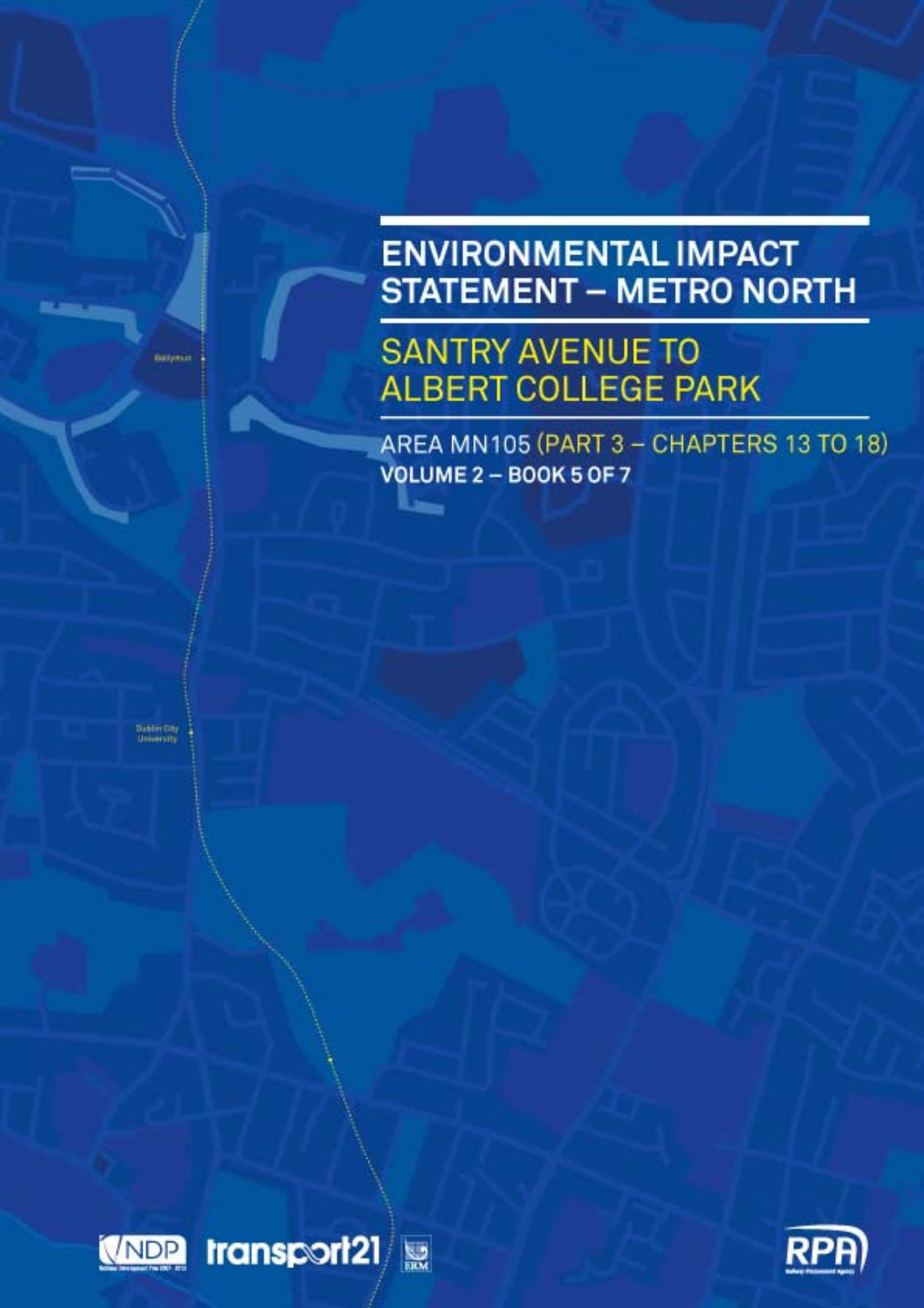


ENVIRONMENTAL IMPACT STATEMENT – METRO NORTH

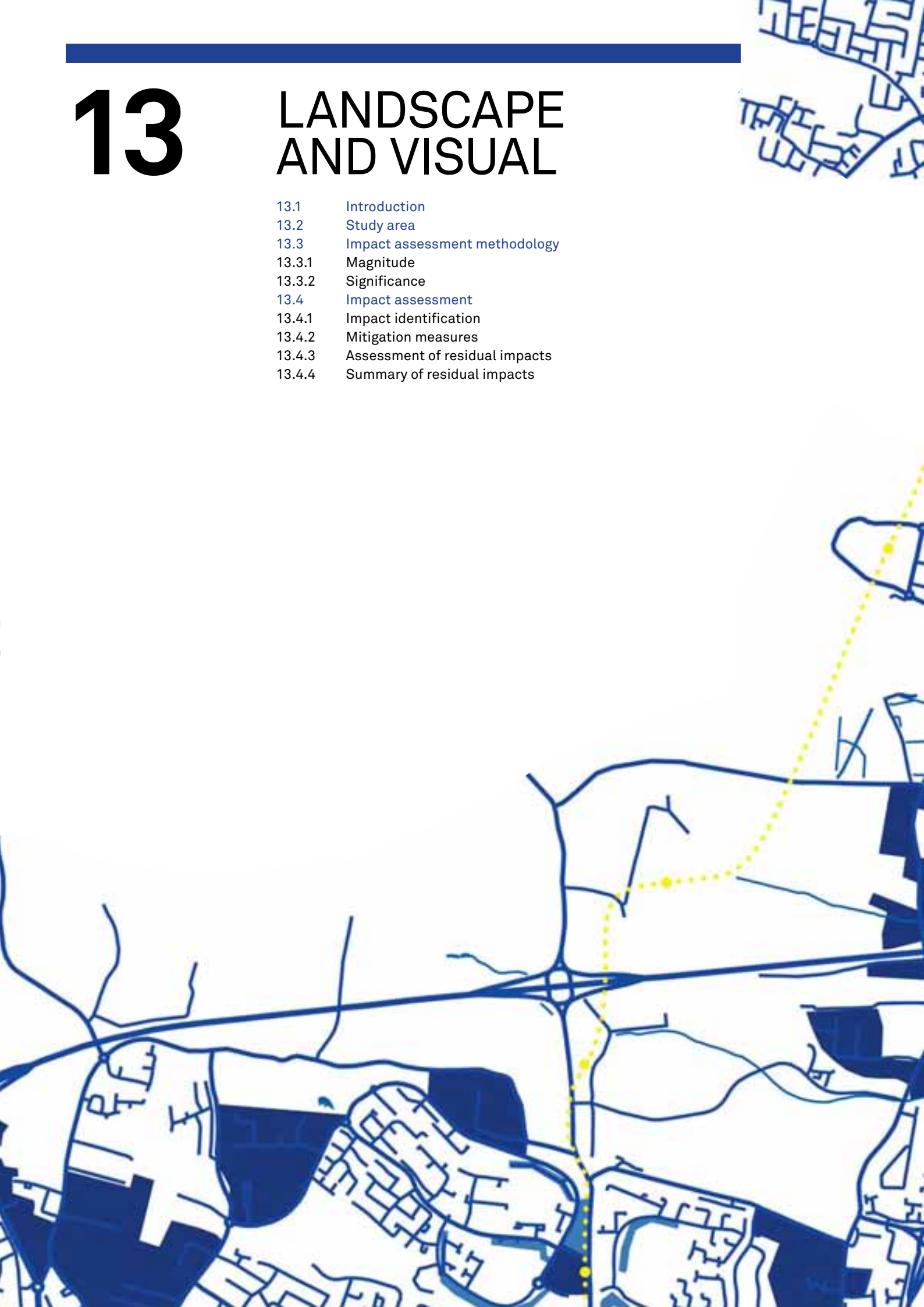
SANTRY AVENUE TO ALBERT COLLEGE PARK

AREA MN105 (PART 3 – CHAPTERS 13 TO 18)

VOLUME 2 – BOOK 5 OF 7

NDP transport21 EIRM RPA

13 LANDSCAPE AND VISUAL



This chapter of the EIS evaluates the potential for landscape and visual impacts arising from the construction and operation of the proposed scheme in Area MN105.

13.1 INTRODUCTION

This chapter of the EIS evaluates the potential for landscape and visual impacts arising from the construction and operation of the proposed scheme in Area MN105.

13.2 STUDY AREA

The study area corresponds to the potential zone of visual influence of the proposed scheme. The study area is illustrated in the maps (Baseline Landscape) included in Volume 3, Book 1 of 2.

The dimensions of the study area vary in width depending on the local landscape. In built-up areas, the study area typically extends to the edges of the buildings on either side of the centre line of the proposed scheme. The dimensions of the study area are generally wider in locations where the proposed alignment runs through open space or farmland where longer distance views are possible.

13.3 IMPACT ASSESSMENT METHODOLOGY

The source and type of all potential impacts is described in Section 13.4.1. Mitigation measures to be put in place are defined in Section 13.4.2. Mitigation measures are defined for any adverse impacts that are deemed to be of Medium or greater significance prior to mitigation. The extent to which mitigation is needed increases as the significance of the impact increases.

The residual impacts on landscape and visual amenity are assessed based on the assumption that all mitigation planting will be established successfully and good growth and development will have taken place over a 15 year period from implementation of the planting. The planting is therefore assumed to be effective in providing visual screening of the proposed scheme which will be most effective during the summer months and hence the impact of the proposed scheme is expected to be significantly reduced.

Residual impacts that persist after mitigation measures have been put in place are evaluated in terms of magnitude and significance as described in this section. A summary of all residual impacts is provided in Section 13.4.3.

13.3.1 Magnitude

The magnitude of change affecting landscape or visual receptors depends on the nature, scale and duration of the particular change that is envisaged, the location in which it is proposed, and the overall effect on a particular view. This may be very small if the proposed scheme is at some distance. In a landscape, the magnitude of change will depend on the loss or change in any important feature or change in the backdrop to, or outlook from, a landscape. The angle of view, duration of view, distance from the proposed scheme, degree of contrast with the existing view and the extent of visibility all influence the magnitude of the change in view.

The criteria used to assess the different levels of magnitude of change associated with impacts on landscape are shown in Table 13.1. The criteria used to assess the different levels of magnitude of change associated with impacts on visual amenity are shown in Table 13.2.

Table 13.1 Criteria for assessment of magnitude of change on landscape

Criteria	Magnitude of change
- A clearly evident and frequent or continuous change in key landscape characteristics or components affecting an extensive area.	very high
- A clearly evident change either over a restricted area or infrequently perceived or a moderate change in key landscape characteristics or components, frequent or continuous and over a wide area.	high
- A moderate change either over a restricted area or infrequently perceived or a small change in key landscape characteristics or components over a wide area.	medium
- A barely or rarely perceptible change in key landscape characteristics or components.	low
- Imperceptible change.	very low

Table 13.2 Criteria for assessment of magnitude of change in visual amenity

Criteria	Magnitude of change
- Major changes in view such as at close distances, affecting a substantial part of the view, continuously visible for a long duration, or obstructing a substantial part or important elements of view.	very high
- Clearly perceptible changes in views such as at intermediate distances; resulting in a either a distinct new element in a significant part of the view; or a more wide ranging, less concentrated change across a wider area.	high
- Moderate changes in views, such as at long distances, or visible for a short duration, perhaps at an oblique angle, or which blends to an extent with the existing view.	medium
- Change which is barely visible, such as at very long distances, or visible for a very short duration, perhaps at an oblique angle, or which blends with the existing view.	low
- Imperceptible change.	very low

13.3.2 Significance

Significance is determined by considering the sensitivity (functional value) of the landscape or visual receptor and the magnitude of change expected as a result of the proposed scheme. Each case is assessed on its own merits as significance is not absolute and factors unique to each circumstance need to be considered.

However, the general principles underpinning the evaluation of significance are set out in Table 13.3 and this table provides a guide to the application of professional judgement and experience in each individual case.

Table 13.3 Criteria for assessment of impact significance

		Magnitude of change				
		very low	low	medium	high	very high
Sensitivity of landscape / viewpoint (Functional value)	low	Not significant	Low significance	Low significance	Medium significance	Medium or High significance
	medium	Not significant	Low significance	Medium significance	High significance	High or Very high significance
	high	Not significant	Low significance	Medium or High significance	High or Very high significance	Very high significance

13.4 IMPACT ASSESSMENT

13.4.1 Impact identification

Sources of impact on landscape and visual amenity include the following;

- All above ground structures including track sections, LMVs, elevated structures, bridge crossings, roads and road realignments, buildings, earthworks, Park & Ride facilities, the depot, stops and associated furniture;
- Lighting.

These sources of impact will result in the following impact types:

Direct Impacts

- Loss of landscape elements, including permanent land loss, vegetation losses, severance of watercourses, loss of built elements (which are part of the existing landscape or townscape fabric);
- Changes in physical topography as a result of the introduction of earthworks embankments or cuttings;
- Physical changes arising from the introduction of new structures into the receiving landscape or townscape.

Indirect Impacts

- Change to the character of a local landscape arising as a result of the visibility of the proposed scheme.

Landscape and visual impacts may be:

- Positive: a change, which improves the quality of the environment (for example, improving landscape diversity; removal of existing negatively impacting aspect etc.);
- Neutral: a change, which does not affect the quality of the environment;
- Negative: a change, which reduces the quality of the environment (for example, impact on broadleaved woodland; obstructing an existing view; etc).

13.4.2 Mitigation measures

13.4.2.1 Construction phase

The following mitigation measures will be applied throughout the construction phase to minimise landscape and visual impacts:

- Fencing will be erected around all temporary work sites;
- Materials and machinery will be stored tidily during the works;
- Portable machinery will be stored behind fencing in compounds when not in use;
- Roads providing access to site compounds and work areas will be maintained free of excessive dust and mud as far as is reasonably practical;
- Lighting of compounds and work sites will be restricted to agreed working hours and that which is necessary for security;
- Temporary fencing, barriers, traffic management and signage will be removed when no longer required;
- All existing trees to be retained will be protected prior to the commencement of construction in accordance with BS 5837 (or an equivalent standard);
- On completion of construction, all remaining spoil and construction material will be removed;
- Work sites and other land occupied temporarily will be reinstated.

