Lower Thames Crossing

Thurrock Council Local Impact Report

Appendix A - Costs and Disbenefits outweigh Benefits and provide Poor Value for Money

Appendix A Costs and Disbenefits outweigh Benefits and Poor Value for Money

A.1. Highways News article – Highways England invites tenders for Lower Thames Crossing - 11 November 2020

A.1.1 Highways News presented an article quoting several senior directors of the LTC scheme on 11 November 2020. One of these was Keith Bowers, LTC's Tunnels and Systems Director, who made the following quote (see Figure 1) concerning the safety commitments that have been committed to by NH by 2040. The Council regards these commitments for zero fatalities or serious injuries to contradict the assessment of the LTC's safety objective.

Figure 1: Highways News *Highways England invites tenders for Lower Thames Crossing* article (2020) (Partial)

Keith Bowers, the Lower Thames Crossing's Tunnels and Systems Director, added: "This contract is unparalleled in its ambition, and we need the right partner to match that ambition. From our bidders we're looking for outstanding construction, health, safety and wellbeing performance. We have committed to targets that mean by 2040 nobody will be killed or seriously injured on our roads and motorways, and we need our contractors' design and delivery to meet that target for our road users and workers.

"We are setting priorities in our contracts that will reward excellence during delivery by offering an enhanced share of cost savings for high performance in areas including health and safety, customer focus, delivery, environment, people and communities and economics."

Source: Highways England invites tenders for Lower Thames Crossing - Highways News (highways-news.com)

A.2. Extract from National Highways Net Zero Plan – Commitments (page 2)

A.2.1. The National Highways Net Zero Plan is NH’s commitment to reducing its carbon emissions and aim for carbon neutrality by 2050. There are various commitments from the Plan that have been incorporated into the LTC assessment including:

i. Net zero carbon emissions for Operational Carbon by 2030

ii. Net zero carbon emissions for maintenance and construction by 2040

iii. Net zero carbon emissions for travel on NH roads by 2050

A.2.2. These items are presented in the extract from the Net Zero Plan provided in Figure 2.

Figure 2: National Highways Net Zero Plan commitments

NET ZERO HIGHWAYS
Our 2030 / 2040 / 2050 plan

An ambitious programme putting roads at the heart of Britain’s net zero future

Roads will be a vital part of zero carbon travel

- Most journeys are made by road
- Road travel will decarbonise fast, but there is more to do
- A net zero Britain will still travel by road in 2050
- Investment in Britain’s roads supports a thriving net zero economy

This plan is based on strong science and evidence. It aligns with:

- The 1.5°C reduction goal of the Paris Agreement
- The UK’s commitment to be a net zero economy by 2050
- Government’s Decarbonising Transport: A Better, Greener Britain (2021) and Industrial Decarbonisation Strategy
- The Committee on Climate Change’s sixth carbon budget

Building on existing progress

- 95% of our network is within 20 miles of an electric chargepoint today
- We have been measuring the carbon footprint of our schemes for 30 years
- We are Britain’s largest builder of cycleways having completed 150 schemes in the past five years
- We are part of a wider transport system that supports inter-modal travel

THREE STRONG COMMITMENTS - BACKED BY IMMEDIATE AND SUSTAINED ACTION

CORPORATE EMISSIONS
Net zero by 2030

Net zero for our own operations by 2030
Covering our own energy and travel. Actions include:

- We have bought certified, renewable electricity for our network lighting and operations since 2020
- We will replace 70% of our road lighting with LEDs by 2027
- Our non-traffic officer vehicles will be 100% electric by 2027, with traffic officer vehicles to be 100% electric by 2030
- We will plant at least 3 million trees by 2030
- We will reduce our corporate emissions by 75% by 2025 when compared to a 2017/18 baseline

MAINTENANCE & CONSTRUCTION EMISSIONS
Net zero by 2040

Net zero for maintenance and construction by 2040
Covering emissions from making and transporting the materials used to maintain our network. Actions include:

- Launch a zero carbon construction innovation programme
- Develop a near-zero plan for each of our procurement categories by the end of 2022
- Design and build the first net-zero major road enhancement scheme, open by 2035
- Increase capacity on existing roads by roll out of our digital roads vision
- We will follow a trajectory of 0-10% reduction by 2025, 40-50% by 2030, 70-80% by 2035 and net zero by 2040 against a 2020 baseline

ROAD USER EMISSIONS
Net zero by 2050

Net zero carbon travel on our roads by 2050
Covering emissions from users of our network. Actions include:

- We will publish our proposed approach to zero carbon HGV trials by the end of 2022
- We will publish a blueprint for EV charging services on our roads by 2023
- Integrate a strong modal shift programme in Road Period 3 (RP3) building on our work to date
- We are planning for a trajectory of 31-26 $MtCO_2e$ by 2025, 25-15 $MtCO_2e$ by 2030, 20-7 $MtCO_2e$ by 2035, 8-3 $MtCO_2e$ by 2040, 5-1 $MtCO_2e$ by 2045 and net zero by 2050 against a 33 $MtCO_2e$ 2020 baseline

OUR MAIN FOCUS IS ON **CUTTING EMISSIONS**

- Net zero for us means focussing on cutting greenhouse gas emissions to zero or near zero rather than offset
- We will take immediate action, with an ambition for major investment in the third road period (RP3) and beyond to deliver transformative action
- Reducing emissions to net zero is a journey. Over time new solutions will become available and the path will become clearer. This plan provides a snapshot of what we intend now. We will use a process of continual improvement to refine our course into the future

Net zero highways: our 2030 / 2040 / 2050 plan 2

Source: net-zero-highways-our-2030-2040-2050-plan.pdf (nationalhighways.co.uk)

A.3. Analysis of Lack of Relief to Dartford Crossing and SRN

A.3.1. One of LTC's stated objectives is to '*To relieve the congested Dartford Crossing and approach roads and improve their performance by providing free-flowing north-south capacity*' (APP-494, Table 1.1). The Council has therefore used the modelled flows and capacities from ComMA: Traffic Forecasting Report (APP-522) to determine whether the scheme meets this objective.

A.3.2. DMRB LA 105 Table A.1 (National Highways 2019) defines the 'free flow' speed band to be a road with a Volume/Capacity<80% (V/C<80%) (This table is quoted in Table 9.4 of APP-522). APP-518, paragraph 5.8.11 states that

'A V/C ratio of above 0.85 indicates the likelihood of frequent occurrences of slow-moving traffic and above 0.95 indicates a network under pressure'.

A.3.3. This shows that NH acknowledge that a section of road with a V/C of more 0.85 is no longer providing free flow conditions and is subject to congestion. A 95% V/C should be considered a road operating regularly at capacity.

