A582 South Ribble Western Distributor

Appraisal Specification Report

OD/01 | 0

29 August 2020

Lancashire County Council

A582 South Ribble Western Distributor

Project No:	B2327FTK
Document Title:	Appraisal Specification Report
Document No.:	OD/01
Revision:	0
Document Status:	Draft for DfT Review
Date:	29 August 2020
Client Name:	Lancashire County Council
Client No:	N/A
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File Name:	A582 Dualling_ASR_OBC_rev0d.docx

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Document history and status

Revision	Date	Description	Author	Checked	Reviewed	Approved
0	28/08/2020		JF	SM	MR	SM

Contents

1. Introduction

1.1 The Purpose of the Appraisal Specification Report

This document represents the Appraisal Specification Report (ASR) for the Outline Business Case (OBC) development of the A582 South Ribble Western Distributor (SRWD) scheme.

The OBC is required to secure a conditional approval of the £50m contribution towards the cost of the A582 scheme from the National Roads Fund through the Major Roads Network (MRN) Programme. The OBC will be produced in line with DfT Transport Business Case and MRN Outline Business Case guidance.

The overarching aim of the ASR is to:

- define the scope, methodology, assumptions and associated risks of the transport appraisal, and how it will be supported by traffic modelling;
- provide a platform for agreement of the appraisal approach with DfT who will be undertaking assurance on the modelling and economics underpinning VfM of the scheme, and to provide timely, agreed inputs to the appraisal process;

In line with the best practice, the ASR will be a live document and will be revised as and when necessary in response to comments from DfT and/or other stakeholders throughout the business case progression.

The ASR is supported by an Appraisal Specification Summary Table (ASST) in Appendix A, which proposes a methodology for appraisal, set out against each of sub-impacts in the Appraisal Summary Table (AST) and Distributional Impacts Appraisal Proforma in Appendix A.

The ASR allows all stakeholders involved in scheme preparation (LCC, TfN, DfT, HE) to understand the assessment and appraisal work required for the submission of the OBC.

This document also contains details of pertinent risks which have been identified at the time of writing. The risks will feed into the risk management process, and since the ASR is a live document this will be continued throughout. By highlighting these risks, this will increase their visibility and allow a greater understanding of how the technical work detailed in the ASR may impact on project timescales, quality and cost.

1.2 Structure of the Report

The structure of the ASR is set up in accordance with TAG and following this introduction includes:

- Chapter 2 – Project Definition
- Chapter 3 – Traffic Model
- Chapter 4 – Forecasting
- Chapter 5 – Economic Case
- Chapter 6 – Overview of Deliverables and Risks

2. Project Definition

2.1 Project Title

The project is the A582 South Ribble Western Distributor (SRWD) Outline Business Case.

2.2 OBC Scope

Lancashire County Council is seeking a funding contribution from the National Roads Fund to enhance economic growth, support housing provision and relieve congestion through the delivery of a significant road improvement scheme on the A582 in South Ribble. The A582 is part of the indicative Major Road Network published by the Department for Transport in December 2017 and the A582 Dualling is one of the schemes included in the TfN final Investment Programme.

The SOBC for the MRN funding was submitted to DfT in July 2019 and the scheme received approval to progress to the OBC stage in early 2020.

The OBC shall be developed in line with the DfT guidance for the production of 'Transport Business Case' (January 2013), as prescribed in the MRN Outline Business Case form and will be accompanied by:

- A completed bid pro-forma:
- A checklist to highlight where key information can be found in the OBC;
- Supporting modelling and appraisal documents;
- Other information and evidence as required by DfT (cost estimates, Section 151 Officer declaration, programme, communication strategy etc)

The OBC will set out the need for the scheme, the benefits it is expected to bring, its estimated costs, how it would be managed, procured and what risks are associated with it. It should also provide the timetable for development, planning and construction of the scheme.

In line with TAG the process is flexible to ensure that the time and resources invested in making a decision are proportionate to the size of the investment or intervention and the approach is tailored to suit the individual project.

Table 2-1 provides a list of products in line with TAG that will be either produced, updated or refreshed for the OBC:

Table 2-1: OBC Deliverables

Product	Work required	Comment
Appraisal Specification report (ASR)	Update	This document. The ASR has been updated to reflect scheme appraisal work required to support the OBC including any work related to address TfN, DfT and HE comments on the SOBC.
Options Assessment Report (OAR)	Refresh	The Options Assessment Report was produced and submitted alongside the SOBC. No comments have been received from either DfT or other parties since then. The preferred option for the A582 scheme as identified in the OAR remains the same and the next best alternative option consists in Partial dualling of the A582 alongside a parallel cycle route between Stanifield Lane and Tank Roundabout. These two options will be modelled and appraised in the OBC Economic Case. The OAR will be reviewed and refreshed as necessary to ensure consistency with the rest of the OBC.
Traffic Survey Report	Produce	The TSR supporting model update was signed off by DfT in April 2020.

Product	Work required	Comment
Model Recalibration Report	Produce	The 2018 CLHTM model (base year 2013) that was used to support the A582 SOBC has been re-calibrated to 2019 observed data and the VDM has been upgraded to P/A format to support the A582 OBC. Two technical notes outlining Model Revalidation and P/A VDM methodology are provided in Appendix C and Appendix D, along with Comments Log (Appendix E). The final Model Recalibration Report will be appended to the OBC as a supporting document for the EC.
Traffic Forecasting Report (TFR)	Produce	The SOBC was based on 2014 model and included 2022 and 2037 as forecast years. The forecasting and associated report will be re-done to reflect the updated model and most recent programme for the A582 scheme. Forecasting methodology is provided in Chapter 4 of this document.
Economic Appraisal Report (EAR)	Update	No major change to economic assessment methodology is expected subject to DfT comments. However, in view of the new model being used all economic appraisal work will require a full update. Economic appraisal methodology is provided in Chapter 5 of this document and is largely consistent with the SOBC Economic Appraisal Report (Appendix F).
Distributional Impact Appraisal Report (DI)	Produce	No distributional impact assessment was done at the SOBC stage. A full DI appraisal will be required. DI proforma is contained in Appendix A
Strategic Case	Refresh	The Strategic Case for the A582 dualling developed at the SOBC stage remains valid and is not expected to undergo major changes. No comments from DfT have been received. The SOBC SC will be reviewed and refreshed where additional evidence is now available to support the need for the scheme (e.g. 2019 traffic data, alignment with new policy documents, planning status of the scheme, quantum of dependent developments etc).
Economic Case	Update	Economic case will be updated to reflect updated VfM assessment
Financial Case	Update	Financial case will be updated to reflect the latest scheme cost including risks, uncertainties, inflation forecasts etc, and identified funding sources
Commercial Case	Update	Commercial Case will be updated to include details of procurement method, chosen type of contract, risk allocation, contract management etc in line with DfT Transport BC requirements and DfT feedback on the SOBC
Management Case	Update	Management Case will be updated to include details of project governance, assurance, risk management, communications and stakeholder management and planned monitoring and evaluation in line with DfT Transport BC requirements and DfT feedback on the SOBC
Monitoring and Evaluation Plan	Produce	An outline M&E plan will be produced. Final M&E plan will be developed at the FBC stage.

2.3 Road and Geographical Location

The A582 SRWD is located in Central Lancashire and is one of the radial routes connecting Preston with the M65 (Figure 2-1). It is a modern standard, part single, part dual two-lane road with access generally restricted to

major junctions that are either roundabouts or controlled by traffic signals, and a partial grade-separated junction providing a link with the local road network in the Cop Lane area of Penwortham.

The A582 is part of the Major Road Network (MRN), defined by the DfT as the most economically and regionally important 'A' roads that sit between the SRN and local road networks. Investment in the MRN is identified as a priority for the DfT, with significant funding available through the new National Roads Fund from April 2020. As the North of England's Sub-National Transport Body responsible for prioritising this investment in the MRN in the North of England, Transport for the North (TfN) has been included the **A582 SRWD** scheme in TfN's Investment Programme for delivery before 2027.

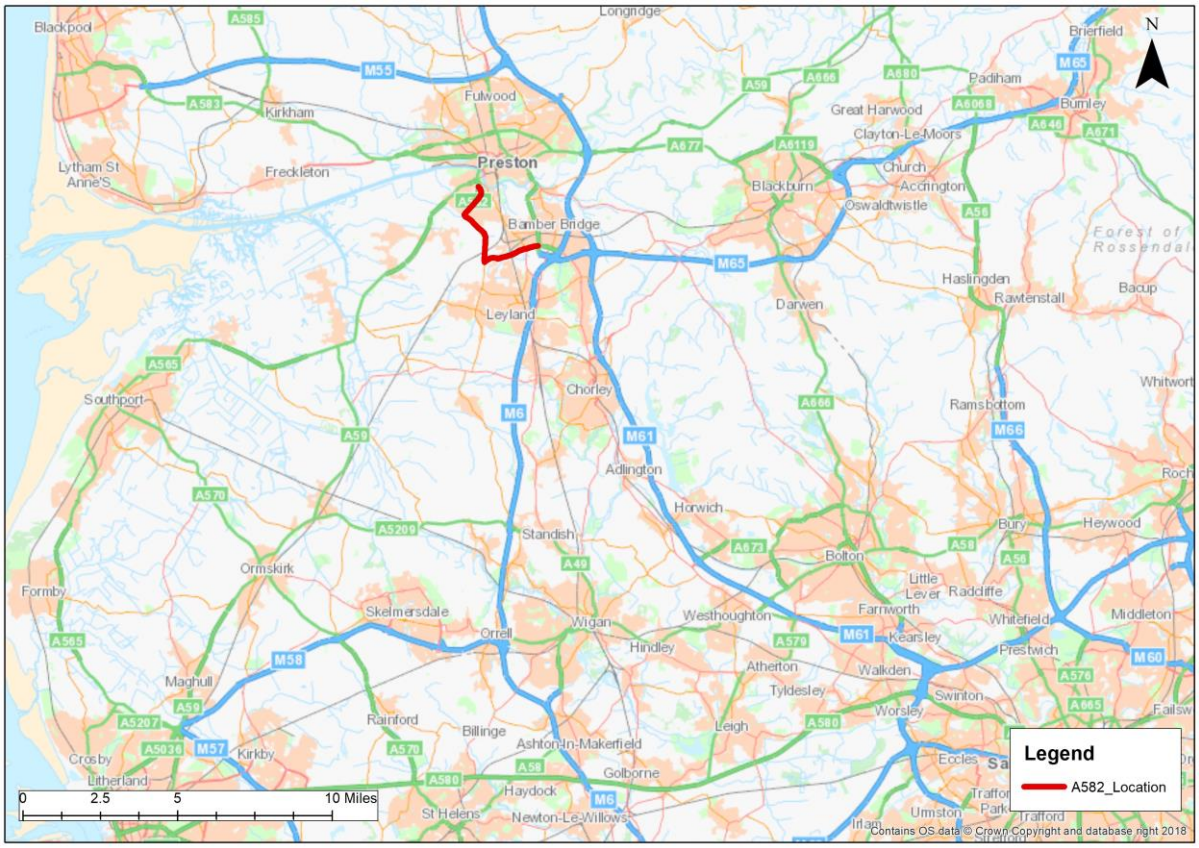


Figure 2-1: A582 location

2.4 Scheme History

The **Central Lancashire Highways and Transport Masterplan** (CLHTM) was adopted in March 2013. It sets out the County Council's priorities for future investment in highways and transport across Central Lancashire in the context of ambitious economic growth plans set out in the **Central Lancashire Core Strategy**.

The schemes identified in the CLHTM to be delivered in the period to 2026 are:

- Preston Western Distributor (PWD);
- A6 Broughton Bypass;
- Penwortham Bypass; and,
- **A582 South Ribble Western Distributor (SRWD)**.

The identified schemes are expected to enable planned new development to go ahead, achieve marked improvements for local communities and their environment and allow significant complimentary improvements to sustainable travel infrastructure.

Delivery of these schemes is essential to resolving current and future problems and issues that could otherwise result in widespread congestion on the highway network and missed opportunities to develop Central Lancashire's economy. Of the four schemes, the Broughton Bypass and Penwortham Bypass have been completed, and the PWD is currently under construction. The SRWD will be the last of these four schemes to be delivered and is required to unlock the full extent of economic growth in Central Lancashire.

Since this initial identification in the masterplan, a preferred scheme for the SRWD has been consulted on and adopted, and whilst alternative extents and alignments were considered, the constraints within the scheme area and requirements for the scheme restricted the number of alternative options for the route. Following the adoption of the preferred route for the scheme, the County Council started work on a planning application, which was submitted in February 2020.

In preparation for the scheme, the County Council has completed a number of interventions in support of the SRWD in the form of improvements to junctions along the A582 corridor to provide early capacity enhancements. These have been future-proofed for delivery of the complete dualling of the route. Their completion dates are shown in Table 2-2.

Table 2-2: Completed junction improvements along the A582 corridor

Junction Improvement	Completion date
Tank roundabout	November 2016
Chain House Lane	November 2014
Pope Lane Junction	October 2017
Stanifield lane	January 2016
Oaks Wood roundabout	March 2015
Broad Oak roundabout	August 2018

2.5 Scheme Description

The scope of the scheme is shown in Figure 2-2.

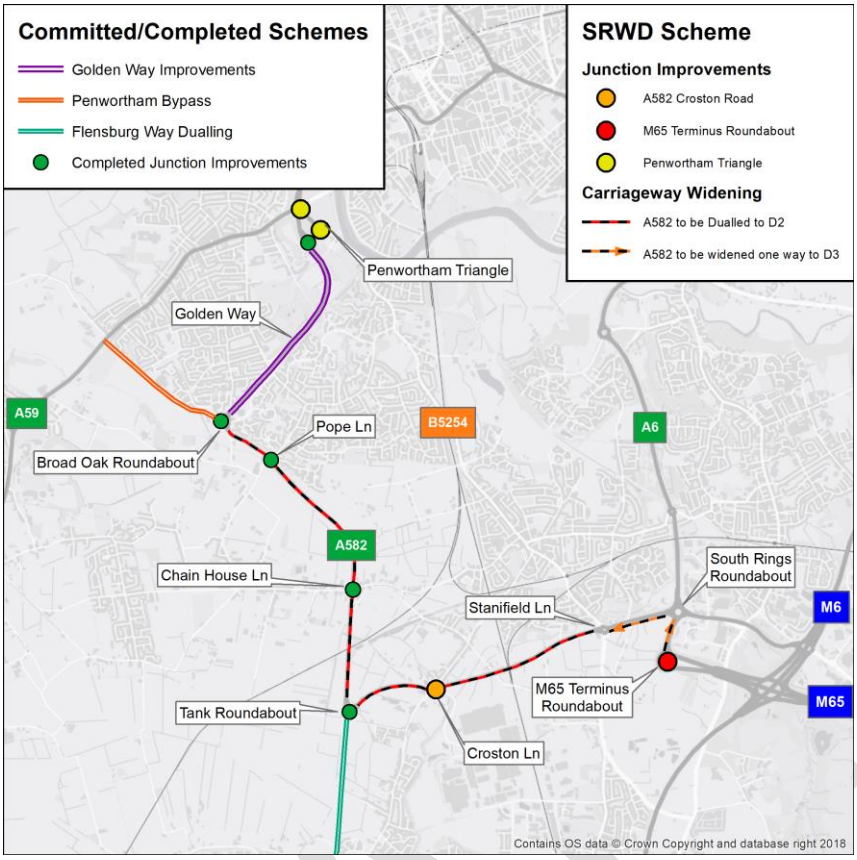


Figure 2-2: Extent of the A582 South Ribble Western Distributor Scheme (including upgraded junctions)

The SRWD scheme comprises 5.2km of upgrades to the existing A582 between Stanifield Land and Broad Oak Roundabout to widen the road from the existing single carriageway to a two-lane dual carriageway with solid concrete central reservation barrier, 500m narrow widening from Dual 2-lane to Dual 3-lanes on the westbound carriageway between South Rings Roundabout and Stanifield Lane and 250m widening from dual 2-lane to dual 3-lanes on the northbound carriageway between the M65 Terminus Roundabout and South Rings Roundabout. The scheme will provide access to Cuerden Strategic Employment Site; and it will introduce improvements to the junctions at A582/Croston Road, B5254/A59/A582 Penwortham Triangle and the M56 Terminus Roundabout to accommodate increased traffic on the A582 corridor and de-prioritise the B5254 at Penwortham Triangle.

