTNL for the Preliminary Draft Transport Strategy is expressed graphically in <i>Figure 9.4</i>.</p> <p>In accordance with the WebTAG appraisal methodology, the Estimated Population Annoyed (EPA) is reduced by approximately 3,500 people, or 5% of the population estimated to be directly exposed to noise from the network within the standard impact corridor of 25m either side of the road. This is also illustrated in <i>Figure 9.6</i>. An overall rating of minor positive is appropriate for this SEA Objective.</p>

SEA Objective	Rating	Assessment
10. To minimise safety risks to human health arising from transport related activity.	+ 2	<p>The Preliminary Draft Transport Strategy will result in moderately positive long-term benefits under this SEA Objective. Modelling data provided by the NTA notes that these benefits to safety and reduced risk of accidents will arise primarily from the lower numbers of car kilometres travelled on the road network. It is estimated that this will result in a 33% reduction in fatal and a 27.5% fall in serious casualties during morning peak periods. Similar benefits can be expected for the evening and off-peak periods.</p> <p>Direct and indirect streetscape and urban improvements, better pedestrian and cycling facilities and infrastructure will also increase overall safety and reduce risks to the GDA's population from transport-related activities.</p>
11. To support health improvements and benefits from transport-related activities.	+ 1	<p>The Preliminary Draft Transport Strategy will result in a small, long-term increase in uptake in walking and cycling as a result of the various measures to enhance and promote these forms of transport. Additionally, the significant modal shift to public transport will also increase start and end of journey walking and cycling.</p>
Water		

SEA Objective	Rating	Assessment
12. 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	<p>The Preliminary Draft Transport Strategy is 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 Strategy does have the potential to directly impact on water resources in the GDA, but these are actually relatively limited in their occurrence (and discussed in SEA Objectives #13 to #17).</p> <p>Note that there are many aspects of RBMPs that are non-transport issues and not relevant to 2030Vision. For example, the pressures in Dublin are identified as being wastewater treatment works and urban pressures; landfills, quarries and mines; agriculture; wastewater and unsewered properties; forestry; usage and discharge of dangerous substances; physical modifications of water bodies and water abstractions. While all of these are significant environmental and sustainable development challenges, they are not relevant to 2030Vision or within the scope of the regional transport plan.</p> <p>The potential does exist that the densification of the urban areas of the GDA over the next 20 or so years could actually result in reduced losses of water and reduce instances of unsewered properties. Thus, there is the slight potential that 2030vision may assist some of the objectives of the WFD. However, there is much uncertainty in relation to the future implementation of the various POMs and their effectiveness and adopting a precautionary approach; a neutral rating has been allocated to this SEA Objective.</p>
13. To minimise impacts to surface water systems and resources.	- 1	<p>GIS analysis was undertaken to identify the number of total river crossings by proposed transport infrastructure. This analysis has identified approximately 21 crossings. The rivers in the GDA are shown in <i>Figure 7.25</i>. The main rivers and tributaries crossed are the Boyne (crossed 6 times), Liffey (crossed 7 times) and the Tolka (crossed 3 times). All of these crossings are caused by the rail-based transport schemes. Additionally, not all of the transport schemes in the Strategy were available as GIS information and these schemes (Sutton to Sandycove cycle scheme, Leinster Orbital and passing rail loops on the south-eastern rail line) will also result in additional river crossings.</p> <p>If poorly designed and constructed, river crossing can have significantly negative and permanent impacts on the surface water system being crossed. Other potential direct and indirect impacts include loss of habitat, pollution of the surface water system and associated ecological impacts. There are also various P&R schemes within the Strategy and this will have some minor negative impact on surface water systems (such as changing the local hydrological regime, increased runoff rates etc.).</p> <p>It is assumed that relevant design standards, good construction practice and management will apply in the implementation of all infrastructural schemes. All of these schemes will also require development consent and in some cases, project-level EIA; and these 'lower-tier' processes will also assist in reducing, managing and limiting negative impacts.</p> <p>However, adopting a cautious and precautionary approach, an overall minor negative rating is deemed appropriate for this SEA Objective.</p>

SEA Objective	Rating	Assessment
14. To minimise impacts to groundwater systems and resources.	- 1	<p>GIS analysis undertaken on the various schemes in the Preliminary Draft Transport Strategy to identify potential impacts to Groundwater Source Protection Zones (GSPZ), the locations of which are illustrated in <i>Figure 7.27</i>. GIS identified no direct impacts on the GSPZs in the GDA. There are also various P&R schemes within the Strategy and these are not expected to impact on GSPZ.</p> <p>It is assumed that transport schemes in the Strategy will comply with relevant design standards and good construction practice and management will apply in the implementation of all schemes.</p> <p>It is considered unlikely that the type of infrastructure schemes proposed in the Strategy would have a significant effect on groundwater systems across the region. While impacts are considered unlikely, the potential for impacts can only fully be investigated at a project-specific stage (e.g. EIA etc.). A minor negative rating is determined for this SEA Objective, based on a cautious and precautionary approach to the assessment.</p>
15. To minimise impacts to coastal systems and resources.	- 1	<p>GIS analysis was undertaken to determine the potential impacts on coastal systems as classified by the WFD (<i>Figure 7.25</i>). This identified proximity to the following coastal systems: Balbriggan, Lusk, Skerries, Sluice and Loughlinstown. The schemes which involve development in or close to these areas are the Northern Line Upgrade, the DART Underground and Luas B1 extension. The Sutton to Sandycove cycle scheme will also have coastal impacts.</p> <p>As with all transport schemes in the Strategy, it is assumed that relevant design standards, good construction practice and management will apply in the implementation of all schemes. If poorly designed and constructed, schemes can have significantly negative impact on the coastal systems and potential impacts include increased runoff rates, pollution of the coastal environment and physical changes to the coastal hydrology.</p> <p>A rating of minor negative is appropriate for this SEA Objective.</p>
16. To minimise impacts to transitional systems and resources.	- 1	<p>GIS analysis was undertaken to determine the potential impacts on transitional systems as classified by the WFD (<i>Figure 7.25</i>). This identified proximity to the following systems: Tolka Estuary, Liffey Estuary Upper, Liffey Estuary Lower, Malahide Estuary and Broadmeadow Estuary.</p> <p>As with all transport schemes in the Strategy, it is assumed that relevant design standards, good construction practice and management will apply in the implementation of all schemes. If poorly designed and constructed, schemes can have significantly negative impact on the transitional systems and potential impacts include increased runoff rates, pollution of the transitional/estuarine environment and physical changes to the transitional hydrology and ecosystem.</p> <p>A rating of minor negative is appropriate for this SEA Objective.</p>

