Appendix D

Traffic Assessment Results for End-to-End Scheme incorporating Online Dualling

The following tables present the results of the traffic assessment of online dualling at Inverurie for the end-to-end route combinations that offer the best performance against each of the individual scheme objectives.

The route options (Cyan, Red, Pink and Brown) all connect with the online dualling options at Inverurie via a section of the Orange route option west of Drimmies. For each of the online dualling options there are therefore four end-to-end route combinations, between east of Huntly and the Tavelty Junction at Kintore, with each end-to-end route generating different levels of impacts.

The online dualling options at Inverurie were tested for all four end-to-end routes using the A96 Corridor Road Assignment Model (CRAM v 1.4). Their traffic impacts, (traffic flows, journey times and accident benefits), were determined by comparing them to the traffic impacts of the Do-Minimum (Do-Min) scenario in the forecast year 2030 (year of opening of the dualling scheme).

The Do-Min scenario includes forecast traffic growth and the traffic impacts of new and committed infrastructure and land use developments (excluding the A96 dualling).

The change in the level of traffic impacts between the Do-Min and the end-to-end dualling combinations was calculated to determine how each of the online dualling options at Inverurie performed against the transport scheme objectives.

The transport impacts of the D2APc (GSJ) and D2APb (At-Grade) online dualling options in the 2030 year of opening are presented in the following tables and their performance appraised against the scheme objectives. There is no significant difference in traffic flows and performance for the D2UAP (GSJ) and D2UAP (At-Grade) carriageway cross-section.

Traffic assessment results for end-to-end scheme incorporating D2APc (GSJ) online dualling at Inverurie					
Scheme Objective (SO)	Measure	Do-Minimum	Do-Something	Change	Appraisal rating
SO1.1 Reduced journey times	Average peak journey time (eastbound am and westbound pm) from Huntly to Craibstone Roundabout	49mins 37s	38mins13s	-11mins 24s	Major benefit
SO1.2 Improved journey time reliability	Difference between congested peak and uncongested interpeak journey times Huntly to Craibstone Roundabout	18mins 37s	9mins 24s	-9mins 13s	Moderate benefit
SO1.3 Increased overtaking opportunities	Total trip distance made in vehicle kilometres on dual carriageway sections of A96, as these offer better overtaking opportunities	205.6 million vehicle km	444.0 million vehicle km	+116%	Major benefit
SO1.4 Improved efficiency of freight movements along the transport corridor	Total journey time savings to freight traffic in vehicle hours as calculated from a Transport Users Benefit Appraisal (TUBA) model based on the CRAM outputs. (TUBA assumes the Do-Minimum has no freight journey time savings). The score is adjusted quantitatively to take account of impacts of gradients on freight efficiency.	0	5.4 million vehicle hours	5.4 million vehicle hours	Major benefit
		Uphill gradients steeper than 2% on 3km of route. (Quantitative adjustment has a neutral effect on rating overall)			

Traffic assessment results for end-to-end scheme incorporating D2APc (GSJ) online dualling at Inverurie					
SO1.5 Reduced conflicts between local traffic and strategic journeys	Average trip distance made by vehicles passing points on the A96 where they interact with local traffic at Pitmachie, Pitcaple and western Inverurie. This score is adjusted qualitatively (using annual average daily traffic (AADT) levels) to take account of the interaction between local trips crossing the A96 and strategic trips on the A96 at any at-grade junctions.	71,422 m	50,284 m	-30%	Moderate benefit
		At the online Inverurie section of the A96, both local and strategic traffic shares the same road thus the benefit is moderate rather than major. Strategic trips on the A96 are completely separated from local trips crossing the A96 as all of the A96 junctions are grade separated (Qualitative adjustment has a neutral effect on rating overall).			
SO2.1 Reduced accident rates and severity	Net reduction in annual personal injury accidents (PIA) in the scheme's area of influence based on COBALT assessment. This score is adjusted qualitatively to take account of the safety implications of providing inconsistent junction types (at-grade junction on an otherwise fully grade separated dual carriageway).	271.8 PIA	242.2 PIA	-29.6 PIA	Major benefit
		D2APc (GSJ) arrangement at Blackhall Road is consistent with the treatment of other new junctions on the A96 dualling scheme. (Qualitative adjustment has a neutral effect on rating overall as GSJs are provided).			
SO2.2 Reduced driver stress	Evaluated qualitatively based on performance against perceived stress factors associated with the existing (Do-Minimum) route, based on the layout of the route and junctions, and congestion and delay.	Improves layout; provides predictable driving conditions; offers consistent overtaking opportunities; reduces congestion and delay including at Blackhall Junction.			Major benefit

