



Metro North Scoping Report

For consultation

February 2008

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Railway Procurement Agency

Metro North EIS:
Draft Scoping Report for consultation

February 2008

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For and on behalf of Environmental Resources Management
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Date: 07/02/08

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Annex A: List of Attendees at the Metro North Scoping Workshop
Annex B: Summary of comments received as part of consultation

Glossary

Term	Definition
Agronomy	The science of soil management, land cultivation, and crop production.
Alignment	The position of tracks relative to the surrounding topography.
Alternative route option	Route options which were considered other than the route that was decided upon.
Alternatives	Any EIS must include an outline of the main alternatives considered during the development of the project design and an indication of the main reasons why significant decisions were made, taking into account the environmental effects. Alternatives typically relate to alternative route alignments, alternative designs and alternative construction processes.
An Bord Pleanála	An Bord Pleanála was established in 1977 under the Local Government (Planning and Development) Act, 1976 and receives and assesses all railway order applications and the associated EIS. The railway order application and EIS for Metro North will be submitted to An Bord Pleanála for deliberation.
Aquifer	An underground bed or layer of earth, gravel, or porous stone that yields water.
Archaeological site	All upstanding and buried archaeological monuments, deposits, and features which pre-date the year 1700AD. All monuments which are listed in the Sites and Monuments Record of the Department of Arts, Heritage, Gaeltacht and the Islands. All sites described and mapped by the SMR have the full protection of National Monuments legislation (1937-1995).
At-grade	At public carriageway level i.e. at ground level (as opposed to underground or elevated).
Baseline environment	Detailed description of the existing environment prior to the introduction of the proposed scheme. Future environmental conditions are assessed relative to this baseline.
Bored tunnel	Tunnel mined using the tunnel boring machine
British and Irish Archaeological Bibliography	An online database containing datasets covering publications from AD 1695 to the present day on archaeology and the historic environment, historic buildings, maritime and industrial archaeology, environmental history, and the conservation of material culture - with a geographical focus on Britain and Ireland.
Candidate Special Area of Conservation (cSAC)	Candidate sites to be strictly protected under the EC Habitats Directive.
Census of Ireland	A census of the population of the whole of Ireland, occurring every ten years between 1821 and 1911.
Civil Survey letters	A detailed survey of landuse and land ownership in Ireland undertaken by the English government in 1641.
CO₂	Carbon Dioxide.
Construction compounds	Site where construction equipment is to be stored and construction operation is to be managed from.
Construction phase	The period of time over which Metro will be constructed
Contamination	The act of contaminating or polluting; including (either intentionally or accidentally) unwanted substances or factors.
Candidate Special Area of Conservation (cSAC)	Candidate sites to be included in Annex I and II of the EC Habitats Directive (92/43/EEC) due to them being considered to be of European interest following criteria given in the directive.

Term	Definition
Culvert	A channel or conduit for passing water under a road or embankment.
Cumulative impacts	Impacts that occur as a result of the addition of the incremental impact of an action to other past, present or reasonably foreseeable actions
Cut and cover	A method of construction whereby a tunnel is excavated from the surface and then covered back over.
DART	Dublin Area Rapid Transport.
DCU	Dublin City University.
Demography	The study of the size, growth, and age and geographical distribution of human populations, and births, deaths, marriages, and migrations.
Dewatering	The removal of water that infiltrates a tunnel during construction.
Direct effects	The effects that will occur as a direct result of the project.
DMRB	Design Manual for Roads and Bridges (UK).
Do-minimum scenario	The future scenario that does not include the Metro North project
Do-something scenario	The future scenario that includes the Metro North project
Dublin Transportation Office (DTO)	Statutory agency which provides transport and landuse advice to organisations operating in the Greater Dublin Area.
Ecosystem	A community of different plant and animal species interacting with one another and with their non-living environment.
EIA regulations	Collective name for the various statutory instruments through which the EC Council Directive on Environmental Assessment (Directive 85/337/EC as amended by Directive 97/11/EC) was implemented in Ireland.
Electoral Divisions (EDs)	The smallest administrative area for which population statistics are published by the Central Statistics Office
Elevated section	A section of Metro that is raised off the surface, i.e. viaduct.
Environmental Impact Assessment (EIA)	The process of examining the environmental effects of the proposed road scheme development – from consideration of environmental aspects at design stage through to preparation of an Environmental Impact Statement, evaluation of the EIS by the competent authority and the subsequent decision as to whether the development should be permitted to proceed, also encompassing public response to that decision
Environmental Impact Statement (EIS)	A statement of the effects, if any, which proposed development, if carried out, would have on the environment. This document presents the findings of the EIA to the decision-makers and the public
Environmental Protection Agency (EPA)	Ireland's statutory body for the balanced and sustainable protection and management of the environment.
Eastern Regional Fishing Board (ERFB)	The statutory body responsible for maintaining and improving environmental quality and developing and protecting the fisheries resource in the eastern region of Ireland.
Fauna	Animals
Flora	Vegetation
Geotechnical investigation	Investigations performed by geotechnical engineers or engineering geologists to obtain information on the physical properties of soil and rock around a site to design earthworks and foundations for proposed structures and for repair of distress to earthworks and structures caused by subsurface conditions.

Term	Definition
Geological Survey Ireland (GSI)	Founded in 1845 it is responsible for providing geological advice and information, and for the acquisition of data for this purpose.
Greater Dublin Area	The Greater Dublin Area comprises the Dublin and Mid-East Regions. The constituent counties are: Dublin County Borough and the Counties of Dun Laoghaire-Rathdown, Fingal, and South Dublin (Dublin Region) together with the counties of Kildare, Meath and Wicklow (Mid-East Region).
Greenbelt	a policy or landuse designation used in landuse planning to retain areas of largely undeveloped, wild, or agricultural land surrounding or neighbouring urban areas.
Greenfield	Uncontaminated, undeveloped land
Greenhouse gases	Components of the atmosphere that contribute to the greenhouse effect. Greenhouse gases include water vapour, carbon dioxide, methane, nitrous oxide, and ozone. The majority of greenhouse gases come mostly from natural sources but are also contributed to by human activity.
Groundborne noise	Sound that passes through the ground and is audible at the surface.
Groundwater	Groundwater is the water beneath the surface that can be collected with wells, tunnels, or drainage galleries, or that flows naturally to the earth's surface via seeps or springs.
Groundwater flow	Movement of water beneath the ground surface facilitated by the types of subsurface materials, faulting and bedding, the slope and hydrological characteristics of the materials and the amount and location of water.
Habitat	The physical and living environment in which an organisms or community of organisms live
Hayes's Indices	A catalogue of all the articles, poems and reviews (apart from short notices) in the periodicals published in Ireland, which contain material likely to be of value for research whatever the intellectual or cultural activity.
Hydrocarbon pollution	The contamination of an environment with substances consisting only of carbon and hydrogen atoms e.g. oils
Hydrological impacts	Impacts on water systems including rivers, lakes, groundwater etc.
Indirect impact	Impacts on the environment which are not a direct result of the project, often produced away from the project or as a result of a complex pathway
In-stream impacts	Impacts which occur within the waters of a watercourse
Irish Rail Interconnector	A connection with a proposed 5.2 km underground line, connecting the Docklands and Hueston Station.
Launch sites	The locations from which the tunnel boring machines are to be launched
Linear scheme	A scheme that is linear in dimension
Luas	Dublin's light rail transport system
M50	A C-shaped orbital motorway transport route around Dublin
Metro stop	Points at which passengers will be able to embark and disembark the Metro
Mining techniques	The methods used to extract from the ground.
Mitigation	The purposeful implementation of decisions or activities that are designed to reduce the undesirable impacts of a proposed action on the affected environment.
Mitigation measures	Measures taken to avoid, reduce and, if possible, remedy significant adverse effects

Term	Definition
Modal share	The proportion of population that uses each mode of transport for their routine journeys.
Modal shift	The decision by people to discontinue using one particular mode of transport and to move to another for their routine journeys.
Monitoring	Repetitive and continuous observation, measurement and evaluation of (environmental) data to follow changes over a period of time. In the context of EIA, monitoring is used to assess the efficiency of control and mitigation measures
National Heritage Area (NHA)	An area considered important for the habitats present or which holds species of plants and animals whose habitat needs protection.
NO₂	Nitrogen Dioxide
Non-statutory bodies	Organisations not established by the government.
Non-technical summary	Information for the non-specialist reader to enable them to understand the main environmental impacts of the proposal
NO_x	Nitrogen Oxides
National Roads Authority (NRA)	Ireland's statutory body for securing the provision of a safe and efficient network of national roads.
Operational phase	The period of time over which the scheme will be in operation
Ordinance Survey Ireland (OSI)	The organisation responsible for mapping Ireland and for disseminating the collated information and data.
Ordinance Survey letters	A collection of correspondences between surveyors from the nineteenth century, detailing geographical data
Overhead contact system	The system through which power is supplied to the scheme.
Park & ride sites	Facilities at public transport stations that allow commuters to leave their personal vehicles in a car park and transfer to a bus, rail system (rapid transit, light rail or commuter rail) or carpool for the rest of their trip.
Permanent effects	Effects that are not reversible and which will persist indefinitely
Phase 1 Habitat Survey	Standard ecological field survey methodology to identify, record and map the key habitats and species, in line with the Heritage Council's 2000 Guidelines
PM₁₀	Particulate matter with a diameter of less than 10 microns
Proposed National Heritage Area (pNHA)	An area that is potentially considered important for the habitats present or which holds species of plants and animals whose habitat needs protection.
R132	A relatively new regional road that passes through Balbriggan and Swords and terminates at a junction with the N1 in Whitehall.
Railway infrastructure	Any land, buildings, structures, equipment, systems, vehicles, services or other structures used in connection with, or necessary or incidental to, the movement of passengers by rail
Railway order	The authorisation given by the Minister for Transport for a railway project to commence construction.
Railway Procurement Agency (RPA)	The independent statutory body responsible for securing the provision of light rail and metro infrastructure
Receiving environment	The extent of the existing environment within which the project is to be developed and any area that may be impacted upon as a result of the project.
Records of Monuments and Places (RMP)	A database of all archaeological monuments in the state compiled by the Archaeological Survey of Ireland.