The scheme will improve travel between the Strategic Road Network (SRN), employment and housing development sites in South Ribble and Preston city centre. It will also facilitate the provision of a north-south bus and active travel corridor along B5254 as identified in the Central Lancashire Transport Masterplan.

As a result of the above, the scheme is expected to directly support and unlock the following outputs and benefits:

- 2,700+ new dwellings in South Ribble including the unlocking of 1,350 dwellings at Pickering's Farm strategic housing location;
- Unlocking of the Cuerden Strategic Site and supporting its future growth;
- Significantly improved access to/from strategic employment sites across South Ribble including the Lancashire and Leyland Business Parks, as well as to support their continued future growth;
- Facilitate the provision of bus improvements and public realm improvements by removing through traffic from the B5254; and
- Reduce the impact of congestion on air quality and pollutant emissions in the Lostock Hall AQMA.

The scheme will deliver the above outputs and benefits through the following measures:

- Relief of existing peak hour congestion on the A582 and other routes in South Ribble;
- Upgraded road infrastructure with sufficient capacity to support traffic generated by new housing and employment growth; and
- Provision of access to the Cuerden Strategic Site from the M65 Terminus Roundabout as an integral part of the scheme.

Together, and facilitated through the SRWD scheme, the above outputs will ensure that Preston and Lancashire remain a key part of the Northern Powerhouse and continue to play a pivotal role in the long-term sustainability of the North's economy.

It should be noted that the Flensburg Way Improvements are considered part of the SRWD in the City Deal programme. Therefore, it will be procured and delivered alongside the A582 improvements as one project. However, given that the Flensburg Way is not part of the MRN and due to different funding arrangements for the purpose of this business case the cost and benefits associated with Flensburg Way Improvements have not been included in the Value for Money assessment of the scheme or the Financial Case.

3. CLHTM Model

3.1 Introduction

Transport Scheme Appraisal is more than just model development, but the transport model plays a fundamental part in the development of a TAG compliant business case.

This is because the model is used to help develop the strategic case, the value for money case, and the financial case along with a range of supporting analyses, including environmental, social and distributional benefits.

3.2 Choice of Transport Model – Central Lancashire Highways & Transport Model (CLHTM)

During 2015-2016, Jacobs built a TAG compliant RSI based highway traffic model (CLHTM) in SATURN to support Central Lancashire's ambitious programme of economic growth and associated infrastructure improvements. Since then, that version of the CLHTM has been used to support:

- planning applications for three City Deal schemes (PWD, Penwortham Bypass and A582 dualling),
- the PWD Business Case,
- Wyre Local Planning,
- the A582 South Ribble Wester Distributor SOBC;
- Preston TCF SOBC;
- multiple local schemes and bus gate schemes in Preston.

The CLHTM was originally calibrated and validated to Autumn 2013 data using 2015 TAG parameters (values of time and vehicle operating costs). In 2018, the model was re-calibrated to 2018 TAG for the purpose of the PWD FBC; nonetheless, the Base Year remained 2013 in the absence of more recent traffic data.

In line with TAG requirements and recent feedback form DfT on the TCF Appraisal Specification Report; the CLHTM model was due for update in 2019, since the age of the data used to build the model was reaching six years. For this purpose, a data collection exercise was undertaken to update and re-calibrate the model to Autumn 2019 traffic counts and journey times. The detailed specification and methodology steps were agreed with DfT by means of producing and obtaining approval on the Model Base Year Revalidation Methodology Technical Note (Appendix C) in advance of the actual calibration work.

Future applications of the model include the following initial list of schemes:

- A582 Dualling OBC and FBC
- TCF Preston Ringway Transformation;
- Cottam Parkway Station Planning Application

It was critical that the traffic surveys were undertaken prior to the starting of the PWD construction works in November 2019 given that temporary traffic management arrangement are likely to have a significant impact on routing of the traffic which would be difficult to model in the first place and would create issues during the forecasting.

Given that the CLHTM was originally built and subsequently re-calibrated to support the A582 scheme it was an obvious choice for the purpose of the A582 OBC and no other local transport models were considered.

The full details of the CLHTM model are provided in the 2019 Model Re-calibration Report that will be appended to the A582 OBC. The following sections provide an overview of the model development and the summary of calibration results.

3.3 CLHTM Key Model Components

3.3.1 Model Software Package

The CLHTM model has been built using SATURN which operates as a static equilibrium highway assignment model and incorporates both simulation and assignment loops. SATURN software version 11.4.07H (the latest version at the time of 2019 re-calibration) was used for this model.

Variable Demand Model (VDM) was built in DIADEM v7.

3.3.2 Modelled Area

Given that the model was built to support the four major highway schemes identified within the Central Lancashire Transport Masterplan (including A582 SRWD) the model study area has been defined to ensure the accurate reflection of the current trip movements within and around Preston.

The A582 scheme is expected to improve travel times along the corridor and accommodate future traffic growth associated with Cuerden Strategic Site and at Pickering Farm residential development. In addition, it will have some wider area impacts and particularly reducing inappropriate use of the M6 between J27 and J32 by local traffic. Moreover, based on the previous feedback there are two SRN junctions of particular concern for Highways England where impacts of the scheme are anticipated (M65 J1 and M6 J29).

Figure 3-1 shows the extent of the fully modelled area (the rest of Great Britain is classed as the external area).

Figure 3-1: CLHTM Fully Modelled Area

The modelled area for CLHTM network is broken into three distinct areas. These are the area of detailed modelling where the granularity within the network and demand matrices is at its greatest, the rest of the fully modelled area where the level of detail is not as great, but capacity restraint is still modelled, and the external

area (rest of Britain) where the level of detail is at its lowest. The two tiers of the fully modelled area are demonstrated in Figure 3-1.

3.3.3 Zoning System

The model simulation area that covered the Preston City Council and South Ribble urban areas are zoned in more detail. Zones further away from the study area and rural zones, where less spatial detail is required are sparser and are generally based on National Trip End Model (NTEM) zone boundaries. Beyond that point, in the external area of the model, several NTEM zones are aggregated to comprise the modelled zone.

The zone system covering the study area of the model is shown in Figure 3-2

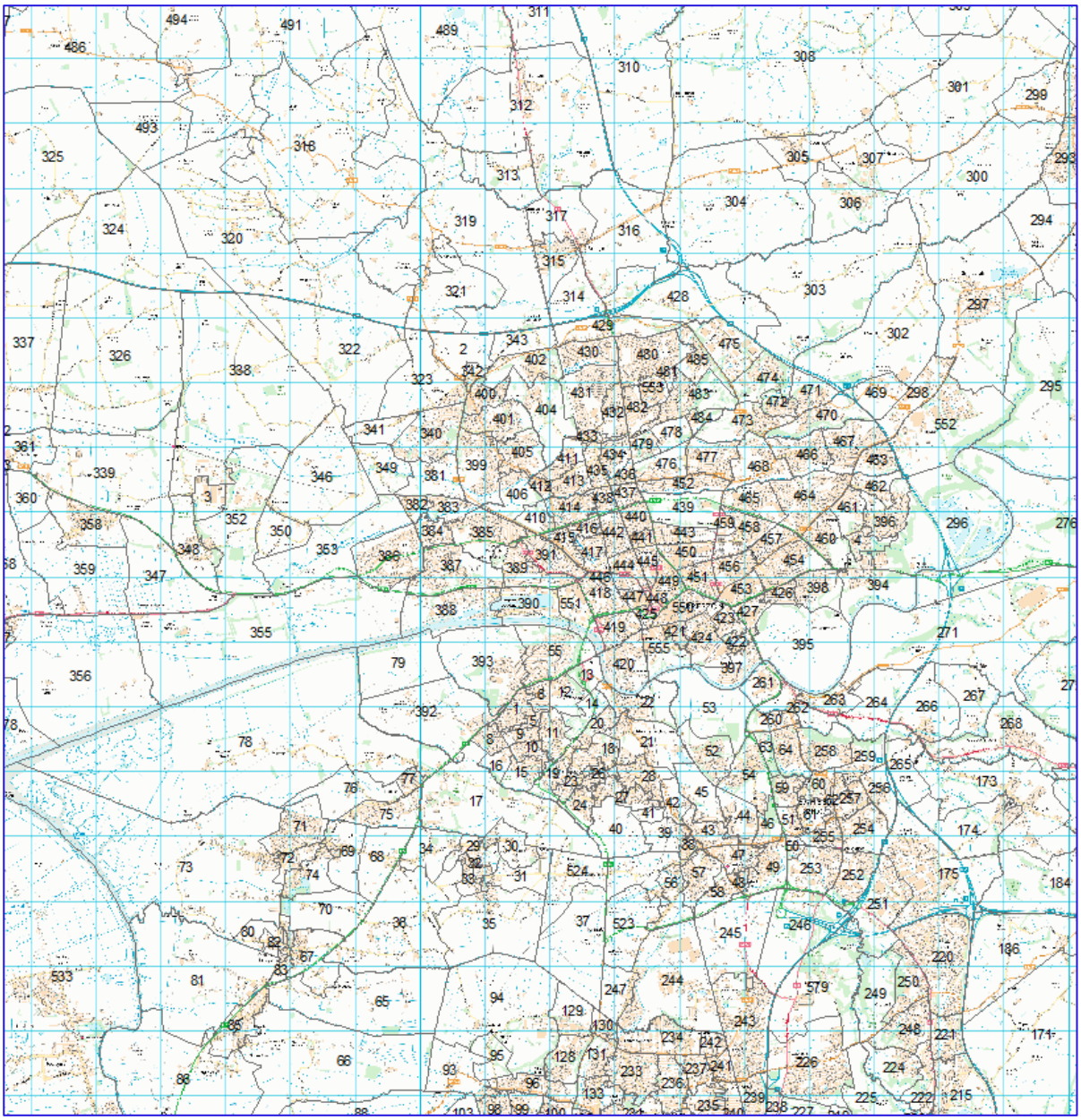


Figure 3-2: Zoning System within the detailed study area

3.3.4 Network Structure

The extent of the CLHTM simulation highway network is detailed below in Figure 3-3, and was developed from initial modelling of the scheme in the previous CLHTM, plus an additional area of detailed modelling such that the model covers the full extent of central Lancashire in full network detail; with a rest of fully modelled area covering the travel to work area.

Figure 3-3: CLHTM Simulation Network

Outside of the detailed modelled area, A roads and Motorways have been modelled to reflect the more spatially aggregate nature of the zoning system (Figure 3-4).

Figure 3-4: Full Model Network

The simulation network capacity restraint mechanisms are based on Capacity Index Functions on links (Speed-flow curves) and defined capacities at junctions. Fixed speeds are used in the buffer network.

Within the SATURN assignment, two parameters are defined for each user class to calculate generalised cost: value of time and vehicle operating cost. Journey times, distances and any tolls included in the model are then combined into a standard unit of generalised time based on these two parameters.

The Values of Time (VoT) used in the CLHTM were taken from the latest available TAG data book (May 2019, v1.12) at the time of model development.

Calculations were undertaken using perceived values of time and distance (i.e. with VAT for non-business and without VAT for business trips), and as per guidance and processes advised by both TAG and Highways England TPG, using Highways England's VoT/VoC calculation worksheet.

When calculating the Vehicle operating cost (VoC), the average speeds for each user class and each time period were taken from the previously validated CLHTM model.

In line with TAG unit M3.1, the HGV VoT were doubled to better take into account the driver's and employer's VOT.

3.3.5 Modelled hours

The CLHTM model has been defined as an average (Monday to Thursday) weekday model[1].

The modelled hours in the model are:

- AM peak hour (8-9am)
- PM peak hour (5-6pm)
- Average hour in the interpeak (10am-4pm)

The relationship between peak hour and peak period derived from analysis of observed daily traffic flow profiles in the modelled area are as follows:

- AM Peak Period: 07:00-10:00
  - AM Peak Hour to AM Peak Period Factor = 2.668
- Interpeak Period: 10:00-16:00
  - IP Average Hour to IP Period Factor = 6
- PM Peak Period: 16:00-19:00
  - PM Peak Hour to AM Peak Period Factor = 2.776

3.3.6 User Class Journey Purpose Segmentation

In terms of vehicle class and trip purpose, the following classifications have been modelled in the CLHTM assignment matrices:

- Car employers' business
- Car commuting
- Car other
- LGV
- HGV

3.3.7 Trip Matrices

The CLHTM Base Year matrices have been developed using 2014 RSI data and calibrated to October/November 2019 traffic counts.

[1] The three modelled hours discussed in this section are relevant to the assignment model only. Modelled time periods represented in Variable Demand Model are discussed in Section 3.5.

The highway prior matrix development process was split into three stages:

- Synthetic matrix development using demographic data to synthesise likely movements through the study area
- Observed matrix development, based on data collected from the 2014 RSI surveys
- Merging the synthetic and observed matrices

The methodology used to build the trip matrices with both surveyed and synthesised data is summarised in Figure 3-5.

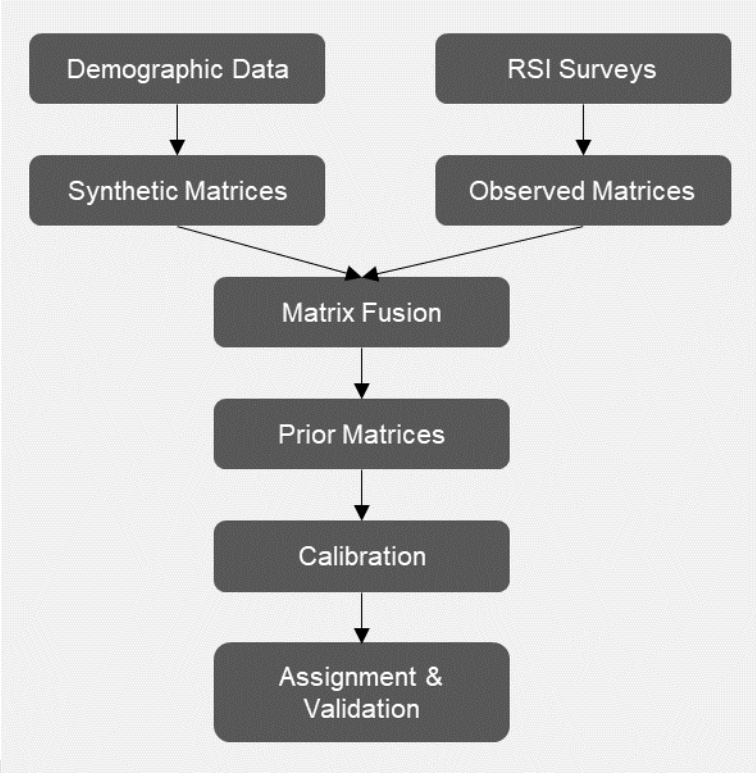


Figure 3-5: Base Year Matrix Development Procedure

3.4 Model Calibration and Validation

3.4.1 Calibration standards

The model was calibrated and validated using the measures and criteria recommended in TAG M3.1[2]:

- Assigned flows and counts totalled for each screenline or cordon, as a check on the quality of the trip matrices;
- Assigned flows and counts on individual links as a check on the quality of the assignment; and
- Modelled and observed journey times along routes, as a check on the quality of the network and the assignment.

