



Lincolnshire County Council

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# NORTH HYKEHAM RELIEF ROAD

Appendix K – EAST Sift





Lincolnshire County **Council**

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Appendix K – EAST Sift

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WSP  
St. Johns House  
Queen Street  
Manchester  
M2 5JB

WSP.com

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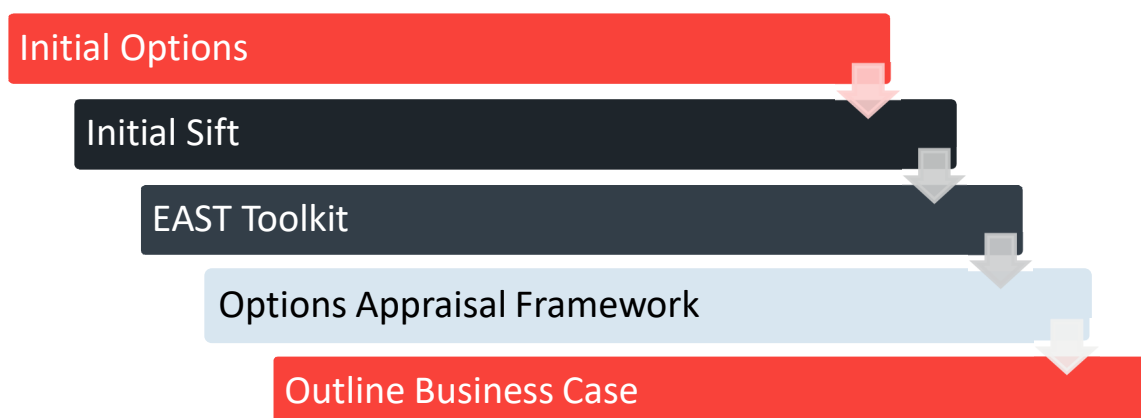
# 1 EAST SIFT

## 1.1 OVERVIEW

In order to determine the better performing options for North Hykeham Relief Road (NHRR), a structured sifting process has been followed which is closely aligned with the DfT's Transport Appraisal Process Guidance (2014).

Figure 1 highlights the adopted process for this assessment. At each sifting stage options are discounted if appropriate, with each subsequent stage requiring a greater detail of analysis resulting in only the better performing options taken forward to the next stage.

**Figure 1 – Option sifting process**



## 1.2 PURPOSE OF THIS APPENDIX

This appendix follows on from 'Appendix J Initial Sift' to present the methodology and results of the EAST toolkit sifting exercise. It is one of three appendix which includes:

- Initial sifting (Appendix J);
- **EAST toolkit (Appendix K)**; and
- Option Assessment Framework (Appendix M).

## 1.3 RESULTS OF INITIAL SIFT

Appendix J - Initial Sift highlighted that three options are to progress to this EAST sifting stage. These options are:

- Option 1: This option would provide a single carriageway link between the A46 and the A15;
- Option 2: This option would provide a single carriageway link between the A46 and the A15 but would include enlarged junctions; and
- Option 3: This option would provide a dual carriageway link between the A46 and the A15.

## 1.4 METHODOLOGY

This appendix is in line with 'Step 6: Initial Sifting' of the Transport Appraisal Guidance (2014) which recommends the use of an Early Assessment and Sifting Tool (EAST). The EAST was developed by the DfT as a decision support tool to develop, quickly summarise and present evidence on options in a clear manner which is consistent with the DfT's five case transport business structure and considers the impact of the scheme under the following business case headings:

- Strategic;
- Economic;
- Managerial;



- Financial; and
- Commercial.

A detailed methodology can be found in Table 1.

**Table 1 – EAST methodology**

Case	Metric	Description	Scoring Mechanism
Strategic	Identification of the problems and objectives	A description of the identified problems in the study area and the key scheme objectives.	Qualitative statement
	Scale of impact	<p>An overall assessment of the impact of the scheme against the specific scheme objectives:</p> <ul style="list-style-type: none"> <li>■ To improve east west connectivity in the South of Lincoln for strategic and local traffic;</li> <li>■ To reduce traffic levels on local urban and rural roads in the South of Lincoln through the transfer of strategic traffic to appropriate routes;</li> <li>■ To reduce NMU severance in South Lincoln caused by high levels of traffic on the local road network and lack of east west connectivity;</li> <li>■ To support the delivery of the Sustainable Urban Extensions by improving access to the identified sites;</li> <li>■ To support the delivery of the South West quadrant through the provision of additional network capacity and non-motorised user infrastructure necessary for the delivery of new housing;</li> <li>■ To reduce traffic levels and congestion around Lincoln and on key routes through the city to support:                             <ul style="list-style-type: none"> <li>● Improved access to central Lincoln;</li> <li>● The improvement of access to the Humber Ports and Airport; and</li> <li>● The improvement of access to the Lincolnshire Coast.</li> </ul> </li> <li>■ To improve the resilience of the orbital and key route network through and around Lincoln and reduce the impact of major incidents.</li> </ul>	'1' (very small) – '5' (fully addresses the problem)
	Fit with wider transport and government objectives	Assessment of the schemes fit to complement/enhance pre-existing proposals such as the LEB and government objectives which are beyond transport. This includes supporting the growth for housing and inward investment.	'1' (poor fit) – '5' (excellent fit)
	Fit with other objectives	How the scheme fits with regional and local objectives. These have been summarised within the Policy Section of the OAR.	'1' (poor fit) – '5' (excellent fit)
	Key uncertainties	Summary of the key uncertainties relating to the strategic objectives and the assumptions that have been made.	Qualitative statement.

