



## N81 Hollywood Cross to Tallaght Road Improvement Scheme



## Route Selection Report

### Volume 1: Main Text

June 2012



Wicklow Co. Council



South Dublin Co. Council



Kildare Co. Council

## **Master Index**

**N81 Hollywood Cross to Tallaght  
Road Improvement Scheme**

**Route Selection Report**

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## **Introduction Note:**

This Route Selection Report for the proposed N81 Hollywood Cross to Tallaght Road Improvement Scheme has been prepared by Kildare County Council National Roads Design Office in co-operation with Kildare, Wicklow and South Dublin County Councils respectively, by means of a Section 85 Agreement which is constituted under the Planning Act 2001.

Kildare County Council National Roads Design Office does not accept any responsibility for use of, or reliance on this report by a third party.

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## **1 INTRODUCTION**

The N81 Hollywood Cross to Tallaght Road Improvement Scheme entails a major improvement to the N81, from Knockroe Bend, which is South of Hollywood Cross, to the existing Tallaght By-Pass Dual Carriageway. The scheme involves an upgrade of approximately 29 km of the N81 National Secondary Road. Improving road safety and journey times are a priority for this scheme.

Kildare County Council National Roads Design Office (KNRDO) was appointed by the National Roads Authority (NRA) to progress the scheme as per the requirements of the NRA Project Management Guidelines (NRA PMG 2010).

This scheme, currently at Phase 2 Route Selection Stage of the NRA PMG 2010, fulfils the requirements as stated in the guidelines for the delivery of a Route Selection Report.

### **1.1 PURPOSE OF THE ROUTE SELECTION REPORT**

This report documents the process undertaken in selecting the Preferred Route Corridor for the N81 Hollywood Cross to Tallaght Road Improvement Scheme and outlines the main alternatives studied, providing an indication of the main reasons for recommending a Preferred Route Corridor, taking into account the environmental effects. When designing a major road scheme consideration needs to be given to delivering a scheme which meets the requirements of the road users such as improving road safety, alignment and journey times, whilst causing the minimum impact on the environment and people within the Preferred Route Corridor.

### **1.2 SUMMARY OF THE ROUTE SELECTION PROCESS**

The steps that were gone through in the development of the Preferred Route are outlined in Table 1.2 below.

<b>Route Selection Process</b>		
<b>Stage</b>	<b>Steps in Assessment Process</b>	<b>Documented in Assessment Report</b>
<b>Constraints Study</b>	<ul style="list-style-type: none"> <li>• <b>Public Consultation, October 2008 and display of Study Area</b></li> <li>• Identification of constraints which will affect the choice and development of a Preferred Route Corridor within a Study Area                             <ul style="list-style-type: none"> <li>- Study Area, Fig 2.0</li> <li>- Accidents, Figs 3.0 to 3.4</li> <li>- Existing N81 infrastructure, Figs 4.0 to 4.4</li> <li>- Existing traffic flows, Figs 5.0 to 5.4</li> <li>- Lands use, Figs 12.0 to 12.4</li> <li>- Planning, Figs 13.0 to 13.4</li> <li>- Ecology, Figs 14.0 to 14.4</li> <li>- Archaeology, architecture, cultural heritage, Figs 15.0 to 15.4</li> <li>- Bedrock geology, Figs 16.0 to 16.4</li> <li>- Superficial deposits, Figs 17.0 to 17.4</li> <li>- Agricultural soils, Figs 18.0 to 18.4</li> <li>- Geological, Figs 19.0 to 19.4</li> <li>- Hydrogeological, Figs 20.0 to 20.4</li> <li>- Hydrological, Figs 21.0 to 21.4</li> <li>- Aquifer classification, Figs 22.0 to 22.4</li> <li>- Aquifer vulnerability, Figs 23.0 to 23.4</li> <li>- Sensitive receptors, Figs 24.0 to 24.4</li> <li>- Water &amp; sewerage, Figs 25.0 to 25.4</li> <li>- Telecommunications, Figs 26.0 to 26.4</li> <li>- ESB &amp; Bord Gáis, Figs 27.0 to 27.4</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• <b>Constraints Report</b></li> <li>• <b>Asset Management Survey of Existing Conditions on the N81</b></li> <li>• <b>Accident Data Report</b></li> </ul>
<b>Pre - Stage 1: Options Assessment</b>	<ul style="list-style-type: none"> <li>• Development of alternative feasible route corridor options in accordance with design standards and in consideration of constraints.                             <ul style="list-style-type: none"> <li>- 13 Route Corridors south of Blessington</li> <li>- 26 Route Corridors north of Blessington</li> <li>- Do Nothing and Do Minimum options</li> </ul> </li> <li>• Assessment of the alternative route corridors and <i>recommendation of options to progress to Stage 1 – Figures 6.0 to 6.4</i></li> </ul>	<b>Pre-Stage 1 Options Assessment Technical Report</b>
<b>Stage 1: Preliminary Options Assessment</b>	<ul style="list-style-type: none"> <li>• <b>Public Consultation April 2010 and display of Stage 1 Route Corridor Options.</b></li> <li>• Consideration of Submissions and questionnaires from the public and interested parties and further development of Stage 1 Route Options</li> </ul>	<b>Stage 1 Preliminary Route Corridor Options Assessment Report – and addendum Report</b>

	<ul style="list-style-type: none"> <li>• Comparative assessment of Stage 1 Feasible Route Options over 4 sections: <ul style="list-style-type: none"> <li>- Hollywood: Options A, B, C; Fig 6.11</li> <li>- Blessington North: Options D, E, F; Figs 6.12 &amp; 6.13</li> <li>- Tinode/Brittas: Options G, H; Fig 6.13</li> <li>- Brittas East: Options I, J; Fig 6.13</li> </ul> </li> <li>• <i>Recommendation of Alternative Route Options to progress to Stage 2; Figs 7.0 to 7.4</i></li> </ul>	
<b>Stage 2: Project Appraisal of Route Options</b>	<ul style="list-style-type: none"> <li>• <b>Public Consultation July 2011 and display of Stage 2 Route Corridor Options</b></li> <li>• Consideration of Submissions comparative assessment of route options and selection of an <i>Emerging Preferred Route Option; Figs 8.0 to 8.4</i></li> <li>• <b>Public Consultation October 2011 and display of Emerging Preferred Route Option.</b></li> <li>• Consideration of Submissions from Public Consultation</li> <li>• Comparison assessment and development of Stage 2 Route Options to include: <ul style="list-style-type: none"> <li>- Traffic modelling to determine projected traffic flows</li> <li>- Cost benefit analysis</li> <li>- Road Safety Audit</li> <li>- Environmental assessment of options</li> <li>- Accessibility &amp; Integration</li> </ul> </li> <li>• Selection of Preferred Route Option</li> <li>• <b>Public Consultation February 2012 and display of Preferred Route Option.</b></li> </ul>	<p><b>Stage 2: Emerging Preferred Route Option Report</b></p> <p><b>Stage 2: Preferred Route Option Report</b></p>
<b>Stage 3: Selection of a Preferred Route Corridor</b>	<ul style="list-style-type: none"> <li>• Consideration of Submissions from Public Consultation</li> <li>• Road Safety Audit Stage F, Part 2 on Preferred Route Option</li> <li>• Appropriate Assessment Studies on Preferred Route Option</li> <li>• Completion of Project Appraisal Balance Sheet for Preferred Route Option,</li> <li>• <i>Recommendation of Preferred Route Corridor</i></li> </ul>	<p><b>Stage 3: Project Appraisal Balance Sheet for Preferred Route Corridor</b></p> <p><b>Road Safety Audit, Stage F, Part 2</b></p>

**Table 1.2 – Summary of Route Selection Process**

### 1.3 STRUCTURE OF THE ROUTE SELECTION REPORT

- Section 2 sets out the need for the N81 Road Improvement Scheme based on baseline data including road safety, traffic assessment, route cross section and journey times.
- Section 3 presents an overview of the objectives for the Scheme.
- Section 4 considers the Do-Nothing and Do-Minimum Route Options
- Section 5 presents a summary of the Constraints Study and the main constraints to be considered.
- Section 6 describes the development of the initial feasible route corridors (13 route options south, and 29 route options north) as part of the Pre-Stage 1 Options Assessment and identifies the feasible route options which warrant preliminary assessment as part of the Stage 1 Process.
- Section 7 describes the comparative assessment of Stage 1 Preliminary Sub- options and provides a recommendation of route options to be brought forward to the Stage 2 assessment process.
- Section 8 documents the Stage 2 Project Appraisal process leading to the selection of the Preferred Route Option.
- Section 9 presents the Stage 3 part of the Route Selection Process in accordance with the NRA Project Management Guidelines. Stage 3 includes the incremental analysis to determine the optimum cross section for the Preferred Route Option together with further ecological field surveys. The Project Appraisal Balance Sheet and Road Safety Audit, Stage F, Part 2 are presented and a recommendation is made for the Preferred Route Corridor to be progressed to Phase 3 & 4 of the NRA Project Management Guidelines.

## 2 THE NEED FOR THE SCHEME

### 2.1 INTRODUCTION

This section describes the baseline conditions prevailing along the existing N81 National Secondary Road between Hollywood Cross and Tallaght and presents the need for the road improvement under the following headings:

- National and Regional strategy
- Accidents
- Traffic and Road Cross Section
- Journey Time

The N81 begins at the N80 Junction in Co. Carlow and terminates in Dublin City Centre and is approximately 85 Km in length. The section contained within the Study Area commences at Knockroe, south of Hollywood Cross and terminates at the end of the Tallaght By-Pass Dual Carriageway / R136 Cheeverstown Junction. It is approximately 29 Km in length. Blessington is the only town located directly on the existing N81 and is connected to Dublin only by means of road transport, passing through the village of Brittas. The scheme traverses West Wicklow, East Kildare and South County Dublin

### 2.2 NATIONAL AND REGIONAL STRATEGY

The following policy documents were reviewed to determine the national and regional objectives and policies relevant to the scheme:

- National Secondary Roads Needs Study – East Region, March 2011.
- National Development Plan 2000-2006
- National Development Plan 2007-2013
- Transport 21
- National Roads Needs Study 1998
- National Spatial Strategy for Ireland 2002-2020
- Wicklow County Development Plan 2010-2016
- Kildare County Development Plan 2011-2017
- South Dublin County Development Plan 2010-2016
- Regional Planning Guidelines for Greater Dublin Area 2004-2016

#### **National Secondary Roads Needs Study, Networks Options Report – East Region, March 2011, National Roads Authority**

- **1.2:** *“In the last decade, road infrastructure investment has focussed primarily on the National Primary Roads. In contrast to this, little capital expenditure or other work has been devoted to upgrading or renewing the National Secondary Road (NSR) network. .... The NRA is now proposing to focus its attention on addressing deficiencies in the NSR network. To that end, it commissioned the National*

Secondary Road Needs Study (NSRNS) to identify an optimal future NSR network, develop and prepare an NSR Network Programme and provide an outline delivery programme which offers value for money.”

- **2.5 Baseline Assessment:**

- **2.5.8 N81 – Dublin to the N80 near Ballon**

- **2.5.8.1 Description**

- “The N81 is 85.548 km long and is situated in counties Dublin, Wicklow, Kildare and Carlow and connects Dublin City to the junction with the N80 near Ballon village through a number of villages and towns including Tallaght, Brittas, Blessington, Baltinglass, Rathvilly and Tullow. It also serves substantial commuter traffic into Dublin city, Naas, Carlow town and possibly Enniscorthy via the N80 route. This route could be considered strategically nationally important for the volume of commuter traffic it carries into Dublin city every day.”
      - “Within the M50, the N81 route passes through Templeogue, Kimmage, Harold’s Cross, Warrenmount, the Coombe, Christchurch and finishes on Dame Street. The N80 connects with the M1, N2, N3, N4, N7 and M11 national primary routes via the M50. The route also connects with the N82 national secondary in Dublin and the N80 national secondary near Ballon.”
      - “Dublin city is a Gateway under the National Spatial Strategy, and the N80 which this route connects into near Ballon, is listed as a Strategic Linking Route between Carlow town and Enniscorthy.”
      - “The route’s principal function varies along its length from a feeder route servicing south county Dublin and north Wicklow into Dublin city at the northern end through to providing connectivity between the towns and villages it connects across Wicklow and also serving as a tourist route between Dublin, Blessington, Hollywood, Donard, Baltinglass, Rathvilly and Tullow.”

- **2.5.8.2 Existing Condition**

- “The route is expected to carry traffic ranging from typically .... 7,000 to 12,000 AADT between Hollywood and the M50 – 15,700 AADT at Blessington. The route carries a typical HCV content of .....between 5-10% HCV content between Baltinglass and Dublin.”
      - “A planned upgrade of this route is the Tallaght to Hollywood Cross scheme”.
      - “The route passes close to a number of environmentally sensitive areas including the River Slaney basin and the Blessington SPA and NHA. Thus in parts it is located in a particularly sensitive area.”

- **8.4 Recommendations**

- “N81 Blessington to Hollywood Cross classified as Priority 2 Scheme – to be seen as a longer-term improvement”
      - “Corridor N81c - N82 near Saggart to Blessington – Scheme already in Planning and no options considered as part of the NSRNS”
      - “NRA to consider safeguarding from development any proposed alignments where land-take would be required”

### **National Development Plan 2000-2006**

- *“The strategy for national secondary roads will concentrate on routes which are of particular importance to economic and regional development, including links to the strategic corridors, roads serving key ports, airports, tourist areas, industry and multipurpose roads.”*
- *“Among the routes on which improvements works will be carried out are:”*  
*“Tallaght to Blessington (N81)”*

### **National Development Plan 2007- 2013**

- *“Investment under the Economic Infrastructure Priority of NDP 2007-2013 is indicatively estimated at €54.7 billion..... The key objectives under this Priority will be:*
- *“To create a road network, in line with the timetable in Transport 21, that will see the completion of the major inter-urban routes and will upgrade links generally between the National Spatial Strategy Gateway Centres and improve the non-national road network;”*
- *N81 National Secondary Route – Tallaght to Blessington is identified within the “Road and Rail Network” as a “Targeted Route”*

### **Transport 21**

- *“Transport 21 sets out to meet the challenges outlined above. The Government has agreed a total investment framework of €34 billion over the period 2006 to 2015. This unprecedented level of capital investment will be used to transform Ireland’s transport system. In particular it will provide funding to:”*
- *“bring about improvements in the rest of the national road network, focusing particularly on the balanced regional development objectives of and on the needs identified in the National Roads Needs Study”*

### **National Road Needs Study 1998**

- *“Each of the routes on the National Secondary network was examined to establish when the link would fall below level of service D. Similarly, the principal towns on the routes were examined to identify bottle-necks. Economic evaluation was used to ascertain the most attractive capital investment returns and the results were subsequently used to rank the bypass needs on the National Secondary Routes.”*

#### **N81; N80 Junction to Blessington**

- *“This route only requires upgrading on the section between Blessington and Tallaght where a “standard two lane” road is necessary during Phase 1 needs between Blessington and the N82 junction.”*

### **National Spatial Strategy for Ireland 2002-2020**

- *“The National Spatial Strategy supports Dublin’s pivotal role in national economic success. It is essential for balanced regional development that the performance*

*of the Greater Dublin Area (Dublin City, and the surrounding 3 counties Kildare, Meath and Wicklow) be built upon and physically consolidated.”*

- *Towns with populations 1500-5000 –“Towns of this scale in the GDA are also generally located on or near the transportation corridors radiating from Dublin and are relatively close to the larger urban areas. While the primary development centres will be the main focus for responding to future growth in the GDA hinterland, these smaller towns cater for local growth in residential, employment and service functions through enhancing the built environment, water services, public transport links and capacity for development in these centres. Accommodating such additional functions must however be balanced with protecting the character and quality of these towns.*

## **Wicklow County Development Plan 2010-2016**

### **Roads & Transportation, Chapter 11 – Section 11.4.1, National Roads.**

- *“The N81 has also been upgraded during the lifetime of the previous plan but not to the same extent as the N11. The NRA’s priority in the last number of years has been firstly the national primary roads and more recently, the Major Interurban Routes (MIU’s), and the N81 being a National Secondary Route, has somewhat been overlooked for investment. However, a recent audit of the national roads has shown it to be particularly deficient in overall safety and this has refocused attention back onto the improvement of this route. The NRA National Roads Design Office in Naas has undertaken a constraints study of the N81 from Tallaght to Hollywood with a view to determining a range of possible improvements, including re-routing some of the existing road from the county boundary to Hollywood Cross”.*
- **Works Objectives for the N81**
  - *“Tallaght to Hollywood Cross upgrade”*
  - *“Upgrades at Derrings and Hangman’s Bends”*
  - *“Local Alignment and width Improvements south of Hollywood Cross”*
  - *“The Council will work to ensure the N81 receives the N81 receives much greater funding than received to date for improvements”*
- **National Roads Objectives**
  - *“NR1 – The Council will, in line with Government and National Roads Authority’s (NRA) policies and in accordance with the “National Roads Needs Study”, published by the NRA and the National Development plan, seek to bring National primary and secondary roads up to the appropriate standard.”*
  - *“NR2 – To Support major road improvements by reserving the corridors, as and when these are identified, of any such routes free of development, which would interfere with the provision of such proposals.”*
  - *“NR3 – To co-operate with the NRA in the upgrade of existing interchanges on the National Routes and where appropriate and necessary, to restrict development immediately adjacent to interchanges to provide for the future enlargement of interchanges.”*

- “NR4 - To co-operate with the National Roads Authority and other Local Authorities to improve existing or provide new links from Wicklow (in particular, the growth centres and ports of Wicklow) to other counties in the region, including the Dublin Outer Orbital Route as proposed in the Regional development guidelines and Transport 21.”
- “NR5 – To safeguard the capacity and safety of the National Road Network by restricting further access onto national primary and national secondary routes outside of restricted speed limits ( which correspond with identified development boundaries) in line with the national roads authority’s policy statement on “development management and access to national roads” (May 2006) as amended.”

### **Kildare County Development Plan 2011-2017**

- **Movement & Transport, Chapter 6 – Section 6.5.3 – Roads Programme.**
  - “RP 11: To upgrade the section of the N81 National Secondary Road (Tallaght / Baltinglass) that is contained within Kildare.”
  - “RP12: To Co-operate with adjoining authorities and other public authorities regarding new and/or improved road infrastructure”.
  - “RP 13: To Co-operate with adjoining authorities and other public authorities regarding new and/or improved road infrastructure at towns bordering the county boundary including Blessington and.....”

### **South Dublin County Development Plan 2010-2016**

- **Section 2 Transportation, Section 2.2.38 Policy.**
  - “Long term objectives are shown in Table 2.2.6 – These are considered essential to provide a long term road network of sufficient standard to serve the anticipated future population growth.”
  - “Where the opportunity arises, roads shown as long term may be brought forward for construction at an earlier date, subject to funding being available”.

Road Type	Description
National / National Secondary Route	N81 from M50 to Hollywood Cross Road Improvement Scheme

“Table 2.2.6 – Long Term Roads Objectives”.

### **Strategic Planning Guidelines for the Greater Dublin Area 1999**

- “Improved Transportation System. The existing transportation system of the Greater Dublin Area, including both public and private transport, is subject to very heavy pressure. It is necessary to implement measures to alleviate the existing

*difficulties, many of which are in planning or under construction, as well as a range of measures to facilitate future development.”*

- *“Strategy for the Hinterland Area – Key Points .....The existing and potential transportation corridors will be strengthened so as to improve links with the Metropolitan Area.”*
- *“There are no major plans for the N81 (Dublin-Blessington-Baltinglass)”*
- *“Notwithstanding the need to facilitate public transport, it has to be recognised that the private car will continue to play an important role in the future. This is especially so in the Hinterland Area, where the pattern and density of settlement and development limits the potential for public transport. It is also important to recognise the significance of the road system for the transportation of goods.”*
- *“Nevertheless, the towns (in the Hinterland Area) will require to be well linked to Dublin by good road and rail infrastructure.”*
- *“A fundamental function of the transportation system, including both roads and public transport, in the Greater Dublin Area is the linking of the Hinterland and Metropolitan Areas.”*

### **Regional Planning Guidelines for the Greater Dublin Area 2004-2016**

- *“Maintaining the distinction between the city and town components within the Greater Dublin Area as envisaged by the Strategic Planning Guidelines for the area, which focus on the metropolitan area, the hinterland and a number of other strategically placed towns as primary or secondary development centres within the hinterland.”*

## **2.3 ASSET MANAGEMENT**

The section of the N81 contained within the study area is characterised by a poor horizontal and vertical alignment. The route consists of a single lane carriageway without a hard strip or hard shoulder over considerable lengths. The section of the N81 contained within the study area has limited overtaking opportunities, resulting in driver frustration which inevitably leads to motor accidents.