3.4.2 2019 CLHTM Cal/Val Data

The survey data used to calibrate and validate the model is described in the TDCR (February 2020). Observed traffic data used for the calibration and validation of the model are listed below:

[2] https://www.gov.uk/government/publications/webtag-tag-unit-m3-1-highway-assignment-modelling

- Traffic Count Data for Matrix Estimation / Calibration
- Traffic Count Data for Validation
- Journey Time Data for Validation

22 bi-directional screenlines were constructed using the traffic count information to capture the total flow of vehicles within and around the study area. Out of these screenlines, 14 (1 to 14) were used for calibrating the transport model, one RSI screenline (15), while the remaining seven (16 to 22) were applied for validation purposes.

Table 3-1 summarises the number of survey sites by screenline type. Full details of the data sources and dates of collection is documented in the Traffic Data Collection Report.

Table 3-1: Number of survey sites

Count type	Number of sites
Calibration	85
RSI	19
Validation	24
Individual Counts	52

In addition, 2016 turning movement and link counts provided by LCC were used as a benchmark with the aim of assuring the right performance of the model in the area around M65(J1) and M6(J29).

2019 TrafficMaster data was used to calculate observed journey times on 14 journey time routes in both directions. The weighted average of the vehicle types captured by TrafficMaster were used to provide the average journey time for each of the identified journey time routes.

The geographical location of the screenlines and journey time routes used in calibration and validation of the 2019 CLHTM model are provided in Figure 3-6 and Figure 3-7, as well as in the TDCR and Model Re-Calibration Report.

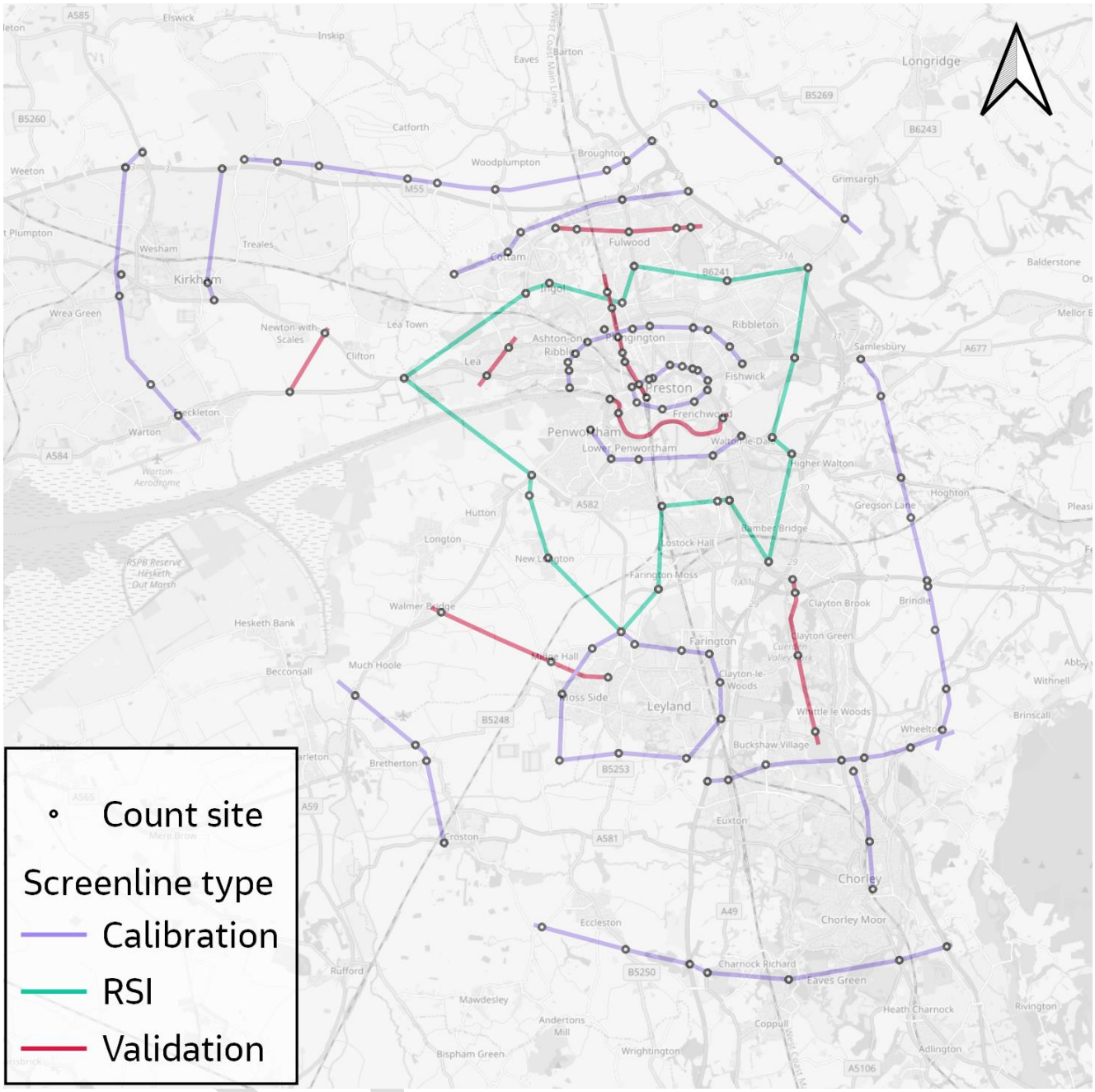


Figure 3-6: Calibration and Validation Screenlines

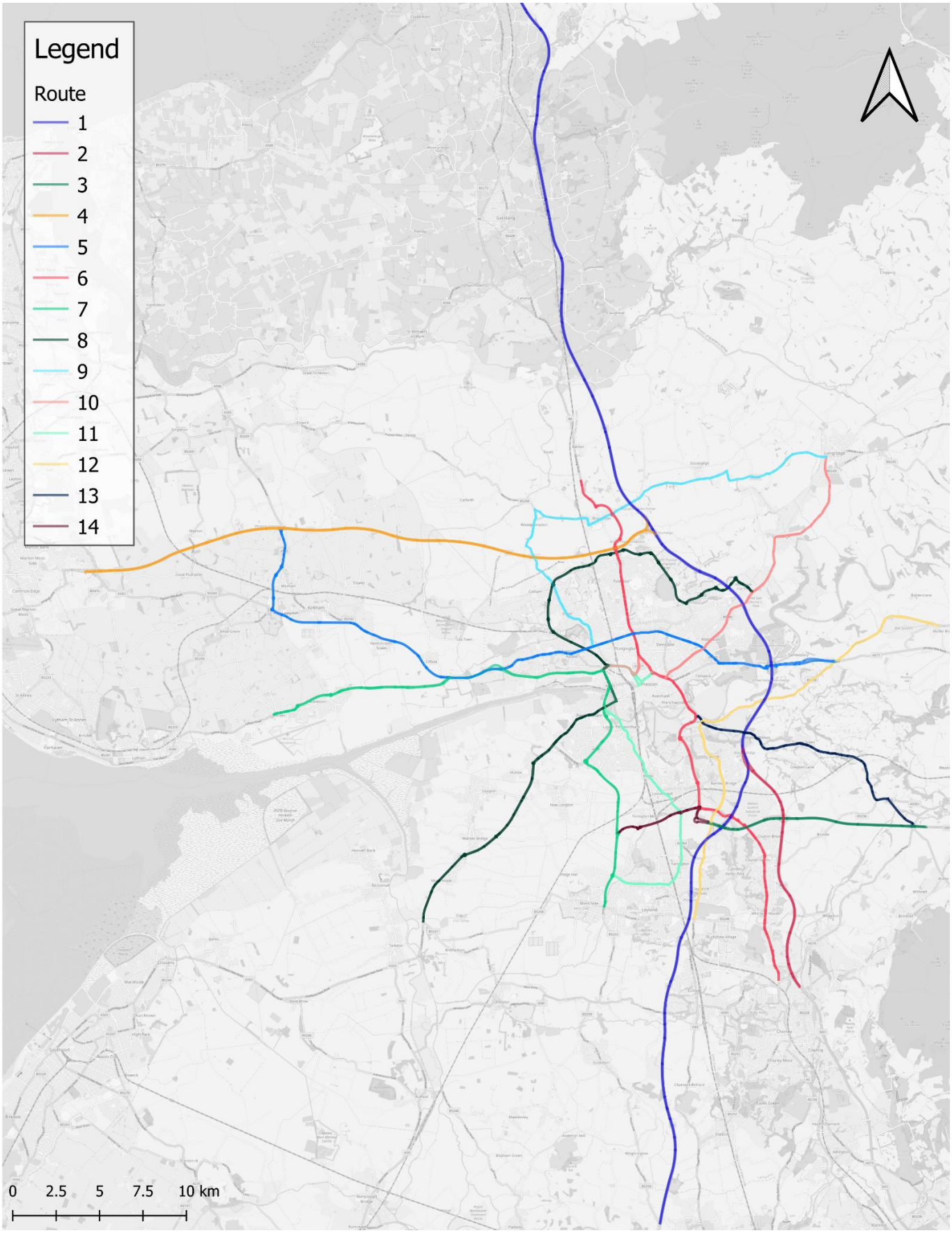


Figure 3-7: Journey Time Routes

3.4.3 2019 CLTHM Model Cal/Val results

The model calibration and validation process was undertaken successfully, and the model provides a good representation of the existing traffic conditions within the modelled area across all three modelled time periods.

The full calibration and validation results will be reported in the Model Re-Calibration Report. The headline figures are provided in the tables below:

Table 3-2: Calibration Count Summary

Time Period	**All Vehicles**		Cars	
	Flow Difference (%Pass)	**GEH (%Pass)**	**Flow Difference (%Pass)**	**GEH (%Pass)**
AM	**92%**	**91%**	**93%**	**91%**
IP	**98%**	**96%**	**98%**	**96%**
PM	**93%**	**92%**	**93%**	**93%**

Table 3-3: Summary of Calibration Cordons and Screenlines

Time Period	All Vehicles		Cars	
	5% Flow Difference (%Pass)	Relaxed GEH <4 (%Pass)	5% Flow Difference (%Pass)	Relaxed GEH <4 (%Pass)
AM	87%	90%	87%	87%
IP	87%	100%	87%	100%
PM	90%	97%	80%	93%

Table 3-4: Validation Count Summary

Time Period	All Vehicles		Cars	
	Flow Difference (%Pass)	GEH (%Pass)	Flow Difference (%Pass)	GEH (%Pass)
AM	94%	94%	92%	96%
IP	96%	96%	96%	100%
PM	92%	92%	92%	92%

Table 3-5: Summary of Validation Cordons and Screenlines

Time Period	All Vehicles		Cars	
	5% Flow Difference (%Pass)	Relaxed GEH <4 (%Pass)	5% Flow Difference (%Pass)	Relaxed GEH <4 (%Pass)
AM	93%	93%	86%	100%
IP	86%	93%	93%	100%
PM	86%	93%	86%	93%

Table 3-6: Journey Time Validation Results

Time Period	Total TAG Compliant (<15% difference)
AM	86%
IP	96%
PM	89%

The model has also been shown to be stable by exceeding acceptable levels of convergence.

3.5 Variable Demand Model

3.5.1 Background

Following discussions with the DfT in early 2020, it was agreed that it would be a risk for the A582 SRWD scheme to pursue DfT approval without VDM undertaken in Production/Attraction (P/A) format as recommended by TAG.

Subsequently, a P/A based VDM has been developed in accordance with the scope and specification outlined in a technical note that was produced by Jacobs in March 2020 (Appendix D. It is acknowledged that DfT have provided comments and clarification questions on the VDM methodology in July 2020 after the VDM calibration was finished. The responses to the comments are contained in the Schedule of Comments (Appendix E).

3.5.2 Demand Model Overview

The demand model has been implemented using DIADEM 7.0 software. The demand model has been calibrated in accordance with the methodology laid out in TAG Unit M2. This process has involved adjusting the model parameters, in accordance with the values outlined in TAG Unit M2 until plausible results were produced from the realism testing.

The VDM is run as an incremental 24-hour Production/Attraction (P/A) based model in line TAG M2 specification and calculates the changes of travellers liable to make travel choice based on change in travel costs. The spatial coverage of VDM is the same as the highway model except External to External movements that do not pass through the study area. Those trips are fixed in DIADEM. The zone system and generalised cost parameters are consistent with the highway assignment model.

The choice mechanisms are:

- *The destination of any given trip.*
- *The generation or loss of trips due to changes in highway accessibility.*

Mode choice is not required as has been demonstrated through the Modal shift significance test in line with TAG criteria.

3.5.3 P/A Demand Matrix and VDM Realism Testing

It should be noted that the assignment model calibration had already been completed when the DfT requested the P/A based VDM to be developed. Therefore P/A demand had to be retrofitted to be consistent with the validated assignment model matrices in O/D.

The detailed methodology for reconciling the Prior P/A matrices and the post matrix estimation O/D matrices is described in the Model Re-Calibration report alongside with the results of the VDM calibration – fuel cost elasticity realism testing.

