

Wicklow County Council

**N11/M11 Junction 4 to Junction 14
Improvement Scheme**

Option Selection Report
Appendix D11 – Material Assets -
non-agriculture

265455-ARP-EGN-SWI-RP-ZZ-0003

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1 Material assets – non-agriculture

1.1 Introduction

This report details the environmental assessment of the Stage 2 Project Appraisal Matrix for the N11/M11 Scheme with respect to the Material assets non-agriculture constraints identified in **Section 8** (Material assets – non-agriculture) of **Volume B**.

For the corridor assessment, the overall scheme has been split into two sections, i.e. the Northern Section and the Southern Section and the corridor options assessed are those discussed in **Chapter 8** of **Volume A**.

The impact assessment for each corridor option has considered the extent of the road “footprint”, which represents the potential landtake required to construct or improve the road and sits inside the wider corridor boundary.

A transport scenario assessment forms part of this Stage 2 Project Appraisal Matrix. This assessment is included in **Section 1.5**. The transport scenarios that were assessed are as follows:

- Transport Scenario 5A - Parallel Links + Junction Rationalisation;
- Transport Scenario 5B - N11/M11 Additional Lane(s) + Junction Improvements; and
- Transport Scenario 4 – Bus Service Enhancements.

Section 1.2 outlines the methodology that was used to carry out the assessment and **Section 1.3** outlines the assessment criteria which were used. The Stage 2 assessment is presented in **Section 1.4** (Corridors) and **Section 1.5** (Transport Scenarios) and references are listed in **Section 1.6**.

1.2 Methodology

Material assets can be defined as economic assets of natural and human origin, or cultural assets of a physical and social type. This section identifies the potential impacts of each option on identified infrastructure constraints in relation to Material assets - non-agriculture, with reference to the following:

- Impacts on infrastructure including public and private utilities/service providers (**Section 1.4.1**).
- Impacts on properties (**Section 1.4.2**)
 - Residential properties; and
 - Commercial and industrial properties.

For the purposes of assessing direct impacts both on properties and infrastructure, the footprint of each corridor option was assessed. This footprint is considered to

be appropriate for this assessment as it best reflects the potential extents of landtake required to construct the design within each corridor option. These footprints allow for the option design and an appropriate buffer width within each corridor, based on engineering judgement, and reflect what is currently considered to be the most likely extents of landtake for each option at the time of writing. This approach allows for a review of all likely direct impacts resulting from the design of each option within its corridor and increases the certainty of the impact assessment.

The methodology adopted for the Stage 2 assessment of impacts on both properties and infrastructure is as per the methodology described in **Appendix C11** (Material assets – non-agriculture) of **Volume C**.

1.3 Assessment criteria

The assessment criteria for this Stage 2 assessment are those criteria described in **Appendix C11** (Material assets – non-agriculture) of **Volume C**.

The assessment was informed by the TII Project Appraisal Guidelines for National Roads (PAG) Unit 7.0 – Multi Criteria Analysis (herein referred to as the TII PAG)¹ and the EPA Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports, 2017 (EIAR)².

The assessment criteria that have been used for the assessment of Material assets - non-agriculture are provided in **Table 1.1** Environmental Factors and associated topics for consideration for Option Selection stage of **Appendix C11** (Material assets – non-agriculture) of **Volume C**.

1.4 Stage 2 Project Appraisal Matrix – corridor assessment

In the Northern Section of the scheme, Corridor Option 1 (North) remains following the Stage 1 Preliminary Options Assessment. Following subsequent refinement/analysis, two versions of this corridor option are now assessed as part of this Stage 2 assessment:

- Corridor Option 1A(North); and
- Corridor Option 1B (North).

¹ Transport Infrastructure Ireland (2016) Project Appraisal Guidelines for National Roads PE-PAG-02031. Available from: <https://www.tiipublications.ie/library/PE-PAG-02031-01.pdf>

² Environmental Protection Agency (2017) Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports. Available from: <http://www.epa.ie/pubs/advice/ea/EPA%20EIAR%20Guidelines.pdf>

The two corridor options are concurrent to the north of Junction 7 (Bray South) and to the south of a new improved capacity junction, included in Corridor Option 1A (North), that has been developed to the south of the existing Junction 7 (Bray South). On this basis, the two corridor options differ only at Junction 7 (Bray South). This Stage 2 assessment will focus on the comparisons between the differing extents of the two corridor options.

In the Southern Section of the scheme, Corridor Option 1 (South), Corridor Option 2 (south), and Corridor Option 5 (South) remain following the Stage 1 Preliminary Options Assessment. A further corridor option, Corridor Option 6 (South), has been developed for the assessment of a tunnel option as part of these Stage 2 assessments.

1.4.1 Infrastructure assessment

1.4.1.1 Utilities

Electricity

ESB Networks provide electricity supply connections throughout the scheme study area as shown on **Figures B8.27-B8.32**.

High voltage overhead and underground cables of 38kV and 110kV are present throughout the study area. Several electrical substations have also been identified within the study area. The nature of clashes and/or impacts between corridor options and electricity cables are both longitudinal and perpendicular. For the purposes of the assessment each of these types of impacts was considered. The number of clashes and extents of impact are included in **Table 1.1** and **Table 1.2**, for the Northern and Southern Section, respectively.

Table 1.1: Potential impact score of each option with respect to impact on electricity network – Northern Section.

Electricity	Corridor Option 1A (North)			Corridor Option 1B (North)		
	‘c’	‘I’	‘t’	‘c’	‘I’	‘t’
All lengths in meters (m)						
ESB 110kV OH	0	0	0	0	0	0
ESB 110kV UG	0	0	0	0	0	0
ESB 38kV OH	1	0	95.5	1	0	95.5
ESB 38kV UG	2	2	488	2	2	448
Substation (110kV)	0			0		
Substation (38kV)	0			0		
Qualitative Assessment	Not Significant / Neutral			Not Significant / Neutral		

Electricity	Corridor Option 1A (North)			Corridor Option 1B (North)		
All lengths in meters (m)	'c'	'l'	't'	'c'	'l'	't'
Score / Impact Level	4			4		
Preference	Preferred			Preferred		
Notes: 'c' = number of crossings 'l' = number of longitudinal impacts 't' = total length of impact						

The assessment of electrical infrastructure in the Northern Section of the scheme does not identify any significant differences in the extents of impacts between Corridor Option 1A (North) and Corridor Option 1B (North). While impacts have been identified on both overhead and underground 38kV cables, and diversions will most probably be required, the extents of impact are consistent across each option and as a result the options can be considered equally preferable.

Table 1.2: Potential impact score of each option with respect to impact on electricity network – Southern Section.

Electricity	Corridor Option 1 (South)			Corridor Option 2 (South)			Corridor Option 5 (South)			Corridor Option 6 (South)		
	'c'	'l'	't'	'c'	'l'	't'	'c'	'l'	't'	'c'	'l'	't'
ESB 110kV OH	3	1	940	7	1	1609	3	1	940	3	1	940
ESB 110kV UG	0	0	0	0	0	0	0	0	0	0	0	0
ESB 38kV OH	0	0	0	0	0	0	0	0	0	0	0	0
ESB 38kV UG	0	0	0	0	0	0	0	0	0	0	0	0
Substation (110kV)	0			0			0			0		
Substation (38kV)	0			0			0			0		
Qualitative Assessment	Minor or Slightly Negative			Major or Highly Negative			Minor or Slightly Negative			Minor or Slightly Negative		

Electricity	Corridor Option 1 (South)			Corridor Option 2 (South)			Corridor Option 5 (South)			Corridor Option 6 (South)		
All lengths in meters (m)	'c'	'l'	't'	'c'	'l'	't'	'c'	'l'	't'	'c'	'l'	't'
Score / Impact Level	3			1			3			3		
Preference	Preferred			Least Preferred			Preferred			Preferred		
Notes: 'c' = number of crossings 'l' = number of longitudinal impacts 't' = total length of impact												

The assessment of electrical infrastructure in the Southern Section of the scheme results in Corridor Option 2 (South) being considered as the least preferred option. This is predominantly due to this option impacting a 110kV overhead electrical cable at 4 additional crossing points when compared with the other corridor options. All four of the corridor options impact the electrical infrastructure equally to the south of Junction 12 (Newtownmountkennedy / Roundwood) as they are concurrent from this point southwards. Corridor Options 1 (South), 5 (South) and 6 (South) are all considered equally Preferred.