The assessment of residual construction impacts assumes that the mitigation measures described in this section are implemented.

13.4.2.2 Operational phase

In assessing the impact of the proposed scheme on the landscape and visual environment, account was taken of various measures that will be taken to mitigate potential adverse effects. The landscape mitigation measures are described in this section and illustrated in the Landscape Insertion Plans (see pages 159 to 197).

The mitigation measures that will apply to the proposed scheme overall include the following;

- ecologically sensitive integration of the proposed scheme into the receiving environment. The proposed landscape treatments will complement the surrounding ecological network and will counter the potential barrier and fragmentation effect of the proposed scheme as well as compensate for the loss of habitat;
- consideration of the landscape character and context of the proposed scheme in the preparation of the landscape design that will also consider the road user. The proposed scheme will aim to retain and reinforce regional identity where possible;
- use of landscape planting treatments that require minimal long term maintenance and whose species content match or enhance the character of the surrounding area;
- a range of different habitats will be created to enhance local biodiversity including grasslands, scrub, woodland planting and hedgerows.

Additional landscape mitigation measures that will be implemented repeatedly in particular locations along this area of the alignment are listed in Table 13.4.

Table 13.4 Mitigation measures specific to Area MN105

Landscape Mitigation measures	Description and purpose	Area in which mitigation will be put in place (Additional detail regarding mitigation measures is provided in the Landscape Insertion Plans (see pages 159 to 197)
GLM 1	As much existing vegetation as possible will be retained within and adjacent to the proposed scheme. Vegetation to be retained will be protected in accordance with BS5837. Where any woodland is removed for essential safety reasons the potential effects of wind-throw will be assessed and appropriate measures included in the design to mitigate any effects.	LLCA 11 & 12
GLM 2	Planting to be introduced to compensate for vegetation loss and contribute or reinstate local landscape character.	LLCA 11 & 12
GLM 3	Planting and/or hedgerow to be introduced to mitigate loss of landscape pattern and contribute to or reinstate local landscape character.	LLCA 11 & 12
SLM 11a	Reinstate new tree planting along central reservation.	LLCA 11 Along Ballymun Road
SLM 12a	Reinstate new tree planting along central reservation.	LLCA 12 Along Ballymun Road
SLM 12b	Reinstate trees and shrubs laid out in formal manner outside Our Lady of Victories church. Reinstate boundary walls and grassed areas disturbed by works.	LLCA 12
SLM 12c	New tree planting in open space to replace lost mature trees.	LLCA 12
SLM 12d	Two rootballed semi mature trees required at entrance to DCU	LLCA 12

13.4.3 Assessment of residual impacts

13.4.3.1 Project scenario: construction phase

LLCA 11: Ballymun Urban Centre

Two construction compounds are located within this local character area. Compound 11 is located at the Ballymun Stop adjacent to Shangan Road and its extent is roughly the same as the permanent works. Its location is close to and is overlooked by commercial buildings.

Compound 11A is located further north in an area of grassed open space. It is overlooked and bounded by residential flats to the west and the R108 to the east. This compound will be present for four years and will contain offices and welfare facilities. Storage will occur and concrete batching.

This area is subject to considerable change and there is construction activity already in this area and likely to be more. The landscape sensitivity of the area is judged as being medium. However this is based on the quality of the area improving in the long term due to the proposed masterplanning proposal.

For the remainder of the alignment, construction activities will be confined to below and along the alignment of Ballymun Road (R108). Much of this work will be similar to general road works with barriers, construction workers and various vehicles. There are likely to be large cranes present for placing concrete tunnel sections but again this type of activity is not unusual for a busy road corridor.

It is considered that construction impact will be Low on landscape and visual receptors in this area and these impacts will be temporary in nature.

LLCA 12: Collins Avenue Residential Area
There are no construction compounds proposed for this LLCA.

Within this area, construction activities will be confined to below and along the alignment of Ballymun Road (R108). Much of this work will be similar to general road works with barriers, construction workers and various vehicles. There are likely to be large cranes present for placing concrete tunnel sections but again this type of activity is not unusual for a busy road corridor.

The exception to this is where the alignment moves away from the centre of the main road and to the east and below the pavement and open space at the front of Our Lady of Victories and alongside Albert College Housing Estate. Due to the proximity to the church and nearby residential properties, construction impacts on landscape and visual receptors are considered of High significance at these particular locations. This concurs with the high landscape sensitivity (functional value) attributed to this character area.

13.4.3.2 Project scenario: operational phase

The impacts on both landscape and visual amenity on the LLCAs are discussed below. The impacts on landscape are described in terms of the direct effects (direct physical changes) that are predicted to occur and indirect effects (effects on landscape character arising from the visibility of the proposed scheme).

The visual impact assessment was undertaken from specific viewpoint locations within the visual envelope of the proposed scheme within the LLCAs.

LLCA 11: Ballymun Urban Centre
This Local Landscape Character area will be directly affected by the proposed scheme.

Within this character area the entire alignment will be underground. The method of construction however, is cut and cover which results in the removal of a large number of small young trees. The location of these trees is entirely along the central reservation of Ballymun Road and they have been recently planted.

Due to the young age of the trees to be removed, they have not yet imparted a character on Ballymun Road.

From south of Shanliss Road, the trees in the central reservation are more mature and impart a tree lined character to the street. These trees are also proposed for removal.

Table 13.5 Direct impacts on LLCA 11

Loss of landscape elements and features
- Approximately 44 young trees between Santry Avenue and Ballymun Road.
- Approximately 23 young trees adjacent to Ballymun Stop
- Approximately 28 young trees from Gateway Crescent to Shanliss Road
- Approximately 20 trees of mature trees of mixed age and size from Shanliss Road to 208 Ballymun Road.
Changes to local topography as a result of earthworks structures
- None
Changes arising from the Introduction of proposed structures
- Introduction into the street of above ground infrastructure elements such as vents, entrance stairs and balustrades.

Landscape Impacts (indirect effects)
Due to the fact that the alignment in this section is underground, there are no indirect effects on this local landscape character area.

Visual Impacts
Two viewpoints are located within LLCA 11 (11a and 11b). A description of the visual impacts that occur at these viewpoint locations is provided in Table 13.8. For each viewpoint, the visual baseline is presented as a brief description of the main components in the existing view. The mitigation measures to be employed at these locations are shown in detail in the Landscape Insertion Plans (see pages 159 to 197). The evaluation of impacts described in Table 13.8 takes into consideration the effects of these mitigation measures.

There will be a minor change in the views along Ballymun Road as a consequence of the removal of the long line of small young trees along the middle of the carriageway. However, these will be replaced by new young trees and the discernible difference will be negligible.

Above ground elements will be visible at the Ballymun Stop such as ventilation vents, entrance stairwells and balustrades. However, these elements will be architecturally designed to harmonise with the future civic plaza development and therefore it is not considered an adverse impact.

It is predicted that there will be adverse visual impacts associated with the infrastructure during years 1 to 15 as the planting will be in an immature state. Visual impacts at Viewpoint 11a are considered to be of Low significance. Visual impacts at Viewpoint 11b are also considered to be of Low significance.

LLCA 12: Collins Avenue Residential Area
This Local Landscape Character area will be directly affected by the proposed scheme which will pass through this LLCA.

Within this character area the entire alignment will be underground. The method of construction however, is cut and cover which results in the loss of several areas of landscape planting.

Close to Our Lady of Victories Church, the alignment transfers from along the middle of Ballymun Road to below the frontage of the church. Several trees and shrubs will be lost as a consequence of the cut and cover construction and the formal layout of the front entrance will be significantly affected.

After crossing below Albert College Drive, the alignment crosses below a green open space which extends as far as Albert College Lawn. A large number of mature trees will be lost which form a significant feature along Ballymun Road.

Two buildings will require demolition and garden boundary walls and adjacent garden shrubs and trees will be lost temporarily. New modern entrance buildings and light and exhaust structures will be introduced into the streetscape. The predominant use of glass for these structures will assist in integrating them into the street and maintain views from adjacent residential properties.

There will be the loss of two mature trees at the entrance to Dublin City University. These trees are part of a formal avenue of trees aligning the entrance road.

Table 13.6 Direct impacts on LLCA 12

Loss of landscape elements and features
Loss of several trees and shrubs at the formal entrance to Our Lady of Victories Church.
Loss of large number of trees in open space between Albert College Drive and Albert College Lawn.
Existing gardens and boundary walls affected alongside Ballymun Road.
Loss of two large trees from the formal avenue of the DCU entrance.
Changes to local topography as a result of earthworks structures
None
Changes arising from the Introduction of proposed structures
Loss of existing buildings.
Introduction of above ground structures and elements such as new buildings, light vents, exhaust vents, stairs, entrances, balustrades.

Landscape Impacts (indirect effects)
Due to the fact that the alignment in this section is underground, there are no indirect effects on this local landscape character area.

Visual Impacts
Two viewpoints are located within LLCA 12 (12a and 12b). A description of the visual impacts that occur at these viewpoint locations is provided in Table 13.8. For each viewpoint, the visual baseline is presented as a brief description of the main components in the existing view. The mitigation measures to be employed at these locations are shown in detail in the Landscape Insertion Plans (see pages 159 to 197). The evaluation of impacts described in Table 13.8 takes into consideration the effects of these mitigation measures.

There will be major changes in views from Ballymun Road as a consequence of the loss of a large number of mature trees and shrubs. This is particularly the case between Albert College Drive and Albert College Lawn.

Residential properties aligning Ballymun Road will have views affected by the removal of the existing trees. This will particularly affect properties west of the road which face towards the disturbed area.

At the DCU Stop, new entrance structures will become the main points of focus. Infrastructure elements will be visible although these will be maintained at a low and unobtrusive level. Tree planting to the rear of the stops will assist in mitigating visual impacts after a period of time.

It is predicted that there will be adverse visual impacts associated with the infrastructure during years 1 to 15 as the planting will be in an immature state. Visual impacts at Viewpoint 12a are considered to be of Medium significance. Visual impacts at Viewpoint 12b are considered to be of High significance. In order to aid the reader, a photomontage of Viewpoint 12a (Outside Our Lady of Victories Church) has been prepared and is included in page 198 of this chapter.

13.4.4 Summary of residual impacts

A summary of all residual impacts is provided in Table 13.7 and Table 13.8.

Table 13.7 Summary of residual impacts on landscape

LLCA ID	Sources of Impact	Amount	Impact Description	Mitigation measures	Sensitivity of LLCA (functional value)	Magnitude (post mitigation	Significance (Post mitigation)
LLCA 11	Cut and Cover method of construction. Ballymun Stop.	Proposed underground alignment of 1186 m length.	Loss of young trees along central reservation of Ballymun Road.	GLM 1 GLM 2 SLM 11a	medium	medium	Medium
LLCA 12	Cut and Cover method of construction. Dublin City University Stop.	Proposed underground alignment of 665m length.	Loss of young trees along central reservation of Ballymun Road. Loss of mature trees, shrubs garden plants in open space area. Loss of two large trees forming part of an important avenue.	GLM 1 GLM 2 SLM 12a SLM 12b SLM 12b SLM 12d	high	high	High

Table 13.8 Summary of residual impacts on visual amenity at selected viewpoint locations

View point ID	Location and viewer type	Components of the existing view	Mitigation measures	Description of the proposed view (with landscape mitigation measures).	Sensitivity of viewpoint (functional value)	Magnitude (post mitigation	Significance (Post mitigation)
11a	Ballymun Road Main Street (T)	Main Street. Street tree planting in the central reserve. Mix of newly constructed residential and commercial developments together with original multi storey tower block residences in the far distance.	Replanting of young trees along central reservation. New planting to integrate new structures.	Similar to existing view with small young trees in central reservation.	medium	low	Low
11b	Main Street outside original residential apartment blocks (T), (H)	Main Street. Street tree planting in the central reservation. New apartments entitled `The Plaza'.	Replanting of young trees along central reservation. New planting to integrate new structures.	Similar to existing view with small young trees in central reservation.	medium	low	Low
12a	Outside Our Lady of Victories Church (T)	Streetscape and street tree planting associated with Ballymun Road. Small linear open space and mature trees. Dwellings on Ballymun Road. (See page 198 for a photomontage of this location)	Replanting of trees to screen views and increase visual amenity.	Reinstated open space with young new planting providing some screening and visual amenity. View of new structures in distance. (See page 198 for a photomontage of this location)	low	high	Medium
12b	Corner of St. Pappin's Road and Ballymun Road (H)	Streetscape associated with Ballymun Road. Linear open space and mature tree planting. Some dwellings associated with Albert College Grove.	Replanting of trees to screen views and increase visual amenity.	Views of existing properties with young new planting providing early integration of new structures. Above ground elements of DCU Stop visible in view.	high	high	High

