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Transport Action Network

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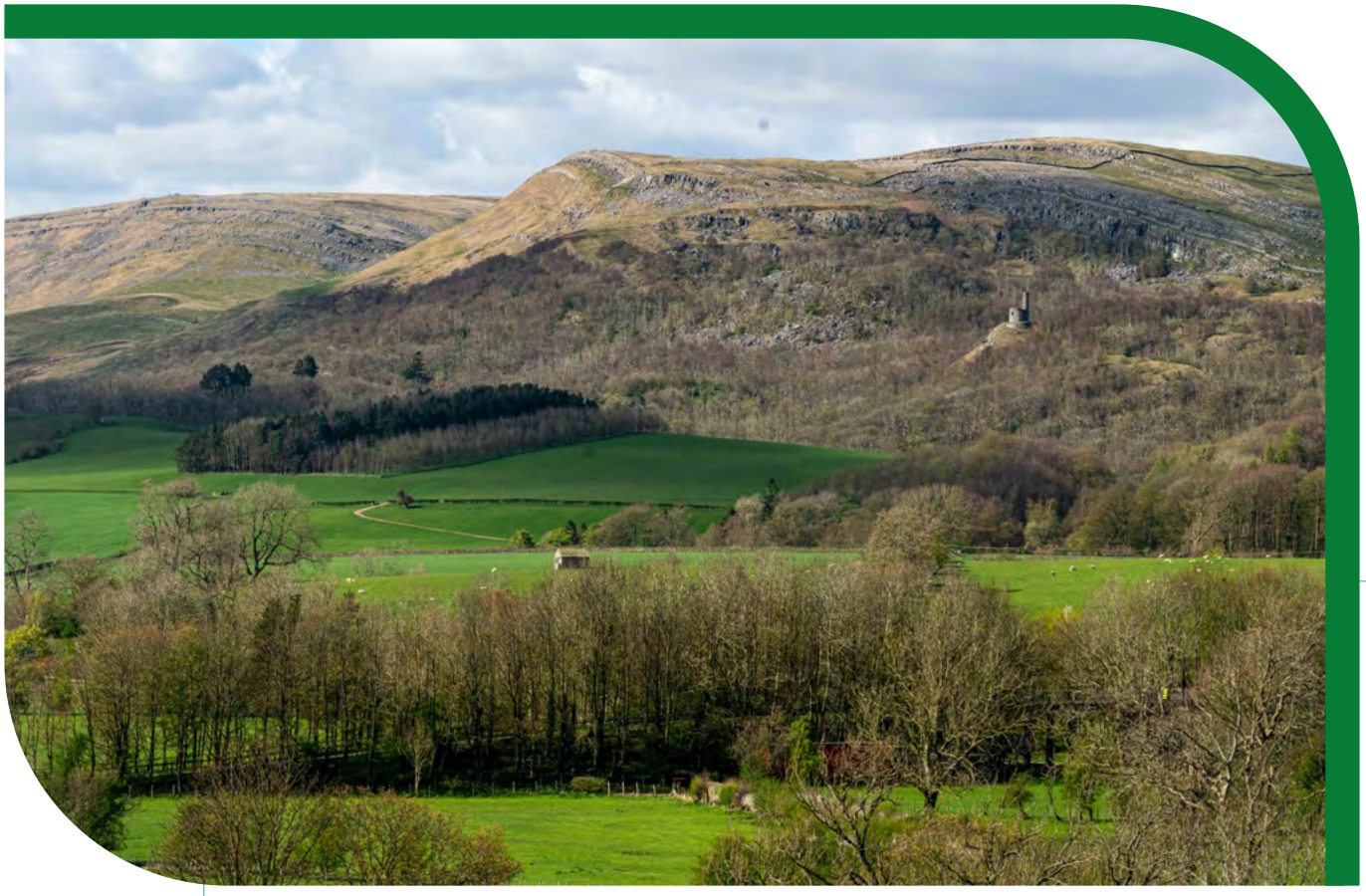


Improving safety on the A66

- *faster*, cheaper

In this short report, Keith Buchan, a highly experienced transport planner, has examined the safety record of the A66 and the evidence submitted during the planning examination for the £1.5 billion A66 Northern Trans-Pennine project. He makes recommendations for safety improvements on the A66 which could be implemented now, at low cost, rather than waiting five years for the £1.5 billion A66 scheme to be built. These safety improvements would reduce collisions and casualties, whilst saving public funds.