Term	Definition
Register of Historic Monuments (RHM)	The name, location and a brief description of all the historic monuments and archaeological areas in State compiled by the National Monuments Service of the Department of the Environment, Heritage and Local Government.
Residual impact	Those impacts that would remain after the effect of mitigation measures have been accounted for
Retained cut	Tunnel that is excavated but is not covered over after, generally the sections of the route where Metro descends to and rises from underground tunnels.
Risk	the likelihood of a specific effect occurring within a specified period or in specified circumstances
Route option	Prior to decision on the route of Metro there were various route options that were considered.
Royal Historical Society Bibliography	an authoritative guide to what has been written about British and Irish history from the Roman period to the present day. The Bibliography is hosted by the Institute of Historical Research, which is part of the University of London.
Scope	The spatial and temporal extent which the environmental impact assessment is to be evaluated over.
Scoping	The process of identification of the most significant issues to be addressed within the EIA process. It is a method of ensuring that an EIA focuses on the important issues and avoids those that are considered to be less significant
Secondary effects	The potential effects of additional changes that are likely to occur later in time or at a different place as a result of the implementation of a particular action.
Segregated	Separated
Sensitive receptors	Those who are likely to experience a change in their environment as a result of the construction of Metro due to their own nature
Severance	The separation/reduction in separation of population from facilities and services they use within their communities.
Significant impact	An impact which, by its character, magnitude, duration of intensity alters the environment
Sites and Monuments Record (SMR)	Lists with accompanying maps and files of all certain or possible archaeological sites and monuments mainly dating to before 1700AD for all counties.
Special Area of Conservation (SAC)	Sites included in Annex I and II of the EC Habitats Directive (92/43/EEC) due to them being considered to be of European interest following criteria given in the directive.
Special Protection Area (SPA)	An SPA is a designation under the European Union directive on the Conservation of Wild Birds (79/409/CEE).
Species migration	The movement of species between habitats
Spoil	The earth excavated during tunnelling
Stakeholders	Those who may be potentially affected by a proposal (e.g. local people, the proponent, government agencies, NGOs, donors and others).
Statutory bodies	Organisations established at the behest of government
Stop	Points at which passengers will be able to embark and disembark Metro
Stop access points	The points via which the stops can be accessed.
Track gauge	The distance between the two rails
Townscape	The urban landscape

Term	Definition
Traffic flow	The number of vehicles travelling along a particular route in a particular direction over a period of time.
Traffic impact model	A model, constructed from data that enables the determination of transportation demands of development proposals and provides for reduction of adverse impacts on the transportation system.
Transport 21	The capital investment framework through which the transport system in Ireland will be developed, over the period 2006 to 2015.
Tunnel Boring Machine (TBM)	The machine used to excavate earth and create the underground tunnels through which Metro will run.
Tunnel sections	Various lengths of the tunnel underground
Twin tunnels	Two tunnels are constructed side by side, but not connected other than by occasional cross-over passages.
Utilities	Services provided such as water, gas, electricity and telecommunications.
Ventilation shaft	A construction which facilitates the movement of air in and out of the tunnel sections
Ventilation shaft sites	The location where the ventilation shaft is to be constructed.
Vertical alignment	The positioning of the Metro relative to the ground level
Vibration attenuating trackforms	Types of track that are specifically designed so as to minimise the potential for impacts associated with vibration
Visual amenity	The value of a particular area or view in terms of what is seen
Wildlife Corridors	A strip of habitat connecting wildlife populations separated by human activities

1.1 BACKGROUND

The Government launched Transport 21 in November 2005. Transport 21 represents the Government's policy framework with regards to meeting Ireland's current and evolving transportation needs. Central to Transport 21 is Metro North, a public transport system linking Dublin City Centre to Dublin Airport and the north of Swords. The Railway Procurement Agency (RPA) is developing Metro North.

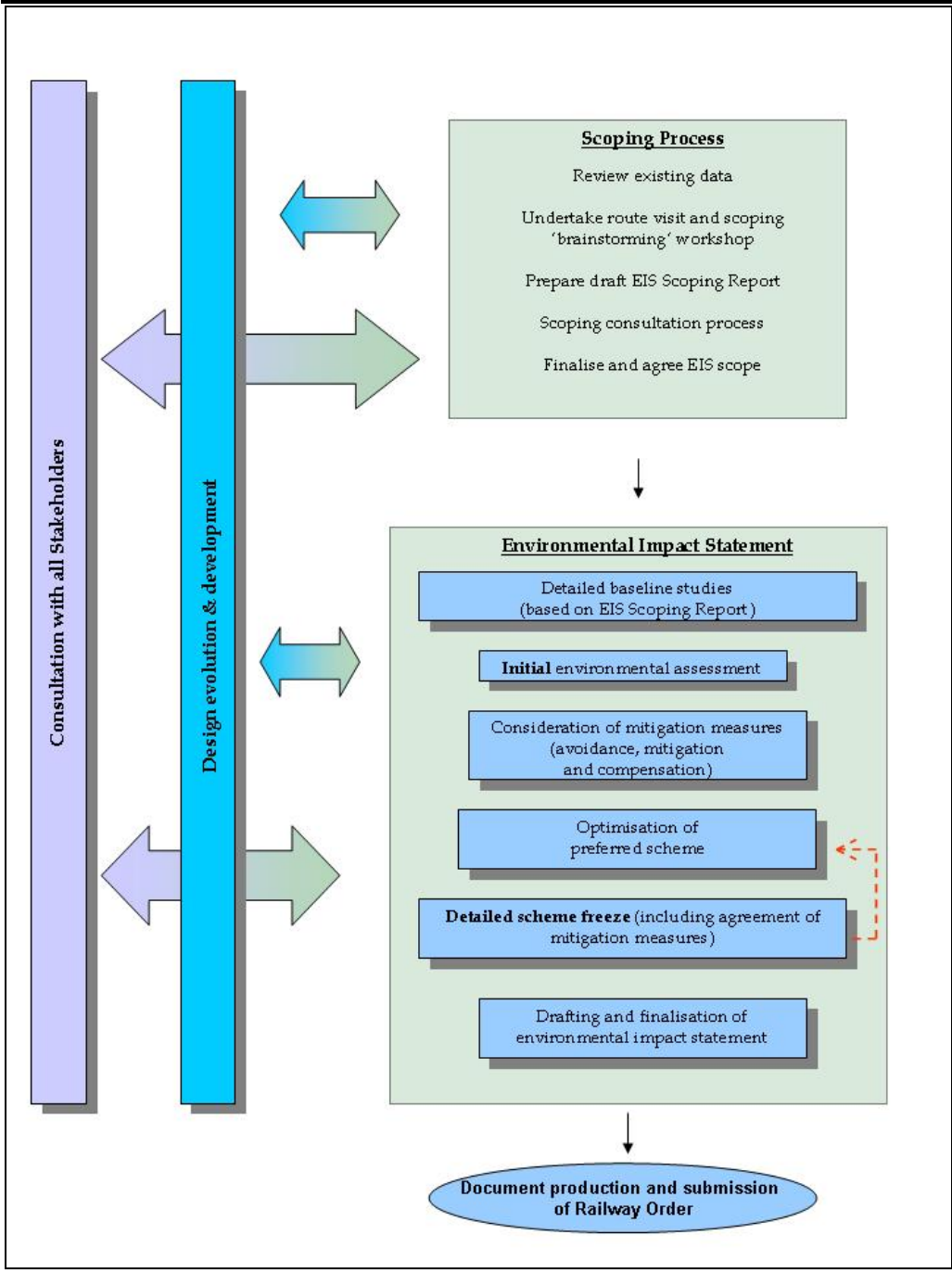
The Transport (Railway Infrastructure) Act (2001), hereafter referred to as the 'the 2001 Act', specifies the legal requirements with respect to railway order applications and provisions, environmental impact statements and regulation of railway schemes. According to the 2001 Act, an EIS is a statement that includes 'a description of the aspects of the environment likely to be significantly affected by the proposed railway works' (Section 39).

The Planning and Development (Strategic Infrastructure) Act (2006), hereafter referred to as the 'the Act', was enacted in July 2006. This Act introduces a new consent process for major, strategic infrastructure projects (such as the Metro North), which are of national and public importance. According to 'the Act', a project such as Metro North requires permission from An Bord Pleanála. This permission is granted in the form of a railway order. In order to obtain the railway order, RPA is required to make a railway order application to An Bord Pleanála and part of this process involves the preparation of an environmental impact statement (EIS).

1.2 THE EIA PROCESS AND THE PURPOSE OF THIS SCOPING REPORT

An early and vital part of any EIA process is the scoping stage. Scoping is defined by the Environmental Protection Agency as a process which 'identifies issues... that are likely to be important during the EIS and eliminates those that are not' (EPA, 2003). Scoping also has to '...ensure that all relevant issues (that might arise during construction and operation) are identified and addressed to an appropriate level of detail' in the EIS (EPA, 2003). Scoping is an ongoing process and the scope of the EIS is always subject to revision if and when new information becomes available. The importance of the scoping phase is illustrated in Figure 1.1. This draft of the scoping report represents the status of the scheme in November 2007. It is envisaged that the EIS will be completed in 2008.

Figure 1.1 Metro North EIA process



Defining the scope of any EIA is an iterative process and during the course of the project the scope can be expected to adapt and change in response to new information that becomes available and comments from interested parties.

This document has been produced in order to facilitate consultation with interested parties and the public and sets out the proposed scope of the EIA. It sets out the issues that RPA proposes to address in the EIA as well as the manner by which RPA proposes that the issues be assessed. The issues to be addressed and the methodologies of assessment are set out in this document in a straightforward, non-technical and transparent manner in order to inform the public and encourage input from all interested parties. It is RPA’s intention that this document should inform the consultation process and

encourage comments from any individual regarding what needs to be addressed by the EIA and the manner by which any issues should be addressed.

All of the information in this document should be considered to be draft proposals as opposed to finalised statements and this document does not in any way prejudice the development and modification of the EIA scope during the course of the assessment.

1.3 SCOPING CONSULTATION

Effective consultation with statutory and non-statutory bodies is an essential part of any scoping process. A number of statutory and non-statutory bodies were sent an earlier draft Scoping Report and were asked to comment on the proposed scope of the Metro North EIS. A list of the parties involved in this consultation initiative is shown below.

- Dublin City Council;
- Fingal County Council;
- Dublin Airport Authority;
- Dublin Transportation Office;
- Department of Transport;
- Department of Environment, Heritage & Local Government;
- Environmental Protection Agency;
- Department of Communications Marine & Natural Resources;
- National Roads Authority;
- An Taisce;
- Heritage Council;
- National Parks and Wildlife Service;
- Eastern Regional Fisheries Board;
- Irish Aviation Authority;
- Dublin Airport Authority;
- Commission for Energy Regulation;
- Ballymun Regeneration;
- Office of Public Works;
- Geological Survey of Ireland;
- Badgerwatch Ireland;
- Bat Conservation Ireland;
- Birdwatch Ireland;
- Waterways Ireland;
- Dublin Port Authority;
- ESB;
- Bord Gáis; and
- Eircom.

RPA published a letter informing a wide range of other interested parties that a draft of the Scoping Report could be downloaded from their website:

www.rpa.ie/metro

A number of comments were received in relation to the draft scoping report and these comments are summarised in Annex B.

RPA also held a Scoping Workshop in the Gresham Hotel on the 18th of December 2006. A list of attendees is provided in Annex A. A summary of the comments received at the workshop is shown in Annex B.

2 ROUTE SELECTION PROCESS

According to the 2001 Act, the EIS must contain 'an outline of the main alternatives studied by the applicant and an indication of the main reasons for its choice, taking into account the environmental effects'. Consideration of the main alternatives for the scheme will be presented in the following stages:

1. System concept selection;
2. Route selection; and
3. Detailed design of the emerging preferred route.

1. System concept selection

The EIS will provide a summary of the options considered in relation to the type of public transport system to be used in this scheme (e.g. light rail, light metro and heavy metro).

2. Route selection

The EIS will provide a summary of the route evaluation work that was carried out in relation to the four alternative route options considered (West, Central, Alternative Central and East). The Alternative Central route was selected by RPA as the Emerging Preferred Route in September 2006.

3. Detailed design of the emerging preferred route

Once the Emerging Preferred Route was selected, more detailed design work was initiated in order to refine the final route alignment. This work involves further consideration of alternatives on a more local scale and at particular locations, such as different ways to cross a junction (i.e. elevated, at ground level or in a cutting) or access a stop. An outline of the main options considered in this regard will be detailed in the EIS.

3.1 ROUTE DESCRIPTION

Metro North is a proposed rail-based, public transport system comprising a combination of bored tunnel, cut & cover tunnel, retained cut, surface and elevated sections. Seventeen individual stops are proposed. Two of these stops, at Lissenhall and Estuary, are located in areas that are currently undeveloped and subject to a new local area plan. The construction of these stops is dependent on the approval of this local area plan. The overall length of the route is approximately 18 km.

