A30 Temple to Higher Carblake Dualling

One-year post-opening project evaluation

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Foreword

National Highways, previously known as Highways England, when the A30 Temple to Higher Carblake dualling project was opened, is the Government-owned company that operates, maintains and improves England's motorway and long-distance trunk road network. This project was promoted and delivered by Cornwall Council as part of the government's first, five-year Roads Investment Strategy (RIS 1) to improve the safety and reliability of our network for the millions who depend on it daily. National Highways provided project governance and was commissioned to evaluate the project.

Our post-opening project evaluations allow us to understand how effective we are making improvements and assess the benefits to customers. This report gives an indication of the project's performance in the first year after the project was finished in October 2018. It forms part of a longer-term evaluation.

Before the project was completed, the A30 between Temple and Higher Carblake was the only section of the A30 between Exeter and Truro that was single lane. This created a significant pinch point on the road network and often-caused severe congestion and delays. This was especially the case during the summer months when tourist traffic is at its highest. The project was designed to remove this pinch point by creating a dual two-lane carriageway, to reduce congestion and improve the resilience of the road network. Improving the route also improves regional economic growth.

Our evaluation showed that the project had, by adding capacity to the road, improved both journey times and journey time reliability, especially in the summer months, meeting its objective to improve customer journeys.

We have also seen a reduction in the number of personal injury collisions at this location when compared to the annual average before the project. This was a positive safety outcome, which we will reassess five years after the road opened when further data will be available.

Environmental impacts were broadly as expected in the short-term. As the landscaping and biodiversity mitigation takes time to fully establish, we will re-evaluate how effective this is as part of our five-year review.

We also identified two outstanding cultural heritage actions in our evaluation. The first, to install an interpretation board at Peverell's Cross Schedule Ancient Monument. Since completing the project, Cornwall Council and Historic England have agreed an information board is not needed as it is too far from the nearest access point to the common. The second, to consider publishing a guide to the history and development of the highway east of Bodmin, Cornwall Council have confirmed they won't be taking it any further.

We are pleased that at this early stage this improvement to a key part of the Cornwall road network has improved capacity, safety, journey times and reliability.

Elliot Shaw

Executive Director, Customer, Strategy and Communications

January 2023

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1. Executive summary

This report presents the one-year after post-opening project evaluation of the A30 Temple to Higher Carblake Dualling project. The project opened to traffic in July 2017 and was officially finished in October 2018 after completion of all associated environmental works.

Evaluations of Major Projects are typically carried out one-year and five-years after a project's opening. The purpose is to determine the extent to which a project's objectives have been achieved and to compare forecast impacts against those observed.

The A30 is located within Devon and Cornwall, in the southwest of the UK, and runs from Exeter to Land's End. The project upgraded 2.8 miles of the A30 to dual carriageway standard, between Higher Carblake in the south and Temple in the north. It provided three new grade-separated junctions, reducing the number of local access junctions on the A30.

Although the A30 is managed by National Highways, the project was promoted and delivered by Cornwall Council using funds from both the European Regional Development fund and the Department for Transport. Highways Agency, the predecessor to National Highways at the time, provided governance and was commissioned to undertake the evaluation.

Before the project, this was the only remaining section of single carriageway on the A30 between Exeter and Truro. The reduction in lanes, from dual to single carriageway in both directions, created a significant pinch point on the network and formed a constraint to the capacity of the A30. Often this caused severe congestion and delays, especially during the busier summer months with 25% more daily road users along the route, compared with those travelling outside of the summer period. During weekends this increases to 80% more road users per day than outside of the summer period.

The project was designed to remove this pinch point, providing a fully dual carriageway road which would relieve congestion, improve resilience, and contribute to enhanced regional economic growth.

We found that the additional capacity the project provided improved customers journeys whilst also supporting the increase in road users. There were fewer delays and congestion during the busier summer months and journey times were now more consistent across both weekends and weekdays. Journey times had improved across all periods. Where congestion was most evident before the project (during the summer weekends), customer journeys improved by up to 20 minutes. Journeys were also more reliable, the difference between the fastest and slowest times of the day reduced from one hour and 20 minutes to 15 minutes. Driving speeds, which at times before the dualling reduced to five miles per hour on the approach to the single-lane section, created very long tailback queues of up to four and a half miles long; have since become more consistent with other sections on the A30.

We have seen a reduction in the number and rate of personal injury collisions. During the first 24 months of the dual carriageway being open to traffic, there had been an average reduction of one personal injury collision along the project extent

per year. This was based on an annual average of three personal injury collisions, compared with four before the project.

Considering the increased number of road users along the project, road users had travelled an additional four million vehicle miles without a personal injury collision occurring. This was a positive safety outcome. However, safety trends can vary each year and so we will reassess this outcome at five-years after when further data will be available. We will then be able to draw firmer conclusions.

The overall effects of the project on the environment were generally considered to be as expected. For air quality and noise, the impacts were better than expected due to the lower than predicted traffic flows. For other environmental impacts, mitigation measures, including provision of planting and vegetation cover, had been implemented as expected. However, the mitigation had yet to become fully established at one-year after. For this reason, the outcome was considered too early to say for impacts on landscape. The mitigation will require ongoing maintenance and will be reconsidered at five-years after to confirm its effectiveness.

2. Introduction

This report presents a one-year after evaluation of the A30 Temple to Higher Carblake dualling project and has been prepared as part of the National Highways Post Opening Project Evaluation (POPE) programme. The purpose of this report is to present a comparison of the conditions on the route before and one-year after[1] construction of the project, and to assess the extent to which the project has met the objectives identified during its appraisal.

What is the project and what was it designed to achieve?

The A30 is the main highway route linking Cornwall and key Cornish towns to the regional and national road network across the UK. Prior to construction of the project, the A30 was of dual carriageway standard from the M5 at Exeter to the junction with the A39 north of Truro. The only exception was the 2.8-mile section of single carriageway between Temple and Higher Carblake, to the northeast of Bodmin.

The reduction in lanes, from dual to single carriageway in both directions, created a significant pinch point on the network and formed a constraint to the capacity of the A30. This often-caused severe congestion and delays, especially during the busier summer months when the influx of tourist traffic meant the road was operating significantly above its design capacity. This had a detrimental impact on road users causing poor journey times and journey time reliability. These issues also limited opportunities for potential economic growth in Cornwall.

The project was designed to remove this pinch point, providing a fully dual carriageway road which would relieve congestion, improve the resilience of the road network and contribute to enhanced regional economic growth.

The project comprised the following elements:

- The 2.8-mile single carriageway section of the A30 trunk road, between Temple and Higher Carblake, was upgraded from single to dual carriageway.
- Three grade-separated vehicle over bridges were installed at strategic locations along the improved route.
- The number of direct private accesses onto the A30 was reduced through the introduction of a limited number of local access roads.

Although the A30 is managed by National Highways, the project was promoted and delivered by Cornwall Council using funds from both the European Regional Development fund and the Department for Transport. Highways Agency, the predecessor to National Highways at the time, provided governance and was commissioned to undertake the evaluation.

The project first opened to road users in July 2017 and officially finished in October 2018, following completion of all associated works.

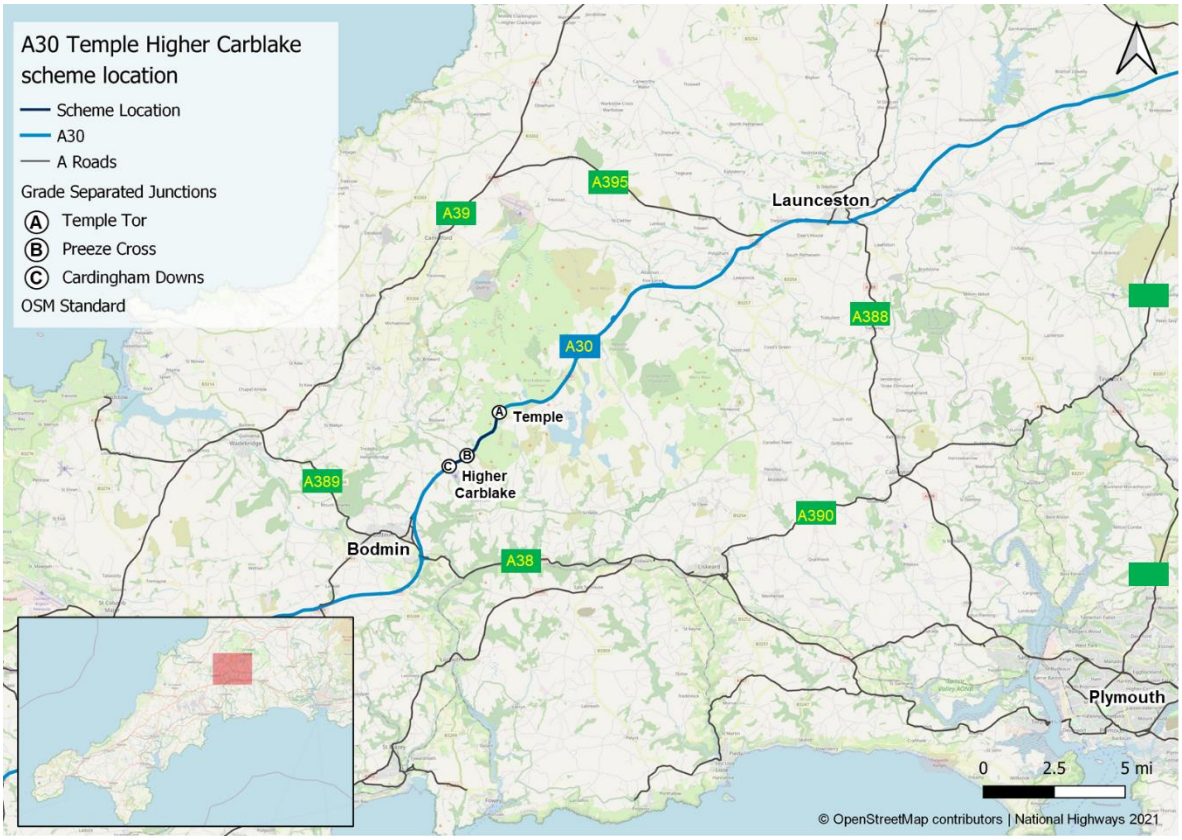
[1] The safety analysis covered the period 24 months after opening of the project to traffic whereas the traffic and environmental analysis covered the period 12 months after completion of all the project works.

Project location

The A30 is located within Devon and Cornwall, in the southwest of the UK, and runs from Exeter to Land's End. The A30 provides connectivity to the M5 at Exeter and to London, via the A303 and M3. It forms a spine down the centre of Cornwall, providing connectivity for key local centres and tourist hotspots, such as Truro, Bodmin, Newquay and St Ives.

The project itself is located just northeast of Bodmin, between Temple and Higher Carblake and is shown in Figure 1 below.

Figure 1 A30 Temple to Higher Carblake dualling project location



Source: National Highways and OpenStreetMap contributors.

The project runs through the south-western edge of Bodmin Moor, an Area of Outstanding Natural Beauty, which was an important environmental consideration during project design and construction.

How has the project been evaluated?

The evaluation assessed the emerging impacts and benefits from the project over the first year. We carry out post-opening project evaluations for major projects to validate the accuracy of the expected project impacts which were agreed as part of the business case for investment. We also seek to determine whether the expected benefits are likely to be realised. This provides opportunities to learn and improve future project appraisals and business cases.

A post-opening project evaluation compares changes in key impact areas[2] by observing trends on the route before the project was constructed (baseline) and tracking these after the opening of the project to traffic. The outturn impacts of the project are evaluated against the expected impacts of the project (presented in the forecasts made during the project planning process) to review the project's performance.

For this evaluation, we considered the project during a summer month (August) and a neutral month (October) to reflect that this section of the road network was subject to quite different demands at different times of year. Traffic levels along the project were much higher over the summer months due to the impact of tourism, whereas traffic levels were much lower outside of the peak tourist season. Therefore, to evaluate how the project was performing overall, it was necessary to understand both periods.