1. Introduction

My name is Keith Buchan. I have 40 years experience as a transport planner in the public and private sectors. I have an MSc in transport planning and am a Chartered Transport Planning Professional (CTPP).

I have been asked to undertake a high level review of the road safety impacts of the A66 Northern Trans Pennine scheme as proposed by National Highways (NH). I understand that development consent has been granted for the scheme. However, the project is still under consideration in the Department for Transport's capital spend review and the Spending Review 2025.

I have therefore undertaken work on assessing the collisions and casualties using the data in NH's Development Consent Order (DCO) application and examination submissions, Google maps and local press reports. I have not undertaken a site visit but have some knowledge of the area from my work on transport planning for the Lake District National Park.

Overview

The reduction of all road collisions and in particular those that result in fatal and serious collisions are an important focus for all transport planners. It is important to allocate resources so the greatest reduction is achieved within the available budget. This is usually through detailed analysis of each serious collision to ascertain cause, which of course includes human error. For the A66, it is stated that road safety is a key objective (para 2.4.1 Combined Modelling and Appraisal Report).

Only by understanding the nature of the problems and any recurring patterns can effective solutions be found. However, collision patterns and significant changes can be hard to define when numbers are relatively low. NH recognises this and therefore uses a seven year period prior to Covid: 2013 to 2019. Examining this data it is immediately apparent that there is huge variation from year to year, especially in fatalities (see table 1).


Credit: Canva/Stephen Barnes

Table 1: A66 Casualties by year

Year	Fatal	Serious
2013	0	27
2014	0	11
2015	12	22
2016	1	16
2017	5	17
2018	6	12
2019	3	15
Total	27	120
Average	3.86	17.14
Standard Deviation (SD)	4.30	5.64

Source: Table 2.3, Combined Modelling and Appraisal Report, Ave and SD calculated for this note.

The 2015 spike is clear and NH points to Warcop and Crackenthorpe as specific locations on the A66 where fatal collisions occurred in that year. In fact they continued to be the site of fatal collisions in 2017 and 2018.

2. Problems and solutions

In this section I consider three issues:

- Has the safety problem been correctly identified?
- Has a package of targeted solutions been proposed?
- What is the likely impact of the current scheme?

What are the safety problems and how are HGVs involved?

NH has produced a collision cluster map, Figure 2.8, which it says "shows a strong correlation between collision cluster sites and the remaining sections of single carriageway."

This is not wholly correct from the map, where 7 of the 15 clusters appear to be on the dual carriageway sections.

