M6 to A1 Corridor Study

Staged Overview Assessment Report (SOAR)

Report Number: SPaTS 1-878 M6- A1M P02 S0
March 2020

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Document Control

Document Title	M6 to A1 Corridor Study **Staged Overview Assessment Report (SOAR)** M6 to A1 Corridor Study Scheme
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Distribution	[redacted] - (Highways England – Project Manager [redacted] - (AECOM – Project Manager)
Document Status	P01

Record of Issue

Revision	Status	Author	Date	Checked	Date	Approver	Date	Authorised for Issue	Date
P01	First Issue	LA	June 2020	FM	June 2020	FM	June 2020		
P01	Final Draft	LA	25.06.20	FM	25.06.20	FM	25.06.20		

Consulted with

Name	Role

Contents

1 INTRODUCTION

1.1 Background

1.1.1 Highways England have commissioned AECOM to examine the potential for a new strategic highway link across the Pennines, creating an additional link between the M6 and the A1(M). This commission follows on from an earlier study which reviewed the existing Central Pennines Corridor (CPC) conditions and examined the potential for Trans Pennine highway improvements.

1.2 Purpose of this Document

1.2.1 The Staged Overview of Assessment Report (SOAR) is intended to provide an overview of the assessment of the scheme to a non-technical audience.

1.2.2 The SOAR has been produced at Project Controls Framework (PCF) Stage 0 for Highways England and this document follows the guidance set out in the PCF Product Matrix V52, 1st December 2019) and therefore:

- Identifies the 'need for intervention' and the potential solutions that have been considered;
- States the scheme-specific objectives and intended outcomes, linking these to the underlying issues;
- Defines the geographical area of impact likely to be addressed by the intervention;
- Informs decision makers by aiding consideration of the likely social, environmental, economic and policy effects of alternative proposals; and
- Allows the public and statutory bodies to comment on proposals, taking account of their environmental, economic and traffic implications.

1.3 Contents

1.3.1 The SOAR has been structured as follows:

- **Chapter 2** – Description of the study and its evolution with references to supporting documentation;
- **Chapter 3** – Existing conditions within the study area from a socio-economic, transport and policy perspective;
- **Chapter 4** – Option development; and
- **Chapter 5** – Recommendations.

2 DESCRIPTION OF THE STUDY

2.1 Introduction

2.1.1 This study falls under Stage 0, 'Strategy Shaping and Prioritisation', of the Highways England Project Control Framework (PCF). Within this pre-project phase, the PCF process anticipates:

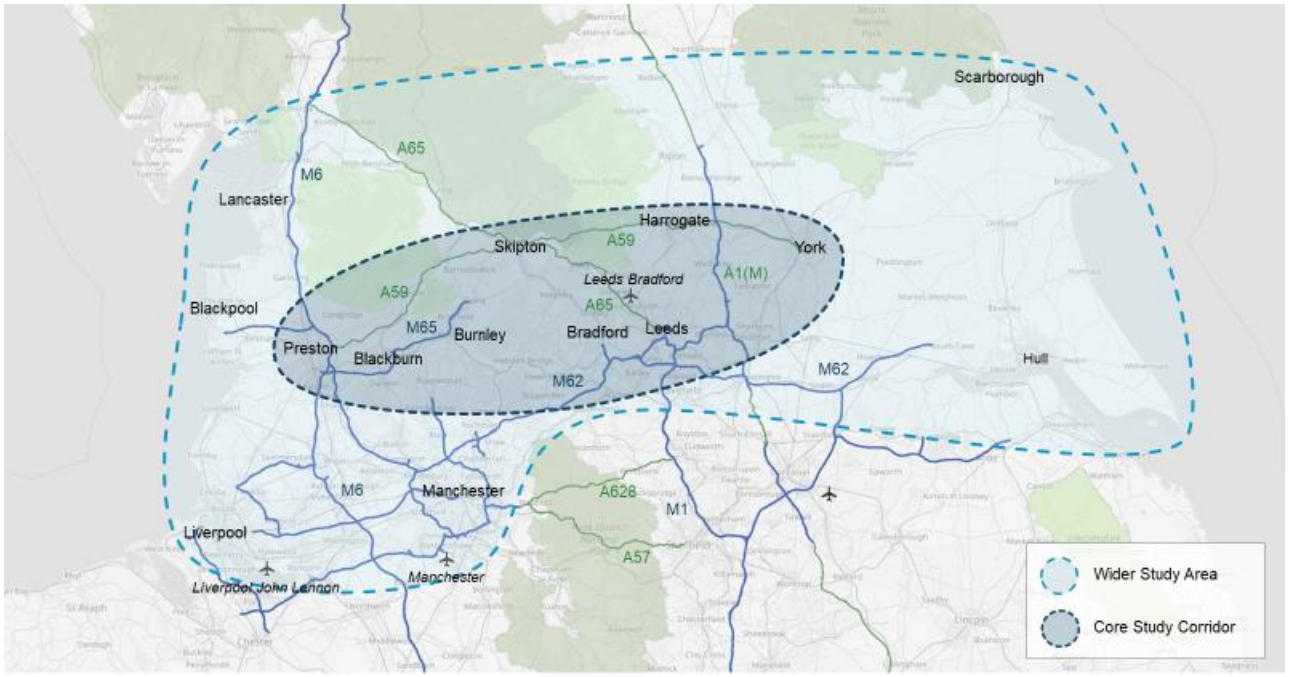
- The identification and prioritisation of potential transport issues; and
- Shaping, investigation and assessment of the viability of transport scheme solutions to the problem.

2.1.2 The SOAR and study approach reflects this.

2.2 Study Evolution

2.2.1 The core study area and wider study area is presented in **Figure 1**.

Figure 1 Extent of Study Area



2.2.2 The development of this M6-A1(M) study has been undertaken in 3 Phases.

2.2.3 Phase 1

2.2.4 The study began with an initial strategy shaping phase which reviewed the existing Central Pennines Corridor (CPC) conditions and examined the potential for Trans-Pennine highway improvements. This desktop-based research study identified four possible Trans Pennine corridor concepts within the core study area to provide additional East-West strategic highway capacity and alleviate congestion issues on existing routes identified within the baseline assessment of the study.

2.2.5 Following the conclusion of the strategy shaping study, the four identified concepts have been taken forward into more detailed modelling and appraisal appropriate to PCF Stage 0 (Phase 2 & 3).

2.2.6 Phase 2

2.2.7 The Phase 2 study involved high-level transport modelling to understand the relative order of magnitude of benefits and to determine the value in pursuing detailed options. The outcome of Phase 2 was the identification of the two 'best-performing' corridor concepts from the shortlist of four, which will then be used to inform a Strategic Outline Business Case (SOBC) for what are considered the best performing options (Phase 3).

2.2.8 Phase 3

2.2.9 Following the identification of the 2 'best performing' corridor concepts, these corridors have then been subject to more detailed refinement, modelling and appraisal assessment. The Phase 3 study builds upon knowledge from previous known corridor studies and will expand on the initial strategy shaping study (Phase 1) and consider the Strategic Transport Plan for the North and Central Pennines Strategic Development Corridor, both prepared by TfN.

2.2.10 With the exception of the M62, there are no complete dual carriageway Trans-Pennine routes between the east and west of England. Ultimately, this study intends to determine the value of pursuing a new Trans Pennine highway link that meets its objectives and is deliverable, affordable and offers value for money. By determining the constraints, opportunities and benefits of a new link, this will allow Highways England to better develop a long-term strategy for the Central and South Pennine areas.

