

Appendix C Summary of Traffic Changes Arising from IRR CAZ B 2020 and 2022 (v2 13/12/17)

1. This note provides a summary of the modelled forecast changes in all day (weekday 0700-1900 and estimated AADT¹) traffic flows arising with the implementation of a Clean Air Zone covering Leeds city centre and the Inner Ring Road (excluding the M621) and applying to HGVs only (taxis are not modelled separately within the Leeds Transport Model and buses are modelled as a fixed demand based on existing routes).
2. This is based on the following assumptions:
 - HGV included but not cars or LGV
 - Daily charges of £100 (HGV) for non-compliant vehicles
 - No suppression of non-compliant trips
 - Assumed compliance levels (%):

Table 1

2020	Car	LGV	HGV
Within CAZ	76.4	60.7	97.4
Outside CAZ	76.4	60.7	80.3

3. The first section of the report considers the impacts on implementation in 2020, the second section examines the effect of the proposed City Centre Package (CCP) scheme which will close City Square to general traffic, reallocate highway capacity within the South Bank and provide additional capacity at Armley Gyratory and on the M621. (The latter scheme is being delivered by Highways England.)
4. Throughout this report the analysis is presented in various ways. Tables and graphs either contain direct outputs from the transport model or adjusted outputs that reflect existing traffic levels and how well the model reproduces them. The former are all labelled as Modelled the latter as Forecast. When it comes to understanding the percentage changes in traffic levels the Forecast data is regarded as being more robust. Both the Modelled and Forecast data are based on AADT estimates, with local factors applied to both traffic counts and model outputs to generate these. In addition, network plots of changes in modelled flows are also included – these are based on modelled 12 hour weekday flows.

Section 1 – Impact in 2020 On Implementation of CAZ

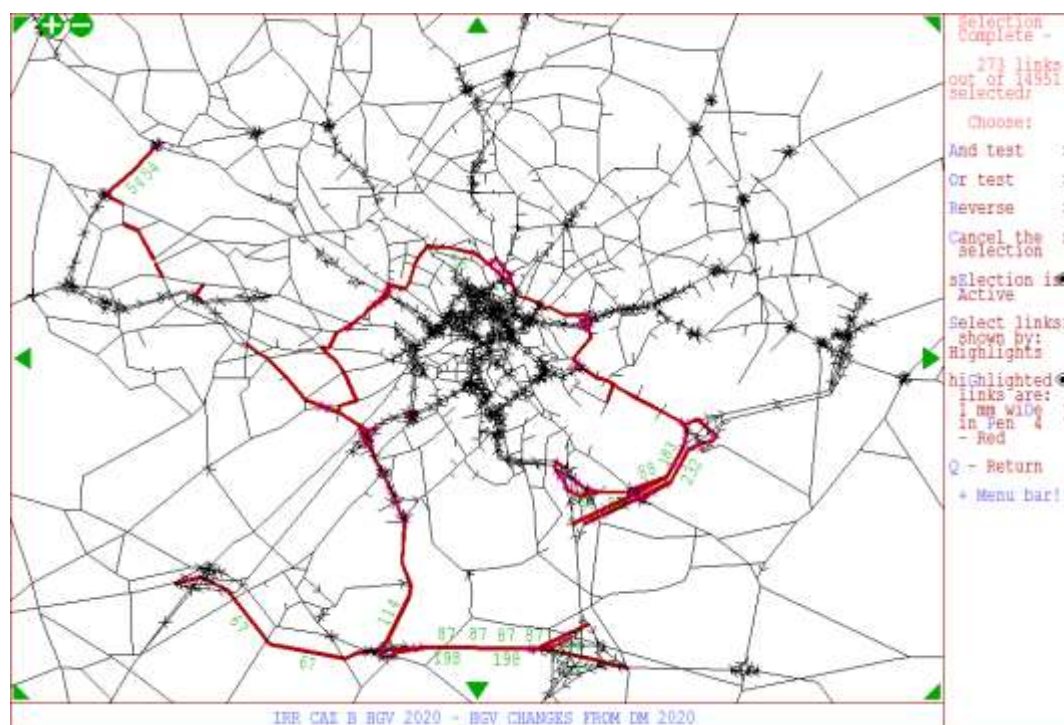
Review of roads with increased traffic

5. The following plots show the modelled changes in flows from a 2020 Do Minimum situation. All changes in LGV and HGV are in vehicles.

¹ Annual Average Daily Traffic

6. The impact of the CAZ has a widespread effect upon HGV traffic across Leeds. Figure 1 shows the roads where an increase of 50 or more HGV's is forecast in either direction of travel over the 12 hour weekday.
7. To provide a context, DfT count data indicates that across the A road network in Leeds, the average road carried almost 900 HGVs (2 way) per 12 hour weekday in 2013-2015. This compares with almost 3,200 LGVs and 19,800 cars².
8. Roads affected by a greater increase of 100 LGVs are shown in Figure 2. This is concentrated around the minor road network to the west of the city centre, A63 East Leeds Link Road, the M1 and M62 and the A658/A6110 to the southwest.
9. Figures 3-5 provide more detail of these forecasts.
10. The scale of increase on some of these roads is significant, with the greatest detrimental impact occurring on the minor roads to the west and north of the city centre. For example the 2 way increase forecast for Canal Rd (linking the A65 to the A647) is over 250 HGVs (12 hr weekday) compared with an observed flow in 2017 of 350 HGVs³.

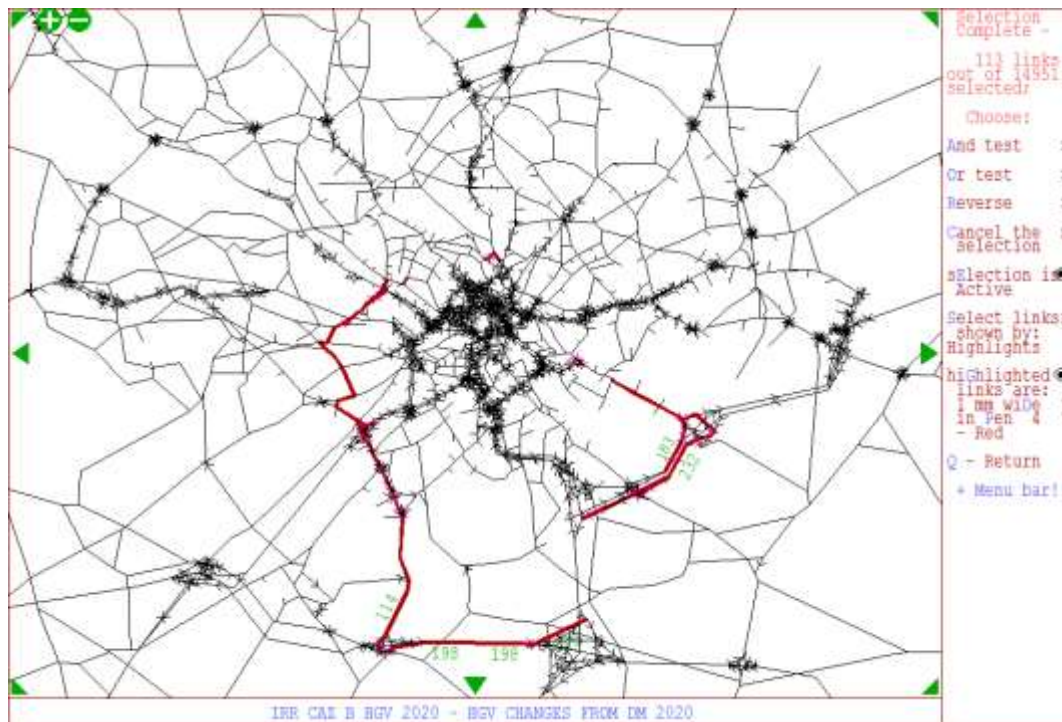
Figure 1 - HGV – increase of 50 or more vehicles (12 hour)



² Data from 159 12 hour manual counts

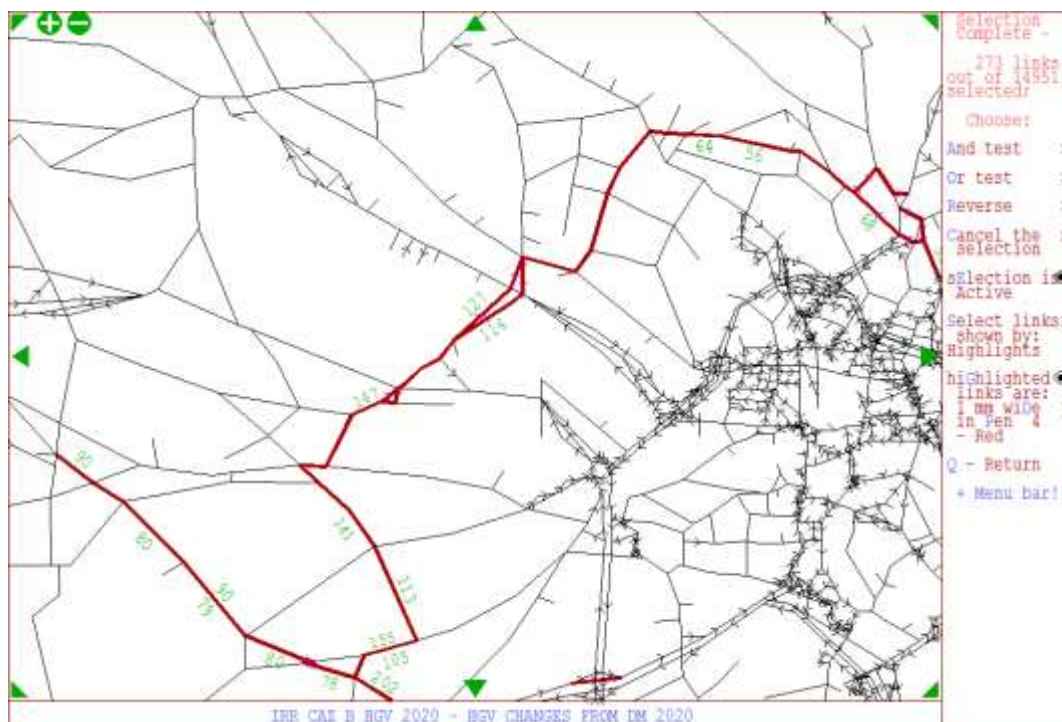
³ Job7866

Figure 2 - HGV – increase of 100 or more vehicles (12 hour)



