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

Bonneagar Iompair Éireann
Transport Infrastructure Ireland

N69 Listowel Bypass

Environmental Impact Statement

Volume 1 of 4: Non-Technical Summary

May 2017

Contents

1 Non-Technical Summary

1.1 Background to the Proposed Road Development

The Kerry National Road Design Office (NRDO), on behalf of Kerry County Council, has developed proposals for a bypass of Listowel Town in County Kerry, titled the 'N69 Listowel Bypass', hereinafter also referred to as the 'proposed development'. Listowel is situated on the N69 Tralee to Limerick National Secondary Route.

This N69 Listowel Bypass Environmental Impact Statement (EIS) presents a statement of the likely effects on the environment of the proposed development and includes a description of the measures envisaged in order to avoid, reduce and where possible, remedy any identified significant adverse effects.

The EIS documents have been subdivided into the following four volumes for ease of use:

- *Volume 1: Non-Technical Summary;*
- *Volume 2: Main Text;*
- *Volume 3: Figures; and*
- *Volume 4: Appendices.*

(a) Need for the Proposed Development

The provision of an N69 Bypass for Listowel Town is a stated objective of national, regional and local policy documents. This reflects the key role played by the N69 in linking Listowel with the Tralee/Killarney Hub, the Tarbert Industrial Landbank, the Port of Foynes, the Limerick/Shannon Gateway and the wider region. The proposed development is in compliance with the hierarchy of development plans for the Region, County, Town and Local Area.

The applicable policy is set out in the following Policy Documents:

- *National Spatial Strategy for Ireland, 2002-2020;*
- *Smarter Travel, 2009;*
- *South West Regional Authority - Regional Planning Guidelines, 2010-2022;*
- *Kerry County Development Plan, 2015-2021;*
- *Listowel Town Development Plan, 2009-2015; and*
- *Listowel/Ballybunnion Functional Areas Local Area Plan 2013 – 2019.*

In addition to the strong policy need for a bypass of Listowel, there is also a strong specific traffic need based on the lack of capacity along the existing N69 to cater for current and future traffic volumes. As a result of this lack of capacity, traffic travelling along the N69 through the town of Listowel is currently subjected to high levels of congestion, which results in delays and increased journey times, which will be exacerbated in the future such that journey times in the evening period will approximately double by 2032, in the absence of any form of intervention.

(b) Scheme Objectives

The proposed development objectives are outlined in Table 1.1. In addition to the core objectives associated with addressing the existing capacity issues, the scheme objectives also include supporting the sustainable development of Listowel Town. The future for Listowel lies in consolidating its existing local market acting as a focal point for the Town while diversifying and developing its unique tourism product. In order to do this Listowel needs to be an attractive, easily accessible, relaxing, pedestrian friendly place to visit without the significant intrusion that comes with a continuous stream of through-traffic travelling through its core and along its main shopping streets.

Table 1.1 N69 Listowel Bypass Scheme Objectives

No	Objective
1	Meet the objectives of National, Regional County and Local Policy Documents.
2	Reduce journey times on the N69 through Listowel.
3	Reduce congestion within Listowel Town Centre.
4	Provide opportunity for the revitalisation of the town of Listowel.
5	Support the sustainable development of Listowel Town.
6	Reduce collisions and fatalities on this section of the N69.
7	Provide opportunity for creating a safer environment for pedestrians by removing National Traffic from Listowel Town Centre.
8	Provide an economically viable proposed development in line with Government public spending code directive (one that provides a Benefit to Cost Ratio greater than 1 and a positive Net Present Value).
9	Provide a proposed development that will improve accessibility.

1.2 Description of the Proposed Development

The proposed development comprises approximately 7 km of single carriageway road between the start and end points on the N69 Tralee Tarbert Road and the existing N69 in Ballygowlogue. Of this 7 km, approximately 3.8 km is new road construction, approximately 1.2 km is an upgrade of the existing road network and approximately 2 km is an upgrade to the existing John B. Keane Road which also includes the additional provision of shared cycle and pedestrian facilities. The proposed development includes three new roundabouts, four bridges, and a number of culverts (to either accommodate existing watercourses/drainage ditches or to provide flood mitigation). One of the bridges is a river crossing of the River Feale and is approximately 115m in length. The proposed development also includes attenuation ponds and wetlands, to attenuate and improve the quality of surface water run-off from the new road. Refer to Figure 1.1 for a plan drawing of the proposed development.

