Appendix E

Appendix E – Demand Sensitivity Test

1 Overview

A strategic traffic model for Cookstown and its surrounding area was developed by WSP to assess the likely impacts of the proposed A29 Cookstown Bypass scheme.

The A29 Cookstown Bypass 2019 base model was built using various data collected from Automatic Traffic Counters (ATCs), Manual Classified Counts (MCCs), Automated Number Plate Recognition (ANPR), Car Park Interview and Roadside Interview surveys (RSIs) undertaken in between March 2019 and April 2019. The A29 Cookstown Bypass Local Model Validation Report (Ref: 718314-2700-R-0004 – November 2019) documents base model development and validation.

Following the unexpected event of Covid-19 pandemic, in April 2023, the DfT issued guidance on accounting for the Covid pandemic in traffic models. In line with this guidance, volumetric traffic data was collected in autumn 2023 to inform the performance of the traffic model against the observed post-Covid traffic data. This confirmed the model's suitability as a tool to be used for the assessment and appraisal of the A29 Cookstown Bypass scheme at SAR3 stage. The results of the model verification exercise are reported in Stage 3 Scheme Assessment Report (Ref: 718314-0000-R-022), Appendix B.

At SAR3 stage, traffic forecasts were updated to reflect the refined scheme design and programme, and to incorporate the various parameter and guidance updates available at the time of model forecast development. Whilst some of the guidance and parameters available at SAR3 stage took account of the Covid pandemic and its impacts, some of the parameters available at the time of model forecast development have subsequently been revised and updated as further information became available. Specifically, the following updates have been published following the SAR3 model forecast development:

- an update to TEMPro-NI v8 which was made available by DfI in summer 2023, which replaced TEMPro-NI V7.3 used in the SAR3 core assessment
- a DfT release of National Road Traffic Projections (NRTP) 2022, which replaced the previous RTF18 projections used in the SAR3 core assessment; and
- an update to the DfT's projections of Fuel and Income factors affecting car travel demand, published within the TAG Databook May 2024.

In order to better understand the potential impact of these updates on the scheme economic performance, a sensitivity test, termed Demand Sensitivity, was undertaken. The assumptions underpinning the Demand Sensitivity test reflect the updates to traffic growth projections released by both DfT and DfI in the period after the completion of traffic forecasting for SAR3.

This note sets out the methodology and presents the outputs of the Demand Sensitivity test, as well as the implications of the outputs on the proposed scheme Value for Money (VfM) categorisation.

2 Demand Forecasting Approach

2.1.1 Forecasting Assumptions

As set out in SAR3 report section 6.2.4, the future year car demand matrices were developed based on local information on expected traffic generation from the proposed developments within Cookstown, and the background growth from TEMPro-NI v7.3. For LGV and HGV growth, use was made of Road Transport Forecasts 2018 (RTF-2018) produced by the Department for Transport. For car user classes, the overall growth in demand was constrained to the appropriate national and regional traffic growth estimates from TEMPro-NI v7.3.

Impacts of future fuel pricing and income changes on car user demand were incorporated through the application of fuel and income factors, derived from Table M4.2.1 in the TAG Data Book v 1.18 (May 2022).

The traffic demand forecasting undertaken for the Demand Sensitivity test relied on the same local information on expected traffic generation from the proposed developments within Cookstown as the Core Scenario but used updated car traffic forecasts from TEMPro-NI v8 and the updated goods vehicle forecasts from NRTP22, together with the most recent fuel and income adjustment factors from TAG Data Book v1.23 published in May 2024.

Assumptions around supply i.e. the highway network assumptions, have remained entirely consistent with the core scenario reported within the SAR3 report.

2.1.2 Forecast Trip Growth

Table 1 presents the hourly matrix totals for the Core Scenario and the Demand Sensitivity scenario. The matrix totals are presented for each modelled time period for forecast years 2027 and 2042. When compared to the Core Scenario, the Demand Sensitivity trip totals show 1 to 4% reduction in the scheme opening year and 7 to 12% reduction in the design year. The greatest reduction in trips is noted in the inter-peak period.