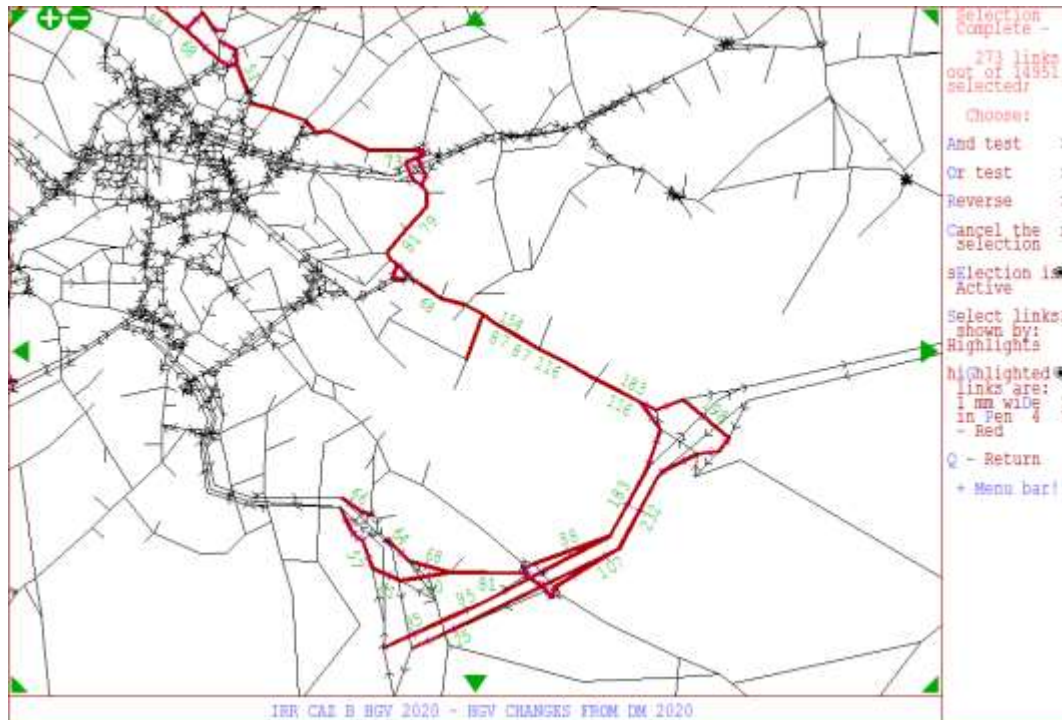
11. To the north of the city centre, the increases are smaller, but still amount to almost doubling HGV levels from observed levels of around 100-200 per 12 hour weekday (2017).

Figure 3 - HGV – increase of 50 or more vehicles (12 hour) – west of city centre



12. In contrast, to the east of the city centre a different situation applies to East Park Parade where the forecast two way increase in HGVs of around 160 (12 hr weekday) compares with an observed level in 2017 of 480⁴.
13. Equally, the forecast increase on A653 Dewsbury Rd (130 HGVs) is relatively small compared with an observed 2 way 12 hr weekday flow of 1060 in 2014⁵.

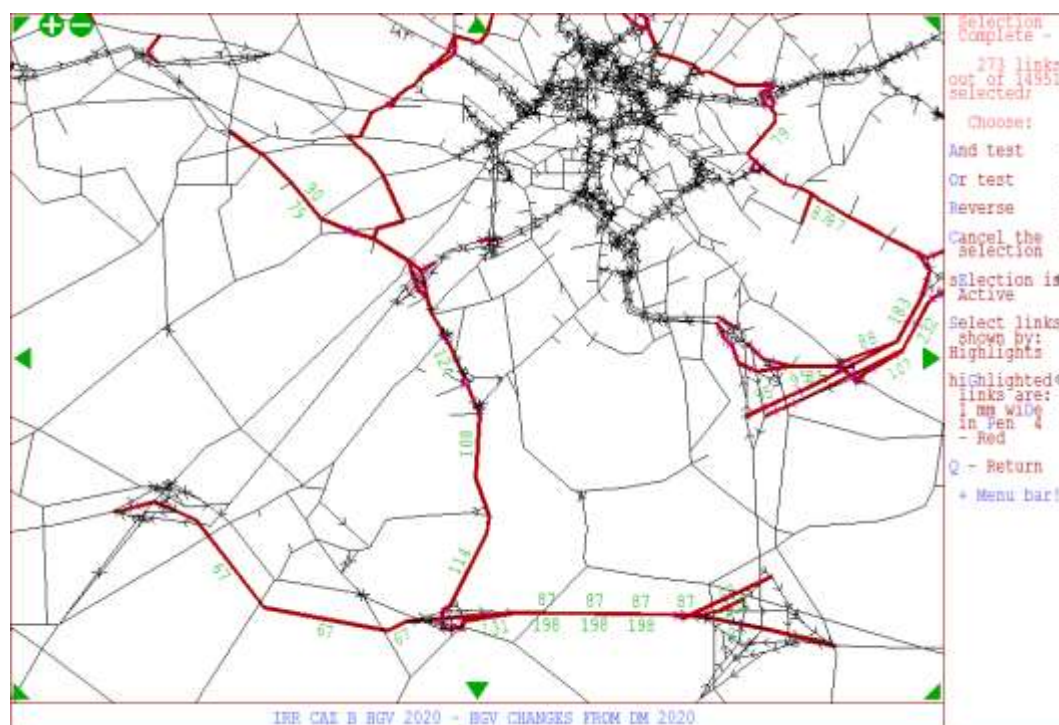
Figure 4 - HGV – increase of 50 or more vehicles (12 hour) – east of city centre



⁴ Job7866

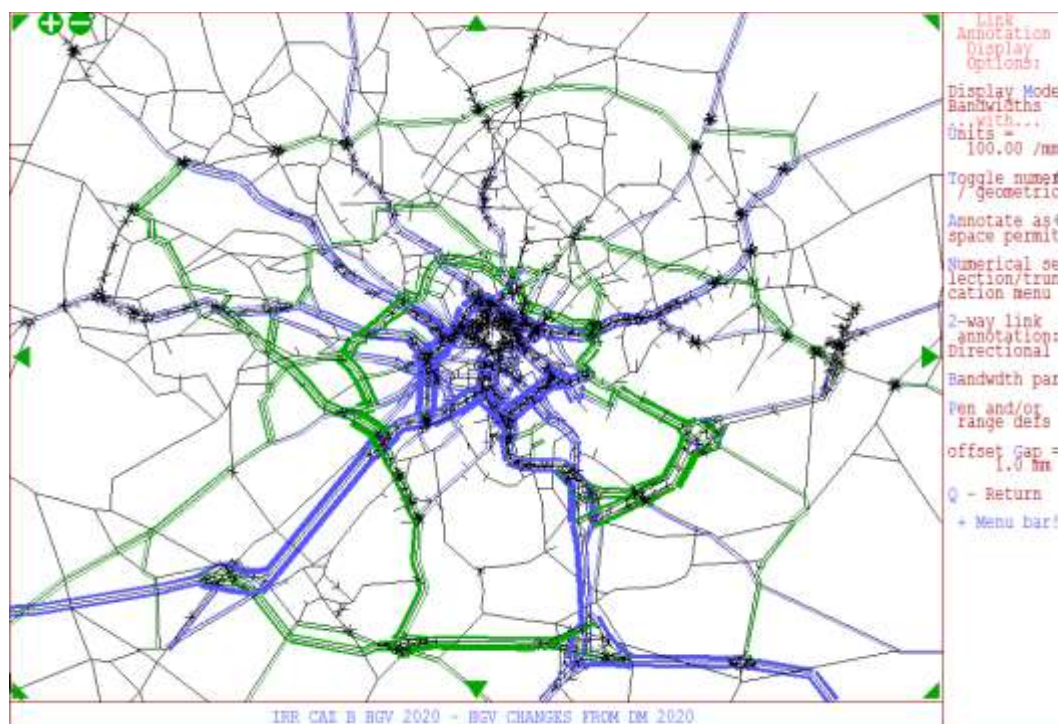
⁵ DfT CP 17369

Figure 5 - HGV – increase of 50 or more vehicles (12 hour) – southwest of city centre



14. The net change in HGVs shown above, only paints part of the picture as the diversion routes used by displaced vehicles are not only attracting additional traffic, but specifically high volumes of non-compliant vehicles, with the associated air quality impacts.
15. Figure 6 clearly shows the migration of non-compliant HGVs from the area affected by the CAZ to the routes highlighted in Figures 1-5.

Figure 6 – non-compliant HGV changes (12 hour)



Note: Green = increase, blue = decrease

16. In general the net change in HGVs is of a similar scale to the change in non-compliant vehicles, although it is worth noting that the model is forecasting a fall in these use of some of these roads in both cars and LGVs as traffic reassigns across the wider network. The overall net change in traffic levels is typically 1% or less – see Table 2.

Table 2 – Forecast Change in Traffic Levels on Routes with Diverted Traffic

Road	Observed	Modelled AADT			Estimated 2020 AADT			
	Est AADT 2015	Base 2015	DM 2020	CAZ 2020	DM 2020	CAZ 2020	Change	%age change
Torre Rd	7000	3370	3570	3702	7200	7332	132	2%
Lincoln Green Rd	9900	6909	7551	7649	10542	10640	98	1%
Woodhouse St	8400	8872	9119	9177	8647	8705	58	1%
Hyde Park Rd	5800	9240	9349	9388	5909	5948	39	1%
Woodsley Rd	5800	6713	6785	6842	5872	5929	57	1%
Canal Rd	13100	16831	17533	17544	13802	13813	11	0%
Town St	10300	12641	13015	13120	10674	10779	105	1%
Upper Wortley Rd	10700	11310	11859	11912	11249	11302	53	0%
A6110 Ring Rd W A62	35400	42107	43388	43141	36681	36434	-247	-1%
A6110 Ring Rd E M621	35800	41674	42208	42046	36334	36172	-162	0%
A653 Dewsbury Rd	35700	39225	40392	40250	36867	36725	-142	0%
East Park Parade	18200	17165	18282	18285	19317	19320	3	0%
A63 Pontefract La	16800	20862	24324	24633	20262	20571	309	2%
A6120 Selby Rd	42200	36593	35194	35195	40801	40802	1	0%
M1 Jn 44-45	82000	79887	88129	88129	90242	90242	0	0%
M62 Jn 28-29	125500	133929	154782	154793	146353	146364	11	0%

17. Comprehensive up to date classified counts have been carried out in 2017 to assess the current levels of HGVs on these routes, supplemented by a number of historic counts, and this has enabled a broad brush assessment of the forecast changes. This indicates that on the minor roads to the north and west of the city centre overall HGV levels are forecast to rise by between 70 and 170% (Table 3). The increase in non-compliant vehicles is forecast to be several times greater than this – see Appendix A.

