



Clifton Scannell Emerson
Associates

Kilkenny Northern Ring Road Extension – Freshford Road to Castlecomer Road

Environmental Impact Statement Volume 1 – Non Technical Summary



Client: Kilkenny County Council

Date: 19th June 2013

Job Number: 07_088

CONSULTING ENGINEERS

Civil
Engineering

Structural
Engineering

Transport
Engineering

Environmental
Engineering

Project
Management

Health
and Safety



Document Control Sheet

Project Name: Kilkenny Northern Ring Road Extension

Project Number: 07_088

Report Title: Environmental Impact Statement - Volume 1: Non Technical Summary

Filename: 07_088-Environmental Impact Assessment 20

File Path: 07_088\Environmental Impact Assessment\Environmental Impact Statement\07_088-Environmental Impact Assessment 20.DOC

Issue No.	Issue Status	Date	Prepared by	Checked by
1st	DRAFT	19/06/13	CAB	GE

PREFACE

THIS ENVIRONMENTAL IMPACT STATEMENT CONSISTS OF THE FOLLOWING FOUR DOCUMENTS:

VOLUME 1
NON-TECHNICAL SUMMARY

VOLUME 2
MAIN REPORT

VOLUME 3
FIGURES

VOLUME 4
APPENDICES

TABLE OF CONTENTS

VOLUME 1

NON TECHNICAL SUMMARY

1.0 INTRODUCTION	vi
2.0 NEED FOR THE PROPOSED SCHEME	vi
3.0 ENVIRONMENTAL IMPACT ASSESSMENT	vii
4.0 CONSULTATION	vii
5.0 ALTERNATIVES	viii
6.0 DESCRIPTION OF THE PROPOSED SCHEME	ix
7.0 TRAFFIC	ix
8.0 HUMAN BEINGS	xi
9.0 FLORA AND FAUNA	xi
10.0 HYDROLOGY	xiv
11.0 SOILS, GEOLOGY AND HYDROGEOLOGY	xiv
12.0 AIR QUALITY AND CLIMATE	xvi
13.0 NOISE AND VIBRATION	xvi
14.0 LANDSCAPE AND VISUAL	xvii
15.0 ARCHAEOLOGY, ARCHITECTURE AND CULTURAL HERITAGE	xvii
16.0 MATERIAL ASSETS	xviii
17.0 INTERACTION OF ENVIRONMENTAL IMPACTS	xviii
18.0 SUMMARY OF ENVIRONMENTAL COMMITMENTS	xviii
19.0 FURTHER INFORMATION	xviii

LIST OF FIGURES INCLUDED IN VOLUME 1

- | | |
|--------|------------------------------|
| Fig. 1 | Proposed Scheme Sheet 1 of 2 |
| Fig. 2 | Proposed Scheme Sheet 2 of 2 |
| Fig. 3 | Proposed Bridge |

1.0 Introduction

Clifton Scannell Emerson Associates Consulting Engineers (CSEA) was commissioned by Kilkenny County Council to prepare a Preliminary Design and an Environmental Impact Statement (EIS) for the proposed Kilkenny Northern Ring Road Extension Scheme. This road development runs between an existing roundabout with the existing N77 Kilkenny Ring Road Extension and N77 Castlecomer Road and a proposed roundabout on the R693 Freshford Road, with a bridge crossing of the River Nore.

2.0 Need for the Proposed Scheme

Carriageway and footway widths in Kilkenny City vary markedly and are generally less than is considered desirable for streets carrying two-way through traffic. As a result many of the streets are unsuitable for the volume and types of traffic they currently carry.

The main traffic flows into the City Centre converge at the existing bridges, Green's Bridge and John's Bridge, both of which are already operating over capacity at peak times. The traffic congestion experienced on the existing bridges at present acts as a constraint to travel between the east and west sides of the City Centre.

HGVs and other through traffic travelling from the M9/N10, N76, N77 & R700 must use the city streets, including the city centre bridge crossings to reach the R693, leading to the M8 and further west and vice versa. This places pressure on Green's Bridge and the proposed scheme provides an alternative for vehicles not looking to access the city centre.

The objectives of the Scheme are to:

- Reduce congestion in the City Centre and Green's Bridge.
- Complement the proposed Central Access Scheme.
- Provide an extension to the N77 Ring Road connecting the Freshford Road and the North West of the City to the existing Ring Road.
- Further develop the Strategic Road Network for the region, connecting the M9 to the M8 via the Kilkenny Ring Road. The Scheme provides a reliable, safe and efficient link between the M9 and the east and south-east of the country and the M8 at Urlingford and the North and North West of the country.
- Facilitate the promotion of walking and cycling.
- Improve traffic safety and convenience.

The Scheme will provide substantial traffic improvements, providing an alternative route for:

- Traffic with origins and destinations outside the City, e.g. traffic travelling from the R700/N10 to the R693; and
- Traffic accessing the City with either an origin or a destination within the City, e.g. traffic travelling from the M9 Dublin Road accessing St. Luke's Hospital or Dean Street.