Traffic assessment results for end-to-end scheme incorporating D2APc (GSJ) online dualling at Inverurie					
SO2.3 Reduced potential conflicts between motorised and NMUs	Evaluated quantitively using the AADT on the A96, where the NMU route runs alongside the carriageway and bus laybys are situated either side of A96 corridor. The score is adjusted qualitatively on the ability to provide NMU facilities within the design and the impact of NMU safety.	Traffic on the A96 at selected locations are decreased by 50% relative to Do-Min. The layout will require the underpass at Blackhall Roundabout to be lengthened and realigned. This may discourage NMUs from using the underpass, instead choosing to cross at the roundabout introducing conflicts. While this has an adverse impact locally through Inverurie, it is considered that it is outweighed by the benefits throughout the remainder of the end-to-end scheme. (Qualitative adjustment has a neutral effect on rating overall).			Moderate benefit
SO3.1 Improved access to the wider strategic transport network	Evaluated using the average journey time saving over a selection of morning peak journeys from urban areas to key strategic transport network nodes, and their reciprocal evening peak journeys. The score is adjusted qualitatively to take account of the safety implications of providing inconsistent junction types.	27mins 33s	23mins 17s	-15.5%	Major benefit
		Removes significant volume of through traffic from urban areas. (Qualitative adjustment has a neutral effect on the overall rating as GSJs provided and quantitative element already shows major benefit).			
SO3.2 Enhanced access to jobs and services	Evaluated using the average journey time saving over a selection of morning peak journeys from urban areas to key employment areas, and their reciprocal evening peak journeys	24mins 15s	19mins 43s	-18.7%	Major benefit

Traffic assessment results for end-to-end scheme incorporating D2APc (GSJ) online dualling at Inverurie						
SO4 To facilitate active travel in the corridor	Evaluated using the fall in average annual daily traffic (AADT) on key links in urban areas which would be attractive for active travellers. Adjusted qualitatively to take account of ability to provide NMU facilities within the existing Inverurie bypass corridor, the impact on the existing Inverurie to Kintore NMU route that runs parallel to the existing A96 and the impact of lengthening the existing underpass at Blackhall Road.	Limited space to provide NMU facilities alongside A96 in Inverurie. Inverurie to Kintore cycle route runs adjacent to and across the lightly trafficked Mill Road. AADT will increase significantly on this road but likely alternative NMU facilities can be provided. Underpass would be longer and less direct, with reduced visual range therefore less attractive/secure and may discourage independent NMU travel in this area. (Qualitative adjustment has an adverse impact, causing the rating to go down by one grade overall).				Minor benefit
SO5 To facilitate integration with public transport facilities	Evaluated using the average journey time saving over a selection of morning peak journeys from urban areas to public transport facilities (primarily Craibstone Park & Ride and the rail stations at Inverurie and Kintore) and their reciprocal evening peak journeys.	07:00 – 08:00 17:00 – 18:00	21mins 14s 21mins 44s	18mins 10s 19mins 7s	Aggregate reduction of 13.2%	Moderate benefit

Traffic assessment results for end-to-end scheme incorporating D2APb (At-Grade) online dualling at Inverurie					
Scheme Objective (SO)	Measure	Do-Minimum	Do-Something	Change	Appraisal rating
SO1.1 Reduced journey times	Average peak journey time (eastbound am and westbound pm) from Huntly to Craibstone Roundabout	49mins 37s	38mins 40s	-10mins 57s	Major benefit
SO1.2 Improved journey time reliability	Difference between congested peak and uncongested interpeak journey times Huntly to Craibstone Roundabout	18mins 37s	9mins 17s	-9mins 19s	Moderate benefit
SO1.3 Increased overtaking opportunities	Total trip distance made in vehicle kilometres on dual carriageway sections of A96, as these offer better overtaking opportunities.	205.6 million vehicle km	415.0 million vehicle km	+102%	Moderate benefit
SO1.4 Improved efficiency of freight movements along the transport corridor	Total journey time savings to freight traffic in vehicle hours as calculated from a Transport Users Benefit Appraisal (TUBA) model based on the CRAM outputs. (TUBA assumes the Do-Minimum has no freight journey time savings). The score is adjusted quantitatively to take account of impacts of gradients on freight efficiency.	0	5.4 million vehicle hours	5.4 million vehicle hours	Major benefit
		Uphill gradients steeper than 2% on 3km of route. (Quantitative adjustment has a neutral effect on rating overall)			