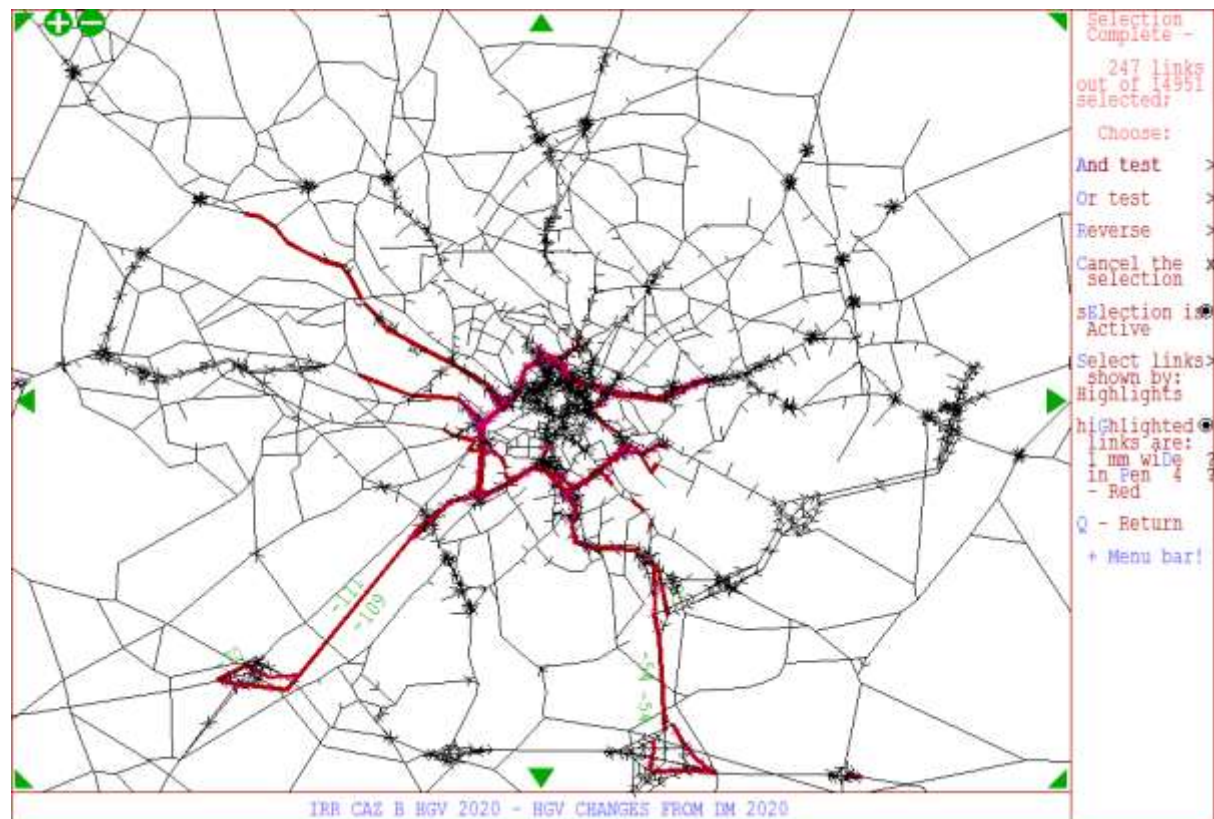
Table 3 – Forecast Change in HGV Levels on Routes with Diverted Traffic

Road	Observed	Modelled AADT			Estimated 2020 AADT			
	Est AADT 2015	Base 2015	DM 2020	CAZ 2020	DM 2020	CAZ 2020	Change	%age change
Torre Rd	170	29	35	177	176	318	142	81%
Lincoln Green Rd	170	56	64	195	178	309	131	74%
Woodhouse St	140	99	103	243	144	284	140	97%
Hyde Park Rd	100	90	93	208	103	218	115	112%
Woodsley Rd	80	78	79	216	81	218	137	169%
Canal Rd	310	312	323	553	321	551	230	72%
Town St	220	263	276	515	233	472	239	103%
Upper Wortley Rd	290	301	314	549	303	538	235	78%
East Park Parade	420	347	357	506	430	579	149	35%

Review of roads with reduced traffic

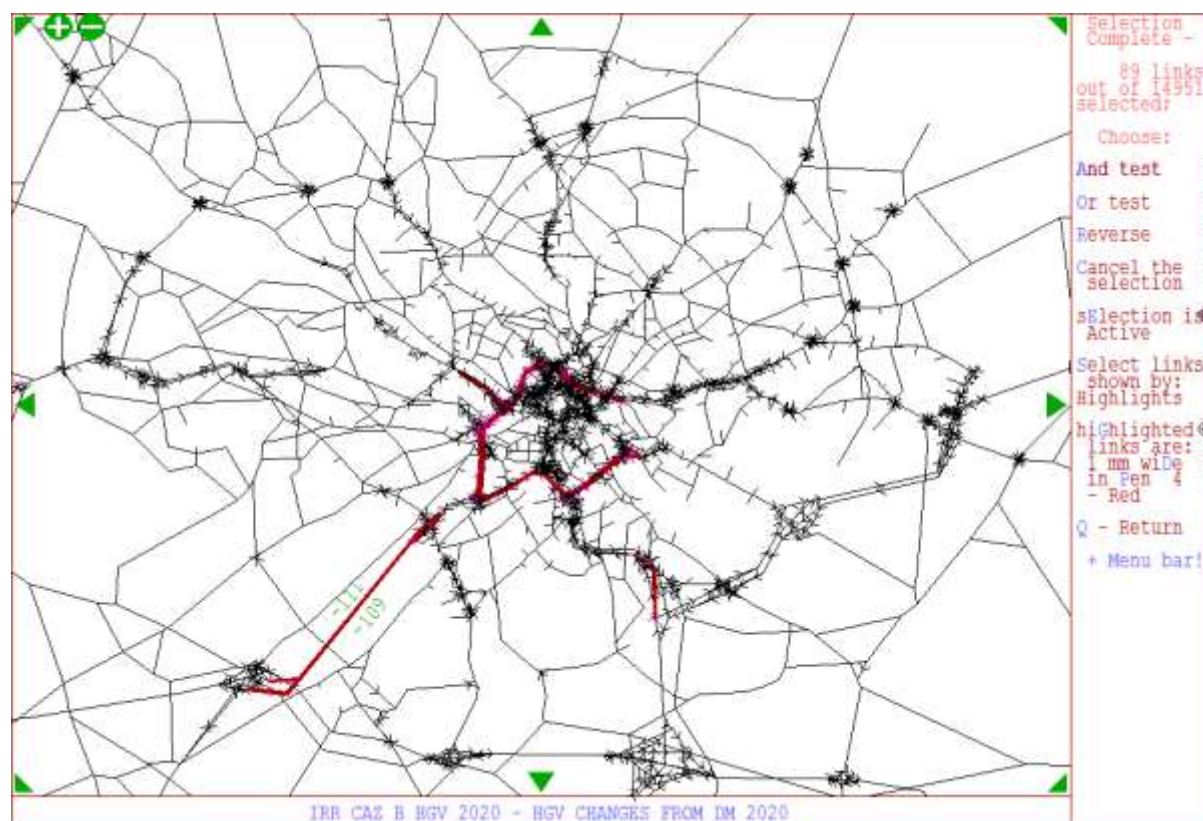
18. Figure 7 shows the parts of the highway network where the overall volume of HGVs is forecast to fall by 50 or more vehicles per 12 hour weekday with an IRR CAZ B. The effect is concentrated upon the area of the CAZ, but with impacts upon a number of radial routes including the M621.

Figure 7 - HGV – decrease of 50 or more vehicles (12 hour)



19. This concentration is further highlighted in Figure 8, which shows links with a decrease of 100 or more HGVs.
20. HGV flows are forecast to fall by around 250 vehicles on the northern Inner Ring Road (2 way 12 hr weekday), 400 on the western section over Wellington Bridge and around 350 on A643 Ingram Distributor and John Smeaton Viaduct.
21. Flows on the M621, although not included within the CAZ, are also forecast to fall.
22. Changes in HGV levels within the City Centre itself are far lower than on the Inner Ring Road. This is down to the high level of cross city traffic that uses the IRR and consequently finds new routes to avoid the CAZ – as highlighted earlier – whereas most traffic within the city centre has an origin or destination there.

Figure 8- HGV – decrease of 100 or more vehicles (12 hour)



23. An assessment on the impact on overall traffic levels, in line with that carried out for routes where traffic is forecast to increase, indicates that the net reduction in traffic on these roads is marginal.