SEA Objective	Rating	Assessment
17. To minimise the risk of flooding.	- 1	<p>There is no national flood hazard mapping available so it is not possible to determine the risk of flooding for these schemes at this strategic stage of the implementation of the various schemes. These will also be subject to their individual flood risk assessments, if required by the planning authority, as part of the planning consent process. The transport schemes included within the Preliminary Draft Transport Strategy may have the potential to either contribute to an increased risk of local flooding or be impacted by flooding – these issues can only be investigated at a project-specific stage (e.g. EIA etc.) and in assessing the potential for impacts, it is taken to be the case that schemes will not be allowed to proceed unless they meet design standards which avoid undue increases to the risk of flooding. While on this basis, it is considered unlikely that there would be significant impacts arising from flooding as a consequence of the Strategy, a cautious rating of minor negative has been assumed for assessment purposes so that this issue is not overlooked.</p>
Air		
18. To reduce negative air quality impacts arising from transport-related emissions.	- 1	<p>Impacts on air quality were assessed by estimating the population living within 20 m of roads where pollution levels for NO₂ and PM₁₀ increase or decrease in by an appropriate level, which was +/- 0.5µg/m³ for PM₁₀ and +/- 1.0µg/m³ for NO₂. The population data was based on 2030 population estimates provided by the NTA (illustrated in Figure 7.19). This population analysis determined that:</p> <ul style="list-style-type: none"> For PM₁₀, there is a net <i>benefit</i> for approximately 6,319 people (i.e. approximately 14,614 people will have exposure reductions of >0.5µg/m³ against 8,295 people who will have exposure increases of >0.5µg/m³ PM₁₀). Thus, the Strategy will have a small positive impact for PM₁₀ across the region. For NO₂, there is a net <i>negative</i> impact for approximately 22,921 people (i.e. approximately 19,002 people will have exposure to reductions of 1µg/m³ against approximately 41,923 people who will have exposure increases of 1µg/m³). Thus, the Strategy will have a small to moderate negative impact for NO₂ across the region. <p>Overall, a greater number of roads subject to slight deterioration in air quality and a greater number of people in the GDA are exposed to slight decreases in air quality.</p> <p>The assessment undertaken is based on traffic modelling data provided by the NTA and this did not directly consider some of the demand management and emissions reduction measures proposed in the Strategy (such as electric vehicles in the region's car fleet, extension of the current Dublin City HGV Management Strategy, better management and allocation of road space, better on-street car parking control measures and mobility management programmes). These elements of <i>2030 Vision</i> can be expected to reduce overall traffic and trips on the GDA's road network below that expressed in the NTA's traffic data (the basis for air quality modelling).</p> <p>Thus, a cumulative consideration of the modelled components of the Strategy plus the non-modelled components results in a minor negative rating against this SEA Objective.</p>

SEA Objective	Rating	Assessment
19. To ensure compliance with the Air Framework Directive and associated daughter Directives (and the transposing Regulations in Ireland).	- 1	<p>Impacts in relation to the EU AQ directives (and associated Irish Regulations) were assessed by identifying the worst-case impacts predicted anywhere on the road network for the Do-Min and the Preliminary Draft Transport Strategy. The assessment was made regarding absolute emissions levels against the annual mean air quality standards for NO₂ and PM₁₀. The assessment indicated that the annual mean air quality standard for PM₁₀ was comfortably achieved in both the Do-Min and the Preliminary Draft Transport Strategy and the predicted absolute PM₁₀ levels for the Strategy are shown in <i>Figure 9.1</i>. It can be seen that PM₁₀ levels are significantly below the Standard. However regarding the annual mean NO₂, negative impacts were identified.</p> <ul style="list-style-type: none"> 36 - 40 µg/m³ (i.e. NO₂ concentrations <i>approaching</i> the air quality standard – orange colouring in <i>Figure 9.2</i>): population analysis (using 2030 population estimation data provided by the NTA: see <i>Figure 7.19</i>) determined that an additional 107 people are exposed to NO₂ concentrations between 36 and 40 µg/m³ with the Strategy compared to the Do-Min; >40 µg/m³ (ie <i>in excess</i> of the air quality standard – red colouring in <i>Figure 9.2</i>): population analysis determined that an additional 278 people are exposed to NO₂ concentrations greater than 40 µg/m³ with the Strategy compared to the Do-Min. <p>The prediction that there will be more roads and more people with concentrations close to or above the NO₂ annual mean air quality standard in the Preliminary Draft Transport Strategy compared to the Do-Min is important as the achievement of air quality standards is a statutory requirement.</p> <p>It is important to note that the majority of roads where NO₂ concentrations approach or exceed the air quality standard are major regional roads such as sections of the M50, the M1, N7 and the N2. These are illustrated by orange and red colouring in <i>Figure 9.2</i> (which shows the absolute NO₂ levels with the Strategy). This suggests that the Strategy is concentrating traffic onto these strategic national roads, and away from less strategic local roads where the majority of people live and work. This is beneficial in one respect as it means that no locations in the city centre where there is a high population density are predicted to be in excess of the standard. However, conversely, whilst there is a lower population density in proximity of these major roads, where there are receptors, these are more likely to be exposed to NO₂ concentrations above the air quality standard. Additionally, one of the road links where there is a predicted exceedance is actually the Dublin Port Tunnel and populations close to this road (according to GIS and population analysis) can be expected to have a much lower NO₂ exposure as they are not living at roadside locations. Additionally, the Port Tunnel has an air quality monitoring system in place which monitors emissions in the tunnel and takes appropriate action should emissions exceed safety limits.</p> <p>As noted in the previous SEA Objective, the NTA traffic model did not directly consider some of the demand management and reduction measures proposed in the Strategy and this can be expected to reduce overall traffic and trips. Additionally, the NTA has developed a new policy commitment that will address this potential air quality issue by putting in place mitigation measures to reduce the impacts of traffic. This may include tolling, changes to the proposed road pricing system, or network changes which will reduce emissions to below EU limits. The overall rating of minor negative takes into account this committed policy.</p>

