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Wicklow County Council

N11/M11 Bus Priority Interim Scheme

Phase 2 - Long-list Option Sifting (Sub-Scheme B, Junction 7 to Junction 8)

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Contents

1. Introduction 1
2. Option Sifting Methodology 2
2.1 Overview 2
2.2 Weighting of Assessment Criteria 3
3. Initial List of Options 5
3.1 Existing Junctions and Accesses 5
3.2 Baseline Assumptions 8
4. Long-list of Options 9
5. Assessment of Options 10
5.1 Long List Sifting Matrix 10
5.2 Economy 10
5.3 Indicative Cost 13
5.4 Safety 13
5.5 Environment 14
5.6 Accessibility and Social Inclusion 15
5.7 Integration 15
5.8 Physical Activity 16
5.9 Summary 16
5.10 Outcomes of Sifting 17
6. Conclusions and Recommendations 17

Tables

Table 2-1 N11/M11 BPIS Project Objectives 2
Table 2-2 Project Objectives and Key Performance Indicators (KPIs) 4
Table 3-1 Existing Junctions / Accesses Northbound 7
Table 4-1 Long-list of Options – Sub-Scheme B, Junction 7 to Junction 8 Northbound 9
Table 5-1 Effectiveness of Northbound options in reducing bus journey time delay 12
Table 5-2 Indicative cost assessment 13
Table 5-3 Total weighted score and recommendations (northbound options) 16
Table 5-4 Summary of long-list sifting outcomes 17

Figures

Figure 1-1 Stage 2 Project Appraisal Process 1
Figure 3-1 Recently Constructed Service Road Southbound at Kilmacanogue 6

Appendices

Appendix A A-1
Option Schematics A-1

Appendix B B-1
Long List Sifting Matrix B-1

1. Introduction

This report details the Long-list Option Sifting Assessment for the N11/M11 Bus Priority Interim Scheme (hereafter the N11/M11 BPIS). As described in Section 8.3 of the Option Selection Report, the long-list assessment represents the first step in the revised Stage 2 Assessment process. It comprises the development of a long list of options aimed at resolving the previously identified deficiencies within Sub-Schemes B and C and the undertaking of a sifting exercise to establish how these options respond to the agreed project objectives. The recommendations of the option sifting exercise inform the list of feasible options to be taken forward for more detailed assessment.

This report specifically focuses on the section of Sub-Scheme B between Junction 7 (Bray South) and Junction 8 (Kilmacanogue), with a view to:

- Identifying feasible options for closing intermediate junctions/accesses
- Identifying feasible options for providing active travel facilities.

The overall process for completing the Stage 2 Project Appraisal Matrix is illustrated in Figure 1-1.



Figure 1-1 Stage 2 Project Appraisal Process

2. Option Sifting Methodology

2.1 Overview

A sifting exercise has been undertaken on the long list of options to assess how each option responded to the project objectives and to refine, if possible, the overall number of options taken forward for more detailed appraisal. In accordance with the TII Project Appraisal Guidelines and the Department of Transport Common Appraisal Framework (CAF)[1], objectives have been established under the six headline CAF criteria of:

- Economy
- Safety
- Environment
- Accessibility and Social Inclusion
- Integration
- Physical Activity.

The objectives defined at the outset of the N11/M11 BPIS are presented in Table 2-1 and are intended to allow a focused definition of options which can be examined both quantitatively and qualitatively against a series of required outcomes.

Table 2-1 N11/M11 BPIS Project Objectives

Criteria	Project Specific Objective
Economy	**Economy Objective 1:** • Provide the infrastructure to increase the people carrying capacity of the N11/M11 between Loughlinstown Roundabout and Junction 9 (Glenview) **Economy Objective 2:** • Deliver a practicable interim transport solution capable of delivering benefits required in the short/medium term **Economy Objective 3:** • Generate positive economic benefits to public transport users by: – Reducing bus journey times – Improving bus journey time reliability
Safety	**Safety Objective 1:** • To deliver bus priority measures which are clearly delineated and understood by general road users and bus drivers in the environment of an inter-urban route. **Safety Objective 2:** • Ensure bus priority can be delivered without adversely impacting on the safety of all road users.
Environment	**Environment Objective 1:** • To provide for more sustainable transport solutions on the N11/M11 corridor, supporting a balance of alternative modes and enabling a reduction in private car dependency and reducing the carbon intensity of travel.
Accessibility and Social Inclusion	**Accessibility & Social Inclusion Objective 1:** • To increase bus patronage along the N11/M11 corridor and enable sustainable travel to provide a faster and more reliable choice. **Accessibility & Social Inclusion Objective 2:** • To support improved access to the GDA for all transport users along the N11/M11 corridor.

[1] Department of Transport Common Appraisal Framework (CAF) for Transport Projects and Programmes (October 2020). It is noted that the Transport Appraisal Framework (TAF) was published by the Department of Transport in June 2023 and replaces the CAF. The requirements of the revised TAF guidance will be applied as the N11/M11 BPIS Project moves to the next phases (i.e. Phase 3 and subsequent phases).

Criteria	Project Specific Objective
Integration	**Integration Objective 1:** • To deliver a practicable interim transport solution which does not introduce significant constraint on the subsequent development of the N11/M11 Junction 4 to Junction 14 Improvement scheme. **Integration Objective 2:** • To support integration of road-based transport with other transport modes. **Integration Objective 3:** • To complement wider government transport policy.
Physical Activity	**Physical Activity Objective:** • To provide a facility that allows for the delivery of an attractive alternative mode of transport for communities which supports the creation of a healthier urban environment for active travel, through congestion relief.

In addition to the six headline CAF criteria, *Indicative Cost* has been extracted from the Economy criterion and assessed as a separate standalone criterion, resulting in a total of seven assessment criteria. To assess the respective merits of each option, a series of Key Performance Indicators (KPIs) have been defined as a measure for judging the alignment of options with the project objectives. Each option has then been qualitatively assessed, with an impact score determined based on the likely impact against each KPI, using the seven-point scale presented below.

- 7 – Major or highly positive
- 6 – Moderately positive
- 5 – Minor or slightly positive
- 4 – Not significant or neutral
- 3 – Minor or slightly negative
- 2 – Moderately negative
- 1 – Major or highly negative.

2.2 Weighting of Assessment Criteria

In developing the long-list sifting matrix, consideration has been given as to how each of the seven criteria should be weighted, to ensure that the individual impacts of each option have been robustly and appropriately assessed relative to each other.

The seven criteria each have varying numbers of KPIs as listed in Table 2-2. Accordingly, a summation of the impact scores will assign a weighting proportionate to the number of KPIs under each heading.

This approach recognises that, as an on-line scheme assessment, direct environmental impacts are expected to be similar in nature across all options and relatively minor in scale when compared against an off-line (i.e. greenfield) options assessment. By comparison, the safety conditions and cost are expected to vary significantly, so it is considered that these elements should be afforded a higher weighting in the final matrix.

Therefore, the seven criteria have been weighted as follows:

- For each option, the scores against each KPI (ranging from 1 – 7) have been summed to produce a total impact score under each of the seven assessment criteria
- The total impact score has then been converted to a weighted score under each of the seven assessment criteria.
- The weighted scores are derived as follows:
  - Equal weighting has been applied to the Economy, Environment, Accessibility & Social Inclusion, Integration and Physical Activity criteria. In each case, the impact score is converted to a weighted score based on marks out of 100

- An increased weighting has been applied to the Indicative Cost and Safety criteria, which are considered to be key differentiators and critical elements to the successful delivery of bus priority within Sub-Scheme B and Sub-Scheme C. In each case, the impact score is converted to a weighted score based on marks out of 200.

