

Our Reference: CLA.D4.WQ2.AS2
Your Reference: TR010044

Response to ExA's Second Written Questions (WQ2) – Q2.11.1.1, c)

This document sets out the response to the Examining Authority (ExA)'s Second Written Questions (WQ2) Q2.11.1.1 c) by Cambridgeshire County Council (CCC), Huntingdonshire District Council (HDC) and South Cambridgeshire District Council (SCDC) (together, the Councils).

Cambridgeshire County Council is the Local Highway Authority for Cambridgeshire.

1. Local Junction Impacts

1.1. This response answers the ExA's Q2.11.1.1 c), which asks:

c) Do LHAs intend on undertaking further analysis such as has been provided for Caxton Gibbet [REP2-003, Fig 1, 7.2.22]? If so, which locations would this relate to and when will this be provided to the ExA?

- 1.2. NH undertook junction assessments that have been used to assess the operation of key junctions both directly on the scheme and in more removed locations. The main scheme junctions are included in the Transport Assessment (APP-241 and APP-242) and the Transport Assessment Annex (APP-243).
- 1.3. The key issue for CCC with the local junction modelling is that the traffic flows (both Base and future year) have been taken directly from the Strategic Model without any reference to observed count data. Whilst it is acknowledged that this is an acceptable practice if there is no other alternative, it is not best practice as strategic models are not validated to individual turning movements. NH claim that they have followed best practice due to the major changes being made to several of the junctions (especially those on the scheme) meaning that it was not possible to provide validated base models. This point is not supported by CCC.
- 1.4. As stated above the approach taken by NH in extracting the flows directly from the strategic model is an acceptable methodology if there is no other alternative. However, in order to make this approach acceptable it is important to verify how the turning proportions in the models compare to any available observed count data. This is required to enable a check to be made as to the turn proportions within the strategic model. CCC have undertaken a review of the information provided in support of both NH's Technical Note 73 [REP1-030] and Technical Note 81 (not submitted as part of the Examination).
- 1.5. The result of this review is that some of the turning movements at junctions both on the scheme and on the local road network in the Base Year Saturn model do not accurately represent the observed turning proportions from the available count data. These differences are exacerbated in the future year models and therefore, CCC are of the opinion that the approach followed NH is not appropriate for the assessment of the scheme on the local road network.
- 1.6. The example included in the Local Impact Report included the data for Caxton Gibbet, this is repeated below for consistency.

1.7. In the information below, the first table is the data supplied by NH and the second represents the comparisons of the turning movements undertaken by CCC

Caxton Gibbet AM Peak

From/To	SATURN Flows (2015)					Survey Flows (2016)					Difference (SATURN - Survey)				
	A1198 Ermine Street (North)	A428 (East)	A1198 (South)	A428 Cambridge Road (West)	Total	A1198 Ermine Street (North)	A428 (East)	A1198 (South)	A428 Cambridge Road (West)	Total	A1198 Ermine Street (North)	A428 (East)	A1198 (South)	A428 Cambridge Road (West)	Total
A1198 Ermine Street (North)	0	416	227	0	642	0	422	172	38	632	0	-6	55	-38	10
A428 (East)	271	0	1	892	1164	430	1	99	812	1342	-159	-1	-98	80	-178
A1198 (South)	280	29	0	61	369	211	274	0	106	591	69	-245	0	-45	-222
A428 Cambridge Road (West)	0	1075	21	0	1096	6	914	113	0	1033	-6	161	-92	0	63
Total	551	1520	249	952	3273	647	1611	384	956	3598	-96	-91	-135	-4	-325 (-9%)

