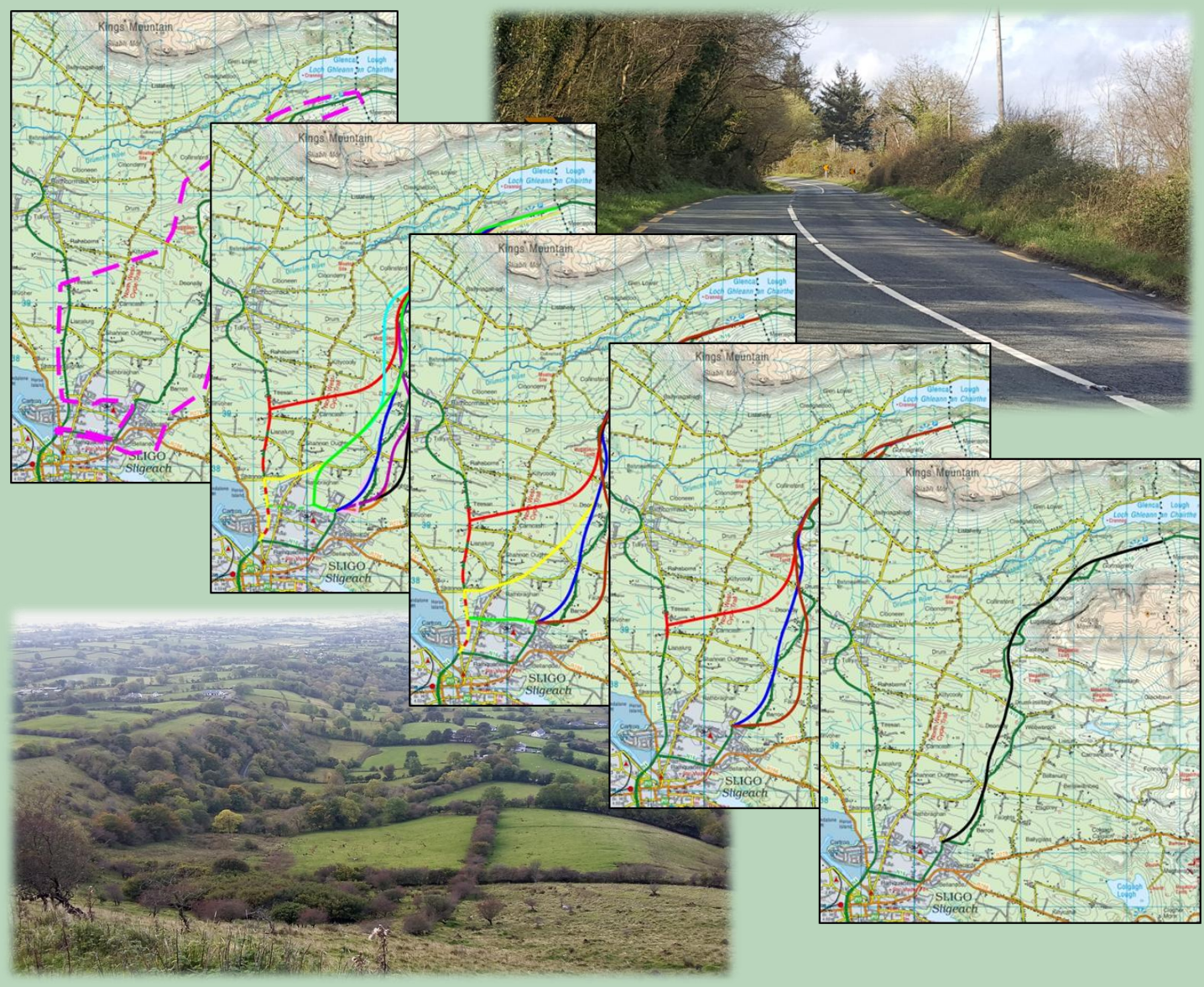
Route Selection Report

Volume 3: Environmental Appendices

PART A: Human Environment

An Roinn Iompair Turasóireachta agus Spóirt
Department of Transport, Tourism and Sport

N16 Sligo to County Boundary



Land of Hearts Desire

SLIGO COUNTY COUNCIL

TII
Bonneagar Iompair Éireann
Transport Infrastructure Ireland

i. PREFACE

THIS ROUTE SELECTION REPORT CONSISTS OF THE FOLLOWING DOCUMENTS:

Volume 1

- Main Report

Volume 2

- Engineering appendices:
  - PART A: Traffic & Transport Assessment;
  - Part B: Road Engineering, Road Safety Impact Assessment and Options Comparison Estimate);

Volume 3

- **Environmental appendices**
  - **PART A: Human Environment (including Urban Planning);**
  - PART B: Natural Environment;
  - Part C: Landscape & Visual, and Cultural Heritage;

Volume 4

- Road Safety Audit Stage F;

Volume 5

- Figures;

Volume 6

- Stage 2, Project Appraisal, Multi Criteria Analysis;

Document Control

Status	Issued For	Signed	Date	Approved
DRAFT	TII Peer Review	Fergus Meehan[1]	April 2017	Emer Concannon[2]

[1] *B.Eng., PgDip. Env., C.Eng MIEI*

Status	Issued For	Signed	Date	Approved
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[2] *B.Eng., MBA, C.Eng MIEI*

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This Route Selection Report (RSR) has been prepared and coordinated by Sligo County Councils National Roads Project Office, under the auspices of Transport Infrastructure Ireland and with the assistance of specialist engineering, planning and environmental sub-consultants as outlined below.

Table 1-1: N16 Sligo to County Boundary Route Selection Team

Study/Element	Body Responsible
Engineering	SCC National Road Design Office
Assessment Coordination, Multi Criteria Analysis and Report Compilation.	
Project Liaison.	
Road Safety Impact Assessment	
Traffic Modelling	Jacobs Engineering
Stage F Road Safety Audit	Kerry and Donegal NRDO's
Economic Appraisal (Stage 2 – Project Appraisal)	Jacobs Engineering
Landscape & Visual	RPS Ireland Ltd.
Flora, Fauna & Fisheries	RPS Ireland Ltd. With input from Denyer Ecology.
Agricultural and Non-Agricultural Property	John Bligh & Associates
Noise & Vibration	Envest Environmental
Air Quality & Climate Change	Envest Environmental
Hydrology & Hydrogeology	Hydro Environmental (Galway)
Soils & Geology	Roughan & O'Donovan
Socio Economic	Optimize Consulting
Archaeology & Cultural Heritage	ASCU
Architectural Heritage	ASCU
Impacts on Sligo & Environs Development Plan	The Planning Partnership

Design

Sligo County Councils National Roads Project Office is responsible for the design of the various route options contained within this Route Selection Report.

TABLE OF CONTENTS

Tables

ii. ENVIRONMENT (PART A)

1 Human Beings (Socio-Economic)

1.1 Introduction

This chapter addresses the potential social and economic (community) effects on Human Beings presented by the alternative route options being considered for the N16 between Sligo and the County Boundary with Leitrim.

This chapter initially describes methodology used for the assessment (Section 1.2), it then describes the receiving environment and relevant constraints (Section 1.3), followed by a description and impact assessment of both the Feasible Route Options and Refined Route Options in Section 1.4 and 1.5 respectively. The effects are summarised for each route option accompanied by a Score Card for each potential route corridor section.

1.2 Appraisal Methodology

1.2.1 Legislation and guidelines

The following guidelines were referred to while preparing and writing this chapter:

- EPA: Guidelines on the Information to be contained in Environmental Impact Statements, 2002;
- EPA: Revised Guidelines on The Information to be Contained in Environmental Impact Statements, Draft, September 2015;
- EPA: Advice Notes on Current Practice (in the preparation of Environmental Impact Statements) 2003;
- EPA: Advice Notes for Preparing Environmental Impact Statements, Draft, September 2015;
- NRA: Environmental Impact Assessment of National Road Schemes- A Practical Guide (Revision 1, November, 2008).

The assessment of potential social and economic effects has been undertaken in line with these guidelines. The EPA Guidelines provide advice on impact types including cumulative impacts which are often important for socio-economic assessments, for instance where improved accessibility presents opportunities or demand for new development.

In addition, reference is made to The Design Manual for Urban Roads and Streets (Department of Transport 2013) and to the guidelines provided on Community Effects in Volume 11 (Section 3, Part 8) of the UK Department of Transport Publication 'Design Manual for Roads and Bridges' (1993, updated 2009). Although the latter guidelines have not been adopted officially in Ireland, they provide further information by which to quantify community impacts.

1.2.2 Data Sources

A socio-economic assessment requires that an understanding of the community is built up through background research, site visits, and conversations with local people and community representatives. At this stage for the route options assessment, data has been collected by means of:

- Primary data sources (e.g. demographic data from Census 2011 and Census 2006 produced by the Central Statistics Office);
- Drawings of the proposed route options;
- Maps of the surrounding area, including Ordnance Survey 1:50,000 maps;
- Other relevant environmental data considered during the Route Selection Environmental Assessment, especially traffic volumes, noise and visual impacts;
- A review of relevant planning documents including the Sligo County Development Plan 2011-2017, the Sligo & Environs Development Plan 2010-2016 (SEDP) and the North Fringe Local Area Plan (LAP) 2010-2016.
- Observation of local settlement and travel patterns and identification of community facilities;
- Conversations with local people and local community facilities such as schools and sports clubs;
- Review of consultations undertaken by Sligo TII Project Office, including submissions made during Public Consultation's held in January/February 2016 and July/August/September 2016.

1.2.3 Impact Categories and their Assessment

1.2.3.1 Overview

The purpose of the socio-economic assessment is to identify the likely significant impacts as they might affect local people and users of the proposed road.

1.2.3.2 Construction impacts

Impacts during the construction period are difficult to assess at the stage of the options assessment due to the limited information currently available. However, some assessment can be made on the basis of the location of communities, or community facilities and:

- The effect of construction traffic on journey or general amenity;
- Effects on environmental and residential amenity.

1.2.3.3 Operational impacts

Impacts during the operational phase, fall into four key categories, namely:

1. Journey characteristics: An assessment of potential impacts on local journey time, journey time reliability (i.e. the assurance of completing a journey within a predictable time range) and travel patterns including connectivity;
2. Community severance: An assessment of potential impacts with regard to any severance from community facilities, particularly those used by older people, children or other sensitive or vulnerable groups. The category includes both new severance and relief from existing severance;
3. Amenity: This category includes journey amenity arising from the exposure of pedestrians and cyclists to traffic (due to proximity, safety, noise, dirt, poor air quality) as well as impacts for all road users arising from factors such as visual intrusion and congestion. In addition, impacts on general amenity are addressed where amenities and residential quality of life are affected;
4. Economic impacts: an evaluation of the proposed road in the context of economic development and employment.

Impacts can result from direct, indirect, secondary and cumulative effects on environmental conditions. Effects can be positive, neutral or negative. The significance of an effect is described as *Not significant*, *Imperceptible, Slight, Moderate, Significant, Very Significant* or a *Profound* impact. Significance depends, among other considerations, on the nature of the environmental effect, the timing and duration of an effect, and the probability of the occurrence of an effect. The impacts may be short term, medium term or long term. All construction impacts are temporary in nature.

It usually follows that impacts of a socio-economic nature are a function of:

- the location and character of the local environment;
- the sensitivity of the local population and its capacity to absorb change;
- the nature of the environmental effect;
- the scale or extent of the effect in terms of area or population affected;
- the duration and frequency of an effect, and
- the probability of an impact's occurrence.

The assessment generally addresses impacts at a community level, rather than for individuals or identifiable properties, although impacts for individual businesses are discussed where these are located beside the road or are very dependent on road traffic or accessibility. Impacts on individual properties are addressed separately in the chapter dealing the Agricultural property and Non-Agricultural Property. There are also interactions arising from possible impacts identified in the chapters on Landscape and Visual Assessment, Noise and Vibration, Air Quality and Climate Change, and Material Assets in particular.

1.2.3.4 Journey Characteristics

Assessment of journey times and patterns is inevitably dependent on precisely where an individual journey originates and ends, when it is undertaken (e.g. within or outside peak hours) and by whom it is undertaken, i.e. by drivers, cyclists, users of public transport or pedestrians including individuals whose transport options may be restricted. The impact varies for each journey, but typical journeys to particular destinations can usually be identified in combination with information on the location of work places and community facilities and traffic counts and projections. Positive impacts result from a decrease in journey length, or, time and negative impacts resulting from an increase in journey length, or, time.

Journey length refers to the distance associated with a particular journey, whilst duration is the time taken to make the journey. Average walking speed for pedestrians is taken to be 5 km/h. Average cycle speed is assumed at 20 km/hr. Impacts on journey amenity and community severance are addressed separately, although there are obvious interactions between each of these categories and with economic impacts. In addition, new transport facilities can improve accessibility or connectivity through the combined effect of reduced journey time and reduced severance. Improved connectivity can have implications for choice of transport mode, for land use and economic development.

1.2.3.5 Journey Amenity, General Amenity and Health

The assessment of journey amenity is supported by cross-reference where necessary with the chapters on Traffic, Landscape and Visual, and Noise and Vibration. The level of traffic on a road, the proximity and separation of footpaths and cycle-paths, the nature of any crossings/junctions to be

negotiated, the legibility of a journey (including signage), visual intrusion (including sightlines) and safety for equestrians, are amongst the factors relevant to the assessment of amenity, as are the number and types of people affected. The principal concern is with pedestrians or cyclists, but journey amenity impacts also apply to drivers, for example due to safety anxiety associated with the crossings of major roads. Such journeys could involve older drivers or school children as passengers. There are interactions too with the assessment of journey characteristics and community severance.

Observations can also be made with regard to impacts on the health and general amenity of people living in the vicinity of a proposed road. The key criteria here are community wellbeing, including social sustainability, and the effect of the interactions with traffic experienced by other road users (including pedestrians and cyclists) and nearby residents. Direct impacts on communities due to large numbers of residential demolitions or the loss of community facilities such as open space can also impact on community wellbeing or interaction. Indirect impacts may result from changes in environmental quality, for instance, from noise or visual intrusion. The possible impact of noise or air quality on people's health is specifically addressed in the relevant chapters of the Route Selection Report. These impacts have a cumulative dimension in that human well-being is affected too, for example where people live in a highly trafficked environment.

1.2.3.6 Community Severance

Severance is a typical impact of a road development. Its effect is to discourage community interaction and occurs where access to community facilities or between neighbourhoods is impeded by a lengthening of journey time or by the physical barrier of a road (for example, high traffic volumes or perimeter fencing). Social severance can occur due to restrictions on people's accessibility, but also where communities become identified by their containment within road boundaries. This can include the psychological effect of traffic or safety concerns as barriers to social interaction. On the other hand, relief from existing severance may be provided by a new road where traffic volumes or speed are moderated, by the inclusion of crossing facilities in the design, or through the presence of overbridges or underpasses.

The definition of severance is not precise. It depends on the location of community facilities, the level of use of facilities, the time of day or duration when traffic conditions are experienced, the sensitivity of the population affected and the geographical spread of the community. Children, the elderly, the mobility impaired and people without access to a private car would be amongst those most affected by community severance and any corresponding loss of neighbourhood interaction.

1.2.3.6.1 *New Severance*

New severance is a negative impact and occurs whenever a barrier is created between people and community facilities. The barrier could take the form of a new road, fencing, additional traffic or the need to detour. Severance applies to pedestrians, to cyclists and potentially to local vehicle journeys too, particularly for some sensitive population sub-groups.

Sensitive groups are identified specifically where they comprise a higher proportion of pedestrian journeys or where specific amenities are associated with these groups. Sensitive groups can include children and people over retirement age, the mobility impaired and people at risk of social isolation. Relevant facilities include surgeries, hospitals, churches, post offices and shops. Schools and colleges can be included among sites that are vulnerable to severance or added traffic due to the vehicle

movements they create, higher levels of walking and large numbers of people accessing these facilities at particular times. Where there are implications for real and perceived safety there are also potential interactions with Journey Amenity.

1.2.3.6.2 *Relief from Severance*

Relief from severance is a positive impact which can be defined in relation to existing severance. Relief from severance could follow from a transfer of traffic, including heavy goods vehicles (HGVs), due to improvements to road design or sightlines, or from the introduction of crossing facilities, underpasses or bridges. The degree of relief from severance depends on the context in which this change occurs including the existing absolute volume of road traffic, the speed of traffic, sightlines and the number of crossings by pedestrians, cyclists or others.

1.2.3.7 Economic Impacts

Economic and employment impacts occur at both the regional and local scale and can be either positive or negative. Much road development is proposed with the intention of improving national competitiveness and economic/social linkages, for instance in relation to reducing journey time and improving journey time reliability for commercial goods, or, for travel and commuting by employees. However, there can also be some negative impacts in relation to loss of passing trade to businesses such as newsagents, grocery stores, service stations, guest houses, etc.

1.3 Description of the Existing Environment and Constraints

1.3.1 **Overview**

The North and Central Sections of study area are rural and lightly populated, but include areas of light scattered or linear residential development along minor roads. It includes (form north to south) the townlands of Gortnagrelly, Lugnagall, Lugatober, Castlegal, Kiltycooly, Drum East, Drumkilsellagh, Willowbrook, Doonally, Carncash, Rathbraghan, Barroe, Teesan, Shannon Oughter and Shannon Eighter. The southern section consists of the urban fringe of north Sligo including Farnacardy, Rathbraghan and Ballytivnan.

1.3.2 **Traffic conditions, journey characteristics and journey amenity**

Current traffic volumes on the N16, together with vehicle speeds up to and often exceeding the 100km limit, prevent casual vehicle stops along the road and greatly limit its use for cycling or walking, e.g. between residential properties. The road provides an important connection between Sligo, Leitrim and Northern Ireland (Enniskillen), but also carries commuting and some slower moving local traffic. Local traffic includes school traffic and school buses that must cross the N16 on route to Calry National School. Crossroad junctions have been the location of accidents in the past, some of which have been of a serious nature.

1.3.3 **Tourism and amenity**

The N16 climbs alongside the western slopes of Cope's Mountain and provides views across to the coast, King's Mountain and Glencar Lough. Cope's Mountain is not generally accessible to the public, but river valleys descending from the mountain across the study area are valued locally for their

wildlife and wooded settings. Glencar is an important tourist destination that includes views of and access to waterfalls and the King's Mountain plateau. Pictures of the area regularly feature in promotional literature for the county and the area is well visited by local people and tourists, both domestic and international, for casual visits, cycling and walking. A lay-by at Gortnagrelly provides views across to Glencar and King's Mountain. Consequently, the landscape, and the minimisation of visual impacts is an important consideration in the route selection process.

1.3.4 Community facilities and businesses

Community facilities in the North and Central Sections of the study area include an Alzheimer's daycare facility at Doonally and the Sligo Tennis Club in the vicinity of Shannon Oughter. As well as private dairy, cattle and sheep farms, several other types of business are located along the N16 including B&Bs at Lugatober and Farranacardy, a shot blasting business, a haulage business and the Regional Veterinary Laboratory. Calry National School (St. Patrick's) is located to the east of the study area, but as noted above is accessed by traffic from across the study area.

A high concentration of community facilities and businesses are found in the southern section. These, together with residential development and the identifiable communities of Ballytivnan and Rathbraghan, restrict the space available for route options. On the northern boundary of this section is Clarion Hotel which is contained within the impressive façade of the former St. Columba's Hospital and occupies extensive grounds. This section also includes Sligo IT and student residences, Bellanode Community College, Sligo College of Further Education, and HSE Mental Health Inpatient Facilities, Resource and Training Centres. On the edge of Ballytivnan are St. Edwards National School, St. Joseph's Special School and St. Joseph's Parish Church. The suburb also includes a nursing home, a community centre and a small park area including a basketball court. The AbbVie international pharmaceutical company occupies two sites, one off the N16 and another just north of Ballytivnan. Sligo University Hospital and Sligo Grammar School are located south of the N16 Ash Lane, the former with an entrance off this road. A Traveller halting site is also located here.

1.4 Socio-economic assessment – Feasible Route Options

1.4.1 Feasible Route 01A (Red)

The direct connection of FRO 1A to the N15 on the northern boundary of the South Section of the study area means that much residual traffic from outside the area will remain on the substandard N16 to destinations such as Sligo IT on the edge of Sligo town, presenting a negative impact relative to other options in terms of the general amenity of people living beside the existing road, and a negative journey amenity of local users on this road or for those crossing this road. There is also a *moderate negative* amenity impact due to a proposed junction with the L7421-0 which would also cut across the North-West Cycle Trail in this rural location and add traffic to the south to Ballytivnan. According to the traffic analysis, some traffic is also placed on the L3410-0 into Ballytivnan and this would have further impacts on local journey and general amenity. However, some traffic accessing Ballytivnan from the existing N16 using the L-7422-0 is removed by this and FRO 1A/1B.

On the boundary between the South and Central Section the option intercepts the L-3406 Drum Road which is connected to the east with a simple T-junction to the existing N16, but would be closed to the west. If this arrangement is maintained, the option would have a *moderate negative* impact on

vehicle journey characteristics given that the Drum Road carries a moderate level of traffic from the west and is bordered by some linear residential development. Journeys diverted from here would need to use the minor L-7421-0 and the L-3407-0.

The route option preserves much of the connectivity of the existing N16, but at the expense of a *direct profound economic* impact on a shot-blasting business and a B&B. The L-7413-0 to the north would be severed to the east and there is *moderate s*ocial severance at this location which includes residential property and farmland owned by an extended family. However, this impact applies to all options but for FRO4.

In the North Section, connectivity is maintained with the minor L-34041-0, the L-3404-0 and the existing N16 in Gortnagrelly. Access to the L-3404-0 will be safer than at present, providing a *significant positive* impact on journey amenity. The connection with the minor L-7411-0 would be severed, but this presents an imperceptible negative impact in terms of less direct access to the east and severance removes the hazard presented by the existing junction with the N16. Positive impacts on journey amenity are shared with other options due to the transfer of traffic from the existing N16 which contains sharp bends in the central and northern sections.

1.4.2 Feasible Route Option 1A/1B (Red)

This route option represents a continuation of Route 1 in the Southern Section at Teesan where it provides a direct connection for through traffic with the N15 and an improvement to this existing road that provides for a higher ranking than FRO1. This presents a positive journey impact despite the option being over a kilometre longer than the alternatives, but for only a minority of the traffic using the N16. The route option will add traffic to the existing N15 which would present a potential journey amenity impact on other users of this road and a further community severance impact in Cartron. However, these impacts are present at a high level in the existing environment and the overall impact is less than for the previous FRO due to the improvements to the existing N15 that are inherent to FRO 1A/1B. A staggering of the existing junction with the L-7316-0 and the L-3411-0 will help to reduce the local impact on increased traffic on journey amenity, but some additional traffic is placed on the L-3410-0 with a negative impact on local journey and general amenity as with FRO 1A. However, some traffic accessing Ballytivnan from the existing N16 using the L-7422-0 is removed from this road.

Proposed design improvements in connection with other planned schemes, including the Cartron Link Roundabout, the Scotsman's Walk East Junction as well as road widening will reduce the negative impact of increased traffic on journey amenity and community severance. There would be impacts on the curtilage of individual properties at this location which are addressed in the relevant chapter on Non-Agricultural Property.

1.4.3 Feasible Route Option 02A (Yellow)

The route option has a junction with the Old Bundoran Road that would permit access into Ballytivnan. The road also crosses the North-West Cycle Trail at this point, introducing a slight new severance impact and adding additional traffic to the south. In the South Section, the L3407-0 would be severed east and west affecting journeys to the N16 or Calry NS and requiring a modest volume of diversions onto the L-7421 or to the L-3406-0 Drum Road. Most properties on this road are to the west of the L-7421-0, although eight are located on the eastern severed section. Impacts on

individual businesses are relegated to a likely reduction in passing trade or loss of familiarity with indirect access to the shot blasting business and B&B.

In the North Section, this option links into FRO 5 or FRO 8. Connectivity with local roads is maintained, but there is a degree of social severance as with 1A at the 7413-0. Access to the L-34041 and L-3404 is maintained with a realigned section and the positive journey amenity impact is shared with other options. The option has a severance impact on the very minor L-7411-0.

1.4.4 Feasible Route Option 02A/02B (Yellow)

Impacts are as for FRO 2A and the N15 extension section of FRO 1A/1B except that direct impacts on journey amenity are avoided north of Scotsman's Walk.

1.4.5 Feasible Route Option 03 (Green)

Impacts below the junction with the N15 are similar as for FRO2 and 2A/2B, but reduced by the transfer of a high proportion of traffic to the eastern arm of FRO3. Both arms provide positive connectivity to community facilities, to Sligo General Hospital and, potentially, to an easterly crossing of the Garvogue River. By doing so, the Route Option also effectively removes a high proportion of regional traffic from the existing N16. It would provide good accessibility to the existing AbbVie plants, noting also the junction with the L-7422-0, but the zoned lands between the two plants would be severed. Connectivity could be achieved if required through a dedicated service bridge or tunnel, but FRO3 could restrict subsequent development and would involve some landtake.

However, the westward arm to the N15 at Elm Gardens does present significant community severance in Ballytivnan with respect to the estate at Glendallon. Severance arises due to existing interaction with around 40 residences on The Woodlands estate and properties on the south side of Elm Park as well as with a green space and basketball court. Speed limits on FRO3 would be reduced to urban levels and further mitigation possible due to crossing facilities. Signalised traffic and pedestrian crossing facilities would certainly be available at the junction with Avondale and Old Bundoran Road allowing for safe connectivity with community facilities to the south. To the east, FRO3 passes through green fields without impacts of a socio-economic nature.

To the north, there would be severance of L-7422-0 to the east affecting residences as far as Doonally Bridge. There would also be severance of the L-3407-0 as per FRO 2 and 2A/2B affecting journeys to the existing N16 and also to Calry NS requiring a modest volume of diversions to join this option.

In the Central Section the impact on the short-blasting business and B&B is reduced to a loss of some passing trade due to the distance of the route option from these businesses and the less direct access. There would also be potential social severance in Drumkilsellagh as for FRO 2A and FRO 2A/B.

Despite the good connectivity and accessibility provided by this Route Option, its score in terms of socio-economic impacts is reduced by the community severance introduced in Ballytivnan and the physical severance of the industrially zoned lands. However, given the respective share of traffic heading to the N15 and to central Sligo or an eastern river crossing, the FRO has the potential to connect both the N15 and existing N16 via the two arms of the Option with the western arm down-graded to a distributor Road.

Impacts in the Central and North Section are as per Option 2.

1.4.6 Feasible Route Option 4 (Light Blue)

Impacts in the South Section are as per FRO3 prior to the Option taking a more direct northerly direction in Doonally. In the Central Section this allows for a continued connection for the L-3406-0 with positive impacts for connectivity, but negative for community amenity. There is also a staggered junction with this road as is the case for FRO3 and slightly less social severance in Drumkilsellagh compared with FRO2 or 3.

FRO4 has the merit of maintaining the connectivity of the existing N16 for local journeys and interaction. Access to one property at the end of the minor L-74151 would require a bridge across the proposed cutting or a new link to the L3404-0. The option does introduce possible social severance to the immediate west due to the height of the embankment here. This embankment also introduces a visual barrier for the B&B while additionally further removing the opportunity for passing trade for this business. The visual impact of the embankment is mainly imposed on local residents rather than tourists with the exception of those following the cycle trail.

Impacts in the North Section are as for most other options.

1.4.7 Feasible Route Option 5 (Dark Blue)

In the South Section, FRO5 keeps existing levels of traffic on the N16 through the northern fringe of Sligo and along Ash Lane while potentially providing a connection with an eastern river crossing. This maintains existing levels of severance in this area, although these are not severe given the presence of crossing facilities, including for students moving between residences on the east side of the road and the IT or other education facilities to the west. The Option would have an impact on areas envisaged for potential residential development to the immediate west of the N16 above the AbbVie junction. There is the possibility of providing a distributor road connection from the AbbVie Roundabout to the N15.

At Doonally Bridge it would follow the existing N16 with an impact on the wooded setting, although this does not amount to an evident amenity. Journey severance is reduced compared with the do-nothing scenario by the presence of a staggered junction for roads that are used by school traffic and which has been the location of past accidents. However, community severance is retained while other options present an opportunity to improve social connections between residences in all directions by transferring regional traffic to another location. FRO5 maintains some social severance at Drumkilsellagh despite the inclusion of separated junctions here to the L-3406 and L7416-0.

In the Central Section there is an impact on individual businesses due to the likelihood of a reduction in passing trade for a B&B in Drum East which would only be connected to FRO 5 from a point one kilometre to the south. There would also be a loss of familiarity for a shot-blasting business which would be located at a greater distance from the option than for FRO 1A.

1.4.8 Feasible Route Option 6 (Pink)

Impacts in the southern section are as per FRO 5. The option would be further away from houses in Barroe, but this is more a visual or noise impact than socio-economic.

Impacts in the Central and North sections are as per FRO 5.

1.4.9 Feasible Route Option 7 (Brown)

The option commences as per FRO 6, but takes a more easterly sweep. In doing so it introduces slight new social severance for two properties in Barroe, but with a connection to the existing N16. Physical severance is presented for properties to the north for whom a diversion of up to more than 2km would be needed via Doonally Bridge without a southern connection to the existing N16. The Option introduces a second road crossing of L-3407-22 at Doonally Bridge within a short distance of the crossing of the existing (but now less trafficked) N16 with an additional impact on local journey amenity. Relative to FRO5 and 6, social severance is transferred from Doonally Bridge to locations to the east as is also the case for subsequent options. There are impacts on individual property access to the north of this point.

In the Central and North sections there are no impacts distinct from most other options.

1.4.10 Feasible Route Option 8 (Black)

FRO8 commences as per the preceding option with the same implications for local social severance but for one more property at Barroe to the south of the option. For properties to the north in Barrow, a connection is provided to the existing N16 and avoiding significant new severance. FRO8 then takes a more easterly direction that provides a crossing of the L-3407-22 that is further away from the existing crossroads at Doonally Bridge with relatively slightly lower potential impacts on journey amenity and local community severance than the previous option. It passes beside the Alzheimer's care centre, although the facility is understood to have plans to relocate. In the Central Section, the route options links into FRO9.

1.4.10 Feasible Route Option 9 (Purple)

In the South Section, impacts are very similar to FRO 7, but that one additional property is impacted by social severance (but not physical severance) to the south.

There is an economic impact in that a B&B would likely experience a reduction in passing trade as the business will be less directly accessible to the proposed road. As with other options there is *moderate s*ocial severance at L-7413-0 to the north between members of an extended family.

In the North Section, indirect access would be provided to the L3404-0 via a T-junction connection with the existing N16 on the east side of FRO9. Although this connection would be less direct than at present, it would represent a positive impact in terms of journey amenity being considerably safer than the current arrangement. The connection with the minor L-7411-0 would be severed, but this presents only an imperceptible impact in terms of less direct access to the east. In other respects, the severance removes the hazard presented by the existing junction. One kilometre to the east FRO9 is on line with the existing N16 and so without impacts compared with a Do-nothing scenario.

1.4.11 Route Option 10 (Lime Green)

Impacts in the South and Central sections are as per FRO 3 or 4. FRO 10 takes a distinct path in the northern section where it progresses higher up the slope of Cope Mountain than other options. In doing so, it does not sever the very minor L-7411-0, but would have impacts on farm landholdings and visual impacts on individual properties in Gortnagrelly due to the presence of roads behind and (in the case of the existing N16) in front of these properties. The existing N16 would provide safe

access to these properties. These impacts are, however, better addressed in the Non Agricultural Property, Agricultural Property and Landscape and Visual chapters. From a socio-economic perspective any significant impact coincides with that identified by the Visual chapter for views from across the valley affecting tourism and amenity.

1.4.12 Route Option 11 (Grey)

Impacts in the South and Central Sections are as per FRO 3 or 4. The Option takes a distinct path lower down the slope of Cope Mountain than the existing N16. In doing so, there is a positive impact on access to existing properties in Gortnagrelly (for which see Non-Agricultural Property). The visual impact from Glencar is relevant to tourism activity at this location.

1.4.13 All Route Options - Summary

All of the route options provide benefits particularly in terms of improved journey amenity for all users (walkers, cyclists and drivers) using the N16/existing N16 due to the transfer of traffic, separation of regional/commuting and local traffic and improved sightlines. There are benefits to journey characteristics in terms of improved journey time reliability and improved connectivity and also general amenity benefits to most properties along the existing N16 due to the transfer of traffic. The prospective impacts of each of the options vary, depending in the volume of traffic remaining on the N16, the remaining functionality of the existing N16 for local and cycle journeys, impacts on local businesses (direct impacts and passing trade) and impacts in terms of access to properties, social severance and tourism.

Table 1-1 illustrates the relative preference scores of each option in terms of the socio-economic impact.

Table 1-1: Feasible Route Options, Impact scores - socio-economics

Section	Feasible Route Option												
	1A	1A/B	2A	2A/B	3	4	5	6	7	8	9	10	11
South	5	4	4	3	4	4	2	2	3	1	3	4	4
Central	5	5	3	3	3	4	2	2	2	2	2	3	3
North	2	2	2	2	2	2	2	2	2	2	2	2	2
Overall	5	5	4	3	4	4	2	2	2	1	2	4	4

Much of the above assessment summary hinges on the treatment of severance in Ballytivnan by Options 3 and 4. The potential impact here is significant rather than profound and could be mitigated by good pedestrian and cyclist crossing facilities. The options receive a higher ranking than 01A and 01A/01B in that they remove more traffic form the existing N16 and provide for journey connections to the N15 and an eastern river crossing without adding to existing severance in Cartron. However, while the options do provide connectivity to the two AbbVie plants, they also bisect the area in between. While a connection would be possible, this would involve land-take that could restrict development options.

Alternatively, a distributor road connection could be considered for Options 5 to 9 from the N16 to the N15. This would provide connectivity to Ballytivnan and the AbbVie plant, but also to Cartron via other proposed road enhancements at the N15. The level of severance would be moderated by the lesser capacity of the road.

1.5 Socio-economic assessment – Refined Route Options

1.5.1 Refined Route Option 1A- v2 (Red)

South Section

Compared with Refined Route Options 05, 08-v2 and 12, RRO 01A-v2 presents a continued high level of use of the existing N16 south of the L3406-0. As a principal rationale for the proposed road development is to remove unnecessary through traffic from the substandard alignment of the N16, RRO 1A-v2 (and RRO 1A/1B, 2A-v2 and 2A/2B) compares poorly with other RROs in the revised ranking table below.

RRO 01A-v2 is similar to FRO 01A, but for the provision of an underbridge for the L7421-0. This underbridge maintains connectivity with individual properties/small communities to the north (Kiltycooly) and the south (Carncash) including also community facilities/places of employment to the south. As the underbridge replaces the proposed junction with the L-7421-0, no new traffic is added to baseline levels on this road when compared with FRO 01A. The impact on the North-West Cycle Trail is limited to the presence of the traffic above the underpass and so is of *imperceptible-slight negative* significance. However, while this is a positive change, this traffic is added to the N15 route, thereby increasing the level of severance end environmental effects on that route. In addition, the traffic model predicts that a small proportion of this traffic will divert to the Ballytivnan Road through Elm gardens.

Central Section

In this Section, there is a potential negative impact in terms of some loss of passing trade to a B&B, although nearby access is maintained. To the north, RRO 1A-v2 merges with RRO 8-v2.

1.5.2 Refined Route Option 1A/1B- v2 (Red)

South Section

As with RRO 1A-v2, RRO 1A/1B-v2 presents a continued high level of use of the existing N16 south of the L3406-0. As a principal rationale for the proposed road development is to remove unnecessary through traffic from the substandard alignment of the N16, RRO 1A/1B-v2 (and RRO 1A-v2, 2A-v2 and 2A/2B) compares poorly with other RROs in the revised ranking table below.

The assessment is as for FRO 1A/1B, but that, as with the former refined option, the underbridge at the L-7421-0 replaces the proposed junction with this local road, ensuring that no new traffic is added to baseline levels on this road and reducing the impact on the North-West Cycle Trail to *imperceptible-slight negative*. However, while this is a positive change relative to the FRO, this traffic is added to the N15 route, thereby increasing the level of severance end environmental effects on that route. In addition, the traffic model predicts that a small proportion of this traffic will divert to the Ballytivnan Road through Elm gardens.

As with FRO 1A/1B, the existing N15 is upgraded south of Teesan to include also a staggered junction with the L3411-0/L7316-0 and prospective roundabout junctions with other proposed road

developments at Scotsman's Walk and at Elm Gardens/the proposed N4/N15 Sligo Urban Road Improvement.

Central Section

In this Section (as with RRO 1A-v2) RRO 1A/1B-v2 avoids direct impacts on the B&B. There is a potential impact in terms of some loss of passing trade, although nearby access is maintained. The route option then merges with RRO 8-v2.

1.5.3 Refined Route Option 2A - v2 (Yellow)

South Section

Although the amount of residual traffic on the existing N16 is less for RRO 2A-v2 than for RRO 01A-v2 and 01A/01B-v2 due to the more southerly interception of the N15, almost 50% of traffic remains on this road south of the L3406-0. As a principal rationale for the proposed road development is to remove unnecessary through traffic from the substandard alignment of the N16, RRO 2A-v2 compares poorly with other RROs in the revised ranking table below (if less so than RRO 1A-v2 and 1A/1B-v2) . Compared with RRO 1A-v2 and 1A/1B-v2, N16 traffic is removed from the N15 north of Shannon Eighter with some consequent relative benefits for general residential and journey amenity on the N15.

The RRO 2A-v2 is similar to FRO 2A, but for the provision of an underbridge over the L7421-0 and changes in the junction with the L3407-0. Relative to FRO 2A, the impact on the North West Cycle Trail is reduced to *imperceptible-slight negative*. However, while this is a positive change relative to the FRO, this traffic is added to the N15 route, thereby increasing the level of severance end environmental effects on that route. In addition, the traffic model predicts that a small proportion of this traffic will divert to the Ballytivnan Road through Elm gardens.

To the north, the junction with L-3407-0 has been modified to a westward direction. Due to the refined junction with the L-7422-0, the diversion of traffic from the L3407-0, for example to Calry NS, is reduced relative to the FRO 2A.

Central Section

In this Section, there is a higher impact on the B&B and also on the shot blasting business from potential loss of passing trade/familiarity than for RRO 1A-v2 due to their greater distance from the proposed junction with the RRO and from the junction with this road. RRO 2A-v2 merges with RRO 5 just to the north before merging in turn with RRO 8-v2 in the North Section.

1.5.4 Refined Route Option 2A/2B- v2 (Yellow)

South Section

Although the amount of residual traffic on the existing N16 is less for RRO 2B/2A-v2 than for RRO 1A-v2 and 1A/1B-v2 due to the more southerly interception of the N15, almost 50% of traffic remains on this road south of the L3406-0. As a principal rationale for the proposed road development is to remove unnecessary through traffic from the substandard alignment of the N16, RRO 2A/2B-v2

compares poorly with other RROs in the revised ranking table below (if less so than RRO 1A-v2 and 1A/1B-v2).

Compared with RRO 1A-v2 and 1A/1B-v2, N16 traffic is removed from the N15 north of Shannon Eighter with some consequent relative benefits for general residential and journey amenity on the N15. Additional severance is added to Cartron where there is already a high level of severance, but this impact is mitigated by the proposed improvements to the N15 that are inherent to the RRO.

The RRO 2A/2B-v2 is similar to FRO 2A/2B, but for the provision of an underbridge over the L7421-0 and changes in the junction with the L3407-0. Relative to FRO 2A/2B, the impact on the North West Cycle Trail is reduced to *imperceptible-slight negative*. However, while this is a positive change relative to the FRO, this traffic is added to the N15 route, thereby increasing the level of severance end environmental effects on that route. In addition, the traffic model predicts that a small proportion of this traffic will divert to the Ballytivnan Road through Elm gardens.

To the north, the junction with L-3407-0 has been modified to a westward direction. Due to the refined junction with the L-7422-0, the diversion of traffic from the L3407-0, for example to Calry NS, is reduced relative to the FRO 2A/2B.

Central Section

In this section, as with RRO 2A-v2, there is a higher impact on the B&B and shot blasting business than for RRO 1A/1B-v2 due to their greater distance from the proposed route option and the junction. RRO 2A-v2 merges with RRO 5 just to the north before merging in turn with RRO 8-v2 in the North Section 8 as for the preceding Option.

1.5.5 Refined Route Option 5 (Blue)

South Section

By comparison with RRO 1A-v2, 1A/1B-v2, 2A-v2 and 2A/2B-v2, this option allows traffic from the north to directly access community facilities on the edge of North Sligo such as Sligo IT and transfers more traffic from the existing N16. In doing so it does, however, maintain community severance in this built-up area. This severance is likely to increase over time as traffic volumes increases, but is mitigated by the presence of pedestrian crossings and cycle facilities. By comparison, no new community severance is added in Cartron where severance is already significant, although traffic is retained on Ash Lane with a continued severance impact at Ballytivnan Road/Holborn Hill and The Mall.

RRO 5 introduces new severance for Barroe, but to a lesser degree than for RRO 8 and RRO 12. It also maintains some existing severance at Doonally Bridge, although the introduction of a staggered junction between the L3407-0 and L3407-22 reduces this relative to the existing or do-nothing situation. Access is provided north of Doonally Bridge to a severed section of the existing N16.

Central Section

Access is provided to the L3406-0 behind a cluster of properties at the existing location. A shot-blasting business and B&B continue to be impacted as for the FRO (and RROs 2A-v2 & 2A/2B-v2) due to respective effects on passing trade combined with access 1km to the south.

In the North Section, RRO 5 now ties in with RRO 8-v2.

1.5.6 Refined Route Option 8 (Black) - v2

South Section

RRO 8-v2 proceeds north from the L7415-0 below which it ties in with RRO 12.

Central Section

In this section, the RRO passes closer to the aforementioned short blasting business and B&B and a more direct connection is provided. This reduces the potential for impacts due to any loss of passing trade. Road design modifications also now provide for access to the L3404-0 and L34041-0 that is safer than the current alignment.

North Section

In this section a more continuous length of the existing N16 is maintained.

1.5.7 Refined Route Option 12-v1 (Brown)

RRO 12-v1 represents an amalgamation of some of the existing feasible route options following the preliminary assessments.

South Section

RRO 12-v1 commences at the AbbVie roundabout, impacts are as per FRO 7, beginning with slight social severance to a short length of the existing N16, affecting two properties in Barroe. The existing N16 would be severed to the north, requiring the occupants of 18 properties to detour up to one kilometre north to a connection with the L-3407-22. The Option also introduces a second road crossing of this last road within a short distance of the existing crossroads at Doonally Bridge, but given the residual light traffic on the existing N16 the community severance or local journey amenity is *imperceptible.* However, compared with RRO 5 new community integrity is provided for the numerous properties centred on Doonally Bridge due to the relief in severance at this location. This positive impact does not quite cancel out the impact of the aforementioned new severance at Barroe in the absence of any design modification.

The existing N16 would be severed to the south at Fawcett's Bridge and to the north (Willowbrook Bridge). Most outward journeys on the former section of the existing N16 are likely to be southbound, but any northbound journeys would require a detour of over one kilometre to the junction between RRO 12 and the L-3407-22. Residents of a cluster of properties on the latter severed section to the north, along with residents living along the L-7416-0, would be able to connect to RRO 12 with minimal inconvenience via a staggered junction shared with the L3406-0.

Central Section

In this section, the impact on the shot blasting business and a B&B due to any reduction in passing trade is minimised due to its visibility from the road and the availability of nearby access. Access is maintained to the L-7413-0.

North Section

In this section, RRO 12 severs two sections of the existing N16 compared with only one in the case of RR8 5 and RRO 8, with relatively adverse but minor implications for farm and leisure cycling and inter-house traffic. The existing N16 is severed south of Gortnagrelly Bridge, being connected instead to the north with imperceptible-slight journey time impacts for two or more properties, but with safer indirect access to the N16 than for the existing alignment. Access is provided to private properties on the L-34041-0 and L3404-0, of which Alternative Junction Arrangement No. 03, presents the superior access and least severance.

1.5.8 Refined Route Option 12-v2 (Brown)

RRO 12 – v2 is as for the option above, but that in the North Section only a very short length of the existing N16 is severed to the south along with a similarly short section to the north. Assuming that there is no direct access to the N16 for properties under either RRO 12-v1 or RRO 12-v2 in this section there is no socio-economic distinction between the two versions. .

1.6 Socio-economic assessment – Refined Route Options

The relative ranking of the Refined Route Options represents a trade-off of similar impacts at alternative locations. RRO 1A-v2 and 1/01B-v2 place additional traffic on to the existing N15 south to Cartron, adding to existing community severance at this location and impacting on the journey amenity of existing N15 traffic while leaving a proportion of traffic on the existing N16. Revised Route Options 02A-v2 and 02A/02B-v2 do the same, but for a shorter length of the N15. In both cases, RRO 1A/B-v2 and RRO 2A/2B-v2 provide for improvements to the existing N15 and improved journey amenity. However, both introduce new severance into Ballytivnan. RRO 5, 8 and 12 remove through traffic from the N16 without adding to traffic volumes on the N15 or severance at Cartron, but RRO 8 and 12 do introduce some severance (or a journey detour) in the South Section for a large number of residences. This severance could potentially be removed with the introduction of a southern junction to the N16. Relative to RRO 8 and 12, RRO 5 maintains existing severance at Doonally Bridge, but this is reduced relative to the existing level of severance.

Table 1-2: Refined Route Options rankings (socio-economic)

Section	Refined Route Options														
	1A (v2)	1A/B (v2)	2A (v2)	2A/B (v2)	3	4	5	6	7	8 (v2)	9	10	11	12	12 (v2)
South	5	4	4	3	n/a	n/a	1	n/a	n/a	ref 12	n/a	n/a	n/a	2	ref 12
Central	ref 8-v2	ref 8-v2	ref 5	ref 5	n/a	n/a	2	n/a	n/a	1	n/a	n/a	n/a	1	ref 12
North	ref 8-v2	ref 8-v2	ref 8-v2	ref 8-v2	n/a	n/a	ref 8-v2	n/a	n/a	1	n/a	n/a	n/a	2	2
Overall	4	3	4	3	n/a	n/a	1	n/a	n/a	1	n/a	n/a	n/a	2	2

2 Non Agricultural Property

2.1 Introduction

This section is a comparative study of the impact on non-agricultural property from Route Options for the N16 Sligo to County Boundary road project. An evaluation of the preference for each route option in terms of least impact on non-agricultural property will contribute towards the refinement of route options under Stage 1 Preliminary Options Assessment. This assessment should be read in conjunction with drawings no. N16-RS-071 to N16-RS-073 (Feasible Route Options – Agriculture and Non-Agriculture Assessment) and N16-RS-099 to N16-RS-101 (Refined 'Feasible' Route Options - Agriculture and Non-Agriculture Assessment).

Following the completion of the Preliminary Options Assessment and discussions at the multi-disciplinary workshop a comparative assessment was then undertaken on the impact of Refined Route Options on non-agricultural property.

Impacts on non-agricultural property have been assessed based on the broad design footprints presented at Route Selection Stage, with an additional allowance for a land-take offset of 10m. This allows principally, for a comparable to be undertaken of the various route options. In this regard, the assessment in this report is relative to the stage of the design. Further detail on the extent of individual property impacts, will be established at the next stage of the design once a preferred route has been established. The design will be developed in a manner to reduce the impacts as far as is reasonably practicable.

A separate assessment of the Route Options in terms of agricultural property is presented in Section 5 of this report.

2.1.1 Description of Feasible and Refined Route Options

Refer to Sections 5 and 8 of the Main Report (Volume 1) for a full description of Feasible Route Options and Refined Route Options respectively.

2.2 Appraisal Methodology

There are no guidelines specific to the assessment of impacts on non-agricultural property. In line with best practice this section was prepared with regards to the following documents:

- Guidelines on the information to be contained in EIS (EPA, 2002);
- Revised guidelines on the information to be contained in Environmental Impact Statements (Draft) (EPA, 2015);
- Advice notes on current practice in the preparation of EIS (EPA, 2003);
- Advice notes for preparing Environmental Impact Statements (Draft) (EPA, 2015);
- Environmental Impact Assessment of National Road Schemes – A Practical Guide (NRA, 2008); and
- Project Management Guidelines (NRA, 2010).

The appraisal of the Feasible and Refined Route Options consisted of desktop study and roadside survey of the study area and route option alignments. The desktop study considered study area mapping, route option alignments, aerial photography, landownership data and submissions made following public consultation in February 2016. Roadside surveys were carried out in March 2016.