2.3 Supporting Documents

2.3.1 The following documents have been prepared as part of this piece of work:

- **Phase 1** – Original strategy shaping study which identified four possible Trans Pennine corridor concepts to provide additional East-West strategic highway capacity and alleviate congestion issues on existing routes:
  - *M6-A1M Central Pennines Study*
- **Phase 2** – Indicative modelling results on the four corridor concepts as identified in Phase 1 (Preliminary Analysis Report):
  - *SPaTS Package 1-878 M6-A1(M) Preliminary Analysis Report (PAR) 4.0*
- **Appraisal Specification Report** – details on how the scenarios and environmental assessments will be undertaken in PCF Stage 0 and supported by the traffic modelling work. This report defines how the economic narrative within the Analytical Requirements Report (ARR) will be maintained through the appraisal process, and defines the methodology, assumptions and associated risks of the transport assessment, including transport modelling.
  - *M6-A1(M) Stage 0 – ASR V3.0*
- **Suitability of the modelling tool** – technical note detailing the use of the Trans Pennine South Regional Transport Model (TPS RTM) as the tool for the PCF Stage 0 assessment. This technical note summarises the key features of the model in terms of structure, level of detail, how closely the model replicates existing traffic conditions and any perceived weaknesses in the suitability of the model as the tool being used in this study.
  - *Suitability of TPS RTM - Technical Note_P01_Feb20*
  - *Central Pennines Strategic Development Corridor: Product 07 – Data Requirements and Model Zoning System, TfN January 2018*

2.3.2 Chapter 4 details the option testing and appraisal undertaken in Phase 2, leading to the two preferred corridor concepts being taken forward to SOBC (Phase 3).

3 EXISTING CONDITIONS

3.1 Introduction

3.1.1 This section of the SOAR describes the existing conditions within the study area, setting out the policy fit and investment rationale for the project. This is supported by a robust evidence base that considers the current and future transport conditions and issues within the M6 to A1(M) study area, enabling development of scheme objectives. Scheme practicalities are also presented, including the identification of key stakeholders, constraints and inter-dependencies and have been used to support the option assessment process.

3.2 Supporting Documentation

3.2.1 The following documents have been prepared as part of this piece of work:

- **Phase 1** – Original strategy shaping study which provides a detailed review of key socio-economic conditions, examines the existing transport conditions and provides a high level review of key economic and transport policies against major growth aspirations planned within the study corridor:
  - *M6-A1M Central Pennines Study*
- **SOBC Strategic Case** – the Strategic Case presents details of the following:
  - *Business Strategy;*
  - *Problems Identified;*
  - *Impact of Not Changing;*
  - *Objectives;*
  - *Measures for Success;*
  - *Constraints;*
  - *Options;*
  - *Scope;*
  - *Interdependencies; and*
  - *Stakeholders and Delivery Partners.*
  - *SPaTS Package 1-878 M6-A1(M) SOBC v4*

3.3 Socio-Economic

3.3.1 Section 2.3.6 of the SOBC Strategic Case provides a high-level review of the socio-economic conditions for the study area, and considers the existing characteristics, such as population, jobs and education, as well as outlining the challenges and potential opportunities of the socio-economic make up for the area.

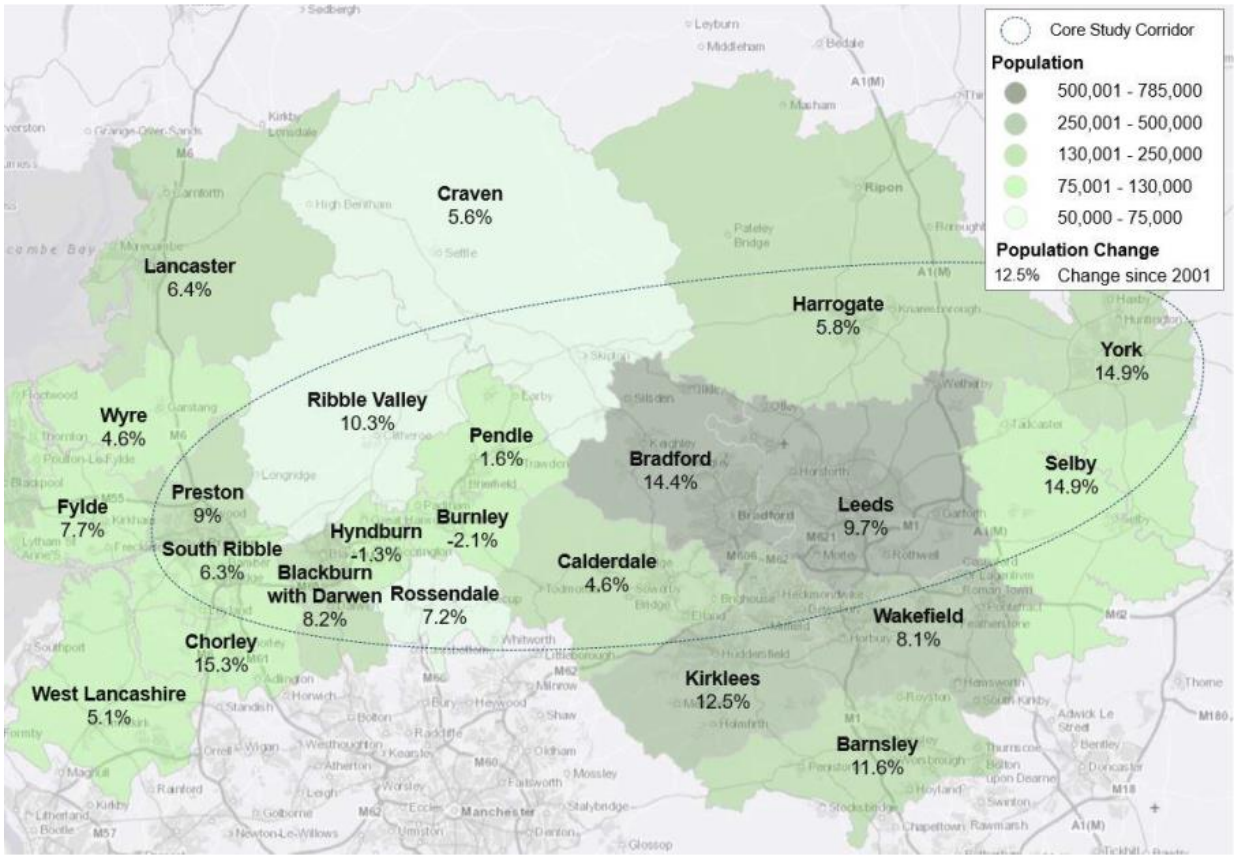
3.3.2 Population

3.3.3 Figure 2 shows the clustering of the population on either side of the Pennines in Lancashire and West Yorkshire, with the highest concentration in the Leeds City Region.

3.3.4 Although relatively close in distance, connectivity between the two regions is limited. The Northern Powerhouse Independent Economic Review (2016) has shown that improved connectivity between areas of larger population is known to contribute towards agglomeration effects. This suggests that improving connectivity between the

two areas could potentially promote agglomeration effects between the clusters and may also benefit areas in between.