The Metro North maintenance depot is located in Belinstown, approximately 1.6 km to the north of Swords, and west of the M1 motorway, on land that is currently used for agriculture. A high-voltage substation is to be located in this area. The northern terminus stop of Metro North, **Belinstown**, lies immediately southwest of the depot. A park & ride facility with 2,000 parking spaces designed as a multi-storey car park is planned to serve this stop. From Belinstown, the proposed route continues southwards at surface level to the first provisional stop, **Lissenhall**. The route then crosses the Broadmeadow River and the Ward River and runs at the surface along the western verge of the R132 to the second provisional stop, **Estuary**.

To the south of this stop, the route ascends as an elevated section of track, crosses over the Estuary roundabout, travels along the median of the R132 and over traverses the Seatown roundabout before descending to reach the next surface stop, **Seatown**, located in the median of the R132. Access to this stop will be by pedestrian crossings on the R132. After this stop, the route proceeds southwards on the surface along the central median of the R132 and then crosses under the Malahide roundabout. To the south of the roundabout, the route emerges from the underpass and runs on the surface in the median of the R132 to the **Swords** stop which is located opposite the Pavilions Shopping Centre. Initially, access to this stop will be by pedestrian crossings on the R132. Provision is being made to allow this stop be accessed from a possible future east-west bridge over the R132.

South of Swords stop, the route ascends as an elevated section of track to cross over Pinnock Hill roundabout and continues south to a surface stop at **Fosterstown**. This stop is located close to the entrance to the Airside Retail Park on the eastern side of the R132. A park & ride carpark with 300 spaces is to be provided to the east of this stop. The route then continues southwards along the eastern side of the R132 and crosses the R132 by means of an underpass just south of junction at Airside and Boroimhe. The route emerges from the underpass to run on the surface and on embankments through a greenfield area to enter two bored tunnels, one for northbound Metro services and one for southbound, to the north of Dublin Airport. A turn-back facility is to be provided in this area to the north of the airport to allow some services to commence at the airport.

The route proceeds in bored tunnels under Dublin Airport and emerges south of the airport. An underground stop, **Airport**, is located on this tunnelled section close to the existing terminal and the planned second terminal on the site of the proposed airport Ground Transportation Centre.

South of the airport, the route travels on the surface and turns south-west crossing agricultural lands between Dublin Airport and the M50 motorway. The stop at **Dardistown** is located to the north of the M50 and a park & ride facility with 300 parking spaces is proposed for this location. To the west of this stop, space provision will be made for a future link to the proposed Metro West line. A high voltage substation is also to be located in this area.

Continuing south, the route crosses the M50 on a bridge to the east of the M50/Ballymun Road interchange. The route then proceeds south on the surface until the next stop, **Northwood**, which is located near Santry Demesne, south of the M50. The route then proceeds southwards in a cut and cover tunnel along the Ballymun Road to a shallow underground stop at **Ballymun**, adjacent to the new civic plaza. Ballymun stop will be constructed by cut and cover techniques.

Continuing south in a cut and cover tunnel along Ballymun Road, the next stop is **DCU**, which is a shallow underground stop on the eastern side of Ballymun Road beside the Albert College housing estate. This stop will be constructed by cut and cover techniques. After this stop, the cut and cover tunnel continues south to pass through Albert College Park/Hampstead Park, changing to two bored tunnels within the park. From here, the route remains underground in the bored tunnels until its termination at St. Stephen's Green. All of the stops to the south of this location are underground stops to be constructed by cut and cover techniques with the exception of the stop under O'Connell Bridge, which is to be part mined.

Continuing south in bored tunnel from Albert College/Hampstead Park, the next stop is **Griffith Avenue**. This stop is to be located to the southwest corner of the agricultural lands on the northern side of Griffith Avenue. Proceeding in a south-easterly direction, the route continues in tunnel under St. Patrick's College playing fields. An emergency access and ventilation shaft is to be located in the southwest corner of the college campus. The route continues in tunnel under the Tolka River and the next stop is **Drumcondra**, where an interchange with Iarnród Éireann's suburban rail services to Maynooth will be provided.

The route then turns in a south-westerly direction under the Royal Canal to **Mater** stop, proposed to be under the Mater Hospital's existing surface car park. To the south of this, the route turns and runs in a south-easterly direction to **Parnell Square** stop, located on Parnell Square East.

South of Parnell Square, the route proceeds in tunnel under O'Connell Street to **O'Connell Bridge** stop. This stop will be located under the Liffey and access to this stop will be provided to the north and the south of O'Connell

Bridge. Entrances to the north of the River Liffey will facilitate interchange with the Luas Red Line.

From O'Connell Bridge the alignment proceeds to the final stop, which is **St. Stephen's Green**. This stop is to be located under St. Stephen's Green, with entrances outside the northwest corner of the Green, close to Grafton Street. This terminus stop will permit interchange with the Luas Green Line services and the proposed Irish Rail Interconnector. Turnback of metro vehicles will be via a tunnel loop under St. Stephen's Green. This loop will be constructed using mining techniques.

3.2

SYSTEM CONCEPT

In terms of its size, range and capacity, Metro North is considered to be in between the existing Luas system (a partially-segregated, light rail system) and the DART system (a segregated, heavy rail system). It will be totally segregated for most of its length, though it is proposed to operate as a light railway once north of Swords.

The system will be electrified with a power supply of 750 volts of direct current (DC) supplied via sixteen substations along the route. Metro North will have an overhead contact system which supplies power to the individual metro vehicles. The track gauge of Metro North will be 1,435mm, which is the same as the Luas Red and Green Lines.

The tracks in the bored tunnel sections will be generally located between twenty metres and thirty metres below ground level. The precise depths will be clarified in the EIS once the vertical alignment of the track has been finalised. In locations where the alignment is underground, twin-tunnels will be constructed and these will each have an internal diameter of approximately six metres.

It is anticipated that 95,000 passengers will use Metro North each day, totalling 34 million passengers a year. The frequency of services will be every four minutes at peak times initially. This may be increased to services every two minutes over time to meet growing demand. The travel time from Dublin city centre to Dublin Airport will be approximately twenty minutes and to Swords will be approximately twenty-five minutes.

3.3

SYSTEM CONSTRUCTION

The construction of a linear scheme such as Metro North is typically undertaken at a number of locations simultaneously with many work activities running concurrently. The construction period will last from 2009 – 2013 (approximately). During this period, the main construction compounds will be located within lands at Albert College/Hampstead Park, at the proposed Metro North depot site in Belinstown to the north of Swords and at Dardistown, between the M50 and the airport. There will also be large construction sites at each of the underground stops. A number of smaller construction sites will be required at areas along the above ground sections of

the alignment and also at park & ride sites, stop access points, ventilation shaft sites and the launch sites for the tunnel boring machines.

The majority of the tunnelled sections of the scheme will be constructed using tunnel boring machines. The remaining tunnel sections will be constructed using cut and cover techniques. Most of the underground stops will be constructed using cut and cover methods. The exception is the O'Connell Bridge stop which will be partly mined, though the entrance concourses will be constructed by cut and cover.

4 SCOPE OF THE ASSESSMENT

4.1 TECHNICAL SCOPE

The range of issues to be addressed in the EIS is referred to as the 'technical scope'. Section 39 of the 2001 Act (as amended by the Act) lists the required components of EISs prepared in relation to railway orders:

39. – (1) *An environmental impact statement shall contain the following information:*

(a) a description of the proposed railway works comprising information on the site, design and size of the proposed railway works;

(b) a description of the measures envisaged in order to avoid, reduce and, if possible, remedy significant adverse effects;

(c) the data required to identify and assess the main effects which the proposed railway works are likely to have on the environment;

(d) an outline of the main alternatives studied by the applicant and an indication of the main reasons for its choice, taking into account the environmental effects; and

(e) a summary in non-technical language of the above information.

(2) An environmental impact statement shall, in addition to and by way of explanation or amplification of the specified information referred to in subsection (1), contain further information on the following matters:

(a) (i) a description of the physical characteristics of the whole proposed railway works and the land-use requirements during the construction and operational phases,

(ii) an estimate, by type and quantity, of the expected residues and emissions (including water, air and soil pollution, noise, vibration, light, heat and radiation) resulting from the operation of the proposed railway works;

(b) a description of the aspects of the environment likely to be significantly affected by the proposed railway works, including in particular –

(i) human beings, fauna and flora,

- (ii) soil, water, air, climatic factors and the landscape,
 - (iii) material assets, including the architectural and archaeological heritage, and the cultural heritage,
 - (iv) the inter-relationship between the matters referred to in this paragraph;
- (c) a description of the likely significant effects (including direct, indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative) of the proposed railway works on the environment resulting from –
- (i) the existence of the proposed railway works,
 - (ii) the use of natural resources,
 - (iii) the emission of pollutants, the creation of nuisances and the elimination of waste, and a description of the forecasting methods used to assess the effects on the environment;
- (d) an indication of any difficulties (technical deficiencies or lack of know-how) encountered by the applicant in compiling the required information; and
- (e) a summary in non-technical language of the above information, to the extent that such information is relevant to a given stage of the consent procedure and to the specific characteristics of the railway works or type of railway works concerned, and of the environmental features likely to be affected, and the applicant may reasonably be required to compile such information having regard, amongst other things, to current knowledge and methods of assessment.
- (3) (a) If a person, before applying to the Board for a railway order, so requests, the Board shall, after consulting the person and such bodies as may be specified by the Minister for the Environment, Heritage and Local Government for that purpose, give a written opinion on the information to be contained in an environmental impact statement.
- (b) The giving of a written opinion in accordance with this subsection shall not prejudice the exercise by the Board of its powers pursuant to this Act to require an applicant to furnish further information in relation to the effects on the environment of the proposed railway works.
- (4) The European Communities (Environmental Impact Assessment) Regulations 1989 to 2005 and the Act of 2000 and any regulation made thereunder in relation to environmental impact assessment shall not apply to anything done under an order made under this Act

An assessment will be undertaken by specialists for each of the environmental topics required under Section 39(b) of the 2001 Act. Construction and operation of Metro North will be carried out in accordance with the relevant health and safety legislation, having particular regard to:

- EU-Framework, European Council Directive 12th of June 1989 (89/391/EEC);
- The Safety, Health and Welfare at Work Act 2005;
- S.I. No. 504 of 2006, Safety, Health and Welfare at Work (Construction) Regulations 2006;
- Railway Safety Act, 2005; and

- Applicable standards and guidelines.

As a result, occupational health and safety issues have been scoped out of the EIS for Metro North.

If during the EIA process, it becomes apparent that a significant environmental effect may arise in relation to a matter previously excluded from the technical scope of the EIS, the environmental issue in question will be addressed in the EIS, as appropriate. Consultation with the public has prompted RPA to include a human health assessment in the EIS.

4.2 SPATIAL SCOPE

The geographical or spatial scope of the appraisal takes into account the following factors:

- the physical extent of the proposed works;
- the nature of the baseline environment; and
- the manner by which the impacts are likely to be propagated.

The spatial extent of the EIS study area will depend on the environmental topic being considered. Landscape and visual effects may extend over long distances (e.g. views of the bridge over the M50). In contrast, construction noise and dust effects may be limited to areas in the immediate vicinity of construction sites. The study area will therefore be identified and defined for each individual environmental topic chapter of the EIS.

