A57 LINK ROADS
TRO10034

DEADLINE 12 – 16th MAY 2022

CAR FREE LOW CARBON TRAVEL FOR LONGDENDALE AND GLOSSOPDALE

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For
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Unique Reference: 20029243

Correction to REP2-070

1 Developing and testing Options

The development and testing of options is central to any scheme preparation and appraisal. This is embedded in the Treasury Green Book and WebTAG. The normal approach is to identify objectives which the schemes seek to achieve, and problems which are to be solved. The two are obviously related.

In the case of this DCO the option assessment stage is claimed by NH to be covered by the February 2015 report[1] referred to in the HA/NH Environmental Statement[2]. The NH have confirmed to us that this document is the basis for their initial option assessment.

It is clear from the source documents that, even in 2015, the appraisal table lacked some key strategic environmental and social objectives, in particular reducing greenhouse gases and promoting Active Travel (Climate Change and Health).

It is also clear that the rejection of the HGV control scheme and sustainable travel measures was on the basis of the former being difficult to deliver and the latter not having enough impact. Apart from that the HGV proposal scored reasonably well.

It is important to make the distinction between "feasible" and "deliverable". HA agreed that the alternative package was feasible, i.e. deliverable in practical terms, but had some risks associated with it, for example objections to any TRO required and enforcement costs. The former is normal for any TRO, including those required as part of and subsequent to, this DCO. For the latter the HA judgement has clearly been overtaken by technologies such as ANPR[3] which is now very widely used and an established tool in the transport planner's toolbox.

The importance of carbon emissions and a move to sustainable transport has grown, especially with the passing into law of reduction targets which depend crucially on mode transfers. This is reflected in the most recent national and local policies, for example the DfT Decarbonisation Strategy[4] with walking and cycling 50% targets for 2030, and the TfGM "50-50" policy[5] which has locally specific targets for sustainable travel from now to 2040.

This is a transformation in policy objectives and legal targets since 2015. While the objectives used for the initial option appraisal were in our view incorrectly drawn at the time, they are now completely out of date. We have no hesitation therefore in revisiting the question of whether this road scheme is the best option to achieve strategic or local objectives.

2 Solving problems

In terms of the problems and objectives for this scheme, we would amend the HA/NH list as follows. The key existing problems we consider should be addressed are:

1) High carbon emissions from existing traffic
2) Noise, air pollution and severance from existing traffic in local streets
3) Noise, air pollution, severance and landscape detriment from much of the same traffic in the National Park
4) Unreliable journey times
5) Poor local conditions for walking and cycling (with associated health disbenefits)

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1 Trans-Pennine Routes Feasibility Study Stage 1 Report February 2015

2 A57 Link Roads TR010034 6.3 Environmental Statement Chapters 1-4 June 2021

3 ANPR: Automatic Number Plate Recognition, used widely for traffic and speed limit enforcement on the strategic and local networks including congestion charging and air quality zones.

4 DecarbonisingTransport, A Better, Greener Britain, DfT 2021

5 Greater Manchester Transport Strategy 2040 – 'Right Mix' Technical Note, TfGM January 2021

6) Delays to local buses
7) Long journey times on strategic transport links between Manchester and Sheffield

In relation to these the A57 road scheme has a strong negative score in relation to carbon - it adds nothing other than the external impact of transfer to electric vehicles and will discourage established local and national plans to transfer traffic to sustainable modes. This is not necessarily the case with all road schemes – the A57 happens to be located within the outer area of a major conurbation and next to an important national asset. It has been and is being developed and produces its own locally generated traffic.

The road proposal has a mixed picture on local impacts (2 above) with increases and decreases, and has a negative impact on the National Park (3 above). Journey times are in some cases given for sections of road rather than actual journeys but more information may be forthcoming from NH. In relation to 5) walking and cycling routes are fitted on to the new road using walk with traffic schemes which hold users in the middle of the carriageway so as not to interfere with the traffic stream and offer no direct crossing[6]. If used at all, they will encourage risky behaviour from trying to beat the traffic cycle which could otherwise cause crossing times up to 2 minutes. No information is available on predicted walking and cycling use of these routes or route timings. Several footpaths are severed by the new road and associated large scale junction.

Strategic route timings are predicted to get longer in future years compared to the present day, but are claimed to be less worse with the scheme. However this conclusion is subject to the criticism of the modelling in another section of this report. Basically the impact of the traffic changes on the road network in Manchester are screened out by the use of a buffer network and "masking". This is referred to by NH as removing "model noise".

It is important to emphasise that a scheme which makes road traffic faster will make such travel more attractive. The variable demand model is supposed to represent this, although it does not do so for freight. Neither does it identify exactly how this will change the balance of competition between sustainable modes and motorised vehicles across the area. In this specific case the majority of the benefits appear to be to traffic in local areas, although the diagram supplied by NH is hard to read and there is no full table. Both have been requested and the map was received 3 days before the submission deadline for this report. This is important because it is traffic in these areas which is subject to the key Government policies to reduce carbon, for example as set out in the DfT Decarbonisation Strategy and the TfGM "50-50" policy referred to previously.

Some of the elements of this package involve the concept of "coherence" in terms of creating an area where public realm and traffic control work together, and a series of consistent signs, planters, seating and crossings gain from a consistent and clearly signposted approach. This in turn moderates driver behaviour and improves safety. The importance of this approach is found, for example in the DfT guidance on walking and cycling networks[7].

3 Overall approach: building a package

Before setting out some more detailed proposals to the high level problems listed above a summary of the approach is set out below.