Drawing Number

32105301/EIS/Figure 1.1

Legend:

- Scheme Terminus Locations
- New Road Element on Embankment
- New Road Element in Cutting
- Attenuation Pond/Wetland
- Townland Boundary
- Shared Cycleway and Footpath

All details shown on this drawing are indicitative only and are subject to development at detailed design stage.

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Rev	By	Date	Description
0	JTM	April 2017	For Publication

Project:	N69 LISTOWEL BYPASS
Component:	Environmental Impact Statement
Title:	The Proposed Development
Designed: JTM	File Name:
Drawn: MW	Original scales: 1:7,500 @ A1 1:15,000 @ A3
Checked: AM	Date: JUNE 2014
Drawing No.	32105301/EIS/Fig 1.1

An assessment of the proposed development and its compliance with the projects defined objectives is outlined in Table 1.2 below.

Table 1.2 Objective Compatibility

No	Objective	Compliance Consideration	Compliance
1	Meet the objectives of national, regional, county and local policy documents.	The proposed development meets the objectives of National, Regional and Local Policy Documents as set out in Section 1.3.	Yes
2	Reduce journey times on the N69 through Listowel.	As identified in Section 2.12, the proposed development reduces journey times on the N69.	Yes
3	Reduce congestion within Listowel Town Centre.	As identified in Section 2.12, the proposed development reduces congestion within Listowel Town Centre.	Yes
4	Provide opportunity for the revitalisation of the town of Listowel.	Reduced congestion will create a better environment for the revitalisation of Listowel.	Yes
5	Support the sustainable development of Listowel Town.	The proposed development is in compliance with the objectives of National, Regional and Local Policy documents, it will inevitably support the development of Listowel Town in a sustainable manner consistent with the planning documents listed. Much of the lands proposed for retail development are to the north of Listowel Town which is also consistent with the northern bypass proposed.	Yes
6	Reduce collisions and fatalities on this section of the N69.	High Quality Alternative provided to the existing N69.	Yes
7	Provide opportunity for creating a safer environment for pedestrians by removing national traffic from Listowel Town Centre.	As identified in Section 2.12, the reduced congestion in Listowel Town combined with the improved pedestrian facilities along the John B. Keane Road will improve the environment for pedestrians.	Yes
8	Provide an economically viable proposed development in line with Government public spending code directive (one that provides a Benefit to Cost Ratio greater than 1 and a positive Net Present Value).	The proposed development demonstrates a positive Net Present Value and a Benefit to Cost Ratio ranging between 2.1 and 3.1 subject to the level of anticipated traffic growth.	Yes
9	Provide a proposed development that will improve accessibility.	The proposed development improves accessibility by providing alternative access routes into and out of different parts of Listowel Town and also includes improved pedestrian and cyclist provision.	Yes

As evidenced from the above table, the proposed development complies with all the objectives which were outlined.

1.3 Outline of Alternatives Considered

A route selection process was undertaken in 2011 and 2012 by Kerry NRDO which culminated in the production of a Route Selection Report. The Route Selection Report was prepared in accordance with the NRA Project Management Guidelines and the assessment was undertaken in accordance with these guidelines and the NRA Environmental Appraisal and Construction Guidelines.

Various alternative solutions were considered to address the scheme objectives as part of this route selection process. This comprised five different infrastructure options, i.e. options which included a new road, a 'Do Nothing'/'Do Minimum' option and also a Traffic Management option.

Based on the consideration of the 'Do-Nothing / Do-Minimum' and Traffic Management options and the conclusion that such measures were not viable or would not satisfy the scheme objectives, these options were discounted from further consideration.