A.3.4. To understand whether the Dartford Crossing is forecast to operate at or near its capacity the traffic modelling results provided by NH have been examined.

A.3.5. The effective capacities and traffic flow data on the Dartford Crossing for each direction, as presented in the LTC ComMA (APP-518), are presented in Figure 3. This traffic flow data provides the basis for the assessment of southbound and northbound traffic flows. For reference, traffic flows are measured in Passenger Car Units (PCUs).

A.3.6. The key values to consider are those for "maximum" and "effective" capacity. The 'maximum' capacity of the northbound tunnels is reduced to an 'effective' capacity due to the operation of the Traffic Management Cell (TMC) which holds traffic back for safety reasons, the three main reasons being:

- escorting Dangerous Goods through in convoy;
- flow metering if there is significant queuing on the northern side to avoid queues in the tunnel itself; and
- extracting broken down or prohibited vehicles.

Figure 3: Dartford Crossing Effective capacities (APP-518 Tables 5.3 and 5.4)

Table 5.3 Dartford Crossing capacity (northbound) for March 2016

Time period	Tunnel	Maximum capacity (PCUs/h)	Effective capacity (PCUs/h)	Base year observed flow (PCUs/h)	Base year V/C ratio
AM	Western	3,650	3,194	3,108	0.97
	Eastern	3,850	3,754	3,652	0.97
	Total	7,500	6,948	6,760	0.97
IP	Western	3,650	3,125	2,773	0.89
	Eastern	3,850	3,754	3,330	0.89
	Total	7,500	6,879	6,103	0.89
PM	Western	3,650	2,814	2,874	1.02
	Eastern	3,850	3,305	3,376	1.02
	Total	7,500	6,118	6,250	1.02

Table 5.4 Dartford Crossing capacity (southbound) for March 2016

Time period	Maximum capacity (PCUs/h)	Effective capacity (PCUs/h)	Base year observed flow (PCUs/h)	Base year V/C ratio
AM	8,500	8,500	7,633	0.90
IP	8,500	8,500	5,531	0.65
PM	8,500	8,500	6,777	0.80

Current (2016) Traffic Flows

A.3.7. The "current" traffic flows used by NH are for 2016 and they are presented in Table 4.14 of the Combined Modelling and Appraisal Report – Appendix B – Traffic Model Package (APP-520). This table is repeated below in Figure 4.

Figure 4 Dartford Crossing 2016 Traffic Flows (APP-520)

Table 4.14 Final traffic flow count values for Dartford Crossing used in LTAM calibration

Direction	Tunnel	Time period	Car	LGV	HGV	Total (veh)	Total (PCU)
SB	N/A	AM	3,130	1,440	1,225	5,795	7,633
		IP	2,363	565	1,041	3,969	5,531
		PM	4,116	798	746	5,659	6,777
NB	Western	AM	1,309	405	557	2,272	3,108
		IP	1,006	279	595	1,880	2,773
		PM	1,547	336	397	2,279	2,874
	Eastern	AM	2,080	644	371	3,095	3,652
		IP	1,443	400	595	2,438	3,330
		PM	1,959	425	397	2,781	3,376
	Total	AM	3,389	1,049	929	5,367	6,760
		IP	2,449	679	1,190	4,318	6,103
		PM	3,506	761	794	5,060	6,251

A.3.8. This data was used to baseline the modelled traffic flows for the Dartford Crossing.

Forecast Traffic Flows

A.3.9. The forecast traffic flows for 2030 (opening year – now assumed to be 2032), 2037, 2045 and 2051 as presented by NH in APP-522are shown below. These flows have been used to compare traffic flows with the effective capacity for each direction of the Dartford Crossing.

Figure 4: National Highways Dartford Crossing Flows – 2030 (APP-522Table 8.11)

Table 8.11 Cross-river traffic flows (NB flows approaching TMC) – 2030 core DM vs DS (hourly flows in PCUs)

Direction	Crossing	Time period	Cars				LGV				HGV				Total				Effective capacity	Link V/C ratio	
			DM	DS	Diff.	Diff. %	DM	DS	Diff.	Diff. %	DM	DS	Diff.	Diff. %	DM	DS	Diff.	Diff. %		DM	DS
SB	Dartford Crossing	AM	3,526	3,452	-75	-2%	1,704	1,565	-139	-8%	3,270	2,514	-756	-23%	8,500	7,530	-970	-11%	8,500	1.00	0.89
		IP	3,223	2,665	-558	-17%	825	678	-147	-18%	2,983	1,936	-1,047	-35%	7,031	5,279	-1,752	-25%	8,500	0.83	0.62
		PM	4,819	3,914	-905	-19%	1,093	838	-255	-23%	2,062	1,318	-744	-36%	7,974	6,071	-1,904	-24%	8,500	0.94	0.71
	Lower Thames Crossing	AM	0	2,092	–	–	0	317	–	–	0	1,063	–	–	0	3,472	–	–	6,360	–	0.55
		IP	0	1,581	–	–	0	170	–	–	0	1,100	–	–	0	2,851	–	–	6,360	–	0.45
		PM	0	3,316	–	–	0	304	–	–	0	794	–	–	0	4,415	–	–	6,360	–	0.69
	Total	AM	3,526	5,543	2,017	57%	1,704	1,882	178	10%	3,270	3,577	307	9%	8,500	11,002	2,502	29%	14,860	–	0.74
		IP	3,223	4,246	1,023	32%	825	848	23	3%	2,983	3,036	54	2%	7,031	8,130	1,099	16%	14,860	–	0.55
		PM	4,819	7,230	2,412	50%	1,093	1,142	49	4%	2,062	2,112	50	2%	7,974	10,485	2,511	31%	14,860	–	0.71
NB	Dartford Crossing *	AM	3,683	3,190	-493	-13%	1,407	980	-426	-30%	2,427	1,577	-851	-35%	7,517	5,747	-1,771	-24%	6,981	1.08	0.82
		IP	3,112	2,746	-366	-12%	939	676	-263	-28%	3,327	2,075	-1,252	-38%	7,378	5,497	-1,881	-25%	6,890	1.07	0.80
		PM	4,416	3,911	-505	-11%	965	781	-184	-19%	1,958	1,258	-700	-36%	7,338	5,950	-1,388	-19%	6,762	1.09	0.88
	Lower Thames Crossing	AM	0	2,970	–	–	0	561	–	–	0	1,035	–	–	0	4,566	–	–	6,360	–	0.72
		IP	0	1,933	–	–	0	319	–	–	0	1,404	–	–	0	3,655	–	–	6,360	–	0.57
		PM	0	2,567	–	–	0	251	–	–	0	755	–	–	0	3,573	–	–	6,360	–	0.56
	Total	AM	3,683	6,160	2,477	67%	1,407	1,542	135	10%	2,427	2,611	184	8%	7,517	10,313	2,795	37%	13,341	–	0.77
		IP	3,112	4,679	1,567	50%	939	995	56	6%	3,327	3,478	151	5%	7,378	9,153	1,775	24%	13,250	–	0.69
		PM	4,416	6,478	2,062	47%	965	1,032	67	7%	1,958	2,013	55	3%	7,338	9,523	2,185	30%	13,122	–	0.73