Figure 3-8 provides a summary of the process and Table 3-7 provides results of VDM calibration

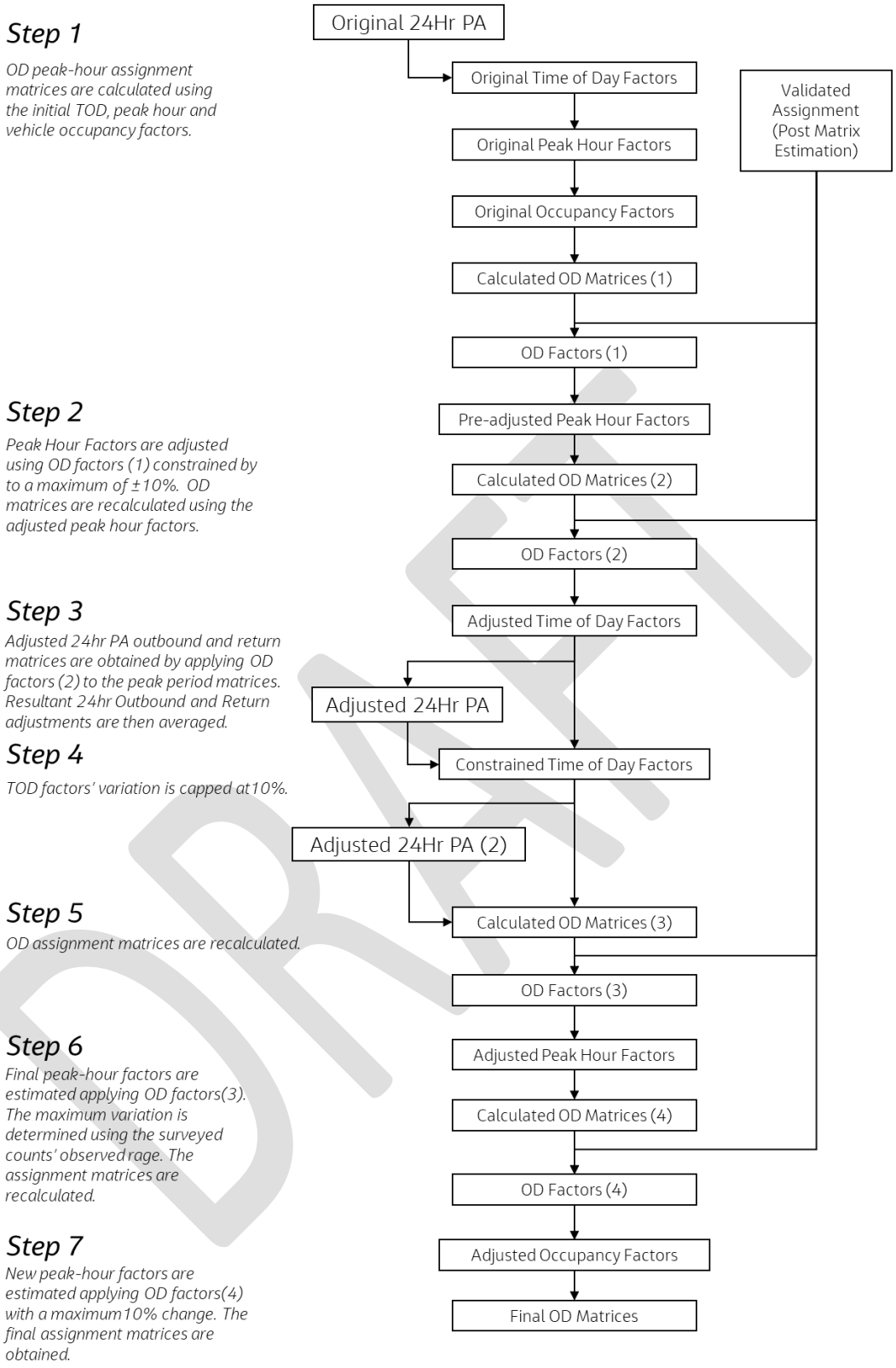


Figure 3-8: 24h P/A matrix adjustment methodology

Table 3-7: Fuel Cost Elasticities

Time Period				
	Commute	Employers Business	Other	Overall
Target	**-0.15 to -0.20**	**Near -0.2**	**Near -0.5**	**-0.25 to -0.35**
AM	-0.176	-0.181	-0.402	-0.257
IP	-0.208	-0.227	-0.396	-0.356
PM	-0.204	-0.143	-0.370	-0.309
Elasticity Results_12 Hour (excl. weekends)	**-0.178**	**-0.184**	**-0.432**	**-0.318**
Elasticity Results_12 Hour (incl. weekends)	**-0.195**	**-0.185**	**-0.434**	**-0.336**

The results demonstrate that:

- *The demand model structure and response hierarchy have been set up correctly and comply with TAG Unit M2 requirements;*
- *The calculations and the methodology used for fuel cost elasticities are compliant to TAG Unit M2 guidance;*
- *The outturn elasticity results fall within the TAG Unit M2 expectations and requirements; and*
- *The distribution parameters that are adopted in the model are TAG Unit M2 compliant and within recommendations.*

Overall, the demand model responses to change are realistic and within the requirements of TAG Unit M2. Thus, these calculated parameters will be considered suitable for variable demand modelling for future year forecasting.

4. Forecast Transport Model

4.1 Overview

Forecasting is used to predict the conditions of with-scheme and without-scheme future scenarios. This chapter outlines the proposed methodology for producing the forecasts for the A582 scheme appraisal. In line with TAG Unit M4 'Forecasting & Uncertainty' guidance, two key elements are considered:

- Future levels of demand wishing to use the transport network influenced by global and national factors, such as the cost of fuel, demographic change, technological change and regional and local factors, such as the quantum of proposed development land in the locality for jobs and housing.
- The future condition of the network, including proposed transport interventions, changes in policy and legislation (such as the introduction of higher or lower speed limits for specific vehicle types).

4.2 Forecast Years

In order to assess the economic benefits over the life cycle of the scheme, there is a need for a minimum of two forecast years to demonstrate the long-term benefits of the A582 scheme. However, given the relevance of the scheme, Jacobs proposes developing a third forecast year for the appraisal. Thus, the following forecast years will be developed to consider future economic, environmental and operational benefits of the scheme:

- Opening year: 2024
- Design year: 2039
- Additional forecast year: 2051

4.3 Uncertainty Log

Following TAG Unit M4 recommendation, the uncertainty log will be produced in collaboration with the local councils to establish the local planning assumptions in relation to the nature, timing, size and other details of the future developments.

As it is not practical to consider every potential development within the defined Local Area, only significant developments that are expected to have any impact on the forecasts have been considered for the uncertainty log. The criteria for discarding developments from the uncertainty log have been defined as follows:

- For housing development: < 100 dwellings
- For employment development: < 100 jobs

In line with TAG, only those development sites which could be categorised as 'Near Certain' or 'More than Likely' based on Table A2 of TAG Unit M4 will be included in the Core Scenario. This represents the most likely outcome and forms the basis for the scheme appraisal.

4.4 Forecast Network

4.4.1 Overview

The 2019 recalibrated CLHTM model will be used as a basis to code the forecast networks for both Do-Minimum and Do-Something scenarios. Future transport schemes in the study area previously identified in the A582 SOBC will be reviewed in collaboration with LCC and HE and any changes to their likelihood, opening year and design will be reflected in the OBC forecast networks.

The modelling of these schemes was informed by drawings made available to the project team.

In addition, buffer links' fixed speeds will be adjusted based on the RTF18 road speed forecasts.

The values of time (VoT) in pence per minute (ppm) and vehicle operating costs (VoC) in pence per kilometre (ppk) will be updated for each forecast year to represent changes in the perceived VoT and VoC in line with the latest TAG Databook.

4.4.2 Do-Minimum

The networks for the Do-Minimum scenario includes those transport schemes that are currently under construction or that are identified as having a construction likelihood of 'near-certain and more-than-likely.

It should be noted that the Flensburg Way dualling and A582 scheme are considered one scheme as part of the planning application (see Figure 4-1); however, given the different funding arrangements, it is necessary to isolate the economic benefits of the Flensburg Way from the Value for Money assessment of the A582 MRN OBC. For this purpose, the Flensburg Way Dualling scheme will be included as part of the Do-Minimum scenario.

4.4.3 Do-Something

The Do-Something networks will be produced using the designs provided by LCC for the A582 SWRD scheme without Flensburg Way dualling. The Do Something networks will be prepared for each of the future years for the preferred and low-cost option

Figure 4-1 shows the main features of the preferred option and the relevant junction improvements.

The preferred option of the scheme is shown in **Error! Reference source not found.** and includes:

- Penwortham Triangle: these improvements will include upgrading the eastern roundabout layout of Penwortham Triangle to a signalised junction. The layout of the movement from Liverpool Road East and A59 South signalised roundabout will change to provide two lanes in each direction for the movements between east to south. Only one lane will be provided for east to west movements.
- Croston Road: The Croston Road improvements will include the removal of the dumbbell roundabout arrangement and to be upgraded to a signalised junction. The improvements will also include severance of Croston Road south with access to Fidler Lane retained with left in/left out arrangement, while a bus gate will also be included allowing access to the A582 from Croston Road for buses.
- Sherdley Road: The Sherdley Road junction will have a new layout which includes a signalised junction.
- Stanifield Lane (Cuerden Associated Works): Minor improvements will be made to the Stanifield Lane roundabout where additional exit lanes will be provided for the northern and eastern arms.
- A582 Link between Stanifield Lane and A6: The westbound carriageway will be widened to three lanes. This widening is undertaken by narrow widening of the existing carriageway.
- A6 Roundabout: The roundabout will include an additional circulation lane.
- M65 Terminus Roundabout: The junction will be upgraded to provide additional lanes on the eastern arm where M65 terminates and a new access arm for the Cuerden Strategic site.
- The proposed dualling is approximately 5.2 kilometres long and comprises provision of a segregated 3-metre-wide combined cycle track/footway with a 0.5 metre buffer strip providing separation from the carriageway along the full length of the road on one side, with connections to existing cycle routes. This will be built along the east side of the A582 Penwortham Way, and the south side of the A582 Flensburg Way and Farington Road.

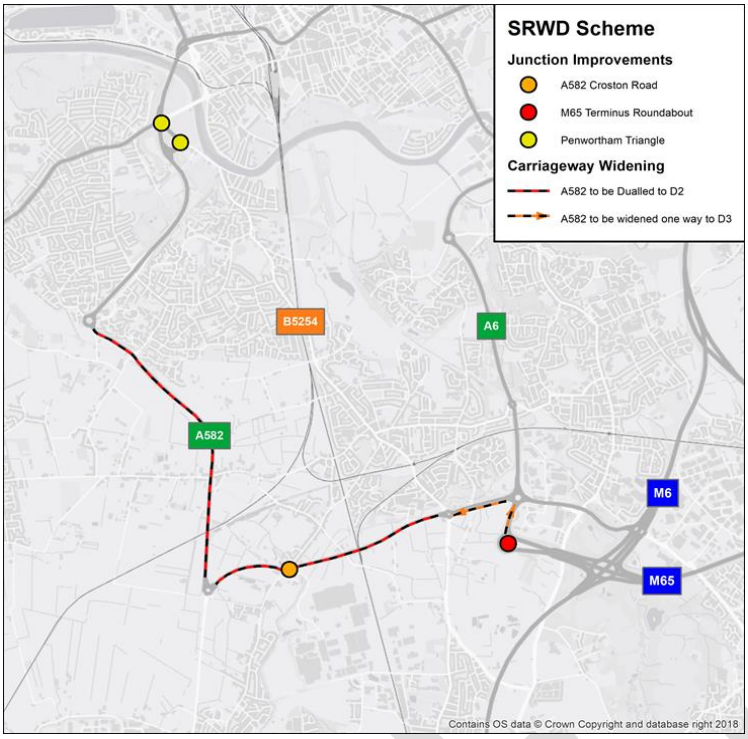


Figure 4-1: A582 SRWD Preferred Option

The low-cost option of the scheme is shown in Figure 4-2 and consists in a partial dualling, only between Stanifield Lane and Tank Roundabout.

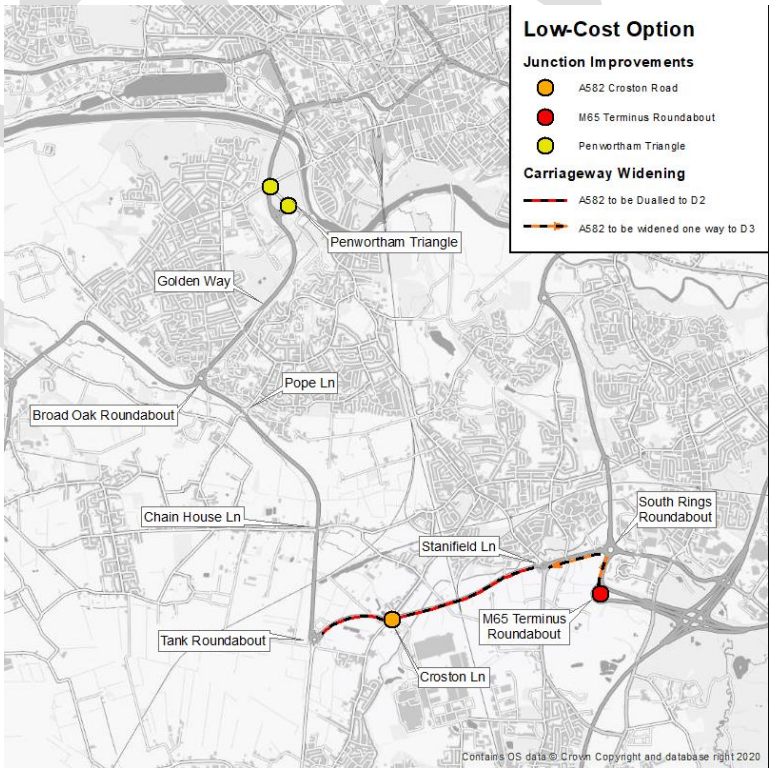


Figure 4-2: A582 SWRD Low Cost Option

4.5 Forecast Demand

4.5.1 Introduction

This section describes the data sources and the methodology to develop the forecast demand matrices in accordance with the guidance outlined in TAG Unit M-4.

Forecast demand for travel will be generated using national, regional and local data sets to inform the amount of travel growth that could be expected from the base year.

The following data will be used to calculate traffic growth for the A582 appraisal:

- TEMPRO planning assumptions and growth factors – NTEM v7.2 dataset
- RTF18 growth factors for GV trips
- Data from Preston City Council on employment and housing developments
- Data from Fylde Council on employment and housing developments
- Data from South Ribble on employment and housing developments
- Transport assessments and Development Site Masterplans
- TRICS trip rates.

4.5.2 Study Area

Housing and employment developments in Fylde, Chorley, South Ribble and Preston Councils are going to be considered. Figure 4-3 shows the extent of the area where the future developments will be modelled explicitly. Beyond that area default TEMPRO growth factors will be applied.

Although Fylde is not in the influence area of the A582 scheme, future developments within this district will be explicitly modelled to future proof the forecast models for the use in appraisal of other transport interventions that may be affected by those developments.

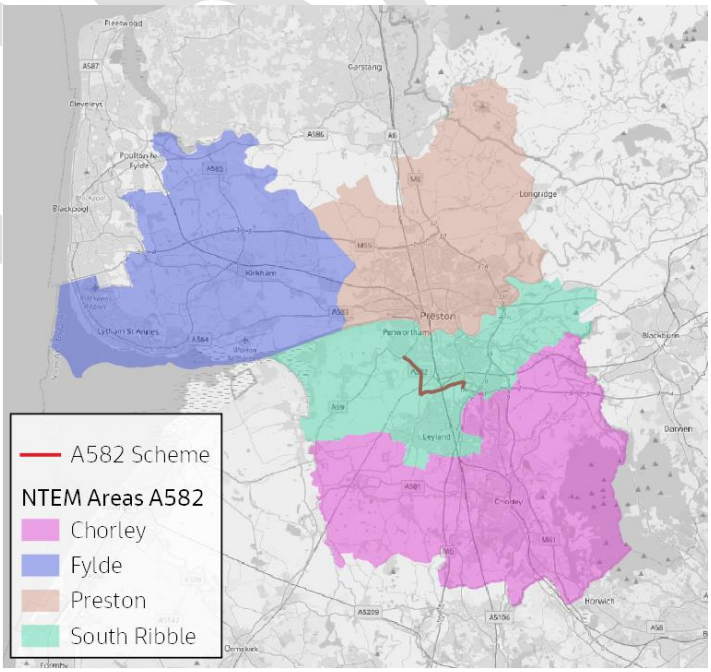


Figure 4-3: Area of Detailed Forecasting

4.5.3 Demand Forecasting Methodology Overview

The 2019 CLHTM demand model has been upgraded to 24h P/A at the request of DfT and therefore the traffic forecasting will need to be undertaken in P/A for home based trips and in O/D for non-home based trips. LGV and HGV O/D movements are fixed in the demand model and therefore their forecasting will be undertaken in O/D.