The need for the Scheme is reinforced within the following policy documents:

- **National Spatial Strategy, 2002-2020, and the National Development Plan 2007-2013** – The overall policy of both of these plans with regard to Kilkenny is to promote an increase in population and economic activity. This policy will lead to increased traffic, and a need to cater, in an appropriate manner, for this traffic volume. The proposed Scheme will provide a critical element of the necessary infrastructure to cater for this increase in traffic, and is therefore in support of the policies outlined in these plans. In February 2013, it was announced that the NSS would be cancelled and replaced by a new policy in about a year's time.
- **'Smarter Travel – A Sustainable Transport Future'** – This is the Government's transport policy for the period 2009-2020. It sets out the vision, goals and targets for achieving a more sustainable transport future and includes a number of 'soft' measures intended to complement infrastructure improvements. The Kilkenny Local Authorities (KLA) are committed to the principles underlying 'Smarter Travel – A Sustainable Transport Future'. A key objective is the development of "a ten minute walking and cycling city". The realisation of this Scheme will

enable the achievement of this objective by reducing traffic congestion and creating improved conditions for the implementation of sustainable transport measure for both pedestrians and cyclists. The KLA were successful in their bid under the Active Travel Towns programme.

- **Kilkenny City & Environs Development Plan 2008-2014**

The Roads Objectives of this Development Plan states 'Reserve free from development the proposed line of the western by-pass for the City from the Castlecomer Road to the Callan Road including for a river crossing.'

- **Kilkenny County Development Plan 2008-2014** - This Development Plan shows the proposed Scheme on the Plan drawings. This Scheme also facilitates the objective "To seek an upgrade of the Kilkenny to Urlingford road (R693) to National Secondary status" by directly linking the existing N77 Ring Road Extension to this proposed national route.

- **Kilkenny City Centre Local Area Plan – 2005** – This Plan provides for securing the continued vitality and viability of the City Centre through sustainable planning, and achieving a balance between preserving its architectural and archaeological heritage, facilitating modern living and enhancing the quality of life for its existing and future residents. The proposed Scheme also facilitates the City Centre traffic management measures proposed in this Plan by reducing the levels of through traffic and HGVs using the City Centre streets.

- **Regional Planning Guidelines for the South-East Region 2010-2022** – These Guidelines support the completion of the Kilkenny Ring Road. They also support the upgrading of the R693, which provides an important link to the M8/M9 and an important link between the hubs of Kilkenny and Wexford.

3.0 Environmental Impact Assessment

This EIS has been prepared in accordance with the requirements of Section 50 of the Roads Act 1993-2007, and amendments thereto conferred by the Planning Acts, 2000-2009 and other enabling legislation including Section 217(B)(4)(b) of the Planning and Development Act, 2000 as inserted by the Planning and Development (Strategic Infrastructure) Act, 2006.

This EIS is being submitted to An Bord Pleanála under Section 217(B)(4)(b) of the Planning and Development Act, 2000.

This EIS has also been prepared in accordance with all relevant guidelines including the Environmental Protection Agency (EPA) publications entitled 'Guidelines on the information to be Contained in an Environmental Impact Statement', 2002 and 'Advice Notes on Current Practice in the Preparation of Environmental Impact Statements', 2003; and the National Road Authority (NRA) guidelines entitled 'Environmental Impact Assessment of National Road Scheme – A Practical Guide', 2008.

Assessment of the potential significant impacts of the proposed Scheme on the following elements of the receiving environment has been undertaken within the EIS:

- Human Beings;
- Flora and Fauna;
- Soils, Geology and Hydrogeology;
- Hydrology;
- Noise and Vibration;
- Air Quality and Climate;
- Landscape and Visual;
- Cultural Heritage; and,
- Material Assets.

4.0 Consultation

Non Statutory Consultations have been an integral component throughout the design and environmental impact assessment processes in order to inform and refine the Scheme. These consultations sought the views of statutory consultees, Elected Members and the affected landowners.

These consultations have taken place in two distinct phases as follows:

1. January 2008 to March 2012 – as part of the preparation of the Constraints and Route Option Study submitted to Kilkenny County Council in March 2012.
2. June 2012 to June 2013 – as part of the preparation of the EIS.

Following preparation of the Constraints and Route Options Study, An Bord Pleanála were consulted. Their recommendations aided the screening of this EIS.

In February 2013 a consultation letter was issued to ten stakeholders, namely Geological Survey of Ireland & Geological Heritage (GSI), Department of Environment, Heritage & Local Government (DoEHLG), Environmental Protection Agency (EPA), Office of Public Works (OPW) Hydrometric section, National Parks and Wildlife Services (NPWS), Inland Fisheries Ireland (IFI), Irish Peatland Conservation Council (IPPC), National Roads Authority (NRA), An Taisce, The Heritage Council. The letter invited the stakeholders to provide comment on the design of the scheme. Responses were received from the OPW, NRA, EPA, GSI, An Taisce, The Heritage Council, and IFI.

A number of meetings were also held with stakeholders as part of the preparation of this EIS, including the NPWS, IFI and the OPW. In addition, the Scheme has been presented to the Elected Members twice, on 5th March 2012 and 26th April 2013. Representatives of Kilkenny County Council and the design team have held a number of meetings with affected landowners.

5.0 Alternatives

Alternative Horizontal Alignments

The horizontal alignment is largely constrained by the end connection points at the R693 Freshford Road and the N77 Castlecomer Road/N77 Kilkenny Ring Road Extension. At the Castlecomer Road/N77 Kilkenny Ring Road Extension there is an existing roundabout, which forms a tie-in point. At the R683 Freshford Road there were a number of possible tie-in locations with satisfactory geometrics. The preferred tie-in point is closest to Kilkenny City, allows the shortest route requiring the least landtake and the least severe severance, allows the shortest crossing of the River Nore and its SAC, and avoids areas of archaeological importance that were impacted on by alternative routes.