Figure 2 2017 Population and Percentage Change Since 2001[1]



3.3.5 Jobs

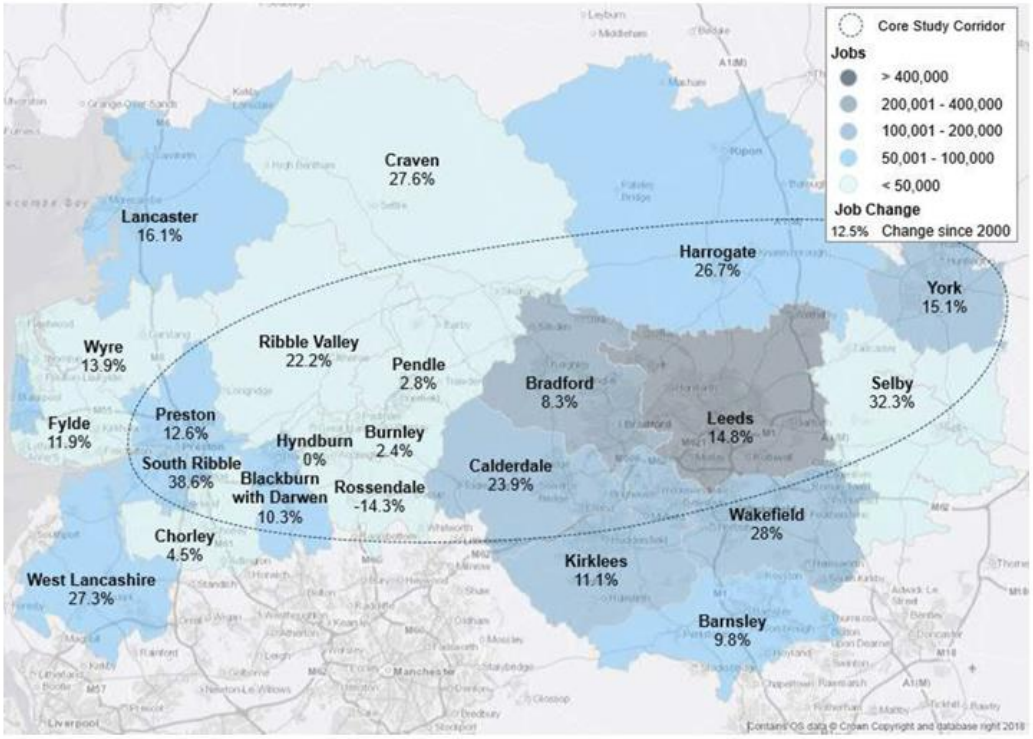
3.3.6 Figure 3 shows the total number of jobs, by district, in 2017 alongside the percentage change in jobs between 2000 and 2017. The map also shows a concentration of jobs in Leeds and Bradford, with the trends in job numbers reflecting the population trends presented earlier.

3.3.7 With regards to percentage change in jobs, the results show most districts have experienced job growth since 2000 albeit to varying extents. Much lower growth in jobs has been observed in parts of East Lancashire, for example just 2.4% in Burnley, compared with 23.9% in neighbouring Calderdale within West Yorkshire. Whilst the number of jobs was notably lower to the east of the M65 Corridor, along the same corridor to the west, there are higher job numbers and job growth over the same time period. This area also benefits from higher levels of connectivity with junctions providing access to the M6, M61 and M65.

3.3.8 The M65 and M62 Corridors have notable differences in both investment and connectivity, which suggests there is a relationship between these aspects. Therefore, by improving connectivity across the M65 Corridor with an M6 to A1(M) improvement, this could potential contribute to similar levels of economic growth and business activity along the M65 as are observed on the M62.

[1] ONS / NOMIS 2001 and 2017 Mid-Year Estimates at District Level

Figure 3: 2017 Jobs and Percentage Change (2000 to 2017)



3.3.9 The findings demonstrate clustering of population and jobs growth within the Core Study Corridor, whilst other locations have seen marginal or negligible changes. Transport improvements can ensure there is suitable accessibility in areas of growth, whilst also providing the necessary connectivity to facilitate growth elsewhere.

3.3.10 With areas amongst some of the most deprived nationally, this suggests there is a need to drive economic growth and productivity to reduce unemployment, improve skills and 'gaps' in employability. Although enhanced connectivity between the M6 and A1(M) is unlikely to solely address the challenges as it primarily benefits those with car access, strategic highway improvements can contribute to reducing deprivation levels and boosting employment levels.

3.4 Transport

3.4.1 Section 2.3.1 of the SOBC Strategic Case present detailed analysis of the transport and accessibility conditions across the Wider Study Area, with a particular focus on Trans Pennine movements and the Core Study Corridor.

3.4.2 Within this section, the following components are covered:

- Transport Network;
- Traffic Flows, Compositions and Journey Times;
- Travel Trends;
- Accidents; and
- Resilience.

3.4.3 The existing transport network within the Core Study Corridor highlights several problems across transport modes. The highway network has limited local east-west connectivity between the eastern extent of the M65 and A65, whilst the M62 is the only Trans Pennine route that is part of the SRN. With regards to alternative east-west

routes, the A59 is situated 22 miles north of the M62 and the A66 a further 35 miles north. To the south of the M62 options within a similar distance include the A628 (12 miles south) and A57 (22 miles south).

3.4.4 Rail services within the Core Study Corridor are infrequent and rail journey times are often notably slower than highway. Meanwhile, existing surface access, by all modes, to Leeds Bradford Airport is considered poor, although there are proposals to improve connectivity.

3.4.5 A third of the UK's road, rail, distribution centre and port activity is undertaken in the North of England and this highlights the reliance on the transport network to facilitate these movements. For domestic short-haul movements, road is, and will remain, the dominant mode.

3.4.6 Therefore, a new strategic highway link between the M6 and A1(M) will need to consider the interaction with the local highway network as well as the integration with the wider transport network.

3.4.7 The analysis of traffic flows highlights more than 103,000 vehicles per day on the M62, which is notably higher than the alternative Trans Pennine routes. The dominance of the M62 was also evident in the select link analysis of routes utilised by traffic. This demonstrates the M62 is utilised for longer-distance journeys with movements to the east and west coast of England, compared with the relatively localised demand on the M65.

3.4.8 Several Trans Pennine routes experience localised congestion around key towns, close to urban areas or interchange locations. Congestion constrains the movement of people and goods and therefore limits the catchment area for commuters as well as the reliability for business and freight movements, particularly if the latter are dependent on just-in-time deliveries. The analysis has highlighted a number of congestion "hotspots" which are likely to impact local, as well as, strategic movements within the Core Study Corridor between the M6 and A1(M) including, Colne, Harrogate Town Centre, North Bradford, Leeds Bradford Airport and York.

3.5 Policy

3.5.1 The Strategic Case of the SOBC sets out, in detail, the policy fit and investment rationale for the project. This is supported by a robust evidence base that considers the current and future transport conditions and issues within the M6 to A1(M) study area, together with the policy fit, enabling development of scheme objectives. Scheme practicalities are also presented, including the identification of key stakeholders, constraints and interdependencies and have been used to support the option assessment process.

4 OPTION DEVELOPMENT AND APPRAISAL

4.1 Introduction

4.1.1 This section of the SOAR describes the iterative process of the options developed and assessed. As described in Section 2.2, the development of the appraisal options was undertaken in 3 phases. This section focuses on the final 2 phases of this development cycle; reducing the initial 4 corridor concepts to 2 'best performing' corridors warranting further detailed modelling.

4.2 Supporting Documentation

4.2.1 The following documents have been prepared as part of this piece of work:

- **Phase 1** – Original strategy shaping study which provides a detailed review of key socio-economic conditions, examines the existing transport conditions and provides a high level review of key economic and transport policies against major growth aspirations planned within the study corridor:
  - *M6-A1M Central Pennines Study*
- **Phase 2** – Indicative modelling results on the four corridor concepts as identified in Phase 1 (Preliminary Analysis Report):
  - *SPaTS Package 1-878 M6-A1(M) Preliminary Analysis Report (PAR) 4.0*
- **SOBC Strategic Case** – Section 2.8 presents summarises the details of the options identified as part of the option development and appraisal process.
- **ComMA –** The Combined Modelling and Appraisal (ComMA) Report and its appendices present details of the modelling and appraisal process undertaken on the 2 best performing corridors selected at the end of Phase 2.
  - *SPaTS Package 1-878 M6-A1(M) – Stage 0 – ComMA Report_V02*

4.3 Strategic Corridors – Phase 1

4.3.1 **Figure 3** shows a summary of the strategic option identification and assessment process.