Table 4 – Forecast Change in Traffic Levels on Routes with Reduced Traffic

Road	Observed	Modelled AADT			Estimated 2020 AADT			
	Est AADT 2015	Base 2015	DM 2020	CAZ 2020	DM 2020	CAZ 2020	Change	
IRR Lovell Park Br	44200	55092	59524	59430	48632	48538	-94	-0.2%
IRR Woodhouse tunnel	71000	73191	76956	76936	74765	74745	-20	0.0%
IRR Wellington Br	86700	85539	89118	89187	90279	90348	69	0.1%
A643 Ingram	53300	55483	58584	58695	56401	56512	111	0.2%
M621 Jn 2-2a	70000	67795	73577	73513	75782	75718	-64	-0.1%
M621 Jn 2a-3	n/a	82397	89801	89726	89801	89726	-75	-0.1%
M621 Jn 3-4	69100	66025	72778	72805	75853	75880	27	0.0%
John Smeaton Viaduct	30100	30910	34088	34094	33278	33284	6	0.0%
IRR East Street	28700	27817	31378	31391	32261	32274	13	0.0%
Crown Point Br	31700	27459	29116	29091	33357	33332	-25	-0.1%
Bishopgate St	24000	20106	21137	21136	25031	25030	-1	0.0%

24. As with the minor roads, these changes mask the overall change in the vehicle mix on these routes. A broad brush assessment of traffic composition indicates that HGV volumes are forecast to fall by around 15% on the IRR, but by less than 5% on the M621. Flows within the city centre on Crown Point Bridge and Bishopgate St are forecast to fall by 10-15% – see Table 5.

Table 5– Forecast Change in HGV Traffic Levels on Routes with Reduced Traffic

Road	Observed	Modelled AADT			Estimated 2020 AADT			
	Est AADT 2015	Base 2015	DM 2020	CAZ 2020	DM 2020	CAZ 2020	Change	%age change
IRR Lovell Park Br	n/a	1346	1403	1172	1403	1172	-231	-16%
IRR Woodhouse tunnel	2047	1387	1428	1186	2088	1846	-242	-12%
IRR Wellington Br	2210	2432	2495	2127	2273	1905	-368	-16%
A643 Ingram	2048	1975	2040	1713	2113	1786	-327	-15%
M621 Jn 2-2a	4892	3670	3749	3631	4971	4853	-118	-2%
M621 Jn 2a-3	n/a	4551	4716	4509	4716	4509	-207	-4%
M621 Jn 3-4	5554	3836	4027	3905	5745	5623	-122	-2%
John Smeaton Viaduct	1361	1522	1558	1291	1397	1130	-267	-19%
IRR East Street	1382	742	776	662	1416	1302	-114	-8%
Crown Point Br	322	337	357	317	342	302	-40	-12%
Bishopgate St	220	366	390	346	244	200	-44	-18%

25. However, the modelled forecast changes suggest a very substantial fall in non-compliant HGVs of over 90% on the IRR and within the City Centre, and by 30-40% on the M621, accompanied by increases in compliant vehicles – see Appendix A.

Conclusions

26. In summary much of the impact of the IRR CAZ B is to divert non-compliant vehicles away from the IRR onto the minor road network.

27. Overall traffic levels on the roads to the north and west of the city centre are only forecast change marginally, however, the rise in HGVs is forecast at 70-170%. The change in non-compliant vehicles is forecast to be several times greater than this.

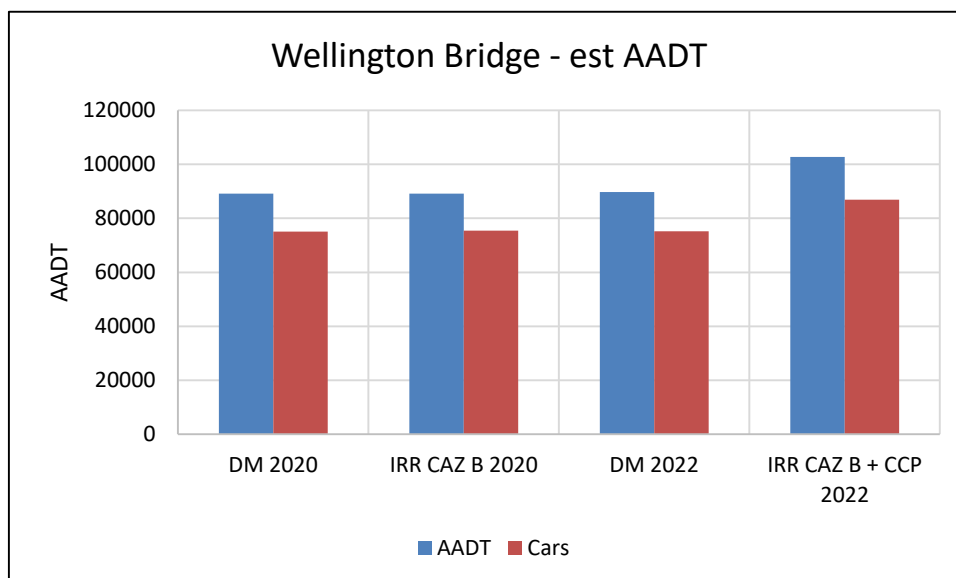
28. Within the CAZ, overall traffic volumes are not forecast to change, but the reduction in HGVs is forecast at around 15% on the IRR. Non-compliant HGVs are forecast to fall by over 90%.

Section 2 – Impact in 2022 On Completion of City Centre Package

Review of roads with increased traffic

29. The CCP is designed to reduce the level of through traffic within the city centre. This is achieved through a combination of road closures and roadspace reallocation and the provision of additional circulatory capacity on the IRR and M621.
30. In particular the CCP increases traffic levels on the western IRR, the section where air quality is of most concern. Figure 9 shows the modelled changes in overall traffic on A58 Wellington Bridge in 2020 and 2022.
31. The introduction of the CAZ in 2020 results in a marginal change in total traffic. The combination of the CAZ with the CCP, however, increases all traffic by 15% and cars by 16% compared with the 2020 DM (modelled flows).

Figure 9 – Wellington Bridge Modelled Traffic Changes 2020 and 2022 (AADT)



32. The impact upon non-compliant HGV remains significant with levels falling by over 90% from the 2020 DM situation and displacement onto the minor road network north and west of the city centre still occurring.
33. The overall levels of non-compliant LGVs and HGVs on Wellington Bridge are modelled to be 30% and 52% lower in 2022 (with the IRR CAZ B and CCP) than with the IRR CAZ B in 2020 – see Figures 10 and 11.

Figure 10 – Wellington Bridge Modelled LGV/HGV Traffic Changes 2020 and 2022 (AADT)

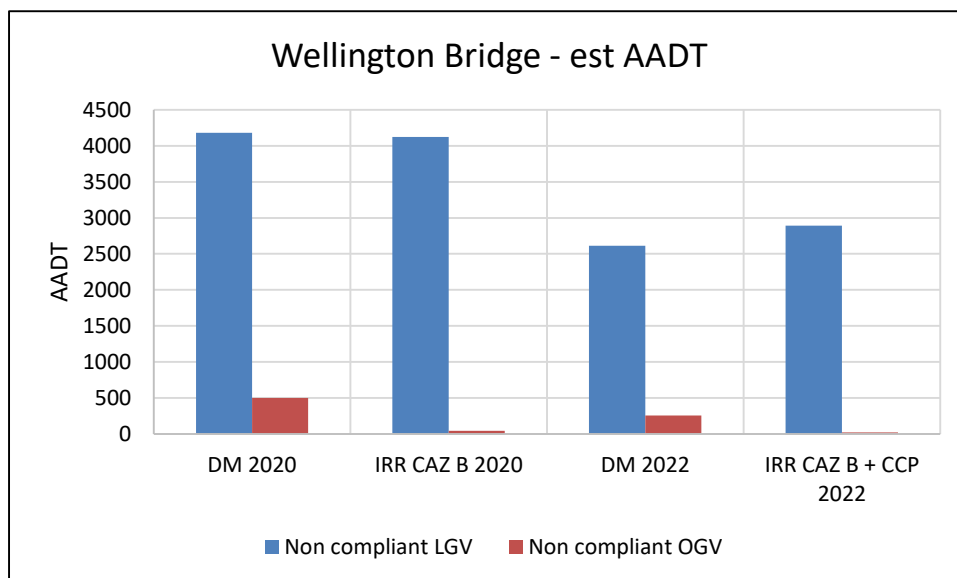
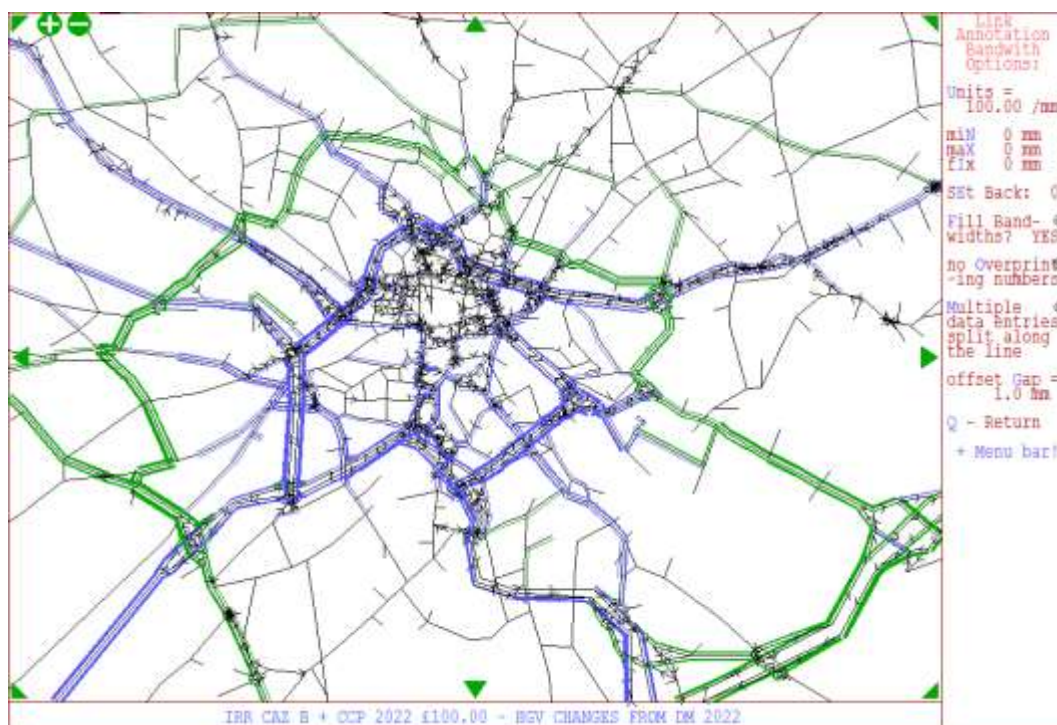