Following the Route Selection Workshop in June, a similar appraisal of Refined Route Options using available information was carried out. The desktop study was based on available information and included further submissions made following public consultation in July 2016.

2.2.1 Data sources

The methodology for this section relied on information from the sources outlined in Table 2-1.

Table 2-1: Information and sources

Information	Source
Digital mapping of Study area - Ordinance Survey, Discovery Series and satellite imagery.	Sligo County Council.
Digital mapping of Feasible Route Options.	Sligo County Council.
Land registry / landownership information	Sligo County Council.
Planning and zoning objectives	Sligo and Environs Development Plan 2010-2016 (2011) Sligo North Fringe LAP 2010-2016 (2009)

2.2.2 Study area

The study area for the N16 Sligo to County Boundary road project is outlined in Figure N16-RS-002. The study area for this section will cover non-agricultural property along each of the Feasible and Refined Route Options.

2.2.3 Assessment methodology

The appraisal of route options for the N16 Sligo to County Boundary road project is based on the route option as having the least impact on non-agricultural property.

The route options appraisal comprises of a quantitative assessment of non-agricultural property for each route option. This assessment is based on direct impacts from the route option alignments including a 10m offset from the extents of the alignment to allow for detailed drainage and earthworks design.

A further assessment was conducted within 10-30m of the extents of the alignment to identify potential significant direct impacts. For online sections of Route Options 1B and 2B, a detailed design is available and the assessment was solely based on the extents of the alignments.

For non-agricultural property, route options are evaluated in terms of:

- A survey count of:
  - Residential property;
  - Commercial / industrial property;

- Community property, amenity and open space; and
- Development property.

- Property impact.

The ranking of the impact of route options on non-agricultural property is based on assessment criteria as presented in Table 2-2.

Table 2-2: Non-agricultural impact criteria on property

Impact	Criteria
High	An impact on the property where the use of the property cannot continue. Acquisition of a residential house Acquisition of a commercial property Acquisition of a community property Acquisition of development property.
Medium	An impact on the property where the use of the property can continue. An impact of permanent duration resulting in a significant change to the character of the property. Residential – Significant effects on house curtilage and garden. Commercial – Significant effects on entrance, parking and commercial lands. Community – Significant effects on entrance, parking and community lands. Development – Significant effects on part of development property.
Low	An impact on the property where the use of the property can continue. An impact of permanent or temporary duration with a minimal or temporary effect on the character of the property. Residential – Slight effects at property boundary and / or garden. Commercial – Slight effects at property boundary and / or entrance. Community – Slight effects at property boundary and / or entrance. Development – Slight effects at property boundary.

The impact assessment ranking and selection of preferences for Feasible Route Options are based on the criteria as presented in Table 2-3.

Table 2-3: Impact assessment criteria for Feasible Route Options

Impact	Preference	Criteria
Major Negative	Very Low Preference	Significant impacts on property of national or regional importance. Residential properties include significant number of High impacts. Commercial properties include significant number of High impacts.
	Low Preference	Residential property impact includes a slight number of High impacts.

Impact	Preference	Criteria
		Commercial property impact includes a slight number of High impacts. Community property impact may include a significant number of High impacts. Development property may include a significant number of High impacts.
Moderate Negative	Medium Preference	There are no High impacts on Residential property. There are no High impacts on Commercial property. Community property impact may include a slight number of High impacts. Development property impact may include a slight number of High impacts.
Minor Negative	High Preference	There are no High or Medium impacts on Residential property. There are no High or Medium impacts on Commercial property. There are no High impacts on Community property. There are no High impacts on Development property.
Neutral	Very High Preference	No effect on non-agricultural property.
Positive	Very High Preference	Not applicable to non-agricultural property.

2.3 Description of Existing Environment

2.3.1 General

The N16 Sligo to County Boundary study area is bordered by the urban area of Cartron and Rathbraghan to the south and the existing N15 through Shannon Eighter and Teesan to the west. The main southern section crosses to the east of the N16 from Barroe to Doonally up to the Drum road (L-3406-0). The central and northern sections of the study area are narrower and run parallel with the existing N16 from Drumkilsellagh to Lugatober and Gortnagrelly where it terminates at the Leitrim County boundary.

The study area is mainly rural in nature as it extends northwards from Sligo town. To the south, Cartron and Ballytivnan are developed urban areas and consist of residential housing, commercial and industrial properties, community and educational facilities and development lands. Some of the properties within this area include:

- Residential housing including Cartron estate, Avondale, Rathbraghan Park and Yeats Heights;
- AbbVie;
- Abbott Ireland; and
- IT Sligo.

From the junction of the N15 and N16 at Duck Street to Shannon Eighter, the N15 is bordered by a mix of residential housing, commercial properties and development lands. The commercial developments along the N15 include:

- Primary Care Centre Sligo;
- Feehily's Funeral Home;
- Topaz filling station;
- Cartron Village;
- Mullens filling station and Horkans garden centre;
- Supermacs restaurant;
- Ford Motorpark (Henderson).

East of the N15 in Shannon Eighter, Shannon Oughter and Rathbraghan the lands are mainly in agricultural use and other properties including one-off residential housing on local roads, the Shannon Eighter residential housing estate on the Ballytivnan road (L-7422-0), Sligo Tennis and Badminton Club and AbbVie-AbbVie/Abbott facility. In Barroe and Faughts the land use is primarily agricultural with one-off housing and ribbon development along the N16 and other local roads.

In Lisnalurg and Teesan non-agricultural property comprises of one-off housing with ribbon development in particular along a number of local roads (L-3410, L3407 and L-7421). Development in Carncash is limited to one-off housing and in Doonally, property consists of one-off housing and the Regional Veterinary Laboratory on the N16.

The remaining townlands of Kiltycooly, Drum East, Drumkilsellagh, Castlegal, Lugatober, Lugnagall and Gortnagrelly are similar in that, with the exception of some ribbon development along the Drum road (L-3406-0), properties are mainly agricultural farm holdings. Along the N16 and local road network there is one-off residential housing and these properties also include a number of guesthouses and a commercial shot blasting business.

2.3.2 Planning

The Sligo and Environs Development Plan (SEDP) 2010-2016 sets out the planning objectives that apply within the study area in the Map 1 - Amended Zoning Map (2011) of the SEDP. The extents of the Plan development limits incorporate much of the southern section of the study area for the scheme and include the following zoning objectives:

- BITP – Business, Industry and Technology Park;
- RE – Existing residential areas;
- R1 – Low density residential areas;
- R3 – Medium/high density residential areas;
- C2 – Commercial and mixed land uses;
- CF – Community Facilities;
- MIX-1 – Mixed uses (non-retail);
- NC – Neighbourhood Centres;
- SLR – Strategic Land Reserve and

- OS – Open space.

The Sligo North Fringe Local Area Plan 2010 – 2016 is a development plan for an area within Shannon Oughter and Lisnalurg. These lands are within the extents of the SEDP and the North Fringe LAP incorporates the relevant zoning objectives as outlined above. It has a strategic objective to "create a vibrant urban quarter, providing for housing, educational needs and employment opportunities with good access and internal links".

Refer to the planning section of this report for further details.

2.4 Feasible Corridor Option Assessment

2.4.1 **Option 1A**

2.4.1.1 Southern section

Route Option 1A commences in Teesan at a junction with the N15 and travels in an easterly direction across a local road (L-7421-0) towards Doonally before turning north and crossing the Drum local road (L-3406-0). The route option will require online widening of short sections of the existing N15 north and south of the roundabout junction with the N15.

Land use is mainly agricultural farm holdings with one-off residential houses and ribbon development on the N15 and local roads. The drumlin topography along the alignment consists of rolling hills and generally ranges from 40m OD to 60m OD.

The route option will have a High impact, involving property acquisition, on one property on the Drum road (L-3406-0) due to a direct impact from the route option alignment. The impact on the remaining properties will be Low involving slight effects to property boundaries, entrances and / or gardens.

2.4.1.2 Central section

From the Drum road (L-3406-0) the alignment continues to the north and runs parallel with the existing N16 for a section before turning to the north east where it intercepts a local road (L-7413-0) in Lugatober. This local road (L-7413-0) is maintained to the existing N16 via an underbridge and link road.

Land use is agricultural comprised of farm holdings and a lower number of one-off residential houses on the N16 and local roads. This section is dominated by Cope Mountain with steeply sloping lands ranging from 60m OD to 90m OD at Lugatober.

There will be a High impact, involving property acquisition, on both a house and separate commercial business in Drum East; on a house / guesthouse located in Castlegal and on a development site on the Drum road (L-3406-0) due to the route option alignment. There are also High impacts involving direct impacts on four houses considered as farm houses, however these impacts are considered as part of the assessment in the Agricultural Chapter.

2.4.1.3 Northern section

From Lugatober the alignment continues in a north easterly direction and intercepts local roads (L-34041-0 and L-34004-0) in Collinsford and Lugnagall and continues to Gortnagrelly where it ends at the County Boundary. The route option severs the N16 at Lugnagall and after tuning east in Gortnagrelly it overlies the N16 for the remainder of the route option.

The land use is mainly agricultural consisting of farm holdings and a number of one-off residential houses on the N16 and local roads. The lands are steeply sloping towards the Drumcliff River and Glencar Lake and range from 90m OD to 130m OD at the County Boundary.

There will be a High impact, involving property acquisition, on two houses in Gortnagrelly. There will be a Medium impact on a site in Gortnagrelly. There is one remaining property with a Low impact.

Summary details of the assessment of Option 1A sections are presented in Table 2-8 – Feasible Route Option 1A.

2.4.2 **Option 1A/1B**

2.4.2.1 Southern section

Route Option 1A/1B commences at Duck Street in Sligo town at the junction between the N16 and N4/N15 and extends to the R291 Junction with online widening to Dual Carriageway standard and junction improvements. The route option continues north and online to the proposed Cartron Link roundabout junction and to the proposed roundabout with Scotsman's Walk. Following the Scotsman's Walk East Junction the route option will change to a Single Carriageway standard and extend north and online with localised widening and improvements to the existing N15. Improvements to the N15 section of this FRO terminate approximately 250m north of the proposed roundabout with the N16 in Teesan. The FRO then travels in an easterly direction across a local road (L-7421-0) towards Doonally before turning north and crossing the Drum local road (L-3406-0). The route option will require online widening of short sections of the existing N15 north and south of the roundabout junction with the N15.

Land use along Route Option 1B is a diverse property mix including residential, commercial, community, development and agricultural property. These properties consist of those with direct access off the N15 and properties that do not directly access the N15.

From the start of the route option to the Scotsman's Walk Junction, the properties with direct access include several commercial businesses including Topaz filling station, Horkans Garden Centre, Esso filling station, Supermacs restaurant, Ford Henderson Motorpark and TOP filling station. There are two residential properties and one farm holding with access onto the N15. Properties along the route option that do not have direct access from the N15 include a residential property, a commercial warehouse (former Cash and Carry) premises and development lands. The Avondale and Cartron Estate housing developments with access from Ballytivnan Road extend to the boundary of the N15. The AbbVie site and development lands are accessed from the N16, the Ballytivnan road (L-7421-0) in Shannon Eighter and a local road (L-7422-0) in Rathbraghan.

The route option topography is low-lying with elevations rising from 10m OD in Sligo town to a peak of 60m OD at the Drum road (L-3406-0).

The route option will have a High impact, involving property acquisition, on two houses involving one property on the N15 at Shannon Eighter and one property on the Drum road (L-3406-0). There will be a High impact on two plots of development lands at Cartron. There are Medium impacts on three houses at Ballytivnan, Shannon Eighter and Lisnalurg due to significant effects on the property curtilage and garden. At the Cartron Link Junction, there are Medium impacts on three commercial properties due to the significant effects on the property curtilage, property boundary and access:

- Esso / Horkans;
- Supermacs restaurant; and
- Warehouse premises (former Cash and Carry).

There will be a medium impact on one plot of development land at Cartron. The impact on the remaining properties will be Low involving slight effects to property boundaries, entrances and / or gardens.

2.4.2.2 Central section

From the Drum road (L-3406-0) the alignment continues to the north and runs parallel with the existing N16 for a section before turning to the north east where it intercepts a local road (L-7413-0) in Lugatober. This local road (L-7413-0) is maintained to the N16 to the east via an underbridge and link road.

Land use is agricultural comprised of farm holdings and a lower number of one-off residential houses on the N16 and local roads. This section is dominated by Cope Mountain with steeply sloping lands ranging from 60m OD to 90m OD at Lugatober.

There will be a High impact, involving property acquisition, on both a house and separate commercial business in Drum East; on a house / guesthouse located in Castlegal and on a development site on the Drum road (L-3406-0) due to the route option alignment. There are also High impacts involving direct impacts on four houses considered as farm houses, however these impacts are considered as part of the assessment in the Agricultural Chapter.

2.4.2.3 Northern section

From Lugatober the alignment continues in a north easterly direction and intercepts local roads (L-34041-0 and L-34004-0) in Collinsford and Lugnagall and continues to Gortnagrelly where it ends at the County Boundary. The route option severs the N16 at Lugnagall and after tuning east in Gortnagrelly it overlies the N16 for the remainder of the route option.

The land use is mainly agricultural consisting of farm holdings and a number of one-off residential houses on the N16 and local roads. The lands are steeply sloping towards the Drumcliff River and Glencar Lake and range from 90m OD to 130m OD at the County Boundary.

There will be a High impact, involving property acquisition, on two houses in Gortnagrelly. There will be a Medium impact on a site in Gortnagrelly. There is one remaining property with a Low impact.

Summary details of the assessment of Option 1B sections are presented in Table 2-9 – Feasible Route Option 1B.

2.4.3 **Option 2A**

2.4.3.1 Southern section

Route Option 2A commences in Shannon Eighter at a roundabout junction with the N15 and travels east towards a junction with a local road (L-7421-0) and intercepts a local road (L-7422-0) in Rathbraghan. The route takes a north easterly direction intercepting a local road (L-3407-0) in Carncash and the Drum local road (L-3406-0).

On the Ballytivnan road (L-7421-0) in Shannon Eighter, there will be a High impact on one development site and a Medium impact on a house due to the significant effect on the property curtilage. The impact on the remaining properties will be Low.

2.4.3.2 Central section

In a northern direction, the proposed route option overlies a section of the N16 before moving offline in Drumkilsellagh and running parallel to the N16. There is a link road from the existing N16 to the Drum road (L-3406-0). The route option intercepts a local road (L-7415-0) before it crosses the N16 and intercepts another local road (L-7413-0) in Lugatober. This local road (L-7413-0) is connected to the N16 to the south via a link road and to the N16 to the east via an access underbridge.

Land use is agricultural comprised of farm holdings and a lower number of one-off residential houses on the N16 and local roads. The topography is hilly with elevations between 60-90m OD and steeply sloping lands in the Castlegal and Lugatober townlands.

There will be a Medium impact on a development site on the Drum road (L-3406-0) due to the route option alignment. There are High impacts involving direct impacts on four houses considered as farm houses, however these impacts are considered as part of the assessment in the Agricultural Chapter.

2.4.3.3 Northern section

From Lugatober the alignment continues in a north easterly direction and intercepts local roads (L-34041-0 and L-3404-0) in Collinsford and Lugnagall and continues to Gortnagrelly where it ends at the County Boundary. In Lugnagall the local road (L-3404-0) is realigned to the route option. The route option remains north of the N16 at Lugnagall and in Gortnagrelly overlies the N16 for the remainder of the route option.

The land use is agricultural consisting of farm holdings and a number of one-off residential houses. The lands are steeply sloping towards the Drumcliff River and Glencar Lake and range from 90m OD to 130m OD at the County Boundary.

There will be a Medium impact on a house on a local road (L-3404-0) in Lugnagall due to the significant effect on the house curtilage and garden. There will be a Low impact on the remaining properties.

Summary details of the assessment of Option 2A sections are presented in Table 2-10 – Feasible Route Option 2A.

2.4.4 **Option 2A/2B**

2.4.4.1 Southern section

Route Option 2A/2B commences at Duck Street in Sligo town at the junction between the N16 and N4/N15 and extends to the R291 Junction with online widening to Dual Carriageway standard and junction improvements. The route option continues north and online to the proposed Cartron Link roundabout junction, it then extends to a further proposed roundabout with the proposed N16 and Scotsman's Walk. From this roundabout the FRO travels in an easterly direction towards a junction with a local road (L-7421-0) and intercepts a local road (L-7422-0) in Rathbraghan. The route takes a north easterly direction intercepting a local road (L-3407-0) in Carncash and the Drum local road (L-3406-0).

Land use along Route Option 2A/2B is a diverse property mix including residential, commercial, community, development and agricultural property. These properties consist of those with direct access off the N15 and properties that do not directly access the N15.

From the start of the route option to the roundabout proposed with the N16/Scotsman's Walk, the properties with direct access include several commercial businesses including Topaz filling station, Horkans Garden Centre, Esso filling station, Supermacs restaurant, Ford Henderson Motorpark and TOP filling station. There are two residential properties and one farm holding with access onto the N15. Properties along the route option that do not have direct access from the N15 include a residential property, a commercial warehouse (former Cash and Carry) premises and development lands. The Avondale and Cartron Estate housing developments with access from Ballytivnan Road (L-7421-0) extend to the boundary of the N15. The AbbVie site and development lands are accessed from the N16, the Ballytivnan road (L-7421-0) in Shannon Eighter and a local road (L-7422-0) in Rathbraghan.

The route option is low-lying with elevations varying from 10m OD to 60m OD at the Drum road (L-3406-0).

There will be a High impact on three plots of development land, two plots located at the Cartron Link roundabout on the N15 and one site on the Ballytivnan local road (L-7421-0) in Shannon Eighter. There will be Medium impacts on three houses due to the significant effect on the property curtilage and garden. Two houses are located on the N15 in Ballytivnan and Shannon Eighter and one house is located on the Ballytivnan road (L-7421-0) in Shannon Eighter. At the Cartron Link Junction, there are Medium impacts on three commercial properties due to the significant effect on the property curtilage, property boundary and access. These properties include:

- Esso / Horkans;
- Supermacs restaurant; and
- Warehouse premises (former Cash and Carry).

The impact on the remaining properties will be Low involving slight effects to property boundaries, entrances and / or gardens.

2.4.4.2 Central section

In a northern direction, the proposed route option overlies a section of the N16 before moving offline in Drumkilsellagh and running parallel to the N16. There is a link road from the existing N16 to the Drum road (L-3406-0). The route option intercepts a local road (L-7415-0) before it crosses the N16 and intercepts another local road (L-7413-0) in Lugatober. This local road (L-7413-0) is connected to the N16 to the south via a link road and to the N16 to the east via an access underbridge.

Land use is agricultural comprised of farm holdings and a lower number of one-off residential houses on the N16 and local roads. The topography is hilly with elevations between 60-90m OD and steeply sloping lands in the Castlegal and Lugatober townlands.

There will be a Medium impact on a development site on the Drum road (L-3406-0) due to the route option alignment. There are High impacts involving direct impacts on four houses considered as farm houses, however these impacts are considered as part of the assessment in the Agricultural Chapter.

2.4.4.3 Northern section

From Lugatober the alignment continues in a north easterly direction and intercepts local roads (L-34041-0 and L-34004-0) in Collinsford and Lugnagall and continues to Gortnagrelly where it ends at the County Boundary. In Lugnagall the local road (L-3404-0) is realigned to the route option. The route option remains north of the N16 at Lugnagall and in Gortnagrelly overlies the N16 for the remainder of the route option.

The land use is agricultural consisting of farm holdings and a number of one-off residential houses. The lands are steeply sloping towards the Drumcliff River and Glencar Lake and range from 90m OD to 130m OD at the County Boundary.

There will be a Medium impact on a house on a local road (L-3404-0) in Lugnagall due to the significant effect on the house curtilage and garden. There will be a Low impact on the remaining properties.

Summary details of the assessment of Option 2B sections are presented in Table 2-11– Feasible Route Option 2B.

2.4.5 **Option 3**

2.4.5.1 Southern section

Route Option 3 is strategically placed between the existing N16 and N15 within the townland of Ballytivnan. It connects via a proposed roundabout, with links to the east (N16) and to the west (N15 via a local link). From the proposed roundabout, the route travels north to intercept a local road (L-7422-0) before turning north east where it intercepts a further local road (L-3407-0) in Carncash. It then intercepts a further local road (L-3406-0) known locally as the Drum Road.

Land use from the N15 and N16 to the local road (L-7422-0) in Rathbraghan is mixed involving residential, commercial, community and development property. The main property on this section is AbbVie extending from the N16 roundabout to the local road (L-7422-0) in Rathbraghan. Along the Shannon Road properties include commercial warehouses, housing developments (Glendallon and Elm Garden estates), community land / open space and development lands.

North of the local road (L-7422-0), land use is mainly agricultural farm holdings with one-off residential houses. The drumlin topography along the alignment consists of rolling hills and ranges from 10m OD to 60m OD.

There will be a Medium impact on AbbVie lands due to landtake and severance impact from the alignment, roundabout junction and associated link roads. The location of the proposed route option will have a permanent impact on these development lands and a significant effect on the commercial use of this property. There will be a Low impact on the remaining properties.

2.4.5.2 Central section

In a northern direction, the proposed route option overlies a section of the N16 before moving offline in Drumkilsellagh and running parallel to the N16. There is a link road from the existing N16 to the Drum road (L-3406-0). The route option intercepts a local road (L-7415-0) before it crosses the N16 and intercepts another local road (L-7413-0) in Lugatober. This local road (L-7413-0) is connected to the N16 to the south via a link road and to the N16 to the east via an access underbridge.

Land use is agricultural comprised of farm holdings and a lower number of one-off residential houses on the N16 and local roads. The topography is hilly with elevations between 60-90m OD and steeply sloping lands in the Castlegal and Lugatober townlands.

There will be a Medium impact on a property in Drumkillsellagh/Doonally due to the impact on the property curtilage. There will be a Medium impact on a development site on the Drum road (L-3406-0) due to the route option alignment. There are High impacts involving direct impacts on four houses considered as farm houses, however these impacts are considered as part of the assessment in the Agricultural Chapter.

2.4.5.3 Northern section

From Lugatober the alignment continues in a north easterly direction and intercepts a section of the N16 and local roads (L-34041-0 and L-34004-0) in Collinsford and Lugnagall. The route option continues to Gortnagrelly where it ends at the County Boundary. In Lugnagall the local road (L-3404-0) is realigned to the route option. The route option remains north of the N16 at Lugnagall and in Gortnagrelly overlies the N16 for the remainder of the route option.

The land use is agricultural consisting of farm holdings and a number of one-off residential houses. The lands are steeply sloping towards the Drumcliff River and Glencar Lake and range from 90m OD to 130m OD at the County Boundary.

There will be a Low impact on each of the properties affected in this section.

Summary details of the assessment of Option 3 sections are presented in Table 2-12 – Feasible Route Option 3.

2.4.6 **Option 4**

2.4.6.1 Southern section

Route Option 4 is strategically placed between the existing N16 and N15 within the townland of Ballytivnan. It connects via a proposed roundabout, with links to the east (N16) and to the west (N15

via a local link). From the proposed roundabout, the route travels north to intercept a local road (L-7422-0) before turning north east where it intercepts a further local road (L-3407-0) in Carncash. It then intercepts a further local road (L-3406-0) known locally as the Drum Road.

The land use along the links from the N15 and N16 to the local road (L-7422-0) in Rathbraghan is mixed involving residential, commercial, community and development property. The main property on this section is AbbVie extending from the N16 roundabout to the local road (L-7422-0) in Rathbraghan. Along the Shannon Road, properties include commercial warehouses, housing developments (Glendallon and Elm Garden), community land / open space and development lands. North of the local road (L-7422-0) land use is mainly agricultural farm holdings with one-off residential houses. The drumlin topography along the alignment consists of rolling hills and ranges from 10m OD to 60m OD.

There will be a Medium impact on AbbVie lands due to landtake and severance impact from the alignment, roundabout junction and associated link roads. The location of the proposed route option will have a permanent impact on these development lands and a significant effect on the commercial use of this property. There will be a Low impact on the remaining properties.

2.4.6.2 Central section

In a northern direction, the proposed route option intercepts a local road (L-74151-0) in Drum East before it turns to the north east and intercepts a local road (L-7413-0) in Lugatober. This local road (L-7413-0) will be connected to the N16 to the east via an access underbridge and offline link.

Land use is agricultural comprised of farm holdings and one-off residential houses on the N16 and local roads. The topography is hilly with elevations between 60-90m OD and steeply sloping lands in Drum East and Lugatober.

There will be a Low impact on each of the properties affected in this section.

2.4.6.3 Northern section

From Lugatober the alignment continues in a north easterly direction and intercepts local roads (L-34041-0 and L-34004-0) in Collinsford and Lugnagall and continues to Gortnagrelly where it ends at the County Boundary. In Lugnagall the local road (L-3404-0) is realigned to the route option. The route option remains north of the N16 at Lugnagall and in Gortnagrelly overlies the N16 for the remainder of the route option.

The land use is agricultural consisting of farm holdings and a number of one-off residential houses. The lands are steeply sloping towards the Drumcliff River and Glencar Lake and range from 90m OD to 130m OD at the County Boundary.

There will be a Low impact on each of the properties affected in this section.

Summary details of the assessment of Option 4 sections are presented in Table 2-13 – Feasible Route Option 4.

2.4.7 **Option 5**

2.4.7.1 Southern section

Route Option 5 commences in Ballytivnan at the AbbVie roundabout on the N16 and travels in a north easterly direction through Rathbraghan before turning north where it overlies the N16 at a junction with two local roads (L-7422-0 and L-3407-0). The route option continues north through Doonally where it intercepts the Drum road (L-3406-0) in the townland of Drumkilsellagh.

Land use is mainly agricultural farm holdings with one-off residential houses and ribbon development in Barroe and Faughts. The topography along the alignment is undulating lowland and ranges from 30m OD to 60m OD.

There will be a Medium impact on one property in Barroe due to the impact on the property curtilage, existing property access and a family building replicating a gate lodge. There will be a Medium impact on a second property in Barroe due to the impact on the property curtilage and existing access. There will be a Low impact on the remaining properties.

2.4.7.2 Central section

In a northern direction, the proposed route option overlies a section of the N16 before moving offline in Drumkilsellagh and running parallel to the N16. The route option connects to a link road from the existing N16 to the Drum road (L-3406-0). The route option intercepts a local road (L-7415-0) in Castlegal, the N16 and another local road (L-7413-0) in Lugatober. This local road (L-7413-0) is connected to the N16 via an offline link road to the west and online link to the east.

Land use is agricultural comprised of farm holdings and one-off residential houses on the N16 and local roads. The topography is hilly with elevations between 60-110m OD and steeply sloping lands in the Castlegal and Lugatober townlands.

There will be a Medium impact on a property in Drumkillsellagh/Doonally due to the impact on the property curtilage. There will be a Low impact on the remaining properties affected in this section. There are also High impacts involving direct impacts on three houses considered as farm houses, however these impacts are considered as part of the assessment in the Agricultural Chapter.

2.4.7.3 Northern section

From Lugatober the alignment continues in a north easterly direction and intercepts a section of the N16 and local roads (L-34041-0 and L-3404-0) in Collinsford and Lugnagall. The route option continues to Gortnagrelly where it ends at the County Boundary. In Lugnagall the local road (L-3404-0) is realigned to the route option. The route option remains north of the N16 at Lugnagall and in Gortnagrelly overlies the N16 for the remainder of the route option.

The land use is agricultural consisting of farm holdings and a number of one-off residential houses. The lands are steeply sloping towards the Drumcliff River and Glencar Lake and range from 90m OD to 130m OD at the County Boundary.

There will be a High impact, involving property acquisition, on two houses in Gortnagrelly due to a direct impact from the route option alignment. There will be a High impact on a development site in Gortnagrelly. There will be a Medium impact on two houses in Lugnagall and Gortnagrelly due to the

significant effects on the property curtilage and garden. There are also High impacts involving direct impacts on three houses considered as farm houses, however these impacts are considered as part of the assessment in the Agricultural Chapter.

Summary details of the assessment of Option 5 sections are presented in Table 2-14 – Feasible Route Option 5.

2.4.8 **Option 6**

2.4.8.1 Southern section

Route Option 6 commences in Ballytivnan at the AbbVie roundabout on the N16 and stays online to a roundabout junction in Barroe. The route option is then offline and travels north until it overlies the N16 at a junction with two local roads (L-7422-0 and L-3407-0). The route option continues north through Doonally, before it intercepts the Drum road (L-3406-0) in the townland of Drumkilsellagh.

From the N16 roundabout to the proposed junction at Barroe the properties include AbbVie, a housing development (Yeats Heights) and agricultural lands. Land use is mainly agricultural farm holdings with one-off residential houses and ribbon development in Barroe and Faughts. The topography along the alignment is undulating lowland and ranges from 30m OD to 60m OD.

There will be a Medium impact on two properties in Barroe due to the impact on the property curtilage and existing property access. There will be a Low impact on the remaining properties.

2.4.8.2 Central section

In a northern direction, the proposed route option overlies a section of the N16 before moving offline in Drumkilsellagh and running parallel to the N16. The route option connects to a link road from the existing N16 to the Drum road (L-3406-0). The route option intercepts a local road (L-7415-0) in Castlegal, the N16 and another local road (L-7413-0) in Lugatober. This local road (L-7413-0) is connected to the N16 via an offline link road to the west and online link to the east.

Land use is agricultural comprised of farm holdings and one-off residential houses on the N16 and local roads. The topography is hilly with elevations between 60-110m OD and steeply sloping lands in the Castlegal and Lugatober townlands.

There will be a Medium impact on a property in Drumkillsellagh/Doonally due to the impact on the property curtilage. There will be a Low impact on the remaining properties affected in this section. There are also High impacts involving direct impacts on two houses considered as farm houses, however these impacts are considered as part of the assessment in the Agricultural Chapter.

2.4.8.3 Northern section

From Lugatober the alignment continues in a north easterly direction and intercepts a section of the N16 and local roads (L-34041-0 and L-3404-0) in Collinsford and Lugnagall. The route option continues to Gortnagrelly where it ends at the County Boundary. In Lugnagall the local road (L-3404-0) is realigned to the route option. The route option remains north of the N16 at Lugnagall and in Gortnagrelly overlies the N16 for the remainder of the route option.

The land use is agricultural consisting of farm holdings and a number of one-off residential houses. The lands are steeply sloping towards the Drumcliff River and Glencar Lake and range from 90m OD to 130m OD at the County Boundary.

There will be a High impact, involving property acquisition, on two houses in Gortnagrelly due to a direct impact from the route option alignment. There will be a High impact on a development site in Gortnagrelly. There will be a Medium impact on two houses in Lugnagall and Gortnagrelly due to the significant effects on the property curtilage and garden. There are also High impacts involving direct impacts on three houses considered as farm houses, however these impacts are considered as part of the assessment in the Agricultural Chapter.

Summary details of the assessment of Option 6 sections are presented in Table 2-15 – Feasible Route Option 6.

2.4.9 **Option 7**

2.4.9.1 Southern section

Route Option 7 commences in Ballytivnan at the AbbVie roundabout on the N16 and travels offline in an easterly direction to intercept the N16 at Barroe before turning north and into Faughts where it intercepts a local road (L-3407-22). The alignment continues north into Doonally and crosses the N16 to a junction at the Drum road (L-3406-0).

Properties include AbbVie, a housing development (Yeats Heights), one-off residential houses and agricultural lands. The topography along the alignment is undulating lowland and ranges from 30m OD to 60m OD.

There will be a High impact, involving property acquisition, on two houses in Faughts due to direct impact from the route option alignment. There will be a Medium impact on two houses in the Yeats Heights residential development and seven houses in Barroe and Faughts townlands due to significant effects of the route option alignment on property curtilage and gardens. There will be a Low impact on the remaining properties.

2.4.9.2 Central section

From the Drum road (L-3406-0), the proposed route option moves offline before crossing the N16 before intercepting a local road (L-7415-0) in Drumkilsellagh. The route option continues north and intercepts the N16 and a local road (L-7413-0) in Lugatober. The local road (L-7413-0) is connected to the south via an offline link to the N16 and to the east via an accommodation underbridge to the N16.

Land use is agricultural comprised of farm holdings and one-off residential houses on the N16 and local roads. There is a hilly topography and elevations between 60-110m OD.

There will be a Medium impact on a house and a separate site on the Drum Road (L-3406-0) due to significant effects from the route option alignment on the property curtilage. There will be a Low impact on the remaining properties.

2.4.9.3 Northern section

From Lugatober the alignment continues in a north easterly direction and intercepts a section of the N16 and local roads (L-34041-0 and L-3404-0) in Collinsford and Lugnagall. The route option continues to Gortnagrelly where it ends at the County Boundary. In Lugnagall the local road (L-3404-0) is realigned to the L-3441-0 via an offline link. The route option remains north of the N16 at Lugnagall and in Gortnagrelly overlies the N16 for the remainder of the route option.

Land use is agricultural comprised of farm holdings and one-off residential houses on the N16 and local roads. The lands are steeply sloping towards the Drumcliff River and Glencar Lake and range from 90m OD to 130m OD at the County Boundary.

There will be a Medium impact on one house in Lugnagall due to the significant effects on the property curtilage and garden. There will be a Low impact on the remaining properties.

Summary details of the assessment of Option 7 sections are presented in Table 2-16 – Feasible Route Option 7.

2.4.10 **Option 8**

2.4.10.1 Southern section

Route Option 8 commences in Ballytivnan at the AbbVie roundabout on the N16 and travels offline in an easterly direction to intercept the N16 at Barroe before turning north and into Faughts where it intercepts a local road (L-3407-22). The alignment continues north into Doonally and crosses the N16 to a junction at the Drum road (L-3406-0).

Properties include AbbVie, a housing development (Yeats Heights), one-off residential houses and agricultural lands. Land use is mainly agricultural farm holdings with one-off residential houses and ribbon development. The topography along the alignment is undulating lowland and ranges from 30m OD to 60m OD.

There will be a High impact, involving property acquisition, on one house in Faughts that is currently used as a Day Care centre due to a direct impact from the route option alignment. There will be a Medium impact on two houses located in Faughts and Doonally due to the significant effect of the route option alignment on property curtilage and garden. There will be a Low impact on the remaining properties.

2.4.10.2 Central section

From the Drum road (L-3406-0), the proposed route option moves offline before crossing the N16 before intercepting a local road (L-7415-0) in Drumkilsellagh. The route option continues north and intercepts the N16 and a local road (L-7413-0) in Lugatober. The local road (L-7413-0) is connected to the south via an offline link to the N16 and to the east via an accommodation underbridge to the N16.

Land use is agricultural comprised of farm holdings and one-off residential houses on the N16 and local roads. There is a hilly topography and elevations between 60-110m OD.

There will be a Medium impact on a house and a separate site on the Drum Road (L-3406-0) due to significant effects from the route option alignment on the property curtilage. There will be a Low impact on the remaining properties. There are High impacts involving a direct impact on one house

considered as a farm house, however this impact is considered as part of the assessment in the Agricultural Chapter.

2.4.10.3 Northern section

From Lugatober the alignment continues in a north easterly direction and intercepts a section of the N16 and local roads (L-34041-0 and L-3404-0) in Collinsford and Lugnagall. The route option continues to Gortnagrelly where it ends at the County Boundary. In Lugnagall the local road (L-3404-0) is realigned to the L-3441-0 via an offline link. The route option remains north of the N16 at Lugnagall and in Gortnagrelly overlies the N16 for the remainder of the route option.

Land use is agricultural comprised of farm holdings and one-off residential houses on the N16 and local roads. The lands are steeply sloping towards the Drumcliff River and Glencar Lake and range from 90m OD to 130m OD at the County Boundary.

There will be a Medium impact on one house in Lugnagall due to the significant effects on the property curtilage and garden. There will be a Low impact on the remaining properties.

Summary details of the assessment of Option 8 sections are presented in Table 2-17 – Feasible Route Option 8.

2.4.11 **Option 9**

2.4.11.1 Southern section

Route Option 9 commences in Ballytivnan at the AbbVie roundabout on the N16 and travels offline in an easterly direction to intercept the N16 at Barroe before turning north and into Faughts where it intercepts a local road (L-3407-22). The alignment continues north into Doonally and crosses the N16 to a junction at the Drum road (L-3406-0).

From the N16 roundabout properties include AbbVie, one-off residential houses and agricultural lands. The topography along the alignment is undulating lowland and ranges from 30m OD to 60m OD.

There will be a High impact, involving property acquisition, on two houses in Faughts due to direct impact from the route option alignment. There will be a Medium impact on five houses in Faughts and Doonally due to significant effects of the route option alignment on property curtilage and gardens. There will be a Low impact on the remaining properties.

2.4.11.2 Central section

From the Drum road (L-3406-0), the proposed route option moves offline before crossing the N16 before intercepting a local road (L-7415-0) in Drumkilsellagh. The route option continues north and intercepts the N16 and a local road (L-7413-0) in Lugatober. The local road (L-7413-0) is connected to the south via an offline link to the N16 and to the east via an accommodation underbridge to the N16.

Land use is agricultural comprised of farm holdings and one-off residential houses on the N16 and local roads. Land use is grassland with a hilly topography and elevations between 60-110m OD.

There will be a Medium impact on both a house and a separate site on the Drum Road (L-3406-0) due to significant effects from the route option alignment on the property curtilage. There will be a Low

impact on the remaining properties. There are High impacts involving a direct impact on one house considered as a farm house, however this impact is considered as part of the assessment in the Agricultural Chapter.

2.4.11.3 Northern section

From Lugatober the alignment continues in a north easterly direction and intercepts a section of the N16 and local roads (L-34041-0 and L-3404-0) in Collinsford and Lugnagall. The route option continues to Gortnagrelly where it ends at the County Boundary. In Lugnagall the local road (L-3404-0) is realigned to the L-3441-0 via an offline link. The route option remains north of the N16 at Lugnagall and in Gortnagrelly overlies the N16 for the remainder of the route option.

Land use is agricultural comprised of farm holdings and one-off residential houses on the N16 and local roads. The lands are steeply sloping towards the Drumcliff River and Glencar Lake and range from 90m OD to 130m OD at the County Boundary.

There will be a Medium impact on one house in Lugnagall due to the significant effects on the property curtilage and garden. There will be a Low impact on the remaining properties.

Summary details of the assessment of Option 9 sections are presented in Table 2-18 – Feasible Route Option 9.

2.4.12 **Option 10**

2.4.12.1 Southern section

Route Option 3 is strategically placed between the existing N16 and N15 within the townland of Ballytivnan. It connects via a proposed roundabout, with links to the east (N16) and to the west (N15 via a local link). From the proposed roundabout, the route travels north to intercept a local road (L-7422-0) before turning north east where it intercepts a further local road (L-3407-0) in Carncash. It then intercepts a further local road (L-3406-0) known locally as the Drum Road.

Land use from the N15 and N16 to the local road (L-7422-0) in Rathbraghan is mixed involving residential, commercial, community and development property. The main property on this section is AbbVie extending from the N16 roundabout to the local road (L-7422-0) in Rathbraghan. Along the Shannon Road properties include commercial warehouses, housing developments (Glendallon and Elm Garden estates), community land / open space and development lands.

North of the local road (L-7422-0), land use is mainly agricultural farm holdings with one-off residential houses. The drumlin topography along the alignment consists of rolling hills and ranges from 10m OD to 60m OD.

There will be a Medium impact on AbbVie lands due to landtake and severance impact from the alignment, roundabout junction and associated link roads. The location of the proposed route option will have a permanent impact on these development lands and a significant effect on the commercial use of this property. There will be a Low impact on the remaining properties.

2.4.12.2 Central section

In a northern direction, the proposed route option overlies a section of the N16 before moving offline in Drumkilsellagh and running parallel to the N16. There is a link road from the existing N16 to the Drum road (L-3406-0). The route option intercepts a local road (L-7415-0) before it crosses the N16 and intercepts another local road (L-7413-0) in Lugatober. This local road (L-7413-0) is connected to the N16 to the south via a link road and to the N16 to the east via an access underbridge and offline link.

Land use is agricultural comprised of farm holdings and a lower number of one-off residential houses on the N16 and local roads. The topography is hilly with elevations between 60-90m OD and steeply sloping lands in the Castlegal and Lugatober townlands.

There will be a Medium impact on a development site on the Drum road (L-3406-0). There will be a Low impact on the remaining properties. There are High impacts involving direct impacts on three houses considered as farm houses, however these impacts are considered as part of the assessment in the Agricultural Chapter.

2.4.12.3 Northern section

From Lugatober the alignment continues in a north easterly direction and intercepts a section of the N16 and local roads (L-34041-0 and L-3404-0) in Collinsford and Lugnagall. The route option overlies the N16 for a short section in Lugnagall and continues offline to the north of the N16 before intercepting the N16 again at Gortnagrelly where it proceeds to the County Boundary. In Lugnagall, the local road (L-34041-0) is realigned offline to the local road (L-3404-0) and route option.

The land use is agricultural consisting of farm holdings and a number of one-off residential houses. The lands are steeply sloping towards the Drumcliff River and Glencar Lake and range from 90m OD to 130m OD at the County Boundary.

There will be a High impact, involving property acquisition, on two houses on a local road (L-3404-0) in Lugatober where the house will be directly impacted by the route option alignment. There will be a High impact on one development site in Lugatober. There is a High impact involving a direct impact on one house considered as a farm house, however this impact is considered as part of the assessment in the Agricultural Chapter.

Summary details of the assessment of Option 10 sections are presented in Table 2-19 – Feasible Route Option 10.

2.4.13 **Option 11**

2.4.13.1 Southern section

Route Option 11 is strategically placed between the existing N16 and N15 within the townland of Ballytivnan. It connects via a proposed roundabout, with links to the east (N16) and to the west (N15 via a local link). From the proposed roundabout, the route travels north to intercept a local road (L-7422-0) before turning north east where it intercepts a further local road (L-3407-0) in Carncash. It then intercepts a further local road (L-3406-0) known locally as the Drum Road.

Land use from the N15 and N16 to the local road (L-7422-0) in Rathbraghan is mixed involving residential, commercial, community and development property. The main property on this section is AbbVie extending from the N16 roundabout to the local road (L-7422-0) in Rathbraghan. Along the Shannon Road properties include commercial warehouses, housing developments (Glendallon and Elm Garden estates), community land / open space and development lands.

North of the local road (L-7422-0), land use is mainly agricultural farm holdings with one-off residential houses. The drumlin topography along the alignment consists of rolling hills and ranges from 10m OD to 60m OD.

There will be a Medium impact on AbbVie lands due to landtake and severance impact from the alignment, roundabout junction and associated link roads. The location of the proposed route option will have a permanent impact on these development lands and a significant effect on the commercial use of this property. There will be a Low impact on the remaining properties.

2.4.13.2 Central section

In a northern direction, the proposed route option overlies a section of the N16 before moving offline in Drumkilsellagh and running parallel to the N16. There is a link road from the existing N16 to the Drum road (L-3406-0). The route option intercepts a local road (L-7415-0) before it crosses the N16 and intercepts another local road (L-7413-0) in Lugatober. This local road (L-7413-0) is connected to the N16 to the south via a link road and to the N16 to the east via an access underbridge.

Land use is agricultural comprised of farm holdings and a lower number of one-off residential houses on the N16 and local roads. The topography is hilly with elevations between 60-90m OD and steeply sloping lands in the Castlegal and Lugatober townlands.

There will be a Medium impact on a development site on the Drum road (L-3406-0). There will be a Low impact on the remaining properties. There are High impacts involving direct impacts on three houses considered as farm houses, however these impacts are considered as part of the assessment in the Agricultural Chapter.

2.4.13.3 Northern section

From Lugatober the alignment continues in a north easterly direction and intercepts a section of the N16 and local roads (L-34041-0 and L-3404-0) in Collinsford and Lugnagall. The route option overlies the N16 for a short section in Lugnagall and continues offline north of the N16 before intercepting the local road (L-7411-0) at Gortnagrelly. From here the route option remains offline and north of the N16 and proceeds through Gortnagrelly to the County Boundary. In Lugnagall, the local road (L-3404-0) is realigned offline to the local road (L-34041-0) and the route option.

The land use is agricultural consisting of farm holdings and a number of one-off residential houses. The lands are steeply sloping towards the Drumcliff River and Glencar Lake and range from 90m OD to 130m OD at the County Boundary.

There are no direct impacts on non-agricultural property.

Summary details of the assessment of Option 11 sections are presented in Table 2-20 – Feasible Route Option 11.

2.4.14 Summary of Feasible Route Options

An overall summary of the assessment of the Feasible Route Options is presented in *Table 5-4*.

Table 2-4: Overall summary of non-agricultural property assessment

Feasible Route Option	Southern Section		Central Section		Northern Section	
	Impact	Preference	Impact	Preference	Impact	Preference
1A	Major Negative	Low Preference	Major Negative	Very Low Preference	Major Negative	Low Preference
1A / 1B	Major Negative	Low Preference	Major Negative	Very Low Preference	Major Negative	Low Preference
2A	Moderate Negative	Medium Preference	Minor Negative	High Preference	Moderate Negative	Medium Preference
2A / 2B	Moderate Negative	Medium Preference	Minor Negative	High Preference	Moderate Negative	Medium Preference
3	Major Negative	Very Low Preference	Minor Negative	High Preference	Minor Negative	High Preference
4	Major Negative	Very Low Preference	Minor Negative	High Preference	Minor Negative	High Preference
5	Moderate Negative	Medium Preference	Minor Negative	High Preference	Major Negative	Low Preference
6	Moderate Negative	Medium Preference	Minor Negative	High Preference	Major Negative	Low Preference
7	Major Negative	Low Preference	Moderate Negative	Medium Preference	Moderate Negative	Medium Preference
8	Major Negative	Low Preference	Moderate Negative	Medium Preference	Moderate Negative	Medium Preference
9	Major Negative	Low Preference	Moderate Negative	Medium Preference	Moderate Negative	Medium Preference
10	Major Negative	Very Low Preference	Minor Negative	High Preference	Major Negative	Low Preference
11	Major Negative	Very Low Preference	Minor Negative	High Preference	Neutral	Very High Preference

Table 2-5: Feasible Route Options Preferences (non-agricultural property assessment)

Section	Feasible Route Option												
	1A	1A/B	2A	2A/B	3	4	5	6	7	8	9	10	11
South	4	4	3	3	5	5	3	3	4	4	4	5	5
Central	5	5	2	2	2	2	2	2	3	3	3	2	2
North	4	4	3	3	2	2	4	4	3	3	3	4	1
Overall	4	4	3	3	3	3	3	3	3	3	3	4	3

2.5 Refined Route Corridor Option Assessment

2.5.1 **Option 1A-V2**

2.5.1.1 Southern section

Route Option 1A-V2 commences in Teesan at a junction with the N15 and travels in an easterly direction to an underbridge of the Ballytivnan local road (L-7421-0) in Teesan / Carncash and on towards Doonally before turning north and crossing the Drum local road (L-3406-0). The route option will require online widening of short sections of the existing N15 north and south of the roundabout junction with the N15.

Land use is mainly agricultural farm holdings with one-off residential houses and ribbon development on local roads. The drumlin topography along the alignment consists of rolling hills and generally ranges from 40m OD to 60m OD.

The route option will have a High impact, involving property acquisition, on one property on the Drum road (L-3406-0) due to a direct impact from the route option alignment. There will be a High impact on one site on the Drum Road (L-3406-0) due to landtake. There will be a Medium impact on one house at Teesan due to significant effects on the property curtilage and garden shed. There will be a Medium impact on two houses on the Drum road (L-3406-0) due to significant effects on the property curtilage. The impact on the remaining properties will be Low involving slight effects to property boundaries, entrances and / or gardens.

Summary details of the assessment of Option 1A-V2 are presented in *Table 2-21*.

2.5.2 **Option 1A/1B-V2**

2.5.2.1 Southern section

Route Option 1A/1B-V2 commences at Duck Street in Sligo town at the junction between the N16 and N4/N15 and extends to the R291 Junction with online widening to Dual Carriageway standard and junction improvements. The route option continues north and online to the proposed Cartron Link roundabout junction and to the proposed roundabout with Scotsman's Walk. Following the Scotsman's Walk East Junction the route option will change to a Single Carriageway standard and extend north and online with localised widening and improvements to the existing N15. Improvements to the N15 section of this FRO terminate approximately 250m north of the proposed roundabout with the N16 in Teesan. The FRO then travels in an easterly direction to an underbridge of the Ballytivnan local road (L-7421-0) in Teesan / Carnacash and on towards Doonally before turning

north and crossing the Drum local road (L-3406-0). The route option will require online widening of short sections of the existing N15 north and south of the roundabout junction with the N15.