Figure 4-4 illustrates the demand forecasting process that will be undertaken. Once the relevant housing and employment developments have been identified, the trip generation of each development will be calculated using trip rates either derived from TRICS database or from available Transport Assessments.

For those developments where TRICS trip rates are used, the12-hour trip rates will be factored to 24-hour using the 12 to 24-hour factor extracted from TEMPro. A more detailed description of the assumptions for both types of developments is provided in the following sections.

For the purpose of replicating local travel patterns, each new development is assigned one or more parental zones from which the journey purpose split and tour factors will be inherited. This approach, however, will not be applied for the trip distribution since the trips patterns among future developments are not present in the base year model. Therefore, a gravity model will be applied to distribute 24-hour trip ends (containing both base and future year trips) by journey purpose using the base year calibrated trip length distribution.

It should be noted that the resulting distribution is only applied to the development trips to produce standalone development matrices. The background growth trip ends (i.e. base factored by adjusted TEMPRO factors) are distributed using the Furness iterations, and the resulting matrices are then combined with Development matrices to form the Final TEMPro constrained P/A forecast reference matrices.

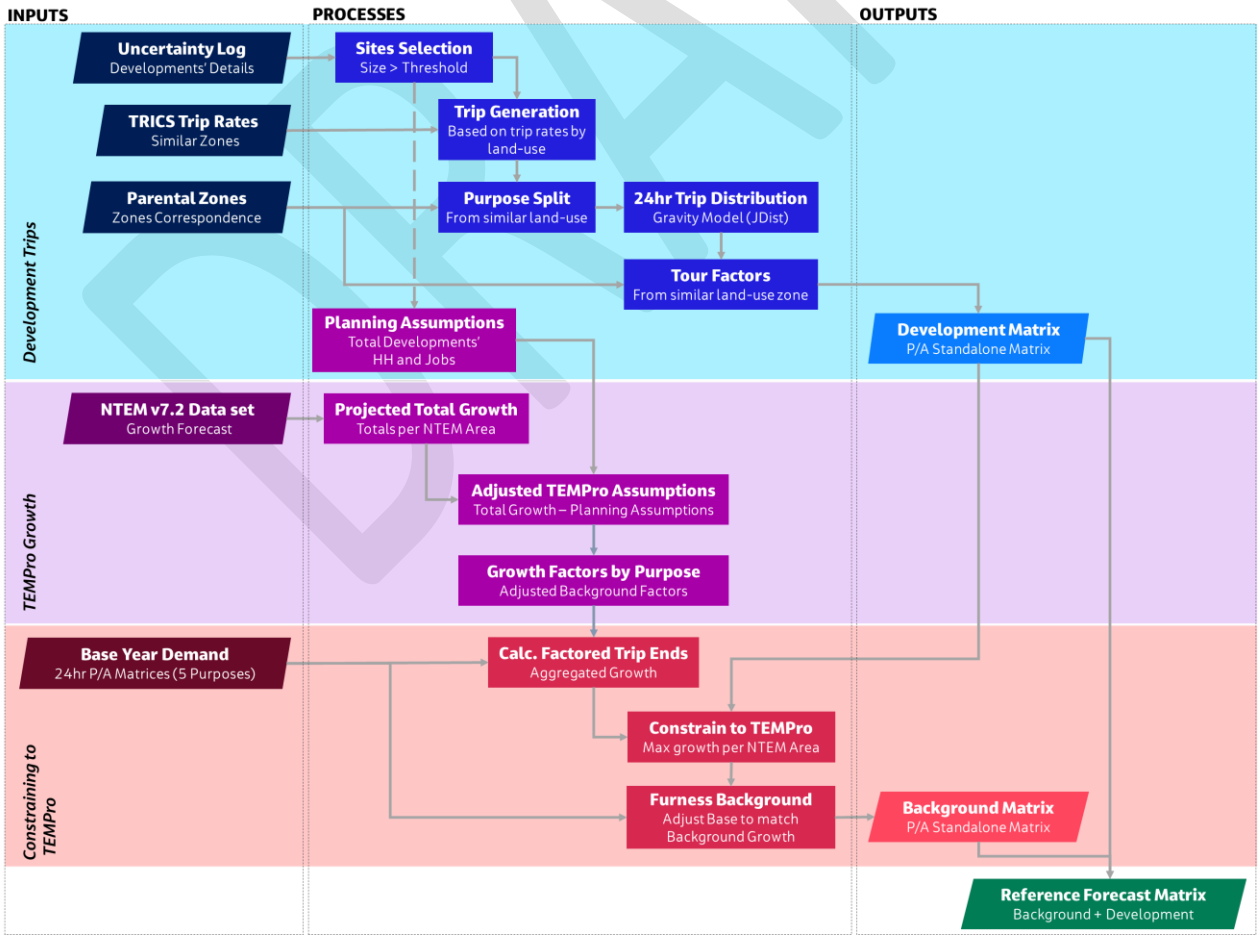


Figure 4-4: Car Demand Forecasting Methodology

4.5.4 Housing Developments

Average 12h trip rates per dwelling will be obtained from TRICS for all the housing developments. Then, the origin and destination trips of each zone will be calculated using the number of dwellings recorded in the uncertainty log.

The 12 to 24-hour factor will then be applied to produce 24-hour Origin and Destination trips. The 12 to 24-hour factor will be calculated using TEMPRO by extracting 12-hour and 24-hour total trips for each Local Authority.

As these are housing developments, and production end is always the home end of the trip regardless of the direction of travel, it is assumed that these are all production trips, and therefore the origin and destination trips are added together and divided by two to convert to 24-hour P/A (where the number of attraction trips is 0). The proportion where this is not the case, e.g. visiting friends and relatives, is assumed to be negligible for this exercise.

Parental zone journey purpose split will then be applied to the 24h Production trips to determine Home Based Commute, Home Based Business and Home Based Other trips.

4.5.5 Employment developments

If available, trip rates from the Transport Assessment of the developments will be used to estimate trip numbers. TRICS trip rates by land use will be used where the TA is not available, or the provided trip rates are not found reasonable. TRICS rates per Gross Floor Area (GFA) will be applied to each identified development to calculate the number of trips for the 12-hour period.

Similarly to Housing the 12h trips will be converted to 24h using factors derived from TEMPro.

Parental zone Home-Based (HB) and Non-Home Based (NHB) split proportions are then used to split out these two types of journeys for employment sites. As these are employment sties, all HB trips are considered to be attractions, and therefore the origin and destination trips are added together and divided by two to convert to 24 hour PA (where number of production trips is 0). Parental zone purpose splits are then applied to determine the journey purpose splits for home based employment trips for Home Based Commute, Home Based Business and Home Based Other trips.

For NHB trips, origin and destination trips are added together to determine 24 hour NHB PA demand. In case on NHB trips Origin becomes Production and Destination becomes Attraction. Similar to HB trips, NHB trips are then split into NHBEB and NHBO trips using TEMPro factors.

4.5.6 Background Growth Calculation and Constraining to TEMPro

The National Trip End Model (NTEM) version 7.2 will be interrogated to obtain growth factors for future changes in car trips between the model base year and each forecast year. Given that the development matrix accounts for the trips associated with the increase in numbers of jobs and houses from the explicitly modelled developments; planning assumptions within TEMPro need to be adjusted accordingly to avoid double counting. For this purpose, the number of estimated households and jobs in modelled developments will be deducted from each NTEM area' households and jobs totals to obtain adjusted growth factors from TEMPro.

The adjusted factors for the four district areas and unadjusted factors for other zones will be applied to the base year trip ends by demand segment of the corresponding model zones. The growth due to TEMPro in each TEMPro area was then further adjusted based on the following factor:

$$F = \frac{Default\ TEMPRO\ Growth - Development\ Trips}{Adjusted\ TEMPRO\ Growth}$$

This creates a revised growth for each TEMPro area which represents final background growth, i.e. growth not including development.

It should be noted that external to external trips are not affected by the development growth and therefore they were excluded from the background growth calculation. These trips were factored by default TEMPRO NTEM v7.2 growth for the corresponding area and added to the final forecast matrices to ensure the through traffic is present in the model.

If the number of households and jobs in the UL exceed the growth predicted by NTEM, this will produce negative background growth. It is acknowledged that negative background growth should be avoided.

Considering that the main reason for explicit modelling of large local developments is to ensure a more accurate spatial distribution of future demand growth while still making sure that the total growth at a district level is within TEMPro we will undertake following checks to review the situations where local UL numbers are higher than TEMPro.

- We will undertake an initial check to compare forecast increases between TEMPro and Local Plans to give us an early idea whether we might encounter negative background growth whilst constraining to TEMPro. Since the likelihood of the developments has been determined based on their planning status, for those Local Authorities where UL numbers exceed TEMPro, we will reconfirm if any of the planning applications have potential to be rejected and, therefore, certain developments with planning application can be removed from the Core Scenario.
- The next check is to determine whether there are any developments located at the boundary of the Local Area and which partly fall into the adjacent TEMPro zones, including zones outside the explicitly modelled area. This would allow us to assume that only a certain proportion of the future jobs or houses generated by those developments can be attributed to these Local Authority areas with development growth that exceeds TEMPro.

The above approach will allow the Core Matrices to be constrained to TEMPRO as recommended by TAG and ensure that there will be no zones with negative growth between the base and the forecast year unless so forecasted by TEMPro.

Once the final background trip ends have been established, the base year demand matrices will be subjected to a furnessing process to obtain the standalone background matrices.

4.5.7 Variable Demand

Development matrices and background growth matrices will then be added together to produce the final Core Reference Case matrices.

Subsequently these matrices will be used in the variable demand model, pivoted off the base year skim costs to capture the changes in demand distribution and trip frequency as a result of the travel cost change in Do Minimum and Do Something Scenarios.

The VDM matrix adjustment process is shown in Figure 4-5.

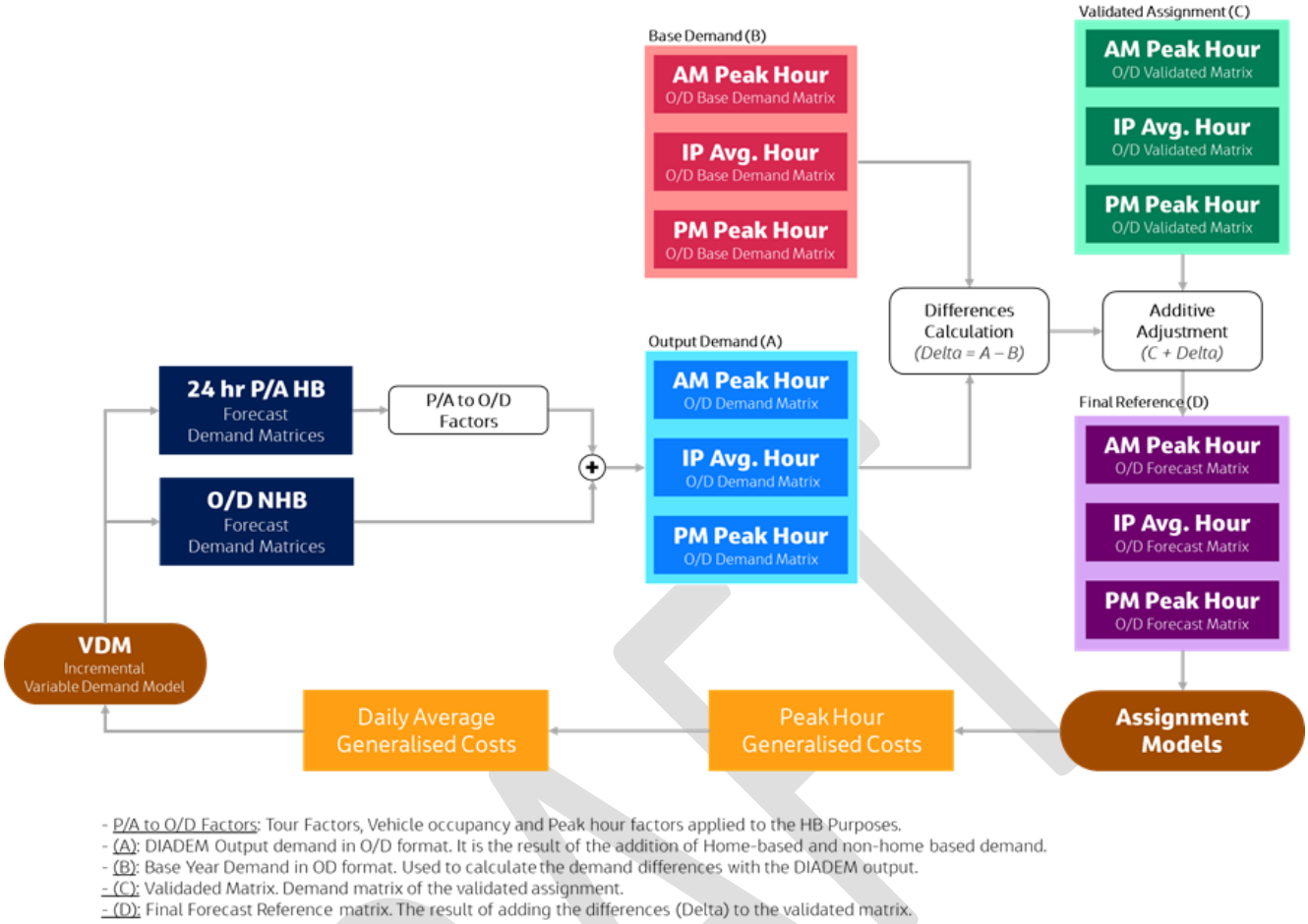


Figure 4-5: VDM process

4.5.8 Dependent Development Demand

One of the key objectives of the A582 scheme is to unlock future housing development in South Ribble which is a critical driver for the LEP and the government as part of the agreed City Deal.

TAG categorises new development that is dependent on the provision of a transport scheme as Dependent Development. Given that the dependent development is conditional to the provision of the scheme and to ensure a fair comparison between With and Without Scheme scenarios the dependent development should not be included in to the Core matrices and therefore the benefits associated with the trips generated by the dependent development would not be included in calculation of the BCR of the scheme.

In the SOBC, two sites were treated as dependent, Cuerden Strategic Site (employment) and Pickerings Farm (residential).

Demand for the above sites will be produced using the methodology for explicit modelling of future developments as outlined in the previous sections.

Dependent development matrices will be produced in order to quantify the transport external cost, imposed by dependent transport users on all other users in line with Tag Unit A2.2 Appraisal of Induced Investment Impacts.

4.5.9 Goods Vehicles Demand Growth

In order to ensure a proportionate approach in line with TAG, non-development LGV and HGV growth will be based on growth factors calculated for principal roads in England using RTF18. These growth factors will be applied to the 2019 base year matrices. In the case of identifying developments that might be expected to generate a significant number of LGV or HGV trips goods vehicles (>100 tips per day), development matrices will be produced accordingly.

This approach is consistent with TAG Unit M4 paragraph 7.3.18 guidance on forecasting changes in freight traffic which recommends applying a single growth factor for the whole matrix based on NTEM forecast growth.

As the CLHTM model does not differentiate between OGV1 and OGV2, the HGV factors will be calculated using the split of 47% and 53% for OGV1 and OGV2, respectively, based on national average splits from COBA Manual Part 4 Chapter 8 ("Table 8/1. Annual Average Category Proportions by Class of Road").

4.6 Sensitivity Tests

The Business Case should be developed for the most likely scenario based on the most unbiased and realistic assumptions about the scheme design, changes to the transport network, traffic growth, land use etc.