Two of the conflicts which occur between Corridor Option 2 (South) and the 110kV electricity cables are conflicts spanning over significant cuts and two conflicts occur over sections of fill. Three 110kV pylons are located within the significant cuts and it is likely that new poles/pylons will be required to address this conflict. Significant diversions of the 110kV electrical cable may be required at these locations as the spans required to cross the significant cuts along the existing alignment may be excessive. These are significant electrical cables and pylons. At a minimum, three pylons would require relocation as a result of progressing with Corridor Option 2 (South). Further changes to the HV alignment may also be required – a minimum of 5 new pylon locations would be required to allow for a change in direction and the spanning of 2 significant cut sections which would be an overall increase in pylon numbers. The introduction of additional pylons would likely have a negative impact on other assessment criteria such as visual impact. Refer to **Appendix D5** (Landscape and visual) of **Volume D**.

Where the HV cables come into conflict with the corridor options to the south of Junction 12 (Newtownmountkennedy / Roundwood), it is considered unlikely that the clashes will be as significant as those associated with the off-line segment of Corridor Option 2 (South) described above.

Clashes occur at Junction 12 (Newtownmountkennedy / Roundwood), Junction 13 R772 (Newtownmountkennedy / Newcastle) & Junction 14 R772 (Coynes Cross) where the likelihood of significant re-working of the junctions may be considered low. The scope for significant changes that may impact upon the HV infrastructure at these locations is not considered to be overly significant.

Gas

Gas Networks Ireland (Bord Gáis) gas supply lines, both transmission and distribution, are widespread throughout the scheme study area as shown on **Figures B8.9-B8.14** in **Volume E**.

The significant infrastructure considered by this assessment includes high pressure transmission and distribution gas lines and the Hollybrook Above Ground Installation (AGI) which represents a valuable facility which forms an integral part of the Gas Networks Ireland gas network that would be difficult and costly to relocate. AGI's are pressure regulating installations which allow GNI to ensure their gas networks function effectively. There is a Hazardous Area associated with every AGI and this zone is wholly contained within the AGI fenceline.

The number of clashes and extents of impact are included in **Table 1.3** and **Table 1.4**, for the Northern and Southern Section, respectively.

Table 1.3: Potential impact score of each option with respect to impact on gas network – Northern Section.

Gas	Corridor Option 1A (North)			Corridor Option 1B (North)		
	'c'	'l'	't'	'c'	'l'	't'
All lengths in meters (m)						
Transmission Main 200mm-ST-70bar / 300mm-ST-40bar	0	1	3399	0	1	3399
Distribution Mains (Variable Size & Pressure)	5085			5085		
Above Ground Installation	1 (Hollybrook)			1 (Hollybrook)		

Gas	Corridor Option 1A (North)			Corridor Option 1B (North)		
All lengths in meters (m)	‘c’	‘l’	‘t’	‘c’	‘l’	‘t’
Qualitative Assessment	Moderately Negative			Moderately Negative		
Score / Impact Level	2			2		
Preference	Preferred			Preferred		
Notes: ‘c’ = number of crossings ‘l’ = number of longitudinal impacts ‘t’ = total length of impact						

The assessment of gas infrastructure in the Northern Section of the scheme does not identify any significant differences in the extents of impacts between Corridor Option 1A (North) and Corridor Option 1B (North). While impacts have been identified on both transmission and distribution gas mains within each corridor option, most likely resulting in future gas main diversions, the extents of impact are consistent across each option and as a result the options are considered equally preferable.

Table 1.4: Potential impact score of each option with respect to impact on gas network – Southern Section.

Gas	Corridor Option 1 (South)			Corridor Option 2 (South)			Corridor Option 5 (South)			Corridor Option 6 (South)		
All lengths in meters (m)	‘c’	‘l’	‘t’	‘c’	‘l’	‘t’	‘c’	‘l’	‘t’	‘c’	‘l’	‘t’
Transmission Main 200mm-ST-70bar / 300mm-ST-40bar	4	2	5330	6	2	5232	4	2	5330	4	2	5033
Distribution Mains (Variable Size & Pressure)	524			185			524			524		

Gas	Corridor Option 1 (South)	Corridor Option 2 (South)	Corridor Option 5 (South)	Corridor Option 6 (South)
Qualitative Assessment	Moderately Negative	Moderately Negative	Moderately Negative	Moderately Negative
Score / Impact Level	2	2	2	2
Preference	Intermediate	Least Preferred	Intermediate	Preferred
Notes: 'c' = number of crossings 'l' = number of longitudinal impacts 't' = total length of impact				

The assessment of gas infrastructure in the Southern Section of the scheme results in Corridor Option 6 (South) being considered as the Preferred corridor and Corridor Option 2 (South) being considered as the least preferred corridor.

The assessment considered both transmission and distribution mains and considered the impacts to the transmission mains as being more significant in nature than those to the distribution mains.

Although the overall lengths of transmission mains impacted by all four options in the Southern Section are relatively similar, the impacts resulting from Corridor Option 2 (South) are of a greater significance than those resulting from the other corridor options. This is largely attributed to the greater number of transmission main crossing points associated with Corridor Option 2 (South) when compared with the other options. The areas of extensive cut and fill along Corridor Option 2 (South) are also considered to present a much greater likelihood of a significant impact on the gas infrastructure when compared with the other corridor options which typically see the existing transmission mains located within the central median of the existing N11/M11.

Corridor Options 1 (South), 5 (South) and 6 (South) generally present a close to at grade scenario, apart from the extents of the tunnel section of Corridor Option 6 (South), which does not directly impact upon the gas network. In areas along Corridor Options 1 (South), 5 (South) and 6 (South) where gas infrastructure is located, the risk presented by significant cuts is not encountered. The existing gas main located within the current N11/M11 central median will need to be managed with care for all of the corridor options. The overall impacts of Corridor Options 1 (South), 5 (South) and 6 (South) are considered to be less significant than those attributed to Corridor Option 2 (South).

Corridor Option 6 (South) is considered the preferred option as it contains the shortest length of impact with the transmission mains overall, and what impacts do occur are typically located within the existing N11/M11 central median. The areas where tunnelling is to take place are free from gas infrastructure and do not present any significant impacts in this respect.

Telecommunications

Telecommunications infrastructure is widespread throughout the study area. Impacts on ducting and chambers are likely to be the main form of impact. The number of clashes and extents of impact are included in **Table 1.5** and **Table 1.6**, for the Northern and Southern Section, respectively.

Table 1.5: Potential impact score of each option with respect to impact on telecommunications network – Northern Section.

Telecom	Corridor Option 1A (North)			Corridor Option 1B (North)		
EIR Network Ducts	17,950m			18,312m		
EIR Network Chambers	152			154		
	'c'	'l'	't'	'c'	'l'	't'
EIR – National Core Fibre	3	1	1350m	3	1	1350m
EIR – Rural Fibre Network	4	2	3400	4	3	3900m
EIR – Digital Telephone Exchange	1			1		
EIR – Digital Fibre Cabinet Exchange	1			1		
E-Net	0			0		
Virgin Media Ducting	2062			2062		
Qualitative Assessment	Moderately Negative			Moderately Negative		
Score / Impact Level	2			2		

Telecom	Corridor Option 1A (North)	Corridor Option 1B (North)
Preference	Preferred	Least Preferred
Notes: ‘c’ = number of crossings ‘l’ = number of longitudinal impacts ‘t’ = total length of impact		

The assessment of telecommunications infrastructure has resulted in Corridor Option 1A (North) being considered as the preferred option in the Northern Section. This preference is predominantly based on the additional length of EIR ducts and Rural Fibre Network within the extents of Corridor Option 1B (North) along Kilcroney Lane specifically. It is likely that there will need to be a significant number of alterations and diversions of existing telecommunications infrastructure as a result of the scheme, however these alterations and diversions are considered to be of similar extents for each corridor option.

Table 1.6: Potential impact score of each option with respect to impact on telecommunications network – Southern Section.