As tourist traffic affects this route, another factor that was considered was that weekends represent peak traffic conditions. For routes not affected by tourist traffic peak traffic conditions would usually be weekdays. As such, for this evaluation, average daily traffic (ADT) was used throughout to analyse traffic flows, as it was important to reflect both weekday and weekend flows along the project.

For more details of the evaluation methods used in this study please refer to the post-opening project evaluation methodology manual. This can be found on our website.[3]

[2] Key impact areas including, safety, journey reliability and environmental impacts
[3] https://nationalhighways.co.uk/our-work/post-opening-project-evaluation-pope-of-major-schemes/

3. Delivering against objectives

How has the project performed against objectives?

All our major projects have specific objectives which are defined early in the business case when project options are being identified. The project had four key objectives, to reduce congestion, improve road safety, improve route resilience, and support the economy. These objectives are appraised to be realised over 60 years. Our one-year evaluation therefore provides early indication on whether the project is on track to deliver the benefits.

Table 1 summarises the project's performance against each of the objectives, using evidence gathered for this study.

Table 1 Objectives and Evaluation summary

Objective	One-year evaluation
Reduce congestion (and resulting environmental effects)	Speeds and journey times had both improved, whilst the road supported more road users, particularly in the high-demand summer months. This suggested that customers experienced less congestion. Reducing congestion and the stop start driving conditions that results from congested routes, was likely to lead to beneficial environmental effects.
Improve road safety	The first 24 months of analysis showed positive signs of improvement to personal injury collisions. The analysis will be revisited in later years to verify findings.
Improve the resilience of the route	Resilience of the route had improved, for example: • The road is now dual carriageway, making full road closure less likely and improving access for emergency vehicles, meaning incidents can be cleared more quickly. • The initial evidence showed that collisions were now less frequent, meaning fewer road closures.
Support the Cornish Economy, improve business and the economy	The project had improved customer journeys during high tourism periods. These benefits should support the Cornish economy.

4. Customer journeys

Summary

Before the project, the A30 Temple to Higher Carblake was the only remaining section of single carriageway on the A30 between Exeter and Truro. The reduction in lanes, from dual to single carriageway in both directions, created a significant pinch point on the network and formed a constraint to the capacity of the A30. This often-caused severe congestion and delays, especially during the busier summer months with 25% more daily road users along the route, compared with those travelling outside of the summer period. During weekends this increases to 80% more road users per day than outside of the summer period.

The project was designed to remove this pinch point, providing a fully dual carriageway road which would relieve congestion, improve resilience, and contribute to enhanced regional economic growth.

We found that the additional capacity the project provided, improved customers journeys, whilst also supporting the increase in road users. With fewer delays and congestion during the busier summer months and journey times now consistent across both weekends and weekdays.

Journey times had improved across all periods. Where congestion was most evident before the project (during the summer weekends), customer journeys improved by up to 20 minutes. Journeys were also more reliable with the difference between the fastest and slowest times of the day reduced from one hour and 20 minutes to 15 minutes. Driving speeds, which at times before the dualling reduced to five miles per hour on the approach to the single-lane section, creating tailbacks and queues of up to four and a half miles long; have since become more consistent with other sections on the A30.

How have traffic levels changed?

The following sections examine if the traffic levels changed over the evaluation period and to what extent the forecast traffic levels were realised. This helps to frame the changes found in our assessment of journey times and reliability.

National and regional traffic changes

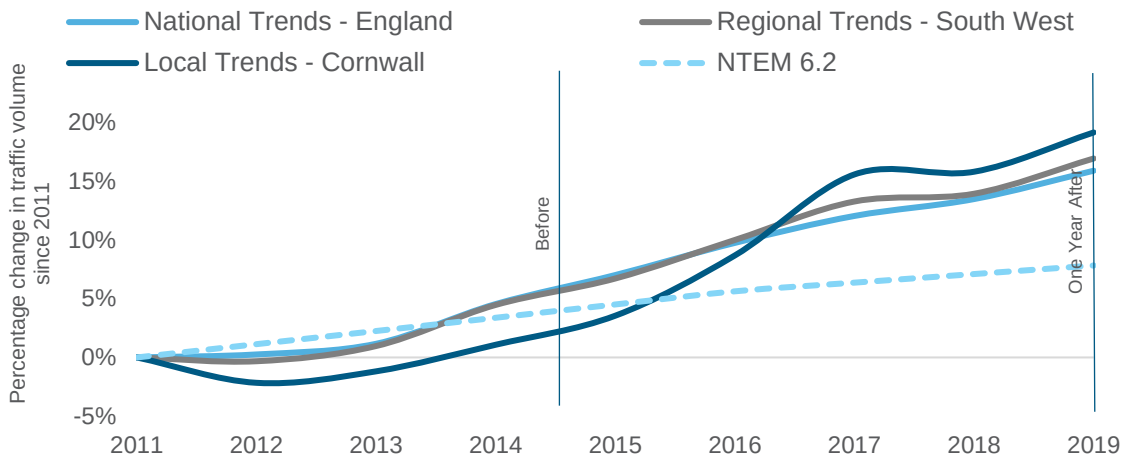
The Department for Transport produces annual traffic statistics by local authority and road type, recording the total number of million vehicle kilometres travelled.[4] We attribute any growth observed on roads in the study area, which is above the chosen background trend, to the project.

We have illustrated the change between 2011 (the project model base year) and 2019 (one-year after project completion) (see Figure 2). The National Trip End Model (NTEM)[5] shows the expected national growth at the time the traffic model was developed.

[4] Motor vehicle traffic (vehicle kilometres) by region in Great Britain, annual from 1993, Table TRA 8904, Department for Transport.
[5] The National Trip End Model (NTEM) model forecasts the growth in trip origin-destinations up to 2051 for use in transport modelling.

We found that traffic volumes had increased at a local (Cornwall), regional (South-West) and national level, above the national growth expected by the traffic model (NTEM).

Figure 2 National, regional, and local trends

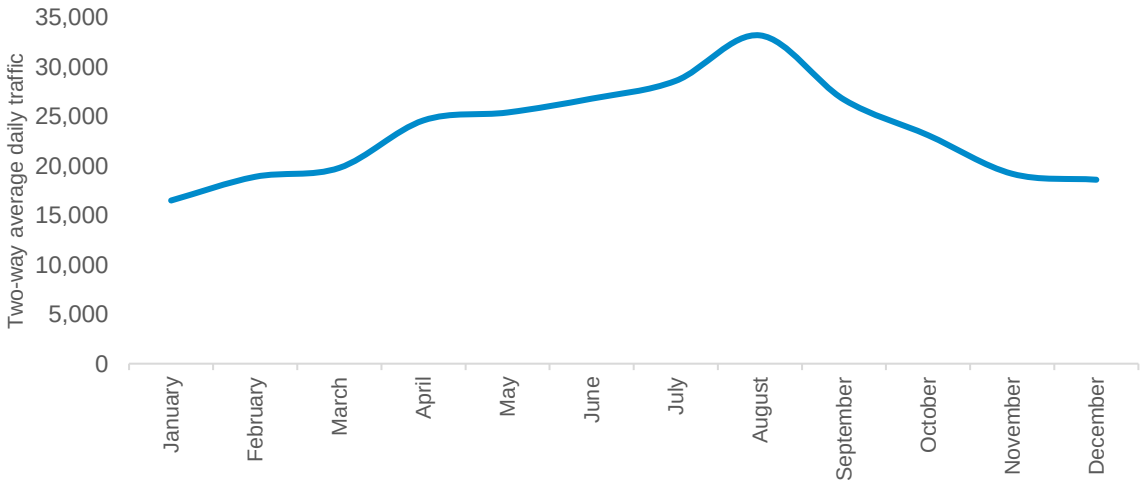


Source: Department for Transport statistics, September 2020

How did traffic volumes change on the SRN?

Traffic demand on the A30 is subject to substantial seasonality due to tourism, as holidaymakers are drawn to various destinations in Cornwall during the summer months (Figure 3). It was therefore important to consider how the project performed against objectives in both the summer (August) and at a more neutral time of the year (October).

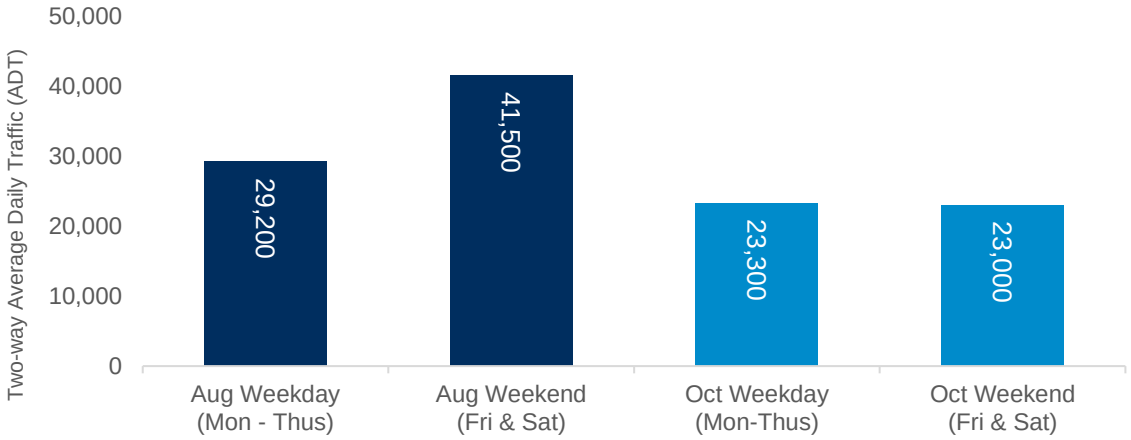
Figure 3 Average two-way daily traffic flow on the A30 (2019)



Source: WebTRIS Data 2019

During the peak tourist season the demand on the road increases to an average of over 29,000 vehicles per weekday. This is around 25% more daily road users compared with those travelling outside of the summer period. During weekends this increases to an average of 41,500 vehicles per day, which is 80% more road users per day than outside of the summer period[6] (Figure 4).

Figure 4 Two-way average daily traffic flows along the project 2019 (weekday and weekend)

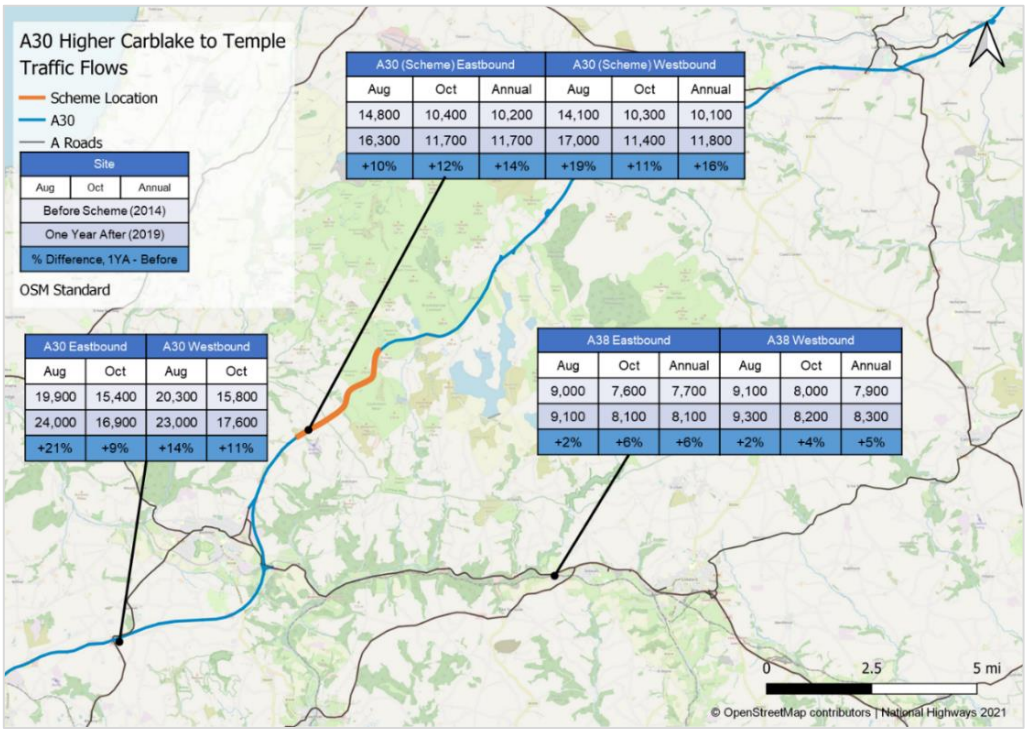


Source: WebTRIS data 2019

We found traffic volumes in the summer period (August) on the project extent had grown by between 10-19% compared with before. 1,500 more customers travelled eastbound daily on the A30, and 2,900 more customers travelled westbound towards Cornwall. In the off-peak tourism period (October) traffic exhibited lower growth, of around 12% on both eastbound and westbound carriageways, with an average increase of 1,200 road users daily (Figure 5). The increases observed in traffic volumes on the project extent were consistent with local background trends in Cornwall, suggesting that the growth observed was related to wider trends and not due to the project.