KNRDO carried out an Asset Management Survey of the N81 to address the existing asset in terms of the number of entrances & accesses and junction types presently located along the N81 and the deficiencies of road alignment and road safety problems. The **Asset Management Survey Report** includes for:

- **Existing Road Infrastructure (Figure 4.0 to Figure 4.4)**
  - Number of private accesses, driveways and commercial properties with direct access onto the N81
  - Changes in the road cross section type along the N81. Width of the carriageway along with the verge and/or hard shoulder widths.
  - Record drawings showing the location of hard shoulders, footpaths, Dublin Bus Stops, EIRSPAN structures, proposed bus stops and pedestrian crossing points.

- **Land Use Survey – within the Study Area (Figure 12.0 to Figure 12.4)**
  - Number of residential, commercial & farm entrance/access onto the existing N81.
  - Location within the Study area of residential and commercial property, built up areas, dairy farms, equine enterprises, golf courses, quarries, schools, sports facilities, agri-businesses, Garda stations, fire stations, hospitals, churches and graveyards.
  
- **Traffic Data (Figure 5.0 to Figure 5.4)**
  - Traffic surveys carried out in Year 2007 were updated during Years 2010 and 2011.
  - Annual average Daily Traffic (AADT) was arrived at for the N81, and for all Regional and Local Roads accessing onto the N81.
  
- Comparison of Year 2007 data with Year 2010/2011 data determined that traffic flow on the N81 north and south of Blessington had increased by some 4% north and 11% south. Traffic flows on the N81 within the vicinity of Brittas had not changed significantly. As a result of the opening of the R136, Cheverstown Road, traffic flows on the N82 had reduced by some 41% with flow on the N81 between the N82 and the R136 reduced by some 21%. Summary of existing traffic flows:
  - N81, West of Blessington - AADT 7,200
  - N81, East of Blessington / West of Brittas – AADT 12,700
  - N81, East of Brittas / West of N82 – AADT 10,800
  - N81, East of N82 to R136, Tallaght Bypass – AADT 22,300 (26,913 max)

### 2.3.1 Traffic Accident Data (Figure 3.0 to Figure 3.4)

The section of the N81 contained within the study area, has been assessed under the European Road Assessment Programme (euro-RAP) as being “Medium to High Risk”. Analysis of accident data relating to the section of the N81 contained within the Study Area for the period January 1996 to December 2007 found:

Type	Number	Percentage
Fatal	18	5.5%
Serious	59	17.9%
Minor	253	76.6%

The principal collision types for the N81 are single vehicle accidents, head on collisions, rear end collisions and accidents involving pedestrians. In many collisions, the accidents occur on straight sections of the carriageway with hollows and dips in the road which are likely to obscure the view of oncoming traffic. A detailed analysis of the data for the various sections of the N81 within the study area found:

- **Section 1, N81 Embankment to Brittas:** 41% of collisions are head on which is over three times the national average of 13%. In addition most of the collisions occur on straight sections of the carriageway alignment.
- **Section 2, N81 Brittas to the Lamb:** 30% of collisions are head on with most of the collisions occurring on straight sections of the carriageway alignment.

- **Section 3, N81, The Lamb to Blessington:** The accidents on this section are mainly rear end shunts. The significant number of road junctions and accesses from domestic and commercial properties with the associated right turning movements create a rear end shunt high risk.
- **Section 4, N81, Blessington to Poulaphoca:** 42% of accidents involve single vehicle collisions, which is double the national average of 21% and this reflects the very poor horizontal alignment, with the majority of accidents occurring on bends. There is also a high head on collision rate of 18%.
- **Section 5, N81, Poulaphoca to Blessington:** 43% of accidents occur at cross roads which is five times higher than the national average of 9%. Most of these accidents are head on type collisions with a rate of over seven times the national average.

The analysis of accident data clearly demonstrates that the existing road carriageway alignment and the significant number of accesses and junctions are a contributing factor to the number of accidents which have occurred on the N81. The high percentage of head on collisions (up to seven times the national average) demonstrate the dangers to the road user from the substandard and unsafe vertical alignment which causes oncoming traffic to be obscured from view giving the appearance of the road being clear of traffic for overtaking.

### 2.3.2 Level of Service

As traffic volumes increase, the average speed is affected by the reduced opportunities to overtake and by interactions with other vehicles. During high flows of traffic, the passing opportunities decrease such that demand exceeds passing opportunities resulting in the formation of platoons of vehicles. At very high traffic volumes the flows become unstable, resulting in a “wave-effect” with “stop–start” conditions.

Speed and convenience reduces as the flow increases, leading to a lower “Level of Service” (LOS). NRA TA 43 of the Design Manual for Roads and Bridges define the different levels of service for two lane roads in Table 2.3.1 shown below:

Classification	% Time Delay	Average Speed Km/h	Passing Conditions	Driving Conditions
LOS A	≤ 30	93	Passing demand well below capacity.	Slow vehicles causing delay ≤ 30% of time.
LOS B	≤ 45	88	Passing demand approximately equal to passing opportunity.	Driver Delay 45% of time due to slower vehicles.
LOS C	≤ 60	84	Platoon formation occurs with passing demand exceeding opportunity.	Driver delay up to 60% due to slower vehicles.
LOS D	≤ 75	80	Passing extremely difficult, with very high demand and limited opportunity.	Driver delay up to 75%. Turning Vehicles or roadside distractions cause major shockwaves in the traffic System.
LOS E	> 75	72	Passing becomes impossible, with intense platooning.	Driver Delay over 75%. LOS E rarely maintained, as traffic disturbance leads to LOS F.
LOS F	100	< 72	No passing – Platoon flow.	Congested traffic.

**Table 2.3.2 – Definitions of Levels of Service (LOS) for Two Lane Roads (DMRB)**

The target adopted as part of the “National Roads Needs Study” and “National Secondary Roads Needs Study” was to ensure that no section of the national roads network falls below Level of Service D. In addition, NRA TA 43 states that “generally, Level of Service D, equivalent to an average inter-urban journey speed of 80km/h, would be regarded as a minimum acceptable standard”.

### 2.3.3 Road Cross Section (Road Type)

A traffic model was built to assess the likely traffic impact of a range of road improvement options. The **Traffic Modelling Report** describes the traffic data that was collected, sets out the development of the base year traffic model, summarises the forecasting inputs used and determines the forecast traffic flows for the Design Year 2035.

Projected traffic flows for the N81 in the design year **without** any Road Improvement Scheme are shown as:

Section	AADT – Low Growth, Yr 2035 (N81 with no Road Improvement Scheme)	AADT - High Growth, Yr 2035 (N81 with no Road Improvement Scheme)
N81 West of Blessington	7,170 - Hollywood 7,920 - west of R758 9,910 – east of R758	9,920 – Hollywood 10,760 - south of R758 13,360 – north of R758
N81 Within Blessington	12,020	16,000
N81 East of Blessington	12,900 – west of Brittas 13,950 – east of Brittas 29,070 – east of N82 (Tallaght)	17,410 – west of Brittas 17,280 – east of Brittas 39,800 – east of N82 (Tallaght)

The level-of-service concept accepts that for each Level of Service there is a maximum (ideal) capacity for any given road cross section. Table 6/1 of NRA TD 9, Design Manual for Roads and Bridges (DMRB), lists the recommended road layout type, depending on the AADT, in order to provide a “LOS - D”. The recommended road type depending of the AADT to achieve a Level of Service “D” is shown below – Table 2.3.3

Type of Road <sup>1</sup>	Capacity (AADT) for Level of Service D	Edge Treatment	Access Treatment	Junction Treatment at Minor Road	Junction Treatment at Major Road
<b>Reduced Single</b> (7.0m) Carriageway S2	8,600	0.5m hard Strips.	Minimise number of access to avoid standing vehicles and concentrate turning movements.	Priority Junctions with ghost islands where necessary	Ghost Islands
<b>Standard Single</b> (7.0m) Carriageway S2	11,600	2.5m hard shoulders	Minimise number of access to avoid standing vehicles and concentrate turning movements.	Priority Junctions with ghost islands where necessary	Ghost Islands or Roundabouts <sup>2</sup>
<b>Type 3 Dual</b> <sup>3</sup> (7.0m + 3.5m) Divided 2 +1 lanes Primarily for retro fit projects	14,000	1.0m hard strips	Minimise number of access to avoid standing vehicles and concentrate turning movements.	Restricted numbers of left in / left out or ghost priority junctions	Priority Junctions or at Grade Roundabouts
<b>Type 2 Dual</b> <sup>3</sup> Divided 2+2 Lane Carriageway ( 2 x 7.0m)	20,000	0.5m hard strips	Left in / Left out	No gaps in the central reserve	At-Grade roundabouts and compact grade separation
<b>Type 1 Dual</b> Divided 2+2 Lane Carriageway ( 2 x 7.0m)	38,100	2.5m hard shoulders	Left in / Left out	No gaps in the central reserve	Left in / Left out and grade separation
<b>Standard Dual</b> Divided 2+2 Lane ( 2 x 7.0m) Motorway	44,100	2.5m hard shoulders	Motorway Regulations	No gaps in the central reserve	Motorway Standard. Full Grade

(D2M)					separation
<b>Wide Dual</b> Divided 2+2 Lane (2 x 7.5m) Motorway (D2M)	55,500	3.0m hard shoulders	Motorway Regulations	No gaps in the central reserve	Motorway Standard. Full Grade separation

**Table 2.3.3 – Recommended Rural Road Layouts (DMRB) (Level of Service “D”)**

The traffic flows predicted for the N81 during the Design Year **without** any Road Improvement Scheme indicate the following road cross section is required to achieve a Level of Service “D”:

Section	Road Type (LoS D) Recommended
N81 West of Blessington – from Hollywood Cross to the R410 (Naas Road)	Standard Single S2 – 7.0m carriageway 2.5m hard shoulders Priority junctions / ghost islands
N81 Within Blessington - from the R410 to N81 at Blessington East	Type 2 Dual – 2 x 7.0m, 0.5m hard strips No gaps in central reserve At-grade roundabouts
N81 East of Blessington – from N81 at Blessington East to R136, Tallaght Bypass	Type 2 Dual – 2 x 7.0m, 0.5m hard strips No gaps in central reserve At-grade roundabouts

### 2.3.4 Journey Times

Journey time surveys were undertaken within the Study Area to determine the existing Level of Service (LOS) of the N81. The surveys were carried out in accordance with the Journey Time Measurement for the Assessment of Major Road Projects published by the Environmental Research Unit. The surveys are carried out between 8am and 6pm on neutral days with 20 surveys per day undertaken. The speed limits were obeyed for the assessment.

The survey was conducted on Tuesday the 17<sup>th</sup> April 2006 and Wednesday 2<sup>nd</sup> May 2006. The distance for the survey was 25.4Km or 15.8miles. A number of points were chosen along the route to record times in order to allow for analysis over various sections of the route independently.

The **Journey Time Assessment Report** provides the results of the survey and indicates an average speed of 62Km/h along the route. In addition further journey time surveys were carried out along the N11 and the parallel M7/N7 in June 2011; these were subsequently used in development of the Traffic Model.

### 3 SCHEME OBJECTIVES

Transport Improvements in Ireland have 5 principal objectives:

- to boost the Economy
- to reduce the number and severity of Road Accidents
- to preserve the Environment
- to improve Social Inclusion by enhancing Accessibility
- to provide an integrated transport system which supports other government policy.

As determined from the Asset Management Surveys and as described when considering the Do-Nothing and Do-Minimum Route Options the conditions in the N81 corridor clearly show:

- journey times (as measured by level of service) are poor, which will tend to lead to lack of economic and social opportunities for those living and working within the study area
- accident rates are high
- the need for improvement is recognised in the Local County Development Plans and national development strategies.

The specific objectives of the N81 Hollywood Cross to Tallaght scheme are therefore to:

- Deliver the policy of road improvements within the corridor as set out in Local Plans
- Reduce the number and severity of Road Accidents within the corridor
- Support the local economy and combat social exclusion by enhancing accessibility in a way which minimises negative impacts on the environment.

The choice between scheme options was undertaken in a way that reflects these objectives, with assessment being carried out in progressively greater detail as the number of options was narrowed down.

## 4 CONSIDERATION OF DO-NOTHING & DO-MINIMUM OPTIONS

### 4.1 REQUIRED ROAD CROSS SECTION (ROAD TYPE)

To achieve the required Level of Service “D” to meet the NRA DMRB safety standards the following road types is recommended for the Comparison of Road Improvement Options:

#### **Recommended Road Type for South of Hollywood Cross to Blessington:**

A Standard Single Carriageway, S2, is recommended from South of Hollywood Cross to tie into the R410 Junction at Blessington (Naas Road).

- 7.0m carriageway, 2 x 2.5m hard shoulders, priority junctions with ghost islands where necessary for minor roads and ghost islands or roundabouts for major junctions.

#### **Recommended Road Type for Blessington to Tallaght:**

A Type 2 Dual Carriageway is recommended from Blessington, R410 Naas Road, to R136 Tallaght Bypass.

- 2 + 2 lane carriageways with a 0.5m hard strip, left in / left out access treatment, no gaps in the central reserve for junction treatment at minor road, and for junction treatment at major road at-grade roundabouts and compact grade separation.

### 4.2 DO-NOTHING ROUTE OPTION

It is clear within the surveys undertaken for the Asset Management Report that the existing single carriageway road cross section with sections of very poor alignment and with the absence of hard strips and hard shoulders, does not provide capacity to achieve a quality of service Level of service “D”, for the existing and for the design year traffic flows. The existing road cross section provides a level of service which is highly unstable, heavily congested, uncomfortable for drivers, and has limited overtaking opportunities leading to driver frustration. The existing road alignment does not conform to the NRA DMRB for design speed related parameters.

In addition existing average journey times confirm the poor quality of the existing road infrastructure which contributes to driver frustration and compromises road safety. A level of Service “D” with an average journey time of 80Km/h is not achieved.

A road improvement scheme is required to provide the appropriate level of services for the projected traffic flows.

***A Do-Nothing Option consisting of routine maintenance to the existing road infrastructure and planned routine works is not considered as a Route Option for consideration as part of the Route Selection process.***

### 4.3 DO-MINIMUM ROUTE OPTION

The Do-Minimum Route Option is an investigation of the feasibility of an on-line upgrade of the existing N81 route to determine if the road is capable of delivering the required Level of Service "D" and safety.

#### 4.3.1 North Section – Blessington to Tallaght

As determined within the asset management report and survey undertaken of the road infrastructure there are high levels of development along the N81 particularly between Blessington and Tallaght with a considerable number of private, commercial and quarry operations with direct access to the N81.

Given the existing very poor alignment and the need to provide a Type 2 Dual Carriageway Road Type to meet projected traffic demand to achieve a Level of service "D" and given the high number of accesses directly onto the N81, ***it is considered that a Do-Minimum Route Option is not a feasible alternative for the section of the Scheme between Blessington and Tallaght.***

#### 4.3.2 South Section – Hollywood Cross to Blessington

As determined a Standard Single Carriageway, S2, Road Type is required to be provided from south of Hollywood Cross to Blessington. This Road Type constructed with a horizontal alignment and vertical alignment in accordance with the NRA DMRB standards will provide a Level of Service "D".

A Do-minimum Route Option has been developed to achieve the required cross section and to provide the appropriate alignments by carrying out road improvements at bends, and by constructing new structures (particularly adjacent to the existing structures at Poulaphuca) and by limiting direct access onto the N81 with the introduction of collector roads.

The Do-Minimum Route Option between Hollywood and Blessington South is a combination of online and offline alignments with the majority of the new alignment online. The alignments conform to the NRA DMRB however it is not always possible to achieve standard junction layouts at existing junctions.

***A Do-Minimum Route Option, Hollywood Cross to Blessington South is included with the Comparison Assessment of Route Options as part of the Route Selection process.***

## 5 CONSTRAINTS STUDY

### 5.1 INTRODUCTION

The “**Constraints Study Report**” (April 2009) of the N81 Hollywood Cross to Tallaght Road Improvement Scheme has been prepared in accordance with the National Roads Authority’s (NRA) Project Management Guidelines (Version 1.1, March 2000).

The “Constraints Study Report” identifies the constraints which will affect the choice and development of a preferred route corridor for the scheme, and has been compiled based on desk studies, site survey work (windscreen survey) and consultation with concerned parties. In addition the report includes data provided from the public and interested parties as a result of the **Public Consultation process held in October 2008**.

The study area is primarily rural in general, with urbanisation primarily in South Dublin. There is extensive one off housing along the existing between Blessington and Tallaght. The main settlements within the study area are Tallaght, Brittas, Kilbride, Blessington, Ballymore Eustace and Hollywood. Outside these settlements, land use is primarily agricultural with scattered residential properties, together with forestry on more marginal areas on hill tops and mountain sides. There are a number of commercial and industrial enterprises. Pollaphuca Reservoir and Wicklow Mountains are situated within the study area offering amenity and recreational opportunities, as well as the water supply for the Dublin area.

The findings of all the constraints identified include, but not limited to, the following headings:

- Archaeology and Cultural Heritage
- Landscape & Visual
- Ecology
- Soils, Geology, Hydrology and Hydrogeology
- Noise & Air Quality
- Existing Services
- Topography
- Highways and Traffic issues
- Land Ownership
- Water quality and Fisheries / Flooding
- Agriculture
- Planning
- Local Economy & Tourism

## 5.2 MAJOR CONSTRAINTS WITHIN THE STUDY AREA

### 5.2.1 Infrastructure Constraints

The following major infrastructure constraints are within the Study Area:

- Pollaphuca Reservoir
- Pollaphuca Dam is classified as a Category A Dam and is a Strategic National Infrastructure. This is a major constraint due to the engineering and environmental requirements of crossing such a reservoir. A new bridge structure for the N81 Preferred Route will be required to span Golden Falls Reservoir (to the West of Pollaphuca Dam) for all options including the Do-Minimum Option. The selection of a Preferred Route Corridor should reflect the significance of Strategic National Infrastructure located at Pollaphuca.
- All existing services present throughout the study area were mapped and recorded and present varying levels of constraint to the development of a route corridor.

### 5.2.2 Ecological Constraints

A summary of the key ecological constraints identified one cSAC, which is also designated as a pNHA, one SPA which is also designated as a pNHA and three pNHA's. The designated conservation areas within the study area are shown in Table 5.2.2:

Site Name	NPWS Code	Status	Features of conservation interest/description
Red Bog, Kildare	00397	cSAC, pNHA	Wetland complex of lake, fen and bog. Selected for the Annex 1 habitat transition mire
Pollaphuca Reservoir	004063/000731	SPA, pNHA	Of international importance for its greylag goose population
Slade of Saggart and Crooksling Glen	00211	pNHA	Wooded river valley and wetland system. Rare plant and invertebrate species
Newtown Marshes	001759	pNHA	Freshwater marsh and ponds within area of calcareous eskers
Lugmore Glen	00001212	pNHA	Woodland glen with good representation of woodland plants. Rare plant recorded

**Table 5.2.2 – Designated Conservation Areas within the N81 Study Area.**

## 5.3 SUMMARY OF CONSTRAINTS TO BE CONSIDERED

The purpose of the Constraints Study was to identify record and map any constraints within the study area which may influence the selection of the Preferred Route Corridor for the upgrade of the proposed N81 Hollywood Cross to Tallaght Road Improvement Scheme. Kildare National Roads Design Office liaised with statutory and non-statutory bodies and appointed a number of specialist sub-consultants to identify constraints in specialist areas.

The constraints within the study area are many and complex, and present significant obstacles to the selection of a preferred route corridor. The main constraints identified are as follows:

- areas of ecological sensitivity – see Table 5.2.2
- graveyard and early Christian site at Bishopsland,
- construction of a reservoir crossing in the vicinity of Pollaphuca Dam (a prerequisite of every route option),
- the minimal impact on Russborough Demesne,
- construction in quarried lands in the vicinity of Blessington,
- the impact on viability of a number of golf clubs,
- impact upon Slade Valley and the urban area of Tallaght.

From both the Environmental and Engineering consideration, the Preferred Route Corridor Option should be sensitive to the scenic beauty of the landscape, its natural recreational amenities and tourism.