- The weighted scores under each of the seven criteria are summed to produce an overall total score for each option on the long list (expressed as marks out of 900 – i.e. 200 for Indicative Cost and Safety, and 100 for each of the remaining five criteria).

Table 2-2 Project Objectives and Key Performance Indicators (KPIs)

Criteria	Project Objective	Key Performance Indicator (KPI)
Economy (Weighted Max. Score = 100)	• To increase the people carrying capacity of the N11/M11 between Loughlinstown Roundabout and Junction 9 (Glenview) • Deliver an interim transport solution capable of delivering value for money • Generate positive economic benefits to public transport users by: – Reducing bus journey times – Improving bus journey time reliability	**Constructability:** • Extent of enabling/corrective works to deliver effective bus priority • Extent of demolition/disruption during construction • Extent of potential realignment of existing N11/M11 mainline **Bus Priority:** • Effectiveness of bus priority measures at key delay points
Indicative Cost (Weighted Max. Score = 200)	N/A (Cost has been assessed as a separate criterion)	Indicative Cost Range
Safety (Weighted Max. Score = 200)	• To deliver bus priority measures which are clearly delineated and understood by general road users and bus drivers in the environment of an inter-urban route. • Ensure bus priority can be delivered without adversely impacting on the safety of all road users.	**Compliance with TII Standard DN-GEO-03087:** • Junction strategy (merge/diverge closed) • Number of minor junctions closed • Requirement for departures • Number of conflict points • Extent of continuous bus priority achieved
Environment (Weighted Max. Score = 100)	• To provide for more sustainable transport solutions on the N11/M11 corridor, supporting a balance of alternative modes and enabling a reduction in private car dependency and reducing the carbon intensity of travel.	Circular Economy impact – degree of re-use of existing asset Impacts to community Impact on environmental constraints
Accessibility & Social Inclusion (Weighted Max. Score = 100)	• To increase bus patronage along the N11/M11 corridor and enable sustainable travel to provide a faster and more reliable choice. • To support improved access to the GDA for public transport users along the N11/M11 corridor.	**Bus Priority:** • Effectiveness of bus priority measures at key delay points
Integration (Weighted Max. Score = 100)	• To deliver a practicable interim transport solution which does not introduce significant constraint on the subsequent development of the N11/M11 Junction 4 to Junction 14 Improvement Scheme. • To support the integration of road-based transport with other transport modes. • To complement wider government transport policy.	**Compatibility with N11/M11 Scheme** • Extent that the form of option aligns with the N11/M11 J4-J14 Scheme Phase 2 Preferred Option • Extent of abortive works **Compliance with Government Policy**
Physical Activity (Weighted Max. Score = 100)	• To provide a facility that allows for the delivery of an attractive alternative mode of transport for communities which supports the creation of a healthier urban environment for active travel, through congestion relief.	**Active Travel Facility** • Provision of a safe alternative facility • Conflicts between active travel users and buses

3. Initial List of Options

Numerous options have been considered which seek to remove the conflict points at intermediate junctions and accesses and provide active travel facilities within Sub-Schemes B and C. The development of options has taken guidance from TII Publication DN-GEO-03087[2], which specifically notes the following in respect of minor junctions and accesses:

"In order to reduce conflict points and assist vehicles in navigating junctions, compact grade separated and left-in left-out junctions should be upgraded to have full merge and diverge layouts. Where space does not permit this, design organisations should carefully consider how the design will minimise the risk of vehicle conflict. Design organisations should review what measures can be implemented to improve the safety of the existing junction and its interaction with the scheme.".

"In line with the guidelines set out in DN-GEO-03060[3], the overriding principle is that direct vehicular access onto national roads should be avoided as far as practicable. Hard shoulder bus priority schemes should not contain direct accesses as per DN-GEO-03060. Where a hard shoulder bus priority measures scheme is being undertaken on a Type 1 Dual Carriageway all existing accesses should be closed. Where it is not possible to remove a direct access, a departure is required as set out in DN-GEO-03060."

While the primary basis behind options development is to identify ways of closing existing minor junctions and accesses northbound and southbound within Sub-Schemes B and C – as required by TII Standard DN-GEO-03087 – the challenges involved in doing so have meant that the following approach has been taken:

- The closure of many of the legacy accesses along the N11 dual carriageway poses very specific and difficult challenges in terms of engineering feasibility, environmental impact, and cost.
- Although the retention of any minor junction or direct access would require a departure, a pragmatic view has been taken in line with the objectives of the scheme, which does not seek to close each access at all costs or impact. It may, in certain cases, be preferable to retain an access and seek a departure from TII Standard DN-GEO-03087.
- It is acknowledged that the presence of certain minor junctions/accesses poses a greater impediment to the safe operation of bus priority than others. For example, some accesses are more geometrically sub-standard than others, such that it would not be acceptable to retain the access along the hard shoulder bus priority measure under any circumstance. In other cases, it may be possible to retain an existing access and mitigate or manage any safety implications to an acceptable level.
- Furthermore, the degree to which each minor junction or access is likely to impede bus journey time is also variable. Highly trafficked accesses with greater turning movements will result in higher weaving volumes into the hard shoulder, frequently slowing the progress of the bus through the network. Conversely, lightly trafficked accesses may impede bus priority only very occasionally.
- Options have therefore been developed which close all accesses, or only close certain accesses within Sub-Schemes B and C. The aim of the analysis is to determine the optimal junction strategy in consideration of the specific objectives of the scheme.

3.1 Existing Junctions and Accesses

For the purposes of undertaking the assessment, all existing intermediate junctions and direct accesses between Junction 7 (Bray South) and Junction 8 (Kilmacanogue) have been considered. In addition, the assessment has also considered the possible interventions at the primary junction access points, as these also represent a point of potential conflict and delay for bus traffic.

[2] Hard Shoulder Bus Priority on Motorways and Type 1 Dual Carriageway, DN-GEO-03087, TII (May 2022). Available from: https://www.tiipublications.ie/library/DN-GEO-03087-01.pdf.

[3] Geometric Design of Junctions (priority junctions, direct accesses, roundabouts, grade separated and compact grade separated junctions), DN-GEO-03060, TII (May 2023). Available from: https://www.tiipublications.ie/library/DN-GEO-03060-03.pdf.

This ensures that the assessment considers the overall impacts on bus priority across the full extent of the N11 route segment in question (i.e. Junction 7 to Junction 8 in this case).

It is noted that the recent construction of a southbound parallel service road through Kilmacanogue has removed all direct accesses to the N11 mainline in the southbound direction. The construction of the N11 Parallel Service Road at Kilmacanogue[4] has also eliminated the southbound hard shoulder through the village, as shown in Figure 3-1. The spatial constraints over the extent of the parallel service road do not allow further widening to reinstate a hard shoulder and thereby accommodate a future hard shoulder bus priority measure on the mainline without substantial property acquisition. Considering this, it has been determined that any southbound bus priority measures will not extend south of Junction 7 (Bray South), with buses merging into the general traffic lanes beyond this point. Therefore, no options assessments for intermediate junction/access closures have been undertaken in the southbound direction.