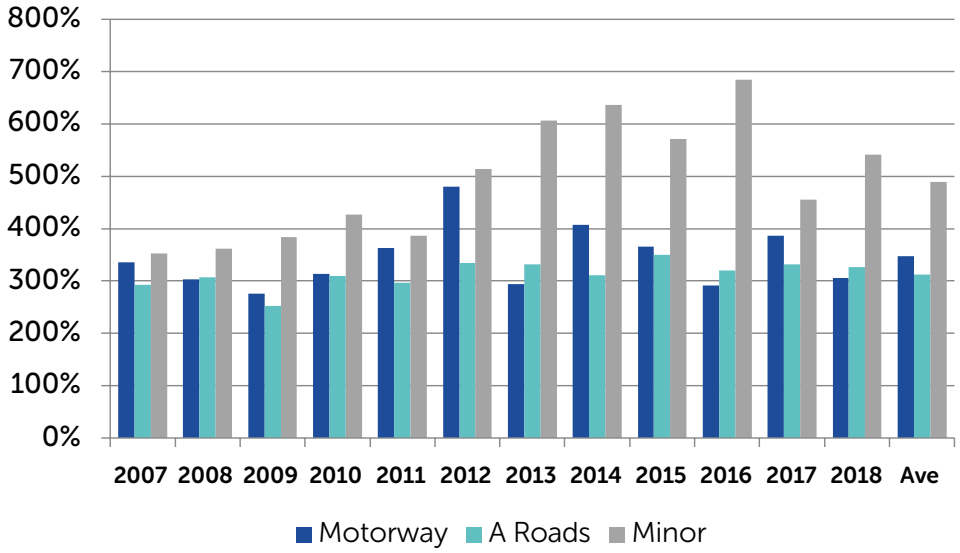
In Appendix E of the Transport Assessment (TA) more details are given for collisions and casualties. Unfortunately these do not appear to be the same numbers used for Tables 2.2 and 2.3 in the Combined Modelling and Appraisal Report (COMMA). They have some useful commentary on road conditions and vehicles but do not draw out conclusions which would lead to specific remedial measures.

Looking into the fatal collisions in more detail, it is clear that HGV involvement is a key factor. This is separate from any causal link. The 2015 examples given in COMMA para 2.4.4 (Warcop and Crackenthorpe) both involved HGVs. The single fatality in 2016 involved an HGV, as did the fatal collisions at Warcop and Crackenthorpe in 2017 and 2018. During the research into news reports I came across another fatal collision at Warcop in 2022, again involving an HGV[1].

The reason for this predominance of HGV involvement is contained elsewhere in the COMMA, where the proportion of HGVs is clearly above average figures, 22.5% in the A66 corridor compared to 12% for non-motorway trunk roads.

This is crucial for the analysis of fatalities because HGVs are about three times more likely to be involved in a fatal accident than cars and light vans. This is shown in the chart below from an MTRU time series running up to data available in 2019 and covering the period that NH bases its collision data on.

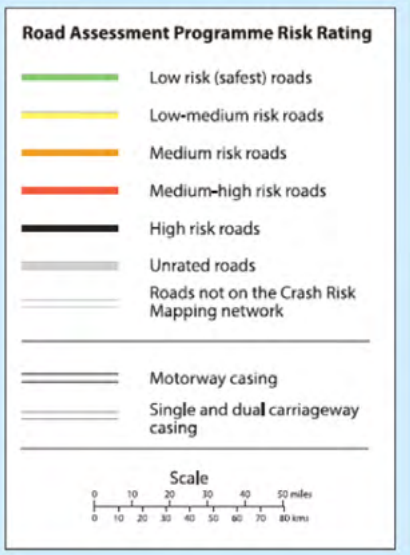
Figure 1: Involvement in fatalities by road type GB HGVs over 3.5tonnes compared to all traffic



Sources: Traffic statistics table TRA0104, Accident statistics Table RAS 30017, both DfT, 2007-9 use TSGB, Road Freight Statistics and Goods Vehicle Accidents and Casualties 2007.

One issue which has arisen is the comparative collision record of this section of the A66. The approach of this brief report is that all collisions need to be avoided and this is in line with the objectives of Vision Zero and the "Safe System". [2] However it is implied that the A66 is worse than average (COMMA 2.4.2). This is done without detailed description of the road lengths and benchmarking against the rates by each road type. The use of the average for the Strategic Road Network (SRN) is potentially very misleading since it is based on data including a majority of traffic on motorways which exclude many vulnerable road users and have significantly lower rates. A more independent and recent view is contained in The Road Safety Foundation (RSF) 2024 report. This has the A66 as medium/low risk as in the map below.[3]

Chart 3: Extract from Road Programme Risk rating



The RSF report recommends a UK wide programme of safety schemes totalling £2.5bn. The £1.5bn cost of the A66 would pay for 60% of the RSF programme. This would achieve far greater reductions in collisions, including fatalities, across the UK with a higher rate of economic return.

Has a package of targeted solutions been implemented?