[6] This differs from much of our road network where weekday commuting is the norm. We therefore considered traffic impacts using average daily traffic (ADT) rather than average weekday (AWT) to get a better sense of what changes may have occurred.

Figure 5 Before and one-year after annual average daily traffic (AADT)



Site	A30 (Scheme) Eastbound			A30 (Scheme) Westbound		
	Aug	Oct	Annual	Aug	Oct	Annual
Before Scheme (2014)	14,800	10,400	10,200	14,100	10,300	10,100
One Year After (2019)	16,300	11,700	11,700	17,000	11,400	11,800
% Difference, 1YA - Before	+10%	+12%	+14%	+19%	+11%	+16%

	A30 Eastbound		A30 Westbound	
	Aug	Oct	Aug	Oct
Before Scheme (2014)	19,900	15,400	20,300	15,800
One Year After (2019)	24,000	16,900	23,000	17,600
% Difference, 1YA - Before	+21%	+9%	+14%	+11%

	A38 Eastbound			A38 Westbound		
	Aug	Oct	Annual	Aug	Oct	Annual
Before Scheme (2014)	9,000	7,600	7,700	9,100	8,000	7,900
One Year After (2019)	9,100	8,100	8,100	9,300	8,200	8,300
% Difference, 1YA - Before	+2%	+6%	+6%	+2%	+4%	+5%

Source: WebTRIS Data, 2014 and 2019[7]

Was traffic growth as expected?

The project was expected to have greatest impact on traffic growth in the summer months, with increases of up to 33% forecast in the 'with project' scenario (886 more road users)[8] compared to 6% for the 'without project' scenario (77 more road users).

The project's improvements were expected to induce, or draw, more traffic from surrounding roads in the summer. However, the project was not expected to have as much impact in the neutral months.

We found that the forecasts for 2017 and 2019 were higher than observed in 2019, for both with project and without the project scenarios. This suggested that the base year flows[9] may have been too high or too much growth was estimated to occur. We noted the NTEM growth from 2011 was above that which occurred in Cornwall between 2011 and 2015 (see background trends in Figure 2).

Relieving congestion and making journeys more reliable

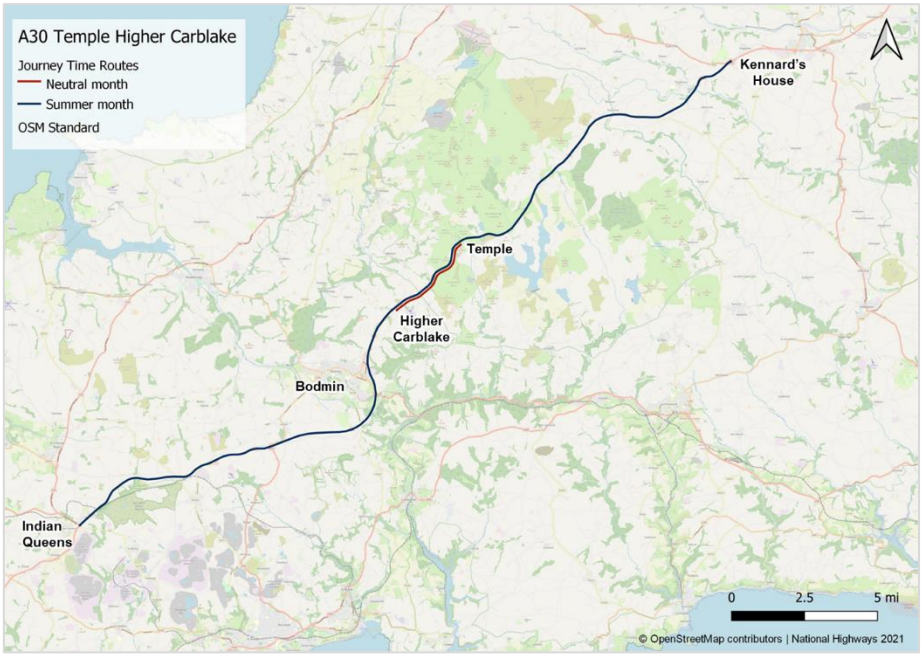
Analysis of journey times and speeds help us to understand the impact of the project on congestion. The extent to which journey times vary from the expected average journey time indicates how reliable a journey is. This section evaluates how the project impacted journey times, journey speeds and the reliability of journeys for road users.

[7] Data was not available for the full calendar year at the A30 count site to the south of the scheme extent. As such, annual average data has not been presented in Figure 5
[8] Comparing forecast for 2017, with project and without
[9] Observed traffic flows used to calibrate and validate the traffic model during its production before its use in forecasting.

Did the project deliver journey times savings?

We analysed satnav data[10] to determine whether the project had reduced road users' average journey times and whether the objective of reducing congestion had been achieved. We assessed journey times and reliability on two routes, a 31-mile-long route between Indian Queens to Kennard's House to compare against the route used as part of the appraisal, and a 2.8-mile-long route between Temple to Higher Carblake to understand the impact on customer journeys travelling through the project extent[11] (Figure 6).

Figure 6 Journey time routes



Source: Traffic Forecasting Report (2013)

We found that the project's capacity enhancements had improved road users' journey times when travelling on the A30 between Indian Queens and Kennard's House, both east and westbound. Journeys were improved when travelling during the week and at weekends.

In the period where congestion was most evident before the project (during the summer weekends), customers journeys improved by up to 20 minutes (Figure 7).

The project had improved customers journeys whilst also supporting the increased traffic volumes during the peak tourist period. In the summer months before the project, customers experienced queuing on this route, particularly during weekends due to the constraint on capacity. Speeds along the A30 Temple to Higher Carblake were reduced by the merging of vehicles where the route reduced to single carriageway, resulting in speeds as low as 6mph. Speeds observed post-project now remain over 59mph (see Annex 1 speed analysis).

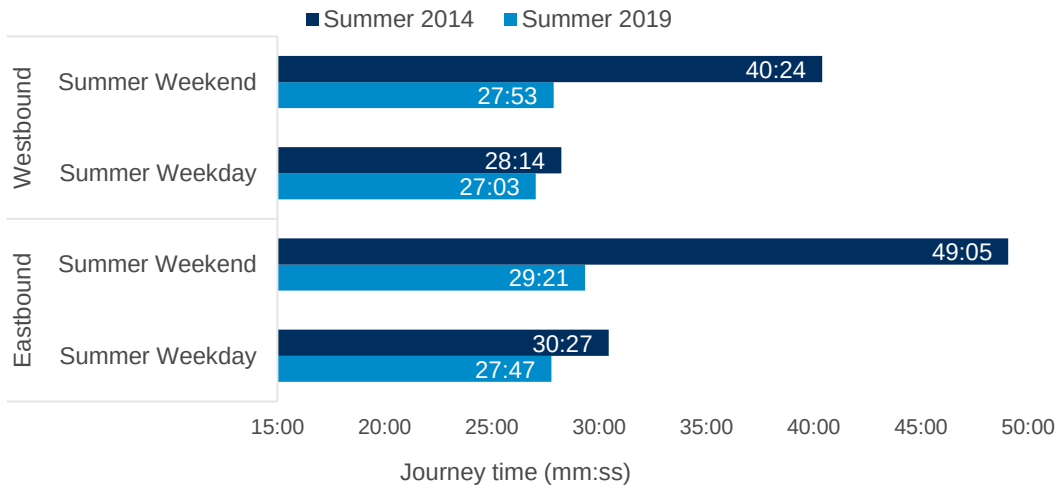
[10] We used TomTom satellite navigation data in our analysis. It provides vehicle speeds (average, median, percentiles), journey times and standard deviations. Routes were divided between each section of the project area to assess the impact of the project in isolation, including the use of variable mandatory speed limits and the conversion of the hard shoulder to a permanent running lane.

[11] For the neutral month, where journey time changes were predicted to be small, initial tests found the long route Indian Queens to Kennard's House introduced too much "noise" which prevented the impacts of the project being captured. As such, journey times in the neutral month were assessed over the shorter 2.8-mile project extent.

The additional capacity had resulted in fewer delays and congestion during the busier summer months and journey times were now consistent across both weekends and weekdays.

The project brought savings in October (the neutral month), though as traffic flows were lower the scope for improvement was smaller and the savings were proportionately lower too. Customers' journey ranged between 30 seconds and a minute, faster compared to before.

Figure 7 Indian Queens to Kennard's House – average journey times

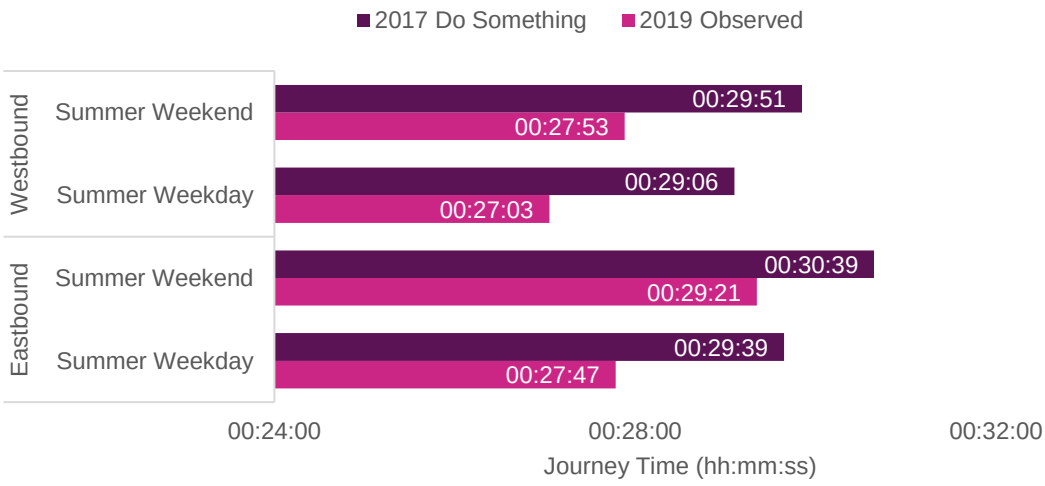


Source: TomTom GPS Data, August 2014 and 2019

Were journey time savings in line with forecast?

The traffic model forecast that the project would deliver journey time savings in all periods. We found that the project delivered journey time savings greater than were forecast (Figure 8).

Figure 8 Indian Queens to Kennard's House - forecast journey times and observed journey times (summer month)



Source: Traffic Forecasting Report and TomTom GPS Data, August 2019

The weekend summer journey time savings were significantly greater than forecast (by almost 12 minutes). Journey time savings during the non-tourist period (October) were generally smaller than forecast (by up to 30 seconds).