Land use along Route Option 1A/1B is a diverse property mix including residential, commercial, community, development and agricultural property. These properties consist of those with direct access off the N15 and properties that do not directly access the N15.

From the start of the route option to the Scotsman's Walk Junction, the properties with direct access include several commercial businesses including Topaz filling station, Horkans Garden Centre, Esso filling station, Supermacs restaurant, Ford Henderson Motorpark and TOP filling station. There are two residential properties and one farm holding with access onto the N15. Properties along the route option that do not have direct access from the N15 include a residential property, a commercial warehouse (former Cash and Carry) premises and development lands. The Avondale and Cartron Estate housing developments with access from Ballytivnan Road extend to the boundary of the N15. The AbbVie site and development lands are accessed from the N16 in Rathbraghan, from the Ballytivnan road (L-7421-0) in Shannon Eighter and off a local road (L-7422-0) in Rathbraghan.

North of the Scotsman's Walk Junction the properties that directly access the N15 include one-off residential houses, farm holdings and agricultural access to farmyards and lands in Lisnalurg and Teesan. Junction improvements are proposed for local roads (L-3411-0, L-7316-0 and the L-3407-0).

The route option topography is low-lying with elevations rising from 10m OD in Sligo town to a peak of 60m OD at the Drum road (L-3406-0).

The route option will have a High impact, involving property acquisition, on two houses involving one property on the N15 at Shannon Eighter and one property on the Drum road (L-3406-0). There will be a High impact on two plots of development lands at Cartron. There will be a High impact on one site on the Drum Road (L-3406-0) due to landtake. There are Medium impacts on six houses at Ballytivnan, Shannon Eighter, Lisnalurg, Teesan and on the Drum Road due to significant effects on the property curtilage and garden. At the Cartron Link Junction, there are Medium impacts on three commercial properties due to the significant effects on the property curtilage, property boundary and access:

- Esso / Horkans;
- Supermacs restaurant; and
- Warehouse premises (former Cash and Carry).

There will be a medium impact on one plot of development land at Cartron. The impact on the remaining properties will be Low involving slight effects to property boundaries, entrances and / or gardens.

Summary details of the assessment of Option 1A/1B-V2 are presented in *Table 2-22* in section 2.8 Appendices.

2.5.3 **Option 2A-V2**

2.5.3.1 Southern section

Route Option 2A-V2 commences in Shannon Eighter at a roundabout junction with the N15 and travels east towards an underbridge of the local road (L-7422-0) in Drumcliff East and a junction with local road (L-7421-0) in Rathbraghan. The route takes a north easterly direction intercepting a local road (L-3407-0) in Carncash and the Drum local road (L-3406-0).

Land use is mainly agricultural farm holdings with one-off residential houses and ribbon development, particularly in Shannon Eighter and on the Drum local road (L-3406-0). In Rathbraghan, there are development lands that are currently in agricultural use. The drumlin topography along the alignment consists of rolling hills and ranges from 10m OD to 60m OD.

On the Ballytivnan road (L-7421-0) in Shannon Eighter, there will be a High impact on one development site and a Medium impact on a house due to the significant effect on the property curtilage. The impact on the remaining properties will be Low.

Summary details of the assessment of Option 2A-V2 are presented in *Table 2-23*.

2.5.4 **Option 2A/2B-V2**

2.5.4.1 Southern section

Route Option 2A/2B-V2 commences at Duck Street in Sligo town at the junction between the N16 and N4/N15 and extends to the R291 Junction with online widening to Dual Carriageway standard and junction improvements. The route option continues north and online to the proposed Cartron Link roundabout junction, it then extends to a further proposed roundabout with the proposed N16 and Scotsman's Walk. From this roundabout the FRO travels in an easterly direction towards an underbridge of the local road (L-7422-0) in Drumcliff East and a junction with local road (L-7421-0) in RathbraghanThe route takes a north easterly direction intercepting a local road (L-3407-0) in Carncash and the Drum local road (L-3406-0).

Land use along the route option is a diverse property mix including residential, commercial, community, development and agricultural property. These properties consist of those with direct access off the N15 and properties that do not directly access the N15.

From the start of the route option to the roundabout proposed with the N16/Scotsman's Walk, the properties with direct access include several commercial businesses including Topaz filling station, Horkans Garden Centre, Esso filling station, Supermacs restaurant, Ford Henderson Motorpark and TOP filling station. There are two residential properties and one farm holding with access onto the N15. Properties along the route option that do not have direct access from the N15 include a residential property, a commercial warehouse (former Cash and Carry) premises and development lands. The Avondale and Cartron Estate housing developments with access from Ballytivnan Road (L-7421-0) extend to the boundary of the N15. The AbbVie site and development lands are accessed from the N16, the Ballytivnan road (L-7421-0) in Shannon Eighter and a local road (L-7422-0) in Rathbraghan.

The route option is low-lying with elevations varying from 10m OD to 60m OD at the Drum road (L-3406-0).

There will be a High impact on three plots of development land, two plots located at the Cartron Link roundabout on the N15 and one site on the Ballytivnan local road (L-7421-0) in Shannon Eighter. There will be Medium impacts on three houses due to the significant effect on the property curtilage and garden. Two houses are located on the N15 in Ballytivnan and Shannon Eighter and one house is located on the Ballytivnan road (L-7421-0) in Shannon Eighter. At the Cartron Link Junction, there are Medium impacts on three commercial properties due to the significant effect on the property curtilage, property boundary and access. These properties include:

- Esso / Horkans;
- Supermacs restaurant; and
- Warehouse premises (former Cash and Carry).

There will be a Medium impact on one small plot of development land in Ballytivnan. The impact on the remaining properties will be Low involving slight effects to property boundaries, entrances and / or gardens.

Summary details of the assessment of Option 2A/2B-V2 are presented in *Table 2-24*.

2.5.5 **Option 5**

2.5.5.1 Southern section

Route Option 5 commences in Ballytivnan at the AbbVie roundabout on the N16 and travels in a north easterly direction through Rathbraghan before turning north where it overlies the N16 at a junction with two local roads (L-7422-0 and L-3407-0). The route option continues north through Doonally where it intercepts the Drum road (L-3406-0) in the townland of Drumkilsellagh.

Land use is mainly agricultural farm holdings with one-off residential houses and ribbon development in Barroe and Faughts. The topography along the alignment is undulating lowland and ranges from 30m OD to 60m OD.

There will be a Medium impact on one property in Barroe due to the impact on the property curtilage, existing property access and a building replicating a gate lodge. There will be a Medium impact on a second property in Barroe due to the impact on the property curtilage and existing access. There will be a Low impact on the remaining properties.

2.5.5.2 Central section

In a northern direction, the proposed route option overlies a section of the N16 before moving offline in Drumkilsellagh and running parallel to the N16. The route option connects to a link road from the existing N16 to the Drum road (L-3406-0). The route option intercepts a local road (L-7415-0) in Castlegal, the N16 and another local road (L-7413-0) in Lugatober. This local road (L-7413-0) is connected to the N16 via an offline link road to the west and online link to the east.

Land use is agricultural comprised of farm holdings and one-off residential houses on the N16 and local roads. The topography is hilly with elevations between 60-110m OD and steeply sloping lands in the Castlegal and Lugatober townlands.

There will be a Medium impact on a property in Drumkillsellagh/Doonally due to the impact on the property curtilage. There will be a Low impact on the remaining properties affected in this section. There are also High impacts involving direct impacts on two houses considered as farm houses, however these impacts are considered as part of the assessment in the Agricultural Chapter.

Summary details of the assessment of Option 5 are presented in *Table 2-25*.

2.5.6 **Option 8-V2**

2.5.6.1 Central section

From the Drum road (L-3406-0), the route option moves offline before crossing the N16 and intercepting a local road (L-7415-0) in Drumkilsellagh. The route option continues north and intercepts the N16 and a local road (L-7413-0) in Lugatober. The local road (L-7413-0) is connected to the south via an offline link to the N16 and to the east via an accommodation underbridge to the N16.

Land use is agricultural comprised of farm holdings and one-off residential houses on the N16 and local roads. There is a hilly topography and elevations between 60-110m OD.

There will be a Medium impact on a house and a separate site on the Drum Road (L-3406-0) due to significant effects from the route option alignment on the property curtilage. There will be a Low impact on the remaining properties.

2.5.6.2 Northern section

This section commences at the crossing of an underbridge for local roads (L-34041-0 and L-3404-0) to Collinsford and Lugnagall. It remains offline in a north easterly direction before intercepting the local road (L-7411-0) at Gortnagrelly. From here the route option remains online with the local road (L-7411-0) and N16 to the County Boundary. In Lugnagall, the Collinsford local road (L-3441-0) is realigned to local road (L-3404-0) and subsequently to the existing N16 via an underbridge.

Land use is agricultural comprised of farm holdings and one-off residential houses on the N16 and local roads. The lands are steeply sloping towards the Drumcliff River and Glencar Lake and range from 90m OD to 130m OD at the County Boundary.

There will be a Medium impact on one house in Lugnagall due to the significant effects on the property curtilage and garden. There will be a Low impact on the remaining properties. There is a High impact involving a direct impact on one house considered as a farm house, however this impact is considered as part of the assessment in the Agricultural Chapter. Summary details of the assessment of Option 8-V2 are presented in *Table 2-26*.

2.5.7 **Option 12**

2.5.7.1 Southern section

Route Option 12 commences in Ballytivnan at the AbbVie roundabout on the N16 and travels offline in an easterly direction to intercept the N16 at Barroe and into Faughts before turning north where it intercepts a local road (L-3407-22). The alignment continues north into Doonally and crosses the N16 to a junction at the Drum road (L-3406-0).

Land use is mainly agricultural farm holdings with one-off residential houses and ribbon development. The topography along the alignment is undulating lowland and ranges from 30m OD to 60m OD.

There will be a Medium impact on a property (currently a Day Care Centre) in Faughts due to the impact on the property curtilage, existing property access and garden. There will be a Medium impact on a second property in Doonally due to the impact on existing access. There will be a Low impact on the remaining properties.

2.5.7.2 Central section

From the Drum road (L-3406-0), the proposed route option continues offline in a northerly direction before intercepting the N16 and a local road (L-7415-0) in Drumkilsellagh / Castlegal. The route option intercepts the N16 again and a local road (L-7413-0) in Lugatober. There is a junction with the local road (L-7413-0) to the west and N16 to the east. The section continues offline to the Lugnagall townland boundary.

Land use is mainly agricultural farm holdings with a hilly topography and elevations between 60-110m OD.

There will be a Medium impact on a four houses and a separate site on the Drum Road (L-3406-0) due to significant effects from the route option alignment on the property curtilage. There will be a Low impact on the remaining properties.

2.5.7.3 Northern section

This section commences at a junction for local roads (L-34041-0 and L-3404-0) to Collinsford and Lugnagall. The route option overlies the N16 for a short section in Lugnagall and continues north and offline before intercepting the local road (L-7411-0) at Gortnagrelly. From here the route option remains online with the local road (L-7411-0) and N16 to the County Boundary. The Collinsford local road (L-34041-0) is realigned offline to the local road (L-3404-0).

The land use is mainly agricultural farm holdings and a number of one-off residential houses. The lands are steeply sloping towards the Drumcliff River and Glencar Lake and range from 90m OD to 130m OD at the County Boundary.

There is a Low impact on each of the affected properties.

Summary details of the assessment of Option 12 sections are presented in Table 2-27.

2.5.8 **Option 12-V2**

2.5.8.1 Northern section

From Lugatober, this section commences at a junction for local roads (L-34041-0 and L-3404-0) to Collinsford and Lugnagall. The route option overlies the N16 to a short offline realignment section at Gortnagrelly after which it remains online with the N16 until the County Boundary. The proposed junction involves the realignment of the Collinsford local road (L-34041-0) onto the Lugnagall local road (L-3404-0) and a single connection to the N16.

The land use is mainly agricultural farm holdings and a single one-off residential house. The lands are steeply sloping towards the Drumcliff River and Glencar Lake and range from 90m OD to 130m OD at the County Boundary.

There will be a Low impact on one property.

Summary details of the assessment of Option 12-V2 are presented in *Table 2-28*.

2.5.9 **Option 12-Alternative Junctions (J1, J2 and J3)**

This is an assessment of junction options at Collinsford on Refined Option 12.

2.5.9.1 Junction 1

This section commences in Lugatober at Ch. 5+020m and continues to the proposed junction with the Collinsford local road (L-34041-0) and Lugnagall local road (L-3404-0). The section remains online with the N16 until Ch. 6+200m. The proposed junction involves the realignment of the Collinsford local road (L-34041-0) onto the Lugnagall local road (L-3404-0) and a single connection to the N16.

Land use is mainly agricultural farm holdings and a number of one-off residential houses. Topography is hilly with elevations between 80-90m OD.

There is no impact on non-agricultural property.

2.5.9.2 Junction 2

This section commences in Lugatober at Ch. 5+020m and continues to the proposed junction with the Collinsford local road (L-34041-0) and Lugnagall local road (L-3404-0). The section remains online with the N16 until Ch. 6+200m. The proposed junction involves two separate connections onto the N16 for the Collinsford local road (L-34041-0) onto the Lugnagall local road (L-3404-0).

Land use is mainly agricultural farm holdings and a number of one-off residential houses. Topography is hilly with elevations between 80-90m OD.

There is no impact on non-agricultural property.

2.5.9.3 Junction 3

This section commences in Lugatober at Ch. 5+020m and continues to the proposed junction with the Collinsford local road (L-34041-0) and Lugnagall local road (L-3404-0). The section remains online with the N16 until Ch. 6+200m. The proposed junction involves the realignment of the Collinsford local road (L-34041-0) onto the Lugnagall local road (L-3404-0) and a single connection to the N16.

Land use is mainly agricultural farm holdings and a number of one-off residential houses. Topography is hilly with elevations between 80-90m OD.

There is no impact on non-agricultural property.

Summary details of the assessment of Option 12-Alternative Junction are presented in *Table 2-29*.

2.5.10 Summary of Refined Route Options

An overall summary of the assessment of the Refined Route Options is presented in Table 2-6 and Table 2-7.

Table 2-6: Overall summary of non-agricultural property assessment

Feasible Route Option	Southern Section		Central Section		Northern Section	
	Impact	Preference	Impact	Preference	Impact	Preference
1A	Major Negative	Low Preference	N/A	N/A	N/A	N/A
1A / 1B	Major Negative	Low Preference	N/A	N/A	N/A	N/A
2A	Moderate Negative	Medium Preference	N/A	N/A	N/A	N/A
2A / 2B	Moderate Negative	Medium Preference	N/A	N/A	N/A	N/A
5	Moderate Negative	Medium Preference	Minor Negative	High Preference	N/A	N/A
8	N/A	N/A	Moderate Negative	Medium Preference	Moderate Negative	Medium Preference
12	Minor Negative	High Preference	Moderate Negative	Medium Preference	Minor Negative	High Preference
12 V2	N/A	N/A	N/A	N/A	Minor Negative	High Preference
13	Major Negative	Low Preference	N/A	N/A	N/A	N/A
Junction Option	Junction 1		Junction 2		Junction 3	
	Impact	Preference	Impact	Preference	Impact	Preference
12 J3	Neutral	Very High Preference	Neutral	Very High Preference	Neutral	Very High Preference

Table 2-7: Refined Route Options Preferences (Non-Agricultural property)

Section	Refined Route Option														
	1A (v2)	1A/B (v2)	2A (v2)	2A/B (v2)	3	4	5	6	7	8 (v2)	9	10	11	12	12 (v2)
South	4	4	3	3	n/a	n/a	3	n/a	n/a	ref 12	n/a	n/a	n/a	2	ref 12
Central	ref 8-v2	ref 8-v2	ref 5	ref 5	n/a	n/a	2	n/a	n/a	3	n/a	n/a	n/a	3	ref 12
North	ref 8-v2	ref 8-v2	ref 8-v2	ref 8-v2	n/a	n/a	ref 8-v2	n/a	n/a	3	n/a	n/a	n/a	2	2
Overall	3	3	3	3	n/a	n/a	3	n/a	n/a	3	n/a	n/a	n/a	2	2

2.6 Mitigation

The comparative study of Feasible Route options has included mitigation of non-agricultural property impacts. The development of Feasible Route Options has, where possible, included mitigation by avoidance of residential, commercial and community property.

The discounting of Feasible Route Option sections during the selection process together with the design and modification of sections subsequently included as Refined Route Options has further considered such constraints.

The design of the preferred route option will include provision for a suite of measures to mitigate property impacts including the provision of suitable access, restoration of property entrances and boundaries on a like for like basis and interruption of services. It will include further measures dealing with the mitigation of construction and operation impacts on non-agricultural property from noise, dust, visual impacts, etc.

For non-agricultural properties directly impacted by the compulsory purchase of lands, monetary compensation for land acquisition and disturbance will be agreed following the approval of the scheme.

2.7 Conclusions

This study involved a comparative assessment of the impact of Route Options for the N16 Sligo to County Boundary road project on non-agricultural property. This involved a quantitative assessment of direct impacts on residential, commercial, community and development property for each section of the Feasible Route Options for the study area. Each section was assessed using the impact criteria as presented in Table 2-3. An overall summary of the study findings is presented in Table 5-4.

For the Southern section of the study area, the impact on non-agricultural property was deemed to be Moderate Negative on Feasible Route Options 2A, 2A / 2B, 5 and 6 resulting in a Medium preference. The impact was deemed to be Major on the remaining options with a Low preference on FRO 1A, 1A / 1B, 7, 8 and 9 and a Very Low preference on FRO 3, 4, 10 and 11.

For the Central section, the impact on non-agricultural property was deemed to be Minor Negative on Feasible Route Options 2A, 2A / 2B, 3, 4, 5, 6, 10 and 11 resulting in a High preference. The impact is Moderate Negative on FRO 7, 8 and 9 resulting in a Medium preference. There is a Major Negative impact on FRO 1A and 1A / 1B resulting in a Very Low preference.

On the Northern section, the impact on non-agricultural property was deemed to be Neutral on FRO 11 indicating a Very High Preference. There is a Minor Negative impact on FRO 3 and 4 resulting in a High preference. The impact is Moderate Negative on FRO 2A / 2B, 7, 8 and 9 resulting in a Medium

preference. There is a Major Negative impact on the remaining options with a Low preference on FRO 1A, 1A / 1B, 5, 6 and 10.

Following the completion of the Preliminary Options Assessment and discussions at the multi-disciplinary workshop a comparative assessment was undertaken on the impact of the Refined Route Options on non-agricultural property.

For the Southern section of the study area, the impact on non-agricultural property was deemed to be Minor Negative on Refined Route Option 12 resulting in a High Preference. The impact was deemed to be Moderate Negative on Refined Route Options 2A-V2, 2A / 2B-V2 and 5 resulting in a Medium preference. The impact was deemed to be Major on the remaining options with a Low preference on Refined Route Options 1A-V2, 1A / 1B-V2 and 13.

For the Central section, the impact on non-agricultural property was deemed to be Minor Negative on Refined Route Option 5 resulting in a High preference. The impact is Moderate Negative on Refined Route Options 8-V2, and 12 resulting in a Medium preference.

For the Northern section, the impact on non-agricultural property was deemed to be Minor Negative on Refined Route Options 12 and 12-V2 resulting in a Medium preference. The impact is Moderate Negative on Refined Route Options 8-V2 resulting in a Medium preference.

For the junction assessment at Collinsford on Refined Route Option 12, there was no impact on non-agricultural property and the summary assessment was deemed to be Neutral for Junction Options 1, 2 and 3 resulting in a Very High preference.

2.8 Appendices

Table 2-8: Feasible Route Option 1A

Assessment criteria	Southern		Central		Northern		Total	
Route corridor option details Physical length of route option (km) Length considering additional Urban Links (km) Total journey length (km) Landtake – estimated on physical works length (ha)							7.125km 2.500km 9.625km 35.625ha	
Non-agricultural property Residential	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
High	1	8.3	2	50.0	2	66.7	5	26.3
Medium	0	0	0	0	0	0	0	0
Low	11	91.7	2	50.0	1	33.3	14	73.7
	12	**0**	**4**	**100**	**3**	**100**	**19**	**100**
Commercial								
High	0	0	1	100	0	0	1	100
Medium	0	0	0	0	0	0	0	0
Low	0	0	0	0	0	0	0	0
	0	**0**	**1**	**0**	**0**	**0**	**1**	**0**
Community								
High	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0
Low	0	0	0	0	0	0	0	0
	0	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Development								
High	0	0	1	100	0	0	1	50.0
Medium	0	0	0	0	1	100	1	50.0
Low	0	0	0	0	0	0	0	0
	0	**0**	**1**	**0**	**1**	**0**	**2**	**100**
Non-agricultural property impact	**Major Negative**		**Major Negative**		**Major Negative**			
Preference	**Low Preference**		**Very Low Preference**		**Low Preference**			

Table 2-9: Feasible Route Option 1A / 1B

Assessment criteria	Southern		Central		Northern		Total	
Route corridor option details Physical length of route option (km) Length considering additional Urban Links (km) Total journey length (km) Landtake – estimated on physical works length (ha)							9.625km 0km 9.625km 48.125ha	
Non-agricultural property								
Residential	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
High	2	10.5	2	50.0	2	66.7	6	23.1
Medium	3	15.8	0	0	0	0	3	11.5
Low	14	73.7	2	50.0	1	33.3	17	65.4
	19	**100**	**4**	**100**	**3**	**100**	**26**	**100**
Commercial								
High	0	0	1	100	0	0	1	14.2
Medium	3	50.0	0	0	0	0	3	21.4
Low	3	50.0	0	0	0	0	3	21.4
	6	**100**	**1**	**100**	**0**	**0**	**7**	**100**
Community								
High	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0
Low	5	100	0	0	0	0	5	100
	5	**100**	**0**	**0**	**0**	**0**	**5**	**100**
Development								
High	2	33.3	1	100	0	0	3	37.5
Medium	1	16.7	0	0	1	100	2	25.0
Low	3	50.0	0	0	0	0	3	37.5
	6	**100**	**1**	**100**	**1**	**100**	**8**	**100**
Non-agricultural property impact	**Major Negative**		**Major Negative**		**Major Negative**			
Preference	**Low Preference**		**Very Low Preference**		**Low Preference**			

Table 2-10: Feasible Route Option 2A

Assessment criteria	Southern		Central		Northern		Total	
Route corridor option details								
Physical length of route option (km)							8.180km	
Length considering additional Urban Links (km)							1.180km	
Total journey length (km)							9.360km	
Landtake – estimated on physical works length (ha)							46.800ha	
Non-agricultural property								
Residential	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
High	0	0	0	0	0	0	0	0
Medium	1	16.7	1	25.0	1	25.0	3	21.4
Low	5	83.3	3	75.0	3	75.0	11	78.6
	6	**100**	**4**	**100**	**4**	**100**	**14**	**100**
Commercial								
High	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0
Low	0	0	0	0	0	0	0	0
	0	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Community								
High	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0
Low	0	0	0	0	0	0	0	0
	0	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Development								
High	1	50.0	0	0	0	0	1	25.0
Medium	0	0	1	100	0	0	1	25.0
Low	1	50.0	0	0	1	100	2	50.0
	2	**100**	**1**	**100**	**1**	**100**	**4**	**100**
Non-agricultural property impact	**Moderate Negative**		**Minor Negative**		**Moderate Negative**			
Preference	**Medium Preference**		**High Preference**		**Medium Preference**			

Table 2-11: Feasible Route Option 2A / 2B

Assessment criteria	Southern		Central		Northern		Total	
Route corridor option details Physical length of route option (km) Length considering additional Urban Links (km) Total journey length (km) Landtake – estimated on physical works length (ha)							9.360km 0km 9.360km 46.800ha	
Non-agricultural property								
Residential	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
High	0	0	0	0	0	0	0	0
Medium	3	30.0	1	25.0	1	25.0	5	27.8
Low	7	70.0	3	75.0	3	75.0	13	72.2
	10	**100**	**4**	**100**	**4**	**100**	**18**	**100**
Commercial								
High	0	0	0	0	0	0	0	0
Medium	3	50.0	0	0	0	0	3	50.0
Low	3	50.0	0	0	0	0	3	50.0
	6	**100**	**0**	**0**	**0**	**0**	**6**	**100**
Community								
High	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0
Low	5	100	0	0	0	0	5	100
	5	**100**	**0**	**0**	**0**	**0**	**5**	**100**
Development								
High	3	37.5	0	0	0	0	3	30.0
Medium	1	12.5	1	100	0	0	2	20.0
Low	4	50.0	0	0	1	100	5	50.0
	8	**100**	**1**	**100**	**1**	**100**	**10**	**100**
Non-agricultural property impact	**Moderate Negative**		**Minor Negative**		**Moderate Negative**			
Preference	**Medium Preference**		**High Preference**		**Medium Preference**			

Table 2-12: Feasible Route Option 3

Assessment criteria	Southern		Central		Northern		Total	
Route corridor option details								
Physical length of route option (km)							8.220km	
Length considering additional Urban Links (km)							1.900km	
Total journey length (km)							10.120km	
Landtake – estimated on physical works length (ha)							50.600ha	
Non-agricultural property								
Residential	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
High	0	0	0	0	0	0	0	0
Medium	0	0	1	25.0	0	0	1	9.1
Low	4	100	3	75.0	3	100	10	90.9
	4	**100**	**4**	**100**	**3**	**100**	**11**	**100**
Commercial								
High	0	0	0	0	0	0	0	0
Medium	1	33.3	0	0	0	0	1	33.3
Low	2	66.7	0	0	0	0	2	66.7
	3	**100**	**0**	**0**	**0**	**0**	**3**	**100**
Community								
High	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0
Low	3	100	0	0	0	0	3	100
	3	**100**	**0**	**0**	**0**	**0**	**3**	**100**
Development								
High	0	0	0	0	0	0	0	0
Medium	0	0	1	100	0	0	1	33.3
Low	1	100	0	0	1	100	2	66.7
	1	**100**	**1**	**100**	**1**	**100**	**3**	**100**
Non-agricultural property impact	**Major Negative**		**Minor Negative**		**Minor Negative**			
Preference	**Very Low Preference**		**High Preference**		**High Preference**			

Table 2-13: Feasible Route Option 4

Assessment criteria	Southern		Central		Northern		Total	
Route corridor option details Physical length of route option (km) Length considering additional Urban Links (km) Total journey length (km) Landtake – estimated on physical works length (ha)							8.310km 1.900km 10.210km 51.500ha	
Non-agricultural property								
Residential	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
High	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0
Low	6	100	3	100	4	100	13	100
	6	**100**	**3**	**100**	**4**	**100**	**13**	**100**
Commercial								
High	0	0	0	0	0	0	0	0
Medium	1	33.3	0	0	0	0	1	33.3
Low	2	66.7	0	0	0	0	2	66.7
	3	**100**	**0**	**0**	**0**	**0**	**4**	**100**
Community								
High	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0
Low	2	100	0	0	0	0	2	100
	2	**100**	**0**	**0**	**0**	**0**	**2**	**100**
Development								
High	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0
Low	1	100	1	100	1	100	3	100
	1	**100**	**1**	**100**	**1**	**100**	**3**	**100**
Non-agricultural property impact	**Major Negative**		**Minor Negative**		**Minor Negative**			
Preference	**Very Low Preference**		**High Preference**		**High Preference**			

Table 2-14: Feasible Route Option 5

Assessment criteria	Southern		Central		Northern		Total	
Route corridor option details								
Physical length of route option (km)							7.680km	
Length considering additional Urban Links (km)							1.900km	
Total journey length (km)							9.580km	
Landtake – estimated on physical works length (ha)							47.900ha	
Non-agricultural property								
Residential	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
High	0	0	0	0	2	50.0	2	13.3
Medium	2	20.0	1	100	2	50.0	5	33.3
Low	8	80.0	0	0	0	0	8	53.4
	10	**100**	**1**	**100**	**4**	**100**	**15**	**100**
Commercial								
High	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0
Low	3	100	0	0	0	0	3	100
	3	**100**	**0**	**0**	**0**	**0**	**3**	**100**
Community								
High	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0
Low	1	100	0	0	0	0	1	100
	1	**100**	**0**	**0**	**0**	**0**	**1**	**100**
Development								
High	0	0	0	0	1	100	1	50.0
Medium	0	0	0	0	0	0	0	0
Low	0	0	1	100	0	0	1	50.0
	0	**0**	**1**	**100**	**1**	**100**	**2**	**100**
Non-agricultural property impact	**Moderate Negative**		**Minor Negative**		**Major Negative**			
Preference	**Medium Preference**		**High Preference**		**Low Preference**			

Table 2-15: Feasible Route Option 6

Assessment criteria	Southern		Central		Northern		Total	
Route corridor option details								
Physical length of route option (km)							7.880km	
Length considering additional Urban Links (km)							1.900km	
Total journey length (km)							9.780km	
Landtake – estimated on physical works length (ha)							48.900ha	
Non-agricultural property								
Residential	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
High	0	0	0	0	2	50.0	2	10.5
Medium	2	14.3	1	100	2	50.0	5	26.3
Low	12	85.7	0	0	0	0	12	63.2
	14	**100**	**1**	**100**	**4**	**100**	**19**	**100**
Commercial								
High	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0
Low	3	100	0	0	0	0	3	100
	3	**100**	**0**	**0**	**0**	**0**	**3**	**100**
Community								
High	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0
Low	1	100	0	0	0	0	1	100
	1	**100**	**0**	**0**	**0**	**0**	**1**	**100**
Development								
High	0	0	0	0	1	100	1	50.0
Medium	0	0	0	0	0	0	0	0
Low	0	0	1	100	0	0	1	50.0
	0	**0**	**1**	**100**	**1**	**100**	**2**	**100**
Non-agricultural property impact	**Moderate Negative**		**Minor Negative**		**Major Negative**			
Preference	**Medium Preference**		**High Preference**		**Low Preference**			

Table 2-16: Feasible Route Option 7

Assessment criteria	Southern		Central		Northern		Total	
Route corridor option details Physical length of route option (km) Length considering additional Urban Links (km) Total journey length (km) Landtake – estimated on physical works length (ha)							8.110km 1.900km 10.010km 50.050ha	
Non-agricultural property								
Residential	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
High	2	14.3	0	0	0	0	2	9.1
Medium	9	64.3	1	25.0	1	25.0	11	50.0
Low	3	21.4	3	75.0	3	75.0	9	40.9
	14	**100**	**4**	**100**	**4**	**100**	**22**	**100**
Commercial								
High	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0
Low	1	100	0	0	0	0	1	100
	1	**100**	**0**	**0**	**0**	**0**	**1**	**100**
Community								
High	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0
Low	1	100	0	0	0	0	1	100
	1	**100**	**0**	**0**	**0**	**0**	**1**	**100**
Development								
High	0	0	0	0	0	0	0	0
Medium	0	0	1	100	0	0	1	50.0
Low	0	0	0	0	1	100	1	50.0
	0	**0**	**1**	**100**	**1**	**100**	**2**	**100**
Non-agricultural property impact	**Major Negative**		**Moderate Negative**		**Moderate Negative**			
Preference	**Low Preference**		**Medium Preference**		**Medium Preference**			

Table 2-17: Feasible Route Option 8

Assessment criteria	Southern		Central		Northern		Total	
Route corridor option details Physical length of route option (km) Length considering additional Urban Links (km) Total journey length (km) Landtake – estimated on physical works length (ha)							8.130km 1.900km 10.030km 50.150ha	
Non-agricultural property								
Residential	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
High	0	0	0	0	0	0	0	0
Medium	2	16.7	1	25.0	1	25.0	4	20.0
Low	10	83.3	3	75.0	3	75.0	16	80.0
	12	**100**	**4**	**100**	**4**	**100**	**20**	**100**
Commercial								
High	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0
Low	1	100	0	0	0	0	1	100
	1	**100**	**0**	**0**	**0**	**0**	**1**	**100**
Community								
High	1	50.0	0	0	0	0	1	50.0
Medium	0	0	0	0	0	0	0	0
Low	1	50.0	0	0	0	0	1	50.0
	2	**100**	**0**	**0**	**0**	**0**	**2**	**100**
Development								
High	0	0	0	0	0	0	0	0
Medium	0	0	1	100	0	0	1	50.0
Low	0	0	0	0	1	100	1	50.0
	0	**0**	**1**	**100**	**1**	**100**	**2**	**100**
Non-agricultural property impact	**Major Negative**		**Moderate Negative**		**Moderate Negative**			
Preference	**Low Preference**		**Medium Preference**		**Medium Preference**			

Table 2-18: Feasible Route Option 9

Assessment criteria	Southern		Central		Northern		Total	
Route corridor option details Physical length of route option (km) Length considering additional Urban Links (km) Total journey length (km) Landtake – estimated on physical works length (ha)							8.020km 1.900km 9.920km 49.600ha	
Non-agricultural property								
Residential	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
High	2	16.6	0	0	0	0	2	10.0
Medium	5	41.7	1	25.0	1	25.0	7	35.0
Low	5	41.7	3	75.0	3	75.0	11	55.0
	12	**100**	**4**	**100**	**4**	**100**	**20**	**100**
Commercial								
High	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0
Low	1	100	0	0	0	0	1	100
	1	**100**	**0**	**0**	**0**	**0**	**1**	**100**
Community								
High	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0
Low	1	100	0	0	0	0	1	100
	1	**100**	**0**	**0**	**0**	**0**	**1**	**100**
Development								
High	0	0	0	0	0	0	0	0
Medium	0	0	1	100	0	0	1	50.0
Low	0	0	0	0	1	100	1	50.0
	0	**0**	**1**	**100**	**1**	**100**	**2**	**100**
Non-agricultural property impact	**Major Negative**		**Moderate Negative**		**Moderate Negative**			
Preference	**Low Preference**		**Medium Preference**		**Medium Preference**			

Table 2-19: Feasible Route Option 10

Assessment criteria	Southern		Central		Northern		Total	
Route corridor option details								
Physical length of route option (km)							8.220km	
Length considering additional Urban Links (km)							1.900km	
Total journey length (km)							10.120km	
Landtake – estimated on physical works length (ha)							50.600ha	
Non-agricultural property								
Residential	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
High	0	0	0	0	2	100	2	20.0
Medium	0	0	0	0	0	0	0	0
Low	4	100	4	100	0	0	8	80.0
	4	**100**	**4**	**100**	**2**	**100**	**10**	**100**
Commercial								
High	0	0	0	0	0	0	0	0
Medium	1	33.3	0	0	0	0	1	33.3
Low	2	66.7	0	0	0	0	2	66.7
	3	**100**	**0**	**0**	**0**	**0**	**3**	**100**
Community								
High	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0
Low	3	0	0	0	0	0	3	100
	3	**0**	**0**	**0**	**0**	**0**	**3**	**100**
Development								
High	0	0	0	0	1	100	1	33.3
Medium	0	0	1	100	0	0	1	33.3
Low	1	100	0	0	0	0	1	33.3
	1	**100**	**1**	**100**	**1**	**100**	**3**	**100**
Non-agricultural property impact	**Major Negative**		**Minor Negative**		**Major Negative**			
Preference	**Very Low Preference**		**High Preference**		**Low Preference**			

Table 2-20: Feasible Route Option 11

Assessment criteria	Southern		Central		Northern		Total	
Route corridor option details								
Physical length of route option (km)							8.220km	
Length considering additional Urban Links (km)							1.900km	
Total journey length (km)							10.120km	
Landtake – estimated on physical works length (ha)							50.600ha	
Non-agricultural property								
Residential	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
High	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0
Low	4	100	4	100	0	0	8	100
	4	**100**	**4**	**100**	**0**	**0**	**8**	**100**
Commercial								
High	0	0	0	0	0	0	0	0
Medium	1	33.3	0	0	0	0	1	33.3
Low	2	66.7	0	0	0	0	2	66.7
	3	**100**	**0**	**0**	**0**	**0**	**3**	**100**
Community								
High	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0
Low	3	100	0	0	0	0	3	100
	3	**100**	**0**	**0**	**0**	**0**	**3**	**100**
Development								
High	0	0	0	0	0	0	0	0
Medium	0	0	1	100	0	0	1	50.0
Low	1	100	0	0	0	0	1	50.0
	1	**100**	**1**	**100**	**0**	**0**	**2**	**100**
Non-agricultural property impact	**Major Negative**		**Minor Negative**		**Neutral**			
Preference	**Very Low Preference**		**High Preference**		**Very High Preference**			

Refined Route Options

Table 2-21: Refined Route Option 1A – V2

Assessment criteria	Southern	
Non-agricultural property		
Residential	**No.**	**%**
High	1	7.1
Medium	3	21.4
Low	10	71.5
	14	**100**
Commercial		
High	0	0
Medium	0	0
Low	0	0
	0	**0**
Community		
High	0	0
Medium	0	0
Low	0	0
	0	**0**
Development		
High	1	100.0
Medium	0	0
Low	0	0
	1	**100**
Non-agricultural property impact	**Major Negative**	
Preference	**Low Preference**	

Table 2-22: Refined Route Option 1A/1B - V2

Assessment criteria	Southern	
Non-agricultural property		
Residential	**No.**	**%**
High	2	9.5
Medium	6	28.6
Low	13	61.9
	21	**100**
Commercial		
High	0	0
Medium	3	50.0
Low	3	50.0
	6	**100**
Community		
High	0	0
Medium	0	0
Low	5	100.0
	5	**100**
Development		
High	3	42.9
Medium	1	14.2
Low	3	42.9
	7	**100**
Non-agricultural property impact	**Major Negative**	
Preference	**Low Preference**	

Table 2-23: Refined Route Option 2A - V2

Assessment criteria	Southern	
Non-agricultural property		
Residential	**No.**	**%**
High	0	0
Medium	1	16.7
Low	5	83.3
	6	**100**
Commercial		
High	0	0
Medium	0	0
Low	0	0
	0	**0**
Community		
High	0	0
Medium	0	0
Low	0	0
	0	**0**
Development		
High	1	50.0
Medium	0	0
Low	1	50.0
	2	**100**
Non-agricultural property impact	**Moderate Negative**	
Preference	**Medium Preference**	

Table 2-24: Refined Route Option 2A/2B - V2

Assessment criteria	Southern	
Non-agricultural property		
Residential	**No.**	**%**
High	0	0
Medium	3	30.0
Low	7	70.0
	10	**100**
Commercial		
High	0	0
Medium	3	50.0
Low	3	50.0
	6	**100**
Community		
High	0	0
Medium	0	0
Low	5	100.0
	5	**100**
Development		
High	3	37.5
Medium	1	12.5
Low	4	50.0
	8	**100**
Non-agricultural property impact	**Moderate Negative**	
Preference	**Medium Preference**	

Table 2-25: Refined Route Option 5

Assessment criteria	Southern		Central	
Non-agricultural property				
Residential	**No.**	**%**	**No.**	**%**
High	0	0	0	0
Medium	2	20.0	1	100.0
Low	8	80.0	0	0
	10	**100**	**1**	**100**
Commercial				
High	0	0	0	0
Medium	0	0	0	0
Low	3	100.0	0	0
	3	**100**	**0**	**0**
Community				
High	0	0	0	0
Medium	0	0	0	0
Low	1	100.0	0	0
	1	**100**	**0**	**0**
Development				
High	0	0	0	0
Medium	0	0	0	0
Low	0	0	1	100.0
	0	**0**	**1**	**100**
Non-agricultural property impact	**Moderate Negative**		**Minor Negative**	
Preference	**Medium Preference**		**High Preference**	

Table 2-26: Refined Route Option 8 - V2

Assessment criteria	Central		Northern	
Non-agricultural property				
Residential	**No.**	**%**	**No.**	**%**
High	0	0	0	0
Medium	1	25.0	1	25.0
Low	3	75.0	3	75.0
	4	**100**	**4**	**100**
Commercial				
High	0	0	0	0
Medium	0	0	0	0
Low	0	0	0	0
	0	**0**	**0**	**0**
Community				
High	0	0	0	0
Medium	0	0	0	0
Low	0	0	0	0
	0	**0**	**0**	**0**
Development				
High	0	0	0	0
Medium	1	100.0	0	0
Low	0	0	1	100.0
	1	**100**	**1**	**100**
Non-agricultural property impact	**Moderate Negative**		**Moderate Negative**	
Preference	**Medium Preference**		**Medium Preference**	

Table 2-27: Refined Route Option 12

Assessment criteria	Southern		Central		Northern		Total	
Non-agricultural property								
Residential	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
High	0	0	0	0	0	0	0	0
Medium	1	0	4	100	0	0	4	21
Low	10	100	0	0	3	100	15	79
	11	**0**	**4**	**100**	**3**	**100**	**19**	**100**
Commercial								
High	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0
Low	1	100	0	0	0	0	0	0
	1	**100**	**0**	**0**	**0**	**0**	**0**	**0**
Community								
High	0	0	0	0	0	0	0	0
Medium	1	50.0	0	0	0	0	1	50
Low	1	50.0	0	0	0	0	1	50
	2	**100**	**0**	**0**	**0**	**0**	**2**	**100**
Development								
High	0	0	0	0	0	0	0	0
Medium	0	0	0	0	0	0	0	0
Low	0	0	1	100	1	100	2	100
	0	**0**	**1**	**100**	**1**	**100**	**2**	**100**
Non-agricultural property impact	**Minor Negative**		**Moderate Negative**		**Minor Negative**			
Preference	**High Preference**		**Medium Preference**		**High Preference**			

Table 2-28: Refined Route Option 12 - V2

Assessment criteria	Northern	
Non-agricultural property		
Residential	**No.**	**%**
High	0	0
Medium	0	0
Low	1	100.0
	1	**100**
Commercial		
High	0	0
Medium	0	0
Low	0	0
	0	**0**
Community		
High	0	0
Medium	0	0
Low	0	0
	0	**0**
Development		
High	0	0
Medium	0	0
Low	0	0
	0	**0**
Non-agricultural property impact	**Minor Negative**	
Preference	**High Preference**	

Table 2-29: Refined Route Option 12 (Collinsford Alternative J3)

Assessment criteria	Junction 1		Junction 2		Junction 3	
Non-agricultural property						
Residential	**No.**	**%**	**No.**	**%**	**No.**	**%**
High	0	0	0	0	0	0
Medium	0	0	0	0	0	0
Low	0	0	0	0	0	0
	0	**0**	**0**	**0**	**0**	**0**
Commercial						
High	0	0	0	0	0	0
Medium	0	0	0	0	0	0
Low	0	0	0	0	0	0
	0	**0**	**0**	**0**	**0**	**0**
Community						
High	0	0	0	0	0	0
Medium	0	0	0	0	0	0
Low	0	0	0	0	0	0
	0	**0**	**0**	**0**	**0**	**0**
Development						
High	0	0	0	0	0	0
Medium	0	0	0	0	0	0
Low	0	0	0	0	0	0
	0	**0**	**0**	**0**	**0**	**0**
Non-agricultural property impact	**Neutral**		**Neutral**		**Neutral**	
Preference	**Very High Preference**		**Very High Preference**		**Very High Preference**	

Table 2-30: Refined Route Option 13

Assessment criteria	Southern Link	
Non-agricultural property		
Residential	**No.**	**%**
High	0	0
Medium	0	0
Low	0	0
	0	**0**
Commercial		
High	1	33.3
Medium	0	0
Low	2	66.7
	3	**100**
Community		
High	0	0
Medium	0	0
Low	2	100.0
	2	**100**
Development		
High	0	0
Medium	0	0
Low	1	100.0
	1	**100**
Non-agricultural property impact	**Major Negative**	
Preference	**Low Preference**	

3 Noise & Vibration

3.1 Introduction

This section of the Route Selection Report assesses and evaluates the potential noise and vibration impacts for the N16 Sligo to County Boundary Realignment.

This assessment focuses on the potential noise and vibration impacts along the various route corridors and tries to quantify and qualify these constraints as appropriate to reach a conclusion on the most acceptable route in noise and vibration terms.

3.2 Methodology

This assessment has been completed in accordance with the following relevant guidance notes;

- NRA (now TII) Guidelines for the Treatment of Noise & Vibration in National Road Schemes (2004).
- Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes (March 2014)

The Guidelines for the Treatment of Noise & Vibration in National Road Schemes (2004) state that "the work undertaken as part of the Constraints Study is used by the project engineers responsible to refine the broad corridor into a small number of route corridor options. The National Roads Project Management Guidelines state that the purpose of Route Corridor Selection is to "carry out a detailed technical evaluation of the scheme corridor. The route selection process involves….[the] identification and investigation of Route Options, assessment of Environmental Impacts for each option…" This evaluation in turn leads to the production of a Route Corridor Selection Report".

The NRA (TII) Guidelines for the Treatment of Noise & Vibration in National Road Schemes (2004), states that there are three elements to the Route Corridor Selection. These elements consist of the following;

- an assessment of potential impact based upon property counts,
- a consideration of likely changes in traffic flow, and
- a review of the need for, and difficulties associated with, noise mitigation measures.

Once these three elements have received detailed consideration, route options should be ranked with respect to noise.

The Authority has undertaken a review of the Guidelines for the Treatment of Noise & Vibration in National Road Schemes (2004). This review was based on the experiences acquired from the implementation of the original draft guidelines and on a validation study that was undertaken to assess the applicability of the specified design criteria and the functionality of the various Transport Research Laboratory (TRL) conversion methodologies for Irish road conditions. This review provides guidance on the revised design criteria and the application of validated approaches to deriving the L_{den} values as well as an overview of the baseline monitoring and model validation procedure. The new Good Practice Guidance for the Treatment of Noise during the Planning of National Road

Schemes is based on the lessons learned from post EIA noise evaluations studies and research undertaken on the design of noise barriers. It provides advice and information for use by acousticians and it is also relevant for traffic, motorway and pavement engineers. The advice amplifies and supplements the original noise guidelines and it should be read in conjunction with that document. The new Good Practice Guidance does not affect the approach to preferred route option selection.

A full route selection analysis (as per the NRA (TII) guidelines) of the 13 Feasible Route Options for the N16 Sligo to County Boundary Realignment is presented in this chapter.

3.3 Route Selection Assessment

3.3.1 **Assessment of Potential Impact based on Receiver Counts**

3.3.1.1 Potential Impact Rating (PIR) Calculations

This aspect of the route selection process has involved identification of all sensitive receivers within 300m of each route option and assigning into one of four "bands". These bands are defined by their distance to either side of the centre line of each route option. Band 1 is from 0 to 50m of the centre line, Band 2 is from 50 to 100m, Band 3 is from 100 to 200m and Band 4 is from 200 to 300m. The NRA (TII) Guidelines for the Treatment of Noise & Vibration in National Road Schemes, states that a receiver is defined as being any dwelling house, hotel, hostel, health building, educational establishment, place of worship, entertainment venue or any other facility or area of high amenity which benefits from, or requires the absence of, high noise levels. Noise sensitive receiver band count numbers based on identification of all dwelling houses, hotels, hostels, health buildings, educational establishments and places of worship within 300m of each route option have been determined based on mapping provided by the design team.

The total number of receivers in each band has been multiplied by an arbitrary rating factor. The rating factor is 4 for Band 1, 3 for Band 2, 2 for Band 3 and 1 for Band 4. The resultant values have been summed to give a single number for each route option, termed the Potential Impact Rating (PIR). The PIR values have been used to assess the potential impact of each route option, the larger the PIR the greater the potential impact.

A PIR of the Feasible Route Option design bands for the N16 Sligo to County Boundary have been provided. The PIR figures outlined in the tables overleaf are based on Band Count Property Numbers for each of the of the Feasible Route Option design bands – i.e. the physical footprint of the works.

A PIR of the Feasible Route Options for the N16 Sligo to County Boundary from the commencement of all feasible route options from the existing N16's junction with the N4/N15 has also been provided. The PIR figures outlined in Table 3-2 are based on Band Count Property Numbers for each of the Feasible Route Options – i.e. considering a consistent starting point for each route

PIR values for the southern section, central section and the northern section of the Feasible Route Options for the N16 Sligo to County Boundary have also been prepared.