Alternative Vertical Alignments

The vertical alignment is influenced by the need to ensure the proposed River Nore bridge structure maintains adequate clearance above predicted flood levels for the River Nore. The land to the west of the river is a floodplain, and the vertical alignment through this floodplain must also ensure that there is adequate clearance over flood levels. The 1:100 year flood level has been predicted to be 49.410m AOD at the proposed River Nore bridge location. The road level through the floodplain will be between 51.300m AOD at the eastern extent of the floodplain and 52.950m AOD at the western pier of the bridge. The proposed vertical alignment on embankment through the flood plain also facilitates the headroom required for farm underpasses on either side of the Bleach Road, which will become a cul-de-sac on the town side. Outside of the bridge structure and the road crossing the floodplain, the vertical alignment achieves a balance of cut and fill with the existing ground level.

Vertical Alignment options considered included grade separation of Bleach Road, which would require significant increased embankment height. This would require substantially more landtake to allow for the embankment, in addition to increased earthworks.

The preferred alignment provides access between the proposed Scheme and the Bleach Road north of the scheme, hence providing enhanced road access to Kilkenny City and the Strategic Road network from the Bleach Road. The Bleach Road south of the new road will be cul-de-saced. Access to Kilkenny City and Greens Bridge will remain as current for residents south of the new road.

Alternative Bridge Design

The preferred option for the River Nore Bridge is a three-span structure with a centre span of 45m and edge spans of 22.5m each, supported by abutments at each end. The bridge piers will be set back several metres from the river banks. This option is preferred over a clear 50m span as it reduces the structural depth by making use of the hogging movement over the intermediate supports. Alternative

designs, such as two 25m spans with a central pier within the river bed, were discounted due to ecological and hydrological concerns.

Alternative Flood Plain Design

Approximately 300m of the proposed road runs through a major floodplain of the River Nore. A number of options were considered for crossing this floodplain. The need to maintain it as a floodplain that can drain to the river in a similar way to how it currently behaves following flooding was acknowledged and accepted early in the design process. Building the road over the floodplain on an embankment without allowing for the behaviour of the floodplain was not considered as a viable option. Bridging the 300m in a similar fashion to the proposed River Nore bridge was considered but was discounted in favour of a more cost effective solution. The preferred option is to provide 20No. 10m wide and 3.6m high arched culverts evenly spaced through the 300m of floodplain. These culverts will allow the flood water to dissipate following a flood event at a rate and in a manner similar to that which occurs at present.

6.0 Description of the Proposed Scheme

The proposed Scheme is illustrated in Figures 1, 2, and 3, and described briefly in this section.

Road Design

- The proposed Scheme has been planned as a regional road with an 80kph speed limit. However, the road has been designed to a 100kph speed limit, which will facilitate a speed limit increase should the road be upgraded to a national route in the future.
- The vertical alignment of the road has been designed to allow for 1/100 year flood levels.
- The proposed cross-section of the road will consist of two 3.65m lanes for motor vehicles, two 2.5m hard shoulders, a 1.5m verge, 1.75m cycletrack, and 1.8m footpath on the city side of the road, and a 3.0m verge on the northern side. At the proposed River Nore bridge and on the reinforced earth embankment through the floodplain the proposed cross-section of the road will consist of two 3.65m lanes for motor vehicles, two 0.5m hard shoulders, a 1.5m verge, 1.75m cycletrack, and 1.8m footpath on the city side of the road, and a 1.5m verge on the northern side.
- The junctions at either end of the proposed Scheme will be roundabouts. These will be a newly constructed roundabout at the junction with the R693 Freshford Road, and the existing roundabout at the junction of the N77 Kilkenny Ring Road Extension and the N77 Castlecomer Road. The Bleach Road will become a cul-de-sac at the city side of the proposed Scheme, and will form a T-junction with the proposed Scheme on the northern side.
- Pedestrian access will be provided to the city side of the proposed road at Bleach Road.

River Nore Bridge Crossing

- The proposed bridge is designed as a three-span structure with a centre span of 45m and edge spans of 22.5m each, supported by abutments at each end.
- The proposed bridge supports a carriageway with 4.15m wide lanes in each direction. There will be a 1.5m verge, 1.75m cycletrack, and 1.8m footpath on the city side of the road, and a 1.5m verge on country side of the proposed bridge giving an overall width of 14.85m.

River Nore Flood Plain Crossing

- The 300m long River Nore floodplain will be crossed by 20No. 10 wide by 3.6m high arched culverts.
- Through the floodplain the paved area will be 14.85 in width, comprised of 4.15m wide lanes in each direction, a 1.5m verge, 1.75m cycletrack, and 1.8m footpath on the city side of the road, and a 1.5m verge on country side.

7.0 Traffic

The traffic modelling and forecasting for this EIS were undertaken using the Kilkenny City Traffic Model (KCTM). During the preparation of this EIS, the model was updated using traffic data from 2012 and 2013 and revised traffic forecasts. The projected development inputs for the traffic forecasts were

agreed with Kilkenny County Council Planning Department and were informed by the Regional Planning Guidelines and projected Residential, Industrial and Commercial development.

The 2011 census recorded the population of Kilkenny City at 24,423. This is projected to increase to 27,000 by 2019 and 33,000 by 2034.