Furthermore, the Kilmacanogue to Southern Cross Greenway Scheme (separately being progressed by Wicklow County Council) is proposing an off-line Active Travel Facility between the Bray Retail Park Roundabout on the R768 Southern Cross Road and the existing Junction 8 (Kilmacanogue) eastern roundabout. It is considered therefore that safe alternative provision for pedestrians and cyclists between Bray and Kilmacanogue is likely to be best served by the greenway scheme.

Accordingly, the full list of junctions and access points considered within this assessment is presented in Table 3-1 for the northbound direction.



Figure 3-1 Recently Constructed Service Road Southbound at Kilmacanogue

[4] The N11 Parallel Service Road at Kilmacanogue opened to traffic in September 2021

Table 3-1 Existing Junctions / Accesses Northbound

Junction / Access Description	Existing Junction / Access Image
Name: Junction 7 Northbound Diverge **Location:** Sub-Scheme B Northbound **Type:** Grade separated junction	
Name: Private access (Woodlands Academy) **Location:** Sub-Scheme B Northbound **Type:** Direct access	
Name: L1019 Glencormick / Avoca **Location:** Sub-Scheme B Northbound **Type:** Segregated Service Road with diverge / merge layout	
Name: Junction 8 Northbound Merge **Location:** Sub-Scheme B Northbound **Type:** At-grade auxiliary lane merge	

3.2 Baseline Assumptions

It should be noted that the following baseline assumptions have been applied for the purposes of the long-list sifting exercise:

- The N11/M11 mainline cross-section is assumed to consist of 2 general traffic lanes and a hard shoulder bus priority measure as per the requirements outlined within TII Standard DN-GEO-03087. For appropriate comparison of options, the sifting exercise has assessed the impacts and indicative cost of the additional infrastructure associated with the option – i.e. the mainline cross-section has not been assessed or costed as part of the scoring and assessment of options.
- High level cost estimates developed for the purposes of the long-list sifting exercise are preliminary in nature and subject to change.
- At the time of undertaking the long-list option assessment, microsimulation traffic modelling was not available. Considering this, only qualitative assessments of the options have been prepared for this stage.
- It is assumed that the Junction 8 northbound merge would adopt a modified Through Junction Running (TJR) with bus priority signalling treatment to ensure additional prioritisation of buses. This would be provided in the form of a signal-controlled junction in advance of the merge (to be designed during later stages).
- It is assumed that the existing N11 mainline direct access to the Woodlands Academy is closed across all options, and an alternative link is provided to connect to the L1001 Kilcroney Lane.
- It is assumed that the Junction 7 northbound diverge remains open and a TJR Fork Diverge treatment is provided.

4. Long-list of Options

The long list of options considered within this section of the corridor are presented in Table 4-1 for the northbound direction. Schematics of the options are presented in Appendix A. Each option covers the full extent of the N11 between Junction 7 and Junction 8 and is defined by the series interventions proposed at each junction/access point.

Table 4-1 Long-list of Options – Sub-Scheme B, Junction 7 to Junction 8 Northbound

Northbound Options	Intervention Proposed at Junction/Access:			
	Junction 7 Northbound Diverge	Woodlands Academy Access	Glencormick/Avoca Service Road	Junction 8 Northbound Merge
Option 1 (Closure of Glencormick / Avoca Service Road)	Apply Through Junction Running (TJR)	Close Permanently (Alternative link provided to L1001 Kilcroney Lane)	Closed from mainline – access provided to local movements only via connection between L1019 Glencormick Road and Avoca	Apply Through Junction Running (TJR) with bus priority signalling at merge
Option 1A (Retention of Glencormick / Avoca Service Road for all traffic)	Apply Through Junction Running (TJR)	Close Permanently (Alternative link provided to L1001 Kilcroney Lane)	Retained – access to mainline for buses and general traffic	Apply Through Junction Running (TJR) with bus priority signalling at merge
Option 2 (Retention of Glencormick / Avoca Service Road for buses only, with Rockfield Park to Junction 8 Connection)	Apply Through Junction Running (TJR)	Close Permanently (Alternative link provided to L1001 Kilcroney Lane)	Closed – mainline access provided for buses only. New connection between Glencormick / Avoca and Junction 8 provided via Rockfield Park	Apply Through Junction Running (TJR) with bus priority signalling at merge

5. Assessment of Options

5.1 Long List Sifting Matrix

The Long List Sifting Matrix is presented in Appendix B.

5.2 Economy

5.2.1 Constructability

The objective to deliver a practicable interim scheme has been assessed based on the expected constructability challenges associated with each option. As with the cost estimates, the constructability assessment considers works additional to the provision of the hard shoulder bus priority measures – which is consistent across all options. Options which involve significant enabling works/re-alignment of the mainline and/or demolition and reconstruction of existing infrastructure have been scored negatively, while options which optimise the use of existing infrastructure have been scored positively.

The following is noted in relation to the **Northbound** option assessments:

- Option 1A and Option 2 involve minimal additional construction works and were therefore considered to be moderately positive with a score of 6.
- The additional works required for Option 1 involve substantial realignment of the existing two-way parallel service road to allow for widening of the N11 mainline with two lanes and bus priority within the hard shoulder, while maintaining separation between the mainline and parallel road. Considering this, the option was considered to be minor or slightly negative with a score of 3.

5.2.2 Bus Priority

The objectives to increase people carrying capacity and generate positive economic benefits can be related to the respective bus journey time benefits achieved by options. At this stage, detailed microsimulation modelling is not available to quantify and evaluate journey time performance across the options. Considering this, a qualitative assessment of the options has been undertaken based on the expected effectiveness in addressing delay points for a bus moving along the corridor. Options which do not address delay points which could otherwise impede bus priority are assigned a lower score, with the assessment factoring in a higher weighting to more significant delay points along the corridor, such as Junction 7 northbound diverge and Junction 8 northbound merge.

To explain this more clearly:

- For each junction or minor access, a ranking has been assigned to represent the likely degree to which that junction or minor access can be expected to delay or impede bus traffic operating in the hard shoulder. Using a ranking scale of 1-5, a rank of 1 indicates minor delay potential, with a rank of 5 indicating very significant delay potential. In general, higher rankings are assigned to accesses where turning volumes (and associated weaving movements and/or queuing) are highest, as these movements can be expected to impede bus priority.
- The expected effectiveness considers the relative ability of each junction treatment or intervention to mitigate that delay point. Using a scoring scale of 1-7, a score of 1 indicates that the intervention will have minimal impact in addressing the delay point, whereas a score of 7 indicates that the proposed intervention is fully effective in addressing the likely delay to bus traffic. Interventions which propose to close a minor junction or access are assigned the highest score as the delay point is removed altogether.
- The delay ranking (1-5) and expected effectiveness score (1-7) are multiplied to calculate an overall score for each option, which serves as a metric for quantifying the relative effectiveness of the proposed junction intervention in reducing bus journey time delay and hence maximising bus priority.

- Using the overall score for each option, an impact score is then assigned aligning with the TII PAG scaling system as presented in Section 2.1.

The assessments are presented in Table 5-1.

The following is noted in relation to the **Northbound** option assessments:

- From a functionality perspective, Option 1 and Option 2 provide full priority through the Glencormick/Avoca area as the service road is closed to local traffic with dedicated bus priority achieved. It should be noted however that delays to bus movement are still likely to be experienced at the Junction 8 merge and Junction 7 diverge given the anticipated volumes of general traffic conflicting with bus traffic. These options are both considered to be minor or slightly positive in the qualitative assessment.
- Option 1A requires buses to share the parallel service road with local traffic movements to the L1019 Glencormick Road and Avoca. Due to the reduced priority achieved, this option is considered to be neutral in the qualitative assessment.