4.3 TEMPORAL SCOPE

The construction phase of the project is currently envisaged to occur between 2009 and 2013. Impacts associated with the construction phase during this time will be assessed as part of the EIA process and detailed in the EIS.

With regards to the operational phase of the scheme, the temporal scope of the EIA extends beyond the date that the scheme opens because:

- Certain environmental topics are dependent upon longer term considerations. For example, long-term plans for natural or planned restoration may have effects on ecology and landscape in the distant future; and
- Metro North will not attain maximum capacity until some time after the opening date. Certain effects will therefore continue to increase after the opening date e.g. noise associated with growth in rail traffic.

The EIS will assess the operative scenario of Metro North operating at maximum capacity in 2027.

The temporal scope of the EIS will also take into account the time period during which works are likely to be undertaken i.e. during day-time or night-time periods.

Desk-based studies and site visits have facilitated the identification of a number of potential environmental topics. These topics form part of the proposed scope of the EIS. As baseline studies and the alignment design detail progresses, it is possible that further potential impacts will arise. These will also be considered in the EIS. Table 5.1 outlines the main issues that have been identified to date.

Table 5.1: Potential environmental impacts to be considered in the Metro North EIS

Environmental impact	Human Beings : Policies	Human Beings: Landuse	Human Beings: Socio-economic	Human Beings: Traffic	Human Beings: Noise	Human Beings: Vibration	Flora and Fauna	Water (surface and groundwater)	Air quality and climate impacts	Soil and geology (incl. settlement)	Landscape & visual impacts	Material Assets: Archaeology and Cultural Heritage impacts	Material assets : property	Material assets : agronomy	Material assets : EMC	Material assets : Utilities
	LOCATION															
Belinstown stop including the depot	☐ ●	☐ ●	●	☐ ●	☐ ●		☐ ●	☐ ●	☐ ●	●	☐ ●	☐ ●	☐ ●	☐ ●	☐ ●	
Belinstown to Lissenhall stop	☐ ●	☐ ●	●	☐ ●	☐ ●		☐ ●	☐ ●	☐ ●	●	☐ ●	☐ ●	☐ ●	☐ ●		
Lissenhall stop	☐ ●	☐ ●	●	☐ ●	☐ ●		☐ ●	●	☐ ●	●	●	☐ ●	☐ ●	☐ ●		☐ ●
Lissenhall stop to Estuary provisional stop	☐ ●	☐ ●	●	☐ ●	☐ ●		☐ ●	☐ ●	☐ ●	●	●	☐ ●	☐ ●	☐ ●		☐ ●
Estuary provisional stop to Seatown stop	☐ ●	☐ ●	●	☐ ●	☐ ●		☐ ●	☐ ●	☐ ●	●	●	☐ ●	☐ ●			
Seatown stop	☐ ●	☐ ●	●	☐ ●	☐ ●		☐ ●	☐ ●	☐ ●	●	●	☐ ●	☐ ●			☐ ●
Seatown stop to Swords stop	☐ ●	☐ ●	●	☐ ●	☐ ●		☐ ●		☐ ●	●	●		☐ ●			☐ ●
Swords stop	☐ ●	☐ ●	●	☐ ●	☐ ●		☐ ●	☐ ●	☐ ●	●	●	☐ ●	☐ ●		☐ ●	☐ ●
Swords stop to Fosterstown stop	☐ ●	☐ ●	●	☐ ●	☐ ●		☐ ●		☐ ●	●	●		☐ ●		☐ ●	☐ ●
Fosterstown stop	☐ ●	☐ ●	●	☐ ●	☐ ●		☐ ●	☐ ●	☐ ●	●	●	☐ ●	☐ ●		☐ ●	☐ ●
Fosterstown to Airport stop	●	●	●	☐ ●	☐ ●	☐ ●	☐ ●	☐ ●	☐ ●	●	●	☐ ●	☐ ●	☐ ●		☐ ●
Airport stop	☐ ●	☐ ●	●	☐ ●	☐ ●	☐ ●	☐ ●	☐ ●	☐ ●		☐ ●		☐ ●		☐ ●	☐ ●
Airport stop to Dardistown stop	☐ ●	☐ ●	●	☐ ●	☐ ●	☐ ●	☐ ●	☐ ●	☐ ●	●	●		☐ ●	☐ ●		☐ ●

Environmental impact	Human Beings : Policies	Human Beings: Landuse	Human Beings: Socioeconomic	Human Beings: Traffic	Human Beings: Noise	Human Beings: Vibration	Flora and Fauna	Water (surface and groundwater)	Air quality and climate impacts	Soil and geology (incl. settlement)	Landscape & visual impacts	Material Assets: Archaeology and Cultural Heritage impacts	Material assets : property	Material assets : agronomy	Material assets : EMC	Material assets : Utilities
Dardistown stop	☐ ●	☐ ●	●	☐ ●	☐ ●	☐ ●	☐ ●	☐ ●	☐	●	●	☐	☐ ●	☐ ●		☐
Dardistown stop to Northwood stop	☐ ●	☐ ●	●	☐	☐ ●	☐ ●	☐ ●	☐ ●	☐	●	●	☐	☐ ●			☐
Northwood stop	☐ ●	☐ ●	●	☐ ●	☐ ●	☐ ●	☐ ●	☐ ●	☐	●	●	☐	☐ ●		☐ ●	☐
Northwood stop to Ballymun stop	☐ ●	●	●	☐ ●	☐ ●	☐ ●		☐ ●	☐		●		☐ ●		☐ ●	☐
Ballymun stop	☐ ●	☐ ●	●	☐ ●	☐	☐ ●		☐	☐		●		☐ ●		☐ ●	☐
Ballymun stop to DCU stop	☐ ●	●	●	☐ ●	☐	☐ ●		☐	☐		●		☐ ●		☐ ●	☐
Dublin City University stop	☐ ●	☐ ●	●	☐ ●	☐	☐ ●	☐	☐	☐	●	●	☐	☐ ●		☐ ●	☐
DCU stop to Griffith Avenue stop	☐ ●	☐	●	☐	☐	☐ ●		☐	☐		☐	☐	☐ ●	☐ ●		☐
Griffith Avenue stop	☐ ●	☐ ●	●	☐ ●	☐	☐ ●	☐	☐	☐	●	●	☐	☐ ●			☐
Griffith Avenue stop to Drumcondra stop	☐ ●		●			☐ ●		☐					☐ ●			☐
Drumcondra stop	☐ ●	☐ ●	●	☐ ●	☐	☐ ●		☐	☐	●	●	☐	☐ ●			☐
Drumcondra stop to Mater stop	☐ ●		●			☐ ●		☐					☐ ●			☐
Mater stop	☐ ●	☐ ●	●	☐ ●	☐	☐ ●		☐	☐	●	●	☐	☐ ●			☐
Mater stop to Parnell Square stop	☐ ●		●			☐ ●		☐					☐ ●			☐
Parnell Square stop	☐ ●	☐ ●	●	☐ ●	☐	☐ ●		☐	☐	●	●	☐	☐ ●			☐
Parnell Square stop to O'Connell Bridge stop	☐ ●		●			☐ ●		☐					☐ ●			☐
O'Connell Bridge stop	☐ ●	☐ ●	●	☐ ●	☐	☐ ●		☐	☐	●	●	☐	☐ ●			☐
O'Connell Bridge stop to St. Stephen's Green stop	☐ ●		●			☐ ●		☐					☐ ●			☐
St. Stephen's Green stop	☐ ●	☐ ●	●	☐ ●	☐	☐ ●	☐	☐	☐	●	●	☐	☐ ●			☐

☐ Temporary impacts (generally occurring during construction)

● Permanent and long-term impacts (generally occurring during operation of the scheme with some also arising from construction)

PROPOSED METHODOLOGIES FOR ASSESSING ENVIRONMENTAL IMPACTS

This section outlines the proposed assessment methodology for the potential environmental impacts associated with Metro North. The basic methodology that is used in this EIS to evaluate the baseline environment is consistent where possible across all baseline chapters. This is in order to ensure that the methodology is as transparent as possible, and can be effectively communicated and understood by all stakeholders including the general public.

The existing baseline is evaluated on the basis of specific, qualitative criteria relating to importance, sensitivity and existing adverse effects that may diminish environmental quality. The combined effect of these three considerations is expressed quantitatively in terms of a 'functional value'. The magnitude of any impact will be assessed and quantified and then the significance of all impacts will be determined through consideration of the functional value of the existing environment and the magnitude of the potential environmental impact.

Each of the topic-specific methodologies to be used are described in brief in this section.

6.1 HUMAN HEALTH

Feedback from the Metro North consultation initiatives suggests that the public has concerns with respect to the potential for human health effects associated with the project. These concerns relate to the construction phase in particular. In response to this feedback, a public health specialist has been appointed to the EIA team and the EIS will contain a chapter specifically focusing on human health.

Construction

During the construction phase, there is potential for human health effects due to emissions such as noise, vibration, electromagnetic conductivity, dust or traffic. Disturbance of vermin populations may also occur and the potential for any human health impacts to occur as a result of this will be assessed.

Operation

The potential for human health effects during operation is thought to be largely positive. However, potential psychosocial impacts such as violence, suicide and stress could also occur and will be fully assessed

Assessment Methodology

The baseline human health section of the EIS comprises an overview of relevant consultation feedback and a literature review. This identifies the human health effects that will be assessed. Census data and landuse survey

data will be used to identify sensitive receptors in electoral districts along the alignment. These receptors will be described in terms of their location and sensitivities.

The potential effects associated with the construction and operational phase will be assessed as follows.

The potential for health effects associated with noise and vibration during the construction and operational phases will be assessed through review of the results of the noise and vibration modelling exercises. Particular attention will be given to potentially sensitive receptors such as schools and hospitals and potential effects such as disturbance of sleep. The modelled levels will be assessed by comparing the predicted levels with levels specified in relevant standards.

The potential for health effects associated with radon gas during the construction and operational phases will be assessed through review of predicted levels of radon occurrence and comparison of these levels to relevant standards.

Similarly the potential for health effects associated with EMF (Electrical and Magnetic Fields) during the construction and operational phases will be assessed through review of predicted levels of EMF occurrence and comparison of these levels to relevant standards.

The potential for health effects associated with traffic during the construction and operational phases will be assessed through review of the traffic modelling results.

The potential for health effects associated with dust particularly relating to the construction phase but also the operational phase will be assessed. The construction engineers will provide information regarding the type and likely quantities of dust to be generated by the project. This information will be reviewed and assessed through comparison with relevant standards.

The potential effects of biological agents e.g. from sewers and the potential for contamination of water supplies, will be assessed through review of information provided by the construction design team.

The potential psychosocial impact (violence, suicide, stress etc) of the construction and operational phases of the project will be assessed using evidence from similar projects elsewhere both in Ireland (e.g. Luas) and elsewhere e.g. metros elsewhere. Consultation will be held with HSE (Health Service Executive) personnel to ensure that local factors are recognised and considered.

6.2

HUMAN BEINGS

According to the EPA's 'Advice Notes on Current Practice in the Preparation of Environmental Impact Statements' (EPA, 2003), the Human Beings chapter should address the identification and evaluation of impacts from the construction and operation of Metro North in terms of policy, socio-economic impacts and landuse applications.

6.2.1

Policy

The overall policy context for Metro North will be fully considered in the EIS.