From/To	SATURN Flows (2015)					Survey Flows (2016)					Difference (SATURN - Survey)				
	A1198 Ermine Street (North)	A428 (East)	A1198 (South)	A428 Cambridge Road (West)	Total	A1198 Ermine Street (North)	A428 (East)	A1198 (South)	A428 Cambridge Road (West)	Total	A1198 Ermine Street (North)	A428 (East)	A1198 (South)	A428 Cambridge Road (West)	Total
A1198 Ermine Street (North)	0.0%	64.7%	35.3%	0.0%	100%	0.0%	66.8%	27.2%	6.0%	100%	0%	-2%	8%	-6%	0%
A428 (East)	23.3%	0.0%	0.1%	76.6%	100%	32.0%	0.1%	7.4%	60.5%	100%	-9%	0%	-7%	16%	0%
A1198 (South)	75.8%	7.8%	0.0%	16.4%	100%	35.7%	46.4%	0.0%	17.9%	100%	40%	-39%	0%	-1%	0%
A428 Cambridge Road (West)	0.0%	98.1%	1.9%	0.0%	100%	0.6%	88.5%	10.9%	0.0%	100%	-1%	10%	-9%	0%	0%
Total	16.8%	46.4%	7.6%	29.1%	100%	18.0%	44.8%	10.7%	26.6%	100%	-1%	2%	-3%	3%	

1.8. From this information it is possible to see that the link flows are very similar in the model and the observed data meaning that there is no issue with the use of the strategic model in this location. However, when the individual turn proportions are analysed, it is possible to see that the model does not accurately reflect the turn proportions in the observed count data. The worst arm is the A1198 (South) where the model overestimated the traffic heading North on the A1198 by 40% while the turn proportion on to the A428 (East) is underestimated by

39%. Due to the issues with the A1198 (South) turn proportions the Councils require this junction to be included in the sensitivity testing proposed by NH in light of the matters highlighted at ISH2.

Caxton Gibbet PM

From/To	SATURN Flows (2015)					Survey Flows (2016)					Difference (SATURN - Survey)				
	A1198 Ermine Street (North)	A428 (East)	A1198 (South)	A428 Cambridge Road (West)	Total	A1198 Ermine Street (North)	A428 (East)	A1198 (South)	A428 Cambridge Road (West)	Total	A1198 Ermine Street (North)	A428 (East)	A1198 (South)	A428 Cambridge Road (West)	Total
A1198 Ermine Street (North)	0	404	263	0	667	1	420	166	185	772	-1	-16	97	-185	-105
A428 (East)	568	0	22	1221	1811	724	0	70	1039	1833	-156	0	-48	182	-22
A1198 (South)	307	2	0	27	336	152	159	1	105	417	155	-157	-1	-78	-81
A428 Cambridge Road (West)	0	744	26	0	770	15	611	197	1	824	-15	133	-171	-1	-54
Total	875	1150	310	1248	3583	892	1190	434	1330	3846	-17	-40	-124	-82	-263 (-7%)

From/To	SATURN Flows (2015)					Survey Flows (2016)					Difference (SATURN - Survey)				
	A1198 Ermine Street (North)	A428 (East)	A1198 (South)	A428 Cambridge Road (West)	Total	A1198 Ermine Street (North)	A428 (East)	A1198 (South)	A428 Cambridge Road (West)	Total	A1198 Ermine Street (North)	A428 (East)	A1198 (South)	A428 Cambridge Road (West)	Total
A1198 Ermine Street (North)	0.0%	60.6%	39.4%	0.1%	100%	0.1%	54.4%	21.5%	24.0%	100%	0%	6%	18%	-24%	0%
A428 (East)	31.4%	0.0%	1.2%	67.4%	100%	39.5%	0.0%	3.8%	56.7%	100%	-8%	0%	-3%	11%	0%
A1198 (South)	91.4%	0.6%	0.0%	8.0%	100%	36.5%	38.1%	0.2%	25.2%	100%	55%	-38%	0%	-17%	0%
A428 Cambridge Road (West)	0.0%	96.7%	3.3%	0.0%	100%	1.8%	74.2%	23.9%	0.1%	100%	-2%	23%	-21%	0%	0%
Total	24.4%	32.1%	8.6%	34.8%	100%	23.2%	30.9%	11.3%	34.6%	100%	1%	1%	-3%	0%	

1.9 From this information it is possible to see that the link flows are very similar in the model and the observed data meaning that there is no issue with the use of the strategic model in this location. However, when the individual turn proportions are analysed, it is possible to see that the model does not accurately reflect the turn proportions in the observed count data. The worst arm is the A1198 (South) where the model overestimated the traffic heading North on the A1198 by 55% while the turn proportion on to the A428 (East) is underestimated by

38% and the A428 Cambridge Road (wase) is underestimated by 17%. Due to the issues with the A1198 (South) turn proportions the Councils require this junction to be included in the sensitivity testing proposed by NH in light of the matters highlighted at ISH2.