## 6 DEVELOPMENT OF FEASIBLE ROUTE CORRIDOR OPTIONS

### 6.1 INTRODUCTION

Within the *Pre-Stage 1 Options Assessment Technical Report* as prepared by the KNRDO a number of potential route corridor options are developed in accordance with the NRA DMRB having regard to the constraints identified and the requirement to provide a Level of Service “D”, **Figure 6.0 - 6.4 refers**. The report provides an assessment of each potential route corridor and recommends feasible route corridor options to be brought to “*Stage 1 - Preliminary Options Assessment*” in accordance with the NRA PMG 2010.

Each route corridor was assessed by listing the constraints which may influence the selection of a route corridor, including Archaeology, Architectural Heritage, Cultural Heritage, Ecology, Geology, Hydrogeology, Hydrology and Planning, and by identifying potential impact on the constraints.

### 6.2 ROUTE OPTIONS DEVELOPED

A series of 30 Node points are identified, which allow for the creation of different route alignments, with some alignment options extending between two nodes and other alignments extending for a greater number.

The route options identified include:

South – N81 south of the R758, Valleymount Junction to Knockroe (Hollywood)

- 13 route options identified

North - N81 north of the R758 Valleymount Junction to Tallaght By-pass.

- 26 route options identified

### 6.3 ROUTE OPTIONS TO PROGRESS TO STAGE 1

Section 4 of the *Pre-Stage 1 Options Assessment Technical Report* provides a summary of the assessment for each route option and details the reasons for excluding a route option from the Stage 1 Route Selection Process. Reasons for eliminating route options include combinations of the following:

#### **South Section**

- Alignment constrained and any junction provision would have a major impact on Hollywood Village
- Poor geometric parameters due to compaction of horizontal curves
- Limited overtaking opportunities
- Width of the lake at specific location at Golden Falls requires the construction of an unfeasible 200m bridge span
- Unacceptable adverse visual impact on landscape and proximity to water-sports recreation facility.
- Route options does not facilitate traffic desire movements

### North Section

- Route option impacts on Greylag Goose feeding area
- Proximity to Brittas does not accommodate the development of junctions to acceptable standards
- Large quantity of cut material from hill at Moanbream.
- Severe visual intrusion of Preserved Views
- Proximity to sensitive receptor
- Impact on golf clubs
- Impact on scenic route and proximity to Red Bog SAC, pNHA.
- Impact on Slade of Saggart & Crooklings Glen pNHA and extreme aquifer vulnerability in the area.
- Effect of farming
- Significant ribbon development and difficulties in providing side road diversions and structures
- Excessive length of bridge spans at Poulaphoca reservoir and river Liffey
- Effect of Greylag Goose feeding grounds
- Vertical alignment compromised

Route Alignment Options have been identified within the Pre-Stage 1 Assessment Technical Report as feasible options to be developed further as part of the comparison assessment for Stage 1 Route Corridor options.

The developed Stage 1 Route Corridor Options, as shown in **Figures 6.5 to 6.9** inclusive were brought to ***Public Consultation in April 2010.***

## 7 STAGE 1 - PRELIMINARY OPTIONS ASSESSMENT

### 7.1 INTRODUCTION

Following the identification and the assessment of potential route options and the selection of feasible route options a **Public Consultation was held in April 2010** during which Stage 1 Feasible Route Corridors were displayed, as shown in **Figures 6.10 to 6.14** inclusive. Members of the public and interested parties were invited to complete a questionnaire and to make submissions with regard to the route corridors displayed. The “Public Consultation Summary Report” from the Public Consultation provides detail of the consultation process and provides an analysis of the submissions received.

Having considered the constraints, the submissions received and following further development of the route alignments and junction layouts the feasible route options were modified. A systematic assessment of the Stage 1 modified route options was carried out to determine the route options to progress to Stage 2.

### 7.2 CONSIDERATION OF ROUTE ALIGNMENTS FOR ASSESSMENT

#### 7.2.1 Alignments Automatically Progressed to Stage 2

To determine the Route Options to progress to detailed comparative assessment as part of Stage 2, consideration was given to ensuring that each section of the scheme from Hollywood to Tallaght would have an alternative alignment to be assessed under Stage 2. Alignment options within sections of the Scheme to automatically progress to detailed Stage 2 comparative assessment are:

#### Alternative Alignments Automatically Progressed to Stage 2 (Figures 6.10 to 6.14)

- South of Ballymore Eustace and two crossing points of Golden Falls  
Node 2 to Node 4  
Node 3 to Node 4
- West of Russborough House and East of Russborough House  
Node 4 to Node 6/7  
Node 3 to Node 6
- Blessington (to provide two alternative Bypass locations)  
Route through Node 6  
Route through Node 7
- Hempstown, west and east of the N81  
Route through Node 8  
Route through Node 9
- Brittas,  
Node 10 to Node 12 minimise impact on west side of South County Golf Club  
Node 11 to Node 12 to avoid South County Golf Club
- Slade Valley and Mountseskin  
Nodes 10-13-14  
Nodes 11-12-13-14

### 7.2.2 Alternative Alignments for Stage 1 Assessment

Having determined route alignments to automatically progress to “Stage 2 Detailed Comparative Assessment”, a comparative assessment was carried out on the following “Options” to reduce the route alternatives to a number feasible for traffic modelling and detailed assessment under Stage 2 of the Route Selection Process. The following Options were progressed for Stage 1 Assessment:

#### Options Assessed as Part of Stage 1 Comparative Assessment

- Section 1: Knockroe (Hollywood) to Bishopslane  
Node 1 to Node 3
  - Option A or Option B or Option C (Figure 6.11)
- Section 2: R410 (Blessington, Naas Road) to Hempstown/Goldenhill  
Node 6 to Node 8
  - Option D or Option E or Option F (Figure 6.12 & Figure 6.13)
- Section 3: Hempstown/Goldenhill to Brittas East  
Node 8 to Node 10
  - Option G or Option H (Figure 6.13)
- Section 4: Hempstown/Goldenhill to Brittas East/Aghfarrell  
Node 8 to Node 11
  - Option I or Option J

## 7.3 COMPARATIVE ASSESSMENT ROUTE SUB-OPTIONS

The **Stage 1 Preliminary Modified Options Assessment Report** provides an outline of the process by which KNRDO carried out a systematic assessment of the Stage 1 Feasible Route Options, Sections 1, 2, 3 & 4, to identify those route options which are to be progressed to Stage 2 of the Route Selection process. The Framework matrix for the assessment of the route options is comprised of the three criteria: **Engineering** parameters, **Environmental** parameters and **Economic** parameters. The route sub-options were assessed on a relative advantage scale which outlined those route sub-options with a particular positive attribute as being ‘High Preference’ relative to another route sub-option which had a less positive attribute on one of the three criteria in which case it was categorised as ‘Medium Preference’ or ‘Low Preference’. The combined matrix for all the three criteria was produced to determine the overall relative advantage of the route sub-options in order to determine those route sub-options which were to be progressed to Stage 2 along with Do Minimum Route Option over the Southern Section which shall automatically be progressed to Stage 2.

Following the analysis of submissions received as part of the Public Consultation process into the **Emerging Preferred Route** display, and based on professional judgement certain parameters were provided priority at locations throughout the Project to reflect the sensitivity of the receptors. The **Stage 1 Preliminary Options Assessment Addendum Report** provides a detailed outline of the sensitive receptors and the need to prioritise parameters. The following parameters were given priority:

Section	Sub-options	Sensitive Receptor	Priority Parameter
Section 1	A, B & C	Hollywood Village	Socio Economics Landscape & Visual Architectural Archaeological
Section 2	D, E & F	Blessington West	Quarrying
Section 3	G & H	Tinode House  SDGC, Dublin Mountain GC	Noise & Vibration Architectural Golf Courses
Section 4	I & J	Tinode House	Noise & Vibration Architectural

In addition to inform the selection process consideration was given to the Road Safety Review carried out by the Donegal Regional Design Office, May 2007 and included within the Stage 1 Preliminary Route Options Assessment Report

### 7.3.1 ENGINEERING – Comparative Assessment of Sub-Options

The comparison of Sub-Options was carried out under the engineering parameters of compliance with the Design Manual of Roads and Bridges, Junction Strategy under the four sub-parameters of Integration of Scheme into the Road Network, Proximity to Development Nodes, Traffic Management/ Ease of Construction and Phasing of Road Construction, Structures under the three sub-parameters of numbers of watercourse culverts, road bridges and river bridges, Drainage System requirements, and Services and Utility requirements.

The Overall Preference Ratings derived from the Engineering Assessment are included in the **Stage 1 Combined Matrix Assessment, Table 7.4.2**

### 7.3.1.1 Engineering Assessment of Section 1: Sub-Options A, B, C (Figure 6.1)

Table 7.3.1.1 (below) provides a summary of the impact assessment rating for each Sub-option together with the Overall Preference Rating:

Parameter	Sub-Option A	Sub-Option B	Sub-Option C
1.DMRB Compliance	High	High	High
2.(i)Integration of Scheme into the Road Network	Medium	High	High
2. (ii)Proximity to Development Nodes	High	Medium	Low
2 (iii)Traffic Manag./ Ease of Construction	Low	Medium	High
2 (iv) Phasing of Road Construction	Low	Low	Low
3. (i) Watercourse Culverts	Low	Low	Low
3 (ii)Roadbridges	Medium	Medium	High
3 (iii) River Bridges	Low	Low	Low
4. Drainage Systems	Low	Low	Low
5. Services & Utilities	Low	Medium	Medium
<b>Overall Preference Rating</b>	Medium Preference	High Preference	Medium Preference

**Table 7.3.1.1. Summary of Engineering Preference Ratings for Sub-Options A, B, & C.**

The overall preference rating for Sub-Option B is assessed to be High Preference compared to Sub-Option A and C which both score Medium Preference. Sub-Option B and C are practically the same in assessment across the five parameters with Sub-Option B having a better preference rating due to closer proximity to the Development Nodes, in spite of Sub-Option C scoring a higher rating due to the lack of requirement for any Road Bridge under Sub-Option C. Sub-Option C rates poorer in the Junction Strategy and Services by comparison with the other Sub-Options but has the same overall preference rating of Medium Preference as Sub-Option C.

### 7.3.1.2 Engineering Assessment of Section 2: Sub-Options D, E & F

Table 7.3.1.2 (below) provides a summary of the impact assessment rating for each Sub-option together with the Overall Preference Rating:

Parameter	Sub-Options D	Sub-Options E	Sub-Options F
1. DMRB Compliance	High	High	High
2. (i) Integration of Scheme into the Road Network	High	High	High
2. (ii) Proximity to Development Nodes	High	Medium	Low
2 (iii) Traffic Manag./ Ease of Construction	Medium	Medium	Low
2 (iv) Phasing of Road Construction	High	High	High
3. (i) Watercourse Culverts	Low	Medium	High
3 (ii) Roadbridges	Medium	Medium	Low
3 (iii) River Bridges	High	High	High
4. Drainage Systems	Low	Low	Low
5. Services & Utilities	Medium	Medium	Medium
Overall Preference Rating	High Preference	High Preference	High Preference

**Table 7.3.1.2: Summary of Preference Ratings for Sub-Options D, E, & F.**

It is considered that the overall assessment preference rating for Sub-Options D, E and F is High Preference. All three sub-options are similar across a number of the parameters including DMRB compliance, Drainage and Services with only a small difference in assessment rating under the Structure Parameter.

### 7.3.1.3 Engineering Assessment of Section 3: Sub-Options G and H

Table 7.3.1.3 (below) provides a summary of the impact assessment rating for each Sub-option together with the Overall Preference Rating:

Parameter	Sub-Option G	Sub-Option H
1. DMRB Compliance	High	High
2. (i) Integration of Scheme into the Road Network	High	High
2. (ii) Proximity to Development Nodes	Medium	Medium
2 (iii) Traffic Manag./ Ease of Construction	Medium	High
2 (iv) Phasing of Road Construction	High	Medium
3. (i) Watercourse	Low	Medium
3 (ii) Roadbridges	Medium	Medium
3 (iii) River Bridges	High	Low
4. Drainage Systems	Low	Low
5. Services & Utilities	Medium	High
Overall Preference Rating	High Preference	High Preference

**Table 7.3.1.3: Summary of Preferences for Sub-Options G & H.**

Overall while significant difference in terms of assessment rating exist for Sub-Options G & H linked to the crossing of rivers and the existing road infrastructure with the implications this has for phasing, traffic management and impact on services, the overall assessment is a High Preference for both Sub-Options.

### 7.3.1.4 Engineering Assessment of Section 4: Sub-Options I and J

Table 7.3.1.4 (below) provides a summary of the impact assessment rating for each Sub-option together with the Overall Preference Rating:

<b>Parameter</b>	<b>Sub-Option I</b>	<b>Sub-Option J</b>
1. DMRB Compliance	High	High
2. (i) Integration of Scheme into the Road Network	High	High
2. (ii) Proximity to Development Nodes	Medium	Medium
2 (iii) Traffic Manag./ Ease of Construction	High	High
2 (iv) Phasing of Road Construction	Low	Low
3. (i) Watercourse	Low	Low
3 (ii) Roadbridges	Medium	Medium
3 (iii) River Bridges	Medium	Medium
4. Drainage Systems	Low	Low
5. Services & Utilities	High	High
Overall Preference Rating	High Preference	High Preference

**Table 7.3.1.4: Summary of Preferences for Sub-Options I & J.**

Overall both Sub-options I & J are rated as High Preference due to the fact that there is no significant difference between them in terms of the Engineering parameters given that they are parallel routes, away from the existing N81 National Route and Brittas Village.

On both Sub-Options similar features across a broadly parallel corridor which is not in close proximity to the existing N81 National Route or Brittas Village results in an overall High Preference for both Sub-Options.

## 7.3.2 ENVIRONMENT – Comparative Assessment of Sub-Options

### 7.3.2.1 Environmental Assessment – Halcrow Barry, Consultants

Halcrow Barry Consulting Engineers were appointed by Kildare Co. Council to provide the environmental comparative assessment for the Route Selection Process. Comparative assessment Preference Ratings were provided for the following nine separate environmental impact assessment areas:

- Agriculture
- Air
- Noise & Vibration – *(Priority Parameter for Section 3 & Section 4)*
- Landscape and visual – *(Priority Parameter for Section 1)*

- Flora, Fauna and Fisheries
- Architectural Heritage – *(Priority Parameter for Section 1, Section 3 & Section 4)*
- Socio-economics – *(Priority Parameter for Section 1)*
- Soils and Geology
- \*Hydrology and Hydrogeology

Impact assessment on each environmental parameter was undertaken by specialist consultants under the management of Halcrow Barry. Each impact assessment was based on desk top studies and field surveys. Preference Ratings provided by each specialist consultant for each parameter studied are included within the **Stage 1 Environmental Matrix Assessment, Table 7.4.1** with Preference Ratings for Priority Parameters included within the **Stage 1 Combined Matrix Assessment, Table 7.4.2** as discussed previously.

#### **7.3.2.2 Environmental Assessment - Archaeology, *(Priority Parameter for Section 1)***

The National Roads Authority, Project Archaeologist assessed the impact on the archaeology for the various Route Options.

In addition to known and recorded archaeology consideration was also given to the potential impact on de-listed sites to determine route preference.

Preference Ratings provided by the Project Archaeologist are included within the overall **Stage 1 Environmental Matrix Assessment, Table 7.4.1**, and also included within the **Stage 1 Combined Matrix Assessment, Table 7.4.2**, as a Priority Parameter for assessment of Section 1.

#### **7.3.2.3 Environmental Assessment - Quarrying, *(Priority Parameter for Section 2)***

TOBIN Consulting Engineers were engaged by Kildare County Council as the Quarry Consultant to determine the assessment of impacts on Quarrying Operations for the various Route Options.

Preference Ratings provided by TOBIN are included within the overall **Stage 1 Environmental Matrix Assessment, Table 7.4.1**, and also included within the **Stage 1 Combined Matrix Assessment, Table 7.4.2**, as a Priority Parameter for assessment of Section 2.

#### **7.3.2.4 Environmental Assessment - Golf Amenities, *(Priority Parameter for Section 3)***

(re)GOLF Design was engaged by Kildare County Council as the specialist consultant to determine the assessment of impacts on golf amenities as a result of the various route options.

Preference Ratings provided by (re)Golf Design are included within the overall **Stage 1 Environmental Matrix Assessment, Table 7.4.1**, and also included within the **Stage 1 Combined Matrix Assessment, Table 7.4.2**, as a Priority Parameter for assessment of Section 3.

### 7.3.3 ECONOMIC – Comparative Assessment of Sub-Options

For each Route Sub-option an estimate of the Main Contract Costs and Non Construction Costs was arrived at, together with the cost per km of each Sub-option. A Preference Rating for each Sub-option was derived based on the comparison of costs estimates.

The following Table 7.3.3, provides the Operation Cost Estimates (OCE) for each Sub-option together with the Preference Rating:

Sub-option	Length km	Operation Cost Estimate €M	Cost per km €M	Preference Rating
A	5.66	26.535	4.688	High Preference
B	5.69	26.713	4.695	High Preference
C	5.52	31.110	5.635	Medium Preference
D	6.60	42.431	6.429	Medium Preference
E	5.95	38.682	6.501	Medium Preference
F	5.80	41.096	7.086	Low Preference
G	4.55	34.250	7.528	Medium Preference
H	4.25	32.794	7.716	Medium Preference
I	5.60	51.215	9.145	Medium Preference
J	5.40	48.015	8.892	Medium Preference

Table 7.3.3: Operation Cost Estimate for Stage 1 Sub-options

## 7.4 ROUTE SUB-OPTIONS TO PROGRESS TO STAGE 2 APPRAISAL

The following Tables provide the Comparison Assessment Framework Matrix for:

- **Table 7.4.1: Stage 1 Environmental Assessment Matrix**

The overall assessment of Sub-option Preference Rating based on professional judgement excluding the environmental priority parameters brought forward to the Combined Assessment Matrix.

- **Table 7.4.2: Stage 1 Combined Assessment Matrix**

Sub-Option Overall Preference Rating based on professional judgement and includes for the environmental priority parameters, the overall environmental rating and the rating for engineering and economics.

### 7.4.1 Recommendation

Having considered the submissions received from the public and all parties in response to the Public Consultation Process and having consulted with the three Planning Authorities and Statutory Undertakers, and having completed a Comparative Assessment of Route Sub-options it was determined that the following Route Sub-Options should progress to Stage 2 of the Route Selection Process:

- Section 1: Route Sub-option A
- Section 2: Route Sub-option E
- Section 3: Route Sub-option H
- Section 4: Route Sub-option J

Stage 2 Route Options between Node Points to be subject to Comparative Assessment in accordance with the NRA Project Management Guidelines are as shown in **Figures 10.0 to 10.4 inclusive**

Route combinations including the Do Minimum Route Option from Hollywood to Blessington provide for a total of 30 Route Options to be assessed in Stage 2 under the various parameters to determine the Preferred Route Corridor Option.