Table 5-1 Effectiveness of Northbound options in reducing bus journey time delay

Junction / Access	Delay Potential (D) (1-5)	Option 1		Option 1A		Option 2	
		Expected Effectiveness (E) (1-7)	Score (DxE)	Expected Effectiveness (E) (1-7)	Score (DxE)	Expected Effectiveness (E) (1-7)	Score (DxE)
J8 Northbound Diverge	Moderate (3)	4	12	4	12	4	12
J8 Northbound Merge	Moderate (3)	4	12	4	12	4	12
Glencormick/Avoca Service Road (Diverge)	Minor (2)	7	14	2	4	7	14
Glencormick/Avoca Service Road (Merge)	Very Minor (1)	7	7	2	2	7	7
Woodlands Academy Access	Very Minor (1)	7	7	7	7	7	7
J7 Northbound Diverge	Very Significant (5)	3	15	3	15	3	15
Overall Score / Maximum Score		**67 / 105**		**52 / 105**		**67 / 105**	
Overall Effectiveness of Option (TII PAG Scale 1-7)		**Minor or Slightly Positive – 4.5**		**Not Significant or Neutral – 3.5**		**Minor or Slightly Positive – 4.5**	

5.3 Indicative Cost

Indicative Cost has been considered as a separate criterion due to the expected variability across the options. Order of magnitude cost estimates have been prepared based on the feasibility designs prepared for the options and are presented in Table 5-2. The following assumptions are noted:

- The cost estimates are high-level in nature and subject to change with further information available in future stages.
- Commensurate with the high-level nature of the long-list sifting exercise, the impact scores for cost have been determined based on an expected indicative cost range for an option, rather than the absolute cost. This is considered appropriate for the comparison of options at this stage, and the costs will be developed to further detail for options which are progressed to the Stage 2 Project Appraisal Matrix for wider and more detailed assessments.
- The impact score range for the cost assessment considers a relative range of costs for the northbound options.
- Property acquisition costs have been based on valuation information provided by an external land valuer.

Table 5-2 Indicative cost assessment

Option	Indicative Cost	Score	Notes
Northbound Options			
Option 1	Base Cost for SS-B plus €3.5 – 4.0 million	1	High cost attributable to realignment of existing Glencormick/Avoca Service Road to create additional space for N11 hard shoulder bus priority
Option 1A	Base Cost for SS-B plus €1.5 – 2.0 million	5	Costs largely attributable to implementation of TJR at primary junctions
Option 2	Base Cost for SS-B plus €2.0 – 2.5 million	4	Costs attributable to implementation of TJR at primary junctions and provision of new local link via Rockfield Park

5.4 Safety

The N11/M11 BPIS project objectives include specific aims in respect of road safety, to deliver bus priority measures which are clearly delineated and understood by road users, and without adversely impacting on the safety of all road users.

The safety assessment has therefore considered the degree of compliance of the options with TII Standard DN-GEO-03087, including how the options have achieved a reduction in the number of conflict points, with the closure of intermediate junctions and/or major junction merges and diverges, contributing to improvements to safety. In addition, the assessment of options has considered the likely requirement for departures and the level of continuous bus priority achieved.

The following is noted in relation to the **Northbound** option assessments:

- Options 1 and 2 close all intermediate junctions and accesses to/from the N11 mainline, including the Woodlands Academy access and the Glencormick/Avoca Service Road. While this can be expected to have a beneficial safety impact on the operation of the N11 mainline, both options would require traffic using the existing service road to access destinations including Avoca, Glencormick Business Park and the L1019, to do so via alternative routes, with consequent safety implications. In the case of Option 1, traffic would divert via Junction 7 and Kilcroney Lane (L1001) to the north, which is a steeply graded and sub-standard local route. In the case of Option 2, traffic would divert via a new connection through Rockfield Park, which would bring additional traffic into a residential area. Overall, the negative safety impacts arising from the necessary detours are considered to outweigh the safety benefits to N11 operation, with both options considered to be moderately negative with a score of 2.

- Option 1A retains the existing Glencormick/Avoca Service Road in its current configuration with buses required to share the two-way parallel road with general traffic. This would create additional conflict points between buses and general traffic and retain a reduced weaving length between junctions. This option was therefore considered to be minor or slightly negative with a score of 3.
- It should be noted that for all options, it has been assumed that a safer alternative for active travel users will be provided via the Kilmacanogue to Southern Cross Greenway Scheme (separately being progressed by Wicklow County Council), such that this is not a differentiator between the options.

5.5 Environment

5.5.1 Circular Economy Impact

Under the heading of Circular Economy, the degree of re-use of the existing infrastructure has been considered in the options assessment.

The following is noted in relation to the **Northbound** option assessments:

- Option 1 requires realignment of the existing two-way section of the Glencormick/Avoca Service Road and separation to create additional space to enable provision of hard shoulder bus priority along a (widened) N11 hard shoulder. As such, this option is considered to be moderately negative with a score of 2.
- Option 1A and Option 2 allow for greater re-use of existing pavement, by re-using the existing road space along the N11 corridor and/or via Rockfield Park (Option 2). Both options are considered to be neutral with a score of 4.

5.5.2 Impacts to Community

Impacts to community are assessed in consideration of the expected impacts of junction closures on existing businesses and nearby residents.

The following is noted in relation to the **Northbound** option assessments:

- Option 1 proposes the closure of the existing Glencormick/Avoca Service Road which would alter existing access arrangements into Avoca, the Glencormick Business Park and other residents and businesses along the L1019 local road. Although alternative access arrangements would be possible via Junction 7 and Kilcroney Lane (L1001) to the north, the length of the detour and unsuitability of these alternative routes would give rise to negative accessibility impacts for businesses and residents who currently utilise the Glencormick/Avoca Service Road as their primary point of access. As such, this option is considered to be moderately negative with a score of 2.
- Option 1A is as per the existing scenario with accesses to/from the mainline retained. The option is therefore considered to be neutral with a score of 4.
- Option 2 closes local access from the N11 to Glencormick/Avoca, with the existing service road converted into a priority facility for buses only. As per Option 1, this would impact any existing businesses and residents currently utilising the Glencormick/Avoca Service Road as their primary point of access. Additionally, however, the provision of an alternative link to Glencormick/Avoca via a connection through Rockfield Park would increase traffic volumes through a residential road, giving rise to a significant negative local impact. Option 2 is therefore considered to be major or highly negative with a score of 1.

5.5.3 Impacts on Environmental Constraints

Impacts on environmental constraints are assessed in consideration of the extent of widening and/or off-line construction works required, and the degree to which the options could impact on identified environmental constraints.

The following is noted in relation to the **Northbound** option assessments:

- Option 1 may have the potential to impact on Glencormick House (BH191) given the likely extent of widening/realignment required to enable retention if the service road with provision of hard shoulder bus priority measures on the N11 mainline. Although not subject to statutory protection, the impact is considered to be moderately negative with a score of 2.

- Option 1A and Option 2 are not expected to have any significant impacts on environmental constraints. Option 1A largely retains the existing scenario at the Glencormick/Avoca Service Road and is considered to be neutral with a score of 4. However, the provision of the new link connection through Rockfield Park as part of Option 2 would increase traffic in proximity to sensitive receptors in a residential area, as well as introducing a negative impact on general amenity of residents and on local journey amenity. Option 2 is therefore considered to be minor or slightly negative with a score of 3.