Table 3-1: Overall Potential Impact Rating of the Feasible Route Option design bands for the N16 Sligo to County Boundary:

Option	Potential Impact Rating						Potential Impact Ratings						Potential Impact Rating							
	Southern Section				PIR	PIR	Central Section				PIR	PIR	Northern Section				PIR	PIR	PIR	PIR
	0-50m	50-100m	100-200m	200m-300m	Sub-Total	RANK	0-50m	50-100m	100-200m	200m-300m	Sub-Total	RANK	0-50m	50-100m	100-200m	200m-300m	Sub-Total	RANK	TOTAL	RANK
Opt 1A	60	24	22	19	125	1	0	12	8	3	23	=1	16	9	10	5	40	=2	188	1
Opt 1B	268	264	378	227	1137	12	0	12	8	3	23	=1	16	9	10	5	40	=2	1200	12
Opt 2A	16	60	138	93	307	7	0	6	18	0	24	=3	20	12	12	10	54	=10	385	7
Opt 2B	188	270	462	254	1174	13	0	6	18	0	24	=3	20	12	12	10	54	=10	1252	13
Opt 3	192	246	290	124	852	9	4	6	16	1	27	=7	12	15	6	12	45	7	924	10
Opt 4	184	258	294	119	855	10	0	9	20	4	33	10	16	15	10	11	52	8	940	11
Opt 5	8	60	54	9	131	2	4	3	18	0	25	=5	12	6	16	7	41	=4	197	2
Opt 6	32	63	50	23	168	6	4	3	18	0	25	=5	12	6	16	7	41	=4	234	3
Opt 7	32	69	34	17	152	5	4	24	8	0	36	=11	20	12	10	11	53	9	241	6
Opt 8	20	39	70	18	147	4	4	24	8	0	36	=11	20	12	12	10	54	=10	237	5
Opt 9	20	48	70	8	146	3	4	24	8	0	36	=11	20	12	12	10	54	=10	236	4
Opt 10	180	246	302	119	847	8	4	6	16	1	27	=7	0	15	10	10	35	1	909	8
Opt 11	196	243	296	121	856	11	4	6	16	1	27	=7	0	21	10	10	41	=4	924	9
Existing N16	164	117	96	35	412		24	9	4	4	41		20	9	10	7	46		499	

Table 3-2: Overall Potential Impact Rating of the Feasible Route Options for the N16 Sligo to County Boundary from the commencement of all feasible route options from the existing N16's junction with the N4/N15:

Option	Potential Impact Ratings						Potential Impact Ratings						Potential Impact Ratings						PIR	PIR
	Southern Section				PIR	PIR	Central Section				PIR	PIR	Northern Section				PIR	PIR		
	0-50m	50-100m	100-200m	200m-300m	Sub-Total	RANK	0-50m	50-100m	100-200m	200m-300m	Sub-Total	RANK	0-50m	50-100m	100-200m	200m-300m	Sub-Total	RANK	TOTAL	RANK
Opt 1A	268	264	378	227	1137	-	0	12	8	3	23	-	16	9	10	5	40	-	1200	-
Opt 1B	268	264	378	227	1137	1	0	12	8	3	23	1	16	9	10	5	40	-	1200	-
Opt 2A	192	270	462	295	1219	-	0	6	18	0	24	-	20	12	12	10	54	=8	1297	2
Opt 2B	188	270	462	254	1174	2	0	6	18	0	24	2	20	12	12	10	54	=8	1252	1
Opt 3	848	837	1044	483	3212	9	4	6	16	1	27	5	12	15	6	12	45	5	3284	10
Opt 4	840	849	1048	478	3215	10	0	9	20	4	33	8	16	15	10	11	52	6	3300	11
Opt 5	488	426	528	244	1686	3	4	3	18	0	25	=3	12	6	16	7	41	=2	1752	3
Opt 6	512	429	524	258	1723	7	4	3	18	0	25	=3	12	6	16	7	41	=2	1789	4
Opt 7	512	435	508	252	1707	6	4	24	8	0	36	=9	20	12	10	11	53	7	1796	7
Opt 8	500	405	544	253	1702	5	4	24	8	0	36	=9	20	12	12	10	54	=8	1792	6
Opt 9	500	414	544	243	1701	4	4	24	8	0	36	=9	20	12	12	10	54	=8	1791	5
Opt 10	836	837	1056	478	3207	8	4	6	16	1	27	=5	0	15	10	10	35	1	3269	8
Opt 11	852	834	1050	480	3216	11	4	6	16	1	27	=5	0	21	10	10	41	=2	3284	9
Existing N16	644	483	570	270	1967		24	9	4	4	41		20	9	10	7	46		2054	

3.3.1.2 Discussion of Potential Impact Rating (PIR) Calculations

Based on PIR values of the Feasible Route Option design bands (physical footprint) for the N16 Sligo to County Boundary, as quoted in Table 3-1 above, Option 01A could be rated as the best ranked option in terms of potential noise impact. Route Options 05 and 06 could be rated as the 2nd and 3rd ranked options respectively. Route Options 09, 08 and 07 could be rated as the 4th, 5th and 6th ranked options respectively.

Based on PIR values of the Feasible Route Options for the N16 Sligo to County Boundary from the commencement of all feasible route options from the existing N16's junction with the N4/N15, as quoted in Table 3-2 above, Options 2A and 2B could be rated as the 1st and 2nd best ranked options in terms of potential noise impact. Route Option 5 could be rated as the 3rd ranked option. Route Options 6, 9, 8 and 7 could be rated as the 4th, 5th, 6th and 7th ranked options respectively.

Based on PIR values, Options 01B & 02B could be rated as the 1st and 2nd best ranked options in terms of potential noise impact in the Southern Section of the Feasible Route Options. Option 05 could be rated as the 3rd ranked route option in terms of potential noise impact in the Southern Section of the Feasible Route Options.

Based on PIR values, Options 01B & 02B could be rated as the 1st and 2nd best ranked options in terms of potential noise impact in the Central Section of the Feasible Route Options. Options 05 and 06 could be rated as the 3rd and 4th ranked options in terms of potential noise impact in the Central Section of the Feasible Route Options.

Based on PIR values, Option 10 could be rated as the best ranked route option in terms of potential noise impact in the Northern Section of the Feasible Route Options. Options 05, 06 & 11 could be rated as the 2nd ranked route options in terms of potential noise impact in the Northern Section of the Feasible Route Options.

In summary, based on Potential Impact Rating calculations, Options 1B, 2B and 5 could be rated as the 1st, 2nd and 3rd ranked route options respectively in terms of potential noise impact.

3.3.2 Assessment of Changes in Traffic Flow

Outlined below is an overall assessment of the potential noise impact in terms of changes in traffic flow data provided at this stage of the scheme appraisal, based on the data presented in the 'Traffic Model Information' flow diagrams. The NRA (TII) Guidelines for the Treatment of Noise & Vibration in National Road Schemes, states that an estimate should be made of the number of receivers where traffic flows are likely to increase or decrease by 25% or more.

The traffic flow data for all Options indicate that there will be a very significant reduction in traffic volumes experienced on the existing N16 with the 'central section' and 'northern section' of the proposed N16 realignment in operation. Future traffic volumes of less than 10% of the existing traffic volumes will be experienced on the existing N16 for all options except Options 01A, 01B, 02A and 02B. In terms of changes in traffic flow data, the potential noise impact will be beneficial to noise sensitive receivers located in close proximity to the existing N16 alignment, where the proposed N16 realignment will be further removed from their property. However, in many areas of the 'central section' and 'northern section' of the proposed N16 realignment, the Options do not significantly deviate away from the existing N16 alignment.

Significant changes in traffic flow on various road links of the existing and proposed road design network are predicted to occur for the various Options in the 'southern section' of the proposed N16 realignment.

Options 01A, 01B, 02A & 02B will result in an approximate 20% - 30% decrease in traffic flow on the existing N16 from the N16-R286 junction at Sligo IT to the roundabout at AbbVie and on the existing N16 north of the roundabout at AbbVie. Options 01A, 01B, 02A & 02B will result in a significant increase in traffic flow on the existing Ballytivnan Road, Avondale and Old Bundoran Road. For example, Option 02B would result in a 72% increase in traffic flow on Avondale and a 65% increase in traffic flow on Ballytivnan Road. Properties close to Avondale and Ballytivnan Road would experience a discernible noise level increase with such a change in traffic flows.

Options 03, 04, 10 & 11 will result in an approximate 20% decrease in traffic flow on the existing N16 from the N16-R286 junction at Sligo IT to the roundabout at AbbVie with future traffic volumes of less than 10% of the existing traffic volumes experienced on the existing N16 north of the roundabout at AbbVie. However, Options 3, 4, 10 & 11 will introduce significant additional traffic flows on existing roads adjacent to the properties near to Elm Gardens, Church View, Glendallon and The Woodlands as well as a new road link to the rear of The Grove Student Complex. Options 3, 4, 10 & 11 would result in over a doubling of traffic flows (a 115% increase) and a discernible noise level increase on Elm Gardens, Church View, Glendallon and The Woodlands and surrounding receivers.

Options 5, 6, 7, 8 and 9 will result in an approximate 30% increase in traffic flow on the existing N16 from the N16-R286 junction at Sligo IT to the roundabout at AbbVie with less than 10% of the existing traffic volumes experienced on the existing N16 north of the roundabout at AbbVie. Some of this traffic change is accounted for in the Do-Minimum Traffic scenario and is on account of the proposed new Garvogue Bridge. In effect, all traffic on the existing N16 will move to the proposed N16. In terms of changes in traffic flow data, the potential noise impact will be beneficial to noise sensitive receivers located in close proximity to the existing N16 alignment, where the proposed N16 realignment will be further removed from their property.

The traffic flow data on the proposed N16 realignment of in the order of 3,500 AADT indicates that existing properties adjacent to the proposed route options may experience an increase in nearby traffic volume and therefore, a potentially significant increase in noise level compared to the currently experienced background noise levels. Existing properties in rural areas adjacent to low traffic volume roads are likely to experience a greater subjective negative response to the proposed route than those existing properties which are located in relatively closer proximity to the existing N16.

3.3.3 Assessment of Likely Need for Mitigation Measures

A prediction of the likely noise levels at receivers in proximity to the proposed N16 has been undertaken using the *Calculation for Road Traffic Noise* (CRTN) calculation methodology and CadnaA noise modelling software. The noise level prediction parameter is the L_{den} noise indicator as specified in the NRA (TII) document "Guidelines for the Treatment of Noise and Vibration in National Road Schemes". This is a composite of L_{Aeq} values for L_{Day}, $L_{Evening}$ and L_{Night}. The design goal set out in the NRA (TII) document is to achieve 60dB L_{den} (free field residential façade criterion) or less at each receptor. The NRA (TII) document states that mitigation measures are only deemed necessary when the following three conditions are satisfied at designated sensitive receptors:

- the combined expected maximum traffic noise level, i.e. the relevant noise level, from the proposed road scheme together with other traffic in the vicinity is greater than the design goal - 60dB L_{den}
- the relevant noise level is at least 1dB more than the expected traffic noise level without the proposed road scheme in place
- the contribution to the increase in the relevant noise level from the proposed road scheme is at least 1dB

The predicted noise levels at receivers in proximity to the proposed N16 options have been used to give an initial indication of where noise mitigation measures are likely to be necessary in order to achieve the design goal of 60dB L_{den} or less at each receiver.

Table 3-3: Number of receivers in proximity to the proposed N16 in excess of the design goal of 60dB L_{den} where noise mitigation measures are likely to be necessary in order to achieve the design goal of 60dB L_{den} or less at each receiver.

Option No.	Possible Number of Receivers at which Noise Mitigation Measures may be required
Option 1A	6
Option 1B	6
Option 2A	14
Option 2B	14
Option 3	43
Option 4	59
Option 5	6
Option 6	2
Option 7	13
Option 8	8
Option 9	12
Option 10	41
Option 11	42

During the course of the detailed assessment of the preferred route option (at the next stage of the design process), the noise impact assessment methodology and detailed mitigation design will include for the use of noise prediction modelling software. All residences within 300m of the preferred route option will be represented in the noise model. Proposed and existing routes with corresponding predicted traffic data for the Base Year, Year of Opening and a Future Year will also be input to the model. Existing and proposed digital terrain data will be used to interpret potential 'natural noise mitigation' in the CadnaA model. Topographical data will be modified to reflect changes in the terrain due to the scheme and these changes will be based on information provided in the design drawings for the preferred route option. All residences will be identified using Ordnance Survey mapping and field investigation will be carried out to determine whether houses were bungalows, two storey residences and if the attic in each residence is used as a living space, where possible. The CadnaA model will be validated against actual noise monitoring data collected as part of the baseline assessment of the detailed Noise Impact Assessment process. Accurate noise impact prediction and subsequently noise mitigation design will be completed using the noise prediction modelling approach described.

3.3.4 Opportunities for Noise Mitigation Measures

Throughout the length of each of the proposed route options, cuttings and embankments will be required to allow for the construction of the proposed route options. The occurrence of cuttings on a

route option has the potential to provide natural noise attenuation whereas embankments have the potential to allow road traffic noise to propagate un-attenuated further from the road. Deep cuttings will attenuate the potential noise impact to a greater extent than a shallow cutting. However, the relative expense of constructing a road through an area requiring deep cutting will generally greatly exceed the cost of noise barrier construction adjacent to a road and a noise sensitive property as required along sections of a new national road scheme.

Many of the Options share a common or close alignment in certain places. Therefore, this equates to no difference in the opportunities for noise mitigation measures for these sections of the proposed Options. There are varying lengths of each of the Options which include for cuttings and embankments which will be required to allow for the construction of the proposed N16 realignment.

3.3.5 Construction Impacts

As stated in the NRA (TII) Guidelines, "there is no published Irish guidance relating to the maximum permissible noise level that may be generated during the construction phase of a project. Local authorities, where appropriate, should control construction activities by imposing limits on the hours of operation and consider noise limits at their discretion. The Authority considers that the noise levels in Table 3-4 are typically deemed acceptable [Note: that these values are indicative only; it may be appropriate to apply more stringent limits in areas where pre-existing noise levels are low]. These construction noise limits would be applied to all Options.

Table 3-4: Maximum permissible noise levels at the façade of dwellings during construction

Days & Times	$L_{Aeq\ (1\ hour)}$ dB	$L_{pA(max)slow}$ dB
Monday to Friday - 07.00 to 19.00	70	80[1]
Monday to Friday - 19.00 to 07.00	60[1]	65[1]
Saturday - 08.00 to 16.30	65	75
Sundays & Bank Holidays - 08.00 to 16.30	60[1]	65[1]

Note 1. Construction activities at these times, other than that required in respect of emergency works, will normally require the explicit permission of the relevant local authority.

3.3.6 Summary of Preferred Route Options & Conclusions

The prevailing noise climate in the study area of the route options varies from rural areas with very low background noise levels to larger urban areas which are likely to experience an elevated background noise level due to traffic flows and residential, commercial and industrial activities typical of such urban areas.

Based on the three elements of Route Corridor Selection outlined in The NRA Guidelines for the Treatment of Noise & Vibration in National Road Schemes, including an assessment of potential impact rating (PIR) based upon property counts, a consideration of likely changes in traffic flow, and a review of the need for and difficulties associated with noise mitigation measures, the best ranked option may be deemed to be Options 5 and 6. The overall results of these assessments are outlined in the following tables.

Table 3-5: Summary of preferred route options

Option No.	Preference
Option 01A	Medium Preference
Option 01B	Medium Preference
Option 02A	Medium Preference
Option 02B	Medium Preference
Option 03	Medium Preference
Option 04	Low Preference
Option 05	High Preference
Option 06	High Preference
Option 07	Medium Preference
Option 08	Medium Preference
Option 09	Medium Preference
Option 10	Medium Preference
Option 11	Medium Preference

In the Southern Section, based on the three elements of Route Corridor Selection outlined in The NRA (TII) Guidelines, the best ranked options may be deemed to be Options 05, 06, 07, 08 and 09.

Table 3-6: Summary of preferred route options – Southern Section

Option No.	Preference
Option 01A	Low Preference
Option 01B	Low Preference
Option 02A	Low Preference
Option 02B	Low Preference
Option 03	Low Preference
Option 04	Low Preference
Option 05	High Preference
Option 06	High Preference
Option 07	High Preference
Option 08	High Preference
Option 09	High Preference
Option 10	Low Preference

Option No.	Preference
Option 11	Low Preference

In the Central Section, based on the three elements of Route Corridor Selection outlined in The NRA (TII) Guidelines, the best ranked options may be deemed to be Options 1A and 1B.

Table 3-7: Summary of preferred route options – Central Section

Option No.	Preference
Option 01A	High Preference
Option 01B	High Preference
Option 02A	Medium Preference
Option 02B	Medium Preference
Option 03	Medium Preference
Option 04	Low Preference
Option 05	Medium Preference
Option 06	Medium Preference
Option 07	Low Preference
Option 08	Low Preference
Option 09	Low Preference
Option 10	Medium Preference
Option 11	Medium Preference

In the Northern Section, based on the three elements of Route Corridor Selection outlined in The NRA (TII) Guidelines, the best ranked options may be deemed to be Options 10 and 11.

Table 3-8: Summary of preferred route options – Northern Section

Option No.	Preference
Option 01A	Medium Preference
Option 01B	Medium Preference
Option 02A	Medium Preference
Option 02B	Medium Preference
Option 03	Medium Preference
Option 04	Medium Preference
Option 05	Medium Preference

Option No.	Preference
Option 06	Medium Preference
Option 07	Medium Preference
Option 08	Medium Preference
Option 09	Medium Preference
Option 10	High Preference
Option 11	High Preference

Table 3-9: Summary of Feasible Route Options (Noise)

Section	Feasible Route Option												
	1A	1B	2A	2B	3	4	5	6	7	8	9	10	11
South	4	4	4	4	4	4	2	2	2	2	2	4	4
Central	2	2	3	3	3	4	3	3	4	4	4	3	3
North	3	3	3	3	3	3	3	3	3	3	3	2	2
Overall	3	3	3	3	3	4	2	2	3	3	3	3	3

3.4 Refined Route Options

This section assesses the potential noise and vibration impacts of the refined route options set out below that were identified through the route option appraisal process.

3.4.1 **Assessment of Potential Impact based on Receiver Counts**

3.4.1.1 Potential Impact Rating (PIR) Calculations

The following PIR values have been used to assess the potential impact of each of the Refined Route Options, the larger the PIR the greater the potential impact.

Table 3-10: Overall Potential Impact Rating of the Refined Feasible Route Option design bands for the N16 Sligo to County Boundary:

Option	Potential Impact Rating						Potential Impact Ratings						Potential Impact Rating							
	Southern Section				PIR	PIR	Central Section				PIR	PIR	Northern Section				PIR	PIR	PIR	PIR
	0-50m	50-100m	100-200m	200m-300m	Sub-Total	RANK	0-50m	50-100m	100-200m	200m-300m	Sub-Total	RANK	0-50m	50-100m	100-200m	200m-300m	Sub-Total	RANK	TOTAL	RANK
Opt 1A-v2	60	24	22	19	125	1	16	18	10	0	44	5	12	12	12	10	46	2	215	3
Opt 1A+1B-v2	268	264	378	227	1137	7	16	18	10	0	44	5	12	12	12	10	46	2	1227	6
Opt 2A-v2	16	60	138	93	307	5	12	3	18	0	33	1	12	12	12	10	46	2	386	5
Opt 2A+2B-v2	188	270	462	254	1174	8	12	3	18	0	33	1	12	12	12	10	46	2	1253	7
Opt 5	8	60	54	9	131	4	12	3	18	0	33	1	12	12	12	10	46	2	210	1
Opt 8-v2	24	24	52	30	130	2	12	24	8	0	44	5	12	12	12	10	46	2	220	4
Opt 12	24	24	52	30	130	2	12	21	10	0	43	4	12	12	6	11	41	1	214	2
Opt 13	208	228	282	110	828	6													828	
Existing N16	164	117	96	35	412		24	9	4	4	41		20	9	10	7	46		499	

Table 3-11: Overall Potential Impact Rating of the Refined Feasible Route Options for the N16 Sligo to County Boundary from the commencement of all feasible route options from the existing N16's junction with the N4/N15:

Option	Potential Impact Rating						Potential Impact Ratings						Potential Impact Rating							
	Southern Section				PIR	PIR	Central Section				PIR	PIR	Northern Section				PIR	PIR	PIR	PIR
	0-50m	50-100m	100-200m	200m-300m	Sub-Total	RANK	0-50m	50-100m	100-200m	200m-300m	Sub-Total	RANK	0-50m	50-100m	100-200m	200m-300m	Sub-Total	RANK	TOTAL	RANK
Opt 1A-v2	272	264	378	227	1141	5	16	18	10	0	44	5	12	12	12	10	46	2	1231	4
Opt 1A+1B-v2	268	264	378	227	1137	4	16	18	10	0	44	5	12	12	12	10	46	2	1227	3
Opt 2A-v2	192	270	462	295	1219	7	12	3	18	0	33	1	12	12	12	10	46	2	1298	6
Opt 2A+2B-v2	188	270	462	254	1174	6	12	3	18	0	33	1	12	12	12	10	46	2	1253	5
Opt 5	488	426	528	244	1686	8	12	3	18	0	33	1	12	12	12	10	46	2	1765	7
Opt 8-v2	504	24	52	30	610	1	12	24	8	0	44	5	12	12	12	10	46	2	700	2
Opt 12	504	24	52	30	610	1	12	21	10	0	43	4	12	12	6	11	41	1	694	1
Opt 13	208	228	282	110	828	3													828	
Existing N16	644	483	570	270	1967		24	9	4	4	41		20	9	10	7	46		3609	

3.4.1.2 Discussion of Potential Impact Rating (PIR) Calculations

Based on PIR values of the Feasible Route Options for the N16 Sligo to County Boundary from the commencement of all feasible route options from the existing N16's junction with the N4/N15, as quoted in the tables above, Options 12, 08 and 01A and 01B could be rated as the 1st, 2nd and 3rd best ranked route options in terms of potential noise impact.

Based on PIR values, Options 12 and 08-v2 could be rated as the 1st and 2nd best ranked route options in terms of potential noise impact in the Southern Section of the Feasible Route Options.

Based on PIR values, Options 05, 02B & 02B could be rated as the 1st and 2nd best ranked route options in terms of potential noise impact in the Central Section of the Feasible Route Options.

Based on PIR values, Options 12 and 08 could be rated as the 1st and 2nd best ranked route options in terms of potential noise impact in the Northern Section of the Feasible Route Options.

In summary, based on Potential Impact Rating calculations, Options 5, Route Options 12 and 01A could be rated as the 1st, 2nd and 3rd best ranked route options respectively in terms of potential noise impact.

3.4.2 Assessment of Changes in Traffic Flow

The NRA (TII) Guidelines for the Treatment of Noise & Vibration in National Road Schemes, states that an estimate should be made of the number of receivers where traffic flows are likely to increase or decrease by 25% or more.

As stated above, the traffic flow data for all Options indicate that there will be a very significant reduction in traffic volumes experienced on the existing N16 with the 'central section' and 'northern section' of the proposed N16 realignment in operation. Future traffic volumes of less than 10% of the existing traffic volumes will be experienced on the existing N16 for all options except Options 01A, 01B, 02A and 02B. In terms of changes in traffic flow data, the potential noise impact will be beneficial to noise sensitive receivers located in close proximity to the existing N16 alignment, where the proposed N16 realignment will be further removed from their property. However, in many areas of the 'central section' and 'northern section' of the proposed N16 realignment, the Options do not significantly deviate away from the existing N16 alignment.

Significant changes in traffic flow on various road links of the existing and proposed road design network are predicted to occur for the various Options in the 'southern section' of the proposed N16 realignment for all of the route options assessed.

3.4.3 Assessment of Likely Need for Mitigation Measures

As stated above, during the course of the detailed assessment of the preferred route option (at the next stage of the design process), the noise impact assessment methodology and detailed mitigation design will include for the use of noise prediction modelling software. Accurate noise impact prediction and subsequently noise mitigation design will be completed using the noise prediction modelling approach described.

A prediction of the likely noise levels at receivers in proximity to the refined route options has been undertaken using the *Calculation for Road Traffic Noise* (CRTN) calculation methodology and CadnaA noise modelling software. The predicted noise levels at receivers in proximity to the refined route

options have been used to give an initial indication of where noise mitigation measures are likely to be necessary in order to achieve the design goal of 60dB L_{den} or less at each receiver.

Table 3-12: Number of receivers in proximity to the proposed N16 in excess of the design goal of 60dB L_{den} where noise mitigation measures are likely to be necessary in order to achieve the design goal of 60dB L_{den} or less at each receiver.

Option No.	Possible Number of Receivers at which Noise Mitigation Measures may be required
Opt 1A-v2	9
Opt 1A+1B-v2	9
Opt 2A-v2	20
Opt 2A+2B-v2	20
Opt 5	6
Opt 8-v2	8
Opt 12-v2	6

3.4.4 Summary of Preferred Refined Route Options & Conclusions

Based on the three elements of Route Corridor Selection outlined in The NRA Guidelines for the Treatment of Noise & Vibration in National Road Schemes, including an assessment of potential impact rating (PIR) based upon property counts, a consideration of likely changes in traffic flow, and a review of the need for and difficulties associated with noise mitigation measures, the best ranked option may be deemed to be Option 5.

Table 3-13: Summary of preferred refined route options

Option No.	Preference
Opt 1A-v2	High Preference
Opt 1A+1B-v2	Medium Preference
Opt 2A-v2	Medium Preference
Opt 2A+2B-v2	Medium Preference
Opt 5	Very High Preference
Opt 8-v2	Medium Preference
Opt 12-v2	High Preference

In the Southern Section, based on the three elements of Route Corridor Selection outlined in The NRA (TII) Guidelines, the best ranked options may be deemed to be Options 1A, 05, 08-V2 and 12.

Table 3-14: Summary of preferred refined route options – Southern Section

Option No.	Preference
Opt 1A-v2	High Preference
Opt 1A+1B-v2	Low Preference
Opt 2A-v2	Medium Preference
Opt 2A+2B-v2	Medium Preference
Opt 5	High Preference
Opt 8-v2	High Preference
Opt 12	High Preference

In the Central Section, based on the three elements of Route Corridor Selection outlined in The NRA (TII) Guidelines, the best ranked options may be deemed to be Options 2A-V2, 2B-V2 and 05.

Table 3-15: Summary of preferred refined route options – Central Section

Option No.	Preference
Opt 1A-v2	Medium Preference
Opt 1A+1B-v2	Medium Preference
Opt 2A-v2	High Preference
Opt 2A+2B-v2	High Preference
Opt 5-v2	High Preference
Opt 8-v2	Medium Preference
Opt 12	Medium Preference

In the Northern Section, based on the three elements of Route Corridor Selection outlined in The NRA (TII) Guidelines, the best ranked options may be deemed to be Option 12.

Table 3-16: Summary of preferred refined route options – Northern Section

Option No.	Preference
Opt 1A-v2	Medium Preference
Opt 1A+1B-v2	Medium Preference
Opt 2A-v2	Medium Preference
Opt 2A+2B-v2	Medium Preference
Opt 5-v2	Medium Preference
Opt 8-v2	Medium Preference
Opt 12	High Preference

Table 3-17: Summary of Refined Route Options (Noise)

Section	Refined Route Option													
	1A (v2)	1A/B (v2)	2A (v2)	2A/B (v2)	3	4	5	6	7	8 (v2)	9	10	11	12
South	2	4	3	3	n/a	n/a	2	n/a	n/a	ref 12	n/a	n/a	n/a	2
Central	ref 8-v2	ref 8-v2	ref 5	ref 5	n/a	n/a	2	n/a	n/a	3	n/a	n/a	n/a	3
North	ref 8-v2	ref 8-v2	ref 8-v2	ref 8-v2	n/a	n/a	ref 8-v2	n/a	n/a	3	n/a	n/a	n/a	2
Overall	2	3	3	3	n/a	n/a	1	n/a	n/a	3	n/a	n/a	n/a	2

4 Air Quality and Climate

4.1 Introduction

This section of the Route Selection Report assesses and evaluates the potential air quality and climate impacts for the N16 Sligo to County Boundary Realignment.

This assessment focuses on the potential air quality and climate impacts along the various route corridors and tries to quantify and qualify these constraints as appropriate to reach a conclusion on the most acceptable route in air quality and climate terms.

4.2 Methodology

This assessment has been completed in accordance with the following relevant guidance notes;

- NRA (now TII) Guidelines for the Treatment of Air Quality in National Road Schemes during the Planning and Construction of National Road Schemes (Revised May 2011);

The Guidelines for the Treatment of Air Quality in National Road Schemes state that "the work undertaken as part of the Constraints Study (Stage 1) is used by the project engineers responsible to refine the broad corridor into a small number of route corridor options. The National Roads Project Management Guidelines state that the purpose of Route Corridor Selection is to "carry out a detailed technical evaluation of the scheme corridor. The route selection process involves ….[the] identification and investigation of Route Options, assessment of Environmental Impacts for each option…". This evaluation in turn leads to the production of a Route Corridor Selection Report".

In accordance with the NRA (TII) Guidelines for the Treatment of Air Quality in National Road Schemes during the Planning and Construction of National Road Schemes (2011), the following are considered as part of a Stage 2 assessment:

- Changes to baseline air quality conditions noted in the Stage 1 assessment;
- Calculation of the index of overall change in exposure for the existing route and each route option in the opening year;
- Calculation of local-scale pollutant concentrations; and
- Impacts on sensitive ecosystems.

Once these four elements have received detailed consideration, route options should be ranked with respect to air quality and climate.

A full route selection analysis (as per the NRA (TII) guidelines) of the Feasible Route Options for the N16 Sligo to County Boundary Realignment is presented in this chapter.

4.3 Route Selection Assessment

4.3.1 **Changes to baseline air quality conditions since Stage 1 assessment**

No changes to the baseline assessment prepared as part of the Stage 1 Constraints Study is required.

4.3.2 Calculation of the index for overall change in exposure

Calculation of the Index of Overall Change in Exposure allows a comparison of the overall impact on people of each route option to be carried out. The Index is based on taking the number of sensitive receptor locations within 50m of the carriageway of all road links that would experience a significant change in traffic for each of the route options. Fifty metres represents the distance within which detectable impacts of a road might be found, while a significant change can be considered to be an increase or decrease in traffic emissions of 10% or more. The number of properties is then multiplied by the predicted change in the emission rate along that link, and then summed across all links for the Route Options. The changes in emissions will be influenced by changes in traffic flow, composition and speed.

The assessment of the calculation of the index for overall change in exposure is completed using the UK DMRB assessment for regional assessment. The index of overall change in exposure is calculated for NO_2 and PM_{10} for the different route options.

A negative Index score indicates that there would be an overall reduction in exposure to pollution, i.e. a benefit, a positive Index score indicates an increase in exposure to pollution, i.e. adverse impact.

The results of the overall change in exposure is provided in the following tables for each route option for nitrogen oxides and for particulate matter (PM_{10}).

Table 4-1: Route Option 1A NOx index

Link Name	Properties within 50m	Link Length (m)	Do-Minimum Emissions (Kg/yr)	Do Something Emissions (Kg/yr)	Change in Emissions (Kg/yr)	Change in Emissions (%)	Change in NOx Emission rate (Kg/Km/yr)	NOx Index
Option 1A - 1	2	0.98	0	32	32	100.0	32.8	65.5
Option 1A - 2	2	3.93	0	2,378	2,378	100.0	605.8	1211.7
Option 1A - 3	4	2.22	0	1,738	1,738	100.0	782.9	3131.8
Option 1A - 4 (Ballytivnan Rd/Avondale)	69	0.67	420	530	110	20.7	164.1	11321.9
Option 1A - 5 (Old Bundoran Rd 1)	131	0.84	417	556	140	25.1	166.2	21769.9
Option 1A - 6 (Old Bundoran Rd 2)	24	1.64	170	775	605	78.0	369.9	8878.4
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	1,012	1,108	96	8.7	118.7	3325.0
N16 - EX Link 2 - N16/R286 Jtn to Abbvie Rbt	78	0.85	419	351	-68	-19.4	-80.3	-6261.5
N16 - EX Link 3	52	6.22	2,671	2,137	-534	-25.0	-85.9	-4465.6
N16 - EX Link 4	6	2.28	979	39	-940	-2394.4	-412.2	-2473.1
TOTAL			6088.5	9644.9				36503.9

Table 4-2: Route Option 2A NOx index

Link Name	Properties within 50m	Link Length (m)	Do-Minimum Emissions (Kg/yr)	Do Something Emissions (Kg/yr)	Change in Emissions (Kg/yr)	Change in Emissions (%)	Change in NOx Emission rate (Kg/Km/yr)	NOx Index
Option 2A - 1	2	0.70	0	80	80	100.0	114.7	229.3
Option 2A - 2	1	1.29	0	547	547	100.0	425.9	425.9
Option 2A - 3	0	1.44	0	759	759	100.0	527.0	0.0
Option 2A - 4	9	4.75	0	2,609	2,609	100.0	549.2	4943.1
Option 2A - 5 (Ballytivnan Rd)	44	0.48	234	256	22	8.5	45.9	2018.4
Option 2A - 6 (Avondale)	27	0.19	144	169	25	14.7	130.5	3523.6
Option 2A - 7 (Old Bundoran rd)	126	0.74	367	430	63	14.7	85.4	10762.1
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	1,141	1,108	-33	-3.0	-40.6	-1135.9
N16 - EX Link 2 - N16/R286 Jtn to Abbvie Rbt	78	0.85	419	361	-58	-16.2	-68.8	-5367.0
N16 - EX Link 3	45	3.49	1,499	1,156	-343	-29.6	-98.1	-4416.6
N16 - EX Link 4	12	5.01	2,151	86	-2,065	-2394.4	-412.2	-4946.1
TOTAL			5955.7	7561.9				6036.7

Table 4-3: Route Option 2B NOx index

Link Name	Properties within 50m	Link Length (m)	Do-Minimum Emissions (Kg/yr)	Do Something Emissions (Kg/yr)	Change in Emissions (Kg/yr)	Change in Emissions (%)	Change in NOx Emission rate (Kg/Km/yr)	NOx Index
Option 2A - 1	2	0.70	0	11	11	100.0	16.4	32.8
Option 2A - 2	1	1.29	0	547	547	100.0	425.9	425.9
Option 2A - 3	0	1.44	0	759	759	100.0	527.0	0.0
Option 2A - 4	9	4.75	0	3,205	3,205	100.0	674.8	6073.5
Option 2A - 5	44	0.48	234	387	153	39.4	321.1	14128.6
Option 2A - 6	27	0.19	144	249	105	42.1	552.4	14915.8
Option 2A - 7	126	0.74	367	478	111	23.2	149.5	18841.5
Option 2B - 1	63	1.23	2,335	1,897	-438	-23.1	-355.9	-22423.0
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	1,012	982	-30	-3.0	-36.7	-1028.9
N16 - EX Link 2 - N16/R286 Jtn to Abbvie Rbt	78	0.85	419	361	-58	-16.2	-68.8	-5367.0
N16 - EX Link 3	45	3.49	1,499	1,156	-343	-29.6	-98.1	-4416.6
N16 - EX Link 4	12	5.01	2,151	86	-2,065	-2394.4	-412.2	-4946.1
TOTAL			8161.5	10119.2				16236.4

Table 4-4: Route Option 3 NOx index

Link Name	Properties within 50m	Link Length (m)	Do-Minimum Emissions (Kg/yr)	Do Something Emissions (Kg/yr)	Change in Emissions (Kg/yr)	Change in Emissions (%)	Change in NOx Emission rate (Kg/Km/yr)	NOx Index
Option 3-1	9	0.24	107	230	123	53.6	513.8	4624.0
Option 3-2	36	0.63	0	148	148	100.0	235.0	8459.9
Option 3-3	1	0.43	0	188	188	100.0	442.8	442.8
Option 3-4	0	0.79	0	225	225	100.0	285.0	0.0
Option 3-5	0	2.24	0	1,620	1,620	100.0	723.4	0.0
Option 3-6	6	4.75	0	3,540	3,540	100.0	745.3	4471.6
Option 3-7 (Avondale)	27	0.18	137	223	86	38.6	478.2	12912.6
Option 3-8(Ballytivnan Rd)	44	0.48	269	435	166	38.2	346.1	15230.0
Option 2B-1	47	0.69	1,310	1,091	-218	-20.0	-316.4	-14869.5
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	1,012	1,002	-10	-1.0	-12.2	-343.0
N16 - EX Link 2 - N16/R286 Jtn to Abbvie Rbt	78	0.85	419	283	-136	-48.3	-160.6	-12523.1
N16 - EX Link 3	45	3.49	1,499	60	-1,438	-2394.4	-412.2	-18547.9
N16 - EX Link 4	12	5.01	2,151	86	-2,065	-2394.4	-412.2	-4946.1
TOTAL			6903.1	9132.1				-5088.6

Table 4-5: Route Option 4 NOx index

Link Name	Properties within 50m	Link Length (m)	Do-Minimum Emissions (Kg/yr)	Do Something Emissions (Kg/yr)	Change in Emissions (Kg/yr)	Change in Emissions (%)	Change in NOx Emission rate (Kg/Km/yr)	NOx Index
Option 4-1	9	0.24	107	230	123	53.6	513.8	4624.0
Option 4-2	36	0.63	0	148	148	100.0	235.0	8459.9
Option 4-3	1	0.43	0	188	188	100.0	442.8	442.8
Option 4-4	0	0.79	0	225	225	100.0	285.0	0.0
Option 4-5	0	2.24	0	1,620	1,620	100.0	723.4	0.0
Option 4-6	5	4.75	0	3,540	3,540	100.0	745.3	3726.4
Option 4-7	27	0.18	137	223	86	38.6	478.2	12912.6
Option 4-8	44	0.48	269	435	166	38.2	346.1	15230.0
Option 2B-1	47	0.69	1,310	1,091	-218	-20.0	-316.4	-14869.5
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	1,012	1,002	-10	-1.0	-12.2	-343.0
N16 - EX Link 2 - N16/R286 Jtn to Abbvie Rbt	78	0.85	419	283	-136	-48.3	-160.6	-12523.1
N16 - EX Link 3	45	3.49	1,499	60	-1,438	-2394.4	-412.2	-18547.9
N16 - EX Link 4	12	5.01	2,151	86	-2,065	-2394.4	-412.2	-4946.1
TOTAL			6903.1	9132.1				-5833.9

Table 4-6: Route Option 5 NOx index

Link Name	Properties within 50m	Link Length (m)	Do-Minimum Emissions (Kg/yr)	Do Something Emissions (Kg/yr)	Change in Emissions (Kg/yr)	Change in Emissions (%)	Change in NOx Emission rate (Kg/Km/yr)	NOx Index
Option 5 - 1	2	1.20	0	1,289	1,289	100.0	1074.1	2148.1
Option 5 - 2	2	1.95	0	1,437	1,437	100.0	736.9	1473.8
Option 5 - 3	4	4.50	0	3,523	3,523	100.0	782.9	3131.8
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	0	1,042	1,042	100.0	1286.1	36012.0
N16 - EX Link 2 - N16/R286 Jtn to Abbvie Rbt	78	0.85	0	758	758	100.0	891.6	69546.7
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	1,012	0	-1,012	100.0	-1249.4	-34983.1
N16 - EX Link 2 - N16/R286 Jtn to Abbvie Rbt	78	0.85	562	0	-562	100.0	-661.0	-51560.5
N16 - EX Link 3	30	1.43	797	25	-773	-3138.8	-540.3	-16209.6
N16 - EX Link 4	16	2.28	1,271	39	-1,232	-3138.8	-540.3	-8645.1
N16 - EX Link 5	12	4.80	2,676	83	-2,594	-3138.8	-540.3	-6483.8
TOTAL			6318.5	8195.2				-5569.7

Table 4-7: Route Option 6 NOx index

Link Name	Properties within 50m	Link Length (m)	Do-Minimum Emissions (Kg/yr)	Do Something Emissions (Kg/yr)	Change in Emissions (Kg/yr)	Change in Emissions (%)	Change in NOx Emission rate (Kg/Km/yr)	NOx Index
Option 6 - 1	7	1.40	0	1,096	1,096	100.0	782.9	5480.6
Option 6 - 2	2	1.90	0	1,400	1,400	100.0	736.9	1473.8
Option 6 - 3	4	4.59	0	3,594	3,594	100.0	782.9	3131.8
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	0	1,022	1,022	100.0	1261.6	35326.0
N16 - EX Link 2 - N16/R286 Jtn to Abbvie Rbt	78	0.85	0	758	758	100.0	891.6	69546.7
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	1,012	0	-1,012	100.0	-1249.4	-34983.1
N16 - EX Link 2 - N16/R286 Jtn to Abbvie Rbt	78	0.85	562	0	-562	100.0	-661.0	-51560.5
N16 - EX Link 3	30	1.40	781	24	-756	-3138.8	-540.3	-16209.6
N16 - EX Link 4	16	2.24	1,247	38	-1,208	-3138.8	-540.3	-8645.1
N16 - EX Link 5	12	4.88	2,718	84	-2,634	-3138.8	-540.3	-6483.8
TOTAL			6319.1	8016.2				-2923.2

Table 4-8: Route Option 7 NOx index

Link Name	Properties within 50m	Link Length (m)	Do-Minimum Emissions (Kg/yr)	Do Something Emissions (Kg/yr)	Change in Emissions (Kg/yr)	Change in Emissions (%)	Change in NOx Emission rate (Kg/Km/yr)	NOx Index
Option 7 - 1	10	1.73	0	1,739	1,739	100.0	1008.3	10083.1
Option 7 - 2	0	1.67	0	1,537	1,537	100.0	920.6	0.0
Option 7 - 3	8	4.73	0	3,703	3,703	100.0	782.9	6263.5
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	0	1,042	1,042	100.0	1286.1	36012.0
N16 - EX Link 2 - N16/R286 Jtn to Abbvie Rbt	78	0.85	0	732	732	100.0	860.9	67148.6
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	1,012	0	-1,012	100.0	-1249.4	-34983.1
N16 - EX Link 2 - N16/R286 Jtn to Abbvie Rbt	78	0.85	562	0	-562	100.0	-661.0	-51560.5
N16 - EX Link 3	45	3.49	1,946	60	-1,886	-3138.8	-540.3	-24314.3
N16 - EX Link 4	12	5.02	2,799	86	-2,712	-3138.8	-540.3	-6483.8
TOTAL			6318.5	8900.1				2165.4

Table 4-9: Route Option 8 NOx index

Link Name	Properties within 50m	Link Length (m)	Do-Minimum Emissions (Kg/yr)	Do Something Emissions (Kg/yr)	Change in Emissions (Kg/yr)	Change in Emissions (%)	Change in NOx Emission rate (Kg/Km/yr)	NOx Index
Option 8 - 1	6	1.73	0	1,739	1,739	100.0	1008.3	6049.8
Option 8 - 2	0	1.67	0	1,537	1,537	100.0	920.6	0.0
Option 8 - 3	8	4.73	0	3,703	3,703	100.0	782.9	6263.5
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	0	1,042	1,042	100.0	1286.1	36012.0
N16 - EX Link 2 - N16/R286 Jtn to Abbvie Rbt	78	0.85	0	732	732	100.0	860.9	67148.6
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	1,012	0	-1,012	100.0	-1249.4	-34983.1
N16 - EX Link 2 - N16/R286 Jtn to Abbvie Rbt	78	0.85	562	0	-562	100.0	-661.0	-51560.5
N16 - EX Link 3	45	3.49	1,946	60	-1,886	-3138.8	-540.3	-24314.3
N16 - EX Link 4	12	5.02	2,799	86	-2,712	-3138.8	-540.3	-6483.8
TOTAL			6318.5	8900.1				-1867.8

Table 4-10: Route Option 9 NOx index

Link Name	Properties within 50m	Link Length (m)	Do-Minimum Emissions (Kg/yr)	Do Something Emissions (Kg/yr)	Change in Emissions (Kg/yr)	Change in Emissions (%)	Change in NOx Emission rate (Kg/Km/yr)	NOx Index
Option 9 - 1	7	1.73	0	1,739	1,739	100.0	1008.3	7058.2
Option 9 - 2	1	1.67	0	1,537	1,537	100.0	920.6	920.6
Option 9 - 3	9	4.73	0	3,703	3,703	100.0	782.9	7046.5
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	0	1,042	1,042	100.0	1286.1	36012.0
N16 - EX Link 2 - N16/R286 Jtn to Abbvie Rbt	78	0.85	0	732	732	100.0	860.9	67148.6
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	1,012	0	-1,012	100.0	-1249.4	-34983.1
N16 - EX Link 2 - N16/R286 Jtn to Abbvie Rbt	78	0.85	562	0	-562	100.0	-661.0	-51560.5
N16 - EX Link 3	45	3.49	1,946	60	-1,886	-3138.8	-540.3	-24314.3
N16 - EX Link 4	12	5.02	2,799	86	-2,712	-3138.8	-540.3	-6483.8
TOTAL			6318.5	8900.1				844.0

Table 4-11: Route Option 10 NOx index

Link Name	Properties within 50m	Link Length (m)	Do-Minimum Emissions (Kg/yr)	Do Something Emissions (Kg/yr)	Change in Emissions (Kg/yr)	Change in Emissions (%)	Change in NOx Emission rate (Kg/Km/yr)	NOx Index
Option 10-1	9	0.24	107	230	123	53.6	513.8	4624.0
Option 10-2	36	0.63	0	148	148	100.0	235.0	8459.9
Option 10-3	1	0.43	0	188	188	100.0	442.8	442.8
Option 10-4	0	0.79	0	225	225	100.0	285.0	0.0
Option 10-5	0	2.24	0	1,620	1,620	100.0	723.4	0.0
Option 10-6	2	4.75	0	3,540	3,540	100.0	745.3	1490.5
Option 10-7	27	0.18	137	223	86	38.6	478.2	12912.6
Option 10-8	44	0.48	269	435	166	38.2	346.1	15230.0
Option 2B-1	47	0.69	1,310	1,091	-218	-20.0	-316.4	-14869.5
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	1,012	1,002	-10	-1.0	-12.2	-343.0
N16 - EX Link 2 - N16/R286 Jtn to Abbvie Rbt	78	0.85	419	283	-136	-48.3	-160.6	-12523.1
N16 - EX Link 3	45	3.49	1,499	60	-1,438	-2394.4	-412.2	-18547.9
N16 - EX Link 4	12	5.01	2,151	86	-2,065	-2394.4	-412.2	-4946.1
TOTAL			6903.1	9132.1				-8069.7

Table 4-12: Route Option 11 NOx index

Link Name	Properties within 50m	Link Length (m)	Do-Minimum Emissions (Kg/yr)	Do Something Emissions (Kg/yr)	Change in Emissions (Kg/yr)	Change in Emissions (%)	Change in NOx Emission rate (Kg/Km/yr)	NOx Index
Option 11-1	9	0.24	107	230	123	53.6	513.8	4624.0
Option 11-2	36	0.63	0	148	148	100.0	235.0	8459.9
Option 11-3	1	0.43	0	188	188	100.0	442.8	442.8
Option 11-4	0	0.79	0	225	225	100.0	285.0	0.0
Option 11-5	0	2.24	0	1,620	1,620	100.0	723.4	0.0
Option 11-6	5	4.75	0	3,540	3,540	100.0	745.3	3726.4
Option 11-7	27	0.18	137	223	86	38.6	478.2	12912.6
Option 11-8	44	0.48	269	435	166	38.2	346.1	15230.0
Option 2B-1	47	0.69	1,310	1,091	-218	-20.0	-316.4	-14869.5
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	1,012	1,002	-10	-1.0	-12.2	-343.0
N16 - EX Link 2 - N16/R286 Jtn to Abbvie Rbt	78	0.85	419	283	-136	-48.3	-160.6	-12523.1
N16 - EX Link 3	45	3.49	1,499	60	-1,438	-2394.4	-412.2	-18547.9
N16 - EX Link 4	12	5.01	2,151	86	-2,065	-2394.4	-412.2	-4946.1
TOTAL			6903.1	9132.1				-5833.9