** Flows are extracted for the link approaching the TMC*

Note: Red text indicates negative values. The V/C ratio is shaded green for a V/C below 0.85, orange 0.85 to 0.95 and red if 0.95 or above

Figure 5: National Highways Dartford Crossing Flows – 2037 (APP-522Table 8.32)

Table 8.32 Cross-river traffic flows (NB flows approaching TMC) – 2037 core DM vs DS (hourly flows in PCUs)

Direction	Crossing	Time period	Cars				LGV				HGV				Total				Effective capacity	Link V/C ratio	
			DM	DS	Diff.	Diff. %	DM	DS	Diff.	Diff. %	DM	DS	Diff.	Diff. %	DM	DS	Diff.	Diff. %		DM	DS
SB	Dartford Crossing	AM	3,554	3,768	215	6%	1,785	1,703	-82	-5%	3,161	2,635	-526	-17%	8,500	8,106	-394	-5%	8,500	1.00	0.95
		IP	3,535	3,019	-515	-15%	900	749	-151	-17%	3,082	2,099	-983	-32%	7,517	5,868	-1,649	-22%	8,500	0.88	0.69
		PM	4,970	4,244	-726	-15%	1,166	908	-258	-22%	2,109	1,381	-727	-34%	8,244	6,533	-1,711	-21%	8,500	0.97	0.77
	Lower Thames Crossing	AM	0	2,325	–	–	0	348	–	–	0	1,011	–	–	0	3,684	–	–	6,360	–	0.58
		IP	0	1,829	–	–	0	189	–	–	0	1,054	–	–	0	3,072	–	–	6,360	–	0.48
		PM	0	3,463	–	–	0	322	–	–	0	783	–	–	0	4,568	–	–	6,360	–	0.72
	Total	AM	3,554	6,094	2,540	71%	1,785	2,051	266	15%	3,161	3,646	485	15%	8,500	11,791	3,291	39%	14,860	–	0.79
		IP	3,535	4,849	1,314	37%	900	939	39	4%	3,082	3,153	71	2%	7,517	8,941	1,423	19%	14,860	–	0.60
		PM	4,970	7,707	2,737	55%	1,166	1,229	64	5%	2,109	2,165	56	3%	8,244	11,101	2,857	35%	14,860	–	0.75
NB	Dartford Crossing*	AM	3,755	3,441	-314	-8%	1,496	1,072	-424	-28%	2,446	1,643	-804	-33%	7,697	6,155	-1,542	-20%	6,981	1.10	0.88
		IP	3,247	3,090	-157	-5%	986	737	-248	-25%	3,359	2,170	-1,189	-35%	7,592	5,998	-1,595	-21%	6,890	1.10	0.87
		PM	4,598	4,253	-345	-8%	1,035	839	-196	-19%	1,996	1,352	-644	-32%	7,629	6,444	-1,185	-16%	6,762	1.13	0.95
	Lower Thames Crossing	AM	0	3,167	–	–	0	595	–	–	0	1,056	–	–	0	4,819	–	–	6,360	–	0.76
		IP	0	2,202	–	–	0	348	–	–	0	1,440	–	–	0	3,989	–	–	6,360	–	0.63
		PM	0	2,860	–	–	0	279	–	–	0	706	–	–	0	3,846	–	–	6,360	–	0.60
	Total	AM	3,755	6,608	2,853	76%	1,496	1,667	171	11%	2,446	2,699	253	10%	7,697	10,974	3,277	43%	13,341	–	0.82
		IP	3,247	5,292	2,045	63%	986	1,085	99	10%	3,359	3,610	251	7%	7,592	9,987	2,395	32%	13,250	–	0.75
		PM	4,598	7,113	2,515	55%	1,035	1,119	83	8%	1,996	2,058	62	3%	7,629	10,289	2,660	35%	13,122	–	0.78

** Flows are extracted for the link approaching the TMC*

Figure 6: National Highways Dartford Crossing Flows – 2045 (APP-522Table 8.52)

Table 8.53 Cross-river traffic flows (NB flows approaching TMC) – 2045 core DM vs DS (hourly flows in PCUs)

Direction	Crossing	Time period	Cars				LGV				HGV				Total				Effective capacity	Link V/C ratio	
			DM	DS	Diff.	Diff. %	DM	DS	Diff.	Diff. %	DM	DS	Diff.	Diff. %	DM	DS	Diff.	Diff. %		DM	DS
SB	Dartford Crossing	AM	3,517	3,899	382	11%	1,858	1,824	-34	-2%	3,124	2,719	-405	-13%	8,500	8,443	-57	-1%	8,500	1.00	0.99
		IP	3,735	3,281	-454	-12%	973	819	-154	-16%	3,197	2,289	-908	-28%	7,905	6,389	-1,516	-19%	8,500	0.93	0.75
		PM	5,083	4,450	-633	-12%	1,240	962	-279	-22%	2,161	1,422	-739	-34%	8,484	6,834	-1,651	-19%	8,500	1.00	0.80
	Lower Thames Crossing	AM	0	2,484	–	–	0	371	–	–	0	1,012	–	–	0	3,867	–	–	6,360	–	0.61
		IP	0	2,051	–	–	0	209	–	–	0	1,014	–	–	0	3,273	–	–	6,360	–	0.51
		PM	0	3,579	–	–	0	349	–	–	0	787	–	–	0	4,715	–	–	6,360	–	0.74
	Total	AM	3,517	6,383	2,866	81%	1,858	2,195	337	18%	3,124	3,731	607	19%	8,500	12,310	3,810	45%	14,860	–	0.83
		IP	3,735	5,332	1,597	43%	973	1,028	54	6%	3,197	3,303	107	3%	7,905	9,663	1,758	22%	14,860	–	0.65
		PM	5,083	8,029	2,946	58%	1,240	1,311	70	6%	2,161	2,209	48	2%	8,484	11,549	3,064	36%	14,860	–	0.78
NB	Dartford* Crossing*	AM	3,783	3,600	-183	-5%	1,580	1,136	-444	-28%	2,396	1,689	-706	-29%	7,759	6,425	-1,333	-17%	6,981	1.11	0.92
		IP	3,301	3,310	9	0%	1,038	799	-239	-23%	3,415	2,274	-1,140	-33%	7,754	6,384	-1,370	-18%	6,890	1.13	0.93
		PM	4,660	4,394	-266	-6%	1,108	908	-200	-18%	2,027	1,405	-621	-31%	7,794	6,707	-1,087	-14%	6,762	1.15	0.99
	Lower Thames Crossing	AM	0	3,314	–	–	0	668	–	–	0	1,095	–	–	0	5,077	–	–	6,360	–	0.80
		IP	0	2,478	–	–	0	380	–	–	0	1,458	–	–	0	4,316	–	–	6,360	–	0.68
		PM	0	3,108	–	–	0	292	–	–	0	714	–	–	0	4,114	–	–	6,360	–	0.65
	Total	AM	3,783	6,914	3,131	83%	1,580	1,804	224	14%	2,396	2,784	388	16%	7,759	11,502	3,744	48%	13,341	–	0.86
		IP	3,301	5,788	2,487	75%	1,038	1,180	141	14%	3,415	3,732	318	9%	7,754	10,700	2,946	38%	13,250	–	0.81
		PM	4,660	7,502	2,843	61%	1,108	1,199	91	8%	2,027	2,119	92	5%	7,794	10,821	3,027	39%	13,122	–	0.82