Telecom Lengths in ‘m’	Corridor Option 1 (South)			Corridor Option 2 (South)			Corridor Option 5 (South)			Corridor Option 6 (South)		
	‘c’	‘l’	‘t’	‘c’	‘l’	‘t’	‘c’	‘l’	‘t’	‘c’	‘l’	‘t’
EIR Network Ducts	10560			2748			10560			9037		
EIR Network Chambers	115			25			115			98		
EIR – National Core Fibre	1	0	200	1	0	200	1	0	200	1	0	200
EIR – Rural Fibre Network	2	4	2700	1	4	1000	2	4	2700	2	4	2700
EIR – Digital Telephone Exchange	0			0			0			0		
EIR – Digital Fibre Cabinet Exchange	0			0			0			0		
E-Net	387			387			387			387		

Telecom Lengths in 'm'	Corridor Option 1 (South)	Corridor Option 2 (South)	Corridor Option 5 (South)	Corridor Option 6 (South)
Virgin Media Ducting	0	0	0	0
Qualitative Assessment	Minor or Slightly Negative	Not Significant / Neutral	Minor or Slightly Negative	Minor or Slightly Negative
Score / Impact Level	3	4	3	3
Preference	Least Preferred	Preferred	Least Preferred	Least Preferred
Notes: 'c' = number of crossings 'l' = number of longitudinal impacts 't' = total length of impact				

The assessment of telecommunications infrastructure in the Southern Section of the scheme resulted in Corridor Option 2 (South) being considered as the preferred option over Corridor Options 1 (South), 5 (South) and 6 (South) which are all considered equally least preferable.

Significant lengths of telecommunications ducts, and large quantities of chambers, in the areas surrounding Junction 9 (Glenview), Junction 10 (Delgany / Drummin), Junction 11 (Greystones / Kilpedder / Kilcoole) and Junction 12 (Newtownmountkennedy / Roundwood) are not impacted by Corridor Option 2 (South). While the potential impact on the telecommunications network is not considered to be overly significant in isolation, the overall quantity of impacts on the telecommunications network, in terms of length of network ducts and number of chambers impacted, is moderately significant.

Water and wastewater

Water and wastewater infrastructure are widespread throughout the study area. Impacts on trunk and distribution watermains and sewer networks as well as pump stations are the main forms of impact considered. The number of clashes and extents of impact are included in **Table 1.7** and **Table 1.8**, for the Northern and Southern Section, respectively.

Table 1.7: Potential impact score of each option with respect to impact on the water and wastewater network – Northern Section.

Water and Wastewater	Corridor Option 1A (North)			Corridor Option 1B (North)		
	'c'	'l'	't'	'c'	'l'	't'

Water and Wastewater	Corridor Option 1A (North)			Corridor Option 1B (North)		
Water - Trunk Main	0	2	7302	0	2	7624
Water Distribution Main	6	2	5615	6	2	5513
Abandoned Main	12			12		
Foul Sewer	2	1	5154	2	1	5154
Water Pump Station	0			0		
Sewer Pump Station	1			1		
Qualitative Assessment	Moderately Negative			Moderately Negative		
Score / Impact Level	2			2		
Preference	Preferred			Least Preferred		
Notes: 'c' = number of crossings 'l' = number of longitudinal impacts 't' = total length of impact						

The assessment of water and wastewater infrastructure has resulted in Corridor Option 1A (North) being considered as the preferred option in the Northern Section. This preference is predominantly based on the slight additional length of trunk main impacted within the extents of Corridor Option 1B (North) much of which is located in the Kilcrouney Lane vicinity. The variation between Corridor Option 1A (North) and Corridor Option 1B (North) is generally slight under this criterion.

Table 1.8: Potential impact score of each option with respect to impact on the water and wastewater network – Southern Section.

Water and Wastewater	Corridor Option 1 (South)			Corridor Option 2 (South)			Corridor Option 5 (South)			Corridor Option 6 (South)		
	'c'	'l'	't'	'c'	'l'	't'	'c'	'l'	't'	'c'	'l'	't'
Water - Trunk Main	3	2	10664	2	1	2742	3	2	10689	2	1	6476
Water Distribution Main	6	2	4313	6	1	2228	6	2	4353	6	1	3715
Abandoned Main	494			170			494			170		
Foul Sewer	2	0	397	2	0	291	2	0	397	2	0	397
Water Pump Station	1			0			1			1		
Sewer Pump Station	0			0			0			0		
Qualitative Assessment	Moderately Negative			Minor or Slightly Negative			Moderately Negative			Moderately Negative		
Score / Impact Level	2			3			2			2		
Preference	Least Preferred			Preferred			Least Preferred			Intermediate		
Notes: 'c' = number of crossings 'l' = number of longitudinal impacts 't' = total length of impact												

The assessment of water and wastewater infrastructure in the Southern Section of the scheme has resulted in Corridor Option 2 (South) being considered as the preferred option in this section. Corridor Options 1 (South) and 5 (South) are considered least preferable.

Corridor Option 2 (South) results in significantly less impact with existing water and wastewater infrastructure, particularly the trunk and distribution water mains, than the other 3 corridor options. Though Corridor Option 6 (South) impacts on less water and wastewater infrastructure than either Corridor Option 1 (South) or 5 (South), the nature of constructing a tunnel may result in more significant impacts on the networks at the points at which it is impacted than the on-line corridor options which will not involve the same level of cutting as Corridor Option 6 (South).

Most impacts arising from Corridor Options 2 (South) and 6 (South) occur to the south of the points at which the options tie in with the on-line options and as a result many of these impacts are concurrent across all options.

Utilities summary

The results of the utilities assessment are presented in **Table 1.9**:

Table 1.9: Summary of utilities infrastructure.

Utilities Summary	Corridor Option 1A (North)	Corridor Option 1B (North)	Corridor Option 1 (South)	Corridor Option 2 (South)	Corridor Option 5 (South)	Corridor Option 6 (South)
Electricity	4	4	3	1	3	3
	Preferred	Preferred	Preferred	Least Preferred	Preferred	Preferred
Gas	2	2	2	2	2	2
	Preferred	Preferred	Intermediate	Least Preferred	Intermediate	Preferred
Telecom	2	2	3	4	3	3
	Preferred	Least Preferred	Least Preferred	Preferred	Least Preferred	Least Preferred
Water and Wastewater	2	2	2	3	2	2
	Least Preferred	Preferred	Least Preferred	Preferred	Least Preferred	Intermediate
Total	10	10	10	10	10	10
	Preferred	Preferred	Intermediate	Least Preferred	Intermediate	Preferred

The assessment of utilities infrastructure in the Northern Section of the scheme reflects a broadly similar level of impact between both Corridor Option 1A (North) and Corridor Option 1B (North) with the only differences of note occurring in telecommunications and water and wastewater infrastructure. The scale of preference for one option over the other is not considered significant enough to separate these options and as a result they are considered equally preferable.

As per the Northern Section, the assessment of utilities in the Southern Section of the scheme again returns a very similar level of impact to existing infrastructure. The impacts to both electrical and gas infrastructure by Corridor Option 2 (South), however, are more significant than the impacts of the other corridor options on utilities and this corridor option is therefore considered least preferred. Corridor Option 6 (South) generally resulted in slightly fewer and less significant impacts than either Corridor Option 1 (South) or 5 (South) and is the preferred option in the Southern Section of the scheme.

1.4.1.2 Transport infrastructure

Road Network

This section of the assessment assesses the impact of each of the current options in both the northern and southern sections on the existing road network. Aspects considered include the number of interactions with the existing, and surrounding, road network, the need for road closures or diversions, requirements for development of side roads, and the need for additional junctions.

The N11/M11 is a vital piece of infrastructure, depended on by many for private and commercial movements. Each corridor option will impact upon the existing road network to varying degrees. Many of the most significant impacts will be felt during the construction period where there is likely to be a high level of disruption to the existing network and network users. These relatively short term impacts during the construction phase will, over time, be outweighed by the operational benefits of the improved N11/M11 Road Scheme which will greatly improve journey time reliability, safety and connectivity along the length of the scheme and the east coast of the country.

The assessment and impact levels associated with the existing road network are included in **Table 1.10** and **Table 1.11**, for the Northern and Southern Section, respectively.