Case	Metric	Description	Scoring Mechanism
	Degree of consensus over outcomes	Assessment of the level consultation that has taken to place and/or the level of agreement around the impact of the intervention.	'1' (Little/no consultation/high level of disagreement) – '5' (extensive consultation/high degree of consensus)
Economic	Economic Growth	Assessment of the impact of the scheme on: <ul style="list-style-type: none"> <li>- Connectivity.</li> <li>- Reliability.</li> <li>- Resilience.</li> <li>- Delivery of housing.</li> <li>- Wider economic impacts.</li> </ul>	RAG <sup>1</sup> scoring. ('1' red – '5' green). See Appendix A for further details and results.
	Carbon emissions	Assessment of the impact of the scheme on: <ul style="list-style-type: none"> <li>- Activity.</li> <li>- Embedded carbon.</li> <li>- Carbon content.</li> <li>- Efficiency.</li> <li>- Overall effect on carbon emissions.</li> </ul>	RAG scoring. ('1' red – '5' green). See Appendix A for further details and results.
	Social and distributional impacts	Assessment of the impact of the scheme on: <ul style="list-style-type: none"> <li>- Social and distributional impacts (Air Quality/Noise).</li> <li>- Economy.</li> <li>- Severance/Accessibility.</li> <li>- Safety.</li> </ul>	RAG scoring. ('1' red – '5' green). See Appendix A for further details and results.
	Local environment	Assessment of the impact of the scheme on: <ul style="list-style-type: none"> <li>- Air quality.</li> <li>- Noise.</li> <li>- Natural environment, heritage and landscape.</li> <li>- Streetscape and urban environment.</li> </ul>	RAG scoring. ('1' red – '5' green). See Appendix A for further details and results.

<sup>1</sup> RAG 5 level scoring system: Red, Red/Amber, Amber, Amber/Green, Green



Case	Metric	Description	Scoring Mechanism
	Wellbeing	Assessment of the impact of the scheme on: <ul style="list-style-type: none"> <li>- Physical activity.</li> <li>- Injury or death.</li> <li>- Severance.</li> <li>- Crime.</li> <li>- Access to a range of goods, services, people and places.</li> </ul>	RAG scoring. ('1' red – '5' green). See Appendix A for further details and results.
	Expected VfM category	Discussion on the potential VfM category for the intervention (i.e. the BCR) <sup>2</sup> .	RAG scoring. ('1' red – '5' green).
Financial	Affordability	Assessment of affordability, the estimated scheme cost against the level of funding anticipated.	'1' (not affordable) – '4' (affordable).
	Capital cost	Consideration of the estimated capital cost for delivery of the intervention.	'1' (£100m+) – '4' (<£30m).
	Revenue cost	Consideration of the estimated revenue cost for the operation/maintenance of the intervention.	'0' (continued high maintenance and monitoring costs) – '1' (reduced maintenance and monitoring costs).
	Cost profile	Qualitative statement regarding the anticipated profile of scheme costs, both capital and revenue.	Qualitative statement.
	Overall cost risk	Assessment of the key areas of risk associated with assumptions informing the cost estimates. Summary of the level of risk and uncertainty contained within the estimates (e.g. level of optimism bias, proportion of contingency/uncertainty allowance).	'1' (high risk) – '5' (low risk).
Management	Implementation timetable	Estimate of the timescales for implementation, from inception through to delivery.	'1' (0 - 1 month); 2 (1 - 6 months); 3 (6 - 12 months); 4 (1 - 2 years); 5 (2 - 5 years); 6 (5 - 10 years); & 7 (10+ years)
	Public acceptability	Assessment of the level of public acceptability associated with the scheme, including the likely issues of importance to the public.	'1' (low) – '5' (high).
	Practical feasibility	Assessment of the practical feasibility of delivering the option, including consideration of the statutory powers needed, planning implications and the construction/engineering feasibility of delivering the option.	'1' (low) – '5' (high).
	Quality of supporting evidence	Consideration of the quality/applicability of the information used as part of the scheme development and assessment.	'1' (low) – '5' (high).

<sup>2</sup> Note, at this stage of the study, it has not been possible to calculate actual Benefit Cost Ratios.



Case	Metric	Description	Scoring Mechanism
	Key risks	Summary of the key scheme risks to the delivery of the intervention.	Qualitative statement.
Commercial	Flexibility of option	Assessment of the extent to which the intervention can be scaled up or down, depending on the level of funding available, or amended to fit with changing circumstances.	'1' (static) – '5' (dynamic).
	Where is funding coming from?	Qualitative statement regarding the funding of the investment/operation costs for the intervention and the level of certainty.	Qualitative statement.
	Any income generated?	High level estimate of the level of income generated, if applicable.	Yes/No.

## 1.5 OUTCOME

An outcome sheet showing all the scores for the EAST has been presented within Appendix B and a detailed description for assigning the scores presented below.