5.6 Accessibility and Social Inclusion

For the accessibility and social inclusion assessment, it is noted that the options are not geographically distinct, hence the positive impacts of bus priority measures proposed as part of each option will all serve the same geographical area. Considering this, the accessibility and social inclusion assessment and scoring has been based on the qualitative assessment for bus priority as outlined in Section 5.2.2.

5.7 Integration

5.7.1 Integration with N11/M11 Main Scheme

It is a key objective of the N11/M11 BPIS to deliver a practicable interim transport solution which does not introduce significant constraint on the subsequent development of the N11/M11 Junction 4 to Junction 14 Improvement Scheme (N11/M11 J4-J14 Scheme). The integration assessment has therefore considered the degree to which each option could be readily integrated into the Phase 2 preferred option for the future N11/M11 J4-J14 Scheme.

The following is noted in relation to the **Northbound** option assessments:

- Option 1 proposes the closure of all northbound intermediate junctions and accesses between Junction 7 (Bray South) and Junction 8 (Kilmacanogue). This aligns with the N11/M11 J4-J14 Scheme preferred option. However, the realignment of the two-way section of the Glencormick/Avoca Service Road and the introduction of bus priority within the mainline hard shoulder will impact the northbound service road design proposed as part of the N11/M11 J4-J14 Scheme preferred option. In addition, the implementation of TJR at the Junction 8 northbound merge with bus priority signalling, is inconsistent with the N11/M11 J4-J14 Scheme preferred option, which proposes the closure of this merge and provision of a one-way parallel service road northbound to a point beyond the L1019 Glencormick Road. Option 1 is considered to be moderately negative with a score of 2.

- Option 1A retains the Glencormick/Avoca Service Road with buses sharing the service road with general traffic. This option also proposes the implementation of TJR at the Junction 8 northbound merge with bus priority signalling, which is inconsistent with the N11/M11 J4-J14 Scheme preferred option, which proposes the closure of this merge and provision of a one-way parallel service road northbound to a point beyond the L1019 Glencormick Road. Consequently, Option 1A is expected to involve a level of abortive works and is therefore considered to be minor or slightly negative with a score of 3.

- Option 2 proposes the closure of all northbound intermediate junctions and accesses between Junction 7 (Bray South) and Junction 8 (Kilmacanogue). This aligns with the N11/M11 J4-J14 Scheme preferred option. However, the retention of the Junction 8 (Kilmacanogue) northbound merge (with implementation of TJR and bus priority signalling) involves a similar level of abortive works as the other options. Therefore, Option 2 is considered minor or slightly negative with a score of 3.

5.7.2 Alignment with wider government policy

All options aim to deliver an improved public transport corridor that will encourage and support investment, tourism and employment and support a balance of alternative modes within the study area. While the degree to which each option delivers the corridor may vary, the intention to align with government policy is not seen as a differentiating factor at this stage. Considering this, all options are considered to be minor or slightly positive with a score of 5.

5.8 Physical Activity

One of the key aspects of the revised design basis for the Stage 2 assessments has been to provide bus priority measures only where there is no adverse impact on any road users. To achieve this, Active Travel facilities that are segregated from the mainline (on-line / off-line) have been considered within the options development.

As noted previously, the Kilmacanogue to Southern Cross Greenway Scheme (separately being progressed by Wicklow County Council) is proposing an off-line Active Travel Facility between the Bray Retail Park Roundabout on the R768 Southern Cross Road and the existing Junction 8 (Kilmacanogue) eastern roundabout. It is considered therefore that safe alternative provision for pedestrians and cyclists between Bray and Kilmacanogue is likely to be best served by the greenway scheme. As this is not a differentiator between the options, all northbound options have been considered neutral with a score of 4.

5.9 Summary

5.9.1 Northbound Options

A summary of the total weighted score for northbound options is provided in Table 5-3.

Table 5-3 Total weighted score and recommendations (northbound options)

Criterion	Option 1	Option 1A	Option 2
Economy (/100)	54	68	75
Cost (/200)	29	143	114
Safety (/200)	57	86	57
Environment (/100)	29	57	38
Accessibility & Social Inclusion (/100)	64	50	64
Integration (/100)	50	57	57
Physical Activity (/100)	57	57	57
Total Weighted Score	**339**	**518**	**463**
Recommendation	**Discounted**	**Progressed**	**Progressed**

The following recommendations are noted in relation to the northbound options:

- Option 1 achieved the lowest score in the assessment. While continuous bus priority is achieved through the Glencormick/Avoca area, Option 1 involves significant re-alignment of the existing two-way service road to enable the provision of hard shoulder bus priority measures on the N11 mainline and therefore involves the largest degree of new pavement construction. Additionally, an impact to Glencormick House (BH191) is likely, while 4 properties are expected to be partially impacted due to the re-alignment of the service road. Option 1 is also expected to have the highest cost and re-routing of traffic to Glencormick/Avoca via unsuitable routes is expected to have an adverse impact on safety. Considering the impacts noted, it is recommended that Option 1 is discounted.

- Option 1A achieved the highest score in the assessment. Buses are expected to use the local road through Glencormick/Avoca with the merge and diverge retained in its current configuration. While this is expected to result in a reduced level of bus priority, it is understood that the local trip demand to the Avoca business area is highest during the weekend peaks rather than the weekday morning and evening peak hours. As such, delays to a bus during the peak periods may be manageable.

The retention of the two-way parallel road also creates additional conflict points between buses and general traffic. Notwithstanding, it is expected to operate as per the existing configuration and avoids the requirement for detours via unsuitable routes.

Overall, it is recommended that Option 1A is progressed to Stage 2A for further assessment.

- Option 2 achieved the second highest score in the assessment. This arrangement optimises the use of the existing two-way parallel road at Glencormick/Avoca, with provision for buses only. As such, continuous bus priority through this area achieved. Option 2 proposes that the connection between the Avoca access road and Glencormick (L1019) are closed, with cul-de-sacs provided. A new connection is proposed between the Avoca/Glencormick Business Park to Junction 8 via Rockfield Park. It should be noted that this would increase traffic volumes through a residential area, with safety implications and potentially negative impacts on sensitive receptors. It is recommended that Option 2 is progressed to Stage 2A to better understand the impacts and appraise in further detail.

5.10 Outcomes of Sifting

A summary of the initial option/alternative sifting is presented in Table 5-4.

Table 5-4 Summary of long-list sifting outcomes

Option / Alternative	Name	Outcome of Sifting Exercise	
Junction 7-8 Northbound			
Option 1	Closure of Glencormick / Avoca Service Road	Option Discounted	✗
Option 1A	Retention of Glencormick / Avoca Service Road for all traffic	Progress option and assess in further detail as part of Stage 2A	✓
Option 2	Retention of Glencormick / Avoca Service Road for buses only, with Rockfield Park to Junction 8 Connection	Progress option and assess in further detail as part of Stage 2A	✓