Table 2 Journey time savings (mm:ss) - summer month

Time period	Forecast journey time saving	Observed journey time saving (one-year after)	Difference	Percentage difference
Eastbound				
Weekday	02:10	02:40	00:30	+23%
Weekend	08:10	19:44	11:34	+142%
Westbound				
Weekday	01:27	01:11	-00:16	-18%
Weekend	07:03	12:31	05:28	+78%

Source: Traffic Forecasting Report and TomTom GPS Data, August 2019

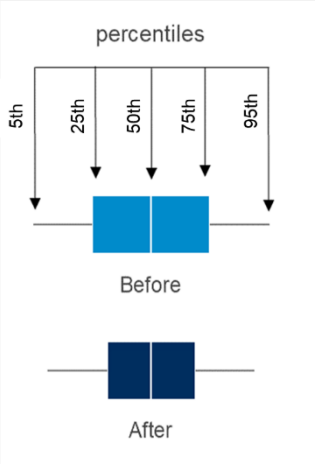
The traffic model forecast that journeys between Indian Queens and Kennard's House during the summer were around 2 minutes longer than was observed. When we looked at the absolute forecast savings, we found the forecast in the summer month underestimated the benefits the project would deliver by one-year after. The observed summer weekend saving was greater than that forecast. The project was modelled reasonably accurately in all other time periods.

The traffic model expected journey time savings of between 33 and 85 seconds. Smaller journey time savings were observed, ranging from 10 to 55 seconds.

Did the project make journeys more reliable?

Congestion can make journey times unreliable. If the time taken to travel the same journey each day varies, journey times are unreliable, and the road user is less confident in planning how long their journey will take them. If journey times do not vary, the road user can be more confident in the time their journey will take and allow a smaller window of time to make that journey. We use a box plot to illustrate the journey reliability (Figure 9).

Figure 9 What does a box plot show?



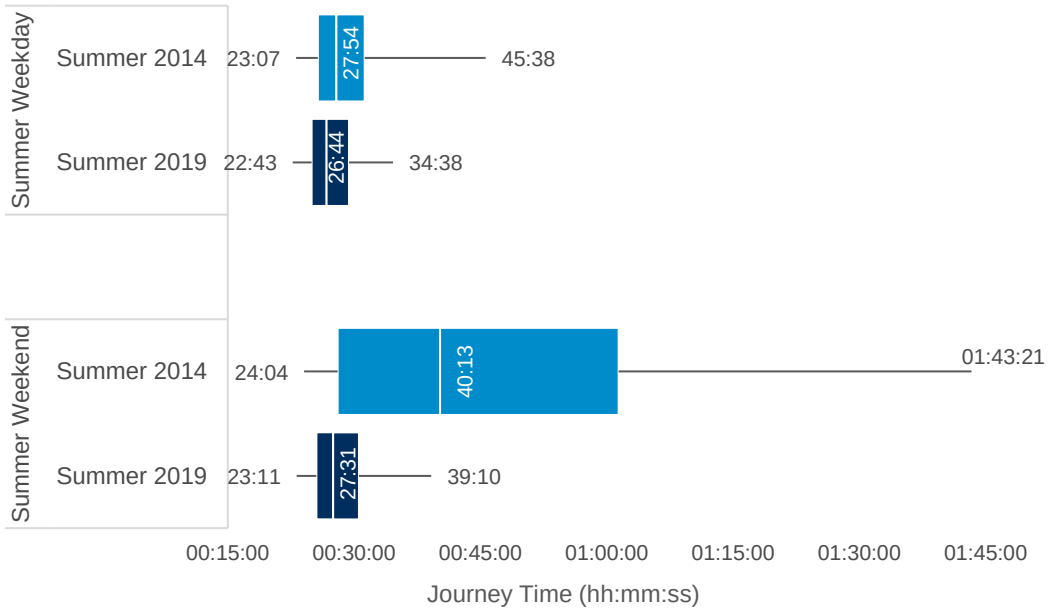
The lowest point is the 5th percentile, this means 5% of journeys take less than this amount of time to complete. The highest point is the 95th percentile, this means 95% of journeys take less time than this to complete. This shows the difference between the longest and the shortest journey times observed.

The length of the box shows how the journey times vary between the 25th and 75th percentile (the journey time 25% and 75% of journeys are faster than). The narrower the box the less variable and hence more reliable a journey is.

We assessed journey time reliability during the summer along the route between Indian Queens to Kennard's House, and for October along the project extent only.[12]

We found that customers' journeys were more reliable in the summer. In line with the improvements outlined earlier, the biggest improvement occurred at the weekend, with most journeys and the worst journeys now much more reliable. Figure 10 and Figure 11 illustrate the changes for the summer period. The most significant improvement occurred in the summer weekend period where the difference between the fastest and slowest times of the day reduced from one hour and 20 minutes to 15 minutes.

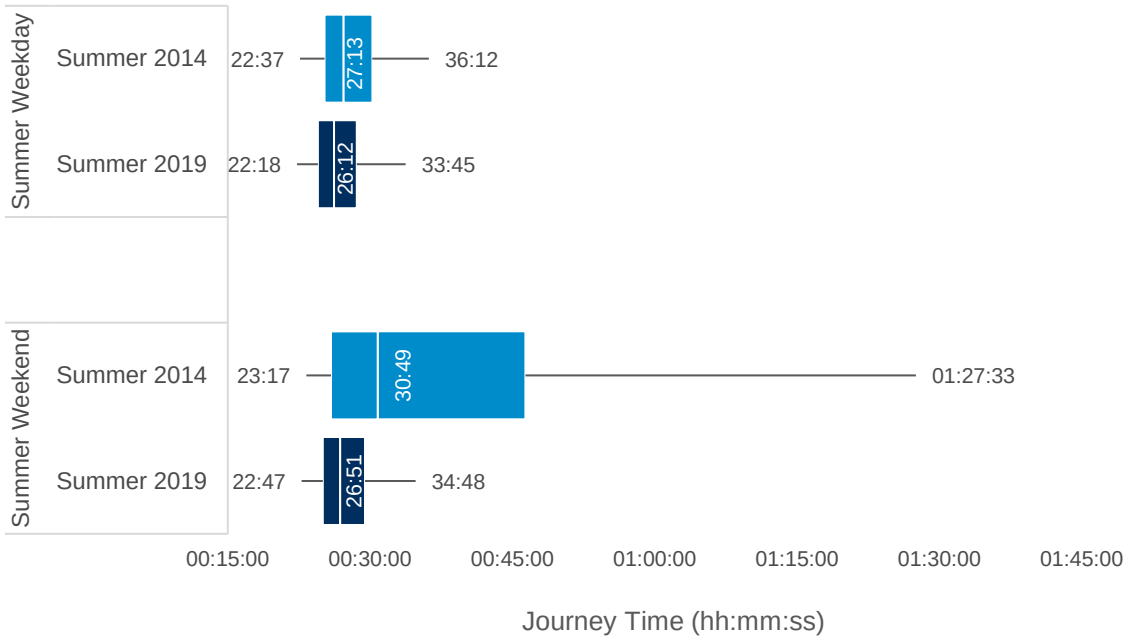
Figure 10 Summer journey time reliability - Indian Queens to Kennard's House (eastbound)



Source: TomTom satellite navigation data, August 2014 and 2019

[12] for the neutral month, where journey time changes were predicted to be small, initial tests found the long route Indian Queens to Kennard's House introduced too much "noise" which prevented the impacts of the project being captured. As such, journey times in the neutral month were assessed over the shorter 2.8-mile project extent

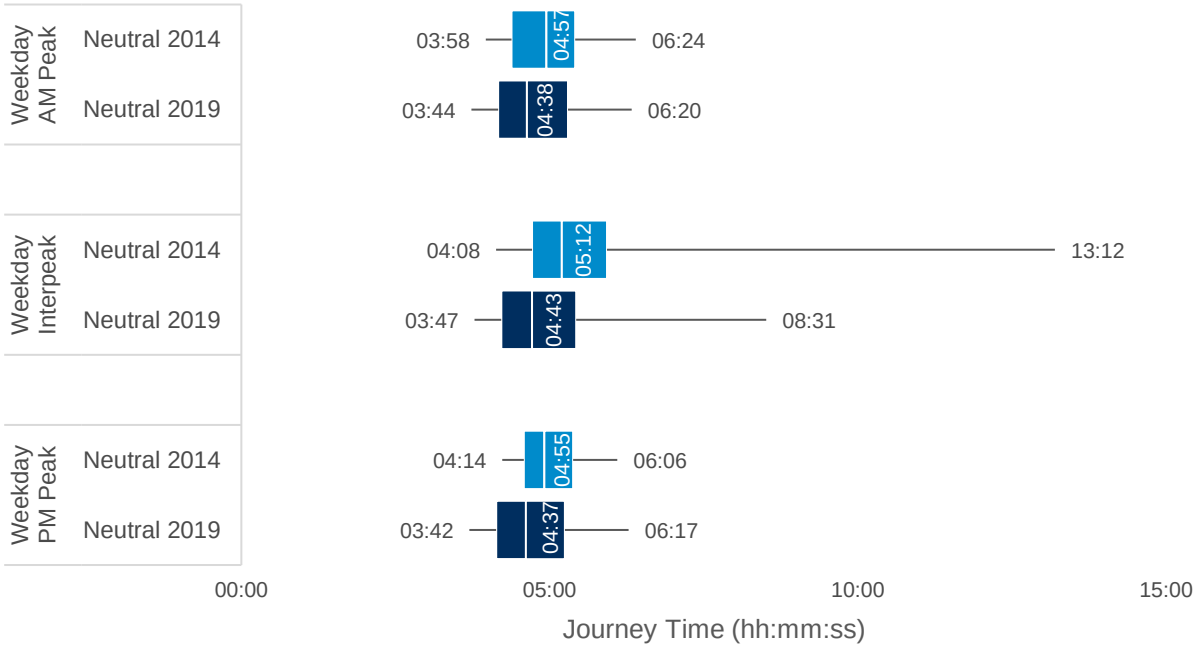
Figure 11 Summer journey time reliability - Kennard's House to Indian Queens. (westbound)



Source: TomTom satellite navigation data, August 2014 and 2019

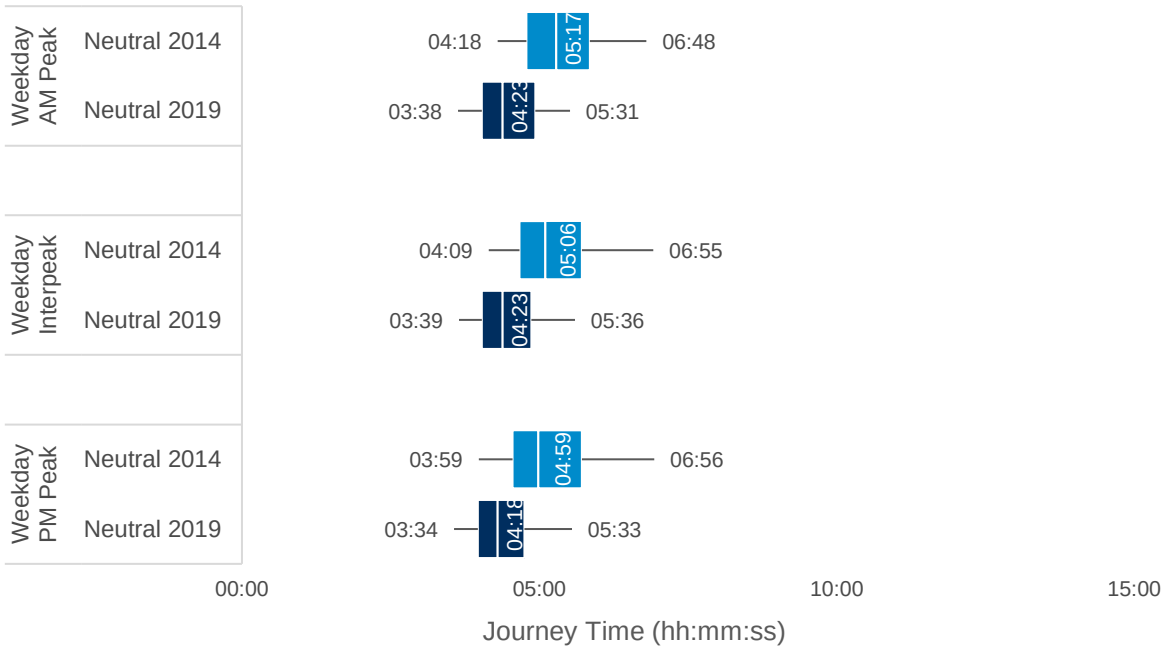
The results for journeys in the neutral month were more variable. Customers' westbound journeys were more reliable, across the key parts of the day. However, their eastbound journeys were a bit less reliable, despite the improvements in average journey times - the spread of journeys for most customers around the average had increased slightly. However, the worst journeys pre project in the interpeak were substantially improved. (Figure 12 and Figure 13)

Figure 12 Neutral month journey time reliability - Project extent (eastbound)



Source: TomTom satellite navigation data, August 2014 and 2019

Figure 13 Neutral month journey time reliability - Project extent (westbound)



Source: TomTom satellite navigation data, August 2014 and 2019

5. Safety evaluation

Summary

The safety objective for this project was to maintain and, where possible, improve current safety standards. The single carriageway between Temple and Higher Carblake was sandwiched between two sections of dual carriageway. As a consequence, the proportion of fatal and serious collisions for this section of single carriageway road was higher compared to the national average for this road type. Collisions had resulted in road closures with traffic having to be diverted onto unsuitable alternative routes.