TABLE 7.4.1

**STAGE 1 ENVIRONMENTAL MATRIX ASSESSMENT**

Route Options	Socio Economic	Flora, Fauna & Fisheries	Hydrology & Hydrogeology	Soils & Geology	Air Quality	Noise & Vibration	Landscape & Visual	Agriculture	Architectural Heritage	Impacts on Quarries	Impact on Golf Courses	Archaeological Impacts	Overall Rating
Route Options between Points 1 & 3													
A	Priority Parameter	Medium	Medium	Medium	Low	Medium	Priority Parameter	Low	Priority Parameter	High	High	Priority Parameter	Medium
B		High	High	High	High	High		Low		High	High		High
C		Low	High	High	High	High		Medium		High	High		High
Route Options between Points 8 & 10													
D	Low	Low	Medium	Medium	High	High	Low	Medium	Medium	Priority Parameter	High	High	High
E	High	Medium	Medium	Medium	Medium	Low	Low	High	Medium		High	High	High
F	Medium	High	High	High	Medium	Low	Medium	Medium	Low		High	High	High
Route Options between Points 8 & 11													
G	Medium	Low	High	Medium	Medium	Priority Parameter	Low	Low	Priority Parameter	High	Priority Parameter	High	Medium
H	Low	Medium	Medium	Medium	High		Medium	Medium		High		High	High
Route Options between Points 8 & 11													
I	Low	Medium	Medium	Medium	Medium	Priority Parameter	Low	Low	Priority Parameter	High	High	High	Medium
J	Medium	Low	Medium	Medium	High		Medium	Medium		High	High	High	High

NOTE 1: Route Options A, B & C - Priority Parameters "Socio Economic", "Landscape & Visual", "Architectural" and "Archaeological"

NOTE 2: Route Options D,E & F - Priority Parameter "Quarrying"

NOTE 3: Route Options G & H - Priority Parameters "Noise & Vibration", "Architectural" & "Golf Courses "

NOTE 4: Route Options I & J - Priority Parameters "Noise & Vibration" & "Architectural" Re Tenode House

TABLE 7.4.2

**STAGE 1 COMBINED MATRIX ASSESSMENT**

Route Options	*Overall Environmental Assessment	Socio Economic Assessment	Noise & Vibration Assessment	Landscape & Visual Assessment	Architectural Heritage Assessment	Archaeological Assessment	Impact on Quarries	Impact on Golf Courses	Engineering Assessment	Economic Assessment	Overall Rating	
<b>Route Options between Points 1 &amp; 3</b>												
A	Medium	Medium	Included within Overall Environmental Assessment Ranking	Medium	Medium	Medium	Included within Overall Environmental Assessment Ranking	Included within Overall Environmental Assessment Ranking	Medium	High	High	
B	High	Low		Low	Low	Low			High	High	High	Medium
C	High	Low		Low	Low	High			Medium	Medium	Medium	
<b>Route Options between Points 6 &amp; 8</b>												
D	High	Included within Overall Environmental Assessment Ranking	Low	High	Medium	Medium						
E	High								Medium	High	Medium	High
F	High								Medium	High	Low	Medium
<b>Route Options between Points 8 &amp; 10</b>												
G	Medium	Included within Overall Environmental Assessment Ranking	Low	Included within Overall Environmental Assessment Ranking	Low	Included within Overall Environmental Assessment Ranking	Included within Overall Environmental Assessment Ranking	Included within Overall Environmental Assessment Ranking	Medium	High	Medium	Medium
H	High		Medium		High				Low	High	Medium	High
<b>Route Options between Points 8 &amp; 11</b>												
I	Medium	Included within Overall Environmental Assessment Ranking	Low	Included within Overall Environmental Assessment Ranking	Low	Included within Overall Environmental Assessment Ranking	High	Medium	Medium			
J	High		High		High					High	High	Medium

NOTE 1: Route Options A, B & C - Priority Parameters "Socio Economic", "Landscape & Visual", "Architectural" and "Archaeological"

NOTE 2: Route Options D,E & F - Priority Parameter "Quarrying"

NOTE 3: Route Options G & H - Priority Parameter "Noise & Vibration", "Architectural" & "Golf Courses"

NOTE 4: Route Options I & J -Priority Parameters "Noise & Vibration" & Architectural"

\* Overall Environmental Assessment excluding Priority Parameters at Specific Sections

## 8 STAGE 2 PROJECT APPRAISAL

### 8.1 INTRODUCTION

The Route Selection Process as described in Section 1.2 included for the comparative assessment of Stage 1 Route Options, the comparative assessment of Stage 2 Route Options and included for Public Consultation Sessions to determine the Preferred Route Option.

The Public Consultation Process included for the following public sessions:

- April 2010, Display of **Stage 1 Route Corridors**
- July 2011, Display of **Stage 2 Route Corridor Options**
- October 2011 Display of **Emerging Preferred Route Option**
- February 2012, Display of **Preferred Route Option**

To determine the Emerging Preferred Route Option that was displayed in October 2011, a comparison appraisal was carried out based on all the available impact assessments. Within the **Stage 2: Emerging Preferred Option Report** consideration was given to the Preference Ratings provided by the Engineering, Environmental, Economic, Safety, Accessibility and Social Inclusion and Integration Assessments. The Preference Ratings were derived by each Specialist and are summarised within the report. The specialist assessments also formed the basis for the identification of the Preferred Route Option as displayed in February 2012 and as included within the **Stage 2 Preferred Route Option Report**.

To determine the Preferred Route Option that was displayed in February 2012 consideration was given to all submissions received from the consultation process, consideration was given to assessments carried out as part of the Emerging Preferred Route appraisal process and consideration was given to further studies which were undertaken. The following is a summary of the reviews undertaken and the further studies undertaken following the display of the Emerging Preferred Route.

#### Stage 1 Sub-options – review of assessments

- The assessments of Stage 1 Sub-options were reviewed following the analysis of submissions received as part of the Public Consultation process into the **Emerging Preferred Route** display, and based on professional judgement. Certain parameters were provided priority at locations throughout the Project to reflect the sensitivity of the receptors as described within Section 7.3. In addition:
  - Additional archaeological sites were assessed in Hollywood Demesne townland. These sites were incorporated in the original Sites and Monuments (SMR) record for Co Wicklow, but were de-listed in the subsequent Record of Monuments and Places (RMP). A field inspection and further investigation justified the necessity to include the sites within the archaeological appraisal of route options. This review of the assessment of Stage 1 Sub-options resulted in the recommendation of Sub-option A to progress to Stage 2 Project Appraisal – previously Sub-option B was preferred. No other changes were made to the Sub-option preferences.
  - A further alignment was developed to the west of the existing N81 at Hollywood Village. This alignment has severe impact on property and does

not facilitate the design of a junction to access Hollywood Village which would meet design standards. The option was not progressed further.

- The assessment of the Stage 1 Sub-options as included within Section 7, “Stage 1 – Preliminary Options Assessment” incorporates the review assessment of Sub-options following the Emerging Preferred Route Public Consultation. Section 7.3, “Comparative Assessment of Sub-options”. Section 7.4 provides the final Stage 1 Matrix Assessment and includes the recommendation of Route Options to progress to Stage 2 Project Appraisal.

#### Further Completed Assessment Studies

- In consultation with the NRA the costs estimate for each route option was reviewed using the rates as provided by the NRA together with rates within the **ARUP Geotechnical Report** produced for the proposed deep rock cutting at Mountseskin for route options passing through 10-12-13-14 and 11-12-13-14 and at Slade Valley route option passing through 10-13-14. Section 8.3.1.2 refers.
- Further to the ARUP Geotechnical Report and an assessment of slope stability the cross sections of the Mountseskin and Slade Valley deep rock cuttings were revised to provide a near vertical side slope resulting in reduced land take. This eliminated any impact on Kilsarin Quarry at Mountseskin which was reflected in the assessment of impacts on quarrying operations
- RPS consulting engineers completed the Traffic Modelling and carried out the Cost Benefit Analysis (CBA) to determine the Benefit Cost Ratio (BCR) for each Route Option. Section 8.3.1 refers
- From the data provided by the Local Traffic Model, Halcrow Barry completed a comprehensive Noise and Air Quality assessment of route options.
- From the data provided by the Local Traffic Model ROADPLAN completed the Road Safety Audit, Stage F, Part 1.
- Meetings were held between the Design team and the Planning Authorities to inform the Preference Ratings for route options based for the Accessibility and Integration parameters.
- Following review of the assessment of impacts on the ecology the route south of the N81 at Hempstown was re-aligned to avoid a direct impact on a potential Annex 1 habitat site.

The Stage 2 Preferred Route Appraisal includes for an appraisal of route options using the five Common Appraisal Criteria of Economy, Safety, Environment, Accessibility & Social Inclusion and Integration.

The findings of the Stage 2 Project Appraisal process is summarised in a **Stage 2 Project Appraisal Matrix** in accordance with the NRA Project Management Guidelines.

## 8.2 COMMON APPRAISAL CRITERIA – IDENTIFICATION OF ROUTE OPTIONS

The Stage 2 Project Appraisal Matrix for the assessment of the route options to determine the Preferred Route Corridor is comprised of:

- **Environmental Appraisal** criteria to include:
  - geotechnical and soils,
  - hydrology and hydrogeology,
  - air,
  - noise,
  - landscape & visual,
  - socio-economics,
  - agronomy,
  - ecology
  - architectural heritage,
  - archaeology,
  - golf amenities
  - quarry operations.
  
- **Safety Appraisal** criteria:
  - Road Safety Audit, Stage F, Part 1
  
- **Economic Appraisal** criteria
  - Cost Benefit Analysis based on Benefit Cost Ratio (BCR) and derived from the Traffic Model. Data from the Traffic Model includes projected traffic flows (Average Annual Daily Traffic, AADT) and accident data which in addition to providing input for the calculation of the BCR, informed the Air Model, the Noise Model and the Road Safety Audit.
  
- **Accessibility – Social Inclusion** criteria:
  - An assessment of the impact of the proposed road options in terms of the benefits provided to lower income social areas and vulnerable social group through the facilitation of greater access to social infrastructure and socio-economic opportunities.
  
- **Integration** criteria
  - An assessment of the degree to which the proposed route options integrate with transport, land use and other government policies

### 8.2.1 Description of Stage 2 Route Options for Appraisal

In determining a Framework Matrix to provide a comparative assessment of Route Options, where possible, consideration was given to an appraisal of Sub-routes within common Sections of the Project from Hollywood to Tallaght. **Figure 11.0 to Figure 11.30** inclusive identifies each Sub-Route Option between Node Points. Appraisal of Route Options within the Appraisal Framework Matrix includes for the following Sections:

Southern Section (Hollywood to Blessington)	Central Section (Blessington to Brittas)	Northern Section (Brittas to Tallaght)
Nodes 1-2-4-6	Nodes 6-8-10	Nodes 10-13-14
Nodes 1-2-4-7	Nodes 6-8-11	Nodes 10-12-13-14
Nodes 1-3-4-6	Nodes 6-9-10	Nodes 11-12-13-14
Nodes 1-3-4-7	Nodes 6-9-11	
Nodes 1-3-5-6	Nodes 7-9-10	
Do-Minimum-5-6	Nodes 7-9-11	

The combination of Sub-Route Options from Hollywood to Tallaght provides for 30 complete Route Options to be subject to Project Appraisal.

From the submissions received as part of the **Public Consultations** and from the constraints identified as part of the Constraints Study and from desk studies and surveys undertaken by specialists, the significant features to consider within each Section include:

#### Southern Section (Hollywood to Blessington)

- Proximity to village, shop, businesses and severance of community at Hollywood
- Impact on land used for community parking and Village Fair
- Proximity and impact on rural housing
- Impact on local businesses, garden centre, Poulaphuca Hotel, Petrol station etc
- Crossing of Golden Falls in the vicinity to Poulaphuca Dam and heritage bridge
- Category A Dam with associated underground service mains, overhead electric power lines, communication facilities and 24 access requirements
- Sensitive ecological sites and water quality re water run-off to Blessington Lake.
- Impact on potential Annex 1 habitat in vicinity of Ballymore Eustace at Site 4
- Early Christian site and graveyard at Bishopsland
- Impact on Russborough House, attended grounds and bus access arrangements
- Impact on quarry sites at Russborough and local area – unknown landfill areas
- Crossing of Bord Gais 4 bar Med 180 mm dia main at Glenmore and Glebe East
- Impact on Poulaphouca Reservoir SPA, pNHA and ecological sites
- Accessibility to Valleymount and Blessington South
- Impact and visual intrusion on Kildare East Uplands
- Accessibility to Ballymore Eustace and areas of population
- Impact on equine activities
- Impact on pitch & putt facilities, recreation activities, GAA grounds
- Visual Intrusion and effect on Landscape

#### Central Section (Blessington to Brittas)

- Crossing of quarry activity sites with unknown landfill areas
- Impact on quarry activities.
- Impact on Glending Forest

- Impact on West Wicklow Water Supply and Glending Reservoir Site
- Impact on local housing estates within Blessington
- Visual intrusion at laneway at Old Paddocks
- Impact on cycling and walking along L6052 from Ballymore to Blessington
- Lake sediment and alluvial soft ground at the Lisheen River, Hempstown
- Existing flood regimes
- Impact on recreation facilities including soccer and GAA.
- Pedestrian activity and school access
- Red Bog cSAC, pNHA
- Greylag Goose feeding areas in area prone to flooding
- Ecological sensitive areas
- Crossing of National Road and proximity to Blessington
- Potential impact on water quality and impact on Lisheen River, Brittas River, Blessington Lake and watercourses re habitats and protected species, Brook Lamprey and White Crawfish – compliance with Inland Fisheries Board requirements

#### Northern Section (Brittas to Tallaght)

- Proximity to school and community facilities in Brittas, Tallaght and Jobstown
- Impact on Golf Clubs at Brittas and Jobstown/Tallaght
- Impact of sensitive ponds at Brittas
- Proximity to Crooklings Hospital
- Construction of junctions in close proximity to Brittas
- Impact on Slade of Saggart and Crooklings Glen, pNHA
- Construction of deep rock cutting through Mountseskin – disposal of significant volumes of surplus rock material
- Construction of rock cutting at side of Slade Valley
- Visual intrusion from embankments and deep rock cutting re Kilbride Village and hinterland
- Consideration of harsh climatic conditions at Mountseskin and area
- Crossing on National Road and tie in to Tallaght Bypass
- Crossing of Bord Gais 70 bar transmission main at Jobstown
- Proximity to old RIC Barracks heritage building at Slade Valley and listed buildings
- Pedestrian movements and access to property in Tallaght and Jobstown
- Access to potential SDCC development lands and zoned lands

### 8.3 APPRAISAL OF ROUTE OPTIONS – COMPARISON ASSESSMENT

The Stage 2 Framework Appraisal Matrix provides the summary of the Preference Rating as provided by each specialist consultant for each Route Option, and where possible each Sub-Route Option, for each Common Appraisal Criteria.

#### 8.3.1 Summary of Economy Appraisal

RPS consulting engineers completed the Traffic Modelling and carried out the Cost Benefit Analysis (CBA) to determine the Benefit Cost Ratio (BCR) for each Route Option.

##### 8.3.1.1 Traffic Model

A local traffic model of the N81 corridor was constructed, starting from a cordon from the NRA's National Traffic Model, and enhancing the network, zoning system and matrices based on roadside interviews, traffic counts and journey time surveys collected in 2010/2011. Figures 8.3.1.1.1 to 8.3.1.1.4 inclusive show the modelled base year AADT traffic flows at Year 2010.

Junction delays were modelled at key junctions and the model was calibrated to be a satisfactory fit to the traffic count data and journey time data.

Forecasting forward to a projected opening year of 2020 and design year of 2035 was carried out using the standard NRA methodology. Trip-end growth factors from NRA project appraisal guidance were applied for internal zones; traffic growth factors from national model screenlines were applied to external zones.

The model shows that traffic flows are highest at the Tallaght end of the study area, with the section near the Cheeverstown Road junction projected to carry around 19,000-25,000 vehicles per day (AADT) in the design year. At this level of flow, a dual carriageway standard is clearly indicated.

Between the Saggart Road junction and Blessington, flows vary along the length of the route and between different options. Design year traffic flows at the Hollywood end of the scheme are lower, being around 9000 - 12,500 AADT in the Do-Minimum case.

All 30 combinations of route options, from Hollywood to Tallaght, have been represented in the model. The impacts of the scheme will include attracting some small amounts of traffic from the parallel M9/M7 corridor.

The traffic results show that while some options clearly perform better than others in terms of the volumes of traffic they attract, many of the options tested have similar traffic impacts. The options that offer the highest levels of congestion relief are those where the new route ties in best with the regional roads act as feeder routes to the N81.

The modelling work was fully documented in the *Traffic Modelling Report* which was reviewed and approved by the NRA's Strategic Planning Unit.



Figure 8.3.1.1.1: Base Year AADT flows – Hollywood area



Figure 8.3.1.1.2: Base Year AADT flows – Blessington area



### 8.3.1.2 Options Comparison Estimate

An Option Comparison Estimate (OCE) has been prepared for each of the 30 Route Options as required in Phase 2, Route Selection of the NRA PMG January 2010.

Cost Estimates were calculated based on unit cost rates as stated in the NRA "Roadwork's Unit Rate Database", Version 5 – medium rate. The cost estimates used are based upon analysis of average construction costs for NRA Projects. The total scheme cost estimate includes an allowance for Inflation and NRA Programme Risk. Also, it should be noted that VAT and all non-main line construction costs are included in the OCE.

In addition to the rates as provided by the NRA the **ARUP Geotechnical Report** for the proposed deep rock cutting at Mountseskin for Sub-route options 10-12-13-14 and 11-12-13-14 and at Slade Valley for Sub-route option 10-13-14, was produced by ARUP consulting engineers and informed the estimate of the works costs.

Following liaison with the NRA Cost Estimation Unit the OCE for each route option was submitted for formal validation and approval by the NRA Cost Estimation Unit and the NRA Strategic Planning Unit respectively. The approved OCE is used as the basis of the economic evaluation of Route Options and is as shown in **Table 8.3.1.2**.

No.	ROUTE OPTIONS	OCE PER Route (€m)	Length (Km)
1	1-2-4-7*7-9-10*10-13-14	€278.2	31.1
2	1-2-4-7*7-9-10*10-12-13-14	€415.6	30.9
3	1-2-4-6*6-9-10*10-13-14	€251.6	30.4
4	1-2-4-6*6-9-10*10-12-13-14	€414.8	30.2
5	1-2-4-6*6-9-11*11-12-13-14	€427.4	30.9
6	1-2-4-6*6-8-10*10-13-14	€234.3	31.2
7	1-2-4-6*6-8-10*10-12-13-14	€393.6	30.5
8	1-2-4-7*7-9-11*11-12-13-14	€438.5	31.6
9	1-2-4-6*6-8-11*11-12-13-14	€398.2	31.3
10	1-3-4-7*7-9-10*10-13-14	€281.7	30.6
11	1-3-4-7*7-9-10*10-12-13-14	€419.1	30.4
12	1-3-4-6*6-9-10*10-13-14	€256.3	30.0
13	1-3-4-6*6-9-10*10-12-13-14	€419.5	29.8
14	1-3-4-6*6-9-11*11-12-13-14	€432.1	30.5
15	1-3-4-6*6-8-10*10-13-14	€239.0	30.8
16	1-3-4-6*6-8-10*10-12-13-14	€398.3	30.1
17	1-3-4-7*7-9-11*11-12-13-14	€442.0	31.1
18	1-3-4-6*6-8-11*11-12-13-14	€402.9	30.9
19	1-3-5-6*6-9-10*10-13-14	€260.9	30.5
20	1-3-5-6*6-9-10*10-12-13-14	€424.1	30.3
21	1-3-5-6*6-9-11*11-12-13-14	€436.7	31.0
22	1-3-5-6*6-8-10*10-13-14	€243.6	31.3
23	1-3-5-6*6-8-10*10-12-13-14	€402.9	30.6
24	1-3-5-6*6-8-11*11-12-13-14	€407.5	31.4
25	Do Minimum - 5-6*6-9-10*10-13-14	€257.1	30.4
26	Do Minimum - 5-6*6-9-10*10-12-13-14	€420.3	30.2
27	Do Minimum - 5-6*6-9-11*11-12-13-14	€432.9	30.9
28	Do Minimum - 5-6*6-8-10*10-13-14	€239.8	31.2
29	Do Minimum - 5-6*6-8-10*10-12-13-14	€399.1	30.5
30	Do Minimum - 5-6*6-8-11*11-12-13-14	€403.7	31.3
31	1-3-5-N81 (Blessington) *	€48.6	9.5
32	Do Minimum - N81 (Blessington) *	€48.5	10.5

**Table 8.3.1.2 Options Comparison Estimate** (\*part Improvement Hollywood to Blessington)

### 8.3.1.3 Calculation of Benefit-Cost Ratio (BCR)

The economic assessment was carried out by RPS consulting engineers based on the final Traffic Modelling Report.

The Cost-Benefit Analysis used the TUBA software, which calculates the economic value of the time savings estimated by the traffic model, and calculates vehicle operating cost savings corresponding to the changes in journey distances and speeds as estimated by the traffic model.

These benefits are compared with the costs of constructing the scheme, to give for each route option a Benefit-Cost Ratio (BCR), which is an indicator of the economic value of the proposed route.

A separate calculation was carried out to estimate the economic benefits from accident savings.

The economic appraisal work was fully documented in the **Cost Benefit Analysis Report** as produced by RPS and as reviewed and approved by the NRA's Strategic Planning Unit.