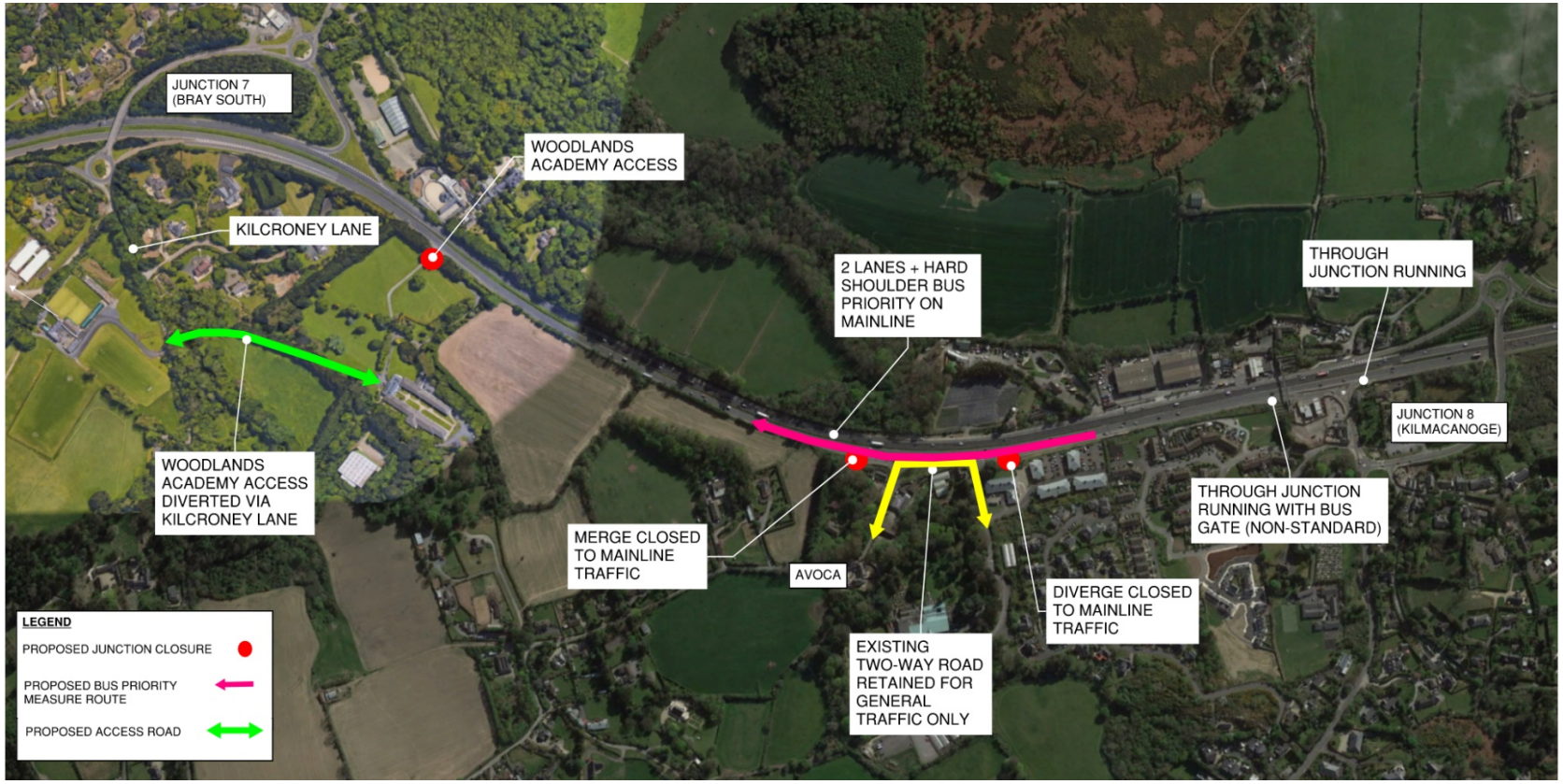
6. Conclusions and Recommendations

From the initial sifting exercise, it is evident that Option 1 failed to respond positively to the project objectives due to the retention of intermediate junctions, high cost, safety implications and environmental impacts. Options 1A and 2 have potential at this stage to fulfil some or many objectives and / or require further investigations to be undertaken before this can be determined – these have been progressed to the Stage 2A assessments.