TAG Unit M4 'Forecasting and Uncertainty' recommends developing alternative scenarios to address the uncertainty in the forecasting assumptions which might lead to a deviation from the results of the core scenario. Thus, two additional scenarios will be developed, referred to as high-growth and low-growth. These assessments will support the Value for Money of the scheme under higher and lower demand conditions.

Growth assumptions for both scenarios account for the uncertainty related to elements such as demographic change (population and employment), GDP growth, fuel price trends and vehicle efficiency changes. For this purpose, the high-growth scenario will include developments that are reasonably foreseeable, and an additional portion of the base year matrix will be added; while in the low-growth scenario, a portion will be subtracted from the base year matrix. The portion (added or subtracted to the base year matrix) will calculated according to the guidance, as follows:

$$2.5\% \times \sqrt[2]{\text{Forecast Year-Base Year}}$$

Table 4.1 summarises the general assumptions for sensitivity test scenarios.

Table 4.1: Forecast Scenarios

Scenario	Supply (Transport Schemes)	Demand (Developments)
Core	Near Certain More than Likely	Near Certain More than Likely
High Growth (optimistic)	Near Certain, More Than Likely	Near Certain More Than Likely Reasonably Foreseeable
Low Growth (pessimistic)	Near Certain More than Likely	Near Certain More than Likely

5. Economic Case

5.1 Introduction

Economic Assessment involves the determination of costs and benefits of a scheme using travel demand, traffic flows, journey times and other inputs from a traffic model.

By comparing the costs with the benefits of a scheme over a 60-year assessment period, a Benefit Cost Ratio (BCR) can be calculated, which is an indicator of the value for money of the scheme.

In line with HM Treasury's appraisal requirements, non-monetised impacts of the scheme should also be considered as part of the Value for Money (VfM) assessment.

This chapter provides a general description of the VfM Assessment approach proposed for the A582 SRWD OBC.

5.2 VfM Assessment Approach

5.2.1 Background

The appraisal undertaken at the SOBC stage was largely consistent with the requirements for the OBC VfM assessment, as evidenced in the SOBC Economic Assessment Report (July 2020) provided in Appendix F, and therefore it is suggested that it remains appropriate for the OBC. The main differences from the SOBC will be addition of the Low-Cost Option, inclusion of the High and Low Growth scenario and changes related to updating the analysis to the most recent DfT TAG Databook parameters released since the SOBC stage.

The subsequent sections set out the proposed approach for each impact separately highlighting any differences with the SOBC described in Chapter 5 of the EAR (Appendix F).

5.2.2 Overview of the approach

The A582 scheme is designed to promote economic growth whilst simultaneously delivering transport user benefits and business competitive advantage. Therefore, the focus of the VfM assessment will be on capturing both traditional sources of transport scheme benefits, alongside wider economic benefits.

As per TAG the VfM assessment is a staged process which includes appraisal of the scheme's economic, environmental, social, distributional and fiscal impacts using qualitative, quantitative and monetised information.

The impacts of some impacts can be monetised, while others cannot. Even for those impacts which can be monetised, the methods for identifying some monetary impacts are more widely accepted than others. This is because some impacts have well-researched, tried-and-tested methods which are considered more robust than those for other impacts. As a result, the DfT Value for Money Framework (July 2017) distinguishes between three 'types' of monetised impacts: established, evolving, and indicative monetised impacts. These are treated differently in the value for money assessment and presented separately in Value for Money Statements.

Value for Money assessment starts with analysis of costs and established monetised benefits and calculation of the Initial BCR of the Scheme. The next stage is to capture and analyse evolving monetised impacts, which will be subsequently added to the original assessment to generate an Adjusted BCR.

The third stage involves capturing indicative monetised impacts and non-monetised impacts (i.e. impacts that cannot be monetised but can be presented as qualitative information). The methodologies to analyse and monetise indicative impacts are generally developing and have a high degree of uncertainty in the magnitude of the impact exists. Therefore, they are not considered in the BCR calculation. They do however support the overall VfM conclusions of the scheme, as reported in the Economic Case.

Finally, the assessment looks at how the impacts of the scheme are distributed across different social groups, including those which are potentially more vulnerable to the effects of transport. This is informed by a Distributional Impacts Analysis.

Figure 5-1 includes a flow-chart which displays how the costs and impacts feed into the AST and VfM statement.

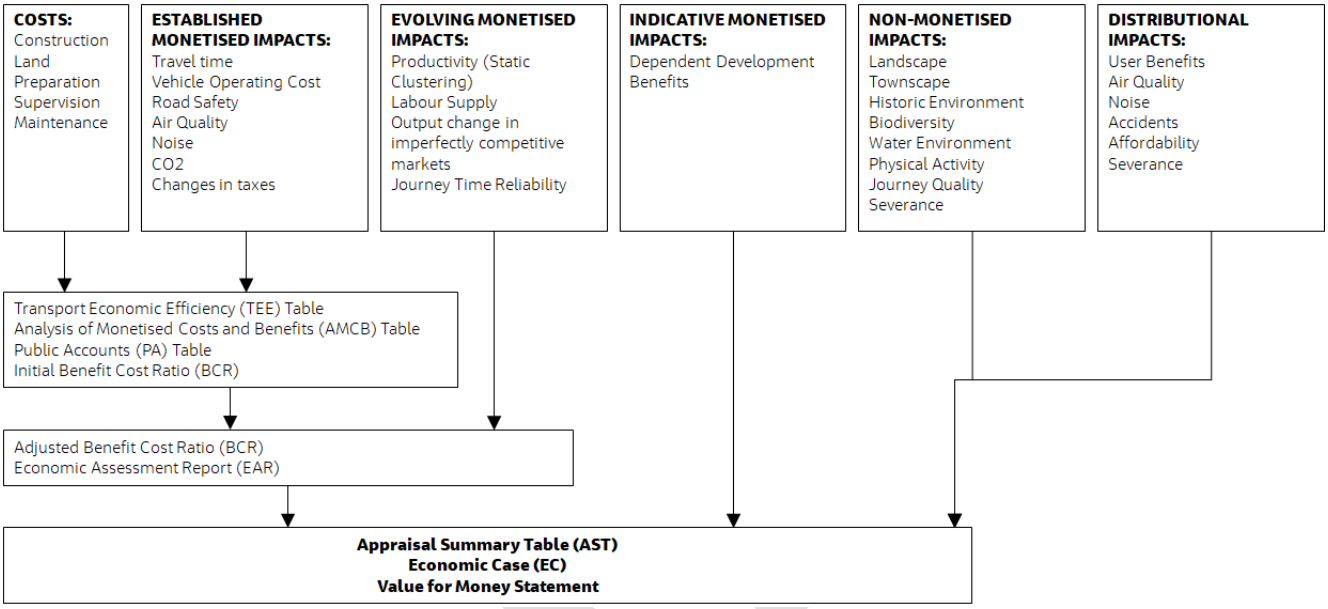


Figure 5-1: Scope of Value for Money Assessment

5.3 Options Assessed

Prior to the SOBC submission, a large number of potential scheme options were identified across different modes. These were sifted into three packages of better-performing options, plus a 'Do Minimum' option. Following an option scoring process, one of these was identified as the best-performing option that became the Preferred Option: This consists of full dualling of the A582 delivered alongside a parallel cycle route. **Unless stated otherwise the scheme and the Preferred option are interchangeable in the remainder of this document**.

Another option was identified as the next best option and low-cost alternative. This consists of partial dualling of the A582 alongside a parallel cycle route, only between Stanifield Lane and Tank Roundabout. As the second-highest scoring option, this option will be assessed alongside the Preferred Option in the OBC.

Given the similarity between Low-Cost and Preferred Option, it is proposed that the Low-Cost option economic assessment will be limited to TUBA and Core Forecast Scenario only. Other impacts will either be assumed to be consistent between options or will be estimated based on the difference between Preferred and Low-cost option TUBA results.

5.4 Assessment Data and Tools

Transport User Benefit Appraisal (TUBA) – version 1.9.13 (August 2019) will be used to derive travel time benefits, VOC and indirect tax benefits of the scheme, as well as the impacts on the transport network of unlocking new development.

COst and Benefit to Accidents – Light Touch (COBA-LT) – version 2013.2 with parameter file 2020.1 (August 2020) will be used to derive the expected change in number of accidents and their associated cost to the economy.

QUeues And Delays at ROadworks (QUADRO) – version 2018 will be used to derive the cost of delay due to construction and maintenance works.

2019 Teltrac Navman GPS (observed journey times) data will be used to determine journey time reliability impacts of the scheme.

5.5 Appraisal Period

In line with TAG guidance, the impacts of the scheme will be assessed over the 60-year period after the scheme opens, capturing the planned period of scheme development and implementation. The 60-year appraisal period for the scheme is 2024-2083.

The transport model provides estimates for three years: the opening year (2024), the design year (2039) and the final year (2051). The results of the model will be interpolated and extrapolated to cover the whole appraisal period of 60 years. To ensure a conservative approach to the calculation of scheme benefits, it is assumed that there will be no growth in traffic flows after the final year.

5.6 Discounting and Cost Units

Costs and benefits occur in different years throughout the assessment period, for example the construction costs occur before the scheme opens, whilst the benefits occur in the 60 years afterwards. In addition, it is considered that benefits that accrue now are considered to be more valuable than those that accrue further into the future. Therefore, to compare benefits and costs, it is essential that they are all converted to a common base and a common value (known as the present value year).

The process used is called discounting, and the present value year is currently 2010. Discounting will be undertaken internally within the computer programs unless a bespoke spreadsheet based approach is used, using the standard DfT discount rates of 3.5% per year for the first 30 years of appraisal and 3.0% per year thereafter.

Costs can also be in different price bases. To enable comparisons to be made between such costs, they will need to be adjusted so that they are all in a common price base. The unit of account must also be consistent between costs and benefits to allow comparison between the two. There are two different units of accounts:

- Market price unit of account – this refers to the prices paid by consumers for goods and services and therefore includes indirect taxation (e.g. VAT).
- Factor cost unit of account – this excludes indirect taxation. Prices paid by government bodies are usually quoted in the factor cost unit of account as any tax paid is recovered by the government and is therefore ignored.

While scheme benefits are calculated in market prices, scheme costs are usually quoted as factor costs. The scheme costs will therefore be adjusted to market prices for economic assessment purposes – this is done within the economic assessment software.

5.7 Costs for Economic Assessment

Costs can be defined as the total amount of money spent on constructing and maintaining the scheme. The costs are therefore referred to as Scheme costs and Maintenance costs:

- Scheme costs are construction costs, land costs, preparation costs (planning and designing the scheme) and supervision costs during the scheme construction.
- Maintenance costs are the cost of people, machinery and materials required to maintain the highway network. These costs are also known as the Capital Costs of Maintenance.

The estimation of scheme costs is a crucial part of the scheme appraisal.

The costs used in scheme appraisal differ from the outturn costs used for funding decisions. Costs for scheme appraisal will be adjusted to the DfT's standard present value year for appraisal (2010) to allow direct comparison with the monetised benefits, and the costs are in calendar years. Scheme costs used for funding submissions are the outturn costs in the expected years of expenditure and are in financial years converted to market price units of account.

Base cost estimates and spend profile for construction, land / property, preparation / administration and supervision, including adjustment for risk and inflation will be provided by the scheme promoter, LCC. The cost estimates derived will meet the following criteria, and will be checked against them:

- Costs are based on the latest scheme design
- Expenditure in calendar years
- Exclude any costs already incurred
- Exclude both recoverable and non-recoverable VAT
- Exclude any costs that are present in both the Do-Minimum and the Do-Something scenarios
- Costs to be incurred by Central Government and local government are provided separately
- Include the amount of developer contribution, if any.

Jacobs will make further adjustment for investment costs because of Optimism Bias (OB). In line with TAG an additional 15% uplift of the scheme cost is recommended at the Outline Business Case stage (TAG Unit A1.2: Table 8).

The adjusted costs will be entered into TUBA to derive the Present Value Cost (PVC) for construction, land/ property and preparation and administration.

The Capital Cost of Maintenance is the cost of people, machinery and materials to maintain the highway network. Maintenance cost will be derived using typical maintenance profiles and costs provided in Part 2, Chapter 4 of the QUADRO manual, designed for such assessments. The maintenance costs will be entered into TUBA together with other scheme costs to derive operating costs and total PVC of the scheme.

For transparency of how the cost was derived and adjusted costs in the Economic Assessment Report and OBC Economic Case will be presented in the DfT Cost Proforma format.

5.8 Monetised Benefits ('Established' Impacts)

5.8.1 Overview

As shown in Figure 5-1 the following impacts of the scheme can be considered 'established' monetised impacts, and are included within the Initial BCR:

- *Transport Economic Efficiency benefits – this includes travel time savings and vehicle operating cost impacts due to the scheme, as well as changes in delays during its construction and maintenance*
- *Changes in indirect tax revenues*
- *Changes in accident numbers*
- *Changes in noise, air quality and greenhouse gases*

5.8.2 Transport Economic Efficiency Benefits

TEE benefits constituted the vast majority of the scheme benefits at the SOBC stage. Over £94m of TUBA benefits from changes in travel time and VOC were slightly offset by £4m of construction delay impacts and £0.3M of maintenance delay disbenefits.

The TEE analysis will be repeated for the OBC using the updated traffic model and latest versions of TUBA and QUADRO.

The latest approved version of TUBA at the time of the economic assessment will be used, at the time of writing this is 1.9.13. **It is understood that assessment with March 2020 OBR forecast parameters will be required. We will seek DfT advice on whether these parameters should be used as a Core scenario or a sensitivity test.**

In accordance with best practice, the results of the TUBA assessments will be checked at a sector level (as it would be difficult to do this assessment at a zonal level). Other checks will include:

- Analysis of benefits by time period and journey purpose
- Benefits profile over 60-year period
- Analysis of benefits by size of time-saving

Additionally, TUBA warnings will be closely checked to ensure that the results are logical, and the input data was loaded correctly.

In accordance with the TUBA guidance, the modelled time periods will be converted to annual time periods using annualisation factors. Annualisation factors will be consistent with the SOBC appraisal, unless analysis of the recent traffic flow on the A582 shows a different traffic flow profile.

Off-peak and Weekend benefits will not be assessed. TAG recommends including Off-Peak and Weekends in the assessment only if they have been specifically modelled.

Construction and maintenance activities, traffic management arrangements and diversion routes will be coded into QUADRO, which will then be run to simulate the impact of the construction and maintenance activities on travel times, VOC and accidents on the existing network.

Table 5-1 provides a summary of the key assumptions used in the SOBC QUADRO assessment. They will be reviewed and, if no change is required, will be adopted as part of the analysis for the OBC.

Table 5-1: QUADRO Assumptions

Item	Assumptions/Notes
Software	QUADRO 2018 (current version)
Construction work traffic management assumptions	▪ Most sections of online widening will require full-time traffic management for the entire construction period, consisting of narrow lanes and closure of the other lane, and a reduced speed limits of 40mph. ▪ It is assumed that four Weekend night closures are each essential to upgrade junctions of the A582 with the A6 and the M65 connection and the A582 with the Croston Road. While two weekend night closures are assumed for the junction upgrades of the A582 with Watkin Lane and Chain House Lane. For junctions that are already upgraded along the A582, it is assumed that a night closure along the route is needed to tie in the dual carriageway works with the junctions at B5253, Pope Lane and Millbrook Way ▪ As a number of the construction phases require complete road closures and the appropriate diversion routes were identified by the design team. For most closures, a 6-km diversion route was identified. This diversion route is of a lower standard than the A582 due to the lack of alternative routes and is primarily via the B5254 at a much lower speed of 30mph.