Following the spike in fatalities in 2015 some individual remedial measures have been implemented, mostly speed limit reductions, and limited use of average speed cameras. NH say there is insufficient data to tell whether they have been effective (COMMA 2.4.6).

While HGV traffic has been identified as a key factor in the level of fatalities, the detailed analysis of collisions in the TA suggests that at some locations sight lines and sometimes darkness are also contributory factors. This is exactly what would be expected.

In designing effective schemes to reduce fatalities it is important to identify the different users involved and encourage their safer behaviour including the possibility of new infrastructure. An NH scheme to cater for drivers' use of a café (the Llama Karma), considered a risk, is an example of the latter, in this case on a dual carriageway. However, a more effective solution requires a route analysis from the HGV point of view. One comment is that if turning movements into cafes are to be restricted on the new dual carriageway is it anticipated that they will shut or that drivers will exit onto the existing roads to access them or other facilities.

This needs a whole of route approach, identifying HGV behaviours and risks and applying consistent and targeted signing, surface markings and addressing any turning issues such as the one that was involved in the fatality at Stainmore in 2016[4]. Detailed analysis led by the type of collisions would also produce specific proposals to reduce collisions for all road users.

Such proposals are likely to require a review of lighting (not all of which needs to be overhead or intrusive), and road surfacing, both to provide warning if vehicles stray out of lane, and improved braking at locations where this has been a factor. There are a lot of options available and it is also possible to provide satnav warnings. Corridor treatments tend to be more effective because their consistency increases overall safety awareness as well as removing the need for rapid adjustment to unforeseen road hazards. This is further explored in Section 3.

What is the likely impact of the current scheme – and will it generate traffic?

It appears that NH has used an average casualty figure approach through COBALT, which produces the valuations for the scheme's economic case. Obviously one of the most important factors is HGV use and the level of new traffic generation. To illustrate this, the proportion of HGVs on the A66 is currently 22.5%. Given that they are 3 times more likely to be involved in fatalities than light vehicles, they would on average be involved in about half of all collisions. In fact the random sample of accidents researched indicate that they are involved in much more than this.

It is thus crucially important that HGV traffic is not generated by this scheme. While it is claimed that car traffic has been subject to such a test for induced traffic (although there are inconsistencies in the figures presented for that) I have found no evidence that such a test was performed for HGVs. Given the high proportion of HGVs on this route this is a major omission.

Appraisals often ignore HGVs on the grounds that goods consumed (measured as tonnes) are independent from traffic conditions and that HGVs have a small impact on appraisal. However, HGV traffic should really be measured in vehicle kilometres as it is far more sensitive to changes in cost than car traffic. The measure of this, the elasticity, is more than double that for cars. The underlying reason is that HGV traffic is affected by factors such as choice of mode (NH says this is a strategic long distance route), organisation of stockholding and choice of depot, and load factors (how far there is an incentive to consolidate loads).

The same freight model quoted by NH predicts growth in rail freight which could reduce SRN HGV traffic. Conversely, faster journey times on the A66 will undermine rail freight and increase road freight's mode share.

However, in looking at the COMMA I can find no evidence that the HGV traffic component was included in the modelling for the scheme. In schemes with lower levels of HGV use with a small time saving this might be disproportionate. But in para 5.7.17 of COMMA this scheme offers significant time savings:

"A journey time decrease between the DM and DS scenarios, with time saving increasing in the later forecast years. Time savings for AM/IP/PM are as follows:

- 10 – 11 minutes (2029)
- 11 – 13 minutes (2044)
- 12 – 14 minutes (2051)".

It is clear that this major impact has not been calculated, even using a simple matrix based elasticity model. Because HGVs need more road space than light vehicles and travel at slower speeds, increasing HGVs on the A66 would also reduce the time savings.

3. What should be done to address road safety now?

While there has been insufficient time for me to prepare a full safety based option for the route including a site visit, local residents have been able to supply driver videos for key sections of the route. They have also supplied some additional Crashmap data, plotted on the route. This has enabled a video check of several of the collision sites as well as using Google maps' pictures.