Landscape Baseline Plans and Landscape Insertion Plans

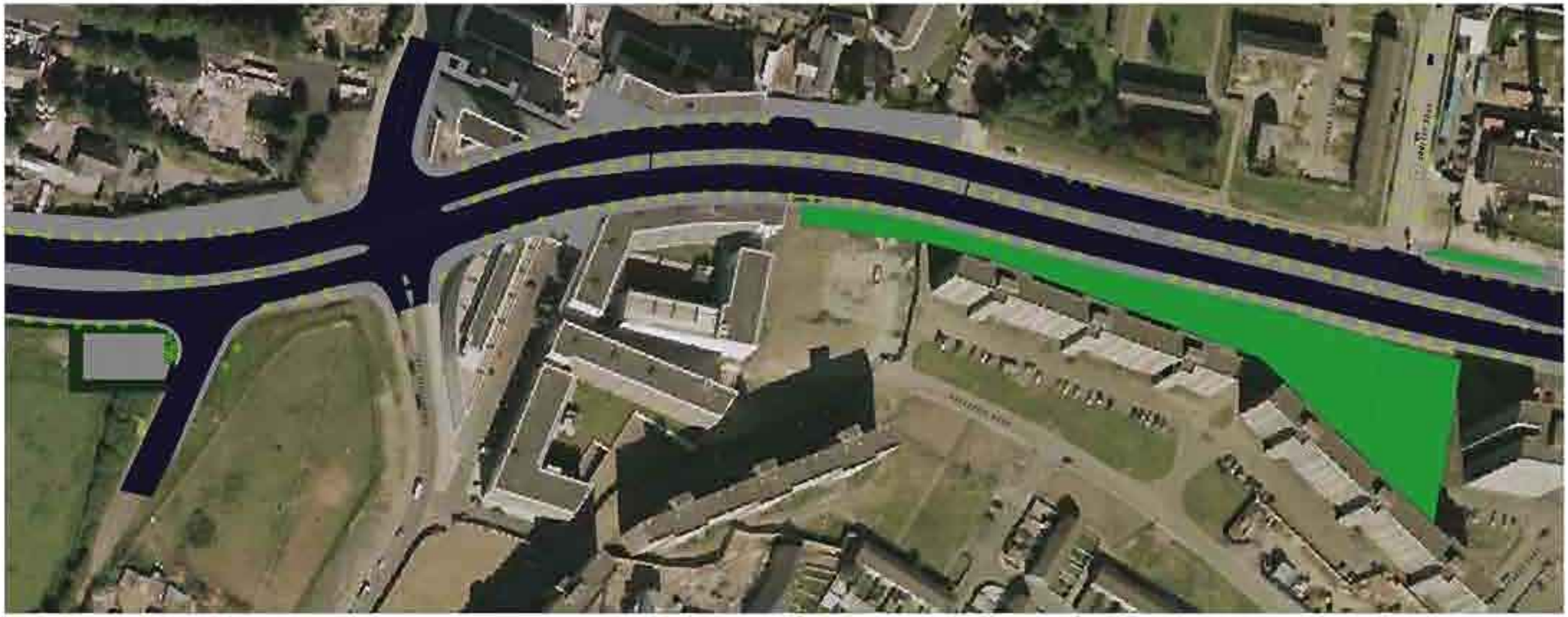
Baseline Plans
Santry Avenue to Coultry Road

fold-out

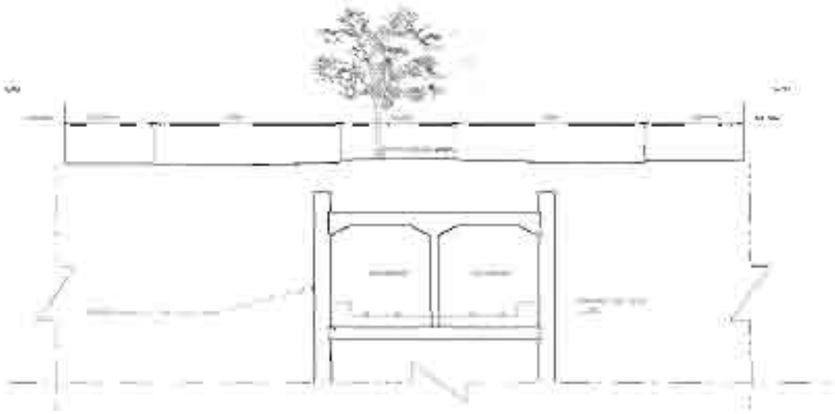

Proposed Metro North Alignment
RAILWAY ORDER DRAWING EXTENT
Coultry Road
Santry Avenue
Ballymun Road
Balbutcher Lane
Ballymun
RPA
METRO
RAILWAY WORKS
BASELINE LANDSCAPE

Landscape Insertion Plans
Santry Avenue to
Coultry Road

fold-out



PLAN



CROSS SECTION 05-01

DRAWING LEGEND

SEE MAP METRO NORTH

RPA

METRO

RAILWAY WORKS

LINE MN - ALIGNMENT DETAILS

SANTRY AVENUE - COULTRY ROAD

105

Baseline Plans
Coultry Road to
Gateway Crescent

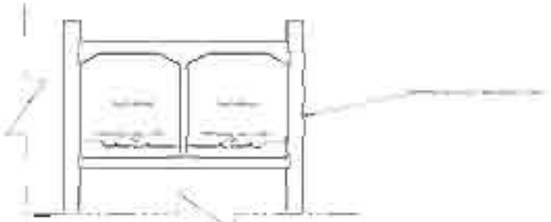
fold-out


Coultry Road
RAILWAY ORDER DRAWING EXTENT
Ballymun Road
Gateway Avenue
Ballymun Shopping Centre
Proposed Metro North Alignment
RPA
METRO
RAILWAY WORKS
BASELINE LANDSCAPE

Landscape Insertion Plans
Coultry Road to
Gateway Crescent

fold-out

PLAN



05-02
CROSS SECTIONS

DRAWING LEGEND

SEE MAP METRO NORTH

RPA METRO

RAILWAY WORKS
LINE MN - ALIGNMENT DETAILS
COULTRY ROAD TO GATEWAY CRESCENT

105

Baseline Plans
Gateway Crescent to Collins Avenue Ext.

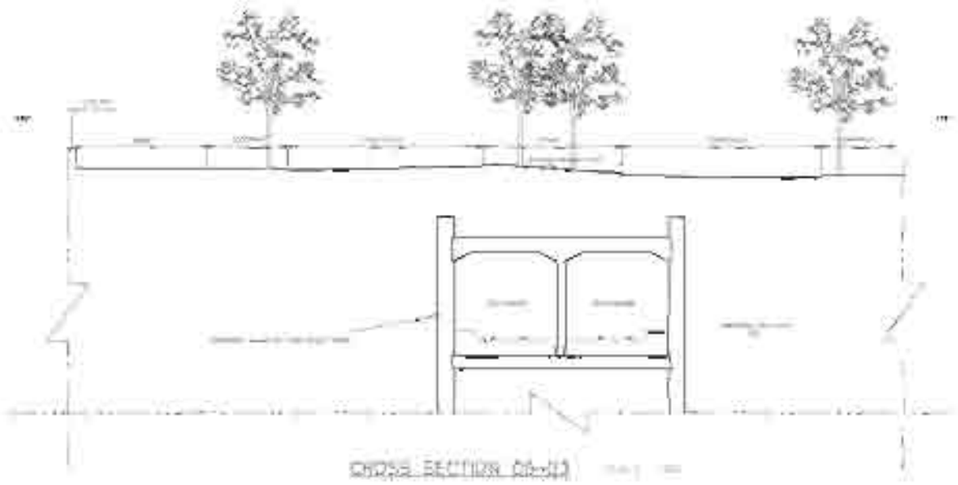
fold-out


RAILWAY ORDER DRAWING EXTENT
Ballymun Road
Gateway Avenue
Ballymun Road
Proposed Metro North Alignment
RPA
METRO
RAILWAY WORKS
BASELINE LANDSCAPE
Area 3 - Country Road to Gateway Crescent

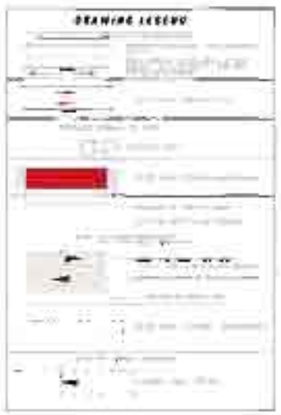
Landscape Insertion Plans
Gateway Crescent to
Collins Avenue Ext.

fold-out

PLAN



CROSS SECTION (Shed)



RPA METRO

RAILWAY WORKS

LINE MN - ALIGNMENT DETAILS

GATEWAY CRESCENT-COLLINS AVENUE EXT.

105

Baseline Plans
Collins Avenue Ext. to Albert College Drive

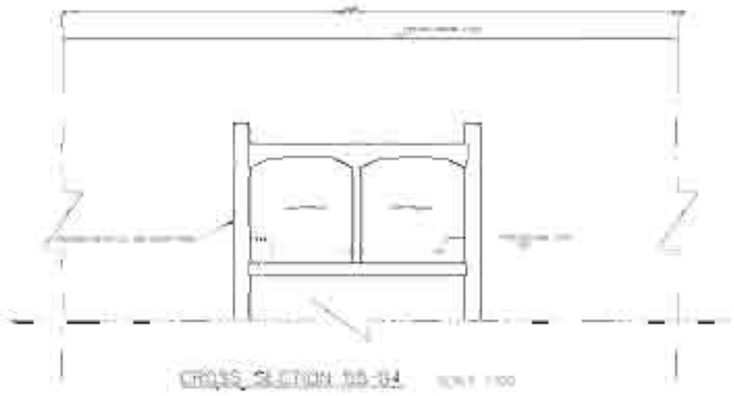
fold-out


RAILWAY ORDER DRAWING EXTENT
Albert College Crescent
Albert College Grove
Albert College Drive
Collins Avenue
Ballymun Road
Ballymun Road
St. Papin Road
Proposed Metro North Alignment
RPA
METRO
RAILWAY WORKS
BASELINE LANDSCAPE

Landscape Insertion Plans
Collins Avenue Ext. to
Albert College Drive

fold-out

PLAN
SCALE 1:500



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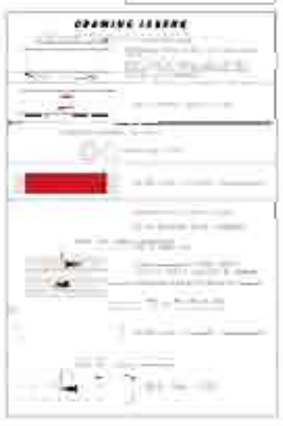

RPA

METRO

RAILWAY WORKS

LINE MN - ALIGNMENT DETAILS
COLLINS AVE. EXT. TO ALBERT COLLEGE DR.

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105 MN-RO 105 C-0 RAIL ORDER

Baseline Plans
Albert College Drive to Hampstead Park

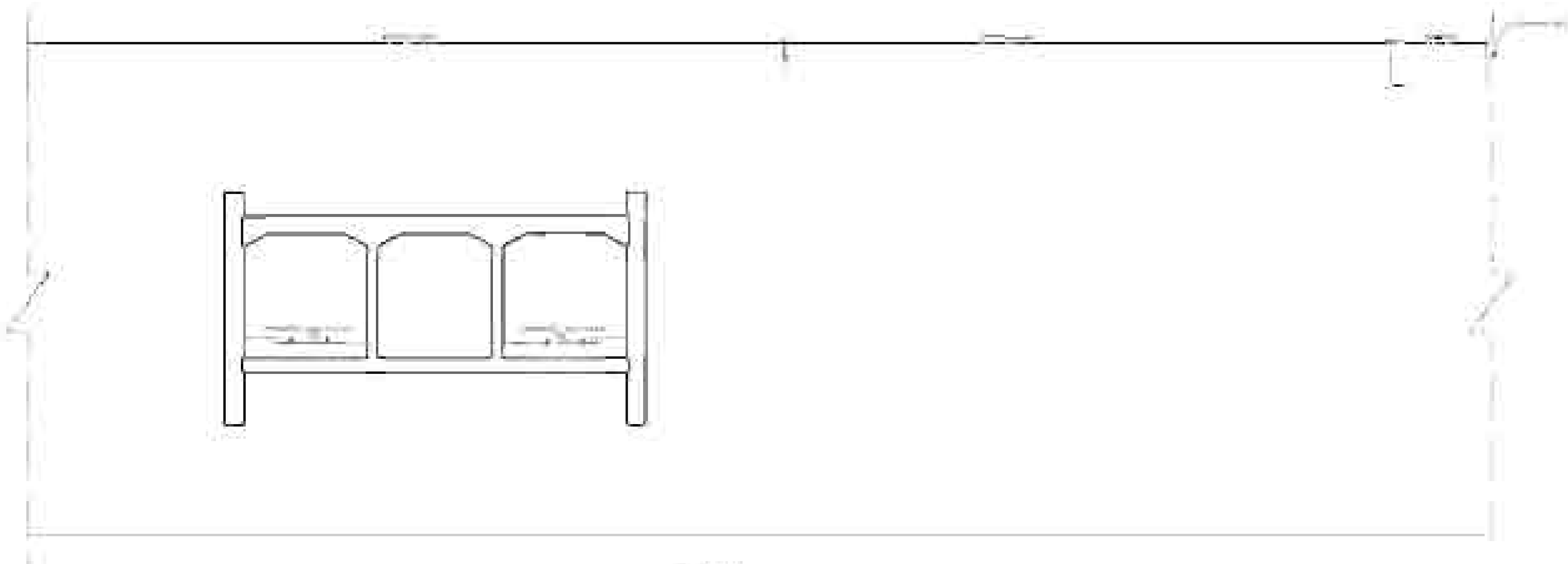
fold-out


Proposed Metro North Alignment
RAILWAY ORDER DRAWING EXTENT
Albert College Drive
Albert College Crescent
Albert College Grove
Albert College Lawn
Ballymun Road
Hampstead Park
St. Papin Road
Ballymun Road
RPA
METRO
RAILWAY WORKS
BASELINE LANDSCAPE

