

N9/N10 Kilcullen to
Waterford

Route Selection Report

Volume 1 - Summary

Arup Consulting Engineers / Roughan & O'Donovan Maunsell-Alliance

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1. INTRODUCTION

1.1 Background and Report Format

The development of a route between Dublin and Waterford was identified in the National Development Plan. The route was to be developed to motorway/high quality dual carriageway standard and was intended to replace the existing N9 which runs for 107km between Kilcullen and Waterford. Much of the existing road is of poor standard.

Consultants were appointed in September 2000 to carry out the surveys and route planning work necessary to recommend a preferred route. Two consultants were appointed to cover the extent of the route; Roughan & O'Donovan-Maunsell Alliance were to undertake all work between Kilcullen (where the existing M7/M9 from Dublin finishes) and Paulstown, and Arup Consulting Engineers were to undertake all work between Paulstown and Waterford. Both consultants were to work together throughout the procedures and reporting leading to the Route Selection Report.

This report concludes the process of Route Selection and has been set out as follows: -

- A summary of the selection process for the whole scheme in **Volume 1**.
- Details of route selection between Kilcullen and Paulstown in **Volume 2**.
- Details of route selection between Paulstown and Waterford in **Volume 3**.

Volumes 2 and 3 have three parts each, the main text, appendices and figures. Figure numbers have been abbreviated to RSR1 (Volume 1), RSR2 (Volume 2) and RSR3 (Volume 3).

1.2 Scheme Objectives

The scheme objectives were set out in the National Development Plan, 2000 – 2006, as part of the Strategy for National Roads, i.e.: -

- to improve the reliability of the road transport system by removing bottlenecks, remedying capacity deficiencies and reducing absolute journey times and journey time variance;
- to improve internal road transport infrastructure between regions and within regions, contribute to the competitiveness of the productive sector and foster balanced regional development;
- to facilitate better access to and from the main ports and airports with the main objective of offsetting the negative effects of peripherality;
- to contribute to sustainable transport policies, facilitating continued economic growth and regional development while ensuring a high level of environmental protection; and
- to help achieve the objectives of the Government's Road Safety Strategy in relation to the reduction in fatalities and serious injuries caused by road accidents.

1.3 Need for the Scheme

In July 1998 the National Roads Authority (NRA) published its National Road Needs Study. This study set out to determine an appropriate and affordable future national road network in order to cater for the projected traffic flows for the period from the year 2000 to 2019.

The study recommended that improvements should be made to both the N9 and N10 between Waterford and Kilcullen, basically to provide a standard two lane single carriageway. Bypasses were required for Mullinavat, Knocktopher/Ballyhale, Thomastown, Paulstown, Carlow, Castledermot and Moone/Timolin.

The National Road Needs Study represented only one input into the current National Development Plan, 2000 to 2006 (NDP). The NDP also gives due consideration to broader policy issues including regional and industrial development. It was in this context that Government policy for the improvement of national roads as set out in the NDP adopted standards equivalent to an average inter-urban speed of 94kph on dual carriageway and 105kph on motorways. In addition the NDP has the objective of providing a uniform carriageway type either to motorway or high quality dual carriageway, or a combination of both on the five identified major Inter Urban routes. Furthermore, the NDP requires that route selection be undertaken “for substantial sections of the routes rather than focusing solely on the delivery of bypasses of congested centres of population”. The combination of these objectives resulted in the removal of the single carriageway links specified for sections of the inter-urban routes in the Road Needs Study and their replacement with dual carriageway type links. This provides a greater degree of safety than the single carriageway links and satisfies the higher standards as specified in the NDP. In addition it facilitates shorter (and safer) journey times and greater driver comfort.

The National Development Plan required further evaluation of the road type and route between Dublin and Waterford. This assessment was completed by the NRA and published in February 2000. This assessment looked at three corridor options for the route, broadly along the existing N9, an East Coast Route (via Arklow, Enniscorthy and New Ross) and the ‘Durrow Route’ (departing the N8 at Durrow, continuing southwards to Waterford via Kilkenny). It was concluded that the central N9 corridor was preferred and that the scheme should be a dual carriageway / motorway road in its entirety in accordance with the NDP requirements.

1.4 Constraints Study

A preliminary study was carried out by collecting information on major engineering and environmental constraints within the full extent of the initial study area shown in RSR1 figure 1. This information was methodically reviewed and displayed geographically such that areas where the probability of locating a feasible route would be unlikely (low routing potential) were identified. The issues that were considered included: -

- the existing infrastructure, land use, topography and physical features;
- identification of sites or areas of environmental significance or sensitivity;
- planning, development and socio-economic character; and
- engineering constraints.

These areas of low routing potential, and adjacent areas which became areas of low routing potential by association, have not been considered further.

Public Consultation No. 1 was undertaken at the end of March 2001. Comments from the public were invited and facilitated by a “cut out” comment sheet which would be returned to the County Council. The results of the consultation were recorded in the Constraints Study.

The Constraints Study, published in May 2001, provided a comprehensive record of environmental and engineering constraints in the area. It assembled existing data such as traffic counts, accident records and geotechnical data that were then used in the Route Selection stage of the project.

1.5 Engineering Parameters

The design standards for the scheme are set out in the National Roads Authority's Design Manual for Roads and Bridges (the NRA DMRB). The standard for the new road, in accordance with the NDP, will be either: -

Standard Grade Separated Dual 2 Lane (7.0m) Carriageway (NRA DMRB Category 5A)

or

Standard Dual 2 Lane (7.0m) Motorway (NRA DMRB Category 7B)

Both categories have the same cross-section. During the route corridor investigations larger than minimum horizontal radii were used wherever possible. However, scattered ribbon development and other constraints throughout the Study Area meant that radii were restricted in many places.

2. INITIAL ASSESSMENT OF OPTIONS

A number of initial routes were developed based on site visits and information recorded in the Constraints Study. Routes in specific corridors were discarded early in the development stage as described in the following paragraphs.