HGV speed and impact

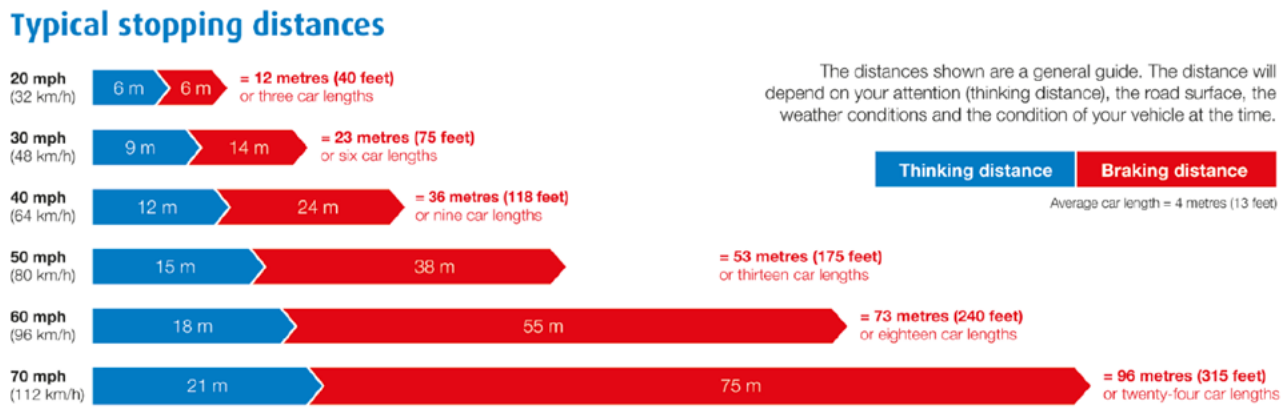
Before suggesting any safety measures it is important to understand the difference between heavier vehicles and cars in terms of stopping distance and force of impact. The latter is not linear and thus a car hitting any vehicle more than around 12 tonnes means most of the impact is absorbed by the car. A heavy articulated vehicle weighs about this much even when carrying no load.

The weight/speed combination also means that stopping distances are far greater for heavier vehicles. This depends to a major extent on the exact weight and road conditions. It also means that the impact force remains high quite late in the HGV stopping cycle. Comprehensive real world test data is hard to find but Manual for Streets 2 reported that at 30 mph the best 36 tonne HGV recorded would take about three times further to stop than the best car.

It is for reasons such as these that HGVs are subject to lower speed limits than cars. Despite this they are disproportionately involved in fatal collisions mainly for the reasons given above. The sample of fatal collisions considered for this report showed the involvement of HGVs in all but one.

In terms of cars, stopping distance is strongly related to speed and, given that cars have less variation in weight, average distances are published in the Highway Code. These are shown below.

Chart 4: Highway Code extract



It is important to note that these are somewhat idealised: first for thinking times (assuming a high level of alertness) and for road surface conditions, which vary greatly according to weather.

Thus it is reasonable to assume that even at 40 mph a fully laden HGV would take more than 100 metres to stop and at a speed of 55 mph over 150 metres. Unfortunately I have been unable to identify any recent speed surveys covering HGVs on the route.

Given the high proportion of HGVs here and their high level of involvement in fatal and serious collisions, action to reduce their speed has the potential to improve road safety significantly.