From the economic appraisal the Benefit-Cost Ratio (BCR) determined the Preference Rating for each Route Option for the Economic Criteria as included within the **Stage 2 Preferred Route Overall Appraisal Matrix, Table 8.4.2**

The following Preference Ratings were determined for each Route Option:  
(**Figure 11.0 to Figure 11.31** inclusive)

High Preference	Medium Preference	Low Preference
1-2-4-7-9-10-13-14	1-3-4-6-9-10-12-13-14	1-2-4-7-9-10-12-13-14
1-2-4-6-9-10-13-14	1-3-5-6-9-10-13-14	1-2-4-6-9-10-12-13-14
1-2-4-6-8-10-13-14	Do-minimum-5-6-8-10-13-14	1-2-4-6-9-11-12-13-14
1-3-4-7-9-10-13-14		1-2-4-6-8-10-12-13-14
1-3-4-6-9-10-13-14		1-2-4-7-9-11-12-13-14
1-3-4-6-8-10-13-14		1-2-4-6-8-11-12-13-14
1-3-5-6-8-10-13-14		1-3-4-7-9-10-12-13-14
		1-3-4-6-9-11-12-13-14
		1-3-4-6-8-10-12-13-14
		1-3-4-7-9-11-12-13-14
		1-3-4-6-8-11-12-13-14
		1-3-5-6-9-10-12-13-14
		1-3-5-6-9-11-12-13-14
		1-3-5-6-8-10-12-13-14
		1-3-5-6-8-11-12-13-14
		Do-minimum-5-6-9-10-13-14
		Do-minimum-5-6-9-10-12-13-14
		Do-minimum-5-6-9-11-12-13-14
		Do-minimum-5-6-8-10-12-13-14
		Do-minimum-5-6-8-11-12-13-14

**Table 8.3.1.3: Economy Criteria, Preference Ratings for Route Options**

From the economic appraisal it can be seen;

- All route options which pass through Node 4 (west/back of Russborough House) and which pass through Nodes 10-13-14 (Slade Valley) have been ranked as *High Preference*. In addition, the route option passing through Node 5 (east/front of Russborough House) and Node 8 and which passes through Nodes 10-13-14 (Slade Valley) has been assessed as *High Preference*.
- The route option passing through Node 5 and Node 9 and Nodes 10-13-14 (Slade Valley) has been assessed as *Medium Preference*, together with the route option Do-minimum-5-6-8-10-13-14. The route option passing through Nodes 4 and Node 9 and Nodes 10-12-13-14 (Mountseskin) has also been assessed as *Medium Preference*.
- With the exception of Route Option “1-3-4-6-9-10-12-13-14” all other route options which pass through Nodes 12-13-14 (Mountseskin) are assessed as *Low Preference*, reflecting the significant construction costs associated with the deep rock excavations.
- With the exception of Route Option “Do-minimum-5-6-8-10-13-14” all other route options which include the Do-minimum are assessed as *Low Preference* reflecting the significant reduction in accident savings with a Do-minimum route option.

### 8.3.2 Summary of Safety Appraisal

ROADPLAN were appointed by Kildare Co. Council to provide the **Road Safety Audit, Stage F, Part 1** (RSA) for the Route Selection Process. The availability of the projected traffic flows and accident data within the completed Traffic Model and CBA facilitated the completion of the Road Safety Audit (RSA).

The Safety Criteria appraisal of each Route Option is included within the RSA and Preference Ratings for each Route Option are provided. Preference Ratings for the Safety Criteria for each Route Option are included within the **Stage 2 Preferred Route Overall Appraisal Matrix, Table 8.4.2**

The following Preference Ratings were determined for each Route Option:  
(**Figure 11.0 to Figure 11.31** inclusive)

High Preference	Medium Preference	Low Preference
1-2-4-6-8-10-13-14	1-2-4-7-9-10-13-14	1-2-4-7-9-11-12-13-14
1-3-4-6-8-10-13-14	1-2-4-7-9-10-12-13-14	Do-minimum-5-6-9-10-13-14
1-3-5-6-9-10-13-14	1-2-4-6-9-10-13-14	Do-minimum-5-6-9-10-12-13-14
1-3-5-6-8-10-13-14	1-2-4-6-9-10-12-13-14	Do-minimum-5-6-9-11-12-13-14
	1-2-4-6-9-11-12-13-14	Do-minimum-5-6-8-10-13-14
	1-2-4-6-8-10-12-13-14	Do-minimum-5-6-8-10-12-13-14
	1-2-4-6-8-11-12-13-14	Do-minimum-5-6-8-11-12-13-14
	1-3-4-7-9-10-13-14	
	1-3-4-7-9-10-12-13-14	
	1-3-4-6-9-10-13-14	
	1-3-4-6-9-10-12-13-14	
	1-3-4-6-9-11-12-13-14	
	1-3-4-6-8-10-12-13-14	
	1-3-4-7-9-11-12-13-14	
	1-3-4-6-8-11-12-13-14	
	1-3-5-6-9-10-12-13-14	
	1-3-5-6-9-11-12-13-14	
	1-3-5-6-8-10-12-13-14	
	1-3-5-6-8-11-12-13-14	

**Table 8.3.2: Safety Criteria, Preference Ratings for Route Options**

From the safety appraisal it can be seen:

- All route options which include a Do-minimum section are ranked as *Low Preference*. They have the least accident savings and have a low value of savings. On-line options give rise to safety issues with the potential for serious accidents. In addition, the route option which includes Node 7, Node 4 and is to the west of Hempstown is also ranked as *Low Preference*. Node 6 is preferred over Node 7 and Node 8 is preferred over Node 9 as they provide better connectivity from the new road to ensure that traffic uses the new road and avoids the old road as much as possible.
- The RSA identifies Node 3 as the preferred option over Node 2. Of the four route options ranked as *High Preference* three use Node 3 together with Node 6 (Blessington) and Nodes 13,14 (Slade Valley). The one route identified as *High Preference* and uses Node 4 also uses Node 6 (at Blessington), Node 8 (east of Hempstown) and Nodes 13, 14 (Slade Valley)
- The RSA has identified safety concerns with regard to the route options through Node 5 (front of Russborough) which are existing accesses over the on-line section and the junction arrangement at the Vallemount Regional Road, R758. However, two of the routes ranked as *High Preference* use Node 5 and in addition the route options over this section can incorporate an improved junction layout at the R758.

The RSA has identified Node 5 (front of Russborough House) as the preferred route option over Node 4 should an improved junction layout at the R758 be provided.

### 8.3.3 Summary of Environment Appraisal

#### 8.3.3.1 Environmental Assessment - Halcrow Barry, Consulting Engineers

Following on from the impact assessment of Stage 1 Sub-options carried out by specialists under the management of Halcrow Barry (Section 7.3.2.1 refers), each specialist carried out an impact assessment for each of the Stage 2 Route Options. Where possible impacts were assessed over the three Scheme Sections as described within Section 8.2.1:

- Southern Section: Hollywood to R410 Blessington South
- Central Section: R410 Blessington South to R114 Brittas
- Northern Section: R114 Brittas to R136 Tallaght

The summary of the impact assessments and the preference ranking of routes as carried out by each specialist is included within the Halcrow Barry reports **Stage 2 – Environmental Appraisal of Route Options** and **Stage 2 – Environmental Assessment Review**.

Preference Ratings provided by each specialist consultant for each parameter studied are included within the **Stage 2 Preferred Route Selection - Environmental Appraisal Matrix, Table 8.4.1**

#### Soils & Geology

Over all Route Corridors it was derived that distinguishing features which determine the preference from a Soils & Geology perspective are the presence of peat or soft ground. Consideration was also given to areas of large cuttings which generate significant amount of material particularly where the material cannot be reused and is considered waste and is to be disposed of in a suitable manner. The following preferences were determined:

##### Southern Section:

No preference and all routes assessed as Medium Ranking.

##### Central Section:

All route options passing through Node 8 are assessed as Low Preference due to the presence of lake sediments and alluvium in the vicinity of Brittas River and the extent of soft ground/unsuitable material. All other routes are assessed as Medium Ranking.

##### Northern Section:

All route options passing through Node 12 are assessed as Low Preference, due to the significantly large volume of material for disposal which will be generated from the extensive deep cutting at Mountseskin. All other routes are assessed as Medium Ranking.

#### Hydrology & Hydrogeology

In determining the route preference from a hydrology perspective consideration was given to:

- the number of river and stream crossings and the proximity to Poulaphuca Reservoir with the risk of contamination of the drinking water. (the proximity of the existing N81 to the reservoir is acknowledged)

- the location of deep cuttings in the vicinity of sensitive ecological receptors and sites of interest with a risk of contamination
- proximity to areas prone to flooding with the risk of exacerbating flooding events by the runoff from the proposed road.

In determining the route preference from a hydrogeological perspective consideration was given to:

- classification of aquifers underlying each route option and preference for routes underlain by the highest proportion of least important aquifers.
- the vulnerability of underlying aquifers and the risk of contamination from road runoff.
- The proximity to public groundwater supplies (within 500 metres) and the risk of contamination. Proximity of deep cuttings to groundwater supplies resulting in a higher risk of having yields compromised.
- The proximity to groundwater related special ecological sites of interest and the risk of contamination. In particular, proximity of deep cuttings to sensitive receptors which can alter the flow regime resulting in severe impacts on the integrity of the site.

The following preferences were determined:

Southern Section:

All route options passing through Node 2 have been assessed as Low Preference as they will impact on the Ecological Site 4 which is a potential Annex 1 habitat and would be vulnerable to a change in drainage patterns. All other routes are assessed as High Preference

Central Section:

All route options passing through Node 8 and Node 11 are in the vicinity of two potential Annex 1 habitats, Ecological Sites 18 and 22. In addition, the source of the Hempstown GWS is on/near the alignments passing through Node 9. Route Options going through Nodes 8 & 11 are assessed as Low Preference with Route Options going through Nodes 9 & 11 assessed as Medium Preference. All other routes are assessed as High Preference.

Northern Section:

All route options passing through Slade Valley have been assessed as Low Preference given the requirement for a significant cutting running along the existing N81 which may impact on Crooksling Glen pNHA. Route options passing through the extensive deep cutting in Mountseskin are considered to be High Preference given that there are no known water extraction points in the vicinity.

## **Air**

In determining the route preference from an air perspective consideration was given to the NRA document “Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes” and in particular to:

- Identification of sensitive receptors within 50 metres of the edge of each route option.
- Estimates of traffic flows for the design year of 2035 as derived from the Traffic Model
- Potential change in air quality as determined by a calculation of the Index of Overall Change in Exposure to NO<sub>2</sub> and PM<sub>10</sub> resulting from each route option.

Unlike the assessment of other environmental parameters the Air Quality assessment considers the routes as a whole from Hollywood to Tallaght. The following whole route preferences were determined:

Whole Route:

All route options would have a highly positive impact on ambient air quality and would result in a potential improvement. However, Route Option 1-3-5-6-8-10-13-14 would have a marginally better potential improvement and has been assessed as High Preference. All other routes are assessed as Medium Preference

## **Noise**

In determining the route preference from a noise perspective consideration was given to the NRA document "Guidelines for the Treatment of Noise and Vibration in National Road Schemes, (2004)" and in particular to:

- Property counts within four bands either side of the centreline of each route option, i.e. 0 to 50m, 100 to 200m and 200 to 300m.
- Indicative Lden calculations for the four distance bands using traffic flows derived from the Traffic Model and vertical alignment profiles.
- Assessment of the likely requirement for noise mitigation for each route to achieve the NRA criteria.

Unlike the assessment of other environmental parameters the Noise assessment considers the routes as a whole from Hollywood to Tallaght. The following whole route preferences were determined:

Whole Route:

Route options which pass through Node 2 have been assessed as High Preference if the routes also pass through Node 9 and Node 12. In addition, route options which pass through Node 3 have been assessed as High Preference if the routes also pass through Node 4, Node 9 and Node 12.

All route Options which pass through Node 6, Node 8 and Slade Valley have been ranked as Low Preference. A Low Preference ranking has also been assigned to the route option 1-3-5-6 which passes through Node 9 and Slade Valley. All route options 1-3-5-6 which pass through Node 8 are assigned as Low Preference The lowest ranking route is Do-minimum-5-6-8-10-13-14 which is assigned a ranking of Low Preference.

## **Landscape**

Minimising impact on residential properties – that are clustered and dispersed within the landscape – is a key consideration. Off-line route options will give rise to instances of significant medium and longer-term visual impact for properties along the route corridor. Consideration was also given to the designation of landscape areas with the Council Development Plans and in particular the SDCC Plan 2010-2016, Objective H – "*To protect the outstanding natural character of the Dublin Mountain Area*" The following preferences were determined:

Southern Section:

All route options which pass through Node 4 are assessed as Low Preference especially where they pass through the demesne landscapes of Bishopsland and Russborough and

consequently impact on the setting and character, potentially removing mature tree belts and woodland. Routes passing through Node 4 will also impact on the character of an open and more remote landscape at Ballydalagh and Bishopsland Common. Route options 1-3-5-6 are assessed as Medium Preference with route options Do-minimum-5-6 assessed as High Preference.

Central Section:

Route options in close proximity to Tinode House are the least preferred. Route options passing through Node 8 and Node 10 are assessed as High Preference with route options passing through Node 9 and Node 11 assessed as Low Preference. All other route options are assessed as Medium Preference.

Northern Section:

Route options which diverge greatly from the existing N81 are considered the least preferable especially route options which impact upon Crooklings Woodland, Deerpark and Mountseskin. All route options passing through Slade Valley are ranked as High preference. With route options passing through Mountseskin ranked as Low Preference.

## Socio Economics

The following preferences were determined:

Southern Section:

Severance and proximity of routes to Hollywood Village, impacts on the ESP infrastructure at Poulaphuca and impacts on Russborough House were the key constraints within this section. Following the **Public Consultation into the Emerging Preferred Route held in October 2011** and the re-assessment of Sub-options it was determined that the On-Line route option at Hollywood to Node 3, brings the route away from the primary school in the village, the church, and the Hollywood Centre and has the effect on improving visibility at the Emo garage and shop at Hollywood Cross. All route options passing through Node 3 are assessed as the preferred options with route options 3-4-7 assessed as High Preference and 3-4-6 assessed as Medium Preference. All other route options including routes which pass through Node 2 and routes which pass through the Do-minimum are assessed as Low Preference.

Central Section:

As all route options over this section are off-line there will be a reduction in passing trade in Blessington and for businesses along the existing N81. Route Option 7-9 will have a direct impact on Blessington FC and the access to Frank Murphy Concrete at Edmondstown. All route options which pass through Node 9 are assessed as Low Preference. All route options which pass through Node 8 (6-8) are assessed as High Preference.

Northern Section:

As all route options over this section are off-line there will be a reduction in passing trade in Brittas and for businesses along the existing N81. In addition, all route options have a number of impacts on properties in Tallaght including Killinarden Community School. There are also direct physical impacts on three golf courses along the route as assessed elsewhere. Given the direct impact on St Brigid's Home, Crooksling and on the access to the Embankment Pub, and the proximity of St Martin's GAA all route options 10-13 (Slade Valley) are assessed as Low Preference. Route options which pass through Node 12 (Mountseskin and preferred with route options through Node 11 and Node 12 assessed as High Preference.

## **Agronomy**

In determining the route preference from an agronomy perspective consideration was given to an assessment of the agricultural impact and in particular consideration was given to land quality, land use, land severance and farmyard disturbance. The assessment of land use also considered local farms of particular note such as dairy or equine farms. The following preferences were determined:

### Southern Section:

All route options passing through Nodes 1-3-5-6 and Nodes 1-3-4-6 together with route options Do-minimum-5-6 are assessed as High Preference with the least impact on agriculture. All other route options are assessed as Medium Preference.

### Central Section

All route options passing through Node 11 are assessed as Low Preference with routes from Node 9 to Node 11 passing through two dairy, an equine and two horticulture farms. Route option Nodes 6-9-10 is also assessed as Low Preference. All other routes are assessed as Medium Preference.

### Northern Route:

All route options which pass through Node 10 and which pass through Node 12 are assessed as High Preference with the minimum amount of impact on agricultural land. The highest level of severance is on route option 10-13-14 with farmyard disturbance occurring on two land parcels. Route options passing through Node 10-13-14 and Nodes 11-12-13-14 are assessed as Medium Preference.

## **Ecology**

The potential impacts of the route options on ecological sites and fisheries waters were assessed on the basis of the ecological value of the site and the scale of the likely impact. A detailed faunal survey would be undertaken as part of the Stage 3 Assessment of the Preferred Route within this Route Selection Report. The following preferences were determined:

### Southern Route:

All route options which pass through Node 3 and pass through Node 4 (1-3-4-6, 1-3-4-7) are assessed as High Preference as they avoid significant impacts on Pollaphuca Reservoir pNHA and ecological sites of county and high ecological value. All other routes are assessed as Low preference, however, route options passing through Node 2 are the least preferred as they have potentially significant impacts on sensitive Annex 1 habitats. Route option Do-minimum-3-5 is also least preferred as it impacts directly on the Pollaphuca SPA and pNHA.

### Central Section:

All route options which pass through Node 8 and/or Node 11 have the potential to impact on Site 18 and/or Site 22 which contain habitats with possible links to Annex 1 habitat types and are assessed as Low Preference. (Note: should the Preferred Route pass through Node 8 and/or Node 11 then a detailed faunal survey would be undertaken as part of the Stage 3 Route Selection process and the route alignment modified within the route corridor where possible). Route options passing through Nodes 6-9-10 are assessed as Medium Preference with route options passing through Nodes 7-9-10 assessed as High Preference.

## Architectural Heritage

### Southern Section:

It is considered that route option Do-minimum-5-6 is the preferred option and is assessed as High Preference. All other routes have been assessed as Low Preference given their impact on the Russborough Demesne (a protected structure and national monument) and the estate of Bishopsland House (a protected structure). It is acknowledged however, that the Do-minimum route option will require a new bridge over the River Liffey at Poulaphuca with an indirect impact on the setting of the two protected bridges on the N81 at this location.

### Central Section:

Preference is given to the avoidance of impacts on Tinode House (RPS ref: 01-04) and the associated demesne lands and gate house (NIAH ref:16400102). All route options passing through Node 9 are assessed as Low Preference and all route options passing through Node 8 are assessed as High Preference.

### Northern Section:

Preference is given to the avoidance of impacts on a vernacular farm complex in Raheen (NIAH ref: 11224002). All route options passing through Nodes 10-13-14 (Slade valley) are assessed as Medium Preference and all route options passing through Node 8 are assessed as High Preference.

## Summary of Comparative Environmental Appraisal –Halcrow Barry Assessment

Many of the assessment parameters have directly contrasting preferences. Overall the differences between the environmental preferences, as assessed by Halcrow Barry, roughly balance. Within the Southern Section and considering impacts on Hollywood Village, Russborough House, the ESB infrastructure, Ecological Site 4 and Poulaphuca Reservoir the overall preference is for route option Do-mimumun-5-6. Within the Northern Section there is an overall preference for route option 10-13-14 (Slade Valley) to avoid the significant deep excavations at Mountseskin. There is no overall preference for the Central Section, however, route options passing through Node 7 and Node 9 impact upon Tinode House, Blessington FC and the public group water supply at Hempstown, with routes passing through Node 6 and Node 8 in proximity to Site 18 and 22 identifies as having the potential to contain Annex 1 habitat.

The preference ratings for each route option, for each environmental parameter, are included within the **Stage 2 Preferred Route Environmental Appraisal Matrix, Table 8.4.1** to determine the Overall Environmental Route Preference Rating.

### 8.3.3.2 Environmental Assessment - Archaeology

The archaeological implications of the various Route Options were assessed by the NRA, Project Archaeologist. The Preference Ratings provided by the Project Archaeologist for each Route Option are included within the **Stage 2 Preferred Route Environmental Appraisal Matrix, Table 8.4.1** to determine the Overall Environmental Preference Rating.

The project appraisal from an archaeological perspective consideration included:

- a Desk Study with the examination of all relevant and applicable sources. Lists of areas of archaeological potential were compiled. Sources examined included:
  - Record of Monuments and Places (RMP)

- Sites and Monuments Records (SMR)
  - National Monuments in State Ownership or Guardianship
  - Preservation Orders List
  - Register of Historic Monuments
  - Topographical Files of the National Museum of Ireland
  - South County Dublin Development Plan (2004-2010 and 2010-2014)
  - Wicklow County Development Plan (2004-2010 and 2010-2016)
  - Kildare County Council Development Plan (2005-2011 and 2011-2017)
  - Published County Archaeological Inventories
  - Cartographic Sources
  - Excavation Bulletins
  - Documentary Sources
- A Windshield Survey of the Study Area including a site visit of recorded archaeological sites within 250m of the proposed route options carried out in July/August 2010 and October 2011 during which sites were photographed and their current position noted.