4.3.2 The process began with the identification of three strategic corridors and options for each of these. The three corridors are shown in **Figure 4**.

4.3.3 From the identification of the strategic corridors, a component long list was identified, as shown in **Figure 5**. From this initial list of 16, a two-step sifting assessment was undertaken to reduce the long list of options from 16 to 4. Section 2.8.3 and 2.8.4 of the SOBC present more details of this process.

Figure 3 Strategic Corridor Option Assessment Process

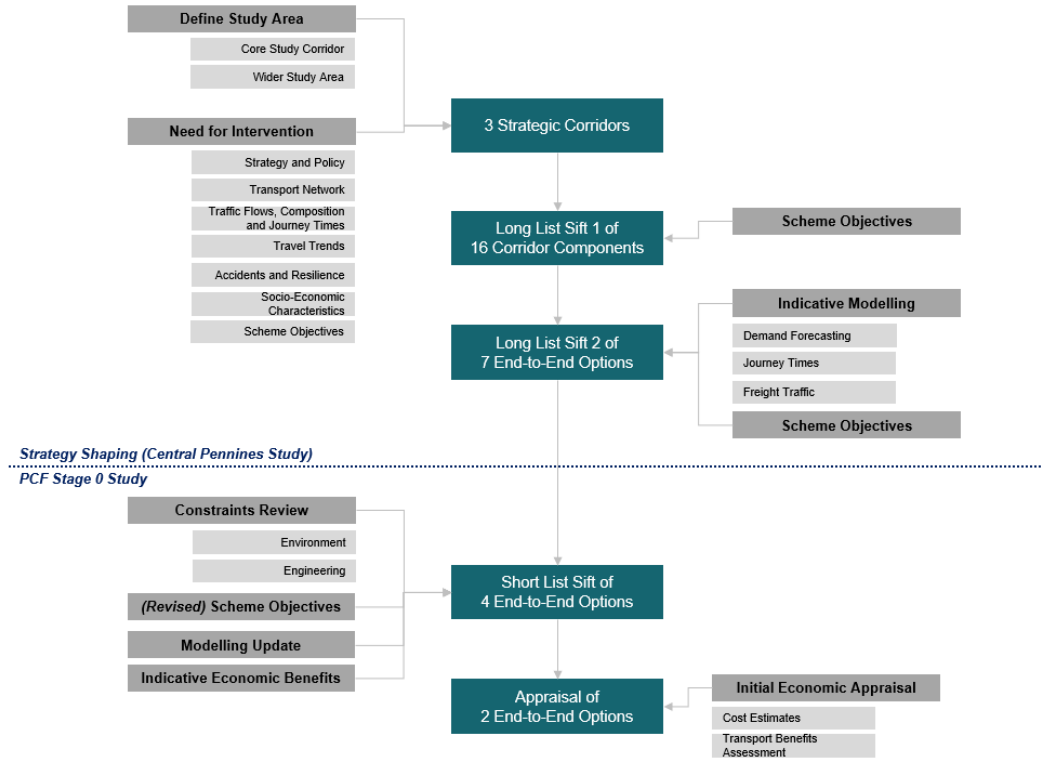


Figure 4 Strategic Corridors

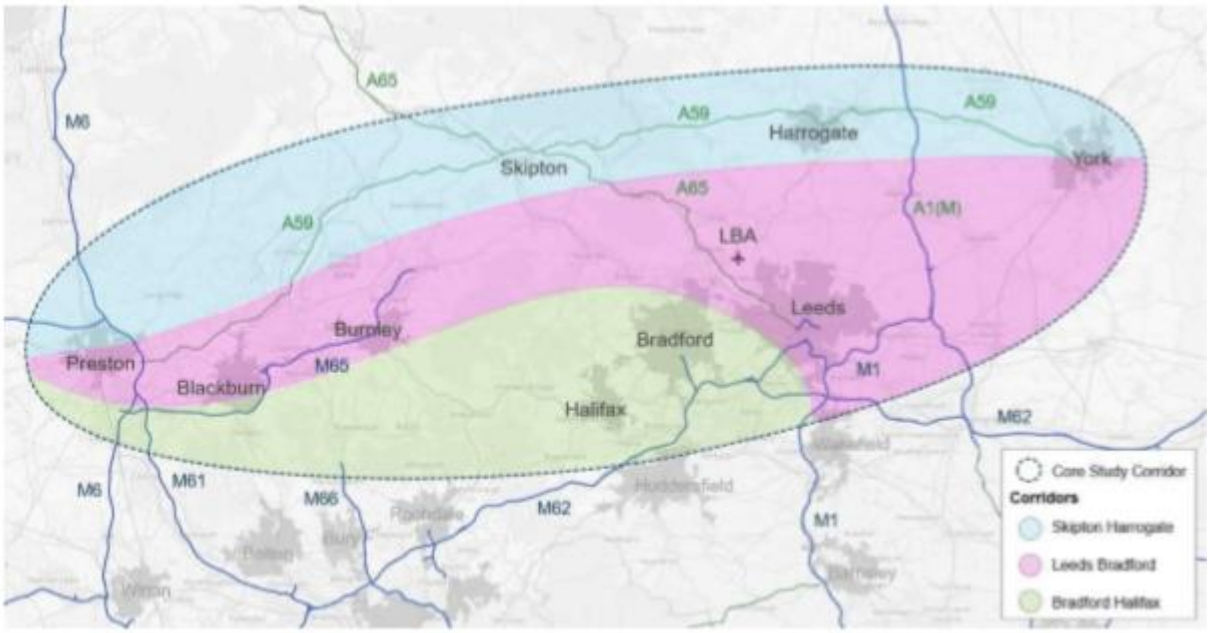
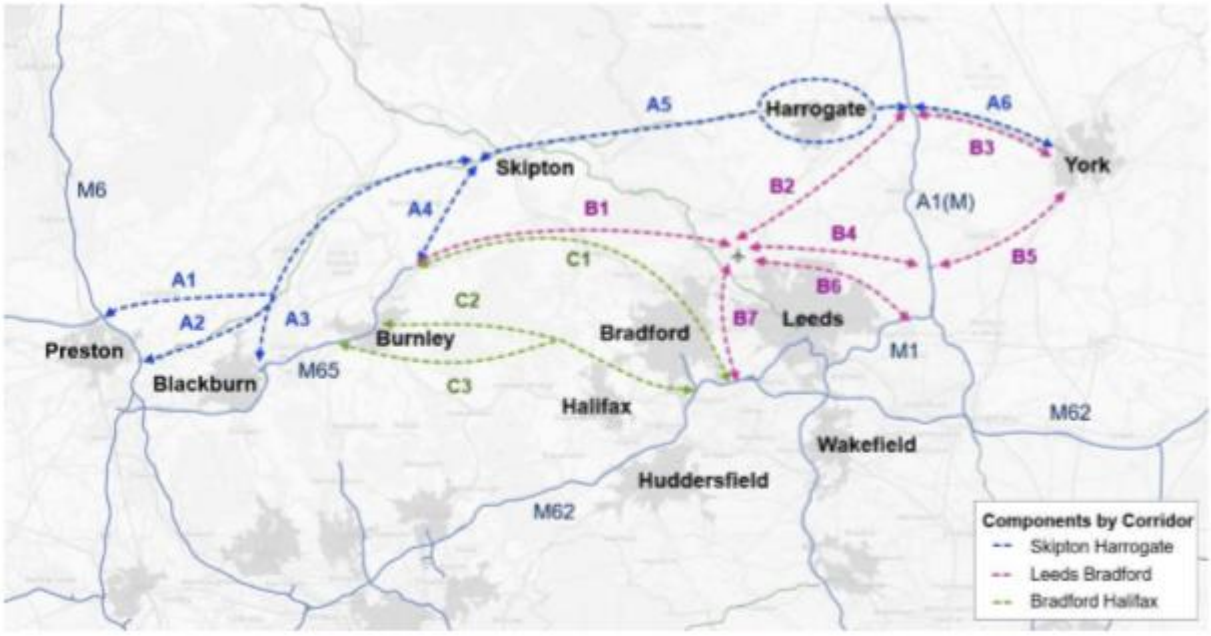