** Flows are extracted for the link approaching the TMC*

Note: Red text indicates negative values

Figure 7: National Highways Dartford Crossing Flows – 2051 (APP-522Table 8.74)

Table 8.74 Cross-river traffic flows (NB flows approaching TMC) – 2051 core DM vs DS (hourly flows in PCUs)

Direction	Crossing	Time period	Cars				LGV				HGV				Total				Effective capacity	Link V/C ratio	
			DM	DS	Diff.	Diff. %	DM	DS	Diff.	Diff. %	DM	DS	Diff.	Diff. %	DM	DS	Diff.	Diff. %		DM	DS
SB	Dartford Crossing	AM	3,482	3,940	458	13%	1,885	1,878	-7	0%	3,133	2,682	-451	-14%	8,500	8,500	0	0%	8,500	1.00	1.00
		IP	3,825	3,418	-407	-11%	1,010	857	-154	-15%	3,262	2,348	-915	-28%	8,097	6,622	-1,475	-18%	8,500	0.95	0.78
		PM	5,069	4,511	-558	-11%	1,269	988	-281	-22%	2,162	1,453	-709	-33%	8,500	6,952	-1,548	-18%	8,500	1.00	0.82
	Lower Thames Crossing	AM	0	2,582	–	–	0	380	–	–	0	1,022	–	–	0	3,984	–	–	6,360	–	0.63
		IP	0	2,156	–	–	0	215	–	–	0	1,039	–	–	0	3,410	–	–	6,360	–	0.54
		PM	0	3,633	–	–	0	361	–	–	0	785	–	–	0	4,779	–	–	6,360	–	0.75
	Total	AM	3,482	6,522	3,040	87%	1,885	2,258	373	20%	3,133	3,704	571	18%	8,500	12,484	3,984	47%	14,860	–	0.84
		IP	3,825	5,574	1,749	46%	1,010	1,072	62	6%	3,262	3,386	124	4%	8,097	10,032	1,935	24%	14,860	–	0.68
		PM	5,069	8,145	3,076	61%	1,269	1,349	80	6%	2,162	2,238	76	4%	8,500	11,732	3,232	38%	14,860	–	0.79
NB	Dartford Crossing*	AM	3,758	3,659	-99	-3%	1,625	1,183	-442	-27%	2,396	1,729	-667	-28%	7,778	6,571	-1,208	-16%	6,981	1.11	0.94
		IP	3,315	3,408	93	3%	1,064	815	-249	-23%	3,415	2,352	-1,062	-31%	7,794	6,576	-1,218	-16%	6,890	1.13	0.95
		PM	4,716	4,448	-268	-6%	1,138	942	-196	-17%	1,968	1,426	-542	-28%	7,821	6,816	-1,005	-13%	6,762	1.16	1.01
	Lower Thames Crossing	AM	0	3,376	–	–	0	696	–	–	0	1,114	–	–	0	5,186	–	–	6,360	–	0.82
		IP	0	2,627	–	–	0	416	–	–	0	1,453	–	–	0	4,495	–	–	6,360	–	0.71
		PM	0	3,250	–	–	0	297	–	–	0	727	–	–	0	4,274	–	–	6,360	–	0.67
	Total	AM	3,758	7,035	3,277	87%	1,625	1,879	254	16%	2,396	2,843	448	19%	7,778	11,757	3,979	51%	13,341	–	0.88
		IP	3,315	6,035	2,720	82%	1,064	1,231	167	16%	3,415	3,805	390	11%	7,794	11,071	3,277	42%	13,250	–	0.84
		PM	4,716	7,698	2,982	63%	1,138	1,240	102	9%	1,968	2,153	185	9%	7,821	11,090	3,269	42%	13,122	–	0.85

** Flows are extracted for the link approaching the TMC*

Note: Red text indicates a negative value

Analysis of Southbound Direction

A.3.10. The southbound Dartford Crossing uses the Queen Elizabeth Bridge and as this bridge is not subject to any prohibited load escorting so has the same traffic flow capacity of 8,500 pcus per hour in **all time periods**.

A.3.11. Table 1 below presents the quoted capacities from ComMA: Traffic Forecasting Report (APP-522, Table 5.3 and Table 5.4) and the calculated 95% and 85% capacities to reflect the capacity bands used by National Highways in APP-522.

Table 1: Dartford Crossing Southbound Effective Capacity bands

Effective Southbound Capacity	8,500
95% Effective Capacity (PCUs/hour)	8,075
85% Effective Capacity (PCUs/hour)	7,225

A.3.12. The following figures combine information on the effective capacity of the southbound Dartford Crossing with the traffic forecasts provided by NH. Information is provided for AM Peak, Interpeak and PM peak periods.