2.1 N78 Corridor (Kilkenny – Castlecomer – Athy)

A route corridor was investigated from north of Kilkenny City to Athy following the N78 corridor and is shown in RSR2 Figure 6.1. This corridor, when compared with other possible route corridors which followed the River Barrow valley further east, was discarded for a number of reasons.

Firstly, the engineering design was difficult and would require extensive embankments and cuttings hence increasing the cost of construction and maintenance. The route corridor passes over the Castlecomer Plateau which has steep slopes at its edges. The steep ground would require the road vertical alignment to have gradients greater than 3% in order to keep cutting and embankment heights within reasonable limits. This would have an impact on road safety in that there is a progressive decrease in safety with steeper gradients.

Secondly, a considerable length of the route would be at a relatively high elevation, with 15 kilometres at an elevation of over 150 metres and 2 kilometres over 200 metres. This could lead to a reduction in road safety and to maintenance problems due to the higher frequency of fog, frost and snow at these elevations compared to a route at a lower elevation. Winter maintenance requirements would be increased.

Thirdly, any route corridor following the N78 would not serve Carlow directly. A new link road, or upgrading of the N80 or R430 would be required, and may not attract the Carlow to Dublin traffic off the existing N9.

In environmental terms the route corridor passes close to Castlecomer and adjacent sites of ecological value, and does not appear to have any over-riding benefits when compared to other route corridors.

In view of these reasons the route corridor was discarded prior to Public Consultation No. 2.

2.2 Athy to Monasterevin Route

The obvious tie-in point at the northern end of the study area was the southern termination of the M9 Kilcullen spur at Kilcullen. However an alternative tie-in further west was investigated. This route corridor (the “western corridor”) ran parallel to the railway north of Athy to join the proposed Heath to Mayfield M7 motorway scheme to the south of Monasterevin. However it was found that a western corridor would not attract traffic from Carlow and this traffic would continue to use the existing N9. In view of this result and the discarding of routes in the N78 corridor, as described above, no further work was done on the western route as it failed to meet the objective of attracting traffic from the N9 corridor north of Carlow.

2.3 Gowran – Thomastown – Waterford

A number of options were investigated that followed the existing N9 corridor between Gowran and Thomastown and were then routed west of Inistioge to climb the south Kilkenny hills alongside the Arrigle Valley. Options then occupied the higher ground between Tory Hill and Glenmore before dropping towards to planned Waterford Bypass.

Options in this corridor were discarded because of the high environmental impacts associated with crossing the Nore Valley in the vicinity of Thomastown and the engineering disadvantages resulting from the steep gradients and high elevation of the road. It was concluded that the scheme objectives could not be met using this corridor.

2.4 Incorporation of Moone-Timolin Bypass

To enable the new Moone-Timolin Bypass to be used as part of the proposed N9/N10 Scheme, the Bypass would have to be widened by approximately seven metres to accommodate a new dual carriageway - see RSR2 Figure 6.3. The standard of the new high quality dual carriageway/motorway is such that all direct accesses would have to be closed off for safety and capacity reasons. Alternative provision would have to be made for access and a parallel route maintained for local traffic. This would require reconnecting the 'old' N9 through the villages to the existing N9 north and south of the Bypass. Two new overbridges would be required to provide a continuous connection along the 'old' N9. A possible arrangement is shown in RSR2 Figures 6.4 and 6.5.

A single overbridge carries the Moone to Athy Road over the new Bypass. It is a single span bridge over the wide single carriageway. Investigations showed that, because the overbridge has a curved soffit lowering of the Moone-Timolin Bypass would be required to achieve the necessary headroom for the widened carriageway. Approximately one kilometre of the Bypass would be affected and would require extensive traffic management measures during construction.

The option of incorporating the Moone Timolin Bypass into the scheme was rejected for the following reasons: -

- Construction difficulties and traffic delays associated with lowering the main carriageway and construction of retaining walls at Moone - Bridge, whilst maintaining the flow of traffic.
- Requirement for extensive access tracks and service roads to provide access to fields and properties currently serviced from the Bypass.
- The reintroduction of a significant volume of traffic onto the 'old' N9 through the villages of Moone, Timolin and Crookstown Upper. This would negate the objective of the original Bypass and have a negative environmental impact on the villages.

2.5 Upgrading the N9 to Dual Carriageway / Motorway Standard

Early in the project the advantages and disadvantages of routing the proposed N9/N10 high quality dual carriageway / motorway along the existing N9 were considered. However the brief for the scheme stipulates that the new road shall be a high quality dual carriageway or motorway based on the strategy outlined in the National Development Plan 2000-2006.

An initial review was carried out to determine sections of the existing N9 which were within the settlement areas and would require an off-line bypass. There were proposals for bypasses at Carlow, Castledermot, Thamestown and Lukeswell. Secondly there are lengths of the N9 where the horizontal alignment is below standard of a high quality dual carriageway / motorway. For these sections there is no alternative but to go “off-line” to achieve the necessary standard. Examples of this arrangement are shown in RSR2 Figure 6.6 and RSR3 Figures 6.6, 6.7 and 6.8. These factors reduced the length of possible on-line improvement from 107km to 50km (47% of total length). Over 53% of the route would need to be “off-line” to avoid settlements and to improve the horizontal alignment.

A sample length of on-line route was studied in more detail and a number of major disadvantages were identified:

- (i) Service roads would be needed over significant lengths of the on-line section to maintain access to properties and land. This would increase the cross-section, verge to verge, compared to an off-line solution, from 26 metres to 49 metres.
- (ii) A significant number of properties close to the existing N9 would have to be demolished to accommodate this very wide cross-section.
- (iii) Access for communities located in the vicinity of the N9 would be severely affected by restricting access to the new road. Local journeys and journeys to and from the new road would be forced to use low standard rural roads.
- (iv) Severance would be significant for properties and land currently fronting the N9.
- (v) Extensive traffic management measures would be required during construction which would increase the number of accidents and increase construction costs.
- (vi) There would be significant delays to traffic on the existing N9 during construction.