Figure 5 Corridor Component Long List Options



4.4 Four Corridor Concepts – Phase 2

4.4.1 The four corridor concepts identified at the end of Phase 1 are summarised as follows and are displayed in **Figure 6 - Figure 9**:

- **Orange** – Colne (M65), Skipton, Leeds Bradford Airport (LBA), A1(M) and York (A64);
- **Pink** – Colne (M65), Skipton, Harrogate, A1(M) and York (A59);
- **Purple** – Colne (M65), LBA and M1 east of Leeds; and
- **Red** - Colne (M65), LBA, Leeds outer ring road and M62.

Figure 6 Indicative Alignment for Orange Corridor

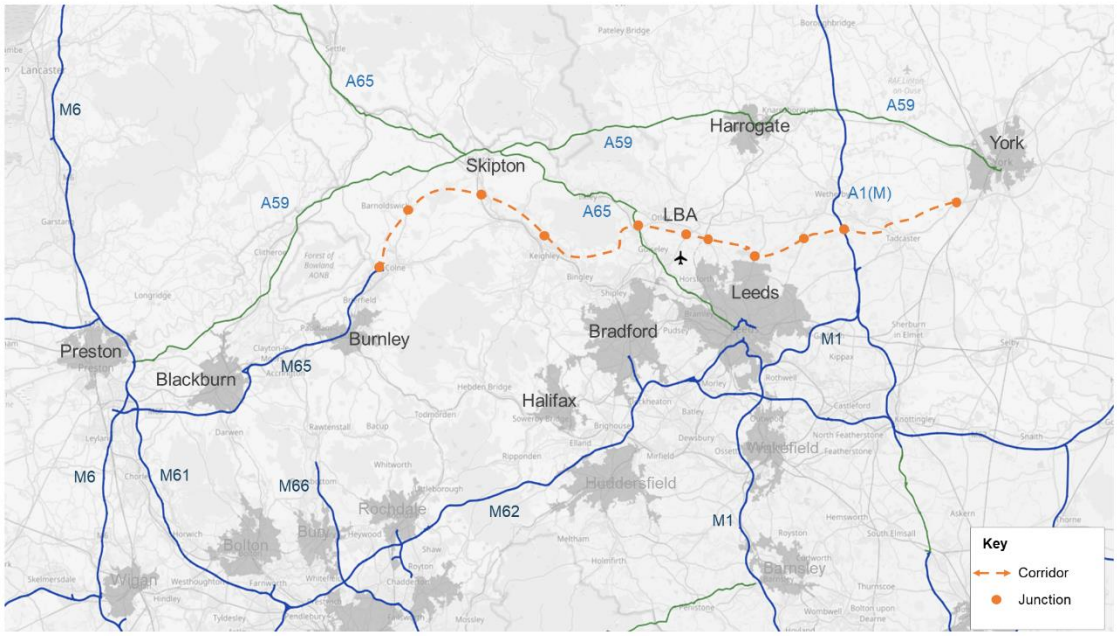


Figure 7 Indicative Alignment for Pink Corridor

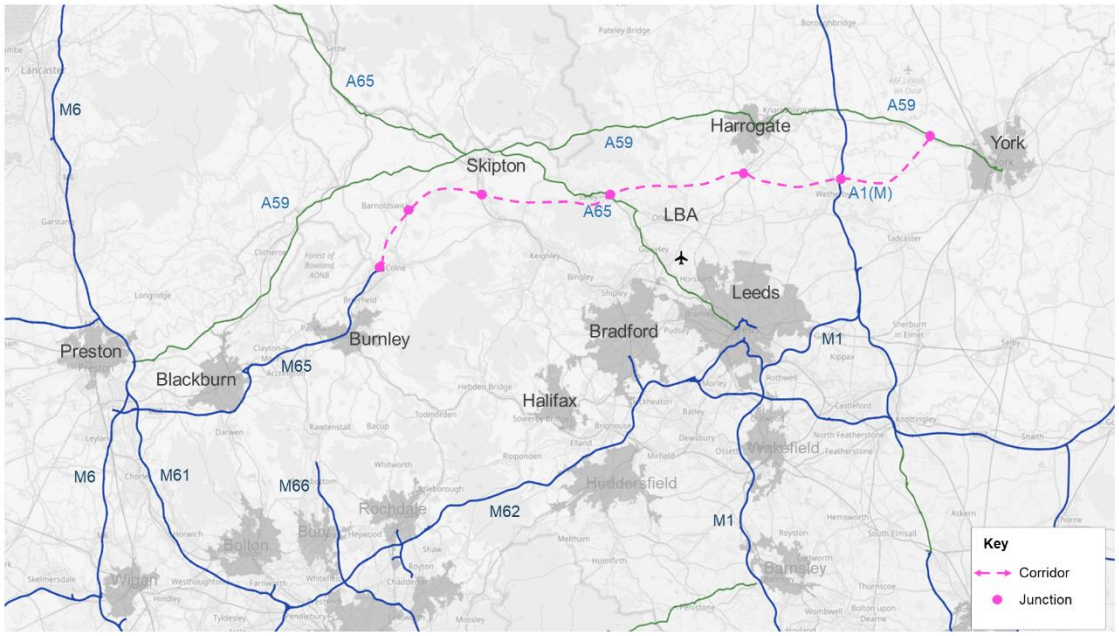


Figure 8 Indicative Alignment for Purple Corridor

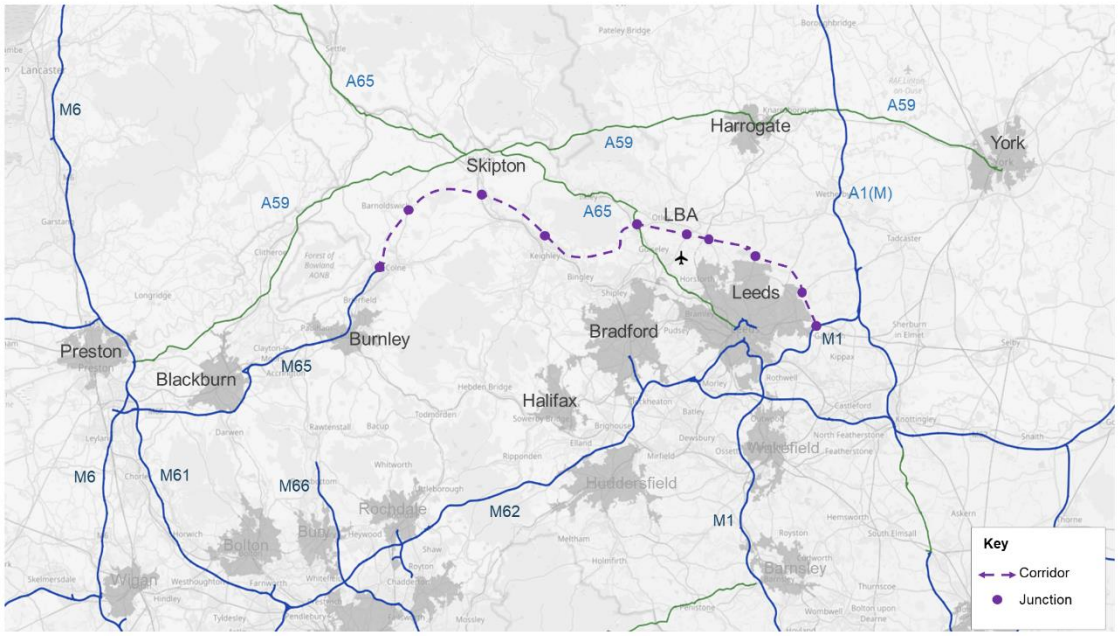
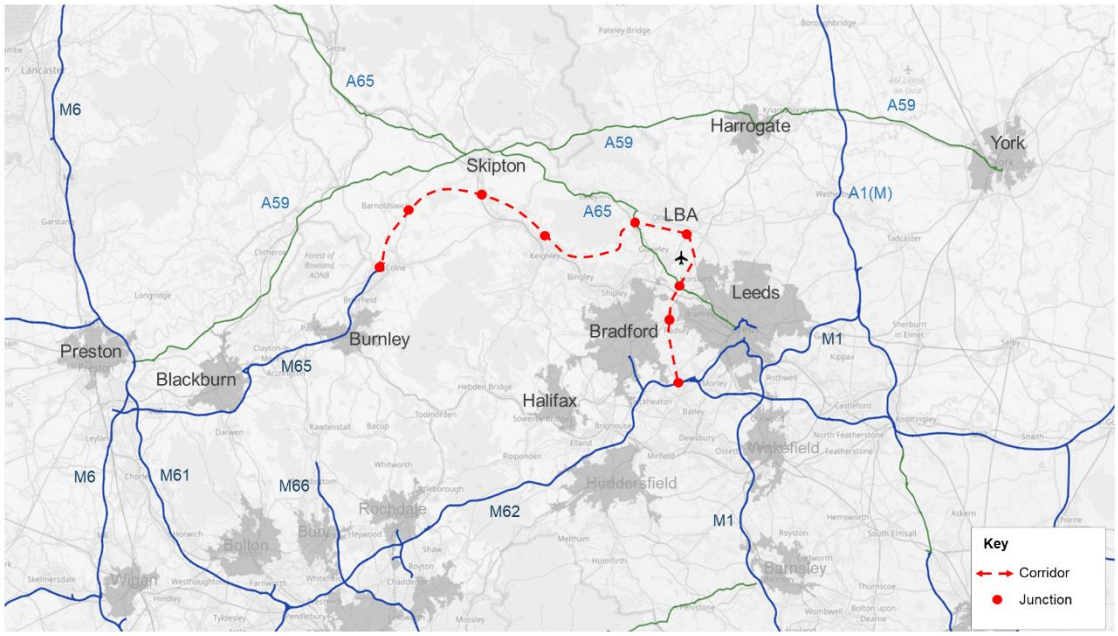


Figure 9 Indicative Alignment for Red Corridor



4.4.2 The Phase 2 Preliminary Analysis Report (PAR) assessed each of these corridor concepts against a series of objectives and a series of high-level modelling outputs.

4.4.3 Each scheme was considered as a D2AP carriageway standard with grade separated junctions. Modelling was carried out using fixed demand matrices for a single forecast year, 2041. All schemes were compared against a do minimum network scenario which included all RIS schemes forecast to be complete by 2041.

4.5 Scheme Outcomes – Phase 2 Results

4.5.1 Against environmental measures all four options were given broadly similar assessments. As all scenarios are new to the study area, they will each have a significant environmental impact. At this stage mitigation has not been considered so the relative performance could not be assessed.