Therefore preliminary option assessments were conducted in relation to the five infrastructure options comprising an assessment of the alternatives on the basis of Engineering, Environment and Economic criteria. This resulted in the further discounting of options leaving three remaining options for a more detailed appraisal. These remaining options were assessed based on the following criteria:

- *Economy;*
- *Safety;*
- *Environment;*
- *Accessibility and Social Inclusion; and*
- *Integration.*

The preferred route corridor option following this process was the route option titled Option C/D. Note the following in relation to this option:

- *It ranked 'Preferred' in the Environmental Evaluation;*
- *All three options were ranked as 'Similar' under the headings of Accessibility & Social Inclusion and Integration;*
- *It ranked as 'Intermediate' in the Safety Assessment; and*
- *It ranked 'Preferred' in the Economic Evaluation with a higher benefit to cost ratio and it was also the least expensive option.*

Option C/D was therefore taken forward and refined and improved to reflect the current proposed development as presented in this EIS.

1.4 Socio-Economics

The impacts on human beings considered in this assessment relate to direct physical impacts of the construction work and impacts on quality of life and safety arising from changed traffic flows and changes in commuting patterns. The assessment also seeks to identify the land use changes and changes in economic activities directly attributable or attributable in part to the proposed development.

The assessment was undertaken in line with a number of guidance documents including the Environmental Impact Assessment of National Road Schemes – A Practical Guide (Revision 1, NRA, 2008).

Impacts on the socio-economic environment have been assessed for both the construction and the operational phase of the proposed development for the following socio–economic aspects:

- *Economic activity and employment;*
- *Commuting patterns and health and safety;*
- *Tourism, recreation and access; and*
- *Land use and development.*

The assessment concluded that there would be no significant negative impacts on the local communities or other socio-economic receptors during construction. The overall impact of the construction phase on economic activity and employment is assessed as being positive. The construction of the scheme will also provide in the region of 118 construction jobs over a two year period. The majority of these positions are expected to be filled from within the local area. This is considered to be a positive benefit to the local economy.

The assessment concluded no significant residual negative impacts on the local communities or other socio-economic receptors during operation. The overall positive impact of relieving the congestion in central Listowel is envisaged to facilitate the movement of people and freight. A negative impact has been identified related to access to the Sive Walk, however measures to retain access have been included in the proposed development. Signage will be installed and maintained to ensure visitors are aware of access arrangements to this feature. Also, planting and landscaping will be undertaken to maximise the amenity value. Overall, during operation of the proposed development it is thought that there will be a moderate-positive impact to economic activity and employment, commuting patterns and health & safety.

1.5 Agronomy

The proposed development will traverse agricultural land passing through two Electoral Divisions (EDs); Listowel Rural and Listowel Urban, and is located within an area of lowland which consists of lands of good agricultural range and usage. The main farm enterprises are dairying and mixed livestock. The impact on agriculture will be limited to those farms directly traversed by the proposed development. The impacts on agronomy considered in this assessment relate to how the proposed development would impact on the current farming activities carried out on the land affected by the proposed development.

The assessment was undertaken in line with a number of guidance documents including the Environmental Impact Assessment of National Road Schemes – A Practical Guide (Revision 1, NRA, 2008).

Impacts on the agricultural environment have been assessed for both the construction and operational phases of the proposed development.

The principal impacts on agricultural activity during the construction phase of the proposed development will be:

- *Construction noise;*
- *Dust;*
- *Restricted access to sub-divided land parcels;*
- *Disturbance of drainage systems; and*
- *Disturbance of services.*

The assessment concluded that there would be no significant negative impacts on agronomy during construction with mitigation measures in place.

The principal impacts on agricultural activity during the operational phase of the proposed development will be:

- *Loss of agricultural land;*
- *Individual farm impact;*
- *Overall impact on individual farm holdings; and*
- *Impact on individual farm parcels.*

As a result of the proposed development design, specifically the accommodation works, one farm will have a major impact reduced to a moderate residual impact and one Farm will have a moderate impact reduced to minor. One farm will still have a residual impact of major (representing 4.8% of all farms) as the permanent land take significantly reduces the dairy herd grazing area.

1.6

1.7 Flora and Fauna

The EIS considered and assessed the potential direct, indirect and cumulative ecological impacts on terrestrial and aquatic ecology within the ecological study area (zone of influence) of the proposed development.

The assessment was undertaken in line with a number of guidance documents including the Guidelines for Assessment of Ecological Impacts of National Road Schemes (Revision 2, NRA, 2009).

The offline footprint of the proposed development is predominantly characterised by agricultural lands with a crossing of the River Feale. The River Feale is designated as part of the Lower River Shannon candidate Special Ares of Conservation (cSAC) at the proposed bridge site.