Traffic assessment results for end-to-end scheme incorporating D2APb (At-Grade) online dualling at Inverurie					
SO1.5 Reduced conflicts between local traffic and strategic journeys	Average trip distance made by vehicles passing points on the A96 where they interact with local traffic at Pitmachie, Pitcaple and western Inverurie. This score is adjusted qualitatively (using annual average daily traffic (AADT) levels) to take account of the interaction between local trips crossing the A96 and strategic trips on the A96 at any at-grade junctions.	71,422 m	50,610 m	-29%	Minor benefit
		At the online Inverurie section of the A96, both local and strategic traffic shares the same road thus the benefit is moderate rather than major. Strategic trips on the A96 are separated from local trips crossing the A96 by the grade separated junctions except at a signalised at-grade Blackhall Roundabout. This offers moderate benefit. (Qualitative adjustment has an adverse impact, causing the rating to go down by one grade overall).			
SO2.1 Reduced accident rates and severity	Net reduction in annual personal injury accidents in the scheme's area of influence based on COBALT assessment. Adjusted qualitatively to account of the safety impact of inconsistent junction types (at-grade junction on an otherwise fully grade separated dual carriageway).	271.8	243.6	-28.2	Moderate benefit
		D2APb (At-Grade) arrangement at Blackhall Road is inconsistent with the treatment of other proposed new junctions on the A96 dualling scheme, all of which are grade separated. (Qualitative adjustment has an adverse impact, causing the rating to go down by one grade overall).			

Traffic assessment results for end-to-end scheme incorporating D2APb (At-Grade) online dualling at Inverurie					
SO2.2 Reduced driver stress	Evaluated qualitatively based on performance against perceived stress factors associated with the existing (Do-Minimum) route, based on the layout of the route and junctions, and congestion and delay	The dualling improves layout; provides predictable driving conditions; offers consistent overtaking opportunities except on the approaches to the signalised roundabout; reduces peak congestion and delay. The Blackhall signalised roundabout the layout reduces overtaking opportunities on the approaches and introduces delay.			Moderate benefit
SO2.3 Reduced potential conflicts between motorised and NMUs	Evaluated quantitively using the AADT on the A96, where the NMU route runs alongside the carriageway and bus laybys are situated either side of A96 corridor. The score is adjusted qualitatively on the ability to provide NMU facilities within the design and the impact on NMU safety.	Traffic on the A96 at selected locations are decreased by 50% relative to Do-Min. The layout will require the underpass at Blackhall Roundabout to be lengthened and realigned. This may discourage NMUs from using the underpass, instead choosing to cross at the roundabout introducing conflicts. While this has an adverse impact locally, it is considered that it is outweighed by the benefits throughout the remainder of the end-to-end scheme. (Qualitative adjustment has a neutral effect on rating overall).			Moderate benefit
SO3.1 Improved access to the wider strategic transport network	Evaluated using the average journey time saving over a selection of AM peak journeys from urban areas to key	27mins 33s	23mins 29s	-14.7%	Moderate benefit

Traffic assessment results for end-to-end scheme incorporating D2APb (At-Grade) online dualling at Inverurie						
	strategic transport network nodes, and their reciprocal evening peak journeys. The score is adjusted qualitatively to take account of the safety implications of providing inconsistent junction types.		Removes significant volume of through traffic from urban areas. (Qualitative adjustment has a neutral effect on the overall rating as quantitative element already shows major benefit).			
SO3.2 Enhanced access to jobs and services	Evaluated using the average journey time saving over a selection of morning peak journeys from urban areas to key employment areas, and their reciprocal evening peak journeys		24mins 15s	19mins 54s	-18.0%	Major benefit
SO4 To facilitate active travel in the corridor	Evaluated using the fall in average annual daily traffic (AADT) on key links in urban areas which would be attractive for active travellers. Adjusted qualitatively to take account of ability to provide NMU facilities within the existing Inverurie Bypass corridor, the impact on the existing Inverurie to Kintore NMU route that runs parallel to the existing A96 and the impact of lengthening the existing underpass at Blackhall Roundabout.	Limited space to provide NMU facilities alongside the A96 Bypass. Inverurie to Kintore cycle route runs adjacent to and across the lightly trafficked Mill Road. AADT will increase significantly on this road but likely alternative NMU facilities can be provided. Underpass is now longer and less direct, with reduced visual range therefore less attractive/secure and may discourage independent NMU travel in this area. (Qualitative adjustment has an adverse impact, causing the rating to go down by one grade overall).				Minor benefit

Traffic assessment results for end-to-end scheme incorporating D2APb (At-Grade) online dualling at Inverurie						
SO5 To facilitate integration with public transport facilities	Evaluated using the average journey time saving over a selection of morning peak journeys from urban areas to public transport facilities (primarily Craibstone Park and Ride and the rail stations at Inverurie and Kintore) and their reciprocal evening peak journeys.	07:00 – 08:00 17:00 to 18:00	21mins 14s 21mins 44s	18mins 17s 19mins 15s	Aggregate reduction of 12.7%	Moderate benefit