Black Cat AM Peak

From/To	SATURN Flows (2015)					Survey Flows (2016)					Difference (SATURN - Survey)				
	A1 North	A1 South	Bedford Road	A421 (West)	Total	A1 North	A1 South	Bedford Road	A421 (West)	Total	A1 North	A1 South	Bedford Road	A421 (West)	Total
A1 North	14	845	105	1430	2394	0	862	14	1488	2364	14	-17	91	-58	30
A1 South	828	0	32	101	960	771	0	31	122	924	57	0	1	-21	36
Bedford Road	113	64	0	85	261	187	26	0	52	265	-74	38	0	33	-4
A421 (West)	1186	110	0	0	1297	1288	197	5	0	1490	-102	-87	-5	0	-193
Total	2140	1020	136	1616	4912	2246	1085	50	1662	5043	-106	-65	86	-46	-131 (-2.6%)

From/To	SATURN Flows (2015)					Survey Flows (2016)					Difference (SATURN - Survey)				
	A1 North	A1 South	Bedford Road	A421 (West)	Total	A1 North	A1 South	Bedford Road	A421 (West)	Total	A1 North	A1 South	Bedford Road	A421 (West)	Total
A1 North	0.6%	35.3%	4.4%	59.7%	100%	0.0%	36.5%	0.6%	62.9%	100%	1%	-1%	4%	-3%	0%
A1 South	86.2%	0.0%	3.3%	10.5%	100%	83.4%	0.0%	3.4%	13.2%	100%	3%	0%	0%	-3%	0%
Bedford Road	43.1%	24.5%	0.0%	32.4%	100%	70.6%	9.8%	0.0%	19.6%	100%	-27%	15%	0%	13%	0%
A421 (West)	91.5%	8.5%	0.0%	0.0%	100%	86.4%	13.2%	0.3%	0.0%	100%	5%	-5%	0%	0%	0%
Total	43.6%	20.8%	2.8%	32.9%	100%	44.5%	21.5%	1.0%	33.0%	100%	-1%	-1%	2%	0%	

1.10 As can be seen that, whilst the link flows for each arm at the junction are not exactly the same in the model as in the observed traffic data, they are within a reasonable range. when the turning proportions are examined it is clear that the model reasonably represents the observed movements in the AM peak and therefore the use of the strategic model flows in the assessment of this junction is reasonable.

Black Cat PM Peak

From/To	SATURN Flows (2015)					Survey Flows (2016)					Difference (SATURN - Survey)				
	A1 North	A1 South	Bedford Road	A421 (West)	Total	A1 North	A1 South	Bedford Road	A421 (West)	Total	A1 North	A1 South	Bedford Road	A421 (West)	Total
A1 North	46	868	114	1317	2345	3	857	54	1446	2360	43	11	60	-129	-15
A1 South	976	0	18	78	1072	1014	0	31	162	1207	-38	0	-13	-84	-135
Bedford Road	260	42	0	33	335	293	42	0	71	406	-33	0	0	-38	-71
A421 (West)	1298	40	0	0	1338	1341	51	20	0	1412	-43	-11	-20	0	-74
Total	2580	950	132	1428	5090	2651	950	105	1679	5385	-71	0	27	-251	-295 (-5%)

From/To	SATURN Flows (2015)					Survey Flows (2016)					Difference (SATURN - Survey)				
	A1 North	A1 South	Bedford Road	A421 (West)	Total	A1 North	A1 South	Bedford Road	A421 (West)	Total	A1 North	A1 South	Bedford Road	A421 (West)	Total
A1 North	2.0%	37.0%	4.9%	56.2%	100%	0.1%	36.3%	2.3%	61.3%	100%	2%	1%	3%	-5%	0%
A1 South	91.0%	0.0%	1.7%	7.3%	100%	84.0%	0.0%	2.6%	13.4%	100%	7%	0%	-1%	-6%	0%
Bedford Road	77.6%	12.6%	0.0%	9.8%	100%	72.2%	10.3%	0.0%	17.5%	100%	5%	2%	0%	-8%	0%
A421 (West)	97.0%	3.0%	0.0%	0.0%	100%	95.0%	3.6%	1.4%	0.0%	100%	2%	-1%	-1%	0%	0%
Total	50.7%	18.7%	2.6%	28.1%	100%	49.2%	17.6%	1.9%	31.2%	100%	1%	1%	1%	-3%	

1.11 As can be seen that whilst the link flows for each arm at the junction are not exactly the same in the model as in the observed traffic data, they are within a reasonable range. when the turning proportions are examined it is clear that the model reasonably represents the observed movements in the PM peak and therefore the use of the strategic model flows in the assessment of this junction is reasonable.