1) Reduce pressure on the system overall through traffic reduction and dispersal

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[6] There are exceptions at the major M67 roundabout: All pedestrian phases are 'walk with traffic' apart from 3 linked to the traffic timings and requiring demand actuation (push button) at:
Eastbound exit onto Hyde Rd; Southbound exit onto Stockport Rd; Westbound exit onto Mottram Rd

[7] Local Walking and Cycling Infrastructure Plans, Guidance for Local Authorities, DfT April 2017

2) Reduce the number of the most environmentally damaging vehicles on the local road network
3) Improve safety on the whole A628 PDNP route by reducing speed limits
    - 50 mph through the Park
    - 20 mph from Tintwistle to Hyde Road
4) Encourage more walking for local journeys and increase footfall in all the settlements at the Western end of the A628 by:
    - more frequent protected crossings
    - reduced speeds
    - public realm improvements and "signals" to motorised users
5) Use junction reconfiguration, signalisation and revised signalisation to
    - control remaining traffic
    - introduce greater priority for buses, pedestrians and cyclists
6) Undertake a travel planning exercise locally which would:
    - inform people about existing alternatives to car use
    - identify barriers to using alternatives
    - identify improved provision on the basis of the travel planning exercise
    - implement improvements, monitor and modify
7) Improve sustainable North/South links as well as East/West

4 Summary Package: Longdendale and Glossopdale Sustainable Transport Strategy

1) A number of new combined pedestrian signals/bus stops and gates on the A628 route through the Longdendale settlements, linked to existing paths and developments
2) Public realm improvements to create a coherent network and encourage footfall
3) Enlarged junction at Woolley Bridge to include a priority entry lane for buses and cyclists from the A57.
4) A comprehensive travel plan for Longdendale, beginning with a travel planning programme including both workplaces and residential areas (these need different techniques)
5) Use the travel planning exercise to:
    - define place to place local cycle and walking routes (not necessarily the same)
    - set up new or improved bus services with initial incentives to try them
    - better integrate rail and bus services locally
    - improve links to TfGM networks for public transport and cycling
    - pilot bike and e-bike deliveries from local shops
    - create financial incentives to overcome barriers and provide longer term support (particularly useful for workplace plans encouraging public transport and cycling)
6) Institute an HGV control scheme for the National Park to remove through HGVs. This would need an area based approach and have two options: restricting only the heaviest (over 24 tonnes) or all HGVs (over 7.5 tonnes) except for access.
7) Link new and existing traffic signals to a centralised area wide controller and the TfGM system.

5 Pedestrians and buses: improving access and controlling traffic

The need to improve public transport, walking and cycling in the area is well established, for example in the Tameside LITS study of 2010. This underwent extensive consultation and the results helped to inform this package. LITS is referred to in the ES as an option with elements which could not proceed due to lack of funding. Some helpful work on what the bus improvements might look like can be found in the summary and consultation documents[8]. A more detailed package would require the supply of data which has been requested from NH. This may not be available but is being requested.

One of the points of the proposed travel planning exercise is to reveal demand for facilities and refine services and infrastructure improvements rather than imposing solutions. This means they are more likely to be used (there are many workplace travel plan examples). However, some useful suggestions were gathered in the public consultation exercises, both for the original LITS in 2009 and the CPRE Green Travel Challenge[9] consultation in October 2021.

The findings from the latter have assisted in preparing this package and the Green Travel Challenge report is submitted at the same time as this one and should be considered alongside it. In terms of possible elements of the package all authorities were invited to the consultation and we have had a useful follow up meeting with the National Park. The alternatives need to be co-ordinated with PDNP sustainable travel initiatives. These in turn are another relevant policy since they influence traffic flowing into the study area (and are part of the NH Area of Detailed Modelling).

The approach to pedestrian crossings is to provide more of them, both to encourage walking and also to create easy access to buses. A full review would be needed but initial work on the ground (including analysis of existing demand points and bus stops) and the responses from the consultation have been used to show how this would work. It takes full account of the need for coherence, and the other recommendations in DfT guidance. This states that walking (and cycling) should have "five core design outcomes":

- attractiveness
- comfort
- directness
- safety
- coherence

The package addresses all of these issues directly, whereas the proposed scheme essentially relocates them. The list of improvements in the guide is attached as Annex 1.

Overall on the 3 mile section of road between Tintwistle and Hyde Road there are currently 7 sets of signals of which 4 are pedestrian crossings. Four new sites have been identifies as shown on the attached map. Some photos of the existing sites are in the Appendix and show the opportunities for also improving the existing facilities, for example through replacing guard rails and using coloured road surfacing and planters. The intention here is not just to create the improved crossings, but by having a series of them, properly integrated with public realm improvements, a sense is created in drivers that this is not an area where traffic alone dominates – there is a balance. The map below (Figure A1) shows a first draft of sites for crossings[10]. All of these are associated with footpaths, local residential settlements and bus stops. Some of the routes to the latter via the crossings will also need items such as improved lighting.

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8 See https://www.tameside.gov.uk/lits/summary

9 See [redacted] This was conducted by independent specialist consultants and the Consultation Report published in November 2021