SEA Objective	Rating	Assessment
Climatic Factors		
20. To contribute to the reduction of greenhouse gas emissions arising from transport-related activities.	+ 1	<p>The assessment quantified the total annual CO₂ emissions on the assessed road network, and compared this to the Do-Min CO₂ emissions. Rating criteria were used of >30% decrease as +3; 15-30% decrease as +2; 5-10% decrease as +1; 5% decrease to 55 increase as 0; 5-10% increase as -1; 15-30% increase as -2; and >30% increase as -3. The Strategy demonstrated a total decrease of 7.1% compared to the Do-Min.</p> <p>On this basis the score of +1 was awarded. This analysis takes account only of road traffic and makes no account of increased CO₂ emissions from other/indirect sources, for example power generation required for additional light rail. The assessment also does not account for some of the demand management and reduction measures within the Strategy (some these are noted in the text for SEA Objective #19) and a qualitative consideration of these cumulative and in-combination effects can be expected to result in further greenhouse gas benefits.</p>
Soils & Geology		
21. To minimise negative impacts on important and vulnerable soils resources used for agricultural purposes.	0	<p>The Strategy has the potential to give rise to impacts on soils and some of these could be important and vulnerable soils used for agricultural purposes (especially in the outer counties of Fingal, Meath and Kildare), though the potential is considered likely to be low. This is because the quantum of infrastructure being provided in the Preliminary Draft Transport Strategy is relatively low with only one new road and the remainder consisting of rail schemes (most of which are located in urban areas). There are 27 P&R schemes in the Strategy and these may also impact on potentially important soil resources.</p> <p>Against these potential impacts on potentially important soil resources is the positive aspect for biodiversity in the Preliminary Draft Transport Strategy, a key one of which is the commitment to address urban sprawl and urban expansion of the GDA. Measure LU4 contains a commitment to increase development densities and this will partially addresses the historic instances of urban sprawl and population growth in suburban areas and outer towns of the GDA (a consequence of which is the dominance of the private car for commuter journeys). Measure LU1 proposes the densification of the urban areas of the GDA and will result in better conservation of undeveloped lands in the GDA and this is expected to reduce future impacts on potentially important soils.</p>
22. To reduce consumption of construction material and generation of construction waste as part of transport infrastructure projects.	- 1	<p>There is likely to be an increase in the consumption of construction material and the generation of construction waste through the development of new infrastructure projects. The various urban and streetscape improvements will also result in additional resource consumption. The potential for impacts will be reduced where the principles of sustainable development are applied to construction and procurement of materials (ie re-used or recycled materials).</p>

SEA Objective	Rating	Assessment
23. To avoid or, where infeasible, minimise impacts to protected and designated geological and geomorphological sites.	- 1	The transport schemes included within the Preliminary Draft Transport Strategy may have the potential to impact on geological and geomorphological sites. However, there is no national (or regional) designation for geological and geomorphological sites. Potential direct impacts on geological and geomorphological sites is considered unlikely given the reduced quantum of new infrastructure development and given that much of this is in urban areas which have already been developed; the potential for impacts can only fully be investigated at a project-specific stage (e.g. EIA etc.). A minor negative rating is determined for this SEA Objective, based on a cautious and precautionary approach to the assessment.
Material Assets		
24. To protect public assets and infrastructure.	+ 1	<p>The Strategy is assessed as positive for the protection of public assets and infrastructure as it permanently increases regional accessibility through enhanced transport infrastructure in the GDA, thereby enhancing access to public assets and infrastructure. Journey times by road to Dublin Airport are reduced by 29% while public transport journey times from the Airport are reduced by almost 55% (primarily due to the Metro North). Dublin Port sees car traffic trip times reduce by 31% for arrivals and 13% for departures.</p> <p>Enhancing and increasing access to these public assets (such as Dublin Airport, Dublin Port, national road network, rail network, regionally-important recreational spaces and facilities, key urban centres etc) benefits them as they require certain levels of usage and therefore good accessibility to make them more economically and socially viable and to encourage ongoing investment. It is assumed that utilities such as telecommunications networks, electricity transmissions network, gas network etc. will not be negatively impacted the Preliminary Draft Transport Strategy (through consultation with utilities companies, following appropriate procedures and compensation where necessary) and that temporary loss in service will be minimised during implementation of the Preliminary Draft Transport Strategy.</p>
25. To reduce the fossil fuel demand by the transport sector.	+ 2	<p>The assessment quantified the total annual vehicle kilometres on the road network for fossil fuel usage. Criteria were used of >30% decrease as + 3; 15-30% decrease as + 2; 5-10% decrease as + 1; 5% decrease to 55 increase as 0; 5-10% increase as - 1; 15-30% increase as - 2; and >30% increase as - 3.</p> <p>Climate change calculations (based in traffic data provided by the NTA) identified that the Strategy will result in a 16.9% decrease in total kms travelled by vehicles on the road network, a moderately positive permanent impact. Please note that this rating (or the calculations) do not account for electric vehicles on the road network or future improvements in engine technology. The assessment also does not account for some of the demand management and reduction measures within the Strategy and a qualitative consideration of these cumulative and in-combination measures with the Strategy can be expected to result in further reductions in fossil fuel demand.</p>