Figure 8: Dartford Crossing AM Peak Southbound Traffic Flow

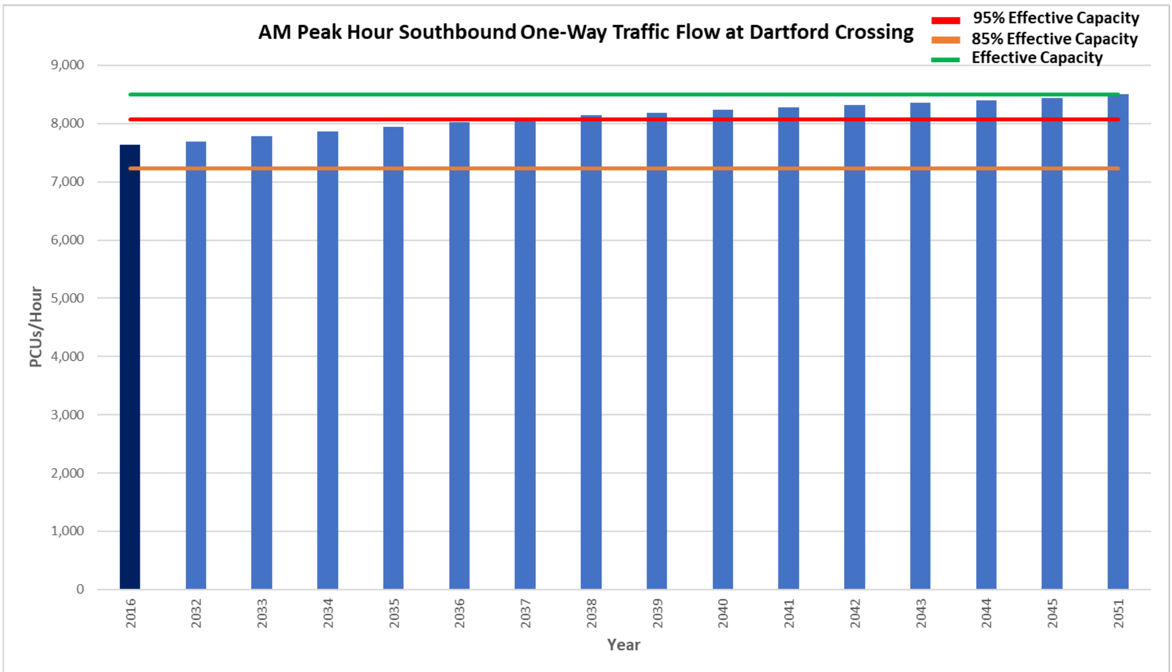


Figure 9: Dartford Crossing Interpeak Southbound Traffic Flow

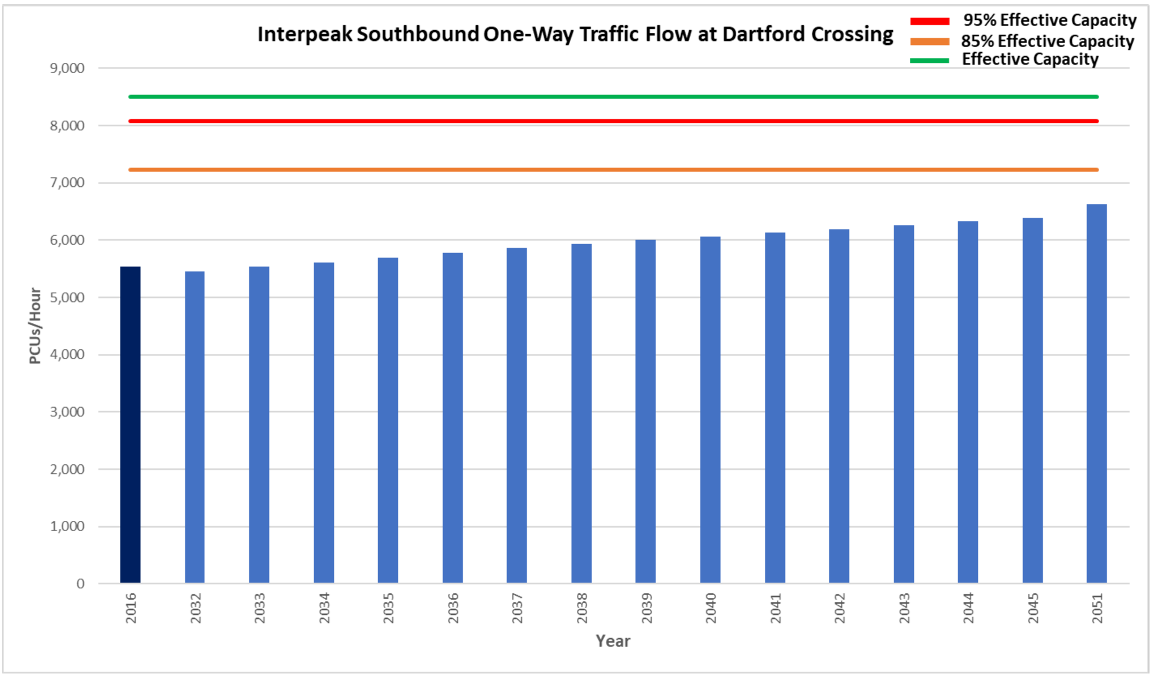
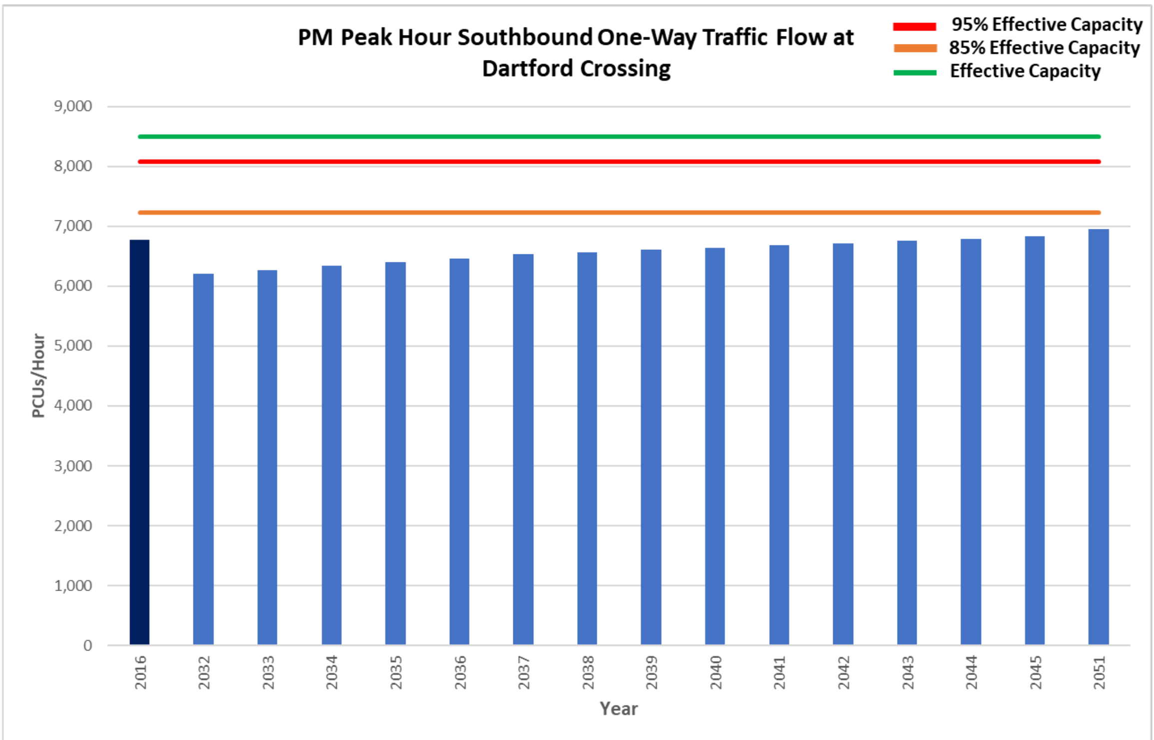