The dualling of this section of road was expected to reduce the number of collisions for both the project and wider area as there would be fewer collisions that cause diversions onto unsuitable alternative routes.

The early indications were that the safety objective was on track to be achieved. The number and rate per hundred million vehicle miles of personal injury collisions were analysed to track a change over time. In the first 24 months of the dual carriageway being open to traffic, there had been a reduction in the rate and number of personal injury collisions compared with the annual average for the five years before the project was built.

Before the dualling became operational we observed one fatal collision in total and a total of 4.19 serious collisions and 12.81 slight collisions. During the first 24 months of operation, we observed five slight collisions.

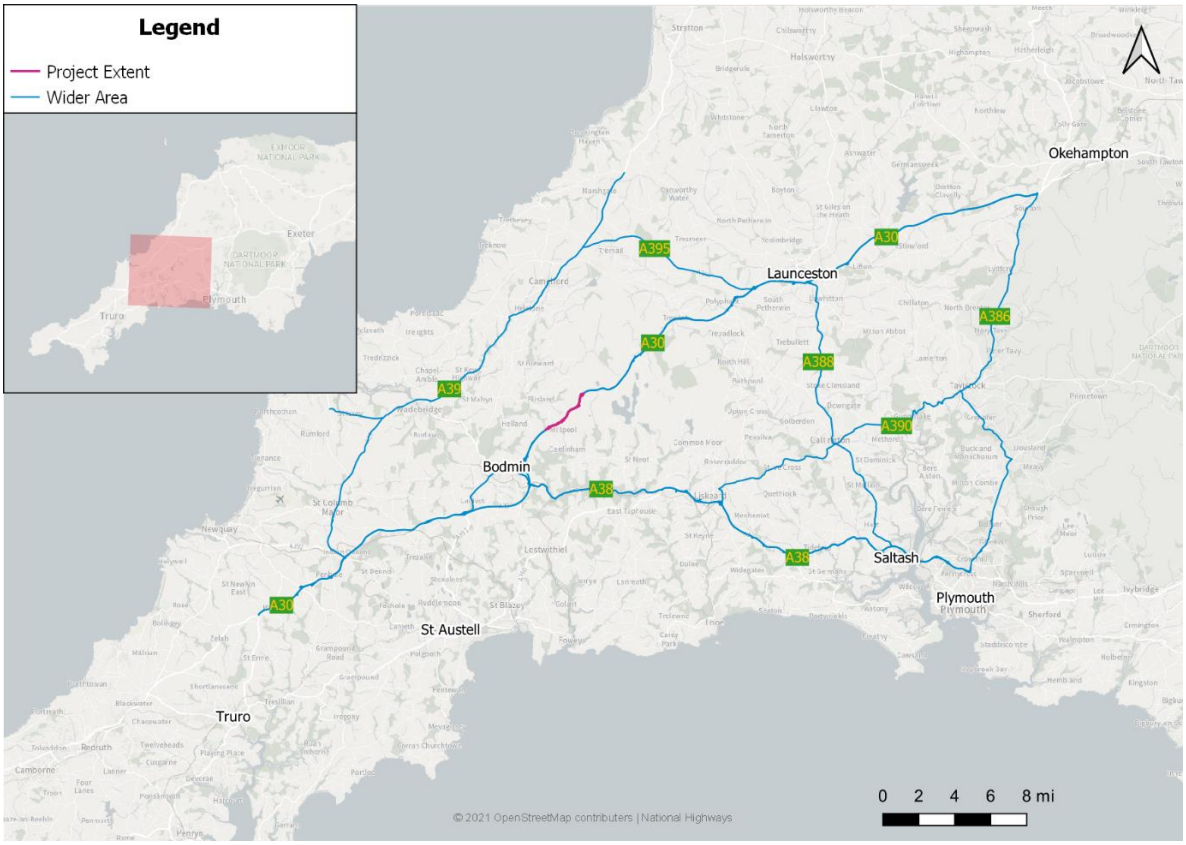
The dualling appeared to have had a positive impact on the safety in the wider area, potentially due to the route now supporting more road users.

The analysis will need to be revisited in later years before we are sure that the change is significant. It will require a longer timeframe to determine if these initial positive findings are a real trend or natural fluctuation.

Safety study area

The safety study area is shown in Figure 14. This is a wider area encapsulating both strategic and local roads surrounding the project. This area was assessed in the appraisal supporting the business case for the project. It checks any potential wider implications for the intervention. This information was then used with other predictions around the potential impact of the project such as by how much traffic may grow. We therefore replicated the appraisal study area to understand the emerging safety trends.

Figure 14 Safety study area



Source: National Highways and OpenStreetMap contributors.

What were the emerging safety trends within the first 24 months?

Safety data for this evaluation was obtained from Department for Transport Road Safety Data. This records incidents on public roads that were reported to the police. This evaluation considered only collisions that resulted in personal injury.

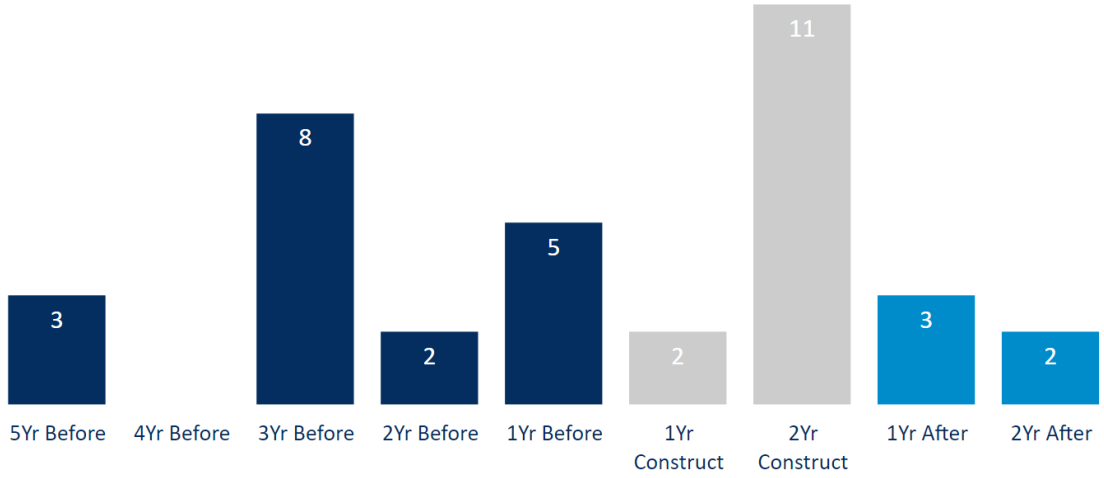
The safety analysis was undertaken to assess changes over time looking at the trends in the five years before the project was constructed to provide an annual average. We then assessed the trends from the first 24 months after the dual carriageway was operational and open for road users. This provided an early indication of the safety trends but will be monitored over a longer timeframe before conclusions about the safety impact of the project are drawn.

The analysis drew on the following data collection periods

- Pre-construction: 1 March 2010- 28 February 2015;
- Construction: 1 March 2015- 11 July 2017;
- Post-opening: 12 July 2017- 11 July 2019

The early indications were that the number of personal injury collisions for the first 24 months of the project were lower than the period before construction began. The number of personal injury collisions had reduced from an annual average of four to three personal injury collisions during the first 24 months of the project being open for road users. Safety trends can vary each year and we will monitor this trend over a longer timeframe before drawing conclusions about the safety impact of the dual carriageway.

Figure 15 Number of personal injury collisions



Source: STATS19 1 March 2010 – 11 July 2019[13]

As part of the safety evaluation, we look to assess what changes in personal injury collisions might have occurred due to factors external to the project over this timeframe. To do this we estimated the trend in personal injury collisions which might have occurred if the road had not been dualled (this is referred to as a counterfactual). This was based on changes in regional safety trends for conventional roads with a high volume of roads users. This helped us to estimate how the pre-construction safety levels would have changed over the evaluation period if the road had remained a conventional single carriageway

Previously the counterfactual for projects was based on the national trends averaged across all types of A road, the new method provides information for average conventional A roads and those with higher-than-average traffic levels. It also allows for differentiation between different types of projects.

In this case, it was not possible to produce a counterfactual for the project extent as to do so requires a count of at least 15 incidents per year. This was achieved in the wider area but not within the project extent.

How had the number of road users impacted on collision rates?

It is important to contextualise any incidents along a road project with the volume of traffic seen on it. To do so a collision rate is calculated: the number of collisions per annual hundred million vehicle miles (hmvm).

Before the project was constructed (based on the five-year pre-construction period), the average collision rate was 18 personal injury collisions per hundred million vehicle miles (an average of one personal injury collision for every six million miles travelled). Since the dualling the average collision rate was 11 personal injury collisions per hundred million vehicle miles (an average of one personal injury collision for every 9 million miles travelled).

If the route had remained a single carriageway, we estimated that the collision rate would be 15 personal injury collisions per hundred million vehicle miles. The initial indications are positive, but safety trends can vary each year and we will monitor

[13] There were no reported personal injury collisions at four years before. Zero is not shown

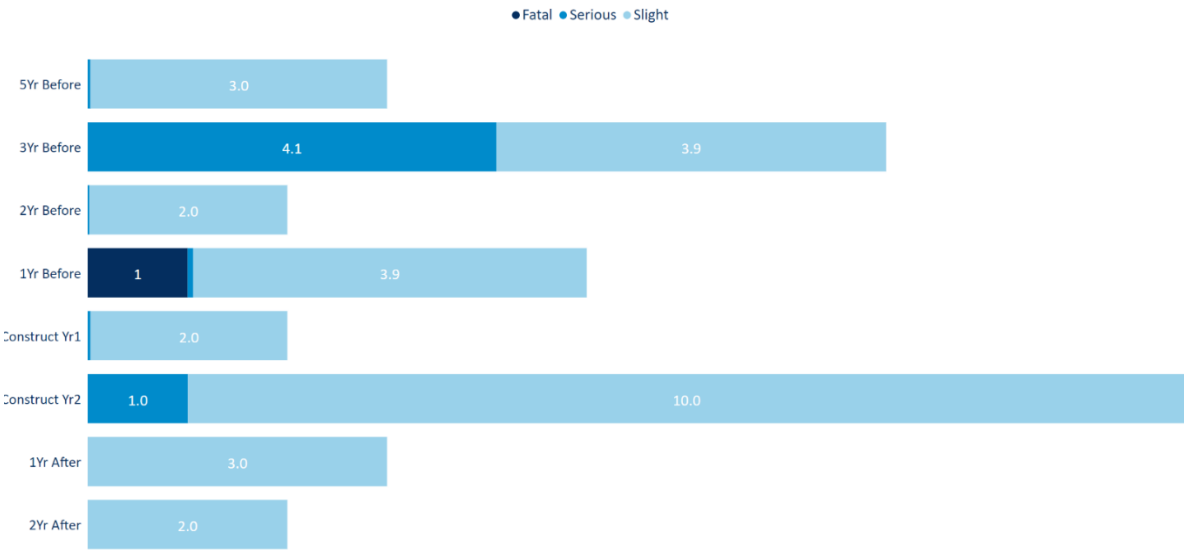
this trend over a longer timeframe before drawing conclusions about the safety impact of the project.