### 1.5.1 STRATEGIC CASE

**Scale of impact:** the scale of impact has been assessed based on how each option scored against the specific scheme objectives which include:

- To improve east west connectivity in the South of Lincoln for strategic and local traffic;
- To reduce traffic levels on local urban and rural roads in the South of Lincoln through the transfer of strategic traffic to appropriate routes;
- To reduce NMU severance in South Lincoln caused by high levels of traffic on the local road network and lack of east west connectivity;
- To support the delivery of the Sustainable Urban Extensions by improving access to the identified sites;
- To support the delivery of the South West quadrant through the provision of additional network capacity and non-motorised user infrastructure necessary for the delivery of new housing;
- To reduce traffic levels and congestion around Lincoln and on key routes through the city to support:
  - Improved access to central Lincoln;
  - The improvement of access to the Humber Ports and Airport; and
  - The improvement of access to the Lincolnshire Coast.
- To improve the resilience of the orbital and key route network through and around Lincoln and reduce the impact of major incidents.

All three options are expected to meet the defined objectives, however when compared to the single carriageway and future proofed options the dual carriageway option is forecast to have a greater impact on traffic relief of the existing network.

**Fit with wider transport and government objectives and other objectives:** in accordance with guidance this metric was assessed against how well the options complement pre-existing proposals. In this instance this included support to the major national strategies such as the Transport Investment Strategy, Road Investment Strategy and National Infrastructure Delivery Plan, the key regional and local strategies including the Greater Lincolnshire Strategic Economic Plan, Central Lincolnshire Local Plan and delivery of the South West Quadrant, Lincoln Integrated Transport Strategy, Local Transport Plan and North Hykeham Local Plan. It also looked at the relationship with the delivery of existing proposals including the LEB.

All options would support the key strategies and existing proposals. However, the dual carriageway option is forecast to provide a greater level of relief to the orbital road network on the western side of Lincoln and the local road network in the south of the city when compared to the single carriageway and future proofed options. As a result it will likely better support strategies, schemes and local objectives outlined in the Options Assessment Report through improving access to central Lincoln and strategic connectivity, improving the efficiency of the transport network and supporting the delivery of the SWQ.

**Key uncertainties:** a qualitative assessment has considered the key uncertainties with development of an intervention. It is anticipated that these are equally applicable to all options:

- Funding availability – funding has yet to be identified and secured
- Design – the design is at a concept design stage
- Dependant development – the level of dependant development has yet to be assessed
- Third party land – third party land will be required. If this is not purchased through negotiation a CPO will be required.

**Degree of consensus over outcomes:** The NHRR has been a long-term aspiration for the County Council and the concept of a new east west link forms part of a number of strategies including the adopted CLLP and the LITS. The development of the scheme has been informed by stakeholder and public engagement most recently in 2018. The 2018 engagement resulted in the dual carriageway being identified as the preferred approach when compared to the single carriageway and future proofed options. As a result the dual carriageway option scores 5 and the single carriageway options 4.

## 1.5.2 ECONOMIC CASE

**Economic growth:** Appendix A sets out the factors considered as part of the assessment for economic growth and associated scores for all three options. As can be seen in Appendix A a RAG<sup>3</sup> scoring assessment was utilised. The scores show:

- **Connectivity:** Each option will improve east west connectivity across Lincoln with the largest journey time savings being for east west and northeast / southwest journeys. Each option will also increase the average speed on the network with the dual carriageway providing the biggest change. This is reflected in the Transport User Benefits Assessment (TUBA) where the dual carriageway will provide the largest benefits (£307m).
- **Reliability:** Each option will improve the variability of journey times on the existing orbital, radial and local road network and lead to a reduction in traffic on the A46, A1434 and on a number of local roads in North Hykeham (including Moor Lane, Mill Lane and Meadow Lane). The provision of the dual carriageway option is forecast to result in the largest decreases in traffic on these routes.
- **Resilience:** All three options will improve the resilience of the transport network through the expansion of the orbital network and increase in capacity.
- **Deliver of housing:** All three options will facilitate the delivery of new housing and will support the development of the SWQ.

Based on the above, the overall economic growth RAG score was assessed as amber / green for options 1 and 2 and Green for option 3 (dual carriageway).

**Carbon emissions:** Appendix A sets out the factors measured for the carbon emissions assessment. The improvements in journey times and reduction in congestion will result in a reduction in greenhouse gas emissions. This is forecast to be marginally greater for the dual carriageway option. Therefore, the dual carriageway option scores an amber/green rating while the single carriageway options amber.

**Socio-distributional impacts and the regions:** Appendix A sets out the factors measured for the socio-distribution impacts and the region assessment. All three options will improve accessibility by providing additional east west connectivity to the south of Lincoln, reduce severance caused by the high levels of traffic and result in improvements in air quality and noise in existing urban areas. However, the dual carriageway scheme would be expected to have a marginally bigger impact on these areas due to additional traffic relief that it will provide.

This provides benefits for:

- Local residents particularly those living in villages to the south of Lincoln and North Hykeham;
- Strategic traffic which currently use radial routes through the city centre;
- Businesses within the city centre through improved access due to a reduction in traffic on the radial routes; and
- Strategic traffic wishing to access the Humber ports.