A number of specialist surveys have been carried out to establish the terrestrial and aquatic baseline within and adjacent to the proposed development including:

- *Habitat Surveys;*
- *Detailed botanical surveys of habitats that were considered to be of a higher ecological value including the lands within the boundary of the Lower River Shannon cSAC;*
- *Otters and Badgers surveys;*
- *Amphibians and Reptiles surveys;*
- *Breeding Bird survey;*
- *Wintering Birds - Whooper Swan surveys;*
- *Bats surveys;*
- *Freshwater Pearl Mussel Survey; and*
- *Wolf Spider Survey at the River Feale.*

There are nine designated sites within 15km of the proposed development and of these, only three are considered to be potentially impacted by the proposed development:

- *Lower River Shannon cSAC;*
- *Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle Special Protection Area (SPA); and*
- *The Cashen River Estuary proposed Natural Heritage Area (pNHA).*

A Natura Impact Statement (NIS) prepared in line with the requirements of the European Union Habitats Directive assesses the potential adverse effects to the integrity of the SACs and SPAs (collectively known as Natura 2000 Sites) within 15km of the proposed development.

In addition to the above protected sites there are a number of internationally and nationally protected mammal, bird, fish and amphibian species recorded in the vicinity of the proposed development.

Invasive species were found to be present in the study area including along both banks of the River Feale in the vicinity of the proposed crossing point.

Key sources of potential ecological impact arising from the proposed development include:

- *Direct habitat loss of terrestrial and fluvial habitats during construction;*
- *Noise and physical disturbance during construction;*
- *Surface water run-off during construction;*
- *Spread of invasive species during construction;*
- *Road crossings of water features creating obstructions to mammal movement during construction and operation;*
- *Road drainage during operation; and*
- *Lighting during operation.*

Before implementation of mitigation, the proposed development will result in a range of significant impacts due to habitat loss, potential spread of invasive plant species and potential pollution risk. Following implementation of mitigation, all impacts will be reduced to either non-significant or significant impacts at a local level only.

1.8 Soils, Geology and Hydrogeology

(a) Soils, Geology and Contamination

This soils and geology assessment considered the impacts on soils and geology associated with the construction and operational phases of the proposed development.

In addition, the assessment of impacts within this chapter has also considered the potential for contamination sources to be introduced during construction and operation of the proposed development that may potentially cause contamination of the sub-surface and impact on identified receptors.

The assessment was undertaken in line with a number of guidance documents including the Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (NRA, 2008).

The study area for the soils and geology assessment extended 250 m from the centre line of the proposed development. The ground investigation undertaken for the proposed development encountered topsoil, peat, made ground, alluvial (river) deposits and glacial till at the site. No evidence of contamination was observed during the ground investigation works.

No sites of geological heritage, sites or features of high or medium geological importance will be affected by the proposed development. The presence of peat may pose some geotechnical constraints during construction and ground improvement solutions may be required. However, once ground improvement solutions have been implemented, the impact of the proposed development on soils and geology will be Imperceptible. No significant impacts have been identified during operation.

(b) Hydrogeology

The hydrogeological assessment assesses the potential impacts generated by the construction and operational phases of the proposed development on the groundwater environment, including groundwater water supplies and surface water bodies potentially supported by shallow groundwater.

The assessment was undertaken in line with a number of guidance documents including the Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (NRA, 2008).

The majority of the area is underlain by a Regionally Important Aquifer. No karst features have been identified in the area.

A number of private water supplies were identified within a distance of 500m of the proposed development.

The following construction activities have been identified as potentially causing adverse impacts on groundwater or surface water receptors:

- *Piling;*
- *Dewatering;*
- *Preloading of Earthwork Embankments and Construction of Piled Sections; and*
- *Accidental Spillages and Contaminated Runoff.*

Impacts associated with the operational phase of the proposed development have been identified as a result of road runoff and accidental spillages.

A series of mitigation measures have been proposed to mitigate these impacts and post implementation of these measures, the residual impacts associated with the proposed development during the construction and operational phase of the proposed development are considered slight to imperceptible.