10 Please note: a further crossing on the A57 and a bus gate at the Eastern edge of Glossop are not shown

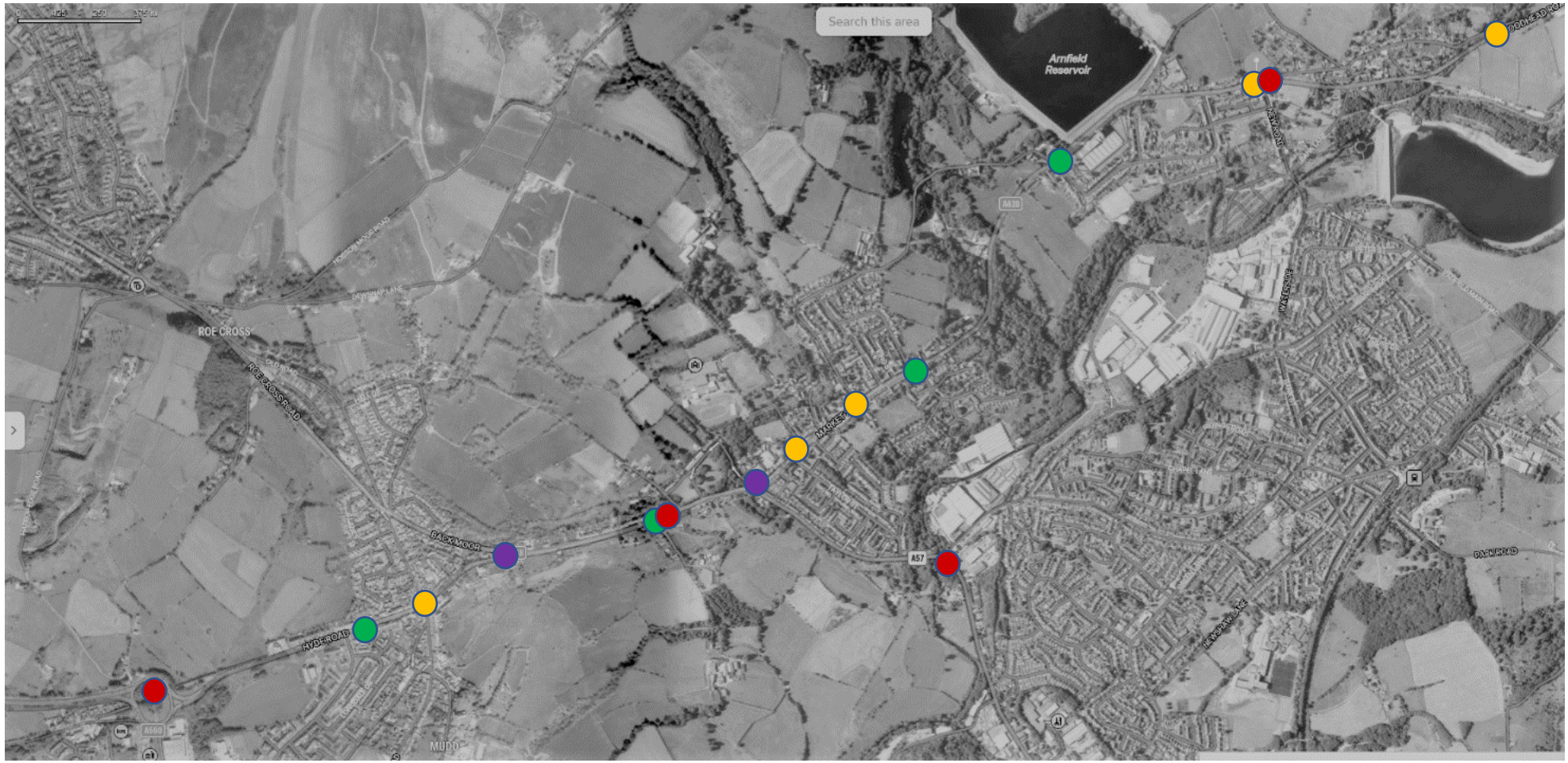

Figure A1

New signalised crossing

Existing signals

New bus priority/signalisation

Existing signals no pedestrian phase currently

Please note: a further crossing on the A57 and a bus gate at the Eastern edge of Glossop are not shown

6 Bus service improvements: an integrated approach

While improving conditions for walking as well as access to bus stops is one part of the picture, the package proposes improvements to:

- the stops and waiting areas
- the buses themselves
- service frequency and reliability.

Proposals for stop and shelter improvements were made by Tameside in its LITS Strategy from 2010. In this package the idea would be to co-ordinate with and reinforce the public realm improvements and driver behaviour indicators. Consistent signing would be used to emphasise that it is a local community and recreational area, including the theme of Longdendale's special qualities and connection to the National Park (e.g. as a "Gateway"). Such behavioural approaches are increasingly common and understood, particularly where space is shared between traffic and local movement on foot. The modern understanding that walking is not just a mode of transport, just without wheels, but an opportunity for social interaction and creating demand for local facilities such as retail is the basis for some of the proposals in the Longdendale Package.

In terms of external air quality and internal comfort, buses should be replaced as soon as possible by electric versions with air circulation/conditioning and WiFi. However, the package also includes improved services. From an initial look at the data from NH, and the feedback from the consultation, both on the original LITS and the recent one specific to this scheme, the following is an indicative package:

- the purchase and operation of three new electric buses to raise the profile of bus services and allow for increased services
- one service could be reviving part of the X57 Glossop to Manchester to provide an hourly (2 new buses). The A57 South of Hollingsworth and Hadfield has significant employment areas and a settlement at Gamesley. The latter has an hourly hail and ride service (no evenings) but much of it is less than the recommended limit for bus stop access. This would enable a guaranteed interchange between local buses and the X57, for example from the existing 20 minute service on the 237. This would enable much faster links between Tintwistle and Manchester destinations (the 237 turns North off the A57 at Mottram and goes to Ashton). The X57 used to run from Sheffield, but was poorly used. It is not clear why this was, given that the NH scheme is predicated on a lack of links between the two cities.
- a new local hopper type service serving Tintwistle, Hadfield and Glossop (including South of the centre). This would be co-ordinated with the X57 so that some of the frequent stops for this service in Glossop could be avoided. This could be used to reduce the X57 journey time as an express service.
- A new junction layout at Woolley Bridge to widen access inbound from the A57 allowing for a bus and cycle approach lane and a priority entry. The junction should also be signalised.
- Bus gates at selected pedestrian crossings would have the dual function of breaking up and distributing any queuing traffic and improving bus journey times. These would be directional, with the ones at the Eastern end having Westbound priority and vice versa. The use of gates instead of full length bus lanes is one which was pioneered in London but is now widely used and has three main advantages:
    - Less disruption to general traffic of all types
    - Lower space requirements and better compliance
    - Easier to integrate with other functions, in particular pedestrian and cycling crossings

7 HGV control scheme

Introduction

Since the proposals considered by the then HA in 2015 there has been considerable progress in enforcement. An recent example of an HGV scheme is the London Low Emission Zone (LEZ) which covers the whole of the Metropolitan area. This applies to all HGVs over 3.5 tonnes and is more stringent than many HGV restrictions which operate at 7.5 tonnes. Examples of the latter can be found in Tameside, for example Old Glossop. The original proposal was for an HGV Access Only restriction but in developing such an option, and as part of any further consultation, other options should be considered. Further work indicates that a less restrictive control would achieve most of the benefits.