Assessment Methodology

Metro North will be assessed against all relevant policy documents including:

- Sustainable Development - A Strategy for Ireland (1997);
- National Development Plan (1999);
- National Climate Change Strategy (2000);
- A Platform for Change (2001);
- National Heritage Plan (2002);
- National Spatial Strategy (2002);
- National Biodiversity Plan (2002);
- Transport 21 (2005);
- Ten-Year Framework Social Partnership Agreement 'Towards 2016';
- Regional Planning Guidelines for the Greater Dublin Area;
- Dublin City Development Plan 2006 - 2011;
- Fingal Development Plan 2006 - 2011;
- North Ballymun Local Area Plan (2005);
- Dublin Airport Masterplan (2006); and
- Greater Dublin Strategic Drainage Strategy (2005).

6.2.2

Socio-economics

Construction

The construction phase of the project has the potential to disrupt people and businesses along the proposed route. Construction will require the temporary closure of specific roads to allow construction of the scheme. RPA is already considering mitigation measures in this regard including: careful management of the construction process; extensive communication with the public, businesses, local authorities and other relevant stakeholders; and creation and advertising of alternative transport/access routes. The construction phase may also be associated with positive socio-economic impacts in terms of employment created for individuals involved in the construction sector.

Operation

The operation of the Metro North service is likely to bring long-term socio-economic benefits to the areas that it serves. Metro North will provide transport options and accessibility to a significant proportion of the population of Dublin. This new transport system is likely to reduce traffic congestion during peak hours along the major arteries in Dublin thereby improving the quality of life for commuters. A reduction in the extent of

delays arising from traffic congestion will result in a reduction in the economic cost of congestion. Metro North will also enhance the ongoing regeneration of Ballymun and assist the future expansion of Dublin Airport including the new passenger terminal building.

Assessment Methodology

The key socio-economic issues which will be assessed in the EIS are demography, population age-profile, unemployment rates, and travel to work data. Quantitative census data will be obtained (where available) from 2002 Census and 2006 Census for the Metro North study area (deemed to be the Electoral Districts (EDs) which are within 500m of the alignment). This data will be qualitatively assessed to provide the socio-economic baseline. The assessment of potential impacts will comprise a qualitative assessment of the likely impacts of Metro North on this socio-economic baseline. The assessment will indicate general changes in baseline data trends (e.g. changes in unemployment, populations, travel to work etc.) and also potential impacts on commercial businesses within the study area. Potential impacts on the wider area (i.e. Greater Dublin Area) will also be assessed on a high-level qualitative basis.

6.2.3

Landuse

This section of the EIS will focus on the existing landuse in the area of Metro North, the land-take required for both construction and operation of Metro North, and the effects that the development will have on landuse.

Construction

The construction phase of the scheme will require the temporary use of land. Compound areas will be required during the construction phase including the depot site at Belinstown; lands north and south of the M50; parts of Albert College/Hampstead Park; and parts of St. Stephen's Green. The sensitivity of St. Stephen's Green and Albert College/Hampstead Park will be carefully considered during the design and sizing of any compounds in these areas. Land will also have to be temporarily used in a number of locations along the length of the route to provide for localised construction access, tunnel portals, the vent shaft locations, cut & cover locations etc.

Operation

Lands will be permanently required to facilitate Metro North track and associated railway infrastructure (the depot, surface stops, underground stop entrances, signage, sub-stations etc.).

Assessment Methodology

A landuse classification survey will be undertaken to determine all existing landuses along the alignment including residential, commercial, retail, health/medical, educational, industrial and recreational.

Temporary (construction) and permanent (operation) land-take will be assessed and evaluated in the EIS. The significance of any impact on landuse

will be assessed with reference to the current use and functional value of the existing landuse.

6.3

TRAFFIC

Construction

The construction of surface, cut and cover and elevated sections of the alignment has the potential to cause traffic disruption during the construction phase of the project because road closures and traffic diversions will be required. Traffic disruption is likely to occur around stops that are to be constructed on the surface and using cut and cover techniques. The construction phase will also generate traffic as trucks will be needed to transport plant, equipment and materials to and from sites. Traffic will also be created in association with the transport of construction and demolition waste and excavated spoil generated in the course of tunnelling and construction of underground stops. The impact during construction is expected to be greater than that during the operational phase.

Operation

The operation of Metro North will result in a modal shift from car and bus-based transport to Metro. This is likely to reduce the total number of car journeys on the road network. However, localised areas of traffic congestion may occur at specific junctions and roads, around park & ride facilities and around the proposed Metro North stops. Some roads may be permanently reconfigured to facilitate the scheme.

Assessment Methodology

The first step in a traffic assessment is to define the scale and extent of the area to be covered by the traffic assessment. According to the Design Manual for Roads and Bridges, Volume II – Environmental Assessment (UK Department of Transport, 1993), the area to be covered by the traffic assessment can be divided into two categories:

- Highway links where traffic flows will increase by more than 30%; and
- Any specifically sensitive areas where traffic flows will increase by 10% or more (sensitive areas would include high pedestrian flow links or links surrounding hospitals or schools).

In view of the above guidance, the traffic assessment will consider:

- Any area where traffic flow is predicted to increase by more than 30%; and
- Any specifically sensitive areas where traffic flow is predicted to increase by 10% or more.

Areas where traffic flow will change by less than 10% will not therefore be considered in the EIA.

Once the study area has been defined, the traffic assessment will involve the following tasks:

- Collation of existing traffic data in terms of vehicular, pedestrian and cyclist flows;
- Collation of accident data;
- Modelling of this existing data to establish baseline flows for 2011 (the peak construction period) and 2027 (the peak operation period); and
- Development of do-something scenarios for 2011 and 2027.

The models that are developed will be then be used to:

- Identify changes in traffic flow and modal share between baseline and do-something scenarios during the construction phase and operational phase;
- determine the impact of the scheme (construction and operation) on cyclist routes including severance of cycle lanes and the effect of this disruption and any required realignments of cycle lanes;
- determine the impact of the scheme (construction and operation) on pedestrian routes located in specific sensitive areas (schools, hospitals, community facilities) and in areas where traffic is predicted to increase by 10% or more and significant levels of pedestrian flow are experienced; and
- Develop mitigation measures during construction and operational phases including:
 - Identification of traffic routing alternatives;
 - Junction design assessments and alterations;
 - Assessment of the interaction between Metro and road traffic at surface crossing points; and
 - Assessment of accessibility arrangements at stops for vehicular, cycle and pedestrian access.

6.4

NOISE

Construction

Airborne noise may potentially occur in areas where above ground sections of the route are being constructed and at construction sites along the alignment. Noise may also be generated in areas where ancillary structures are being constructed e.g. ventilation shafts such as the shaft at St Patrick's College.

Operation

Airborne noise from the underground sections of Metro North is not anticipated to be an issue of concern. Areas that may experience airborne noise during the operation period are therefore restricted to: areas where the route passes above ground; areas around above-ground stops; the depot; and areas where noise may occur in association with changes in traffic flows e.g. areas around traffic/road diversions and areas around and within park & ride facilities. Noise may be generated due to testing of the emergency ventilation system during commissioning and maintenance of the system.

Noise impacts during the operational phase may include both positive and negative impacts depending on changes in traffic levels in localised areas.

Assessment Methodology

A site walkover has been carried out to identify sensitive receptors along the route. A noise survey has been undertaken to determine the ambient noise environment at these sensitive receptors along the route. Both day and night-time measurements have been taken. In areas such as Ballymun, where the area may be redeveloped and ambient noise may change, it may be necessary to estimate ambient noise levels for future years based on predicted traffic flows or extrapolation from other comparable sites.

The EIS will examine the impact of the addition of airborne noise from Metro North to the existing ambient noise levels. The significance of any noise impact will be assessed with reference to whether or not it exceeds any relevant absolute standards that may be set by legislation or guidance documents and also in consideration of the existing ambient noise level, the duration of the activity and the sensitivity of the receptor.

All of the issues detailed in this section will be assessed in the EIS. The EIS will also identify measures to attenuate noise to as low as reasonable practicable during construction and operation.

6.5

VIBRATION

Construction

Vibration may occur in areas where the tunnel boring machines are being operated. These areas include the inner city areas and around the area of the airport. Vibration from tunnelling may also result in some groundborne noise effects and this will also be considered. This is only likely to have a noticeable effect at a few locations where airborne noise may be absent within a building.

Operation

Vibration could potentially occur in some areas due to movement of the metro vehicles on the track.

Assessment Methodology

A survey of the existing environment in the area of the scheme will be carried out to identify sensitive human populations, sensitive features of archaeological, architectural or cultural importance and facilities that have vibration-sensitive equipment. Baseline vibration monitoring will be carried out to assess existing vibration levels in areas that have existing sources of vibration.

Vibration criteria will be developed for different receptors i.e. human beings, structure types, equipment etc. These criteria will be based on conservative international standards for annoyance and disturbance and will take into account the operational characteristics of Metro North.

Levels of operational vibration to be produced by the scheme will be predicted using a computer model called FINDWAVE®. FINDWAVE is a finite difference time-domain numerical model for computing the propagation of waves in elastic media. The groundborne noise and vibration assessment at

the representative sensitive receivers will be used to outline the linear extent of recommended vibration attenuating trackforms.

The EIS will identify mitigation measures to attenuate vibration as low as reasonably practicable during construction and operation.

6.6

FLORA AND FAUNA

Construction

The predominant habitat type through which the alignment passes is built land. This occurs in the city centre, Dublin Airport and Swords. Improved agricultural grassland, amenity grassland and arable crops are also traversed by the proposed alignment. Agricultural grassland and arable crops are often associated with hedgerows of variable quality. Hedgerows are an important ecological resource (they function as wildlife corridors and facilitate the movement of species) and any significant impacts on hedgerows will require mitigation. The main areas of ecological interest are the Broadmeadow River, Broadmeadow SPA (Special Protection Area) and the Malahide cSAC (candidate Special Area of Conservation) and pNHA (proposed National Heritage Area). All of these areas are located towards the northern end of the scheme.

The route passes under a number of other ecologically-important systems (such as the River Liffey and Royal Canal).

Operation

In some areas (located primarily around Dublin Airport and north of Swords) the route crosses greenfield areas on the surface. These lands are currently used for agriculture or recreation. In these areas, the proposed alignment has the potential to act as a barrier to species migration and to sever existing habitats during the operation phase. Sections of Metro North may also cause severance of hedgerows in these areas.

The elevated sections of Metro North may have the potential to interfere with flight paths of bats and birds, especially in the case of sections that cross close to wooded areas or cross water bodies.

Assessment Methodology

The ecological assessment will be undertaken in three distinct phases, namely baseline assessment, impact prediction and identification of mitigation measures. This section of the EIA will be prepared in consideration of all relevant EIS guidance including the following specific guidance documents:

- Guidelines for Ecological Assessment, Institute of Ecological and Environmental Management (EPA, 2002); and
- Guidelines for the Assessment of Ecological Impacts of National Road Schemes (National Roads Authority, 2006).

The baseline assessment will include a review of existing published ecological information and accessible unpublished sources.

Following the desktop survey, the ecological survey team conducted an in-field Phase 1 Habitat Survey along the route alignment to identify and classify the habitats that occur along the proposed route. This survey focuses on the non-urban sections of the scheme and has been carried out in accordance with the Heritage Council's 'Guide to Habitats in Ireland' (Fossit, 2002). A description of species composition, vegetation condition and sensitivity has been compiled for each habitat. The classification of habitats by their vegetation and species allows areas of high floral diversity and sensitivity to be plotted on maps. These Habitat Maps indicate the location of different habitat types and are supported by associated species lists, photographs and other relevant information.

Regular site walkovers have been undertaken to assess the presence of birds, bats, badgers, amphibians and other fauna. The Phase 1 survey identified species of particular interest; therefore additional specialised surveys have been carried out. The study team pays particular attention to seasonality when undertaking fieldwork.