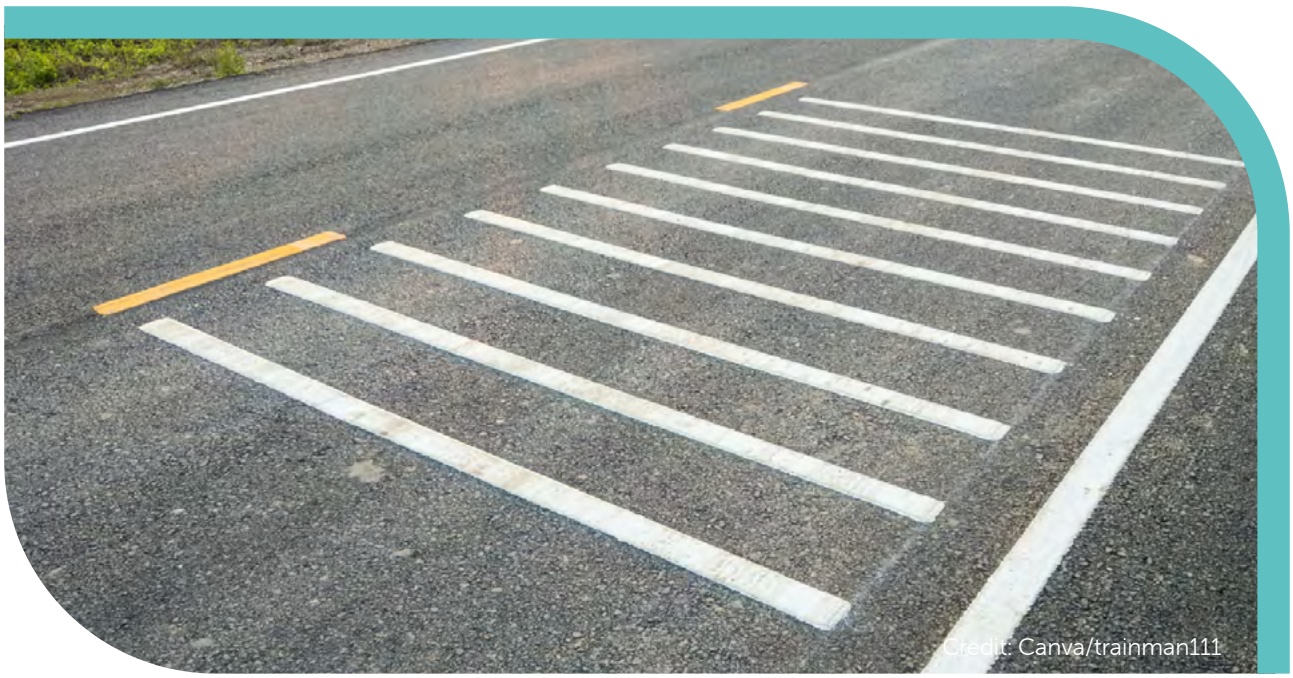
Staying alert

Sampling the collisions as described earlier it is clear that some are caused by vehicles straying out of their lane and colliding with oncoming traffic. Avoiding this is related to two main factors: speed and the way the road retains the attention of the driver. The former reflects the stopping distance chart – reducing speed from 60mph to 40mph would halve the stopping distance. Of course, people will drive slower and faster than this but there does not seem to be recent comprehensive speed survey data to assess this. It should be noted that some busier sections (such as close to Penrith) can be quite congested and thus speeds will be lower.

From the videos it appears that signing is very sparse and there is no consistent approach. There are clear locations where collisions occur and these could be signed – it is recommended that specific reasons are given rather than blanket warnings. There is very little by way of safety features now commonly used such as variable surfacing to indicate loss of road position or use of simple wands to make the delineation between directions very clear. In the event of a loss of attention these would act to provide a physical alert. Illuminated speed signs have a dual use in this regard but are not present because the speed limit on much of the single carriageway is unrestricted (60mph).

There appear to be reflective studs (cats eyes) along most of the single carriageway sections but these need to be checked and maintained.

These observations are shared by other bodies including the local emergency services and have been the subject of discussion at local Coroner Inquiries. For example in 2023 it was reported that, during police evidence.[5]


Credit: Canva/trainman111

"During the past four years, police have identified seven fatal collisions across a 20-mile section of the trans-Pennine route and flagged up one particular patch between Kirkby Thore and Crackenthorpe as a major concern."

2023 report

"A coroner said she will support extra safety measures being mooted in a bid to stop a trend of fatigue-related crash deaths on a A66 stretch through the Eden Valley.