Figure 11 – Non-compliant HGV changes (12 hour) 2022



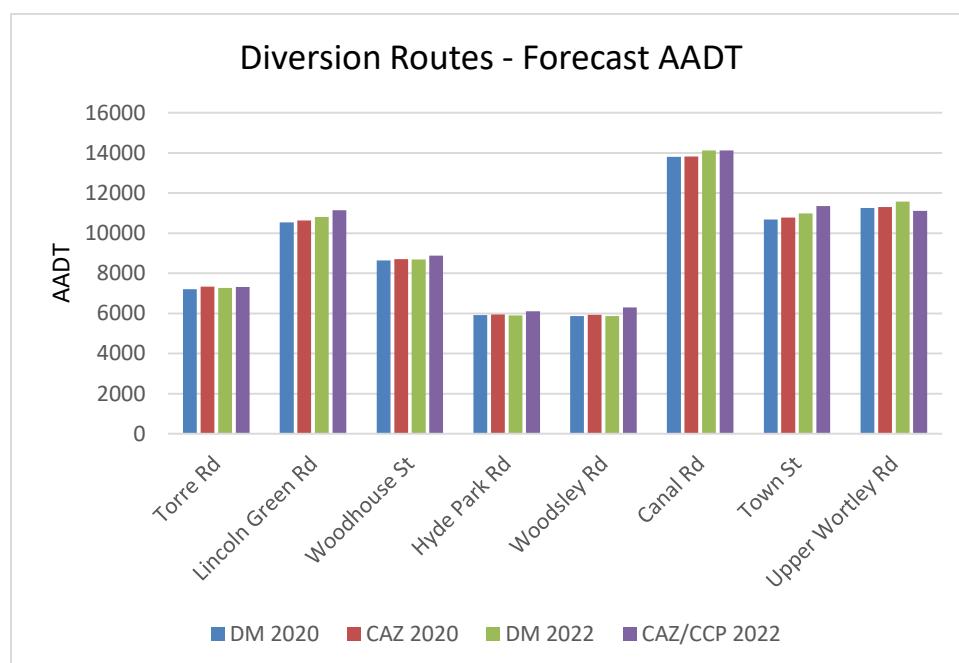
Note: Green = increase, blue = decrease

34. The section of the IRR most affected by additional traffic is A643 Ingram Distributor, where volumes are forecast to increase by 39% compared with the 2022 DM – see Table 6.

Table 6 – Forecast Change in Traffic Levels on Leeds IRR/M621 (2022)

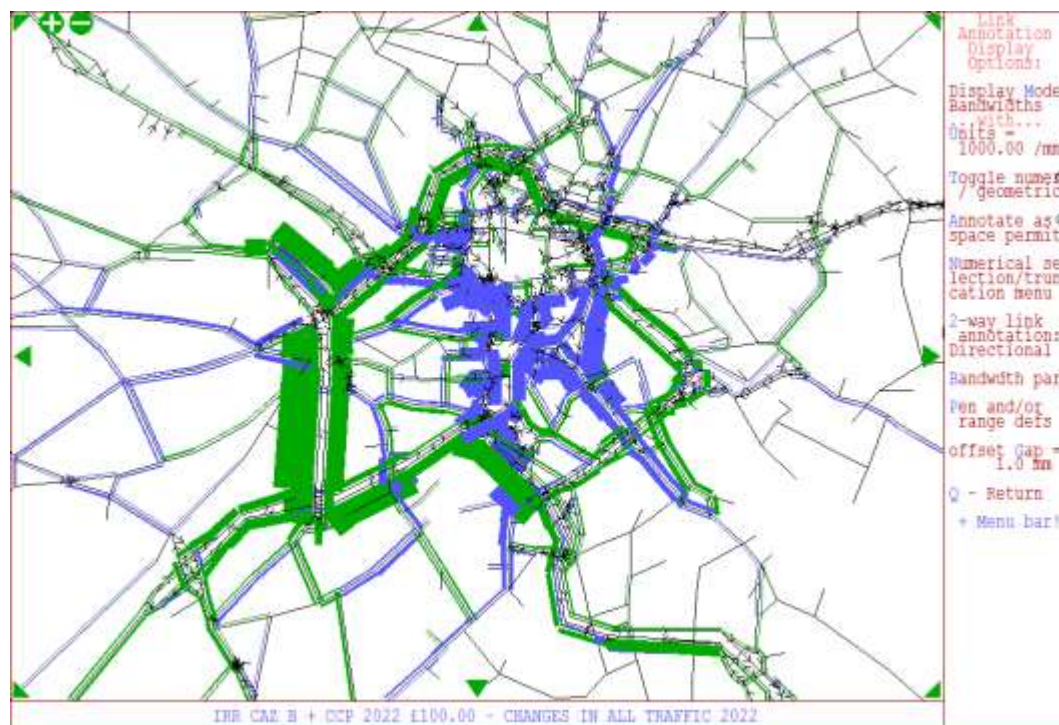
Road	Observed	Modelled AADT			Estimated 2022 AADT			
	Est AADT 2015	Base 2015	DM 2022	CAZ/CCP 2022	DM 2022	CAZ/CCP 2022	Change	
IRR Lovell Park Br	44200	55092	60420	64150	49528	53258	3730	8%
IRR Woodhouse tunnel	71000	73191	77687	84208	75496	82017	6521	9%
IRR Wellington Br	86700	85539	89778	102695	90939	103856	12917	14%
A643 Ingram	53300	55483	59498	81936	57315	79753	22438	39%
M621 Jn 2-2a	70000	67795	74247	86631	76452	88836	12384	16%
M621 Jn 2a-3	n/a	82397	90774	95461	92979	97666	4687	5%
M621 Jn 3-4	69100	66025	73605	70291	76680	73366	-3314	-4%
John Smeaton Viaduct	30100	30910	34329	36354	33519	35544	2025	6%
IRR East Street	28700	27817	31904	37235	32787	38118	5331	16%

35. These increases include higher levels of LGVs and HGVs on Ingram Distributor, M621 2-2a and East Street. The level of non-compliant HGVs is forecast to fall by around 90% on Ingram Distributor and East Street compared with the 2022 DM and by 20% on M621 2-2a (the M621 is not part of the IRR CAZ B) – see Appendix B.
36. Similar to Wellington Bridge, when compared with the IRR CAZ B in 2020, the volume of non-compliant vehicles on Ingram Distributor is forecast to be reduced by 19% (LGV) and 41% (HGV).
37. The level of additional traffic forecast for the minor roads to the north and west of the city centre is broadly similar to that with the IRR CAZ B in 2020 – see Figure 12. Although there are higher levels of traffic overall across the network in 2022, the proportion of non-compliant vehicles is lower and therefore the reassignment is proportionately less.
38. For example, the volume of modelled non-compliant HGVs on these minor roads in 2022 with the IRR CAZ B and CCP is around 45% lower than forecast for 2020 with the CAZ on its own. Nevertheless, the volumes are still substantially above the situation without a CAZ – see Appendix B.

Figure 12 – Minor Road Diversion Routes – Forecast Traffic Changes 2020 and 2022 (AADT)

Review of roads with reduced traffic

39. Figure 13 shows the changes in total traffic around the city centre resulting from the combination of the IRR CAZ and the CCP. The increases on the western IRR and westbound M621 are very clear, as are the significant falls in traffic within the city centre – in particular through City Square and across Crown Point Bridge.

Figure 13 – Total Traffic Changes (12 hour pcus) 2022

Note: Green = increase, blue = decrease

40. Traffic levels on Crown Point Bridge are forecast to fall by around a third compared with the 2022 DM and on Bishopgate St by over 80% - see Table 7.

Table 7 – Forecast Change in Traffic Levels on Routes with Reduced Traffic (2022)

Road	Observed	Modelled AADT			Estimated 2022 AADT			
	Est AADT 2015	Base 2015	DM 2022	CAZ/CCP 2022	DM 2022	CAZ/CCP 2022	Change	%age change
Duke Street	35790	33529	35948	32571	38209	34832	-3377	-9%
The Calls	11000	12606	13832	8670	12226	7064	-5162	-42%
Bishopgate St	24000	20106	21401	791	25295	4685	-20610	-81%
Crown Point Br	31700	27459	29403	18863	33644	23104	-10540	-31%
Great Wilson St	32300	29014	31812	18487	35098	21773	-13325	-38%

41. The volume of traffic entering the city centre (inside the IRR) is forecast to fall by 8.5% overall, with a 10% reduction in LGVs and 16% in HGVs – see Table 8. The fall in non-compliant vehicles is much more variable, with an 11% fall in LGVs but a substantial 92% fall in HGVs, reflecting the differential impact of the CAZ.
42. Overall traffic levels on the approach to the IRR, however, are only forecast to change marginally (up less than 1%), with a marginal change in non-compliant LGVs (up 0.3%) but a more substantial 64% drop in non-compliant HGVs.

Table 8 – Modelled Changes in Traffic Crossing Cordons Around Leeds City Centre (AADT 2022)

				Compliant		Non compliant			Total	
Summary		AADT	Cars	LGV	OGV	LGV	OGV	PSV	LGV	OGV
Cordon on approaches to IRR										
DM 2022		670664	567073	55335	18372	17477	2042	10365	72812	20414
IRR CAZ B + CCP 2022		676151	571824	56773	18914	17538	742	10360	74311	19656
IRR Cordon Changes		5487	4751	1438	542	61	-1300	-5	1499	-758
Percentage change		0.8%	0.8%	2.6%	3.0%	0.3%	-63.7%	0.0%	2.1%	-3.7%
Cordon within IRR										
DM 2022		340435	291219	24521	6652	7745	740	9558	32266	7392
IRR CAZ B + CCP 2022		311447	266535	22265	6154	6880	63	9550	29145	6217
Within IRR Changes		-28988	-24684	-2256	-498	-865	-677	-8	-3121	-1175
Percentage change		-8.5%	-8.5%	-9.2%	-7.5%	-11.2%	-91.5%	-0.1%	-9.7%	-15.9%

Conclusions

43. In summary, the impact of the City Centre Package (CCP) alongside the IRR CAZ B is to continue divert non-compliant vehicles away from the IRR onto the minor road network. Although trends in levels of compliance are partly balanced against increased traffic levels, the impact remains substantial.
44. Traffic levels within the City Centre are forecast to reduce significantly, however, this results in additional traffic on both the M621 and western IRR, in particular A643 Ingram Distributor which is forecast to attract an additional 39% traffic (compared with the 2022 DM) , together with more LGVs and HGVs. The volume of non-compliant HGVs, however, is forecast to fall by around 90%.
45. The M621 is not part of the IRR CAZ, consequently the CCP impact here not only increases the overall volume of traffic (by 16% between Jn 2 and 2a) but the fall in non-compliant HGVs is markedly less – 20% fewer compared with the 2022 DM – while non-compliant LGVs are forecast to increase by 13%.