**Local environment:** Appendix A sets out the factors measured for the local environment assessment. Overall the RAG score was assessed as amber for all three options as it is anticipated that the proposals will disperse traffic from existing Air Quality Management Areas and Noise Action Planning Impact Areas to where there are less receptors in proximity to the road, however this will also result in the introduction of new receptors to air quality and noise impacts related to traffic. The proposals will introduce a new road into the rural landscape and therefore will have a negative impact upon the natural environment, however suitable mitigation will be implemented to address the schemes impact on the natural and built environment.

**Well-being:** Appendix A sets out the factors measured for the well-being assessment. Overall the RAG score was assessed as amber / green for all three options. Key points include:

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<sup>3</sup> RAG 5 level scoring system: Red, Red/Amber, Amber, Amber/Green, Green.

- Severance will be reduced by providing an east west link to the south of Lincoln;
- NMU infrastructure provided with NHRR will encourage physical activity;
- Stats 19 data shows that there are higher than average levels of KSI on several sections of the A15 and A57 and the number of accidents/rate per billion vehicle miles is significantly higher than the national average on sections on the A57, A15 and A46. A new bypass to the south of Lincoln will result in traffic transferring off these routes and on to the bypass and therefore improve traffic conditions; and
- The scheme will improve accessibility to services by providing a bypass to the south of Lincoln.

**Expected VfM Category:** The assessment of TUBA benefits shows that they are forecast to range from £272m for the single carriageway to £308m for the dual carriageway. The Present Value of Costs are expected to range from £82m for the single carriageway up to £112m for the dual carriageway option. This places each option in the high value for money category.

Transport User Benefits (TUBA)	Single Carriageway	Single Carriageway + Future Proofing	Dual Carriageway
Benefits	£272,200,000	£272,363,000	£307,500,000

### 1.5.3 MANAGERIAL CASE

**Implementation timetable:** Implementation of all three schemes have been assessed to be between 5 -10 years.

**Public acceptability:** NHRR has been a long-term aspiration for the County Council and the concept of a new east west link forms part of a number of strategies including the adopted CLLP and the LITS. The development of the scheme has been informed by stakeholder and public engagement, this includes the route selection process (which was consulted on in 2006) and the highways concept designs which formed the basis of the most recent consultation (June 2018). The 2018 engagement resulted in the dual carriageway being identified as the preferred approach when compared to the single carriageway and futureproofed options. Therefore, the dual carriageway options scored 5 and the single carriageway options 4.

**Practical feasibility:** A score of 4 out of 5 for all three options was given. All three options have been subject to a robust concept and feasibility design process and all are considered feasible. All options will require planning permission, land acquisition and detailed design and a risk management strategy has been established and the key risks identified.

**What is the quality of the supporting evidence?** A score of 5 out of 5 for all three schemes was given. This is because the NHRR has been developed over a long period of time and has been subject to a significant level of feasibility assessment and design. The scheme forms part of the LITS and is part of the adopted CLLP, the initial route options were assessed and developed in 2006 and subject to stakeholder and public engagement. The highways design options are the subject of the latest options assessment process and were the subject of the 2018 public and stakeholder engagement.

**Key risks:** The NHRR risk register has been established and the key risks assessed and quantified. The key risks for each option relates to unforeseen archaeological finds, developer contributions not being agreed and 3rd party property interests cannot be secured by negotiation.

### 1.5.4 FINANCIAL CASE

**Affordability:** The score rating given for all three options for this metrics was 'don't know'. This is because the funding source has yet to be identified. However, it is anticipated to be a mixture of central and local government as well as private sector.

**Capital Cost:** Regardless of which option is chosen, all three options have been estimated to cost in the region of £100 -250 million each.

**Revenue cost:** The score rating given for all three options for this metrics was 0 to 5 £m. This is the estimated maintenance cost over 60 years.

**Cost profile:** The cost profile of the scheme has yet to be determined.

**Overall cost risk:** Each option has been subject to a robust cost assessment exercise based on the concept designs and inflation and risk has been assessed, quantified and incorporated into the outturn cost estimates – as appropriate for this stage of the design. The cost risk has been rated as a 3 out of 5 for the single carriageway and future proofed options and the dual carriageway is judged to represent a slightly higher cost risk rating due to its scale and the increased base costs. The quantification of key risks has been informed by the lessons learnt from the construction of the LEB. In particular an appropriate level of risk has been attached to the archaeological works given the issues encountered with the LEB.

**Other costs:** As stated above there is a chance of unforeseen archaeological finds which has the potential to significantly increase cost. It is anticipated a preliminary excavation will reduce this risk.

### 1.5.5 COMMERCIAL CASE

**Flexibility of option:** All three options scored 2 out of 5 due to the alignment of all options having already been determined. However due to the proposals being in concept design stage there remains some flexibility on other aspects including, but not limited to, junction design / location, NMU and SUDs provision.

**Where is funding coming from?** This metric requires a qualitative statement and regardless for which option is chosen funding has yet to be identified but it is anticipated that it will be a mixture of central government, local government and private sector.

**Any income generation?** This was assessed as 'no' for all three options.

## 1.6 CONCLUSION

The EAST Assessment identifies the dual carriageway as marginally being the best performing option in relation to the objectives and overall impact. In the main this is due to the level of traffic relief that is expected to result from its implementation. However, each option is likely to deliver a high BCR. As a result all three options shall progress to the Options Assessment Framework (OAF) sifting stage. These options are:

- Option 1: This option would provide a single carriageway link between the A46 and the A15;
- Option 2: This option would provide a single carriageway link between the A46 and the A15 but would include enlarged junctions; and
- Option 3: This option would provide a dual carriageway link between the A46 and the A15.