Table 1.10: Potential impact score of each option with respect to impact on the road network – Northern Section.

Road Network	Corridor Option 1A (North)	Corridor Option 1B (North)
Qualitative Assessment	Moderately Positive	Moderately Positive

Road Network	Corridor Option 1A (North)	Corridor Option 1B (North)
Score / Impact Level	6	6
Preference	Preferred	Least Preferred

In the Northern Section, Corridor Option 1A (North) and Corridor Option 1B (North) do not result in dramatically different levels of interaction with the existing road and surrounding network as both options remain on-line.

A number of existing roads, such as Herbert Road, the R117 and Dargle Lane, will have their existing non-standard junctions with the N11/M11 removed in both corridor options and access provided via parallel service roads or one of the major grade-separated junctions.

As each of the two corridor options in the Northern Section remain on-line, there will be some significant disruption to both corridor options during the construction phase. There are no significant differences to side roads as part of either option. Corridor Option 1A (North) results in the construction of a new junction to the south of the existing Junction 7 (Bray South) – this is the main differentiating factor between both corridor options in the Northern Section of the scheme and results in Corridor Option 1A (North) being considered slightly preferable to Corridor Option 1B (North).

Table 1.11: Potential impact score of each option with respect to impact on the road network – Southern Section.

Road Network	Corridor Option 1 (South)	Corridor Option 2 (South)	Corridor Option 5 (South)	Corridor Option 6 (South)
Qualitative Assessment	Moderately Positive	Moderately Positive	Moderately Positive	Moderately Positive
Score / Impact Level	6	6	6	6
Preference	Preferred	Least Preferred	Preferred	Intermediate

In the Southern Section of the scheme, Corridor Options 1 (South) and Corridor Option 5 (South) result in the least impact on the existing road and surrounding road network as they remain on-line for their entirety. No significant side road works or new junctions are expected though modifications to existing junctions will be required in many cases. Existing non-standard accesses will be removed from the existing N11/M11, and alternatives provided in both cases. The construction works associated with these two corridor options are considered to be the most disruptive and impactful of the corridor options in the Southern Section

as all works will take place on-line. Corridor Option 5 (South) allows for some additional widening and additional construction over Corridor Option 1 (South) resulting in it having a slightly greater construction impact.

The impacts associated with the on-line corridor options are not however considered to be more significant than those associated with the off-line options.

Corridor Option 2 (South) and Corridor Option 6 (South) provide a slight benefit in that they have off-line segments that will be constructed off-line resulting in a lesser impact on the existing traffic using the existing N11/M11 during the construction period. Disruption to road users and impacts to the existing road network will still occur at the extremities of each off-line segment where they will need to tie back into the existing road.

Corridor Option 2 (South) will require the construction of a new junction at the northern and southern end of its off-line section and will incur some impacts to the local roads resulting in the need for the construction of overbridges and some works at the L1031 and Tooman Road respectively. Corridor Option 2 (South) also results in the greatest amount of new construction and landtake of the options under consideration.

Corridor Option 6 (South) also requires the construction of new junctions at either side of its off-line segment including the construction of an overbridge at the R762. Tunnel portals will also be constructed at either end of the tunnel having a construction impact.

Overall, all corridor options are seen as having a positive impact on the road network. Outside of the construction impacts, in the Southern Section, Corridor Option 1 (South) and Corridor Option 5 (South) result in the least impact to the surrounding transport infrastructure and are considered slightly preferable over the corridor options containing off-line segments which will require additional junctions, impacts on local roads, and significant landtake. Corridor Option 6 (South) is ranked as the intermediate preference and is considered to be slightly preferable over Corridor Option 2 (South) due to its shorter length of off-line segment and the lower number of adjacent roads affected by its construction when compared to the longer Corridor Option 2 (South).

Rail network

The South – Eastern railway line, extending from Dublin Connolly (City Centre) to Rosslare Europort runs through the study area along the east coastline, providing an electrified DART service linking the City Centre as far south as Greystones, along with diesel Commuter and Intercity services further southwards, serving towns such as Bray, Greystones, Wicklow, Arklow, Gorey, Wexford and Rosslare. It should be noted that heavy rail capacity on the corridor is limited as all services south of Bray operate on a single line.

The existing Luas light rail green line terminates within the northern extent of the study area at Bride's Glen in Cherrywood, providing a high frequency, high capacity service into Dublin with trams operating up to every 3 minutes at peak hours. While the service is regarded as frequent and reliable, its catchment area

within the overall N11/M11 study boundary is very limited and the line is currently operating close to capacity.

None of the N11/M11 corridor options in either the northern or southern sections directly impact on rail infrastructure.

Therefore, there is no perceptible difference with regards potential impact of each option on the existing railway infrastructure. The impacts associated with rail are considered to be '*Not Significant / Neutral*' across all options and all options are awarded an impact score of '4'.

1.4.2 Waste management infrastructure

None of the waste management infrastructure/facilities identified within the scheme study area are directly impacted by any of the current corridor options. Therefore, there is no perceptible difference with regards potential impact of each option on the existing waste management infrastructure. The impacts associated with waste facilities are '*Not Significant / Neutral*' across all options and all options are awarded an impact score of '4'.

1.4.3 Forestry

Impacts on commercial forestry have been assessed in the Material assets – agriculture assessment as forestry is considered to be an agricultural asset. Refer to **Appendix D10** (Material assets – agriculture) of **Volume D**.

1.4.4 Quarries

There are no live quarries located within the extents of any of the current corridor options and any live quarries located outside of the corridors are considered to have relatively similar proximity to each option, hence, all corridor options are considered to have a *Not Significant / Neutral* impact and awarded an impact score of '4'.

1.4.5 Property assessment

As per the Stage 1 assessment, the Stage 2 assessment considers 5 main aspects of properties. These include:

- Settlements & zoning;
- Residential properties;
- Commercial properties;
- Community facilities; and
- Tourism facilities.

1.4.5.1 Settlements & zoning

The assessment of zones and settlements impacted by the corridor options is based on an assessment of zoning maps contained in Dún Laoghaire-Rathdown County Development Plan 2016-2022³ and the County Wicklow Development Plan 2016-2022⁴.

The types and extents of impacts on settlements and zoning are included in **Table 1.12** and **Table 1.13**, for the Northern and Southern Section, respectively.

The variation between the extents of Corridor Option 1A (North) and Corridor Option 1B (North) occurs outside of the extents of lands zoned for development by either Dún Laoghaire Rathdown County Council or Wicklow County Council. As a result, there is no difference between the impacts of these options under this criterion, and they are considered equally preferable.

Table 1.12: Potential impact score of each option with respect to impact on Settlements and Zoning – Northern Section

Option	Description of Impact	Score / Impact Level	Preference
Corridor Option 1A (North) and Corridor Option 1B (North)	<ul style="list-style-type: none"> Slight impact on lands zoned for Residential to the east of Junction 5. Slight impact on lands zoned for Residential and Open Space to the north of Junction 6 R918 (Bray/Fassaroe). Slight impact on lands for Tourism, Open Space, Local Shops and Services, Community, Education; and Public Utilities between Junction 6 R918 (Bray/Fassaroe) and Junction 7 (Bray South). Slight impact on lands zoned as primary, secondary, and tertiary development area in the greater Kilmacanoge area. 	3	Preferred

Table 1.13: Potential impact score of each option with respect to impact on Settlements and Zoning – Southern Section

Option	Description of Impact	Score / Impact Level	Preference
Corridor Option 1 (South)	<ul style="list-style-type: none"> Slight impact on lands zoned for primary development in the greater Kilmacanoge area. Very slight impact on lands located east of Junction 10 (Delgany / Drummin), zoned 'to generally protect the open nature and landscape quality of lands, to protect and enhance local biodiversity, and to maintain the 	2	Intermediate

³ Dún Laoghaire-Rathdown County Development Plan 2016-2022. Available from: <https://www.dlrcoco.ie/en/county-development-plan/county-development-plan-2016-2022>

⁴ County Wicklow Development Plan 2016-2022. Available from: <https://www.wicklow.ie/Living/Services/Planning/Development-Plans-Strategies/National-Regional-County-Plans/Wicklow-County-Development-Plan/Wicklow-County-Development-Plan-2016-2022>