APPENDIX A – Leeds IRR CAZ B 2020**Table A1 – Forecast Changes in LGV volumes – routes attracting more traffic 2020**

Road	Observed	Modelled AADT			Estimated 2020 AADT			
	Est AADT 2015	Base 2015	DM 2020	CAZ 2020	DM 2020	CAZ 2020	Change	%age change
Torre Rd	590	233	265	259	622	616	-6	-1%
Lincoln Green Rd	770	393	470	468	847	845	-2	0%
Woodhouse St	820	731	797	784	886	873	-13	-1%
Hyde Park Rd	500	571	623	618	552	547	-5	-1%
Woodsley Rd	370	471	512	497	411	396	-15	-4%
Canal Rd	980	1134	1297	1267	1143	1113	-30	-3%
Town St	890	978	1098	1076	1010	988	-22	-2%
Upper Wortley Rd	1030	1216	1357	1333	1171	1147	-24	-2%
East Park Parade	2020	1873	2181	2166	2328	2313	-15	-1%

Note: 2015 observed AADT estimated from 2017 MCC

Table A2 – Forecast Changes in HGV volumes – routes attracting more traffic 2020

Road	Observed	Modelled AADT			Estimated 2020 AADT			
	Est AADT 2015	Base 2015	DM 2020	CAZ 2020	DM 2020	CAZ 2020	Change	%age change
Torre Rd	170	29	35	177	176	318	142	81%
Lincoln Green Rd	170	56	64	195	178	309	131	74%
Woodhouse St	140	99	103	243	144	284	140	97%
Hyde Park Rd	100	90	93	208	103	218	115	112%
Woodsley Rd	80	78	79	216	81	218	137	169%
Canal Rd	310	312	323	553	321	551	230	72%
Town St	220	263	276	515	233	472	239	103%
Upper Wortley Rd	290	301	314	549	303	538	235	78%
East Park Parade	420	347	357	506	430	579	149	35%

Note: 2015 observed AADT estimated from 2017 MCC

Table A3 – Forecast Changes in LGV volumes – routes with reduced traffic 2020

Road	Observed	Modelled AADT			Estimated 2020 AADT			
	Est AADT 2015	Base 2015	DM 2020	CAZ 2020	DM 2020	CAZ 2020	Change	%age change
IRR Lovell Park Br	n/a	4955	5649	5658	5649	5658	9	0%
IRR Woodhouse tunnel	9191	7500	8534	8538	10225	10229	4	0%
IRR Wellington Br	9012	9291	10432	10475	10153	10196	43	0%
A643 Ingram	5932	7074	7978	8038	6836	6896	60	1%
M621 Jn 2-2a	10776	7865	8973	8986	11884	11897	13	0%
M621 Jn 2a-3	n/a	9998	11435	11473	11435	11473	38	0%
M621 Jn 3-4	11326	8923	10164	10208	12567	12611	44	0%
John Smeaton Viaduct	4924	3187	3551	3565	5288	5302	14	0%
IRR East Street	3638	2295	2758	2759	4101	4102	1	0%
Crown Point Br	3365	2034	2384	2367	3715	3698	-17	0%
Bishopgate St	1650	1645	1772	1776	1777	1781	4	0%

Note: 2015 observed AADT estimated from 2014 and 2015 MCC

Table A4 – Forecast Changes in HGV volumes – routes with reduced traffic 2020

Road	Observed	Modelled AADT			Estimated 2020 AADT			
	Est AADT 2015	Base 2015	DM 2020	CAZ 2020	DM 2020	CAZ 2020	Change	%age change
IRR Lovell Park Br	n/a	1346	1403	1172	1403	1172	-231	-16%
IRR Woodhouse tunnel	2047	1387	1428	1186	2088	1846	-242	-12%
IRR Wellington Br	2210	2432	2495	2127	2273	1905	-368	-16%
A643 Ingram	2048	1975	2040	1713	2113	1786	-327	-15%
M621 Jn 2-2a	4892	3670	3749	3631	4971	4853	-118	-2%
M621 Jn 2a-3	n/a	4551	4716	4509	4716	4509	-207	-4%
M621 Jn 3-4	5554	3836	4027	3905	5745	5623	-122	-2%
John Smeaton Viaduct	1361	1522	1558	1291	1397	1130	-267	-19%
IRR East Street	1382	742	776	662	1416	1302	-114	-8%
Crown Point Br	322	337	357	317	342	302	-40	-12%
Bishopgate St	220	366	390	346	244	200	-44	-18%

Note: 2015 observed AADT estimated from 2014 and 2015 MCC

Table A5 – Modelled changes in traffic volumes – routes attracting more traffic 2020

2020 estimated AADT with IRR CAZ B										
Road	Anode Bnode	AADT	Cars	Compliant		Non compliant		PSV	Total	
				LGV	OGV	LGV	OGV		LGV	OGV
Torre Rd		3702	3266	156	29	103	148	0	259	177
Lincoln Green Rd		7649	6793	284	52	184	143	193	468	195
Woodhouse St		9177	8150	476	81	308	162	0	784	243
Hyde Park Rd		9388	8536	375	74	243	134	26	618	208
Woodsley Rd		6842	6129	301	62	196	154	0	497	216
Canal Rd		17544	15570	769	257	498	296	154	1267	553
Town St		13120	11375	653	221	423	294	154	1076	515
Upper Wortley Rd		11912	9978	809	250	524	299	52	1333	549
East Park Parade		18285	15587	1294	287	872	219	26	2166	506
A63 Pontefract La		24633	19023	2028	1502	1494	586	0	3522	2088
A6120 Selby Rd		35195	29887	2385	680	1524	207	512	3909	887
M1 Jn 44-45		88129	70386	6734	5159	4180	1670	0	10914	6829
M62 Jn 28-29		154793	127612	9664	8816	6257	2444	0	15921	11260
Change from 2020 DM										
Road	Anode Bnode	AADT	Cars	Compliant		Non compliant		PSV	Total	
				LGV	OGV	LGV	OGV		LGV	OGV
Torre Rd		132	-4	-2	1	-4	141	0	-6	142
Lincoln Green Rd		98	-31	2	1	-4	130	0	-2	131
Woodhouse St		58	-69	-2	-1	-11	141	0	-13	140
Hyde Park Rd		39	-71	1	-1	-6	116	0	-5	115
Woodsley Rd		57	-65	-6	-1	-9	138	0	-15	137
Canal Rd		11	-189	-9	-1	-21	231	0	-30	230
Town St		105	-112	-5	0	-17	239	0	-22	239
Upper Wortley Rd		53	-158	-5	-2	-19	237	0	-24	235
A6110 Ring Rd W A62		-247	-542	-27	-7	-81	410	0	-108	403
A6110 Ring Rd E M621		-162	-251	-17	15	-63	154	0	-80	169
A653 Dewsbury Rd		-142	-228	5	9	-54	126	0	-49	135
East Park Parade		3	-131	8	1	-23	148	0	-15	149
A63 Pontefract La		309	90	-11	52	-46	224	0	-57	276
A6120 Selby Rd		1	-61	37	7	-20	38	0	17	45
M1 Jn 44-45		0	-358	57	3	-83	381	0	-26	384
M62 Jn 28-29		11	-204	82	19	-131	245	0	-49	264
Percentage change from 2020 DM										
Road	Anode Bnode	AADT	Cars	Compliant		Non compliant		PSV	Total	
				LGV	OGV	LGV	OGV		LGV	OGV
Torre Rd		4%	0%	-1%	4%	-4%	2014%	0%	-2%	406%
Lincoln Green Rd		1%	0%	1%	2%	-2%	1000%	0%	0%	205%
Woodhouse St		1%	-1%	0%	-1%	-3%	671%	0%	-2%	136%
Hyde Park Rd		0%	-1%	0%	-1%	-2%	644%	0%	-1%	124%
Woodsley Rd		1%	-1%	-2%	-2%	-4%	863%	0%	-3%	173%
Canal Rd		0%	-1%	-1%	0%	-4%	355%	0%	-2%	71%
Town St		1%	-1%	-1%	0%	-4%	435%	0%	-2%	87%
Upper Wortley Rd		0%	-2%	-1%	-1%	-3%	382%	0%	-2%	75%
A6110 Ring Rd W A62		-1%	-2%	-1%	0%	-4%	97%	0%	-2%	19%
A6110 Ring Rd E M621		0%	-1%	-1%	2%	-4%	63%	0%	-2%	14%
A653 Dewsbury Rd		0%	-1%	0%	1%	-3%	61%	0%	-1%	13%
East Park Parade		0%	-1%	1%	0%	-3%	208%	0%	-1%	42%
A63 Pontefract La		1%	0%	-1%	4%	-3%	62%	0%	-2%	15%
A6120 Selby Rd		0%	0%	2%	1%	-1%	22%	0%	0%	5%
M1 Jn 44-45		0%	-1%	1%	0%	-2%	30%	0%	0%	6%
M62 Jn 28-29		0%	0%	1%	0%	-2%	11%	0%	0%	2%

Note: Model flow validation is variable across these routes and the results must be taken as indicative only. In particular the results for Torre Rd are not regarded as representative.