Table 4-13: Route Option 1A PM_{10} index

Link Name	Properties within 50m	Link Length (m)	Do-Minimum Emissions (Kg/yr)	Do Something Emissions (Kg/yr)	Change in Emissions (Kg/yr)	Change in Emissions (%)	Change in PM_{10} Emission rate (Kg/Km/yr)	PM_{10} Index
Option 1A - 1	2	0.98	0	1	1	100.0	1.2	2.4
Option 1A - 2	2	3.93	0	66	66	100.0	16.7	33.4
Option 1A - 3	4	2.22	0	51	51	100.0	22.9	91.7
Option 1A - 4 (Ballytivnan Rd/Avondale)	69	0.67	11	13	2	16.2	3.2	219.9
Option 1A - 5 (Old Bundoran Rd 1)	131	0.84	11	14	3	20.8	3.4	448.6
Option 1A - 6 (Old Bundoran Rd 2)	24	1.64	5	19	14	74.6	8.6	205.5
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	29	31	2	5.3	2.0	56.6
N16 - EX Link 2 - N16/R286 Jtn to Abbvie Rbt	78	0.85	13	11	-2	-19.4	-2.4	-189.1
N16 - EX Link 3	52	6.22	78	62	-16	-25.0	-2.5	-130.2
N16 - EX Link 4	6	2.28	29	1	-27	-1839.5	-11.9	-71.3
TOTAL			175.2	268.8				667.4

Table 4-14: Route Option 2A PM_{10} index

Link Name	Properties within 50m	Link Length (m)	Do-Minimum Emissions (Kg/yr)	Do Something Emissions (Kg/yr)	Change in Emissions (Kg/yr)	Change in Emissions (%)	Change in PM_{10} Emission rate (Kg/Km/yr)	PM_{10} Index
Option 2A - 1	2	0.70	0	3	3	100.0	4.2	8.5
Option 2A - 2	1	1.29	0	20	20	100.0	15.8	15.8
Option 2A - 3	0	1.44	0	20	20	100.0	14.2	0.0
Option 2A - 4	9	4.75	0	65	65	100.0	13.6	122.7
Option 2A - 5 (Ballytivnan Rd)	44	0.48	7	8	1	8.5	1.4	61.0
Option 2A - 6 (Avondale)	27	0.19	4	4	1	12.0	2.8	75.5
Option 2A - 7 (Old Bundoran rd)	126	0.74	10	11	1	9.8	1.4	178.9
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	31	31	0	0.4	0.2	4.7
N16 - EX Link 2 - N16/R286 Jtn to Abbvie Rbt	78	0.85	13	11	-2	-16.2	-2.1	-162.1
N16 - EX Link 3	45	3.49	44	34	-10	-29.6	-2.9	-128.8
N16 - EX Link 4	12	5.01	63	3	-60	-1839.5	-11.9	-142.5
TOTAL			170.6	210.1				33.5

Table 4-15: Route Option 2B PM_{10} index

Link Name	Properties within 50m	Link Length (m)	Do-Minimum Emissions (Kg/yr)	Do Something Emissions (Kg/yr)	Change in Emissions (Kg/yr)	Change in Emissions (%)	Change in PM_{10} Emission rate (Kg/Km/yr)	PM_{10} Index
Option 2A - 1	2	0.70	0	0	0	100.0	0.6	1.2
Option 2A - 2	1	1.29	0	20	20	100.0	15.8	15.8
Option 2A - 3	0	1.44	0	20	20	100.0	14.2	0.0
Option 2A - 4	9	4.75	0	79	79	100.0	16.5	148.8
Option 2A - 5	44	0.48	7	12	5	39.4	9.7	426.7
Option 2A - 6	27	0.19	4	7	3	42.1	14.9	403.5
Option 2A - 7	126	0.74	10	12	3	20.9	3.4	433.9
Option 2B - 1	63	1.23	70	56	-13	-23.1	-10.6	-667.7
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	29	29	-1	-3.0	-1.1	-29.9
N16 - EX Link 2 - N16/R286 Jtn to Abbvie Rbt	78	0.85	13	11	-2	-16.2	-2.1	-162.1
N16 - EX Link 3	45	3.49	44	34	-10	-29.6	-2.9	-128.8
N16 - EX Link 4	12	5.01	63	3	-60	-1839.5	-11.9	-142.5
TOTAL			238.6	283.1				299.0

Table 4-16: Route Option 3 PM_{10} index

Link Name	Properties within 50m	Link Length (m)	Do-Minimum Emissions (Kg/yr)	Do Something Emissions (Kg/yr)	Change in Emissions (Kg/yr)	Change in Emissions (%)	Change in PM_{10} Emission rate (Kg/Km/yr)	PM_{10} Index
Option 3-1	9	0.24	3	7	4	53.6	14.8	133.5
Option 3-2	36	0.63	0	4	4	100.0	5.9	210.9
Option 3-3	1	0.43	0	5	5	100.0	11.4	11.4
Option 3-4	0	0.79	0	7	7	100.0	8.6	0.0
Option 3-5	0	2.24	0	49	49	100.0	21.9	0.0
Option 3-6	6	4.75	0	107	107	100.0	22.5	135.2
Option 3-7 (Avondale)	27	0.18	4	6	3	40.7	14.1	380.2
Option 3-8(Ballytivnan Rd)	44	0.48	8	13	5	40.4	10.6	467.7
Option 2B-1	47	0.69	39	33	-7	-20.0	-9.4	-442.8
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	29	29	0	-1.0	-0.4	-10.0
N16 - EX Link 2 - N16/R286 Jtn to Abbvie Rbt	78	0.85	13	9	-4	-48.3	-4.8	-378.2
N16 - EX Link 3	45	3.49	44	2	-41	-1839.5	-11.9	-534.5
N16 - EX Link 4	12	5.01	63	3	-60	-1839.5	-11.9	-142.5
TOTAL			201.8	272.5				-169.1

Table 4-17: Route Option 4 PM_{10} index

Link Name	Properties within 50m	Link Length (m)	Do-Minimum Emissions (Kg/yr)	Do Something Emissions (Kg/yr)	Change in Emissions (Kg/yr)	Change in Emissions (%)	Change in PM_{10} Emission rate (Kg/Km/yr)	PM_{10} Index
Option 4-1	9	0.24	3	7	4	53.6	14.8	133.5
Option 4-2	36	0.63	0	4	4	100.0	5.9	210.9
Option 4-3	1	0.43	0	5	5	100.0	11.4	11.4
Option 4-4	0	0.79	0	7	7	100.0	8.6	0.0
Option 4-5	0	2.24	0	49	49	100.0	21.9	0.0
Option 4-6	5	4.75	0	107	107	100.0	22.5	112.7
Option 4-7	27	0.18	4	6	3	40.7	14.1	380.2
Option 4-8	44	0.48	8	13	5	40.4	10.6	467.7
Option 2B-1	47	0.69	39	33	-7	-20.0	-9.4	-442.8
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	29	29	0	-1.0	-0.4	-10.0
N16 - EX Link 2 - N16/R286 Jtn to Abbvie Rbt	78	0.85	13	9	-4	-48.3	-4.8	-378.2
N16 - EX Link 3	45	3.49	44	2	-41	-1839.5	-11.9	-534.5
N16 - EX Link 4	12	5.01	63	3	-60	-1839.5	-11.9	-142.5
TOTAL			201.8	272.5				-191.6

Table 4-18: Route Option 5 PM_{10} index

Link Name	Properties within 50m	Link Length (m)	Do-Minimum Emissions (Kg/yr)	Do Something Emissions (Kg/yr)	Change in Emissions (Kg/yr)	Change in Emissions (%)	Change in PM_{10} Emission rate (Kg/Km/yr)	PM_{10} Index
Option 5 - 1	2	1.20	0	39	39	100.0	32.5	64.9
Option 5 - 2	2	1.95	0	42	42	100.0	21.6	43.1
Option 5 - 3	4	4.50	0	103	103	100.0	22.9	91.7
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	0	30	30	100.0	37.3	1045.1
N16 - EX Link 2 - N16/R286 Jtn to Abbvie Rbt	78	0.85	0	19	19	100.0	22.7	1772.6
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	29	0	-29	100.0	-36.3	-1015.2
N16 - EX Link 2 - N16/R286 Jtn to Abbvie Rbt	78	0.85	14	0	-14	100.0	-16.8	-1314.1
N16 - EX Link 3	30	1.43	20	1	-19	-2029.0	-13.1	-393.0
N16 - EX Link 4	16	2.28	31	1	-30	-2029.0	-13.1	-209.6
N16 - EX Link 5	12	4.80	66	3	-63	-2029.0	-13.1	-157.2
TOTAL			160.7	239.2				-71.8

Table 4-19: Route Option 6 PM_{10} index

Link Name	Properties within 50m	Link Length (m)	Do-Minimum Emissions (Kg/yr)	Do Something Emissions (Kg/yr)	Change in Emissions (Kg/yr)	Change in Emissions (%)	Change in PM_{10} Emission rate (Kg/Km/yr)	PM_{10} Index
Option 6 - 1	7	1.40	0	32	32	100.0	22.9	160.4
Option 6 - 2	2	1.90	0	41	41	100.0	21.6	43.1
Option 6 - 3	4	4.59	0	105	105	100.0	22.9	91.7
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	0	30	30	100.0	36.6	1025.2
N16 - EX Link 2 - N16/R286 Jtn to Abbvie Rbt	78	0.85	0	19	19	100.0	22.7	1772.6
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	29	0	-29	100.0	-36.3	-1015.2
N16 - EX Link 2 - N16/R286 Jtn to Abbvie Rbt	78	0.85	14	0	-14	100.0	-16.8	-1314.1
N16 - EX Link 3	30	1.40	19	1	-18	-2029.0	-13.1	-393.0
N16 - EX Link 4	16	2.24	31	1	-29	-2029.0	-13.1	-209.6
N16 - EX Link 5	12	4.88	67	3	-64	-2029.0	-13.1	-157.2
TOTAL			160.7	232.7				3.7

Table 4-20: Route Option 7 PM_{10} index

Link Name	Properties within 50m	Link Length (m)	Do-Minimum Emissions (Kg/yr)	Do Something Emissions (Kg/yr)	Change in Emissions (Kg/yr)	Change in Emissions (%)	Change in PM_{10} Emission rate (Kg/Km/yr)	PM_{10} Index
Option 7 - 1	10	1.73	0	53	53	100.0	30.5	304.9
Option 7 - 2	0	1.67	0	46	46	100.0	27.8	0.0
Option 7 - 3	8	4.73	0	108	108	100.0	22.9	183.3
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	0	30	30	100.0	37.3	1045.1
N16 - EX Link 2 - N16/R286 Jtn to Abbvie Rbt	78	0.85	0	19	19	100.0	21.9	1711.4
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	29	0	-29	100.0	-36.3	-1015.2
N16 - EX Link 2 - N16/R286 Jtn to Abbvie Rbt	78	0.85	14	0	-14	100.0	-16.8	-1314.1
N16 - EX Link 3	45	3.49	48	2	-46	-2029.0	-13.1	-589.5
N16 - EX Link 4	12	5.02	69	3	-66	-2029.0	-13.1	-157.2
TOTAL			160.7	261.8				168.6

Table 4-21: Route Option 8 PM_{10} index

Link Name	Properties within 50m	Link Length (m)	Do-Minimum Emissions (Kg/yr)	Do Something Emissions (Kg/yr)	Change in Emissions (Kg/yr)	Change in Emissions (%)	Change in PM_{10} Emission rate (Kg/Km/yr)	PM_{10} Index
Option 8 - 1	6	1.73	0	53	53	100.0	30.5	182.9
Option 8 - 2	0	1.67	0	46	46	100.0	27.8	0.0
Option 8 - 3	8	4.73	0	108	108	100.0	22.9	183.3
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	0	30	30	100.0	37.3	1045.1
N16 - EX Link 2 - N16/R286 Jtn to Abbvie Rbt	78	0.85	0	19	19	100.0	21.9	1711.4
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	29	0	-29	100.0	-36.3	-1015.2
N16 - EX Link 2 - N16/R286 Jtn to Abbvie Rbt	78	0.85	14	0	-14	100.0	-16.8	-1314.1
N16 - EX Link 3	45	3.49	48	2	-46	-2029.0	-13.1	-589.5
N16 - EX Link 4	12	5.02	69	3	-66	-2029.0	-13.1	-157.2
TOTAL			160.7	261.8				46.7

Table 4-22: Route Option 9 PM_{10} index

Link Name	Properties within 50m	Link Length (m)	Do-Minimum Emissions (Kg/yr)	Do Something Emissions (Kg/yr)	Change in Emissions (Kg/yr)	Change in Emissions (%)	Change in PM_{10} Emission rate (Kg/Km/yr)	PM_{10} Index
Option 9 - 1	7	1.73	0	53	53	100.0	30.5	213.4
Option 9 - 2	1	1.67	0	46	46	100.0	27.8	27.8
Option 9 - 3	9	4.73	0	108	108	100.0	22.9	206.2
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	0	30	30	100.0	37.3	1045.1
N16 - EX Link 2 - N16/R286 Jtn to Abbvie Rbt	78	0.85	0	19	19	100.0	21.9	1711.4
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	29	0	-29	100.0	-36.3	-1015.2
N16 - EX Link 2 - N16/R286 Jtn to Abbvie Rbt	78	0.85	14	0	-14	100.0	-16.8	-1314.1
N16 - EX Link 3	45	3.49	48	2	-46	-2029.0	-13.1	-589.5
N16 - EX Link 4	12	5.02	69	3	-66	-2029.0	-13.1	-157.2
TOTAL			160.7	261.8				127.9

Table 4-23: Route Option 10 PM_{10} index

Link Name	Properties within 50m	Link Length (m)	Do-Minimum Emissions (Kg/yr)	Do Something Emissions (Kg/yr)	Change in Emissions (Kg/yr)	Change in Emissions (%)	Change in PM_{10} Emission rate (Kg/Km/yr)	PM_{10} Index
Option 10-1	9	0.24	3	7	4	53.6	14.8	133.5
Option 10-2	36	0.63	0	4	4	100.0	5.9	210.9
Option 10-3	1	0.43	0	5	5	100.0	11.4	11.4
Option 10-4	0	0.79	0	7	7	100.0	8.6	0.0
Option 10-5	0	2.24	0	49	49	100.0	21.9	0.0
Option10-6	2	4.75	0	107	107	100.0	22.5	45.1
Option 10-7	27	0.18	4	6	3	40.7	14.1	380.2
Option 10-8	44	0.48	8	13	5	40.4	10.6	467.7
Option 2B-1	47	0.69	39	33	-7	-20.0	-9.4	-442.8
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	29	29	0	-1.0	-0.4	-10.0
N16 - EX Link 2 - N16/R286 Jtn to Abbvie Rbt	78	0.85	13	9	-4	-48.3	-4.8	-378.2
N16 - EX Link 3	45	3.49	44	2	-41	-1839.5	-11.9	-534.5
N16 - EX Link 4	12	5.01	63	3	-60	-1839.5	-11.9	-142.5
TOTAL			201.8	272.5				-259.2

Table 4-24: Route Option 11 PM_{10} index

Link Name	Properties within 50m	Link Length (m)	Do-Minimum Emissions (Kg/yr)	Do Something Emissions (Kg/yr)	Change in Emissions (Kg/yr)	Change in Emissions (%)	Change in PM_{10} Emission rate (Kg/Km/yr)	PM_{10} Index
Option 11-1	9	0.24	3	7	4	53.6	14.8	133.5
Option 11-2	36	0.63	0	4	4	100.0	5.9	210.9
Option 11-3	1	0.43	0	5	5	100.0	11.4	11.4
Option 11-4	0	0.79	0	7	7	100.0	8.6	0.0
Option 11-5	0	2.24	0	49	49	100.0	21.9	0.0
Option 11-6	5	4.75	0	107	107	100.0	22.5	112.7
Option 11-7	27	0.18	4	6	3	40.7	14.1	380.2
Option 11-8	44	0.48	8	13	5	40.4	10.6	467.7
Option 2B-1	47	0.69	39	33	-7	-20.0	-9.4	-442.8
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	29	29	0	-1.0	-0.4	-10.0
N16 - EX Link 2 - N16/R286 Jtn to Abbvie Rbt	78	0.85	13	9	-4	-48.3	-4.8	-378.2
N16 - EX Link 3	45	3.49	44	2	-41	-1839.5	-11.9	-534.5
N16 - EX Link 4	12	5.01	63	3	-60	-1839.5	-11.9	-142.5
TOTAL			201.8	272.5				-191.6

Table 4-25: Summary of Index of Overall NOx and PM_{10} Exposure for each Route Option.

Option	NOx Exposure Index	Better or Worse	PM_{10} Exposure Index	Better or Worse
Option 1A	36503.9	Worse	667.4	Worse
Option 2A	6036.7	Worse	33.5	Worse
Option 2B	16236.4	Worse	299	Worse
Option 3	-5088.6	Better	-169.1	Better
Option 4	-5833.9	Better	-191.6	Better
Option 5	-5569.7	Better	-71.8	Better
Option 6	-2923.2	Better	3.7	Worse
Option 7	2165.4	Worse	168.6	Worse
Option 8	-1867.8	Better	46.7	Worse
Option 9	844	Worse	127.9	Worse
Option 10	-8069.7	Better	-259.2	Better
Option 11	-5833.9	Better	-191.6	Better

4.3.3 Calculation of the local scale pollutant concentrations

The NRA (TII) guidelines states that if there are sensitive receptors within close proximity to one or more route options, i.e, within 10m the edge of the road, it is necessary to predict pollutant concentrations at Stage 2. The guidance advises that it would be appropriate in these circumstances, to calculate concentrations of both NO_2 and PM_{10} at a small number of 'worst-case' receptors for the year of opening. These predictions should be carried out using the screening model method described in the UK DMRB. Predicted values should then be added to future background levels and compared to air quality standards. Future background levels are calculated based on the NRA (TII) guidance where a factor is applied to determine concentrations in future years.

The DMRB screening model can be run to predict pollutant concentrations at receptor locations near to roads. It can be used to predict annual mean concentrations of nitrogen dioxide (NO_2) and PM_{10}, as well as oxides of nitrogen (NOx), carbon monoxide, benzene and 1,3-butadiene. It also predicts the number of exceedances of 50 $\mu g/m^3$ as a 24-hour mean PM_{10} concentration. The model requires input data on Annual Average Daily Traffic flow (AADT), annual average speeds, the proportion of different vehicle types, the type of road, and the distance from the centre of the road to the receptor.

The method to convert roadside NOx to NO_2 within the DMRB model was based on measurements made between 1999 and 2001. Recent evidence shows that the proportion of primary NO_2 in vehicle exhaust has increased. This means that the relationship between NOx and NO_2 at the roadside has changed from that currently used in the DMRB model. A new NOx to NO_2 calculator is available from the DEFRA website (v4.1, June 2014). The calculator applies to all road types and can also be used to estimate roadside NOx from roadside NO_2 measurements. The use of the DMRB model has been adapted to use the new calculator in accordance with the relevant instructions.

DMRB model validation work carried out by the Highways Agency has indicated that the model may significantly under-predict concentrations of nitrogen dioxide alongside urban city-centre roads classified as 'street canyons'. In this context, a street canyon may be defined as a relatively narrow street with buildings on both sides, where the height of the buildings is generally greater than the width of the road. It has been decided that on review of the streetscapes in proximity to the proposed development that a street canyon effect is unlikely to occur as there are open areas in close proximity to the site.

DEFRA has stated that if the annual mean objectives are not exceeded, it may be confidently assumed that the short-term (1-hour) objectives will also be met. However, if this approach is used, then care must be taken to include relevant locations where the hourly objectives might apply. If the annual mean nitrogen dioxide concentration is greater than 60 µg/m^3, then there is a risk that the 1-hour objective may also be exceeded.

The sensitive residential receptors considered as part of the air quality assessment are the existing residents in the properties in Elm Gardens, Church View, Glendallon and The Woodlands immediately adjacent to Options 03, 04, 10 & 11. Options 03, 04, 10 & 11 will result in an approximate 20% decrease in traffic flow on the existing N16 from the N16-R286 junction at Sligo IT to the roundabout at Abbvie with future traffic volumes of less than 10% of the existing traffic volumes experienced on the existing N16 north of the roundabout at Abbvie. However, Options 03, 04, 10 & 11 will introduce significant additional traffic flows on existing roads in close proximity to the properties at Elm Gardens, Church View, Glendallon and The Woodlands. Options 03, 04, 10 & 11 would result in a 115% increase in traffic flow on a sort section of road off the existing N15.

Based on EPA Air Quality Monitoring Data for similar sized towns in Ireland, conservative background concentrations for NOx, NO_2 and PM_{10} in this residential area of 25 µg/m^3, 20 µg/m^3 and 20 µg/m^3 respectively have been used in the DMRB Screening Assessment. A 'Do Nothing' and 'Do Something' scenario in 2017 have been investigated based on an existing traffic flow of 3,200 AADT and a future traffic flow of 6,900 with 5% HGV.

Table 4-26: Predicted pollutant concentrations at 5m from the proposed Options 3, 4, 10 & 11 at Elm Gardens, Church View, Glendallon and The Woodlands due to traffic emissions.

Scenario	Year	Pollutant concentrations at receptor including Background Concentrations			
		NO_x	NO_2	PM_{10}	
		Annual mean µg/m^3	Annual mean µg/m^3	Annual mean µg/m^3	Days >50 µg/m^3
'Do Minimum'	2017	27.64	20.8	20.26	4
'Do Something'	2017	30.7	21.69	20.57	4
Limit Value		30 µg/m^3 (V)	40 µg/m^3	40 µg/m^3	35

Note: (V) = for the protection of ecosystems.

No exceedance of the Air Quality Standard Regulations 2011 (S.I. No. 180 of 2011) is predicted to occur with Options 03, 04, 10 & 11, other than a potential slight exceedance of the NOx limit for the protection of ecosystems.

No other sensitive receptors are to be within 10m the edge of the road of other route options.

4.3.4 Impacts on Sensitive Ecosystems

The NRA (TII) guidelines states that consideration should be given to all designated sensitive sites that are within 200m of any road that could be affected by the proposed scheme, both during operation and construction. For the purpose of the Route Selection, it should only be necessary to consider roads where there would be a 5% change or greater in traffic flows. For each affected route option nitrogen oxides concentrations and nitrogen deposition rates are calculated within the designated site, in a transect up to 200m away from the road carriageway using the DMRB screening model. The results are then compared with the standard for the protection of vegetation of 30 µg/m3.

Route options 1B and 2B are adjacent to Cummeen Strand/Drumcliffe Bay Special Area of Conservation (SAC) and Cummeen Strand Special Protection Area (SPA). Route options 1B and 2B will follow the existing N15 in proximity to these designated areas and there will not be a greater than 5% additional traffic volume on the Route options 1B and 2B in this area. All route options are in close proximity to the Ben Bulben, Gleniff and Glenade Complex SAC and the Crockauns/Keelogyboy Bogs NHA. As there will not be a greater than 5% additional traffic volume on the route options in this area, there will be no significant impact from the development on designated sites in the study area. Therefore, there will be no significant impact from the development on designated sites in the study area.

4.3.5 Summary of the Best ranked Route Options and Conclusions

The prevailing air quality in the study area is mainly impacted by traffic flows and residential, commercial and industrial activities. The prevailing westerly wind from the Atlantic ensures that the area experiences low background air pollutant concentrations with no exceedance of the the Air Quality Standard Regulations.

Based on the three elements of Route Corridor Selection outlined in Guidelines for the Treatment of Air Quality in National Road Schemes during the Planning and Construction of National Road Schemes (Revised May 2011), the best ranked route option may be deemed to be Option 5.

Table 4-27: Summary of best ranked route options in terms of Overall Exposure for each Route Option

Option No.	Preference
Option 1A	Low Preference
Option 1B	Low Preference
Option 2A	Low Preference
Option 2B	Low Preference
Option 3	Medium Preference
Option 4	Medium Preference
Option 5	High Preference
Option 6	Medium Preference

Option No.	Preference
Option 7	Medium Preference
Option 8	Medium Preference
Option 9	Medium Preference
Option 10	Medium Preference
Option 11	Medium Preference

In the Southern Section, based on the three elements of Route Corridor Selection outlined in The NRA (TII) Guidelines, the best ranked option may be deemed to be Option 05.

Table 4-28: Summary of best ranked Route Options – South

Option No.	Preference
Option 01A	Low Preference
Option 01B	Low Preference
Option 02A	Low Preference
Option 02B	Low Preference
Option 03	Low Preference
Option 04	Low Preference
Option 05	High Preference
Option 06	Medium Preference
Option 07	Medium Preference
Option 08	Medium Preference
Option 09	Medium Preference
Option 10	Low Preference
Option 11	Low Preference

In the Central Section, based on the three elements of Route Corridor Selection outlined in The NRA (TII) Guidelines, there is no best ranked option in comparison to all other options.

Table 4-29: Summary of best ranked Route Options – North

Option No.	Preference
Option 01A	Medium Preference
Option 01B	Medium Preference
Option 02A	Medium Preference

Option No.	Preference
Option 02B	Medium Preference
Option 03	Medium Preference
Option 04	Medium Preference
Option 05	Medium Preference
Option 06	Medium Preference
Option 07	Medium Preference
Option 08	Medium Preference
Option 09	Medium Preference
Option 10	High Preference
Option 11	High Preference

In the Northern Section, based on the three elements of Route Corridor Selection outlined in The NRA (TII) Guidelines, the best ranked option may be deemed to be the offline Options 10 and 11 as they are furthest from receptor locations.

4-30: Summary of Feasible Route Options (Air Quality)

Section	Feasible Route Option												
	1A	1B	2A	2B	3	4	5	6	7	8	9	10	11
South	4	4	4	4	4	4	2	3	3	3	3	4	4
Central	3	3	3	3	3	3	3	3	3	3	3	3	3
North	3	3	3	3	3	3	3	3	3	3	3	2	2
Overall	4	4	4	4	3	3	2	3	3	3	3	3	3

4.4 Refined Route Options

This section assesses the potential air quality and climate impacts of the refined route options set out below that were identified through the route option appraisal process.

4.4.1 **Calculation of the index for overall change in exposure**

A Calculation of the Index of Overall Change in Exposure for each of the Refined Route Options has allowed for a comparison of the overall impact on people of each route option to be carried out. The Index is based on taking the number of sensitive receptor locations within 50m of the carriageway of all road links that would experience a significant change in traffic for each of the route options.

The refined route options have been re-aligned and changes in emissions will be influenced by the changes in predicted traffic flow numbers and composition as provided at this refined assessment stage. The slightly re-aligned refined route options have also resulted in changes in the number of properties within 50m of the route options.

A negative index score indicates that there would be an overall reduction in exposure to pollution, i.e. a benefit, a positive Index score indicates an increase in exposure to pollution, i.e. adverse impact.

The results of the overall change in exposure, is provided in the following tables for each refined route option for nitrogen oxides and for particulate matter.

Table 4-31: Route Option 1A(V2) NOx index

Link Name	Properties within 50m	Link Length (m)	Do-Minimum	Do Something	Change in Emissions (Kg/yr)	Change in Emissions (%)	Change in NOx Emission rate (Kg/Km/yr)	NOx Index
Option 1A - 1	4	3.03	0	1,090	1,090	100.0	359.8	1439.1
Option 1A - 2	7	4.07	0	3,251	3,251	100.0	798.8	5591.4
Option 1A - 3	224	3.15	3,907	1,371	-2,536	-184.9	-805.0	-180311.7
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	1,012	1,034	22	2.1	26.8	751.0
N16 - EX Link 2 - N16/R286 Jtn to Abvie Rbt	78	0.85	419	538	119	22.1	139.9	10914.5
N16 - EX Link 3	52	6.22	2,671	3,245	575	17.7	92.4	4803.9
N16 - EX Link 4	6	2.28	979	51	-928	-1805.4	-406.9	-2441.1
TOTAL			8988.0	10581.1				-159252.8

Table 4-32: Route Option 1A+1B (V2) NOx index

Link Name	Properties within 50m	Link Length (m)	Do-Minimum	Do Something	Change in Emissions (Kg/yr)	Change in Emissions (%)	Change in NOx Emission rate (Kg/Km/yr)	NOx Index
Option 1A+1B - 1	4	3.03	0	1,077	1,077	100.0	355.3	1421.2
Option 1A+1B - 2	5	4.07	0	3,251	3,251	100.0	798.8	3993.8
Option 1A+1B - 3	22	3.15	4,335	10,372	6,037	58.2	1916.4	42160.7
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	1,012	915	-97	-10.6	-119.6	-3350.0
N16 - EX Link 2 - N16/R286 Jtn to Abvie Rbt	78	0.85	419	541	121	22.5	142.9	11148.7
N16 - EX Link 3	52	6.22	2,671	3,221	550	17.1	88.5	4599.9
N16 - EX Link 4	6	2.28	979	51	-928	-1805.4	-406.9	-2441.1
TOTAL			9416.4	19427.7				57533.2

Table 4-33: Route Option 2A (V2) NOx index

Link Name	Properties within 50m	Link Length (m)	Do-Minimum	Do Something	Change in Emissions (Kg/yr)	Change in Emissions (%)	Change in NOx Emission rate (Kg/Km/yr)	NOx Index
Option 2A - 1	2	0.70	0	291	291	100.0	416.0	832.1
Option 2A - 2	0	2.73	0	848	848	100.0	310.6	0.0
Option 2A - 3	6	4.75	0	3,278	3,278	100.0	690.0	4140.2
Option 2A - 4	197	1.41	2,425	386	-2,040	-528.9	-1446.5	-284953.9
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	1,012	915	-97	-10.6	-119.6	-3350.0
N16 - EX Link 2 - N16/R286 Jtn to Abvie Rbt	78	0.85	419	541	121	22.5	142.9	11148.7
N16 - EX Link 3	45	3.49	1,499	1,807	309	17.1	88.5	3980.7
N16 - EX Link 4	12	5.01	2,151	113	-2,038	-1805.4	-406.9	-4882.2
TOTAL			7506.1	8178.3				-273084.6

Table 4-34: Route Option 2B (V2) NOx index

Link Name	Properties within 50m	Link Length (m)	Do-Minimum	Do Something	Change in Emissions (Kg/yr)	Change in Emissions (%)	Change in NOx Emission rate (Kg/Km/yr)	NOx Index
Option 2A - 1	2	0.70	0	295	295	100.0	421.6	843.2
Option 2A - 2	0	2.73	0	864	864	100.0	316.4	0.0
Option 2A - 3	6	4.75	0	3,794	3,794	100.0	798.8	4792.6
Option 2A - 4	197	1.41	2,425	380	-2,045	-537.7	-1450.2	-285696.5
Option 2B - 1	45	1.23	2,031	4,552	2,521	55.4	2049.7	92235.3
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	1,141	917	-224	-24.4	-276.5	-7743.2
N16 - EX Link 2 - N16/R286 Jtn to Abvie Rbt	78	0.85	533	541	7	1.3	8.4	657.7
N16 - EX Link 3	45	3.49	1,856	1,776	-81	-4.5	-23.1	-1038.4
N16 - EX Link 4	12	5.01	2,665	113	-2,552	-2260.3	-509.4	-6112.4
TOTAL			10651.9	13232.0				-202061.6

Table 4-35: Route Option 5 (V2) NOx index

Link Name	Properties within 50m	Link Length (m)	Do-Minimum	Do Something	Change in Emissions (Kg/yr)	Change in Emissions (%)	Change in NOx Emission rate (Kg/Km/yr)	NOx Index
Option 5 - 1	2	1.20	0	1,292	1,292	100.0	1077.0	2154.1
Option 5 - 2	2	1.95	0	1,470	1,470	100.0	753.9	1507.7
Option 5 - 3	8	4.50	0	3,594	3,594	100.0	798.8	6390.1
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	0	1,056	1,056	100.0	1303.5	36497.6
N16 - EX Link 2 - N16/R286 Jtn to Abvie Rbt	78	0.85	0	752	752	100.0	884.2	68967.8
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	1,012	0	-1,012	100.0	-1249.4	-34983.1
N16 - EX Link 2 - N16/R286 Jtn to Abvie Rbt	78	0.85	562	0	-562	100.0	-661.0	-51560.5
N16 - EX Link 3	30	1.43	797	32	-765	-2374.0	-535.0	-16049.9
N16 - EX Link 4	16	2.28	1,271	51	-1,220	-2374.0	-535.0	-8560.0
N16 - EX Link 5	12	4.80	2,676	108	-2,568	-2374.0	-535.0	-6420.0
TOTAL			6318.5	8356.1				-2056.0

Table 4-36: Route Option 8 (V2) NOx index

Link Name	Properties within 50m	Link Length (m)	Do-Minimum	Do Something	Change in Emissions (Kg/yr)	Change in Emissions (%)	Change in NOx Emission rate (Kg/Km/yr)	NOx Index
Option 8 - 1	9	1.73	0	1,750	1,750	100.0	1014.6	9131.7
Option 8 - 2	1	1.67	0	1,567	1,567	100.0	938.4	938.4
Option 8 - 3	6	4.73	0	3,778	3,778	100.0	798.8	4792.6
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	0	1,055	1,055	100.0	1301.9	36454.5
N16 - EX Link 2 - N16/R286 Jtn to Abvie Rbt	78	0.85	0	732	732	100.0	860.7	67132.5
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	1,012	0	-1,012	100.0	-1249.4	-34983.1
N16 - EX Link 2 - N16/R286 Jtn to Abvie Rbt	78	0.85	562	0	-562	100.0	-661.0	-51560.5
N16 - EX Link 3	45	3.49	1,946	79	-1,867	-2374.0	-535.0	-24074.9
N16 - EX Link 4	12	5.02	2,799	113	-2,686	-2374.0	-535.0	-6420.0
TOTAL			6318.5	9073.5				1411.3
Option 8 - 1	9	1.73	0	1,750	1,750	100.0	1014.6	9131.7

Table 4-37: Route Option 12 NOx index

Link Name	Properties within 50m	Link Length (m)	Do-Minimum	Do Something	Change in Emissions (Kg/yr)	Change in Emissions (%)	Change in NOx Emission rate (Kg/Km/yr)	NOx Index
Option 12 - 1	9	1.87	0	1,897	1,897	100.0	1014.6	9131.7
Option 12- 2	1	1.62	0	1,520	1,520	100.0	938.4	938.4
Option12 - 3	7	4.75	0	3,794	3,794	100.0	798.8	5591.4
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	0	1,055	1,055	100.0	1301.9	36454.5
N16 - EX Link 2 - N16/R286 Jtn to Abvie Rbt	78	0.85	0	732	732	100.0	860.7	67132.5
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	1,012	0	-1,012	100.0	-1249.4	-34983.1
N16 - EX Link 2 - N16/R286 Jtn to Abvie Rbt	78	0.85	562	0	-562	100.0	-661.0	-51560.5
N16 - EX Link 3	45	3.49	1,946	79	-1,867	-2374.0	-535.0	-24074.9
N16 - EX Link 4	12	5.02	2,799	113	-2,686	-2374.0	-535.0	-6420.0
TOTAL			6318.5	9189.7				2210.1

Table 4-38: Route Option 1A(V2) PM_{10} index

Link Name	Properties within 50m	Link Length (m)	Do-Minimum	Do Something	Change in Emissions (Kg/yr)	Change in Emissions (%)	Change in NOx Emission rate (Kg/Km/yr)	NOx Index
Option 1A - 1	4	3.03	0	34	34	100.0	11.2	44.7
Option 1A - 2	7	4.07	0	94	94	100.0	23.2	162.2
Option 1A - 3	224	3.15	102	39	-63	-160.1	-20.0	-4485.8
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	29	29	0	0.1	0.0	0.7
N16 - EX Link 2 - N16/R286 Jtn to Abvie Rbt	78	0.85	13	14	1	7.7	1.2	96.7
N16 - EX Link 3	52	6.22	78	91	13	14.4	2.1	109.2
N16 - EX Link 4	6	2.28	29	1	-27	-2091.8	-12.0	-71.7
TOTAL			250.9	302.9				-4144.0

Table 4-39: Route Option 1A+1B (V2) PM_{10} index

Link Name	Properties within 50m	Link Length (m)	Do-Minimum	Do Something	Change in Emissions (Kg/yr)	Change in Emissions (%)	Change in NOx Emission rate (Kg/Km/yr)	NOx Index
Option 1A+1B - 1	4	3.03	0	33	33	100.0	11.0	43.9
Option 1A+1B - 2	5	4.07	0	94	94	100.0	23.2	115.8
Option 1A+1B - 3	22	3.15	114	326	212	65.1	67.3	1480.2
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	29	27	-2	-7.8	-2.6	-73.4
N16 - EX Link 2 - N16/R286 Jtn to Abvie Rbt	78	0.85	13	14	1	8.6	1.4	109.8
N16 - EX Link 3	52	6.22	78	79	1	1.6	0.2	10.9
N16 - EX Link 4	6	2.28	29	1	-27	-2091.8	-12.0	-71.7
TOTAL			262.2	574.8				1615.5

Table 4-40: Route Option 2A (V2) PM_{10} index

Link Name	Properties within 50m	Link Length (m)	Do-Minimum	Do Something	Change in Emissions (Kg/yr)	Change in Emissions (%)	Change in NOx Emission rate (Kg/Km/yr)	NOx Index
Option 2A - 1	2	0.70	0	9	9	100.0	12.9	25.9
Option 2A - 2	0	2.73	0	27	27	100.0	9.8	0.0
Option 2A - 3	6	4.75	0	80	80	100.0	16.8	100.8
Option 2A - 4	197	1.41	68	12	-56	-473.9	-39.7	-7828.1
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	29	27	-2	-7.8	-2.6	-73.4
N16 - EX Link 2 - N16/R286 Jtn to Abvie Rbt	78	0.85	13	14	1	8.6	1.4	109.8
N16 - EX Link 3	45	3.49	44	44	1	1.6	0.2	9.4
N16 - EX Link 4	12	5.01	63	3	-60	-2091.8	-12.0	-143.4
TOTAL			216.3	215.7				-7799.2

Table 4-41: Route Option 2B (V2) PM_{10} index

Link Name	Properties within 50m	Link Length (m)	Do-Minimum	Do Something	Change in Emissions (Kg/yr)	Change in Emissions (%)	Change in NOx Emission rate (Kg/Km/yr)	NOx Index
Option 2A - 1	2	0.70	0	9	9	100.0	13.1	26.3
Option 2A - 2	0	2.73	0	27	27	100.0	10.0	0.0
Option 2A - 3	6	4.75	0	110	110	100.0	23.2	139.0
Option 2A - 4	197	1.41	68	11	-57	-513.2	-40.3	-7934.0
Option 2B - 1	45	1.23	61	143	82	57.2	66.6	2995.9
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	31	27	-4	-13.0	-4.4	-122.9
N16 - EX Link 2 - N16/R286 Jtn to Abvie Rbt	78	0.85	14	14	0	-0.2	0.0	-2.0
N16 - EX Link 3	45	3.49	47	44	-3	-7.3	-0.9	-41.4
N16 - EX Link 4	12	5.01	68	3	-65	-2263.2	-12.9	-155.2
TOTAL			143	388.8				-5094.3

Table 4-42: Route Option 5 (V2) PM_{10} index

Link Name	Properties within 50m	Link Length (m)	Do-Minimum	Do Something	Change in Emissions (Kg/yr)	Change in Emissions (%)	Change in NOx Emission rate (Kg/Km/yr)	NOx Index
Option 5 - 1	2	1.20	0	39	39	100.0	32.7	65.4
Option 5 - 2	2	1.95	0	43	43	100.0	21.8	43.6
Option 5 - 3	8	4.50	0	104	104	100.0	23.2	185.3
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	0	30	30	100.0	37.5	1050.8
N16 - EX Link 2 - N16/R286 Jtn to Abvie Rbt	78	0.85	0	19	19	100.0	22.6	1763.7
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	29	0	-29	100.0	-36.3	-1015.2
N16 - EX Link 2 - N16/R286 Jtn to Abvie Rbt	78	0.85	14	0	-14	100.0	-16.8	-1314.1
N16 - EX Link 3	30	1.43	20	1	-19	-2306.0	-13.2	-395.2
N16 - EX Link 4	16	2.28	31	1	-30	-2306.0	-13.2	-210.8
N16 - EX Link 5	12	4.80	66	3	-63	-2306.0	-13.2	-158.1
TOTAL			160.7	240.5				15.3

Table 4-43: Route Option 8 (V2) PM_{10} index

Link Name	Properties within 50m	Link Length (m)	Do-Minimum	Do Something	Change in Emissions (Kg/yr)	Change in Emissions (%)	Change in NOx Emission rate (Kg/Km/yr)	NOx Index
Option 8 - 1	9	1.73	0	52	52	100.0	30.4	273.4
Option 8 - 2	1	1.67	0	47	47	100.0	28.1	28.1
Option 8 - 3	6	4.73	0	110	110	100.0	23.2	139.0
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	0	30	30	100.0	37.5	1049.1
N16 - EX Link 2 - N16/R286 Jtn to Abvie Rbt	78	0.85	0	19	19	100.0	22.0	1716.7
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	29	0	-29	100.0	-36.3	-1015.2
N16 - EX Link 2 - N16/R286 Jtn to Abvie Rbt	78	0.85	14	0	-14	100.0	-16.8	-1314.1
N16 - EX Link 3	45	3.49	48	2	-46	-2306.0	-13.2	-592.9
N16 - EX Link 4	12	5.02	69	3	-66	-2306.0	-13.2	-158.1
TOTAL			160.7	262.8				126.1

Table 4-44: Route Option 12 PM_{10} index

Link Name	Properties within 50m	Link Length (m)	Do-Minimum	Do Something	Change in Emissions (Kg/yr)	Change in Emissions (%)	Change in NOx Emission rate (Kg/Km/yr)	NOx Index
Option 12 - 1	6	1.73	0	57	57	100.0	32.9	197.6
Option 12 - 2	0	1.67	0	45	45	100.0	27.2	0.0
Option 12 - 3	8	4.73	0	110	110	100.0	23.3	186.1
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	0	30	30	100.0	37.5	1049.1
N16 - EX Link 2 - N16/R286 Jtn to Abvie Rbt	78	0.85	0	19	19	100.0	22.0	1716.7
N16 - EX Link 1 - N4/N16/N16 Jtn to N16/R286 Jtn	28	0.81	29	0	-29	100.0	-36.3	-1015.2
N16 - EX Link 2 - N16/R286 Jtn to Abvie Rbt	78	0.85	14	0	-14	100.0	-16.8	-1314.1
N16 - EX Link 3	45	3.49	48	2	-46	-2306.0	-13.2	-592.9
N16 - EX Link 4	12	5.02	69	3	-66	-2306.0	-13.2	-158.1
TOTAL			160.7	266.2				69.3

Table 4-45: Summary of Index of Overall NOx and PM_{10} Exposure for each Route Option.

Option	NOx Exposure Index	Better or Worse	Rank	PM_{10} Exposure Index	Better or Worse	Rank
Option 1A (V2)	-159252.8	Better	3	-41440	Better	1
Option1A-1B (V2)	57533.2	Worse	7	1615.5	Worse	7
Option 2A (V2)	-273084.6	Better	1	-7799.2	Better	2
Option 2A-2B (V2)	-202061.6	Better	2	-5094	Better	3
Option 5 (V2)	-2056	Better	4	15.3	Worse	4
Option 8 (V2)	1411.3	Worse	5	126.1	Worse	6
Option 12 (V2)	2210.1	Worse	6	69.3	Worse	5

4.4.2 Summary of Best ranked Refined Route Options & Conclusions

Based on the Route Corridor Selection approach outlined in Guidelines for the Treatment of Air Quality in National Road Schemes during the Planning and Construction of National Road Schemes (Revised May 2011), the best ranked route option may be deemed to be Option 1A, 2A and 2A+2B.

Table 4-46: Summary of best ranked refined route options

Option No.	Preference
Opt 1A-v2	High Preference
Opt 1A+1B-v2	Low Preference
Opt 2A-v2	High Preference
Opt 2A+2B-v2	High Preference
Opt 5	Medium Preference
Opt 8-v2	Medium Preference
Opt 12-v2	Medium Preference

In the Southern Section, based on the Route Corridor Selection approach outlined in The NRA (TII) Guidelines, the best ranked options may be deemed to be Options 1A, 2A and 2A+2B.

Table 4-47: Summary of best ranked refined route options – Southern Section

Option No.	Preference
Opt 1A-v2	High Preference
Opt 1A+1B-v2	Low Preference
Opt 2A-v2	High Preference
Opt 2A+2B-v2	High Preference
Opt 5	Medium Preference
Opt 8-v2	Medium Preference

Option No.	Preference
Opt 12	Medium Preference

In the Central Section, based on the Route Corridor Selection approach outlined in The NRA (TII) Guidelines, the best ranked options may be deemed to be Options 2A-V2, 2B-V2 and 05.

Table 4-48: Summary of best ranked refined route options – Central Section

Option No.	Preference
Opt 1A-v2	Medium Preference
Opt 1A+1B-v2	Medium Preference
Opt 2A-v2	Medium Preference
Opt 2A+2B-v2	Medium Preference
Opt 5-v2	Medium Preference
Opt 8-v2	Medium Preference
Opt 12	Medium Preference

In the Northern Section, based on the Route Corridor Selection approach outlined in The NRA (TII) Guidelines, the best ranked options may be deemed to be Options 12.

Table 4-49: Summary of best ranked refined route options – Northern Section

Option No.	Preference
Opt 1A-v2	Medium Preference
Opt 1A+1B-v2	Medium Preference
Opt 2A-v2	Medium Preference
Opt 2A+2B-v2	Medium Preference
Opt 5-v2	Medium Preference
Opt 8-v2	Medium Preference
Opt 12	Medium Preference

Table 4-50: Summary of Refined Route Options (Air Quality)

Section	Refined Route Option													
	1A (v2)	1A/B (v2)	2A (v2)	2A/B (v2)	3	4	5	6	7	8 (v2)	9	10	11	12
South	2	4	2	2	n/a	n/a	3	n/a	n/a	ref 12	n/a	n/a	n/a	3
Central	ref 8-v2	ref 8-v2	ref 5	ref 5	n/a	n/a	3	n/a	n/a	3	n/a	n/a	n/a	3
North	ref 8-v2	ref 8-v2	ref 8-v2	ref 8-v2	n/a	n/a	ref 8-v2	n/a	n/a	3	n/a	n/a	n/a	3
Overall	2	4	2	2	n/a	n/a	3	n/a	n/a	3	n/a	n/a	n/a	3

5 Agriculture

5.1 Introduction

This section is a comparative study of the impact on agriculture from Route Options for the N16 Sligo to County Boundary road project. An evaluation of the preference for each route option in terms of least impact on agricultural property will contribute towards the refinement of route options under Stage 1 Preliminary Options Assessment and selection of the emerging preferred route under Stage 2 Project Appraisal. This assessment should be read in conjunction with drawings no. N16-RS-071 to N16-RS-073 (Feasible Route Options – Agriculture and Non-Agriculture Assessment) and N16-RS-099 to N16-RS-101 (Refined 'Feasible' Route Options - Agriculture and Non-Agriculture Assessment).

A separate assessment of the Route Options in terms of non-agricultural property is presented in Section 2 of this report.

Impacts on agricultural property have been assessed based on the broad design footprints presented at Route Selection Stage, with an additional allowance for a land-take offset of 10m. This allows principally, for a comparable to be undertaken of the various route options. In this regard, the assessment in this report is relative to the stage of the design. Further detail on the extent of individual property impacts, will be established at the next stage of the design once a preferred route has been established. The design will be developed in a manner to reduce the impacts as far as is reasonably practicable.

5.1.1 Description of Route Options

Refer to Sections 7 and 10.1 of the Main Report (Volume 1) for a full description of the Feasible Route Options and Refined Route Options respectively.

5.2 Appraisal Methodology

There are no guidelines specific to the assessment of impacts on agricultural property. In line with best practice this section was prepared with regards to the following documents:

- Guidelines on the information to be contained in EIS (EPA, 2002);
- Revised guidelines on the information to be contained in Environmental Impact Statements (Draft) (EPA, 2015);
- Advice notes on current practice in the preparation of EIS (EPA, 2003);
- Advice notes for preparing Environmental Impact Statements (Draft) (EPA, 2015);
- Environmental Impact Assessment of National Road Schemes – A Practical Guide (NRA, 2008); and
- Project Management Guidelines (NRA, 2010).

The appraisal of the Feasible Route Options consisted of desktop study, local consultation and roadside survey of the study area and route option alignments. The desktop study considered study area mapping, route option alignments, aerial photography, landownership data and submissions made following public consultations in January – February 2016. The roadside surveys and local consultation took place in March 2016.

Following the Route Selection Workshop in June, a similar appraisal of Refined Route Options using available information was carried out. The desktop study was based on available information and included further submissions made following public consultation in July 2016.

5.2.1 Data sources

The methodology for this section relied on information from the sources outlined in Table 1-1.