1.9 Hydrology, Geomorphology and Hydromorphology

The potential impact on various hydrological aspects such as flooding, water quality geomorphology/hydromorphology, and amenity value likely to be caused by the proposed development have been identified as a result of:

- *Water quality impact on receiving rivers and streams from routine carriageway runoff and from accidental spillages;*
- *The construction and operation of the proposed River Feale bridge crossing;*
- *Other construction work in or adjacent to watercourses including installation of culverts, watercourse crossings and realignments; and*
- *Increased flood risk as a result of reducing the conveyance of the existing watercourse and floodplain network, reducing the volume of flood storage available on the watercourse floodplains and/ or increasing runoff rates and volume.*

The hydrology assessment was undertaken in line with a number of guidance documents including the Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (NRA, 2008).

The hydrological study area extends 250 m beyond the landtake boundary of the proposed development. Where required the study area was extended beyond this to account for potential impacts outside this study area.

A number of field studies including baseline water quality monitoring have been undertaken in order to gain an understanding of the hydrological environment in the vicinity of the proposed development.

(a) Hydrology

The major watercourse within and adjacent to the study area is the River Feale.

There are other water features within the study area consisting of minor streams and channels and freshwater wetlands.

The study area is served by the Dromin Water Works north of the existing N69 which is connected to the main Kerry County Council water supply. The plant serves approximately 5,000 – 6,000 people. Water is abstracted from the River Feale at Scartleigh to serve the Dromin Water Works. This abstraction point is located over 600 m west and downstream of the proposed development.

(i) Flood Risk

A flood risk assessment (FRA) in line with the Office of Public Works (OPW) Guidelines for Planning Authorities (GPA) 20: The Planning System and Flood Risk Management (OPW, 2009), has been undertaken. The primary objective of the FRA was to assess the flood risk in the existing situation and with the proposed development in operation. The FRA concluded that the proposed N69 Listowel bypass is at low risk of flooding and will not significantly increase the risk of flooding elsewhere.

(ii) Water quality

During the construction phase there is the potential for pollution of surface water features from sediment and polluting substances entering watercourses as a result of surface water runoff or spills on-site. Potential sources during the construction phase include:

- *Installation of the bridge structure with a clear span over the River Feale;*
- *Construction works within and adjacent to watercourses including provision of culverts and watercourse realignments;*
- *Excavations including those associated with the provision of drainage works;*
- *Site clearance works;*
- *Stockpiling of materials;*
- *Accidental spillage of anthropogenic polluting substances in or adjacent to watercourses; and*
- *Construction plant and vehicle washing.*

To prevent or reduce the amount of sediment released into watercourses the contractor will be required to implement a number of mitigation measures as outlined in the main EIS and to prepare an erosion and sediment/silt control plan prior to commencing the construction works.

In addition, carriageway runoff during the operational phase may contain pollutants that can have an adverse effect on the quality of the water within the receiving watercourse or waterbody and therefore the drainage system identified provides a form of treatment to ensure that any negative impact is reduced. Under the proposed development a three stage system is proposed for the proposed development incorporating an oil/petrol interceptor, an attenuation pond and a constructed wetland.

The assessment concluded that the proposed development will not cause the deterioration of water quality within the water bodies adjacent to the proposed development either during construction (with implementation of appropriate mitigation measures) or during the subsequent operational phase.

(b) Geomorphology and Hydromorphology

The NRA guidelines recommend that geomorphological impacts are considered within the EIS. The Water Framework Directive defines ‘hydromorphology’ as the hydrological and geomorphological condition of surface water bodies.

The predicted residual long term impact of the proposed development on geomorphology is considered to be negligible for all watercourses within the study area. This results in an imperceptible significance for the geology of the eleven watercourses within the study area. The predicted residual long term impact on the hydromorphology of the River Feale water body is considered to be negligible resulting in an imperceptible significance.

1.10 Air Quality and Climate

Air quality monitoring indicates that the existing air quality environment in the area is generally well within the national and European Union (EU) ambient air quality standards. The main pollutants associated with traffic assessed under this study are nitrogen dioxide (NO2), carbon monoxide (CO) and benzene.

The assessment was undertaken in line with a number of guidance documents including the Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes (NRA, 2006).

The greatest potential impact on air quality during the construction phase of the proposed development is from construction dust emissions and the potential for nuisance dust. Dust minimisation measures will be put in place to minimise dust emissions during construction.