The following preferences were determined:

#### Southern Section:

All route options passing through Node 4 have been assessed as Low Preference given their direct impact on two recorded archaeological sites – a graveyard site and a rectangular enclosure site at Kilmalum. All route options passing through Node 5 (3-5-6 and Do-minimum-5-6) are assessed as High Preference with no direct impact on any recorded archaeological sites.

#### Central Section

All route options passing through Node 9 have a direct impact on a Standing Stone at Tinode and an enclosure at Tinode and are assessed as Low Preference. Route Options passing through Node 8 do not impact on archaeological sites and are assessed as High Preference.

#### Northern Section

All routes passing through Mountseskin, 10-12-13 have been assessed as Low Preference given that they have a direct impact on three sites with an additional six sites in close proximity to the route options (within 250m of the centreline). All route options passing through Mountseskin, 11-12-13 have a direct impact on one site with five sites in close proximity to the route centrelines and are assessed as Medium Preference. In addition route options passing through Nodes 10-13 have been assessed as Medium Preference as they have a direct impact on one site with seven sites in proximity.

The Preference Rating for the archaeological appraisal of route options is included within the **Stage 2 Preferred Route Environmental Appraisal Matrix, Table 8.4.1** to determine the Overall Environmental Preference Rating.

### 8.3.3.3 Environmental Assessment - Quarrying Operations

TOBIN Consulting Engineers were engaged by Kildare County Council as the Quarry Consultant to conduct the Quarrying Operations Impact Assessment of the various Route Options. TOBIN assessed the potential impacts of the route options on the quarrying operations.

The project appraisal from a quarrying perspective included:

- direct impact to existing quarrying operations
- potential impact on future reserves
- impact on nearby operations as a result of proposed changes to existing access arrangements

The following preferences were determined:

#### Southern Section

All route options passing through Nodes 1-2-4-6/7 and Do-minimum-5-6, do not traverse any quarrying operations and are assessed as High Preference. Route options 3-4 traverse the boundary of Tracey Enterprises Ltd quarry west of Russborough House which is not currently operational and are assessed as Medium Preference. Route options 3-5 traverses Tracey Enterprises Ltd quarry west of Russborough House which is currently operational and in addition crosses lands in the ownership of the Beit Foundation at Russborough House which may have potential reserves. Route Options 3-5 have been assessed as Low Preference.

#### Central Section

All route options passing through Nodes 6-9 and Nodes 7-9 have the greatest potential impact on quarrying operations as these routes directly impact on the highest number of operators and existing a future reserves of aggregate, and have been assessed as Low Preference. Route options passing through Nodes 6-8-10 are assessed as High Preference with route options passing through Nodes 6-8-11 assessed as Medium Preference.

#### Northern Section

Following the redesign of the deep cutting slopes at Mountseskin with a reduction in land requirements the impact on the Kilsarin quarry operations from route options was eliminated. All route options in the Northern Section are assessed as High Preference with no impact on quarry operations.

Preference ratings provided by TOBIN are included within the **Stage 2 Preferred Route Environmental Appraisal Matrix, Table 8.4.1** to determine the Overall Environmental Preference Rating.

### 8.3.3.4 Environmental Assessment - Golf Amenities

(re)GOLF Design was engaged by Kildare County Council as the specialist consultant to determine the Impact Assessment of the various golf amenities located within the Route Options. In addition to an assessment of the potential impact on the golf amenity – course layout, club house, maintenance buildings - (re)GOLF provided the design team with possible course design solutions together with costings, to inform the route selection process.

The project appraisal from a golf amenities perspective included:

- direct impact on course layout, clubhouse, maintenance shed/buildings
- potential impact on layout, clubhouse, maintenance shed/buildings

In addition to the appraisal of impacts on golf amenities to determine a preference rating of route options, (re)GOLF also provided possible course design solutions, together with costings to inform the valuation of lands and to inform the route selection process.

The following preferences were determined:

#### Southern Section

Route options 1-3-5-6 have a direct impact on the maintenance shed of Blessington Pitch & Putt and the routes have been assessed as Low Preference. Route options Do-minimum-5-6 also have an impact on the course, however, the sheds or the course are not affected and the routes have been assessed as Medium Preference. All other route options are assessed as High Preference.

#### Central Section

All route options passing through Node 10 have a significant impact on South County Golf Club and are assessed as Low Preference. The assessment shows a potential impact on the following:

- Hole 12 unplayable: the golf hole is bisected with impact on the landing area, the green site and the link from the 12<sup>th</sup> green to the 13<sup>th</sup> tee.
- Hole 13 unplayable: the golf hole is bisected with impact on the landing area.
- Hole 14 unplayable: the golf hole is bisected with impact on the 1<sup>st</sup> landing area.
- Hole 15 unplayable: the golf hole is bisected with impact on the 2<sup>nd</sup> landing area.
- Hole 16 unplayable: as a result of the impact on Holes 12, 13, 14 & 15 the golf hole is isolated from the remainder of the golf course routing.
- Entrance Road: the route options traverse the entrance road.

All other route options are assessed as High Preference.

#### Northern Section

All route options will impact on Hazel Grove Golf Club. The assessment shows a potential impact on the following:

- Hole 01 unplayable: the golf hole is bisected with impact on the landing area.
- Hole 09 unplayable: the golf hole is bisected with impact on the 2<sup>nd</sup> landing area.
- Hole 10 unplayable: the golf hole is bisected with impact on the 1<sup>st</sup> landing area.
- Hole 18: unplayable: the golf hole is bisected with impact on the green site area.
- Practice area: the route options are within the safety guidelines and may pose a danger to road users.
- Putting / Pitching: the route options are within the safety guidelines and may pose a danger to road users.
- Clubhouse & Maintenance Areas total loss of structures: route options traverses directly through the clubhouse and maintenance areas.

All route options passing through Nodes 10-13-14 and 10-12-13-14 also impact upon Dublin Mountain Golf Club. The assessment shows a potential impact on the following:

- Hole 03: the route options are within the safety guidelines and may pose a danger to road users.
- Hole 15: the route options are within the safety guidelines and may pose a danger to road users.

All route options passing through Nodes 10-13-14 and 10-12-13-14 have been assessed as Low Preference given the impact on Hazel Grove and Dublin Mountain Golf Club. All route options passing through Nodes 11-12-13-14 have been assessed as Medium Preference.

Preference ratings provided by (re)GOLF are included within the **Stage 2 Preferred Route Environmental Appraisal Matrix, Table 8.4.1** to determine the Overall Environmental Preference Rating.

#### 8.3.4 Summary of Accessibility & Social Inclusion

The Accessibility - Social Inclusion criteria provides for an assessment of the impact of the proposed road options in terms of the benefits provided to lower income social areas and vulnerable social group through the facilitation of greater access to social infrastructure and socio-economic opportunities. The measures for consideration include the extent to which the proposed road options:

- facilitate access to social infrastructure such as schools and hospitals,
- improves employment opportunities for lower income groups and distributes the benefits of the proposed scheme to these groups,
- the degree to which access is improved for social groups in the RAPID and CLAR Areas
- enhance public transport which is widely utilised by disabled and lower income groups.
- facilitate Key Objectives within the Council Development Plans as determined by the Planning Authorities within the Study Area

The Accessibility - Social Inclusion appraisal thus provides a quantitative and qualitative evaluation of the benefits which will accrue to vulnerable and deprived social groups from the proposed road scheme.

The project appraisal from an accessibility-social inclusion perspective specifically included:

- proximity and access to Ballymore Eustace

- proximity and access to South Blessington
- proximity and access to West Blessington
- proximity and access to Brittas
- proximity and access to Tallaght and RAPID area at Jobstown

The following preferences were determined for the Scheme:

#### Southern Section

All route options passing through Node 2 (Ballymore Eustace) in addition to Node 6 (West Blessington), together with route options passing through Node 5 (South Blessington) in addition to Node 6 (West Blessington) have been assessed as High Preference. Route options passing through either Node 2 or Node 6 are assessed as Medium Preference. Route options which do not pass through either Node 2 or Node 5 or Node 6 are assessed as Low Preference.

#### Central Section

All route options passing through Node 6 (West Blessington) in addition to Node 10 (Brittas) have been assessed as High Preference. Route options passing through either Node 6 or Node 10 are assessed as Medium Preference. Route options which do not pass through either Node 6 or Node 10 are assessed as Low Preference.

#### Northern Section

All route options passing through Node 10 (Brittas) in addition to Node 14 (Tallaght, Jobstown RAPID area) have been assessed as High Preference. All route options pass through Node 14 and therefore all other route options are assessed as Medium Preference.

#### Overall Route (Hollywood to Tallaght)

Route options which have been assessed as providing the most benefits with regard to accessibility – social inclusion are:

- Southern Section: Route options 1-2-4-6 and 1-3-5-6,
- Central Section: Route options 6-8-10 and 6-9-10
- Northern Section: Route Options 10-13-14 and 10-12-13-14

Preference ratings from the appraisal of the Accessibility-Social Inclusion criteria are included within the **Stage 2 Overall Appraisal Matrix, Table 8.4.2** to determine the Preferred Route Option.

### 8.3.5 Summary of Integration

The Integration criteria provides for an appraisal of the degree to which the proposed route options integrate with transport, land use and other government policies. In determining the route preference from an Integration perspective consideration was given to:

- Consideration of Transport Integration which provides for a qualitative assessment of the route options in terms of the degree to which each option provides a required link in the overall strategic road network, along with improvement of inter-connectivity to other transport infrastructure such as airports, ports, railways, metros, and the extent to which it provides for enhanced public transport, cyclist and pedestrian travel modes. The route option should be appraised in terms of its facilitation of long range traffic flows over local traffic distribution needs.
- Consideration of the Land Use Integration which provides for a qualitative assessment of the impact of each route option in terms of its integration with land use strategies and objectives, and regional and local planning guidelines. The route option should facilitate land use which promotes sustainable transport and settlement objectives which avoid the promotion of long distance commuting and are compliant with the relevant planning guidelines.
- Consideration of the Geographical Integration which assesses the impact of each route option in terms of its improvement of all island transport links with Northern Ireland and international links to the European Union and the Rest of the World, through the Trans-European Network of Transportation (TEN-T), which account for 50% of all cargo and passenger traffic in the E.U.

The following preferences were determined for the Scheme:

Whole Route (Hollywood to Tallaght)

- All route options have been determined to score a Similar Preference Rating on the Integration criteria given the lack of any difference in impact assessment within the areas of consideration.

Within the **Stage 2 Overall Appraisal Matrix, Table 8.4.2**, each route option is shown to have a neutral / Similar Preference Rating to determine the Preferred Route Option.

## 8.4 PROJECT APPRAISAL MATRIX

In accordance with the NRA Project Management Guidelines the findings of the Project Appraisal are summarised in a Project Appraisal Matrix from which a Preferred Route Corridor is selected.

### 8.4.1 Stage 2: Environmental Appraisal Matrix

The findings of the Environmental Appraisal as summarised within Section 8.3.3 are shown within **Table 8.4.1, the “Stage 2 Preferred Route Environmental Appraisal Matrix”**.

From the findings of the Environmental Appraisal an Overall Combined Preference Rating for each route option was determined based on professional judgement and based on the findings within each individual environmental parameter. Table 8.4.1 identifies the route options which are the “Least Preferred” and “Preferred” together with the route options which are neutral and shown as “Intermediate” preference.

The Overall Combined Environmental Preference Rating has been included within the **Stage 2, Overall Project Combined Appraisal Matrix, Table 8.4.2** to determine a selected Preferred Route Corridor Option.

The following route options have been determined as Preferred Route Options based on the overall combined environmental rating:

- Route Option passing through Nodes: 1-3-4-7-9-10-12-13-14
- Route Option passing through Nodes: 1-3-4-6-9-11-12-13-14
- Route Option passing through Nodes: 1-3-4-6-8-10-12-13-14
- Route Option passing through Nodes: 1-3-4-7-9-11-12-13-14
- Route Option passing through Nodes: 1-3-4-6-8-11-12-13-14
- Route Option passing through Nodes: Do-minimum-8-10-12-13-14
- Route Option passing through Nodes: Do-minimum-8-11-12-13-14

N81 Hollywood to Tallaght Road Improvement Scheme - Stage 2 Preferred Route - Environmental Appraisal Matrix

TABLE 8.4.1

ROUTE OPTIONS	Soils & Geology	Hydrology / Hydrogeology	Air	Noise	Landscape	Socio Economics	Agronomy	Ecology	Architectural Heritage	Archaeology	Golf Amenities	Quarries	Overall Environmental Preference Rating
1 1-2-4-7*7-9-10*10-13-14	Yellow	Red	Yellow	Yellow	Yellow	Red	Yellow	Red	Red	Red	Green	Green	Least Preferred
2 1-2-4-7*7-9-10*10-12-13-14	Yellow	Green	Yellow	Green	Yellow	Red	Yellow	Green	Red	Red	Green	Green	Intermediate
3 1-2-4-6*6-9-10*10-13-14	Yellow	Red	Yellow	Yellow	Yellow	Red	Yellow	Red	Red	Red	Green	Green	Least Preferred
4 1-2-4-6*6-9-10*10-12-13-14	Yellow	Green	Yellow	Green	Yellow	Red	Yellow	Green	Red	Red	Green	Green	Least Preferred
5 1-2-4-6*6-9-11*11-12-13-14	Yellow	Green	Yellow	Green	Yellow	Red	Yellow	Green	Red	Red	Green	Green	Intermediate
6 1-2-4-6*6-8-10*10-13-14	Yellow	Red	Yellow	Red	Yellow	Green	Yellow	Red	Green	Green	Green	Green	Least Preferred
7 1-2-4-6*6-8-10*10-12-13-14	Yellow	Green	Yellow	Yellow	Yellow	Green	Yellow	Green	Green	Green	Green	Green	Intermediate
8 1-2-4-7*7-9-11*11-12-13-14	Yellow	Green	Yellow	Green	Yellow	Red	Yellow	Green	Red	Red	Green	Green	Intermediate
9 1-2-4-6*6-8-11*11-12-13-14	Yellow	Red	Yellow	Yellow	Yellow	Green	Yellow	Red	Green	Green	Green	Green	Intermediate
10 1-3-4-7*7-9-10*10-13-14	Yellow	Green	Yellow	Yellow	Yellow	Green	Yellow	Green	Red	Red	Green	Yellow	Intermediate
11 1-3-4-7*7-9-10*10-12-13-14	Yellow	Green	Yellow	Yellow	Yellow	Red	Yellow	Green	Red	Red	Green	Green	Preferred
12 1-3-4-6*6-9-10*10-13-14	Yellow	Green	Yellow	Yellow	Yellow	Red	Yellow	Green	Red	Red	Green	Green	Least Preferred
13 1-3-4-6*6-9-10*10-12-13-14	Yellow	Green	Yellow	Yellow	Yellow	Red	Yellow	Green	Red	Red	Green	Green	Intermediate
14 1-2-4-6*6-9-11*11-12-13-14	Yellow	Green	Yellow	Green	Yellow	Red	Yellow	Green	Red	Red	Green	Green	Preferred
15 1-3-4-6*6-8-10*10-13-14	Yellow	Red	Yellow	Red	Yellow	Green	Yellow	Green	Green	Green	Green	Green	Intermediate
16 1-3-4-6*6-8-10*10-12-13-14	Yellow	Red	Yellow	Red	Yellow	Green	Yellow	Green	Green	Green	Green	Green	Preferred
17 1-3-4-7*7-9-11*11-12-13-14	Yellow	Green	Yellow	Green	Yellow	Red	Yellow	Green	Red	Red	Green	Green	Preferred
18 1-3-4-6*6-8-11*11-12-13-14	Yellow	Green	Yellow	Green	Yellow	Red	Yellow	Green	Red	Red	Green	Green	Preferred
19 1-3-5-6*6-9-10*10-13-14	Yellow	Green	Yellow	Red	Yellow	Red	Yellow	Red	Red	Green	Red	Green	Least Preferred
20 1-3-5-6*6-9-10*10-12-13-14	Yellow	Green	Yellow	Yellow	Yellow	Red	Yellow	Green	Red	Red	Red	Green	Least Preferred
21 1-3-5-6*6-9-11*11-12-13-14	Yellow	Green	Yellow	Yellow	Yellow	Red	Yellow	Green	Red	Red	Green	Green	Intermediate
22 1-3-5-6*6-8-10*10-13-14	Yellow	Red	Yellow	Red	Yellow	Green	Yellow	Red	Green	Green	Green	Green	Intermediate
23 1-3-5-6*6-8-10*10-12-13-14	Yellow	Red	Yellow	Red	Yellow	Green	Yellow	Red	Green	Green	Green	Green	Intermediate
24 1-3-5-6*6-8-11*11-12-13-14	Yellow	Red	Yellow	Red	Yellow	Green	Yellow	Red	Green	Green	Green	Green	Intermediate
25 Do Minimum - 5-6*6-9-10*10-13-14	Yellow	Green	Yellow	Yellow	Yellow	Red	Yellow	Red	Red	Green	Red	Green	Intermediate
26 Do Minimum - 5-6*6-9-10*10-12-13-14	Yellow	Green	Yellow	Yellow	Yellow	Red	Yellow	Green	Red	Red	Red	Green	Intermediate
27 Do Minimum - 5-6*6-9-11*11-12-13-14	Yellow	Green	Yellow	Yellow	Yellow	Red	Yellow	Green	Red	Red	Green	Green	Intermediate
28 Do Minimum - 5-6*6-8-10*10-13-14	Yellow	Red	Yellow	Red	Yellow	Green	Yellow	Red	Green	Green	Green	Green	Intermediate
29 Do Minimum - 5-6*6-8-10*10-12-13-14	Yellow	Red	Yellow	Red	Yellow	Green	Yellow	Green	Green	Green	Green	Green	Preferred
30 Do Minimum - 5-6*6-8-11*11-12-13-14	Yellow	Red	Yellow	Red	Yellow	Green	Yellow	Red	Green	Green	Green	Green	Preferred

Table 8.4.1: Stage 2 Preferred Route Environmental Appraisal Matrix

### 8.4.2 Stage 2: Overall Combined Appraisal Matrix

The findings of the Project Appraisal are summarised within the **Stage 2, Overall Project Combined Appraisal Matrix, Table 8.4.2**, inclusive of the Overall Combined Environmental Preference Rating for each route option.

From the findings of the Project Appraisal an Overall Combined Preference Rating for each route option was determined based on professional judgement and based on the findings within each Common Appraisal Criteria. **Table 8.4.2** identifies the route options which are the “Least Preferred” and “Preferred” together with the route options which are neutral and shown as “Intermediate” preference.

It can be seen that all the route options which have been determined as “Preferred” with regard to an Overall Environmental Assessment are not rated “Preferred” under either the Safety or the Economic or the Accessibility criteria, with the exception of the route option passing through Nodes: Do-minimum-5-6-8-10-12-13-14 which is rated as “Least Preferred” under the Safety and the Economic criteria and “Preferred” under the Accessibility criteria.