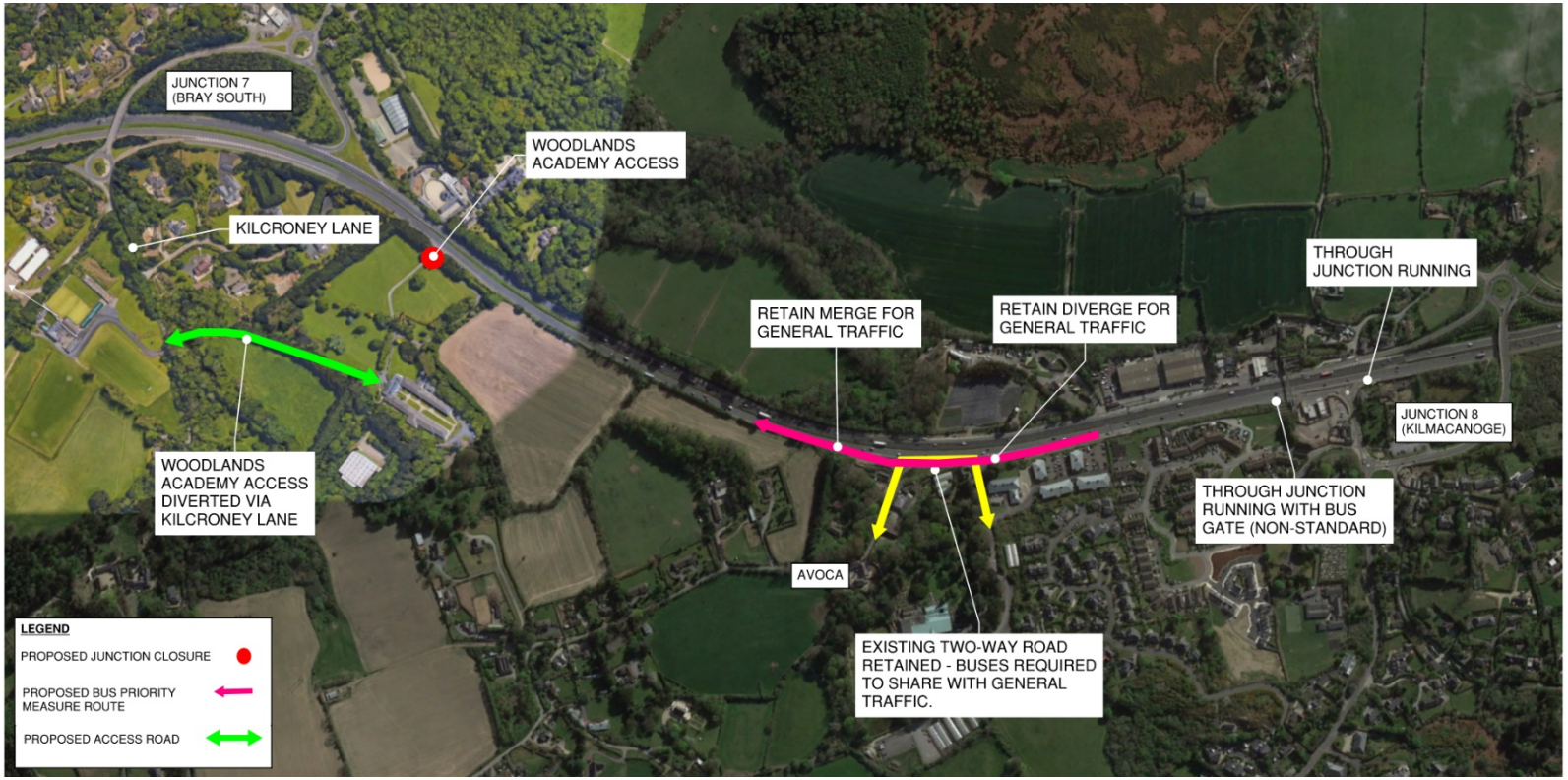
Appendix A

Option Schematics

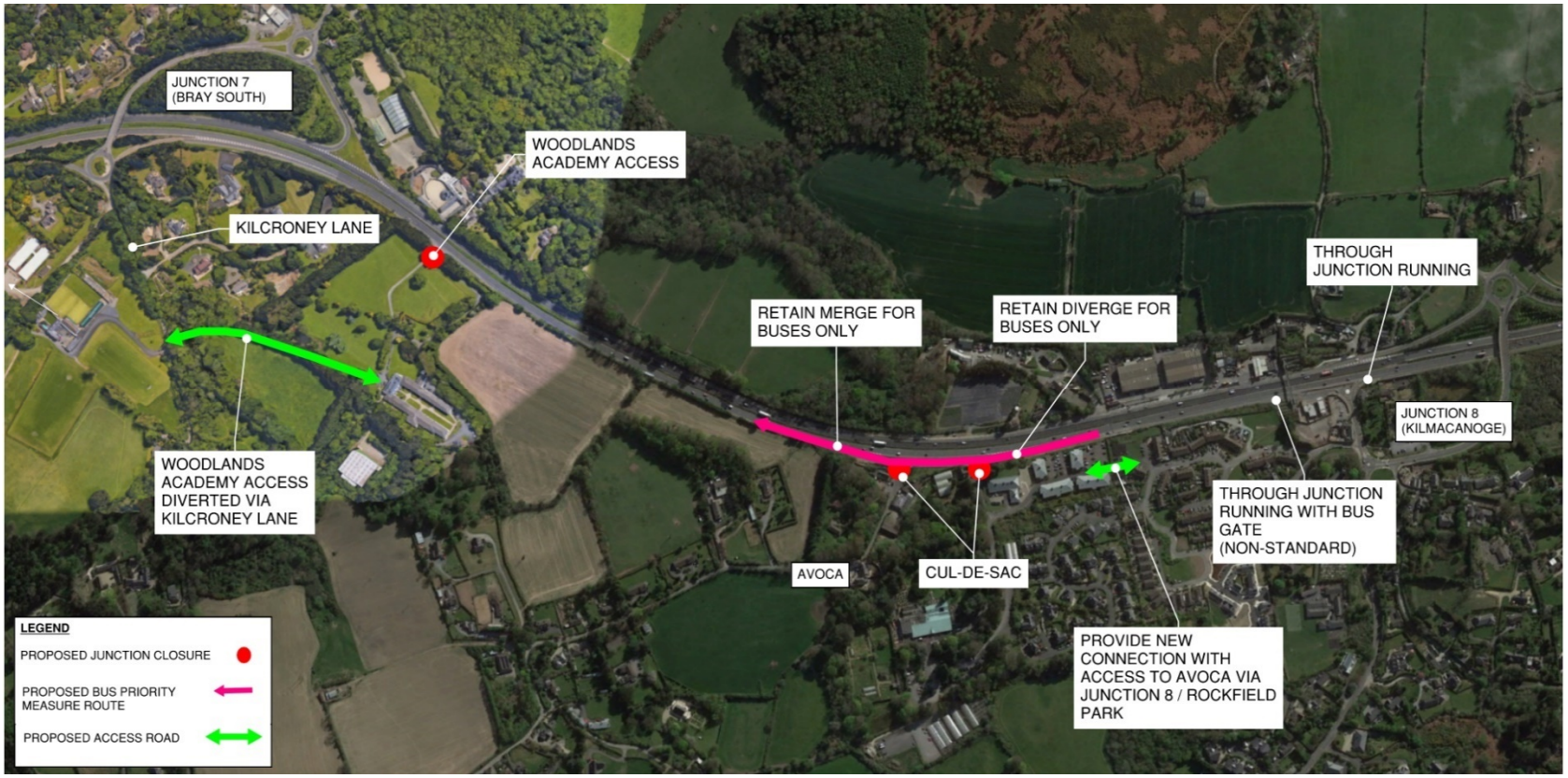
Northbound Options	Intervention Proposed at Junction/Access:			
	Junction 7 Northbound Diverge	**Woodlands Academy Access**	**Glencormick/Avoca Service Road**	**Junction 8 Northbound Merge**
Option 1 (Closure of Glencormick / Avoca Service Road)	Apply Through Junction Running (TJR)	Close Permanently (Alternative link provided to Kilcroney Lane)	Closed from mainline – access provided to local movements only	Apply Through Junction Running (TJR) with bus priority signalling at merge
Access Open (✓) / Closed (✖)	✓	✖	✖	✓



Northbound Options	Intervention Proposed at Junction/Access:			
	Junction 7 Northbound Diverge	**Woodlands Academy Access**	**Glencormick/Avoca Service Road**	**Junction 8 Northbound Merge**
Option 1A (Retention of Glencormick / Avoca Service Road for all traffic)	Apply Through Junction Running (TJR)	Close Permanently (Alternative link provided to Kilcroney Lane)	Retained – access to mainline for buses and general traffic	Apply Through Junction Running (TJR) with bus priority signalling at merge
Access Open (✓) / Closed (✖)	✓	✖	✖	✓



Northbound Options	Intervention Proposed at Junction/Access:			
	Junction 7 northbound diverge	**Woodlands Academy Access**	**Glencormick/Avoca Service Road**	**Junction 8 northbound merge**
Option 2 (Retention of Glencormick / Avoca Service Road for buses only, with Rockfield Park to Junction 8 Connection)	Apply Through Junction Running (TJR)	Close Permanently (Alternative link provided to Kilcroney Lane)	Closed – mainline access provided for buses only. New connection between Glencormick / Avoca and Junction 8 provided via Rockfield Park	Apply Through Junction Running (TJR) with bus priority signalling at merge
Access Open (✓) / Closed (✖)	✓	✖	✖	✓