Forecasts were undertaken for the following years:

- 2019 (proposed year of opening of the proposed Scheme); and,
- 2034 (design year, 15 years after opening of the proposed Scheme).

Traffic growth that will occur in the period 2013 – 2034 was predicted for the purpose of this model. Traffic growth will occur from the traffic generated by specific developments that are currently predicted to occur within Kilkenny in the period up to 2034. Based on the current land-use planning, the Regional Planning Guideline projections and projected industrial and commercial development the model zones were updated for 2019 and 2034 projected demands. No baseline annual traffic growth was included.

The following assumptions have been made with regard to key development sites within Kilkenny:

- Some development of the Brewery and Old Mart brown field sites to occur by 2034.
- Residential development at Loughmacask is estimated at 270 additional units in 2019 and 450 additional units in 2034;
- Residential development in the Western Environs is estimated at 250 additional units by 2019 and 1560 additional units by 2034;
- Development of substantial areas of industrial zoned lands to the east and south of the City by 2034.

Assessment of the traffic modelling clearly demonstrates the need for the proposed Scheme to alleviate traffic congestion within Kilkenny City Centre. In the absence of the Scheme, the traffic congestion and delay currently being experienced on John's Bridge and Green's Bridge will continue to increase. This congestion will prevent proposed improvement to public transport and facilities for pedestrians and cyclists in the City Centre from being implemented. The congestion will also impact on business and trade, and will reduce the attractiveness of the City Centre for business and tourism.

Analysis confirms that the introduction of the proposed Northern Ring Road Extension River Nore bridge crossing will provide significant relief to all other river crossings, with the greatest relief provided to the Green's Bridge crossing. The traffic model shows that the throughput of traffic across the River Nore in 2034 is severely hampered by congestion in the absence of the Central Access Scheme (CAS) and the Northern Ring Road. The provision of both the Central Access Scheme and the Northern Ring Road complement each other to control traffic levels to sustainable levels in the City Centre and on John's Bridge and Green's Bridge.

Table 7.1 – Traffic Flows Crossing River Nore

Location	AADT Flows				
	2019		2034		
	Without Scheme	With Scheme	Without Scheme	With Scheme	Without Scheme and CAS
Proposed Scheme	-	7705	-	15925	-
John's Bridge	7049	6988	15814	14424	18118
Central Access Scheme	10388	7350	21541	15925	-
Green's Bridge	11956	9383	17854	12734	22154
N10 Ring Road Bridge	27900	28160	28790	27970	29565
Totals	57293	59586	83999	86978	69837

Reductions in flows in the City Centre will enhance the general amenity of the City Centre streets. The predicted reductions in traffic volumes will make for a safer environment for both pedestrians and cyclists.

The model also shows that the proposed scheme provides significant traffic relief in the City Centre, not only on the bridge crossings, but also the Dublin Road, Hebron Road, Castlecomer Road, and Freshford Road.

Economic Assessment

An economic assessment of the proposed Scheme has been undertaken using information from traffic forecasts undertaken both with (Do Something) and without (Do Minimum) the proposed Scheme in place. The results of this assessment confirm that the proposed Scheme shows a positive Benefit to Cost Ratio (BCR) of 3.66 which indicates that the proposed Scheme is economically viable.

There are other non-tangible benefits which will accrue to the citizens of Kilkenny, through the provision of cycletracks and footpath as a walking route and extension of the existing cycletracks and footpaths on the Ring Road, reduced accident risk and improved environment in the City Centre which have not been assessed through the above analysis but will clearly enhance the overall benefit value in relation to costs.

8.0 Human Beings

The proposed Scheme will have a positive local impact in terms of facilitating the future development of Kilkenny City and Environs, alleviating traffic congestion and improving connectivity. The Scheme will have a positive impact on travel patterns as it will provide an alternative route across the River Nore, avoiding the two existing City Centre bridges. Traffic from the M9 will be able to reach the M8 without travelling over Green's Bridge.

The provision of a dedicated off-road cycle and pedestrian facility along the length of the Scheme, adds to the existing service on the existing Ring Road, which is currently widely used for recreational walking and cycling. Pedestrian access will be provided to the City side of the Bleach Road.

The proposed Scheme will lead to the re-routing of some existing journeys; however, no adverse impacts to travel times are envisaged. The proposed Scheme will generally improve journey times within the City.

There are no direct impacts on buildings. The proposed Scheme impacts on agricultural land only.

There may also be indirect disruption to local residents during the construction phase, arising due to traffic restrictions which may be necessary during certain times of construction, however, such impacts will be short term and temporary in nature, and mitigated as much as possible.

Construction of the proposed Scheme will provide a positive impact on employment in the local area through the generation of jobs within the construction sector, and local businesses and services are expected to experience increased turnover from the supply of goods and services.

9.0 Flora and Fauna

Sites of Ecological Importance

The River Nore is within the River Barrow and River Nore candidate Special Area of Conservation (cSAC) (site code 002162) and the Special Protection Area of the River Nore (Site Code 4233) as designated under the EU Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (Directive 92/432/EEC), known as the Habitats Directive. The River Nore cSAC is an important river corridor for upstream and downstream migration of salmon and lamprey, both of which are protected species. The SPA is based on the kingfisher, an Annex I species under the Birds Directive and therefore a species of special conservation interest. Other species noted to occur are mute swan, cormorant, mallard, snipe and sand martin.