During the past four years, police have identified seven fatal collisions across a 20-mile section of the trans-Pennine route and flagged up one particular patch between Kirkby Thore and Crackenthorpe as a major concern."

Specific measures recommended by the coroner included rumble strips at the entry to single carriageway sections, illuminated warning signs and separating the two carriageways.

Similar concerns about momentarily losing attention were reported at the Coroner Inquiry as the cause for another fatality in 2024.[6]

"The collision may have been caused by one or a combination of fatigue leading to a micro sleep; a medical episode or distraction which meant he was not alert and concentrating on his driving and surroundings in the moments leading up to and at the time of the collision."

Recommendations for a safety package

This report does not represent a fully comprehensive review of safety and detailed design proposals. This would almost certainly require some additional survey data focussed on traffic speed and a detailed sight line analysis. However, based on the collision data and driver videos there is a clear basis for an immediate and effective safety programme for the single carriageway sections of the route. This would include:

1. Rumble strips at single carriageway entry points
2. Average speed cameras to enforce a speed limit of 40 mph for all traffic on the single carriageways[7]
3. A series of illuminated signs warning drivers to stay alert and that there have been a series of fatal accidents
4. A number of illuminated speed warning signs in addition to the cameras which would help to maintain driver alertness
5. A maintenance review of existing reflective studs (cats eyes) and replacement where needed
6. Additional reflective posts at the side of the road to delineate the carriageway generally and maintain attention

In addition, further work should be undertaken to choose a method to prevent vehicles crossing the carriageway at key points where risks are greatest. The work would be focussed on choosing which methods are most appropriate. The two main options are:

- more frequent studding and noise surfacing
- low impact wands such as those to delineate traffic lanes where schemes are implemented quickly

The two maps opposite show two of the most important areas to be subject to safety improvement with collisions plotted from www.crashmap.co.uk. Kirkby Thore to Crackenthorpe is approximately 4.4 miles, Appleby to Brough 4.8 miles. It is possible to estimate approximate sign and camera costs based on the two schemes being implemented now on A66 west of Penrith and A590. For this purpose we have assumed:

- 4 cameras for each stretch: £800,000 (as the 4 for A66 Dubwrath/ Cockermouth)
- 4 speed signs and 4 warning signs: £400,000
- 4 rumble strip treatments at entry points: subject to more detailed estimate but allow £500,000
- Permanent central delineators such as studs and surfacing would need specific costing but wands are cheap and easy to install and a sum of £100,000 is allowed for this.

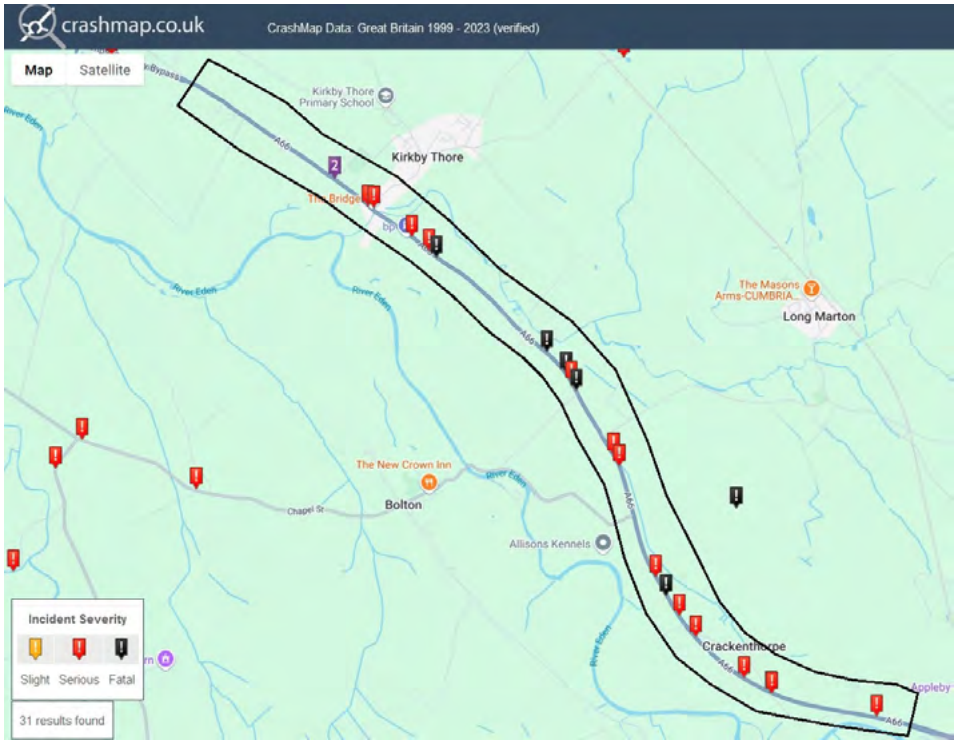
Overall the cost of treating the two stretches of the single carriageway, allowing for a high Optimism Bias (44%) as is normal for civil engineering projects, would be £2.6million. However there would be some additional costs involved in the design and appraisal process. This