It is anticipated that the greater in-depth analysis within the OAF will help to further differentiate between the three options.

A summary of all the scores received within the EAST assessment is provided in Appendix B.

## APPENDIX A

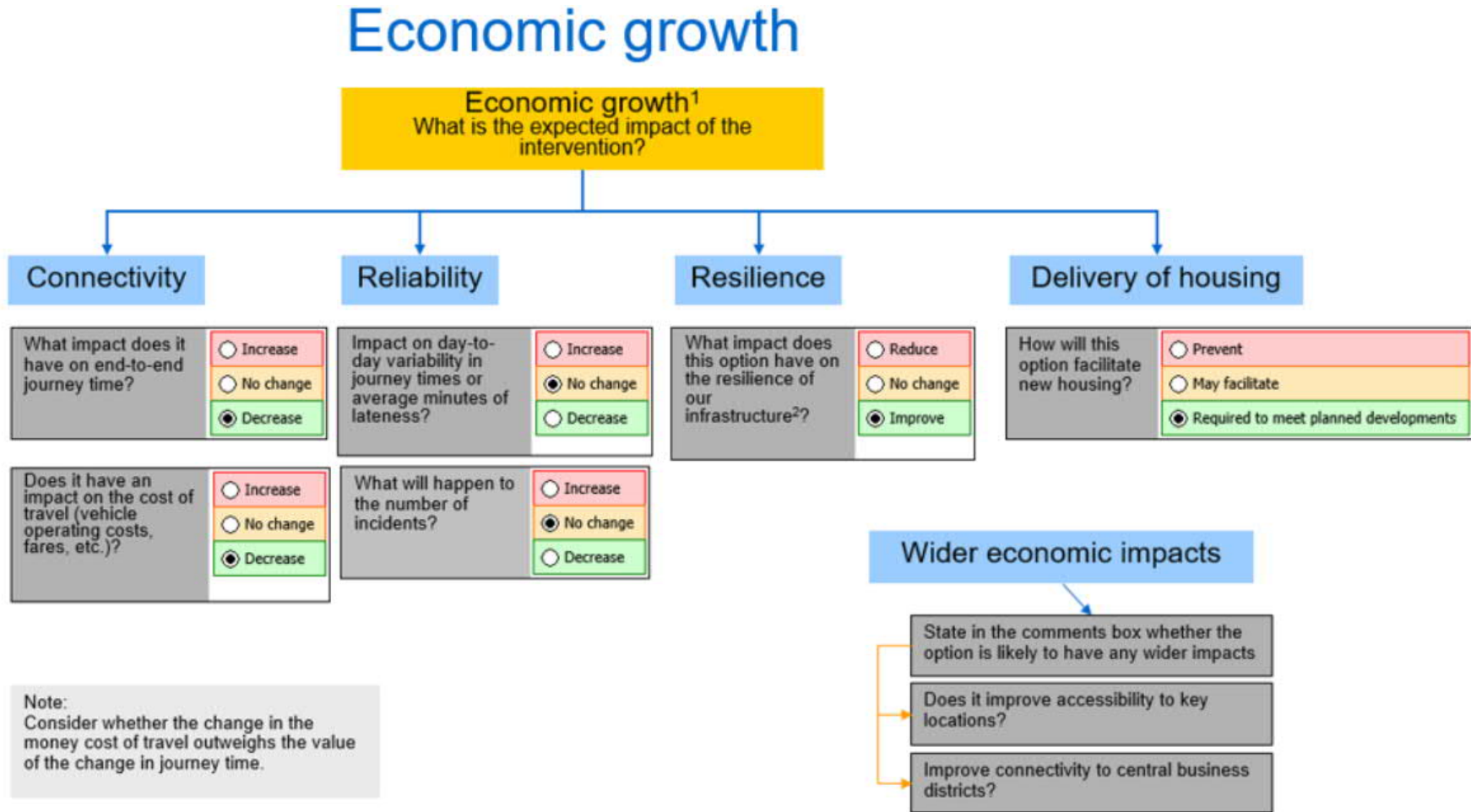
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In line with the Department for Transport guidance, and the decision tree for the Red Amber Green (RAG) scoring, the three options which have progressed to the EAST assessment have been scored against various metrics including:

- Economic Growth (Figure A)
- Carbon Emissions (Figure B)
- Socio-Distributional Impacts and Regions (Figure C)
- Local Environment (Figure D)
- Well Being (Figure E)

The following figures provide the factors measured for each of the above assessments.