Table 1: Summary of Matrix Totals

Scenario	Model Year	Total Trips (in PCUs/Hr)		
		AM	IP	PM
Core Scenario	2027	7,291	6,336	8,294
	2042	8,575	7,610	9,867
Demand Sensitivity	2027	7,248	6,097	8,190
	2042	7,944	6,683	9,054
% Difference	2027	-1%	-4%	-1%
	2042	-7%	-12%	-8%

3 Traffic Forecasts and Economic Appraisal Results

3.1.1 Traffic Flow Forecast

As shown in Table 1 in the previous section, the total demand across the network in 2027 is marginally lower in the Demand Sensitivity test when compared to the Core Scenario, with a more notable reduction in demand of up to 12% in 2042. This is a direct reflection of the differences in traffic growth parameters in the more recent national projections. As expected, this is reflected in traffic flows whereby at a daily level, lower AADT flows through Cookstown are forecast in the Demand Scenario when compared against the Core Scenario, particularly in 2042. Correspondingly, this results in lower AADT flows on the proposed Bypass in the Demand Sensitivity with a reduction of around 8% in traffic using the Bypass relative to the Core Scenario in 2042.

3.1.2 Economic Appraisal

The economic assessment of this Demand Sensitivity test was limited to the appraisal of transport economic efficiency benefits, accident benefits and indirect tax revenues only, which form in excess of 85% of the total established monetary impacts of the scheme.

3.1.3 Economic Efficiency Results

Table 2 shows the transport user benefits for each scenario, along with the absolute and proportional difference between the two scenarios. All values are in £000's in 2010 values and prices.

Table 2: Transport User Benefits (£000's) and Comparison

Time Period	Core Scenario	Demand Sensitivity	Absolute Difference	Proportional Difference
AM peak period	27,127	24,408	-2,719	-10.0%
PM peak period	32,179	28,417	-3,762	-11.7%
Interpeak period	50,372	41,793	-8,579	-17.0%
TOTAL	109,678	94,618	-15,060	-13.7%

Overall, the Demand Sensitivity test results in a reduction in transport user benefits of approximately 14%. The same trend is observed across all three time periods, with benefits in AM and PM reducing by 10-12% and a larger difference in the interpeak period at 17% reduction. The reduction in benefits is due to the decreased projection of traffic growth in and around Cookstown, which will reduce the delays and congestion within the town in the Do Minimum scenario. This reduced delay in the Do Minimum scenario means that the economic impact of the Do Something (with the bypass) is also reduced in the Demand Sensitivity scenario.

3.1.4 Accident Benefits

Table 3 presents the benefits that can be attributed to reductions in collisions and their severity. All values are in 2010 prices.

Table 3: COBALT Results and Comparison

Benefit Metric		Core Scenario	Demand Sensitivity	Absolute Difference	Proportional Difference
Economic Benefits (£000's)		13,164.8	12,861.0	-303.8	-2.3%
Number of Collisions Saved		404.4	390.0	-14.4	-3.6%
Number of Casualties Saved (By Severity)	Fatal	0.2	0.3	0.1	50.0%
	Serious	41.7	40.4	-1.3	-3.1%
	Slight	463.7	448.7	-15.0	-3.2%

Overall, the Demand Sensitivity test results in a reduction in benefits, and a reduction in the number of casualties saved by the scheme. This is because of the reduction in the overall forecast demand in and around Cookstown under the Demand Sensitivity scenario, which reduces the number (and in turn, the total monetary value) of projected collision savings.