4.5.2 The preliminary appraisal thus focussed on the quantified traffic and economic impacts of the scenarios as forecast through the traffic modelling. The performance of each scheme was ranked in order of how it performed in terms of improving journey times, providing relief to other major routes and in terms of its economic benefits for journey cost savings and their wider economic impact within the corridor. The rankings are shown in **Table 1**.

Table 1 Summary of Scenario Indicators

Indicator	Orange	Pink	Red	Purple
Key economic centre travel times	1	4	3	2
Journey times on M62	1	2	4	3
Corridor flows(1)	3	4	1	1
Relief to M62(2)	1	3	4	2
Relief to A59	2	1	4	3
PVB (Level 1 + 2)	2	4	3	1

Notes:

(1) This metric considers flows only between the M6 and A1(M). It is effectively a proxy for wider network relief given the fixed trip nature of the assignments.

(2) Only M62 has been considered here as all scenarios attract trips to the M65 and scoring for M65 would effectively be opposite to the preceding indicator (corridor flows). In addition, the relief to the A1(M) is not considered of significant value in contrast to the M62 as the scheme is to provide resilience and capacity to the Trans Pennine corridor.

4.5.3 As a result, the Orange and Purple scenarios were identified as performing best against the range of indicators assessed against and were shortlisted for further, detailed assessment.

4.6 Shortlist Routes for Assessment

4.6.1 Following the identification of the Orange and Purple routes further work was carried out to seek optimise the alignment of each in terms of minimising the need for extensive cutting and tunnelling along the route.

4.6.2 A further shorter variation of the orange route was developed as a sensitivity test to examine the impact of the additional section east of the A1M.

4.6.3 The Orange and Purple test routes are shown in Figure 10 and Figure 11. The additional Orange(short) route is shown in Figure 12.