Option	Description of Impact	Score / Impact Level	Preference
	<p>primary use of the land for agricultural purposes.’</p> <ul style="list-style-type: none"> • Very slight impact on lands located east of Junction 10, zoned ‘to provide for the development of sustainable residential communities up to a maximum density of 2.5 units per hectare and to preserve and protect residential amenity.’ • Severance occurs to lands located east of Junction 11 (Greystones / Kilpedder / Kilcoole), zoned ‘to provide for employment uses’ resulting in a <i>moderately negative</i> impact. Here, a proposed link road connects in with an existing roundabout and road network and may provide some benefit to the severed lands. • Very slight impact on lands located east of Junction 12 (Newtownmountkennedy / Roundwood), zoned ‘existing residential.’ • Slight impact to lands located north, east, and west of Junction 12 (Newtownmountkennedy / Roundwood), zoned ‘for agriculture’, and ‘to protect and improve rural amenities and character and to preserve the greenbelt between Newtownmountkennedy and Kilpedder.’ • Slight impact to ‘AG’ zoned lands which are zoned ‘to provide for agricultural uses’ and ‘to provide for forestry uses’ south-west of Junction 12 (Newtownmountkennedy / Roundwood). • Very slight impact on lands located south-east and south-west of Junction 12 (Newtownmountkennedy / Roundwood), zoned ‘employment.’ 		
Corridor Option 2 (South)	<ul style="list-style-type: none"> • Slight impact on lands zoned for primary development in the greater Kilmacanoge area. • Severance occurs to lands located north-west of Junction 12 (Newtownmountkennedy / Roundwood), resulting in <i>moderately negative</i> impact on lands zoned ‘AG’ for agriculture and zoned ‘to protect and improve rural amenities and character and to preserve the greenbelt between Newtownmountkennedy and Kilpedder in Newtownmountkennedy Demesne.’ • Slight impact to ‘AG’ zoned lands which are zoned ‘to provide for agricultural uses’ and ‘to provide for forestry uses’ south-west of Junction 12 (Newtownmountkennedy / Roundwood). • Very slight impact on lands located east of Junction 12 (Newtownmountkennedy / Roundwood), zoned ‘existing residential.’ 	2	Least Preferred

Option	Description of Impact	Score / Impact Level	Preference
	<ul style="list-style-type: none"> Very slight impact on lands located south-east of Junction 12 (Newtownmountkennedy / Roundwood), zoned ‘employment.’ 		
Corridor Option 5 (South)	<ul style="list-style-type: none"> The same impact on zoned lands as for Corridor Option 1 (South), as there are no zoned lands over the area where these two corridor options differ. 	2	Intermediate
Corridor Option 6 (South)	<ul style="list-style-type: none"> Slight impact on lands zoned for primary development in the greater Kilmacanoge area. The tunnel section of this corridor option does not impact on zoned lands. The slight impacts that Corridor Option 1 (South) and 5 (South) have at Junction 10 (Delgany / Drummin) are not impacted by the tunnel section of this option. Moving southwards from and including the Junction 11 area, this corridor option is concurrent with Corridor Options 1 (South) and 5 (South) and has the same impacts. 	2	Preferred

Similar to the Northern Section, in the Southern Section of the scheme many of the impacts on settlements and lands zoned for development are slight or very slight. This is largely due to the re-use of the existing N11 road footprint. The impacts generally occur where additional width is required by the proposed corridor option footprints. This in turn encroaches into lands zoned for development. All corridor options are concurrent to the south of Junction 12 (Newtownmountkennedy / Roundwood).

The most significant impact resulting from Corridor Options 1 (South), 5 (South) and 6 (South) is to lands located to the east of Junction 11 (Greystones / Kilpedder / Kilcoole) where severance of lands zoned for employment occurs. This severance, however, may in time provide some benefit to the zoned lands through the provision of additional accessibility to the lands.

Corridor Option 2 (South) avoids the impacts on the zoned lands to the east of Junctions 10 (Delgany / Drummin) and 11 (Greystones / Kilpedder / Kilcoole). The most significant impact resulting from Corridor Option 2 (South) is to lands to the north-west of Junction 12 (Newtownmountkennedy / Roundwood) where severance occurs of lands zoned ‘AG’ ‘to protect and improve rural amenities and character and to preserve the greenbelt between Newtownmountkennedy and Kilpedder in Newtownmountkennedy Demesne’.

Corridor Option 6 (South) avoids lands located to the east of Junction 10 (Delgany / Drummin), impacted by Corridor Options 1 (South) and 5 (South), zoned “to generally protect the open nature and landscape quality of lands, to protect and enhance local biodiversity, and to maintain the primary use of the land for agricultural purposes’ and zoned ‘to provide for the development of sustainable residential communities up to a maximum density of 2.5 units per hectare and to preserve and protect residential amenity’. It shares its most

significant impact of severance of lands zoned for ‘employment’ with Corridor Options 1 (South) and 5 (South).

Corridor Option 6 (South) is the preferred option under this criterion as it has fewer significant impacts on zoned lands than the other corridor options. Corridor Options 1 (South), 2 (South) and 5 (South) are considered equally least preferable due to the range and significance of their impacts on zoned lands. While Corridor Option 2 (South) results in fewer individual impacts on zoned lands than Corridor Options 1 (South) and 5 (South), the significance of the severance to zoned lands caused by Corridor Option 2 (South) is considered to be more significant than the severance resulting from Corridor Options 1 (South), 5 (South) and 6 (South). The possible future benefits offered by the severance of lands impacted by Corridor Options 1 (South), 5 (South) and 6 (South), described above, is considered to be less significant than the severance resulting from Corridor Option 2 (South).

1.4.5.2 Residential properties

The assessment of the number of residential properties^{5,6} impacted by each corridor option are included in **Table 1.14** and **Table 1.15**, for the Northern and Southern Section, respectively.

Table 1.14: Residential properties assessment – Northern Section

Residential Property	Corridor Option 1A (North)	Corridor Option 1B (North)
Option Footprint Assessment	5	6
0-50m Band Outside Option Footprint	492	497
Live Planning Applications – Within Footprint	0	0
Live Planning Applications – Within 0-50m Band	47	49
Qualitative Assessment	Minor or Slightly Negative	Minor or Slightly Negative
Score / Impact Level	3	3
Preference	Preferred	Least Preferred

⁵ Ordnance Survey Ireland. Licence Number 2020/35/CCMA/Wicklow County Council, OSI Digital Terrain Data (Prime 2) [Received from Wicklow County Council: 20 September 2019]

⁶ Department of Housing, Local Government and Heritage. Available from: <https://data.gov.ie/dataset/national-planning-applications> [Accessed: 16 December 2020]

The assessment of residential properties impacted by Corridor Options 1A (North) and 1B (North), reflects a very similar level of impact. Corridor Option 1B (North) is considered least preferred, mainly because its footprint directly impacts upon one additional residential property when compared with Option 1A (North). The potential for additional impacts of each corridor option is considered to be slightly greater for Option 1B (North) based on the slightly higher volume of properties located within 50m of the current option footprints and a slightly higher volume of live planning applications within 50m of the current option footprints.

Table 1.15: Residential properties assessment – Southern Section

Residential Property	Corridor Option 1 (South)	Corridor Option 2 (South)	Corridor Option 5 (South)	Corridor Option 6 (South)
Option Footprint Assessment	9	5	9	6
0-50m Band Outside Option Footprint	166	85	166	171
Live Planning Applications	0	0	0	0
Live Planning Applications – Within 0-50m Band	10	5	10	11
Qualitative Assessment	Minor or Slightly Negative	Minor or Slightly Negative	Minor or Slightly Negative	Minor or Slightly Negative
Score / Impact Level	3	3	3	3
Preference	Least Preferred	Preferred	Least Preferred	Intermediate

As in the Northern Section, the assessment of residential properties impacted by the four corridor options in the Southern Section of the scheme reflect a broadly similar level of impact across all options with Corridor Options 1 (South) and 5 (South) being considered least preferred and Option 2 (South) as preferred. The ranking is attributed to the fact that the footprints of Corridor Option 1 (South) and 5 (South) directly impact upon two more residential properties than Option 6 (South) and upon four more residential properties than Corridor Option 2 (South). The potential for additional impacts of each Corridor Option 1(South), 5 (South) and 6 (South) on residential properties and live planning applications located within 50m of the current option footprints is again higher than for Corridor Option 2 (South), reinforcing the consideration of Corridor Option 2 (South) as the preferred option.