What impact did the project have on the severity of collisions?

Collisions which result in injury are recorded by severity as either fatal, serious, or slight. The way the police record the severity of road safety collisions changed within the timeframes of the evaluation, following the introduction of a standardised reporting tool – Collision Recording and SHaring. This is an injury-based reporting system, and as such severity is categorised automatically by the most severe injury. This has led to some disparity when comparing trends with the previous reporting method, where severity was categorised by the attending police officer[14]. As a consequence, the Department for Transport have developed a severity adjustment methodology[15] to enable robust comparisons to be made.

For this evaluation, one reporting mechanism was largely used prior to the project and another afterwards. The pre-conversion collision severity has been adjusted, using the Department for Transport's severity adjustment factors, to enable comparability with the post-conversion safety trends.[16]

Figure 16 Personal injury collisions by severity



Source: STATS19 1 March 2010 – 11 July 2019

Before the dualling became operational we observed one fatal collision in total and a total of 4.19 serious collisions and 12.81 slight collisions. During the first 24 months of operation, we observed five slight collisions.

How had safety trends changed across the wider study area?

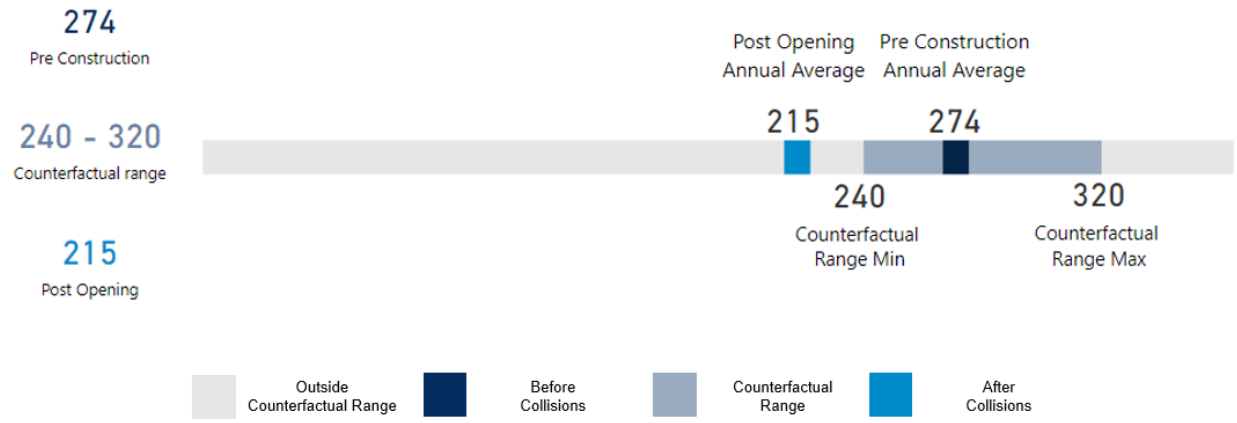
Changes in personal injury collisions in the wider impact area were analysed. The area was defined in the project's appraisal – where the evidence for the value of a

[14] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/820588/severity-reporting-methodology-final-report.odt
[15] https://www.gov.uk/government/publications/guide-to-severity-adjustments-for-reported-road-casualty-statistics/guide-to-severity-adjustments-for-reported-road-casualties-great-britain#guidance-on-severity-adjustment-use
[16] Collision Severities within this report use the 2020 adjustment factor

project is assessed ahead of a decision to deliver an intervention. The study area is shown in Figure 14

There was a reduction in the average number of personal injury collisions per year in the wider safety area, from 274 per year in the five years before the project to 215 in the first two years after. There were on average 59 fewer personal injury collisions per year in the wider safety area. It was estimated that if the route had remained a single carriageway the safety trends across the wider area would have remained in the range of 240-320 personal injury collisions per year.

Figure 17 Annual average number of personal injury collisions in the wider study area



Source: STATS19 1 March 2010 – 11 July 2019

How had traffic flow impacted collision rates?

The average collision rate had decreased to 15 per hundred million vehicle miles – this equates to travelling almost seven million vehicle miles before seeing an incident. Before the project this figure stood at 21 per hundred million vehicle miles. The decrease was six personal injury collisions per hundred million vehicle miles.

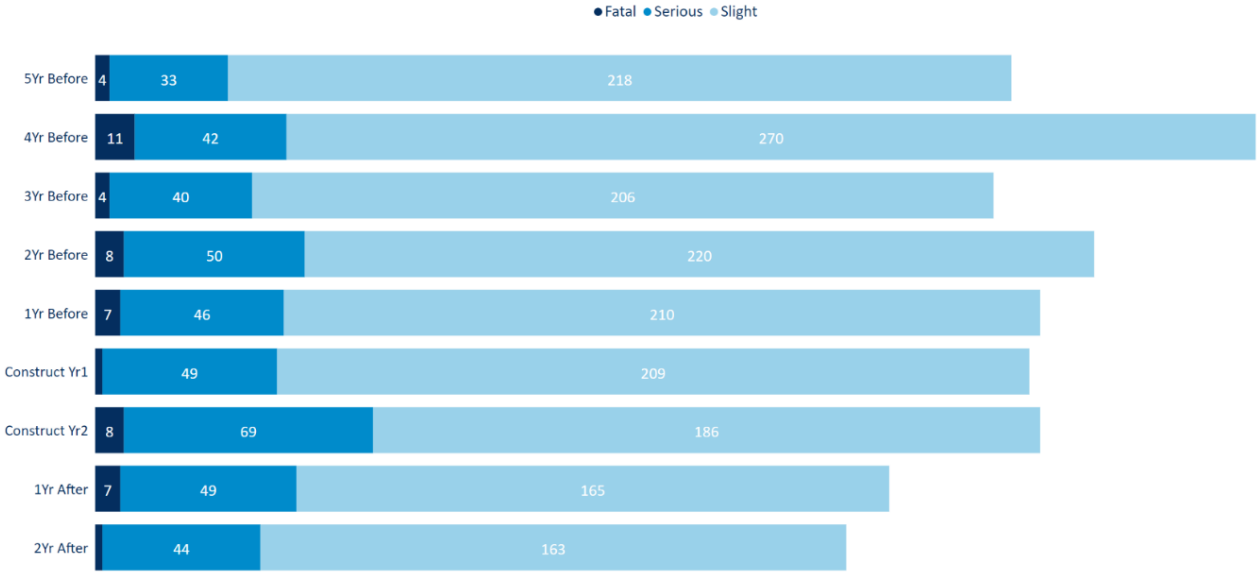
A counterfactual test was undertaken. It found that the collision rate would likely have been 20 collisions per hundred million vehicle miles in the counterfactual period; above that of the first 24 months after opening the project.

What impact did the project have on the severity of collisions across the wider area?

For the wider area the same methodology was used as for the project extent. Before the project became operational, we observed a total of 34 fatal collisions. During the first 24 months of operation, nine fatal collisions were observed.

Before the project became operational there was an annual average of 42.15 personal injury collisions with a serious casualty. During the first 24 months of operation, this has increased to 46.5. We have observed a reduction in the number of personal injury collisions with slight casualties. Before the project there was an average of 224.85, after this had reduced to 164.

Figure 18 Personal injury collisions by severity for the wider area



Source: STATS19 1 March 2010 – 11 July 2019

How had the project performed compared to expectations?

The dualling of this section of road was expected to reduce the number of collisions for both the project and also the wider area as there would be fewer collisions that cause diversions onto unsuitable alternative routes.

The project is forecasted to reduce the number of collisions for the project extent and wider area by an average of three per year (a reduction of 201 collisions over the projects 60-year lifespan).

Had the project's safety objective been met?

The analysis undertaken indicated that the project was on track to achieve its objective to improve road safety. However, safety trends vary year on year, and it cannot be confirmed that the objective had been met at this stage. Evaluation of safety trends should be revisited at five-years after once additional data has been collected and trends established. We will then determine whether the project has met its safety objective.

6. Environmental evaluation

Summary

The evaluation of environmental impacts used information on the predicted impacts gathered from the Transport Analysis Guidance (TAG) environmental appraisal[17] and the Environmental Statement. It then compared them with findings obtained one-year after the completion of all the project works. For the purpose of the evaluation of noise and air quality impacts, the one-year after (2019) observed traffic flows were compared to a 2019 forecast which was derived through interpolation of the 2017 and 2032 forecasts. These were provided in the Transport Assessment.

Observed impacts were determined during a site visit in September 2020 supported by desktop research. The results of the evaluation are recorded against each of the TAG environmental sub-objectives. Some key findings have been summarised below and also presented in Table 3.

The one-year after evaluation highlighted that:

Noise and Air Quality: Traffic flows were lower than forecast by 39% (14,803 vehicles). This suggested that the effects on the noise climate from traffic were likely to be 'better than expected', and the potential for air pollutant concentrations to be 'lower than expected' along the A30 corridor.

Landscape –The project had introduced new prominent features into the local landscape, but new mitigation planting had been provided to reduce the impacts. However, at one-year after, the planting was too immature to determine if the long-term objectives would be met.

Heritage and Historic Resources - Awareness of the A30 route corridor within the historic landscape had increased as expected. Archaeological mitigation and reporting of fieldwork had been undertaken as expected although at one-year after the proposed popular archaeology guide had not been produced and the interpretation boards had not been installed.

Water Environment – New drainage features designed to minimise impacts to the water environment had been provided, although it was not possible at one-year after to assess the effects on the local water environment.

Noise

The environmental appraisal stated that the dualling of this section of the A30 had the potential to slightly increase the noise and vibration levels experienced by nearby residents. This was due to changes in alignment, as well as associated changes in the speed and volume of traffic along existing and altered sections of road. Overall effects of the project on noise were assessed to be slight adverse.

The project had included the mitigation measures that were proposed to reduce the impacts of noise on sensitive receptors. This included low noise surfacing on the new and altered sections of the A30 and a noise barrier at Penhallow (bungalow east of Preeze Cross junction).

[17] https://www.gov.uk/government/publications/tag-unit-a3-environmental-impact-appraisal

It was not possible to compare traffic speeds or HGV numbers at one-year after with predictions from the Environmental Statement as comparable data was not available. POPE methodology states that if observed traffic flows are 25% more or 20% less than expected, the impact on noise will be assessed as worse than expected or better than expected respectively. Based on the traffic flow data in Annex 3 Table 4, it was likely that the effects of the project on the noise climate along the A30 were better than expected.

Air quality

The environmental appraisal stated that the impact of the project would have a slight worsening of air quality at the roadside. Although, with predicted concentrations well below the air quality objective[18] for the area, the potential impact of the project was considered unlikely to be significant. An initial assessment of likely impacts on nitrogen oxides concentrations over the Bodmin Moor Site of Special Scientific Interest (SSSI) suggested that the air quality objective for nitrogen oxides for the protection of vegetation was currently exceeded at the roadside. This would continue to be so for some time in the future. The overall effects of the project on air quality were considered to be slight adverse.