Landscape Insertion Plans
Albert College Drive
to Hampstead Park

fold-out

PLAN



56-56
CROSS SECTION

RPA

METRO

RAILWAY WORKS
LINE MN - ALIGNMENT DETAILS
ALBERT COLLEGE DR. TO HAMPSTEAD PARK

DRAWING LEGEND

L	MN	000	EN	105985	A

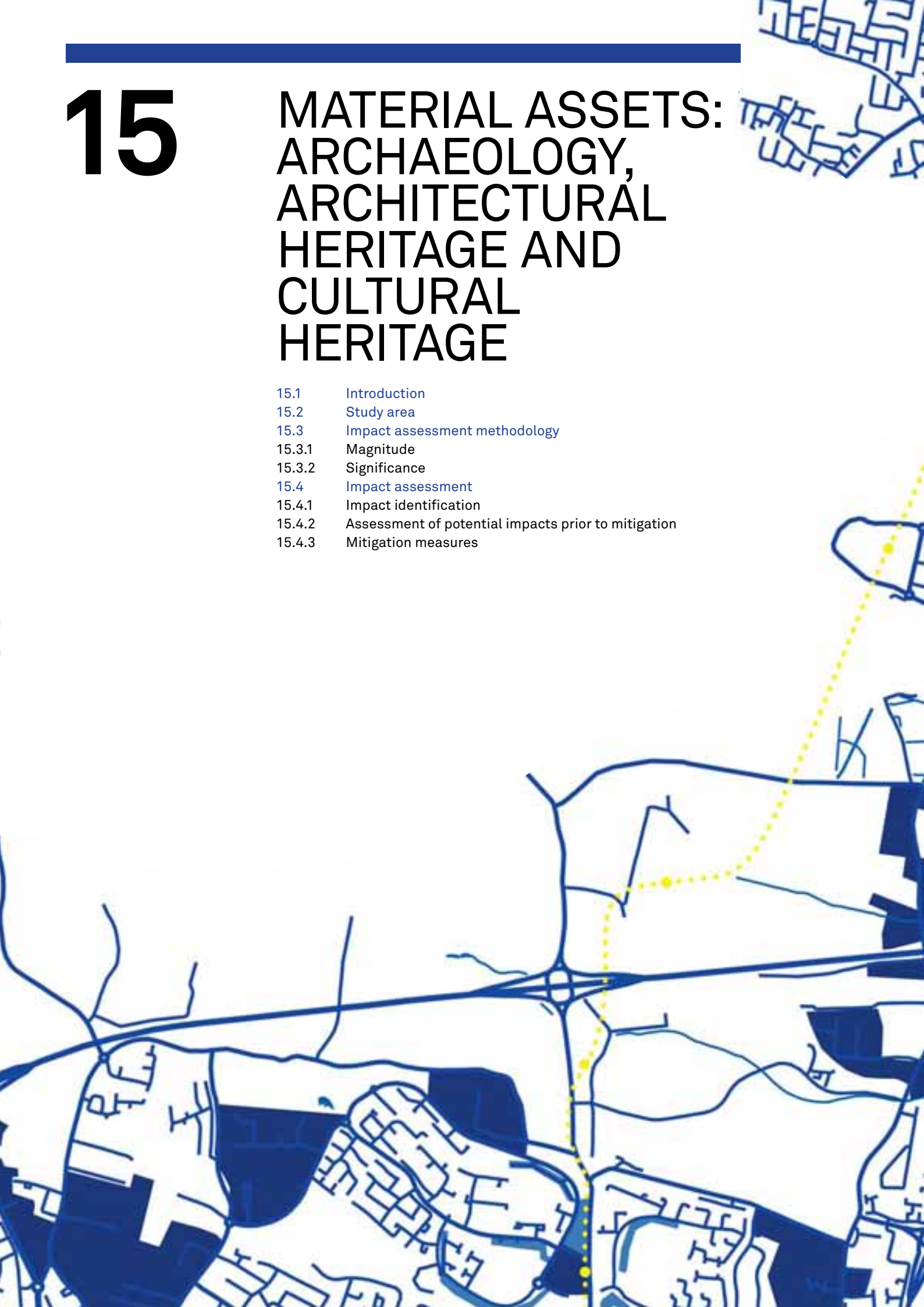
105 | MN-00 105 2-0 | RAIL ORDER

Viewpoint 12a

14 MATERIAL ASSETS: AGRONOMY

No agricultural lands were recorded within the defined study area of MN105. Therefore no environmental assessment was undertaken.

15 MATERIAL ASSETS: ARCHAEOLOGY, ARCHITECTURAL HERITAGE AND CULTURAL HERITAGE



This chapter of the EIS describes the potential impacts on archaeology, architectural heritage and cultural heritage, which may arise due to activities associated with the construction and operation of the proposed scheme in Area MN105.

15.1 INTRODUCTION

This chapter of the EIS describes the potential impacts on archaeology, architectural heritage and cultural heritage, which may arise due to activities associated with the construction and operation of the proposed scheme in Area MN105. Cultural heritage comprises archaeology and architectural heritage and also includes environmental aspects that are dealt with in other chapters of the EIS including the Landuse, Soil and Geology and Landscape and Visual chapters of this EIS (Volume 2, Chapters 2, 9 and 13 respectively).

Archaeology and architectural heritage all refer to traces of human activity in the physical environment inherited from past generations, maintained in the present and preserved for the benefit of future generations. Elements of archaeology and architectural heritage are not restricted by size and as such individual finds, buildings, or whole sites can be considered important to cultural heritage.

Preservation of archaeology and architectural heritage is deemed important as heritage that survives from the past is often unique and irreplaceable, important to the study of human history, and can serve an important component in a country's tourist industry.

The Environment Impact Assessment Directive of the European Union (EU) requires that potential impacts on archaeology, architectural heritage and cultural heritage are examined. As such this chapter of the EIS examines the impact that the proposed scheme may have on archaeology and architectural heritage. Impacts on other aspects of cultural heritage are examined in the other chapters of the EIS described previously.

The proposed mitigation measures for archaeological impacts have been further developed and detailed in an Archaeology Strategy document for the proposed scheme. This provides a base from which to plan the execution of the works. The overall approach to archaeological mitigation as detailed in the Archaeological Strategy has been agreed with the Department of Environment, Heritage and Local Government (DoEHLG) and Dublin City Council (DCC). This strategy document is live and will continue to evolve with the project through the detailed design and construction phase of the project.

15.2 STUDY AREA

The study area for this assessment is set out in Table 15.1.

Table 15.1 Study area

Criteria	Width of corridor (on either side of the alignment)
Designated features of archaeological and architectural heritage	250m in areas of undeveloped Greenfield 100m in developed areas
Areas of archaeological potential	50m around proposed tunnelled sections
Properties of architectural merit	Properties that are to be impacted upon by the proposed alignment and which occur within the study area detailed above.
Townland boundaries	Townland boundaries intersected by the proposed alignment occurring within the study area detailed above

15.3 IMPACT ASSESSMENT METHODOLOGY

The impact assessment methodology in this section is set out in a number of steps:

- Impact identification;
- Assessment of potential impacts pre-mitigation;
- Derivation of mitigation measures;
- Assessment of residual impacts.

The source and type of all potential impacts is described in Section 15.4.1. The impact that would occur if mitigation were not put in place is evaluated in Section 15.4.2 in terms of magnitude and significance. Mitigation measures to be put in place are defined in Section 15.4.3. Mitigation measures are defined for any adverse impacts that are deemed to be of Medium or greater significance prior to mitigation. The extent to which mitigation is needed increases as the significance of the impact increases. The residual impact of each impact is then evaluated in Section 15.4.4 in terms of magnitude and significance.

15.3.1 Magnitude

The criteria used to assess the different impacts associated with the proposed scheme are shown in Table 15.2.

Table 15.2 Criteria for assessment of impact magnitude

Criteria	Impact magnitude
- Applies where mitigation would be unlikely to remove adverse effects. Reserved for adverse, negative effects only. These effects arise where an archaeological site is completely and irreversibly destroyed by a proposed development. - An impact that obliterates the architectural heritage of a structure or feature of national or international importance. These effects arise where an architectural structure or feature is completely and irreversibly destroyed by the proposed development. Mitigation is unlikely to remove adverse affects.	very high
- An impact which, by its magnitude, duration or intensity, alters an important aspect of the environment. An impact like this would be where part of a site would be permanently impacted upon, leading to a loss of character, integrity and data about the archaeological feature/site. - An impact that, by its magnitude, duration or intensity alters the character and/or setting of the architectural heritage. These effects arise where an aspect or aspects of the architectural heritage is/are permanently impacted upon leading to a loss of character and integrity in the architectural structure or feature. Appropriate mitigation is likely to reduce the impact. - A beneficial effect that permanently enhances or restores the character and/or setting of the architectural heritage in a clearly noticeable manner.	high

Criteria	Impact magnitude
- A Medium direct impact arises where a change to the site is proposed which though noticeable, is not such that the archaeological integrity of the site is compromised and which is reversible. This arises where an archaeological feature can be incorporated into a modern day development without damage and that all procedures used to facilitate this are reversible. - An impact that results in a change to the architectural heritage which, although noticeable, is not such that alters the integrity of the heritage. The change is likely to be consistent with existing and emerging trends. Impacts are probably reversible and may be of relatively short duration. Appropriate mitigation is very likely to reduce the impact. - A beneficial effect that results in partial or temporary enhancement of the character and/or setting of the architectural heritage and which is noticeable and consistent with existing and emerging trends.	medium
- An impact which causes changes in the character of the environment which are not High or Very high and do not directly impact or affect an archaeological feature or monument. - An impact that causes some minor change in the character of architectural heritage of local or regional importance without affecting its integrity or sensitivities. Although noticeable, the effects do not directly impact on the architectural structure or feature. Impacts are reversible and of relatively short duration. - A beneficial effect that causes some minor or temporary enhancement of the character of architectural heritage of local or regional importance which, although positive, is unlikely to be readily noticeable.	low
- An impact on the archaeological heritage capable of measurement but without noticeable consequences. - An impact on architectural heritage of local importance that is capable of measurement but without noticeable consequences - A beneficial effect on architectural heritage of local importance that is capable of measurement but without noticeable consequences.	very low

15.3.2 Significance

The significance of impacts is assessed in consideration of the magnitude of the impact and the importance and sensitivity (functional value) of the baseline environment. Functional value is set out in the baseline Archaeology, Architectural and Cultural Heritage chapter of this EIS (Volume 1, Chapter 23).

15.4 IMPACT ASSESSMENT

15.4.1 Impact identification

The potential for impacts on archaeology and architectural heritage has been assessed in consideration of the Environmental Protection Agency (EPA) Guidelines on the preparation and content of EISs (EPA, 2002 & 2003) and the National Roads Authority (NRA) Guidelines for the assessment of Archaeological Heritage Impacts of National Road Schemes (NRA, 2005).

15.4.1.1 Archaeology

Direct impacts on the archaeological heritage can be defined as follows:

- A change that will detract from or permanently remove an archaeological monument or site from the landscape;

Indirect Impacts on the archaeological heritage can be defined as follows:

- A change that does not affect the archaeological heritage;
- A change that improves or enhances the setting of an archaeological monument.

15.4.1.2 Architecture

Direct Impacts on the architectural heritage can be defined as follows:

- Total loss of structure or grounds - demolition of buildings or features or removal of demesne land;
- Partial loss of structure or grounds - part removal of buildings or feature or part removal of demesne land;
- Severance - interruption of linked features such as gardens, outbuildings or lodges;
- Reunification of structures – removal of severance caused by existing development;

Indirect Impacts on the architectural heritage can be defined as follows:

- Visual Intrusion - development encroaching on established views of buildings, structures or landscapes, the disruption or destruction of designed vistas, light intrusion (dealt elsewhere);
- Degradation of setting - Changes in the original landscape, townscape or garden setting of a building or structure;
- Degradation of amenity - loss of amenity, especially where an historic house is open to the public;
- Enhancement of setting – changes in the original landscape, townscape or garden setting of a building or structure;
- Enhancement of amenity – improvement of amenity, especially where the historic house is open to the public.

15.4.2 Assessment of potential impacts prior to mitigation

15.4.2.1 Project scenario: construction phase

The principle source of impacts on features of archaeological, architectural and cultural heritage is ground disturbance. Ground disturbance can occur at the construction compounds, during site clearance, utilities removal, sub-surface site investigation, demolition, site excavation and ground preparation. Heritage constraint features that may potentially be impacted upon by ground disturbance during the construction phase of the project are set out in Table 15.3.

Table 15.3 Assessment of impacts (direct effects) associated with ground disturbance during construction

Impact Ref #	Affected Area/ Feature	Impact assessment prior to mitigation
MN105_C01	HC#390 (Westfield House, Ballymun Road). Structure of Architectural Merit	- The construction will directly impact on this house of architectural merit. This impact will result in the total loss of the structure. - The magnitude of this impact is very high and the impact affects an area of high functional value so the impact is considered to be of High significance.

Table 15.4 Assessment of potential unknown impacts (direct effects) during construction

Impact Ref #	Affected Area/ Feature	Impact assessment prior to mitigation
MN105_C02	Albert College Park to Tunnel Portal.	The magnitude and significance of impacts in this area cannot be assessed based on existing information because these areas are green undeveloped areas.

15.4.2.2 Project scenario: operational phase

It is not anticipated there will be any impacts at operational phase.

15.4.3 Mitigation measures

The mitigation measures that are to be put in place are detailed in this section.

15.4.3.1 Mitigation of potential construction impacts

Table 15.5 Mitigation of potential impacts (direct effects) associated with ground disturbance during construction

Impact Ref #	Affected Area/ Feature	Mitigation measures
MN105_C01	HC#390 (Westfield House, Ballymun Road). Structure of Architectural Merit	- A full measured drawn and photographic survey of the structure prior to removal, to be lodged with the Irish Architectural Archive. - When this mitigation measure is taken into consideration, the magnitude of the impact decreases to low.

Table 15.6 Mitigation of potential unknown impacts (direct effects) during construction

Impact Ref #	Affected Area/ Feature	Mitigation measures
MN105_C02	Albert College Park to Tunnel Portal.	- This stretch of undeveloped green field land requires standard archaeological assessment including Geophysical Survey, Test excavation and excavation should any archaeological deposits be shown to survive. - When this mitigation measure is taken into consideration, the magnitude of the impact decreases to very low.

15.4.3.2 Mitigation of potential operational impacts

No mitigation measures are required.