Appendix B

Long List Sifting Matrix

Assessment Criteria	Project Objectives	Key Performance Indicators (KPI)	Option 1 (Closure of Glencormick / Avoca Service Road) • TJR applied at Junction 7 NB Diverge • TJR applied at Junction 8 NB Merge •All other intermediate junctions/accesses closed		Option 1A (Retention of Glencormick / Avoca Service Road for all traffic) • TJR applied at Junction 7 NB Diverge • TJR applied at Junction 8 NB Merge •Woodlands Academy N11 acces closed •Glencormick / Avoca Service Road retained (all traffic)		Option 2 (Retention of Glencormick / Avoca Service Road for buses only, with Rockfield Park to Junction 8 Connection) • TJR applied at Junction 7 NB Diverge • TJR applied at Junction 8 NB Merge •Woodlands Academy N11 acces closed •Glencormick / Avoca Service Road retained (bus traffic only)	
			Qualitative Assessment	Score (1-7)	Qualitative Assessment	Score (1-7)	Qualitative Assessment	Score (1-7)
Economy	• Deliver a practicable interim transport solution capable of delivering benefits required in the short/medium term.	**Constructability:** • Extent of enabling/corrective works to deliver effective bus priority • Extent of demolition/disruption during construction • Extent of potential realignment of existing N11/M11 mainline	• Additional works are adjacent to existing N11 carriageway • Significant re-alignment of existing 2-way service road required to enable bus priority provision within N11 hard shoulder	3	• Minimal additional construction	6	• Minimal additional construction	6
	• Provide the infrastructure to increase the people carrying capacity of the N11/M11 between Loughlinstown Roundabout and Junction 9 (Glenview). • Generate positive economic benefits to public transport users by: - Reducing bus journey times; and - Improving bus journey time reliability	**Bus Priority:** • Effectiveness of bus priority at key delay points	• Good priority achieved at intermediate junction closures (Woodlands Academy, Glencormick/Avoca Service Road) • Delays to bus traffic remain likely at Junction 7 NB Diverge given high traffic volumes	4.5	• Reduced priority given retention of Glencormick/Avoca Service Road for all traffic	3.5	• Good priority achieved at intermediate junction closures (Woodlands Academy, Glencormick/Avoca Service Road) • Delays to bus traffic remain likely at Junction 7 NB Diverge given high traffic volumes	4.5
	Sum of Impact Scores		**Total**	**7.5**	**Total**	**9.5**	**Total**	**10.5**
	Economy Weighted Score (out of 100)		**Total**	**54**	**Total**	**68**	**Total**	**75**
Cost	Cost Range NB: < 1.0 million = 7 1.0 - 1.5 million = 6 1.5 - 2.0 million = 5 2.0 - 2.5 million = 4 2.5 - 3.0 million = 3 3.0 - 3.5 million = 2 > 3.5 million = 1		• Base Cost for SS-B plus >€3.5 million	1	• Base Cost for SS-B plus €1.5 - 2.0 million	5	• Base Cost for SS-B plus €2.0 - 2.5 million	4
	Sum of Impact Scores		**Total**	**1**	**Total**	**5**	**Total**	**4**
	Cost Weighted Score (out of 200)		**Total**	**29**	**Total**	**143**	**Total**	**114**
Safety	• To deliver bus priority measures which are clearly delineated and understood by general road users and bus drivers in the environment of an inter-urban route • Ensure bus priority can be delivered without adversely impacting on safety of all road users	• Compliance with Draft TII IAN – - Junction strategy - Requirement for departures (if known), - No. of conflict points retained - Overall continuity of bus facility and junction • Compliance with Draft TII IAN. Provision of safe alternative facility for active travel.	• 2 minor junctions closed • Departures for junctions required = 0 • No. of conflict points = 2 • Continuous bus priority achieved • Safe off-line AT facility provided • Traffic to Glencormick/Avoca diverted along unsuitable routes	2	• 1 minor junction closed • Departures for junctions required = 1 • No. of conflict points = 4 • Continuous bus priority interrupted • Safe off-line AT facility provided	3	• 2 minor junctions closed • Departures for junctions required = 0 • No. of conflict points = 2 • Continuous bus priority achieved • Safe off-line AT facility provided • Traffic to Glencormick/Avoca diverted along unsuitable routes	2
	Sum of Impact Scores		**Total**	**2**	**Total**	**3**	**Total**	**2**
	Safety Weighted Score (out of 200)		**Total**	**57**	**Total**	**86**	**Total**	**57**
Environment	• To provide for more sustainable transport solution, supporting balance of alternative modes and enabling a reduction in private car dependency and reducing carbon intensity of travel	• Assess circular economy impact – degree of re-use of existing asset.	• Additional works are adjacent to existing N11 carriageway • Significant re-alignment of existing 2-way service road required to enable bus priority provision within N11 hard shoulder	2	• Minimal additional construction and/or optimised use of existing road space	4	• Minimal additional construction and/or optimised use of existing road space	4
		• Impacts to community	• Potential negative accessibility impacts on adjacent communities and businesses due to closure of Glencormick/Avoca Service Road (requiring detours via Kilcroney to access Avoca/Business Park)	2	• No change to existing scenario	4	• Potential negative accessibility impacts on adjacent communities and businesses due to closure of Glencormick/Avoca Service Road (detours to Avoca/Business Park lessened relative to Option 1) • Significant negative impact in Rockfield Park residential area	1
		• Impact on environmental constraints	• Potential for impact to Glencormick House (BH191) due to extent of widening/realignment required.	2	• Minimal extent of widening and/or off-line road construction works required	4	• Impacts to residential area of Rockfield Park	3
	Sum of Impact Scores		**Total**	**6**	**Total**	**12**	**Total**	**8**
	Cost Weighted Score (out of 100)		**Total**	**29**	**Total**	**57**	**Total**	**38**
Accessibility and Social Inclusion	•To increase bus patronage along the N11/M11 corridor and enable sustainable travel to provide a faster and more reliable choice •To support improved access to the GDA for all transport users along the N11/M11 corridor	• Extent of bus priority achieved. Effective provision of bus priority at key delay points on the network	• Good priority achieved at intermediate junction closures (Woodlands Academy, Glencormick/Avoca Service Road) • Delays to bus traffic remain likely at Junction 7 NB Diverge given high traffic volumes	4.5	• Reduced priority given retention of Glencormick/Avoca Service Road for all traffic	3.5	• Good priority achieved at intermediate junction closures (Woodlands Academy, Glencormick/Avoca Service Road) • Delays to bus traffic remain likely at Junction 7 NB Diverge given high traffic volumes	4.5
	Sum of Impact Scores		**Total**	**4.5**	**Total**	**3.5**	**Total**	**4.5**
	Cost Weighted Score (out of 100)		**Total**	**64**	**Total**	**50**	**Total**	**64**
Integration	• To deliver a practicable interim transport solution which does not introduce significant constraint on the subsequent development of the N11/M11 Junction 4 to Junction 14 Improvement scheme	• Compatibility with Phase 2 Preferred Option for N11/M11 Scheme. Extent of abortive works.	• Realignment of Glencormick/Avoca Service Road and provision of N11 bus priority will impact space available to deliver N11/M11 J4-J14 Scheme preferred option • Implementation of TJR and bus priority signalling at J8 NB Merge inconsistent with N11/M11 J4-J14 Scheme preferred option	2	• Minimal additional construction, therefore less likely to place a constraint for future N11/M11 J4-J14 Scheme • Implementation of TJR and bus priority signalling at J8 NB Merge inconsistent with N11/M11 J4-J14 Scheme preferred option	3	• Minimal additional construction, therefore less likely to place a constraint for future N11/M11 J4-J14 Scheme • Implementation of TJR and bus priority signalling at J8 NB Merge inconsistent with N11/M11 J4-J14 Scheme preferred option	3
	• To support integration of road-based transport with other transport modes • To complement wider government transport policy	• Level of compliance with plans and policies.	• Aligned with policy	5	• Aligned with policy	5	• Aligned with policy	5
	Sum of Impact Scores		**Total**	**7**	**Total**	**8**	**Total**	**8**
	Cost Weighted Score (out of 100)		**Total**	**50**	**Total**	**57**	**Total**	**57**
Physical Activity	• To provide a facility that allows for the delivery of an attractive alternative mode of transport for communities which supports the creation of a healthier urban environment for active travel, through congestion relief.	• Provision of safe alternative facility for active travel (buses not in conflict with active travel users).	• Safer alternative AT facility proposed as part of separate Kilmacanogue to Southern Cross Greenway Scheme	4	• Safer alternative AT facility proposed as part of separate Kilmacanogue to Southern Cross Greenway Scheme	4	• Safer alternative AT facility proposed as part of separate Kilmacanogue to Southern Cross Greenway Scheme	4
	Sum of Impact Scores		**Total**	**4**	**Total**	**4**	**Total**	**4**
	Cost Weighted Score (out of 100)		**Total**	**57**	**Total**	**57**	**Total**	**57**
	Total Weighted Score (out of 900)		**339**		**518**		**463**	