5.8.3 Change in Indirect Tax

At the SOBC stage an overall increase in indirect tax revenue received by the government of £4.0m was estimated due to an increase in fuel consumption due to an increase in distance travelled with the scheme in place.

The analysis will be repeated in TUBA using the updated traffic model inputs and reported in the OBC EAR and Economic Case.

5.8.4 Accident Benefits

COBALT analysis undertaken at the SOBC stage and resulting in £3.9m of accident benefits will be repeated using the 2020 parameter file for the A582 OBC in line with the methodology described in the SOBC EAR Chapter 5.5 (Appendix F). **We would welcome DfT advice on whether a sensitivity test using the COBALT 2020.2 parameter file will be required.**

The SOBC COBALT network shown in Figure 5-2 will be reviewed and adjusted as necessary based on the traffic flow changes between With and Without the scheme scenarios.

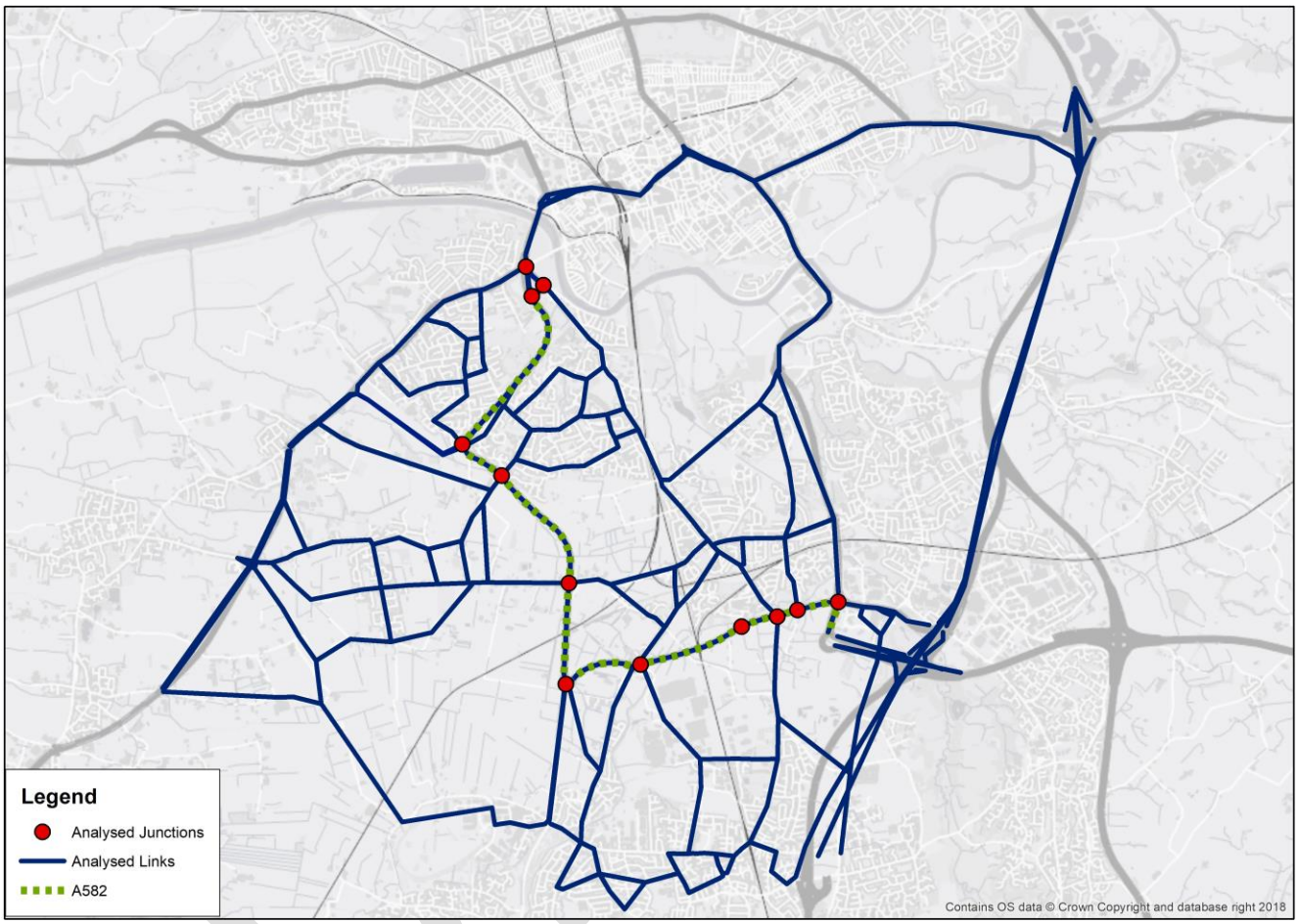


Figure 5-2: COBALT Network

The observed accident rates will be re-calculated using STATS19 data for the latest available complete five-year period.

The warning messages within the output files will be closely checked to understand their impact on the results of the COBALT analysis. Further checks will be carried out to ensure that the inputs for observed accidents rates calculation are correct and the resulting rates were representative of the actual situation on the ground.

The results of COBALT analysis (the number of accidents and casualties, and their associated costs, discounted over the 60-year assessment period for the future situations with and without the scheme, together with the net changes in accidents and casualties) will be reported in the OBC EAR and the Economic Case.

5.8.5 Environmental Benefits

The SOBC assessment of CO2, Air Quality and Noise impacts was undertaken using the TAG standard worksheets and resulted in a positive scheme impact on Noise (£1.8m), negative CO2 impacts (-£7.3m) due to overall

increase in distance travelled once the scheme is in place despite there being a decrease in travel times, and a negligible (-£0.1m) monetary impact on AQ.

The analysis will be updated for the OBC with the most up-to-date parameters and based on the latest guidance.

5.9 Monetised Benefits ('Emerging' and 'Indicative' Impacts)

5.9.1 Overview

As shown in Figure 5-1 some impacts of the scheme can be monetised, but there is more uncertainty about the evidence surrounding their assessment methodology. These impacts classed as emerging impacts, and are excluded from the 'Initial BCR', but included within an 'Adjusted BCR'. Other impacts, known as 'indicative' impacts, are generally based on a developing assessment approach, and have a high degree of uncertainty associated with them. These impacts are not included in any BCR calculation but do support the overall Value for Money conclusions of the scheme as reported in the Economic Case.

The following impacts will be assessed for the OBC:

- Emerging impacts:
  - Journey Time Reliability
  - Wider Impacts (productivity, labour supply impacts, and output change in imperfectly competitive markets)
- Indicative Impacts:
  - Dependent Development

5.9.2 Journey Time Reliability

Journey time reliability relates to the variability of journey times that users are unable to predict.

The reliability benefits of the scheme can be captured and monetised, however they are not included in the scheme AMCB table and will be included in the adjusted BCR.

The standard tool to assess the journey time reliability benefits of rural roads is MyRIAD which is only applicable to motorway and dual carriageway improvement schemes. With A582 scheme, it is possible to infer the likely change in variability by comparing the level of variability on different sections of the existing route.

Once the A582 dualled, it is assumed that road users on A582 between Golden Way and Stanifield Lane will experience the level of reliability currently experienced on the dual carriageway section between Broad Oak Lane and Penwortham Triangle. This section is adjacent to the scheme, and hence experiences broadly similar traffic flows and seasonal variation.

For each section, variability in journey time will be measured across a sample of journey time observations taken from the DfT TrafficMaster GPS data.

It is important to distinguish between unpredictable and predictable variation in journey times. To ensure that the analysis only captures unpredictable variation, journey time will only measure and compare separately across specific times of the day (AM, Inter-peak and PM periods), days of the week (Monday – Thursday, Friday, and Saturday – Sunday) and months of the year (on any neutral month that has captured Golden Way GPS data with no works on the road).

The assessment will be undertaken in three steps:

- calculation of average journey times for a sample of hours over a month period for each section of the A582 scheme

- calculation of the standard deviation of average journey times across this sample for a Do Minimum and Do Something scenario
- application of monetary values and the 'reliability ratio' (the ratio of the benefit of a 1-minute change in the standard deviation of journey times and a 1-minute change in travel time) to convert changes in standard deviation into a monetised benefit.

The reliability ratio is defined as the ratio of the value of a one-minute change in journey time variability to the value of a one-minute change in journey times. TAG Unit A1.3 (May 2018) suggests a reliability ratio of 0.4 (meaning that a one-minute improvement in variability is worth 0.4 minutes of travel time savings).

5.9.3 Wider Economic Impacts

The previous sections of this Chapter described the approach to assessment of user benefits, including economic, environmental and social impacts.

Under a well-defined set of circumstances, these user benefits will capture the entire welfare impact of a transport investment. However, as described the scheme's Economic Narrative produced at the SOBC stage and included as Appendix H to the SOBC EAR (Appendix F), several market failures have been identified which will lead to additional impacts that should be captured.

The following additional impacts are expected to occur:

- Productivity improvements due to agglomeration impacts ('static clustering')
- Labour supply impacts
- Increased business output ('output change in imperfectly competitive markets')
- Facilitating Investment ('dependent development')

The first three of these impacts listed above are known as "wider impacts" and are included in the Adjusted BCR. The impact from facilitating investment ('dependent development') is categorised as 'Indicative' in TAG and will not be part of BCR calculation but will support the VfM of the scheme.

The wider impacts assessed at the SOBC stage cumulatively provided £42.5m of benefits towards the scheme VfM. Their assessment will be repeated using the DfT's WITA v2 software and the latest DfT Databook parameters. The approach to reconciling the traffic model data (based on the mode zoning system) and economic data used in WITA (at Local Authority District (LAD) level), estimation of PT and walking demand and cost matrices required by WITA will be consistent with the SOBC and are described in the SOBC EAR Chapter 5.8 (Appendix F).

5.9.4 Dependent Development Benefits

One of the key objectives – and likely sources of benefits – of the scheme, is the fact it helps to unlock wider growth planned by in Central Lancashire.

Two particular developments were identified as being dependent on the scheme during the SOBC stage:

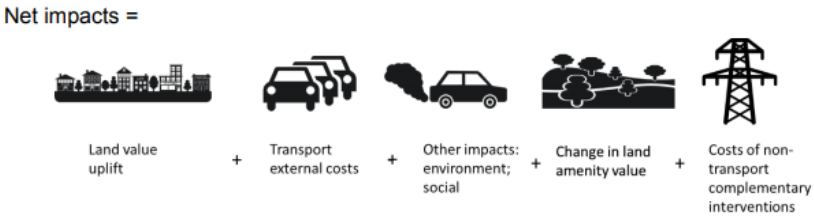
- "Pickerings Farm" – a residential development of 1,350 homes
- "Cuerden Strategic Site" – a large-scale employment development over 65 hectares

Both sites are identified in the City Deal as essential to unlocking the city region's economic growth potential, and both are reliant on future improvement of the transport network which will be provided by the City Deal schemes (one of which is A582 SRWD).

As these schemes are considered to be unable to proceed without the scheme in place, their impacts will be excluded from the Core economic assessment described above (i.e. the user benefits in this economic case will be based on the assumption that these developments do not come forward).

However, this means that a potentially significant benefit of the scheme is missing from its core economic assessment. To capture this benefit, a 'land value uplift' assessment have been undertaken at the SOBC stage and will be repeated for the OBC based on the latest planning data for these two sites. This Land value uplift measures the increase in the value of the housing and employment land compared to its existing use, and uses this as a proxy for the economic benefits to society provided by the new development.

A summary of the methodology is shown in the figure below. The uplift in land value compared to its existing use will be calculated. This figure will then be reduced to account for the additional traffic impact of the developments on existing road users (transport external costs), negative impacts on the environment and loss of land amenity value. Adjustments will also be made to ensure that benefits are calculated at the national level, i.e. ensuring the economic benefits of the development have not just displaced economic activity from elsewhere in the country.



The detailed methodology for assessing unlocked developments is described in the Technical Note produced at the SOBC stage and provided as Appendix K to the SOBC EAR (Appendix F).

5.10 Non-monetised Benefits

In addition to the monetised costs and benefits, a VfM assessment must consider the impacts which cannot be monetised and how they contribute to the VfM of the scheme.

As per TAG these impacts will be appraised using qualitative and quantitative information, and will be given an overall qualitative assessment score.

The following social and environmental impacts are proposed to be included in the scope of the OBC update:

- Landscape
- Townscape
- Historic Environment
- Biodiversity
- Water Environment
- Physical Activity
- Journey Quality; and
- Severance.

Their assessment undertaken at the SOBC stage will be reviewed and updated as necessary in line with the latest TAG guidance. Further detail on the proposed approach for the above impacts is provided in ASST (Appendix A).

5.11 Distributional Impacts

The assessment of Distributional Impacts (DIs) is designed to help understand the impacts of transport interventions on different groups of people, including those potentially more vulnerable to the effects of transport. The likely impact of the scheme on vulnerable groups has been identified using the DI Proforma (Appendix A). The DI appraisal for the identified impacts will be undertaken in line with TAG Unit A4-2.

5.12 Sensitivity Tests

As pointed out in Section 4.6 in order to take into account uncertainty regarding the assumptions about scheme design, changes to transport network, traffic growth, land use etc, a series of sensitivity tests will need to be undertaken along with the Core scenario.

Given that the travel time benefits are expected to remain the main contributor to the scheme VfM and to ensure a proportionate approach to the appraisal in line with TAG the economic assessment of sensitivity test scenarios will be limited to TUBA analysis.

All other assessment results (such as accidents and environmental benefits) in the calculation of the PVB and BCR figures will either be consistent or will be estimated based on the difference between the Core and Sensitivity Test scenarios TUBA results.

6. Overview of Deliverables and Risks

6.1 Introduction

The purpose of this chapter is to agree a time-table for DfT OBC assurance and identify key risks that may affect the OBC programme.

6.2 Reports, Assessments, Data and Model Outputs

The proposed schedule of products for the delivery of the OBC is provided in Table 6-1. To ensure a smooth assurance process and reduce the risk of abortive work a DfT feedback on the ASR would be required within 3 weeks after submission and on other deliverables within 4 weeks after submission.

Table 6-1: Schedule of Deliverables

Item	Format	Date of Draft
Data Collection Report (Traffic Survey Report)	Report	Submitted on 10/02/2020 DfT approval: 08/04/2020
Appraisal Specification Report	Report (this document)	28/08/2020
Options Assessment Report	Report Update	w/c 14/09/2020
Strategic Case	BC Chapter Update	w/c 14/09/2020
Model Re-Calibration Report	Report	w/c 21/09/2020
Traffic Forecasting Report	Report	w/c 07/12/2020
Economic Appraisal Report (with preliminary scheme cost)	Report	w/c 04/01/2021
Distributional Impacts Appraisal Report	Report	w/c18/01/2021
Appraisal Summary Table and TAG Worksheets	Worksheets	w/c 18/01/2021
Outline Business Case	Report	w/c 15/02/2021

6.3 Risks

All assumptions made as part of the appraisal shall be documented within the relevant reports and the Outline Business Case document. All key assumptions will be provided to DfT during ongoing discussions.