SEA Objective	Rating	Assessment
26. To assist with the reuse and regeneration of brownfield sites.	+ 2	The Preliminary Draft Transport Strategy contains planning policy elements which promote development at greater densities and also at sites in existing urban areas of the GDA (Settlement Hierarchy). The Preliminary Draft Transport Strategy also assume a distribution of development which will directly and indirectly promote the reuse and regeneration of brownfield sites, especially those close to high quality public transport corridors. The long-term densification of the GDA will also increase the value and viability of brownfield sites in the GDA, thus indirectly promoting their value and development potential.
Cultural Heritage		
27. To avoid or, where infeasible, minimise impacts to designated cultural, architectural and archaeological resources.	- 1	<p>GIS analysis shows that there are no direct impacts on National Monuments in the GDA from the GIS files of the transport schemes in the Preliminary Draft Transport Strategy. However, it is assumed that some potentially negative indirect impacts can be expected at a project-specific level given the quantum of transport infrastructural development as there are 91 National Monuments within 20m of these schemes. Schemes which are in the urban centres of the GDA (such as the Luas BX scheme on College Green and O'Connell Street) may potentially impact on the setting and context of historically important streets and areas.</p> <p>However, it is assumed that all transport projects 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 enhance the setting of the urban cultural heritage resources.</p> <p>Overall, a minor negative rating has been assigned for this SEA Objective. This rating for the Preliminary Draft Transport Strategy does not imply that there will be significant impacts over the study area as a whole.</p>

SEA Objective	Rating	Assessment
Cumulative Effects		
Cumulative impacts and impact interactions	-1 to +1	<p>Section 7.14 of this report presented a set of possible baseline impact interactions and interrelationships. These same types of interaction and interrelationship are also relevant to the environmental assessment results of the Preliminary Draft Transport Strategy. For example, potential adverse impacts on biodiversity or flora and fauna from landtake for new infrastructure may also result in combined impacts on landscape and the setting of heritage features, and vice versa. In addition, where proposals for new infrastructure in the Strategy may lead to biodiversity enhancement along a given corridor, there may also be a related potential for combined enhancements to landscape and the setting of heritage features at the same time. 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.</p> <p>A further point to note with respect to the potential for cumulative impacts is the role that the Transport Strategy is likely to play in conjunction with other relevant plans and programmes. In particular, the Transport Strategy and the Regional Planning Guidelines for the Greater Dublin Region are expected to work together to provide positive cumulative outcomes in terms of more sustainable planning, urban consolidation and transport provision.</p>