A good example would be a restriction on the heaviest and most damaging vehicles only: for example those with four or more axles. These are basically over 32 tonnes and include most articulated HGVs. Analysis of the traffic flows at Chapel Brow and Woodhead from the DfT dataset shows how these are the dominant vehicle type. Because the manual counts were not conducted in the same year, an extra check was done for Woodhead. This data has been shared with NH.

Table A1: HGVs and traffic A628

	All traffic	HGVs (%)	Large HGVs (%)
Chapel Brow 2019 Manual count	11676	1423 (12%)	1051 (9%)
Woodhead 2016 Manual count	12592	1537 (12%)	1137 (9%)
Woodhead 2019 Estimated	12957	1621 (12%)	1181 (9%)

Source: DfT at roadtraffic.dft.gov.uk

External costs and HGVs

One issue in assessing the alternatives is the extra costs of diverting HGVs from the PDNP. It is important to understand that HGVs, especially the largest HGVs, have a scale of environmental, infrastructure and congestion impact which is hugely greater than cars. The most extreme example is road surface damage, and thus road maintenance, which is about 180,000 times greater for the heaviest articulated HGV than a car[11]. Noise, vibration, visual intrusion, emissions and particulates are all greater, if not to the same extent. All of these effects (known to economists as external costs) are well known and documented.

Purpose built roads, such as motorways, are designed to minimise these external costs. The DfT data on external costs, in the TAG Data Book, sets out values for such impacts, to be used for broad brush assessment. Although the diversion of HGVs from the PDNP is likely to cause an increase in distance, this will be at a lower rate of external cost. In this case there would likely be reduction in external costs. In addition, demand for using HGVs is related to the cost. Such effects are included by NH in their modelling for cars, but not for HGVs. The latter are in fact quite sensitive to cost – this is because there are a variety of options including use of other modes, time switching, use of alternative depots and logistics. HGVs are quite underused - they are completely empty[12] for 28%

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11 This is because damage rises rapidly with axle weight, usually calculated using the 4th power law

12 DfT freight statistics Table FRS 0125

of their travel. It should be noted that the amount of goods by weight which are delivered (usually referred to as "tonnes lifted") is relatively insensitive to cost.

DfT recommends using the TAG Data Book for broad brush assessment of external costs and these data are the same as those used for detailed appraisal, for example carbon values. Using this it is possible to calculate the external cost impact of the control scheme at the strategic level. The key factor is that external costs will be lower on motorways than A roads. This is illustrated in the table below which shows the significantly lower accident rates for HGVs on motorways compared to non-built up A roads.

Table A2

Ratio of casualties on non-built up A Roads compared to Motorways		
Killed	KSI	All severities
4.4	3.3	2.1

Source: DfT tables RAS 30017 and TRA 0104

The full assessment awaits some data from NH on the trip length of HGVs on the A628 – a "select link analysis" at Woodhead. Initial assessments are that the maximum increase in journey length would be 22 miles replacing the A628 with the M1/M62. This will not apply to all trips but provides an upper bound. Using similarly congested networks, replacing travel on A roads with motorway travel results in an external cost net benefit. More detailed calculations can be undertaken quickly once the data is to hand.

In terms of traffic relief, and therefore congestion, HGVs clearly take up significantly more road space than cars. Most traffic assessments and modelling uses the passenger car unit (pcu) as its basis for comparison. The average for all HGVs is usually taken as 2.4 or above (depending on specifics such as junction delays). However, this average conceals differences between smaller HGVs and heavy articulated vehicles which are rated at 2.9 and above.

In this case, where there are high proportions of the heaviest HGVs, analysis shows that a majority of the congestion benefits from the control scheme would come from removing the heaviest vehicles. This allows for a proportion which would require local access estimated from the flow differences at the count sites (10%).

Based on the opening year flows supplied by HA/NH [13] a restriction on HGVs, using a 2.4 pcu value, would result in a traffic reduction of at least 17.3%. Removing only the heaviest (about 75% of the total) but applying the higher pcu value results in a traffic reduction of at least 15.4%. The remaining car traffic is subject to the sustainable travel package and the two results combined to provide an overall reduction.

The initial figures have been public since October and were used in the CPRE consultation. The slides from that, which summarise the first draft of the package and the impacts, are part of the consultation report which should be read in conjunction with this more detailed analysis. Overall the assumptions have changed since the consultation, but the reduction figures have not changed significantly.

[13] Appendix 2.1 of HA Document 6.5, the Environmental Statement, Traffic Data

8 Overall impact of the Strategy

An initial assessment of local traffic which might be affected by the sustainable travel package can be gained from the change in flow data between the cross Pennine routes and the local flows at Mottram. More detailed trip matrices have been supplied by NH but did not arrive until 12th January. An initial extraction of local data from them has been used to sense check the local traffic assumptions used for the calculations. Assumptions about load factors for the three new buses have been used as a further input. It is difficult to apply data to 2025 because the DfT uses 2030 and TfGM use 2040 as target dates. Using TfGM assumptions, 2040 local traffic levels would reduce by about 17% but the impact of sustainable policies on the rest of the traffic is an unknown. Even assuming this is zero (itself a limiting case) traffic reduction overall would be about half that. A more detailed analysis using local data awaits material from NH. It should be possible to refine the impact assessment of the alternatives in time for the next deadline.

Combining the HGV control and traffic reduction results in the following traffic reductions at Mottram Moor.