The significance of ecological impacts will be evaluated. Impacted receptors may include affected species, populations, communities, habitats and ecosystems. The significance of any impact will depend on the distributional spread, rarity and vulnerability of the receptor and its ability to recover.

Measures may be required to mitigate impacts on ecological resources. Measures may include avoidance of habitats, design alterations and rehabilitation if the flora/fauna and ecosystems are identified as significantly affected by the development. Where significant loss of high value habitat, flora or fauna is predicted, monitoring and management of residual or cumulative impacts will be required.

6.7

SOIL AND GEOLOGY

Construction

The construction of Metro North can be associated with a number of potential impacts on soil and geology. To the north of the scheme, the soil that currently occupies the depot location will have to be stripped back in order to facilitate construction of the depot. This soil will be stockpiled on-site and then reused for landscaping and levelling of the depot area.

In all areas where the alignment is located on the surface, some impact on soils may occur as soil is removed to lay the foundations for the track. In areas where cut and cover techniques are used, temporary extraction, followed by reuse of spoil, will occur. The tunnel boring machines can also be expected to generate significant volumes of spoil. The spoil that will be generated will be extracted at Albert College/Hampstead Park and in an area near Dublin Airport. This spoil will have to be carefully stored in a suitable location and inspected prior to being reused in the scheme or being disposed of in an appropriate manner.

The risk of encountering contamination during construction has been predicted to be high in a number of areas along the scheme in view of the industrial and landuse history of the areas and the results of geotechnical investigations that have been carried out. Areas identified as high risk include: most of the city centre; North Ballymun; the M50 crossing area; and areas around Swords. If contaminated material is encountered, it will need to be carefully removed and treated or disposed of in a suitably licensed waste facility. The means by which any contaminated spoil will be managed and the impact that this may have on the environment will be discussed in the EIS.

The construction of the underground and retained cut portions of the alignment may have the potential to cause ground movements which may affect property and infrastructure. Construction techniques and instrumentation and monitoring strategies will be adopted to ensure that these movements are kept to a minimum. The EIA will fully assess the potential for any impacts to occur with respect to ground settlement.

Operation

No operational impacts are envisaged.

Assessment Methodology

Existing soil and geology in the area of the alignment has been determined through desktop review of the information that is publicly available from the GSI. The results of the geotechnical investigations have been reviewed. Potential sources of contamination have been identified through review of historic records of landuse in specific areas, existing reports on contamination and the results of the geotechnical investigations.

The potential for ground settlement to occur will also be assessed as part of the EIA. Potential impacts will be identified through review of the construction strategy and any potential impacts will be evaluated in terms of magnitude and significance. Strategies for the management of spoil, settlement and potential contamination will be devised in order to minimise the potential for environmental impact.

6.8

WATER

Construction

A number of water bodies are located along the route of the proposed scheme (e.g. the Broadmeadow River, the Ward River, the Tolka River, the Royal Canal, the River Liffey etc.). Construction sites and vehicles may act as sources of contamination with respect to these surface watercourses and also underlying groundwater resources. Careful management will be needed in order to minimise this risk. Any bridging of watercourses will require careful design considerations to minimise in-stream impacts and hydrological impacts.

The removal of the surface layer of soil and vegetation and the subsequent stockpiling of excavated material during the construction phase has the potential to increase the vulnerability of groundwater resources. This practice

could also potentially lead to increased sediment loads in run-off and this run-off could potentially enter surface water bodies.

The tunnelling section of the scheme may require dewatering. The tunnel under the River Liffey will require careful consideration in this regard. Dewatering has the potential to alter the groundwater regime in the surrounding area. In addition, the volumes of water generated from the dewatering process may exceed the capacity of the nearby stormwater/foul drains. Groundwater generated from the dewatering process is also vulnerable to contamination. Dewatering may require disposal of groundwater in which case a Discharge Licence from Dublin City Council and/or Fingal County Council may be required. The structures associated with both stop boxes and tunnelled sections of Metro North may also potentially impede or alter the rate and direction of groundwater flow.

Spoil from tunnelling activities and construction of underground stops may also be in a liquid form and require careful management and storage.

Operation

Tunnelled sections of Metro North may impede or alter the rate and direction of groundwater flow.

Hydrocarbon pollution of soils and groundwater systems may arise through leaching of oils, mechanical fluids, lubricants etc. along the scheme. Vegetated sections of the route may need to be controlled or maintained and this may demand the use of pesticide sprays, which could potentially leach into the groundwater in the long-term and cause pollution.

The operation of the depot is likely to require the use of oils and fluids as part of routine maintenance activities. The depot will need to be designed in such a manner as to ensure the protection of groundwater and surface water resources from such potential pollution sources.

An indicative flooding map is not available for Dublin but the Greater Dublin Strategic Drainage Study has indicated that certain watercourses along the route (e.g. the Ward River, Broadmeadow River and the River Tolka) are prone to flooding. The design of Metro North will therefore need to consider any such flood risk and the EIS will have to consider any associated potential impacts.

Assessment Methodology

The description of the baseline environment for this chapter includes a description of the groundwater and surface water regime. The baseline is being determined through a combination of desk-based research and field surveys. Consultation with relevant authorities such as GSI, the OPW, Dublin City Council, Fingal County Council, Dublin City Archive, Trinity Map Library, Eastern Regional Fisheries Board and Waterways Ireland is being carried out.

This section of the EIA will be prepared in consideration of all relevant EIS guidance including the following specific guidance documents:

- IGI (2002), *Geology in Environmental Impact Statements – A Guide*, IGI;
- *Fisheries Guidelines for Local Authority Works (Draft) (1997)*, Engineering Division, Department of the Marine and Natural resources, Leeson Lane, Dublin 2;

Field surveys and visual inspections of all proposed water crossings will be undertaken. Geotechnical investigations commenced in the summer of 2006 and groundwater samples are currently being taken from some borehole locations.

6.9

AIR AND CLIMATIC FACTORS

Construction

Dust emissions and localised areas of low air quality have the potential to temporarily exist around construction sites for: the surface sections of the scheme; cut and cover sections; park & ride facilities and depot facilities. In the case of the tunnelled sections, air impacts are likely to occur only in close proximity to stops constructed using cut and cover techniques.

Construction may also result in the temporary closure of certain streets, which could in turn have implications for traffic flows and therefore distribution of air pollution and dust.

Significant construction-related impacts on microclimate are not envisaged during the construction phase. This will be assessed as part of the EIA process.

Operation

Operation of the scheme itself will have very little impact on local air quality. Local traffic in the area of the park & ride sites has the potential to impact on local air quality. Indirect effects on air quality may also be important because significant changes in traffic flows (and therefore air pollution) may occur as an indirect result of the scheme.

If green areas are paved over, this could have a localised effect on the microclimate of specific areas within the city. Metro North is also likely to reduce the volume of potential car-based journeys and therefore indirectly lead to a reduction in the amount of greenhouse gases produced in areas along the alignment. Additional power resources will however, be required for the project. These issues will be examined in the EIS.

Assessment Methodology

Air quality baseline data will be obtained from Dublin City Council, Fingal County Council and the EPA. Climate data will be obtained from Met Éireann. Existing localised air quality occurring as a result of traffic will also be assessed using the Design Manual for Roads and Bridges (DMRB) model. This is a spreadsheet-based model and will calculate existing emissions and concentrations of Carbon Monoxide (CO), Nitrogen Dioxide (NO₂), benzene

and particulate matter (PM₁₀) emitted along each of the road links specified in the traffic model.

The environmental effects of dust generation will be assessed qualitatively by considering the potential for impact at sensitive receptors along the route and in close proximity to work sites. Changes to roadside air quality will be investigated using dispersion modelling techniques and the traffic information obtained from the DMRB traffic impact model.

6.10 LANDSCAPE AND VISUAL

The introduction of new infrastructure to a landscape or townscape can have an obvious and immediate effect that can be either positive or negative, depending on the design of the newly introduced development and the nature and quality of the receiving landscape environment. These effects are measured in terms of the material changes that are likely to occur in the receiving environment (landscape or townscape impacts), together with the effects or impacts on views gained or lost by individuals (visual impacts).

Construction

Cut and cover construction sites, construction lighting, construction traffic haulage routes, construction plant and machinery and site compounds have the potential to impact on the landscape. Careful site management, use of site hoardings and other construction mitigation measures will be required in order to minimise these impacts.

Operation

Certain elements of the scheme may have long-term landscape and visual impacts. Examples include stop entrances, surface stops and surface or elevated route sections, embankments, the overhead contact system and ventilation shafts.

The extent to which the scheme can have a visual impact or a landscape impact is also dependent on the sensitivity of the receiving landscape or townscape. A number of areas along the alignment are recognised to be of high landscape or townscape value e.g. St. Stephen's Green, O'Connell Bridge, the town centre of Ballymun and undeveloped greenbelt areas located between Dublin Airport and Swords.

Assessment Methodology - Landscape Impact

This section of the EIA will be prepared in consideration of all relevant EIS guidance including the following specific guidance document:

- The Guidelines for Landscape and Visual Impact Assessment, Second Edition (Landscape Institute with the Institute of Environmental Management and Assessment, 2002).

The baseline character of the receiving landscape and townscape has been analysed by means of a desktop review and field survey. The desktop review includes a review of the relevant sections of the development plans.

On the basis of this desk exercise and site survey, impacts on landscape character, landscape policy, and designations will be predicted. Impacts in terms of loss of landscape elements such as significant tree or vegetation groups will also be assessed. The significance of any impacts will be evaluated with reference to the potential magnitude of change and the sensitivity of the receiving environment.

Assessment Methodology - Visual Impact

Viewpoints will be selected to represent visual receptors (individuals who are likely to experience a change in view) and significant views in the area of the alignment. Each viewpoint will be categorised in terms of viewer type i.e. residents of dwellings, recreational users and/or those engaged in work or travel. Impacts on any viewpoint will be assessed taking into account the potential magnitude of impact and the sensitivity of the viewer and the viewpoint.

6.11 MATERIAL ASSETS

6.11.1 Archaeology, architectural heritage and cultural heritage

Construction

Groundbreaking will be required in any area where stops are to be constructed by cut and cover methods. Groundbreaking will also be required in areas where the track alignment is to be constructed using cut and cover methods and in some other localised areas such as: areas around carparks; park & ride facilities; tunnel boring machine launch sites; the depot; and in areas where infrastructure associated with the track is to be constructed e.g. the ventilation shaft in St. Patrick's College.

Operation

Metro North is not likely to have any significant impact on features of archaeological, architectural or cultural heritage during the operational phase of the scheme.

Assessment Methodology

The assessment will be carried out in consideration of the guidance given in 'Architectural Heritage Protection: Guidelines for Planning Authorities' (DoEHLG, 2004) and any other relevant guidance that has been published by the DoEHLG or other recognised sources.

Recognised and potential features of importance in terms of archaeological, architectural or cultural heritage have been identified through review of existing data and field surveys. Consultation with relevant authorities is being undertaken in order to facilitate the identification of sensitive areas, potential impacts and required mitigation measures. Existing data sources to be consulted will include the following:

- Archaeological sites and monuments – The Sites and Monument Record (SMR), Record of Monuments and Places (RMP) maps, Register of Historic

Monuments (RHM) and Urban Archaeological survey for the county will be reviewed. The relevant files contain aerial photographs, early maps, Ordnance Survey (OS) memoirs, Office of Public Works' (OPW) Archaeological Survey notes and other relevant publications.