Figure 9.1 Predicted PM₁₀ levels for the Strategy



Figure 9.2 Predicted NO₂ levels for the Strategy



Figure 9.3 Distribution of Noise Levels

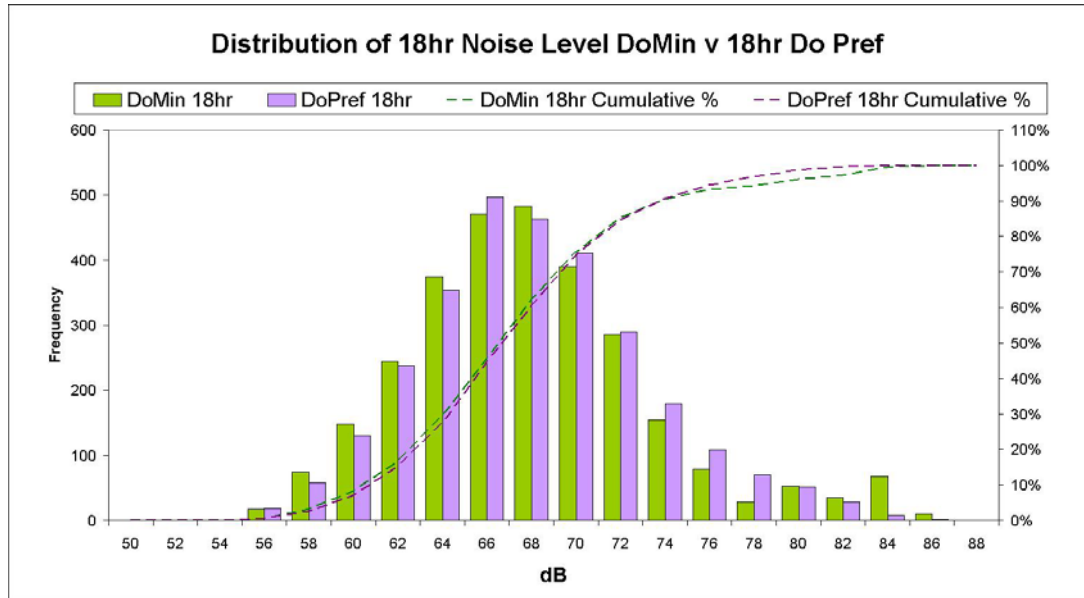


Figure 9.4 Distribution of 18hr Noise Levels Increases and Decreases

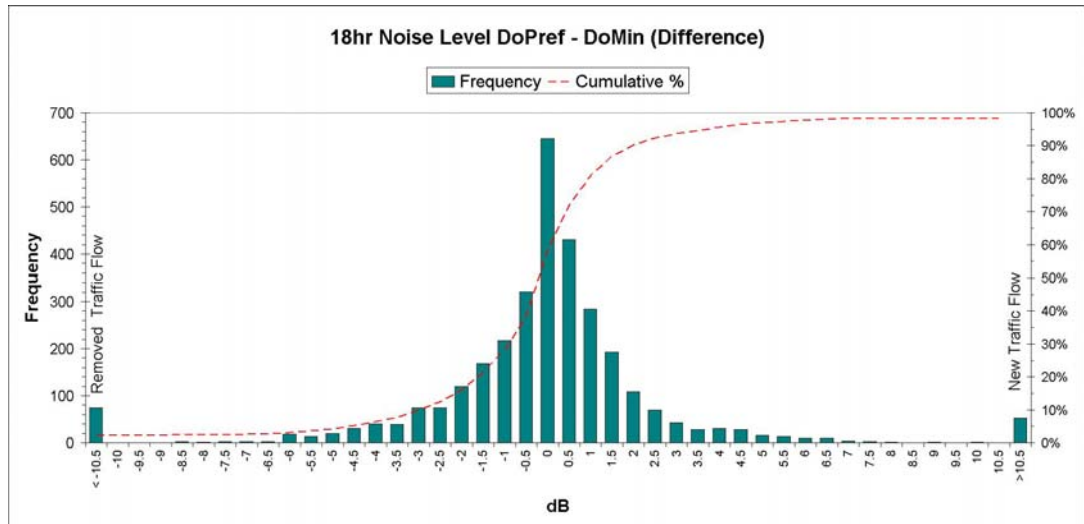


Figure 9.5 Changes in Road Traffic Noise (Preliminary Draft Transport Strategy 2030 vs Do-Min 2030)



Figure 9.6 Changes in 'Estimated Population Annoyed' by Road Traffic Noise (Preliminary Draft Transport Strategy 2030 vs Do-Min 2030)



10.1 INTRODUCTION

This section summarises the mitigation measures identified and committed to during the course of the preparation and development of *2030Vision* to address the potential negative impacts of the Strategy and also to enhance some of the positive impacts.

A key feature of the development of mitigation measures is that the minimisation of negative impacts was considered through-out the development of the various iterations of *2030vision*.

The mitigation measures have been presented in two categories:

1. *Embedded and Iterative mitigation*: this is mitigation and Strategy-improvement actions which were created and developed in parallel with the evolution of early iterations of *2030Vision*; and
2. *Additional mitigation*: this is specific mitigation which has been subsequently developed to address specific impacts identified in the environmental assessment of *2030Vision* (Chapter 9).

10.2 EMBEDDED AND ITERATIVE MITIGATION

As noted in Section 3.3.3, the NTA undertook a preliminary environmental assessment during the early stages of the draft Strategy development process. This preliminary assessment was undertaken on a suite of high level Measures which were then used to build the three Alternatives packages. The assessment was undertaken using the same SEA Objectives which were also used in the assessment of alternatives (Chapter 8) and the Strategy (Chapter 9). The preliminary environmental assessment results were published in the *Draft Strategy Potential Measures SEA Report* in February 2009 for public consultation with the *Final Strategy Potential Measures SEA Report* published in July 2009.

A key feature of this preliminary assessment was that mitigation measures were proposed to address the generic environmental impacts identified. These were then taken into account in the development of the Alternatives packages.

Iterative mitigation was also a key feature of the assessment of the Alternatives packages. The comparative assessment of all three Alternatives packages (Chapter 8) resulted in positive and negative impacts being identified across all three packages. The relative advantages and disadvantages of each Alternative Strategy option was then taken into account as part of the process when the Preliminary Draft Transport Strategy was prepared and developed.

Further detail on the development of the Preliminary Draft Transport Strategy can be found in *Section 8.5*.

10.3 ADDITIONAL MITIGATION

10.3.1 Overview

Additional mitigation refers to measures which have been subsequently developed in response to potential negative impacts identified in the environmental assessment of *2030Vision*.

These additional mitigation measures have been developed with and fully accepted by the NTA. Thus, they can now be considered as being formally part of *2030Vision*.

10.3.2 Specific policy-protection of Natura 2000 sites

The SEA and the Habitats Directive Assessments have identified a number of transport schemes within the Strategy which will potentially have a direct effect on Natura 2000 sites in the GDA. In response to these potentially significant impacts, the Natura Impact Statement proposes various policy-based mitigation measures to address these identified impacts.

An overarching Natura 2000 protection policy wording was included in relation to the various schemes in *2030Vision*:

In preparing the Strategy, it has been identified that a number of schemes have the potential to impact on Natura 2000 sites. This is dealt with in the Natura Impact Statement, which has identified that this should be further addressed through project-level Appropriate Assessment.

In addressing such issues at project level development, the preferred approach will be to avoid significant negative impacts through appropriate design and mitigation. However, if this is not possible, then alternatives will need to be examined and in the absence of these, there will be a requirement to demonstrate imperative reasons of overriding public interest for the scheme and to implement compensatory measures to offset any significant negative impacts that are identified.

Related policy amendments were included and these apply to the following schemes which have the potential for Natura 2000 effects:

- Electrification and four-tracking of the Northern Rail Line;
- New Navan Railway Line;
- Upgrades (including passing loops) to the Southern Line;
- Eastern Bypass (retention of a route corridor only);
- Leinster Orbital; and
- Sutton to Sandycove cycle track.