Table 5-1: Information and sources

Information	Source
Digital mapping of Study area - Ordinance Survey, Discovery Series and Satellite Imagery.	Sligo County Council.
Digital mapping of Feasible Route Options.	Sligo County Council.
Land registry / landownership information	Sligo County Council.
Land cover, land use, farm details	Roadside survey and landowner submissions to public consultation.
Soils information	Irish National Soils Map, 1:250,000k, V1b(2014).Teagasc, Cranfield University.
Agricultural statistics	National census of agriculture statistics derived from the June 2010 census of agriculture (Central Statistics Office, 2012).

5.2.2 Study area

The study area for the N16 Sligo to County Boundary road project is outlined in drawing no. N16-RS-002 (Study Area Overview: Sectional Splitting). This section will cover the effects on agriculture and farm holdings along the Feasible and Refined Route Options.

5.2.3 Assessment methodology

The route options appraisal comprises of a quantitative and qualitative assessment of agricultural property for each route option. These assessments are based on direct impacts from Route Option alignments and will include a 10m offset from the extents of the alignment to allow for detailed drainage and earthworks design (This offset does not include for parallel access tracks, or direct access arrangements which will be determined at the next stage of the design process – it is considered in effect, that such arrangements will be broadly similar for each Route Option).

A further assessment was conducted within 10-30m of the extents of the alignment to identify potential significant direct impacts. For the dual carriageway sections of Route Options 01B and 02B, a detailed design is available and the assessment was based on the extents of the alignment.

For agricultural property, each route option is evaluated in terms of:

- Agricultural landtake;
- Land use;
- Land quality;
- Land impact / land severance;
- Impact on farmhouses and farmyards; and

- Key agricultural enterprises.

Agricultural landtake is based on length of route corridor and indicative cross section width for the relevant road type. For landtake purposes, an indicative cross section width of 50m is taken for a Type 2 Single Carriageway (inclusive of 1 No. 6m access accommodation track) at route selection stage.

The land use and land quality assessments are carried out as a desktop study of digital satellite imagery using the 10m offset from the extents of each route option. Agricultural land along this route corridor is evaluated for each route option.

Landownership information on land and property within the study area allowed for an assessment of impact and land severance for agricultural property. Farm holdings were individually assessed for agricultural impact based on landtake, land severance and effects on farm house and farm yards. The criteria for agricultural impact on farm holdings are presented in Table 5-2.

Table 5-2: Agricultural impact criteria on farm holdings

Impact	Criteria
High	Landtake may involve a significant portion of the plot or holding. and / or Land severance may split the holding in two resulting in a significant area becoming inaccessible or landlocked. Mitigation of access involving the provision of accommodation structures may be required. and / or Impact on farm house and / or farmyard buildings.
Medium	Landtake represents a sizeable reduction in the agricultural area. and / or Land severance of a significant area although large enough to continue to be farmed in a productive manner. There may be operational difficulties when moving livestock or machinery. Mitigation of access to existing or severed areas may be required. and / or Impact on farmyard area or animal handling facilities.
Low	Landtake is a relatively small portion of the affected holding. This may involve areas along the external or roadside boundary. and / or No land severance or severance of a relatively small portion of land. Mitigation of access to existing or severed areas may be required. No impact on farm house, farmyard or farm facilities.

A quantitative assessment of the farm houses and farmyards directly impacted by each route option alignment was carried out as a desktop study of digital satellite imagery using the 10m offset from the earthworks extents of the route options.

A quantitative assessment was carried out for key agricultural holdings with farm enterprises considered most sensitive to new road development. These key agricultural enterprises consist mainly of dairy and equine farm enterprises and in some cases beef or other farm enterprises. Dairy farms, as intensively operated grassland farms, are particularly sensitive to significant landtake and severance impacts that may adversely affect daily livestock movements and farm milk production. Activities on equine farms vary between breeding and training of high value bloodstock that are

considered particularly sensitive to noise and visual impacts associated with the construction and operation of a new road development. Such impacts have the potential to adversely affect the day to day interaction with horses and overall operation of such equine farms.

There are a small number of key dairy farms identified within the study area. There were no key equine farms.

5.2.4 Assessment of impact and preferences

Under the NRA (TII) Project Management Guidelines (2010) the required output from the Preliminary Options Assessment is an assessment of the impact of the Feasible Route Options for each specialist area in terms of preference. Under the Environment criteria, the agricultural assessment will contribute towards the refinement of route options.

There are seven impact rankings ranging from Highly Positive to Major Negative and four of these are deemed to be applicable to the assessment of agricultural impact – Neutral, Minor Negative, Moderate Negative and Major Negative. There are five levels of preference determined for the purposes of the current Route Selection, ranging from Very High Preference, High Preference, Medium Preference, Low Preference and Very Low Preference.

The impact assessment ranking and selection of preferences for Route Options are based on the criteria as presented in Table 5-3.

Table 5-3: Impact assessment criteria for Route Options

Impact	Preference	Criteria
Major Negative	Very Low Preference	Land use is primarily grass or arable based. Land quality is primarily good being suited to intensive agricultural production and a wide range of agricultural uses. Impact / land severance is predominantly High. Impact on a high number of farmhouses and farmyards. Highly Significant impact on one or more sensitive farming enterprises, i.e. dairy, equine, etc.
	Low Preference	Land use is primarily grass or arable based. Land quality is primarily good being suited to intensive agricultural production and a wide range of agricultural uses. Impact / land severance is predominantly Medium to High. Impact on a medium to high number of farmhouses and farmyards. Moderately Significant impact on sensitive farming enterprises, i.e. dairy, equine, etc.
Moderate Negative	Medium Preference	Land use is mainly grass based with low levels of forestry, rough grassland / scrub. Land quality is average to good and with effective management is suited to intensive agricultural production and a wide range of agricultural uses. Impact / land severance is predominantly Medium. Impact on a low number of farmhouses and farmyards. Slight or Not Significant impact on sensitive farming enterprises, i.e. dairy, equine,

Impact	Preference	Criteria
		etc.
Minor Negative	High Preference	Land use is grass based with medium levels of forestry, rough grassland / scrub. Land quality is primarily average being less suited to intensive agricultural production. Lands are limited in the range of agricultural use. Impact / land severance is Low to Medium. There are no impacts on farmhouses and farmyards. There are no impacts on sensitive farming enterprises, i.e. dairy, equine, etc.
Neutral	Very High Preference	No effect on agricultural lands.
Positive	Very High Preference	Not applicable to agriculture.

5.3 Description of Existing Environment

5.3.1 General

The N16 Sligo to County Boundary study area is mainly rural in nature as it extends northwards from Sligo town. The land use in the southern end of the study area incorporates residential and industrial development adjacent to agricultural lands. The remaining area is predominantly in agricultural use along with residential property along the local road network.

Agricultural lands in the townlands of Lisnalurg and Shannon Oughter are included in the Sligo North Fringe Local Area Plan (2010-2016). Under the plan, these lands are the proposed location for an integrated development incorporating residential, community, educational, commercial and industrial land use. Currently these lands are in agricultural use with one off rural housing or ribbon development along the existing road network.

The drumlin topography is generally rolling and hilly throughout the study area with steeply sloping lands in the northern section that passes between Cope Mountain and Glencar Lake. Elevations range from a high of 130m OD in the northern section (at the county boundary) in Gortnagrelly to 70-100m in the middle section in Lugatober. From there it falls to approximately 40-60m OD across the general southern section and to a low point of 10m OD in Shannon Eighter.

Land use in the study area is predominantly grassland based with farming activities based on livestock production involving beef, sheep and dairy.

5.3.2 Agriculture in County Sligo

The total agricultural area of Co. Sligo is 128,417ha and when commonage and rough grazing are excluded there is 102,380ha grassland, 42ha cereals and 100ha of other crops, fruit and horticulture (CSO, 2012).

There are 4,395 farms with an average farm size of 26.3ha which is significantly lower than the national average of 32.7ha. The main agricultural enterprises are beef (67.6%), sheep (11.2%), mixed grazing livestock (10.4%) and mixed field crops (7.1%). There is a low level of dairy farming (3.2%)

and there are very low levels of farms specialising in mixed crops and livestock (0.2%) and tillage (<0.1%) (CSO, 2012).

5.3.3 Agriculture in the study area

The agricultural data for the Electoral Districts (ED) of Glencar, Drumcliff East and Calry are taken as representative of the study area although the information is not directly comparable with data on a county and national level. Land use in the three districts is grassland based with pasture, silage and hay accounting for 69.8%, 18.0% and 2.8% respectively. The remaining lands are categorised as rough grazing (9.3%).

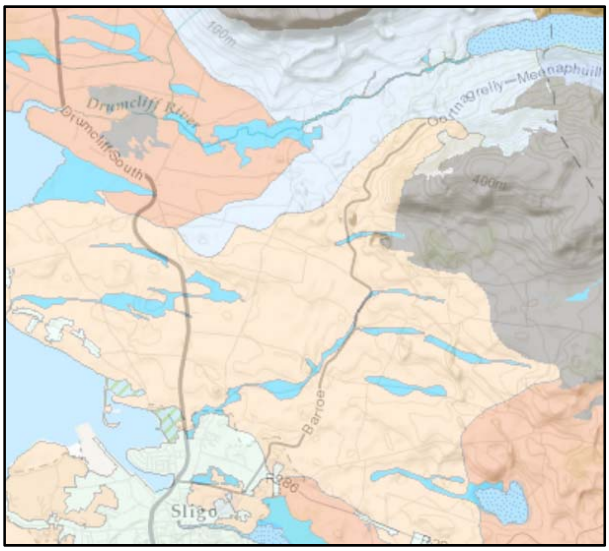
Farming enterprises in the study area are predominantly involved in sheep and beef production with low levels of dairy and equine farming. Farm sizes are mostly within 0-30ha (74.7%) although there are a low number of farms in excess of 50ha in size (7.8%).

5.3.4 Soils

Agriculture in the study area is defined by the drumlin topography and the suitability of the soils to agricultural use. Soils information is assembled as Soils Associations – mapping of local soils or soil types that commonly occur in the landscape. The Soil Associations within the study area are presented in Figure 5-1.

There are two soil associations within the study area, namely Mullabane and Drumkeeran. Soils within the Mullanbane association (Figure 5-1 - Light orange) are Typical Brown Earth soils described as having a coarse loamy texture and derived from limestone drift. The soils are well drained and are regarded as moderately suitable for grassland use. The Drumkeeran soil association (Figure 5-1 – Pale blue) is composed of Typical Surface Water Gley soils with a Clayey texture and are derived from a sticky glacial till. The high Clay content of the soil and subsoils has produced a weak structured soil of low permeability. The soils are limited to grassland and forestry use due to poor drainage, soil structure and prevalence of steep slopes.

Figure 5-1: Study area soils map (Teagasc)



5.3.5 Agricultural constraints

The agricultural constraints within the study area include key farming enterprises considered as sensitive to road development works. There are a small number of key dairy farms located at Doonally and Shannon Eighter.

5.4 Feasible Route Corridor Option Assessment

5.4.1 Option 01A

5.4.1.1 Southern section

Route Option 01A commences in Teesan at a junction with the N15 and travels in an easterly direction to a junction with the Ballytivnan local road (L-7421-0) and towards Doonally before turning north and crossing the Drum local road (L-3406-0). The route option will require online widening of short sections of the existing N15 north and south of the roundabout junction with the N15.

Land use is mainly agricultural farm holdings with one-off residential houses and ribbon development on local roads. The drumlin topography along the alignment consists of rolling hills and generally ranges from 40m OD to 60m OD. The land quality is moderate and improving to good towards Doonally. Farming activity is grassland based centred around beef, sheep and dairy enterprises.

On this section there is a High impact on one farm holding due to landtake and severance. The alignment will be in close proximity to one farmhouse and a farmyard in Teesan. There is a Low impact on a Key dairy enterprise at Doonally. There is one farm house and one farm yards in close proximity to the route option. The impact on the remaining farm holdings will be Low to Medium.

5.4.1.2 Central section

From the Drum road (L-3406-0) the alignment continues to the north and runs parallel with the existing N16 for a section before turning to the north east towards Lugatober.

Land use is agricultural comprised of farm holdings and a lower number of one-off residential houses. This section is dominated by Cope Mountain with steeply sloping lands ranging from 60m OD to 90m OD at Lugatober. The land quality west of the N16 is generally moderate being limited by slope. Farming activity is grassland based, involving beef and sheep production.

There will be a High impact on two farm holdings due to direct impacts on both the farm house and farmyard in Drum East and Lugatober. There will be a High impact on two farm holdings due to direct impacts on farm houses in Castlegal and Lugatober. There will be a High impact on one farm holding in Lugatober due to direct impacts on farmyards, landtake and severance. There will be a High impact on two farm holdings due to landtake and severance. There are two farm houses and one farm yards in close proximity to the route option. The impacts on the remaining farm holdings will be low to medium.

5.4.1.3 Northern section

From Lugatober the alignment continues in a north easterly direction and intercepts local roads (L-34041-0 and L-34004-0) in Collinsford and Lugnagall and continues to Gortnagrelly where it ends at the County Boundary. The route option severs the N16 at Lugnagall and after tuning east in Gortnagrelly it overlies the N16 for the remainder of the route option.

The land use is mainly agricultural consisting of farm holdings and a number of one-off residential houses. The lands are steeply sloping towards the Drumcliff River and Glencar Lake and range from 90m OD to 130m OD at the County Boundary. The land quality is marginal to moderate with marginal lands evident on more extensively managed holdings. The predominant farm enterprise is sheep with beef farming to a lesser extent.

There are four farm houses and three farm yards in close proximity to the route option. The impact on farm holdings is Low to Medium.

Summary details of the assessment of Option 1A sections are presented in Table 6-1 – Feasible Route Option 1A.

5.4.2 **Option 1A/1B**

5.4.2.1 Southern section

Route Option 1A/1B commences at Duck Street in Sligo town at the junction between the N16 and N4/N15 and extends to the R291 Junction with online widening to Dual Carriageway standard and junction improvements. The route option continues north and online to the proposed Cartron Link roundabout junction and to the proposed roundabout with Scotsman's Walk. Following the Scotsman's Walk East Junction the route option will change to a Single Carriageway standard and extend north and online with localised widening and improvements to the existing N15. Improvements to the N15 section of this FRO terminate approximately 250m north of the proposed roundabout with the N16 in Teesan. The FRO then travels in an easterly direction to a junction with the Ballytivnan local road (L-7421-0) and towards Doonally before turning north and crossing the Drum local road (L-3406-0). The route option will require online widening of short sections of the existing N15 north and south of the roundabout junction with the N15.

Land use along Route Option 1A/1B is a diverse property mix including residential, commercial, community, development and agricultural property. These properties consist of those with direct access off the N15 and properties that do not directly access the N15.

From the start of the route option to the Scotsman's Walk East Junction, agricultural properties with direct access include one farm holding with access onto the N15. The route option topography is low-lying with elevations rising from 10m OD in Sligo town to a peak of 30m OD in Lisnalurg. The agricultural lands between Cartron Link junction and Scotsman's Walk East Junction are good quality grassland and are part of a Key dairy enterprise in Shannon Eighter.

North of the Scotsman's Walk Junction the properties that directly access the N15 include one-off residential houses, farm holdings and agricultural access to farmyards and lands in Lisnalurg and Teesan. Junction improvements are proposed for local roads (L-3411-0, L-7316-0 and the L-3407-0). The route option is low-lying with elevations varying from 30m OD to 40m OD until Teesan. The agricultural lands from Scotsman's Walk Junction to the Teesan junction are average to good in quality and are used for beef and sheep production.

There will be a High impact on a farm holding in Lisnalurg due to the impact on the farmyard. There will be a High impact on a farm holding in Carncash due to landtake and severance. There will be a Medium impact on the key dairy enterprise in Shannon Eighter and a Low impact on the key dairy enterprise in Doonally. The impact on the remaining farm holdings will be Low to Medium.

5.4.2.2 Central section

From the Drum road (L-3406-0) the alignment continues to the north and runs parallel with the existing N16 for a section before turning to the north east towards Lugatober.

Land use is agricultural comprised of farm holdings and a lower number of one-off residential houses. This section is dominated by Cope Mountain with steeply sloping lands ranging from 60m OD to 90m OD at Lugatober. The land quality west of the N16 is generally moderate being limited by slope. Farming activity is grassland based involving beef and sheep production.

There will be a High impact on two farm holdings due to direct impacts on both the farm house and farmyard in Drum East and Lugatober. There will be a High impact on two farm holdings due to direct impacts on farm houses in Castlegal and Lugatober. There will be a High impact on one farm holding in Lugatober due to direct impacts on farmyards, landtake and severance. There will be a High impact on two farm holdings due to landtake and severance. There are two farm houses and one farm yards in close proximity to the route option. The impacts on the remaining farm holdings will be Low to Medium.

5.4.2.3 Northern section

From Lugatober the alignment continues in a north easterly direction and intercepts local roads (L-34041-0 and L-34004-0) in Collinsford and Lugnagall and continues to Gortnagrelly where it ends at the County Boundary. The route option severs the N16 at Lugnagall and after tuning east in Gortnagrelly it overlies the N16 for the remainder of the route option.

The land use is mainly agricultural consisting of farm holdings and a number of one-off residential houses. The lands are steeply sloping towards the Drumcliff River and Glencar Lake and range from 90m OD to 130m OD at the County Boundary. The land quality is marginal to moderate with marginal lands evident on more extensively managed holdings. The predominant farm enterprise is sheep with beef farming to a lesser extent.

There are three farm houses and two farm yards in close proximity to the route option. The impact on farm holdings is Low to Medium.

Summary details of the assessment of Option 1B sections are presented in Table 6-2 – Feasible Route Option 1B.

5.4.3 **Option 2A**

5.4.3.1 Southern section

Route Option 2A commences in Shannon Eighter at a roundabout junction with the N15 and travels east towards a junction with a local road (L-7421-0) and intercepts a local road (L-7422-0) in Rathbraghan. The route takes a north easterly direction intercepting a local road (L-3407-0) in Carncash and the Drum local road (L-3406-0).

Land use is mainly agricultural farm holdings with one-off residential houses and ribbon development, particularly in Shannon Eighter and on the Drum local road (L-3406-0). In Rathbraghan, there are development lands that are currently in agricultural use. The drumlin topography along the alignment consists of rolling hills and ranges from 10m OD to 60m OD. Land cover is improved grassland with small strips of woodland and land quality is generally good. Farming activity consists of dairy farming with beef and sheep production.

At the junction with the N15 at Shannon Eighter, there is a High impact on a key dairy enterprise arising from the landtake and severance associated with the alignment, direct impact on the farmyard and proximity to the farm house. There will be a High impact on a farm holding on the Drum road (L-3406-0) resulting from a direct impact on a farmyard comprising of animal housing and other facilities. There is a High impact on a Key dairy enterprise at Doonally arising from the landtake and severance of the alignment. The remaining impacts on other farm holdings are Low to Medium.

5.4.3.2 Central section

In a northern direction, the proposed route option overlies a section of the N16 before moving offline in Drumkilsellagh and running parallel to the N16. There is a link road from the existing N16 to the Drum road (L-3406-0). The route option intercepts a local road (L-7415-0) before it crosses the N16 and intercepts another local road (L-7413-0) in Lugatober. This local road (L-7413-0) is connected to the N16 to the south via a link road and to the N16 to the east via an access underbridge.

Land use is generally improved grassland with rough grazing and small areas of woodland. The topography is hilly with elevations between 60-90m OD and steeply sloping lands in the Castlegal and Lugatober townlands. Land quality is average to good with farming activity based on grassland for beef and sheep production.

At the Drum local road (L-3406-0) the offline link to the N16 will sever lands. The route option will have a High impact on one farm holding in Castlegal arising from direct impacts on the house and farmyard and landtake and severance. There is a High impact on two farm holdings due to direct impacts on both the house and farmyard at Lugatober and Collinsford. There is a High impact on one farm holding due to a direct impact on a house in Lugatober. There is one farmyard in close proximity to the route option. There is a High impact on one farm holding due to the severance involved. The impact on remaining farm holdings is Low to Medium.

5.4.3.3 Northern section

From Lugatober the alignment continues in a north easterly direction and intercepts local roads (L-34041-0 and L-34004-0) in Collinsford and Lugnagall and continues to Gortnagrelly where it ends at the County Boundary. In Lugnagall the local road (L-3404-0) is realigned to the route option. The route option remains north of the N16 at Lugnagall and in Gortnagrelly overlies the N16 for the remainder of the route option.

The land use is agricultural consisting of farm holdings and a number of one-off residential houses. The lands are steeply sloping towards the Drumcliff River and Glencar Lake and range from 90m OD to 130m OD at the County Boundary. The land quality is generally average with marginal lands evident on more extensively managed holdings. The predominant farm enterprise is sheep with beef farming to a lesser extent.

There is a Medium impact on one farm holding due to the impact on the farmyard area. The remaining farm holdings will have a Low to Medium impact.

Summary details of the assessment of Option 2A sections are presented in Table 6-3 – Feasible Route Option 2A.

5.4.4 **Option 2A/2B**

5.4.4.1 Southern section

Route Option 2A/2B commences at Duck Street in Sligo town at the junction between the N16 and N4/N15 and extends to the R291 Junction with online widening to Dual Carriageway standard and junction improvements. The route option continues north and online to the proposed Cartron Link roundabout junction, it then extends to a further proposed roundabout with the proposed N16 and Scotsman's Walk. From this roundabout the FRO travels in an easterly direction towards a junction with a local road (L-7421-0) and intercepts a local road (L-7422-0) in Rathbraghan. The route takes a north easterly direction intercepting a local road (L-3407-0) in Carncash and the Drum local road (L-3406-0).

Land use along the route option is a diverse property mix including residential, commercial, community, development and agricultural property. These properties consist of those with direct access off the N15 and properties that do not directly access the N15.

From the start of the route option to the roundabout proposed with the N16/Scotsman's walk, agricultural properties include one farm holding with direct access onto the N15. The route option topography is low-lying with elevations rising from 10m OD in Sligo town to a peak of 30m OD in Lisnalurg. The agricultural lands between the Cartron Link junction and the N16/Scotsman's Walk Junction are good quality grassland and are part of a key dairy enterprise in Shannon Eighter. Land use on the offline section is mainly agricultural farm holdings with one-off residential houses and ribbon development, particularly in Shannon Eighter and on the Drum local road (L-3406-0). In Rathbraghan, there are development lands that are currently in agricultural use. The drumlin topography along the alignment consists of rolling hills and ranges from 10m OD to 60m OD. Land cover is improved grassland with small strips of woodland and land quality is generally good. Farming activity consists of dairy farming with beef and sheep production

At the junction with the N15 at Shannon Eighter, there is a High impact on a key dairy enterprise arising from the landtake and severance associated with the alignment, direct impact on the farmyard and proximity to the farm house. There will be a High impact on a key dairy enterprise in Doonally due to landtake and severance. There will be a High impact on a farm holding on the Drum road (L-3406-0) resulting from a direct impact on a farmyard comprising of animal housing and other facilities. The impact on the remaining farm holdings will be Low to Medium.

5.4.4.2 Central section

In a northern direction, the proposed route option overlies a section of the N16 before moving offline in Drumkilsellagh and running parallel to the N16. There is a link road from the existing N16 to the Drum road (L-3406-0). The route option intercepts a local road (L-7415-0) before it crosses the

N16 and intercepts another local road (L-7413-0) in Lugatober. This local road (L-7413-0) is connected to the N16 to the south via a link road and to the N16 to the east via an access underbridge.

Land use is generally improved grassland with rough grazing and small areas of woodland. The topography is hilly with elevations between 60-90m OD and steeply sloping lands in the Castlegal and Lugatober townlands. Land quality is average to good with farming activity based on grassland for beef and sheep production.

At the Drum local road (L-3406-0) the offline link to the N16 will sever lands. The FRO will have a High impact on three farm holdings in Castlegal, Lugatober and Collinsford arising from direct impacts on the farm house, farmyard and landtake and severance. There is a High impact on one farm holding due to a direct impact on a farm house in Lugatober. There is one farmyard in close proximity to the route option. There is a High impact on one farm holding due to the severance involved. The impact on remaining farm holdings is Low to Medium.

5.4.4.3 Northern section

From Lugatober the alignment continues in a north easterly direction and intercepts local roads (L-34041-0 and L-34004-0) in Collinsford and Lugnagall and continues to Gortnagrelly where it ends at the County Boundary. In Lugnagall the local road (L-3404-0) is realigned to the route option. The route option remains north of the N16 at Lugnagall and in Gortnagrelly overlies the N16 for the remainder of the route option.

The land use is agricultural consisting of farm holdings and a number of one-off residential houses. The lands are steeply sloping towards the Drumcliff River and Glencar Lake and range from 90m OD to 130m OD at the County Boundary. The land quality is generally average with marginal lands evident on more extensively managed holdings. The predominant farm enterprise is sheep with beef farming to a lesser extent.

There is a Medium impact on one farm holding due to the impact on the farmyard area. The remaining farm holdings will have a Low to Medium impact.

Summary details of the assessment of Option 2B sections are presented in Table 6-4 – Feasible Route Option 2B.

5.4.5 **Option 3**

5.4.5.1 Southern section

Route Option 3 is strategically placed between the existing N16 and N15 within the townland of Ballytivnan. It connects via a proposed roundabout, with links to the east (N16) and to the west (N15 via a local link). From the proposed roundabout, the route travels north to intercept a local road (L-7422-0) before turning north east where it intercepts a further local road (L-3407-0) in Carncash. It then intercepts a further local road (L-3406-0) known locally as the Drum Road.

Land use is mixed comprising of non-agricultural lands until the local road (L-7422-0) in Rathbraghan. After this the land use is mainly agricultural farm holdings with one-off residential houses and ribbon development. The drumlin topography along the alignment consists of rolling hills and ranges from 10m OD to 60m OD. Land cover is improved grassland and land quality is generally good. Farming activity consists of dairy farming with beef and sheep production.

There will be a High impact on a farm holding on the Drum road (L-3406-0) resulting from a direct impact on a farmyard comprising of animal housing and other facilities. There is a High impact on a

key dairy enterprise at Doonally arising from the landtake and severance of the alignment. The remaining impacts on other farm holdings are Low to Medium.

5.4.5.2 Central section

In a northern direction, the proposed route option overlies a section of the N16 before moving offline in Drumkilsellagh and running parallel to the N16. There is a link road from the existing N16 to the Drum road (L-3406-0). The route option intercepts a local road (L-7415-0) before it crosses the N16 and intercepts another local road (L-7413-0) in Lugatober. This local road (L-7413-0) is connected to the N16 to the south via a link road and to the N16 to the east via an access underbridge and offline link.

Land use is generally improved grassland with small areas of rough grazing. The topography is hilly with elevations between 60-110m OD and steeply sloping lands in the Castlegal and Lugatober townlands. Land quality is medium to good with farming activity based on grassland for beef and sheep production.

At the Drum local road (L-3406-0) the offline link to the N16 will sever lands. The FRO will have a High impact on two farm holdings in Castlegal and Lugatober arising from direct impacts on the farm house and farmyard and landtake and severance. The route option will have a High impact on one farm holding arising from the direct impact on a farm house in Lugatober. There is a further direct impact on a farmyard in Lugatober. There is one farm house in close proximity to the route option. There is a High impact on one farm holding due to the severance involved. The impact on remaining farm holdings is Low to Medium.

5.4.5.3 Northern section

From Lugatober the alignment continues in a north easterly direction and intercepts a section of the N16 and local roads (L-34041-0 and L-3404-0) in Collinsford and Lugnagall. The route option continues to Gortnagrelly where it ends at the County Boundary. In Lugnagall the local road (L-3404-0) is realigned to the route option. The route option remains north of the N16 at Lugnagall and in Gortnagrelly overlies the N16 for the remainder of the route option.

The land use is agricultural consisting of farm holdings and a number of one-off residential houses. The lands are steeply sloping towards the Drumcliff River and Glencar Lake and range from 90m OD to 130m OD at the County Boundary. The land quality is generally average with marginal lands evident on more extensively managed holdings. The predominant farm enterprise is sheep with beef farming to a lesser extent.

There is a Medium impact on one farm holding due to the impact on the farmyard area. The remaining farm holdings will have a Low to Medium impact.

Summary details of the assessment of Option 3 sections are presented in Table 6-5 – Feasible Route Option 3.

5.4.6 **Option 4**

5.4.6.1 Southern section

Route Option 4 is strategically placed between the existing N16 and N15 within the townland of Ballytivnan. It connects via a proposed roundabout, with links to the east (N16) and to the west (N15 via a local link). From the proposed roundabout, the route travels north to intercept a local road (L-

7422-0) before turning north east where it intercepts a further local road (L-3407-0) in Carncash. It then intercepts a further local road (L-3406-0) known locally as the Drum Road.

Land use is mixed comprising of non-agricultural lands until the local road (L-7422-0) in Rathbraghan. After this the land use is mainly agricultural farm holdings with one-off residential houses and ribbon development. The drumlin topography along the alignment consists of rolling hills and ranges from 10m OD to 60m OD. Land cover is improved grassland and land quality is generally good. Farming activity consists of dairy farming with beef and sheep production.

There is a High impact on a key dairy enterprise at Doonally arising from the landtake and severance of the alignment. The remaining impacts on other farm holdings are Low to Medium.

5.4.6.2 Central section

In a northern direction, the proposed route option intercepts a local road (L-74151-0) in Drum East before it turns to the north east and intercepts another local road (L-7413-0) in Lugatober. This local road (L-7413-0) is connected to the N16 to the east via an access underbridge and offline link.

Land use is generally improved grassland with a small area of rough grazing. The topography is hilly with elevations between 60-90m OD and steeply sloping lands in Drum East and Lugatober. Land quality is medium to good with farming activity based on grassland for beef and sheep production.

The FRO will have a High impact on one farm holding in Collinsford arising from direct impacts on the farm house, farm buildings and landtake and severance. The route option will have a High impact on two farm holdings arising from landtake and severance from the alignment. There will be a High impact on one farm holding arising from an impact on a site and severance of lands. There is one farm house in close proximity to the route option. The impact on remaining farm holdings is Low to Medium.

5.4.6.3 Northern section

From Lugatober the alignment continues in a north easterly direction and intercepts local roads (L-34041-0 and L-34004-0) in Collinsford and Lugnagall and continues to Gortnagrelly where it ends at the County Boundary. In Lugnagall the local road (L-3404-0) is realigned to the route option. The route option remains north of the N16 at Lugnagall and in Gortnagrelly overlies the N16 for the remainder of the route option.

The land use is agricultural consisting of farm holdings and a number of one-off residential houses. The lands are steeply sloping towards the Drumcliff River and Glencar Lake and range from 90m OD to 130m OD at the County Boundary. The land quality is generally average with marginal lands evident on more extensively managed holdings. The predominant farm enterprise is sheep with beef farming to a lesser extent.

There is a High impact on one farm holding in Gortnagrelly due to the direct impact on a farmyard comprising of animal housing and other facilities. The remaining farm holdings will have a Low to Medium impact.

Summary details of the assessment of Option 4 sections are presented in Table 6-6 – Feasible Route Option 4.

5.4.7 **Option 5**

5.4.7.1 Southern section

Route Option 5 commences in Ballytivnan at the AbbVie roundabout on the N16 and travels in a north easterly direction through Rathbraghan before turning north where it overlies the N16 at a junction with two local roads (L-7422-0 and L-3407-0). The route option continues north through Doonally, before it intercepts the Drum road (L-3406-0) in the townland of Drumkilsellagh.

Land use is mainly agricultural farm holdings with one-off residential houses and ribbon development. The topography along the alignment is undulating lowland and ranges from 30m OD to 60m OD. Land cover is improved grassland and land quality is generally good. Farming activity consists of dairy farming, beef and sheep production.

There will be a High impact on a farm holding on the Drum road (L-3406-0) resulting from a direct impact on a farmyard comprising of animal housing and other facilities. There is a High impact on a Key dairy enterprise due to landtake and severance and the proximity of the alignment to the farmyard. There is a High impact on one farm holding arising from landtake and severance. The remaining impacts on other farm holdings are Low to Medium.

5.4.7.2 Central section

In a northern direction, the proposed route option overlies a section of the N16 before moving offline in Drumkilsellagh and running parallel to the N16. The route option connects to a link road from the existing N16 to the Drum road (L-3406-0). The route option intercepts a local road (L-7415-0) in Castlegal, the N16 and another local road (L-7413-0) in Lugatober. This local road (L-7413-0) is connected to the N16 via an offline link road to the west and online link to the east.

Land use is generally improved grassland with small areas of rough grazing. The topography is hilly with elevations between 60-110m OD and steeply sloping lands in the Castlegal and Lugatober townlands. Land quality is average to good with farming activity based on grassland for beef and sheep production.

At the Drum local road (L-3406-0) the offline link to the N16 will sever lands. The FRO will have a High impact on three farm holdings in Castlegal, Lugatober and Collinsford arising from direct impacts on the farm house, farmyard and landtake and severance. There is a Medium impact on one farm holding due to a direct impact on a farmyard in Drumkilsellagh. There are three farm houses and one farmyard in close proximity to the route option. There is a High impact on one farm holding due to the severance involved. The impact on remaining farm holdings is mostly Medium.

5.4.7.3 Northern section

From Lugatober the alignment continues in a north easterly direction and intercepts a section of the N16 and local roads (L-34041-0 and L-3404-0) in Collinsford and Lugnagall. The route option continues to Gortnagrelly where it ends at the County Boundary. In Lugnagall the local road (L-3404-0) is realigned to the route option. The route option remains north of the N16 at Lugnagall and in Gortnagrelly overlies the N16 for the remainder of the route option.

The land use is agricultural consisting of farm holdings and a number of one-off residential houses. The lands are steeply sloping towards the Drumcliff River and Glencar Lake and range from 90m OD to 130m OD at the County Boundary. The land quality is generally average with marginal lands evident on more extensively managed holdings. The predominant farm enterprise is sheep with beef farming to a lesser extent.

There is a High impact on two farm holdings in Gortnagrelly due to the direct impact on both farm houses and adjoining farmyard buildings. There is a High impact on one farm holding due to impact of the route option and link road on the farm house at Lugnagall. The remaining farm holdings will have a Low to Medium impact.

Summary details of the assessment of Option 5 sections are presented in Table 6-7 – Feasible Route Option 5.

5.4.8 **Option 6**

5.4.8.1 Southern section

Route Option 6 commences in Ballytivnan at the AbbVie roundabout on the N16 and stays online to a roundabout junction in Barroe. The route option is then offline and travels north until it overlies the N16 at a junction with two local roads (L-7422-0 and L-3407-0). The route option continues north through Doonally, before it intercepts the Drum road (L-3406-0) in the townland of Drumkilsellagh.

Land use is mainly agricultural farm holdings with one-off residential houses and ribbon development. The topography along the alignment is undulating lowland and ranges from 30m OD to 60m OD. Land cover is improved grassland and land quality is generally good. Farming activity consists of dairy farming, beef and sheep production.

There will be a High impact on a farm holding on the Drum road (L-3406-0) resulting from a direct impact on a farmyard comprising of animal housing and other facilities. There is a High impact on a key dairy enterprise in Doonally due to landtake and severance and the proximity of the alignment to the farmyard. There is a High impact on one farm holding arising from landtake and severance. The remaining impacts on other farm holdings are Low to Medium.

5.4.8.2 Central section

In a northern direction, the proposed route option overlies a section of the N16 before moving offline in Drumkilsellagh and running parallel to the N16. The route option connects to a link road from the existing N16 to the Drum road (L-3406-0). The route option intercepts a local road (L-7415-0) in Castlegal, the N16 and another local road (L-7413-0) in Lugatober. This local road (L-7413-0) is connected to the N16 via an offline link road to the west and online link to the east.

Land use is generally improved grassland with small areas of rough grazing. The topography is hilly with elevations between 60-110m OD and steeply sloping lands in the Castlegal and Lugatober townlands. Land quality is average to good with farming activity based on grassland for beef and sheep production.

At the Drum local road (L-3406-0) the offline link to the N16 will sever lands. The FRO will have a High impact on two farm holdings in Castlegal and Collinsford arising from direct impacts on the farm house, farmyard and landtake and severance. There is a High impact on one farm holding due to a direct impact on the farmyard and landtake and severance. There is a Medium impact on one farm holding due to a direct impact on a farmyard in Drumkilsellagh. There are three farm houses and one farmyard in close proximity to the route option. There is a High impact on one farm holding due to the severance involved. The impact on remaining farm holdings is Low to Medium.

5.4.8.3 Northern section

From Lugatober the alignment continues in a north easterly direction and intercepts a section of the N16 and local roads (L-34041-0 and L-3404-0) in Collinsford and Lugnagall. The route option

continues to Gortnagrelly where it ends at the County Boundary. In Lugnagall the local road (L-3404-0) is realigned to the route option. The route option remains north of the N16 at Lugnagall and in Gortnagrelly overlies the N16 for the remainder of the route option.

The land use is agricultural consisting of farm holdings and a number of one-off residential houses. The lands are steeply sloping towards the Drumcliff River and Glencar Lake and range from 90m OD to 130m OD at the County Boundary. The land quality is generally average with marginal lands evident on more extensively managed holdings. The predominant farm enterprise is sheep with beef farming to a lesser extent.

There is a High impact on two farm holdings in Gortnagrelly due to the direct impact on both farm houses and adjoining farmyard buildings. There is a High impact on one farm holding due to the direct impact of the route option and link road on a farm house at Lugnagall. The remaining farm holdings will have a Low to Medium impact.

Summary details of the assessment of Option 6 sections are presented in Table 6-8 – Feasible Route Option 6.

5.4.9 **Option 7**

5.4.9.1 Southern section

Route Option 7 commences in Ballytivnan at the AbbVie roundabout on the N16 and travels offline in an easterly direction to intercept the N16 at Barroe before turning north and into Faughts where it intercepts a local road (L-3407-22). The alignment continues north into Doonally and crosses the N16 to a junction at the Drum road (L-3406-0).

Land use is mainly agricultural farm holdings with one-off residential houses and ribbon development. The topography along the alignment is undulating lowland and ranges from 30m OD to 60m OD. Land cover is improved grassland and land quality is generally good. Farming activity consists of dairy farming, beef and sheep production.

There will be a High impact on a farm holding in Barroe due to landtake and severance and the proximity of the alignment to the farmyard. There is a Medium impact on a key dairy enterprise in Doonally due to landtake and severance. There is a High impact on one farm holding in Doonally arising from landtake and severance. There is a farm house and a farmyard in close proximity to the route option. The remaining impacts on other farm holdings are Low to Medium.

5.4.9.2 Central section

From the Drum road (L-3406-0), the proposed route option moves offline before crossing the N16 before intercepting a local road (L-7415-0) in Drumkilsellagh. The route option continues north and intercepts the N16 and a local road (L-7413-0) in Lugatober. The local road (L-7413-0) is connected to the south via an offline link to the N16 and to the east via an accommodation underbridge to the N16.

Land use is grassland with a hilly topography and elevations between 60-110m OD. Land quality is average to good with farming activity based on grassland for beef and sheep production.

The FRO will have a High impact on two farm holdings in Lugatober and Collinsford arising from direct impacts on the farm house, farmyard and landtake and severance. There is a High impact on two farm holdings due to landtake and severance. There are two farm houses and one farmyard in close proximity to the route option. The impact on remaining farm holdings is Low to Medium.

5.4.9.3 Northern section

From Lugatober the alignment continues in a north easterly direction and intercepts a section of the N16 and local roads (L-34041-0 and L-3404-0) in Collinsford and Lugnagall. The route option continues to Gortnagrelly where it ends at the County Boundary. In Lugnagall the local road (L-3404-0) is realigned to the L-3441-0 via an offline link. The route option remains north of the N16 at Lugnagall and in Gortnagrelly overlies the N16 for the remainder of the route option.

The land use is agricultural consisting of farm holdings and a number of one-off residential houses. The lands are steeply sloping towards the Drumcliff River and Glencar Lake and range from 90m OD to 130m OD at the County Boundary. The land quality is generally average with marginal lands evident on more extensively managed holdings. The predominant farm enterprise is sheep with beef farming to a lesser extent.

There is a High impact on one farm holding due to the landtake impact. There is a Medium impact on one farm holding due to the impact on the farmyard area. There are two farm houses and one farmyard in close proximity to the route option. The remaining farm holdings will have a Low to Medium impact.

Summary details of the assessment of Option 7 sections are presented in Table 6-9 Feasible Route Option 7.

5.4.10 **Option 8**

5.4.10.1 Southern section

Route Option 8 commences in Ballytivnan at the AbbVie roundabout on the N16 and travels offline in an easterly direction to intercept the N16 at Barroe before turning north and into Faughts where it intercepts a local road (L-3407-22). The alignment continues north into Doonally and crosses the N16 to a junction at the Drum road (L-3406-0).

Land use is mainly agricultural farm holdings with one-off residential houses and ribbon development. The topography along the alignment is undulating lowland and ranges from 30m OD to 60m OD. Land cover is improved grassland and land quality is generally good. Farming activity consists of dairy farming, beef and sheep production.

There will be a High impact on one farm holding in Barroe due to direct impact on farm buildings and landtake and severance. There will be a High impact on one farm holding in Barroe due to landtake and severance and the proximity of the alignment to the farmyard. There will be a High impact on four farm holdings arising from landtake and severance. There will be a Medium impact on a key dairy enterprise in Doonally due to landtake and severance. There is a farm house and two farmyards in close proximity to the route option. The remaining impacts on other farm holdings are Low to Medium.

5.4.10.2 Central section

From the Drum road (L-3406-0), the proposed route option moves offline before crossing the N16 before intercepting a local road (L-7415-0) in Drumkilsellagh. The route option continues north and intercepts the N16 and a local road (L-7413-0) in Lugatober. The local road (l-7413-0) is connected to the south via an offline link to the N16 and to the east via an accommodation underbridge to the N16.

Land use is grassland within a hilly topography and elevations between 60-110m OD. Land quality is average to good with farming activity based on grassland for beef and sheep production.

The route option will have a High impact on one farm holding in Collinsford arising from direct impacts on the farm house, farmyard and landtake and severance. There is a High impact on one farm holding in Lugatober arising from a direct impact on the farmyard and landtake and severance. There is a High impact on two farm holdings in Drumkilsellagh and Lugatober due to landtake and severance. There are three farm houses and one farm yard in close proximity to the route option. The impact on remaining farm holdings is Low to Medium.

5.4.10.3 Northern section

From Lugatober the alignment continues in a north easterly direction and intercepts a section of the N16 and local roads (L-34041-0 and L-3404-0) in Collinsford and Lugnagall. The route option continues to Gortnagrelly where it ends at the County Boundary. In Lugnagall the local road (L-3404-0) is realigned to the L-3441-0 via an offline link. The route option remains north of the N16 at Lugnagall and in Gortnagrelly overlies the N16 for the remainder of the route option.

The land use is agricultural consisting of farm holdings and a number of one-off residential houses. The lands are steeply sloping towards the Drumcliff River and Glencar Lake and range from 90m OD to 130m OD at the County Boundary. The land quality is generally average with marginal lands evident on more extensively managed holdings. The predominant farm enterprise is sheep with beef farming to a lesser extent.

There is a High impact on one farm holding due to the direct impact on farmyard buildings. The remaining farm holdings will have a mostly Low impact.

Summary details of the assessment of Option 3 sections are presented in Table 6-10 – Feasible Route Option 8.

5.4.11 **Option 9**

5.4.11.1 Southern section

Route Option 9 commences in Ballytivnan at the AbbVie roundabout on the N16 and travels offline in a north easterly direction to intercept the N16 at Barroe before turning north and into Faughts where it intercepts a local road (L-3407-22). The alignment continues north into Doonally and crosses the N16 to a junction at the Drum road (L-3406-0).

Land use is mainly agricultural farm holdings with one-off residential houses and ribbon development. The topography along the alignment is undulating lowland and ranges from 30m OD to 60m OD. Land cover is improved grassland and land quality is generally good. Farming activity consists of dairy farming, beef and sheep production.

There will be a High impact on a farm holding in Barroe due to a direct impact on the farmyard and landtake and severance. There is a High impact on one farm due to a farmyard impact and landtake and severance. There is a High impact on three farm holdings arising from landtake and severance. There is a Medium impact on a key dairy enterprise in Doonally due to landtake and severance. The remaining impacts on other farm holdings are Low to Medium.

5.4.11.2 Central section

From the Drum road (L-3406-0), the proposed route option moves offline before crossing the N16 before intercepting a local road (L-7415-0) in Drumkilsellagh. The route option continues north and intercepts the N16 and a local road (L-7413-0) in Lugatober. The local road (l-7413-0) is connected to

the south via an offline link to the N16 and to the east via an accommodation underbridge to the N16.

Land use is grassland with a hilly topography and elevations between 60-110m OD. Land quality is average to good with farming activity based on grassland for beef and sheep production.

The route option will have a High impact on one farm holding in Collinsford arising from a direct impact on the farm house and farmyard and landtake and severance. There will be a High impact on one farm holding in Lugatober due to a direct impact on the farmyard and landtake and severance. There is a High impact on two farm holdings due to landtake and severance. There are three farm houses and one farmyard in close proximity to the route option. The impact on remaining farm holdings is Low to Medium.

5.4.11.3 Northern section

From Lugatober the alignment continues in a north easterly direction and intercepts a section of the N16 and local roads (L-34041-0 and L-3404-0) in Collinsford and Lughnagall. The route option continues to Gortnagrelly where it ends at the County Boundary. In Lugnagall the local road (L-3404-0) is realigned to the L-34041-0 via an offline link. The route option remains north of the N16 at Lughnagall and in Gortnagrelly overlies the N16 for the remainder of the route option.

The land use is agricultural consisting of farm holdings and a number of one-off residential houses. The lands are steeply sloping towards the Drumcliff River and Glencar Lake and range from 90m OD to 130m OD at the County Boundary. The land quality is generally average with marginal lands evident on more extensively managed holdings. The predominant farm enterprise is sheep with beef farming to a lesser extent.

There is a High impact on one farm holding due to the landtake impact. There is a Medium impact on one farm holding due to the impact on the farmyard area. The remaining farm holdings will have a mostly Low impact.

Summary details of the assessment of Option 3 sections are presented in Table 6-11 – Feasible Route Option 9.

5.4.12 **Option 10**

5.4.12.1 Southern section

Route Option 10 is strategically placed between the existing N16 and N15 within the townland of Ballytivnan. It connects via a proposed roundabout, with links to the east (N16) and to the west (N15 via a local link). From the proposed roundabout, the route travels north to intercept a local road (L-7422-0) before turning north east where it intercepts a further local road (L-3407-0) in Carncash. It then intercepts a further local road (L-3406-0) known locally as the Drum Road.

Land use is mixed comprising of non-agricultural lands until the local road (L-7422-0) in Shannon Oughter. After this the land use is mainly agricultural farm holdings with one-off residential houses and ribbon development. The drumlin topography along the alignment consists of rolling hills and ranges from 10m OD to 60m OD. Land cover is improved grassland and land quality is generally good. Farming activity consists of dairy farming with beef and sheep production.

There will be a High impact on a farm holding on the Drum road (L-3406-0) resulting from a direct impact on a farmyard comprising of animal housing and other facilities. There is a High impact on a key dairy enterprise at Doonally arising from the landtake and severance of the alignment. The remaining impacts on other farm holdings are Low to Medium.

5.4.12.2 Central section

In a northern direction, the proposed route option overlies a section of the N16 before moving offline in Drumkilsellagh and running parallel to the N16. There is a link road from the existing N16 to the Drum road (L-3406-0). The route option intercepts a local road (L-7415-0) before it crosses the N16 and intercepts another local road (L-7413-0) in Lugatober. This local road (L-7413-0) is connected to the N16 to the south via a link road and to the N16 to the east via an access underbridge and offline link.

Land use is generally improved grassland with small areas of rough grazing. The topography is hilly with elevations between 60-110m OD and steeply sloping lands in the Castlegal and Lugatober townlands. Land quality is medium to good with farming activity based on grassland for beef and sheep production.

At the Drum local road (L-3406-0) the offline link to the N16 will sever lands. The FRO will have a High impact on two farm holdings in Castlegal and Lugatober arising from direct impacts on the farm house and farmyard and landtake and severance. The route option will have a High impact on one farm holding arising from the direct impact on a farm house in Lugatober. There is a further direct impact on a farmyard in Lugatober. There are two farm houses and one farmyard in close proximity to the route option. There is a High impact on one farm holding due to the severance involved. The impact on remaining farm holdings is Low to Medium.