Cambridge Road AM Peak

From/To	SATURN Flows (2015)				Survey Flows (2017)				Difference (SATURN - Survey)			
	B1428 Cambridge Road	A428 Cambridge Road (East)	A428 (West)	Total	B1428 Cambridge Road	A428 Cambridge Road (East)	A428 (West)	Total	B1428 Cambridge Road	A428 Cambridge Road (East)	A428 (West)	Total
B1428 Cambridge Road	0	264	24	288	1	196	38	235	-1	68	-14	53
A428 Cambridge Road (East)	273	0	657	930	276	0	642	918	-3	0	15	12
A428 (West)	12	828	0	840	22	461	2	485	-10	367	-2	355
Total	285	1091	681	2057	299	657	682	1638	-14	434	-1	419 (26%)

From/To	SATURN Flows (2015)				Survey Flows (2017)				Difference (SATURN - Survey)			
	B1428 Cambridge Road	A428 Cambridge Road (East)	A428 (West)	Total	B1428 Cambridge Road	A428 Cambridge Road (East)	A428 (West)	Total	B1428 Cambridge Road	A428 Cambridge Road (East)	A428 (West)	Total
B1428 Cambridge Road	0.0%	91.7%	8.3%	100%	0.4%	83.4%	16.2%	100%	-0.4%	8.3%	-7.9%	0.0%
A428 Cambridge Road (East)	29.3%	0.0%	70.7%	100%	30.1%	0.0%	69.9%	100%	-0.8%	0.0%	0.8%	0.0%
A428 (West)	1.4%	98.6%	0.0%	100%	4.5%	95.1%	0.4%	100%	-3.1%	3.5%	-0.4%	0.0%
Total	13.8%	53.1%	33.1%	100%	18.3%	40.1%	41.6%	100%	-4.4%	12.9%	-8.5%	

1.12 The link flow comparison indicates that the model has reasonable link flow comparison for the B1428 and A428 west but has too much traffic on the A428 Cambridge Road (+434). In addition, the turning proportions in the model are not representative of the observed data with the main issues seen on the B1428 Cambridge Road where the model underestimates the number of vehicles turning west and overestimates the number turning east onto the A428 from this junction, whilst the turn proportions from the A428 are reasonable representative. Due to the issues with the Cambridge Road turn proportions the Councils require this junction to be included in the sensitivity testing proposed by NH in light of the matters highlighted at ISH2.

Cambridge Road PM Peak

From/To	SATURN Flows (2015)				Survey Flows (2017)				Difference (SATURN - Survey)			
	B1428 Cambridge Road	A428 Cambridge Road (East)	A428 (West)	Total	B1428 Cambridge Road	A428 Cambridge Road (East)	A428 (West)	Total	B1428 Cambridge Road	A428 Cambridge Road (East)	A428 (West)	Total
B1428 Cambridge Road	0	251	25	275	2	177	20	199	-2	74	5	76
A428 Cambridge Road (East)	450	0	762	1212	316	0	510	826	134	0	252	386
A428 (West)	51	538	0	589	108	530	0	638	-57	8	0	-49
Total	501	789	787	2077	426	707	530	1663	75	82	257	414 (25%)