Figure 10 Indicative Alignment for Orange (long) Route

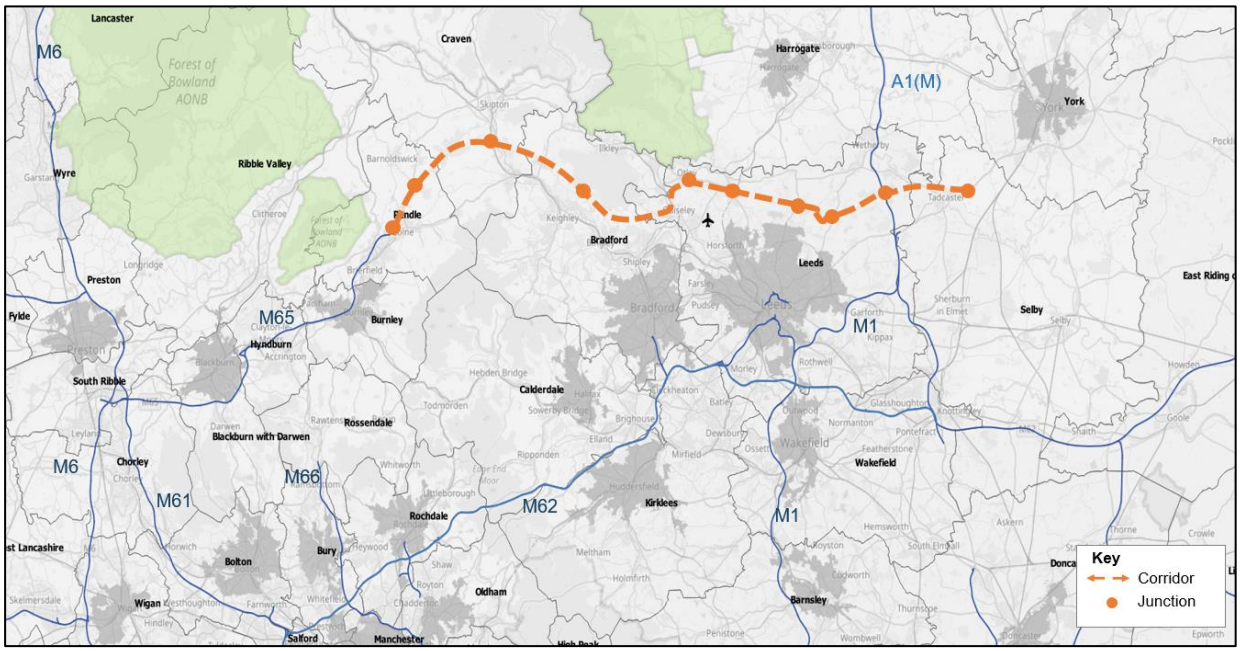


Figure 11 Indicative Alignment for Purple Route

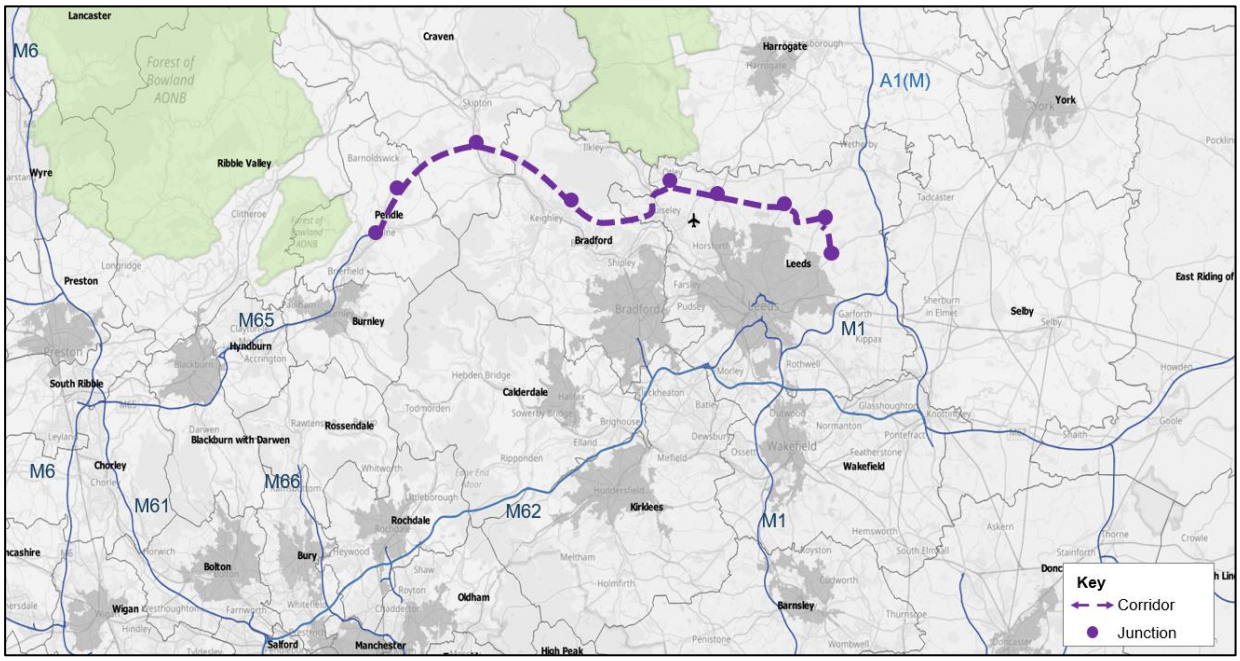
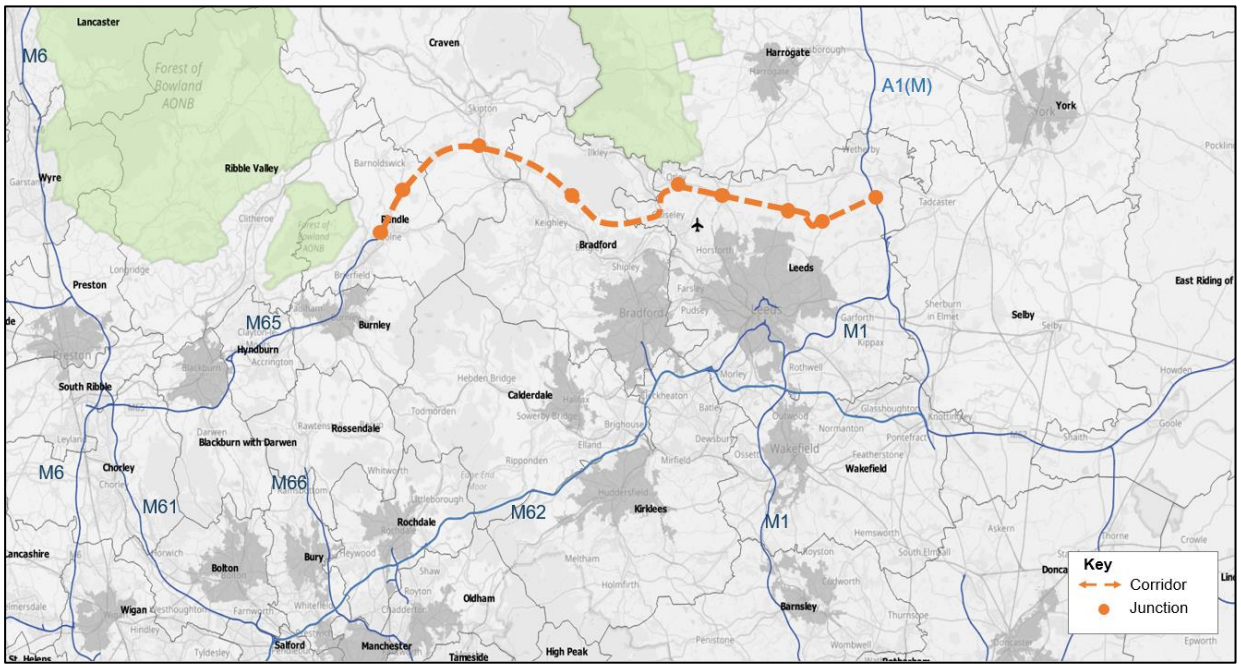


Figure 12 Indicative Alignment for Orange (short) Route



4.7 Modelling Appraisal

4.7.1 The modelling appraisal is fully described in the Combined Modelling and Appraisal (ComMA) Report and its appendices.

4.7.2 Modelling was carried out using the full Trans Pennine South RTM. The Do-Minimum demand was fixed for testing the Do-Something Options. Forecasts were undertaken for a single forecast year of 2041 (assumed to be the year when the scheme has been completed. Each scenario was modelled as a D2M standard carriageway with each junction represented by a grade separated intersection.

4.7.3 All scenario options were compared against a do minimum scenario which included all RIS schemes and local authority schemes currently forecast to be open by 2041.

4.7.4 Traffic model results have been compiled based upon a series of metrics which reflect the study objectives set out in the strategy shaping study. These are:

- Journey time differences between key economic centres east and west of the Pennines;
- The journey time and delay impact on the existing major Trans Pennine corridor, the M62 motorway;
- The level of flow in the new corridor by scenario; and
- Impact on flows on the existing M65 and M62 corridors.

4.7.5 Each corridor was shown to attract a broadly similar level of traffic flow in 2041 as shown in **Table 2**. The orange long corridor shows a significantly different lower bound to the others which can be attributed to the additional route section east of the A1M for which there is lower strategic demand.

Table 2 AADT Corridor Flows

Route	AADT Range (PCUs)
Orange (long)	11,000 – 43,000
Purple	26,000 – 44,000
Orange (short)	25,000 – 43,000

4.7.6 **Table 3** shows the point to point travel time savings between economic centres as an important metric to assess the connectivity impact of the route. The analysis shows significant time savings to cities such as Preston and York. The times to Leeds show an imbalance by direction attributed to route choice within the model where traffic uses either the new route or the M62 as before.