1.4.5.3 Commercial properties

The assessment of the number of commercial properties^{5,6} impacted by each corridor option are included in **Table 1.16** and **Table 1.17**, for the Northern and Southern Section, respectively.

Table 1.16: Commercial properties assessment – Northern Section

Commercial Property	Corridor Option 1A (North)	Corridor Option 1B (North)
Option Footprint Assessment	9	10
0-50m Band Outside Option Footprint	239	243
Live Planning Applications	0	0
Qualitative Assessment	Moderately Negative	Moderately Negative
Score / Impact Level	2	2
Preference	Preferred	Least Preferred

The assessment of commercial properties impacted by the two corridor options in the Northern Section of the scheme, Corridor Options 1A (North) and 1B (North), reflect a very similar level of impact with Corridor Option 1B (North) being considered as the least preferred option due to the fact that its footprint directly impacts upon one more commercial property than Corridor Option 1A (North). The potential for additional impacts of each corridor option is considered to be very slightly greater for Corridor Option 1B (North) based on the slightly higher volume of commercial properties located within 50m of the current option footprints.

Table 1.17: Commercial properties assessment – Southern Section

Commercial Property	Corridor Option 1 (South)	Corridor Option 2 (South)	Corridor Option 5 (South)	Corridor Option 6 (South)
Option Footprint Assessment	7	10	8	7
0-50m Band Outside Option Footprint	134	58	133	138
Live Planning Applications	0	0	0	0
Qualitative Assessment	Minor or Slightly Negative	Minor or Slightly Negative	Minor or Slightly Negative	Minor or Slightly Negative
Score / Impact Level	3	3	3	3

Commercial Property	Corridor Option 1 (South)	Corridor Option 2 (South)	Corridor Option 5 (South)	Corridor Option 6 (South)
Preference	Preferred	Least Preferred	Intermediate	Preferred

In the Southern Section of the scheme, Corridor Option 2 (South) has been ranked as the least preferred corridor option and Corridor Options 1 (South) and 6 (South) as joint preferred options. This ranking is based on Corridor Option 2 (South) having a direct impact on 2 additional properties than Corridor Option 5 (South) which in turn has 1 additional impact above Corridor Options 1 (South) and 6 (South). There are no live planning applications within the footprints of the corridors in the Southern Section, or within the 0-50m band, of the corridor options in the Southern Section of the scheme.

1.4.5.4 Community facilities

The assessment of the number of community facility properties impacted by each corridor option is included in **Table 1.18** and **Table 1.19**, for the Northern and Southern Section, respectively.

Table 1.18: Community facility properties assessment – Northern Section

Community Facility Property	Corridor Option 1A (North)	Corridor Option 1B (North)
Option Footprint Assessment	0	0
0-50m Band Outside Option Footprint	1	1
Live Planning Applications	0	0
Qualitative Assessment	Not Significant / Neutral	Not Significant / Neutral
Score / Impact Level	4	4
Preference	Intermediate	Intermediate

The assessment of the two corridor options in the Northern Section has not identified any direct impacts on community facilities within the extents of the footprints of Corridor Options 1A (North) or Corridor Option 1B (North) resulting in each corridor being considered to be of equal preference and considered to have a qualitative assessment of *Non-Significant / Neutral*. The Little Bray Community Centre has been identified within the 0-50m band within the extents of both northern corridor options.

Table 1.19: Community facility properties assessment – Southern Section

Community Facility Property	Corridor Option 1 (South)	Corridor Option 2 (South)	Corridor Option 5 (South)	Corridor Option 6 (South)
Option Footprint Assessment	0	0	0	0
0-50m Band Outside Option Footprint	0	0	0	0
Live Planning Applications	0	0	0	0
Qualitative Assessment	Not Significant / Neutral	Not Significant / Neutral	Not Significant / Neutral	Not Significant / Neutral
Score / Impact Level	4	4	4	4
Preference	Intermediate	Intermediate	Intermediate	Intermediate

The assessment of the four corridor options in the Southern Section of the scheme has not identified any direct impacts on community facilities within the extents of the footprints of each corridor options resulting in each option being considered to be of equal preference and considered to have a qualitative assessment of *Non-Significant / Neutral*.

1.4.5.5 Tourism facilities

The study area and proposed options form part of the ‘Ireland’s Ancient East’ tourism region. It is considered that the N11/M11 will have a positive impact on the region overall by providing improved accessibility and reduced journey times to tourist facilities within the region.

Many of the tourist related assets and amenities within the greater study area do not fall within the extents of the option footprints within each corridor option and as a result, the impacts on accessibility to tourism attractions such as the Great and Little Sugarloaf Mountains, The Glen of the Downs Nature Reserve, Powerscourt Waterfall, Wicklow beaches, demesnes and hotels/B&B’s will have a greater influence on the assessment of this topic than direct impacts.

Properties such as B&B’s, hotels or hostels may be affected by a loss of passing traffic in some cases and may benefit from a reduction in traffic noise and congestion in others, however, it is not possible to extract the numbers of these property types from the current information^{5 6}, so the impacts are considered to be slight across all options.

The assessment in relation to tourism assets impacted by each corridor option is included in **Table 1.20** and **Table 1.21**, for the Northern and Southern Section, respectively.

Table 1.20: Tourism facilities assessment – Northern Section

Option	Description of Impacts	Score / Impact Level	Preference
Corridor Option 1A (North)	<p>Slight impact on lands zoned for tourism to the south west of Junction 6a (Enniskerry).</p> <p><i>Major or highly negative</i> impact on Brennanstown Riding School which would be severely impacted by the new Junction 7 link road and proposed new junction. The riding school lands would be severed, and the addition of the new link road and junction would have a negative effect on lands currently used by the riding school.</p> <p>Potential negative impact on cycling clubs who rely on the existing N11 to access other cycling routes throughout County Wicklow. The provisions of alternative cycle tracks or alternative routes provided as part of the scheme may not suit the larger groups of cyclists currently using the N11 as a facility though the alternatives provided may in turn prove a more attractive alternative to the recreational or commuter cyclist.</p>	3	Least Preferred
Corridor Option 1B (North)	<p>Slight impact on lands zoned for tourism to the south west of Junction 6a (Enniskerry).</p> <p>Impact to Brennanstown Riding School avoided.</p> <p>Potential negative impact on cycling clubs who rely on the existing N11 to access other cycling routes throughout County Wicklow. The provisions of alternative cycle tracks or alternative routes provided as part of the scheme may not suit the larger groups of cyclists currently using the N11 as a facility though the alternatives provided may in turn prove a more attractive alternative to the recreational or commuter cyclist.</p>	3	Preferred

The two corridor options have a relatively similar level of impact on tourism facilities. The overall improvements to the N11/M11 will offer greater linkage between facilities throughout Wicklow which can be seen as positive. The impacts on the lands zoned for tourism and Brennanstown Riding School will offer negative impacts.

The cycling clubs which currently use the N11 to access the greater Wicklow area are likely to be negatively impacted should the road improvements result in the improved N11 being less attractive to cycling groups, which could occur depending on the road design ultimately selected for the scheme. It would be expected that should cycling facilities on the N11 be impacted, that this would be offset by the provision of alternative routes for cyclists in the form of a parallel cycle way or an alternative route.

Parallel cycle paths, and/or alternative routes, may not suit the needs of cycling clubs in particular as the club cyclists typically travel at greater speeds than recreational cyclists, and travel in groups which may clash with other recreational or commuter cyclists on alternative provisions. This impact is common to all corridor options, though the extents of impact may vary slightly.

Corridor Option 1B (North) is seen as the preferred option under this criterion, mainly due to the fact that it avoids a direct impact on Brennanstown Riding School while Corridor Option 1A (North) results in a substantial impact on the riding school lands. Due to the impact on lands zoned for tourism, each of the options in the Northern Section is seen to be a *minor or slightly negative*.