Figure A – Economic Growth



<sup>1</sup> Applicable only to business and commuters only (excludes leisure) <sup>2</sup> Eg. acts of terrorism, severe weather events or the effects of climate



Figure B – Carbon Emissions

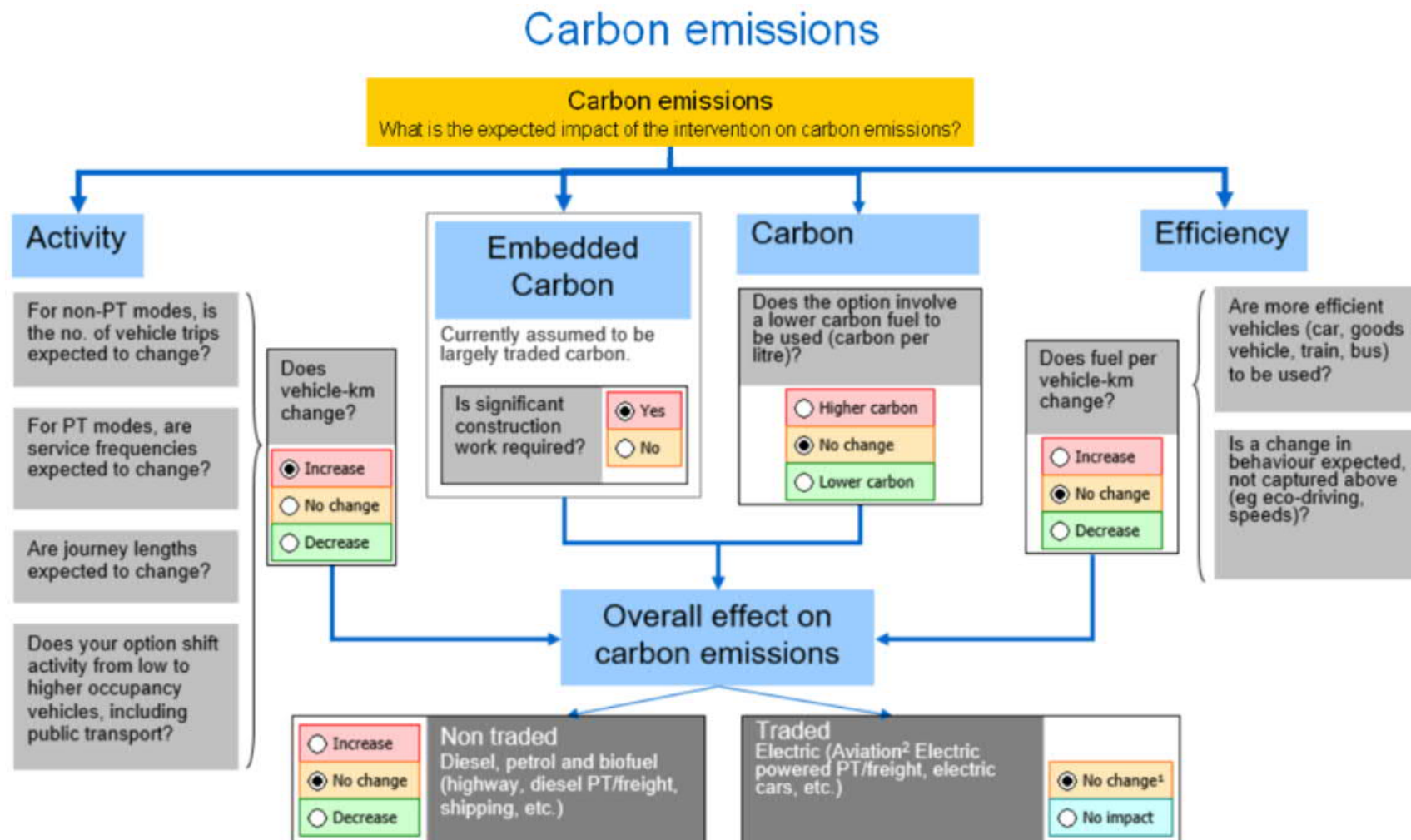
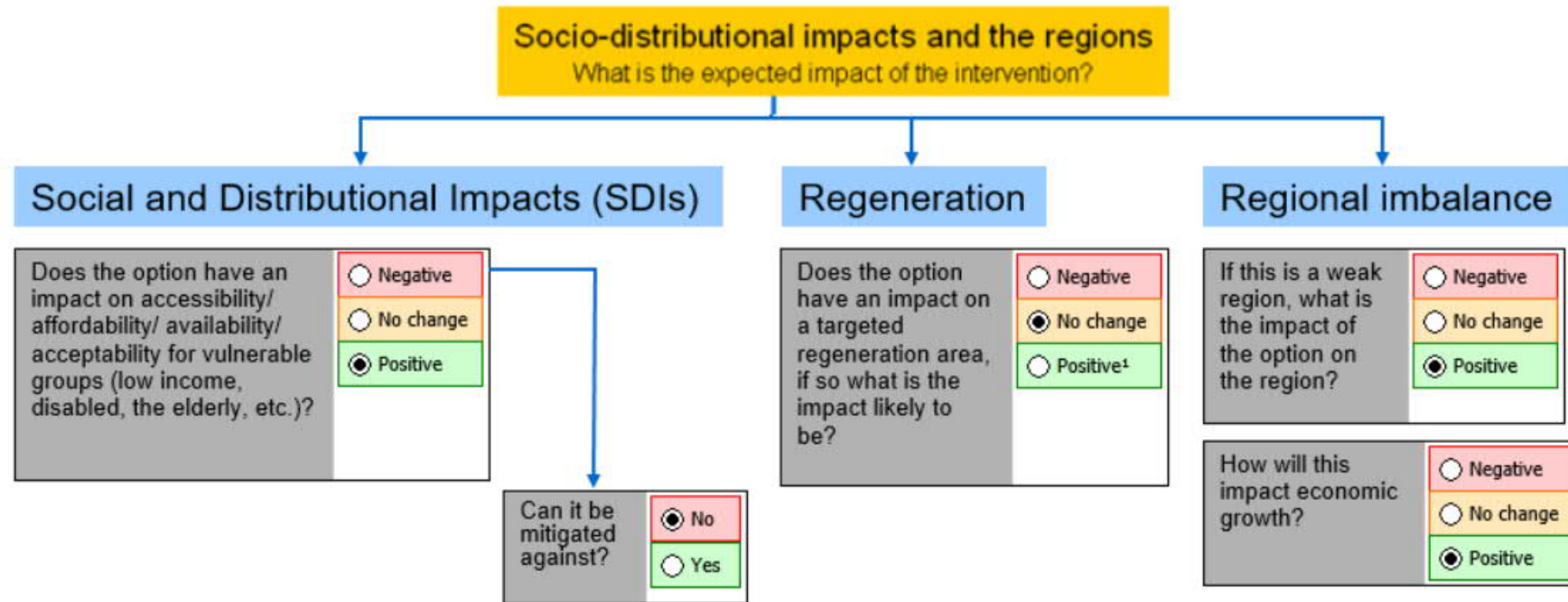