Traffic flow information has been used to model pollutant levels to assess whether any significant air quality impact on sensitive receptors may occur. Levels of traffic-derived air pollutants will not exceed the ambient air quality standards either with or without the proposed development in place. Thus, the impact of the proposed development in terms of air pollutants is negligible at all eleven worst-case receptors assessed.

No significant air quality impact on ecology will occur as a result of the proposed development.

Greenhouse gas emissions as a result of the proposed development will be insignificant in terms of Ireland's obligations under the Kyoto Protocol.

1.11 Noise and Vibration

(a) Noise

This assessment considered the anticipated types of noise and the impacts of same associated with both the construction and operation of the proposed development.

The assessment was undertaken in line with a number of guidance documents including the Guidelines for the Treatment of Noise and Vibration in National Road Scheme (NRA, 2004).

During the construction works a variety of items of plant will be in use, such as excavators, piling equipment, lifting equipment, dumper trucks, compressors and generators. It is also possible that rock breaking may be required on occasions and there will be vehicular movements to and from the site that will make use of existing roads. Due to the nature of the activities undertaken on a large construction site, there is potential for generation of significant levels of noise.

A series of measures have been proposed to mitigate noise levels during construction including adherence to best practice guidelines, timing of works and maintenance of plant machinery. The application of binding noise limits and hours of operation, along with implementation of appropriate noise control measures, will ensure that noise impact is kept to a minimum.

With regard to operational noise level a computer based model has been prepared in order to quantify the traffic noise level associated with the operational phase of the proposed development.

For eleven locations, with the proposed development in place, the noise levels result in the requirement for noise mitigation. It is proposed to use a combination of acoustic barriers and low noise road surfacing as the noise mitigation measure on those road sections which dominate the noise environment for the receivers requiring mitigation. With the mitigation measures in place, the noise levels are calculated to be within the design goals for noise at all locations assessed.

(b) Vibration

The potential for vibration at neighbouring sensitive locations during construction is typically limited to piling, demolition, excavation works, rock-breaking operations and lorry movements on uneven road surfaces. However, the contractor will be obliged to take specific abatement measures during construction to comply with the limits set in the main EIS.

As a vehicle travels along a road, vibration can be generated in the road and subsequently propagate towards nearby buildings. Such vibration is generated by the interaction of a vehicle's wheels and the road surface. However, vibration from road traffic is unlikely to cause a perceptible impact to properties near the road as long as the road surface is subject to normal maintenance requirements. Problems attributable to road traffic vibration can therefore largely be avoided by normal routine maintenance of the road surface.

1.12 Landscape and Visual

The landscape assessment involved reviewing plans and sections of the proposed road development, aerial photography and various publications, together with visits to the environs of the proposed development.

The assessment was undertaken in line with a number of guidance documents including the Environmental Impact Assessment of National Road Schemes – A Practical Guide (Revision 1, NRA, 2008).

Listowel Town itself has a population of almost 5,000 according to the 2011 census and it is a market town, which has undertaken environmental and renewal works in recent years. It is also a town of both architectural and historical heritage and was officially designated as one of Ireland's 26 "Heritage Towns" in July 2000. The study area has a number of landscape components including;

- *Outside the town itself, much of the land is flat, with dispersed ribbon development. Dairy farmland dominates the area with large farm holdings where much of the hedgerows have been removed;*
- *To the north of the study area there is the old railway line, known locally as 'Sive Walk', that is used as an amenity path;*
- *Approximately 10 km northwest of Listowel is Knockanore Mountain, at a height of 267 metres;*
- *To the west of the study area, approximately 2 km from the town centre, lies the Dirrha Bog, which is a blanket bog. This is a unique contrast to the agricultural land and was much written about by John B. Keane;*
- *To the south lies the River Feale, this meanders through the town of Listowel;*
- *The land beyond the River Feale is also agricultural land but with a greater definition of field boundaries;*
- *Further south the prominent ridgelines within the elevated hills around Coolnaleen Upper and Ballyduhig, with the Stack's Mountains beyond, are important features in the landscape; and*
- *Views north, east and west of the study area are open, extending over the agricultural land. To the south the views are somewhat contained by the backdrop of Stack's Mountains.*

The proposed development does not pass through or is not within close proximity to any listed areas of Outstanding Landscape. There are no designated scenic landscapes or tree preservation orders within the study area.