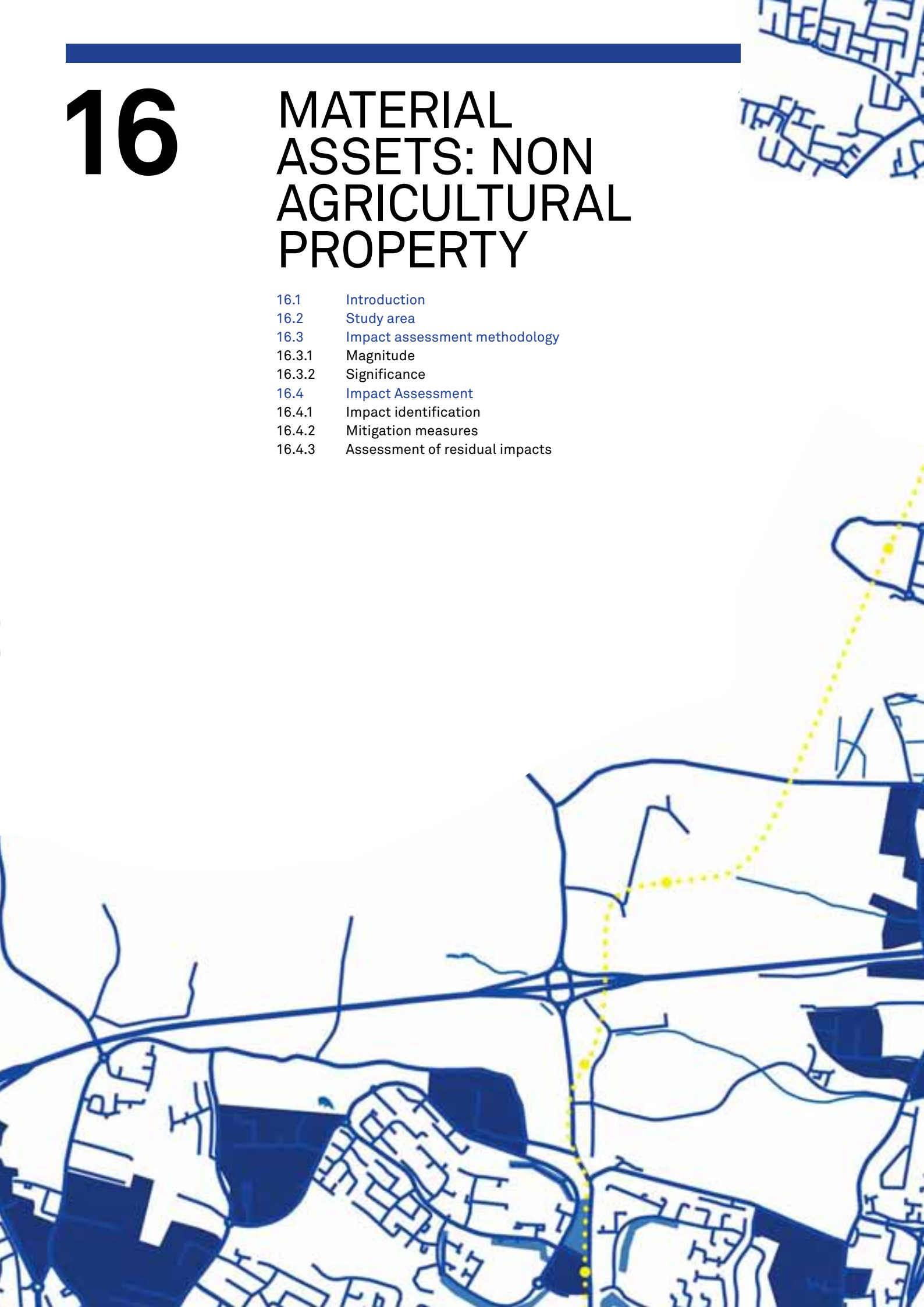
15.4.4 Assessment of residual impacts

A summary of the residual impacts associated with the proposed scheme is provided in Table 15.7.

Table 15.7 Summary assessment of residual impacts

Impact Ref #	Affected Area/ Feature	Impact Type	magnitude of impact taking into account mitigation	Functional value of area affected	Significance of impact taking into account mitigation
Construction					
MN105_C01	HC#390 (Westfield House, Ballymun Road). Structure of Architectural Merit	Ground disturbance	low	high	Low
MN105_C02	Albert College Park to Tunnel Portal.	Potential unknown	very low	medium	Very Low

16 MATERIAL ASSETS: NON AGRICULTURAL PROPERTY



This chapter of the EIS evaluates potential impacts on non agricultural property arising from the construction and operation of the proposed scheme in Area MN105.

16.1 INTRODUCTION

This chapter of the EIS evaluates potential impacts on non agricultural property arising from the construction and operation of the proposed scheme in Area MN105.

16.2 STUDY AREA

All of the properties to be impacted upon as part of the proposed scheme are located within 50m of the alignment. The study area is therefore limited to 50m either side of the proposed alignment.

16.3 IMPACT ASSESSMENT METHODOLOGY

The source and type of all potential impacts is described in Section 16.4.1. Mitigation measures to be put in place are defined in Section 16.4.2. The residual effect of each impact is then evaluated in Section 16.4.3 in terms of magnitude and significance.

16.3.1 Magnitude

The criteria used to assess the impacts associated with the proposed scheme are shown in Table 16.1.

Table 16.1 Criteria for assessment of impact magnitude

Criteria	Impact magnitude
- Any impact on non agricultural property where the use of the property cannot continue	very high
- Not applicable	high
- Any impact on non agricultural property where the use of the property can continue (in some cases, after temporary disruption)	medium
- Not applicable	low
- Not applicable	very low

16.3.2 Significance

The significance of all impacts is assessed in consideration of the magnitude of the impact and the functional value of the property upon which the impact has an effect. Impacts are evaluated in terms of five classes of significance: Very high, High, Medium, Low or Very low.

16.4 IMPACT ASSESSMENT

16.4.1 Impact identification

Impacts on non agricultural property occur due to land-take associated with the proposed scheme.

Three types of impact are assessed in this chapter:

- Non agricultural properties to be demolished (in whole or in part);
- Non agricultural properties to be acquired on a temporary basis;
- Non agricultural properties to be acquired on a permanent basis.

All temporary and permanent land-take on private property is shown on the property drawings that accompany the Railway Order application. Potential impacts on property due to ground settlement are addressed in the Soil and Geology chapters of this EIS (Volume 2, Chapter 9).

In some cases, acquisition of properties is undertaken to reduce the potential for negative impacts on residents during construction. In this context, the acquisition of properties is considered to be a mitigation measure (as well as an impact) and is assessed as such in other appropriate EIS chapters e.g. Noise, Vibration and Archaeology, Architectural and Cultural Heritage (Volume 2, Chapters 4, 5 and 15 respectively).

16.4.2 Mitigation measures

In cases where properties are to be demolished, alternative pedestrian crossing facilities will be provided prior to demolition taking place such that no significant disruption of individuals will occur. The magnitude of the residual impact is therefore assumed to reduce to low.

RPA are committed to having a Property Protection Scheme in place prior to construction works commencing. In cases where parts of properties are occupied, access to the remaining unoccupied parts will be maintained where it is possible and safe to do so. Protection such as hoarding will be used to ensure that the boundary of any construction sites are maintained and damage does not occur outside of this boundary. Where damage cannot be avoided, it will be repaired. Reinstatement of any natural boundaries will be carried out upon completion of the construction phase.

Mitigation measures to reduce any potential impacts on property due to vibration, ground settlement, dust or changes in visual amenity are addressed in the Vibration, Soil and Geology, Air and Climatic Factors and Landscape and Visual chapters of this EIS (Volume 2, Chapters 5, 9, 12 and 13 respectively).

In addition to the above mitigation measures, in a number of cases, where demolition of properties is to occur, RPA has offered compensation. Where appropriate, compensation is payable to owners of property that is acquired land in accordance with the general compulsory purchase code. Appropriate compensation will also be payable to owners of property that is subject to temporary acquisition. Compensation will be provided through the CPO process. Any land temporarily acquired will be reinstated. In light of the above mitigation measures and in all cases where compensation is agreed, the magnitude of the impact is assumed to reduce to medium.

No mitigation measures are required with respect to the operational phase of the proposed scheme.

16.4.3 Assessment of residual impacts

16.4.3.1 Project scenario: construction phase

A number of non agricultural properties are to be acquired in this area. These properties are shown in Table 16.2.

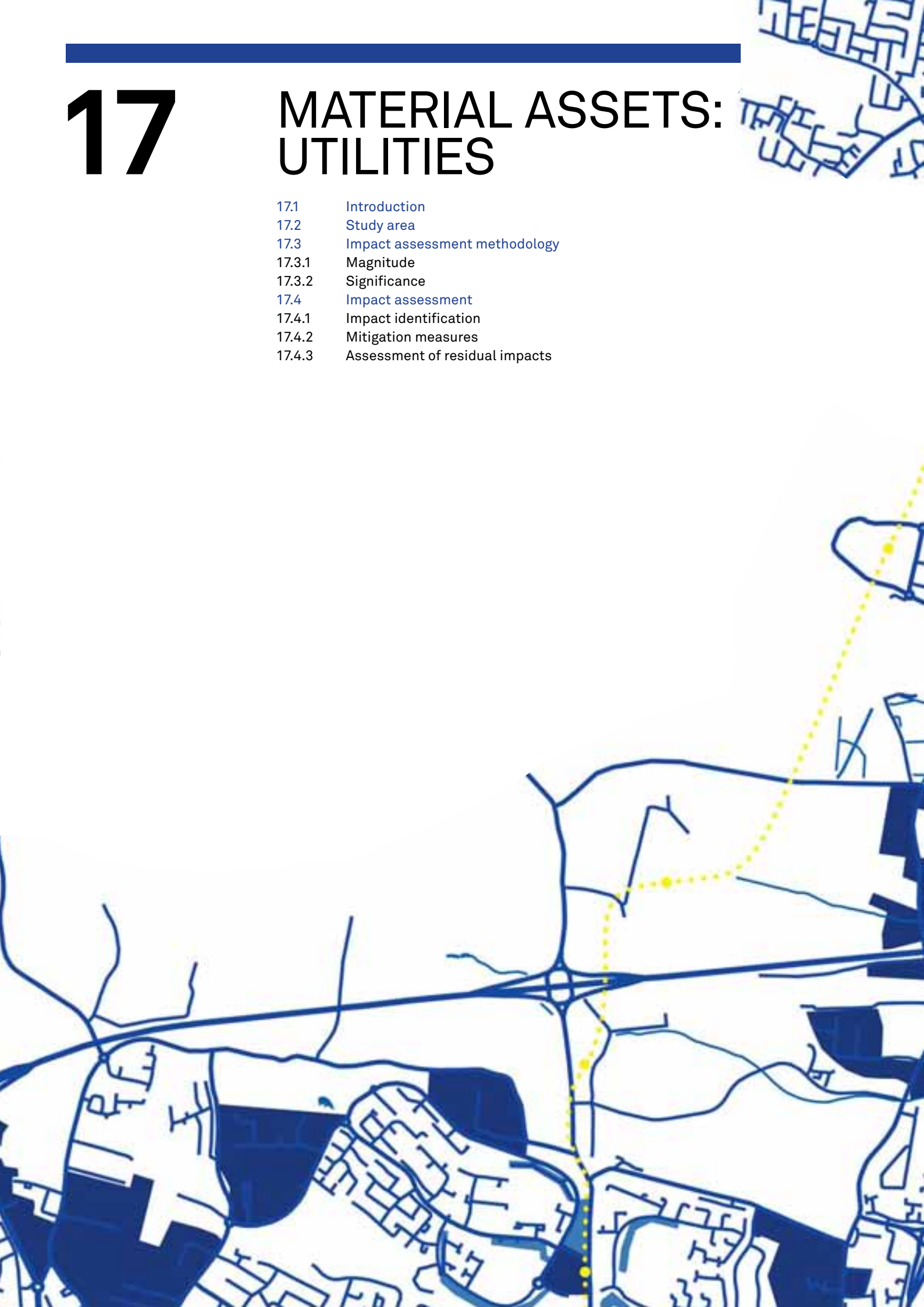
Table 16.2 Non agricultural properties to be impacted upon during the construction phase

Property	Functional value	Impact	Mitigation measure	Residual impact magnitude	Residual impact significance
Part of garden at 173 Ballymun Road	very high	Temporary land take for traffic diversions	Compensation	medium	Medium significance
Part of garden at 171a Ballymun Road	very high	Temporary land take for traffic diversions	Compensation	medium	Medium significance
Part of garden at 2 Glasnevin Avenue	very high	Temporary land take for traffic diversions	Compensation	medium	Medium significance
Part of garden of Victory Credit Union, 171 Ballymun Road	very high	Temporary land take for traffic diversions	Compensation	medium	Medium significance
Strip of land at Our Lady of Victories School, Ballymun Road	very high	Temporary land take for traffic diversions	Compensation	medium	Medium significance
Part of garden at 160 Ballymun Road	very high	Temporary land take for entrance to 158	Compensation	medium	Medium significance
Part of garden at 158 Ballymun Road	very high	Permanent/ Temporary land take for Metro underpass	Compensation	medium	Medium significance
Part of front lawn of Our Lady of Victories Church, Ballymun Road	very high	Permanent/ Temporary land take for Metro underpass	Compensation	medium	Medium significance
Strip of land at Albert College Court	very high	Permanent/ Temporary land take for Metro underpass	Compensation	medium	Medium significance
Strip of land at Scout Hall	very high	Permanent/ Temporary land take for Metro underpass	Compensation	medium	Medium significance
Westfield House, Ballymun Road, Dublin 9	very high	Permanent land take for Metro underpass	Compensation	medium	Medium significance
1 Albert College Lawn, Glasnevin, Dublin 9	very high	Permanent land take for Metro underpass	Compensation	medium	Medium significance
2 Albert College Lawn, Glasnevin, Dublin 9	very high	Temporary land take for Metro underpass	Compensation	medium	Medium significance

16.4.3.2 Project scenario: operational phase

Existing and planned future properties within this area will benefit from their location and close proximity to a new permanent public transport and upgraded road system. Experience of the effects of the Luas Red and Green lines on house prices along these lines would indicate the residential property values and land values generally in the study area should also increase due to a positive 'Luas effect'. A property market analysis report from the estate agent Douglas Newman Good (DNG, 2005), indicated a Luas effect on house prices in the Tallaght area, and stated that 'an analysis of property price increases along the two Luas lines to Tallaght and Sandyford confirms that those properties within a five minute walk of a Luas station have seen higher increases in value than other comparable properties with no immediate access to the tram system'. More specifically, the report states that in Dublin 24, properties close to a Luas stop increased on average by 54% between January 2002 and January 2005 whilst the average increase was 37% in areas not within easy walking distance of a stop, a differential of 17%. The impact on property values in proximity to the proposed scheme is therefore likely to be positive. In general, operation of the proposed scheme is therefore assumed to have a positive impact on property by increasing the attractiveness of areas and strengthening the overall property market in the vicinity of the proposed scheme.