For the above reasons the “on-line” option was discarded.

2.6 Route Options for Public Consultation

The route options that were taken forward to the Public Consultation No. 2 are shown on RSR2 Figures 6.11 to 6.14 and RSR3 Figures 6.11 to 6.15.

3. PUBLIC CONSULTATION

Public Consultation No. 2 was undertaken between May 2001 and August 2001 with the public consultation exhibitions being held over a two-week period in May 2001. The objectives of the consultation were: -

- Present the route corridor options to the public.
- Inform them of process and programme for the project.
- Invite submissions on these options.
- Gather local information, which may not be known to the design team.

Because the scheme covered such a large geographical area the study area was split into seven sections; A, B, C and D covered the north and E, F and G covered the south. Each route corridor option shown covered a corridor width of 100 metres.

A total of 55,000 flyers giving details of the exhibition venues and dates were delivered to households in the study area. Advertisements were placed in the local papers and broadcast on local radio. A total of 1,623 people attended the northern consultation exhibitions held in Carlow Town, Athy, Castledermot and Bagnalstown, and 1,545 attended southern exhibitions at Kilkenny, Thomastown, Mullinavat and Waterford. Attendees were asked to sign a register and were handed the information brochure, map inserts, questionnaire and freepost envelope on entry. Letters of consultation were issued to a number of statutory and non-statutory bodies notifying them of the route options under consideration and inviting them to comment on the options. Responses from ten of these bodies were obtained together with responses from a further seven official bodies.

In the north a total of 1,308 responses were received from individuals together with five from local resident groups, whilst 682 responses were received in the south.

Most responses were from people who would be affected by one of the options. In the north 25% of responses agreed in principle with the need for the N9/N10 scheme with 57% unsure; in the south the corresponding figures were 22% and 7%.

Environmental issues were of major concern together with the impact on people living near the route corridor or affected by demolition of property.

Throughout Public Consultation No. 2 valuable information was collected which assisted the route selection process.

Whilst the public consultation was underway a full range of studies was being undertaken by environmental and engineering specialists to gather details along each of the route options. Wider studies, not specific to each option, were also undertaken to gather socio-economic data and planning constraints.

4. TRAFFIC PREDICTIONS AND JUNCTION STRATEGY

A road traffic model was built which covered both the northern and southern sections of the route corridor. Existing data from origin-destination surveys, carried out at six locations during 1997 and 1998 and new data collected in March / April 2001 were used to provide a base year trip matrix.

Forecasting of traffic growth was carried out in accordance with the methods used in the National Roads Needs Study for a design year of 2022. In addition, an estimate was made of the potential transfer of longer distance trips to the N9/N10 corridor from other parallel corridors, as a result of construction of the scheme. A number of initial routes were tested. These routes included routes close to the N9 and N78 and bypasses to the east and west of Carlow. Further south the tests included a route close to the N9 (Thomastown) corridor and a route close to the N10 towards Kilkenny.

Further tests were carried out during the route selection process, to evaluate the effects of a route following the N9 corridor (Route 9) a route following the N78 corridor towards Athy (Route 10) and a route following the N9 (Thomastown) corridor (Route 11).

The conclusion reached was that an eastern bypass of Carlow had advantages in traffic terms. An eastern bypass could easily distribute the traffic around Carlow with junctions on the N9 to the north and south of Carlow Town. Traffic from a western bypass would overload the N80 to the west of Carlow Town and would cause circulation difficulties within the Town. Junctions were located to serve Athy and Paulstown and on the N80 east of Carlow to serve County Wexford.

Movements to and from Kilkenny were shown to be crucial in the traffic assignments and there was clearly a benefit in route options which passed close to Kilkenny.

Access to Kilkenny was also an important factor in the location of proposed junctions. It had been concluded from the traffic analysis that junctions should be provided to the east and south of Kilkenny (in both cases close to the N10) and that a new single carriageway link should be added between the new junction on the east side of Kilkenny and Kilkenny City (linking to the ring road). Thomastown would best be served by a new junction in the vicinity of Knocktopher and an additional junction was planned at Mullinavat to serve the local community rather than for overall strategic reasons.

The economic benefits of the route options were compared using the UK COBA (Cost Benefit Analysis) programme using default parameters calculated for Irish conditions. The results showed Benefit to Cost ratios in the range of 1.66 to 2.11 and these were used to compare the relative economic performance of the various options.

5. DEVELOPMENT OF PREFERRED ROUTE

5.1 Nodes

The information gathered from the studies and surveys along each of the options, and from the public consultation, was collated so that a full comparison could be made and a preferred route corridor identified for the third consultation. For this assessment all the reporting from the studies and surveys was based on sections of the route between “nodes”, i.e. points where different options joined. The nodes for the northern section are shown on RSR2 figure 6.10 and those for the southern section are shown on RSR3 figures 6.11 to 6.15.

5.2 Northern Assessment

The environmental and engineering impact of each of the route options has been assessed and is described in full in Chapters 8 to 16 of Volume 2 of this Report. The conclusions from each of these assessments are included in the paragraphs below. Full details can be found in the relevant chapter and supporting appendices, and the results are summarised in the Route Impact Matrices included as RSR2 figures 17.1 to 17.4.

Planning and Socio-Economic Impact.

The principal socio-economic benefit of all the route options is the enhancement of the connection between the Kilcullen – Waterford corridor and major centres within Ireland including the major ports and airports. The creation of a motorway / dual carriageway will improve the accessibility of all towns and industry served by the corridor.

In overall socio-economic terms, the preferred corridor combines the following sequence of Route Corridors A1, B2, C3 and D2 for the following reasons: -

- Services Athy well, reinforcing and supporting its role as a designated Secondary Development Centre in the Greater Dublin Area.
- Services Carlow with a choice of interchanges and provides links to Castledermot and Tullow. This corridor and associated interchanges will facilitate the possible expansion of existing industries and businesses on the east side as well as attracting new industries to Carlow.