Generally all policy commitments regarding the above schemes have been revised as generally set out in the following example:

Appropriate Assessment of this Strategy has identified the possibility that the implementation of additional tracks on the Northern Line may have impacts in relation to Nature 2000 sites. This is dealt with in the Natura Impact Statement, which has identified that that this should be further addressed through project-level Appropriate Assessment.

The HDA Report concludes that provided the final, published version of the Strategy incorporates all of the mitigation measures that have been proposed in Section 4 of the Natura Impact Statement, it is considered that the Strategy's implementation, with the exception of the Northern Rail line should not result in any significant impact on the Conservation Objectives any Natura 2000 site, and it is considered that the potential for such significant impacts have been assessed appropriately.

10.3.3 *Minimisation of visual impacts from signage*

Additional policy wording was included in relation to signage (a key feature in many measures which will improve street signage and notification of walking, cycling and public transport facilities and routes) in order to take full account of potential effects on visual amenity:

"Any additional signage will be provided in a manner which contributes to the visual amenity of an area and should not add to signage clutter".

10.3.4 *Addressing potential NO₂ air quality standard exceedances*

The environmental assessment noted that there was the potential for exceedances of the NO₂ annual limit on a limited number of links in the study area. The assessment was based on modelled traffic data (supplied by the NTA) which did not consider various demand management and reduction measures included in the Preliminary Draft Transport Strategy (as the NTA's traffic model is not designed to directly model these measures). Thus, the modelled exceedances (Figure 9.2) are likely to be an overestimation in 2030 as a result of the Strategy.

However, in recognition of the potential for these significant effects, the NTA has included the following additional policy in 2030 Vision:

The Authority will continue to monitor these parameters, in conjunction with the relevant agencies, and will seek the implementation of appropriate measures, where necessary, to comply with applicable standards.

10.3.5 *Brownfield development policy*

The various land use policies in *2030Vision* will result in the general consolidation of the urban areas of the Greater Dublin Area, especially along key transport corridors. This will result in the likelihood that urban-based brownfield (previously-developed) sites will be re-developed to take advantage of good public transport links and proximity to existing employment, services and other infrastructure.

However, to ensure that these sites are prioritised for development, the NTA has agreed to include the following additional policy in *2030Vision*:

The re-development of brownfield (previously developed) sites close to existing or proposed public transport corridors are supported.

10.3.6 *Implementation of transport schemes and infrastructure*

The environmental assessment of the Preliminary Draft Transport Strategy has resulted in the identification of the potential for negative impacts associated with the construction of the transport schemes contained in the Strategy. These impacts include landtake resulting in potential impacts on biodiversity, landscape, heritage and vulnerable soils. The assessment assumes that the relevant environmental regulations, standards and planning processes will be followed during the implementation of each of these projects (including environmental appraisal, project specific EIA and project specific mitigation). However, to further reduce the potential for negative impacts, and to establish the NTA's commitment to protect and enhance, where practical, the natural, built and historic environment, the NTA has included the following additional policy text in the Preliminary Draft Transport Strategy regarding all future schemes to be implemented under *2030Vision*:

In delivering the Strategy, the Authority will, in collaboration with the relevant agencies, actively address the protection and enhancement, where practical, of the natural, built and historic environment associated with these schemes. Projects which are taken forward to development consent stage will be supported by environmental appraisal and Environmental Impact Assessment (EIA) where appropriate. All transport projects will be constructed in accordance with applicable design standards and environmental regulations and that mitigation measures in accordance with good practice will be incorporated into the design and construction of these schemes.

11.1 INTRODUCTION

This chapter sets out the proposed monitoring programme to be implemented with the adoption of *2030Vision*. The SEA Directive states that monitoring must be undertaken of the likely significant environmental effects of the implementation of plans and programmes in order to identify at an early stage unforeseen effects and be able to undertake appropriate remedial measures.

11.2 PROPOSED MONITORING PROGRAMME

The SEA monitoring programme for *2030Vision* is set-out below in *Table 11.1*. Monitoring has been proposed for all 27 SEA Objectives and not limited to topics for which more significant effects are predicted. This was undertaken with a view to better understanding the effects of the Strategy's implementation across all environmental topics.

The intention when developing the monitoring programme was to build upon the existing data collected by the NTA and the other agencies in the Greater Dublin Area. The role of the Regional Planning Guidelines for the GDA will be of specific relevance in this regard.

2030 Vision itself will be subject to its own monitoring programme and this will be carried out concurrently and be integrated fully with the SEA Monitoring programme. This will be set out in the forthcoming Implementation Plan, itself subject to SEA.

It is recommended that a bi-annual Monitoring Report is prepared to report on the progress of the SEA monitoring programme and that a summary of key actions required (to address both predicted and also unforeseen significant environmental effects) included.

If monitoring identifies a regular frequency of a negative significant environmental effect, then more frequent – such as annual – monitoring report may be required to determine if remedial action is effective in addressing the negative effect.

The availability of data and the development of new or more detailed data sets are likely to be important issues and should be noted in all Monitoring Reports.

The suite of monitoring measures below should also be reviewed on an annual basis with new monitoring measures included should new and relevant data sets become available.