17 MATERIAL ASSETS: UTILITIES



This chapter of the EIS evaluates the potential impacts on utilities, which may arise due to activities associated with the construction and operation of the proposed scheme in Area MN105.

17.1 INTRODUCTION

This chapter of the EIS evaluates the potential impacts on utilities, which may arise due to activities associated with the construction and operation of the proposed scheme in Area MN105.

This chapter specifically refers to impacts on over and underground utility infrastructure such as water, gas, electricity, sewers, surface water drainage and telecommunications. It includes an evaluation of the impacts associated with protection, diversion and relocation of utility services equipment and plant in the vicinity of surface running tracks, stops, tunnels, ventilation shafts and other areas associated with the proposed scheme. Any impacts due to electromagnetic interference are addressed in the Radiation and Stray Current chapter of this EIS (Volume 2, Chapter 6). Indirect impacts that may occur due to the activities and potential disruption caused during utilities diversions are addressed in other chapters of this EIS. Examples include the Socio-economics and Traffic chapters of this EIS (Volume 2, Chapters 3 and 7).

17.2 STUDY AREA

The study area for this chapter is approximately 84m either side of the centre line of the track alignment.

17.3 IMPACT ASSESSMENT METHODOLOGY

Due to the extensive footprint and geographical extent of the proposed scheme and its associated structures, impacts on utility services are unavoidable. Early recognition of the type and level of impact makes it possible to provide suitable mitigation measures to minimise service disruption. The source and type of all potential impacts are described in Section 17.4.1.

Mitigation measures to be put in place are defined in Section 17.4.2. Mitigation measures are defined for any adverse impacts deemed to be of Medium or greater significance. The extent to which mitigation is needed increases as the significance of the impact increases. The residual impact is then evaluated in Section 17.4.3 in terms of magnitude and significance.

17.3.1 Magnitude

The criteria used to assess the different impacts associated with the proposed scheme are shown in Table 17.1.

Table 17.1 Criteria for assessment of impact magnitude

Criteria	Impact magnitude
- Long-term disruption of service e.g. for more than one week; - Relevant stakeholders are notified at short notice or not at all prior to disruption taking place; - The level of service provided by the original utilities infrastructure is not reinstated.	very high
- Long-term disruption of service e.g. for a week; - Relevant stakeholders are notified at short notice prior to disruption taking place; - The level of service provided by the original utilities infrastructure is reinstated.	high
- Medium-term disruption of service e.g. for up to two days; - Relevant stakeholders are notified prior to disruption taking place; - The level of service provided by the original utilities infrastructure is reinstated or improved.	medium
- Short-term disruption of service e.g. for several hours; - Relevant stakeholders are notified prior to disruption taking place; - The level of service provided by the original utilities infrastructure is reinstated or improved.	low
- No disruption of the existing level of service.	very low

17.3.2 Significance

The significance of impact is assessed in consideration of the magnitude of the impact and the functional value of the utility service upon which the impact has an effect.

17.4 IMPACT ASSESSMENT

17.4.1 Impact identification

Activities related to construction and installation of the following components of the proposed scheme may have impacts on utility services:

- Stops, tracks, depot, Park & Ride, substations, ventilation shafts, landscaping bunds, ancillary roads and access ways, cut and cover tunnel sections, tunnels and tunnel portals;
- Earthworks, such as cuttings and embankments;
- Construction compounds.

Two types of impacts are recognised to occur: temporary and permanent.

17.4.1.1 Temporary Impacts

Temporary impacts are typically associated with the construction phase of the proposed scheme. These impacts are short-term in nature and are required to facilitate construction. Direct impacts occur where utilities are located in whole or in part within the footprint of the proposed scheme.

17.4.1.2 Permanent Impacts

Permanent impacts are long-term impacts which are expected to persist over the lifetime of the proposed scheme.

17.4.2 Mitigation measures

Utilities infrastructure ensures reliable provision of power (electricity/gas), water and other amenity services in accordance with service level agreements. RPA recognises the importance of ensuring that disruption to any utility service is minimised and where necessary, depending on service level agreement, alternative measures are to be taken to ensure continuity of the service whilst diverted.

The importance of continuity of service to consumers within the study area is recognised. Utility services within Area MN105 have been identified; extensive consultations have taken place with stakeholders including Statutory Undertakers, Local Authorities and other relevant parties. Reviews of relevant existing service networks and civil infrastructure have been carried out to identify potential impacts on existing service networks.

A schedule of proposed utility diversions has been prepared which identifies infrastructure requiring diversion and includes information on the type and size of each utility. This schedule also identifies the necessary mitigation measures required by the utility company and the contractor to facilitate the implementation of works. A summary of this schedule specific to MN105 is provided in Table 17.2.

Utility drawings have been prepared by digitally transferring data from the existing drawings of Statutory Undertakers into computer aided drawing (CAD) format. Because of potential inaccuracies and errors in these records, the information is supplemented by an extensive survey of the proposed scheme using invasive and non-invasive methods of underground service mapping in order to verify the positions of buried apparatus.

To ensure that the operation of the proposed scheme is not affected by future utility maintenance or diversion activities, utility services will generally be diverted away from the track. All utilities that cross the track or the proposed scheme infrastructure will be protected or lowered, relocated or diverted as necessary and spare capacity may be provided for future maintenance or expansion.

All works will be carried out in ongoing consultation with the relevant Statutory Undertakers and Local Authority representatives and will be in compliance with their requirements (including health and safety) and relevant codes of practice. Agreement will be reached prior to any works taking place and relevant design documentations prepared. The works will be coordinated and programmed in consultation with the relevant undertaker to minimise impact. The contractor will be responsible for design and co-ordination of utility diversionary works.

17.4.3 Assessment of residual impacts

17.4.3.1 Construction phase

The utility works in area MN105 include, but are not limited to the diversion of water mains of varying diameters and materials, gas mains (local distribution) of varying diameters and materials, drainage pipes (surface water, sewage, and combined systems) of various diameters, alteration of manholes, duct systems for telecommunications providers, street lighting, traffic lighting and signals, cable TV operators and ESB (local distribution and high voltage), including miscellaneous chambers as detailed in Table 17.2. The works also include any alterations to service connections to individual properties necessitated by the diversion of the associated main utility services.

During the construction phase, if mitigation measures were not put in place the impacts on utility services would be of high magnitude. All utility services are considered to be of very high functional value and therefore if mitigation were not put in place, the significance of the impacts would be High to Very high. However, if the mitigation measures described in Section 17.4.2 are put in place, the magnitude of the impact decreases to very low and therefore is not considered to be significant.

Table 17.2 Impacts and mitigation measures

Utility Type	Description/ Pipe Size	Approximate length that may be impacted upon (m)	Likely mitigation measures	Potential duration of disrupted service (Magnitude of residual impact)	Significance of residual impact
Miscellaneous	CCTV	505.9	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	Unknown	59.6	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
Traffic	Traffic Ducting	356.2	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
Alt Comms	CCTV	557.9	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
NTL	2 WAY	1,004.8	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	Unknown	10	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low

Utility Type	Description/ Pipe Size	Approximate length that may be impacted upon (m)	Likely mitigation measures	Potential duration of disrupted service (Magnitude of residual impact)	Significance of residual impact
Public Lighting	1x100mm Duct	102	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	Ducting	47	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	Public Lighting	41.5	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	Unknown	76	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
Gas Transmission	200mm, DI Gas Main	26	Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
Gas Distribution	2" Pipe	27	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	4" Pipe	4	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	6" Pipe	32	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	8" Pipe	27	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	12" Pipe	53	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	63 PE 25 mbar	54.3	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	65 PE 25 mbar	2	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	90 PE 25 mbar	11	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	180 PE 4 bar	27	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	250 PE 25 mbar	1,81.8	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low

Utility Type	Description/ Pipe Size	Approximate length that may be impacted upon (m)	Likely mitigation measures	Potential duration of disrupted service (Magnitude of residual impact)	Significance of residual impact
	250 PE 4 bar	1,066	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	315 PE 25 mbar	93.8	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	315 PE (8in) 25 mbar	34	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	8" CI 25 mbar	26	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	Unknown	494.6	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
ESB Transmission	38 KV Cable	53	Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	110 KV Cable	50	Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
ESB Distribution	1 x LV	260.7	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	2 x LV	24	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	3 x LV	69	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	3x1/185 XLP	433.2	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	3 x 1 x 400 "VV"	26	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low

Utility Type	Description/ Pipe Size	Approximate length that may be impacted upon (m)	Likely mitigation measures	Potential duration of disrupted service (Magnitude of residual impact)	Significance of residual impact
	4 x 185 XLP	26	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	3 x 1 x 400 XLP	17	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	3 x 1 630 “AE”	25	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	3 x 185 Al	18	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	4 x PVC Ducts	253.8	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	4 x 185 Al	32.4	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	HT Cable	26	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	3 x 70C	25	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	2 Way 4 x 185 Al	116	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	10 KV OH Wire	144	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	Unknown	293.9	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
DCC Water	4” uPVC	114	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low

Utility Type	Description/ Pipe Size	Approximate length that may be impacted upon (m)	Likely mitigation measures	Potential duration of disrupted service (Magnitude of residual impact)	Significance of residual impact
	12" uPVC	93	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	Unknown	249	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	100mm uPVC	4	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	150mm uPVC	122	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	150mm Pipe	50	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	150mm MOPVC	139	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	200mm MOPVC	24	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	300mm DI	377	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	450mm DI	96	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	800mm DI	1,755	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
DCC Drainage	100mm Surface	3	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	150mm Surface	76	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low

Utility Type	Description/ Pipe Size	Approximate length that may be impacted upon (m)	Likely mitigation measures	Potential duration of disrupted service (Magnitude of residual impact)	Significance of residual impact
	225mm Surface	58	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	450mm Surface	51	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	525mm Surface	122	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	600mm Surface	131	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	900mm Surface	87	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	1350mm Surface	199	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	Unknown	281	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	225mm Foul	119	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	300mm Foul	96	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	Unknown	119	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	180mm Combined	28	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
	225mm Combined	4	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low

Utility Type	Description/ Pipe Size	Approximate length that may be impacted upon (m)	Likely mitigation measures	Potential duration of disrupted service (Magnitude of residual impact)	Significance of residual impact
	300mm Combined	18	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low
Eircom	4x100	1,418	Decommission/ Divert/ Protect Permit to dig system and liaison with service provider	Short-term (low)	Low

17.4.3.2 Operational phase

Provided that the mitigation measures specified in Section 17.4.2 are implemented, the operation of the proposed scheme will not impact on utility services.

18 INTERRELATIONSHIPS, INTERACTIONS AND CUMULATIVE IMPACTS

Section 39(2)(b) of the Railway Infrastructure Act, 2001 specifies that an environmental impact statement must contain a description of the inter-relationship between the likely significant impacts on the aspects of the environment listed in Section 39.

18.1 INTRODUCTION

Section 39(2)(b) of the Railway Infrastructure Act, 2001 specifies that an environmental impact statement must contain a description of the inter-relationship between the likely significant impacts on the aspects of the environment listed in Section 39.

The purpose of this chapter is to illustrate the key inter-relationships that exist between the various affected environmental topics. Cumulative impacts due to the proposed scheme are considered. Cumulative or combined impacts due to the combination of the proposed scheme and other projects in the same area are also examined. This includes cumulative impacts (impacts which accumulate over space or time to generate a larger overall impact), cross-media impacts and other impact interactions.

European guidelines state why this is an important process:

'An impact which directly affects one environmental medium may also have an indirect impact on other media (sometimes referred to as cross media impacts). This indirect effect can sometimes be more significant than the direct effect.' (E.C. 1999)

For example, in some cases, changes in noise or vibration levels may have a profound effect on human beings. Whilst the additional noise may not constitute a significant increase when using simple assessment methods, vulnerable groups of individuals may be indirectly affected.

'Visual intrusion may also have an indirect impact on the amenity value of sites of historical interest. Again, in the absence of the analysis of indirect impacts, visual intrusion may not be considered as significant. However, the indirect impacts may be considered as being substantial' (E.C. 1999).

18.2 METHODOLOGY

Impact interactions and inter-relationships have been considered throughout the EIA process and in the preparation of the individual impact chapters (Volume 2) so that it can take into account the broader picture of how the proposed scheme may affect the various environmental media.

All environmental topics are interlinked to a degree such that interrelationships exist on numerous levels. A summary matrix has been developed to identify key interactions that exist with respect to this specific project. As such, does not represent a form of relative assessment of impacts and other interactions are recognised to exist and have been addressed in individual chapters of the EIS. The matrix that has been developed is presented as Figure 18.1.