Impacts on People

Each of the route corridor options was assessed in terms of their impact on people living or working near the corridors. These impacts were recorded under the following headings: -

- Noise and Air Environment
- Severance
- Community Facilities
- Number of Properties within the Route Corridor
- Planning Permissions Granted within Route Corridor

The number of properties within 300 metres of the route corridor centreline was relatively low in Sections A and B reflecting the rural nature of the study area. The routes closest to Athy affected more properties. In Section C the numbers of properties within 300 metres of the route corridors were larger especially on Route Corridors C3 and C5 close to the eastern side of Carlow Town. Again in Section D the number of properties within 300 metres was relatively low.

Communities close to each route option are listed in the tables. However the community severance is not severe on any of the route options as, in general, the existing road network will be maintained by the provision of overbridges or underbridges.

The impacts of each route corridor have been compared, and the preferred options for each section, in terms of their impact on people, are: -

- Route Corridor A5 (followed by Route Corridor A1)
- Route Corridor B4 (followed by Route Corridor B5)
- Route Corridor C6 (followed by Route Corridor C1)
- Route Corridor D1 (followed by Route Corridors D2 and D3).

Flora, Fauna and Fisheries

The route options pass through a broad band of mainly flat to gently undulating land in counties Kildare, Laois, Carlow and Kilkenny. Most of the land is used for agriculture and is under intensive pasture with a high proportion of arable land, most notably around Athy and Carlow. Comparatively few ecological sites are impacted by the route options and most of these have a scattered distribution and are limited in size. Hedgerows are found throughout the study area and many contain mature broadleaved trees. The route corridors cross numerous watercourses. Apart from a small area that occurs within the River Liffey catchment in the north-east, most of the impacted watercourses are part of the River Barrow system. All the main watercourses are important for salmonid fish.

There are no candidate Special Areas of Conservation (cSAC) or proposed Natural Heritage Areas (pNHAs) intersected by any of the route corridors. The southern end of Cloghrick Wood, a pNHA, is close to Route Corridor D2. The results from the analysis are that the impacts do not vary significantly between the route options, and the following are the preferred options based on their impacts on ecological sites and watercourses:

- Route Corridor A5
- Route Corridor B2
- Route Corridor C3
- Route Corridor D3

Archaeological and Cultural Heritage.

An area approximately 500 metres wide (250 metres each side of the route corridor centreline) was assessed on each route option. The assessment was based on a paper survey, identifying all recorded sites, followed by an aerial (helicopter) site inspection. The area is a particularly rich archaeological landscape. The vast majority of the total of 123 sites consisted of earthworks and enclosures, although a large number of fulachta fiadh and ringforts were also identified. Further sites included a cist site, a moated site, several mottes and a number of castles and tower houses were also recorded. One site classed as a Natural Monument, Site N2, is close to Route A1. There are no sites with Preservation Orders or Registered Sites and the vast majority of sites are listed in the Record of Historic Monuments and Places (RMP). 71 sites of Architectural Importance and 19 sites of Industrial Archaeology were also documented, together with historic towns and deserted settlements.

An assessment was made of each route corridor option and is summarised in the Impact Matrices, RSR2 Figures 17.1 to 17.4.

The impact took into account the following three factors: -

- the nature of the sites
- the number of sites impacted, and
- the proximity of the sites to the route.

Having considered these factors the following route corridor options were preferred as having the least impact on the recorded archaeology at the area: -

- Route Corridor A5
- Route Corridor B1
- Route Corridor C1
- Route Corridor D5

From an archaeological and cultural heritage point of view the preferred route should avoid direct impacts with the identified elements of the archaeological landscape wherever possible. Should this not be possible, a full programme of archaeological mitigation including aerial survey, topographical survey, geophysical survey and investigative excavation is recommended. This would be followed by full-scale excavation, should this be required.

Agricultural Land Use

The northern section of the proposed N9/N10 road scheme will have a significant affect on farming in the area and in particular on individual holdings that it intersects. The area in question, from Kilcullen to Paulstown, contains some of the most productive land in the country and the majority of this land is being used intensively.

The area is predominately used for tillage operations but significant grassland based enterprises are also located in the area. All of the routes will impact on farming activity in a particular location with no individual route available which avoids affecting farm holdings.

The level of dairy farming in the area does not appear to be significant however the design of the preferred route should seek to minimise the impact on dairy farms wherever possible. Horse training and stud farms are also particularly sensitive to noise and lights associated with a road and these enterprises appear to be concentrated close to Kilcullen at the northern end of the route and adjacent to Leighlinbridge and Bagenalstown.

Two intensive agricultural enterprises consisting of a pig fattening unit and a free range egg production unit have been identified at this stage.

None of the route options have a profound impact level and in terms of agricultural impact the following routes are preferred: -

- Route Corridor A1 or Route Corridor A2
- Route Corridor B5
- Route Corridor C3
- Route Corridor D5

The differences between the route options are not large, with the preferred routes having moderately significant impact level compared to the remaining route options which have major significant impact level.

Landscape and Visual Assessment

Visual impact, landscape impact and landscape planning impacts for each option were assessed and rated in terms of the severity of impact. These assessments are summarized in the Impact Matrices, RSR2 Figures 17.1 to 17.4. For each section of route the following had the least potential for adverse landscape and visual impact.

- Route Corridors A1 and A5
- Route Corridors B4 and B5
- Route Corridor C6
- Route Corridor D1 and D3

Engineering Assessment

The engineering assessment was carried out under the following subject headings: -

- Horizontal alignment
- Vertical alignment
- Junctions
- Impact on Utility Services
- River Crossings and Structures
- Earthworks and Geotechnical Requirements

The results are summarised in the Impact Matrices RSR2 Figures 17.1 to 17.4. All routes meet the NRA Design Standards and there was little to choose between the routes on engineering grounds in sections A and B. In section C, Route C6 is preferred in that a better earthwork balance could be achieved and it had the least number of crossings.