- Archaeological finds – The topographical files in the National Museum of Ireland will be consulted to identify any archaeological artefacts that have been discovered for any of the townlands within the study area. Other published catalogues of archaeological objects will also be reviewed.
- Excavations bulletins – Excavations bulletins and journals will be reviewed to identify previous archaeological excavations in the area of the alignment.
- Aerial photography – All available aerial photographs of the area will be assessed, including those available from RPA, OS, National Museum of Ireland (NMI) and Geological Surveyors Ireland collections.
- Cartographic research – Primary cartographic sources to be consulted will consist of the early editions of the Ordnance Survey 6 inch maps (TCD Map Library). Earlier cartographic sources, such as private estate papers, will also be examined.
- Dublin and Fingal Development Plan – The relevant sections of the development plans will be studied to identify potential areas of high sensitivity.
- Archaeological and historical publications – A comprehensive study of archaeological and historical publications will be carried out. The study will include primary historical sources as well as bibliographies of published works such as the British & Irish Archaeological Bibliography, Royal Historical Society Bibliography, Hayes's Indices, The Census of Ireland, The Civil Survey and Ordnance Survey letters.

A detailed site survey will also be carried out to supplement the desktop review and further assess the potential impact of the scheme.

Potential impacts will be identified and mitigation measures to reduce or ameliorate the significance of the potentially adverse impacts on features of importance will be devised.

6.11.2 Utilities, Electromagnetic Conductivity (EMC) and Radiation

Construction

Utilities, in this context, refer to physical infrastructure associated with telecommunications and the supply of electricity, gas and water services. Construction of Metro North is likely to impact on existing utilities in areas where groundbreaking will occur e.g. at all cut and cover stops.

Impacts relating to EMC and radiation are unlikely to occur during the construction phase of the project.

Operation

No significant impacts on utilities are envisaged. Potential EMC impacts may be associated with stray currents and interference with computers, TVs, radios and other telecommunication equipment. The level of impact is expected to be minimal because Metro North will meet all European standards regarding

telecommunication equipment (Directive on Electromagnetic Compatibility (89/336/EEC) which is transposed into Irish Law by means of S.I. No. 22 of 1998). In meeting this requirement, Metro North will not interfere with any computer, telecommunication or electronic system. Metro North does not have the potential to have any impact relating to radiation.

Assessment Methodology

All utility infrastructure and equipment will be identified along the Metro North alignment. This exercise will be undertaken in close consultation with the respective utility owners. RPA will liaise with the utility owners to define a programme for the relocation of utilities where required. The potential for any EMC impact to occur will also be assessed and any residual impacts that may occur will be fully described in the EIS.

6.11.3 Property

Construction

The route passes through a number of densely populated city areas. It is therefore possible that the scheme may impact on properties adjacent to the proposed alignment during the construction phase. A small number of properties will have to be acquired and demolished in order to facilitate the construction of the scheme. In a small number of locations, the alignment passes on the surface through areas of private property. Appropriate mitigation measures will be put in place in these areas. Tunnelling during the construction phase may also cause ground settlement, which could have an impact on property. This will be assessed as part of the EIA process.

Operation

The scheme is not likely to have any significant impact on property during the operational phase.

Assessment Methodology

The EIS will carry out a detailed analysis of property utilisation along the route and show any properties that will be affected by the scheme.

6.11.4 Agronomy

Construction

In a number of areas, the proposed alignment passes through land that is currently used for agricultural purposes. These lands are primarily located to the north of the M50 and a number of stops are located in this area. Geotechnical and archaeological investigations of the land through which the alignment passes will have to be carried out prior to the scheme being constructed. This may cause short-term disruption of farming practices. The construction of the surface sections of the alignment and the surface stops at these locations will also cause disruption of farmland. The construction of the tunnelled sections of the alignment under the airport will not have any significant impact on agronomy practices in the overlying lands within the airport boundary.

Operation

In the majority of the agricultural areas, the alignment is located on the surface so once the scheme is constructed, the land will not be available for agriculture. As well as having an impact in terms of direct land-take, the scheme also has the potential to sever existing farmland areas and may result in alternative access routes being needed in some areas.

Assessment Methodology

A site survey of all farms in the area of the alignment will be carried out and consultation with individual farmers will be undertaken in order to determine the size of individual farms and the type of farming that is taking place on the lands. Potential impacts on farming will be identified and described qualitatively. The significance of any impacts will be determined with reference to the functional value of the farmland and the magnitude of the impact. Appropriate mitigation measures will be devised so as to minimise the impact on agriculture.

6.12 INDIRECT IMPACTS, CUMULATIVE EFFECTS AND INTERACTIONS

A specific section of the EIS will discuss any predicted indirect or cumulative impacts. Indirect effects may be associated with activities that do not explicitly form part of the scheme. Cumulative impacts may arise from the combination of different impacts, the recurrence of impacts of the same type at different locations and the interaction of different impacts over time. Any indirect or cumulative effects associated with the scheme will be discussed in detail in this chapter.

7 MITIGATION MEASURES AND RESIDUAL IMPACTS

Mitigation measures

For each significant, adverse effect of the scheme, the specialists undertaking the EIA will specify mitigation measures consistent with best practice in their respective field. The mitigation measures are likely to fall into three categories:

- Mitigation by avoidance;
- Mitigation by reduction; or
- Mitigation by remedy.

Residual Impacts

Residual impacts (i.e. impacts of the scheme that persist even when mitigation measures have been implemented) will be classified as insignificant or significant (albeit reduced). If residual impacts are deemed to be significant, then the level of significance will be explained in the EIS.

The EIS will be submitted to An Bord Pleanála as part of the railway order application for the scheme. The EIS will comprise of a number of sections and the precise manner in which these sections will be presented is currently being determined. Key sections of the EIS are set out below.

- **Section 1** will describe the requirement for an EIA, the structure of the EIS and the EIS study team. The need for the Metro North scheme and the objectives of the scheme will also be discussed.
- **Section 2** will describe the alternatives that were considered during the design of the scheme and during the EIA process. The consultation that was undertaken with regards to the design of the scheme will also be discussed.
- **Section 3** will describe the proposed scheme including the construction methodology and programme.
- **Section 4** will provide the planning context for the scheme, including national and regional policy guidance and local planning policies.
- **Section 5** will outline the overall approach adopted in the EIA process including a description of how the scope of the EIS was defined and the issues relating to the consultation process undertaken by RPA. This section will also include a description of any data limitations experienced by the project team.
- **Section 6** will provide a summary of baseline environment along the Metro North route. Baseline descriptions will be provided for each environmental topic.
- **Section 7** will discuss the impacts that will occur during the construction and operational phase in the case of each of the environmental topics. Impacts will be described in terms of magnitude and significance.
- **Section 8** will discuss the mitigation measures to be put in place to mitigate the significant impacts. Residual impacts that will persist after mitigation has been put in place will be highlighted.
- A separate **Non-Technical Summary (NTS)** will be prepared to describe the main findings of the EIS in non-technical language.

Annex A

List of attendees at the
Metro North Scoping
Workshop

Organisation	Representative
RPA	Anne Lillis Rory O'Connor Geoff Featherstone
ERM	Angelika Grohmann-Wörle Olan Howell Caroline Kennedy
An Taisce	Frank Corcoran Kevin Duff
Bord Gáis	Aiden Toher
Department of the Environment, Heritage and Local Government	Eamon Cody Gerry Browner Margaret Keane
Dublin Airport Authority	Barry Drinan
Dublin City Council	Eoghan Madden Tim O'Sullivan
Dublin Port Company	Michael Sheary
Dublin Transportation Office	Owen Shinkwin
Eircom	Gerry McNamara
Electricity Supply Board	Tony Hickey
Fingal County Council	Jim Cleary Marjorie O'Shea Pat O'Callaghan Rachel Kenny
The Geological Survey of Ireland	Ronnie Creighton
Irish Aviation Authority	Billy Hann
Jacobs Engineering	Richard Tucker
National Roads Authority	Ronan O'Dea
Office of Public Works	Angela Rolfe Margaret Gormley
Roughan & O'Donovan (on behalf of Fingal County Council)	Mark Smillie

Annex B

Summary of comments
received as part of
consultation

The following abbreviations are used in this section:

BG: Bord Gáis

BR: Ballymun Regeneration

DCC: Dublin City Council

DTO: Dublin Transport Authority

FCC: Fingal City Council

GADRA: Griffith Avenue & District Residents Association

IAA: Irish Aviation Authority

OPW: Office of Public Works

BNC: Ballymun Neighbouring Council

DCBA: Dublin City Business Association

DoEHLG: Dept. of Env., Heritage & Local Government

ESB: Electricity Supply Board

FI: Fáilte Ireland

GSI: The Geological Survey of Ireland

NRA: National Roads Authority

PR: Private Resident

Subject	Comment	Party
Archaeology & Architectural Heritage	<ul style="list-style-type: none"> The central line should be tested for archaeological impacts as early as possible to assess unknown archaeology. The assessment methodology should be agreed with the DoEHLG prior to commence of the work. St. Stephen's Green should be considered as a feature of architectural heritage. The architectural impact must therefore be considered as well as the archaeological impact. The assessors should consider whether or not St. Stephen's Green is a National Monument under the National Monuments Acts 1930 - 2004. At least one member of DoEHLG believes that it is and if it is, Ministerial Consent will be required prior to development.. 	DoEHLG
	<ul style="list-style-type: none"> Structures within St. Stephen's Green must be protected e.g. statues, rails etc. 	OPW
	<ul style="list-style-type: none"> Any impact on St. Pappin's Church in Ballymun (a listed structure) should be considered. 	BR
	<ul style="list-style-type: none"> Parnell Square East is an important tourist and heritage area. 	DCBA
Traffic	<ul style="list-style-type: none"> The impacts of the development on bus routes and existing bus services must be considered, particularly during the construction phase i.e. requirements for temporary or permanent redefinition of bus routes during construction and/or to better support bus-Metro interchange. 	DTO, DCC, FCC
	<ul style="list-style-type: none"> Pedestrian traffic at O'Connell Street must be facilitated at all times. Private contractors should not park on the street. Construction compounds should only be sized for construction vehicles and not contractor cars. Road closures should be avoided where possible and should only be carried out in consultation with the DCBA. All soil removal should be via the two main construction compounds and not the city centre roads. 	DCBA
	<ul style="list-style-type: none"> Construction traffic must be minimised. 	BNC
	<ul style="list-style-type: none"> The assessment of traffic impact on pedestrians and the rating of traffic aspects should consider traffic during operation (i.e. severance and barriers) as well as traffic during construction. 	BR
	<ul style="list-style-type: none"> Severance impacts on traffic movements and pedestrian/cycle movements particularly in relation to the at-grade line at Lissenhall, Metropark and Ballymun/Santry must be assessed. <i>(Note: The stop at Metropark has now been renamed Dardistown)</i> 	DCC, FCC