	Gradual TfGM 2025	Gradual TfGM 2040	Rapid sustainable 2025
Package + all HGV	**-21.3%**	**-24.1%**	**-28.2%**
Package + heaviest HGV	**-19.5%**	**-22.3%**	**-26.4%**

9 Package costs

In seeking to move this package forwards some indicative costs have been allocated. The least certain aspects are the two major junctions: the M67 and Woolley Bridge. The latter is moderately sized while the M67 needs further detailed design work and is not included in the estimate below but could be of the order of £5million. Some of this may have been done by NH but they could not supply any detailed costs for this part of the scheme. In any case the layout would not need as much major change as with the scheme. The package has been costed at £9.7million at today's prices including optimism bias at 44%. This is important because construction costs have some uncertainty at the moment. It includes the following:

- Signalisation and remodelling of Woolley Bridge
- 3 new electric buses
- Area wide Travel Planning
- Travel plan incentives for three years
- 50 kms Footpath and walking route improvements
- 50 kms cycling links and improvements
- 3 new pedestrian crossings
- 1 new pedestrian crossing with bus gate
- 1 new bus gate on an existing pedestrian crossing
- 2 additional pedestrian phases at existing signals
- 20 kms of 20 mph implementation with public realm improvements
- HGV signing and warning package (cameras self funding)

10 Modelled area

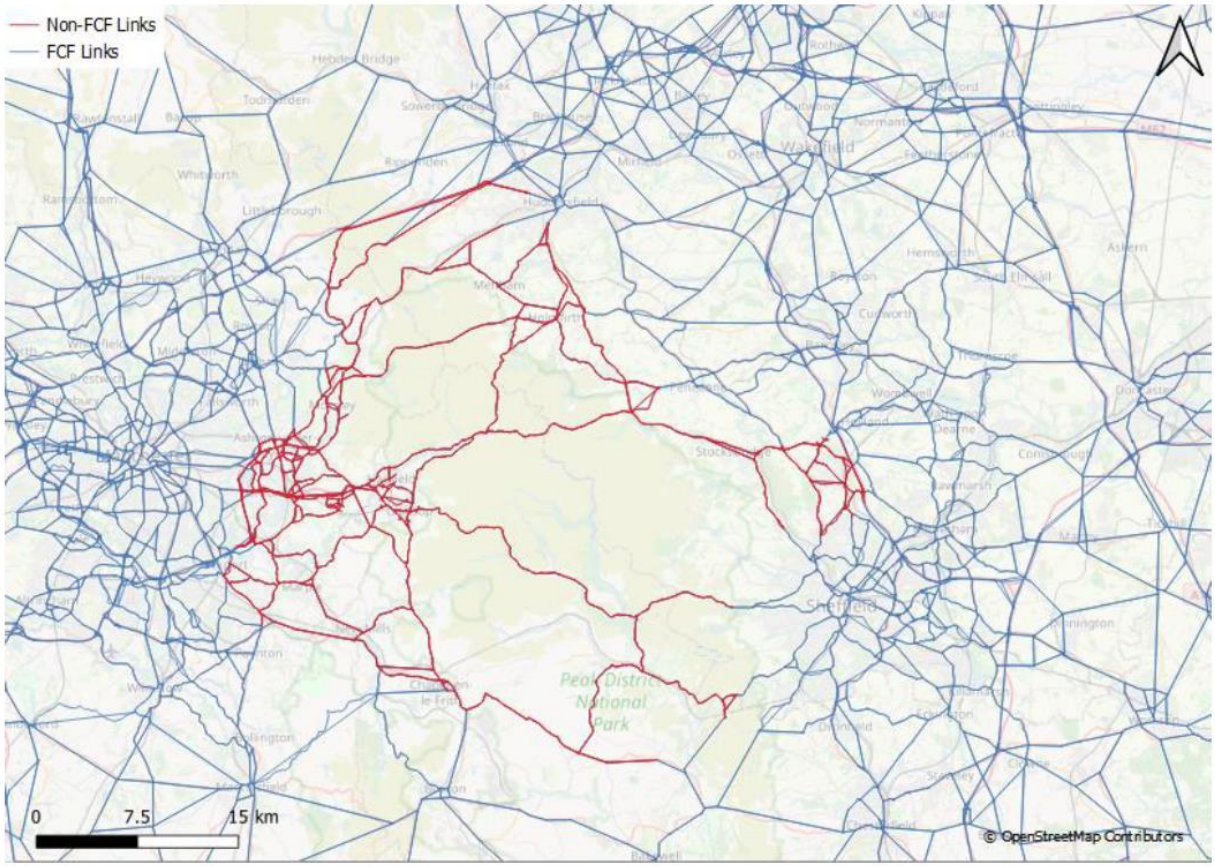
NH are using an existing large area simulation traffic model (SATURN). This is shown in Figure 13-1 of the Combined Modelling and Appraisal report supplied to CPRE and submitted to the Examination by them. It stretches from Liverpool to Grimsby and Harrogate to Matlock and includes Leeds and other major towns and cities.

It is normal to take such a model and produce greater detail in the area of interest. For example, NH have done this by expanding the zones in the immediate neighbourhood of the scheme. What has not been done is to do the same for the neighbouring areas where most of the traffic comes from and goes to: Greater Manchester.

Another key reason that most of the network is not modelled in the same detail as the area around the scheme is in order to stabilise the model quickly when it runs. This reduces the time needed to run the model and the amount of sense checking work. The area of detailed modelling (ADM) referred to in the documents submitted in fact refers to the way in which different parts of the road network are modelled.

What was clear and confirmed and clarified in the new documentation is that the scheme is treated more like a bypass which is fairly isolated from major urban areas and has limited entry and access points. This is plainly not the case, as can be seen from the map below. For this reason it is considered that the area of detailed modelling is insufficient and indeed lop sided in a very obvious way.

Figure 3-7 – **Fixed Cost Function (FCF) area**



In the above the red network is essentially the Area of detailed Modelling (**ADM**) and the blue network has a Fixed Cost Function – i.e. it is not sensitive to changes in the cost of using the network caused by changing traffic patterns.

In addition it is clear that a further technique was required to provide a reliable model output. This is known as masking. The two techniques are described in the Combined Modelling and Appraisal report in section 13-7 on page 164 and 165.

It is clear from this that:

- Both Sheffield and Manchester are excluded from the detailed modelling
- Because of the base model's overall size and strategic nature the networks within both cities are limited

For this reason the modelling cannot represent the impact of the scheme on traffic patterns in Greater Manchester.