5.4.12.3 Northern section

From Lugatober the alignment continues in a north easterly direction and intercepts a section of the N16 and local roads (L-34041-0 and L-3404-0) in Collinsford and Lugnagall. The route option overlies the N16 for a short section in Lugnagall and continues offline to the north of the N16 before intercepting the N16 again at Gortnagrelly where it proceeds to the County Boundary. In Lugnagall, the local road (L-34041-0) is realigned offline to the local road (L-3404-0) and route option.

The land use is agricultural consisting of farm holdings and a number of one-off residential houses. The lands are steeply sloping towards the Drumcliff River and Glencar Lake and range from 90m OD to 130m OD at the County Boundary. The land quality is generally average with marginal lands evident on more extensively managed holdings. The predominant farm enterprise is sheep with beef farming to a lesser extent.

There is a High impact on one farm holding in Gortnagrelly due to the direct impact on one farm house and adjoining farmyard buildings. There is a High impact on two farm holdings due to the landtake and severance impact. The remaining farm holdings will have a Low to Medium impact.

Summary details of the assessment of Option 10 sections are presented in Table 6-12 – Feasible Route Option 10.

5.4.13 **Option 11**

5.4.13.1 Southern section

Route Option 11 is strategically placed between the existing N16 and N15 within the townland of Ballytivnan. It connects via a proposed roundabout, with links to the east (N16) and to the west (N15 via a local link). From the proposed roundabout, the route travels north to intercept a local road (L-7422-0) before turning north east where it intercepts a further local road (L-3407-0) in Carncash. It then intercepts a further local road (L-3406-0) known locally as the Drum Road.

Land use is mixed comprising of non-agricultural lands until the local road (L-7422-0) in Shannon Oughter. After this the land use is mainly agricultural farm holdings with one-off residential houses and ribbon development. The drumlin topography along the alignment consists of rolling hills and ranges from 10m OD to 60m OD. Land cover is improved grassland and land quality is generally good. Farming activity consists of dairy farming with beef and sheep production.

There will be a High impact on a farm holding on the Drum road (L-3406-0) resulting from a direct impact on a farmyard comprising of animal housing and other facilities. There is a High impact on a key dairy enterprise at Doonally arising from the landtake and severance of the alignment. The remaining impacts on other farm holdings are Low to Medium.

5.4.13.2 Central section

In a northern direction, the proposed route option overlies a section of the N16 before moving offline in Drumkilsellagh and running parallel to the N16. There is a link road from the existing N16 to the Drum road (L-3406-0). The route option intercepts a local road (L-7415-0) before it crosses the N16 and intercepts another local road (L-7413-0) in Lugatober. This local road (L-7413-0) is connected to the N16 to the south via a link road and to the N16 to the east via an access underbridge and offline link.

Land use is generally improved grassland with small areas of rough grazing. The topography is hilly with elevations between 60-110m OD and steeply sloping lands in the Castlegal and Lugatober townlands. Land quality is medium to good with farming activity based on grassland for beef and sheep production.

At the Drum local road (L-3406-0) the offline link to the N16 will sever lands. The FRO will have a High impact on two farm holdings in Castlegal and Lugatober arising from direct impacts on the farm house and farmyard and landtake and severance. The route option will have a High impact on one farm holding arising from the direct impact on a farm house in Lugatober. There is a further direct impact on a farmyard in Lugatober. There are two farm houses and one farmyard in close proximity to the route option. There is a High impact on one farm holding due to the severance involved. The impact on remaining farm holdings is Low to Medium.

5.4.13.3 Northern section

From Lugatober the alignment continues in a north easterly direction and intercepts a section of the N16 and local roads (L-34041-0 and L-3404-0) in Collinsford and Lugnagall. The route option overlies the N16 for a short section in Lugnagall and continues offline north of the N16 before intercepting the local road (L-7411-0) at Gortnagrelly. From here the route option remains offline and north of the N16 and proceeds through Gortnagrelly to the County Boundary. In Lugnagall the local road (L-3404-0) is realigned offline to the local road (L-34041-0) and the route option.

The land use is agricultural consisting of farm holdings and a number of one-off residential houses. The lands are steeply sloping towards the Drumcliff River and Glencar Lake and range from 90m OD to 130m OD at the County Boundary. The land quality is generally average with marginal lands evident on more extensively managed holdings. The predominant farm enterprise is sheep with beef farming to a lesser extent.

There is a High impact on one farm holding in Gortnagrelly due to the direct impact on farmyard buildings. There is a High impact on five farm holdings due to the landtake and severance impact. The remaining farm holdings will have a Low to Medium impact.

Summary details of the assessment of Option 11 sections are presented in Table 6-13 – Feasible Route Option 11.

5.4.14 Summary of Feasible Route Options

An overall summary of the assessment of the Feasible Route Options is presented in *Table 5-4* and *Table 5-5*.

Table 5-4: Overall summary of agricultural property assessment

Feasible Route Option	Southern Section		Central Section		Northern Section	
	Impact	Preference	Impact	Preference	Impact	Preference
1A	Moderate Negative	Medium Preference	Major Negative	Very Low Preference	Moderate Negative	Medium Preference
1A / 1B	Major Negative	Low Preference	Major Negative	Very Low Preference	Moderate Negative	Medium Preference
2A	Major Negative	Very Low Preference	Major Negative	Very Low Preference	Moderate Negative	Medium Preference
2A / 2B	Major Negative	Very Low Preference	Major Negative	Very Low Preference	Moderate Negative	Medium Preference
3	Major Negative	Very Low Preference	Major Negative	Very Low Preference	Moderate Negative	Medium Preference
4	Major Negative	Very Low Preference	Major Negative	Low Preference	Moderate Negative	Medium Preference
5	Major Negative	Very Low Preference	Major Negative	Very Low Preference	Major Negative	Very Low Preference
6	Major Negative	Very Low Preference	Major Negative	Very Low Preference	Major Negative	Very Low Preference
7	Major Negative	Low Preference	Major Negative	Very Low Preference	Moderate Negative	Medium Preference
8	Major Negative	Low Preference	Major Negative	Low Preference	Moderate Negative	Medium Preference
9	Major Negative	Low Preference	Major Negative	Low Preference	Moderate Negative	Medium Preference
10	Major Negative	Very Low Preference	Major Negative	Very Low Preference	Major Negative	Low Preference
11	Major Negative	Very Low Preference	Major Negative	Very Low Preference	Moderate Negative	Medium Preference

Table 5-5: Preference Ranking (Agriculture)

Section	Feasible Route Option												
	1A	1A/B	2A	2A/B	3	4	5	6	7	8	9	10	11
South	3	3	5	5	5	5	5	5	4	4	4	5	5
Middle	5	5	5	5	5	4	5	5	5	4	4	5	5
North	3	3	3	3	3	3	5	5	3	3	3	4	3
Overall	4	4	4	4	4	4	5	5	4	4	4	5	4

5.5 Refined Route Corridor Option Assessment

5.5.1 **Option 1A-V2**

5.5.1.1 Southern section

Route Option 1A-V2 commences in Teesan at a junction with the N15 and travels in an easterly direction to an underbridge of the Ballytivnan local road (L-7421-0) in Teesan / Carnacash and on towards Doonally before turning north and crossing the Drum local road (L-3406-0). The route option will require online widening of short sections of the existing N15 north and south of the roundabout junction with the N15.

Land use is mainly agricultural farm holdings with one-off residential houses and ribbon development on local roads. The drumlin topography along the alignment consists of rolling hills and generally ranges from 40m OD to 60m OD. The land quality is moderate and improving to good towards Doonally. Farming activity is grassland based centred around beef, sheep and dairy enterprises.

On this section there is a High impact on one farm holding due to landtake and severance. The alignment will be in close proximity to one farmhouse and a farmyard in Teesan. There is a Low impact on a Key dairy enterprise at Doonally. The impact on the remaining farm holdings will be Low to Medium.

Summary details of the assessment of Option 1A-V2 are presented in Table 6-14.

5.5.2 **Option 1A/1B-V2**

5.5.2.1 Southern section

Route Option 1A/1B-V2 commences at Duck Street in Sligo town at the junction between the N16 and N4/N15 and extends to the R291 Junction with online widening to Dual Carriageway standard and junction improvements. The route option continues north and online to the proposed Cartron Link roundabout junction and to the proposed roundabout with Scotsman's Walk. Following the Scotsman's Walk East Junction the route option will change to a Single Carriageway standard and extend north and online with localised widening and improvements to the existing N15. Improvements to the N15 section of this FRO terminate approximately 250m north of the proposed roundabout with the N16 in Teesan. The FRO then travels in an easterly direction to an underbridge of the Ballytivnan local road (L-7421-0) in Teesan / Carnacash and on towards Doonally before turning north and crossing the Drum local road (L-3406-0). The route option will require online widening of short sections of the existing N15 north and south of the roundabout junction with the N15.

Land use along Route Option 1A/1B is a diverse property mix including residential, commercial, community, development and agricultural property. These properties consist of those with direct access off the N15 and properties that do not directly access the N15.

From the start of the route option to the Scotsman's Walk East Junction, agricultural properties with direct access include one farm holding with access onto the N15. The route option topography is low-lying with elevations rising from 10m OD in Sligo town to a peak of 30m OD in Lisnalurg. The agricultural lands between Cartron Link junction and Scotsman's Walk East Junction are good quality grassland and are part of a Key dairy enterprise in Shannon Eighter.

North of the Scotsman's Walk Junction the properties that directly access the N15 include one-off residential houses, farm holdings and agricultural access to farmyards and lands in Lisnalurg and Teesan. Junction improvements are proposed for local roads (L-3411-0, L-7316-0 and the L-3407-0). The route option is low-lying with elevations varying from 30m OD to 40m OD until Teesan. The agricultural lands from Scotsman's Walk Junction to the Teesan junction are average to good in quality and are used for beef and sheep production.

There will be a High impact on a farm holding in Lisnalurg due to the impact on the farmyard. There will be a High impact on a farm holding in Carncash due to landtake and severance. There will be a Medium impact on the key dairy enterprise in Shannon Eighter and a Low impact on the key dairy enterprise in Doonally. The impact on the remaining farm holdings will be Low to Medium.

Summary details of the assessment of Option 1A/1B-V2 are presented in Table 6-15.

5.5.3 **Option 2A-V2**

5.5.3.1 Southern section

Route Option 2A-V2 commences in Shannon Eighter at a roundabout junction with the N15 and travels east towards an underbridge of the local road (L-7422-0) in Drumcliff East and a junction with local road (L-7421-0) in Rathbraghan. The route takes a north easterly direction intercepting a local road (L-3407-0) in Carncash and the Drum local road (L-3406-0).

Land use is mainly agricultural farm holdings with one-off residential houses and ribbon development, particularly in Shannon Eighter and on the Drum local road (L-3406-0). In Rathbraghan, there are development lands that are currently in agricultural use. The drumlin topography along the alignment consists of rolling hills and ranges from 10m OD to 60m OD. Land cover is improved grassland with small strips of woodland and land quality is generally good. Farming activity consists of dairy farming with beef and sheep production.

At the junction with the N15 at Shannon Eighter, there is a High impact on a key dairy enterprise arising from the landtake and severance associated with the alignment, direct impact on the farmyard and proximity to the farm house. There will be a High impact on a farm holding on the Drum road (L-3406-0) resulting from a direct impact on a farmyard comprising of animal housing and other facilities. There is a High impact on a Key dairy enterprise at Doonally arising from the landtake and severance of the alignment. The remaining impacts on other farm holdings are Low to Medium.

Summary details of the assessment of Option 2A-V2 are presented in Table 6-16.

5.5.4 **Option 2A/2B-V2**

5.5.4.1 Southern section

Route Option 2A/2B-V2 commences at Duck Street in Sligo town at the junction between the N16 and N4/N15 and extends to the R291 Junction with online widening to Dual Carriageway standard and junction improvements. The route option continues north and online to the proposed Cartron Link roundabout junction, it then extends to a further proposed roundabout with the proposed N16 and Scotsman's Walk. From this roundabout the FRO travels in an easterly direction towards an underbridge of the local road (L-7422-0) in Drumcliff East and a junction with local road (L-7421-0) in RathbraghanThe route takes a north easterly direction intercepting a local road (L-3407-0) in Carncash and the Drum local road (L-3406-0).

Land use along the route option is a diverse property mix including residential, commercial, community, development and agricultural property. These properties consist of those with direct access off the N15 and properties that do not directly access the N15.

From the start of the route option to the roundabout proposed with the N16/Scotsman's walk, agricultural properties include one farm holding with direct access onto the N15. The route option topography is low-lying with elevations rising from 10m OD in Sligo town to a peak of 30m OD in Lisnalurg. The agricultural lands between the Cartron Link junction and the N16/Scotsman's Walk Junction are good quality grassland and are part of a key dairy enterprise in Shannon Eighter. Land use on the offline section is mainly agricultural farm holdings with one-off residential houses and ribbon development, particularly in Shannon Eighter and on the Drum local road (L-3406-0). In Rathbraghan, there are development lands that are currently in agricultural use. The drumlin topography along the alignment consists of rolling hills and ranges from 10m OD to 60m OD. Land cover is improved grassland with small strips of woodland and land quality is generally good. Farming activity consists of dairy farming with beef and sheep production

At the junction with the N15 at Shannon Eighter, there is a High impact on a key dairy enterprise arising from the landtake and severance associated with the alignment, direct impact on the farmyard and proximity to the farm house. There will be a High impact on a key dairy enterprise in Doonally due to landtake and severance. There will be a High impact on a farm holding on the Drum road (L-3406-0) resulting from a direct impact on a farmyard comprising of animal housing and other facilities. The impact on the remaining farm holdings will be Low to Medium.

Summary details of the assessment of Option 2A/2B-V2 are presented in Table 6-17.

5.5.5 **Option 5**

5.5.5.1 Southern section

Route Option 5 commences in Ballytivnan at the AbbVie roundabout on the N16 and travels in a north easterly direction through Rathbraghan before turning north where it overlies the N16 at a junction with two local roads (L-7422-0 and L-3407-0). The route option continues north through Doonally, before it intercepts the Drum road (L-3406-0) in the townland of Drumkilsellagh.

Land use is mainly agricultural farm holdings with one-off residential houses and ribbon development. The topography along the alignment is undulating lowland and ranges from 30m OD to 60m OD. Land cover is improved grassland and land quality is generally good. Farming activity consists of dairy farming, beef and sheep production.

There will be a High impact on a farm holding on the Drum road (L-3406-0) resulting from a direct impact on a farmyard comprising of animal housing and other facilities. There is a High impact on a Key dairy enterprise due to landtake and severance and the proximity of the alignment to the farmyard. There is a High impact on one farm holding arising from landtake and severance. The remaining impacts on other farm holdings are Low to Medium.

5.5.5.2 Central section

In a northern direction, the proposed route option overlies a section of the N16 before moving offline in Drumkilsellagh and running parallel to the N16. The route option connects to a link road from the existing N16 to the Drum road (L-3406-0). The route option intercepts a local road (L-7415-0) in Castlegal, the N16 and another local road (L-7413-0) in Lugatober. This local road (L-7413-0) is connected to the N16 via an offline link road to the west and online link to the east.

Land use is generally improved grassland with small areas of rough grazing. The topography is hilly with elevations between 60-110m OD and steeply sloping lands in the Castlegal and Lugatober townlands. Land quality is average to good with farming activity based on grassland for beef and sheep production.

At the Drum local road (L-3406-0) the offline link to the N16 will sever lands. There will be a High impact on two farm holdings in Castlegal and Collinsford arising from direct impacts on the farm house, farmyard and landtake and severance. There is a Medium impact on one farm holding due to a direct impact on a farmyard in Drumkilsellagh. There are three farm houses and one farmyard in close proximity to the route option. There is a High impact on one farm holding due to the severance involved. The impact on remaining farm holdings is mostly Medium.

Summary details of the assessment of Option 5 are presented in Table 6-18.

5.5.6 **Option 8-V2**

5.5.6.1 Central section

From the Drum road (L-3406-0), the route option moves offline before crossing the N16 and intercepting a local road (L-7415-0) in Drumkilsellagh. The route option continues north and intercepts the N16 and a local road (L-7413-0) in Lugatober. The local road (L-7413-0) is connected to the south via an offline link to the N16 and to the east via an accommodation underbridge to the N16.

Land use is grassland within a hilly topography and elevations between 60-110m OD. Land quality is average to good with farming activity based on grassland for beef and sheep production.

There is a High impact on one farm holding in Lugatober arising from a direct impact on the farmyard and landtake and severance. There is a High impact on two farm holdings in Drumkilsellagh and Lugatober due to landtake and severance. The route option will have a Medium impact on one farm holding in Collinsford arising from impact on a workshop, farmyard area and landtake and severance. There are three farm houses and one farm yard in close proximity to the route option. The impact on remaining farm holdings is Low to Medium.

5.5.6.2 Northern section

This section commences at the crossing of an underbridge for local roads (L-34041-0 and L-3404-0) to Collinsford and Lugnagall. It remains offline in a north easterly direction before intercepting the local road (L-7411-0) at Gortnagrelly. From here the route option remains online with the local road

(L-7411-0) and N16 to the County Boundary. In Lugnagall, the Collinsford local road (L-3441-0) is realigned to local road (L-3404-0) and subsequently to the existing N16 via an underbridge.

The land use is agricultural consisting of farm holdings and a number of one-off residential houses. The lands are steeply sloping towards the Drumcliff River and Glencar Lake and range from 90m OD to 130m OD at the County Boundary. The land quality is generally average with marginal lands evident on more extensively managed holdings. The predominant farm enterprise is sheep with beef farming to a lesser extent.

There is a High impact on one farm holding in Collinsford due to the direct impact on the dwelling house. The remaining farm holdings will have a mostly Low impact.

Summary details of the assessment of Option 8-V2 are presented in Table 6-19.

5.5.7 **Option 12**

5.5.7.1 Southern section

Route Option 12 commences in Ballytivnan at the AbbVie roundabout on the N16 and travels offline in an easterly direction to intercept the N16 at Barroe and into Faughts before turning north where it intercepts a local road (L-3407-22). The alignment continues north into Doonally and crosses the N16 to a junction at the Drum road (L-3406-0).

Land use is mainly agricultural farm holdings with one-off residential houses and ribbon development. The topography along the alignment is undulating lowland and ranges from 30m OD to 60m OD. Land cover is improved grassland and land quality is generally good. Farming activity consists of dairy farming, beef and sheep production.

There will be a High impact on five farm holdings in Barroe, Faughts and Doonally (Calry ED) due to landtake and severance. There will be a Medium impact on a key dairy enterprise in Doonally (Drumcliff East ED) due to landtake and severance. There is a farm house in Doonally (Calry ED) and two farmyards in Doonally (Drumcliff East ED) and Drumkillsellagh that are in close proximity to the route option. The remaining impacts on other farm holdings are Low to Medium.

5.5.7.2 Central section

From the Drum road (L-3406-0), the proposed route option continues offline in a northerly direction before intercepting the N16 and a local road (L-7415-0) in Drumkilsellagh / Castlegal. The route option intercepts the N16 again and a local road (L-7413-0) in Lugatober. There is a junction with the local road (L-7413-0) to the west and N16 to the east. The section continues offline to the Lugnagall townland boundary.

Land use is grassland with a hilly topography and elevations between 60-110m OD. Land quality is average to good with farming activity based on grassland for beef and sheep production.

The Refined Route Option will have a High impact on one farm holding in Lugatober arising from direct impacts on the farm house, farmyard and landtake and severance. There is a High impact on three farm holdings in Drumkilsellagh and Lugatober due to landtake and severance. There is a Medium impact on one farm holding in Collinswood due to impact on a workshop, farmyard area and landtake and severance. There is one farm house in Drumcliff East in close proximity to the route option. The impact on remaining farm holdings is Low to Medium.

5.5.7.3 Northern section

This section commences at a junction for local roads (L-34041-0 and L-3404-0) to Collinsford and Lugnagall. The route option overlies the N16 for a short section in Lugnagall and continues north and offline before intercepting the local road (L-7411-0) at Gortnagrelly. From here the route option remains online with the local road (L-7411-0) and N16 to the County Boundary. The Collinsford local road (L-34041-0) is realigned offline to the local road (L-3404-0).

The land use is agricultural consisting of farm holdings and a number of one-off residential houses. The lands are steeply sloping towards the Drumcliff River and Glencar Lake and range from 90m OD to 130m OD at the County Boundary. The land quality is generally average with marginal lands evident on more extensively managed holdings. The predominant farm enterprise is sheep with beef farming to a lesser extent.

There is a Medium impact on one farm holding in Lugnagall and one farm holding in Gortnagrelly due to the landtake and severance impact. The remaining farm holdings will have a Low impact.

Summary details of the assessment of Option 12 sections are presented in Table 6-20.

5.5.8 **Option 12-V2**

5.5.8.1 Northern section

From Lugatober commences at a junction for local roads (L-34041-0 and L-3404-0) to Collinsford and Lugnagall. The route option overlies the N16 to a short offline realignment section at Gortnagrelly after which it remains online with the N16 until the County Boundary. The proposed junction involves the realignment of the Collinsford local road (L-34041-0) onto the Lugnagall local road (L-3404-0) and a single connection to the N16.

The land use is agricultural consisting of farm holdings and a number of one-off residential houses. The lands are steeply sloping towards the Drumcliff River and Glencar Lake and range from 90m OD to 130m OD at the County Boundary. The land quality is generally average with marginal lands evident on more extensively managed holdings. The predominant farm enterprise is sheep with beef farming to a lesser extent.

All farm holdings will have a Low to Medium impact.

Summary details of the assessment of Option 12-V2 are presented in Table 6-21.

5.5.9 **Option 12-Alternative Junctions (J1, J2 and J3)**

This is an assessment of junction options at Collinsford on Refined Option 12.

5.5.9.1 Junction 1

This section commences in Lugatober at Ch. 5+020m and continues to the proposed junction with the Collinsford local road (L-34041-0) and Lugnagall local road (L-3404-0). The section remains online with the N16 until Ch. 6+200m. The proposed junction involves the realignment of the Collinsford local road (L-34041-0) onto the Lugnagall local road (L-3404-0) and a single connection to the N16.

Land use is grassland with a hilly topography and elevations between 80-90m OD. Land quality is average to good with farming activity based on grassland for beef and sheep production.

The Refined Route Option will have a High impact on one farm holding in Lugatober arising from landtake and severance. There is a Medium impact on one farm holding in Collinswood due to

impact on a workshop, farmyard area and landtake and severance. The impact on remaining farm holdings is Low to Medium.

5.5.9.2 Junction 2

This section commences in Lugatober at Ch. 5+020m and continues to the proposed junction with the Collinsford local road (L-34041-0) and Lugnagall local road (L-3404-0). The section remains online with the N16 until Ch. 6+200m. The proposed junction involves two separate connections onto the N16 for the Collinsford local road (L-34041-0) onto the Lugnagall local road (L-3404-0).

Land use is grassland with a hilly topography and elevations between 80-90m OD. Land quality is average to good with farming activity based on grassland for beef and sheep production.

The Refined Route Option will have a High impact on one farm holding in Lugatober arising from landtake and severance. There is a Medium impact on one farm holding in Collinswood due to impact on a farmyard area and landtake and severance. The impact on remaining farm holdings is Low to Medium.

5.5.9.3 Junction 3

This section commences in Lugatober at Ch. 5+020m and continues to the proposed junction with the Collinsford local road (L-34041-0) and Lugnagall local road (L-3404-0). The section remains online with the N16 until Ch. 6+200m. The proposed junction involves the realignment of the Collinsford local road (L-34041-0) onto the Lugnagall local road (L-3404-0) and a single connection to the N16.

Land use is grassland with a hilly topography and elevations between 80-90m OD. Land quality is average to good with farming activity based on grassland for beef and sheep production.

The Refined Route Option will have a High impact on one farm holding in Lugatober arising from landtake and severance. There is a Medium impact on one farm holding in Collinswood due to impact on a farmyard area and landtake and severance. The impact on remaining farm holdings is Low to Medium.

Summary details of the assessment of junction options for Refined Option 12 are presented in Table 6-22: Option 12 – Collinsford Junctions.

5.5.10 Summary of Refined Route Options

An overall summary of the assessment of the Refined Route Options is presented in *Table 5-6*.

Table 5-6: Overall summary of agricultural property assessment

Refined Route Option	Southern Section		Central Section		Northern Section	
	Impact	Preference	Impact	Preference	Impact	Preference
1A	Moderate Negative	Medium Preference	N/A	N/A	N/A	N/A
1A / 1B	Moderate Negative	Medium Preference	N/A	N/A	N/A	N/A
2A	Major Negative	Very Low Preference	N/A	N/A	N/A	N/A

Refined Route Option	Southern Section		Central Section		Northern Section	
	Impact	Preference	Impact	Preference	Impact	Preference
2A / 2B	Major Negative	Very Low Preference	N/A	N/A	N/A	N/A
5	Major Negative	Very Low Preference	Major Negative	Very Low Preference	N/A	N/A
8	N/A	N/A	Major Negative	Low Preference	Moderate Negative	Medium Preference
12	Major Negative	Low Preference	Major Negative	Low Preference	Minor Negative	High Preference
12 V2	N/A	N/A	N/A	N/A	Minor Negative	High Preference
13	Neutral	High Preference	N/A	N/A	N/A	N/A
Junction Option	Junction 1		Junction 2		Junction 3	
	Impact	Preference	Impact	Preference	Impact	Preference
12 J3	Moderate Negative	Medium Preference	Minor Negative	High Preference	Moderate Negative	Medium Preference

Table 5-7: Agricultural Property – Preferences

Section	Refined Route Option														
	1A (v2)	1A/B (v2)	2A (v2)	2A/B (v2)	3	4	5	6	7	8 (v2)	9	10	11	12	12 (v2)
South	3	3	5	5	n/a	n/a	5	n/a	n/a	ref 12	n/a	n/a	n/a	4	ref 12
Central	ref 8-v2	ref 8-v2	ref 5	ref 5	n/a	n/a	5	n/a	n/a	4	n/a	n/a	n/a	4	ref 12
North	ref 8-v2	ref 8-v2	ref 8-v2	ref 8-v2	n/a	n/a	ref 8-v2	n/a	n/a	3	n/a	n/a	n/a	2	2
Overall	3	3	4	4	n/a	n/a	4	n/a	n/a	4	n/a	n/a	n/a	3	3

5.6 Mitigation

The design of Feasible Route Options has, where possible, avoided agricultural constraints such as dwelling houses, farmyard and key agricultural enterprises. The discounting of Feasible Route Option sections during the selection process together with the design of modifications sections and subsequently included in the Refined Route Options has further considered such constraints.

The final design of the route alignment will include provision for a suite of measures to mitigate agricultural impacts such as land severance, impact on field drainage, interruption of water / power supplies / access to drinking points. It will include further measures dealing with the mitigation of construction and operation impacts on agriculture and non-agricultural property from noise, dust, visual impacts, etc.

For agricultural properties directly impacted by the compulsory purchase of lands, monetary compensation for land acquisition and disturbance will be agreed following the approval of the scheme.

5.7 Conclusions

This study involved a comparative assessment of the impact of Route Options for the N16 Sligo to County Boundary road project on agricultural property. This involved a quantitative assessment of the impact of route options on agricultural property comprising of farm houses, farmyards and agricultural lands. Each section of the Feasible Route Options was assessed using the impact criteria as presented in Table 5-3: Impact assessment criteria for Route Options. An overall summary of the study findings is presented in Table 5-4.

For the Southern section of the study area, the impact on agricultural property was deemed to be Moderate Negative on Feasible Route Options 1A and 1A / 1B resulting in a Medium preference. The impact was deemed to be Major on the remaining options with a Low preference on Options 7, 8 and 9 and a Very Low preference on Options 2A, 2A / 2B, 3, 4, 5, 6, 10 and 11.

For the Central section, the impact on agricultural property was deemed to be Major Negative on all route options with a Low preference on Feasible Route Options 4, 8 and 9 and a Very Low preference on Options 1A, 1A / 1B, 2A, 2A / 2B, 3, 5, 6, 7, 10 and 11.

On the Northern section, the impact on agricultural property was deemed to be Moderate Negative on Options 1A, 1A / 1B, 2A, 2A / 2B, 3, 4, 7, 8, 9 and 11 resulting in a Medium preference. There is a Major Negative impact on the remaining options with a Low preference on Option 10 and a Very Low preference on Options 5 and 6.

Following the completion of the Preliminary Options Assessment and discussions at the multi-disciplinary workshop a comparative assessment was undertaken on the impact of the Refined Route Options on agricultural property.

For the Southern section of the study area, the impact on agricultural property was deemed to be Neutral on Refined Route Option 13 resulting in a Very High Preference. The impact was deemed to be Moderate Negative on Refined Route Options 1A-V2, 1A / 1B-V2 resulting in a Medium preference. The impact was deemed to be Major on the remaining options with a Low preference on Refined Route Option 12 and a Very Low preference on Refined Route Options 2A, 2A / 2B-V2 and 5.

For the Central section, the impact on agricultural property was deemed to be Major Negative all options resulting in a Low Preference on Refined Route Options 8-V2 and 12 and a Very Low preference on Refined Route Options 5.

For the Northern section, the impact on agricultural property was deemed to be Minor Negative on Refined Route Option 12, 12-V2 resulting in a High preference. The impact is Moderate Negative on Refined Route Options 8-V2 resulting in a Medium preference.

For the junction assessment at Collinswood on Refined Route Option 12, the impact on agricultural property was deemed to be Minor Negative on Junction Option 2 resulting in a High preference. The impact was deemed to be Moderate Negative on Junction Options 1 and 3 resulting in a Medium preference.

6 Agricultural Property Appendices

Table 6-1: Feasible Route Option 1A

Assessment criteria	Southern		Central		Northern		Total	
Route corridor option details								
Physical length of route option (km)							7.125km	
Length considering additional Urban Links (km)							2.500km	
Total journey length (km)							9.625km	
Estimated landtake – based on physical works length (ha)							35.625ha	
Agricultural property								
Land use (% holdings)	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Grassland	18	100	11	78.6	13	92.9	42	91.3
Rough Grassland / Scrub	0	0	2	14.3	1	7.1	3	6.5
Forestry, Woodland	0	0	1	7.1	0	0	1	2.2
	18	**100**	**14**	**100**	**14**	**100**	**46**	**100**
Land quality (% holdings)								
Good	5	27.8	0	0	3	21.4	8	17.4
Average	13	72.2	11	78.6	10	71.5	34	73.9
Poor	0	0	3	21.4	1	7.1	4	8.7
	18	**100**	**14**	**100**	**14**	**100**	**46**	**100**
Land impact / severance (% holdings)								
High	1	5.5	7	50.0	0	0	8	17.4
Medium	5	27.8	3	21.4	5	35.7	13	28.3
Low	12	66.7	4	28.6	9	64.3	25	54.3
	18	**100**	**14**	**100**	**14**	**100**	**46**	**100**
Agricultural property (No.)								
Farm houses	0		4		0		4	
Farmyards	0		4		0		4	
Key agricultural enterprises (No.)								
Dairy	1		0		0		1	
Equine	0		0		0		0	
Beef / Other	0		0		0		0	
Agricultural property impact	**Moderate Negative**		**Major Negative**		**Moderate Negative**			
Preference	**Medium Preference**		**Very Low Preference**		**Medium Preference**			

Table 6-2: Feasible Route Option 1A/1B

Assessment criteria	Southern		Central		Northern		Total	
Route corridor option details								
Physical length of route option (km)							9.625km	
Length considering additional Urban Links (km)							0km	
Total journey length (km)							9.625km	
Estimated landtake – based on physical works length (ha)							48.125ha	
Agricultural property								
Land use (% holdings)	No.	%	No.	%	No.	%	No.	%
Grassland	23	100	11	78.6	13	92.9	47	92.2
Rough Grassland / Scrub	0	0	2	14.3	1	7.1	3	5.9
Forestry, Woodland	0	0	1	7.1	0	0	1	1.9
	23	**100**	**14**	**100**	**14**	**100**	**51**	**100**
Land quality (% holdings)								
Good	8	34.8	0	0	3	21.4	11	21.6
Average	15	65.2	11	78.6	10	71.5	36	70.6
Poor	0	0	3	21.4	1	7.1	4	7.8
	23	**100**	**14**	**100**	**14**	**100**	**51**	**100**
Land impact / severance (% holdings)								
High	2	8.7	7	50.0	0	0	9	17.6
Medium	6	26.1	3	21.4	5	35.7	14	27.5
Low	15	65.2	4	28.6	9	64.3	28	54.9
	23	**100**	**14**	**100**	**14**	**100**	**51**	**100**
Agricultural property (No.)								
Farm houses	0		4		0		4	
Farmyards	1		4		0		5	
Key agricultural enterprises (No.)								
Dairy	2		0		0		2	
Equine	0		0		0		0	
Beef / Other	0		0		0		0	
Agricultural property impact	**Moderate Negative**		**Major Negative**		**Moderate Negative**			
Preference	**Medium Preference**		**Very Low Preference**		**Medium Preference**			

Table 6-3: Feasible Route Option 2A

Assessment criteria	Southern		Central		Northern		Total	
Route corridor option details								
Physical length of route option (km)							8.180km	
Length considering additional Urban Links (km)							1.180km	
Total journey length (km)							9.360km	
Estimated landtake – based on physical works length (ha)							46.800ha	
Agricultural property								
Land use (% holdings)	No.	%	No.	%	No.	%	No.	%
Grassland	11	78.6	11	91.7	13	86.7	35	85.4
Rough Grassland / Scrub	3	21.4	1	8.3	2	13.3	6	14.6
Forestry, Woodland	0	0	0	0	0	0	0	0
	14	**100**	**12**	**100**	**15**	**100**	**41**	**100**
Land quality (% holdings)								
Good	6	42.9	1	8.3	3	20.0	10	24.4
Average	5	35.7	10	83.4	10	66.7	25	61.0
Poor	3	21.4	1	8.3	2	13.3	6	14.6
	14	**100**	**12**	**100**	**15**	**100**	**41**	**100**
Land impact / severance (% holdings)								
High	3	21.4	5	41.7	0	0	8	19.5
Medium	5	35.7	3	25.0	5	33.3	13	31.7
Low	6	42.9	4	33.3	10	66.7	20	48.8
	14	**100**	**12**	**100**	**15**	**100**	**41**	**100**
Agricultural property (No.)								
Farm houses	0		4		0		4	
Farmyards	2		3		1		6	
Key agricultural enterprises (No.)								
Dairy	2		0		0		2	
Equine	0		0		0		0	
Beef / Other	0		0		0		0	
Agricultural property impact	**Major Negative**		**Major Negative**		**Moderate Negative**			
Preference	**Very Low Preference**		**Very Low Preference**		**Medium Preference**			

Table 6-4: Feasible Route Option 2A/2B

Assessment criteria	Southern		Central		Northern		Total	
Route corridor option details								
Physical length of route option (km)							9.360km	
Length considering additional Urban Links (km)							0km	
Total journey length (km)							9.360km	
Estimated landtake – based on physical works length (ha)							46.800ha	
Agricultural property								
Land use (% holdings)	No.	%	No.	%	No.	%	No.	%
Grassland	11	78.6	11	91.7	13	86.7	35	85.4
Rough Grassland / Scrub	3	21.4	1	8.3	2	13.3	6	14.6
Forestry, Woodland	0	0	0	0	0	0	0	0
	14	**100**	**12**	**100**	**15**	**100**	**41**	**100**
Land quality (% holdings)								
Good	6	42.9	1	8.3	3	20.0	10	24.4
Average	5	35.7	10	83.4	10	66.7	25	61.0
Poor	3	21.4	1	8.3	2	13.3	6	14.6
	14	**100**	**12**	**100**	**15**	**100**	**41**	**100**
Land impact / severance (% holdings)								
High	3	21.4	5	41.7	0	0	8	19.5
Medium	5	35.7	3	25.0	5	33.3	13	31.7
Low	6	42.9	4	33.3	10	66.7	20	48.8
	14	**100**	**12**	**100**	**15**	**100**	**41**	**100**
Agricultural property (No.)								
Farm houses	0		4		0		4	
Farmyards	2		3		1		6	
Key agricultural enterprises (No.)								
Dairy	2		0		0		2	
Equine	0		0		0		0	
Beef / Other	0		0		0		0	
Agricultural property impact	**Major Negative**		**Major Negative**		**Moderate Negative**			
Preference	**Very Low Preference**		**Very Low Preference**		**Medium Preference**			

Table 6-5: Feasible Route Option 3

Assessment criteria	Southern		Central		Northern		Total	
Route corridor option details								
Physical length of route option (km)							8.220km	
Length considering additional Urban Links (km)							1.900km	
Total journey length (km)							10.120km	
Estimated landtake – based on physical works length (ha)							50.600ha	
Agricultural property								
Land use (% holdings)	No.	%	No.	%	No.	%	No.	%
Grassland	8	88.9	11	91.7	13	86.7	32	88.9
Rough Grassland / Scrub	1	11.1	1	8.3	2	13.3	4	11.1
Forestry, Woodland	0	0	0	0	0	0	0	0
	9	**100**	**12**	**100**	**15**	**100**	**36**	**100**
Land quality (% holdings)								
Good	4	44.45	1	8.3	3	20.0	8	22.2
Average	4	44.45	10	83.4	10	66.7	24	66.7
Poor	1	11.1	1	8.3	2	13.3	4	11.1
	9	**100**	**12**	**100**	**15**	**100**	**36**	**100**
Land impact / severance (% holdings)								
High	2	22.2	4	33.3	0	0	6	16.7
Medium	4	44.45	5	41.7	4	26.7	13	36.1
Low	3	33.3	3	25.0	11	73.3	17	47.2
	9	**100**	**12**	**100**	**15**	**100**	**36**	**100**
Agricultural property (No.)								
Farm houses	0		3		0		3	
Farmyards	1		3		1		5	
Key agricultural enterprises (No.)								
Dairy	1		0		0		1	
Equine	0		0		0		0	
Beef / Other	0		0		0		0	
Agricultural property impact	**Major Negative**		**Major Negative**		**Moderate Negative**			
Preference	**Very Low Preference**		**Very Low Preference**		**Medium Preference**			

Table 6-6: Feasible Route Option 4

Assessment criteria	Southern		Central		Northern		Total	
Route corridor option details								
Physical length of route option (km)							8.310km	
Length considering additional Urban Links (km)							1.900km	
Total journey length (km)							10.210km	
Estimated landtake – based on physical works length (ha)							51.500ha	
Agricultural property								
Land use (% holdings)	No.	%	No.	%	No.	%	No.	%
Grassland	8	88.9	10	90.9	13	86.7	31	88.6
Rough Grassland / Scrub	1	11.1	1	9.1	2	13.3	4	11.4
Forestry, Woodland	0	0	0	0	0	0	0	0
	9	**100**	**11**	**100**	**15**	**100**	**35**	**100**
Land quality (% holdings)								
Good	4	44.45	0	0	3	20.0	7	20.0
Average	4	44.45	10	90.9	10	66.7	24	68.6
Poor	1	11.1	1	9.1	2	13.3	4	11.4
	9	**100**	**11**	**100**	**15**	**100**	**35**	**100**
Land impact / severance (% holdings)								
High	1	11.1	4	36.4	1	6.7	6	17.1
Medium	5	55.6	3	27.2	3	20.0	11	31.4
Low	3	33.3	4	36.4	11	73.3	18	51.4
	9	**100**	**11**	**100**	**15**	**100**	**35**	**100**
Agricultural property (No.)								
Farm houses	0		1		0		1	
Farmyards	0		1		1		2	
Key agricultural enterprises (No.)								
Dairy	1		0		0		1	
Equine	0		0		0		0	
Beef / Other	0		0		0		0	
Agricultural property impact	**Major Negative**		**Major Negative**		**Moderate Negative**			
Preference	**Very Low Preference**		**Low Preference**		**Medium Preference**			

Table 6-7: Feasible Route Option 5

Assessment criteria	Southern		Central		Northern		Total	
Route corridor option details								
Physical length of route option (km)							7.680km	
Length considering additional Urban Links (km)							1.900km	
Total journey length (km)							9.580km	
Estimated landtake – based on physical works length (ha)							47.900ha	
Agricultural property								
Land use (% holdings)	No.	%	No.	%	No.	%	No.	%
Grassland	9	90.0	10	90.9	11	84.6	30	88.2
Rough Grassland / Scrub	1	10.0	1	9.1	2	15.4	4	11.8
Forestry, Woodland	0	0	0	0	0	0	0	0
	10	**100**	**11**	**100**	**13**	**100**	**34**	**100**
Land quality (% holdings)								
Good	7	70.0	1	9.1	3	23.1	11	32.4
Average	2	20.0	9	81.8	8	61.5	19	55.9
Poor	1	10.0	1	9.1	2	15.4	4	11.7
	10	**100**	**11**	**100**	**13**	**100**	**34**	**100**
Land impact / severance (% holdings)								
High	3	30.0	4	36.4	3	23.1	10	29.4
Medium	3	30.0	6	54.5	3	23.1	12	35.3
Low	4	40.0	1	9.1	7	53.8	12	35.3
	10	**100**	**11**	**100**	**13**	**100**	**34**	**100**
Agricultural property (No.)								
Farm houses	0		3		3		6	
Farmyards	1		4		2		7	
Key agricultural enterprises (No.)								
Dairy	1		0		0		1	
Equine	0		0		0		0	
Beef / Other	0		0		0		0	
Agricultural property impact	**Major Negative**		**Major Negative**		**Major Negative**			
Preference	**Very Low Preference**		**Very Low Preference**		**Very Low Preference**			

Table 6-8: Feasible Route Option 6

Assessment criteria	Southern		Central		Northern		Total	
Route corridor option details								
Physical length of route option (km)							7.880km	
Length considering additional Urban Links (km)							1.900km	
Total journey length (km)							9.780km	
Estimated landtake – based on physical works length (ha)							48.900ha	
Agricultural property								
Land use (% holdings)	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Grassland	10	90.9	10	90.9	11	84.6	31	88.6
Rough Grassland / Scrub	1	9.1	1	9.1	2	15.4	4	11.4
Forestry, Woodland	0	0	0	0	0	0	0	0
	11	**100**	**11**	**100**	**13**	**100**	**35**	**100**
Land quality (% holdings)								
Good	8	72.7	1	9.1	3	23.1	12	34.3
Average	2	18.2	9	81.8	8	61.5	19	54.3
Poor	1	9.1	1	9.1	2	15.4	4	11.4
	11	**100**	**11**	**100**	**13**	**100**	**35**	**100**
Land impact / severance (% holdings)								
High	3	27.2	4	36.4	3	23.1	10	28.6
Medium	4	36.4	6	54.5	3	23.1	13	37.1
Low	4	36.4	1	9.1	7	53.8	12	34.3
	11	**100**	**11**	**100**	**13**	**100**	**35**	**100**
Agricultural property (No.)								
Farm houses	0		2		3		5	
Farmyards	1		4		2		7	
Key agricultural enterprises (No.)								
Dairy	1		0		0		1	
Equine	0		0		0		0	
Beef / Other	0		0		0		0	
Agricultural property impact	**Major Negative**		**Major Negative**		**Major Negative**			
Preference	**Very Low Preference**		**Very Low Preference**		**Very Low Preference**			

Table 6-9: Feasible Route Option 7

Assessment criteria	Southern		Central		Northern		Total	
Route corridor option details								
Physical length of route option (km)							8.110km	
Length considering additional Urban Links (km)							1.900km	
Total journey length (km)							10.010km	
Estimated landtake – based on physical works length (ha)							50.050ha	
Agricultural property								
Land use (% holdings)	No.	%	No.	%	No.	%	No.	%
Grassland	20	95.2	10	76.9	13	86.7	43	87.7
Rough Grassland / Scrub	0	0	2	15.4	2	13.3	4	8.2
Forestry, Woodland	1	4.8	1	7.7	0	0	2	4.1
	21	**100**	**13**	**100**	**15**	**100**	**49**	**100**
Land quality (% holdings)								
Good	12	57.1	0	0	3	20.0	15	30.6
Average	8	38.1	10	76.9	10	66.7	28	57.2
Poor	1	4.8	3	23.1	2	13.3	6	12.2
	21	**100**	**13**	**100**	**15**	**100**	**49**	**100**
Land impact / severance (% holdings)								
High	2	9.5	4	30.7	1	6.7	7	14.3
Medium	13	61.9	3	23.1	4	26.7	20	40.8
Low	6	28.6	6	46.2	10	66.7	22	44.9
	21	**100**	**13**	**100**	**15**	**100**	**49**	**100**
Agricultural property (No.)								
Farm houses	0		2		0		2	
Farmyards	1		2		1		4	
Key agricultural enterprises (No.)								
Dairy	1		0		0		1	
Equine	0		0		0		0	
Beef / Other	0		0		0		0	
Agricultural property impact	**Major Negative**		**Major Negative**		**Moderate Negative**			
Preference	**Low Preference**		**Very Low Preference**		**Medium Preference**			

Table 6-10: Feasible Route Option 8

Assessment criteria	Southern		Central		Northern		Total	
Route corridor option details								
Physical length of route option (km)							8.130km	
Length considering additional Urban Links (km)							1.900km	
Total journey length (km)							10.030km	
Estimated landtake – based on physical works length (ha)							50.150ha	
Agricultural property								
Land use (% holdings)	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Grassland	16	94.1	10	76.9	13	86.7	39	86.7
Rough Grassland / Scrub	1	5.9	2	15.4	2	13.3	5	11.1
Forestry, Woodland	0	0	1	7.7	0	0	1	2.2
	17	**100**	**13**	**100**	**15**	**100**	**45**	**100**
Land quality (% holdings)								
Good	8	47.05	0	0	3	20.0	11	24.5
Average	8	47.05	10	76.9	10	66.7	28	62.2
Poor	1	5.9	3	23.1	2	13.3	6	13.3
	17	**100**	**13**	**100**	**15**	**100**	**45**	**100**
Land impact / severance (% holdings)								
High	6	35.3	4	30.7	1	6.7	11	24.5
Medium	4	23.5	3	23.1	3	20.0	10	22.2
Low	7	41.2	6	46.2	11	73.3	24	53.3
	17	**100**	**13**	**100**	**15**	**100**	**45**	**100**
Agricultural property (No.)								
Farm houses	0		1		0		1	
Farmyards	2		2		1		5	
Key agricultural enterprises (No.)								
Dairy	1		0		0		1	
Equine	0		0		0		0	
Beef / Other	0		0		0		0	
Agricultural property impact	**Major Negative**		**Major Negative**		**Moderate Negative**			
Preference	**Low Preference**		**Low Preference**		**Medium Preference**			

Table 6-11: Feasible Route Option 9

Assessment criteria	Southern		Central		Northern		Total	
Route corridor option details								
Physical length of route option (km)							8.020km	
Length considering additional Urban Links (km)							1.900km	
Total journey length (km)							9.920km	
Estimated landtake – based on physical works length (ha)							49.600ha	
Agricultural property								
Land use (% holdings)	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Grassland	20	95.2	10	76.9	13	86.7	43	87.7
Rough Grassland / Scrub	0	0	2	15.4	2	13.3	4	8..2
Forestry, Woodland	1	4.8	1	7.7	0	0	2	4.1
	21	**100**	**13**	**100**	**15**	**100**	**49**	**100**
Land quality (% holdings)								
Good	12	57.1	0	0	3	20.0	15	30.6
Average	8	38.1	10	76.9	10	66.7	28	57.2
Poor	1	4.8	3	23.1	2	13.3	6	12.2
	21	**100**	**13**	**100**	**15**	**100**	**49**	**100**
Land impact / severance (% holdings)								
High	5	23.8	4	30.7	1	6.6	10	20.4
Medium	10	47.6	3	23.1	4	26.7	17	34.7
Low	6	28.6	6	46.2	10	66.7	22	44.9
	21	**100**	**13**	**100**	**15**	**100**	**49**	**100**
Agricultural property (No.)								
Farm houses	0		1		0		1	
Farmyards	3		2		1		6	
Key agricultural enterprises (No.)								
Dairy	1		0		0		1	
Equine	0		0		0		0	
Beef / Other	0		0		0		0	
Agricultural property impact	**Major Negative**		**Major Negative**		**Moderate Negative**			
Preference	**Low Preference**		**Low Preference**		**Medium Preference**			