The crossing of the River Barrow on Route D5 would be difficult and expensive requiring either one continuous structure, or two structures crossing the canal navigation and River Barrow separated by approximately 150 metres. Similarly the River Barrow crossing on Route D4 would be skewed and, in addition, a wider deck is likely to be required to accommodate the slip roads from the adjacent junction on the N9. Hence these routes were the least preferred on engineering grounds and Route D1 is preferred (the River Barrow crossing occurs upstream in Section B or Section C) followed by Route D2 as it is shorter and has a better earthwork balance than Route D3.

The conclusion from the engineering assessment of the options in each route section is that the following are preferred options: -

- Route Corridor A2
- Route Corridor B5
- Route Corridor C6
- Route Corridor D1

Geological and Hydrogeological Assessment

The geology and hydrogeology along each of the route options was considered in some detail. As far as possible, all constraints were placed in one of the following categories: -

- Topographical features;
- Geotechnical ground conditions;
- Aquifer and source vulnerability;
- Economic minerals; and
- Geological landscape.

In section A, Routes A1 and A2 are preferred as they avoid the potentially economic sand and gravel resources which occur towards the eastern side of the study area. Similarly Route B5 fares marginally better than other routes in that it has a minimum length of crossing potentially economic sand and gravel resources. In section C, Route C6 is clearly preferred as it avoids impacts on aquifers which would occur with the other routes in Section C. Routes D2, D3 and D4 all have impacts on vulnerable gravel aquifers and Route D5 has more severe hydrogeological impacts. Route D1 thus, has the most favourable geotechnical ground conditions. Overall the preferred options from a geological and hydrogeological point of view are: -

- Route Corridor A1
- Route Corridor B5
- Route Corridor C6
- Route Corridor D1

Results of Assessments

A formalised process was applied to the evaluation process which is documented in Chapter 17 of Volume 2 and summarised in the Impact Matrices, RSR2 figures 17.1 to 17.4 and the Selection Matrices shown in tables 17.1 to 17.8 of Volume 2.

These steps are summarised below together with the results of each evaluation.

Step 1 **The engineering and environmental effects of each route corridor within each Section A to D were recorded on an Impact Matrix. Also lengths of route where the route corridor could be modified to overcome major impacts were identified. Impact Matrices for Section A to D are shown in RSR2 figures 17.1 to 17.4.**

The route options were compared under the following headings: -

- Impacts on People
- Flora, Fauna and Fisheries
- Archaeology and Cultural Heritage
- Agricultural Land Use
- Landscape and Visual
- Engineering
- Geology and Hydrogeology

Step 2 **Where alternative routes started and finished at common points within a single Section, the two route corridors were compared using a summary Selection Matrix and the less favourable route corridor discarded.**

As a result, Route A3 was discarded in view of its greater impact on people. Route A4 was discarded because of its ecological and landscape impacts near Calberstown and the impact on a major pig unit at Kilgowan.

Overall Route D3 was seen to have advantages compared with Route D5 particularly in relation to the crossing of the River Barrow. Hence Route D5 was discarded from further considerations.

Step 3 **Matrices for the main Traffic/Cost-Benefit/Socio-Economic Impacts were prepared for a number of representative overall Route Options (Route 1, 2, 3, 4 and 7) see table 17.9 of Volume 2. Those route options which were deemed to be less favourable were discarded from further evaluation.**

Consideration of the traffic issues indicated that routes to the east of Carlow were preferred. Excellent access to Carlow Town could be provided via junctions on the existing N9 to the north and south of the town. With routes to the west of Carlow, traffic volumes entering Carlow Town from the west increased significantly compared with the do-nothing situation. Traffic would have to cross the town to reach the industrial/commercial developments which are predominantly on the east side of the town.

The Present Value of Benefits was higher for the routes to the east of Carlow. As the capital costs of all routes were similar, these routes also showed higher Benefit to Cost Ratios.

In socio-economic terms the favoured route was via Athy and east of Carlow as it best served Athy and provided excellent access to Carlow Town. The issues summarised above, together with consideration of the engineering and environmental impact of Route C4 west of Carlow, led to the conclusion to discard route options to the west of Carlow Town. This decision reduced the number of possible route options significantly and, in the next step, the remaining route options were compared on a section by section basis.

Step 4 **Selection matrices were drawn up for the remaining route corridors in each section. These are shown in tables 17.4 to 17.7 of Volume 2.**

From Step 4, Route C6 at Carlow emerged clearly as the Preferred Route when compared with Routes C3 and C5. Route C6 directly affected significantly fewer properties and also had fewer people within the 300 metre corridor each side of the route centreline. Route C6 had significant advantages in engineering terms in that it has the best earthwork balance. Further the route is preferred in hydrogeological terms in that it does not cross any reported groundwater resources, whereas Routes C3 and C5 cross major gravel aquifers between Maganey and Knockarda and south of Newtownallen respectively.

With Route C6 selected, the choice north of Carlow was thus reduced to Route A1 plus B3 or Route A5 plus B5 and these routes were evaluated further as Route 9 and Route 10.

Step 5 **Selection matrices were prepared for the remaining overall Route Options (Routes 9 and 10) together with Traffic/Cost-Benefit/Socio-Economic Impacts see RSR2 figure 17.5 and table 17.10 of Volume 2. This enabled a Preferred Route from Kilcullen to south of Carlow to be identified.**

The Routes 9 and 10 were identical south of Carlow and were tested to assess the advantages and disadvantages of a route following the N9 corridor (Route 9) or going via Athy (Route 10). Route 9 included as part of the scheme, the cost of a high standard single carriageway link from the N9/N10 scheme to Athy with a connection eastwards to the R747 near Ballitore. In environmental and engineering terms the analysis showed that the differences between the two routes were generally not significant.

The traffic and cost-benefit analysis showed that volume of traffic attracted to Route 10 was marginally higher than to Route 9. However the discounted travel and accident benefits were significantly higher for Route 9 than for Route 10. This is due to the extra distance traffic has to travel between Carlow and Kilcullen using Route 10 via Athy. It results in a reduction of the Benefit to Cost Ratio from 2.01 to 1.66.