Figure C – Social Distributional Impacts and Regions

## Socio-distributional impacts and the regions



It should be noted that there are eight Social and Distributional Impacts (SDIs) that need to be considered in a full appraisal. The eight SDIs are Noise, Air Quality, Severance, Accessibility, Personal Affordability, Accidents, Security, and User Benefits, which are also relevant to the other goals. See the Strategic Appraisal Guidance for more information.

Figure D - Local Environment

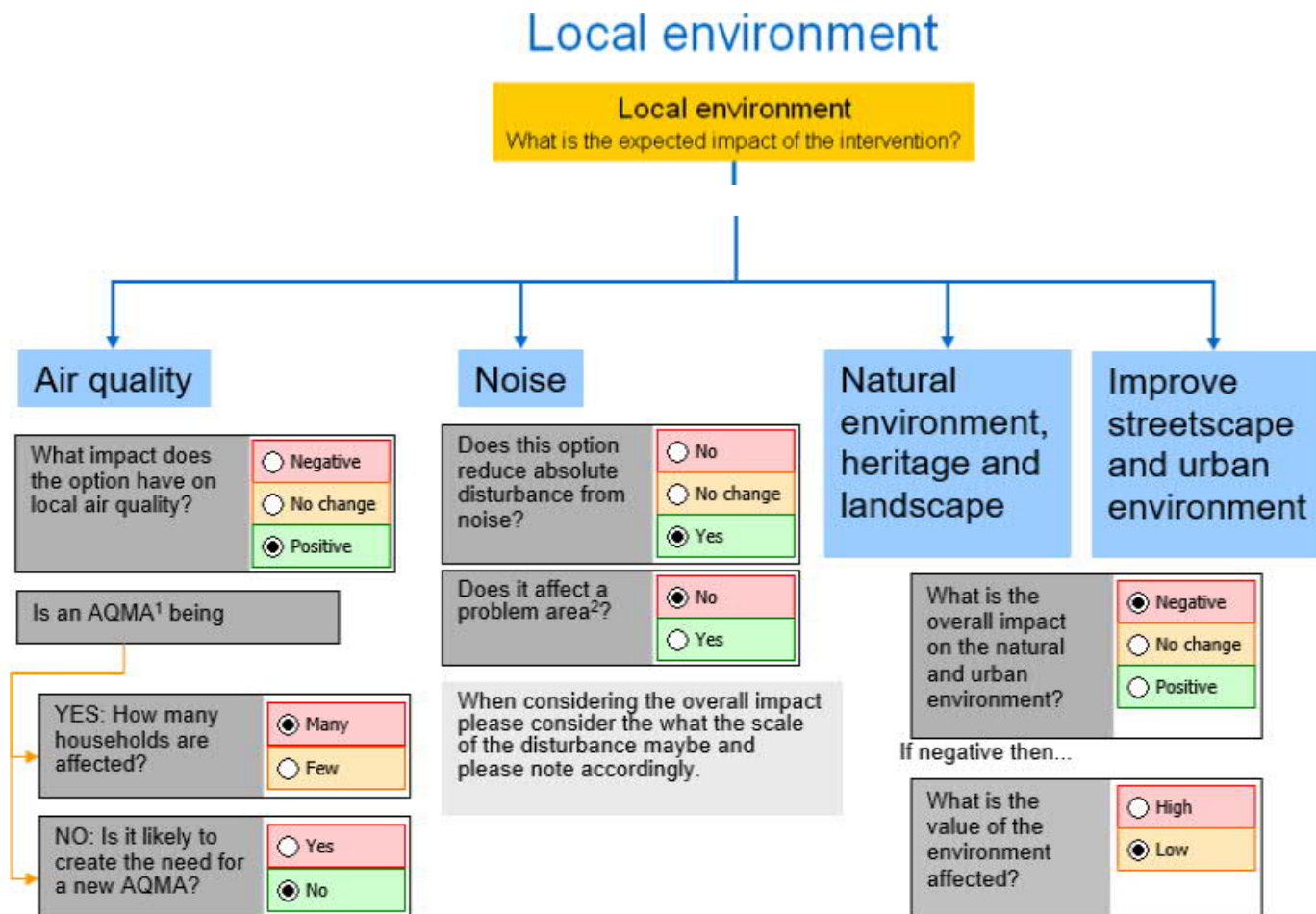
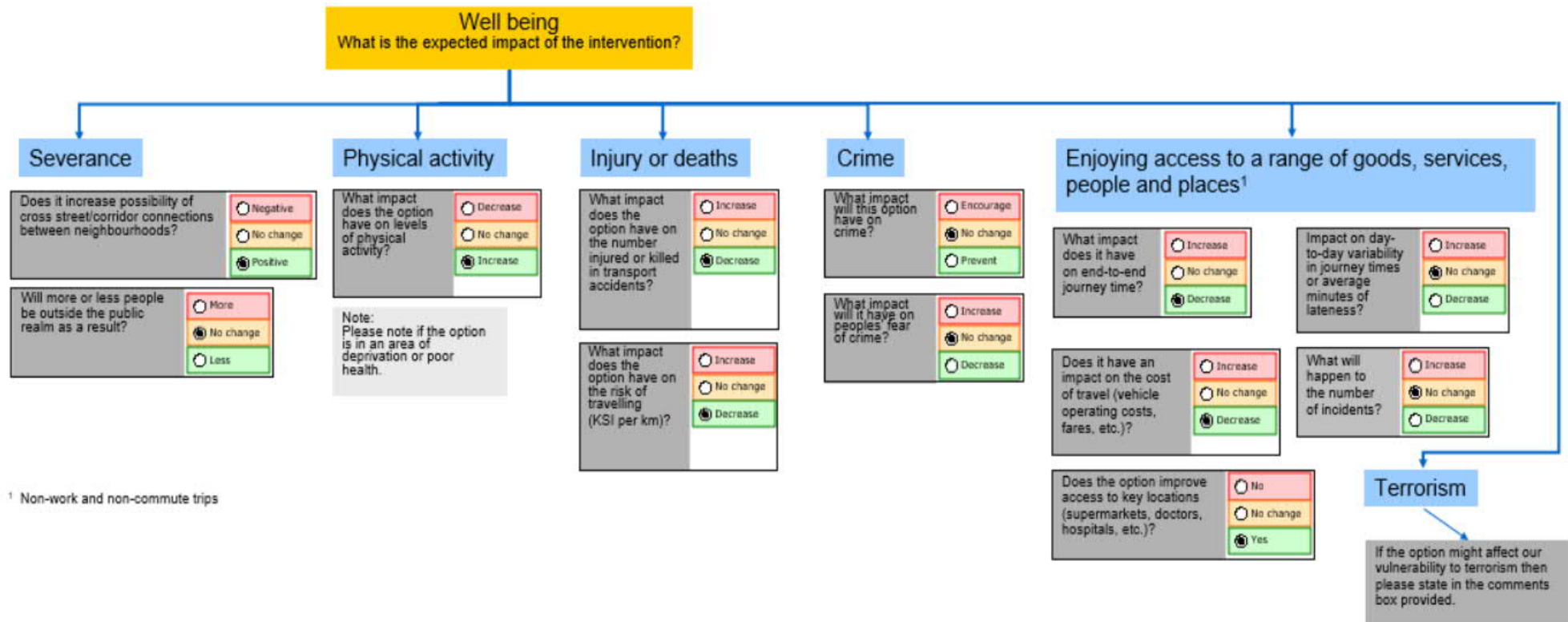