Terrestrial Flora and Fauna

Habitats

The habitats that occur in this section of the floodplain and adjacent river valley comprise a large area of improved agricultural grassland and smaller sections of wet woodland, dry deciduous woodland, lowland river, drainage ditches and treelines/hedgerows. Small areas of buildings and artificial surfaces are provided by the roads and trackways while there is also a little disturbed ground just west of the existing roundabout on the N77.

Pockets of interesting habitat occur along the route with plant species that are uncommon locally, though none of them are rare or protected. Starting from the eastern end, a patch of disturbed ground supports hawkweed ox-tongue *Picris hieracioides*, an introduced, but Kilkenny, speciality. The wet woodland in its clearings and drains has large sedges (*Carex acutiformis*, *C. riparia*, *C. otrubae*) as well as herbs like yellow loosestrife *Lysimachia vulgaris* and the floating liverwort *Riccia fluitans*.

Another centre of interest is the drain along the western side of the Bleach Road where creeping jenny *Lysimachia nummularia* is abundant. The Nore banks have patches of creeping yellowcress *Rorippa sylvestris* but this is ubiquitous along the channel, if rare over much of the country.

Mammals

The only large mammal dependant on the area is the otter and the species is relatively common in that a regular otter path is seen on some of the Nore bank. Feeding activities may take animals into the drains and woodland east of the Bleach Road, especially in spring when looking for frogs. Otters breed in holes in riverbanks, often under fallen trees but there are no especially favourable sites in this section of the Nore.

Badgers are resident, or at least regular, in the woodland on the southwest bank of the river, visiting the fields north of Auteven. No evidence of them crossing the route was seen but this is likely to happen when feeding demands it.

A bat survey indicates that at least six species occur in the area with the river channel being the most valuable habitat, followed by the riverside woodland east of Auteven and the wet woodland at the eastern edge. There are no buildings potentially affected by the project that would be suitable as breeding roosts. Temporary roosting does also occur on trees during summer, especially if ivy-covered.

The floodplain of the river attracts wildfowl when flooded and small flocks of whooper swans occur for short periods in some winters. Geese, probably grey-lag, have also been seen but very rarely. Considerable numbers of snipe feed in wetter areas of the floodplain in winter and some are likely to nest in the marshland west of the routes. Little egrets also occur sporadically along the river but do not nest. A species that has nested is the yellowhammer, seen in the hedges along the Bleach Road.

Aquatic Flora and Fauna

The Nore river supports a wide variety of fish, both salmonids and coarse types like perch and pike. It is a migratory route for salmon and river lamprey and there is some breeding in this section. Lamprey larvae are found in muddy embayments along the bank. Some salmonid fry also penetrate into the drains leading to the river.

Effects of Development

The only unavoidable consequences of the project are the covering up of habitat inside a Natura 2000 site and the creating of noise and a level of air pollution that has not been present before. All other effects may be mitigated by attention to detail in design and construction.

Habitat Loss

The road will run for 173m through the cSAC, made up of 67m at the eastern end, 44m beside the Bleach Road and 62m in crossing the river. The comparable distance through the SPA is 22m, the width of the river channel itself. None of these areas has significant ecological interest and the plant

species are widespread in the river valley. In particular, there are no areas of Annexed habitat and no protected plants under national legislation.

Other Impacts

- Severance: This is probably most important for mammals which move extensively during feeding such as bats, badgers and otters.
- Lighting also may constitute a barrier particularly to bats as some species will not cross a lighted area.
- Few otter (or badger) movements occur on the floodplain fields but the frequent openings for water flow will facilitate animal movements provided they are not fenced.
- The bridge itself is a potential barrier but this will be much reduced by having the span high enough over the water to allow swans etc to fly underneath and also to have the free space on each bank to allow for continuous vegetation especially of shrub height.
- Culverts can create a significant barrier on streams and drains that are crossed, and care must be taken to make them fully passable by fish, particularly as some salmonids are found in drain on the floodplain.
- Disturbance in terms of noise seems seldom to be an issue for wildlife and is much more noticed by people.
- The main disturbance during the construction phase is site clearance and the removal of tree or bush cover.
- Air pollution: Raised levels of nitrogen oxides are experienced by all road verges with a reasonable amount of traffic and these might be considered to impact on the vegetation of the SAC. However a floodplain is a nutrient-rich habitat, a situation produced by river flooding and, in this case, intensive management of the grassland over most of the adjoining area. Additional nitrate input will not be significant in this case.

Positive impacts

The extensive embankment will allow for an ecological type of management that could favour plant communities and insect life in places where the current intensive agriculture prohibits them. This will depend on the type of material used but should be considered at an early stage with the aim of offsetting some of the negative effects of the project in the SAC.

Mitigation Measures

The effect of site clearance, cut and fill and general traffic movements are recognised as major factors in releasing sediment that can feed into the river to the detriment of most forms of aquatic life and especially salmonid fish. Method statements will be prepared by the contractors to cover all activities, with sufficient settlement and run-off capacity to minimise this risk. Building the embankment progressively from one end to the other will minimise this potential impact as will the naturally low gradients of the floodplain.

Water Quality

In designing appropriate mitigation measures to safeguard water quality in the river the requirements of Inland Fisheries Ireland will be met.

Disturbance

The river banks will be checked in case of nesting kingfishers prior to construction and the bridge works timed to avoid any impact.