would represent a fraction of the cost of the proposed £1.5 billion A66 Northern Trans Pennine project. The safety measures would also be very quick to implement, whereas the A66 dualling project would take several years to complete, and would not be open until 2030 at the earliest.

This type of approach is currently being carried out by National Highways elsewhere on its network on the A5[8] and the A46[9] and is significantly cheaper and quicker to implement than major construction.

Crashmap 1: Appleby to Brough

Crashmap 2: Kirby Thore to Crackenthorpe



4. Conclusions and final observations

In assessing the impact of any scheme it is important to compare it with a reasonable Do Minimum in which lower cost options are properly considered, and the production of realistic Do Something scenarios which include generated as opposed to re-routed traffic. This has not been done.

As noted above the cost of the A66 upgrade would pay for 60% of the road safety measures identified by the Road Safety Foundation to treat the whole of the UK. Considering safety objectives alone, the justification to spend such a significant sum of money on a road with a low/medium safety rating doesn't appear warranted, especially when National Highways is taking a more proportionate approach elsewhere on the A5, A46, the A66 west of Penrith, and the A590.

It is particularly surprising that no account appears to have been taken of the likely generation of HGV traffic. As well as having a major detrimental impact to the economic case it would increase fatal collisions and casualties over what has been modelled. As a result, it is likely that there would still be safety issues on the upgraded A66.

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07889 302229
Transport Action Network
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References

[1] https://www.bbc.co.uk/news/uk-england-cumbria-66924548

[2] https://www.rospa.com/road-safety/advice-and-information/drivers/safe-system

[3] https://roadsafetyfoundation.org/project/driving-change-investing-in-safer-roads/

[4] https://www.bbc.co.uk/news/uk-england-cumbria-45263635

[5] https://cwherald.com/news/coroner-backs-mooted-measures-to-stop-alarming-a66-crash-death-trend/

[6] https://www.newsandstar.co.uk/news/24401067.inexplicable-momentary-lapse-caused-fatal-a66-collision-court-told/

[7] 40 mph has been chosen to reduce the risk of a micro-lapse in driver attention having enough time to cause a major vehicle deviation

[8] A five-mile stretch of the A5 in Bedfordshire is having similar safety measures implemented at a cost £2.1 million: https://nationalhighways.co.uk/safety-boost-for-major-a-road-through-beds-and-bucks/

[9] Work on resurfacing, resigning, and remarking the A46 in Warwickshire is underway by National Highways: https://nationalhighways.co.uk/press/chance-to-find-out-more-about-national-highways-safety-scheme/

Transport Action Network (TAN) helps communities press for better and more sustainable transport through investment in bus and rail services and active travel. We also seek better maintenance of existing roads, especially tackling the scourge of potholes. We have consistently sounded the alarm on the damaging consequences of the previous Conservative Government's outdated obsession with road building.

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