Table 11.1 **2030Vision SEA Monitoring Programme**

SEA Objective	SEA Monitoring Indicator	Source	Authority
1. To avoid impacts on the integrity of European Conservation Sites (SACs and SPAs) and nationally designated sites (NHAs).	<ul style="list-style-type: none"> Area of direct impacts on Natura 2000 network affected by implementation of 2030 Vision. 	<ul style="list-style-type: none"> Project level HDA (where applicable for projects) NPWS Reporting County and City Development Plan Reporting (relevant to Natura 2000 Network) 	<ul style="list-style-type: none"> Irish Rail RPA NRA Local Authorities National Parks and Wildlife Service
2. To support the overall goal of the National Biodiversity Plan.	<ul style="list-style-type: none"> Key findings and reporting of the National Biodiversity Plan 	<ul style="list-style-type: none"> Updates and Reviews of National Biodiversity Plan 	<ul style="list-style-type: none"> Department of Environment, Heritage and Local Government
3. To minimise impacts on locally-important biodiversity in the Greater Dublin Area.	<ul style="list-style-type: none"> Impact on biodiversity from 2030Vision transport schemes; Area of greenfield land zoned for development; Region-wide biodiversity impacts 	<ul style="list-style-type: none"> Project level EIA County and City Development Plan Reporting (relevant to biodiversity); Biodiversity Action Plan Reporting 	<ul style="list-style-type: none"> Irish Rail RPA NRA Local Authorities
4. To avoid or, where infeasible, minimise impacts on designated and protected landscapes and conservation areas.	<ul style="list-style-type: none"> Impact on designated landscapes (when/if developed) by 2030Vision transport schemes Biodiversity Action Plan reporting Impacts on Protected Structures from 2030Vision transport schemes 	<ul style="list-style-type: none"> Project level EIA County and City Development Plan Reporting (relevant to biodiversity); Biodiversity Action Plan Reporting 	<ul style="list-style-type: none"> Irish Rail RPA NRA Local Authorities
5. To minimise impacts on undesignated landscape resources (townscapes, seascapes, riverscapes, general landscapes).	<ul style="list-style-type: none"> Localised landscape impacts Biodiversity Action Plan reporting 	<ul style="list-style-type: none"> Project level EIA Biodiversity Action Plan Reporting 	<ul style="list-style-type: none"> Irish Rail RPA NRA Local Authorities
6. To increase accessibility to economic and employment opportunities, in particular for those who are physically, economically or socially disadvantaged within the GDA.	<ul style="list-style-type: none"> Time taken to travel to work, including for disadvantaged Rates of Unemployment by ED in GDA Specific monitoring of accessibility (travel times, frequency of PT, alternative PT options etc.) 	<ul style="list-style-type: none"> Analysis of Censuses of Population Live Register Quarterly National Household Survey NTA specialist monitoring 	<ul style="list-style-type: none"> Central Statistics Office NTA
7. To increase accessibility to	<ul style="list-style-type: none"> Time taken to travel to schools, colleges, retail, cultural 	<ul style="list-style-type: none"> Analysis of Censuses of Population 	<ul style="list-style-type: none"> Central Statistics Office

quality public, cultural and community services, in particular, for those who are physically, economically or socially disadvantaged within the GDA.	<ul style="list-style-type: none"> facilities and services, including for disadvantaged Specific monitoring of accessibility (travel times, frequency of PT, alternative PT options etc.) 	<ul style="list-style-type: none"> NTA Household Surveys NTA specialist monitoring 	<ul style="list-style-type: none"> NTA
8. To contribute to improvements to transport-related aspects of quality of life for residents, workers and visitors to the GDA.	<ul style="list-style-type: none"> Transport mode split Extent and Quality of bus corridors (Km) Extent of walking/cycling routes (km) Mean Travel Times Customer satisfaction Dublin City Canal Cordon Counts 	<ul style="list-style-type: none"> Analysis of Censuses of Population NTA Travel and Household Surveys Transport Operator's Passenger attitudinal surveys Bus Monitoring 	<ul style="list-style-type: none"> Central Statistics Office NTA RPA NRA Irish Rail Dublin Bus Bus Éireann Dublin City Council
9. To support the objectives of the Environmental Noise Directive in relation to transport-related noise.	<ul style="list-style-type: none"> Monitoring and reporting associated with the Dublin Agglomeration Noise Action Plan 	<ul style="list-style-type: none"> Dublin Agglomeration Noise Action Plan Monitoring and Implementation 	<ul style="list-style-type: none"> Dublin Local Authorities
10. To minimise safety risks to human health arising from transport related activity.	<ul style="list-style-type: none"> Number Injured and killed in the GDA in Road Accidents 	<ul style="list-style-type: none"> Annual Road Collision Handbook 	<ul style="list-style-type: none"> Road Safety Authority
11. To support health improvements and benefits from transport-related activities.	<ul style="list-style-type: none"> Mode split for cycling and walking Incidence or prevalence of heart disease or obesity 	<ul style="list-style-type: none"> Health Atlas Analysis of Censuses of Population Dublin City Canal Cordon Counts NTA Household Survey 	<ul style="list-style-type: none"> Health Service Executive Dublin City Council Central Statistics Office
12. 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).	<ul style="list-style-type: none"> Direct and indirect impacts on POMs Applicable monitoring data 	<ul style="list-style-type: none"> WFD monitoring programme reports 	<ul style="list-style-type: none"> Relevant River Basin Districts EPA