From/To	SATURN Flows (2015)				Survey Flows (2017)				Difference (SATURN - Survey)			
	B1428 Cambridge Road	A428 Cambridge Road (East)	A428 (West)	Total	B1428 Cambridge Road	A428 Cambridge Road (East)	A428 (West)	Total	B1428 Cambridge Road	A428 Cambridge Road (East)	A428 (West)	Total
B1428 Cambridge Road	0.0%	91.0%	9.0%	100%	1.0%	88.9%	10.1%	100%	-1.0%	2.1%	-1.1%	0.0%
A428 Cambridge Road (East)	37.1%	0.0%	62.9%	100%	38.3%	0.0%	61.7%	100%	-1.2%	0.0%	1.2%	0.0%
A428 (West)	8.7%	91.3%	0.0%	100%	16.9%	83.1%	0.0%	100%	-8.2%	8.2%	0.0%	0.0%
Total	24.1%	38.0%	37.9%	100%	25.6%	42.5%	31.9%	100%	-1.5%	-4.5%	6.0%	

1.13 The link flow comparison indicates that the model has reasonable link flow comparison for the B1428 and A428 west but has too much traffic on the A428 Cambridge Road (+257) the level of flow discrepancy is lower than in the AM peak. The turning proportions are more representative than in the AM peak and therefore the Councils require this junction to be included in the sensitivity testing proposed by NH in light of the matters highlighted at ISH2.

Potton Road AM Peak

From/To	SATURN Flows (2015)				Survey Flows (2017)				Difference (SATURN - Survey)			
	B1046 (N)	B1046 (E)	Potton Road (S)	Total	B1046 (N)	B1046 (E)	Potton Road (S)	Total	B1046 (N)	B1046 (E)	Potton Road (S)	Total
B1046 (N)	0	105	182	287	0	403	99	502	0	-298	83	-215
B1046 (E)	53	0	19	72	55	0	0	55	-2	0	19	17
Potton Road (S)	84	12	0	96	55	0	0	55	29	12	0	41
Total	137	117	201	456	110	403	99	612	27	-286	102	-156 (-26%)

From/To	SATURN Flows (2015)				Survey Flows (2016)				Difference (SATURN - Survey)			
	B1046 (N)	B1046 (E)	Potton Road (S)	Total	B1046 (N)	B1046 (E)	Potton Road (S)	Total	B1046 (N)	B1046 (E)	Potton Road (S)	Total
B1046 (N)	0.0%	36.6%	63.4%	100%	0.0%	80.3%	19.7%	100%	0%	-44%	44%	0%
B1046 (E)	73.5%	0.0%	26.5%	100%	100.0%	0.0%	0.0%	100%	-27%	0%	27%	0%
Potton Road (S)	87.5%	12.5%	0.0%	100%	100.0%	0.0%	0.0%	100%	-13%	13%	0%	0%
Total	30.1%	25.7%	44.2%	100%	18.0%	65.8%	16.2%	100%	12%	-40%	28%	

1.14 The link flow comparison indicates that the model in this location does not show a reasonable link flow comparison on all arms. The turning proportions are also significantly different for all movements than indicated by the observed count data and therefore the Councils require this junction to be included in the sensitivity testing proposed by NH in light of the matters highlighted at ISH2.

Potton Road PM Peak

From/To	SATURN Flows (2015)				Survey Flows (2017)				Difference (SATURN - Survey)			
	B1046 (N)	B1046 (E)	Potton Road (S)	Total	B1046 (N)	B1046 (E)	Potton Road (S)	Total	B1046 (N)	B1046 (E)	Potton Road (S)	Total
B1046 (N)	0	45	85	130	0	86	70	156	0	-41	15	-26
B1046 (E)	95	0	13	108	192	0	1	193	-97	0	12	-85
Potton Road (S)	142	14	0	157	150	4	0	154	-8	10	0	3
Total	238	60	98	395	342	90	71	503	-104	-30	27	-108 (-21%)

From/To	SATURN Flows (2015)				Survey Flows (2016)				Difference (SATURN - Survey)			
	B1046 (N)	B1046 (E)	Potton Road (S)	Total	B1046 (N)	B1046 (E)	Potton Road (S)	Total	B1046 (N)	B1046 (E)	Potton Road (S)	Total
B1046 (N)	0.0%	34.9%	65.1%	100%	0.0%	55.1%	44.9%	100%	0%	-20%	20%	0%
B1046 (E)	88.1%	0.0%	11.9%	100%	99.5%	0.0%	0.5%	100%	-11%	0%	11%	0%
Potton Road (S)	90.8%	9.2%	0.0%	100%	97.4%	2.6%	0.0%	100%	-7%	7%	0%	0%
Total	60.1%	15.2%	24.7%	100%	68.0%	17.9%	14.1%	100%	-8%	-3%	11%	

1.15 The link flow comparison indicates that the model in this location does not show a reasonable link flow comparison on all arms. The turning proportions are also significantly different for all movements than indicated by the observed count data and therefore the Councils require this junction to be included in the sensitivity testing proposed by NH in light of the matters highlighted at ISH2.