Figure 10: Dartford Crossing PM Peak Southbound Traffic Flow



A.3.13. The AM peak shows capacity issues from the opening of LTC. The AM peak hour is above 85% V/C from 2032 (opening year) and is carrying more traffic than in 2016 from this opening year. In the AM peak, the southbound Dartford Crossing is over 95% V/C by 2037. The scheme is shown to be operating at, or above, effective capacity by 2045.

A.3.14. The analysis of the southbound direction shows it to be below 85% V/C in the Interpeak and PM peaks until 2051.

Analysis of Northbound Direction

A.3.15. The northbound Dartford Crossing uses the two tunnels adjected to the Queen Elizabeth II bridge. These are subject to prohibited load escorting so have differing flow capacities in each peak period. Figure 11 below presents the quoted capacities from ComMA: Traffic Forecasting Report (APP-522) and the calculated 95% and 85% capacities in line with the capacity bands used by National Highways in APP-522.

Figure 11: Dartford Crossing Northbound Effective Capacity bands

Effective Capacity AM Peak hour (PCUs/hour)	6,981
95% Effective Capacity (PCUs/hour)	6,632
85% Effective Capacity (PCUs/hour)	5,934

Effective Capacity Interpeak (PCUs/hour)	6,890
95% Effective Capacity (PCUs/hour)	6,546
85% Effective Capacity (PCUs/hour)	5,857

Effective Capacity PM (PCUs/hour)	6,762
95% Effective Capacity (PCUs/hour)	6,424
85% Effective Capacity (PCUs/hour)	5,748

A.3.16. The following figures combine information on the effective capacity of the southbound Dartford Crossing with the traffic forecasts provided by NH. Information is provided for AM Peak, Interpeak and PM peak periods.