Table A6 – Modelled changes in traffic volumes – routes with reduced traffic 2020

2020 estimated AADT with IRR CAZ B										
Road				Compliant		Non compliant			Total	
	Anode Bnode	AADT	Cars	LGV	OGV	LGV	OGV	PSV	LGV	OGV
IRR Lovell Park Br		59430	52600	3398	1160	2260	12	0	5658	1172
IRR Woodhouse tunnel		76936	67212	5154	1173	3384	13	0	8538	1186
IRR Wellington Br		89187	75461	6351	2085	4124	42	1124	10475	2127
A643 Ingram		58695	48944	4899	1684	3139	29	0	8038	1713
M621 Jn 2-2a		73513	60667	5480	3120	3506	511	229	8986	3631
M621 Jn 2a-3		89726	73515	6990	3966	4483	543	229	11473	4509
M621 Jn 3-4		72805	58692	6242	3369	3966	536	0	10208	3905
John Smeaton Viaduct		34094	29238	2164	1282	1401	9	0	3565	1291
IRR East Street		31391	27868	1655	654	1104	8	102	2759	662
Crown Point Br		29091	26228	1448	313	919	4	179	2367	317
Bishopgate St		21136	18272	1086	342	690	4	742	1776	346
Change from 2020 DM										
Road				Compliant		Non compliant			Total	
	Anode Bnode	AADT	Cars	LGV	OGV	LGV	OGV	PSV	LGV	OGV
IRR Lovell Park Br		-94	128	45	37	-36	-268	0	9	-231
IRR Woodhouse tunnel		-20	218	62	31	-58	-273	0	4	-242
IRR Wellington Br		69	394	99	89	-56	-457	0	43	-368
A643 Ingram		111	378	92	52	-32	-379	0	60	-327
M621 Jn 2-2a		-64	41	71	121	-58	-239	0	13	-118
M621 Jn 2a-3		-75	94	103	194	-65	-401	0	38	-207
M621 Jn 3-4		27	105	98	147	-54	-269	0	44	-122
John Smeaton Viaduct		6	259	33	36	-19	-303	0	14	-267
IRR East Street		13	126	20	33	-19	-147	0	1	-114
Crown Point Br		-25	32	6	27	-23	-67	0	-17	-40
Bishopgate St		-1	39	15	30	-11	-74	0	4	-44
Percentage change from 2020 DM										
Road				Compliant		Non compliant			Total	
	Anode Bnode	AADT	Cars	LGV	OGV	LGV	OGV	PSV	LGV	OGV
IRR Lovell Park Br		0%	0%	1%	3%	-2%	-96%	0%	0%	-16%
IRR Woodhouse tunnel		0%	0%	1%	3%	-2%	-95%	0%	0%	-17%
IRR Wellington Br		0%	1%	2%	4%	-1%	-92%	0%	0%	-15%
A643 Ingram		0%	1%	2%	3%	-1%	-93%	0%	1%	-16%
M621 Jn 2-2a		0%	0%	1%	4%	-2%	-32%	0%	0%	-3%
M621 Jn 2a-3		0%	0%	1%	5%	-1%	-42%	0%	0%	-4%
M621 Jn 3-4		0%	0%	2%	5%	-1%	-33%	0%	0%	-3%
John Smeaton Viaduct		0%	1%	2%	3%	-1%	-97%	0%	0%	-17%
IRR East Street		0%	0%	1%	5%	-2%	-95%	0%	0%	-15%
Crown Point Br		0%	0%	0%	9%	-2%	-94%	0%	-1%	-11%
Bishopgate St		0%	0%	1%	10%	-2%	-95%	0%	0%	-11%

Note: Model flow validation is variable across these routes and the results must be taken as indicative only.

Table A7 – Modelled Changes in Traffic Crossing Cordons Around Leeds City Centre (AADT 2020)

				Compliant		Non compliant			Total	
Summary		AADT	Cars	LGV	OGV	LGV	OGV	PSV	LGV	OGV
Cordon on approaches to IRR										
DM 2020		663808	563136	42011	16230	28000	4058	10373	70011	20288
IRR CAZ B 2020		663524	564461	42642	17107	27601	1343	10370	70243	18450
IRR Cordon Changes		-284	1325	631	877	-399	-2715	-3	232	-1838
Percentage change		0.0%	0.2%	1.5%	5.4%	-1.4%	-66.9%	0.0%	0.3%	-9.1%
Cordon within IRR										
DM 2020		336622	288318	18790	5945	12519	1487	9563	31309	7432
IRR CAZ B 2020		336641	288844	19071	6705	12335	124	9562	31406	6829
Within IRR Changes		19	526	281	760	-184	-1363	-1	97	-603
Percentage change		0.0%	0.2%	1.5%	12.8%	-1.5%	-91.7%	0.0%	0.3%	-8.1%

Note: Model flow validation is variable across these routes and the results must be taken as indicative only.

APPENDIX B – Leeds IRR CAZ B plus City Centre Package 2022**Table B1 – Forecast Changes in LGV volumes – minor routes attracting more traffic 2022**

Road	Observed	Modelled AADT			Estimated 2022 AADT			
	Est AADT 2015	Base 2015	DM 2022	CAZ/CCP 2022	DM 2022	CAZ/CCP 2022	Change	
Torre Rd	590	233	285	295	642	652	10	2%
Lincoln Green Rd	770	393	498	491	875	868	-7	-1%
Woodhouse St	820	731	834	850	923	939	16	2%
Hyde Park Rd	500	571	634	645	563	574	11	2%
Woodsley Rd	370	471	536	576	435	475	40	9%
Canal Rd	980	1134	1387	1386	1233	1232	-1	0%
Town St	890	978	1166	1281	1078	1193	115	11%
Upper Wortley Rd	1030	1216	1402	1366	1216	1180	-36	-3%
East Park Parade	2020	1873	2217	2153	2364	2300	-64	-3%

Note: 2015 observed AADT estimated from 2017 MCC

Table B2 – Forecast Changes in HGV volumes – minor routes attracting more traffic 2022

Road	Observed	Modelled AADT			Estimated 2022 AADT			
	Est AADT 2015	Base 2015	DM 2022	CAZ/CCP 2022	DM 2022	CAZ/CCP 2022	Change	
Torre Rd	170	29	35	114	176	255	79	45%
Lincoln Green Rd	170	56	65	139	179	253	74	41%
Woodhouse St	140	99	103	187	144	228	84	58%
Hyde Park Rd	100	90	94	165	104	175	71	68%
Woodsley Rd	80	78	81	166	83	168	85	102%
Canal Rd	310	312	334	391	332	389	57	17%
Town St	220	263	285	397	242	354	112	46%
Upper Wortley Rd	290	301	318	436	307	425	118	38%
East Park Parade	420	347	363	438	436	511	75	17%

Note: 2015 observed AADT estimated from 2017 MCC

Table B3 – Forecast Changes in LGV volumes – Leeds IRR and M621 2022

Road	Observed	Modelled AADT			Estimated 2022 AADT			
	Est AADT 2015	Base 2015	DM 2022	CAZ/CCP 2022	DM 2022	CAZ/CCP 2022	Change	%age change
IRR Lovell Park Br	n/a	4955	5861	6502	5861	6502	641	11%
IRR Woodhouse tunnel	9191	7500	8873	9552	10564	11243	679	6%
IRR Wellington Br	9012	9291	10878	12248	10599	11969	1370	13%
A643 Ingram	5932	7074	8373	10824	7231	9682	2451	34%
M621 Jn 2-2a	10776	7865	9396	10838	12307	13749	1442	12%
M621 Jn 2a-3	n/a	9998	11932	12285	11932	12285	353	3%
M621 Jn 3-4	11326	8923	10625	9801	13028	12204	-824	-6%
John Smeaton Viaduct	4924	3187	3752	4237	5489	5974	485	9%
IRR East Street	3638	2295	2932	3787	4275	5130	855	20%

Note: 2015 observed AADT estimated from 2014 and 2015 MCC

Table B4 – Forecast Changes in HGV volumes – Leeds IRR and M621 2022

Road	Observed	Modelled AADT			Estimated 2022 AADT			
	Est AADT 2015	Base 2015	DM 2022	CAZ/CCP 2022	DM 2022	CAZ/CCP 2022	Change	%age change
IRR Lovell Park Br	n/a	1346	1442	1401	1442	1401	-41	-3%
IRR Woodhouse tunnel	2047	1387	1466	1470	2126	2130	4	0%
IRR Wellington Br	2210	2432	2543	2465	2321	2243	-78	-3%
A643 Ingram	2048	1975	2075	2409	2148	2482	334	16%
M621 Jn 2-2a	4892	3670	3731	4170	4953	5392	439	9%
M621 Jn 2a-3	n/a	4551	4693	4541	4693	4541	-152	-3%
M621 Jn 3-4	5554	3836	4055	3610	5773	5328	-445	-8%
John Smeaton Viaduct	1361	1522	1602	1452	1441	1291	-150	-10%
IRR East Street	1382	742	781	820	1421	1460	39	3%

Note: 2015 observed AADT estimated from 2014 and 2015 MCC

Table B5 – Modelled changes in traffic volumes – routes attracting more traffic 2022