In relation to travel between the two cities, it is limited for two reasons:

- the cities themselves are outside the ADM and modelled at a low level of detail
- access to the A628 is included in the ADM but strategic routes which are likely to be affected to the North and South are not.

11 Uncertainty and the Uncertainty log

The TAG Unit on this subject, M4, dated May 2019, states in para 2.1.1:

"There are two sources of forecast error: uncertainty in the inputs (such as size of new housing development) and error in the model parameters and specification (how these inputs propagate through the model). The practitioner should summarise all known assumptions and uncertainties in the modelling and forecasting approach in an uncertainty log. The uncertainty log will also be the basis for developing a set of alternative scenarios. The alternative scenario is used to understand the possible impact of an error in assumptions on the model forecasts."

This guidance is supplemented by the Uncertainty Toolkit, dated May 2021.

NH appear to have completed part of the log, relating to new development. They have not dealt with the second source of errors in terms of model parameters and specification. The Uncertainty toolkit gives more detail on what these might be in the table below.

Table A3: Extract from the DfT Uncertainty Toolkit

Technology	Economy	Behaviour
• Range of road vehicle types, and extent of technological standardisation;	• Economic performance; • Composition of labour market, different ways of working and changing business models; • Level of automation;	• Use of digital infrastructure and services; • Level of car ownership and extent of licence holding;
Take-up of Connected Autonomous Vehicles and Electric Vehicles; • Nature, sufficiency and cost of energy supply; • Connecting energy supply to vehicle energy demand.	• Patterns of spatial development and changes in regional distribution.	• Level of vehicle occupancy; • Demand for active travel; • Adoption of new technologies;

Social	Political	Transport Supply
• Changes in demographic composition (e.g. ageing population); • Changes in public health; • Importance of equity; • Climate change impacts and response; • Potential disruption to transport systems.	• Regulatory influence (e.g. road-pricing) • Decisions on national infrastructure projects; • Roles, responsibility and interconnectedness of the public and private sectors; • International action on decarbonisation.	• Other transport investments • Availability of and demand for public transport; • Carrying capacity of the rail network; • Digital vs. physical connectivity for access; • Production to consumption supply chains;

Some of these are directly relevant to this scheme: for example most of the Behaviour and Transport Supply entries. Climate change responses and decarbonisation are also major sources of uncertainty.

To give a specific example, it appears that it is unlikely that the current central road traffic forecasts are compatible with achieving international and national obligations on climate change. Carbon reductions will be required at a faster rate. However, the DfT has provided scenarios for forecasting and in this case, especially given that this is within a conurbation (albeit outside the centre) a more specific demand management forecast would have been advisable. Overall demand management to reduce the central forecast is assumed within the Committee on Climate Change sixth carbon budget report and subsequent work to translate the implications. At the very least this should have been in the Uncertainty log but it is so close to likelihood that it should have been included in the low forecast scenario.

In terms of alternatives, some of what is proposed by CPRE: demand management locally in Longdendale, and more widely across the National Park, is pretty much essential to achieving the carbon targets. To be effective it must transfer drivers from their cars (and higher levels of car occupancy, as in Table A3 Behaviour above and the DfT Decarbonisation strategy).

Overall the conclusion is that NH have only completed part of the Uncertainty Log and have not undertaken an appropriate sensitivity test.

Carbon emissions

There are several issues which need to be addressed by the DCO. In summary these are:

- The de minimis assertion in the NPSNN
- The new valuations for carbon and impact on the BCR
- The issue of carbon persistence and its importance in assessment beyond the one off cost.

De minimis

The first issue is whether this scheme has an impact on the achievement of the Government's target (the so called NPSNN de minimis statement). This contends that:
"5.17 Carbon impacts will be considered as part of the appraisal of scheme options (in the business case), prior to the submission of an application for DCO. Where the development is subject to EIA, any Environmental Statement will need to describe an assessment of any likely significant climate factors in accordance with the requirements in the EIA Directive. It is very unlikely that the impact of a road project will, in isolation, affect the ability of Government to meet

its carbon reduction plan targets. However, for road projects applicants should provide evidence of the carbon impact of the project and an assessment against the Government's carbon budgets."
The DfT Decarbonisation Strategy says:
"The current National Policy Statement (NPS) on National Networks, the government's statement of strategic planning policy for major road and rail schemes, was written in 2014 – before the government's legal commitment to net zero, the Ten Point Plan for a Green Industrial Revolution, the new Sixth Carbon Budget and most directly the new, more ambitious policies outlined in this document. While the NPS continues to remain in force, it is right that we review it in the light of these developments, and update forecasts on which it is based to reflect more recent, post-pandemic conditions, once they are known."

While that review has yet to take place, the statement supports the approach set out in this report in many sections, the forecasting, the uncertainty log and the carbon assessment. As we move out of the pandemic this should be implemented and can be for this scheme. For example, the real comparison for carbon emissions is between a package of sustainable measures with less traffic and the scheme as proposed with the central traffic forecast.

This is a strong argument for finding against this scheme in light of the Decarbonisation Strategy. However it would be wrong to ignore the fact that the NPSNN statement itself has always contained a lack of credibility in relation to its impact. It is clear, for example, that the single failure to purchase of an electric car in isolation is very, indeed extremely, unlikely to derail the Government's carbon reduction target. If everyone adopted this approach, i.e. not in isolation, the Government's policy would fail. However, HA and now NH road schemes are not promulgated in isolation - the de minimis argument does not hold in any normal sense. It might be worth asking the question, what if every scheme in the current RIS was predicted to produce as much carbon as this one?

Even viewing this scheme on its own, to put this in perspective the 400,000 tonnes of extra carbon compares to the 1million to 6million tonnes reduction from the Government's planned local walking and cycling improvements. That programme is costing £2billion. There needs to be account taken of the way in which such schemes will make walking and cycling less attractive compared to car. Not only will this undermine carbon targets but it will undermine health targets too. I have requested the total amounts of carbon in the low and central forecasts but these have not been supplied.