Figure 12: Dartford Crossing AM Peak Northbound Traffic Flow

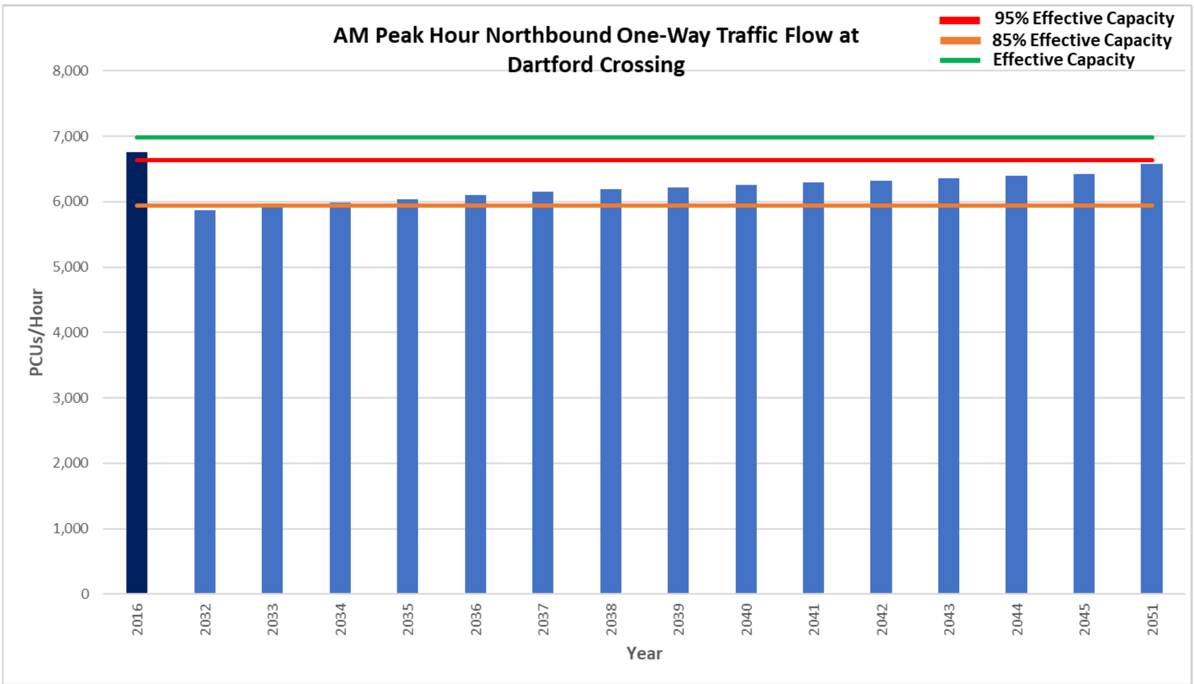


Figure 13: Dartford Crossing Interpeak Northbound Traffic Flow

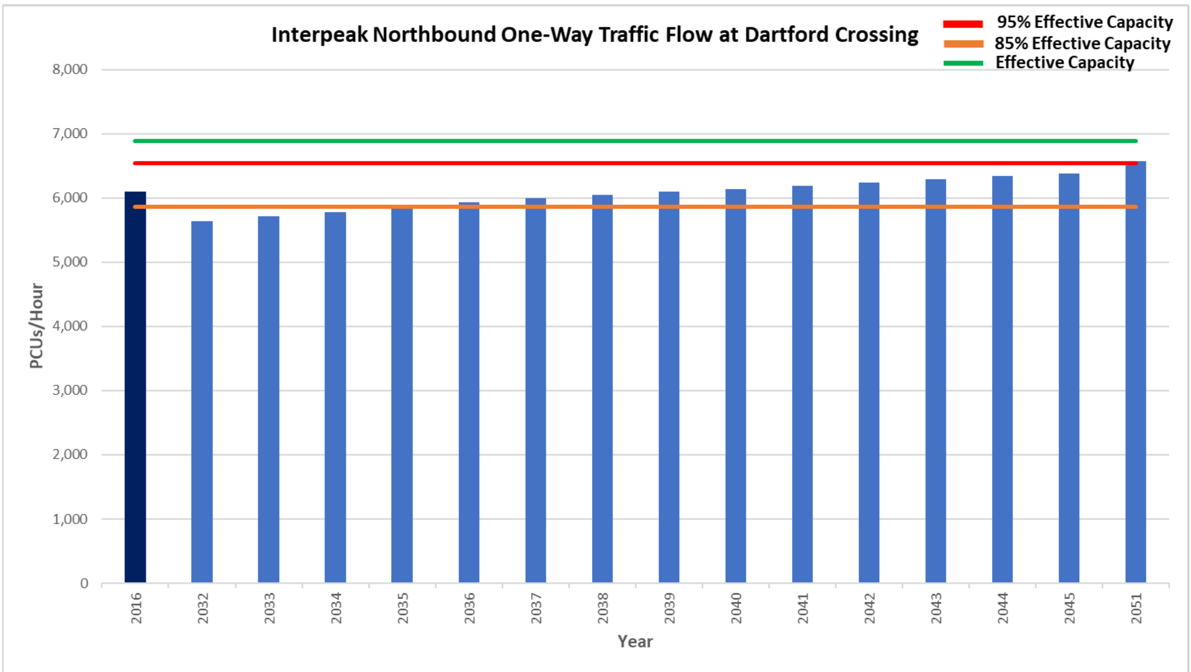
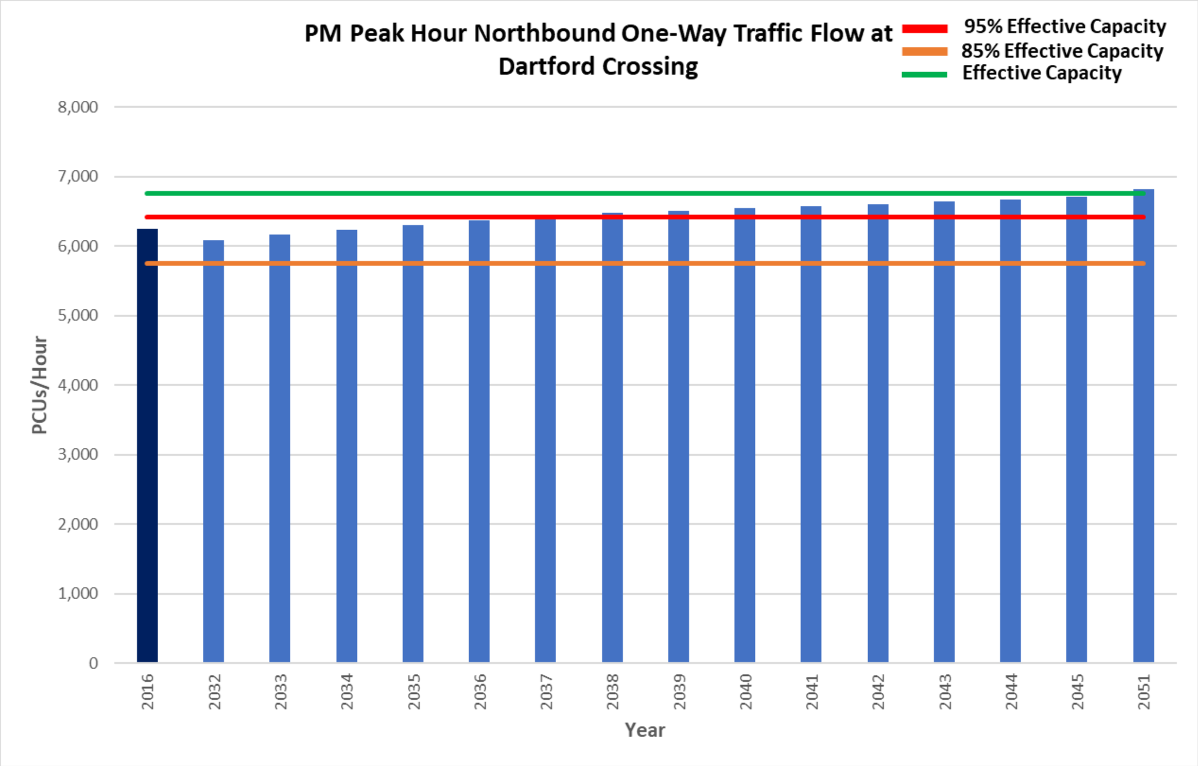


Figure 14: Dartford Crossing PM Peak Northbound Traffic Flow



A.3.17. The analysis shows that in the AM peak and Interpeak periods the northbound Dartford Crossing flow (taken from APP-522) will be above 85% V/C by 2034 and 2035 respectively.

A.3.18. The PM peak is shown in the figure to be above 85% V/C from opening, and above 95% V/C (defined by National Highways as a network under pressure) by 2037. By 2045, Dartford Crossing is shown to be at effective capacity.

Analysis of Two-way Peak Hour Flows

A.3.19. In the Traffic Forecast Non-Technical Summary (APP-528) Table 5.1, National Highways present two-way forecast AM peak, PM peak and interpeak flows at the Dartford Crossing and LTC. A copy of this table is included as Figure 15.

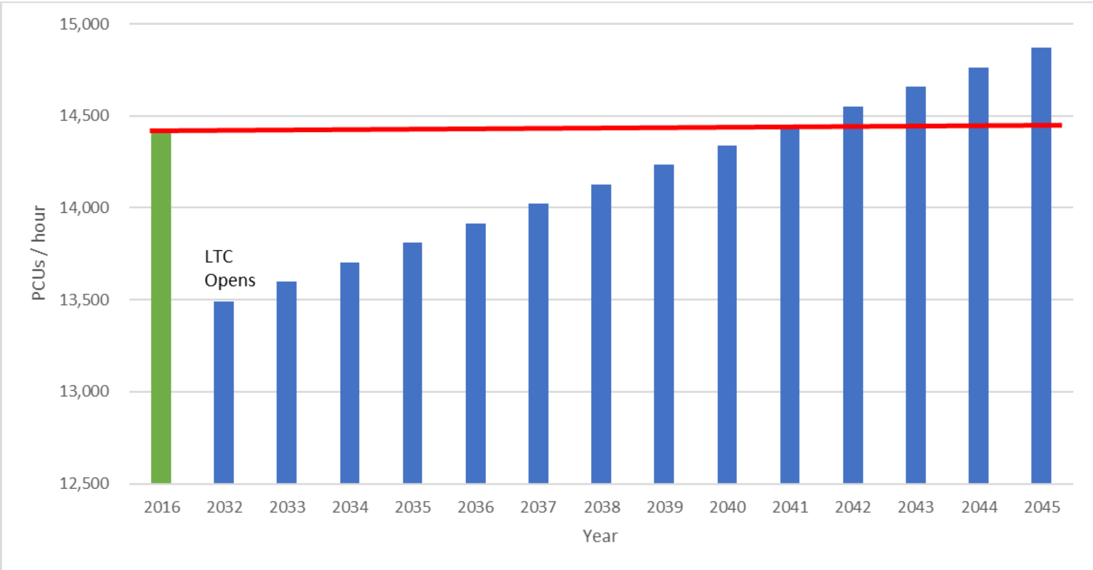
Figure 15: Table 5.1 Traffic Forecast Non-Technical Summary (APP-528) – Forecast peak and interpeak two-way Flows