Subject	Comment	Party
	<ul style="list-style-type: none"> ▪ The 500m assessment area within the city centre may not adequately address the traffic impact and may need to be widened. ▪ In Ballymun, the dual carriageway is the only vehicular link and Quality Bus Corridor – may have to replace some car capacity. 	DCC
	<ul style="list-style-type: none"> ▪ The impacts on traffic need to be considered in particular in relation to: <ul style="list-style-type: none"> - the areas around the stops; - the area around St. Stephen’s Green and along the Ballymun road between the town centre and the M50; - the 2,000 space car park; and - The interchange of two Luas Lines and the Metro at the corner of Abbey Street & O’Connell Street and the resulting pedestrian volumes. 	DTO, FCC, DCC
	<ul style="list-style-type: none"> ▪ If any sections of the M50 have to be closed (e.g. at the crossing point), approval from the NRA will have to be obtained. ▪ Scope of the traffic assessment should include an assessment of any impact that the development may have on: <ul style="list-style-type: none"> - the Lissenhall interchange on the M1; - the Ballymun and Finglas interchanges on the M50; and - any future plans to upgrade the Ballymun interchange to free flow operation. 	NRA
	<ul style="list-style-type: none"> ▪ The EIS should include an assessment of the demand for safe and convenient cycle and pedestrian access routes to the Metro stops. 	DTO
	<ul style="list-style-type: none"> ▪ Severance impacts on traffic movements and pedestrian/cycle movements particularly in relation to the at-grade line at Lissenhall, Metropark and Ballymun/Santry should be considered. <i>(Note: The stop at Metropark has now been renamed Dardistown)</i> 	DCC, FCC
Human Beings: Policy & Social & Economic	<ul style="list-style-type: none"> ▪ The impact of the development on local business – in particular in Parnell Square East where a major link will be removed. 	DCC
	<ul style="list-style-type: none"> ▪ The potential for Metro to encourage more compact development forms along its corridor, therefore contributing to the socio-economic development of the area should be assessed. 	DTO
	<ul style="list-style-type: none"> ▪ The Ballymun Masterplan and Integrated Area Plan and Main Street Strategy should be included in the policy documents against which the Metro is assessed. 	BR
	<ul style="list-style-type: none"> ▪ The impact of the development at St. Stephen’s Green in terms of health and safety should be considered. 	OPW
Material Assets including Land-Use, Property & Utilities	<ul style="list-style-type: none"> ▪ The impact of the development on utilities must be considered. Specific items to be considered include: <ul style="list-style-type: none"> - The stop construction method’s impact on utilities; - Access difficulties to cables under the track; and - The diversion of gas mains along the route and near the stops; ▪ Existing navigation systems located at Dublin Airport must not be affected and assurances are required that there will be no electromagnetic interference with navigational systems (the airport has the following navigational aids: ILS, Dvor/DME, Radar and VHF Comms equipment). A software model will have to be used to prove that there will be no unwanted electronic interference. 	ESB, IAA, BG
	<ul style="list-style-type: none"> ▪ Erosion of greenbelts with the location of stops must be considered, especially in relation to the impact on the footprint of St. Stephen’s Green (the entire Green and not just the 500m radius). 	FCC, OPW
	<ul style="list-style-type: none"> ▪ The impact that the park & ride will have on land-take. 	FCC

Subject	Comment	Party
	<ul style="list-style-type: none"> Clarification needs to be provided in relation to the scope of the material assets assessment to explain whether the property-related aspect of this assessment will refer to acquisition value or other considerations. 	BR
	<ul style="list-style-type: none"> Changes in land-use that may develop as a consequence of the Metro need to be considered e.g. densification in the catchment area. 	DTO
Noise & Vibration	<ul style="list-style-type: none"> Must be considered in particular in relation to the depots and for the people of Swords. 	FCC
	<ul style="list-style-type: none"> Condition surveys may be required in some areas during both construction and operation. 	DCC
	<ul style="list-style-type: none"> The 500m zone of assessment within the urban areas should be extended to encompass the entire Green. 	OPW
	<ul style="list-style-type: none"> Any noise impact associated with the ventilation shafts must be assessed. 	DCC
	<ul style="list-style-type: none"> Work at Griffith Avenue should not be allowed to be carried on 24/7 because noise levels would be intolerable. 	PR member of GADRA
Landscape & Visual	<ul style="list-style-type: none"> Visual impacts in relation to elevated sections must be assessed. 	FCC
	<ul style="list-style-type: none"> The visual impacts of lighting must be assessed. The impact of lighting should be considered in particular for any elevated sections and sections along the R132 where the line is located very close to existing properties. 	FCC
	<ul style="list-style-type: none"> Visual impacts need to be considered in relation to the entrances to the stops. 'Landmark stops' are needed in some locations. 	DoEHLG
	<ul style="list-style-type: none"> The potential for any development works to have a positive visual impact should also be assessed as part of the EIA and design process. 	DoEHLG
	<ul style="list-style-type: none"> The entrances to the O'Connell Stop must be compatible with the streetscape. 	DCC and An Taisce
	<ul style="list-style-type: none"> The exterior of the compounds should be used to advertise the scheme and not the contractors. All construction plant and equipment should be kept within the confines of St. Stephens Green so as to minimise the visual impact on the surrounding environment. 	DCBA
Air	<ul style="list-style-type: none"> The impact of dust from the development should be considered in relation to the entire area of St. Stephen's Green and not just a 500m radius. 	OPW
	<ul style="list-style-type: none"> The impacts associated with the removal of spoil must be considered, particularly in the city centre. The efficiency of any wheelwash system will have to be proven. 	DCC
	<ul style="list-style-type: none"> Work at Griffith Avenue should not be allowed to be carried on 24/7 because dust levels would be intolerable. 	PR member of GADRA
Ecology, Flora & Fauna	<ul style="list-style-type: none"> The 500m zone of assessment within the urban areas should be extended to encompass the entire area of St. Stephen's Green. 	OPW
	<ul style="list-style-type: none"> If any permanent structures are to be erected in the Green, the impact must be considered. 	OPW
	<ul style="list-style-type: none"> The impact that pedestrian footfall and the development may have on the water table for the trees. 	OPW
	<ul style="list-style-type: none"> The main areas of conservation concern are hedgerows, nesting birds, badgers, bats and the Broadmeadow Estuary, which enters the Malahide Estuary (an SAC, SPA and pNHA). 	NPWS
	<ul style="list-style-type: none"> Griffith Avenue should not be damaged and the trees along this avenue should be retained. 	PR member of GADRA
	<ul style="list-style-type: none"> The stop entrance should be moved further east on Griffith Avenue at the entrance to the Courtlands Estate so as to eliminate any need to damage any trees. 	PR member of GADRA
Water	<ul style="list-style-type: none"> The potential impact and results of groundwater drawdown, ingress and level stabilisation must be assessed. 	GSI

Subject	Comment	Party
	<ul style="list-style-type: none"> ▪ Ground stability and potential for subsidence of the tunnel will have to be considered as well as the need for ongoing monitoring of ground stability. ▪ Best practice measures must be used to ensure that only clean, uncontaminated surface water and storm water run-off is allowed to enter the River Tolka (salmonid) and the Royal Canal (coarse fish fishery). Surface water discharge should be treated by means of Class 1 interceptors, SUDS mechanisms (and possibly hydrobrake controls). Solids must not be allowed to enter the watercourse and any flooding issues must be addressed. ▪ If culverts or bridges have to be installed, then they must not obstruct the ongoing free movement of salmonid species. It is preferable for bridges to be in the form of clear span designs. Any associated in-stream work must be carried out between May and September. ▪ The in-stream and riparian habitat integrity must be protected. Any proposals for works directly affecting watercourses or riparian habitats, or works to manipulate surface water channels must be submitted to the Board for approval prior to commencement. The Board must be notified at least 3-4 weeks prior to any diversion work commencing. ▪ The relevance of the Fisheries (Consolidation) Act and regulations covering discharges to salmonid waters has been pointed out as well as the importance of the guidance document 'Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites'. ▪ Consultation with the ERFB should be ongoing and consultation with Waterways Ireland should be carried out. ▪ The permanent impact of the Metro needs to be considered in relation to all stops e.g. potential for contamination with hydrocarbons and pesticides. ▪ The impact that the hardstanding areas may have on aquifer recharge may need to be considered. 	<p>ESB & GSI</p> <p>ERFB</p> <p>GSI</p>
Design	<ul style="list-style-type: none"> ▪ Clarification is needed in relation to the proposed size of the compound at St. Stephen's Green and other design arrangements. ▪ An elevated stop is not acceptable and the 'at-grade' option is not feasible. The route should be placed underground tunnels or a cut and cover route. ▪ The Metro design should support the ongoing regeneration of Ballymun. ▪ The potential for integration of the route with passenger linkages (bus, cycle and pedestrian) to stops should be considered, especially in new areas in Swords. The potential for feeder buses to restrict or maximise the utilisation of the Metro should be recognised. ▪ Stops should be located on landbanks that are prime for development or redevelopment and should not occupy space that has potential for significant development densification. ▪ The possibility of constructing a multi-storey P&R facility to minimise land-take should be considered. ▪ The possibility of providing access to stops through existing buildings should be considered, especially in the case of the O'Connell Bridge stop. 	<p>DCC & DoEHLG</p> <p>BNC</p> <p>FCC</p> <p>DCC and An Taisce</p>

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	<ul style="list-style-type: none"> ▪ The potential to integrate the system with future developments needs to be considered and any resulting predicted impacts assessed e.g. <ul style="list-style-type: none"> - rest of the transport network and provision for extensions beyond St. Stephen's Green to Bray/Sandyford and Tallaght; - future shuttle/feeder; - the second stop under St. Stephen's Green; - The location of the crossing of the M50 should be chosen so as to not limit the future upgrading of the Ballymun interchange post current upgrading; and - Any other future developments. ▪ The potential to integrate the system with different modes of transport including bus services should be considered as part of the design process. ▪ The working compound should be situated in a different area North of Hampstead/St. Albert College Park in an area which is public land and not bordered by residences. ▪ A metro stop should be located at the Parnell Monument end of O'Connell Street. ▪ The DCBA supports the selected route, welcomes the metro stops at the Green, O'Connell Street and Parnell Square East and supports the decision to put the stop at Dublin Airport underground and the main construction compounds in the Albert College/Hampstead Park and the Metro North Depot site. ▪ All boring should start in the North and proceed south with soil removed northbound via the tunnel. 	<p>NRA, DTO</p> <p>DTO & DCC</p> <p>PR member of GADRA</p> <p>Senator D. Norris</p> <p>DCBA</p>
Other	<ul style="list-style-type: none"> ▪ A full assessment of the alternative vertical alignments through the Ballymun area and their associated environmental impacts must be carried out and made available prior to the final decision being made. ▪ The methodology to be applied in relation to the severance and barrier impacts needs to be explained. ▪ The EIS should take into account the connection of the Metro North Scheme to the Luas Green Line. ▪ The EIS must provide sufficient investigation and hopefully full justification for continuous 24 hour operation of Tunnel Boring Machines (TBMs). ▪ Flood catastrophe closing doors should be used to protect the entire underground section. ▪ Any retailing/land-use activity should be subject to Planning and Competition laws. ▪ Terms and conditions of employment should be enacted on the basis that platform and train operator staff cannot be permitted to strike. ▪ The impacts associated with the removal of spoil must be considered, particularly in the city centre. The efficiency of any wheelwash system will have to be proven. ▪ Clarification needs to be provided in relation to the definition of the area encompassed by Albert College/Hampstead Park. ▪ Severance impacts in relation to the route cutting straight through existing and perhaps historic field patterns should be assessed. There must be a clear explanation of what historic settlement patterns exist, how these patterns were analysed and why was the route chosen. ▪ Tourism and Tourist amenities should be considered as part of the EIA. ▪ The 500m zone of assessment within the urban areas should be extended to encompass the entire area of St. Stephen's Green. 	<p>BR</p> <p>PR</p> <p>DCBA</p> <p>DCC</p> <p>PR member of GADRA</p> <p>OPW, DoEHLG</p> <p>FI</p> <p>OPW</p>

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