Other Mitigation

Tall growing trees will be planted close the road edge on the old railway embankment so that a flight bridge may be established with trees there.

Mature trees will be left as close as practicable to the bridge on the river bank and willows will be allowed to grow under the bridge itself. This will lessen any severance effect of the bridge for bats.

Summary

The project will be completed without significant effect on the Natura 2000 sites. A number of mitigation measures are proposed as part of the Scheme. Local impacts will occur but these will not endanger the special features of the sites or their conservation objectives.

The project will not add cumulatively to others to create any significant impacts on the Natura 2000 sites.

10.0 Hydrology

The proposed bridge crosses an active floodplain of the River Nore. The impacts of the proposed bridge were assessed by hydraulic modelling of a river reach that extends upstream and downstream of the bridge location. The model comprised two parts. The first part was a model that extended for approximately 6 km to a point just downstream of Green's Bridge. This model was constructed with data inputs collected specifically for this EIS. The second part was an existing HEC-RAS model developed by Mott McDonald EPO for the River Nore (Kilkenny City) drainage scheme. This model extended for approximately 1 km from upstream of Green's Bridge to downstream of John's Bridge resulting in the combined model length of 7 km. The downstream boundary of the tested model coincided with the downstream boundary of the physical model of the Kilkenny Flood Relief Scheme that was tested by HR Wallingford in 1996/ 97.

The HEC-RAS hydraulic model was used to assess the impact of the proposed bridge on upstream water levels. The model shows that considerable inundation of the eastern floodplain (left floodplain when viewed downstream) occurs when the River Nore is in flood. For this reason, maintaining conveyance through the two sides of this eastern floodplain that will be divided by the proposed bridge is a key consideration in the Scheme design.

The proposed bridge is shown in Figures 3. The proposed bridge is designed as a three-span structure with a centre span of 45m and edge spans of 22.5m each, supported by abutments at each end. The proposed bridge is designed to carry paved areas 14.85m in width.

The 300m long River Nore floodplain will be crossed by 20No. 10 wide by 3.6m high arched culverts. The 20No. culverts will allow the flood water to dissipate following a flood event at a rate and in a manner similar to that which occurs at present. The embankments through the flood plain will be constructed using reinforced earth which can be constructed at a steeper grade and, therefore, reduce the overall footprint of this 300m length of road. Reducing the footprint through the floodplain reduces the volume of dig and replace material from under the embankment, and reduces the length of the arched culverts running under the road. The length of these culverts has been further reduced by running the culverts perpendicular to the road, rather than in the direction of the river.

The engineering works will ensure that the design flood can be accommodated in the channel and floodplains with only very minor changes from the existing situation. Therefore, no further mitigation measures are necessary in the context of the predicted changes to the river's flow regime.

The residual impacts will be minimized with a maximum of 30mm increase in existing water levels (in a 100-year storm) immediately upstream of the bridge. Hence there will be negligible increase of flood risks.

11.0 Soils, Geology and Hydrogeology

The potential impacts and proposed mitigations of the construction and operational phases of the proposed development on the soil, geological and hydrogeological environment are summarised below.

Construction Phase

- During construction of the road development accidental spillages may result in contamination of soils and groundwater underlying the site. To minimise any impact on the underlying subsurface strata from material spillages, all oils, solvents and paints used during construction

- will be stored within temporary bunded areas and refuelling of construction vehicles will take place in a designated area (where possible).
- Surface water runoff during the construction phase may contain increased silt levels or become polluted from construction activities, and will not be discharged directly to local drains.
 - All topsoil and unsuitable subsoils will be stripped and removed from the proposed route and temporary access routes prior to construction. This loss of natural soil is an essential part of the development. Construction works will be carried out in such a manner as to ensure the least feasible disturbance of soils and subsoils.
 - Temporary storage of any spoil will be carefully managed in such a way as to prevent any potential negative impact on the receiving environment and the material will be stored away from any surface water drains.
 - Temporary access roads will be constructed for the delivery and removal of materials to the site.
 - Raising of the ground level will be required along much of the route. The ground level will be raised by up to 6m to the east of the route (around CH1+260). Geological issues to be considered with regards to the raising of ground level include settlement of the existing ground profile, slope stability of the constructed embankments and determining a source for the material required. Suitable methods will be used where the ground levels are to be increased such that ground settlement and slope stability are addressed.
 - Limited areas of cut are required during construction. The areas of cut are generally to the west of the River Nore and are up to 2.4m in depth.
 - The impact of the bridge on the geological environment will largely depend on the founding level of the proposed structure and a program of dewatering may be employed during construction.
 - Groundwater may be encountered in shallow sand and gravel deposits during cutting. Should dewatering be required during the cuts, dewatering techniques to facilitate construction activities will result in temporary drawdown of groundwater potentially impacting groundwater in the gravel and bedrock in the vicinity during construction. The migration of fines during dewatering activities will be mitigated by the appropriate design and location of abstraction points.

In relation to the construction phase the potential impact on the soils, geology and hydrogeology is considered to be short term - moderate. This is because of the potential for spillages and soil stripping and subsoil removal that may be required and potential dewatering during the founding level of the proposed bridge structure. Implementation of mitigation measures during the construction phase will reduce the potential impact soils, geology and hydrogeology from short term - moderate to short term - imperceptible.