Table 6-12: Feasible Route Option 10

Assessment criteria	Southern		Central		Northern		Total	
Route corridor option details								
Physical length of route option (km)							8.220km	
Length considering additional Urban Links (km)							1.900km	
Total journey length (km)							10.120km	
Estimated landtake – based on physical works length (ha)							50.600ha	
Agricultural property								
Land use (% holdings)	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Grassland	8	88.9	11	78.6	8	100	27	87.1
Rough Grassland / Scrub	1	11.1	3	21.4	0	0	4	12.9
Forestry, Woodland	0	0	0	0	0	0	0	0
	9	**100**	**14**	**100**	**8**	**100**	**31**	**100**
Land quality (% holdings)								
Good	4	44.45	1	7.4	3	37.5	8	25.8
Average	4	44.45	10	71.4	5	62.5	19	61.3
Poor	1	11.1	3	21.4	0	0	4	12.9
	9	**100**	**14**	**100**	**8**	**100**	**31**	**100**
Land impact / severance (% holdings)								
High	2	22.2	4	28.6	3	37.5	9	29.0
Medium	4	44.45	5	35.7	3	37.5	12	38.7
Low	3	33.3	5	35.7	2	25.0	10	32.3
	9	**100**	**14**	**100**	**8**	**100**	**31**	**100**
Agricultural property (No.)								
Farm houses	0		3		1		4	
Farmyards	1		4		1		6	
Key agricultural enterprises (No.)								
Dairy	1		0		0		1	
Equine	0		0		0		0	
Beef / Other	0		0		0		0	
Agricultural property impact	**Major Negative**		**Major Negative**		**Major Negative**			
Preference	**Very Low Preference**		**Very Low Preference**		**Low Preference**			

Table 6-13: Feasible Route Option 11

Assessment criteria	Southern		Central		Northern		Total	
Route corridor option details								
Physical length of route option (km)							8.220km	
Length considering additional Urban Links (km)							1.900km	
Total journey length (km)							10.120km	
Estimated landtake – based on physical works length (ha)							50.6ha	
Agricultural property								
Land use (% holdings)	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Grassland	8	88.9	11	78.6	9	90.0	28	84.8
Rough Grassland / Scrub	1	11.1	3	21.4	1	10.0	5	15.2
Forestry, Woodland	0	0	0	0	0	0	0	0
	9	**100**	**14**	**100**	**10**	**100**	**33**	**100**
Land quality (% holdings)								
Good	4	44.45	1	7.4	1	10.0	6	18.2
Average	4	44.45	10	71.4	8	80.0	22	66.7
Poor	1	11.1	3	21.4	1	10.0	5	15.1
	9	**100**	**14**	**100**	**10**	**100**	**33**	**100**
Land impact / severance (% holdings)								
High	2	22.2	4	28.6	6	60.0	12	36.4
Medium	4	44.45	5	35.7	2	20.0	11	33.3
Low	3	33.3	5	35.7	2	20.0	10	30.3
	9	**100**	**14**	**100**	**10**	**100**	**33**	**100**
Agricultural property (No.)								
Farm houses	0		3		0		3	
Farmyards	1		4		1		6	
Key agricultural enterprises (No.)								
Dairy	1		0		0		1	
Equine	0		0		0		0	
Beef / Other	0		0		0		0	
Agricultural property impact	**Major Negative**		**Major Negative**		**Moderate Negative**			
Preference	**Very Low Preference**		**Very Low Preference**		**Medium Preference**			

Refined Route Options

Table 6-14: Refined Route Option 1A – V2

Assessment criteria	Southern	
Agricultural property		
Land use (% holdings)	**No.**	**%**
Grassland	21	100.0
Rough Grassland / Scrub	0	0
Forestry, Woodland	0	0
	21	**100**
Land quality (% holdings)		
Good	5	23.8
Average	16	76.2
Poor	0	0
	21	**100**
Land impact / severance (% holdings)		
High	1	4.8
Medium	7	33.3
Low	13	61.9
	21	**100**
Agricultural property (No.)		
Farm houses	0	
Farmyards	0	
Key agricultural enterprises (No.)		
Dairy	1	
Equine	0	
Beef / Other	0	
Agricultural property impact	**Moderate Negative**	
Preference	**Medium Preference**	

Table 6-15: Refined Route Option 1A/1B - V2

Assessment criteria	Southern	
Agricultural property		
Land use (% holdings)	**No.**	**%**
Grassland	26	100.0
Rough Grassland / Scrub	0	0
Forestry, Woodland	0	0
	26	**100**
Land quality (% holdings)		
Good	8	30.8
Average	18	69.2
Poor	0	0
	26	**100**
Land impact / severance (% holdings)		
High	2	7.7
Medium	8	30.8
Low	16	61.5
	26	**100**
Agricultural property (No.)		
Farm houses	0	
Farmyards	1	
Key agricultural enterprises (No.)		
Dairy	2	
Equine	0	
Beef / Other	0	
Agricultural property impact	**Moderate Negative**	
Preference	**Medium Preference**	

Table 6-16: Refined Route Option 2A- V2

Assessment criteria	Southern	
Agricultural property		
Land use (% holdings)	**No.**	**%**
Grassland	11	78.6
Rough Grassland / Scrub	3	21.4
Forestry, Woodland	0	0
	14	**100**
Land quality (% holdings)		
Good	6	42.9
Average	5	35.7
Poor	3	21.4
	14	**100**
Land impact / severance (% holdings)		
High	3	21.4
Medium	5	35.7
Low	6	42.9
	14	**100**
Agricultural property (No.)		
Farm houses	0	
Farmyards	2	
Key agricultural enterprises (No.)		
Dairy	2	
Equine	0	
Beef / Other	0	
Agricultural property impact	**Major Negative**	
Preference	**Very Low Preference**	

Table 6-17: Refined Route Option 2A/2B- V2

Assessment criteria	Southern	
Agricultural property		
Land use (% holdings)	**No.**	**%**
Grassland	11	78.6
Rough Grassland / Scrub	3	21.4
Forestry, Woodland	0	0
	14	**100**
Land quality (% holdings)		
Good	6	42.9
Average	5	35.7
Poor	3	21.4
	14	**100**
Land impact / severance (% holdings)		
High	3	21.4
Medium	5	35.7
Low	6	42.9
	14	**100**
Agricultural property (No.)		
Farm houses	0	
Farmyards	2	
Key agricultural enterprises (No.)		
Dairy	2	
Equine	0	
Beef / Other	0	
Agricultural property impact	**Major Negative**	
Preference	**Very Low Preference**	

Table 6-18: Refined Route Option 5

Assessment criteria	Southern		Central	
Agricultural property				
Land use (% holdings)	**No.**	**%**	**No.**	**%**
Grassland	9	90.0	10	90.9
Rough Grassland / Scrub	1	10.0	1	9.1
Forestry, Woodland	0	0	0	0
	10	**100**	**11**	**100**
Land quality (% holdings)				
Good	7	70.0	1	9.1
Average	2	20.0	9	81.8
Poor	1	10.0	1	9.1
	10	**100**	**11**	**100**
Land impact / severance (% holdings)				
High	3	30.0	3	27.3
Medium	3	30.0	7	63.6
Low	4	40.0	1	9.1
	10	**100.0**	**11**	**100**
Agricultural property (No.)				
Farm houses	0		2	
Farmyards	1		5	
Key agricultural enterprises (No.)				
Dairy	1		0	
Equine	0		0	
Beef / Other	0		0	
Agricultural property impact	**Major Negative**		**Major Negative**	
Preference	**Very Low Preference**		**Very Low Preference**	

Table 6-19: Refined Route Option 8 – V2

Assessment criteria	Central		Northern	
Agricultural property				
Land use (% holdings)	**No.**	**%**	**No.**	**%**
Grassland	10	76.9	13	86.7
Rough Grassland / Scrub	2	15.4	2	13.3
Forestry, Woodland	1	7.7	0	0
	13	**100**	**15**	**100**
Land quality (% holdings)				
Good	0	0	3	20.0
Average	10	76.9	10	66.7
Poor	3	23.1	2	13.3
	13	**100**	**15**	**100**
Land impact / severance (% holdings)				
High	3	23.1	1	6.7
Medium	4	30.8	3	20.0
Low	6	46.1	11	73.3
	13	**100**	**15**	**100**
Agricultural property (No.)				
Farm houses	0		1	
Farmyards	2		0	
Key agricultural enterprises (No.)				
Dairy	0		0	
Equine	0		0	
Beef / Other	0		0	
Agricultural property impact	**Major Negative**		**Moderate Negative**	
Preference	**Low Preference**		**Medium Preference**	

Table 6-20: Refined Route Option 12

Assessment criteria	Southern		Central		Northern		Total	
Agricultural property								
Land use (% holdings)	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Grassland	21	91.4	11	91.7	13	86.7	45	90.0
Rough Grassland / Scrub	1	4.3	1	8.3	2	13.3	4	8.0
Forestry, Woodland	1	4.3	0	0	0	0	1	2.0
	23	**100**	**12**	**100**	**15**	**100**	**50**	**100**
Land quality (% holdings)								
Good	10	43.5	0	0	3	20.0	13	26.0
Average	11	47.8	11	91.7	10	66.7	32	64.0
Poor	2	8.7	1	8.3	2	13.3	5	10.0
	23	**100**	**12**	**100**	**15**	**100**	**50**	**100**
Land impact / severance (% holdings)								
High	5	21.7	4	33.3	0	0	9	18.0
Medium	5	21.7	3	25.0	2	13.3	10	20.0
Low	13	56.6	5	41.7	13	86.7	31	62.0
	23	**100**	**12**	**100**	**15**	**100**	**50**	**100**
Agricultural property (No.)								
Farm houses	0		0		0		0	
Farmyards	0		2		0		2	
Key agricultural enterprises (No.)								
Dairy	1		0		0		1	
Equine	0		0		0		0	
Beef / Other	0		0		0		0	
Agricultural property impact	**Major Negative**		**Major Negative**		**Minor Negative**			
Preference	**Low Preference**		**Low Preference**		**High Preference**			

Table 6-21: Refined Route Option 12-V2

Assessment criteria	Northern	
Agricultural property		
Land use (% holdings)	**No.**	**%**
Grassland	11	84.6
Rough Grassland / Scrub	2	15.4
Forestry, Woodland	0	0
	13	**100**
Land quality (% holdings)		
Good	3	23.1
Average	8	61.5
Poor	2	15.4
	13	**100**
Land impact / severance (% holdings)		
High	0	0
Medium	3	23.1
Low	10	76.9
	13	**100**
Agricultural property (No.)		
Farm houses	0	
Farmyards	0	
Key agricultural enterprises (No.)		
Dairy	0	
Equine	0	
Beef / Other	0	
Agricultural property impact	**Minor Negative**	
Preference	**High Preference**	

Table 6-22: Option 12 – Collinsford Junctions

Assessment criteria	Junction 1		Junction 2		Junction 3	
Agricultural property						
Land use (% holdings)	**No.**	**%**	**No.**	**%**	**No.**	**%**
Grassland	6	75.0	5	71.4	6	75.0
Rough Grassland / Scrub	2	25.0	2	28.6	2	25.0
Forestry, Woodland	0	0	0	0	0	0
	8	**100**	**7**	**100**	**8**	**100**
Land quality (% holdings)						
Good	1	12.5	1	14.3	1	12.5
Average	5	62.5	4	57.1	5	62.5
Poor	2	25.0	2	28.6	2	25.0
	8	**100**	**7**	**100**	**8**	**100**
Land impact / severance (% holdings)						
High	1	12.5	1	14.3	1	12.5
Medium	3	37.5	2	28.6	5	62.5
Low	4	50.0	4	57.1	2	25.0
	8	**100**	**7**	**100**	**8**	**100**
Agricultural property (No.)						
Farm houses	0		0		0	
Farmyards	1		1		1	
Key agricultural enterprises (No.)						
Dairy	0		0		0	
Equine	0		0		0	
Beef / Other	0		0		0	
Agricultural property impact	**Moderate Negative**		**Minor Negative**		**Moderate Negative**	
Preference	**Medium Preference**		**High Preference**		**Medium Preference**	

7 Urban Planning Assessment

7.1 Introduction

This section of the report focuses on the implications of each Feasible Route Option on the Sligo & Environs Development Plan 2010-2016 (SEDP) and more particularly on the North Fringe Local Area Plan (LAP) 2010-2016, and also having regard to the Sligo County Development Plan 2011-2017, as varied (Variation no. 2) in October 2011 by the introduction of the Core Strategy.

We note that the proposed upgrading of the N16 national primary route is a strategic objective of both the Sligo & Environs Development Plan 2010-2016 and Sligo County Development Plan 2011-2017.

The Sligo County Development Plan is currently under review, with a Draft new plan having been published, which acknowledges the importance of the upgrading of the Route and estimates completion of same by 2021, subject to TII approval/funding.

It should also be noted that the SEDP was incorporated into the Sligo County Development Plan 2011-2017 following the abolition of Sligo Borough Council and the establishment of a single planning authority with jurisdiction over the entire county. The zoning and objectives contained in the SEDP are intended to be incorporated as statutory provisions into the emerging County Development Plan (2017-2023) and shall remain unchanged until the adoption of a Local Area Plan for Sligo and Environs (expected in 2018).

The route (along with the A4 route within Northern Ireland) is also noted as a Strategic Link in the Border Regional Planning Guidelines 2010, which note the importance of the route (as part of a wider network) as follows:

> *"The Northern Cross, providing strategic high speed road access from Dublin to Letterkenny/Derry (N2/A5), and from Belfast to Sligo/Enniskillen (M1, A4, N16), has the potential to spatially reintegrate much of the entire historic province of Ulster, including the south and west of Northern Ireland and the counties within the Border Region. Since 2004, these key corridors have gained strong political support in both jurisdictions, with advanced works already on-going on some routes, particularly on the extension of the M1 from Belfast to Ballygawley, and the A4 towards Enniskillen. The further development of the Northern Cross will act as the conduit for the economic re-invention of the Border Region both north and south. Not only is the Northern Cross a key infrastructural concept for the Central Border Region, but it is also one which provides an essential infrastructural link between both jurisdictions on the island."*

The SEDP and the LAP have also been adopted having regard to proposals to upgrade the road, based on the proposed route at the time of adoption. The route illustrated / used for the purpose of the SEDP and the LAP follows the alignment of Route 01A.

The SEDP and LAP plan for the long term expansion of Sligo, e.g. identifying long term needs over a 10-20 year period, with Section 17.2 of the SEDP noting that the LAP: *"has been prepared in parallel with the SEDP 2010-2016 and may be reviewed or amended as/if necessary, within the six years from 2010 to 2016. While it is recognised that this is a long-term plan,* ***it was considered important to prepare it at this stage, in order to clarify the proposed roads network and offer a degree of certainty to landowners and developers interested in the future of the area****."* [author emphasis]

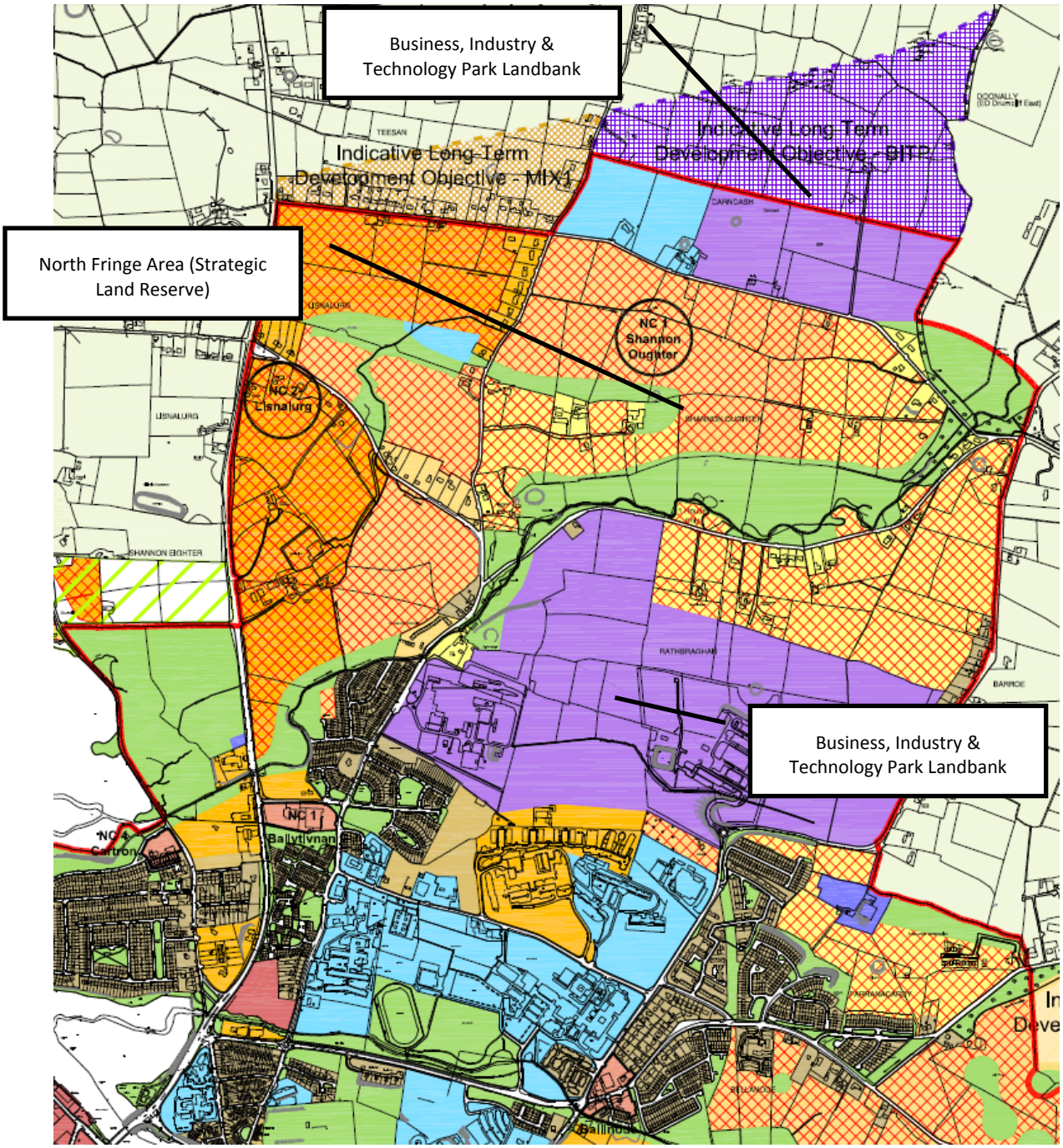
The Variation to the SEDP and LAP reinforces this long term approach, identifying the North Fringe LAP area as part of the 'Strategic Land Reserve', i.e. retaining the underlying land use development objectives whilst restricting development in the short-medium term, until the lands are required. Relevant associated policies of the SEDP include:

> ***"P-SLR-3** On lands included in the SLR, permit the development of community facilities and other non-residential developments compatible with residential uses insofar as they do not adversely impact on the potential for comprehensive and co-ordinated development of surrounding lands.*
> ***P-SLR-5** Notwithstanding the policies, objectives and any other provisions contained in Chapters 6 to 16 of the SEDP, no development will be permitted if it conflicts with the Core Strategy."*

The Variation (no. 2) to the SEDP also identified additional lands to the north of the LAP boundary and the originally planned N16 route, i.e. generally Route 01A alignment) as being potentially developed in the long term for mixed use and business, industry and technology park.

Figure 7-1 below illustrates the 'as varied' zoning plan for the area, inclusive of the North Fringe LAP area.

Figure 7-1: North Sligo Zoning



Source: SEDP Map 1_Zoning Map_(Variation No2_- 3 October 2011)

During its preparation, the SEDP has considered a number of development scenarios and adopts a 'compact city' approach, based upon achieving a balance between the consolidation / regeneration of the existing built-up area and the planned expansion of the City into the Environs. This approach has been determined to have the least extent of potential environmental effects.

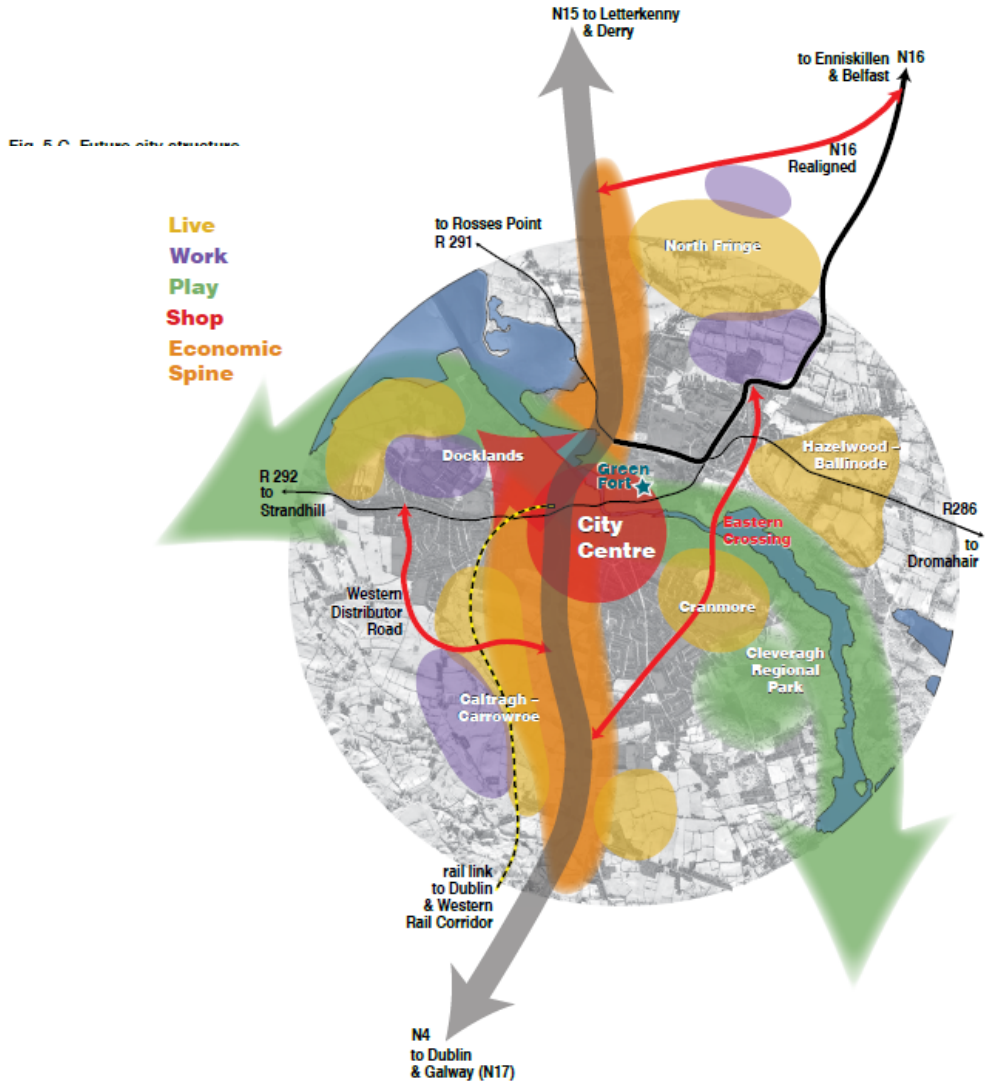
The North Fringe area is a key element of this adopted development scenario, providing a substantial proportion of the expansion capacity for Sligo into the long term, approximately 1,642 – 3,280 persons of an overall growth capacity throughout the settlement and its environs of c. 27,000

persons, along with employment and other facilities / amenities necessary to support such population growth. Lands adjacent the LAP area, and also largely within the Southern study area have further capacity for population growth, in the order of 2,096 – 4,148 additional persons.

Figure 7-2 below outlines the North Fringe area in the context of the overall strategy for the expansion of Sligo into the long term and highlights the originally planned N16 route, i.e. generally Route 1A alignment.

In addition, the below illustrates the adjacent (purple) landbanks identified for business, industry and technology parks

Figure 7-2: Future City Structure



Source: Figure 5C, SEDP

In terms of the proposed N16 and current feasible routes, these are located within three sections – Southern, Central and Northern.

This report focuses on the route options as they occur within the Southern Section, as identified in drawing no's. N16-RS-003 to N16-RS-005 (Route Options – General Overview).

Furthermore, we note that whilst the N16 forms part of an overall national road network, connecting with, for instance the N4, which in turn connects with the N17 and N59 (and other) national routes, the primary function of the N16 is for trips originating and terminating in Sligo City, rather than 'pass by' traffic.

Accordingly, we have had regard to information available from the Scheme Feasibility Report and the Route Selection Traffic Study which outlines the pattern of traffic on the N16. The former states for instance:

> *"In both the AM and Inter peak periods the modelled origin of Traffic on the N16 is mainly from Sligo Town (54%). The origin of the remaining traffic is predominately (33% AM/30% IP) to the south or directly to the west of the N16 junction with the N4/N15. Approximately 13% AM/12% IP of traffic has their origin from the N15."*
>
> *"In both the AM and Inter peak periods the modelled destination of Traffic on the N16 is mainly to Sligo Town (87% to 55%). The destination of the remaining traffic (12% AM/40% IP) to the south or directly to the west of the N16 junction with the N4/N15. Approximately 2% AM/6% IP of traffic has a destination to the N15."*

The latter states:

> *"Options 1A and 1B and Option 2A and 2B show similar patterns of traffic using the N16, with significant reductions in traffic on the N16 the closer it gets to the N15. This highlights that traffic demand on the N16 is focussed more within Sligo and results in this demand utilising the existing N16 route and the L-7421-0 as alternative routes to the proposed alignments. Option 3 retains more of the traffic demand on the proposed N16 alignment than Options 1 and 2, however, again to the south of the Option 3 connection with the L-7422-0 there is a reduction in traffic using the N16, showing that the demand is utilising the alternative route."*
>
> *"Options 5, 6 and 8, show similar traffic patterns, with traffic volumes on the proposed N16 alignments increasing closer to Sligo. This suggests that these routes generally cater for the demand to Sligo, with limited use of the alternative routes to the N16. Option 5 caters for the highest demand levels of all of the alignment options, followed by Option 8."*

In terms of the Traffic Study of the Refined Route Options, is it noted *inter-alia* that:

- the Do Minimum traffic volumes increase on the approach to Sligo, but reduce slightly to the south of the N16 junction with the L-3407-22 due to traffic using the L-7422-0 as an alternative route to the N16;
- Options 01A-v2, 01A/B-v2, 02A-v2, 02A/B-v2 show similar patterns of traffic using the N16, with significant reductions in traffic on the N16 as it gets closer to the N15. This highlights that traffic demand on the N16 is focussed more within Sligo and results in this demand utilising the existing N16 route and the L-7421-0 as alternative routes to the proposed alignments;
- The Select Link Analysis preformed on the existing N16 in the Do Minimum, has shown that around 30% of southbound traffic diverts on to the Ballytivnan Road. In Options 01A-v2, 01A/B-v2, 02A-v2 and 02A/B-v2, the southbound traffic also splits itself (almost evenly in some scenarios) between the proposed N16 and existing N16.

In considering the various routes, it will be necessary to have regard to the above factors, for instance to ensure that the preferred option operates as intended, without causing overspill / diversion of trips to non-national roads within the urban area, which could in turn lead to impacts on the proper planning of the area.

7.2 Description of Feasible and Refined Route Options

13 no. feasible route options have been identified as part of the route selection process up to preliminary options assessment stage. 11 no. of same are relevant / occurring within the 'Southern Section'. Further to the preliminary options stage, a number of revisions have been made, which include the addition of 6 no. further options in the Southern Section (largely being variants of preliminary options) - Option 1A-v2, Option 1A/B-v2, Option 2A-v2, Option 2A/B-v2, Option 12 (Amalgamated Option) and Option 13 (Amalgamated Option).

These Feasible and Refined Route Options are classified / subdivided as follows:

7.2.1 Western

Route 01A and 01B, the former being largely similar to the 'original' route option as applied to the formulation and adoption of the SEDP and LAP. This route connects to the National Road Network along the existing N15 to the north of Sligo, relatively remote from the existing or planned built up area, effectively bypassing the area. Route 1B is identical to Route 1A other than it also incorporates online upgrade of the existing N15 southward of the connection to the existing N15 to the Emerging Preferred Route for the N15 upgrade where it departs from the existing alignment at Scotsman's Walk, and continues south to the existing N4 / Inner Relief Road, at the existing N4/N16 junction.

Refined Route Options 1A-V2 and 1A/B-V2 are substantially similar (from a planning perspective) to the initial Routes 1A and 1B, with modifications in terms of separating the National and Local Network on the approaches to Sligo – i.e. modification of the vertical design to provide road underbridges, which would reduce the volume of traffic emanating from the N16 and using the local network.

7.2.2 Central

Route options 2A, 2B, 3, 4, 5 and 6 travel through the area to the west of the existing N16.

Options 5, and 6 maintain an eastern alignment to the west / 'inside' of the existing N16 connection to the existing N16 at the 'AbbVie' Roundabout, thereafter following the existing alignment of the N16 to where it currently intersects with the N4 / N15 / Inner Relief Road.

Route options 2A, whilst travelling through the centre of the area to the west of the existing N16, continue westward to join with the N15 to the north of Sligo – and the Emerging Preferred Route for the N15 upgrade where it departs from the existing alignment at Scotsman's Walk, (just) outside the main existing built up area, effectively bypassing the existing urban area, though traverses through the planned built up area. Route 2B is identical to Route 2A other than it also incorporates online upgrade of the existing N15 southward of the connection to the existing N15 continuing south to the existing N4 / Inner Relief Road, at the existing N4/N16 junction.

Route options 3 and 4 are very similar in that they follow virtually the same alignment within the existing or planned built up area of Sligo, approximately bisecting the area between the existing N15 and N16 routes, between both AbbVie Ireland campuses, before travelling east towards the 'AbbVie' Roundabout, thereafter following the existing alignment of the N16 to where it currently intersects with the N4 / N15 / Inner Relief Road. Local widening and junction improvements of the retained section of the route would likely be implemented.

Refined Route Options 2A-V2 and 2A/B-V2 are substantially similar (from a planning perspective) to the initial Routes 2A and 2B, with modifications similar to Route 1A-v2 and 1A/B-v2, to reduce the

volume of additional traffic being attracted (prior to reaching the primary destination of the City Centre and immediate environs) to the local network from the national network.

Route Option 13 also relates to the Central area involving an 'east-west access link' from the existing AbbVie N16 Roundabout to the existing N15, similar in part to Options 3, 4, 10 & 11. It is a potential addition to Route Options 12 and 5.

7.2.3 **Eastern**

Route options 7, 8 and 9 primarily travel through the area to the east of the existing N16, in terms of the existing and planned built up area of the town or the 'Southern Section'.

All three divert from the existing N16 at the 'AbbVie' Roundabout, and would all involve following the existing alignment of the N16 to where it currently intersects with the N4 / N15 / Inner Relief Road.

Refined Route Option 12 (Amalgamated Option) relates to a variation to Option 8, which also incorporates elements of Options 7.

7.3 Description of Existing Environment

The principal study area, i.e. the Southern Section of the route corridor, consists of urban, suburban and peri-urban / rural elements, to the north of Sligo City Centre.

The southern / urban part of the area contains or adjoins substantial urban development of a commercial and residential nature and a number of locally strategic facilities, including Sligo University Hospital and Sligo Institute of Technology. Additional uses such as schools, nursing homes, health centres, recreational facilities etc. are also located in the area.

North of the Sligo Institute of Technology and nearby residential uses is a substantial land bank identified for business, industry and technology uses and currently contains two AbbVie Plants, one of which (Ballytivnan) currently also accommodate Abbott Ireland – (Ireland Nutrition Division - Sligo), both of which are understood to be major employers in Sligo town and environs.

The future expansion of this land bank for business, industry and technology uses whether by expansion of existing facilities or the introduction of additional industries is a key objective of the SEDP for the long term development of Sligo, as illustrated in Figure 7-2 above.

North of the business, industry and technology land bank, the study area is largely rural / peri-urban, with established residential use to the west. Outside the main existing built up area, there are dispersed rural dwellings and ribbon development, and limited commercial development along a number of local roads and along the N15 and N16 routes.

Much of the land north of the existing built up area is in agricultural type use, however has been zoned for longer term expansion of the town for varying uses necessary to achieve the growth targets and appropriate distribution of land uses for the City.

7.4 Urban Planning Assessment

As noted above, the SEDP and LAP plan for the long term expansion of Sligo, e.g. identifying long term needs over a 10-20 year period.

The LAP identifies a significant land bank of c. 153 hectares in the southern section of the route corridor, which is to accommodate substantial residential development (i.e. accommodating up to 3,280 additional persons) and associated retail, educational, community uses, and a designated business, industry and technology park. In addition a substantial area of land is designated for open

space which will form a riverside park as part of a connected network of open spaces throughout the urban area of Sligo.

In addition to the LAP area, lands to the south at Shannon Eighter have been designated for residential and mixed use whilst lands at Rathbraghan have been designated for low density residential and business, industry and technology uses. The development of these lands will link the North Fringe area to the existing urban built up area and provide *inter alia* for in the order of 2,096 – 4,148 additional persons over and above the potential population of the LAP area.

North of the LAP area, additional lands have also been identified as mixed use and business, industry and technology use for the longer term, e.g. as a subsequent phase of development to the build out of the North Fringe area.

The combined urban expansion area as noted above is therefore a strategic area for the long term orderly expansion of Sligo. Based on the geographical features of the City there is more limited capacity for expansion to the west of the existing N15 and similarly more limited capacity for expansion to the east of the N16 north of the existing built up area. The area between is therefore a key area of expansion of the northern environs of the town, along with the Hazelwood – Bellanode area.

Substantial additional future development lands have also been identified to the South of the town at Caltragh-Carrowroe, and urban regeneration in the Docklands and Cranmore-Cleveragh areas will also deliver considerable additional capacity for population increase.

It is noted however that an appropriate distribution of population increase is necessary to avoid imbalance of the urban area and to ensure the primacy of the town centre as the focal point of the urban area.

As noted above, the route options can be classified into three categories of Western, Central and Eastern, all within the Southern Area.

Of particular note is that the western routes follow the alignment of the assumed route at the time of preparation of the SEDP and LAP hence these routes would not particularly impact on or affect the implementation of the SEDP and LAP, however it is noted that these routes do not follow the 'desire line' of traffic into / out of the City Centre and immediate environs.

Furthermore, the SEDP envisages a future bypass of the City which would be likely to be developed to the western side of the town. The western routes would be positioned to connect directly into same should it be developed.

As noted above, however, the dominant origin / destination of traffic on the N16 is to the City Centre, hence whilst linkages to any future bypass would be appropriate, the primary role of the N16 to service the City Centre would remain.

In terms of the eastern routes, whilst these were not envisaged at the time of the preparation of the SEDP and LAP they would largely avoid the lands zoned for urban expansion – only quite limited loss of development land would arise.

In terms of the central routes, these generally traverse lands which are planned to be relatively intensively developed over the long term.

Options 5 and 6 are located just westward of the existing route and would avoid splitting the lands zoned for urban expansion though lead to loss of a corridor of development land between the route options and the existing road.

Options 2A+2B (and its partially shared alignment with Option 3 & 4) would also traverse the area planned to be relatively intensively developed over the long term and would subdivide the expansion area, with considerable ramifications for the planned layout of the area, and would require considerable reconsideration of the future development of the North Fringe LAP area.

In relation to Options 3 & 4, which would also require considerable reconsideration of the future development of the North Fringe LAP area, would particularly affect the existing / active business, industrial and technology lands at Rathbraghan, in that the existing large land bank would be subdivided, in addition to the loss of an amount of land for the purposes of road construction. This could affect the overall development of the area, in that it could prevent the potential clustering of industry over a single area, as the road would likely act as a considerable barrier splitting the area.

Refined Route Option 13, the 'east west access link', which could be deployed in conjunction with either Option 8 or RFO 12, also traverses the area planned to be relatively intensively developed over the long term however would not subdivide the expansion area, rather would generally follow the intended development block pattern envisaged under the SEDP.

7.5 Assessment of Route Corridor Options

Following from the above discussion of the various route options and general issues arising, each option is considered individually as detailed below. The following Table 7-1 illustrates the summary of the 'score card' for each route. As noted previously, this report focuses on the southern section of the route corridor / options, and as such the scoring for the southern section dictates the scoring for other sections.

The following Tables also incorporates the additional route options identified following the preliminary appraisal.

Table 7-1: Feasible Route Options – Urban Planning Preference

Section	Feasible Route Option												
	1A	1A/B	2A	2A/B	3	4	5	6	7	8	9	10	11
South	3	3	4	4	5	5	3	3	2	2	2	5	5

Table 7-2: Refined Route Options – Urban Planning Preference

Section	Refined Route Option														
	1A (v2)	1A/B (v2)	2A (v2)	2A/B (v2)	3	4	5	6	7	8 (v2)	9	10	11	12	12 (v2)
South	3	3	4	4	n/a	n/a	3	n/a	n/a	Ref 12	n/a	n/a	n/a	2	n/a

7.5.1 **Route 1A**

Route 1A would initially be considered to be a preferred route option as it would avoid the planned urban extension of Sligo whilst connecting to the existing (and proposed) N15 and N4 corridors, the latter being a particularly important connection in terms of facilitating traffic passing through Sligo via the N4-N16 network.

Furthermore, this option also allows the possibility of connecting into a potential future (N4) western bypass of the town, which may be progressed in the longer term.

However, analysis conducted as part of the traffic study, and information available from the Scheme Feasibility Report demonstrates that this route option would not necessarily serve the principal 'desire line' of traffic into the City Centre road network and would accordingly be under-utilised and lead to increased traffic on existing roads in suburban areas. It is considered preferable from an

urban planning perspective that the chosen route would be the primary corridor of inter urban traffic, rather than splitting same over a new (underutilised) route, an existing (unimproved) route and suburban roads, e.g. the Ballytivnan Road.

Accordingly, this route option would be a medium preference.

7.5.2 Route 01A-V2

Following analysis as discussed above, Route 1A has been modified to Route 1A-v2 which aims to avoid the negatives arising, principally to encourage retaining traffic along the route alignment. The principal modification is the provision of a bridge over the L-3410-0 in effect closing off access to the Ballytivnan Road into Sligo city centre from the proposed N16.

The updated traffic analysis, as noted above, demonstrates however that notwithstanding the modifications, this route still would not retain significant traffic, with the existing (unimproved) route remaining as a competing alternative route. For instance, drawing no. N16-RS-098 (Traffic Assessment: Select Link Analysis) illustrates that Route 1A-V2 would generate an AADT of 1,706 compared to an AADT of 3,271 on the 'old' N16 route.

Accordingly, similar to Route 1A, this route option would be a medium preference.

7.5.3 Route 1A+1B

Similar to Route 1A, Route 1A+1B would initially be considered to be a preferred option, having the benefits of Route 1A and also providing for online enhancements from the existing N4 / Inner Relief Road to the 'new' road commencing in the Teesan area.

However, similar issues arise insofar as the route being unlikely to be fully utilised. Accordingly, this route option would be a medium preference.

7.5.4 Route 1A+1B-V2

Following analysis as discussed above, Route 1A+1B has been modified to Route 1A+1BV2 which aims to avoid the negatives arising, principally to encourage retaining traffic along the route alignment. The principal modification is the provision of a bridge over the L-3410-0 in effect closing off access to the Ballytivnan Road into Sligo city centre from the proposed N16.

The updated traffic analysis, as noted above, demonstrates however that notwithstanding the modifications, this route still would not retain significant traffic. For instance, drawing no. N16-RS-098 illustrates that Route 1A+1B-V2 would generate an AADT of 1,676 compared to an AADT of 3,236 on the 'old' N16 route.

Accordingly, similar to Route 1A, this route option would be a medium preference.

7.5.5 Route 2A

Route 2A, whilst largely avoiding the existing built up area of the town, would traverse the area planned to be relatively intensively developed over the long term and would subdivide the expansion area, with considerable ramifications for the planned layout of the area, and would require considerable reconsideration of the future development of the North Fringe LAP area.

Such reorganisation would be possible, particularly were there to be a degree of flexibility in the precise alignment of the route, though may ultimately compromise the future urban structure to a degree, depending on the outcome of any update of the LAP on the basis of this route.

In addition, similar issues arise to that of Routes 1A and 1B, insofar as the route is unlikely to be fully utilised, and would lead to a 'split' in traffic on the old and new routes, whilst it is considered preferable from an urban planning perspective that the chosen route would be the primary corridor of inter urban traffic.

Having regard to the foregoing, it would be appropriate to consider this route option as a low preference.

7.5.6 Route 2A-V2

Following analysis as discussed above, Route 2A has been modified to Route 2AV2 which aims to avoid the negatives arising, principally to encourage retaining traffic along the route alignment. The principal modification is the provision of a bridge over the Old Bundoran Road in effect closing off access to the Ballytivnan Road into Sligo city centre from the proposed N16.

The updated traffic analysis, as noted above, demonstrates however that notwithstanding the modifications, this route would retain only circa 50% of the traffic with the balance primarily continuing to utilise the existing N16 entering Sligo at the AbbVie roundabout For instance, drawing no. N16-RS-098 that Route 2A-V2 would generate an AADT of 1,502-1,977 compared to an AADT of 3,229 on the 'old' N16 route.

Accordingly, similar to Route 2A, this route option would be a low preference.

7.5.7 Route 2A+2B

Route 2A+2B differs from 2A only in that it has additional proposals for online enhancements from the existing N4 / Inner Relief Road to the 'new' road commencing in the Teesan area. Whilst this additional element would render it more preferable to option 2A, the negative impacts of option 2A remain, hence this option is similarly a low preference.

7.5.8 Route 2A+B-V2

Following analysis as discussed above, Route 2A+2B has been modified to Route 2A+2BV2 which aims to avoid the negatives arising, principally to encourage retaining traffic along the route alignment. The principal modification is the provision of a bridge over the Old Bundoran Road in effect closing off access to the Ballytivnan Road into Sligo city centre from the proposed N16.

The updated traffic analysis, as noted above, demonstrates however that notwithstanding the modifications, this route still would not retain significant traffic. For instance, drawing no. N16-RS-098 illustrates that Route 2A-V2 would generate an AADT of 1,536-2,013 compared to an AADT of 3,209 on the 'old' N16 route.

Accordingly, similar to Route 2A+2B, this route option would be a low preference.

7.5.9 Route 3

Route 3 would involve considerable reconsideration of the future development of the North Fringe LAP area, and would more immediately affect the existing / active business, industrial and technology lands at Rathbraghan, in that the existing large land bank would be subdivided, in addition to the loss of an amount of land for the purposes of road construction.

This could affect the overall development of the area, in that it could prevent the potential clustering of industry over a single area, as the road would likely act as a considerable barrier splitting the area.

For the above reasons, this route is considered to be a very low preference.

7.5.10 Route 4

Route 4 has near identical characteristics (and near identical route within the southern study area), in planning terms to that of Route 3, hence is similarly considered to be a very low preference.

7.5.11 Route 5

Route 5 follows an alignment to the west / 'inside' of the existing N16 connection to the existing N16 at the 'AbbVie' Roundabout, thereafter following the existing alignment of the N16 to where it currently intersects with the N4 / N15 / Inner Relief Road. Being located just westward of the existing route this route would avoid splitting the lands zoned for urban expansion though lead to loss of a corridor of development land between the route options and the existing road.

This route would also rely on reuse of the existing N16 from the N4 / Inner Relief Road to the AbbVie Roundabout. However, the primary destination and origin of N16 traffic is the City Centre and environs (rather than the N4 / N15 corridor), and the traffic model clearly demonstrates that utilisation of the N15 corridor would likely lead to traffic leaving the more western routes, travelling through the urban area, e.g. along Ballytivnan Road and/or along the existing N16 alignment. Therefore, this route is considered to have a relatively neutral effect in urban planning terms of any potential 'barrier' effect of routing national road traffic through the urban area.

For the above reasons, this route is considered to be a medium preference.

7.5.12 Route 6

Route 6 has near identical characteristics (and near identical route within the southern study area), in planning terms to that of Route 5, hence is similarly considered to be a medium preference.

7.5.13 Route 7

Route 7 largely avoids the planned urban extension to the north of the existing built up area diverting from the existing N16 at the 'AbbVie' Roundabout.

This route would involve very limited encroachment on the planned development areas in the SEDP and LAP.

Similar to Options 3, 4, 5, 6, 10 & 11 this route would rely on reuse of the existing N16 from the N4 / Inner Relief Road to the AbbVie Roundabout. Similar to the above discussion in relation to Route 5, this route is considered to have a relatively neutral effect in urban planning terms of any potential 'barrier' effect of routing national road traffic through the urban area. Accordingly, a managed routing of traffic through the urban area (such as would be provided by a designated route option) would be preferable.

For the above reasons, this route is considered to be a high preference.

7.5.14 Route 8

Route 8 has similar characteristics (and similar route within the southern study area), in planning terms to that of Route 7, other than a requirement for an additional amount of development land given the particular alignment of the route, i.e. diverting from the AbbVie Roundabout in a more northerly direction than Route 7.

Having regard to same, this Route is similarly considered to be a high preference.

7.5.15 Route 9

Route 9 has near identical characteristics (and near identical route within the southern study area), in planning terms to that of Route 8, hence is similarly considered to be a high preference.

7.5.16 Route 10

Route 10 has near identical characteristics (and near identical route within the southern study area), in planning terms to that of Routes 3 & 4, hence is similarly considered to be a very low preference.

7.5.17 Route 11

Route 11 has near identical characteristics (and near identical route within the southern study area), in planning terms to that of Routes 3, 4 & 11, hence is similarly considered to be a very low preference.

7.5.18 (Amalgamated) Route 12

Route 12 (Amalgamated Option) relates to a variation to Option 8, which also incorporates elements of Options 7, and similarly largely avoids the planned urban extension to the north of the existing built up area diverting from the existing N16 at the 'AbbVie' Roundabout.

This route would involve very limited encroachment on the planned development areas in the SEDP and LAP.

Similar to Options 3, 4, 5, 6, 10 & 11 this route would rely on reuse of the existing N16 from the N4 / Inner Relief Road to the AbbVie Roundabout. Similar to the above discussion in relation to Route 5, this route is considered to have a relatively neutral effect in urban planning terms of any potential 'barrier' effect of routing national road traffic through the urban area. Accordingly, a managed routing of traffic through the urban area (such as would be provided by a designated route option) would be preferable.

For instance, comparing the AADT and HGV proportion along Ash Lane in Option 1A-v2 (which 'bypasses' the built up area) and Option 12, the former is not significantly less than the latter (at 10,066 / 6.55% and 10,482 / 6.22% respectively – Refer to Traffic Modelling Information within Volume 2). According to this AADT analysis, 'bypassing' the built up area would have little benefit to the urban environment.

In the updated (November 2016) traffic analysis, this route would (north of the AbbVie roundabout) have an AADT of up to 4,562, indicating it would be widely used.

For the above reasons, this route is considered to be a high preference.

7.6 Conclusions

This report assesses the strategic planning implications of the proposed N16 Feasible Route Options on the existing SEDP and North Fringe LAP focusing on the Southern section of the study area.

The above reviews options developed to date, including Feasible and Refined routes.

The overriding objective of the report is to rank / discuss the various options in terms of the extent to which they would interfere with the planned development and expansion of Sligo.

It is noted that the Planning Authority have taken a long term view in their planning of the town, projecting extensive development needs over a number of decades, which is considered to be appropriate in avoiding constraints to the towns expansion.

In this regard the SEDP and LAP are considered to be of major significance to the future orderly development of the town and minimisation of impact on the planned layout of the town should be prioritised, secondary only to minimising impacts on the existing built up area.

In addition, we acknowledge the findings of the Scheme Feasibility Report and the Route Selection Traffic Study, which indicate that traffic / motorist behaviour would have a major effect on the viability / utilisation of various routes.

Accordingly, whilst the eastern routes (01A/01B, 01A/01B-V2, etc.) would have certain planning advantages in terms of avoiding urban roads and streets, these advantages would be eroded by unregulated / unintended traffic patterns which would result in urban roads and streets becoming a 'short cut' to the City Centre.

Having regard to same, at Feasible Route Option stage, Route Options 07, 08 & 09 are considered to be the most preferred routes in planning terms, with Routes 05 & 06 being of second preference and Route nos. 01A/01B/02A/02B being of third preference.

At Refined Route Option design stage, (where Options 03, 04, 06, 07, 09, 10 & 11 have been discounted), In the south section Option 12 is considered to be the most preferred route in planning terms, with Option 05 being of second preference. Route nos. 1A/1B/2A/2B (and their respective V2 options) remain of third preference.