13. To minimise impacts to surfacewater systems and resources.	<ul style="list-style-type: none"> ▪ Extent of surfacewater bodies directly affected by implementation of <i>2030Vision</i> ▪ Extent of surfacewater bodies directly and indirectly affected by land use policies in Development Plans and 2030 Vision 	<ul style="list-style-type: none"> ▪ Project level EIA ▪ Development Plans ▪ WFD monitoring programme reports 	<ul style="list-style-type: none"> ▪ Irish Rail ▪ RPA ▪ NRA ▪ Local Authorities ▪ EPA
14. To minimise impacts to groundwater systems and resources	<ul style="list-style-type: none"> ▪ Extent of groundwater bodies directly affected by implementation of <i>2030Vision</i> ▪ Extent of groundwater bodies directly and indirectly affected by land use policies in Development Plans and 2030 Vision 	<ul style="list-style-type: none"> ▪ Project level EIA ▪ Development Plans (inc SEA monitoring) ▪ WFD monitoring programme reports 	<ul style="list-style-type: none"> ▪ Irish Rail ▪ RPA ▪ NRA ▪ Local Authorities ▪ EPA
15. To minimise impacts to coastal systems and resources.	<ul style="list-style-type: none"> ▪ Extent of coastal systems directly affected by implementation of 2030 Vision ▪ Extent of coastal systems directly and indirectly affected by land use policies in Development Plans and 2030 Vision 	<ul style="list-style-type: none"> ▪ Project level EIA ▪ Development Plans (inc SEA monitoring) ▪ WFD monitoring programme reports 	<ul style="list-style-type: none"> ▪ Irish Rail ▪ RPA ▪ NRA ▪ Local Authorities ▪ EPA
16. To minimise impacts to transitional systems and resources.	<ul style="list-style-type: none"> ▪ Extent of transitional systems directly affected by implementation of 2030 Vision ▪ Extent of transitional systems directly and indirectly affected by land use policies in Development Plans and 2030 Vision 	<ul style="list-style-type: none"> ▪ Project level EIA ▪ Development Plans (inc SEA monitoring) ▪ WFD monitoring programme reports 	<ul style="list-style-type: none"> ▪ Irish Rail ▪ RPA ▪ NRA ▪ Local Authorities ▪ EPA
17. To minimise the risk of flooding.	<ul style="list-style-type: none"> ▪ Flood risk ▪ Number, extent and location of flood events in the GDA 	<ul style="list-style-type: none"> ▪ Project level EIA ▪ Flood Mapping 	<ul style="list-style-type: none"> ▪ Irish Rail ▪ RPA ▪ NRA ▪ Local Authorities ▪ Office of Public Works
18. To reduce negative air quality impacts arising from transport-related emissions. <i>and</i> 19. To ensure compliance with the Air Framework Directive and associated daughter	<ul style="list-style-type: none"> ▪ Air quality monitoring reports 	<ul style="list-style-type: none"> ▪ EPA Air Quality Reports ▪ Local Authority Annual Reports 	<ul style="list-style-type: none"> ▪ EPA ▪ Local Authorities

Directives (and the transposing Regulations in Ireland).			
20. To contribute to the reduction of greenhouse gas emissions arising from transport-related activities.	<ul style="list-style-type: none"> ▪ Sectoral GHG emissions ▪ Atmospheric Carbon Dioxide Levels 	<ul style="list-style-type: none"> ▪ EPA Reporting (Indicators) 	<ul style="list-style-type: none"> ▪ EPA
21. To minimise negative impacts on important and vulnerable soils resources used for agricultural purposes.	<ul style="list-style-type: none"> ▪ Land cover changes in the GDA ▪ Changes in land zoned for development 	<ul style="list-style-type: none"> ▪ CORINE Land Cover data changes ▪ Development Plan data (inc SEA monitoring) 	<ul style="list-style-type: none"> ▪ EPA ▪ Local planning authorities
22. To reduce consumption of construction material and generation of construction waste as part of transport infrastructure projects.	<ul style="list-style-type: none"> ▪ Estimated level of construction waste recovered during major transport schemes 	<ul style="list-style-type: none"> ▪ Information on Major Transport Infrastructure Projects 	<ul style="list-style-type: none"> ▪ National Roads Authority ▪ RPA ▪ Irish Rail
23. To avoid or, where infeasible, minimise impacts to protected and designated geological and geomorphological sites.	<ul style="list-style-type: none"> ▪ Impacts on designated geological and geomorphological sites (when/if developed) by 2030 Vision transport schemes 	<ul style="list-style-type: none"> ▪ Project level EIA ▪ NPWS Reporting 	<ul style="list-style-type: none"> ▪ National Roads Authority ▪ RPA ▪ Irish Rail ▪ NPWS
24. To protect public assets and infrastructure.	<ul style="list-style-type: none"> ▪ Passenger numbers at GDA Ports and Airports ▪ Public transport use and modal share ▪ Occupancy rates of Bus and Rail ▪ Condition of Public Transport Infrastructure and Quality of Services ▪ Road, Footpath and Cycle Facility Maintenance Budget 	<ul style="list-style-type: none"> ▪ Public Transport Statistics (all modes of transport) ▪ Census data (transport info) ▪ Reporting requirements of PSO Contracts ▪ Annual Departmental Budgets 	<ul style="list-style-type: none"> ▪ Central Statistics Office ▪ Dublin Bus ▪ Bus Éireann ▪ National Roads Authority ▪ RPA ▪ Irish Rail ▪ Dublin Airport Authority ▪ Dublin Port ▪ NTA ▪ Local planning authorities ▪ Department of Transport
25. To reduce the fossil fuel demand by the transport sector.	<ul style="list-style-type: none"> ▪ Public transport use and modal share ▪ Sales of Petrol and Diesel 	<ul style="list-style-type: none"> ▪ Public Transport Statistics (all modes of transport) ▪ Census data (transport info) ▪ Revenue returns 	<ul style="list-style-type: none"> ▪ Central Statistics Office ▪ Revenue

26. To assist with the reuse and regeneration of brownfield sites.	<ul style="list-style-type: none"> Proportion of development occurring on brownfield sites 	<ul style="list-style-type: none"> Development Plans Local Area Plans Analysis of Planning Permissions Geo-Directory 	<ul style="list-style-type: none"> Local Authorities An Post Central Statistics Office
27. To avoid or, where infeasible, minimise impacts to designated cultural, architectural and archaeological resources.	<ul style="list-style-type: none"> Sites affected by implementation of <i>2030Vision</i> 	<ul style="list-style-type: none"> Project level EIA 	<ul style="list-style-type: none"> Irish Rail RPA NRA Local Authorities