Figure E – Well Being



<sup>1</sup> Non-work and non-commute trips



Option		Strategic			Economic						Management				Financial					Commercial		
Name /No.	Desc.	Scale of impact	Fit with wider transport and government objectives	Degree of consensus over outcomes?	Economic Growth	Carbon emissions	Socio-distributional impacts and the regions	Local environment	Well being	Expected VfM Category	Implementation timetable	Public acceptability	Practical feasibility	What is the quality of the supporting evidence?	Affordability	Capital Cost (£m)?	Revenue Costs (£m)?	Cost Profile	Overall cost risk	Flexibility of option	Where is funding coming from?	Any income generated? (Y/N)
Option 1	Single carriage.	4	4	4	4. Amber/green	3. Amber	4. Amber/green	4. Amber/green	4. Amber/green	2. High 2-4	6. 5-10 years	4	4	5. High	Don't know	07. 100-250	02. 0-5	Yet to be determined	3	2	Mixture of central government, local government and private sector.	No
Option 2	Single Carriage way + Future Proofing	4	4	4	4. Amber/green	3. Amber	4. Amber/green	4. Amber/green	4. Amber/green	2. High 2-4	6. 5-10 years	4	4	5. High	Don't know	07. 100-250	02. 0-5	Yet to be determined	3	2	Mixture of central government, local government and private sector.	No
Option 3	Dual carriage way.	5.	5. High	4	5. Green	4. Amber/green	5. Green	3. Amber	4. Amber/green	2. High 2-4	6. 5-10 years	5. High	4	5. High	Don't know	07. 100-250	02. 0-5	Yet to be determined	2	2	Mixture of central government, local government and private sector.	No



St. Johns House  
Queen Street  
Manchester  
M2 5JB

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