Table 5.1 Forecast peak and inter-peak two-way hourly traffic flows at the Dartford Crossing and the Lower Thames Crossing (PCUs)

Period	Year	Without the Project	With the Project	
		Dartford Crossing*	Dartford Crossing*	Lower Thames Crossing
AM peak hour	2016	14,430		
	2030	16,020	13,280	8,040
	2045	16,260	14,870	8,940
Inter-peak hour	2016	11,790		
	2030	14,410	10,780	6,510
	2045	15,660	12,770	7,590
PM peak hour	2016	12,830		
	2030	15,310	12,020	7,990
	2045	16,280	13,540	8,830

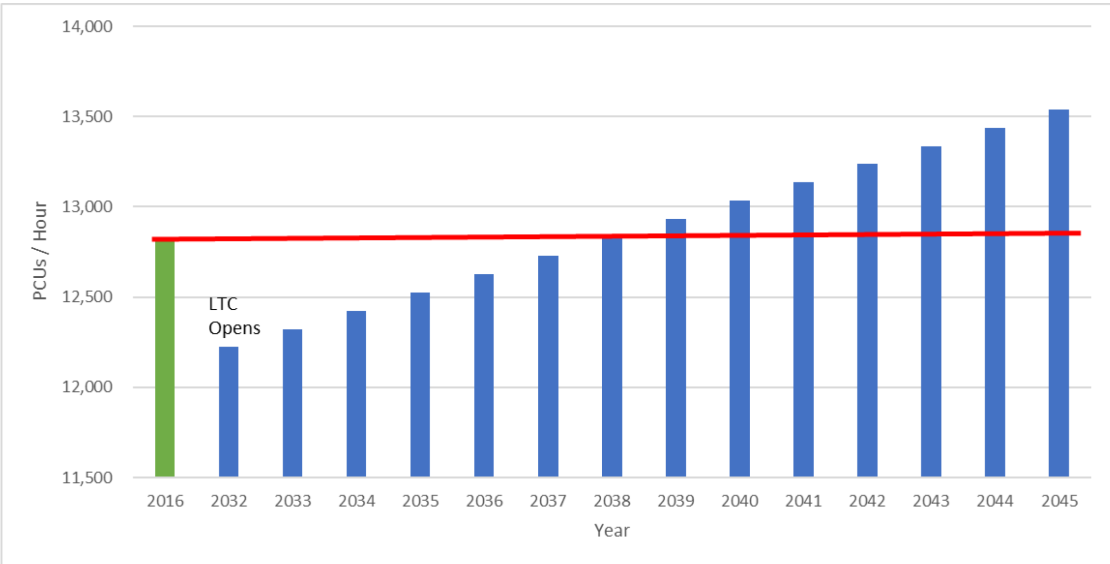
A.3.20. Using these flows, the Council has interpolated between the modelled years to understand the likely point at which two-way flows at Dartford Crossing return to 2016 levels of traffic flow once LTC has opened. This analysis is presented in Figure 16 and Figure 17.

Figure 16: AM Peak Hour Two-way Traffic Flow at Dartford Crossing



A.3.21. Figure 16 shows that in the AM peak, the two-way flows return to 2016 levels by 2041 suggesting that the relief from LTC is limited to nine years. It should be noted that the analysis of one-way flows shows there are capacity issues in both directions before this date.

Figure 17: PM Peak Hour Two-way Traffic Flow at Dartford Crossing



A.3.22. Figure 17 shows that in the PM peak, the two-way flows return to 2016 levels by 2038 suggesting that the relief from LTC is limited to six years. The previously presented analysis of one-way flows shows there are capacity issues in the northbound direction around this date, with a V/C of 95% from 2037.

A.4. A303 Stonehenge ComMA Table 6-1 – Costs and Benefits

A.4.1. The A303 Stonehenge scheme is also a Tier 1 (>£500m) National Highways scheme. Like LTC, it is a large complex scheme. Unlike LTC however, Figure 18 shows that Wider Economic Impacts only account for only 3% of total scheme benefits compared to 46% of total benefits for LTC.

Figure 18: A303 Stonehenge ComMA Table 6-1 – Costs and Benefits

Table 6-1: A303 Amesbury to Berwick Down costs and benefits (£ million)

Component		Publicly Funded	Privately Financed
Costs	Capital expenditure*	970	180
	Unitary charge	0	860
	Operating expenditure*	235	109
	PVC	**1,206**	**1,149**
Initial PVB	TEE benefits (including construction), of which:	252	252
	(… Commuting user benefits)	*(…12)*	*(…12)*
	(… Other user benefits)	*(…61)*	*(…61)*
	(… Business user benefits)	*(…179)*	*(…179)*
	Indirect tax revenues	87	87
	Corporation Tax revenues	0	6
	Accident benefits	4	4
	Air quality	0	0
	Noise	0	0
	Greenhouse gas emissions	-86	-86
	Initial BCR	**0.21**	**0.23**
Adjusted PVB	Travel time reliability	61	61
	Wider Impacts	35	35
	Cultural heritage impacts	955	955
	Adjusted BCR	**1.08**	**1.14**

* Retained public sector costs under a PF2 contract

2010 market prices, discounted to 2010. Costs and benefits rounded to nearest million.

A.5. Quantifying Wider Economic Impacts of Agglomeration for Transport Appraisal: Existing Evidence and Future Direction (DfT, 2018) Reference Section

A.5.1. *Quantifying Wider Economic Impacts of Agglomeration for Transport Appraisal: Existing Evidence and Future Directio*n (DfT, 2018) outlines the existing evidence used to inform wider economic impacts for transport schemes. This evidence is used to underpin WITA assessments for highway schemes such as LTC.

A.5.2. The majority of the quoted evidence is from 2009 or before meaning it is relatively old and based upon older economic patterns compared to the post COVID pandemic world of today.

Figure 19: A.5. ***Quantifying Wider Economic Impacts of Agglomeration for Transport Appraisal: Existing Evidence and Future Direction* (DfT, 2018) Reference Section**

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