In socio-economic terms it was concluded that, with the high standard Athy to R747 Link Road, Route 9 would bring major socio-economic benefits to Athy. Route 9 would provide most of the benefits that would accrue from implementation of Route 10.

Based on this analysis, Route 9 was selected as the draft Preferred Route because of its significantly better economic performance compared with Route 10.

Step 6 **Selection matrices for the remaining combination of routes in Selection D were prepared for those options which connected to Route Corridor E1 which was the emerging Preferred Route Corridor in the southern section of the study area.**

South of Carlow Route D3 affected less properties than Route D4 and was selected. As Route E1 was emerging as the Preferred Route south of Paulstown, see Volume 3, a final comparison was completed and is shown in table 17.8 of Volume 2. This compared a new connector between Route D3/D2 and Route D4 (i.e. via node 33) with an alternative route using the E1/E6 connector (i.e. via node 36). The comparison showed that the route via node 33 had less impact in terms of properties affected and was chosen in preference to the route using connector E1/E6.

Step 7 **Where possible the draft Preferred Route Corridor was adjusted to reduce the impacts further. Preliminary junction locations and layouts further. Preliminary junction locations and layouts were developed and link roads were included.**

The draft Preferred Route Corridor was adjusted in four main locations prior to the Preferred Route being exhibited at Public Consultation No. 3. The amendments were made primarily to reduce the impacts on residential and other property following examination of available material from Public Consultation No. 2 and extensive site visits. The main four locations were: -

- Crookstown Lower to Belan
- Belan to Prumpelstown
- Bennekerry to Tinryland
- Clonmelsh to Powerstown

Athy to R747 Link Road

As described earlier a high quality link road was included in the draft Preferred Route to improve, significantly, the standard of road connections between Athy and the National Primary Road Network. Four options for the alignment of the Link Road were investigated and an option selected which avoided demolition for properties and reduced farm severance by adopting an 1.8km length on the existing Country Road.

5.3 Southern Assessment

5.3.1 Method of Assessment

The assessment process by which a preferred route corridor was selected covered 5 steps.

Step 1: A detailed assessment of all options was undertaken between “nodes” by Arup Consulting Engineers and expert sub-consultants to cover the areas identified in 5.2.2 to 5.2.8 above. Added to that was an assessment for hydrology and drainage. These assessments are explained in detail in RSR3 Chapters 9 to 16 and tabulated in matrix form in Selection Matrix A, RSR3 Figures 18.1 to 18.3. The matrices have all summarised impacts (where possible) using significance criteria based on the Environmental Protection Agency Guidelines which recommended five levels of importance, severe, major, moderate, minor and neutral. The criteria is explained in detail in Section 2.5 of RSR Volume 3/1.

The planning and socio-economic aspects of the assessment reported in complete sections (E, F or G) rather than between nodes given the wider geographical nature of those type of impacts.

Step 2 A review of the Step 1 process took place at a workshop attended by the contributors to the assessments. The aim was to discuss the assessment and the reasons why certain links attracted high impacts. Socio economics and traffic were included in the workshop review and options were discarded that could not meet the scheme objectives. The workshop then identified a number of modifications to the remaining links, and new links, that should reduce impacts in the areas of greatest concern.

Step 3 Assessment of the modifications and new links and preparation of Selection Matrix B, based on the most favourable links.

Step 4 Preparation of a number of complete route options in each section (E, F and G). A further Selection Matrix C compared these options and an analysis of this matrix assisted in the decision on the preferred route corridor. This analysis included discussions on junction arrangements in any option and traffic, economic, socio economics and cost benefit factors that might affect the choice of preferred route corridor.

Step 5 Description of the preferred route corridor with the relevant details summarised in the Preferred Route Corridor Residual Impacts table.

The following is a summary of Step 1

5.3.2 Planning and Socio-Economics

- Strategic Planning

It is considered that the scheme will have a beneficial effect in terms of satisfying the National planning policy outlined in the National Development Plan.

- Regional Planning

The route corridor options are largely in conformance with the stated policies and objectives. In overall terms, it is considered that there is a beneficial effect on the planning environment in County Kilkenny.

Socio-Economics

The principal socio-economic benefit of all of the routes is the enhancement of the links from the wider Kilcullen-Waterford corridor as described earlier in this section.

In overall socio-economic terms, the highest benefits would arise from Option E1 (and possibly utilising E3). These Options service Kilkenny well, promoting and consolidating development within the City boundary. There is little to differentiate in socio-economic terms, between the options in the remaining sections, with any of the options presenting a socio-economic benefit to the region, subject to any mitigation measures that may be necessary.

5.3.3. Impact on People

The route corridor options pass through the county of Kilkenny, which is mainly rural in character. Due to the lack of restriction on one-off housing developments in rural areas in the past, the entire county of Kilkenny is sprinkled with ribbon development along its existing roads network. In this respect the routing of any corridor through the area is hindered by this spread of development.

There are also many fine older houses and estates (as discussed in Section 11.0 and 13.0 of Volume 3) and numerous agricultural based developments (as outlined in Section 12.0).

There are a number of noteworthy community centres within each section. In section E, the towns of Paulstown, Bennettsbridge, Gowran and Stoneyford are the most significant, after the city of Kilkenny. In Section F, Knocktopher and Ballyhale (both on the National Primary Roads network) are the main population centres and in Section G, Mullinavat and Kilmacow villages are most prominent.

In addition to the above, there are numerous local communities and many rural and tourism based community facilities across the county.

In overall terms it was shown that in Section E Options E1 and E6 would have the greatest impact on property and people whereas options E1/E6, E2, E3, E4 and E5 have lesser impact and are similar to each other. In Section F, F3 would have the greatest impact and F1 the least. Option G2 had the greatest overall impact in Section G with Options G1 and G3 being similar.

Community facilities features a range that could be considered typical for County Kilkenny including racecourses, stud farms, caravan parks, golf courses, GAA pitches and quarrying industries. The highest number of facilities were located in Section E and impacts varied with the differing options.