The main predicted air quality impact arising from the operational phase of the proposed project would be pollutant emissions arising from the changes to traffic flows and speeds.

It was not possible to compare traffic speeds or HGV numbers at one-year after with predictions from the Environment Statement as comparable data was not available. POPE methodology states that if observed traffic flows differ from forecasted traffic flows by more or less than 1,000 vehicles, the concentrations of air pollutants will be assumed to be higher than expected or lower than expected. Based on the interpolated traffic flow data in Annex 3 Table 4, it's likely that the concentrations of air pollutants along the A30 were lower than expected.

In addition, the Environment Statement stated that by alleviating congestion along the project, stop-start driving conditions would be reduced and therefore have a beneficial impact on air quality. More detailed assessment would be required to confirm and quantify this, however the traffic analysis conducted indicated that stop-start conditions had indeed been reduced.

Greenhouse gases

The environmental appraisal predicted that the project would have an adverse impact on carbon emissions dues to changes in traffic flows and traffic speeds following the implementation of the project.

The POPE methodology manual sets out an approach for evaluating the carbon emissions along our projects. It recognises that it is not possible to make a direct comparison between predicted and observed carbon emission. This is because the appraisal is based on the entire modelled area over 60 years whereas, at evaluation, traffic information for the whole study area is not usually available. Instead, we evaluate the impacts by comparing a forecast and observed emission

[18] Further information on air quality objectives can be found on the Government's website https://uk-air.defra.gov.uk/air-pollution/uk-eu-limits

just for the project extent. To calculate the emissions the emission factor toolkit[19] published by UK Government is used. For this project it was not possible to quantify the emissions along the project extend because we did not have sufficient information on the HGVs and speeds to enable this to be done.

However, based on the available traffic flow data the number of road users were 39% (more than 14,000) lower than forecast. This would suggest that carbon emissions may be lower than forecast along the project extent. However, it was not possible to quantify the change in emissions, because we did not have enough data on speeds and %HGVs.

Landscape

The environmental appraisal noted that the landscape within the study area was of particularly high quality and subject to both national and local designations. The appraisal described how the sweeping landforms of the granite moorland plateau within the Bodmin Moor Area of Outstanding Natural Beauty (AONB) gave an impression of bleak, endless vastness and huge scale compared with the more intimate surrounding lower valleys. At the local level between the junction at Cardinham Downs and the Pounds Conce / Peverell's Cross, the appraisal stated that the landscape was characterised by gently rolling enclosed farmland drained by occasional streams. On the Bodmin Moor section, it is characterised by open unenclosed moorland.

The widening of A30 and the new overbridges involved was predicted to increase the dominance of the road in the landscape. It was expected that the long-term adverse landscape and visual impacts would be reduced by including a range of mitigation measures. These measures were designed to integrate the project as far as possible into the local landscape character. This would include the siting and detailed design of crossings and new planting and natural regeneration.

The appraisal concluded that the overall effects on the local landscape would reduce from moderate adverse during and immediately following construction to slight adverse after 15 years once mitigation planting had matured.

Our evaluation found that the project widening had mainly been within the existing A30 road corridor. However, as expected the new infrastructure, particularly the grade separated junctions and earthworks, had introduced prominent features into the local landscape.

Mitigation planting and seeding was in place and given time and subject to successful ongoing establishment should help reduce the landscape and visual effects of the project. As expected, the project reflects local design characteristics and used local materials. Local stone had been used as cladding at structures and in locally characteristic detailing such as standing stones. Traditional Cornish hedges had been incorporated as boundary features to help integration with the surrounding landscape.

[19] https://laqm.defra.gov.uk/air-quality/air-quality-assessment/emissions-factors-toolkit/

Figure 19 View north along A30 from Preeze Cross

Source: Site visit 2020

Figure 20 Cornish hedges at Preeze Cross

Source: Site visit 2020

At one-year it was considered likely that the effects of the project on local landscape character and visual amenity were in line with those predicted. However, it was considered too early to fully evaluate the effectiveness of the landscape mitigation measures as they had yet to fully establish. The project included a five-year aftercare period which should ensure that the mitigation planting establish sufficiently to ensure the longer-term design objectives are achieved. The project will be evaluated again at five-years after to monitor progress and when further information, including the as built drawings and the final version of the Handover Environmental Management Plan[20] should be available.

Heritage of historic resources

The environmental assessment and appraisal identified that the study area contained several historic landscapes, such as east of Pounds Conce, as well as a large number of archaeological features. These features were of local, regional, and national importance and included the scheduled monument at Peverell's Cross. The assessment also highlighted the presence of listed buildings across the

[20] A document that provides details of the outcome of aftercare monitoring and plans for long term maintenance to ensure the design year outcomes will be met.

study area and considered the potential for impacts from the dualling on their settings. This was assessed to range from slight to moderate adverse depending on the mitigation undertaken[21]. This was because the project design would generally be a widening of the existing A30 which would minimise the impact on the surrounding historic landscape and setting of historic buildings. It was also considered that although the project involved widening, much of the adjacent verges had been disturbed and therefore the impact on buried archaeology would be limited. An agreed programme of archaeological investigations would be undertaken to reduce these impacts further.

Our evaluation included a site visit to observe the impacts of the project on historic landscapes and the setting of listed buildings. It also included a review of the available documentary evidence.

Historic landscapes

The Environmental assessment noted that the high concentration of prehistoric features, including settlements and barrows, in the study area were visible within the open moorland landscape and were characteristic of the setting. As expected, it was considered at one-year after that the introduction of new structures and earthworks into the open landscape had an adverse visual effect on settings. These new features were detracting from the experience and understanding of these heritage assets.

At Temple Tor junction the environmental statement stated that:

'*the impact of the scheme on the settings of designated and equivalent value heritage assets around the proposed dualling corridor is assessed as Moderate adverse overall. Should the scheme be modified to avoid the introduction of a bridge over the A30 at the Temple Tor junction on the east, the residual overall effect on settings would be considered to be Slight adverse. Otherwise, the Moderate adverse effect on settings would remain.*'

The project was not modified, and a bridge had been constructed at Temple Tor, which was prominent in the local landscape. Therefore, it was considered at one-year that the impact of the project on the settings of designated and equivalent value heritage assets around the proposed dualling corridor was moderate adverse overall as predicted by the environmental statement.

Archaeology

Our evaluation confirmed that archaeological mitigation and reporting of fieldwork had been undertaken and effects were likely to be as expected. The archaeological report noted that the project archive was currently being stored at Cornwall Archaeological Unit premises but would be transferred to an archive repository when space became available. The environmental statement proposed that a guide to the history of the A30 east of Bodmin would be produced to provide additional mitigation and to engage with wider non-academic readers. At one-year after it was not known if this proposed guide had been produced. This will be revisited at five-years after.

[21] Both the appraisal and environmental statement predicted that the impacts could be slight adverse. The latter specifying that specific mitigation relating to modifying the design would be required otherwise the moderate adverse effect on settings would remain.

Listed buildings and other historic features

The environmental assessment predicted that although there would be no direct impact, the settings of the scheduled Peverell's Cross and two listed milestones would be adversely affected. This was because the project would obscure the historic origin of the road to which they relate. These impacts would be partly mitigated by installing interpretation boards and inclusion in a proposed guide to the history of the A30 east of Bodmin. It was also expected that footpath access would be made available at Peverells' Cross. At one-year after the interpretation boards had not been installed. This will be revisited at five-years after when further information on what is proposed will be known.

The environmental statement predicted that the project would not have a significant impact on the settings of the Church of St Catherine at Temple (Grade II*) or the Old Farmhouse and barn at Merrifield (Grade II). The project would however have slight adverse impacts on the setting of Trewardale (Grade II*); Praze Farmhouse (Grade II) and Trethorne Farmhouse (Grade II). The evaluation site visit confirmed that the impacts were as expected.

Overall, the effects of the project on heritage and historic resources were considered to be as expected for archaeology and listed buildings. Historic landscape was worse than expected in the appraisal because the modification to avoid the introduction of a bridge over the A30 at the Temple Tor junction, recommended in the environmental statement was not undertaken.

Biodiversity

The environmental assessment reported that the project falls partly within the Bodmin Moor Site of Special Scientific Interest. The project survey area consisted of a wide variety of statutory designated and non-statutory designated habitats including woodland, heath and mire[22]. Large areas of managed grassland were present along the road verges, with numerous hedges and mature trees. Species identified within the study area included badger, otter, dormice, bats, reptiles, butterflies including the Marsh Fritillary[23] and aquatic macro-invertebrates.

The appraisal stated that the impacts of the project on ecology would mainly occur during the construction phase and be caused by approximately 10 hectares of land take. This would cause initial low-level habitat loss and severance of habitat for a wide range of species that used the area and potentially increased mortality for a few species.

Once the project opened, the impacts would be caused by an increased risk of animal mortality caused by collisions with vehicles and the increased fragmentation of habitats by the widened road. The fragmentation would make it harder for species to move and forage across different habitats. These were determined to have the potential to impact on population levels and so a range of mitigation measures were proposed. These measures would reduce the residual effects such that they were significant at no more than a local level. The appraisal concluded that the overall effects on biodiversity would be slight adverse.

The evaluation confirmed that mitigation measures had been provided broadly as expected including replacing lost habitat and new enhancement areas. Measures

[22] A wetland area dominated by living peat-forming plants
[23] https://butterfly-conservation.org/butterflies/marsh-fritillary

also included safe wildlife crossings (mammal ledge beneath the road) and fencing; dormice compensatory habitat and nest boxes; bat boxes and reptile hibernacula.

Figure 21 Otter fencing and mammal ledge within culvert at Pounds Conce

Source: Site visit 2020

At one-year after, As-built plans, information relating to any monitoring due to be undertaken in 2020 and final reporting of other monitoring activity was not available. At the one-year stage it was considered that the planting and seeding areas were not well enough established to be providing habitat connectivity or vegetation cover. However, given time this should develop as expected. A draft Handover Environmental Management Plan had been produced and it included details of the monitoring and maintenance designed to ensure the design year outcomes would be met.

Based on the available information, our evaluation confirmed that the key mitigation measures and enhancements had been implemented and as such biodiversity outcomes at one-year were considered to be as expected. This will be reassessed during our five-year after evaluation when further information on maintenance and monitoring will be available.

Water environment

The environmental statement reported that the project crossed the boundary of two main river catchments, the River Camel to the north and the Fowey River to the south. The existing road drained, either via road gullies or over the verge into minor tributaries of Cardinham Water and Warleggan River or via infiltration to groundwater. It was noted that this system did not provide pollution or flood control measures. Sensitive features of the water environment near the project included the Temple Fishery, private water supplies, designated fisheries, the South West Water reservoir and the River Camel Special Area of Conservation (SAC).

The project would include a drainage strategy and new drainage infrastructure designed to ensure no significant adverse effects would arise. A new drainage

network would ensure all road surface run off was collected and channelled through one of three balancing and attenuation ponds before being discharged via interceptors. This would provide an opportunity for water quality improvements as well as mitigation to ensure the additional road surface runoff caused by the road widening did not increase flood risk. Overall, the appraisal predicted that the impact on the water environment would be neutral or possibly beneficial.

Drainage features observed at one-year after included various filter drains and culverts which appeared to be functioning as expected. The balancing ponds and attenuation features had been landscaped and planted to create new wetland habitats and provide opportunities for water quality treatment as was expected. However, there was evidence at some locations of soil erosion due to slow establishment of the grass sward. This should be reconsidered at five-years after.