There are a number of protected structures and recorded monuments within the study area. A number of these structures are visually prominent within the landscape and significantly contribute to the visual character of the area.

The following main elements have the potential for landscape and visual impact on the adjoining residential properties and protected structures, visitors to Listowel, the River Feale, adjoining areas of commercial and industrial development; road users; and amenity users of the dismantled railway line:

- *Removal of existing vegetation;*
- *General construction disturbance;*
- *Significant, elevated structures and bridge over the River Feale including earthen embankments and earth retaining / structural walls;*
- *Illumination at the proposed roundabout junctions comprising 8-10 m high street lighting columns;*
- *Signage; route confirmatory type and active digital signage (ADS); and*
- *Moving traffic during operation.*

Mitigation in the form of landscape planting is proposed, and retention of existing vegetation, which will reduce the visual intrusion of the proposed development in the medium to long term. Reduction of traffic in the town centre will improve the quality and environment of the town centre.

1.13 Archaeology, Cultural Heritage and Architectural Heritage

The cultural heritage assessment was undertaken in line with a number of guidance documents including the Guidelines for the Assessment of Archaeological Heritage Impacts on National Road Schemes (NRA, 2005) and Guidelines for the Assessment of Architectural Heritage Impacts of National Road Schemes, (NRA, 2005).

(a) Archaeological & Cultural Heritage

A total of 35 archaeological and cultural heritage sites were identified within the study area.

Impacts resulting from the construction of the proposed development have been identified for 16 of the 35 archaeological and cultural heritage sites, therefore mitigation is required. Mitigation will be by preservation in situ and, where this is not possible, preservation by record is required to mitigate identified impacts.

After mitigation the following impacts are predicted during construction; neutral impacts on six sites, moderate negative impacts on two sites, a slight negative impact on four sites, imperceptible negative impacts on three sites and unknown impact on one area of archaeological potential.

After mitigation, no additional impacts are predicted during operation.

(b) Architectural

A total of 15 architectural heritage sites were identified within the study area.

Measures to avoid or reduce potential impacts on architectural heritage sites have been considered throughout the design of the proposed development. In addition landscape planting measures will mitigate any impact on specific architectural sites.

During construction, potential impacts were identified on 11 of the 15 architectural heritage sites. After mitigation, there will be a slight negative impact on four sites and imperceptible impact on seven sites.

During operation, potential impacts were identified on eight sites. After mitigation there will be a slight negative impact on two sites, imperceptible impact on five sites and no impact on one site.

1.14 Waste

This assessment considers the anticipated types of waste and the impacts of same associated with both the construction and operation of the proposed development.

Waste will be generated during the construction phase as a result of:

- *Excavated materials / Demolished Structures;*
- *Pile Arisings;*
- *Surplus Materials; and*
- *General Waste Management.*

It is likely that the majority of excavated material will be unacceptable for reuse in road embankments, but is likely to be acceptable for reuse as landscaping material. Where the waste generated is not reusable, it will be sent to an appropriate licensed/permitted facility.

A Project Construction and Demolition Waste Management Plan will be prepared by the contractor for the provision of waste management during the construction phase of the proposed development. The plan will take into account best practice guidance. The contractor will ensure that the facility to which waste is brought is licensed/permitted in compliance with waste management legislation.

The impacts associated with the proposed development after adherence to the mitigation measures during construction phase are slight to negligible.

The main potential impacts from the operational phase of the proposed development are likely to arise from road maintenance, verge cleaning, green waste from landscape maintenance and wastes generated through littering.

Management of wastes arising during the operational phase of the proposed development will be the responsibility of Kerry County Council or contractors appointed by Kerry County Council to provide waste management and landscaping services.

1.15 Material Assets

The material assets considered as part of the material assets assessment include major utilities.

Impact to the utility providers' services shall be permanent in nature, and occur during the construction phase. The impact on services in the absence of mitigation would be profound as many of the services would no longer be functioning. There will be no additional impact during the operational phase which has not already been considered as part of the construction phase.

When the mitigation measures detailed in the EIS are implemented such as protection and diversion of utilities, the magnitude of impact is reduced to imperceptible as the services will continue to operate in their current form.