Table 1.21: Tourism facilities assessment – Southern Section

Option	Description of Impact	Score / Impact Level	Preference
Corridor Option 1 (South)	<p>Potential negative impact on cycling clubs who rely on the existing N11 to access other cycling routes throughout County Wicklow. The provisions of alternative cycle tracks or alternative routes provided as part of the scheme may not suit the larger groups of cyclists currently using the N11 as a facility though the alternatives provided may in turn prove a more attractive alternative to the recreational or commuter cyclist.</p> <p>Existing access to Glen of the Downs Nature Reserve would be removed. Impact would be offset by provision of alternative access. This is a neutral impact.</p>	3	Intermediate
Corridor Option 2 (South)	<p>Potential negative impact on cycling clubs who rely on the existing N11 to access other cycling routes throughout County Wicklow. The provisions of alternative cycle tracks or alternative routes provided as part of the scheme may not suit the larger groups of cyclists currently using the N11 as a facility though the alternatives provided may in turn prove a more attractive alternative to the recreational or commuter cyclist. Corridor Option 2 (South) would retain a relatively significant length of the existing N11 that would remain available to cyclists.</p> <p>Slight impact to walking and cycling trails on Downs Hill.</p> <p><i>Slight to moderately negative</i> impact to Newtownmountkennedy Demesne.</p> <p>The removal of main flow of traffic from Glen of the Downs could present opportunities for the development of walking and/or cycling related tourism within the Glen which could result in a positive impact on tourism in the longer term.</p>	3	Least Preferred
Corridor Option 5 (South)	<p>Potential negative impact on cycling clubs who rely on the existing N11 to access other cycling routes throughout County Wicklow.</p>	3	Intermediate

Option	Description of Impact	Score / Impact Level	Preference
	<p>The provisions of alternative cycle tracks or alternative routes provided as part of the scheme may not suit the larger groups of cyclists currently using the N11 as a facility though the alternatives provided may in turn prove a more attractive alternative to the recreational or commuter cyclist.</p> <p>Existing access to Glen of the Downs Nature Reserve would be removed. Impact would be offset by provision of alternative access. This is a neutral impact.</p>		
Corridor Option 6 (South)	<p>Potential negative impact on cycling clubs who rely on the existing N11 to access other cycling routes throughout County Wicklow. The provisions of alternative cycle tracks or alternative routes provided as part of the scheme may not suit the larger groups of cyclists currently using the N11/ as a facility though the alternatives provided may in turn prove a more attractive alternative to the recreational or commuter cyclist.</p> <p>Removal of main flow of traffic from Glen of the Downs be a positive impact.</p>	4	Preferred

Corridor Option 2 (South) is considered least preferred under the tourism facilities criterion as it has the potential to impact on the greatest range of tourism facilities. Impacts on Downs Hill and Newtownmountkennedy Demesne are the main impacts. Corridor Option 6 (South) by nature of being underground through the Glen of the Downs amenity, has the least impact on tourism facilities resulting in it being considered the preferred option.

The impact to cycling clubs is common to all corridor options, though the selection of Corridor Option 2 (South) or Corridor Option 6 (South) would allow for the continued use of the existing N11 by cyclists between the northern and southern extents of their off-line segments.

Corridor Option 6 (South) and Corridor Option 2 (South) will take the main flow of traffic away from the Glen of the Downs which could allow the existing road through the Glen to be developed for use by cyclists and pedestrians as well as traffic looking to access the Glen of the Downs as a Tourist Feature. This is not seen as an influencing factor in the assessment of Corridor Options 2 (South), it only presents as an opportunity for future development and it is outweighed by the potential negative impacts that this option has on tourism constraints.

1.4.6 Corridor assessment - summary and conclusions

The overall results of the assessment of Material Assets Non-Agriculture are presented in **Table 1.22**:

Table 1.22: Corridor Assessment Summary

		Corridor Option 1A (North)	Corridor Option 1B (North)		Corridor Option 1 (South)	Corridor Option 2 (South)	Corridor Option 5 (South)	Corridor Option 6 (South)
Infrastructure	Utilities	2	2		2	1	2	2
	Transport	6	6		6	6	6	6
	Waste Management	4	4		4	4	4	4
	Forestry	4	4		4	4	4	4
	Quarries	4	4		4	4	4	4
Properties	Settlements & Zoning	3	3		2	2	2	2
	Residential	3	3		3	3	3	3
	Commercial	2	2		3	3	3	3
	Community Facilities	4	4		4	4	4	4
	Tourism	3	3		3	3	3	4
	Total	32	32		32	32	32	33
	Overall Impact Score	3	3		3	1	3	3
	Overall Impact Description	Minor or Slightly Negative	Minor or Slightly Negative		Minor or Slightly Negative	Major or highly Negative	Minor or Slightly Negative	Minor or Slightly Negative
	Preference	Preferred	Least Preferred		Intermediate	Least Preferred	Intermediate	Preferred

In the Northern Section of the scheme, Corridor Option 1A (North) is the preferred option. The assessment of material assets relating to infrastructure reflects a broadly similar level of impact across both Corridor Option 1A (North) and Corridor Option 1B (North), though Corridor Option 1A (North) is considered to be slightly preferable in terms of impacts on transport infrastructure. The impacts on both gas and electrical infrastructure are considered to be equal as these assets are located outside of the extents where there is a difference in layout between the two corridor options. Corridor Option 1A (North) results in a slightly greater impact on trunk watermain infrastructure when compared with Corridor Option 1B (North), though this is only in the range of 5% additional length of impact. The property assessment provides a greater level of differential impact between the two options with Corridor Option 1A (North) directly impacting upon 3 fewer residential properties and 4 fewer commercial properties. This level of difference is the decisive factor in the overall consideration of Corridor Option 1A (North) as the preferred option. The impacts on waste facilities, forestry and quarries are equal across both options as no facilities or infrastructure are impacted under these criteria. Although the significant impact on Brennanstown Riding School of Corridor Option 1A (North) results in Corridor Option 1B (North) being preferred under the tourism criterion, this is not seen as being more significant than the impacts on transport infrastructure, residential properties and commercial properties which result in Corridor Option 1A (North) being preferred overall in the Northern Section of the scheme.

In the Southern Section of the scheme, Corridor Option 6 (South) is the preferred option. Impacts from Corridor Option 1 (South), Corridor Option 5 (South) and Corridor Option 6 (South) are all rather similar as they are concurrent over a significant portion of their lengths. Impacts on zoned lands resulting from Corridor Option 1 (South) and Corridor Option 5 (South) in the Junction 10 (Delgany/Drummin) area as well as those on utilities infrastructure again in the Junction 10 (Delgany/Drummin) area are avoided by Corridor Option 6 (South) which make it preferable to the on-line corridors. Impacts on tourism relating to Corridor Option 6 (South) are considered to be lesser than for the other corridor options in the Southern Section of the scheme. The assessment of material assets relating to infrastructure resulted in a 1 – *major or highly negative* score for Corridor Option 2 (South.)

The significance of the impact relates to high voltage electrical infrastructure and gas transmission mains that are of a greater significance than the impacts on infrastructure contained within the extents of the other corridor options. The significance of these assets is sufficiently greater such that the score continues through to the overall qualitative score for Corridor Option 2 (South). These negative impacts including impacts on transport infrastructure during the construction phase, settlements and zoning, commercial properties, and tourism facilities in the form of Downs Hill all add further weight to the consideration of Corridor Option 2 (South) as the least preferred option in the Southern Section of the scheme.

1.5 Stage 2 Project Appraisal Matrix – transport assessment

This assessment has been undertaken to consider the following transport scenarios:

- Transport Scenario 5A - Parallel Links + Junction Rationalisation; and
- Transport Scenario 5B – N11/M11 Additional lane(s) + Junction Improvements.

For the purposes of the assessment the corridor footprints for each transport scenario, 5A and 5B, are considered to be equal, however the road designs shown on **Figure A8.3.1-A8.3.31** in **Volume E** have been assessed for each transport scenario.

The criteria for the assessment are as per the corridor assessment carried out and documented in **Section 1.4**.