Figure 22 Balancing pond with wildlife enhancements near Temple Tor

Source: Site visit 2020

The environmental assessment expected that the drainage system would be maintained through periodic inspections and maintenance works. This would include the clearance of vegetation from surface drains and silt from catch-pits and interceptors. Monthly monitoring of chemical water quality would be undertaken for twelve months following the opening of the project through surface and groundwater sampling. In addition, two biological water quality samples would be taken at six-monthly seasonal intervals. This monitoring would seek to understand whether water quality was the same or better than baseline levels in the environmental statement.

Our evaluation confirmed that the impacts were broadly as expected, and the mitigation had been installed. However, at one-year after As-built information relating to drainage network or water quality monitoring results or ongoing maintenance was unavailable. This information would be required to confirm if any effects on the local water environment had arisen. Therefore, at one-year after it was considered too early to fully evaluate impacts on water quality and drainage and so this should be reconsidered at five-years after.

Physical activity

The appraisal recorded that the construction of over bridges would lead to improved facilities for pedestrians and cyclists. However, due to the low level of population adjacent to the project and the rural nature, benefits would be slight.

Car use was predicted to remain high. The appraisal concluded that the overall effects of the project would be slight beneficial.

The existing A30 already severed connections and affected the enjoyment of users accessing footpaths near the project. As expected, our site visit confirmed that some minor adjustments to the alignment of footpaths had been made where the few existing footpaths abut the A30. New signage had also been added to make it clear that the A30 was not a route suitable for pedestrians. Facilities to enable NMUs[24] to make use of the new safer crossings at the overbridges were in place which may enable increased NMU activity in the vicinity of the project. However no new NMU surveys were undertaken specifically for this evaluation, and National Highways was not aware of any other audits or user studies having been undertaken for this project. At one-year after it was not possible to quantify any changes in pedestrian or cyclist use that the project may have caused.

Based on the information available, the impacts of the project on physical activity were likely to be as expected. However, further information would be required to confirm the level of any benefits that might have occurred for NMUs.

Journey quality

The appraisal of journey quality considered traveller care (facilities and information), traveller views, and traveller stress (driver frustration, fear of potential accidents, and route uncertainty). The appraisal considered that journey quality would be improved by providing safer overtaking opportunities along the section of the A30 and assessed the impact of the project to be slight positive.

Our evaluation included a site visit as well as a qualitative review of the analysis on customer journeys and safety in sections 4 and 5 of this report.

Traveller Care - Changes to facilities and information were not a project requirement and were not evaluated as part of this study. However, it was noted during the site visit, that the existing small car park / rest area at Temple Junction remained accessible and well used.

Traveller Views - Many of the open and distant views from the A30 towards the wider surrounding moorland landscape were still visible. As landscape planting becomes more established and mature, it will in time restrict some traveller views. Traveling through cuttings and when close to overbridges / earthworks also restricted previous long distant views. These impacts were as expected.

Traveller Stress - Journey times had improved because of the increased capacity and reduced congestion and delay. The route was more likely to be resilient to the impact of accidents. Route uncertainty was likely to have improved as drivers had less need to re-route onto unfamiliar country roads. These changes were likely to have reduced traveller stress.

Overall, as driver stress was expected to have reduced, it was considered that journey quality had improved as expected.

[24] Non-motorised users such as pedestrians, cyclists and equestrians

Overview

The results of the evaluation are summarised against each of the Transport Appraisal Guidance (TAG)[25] environmental sub-objectives and presented in Table 3.

Table 3 Overview of environmental impacts

Sub-objective	Appraisal Score	One-year Evaluation	Summary
Noise	Net Properties win/lose NPV -£0.029m Slight Adverse	Better than expected	A low noise surface and environmental barrier was installed. A comparison of forecast and observed traffic data suggested that noise impacts were likely to be better than expected.
Air quality	Slight adverse	Likely to be better than expected	A comparison of forecast and observed traffic data suggested that air quality impacts were likely to be better than expected
Greenhouse gases	Adverse	Only the project extent considered.	Total traffic flows along the project extent were lower than forecast. This may suggest that emissions were lower than forecast but it was not possible to quantify across the whole impact area.
Landscape	Slight adverse	Too early to say	The project was mainly within the existing A30 road corridor as expected. New infrastructure had introduced new prominent features into the local landscape. Mitigation planting and seeding was in place, but more time was required to determine if the mitigation would be successful.
Townscape	N/A	-	Townscape was scoped out of the appraisal and the evaluation.
Heritage of historic resource	Slight adverse	As expected for archaeology. Worse than expected for	The project had introduced new infrastructure into the landscape and archaeology investigations were undertaken. However, an overbridge had been included at Temple Tor junction. The

[25] TAG provides guidance on appraising transport options against the government's objective for transport.

		historic landscape	environmental statement suggested that this would cause moderate adverse impacts.
Biodiversity	slight adverse	As expected	The project had caused loss and fragmentation of habitats. Mitigation had been provided that should in time deliver the design year outcome.
Water environment	Neutral	Too early to say	The new drainage network had been installed broadly as expected and mitigation was in place. Water quality monitoring programme was proposed but data was not available.
Physical activity	Slight beneficial	As expected	New safer crossings at the overbridges were in place which should encourage more physical activity
Journey quality	Slight positive	As expected	Traveller care was unaffected and traveller views had altered as expected. Lower congestion and delays had reduced traveller stress.

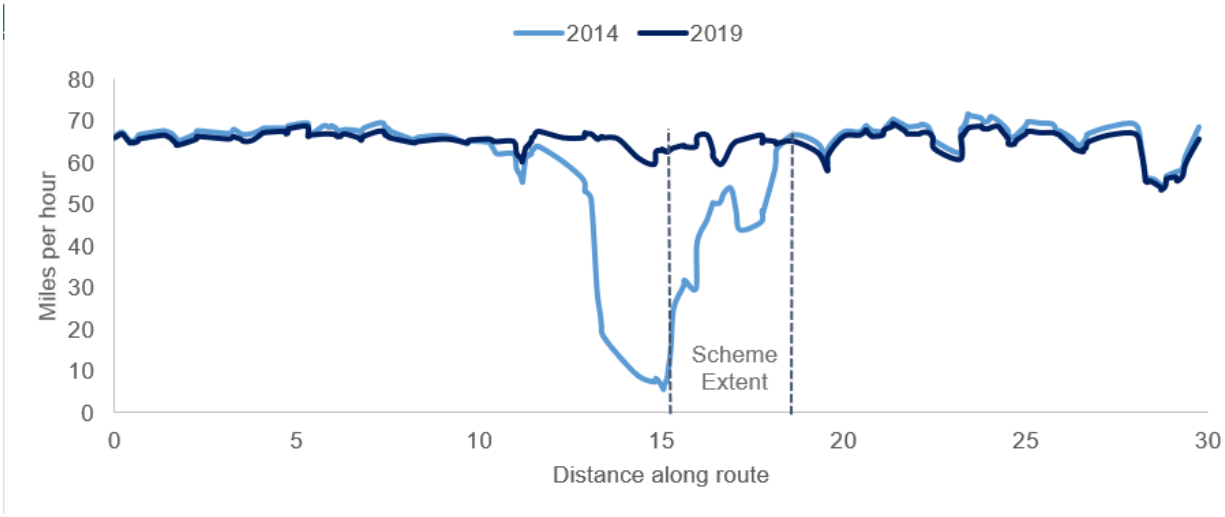
7. Value for money

When a project is appraised, an economic assessment is used to determine the project's value for money. The assessment is based on an estimation of costs and benefits from different sources. This includes Transport Economic Efficient (TEE) benefits (savings related to travel times, vehicle operating costs and user charges), accident costs (savings related to numbers and severity level of accidents) and costs to users due to delays during construction and future maintenance periods.

This was out of scope for the one-year after evaluation, but an attempt to reforecast an outturn BCR (Benefit-cost ratio) will be made at five-years after.

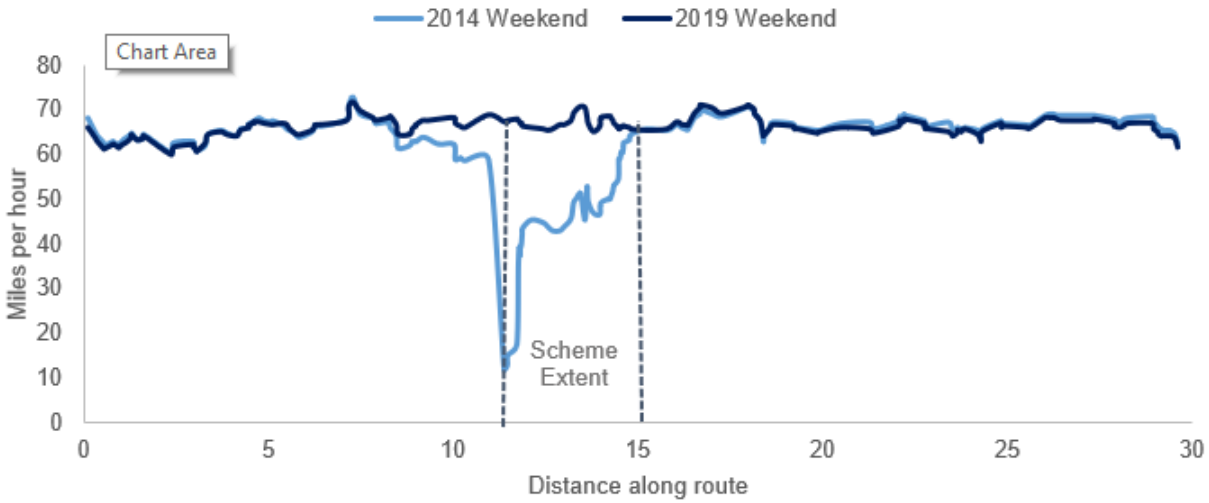
Annex 1: Speed impacts

Figure 23 Average speeds - eastbound, summer weekend



Source: TomTom GPS Data (August 2014 and 2019)

Figure 24 Average speeds - westbound, summer weekend



Source: TomTom GPS Data (August 2014 and 2019)

Annex 2: Safety Methodology

Police forces choose how they collect STATS19 data. Some police forces do this electronically, for example using mobile devices, while others complete paper forms which are later digitised. In addition, some collisions are reported by members of the public after the event. Since 2016, new data collection systems (called CRaSH and COPA) have been introduced by some police forces.

Before these new systems, reporting police officers categorised the severity of non-killed casualties as either serious or slight according to their own judgment of the injuries sustained. This was based on information available within a short time of the collision, and often did not reflect the results of medical examination. This sometimes led to casualties being incorrectly classified as slight injuries when they were serious, or vice versa.

In December 2015 Devon & Cornwall police constabulary transferred from Stats19 to CRaSH (Collision Recording and Sharing) system for reporting personal injury collisions. In CRaSH reporting, police officers record the types of injuries suffered by the casualty rather than the severity. In previous systems the determination of severity was at the discretion of the reporting police officer. CRaSH automatically converted the injury type to a severity classification. This led to implications for reporting on collision severity as there had been an increase in the number of serious collisions recorded.

These changes make it difficult to monitor trends in the number of KSI casualties over time or between different police forces. To help with this, the Office for National Statistics (ONS) has undertaken research to identify methods of estimating and adjusting for the increased recording of serious injuries in the new systems. Based on this work, DfT have published an adjusted time series of KSIs at the national level and statistical adjustments at the record level. These adjustments are based on estimates of how casualty severities may have been recorded had injury-based severity reporting systems always been used.

The adjustments will be reviewed by the ONS and DfT as more data becomes available, and it is possible that further refinements will be made to the adjustment methodology in the future. Currently it is not possible to reliably adjust collision severity information at the granular level required for this project.

Annex 3: Two-way AADT flows on the A30

Table 4 Two-way AADT flows on the A30

Location	Interpolated one-year after forecast[26]	Observed 2019 (one-year after)	Difference between observed 2019 and interpolated one-year after forecast
A30	38,250	23,447	14,803 (39%)

Source: Interpolated from the traffic forecast report

[26] A forecast AADT value was not available within the appraisal documents. As such, a forecast AADT was calculated by factoring available forecast data.

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