Table 3 Point to Point Travel Time Savings (minutes)

	Orange (Long)		Purple		Orange (Short)	
	AM	PM	AM	PM	AM	PM
Preston to York	-35	-33	-31	-39	-30	-29
York to Preston	-30	-27	-25	-22	-26	-23
Preston to Leeds	-21	-13	-21	-13	-21	-13
Leeds to Preston	-2	-4	-2	-5	-2	-5
Liverpool to Harrogate	-9	-10	-3	-4	-9	-11
Harrogate to Liverpool	0	-1	0	-1	0	-1

4.7.7 **Table 4** shows the impact of each scenario on the M65 at the western side of the corridor. The table shows little difference between each of the proposed routes. The table shows that each option would lead to an increase in demand of the order of 20-25% on the eastern sections of the M65.

Table 4 M65 Flow Changes (2041 two-way AADT in PCUs)

M65 Section		Do Minimum	Orange (Long)	Purple	Orange (Short)
M61 – Blackburn (J3-J4)	Flow	87,000	94,000	94,000	94,000
	Change		7,000	7,000	7,000
Blackburn – A56 (J7-J8)	Flow	91,000	107,000	108,000	106,000
	Change		16,000	17,000	15,000
A56 – Colne (J11-J12)	Flow	74,000	97,000	97,000	97,000
	Change		23,000	23,000	23,000

4.7.8 **Table 5** shows the impact of each scenario on the M62. As each of the routes provide additional Trans Pennine road capacity and resilience, all three scenarios show a decrease in M62 traffic levels, the difference between the three routes is minimal since the Trans Pennine sections of the proposed routes are consistent with one another.

Table 5 M62 Traffic Flow Changes (2041 two-way AADT in PCUs)

M62 Section		Do Minimum	Orange Long	Purple	Orange Short
M60 to Halifax	Flow	185,000	180,000	180,000	180,000
	Change		-5,000	-5,000	-5,000
Halifax to A1(M)	Flow	160,000	157,000	157,000	158,000
	Change		-3,000	-3,000	-3,000

4.8 Economic Appraisal

4.8.1 Initial cost estimates have been provided by Benchmark for the two main route options and for the shorter sensitivity test. The assumption in calculating the scheme costs was that the route would be split into four or five sections which would be constructed sequentially between 2029 and 2046. Each route section would be open to traffic once completed. Two sets of cost estimates were made, one assumes that the route would be constructed to a dual 2 lane motorway (D2M) standard, the second considers the same route constructed to a dual 2 lane all purpose (D2AP) standard. The scheme costs are shown in **Table 6** and **Table 7**.

Table 6 D2M Scheme Costs (£ millions)

	Orange (long)	Purple	Orange (short)
Cost (Q1 2016)	£6,502	£6,019	£5,908
Inflation	£7,153	£6,656	£6,558
Risk	£1,348	£1,250	£1,229
Total	**£15,004**	**£13,925**	**£13,696**

All entries are in 2016 Q1 prices.

Table 7 D2AP Scheme Costs (£ millions)

	Orange (long)	Purple	Orange (short)
Cost (Q1 2016)	£5,952	£5,502	£5,408
Inflation	£6,550	£6,088	£6,006
Risk	£1,227	£1,137	£1,119
Total	**£13,728**	**£12,727**	**£12,533**

All entries are in 2016 Q1 prices.

4.8.2 Since there are relatively small differences in design between the two carriageway standards, for modelling at Stage 0 it was considered proportionate to use the same model coding to represent both standards and thus it has been assumed that the benefits that would accrue would be broadly similar for both carriageway options.

4.8.3 The standard assessment programs TUBA and WITA have been used to calculate Level 1 and Level 2 benefits for the three route options. Each route has been assessed on the simplified basis that all route sections would open to traffic in 2041 and the assessment has been made over the standard 60-year period up to 2100. It has been assumed that traffic flow volumes would remain fixed throughout the assessment period.

4.8.4 The calculated values of costs and benefits for each carriageway standard are shown in **Table 8** and **Table 9**. The results show that the schemes provide a relatively low value for money. All three schemes when considered as a motorway standard route produce benefit to cost ratios (BCR) around 0.9. For the all-purpose carriageway standard the value for money remains low with orange long and purple schemes both returning a BCR of 1.0 or lower. The shorter orange scheme returns a low BCR of 1.01.

Table 8 Overview of Costs and Benefits – D2M Scheme (£ millions)

	Orange (long)	Purple	Orange (short) – sensitivity test
Present Value of Benefits (PVB)	3,084.6	2,976.2	2,949.6
Present Value of Costs (PVC)	3,532.5	3,270.9	3,205.7
Initial Benefit to cost Ratio (BCR)	0.87	0.91	0.92

All entries are present values discounted to 2010, in 2010 prices.

Table 9 Overview of Costs and Benefits – D2AP Scheme (£ millions)

	Orange (long)	Purple	Orange (short) – sensitivity test
Present Value of Benefits (PVB)	3,084.6	2,976.2	2,949.6
Present Value of Costs (PVC)	3,230.0	2,986.4	2,931.3
Initial Benefit to cost Ratio (BCR)	0.95	1.00	1.01

All entries are present values discounted to 2010, in 2010 prices.

4.9 Environmental Appraisal

4.9.1 Outline environmental impacts are reported in the AST Benefit Registers for each option. The following have been assessed qualitatively at a high level:

- Noise
- Air quality

- Greenhouse gas
- Landscape
- Cultural heritage
- Biodiversity
- Water

4.9.2 The assessments conclude that both orange and purple schemes would have a slight adverse impact on noise and greenhouse gases; a moderate adverse impact on Water Environment and a large adverse on impact on air quality, landscape, cultural heritage and Biodiversity.

5 RECOMMENDATIONS

The M6 to A1(M) project is currently at Stage 0 of the PCF process which is the strategy, shaping and prioritisation stage. This Report presents the process to identify two possible options which have subsequently been appraised based on indicative scheme designs, which would be developed further during Stage 1 and Stage 2 of the PCF process should the decision be to proceed with the project.

The strategic need for an intervention within the *Core Study Corridor* is driven by the need to improve connectivity between IECs to support economic growth of the Northern Powerhouse economy. The Central Pennines SDC SPOC clearly identified an aspiration of TfN to improve east-west connectivity, particularly between East Lancashire and North and West Yorkshire.

Significant political and public interest in environmental considerations have been seen over the past 24 months with local authorities declaring climate emergencies and the Government announcing the preparation of a TDP. This is likely to have a considerable impact on all future road schemes and a detailed assessment to understand the environmental impacts will be necessary. In addition, the Covid-19 pandemic is also likely to have an impact on travel behaviour so further option development will need to cognisant of this.

Both options appraised generated similar BCRs when considered as a D2AP scheme, inclusive of wider economic impacts, with Orange just below 1, representing a 'Poor' Value for Money and Purple delivering a BCR of 1, a 'Low' Value for Money. When the routes are considered as motorway standard the value for money is again classified as 'Poor'. Whilst both options are expected to generate economic benefit from improved journey times and regeneration opportunities across *the Central Pennine Corridor,* detailed in **Section 3.7**, the significant cost associated with the options has an adverse impact on the BCR.

Given the BCR of below 1, reflecting Poor VfM, the next step for this project could be to consider the potential for a staggered investment of shorter sections along the route, potentially as MRN schemes, which would deliver localised improvements. Further analysis of the modelling and appraisal could seek to identify those sections which deliver higher VfM. This could enable lower cost options to be explored for particular sections of the corridor.

Should the improvements be delivered as a series of localised schemes, the scheme objectives are likely to be re-visited as there may be more opportunity to consider the integration with the public transport and active travel networks to support sustainable travel. In addition, there would need to be consideration with who is best placed to be the scheme promoter. For example, this may lead to Highways England becoming a stakeholder rather than delivery partner.