3.1.5 VFM Assessment

As noted above, the economic assessment of the Demand Sensitivity test was limited to the appraisal of transport economic efficiency benefits, accident benefits and indirect tax revenues only. For all other aspects, Core Scenario values reported in SAR3 were retained, including the scheme costs. Table 4 shows the comparison of the Demand Sensitivity test against the Core Scenario. It also presents the economic appraisal results of the Low and High traffic growth sensitivity tests which identify the range of BCRs that the scheme is expected to fall within.

The Economic appraisal of the Demand Sensitivity presented in Table 4 has shown, it provides a lower NPV and BCR than the Core Scenario. This is because of the lower levels of traffic predicted in the Demand Sensitivity test leading to a lower level of congestion across the model network in the Do Minimum, combined with a lower volume of bypass users in the Do Something, which results in fewer vehicles benefiting from the scheme.

Table 4: Appraisal Summary (£000's) and Comparison

Benefit and Cost Category	Low Growth Scenario	Core Scenario	High Growth Scenario	Demand Sensitivity
Local Air Quality	*5,225*	*5,225*	*5,225*	*5,225*
Greenhouse Gases	*3,282*	*3,282*	*3,282*	*3,282*
Noise	*8,291*	*8,291*	*8,291*	*8,291*
Accident Savings	12,318	13,165	14,115	12,861
Economic Efficiency: Consumer Users (Commuting)	26,421	31,622	33,162	30,049
Economic Efficiency: Consumer Users (Other)	28,690	35,467	42,348	28,820
Economic Efficiency: Business Users and Providers	36,103	42,590	48,280	35,750
Wider Public Finances (Indirect Taxation Revenues)	-1,955	-2,563	-3,116	-2,214
Construction and Maintenance	*-783*	*-783*	*-783*	*-783*
PVB (TUBA+COBALT)	**103,532**	**122,844**	**137,905**	**107,480**
Present Value Benefits - PVB	**117,592**	**136,296**	**150,804**	**121,281**
Present Value Costs -PVC	***34,215***	***34,215***	***34,215***	***34,215***
Net Present Value - NPV	**83,377**	**102,081**	**116,589**	**87,066**
BCR	**3.44**	**3.98**	**4.41**	**3.54**

Note: Values in Italics have been taken directly from the SAR3 assessment of the Core Scenario

Table 4 shows a comparison of total PVB, PVC, NPV and BCR for the Core Scenario, Low growth scenario, High growth scenario and the Demand Sensitivity scenario. This clearly demonstrates that in all modelled scenarios, the scheme provides a positive NPV and a BCR exceeding 3.4. This places the scheme in the High Value for Money (VfM) category. Despite it not providing as high transport user benefit as the Core Scenario, the results of the Demand Sensitivity test achieve a BCR of 3.54 placing it within the range of Low and High Growth BCRs reported as part of the SAR3 assessments and continue to place the scheme at High VfM category.

4 Summary And Conclusions

Sensitivity tests have been undertaken to reflect the updates to economic parameters and traffic growth projections released by the DfT and DfI after the completion of traffic forecasting for SAR3. These include:

- an update to TEMPro-NI v8 which was made available by DfI in summer 2023, which replaced TEMPro-NI V7.3 used in the SAR3 core assessment
- a DfT release of National Road Traffic Projections (NRTP) 2022, which replaced the previous RTF18 projections used in the SAR3 core assessment; and
- an update to the DfT's projections of Fuel and Income factors affecting car travel demand, published within the TAG Databook May 2024.

To test the cumulative impact of these changes the SAR3 traffic model was rerun updating the above parameters and an economic assessment was undertaken. The economic assessment of the Demand Sensitivity test was limited to the appraisal of transport economic efficiency benefits, accident benefits and indirect tax revenues only, which form in excess of 85% of core scheme benefits.

The results of the Demand Sensitivity test demonstrate that even with the updated economic parameters and revised growth projections, the scheme is shown to achieve a BCR of 3.54 placing it within the range between Low and High Growth BCRs and continues to place the scheme at High Value for Money (VfM) category.

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