5.3.4 Flora, Fauna and Fisheries

The route options would pass through a broad band of mainly flat to gently undulating land from Paulstown to Stoneyford in the east and centre of Co Kilkenny. Most of the land is used for intensive agriculture with a high proportion of improved grassland and some arable land. Further south, the route options pass through undulating to hilly land and along river valleys in south Co Kilkenny. The land is primarily agricultural and varies from intensive with large areas of improved grassland and abundant dairy farms in lowland areas, to less intensive pasture with sheep and cattle grazing in the uplands. There are numerous large conifer plantations in the uplands and scattered small conifer and broad-leaved plantations in wetland areas and along river floodplains, particularly in the south. Areas of broad-leaved woodland are widespread but generally limited in extent on old estates and along the river valleys. Comparatively few ecological sites would be impacted by the route corridors in lowland areas.

Ecological sites are shown on RSR3 Figures 10.1 to 10.5 and a full list of the ecological sites with site number references is included in Appendix B of Volume 3 as Table 3. The number of ecological sites increases in the uplands and river valleys to the south. Hedgerows are found throughout the study area and many contain mature broad-leaved trees. The route corridors would cross numerous watercourses which are part of the Barrow, Nore and Suir catchments. This includes the main channel of the Nore and King's rivers, and the Blackwater and Pollanassa rivers, tributaries of the Suir. All the main watercourses are important for salmonid fish.

All options in Section E would cross designated conservation areas at either the River Nore or Kings River, both of which are part of the River Barrow and Nore cSAC. Option E5 would affect the Red Bog at Dungarvan (pNHA) and both F1 and G2 would affect Hugginstown Fen, also pNHA.

5.3.5 Archaeology and Cultural Heritage

The area is relatively rich in archaeology with 105 sites identified. A full description of the sites is given in Appendix C of Volume 3 and the sites are shown on RSR3 Figures 11.1 to 11.5 and includes fulacht fiadh sites, ring forts, souterrains, moated sites, castles and town houses, ecclesiastical remains and holy wells. Notable sites are: -

- National Movements at Tullaherin (close to E6) and at Sheepstown (close to F1).
- One site protected by a Preservation Order at Danesfort (affected by E1).
- One site listed as a Registered site at Church Hill.

In addition to the above, 37 sites were identified as sites of Architectural Importance and 18 Industrial Archaeological sites.

5.3.6 Agricultural Land Use

The land quality within the study area is generally very fertile and free draining. There is a higher percentage of tillage farming in Section E as opposed to Sections F and G. Farm size tend to be larger in Section E as opposed to Sections F and G. There are no discernable patterns identified for the degree of severance resulting from route corridors through these sections.

There are known stud farms which would be affected by route corridors E6 (node 45 – 46), E1 (node 38 – 41), G1 (node 51 – 50), E4 (node 40 – 44), F2 (node 46 – 47) and E2 (node 33 – 42). Another key agricultural enterprise would be affected by route corridor E6 (node 45 – 46).

This evaluation has shown little difference in Section E between the options under the headings of soil type, land quality and land use. Routes E1, E2, E4 and E6 all contain stud

farms or key agricultural enterprises within these route corridors and therefore, have been classed as Moderate / Major impacts. Route E6 has the highest level of agricultural enterprises which would make it the least favourable of the E route options.

Option F1 contains tracts of poor quality land; option F3 contains reasonable good quality land. There is a stud farm located within the F2 corridor. This would make route F1 the most favourable option of these three routes as it takes poorer quality agricultural land and it does not contain a key agricultural enterprise.

G1 is the least favourable in Section G as it has a stud farm near Kilmacow. Land quality on the northern end of option G3 is of poorer quality than land quality on G1 and therefore option G3 would be the more favourable route corridor option.

5.3.7 Landscape and Visual

Through the Section E study area, E2 has the least landscape and visual impact. The E2 alignment has little in the way of landscape or landscape planning impact and has less incidence of visual impact when compared to other corridors. Route Sections E1 and E1/E6 have the greatest incidence of potentially severe and major impact on properties. In terms of landscape and landscape planning, Route Sections E3 and E6 have particularly severe landscape and landscape planning impacts especially at the King's River / River Nore confluence and the respective river valleys which are areas of designated high amenity landscape.

Through the Section F study area, F2 is the least impacting corridor followed by F1. In overall terms there is little to distinguish between the three corridors especially in terms of visual impact from properties. However, given that F2 and F3 are only possible by connecting through from either of the particularly adverse E3 or E6 Sections, F1 is considered to be the least impacting route corridor. Given that the landscape impact at Knockadrina Hill by F1 could also be avoided by a minor westward adjustment to the alignment. The F1 corridor has potential for further improvement.

Through the Section G study area, G3 is the least impacting corridor followed by G1. In overall terms there is little to distinguish between the three alignments in terms of visual impact from properties. However, both G1 and G2 have a number of landscape impacts with particularly adverse impacts on the River Blackwater and its wooded valley south of Mullinavat.

Details of the Landscape Assessment are contained in Appendix D of Volume 3 and on RSR3 Figures 13.1 to 13.5.

5.3.8 Engineering

Following the initial stage where a number of options were discarded for reasons described in Section 6.1 of Volume 3, the remaining route corridors were established with the following broad objectives being considered: -

Section E: Location in relation to Paulstown, Kilkenny, Stoneyford and Thomastown. As the topography in this section is relatively flat a wide range of possible corridors was considered.

Section F: Location of route corridors to avoid high ground and their position in relation to Knocktopher and Ballyhale.

Section G: Location of route corridors to avoid high ground and their position in relation to Lukeswell and Mullinavat. Proximity to the existing N9 and Waterford to Kilkenny railway corridor.

Selection Matrix A in Volume 3 summarises the results of the engineering assessment under the following headings: -

- Length
- Cost
- Alignment
- Rivers
- Railways
- Roads
- Services
- Earthworks and construction issues

5.3.9 Geology and Hydrogeology

The geological and hydrogeological assessment has been detailed in Appendix E of Volume 3 with impacts recorded on RSR3 Figures 15.6 to 15.10.