The following Preference Rating for each route option has been determined from the Overall Combined Preference Rating for each Common Appraisal Criteria:

“Least Preferred” (passing through Nodes)	“Intermediate” Preference (passing through Nodes)	“Preferred” (passing through Nodes)
1-2-4-7-9-10-13-14	1-2-4-6-9-10-13-14	1-3-5-6-8-10-13-14
1-2-4-7-9-10-12-13-14	1-2-4-6-8-10-13-14	
1-2-4-6-9-10-12-13-14	1-3-4-7-9-10-13-14	
1-2-4-6-8-10-12-13-14	1-3-4-6-8-10-13-14	
1-2-4-7-9-11-12-13-14	1-3-4-6-8-10-12-13-14	
1-2-4-6-8-11-12-13-14	1-3-5-6-9-10-13-14	
1-3-4-7-9-10-12-13-14	Do-minimum-5-6-8-10-13-14	
1-3-4-6-9-11-12-13-14		
1-3-4-7-9-11-12-13-14		
1-3-4-6-8-11-12-13-14		
1-3-5-6-9-10-12-13-14		
1-3-5-6-9-11-12-13-14		
1-3-5-6-8-10-12-13-14		
1-3-5-6-8-11-12-13-14		
Do-minimum-5-6-9-10-13-14		
Do-minimum-5-6-9-10-12-13-14		
Do-minimum-5-6-9-11-12-13-14		
Do-minimum-5-6-8-10-12-13-14		
Do-minimum-5-6-8-11-12-13-14		

N81 Hollywood to Tallaght Road Improvement Scheme - Stage 2 Preferred Route - Overall Combined Appraisal Matrix

TABLE 8.4.2

ROUTE OPTIONS		Environmental	Safety	Economic	Accessibility	Integration	Overall Combined Preference Rating
1	1-2-4-7*7-9-10*10-13-14	Least Preferred	Intermediate	Preferred	Intermediate	Similar	Least Preferred
2	1-2-4-7*7-9-10*10-12-13-14	Intermediate	Intermediate	Least Preferred	Intermediate	Similar	Least Preferred
3	1-2-4-6*6-9-10*10-13-14	Least Preferred	Intermediate	Preferred	Preferred	Similar	Intermediate
4	1-2-4-6*6-9-10*10-12-13-14	Least Preferred	Intermediate	Least Preferred	Preferred	Similar	Least Preferred
5	1-2-4-6*6-9-11*11-12-13-14	Intermediate	Intermediate	Least Preferred	Intermediate	Similar	Least Preferred
6	1-2-4-6*6-8-10*10-13-14	Least Preferred	Preferred	Preferred	Preferred	Similar	Intermediate
7	1-2-4-6*6-8-10*10-12-13-14	Intermediate	Intermediate	Least Preferred	Preferred	Similar	Least Preferred
8	1-2-4-7*7-9-11*11-12-13-14	Intermediate	Least Preferred	Least Preferred	Least Preferred	Similar	Least Preferred
9	1-2-4-6*6-8-11*11-12-13-14	Intermediate	Intermediate	Least Preferred	Intermediate	Similar	Least Preferred
10	1-3-4-7*7-9-10*10-13-14	Intermediate	Intermediate	Preferred	Intermediate	Similar	Intermediate
11	1-3-4-7*7-9-10*10-12-13-14	Preferred	Intermediate	Least Preferred	Intermediate	Similar	Least Preferred
12	1-3-4-6*6-9-10*10-13-14	Least Preferred	Intermediate	Preferred	Intermediate	Similar	Intermediate
13	1-3-4-6*6-9-10*10-12-13-14	Intermediate	Intermediate	Intermediate	Intermediate	Similar	Intermediate
14	1-3-4-6*6-9-11*11-12-13-14	Preferred	Intermediate	Least Preferred	Intermediate	Similar	Least Preferred
15	1-3-4-6*6-8-10*10-13-14	Intermediate	Preferred	Preferred	Intermediate	Similar	Intermediate
16	1-3-4-6*6-8-10*10-12-13-14	Preferred	Intermediate	Least Preferred	Intermediate	Similar	Intermediate
17	1-3-4-7*7-9-11*11-12-13-14	Preferred	Intermediate	Least Preferred	Least Preferred	Similar	Least Preferred
18	1-3-4-6*6-8-11*11-12-13-14	Preferred	Intermediate	Least Preferred	Intermediate	Similar	Least Preferred
19	1-3-5-6*6-9-10*10-13-14	Least Preferred	Preferred	Intermediate	Preferred	Similar	Intermediate
20	1-3-5-6*6-9-10*10-12-13-14	Least Preferred	Intermediate	Least Preferred	Preferred	Similar	Least Preferred
21	1-3-5-6*6-9-11*11-12-13-14	Intermediate	Intermediate	Least Preferred	Intermediate	Similar	Least Preferred
22	1-3-5-6*6-8-10*10-13-14	Intermediate	Preferred	Preferred	Preferred	Similar	Preferred
23	1-3-5-6*6-8-10*10-12-13-14	Intermediate	Intermediate	Least Preferred	Preferred	Similar	Least Preferred
24	1-3-5-6*6-8-11*11-12-13-14	Intermediate	Intermediate	Least Preferred	Intermediate	Similar	Least Preferred
25	Do Minimum-5-6*6-9-10*10-13-14	Intermediate	Least Preferred	Least Preferred	Preferred	Similar	Least Preferred
26	Do Minimum-5-6*6-9-10*10-12-13-14	Intermediate	Least Preferred	Least Preferred	Preferred	Similar	Least Preferred
27	Do Minimum-5-6*6-9-11*11-12-13-14	Intermediate	Least Preferred	Least Preferred	Intermediate	Similar	Least Preferred
28	Do Minimum-5-6*6-8-10*10-13-14	Intermediate	Least Preferred	Intermediate	Preferred	Similar	Intermediate
29	Do Minimum-5-6*6-8-10*10-12-13-14	Preferred	Least Preferred	Least Preferred	Preferred	Similar	Least Preferred
30	Do Minimum-5-6*6-8-11*11-12-13-14	Preferred	Least Preferred	Least Preferred	Intermediate	Similar	Least Preferred

Table 8.4.2: Stage 2, Preferred Route Overall Combined Appraisal Matrix

## 8.5 RECOMMENDATION ON A PREFERRED ROUTE CORRIDOR

### 8.5.1 “Preferred” Route Option to Progress to Stage 3

Having completed the Project Appraisal of the Stage 2 Route Options and having carried out a comparative assessment based on the five Common Appraisal Criteria of Economy, Safety, Environment, Accessibility & Social Inclusion and Integration, in accordance with the National Roads Authority’s 2010 Project Management Guidelines the following Route Option was recommended to be taken forward to Stage 3 of Phase 2 Route Selection – “Selection of a Preferred Route Corridor” for further consideration.

#### Route Option Passing Through Nodes:

**1 – 3 – 5 – 6 – 8 – 10 – 13 - 14**

<b>Nodes:</b>	<b>Description:</b>
1-3-5-6:	Knockroe, Silverhill Lower, Bishopslane, N81 at front of Russborough House, Glebe East, R410 at Newtownpark
6-8-10:	R410 at Newtownpark, Hempstown (East of the N81), Brittas (Gortlum)
10-13-14:	Brittas (Gortlum/South County Golf Club), Raheen, Crooksling, Slade, Boherboy, Kiltalown (Hazel Grove Golf Club), Tallaght Bypass

## 9 STAGE 3 PREFERRED ROUTE CORRIDOR

### 9.1 INTRODUCTION

Following the identification of a Preferred Route Option as part of the Stage 2 Route Selection Process and having considered the Project Appraisal it was determined that the following criteria required further assessment to inform the selection of a Preferred Route Corridor.

#### Economics Criteria:

The Preferred Route Option is some 31.3km in length with an Option Comparison Estimate cost of €243.6M approx. The Preferred Route Option consists of:

Section	Road Type (LoS D) Recommended
Southern Section: Hollywood Cross to the R410 (Naas Road)	Standard Single S2 – 7.0m carriageway 2.5m hard shoulders Priority junctions / ghost islands
Central Section: the R410 (Naas Road) to N81 at Blessington East	Type 2 Dual – 2 x 7.0m, 0.5m hard strips No gaps in central reserve At-grade roundabouts
Northern Section: N81 at Blessington East to R136 (Tallaght Bypass)	Type 2 Dual – 2 x 7.0m, 0.5m hard strips No gaps in central reserve At-grade roundabouts

The Common Appraisal Framework (Department of Transport, June 2009) requires the consideration of a lower standard investment and a smaller scale project. It is recommended that the scale of the project should be investigated as part of Stage 3 of the Route Selection Process through an **Incremental Analysis** and economic evaluation of various route cross sections

The Incremental Analysis is to include the calculation of Benefit-Cost Ratio (BCR) using observed Accident Data.

#### Safety Criteria:

The Project Appraisal of route options under the Safety criteria was based on the assessment carried out within the Road Safety Audit, Stage F, Part 1. It was determined that the Preferred Route Option best provides connectivity to Blessington South and the R758 at Vallemount. In addition, the Preferred Route Option provides for the greatest reduction in traffic flow through Blessington village.

There is now a requirement to exam the issues within the design of the Preferred Route Option relating to the road safety implications of the Scheme. As part of Stage 3 of the Route Selection Process it is recommended that a **Road Safety Audit, Stage F, Part 2** is carried out in accordance with the relevant sections of NRA HD 19/09.

### Environmental Criteria:

An environmental Appropriate Assessment Stage 1 Screening Report concluded that there is the potential for all route options to have a significant adverse impact on the integrity of the Poulaphouca Reservoir SPA. In addition, the following areas were assessed as having the potential to be classified as an Annex 1 Priority Habitat.

1. Site 4: large site adjoining Poulaphuca Dam and Reservoir, 1km south of Ballymore Eustace between the dam and the Water Treatment Works at Ballymore Eustace.
2. Site 18: extensive area of County to National importance located 3km north-east of Blessington, between the existing N81 and Kilbride.
3. Site 22: located at the foothills of the western Wicklow mountains, 1km south of Brittas.
4. Site located near the shores of Poulaphuca Reservoir and some 600m to the east of Russborough House.

Although only two of the four sites are within the corridor of the Preferred Route Option it is recommended that a **detailed ecological survey** is carried out, in terms of plant species composition and habitat classification, on all four sites to inform the selection of a Preferred Route Corridor.

## 9.2 INCREMENTAL ANALYSIS

RPS consulting engineers completed the Incremental Analysis which included the Cost Benefit Analysis (CBA) to determine the Benefit-Cost Ratio (BCR) for each of the cross section road types considered.

Each Option of different road types considered was compared with the Preferred Route Option. The following options were considered to determine the optimum cross section road type and Table 9.2 provides a summary of the economic evaluation for each option

Option	Southern Section Hollywood to Blessington (R410)	Central Section Blessington (R410) to Blessington East	Northern Section Blessington East to Tallaght
Preferred Route	Standard S2	Type 2 Dual	Type 2 Dual
A	Reduced S2	Type 2 Dual	Type 2 Dual
B	Standard S2	Standard S2	Standard S2
C	Reduced S2	Standard S2	Standard S2
D	Standard S2	Standard S2	Type 2 Dual

OPTION	DESCRIPTION	BUDGET COST	PVC		TUBA PVB		Acc.saved 30 ye		Acc PVB		TOTAL PVB		TOTAL BCR	
			LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
Preferred Route	R410 Blessington To Tallaght - Type 2 Dual Hollywood to R410 Blessington - Standard S2 Single with 2.5m H/S	221.7	159.1	160.9	136.7	326.8	569	643	31.0	35.1	167.7	361.9	1.05	2.25
Option A	R410 Blessington To Tallaght - Type 2 Dual Hollywood to R410 Blessington - Reduced S2 Single with 0.5m H/S	209.2	149.6	151.6	119.9	287.2	556	621	26.9	30.1	146.8	317.3	0.98	2.09
Option B	R410 Blessington To Tallaght - Standard S2 Single with 2.5m H/S Hollywood to R410 Blessington - Standard S2 Single with 2.5m H/S	190.2	134.7	136.2	99.2	199.4	402	434	28.6	31.4	127.8	230.8	0.95	1.69
Option C	R410 Blessington To Tallaght- Standard S2 Single with 2.5m H/S Hollywood to R410 Blessington - Reduced Single with 0.5m H/S	180.1	127.3	129.3	77.0	168.8	397	422	25.0	27.0	102.1	195.8	0.80	1.51
Option D	Tallaght to East of Blessington - Type 2 Dual Hollywood to East of Blessington - Standard S2 Single with 2.5m H/S	209.5	151.0	153.1	131.0	313.7	550	616	30.7	34.6	161.8	348.3	1.07	2.27

**TABLE 9.2: Incremental Annalysis – Economic Evaluation of Road Types**

### 9.2.1 Summary of Incremental Analysis

It can be seen that the Preferred Route Option and Option D have a similar Benefit-Cost Ratio both for Low Traffic Growth and for High Growth and both options perform better than the remaining three options. Both the Preferred Route Option and Option D provide a positive economic return at Present Day Values with a High Growth BCR of 2.25 and 2.27 respectively and a Low Growth BCR of 1.05 and 1.07 respectively. The remaining three options provide a negative economic return for Low Growth.

To determine the Present Value of Benefits (PVB) consideration is given to the benefits arrived from a reduction in journey time and reduction in vehicle operating costs. In addition the BCR includes for the benefits derived from accident savings as determined from TUBA and as adjusted to reflect observed accident rates and the severity of accidents for the links comprising the N81. It can be seen that the Preferred Route Option provides the greater PVB than all other options with some €13.6M benefits greater than Option D at High Growth and €5.9M greater at Low Growth.

Given that the Preferred Route Option has greater benefits at both High and Low Traffic Growth than Option D with some 27 less accidents over the 30 year design period at High Growth and given that both the Preferred Route Option and Option D have similar BCRs it is considered that the Preferred Route Option provides the optimum road type for the Road Improvement Scheme.

Southern Section: Standard S2, with 2.5m hard strips

Central Section: Type 2 Dual Carriageway

Northern Section: Type 2 Dual Carriageway.

### 9.3 ROAD SAFETY AUDIT, STAGE F, PART 2

ROADPLAN consulting carried out the Road Safety Audit (RSA), Stage F, Part 2, in accordance with the relevant sections of NRA HD 19/09. The audit team examined the issues within the design of the Preferred Route Option relating to the road safety implications of the Scheme. The audit team also considered the previously completed RSA, Stage F, Part 1, which was used to inform the Stage 2, Route Selection Process.

Within the RSA Stage F, Part 2, the audit team provides the design team with recommendations to consider which would prevent possible problems to the road users and pedestrians. The recommendations include comments on junction design, spacing of junctions, treatment of closed roads, access arrangements, pedestrians and cyclists crossing the dual carriageway, transition sections between urban road and dual carriageway and severance of the existing N81 route.

The full Road Safety Audit, Stage F, Part 2 is included as **Appendix 1**.

## **9.4 HABITAT SURVEY – POTENTIAL ANNEX 1 HABITAT SITES**

Detailed ecological survey in terms of plant species composition and habitat is not required and was not conducted on the ecological sites as part of the Stage 2 Environmental Assessment. However the Stage 2 assessment identified four sites that had potential Annex 1 Priority habitat. Two of these sites are located along the vicinity of the Preferred Route Option. To inform the Route Selection process a habitat survey was undertaken by Natura Environmental Consultants to fully assess all four sites.

### **9.4.1 Site 4 – between Poulaphuca Dam and Ballymore Eustace**

Site 4 is a large site with good diversity of habitats, adjoining Poulaphuca Dam and reservoir. It is of high local ecological value. The small area of fen/wet grassland near the edge of the reservoir corresponds to the annex 1 habitat Alkaline fen (7230). However the area of fen is small and in a mosaic with wet grassland.

The Preferred Route Option does not affect this site.

### **9.4.2 Site 18 – between the existing N81 and Kilbride**

Site 18, located west of Kilbride, is classified as having an ecological value of County and National importance. It is valley mire comprised of a number of interconnected wetland habitats, including transition mire, which is listed under Annex 1 of the EU Habitats Directive and is rare in Co Wicklow.

The Preferred Route Option crosses the western part of the site, which is drained wet grassland, and does not transverse the area of transition mire.

### **9.4.3 Site 22 – south of Brittas at the foothills of the Wicklow Mts**

Site 22 contains habitats that are transitional from upland heath to grassland. The site has recently been drained and planted with conifers. Prior to drainage it had an ecological classification of County importance. The site still retains a good diversity of habitats and species, including wet heath (Annex 1 habitats), however these will deteriorate with time, reducing the site value to local (Low value).

The Preferred Route Option does not affect this site.

### **9.4.4 Site 600m East of Russborough House – edge of reservoir**

This site some 600m east of Russborough House, is part of the proposed Natural Heritage Area of Poulaphuca Reservoir. It contains a small area of willow-dominated wet woodland (WN6) which adds local biodiversity to the reservoir, which is a designated SPA and pNHA. The site does not conform to any Annex 1 habitat.

Poulaphuca Reservoir SPA is designated for the presence of Greylag Goose, a species listed in Annex 1 of the EU Birds directive. The Greylag Goose do not use the site or the part of the reservoir in the vicinity to the site at any time.

The impacts on the site and reservoir from the Preferred Route Option are of low significance.

## 9.5 PROJECT APPRAISAL BALANCE SHEET (PABS)

The Project Appraisal Balance Sheet (PABS) prepared for the Preferred Route Option, in accordance with the NRA Project Appraisal Guidelines, is presented in **Appendix 2**.

The PABS identifies the overall benefits associated with providing the Preferred Route Option as the Road Improvement Scheme for the N81 from Hollywood to Tallaght. In terms of the five Common Appraisal Criteria the Preferred Route Option scores:

<ul style="list-style-type: none"> <li>● <b>ENVIRONMENT</b></li> </ul>	<p><b>MODERATELY NEGATIVE</b></p>
○ Air Quality & Climate	Highly Positive
○ Noise & Vibration	Moderately Negative
○ Waste	Slightly Negative
○ Biodiversity – Flora & Fauna	Moderately Negative
○ Agriculture	Moderately Negative
○ Non-agriculture	Moderately Negative
○ Architectural Heritage	Highly Negative
○ Archaeological & Cultural heritage	Moderately Negative
○ Landscape & Visual	Slightly Negative
○ Soils & Geology	Moderately Negative
○ Hydrology	Slightly Negative
○ Hydrogeology	Moderately Negative
<ul style="list-style-type: none"> <li>● <b>SAFETY</b></li> </ul>	<p><b>SLIGHTLY POSITIVE</b></p>
○ Accident Reduction	Moderately Positive
○ Security	Neutral
<ul style="list-style-type: none"> <li>● <b>ECONOMY</b></li> </ul>	<p><b>SLIGHTLY POSITIVE</b></p>
○ Efficiency & Effectiveness	Highly Positive
○ Wider Economic Impacts	Slightly Positive
○ Funding Impacts	Neutral
<ul style="list-style-type: none"> <li>● <b>ACCESSIBILITY &amp; SOCIAL INCLUSION</b></li> </ul>	<p><b>SLIGHTLY POSITIVE</b></p>
○ Deprived Areas	Slightly Positive
○ Vulnerable Groups	Slightly Positive

<b>• INTEGRATION</b>	<b>HIGHLY POSITIVE</b>
○ Transport Integration	Moderately Positive
○ Land Use Integration	Slightly Positive
○ Geographical Integration	Highly Positive
○ Other Policy Integration	Moderately Positive

The Project Appraisal Balance Sheet (PABS) for the Preferred Route Option is included as **Appendix 2**.

## **9.6 RECOMMENDATION**

Having carried out a Project Appraisal of all Stage 2 Route Options using the five Common Appraisal Criteria of Environment, Safety, Economy, Accessibility & Social Inclusion and Integration and having completed the Comparison Assessment of Route Options in accordance with the NRA Project Management Guidelines the following Preferred Route Option has been identified:

### **Preferred Route Option (Passing through Nodes)**

**1 - 3 - 5 - 6 - 8 - 10 - 13 -14**

It is recommended that the Preferred Route Corridor as shown in **Volume 2, Figures 28.0, 28.1, 28.2, 28.3 and 28.4** form the basis of the NRA Project Management Guidelines, **Phase 3: Design** and **Phase 4: EIA/EAR & the Statutory Processes**. Future design work will identify the positioning of a route within the Preferred Route Corridor and will facilitate a footprint for the confirmation of the Statutory Scheme.

## **APPENDIX 1**

### **Road Safety Audit, Stage F, Part 2**

**11091a**

**N81 Hollywood Cross to Tallaght Road Improvement Scheme**

**ROAD SAFETY AUDIT STAGE F – PART 2**

**Final**



**7, Ormonde Road Kilkenny Tel: 056 7795800 Fax: 056 7702999**

## 1. INTRODUCTION

This report describes a Stage F Part 2 Road Safety Audit carried out on the proposed N81 Hollywood Cross to Tallaght scheme. The audit took place between 28<sup>th</sup> March 2012 and 13<sup>th</sup> April 2012.

The audit team members were as follows:

Dermot Donovan, Roadplan Consulting (Team Leader)

George Frisby, Roadplan Consulting (Team Member)

The audit comprised an examination of the drawings and documentation relating to the scheme supplied by Kildare National Roads Design Office and its Consultants, and a visit to the site of the scheme.

This Stage F Part 2 audit has been carried out in accordance with the relevant sections of NRA HD 19/09. The team has examined only those issues within the design relating to the road safety implications of the scheme, and has therefore not examined or verified the compliance of the design to any other criteria.

In this report, Section 2 describes the background and context of the scheme; Section 3 describes the scheme; Section 4 identifies the principal road safety factors.

Appendix A lists the drawings and documentation provided to the audit team specifically for this audit.