Key, potential risks that could affect the OBC programme and schedule of deliverables above, as identified at this time, are listed below:

- Impact of COVID-19 – scheme development progress is slowed down by another lockdown or other national and local measures to stop the COVID spread;
- Additional forecasting or economic appraisal sensitivity tests are required outside the scope of this ASR;
- Modelling / economic assessment results are counter-intuitive and further work is required
- DfT reviews take longer than anticipated
- Delays in estimation and submission of scheme costs
- Changes to the scheme design/scope during the appraisal
- Changes to the appraisal guidance
- Assurance programme goes beyond the OBC submission date

Risks will be controlled and mitigated in line with Risk Mitigation Plan and through continued liaison with the LCC and DfT throughout the process.

Appendix A. Appraisal Specification Summary Table

Impacts	Sub-impacts	Estimated Impact in SOBC	Level of uncertainty in SOBC	Proposed proportionate appraisal methodology	Reference to evidence and rationale in support of proposed methodology	Type of Assessment Output (Quantitative/ Qualitative/ Monetary/ Distributional)
Economy	Business users & transport providers	The scheme generates significant journey time savings of £37.9m, for business trips, due to reduced congestion on A582 and faster travel times to and from Preston. The time benefits are highest for short journey time savings as expected due to the nature of the scheme. The scheme also produces a disbenefit of -£0.8m through an increase in Vehicle Operating Costs for business users, adding to the scheme net disbenefit for VOC (-£5.6m). There is also disbenefit of -£1.6m due to construction and maintenance delays to business users.	Impact was estimated in line with the latest guidance at the time of the assessment and based on the best available modelling tool.	TUBA assessment of travel time, VOC benefits and QUADRO assessment of construction and maintenance delay benefits will be updated to the latest TAG parameters and based on the comparison of modelled With and Without Scheme scenarios from the updated traffic model	Scheme is likely to bring about journey time savings for road users by offering a more attractive route and upgraded junctions along the route. Delays during the maintenance of A582 is expected to reduce because the scheme enables traffic managements without closure of the road. On the other hand the scheme construction will cause disbenefit to the road users. Industry standard approach TAG A1-3 will be used.	Monetary

	Reliability impact on Business users	Positive journey time reliability effect is expected for business trips due to scheme because of reduction in congestion and accidents on A582 and B5254, and is estimated to be a total benefit of £1.2m (17% of total journey time reliability benefits).	The journey time reliability analysis was limited to the A582 and B5254 routes only. Quantification of reliability benefits across the wider network has not been undertaken	The SOBC assessment will be repeated using the latest TAG parameters and inputs from the updated traffic model. Journey time variability on the existing network will be derived using TrafficMaster 2019 data.	By upgrading the single carriageway section of A582, the journey time reliability is expected to improve. The reliability (taken as a SD of observed travel times) of the current dual carriageway section of A582 will be assessed and compared to the single carriageway section. The same amount of reliability on the scheme is expected when delivered. This comparison enables quantifying the change in reliability and value of time will be applied to derive monetary values for business users.	Monetary
	Regeneration	Not estimated	Not estimated	Not required	N/A	N/A
	Wider Impacts	As per the SOBC assessment the scheme will generate £42.5m of benefits from labour supply impacts (£0.8m), productivity (Static Clustering) (£38.2m), and output change in imperfectly competitive markets (£3.5m). This benefit can be considered in total PVC to calculate an adjusted BCR for the scheme. In addition, unlocking the Pickerings Farm housing development and Cuerden Business Park will generate £33.6m of benefits, which cannot be used in the BCR calculation. This benefit is monetised as indicative impact to support the overall Value for Money of the proposed scheme.	The wider impacts were assessed in line with the latest guidance at the time of the assessment and based on the best available information about planned dependent developments.	The analysis will be repeated using the current TAG parameters and inputs from the updated traffic model. The dependent development information used in calculation will be reviewed and updated as necessary. WITA v2.00 will be used for wider impacts assessment.	Rationale for Wider Impacts assessment is provided in Economic Narrative produced at the SOBC stage. See SOBC EAR Appendix H provided in Appendix F of the ASR.	Monetary

Environmental	Noise	Small positive impact of £1.8m	Impact was estimated in line with the latest guidance at the time of the assessment and based on the best available modelling tool.	Analysis to be repeated using current TAG parameters and latest guidance and based on the inputs from the updated traffic model	Industry Standard Approach TAG A3, A4-2	Monetary/ Quantitative/ Distributional
	Air Quality	Marginal negative impact of £0.8m	Impact was estimated in line with the latest guidance at the time of the assessment and based on the best available modelling tool.	Analysis to be repeated using current TAG parameters and latest guidance and based on the inputs from the updated traffic model	Industry Standard Approach TAG A3, A4-2 (excluding Local AQ)	Monetary/ Quantitative/ Distributional
	Greenhouse gases	Negative impact of £7.3m	Impact was estimated in line with the latest guidance at the time of the assessment and based on the best available modelling tool.	Analysis to be repeated using current TAG parameters and latest guidance and based on the inputs from the updated traffic model	Industry Standard Approach TAG A3	Monetary/ Quantitative
	Landscape	Neutral	Based on the results of Statutory EI appraisal	SOBC Stage TAG Worksheet to be reviewed and updated based on the latest information	Industry Standard Approach TAG A3	Qualitative
	Townscape	Slight adverse	Based on the results of Statutory EI appraisal	SOBC Stage TAG Worksheet to be reviewed and updated based on the latest information	Industry Standard Approach TAG A3	Qualitative
	Heritage of Historic resources	Neutral	Based on the results of Statutory EI appraisal	SOBC Stage TAG Worksheet to be reviewed and updated based on the latest information	Industry Standard Approach TAG A3	Qualitative

	Biodiversity	Slight adverse	Based on the results of Statutory EI appraisal	SOBC Stage TAG Worksheet to be reviewed and updated based on the latest information	Industry Standard Approach TAG A3	Qualitative
	Water Environment	Neutral	Based on the results of Statutory EI appraisal	SOBC Stage TAG Worksheet to be reviewed and updated based on the latest information	Industry Standard Approach TAG A3	Qualitative
Social	Commuting and Other users	The scheme generates significant journey time savings of £63.6m, for commuting and other users, due to reduced congestion on A582 and faster travel times to and from Preston. The time benefits are highest for short journey time savings as expected due to the nature of the scheme. The scheme also produces disbenefit of -£5.2m due to increase in Vehicle Operating Costs for these users. An overall VOC disbenefit, small in comparison to travel time benefits, is logical as the total travel distance across the network is slightly higher with the scheme than without the scheme. In addition, the impact of Variable Demand Modelling on the travel pattern also contributed to longer journey distances. There is also disbenefit of -£2.9m due to construction and maintenance delays.	Impact was estimated in line with the latest guidance at the time of the assessment and based on the best available modelling tool.	TUBA assessment of travel time, VOC benefits and QUADRO assessment of construction and maintenance delay benefits will be updated to the latest TAG parameters and based on the comparison of modelled With and Without Scheme scenarios from the updated traffic model	Scheme is likely to bring about journey time savings for road users by offering a more attractive route and upgraded junctions along the route. Delays during the maintenance of A582 is expected to reduce because the scheme enables traffic managements without closure of the road. On the other hand, the scheme construction will cause disbenefit to the road users. Industry standard approach TAG A1-3 will be used.	Monetary/ Distributional

	Reliability impact on Commuting and Other users	Positive journey time reliability effect is expected for Commuting and Other trips due to scheme because of reduction in congestion and accidents on A582 and B5254, and is estimated to be a total benefit of £5.5m (83% of total journey time reliability benefits).. Commuting benefits: £3.0m Other benefits: £2.4m	The journey time reliability analysis was limited to the A582 and B5254 routes only. Quantification of reliability benefits across the wider network has not been undertaken	The SOBC assessment will be repeated using the latest TAG parameters and inputs from the updated traffic model. Journey time variability on the existing network will be derived using TrafficMaster 2019 data.	By upgrading the single carriageway section of A582, the journey time reliability is expected to improve. The reliability of the current dual carriageway section of A582 will be assessed and compared to the single carriageway section. The same amount of reliability on the scheme is expected when delivered. This comparison enables quantifying the change in reliability and value of time will be applied to derive monetary values for Commuting and Other users.	Monetary
	Physical activity	Moderate beneficial impact. Overall, non-motorised users (NMU) would experience long-term positive benefit as a result of the introduction of a new three metre wide shared use cycle track along the full length of the proposed scheme (6.5km) combined with the provision of new toucan crossings at Croston Road and Longmeanygate where there is no provision at the present time.	Subject to any change to walking and cycling provision as part of the scheme design the SOBC assessment remains valid	SOBC Stage TAG Worksheet to be reviewed and updated based on the latest information	Industry Standard Approach TAG A4-1	Qualitative

	Journey quality	Moderate beneficial impact. The scheme would have a neutral impact on travellers' views from the road and remain in line with the semi-rural setting. The scheme would be designed to a higher standard than the existing road which reduces driver uncertainty and stress also reducing the opportunity for collisions and drivers' fear of potential accidents. Overall the scheme would result in a long-term moderate benefit to driver stress levels. A slight beneficial impact on traveller care would be experienced through slight improvement the landscape and environmental quality of the journey in some locations. The provision of a combined footway / cycle track along the dualling will provide a facility creating a moderate safety benefit.	Subject to any material change the scheme design which may affect journey quality the SOBC assessment remains valid	SOBC Stage TAG Worksheet to be reviewed and updated based on the latest information	Industry Standard Approach TAG A4-1	Qualitative
	Accidents	The monetary value of the overall change in accidents estimated at the SOBC stage is a benefit of £3.9m. Because of the higher standards of the new carriageway, the number of accidents on the A582 is expected to decrease. The number of accidents on the surrounding area is also expected to decrease due to reduction in traffic.	Impact was estimated in line with the latest guidance at the time of the assessment and based on the best available modelling tool.	COBALT analysis will be repeated using latest TAG parameters for the area where traffic flows change by more than 10% between With and Without scheme scenarios based on the updated traffic model forecasts	Improving road safety is not a key objective of the scheme. However, the scheme can potentially generate accident benefits as the traffic will use a safer dual carriageway road. Industry Standard Approach TAG A4-1, A4-2	Monetary/ Quantitative/ Distributional

	Security	No impact on security was envisaged at the SOBC stage	N/A	N/A	N/A	None
	Access to services	Not estimated	Not estimated	N/A	N/A	None
	Affordability	Not estimated	Not estimated	Affordability benefits as a function of change in VOC for DI Analysis	Industry Standard Approach TAG A4-2	Distributional
	Severance	Slight beneficial impact.	Impact was assessed based on the best available information at the SOBC stage	SOBC Stage TAG Worksheet to be reviewed and updated based on the latest information	Industry Standard Approach TAG A4-1, A4-2	Qualitative/ Distributional
	Option values	Not estimated	Not estimated	N/A	N/A	None
Public Accounts	Cost to Broad Transport Budget	£60.3m in 2010 prices discounted to 2010	Including 40% OB	Costs will be provided by LCC and will include inflation and QRA adjustment as well as 15% OB as per TAG	TAG A1-2	Monetary
	Indirect Tax Revenues	The SOBC analysis estimated an increase in tax being paid to the Exchequer as a result of higher distances travelled of £4m	Impact was estimated in line with the latest guidance at the time of the assessment and based on the best available modelling tool.	Analysis will be repeated for the OBC. Impact is calculated within TUBA	Industry Standard Approach TAG A1-3	Monetary

Appendix B. Distributional Impacts Appraisal Proforma

Indicator	(a) Appraisal output criteria	(b) Potential impact (yes / no, positive/negative if known)	(c) Qualitative Comments	(d) Proceed to Step 2
User benefits	The TUBA user benefit analysis software or an equivalent process has been used in the appraisal; and/or the value of user benefits Transport Economic Efficiency (TEE) table is non-zero.	Yes, Positive	TUBA analysis of travel time and VOC benefits has been undertaken and showed User Benefits of the scheme. Beneficial income distribution in Preston is expected.	Yes
Noise	Any change in alignment of transport corridor or any links with significant changes (>25% or <-20%) in vehicle flow, speed or %HDV content. Also note comment in TAG Unit A3.	Yes, Positive	A noise assessment has been undertaken. The proposed scheme would result in negligible effects in the noise environment for the majority of dwellings in the study area. However an increase of more than 25% in flows on A582 is expected. Therefore a detailed DI assessment should be undertaken.	Yes
Air quality	Any change in alignment of transport corridor or any links with significant changes in vehicle flow, speed or %HDV content: • Change in 24 hour AADT of 1000 vehicles or more • Change in 24 hour AADT of HDV of 200 HDV vehicles or more • Change in daily average speed of 10kph or more • Change in peak hour speed of 20kph or more • Change in road alignment of 5m or more	Yes, Negative	A regional air quality assessment has been undertaken. An increase in regional NOx emissions over the 60-year appraisal period is predicted. However, South Ribble Borough Council AQMA No. 3 (Lostock Hall) has a reduction in traffic flows. This reduction in traffic flows is likely to result in an improvement in air quality in this AQMA. This may introduce beneficial distributional impacts for proportion of population under 16.	Yes
Accidents	Any change in alignment of transport corridor (or road layout) that may have positive or negative safety impacts, or any links with significant changes in vehicle flow, speed, %HGV content or any significant change (>10%) in the number of pedestrians, cyclists or motorcyclists using road network.	Yes, Positive and Negative	COBALT accident analysis has been undertaken. A582 SRWD upgrade will introduce a safer route and a positive impact is predicted.	Yes
Security	Any change in public transport waiting/interchange facilities including pedestrian access expected to affect user perceptions of personal security.	No	The scheme does not include any intervention measure to affect the user perception of personal security.	No
Severance	Introduction or removal of barriers to pedestrian movement, either through changes to road crossing provision, or through introduction of new public transport or road corridors. Any areas with significant changes (>10%) in vehicle flow, speed, %HGV content.	Yes, Positive	The scheme provides new formal crossing access at Croston Road / Farrington Road and also at Longmeanygate which do not exist at the present time. The new facilities provided along the road would provide increased level of access for NMU but after dualling some journeys along existing PRoWs will be diverted owing to the provision of a central crash barrier.	Yes
Accessibility	Changes in routings or timings of current public transport services, any changes to public transport provision, including routing, frequencies, waiting facilities (bus stops / rail stations) and rolling stock, or any indirect impacts on accessibility to services (e.g. demolition & re-location of a school).	No	No effect on accessibility due to the scheme is expected.	No
Affordability	In cases where the following charges would occur; Parking charges (including where changes in the allocation of free or reduced fee spaces may occur); Car fuel and non-fuel operating costs (where, for example, rerouting or changes in journey speeds and congestion occur resulting in changes in costs); Road user charges (including discounts and exemptions for different groups of travellers); Public transport fare changes (where, for example premium fares are set on new or existing modes or where multi-modal discounted travel tickets become available due to new ticketing technologies); or Public transport concession availability (where, for example concession arrangements vary as a result of a move in service provision from bus to light rail or heavy rail, where such concession entitlement is not maintained by the local authority[1]).	Yes, Negative	According to TUBA results car fuel and non-fuel operating costs will vary with the scheme in place for various journeys. DI will be undertaken to assess the affordability impacts of the scheme.	Yes

Appendix C. CLHTM 2019 Model Revalidation Methodology

(provided as a separate file)

Appendix D. P/A Based VDM Methodology

(provided as a separate file)

Appendix E. P/A Based VDM Methodology DfT Comments Log

(provided as a separate file)

Appendix F. A582 SOBC Economic Assessment Report

(provided as a separate file)