Operational Phase

- There will be no direct discharges to the water or soil environment during the operational phase.
- Due to the vulnerable nature of the underlying gravel and bedrock aquifer, road surface run-off containing pollutants such as oils and heavy metals or substances used during the maintenance of roads (such as chemical de-icers and herbicides) have the potential to impact on groundwater quality by causing pollution. De-icers and herbicides will be applied according to manufacturer's instructions having particular regard to application rates.
- There is a potential for leaks and spillages during operation of the road. Any accidental emissions of chemicals or oil, petrol or diesel leaks could cause contamination if the emissions enter the soil and groundwater environment. Suitable drainage will be provided to intercept and divert run-off. Site runoff shall be contained and treated.
- Raising of the ground level will be required along much of the route. The ground level will be raised by up to 6m to the east of the route (around CH1+260). Geological issues to be considered with regards to the raising of ground level include settlement of the existing ground profile, slope stability of the constructed embankments and determining a source for the material required.
- Localised lowering of the water table may be required should the bridge structure require on-going dewatering. This could potentially result in loss or reduction of flow in in the gravel and possibly bedrock in the vicinity of the bridge structure. The migration of fines during dewatering activities will be mitigated by the appropriate design and location of abstraction points.

- There is the potential for a slight local reduction in groundwater recharge to the underlying gravel and bedrock aquifers along the line of the proposed route.

In relation to the operational phase the potential impact on the soils, geology and hydrogeology is considered to be long term - slight.

Residual Impacts

The proposed development will have a short term - imperceptible residual impact on soils, geology and hydrogeology due to the implementation of the mitigation measures outlined in the previous sections. Accordingly, there will be no negative impact (either short term, long term, direct or indirect) as a result of this proposed route on the surrounding soils, geology and hydrogeology environment.

12.0 Air Quality and Climate

The air quality assessment has been carried out following procedures described in the publications by the EPA (EPA 2002, 2003) and using the methodology outlined in the guidance documents published by the UK DEFRA (UK DEFRA 2001, 2007, 2009a, 2009b; UK DETR 1998) and the NRA (NRA 2011). Using traffic data for the opening year of 2019 and the design year of 2034, the assessment ascertained the predicted changes in concentration of traffic related pollutants along the existing road network in scenarios with and without the proposed Scheme in place. The assessment took place at a number of representative receptors in close proximity to the proposed Scheme and on the roads linking to the Scheme.

Air Quality

The regional impact of the Scheme on emissions of NO_x and VOCs has been assessed using the procedures of the NRA (NRA 2011) and the UK DEFRA (UK DEFRA 2007) using the DMRB screening model (V1.03c, July 2007). The results indicate that the impact of the Scheme on Ireland's obligations under the Gothenburg Protocol is negligible.

Climate

The impact of the operational phase of the Scheme on emissions of CO₂ was also assessed using the DMRB screening model. The results show that the impact of the Scheme will be to increase CO₂ emissions by 0.002% of Ireland's Kyoto target in 2019 and 0.004% in 2034. Thus, the impact of the Scheme on national greenhouse gas emissions will be negligible in terms of Ireland's obligations under the Kyoto Protocol (FCCC 1997, DEHLG 2007b).

13.0 Noise and Vibration

Noise

There are no statutory guidelines or standards for noise mitigation in Ireland applicable for Road Schemes. For new roads in Ireland, it is standard practice to adopt the traffic noise design goal contained within the NRA document *Guidelines for the Treatment of Noise and Vibration in National Road Schemes 2004*. The assessment methodology outlined in these guidelines has been used to calculate the L_{den} values for 2019 and 2034, both with and without the proposed Scheme in place. The assessment was taken at a number of representative receptors in close proximity to the proposed Scheme and on the roads linking to the Scheme.

The NRA Guidelines specify that it is considered appropriate to set the design goal for Ireland as day-evening-night 60dB L_{den} (free field residential façade criterion). Accordingly, it is considered that this is a suitable design goal for the onset of noise mitigation measures in respect of the proposed Scheme.

It is proposed to use a low noise road surface along the length of the proposed Scheme which will reduce the need for further mitigation at most sensitive receptors. However, 130m of noise barrier will be required at the top of the cutting adjacent to Aut Even Hospital, and 140m of noise barrier will be required at the edge of road adjacent to the Weirview Estate.

With the proposed mitigation in place residual noise levels at all residential properties are reduced below 60dB L_{den} , hence, the traffic noise impact on the receiving environment can be described as not significant.

Vibration

Given that the existing road scheme does not generate any significant vibration levels at present, vibration levels associated with the upgrade works are not expected to generate any perceptible vibration levels.

14.0 Landscape and Visual

The proposed Scheme runs from the Freshford Road through agricultural land to the River Nore, crosses the River Nore with a bridge, and continues through agricultural land that is subject to severe flooding to the Bleach Road.

The line of the proposed Scheme is not particularly sensitive or significant in terms of landscape and visual impacts. Nevertheless, it does have potential for impact on some sensitive areas, including the River Nore SAC.

The Scheme is designed as a standard single carriageway which will incorporate features appropriate to a rural or ring road setting. The general disturbance associated with construction works, such as tree and boundary removal, soil stripping, construction activity etc. will have a landscape and visual impact along the length of the proposed Scheme.

The proposed Scheme will significantly impact on the landscape of the area that it traverses. The proposed Scheme is for the most part elevated considerably above the level of the surrounding countryside. The large embankments that the Scheme will require will allow for extensive planting and habitat creation.