2022 estimated AADT with IRR CAZ B + CCP										
Road				Compliant		Non compliant			Total	
	Anode Bnode	AADT	Cars	LGV	OGV	LGV	OGV	PSV	LGV	OGV
Torre Rd		3689	3280	225	33	70	81	0	295	114
Lincoln Green Rd		8147	7325	375	60	116	79	192	491	139
Woodhouse St		9357	8320	649	97	201	90	0	850	187
Hyde Park Rd		9551	8715	492	89	153	76	26	645	165
Woodsley Rd		7206	6464	440	79	136	87	0	576	166
Canal Rd		17852	15921	1059	228	327	163	154	1386	391
Town St		13688	11856	979	234	302	163	154	1281	397
Upper Wortley Rd		11714	9860	1044	270	322	166	52	1366	436
East Park Parade		18885	16268	1644	320	509	118	26	2153	438
A63 Pontefract La		24480	18927	2712	1680	838	323	0	3550	2003
A6120 Selby Rd		35742	30191	3181	763	983	113	511	4164	876
M1 Jn 44-45		91523	72987	8997	5840	2779	920	0	11776	6760
M62 Jn 28-29		157104	129331	12587	9953	3888	1345	0	16475	11298
Change from 2022 DM										
Road				Compliant		Non compliant			Total	
	Anode Bnode	AADT	Cars	LGV	OGV	LGV	OGV	PSV	LGV	OGV
Torre Rd		57	-32	8	1	2	78	0	10	79
Lincoln Green Rd		338	272	-3	1	-4	73	-1	-7	74
Woodhouse St		190	90	15	4	1	80	0	16	84
Hyde Park Rd		220	138	10	4	1	67	0	11	71
Woodsley Rd		432	307	33	6	7	79	0	40	85
Canal Rd		4	-52	5	-73	-6	130	0	-1	57
Town St		370	143	93	-22	22	134	0	115	112
Upper Wortley Rd		-475	-557	-22	-17	-14	135	0	-36	118
A6110 Ring Rd W A62		-774	-532	-316	-42	-128	244	0	-444	202
A6110 Ring Rd E M621		1832	2276	-344	-57	-131	88	0	-475	31
A653 Dewsbury Rd		5	225	-192	-17	-86	75	0	-278	58
East Park Parade		321	310	-41	-7	-23	82	0	-64	75
A63 Pontefract La		-426	-488	-63	24	-38	139	0	-101	163
A6120 Selby Rd		110	8	74	-2	2	28	0	76	26
M1 Jn 44-45		1066	747	135	-60	-20	264	0	115	204
M62 Jn 28-29		-1261	-992	-207	-134	-152	224	0	-359	90
Percentage change from 2022 DM										
Road				Compliant		Non compliant			Total	
	Anode Bnode	AADT	Cars	LGV	OGV	LGV	OGV	PSV	LGV	OGV
Torre Rd		2%	-1%	4%	3%	3%	2600%	0%	4%	226%
Lincoln Green Rd		4%	4%	-1%	2%	-3%	1217%	-1%	-1%	114%
Woodhouse St		2%	1%	2%	4%	1%	800%	0%	2%	82%
Hyde Park Rd		2%	2%	2%	5%	1%	744%	0%	2%	76%
Woodsley Rd		6%	5%	8%	8%	5%	988%	0%	7%	105%
Canal Rd		0%	0%	0%	-24%	-2%	394%	0%	0%	17%
Town St		3%	1%	10%	-9%	8%	462%	0%	10%	39%
Upper Wortley Rd		-4%	-5%	-2%	-6%	-4%	435%	0%	-3%	37%
A6110 Ring Rd W A62		-2%	-2%	-7%	-2%	-9%	113%	0%	-8%	9%
A6110 Ring Rd E M621		4%	6%	-10%	-5%	-12%	70%	0%	-10%	2%
A653 Dewsbury Rd		0%	1%	-5%	-2%	-7%	70%	0%	-5%	5%
East Park Parade		2%	2%	-2%	-2%	-4%	228%	0%	-3%	21%
A63 Pontefract La		-2%	-3%	-2%	1%	-4%	76%	0%	-3%	9%
A6120 Selby Rd		0%	0%	2%	0%	0%	33%	0%	2%	3%
M1 Jn 44-45		1%	1%	2%	-1%	-1%	40%	0%	1%	3%
M62 Jn 28-29		-1%	-1%	-2%	-1%	-4%	20%	0%	-2%	1%

Note: Model flow validation is variable across these routes and the results must be taken as indicative only. In particular the results for Torre Rd are not regarded as representative.

Table B6 – Modelled changes in non-compliant HGVs – routes attracting more traffic 2022

Road	Estimated 2020/22 AADT				%age change to CAZ/CCP		
	DM 2020	CAZ 2020	DM 2022	CAZ/CCP 2022	DM 2020	CAZ 2020	DM 2022
Torre Rd	7	148	3	81	1057%	-45%	2600%
Lincoln Green Rd	13	143	6	79	508%	-45%	1217%
Woodhouse St	21	162	10	90	329%	-44%	800%
Hyde Park Rd	18	134	9	76	322%	-43%	744%
Woodsley Rd	16	154	8	87	444%	-44%	988%
Canal Rd	65	296	33	163	151%	-45%	394%
Town St	55	294	29	163	196%	-45%	462%
Upper Wortley Rd	62	299	31	166	168%	-44%	435%

Note: Model flow validation is variable across these routes and the results must be taken as indicative only. In particular the results for Torre Rd are not regarded as representative.

Table B7 – Modelled changes in traffic volumes – Routes with reduced traffic 2022

2022 estimated AADT with IRR CAZ B + CCP										
Road				Compliant		Non compliant		Total		
	Anode	Bnode	AADT	Cars	LGV	OGV	LGV	OGV	PSV	OGV
Duke Street			32571	28363	1932	410	597	3	1266	413
The Calls			8670	7687	595	125	184	2	77	127
Bishopgate St			791	48	0	0	0	0	743	0
Crown Point Br			18863	17037	1140	153	352	2	179	155
Great Wilson St			18487	16196	1151	235	355	3	547	238
Change from 2022 DM										
Road				Compliant		Non compliant		Total		
	Anode	Bnode	AADT	Cars	LGV	OGV	LGV	OGV	PSV	OGV
Duke Street			-3377	-3164	-114	-6	-49	-43	-1	-163
The Calls			-5162	-4729	-249	-80	-83	-21	0	-332
Bishopgate St			-20610	-18412	-1374	-352	-434	-39	1	-1808
Crown Point Br			-10540	-9330	-768	-158	-251	-33	0	-1019
Great Wilson St			-13325	-11595	-1153	-160	-373	-41	-3	-1526
Percentage change from 2022 DM										
Road				Compliant		Non compliant		Total		
	Anode	Bnode	AADT	Cars	LGV	OGV	LGV	OGV	PSV	OGV
Duke Street			-9%	-10%	-6%	-1%	-8%	-93%	0%	-6%
The Calls			-37%	-38%	-30%	-39%	-31%	-91%	0%	-30%
Bishopgate St			-96%	-100%	-100%	-100%	-100%	-100%	0%	-100%
Crown Point Br			-36%	-35%	-40%	-51%	-42%	-94%	0%	-41%
Great Wilson St			-42%	-42%	-50%	-41%	-51%	-93%	-1%	-50%

Note: Model flow validation is variable across these routes and the results must be taken as indicative only.

Table B8 – Modelled changes in traffic volumes – Leeds IRR and M621 2022

2022 estimated AADT with IRR CAZ B + CCP										
Road				Compliant		Non compliant			Total	
	Anode Bnode	AADT	Cars	LGV	OGV	LGV	OGV	PSV	LGV	OGV
IRR Lovell Park Br		64150	56247	4967	1394	1535	7	0	6502	1401
IRR Woodhouse tunnel		84208	73186	7297	1462	2255	8	0	9552	1470
IRR Wellington Br		102695	86860	9357	2445	2891	20	1122	12248	2465
A643 Ingram		81936	68703	8270	2392	2554	17	0	10824	2409
M621 Jn 2-2a		86631	71394	8280	3872	2558	298	229	10838	4170
M621 Jn 2a-3		95461	78406	9386	4240	2899	301	229	12285	4541
M621 Jn 3-4		70291	56880	7488	3316	2313	294	0	9801	3610
John Smeaton Viaduct		36354	30665	3237	1447	1000	5	0	4237	1452
IRR East Street		37235	32526	2893	815	894	5	102	3787	820
Change from 2022 DM										
Road				Compliant		Non compliant			Total	
	Anode Bnode	AADT	Cars	LGV	OGV	LGV	OGV	PSV	LGV	OGV
IRR Lovell Park Br		3730	3130	513	96	128	-137	0	641	-41
IRR Woodhouse tunnel		6521	5838	554	143	125	-139	0	679	4
IRR Wellington Br		12917	11626	1090	157	280	-235	-1	1370	-78
A643 Ingram		22438	19653	1907	524	544	-190	0	2451	334
M621 Jn 2-2a		12384	10503	1139	514	303	-75	0	1442	439
M621 Jn 2a-3		4687	4486	318	16	35	-168	0	353	-152
M621 Jn 3-4		-3314	-2045	-587	-333	-237	-112	0	-824	-445
John Smeaton Viaduct		2025	1690	386	5	99	-155	0	485	-150
IRR East Street		5331	4437	665	112	190	-73	0	855	39
Percentage change from 2022 DM										
Road				Compliant		Non compliant			Total	
	Anode Bnode	AADT	Cars	LGV	OGV	LGV	OGV	PSV	LGV	OGV
IRR Lovell Park Br		6%	6%	12%	7%	9%	-95%	0%	11%	-3%
IRR Woodhouse tunnel		8%	9%	8%	11%	6%	-95%	0%	8%	0%
IRR Wellington Br		14%	15%	13%	7%	11%	-92%	0%	13%	-3%
A643 Ingram		38%	40%	30%	28%	27%	-92%	0%	29%	16%
M621 Jn 2-2a		17%	17%	16%	15%	13%	-20%	0%	15%	12%
M621 Jn 2a-3		5%	6%	4%	0%	1%	-36%	0%	3%	-3%
M621 Jn 3-4		-5%	-3%	-7%	-9%	-9%	-28%	0%	-8%	-11%
John Smeaton Viaduct		6%	6%	14%	0%	11%	-97%	0%	13%	-9%
IRR East Street		17%	16%	30%	16%	27%	-94%	0%	29%	5%

Note: Model flow validation is variable across these routes and the results must be taken as indicative only.

Table B9 – Modelled Changes in Traffic Crossing Cordons Around Leeds City Centre (AADT 2022)

Two way flow changes from DM 2022										
				Compliant		Non compliant			Total	
Summary		AADT	Cars	LGV	OGV	LGV	OGV	PSV	LGV	OGV
Cordon on approaches to IRR										
DM 2022		670664	567073	55335	18372	17477	2042	10365	72812	20414
IRR CAZ B + CCP 2022		676151	571824	56773	18914	17538	742	10360	74311	19656
IRR Cordon Changes		5487	4751	1438	542	61	-1300	-5	1499	-758
Percentage change		0.8%	0.8%	2.6%	3.0%	0.3%	-63.7%	0.0%	2.1%	-3.7%
Cordon within IRR										
DM 2022		340435	291219	24521	6652	7745	740	9558	32266	7392
IRR CAZ B + CCP 2022		311447	266535	22265	6154	6880	63	9550	29145	6217
Within IRR Changes		-28988	-24684	-2256	-498	-865	-677	-8	-3121	-1175
Percentage change		-8.5%	-8.5%	-9.2%	-7.5%	-11.2%	-91.5%	-0.1%	-9.7%	-15.9%

Note: Model flow validation is variable across these routes and the results must be taken as indicative only.