The underlying limestone and sandstone bedrocks are major aquifers and are vulnerable to any road construction that cuts into these formations. As such the impact of options is similar and measures will need to be taken to protect any aquifers affected. Some options would pass close to public water supply wells and the possible sterilisation of gravel deposit is also a feature of a number of options in Section E close to crossings of the River Nore.

5.3.10 Hydrology and Drainage

A study was undertaken of the requirements for drainage structures and river/stream outfalls to cope with potential “cross drainage” and “highway drainage”. The crossing requirements (i.e. culverts or bridges to allow the passage of rivers or streams) is summarised in Table 16.3 of Volume 3 with highway drainage outfalls summarised in Table 16.4 of Volume 3.

The majority of the rivers and streams to be crossed carry substantial flows and will require bridge structures to enable the conveyance of flows across the proposed carriageway. All routes are likely to require the crossing of the same river and watercourse at some stage, and there is little to distinguish between route options as a result.

The water quality of the rivers and watercourses is of a high standard and pollution control measures would be required to reduce the risk of pollution to the environment. As a minimum, by-pass petrol interceptors should be installed at the outfalls although, secondary pollution control measures such as containment lagoons in the event of accidental spillages, dilution lagoons and tertiary treatment in the form of reed beds should be considered for specific circumstances, as necessary.

5.3.11 Summary of Step 2

It was concluded from the Step 1 assessments and workshop discussions that the least favourable options were: -

- E1 between nodes 38 and 41
- E3 between nodes 41 and 45
- E6 between nodes 43 and 45, 45 and 46
- G2 between nodes 48 and 50
- G1 between nodes 50 and 51

The traffic and socio economics presentations highlighted the need to route the new N9 close to Kilkenny in Section E (Routes E1, E2, E3 and E4 should meet the objectives subject to the junction locations) (see Section 8). It appeared that routes E5 and E6 would be least likely to meet the project objectives.

Options discarded at this step were: -

- i) E6 this route would be least likely to meet the project objectives in terms of traffic and economics, and it had high negative impacts between nodes 43 and 46.
- ii) E5 because of its association with E6 in terms of its difficulty in meeting the project objectives, plus environmental implications.
- iii) E3 this option had high negative impacts associated with the crossing of Nore and Kings River.

The analysis of Selection Matrix A and workshop discussion had also identified some link modifications and new links which could help avoid areas of high localised impact whilst retaining much of the original corridor these modifications and new links were identified in all sections (E, F and G) and are described in Volume 3 Section 18.3.6.

5.3.12 Summary of Step 3

Step 3 concluded with the identification of the favourable links (included on RSR3 Figures 18.9 to 18.13) and the preparation of the next Selection Matrix, B, included as RSR3 Figures 18.14 to 18.16. This recorded all the remaining links from Step 1 together with the modified links and new links introduced in Step 2. Where new nodes had been identified, small links had been created as a result and these needed to be included in the matrix. These were between nodes 39A and 44 and 49 to 49A.

5.3.13 Summary of Steps 4 and 5

At this step there was a change from assessment between nodes to assessment of complete route options within sections E, F and G. As a result the following options were identified (see RSR3 Figures 18.17 to 18.28): -

- E Options 1 to 6
- F Options 1 and 2
- G Options 1 to 4

These complete route options were compared using Selection Matrix C (RSR3 Figures 18.29 to 18.31) and it was concluded that the preferred route should be a combination of E Option 2, F Option 1 and G Option 3. The preferred route corridor to form the basis of Public Consultation No. 3 is shown on RSR3 Figures 18.32 to 18.36.

5.3.14 Kilkeny link road

The junction strategy (Section 17.10) had identified the need for a new link to Kilkeny which was to be a single carriageway standard. Having concluded that there was sufficient capacity for a new link to the Ring Road at Hebron Road (see Volume 3 Section 19), four options (A to D) were identified linking between the Ring Road and junction 7 (Dunbell) of the proposed new route. The options are shown on RSR3 Figure 19.1. The assessment process is explained in Section 19 and Option D was selected having the best alignment standard and reduced severance. The proposed link road would be 6.7km long and is estimated to have a construction cost of €20.4 million.

6. PUBLIC CONSULTATION

6.1 Preferred Route Corridor – Public Consultation No. 3

The third public consultation was held in the autumn of 2001 with exhibitions toward the end of October. The purpose was to display the preferred route corridor and gather further information before concluding the route selection process. The exhibitions were preceded by five days of meetings with affected landowners who had all been invited to meet the members of the design and liaison teams. There were 10 venues for the exhibitions, Carlow, Bagenalstown, Athy, Castledermot, Kilkenny, Knocktopher, Mullinavat, Thomastown and Kilmacow and a total of 650 people attended over a 9 day period.

Many requests to adjust the route corridor were received from both the landowner meetings and the exhibitions, particularly with the aim of reducing farming and property impacts, and effects on commercial operations.

7. RECOMMENDED ROUTE CORRIDOR

The route corridor displayed at Public Consultations No. 3 has been modified in a number of areas as outlined below:

- The N78 to N9 Link Road has been moved further west.
- To the Athy to R747 Link Road at its western end and minor realignments have been made at Burtown House and in the vicinity of junction 2.
- At Paulstown the corridor has been moved further east.
- The junction location at Dunbell (with the Kilkenny Link Road)
- At Blanchville
- At the approach and crossing of the River Nore at Dunbell Big.
- At Danesfort and the approach to the King's River Crossing.
- To the north of Knockadrina and the north of Mullinavat.
- Where the corridor meets the Waterford bypass at Dunkitt

The recommended route corridor is shown on RSR1 Figure 1 and in more detail on RSR1 Figures 2 to 10. The capital cost of the scheme is estimated to be €662 million, a figure which excludes preparation costs and the cost of land, compensation and VAT.