	Human Health	Human Beings: Landuse	Human Beings: Socio-Economics	Human Beings: Noise	Human Beings: Vibration	Human Beings: Radiation and Stray Current	Human Beings: Traffic	Air and Climatic Factors	Ground-water	Surface Water	Soil and Geology	Landscape and Visual	Flora and Fauna	Material Assets: Agronomy	Material Assets: Archaeology, Architectural Heritage and Cultural Heritage	Material Assets: Utilities	Material Assets: Non Agricultural Property
Human Health	■	■		■	■	■	■	■	■	■	■						
Human Beings: Landuse	■	■	■	■		■	■	■	■	■	■	■		■	■	■	■
Human Beings: Socio-Economics		■	■	■			■							■		■	■
Human Beings: Noise	■	■	■	■	■		■					■	■				
Human Beings: Vibration	■			■	■		■								■	■	■
Human Beings: Radiation and Stray Current	■	■				■							■			■	
Human Beings: Traffic	■	■	■	■	■		■	■				■	■			■	
Air and Climatic Factors	■	■					■	■									
Groundwater	■	■							■	■	■			■	■	■	
Surface Water	■	■							■	■	■	■	■				
Soil and Geology	■	■							■	■	■		■	■	■	■	
Landscape and Visual		■		■			■			■		■	■		■		
Flora and Fauna				■		■	■			■	■	■	■	■			
Material Assets: Agronomy		■	■						■	■	■		■	■	■		
Material Assets: Archaeology, Architectural Heritage and Cultural Heritage		■			■				■	■	■	■		■	■		■
Material Assets: Utilities		■	■		■	■	■		■	■	■					■	
Material Assets: Non Agricultural Property		■	■		■										■		■

Figure 18.1
Impacts
Interaction and
Interrelationship
Matrix

The consideration of impact interactions and potential cumulative impacts has been addressed during the preparation of the EIA in each of the individual impact chapters. A very diverse range of interactions has been considered as part of this EIA including, but not limited to the examples described in Table 18.1.

Table 18.1 Key Impact interactions and interrelationships

Interaction	Description
Human Health, Air & Climatic Factors and Traffic	Impacts on air quality may occur due to emissions of dust from construction compounds. Impacts on air quality may also occur due to changes in traffic levels and thus exhaust emissions. In some cases, particularly during the construction phase, both impacts occur at the same location. The potential for interactions was therefore considered, particularly when defining the relevant mitigation measures and carrying out the assessment of potential impacts on human health. The potential for traffic emissions to have an indirect impact on climate (in terms of climate change) has also been considered.
Human Health, Noise and Traffic	Noise impacts may occur due to construction or operation activities. Noise impacts may also occur due to changes in traffic levels. In some cases, particularly during the construction phase, both impacts occur at the same location. The potential for interactions was therefore considered, particularly when defining the relevant mitigation measures and carrying out the assessment of potential impacts on human health.
Vibration and Archaeology, Architectural Heritage and Cultural Heritage	The potential for vibration impacts on features of architectural, archaeological or cultural importance has been considered and appropriate measures have been defined.
Groundwater, Soil and Geology and Surface Water	There are direct and physical links between surface water, groundwater, soils and geology. The impacts of the scheme are therefore considered in the chapters that support all three environmental topics in recognition of the fact that impacts to one component of this complex system may have knock-on, indirect effects on other components.
Landscape and Visual and Flora and Fauna	Mitigation measures for landscape impacts and ecological impacts were considered when defining the Landscape Insertion Plans (Volume 2, Chapter 13) in order to ensure that interactions between impacts were considered in an appropriate manner. In many cases, the mitigation measures that have been defined serve the dual purpose of mitigating both landscape and ecological impacts.
Landuse and Socio-economics	Impacts on commercial landuses can often have a knock-on effect in terms of socio-economics. Interactions between the two environmental topics were therefore considered to ensure that both direct and indirect impacts were considered and appropriate mitigation measures put in place.
Traffic and Socio-economics	Traffic impacts and mitigation measures have the potential to impact on socio-economic activity. The potential for indirect impacts of this nature has been considered when defining appropriate mitigation measures.
Landuse, Landscape and Visual and Archaeology, Architectural Heritage and Cultural Heritage	Cultural heritage comprises elements of the landscape which are important to individuals. Landscape elements which are important to individuals may include man-made buildings, traditional landuse, natural environmental features or features of archaeological or architectural importance. Impacts on all of these aspects of cultural heritage are considered in the relevant chapters of this EIS.
Water, Soil and Geology and Flora and Fauna	Direct physical links exist between these topics and potential impacts on surface water or soils were therefore also considered in the Flora and Fauna chapters of this EIS (Volume 2, Chapter 8).

Interaction	Description
Landuse, Non Agricultural Property and Agronomy	Land-take can have an impact on landuse, property and agricultural lands. Changes in landuse affecting Agronomy and Non Agricultural Property have been assessed as part of the EIA and are described in Volume 2, Chapters 14 and 16 respectively.
Soil and Geology and Human Health	The key issue here is radon emissions. The potential for radon emissions from disturbed/excavated soil and geology to have an impact on human health has been considered and appropriate mitigation measures have been established.

18.3 CUMULATIVE IMPACTS

Cumulative impacts occur when the addition of single impacts from a number of individual schemes results in compounding effects. Cumulatively, these impacts may be significant if they occur close together in terms of location and time.

The scheme will inevitably cause a degree of disruption during the construction phase, as with most major transport infrastructure projects. Next to disruption the construction equipment and hoardings are likely to be very visible. Drivers and public transport users may also experience delays during temporary road diversions. The combination of these construction effects is likely to heighten any overall sense of disruption felt by those living and working close to the route of the scheme.

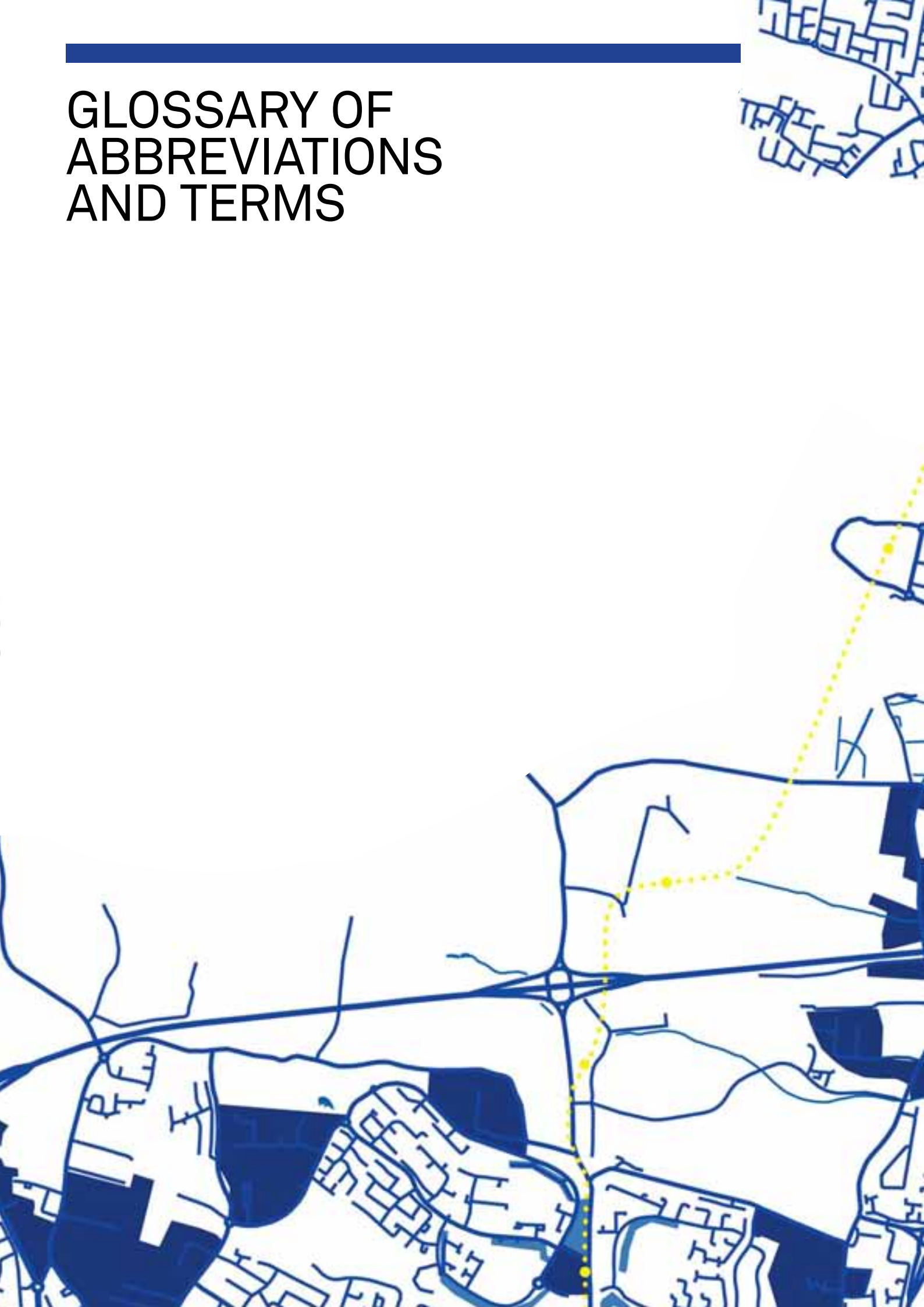
During the construction phase of the scheme, several other projects are likely to take place within the study area. A review of planning applications has been undertaken (as described in the Baseline Landuse chapter of this EIS (Volume 1, Chapter 10)) to identify such developments. Examples include, but are not limited to:

- the Irish Rail Interconnector project;
- the development of Dublin Airport;
- the Luas BX Line;
- the Marlborough Bridge across the River Liffey;
- the extension of Mater Hospital.

The development of schemes such as those listed above has the potential to cause cumulative impacts. In some cases, the timeframe within which the other developments will occur is not yet clearly defined. However, consultation has been undertaken with proponents of these other projects to ensure that the potential for cumulative impacts is considered and appropriate mitigation measures are put in place where relevant. Considerations in this regard were undertaken in relation to the Landuse, Socio-economics, Noise, Traffic and Air and Climatic Factors of this EIS (Volume 2, Chapters 2, 3, 4, 7 and 12 respectively). The means by which cumulative impacts are assessed is clearly defined, where relevant, in all chapters of the EIS.

Given the urban location of the proposed scheme, cumulative impacts arising due to other major construction projects are inevitable. Impacts of this nature have been assessed where possible and must be considered by the planning authority in exercising their development control function for future developments in the local area.

GLOSSARY OF ABBREVIATIONS AND TERMS



1 GLOSSARY OF ABBREVIATIONS

Acronym	Definition
AADT	Annual Average Daily Traffic (total annual traffic flow divided by 365)
AAP	Area Action Plan
AD	Anno Domini (Medieval Latin: 'in the year of our lord') a designation used to number years in the Julian and Gregorian calanders.
AEC	Areas of Ecological Constraint
ALSAA	Aer Lingus Sports and Athletics Association
AP	Aerial Photograph
At-grade	At public carriageway level (as opposed to tunnel or elevated).
BAP	Biodiversity Action Plan
BOD	Biological Oxygen Demand
BRE	Building Research Establishment
BRL	Ballymun Regeneration Ltd.
CBA	Cost Benefit Analysis
CCVM	City Centre Vissim (Micro-simulation) Models
CIRIA	Construction Industry Research and Information Association
CLR	Contaminated Land Report
CRDS	Cultural Resource Development Services Ltd.
cSAC	Candidate Special Area of Conservation
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CPO	Compulsory Purchase Order
CRT	Cathode Ray Tube
CSO	Central Statistics Office
DART	Dublin Area Rapid Transit
dB (Decibel)	The basic unit for sound measurement. Decibels are measured on a linear scale which defines a logarithmic amplitude scale, thereby compressing a wide range of amplitude values into a small set of numbers
dB(A)	A frequency weighting applied to sound measurements which approximates to the frequency response of the human ear
DC	Direct current
DCC	Dublin City Council
DCU	Dublin City University
DEIS	Delivering Equality of Opportunity in Schools
DIT	Dublin Institute of Technology
DMRB	Design Manual for Roads and Bridges, UK
DoE	Department of Environment (in the UK)
DoEHLG	Department of Environment, Heritage and Local Government (in Ireland)
DoT	Department of Transport
DTI	Dublin Transportation Initiative
DTO	Dublin Transportation Office
DTOTM	Dublin Transportation Office Traffic Model
DTS	(Environmental) Desktop Study

Acronym	Definition
EA	Environmental Agency (UK)
ED	Electoral Division
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EM	Electromagnetic
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference
EPA	Environmental Protection Agency
ERFB	Eastern Regional Fisheries Board
ERSA	European Regional Science Association
ESB	Electricity Supply Board
EU	European Union
FAQ	Frequently Asked Questions
FCC	Fingal County Council
FTE	Full-time employment
GAA	Gaelic Athletic Association
GAC	Generic Assessment Criteria
GDA	Greater Dublin Area
GPO	General Post Office
GQRA	Generic Quantitative Risk Assessment
GRP	Glass Reinforced Plastic
GSI	Geological Survey Ireland
HAP	Habitat Action Plan
HC#	Heritage Constraint Number
HGV	Heavy Goods Vehicle
IEEM	Institute of Ecology and Environmental Management
IEMA	Institute of Environmental Management and Assessment
InfraCo	Infrastructure Company appointed to design, construct and operate the proposed scheme
IPPC	Integrated Pollution Prevention and Control
IR	Irish Rail
kph	Kilometres per hour
L_{Aeq}	The equivalent continuous noise level. The notional steady dB(A) level that would produce the same A-weighted sound energy level as the actual, time varying sound, over a stated period
L_{A10}/L_{A90}	The noise levels in dB(A) that are equalled or exceeded for the 10%/90% of the sample time
L_{Amax}	Maximum peak noise level
LAP	Local Area Plan
LGV	Light Goods Vehicle
LI	Landscape Institute
LLCA	Local Landscape Character Areas