In terms of assessing the impacts of each transport scenario on Material Assets - non-agriculture, the largest influencing factor will generally be the extents of the footprint required by each option under consideration. As the two options under consideration, Transport Scenario 5A and Transport Scenario 5B, are considered to have equal corridor footprints for the purposes of this assessment, in many cases the level and extent of impact on each criterion will be equal, or similar, as a result. The nature of the design within the corridor extents, as a result, will be the main influencing factor in the selection of a preferred and least preferred option.

1.5.1 Infrastructure

Utilities

The extents of utilities falling within the corridor footprints of Transport Scenario 5A and Transport Scenario 5B will be equal for this assessment. However, the extent and magnitude of impacts resulting from the two proposed transport scenarios on utilities within this footprint will vary to some degree.

The location of many existing utilities within the existing verge, such as telecommunications infrastructure, stormwater drainage, and trunk/distribution watermains, means that in the event of an extra lane being added to the existing N11/M11 these types of utilities would almost certainly need to be re-located to a new location within a new verge location.

While there is a risk that these types of utilities may ultimately need to be relocated in the event of parallel roads for Transport Scenario 5A being introduced, the chances of being able to retain some of them in their current locations, with lesser disruption to existing infrastructure, is considered to be greater for Transport Scenario 5A.

Where existing infrastructure crosses the existing N11/M11 the diversions and adjustments to these existing elements are considered to be relatively similar for both transport scenarios.

Some of the more significant utilities that stand to be affected by either, or both, of the transport scenarios include the following:

- EIR – Extensive network of ducts and chambers along significant lengths of the N11/M11 verge between Junction 4 M11/M50 (City Centre/Dún Laoghaire) and Junction 8 (Kilmacanoge / Roundwood).
- ESB – HV underground crossings located in the vicinity of Junction 6 R918 (Bray/Fassaroe) will be impacted by both transport scenarios. LV electrical connections to existing lighting and other roadside equipment located in the existing verge will likely need to be relocated for both transport scenarios.
- Significant lengths of trunk and distribution water mains are located predominantly in the verges to the south of Junction 6 R918 (Bray/Fassaroe). Some that are located within the median are less likely to be directly impacted.
- Gas distribution mains and some stormwater drainage are located within the eastern extents of Junction 5 R761 (Bray North) which stand to be impacted by Transport Scenario 5A but not Transport Scenario 5B.

Transport scenario 5A is considered to be slightly preferable over Transport Scenario 5B. The impacts arising from the parallel roads are considered to result in less disruption to existing services. Many of the existing utilities within the existing road footprint are likely to be impacted in some way by both scenarios but the fact that many of the utilities located in the existing verge will almost certainly require relocation should a third lane be added to the N11/M11 makes Transport Scenario 5B less preferable under this criterion.

Transport (Road/Rail)

Impacts on transport infrastructure are expected to be relatively similar for each transport scenario. In terms of an overall impact on road infrastructure, both scenarios will result in a *moderately positive* impact based on the provision of improved connectivity, reduced congestion, improved safety, and more reliable journey times. Direct accesses will be removed in both cases and access to the N11/M11 will be via alternative access arrangements, again for both cases.

Junction improvements are included in both scenarios also, although Transport Scenario 5A is expected to have a slightly greater impact on surrounding roads due to the proposals for more significant revisions to the junction layout at Junction 5 R761 (Bray North).

The provision of parallel service roads which would reduce the volume of local traffic merging and diverging with strategic traffic on the main N11/M11 is considered to be a positive impact on the existing N11/M11 while the additional junction upgrade works at Junction 5 R761 (Bray North) in Transport Scenario 5A are seen as being beneficial to accessibility and also connectivity between areas east and west of the N11/M11.

Transport Scenario 5A results in the need for more road construction than Transport Scenario 5B and will present a change in how the existing N11/M11 functions, when compared with the existing road.

During the construction period, the disruption resulting from the addition of an extra lane, in Transport Scenario 5B, to the N11/M11 mainline is seen as being more significant to the existing road than the construction of parallel roads in Transport Scenario 5A. The extent of construction required around Junction 5 R761 (Bray North) as part of Transport Scenario 5A is expected to offset this impact.

Though the two designs are quite different in nature, each has positives and negatives, the impacts on this criterion are considered to be equally impactful.

Rail infrastructure will remain unimpacted by either Transport Scenario 5A or Transport Scenario 5B so is considered equally impactful.

Waste Management, Forestry & Quarries

Impacts on waste management, forestry and quarries will remain unaffected by either transport scenarios as these factors are not directly impacted by the current corridor options or the proposed transport scenarios within them.

1.5.2 Properties

Transport Scenario 5A will have a larger direct impact on the lands zoned for residential purposes to the west of Junction 5 due to the addition of a western roundabout and slip road with this scenario.

The direct impacts of each transport scenario on properties, in terms of landtake, will remain consistent across both options, based on the concurrent footprints. Transport Scenario 5A will typically bring the road closer to existing properties which can be viewed as a *minor or slightly negative* impact.

Other impacts, not relating to landtake but still related to property impacts, include impacts to property accessibility. Commercial properties which may currently benefit from being more directly accessible from the N11 may be adversely impacted by the introduction of additional lanes or parallel roads and the removal of many of the sub-standard accesses to these businesses. The parallel service roads provided in Transport scenario 5A are considered to provide a slightly preferable level of accessibility to residential, commercial, industrial and tourism properties than Transport Scenario 5B. Improved East-West linkage through the Junction 5 (Bray North) upgrades associated with Transport Scenario 5A is seen as a positive impact.

Visibility of commercial properties from the N11/M11 is expected to be impacted equally by both transport scenarios and this aspect is covered in detail under the Human beings assessment in **Appendix D8** (Human beings) of **Volume D**.

1.5.3 Summary

Overall, the impacts of both Transport Scenario 5A and 5B are broadly similar and both transport scenarios are assigned a *minor or slightly negative* qualitative assessment.

Taking all impacts on Material assets - non-agriculture into account, Transport Scenario 5A is slightly preferred over Transport Scenario 5B. This is predominantly due to an expected lesser impact on existing utilities infrastructure and greater accessibility and connectivity benefits presented by Transport Scenario 5A.

Table 1.23: Transport assessment summary

	Assessment Criteria Considered	Transport Scenario 5A		Transport Scenario 5B	
Infrastructure	Utilities	2	Preferred	2	Least Preferred
	Transport (Road/Rail)	6	Intermediate	6	Intermediate
	Waste Management	4	Intermediate	4	Intermediate
	Forestry	4	Intermediate	4	Intermediate
	Quarries	4	Intermediate	4	Intermediate
Properties	Settlements & Zoning	3	Least Preferred	3	Preferred
	Residential	3	Intermediate	3	Intermediate
	Commercial	2	Intermediate	2	Intermediate
	Community Facilities	4	Intermediate	4	Intermediate
	Tourism	3	Intermediate	3	Intermediate
	Qualitative Assessment	Minor or Slightly Negative		Minor or Slightly Negative	
	Preference	Preferred		Least Preferred	

1.6 Transport Scenario 4 assessment

Transport Scenario 4 is a supplementary measure to Transport Scenarios 5A and 5B. It is compatible with either Transport Scenario 5A or 5B and represents major investment in the bus services within the study area in addition to the bus services already included in the Transport Strategy for the Greater Dublin Area 2016 – 2035 (GDA Strategy) and the Bus Connects project. Transport Scenario 4 is detailed in **Section 7.5.1 of Volume A**

The details of bus stop locations for Transport Scenario 4 are not defined at this stage. However, the final locations of these bus stops are not considered likely to significantly impact on Material assets - non-agriculture constraints.

Some additional electrical ducts, lighting, and drainage provisions will be required but no significant impacts are currently foreseen arising as a result of these bus-stops.

The impacts resulting from the inclusion of Transport Scenario 4 on Material Assets - non-agriculture supplementary to Transport Scenarios 5A and 5B are considered to be minimal unless it results in the footprint being extended. Assuming that bus provision can be made within the footprint of Transport Scenarios 5A and 5B, this will not impact significantly on Material Assets - non-agriculture.

The inclusion of this transport scenario as a supplementary measure to Transport Scenarios 5A and 5B is not considered to adversely impact on Material Assets - non-agriculture.

1.7 References

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