The proposed bridge, though of understated design, will be a significant visual structure, sitting prominently in view from the Freshford Road and Bleach Road. Most of the road itself, on significant embankment, will also be a significant visual structure. Initially, the significance of the scale of change will result in a significant negative impact. However, in the short to medium-term the proposed bridge and embankment will become a well-utilised and appreciated element of the established fabric of the City and County.

The Scheme will give rise to potential impacts not only from the visual presence of the Scheme but also from the changes in traffic movements, illumination etc. Impacts will be greatest in the short-term after opening when the Scheme will be an unfamiliar visual element within the otherwise established rural landscape. In time it will become part of the established character.

The proposed Scheme will also have indirect impacts on the future development of the City changing existing traffic movements. These indirect effects will include the positive impact of reducing congestion within the City Centre. This will allow for an improvement in the urban streetscape and visual environment of the commercial and tourist heart of the City.

15.0 Archaeology, Architecture and Cultural Heritage

The proposed route travels for the most part through Loughmerans townland, crossing the River Nore and finishing in Dunmore townland.

There are no recorded archaeological sites located along the proposed route of the Scheme. A recorded enclosure site (KK014-065) is located c.65m north of the proposed route in Loughmerans townland. A second enclosure site (KK014-065) is located c.235m to the northwest of this site (KK014-065). Two further enclosure sites, a ringfort and a crannóg are recorded within the wider area (KK019-011,-008,-006 & KK014-063). While an additional recorded archaeological site, KK019-010, is shown on the RMP map, this was investigated during archaeological testing in advance of the construction of a section of the ring road on the east side of the N77 road and was found to be non-archaeological in nature.

A section of mid-nineteenth century railway embankment is one of the few surviving elements of railway infrastructure of the Great Southern and Western rail line to Kilkenny. It is considered to be of built heritage interest and part of it will be directly and negatively impacted by the proposed route. This section of the nineteenth-century railway embankment will be recorded by a suitably qualified archaeologist. The proposed route will directly and negatively impact upon a section of the Loughmerans / Dunmore townland boundary. This section of the Loughmerans / Dunmore townland boundary will be recorded by a suitably qualified archaeologist, if the boundaries are to be removed. No other features of architectural heritage merit will be directly impacted by the proposed road; however there is an indirect visual impact on a folly and a house and farm complex.

The impacts on archaeological or architectural sites will be monitored and mitigated through the use of pre-construction archaeological investigative excavation in the form of trial trenching, architectural survey and photographic recording, bankside inspection and salvage of architectural fragments.

No residual impacts are envisaged, as all archaeological, architectural and cultural heritage issues will be resolved at the pre-construction and construction stages of the development.

During the construction of the Scheme, archaeological monitoring will be undertaken during all groundworks and demolition works. In the event of archaeological features or material being uncovered during the construction phase, full archaeological excavation and recording of such remains will be carried out.

16.0 Material Assets

The proposed Scheme has been designed, as far as possible, to avoid direct impact on buildings and property. Compensation payments for lands to be acquired as a result of the Scheme will be agreed between the relevant landowners and Kilkenny County Council. Where lands are to be acquired, replacement boundary treatment will be provided. Where access to lands is affected the access will be reinstated in agreement with the relevant landowners.

17.0 Interaction of Environmental Impacts

The cumulative impact of the above interactions has been addressed in the specialist chapters of Volume 2 of this EIS. The following interactions of environmental impacts have been considered:

- Human Beings: Air, Noise, Water, Landscape and Visual, Material Assets.
- Terrestrial Flora and Fauna: Aquatic Flora and Fauna, Water, Air Quality.
- Aquatic Ecology: Terrestrial Flora and Fauna, Water.
- Soil, Geology and Hydrogeology: Terrestrial and Aquatic Flora and Fauna; Noise and Vibration.
- Hydrology: Terrestrial and Aquatic Flora and Fauna; Noise and Vibration.
- Air Quality and Climate: Traffic, Human Beings, Terrestrial Flora and Fauna.
- Noise and Vibration: Traffic, Human Beings, Landscape and Visual, Cultural Heritage.
- Landscape and Visual: Terrestrial Flora and Fauna, Cultural Heritage.
- Cultural Heritage: Noise and Vibration, Landscape and Visual.
- Material Assets: Groundwater, Landscape and Visual, Cultural Heritage.

18.0 Summary of Environmental Commitments

Chapter 15.0, Volume 2 of this EIS contains a summary of the environmental commitments which will be put in place with regard to each environmental aspect outlined above. These commitments are an integral part of the application for Approval of the proposed Scheme.

20.0 Further Information

The EIS will be available for inspection in the Kilkenny County Council offices at County Hall, John Street, Kilkenny.

The EIS will be uploaded on the Kilkenny County Council website www.kilkennycoco.ie. A hard copy of the EIS may also be purchased from Kilkenny County Council for the fees listed below:

- Non-Technical Summary (Volume 1) – €10.00.
- Complete EIS (Volumes 1 – 4) - €100.00.

Figures

Clifton Scannell Emerson Associates Limited, Civil & Structural Consulting Engineers
Seafort Lodge, Castledawson Avenue, Blackrock, Co. Dublin, Ireland.

T. +353 1 288 5006 F. +353 1 283 3466 E. info@csea.ie W. www.csea.ie