They key point is that it is not a question of marginal change: schemes should be supporting these targets and not undermining them, both in terms of increasing carbon but in terms of negating the impact of other policies.

New carbon value

NH did not supply their carbon spreadsheet so CPRE has undertaken its own calculation using the current carbon tool and this has been confirmed by NH as accurate. It increases the central estimate for carbon cost significantly from -£17.45 to -£30.21 million. The low to high range also increases significantly.

To illustrate the impact the following tables are set out. They show the results from the DfT carbon tool to create a high to low range of outcomes. The first applies the low and high carbon values across the three forecast scenarios: Low, Core and "Optimistic" (High).

The second displays a constant central value for carbon across the forecasts. The tables can be compared to the ones in the existing NH documentation. Where there are disbenefits, for example accidents air quality and carbon, these are shown as negative values.

Table A4 Impact of New Carbon Values

New carbon values: High to Low			
	Low Growth	Core Growth	Optimistic Growth
User benefits (TEE)	£153.44	£181.25	£210.19
Accident benefits	-£7.33	-£7.33	-£7.33
Indirect Taxation	£1.90	£1.41	£1.79
Greenhouse gas benefits	-£45.32	-£30.21	-£15.02
Air quality	-£3.77	-£3.77	-£3.77
Noise	£3.17	£3.17	£3.17
Delays during construction	-£1.04	-£1.04	-£1.04
Total (PVB)	£101.05	£143.48	£187.99
BCR	**0.94**	**1.33**	**1.75**
New carbon values: Constant Central			
	Low Growth	Core Growth	Optimistic Growth
User benefits (TEE)	£153.44	£181.25	£210.19
Accident benefits	-£7.33	-£7.33	-£7.33
Indirect Taxation	£1.90	£1.41	£1.79
Greenhouse gas benefits	-£30.21	-£30.21	-£30.21
Air quality	-£3.77	-£3.77	-£3.77
Noise	£3.17	£3.17	£3.17
Delays during construction	-£1.04	-£1.04	-£1.04
Total (PVB)	£116.16	£143.48	£172.80
BCR	**1.08**	**1.33**	**1.60**

The real impact of carbon

The final issue to be addressed is how to measure failure to achieve carbon targets. This is not fully captured by the cost estimates.

Emissions are usually measured in tonnes of CO2 equivalent, and this the standard measure. The key objective, now enshrined in UK policy and across the world is to avoid a specific level of global warming, such that a catastrophic level of climate change can be avoided. The agreed critical end date is 2050. The level of warming depends, not on the tonnes emitted, but how long their warming effect lasts. Carbon dioxide persists as a warming influence for around 100 years. In relation just to the 2050 target, a tonne emitted now will have its warming effect for 30 years, 30 times a tonne emitted in 2049.

The failure to use the correct metric initially had clear adverse results. Reducing tonnes emitted now is underestimated in assessment against objectives to avoid climate change, while reducing tonnes emitted later may be politically easier but has far less benefit. These flaws were extensively discussed during 2007-2008, and led to the Committee on Climate Change devising the budget periods for emissions. This is not perfect but seeks to address this problem.

A true assessment of carbon impact should take this into account (as do the Committee on Climate Change forecasts). This is especially important because any carbon emitted now will still be having a warming effect past the target date for zero emissions and be contributing to the temperature rise. Any excess over budget emitted now requires a proportionately higher reduction later, and this increases over time. It would be better to measure carbon in tonne years rather than tonnes for the purpose of our commitment to carbon reduction and keeping the temperature rise to 1.5 degrees. It is what is needed to achieve the target of avoiding climate change and would improve the way that demand management and active travel is treated in appraisal.

Annex 1

Extract from Local Walking and Cycling Infrastructure Plans, Guidance for Local Authorities,

DfT April 2017

Chapter 6

6.33 Improvements that can potentially be implemented to address existing deficiencies may include the following:

- **new walking links**
- **additional pedestrian crossings**
- **improving existing pedestrian crossing facilities, e.g. crossing width, introducing refuges, reducing waiting times, and/or increasing crossing times**
- **replacing broken/uneven/rocking paviours**
- **resurfacing footways**
- **improving street lighting**
- **providing CCTV security cameras**
- **increasing pedestrian capacity (Pedestrian Comfort Levels) by widening footways and/or reallocation of carriageway space**
- **removing street clutter**
- **reducing traffic speeds, e.g. by introducing 20mph limits/zones and providing traffic calming features**
- **providing dropped kerbs and tactile paving**
- **improving signage and wayfinding**
- **improving planting, shade and shelter**
- **improving seating facilities to enable people to rest**
- **general improvements to the public realm, encompassing some or all of the above**

Annex 2: Initial Option Assessment 2015

Initial Sifting Criteria

Each option must meet the following sifting criteria to be considered further within EAST:

1: Overall moderate impact against identified problems (Appraisal score >4)

2: Overall moderate fit with route objectives (Appraisal score >3)

3: Must be deliverable in theory

4: Must be feasible in theory

Qualitative assessment against identified problems		Qualitative assessment against identified objectives		Deliverability (e.g. political, planning, timescale or third party issues)	Feasibility (e.g. physical constraint, land availability and design standards)
2	Large beneficial impact	2	Large beneficial impact		
1	Beneficial impact	1	Beneficial impact		
0	Neutral / marginal impact	0	Neutral / marginal impact	Deliverable in theory	Feasible in theory
-1	Adverse impact	-1	Adverse impact	Deliverable but with challenges	Feasible but with challenges
-2	Large adverse impact	-2	Large adverse impact	Very difficult to deliver	Not feasible / significant challenges