The Audit Team previously carried out a Road Safety Audit Stage F1 on the scheme. Information provided for that audit was re-examined by the Team during this audit. That information was:

- Plans of the Stage F1 route options (without vertical design information)
- Accident Data Report (Kildare NRDO)
- A Road Safety Review (Donegal NRDO)
- Cost Benefit Assessment of Route Options (RPS)
- Network Traffic Flows in MapInfo format (RPS) for all routes (except W11 and W24).

## 2. BACKGROUND AND CONTEXT OF THE SCHEME

The National Secondary road N81 runs from the M50, Dublin, to Ballon, Co Carlow. The section of the N81, the subject of this report, extends from Jobstown, South Dublin to Hollywood Cross Roads, County Wicklow, a straight line distance of approximately 26km.

The N81 is one of the two principal roads between Dublin and the areas of north Wicklow and east Kildare; the N11 is the other. The quality of the non-national road network in these areas is severely constrained by the mountainous terrain, and drivers rely heavily on both these national routes to provide a reasonable level of service for their road trips.

This section of the existing N81 is narrow, poorly aligned, and does not cater safely for existing traffic flows. In addition it passes through the centre of Blessington, a busy regional town, creating hazardous conditions for local road users on the town's streets.

## 3. DESCRIPTION OF THE SCHEME

The road upgrading extends between Jobstown, Co Dublin, and Hollywood Cross Roads, Co Wicklow. The northern section of the scheme (between Jobstown and Blessington) is to be Type 2 Dual Carriageway and the southern section is to be standard single carriageway. At Jobstown, the road has two important links: to the N81 (extending to the M50), and to the N82 (extending to the N7).

Thirty two route options were assessed by the design team during the route corridor selection process; the route (subject of this audit) emerged as the Preferred Route Corridor.

On the southern section of the scheme, and at Blessington, the Corridor lies to the west of the existing N81, because the Pollaphuca reservoir, to the immediate east of the existing road, precludes an alignment to that side. North of Blessington the Corridor switches to the east of the existing N81 (at Hempstown) and remains on that side as far as the tie-in at Tallaght (except for one short stretch at Boherboy).

Mainline junctions are indicated to be provided at the following locations:

- Hollywood Cross Roads (staggered crossroads)
- Streamville (staggered crossroads)
- Ballymore Eustace (staggered crossroads)
- Russborough (staggered crossroads)
- R758 (T-junction)
- Blessington south (staggered crossroads)
- Blessington - R440 (roundabout)
- Blessington north (roundabout)
- The Lamb (roundabout)
- Brittas (roundabout)
- N82 (roundabout)
- Kiltalown (roundabout)
- Cheeverstown (roundabout) Regional Route R136

#### 4. PROBLEMS AND RECOMMENDATIONS

##### Severance of the Existing N81

**4.1 Problem** The realignment is mainly off-line, so the existing N81 remains as a parallel route for use by non-national traffic, such as local car trips, cycle and pedestrian traffic, and perhaps some bus services (there are bus stops on the existing N81). However there are some sections of single carriageway at which on-line improvement is to be carried out, thereby severing the existing N81. In those areas, road users who would otherwise remain on the existing N81 will be required to enter onto the new N81, perhaps for a short length only. This is undesirable, in particular for pedestrians and cyclists. It is possible that the existing N81 could become a popular route for walking and cycle touring; it is an attractive route through areas of good landscape and is easily accessible from Dublin. Such road users would be at risk where their journey necessitated entry onto (or travel across) a high speed road.

**Recommendation**

At these on-line sections re-establish the continuity of the existing N81. The following options could be considered:

- Use the L-8361 between Streamville and the R756 (Hollywood Road).
- Extend northwards to the R756 the severed section of existing N81 south of Hollywood Cross. That would provide the additional benefit of removing the L-8341/N81 junction (connecting the L-8341 directly to the R756 instead).
- Provide an off-road two-way footpath cyclepath on the south side of the existing road between Russborough and Blessington. It is not feasible to provide an alternative route in this area to cater for local vehicular traffic.

### Unnecessary Junctions

4.2 Problem Drivers travelling on the L-8341 (south of Hollywood) towards the N81 must negotiate two junctions with the existing N81, increasing the risk of conflict.

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#### Recommendation

Preferably extend the existing N81 northwards to meet the R756 (as recommended in 4.1 above). Otherwise, the L-8341 should be extended directly to the N81, omitting the junctions.

### Direct Accesses

4.3 Problem where the proposed N81 is on-line there are roadside houses and businesses which may remain direct accesses. These are a hazard, particularly on overtaking sections.

#### Recommendation

Do not create direct accesses onto the proposed N81. Provide instead alternative means of access from minor roads.

### Overshoot of Cul-de-Sac Ends

4.4 Problem Extensive stopping-up of existing roads is proposed, particularly on the existing N81. Most stopped-up sections are short and will not present problems; however the section between Streamville and Russborough is long, and drivers on that section of existing N81 could approach the cul-de-sac end at speed, perhaps colliding with the terminated end or overshooting onto the new N81.

#### Recommendation

Alter the layouts at Streamville and at Ballymore Eustace crossroads to remove high speed entry to cul-de-sac ends; the chosen layout will be dependent on the response to Recommendation 4.1 above, but will involve changing junction priority so that cul-de-sac ends lie on short sections of minor road. Gradually reduce the carriageway widths on the approaches to cul-de-sac ends and ensure the termination points are well signed in advance.

### Hazard of Changed Operation of Junctions

**4.5 Problem** The changes in traffic assignment that will result from the revised road network will not be compatible with the existing priority arrangements at junctions, particularly where one arm of the mainline has been stopped up. This occurs at many junctions on the scheme, such as the junction on the existing N81 at Streamville (junction with the L-8361); all traffic will turn between the existing N81 and the L-8361, very little traffic will travel to and from the cul-de-sac end of the existing N81. Drivers, familiar with the arrangement and the absence of conflicting traffic, may fail to stop when turning from the minor road (despite the regulatory signage) creating a hazard for other road users. It happens that this anomaly is sometimes dealt with prior to opening of the scheme by changing the priority; however that often creates the situation of the new mainline being on a right-angled bend, which is itself a hazard. Another example of this problem is the existing junction of the N81 and the L2008.

#### **Recommendation**

Consider each such location, check route consistency and alter the layout as required to ensure that the revised junction and alignments are appropriate to the new traffic paths.

#### **Closely Spaced Junction Layout South of Blessington**

**4.6 Problem** The arrangements of the priority junctions on the single carriageway are good; junctions are on the principal desire lines, serving Hollywood, Ballymore Eustace and Russborough; they are well separated (2 km or so); they are located on, or close to, no-overtaking sections, and have lengthy passing sections in between.

However, the junction layout immediately south of Blessington is not as well developed:

- The R758 forms a separate junction closeby.
- Drivers and vulnerable road users on the L-6052 need to cross the N81 at grade when travelling to and from Blessington.

There is a significant amount of housing development on that road.

- The overall layout has seven junctions within a small area. This is a large number of potential conflict points and the close spacing requires a high level of driver alertness.

#### **Recommendation**

Consider:

- Grade-separating the L-6052 and the N81, possibly omitting a connection between both roads, leaving the situation as it is at present.
- Linking the R758 to the existing N81, omitting the junction onto the proposed N81. Trips between Blessington and the Golf Clubs on the R758 would not need travel onto the new N81 for a short distance.
- Providing a 3-arm roundabout junction on the N81 to cater for traffic turning to Blessington and to the R758.

#### **Local Road Users Crossing the Dual Carriageway**

**4.7 Problem** The existing N81 crosses the dual carriageway at grade at a roundabout junction immediately north of Blessington. Local traffic, which includes pedestrians

and cyclists, travelling on the existing N81 to Blessington will need to cross the proposed N81 by interacting with traffic on the dual carriageway.

#### **Recommendation**

Consider grade-separating the existing N81 and proposed N81. Retain a roundabout on the proposed N81 and provide a link between both roads.

#### **Closely Spaced Roundabouts**

**4.8 Problem** There are two roundabouts close together; one at The Lamb and the other at Brittas. The distance between them is 2.5 km. This separation is short on a rural dual carriageway. Drivers in the fast lane of the dual carriageway could approach the roundabouts at excessive speed, increasing the risk of collision. (See also Problem 4.10)

#### **Recommendation**

It is likely that the turning volumes could be easily accommodated by one roundabout; therefore consider omitting one roundabout (or omit both and provide one between). In addition, grade-separate the roads so that local traffic crossing the dual carriageway does not do so at-grade (as recommended in 4.7 above).

#### **Unimproved Junction at End of Improved Road**

**4.9 Problem** The regional road, labelled R440 on the drawing sheet 4 of 6 (but R759 on OS mapping) is intersected by the L-8375. The junction is heavily skewed and its layout is poor. The R440 is shown to tie in directly at the junction, with no improvement indicated to the junction. Increased traffic speed on the new alignment will create additional hazard at an already sub-standard junction.

#### **Recommendation**

If the recommendation stated in Problem 4.8 is implemented, the problem may be consequently remedied; otherwise the realignment of the R440 should be extended eastwards and the junction should be 'squared-up'.

#### **Short Transition between Urban Road and Dual Carriageway**

**4.10 Problem** The existing R114, between Brittas and the proposed N81, is traffic calmed, has speed ramps and is controlled by a 50 kph speed limit. The dual carriageway roundabout is directly at the eastern end of that section of road; drivers may fail to adjust their driving style to suit the altered road environment and may traverse the 50 kph zone at too high speed (having left the dual carriageway) or may not realise they are joining a high speed dual carriageway (when leaving the 50 kph zone). In view of the fact that the R114 has required the installation of speed ramps and traffic calming it may not be advisable to load additional traffic onto it. (See also problem 4.8)

#### **Recommendation**

Preferably omit the junction at this location, realigning the mainline to suit and grade-separating the crossing of the R114.

### Poor Crossing Facilities for Pedestrians

**4.11 Problem** The N81 is being improved on-line between the start of the scheme at Tallaght and the L-3016. The traffic signals at the existing junctions are to be removed and the junctions are being converted to left-in/left-out operation with a roundabout at either end. Traffic will therefore be free-flow on the mainline. However pedestrians and cyclists will not be able to cross the dual carriageway safely in the absence of controlled crossings (provided at present by the traffic signals).

#### **Recommendation**

Retain the traffic signals at the existing junctions (Cheeverstown Road R136 (L-3004), Killinardin Road, Fortunestown Road, L-3012, L-3009 and Whitestown Road). Consider traffic signals (instead of the proposed roundabout) at the L-3016.

### Accesses onto Dual Carriageway

**4.12 Problem** There is one direct access and one public road connection onto the southbound dual carriageway between the L-3016 roundabout and the N82 roundabout. These create additional risk for all users of the dual carriageway. In addition, the severance of these roads from the local road network means that road users (including pedestrians and cyclists) must use the dual carriageway.

#### **Recommendation**

Grade-separate the proposed N81 and L-7377 and omit the at-grade connection to the dual carriageway. Realign the local road at Corbally, extending it eastward to a new junction with the L-7377 south of Corbally House, and omit the direct access to the N81.

### Queues on N82/N81 Roundabout

**4.13 Problem** The crossroads formed by the intersection of the existing N81 and N82 is likely to be signalised. The stacking distance from the signals is in the order of thirty cars length which, if exceeded, would cause queuing onto the dual carriageway roundabout.

#### **Recommendation**

Check that it is feasible to provide a layout of signals that will not result in a queue extending back to the dual carriageway and, if no suitable layout is found, alter the junction strategy.

### **4.14 Comments**

- An unnumbered road extends between the proposed N81 and the L-3863. No junction is shown to be provided onto the proposed N81 although there is an existing junction. The proposed N81 is an on-line improvement and it is assumed that it is intended to close this junction.

- If the scheme is to be constructed in phases, and the split is to be at Blessington, the impact on the safety of the R410, (Blessington to Naas Road), and the impact on traffic flow and safety through Blessington town should be assessed.
- The road is close to the northern suburbs of Blessington. In order to avoid significant numbers of pedestrians and cyclists crossing the dual carriageway the development boundary (and the urban speed limits) should not cross to north of the road in future. If such is likely to happen in future, grade-separation should be considered at this stage.

#### AUDIT TEAM STATEMENT

We certify that we have examined the drawings and other information listed in Appendix A. This examination has been carried out with the sole purpose of identifying any features of the design that could be removed or modified to improve the safety of the scheme. The problems that we have identified have been noted in the report, together with suggestions for improvement that in our opinion should be studied for implementation.



Date.....5<sup>th</sup> July 2012.....



Date.....5<sup>th</sup> July 2012.....

#### APPENDIX A

Drawings / Reports Examined:

Book of drawings entitled:

N81 Hollywood Cross to Tallaght Road Improvement Scheme Public Consultation – Preferred Route Corridor Sheet 1 of 6 to Sheet 6 of 6

and numbered: NRO 159 / RS / 201 / 111 to NRO

## **APPENDIX 2**

### **Project Appraisal Balance Sheet (PABS)**

Part D: Project Appraisal Balance Sheet

Date:	23/05/2012	Project Title:	N81 Hollywood Cross to Tallaght Road Improvement Scheme	
Version No.:	2	NRA Project Number:	KE-07-370	

  

Criteria	Element	Quantitative Statement	Qualitative Statement	Overall Scale of Impact	Amended Impact Scale
Environment	Air Quality & Climate	Highly Positive	The selected route will have a highly positive impact on ambient air quality in the area given the attraction of traffic from the existing N81 National Route which has a significantly higher number of sensitive receptors within 50m of its carriageway than the Preferred Route Option	Moderately Negative	The proposed route impacts the hydrogeological, geology, architectural, ecological and properties features in the area in a negative manner along with more positive impacts in the air pollution/ climate change parameter and archaeological parameter.
	Noise and Vibration	Moderately Negative	Scheme will pass by a number of properties which are not currently impacted by road traffic noise. Noise mitigation measures will need to be incorporated into scheme to reduce noise levels.		
	Waste	Slightly Negative	Regarding the proposed cutting at Slade Valley, no ground investigation has been carried out in the area however it is assumed that all rock which is excavated at this location will be deposited onsite.		
	Biodiversity - Flora & Fauna	Moderately Negative	The magnitude and significance of the potential impact on the ecological sites and designated areas for nature conservation will depend on a number of factors including the final route alignment and detailed design layout, final CPO area etc. The pNHA at Crookings Glen/Slade Valley which is of national importance will be impacted in negative terms while Site 12 which is of local importance, and is located west of Blessington, will also be impacted in negative terms.		
	Agriculture	Moderately Negative	There are a high number of land parcels with those affected being primarily of average to good land quality. Land use is mainly grassland based. There is a relatively moderate level of landtake on the route option. Land Severance of affected land parcels is moderate to major. There is a level of farmyard disturbance.		

	<b>Non-agriculture</b>	Moderately Negative	The route will have a direct impact on 10 households and the golf amenities at Blessington Pitch and Putt Club, South County Golf Club and Hazelgrove Golf Club.
	<b>Architectural Heritage</b>	Highly Negative	The route will have a direct significant impact on the boundary wall of Russborough Demesne in two locations. Russborough House is a National Monument and its boundaries, footprint and setting form part of its significance. The NIAH designated farmyard site at Raheen will experience a profoundly negative impact as a result of the scheme while the parkland of Bishopsland House and other features will experience moderately negative impacts.
	<b>Archaeological &amp; Cultural Heritage</b>	Moderately Negative	All of the impacted sites are recorded sites in the Record of Monuments and Places (RMP); however, none have National Monuments status. The Profound Negative Impact sites consist of a standing stone at Raheen (A108), a possible section of the Medieval boundary of Saggart Commons at Crooksling/Slade (A133) and a possible section of The Pale boundary at Kiltalown (A138). The Significant Negative Impact sites consist of a cairn site at Crooksling (A118) and a possible church site at Kiltalown (A140). The magnitude and significance of the potential impacts on the archaeological sites will depend on a number of factors including the final route alignment and detailed design layout, test excavations and testing to determine the nature of the sites
	<b>Landscape and Visual Amenity</b>	Slightly Negative	This route has a high preference from a landscape and visual perspective. Visually profound impacts will arise at a small number of properties where the route impinges on the property boundary, or the property is in close proximity to a cutting. The visual and landscape impacts along the route are associated with impacts on national sites such as Russborough House and Slade Valley/Crooksling Glen pNHA along with county sites including the setting of Bishopsland Demesne and the Dublin Mountain area, mature trees on the eastern edge of Deerpark, protected views from the N81 and R114 and the setting of St Bridget's Hospital at Slade Valley.
	<b>Soils &amp; Geology</b>	Moderately Negative	The proposed route will encounter soft ground at Brittas River and will require extensive cutting in the vicinity of Slade Valley/ Crooksling Glen.

	<b>Hydrology</b>	Slightly Negative	The proposed route passes in the vicinity of Poulaphuca Reservoir Catchment although the impact is of such a small magnitude so as to be imperceptible. The impact on the hydrology at Slade Valley/Crooksling Glen pNHA would result in a slightly negative impact from the proposed route while Site No 18 will experience a moderately negative impact.		
	<b>Hydrogeology</b>	Moderately Negative	The proposed route passes through the sensitive area at Blessington however the impact is only slightly negative. The proposed route passes through Ecological Site No. 18 in the vicinity of a possible Annex 1 Habitat which impacts the hydrogeological features at the site in a significantly negative manner while the high vulnerability of the aquifer areas at Slade Valley/Crooksling will also experience a significantly negative impact from the proposed route.		
<b>Safety</b>	<b>Accident Reduction</b>	Moderately positive	The proposed scheme would prevent 22 accidents per annum which would provide a cumulative benefit of €31.0M	Slightly Positive	The proposed scheme would prevent 22 accidents per annum which would provide a benefit of €31.0M while the security aspect for road users can only be determined at detailed design stage.
	<b>Security</b>	Neutral	The impact on personal security of Road Users is largely dependent on the detailed design elements of the scheme (for example lightly used pedestrian underpasses are considered unsafe environments at night). Such detail is not available at corridor selection stage of scheme implementation and the impact can therefore not be determined.		
<b>Economy</b>	<b>Efficiency and Effectiveness</b>	Highly Positive	The preferred route corridor will decrease transit duration, thereby improving transportation network efficiency and reducing transportation cost.	Slightly Positive	The proposed route will create a more efficient transport network in this area and may lead to inward investment thus creating enhanced local employment opportunities arising from the enhanced local economy.
	<b>Wider Economic Impacts</b>	Slightly Positive	The improved transport links to Blessington and surrounding areas may lead to inward investment in tourism related infrastructure and facilities in the vicinity of the Blessington Lakes and continued development of Russborough House as a tourist destination. The proposed route at Blessington may create agglomeration benefits through clustering of economic activity near the proposed bypass route.		
	<b>Funding Impacts</b>	Neutral	None.		

Accessibility and Social Inclusion	Deprived areas	Slightly Positive	The proposed route options intersects with the "RAPID Strand 1" Area of Jobstown, therefore, this is a positive impact arising from the scheme. There are no CLAR designated areas along the N81 Route within the study area.	Slightly Positive	The proposed route will benefit business, employment opportunities and social activity in South Dublin, East Kildare and West Wicklow, particularly among those disadvantaged and vulnerable social groups such as the unemployed, older people, disabled and young mothers with children. These social groups experience particular barriers to participation in social and economic activities which the proposed scheme will address.
	Vulnerable Groups	Slightly Positive	The proposed route improves employment opportunities for vulnerable and deprived social groups. Scheme will improve road based public transport (bus services) between Blessington and Tallaght.		
Integration	Transport Integration	Moderately Positive	The proposed scheme will link East Kildare and West Wicklow with Dublin and provides improved long range traffic flows over local traffic distribution and access to transportation hubs in South Dublin.	Highly Positive	The improvement to the N81 National Route supports government transport and development policy objectives and it will improve public transport access within the area and to the national and international level network.
	Land Use Integration	Slightly Positive	Route Corridor is compatible with National, Regional, County and Local Development Plans and the Route promotes transport connectivity at the regional and national level and will not impact settlement objectives in a negative manner.		
	Geographical Integration	Highly Positive	The proposed route will indirectly facilitate improved transport efficiency and market efficiency through the enhanced access to the national and trans-european road network which facilitates access to Britain and mainland Europe.		
	Other Policy Integration	Moderately Positive	The proposed scheme assists in the achievement of the objectives of the National Development Plan 2007-2012 and Transport 21.		