St Ives Road AM Peak

From/To	SATURN Flows (2015)				Survey Flows (2017)				Difference (SATURN - Survey)			
	B1040 St Ives Road	A428 (E)	A428 (W)	Total	B1040 St Ives Road	A428 (E)	A428 (W)	Total	B1040 St Ives Road	A428 (E)	A428 (W)	Total
B1040 St Ives Road	0	40	162	202	0	260	126	386	0	-220	36	-184
A428 (E)	92	0	920	1012	67	0	912	979	25	0	8	33
A428 (W)	131	1041	0	1171	92	753	0	845	39	288	0	326
Total	222	1081	1082	2386	159	1013	1038	2210	63	68	44	176 (8%)

From/To	SATURN Flows (2015)				Survey Flows (2017)				Difference (SATURN - Survey)			
	B1040 St Ives Road	A428 (E)	A428 (W)	Total	B1040 St Ives Road	A428 (E)	A428 (W)	Total	B1040 St Ives Road	A428 (E)	A428 (W)	Total
B1040 St Ives Road	0%	20%	80%	100%	0%	67%	33%	100%	0%	-47%	47%	0%
A428 (E)	9%	0%	91%	100%	7%	0%	93%	100%	2%	0%	-2%	0%
A428 (W)	11%	89%	0%	100%	11%	89%	0%	100%	0%	0%	0%	0%
Total	9%	45%	45%	100%	7%	46%	47%	100%	2%	-1%	-2%	

1.16 The link flow comparison indicates that the model has reasonable link flow comparison on all arms meaning that the Strategic model is reasonable for use in the assessment of the strategic impact of the proposed scheme. However, the turning proportions are more reasonable on the A428 in both directions but the turn proportions on the B1040 St Ives Road are not representative of the observed data and therefore the Councils require this junction to be included in the sensitivity testing proposed by NH in light of the matters highlighted at ISH2.

St Ives Road PM Peak

From/To	SATURN Flows (2015)				Survey Flows (2017)				Difference (SATURN - Survey)			
	B1040 St Ives Road	A428 (E)	A428 (W)	Total	B1040 St Ives Road	A428 (E)	A428 (W)	Total	B1040 St Ives Road	A428 (E)	A428 (W)	Total
B1040 St Ives Road	0	55	163	218	0	88	69	156	0	-33	94	62
A428 (E)	12	0	1148	1160	85	0	1219	1303	-73	0	-70	-143
A428 (W)	133	746	0	879	271	742	0	1013	-138	4	0	-134
Total	144	801	1311	2256	356	830	1287	2472	-211	-28	24	-216 (-9%)

From/To	SATURN Flows (2015)				Survey Flows (2017)				Difference (SATURN - Survey)			
	B1040 St Ives Road	A428 (E)	A428 (W)	Total	B1040 St Ives Road	A428 (E)	A428 (W)	Total	B1040 St Ives Road	A428 (E)	A428 (W)	Total
B1040 St Ives Road	0%	25%	75%	100%	0%	56%	44%	100%	0%	-31%	31%	0%
A428 (E)	1%	0%	99%	100%	6%	0%	94%	100%	-5%	0%	5%	0%
A428 (W)	15%	85%	0%	100%	27%	73%	0%	100%	-12%	12%	0%	0%
Total	6%	36%	58%	100%	14%	34%	52%	100%	-8%	2%	6%	

1.17 The link flow comparison indicates that the model has reasonable link flow comparison on all arms meaning that the Strategic model is reasonable for use in the assessment of the strategic impact of the proposed scheme. However, the turning proportions are more reasonable on the A428 in both directions but the turn proportions on the B1040 St Ives Road are not representative of the observed data and therefore the Councils require this junction to be included in the sensitivity testing proposed by NH in light of the matters highlighted at ISH2.