Acronym	Definition
LMV	Light Metro Vehicle
LRT	Light Rail Transit
Luas	Dublin's Light Rail Transit system
LV	Low Voltage
MGI	Main Ground Investigation
Mitigation	Measures designed to avoid, reduce or remedy adverse impacts
MID	Mobility Impaired/ Disabled
MNEC	Metro North Economic Corridor
MNTM	Metro North Traffic Model
MRP	Molybdate-Reactive Phosphate
NAQIA	National Air Quality Information Archive UK
NCCS	National Climate Change Strategy
NCT	National Car Test
NDP	National Development Plan
NHA	Natural Heritage Area
NIAH	National Inventory of Architectural Heritage
NMI	National Museum of Ireland
NML	Noise Monitoring Location
NMS	National Monuments Services
NO_2	Nitrogen Dioxide
NO_x	Nitrous Oxides
NPWS	National Parks and Wildlife Service
NRA	National Roads Authority
NSS	National Spatial Strategy for Ireland
OCS	Overhead Catenary System
OPW	Office of Public Works
OS	Ordnance Survey
OSI	Ordnance Survey of Ireland
PAH	Polycyclic aromatic hydrocarbon
PCU	Passenger Car Units
P&R	Park & Ride
PE	Polyethylene
PM_{10}	Particulate Matter with diameter of a less than 10 microns
$PM_{2.5}$	Particulate Matter with diameter of a less than 2.5 microns
pNHA	Proposed Natural Heritage Area
ppb	Parts per billion
PPG	Pollution Prevention Guidelines
ppm	Parts per million
PPP	Public Private Partnership
pteg	Passenger Transport Executive Group
Public Utilities	Water supply, drainage, gas, electricity, telecommunications systems as controlled operated and maintained by statutory bodies such as local authorities, Bord Gais etc.
QBC	Quality Bus Corridor

Acronym	Definition
RAPID	Revitalising Areas by Planning, Investment and Development
RMP	Record of Monuments and Places
RPA	Railway Procurement Agency.
RPG	Regional Planning Guidelines
RPGDA	Regional Planning Guidance for the Greater Dublin Area
RPS	Record of Protected Structures
SAC	Special Area of Conservation
SGVs	Soil Guideline Values
SMR	Sites and Monuments Record (of the Department of Arts, Heritage, Gaeltacht and the Islands)
SO_2	Sulphur Dioxide
SPA	Special Protected Areas
SSG	St. Stephen's Green
Spp.	Species
SUDS	Sustainable Urban Drainage System
SVM	Swords Vissim Models
TAG	Transport Analysis Guidance
TBM	Tunnel Boring Machine
TCD	Trinity College Dublin
TD	Teachta Dála (Member of Parliament)
TPH	Total Petroleum Hydrocarbons
UCD	University College Dublin
µg/m³	Micrograms per cubic metre
UHI	Urban Heat Island
UK	United Kingdom
VOC	Volatile Organic Compound
WWTP	Waste water treatment plant

2 GLOSSARY OF TERMS

Term	Definition
Agronomy	The science of agriculture (soil management, land cultivation, and crop production).
Alignment	The position of the proposed schemes tracks relative to the surrounding topography.
Alignment design detail	Information pertaining to the various positions along the alignment.
Alternative route option	Route options which were considered other than the route decided upon.
Alternatives	The EIA Regulations giving effect to the 1985 and 1997 EIA Directives require an outline of the main alternatives studies by the road authority and an indication of the main reasons for its choice, taking into account the environmental effects. Alternatives typically relate to alternative routes, alternative designs and alternative processes (NRA).
An Bord Pleanála	An Bord Pleanála was established in 1977 under the Local Government (Planning and Development) Act, 1976 and is responsible for the determination of appeals and certain other matters under the Planning and Development Acts, 2000 to 2006, and with appeals under the Building Control Act, 1990, the Local Government (Water Pollution) Acts, 1977 and 1990 and the Air Pollution Act, 1987.
Aquifer	A water-bearing layer of soil, sand, gravel, or rock that yields water.
Archaeological Assessment	An archaeological assessment is the investigation of known, suspected or previously unidentified monuments, sites or areas of archaeological potential in order to assess the impact which the proposed development may have on them. Each assessment should contain a description of the archaeology known to survive in the development area and of the types of archaeological features, not yet identified, which could possibly exist in that location. These should be evaluated in terms of the impact of the proposed works on known or predicted archaeology. Assessments may indicate that archaeological test excavation is required. The assessment procedure also proposes a strategy designed to deal with the possible adverse effects of the development works on archaeology.
Archaeological Excavation	Archaeological excavation is the systematic recording and removal of layers of soil, deposits, structures and artefacts by a qualified archaeologist. As excavation is destructive by its nature it must be carried out with meticulous care so that all information, whether its relevance is immediately obvious or not, will remain available after the site has completely disappeared. This is why it is termed preservation by record. Post-excavation analysis e.g. radio carbon dating, conservation of archaeological finds, the proper storage of archaeological objects and publication of the results of the excavation are all integral parts of the process.
Archaeological Monitoring	Archaeological monitoring involves an archaeologist being present in the course of the carrying out of development works (which may include conservation works), so as to identify and protect archaeological deposits, features or objects which may be uncovered or otherwise affected by the works.
Archaeological site	This encompasses 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 (formerly OPW). All sites described and mapped by the SMR has the full protection of National Monuments legislation (1937-1995).
Archaeological Test Excavation	Archaeological test excavation is excavation of confined strips or areas of a site in order to establish the presence or absence of archaeology and to determine its nature and extent.
At-grade section	A section of the proposed scheme at ground level (as opposed to tunnel or elevated).

Term	Definition
Baseline environment	Environmental conditions that currently exist and against which any future changes can be assessed.
Baseline studies	Work done to determine and describe the baseline environmental conditions against which any future changes can be measured or predicted and assessed.
Bored tunnel	Tunnel constructed 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.
Brownfield	In town planning, Brownfield land is an area of land previously used or built upon or land that is or was occupied by a permanent structure, which has become vacant, underused or derelict and has the potential for development.
Building / Structure of Architectural Merit	A building or Structure which has no legal protection that is, in the opinion of the authors of the EIS, to be of architectural merit and therefore included in the study. N.B. Please see criteria for their inclusion in the archaeological chapters of this EIS.
Census of Ireland	A census of the population of the whole of Ireland, occurring every four years between 1821 and 2006.
Central median	Parcel of land between two carriageways.
Civil Survey letters	A detailed survey of landuse and land ownership in Ireland undertaken by the English Government in 1641.
Conservation Area	An area where the architectural design and scale of these areas is of sufficient importance to require special care in dealing with development proposals and works by the private and public sector alike.
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 the scheme will be constructed.
Contamination	The act of contaminating or polluting; including (either intentionally or accidentally) unwanted substances or factors.
Culvert	A channel or conduit for passing water under a road or embankment.
Cumulative effects	The effect on the environment which results from the incremental impact of an action when added to other past, present or reasonably foreseeable actions regardless of what agency or person undertakes such actions.
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 techniques	The method of constructing tunnels.
Cut and cover tunnel	A tunnel that is excavated from the 'top down' (i.e. from the surface) and then covered over to reinstated the surface.
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.
Direct effects	The effects that will occur as a direct result of the project.
Do-minimum scenario	The scenario that would exist in the future if the project were not to go ahead.
Dublin Transportation Office (DTO)	Statutory agency which provides transport and landuse advice to organisations operating in the Greater Dublin Area.

Term	Definition
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.
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.
Elevated section	A section of the scheme that is raised off the surface i.e. viaduct.
Environmental Impact Assessment (EIA)	The systematic, reproducible and interdisciplinary identification, prediction and evaluation, mitigation and management of impacts from a proposed development and its reasonable alternatives. The process of examining the environmental effects of the proposed 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.
EPA Q-value	An Environmental Protection Agency classification concerning the biological status of a watercourse.
European Union (EU)	The economic and political union established in 1993 after the ratification of the Maastricht Treaty by members of the European Community, which forms its core.
Fáilte Ireland	Established under the National Tourism Development Authority Act, 2003, it provides strategic and practical support to develop and sustain Ireland as a high - quality and competitive tourist destination.
Fauna	All of the living animals.
Flora	All of the plants.
Functional Value	A term used to express the combined consideration of importance, sensitivity and existing adverse effects.
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.
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 tunnels, underground structures and foundations for the proposed scheme and for repair of distress to earthworks and structures caused by subsurface conditions.
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.

Term	Definition
Greenfield	Clean, 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 is the water that is pumped by wells and flows out through 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 organism 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.
Hydrological impacts	The effect on the water systems, river, lakes, groundwater, etc.
Impacted receptors	Those who are likely to experience a change in their environment as a result of the scheme.
Indirect effects	Effects that occur due to the project indirectly.
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 a watercourse.
Irish Rail Interconnector	A connection with a proposed 5.2 km underground line, connecting the Docklands and Hueston Station.
Landuse	The use or activities which occur within particular areas
Launch sites	The locations from which the tunnel boring machines are to be launched.
Light rail	Rail transport systems used to convey light or rapid speeds.
Linear scheme	A scheme that is linear in spatial design.
Long-term effects	Effects that will persist long into the future.
Luas	Dublin's light rail transport system.
M50	A C-shaped orbital motorway transport route around Dublin.
Magnitude of Impacts	Takes into account the quality, type and range of impact that will occur as well as the duration over which the impact will occur.
Medium-term effects	Effects that will persist for some time into the future, but will not be permanent.
Mining techniques	The methods used to extract soil 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	The repetitive and continues observation measurement and evaluation of environmental data to follow changes over a period of time, also used to assess the efficiency of control measures. Monitoring is the regular observation and recording of activities taking place in a project or programme. It is a process of routinely gathering information on all aspects of the project.
National Heritage Area (NHA)	An area considered important for the habitats present or which holds species of plants and animals whose habitat needs protection.
National Monument	Section 2 of the National Monuments 1930 Act provides that 'national monument' 'means a monument or the remains of a monument the preservation of which is a matter of national importance by reason of the historical, architectural, traditional, artistic, or archaeological interest attaching thereto....., and the said expression shall be construed as including, in addition to the monument itself, the site of the monument and the means of access thereto and also such portion of land adjoining such site as may be required to fence, cover in, or otherwise preserve from injury the monument or to preserve the amenities thereof'.
National Roads Authority (NRA)	Ireland's statutory body for securing the provision of a safe and efficient network of national roads.
Negative effect	A result of the project that has made the situation worse than before.
Negative impact	A change that reduces the quality of the environment.
Non-statutory bodies	Organisations not established at the behest of Government.
Non-technical summary	Information for the non-specialist reader to enable them to understand the main environmental impacts of the proposal without reference to the main environmental impact statement.
NO_x	Nitrogen Oxides.
Open Space	Includes all areas of public realm, parks and squares, as well as incidental areas of open spaces peripheral to development and open space specific to residential development.
Operational phase	The period of time over which the proposed scheme will be in operation.
Overhead cantenary system (OCS)	The system through which power is supplied to Metro.
Park & Ride sites	Facilities at public transport stops 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 non-reversible and will persist indefinitely.
pH Index	A measure of the acidity or alkalinity of a solution. The pH scale commonly in use ranges from 0 to 14.
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. Recognised methodology used for collating information on the habitat structure of a particular site.
Positive impact	A result of the project that has made the situation better than before.
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.
Proposed scheme	The Metro North development proposals subject to the Railway Order.

Term	Definition
Public realm	The space between and within buildings that are publicly accessible, including streets, squares, forecourts, parks and open spaces.
Public Utilities	Water supply, drainage, gas, electricity, telecommunications systems as controlled operated and maintained by statutory bodies such as local authorities, Bord Gais etc.
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 thing used in connection with, or necessary or incidental to, the movement of passengers or freight by railway.
Railway Order	The authorisation given by An Bord Pleanála for a railway project to commence construction.
Railway Procurement Agency (RPA)	The independent statutory body responsible for securing the provision of, or provide, such light railway and metro infrastructure as may be determined from time to time by the Minister for Transport.
RAPID (Revitalising Areas by Planning, Investment and Development)	An initiative that is led by the Department of Community, Rural and Gaeltacht Affairs to focus investment into the most concentrated areas of disadvantage in the country.
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.
Receptor	Any element in the environment which is subject to impacts.
Records of Monuments and Places (RMP)	A database of all archaeological monuments in the state compiled by the Archaeological Survey of Ireland.
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	The degree of environmental change that will occur after the proposed mitigation measures have taken effect.
Retained cut	A cutting that is excavated but is not covered over after, generally the sections of the alignment where the proposed scheme descends to and rises e.g. 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 the proposed scheme 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.
Severance	The separation/reduction in separation of population from facilities and services they use within their communities.
Scope	The spatial and temporal extent which the environmental impact assessment is to be evaluated over.
Scoping	The process of identifying the issues to be addressed by an EIA. It is a method of ensuring that an EIA focuses on the important issues and avoids those that are considered to be less significant.
Scoping stage	The stage of the EIA at which the scope is decided upon.
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.

Term	Definition
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.
Short-term effects	Effects that are only short lasting.
Significant impact	An impact which, by its character, magnitude, duration of intensity alters a sensitive aspect of 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.
Soundscape	Any acoustic environment, whether it springs from natural urban or rural sources.
Source Protection Zones (SPZs)	The Environment Protection Agency identifies Source Protection Zones to protect groundwater (especially public water supply) from developments that may damage its quality.
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)	Sites designated under the European Union directive on the Conservation of Wild Birds (79/409/CEE) to protect important bird species.
Species migration	The movement of species between habitats.
Spoil	The earth excavated during tunnelling and other construction works.
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.
Stenotopic species	Species tolerant of only a narrow range of environmental factors.
Stop	Points at which passengers will be able to embark and disembark the proposed scheme.
Stop access points	The points via which the stops can be accessed.
Study Area	This study area encompasses all areas that may potentially be impacted upon by the proposed scheme.
Swords QBC	Bus service linking Swords with Dublin airport and Dublin city.
Temporary effects	Effects that will last for only a certain amount of time.
Temporary impact	Impacts that will last for only a certain amount of time.
Townscape	The urban landscape.
Track gauge	The distance between the two rails.
Traffic assessment	Consists of the collection of data, traffic census and the analysis of this data in order to make traffic flow predictions.
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 the proposed scheme will run.
Tunnel sections	Various lengths of the tunnel.
Twin tunnels	Two tunnels constructed side by side, but not connected other than by occasional cross-over passages.

Term	Definition
Urban Heat Island (UHI)	A microclimatic effect that is experienced in urban areas.
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.
Verge	A small parcel of land of incidental use.
Vertical alignment	The positioning of the proposed scheme tracks relative to the ground surface.
Visual amenity	The value of views to a receptor in a particular area
Visual receptors	Those who are likely to experience a change in view.
Wildlife Corridors	A strip of habitat connecting wildlife populations separated by human activities.