Reference (Route Section-Intervention)	Option Description	Problems (EAST Scale of Impact)								Objectives (EAST Fit with Other Objectives)							Deliverability	Feasibility	Initial Sifting Criteria Prior to EAST				Take to EAST
		1	2	3	4	5	6	7	Total	1	2	3	4	5	6	Total			1	2	3	4	
1.0	A628 HGV Control (inc. complementary sustainable measures)	2	0	1	0	0	2	1	6	-1	1	1	1	0	2	4	Very difficult to deliver	Feasible but with challenges	✓	✓	×	✓	×
2.0	A628 Peak Period Only HGV Control (inc. complementary sustainable measures)	2	0	1	0	0	2	1	6	-1	1	1	1	0	2	4	Very difficult to deliver	Feasible but with challenges	✓	✓	×	✓	×
3.0	M67 to A6018 Link Road	1	0	0	0	1	1	1	4	1	0	1	1	1	1	5	Deliverable but with challenges	Feasible but with challenges	×	✓	✓	✓	×
4.0	A57 Mottram One-Way	1	0	0	0	1	1	2	5	1	0	1	1	1	1	5	Deliverable but with challenges	Feasible but with challenges	✓	✓	✓	✓	✓
5.0	Dual Carriageway Link Road M67 to A57 Mottram Moor (tunnel under Roe Cross and spur connecting to A6018)	1	0	0	1	1	1	2	6	1	-1	1	2	1	1	5	Deliverable but with challenges	Feasible but with challenges	✓	✓	✓	✓	✓
6.0	A57(T) to A57 Link Road	1	0	0	0	1	1	1	4	1	0	1	1	1	1	5	Deliverable but with challenges	Feasible but with challenges	×	✓	✓	✓	×
7.0	Bypass of Mottram, Hollingworth and Tintwistle	1	0	0	1	1	2	2	7	2	-1	1	2	1	1	6	Deliverable but with challenges	Feasible but with challenges	✓	✓	✓	✓	✓
8.0	M67 to M1 Dual Carriageway Link Road	1	1	0	2	2	2	2	10	2	-2	-1	2	1	1	3	Very difficult to deliver	Not feasible / significant challenges	✓	×	×	×	×
9.0	M67 to M1 Trans-Pennine Tunnel	2	2	0	2	2	2	2	12	2	1	2	2	2	1	10	Very difficult to deliver	Feasible but with challenges	✓	✓	×	✓	×
10.0	A628/A616 Selected Dualling	1	0	0	1	1	1	0	4	1	-1	0	1	1	1	3	Very difficult to deliver	Feasible but with challenges	×	×	×	✓	×
11.0	A628/A616 Dualling	2	1	0	2	2	2	0	9	1	-2	-1	1	1	1	1	Very difficult to deliver	Feasible but with challenges	✓	×	×	✓	×
12.0	A61 Dualling	1	0	0	1	1	1	1	5	1	0	0	1	1	1	4	Deliverable but with challenges	Feasible but with challenges	✓	✓	✓	✓	✓
13.0	Climbing Lanes	1	0	0	1	1	1	0	4	1	-1	0	1	1	1	3	Deliverable but with challenges	Feasible but with challenges	×	×	✓	✓	×
14.0	Route Safety Improvements	2	0	1	0	1	0	0	4	0	0	0	0	0	2	2	Deliverable in theory	Feasible in theory	×	×	✓	✓	×
15.0	A616 Widening at Midhopestones	1	0	0	1	1	1	0	4	1	0	0	1	0	1	3	Deliverable but with challenges	Feasible but with challenges	×	×	✓	✓	×
16.0	A616 Langsett Widening Scheme	1	0	0	1	1	1	0	4	1	0	0	1	0	1	3	Deliverable but with challenges	Feasible but with challenges	×	×	✓	✓	×
17.0	A616/A628 Flouch Junction Improvement Scheme	1	0	0	1	1	1	0	4	1	0	0	1	0	1	3	Deliverable but with challenges	Feasible but with challenges	×	×	✓	✓	×
18.0	A628 Salters Brook Scheme - Carriageway Realignment	1	0	0	1	1	1	0	4	1	0	0	1	0	1	3	Deliverable but with challenges	Feasible but with challenges	×	×	✓	✓	×
19.0	Slow Vehicle Refuges	1	0	0	0	0	1	0	2	1	0	0	1	0	1	3	Deliverable but with challenges	Feasible but with challenges	×	×	✓	✓	×
20.0	Technology Package	1	0	2	0	0	0	0	3	0	0	0	0	1	0	1	Deliverable in theory	Feasible in theory	×	×	✓	✓	×
21.0	Maintenance Strategy	0	0	0	2	2	0	0	4	0	0	0	0	1	0	1	Deliverable in theory	Feasible in theory	×	×	✓	✓	×
22.0	A628 Peak District Tunnel	1	2	0	1	2	2	1	9	2	1	1	2	1	1	8	Very difficult to deliver	Feasible but with challenges	✓	✓	×	✓	×
23.0	Sustainable Transport Measures	1	0	0	0	0	0	0	1	0	0	1	0	0	1	2	Deliverable but with challenges	Feasible but with challenges	×	×	✓	✓	×

Problems

1	Accidents reduce journey time reliability, with high accident rates on some routes and a number of accident clusters
2	Severe weather causes road closures which reduce journey time reliability
3	There is a lack of technology to assist in the operation and management of the routes and provide information for travellers
4	Maintenance on single carriageway sections reduces journey-time reliability.
5	Asset condition, including the standard, age and damage to infrastructure, reduce journey-time reliability through significant maintenance operations and risk from closures
6	Journey-times are increased by delays at junctions and the geometry and topography of routes
7	Long term traffic growth will bring some urban sections of routes to their capacity

Objectives

1	**Connectivity** – improving the connectivity between Manchester and Sheffield through reduction in journey times and improved journey-time reliability
2	**Environmental** – avoiding unacceptable impacts on the natural environment and landscape in the Peak District National Park, and optimising environmental opportunities
3	**Societal** – improving air quality and reducing noise impacts, and addressing the levels of severance on the Trans-Pennine routes in urban areas
4	**Capacity** – reducing delays and queues that occur during peak hours and improving the performance of junctions on the routes
5	**Resilience** – improving the resilience of the routes through reductions in the number of incidents and reduction of their impacts
6	**Safety** – reductions in the number of accidents and reductions of their impacts